No. 2003

HANDBOOK OF THE TEN-TON ARTILLERY TRACTOR MODEL 1917

(EIGHTY-TWO PLATES)

JULY 19, 1918

REVISED NOVEMBER 26, 1918

ORDNANCE DEPARTMENT U.S.A.

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Exhibit A to S.P. 13 "

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
WASHINGTON, Nov. 26, 1918.

This manual is published for the information and government of the United States Army.

By order of the Secretary of War:

C. C. WILLIAMS,
Maj. Gen., Chief of Ordnance, U. S. A.

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HANDBOOK OF THE TEN-TON ARTILLERY TRACTOR MODEL 1917

CHAPTER I.

GENERAL INFORMATION.

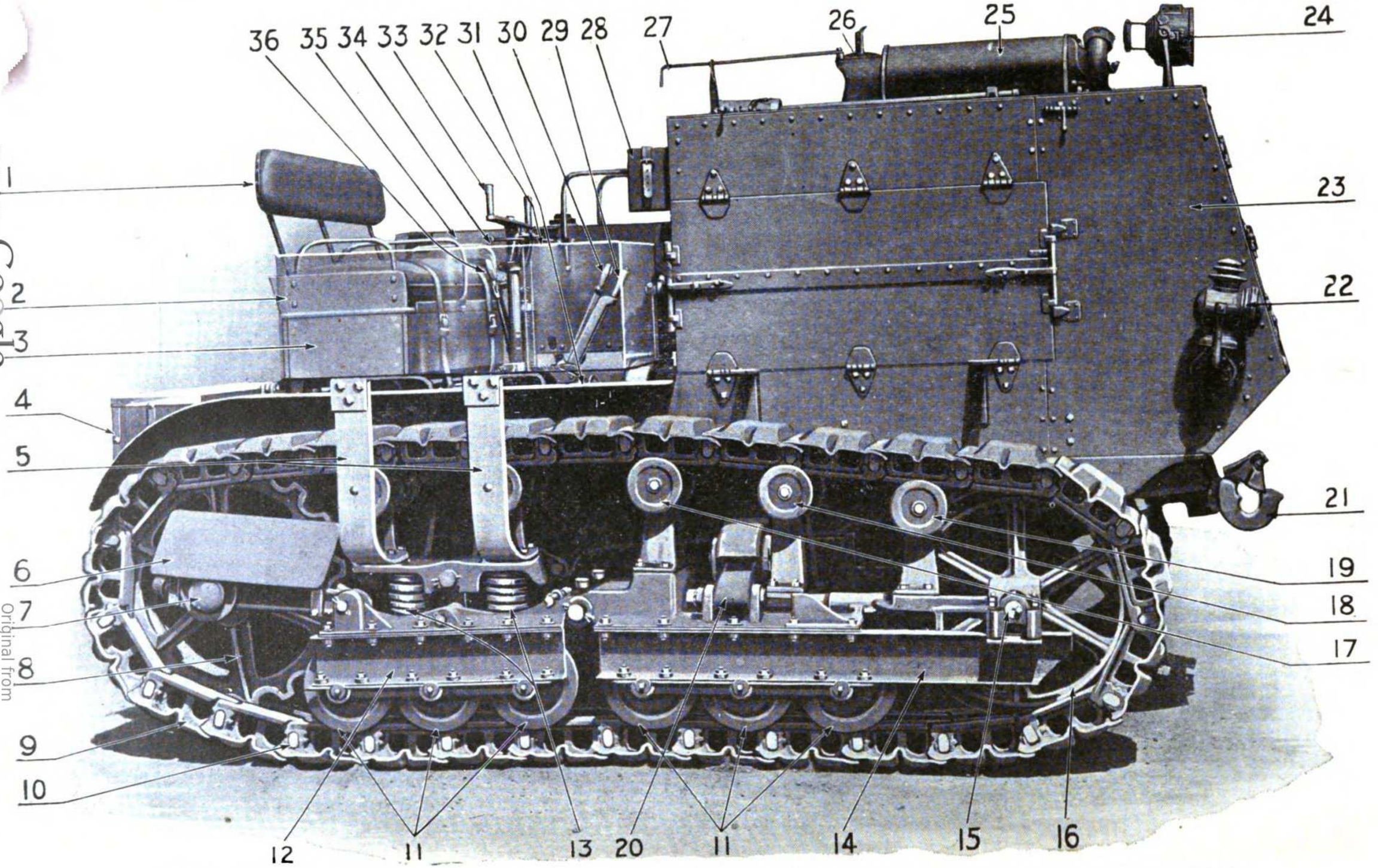
WEIGHTS AND DIMENSIONS.

Overall length	inches	162
Overall width	inches	84
Height (to top of muffler)	inches	96
Length of ground contact	inches	96
Ground clearance (under equalizer bar)	inches	12
Weight (complete with full equipment)	pounds	21,500
Ground pressure, per square inch	pounds	7.46
Weight of each track	pounds	1,725
Weight of each track shoe complete with grouser	pounds	59.5
Width of track shoes	inches	15
Tread of tracks (center to center)	inches	61
Diameter of turning circle	inches	85

Road Speed—

Low speed at 600, 700, 800 R. P. M.	miles per hour—	1.47	1.71 1.96
Direct speed at 600, 700, 800 R. P. M.	miles per hour.	2.71	3.16 3.61
High speed at 600, 700, 800 R. P. M.	miles per hour.	4.19	4.89 5.59
Reverse speed at 600, 700, 800 R. P. M.	miles per hour.	1.09	1.27 1.45

Capacity of gasoline tank	gallons	46
Capacity of auxiliary tank	gallons	10
Capacity of oil tank-engine	gallons	6
Capacity of track oiler tank	gallons	5.5
Brake horse power (600 R. P. M.)		55
Brake horse power (1,000 R. P. M.)		75
Drawbar horse power (average)		35 to 45
Drawbar pull (on direct—second speed)	pounds	5,200
Drawbar pull (on low—first speed)	pounds	8,000



RIGHT SIDE OF 10-TON ARTILLERY TRACTOR COMPLETE, SHOWING GROUSER BOX IN PHANTOM.

OUTLINE SPECIFICATIONS.

ENGINE.

Four-cylinder, four-stroke cycle, valve-in-head type. Bore 6.5 inches. Stroke 7 inches. Cylinders cast separately. H. P. 55 at 600 R. P. M.

RADIATOR.

Tubular type. Separate brass headers.

IGNITION.

K. W. Model R. K. or H. K. high-tension magneto with impulse starter.

CARBURETOR.

Two-inch Model E 4 Kingston carburetor with Stewart vacuum feed system.

GOVERNOR.

Centrifugal flyball type, drives from camshaft.

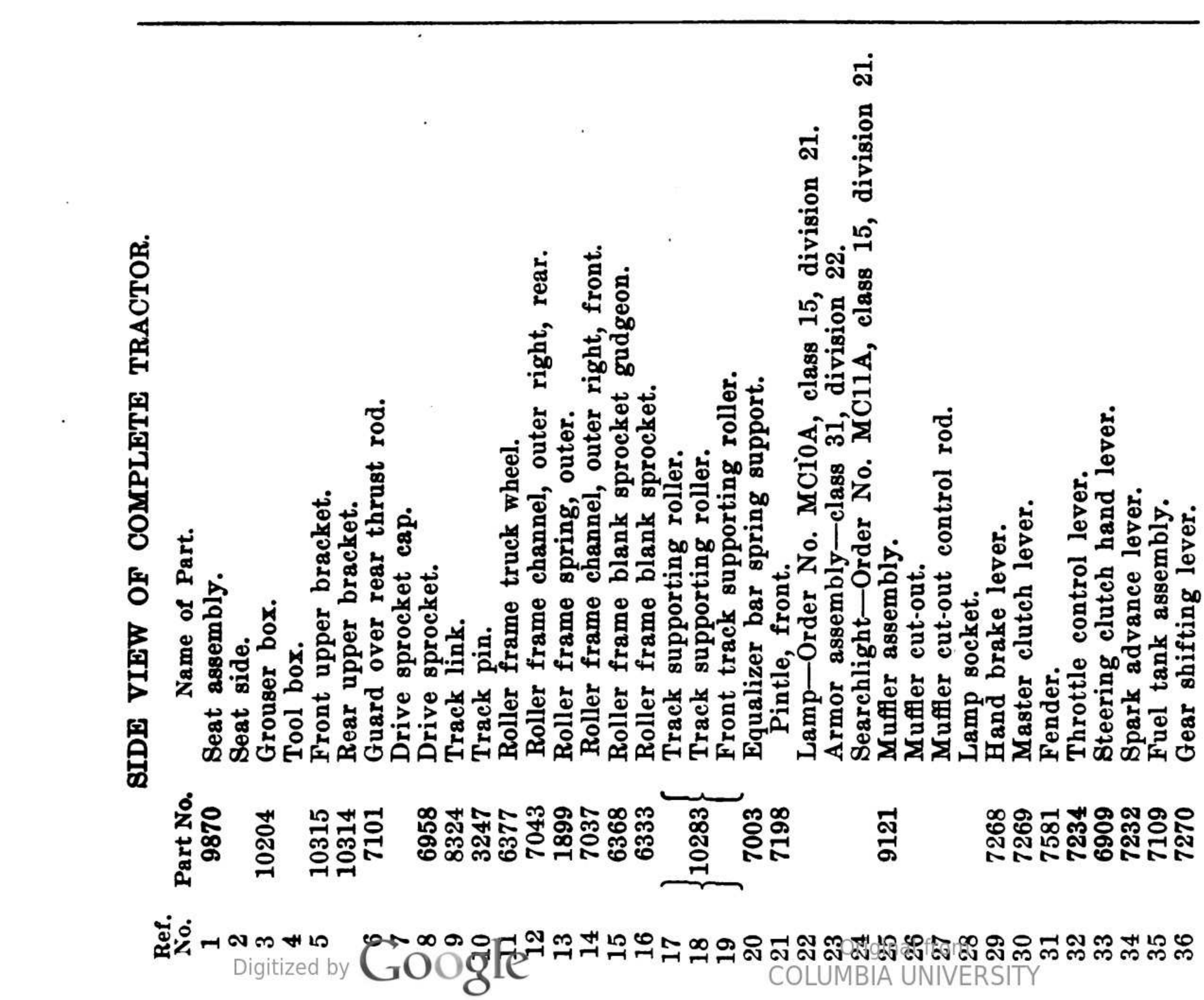
MASTER CLUTCH.

Dry-plate multiple-disk.

TRANSMISSION.

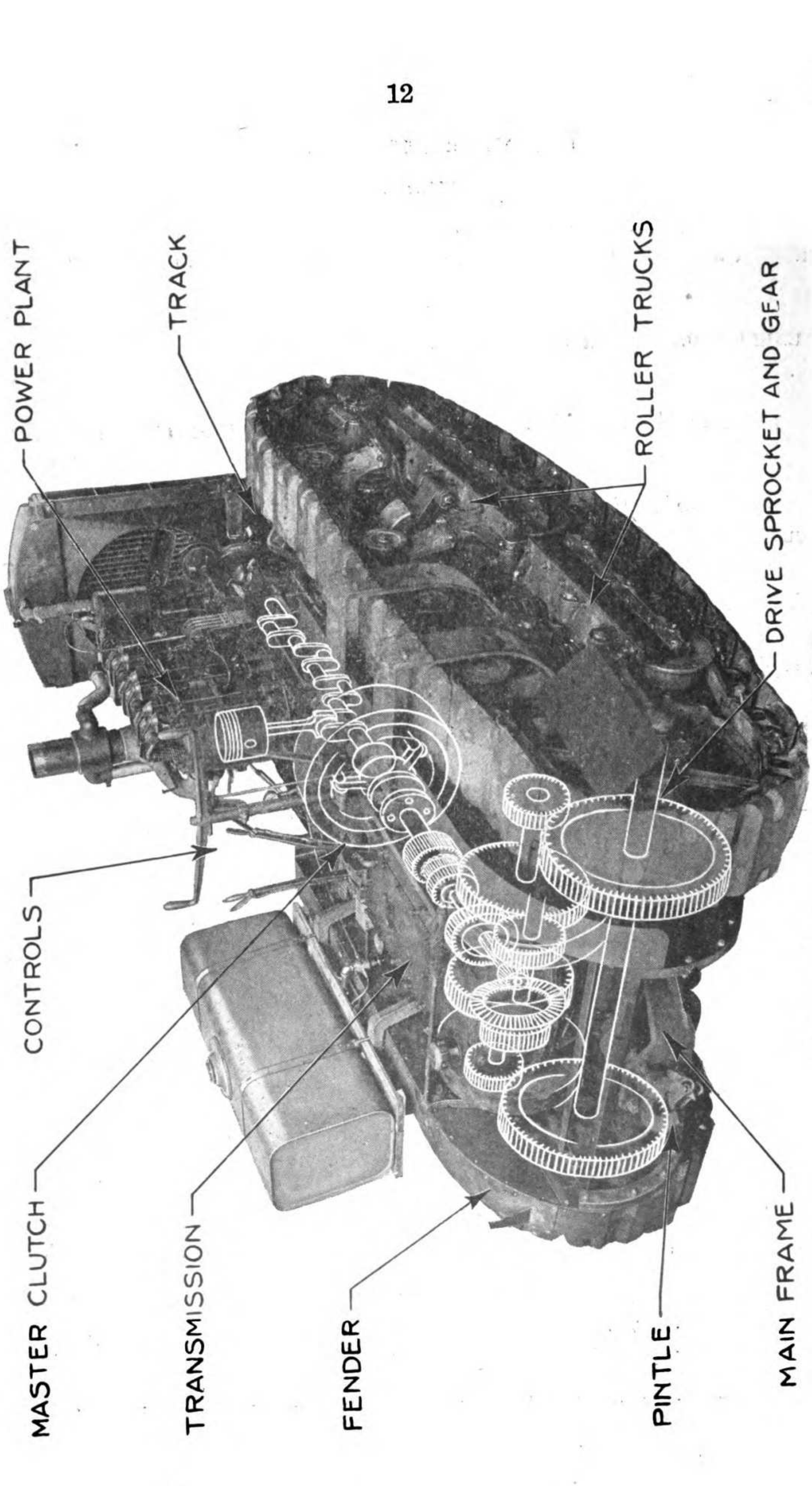
Selective sliding-gear type. Three speeds forward, one reverse. Direct drive on second.

SIDE VIEW OF COMPLETE TRACTOR.



Ref. No.	Part No.	Name of Part.
1	9870	Seat assembly.
2		Seat side.
3	10204	Grouser box.
4		Tool box.
5	10315	Front upper bracket.
	10314	Rear upper bracket.
6	7101	Guard over rear thrust rod.
7		Drive sprocket cap.
8	6958	Drive sprocket.
9	8324	Track link.
10	3247	Track pin.
11	6377	Roller frame truck wheel.
12	7043	Roller frame channel, outer right, rear.
13	1899	Roller frame spring, outer.
14	7037	Roller frame channel, outer right, front.
15	6368	Roller frame blank sprocket gudgeon.
16	6333	Roller frame blank sprocket.
17		Track supporting roller.
18	10283	Track supporting roller.
19		Front track supporting roller.
20	7003	Equalizer bar spring support.
21	7198	Pintle, front.
22		Lamp—Order No. MC10A, class 15, division 21.
23		Armor assembly—class 31, division 22.
24		Searchlight—Order No. MC11A, class 15, division 21.
25	9121	Muffler assembly.
26		Muffler cut-out.
27		Muffler cut-out control rod.
28		Lamp socket.
29	7268	Hand brake lever.
30	7269	Master clutch lever.
31	7581	Fender.
32	7234	Throttle control lever.
33	6909	Steering clutch hand lever.
34	7232	Spark advance lever.
35	7109	Fuel tank assembly.
36	7270	Gear shifting lever.

Plate No. 2.



GENERAL ASSEMBLIES OF TRACTOR.

DRIVE.

Through steering clutch shaft to spur pinions, which mesh with spur gears on drive sprocket shaft to drive sprockets.

STEERING CLUTCHES.

(2) Dry-plate multiple-disk.

STEERING.

By means of separate friction clutches which provide independent drive to either track.

CONTROL.

Right-hand steer. Master clutch release lever, and gear shift lever left of steering column. Hand brake in front of steering column. Spark and throttle lever operates on sector clamped to steering column in front. Steering clutch pedals right and left at bottom of and in front of steering column.

BRAKES.

One set. External contracting. Raybestos lined. Operate on steering clutch housings.

GASOLINE TANK.

Galvanized steel tank, 46-gallon capacity. Auxiliary galvanized steel tank, 10 gallon capacity on new tractors.

MAIN FRAME.

Cast in one piece—open hearth steel.

ROLLER FRAME.

Four pieces steel channel, sides, cast steel tops, joined by roller frame shaft. Two pieces right and left front. Two pieces right and left rear.

TRUCK WHEELS.

Six on each side tractor, fitted with Hyatt roller bearings, turning on steel gudgeons, and flanged to fit on track rail.

TRACK.

Made up of track shoes with track links cast integral, fitted with block spacers and 1.25 (1¼) inch track pins.

TRACK DRIVE SPROCKETS.

Two. Teeth mesh with block spacers in joints of tracks.

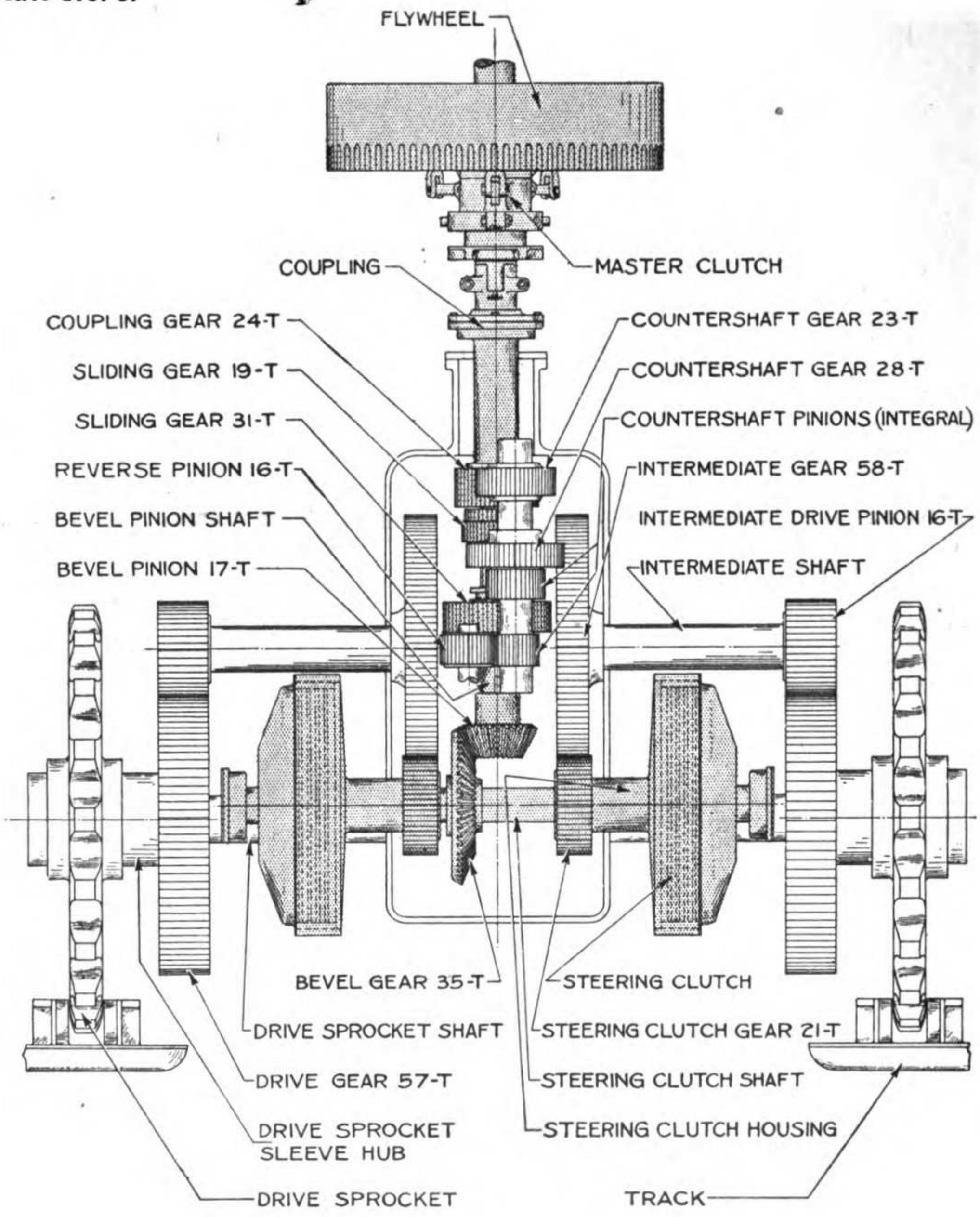
BLANK SPROCKETS.

Two. Fitted with roller bearings, turn on steel gudgeons.

TRACK (CARRIERS) SUPPORTING ROLLERS.

Five on each side of tractor mounted on brackets on front and rear roller frame channels, and on spring bracket bolted to main frame.

Plate No. 3.



THE POWER TRANSMISSION SYSTEM.

SPRINGS.

Four double-coil springs, two on each side bolted on rear roller frame sections

EQUALIZER BAR.

Spring-supported on front roller frame sections.

DESCRIPTION OF 10-TON ARTILLERY TRACTOR MODEL OF 1917.

The 10-ton Artillery Tractor Model of 1917 is a self-propelled road vehicle of the track-laying type; that is, the power is transmitted to the ground through a flexible, endless chain or track (composed of steel links and shoes, cast integral, and connected by hardened steel pins) instead of through the rear wheels as in the usual type of truck construction. The advantage of this type of tractor for military purposes lies in its ability, due to very low unit ground pressure, to negotiate soft or uneven surfaces.

The general design and construction of the 10-ton tractor does not differ materially from that of the modern motor truck except for the above-mentioned method of power transmission and that it is not designed to carry a load but as a power vehicle to be employed in the motorization of ordnance equipment.

MAIN GROUPS OF THE TRACTOR.

The various units or groups composing the 10-ton tractor are assembled on the main frame, a unit steel casting, rigidly reinforced, which not only supports the units or groups but holds them in the proper relation to each other. The main frame with its assembled units is supported on the track by means of a roller frame assembly on which it rests through the medium of an equalizing bar in front and springs in the rear. See Plate 1.

The power is developed by means of a power plant which consists of an internal combustion engine, using gasoline for fuel, suspended in the forward end of the main frame, a fuel supply and carburetion system, an ignition system, lubrication system and a cooling system.

The power developed in the power plant is transmitted to the track drive sprocket, which drives the track through the medium of a power system, consisting, in order, of a master clutch controlling the application of power between the engine and the transmission unit; transmission unit containing the gears by which the speed of the tractor is varied; the steering clutches controlling the application of power to either track; and the track drive sprocket and gears, which transmit the power from the steering clutches to the track. See Plate 2.

The track is an endless chain consisting of steel links and shoes cast integral and connected by hardened steel track pins. The track shoes are so designed that when assembled the links form a continuous double steel rail on which the truck wheels ride, the shoes providing a wide bearing surface which rests on the ground and supports the weight of the tractor.

Ordnance pintles are supplied at either end of the 10-ton tractor, the front pintle being secured to the main frame, and the rear to a bracket bolted to the main frame.

A clevis is bolted to the main frame below the rear pintle.

POWER TRANSMISSION SYSTEM.

It is in the transmission case that the design of the tractor begins its radical difference in principle from conventional motor mobile units. As in most conventional types the power of the engine is transmitted through a clutch, here known as the master clutch, thence through a universal to the change-speed gearset—ordinarily a unit in itself. In this application, however, the change-speed gearset comprises only a part of the mechanism within the transmission case.

The scheme of applying power from the engine to the track is shown in Plate 3.

The main transmission shaft of the gearset, called the pinion shaft, carries a bevel pinion which meshes with a bevel gear of larger diameter mounted on a transverse shaft known as the steering clutch shaft, either end of which extends outside of the transmission case and carries the driving members of a steering clutch.

From this point, the power transmission is the same on both right and left sides of the tractor. The driven plates of the steering clutch are normally engaged with the driving plates, but may be held out of contact with the driving plates on either side by the operation of the steering clutch lever, which corresponds to the steering wheel. The driven plates are attached to a sleeve known as the steering clutch housing within which the steering clutch shaft is free to rotate when the clutch is not engaged. Upon the steering clutch housing is mounted the steering clutch spur gear which is within the transmission case. This pinion meshes with a larger gear known as the intermediate spur gear.

By means of a shaft carried on two roller bearings the intermediate spur gear is connected permanently to a pinion called the drive spur pinion. This pinion meshes with a large gear called the drive gear which is secured by means of a key to a sleeve known as the track sprocket sleeve hub. This sleeve rotates on a dead shaft passing through the frame and is known as the track drive sprocket shaft.

To the outer end of the track sprocket sleeve hub is keyed the track drive sprocket whose teeth engage the block spacers in the chain links of the track and thus cause the track to be drawn around as with any chain and sprocket.

The drive sprocket is at the rear of the track and the front end is guided and kept in tension by means of a similar wheel without teeth known as the blank sprocket. The distance between the centers of the drive sprocket and blank sprocket is adjustable by means of a thrust rod which can be lengthened the length of one link of the chain by a double-threaded nut. This permits the tension to be relieved for replacement of links and also permits the blank sprocket to be moved forward to keep the tracks tight.

OPERATING INSTRUCTIONS.

PLACING THE TRACTOR IN SERVICE.

INSPECTION.

Regardless of the condition under which the tractor is received, the *first* duty of anyone charged with its care and operation is to give it a systematic and detailed inspection.

The initial inspection must cover all possible shortages of easily removable parts, including accessories and tools, such defects as loose parts and any damage that may have been caused in shipment, or at the hands of the previous operator, and any other conditions that would affect its proper operation.

REPAIRS AND REPLACEMENTS.

Such repairs and replacements as are necessary to the proper operation of the tractor must be given attention immediately. If permanent repairs cannot be made at once, temporary repairs should be made and advantage taken of the first opportunity to make this permanent.

GENERAL LUBRICATION.

How long a tractor will give first-class service depends more upon proper lubrication than any other feature of its care. This is particularly true of a new tractor and no precaution should be overlooked to make certain that every lubricated part has a full supply of lubricant. As a precautionary measure tractors are shipped by the manufacturers fully lubricated with the exception of the track oiler and engine. However, when placing the tractor in service this fact should be completely ignored and every lubricated part given careful attention, as indicated in the section on "Lubrication Instructions," Page 25.

FILLING THE COOLING SYSTEM.

Fill the radiator and water circulating system with clean, soft water. Water containing lime and other impurities should not be used. Rain water is ideal for the purpose. If the temperature is below freezing (32 degrees F.) proceed as outlined under Cooling System, Chapter II.

TO FILL THE FUEL TANKS.

These tanks, two in number, are located one at the left of the operator's seat and one in the upper part of the engine armor. Where possible, it is recommended that the gasoline be strained through chamois skin to remove any water that may be in it.

TO PREPARE THE LAMPS FOR SERVICE.

Fill the side lamps (two) and the tail lamp (one) with kerosene. Light and trim the wicks so that immediate service can be depended on.

TO START ENGINE.

It is assumed that the tractor is in condition to operate, that is, that the instructions outlined in the preceding paragraphs on "Placing the Trac-

tor in Service'' have been complied with, and that all adjustments are correct or nearly so.

PRELIMINARY STEPS.

Start the engine with the tractor in this condition, and before starting the engine it is essential to see that the master clutch is disengaged, that the gears are in neutral position and that all tools and materials which might become entangled in moving parts have been removed from the tractor.

ESTABLISHING OIL FILM IN CYLINDERS.

If an engine has been inoperative for more than three days, especially after undergoing the conditions to which it would be subjected in shipment, it is necessary to remove the spark plugs and with aid of an oil can inject about ¼ pint of oil in each of the four cylinders. Revolving the flywheel by hand will distribute the oil between piston rings and cylinder walls and re-establish compression.

TURN ON THE FUEL.

Move the lever of the three-way gasoline valve at the carburetor to "Aux." This permits the flow of gasoline from the auxiliary tank under the armor to the carburetor. This facilitates starting, as in order to start on the main tank, it may be necessay to prime the vacuum tank. In old-model tractors not provided with reserve tanks, the vacuum tanks must be partially filled when the engine is to be started on a wholly new supply of gasoline.

PRIMING A COLD ENGINE.

If the engine is cold, or if it has been inoperative for some time, its starting will be greatly facilitated by priming the cylinders. Open the priming cups by pulling priming cup gang lever towards driver's position, and with squirt can, put three or four squirts of gasoline in each priming cup. Close priming cups.

(NOTE: Overpriming is very detrimental and must not be permitted. Only a small amount of liquid gasoline is necessary to furnish the proper explosive mixture and no more should be used. Overpriming will destroy the lubricant film between the piston rings and the cylinder walls, and, in turn, the compression in the cylinders. It also increases the deposit of carbon under the upper piston ring, which in time will cause cylinder scoring, due to the lack of motion of the piston ring in its slot.)

RETARD THE SPARK.

Move the spark control lever from full retard position to a position about one-eighth of the range of the quadrant.

ADVANCE HAND THROTTLE LEVER.

Advance to a position about one-fourth of the full quadrant.

TRIP IMPULSE STARTER.

Do this by pressing down on back end of the ratchet catch lock, releasing ratchet catch and bringing impulse starter into operating position.

Open compression release cocks.

CRANK ENGINE.

Use the hand starter. To get the best results from the hand starter turn the crank until the starter gear meshes with the teeth on the rim of the flywheel. Turn slowly until on compression and then give the flywheel a quick flip or pull past center.

(NOTE: There should be no occasion for continued cranking of an engine. An engine that has been idle for a long period of time or a cold engine necessitates a certain number of revolutions before the various related units such as the oiling system, carbureter, etc., will function properly, but after this no difficulty should be experienced. If the engine does not start readily after a reasonable number of turns of the starting crank, look for the reason and correct the difficulty instead of attempting to make the engine start by continued cranking.)

IF THE ENGINE FAILS TO START.

Failure of an engine to start can generally be traced to three reasons, namely, ignition, carburetion or lubrication. A short systematic search will reveal which system is at fault and, as a rule, the remedies are simple. Two essentials are necessary before an engine will run, or even start, *fuel* and *ignition*. If fuel reaches the cylinders in the form of a vapor mixed with a certain proportion of air, although not the correct proportion to produce power, and a spark occurs, some result would be noticeable even though it be but a single weak explosion. If no explosion occurs, even after priming, which insures an explosive mixture in the cylinders, it can be reasonably assumed that the ignition is at fault. This trouble can generally be traced to the following causes:

1. Magneto excessively retarded, causing arm on circuit breaker-box to short circuit primary circuit.
2. Breaker points out of adjustment.
3. Breaker or distributor over-lubricated.
4. Open circuit, broken or disconnected wires.
5. Spark plug points too far apart. The spark plug gap should be about 0.0156 inch. In extremely cold weather wet with gasoline the end of the spark plug after cleaning and before inserting in the cylinder head.

If one or more explosions occur and then the engine stops, it proves that the ignition system is functioning and that the fuel is either not reaching the cylinders or has not the proper proportion of air. (The explosions were due to the fuel supplied in priming.)

1. Lack of fuel.

See that needle valve is turned on from one to one and one-quarter turns, and that the shut-off cock in the fuel line is turned on. The screen in the vacuum tank may be clogged. The reservoir in the vacuum tank may be empty. The screen under the fuel tank may be clogged.

2. Carburetion out of adjustment.
3. Water in gasoline.
4. Over-primed engine.

Do not overprime engine with gasoline. Overpriming will wash the lubricating film off the piston and cylinder, thus causing loss of compression. If an engine has been repeatedly primed and compression lost, remove the spark plugs and pour one-quarter cup of cylinder oil in each cylinder and revolve the engine several times by hand to re-establish compression. Prime the cylinders with a small quantity of gasoline. Prime carburetor heavily.

5. Air leaks above carburetor.

Air leaks above the carburetor may make starting difficult. The butterfly shaft should not leak air. The intake manifold gaskets should not leak air. The intake valve-stem guides should not leak air.

LACK OF PROPER LUBRICATION.

This will not necessarily make an engine difficult to start as long as the required lubrication film has been established between the piston rings and the cylinder walls. This film makes the necessary compression possible.

WHAT TO DO WHEN THE ENGINE STARTS.

CLOSE THE RELEASE COCKS as soon as possible after the engine starts.

ADVANCE THE SPARK FULLY. This is the correct position for all ordinary driving.

ADJUST THE ENGINE SPEED.—Place the hand throttle lever in such a position that the engine will idle at a low speed. In cold weather the engine should be allowed to run at a rather high rate of speed until warm.

EXAMINE WATER CIRCULATION.—See that the water is circulating freely. Fill the cooling system to overflowing.

EXAMINE FAN BELT.—See that the fan belt has the proper tension and is not slipping.

IF THE ENGINE RUNS IRREGULARLY (MISSES).—Such a condition must not be neglected. The difficulty should be located and remedied immediately. The trouble can as a rule be traced to a comparatively few causes easily determined and remedied, as indicated later.

IF THE ENGINE STARTS BUT STOPS AFTER A FEW EXPLOSIONS.—It is obvious that the ignition is not at fault and that the difficulty is due to either lack of fuel or failure of the fuel supply system to furnish the proper kind of mixture.

To find out if the vacuum system is working, open the pet cock on the bottom of vacuum tank. If the tank is dry, remove the filler plug, Plate 25, in top and refill.

When the auxiliary gasoline tank, Plate 28, is furnished, turn the lever of the three-way gasoline valve at the carburetor to "Aux" or auxiliary. After the engine has been running for not less than five minutes, turn the lever to "Main."

By this time the suction caused by the running engine has filled the

vacuum tank, making it possible for the fuel from the rear tanks to reach the carburetor.

GEARS.—Select the gear to be used, low, direct or high, and through the medium of the gear shifting lever engage the gear selected. Starting and running is done without a change of gears, in fact the gears cannot be changed when the tractor is in motion. See Plate 4.

CLUTCH.—Move the master clutch hand lever gently forward until the load is taken up and the tractor is in motion, then push it forward firmly and without jerking.

DRIVING THE TRACTOR.

POSITION OF AN OPERATOR.

It is the duty of an operator to remain in his seat at all times when the tractor is in motion. The tendency to jump off momentarily for any reason whatsoever must not be tolerated.

STEERING.

Steering is accomplished from the operator's seat through the medium of a steering clutch hand lever operating the steering clutches located on either side of the transmission unit. These steering clutches control the power transmitted to either track through the track drive sprocket and gears. If it is desired to turn in a certain direction the steering clutch hand lever is turned in the direction it is desired to go, which releases the steering clutch on that side, and in turn releases one track from driving. The released track becomes a pivot while the driving track on the other side will cause the tractor to change direction. The degree of turning can be governed by applying the foot-brake on the released steering clutch as desired. If a short turn is desired, release steering clutch and apply steering clutch housing brake firmly on the released clutch. A brake is located on each steering clutch housing and is controlled by a foot brake pedal for each side located at the base of the steering column. A hand brake lever and ratchet are provided to lock both brakes simultaneously.

With a load, the effect of disengaging a steering clutch is more pronounced, and except for sharp right-angle turns the use of the brakes is not necessary.

CHANGING THE GEARS.

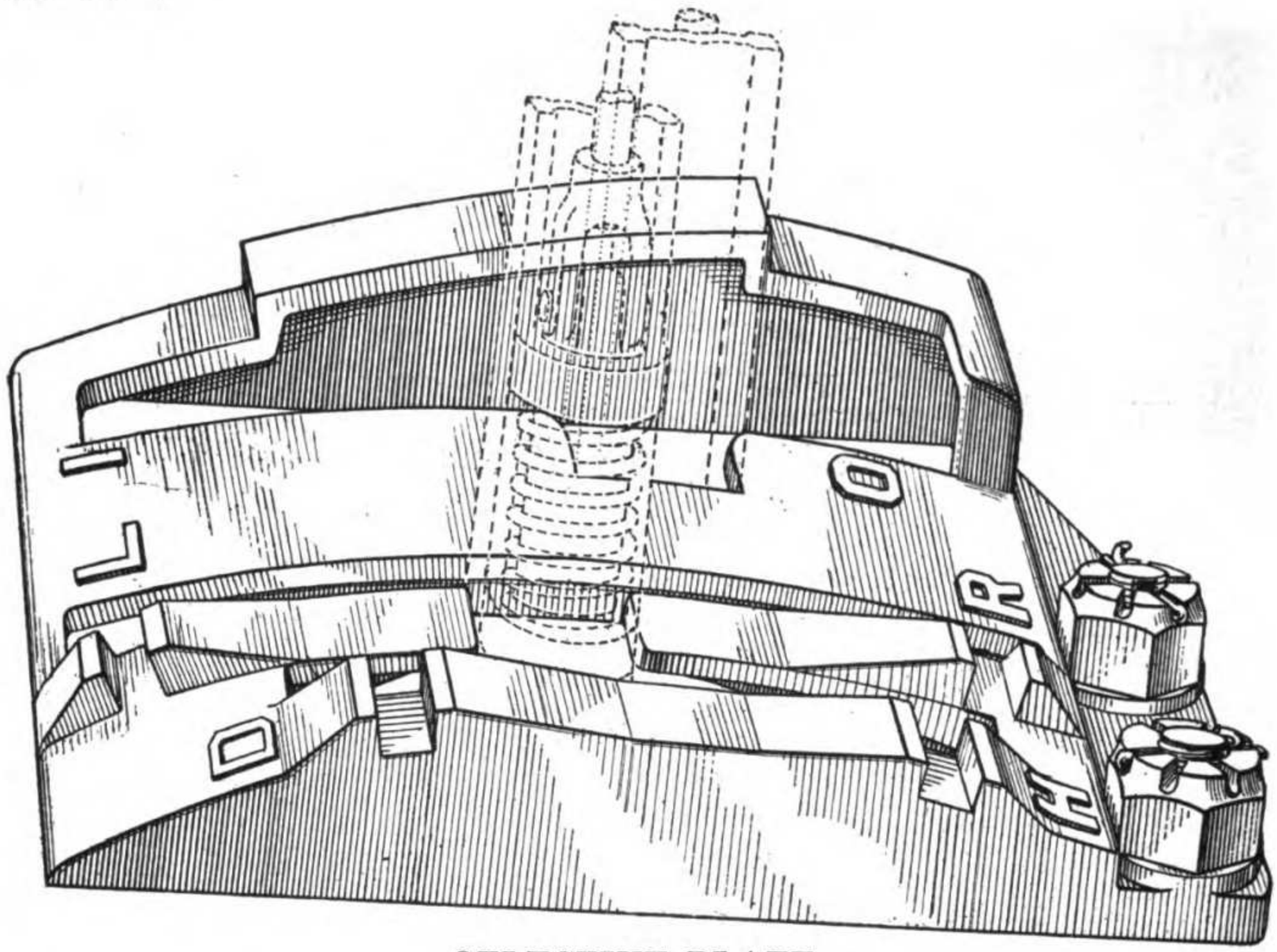
It is not intended that the gears of the 10-ton tractor be changed while the tractor is in motion. Due to the limited coasting abilities of the tractor, the weight of the master clutch and the size and type of gears used, changing of gears while the tractor is in motion is not to be attempted.

TO CHANGE THE GEARS.

See Plate 4.

Stop the tractor by disengaging the master clutch. Engage the gear desired by placing the gear shifter lever in the slot designating the speed. If for any reason the gears do not mesh easily, it is not advisable to force them, but engage the master clutch slightly for a moment and try again.

Plate No. 4.



SELECTIVE PLATE.

LUBRICATION OF TRACKS.

The tracks can be lubricated only while the tractor is in motion. Open the two valves under the front of the driver's seat for 10 minutes each hour while tractor is running. Care must be taken to cut off the flow of lubricant immediately on stopping the tractor. The method of lubrication is indicated under "Lubrication of Track."

BRAKES.

The brake bands operating on the steering clutch housing are used not only to facilitate steering but to retard the motion of the tractor or hold it in position. To facilitate steering, these brakes may be applied independently with the pedals. If it is desired to retard the motion of the tractor or to hold it in position both pedals or the brake lever may be used. The brake hand lever is equipped with a ratchet which holds both pedals.

DRIVING SUGGESTIONS.

While driving, a constant watch must be kept on the oil pressure, oil level and water temperature. A full supply of cylinder oil should be kept in the reservoir at all times and any reduction in oil pressure should be given immediate attention.

Any unusual noise in the operation of the tractor should be immediately investigated. A great amount of trouble can be avoided by giving attention to any symptoms as soon as they become evident, as the remedy at that time is generally simple.

TO STOP TRACTOR TEMPORARILY.

TURN OFF THE TRACK OIL.—Track oil should be used only when the tractor is in motion.

DISENGAGE THE MASTER CLUTCH by pulling the master clutch lever as far to the rear as possible.

REDUCE ENGINE SPEED by moving the hand throttle lever toward "Retard" until the engine runs at a slow even speed.

TO STOP THE ENGINE move the spark lever to full retard position. This short circuits the magneto and stops the engine.

DISENGAGE THE GEARS in mesh by moving the gear shifter lever to the neutral position.

STOPPING AT END OF RUN.

TO STOP THE TRACTOR.—Proceed as outlined in the preceding paragraph.

INSPECTION.—At the end of each run the tractor must be given a general inspection covering all loose or damaged parts, any defects that interfere with the proper operation of the tractor, any shortages of parts or materials, and any conditions which might interfere with the proper functioning of any part.

CLEANING.—Such facilities as may be available to clean the tractor should be taken advantage of. No opportunity should be overlooked to keep the working parts free from any accumulation of dirt and grit.

FUEL AND LUBRICANT.—The supply of fuel and lubricant in all containers should be replenished and the tractor otherwise made ready for immediate service. After the tractor is ready for further service it should be covered with the tarpaulin from the driver's seat as a protection against the elements.

CONCISE OPERATING INSTRUCTIONS.

PRELIMINARY TO STARTING.

Put gear lever in neutral.
See that master clutch is disengaged.
Trip ratchet catch lock on magneto to put impulse starter in motion.
Advance spark lever about one-eighth of total range forward.
Advance gasoline throttle one-fourth to one-half its travel.
Prime engine.
Open release cocks.
Rotate hand cranking device.

AFTER ENGINE IS STARTED.

Close release cocks.
See that the water pump is delivering water to radiator.
Advance the spark.

See that the fan is running properly.
Determine if any slippage is occurring on pulley that drives the fan.
See that the gauge on the force feed oiling system is working.
Never allow the engine to operate on one or more misfiring cylinders.

TO START TRACTOR.

Engage proper speed gear. See Plate 4.
Advance gas throttle.
Engage master clutch at first slowly, then firmly.

GEAR CHANGES.

Stop tractor by disengaging master clutch.
Engage gear desired by placing the gear shifter lever in the slot designating the speed wanted.

TO REVERSE TRACTOR.

Reduce engine speed, release master clutch, when tractor has stopped, engage reverse gear and engage master clutch.
Never engage reverse gear when tractor is moving forward.

TO STOP ENGINE TEMPORARILY.

Close the throttle.
Disengage the master clutch.
Retard the spark to full back position.
Close the valve controlling track oilers.
Inspect oilers, bearings, and cooling system.

TO STOP AT THE END OF A RUN.

Close the throttle.
Disengage the master clutch.
Retard the spark to full back position.
Close valves controlling track oilers.
Close valve on fuel supply line.
Make careful inspection of whole tractor.
In cold weather drain radiator, cylinders and pump.

LUBRICATING INSTRUCTIONS.

After each part mentioned in the lubricating instructions there will be found a figure. The key to the various figures is as follows:

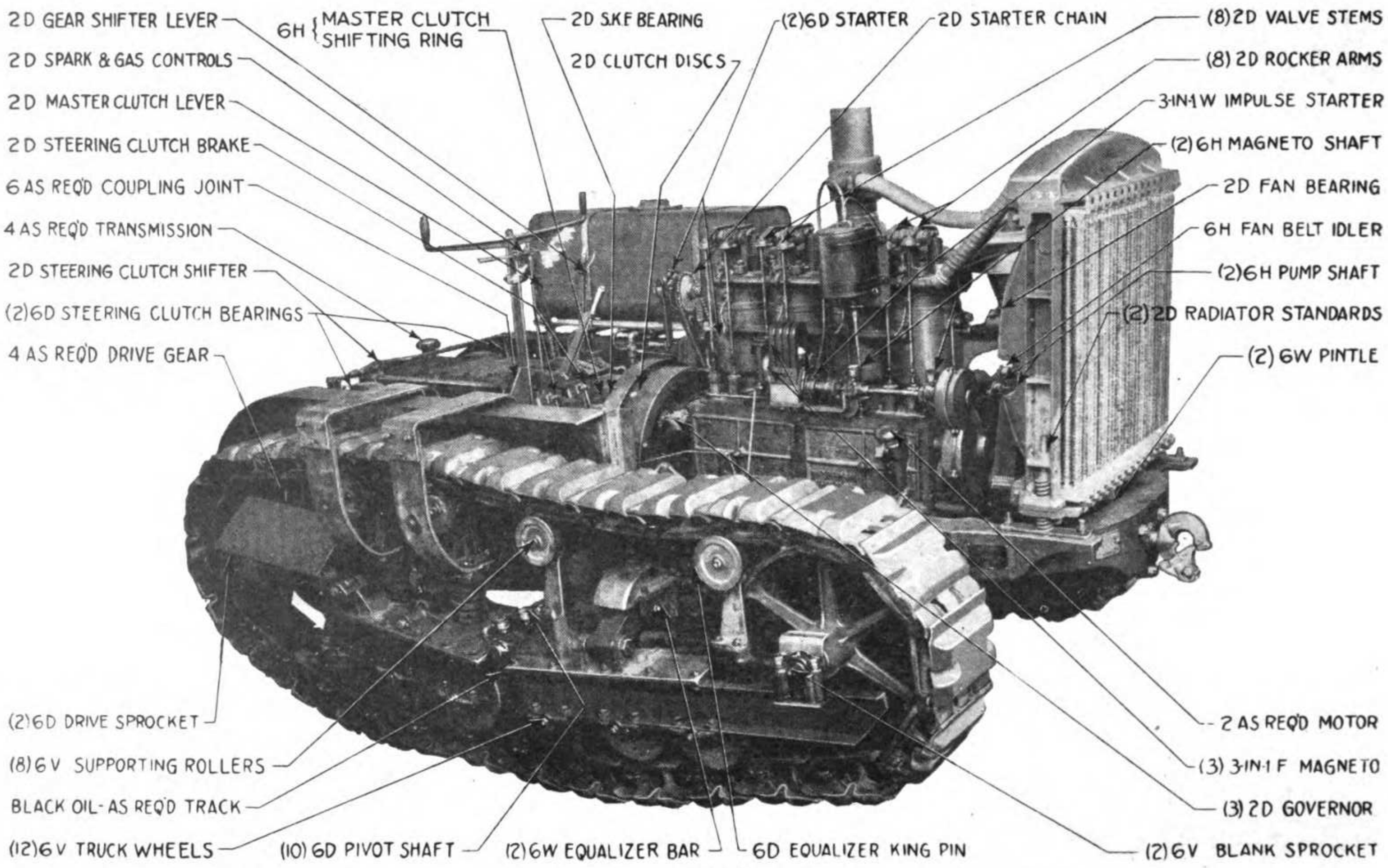
2, No. 3502 cylinder oil furnished in light, heavy and medium.
4, No. 3504 fluid transmission oil.
6, No. 3506 medium cup grease.

Each place on the 10-ton tractor where lubricant must be applied, must be given attention regularly. These places are pointed out on Plate 5, with the lubricant to be used and the frequency. The method of application is:

LUBRICATING CHART.

(BASED ON A 10-HOUR DAY) AT AVERAGE SPEED OF 3 MILES PER HOUR.

Part	*Lubricant*	*How Applied*	*How Often*
Hyatt roller bearing in fan	No. 2 medium	Oil can	Every 6 miles or 4 times daily
Magneto shaft	No. 6	Two grease cups	Two turns per hour
Valve stems	½ No. 2 med. ½ kerosene	Oil can	Every 6 miles or 4 times daily
Rocker arms	No. 2 medium	Oil can	Twice daily
Butterfly valve shaft	No. 2 medium	Oil can	Twice daily
S. K. F. bearing at flywheel end of master clutch.	No. 2 medium	Through pipe carried by clutch	Two times daily
Master clutch discs	No. 2 medium	Between discs	Once daily
Master clutch shifting ring	No. 6	One grease cup	One turn per hour
Gurney 200% ball bearing for shifting steering clutches	No. 6	One grease cup and pipes (2)	Four turns four times daily
Track drive sprocket sleeves	No. 6	Remove pipe plug rear end thrust rods and use grease gun (2)	Fill every day
Track supporting roller	No. 6	Grease cup (10) (new design	Turn down fully twice daily
		Grease gun (old design)	Fill till grease forces out—twice week or every 50 miles
Truck rollers	No. 6	Remove pipe plug (10) in end of gudgeon and use grease gun (2)	Every 50 miles or twice week
Equalizer (king pin)	No. 6	Grease cup	Two turns twice daily
Pintle hook (front and rear)	No. 6	Remove pipe plug (2) and use grease gun	Fill twice a week or every 50 miles
Roller frame pivot shaft	No. 6	Ten grease cups	Two turns one time daily
Fan belt idler	No. 6	One grease cup	Two turns per hour
Pump shaft bearing	No. 6	Two grease cups	Two turns per hour
Mechanical starter	No. 6	Two grease cups, chain-cylinder oil	Two turns daily; once per day
Track	Black oil or refuse oil from crankcase (not crude oil)	Gravity feed (2) through pipe lines from tank regulated by valve for each track	Open valves often enough while running to keep track pins and space blocks oiled
External spur gear (in dust guard)	No. 4	Fill oil tight dust guard by removing plug and filling 1 inch below level of hole (2)	Sufficient to maintain proper level
Transmission	Heavy body fluid No. 4 *mineral* oil	Fill case to level of pipe plug at rear right-hand corner of case, or up over one-third of gears; 6 gals. Fill through vent in upper trans. case	Sufficient to maintain proper level
Engine (timing gears, crankshaft and cylinders)	No. 2 medium	In crankcase	As required
Magneto	3-in-1 or other household oil, no cylinder or other mineral oil	By *drops* with wire oiler (3)	One drop—15 days, main bearings One drop—15 days, circuit breaker roller One drop—15 days, circuit breaker pin bearing
Impulse starter	3-in-1	Ball check oiler, using wire oiler or toothpick	Four drops per week
Governor	No. 2 medium	Squirt can, Hess-Bright bearing, ball pins, levers	Once per day
Spark and gas control connections	No. 2 medium	Squirt can	Once per day
Master clutch lever joints	No. 2 medium	Squirt can	Once per day
Gear shifter lever joints	No. 2 medium	Squirt can	Once per day
Steering clutch shifter joints	No. 2 medium	Squirt can (2)	Once per day
Steering clutch brake joints	No. 2 medium	Squirt can (2)	Once per day
Internal-external universal joint	No. 6	Pack housing	Whenever required
Equalizer bar rocker joints	No. 6	One cup each side (2)	Fill cup once per day
Radiator standards	No. 2 medium	Squirt can (2)	Once each side per day



LEGEND

2 = CYLINDER OIL — SPEC 3502	H = HOURLY V = SEMI-WEEKLY
4 = TRANSMISSION OIL SPEC 3504	D = DAILY W = WEEKLY
6 = CUP GREASE — SPEC 3506	F = SEMI-MONTHLY

LUBRICATING DIAGRAM (FOR FURTHER INSTRUCTIONS SEE PRECEDING PAGE).

MAINTENANCE ROUTINE.

It is essential for the proper care and maintenance of the 10-ton artil lery tractor model 1917 that the following maintenance routine schedule be rigidly adhered to. Preparedness for emergencies can only be obtained by keeping the tractor in excellent condition, and this necessitates that adjustment be kept proper at all times.

Inspections must be systematic and detailed, and made at regular intervals, daily, weekly and monthly.

Daily inspections must cover a general search for loose nuts and connections, all shortages of parts, all defects or conditions that would interfere with the proper operation of the tractor.

Weekly inspection must cover an examination of the compression, valve adjustment, condition of ignition system, clutch adjustments, and any other adjustments that are necessary, due to ordinary wear and tear.

Monthly inspections must be detailed in their nature and assuming that daily, semi-weekly and weekly inspections have been conscientiously made must cover an examination of all bearings, wear and tear on working parts and deterioration.

The following items refer only to inspection and adjustments. Repair or replacements detected as necessary must be made at the earliest opportunity.

DAILY MAINTENANCE ROUTINE.

ENGINE.

Examine all wiring terminals for tightness.
Clean magneto externally.
Inspect all wires for proper support and freedom from damage.
Thoroughly clean engine externally.
Note tension of fan belt.
Inspect oil pump for performing its function.
Inspect radiator water supply.
Inspect gasoline tanks for proper fuel supply.
Inspect pipe line and all connections for leaks.
Inspect action of transmission oil pump by opening test cock on top of transmission case, when transmission gears are revolving.

STEERING, CLUTCH BRAKES, GENERAL.

Inspect for undue wear or looseness.
Inspect for proper operation.
Inspect and thoroughly clean all lamps.

SEMI-WEEKLY MAINTENANCE ROUTINE.

Inspect main bearings and all connecting rod bearings in engine.
Inspect transmission for proper oil level.

WEEKLY MAINTENANCE ROUTINE.

ENGINE.

Inspect for oil leaks.
Inspect control connections.
Inspect all water connections for leaks.
Drain water and dirt from water trap in gasoline line.
Inspect carburetor control connections.
Do not attempt to alter adjustments of carburetor unless this is shown to be necessary when tractor is in service.
Inspect engine oil drain cocks and drain plugs for loss of oil.

STEERING CLUTCH BRAKES.

Inspect thoroughly, cleaning all brake connections.

SPRINGS.

Inspect springs.

TRACKS.

Inspect tracks, truck wheels, carriers, drive sprocket, blank sprocket, equalizer bar for wear, breakage or proper adjustment.

MASTER CLUTCH.

Inspect clutch, clean externally.

TRANSMISSION.

Clean and inspect all control connections.

STEERING CLUTCHES.

Inspect clutches for proper action, and inspect clutch brakes for proper action and adjustment.

GENERAL.

Inspect armor bolts, fasteners and all similar bolts for apparent tightness.
Inspect tool equipment for completeness.

MONTHLY MAINTENANCE ROUTINE.

MASTER CLUTCH.

Thoroughly clean and inspect all lever connections.

TRANSMISSION.

Clean externally and inspect for leaks, particularly in bearing covers at open ends to ascertain if undue leakage is occurring around shafts.

GENERAL.

Inspect speedometer drive.

GENERAL MAINTENANCE INSTRUCTIONS.

EVERY TWO WEEKS.

Renew oil in crankcase and clean it out, washing with kerosene. Use no waste or rags which will leave lint in case as this will clog oiling system.

EVERY NINETY DAYS.

Renew oil in transmission, washing out case with kerosene (not gasoline, because it destroys oil film on bearing surfaces).

KEEPING THE TRACTOR CLEAN.

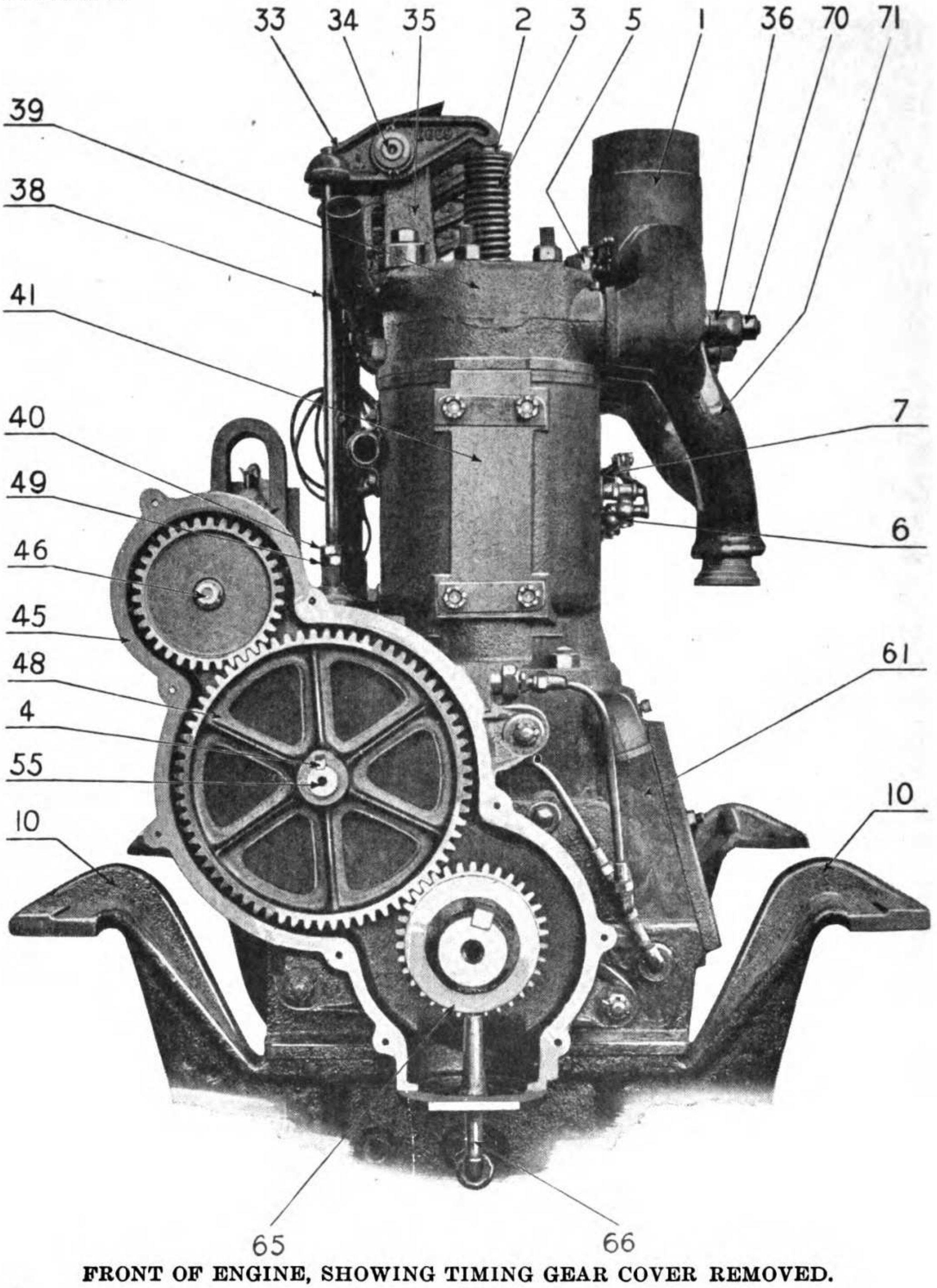
Grit, dirt and mud are the sources of greatest wear to an artillery tractor. All such deposits must be removed as well as facilities permit immediately after every run. If deposits of dirt and grit are allowed to accumulate, particles will soon find their way into bearing surfaces, causing unnecessary wear, and if the condition is not remedied it will soon cause serious difficulty.

When removing crankcase doors, or any other part in making repairs and replacements, or for the purpose of inspection where working joints or bearing surfaces are to be exposed, all dirt and grit that might find its way to the exposed surfaces must be carefully removed. The tools must be clean, and care must always be taken to eliminate the possibility of brushing dirt or grit into the openings with the sleeve.

To cut oil-soaked dirt and grit, hardened grit or road oil, use crude oil or kerosene applied with a waste rag.

The 10-ton artillery tractor is so designed that the possibility of interfering with its proper operation by careless application of cleaning water is very small. However, care should be taken that water in large quantities does not get under the armor as it might interfere with proper ignition and carburetion. Water should not be allowed to stand on exposed metal parts as it will cause rust. Such exposed parts should be painted as soon as conditions permit.

Plate No. 6.



FRONT OF ENGINE, SHOWING TIMING GEAR COVER REMOVED.

Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.
1	ZH17	Manifold, exhaust	39	Z649	Cylinder head
2	M11442	Cylinder head valve spring collar	40	102283	Valve tappet rod and lock nut
3	M10278	Cylinder head valve spring	41	100184	Cylinder, front
4	M11527	Gib key	45	100138	Timing gear case
5	AM1522	Priming cup	46	M1421	Magneto shaft
6	AM1656	Compression release cock	48	102293	Camshaft gear
7	M1427	Compression release cock lever	49	102195	Valve tappet rod adjusting nut
10	Z712	Engine hanger bracket	55	M10664 or M11183	Camshaft
33	M11453	Valve rocker arm	61	Z667	Crankcase
34	M2503	Valve rocker arm pin	65	M11497	Crankshaft gear
35	Z670	Valve rocker arm bracket	66		Oil pipe
36	ZH28	Exhaust and inlet manifold clamp	70	M1945	Exhaust and inlet manifold stud nut
38	AM1632	Valve tappet rod	71	Z650	Inlet manifold

CHAPTER II.

THE ENGINE GROUP.

The engine group consists of the engine proper and its cooling, fuel supply, carburetion, exhaust and ignition systems together with the hand engine starter.

ENGINE.

The engine is a four-cylinder, four-stroke cycle type and is mounted longitudinally on the main frame, being suspended at four points. The cylinders are cast separately, are of the valve-in-the-head type, and have a bore of 6.5 (6½) inches and a stroke of 7, developing 55 horsepower at 600 revolutions per minute. The firing order is 1-2-4-3.

The crankcase is a one-piece construction, is of cast iron and to its lower part is bolted the oil base or sump.

The single camshaft is gear-driven from the crankshaft and the high-tension magneto is driven by a gear in mesh with the camshaft gear. The governor is mounted on the camshaft at the flywheel end of the engine.

Ignition is by a K-W high-tension magneto and there are but four cables or wires, the conventional grounding wire and switch being replaced by a finger or grounding member on the circuit breaker of the magneto.

The fuel supply is by a main and auxiliary tank to a vacuum tank, thence to a Kingston carburetor. Three-way valves at main fuel tank and carburetor control the fuel supply.

The lubrication system is a combined force feed and splash, the oil being circulated by a gear-driven pump located in the oil base or sump.

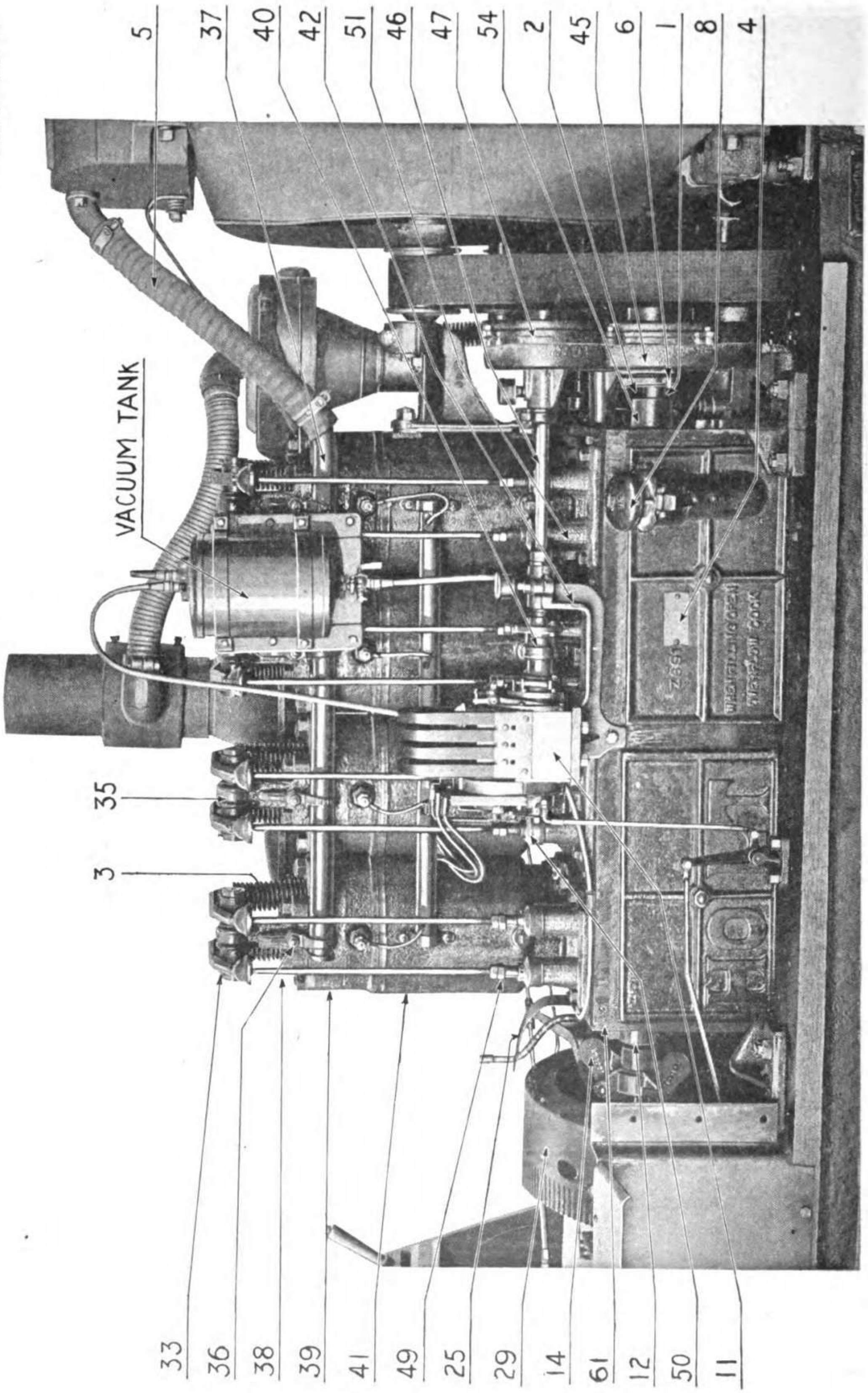
Cooling is by a pump driven by the belt driving the fan, the pump pulley being mounted on a bracket carrying a yoke which has a spring-tensioned idler.

CYCLE OF OPERATION.

The engine operates on the four-stroke cycle which is the same as that of passenger car and truck engines. There are four distinct strokes of the piston necessary for the completion of a cycle, these four strokes being called: Intake, compression, firing (or working stroke) and exhaust.

Upon being cranked by hand, a piston descends while its intake valve is open, and draws a charge of gas into the cylinder through the carburetor and the intake pipe. When the piston is just past the bottom of its stroke, and again returning upwards, the intake valve closes, and as the exhaust valve is at this time also closed, the gas is trapped within the cylinder and

Plate No. 7.



RIGHT SIDE OF ENGINE, SHOWING FITTINGS INSTALLED.

compressed by the piston's upward motion.

When the piston nearly reaches the top of its stroke, the spark occurs and explodes the mixture which, due to its increase in pressure, drives down the piston with considerable force, thus storing up energy in the flywheel for the succeeding stroke.

When the piston nears the bottom of the next stroke the exhaust valve opens, allowing the expanded and now useless gases to escape, and stays open during the following upward movement of the piston, allowing ejection of the remaining burned gases.

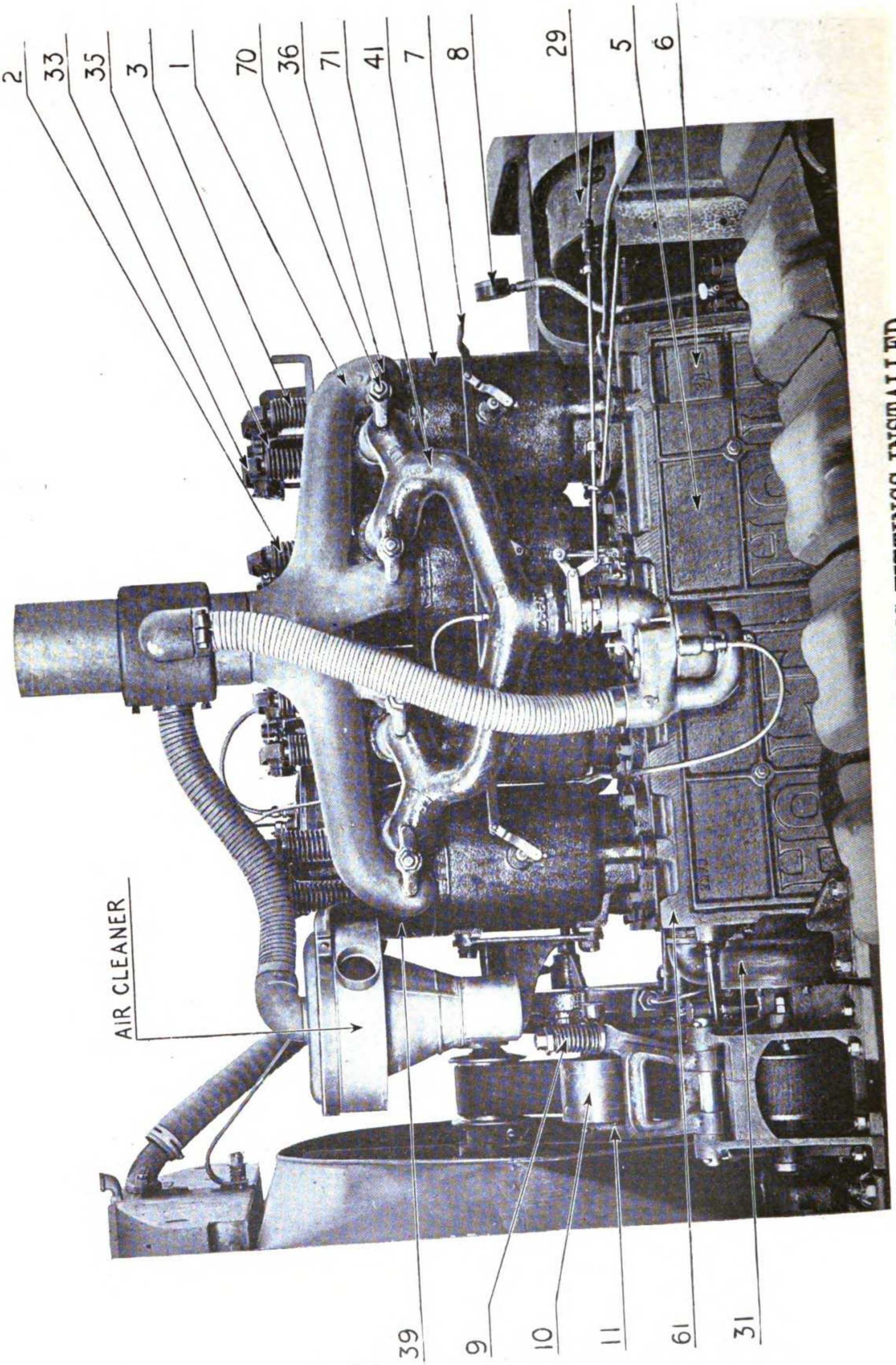
CYLINDERS.

The cylinders (41), Plates 7, 8, 9 and 10, are cast separately, with detachable heads. The material is a close-grained grey iron. The top and bottom ends are machined, after which the cylinders are reamed and the bore ground with a plus or minus tolerance of .001 (one thousandth) inch. The cylinders are attached to the crankcase by four studs and nuts. Both the removable head and the cylinder are water-jacketed.

RIGHT SIDE OF ENGINE, SHOWING FITTINGS INSTALLED.

Ref. No.	Part No.	Name of Part.
1	M10664	Camshaft.
2	160173	Camshaft bearing assembly, timing gear end.
3	M10278	Cylinder head valve spring.
4	AM1408	Crankcase door.
5	7644	Hose.
6	Z717	Camshaft felt retainer ring.
8	Z689	Oil filler cap.
11	AM101	Magneto.
12	160174	Camshaft bearing assembly, flywheel end.
14	100125	Governor weight.
25	M11892	Flywheel pointer.
29	Z683	Flywheel.
33	M11453	Valve rocker arm.
35	Z670	Valve rocker arm bracket.
36	Z731	Water manifold clamp.
37	AM1362	Water manifold assembly.
38	160883	Valve tappet rod.
39	Z649	Cylinder head.
40	AM140	Magneto, Oldham coupling assembly.
41	ZH92	Cylinder, rear.
42	101703	Magneto bracket.
45	100138	Timing gear case.
46	M1421	Magneto shaft.
47	101691	Timing gearcase cover.
49	102195	Valve tappet rod adjusting nut.
50	102197	Valve tappet rod dust cap.
51	Z672	Valve tappet guide.
54	100422	Camshaft bearing assembly, timing gear end.
61	Z667	Crankcase.

Plate No. 8.



LEFT SIDE OF ENGINE, SHOWING FITTINGS INSTALLED.

PISTONS.

The four pistons (6), Plate 9 and Plate 11, are of grey iron and have three rings (7), Plates 8 and 10, above the wristpin (10). They are 6.496 inches in diameter at the bottom, 6.477 at the top and are 6 inches long. The bottom has a 0.0625 ($\frac{1}{16}$)-inch chamfer.

PISTON CLEARANCE.

The piston itself cannot be made an absolute fit in the cylinder because provision has to be made for expansion under the high operating temperature to which it is subjected. The expansion of the piston is taken care of in two ways:

First, the piston is tapered from the bottom of the third piston ring slot to the top of the piston.

Second, the body of the piston or "skirt" is made a certain amount smaller than the cylinder it works in. The piston clearance is 0.001 (one

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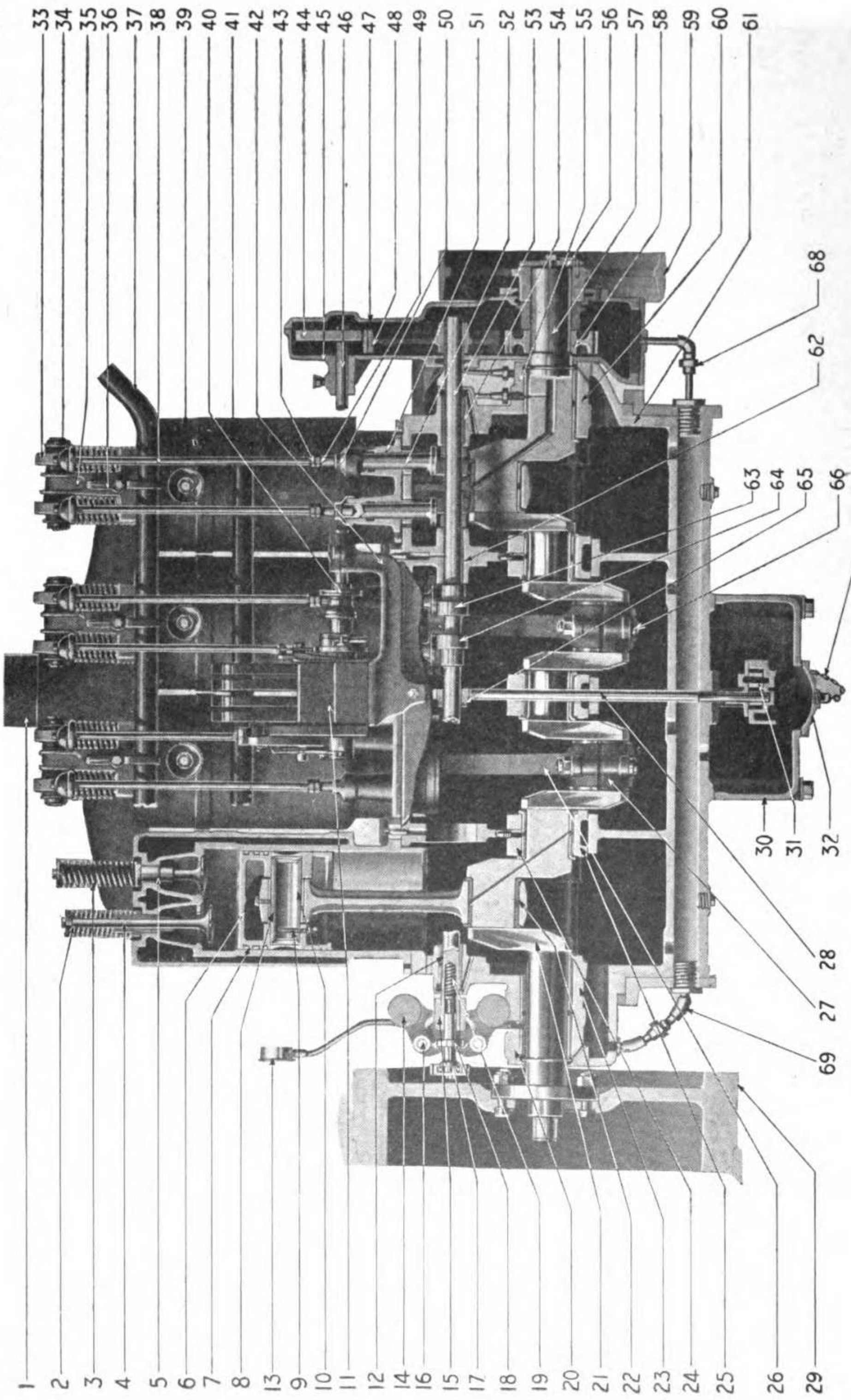
LEFT SIDE OF ENGINE, SHOWING FITTINGS INSTALLED.

Ref. No.	Part No.	Name of Part.
1	ZH17	Manifold, exhaust.
2	M11442	Cylinder head valve spring collar.
3	M10278	Cylinder head valve spring.
5	Z725	Crankcase door.
6		Breather.
7	M1427	Compression release cock lever.
8	10533	Oil gauge.
9	2151	Idler tension spring.
10	10297	Idler pulley.
11	8912	Idler pulley yoke.
29	Z683	Flywheel.
31	8911	Water pump casing.
33	M11453	Valve rocker arm.
35	Z670	Valve rocker arm bracket.
36	ZH28	Exhaust and inlet manifold clamp.
39	Z649	Cylinder head.
41	ZH92	Cylinder, rear.
61	Z667	Crankcase.
70	M1945	Exhaust and inlet manifold stud nut.
71	Z650	Inlet manifold.

Plate No. 9.

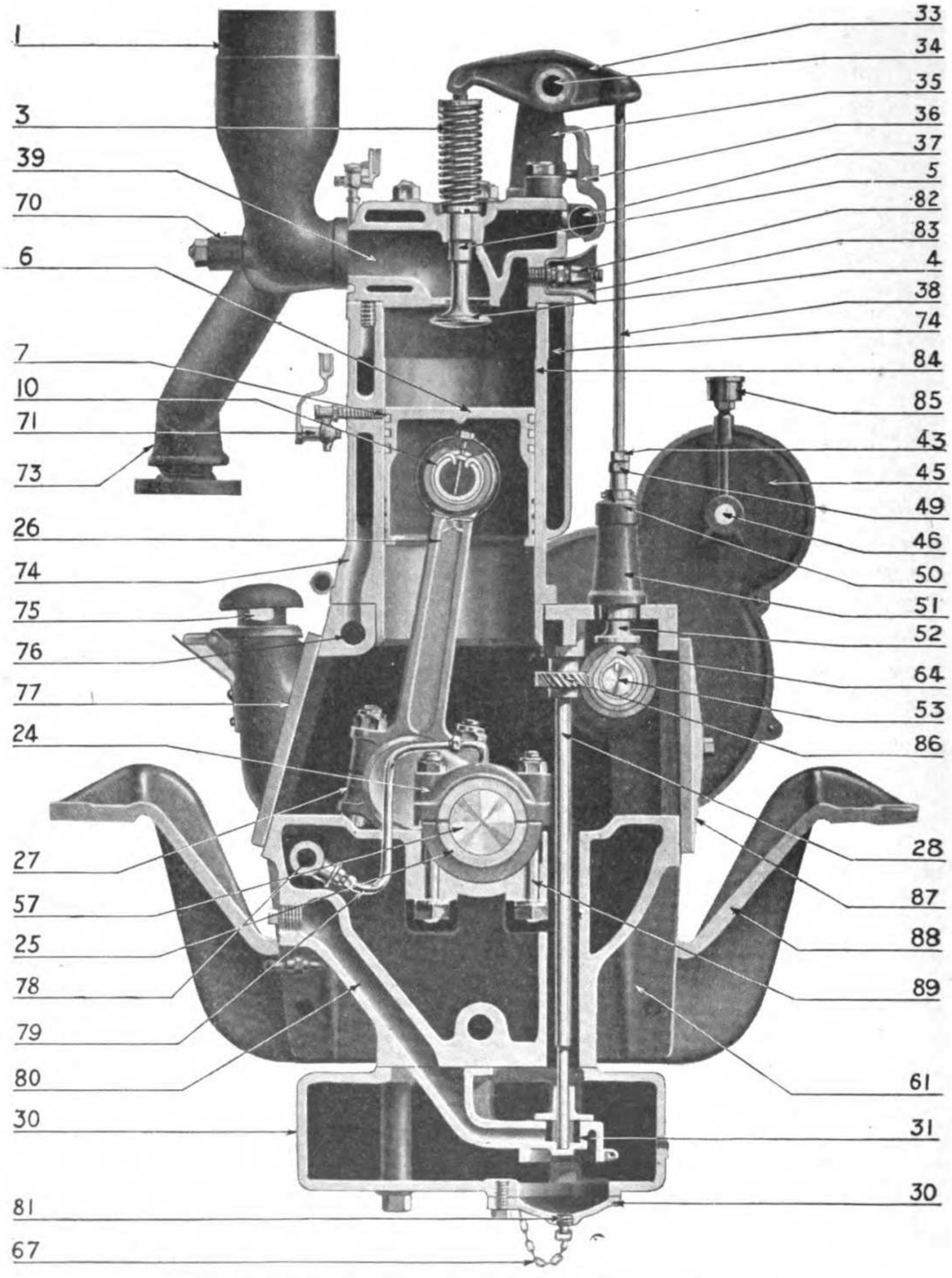


LONGITUDINAL PART SECTION OF ENGINE.

LONGITUDINAL SECTION THROUGH ENGINE.

Ref. No.	Part No.	Name of Part.
1	ZH-17	Manifold, exhaust.
2	M-11442	Cylinder head valve spring collar.
3	M-10278	Cylinder head valve spring.
4	M-11381	Cylinder head valve.
5	Z-714	Cylinder head valve guide.
6	Z-676	Piston.
7	M-2292	Piston ring.
8	B-359	Connecting rod piston-pin end bushing.
9	M-11849	Set screw ($\frac{1}{2}$ x $2\frac{3}{16}$").
10	M-11850	Piston pin.
11	AM-101	Magneto.
12	160174	Camshaft bearing assembly, flywheel end.
13	10533	Oiler gauge.
14	100125	Governor weight.
15	ACDH-4	Governor body.
16	M-1036	Governor weight pin.
17	AM-1403	Governor plunger bearing.
18	100462	Governor plunger.
19	100463	Governor plunger spring.
20	Z-730	Crankshaft bearing cap, flywheel end.
21	M-11101	Crankshaft, flywheel end.
22	B-355	Connecting rod die-cast bushing.
23	Z-659	Crankshaft bearing, flywheel end.
24	Z-660	Crankshaft bearing cap, center.
25	Z-655	Crankshaft bearing, center.
26	100379	Connecting rod.
27	100258	Connecting rod cap.
28	M-1062	Oil pump shaft.
29	Z-683	Flywheel.
30	Z-690	Crankcase oil reservoir.
31	AM-1480	Oil pump assembly.
32	Z-692	Crankcase oil reservoir hand hole cover.
33	M-11453	Valve rocker arm.
34	M-2503	Valve rocker arm pin.
35	Z-670	Valve rocker arm bracket.
36	Z-731	Water manifold clamp.
37	AM-1362	Water manifold assembly.
38	160883	Valve tappet rod.
39	Z-649	Cylinder head.
40	AM-140	Magneto Oldham coupling assembly.
41	100184	Cylinder, front.
42	101703	Magneto bracket.
43	102283	Valve tappet rod lock nut.
44	ZH-20	Magneto shaft gear.
45	100138	Timing gear case.
46	M-1421	Magneto shaft.
47	101691	Timing gear case cover.
48	102293	Camshaft gear.
49	102195	Valve tappet rod adjusting nut.
50	102197	Valve tappet rod dust cap.
51	Z-672	Valve tappet guide.
52	ZH-31	Valve tappet.
53	M-10664 or M-11183	Camshaft.
54	100422	Camshaft bearing assembly, timing gear end.
55	Z-656	Crankshaft bearing cap, gear end.
56	M-11465	Crankshaft end washer.
57	M-11101	Crankshaft, timing gear end.
58	M-11497	Crankshaft timing gear.
59	Z-715	Crankshaft fan pulley.
60	Z-658	Crankshaft bearing, gear end.
61	Z-667	Crankcase.
62	160175	Camshaft bearing assembly.
63	Z-647	Camshaft cam, inlet.
64	Z-648	Camshaft cam, exhaust.
65	M-10630	Camshaft spiral gear.
66	M-11927	Connecting rod bolt.
67	M-11189	Chain for oil reservoir drain plug.
68		Oil pipe.
69		Oil pipe.

Plate No. 10.

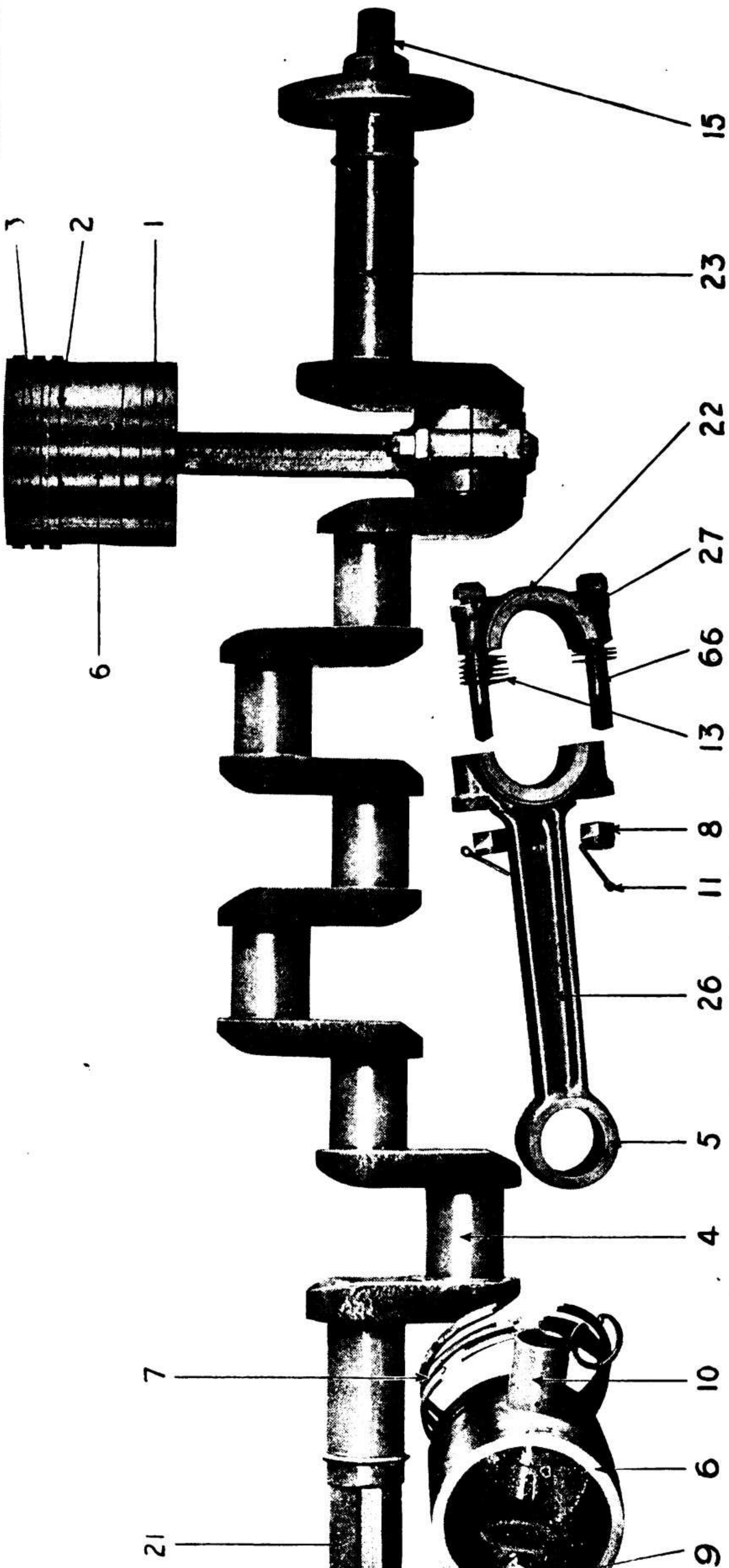


TRANSVERSE SECTION THROUGH ENGINE.

TRANSVERSE SECTION THROUGH ENGINE.

Ref. No.	Part No.	Name of Part.
1	ZH17	Manifold, exhaust.
3	M10278	Cylinder head valve spring.
4	M11381	Cylinder head valve.
5	Z714	Cylinder head valve guide.
6	Z676	Piston.
7	M2292	Piston ring.
10	M11850	Piston pin.
24	Z660	Crankshaft bearing cap (center).
25	Z655	Crankshaft bearing (center).
26	100379	Connecting rod.
27	100258	Connecting rod cap, crank pin end.
28	M1062	Oil pump shaft.
30	Z692	Oil reservoir hand hole cover.
31	AM1480	Oil pump assembly.
33	M11453	Valve rocker arm.
34	M2503	Valve rocker arm pin.
35	Z670	Rocker arm bracket.
36	Z731	Water manifold clamp.
37	AM1362	Water manifold.
38	160883	Valve tappet rod.
39	Z649	Cylinder head.
43	102283	Valve tappet rod lock nut.
45	100138	Timing gear case.
46	M1421	Magneto shaft.
49	102195	Valve tappet rod adjusting nut.
50	102197	Valve tappet rod dust cap.
51	Z672	Valve tappet guide.
52	Z431	Valve tappet.
53	M10664 or M11183	Camshaft.
57	M11101	Crankshaft.
61	Z667	Crankcase.
64	Z648	Camshaft exhaust cam.
67	M11189	Oil reservoir drain plug chain.
70	ZH28	Exhaust and inlet manifold clamp.
71	AM1656	Compression release cock.
73	Z650	Inlet manifold.
74		Water jacket.
75	Z689	Crankcase door oil filler cap.
76		Water jacket inlet.
77	AM1408	Crankcase door with oil filler.
78	M10662	Tee-oil piping assembly.
79	M10658	Copper tubing.
80		Pump outflow.
81	M11150	Crankcase oil reservoir hand hole cover plug.
82	7840	Spark plug.
83	100124	Spark plug protector.
84	ZH92	Cylinder, rear.
85	160516	Grease cup.
86	Z674	Oil pump shaft spiral gear.
87	ZH78	Crankcase door.
88	Z712	Motor hanger bracket.
89	M12039	Crankshaft bearing stud.

Plate No. 11.



CRANKSHAFT, CONNECTING RODS, PISTONS, ETC., PARTIALLY DISASSEMBLED.

thousandth) of an inch for every inch of bore plus 0.0015 (one and one-half thousandth) inch for overall.

The sides of the piston body or "skirt" are parallel. When the working temperatures expand a piston it finally fits the cylinder with a sliding fit. The film of lubricating oil occupies the final clearance between piston ring and cylinder walls, and is the final seal to retain compression.

Three oil grooves (1), Plate 11, are cut on the bottom of the piston skirt to carry the lubricating oil to the cylinder wall and piston rings. The third or lower ring groove (2) is drilled with 0.15625 ($\frac{5}{32}$)-inch holes at a tangent for the purpose of draining excess oil back into the crankcase. These oil grooves and holes must be kept free from carbon and foreign matter.

PISTON RINGS.

The three piston rings (7), Plate 11, are of grey iron, machined and ground. They are of the step type and are located above the wristpin (10). The function of the piston rings is to seal the space between the

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PISTON CONNECTING ROD AND CRANKSHAFT.

Ref. No.	Part No.	Name of Part.
1		Oil grooves.
2		Piston oil drain holes.
3	M2292	Piston ring.
4		Crank pin.
5		Connecting rod, piston pin end.
6	Z676	Piston.
7	M2292	Piston rings.
8	M2023	Castle nut.
9	M11849	Piston pin set screw.
10	M11850	Piston pin.
11	M1590	Cotter pin.
13	M11448 }	Shims.
	M11449 }	
15	M11101	Crankshaft.
21	M11101	Crankshaft.
22	100258	Connecting rod cap.
23		Crankshaft main bearing surface.
26	100379	Connecting rod.
27		Connecting rod crank pin bushing (babbitt).
66	M11927	Connecting rod bolts.

cylinder walls and piston, preventing the escape of the gases under pressure. The rings also prevent excess lubricant from working into the combustion chamber of the cylinder.

PISTON PIN.

The piston pin (10), Plates 9 and 11, is of the fixed type; that is, the small end of the connecting rod (8), Plate 9, and (5), Plate 11, rotates on it. The piston pin is of hollow tube steel, ground to size and case hardened and is 1.9375 ($1\frac{15}{16}$) inch in diameter.

The piston pin hole is bored at right angles to the axis of the piston through two bosses. The hole in the boss that carries the wrist pin set screw is reamed to 1.875 ($1\frac{7}{8}$) inch, while the hole in the other boss is reamed to 1.9375 ($1\frac{15}{16}$) inch.

PISTON PIN RETENTION.

The piston pin is held in position by a pin set screw. This allows the expansion of the case-hardened steel piston pin to occur without carrying the piston out of round, as but one end is anchored. The set screw should be accurately inserted in the place provided on the inside of the pin and should be kept tight and accurate in its position.

CONNECTING ROD.

The connecting rod (26), Plates 10 and 11, so-called because it connects the piston pin (10), Plate 10, of the piston (6), and crankpin. (4) of the crankshaft (21), is a drop forging of H section, and is 13.5 ($13\frac{1}{2}$) inches long from center to center of piston pin and crankpin. The material is carbon steel.

CONNECTING ROD BEARINGS.

The small end of the connecting rod (5), Plate 11, carries a phospohr-bronze bushing (8), Plate 9, which is retained by means of a set screw, which prevents turning of the bushing when the rod oscillates on the piston pin.

The large end of the connecting rod, which is of the split type; is clamped about the crankpin. The bearing is 2.8125 ($2\frac{13}{16}$) inches in diameter, and 3.25 ($3\frac{1}{4}$) inches long. The bearing material is babbitt, in a die-cast bushing (22). The bearing cap (27), Plates 9 and 11, is retained by two connecting rod bolts (66), Plates 9 and 11, which are locked by a nut (8), Plate 11, and cotter pins (11). Shims (13) are provided between the bearing cap and connecting rod proper for the purpose of compensating for wear of the bearing.

CRANKSHAFT.

The crankshaft (21), Plates 9 and 11, is a chrome nickel steel forging, heat-treated and all bearings are ground with a tolerance of plus or minus 0.0005 (one-half thousandth) inch. The flywheel flange is integral with the crankshaft and the flywheel (29), Plate 9, is bolted to the flange. The extreme flywheel end of the shaft (15), Plate 11, is turned down to take a self-aligning S. K. F. ball bearing which supports the weight of the master clutch.

CRANKSHAFT BEARINGS.

The crankshaft is supported by five main bearings, one at the flywheel end (20), Plate 9, one at the timing gear end (60), and by three center bearings (24). The bearing dimensions are: Flywheel end, 7.5625 inches; center, 3.5 inches; timing gear end, 5.1875 inches. For convenience, the main bearings are numbered 1, 2, 3, 4, 5, the timing gear end bearing being known as the No. 1. The main bearings proper of the crankshaft are of the divided type, and the bearing material is babbitt. The bearings are retained by bolts and nuts, cotter pinned.

The cap for the flywheel and gearcase end bearings, in addition, have a plate cast on to completely cover the area of the crankcase required to insert the crankshaft through, consequently these two are called flywheel cap and end plate, and gear case end cap and end plate.

CRANKCASE.

The crankcase (61), Plates 7, 8 and 9, is a one-piece construction of cast iron and bolted to it at either end are the engine hanger brackets (88), Plate 10. These brackets are bolted to the main frame. Two doors on either side of the crankcase afford access to the bearings, etc., and these crankcase doors are secured by a stud and nut. The left rear crankcase door (5), Plate 8, carries the breather (6). The right forward crankcase door (4), Plate 7, includes the oil filler member and cap (8). Gaskets are utilized between the doors and crankcase to avoid the possibility of oil leaking.

CAMSHAFT.

The camshaft (53), Plates 9 and 10, which is supported in the crankcase by cylindrical cast iron bearings, bronze bushed, carries the intake or inlet cams (63), Plate 9, and the exhaust cams (64), the function of which is to open the valves, admitting the mixture into the cylinder and permitting egress of the burned gases or exhaust. The 10-ton tractors have one of two types of cams, those forged integral with the shaft and the built-up, the latter being pinned and keyed to the shaft.

TIMING GEARS.

The camshaft is rotated by the camshaft gear (48), Plate 6, which has sixty-eight teeth. The gear rotates at half crankshaft speed as the crankshaft gear has thirty-four teeth. The timing gear also drives the magneto gear, which has thirty-four teeth. The camshaft rotates in bronze bushings.

VALVE ASSEMBLY.

There are two valves to each cylinder, an intake and an exhaust, and each valve (4), Plate 9, is opened or moved from its seat or the pressure of the valve spring (3), Plate 9, overcome by the valve tappet rod (38), Plates 7 and 9, which is actuated by the valve tappet (52), Plate 9. The valve tappet moves in the valve tappet guide (51), and entrance of dust or other foreign elements to the tappet guide assembly is prevented by the tappet dust cap (50). The valve tappet is lifted by a cam (64), Plate 10.

VALVES.

The valves are of the poppet type, are 2.75 (2¾) inches in diameter and have a 45-degree bevel seat. The inside diameter of the seat is 2.5 (2½) inches and the lift is 0.4137 inch. The valve head is of cast iron electrically welded to a mild steel case-hardened stem. The tappet guide material is cast iron.

The valves are located in the detachable cylinder head (39), Plate 9, and the cylinder head valve spring (3), Plates 7 and 8, is retained by a cylinder head valve spring collar (2) and split lock washer. The valves are opened by compressing the valve springs by a valve rocker arm (33) pivotally mounted on an arm bracket (35). The cylinder head valve guide (5), Plate 9, is of the removable type.

VALVE STEM GUIDE LUBRICATION.

The valve stem guides should be lubricated four times a day with a mixture one-half cylinder oil and one-half kerosene. This penetrates better than straight cylinder oil. The lubrication of valve stems and guides must never be neglected.

FLYWHEEL.

The flywheel (29), Plates 8 and 9, is 25 inches in diameter and is secured to the flanged end of the crankshaft by six bolts. One hole is staggered so that a new marked flywheel can always be inserted in the field. The periphery of the flywheel has 148 teeth with which the gear of the hand engine starter meshes.

ENGINE MANIFOLDS.

There are two manifolds, the exhaust and the intake. The intake manifold (71), Plate 8, conveys the mixture to the cylinders. The exhaust manifold conveys the exhaust gases and, like the intake, has four branches with openings registering with ports in the cylinders. Attached to the exhaust manifold proper is a pipe or exhaust manifold (1), Plate 9. The manifolds are secured to the cylinders by manifold clamps (36), Plate 8, which are tightened on manifold studs (70), Plate 8, by nuts. Copper asbestos gaskets are utilized between the manifolds and cylinder to obtain a tight connection. The conventional gasket between the carburetor and intake manifold is eliminated, the part carrying the throttle operating mechanism being threaded into the carburetor and manifold.

LUBRICATION SYSTEM.

Lubrication of the engine is by a combined force feed and splash system, a rotary pump (31), Plates 9 and 10, located in the bottom of the crankcase oil reservoir (30), pumping the lubricant under pressure to a pipe extending the length of the crankcase. Leads or pipes from the main pipe convey the oil to the main bearings of the crankshaft which is drilled diagonally so that the oil is carried through the crank from the main bearings to the connecting rod bearings.

The oil which overflows at the ends of the connecting rod bearings is splashed by the ends of the connecting rods to the cylinders, piston pins and camshaft bearings. The timing gears are lubricated by the oil from the pump by a check valve with a by-pass into the timing gear housing, the overflow from a standpipe, in the last named returning through a duct, to the crankcase, thence to the oil reservoir. The function of the check valve is to maintain the pressure which is from 3 to 4 pounds.

PRESSURE GAUGE.

A pressure gauge (13), Plate 9, and (8), Plate 8, is mounted at the rear of the engine and in plain view of the driver. It should show a steady pressure at all times. If the gauge or indicating member fluctuates it indicates that the system is clogged at some point and the trouble must be immediately located and the fault corrected.

OIL PUMP.

The oil pump is of the rotary gear type, is driven by a spiral gear (86), Plate 10, on a vertical shaft and the first-named gear meshes with a similar gear (65), Plate 9, on the camshaft.

OIL PUMP SCREEN.

The oil pump screen which is placed over the bottom of the oil pump body (31), Plate 9, may become clogged by foreign matter collecting at this point. In order to clean this screen, the reservoir does not have to be removed, but by draining off the oil in reservoir (30) and taking off hand plate (32) on bottom of oil reservoir, the screen can be readily removed and cleaned. Loss of plate is prevented by a chain (67).

The most common agent in clogging the screen will be particles of waste or lint from rags used in cleaning the crankcase. Waste or rags giving off lint should never be used in the crankcase as the disengaged particles will clog the oiling system and pump screen and damage will result.

If the oil is not drained from the engine, or the crankcase washed at regular intervals, foreign matter may accumulate in the bottom of the reservoir that will clog or impede the circulation of the oil. The correct method of washing the crankcase is described under the section dealing with the crankcase.

RENEWING OIL SUPPLY.

The engine must have the correct supply of clean cylinder oil, Spec. Medium No. 3502, at all times. The oil must always be inserted through the cap and strainer (8), Plate 7. The oil runs under the forward cylinder and thence through a tunnel on the bottom of the crankcase to oil reservoir. A pet cock is provided in the bottom of the crankcase on the right hand forward side of the engine. This pet cock should be opened when putting oil in through strainer and filling continued till oil comes out of pet cock. A pet cock located in the right side of the oil reservoir gives "low" oil level.

FIELD REPAIRS TO ENGINE.

FITTING CYLINDER GASKETS.

The cylinders proper are bolted to the crankcase and it is important that the joint be oil-tight, else the lubricant will escape from the crankcase. If oil escapes, remove the cylinder and clean thoroughly the bottom of the cylinder and the crankcase, taking care to displace all dirt and oil. Make a gasket of heavy wrapping paper, taking care not to cover the water passage to the cylinders. This passage utilizes a cylindrical rubber gasket which is approximately 0.03125 (1/32) inch thick. It is important that this gasket seal the opening between the cylinder and

crankcase and it may be necessary to add paper gaskets to obtain the desired seal. After making the paper gasket, cover it on both sides with shellac and allow the shellac to almost dry before placing it on the crankcase. Replace cylinder and bolt down. The correct size of a gasket may be determined by placing the paper or other material over the part and with a light ball pein hammer lightly tap the material to outline the part.

FITTING CYLINDER HEAD GASKETS.

The joint between the cylinder and cylinder head is made watertight by using a copper-asbestos gasket. If the cylinder head has not been bolted down evenly and tightly into place the cylinder head gasket may leak water into the cylinder, or the water may leak on the outside of the engine. To determine if gasket is leaking due to cylinder head being improperly bolted down, proceed as follows: Slack off the nuts on the cylinder head studs a few turns, seat cylinder head on cylinder head gasket by using a large hammer on the cylinder head and a block of wood to cushion the blows, then commence to bring cylinder head into place with the nuts on the cylinder head studs by giving each nut in rotation around cylinder head an equal number of turns until firmly bolted down. If the gasket still leaks, remove the gasket and replace with a new one. If a new gasket is not at hand an emergency repair can be made by drying the cylinder head and cylinder surface and gasket, shellacking the gasket and allowing it to dry until very tacky. This practice is not to be recommended, but can be used in case of an emergency.

REMOVING PISTON.

When it is desired to remove the pistons for the purpose of fitting new rings or cleaning the piston ring grooves, the pistons can be removed through the crankcase doors on the side opposite the camshaft. Plates 12 and 13 show the method.

(a) Remove the spark plugs so that compression will be released and not interfere with handling the piston.

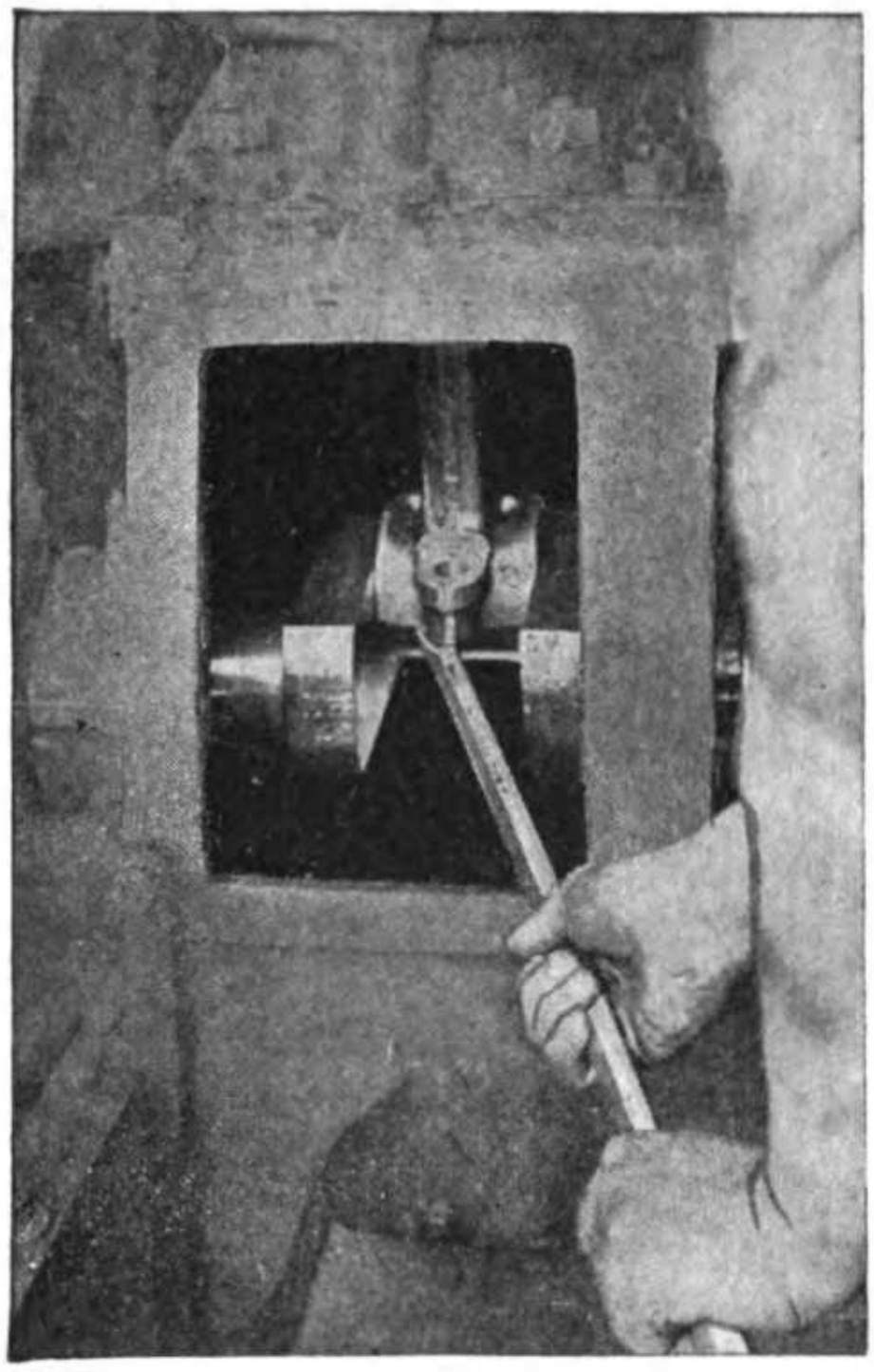
(b) By means of the flywheel revolve the crankshaft until the lower connecting rod bearing of the piston desired is accessible.

(c) Remove the lower half of the connecting rod bearing.

(d) Rotate the flywheel (with the upper half of the connecting rod bearing still on the crank-pin) until the bearing is almost on the opposite side of the crankcase.

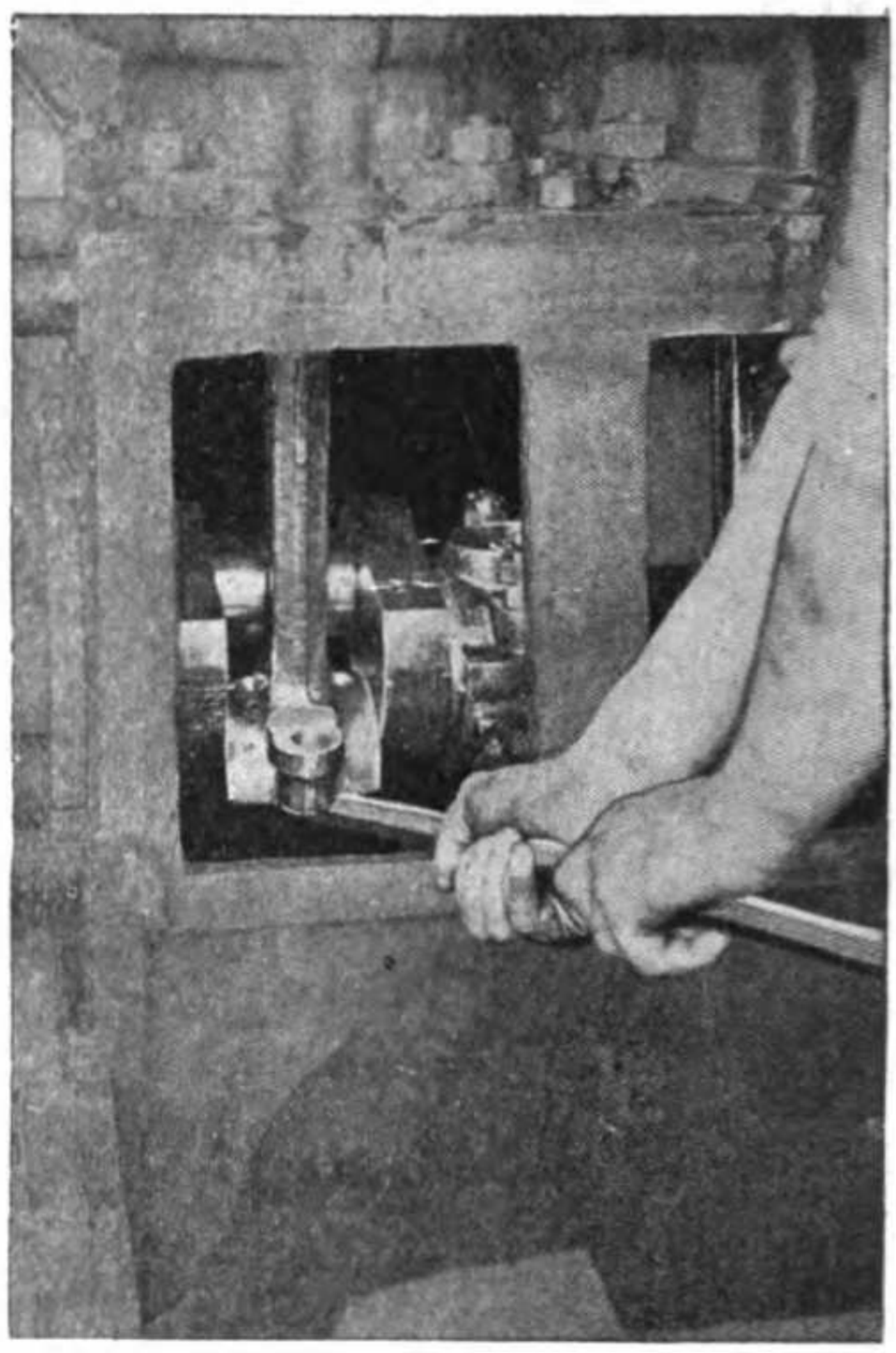
(e) With a light bar unseat the upper half of the connecting rod bearing from the crank-pin and with one hand on the connecting rod lower it with the bar until the upper part of the bottom bearing spans the oil tunnel in

Plate No. 12.



POSITION 1.

After removal of bolts and connecting rod cap, place small bar carefully under rod, taking care not to damage babbitt metal.



POSITION 2.

Lower until connecting rod spans the oil tunnel in the base and piston rests on sides of crank webs.

Plate No. 13.

POSITION 3.

Pull piston forward. Don't let it fall out. It will not bind if crank is in right position.

POSITION 4.

Grasp the piston in the manner shown and lift out of the base.

METHOD OF REMOVING PISTONS.

the base of the crankcase. At this point it may be necessary to rock the crankshaft one way or the other to obtain the necessary angle to allow the piston to clear the top of the door.

REPLACING PISTON.

Replacing the piston after cleaning or repairing is accomplished in the reverse direction given above, except that a light bar must be used under the piston with a light purchase on camshaft to slip it into the cylinder. The bottom edge of the cylinder is beveled to aid in compressing the piston rings and to make the insertion of the pistons an easy matter. Never insert a piston through the top of the cylinder as the necessary bevel is not provided to compress the rings and the piston rings may be damaged on one edge. After the piston has been inserted in the cylinder and the lower half of the connecting rod bearing placed on the connecting rod be sure that all cotter keys are placed in the connecting rod bolts.

FITTING PISTON RINGS.

Fitting piston rings to a piston requires care and accuracy in the work. There are three factors to be considered:

First, the fit of the piston ring in the cylinder to get proper ring "break."

Second, the fit of the piston ring in the slot on the outside of the piston.

Third, the fit of the piston ring when placed on the piston.

One should be able to get a perfect adjustment on new piston rings if the following precautions are observed:

Fit the piston ring in the cylinder first. With a fine file remove any wire edge or burrs from the top or bottom outside edge of ring. There are two methods of placing the ring square in the cylinder in order to get the proper ring "break."

First, if the cylinder heads are removed, one of the pistons can be left in the cylinder and the piston ring placed squarely against the head of the piston and then the piston dropped away for an inch or so, to afford an examination of the "break."

Second, in case that it is not desired to remove the cylinder heads, the piston can be removed through the crankcase, piston ring inserted squarely in the bottom of the cylinder by taking accurate measurement from the bottom edge of cylinder. When the piston ring is fitted in the bottom of the cylinder, using a small hand mirror will facilitate examination of the "break."

Allowance must be made for the piston ring's expansion lengthwise so that when the piston and cylinder are heated to operating temperature the free ends of the piston ring will not meet and cause binding of the ends of the piston ring. The top piston ring should have a "break" of 0.024 inch, as this ring is close to the hottest part of the piston, and the

second and third piston rings should have 0.012 of an inch "break." A steel shim out of the connecting rod bearing is 0.012 of an inch thick and can be used as a gauge in determining the correct piston ring "break."

When material has to be removed from the ends of the piston ring to provide the necessary "break" for expansion, clamp a fine mill file in a vise, open the piston ring and clamp the ends of the ring squarely over it and remove material. Be careful never to damage the piston ring split surfaces where they come together horizontally.

CLEANING PISTONS.

The piston ring slot (3), Plate 11, should be scraped clean of all carbon deposits and washed with kerosene. It is useless to fit a piston ring unless the slots are clean, because deposits will interfere with accurate fitting. Scrape the piston ring slot clean with a flat metal scraper. If it is not possible to remove all of the carbon, use No. 000 sand paper under a flat stick, bearing on it lightly while cleaning the slot. *Never use a file or emery cloth for cleaning piston ring slots.* Rinse the slots with kerosene, and wipe dry with a cloth.

After the piston ring has been fitted in the cylinder it should be fitted to the piston slot by revolving the piston ring on the outside of the piston and inside the slot. The vertical expansion of the piston ring in the slot has to be provided for. The top ring should have a clearance of 0.004 inch and the bottom two rings should have a clearance of 0.003 inch. If the ring does not have free movement in the slot some of the material will have to be removed from the top or bottom edge of the ring. Obtain a flat board over which spread a quantity of fine carborundum powder and cup grease mixed into a paste, or use a reliable valve grinding compound; lay the ring flat in this mixture and rotate until the sufficient quantity of material has been removed to secure the necessary clearance. Wash the piston ring with kerosene and wipe clean before trying it in the slot.

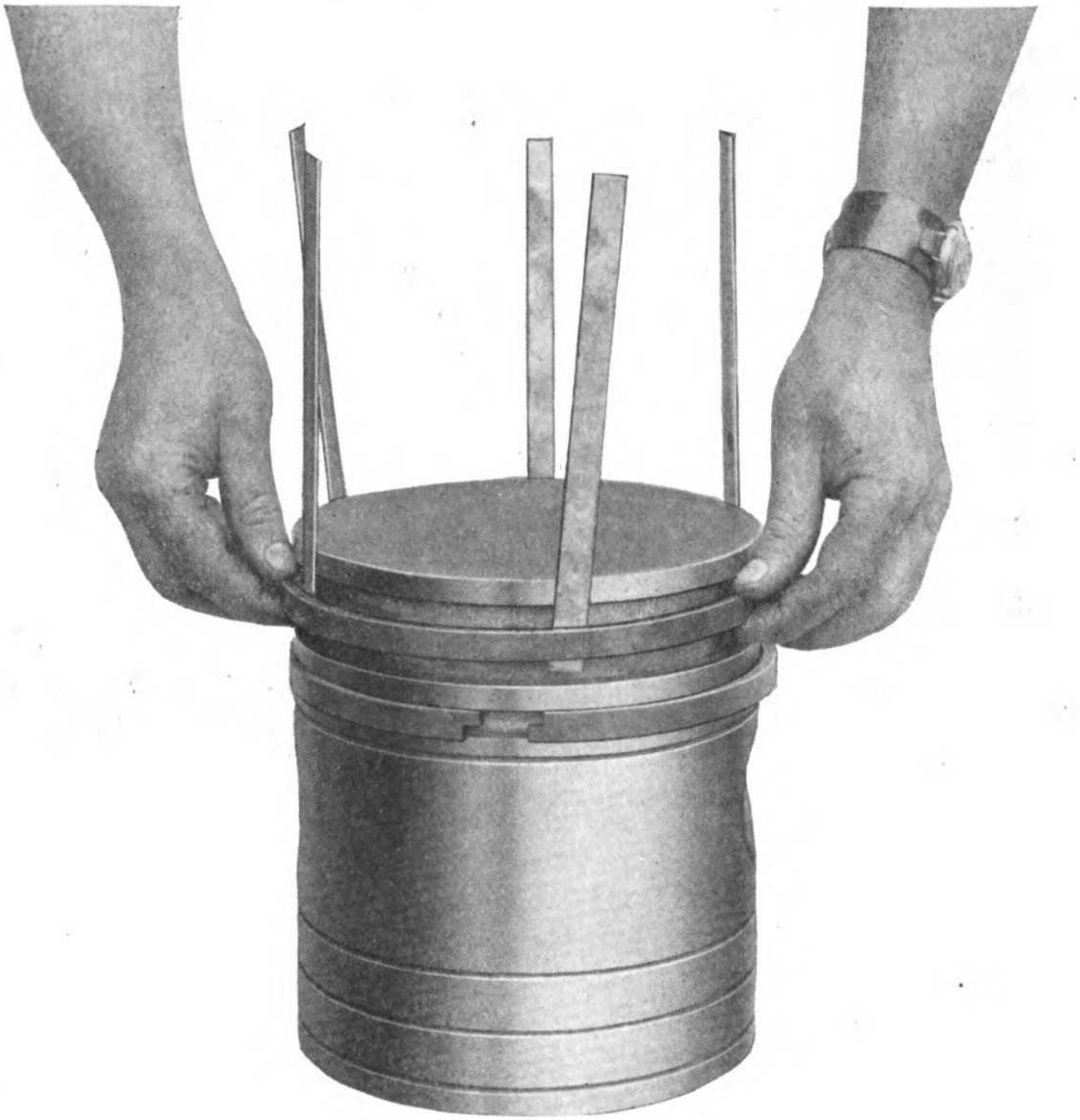
REMOVING RING TOOL.

One of the most convenient tools to have is a piston ring remover, as by its use the piston ring will not be sprung out of round by careless handling or forcing. If removers are not available, three metal guides 0.25 (¼) inch wide, 0.015625 (1/64) inch thick, and about six inches long should be provided. In taking off or replacing piston rings these guides should be placed equally around the piston and underneath the piston ring. In removing rings take off the top first, then the second and third.

In replacing, reverse the order and be careful not to mix the rings, but replace each in the same slot it was taken from.

Place the piston ring in the piston slot to test for freedom of movement horizontally and the correct clearance in the vertical direction.

Plate No. 14.



PUTTING ON PISTON RINGS.

One of the easiest and quickest ways of installing piston rings is here illustrated. Five or six strips of sheet steel, tin or any thin metal is used. Place the ring on the top of the piston ready to slide over the head. Have a helper slip the strips of metal under the ring evenly spaced, as shown. Adjust the metal strips so that their ends are even with the groove into which the particular ring is to be inserted. Then slip the ring down over the strips and it will drop into the groove.

In replacing, be careful not to mix the rings, but replace each in the same slot it was taken from.

Place the piston ring in the piston slot to test for freedom of movement horizontally and the correct clearance in the vertical direction.

Piston rings should be handled carefully and when opened to put on the piston should not be sprung sideways. The piston ring can be easily

sprung so that it will produce a rocking motion when laid on a flat board or bench. It is impossible to fit a rocking or warped piston ring. Piston rings should not be carried indiscriminately with other tools in the tool box. Make provision to carry piston rings separately and stack one on top of the other.

REPLACING PISTON PIN.

The end of the piston pin that carries the hole for the set screw is smaller than the blank end and must be inserted through the hole in the piston opposite the boss carrying the set screw. Piston pins should fit in the piston with a light tapping fit. Always use a bronze or babbitt plug between piston pin and hammer when putting pins into place. In fitting new pistons to piston pins there is always a chance that the operator in the field may get the piston badly out of round by forcing the pin in the piston. Never force a piston pin into piston.

The piston pin bearing (8), Plate 9, is a phosphor-bronze bushing pressed in. This bearing is located at upper end of connecting rod. Two methods can be used for determining looseness in the bearing.

TO DETERMINE LOOSE PISTON PIN BEARING.

First, revolve the crankshaft by the flywheel until the desired piston is at its greatest down position. With a light bar get a "purchase" on the camshaft under the piston, and with one hand on the connecting rod and the thumb extending to the piston. Any movement in the bearing can be felt by the hand. Use pry carefully, observing great care not to injure the bottom edge of the piston.

The best way, however, to determine looseness in the bearing is to remove the pistons and connecting rods from the cylinders, wash the under side of the piston with kerosene, set piston on head and rock the connecting rod sideways. The piston pin bearing can "float" about 0.1875 ($\frac{3}{16}$) inch endwise on the piston pin.

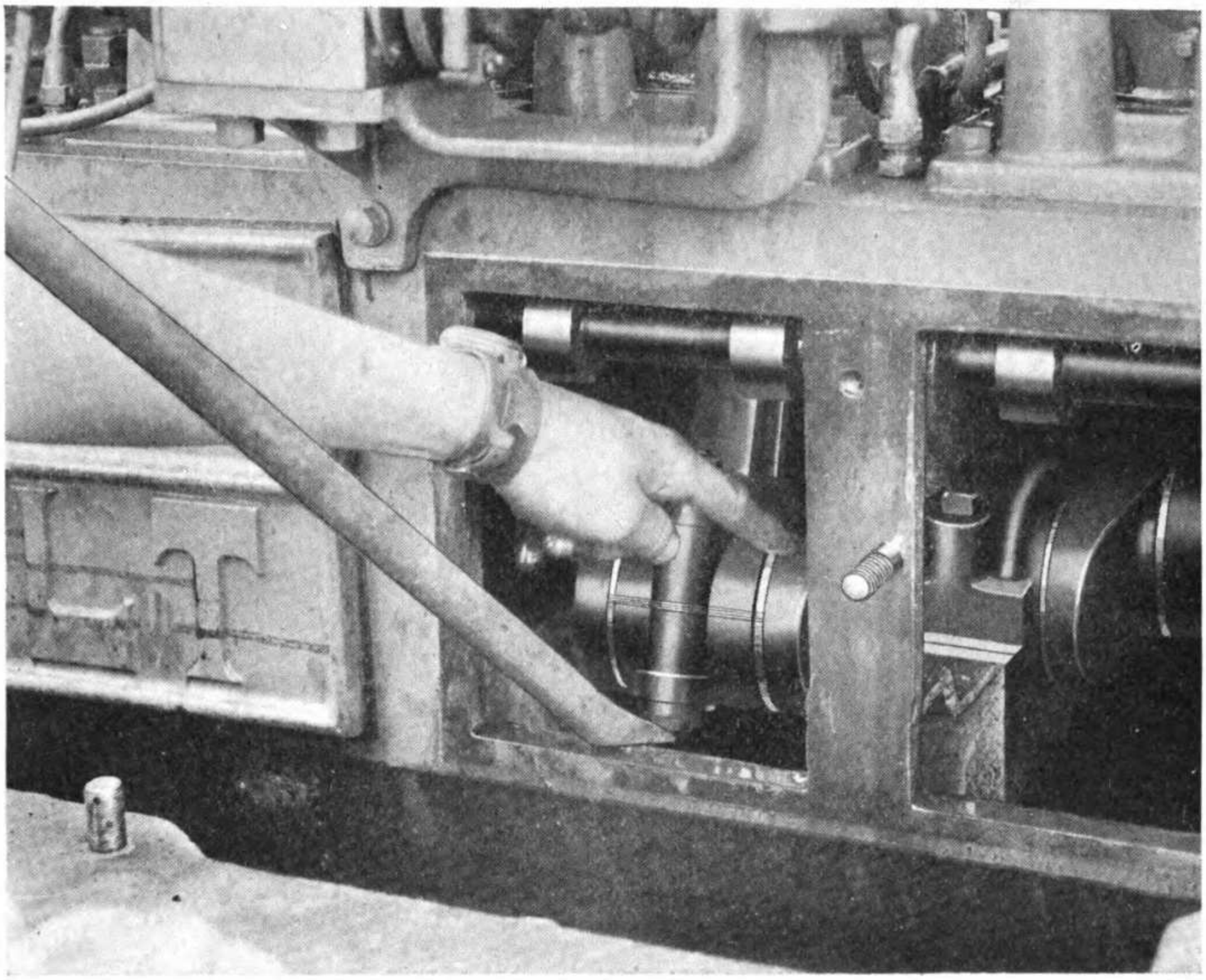
WHEN TO TEST BEARINGS.

The bearings of an engine should be tested when the engine is warm. The operating temperature has then expanded the various parts and the oil film is thinned to the condition under which it has to work. A bearing tested when the engine is cold can have a good deal of play taken up by the thickened oil film, and an accurate determination of loose bearings cannot be made. The bearings of an engine using the force feed system must be maintainel tighter than an engine using the splash feed system. A loose bearing will allow undue escape of oil which will cause the pressure on the rest of the bearings to fall and possibly cause lubrication failure at some point.

TESTING CONNECTING ROD BEARING.

The crankpin bearing is commonly called the connecting rod bearing. This bearing is located in the lower end of the connecting rod. The method of testing is shown in Plate 15. There must be absolutely no vertical movement. The bearing fit, however, must be such that the

Plate No. 15.



TESTING CONNECTING ROD BEARINGS.

Remove the crankcase door and turn the flywheel until the bearing to be tested is at a point nearest the door. Place a bar under the connected rod bearing, using the bottom of the crankcase door as a fulcrum and with a finger placed partly on the top of the bearing and partly on the web of the crankshaft, as shown, move the bar up and down. If the bearing has any looseness, it will readily be felt by this method.

bearing can be moved sideways the thickness of a crankpin bearing shim, or 0.012 of an inch.

FITTING CONNECTING ROD BEARINGS.

Remove the spark plugs to release compression, blue the crankpin with a thin film of color, insert piston in the cylinder and mount the upper

half of the connecting rod bearing on the crankpin and revolve crankshaft slowly. Remove connecting rod and piston, scrape all high spots and continue blueing and scraping until a majority of the bearing shows solid blue. Give relief to edges of bearings about 0.375 (3/8) of an inch down where the two halves of the bearing meet. When the upper half of bearing has been accurately spotted and scraped, place an equal number of shims on each side of the bearing and bring the lower half of the bearing into place by tightening on the connecting rod nuts, and fit cap by spotting and scraping as above outlined. The fit on both the connecting rod bearings and the main bearings must be very close in order that undue escape of oil at one bearing, which will cause a drop of pressure throughout entire system, may be avoided.

One side of each connecting rod and cap contains the same figure on the upper and lower half as 1/1, 2/2, 3/3, 4/4. Always have these numbers on the same side, as the lower part of the bearing will match in the way that it was sawed from the original drop forging, and the connecting rod bolt holes will always line up. When one connecting rod bearing has been satisfactorily scraped in and bolted to the final fit, slack off on the connecting rod bolts and proceed to the next connecting rod. It is not possible to scrape a connecting rod bearing properly without having the piston in the cylinder, as the bearing must be blued and scraped so that the piston will be squared in the cylinder.

TESTING CRANKSHAFT BEARINGS.

To test the crankshaft bearings insert a heavy pinch bar under the crankshaft close to the bearing to be tried, and using the crankcase as a fulcrum try to move the crankshaft vertically in its bearings by prying. One hand should be partly on the bearing and partly on the crankcase web to detect motion, while using the other hand to operate the bar. The least movement in the bearing can be felt. See Plate 15.

SCRAPING IN MAIN BEARINGS.

Bedding or scraping in the crankshaft may be divided into two operations:

First, bedding the main bearings, in crankcase cradles.

Second, bedding the crankshaft in the main bearings.

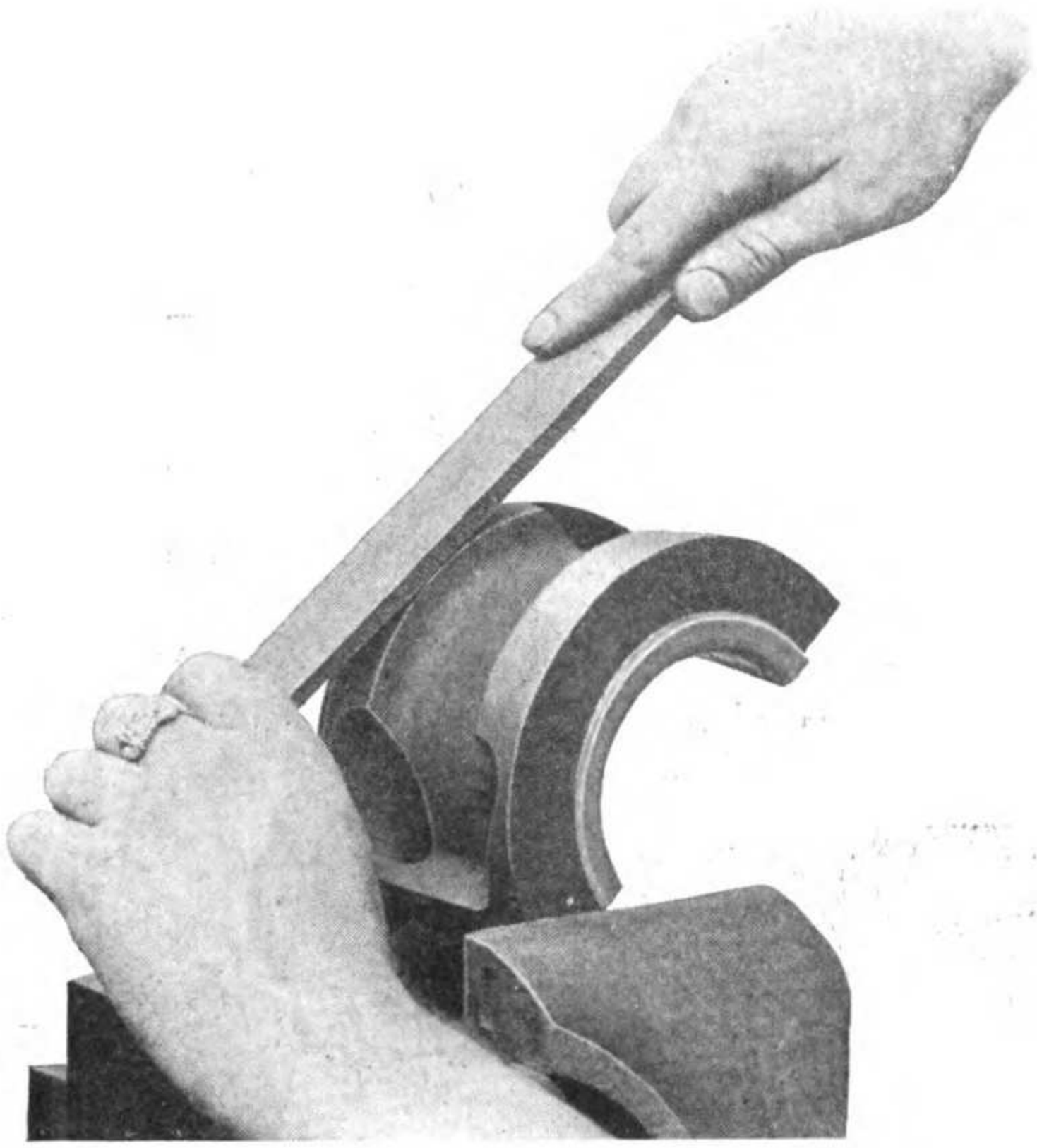
Assuming that crankshaft has not been placed in engine.

(*a*) Blue one end of crankshaft bearing and rotate the babbitted parts of all the lower halves on the crankshaft and scrape to remove high spots. This fitting is not final, but is the starting point for fitting the lower halves.

(*b*) Clean crankcase cradle thoroughly, then blue entire crankcase cradle surface.

(*c*) Put bottom half of main bearing that is to work in that particular

Plate No. 16.



FITTING CAST-IRON BACK OF BEARING.

cradle in place, rock back and forth a few times, then remove lower half from cradle and examine cast iron back of bearing for high spots.

(*d*) Remove any high spots with a fine mill file and continue fitting on back until a perfect seat is secured. *This is important.* See Plate 16.

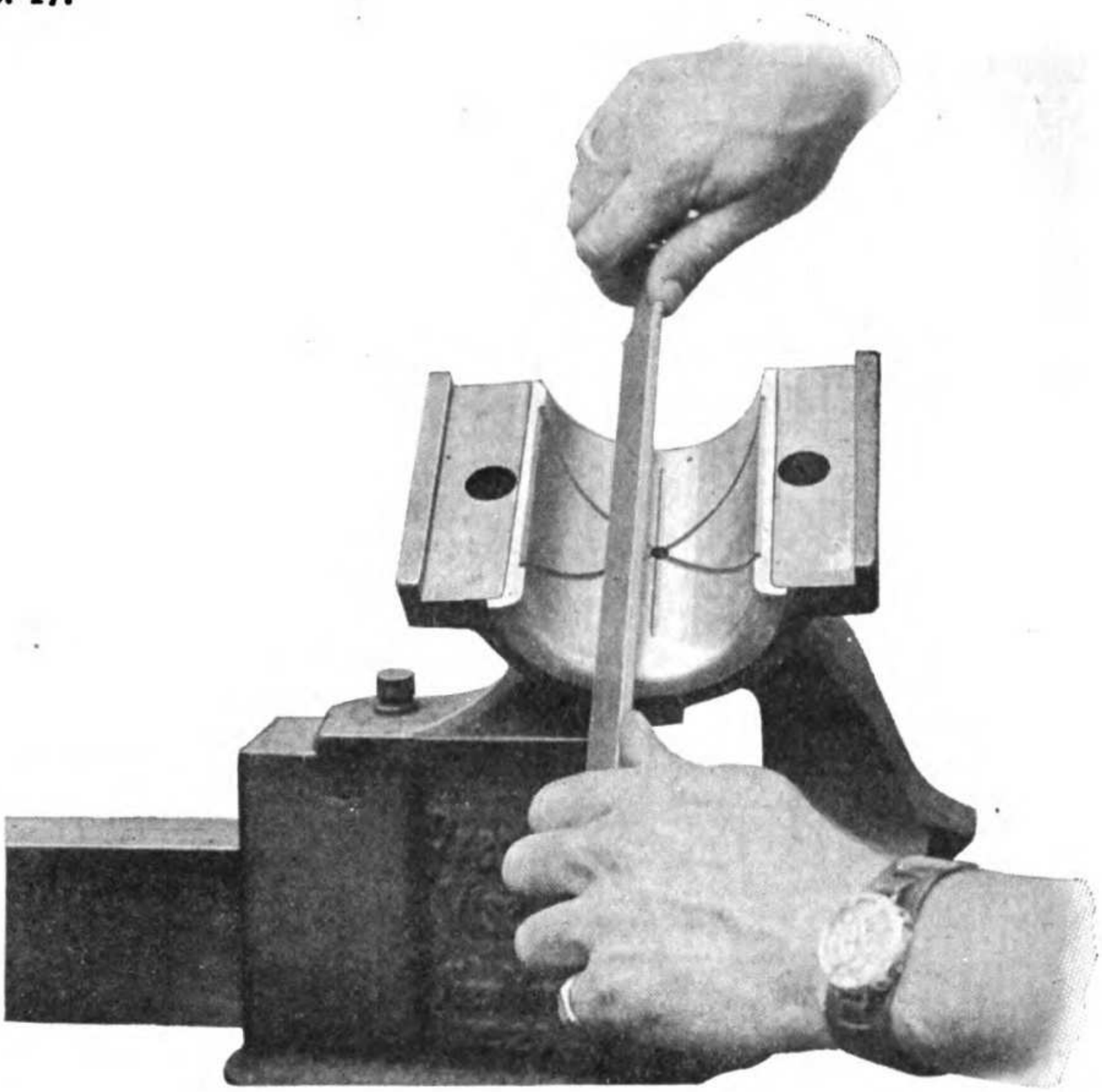
(*e*) After all backs of main bearings have been fitted to crankcase cradles, insert crankshaft which had previously been blued on every main bearing and revolve crankshaft on bottom halves.

(*f*) Either lift up and block crankshaft or remove bottom half bearing by rotating around crankshaft, and scrape all high bearings until they are on line. Never shim up under a low bearing but scrape all high bearings down to a level.

(*g*) Give relief to ends of babbitt in bearing so that the crankshaft can float endwise the thickness of a shim out of the connecting rod bearing 0.012 (twelve thousandths) of an inch. Use a curved babbitt scraper to fit inside edge of fillet of crankshaft. Use a flat babbitt scraper to work on inside of bearing. See Plates 17 and 18.

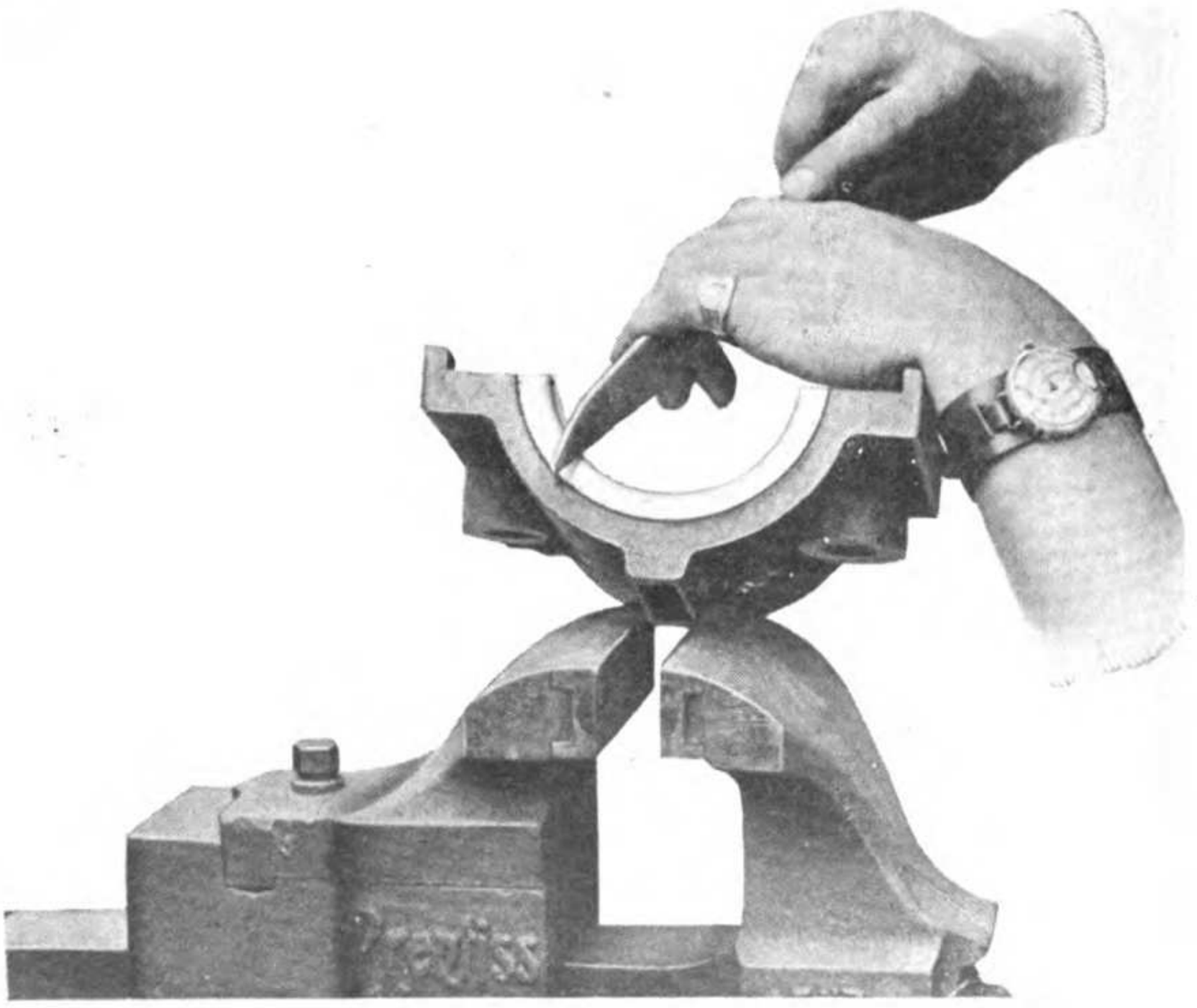
Use a file, applying it level on top of the bottom half of the bearing to bring babbitt down to the level of the cast-iron back of bearing. Give the upper edge of bearing 0.375 (3/8) inch of babbitted surface relief, so that

Plate No. 17.



USING FLAT SCRAPER.

Plate No. 18.



SCRAPING BEARING FILLET.

when pressure is applied to shims the pressure will not be transferred to the babbitt and pinch the crankshaft at the point where the two halves of the bearing meet.

The crankshaft bedding operation has to be accurately done as all the strains are transmitted to the bottom bearing and if one bearing is lower than the others there will be a weave and strain on the crankshaft that will start crystallization and ultimately result in a broken crankshaft.

SHIMMING BEARINGS.

After the bottom bearings have been fitted:

(*a*) Put the bearing bolts into place.

(*b*) Blue the crankshaft.

(*c*) Insert an equal number of shims on each side of the bearing—usually, seven to nine.

(*d*) Bolt down cap lightly, revolve crankshaft.

(*e*) Remove and scrape the cap as before outlined until the bearing surface throughout shows a good seat.

(*f*) Slack off the bearing cap when fitted and proceed to next cap.

(*g*) Slack off the caps as they are fitted so that determination of fit can be made by revolving the crankshaft for the bearing cap that is being worked on.

If the fit is too snug when the bearing caps are all fitted, the final fit is then a matter of inserting shims, always being sure to have an equal number of shims on each side of the bearing.

SHIM DIMENSIONS.

The standard thickness of a shim or liner in the connecting rod and main bearings is 0.012 (twelve thousandths) of an inch. When a bearing is loose and requires the removal of shims to take up the wear, do not remove one shim from one side of the bearing only, but a shim from each side of the bearing. If a shim is removed from each side of a bearing the adjustment of the wearing surfaces of the bearing and the shaft is not altered.

In taking play out of a bearing, removal of a single shim 0.012 (twelve thousandths) of an inch thick may prove too much and the bearing will be too tight. Usually every bearing contains a brass liner 0.005 (five thousandths) of an inch thick which should be carefully preserved when removed from the bearing and used in making close adjustments. If no other means are at hand to get close adjustment a shim cut to shape out of a piece of good tough writing paper can be used. A good grade of writing paper will usually be between 0.003 (three thousandths) and 0.004 (four thousandths) of an inch thick.

CAUSE OF EXCESSIVE WEAR.

If the lower connecting rod or crankpin bearing, and the crankshaft bearings require frequent adjustment it indicates that some cutting compound is at work and a lack of correct care of the crankcase oil supply. Always wipe the crankcase doors clean before removing. Rinse all tools with gasoline before using in crankcase, and have sleeves rolled up. Keeping the crankcase oil supply scrupulously clean means a minimum of bearing trouble and adjustment.

BEARING SCRAPERS.

The best babbitt scraper for crankshaft and connecting rod bearings can be made out of a large mill file which has been hollow ground on one side, one edge brought to a straight edge and a small hollow grinding placed on the thin edge to make a rapid cutting tool. A file is made of very hard material and the grinding is a little difficult.

In using the babbitt scraper on the bearing, take a light firm cut from one edge of the bearing to the other.

REMOVING CRANKSHAFT.

To remove the crankshaft from the engine it will be necessary to:

(*a*) Drain the water from the cooling system.

(*b*) Disconnect the hose (5), Plate 7, between the radiator and water manifold of cylinders and,

(*c*) Remove the radiator.

(*d*) Next displace the fan and

(*e*) Water pump drive pulley,

(*f*) The timing gears and gear housing,

(*g*) Master clutch and

(*h*) Flywheel.

The pistons, connecting rods (see Plate 13), main bearing caps and bolts and oil pump will have to be removed before taking out the crankshaft. In reassembling reverse the order.

REMOVING CAMSHAFT.

The camshaft (53), Plate 9, camshaft bearing assembly timing gear end (54), camshaft bearing assembly flywheel end (12), are removed as a unit. This is accomplished by displacing the radiator, fan, valve tappet assembly, removing the key of timing gear and gear, loosening the three cap screws locked by wire on the triangular plate on the timing gear case or housing, and screws retaining bearings.

This triangular member carries a felt washer.

Remove crankshaft timing gear, magneto gear and timing gear case.

Next displace the governor as a unit and drive out camshaft bearing assemblies (54) and (12), Plate 9, from the inside.

The camshaft assembly can now be moved out through the front end of the crankcase. The camshaft bearing assemblies within the crankcase can be readily loosened after the end camshaft assemblies have been driven out.

WASHING CRANKCASE.

The crankcase of the engine should be washed at regular intervals, usually not less than once every two weeks. Drain all oil from the oil reservoir, remove side plates on one side of engine, and with a squirt gun or dipper wash sides of crankcase allowing kerosene to drain into oil reservoir. With a piece of clean soft canvas or other cloth that does not give off lint, wipe out kerosene on each side of the tunnel in bottom of crankcase. Do not wipe sides of crankcase, thus minimizing chances of getting lint in oil. Wipe out bottom of oil reservoir, replace hand plate cover and fill system with new oil.

VALVE GRINDING.

To grind the valves:

(*a*) Remove the cylinder head and

(*b*) Compress each spring sufficiently to remove the clip that holds it on to the valve stem.

(*c*) Make note of order of removing valves and springs so that they may be reassembled in their proper position or order.

An effective valve grinding tool can be made by forging a bit to fit the slot in the valve head and work in the socket of a brace. This method is much to be preferred over using a screw driver.

A valve grinding tool that can be quickly improvised is a small cut washer inserted in the socket of a brace.

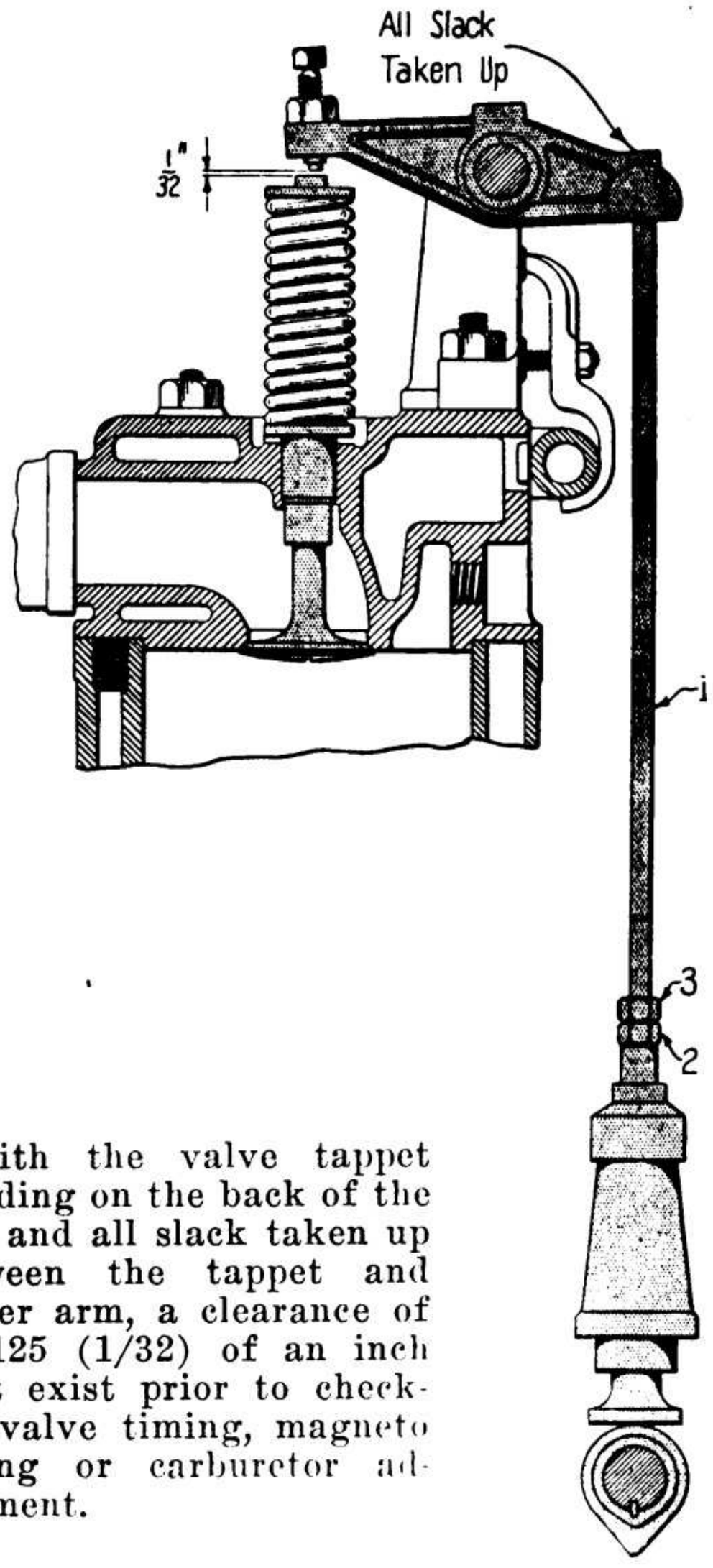
(*d*) Use carborundum powder mixed into a paste with cup grease, or use a reliable valve grinding compound. If the valve or valve seat is pitted badly use a coarse compound first, finishing with a fine compound. In grinding valves do not use a circular motion. Grind valves with a back and forth motion, turning about one-quarter of the way around, then lift the valve off its seat and bring it about one-quarter of a turn toward the right, seat valve and grind as before. Continue this stepping the valve around, so that all the high spots will come in contact with each other, until the valve is ground to an even seat. To watch the progress of the work wash the valve and valve seat with kerosene.

(*e*) When the grinding is finished flush the valve stem, valve stem guide, valve seat and cylinder head thoroughly with kerosene to remove all traces of grinding compound. Never allow the least trace of any grinding compound to get into the cylinders.

TESTING VALVE SEAT.

With a soft lead pencil make six or eight marks at regular intervals around the valve seat, drawing the pencil from the inner edge of the valve seat to the outer edge in a straight line. Place valve on seat and rotate in a circular direction several times. If the valve and seat are evenly ground all the lead pencil marks will be removed. If part of the lines remain it indicates that the valve seat and valve are still uneven and grinding must be continued until the lead pencil marks are removed.

Plate No. 19.



With the valve tappet standing on the back of the cam and all slack taken up between the tappet and rocker arm, a clearance of 0.03125 (1/32) of an inch must exist prior to checking valve timing, magneto timing or carburetor adjustment.

VALVE ADJUSTMENT.

Provision is made for compensating of the wear of the valve stem and rocker arm. The valve rod, Plate 19 (1), is threaded to take an adjustable hexagonal nut (2), which is prevented from turning by a lock nut (3). Loosening the lock nut permits of screwing the adjusting

nut up or down decreasing or increasing the length of the valve rod and consequently the space between the rocker arm and valve stem.

REPLACING VALVE STEM GUIDE.

The valve stem guide, which is the part subjected to wear, can be readily removed by driving it out of the cylinder head and a new one can then be inserted. A worn intake valve stem guide can admit air to the mixture after it has passed the carburetor and give trouble by producing an over-lean mixture.

TIMING THE VALVES.

(*a*) Before starting to time the valves be sure that a clearance of 0.03125 (1/32) of an inch exists between the rocker arm and the valve stem with the valve tappet standing on the back of the cam.

(*b*) Place piston in cylinder next to the radiator on top center.

(*c*) Rotate camshaft by means of governor in the direction opposite to the rotation of the flywheel so that the exhaust cam operates the exhaust valve.

(*d*) Continue turning the camshaft until exhaust valve has been entirely opened and until almost closed, having but slight compression on the exhaust valve tappet.

(*e*) Line up keyway in camshaft and camshaft gear.

(*f*) Mesh camshaft timing gear and insert key.

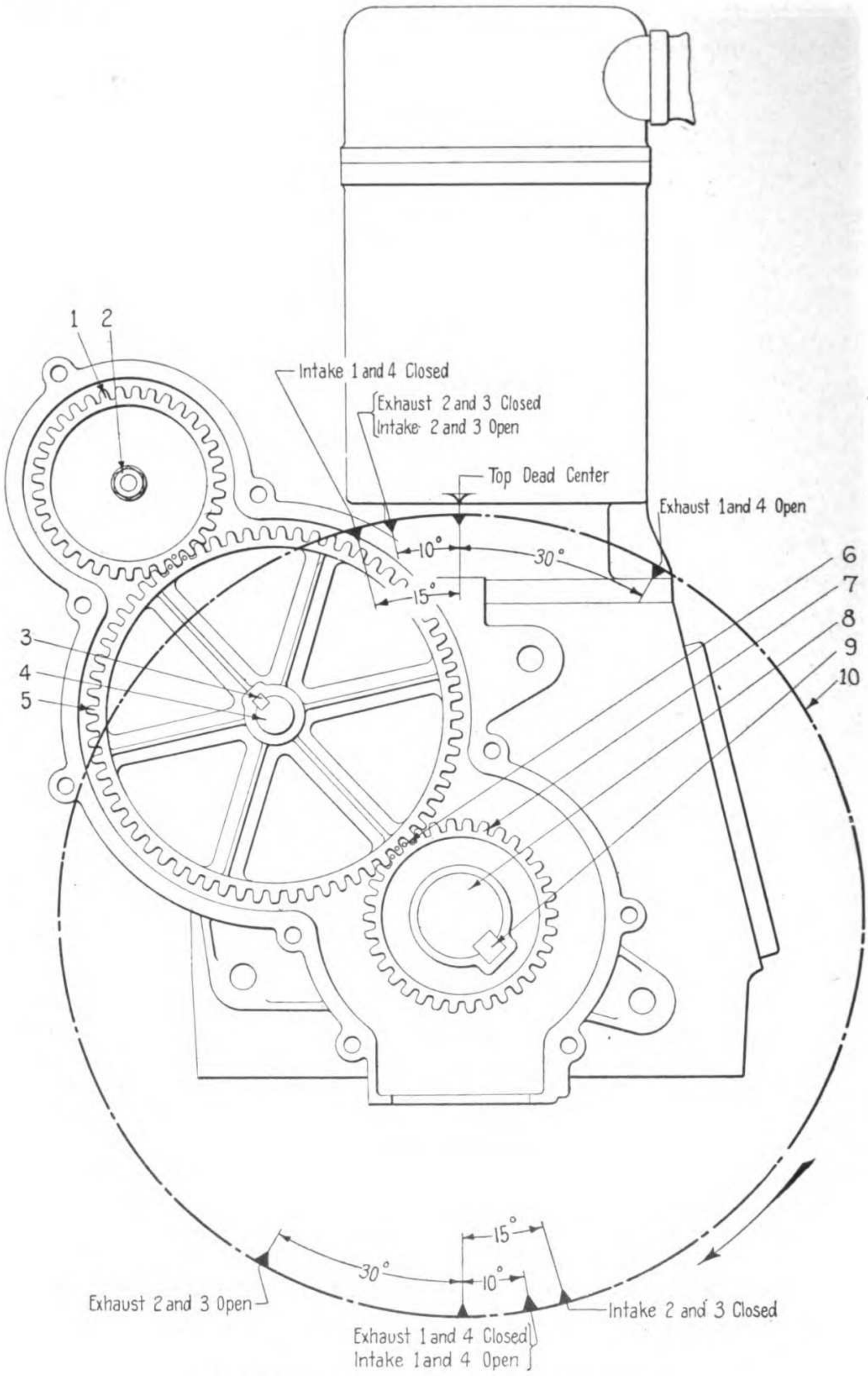
In replacing the camshaft with its gear it is a simple matter to retime the valves if the crankshaft gear and camshaft gear be marked. A tooth of either the camshaft or camshaft gear will be prick punched and this tooth should be meshed between two similarly marked teeth on the other gear.

(*g*) Rotating the crankshaft five degrees past top center should give the rocker arm its full 0.03125 ($\frac{1}{32}$) inch clearance over the exhaust valve stem. The operation of entirely opening and closing exhaust valve insures tappet resting on correct side of cam when gears are meshed. No attention is paid to inlet valve in timing engine except to have rocker arm clearances correct.

The crankshaft gear has 34 teeth, is of steel, is 6 inches in diameter and has a 1.5 (1½) inch face. The keyway is 0.75 by 0.375 (¾ by ⅜) inch.

The camshaft gear has sixty-eight teeth, is 11.66 inches overall diameter, has a 1.5 (1½) inch face and a keyway 0.375 by 0.1875 (⅜ by $\frac{3}{16}$) inch. This gear makes one complete revolution to two of the crankshaft or driving gear.

Plate No. 20.



TIMING GEARS AND FLYWHEEL.

The valves may be timed by observing the flywheel marks, these consisting of letters and figures. For example: the opening of the intake valve is indicated by "IN 1 & 4 OP," meaning that either the No. 1 or No. 4 intake valve should begin to open when the mark corresponds with the indicator or pointer (25), Plate 7, attached to the crankcase: marks "IN 1 & 4 CL" indicate the time of closing of the intake valves. Similarly, "EX 1 & 4 CL" indicates the closing point of the exhaust valves of the No. 1 and No. 4 cylinders. The openings of all valves, intake and exhaust, can be checked by the flywheel marks, as shown by Plate 20.

REMOVING OIL PUMP.

To remove oil pump:

(*a*) Drain oil from reservoir and crankcase.

(*b*) Remove oil reservoir, Plate 9 (30), from bottom of crankcase by taking out four machine bolts.

(*c*) Drive out two taper pins holding spiral gear and collar at upper end of pump shaft inside crankcase.

(*d*) Remove the two 0.5 (½) inch cap screws holding pump body to bottom of crankcase and pump and shaft complete can be removed by dropping down.

(*e*) The oil pump can be completely disassembled for cleaning and inspection.

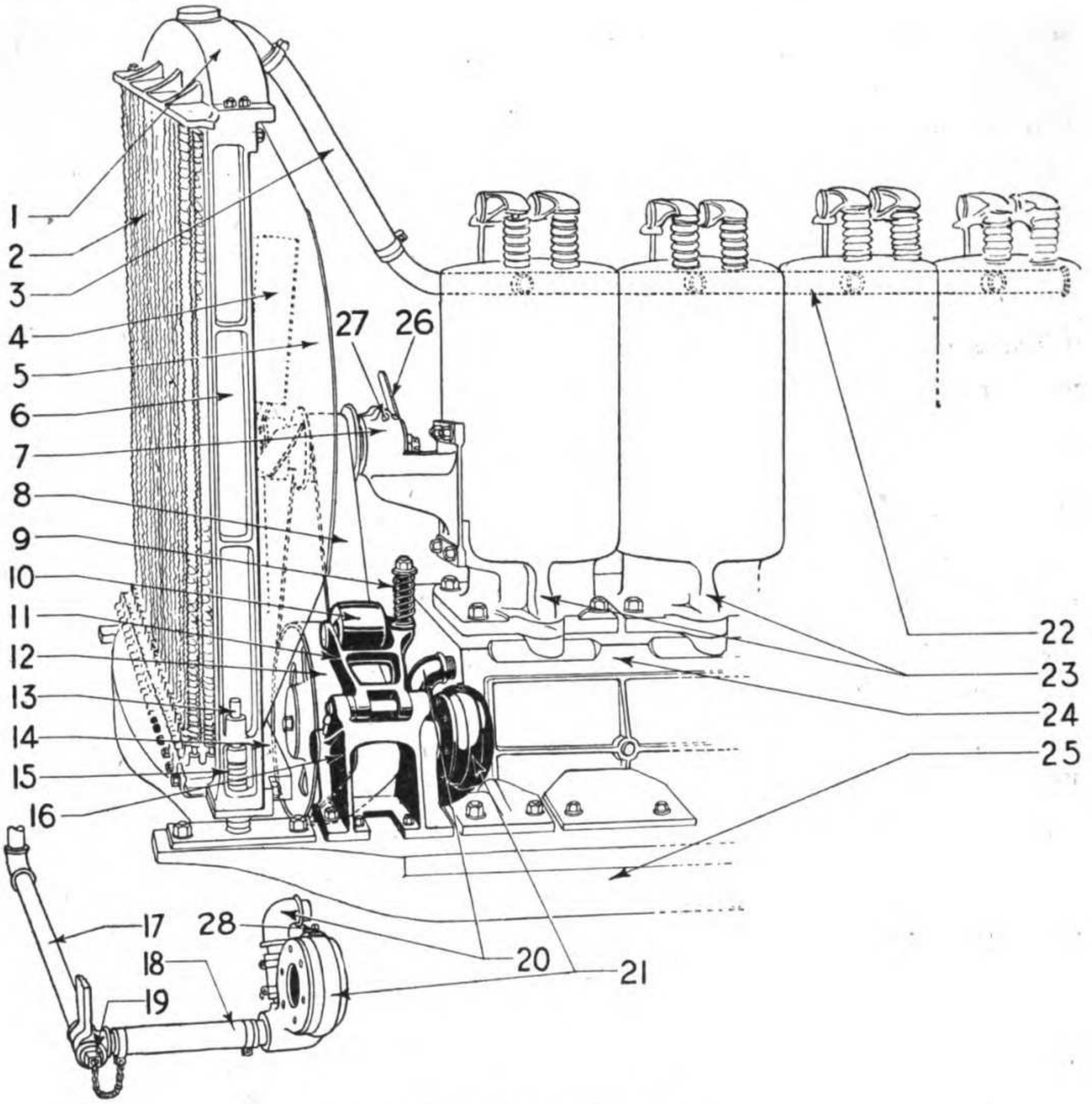
REPLACING OIL PUMP.

In replacing oil pump body, insert pump shaft far enough up in crankcase to put on spiral gear and collar, bring spiral gear into position on shaft so that the holes in the gear and shaft correspond, drive in taper pin, fit holes in collar in like manner and then insert upper end of pump shaft into socket, mesh spiral gear with camshaft gear and replace the 0.5 (½) inch cap screws in pump.

TIMING GEARS.

Ref. No.	Part No.	Name of Part.
1	ZH20	Magneto gear.
2	M2018	Magneto shaft nut.
3	M11527	Camshaft gib key.
4	M10664	Camshaft (built up type).
5	102293	Camshaft gear.
6		Timing gear punch marks.
7	M11497	Timing gear.
8	M11101	Crankshaft.
9	M11443	Crankshaft gear taper key.
10	Z683	Flywheel.

Plate No. 21.



COOLING SYSTEM.

Ref. No.	Part No.	Name of Part.
1	6979	Upper header.
2	6827	Tube.
3	7644	Hose.
4	7032	Fan.
5	6991	Fan housing.
6	6826	Column.
7	6983	Fan bracket.
8	8968	Fan belt.
9	2151	Idler spring.
10	10297	Idler pulley.
11	8912	Idler pulley yoke.
12	Z715	Crankshaft pulley.
13	6823	Radiator foot.
14	5551	Lower header.
15	4505	Supporting spring.
16	8947	Water pump bracket.
17	9981	Pipe.
18	7645	Hose.
19	3142	Pipe plug.
20	54301	Elbow (inlet).
21	8911	Waterpump casing.
22	AM1362	Water manifold (outlet).
23		Water passage.
24		Crankcase.
25	6992 or 9844	Main frame.
26	6988	Fan hub eccentric handle
27	6980	Eccentric clamping screw.
28	56421	Plug pipe.

COOLING SYSTEM.

WATER CIRCULATION.

The engine is cooled by water assisted by a fan (4), Plate 21, and the water is circulated by means of a centrifugal pump (21), which is driven by the belt (8) driving the fan. The water is drawn from the bottom of the radiator by the pump and forced through a water passage (24) cast integral in the upper half of the crankcase, thence through water passages (23) in the cylinders and water jackets to the outlet water manifold (22) which is connected to the radiator by rubber hose (3).

FAN.

The fan (4) is of the four-blade type and is driven by 3-inch flat belt (8) the tension of which is maintained and regulated by an idler puller spring (9), on the idler pulley yoke (11), which carries the leather-covered idler pulley (10). The belt runs over an upper and lower pulley and the lower pulley (12) is the driving pulley, as it is mounted on an extension of the crankshaft.

CENTRIFUGAL WATER PUMP.

The centrifugal water pump (21) is located on the left side of the engine and is driven by the fan belt (8), an idler pulley being mounted on the pump shaft in the bracket (16) which is bolted to the frame (25). The pump is cast iron and a brass gland is utilized. The pump has a 1.375 (1⅜) inch outlet and inlet. Connection with the water passages (23) is by a 1.5 (1½) inch hose and elbow (20) and nipple.

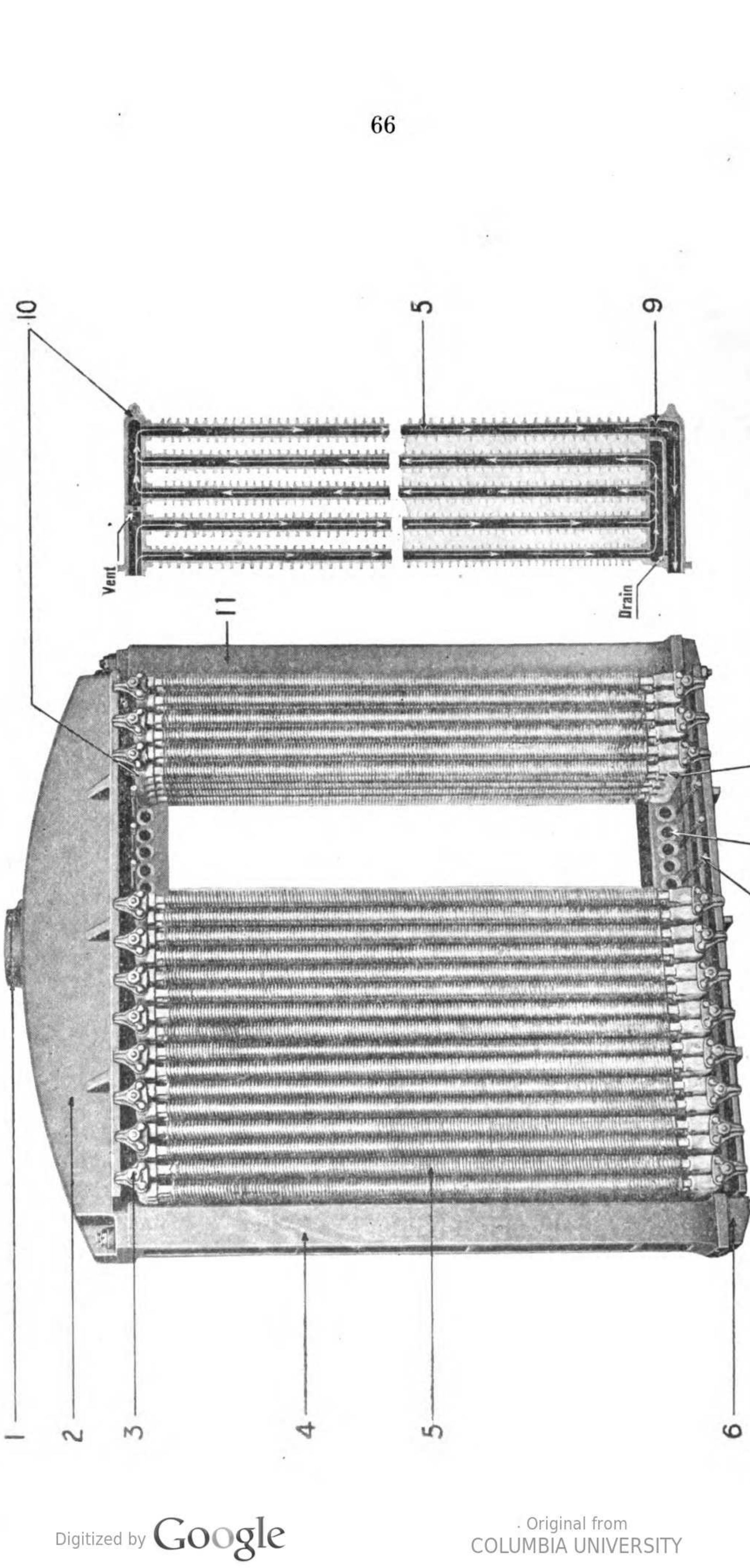
RADIATOR.

The radiator comprises twenty-eight sections, each section containing five tubes or a radiator section assembly (10), Plate 22. The radiator sections are mounted on upper (2) and lower (6) headers and the joints are made water-tight by gaskets (8). The radiator tubes (5) are retained in pairs in the upper and lower headers by section header clamps (3) on studs, and the clamps are secured by nuts. In case of damage to any tube an entire section may be replaced as described under "Assembling Radiator."

RADIATOR SUSPENSION.

The upper and lower headers are supported and the correct distance and alignment preserved by right (4) and left (11) columns each having a foot or extension, also a foot stud (13), Plate 21, on which is mounted two supporting springs (15), Plate 21. These springs compensate for upward and downward thrust of the columns as well as absorb shocks.

Plate No. 22.



RADIATOR, SHOWING SECTIONAL CONSTRUCTION.

RADIATOR WATER CIRCULATION.

The water supply is introduced by displacing the filler cap, Plate 22 (1). The water flows from the upper header (2) down the first two tubes, up the next two and down the last tube, passing out of the radiator through a 1.25 (1¼) inch pipe (17), Plate 21, and 1.5 (1½) inch hose (18) to the pump, to the water jackets and thence back to the top of the radiator.

DRAINING RADIATOR.

A baffle is located between the second and third tubes where the section header joins the radiator header. This causes the water to flow down. A small vent hole is drilled in each baffle affording admission of air to the top of the tubes, preventing vacuum and insuring complete drainage. A small hole is drilled at right angles in the baffle dividing the section header (9), Plate 22, in half lengthwise permitting of completely draining the tube.

The water can be drained from the cooling system by removing the plug (19), Plate 21, from the drain pipe hanger. In order that the pump be thoroughly drained it is important that the plug (28) in the pump housing (21) be removed else a vacuum is likely to retain a portion of the water in the pump. The engine should be cranked several times after draining to make sure all water is displaced from the pump.

LUBRICATION OF WATER PUMP.

Lubrication of the water circulating water pump shaft is by two grease cups supplying lubricant to the bushings in which the pump shaft rotates.

RADIATOR.

Ref. No.	Part No.	Name of Part.
1	7028	Radiator filler cap.
2	6979	Radiator header, upper.
3	1342	Radiator section header
4	6825	Radiator column, right.
5	6827	Radiator section tube.
6	5551	Radiator header, lower.
7	3817	Radiator section header
8		Radiator section header
9		Radiator section header,
10	3813	Radiator section header,
11	6826	Radiator column, left.

REPACKING WATER PUMP.

The water pump brass gland (or stuffing box) should be packed with round, graphited packing which should be wound in the direction the pump shaft rotates to avoid the possibility of unwinding. If the standard packing be not available, loose twisted asbestos packing can be utilized or candle wicking braided. It is important that the material be thoroughly saturated with oil and covered with graphite. If only square packing of too large a size be available, cut off a piece of the desired length, place it between the jaws of a bench vise, squeeze out flat, and then cut off a strip of the desired length and width.

THAWING FROZEN PUMP.

During cold weather, after an engine has been stopped for a sufficient period to permit any water in the cooling system to freeze, the engine should not be cranked until it is ascertained that no water has collected in the water pump, and frozen the pump rotor to the pump housing. The pump may be warmed with a gasoline blow torch, hot water or cloths soaked with gasoline may be applied to the pump and lighted to thaw the ice. The use of an open fire is not recommended as it is dangerous and is suggested only as an emergency measure.

TO AVOID FREEZING COOLING WATER.

To avoid freezing in winter, drain when not in use or use an anti-freezing solution, also cover the radiator with canvas curtain provided. There is a square hole in curtain to admit some air.

ADJUSTMENT OF FAN BELT.

The fan will not be driven at a proper rate of speed if the belt tension be insufficient or if the belt be oily or greasy. The tension of the belt (8), Plate 21, may be adjusted by means of an eccentric mounted in the bracket (7). The eccentric is operated by a handle (26) and the eccentric is locked by a cap screw (27) in the bracket (7). The fan hub or upper pulley bearing is lubricated by means of a ball check oiler. The idler yoke pulley (10) is lubricated by a grease cup.

Note.—Moisture causes a belt to shrink with a consequent increase in the tension of the belt. The increase in the tension of the belt is largely responsible for breakage of fan belts or tearing out of lacing. When the tractor is exposed to the weather the belt should be loosened at the end of a run and tightened up again when the tractor is placed in operation. This will eliminate the majority of fan belt troubles.

REPAIRS TO FAN BELT.

If fan belt will not run true on center of pulleys, the trouble may be

due to two causes: the fan belt may not be cut square on the ends where laced together or either the fan pulley or water pump pulley may not be properly aligned with the crankshaft pulley.

If the fan felt is not laced squarely the belt must be cut square on each end and relaced.

If fan pulley is out of line, the bracket which holds fan assembly on the front cylinder of engine may be loosened up and shims inserted under one end or the other until proper alignment is secured.

The water pump pulley may be lined up in same manner by placing shims between water pump bracket and main frame of tractor.

FIELD REPAIRS TO RADIATOR.

ASSEMBLING RADIATOR.

In replacing radiator sections on the upper and lower header, care must be taken to use new gaskets or ones in good condition. If the gasket is not punched, lay a strip of the gasket material over the header and outline the holes by tapping with a ball pein hammer, being careful not to cut the gasket material in two, and allow part to enter the header. Remove material and complete cutting of openings with a knife.

In replacing radiator tubes, which are clamped in pairs to the upper and lower headers by header clamps (3), Plate 22, and after the nuts on the studs running through the clamps have been tightened, it is advisable to hit the clamps a light blow with a hammer over each section header. This will seat the header firmly and tighten the clamp.

SOLDERING TUBES.

The upper and lower section header where the tubes fit in are "tinned" as are the end of the tubes. In replacing a damaged tube with a new one care must be taken to maintain the proper distance between the upper and lower section headers. After inserting tube, heat one side of the section header and bottom of tube wtih the flame of a blow torch, until the solder begins to run, making a "sweat" joint. Repeat the operation on the other side of the header and tube. Care must be taken not to so heat the parts first soldered that the solder will be melted. Next give the parts a coating of acid and with the torch melt solder, preferably wire solder, sufficiently to fill completely the area between the tube and the header. Do not use a soldering iron.

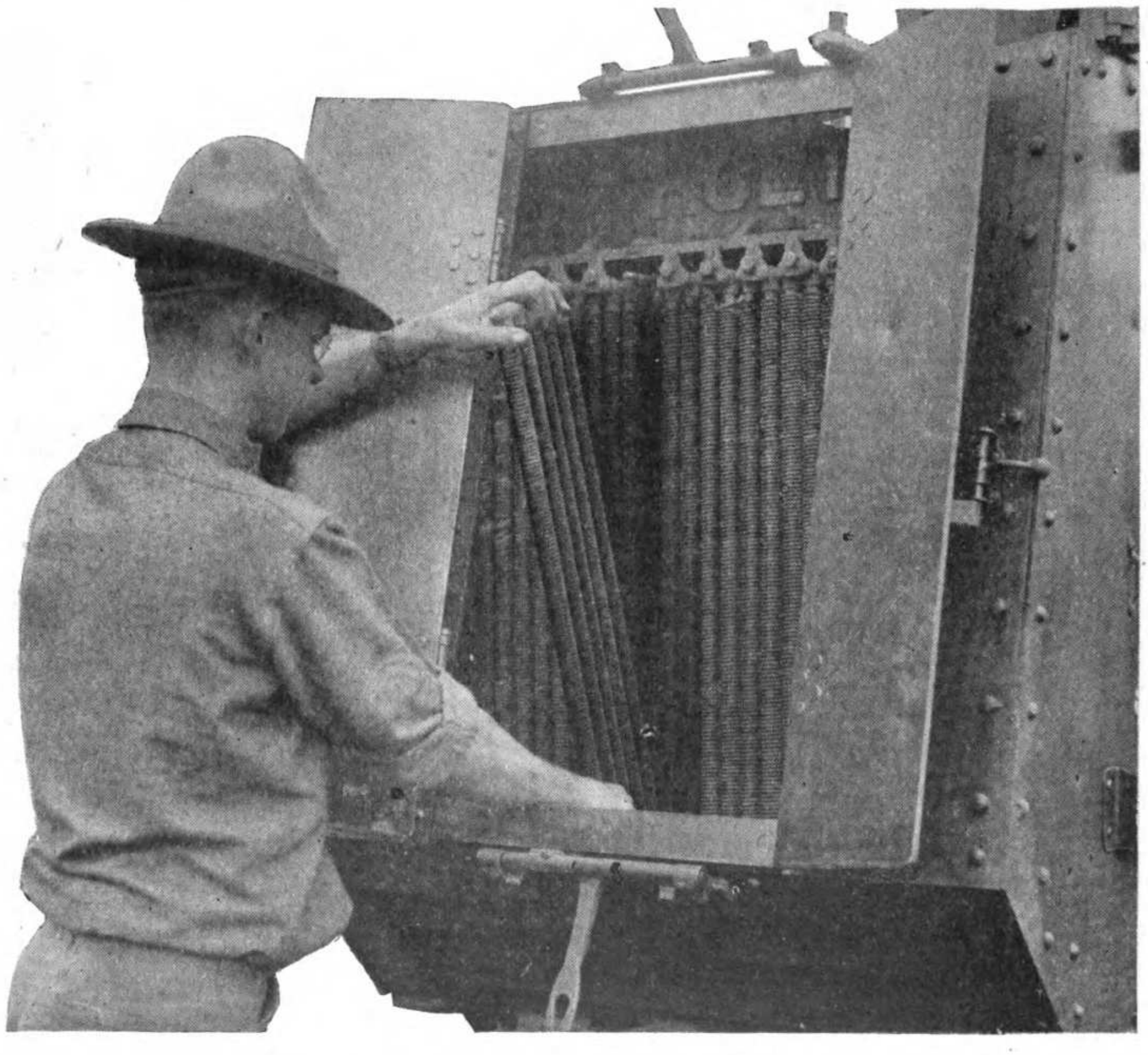
If the header and tube have not been "tinned" prepare a solution of commercial muriatic acid and zinc, adding shavings or small pieces of the latter to the acid until it ceases to give off bubbles. Dip the parts in the solution, then into melted solder, allowing them to remain until all old solder is melted and the part is covered with a bright coating. Wipe all excess solder away with cloth and leave a bright even surface, otherwise the tube will not fit the header.

The upper and lower section headers where the tube fits should be tinned by dipping the header with the holes down about 0.5 (½) inch in the melted solder.

EMERGENCY REPAIRS TO RADIATOR.

In case the radiator develops a leak in one or two sections, and no means are at hand for properly repairing, the sections may be plugged temporarily.

Plate No. 23.



REMOVING RADIATOR SECTION.

To make emergency repair to a damaged radiator section—

First: Drain the radiator.

Second: Remove the damaged section by taking off the clamp at the top and bottom which holds the section in the radiator assembly.

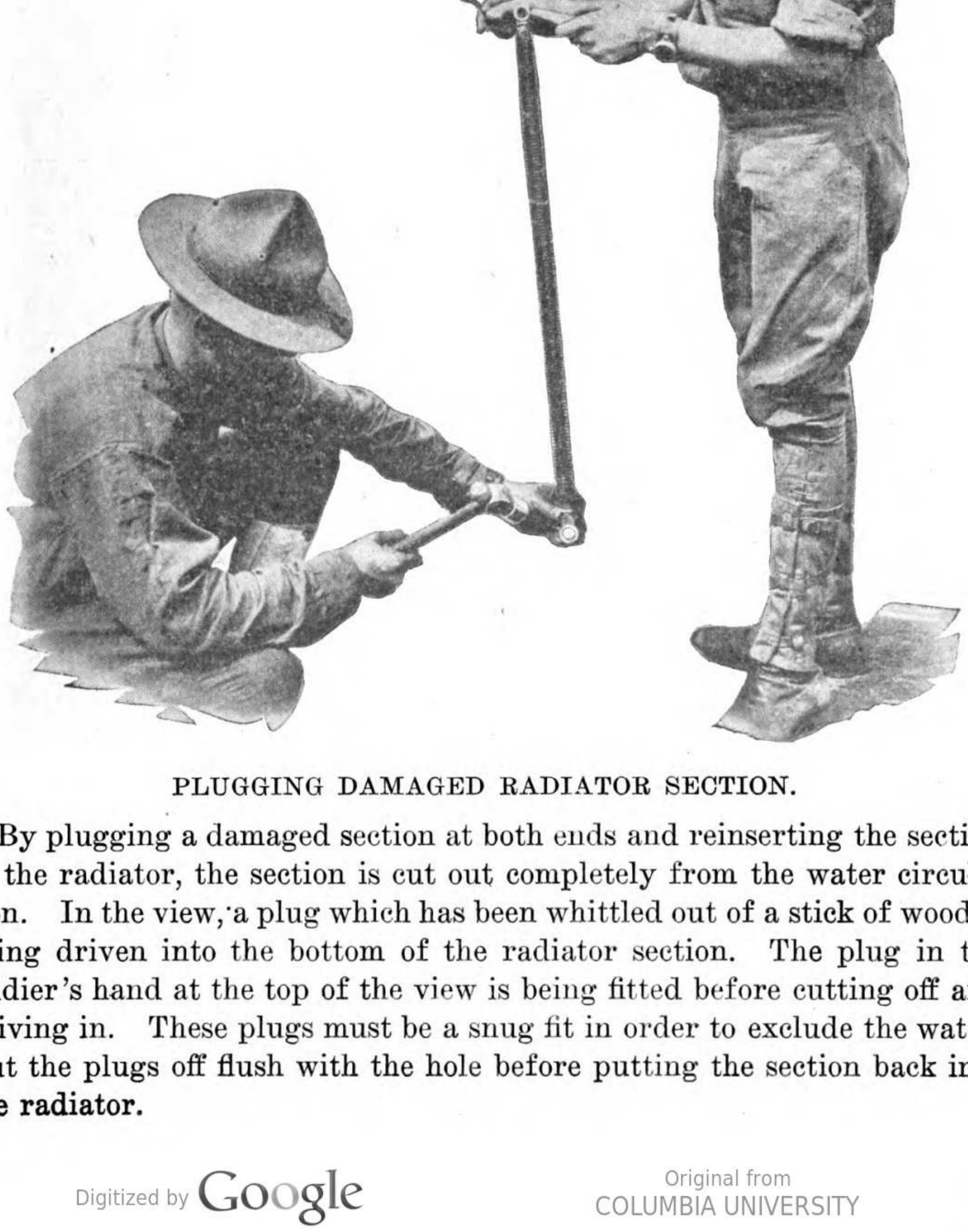
The illustration shows a damaged section being pulled out.

Plate 23 shows a leaking radiator section being removed.

Plate 24 shows the method employed in repairing the damage.

When a repair of this kind is made, it must be born in mind that the repair is only temporary and a permanent repair must be made at the first opportunity.

Plate No. 24.



PLUGGING DAMAGED RADIATOR SECTION.

By plugging a damaged section at both ends and reinserting the section in the radiator, the section is cut out completely from the water circulation. In the view, a plug which has been whittled out of a stick of wood is being driven into the bottom of the radiator section. The plug in the soldier's hand at the top of the view is being fitted before cutting off and driving in. These plugs must be a snug fit in order to exclude the water. Cut the plugs off flush with the hole before putting the section back into the radiator.

CLEANING RADIATOR.

If scale is present in the circulation system it should be treated with common washing soda as follows: Dissolve 6 pounds of common washing soda in 5 gallons boiling water. Fill the radiator and let the solution circulate under load for one full day, and then the entire system should be drained and flushed with clean water. Particles of scale may be disengaged and not completely dissolved and it is advisable to flush the system out.

If convenient to a pressure system, the hose connections on both the bottom and top of the engine and drain plug on bottom radiator frame header should be removed and clean water under pressure should be flushed through the water inlet manifold of the engine as well as through the radiator. The radiator can be readily disassembled if it is necessary to clean out disengaged scale.

THE FUEL SYSTEM.

The gasoline or fuel supply system consists of a main supply tank (20), Plate 25, mounted on brackets (21), bolted to the main frame on the left side of the operator's seat. The fuel is supplied to a vacuum tank (14) through a brass pipe (13). The flow from the vacuum tank to the carburetor is by gravity by the pipe (11).

THE MAIN FUEL TANK.

The main tank is of galvanized steel, of 46 gallons capacity, and is secured by straps (17), having a threaded end and passing through the brackets (21). Nuts and lock washers (30), (32), secure the straps which hold the tank in firm contact with a board (33) interposed between the tank and brackets.

The interior of the tank is provided with two baffle plates to prevent undue movement of the fuel and its collecting at one end when ascending or descending grades, and there is also a partition (19) which provides two compartments known as the main and reserve supply, the last named being about 10 gallons capacity. The main supply is through a brass pipe (23) to a reducing elbow (24), thence to the three-way valve (25), which includes a filter or sediment bulb with a drain cock (26).

RESERVE FUEL SUPPLY.

The reserve supply is connected by a small brass pipe (31) to the three-way valve. This valve has a lever which when moved to a horizontal position permits flow of the fuel to the vacuum tank. Moving the lever to the left or right connects the main and auxiliary tanks, respectively. When occupying a vertical position the fuel supply to the

vacuum tank is shut off. The filler plug (18) of the tank has a hole or vent and this should be kept clear to avoid the possibility of vacuum forming.

AUXILIARY FUEL TANK.

Note—Provision is made in later models of tractors for an auxiliary fuel supply with gravity feed to the carburetor from a small tank under the engine armor. This is illustrated in Plate 28.

VACUUM SYSTEM.

The vacuum system makes use of a small tank (14), Plate 25, which is connected by tubing (11), (12), (13), to the intake manifold of the engine; also to the main fuel supply tank and to the carburetor. The partial vacuum occurring in the intake manifold is transmitted to the vacuum tank and the vacuum is utilized for lifting the fuel from the main tank to the upper chamber of the vacuum tank, Plate 26, which consists of two chambers, an upper or filling, and a lower or emptying. Between the two chambers is a partition attached to and below which is a flapper valve (19).

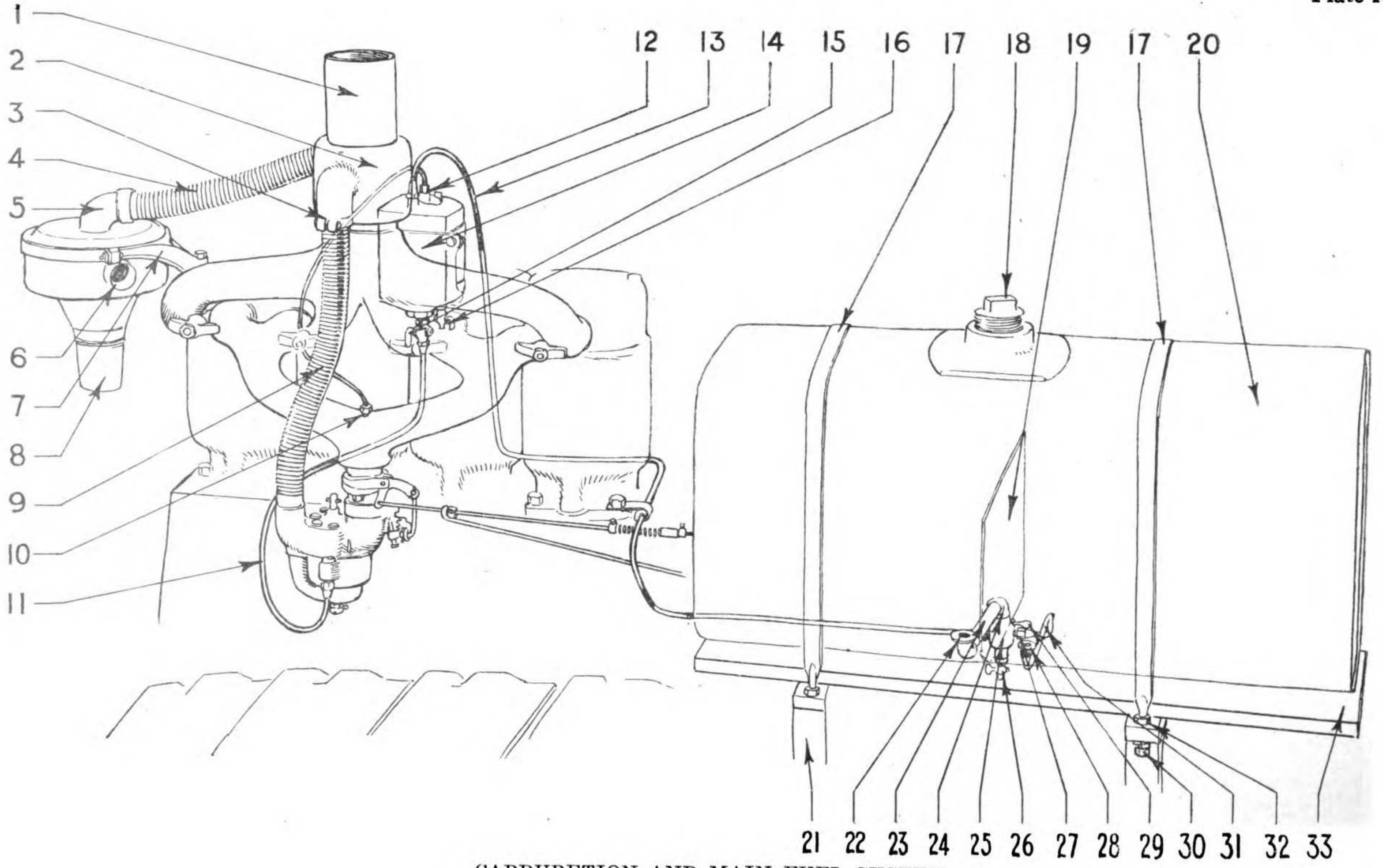
The partial vacuum in the intake manifold on the intake stroke of the piston of the engine creates a vacuum in the upper chamber of the vacuum tank and this vacuum closes the flapper valve (19), also sucks or pumps fuel from the main supply tank into this chamber. The fuel in entering the upper chamber raises the float (14). When this float rises to a predetermined point it actuates the float lever (2), which shuts off the suction and at the same time opens an atmospheric valve (11).

The entrance of the outside air releases the vacuum suction, causing the valve leading into the lower chamber to open and the fuel flows through this valve to the lower or emptying chamber, which is always open to the outside air, so that fuel is supplied to the carburetor by gravity.

A screen or strainer is combined with the outlet member (16) and is located inside the lower tank and attached to it is a petcock (17) for draining water and other foreign elements. The strainer should be maintained in a clean condition and should be first examined when fuel does not flow to the carburetor.

CARBURETION SYSTEM.

The carburetor is a Kingston Model E-4 threaded to the intake manifold of the engine. Its function is to vaporize the fuel and mix the vapor with air, forming a mixture that is burned in the cylinder. The quantity of mixture admitted is regulated by a valve manually controlled by the operator.



CARBURETION AND MAIN FUEL SYSTEM.

Heat is utilized to assist in vaporizing the fuel, a stove or jacket surrounding the exhaust pipe and the heat is conveyed to carburetor by a flexible pipe.

The fuel supply is through a vacuum tank from a main supply tank and auxiliary supply tank. Connection between the vacuum tank and carburetor is by a copper pipe.

CARBURETOR.

All air utilized in the mixture passes through the carburetor, Plate 27, which has a fixed air intake around the needle valve (10), but when the throttle (3) lever is opened to a certain point and when more air is required by the fuel supply, auxiliary air enters above the spray nozzle (17), the bronze balls (14) lifting from their seat and supplying air in volume according to requirements. There is but one adjustment, that of the fuel supply which is regulated by the needle valve (10).

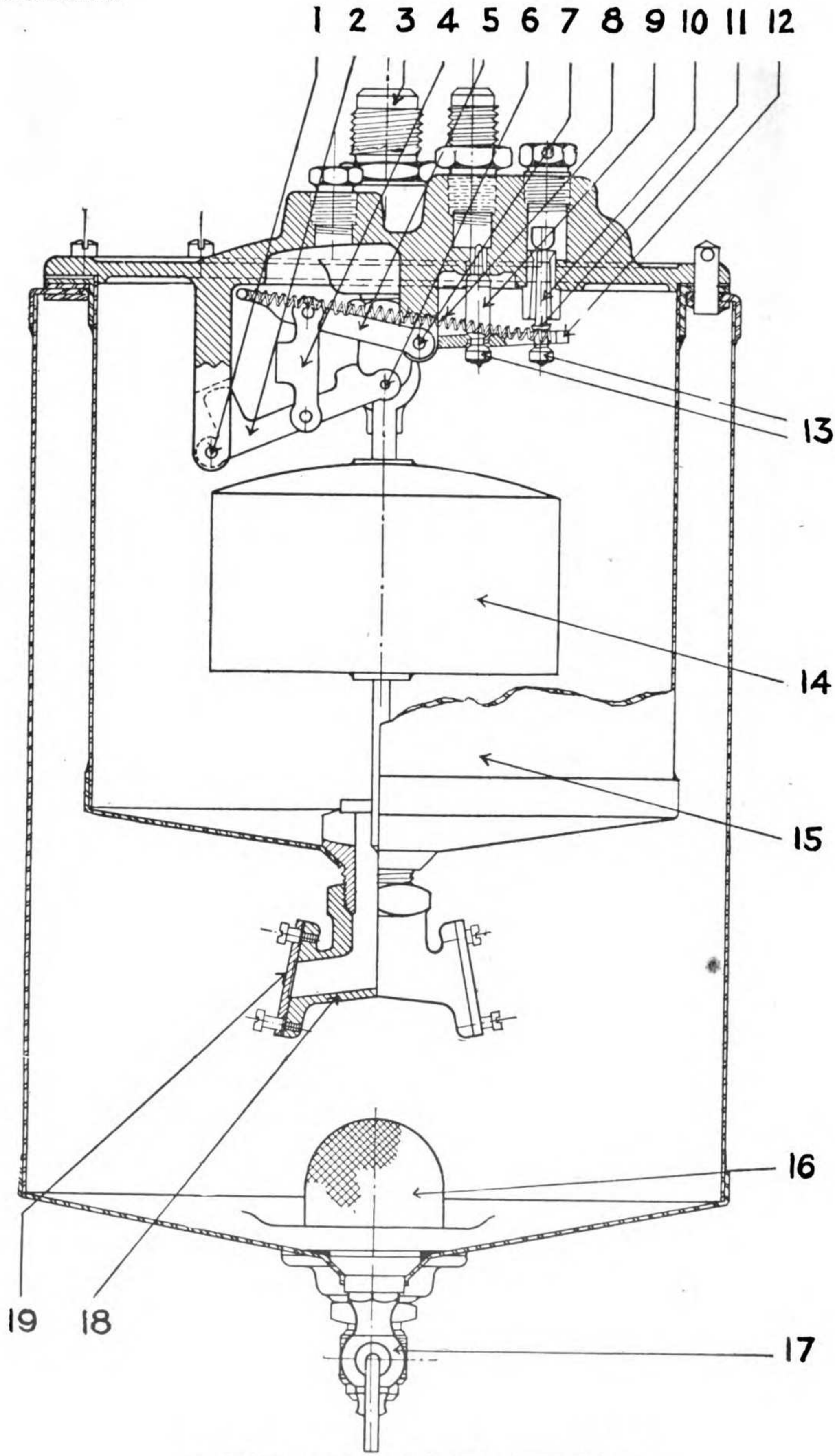
The function of the carburetor is to change the liquid fuel into a fuel vapor mixed with such proportions of air that an explosion of instantaneous burning mixture is obtained. If more air or less air is supplied than is required to make a proper mixture, the fuel vapor mass will be a slow burning mixture.

Specific directions cannot be given for adjusting the carburetor. When adjusting the carburetor on any engine it is necessary to check the rocker arm clearance so that 0.03125 inch clearance will exist between the rocker arm and the valve stem when the valve tappet is standing on the back of the cam and all slack taken up between the rocker arm and valve

CARBURETOR AND MAIN FUEL SYSTEM.

Ref. No.	Part No.	Name of Part.
1		Exhaust manifold.
2	10439	Air heater.
3	7726	Air heater sleeve.
4	7731	Flexible tube.
5		Air cleaner outlet.
6		Air cleaner inlet.
7	9595	Air cleaner bracket.
8		Air cleaner dirt receptacle.
9	7732	Flexible tube.
10	54939} 54925}	Union nut and half union.
11	9738	Tubing.
12	54937	Union nut.
13	9740	Tubing.
14	9741	Stewart vacuum tank.
15	8902	Gasoline shut off cock.
16	8443	Pet cock.
17	7589	Fuel tank strap.
18	5242	Filler plug.
19	7584	Reserve partition.
20	8565	Fuel tank body.
21	8560	Fuel tank outer bracket.
22	7583	Pipe fitting (rear).
23	8321	Pipe from fuel tank to sediment trap.
24	8322	Ell-reducing.
25	7842	Sediment trap.
26		Drain cock.
27		Union nut.
28	7582	Pipe fitting (front).
29		Sediment trap three way valve.
30	53153	Fuel tank strap nut.
31	8320	Tubing-tank to sediment trap.
32	53153	Fuel tank strap adjusting nut.
33	7588	Board.

Plate No. 26.



STEWART VACUUM FUEL FEED TANK.

tappet. The magneto should be checked for correct timing so that when the piston is on top center of the compression stroke and the circuit breaker is put into full retard position, the circuit breaker points will just commence to separate.

The adjustment of the carburetor depends upon the condition under which the engine is operated, atmospheric conditions, elevation, quality of fuel used and load pull. The best adjustment is one just lean enough to enable the engine to develop the required power and still not overheat.

CARBURETOR ADJUSTMENT.

Varying temperatures and altitudes will require changing the supply of fuel. Turning the needle valve (10), Plate 27, to the right decreases the fuel supply and in the opposite direction increases it. The needle valve is prevented from turning by a lock screw (11). Lock the needle valve by tightening the screw (11).

In adjusting the carburetor, decrease the fuel supply by turning needle valve towards the right till there is a tendency for "pop-back," then turn needle valve towards the left till the engine runs smoothly, has the requisite power under load and does not overheat.

AIR LEAKS THAT INTERFERE WITH ADJUSTMENT.

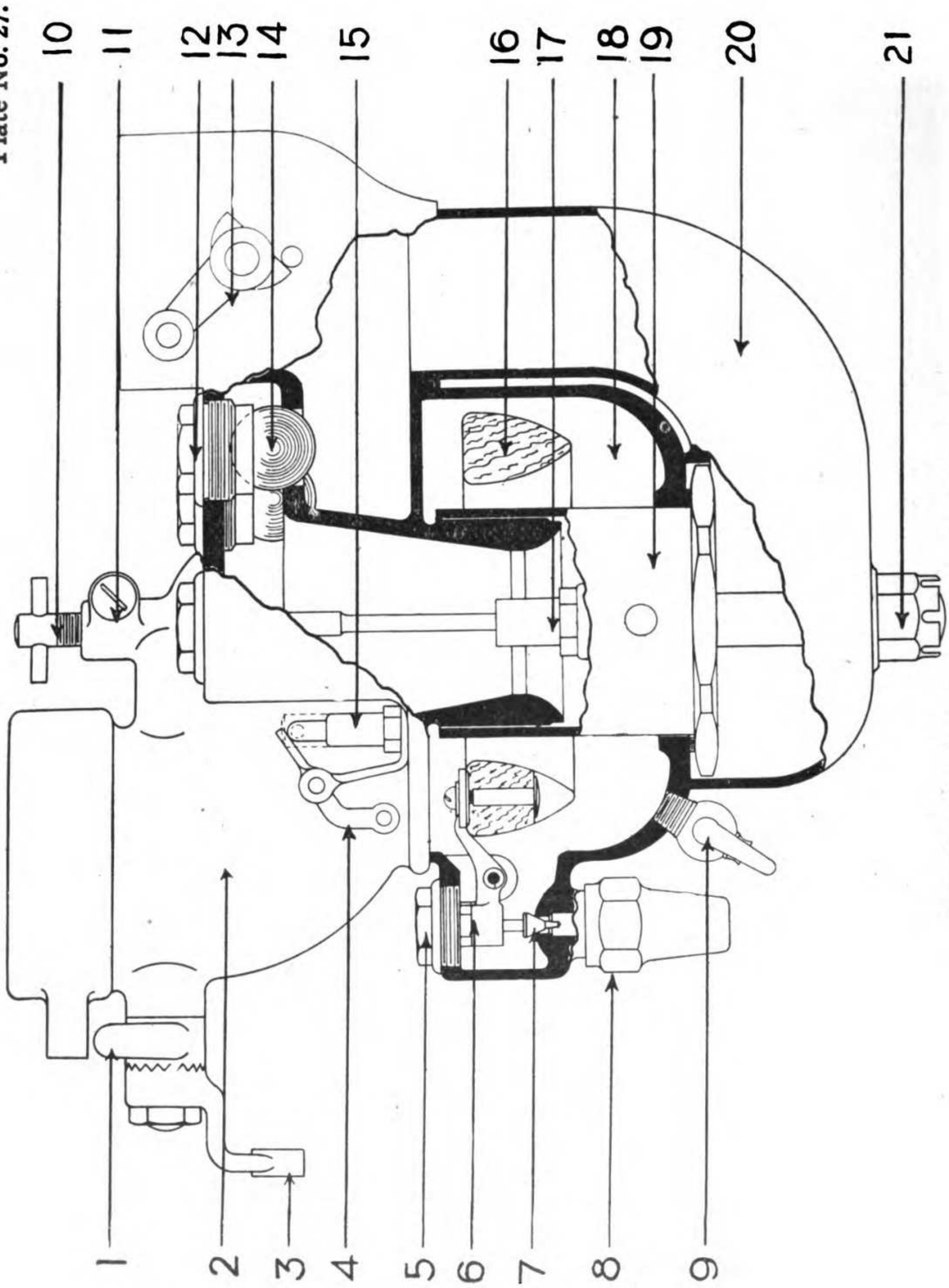
There are five places where air can enter the cylinder besides through the carburetor proper:

1. Throttle shaft or bearing being worn.
2. Intake manifold leaking.

STEWART VACUUM TANK.

Ref. No.	Part No.	Name of Part.
1	9852	Float lever pin.
2	9851	Float lever.
3	8459	Tube fitting.
4	9855	Lever connection link.
5	9853	Spring lever.
6		Float lever pin.
7	9860	Valve stem lever pin.
8	7559	Valve tension springs.
9	9857	Vacuum lever stem.
10	8445	Atmospheric valve stem.
11	8446	Valve stem sleeves.
12	9854	Valve stem lever.
13	8447	Stem washer and float assembled.
14	9858	Valve stem collars.
15	8449	Inner shell assembly.
16	8444	Strainer and outlet assembly.
17	8443	Pet cock.
18	8450	Flapper valve.
19	8453	Flappers.

Plate No. 27.



INTERIOR OF KINGSTON CARBURETOR.

3. Intake manifold gaskets leaking.
4. Worn intake valve stem guides.
5. Poorly fitting piston rings or worn pistons and cylinders.

An accurate carburetor adjustment cannot be secured until all air is excluded from gaining admission through the above mentioned places. Air gaining admission through any of these places dilutes the mixture that has passed through the carburetor thus producing an over-lean mixture and can cause rapid overheating of the engine and consequent loss of power.

LEAN MIXTURE.

Decreasing the fuel supply by means of the needle valve (10) until there is too little fuel in proportion to the air obtains what is termed a lean mixture, a mixture that is slow burning as well as not easily ignited by the spark. A lean mixture is generally indicated by a back-fire or "popping" in the carburetor, due to the flame being present in the combustion chamber, and which ignites the incoming mixture on the intake stroke. A too lean mixture heats the engine.

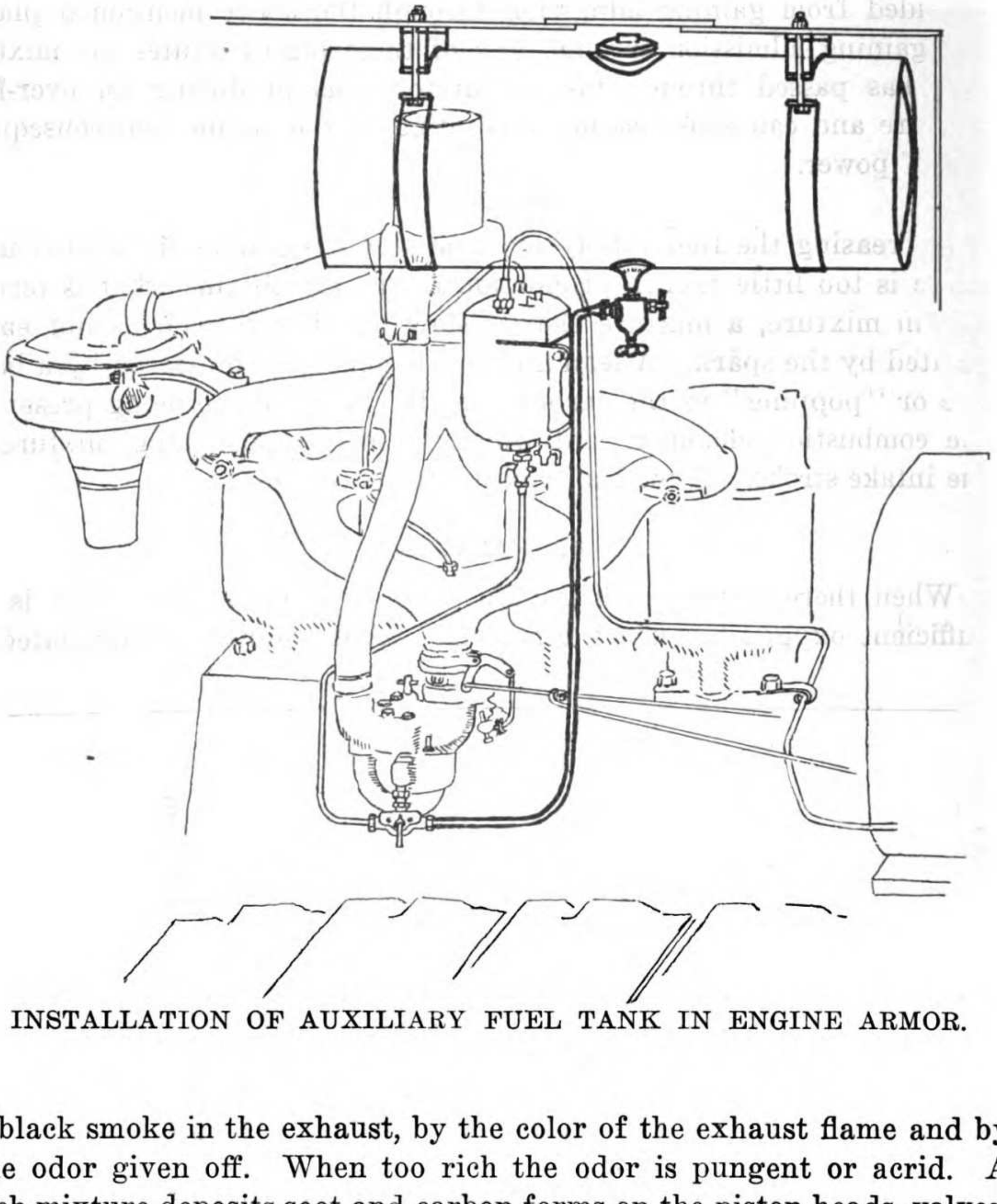
RICH MIXTURE.

When there is too much fuel in proportion to the air, there is not sufficient oxygen to burn the mixture. This condition is indicated by

CARBURETOR.

Ref. No.	Part No.	Name of Part.
1	9374	Carburetor throttle gate stem and screws.
2	9368	Carburetor fuel mixing chamber.
3	9373	Carburetor throttle lever.
4	9379	Carburetor primer lever.
5	7462	Carburetor float valve cap.
6	7459	Carburetor float valve lever.
7	7461	Carburetor float valve.
8		Gasoline feed pipe.
9	7464	Carburetor drain cock.
10	7457	Carburetor needle valve.
11	7517	Carburetor needle valve lock screw.
12	7520	Carburetor bronze retaining cap.
13		Carburetor chock valve lever.
14	7521	Carburetor bronze ball.
15	9378	Carburetor primer.
16	7458	Carburetor float.
17	7463	Carburetor spray nozzle.
18	9367	Carburetor float chamber.
19	9369	Carburetor center member.
20	9375	Carburetor constant air supply connection.
21	7516	Carburetor constant air supply connection lock nut.

Plate No. 28.



INSTALLATION OF AUXILIARY FUEL TANK IN ENGINE ARMOR.

a black smoke in the exhaust, by the color of the exhaust flame and by the odor given off. When too rich the odor is pungent or acrid. A rich mixture deposits soot and carbon forms on the piston heads, valves, combustion chamber, etc. Too rich a mixture is apt to deposit particles of fuel on the cylinder walls and the gasoline may find its way to the crankcase, thinning the lubricant.

FLOAT CHAMBER VENT.

To prevent a vacuum forming in the float chamber there is a small hole or vent drilled in its top. This permits of the entrance of air and the hole should be kept clear.

FIELD REPAIRS TO FUEL SYSTEM.

CARBURETOR FUEL LEVEL ADJUSTMENT.

Proper level of the fuel in the float chamber (18), Plate 27, is important and it should be from 0.03125 ($\frac{1}{32}$) to .015625 (1/64) inch below the top of the fuel spray nozzle (17). The proper fuel level may be determined by displacing the needle valve (10) from the carburetor, also the bronze ball retaining cap (12) and the ball (14) and opposite pair. This will permit of light entering one of the holes and looking through the other.

If the fuel level be too high and fuel overflows the nozzle, lower the float (16) by bending the float level (6). If too low, correct the level by bending the lever the other way. The level should be maintained as above described and if too low will cause difficult starting of the engine. Too high a level will cause flooding.

FLOODING AND LEAKING OF CARBURETOR.

In addition to a heavy float, flooding may be caused by the presence of dirt or other foreign elements in the fuel. Dirt, etc., lodging on the seat of the seat of the float valve (7) will prevent the valve from seating and the fuel will continue to flow into the float chamber.

To displace the dirt, etc., remove the float valve cap (5) and raise the float valve (7) which will permit a sufficient flow of the fuel to remove the foreign particles. By opening the drain cock (9) the dirty fuel can be drained from the float chamber. If this does not correct the trouble rotate the float valve (7) with a small screw driver which will tend to cut any foreign substance on the seat. If the trouble persists, tap the top of the screw driver when rotating the valve, which will tend to form a new seat. The seat must not be ground.

DETECTING HEAVY FLOAT IN CARBURETOR.

The float (16) is of cork and is covered with shellac to prevent the fuel increasing the weight of the float. If the protective covering be broken the cork will absorb the gasoline, and the float will tend to keep the float valve open, causing flooding. The remedy is to remove the float and thoroughly dry same, after which it should be given one or more coats of shellac. Dry each coat thoroughly before replacing the float in the bowl.

RESEATING NEEDLE VALVE.

To obtain proper operation, the needle valve (10) should seat correctly, particularly for low engine speeds or idling. If the valve has been forced on its seat too hard it may become ringed. When this condition exists it should be corrected by reseating.

VACUUM TANK TROUBLES.

When new, the flapper valve (19), Plate 26, may seat so tightly on its seat that fuel will not pass to the upper chamber. If it sticks, the valve should be freed.

The top of the tank can be displaced by removing the screws and running the blade of a knife around its top between the cover and the body of the tank, so as to separate the gasket without damaging it. In replacing a gasket it should be shellacked to insure an air-tight joint. Perfectly tight joints are essential to the successful operation of the vacuum supply system and all connections between the main fuel tank as well as those at the main tank and vacuum tank must be kept tight. In replacing damaged piping with new avoid sharp bends, as they are apt to retard the flow of the fuel.

LEAKS IN FUEL LINE AND TANKS.

The fuel line pipe (13), Plate 25, is anchored to the crankcase and care should be exercised to avoid the possibility of undue vibration of the pipe.

If it becomes broken a temporary repair can be made by utilizing a short section of rubber tubing of inside diameter less than outside diameter of the brass pipe. Use the rubber tube for a connection, slipping it over the ends of the fuel pipe, and place several small strips of flat wood equally spaced around tube and bind with tape or string. The wooden members will provide a splint which will prevent movement of the tube and breaking down of the rubber between the ends of the pipe. One end of the pipe can be reamed or enlarged, the other end slipped in and the joint covered with hard soap, a splint used and taped.

In replacing unions care should be taken to have the two sections align before attempting to catch the thread and make sure the thread is caught before using a wrench. If properly aligned, the nut can be started and several turns made on the threaded member with fingers.

Small leaks in the tanks can be temporarily repaired by hard soap, chewing gum or wooden plugs. Hard soap or shellac can be utilized where connections leak and where the threads have been damaged.

AIR CLEANER.

Any form of dust when conveyed to the combustion chamber of the cylinder by the air drawn in through the carburetor becomes an active abrasive, rapidly wearing the rings, etc. Provision is made for pre-

venting entrance of dust and other foreign elements in the air by the use of a Donaldson air cleaner. It is shown by Plate 25 and is supported in a cylindrical member, which is bolted to a bracket (7) attached to the front cylinder.

The air cleaner is of the centrifugal type, depending upon air velocities set up within the cleaner by passing the air through in a certain direction, the dust being thrown to the container walls by centrifugal force, and a still air chamber to collect the dirt. The incoming air, which enters at (6), after passing over the guides that give the circular direction, leaves the cleaner by entering the outgoing pipe in the vortex of the current, thence out the center part at the top. The dust and other particles of matter fall to the bottom (8) of the cleaner. The cleansed air passes out through an elbow (5) and a flexible tubing (4) to the hot air stove (3) thence to the air intake of the carburetor by the flexible metal pipe (9).

EMPTYING AIR CLEANER.

The motion of the tractor shakes the dust and dirt separated from the air down into a receptacle (8) that is screwed to the bottom of the cleaner. This part should be emptied daily, the number of times depending upon the service. *Caution:* Never empty the container (8), Plate 25, when the engine is running.

GOVERNOR.

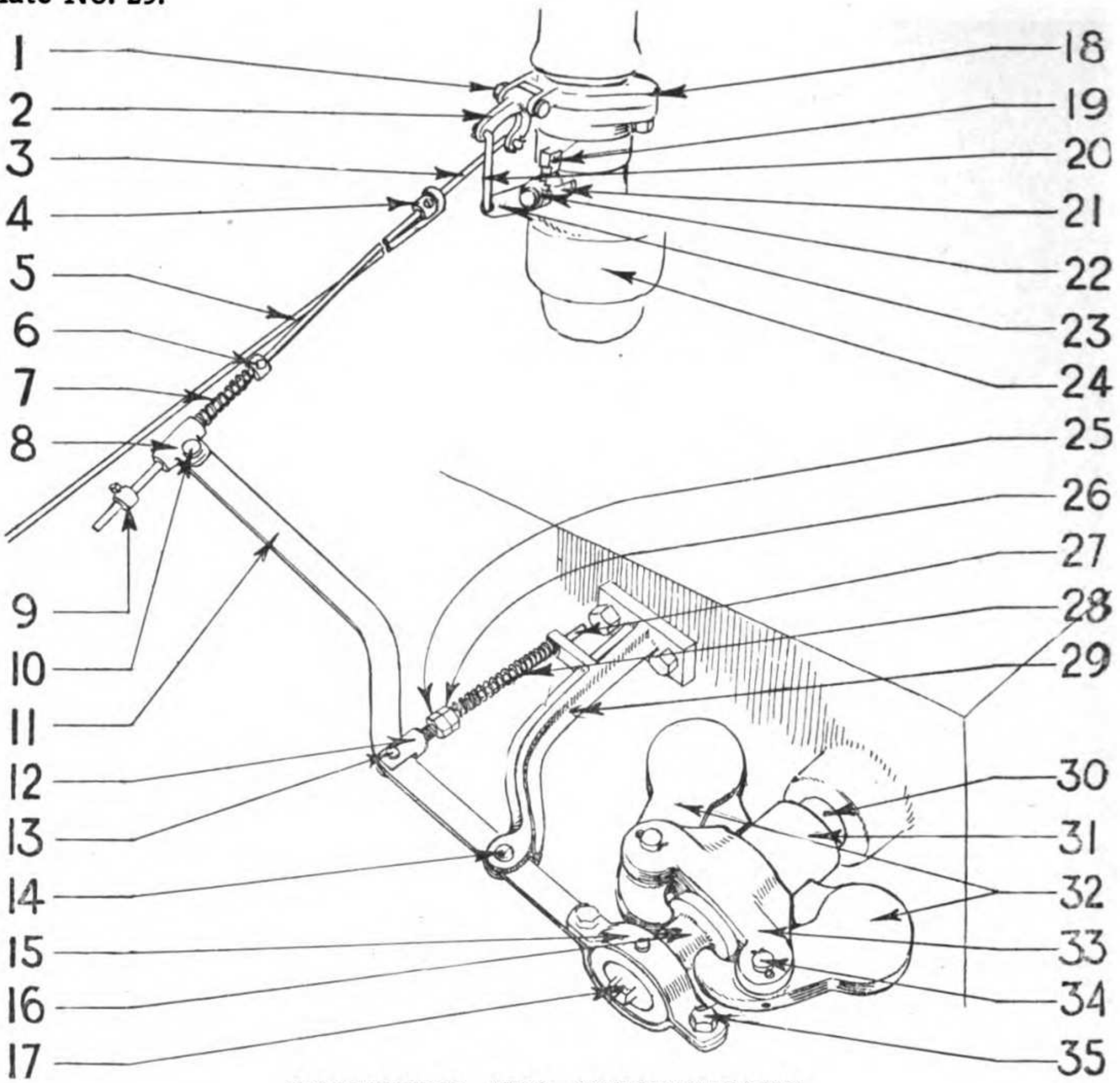
The function of the governor, Plate 29, is to decrease the opening of the throttle or butterfly valve of the carburetor (24) when the engine attains a certain speed; or, in other words, to maintain a predetermined engine speed under varying load and operating conditions. The only function of the throttle lever on the quadrant of the steering wheel is to close the throttle or butterfly valve.

The governor proper consists of a pair of weights (32) so mounted on an extension of the camshaft (30) of the engine that they revolve with it. The weights in revolving move outward, due to centrifugal force, moving a plunger in towards the engine, which movement actuates the governor lever (11), which is attached to the plunger.

The governor lever is pivotally mounted (14) on a bracket (29) bolted to crankcase of the engine and a spring (28) on a tension rod (27) exerts a pressure in a direction opposite to that taken by the plunger when the last named is moved by the weights.

The governor lever (11) is slidingly mounted on a throttle rod (3), having a spring (7), the tension of which is regulated by adjusting set collars (6) and (9). The tension of a spring (7) exerts enough pressure when the engine is inoperative to keep the weights in their normal position.

Plate No. 29.



GOVERNOR AND CONNECTIONS.

ADJUSTING GOVERNOR.

To adjust the governor the engine should be inoperative.

(*a*) Place the gas throttle lever at the extreme end of the quadrant nearest the engine.

(*b*) Loosen set screws on set collars (4) and (9), to allow freedom of travel to the long throttle rod (5).

(*c*) Adjust tension of spring (7) by (6) so that the butterfly valve of the carburetor will be fully opened.

(*d*) Adjust set collar (4) on the throttle rod (3) so that when the gas throttle lever is started to move to rear end of quadrant the butterfly valve will commence to close.

(*e*) With the butterfly valve wide open after adjusting the set collar (4) bring the set collar (9) towards the slide (8) until an interval or space of 0.1875 ($\frac{3}{16}$) inch exists. This distance may have to be varied for different engines, and if the engine runs too fast with the adjustment mentioned the space may have to be decreased until set collar (9) is tight against the governor slide (8). When the weights (32) are

GOVERNOR AND CONNECTIONS.

Ref. No.	Part No.	Name of Part.
1	8434	Bell crank pin.
2	8433	Carbureter control bell crank.
3	8436	Rod-governor arm to carbureter.
4	2973	Butterfly reach rod stop collar.
5	8437	Roof-bell crank to governor.
6	M1045	Throttle rod stop collar.
7	M1046	Throttle rod spring.
8	Z273	Throttle control slide.
9	M1045	Throttle rod stop collar.
10	M2058	Pin.
11	100005	Governor lever.
12	M1042	Governor lever tension rod.
13	M2057	Pin.
14	M2059	Pin.
15	M11232	Governor lever clamp.
16	100462	Governor plunger.
17	100461	Governor plunger cap screw.
18	8432	Intake manifold flange.
19		Carbureter throttle lever retard stop.
20	8435	Rod-carbureter to bell crank.
21	9373	Carbureter throttle lever.
22	7519	Carbureter throttle lever lock nut.
23	9373	Carbureter throttle lever.
24	9331	Carbureter.
25	M2015	Lock nut.
26		Adjusting nut.
27	M1042	Governor lever tension rod.
28	M1043	Governor lever tension rod spring.
29	101001	Governor lever bracket.
30	M10664	Camshaft.
31	ACDH4	Governor body.
32	100125	Governor weights.
33	ACDH4	Governor body.
34	M1036	Governor pin.
35	M2016	Cap screw.

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pulled to their extreme outward position the governor plunger should strike the governor body, and the butterfly valve should be completely closed. The governor spring should exert sufficient pressure when the engine is inoperative to insure contact between the plunger (16) and the ends of the governor weight levers.

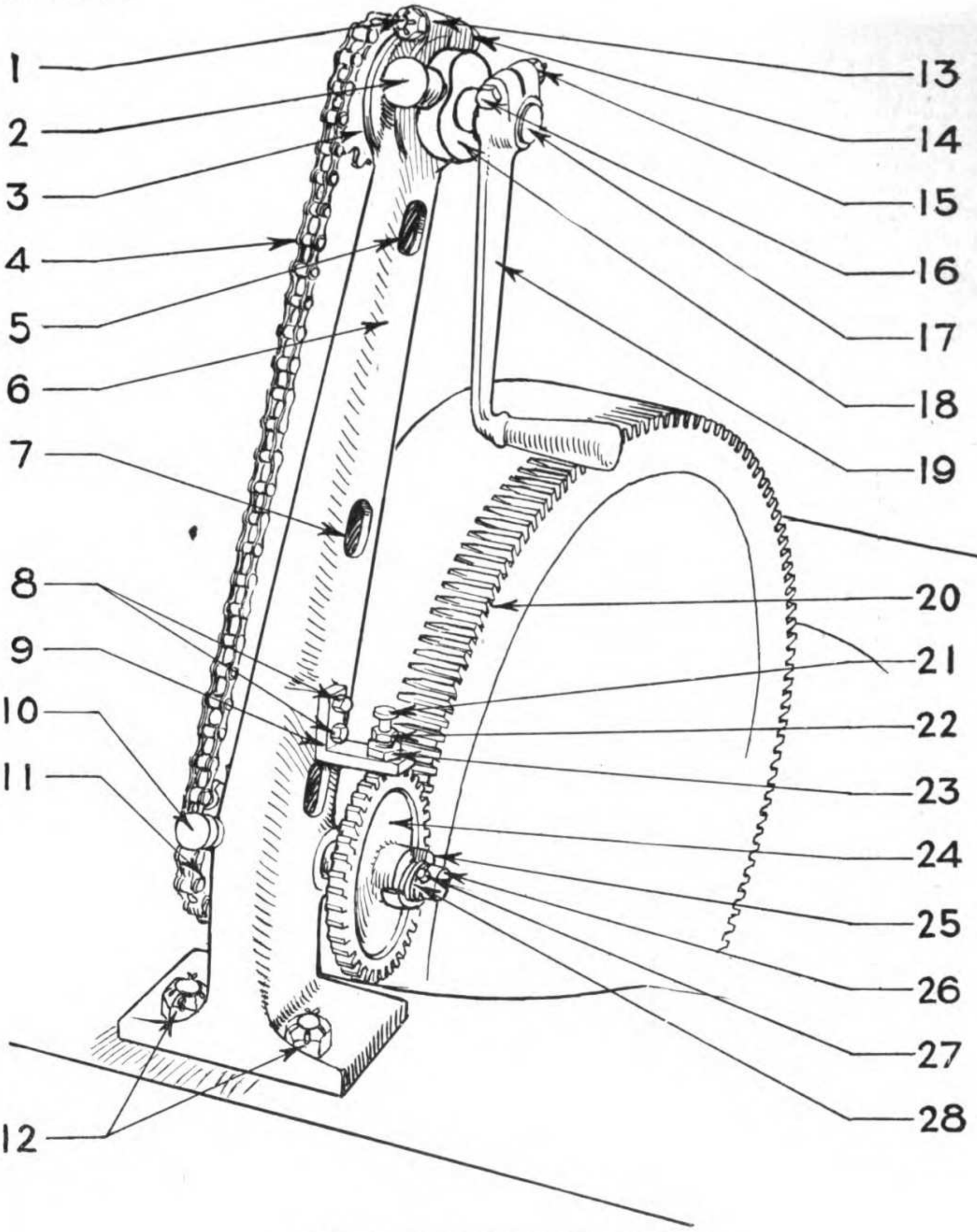
PRIMING CUPS.

There is a priming cup for each cylinder, it being located in the cylinder head (detachable). The function of a priming cup (5), Plate 6, is to permit the introduction of gasoline or other priming fluid into the combustion chamber.

COMPRESSION RELEASE.

Compression release is afforded by four petcocks, controlled by a lever. Each petcock is attached to the cylinder proper, on its left-hand side.

Plate No. 30.



HAND ENGINE STARTER.

Ref. No.	Part No.	Name of Part.
1	53168	Nut.
2	54234	Grease cup.
3		Engine hand starter sprocket.
4	7403	Engine hand starter chain.
5		Hole in casting.
6	9980	Engine hand starter crank bracket.
7		Hole in casting.
8	50529	Retarder case support cap screws.
9		Retarder case support.
10	54234	Grease cup.
11		Engine hand starter sprocket.
12	8920	Stud
13		Chain adjuster clamp.
14	9475	Bolt
15	53166	Nut.
16	53220	Crank bolt.
17	9476	Engine hand starter crank pin.
18	9477	Engine hand starter chain adjuster.
19	11461	Starter crank.
20		Flywheel gear teeth.
21		Retarder pin button.
22		Retarder pin case.
23		Retarder case lock nut.
24		Engine hand starter gear.
25		Spring.
26		Engine hand starter screw shaft.
27		Engine hand starter gear stop pin.
28		Screw shaft teeth.

AIR HEATER.

Use is made of the heat of the exhaust for assisting in vaporizing the fuel, the air from the air cleaner, Plate 8, passing through a tube of flexible steel to a stove on the exhaust member, thence through a two-inch tube of flexible steel to the air intake of the carburetor.

An adapter is to be used on later models, it being so arranged that the tube from the air cleaner can be displaced and so attached to the stove member that the air from the cleaner passes direct to the carburetor.

EXHAUST SYSTEM.

The exhaust system comprises the exhaust manifold, pipe, muffler and cut-out, and serves to lead the exhaust gases away and to silence the noise of the explosion. The assembly is bolted to the armor plate and the exhaust gases pass through the exhaust manifold, and pipe to the muffler, thence through a vertical pipe to the air. The muffler is provided with a cut-out, which is controlled by a pull rod convenient to the driver's seat.

HAND ENGINE STARTER.

The engine starter, Plate 30, by which the engine can be cranked from the operator's seat, is manually operated and is a modification of the Bendix drive principle utilized on passenger motor vehicles. It differs principally in that starter gear (24) meshes with the teeth on the flywheel of the engine when the operator rotates or snaps the starting handle (19) forward or clockwise. Upon the engine starting the starter gear or pinion is automatically thrown out of mesh.

The turning movement of the starting crank (19) is imparted to a sprocket (3), thence by chain to a sprocket (11) mounted on the shaft carrying the starter gear. The sprockets are supported in a bracket (6) secured to the main frame by two bolts (12).

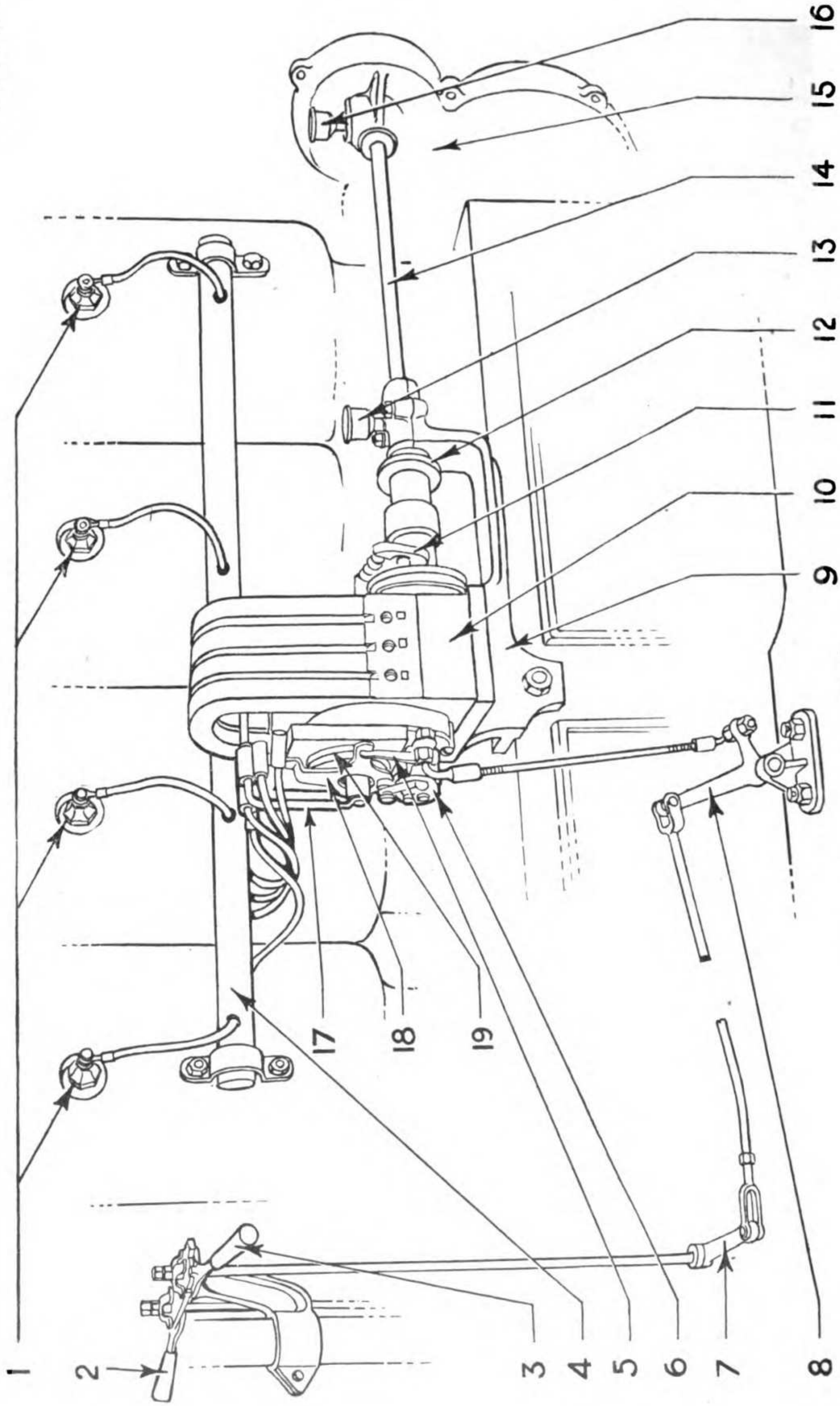
A foot button (21) is mounted on the bracket (9) and has a pointed plunger, which, when depressed, prevents rotation of the starter gear (24) and insures the gear being meshed with the teeth of the flywheel.

ADJUSTMENT OF STARTER CHAIN.

As a precautionary feature, a spring catch is provided between the starting gear and screw shaft in the out of mesh position, so that if a positive start is not made and the first explosion is followed by a "rock back" or a "back fire" there can be no remesh even if crank is still being turned.

Another feature of the spring catch provided, is the making possible of perfect automatic meshing control from the hand crank. This is accomplished by a sharp backward snap of the crank instantly followed by forward (clockwise) cranking. This knack is readily acquired.

Plate No. 31.



IGNITION SYSTEM AND MAGNETO CONNECTIONS.

The starter bracket when assembled in place must be doweled to tractor frame and clamped rigidly with approximately ⅛ inch back lash between gear teeth with starting gear in driving position, all slack in drive being taken up.

Adjustment of the chain (4) is by means of an eccentric, a chain adjuster (18), on the starting crank pin (17). Loosening a nut (1) and bolt (14) permits of turning the eccentric and compensating for elongation of the chain. The starting handle may be displaced by loosening a nut (15) and bolt (16). Lubrication of the sprocket shafts is by grease cups (2), (10).

IGNITION SYSTEM.

K-W HIGH-TENSION MAGNETO.

There is but one source of current supply, a high-tension magneto, a model HK K-W (10), Plate 31. (This is to be replaced in later production with Model R-K.) Incorporated with the magneto is an impulse starter (11), eliminating the necessity of batteries for starting. The ignition system is simple, there being in addition to the magneto and impulse starter four wires or cables contained in a fibre tube (4) clamped to the cylinders, the cables being utilized to convey the high-tension current to the spark plugs (1).

The rotating member in the magneto is called the rotor and comprises a shaft, on which two laminated rotor blocks are mounted at right angles to each other. The winding or coil is stationary and consists of a primary and secondary winding encircling the rotor shaft between the

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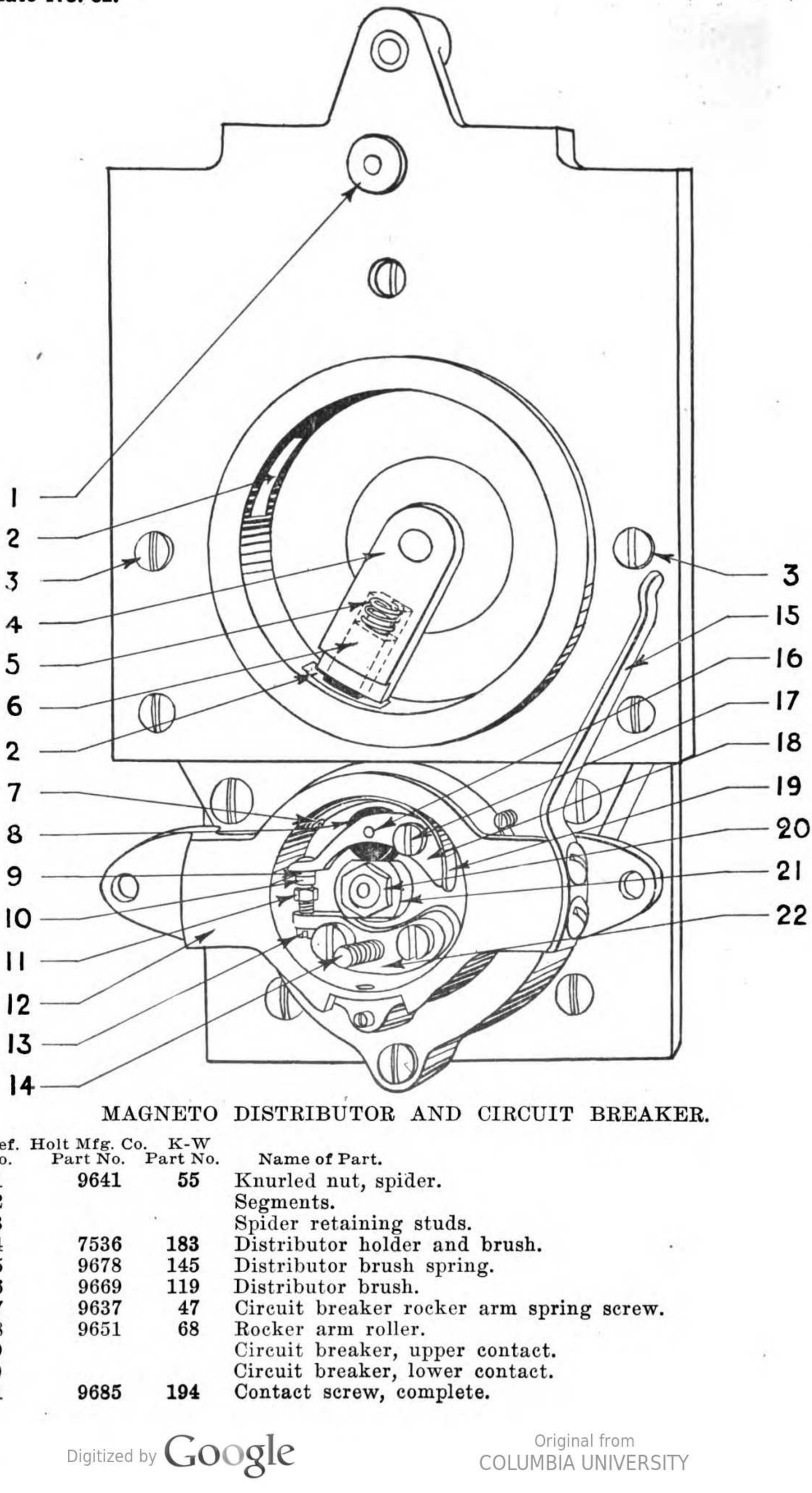
IGNITION SYSTEM.

Ref. No.	Part No.	Part Name.
1	**7840**	Spark plugs.
2	**7290**	Motor control hand lever, throttle.
3	**6801**	Motor control hand lever, spark.
4	**M-1050**	Fibre tube.
5	**6891**	Retard switch.
6	**7523**	Magneto circuit breaker.
7	**7232**	Motor control lever, spark.
8	**7224**	Motor control, bell crank, spark.
9	101703	Magneto bracket.
10	**9601**	Magneto base.
11		Magneto impulse starter.
12	**AM-140**	Magneto Oldham coupling.
13	160516	Grease cup.
14	**M-1421**	Magneto shaft.
15	100138	Timing gear case.
16	160516	Grease cup.
17	7535	High-tension lead.
18	7522	Bridge or spider.
19	9611	Distributor cap.

Plate No. 32.



MAGNETO DISTRIBUTOR AND CIRCUIT BREAKER.

Ref. No.	Holt Mfg. Co. Part No.	K-W Part No.	Name of Part.
1	9641	55	Knurled nut, spider.
2			Segments.
3			Spider retaining studs.
4	7536	183	Distributor holder and brush.
5	9678	145	Distributor brush spring.
6	9669	119	Distributor brush.
7	9637	47	Circuit breaker rocker arm spring screw.
8	9651	68	Rocker arm roller.
9			Circuit breaker, upper contact.
10			Circuit breaker, lower contact.
11	9685	194	Contact screw, complete.

Ref. No.	Holt Mfg. Co. Part No.	K-W Part No.	Name of Part.
12		181	Circuit breaker housing, complete.
13	9645	60	Circuit breaker contact screw nut.
14	9658	79	Primary circuit plunger.
15	6891		Retard or ground switch.
16	9652	69	Rocker arm roller shaft.
17	9629	38	Rocker arm screw.
18	7533	190	Rocker arm.
19	7541	110	Rocker arm spring.
20	9639	54	Rotor shaft nut.
21	9650	67	Rotor cam.

two rotor blocks. The primary winding is carried next to rotor shaft and the secondary winding is placed on the outside of the primary winding and concentric with it.

The rotor shaft of the magneto is driven at engine crankshaft speed, drive being by a shaft (14) and through an Oldham coupling (12).

CIRCUIT BREAKER.

There is but one moving part in the circuit breaker mechanism, the circuit breaker arm (18), Plate 32, comprising a pivotally mounted lever carrying a roller (8) which is actuated by a cam (21). This rocker arm is "grounded," and carries a fixed or ground-carrying contact platinum point (9), Plates 32 and 34, normally in contact with an adjustable platinum contact (11) in the lower contact bar which is insulated from the movable circuit breaker housing (12) by fibre washers and bushings. When the two contact points are together, the low-tension winding is building up its lines of force. When the points are separated by the action of the cam and roller, the primary circuit is interrupted or broken and at the same time the high-tension current is induced in the secondary winding. The spark occurs at the gap of the spark plug when the contact points separate.

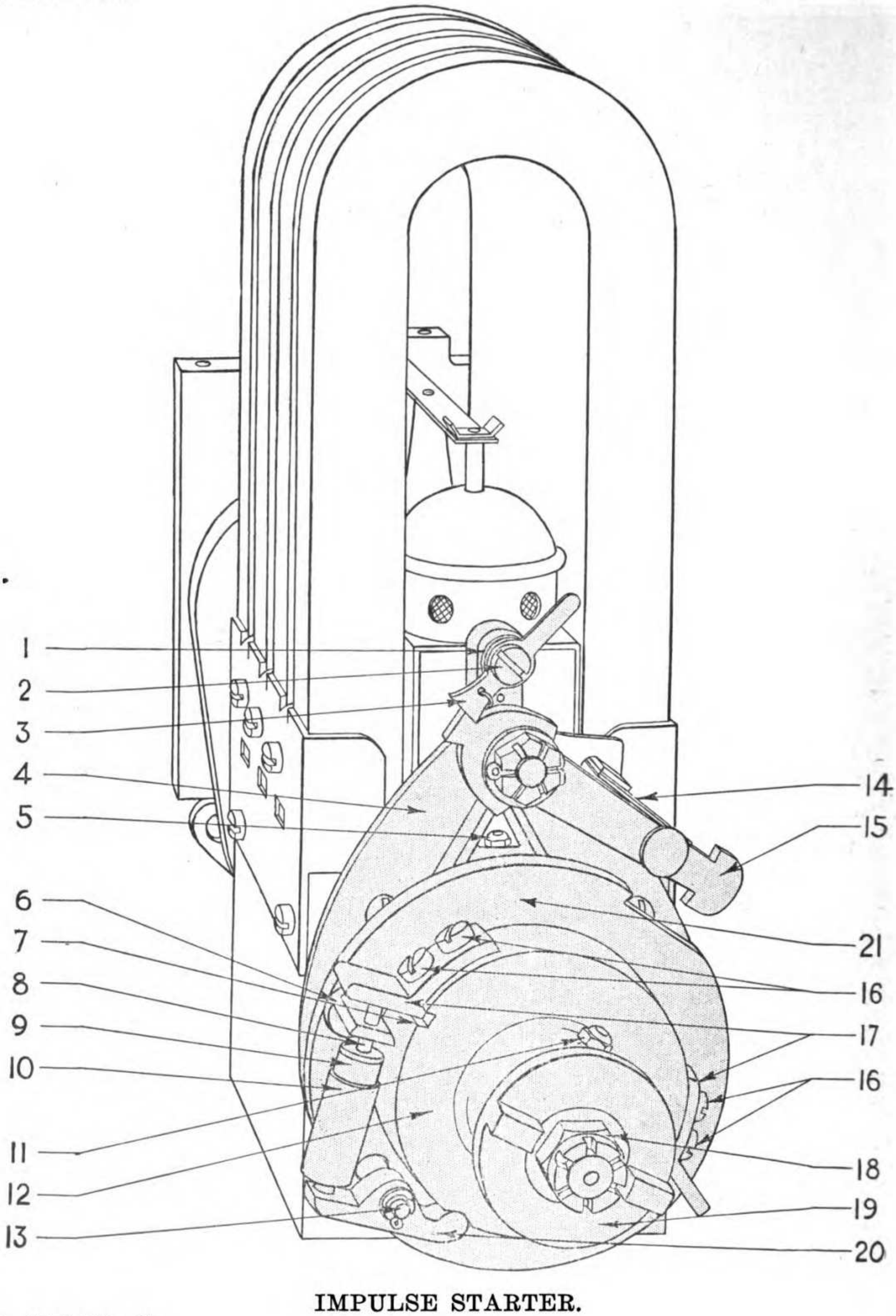
OPERATION OF DISTRIBUTOR.

The distribution of the high tension current is by means of a rotating arm (4), Plates 32 and 34, carrying a carbon brush (6), which makes contact with metal segments (2), Plate 32, imbedded in non-conducting material, the brush making contact in rotation, the firing order of the cylinders which is 1-2-4-3, being obtained by crossing leads to cylinders 3 and 4.

SHORT CIRCUITING SWITCH.

A short circuiting switch (15), Plate 32, is attached to the breaker box and when the last named is fully retarded the short circuiting switch contacts with the low-tension spider, which is connected to the metal cover of circuit breaker by the cap plate retainer spring. This grounds the primary current and prevents induction in the secondary winding, stopping the engine as no spark occurs at the plugs.

Plate No. 33.



IMPULSE STARTER.

Ref. No.	Holt Mfg. Co. Part No.	K-W Part No.	Name of Part.
1	9725	ST-59	Impulse starter ratchet catch lock spring.
2	9710	ST-31	Impulse starter ratchet catch lock screw.
3	9697	ST-14	Impulse starter ratchet catch lock
4	9694	ST-1	Impulse starter bracket.
5			Rotor shaft oiler.
6	7526	ST-23	Impulse starter cushion spring stud.
7			Impulse starter ratchet.
8	9702	ST-21	Impulse starter cushion spring plunger, upper.
9	9700	ST-19	Impulse starter cushion spring sleeve, inner.
10	9701	ST-20	Impulse starter cushion spring sleeve, outer.

Ref. No.	Holt Mfg. Co. Part No.	K-W Part No.	Name of Part.
11	9721	ST-49	Impulse starter case oiler.
12	9722	ST-52	Impulse starter case.
13	7528	ST-29	Impulse starter dog stud.
14	9707	ST-27	Impulse starter ratchet catch spring.
15	7530	ST-13	Impulse starter ratchet catch.
16	7529	ST-55	Impulse starter cam screw.
17	7524	ST-11	Impulse starter cam.
18	9717	ST-40	Impulse starter case nut.
19	9722	ST-52	Impulse starter case coupling drive.
20	7531	ST-12	Impulse starter dog.
21	9695	ST-8	Impulse starter ratchet disk.

IMPULSE STARTER.

To obtain a hot spark for starting the engine, use is made of what is termed the impulse starter, a mechanical device attached to the rotor shaft of the magneto. Normally, the rotor shaft is driven through the Oldham coupling drive (19), Plate 33, but when the impulse starter is utilized, a ratchet catch lock (3), Plate 33, is tripped, which allows a ratchet catch (15) to engage with a notch in the ratchet disk (21). This prevents the disk holding the magneto rotor from revolving until the cam (17), Plate 33, knocks the ratchet catch (15) out of engagement with the disk.

The impulse starter throws the rotor through 80 degrees of a circle as soon as the piston reaches top dead center, giving a spark that is equivalent to that which is generated when the engine reaches its normal speed of 600 R. P. M. When the engine attains a speed of 120 revolutions per minute the impulse starter is automatically thrown out of action. With the impulse starter inoperative, the time of the spark is manually controlled by the engine, control spark lever (3), Plate 31, which is connected by linkage consisting of the control lever (7) and engine control bell crank (8).

When the magneto is timed on top dead center, circuit breaker advanced about one-eighth its travel, with contact points just commencing to separate, the impulse starter causes the spark to occur in cylinder past top center, thus eliminating any danger of "kick back." *Caution*: Never attempt to start engine without tripping impulse starter.

SPARK PLUGS.

A two-point 0.875 (7/8) inch, S. A. E. spark plug (1), Plate 31, is employed, and the insulation material is mica. The proper gap to maintain between the electrodes is 0.015625 (1/64) inch. The gauge of the magneto can be utilized for determining the width of the gap.

SPARK PLUG CABLES.

Heavily insulated wiring, multiple copper strands, is employed to convey the high-tension current from the distributor of the magneto. The spark plug end of the cables is provided with a metal terminal which is so slotted that it grips the terminal of the spark plug. The distributor end of the cable is equipped with a slotted metal pin which is inserted in the hole of the distributor block.

LUBRICATION OF MAGNETO.

The oil lead to the distributor brush bearing is located between the back of distributor block and magnets on top of magneto. *One drop of oil must be applied every fifteen days* at this point.

NOTE: Both end bearings and distributor bearing have two oil leads leading to bearing. These are provided to make one lead accessible whether the magneto is mounted on the right or left side of the engine. *Use but one oil lead on each bearing to apply oil.*

The magneto should be lubricated with a very light oil like 3-in-1 and the oil should never be applied by an oil can. *Never use cylinder oil on any part of magneto.* Obtain a wire and file a notch near the bottom to make wire resemble a crochet hook, put this wire into the cork and use to apply oil. *Lubrication must be applied sparingly and must be measured in drops to prevent excessive lubrication.*

The lubrication of the circuit breaker is essential but over lubrication must be avoided. Lubricate the cam roller *one drop every fifteen days.* After applying oil wipe excess oil away immediately. Lubricate the pin that the upper contact bar rotates on *one drop every fifteen days,* wipe excess oil away. Keep the circuit breaker scrupulously clean of excess oil. Oil on the circuit breaker points will make hard starting.

The main bearings are two ball bearing sets and *one drop of oil should be applied once in fifteen days* to the oil lead on each end of magneto leading to these two bearings. One drop of light oil is sufficient thoroughly to coat all the ball bearings and races. When more oil is applied the oil is thrown off the bearings and may cause trouble.

LUBRICATION OF IMPULSE STARTER.

An oil hole is provided on the impulse starter housing (11), Plate 33, that contains a ball and spring. Four drops of oil per week must be applied at this point.

FIELD REPAIRS TO IGNITION SYSTEM.

LOCATING IGNITION TROUBLES.

In the event of ignition trouble it is advisable, when a cylinder fails to fire or fires intermittently, to locate the faulty cylinder and trace the cause of trouble. It is a simple matter to ascertain which cylinder is missing

by taking a screw driver with an all wood handle and place the blade on the terminal of the cable, then touch a valve push rod with the shank. This grounds or short circuits the high-tension current, preventing it from going to the plug. Try each cylinder until the faulty member is located. Open the cut-out during the tests so that the explosions of the cylinders may be noted.

Before removing plug, test the spark; that is, make sure that magneto or wiring is not at fault. Use the screw driver as above described except make a gap by holding the free end of the blade within 0.125 (⅛) inch of the metal of the cylinder, while holding shank of screw driver against valve rod. If the magneto is functioning and the wires are not at fault, a spark will jump the gap created by the screw driver blade and metal of cylinder.

TESTING SPARK PLUG.

Remove the suspected plug and so place it on the metal of the cylinder that the terminal of the plug or cable will not contact with or be within 0.5 (½) inch of the metal of the cylinder, yet the threaded or metal part of the plug be in contact with the cylinder trip impulse starter. If the plug be at fault a spark will not appear at the gap when the engine is cranked.

ADJUSTING SPARK PLUG GAPS.

The best results are obtained with a high-tension magneto when the gap of the spark plug does not exceed 0.015625 (1/64) inch. Whenever a plug is removed it should be thoroughly cleaned, not only the points but the interior of the shell and the insulator, if the plug be of the type that is readily disassembled. If not, clean by soaking in gasoline. Remove all carbon as it is a conductor of electricity.

TO TIME MAGNETO TO ENGINE.

To time the magneto when it has been replaced after being repaired, or to check timing:

First: Adjust contact points so they separate 0.0156 (1/64) inch when the cam (21), Plate 34, is at its highest point.

Second: Place piston on cylinder being timed *on top dead center compression stroke.* After compression stroke is obtained by revolving flywheel top dead center can be obtained by referring to marked flywheel.

Third: *Place circuit breaker in full retard position.* Rotate the rotor by the free end of Oldham coupling until the distributor brush (6) touches segment connected with the cylinder being timed.

Fourth: Shift rotor by free end of Oldham coupling in proper direction of rotation until the contact points (10) and (11) *are just commencing to separate. This is the firing point of the magneto.* Connect up Oldham coupling in holes that match.

Fifth: With one cylinder timed, connect up cylinders to distributor

so that the engine fires 1-2-4-3. Cylinder No. 1 is the cylinder nearest the flywheel. The numbers 1-2-3-4 on top of distributor block do not refer to the engine cylinders, but indicate the order that the distributor brush

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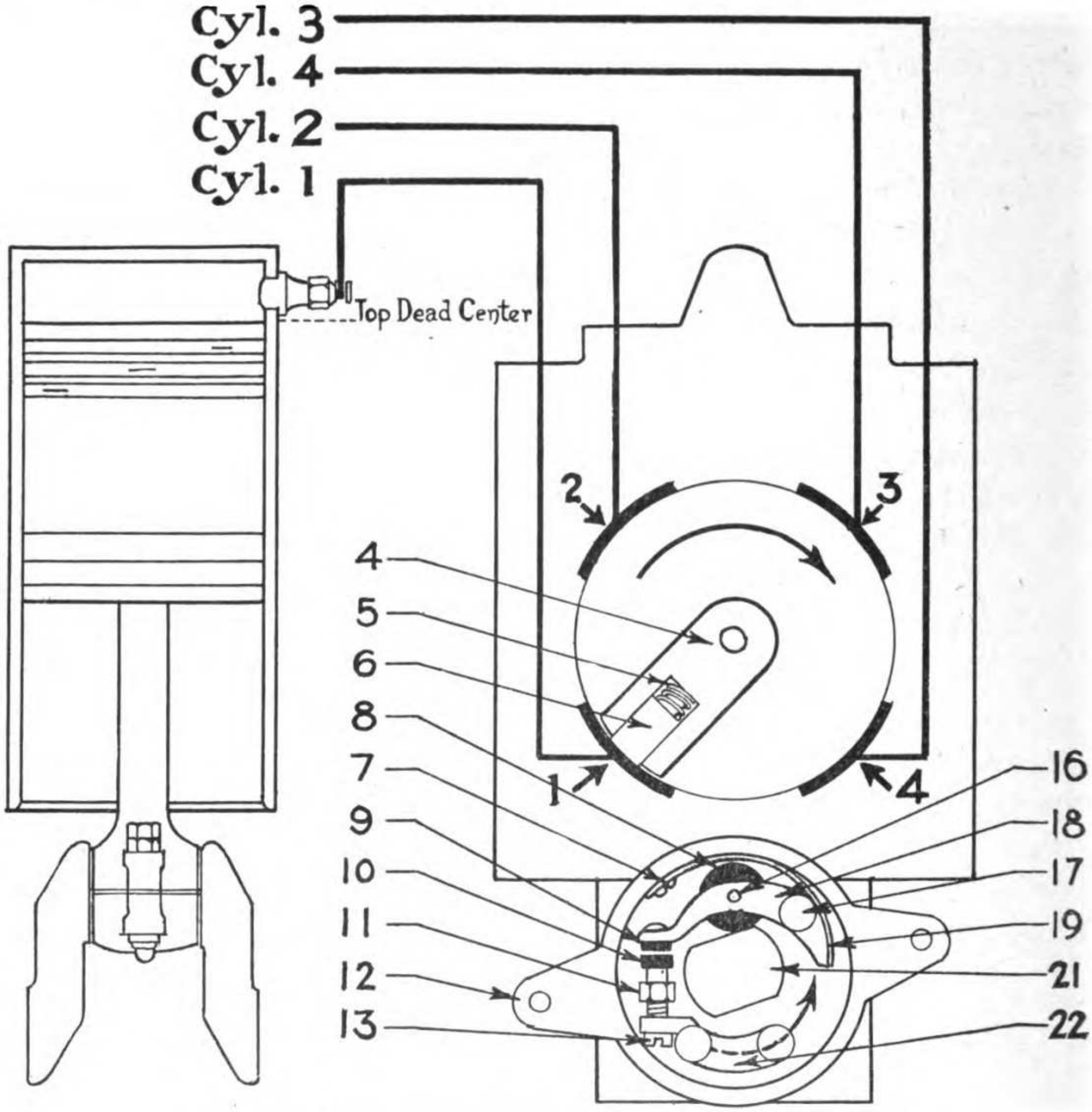
Plate No. 34.



DISTRIBUTOR CONNECTIONS TO SPARK PLUGS.

Ref. No.	Holt Mfg. Co. Part No.	K-W Part No.	Name of Part.
4	7536	183	Distributor brush holder and brush.
5	9678	145	Distributor brush spring.
6	9669	119	Distributor brush.
7	9637	47	Circuit breaker rocker arm spring screw.
8	9651	68	Circuit breaker rocker arm roller.
9			Circuit breaker upper contact.
10			Circuit breaker lower contact.
11	9685	194	Circuit breaker contact screw with contact.
12		181	Circuit breaker housing, complete.
13	9645	60	Circuit breaker contact screw nut.
16	9652	69	Circuit breaker rocker arm roller shaft.
17	9629	38	Circuit breaker rocker arm screw.
18	7533	190	Circuit breaker rocker arm with contact.
19	7541	110	Circuit breaker rocker arm spring.
21	9650	67	Rotor cam.
22	9614	5	Circuit breaker contact block.

(6), Plate 34, passes the segments 1-2-3-4. In timing the engine to fire 1-2-4-3, cross the cables from the distributor block so that segment (3) will lead to cylinder No. 4 and (4) will lead to cylinder No. 3.

Sixth: Replace all parts of magneto, being sure that the nut, Plate 32 (1), and (14) are tight and that the high-tension lead is firmly attached.

WIRING MAGNETO.

There are but four wires or cables in the ignition system, these connecting the spark plugs with the distributor. If the wires be removed for any cause they must be correctly placed and according to the firing order of the engine.

It is not necessary to remove the distributor cap to correctly replace the cables. Plate 34 shows the wiring order and the direction of rotation of the distributor arm when viewed from the distributor end of the magneto. The distributor is marked or numbered 1, 2, 3, 4, but these numbers do NOT indicate the firing order of the cylinders, which is 1-2-4-3. Beginning at the extreme left hand of the distributor the wires are replaced as follows:

No. 1 distributor to No. 1 cylinder and spark plug.
No. 2 distributor to No. 2 cylinder and spark plug.
No. 4 distributor to No. 3 cylinder and spark plug.
No. 3 distributor to No. 4 cylinder and spark plug.

There is no grounding wire as the finger (15), Plates 32 and (5) 31, serves to ground the magneto when the spark lever is fully retarded. If this member becomes bent or injured it should be so adjusted that it will not touch or ground until the circuit breaker is put in full retard position.

MAGNETO TROUBLES.

Failure of the magneto to deliver its maximum spark may be due to a number of causes, among which may be a ground due to the insulating washers on lower contact bar being broken by forcing the screws in too far. If broken, new ones must be put in before magneto will operate.

The lower contact bar and the adjusting screw carries the low-tension circuit and is insulated from the rest of the magneto by fibre washers and bushings, and it is necessary that this insulation never be destroyed nor must it be short circuited with oil, or other current conducting materials. When the circuit breaker points are together the low-tension winding is building up its lines of force. When the cam separates the circuit breaker points the low-tension circuit is broken and it is at this point that the high-tension current is induced in secondary winding, conducted to the distributor and thence to the spark plug on the proper cylinder.

Excessive oil will ground the low-tension current, also cause the platinum points to burn rapidly.

See that all nuts are tight, that the retainer spring is making good contact and all wires leading to the spark plugs are connected and making good contact.

It is important that the screws securing the magnets to the base and all other screws be kept tight.

Dirty or fused contact points or too wide a gap will affect the spark.

Broken down insulation or frayed or chafed cables may, if the wire comes near metal, create a short in the secondary circuit.

If the engine fails to start remove circuit breaker cover and see that circuit breaker is not flooded with oil or has oil on points. Determine if points are meeting square and separating 1/64 in when cam is at highest point.

Examine the spring in impulse starter to determine if it is broken. If spring is broken the magneto will be out of time.

ADJUSTING CONTACT POINTS.

The circuit breaker mechanism, with the exception of the cam, is contained in the movable member (12), Plates 32 and 34, and can be removed by pulling it forward after the knurled nut and housing cap plate retainer spring have been removed. The circuit breaker cap is removed by displacing the knurled nut on the stud (14), Plate 32.

The proper distance between the contact points with cam (21), Plate 32, at highest point is 0.015625 (1/64) inch. Adjustment of the gap or distance, which should be tested when the cam (21), Plate 32, is at its highest point, is by means of a small screw driver, the blade of which is inserted in an opening in the breaker box. The adjustable contact point (11), Plates 32 and 33, is locked by a slotted brass nut which, when loosened, permits of rotating the fixed contact point (11), decreasing or increasing as may be necessary, the space between the contact points. A gauge is provided for ascertaining or measuring the gap and this should be done when the breaker box is on the magneto. If the contact points are fused, pitted or dirty, they should be cleaned with a magneto file, taking care not to remove too much of the metal. The points should be square with each other.

CLEANING DISTRIBUTOR.

The distributor is accessible by removing the high-tension lead (17), Plate 31, and loosening a knurled nut (1), Plate 32. The bridge or spider (18), Plate 31, is next removed by turning it to the left. The distributor cap (19), Plate 31, when displaced, will expose the distributor arm (4), Plates 32 and 34, and brush (6).

The distributor and its components should be kept free from dust, dirt and lubricants. It is easily cleaned with a cloth free from lint and saturated with gasoline. Occasionally carbon dust will be deposited which is due to a soft carbon brush. If the last named member be glazed where it bears against the metal segments, the glaze should be removed by dressing the surface lightly with No. 000 sandpaper. Care should be taken to remove all foreign particles from the distributor after this work.

TO PUT NEW SPRING IN IMPULSE STARTER.

To put new spring in impulse starter proceed as follows:

(*a*) Remove cotter pin from the starter dog stud (13), Plate 33.

(*b*) Pry behind starter dog (20) with a screw driver to remove dog and cushion spring sleeves (9) and (10). The cushion spring between (9) and (10) exerts a heavy pressure, and care must be taken not to let it fly in all directions, as this unit is composed of five separate parts. A convenient tool or clamp for removing the cushion spring sleeves is made by taking a small strip of galvanized iron and bending the two ends up so that the length of the strip will just equal the length of the cushion spring sleeves when they are compressed. Slot the bent ends and insert this clip on the cushion spring sleeve before starting to remove. If no other means are at hand, the cushion spring sleeve must be gripped with a pair of pliers, or held by a piece of waste.

(*c*) Remove the cotter pin and nut (18) on the end of the rotor shaft.

(*d*) Remove the two starter cams (17) from the starter case (12) by displacing the four screws (16).

(*e*) Pull the starter case (12) from the rotor shaft and remove the broken spring.

(*f*) Take the new spring and place its center eye in the notch cut in the arbor that is on the ratchet disk (21), being careful to put it in the right way so that it will wind up, then take the starter case and place the outer eye of the spring in the notch that is about 1 inch from the V-notch in the outer side of the starter case into which the starter dog (20) trips. This notch into which the spring eye fits will be at the left of the notch into which the starter dog fits. There are two notches on the inside of the starter case and the spring must go in the notch farthest away from the notch on the outside of the case (12). Enter the point of this spring partly into the proper notch. Wind the starter case up about one turn, then slip the spring all the way into the starter case (12). Place the starter case on where it belongs and put on the nut (18) and cotter pin, which holds the starter case from slipping end ways. Next wind the spring up a little more than one turn, holding it in this position while attaching one of the starter cams (17) (the one which has just gone past the cushion spring stud (6) on the ratchet disk (21), which holds the cushion spring), then replace the cushion spring sleeve assembly and other parts as taken off and the starter is ready to use. In order to hold the magneto from turning when winding up the starter case (12), engage the ratchet catch (15) into one of the notches on the ratchet disk (21) and use a small wrench on the part of the Oldham coupling on the end of the starter case to get sufficient power to wind up the spring.

ENGINE TROUBLES.

An engine may operate intermittently or one or more cylinders misfire for the following reasons:

(*a*) Too great or small a spark plug gap.
(*b*) Cracked or broken spark plug insulator.
(*c*) Carbonized or dirty spark plugs.
(*d*) Contact points of breaker short circuited, pitted, or not properly adjusted.
(*e*) Magneto magnets weak.
(*f*) Broken, or loose, or disconnected high-tension wire.
(*g*) Distributor brush not making good contact or arm not conducting high-tension current.
(*h*) Grounding finger or switch short circuiting.
(*i*) Improper carburetor adjustment,too rich or too thin a mixture.
(*j*) Water in the fuel.
(*k*) Fuel flow to carburetor restricted.
(*l*) Air leaks through valves, past pistons from crankcase, or between cylinders and intake manifold, etc.
(*m*) Leaking, or sticking valves.
(*n*) Poor, or weak compression.
(*o*) Valve clearance too great or valve tappet preventing valve from opening.
(*p*) Too much oil in combustion chamber.

ENGINE FAILS TO START.

(*a*) Finger or ground switch not disengaged or is making contact with ground of magneto.
(*b*) Spraying nozzle of carburetor clogged or lack of fuel in spraying nozzle and float chamber.
(*c*) Water in carburetor.
(*d*) Lack of fuel in vacuum tank.
(*e*) Cylinders over primed; use of too much gasoline.
(*f*) Water in cylinders. An engine may refuse or be difficult to start for the reasons given under the head of ENGINE TROUBLES.

LACK OF COMPRESSION.

A lack of or poor compression may be due to the following causes:
(*a*) Valves not seating, riding on tappet.
(*b*) Valves and seats require regrinding.
(*c*) Priming cups, compression cocks, cylinder heads or spark plugs leak.
(*d*) Piston rings or cylinder walls worn or scored.
(*e*) Broken valve spring.
(*f*) Valves warped, not seating, etc.
(*g*) Lack of lubrication.
(*h*) Exhaust valve held open by particle of carbon.
(*i*) Badly worn spark plug thread.

ENGINE KNOCKS.

Whenever the engine develops a noise other than those prevailing normally, it should be investigated, the trouble located and corrected. Any foreign noise can be readily detected by the driver after he has become used to the operating sounds of an engine, etc.

Unfamiliar sounds are termed knocks largely because the noise resembles that when a metal hammer strikes metal. Knocks in the power plant may be divided into three general classes and these sub-divided. The classes are: Mechanical, such as bearing, etc.; ignition and overheating.

CAUSES OF ENGINE KNOCKS.

Among the causes for an engine knocking are the following:

(*a*) Loose main bearings.
(*b*) Loose connecting rod bearings.
(*c*) Worn camshaft bearings.
(*d*) Loose flywheel.
(*e*) Loose piston pin.
(*f*) Cylinder worn out of true, scored.
(*g*) Cylinders loose on crankcase.
(*h*) Engine brackets or supports loose.
(*i*) Preignition, too early a spark.
(*j*) Improper oil.
(*k*) Carbon.
(*l*) Timing gears worn, or chipped.
(*m*) End play in camshaft or crankshaft.
(*n*) Spark advanced too far for load or engine speed.
(*o*) Lack of lubricant.
(*p*) Improper mixture.
(*q*) Engine overheated.

LOOSE BEARINGS.

Mechanical knocks or pounds will develop when the main connecting rod and camshaft bearings are loose, the volume of sound depending upon the looseness of the bearing. A loose piston pin will produce a knock as will a loose flywheel or gears on shafts. If the cylinder becomes loose it will cause a pounding noise and end play or movement of the crankshaft and camshaft will create a noise.

The knock of a connecting rod is, perhaps, most noticeable and whenever this condition prevails the trouble should be immediately remedied for with babbitt bearings, particularly, the play is likely to break or pound the bearing material into small pieces and score the crankshaft.

Main bearing knocks are similar to those of the connecting rod and should be removed. Chipped or damaged gear teeth will produce an intermittent knock.

Too much play between the valve stems and rocker arms and between the tappet rod and valve tappet will create a clicking noise, but these conditions affect only the output of the engine; that is, the opening and closing points of the valves as explained in a preceding paragraph.

ENGINE OVERHEATS.

Among the causes for an engine overheating are the following:

(*a*) Fan belt slipping.
(*b*) Pump not working.
(*c*) Lack of water in cooling system.
(*d*) Air pockets in pump, hose or water line.
(*e*) Scale or sediment in radiator.
(*f*) Hose clogged.
(*g*) Weak spark or too late a spark.
(*h*) Improper mixture.

(*i*) **Valves out of time.**

(*k*) **Carbon.**

(*l*) **Lack of lubrication, or dirty or poor oil.**

(*m*) **Extra air drawn in cylinders on intake stroke (see engine and starting troubles).**

(*n*) **Broken piston rings, or scored cylinders, admitting fuel to crankcase, thinning lubricant.**

CARBON.

Carbon is the residue from the incomplete combustion of the hydrocarbon products used in the engine. The hydrocarbon products are fuel and lubricating oil. Occasionally certain operating conditions are encountered under which the engine will carbonize badly and give lots of trouble by erratic running, loss of power and overheating. Most of the causes are directly under the control of the operator, and by studying the various causes and applying the proper adjustment one should be able to reduce carbon troubles to a minimum. All engines are provided with a dry air cleaning device to exclude the entrance of dirt to combustion chamber. Road dust is sometimes confused as carbon. Keep the dry air cleaner connected to the carburetor intake at all times.

The chief causes of carbon are:

(*a*) **Incomplete combustion—over-rich mixture.**

(*b*) **Over-priming the cylinders when starting.**

(*c*) **Late ignition of fuel charge—magneto timed late—engine operated with retarded spark.**

(*d*) **Lubricating oil.**

Most operators are likely to drive with an over-rich mixture. An over-rich mixture is indicated by black color of the exhaust gases and by a pungent or acrid odor. Carbon deposit is rapidly formed in the combustion chamber. Engine may overheat due to oil film on cylinder wall being thinned by excess fuel, allowing metal to metal contact between piston and cylinder.

A very small amount of gasoline should be used in priming the engine to start when cold. Two or three good squirts from priming can is usually all that is required. Prime carburetor if necessary. If an excessive amount of gasoline is used in priming the cylinder it will run to the piston head, gain admission between the piston, piston rings and cylinder and dilute the oil film, particularly under the top piston ring.

It is necessary that ignition of the mixture take place at the correct time. The engine is timed on top dead center, with the spark fully retarded, and circuit breaker points just commencing to separate. Ignition of the mixture is governed by spark lever from top center or 0 degrees to 30 degrees ahead of top dead center. The spark should be kept advanced as far as possible without having a spark knock. Ignition of the mixture taking place near or past top center does not give proper time for combustion to occur before the piston starts on the down stroke, flame

is present on the power stroke, oil film is destroyed and the engine overheats.

REMOVING CARBON.

When carbon accumulates in the combustion chamber, it can best be removed by taking off the cylinder heads, and scraping the deposit off. Remove connecting rods and pistons, scrape under all rings, clean and scrape oil grooves on the pistons and scrape the under side of the piston above the piston pin. The use of water injected with the fuel is not recommended on account of exhaust valve warping or pitting. Occasionally straight kerosene may be fed directly into the air intake of the carbureter with a squirt can when the engine is running, to improve the action of the engine till the cylinder heads can be removed and carbon removed.

SCORING OF CYLINDERS AND PISTONS.

Scoring of cylinders and pistons can be divided into three general classifications:

1. Lack of efficient lubrication.
2. Failure of water circulation system.
3. Mechanical causes.

Scoring of cylinders and pistons due to lack of efficient lubrication can be divided into:

(*a*) Poor bodied oil—oil not suited for engine. If oil is too thin the oil film on the cylinder wall will be dissipated by heat of compression. Too heavy oil—if piston rings are a good fit and cylinder is not worn out of round, too heavy an oil will not reach top piston ring and piston head in sufficient quantity to give lubrication.

(*b*) Dirty oil. Oil may be fouled with carbon and grit or by entrance of fuel particles past piston and piston rings to crankcase oil supply. Fuel particles gaining admission past poorly fitting piston rings or running engine continuously with one or more cylinders "missing" will break down the oil body.

(*c*) Failure of force feed system. Operator may not have put sufficient oil supply into oil reservoir. Rotary pump or screen may be clogged. One or more bearings may be so loose that an undue quantity of oil escapes at one point, causing pressure to drop on rest of bearings with insufficient spray released to the connecting rod and to take care of cylinders and pistons.

(*d*) Running engine below 600 revolutions per minute. Cylinders, pistons, piston pin and camshaft bearings depend upon the spray released from end of connecting rod bearing for their lubrication. If engine is operated a great deal below correct speed the pressure on the oil system will drop to a point where the above named parts will not get their full supply.

Scoring of cylinders and pistons due to failure of water circulation system may be divided into:

(*a*) Pump and fan belt slipping. Presence of oil or water on belt, causing it to slip. Belt may be too long so that idler will not take up sufficient slack. The centrifugal pump and fan have to be positively driven at all times to circulate the water and keep temperature of cylinders at point of safety.

(*b*) Brass gland on pump may admit air to pump. Packing inside of pump gland may be worn out and require repacking to exclude air.

(*c*) Pump shaft may have end play or bushing worn out, thus interfering with circulation.

(*d*) Circulation may be impeded. Rubber particles may become disengaged from hose connection between engine and radiator. Gaskets where crankcase inlet water manifold joins bottom of inlet to water jacket in cylinders may be improperly placed. Water jackets may contain a large deposit of sediment due to using dirty water. Scale may be present in water jackets and radiator tubes.

(*e*) Engine below speed. If engine is operated much below 600 revolutions per minute, under load, the pump may not be driven fast enough to circulate water sufficiently to remove heat generated.

Mechanical causes of scoring may be divided into:

(*a*) Particles of carbon becoming disengaged from the side of a stuck piston ring. Piston ring stuck solid in slot with carbon.

(*b*) Insufficient "break" allowed for expansion when fitting piston ring. When expansion occurs ring will usually break at the split, the broken part will work under piston ring and produce undue pressure of piston ring against cylinder wall in one spot.

(*c*) Piston pin getting loose on its seat. Operator may have been careless in getting piston pin set screw properly seated, or set screw may shear and score cylinder by allowing piston pin to move endwise.

(*d*) Valve grinding compound may find its way into cylinder due to improper cleaning of cylinder head after grinding valves or fitting piston rings.

(*e*) Forcing piston pin to seat, thus carrying the piston out of round.

(*f*) In fitting new piston to cylinder and piston pin, piston may be cocked in cylinder. Piston should be always squared up with top of crankcase and steel square applied against the skirt before putting into the cylinder. If piston is cocked in cylinder, scrape upper half of lower connecting rod bearing until bearing is even from side to side.

CHAPTER III.

MASTER CLUTCH.

The master clutch of the 10-Ton Tractor, which is used for transmitting the power from the engine flywheel to the transmission, is of the multiple disk, dry plate type. There are five disks, two of bronze and three of cast iron, alternately assembled.

The two bronze disks (11) and (18), Plates 35 and 37, are the driving disks, being connected with the engine flywheel by means of a steel retainer ring (1) into which the disks are fitted, six studs being provided to secure the disks to the ring.

The retaining ring (1) has four slots milled in its outside, which slip over four square headed pins (2), the pins fitting into holes in the rim of the flywheel.

The three cast iron disks (4), (15) and (16) are the driven disks, being secured to a sleeve known as the inner disk hub (10). The cast iron disk (4) next to the flywheel known as the inner disk is secured to the inner disk hub (10) by three studs (31).

This disk has three bosses or shoulders cast on it, on which the other two cast iron disks known as the central disk (16) and the outer disk (15) are mounted, these disks having slots which correspond to the bosses on the inner disk.

Power is transmitted from the inner disk hub to the transmission by means of a shaft and universal joint of the internal-external gear type.

The shaft slips inside the inner disk hub and is prevented from turning inside the hub by two keys which are pinned to the shaft and fit into keyways cut in the inside of the hub.

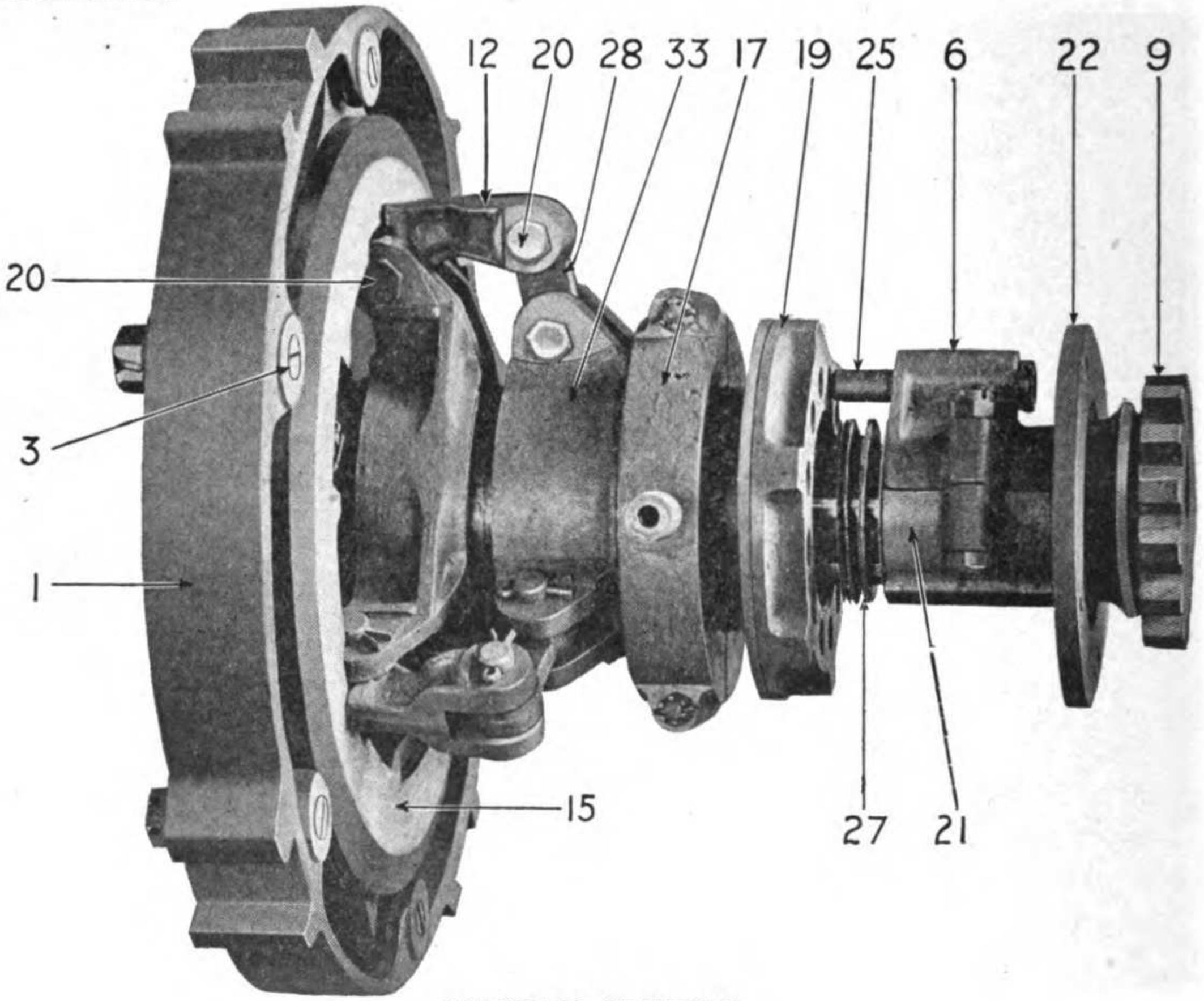
This shaft may be telescoped inside the inner disk hub when removing the master clutch and normally is prevented from telescoping by two half spacers (6) and (21) which are clamped to the shaft by two bolts.

Mounted on the inner disk hub and just in the rear of the outer disk is a steel casting known as the dog holder (14).

The dog holder carries three dogs (12) which are attached to it by three pins (20). The dogs are connected by links (28) and pins to the clutch shifter (33), which is slidably mounted on the inner disk hub. The clutch shifter is actuated by a fork and toggle assembly, Plate 33, which connects it to the master clutch hand lever. When the clutch shifter (33) is moved forward it throws the inner ends of the dogs (12) against the outer disk (15), thus compressing the disks together.

When the clutch shifter (33) is at its extreme forward position, the pressure exerted by the dogs (12) against the disks (4), (11), (15), (16) and (18) creates sufficient friction between the disks to cause them all to revolve together, thus locking the driving and driven members.

Plate No. 35.

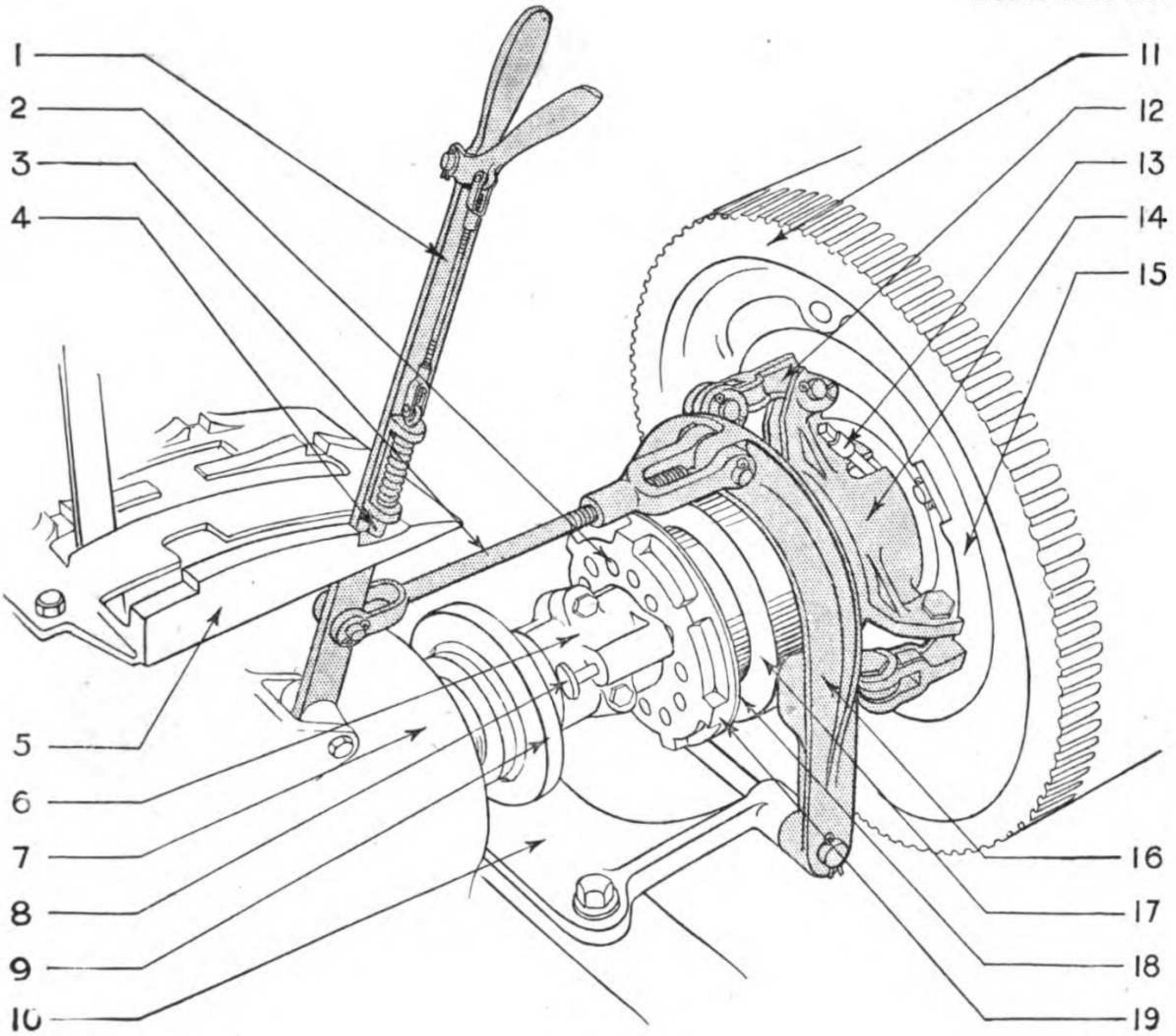


MASTER CLUTCH.

Nomenclature on page 109.

The clutch control connections are shown in Plate 36 from the driver's seat, the master clutch lever (1) engages through the rod and yoke (3) a clutch throw-out bracket (16), which operates on the dogs (12), pulling (33) Plate 37, which in turn carries the master clutch links (28) and the master clutch dogs (12). If the master clutch lever is operated to throw the master clutch "in" the action on the links and dogs is such as to cause the center of the pin in the link closest to the shaft to go past center, thus locking the master clutch and producing pressure between the bronze driving plates and the cast iron driven plates.

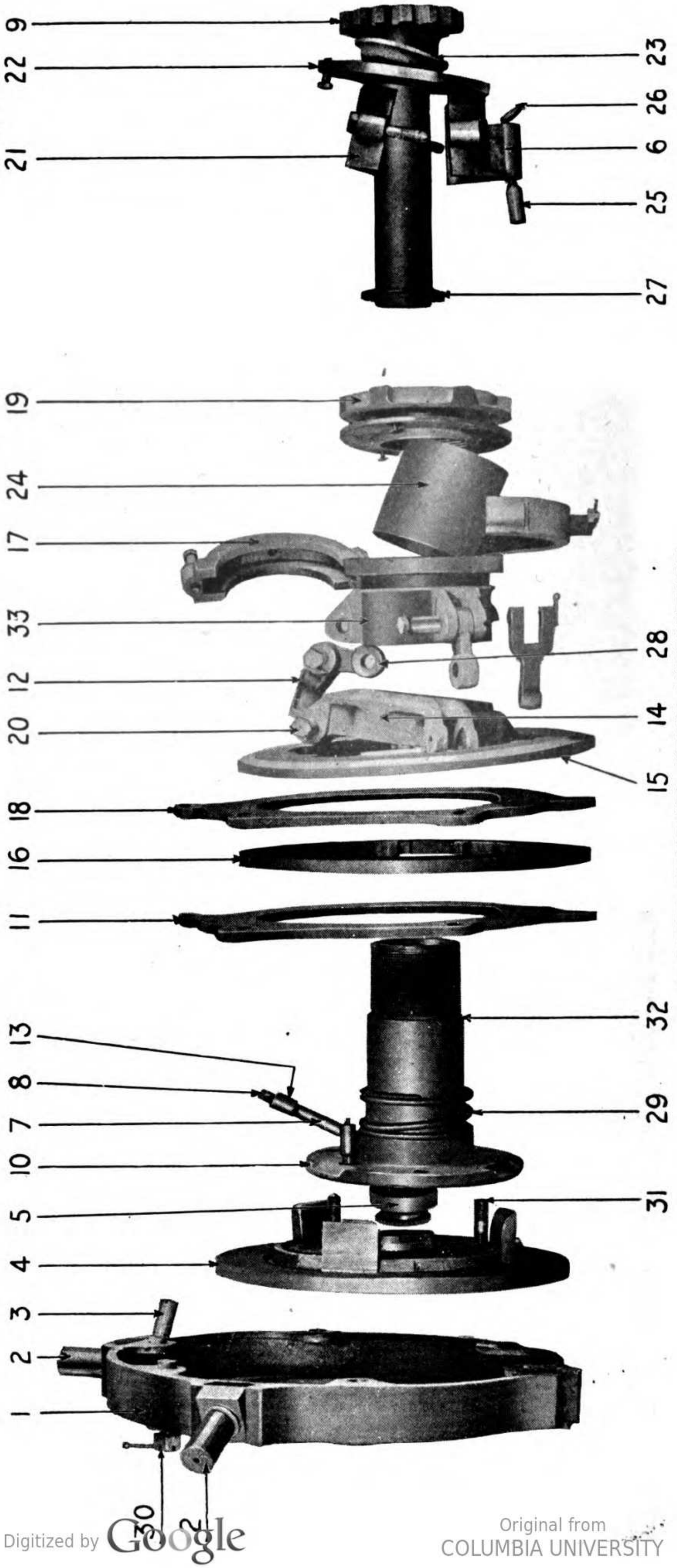
Plate No. 36.



MASTER CLUTCH CONTROL.

Ref. No.	Part No.	Part Name.
1	7269	Master clutch hand lever.
2		Holes for adjusting plunger.
3	7254	Master clutch fork rod.
4	7219	Master clutch hand lever pawl.
5	7275	Selective plate for change gear.
6	6655	Half spacer with plunger hole.
7	7002	Transmission case top.
8	6657	Master clutch adjusting plunger.
9	6843 } 6838 }	Coupling (male and female).
10	7272	Shifter fork support.
11	Z-683	Engine flywheel.
12	6654	Master clutch dog.
13	56371	Coupling, pipe.
14	6668	Master clutch dog holders.
15	1633	Master clutch outer disc.
16	7277	Master clutch shifting fork.
17	6671	Master clutch shifting collar.
18	6666	Master clutch brake disc.
19	6667	Master clutch adjusting collar.

Plate No. 37.

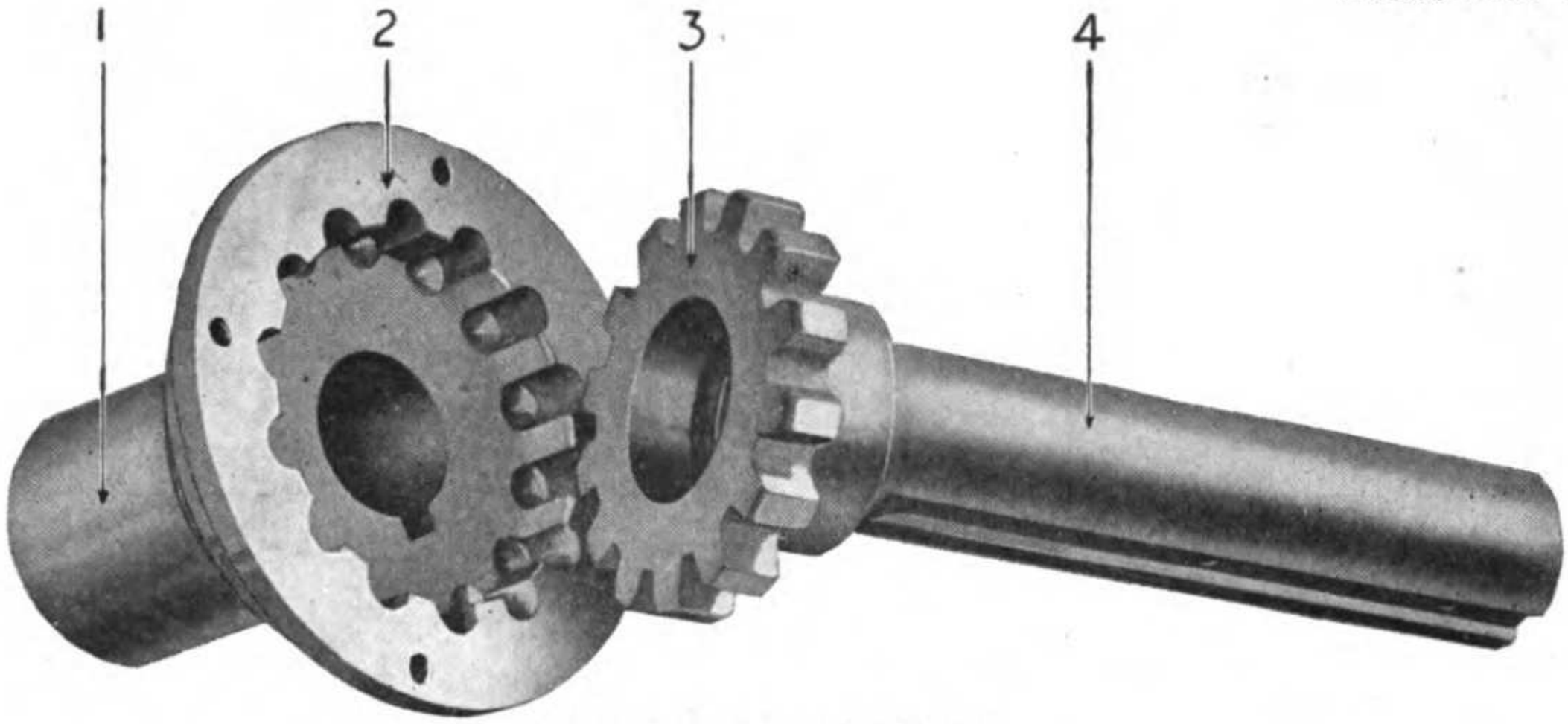


MASTER CLUTCH, SEMI-ASSEMBLED.

When the clutch shifter (33) is moved to its extreme backward position there is no pressure between the disks, consequently the cast iron disks (4), (15) and (16) remain stationary while the bronze disks (11) and (18) are revolving with the flywheel.

The outer end of the inner disk hub is threaded to take a collar (19), which is used for adjusting the clutch. A spring actuated plunger (25) on the half spacer (6) fits into one of a series of holes in the collar (19), providing a lock to prevent the collar turning.

Plate No. 38.



CLUTCH COUPLING.

Ref. No.	Part No.	Part Name.
1		Female coupling hub.
2	6838	Coupling-female half.
3	6843	Coupling-male half.
4		Male coupling shank.

The master clutch assembly is supported by an S. K. F. ball bearing, which is inserted in a recess in the inner disk (4) and fits over the rear end of the **crankshaft.**

MASTER CLUTCH, SEMI-ASSEMBLED.

Ref. No.	Part No.	Part Name.
1	1410	Retaining ring.
2	2306	Flywheel pin.
3	2307	Retaining ring stud.
4	6669	Inner disk.
5	7766	Radial bearing.
6	6655	Half spacer with plunger hole.
7	56551	Nipple.
8	56423	Pipe plug.
9	6843	Coupling, male.
10	6670	Inner disk hub.
11	1630	Disk.
12	6654	Master clutch dog.
13	56371	Coupling.
14	6668	Dog holder.
15	1633	Outer disk.
16	1632	Central disk.
17	6671	Shifting collar.
18	1631	Disk.
19	6667	Adjusting collar.
20	6661	Link pin.
21	6656	Half spacer with keyway.
22	6284	Coupling retaining ring.
23	7721	Dust ring (moulded leather).
24	6664	Spacer.
25	6657	Adjusting plunger.
26	6658	Adjusting plunger spring.
27	6998 } 6999 }	Hub shim.
28	6653	Link.
29	6663	Dog holder spring.
30	53128	Castle nut.
31	6995	Inner disk stud.
32	6670	Inner disk hub.
33	6665	Shifter.

MASTER CLUTCH BRAKE.

To prevent spinning of gears in the transmission when shifting gears, a fiber disk 0.18750 by 7.125 by 7.125 inches in size is riveted to front of adjusting nut (19). When the master clutch is thrown to "out" position, pressing back on the master clutch shifting lever will cause engagement between the two surfaces and act as a brake preventing driven parts of master clutch, and in turn the gears in the transmission, from spinning. It is always necessary to have gears at rest when shifting, unless gears meet with teeth in an end-to-end position. In this case master clutch will have to be revolved a trifle until gear teeth are in proper relation for meshing.

LUBRICATION OF MASTER CLUTCH.

The disks of the master clutch require a certain amount of lubrication to prevent their dragging and cutting. The operator must use his judgment to a certain extent, as operating conditions will vary. Ordinarily, the disks require lubricating once daily; with the engine stopped and the clutch disengaged, squirt a small amount of Specification 3502 between the disks once per day. The 0.5 (½) inch pipe connection (7) having a plug (8) leads to the S. K. F. bearing (5) on the crankshaft. This bearing must be lubricated twice daily by removing the pipe plug (8) and applying a generous amount of Specification 3502 with a squirt can.

The master clutch shifter (17) contains a grease cup which must receive four turns per hour.

The link and dog pins must be given a few drops of cylinder oil each day.

ADJUSTMENT OF MASTER CLUTCH.

There is but one adjustment to the master clutch. The pin (25), Plate 35, engages the adjusting collar (19) in any of the several holes that are drilled in the adjusting collar to receive it, and is locked in position by a spring.

To adjust the master clutch, throw the master clutch lever to "out position," pull the pin (25) back and turn the adjusting nut (19) to the right or to the left, depending on the adjustment wanted. Turning to the right will adjust the master clutch tighter. The female inner disk hub (10) is threaded on the end to receive the adjusting nut (19) and to allow for a wide range of adjustment. Advancing the adjustment nut "in" produces pressure on the part (24), which in turn is transferred to the dogholder (14), the action being to shorten the distance of travel between the center of the pins on the master clutch link next to the shaft and center of the pin on the dog (12), located next to the female outer disk (15). A spring (29) produces pressure to take up any slack between the part (14), (24) and the adjusting nut (19).

When the clutch is properly adjusted the shifting collar (17) should be free to float when the clutch is engaged.

REMOVING MASTER CLUTCH FROM ENGINE.

The master clutch cannot be removed as a unit, but must be disassembled in part.

(*a*) Remove platform covering master clutch.

(*b*) Remove steering column and master clutch shifting fork.

(*c*) Remove four screws in the clutch coupling retaining ring (22).

(*d*) Remove split collar (6) and (21).

(*e*) Remove the three dogs (12).

(*f*) Pull retainer (1) and the four plates out of engagement with flywheel.

(*g*) Uncouple the internal-external tooth clutch coupling.

(*h*) With a light bar apply pressure to the end of the master clutch shaft and collapse it into the clutch toward the engine. This is termed "telescoping the shaft" and gives the necessary clearance for the clutch to be removed without disturbing any other part.

(*i*) After the shaft has been telescoped, lift the clutch back straight until the SKF bearing has come off from the machined end of the crankshaft and the clutch retainer ring is almost out of engagement with the driving pins (2).

(*j*) Tilt the clutch up and lift out.

REPLACING MASTER CLUTCH.

In replacing the master clutch reverse the method of removal.

The four square-headed pins which connect the master clutch retaining ring to the engine flywheel must fit perfectly free in the holes in the flywheel. In replacing the master clutch some difficulty may be experienced in keeping these pins in position, especially the one at the top of the flywheel rim.

Never under any circumstances pein the ends of the pins or the holes in the flywheel to hold the pins in the flywheel while replacing the clutch.

Wrap a piece of paper around the pin and drive it lightly into the hole.

After the clutch is replaced and the tractor placed in operation, a few minutes' run will suffice to work this paper out. This will leave the pins free to "float," which insures a smoother running clutch than if the pins are tight.

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CHAPTER IV.

TRANSMISSION GROUP.

The transmission group includes not only the change-speed gears as in the conventional type of motor vehicle, but also parts of the drive mechanism which in most constructions are embraced in the jackshaft and rear axle. The transmission assembly is immediately to the rear of the master clutch and under the seat assembly. Its case is made in two sections, the upper section containing all the change-speed gears. These are of the selective type, the set providing for three speeds forward and one reverse. Direct drive is on second or intermediate. The change-speed gearset is located at the forward end of the upper half of the transmission case and includes gears on the main or pinion shaft which mesh with gears on the countershaft placed above the mainshaft. An idler shaft also is provided which carries the reverse gear.

Plate 39 shows the upper half of the transmission case as seen from below. At the forward end is the change-speed gearset. Back of these and at the rear of the transmission is a bevel pinion and bevel gear driving the steering clutch shaft assembly.

The change-speed gearset and the steering clutch shaft assembly are assembled as a unit and comprise the upper half of the gear case and may be removed as a unit by lifting it off the bottom half of the gear case. All gears are open-hearth steel, case-hardened. The parts of the gearset are shown disassembled in Plate 44.

SPEEDS.

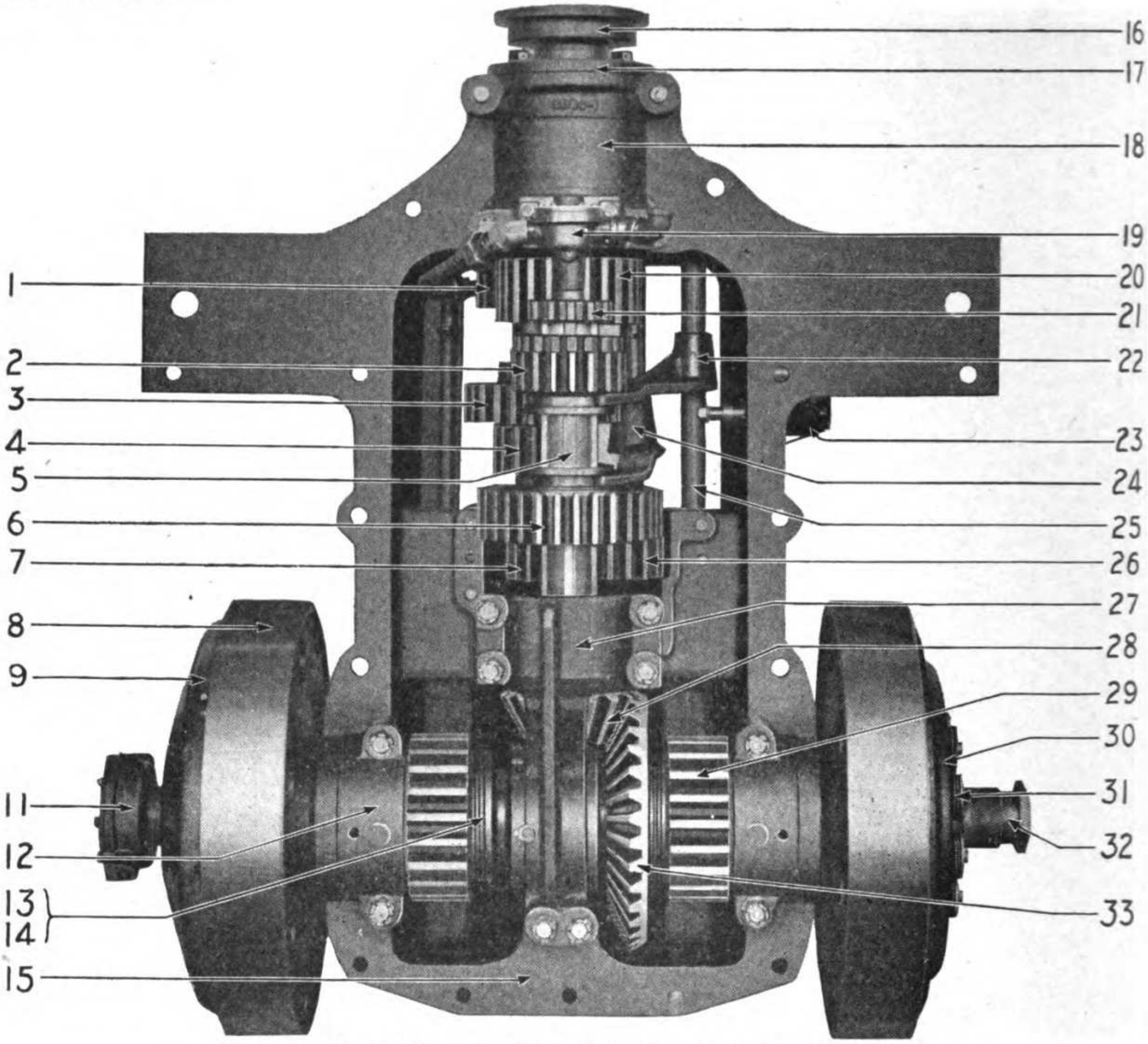
At 600 revolutions per minute of the engine the speed of the tractor is as follows:

Low, 1.47 miles per hour.
Direct, 2.71 miles per hour.
High, 4.19 miles per hour.
Reverse, 1.09 miles per hour.

LOW SPEED.

In Plate 40, for "low" (first speed), power is transmitted from the twenty-four tooth spur coupling gear (20) to the twenty-three tooth gear (1) keyed to the countershaft, then from the sixteen-tooth gear (4), which is integral with the countershaft to the thirty-one tooth sliding gear (6) on the pinion shaft (5), then from the seventeen-tooth bevel pinion (28), Plate 39, to the thirty-five-tooth bevel gear (33) on the steering clutch shaft.

Plate No. 3[illegible].



TRANSMISSION ASSEMBLY—UPPER HALF.

DIRECT SPEED.

For "direct" (second) the power goes from the spur coupling gear (20), Plate 41, to the pinion shaft (5) by meshing the nineteen-tooth sliding gear (2) inside the twenty-four-tooth gear (20) [gear (20) is internally and externally toothed, having nineteen teeth inside and twenty-four teeth outside], thus locking the two shafts together, and power goes direct to the seventeen-tooth bevel pinion without the use of any change-speed gears.

The splined bevel pinion shaft (5) is supported at the forward end on a Hyatt bearing which is located inside of the internal-external tooth gear (20). The seventeen-tooth bevel pinion (28), Plate 39, is supported on a Hyatt roller bearing and in turn provided with a ball thrust unit.

HIGH SPEED.

For "high" (third) speed the power goes from the twenty-four-tooth gear (20), Plate 42, to the twenty-three-tooth gear (1), through the coun-

TRANSMISSION ASSEMBLY—UPPER HALF.

Ref. No.	Part No.	Part Name.
1	6240	Transmission countershaft spur gear (23 tooth).
2	6236	Transmission bevel pinion shaft spur gear (19 tooth).
3	6238	Transmission countershaft spur gear (28 tooth).
4	6245	Transmission countershaft gear (16 tooth).
5	6852	Transmission bevel pinion shaft.
6	6237	Transmission bevel pinion shaft gear spur gear (31 tooth).
7	6245	Transmission countershaft gear (12 tooth).
8	6889	Steering clutch housing.
9	6888	Steering clutch housing dust guard.
11	6896	Steering clutch shifter ring.
12	7137	Transmission steering clutch bearing.
13	6854	Transmission steering clutch shaft thrust washer.
14	6855	Transmission steering clutch shaft thrust washer.
15	7002	Transmission case (upper).
16	6838	Transmission coupling.
17	6961	Transmission coupling bearing collar.
18	6864	Transmission coupling bearing cap.
19	7735	Transmission oil pump assembly.
20	6841	Transmission coupling spur gear (24 tooth).
21	6861	Transmission oil pump spur gear.
22	6876	Transmission gear shifter fork, high and direct.
23		Speedometer.
24	6877	Transmission gear shifter fork, low, and reverse.
25	6295	Transmission gear shifter shaft.
26	6842	Transmission reverse idler pinion.
27	6868	Transmission bevel pinion bearing cap.
28	6837	Transmission bevel pinion.
29	6244	Transmission steering clutch spur gear.
30	6899	Steering clutch pressure ring.
31	6900	Steering clutch spring.
32	6881	Steering clutch pressure ring nut.
33	6844	Transmission steering clutch shaft bevel gear (35 tooth).

tershaft to the twenty-eight-tooth gear (3) to the nineteen-tooth sliding gear (2), and then on to the bevel pinion (28), Plate 39.

REVERSE.

For "reverse" the power goes from the twenty-four-tooth gear (20), Plate 43, to the twenty-three-tooth gear (1), then from the twelve-tooth pinion (7), which is integral with the countershaft, to the sixteen-tooth reverse pinion (26) and then to the thirty-one-tooth sliding gear (6) on the pinion shaft (5), and then to the seventeen-tooth bevel pinion (28), Plate 39.

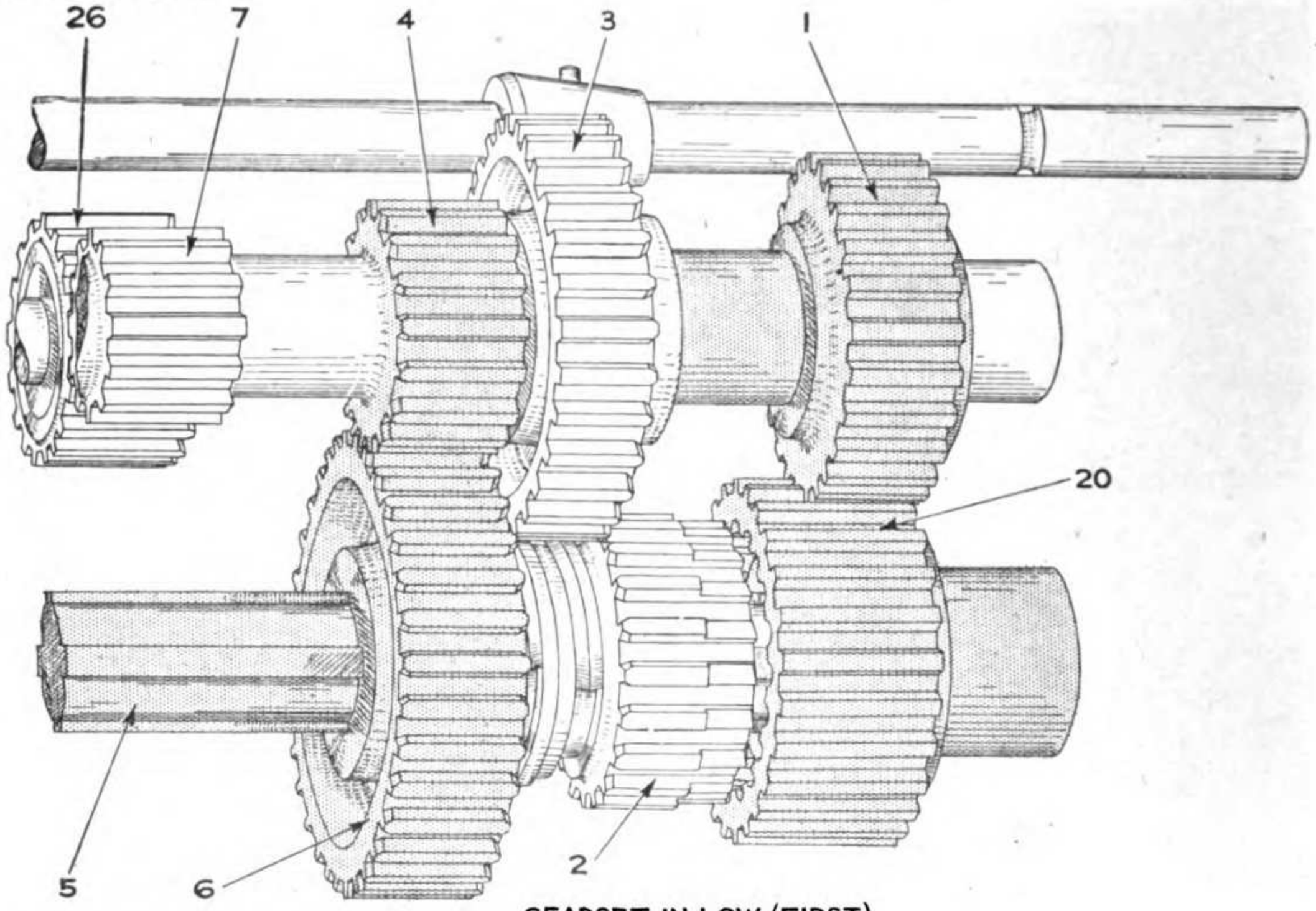
GEAR SHIFTING POSITIONS ON SELECTIVE PLATE.

See Plate 4.

For "low" move the shifting lever to the right and forward—to "L."
For "direct" move the shifting lever to the left forward—to "D."
For "high" pull to the left and back—to "H."
For "reverse" pull shifting lever to the right and back—to "R."

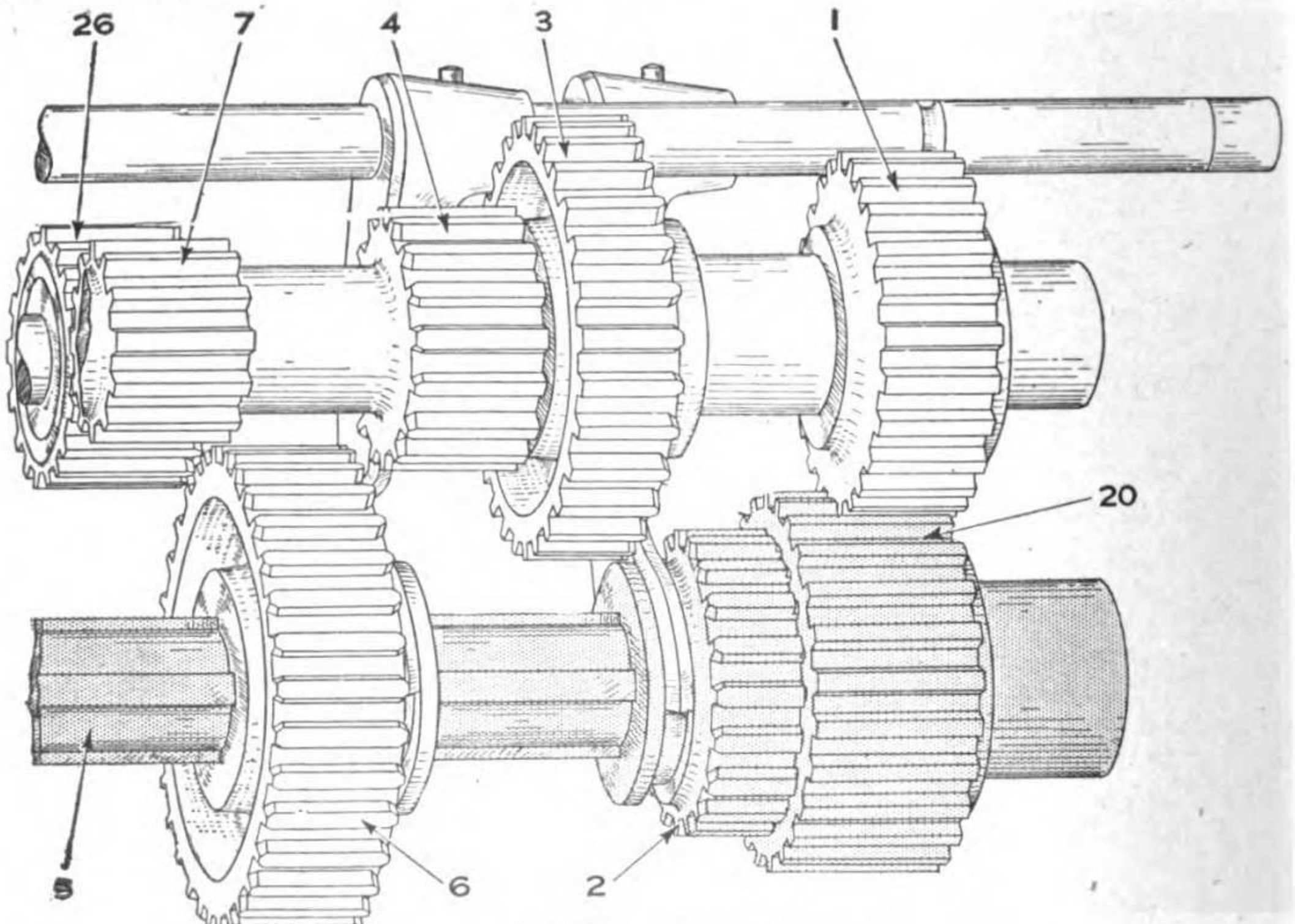
Caution.—Never attempt to shift gears while the master clutch is spinning. A brake is provided to prevent the master clutch from rotating when the clutch is thrown to "out" position.

Plate No. 40.



GEARSET IN LOW (FIRST)

Plate No. 41.



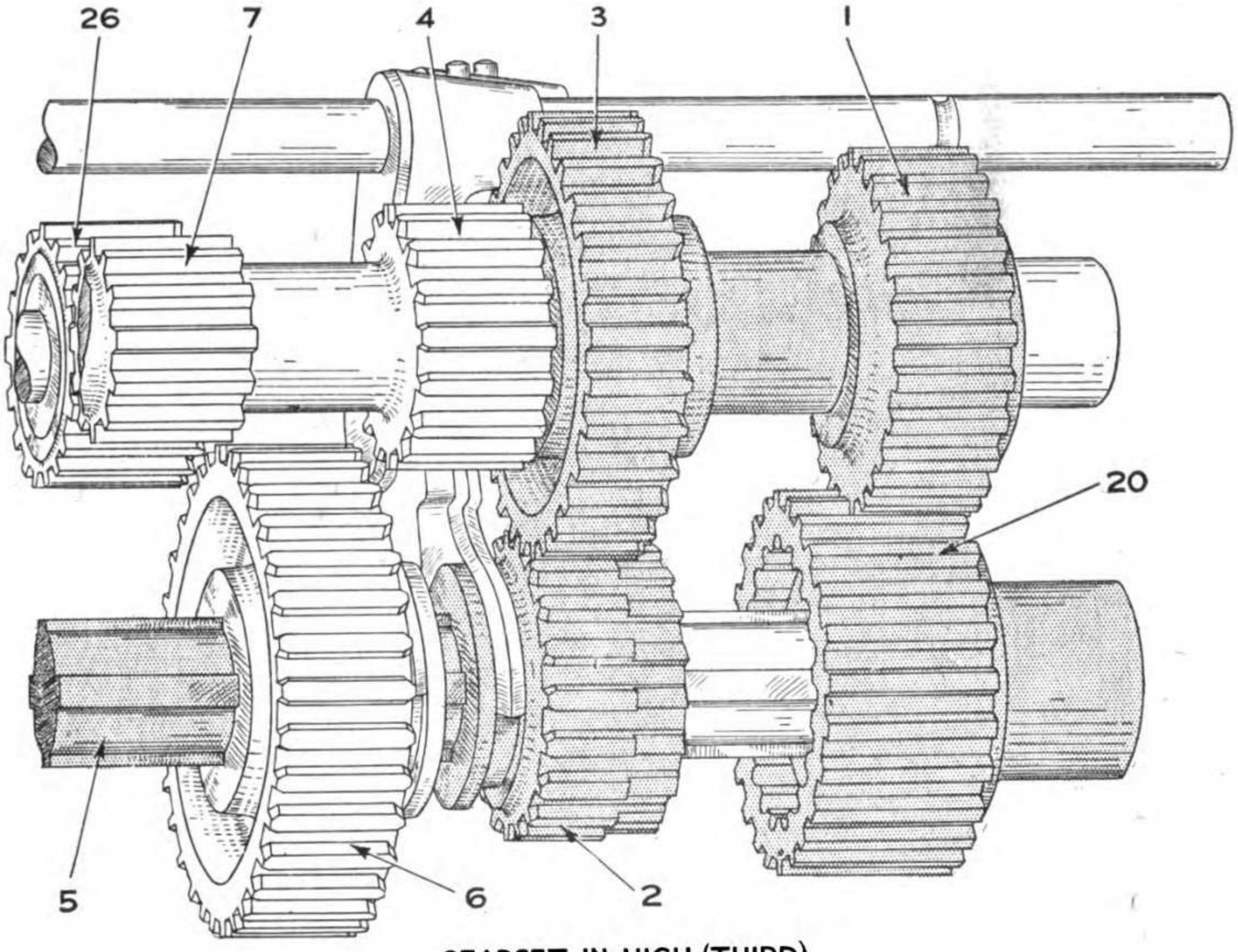
GEARSET IN DIRECT (SECOND)

TRANSMISSION GEARSET COMBINATION.

Shaded parts carry drive.

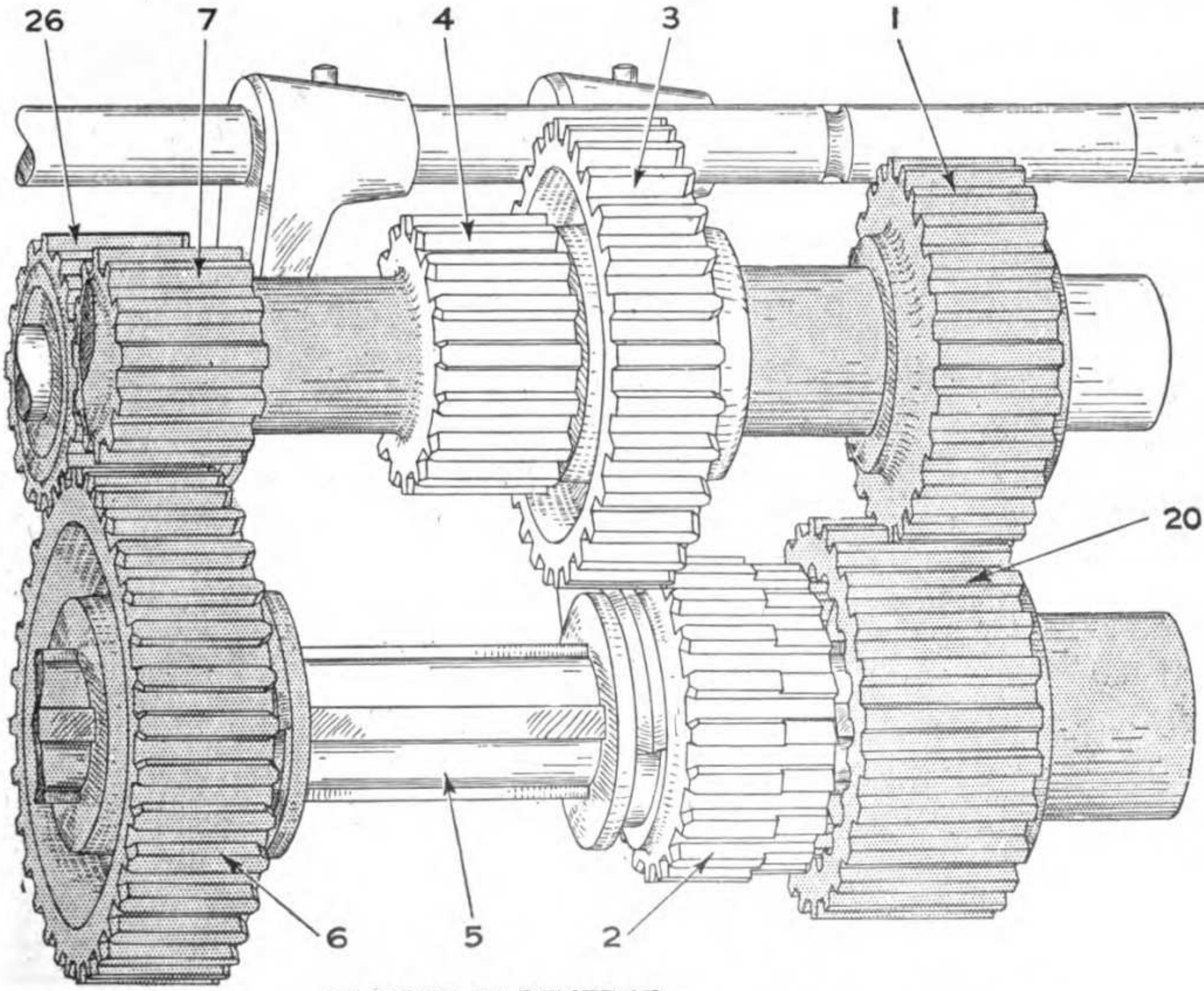
Ref. No.	Part No.	Part Name.
1	**6240**	Transmission countershaft spur gear, 23-tooth.
2	**6236**	Transmission bevel pinion shaft spur gear, 19-tooth.
3	**6238**	Transmission countershaft spur gear, 28-tooth.
4	**6245**	Transmission countershaft gear.
5	**6852**	Transmission bevel pinion shaft.
6	**6237**	Transmission bevel pinion shaft spur gear, 31-tooth.
7	**6245**	Transmission countershaft reverse gear.

Plate No. 42.



GEARSET IN HIGH (THIRD)

Plate No. 43.

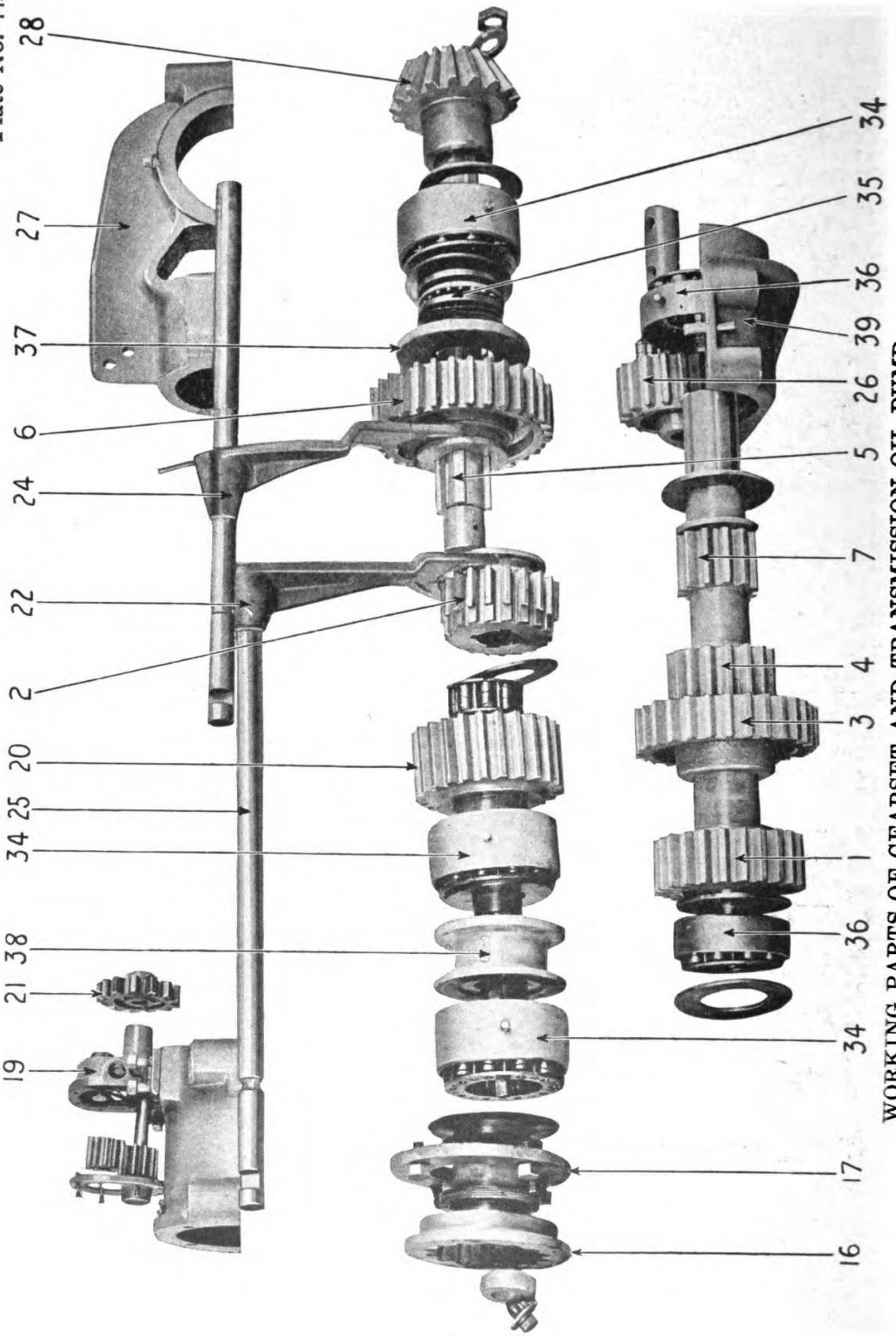


GEARSET IN REVERSE

TRANSMISSION GEARSET COMBINATION.

Shaded parts carry drive.

Plate No. 44.



WORKING PARTS OF GEARSET AND TRANSMISSION OIL PUMP.

BEARINGS.

Plates 39 and 44 show the bearings in the transmission. Hyatt roller bearings are used to take the radial load and ball bearings are employed to take the thrust from bevel pinion and gearset. A Gurney radial thrust bearing is employed at each end of the steering clutch housing.

There are two plain bearings in the transmission case on the steering shaft assembly. These bearings are where the cast-iron steering clutch housing rotates on the 3.5 (3½) per cent nickel-steel shaft. These plain bearings are only in use when one track or the other is disengaged for steering purposes.

HINTS ON SHIFTING GEARS.

In shifting gears in the transmission, it is necessary that the master clutch driven members remain stationary. Occasionally, however, the gears will meet for mesh with the teeth in such an end to end position that meshing cannot be accomplished. In this case, press on the gear shifter lever in the direction it is desired to shift and with the right hand advance master clutch lever slowly to throw the master clutch

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TRANSMISSION GEAR, SEMI-ASSEMBLED.

Ref. No.	Part No.	Part Name.
1	6240	Transmission countershaft spur gear, 23-tooth.
2	6236	Transmission bevel pinion shaft spur gear, 19-tooth.
3	6238	Transmission countershaft spur gear, 28-tooth.
4	6245	Transmission countershaft gear.
5	6852	Transmission bevel pinion shaft.
6	6237	Transmission bevel pinion shaft spur gear, 31-tooth.
7	6245	Transmission countershaft reverse gear.
16	6838	Transmission coupling (female half).
17	6961	Transmission coupling bearing collar.
19	7735	Transmission oil pump case.
20	6841	Transmission coupling spur gear, 24-tooth.
21	6861	Transmission oil pump spur gear.
22	6876	Transmission gear shifter fork (high and direct).
24	6877	Transmission gear shifter fork (low and reverse).
25	6295	Transmission gear shifter shaft.
26	6842	Transmission reverse idler pinion, 16-tooth.
27	6868	Transmission bevel pinion bearing cap.
28	6837	Transmission bevel pinion.
34	7762	Transmission bevel pinion bearing.
35	7774	Transmission bevel pinion thrust bearing.
36	7764	Transmission countershaft bearing.
37	6279	Transmission bevel pinion thrust bearing washer.
38	6828	Transmission coupling bearing spacer.
39	6869	Transmission countershaft bearing cap

into slight movement, and when the gears are in correct relation they will mesh. The action corresponds to the letting the clutch partly "in" on an automobile, when the gears will not shift.

LUBRICATION OF TRANSMISSION.

Lubrication of the transmission is effected by a combined splash and force-feed system. The two intermediate gears (2), Plate 45, located

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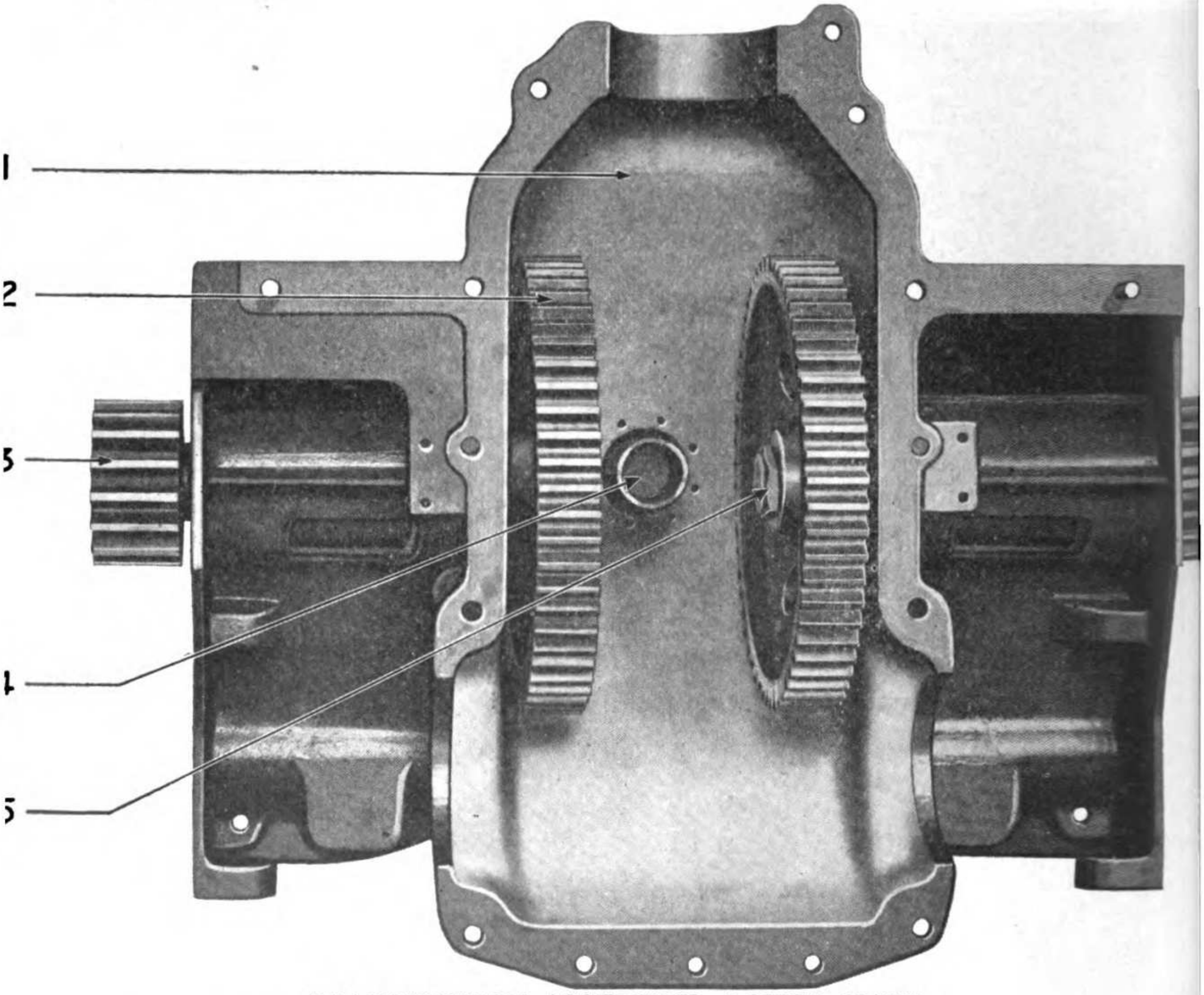
Plate No. 45.



TRANSMISSION ASSEMBLY—LOWER HALF.

Ref. No.	Part No.	Part Name.
1	6303	Transmission case, lower.
2	6840	Transmission intermediate shaft spur gear.
3	6839	Intermediate shaft spur drive pinion.
4	7366	Transmission oil sump case.
5	6621	Transmission intermediate shaft nut.

---

in the bottom half of the gear case dip to a considerable depth in the oil in the transmission case and carry a generous amount of oil to the two spur pinions (29), Plate 39.

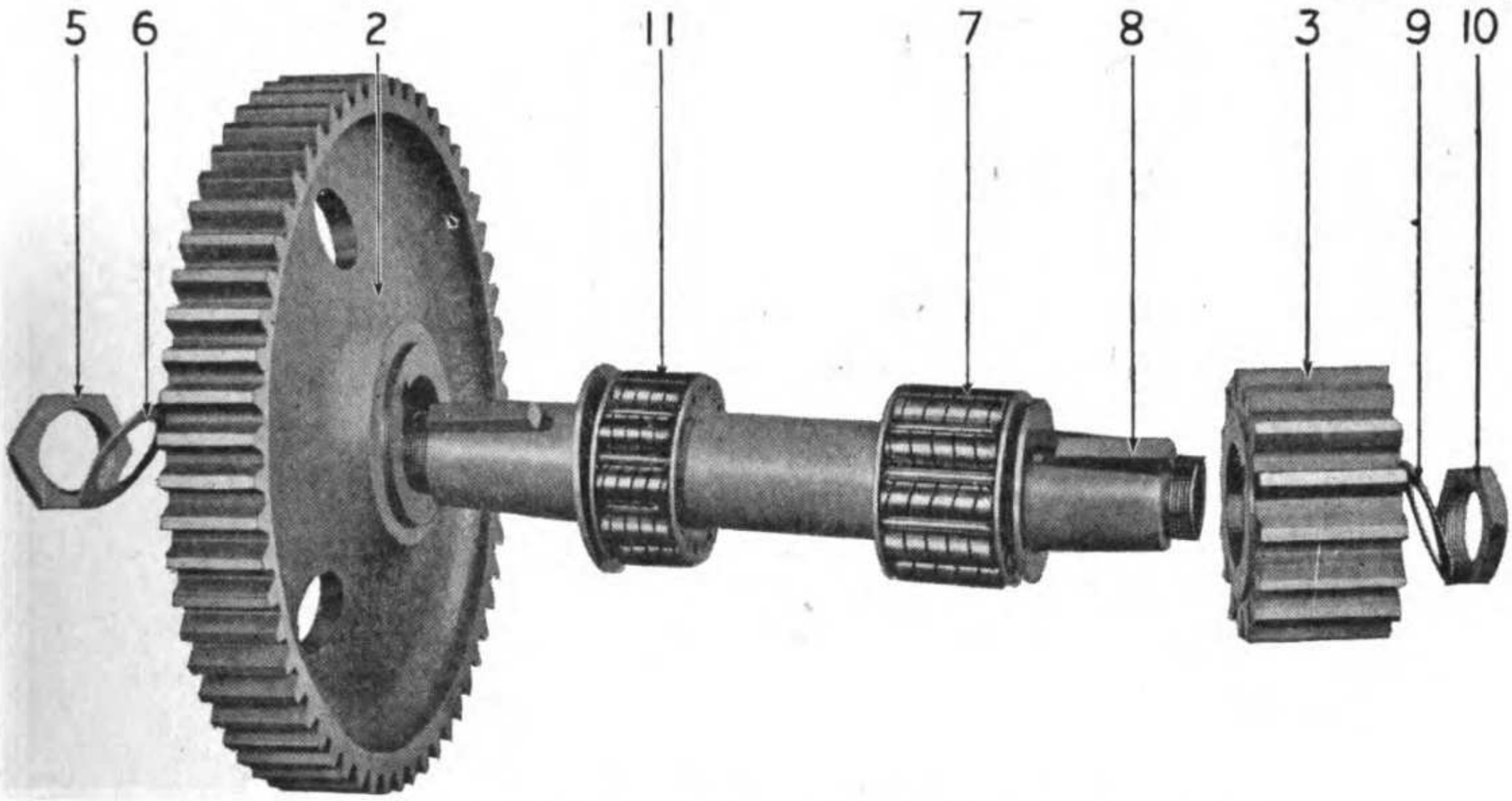
Oil is pumped to all gears and bearings in the upper half of the trans-

mission case by a rotary gear pump (19), Plate 39, which is gear driven off the twenty-four-tooth gear.

In Plate 47 a pipe (9) runs from the pump outlet to the upper part of transmission case where smaller pipes lead off to the various points of distribution. Another pipe (15) leads from pump inlet to oil supply in bottom of the transmission case.

A screen (14) is provided at this point to prevent any foreign matter that might be in the oil from getting into the pump and interfering with its action.

Plate No. 46.



INTERMEDIATE SHAFT, GEAR AND PINION.

Ref. No.	Part No.	Part Name.
2	6840	Transmission intermediate shaft spur gear.
3	6839	Transmission intermediate shaft spur drive pinion.
5	6621	Transmission intermediate shaft nut.
6	6622	Transmission intermediate shaft nut lock washer.
7	7761	Transmission intermediate shaft bearing (Hyatt).
8	6794	Transmission intermediate shaft key.
9	6622	Transmission intermediate shaft lock washer.
10	6621	Transmission intermediate shaft nut.
11	7762	Transmission intermediate shaft bearing (Hyatt).

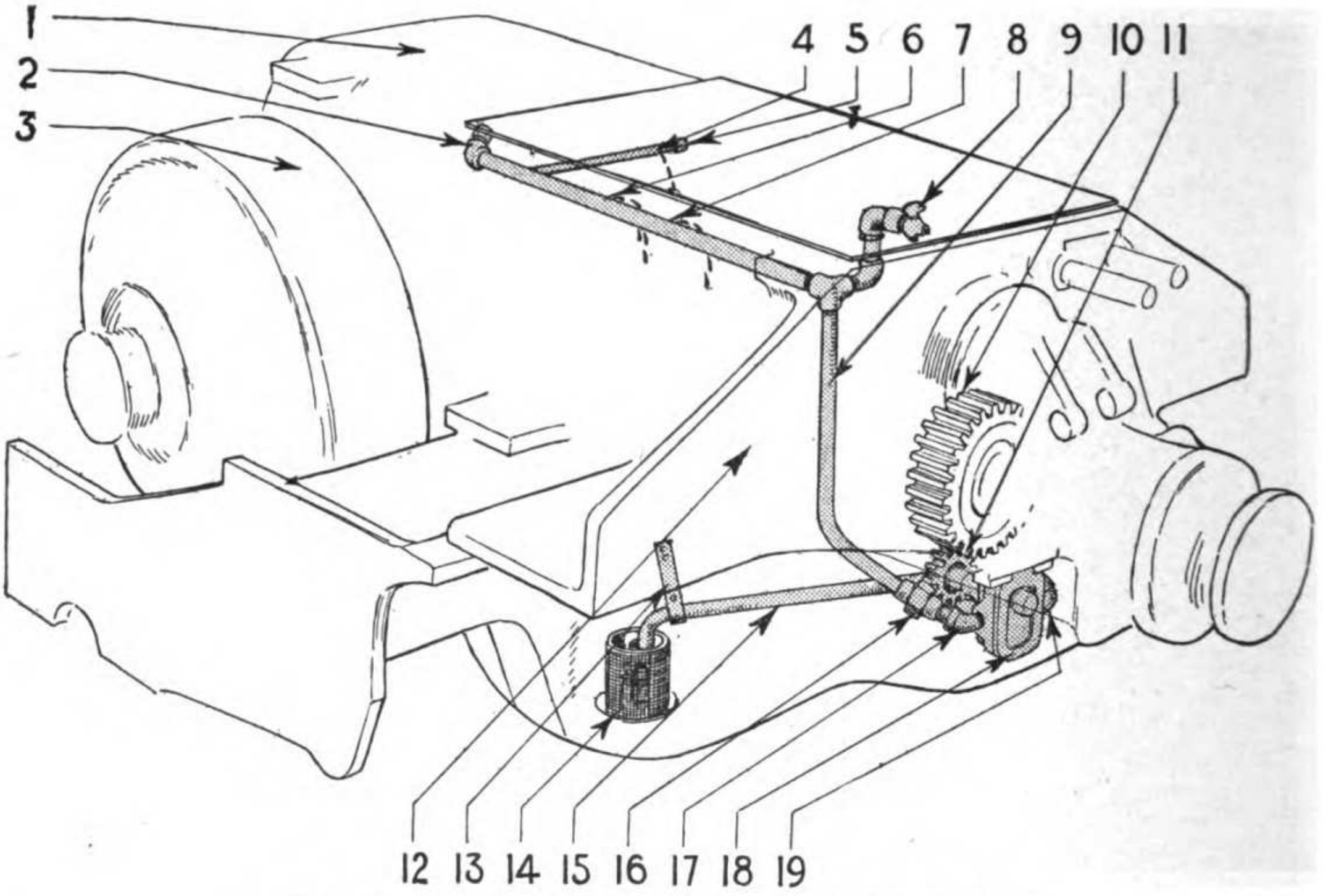
A test cock (8) is placed in the pipe line in the top of transmission case at the forward right-hand corner. By opening this cock one can ascertain if oil is being pumped to the top of the case.

OIL DRAIN.

In Plate 47 the oil pump case to which the screen (14) is attached is placed in the bottom of the transmission case and is held in place by eight cap screws. If the screen becomes clogged with sediment it can be easily removed for cleaning by taking out the cap screws holding it in place.

Whether the screen clogs or not, this plate should be removed and the oil drained from the transmission at least once every 90 days, the transmission case washed out with kerosene and new transmission oil put in. Be sure when replacing the plate that the gasket is in good condition, and the eight cap screws are locked in place by wiring them together, holes being drilled through the heads of the cap screws for this purpose.

Plate No. 47. z



TRANSMISSION LUBRICATION SYSTEM.

Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.
1	7002	Transmission case, upper half.	10	6841	Transmission spur coupling gear.
2	54373	Street ell.	11	6861	Oil pump drive spur gear.
3	7200	Steering clutch assembled.	12	7002	Transmission case, upper.
4		Oil spray hole.	13	7365	Inlet pipe brace.
5	56447	Pipe cap.	14	7298	Wire cloth screen.
6		Oil spray hole.	15	7369	Inlet pipe.
7		Oil spray hole.	16	56401	Union.
8	51243	Straight nose air cock.	17	54373	Street ell.
9	7368	Intermediate pipe.	18	7735	Oil pump.
			19	54295	Ell.

BREATHER PIPE AND OIL FILLER.

The transmission contains a combined breather pipe and the oil filler at the rear left corner of the upper half of the transmission case.

The primary purpose of the breather is to vent the transmission, thus removing the heat generated by internal friction of the oil. To fill the transmission, unscrew the breather cap from the pipe. In filling the transmission be on guard to prevent the entrance of dirt or other foreign matter with the oil.

TRANSMISSION OIL.

The transmission must be lubricated at all times with Spec. No. 3504 transmission oil.

TRANSMISSION OIL LEVEL.

The transmission oil level is made extra high for safety. The test plug is located in rear end of the lower half of the gearcase near right-hand side and is readily accessible.

Remove the plug when the tractor is standing level, and if oil drains out, allow it to continue until the flow stops, as the oil level is too high. Do not put in additional oil. When the transmission is being refilled after being emptied for any cause, fill until the oil runs out of the oil level hole.

TRANSMISSION HEATING.

In case a transmission heats, there are three likely causes in the lubrication to account for it.

First—The oil level may be too high. A tractor operator errs on the side of having too high an oil level in the transmission. If the oil level of the transmission is too high, heat can be generated very rapidly by internal friction, caused by the gears churning the oil. A transmission with a correct oil level should heat but a very few degrees above air temperature.

Second—The wrong kind of transmission lubricant; such as cylinder oil, a mixture of cup grease and cylinder oil and extremely heavy transmission oil or transmission compounds.

Third—The oil may contain grit and dirt that will gum up ball and roller bearings, and also interfere with the proper action of the oil pump in the transmission case.

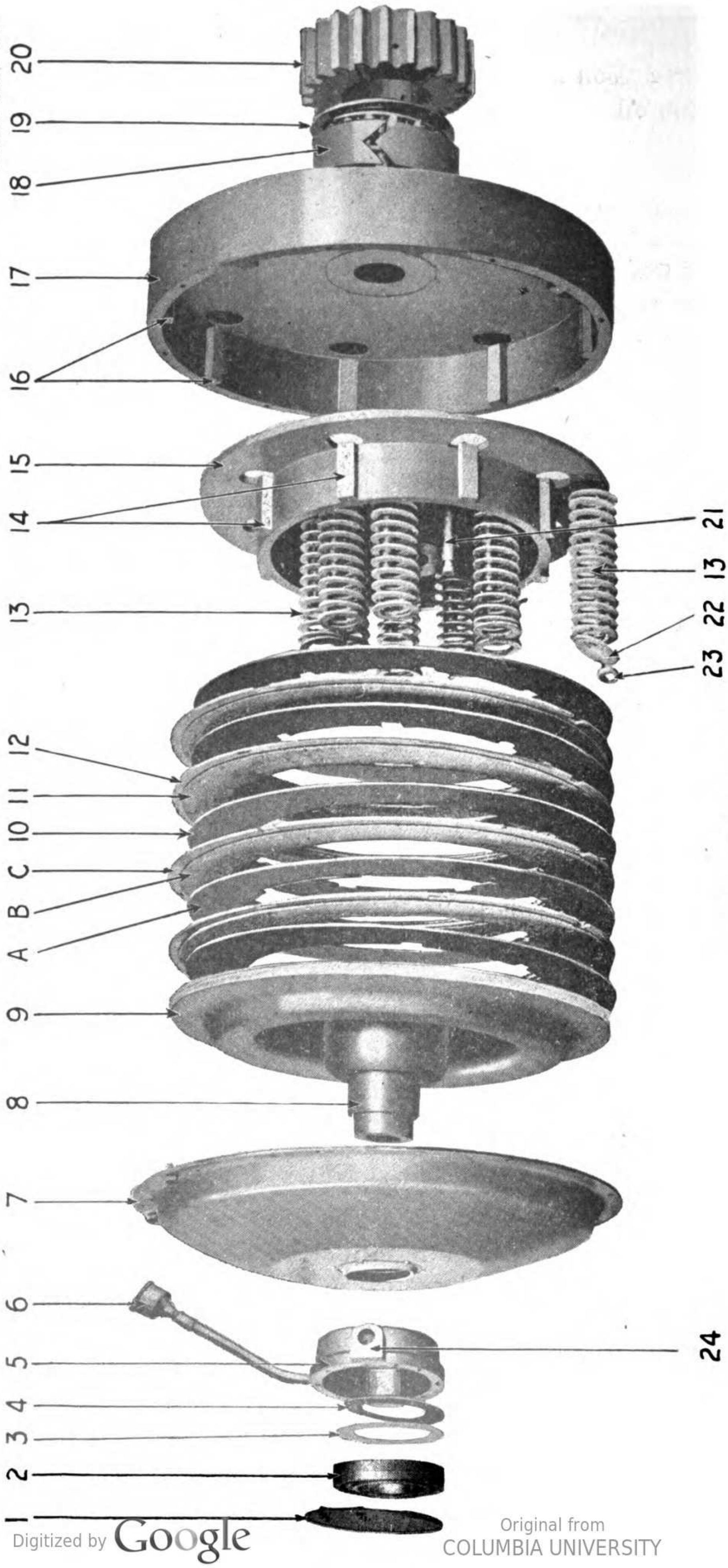
Keep transmission oil clean. Transport it in clean containers and be careful when filling the transmission not to let any dirt fall into the oil or case.

TRANSMISSION CASE—LOWER HALF.

Refer to Plate 45. The lower half of the transmission case contains the intermediate shaft gears (2). The intermediate shaft gear (2) fits over the tapered end of the intermediate shaft, sliding over it on a key and in turn is locked by a large nut (5) and washer (6), Plate 46. A spur pinion (3) outside the case and on the opposite end of the shaft and called the drive pinion, fits in a manner similar to the intermediate gear. The intermediate shaft is supported on two large heavy-duty Hyatt roller bearings (7), Plate 46.

The bottom of the transmission case provides an oil reservoir for the splash lubrication and in addition has the well and strainer (4), Plate 47,

Plate No. 48.



STEERING CLUTCH PARTS.

for the force-feed oiling system to the upper part of the transmission case.

The intermediate shaft spur gears (2), Plate 45, mesh with and are driven by the steering clutch spur gears (29), Plate 39, the drive pinions (3), Plate 45, meshes with and drives the drive gear (5), Plate 50.

THE STEERING CLUTCH ASSEMBLY.

At the rear of the gearcase behind the transmission is located the steering clutch assembly. The power comes from the gearset through the bevel pinion (28), Plate 39, on to bevel gear (33). The bevel gear (33) is keyed solid to the steering clutch shaft. The key and steering clutch retainer is locked by a nut and this nut is locked.

Plate 49 shows the steering clutch and shaft assembled with the bevel gear and the spur pinion which transmits the drive to the intermediate gear inside the transmission housing. Construction of the steering clutch will be seen by referring to Plate 48, which shows it disassembled.

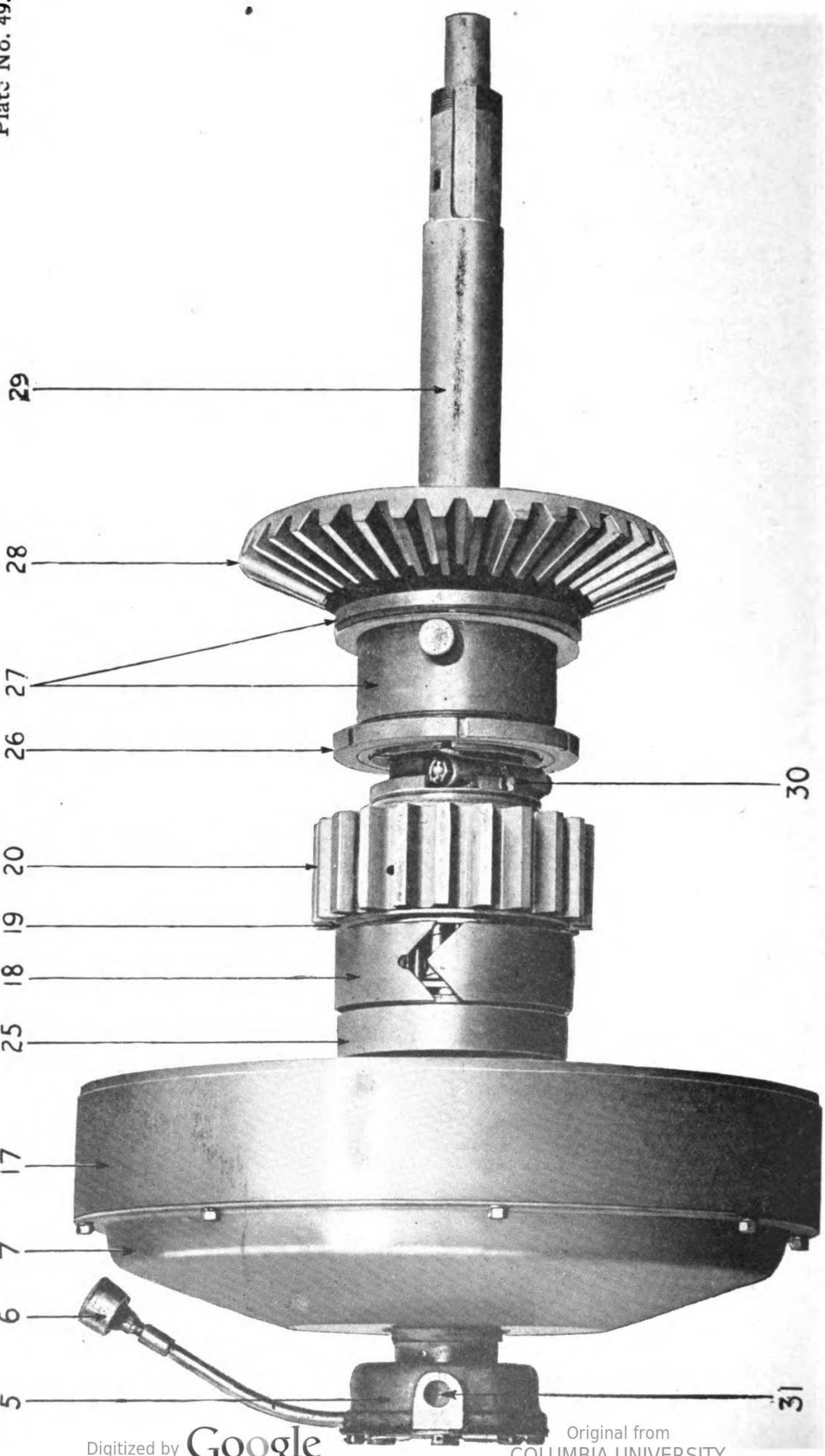
The steering clutch retainer (15) is keyed to the steering shaft. This is the driving member of the steering clutch. The clutch is a multiple-disk, dry-plate type.

Five steel annular members called disks (10) are notched at eight places on their inner edges to slip over driving lugs (14). Between these five driving disks (10) are located four driven disks (11). The driven disks (12) are notched in eight places on their outer edges to fit over eight driven lugs (16), secured on the inner surfaces of the clutch housing or driven member. Each driven disk (12) has a Raybestos fibre disk (11) riveted on each side.

STEERING CLUTCH PARTS.

Ref. No.	Part No.	Part Name.
1	6882	Steering clutch shifting ring cover plate.
2	7763	Steering clutch radial thrust bearing.
3	6883	Steering clutch shifting ring dust washer retainer.
4	6887	Steering clutch dust washer.
5	6896	Steering clutch shifting ring.
6	7149	Steering clutch grease cup.
7	6888	Steering clutch housing dust guard.
8		Steering clutch pressure ring hub.
9	6899	Steering clutch pressure ring.
10	6894-A	Steering clutch driving disk.
11	6895-B	Steering clutch friction lining.
12	6893-C	Steering clutch driven disk.
13	6900	Steering clutch spring.
14	6886	Steering clutch retainer disk key.
15	6898	Steering clutch retainer.
16	6485	Steering clutch housing disk key.
17	6889	Steering clutch housing.
18	7772	Steering clutch bearing.
19	7135	Steering clutch bearing washer.
20	6244	Steering clutch spur gear.
21	6901	Steering clutch spring stud.
22	6902	Steering clutch spring retainer.
23	6959	Steering clutch spring retainer stop.
24		Steering clutch shifting fork hole.

Plate No. 49.



STEERING CLUTCH, SHAFT, GEAR AND BEVEL GEAR.

Nine 150-pound springs (13), produce pressure against the pressure ring (9), so that when the clutch is "in," the driving disks (10), and driven disks (12) are squeezed into contact. The pressure ring (9) revolves with the steering clutch retainer (15), being driven by three studs (21). In order to produce even pressure on the driving plates (10) and driven plates (12), the pressure ring is guided on the steering clutch retainer (15) and on the tapered end of the steering clutch shaft.

When the steering clutch is "in," power is transmitted from steering clutch retainer (15) to the driving disks (10), then by contact to driven disks (12) on to the driven lugs (16), and thence to steering clutch retainer housing (17).

When the power is delivered to steering clutch retainer housing (17), it is brought back inside the gearcase and power is delivered to the steering clutch spur pinion (20), keyed on to the end of hub of steering clutch retainer housing (17).

The steering clutch spur pinion (20), Plate 48, and (29), Plate 39, delivers the power to the intermediate gear (2), Plate 45, as shown in Plate 3, and through the intermediate shaft to the intermediate drive pinion. When the clutch is thrown to the "out" position there is no contact between the plates (10) and (12), Plate 48, with the result that the clutch retainer housing (17) remains stationary. This then breaks the chain of power to the intermediate drive pinion, and in turn to the track drive sprocket and track.

STEERING CLUTCH, SHAFT, GEAR AND BEVEL GEAR.

Ref. No.	Part No.	Part Name.
5	6896	Steering clutch shifting ring.
6	7149	Steering clutch grease cup.
7	6888	Steering clutch housing dust guard.
17	6889	Steering clutch housing.
18	7772	Steering clutch bearing.
19	7135	Steering clutch bearing washer.
20	6244	Steering clutch spur gear.
25	7132	Steering clutch shaft oil retainer outer ring.
26	6863	Steering clutch shaft bearing housing adjusting nut.
27	6851	Steering clutch shaft bearing housing.
28	6844	Steering clutch shaft bevel gear.
29	6870	Steering clutch shaft.
30	6849	Steering clutch shaft thrust collar.
31		Steering clutch shifting fork hole.

The clutch is thrown to "out" position by the operation of a lever and bracket attached at (24), Plate 48, and (31), Plate 49. A Gurney radial thrust bearing (2), whose outer race is anchored to the steering clutch shifting ring (15), and the bottom race locked on to the pressure ring (9), transfers the movement to the pressure ring (9), compressing the springs (13) and taking the pressure from the driving and driven disks.

ADJUSTMENT OF STEERING CLUTCH.

The steering clutch itself has no adjustment. When the Raybestos fibre on both sides of the driven disks wears too thin new fibre will have to be riveted to the plate. The clutch should not slip if not worn, unless oil gains admission to the surface of the disk. The steering shaft housing must be kept free from the presence of oil. There are adjustments in the linkages as described in the chapter on controls.

LUBRICATION OF STEERING CLUTCH.

Two holes drilled in the hub of the clutch retainer housing between the steering clutch gear and the edge of the gearcase provides for the admission of the transmission oil supply between it plain cast-iron bearing and a 3.5 per cent nickel-steel steering clutch shaft. A packing ring prevents this lubrication reaching the steering clutch. The Gurney radial thrust bearing (2) on the end of each steering clutch is lubricated by means of a grease cup (6) piped up into the steering clutch throw-out bracket to be convenient of access. Use Spec. 3506, giving these grease cups four turns four times daily.

REMOVING TRANSMISSION IN FIELD.

To remove or raise the transmission in the field, remove the seat, platform over master clutch, steering column, and gas tank bracket. Uncouple the universal joint between master clutch and transmission, removing half spacer split collar (6), Plate 36, and telescope the shaft into the master clutch. Remove all bolts holding the transmission on lower gearcase and main frame. With two pry bars applied under steering clutch housing lift up rear of transmission a short distance and block up. Pry up front of transmission and block. Pry and block up transmission till clear of interference with intermediate spur gear, then skid transmission back and onto platform or on the ground.

TO REMOVE STEERING CLUTCH SHAFT.

(*a*) Remove transmission as outlined above.

(*b*) When transmission is lifted from lower gearcase, stand it on end on platform or turn transmission upside down.

(*c*) Remove brackets for bearings on steering clutch shaft and pinion shaft.

(*d*) Steering clutch shaft can then be pried out or lifted out.

CHAPTER V.

DRIVE SPROCKET AND GEAR.

Plate 50 shows the drive gear and track drive sprocket assembly. The drive gear (5), Plate 50, receives power from the intermediate drive pinion (3), Plate 46. The drive gear (5), Plate 50, and the track drive sprocket (12) are keyed onto the same sleeve (15). The dust guard (10) over the drive gear (5) is mounted with an oil-tight fit on the sleeve and between the drive gear and the track drive sprocket.

TRACK DRIVE SPROCKET SHAFT.

The track drive sprocket shaft running through the sleeves (15) and clear across the tractor, and which supports the external gear and track drive sprocket assembly, is a 3½ per cent nickel-steel shaft ground to a final diameter where the assembly rests. This track drive sprocket shaft is a dead shaft, being held into place and in line by babbitted bearings in the lower part of frame and the lower part of the rear of gearcase. The drive sprocket and gear assembly are mounted on a heavy-duty Hyatt roller bearing which rotates on the track drive sprocket shaft. This assembly is locked into place by a plate and cap screw. A dust cap (9), Plate 50, is placed over the end of this assembly to exclude dirt from the bearings.

LUBRICATION OF DRIVE SPROCKET AND GEAR ASSEMBLY.

The dust guard (10) should be filled with transmission oil (Spec. 3504). Apply this oil through the plug that will be found in the lower part of the dust guard. The correct oil level is reached when oil will flow out of this hole. The track drive sprocket shaft is drilled along the axis, and two holes are drilled at right angles, so that the bushing and Hyatt roller bearings can receive cup grease. Use Spec. 3506 Medium in pipe plug hole in rear end of thrust rod. Fill with grease gun once per day at this point.

The bronze bearing (7) for the thrust rod has a slight clearance over the shaft. One of the holes drilled at right angles to the sprocket shaft is lined up so that grease will gain admission, go through the hole drilled parallel with the shaft, and thence up the other hole drilled at right angles to the roller bearings.

TO REMOVE DUST GUARD.

To remove the dust guard, or gain access to the drive gear, the track drive sprocket (12) can first be removed and the construction taken down progressively towards the frame of the tractor.

TO REMOVE THE TRACK DRIVE SPROCKET.

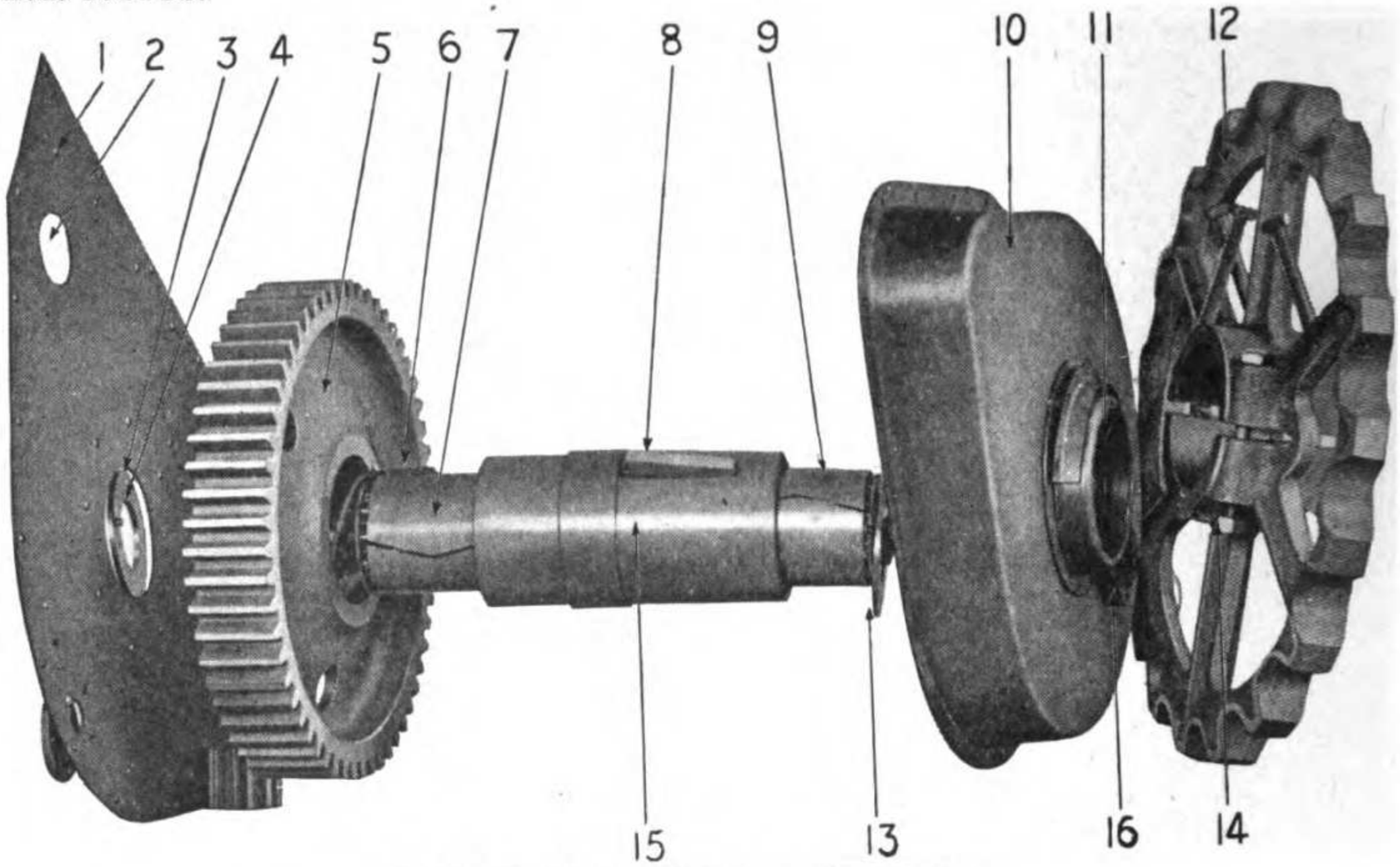
There are two ways of removing the track drive sprocket. In either method:

(*a*) Remove rear thrust rod from sprocket shaft and rear roller frame.

(*b*) Remove one pin in the slide link on the rear roller frame so that the last truck roller will not interfere with removal of the track sprocket.

(*c*) Cut the track, as described, page 156, between the front roller and the blank sprocket on the side to be worked on and lay track flat.

Plate No. 50.



DRIVE SPROCKET AND GEAR.

Ref. No.	Part No.	Part Name.
1	7577	Fender plate (left).
2		Intermediate shaft drive pinion opening.
3		Sprocket drive shaft opening.
4	6375	Drive gear shaft thrust washer (inner).
5	6253	Drive gear.
6	6793	Drive gear key.
7	7773	Drive sprocket sleeve hub bearing.
8	6792	Drive sprocket key.
9	7773	Drive sprocket sleeve hub bearing.
10	6309	Drive gear dust guard.
11	6307	Drive gear dust guard ring.
12	6958	Drive sprocket.
13	6375	Drive sprocket shaft thrust washer (inner).
14	7062	Drive sprocket bolt.
15	6334	Drive sprocket sleeve hub.
16	6374	Drive gear dust guard pipe flange.

(*d*) Jack the tractor main frame up so that track drive sprocket is in the clear.

FIRST METHOD.

(*e*) Remove the bolts in split hub of track drive sprocket.

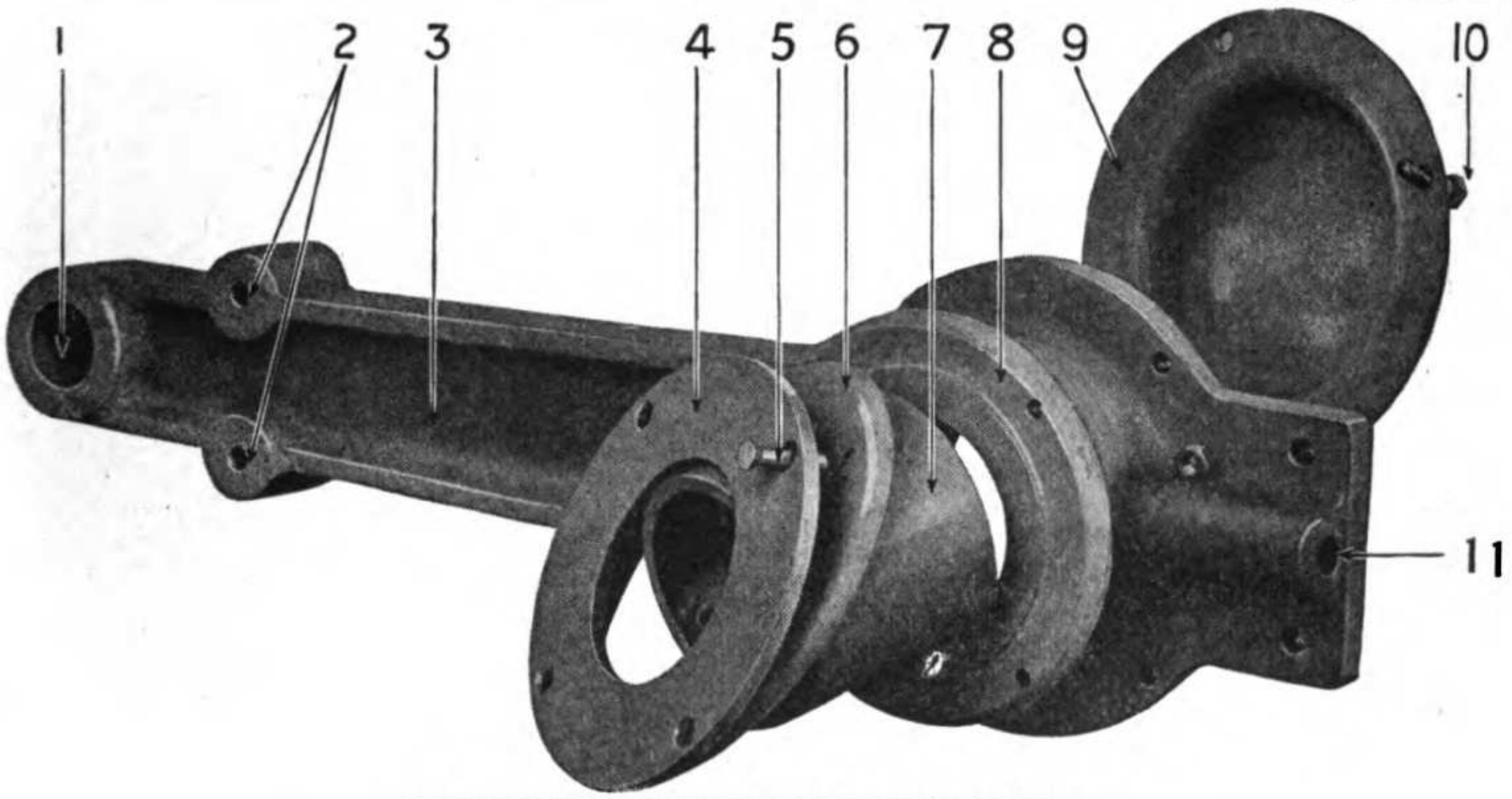
(*f*) Drive four blunt wedges in split hub to release pressure on sleeve.

(*g*) Put a heavy piece of iron over end of sprocket shaft.

(*h*) Place a gear puller on a piece of iron across the end of the track drive sprocket sleeve and engaging the spokes bring gear puller into action. Removing track drive sprocket may be aided by driving lightly on back of sprocket while using puller.

In removing track drive sprocket by this method the operation should be carefully done as all the pressure is transferred to the dust guard and bolts. If track drive sprocket refuses to come off without undue pressure it is best to proceed as follows:

Plate No. 51.



DRIVE SPROCKET THRUST ROD.

Ref. No.	Part No.	Part Name.
1		For thrust rod pin 6921.
2		To attach drive sprocket thrust rod guard No. 7001.
3	6925	Drive sprocket thrust rod.
4	6365	Drive sprocket thrust rod thrust washer.
5	54817	Drive sprocket thrust rod dust washer screws.
6	6372	Drive sprocket thrust rod dust washer.
7	6369	Drive sprocket thrust rod bushing.
8		Inner or sprocket drive face.
9	6918	Drive sprocket shaft dust cover.
10	52558	Drive sprocket shaft dust cover cap screw.
11		For grease gun.

SECOND METHOD.

(*e*) Remove all bolts in dust guard to inner plate.

(*f*) Pull track drive sprocket and external spur gear assembly off the sprocket shaft.

(*g*) Lay the track drive sprocket assembly on the ground or on timbers with track drive sprocket up. A piece of heavy iron will have to be provided to fit on sleeve of assembly and *inside* the hub of track drive sprocket.

(*h*) Place a gear puller on assembly and against piece of iron and remove sprocket in usual manner. In driving wedges in split hub of

track drive sprocket it must be remembered that the wedges must be driven in equally, otherwise the split hub may pinch the track drive sprocket sleeve and make removal difficult.

TO REMOVE EXTERNAL SPUR GEAR.

(*a*) Proceed as outlined in second method above, removing track drive sprocket and external spur gear assembly from sprocket shaft.

(*b*) Lay assembly on the ground or on timbers with external spur gear up. It will be necessary to provide a piece of iron to fit over sleeve and inside of hub of gear. A gear puller having three arms must be provided to engage the three holes in external spur gear.

(*c*) Remove in usual manner for pulling gears.

TO REMOVE TRACK DRIVE SPROCKET SHAFT.

The correct procedure in removing track drive sprocket shaft is as follows:

(*a*) Cut the track on both sides between rear truck roller and track drive sprocket.

(*b*) Run tracks ahead.

(*c*) Remove rear thrust rod on each side.

(*d*) Remove one slide link pin on each side.

(*e*) Unbolt dust guards on each track drive sprocket assembly.

(*f*) Remove both track drive sprocket assemblies.

(*g*) Remove split collar (21), Plate 35.

(*h*) Disengage toothed coupling.

(*i*) Telescope the master clutch shaft into the master clutch.

(*j*) Remove seat, gas tank brackets, tool box, steering column, and steering clutch throw-out brackets.

(*k*) Remove six bolts holding the transmission to the main frame.

(*l*) Jack up complete transmission about 2 inches and the sprocket shaft can be lifted out one side.

TO REBABBITT TRACK DRIVE SPROCKET SHAFT BEARING.

Should it be necessary to rebabbitt the bottom part of transmission (Plate 45) to receive track drive sprocket shaft:

(*a*) Place the sprocket shaft in the bearing on the main frame.

(*b*) Get the shaft projecting equal lengths from main frame.

(*c*) Remove all babbitt from the bearings under transmission.

(*d*) Cut a thin shim (about 0.015625 inch (1/64-inch) thick) and place on each side of the sprocket shaft, against shaft and on the top of the main frame.

(*e*) Drop transmission down on sprocket shaft.

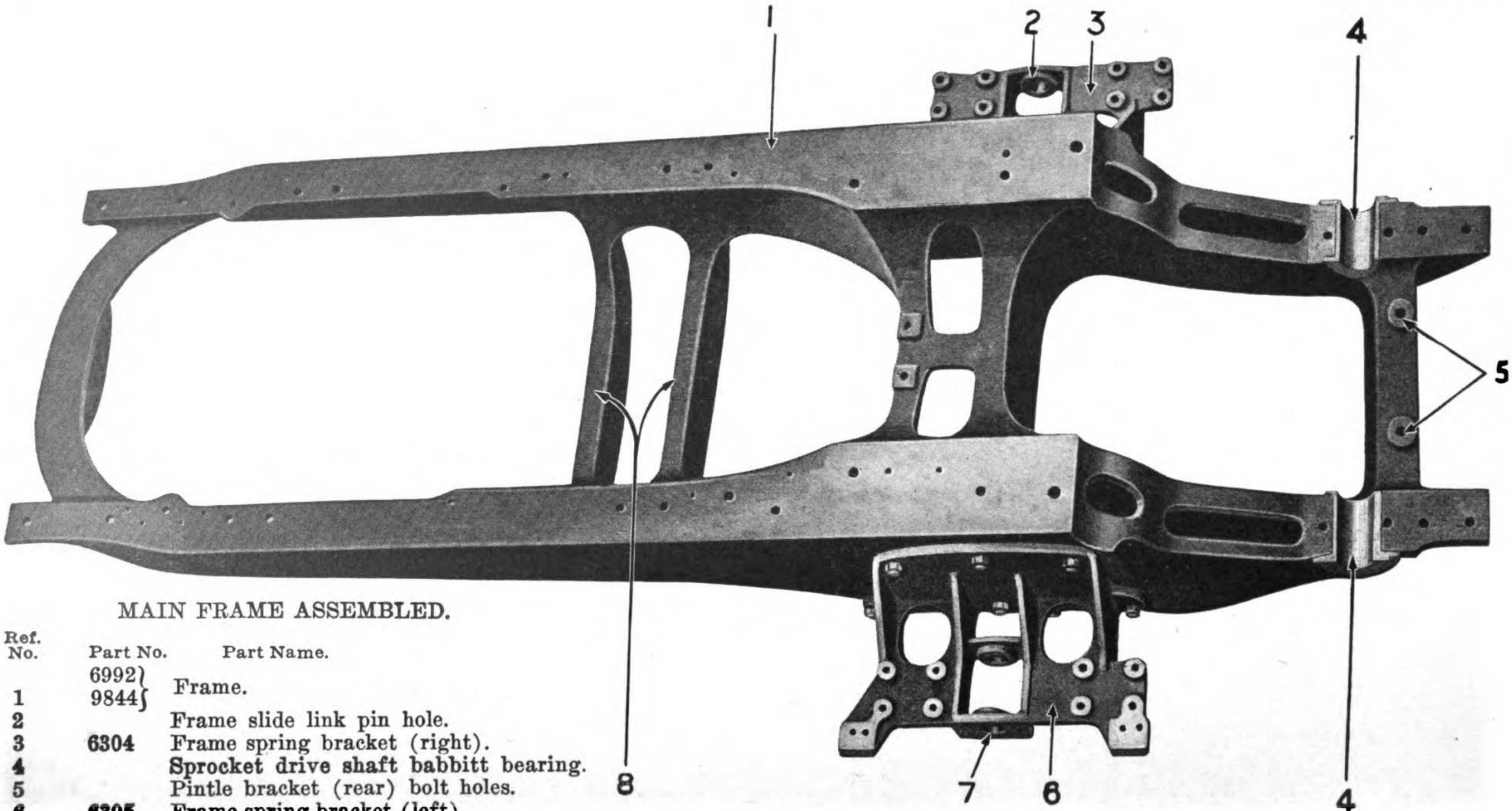
(*f*) To retain babbitt, dam up around the edge of main frame and transmission on track drive sprocket shaft, with clay, putty, soap, or

dough, making a funnel shaped area or lip on the outside of the main frame to pour babbitt in.

(*g*) On the inside of the main frame make a vent hole at top of the dam.

(*h*) Pour babbitt rapidly. When babbitt is poured, remove shims and bolt transmission down. Too thick a shim must not be used between transmission and main frame as it will not be possible to bolt transmission down evenly without much scraping of babbitt.

(*i*) If the transmission does not set level it will be necessary to elevate the transmission and scrape babbitt till the complete transmission sets level on the main frame. It is necessary to get a close fit on the babbitt bearing to prevent shaft from rotating.



MAIN FRAME ASSEMBLED.

Ref. No.	Part No.	Part Name.
1	6992 } 9844 }	Frame.
2		Frame slide link pin hole.
3	6304	Frame spring bracket (right).
4		Sprocket drive shaft babbitt bearing.
5		Pintle bracket (rear) bolt holes.
6	6305	Frame spring bracket (left).
7		Frame slide link pin hole.
8		Equalizer bar suspension.

CHAPTER VI.

SUPPORTING ASSEMBLIES.

The various groups composing the tractor are assembled on the main frame, a unit steel casting, rigidly reinforced, which not only supports the units but holds them in proper relation to each other. It is illustrated in Plate 52. With its assembled units, the main frame is supported on the track by means of a rollar frame assembly, Plate 54, on which it rests, through the medium of an equalizing bar in front and springs in the rear. To the main frame is bolted the front ordnance pintle, Plate 71.

ROLLER FRAME ASSEMBLY.

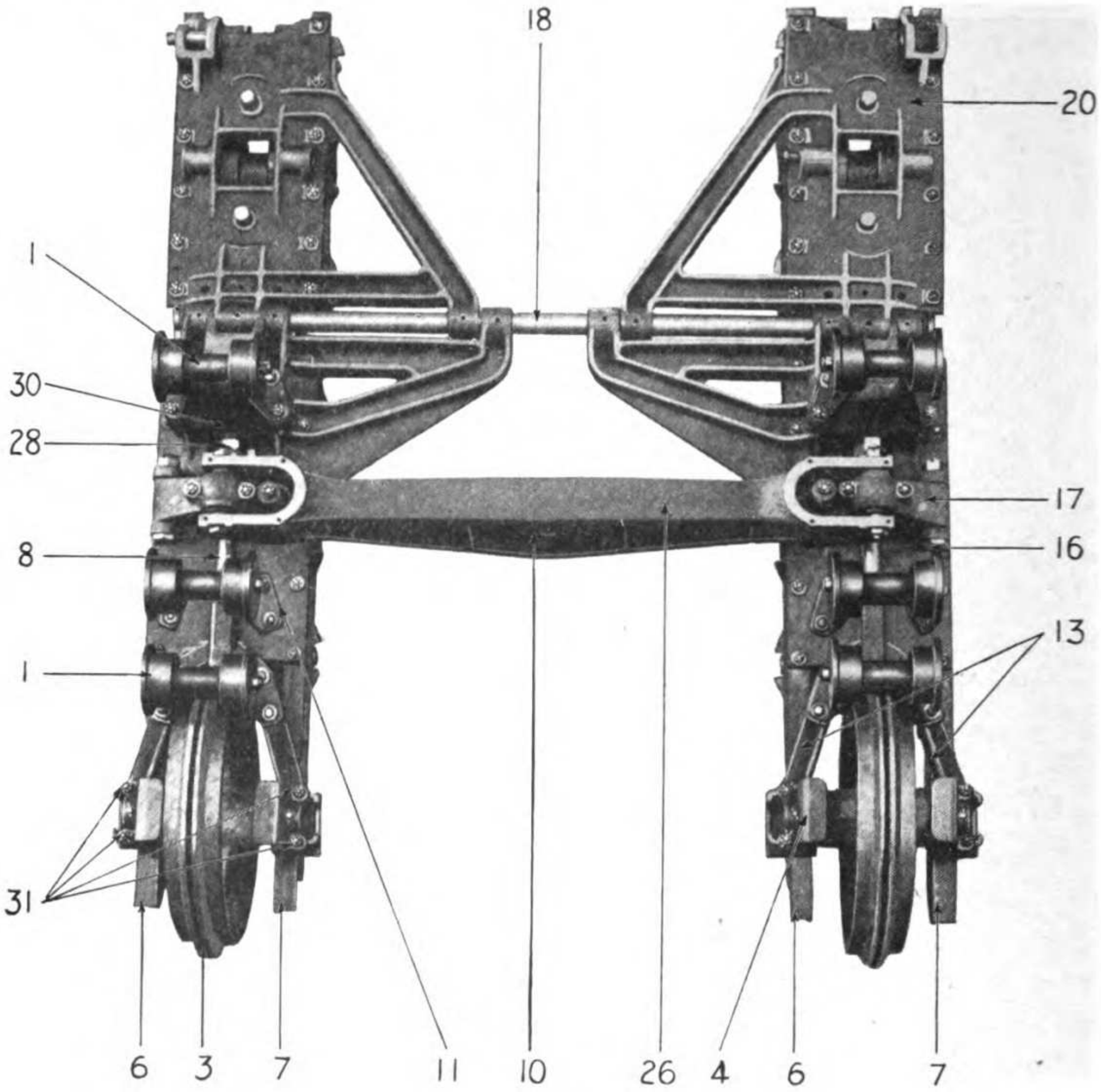
Neither the drive sprocket, Plate 50, nor the blank sprocket, Plates 53 and 54, carry any of the weight of the tractor. The entire weight is carried by the roller frame assembly, Plate 54, which comprises a set of front roller trucks and a set of rear roller trucks. These roller trucks are the same in principle as the trucks of a railroad car and the rollers (9) are wheels themselves, like the wheels of a railroad truck of a few inches gauge. These bear on the inner side of the track, Plate 62, which forms a continuous rail.

The roller frame assembly consists of two side members known as roller frames on each side of the tractor, hinged together by a shaft called the roller frame shaft (18), Plate 53. The blank sprockets are mounted on the front roller frame to lay the track down in front of the truck wheels. To hold up the track between the sprockets, track supporting rollers, Plate 59, journaled on the brackets are provided. These have plain metal bearings. In the old model tractors these rollers are mounted on Hyatt roller bearings.

The weight of the rear of the tractor is transmitted to the roller frame through double springs (21), Plate 54, two springs being located on each roller frame. The front weight of the tractor is transmitted to the front roller frames through a transverse shaft known as an equalizer bar (10), Plate 53, which is spring mounted.

Plate 54 shows a view of the roller frame assembly complete, mounted on the track. The roller frame assembly consists of two roller frames on each side of the tractor, making four units of roller frames, the four frames being hinged on the roller frame shaft (18). The roller frame ahead of the roller frame shaft is called the right or left front roller frame. The rear roller frame is called the right or left rear roller frame. In addition the blank sprocket (3) is mounted on the front roller frame to lay the track down in front of the truck wheels, and two track supporting

Plate No. 53.



ROLLER FRAME.

Ref. No.	Part No.	Part Name.
1	10303	Track supporting roller.
3	6333	Blank sprocket.
4	8900	Blank sprocket mud guard.
6	7037	Channel.
7	7038	Channel.
8	7042	Front thrust rod.
10	7010	Swivel block plate.
11	10639	Truck frame casting, front right.
13	6338	Blank sprocket fork.
16	7017	Equalizer bar roller frame pin.
17	7008	Equalizer bar spring support.
18	6532	Roller frame shaft.
20	7036	Truck frame casting, rear left.
26	7009	Equalizer bar.
28	53462	Front thrust rod lock nut.
30	7039	Front thrust rod adjusting nut.
31	7819	Blank sprocket fork bolt.

rollers and bracket (1) are mounted on the front roller frame to support the track from the track drive sprocket to the blank sprocket.

Note.—On later models three track supporting rollers are provided on the front half of the roller frame.

The top member of each roller frame is a single steel casting (20), Plates 53 and 54, which provides for hinges, spring seats, and seats for all the other parts that are attached to the top of the roller frame. The sides of the roller frame are channel iron (7), Plate 54. The roller frame side channels are bolted to the roller frame top. All bolts are secured with a castle nut and cotter key. The roller frame is prevented from spreading at the bottom by the method of attachment of the gudgeons on the bottom edge, this construction is explained in detail under "Gudgeons."

The roller frame receives the entire weight of the tractor through four double coil springs, two double coil springs being located on each rear roller frame, and to the front roller frames through equalizer bar (26). The equalizer bar; Plate 55, receives a part of the weight of the tractor through a king pin (10) and in turn the weight is distributed to each front truck frame.

The roller frame is propelled by the tractor from the main frame and track drive sprocket shaft by a cast-steel thrust rod. The track drive sprocket is mounted on a dead shaft attached to the main frame and when power from the engine is applied, pressure is exerted by the teeth of the track drive sprocket against the space blocks in track. The main frame moves first, which in turn transfers a driving thrust through the thrust rod, which in turn pushes the roller frame carrying the entire weight of the tractor over the track.

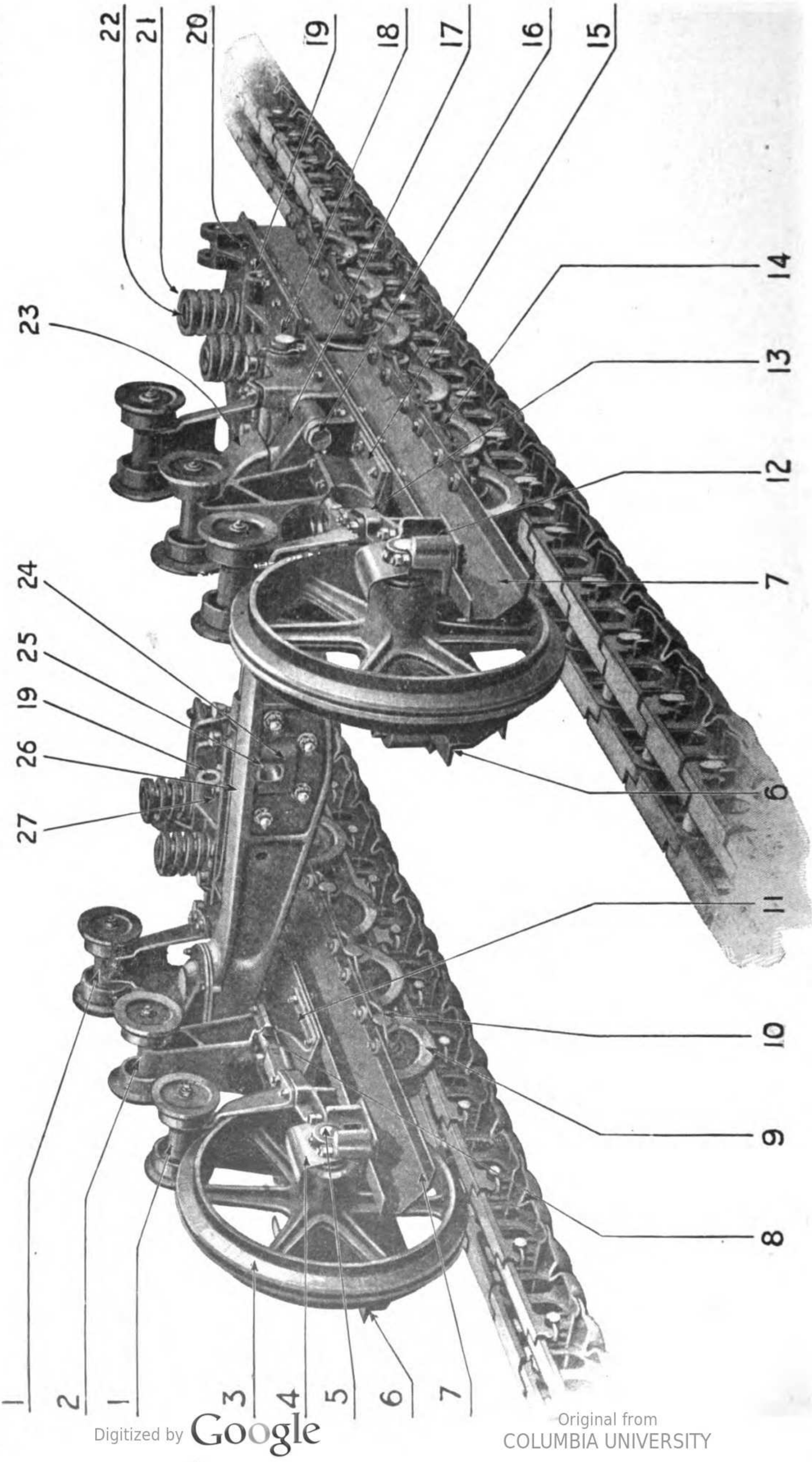
The roller frames being hinged on the roller frame shaft allows the track to conform to the ground surface and produces smooth running of the tractor by reducing the power required to propel the tractor on uneven ground.

EQUALIZER BAR.

Plate 55 shows the equalizer bar and its method of attachment to the roller frame. The main frame of the tractor has two cross ribs which fit on each side of the equalizer bar. The plate (9) fits on the equalizer bar, being secured by four bolts. This plate contains the mounting for king pin (10) and swivel, the main frame being drilled to receive the king pin. Part of the weight of the tractor is distributed to each front roller frame through the equalizer bar (12) to equalizer bar rocker (2) and the equalizer bar spring (8).

The equalizer bar (12) is open on the end and drilled to receive pin (5) which carries a ball and socket joint. This ball and socket joint fits in rocker arm (2). The rocker arm is pivoted on the outside of the front roller frame by a pin (3) and the other end is supported between two

Plate No. 54.



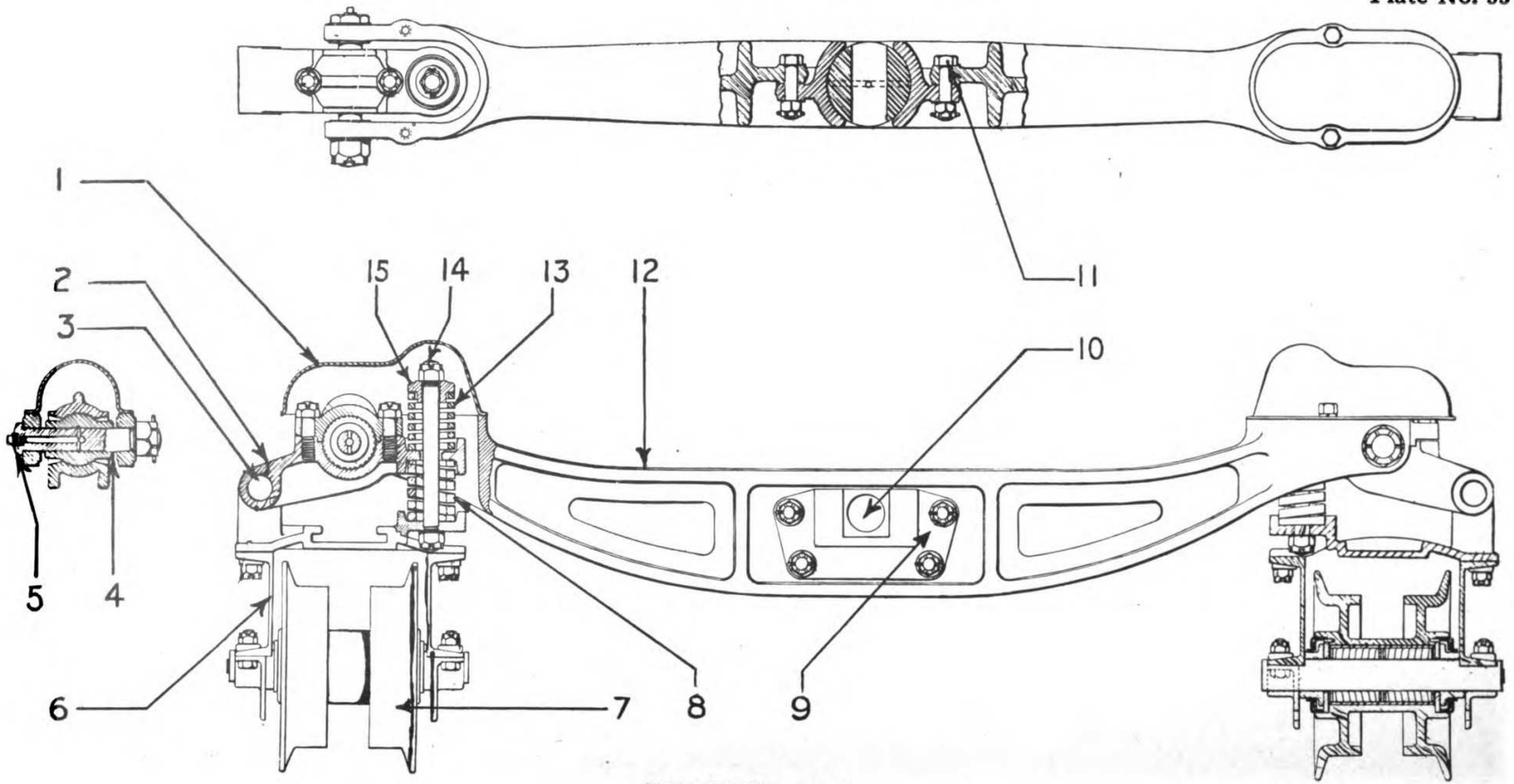
ROLLER FRAME ASSEMBLY AND TRACK.

springs (8). The equalizer bar rocker joint is used as a universal joint. When an obstacle is encountered by one track only, this particular track will conform to this unevenness, allowing the main frame of the tractor to remain level by the equalizer bar oscillating about the king pin and the action of the equalizer rocker arm (2), and ball and socket joint. The end of the equalizer bar rocker joint compresses the upper spring, thus allowing the front roller frame to oscillate on the roller frame shaft at a right angle, relieving strain on hinges. The limit of upward movement of the front roller frame assembly is reached when the lower spring is compressed solid and the equalizer bar reaches the point where it strikes the bottom of the main frame. The limit of downward movement is reached when the upper spring on the rocker arm is compressed to its limit, and the opposite end of the equalizer bar strikes the opposite side of the main frame.

A slide link which is slotted at the lower end of casting is attached to the spring bracket bolted on the main frame and the slotted end fits on a pin inserted on the top of the rear roller frame between the two coiled springs. The limit of upward movement of the rear roller frame is reached when the pin strikes the upper end of the slot. The limit of downward movement is reached when the pin strikes the lower end of the slot. The slide link also performs the function of a radius or cross tie rod, in that it holds the rear roller frame in alignment with the main frame.

ROLLER FRAME ASSEMBLY.

Ref. No.	Part No.	Part Name
1	10303	Track supporting roller assembly.
2		Track supporting roller, center.
3	6333	Roller frame blank sprocket.
4	8900	Roller frame blank sprocket mud guard.
5	6368	Roller frame blank sprocket gudgeon.
6	7037	Roller frame channel.
7	7038	Roller frame channel.
8	7042	Roller frame thrust rod.
9	6377	Roller frame truck wheel, double flanged.
10	6349	Roller frame truck wheel gudgeon.
11	10639	Roller frame casting, front right.
12	4314	Roller frame blank sprocket fork clamp.
13	6338	Roller frame blank sprocket fork.
14	6545	Roller frame truck gudgeon bracket.
15	10640	Roller frame casting, front left.
16	7017	Equalizer bar, roller frame pin.
17	7008	Equalizer bar spring support.
18	6532	Roller frame shaft.
19		Slide link bracket.
20	7036	Roller frame casting, rear left.
21	1899	Roller frame spring, outer.
22	1900	Roller frame spring, core.
23	7011	Equalizer bar end cap.
24	7010	Equalizer bar swivel block plate.
25	7019	Equalizer bar swivel block.
26	7009	Equalizer bar.
27	7110	Roller frame casting, rear right.



EQUALIZER BAR.

Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.
1	7011	Equalizer bar end cap.	6	7043	Roller frame channel.	11	53346	Equalizer bar swivel block plate bolt.
2	7008	Equalizer bar spring support.	7	6377	Truck wheel.	12	7009	Equalizer bar.
3	7017	Equalizer bar roller frame pin.	8	6536	Equalizer bar support spring.	13	6537	Equalizer bar recoil spring.
4	7023	Equalizer bar pin.	9	7010	Swivel block plate.	14	7014	Equalizer bar spring bolt.
5	56423	Equalizer bar pipe plug.	10	7024	Equalizer bar king pin.	15	6539	Equalizer bar recoil spring washer.

TRUCK WHEELS.

Refer to Plate 56. The truck wheel is mounted on two Hyatt roller bearings. The bore of the truck wheel is finished smooth, the bearing spacer (3) is then inserted and the two roller bearings and cages (4), are put into place with light tapping, so that each of the bearings just comes to the edge of the counter bore. The case-hardened gudgeon (9) is oiled evenly and inserted in the roller bearing. The plain case-hardened thrust washer (5) is driven into the counter bore with a driving fit. The case-hardened thrust washer (10) is then inserted on the gudgeon. The thrust washer (10) is prevented from rotating with truck wheel by having a portion of the outer edge milled off, this milled edge fitting on the bottom edge of the roller frame side channel.

The dust washer (7), the leather washer (8) and the dust cap (6) are

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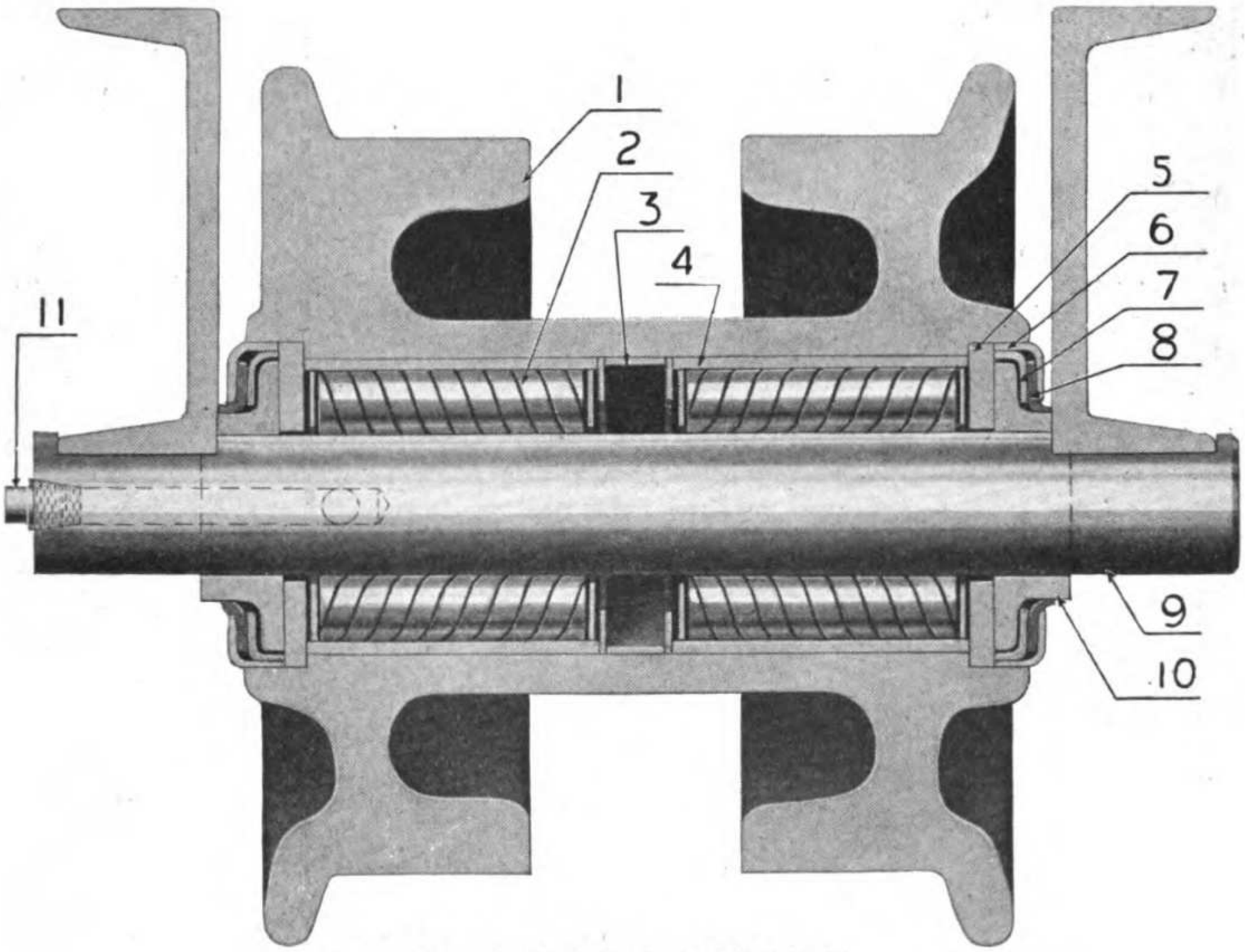
Plate No. 56.



TRUCK WHEEL IN SECTION.

Ref. No.	Part No.	Part Name.
1	6377	Truck wheel, double flanged.
2	7769	Truck wheel roller bearing.
3	6534	Wheel bearing spacers.
4		Truck wheel bearing outer race.
5	6351	Inner thrust washer.
6	6346	Truck wheel dust washer retainer.
7	6347	Truck wheel dust washer retainer.
8	6350	Truck wheel dust washer.
9	6349	Truck wheel gudgeon.
10	6348	Outer thrust washer.
11	56425	Truck wheel gudgeon pipe plug.

usually assembled together and the three parts as a unit driven into the counter bore of truck wheel. This last assembly rotates with truck wheel and the leather washer rotating on (10) prevents the entrance of dirt to the bearing.

GUDGEONS.

The case-hardened gudgeon (9), Plate 56, is milled on each end to receive the roller frame side channel. A hole is then drilled in the gudgeon from one end, and another hole drilled at right angles so that cup grease can be forced into the roller bearing. The gudgeon is then case-hardened and accurately ground within limits.

The gudgeons are mounted with the milled end engaging the bottom of the roller frame side channels. The gudgeon bracket is then put on, spacing the gudgeons equally and holding them in place. The gudgeon bracket is bolted to the bottom of the truck frame by bolts and castellated nuts having a cotter pin.

The mounting of the gudgeon on the bottom of the roller frame side channels prevents the roller frame side channels from spreading at the bottom, and together with the bolted gudgeon brackets makes a very rigid assembly of the roller frame.

BLANK SPROCKET.

The blank sprocket (3), Plate 58, is made of cast steel, inside flanged with broad surfaces to the sprocket where it rides on the track rails. The blank sprocket is used to receive the track coming off the track supporting rollers and to lay track down squarely in front of the roller frame assembly.

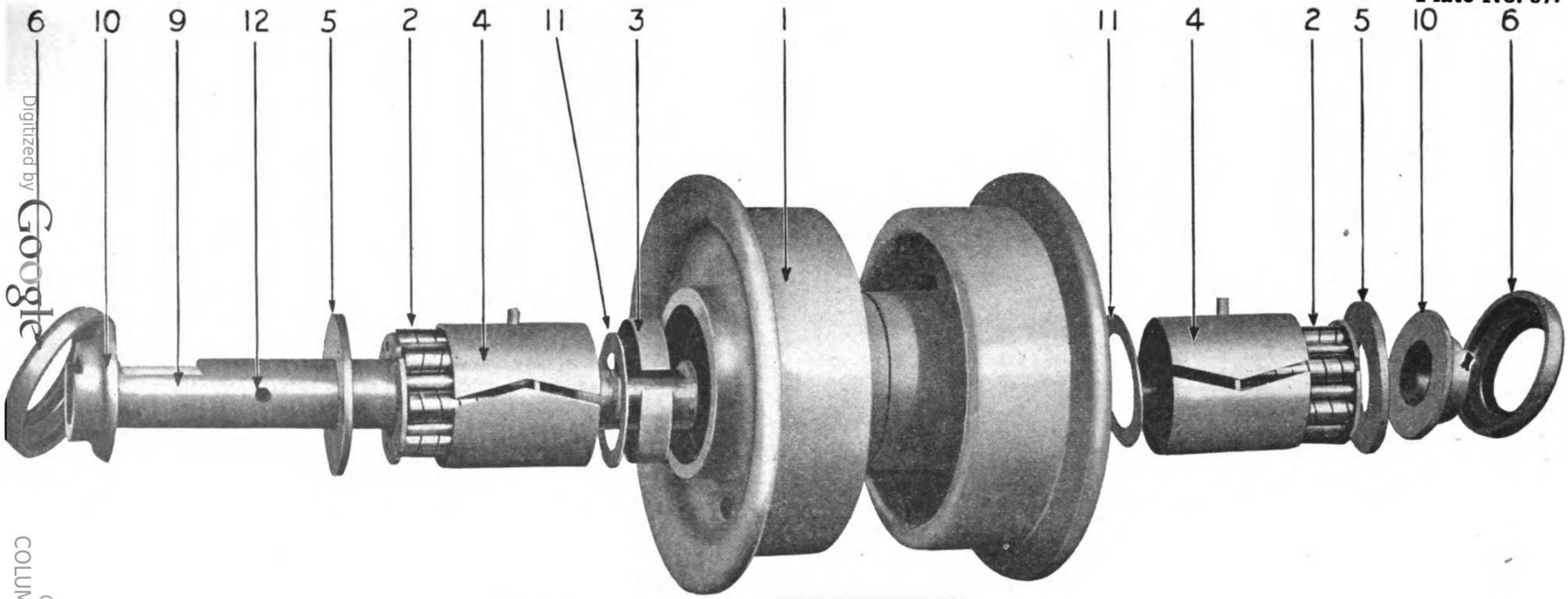
The blank sprocket employs two Hyatt roller bearings and is mounted on the shaft (5). The shaft (5) is mounted on the blank sprocket fork (13) on top of the roller frame. The shaft (5) is mounted so that it remains stationary. The mounting of the blank sprocket fork (13) on the front roller frame assembly is guided so that the blank sprocket is always in line with the roller frame assembly.

TRACK SUPPORTING ROLLERS.

Two track supporting rollers, together with their brackets, are mounted on both front roller frame assemblies. Two additional track supporting rollers are mounted on the spring bracket, bolted to the main frame. These track supporting rollers support the weight of the track from the track drive sprocket to the blank sprocket. They are illustrated in Plate 59.

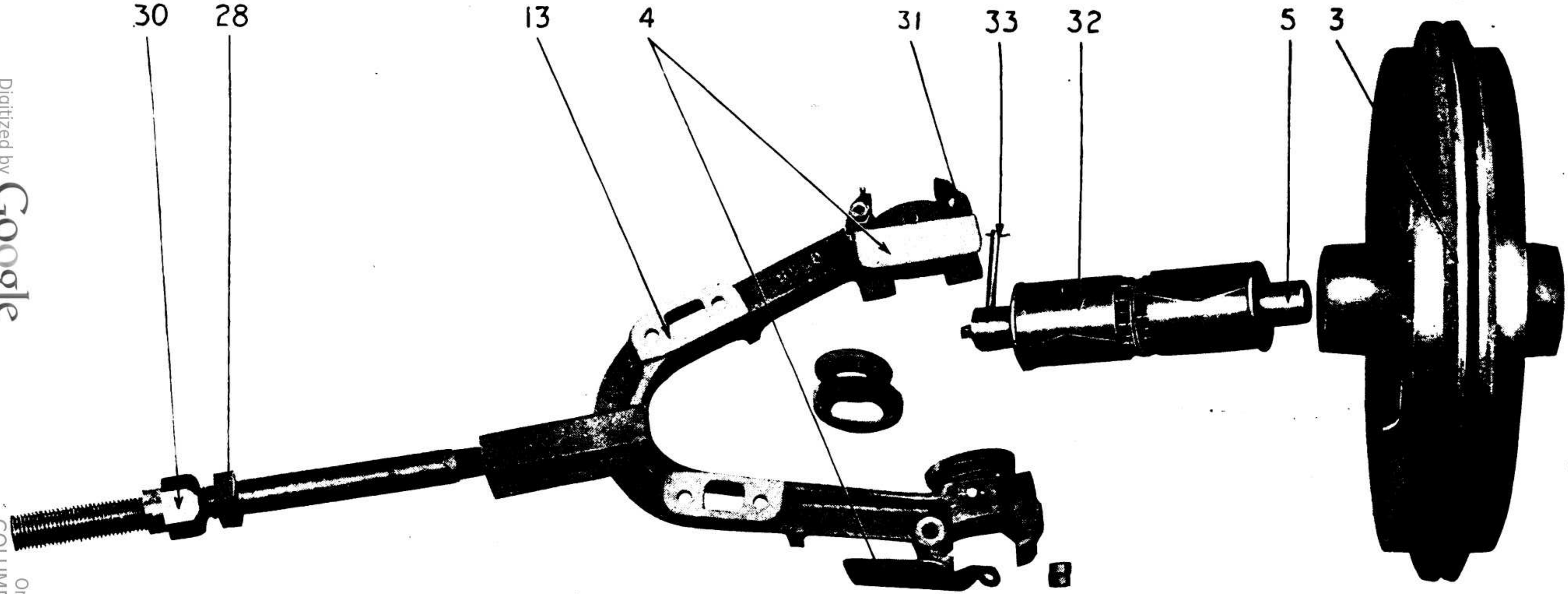
On later models three track supporting rollers are provided on the front half of the roller frame.

The old style track supporting rollers are provided with roller bearings, but the later models have plain bearings as Plate 59 illustrates.



TRUCK WHEEL.

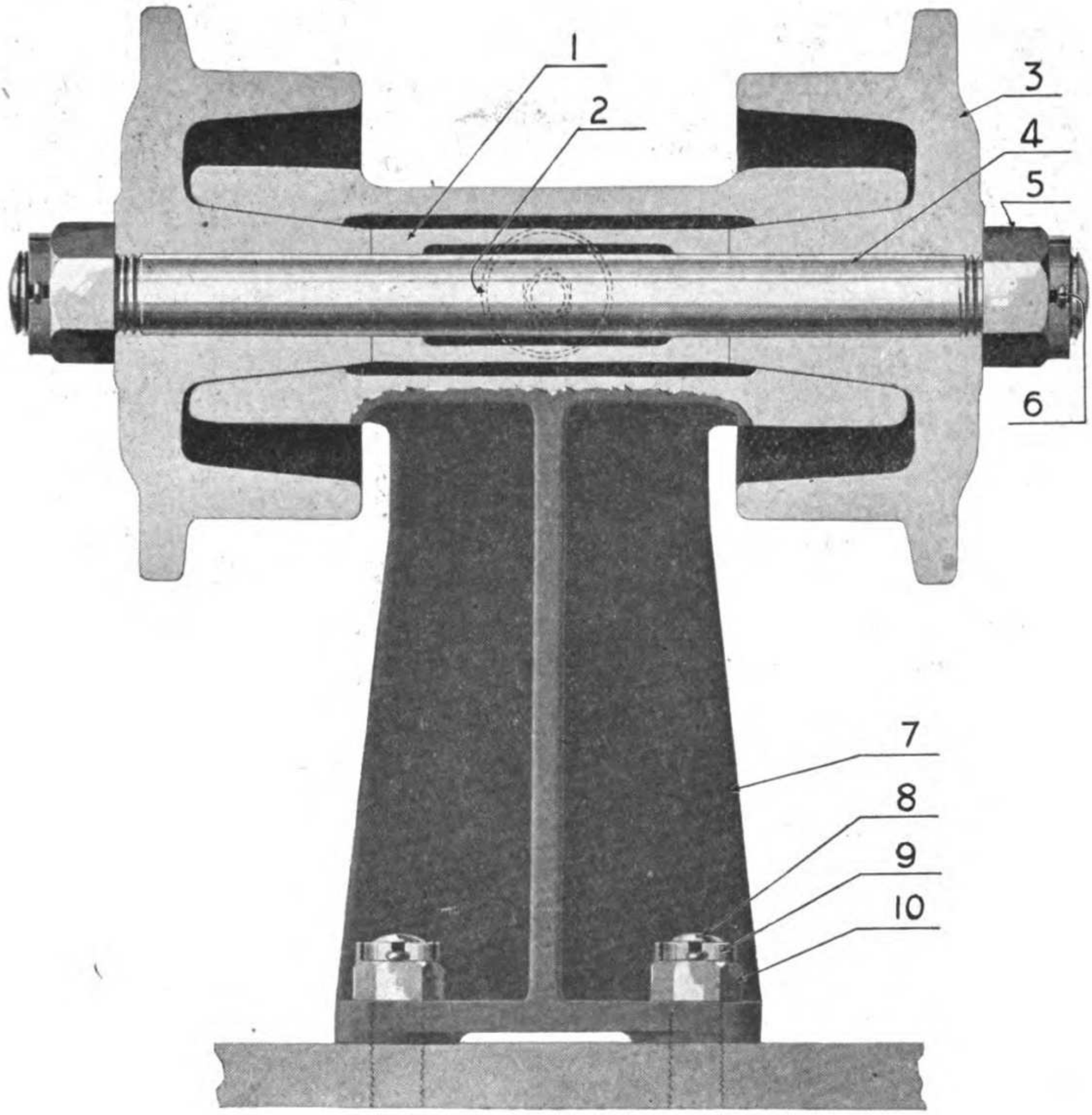
Ref. No.	Part No.	Part Name.
1	6377	Truck wheel.
2	7769	Truck wheel bearing.
3	6534	Truck wheel bearing spacing strip.
4		Truck wheel bearing outer race.
5	6351	Truck wheel inner thrust washer.
6	6346	Truck wheel dust washer retainer.
9	6349	Truck wheel gudgeon.
10	6348	Truck wheel outer thrust washer.
11	6535	Truck wheel bearing spacing washer.
12		Truck wheel gudgeon grease outlet to bearing.



BLANK SPROCKET AND FORK, SEMI-ASSEMBLED.

Ref. No.	Part No.	Part Name.
3	6333	Blank sprocket.
4	8900	Blank sprocket mud guard.
5	6368	Blank sprocket gudgeon.
13	6338	Blank sprocket fork.
28	53462	Front thrust rod lock nut.
30	7039	Front thrust rod adjusting nut.
31	7819	Blank sprocket fork bolt.
32	7054	Blank sprocket bearing.
33	6371	Gudgeon pin.

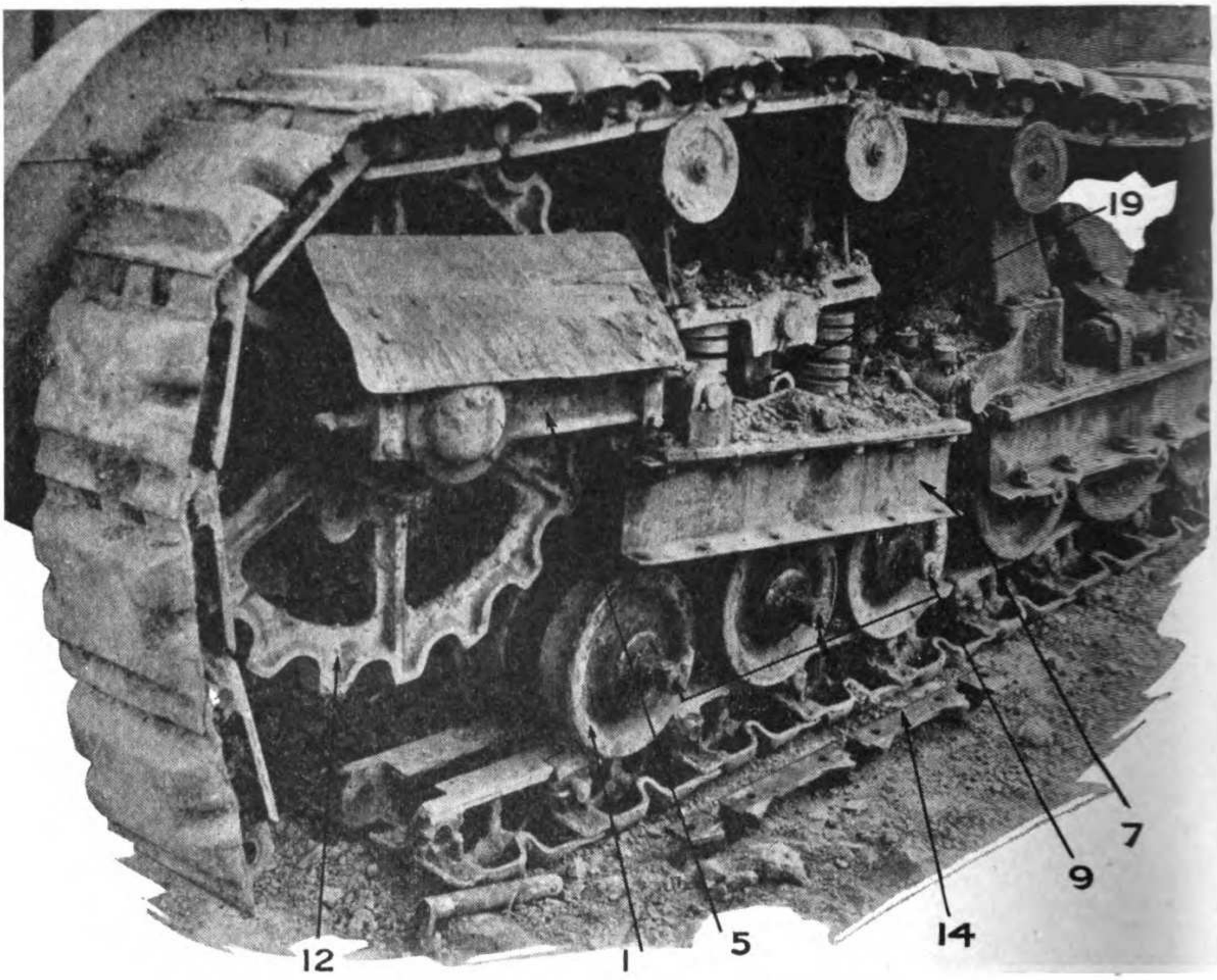
Plate No. 59



TRACK SUPPORTING ROLLER IN SECTION.

Ref. No.	Part No.	Part Name.
1	10296	Track supporting roller spacer.
2	54236	Track supporting grease cup.
3	10283	Track supporting roller.
4	10284	Track supporting roller shaft.
5	53174	Nut (castellated) (1" S. A. E.).
6	53505	Cotter pin.
7	10286	Track supporting roller bracket.
8	7128	Track supporting roller bracket stud.
9	53502	Cotter pin (⅛"x1¼").
10	53170	Nut, castellated (⅝"—18 U. S. F.).

Plate No. 60



REMOVING TRUCK WHEEL WITH USE OF JACK.

Ref. No.	Part No.	Name of part.
1	6377	Truck wheel.
5	6925	Drive sprocket thrust rod.
7	7038	Roller frame channel.
9	6349	Truck wheel gudgeon.
12	6958	Drive sprocket.
14	6545	Gudgeon bracket.
19	7040	Slide link.

LUBRICATION OF ROLLER FRAME ASSEMBLY.

Remove pipe plug out of each gudgeon, insert grease gun and fill with Spec. No. 3506 cup grease every fifty miles. Fill truck wheel until grease comes out of dust cap. Keeping grease in will keep dirt out. Remove pipe plug on end of shaft carrying blank sprocket, and fill with medium weight cup grease every fifty miles. There are ten grease cups located on the roller frame hinges on roller frame shaft. Fill each grease cup once per day with Spec. No. 3506. On the old style track supporting rollers, remove pipe plug on each track supporting roller shaft, and fill with Spec. No. 3506 cup grease every fifty miles.

The new style track supporting rollers are provided with grease cups and the cups must be turned down fully twice daily.

FIELD REPAIRS TO ROLLER FRAME ASSEMBLY.

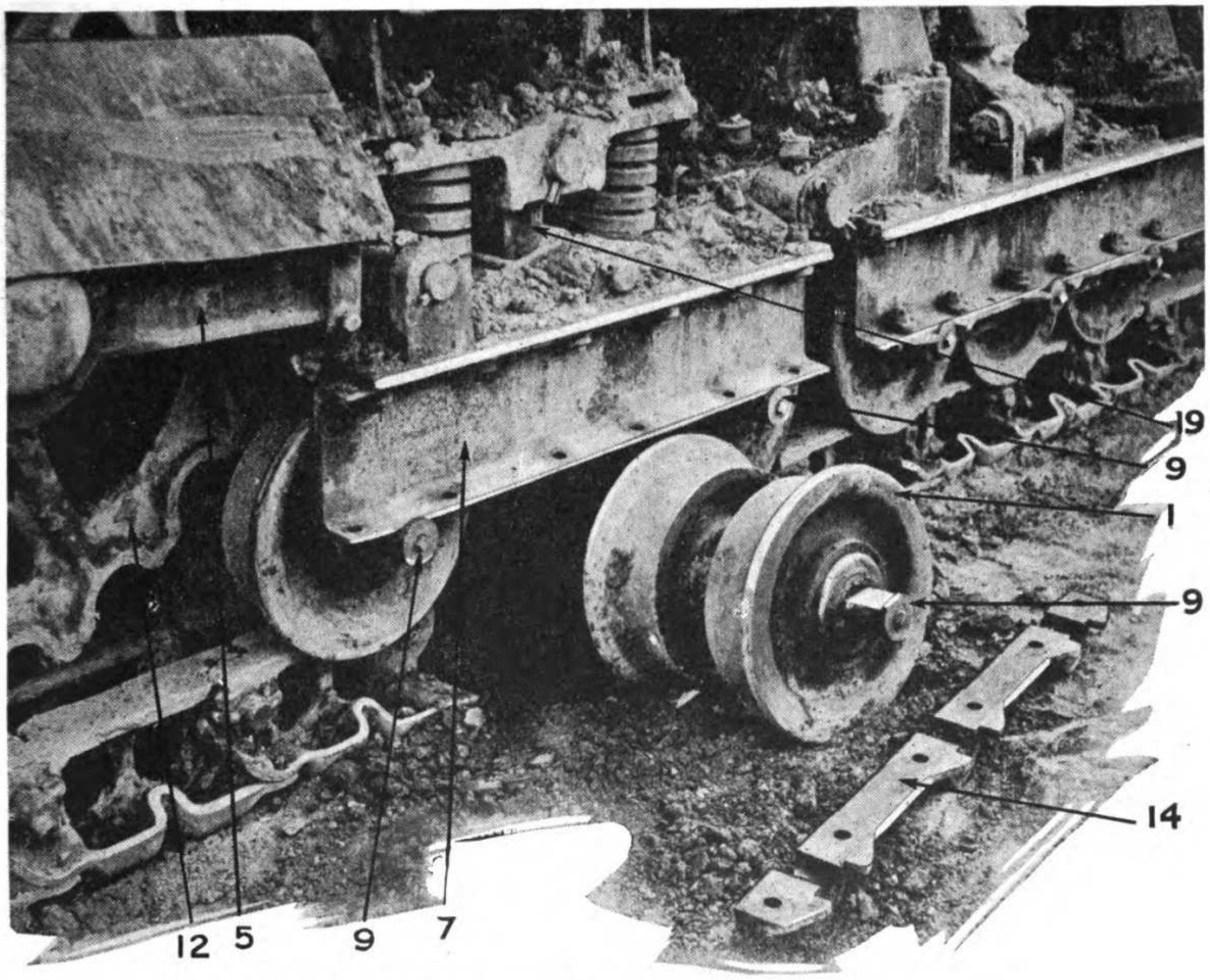
The removal of a truck wheel in the field is described and illustrated in Plates 60 and 61.

REMOVING TRUCK WHEEL.

(*a*) Loosen the lock nut (28), Plate 53, and the adjusting nut (30) on the front thrust rod (8), as much as possible. Also loosen the nuts on the four bolts which clamp the blank sprocket forks (13) to the roller frame channels (7).

(*b*) Cut the track at either the front or rear end.

Plate No. 61.



REMOVING TRUCK WHEEL WITHOUT USE OF JACK.

(*c*) Remove the gudgeon brackets (14), Plate 60, from each end of the gudgeons (9).

(*d*) Jack up under the main frame of the tractor. This will leave the truck wheels resting on the track, as shown in the plate. To replace reverse the order of removal.

Another method of removing a truck wheel is shown in Plate 61.

(*a*) Cut the track at the front end in the usual manner.

(*b*) Back the tractor up until the ends of the track are about 15 inches apart.

Chain the ends of the track together and continue backing until the gap in the track comes around under the truck wheel to be removed.

(*c*) Remove the gudgeon brackets (14) from either end of the gudgeon (9) and allow the truck wheel to drop down into the gap between the ends of the track.

If there is not enough clearance to remove the truck wheel, sufficient earth may be removed to provide the necessary clearance.

The method described in Plate 60 is the quicker, but this method may be used in case no jack is available.

REMOVING ROLLER FRAME.

To remove the roller frame complete from under the main frame, cut the tracks between the front truck wheel and the blank sprocket and lay the track flat in front of the tractor by backing the tractor. Take pin out of front end of the thrust rods (5), Plate 60, on each rear truck roller frame. Take the pin out of the slide link (19). Remove the king pin (10), Plate 55, in the equalizer bar. Jack up the rear end of the tractor about 6 inches and block firmly. Place a heavy timber under the main frame directly under the radiator, place a jack under each end of the timber and jack up the front of the tractor until the second track supporting roller on front roller trucks can pass beneath the timbers. With pry bars move the complete roller frame assembly forward until the roller frame assembly is clear of the main frame and is in front of the tractor on the track, where the repair can be effected.

REPLACING EQUALIZER BAR.

The method of putting in a new equalizer bar (26), Plate 54, is as follows:

If the track is new or not stretched much it will be necessary only to cut the track and leave it in position. If the track is loose or sufficient slack has been taken up by the front thrust rod, slack off the track by the thrust rod. Jack the tractor up under the front end until the equalizer bar can be pulled out the side. Before jacking the tractor up it will be necessary to take off the equalizer bar end cap (23) over each end of the equalizer bar and remove equalizer bar pin (4), Plate 55, from the ball and socket joint, and also remove the equalizer bar king pin.

ASSEMBLING ROLLER BEARINGS.

(1) Drive wheel bearing spacer (3), Plate 56, to the center of the truck wheel.

(2) Insert each cage (4) for roller bearings, finishing by having the edge of cage flush with the counterbore of the truck wheel.

(3) Put the bearings in the cage.

(4) Oil the gudgeon (9) and insert in the bearings.

(5) On each side fit the thrust washer (5). This washer has a driving fit in the counterbore of the truck wheel.

(6) Slip the outer thrust washer (10) over the gudgeon.

(7) The dust washer assembly (6), (7), (8) and (9) are assembled by driving into the counter bore.

FOR THE BLANK SPROCKET. Inserting a bearing in the blank sprocket is about the same procedure as for the truck wheel, except that a spacer and washer for separating the bearings are not used.

REPLACING SPRING IN EQUALIZER.

In putting in a new spring on the equalizer rocker arm proceed as follows:

RECOIL SPRING. Remove four cap screws in end cap (1), Plate 55. Remove cotter and spring stud nut (14) and spring washer (15). Take off the old spring, put a new one in place and reassemble washer, nut and cotter pin and the end caps.

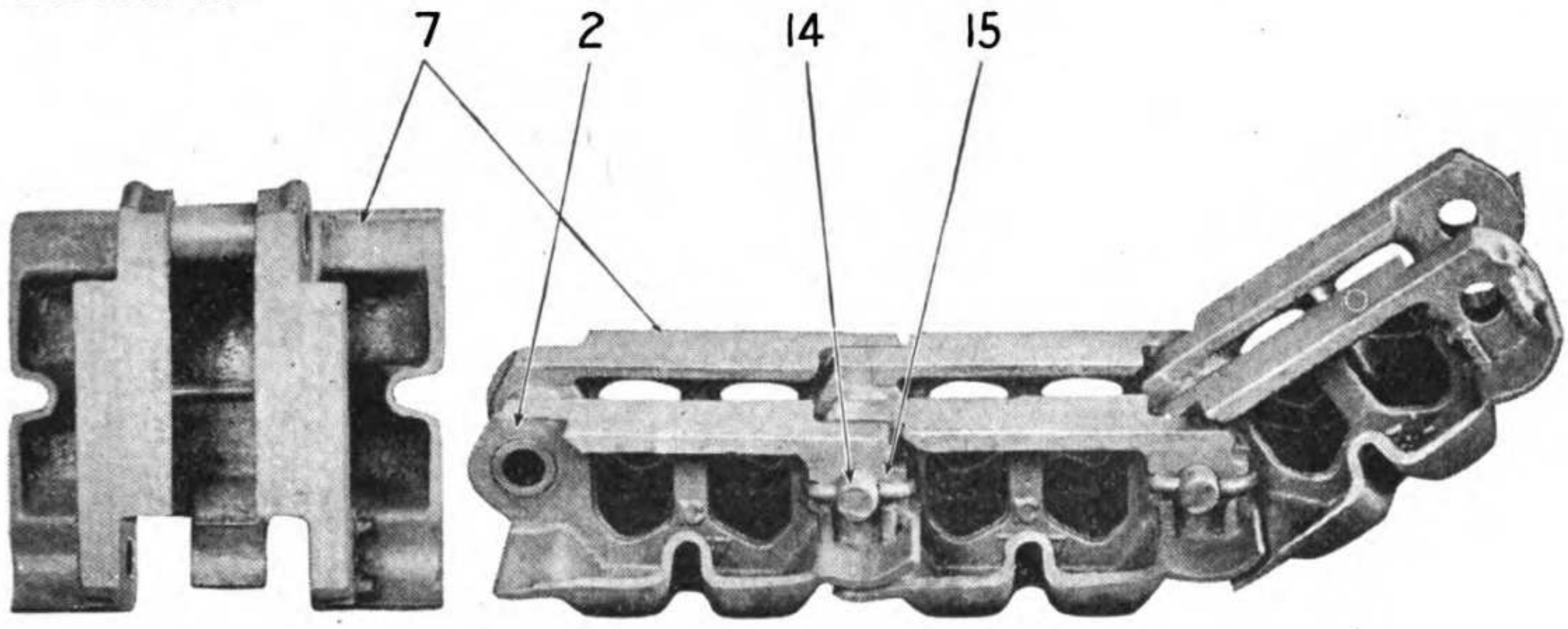
SUPPORT SPRING. Remove four cap screws in end cap (1). Remove spring stud nut (14) and cotter pin from bolt through springs. Pull out the spring stud (14) and the bar spring support pin (3) from equalizer bar spring support (2). Have a jack under the front of the tractor for use to take weight off for the equalizer spring support and ball and socket joint as required to remove the two bolts or pins. When cap (1) and nut (14) are removed jack up the front of the tractor to take the weight off of the lower spring. Remove the spring support (2) and attached parts, remove the support spring (8), place a new one in position and reassemble by the reverse process.

CHAPTER VII.

TRACK GROUP.

The track, Plate 62, is a flexible endless chain composed of cast steel track links (7), connected by case-hardened steel block spacers (2), and case-hardened track pins (14). There are two types of track, the old style with 13-inch width and the new style with 15-inch width. The length of the links from center to center of the pins is 10 inches.

Plate No. 62.



TRACK LINK ASSEMBLY.

Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.
2	2258	Block-spacer.	14	3247	Track pin.
7	8324	Track link.	15	7006	Track pin keeper.

BLOCK SPACERS.

The round, hollow case-hardened steel block spacers, 2 inches in diameter, are forced into the track links under pressure.

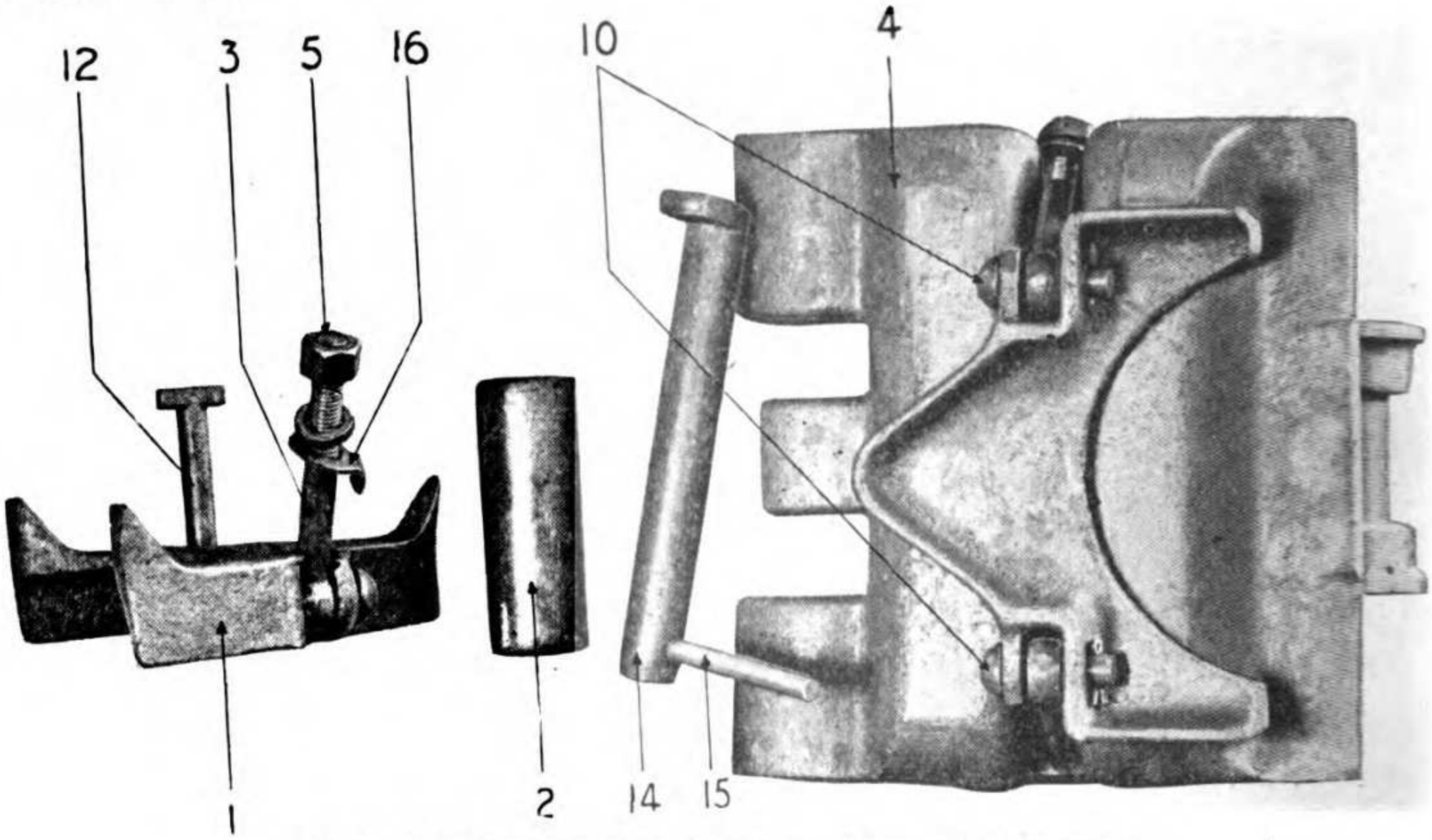
TRACK PINS.

The track pins, 1.25 inch in diameter, are made of case-hardened steel with an L-head. The L-head fits between two stops, which prevent the track pin from turning. The end of the pin, opposite the L-head, is drilled to receive the track pin keeper (15), Plate 62. The track pin keeper is a straight pin tapered on one end. It is driven into the hole through the straight end of the track pin to a point where it projects an equal distance on either side of the track pin, then clinched over against the track link.

GROUSERS.

An accessory to the track is known as the grouser (1), Plates 63 and 64. This is an assembly which clamps onto the track link for purposes of

Plate No. 63.



OLD TYPE TRACK LINK AND GROUSER.

Ref. No.	Part No.	Part Name.	Ref. No.	Part No.	Part Name.
1	7248	Grouser.	10	7281	Grouser eye bolt pin.
2	2258	Block-spacer.	12	7282	Grouser tee bolt.
3	7280	Grouser eye bolt.	14	3247	Track pin.
4	7247	Track link.	15	7006	Track pin keeper.
5	53110	Grouser eye bolt nut.	16	8382	Grouser eye bolt washer.

increasing traction in slippery going. There are two types of grouser, the old style of V surface used on the old-style track link (1), Plate 63, and the new style with straight surface used on the new-style track link (1), Plate 64, but which also can be used on the old-style link.

ATTACHING GROUSERS.

OLD STYLE. (*a*) Turn the hexagon nut (5), Plate 63, well out toward the end of the thread.

(*b*) Holding the assembly horizontal to the track, insert the grouser tee bolt head (12) into the recess for the grouser bolt (13) on the edge of the track link toward the frame.

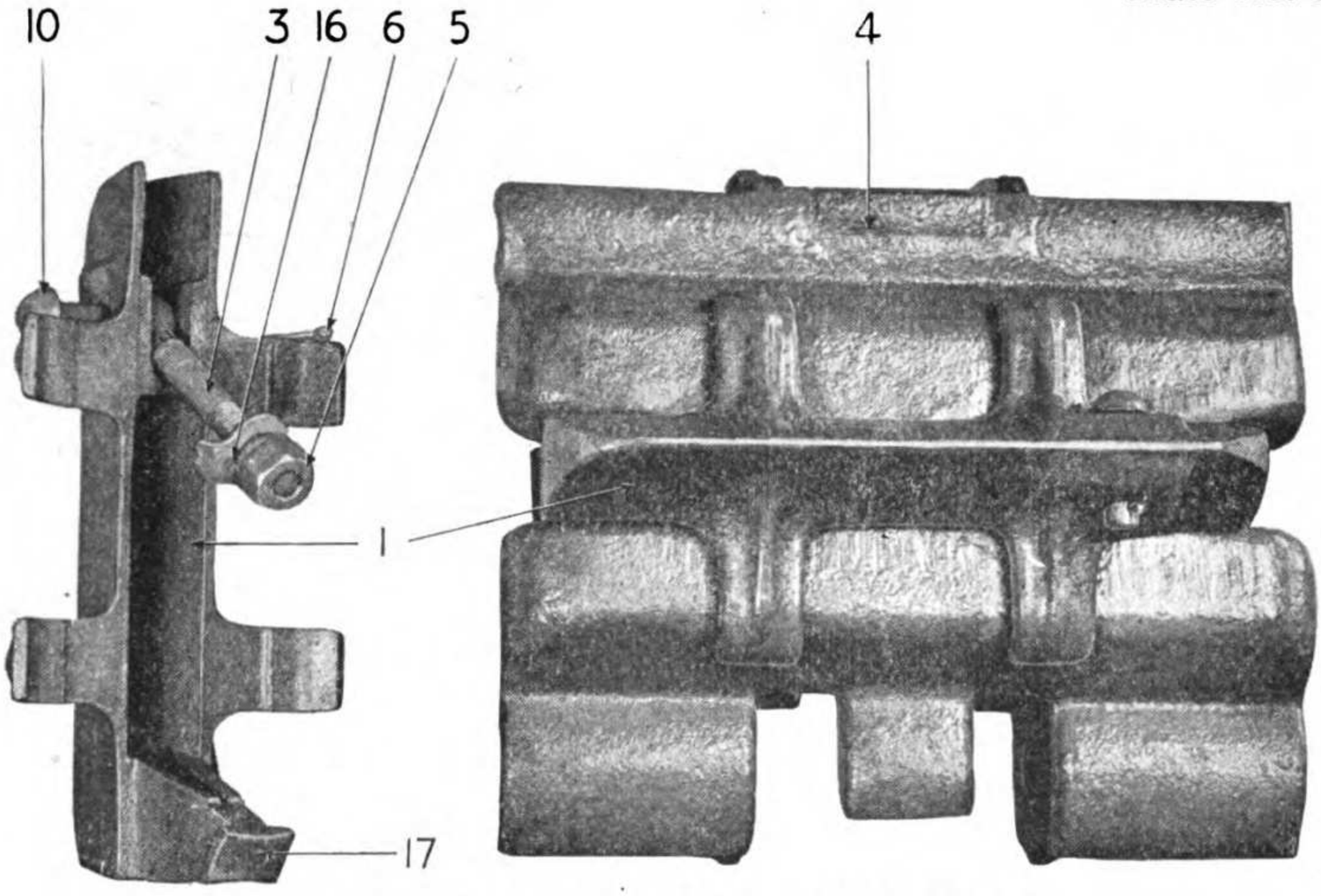
(*c*) Drop the grouser (1) flat against the surface of the track links, fitting the grouser eye bolt (3) into its recess.

(*d*) Tighten hexagon nut (5) against the lock washer and insert the cotter pin (6).

NEW STYLE. Hook the face (17), Plate 64, into the recess on the inner face of the track link. See that the face is firmly seated in the recess by giving it several smart blows with a sledge hammer. Next hook the grouser eye bolt (3) into the recess on the outer face of the track link and before tightening the hexagon nut (5) be sure that the lip on the washer (16) is hooked inside the face of the track link. The tractor should be stopped after a few hundred yards run and the nuts tightened again.

Keep a close watch on the grousers during the first few hours' run to prevent any of the grousers coming off, due to improper fitting.

Plate No. 64.



NEW TYPE TRACK LINK AND GROUSER.

Ref. No.	Part No.	Part Name.
1	8162	Grouser.
3	7280	Grouser eye bolt.
4	8324	Track link.
5	53110	Grouser eye bolt nut.
6	53501	Cotter pin.
10	7281	Grouser eye bolt pin.
16	8382	Grouser eye bolt washer.

ADJUSTING TRACK TENSION.

Refer to Plates 53 and 54. To adjust the tension in the track:

(*a*) Back off lock nut (28) on front thrust rod (8).

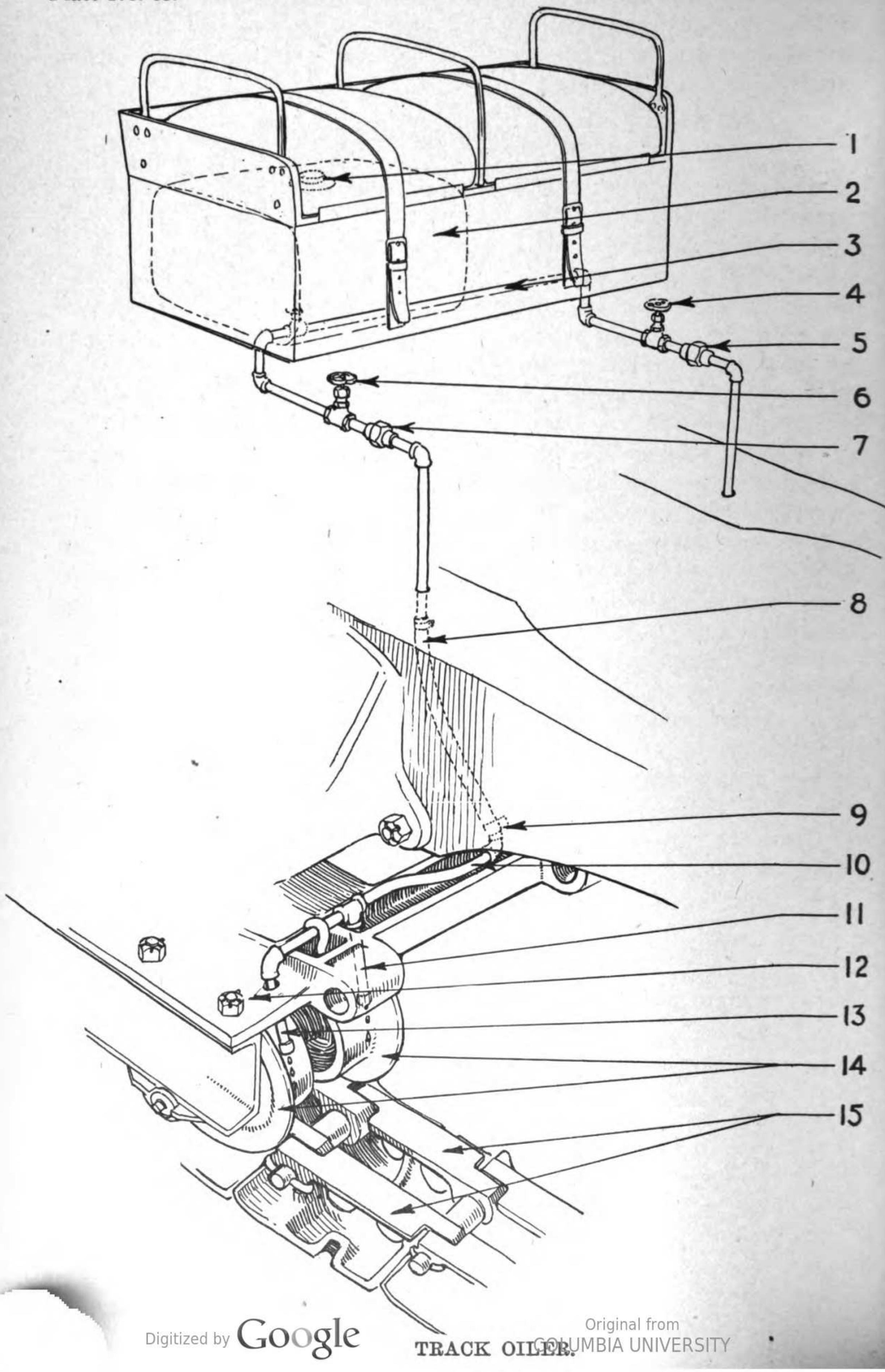
(*b*) Loosen the lock nuts on four bolts (31) on the sides of blank sprocket bearings.

(*c*) Using a large wrench, turn adjusting nut (30) to advance thrust rod (8). Thrust rod (8) forces out the blank sprocket fork (13), advancing the blank sprocket on the front roller frame toward the front of the tractor.

(*d*) When sufficient wear has taken up all available adjustment through the thrust rod, a track link must be removed and the thrust rod brought back to the initial position as when new. It may be necessary to run the track for a period of time after adjustment is exhausted on the thrust rod in order to create sufficient slack to remove a track link and connect the ends of the track remaining.

The track tension must be so maintained that the operator, backed up against the track, can lift the track clear of the track supporting roller

Plate No. 65.



TRACK OILER.

for from 1 to 1:50 inch. *Do not run tractor with track too tight.* This will be indicated by excessive grinding sound. Considerable strain throughout the roller frame and track assembly and excessive power loss results from a too tight track.

LUBRICATION OF TRACK.

Lubrication of the tracks is accomplished by means of the track oiling system illustrated in Plate 65, consisting of the track oil tank (2) carried under the driver's seat and supported on the main frame. The lubricant is conveyed to the tracks through a ⅜-inch pipe line, comprising two leads, each extending to discharge nozzles (11) and (13), located just forward of the front wheel of the rear sections of the roller frames. The flow of oil is controlled by two valves (4) and (6), located in front of and near either end of the driver's seat at the level of the floor board. Each valve controls the flow to the corresponding track. The oil pipes extend down between the front and rear sections of the roller frames and apply the oil just forward of the front wheels of the rear section.

Any grade of lubricant of such consistency as will flow through the track oiling system is satisfactory for track lubrication. Black oil is specified. Waste cylinder oil is ideal for this purpose. *Crude oil or fuel oil should never be used as they have little lubricating value and are likely to clog.*

Driving conditions vary so greatly that it is impossible to specify just when the tracks should be lubricated and an operator will have to use his own judgment in the majority of cases. Tracks should be well lubricated when the tractor is put into service and flooded for 10 minutes about once every hour thereafter, if running is continuous. Track lubricant must not be used in sand, as such a large amount of sand will become mixed with the lubricant that its action will be that of a grinding compound rather than of a lubricant. Flood track as soon as hard ground is reached.

TRACK OILER.

Ref. No.	Part No.	Part Name.
1	56433	Track oiler tank pipe plug.
2	7642	Track oiler tank assembly.
3	9968	Track oiler pipe.
4	53682	Track oiler globe valve, left.
5	56399	Track oiler union, left.
6	53682	Track oiler globe valve, right.
7	56399	Track oiler union, right.
8	9969	Track oiler hose.
9	9755	Track oiler hose clamp.
10	9966	Track oiler pipe.
11	56631	Track oiler nipple.
12	7110	Truck frame casting—rear right.
13	56631	Track oiler nipple.
14	6377	Double flanged truck wheel.
15		Track link rail.

FIELD REPAIR TO TRACKS.

LAYING OUT TRACKS.

To lay out one or both tracks flat on the ground for repair, cut the track in front between the blank sprocket and the front truck wheel, and back the tractor up. This will leave the track laying out in front of the roller frame.

CUTTING TRACK.

The method of cutting the track and laying it out is shown in Plates 66, 67 and 68.

LAYING OUT THE TRACK.

Tools required: track adjusting wrench, adjustable end wrench, hammer, punch, cold chisel, heavy punch and sledge hammer.

Plate No. 66.

CUTTING TRACK PIN KEEPER.

FIRST STEP.

a—With the track adjusting wrench loosen the lock nut (28) and the adjusting nut (30) on the front thrust rod (8), Plate 53, as much as possible.

b—Loosen the two nuts on each of the four bolts which clamp the blank sprocket fork (13) to the top of the roller frame side channels (7).

c—With a chisel and hammer cut the track pin keeper (15) at the tapered end as close to the track pin (14) as possible.

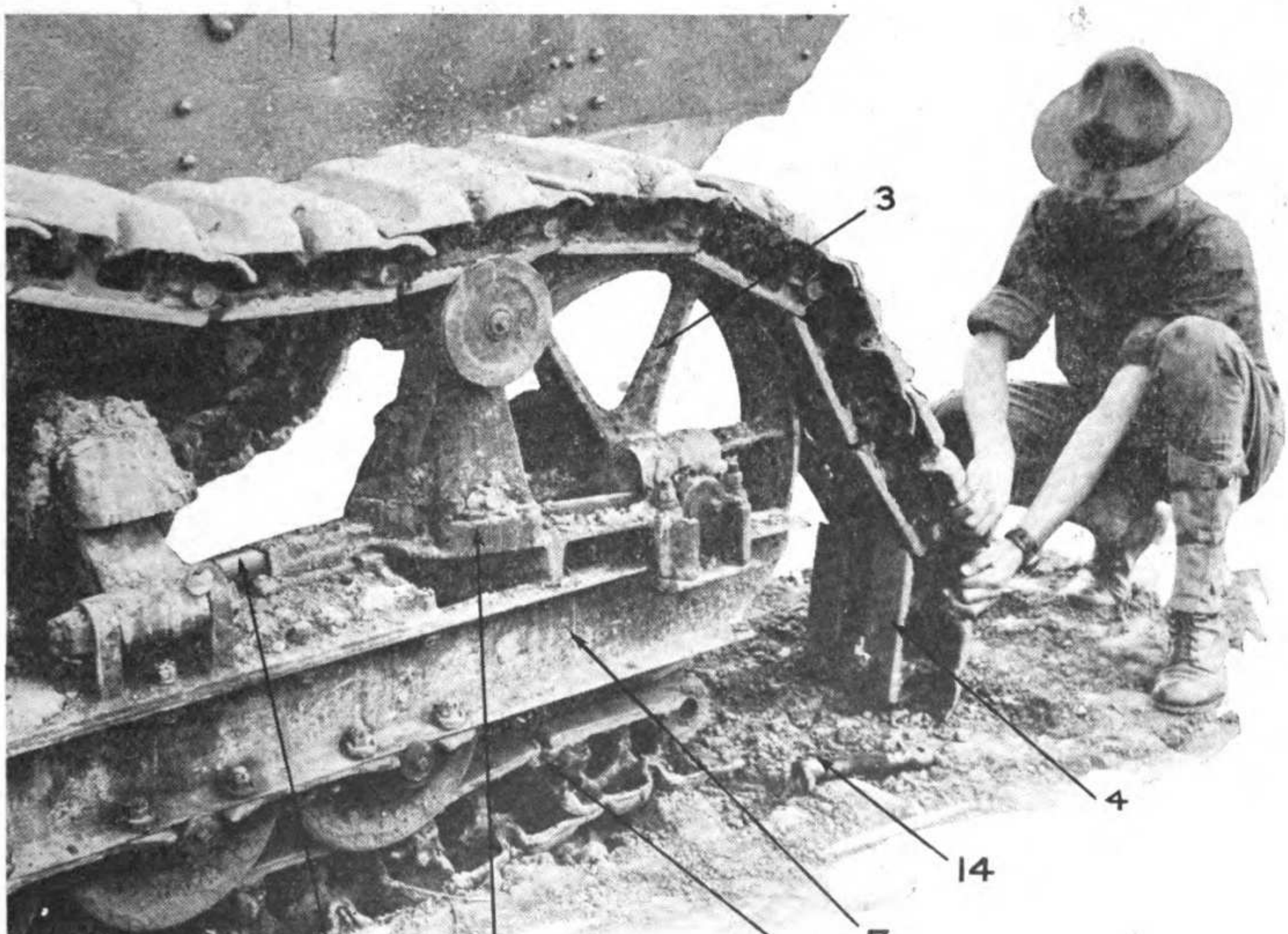
REPLACING BLOCK SPACERS.

When the block spacers (2) become badly worn, they should be replaced with new ones. If no new ones are available, new wearing surface may be obtained on the old ones by completely disassembling the tracks and driving the block spacers out of the links. Then turn the block spacers 180 degrees, or half around, and drive the block spacers back into the links and reassemble the track.

REPLACING TRACK LINKS.

If a track link (4) becomes broken, it may be replaced by running the tractor forward or back until the broken link is between the blank sprocket (3) and the front truck wheel (9). Remove the broken link by removing two track pin keepers (15), and driving out two track pins (14). Then replace the broken link. In replacing a broken link in a track that is considerably worn, the new link must be dressed down to the same width as the old link to prevent the truck wheels and blank sprocket from interfering with it.

Plate No. 67.



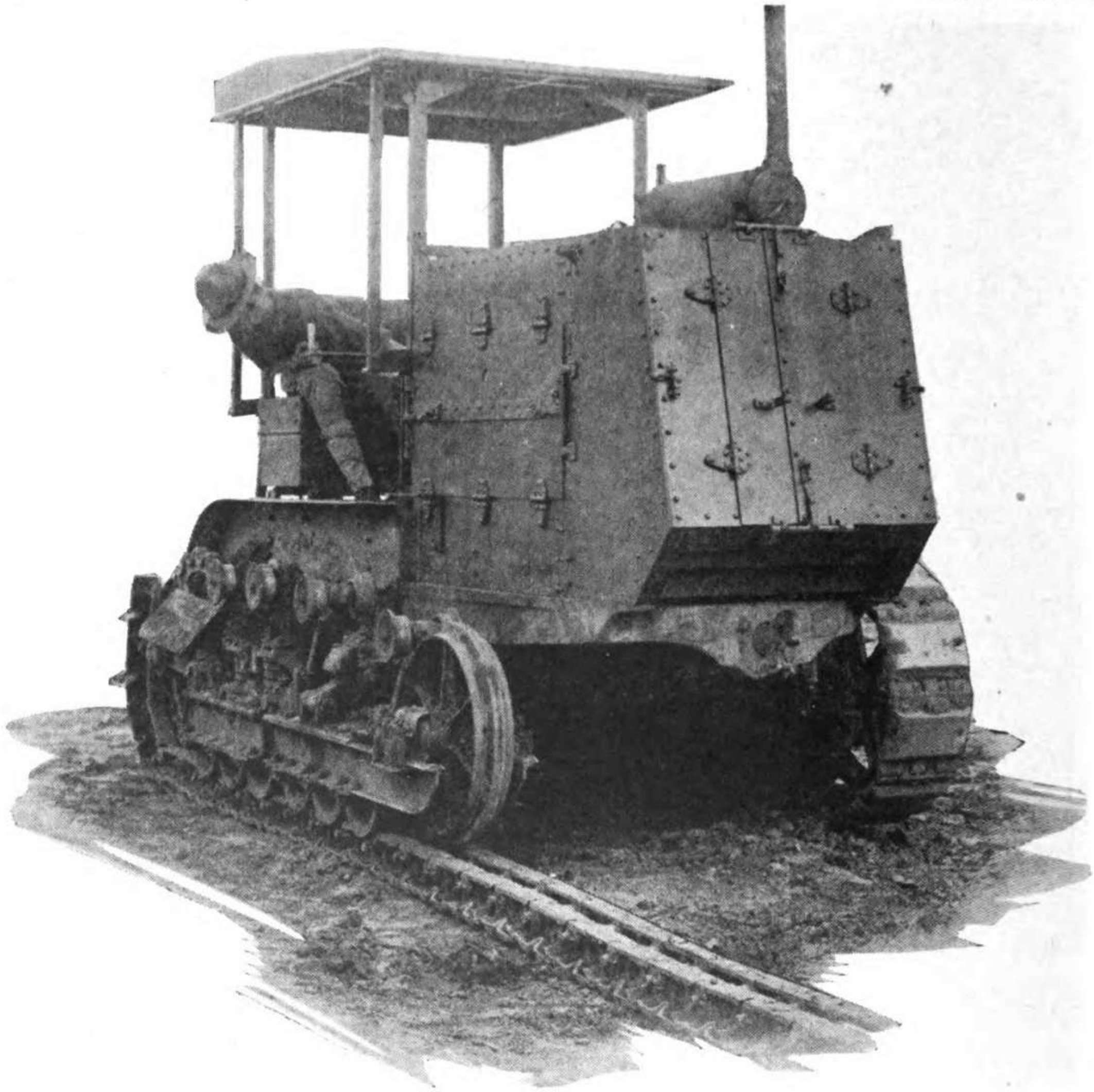
THE TRACK CUT.

d—With a hammer and punch drive the remaining portion of the track pin keeper (15) out of the track pin (14).

e—Then with a heavy punch and sledge hammer drive the track pin (14) out of the track link (4).

This completes the cutting of the track, as shown in Plate 67.

Plate No. 68.



LAYING OUT THE TRACK.

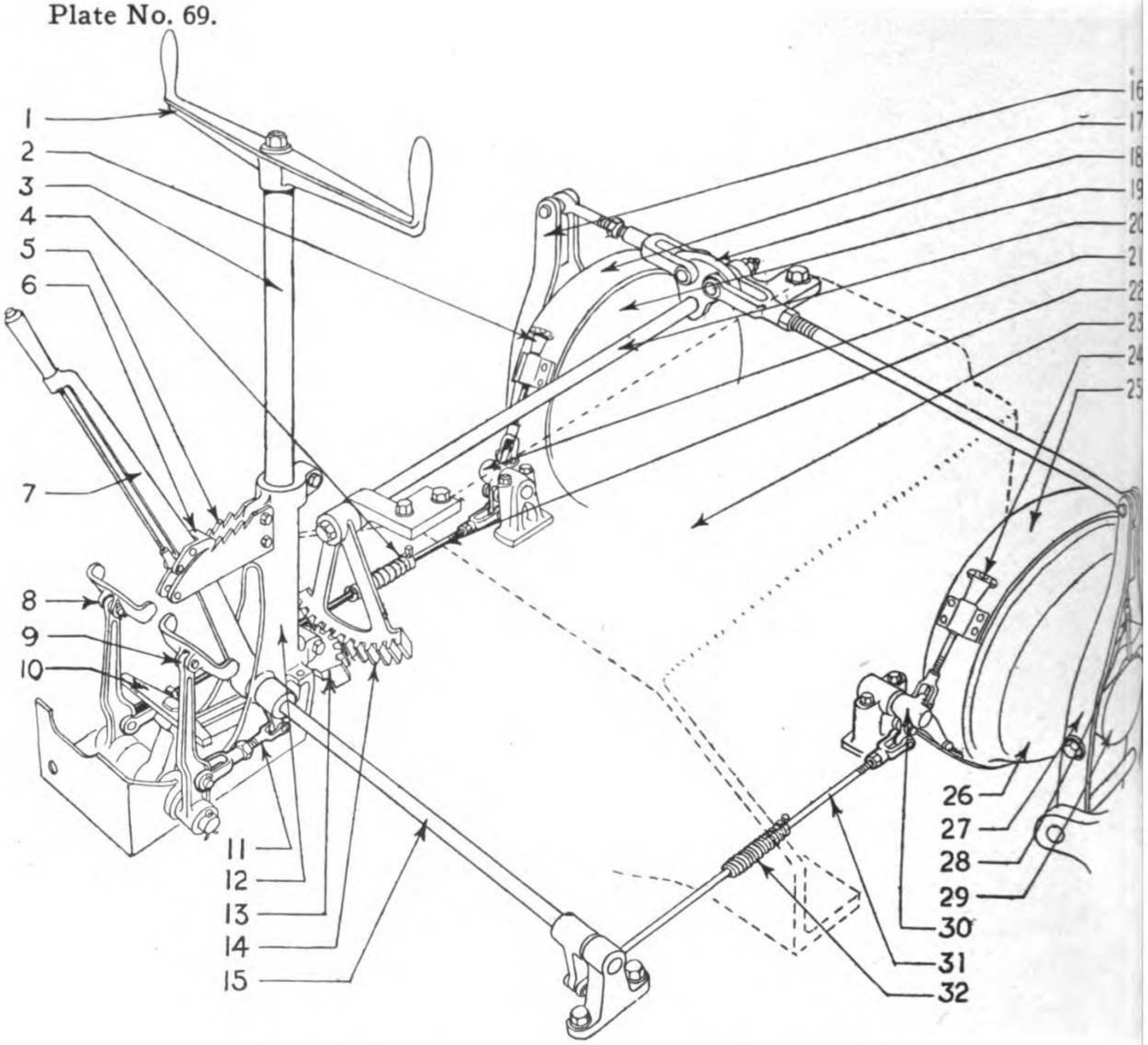
SECOND STEP.

a—Start the engine.

b—Engage the reverse speed in the transmission.

c—Engage the master clutch gently and back up slowly until the track is laid out flat on the ground, as the plate illustrates.

Plate No. 69.



STEERING SYSTEM AND BRAKE CONTROL.

Ref. No.	Part No.	Part Name.
1	6909	Steering clutch hand lever.
2	7217	Brake band adjusting nut.
3	6949	Steering column sleeve.
4	10164	Brake rod spring collar.
5	6764	Hand brake quadrant.
6	6753	Brake lever latch.
7	7268	Brake hand lever.
8	6747	Pedal pad.
9	7273	Brake foot lever pedal.
10	6754	Brake equalizer bar.
11	7264	Foot pedal connecting rod.
12	10431	Steering and brake lever bracket.
13	6910	Steering column gear segment.
14	6913	Steering clutch shaft gear segment.
15	6860	Brake shaft.
16	6976	Steering clutch shifter fork.
17	6815	Steering clutch brake band.
18	844	Steering clutch control slotted crank.
19	6889	Steering clutch housing.
20	6911	Steering clutch control shaft.
21	7260	Brake bell crank.
22	8375	Brake rod right.
23	7002	Transmission case top.
24	7217	Brake bank adjusting nut.
25	6815	Steering clutch brake band.
26	6888	Housing dust guard.
27	6976	Steering clutch shifter fork.
28	7149	Grease cup.
29	6882	Steering clutch shifter ring cover plate.
30	7260	Brake bell crank.
31	8374	Brake rod left.
32	10165	Brake rod spring.

CHAPTER VIII.

CONTROLS.

There are three main control levers, the master clutch (1), Plate 36, the steering clutch (1), Plate 69, and the hand brake lever (7). The master clutch lever operates on a sector provided with notches for locking the clutch in or out at the will of the operator. The gearshift lever operates in an H-shaped quadrant and provides means of bringing into use varying gear ratios to compensate for varying loads. The steering clutch lever controls the linkage operating the steering clutches which in turn control the power transmitted to either track. The hand brake lever controls the movement of the tractor when descending grades and brings it to a stop. In addition there are brakes operating on the drums or housings of the steering clutches. Engine control is by a throttle lever (2), Plate 31, and a spark lever (3) mounted on the steering column.

MASTER CLUTCH CONTROL.

(SEE CHAPTER III.)

CHANGE GEAR CONTROL.

Changes in tractor speed are obtained by changing the gears and this is done by moving the gearshift lever in the selective plate, Plate 4. There are three forward speeds and a reverse, the positions for obtaining these being indicated on the selective plate by letters and as follows:

L—Low speed, move lever to right and forward.
D—Direct, move lever to the left and forward.
H—High, move lever to left and backward.
R—Reverse, move lever to right and backward.

STEERING CLUTCH CONTROL.

Control of the direction of the tractor is by the steering clutches which are in turn controlled by the hand lever (1), Plate 69, attached to a steering column operating in a sleeve (3) on a bracket (12), which also supports the hand brake lever. Turning the lever (1) in a certain direction or to the right, for example, releases the steering clutch on that side. This is accomplished by the steering column actuating the gear segment (13) and a similar member (14) on the steering clutch shaft (20), secured to a slotted crank (18). The crank member (18) is connected to the steering clutch shifter forks (16) (27) by pivotally mounted yoke rods.

The steering clutches proper are not adjustable. Wear of the slotted crank (18) and linkage may be compensated for by the threaded yoke members on either side of the slotted crank.

BRAKES.

The brakes are of the external contracting type, the bands, Plate 69 (17), (25), gripping the drums of steering clutch housings (19) when the brake hand lever (7) or pedals (8) (9) are operated. The hand lever (7) has a latch (6) which engages with teeth in the quadrant (5) locking the lever. Release of the latch is by a plunger in the handle of the brake lever.

The hand brake lever and pedals operate a brake shaft (15) which is linked to bell cranks (21) (30) by rods (22) (31). The brake pedals are also connected to the brake shaft (15) by a yoked rod (11) and the gripping action of the brake bands is equalized by an equalizer bar (10). A spring (32) on each brake rod and retained by a spring collar (4) locked by a set screw, facilitates release of the brakes as well as avoids the possibility of the brakes dragging.

BRAKE ADJUSTMENT.

Adjustment of the brakes is by the brake band adjusting nuts (2) and (24). To adjust, loosen the nuts on the threaded yoke members and turning them to the right which decreases the length of the rod and brings the brake bands in closer relation to the steering clutch housings. The rods (11), (22) and (31) have adjustable yokes and the lengths of the rods may be altered to obtain the maximum pull or leverage of the bell cranks.

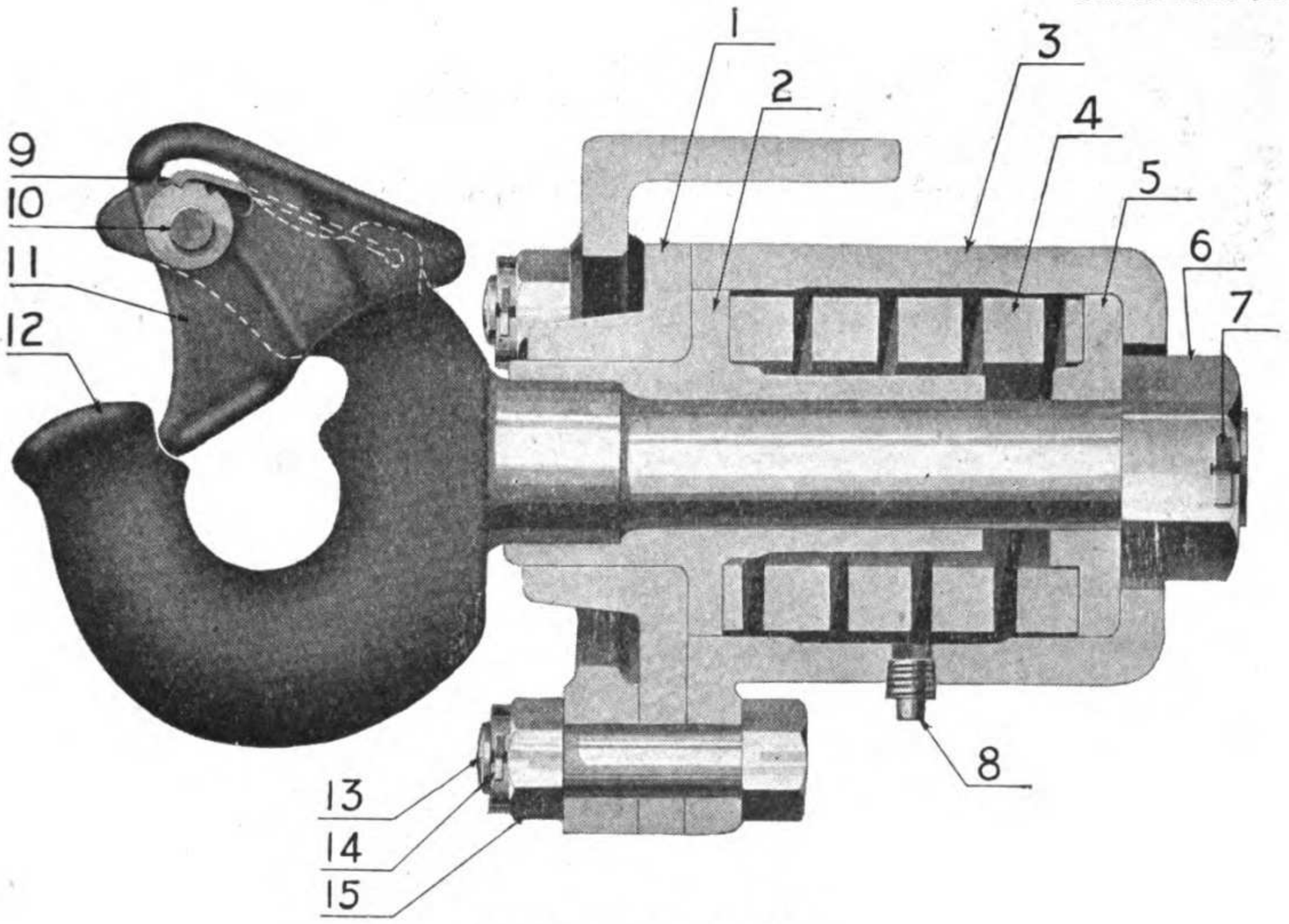
The spark and throttle linkage is adjustable, the connecting rods being equipped with yokes.

CHAPTER IX.

PINTLES.

The ordnance pintles, Plate 70, are hitching devices, one at the front and one at the rear of the main frame. The front and rear pintles differ only in method of attachment to the frame. The principal units of the pintles are: Pintle (12), pintle latch (11), pintle housing cap (1), pintle housing (3), and pintle spring (4).

Plate No. 70.



ORDNANCE PINTLE.

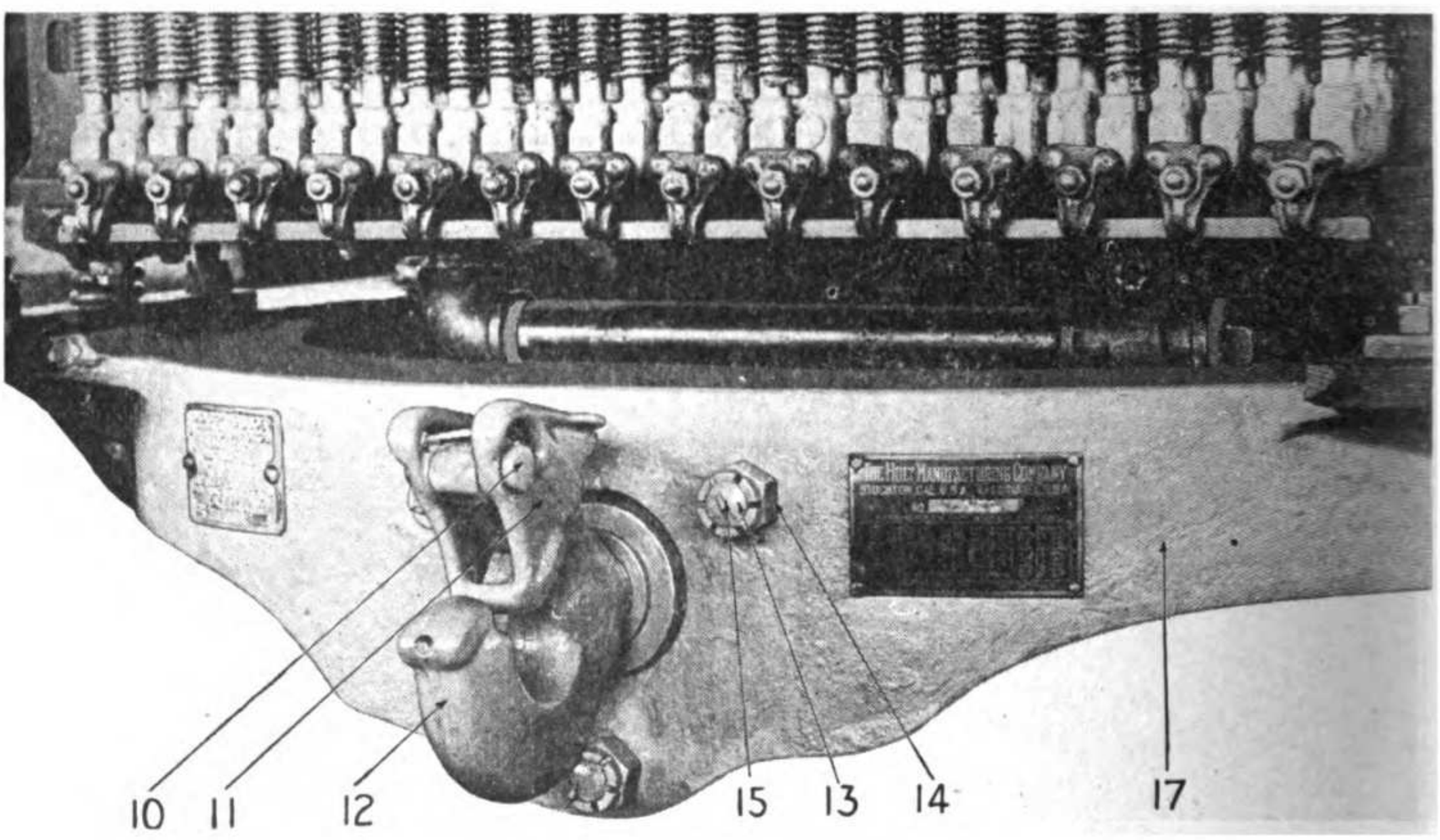
Ref. No.	Part No.	Part Name.
1	7667	Pintle housing cap.
2	7666	Pintle sleeve.
3	7668	Pintle housing.
4	4605	Pintle spring.
5	7665	Pintle spring washer.
6	53136	Nut, slotted semi fin. (1⅝ inch—5½ inches U. S. F.).
7	53563	Cotter pin (⅛ inch x 1¾ inch).
8	56425	Pipe plug (⅜ inch).
9	6735	Pintle latch spring.
10	6736	Pintle latch pin.
11	6737	Pintle latch.
12	7198	Pintle hook.
13	10419	Machine bolt (1 inch x 3¾ inches S. A. E.).
14	53174	Nut (castellated) (1 inch S. A. E.).
15	53504	Cotter pin (7-32x3 inches).

OPERATION OF PINTLES.

The lunette, or hitch of the piece to be drawn by the tractor is pressed against the pintle latch, causing it to open, and dropped into the lugs of the pintle. The pintle latch is then snapped back into place, locking the pintle and hitch together. Release of the hitched piece is effected by pulling up on the thumb lugs of the pintle latch.

When the draw is instituted the shock absorbing units of the pintle assembly come into play. The shaft of pintle (12) can move a short distance contrary to the direction of the draw and against a spring tension. This tension is maintained by pintle spring (4).

Plate No. 71.



FRONT PINTLE, ATTACHED.

Ref. No.	Part No.	Part Name.
10	6736	Pintle latch pin.
11	6737	Pintle latch.
12	7198	Pintle.
13	10419	Pintle bolt.
14	53174	Pintle nut.
15	53504	Pintle cotter pin.
17	6992	Main frame.

FIELD REPAIRS TO PINTLES.

DISASSEMBLING.

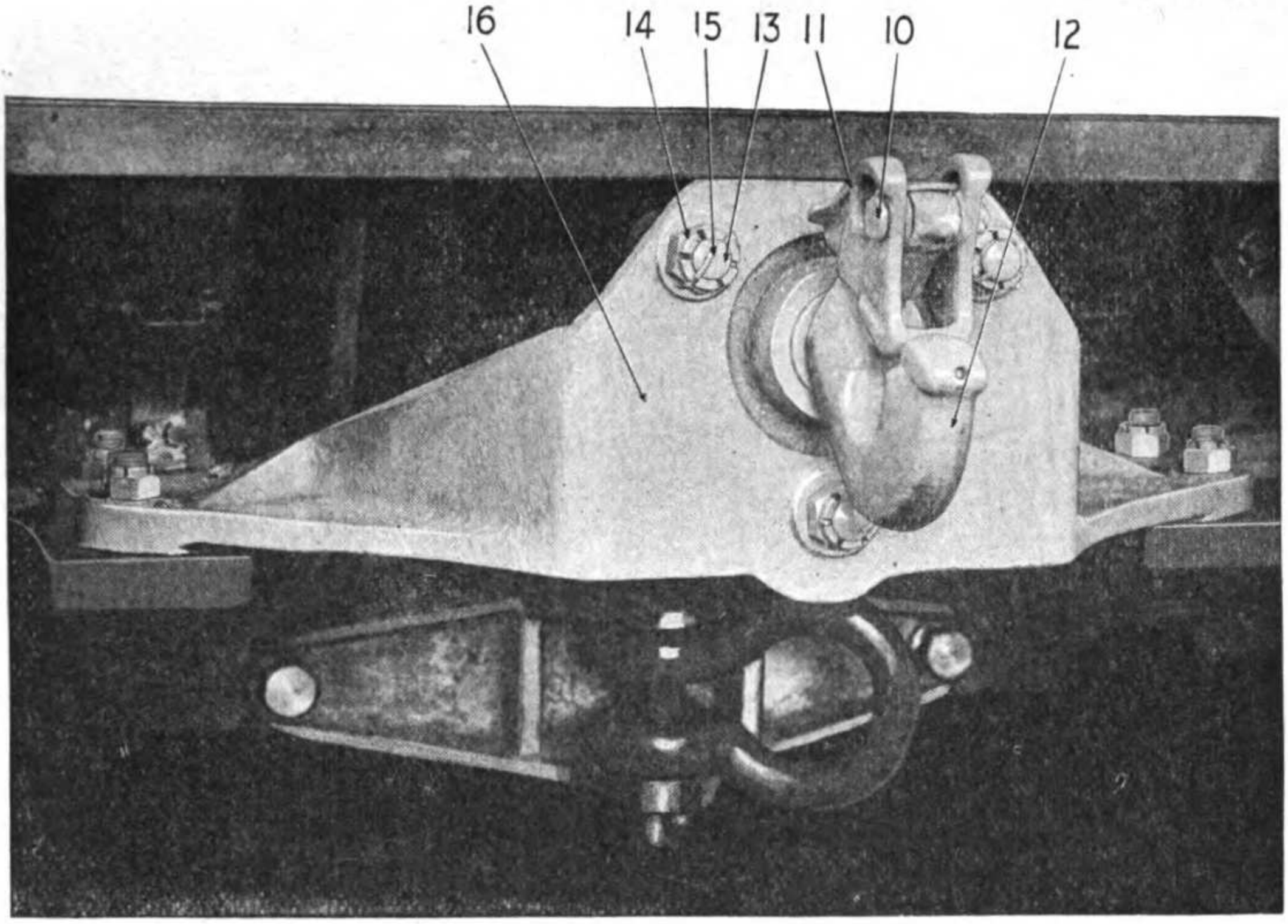
In case of breakage of parts, which is about the only trouble possible in the pintle, proceed to disassemble as follows: Remove cotter pin (14), and castellated nuts (15). Remove cotter pin (7), and slotted nut (6). Pull out of housing. Pull out machine bolts (13). The pintle housing

cap (1), and pintle sleeve (2) may then be disassembled from the pintle housing (3) and the spring (4) and pintle spring washer (5) will drop out of the housing.

OILING PINTLES.

Remove pipe plug (8) from pintle housing and force through grease gun specification No. 3506 grease into housing until it is filled. Pintles should be lubricated monthly.

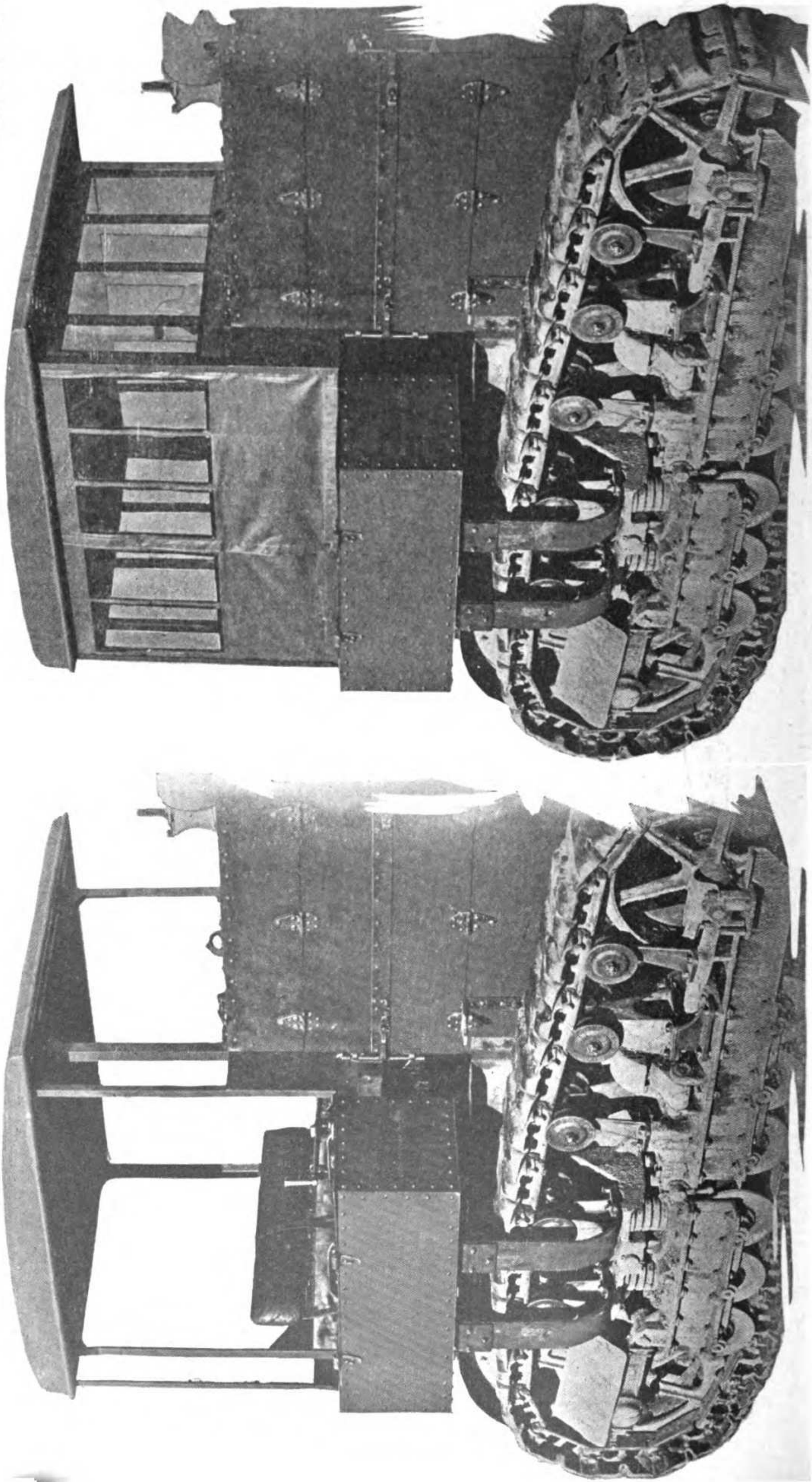
Plate No. 72.



REAR PINTLE, ATTACHED.

Ref. No.	Part No.	Part Name.
10	6736	Pintle latch pin.
11	6737	Pintle latch.
12	7198	Pintle hook.
13	10419	Pintle bracket bolt.
14	53174	Pintle bracket nut.
15	53504	Pintle bracket cotter pin.
16	7669	Pintle bracket.

Plate No. 73



CANOPY TOP OPEN AND WITH CURTAINS IN PLACE.

CHAPTER X.

SUPERSTRUCTURE.

The superstructure is composed of those parts of the tractor which can be called attachments, including the fuel tank, the grouser box, the seat assembly and fenders. The armor, also an attachment, is covered in Chapter XI.

FUEL TANK.

The tractors have a gasoline tank (35), Plate 1, of 46 gallons capacity, the tank being subdivided to provide for a 10-gallon tank for reserve fuel supply. Two valves are provided, one from the main tank and one from the reserve tank. The tank is 46 inches long, 17.75 inches wide and 14.475 inches deep. It is located at the left of the driver's seat, directly over the left track. An auxiliary tank under the engine armor is fitted.

FENDERS.

The fenders (31), Plate 1, are made of 12-gauge sheet stock and are bolted onto the main frame with seven 0.875 inch bolts and four 0.875 inch cap screws. They are made in two sections, the side section bolted to the frame and the top section riveted to the side section. The top sections are 6 inches wide and extend partially over the track on each side. The fenders serve to keep the dirt which is carried up by the track out of the rest of the tractor mechanism.

SEAT ASSEMBLY.

The seat assembly (1), Plate 1, carries driver's and passenger's seat, track oiler tank and the tool box. The seat box is of wood with two cushions mounted and held fast by straps. The cushions are made of 12-ounce khaki waterproof duck with hair filling and are interchangeable. The cushions are 8 inches deep. The seat box width is 42 inches. The box is divided into two compartments, the one on the right side for the track oiler tank and the left for the tool box.

The first few hundred tractors have a shovel mounted on the back of the operator's seat and a fire extinguisher on the front of the seat. In later production these will be placed on the fuel tank armor.

CANOPY TOP.

Protection from inclement weather is afforded the operator by a canopy top, Plate 73. The canopy is 56 inches wide, 75 inches long, and is supported by four angle iron posts, one at either corner. The frame of the

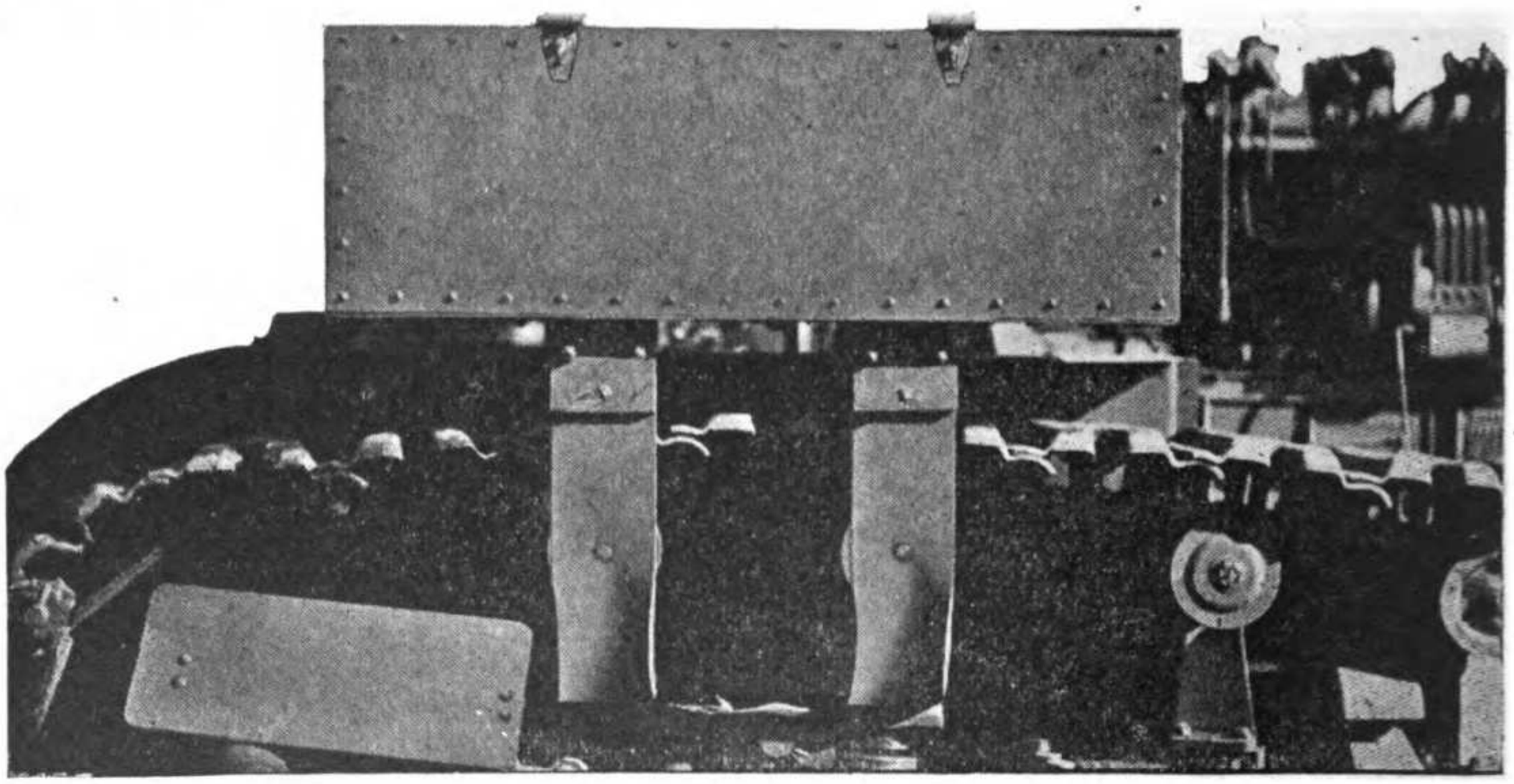
canopy top is wood and the covering is Dupont Fabrikoid (No. 10,000). Curtains containing clear transparent sheeting windows are provided at front, rear and sides of canopy. The curtains are on the inside and when not in use may be removed and folded inside pockets provided in the top.

CARE OF CANOPY TOP.

When the canopy top covering and curtains become slightly worn after a few months' use the finish may be renewed by the application of Dupont leather renovator (No. 19902).

The renovator is applied with a brush the same as paint, except that since the renovator is fairly rapid drying it must be applied lightly and without much rubbing in by the brush.

Plate No. 74.



MOUNTING OF GROUSER BOX.

GROUSER BOX.

The grouser box, shown in Plate 74, is a sheet-steel container, 48 inches long, 18 inches deep and 16 inches wide. Its location is directly opposite that of the fuel tank, being over the right track of the tractor. It serves to carry the grousers in an accessible place so that they may be fastened to the tracks with the least delay.

CHAPTER XI.

ARMOR.

Two portions of the tractor are protected with armor plating. These are the engine and the fuel tank.

ENGINE ARMOR.

As shown in Plates 75 and 76, the engine is provided with a metal shield which completely covers it, and which is bolted to the frame. A permanent opening to admit air to the engine is located at the lower forward end of the armor, between the lower edge of the front end and the forward end of the base. The opening extends the entire width of the armor, and is protected by two baffle plates, which are riveted to the sides of the armor.

Vertical doors are provided at the front, permitting direct access of air to the radiator when the doors are opened, and thus providing better cooling when the tractor is not in the zone of fire. This opens a space 18.5 inches wide and 32.25 inches high.

Horizontal doors are provided on either side of the engine cover to give access to the engine for adjustment and lubrication. These give an opening of 43.25 inches long and 20.5 inches high.

Front and side doors are of the double type, opening along the center line. They are fitted with the regulation ordnance shield hinges, wing-nut and pin locks and lock bars.

A shovel is mounted on the left side of the engine armor by means of a shovel blade bracket of steel riveted to the armor, a strap passing around the shank and through two strap fasteners riveted to the armor. A shovel handle bracket over which the handle of the shovel rests is fitted.

Brackets are provided at the rear of the engine cover for the blade and handle of each of two hatchets which are additionally secured by a strap and strap fastener, shown in Plate 76.

An ax is carried in a similar manner at the rear of the engine cover, its blade slipping into a pocket riveted to the armor.

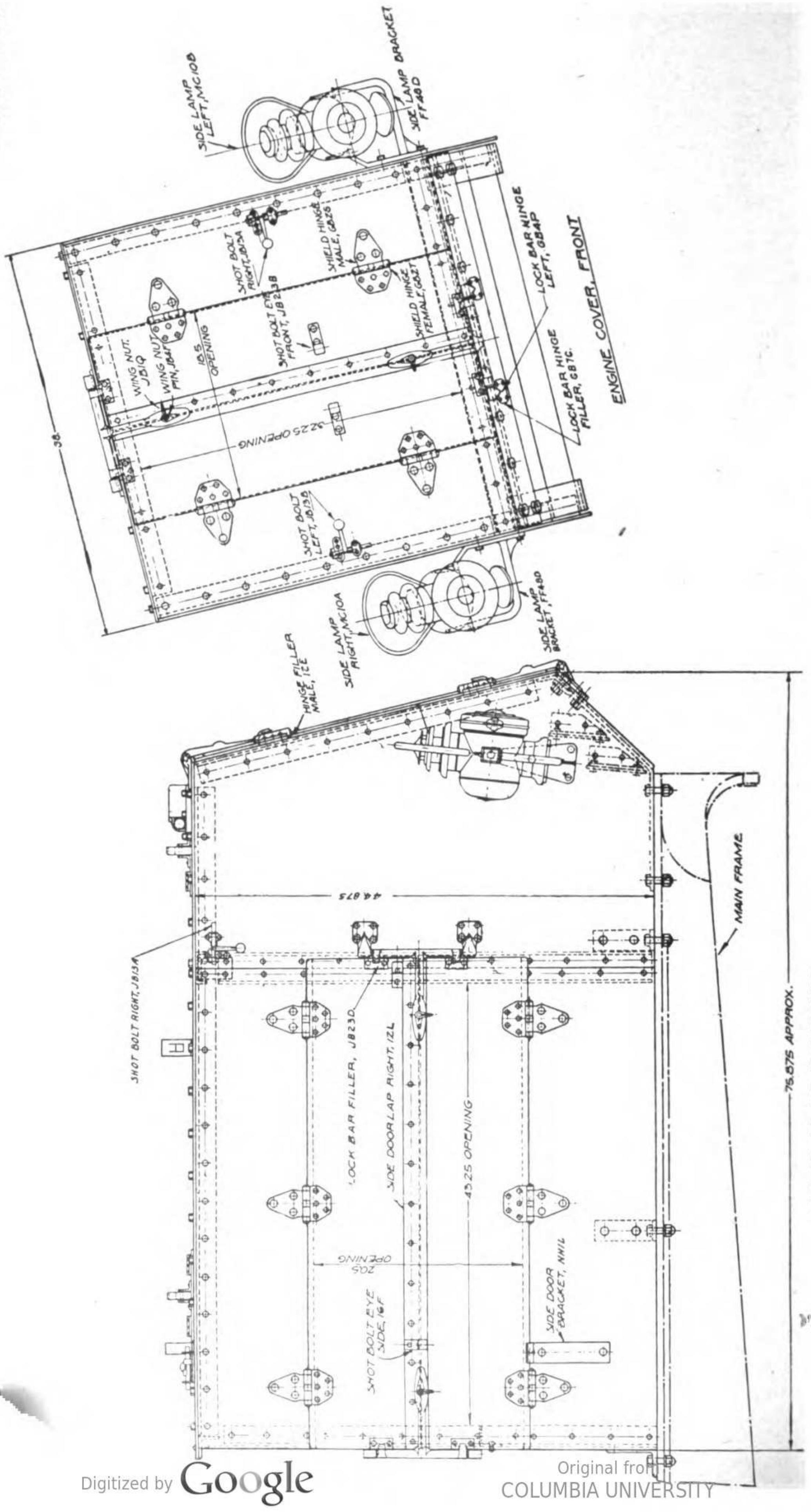
The rear plate of the armor is provided with a small door, which gives access to the compression release cock lever.

The two oil lamps, one on either side of the engine cover, are held by means of brackets attached to the armor.

Provision is made at the front of the top armor for clamping a search-light and an acetylene generator may be fitted.

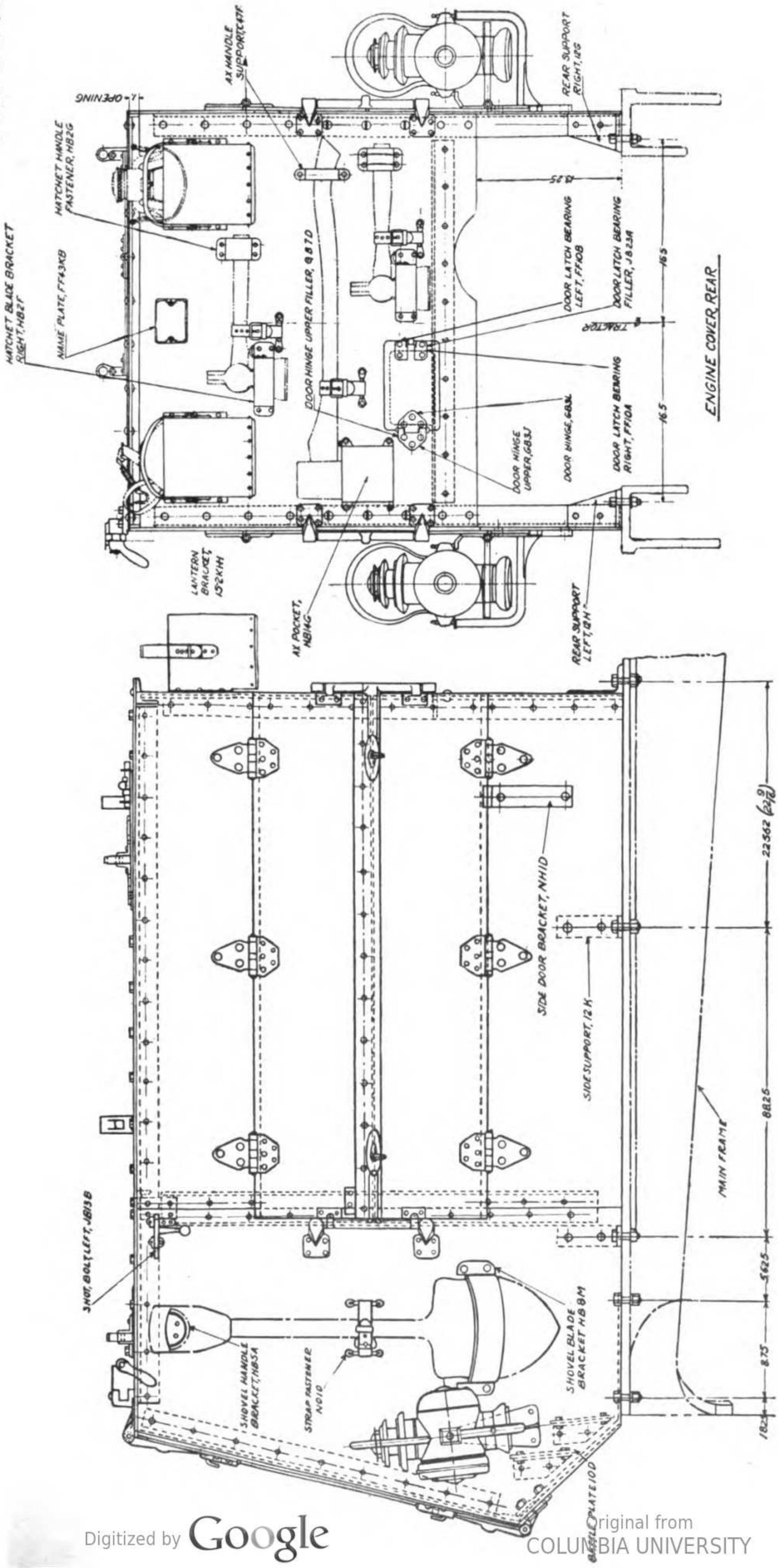
At the upper outer corners of the rear of the engine housing cylindrical sheet metal containers are riveted. The one at the right, called the lantern

Plate No. 75.



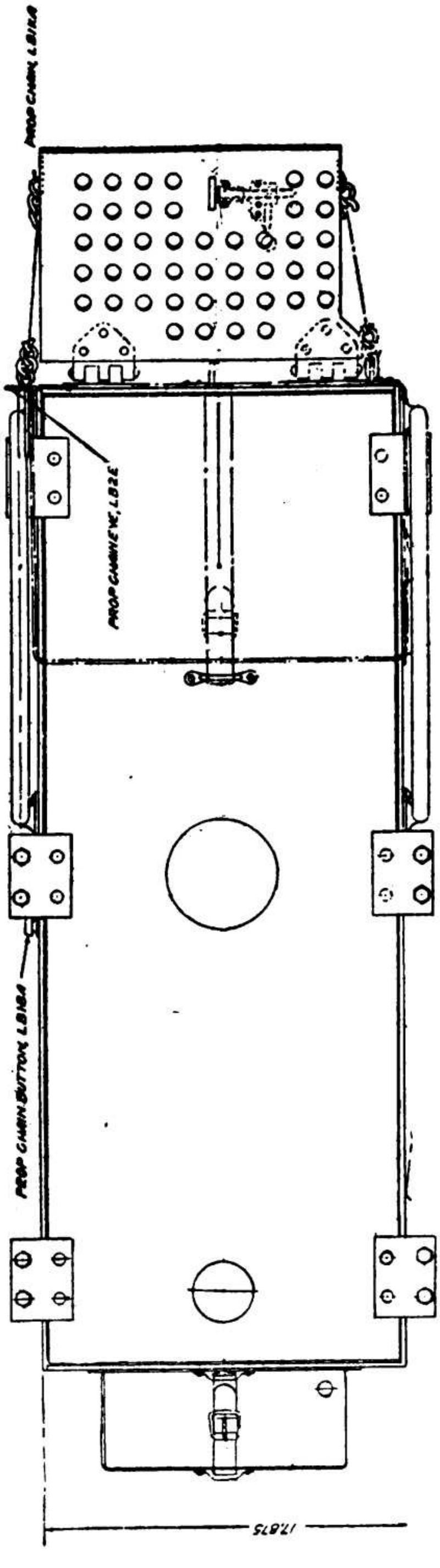
ENGINE ARMOR—FRONT AND RIGHT SIDE.

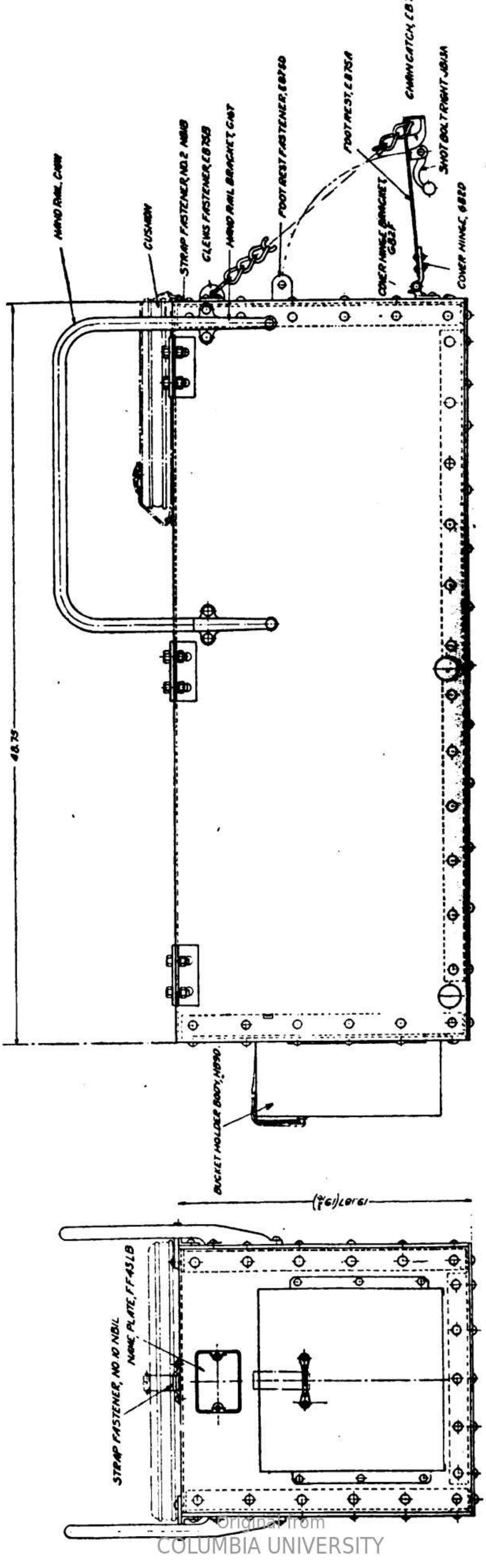
Plate No. 76.



ENGINE ARMOR—REAR AND LEFT SIDE.

Plate No. 77.





FUEL TANK ARMOR—END, TOP AND SIDE.

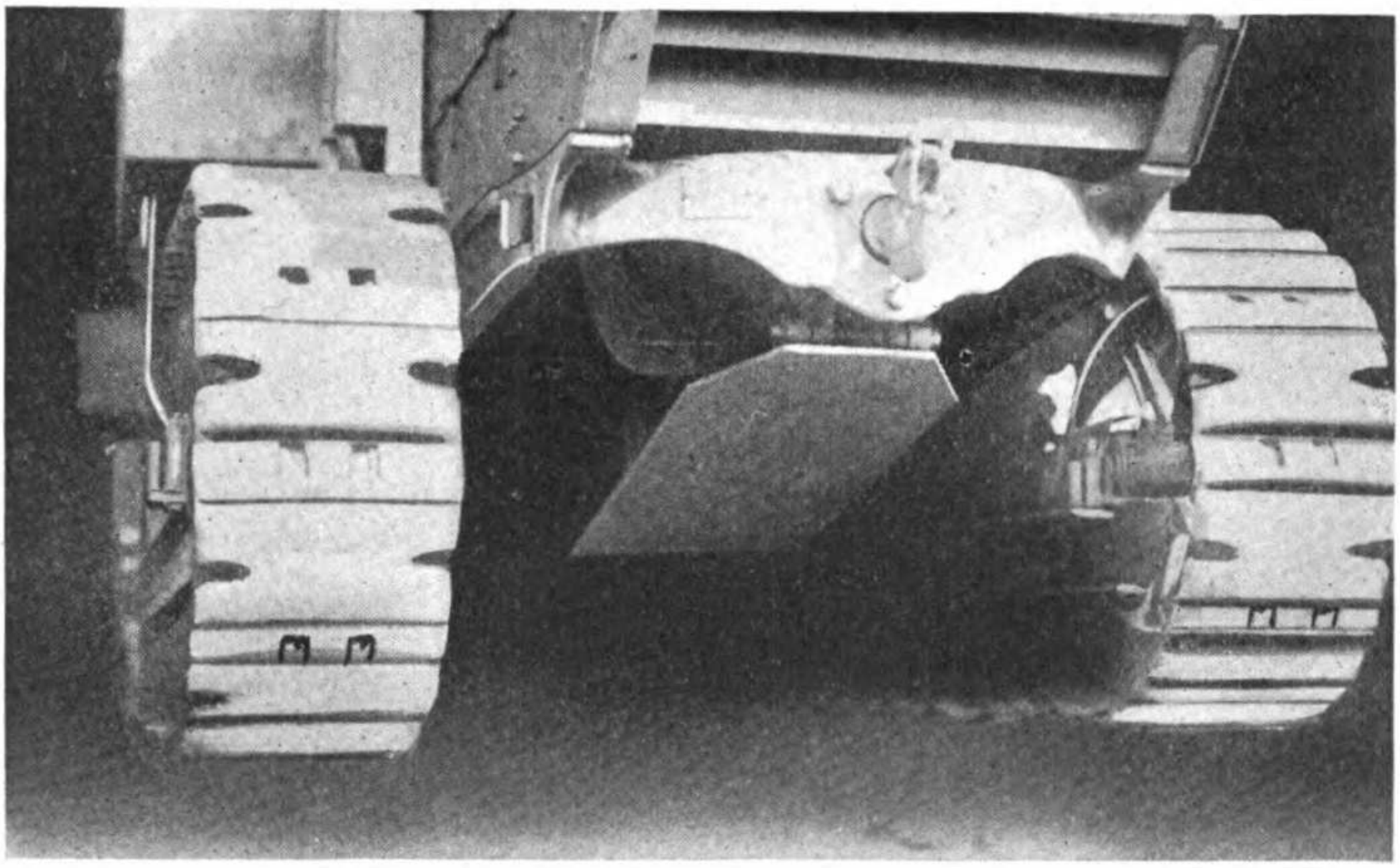
bracket, carries the oil lantern, which is held in place by a clamp. A kerosene can is carried in a similar manner at the left.

A sheet of metal 68 inches long by 38 inches wide forms the top of the armor. A door is provided to the front and in the center of the top. This door gives access to the radiator filler cap. A hole 6 inches in diameter is provided for the exhaust manifold. The muffler is mounted longitudinally on the left side of the top plate. The muffler is secured to the top plate by brackets, which are riveted to the top plate.

Brackets are provided in the center of the top plate for the handle of a pick maddock, which is additionally secured by a strap and fastener.

Holes are drilled through the top plate to receive the ends of strap hangers. These hangers secure an auxiliary fuel tank of 10 gallons capacity to the under side of the top plate.

Plate No. 78.



MOUNTING OF CRANKCASE GUARD.

CRANKCASE GUARD.

The crank case of the engine is guarded from flying fragments and obstructions which may be encountered by a steel plate, Plate 78. This plate is 0.375 (3/8) of an inch thick, 18 inches wide and 46 inches long.

Its rear end is hinged to the main frame of the tractor and the front end to the front pintle housing.

To remove the crank case guard it is not necessary to remove the hinges, but simply remove the pins which connect the guard to the hinges at either end.

FUEL TANK ARMOR.

The fuel tank is provided with a cover, Plate 77, of material similar to that of the engine cover. This is rectangular in shape and is 48.75

inches long, 17.875 inches wide and 19.187 inches high. Across the front end is a seat cushion held in place by a strap passed through strap brackets. On each side of the seat cushion is a hand rail of inverted U shape with its ends set in hand rail brackets riveted to the armor.

A sheet-steel foot rest hinged so that it normally is against the rear of the fuel tank armor, can be let down to a nearly horizontal position where it is held by prop chains on each side attached to clevis fasteners at the upper rear corners of the armor.

Access to the fuel tank filler pipe is provided by a hole in the center of the top of the fuel tank cover.

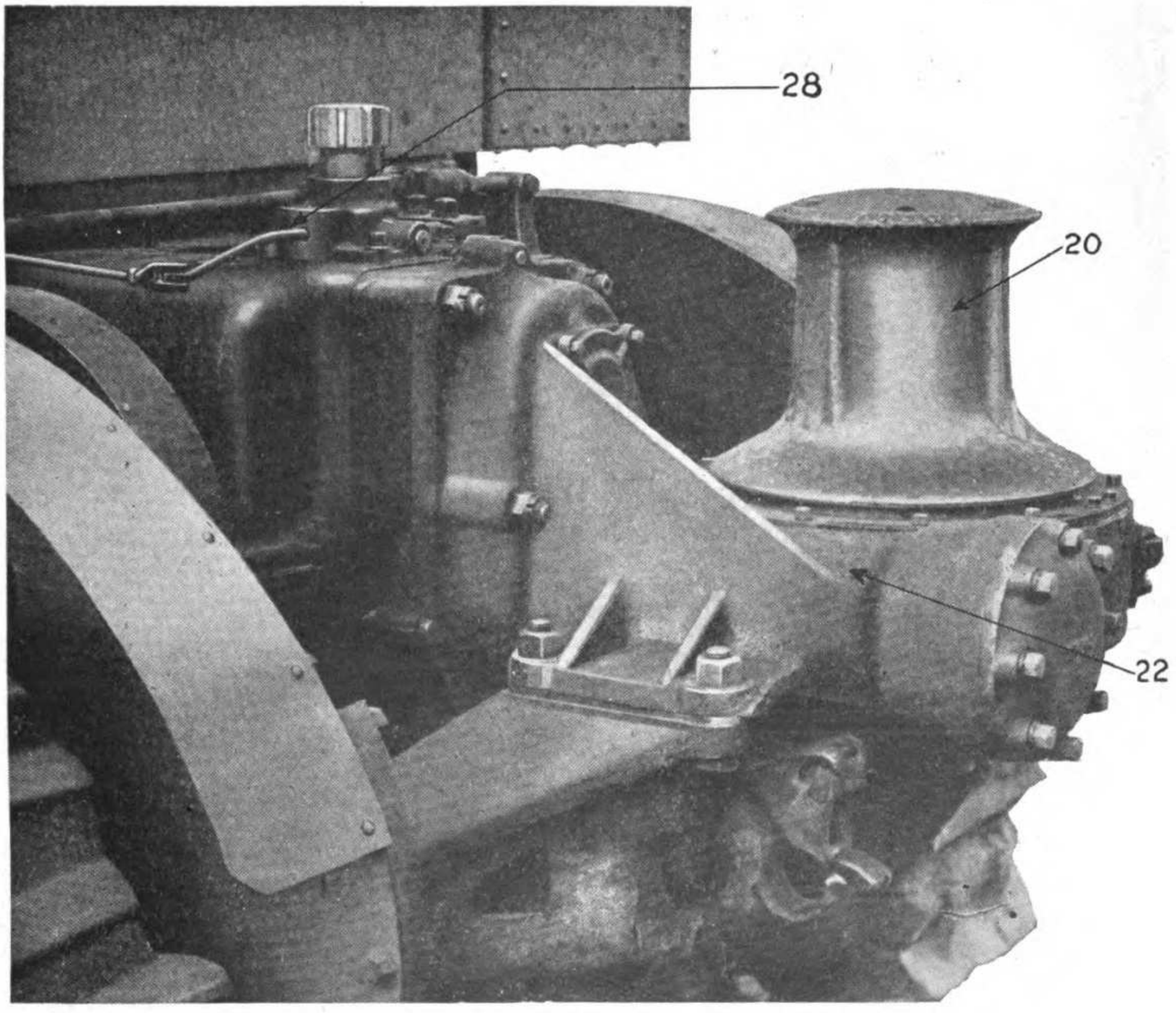
The rear end of the fuel tank cover carries a bucket holder of sheet metal riveted to the armor. It carries the collapsible bucket and is provided with a lid which is fastened by a strap passed through strap fasteners.

CHAPTER XII.

CAPSTAN.

Some of the 10-Ton Tractors are equipped with a capstan, the purpose of which is to move loads that cannot be moved by the tractive power of the machine. The capstan, Plates 79, 80, 81 and 82, is mounted on the main frame of the tractor at the rear of the transmission and is driven from the transmission countershaft. A spline shaft (3), Plate 80, is connected to the countershaft (1) by a coupling (2). Power is transmitted from the shaft (3) to another shaft (8) by a jaw clutch (4) which is actuated by a shifter fork (5). The shifter fork (5) is controlled by a shifter lever (28), Plate 79, which is so arranged that it may be controlled either from the ground or from the operator's seat.

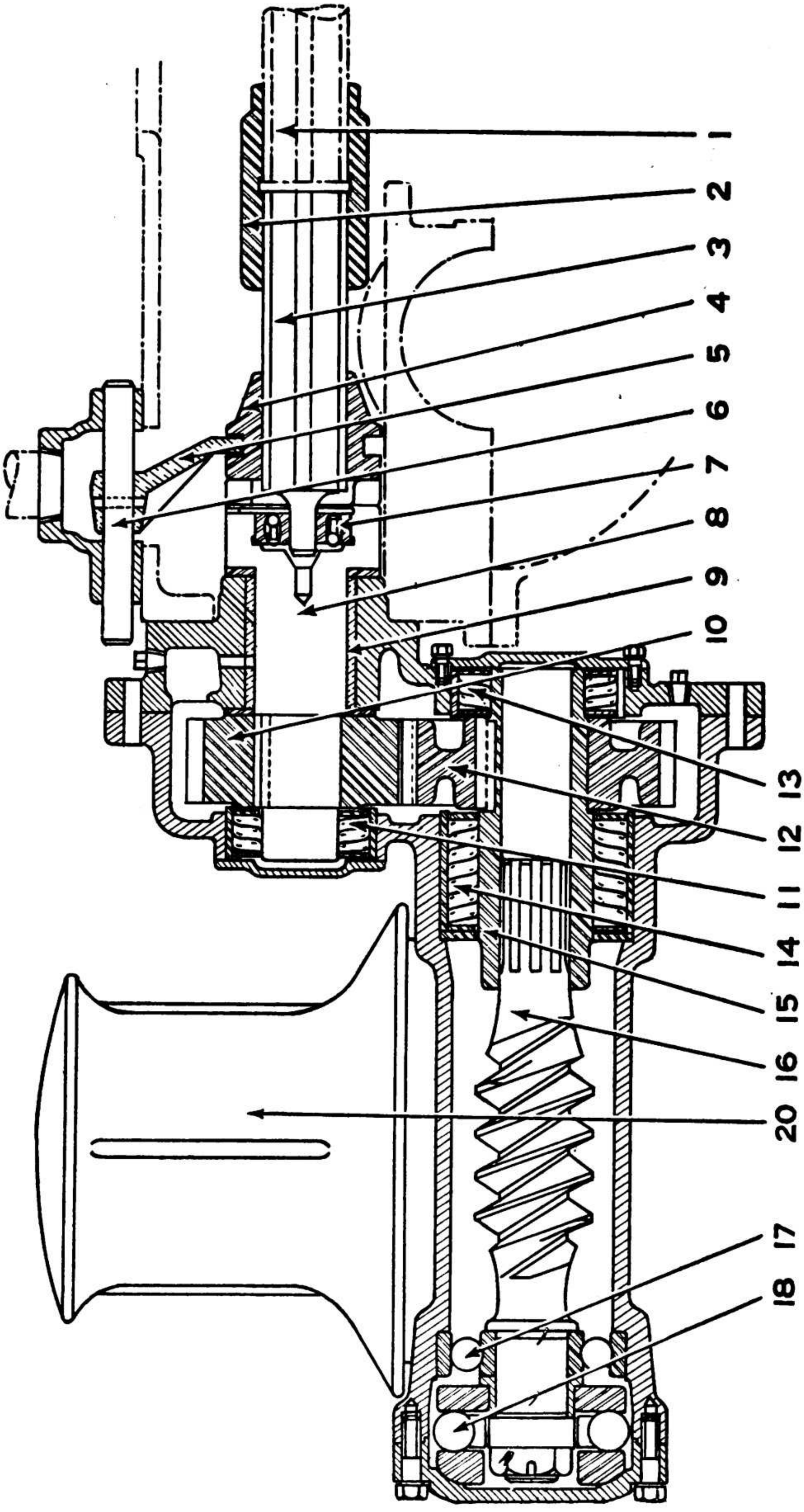
Plate No. 79.



LEFT REAR VIEW OF CAPSTAN.

Ref. No.	Ord. Piece Mark.	Name of Part.
20	BM61A	Capstan drum.
22	BM44A	Worm wheel and gear case.
28	BM57E	Shifter lever.

Plate No. 80.



LONGITUDINAL SECTION THROUGH CAPSTAN.

A ball bearing (7), Plate 80, inserted in a recess in the end of the shaft (8) supports the rear end of the spline shaft (3). The shaft (8) revolves in a bronze bushing (9) and a roller bearing (11) and is keyed to it by a spur gear (10) which transmits power to a similar gear (12) keyed to a sleeve (15), the sleeve (15) being supported by two roller bearings (13) and (14). The sleeve (15) delivers power to a worm (16), one end of the worm having several splines which fit into corresponding grooves cut inside the sleeve. The worm (16) in turn transmits power to the worm wheel (19), Plate 81, to which the drum (20) is bolted.

The rear end of the worm is supported by a radial ball bearing (17), Plate 80, and the end thrust is taken by a ball thrust bearing (18). The worm wheel (19) and drum (20), Plate 81, revolve around the shaft (21), which is provided with two roller bearings (24) and (25). The shaft (21) is pressed into the casting (22) and is prevented from working upward by a plate (23). Upward thrust from the worm (16), Plate 80, is taken by a ball thrust bearing, retained by a cap (26), Plate 81.

The entrance of dust and other foreign matter into the worm wheel case is prevented by a felt ring (29).

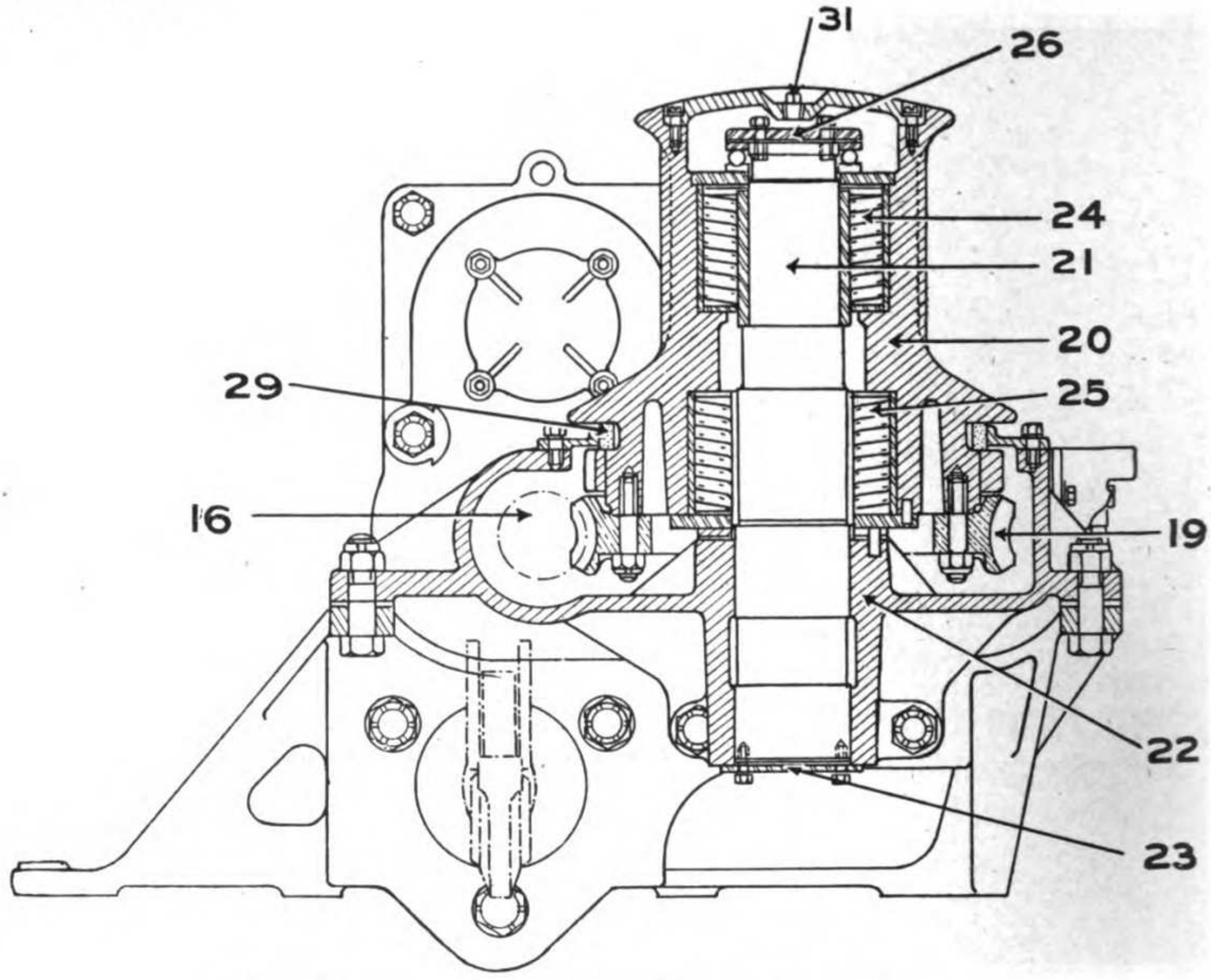
OPERATION.

To move a load with the capstan, place the tractor in the desired position, place the gear shifting lever of the transmission in neutral, set the brakes tightly, and if necessary block behind the tracks at the rear.

The shifter lever (28), Plate 79, is connected by a rod to another lever at the left of the operator's seat.

Ref. No.	Ord. Piece Mark.	Name of Part.
1	AM159A	Transmission countershaft.
2	BM54D	Spline shaft coupling.
3	BM63D	Spline shaft.
4	BM54A	Sliding clutch.
5	BM54B	Shifter fork.
6	BM50E	Shifter shaft.
7	BM55B	Radial ball bearing.
8	BM69A	Drive gear shaft.
9	BM47D	Drive gear shaft bushing.
10	BM47C	Spur gear.
11	BM59C	Drive gear shaft roller bearing.
12	BM60A	Spur gear.
13	BM59D	Spur gear sleeve bearing.
14	BM59E	Spur gear sleeve bearing.
15	BM60C	Spur gear sleeve bearing.
16	BM51A	Worm.
17	BM55A	Worm radial bearing.
18	BM55C	Worm thrust bearing.
20	BM61A	Capstan drum.

Plate No 81



TRANSVERSE SECTION THROUGH CAPSTAN.

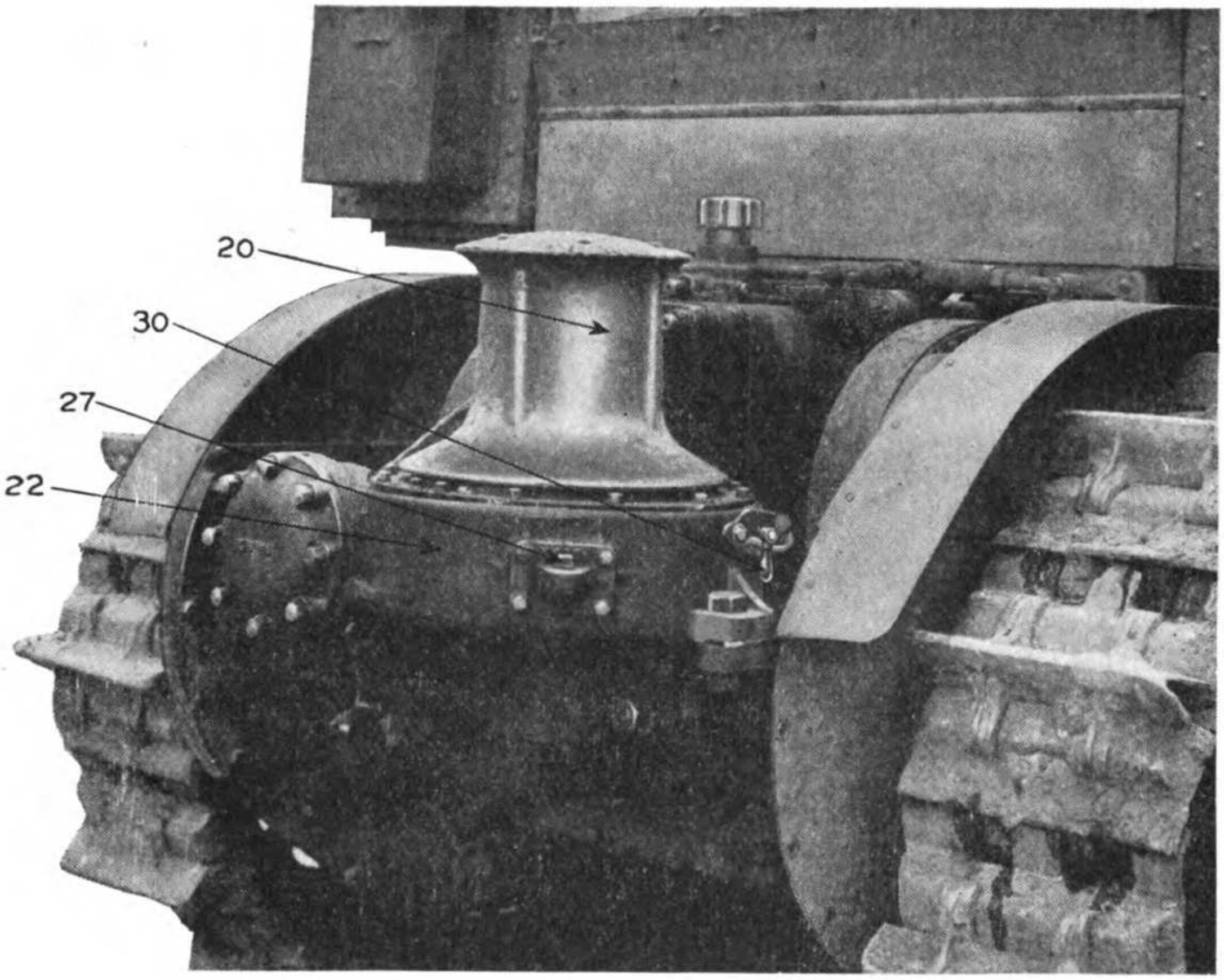
Ref. No.	Ord. Piece Mark.	Name of Part.
16	BM51A	Worm.
19	BM64A	Worm wheel.
20	BM61A	Capstan drum.
21	BM63A	Capstan drum shaft.
22	BM44A	Worm wheel and gear case.
23	BM52D	**Drum shaft cap, bottom.**
24	BM59A	Drum roller bearing, upper.
25	BM59B	Drum roller bearing, lower.
26	BM52F	Drum shaft cap, top.
29	BM66B	Dust ring.
31	BM70B	Pipe plug ⅜".

To engage the capstan drive, move this lever forward. Sometimes the clutch (4), Plate 80, will meet for mesh with the jaws on the shaft (8) in such an end to end position that meshing cannot be readily accomplished. In this event do not force the clutch but engage the master clutch gently, so that it revolves slowly, at the same time pressing forward on the lever of the capstan clutch.

NOTE.—Never attempt to engage the capstan clutch when the master clutch is spinning.

With the capstan clutch engaged and the master clutch disengaged, take a half hitch, with the cable attached to the load, around the drum (20), then engage the master clutch, which will cause the drum to revolve and wind up the cable.

Plate No. 82.



RIGHT REAR VIEW OF CAPSTAN.

Ref. No.	Ord. Piece Mark.	Part Name.
20	BM61A	Capstan drum.
22	BM44A	Worm wheel and gear case.
27	BM48B	Pipe plug, ¾".
30	BM62A	Pawl release rod handle.

A ratchet catch located at the right hand forward side of the capstan engages with ratchet teeth in the lower end of the drum and prevents the load from turning the drum backward when the master clutch of the tractor is disengaged. The ratchet is controlled by a small lever (30), Plate 82. To engage the ratchet, move the handle to a horizontal position; and to disengage, move to a vertical position.

LUBRICATION OF CAPSTAN.

That part of the capstan contained within the transmission which includes the clutch (4), ball bearing (7), shaft (8) and bronze bushing (9) is lubricated by oil from the transmission oil pump, a pipe extension conveying oil to these parts.

The worm wheel spur gears and bearings within the worm wheel case are lubricated by a heavy grade of engine oil which is inserted in the case by removing oil filler plug (27), Plate 82. The proper oil level to maintain is to have the case full to overflowing at the filler hole.

The bearings within the drum (20) Plate 81, are lubricated by a soft grade of cup grease, which may be inserted by removing the pipe plug (31) and using a grease gun.

Specific directions for lubrication of the various parts of the capstan assembly cannot be given, as the use of the capstan is intermittent; and to be on the safe side, the operator must at all times see that the various parts have a generous supply of lubricants.

CHAPTER XIII.

EQUIPMENT.

The following table sets forth the total equipment of one artillery tractor, 10-ton Model 1917, armored.

CONTENTS OF MOTOR VEHICLE TOOL BOX, MODEL 1918.

Drawing	Piece Mark	Item	No. Per Tractor	Item No.
		Book, Ordnance Handbook of 10-Ton Tractor	1	1
14-4-17		Batteries, extra, for flashlight, tungsten, American Everready Co., No. 793	2	2
		Bulb, extra, for flashlight, Mazda, American Everready Co., No. 1197	1	3
		Breaker assembly, magneto	1	4
15-21-12		Chain, towing, 15′ long	1	5
		Chisel, cold, ½″x6″	1	6
15-5-127	U127B	Chisel, cold, ¾″x8″	1	7
		Chisel, cold, ⅜″x6″	1	8
		Chisel, cold, ⅜″x6″, diamond point	1	9
		Calcium carbide, 1-lb. can	1	10
		Drift, copper, ⅜″x4″	1	11
		Drift, copper, ⅝″x6″	1	12
15-5-111	U111G	Drift, solid, $\frac{3}{16}$″ point, 5.6″ long	1	13
		File, flat bastard, double cut, 10″ long	1	14
		File, half round bastard, 10″ long	1	15
3322		File, square bastard, $\frac{5}{16}$″ double cut, 10″ long	1	16
		File, ⅜″, round bastard, 10″ long	1	17
15-5-174	C	File, three cornered, ⅝″ taper, single cut, second cut	1	18
		Files, magneto, "Disston S"	2	19
14-4-17		Flashlight, American Everready, No. 1991, without rubber hood	1	20
		Gauge, thickness, or feeler Starrett No. 72	1	21
15-5-404		Gun, grease and oil, with two nozzles	1	22
		Gaskets, for spark plugs	12	23
		Hammer, ball pein, 12 oz. standard handle	1	24
		Hammer, ball pein, 24 oz. standard handle, "Maydole" or equal	1	25
15-5-180	U180C	Hammer, soft babbitt	1	26
		Jack screw, "Vulcan," size 1¼″x10″, 10-ton capacity with bar	1	27
15-5-46	U46J	Oilers, dome type	2	28
		Puller and spreader, cotter pin, ⅜″x6½″ long, "Bay State"	1	29
		Pins, cotter, box of assorted	1	30
		Pliers, pair of 8″, combination gas	1	31
		Pliers, pair of 6″, round nose	1	32
15-5-234		Pliers, pair of 8″, side cutting	1	33
15-5-384		Pinch-bar, 27″ long	1	34
		Punch, center 4½″ long, "Bay State"	1	35
		Plugs, spark	4	36
		Rule, folding steel, 12″ long, "Starrett" No. 450 M & E	1	37
		Shackles, standard, round pin, drop forged steel, Anchor Style, size ⅝″, No. 213. H. Channon Co., Chicago, Cat. No. 80, page 382	2	38
		Scrapers, set of 3 carbon. H. Channon Co., Cat. No. 80, page 238	1	39
15-5-100	U100E	Screwdriver	1	40
		Screwdriver, all steel, 9″ long, "Channon"	1	41
		Screwdriver, offset 6″ long, straight handle, "Channon"	1	42
15-5-53	U53A, B	Sledge, model 1907	1	43
		Tape, friction, ¾″, ½-lb. rolls	2	44
		Wrench, monkey, 6″ long, steel handle, "Trimo"	1	46
		Wrench, monkey, 15″ long, steel handle, "Trimo"	1	47
		Wrench, pipe, 6″ long, steel handle, "Trimo"	1	48
		Wrench, pipe, 10″ long, steel handle, "Trimo"	1	49
		Wrench, adjustable "S," 6″, Wescott pattern	1	50
		Wrench, adjustable "S," 10″, Wescott pattern	1	51
		Wrench, spark plug	1	52
		Wrench, magneto	1	53
		Wrench, double end $\frac{5}{16}$″ and ⅜″ milled openings, Williams' No. 721, semi-finished	1	54

CONTENTS OF MOTOR VEHICLE TOOL BOX, MODEL 1918—Continued.

Drawing	Piece Mark	Item	No. Per Tractor	Item No.
		Wrenches, double end 13/32" and 1/2" milled openings, Williams' No. 23, semi-finished	2	55
		Wrenches, double end 7/16" and 9/16" milled openings, Williams' No. 725A, semi-finished	2	56
		Wrenches, double end 17/32" and 11/16" milled openings, Williams' No. 27, semi-finished	2	57
		Wrench, double end 5/8" and 3/4" milled openings, Williams' No. 729, semi-finished	1	58
		Wrench, double end 13/16" and 7/8" milled openings, Williams' No. 731-B, semi-finished	1	59
		Wrench, double end 29/32" and 31/32" milled openings, Williams' No. 32, semi-finished	1	60
		Wrench, double end 1 1/8" and 1" milled openings, Williams' No. 33-C, semi-finished	1	61
		Wrench, double end 1 1/8" and 1 1/4" milled openings, Williams' No. 737, semi-finished	1	62
		Wrench, double end 1 1/16" and 1 7/16" milled openings, Williams' No. 38, semi-finished	1	63
		Washers, lock, box of assorted	1	64
		Waste, white cotton, lb	1	65
		Wire, copper, No. 16 B & S. spool	1	66
		Wire, soft steel, No. 16 B & S, spool	1	67
38-9-17		Cover canvas for Ordnance Hand Books	1	68

LIST OF TOOLS AND ACCESSORIES CARRIED ON ENGINE COVER, FUEL TANK COVER AND ON DRIVER'S SEAT.

Drawing	Piece Mark	Item	No. Per Tractor
15-5-51	U51D	Ax	1
15-21-7		Ax handle strap	1
15-21-6		Cushion complete (on fuel tank cover)	1
15-21-7		Cushion strap	1
15-21-8	MC8A	Fire extinguisher	1
15-5-51	U51B	Hatchet	2
15-21-7		Hatchet handle strap	2
15-5-8		Lantern complete	1
15-5-106		Lantern bracket pad complete	2
15-5-8	U8D	Lantern strap	2
15-5-52	U52C	Pick mattock	1
15-21-7		Pick mattock head strap	1
15-21-10	MC10A	Side lamp (right)	1
15-21-10	MC10B	Side lamp (left)	1
15-21-15	MC15B	Tail lamp	1
15-5-50		Watering bucket	2
15-21-7		Watering bucket, strap	1
15-5-51	U51C	Short handle shovel	2
15-21-7		Short handle shovel strap	2
15-21-8	MC8B	Safety can	1

TOOLS AND EQUIPMENT FURNISHED BY TRACTOR MAKER.

No. Per Tractor	Part No.	Item.
1	7539	Magneto screwdriver for K.W. magneto
1	7848	1/8" feeler gauge for K.W. magneto
1	3957	Track wrench
1	9490	Brace wrench for grouser nut
1	7804	16 oz. Townsend grease gun with one 3/8" pipe and one 1/4" pipe
1	7794	Railroad oiler, 1 qt.
1		Wrench for brake band adjustment
1		Special connecting rod bolt wrench
1		Special main bearing bolt wrench
1		Socket wrench for transmission anchor bolt
1		Spring depressor for steering clutch and motor valve springs
1		Special wrench for steering clutch pressure ring nut and main drive pinion nut

TOOLS AND EQUIPMENT FURNISHED BY TRACTOR MAKER—Continued.

No. Per Tractor	Part No.	Item.
2	7994	Transmission eye bolt
1	1958	Clevis
1	10195	Pin for clevis
1	53612	½"x2" cotter pin
1	8324	Track link } Assembled. To be furnished only on tractors equipped with 15" track
1	2258	Space block
1	3247	Track pin
1	7247	Track link } Assembled. To be furnished only on tractors equipped with 13" track
1	2247	Space block
1	3247	Track pin
58	8162	Grouser } One complete set of grousers (straight type) assembled
58	7280	Eye bolt
58	7281	Clevis pin
58	53476	Spring lock washer
58	53501	Cotter pin
58	53536	Cotter pin
58	53110	Nut
58	8382	Washer lock
1		Tractor spare parts list
1		Magneto spare parts list
1		Carburetor spare parts list
1		Vacuum tank spare parts list
1	8562	Whittmore's auto gear protective comp. (No. 7 transmission), (5-lb. can)
1	7812	5-lb. can of hard oil or Whittmore's anti-friction comp.

CHAPTER XIV

NOMENCLATURE.

The following pages set forth the name, ordnance piece mark, makers' part number and the unit weight in pounds, of the necessary parts for one complete 10-ton tractor.

Parts and assemblies that are on the spare and reserve parts list are indicated in heavy type.

For convenience the nomenclature has been divided into two main groups, Engine and Chassis, each of which is subdivided into several groups arranged in alphabetical order.

The location of any part or assembly may be quickly obtained by referring to the nomenclature index on the next page.

Following the nomenclature, a list of all standard hardware used in the 10-ton tractor is given, after which, on page 259, is a numerical index.

The makers' numbers of all parts are arranged in numerical order, with the corresponding ordnance piece mark and the page on which the part is listed directly opposite.

Following the numerical index all ordnance piece marks are arranged in numerical order with the corresponding makers' part number and page directly opposite.

NOMENCLATURE INDEX.

Nomenclature of Engine Parts

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				ENGINE	
				Illustrated on pages 30, 32, 34, 36 and 38	
....	.....	2577.00	1	**Engine, complete with flywheel, crank shaft pulley, magneto, carburetor, vacuum system and fan**	6½"x7"
				AIR CLEANER AND HEATER GROUP	
				Illustrated on pages 32 and 34	
7737	.....	30.17	1	**Air cleaner and heater assembly, consisting of 1—7733, 1—9595, 1—9594, 1—7731, 1—10439, 1—10429, 1—7732, 1—7726, 1—52561, 2—53104, 2—53151, 2—56857, 2—52840, 2—51364 and 2—53470**	
7733	EQ11A	5.00	1	**Air cleaner, Donaldson**	No. 15
9595	EQ12A	5.37	1	**Air cleaner bracket**	⅛"x⅞"x20⅞"
9594	EQ12C	.68	1	**Air cleaner bracket strap**	2" I.D. x 19" long
7731	EQ12D	1.75	1	**Air cleaner tube, flexible steel**	Cast iron or bronze
10439	EQ13A	14.56	1	**Air heater**	Cast iron
10429	EQ15A	.....	1	**Air heater plug**	2" I.D. x 23" long
7732	EQ14B	2.06	1	**Air heater tube, flexible steel**	2¼" O.D. No. 16
7726	EQ14A	.75	4	**Air cleaner tube sleeve**	
				STANDARD PARTS FOR AIR CLEANER AND HEATER GROUP	
52561	EQ12B	.03	2	Bolt, machine, square head (Used on cleaner bracket)	¼"x1¼"
53104	.....	.01	2	Nut, semi fin. hex. (Used on cleaner bracket)	¼"
53151	.....	.03	3	Nut, semi fin. hex. (Used on air heater)	⅜"
56857	.....	.06	2	Pin, split (Used on air cleaner)	5/32"x3"
52840	EQ13C	.08	3	Screw, cap, hex. head (Used on air heater)	⅜"x2"
51364	EQ13B	.07	2	Screw, set, square head, cup point (Used on air heater)	½"x1"
53470	.....	.005	2	Washer, lock (plain heavy) (Used on air cleaner bracket)	¼"
				Belt (See Fan Group)	
				CABLE GROUP	
				Illustrated on page 88	
AM1727	EQ62C	.78	2	**Cable, ignition**	20" long
AM1724	EQ62D	1.17	1	**Cable, ignition**	28" long
AM1725	EQ62E	1.60	1	**Cable, ignition**	37" long
9692	.....	.02	4	**Cable terminal, magneto end**	
9693	.....	.01	4	**Cable terminal, spark plug end**	
M1050	EQ62F	.69	1	**Cable tube, fibre**	1⅜" O.D x 1⅛" I.D. x 31" long
M1052	EQ62A	.13	2	Cable tube clamp stud	⅛" x ¾" x 5¼"
M1996	EQ62B	.02	4	Cable tube clamp	5/16" x 1"

				STANDARD PARTS FOR CABLE GROUP	
53105	.....	.08	4	Nut, semi fin. hex. (On clamp studs)	$\frac{5}{16}$" U.S.S.
				CAM SHAFT GROUP Illustrated on pages 36 and 38	
AM1321	.....	21.30	1	Cam shaft assembly (built-up type), consisting of 1—M10664, 1—100449, 1—100448, 4—Z648, 4—Z647, 1—M10630, 8—50361 and 9—50448	
M10664	EQ19A	13.50	1	Cam shaft	$1\frac{3}{16}$" x 3' 11¼"
160175	.....	4.50	2	Cam shaft bearing assembly (center) consisting of 1—100449 and 2—100448	
100449	EQ21A	3.50	2	Cam shaft bearing, center	Cast iron
100448	EQ21B	.50	2	Cam shaft bearing, bushing (center)	Bronze
Z648	EQ25E	1.50	4	Cam shaft cam, exhaust	Chilled cast
Z647	EQ25A	1.50	4	Cam shaft cam, inlet	**Chilled cast**
M10630	EQ25D	1.20	1	Cam shaft gear, spiral (for oil pump)	13 tooth
160174	.....	4.50	1	Cam shaft bearing assembly (flywheel end) consisting of 1—100420 and 2—100421	
100420	EQ21C	3.50	1	Cam shaft bearing (flywheel end)	Cast iron
100421	EQ21D	.50	2	Cam shaft bearing bushing (F.W. end)	Bronze
160173	.....	...	1	Cam shaft bearing assembly (gear end) consisting of 1—100422 and 1—100423	
100422	EQ21E	4.00	1	Cam shaft bearing (gear end)	Cast iron
100423	EQ21F	.50	1	Cam shaft bearing bushing (gear end)	Bronze
ZH18	EQ26A	22.00	1	Cam shaft gear	68 tooth
M11527	EQ26B	.12	1	Cam shaft key, gib	$\frac{5}{8}$" x $\frac{11}{32}$" x 2¼"
.....	.....	...	..	Cam shaft assembly (integral) consisting of 1—M1183, 2—100290, 1—160171, 1—160170, 1—102293, 1—101773, 1—M4282, 1—53172, 1—53502 and 2—102376	
M11183	EQ20A	...	1	**Cam shaft (integral)**	
100290	EQ22B	...	2	**Cam shaft bearing (center)**	Bronze
100426	EQ24B	...	1	**Cam shaft bearing (flywheel end)**	Cast iron
100427	EQ24D	...	1	**Cam shaft bearing bushing (flywheel end)**	
100428	EQ24A	...	1	**Cam shaft bearing (timing gear end)**	Cast iron
100425	EQ24C	...	1	**Cam shaft bearing bushing (timing gear end)**	
102293	EQ113A	...	1	**Cam shaft gear (timing)**	68 tooth (drop forged)
101773	EQ113B	...	1	Cam shaft washer	1½" Rd. x ¼" long
				Cam Shaft Oil Piping Group (See Oiler Group)	
				STANDARD PARTS FOR CAM SHAFT GROUP	
50361	EQ25C	.005	8	Key, Woodruff (For cams on built-up shaft)	¼" x 1"
M4282	EQ20B	...	1	Key, Woodruff (For timing gear integral shaft)	No. F-⅜" x 1⅜"
53172	.....	...	1	Nut, castle (Holds timing gear integral shaft)	¾"
53502	.....	...	1	Pin, split (Used to lock above nut)	⅛" x 1¼"
50488	EQ25B	.02	11	Pin, taper (8 used for cams, built-up shaft; 1 used for spiral gear, built-up shaft; 1 each used on front and rear bearings, integral shaft	No. 6 x 2¼"
102375	EQ22E	...	2	Screw, set, square head, cup point (Hold front and rear bearings in crank case)	¾" x 3"
102376	EQ22D	...	2	Screw, set, headless, cup point (Hold center bearings in crankcase)	½" x 1¼"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CARBURETOR GROUP Illustrated on page 78 (Specify model and size of carburetor)	
9331	EQ111A	13.00	1	**Carburetor, Kingston**	**Model E4, 2"**
9375	.....	1.75	1	Carburetor air supply connection (Kingston No. 26)	Aluminum
7516	.....	.06	1	Carburetor air supply connection lock nut (Kingston No. 27)	
7521	.....	.09	5	Carburetor ball (Kingston No. 24)	Bronze
7520	.....	.12	5	Carburetor ball retainer cap (Kingston No. 25)	Brass
9369	.....	.87	1	Carburetor center member (Kingston No. 9)	Brass
9381	.....	...	1	Carburetor choke throttle gate (Kingston No. 30)	Steel
9380	.....	...	1	Carburetor choke throttle lever, stem and screws (Kingston No. 29)	
7464	.....	.09	1	Carburetor cock, drain (Kingston No. 28)	Brass, ⅛"
100308	EQ27B	1.25	1	Carburetor flange (lower)	Brass
8432	EQ101C	1.38	1	**Carburetor flange (upper)**	
100309	EQ101G	.005	1	**Carburetor flange gasket**	Seigelite
.....	.....	...	1	Carburetor Butterfly Reach Rod (See Governor Group)	
7456	.....	.07	1	**Carburetor float (Kingston No. 1)**	Cork
9367	.....	2.00	1	Carburetor float chamber (Kingston No. 2)	Brass
7461	.....	.01	1	Carburetor float valve (Kingston No. 3)	Steel
7462	.....	.06	1	Carburetor float valve cap (Kingston No. 6)	Brass
7459	.....	.04	1	Carburetor float valve lever (Kingston No. 4)	Brass
7460	.....	.01	1	Carburetor float valve lever shaft (Kingston No. 5)	Steel
7458	.....	.09	1	Carburetor fuel intake elbow (Kingston No. 21)	Brass
9377	.....	.03	1	Carburetor fuel intake tail piece (Kingston No. 20)	Brass
9376	.....	.03	1	Carburetor fuel intake tail piece nut (Kingston No. 19)	Brass
7518	.....	.03	1	Carburetor gasket (Kingston No. 10)	Copper
9368	.....	6.00	1	Carburetor mixing chamber (Kingston No. 7C)	Brass
7457	.....	.12	1	**Carburetor needle valve (Kingston No. 11)**	Brass
7517	.....	.04	1	Carburetor needle valve lock screw (Kingston No. 12)	Brass
9378	.....	.06	1	Carburetor primer (Kingston No. 22)	Brass
9379	.....	.04	1	Carburetor primer lever (Kingston No. 23)	Brass
7463	.....	.04	1	Carburetor spray nozzle (Kingston No. 8)	Brass
9370	.....	.09	1	Carburetor throttle gate (Kingston No. 13)	Steel
9372	.....	.06	1	Carburetor throttle gate lock screw (Kingston No. 15)	Brass
9371	.....	.02	1	Carburetor throttle gate stop screw (Kingston No. 14)	Brass
9374	.....	.25	1	Carburetor throttle gate stop stem and screw (Kingston No. 17)	Brass
9373	.....	.12	1	Carburetor throttle lever (Kingston No. 16)	Brass
7519	.....	.03	1	Carburetor throttle lever lock nut (Kingston No. 18)	
				STANDARD PARTS FOR CARBURETOR GROUP	
50550	EQ101D	.07	2	Screw, cap (Used on lower flange)	$\frac{7}{16}$" x 1¼"—14 U.S.F.
56473	.....	.008	2	Washer, lock (Used on lower flange)	$\frac{7}{16}$"

				COMPRESSION RELEASE COCK GROUP Illustrated on pages 30, 34 and 38	
AM1656	.....	.30	4	Compression release cock	Brass
M1427	EQ29A	.96	1	Compression release cock lever	$\frac{3}{16}$" x $\frac{5}{8}$" x 33 $\frac{1}{4}$"
M2116	EQ96C	.01	4	Compression release cock rivet	$\frac{1}{4}$" x $\frac{3}{4}$"
				STANDARD PARTS FOR COMPRESSION RELEASE COCK GROUP	
56851	.....	.001	4	Pin, split (Used in ends of rivets)	$\frac{1}{16}$" x $\frac{1}{2}$"
56421	EQ117	.01	4	Pipe plug (Used in release cocks)	$\frac{1}{8}$"
				CONNECTING ROD GROUP Illustrated on pages 34, 38 and 40	
100379	EQ30A	12.25	4	**Connecting rod**	Drop forged
B355	EQ32A	1.50	8	**Connecting rod bushing (die cast)**	Babbitt
B359	EQ33A	1.50	4	**Connecting rod bushing, wrist pin end**	Bronze
M11181	EQ31D	.03	4	**Connecting rod bushing screw, set (For B359)**	$\frac{3}{8}$" x $\frac{5}{8}$"
M11927	EQ31G	1.07	8	**Connecting rod bolt, crank pin**	$\frac{3}{4}$" x 4 $\frac{7}{16}$"
100258	EQ30B	...	4	**Connecting rod cap**	Drop forged
M11449	EQ31B	.01	56	**Connecting rod shim**	No. 28 U.S.Ga. .0156" x 1 $\frac{7}{32}$" x 2 $\frac{7}{8}$"
M11448	EQ31A	.004	32	**Connecting rod shim**	No. 38 B.&S.Ga. .0056" x 1 $\frac{7}{32}$" x 2 $\frac{7}{8}$"
				STANDARD PARTS FOR CONNECTING ROD GROUP	
53172	.....	.02	8	Nut, castle (On connecting rod bolts)	$\frac{3}{4}$" S.A.E.
53502	.....	.005	8	Pin, split (In connecting rod bolts)	$\frac{1}{8}$" x 1 $\frac{1}{4}$"
M12128	EQ32B	.02	4	Wire (Connecting rod bolts)	No. 14 B.&S. Ga. x 18"
				CRANK CASE GROUP Illustrated on pages 30, 32, 34, 36, and 38	
Z667	EQ34A	550.00	1	**Crank case**	Cast iron
ZH78	EQ35A	17.00	2	**Crank case door, plain**	Cast iron
Z725	EQ36A	14.75	1	**Crank case door, plain**	Cast iron
AM1408	.....	23.00	1	**Crank case door (with oil filler) assembly, consisting of 1—Z691, 1—Z689, 1—M11215, 1—M12256, 1—11216, 1—M9377, 1—10670, 2—56851, and 6—54497**	
Z691	EQ37A	19.90	1	Crank case door	Cast iron
Z689	EQ42G	1.85	1	Crank case door oil filler cap	Cast iron
M11215	EQ42A	.03	1	Crank case door oil filler cap pin	$\frac{1}{4}$" x 2"
M12256	EQ38D	.03	1	Crank case door oil filler cap screen	No. 30 mesh x 1 $\frac{1}{2}$" x 5 $\frac{1}{4}$"—No. 27 B. & S. Ga. wire
M11216	EQ42E	.09	1	Crank case door oil filler cap spring	$\frac{1}{16}$" x $\frac{3}{4}$" x 5 $\frac{1}{4}$"
M9377	EQ38E	.08	1	Crank case door oil filler screen	No. 30 mesh x 3 $\frac{1}{4}$" x 3 $\frac{3}{4}$"—No. 27 B. & S. Ga. wire

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CRANK CASE GROUP—Continued	
10870	EQ42F	.60	1	Crank case door oil filler screen retaining washer	1/16" x 3 1/4" I.D. x 4 5/8" O.D.
100010	EQ38A	.50	4	Crank case door gasket (cardboard)	1/8" x 9 3/4" x 16 3/4"
AM1096	.....	.25	1	Crank case door strainer (for oil filler)	
M2164	EQ42B	.02	4	Crank case door stud	1/2" x 2 1/4"
AM1383	.....	55.65	1	Crank case oil reservoir assembly, consisting of 1—Z690, 1—Z692, 1—M9045, 1—M11150, 1—M2116 and 1—51245	
Z690	EQ84C	63.00	1	Crank case oil reservoir	Cast iron
M3516	EQ96A	.12	1	Crank case oil reservoir gasket, cardboard	
Z692	EQ84A	2.25	1	Crank case oil reservoir hand hole cover	1/8" x 9 3/8" x 13 1/2"
M9045	EQ96B	.002	1	Crank case oil reservoir hand hole cover gasket	Cast iron
M11150	EQ84B	.09	1	Crank case oil reservoir hand hole cover plug (drilled)	Blotting paper
M2116	EQ96C	.06	1	Crank case oil reservoir hand hole cover rivet (drilled)	1/2"
102228	EQ89A	.11	3	Crank case oil reservoir hand hole cover stud	1/4" x 3/4"
					1/2" x 2"
				STANDARD PARTS FOR CRANK CASE GROUP	
102371	EQ89B	.83	4	Bolt, machine (Hold reservoir to crank case)	5/8" x 6 1/2"
M11189	EQ96D	.88	1	Chains, steel wire (Holds drain plug to reservoir)	No. 14 B.&S. Ga. x 4" long
51245	EQ118B	.25	2	Cock, test, straight nose "T" handle (One used in crank case; one used in oil reservoir)	3/8"
53108	.....	.06	7	Nut, semi fin. hex. (Used on crank case door and oil reservoir cover studs)	1/2"
56851	.....	.001	2	Pin, split (In oil filler cap pin)	1/16" x 1/2"
M5902	.....	...	1	Pin, split (In hand hole cover rivet)	3/32" x 1"
56423	8A	.07	1	Plug, pipe (Left side of crank case)	1/4"
M3919	EQ86C	.08	4	Plug, pipe (Left side of crank case)	3/8"
56431	EQ117D	.23	4	Plug, pipe (In sides and ends of crank case)	1"
M2027	EQ86A	.04	3	Plug, pipe (countersunk) (Two used in bottom; one in rear end of crank case)	1"
51030	EQ117A	.10	6	Plug, pipe (countersunk) (Top of crank case)	3/4"
54497	EQ38C	.01	6	Screw, machine (Hold oil screen to crank case door)	No. 14—24 x 1/2"
M1495	.....	...	4	Washer, lock (On bottom of oil reservoir)	5/8"
102372	EQ89D	...	1	Wire (On bottom of oil reservoir)	No. 14 B. & S. Ga. 48" long
				CRANK SHAFT GROUP Illustrated on pages 36, 38 and 40	
160092	.....	160.56	1	Crank shaft and collar assembly, consisting of 1—M11101 and 1—M10649	
M11101	EQ43A	160.50	1	Crank shaft	Drop forged nickel steel
M10649	EQ47C	.06	1	Crank shaft collar, shrink	Steel
Z655	EQ44B	5.25	3	Crank shaft bearing, center	Cast iron, babbitted

Z660	EQ45C	5.62	3	**Crank shaft bearing cap, center**	Cast iron, babbitted
Z659	EQ44A	12.25	1	**Crank shaft bearing (F.W. end)**	Cast iron, babbitted
Z730	EQ46A	21.00	1	**Crank shaft bearing cap (F.W. end)**	Cast iron, babbitted
M12058	EQ22A	.002	1	Crank shaft bearing cap gasket (paper)	5½" x 13"
Z658	EQ45B	8.25	1	**Crank shaft bearing (gear end)**	Cast iron, babbitted
Z656	EQ45A	15.50	1	**Crank shaft bearing cap (gear end)**	Cast iron, babbitted
M9060	EQ22C	.003	1	Crank shaft bearing cap gasket (paper)	5" x 13"
M12013	EQ39A	1.24	6	Crank shaft bearing bolt	⅝" x 6½"
100437	EQ39B	.12	6	Crank shaft bearing bolt washer	Copper—Under heads of Bolts
M11503	EQ47B	.003	24	**Crank shaft bearing shim**	No. 38 B.&S. Ga. stock 1⅛" x 3"
M3501	EQ47D	.01	42	**Crank shaft bearing shim**	No. 28 U.S.S. Ga. .0156" x 1⅛" x 3"
M3502	EQ50A	.03	56	**Crank shaft bearing shim**	No. 28 U.S.S. Ga. .0156" x 3½" x 4½"
M11492	EQ50C	.005	32	**Crank shaft bearing shim**	No. 38 Ga. B.&S. .004" x 3½" x 4½"
M11896	EQ50B	.04	56	**Crank shaft bearing shim**	No. 28 Ga. U.S.S. .0156" x 4⅝" x 6"
M11897	EQ50D	.04	32	**Crank shaft bearing shim**	No. 38 Ga. B.&S. .004" x 4⅝" x 6"
M12039	EQ47F	.55	6	**Crank shaft bearing stud**	⅝" x 7¼"
M2025	EQ47E	.23	6	Crank shaft bearing stud nut, square. drilled	⅝"
M11497	EQ51B	5.30	1	**Crank shaft gear, timing**	34 tooth
101002	EQ51C	.19	1	Crank shaft gear, timing, spacer	
M11443	EQ49C	1.00	1	Crank shaft key, taper	¾" x ¾" x 9 $\frac{5}{16}$"
Z715	EQ51A	26.25	1	Crank shaft pulley, fan	Cast iron
M11465	EQ31A	.75	1	Crank shaft washer, end	4⅛" O.D. x $\frac{5}{16}$" thick
M4933	EQ49B	.67	1	Crank shaft washer end screw, cap, drilled	¾" x 1½"
M11743	EQ48C	.17	1	Crank shaft washer end screw, cap, drilled	$\frac{5}{16}$" x ¾"
M11452	EQ48B	.01	1	Crank shaft washer, felt	Felt
				STANDARD PARTS FOR CRANK SHAFT GROUP	
				Babbitt, special armature metal 17¾ lb. used on crank shaft bearings	
53170	.....	.16	12	Nut, castle (Used on bearing bolts and studs)	⅝" S.A.E.
53502	.....	.005	12	Pin, split (Used on bearing bolts and studs)	⅛" x 1¼"
53538	.....	.01	6	Pin, split (Used on center bearing studs)	$\frac{3}{16}$" x 1½"
51028	EQ117B	.04	1	Plug, pipe, countersunk (Plugs oil way in crankshaft)	⅜"
50564	EQ34B	.11	7	Screw, cap, hex. head (Used in front and rear bearing caps)	½" x 1¼"
M11464	EQ48D	.01	1	Wire, lock (Used in M4933 washer screw)	No. 11 B.&S. Ga. x 6" long
				CYLINDER GROUP	
				Illustrated on pages 30, 32, 34, 36 and 38	
160186	.....	75.82	3	**Cylinder assembly (Nos. 2, 3 and 4 from front), each consisting of 1—ZH92, 5—M12124 and 2—12123**	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CYLINDER GROUP—Continued	
ZH92	EQ53A	72.00	3	**Cylinders**	Cast iron, 6½" bore
M12124	EQ57C	.55	15	**Cylinder stud (head)**	⅝" x 6¼"
M12123	EQ57D	.61	6	**Cylinder stud**	⅝" x 7¼"
160185	.....	76.04	1	**Cylinder assembly, consisting of 1—100184, 1—M12124, 2—100443, 2—100444 and 2—M12123**	
100184	EQ54A	72.00	1	**Cylinder**	Cast iron, 6½" bore
M12124	EQ57C	.52	1	**Cylinder stud (head)**	⅝" x 6¼"
100443	EQ55B	.55	2	**Cylinder stud**	⅝" x 6½"
100444	EQ57B	.60	2	**Cylinder stud**	⅝" x 7"
M12123	EQ57D	.62	2	**Cylinder stud**	⅝" x 7¼"
100293	EQ55E	.001	4	Cylinder gasket	Paper
100292	EQ55D	.02	4	**Cylinder gasket**	Rubber
M11744	EQ55A	.002	4	**Cylinder gasket**	Paper
M3976	EQ55C	.30	16	**Cylinder stud (bottom)**	¾" x 2 7/16"
				STANDARD PARTS FOR CYLINDER GROUP	
53157	.....	.19	16	Nut, semi fin. hex. (On crank case cylinder studs)	¾" S.A.E.
53110	.....	.12	28	Nut, semi fin. hex. (On cylinder head studs)	⅝" U.S.S.
56421	EQ117	.01	4	Pipe plug (In cylinder jackets)	⅛"
56427	EQ55F	.08	4	Pipe plug (In cylinder jackets)	½"
				CYLINDER HEAD GROUP Illustrated on pages 30, 32, 34, 36 and 38	
AM1318	.....	40.89	4	**Cylinder head assembly, consisting of 1—Z649, 2—11381, 2—Z714, 2—M10278, 2—M11442 and 2—M11441**	
Z649	EQ56A	36.00	4	**Cylinder head**	Cast iron
M11381	EQ106A	1.25	8	**Cylinder head valve**	Steel, cast head
Z714	EQ107B	1.07	8	**Cylinder head valve guide**	Cast iron
M10278	EQ106B	.31	8	**Cylinder head valve spring**	15 coil, 7" long
M11442	EQ107A	.06	8	**Cylinder head valve spring collar**	
M11441	EQ107C	.25	8	**Cylinder head valve spring keeper**	
M2293	EQ57A	.25	4	**Cylinder head gasket**	6⅝" I.D. x 9½" O.D.
				Cylinder head stud (See Cylinder Group)	
				STANDARD PARTS FOR CYLINDER HEAD GROUP	
56421	EQ117C	.01	4	Plug, pipe (Side of cylinder heads)	⅛"
				ENGINE HANGER BRACKET GROUP Illustrated on pages 30 and 38	
Z712	EQ82A	70.00	2	**Engine hanger bracket**	Cast steel
M11952	EQ49D	.60	8	**Engine hanger bracket bolt**	¾" x 2½" S.A.E.

				STANDARD PARTS FOR ENGINE HANGER BRACKET	
53172	.....	.21	8	**Nut, castle (On bracket bolts)**	¾" S.A.E.
53503	.....	.006	8	**Pin, split (Through ends of bolts)**	⅛" x 1⅜"
				FAN GROUP Illustrated on page 64	
7032		4.00	1	**Fan**	25½" D.
11557	NM75C	1.18	1	**Fan belt (Scandinavian) (Hand woven endless)**	3" x 80"
6983	NM74B	9.00	1	**Fan bracket**	Bronze
7025	NM72D	.12	4	**Fan bracket stud**	
				Fan Housing (See Radiator, Water Circulating Group)	
6985	NM75A	9.00	1	**Fan hub**	Cast iron
7768	NM75B	.50	1	**Fan hub bearing**	No. 19205 Hyatt
6982	NM76B	.50	1	**Fan hub bearing spacer**	
6984	NM74D	2.50	1	**Fan hub eccentric**	
53270	NM74C	.29	1	**Fan hub eccentric bolt (drilled)**	⅛"—20 U.S.F. x 3¾"
6988	NM74A	.75	1	**Fan hub eccentric handle**	
6980	NM72C	.07	2	**Fan hub eccentric screw, cap (drilled)**	⅛" hex. x 1"
10142	NM79D	.08	4	**Fan hub screw, cap (drilled head)**	⅜" x 1¾"
10141	NM79B	3.00	1	**Fan hub spacer**	
10144	NM79A	.005	1	**Fan hub spacer gasket**	Vellumoid .01" thick
6990	NM72E	.31	1	**Fan hub washer**	2⅝" D. x ⅛" thick
6989	NM76A	.62	1	**Fan hub washer, thrust**	2⅛" D. x 1/16" thick
6981	NM72A	3.00	1	**Fan shaft**	1¼" x 9⅜"
				STANDARD PARTS FOR FAN GROUP	
50372	NM72B	.04	1	**Key, Woodruff (Holds eccentric to shaft)**	No. 22
53168	.....	.06	1	**Nut, castle (On eccentric bolt)**	½" 20 U.S.F.
53172	.....	.19	1	**Nut, castle (On fan shaft)**	¾" 16 U.S.F.
53170	.....	.16	4	**Nut, castle (On fan bracket studs)**	⅝" 18 U.S.F.
7830	NM76E	.005	1	**Oiler, Winkley (On fan hub)**	No. 23K—⅛"
53487	.....	.003	1	**Pin, split (Through eccentric bolt)**	3/32" x 1"
53502	.....	.005	4	**Pin, split (Through fan bracket studs)**	⅛" x 1¼"
53503	.....	.006	1	**Pin, split (Through end of fan shaft)**	⅛" x 1½"
7820	NM72F	.01	..	Wire (Fan hub eccentric screws)	No. 18 W.&M. Ga. 6" long
7821	NM79C	.02	..	Wire (Fan hub eccentric)	No. 18 W.&M. Ga. 13" long
				FLYWHEEL GROUP Illustrated on pages 32, 34 and 36	
Z683	EQ63A	322.00	1	**Flywheel**	Cast iron
M11108	EQ49A	.60	6	Flywheel bolt	¾" x 2½" S.A.E.
				Flywheel Cover (See Platform Group)	
M11892	EQ47A	.38	1	Flywheel pointer	No. 16 U.S. Ga. 3¼" x 13½"
				STANDARD PARTS FOR FLYWHEEL GROUP	
53172	.....	.21	6	Nut, castle (On flywheel bolts)	¾" S.A.E.
53503	.....	.006	6	Pin, split (In flywheel bolts)	⅛" x 1½"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				GOVERNOR GROUP Illustrated on page 84	
160038	.....	5.81	1	Governor body assembly, consisting of 1—ACDH4, 2—100125, 2—M1036 and 4—53500	
ACDH4	EQ65A	2.50	1	**Governor body**	Cast iron
100125	EQ65B	1.50	2	**Governor body weight**	Cast iron
M1036	EQ65C	.15	2	**Governor body weight pin**	½" x 2 13/16"
160183	.....	4.46	1	Governor lever assembly, consisting of 1—100005, 1—M11232, 1—Z273, 1—M2058, 1—M1042, 1—M2057, 1—160182, 4—53105, 56851, M2340 and 50528	
100005	EQ18A	.89	1	Governor lever	3/16" x ¾" x 22½"
M11232	EQ18C	.23	1	Governor lever clamp	3/16" x ¾" x 6"
Z273	EQ12E	.23	1	Governor lever slide	Mal. iron
M2058	EQ64D	.03	1	Governor lever slide rivet	3/16" x ⅞"
M1042	EQ18B	.20	1	Governor lever tension rod	Cold rolled
M2057	EQ64F	.008	1	Governor lever tension rod rivet	3/16" x ¾"
M1043	EQ66C	.04	1	**Governor tension rod spring**	⅜" x 3½"
160182	.....	2.78	1	Governor plunger assembly, consisting of 1—100462, 1—AM1403, 1—M11229, 2—M11231, 2—M11230, 1—M11228, 1—100461, 1—53487, 4—M11238	
100462	EQ67D	1.20	1	**Governor plunger**	Cold rolled
AM1403	EQ64C	.19	1	**Governor plunger bearing**	Hess-Bright No. 203
M11229	EQ67C	.56	1	**Governor plunger bearing collar**	Cold rolled
M11231	EQ67A	.03	2	Governor plunger bearing collar pin	Cold rolled
M11230	EQ67B	.30	2	Governor plunger bearing washer, dust	1/16" x 2⅛"
M11228	EQ67E	.10	1	**Governor plunger bearing washer, thrust**	⅛" x 1 3/16"
100461	EQ66A	.16	1	Governor plunger screw, cap (special)	⅜" x 1¼"
101001	EQ64A	1.50	1	**Governor lever bracket**	Mal. iron
M2059	EQ64E	.03	1	Governor lever bracket rivet	3/16" x 1"
100463	EQ66D	.04	1	**Governor plunger spring**	No. 9 Ga. x 5" long
8436	EQ100E	.37	1	Governor throttle rod (long)	¼" x 24¾"
8435	EQ101A	.06	1	**Governor throttle rod (short)**	
8433	EQ101B	.12	1	**Governor throttle rod bell crank**	
9434	EQ101F	.13	1	Governor throttle rod bell crank pin	¼" x 2"
2973	EQ100F	.11	2	Governor throttle rod collar	⅝" x 11/32" x 7/16"
M1046	EQ100A	.04	1	Governor throttle rod spring	3/16" x 4½"
				STANDARD PARTS FOR GOVERNOR GROUP	
53105	.....	.02	3	Nut, semi fin. hex (Two used on governor lever clamp; one used on tension rod)	3/16"

56851	.....	.001	6	Pin, split (One used on tension rod; two on bell crank pin; two on short throttle rod; one on long throttle rod)	1/16" x 1/2"
M2340	.....	.002	1	Pin, split (Used on governor lever slide rivet)	1/8" x 5/8"
53500	.....	.003	4	**Pin, split** (Used on governor weight pins)	1/8" x 3/4"
53499	.....	.002	1	Pin, split (Used on governor lever bracket rivet)	1/8" x 1/2"
53486	.....	.002	1	Pin, split (Used on governor lever slide rivet)	3/32" x 3/4"
53487	.....	.003	1	Pin, split (Used on plunger assembly)	3/32" x 1"
M11238	EQ64G	.002	4	Pin, riveting (Used on plunger assembly)	No. 11 B.&S. Ga. x 7/8" long
M2037	EQ64B	.07	2	Screw, cap (Used on governor lever bracket)	7/16" x 7/8"
50528	EQ18D	.003	2	Screw, cap (Used on governor lever clamp)	5/16" x 3/4"
7725	EQ100C	.005	2	Screw, set, headless (Used on long throttle rod)	1/4" x 1/4"
				MAGNETO GROUP Illustrated on pages 88, 90, 92 and 96	
AM101	EQ83E	35.00	1	**Magneto, K.W. Model H.K-4**	
9601	.....	2.06	1	**Magneto base (K.W. No. 10)**	Bronze
101703	EQ78A	7.00	1	**Magneto bracket**	Brass
C175	EQ76A	.75	1	Magneto bracket bearing cap	Cast iron
M5151	EQ76C	.01	2	Magneto bracket bearing cap shim	.004" x 1" x 2 1/2"
7522	.....	.16	1	**Magneto bridge or spider (K.W. No. 1)**	Steel
9461	.....	.008	2	**Magneto bridge binding post lock nut (K.W. No. 56)**	Brass
9628	.....	.003	2	**Magneto bridge clamping stud (K.W. No. 37)**	Brass
9683	.....	.001	6	**Magneto bridge stud washer (K.W. No. 192)**	Brass
9613	.....	.001	1	**Magneto bridge spring (K.W. No. 196)**	Steel
7523	.....	.50	1	**Magneto circuit breaker complete (K.W. No. 181)**	Brass
9663	.....	.01	1	**Magneto circuit breaker cap (K.W. No. 95)**	Bakelite fibre
9659	.....	.004	1	Magneto circuit breaker cap nut (K.W. No. 80)	Brass
9620	.....	.02	1	Magneto circuit breaker cap plate (K.W. No. 21)	Brass
9614	.....	.01	1	**Magneto circuit breaker contact block (K.W. No. 5)**	Brass
9664	.....	.006	1	**Magneto circuit breaker contact block insulator (K.W. No. 102)**	Fibre
9635	.....	.005	2	**Magneto circuit breaker contact block screw (K.W. No. 46)**	Brass
9686	.....	.001	2	**Magneto circuit breaker contact block screw insulator (K.W. No. 203)**	Fibre
9665	.....	.001	4	**Magneto circuit breaker contact block screw washer (K.W. No. 103)**	Fibre
9685	.....	.004	1	**Magneto circuit breaker contact screw, complete with contact (K.W. No. 194)**	Steel, platinum tipped
9645	.....	.001	2	Magneto circuit breaker contact screw nut (K.W. No. 60)	Steel
9687	.....	.59	1	Magneto circuit breaker dust washer (K.W. No. 214)	Fibre
9597	.....	.59	1	**Magneto circuit breaker end piece (K.W. No. 3)**	Bronze
9631	.....	.008	1	**Magneto circuit breaker end piece screw (lower) fillister head (K.W. No. 40)**	Steel
9630	.....	.009	2	**Magneto circuit breaker end piece, screw (upper) flat head (K.W. No. 39)**	Steel
7538	.....	.001	1	**Magneto circuit breaker housing cap plate retainer spring (K.W. No. 29)**	Brass
9668	.....	.001	1	Magneto circuit breaker primary circuit plunger spring (K.W. No. 109)	Brass
9658	.....	.006	1	**Magneto circuit breaker primary circuit plunger (K.W. No. 79)**	Brass
9646	.....	.003	2	Magneto circuit breaker retainer spring nut (K.W. No. 61)	Brass

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				MAGNETO GROUP—Continued	
7533	.....	.01	1	**Magneto circuit breaker rocker arm, complete with contact (replaces 190 with No. 69 rubber roller, 68 shaft, 66 rivet and 141 retaining ring) (K.W. No. 190)**	
9629	.....	.005	1	**Magneto circuit breaker rocker arm screw (K.W. No. 38)**	Steel
7541	.....	.001	1	**Magneto circuit breaker rocker arm spring (K.W. No. 110)**	Steel
9637	.....	.001	1	**Magneto circuit breaker rocker arm spring screw (K.W. No. 47)**	Steel
9644	.....	.001	1	Magneto circuit breaker rocker arm stud nut (K.W. No. 59)	
9606	.....	.21	1	**Magneto condenser, complete with housing (K.W. No. 126)**	
9608	.....	.19	1	Magneto condenser housing (K.W. No. 138)	
9625	.....	.001	2	**Magneto condenser screw (K.W. No. 34)**	
9623	.....	.001	2	**Magneto condenser housing screw for end piece (flat head) (K.W. No. 32)**	
7542	.....	.76	1	**Magneto distributor block (4 cylinder) (K.W. No. 96)**	Bakelite, fibre
9611	.....	.08	1	**Magneto distributor block cap (K.W. No. 184)**	Bakelite, fibre
9670	.....	.001	1	**Magneto distributor block cap plunger (K.W. No. 120)**	Carbon
9677	.....	.001	1	**Magneto distributor block cap plunger spring (K.W. No. 144)**	Brass
9633	.....	.008	1	**Magneto distributor block screw (long) (K.W. No. 44)**	Steel
9634	.....	.007	1	**Magneto distributor block screw (short) (K.W. No. 45)**	Steel
9669	.....	.003	1	**Magneto distributor brush (K.W. No. 119)**	Carbon
7536	.....	.05	1	**Magneto distributor brush holder and brush (complete) (K.W. No. 183)**	
9678	.....	.005	1	**Magneto distributor brush spring (K.W. No. 145)**	
9596	.....	.50	1	**Magneto distributor gear (K.W. No. 2)**	80 tooth
9674	.....	.08	1	**Magneto distributor gear bearing complete, consisting of 70, 71 and 72 (K.W. No. 129)**	Ball
9654	.....	.02	1	Magneto distributor gear bearing cap (K.W. No. 71)	
9655	.....	.02	1	Magneto distributor gear bearing cone (K.W. No. 72)	
9599	.....	.31	1	Magneto distributor gear bearing housing (K.W. No. 8)	
9623	.....	.001	3	**Magneto distributor gear bearing housing screw (K.W. No. 32)**	
9752	.....	.001	1	Magneto distributor gear bearing retainer ring (K.W. No. 111)	
9598	.....	1.40	1	Magneto distributor gear housing (K.W. No. 7)	
9605	.....	.001	1	Magneto distributor gear molding (K.W. No. 94)	
9638	.....	.002	3	Magneto distributor gear moulding screw (K.W. No. 51)	
9632	.....	.003	1	**Magneto distributor gear screw (K.W. No. 43)**	
9653	.....	.005	1	Magneto distributor gear shaft (K.W. No. 70)	
9688	.....	.001	1	Magneto distributor gear shaft spacing washer (K.W. No. 216)	
9648	.....	.005	1	Magneto drive shaft pinion taper pin (K.W. No. 63)	Bronze
9600	.....	.48	1	**Magneto end piece, for driving end (K.W. No. 9)**	
9621	.....	.02	1	Magneto end piece dust cover (K.W. No. 24)	
9624	.....	.009	2	**Magneto end piece dust cover screw (lower) (K.W. No. 33)**	
9671	.....	.001	1	Magneto end piece dust washer (K.W. No. 123)	
9631	.....	.006	2	**Magneto end piece screw (fillister head) (K.W. No. 40)**	

9625	.....	.002	1	Magneto ground screw (K.W. No. 34)	
9612	.....	.03	1	**Magneto high tension bus bar (K.W. No. 186)**	Brass
9622	.....	.007	1	Magneto high tension bar clip (K.W. No. 25)	
9660	.....	.004	1	Magneto high tension bus bar pilot (K.W. No. 82)	
9662	.....	.001	1	Magneto high tension bus bar rivet (flat head) (K.W. No. 88)	
9754	.....	.001	1	Magneto high tension bus bar rivet (K.W. No. 217)	
7535	.....	.05	1	**Magneto high tension lead (K.W. No. 100)**	Copper, insulated
7537	.....	.08	1	**Magneto high tension plug (K.W. No. 195)**	
9679	.....	.005	1	**Magneto high tension plug plunger (K.W. No. 146)**	
9676	.....	.001	1	**Magneto high tension plug plunger spring (K.W. No. 143)**	
7532	.....	.06	1	**Magneto high tension safety spark gap cap (K.W. No. 118)**	
9617	.....	.04	1	Magneto high tension safety spark gap housing (K.W. No. 15)	Brass and porcelain
9656	.....	.02	1	**Magneto high tension safety spark gap, terminal (K.W. No. 77)**	
9661	.....	.003	1	Magneto high tension safety spark gap terminal (lower) (K.W. No. 87)	
9616	.....	.01	1	**Magneto low tension or primary bus bar (K.W. No. 14)**	
9680	.....	.008	1	**Magneto low tension or primary bus bar stud (K.W. No. 147)**	
9640	.....	.008	1	Magneto low tension or primary bus bar stud lock nut (for bridge) (K.W. No. 55)	
9689	.....	.001	1	Magneto low tension or primary bus bar stud lock washer (K.W. No. 218)	
9657	.....	.03	1	Magneto low tension or primary stud (K.W. No. 78)	
9667	.....	.001	1	Magneto low tension or primary stud insulating washer (lower) (K.W. No. 106)	
9666	.....	.001	1	Magneto low tension or primary stud insulating washer (upper) (K.W. No. 104)	
9643	.....	.01	1	Magneto low tension or primary stud nut (K.W. No. 58)	
9753	.....	.01	1	Magneto low tension or primary stud nut (large) (K.W. No. 53)	
9642	.....	.005	1	Magneto low tension or primary stud nut, lower (K.W. No. 57)	
9684	.....	.001	1	Magneto low tension or primary stud washer (K.W. No. 193)	
9604	.....	2.31	4	**Magneto magnet (K.W. No. 73)**	Steel
9602	.....	.22	2	**Magneto magnet clamp (K.W. No. 26)**	Steel
9627	.....	.01	6	**Magneto magnet clamp screw (long) (K.W. No. 36)**	Steel
9626	.....	.007	4	**Magneto magnet clamp screw (short) (K.W. No. 35)**	Steel
9619	.....	.003	2	Magneto oil hole cover for driving end piece (K.W. No. 17)	
9681	.....	.004	1	Magneto oil hole cover (left) (K.W. No. 148)	
9618	.....	.004	1	Magneto oil hole cover (right) (K.W. No. 16)	
9675	.....	.001	4	Magneto oil hole cover spring (K.W. No. 142)	
9607	.....	2.56	1	**Magneto pole piece, complete (K.W. No. 132)**	
9610	.....	2.87	1	**Magneto rotor, complete (K.W. No. 180)**	
9672	.....	.08	1	**Magneto rotor bearing, circuit breaker end (K.W. No. 127)**	Ball
9673	.....	.17	1	**Magneto rotor bearing, driving end (K.W. No. 128)**	Ball
9650	.....	.008	1	**Magneto rotor cam (K.W. No. 67)**	Steel
9682	.....	.001	1	**Magneto rotor cam key (K.W. No. 170)**	Steel
9608	.....	.25	1	**Magneto rotor driving opinion (K.W. No. 64)**	40 tooth
9639	.....	.002	1	**Magneto rotor shaft nut (K.W. No. 54)**	
9615	.....	.001	7	Magneto rotor spacing bearing washer (K.W. No. 13)	
9647	.....	.005	2	Magneto rotor taper pin (large) (K.W. No. 62)	
9609	.....	1.06	1	**Magneto rotor winding, complete (K.W. No. 139)**	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				MAGNETO IMPULSE STARTER GROUP Illustrated on page 92	
9694	.....	.55	1	Magneto impulse starter bracket (K.W. No. ST-1)	
7524	.....	.05	2	**Magneto impulse starter cam (K.W. No. ST-11)**	
7529	.....	.007	4	Magneto impulse starter cam screw (K.W. No. ST-35)	
9722	.....	1.06	1	Magneto impulse starter case R.H., coupling drive (4 cyl.) (K.W. No. ST-52)	
9704	.....	.09	1	**Magneto impulse starter case bushing (K.W. No. ST-24)**	
9717	.....	.12	1	Magneto impulse starter case nut (K.W. No. ST-40)	
9721	.....	.004	1	Magneto impulse starter case oiler (K.W. No. ST-49)	
9719	.....	.001	1	Magneto impulse starter catch spring support pin (K.W. No. ST-42)	
7527	.....	.009	1	**Magneto impulse starter cushion spring (K.W. No. ST-18)**	
9700	.....	.01	1	Magneto impulse starter cushion spring sleeve, inner (K.W. No. ST-19)	
9701	.....	.01	1	Magneto impulse starter cushion spring sleeve, outer (K.W. No. ST-20)	
9703	.....	.005	1	Magneto impulse starter cushion spring plunger, lower (K.W. No. ST-22)	
9702	.....	.007	1	Magneto impulse starter cushion spring plunger, upper (K.W. No. ST-21)	
7526	.....	.02	1	Magneto impulse starter cushion spring stud (K.W. No. ST-23)	
7531	.....	.06	1	**Magneto impulse starter dog (K.W. No. ST-12)**	
7528	.....	.02	1	Magneto impulse starter dog stud (K.W. No. ST-29)	
9695	.....	1.02	1	**Magneto impulse starter ratchet R.H. (4 cyl.) (K.W. No. ST-8)**	
7530	.....	.13	1	**Magneto impulse starter ratchet catch (K.W. No. ST-13)**	
9697	.....	.02	1	**Magneto impulse starter ratchet catch lock (K.W. No. ST-14)**	
9710	.....	.01	1	Magneto impulse starter ratchet catch lock screw (K.W. No. ST-31)	
9725	.....	.001	1	**Magneto impulse starter ratchet catch lock spring R.H. (K.W. No. ST-59)**	
9709	.....	.01	1	Magneto impulse starter ratchet catch roller (K.W. No. ST-30)	
9724	.....	.001	2	Magneto impulse starter ratchet catch spring R.H. (K.W. No. ST-27)	
9705	.....	.02	1	Magneto impulse starter ratchet catch spring rivet (K.W. No. ST-58)	
9707	.....	.001	1	Magneto impulse starter ratchet catch spring support R.H. (K.W. No. ST-25)	
9708	.....	.05	1	Magneto impulse starter ratchet catch stud (K.W. No. ST-28)	
9711	.....	.02	1	Magneto impulse starter ratchet catch stud nut (K.W. No. ST-32)	
9714	.....	.003	1	Magneto impulse starter ratchet catch stud pin (K.W. No. ST-36)	
9712	.....	.01	1	Magneto impulse starter ratchet catch stud washer (K.W. No. ST-33)	
9698	.....	.01	2	Magneto impulse starter ratchet insert R.H. (K.W. No. ST-15)	
9720	.....	.003	4	Magneto impulse starter ratchet insert pin (K.W. No. ST-43)	
9715	.....	.008	1	Magneto impulse starter ratchet taper pin (K.W. No. ST-37)	
9716	.....	.04	1	Magneto impulse starter rotor shaft nut (K.W No. ST-38)	
9718	.....	.002	1	Magneto impulse starter rotor shaft nut cotter pin (K.W. No. ST-41)	

9713	.....	.02	1	Magneto impulse starter rotor shaft washer (K.W. No. ST-34).....	
7525	.....	.12	1	Magneto impulse starter spring (K.W. No. ST-17).....	
AM140	.....	1.25	1	**Magneto Oldham coupling assembly, consisting of M1429, M1430, M1431, 50799, M2024 and 52813**.....	
M1429	EQ83C	.37	1	**Magneto Oldham coupling piece No. 3**.....	2 11/16" rd. x 11/16" long
M1430	EQ83A	.37	1	**Magneto Oldham coupling piece No. 4**.....	2 11/16" rd. x 11/16" long
M1431	EQ83D	.50	1	**Magneto Oldham coupling piece No. 5**.....	2" rd. x 1" long
M1421	EQ81A	2.10	1	**Magneto shaft**.....	3/4" x 18 1/8" long
M11426	EQ81F	.15	2	Magneto shaft collar.....	5/8" T. x 1 1/16" O.D.
ZH20	EQ81E	5.00	1	**Magneto shaft gear**.....	7/8" face 34 tooth 6" O.D.
M1587	EQ68D	.04	1	Magneto shaft nut, jam, hex.....	1/2" (gear end)
M2018	EQ68A	.06	1	Magneto shaft nut.....	7/16" retapped 1/2" C.P. hex.
				STANDARD PARTS FOR MAGNETO GROUP	
54236	9B	.25	1	Grease cup, iron (On Magneto bracket bearing cap).....	1/4"
50350	EQ81B	.005	1	Key, Woodruff (Keys gear to shaft).....	No. 5, 1/8" x 5/8"
M2024	.....	.02	2	Nut, castle (On Oldham coupling).....	1/4" S.A.E.
50407	EQ81C	.02	1	Pin, taper (Pins Oldham coupling to shaft).....	No. 2 x 1 1/2"
50549	EQ76B	.08	5	Screw, cap, hex. (Used on magneto bracket and cap).....	7/16" x 1"
M2151	EQ83F	.07	4	Screw, cap, hex. (Used on magneto bracket).....	1/2" x 7/8"
50799	EQ116N	.02	2	Screw, cap, hex. (Used on Oldham coupling).....	1/4" x 3/4" S.A.E. thread
53470	.....	.005	2	Washer, lock spring (Used on Oldham coupling).....	1/4"
52816	.....	.006	2	Washer, lock spring (Used on magneto bracket cap).....	7/16"
53474	.....	.01	5	Washer, lock (Four on magneto bracket, one on magneto shaft).....	1/2"
				MANIFOLD GROUP Illustrated on pages 30, 32, 34, 36 and 38	
ZH17	EQ61A	58.75	1	**Manifold, exhaust**.....	Cast iron
Z650	EQ27A	33.00	1	**Manifold, inlet**.....	Cast iron
ZH28	EQ61B	1.00	4	**Manifold, clamp**.....	Cast iron
M1417	EQ27C	.05	8	**Manifold, gasket**.....	Copper asbestos 2 1/8" I.D. x 2 5/8" O.D.
M2000	EQ61C	.62	4	Manifold, stud.....	5/8" x 7 1/2"
AM1362	EQ109A	3.25	1	**Manifold, water**.....	Brass
Z731	EQ109B	...	4	**Manifold, clamp**.....	Malleable iron
M2128	EQ109C	.02	4	**Manifold, gasket (rubber)**.....	1/8" x 3/4" I.D. x 1 1/4" O.D.
				Manifold Stud (See Valve Rocker Arm)	
				STANDARD PARTS FOR MANIFOLD GROUP	
53110	.....	.12	4	Nut, semi fin. hex. (On manifold studs).....	5/8"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				MUFFLER GROUP Illustrated on page 10	
9121	31OU17	55.63	1	**Muffler**	
9138	CP24A	29.00	1	**Muffler head**	**Cast iron**
9123	CP20A	13.00	1	**Muffler head, collector**	Cast iron
9122	CP19A	23.00	1	**Muffler head, exhaust**	Cast iron
9126	CP18A	.50	1	**Muffler head stud**	
9125	CP18C	.68	1	**Muffler nut, handle**	
8859	CP22B	...	1	**Muffler pipe, exhaust inlet**	
8860	CP22A	...	1	**Muffler pipe, exhaust outlet**	
9124	CP21B	7.37	1	**Muffler shell, inner**	
9131	CP21A	9.37	1	**Muffler shell, intermediate**	
9130	CP22C	12.43	1	**Muffler shell, outer**	
9136	CP23B	.31	1	**Muffler spring (cut out)**	
9127	CP23A	.50	1	**Muffler spring stud**	
4413	CP23C	...	1	**Muffler spring stud washer**	
9134	CP18E	3.25	3	**Muffler tie rod**	
9137	CP18B	.14	1	**Muffler valve disc**	
11465	CP18D	...	1	**Muffler valve disc stop pin**	
				STANDARD PARTS FOR MUFFLER GROUP	
10154	.....	.19	3	Nut, semi fin. hex. (On tie rods)	¾"—10 U.S.F.
53153	.....	.06	4	Nut, semi fin. hex. (On muffler head)	½"—20 U.S.F.
53110	.....	.12	2	Nut, semi fin. hex. (On muffler spring stud)	⅝"—11 U.S.F.
53502	.....	.005	1	Pin, split (On muffler spring stud)	⅛" x 1¼"
53539	.....	.01	3	Pin, split (On tie rods)	⅛" x 1¾"
56423	8A	.08	1	Pipe plug (In collector head)	¼"
52863	HM136D	.14	4	Screw, cap (hex. head) (On muffler head)	½" x 1¾"—20 U.S.F.
51278	CP20B	.03	2	Screw, set (square head, cup point) (Hold exhaust pipes in place)	⅜" x ¾"—18 U.S.F.
53474	.....	.01	4	Washer, lock (Plain heavy) (On muffler head screws)	½"
53478	.....	.06	3	Washer, lock (Plain heavy) (On tie rods)	¾"
				NAME PLATE GROUP	
100613	FF218D	.67	1	Name plate	Brass
M11095	FF218B	.25	1	"CATERPILLAR" trade mark plate	Brass
				STANDARD PARTS FOR NAME PLATE GROUP	
54604	FF218E	.006	6	Machine screw, brass (used for name plates)	No. 10—24" x ½"

OILER GROUP

Illustrated on pages 36 and 38

M11446	EQ92A	.37	1	**Oil check bushing**	**⅞" S.A.E. thread**
				Oil filler (See Crank Case Group)	
10533	EQ93A	.44	1	**Oil gauge**	**50 lbs. pressure**
Z652	EQ40F	.75	1	**Oil header cap**	
M10398	EQ40C	1.00	1	**Oil header cap bolt (special)**	**⅞" x 2½"**
M10681	EQ41B	.01	2	**Oil header cap bolt gasket**	**Copper asbestos**
Z724	EQ40A	5.00	1	**Oil manifold**	**Cast iron**
M10650	EQ40E	.002	1	**Oil manifold gasket**	**4½" x 5½"**
100183	.....	1.00	1	**Oil pipe clamp (lower half)**	**⅞" x 3¼"**
100182	.....	.67	1	**Oil pipe clamp (upper half)**	**⅞" x 3¼"**
AM1480	.....	9.20	1	**Oil pump assembly, consisting of 1—ACDH5, 1—Z713, 1—M9046, 1—M11188, 1—M11187, 1—M1186, 1—M2013, 1—M2087, 1—M1062, 1—M9047, 1—50350 and 54622**	
ACDH5	EQ94D	4.75	1	**Oil pump body**	**Cast iron**
100348	EQ17D	.001	1	**Oil pump gasket**	**3½" x 3½"**
Z713	EQ17C	.95	1	**Oil pump body cover**	**Bronze**
M9046	EQ94B	.002	1	**Oil pump body cover gasket**	**2¾" x 3⅞"**
M11188	EQ17F	.36	1	**Oil pump spur gear (plain)**	
M11187	EQ17E	.40	1	**Oil pump spur gear (with keyway)**	
M1186	EQ17C	.10	1	**Oil pump spur gear pin**	**½" x 1 11/16"**
M2013	EQ94A	.03	1	**Oil pump screen**	**No. 30 mesh x 4½" D.**
M2087	EQ17A	.12	1	**Oil pump screen clamp**	**⅛" x ½" x 12⅜"**
M1062	EQ94C	2.46	1	**Oil pump shaft**	**11/16" x 24"**
B251	EQ17M	.25	1	**Oil pump shaft bushing**	**Bronze**
Z674	EQ17K	.85	1	**Oil pump shaft spiral gear**	**Bronze**
M2030	.....	.01	1	**Oil pump shaft spiral gear taper pin (drilled)**	**No. 4 x 1½"**
				Oil Pump Shaft Spiral Gear (Steel) (See Cam Shaft Group)	
102141	EQ95A	...	1	**Oil pump shaft washer, thrust**	**1¾" O.D. x 1/32"**
102142	EQ95B	.25	1	**Oil pump shaft washer, thrust**	**1¾" O.D. x ⅛"**
102143	EQ95C	...	1	**Oil pump shaft washer, thrust**	**1¾" O.D. x 3/16"**
				(Use one of each of the above, or more, as required)	
				Oil Reservoir (See Crank Case Group)	

STANDARD PARTS FOR OILER GROUP

M9047	EQ17B	.01	1	**Bolt, stove (with nut) (On oil pump screen clamp)**	**5/16" x 1¼"**
50350	EQ81B	.006	1	**Key, Woodruff (Used in oil pump spur gear)**	**⅛" x ⅝"**
M10095	.....	...	1	**Nut, lock (On crank case oil pipe)**	**⅞"**
56851	.....	.001	1	**Pin, split (Pump shaft spiral gear taper pin)**	**1/16" x ½"**
50541	.....	.07	1	**Screw, cap (On oil pipe clamps)**	**⅜" x 1½"**
50563	EQ94E	.10	2	**Screw, cap (On oil pump assembly)**	**½" x 1"**
50539	EQ40B	.05	4	**Screw, cap (On oil manifold)**	**⅜" x 1"**
54604	EQ34C	.006	1	**Screw, machine, brass (For oil pump shaft bushing)**	**No. 10—24" x ¼"**
54622	.....	.006	6	**Screw, machine, brass (For oil pump body cover)**	**No. 12—24" x ½"**
53472	.....	.005	1	**Washer, lock (On oil pipe clamps)**	**⅜"**

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PIPE, TUBING AND FITTINGS FOR OILER GROUP	
56347	EQ16B	.03	1	**Bushing, reducing (Used on oil gauge)**	¼" x ⅛"
M1616	EQ97A	...	1	**Cock, air (Between manifold and gauge)**	¼"
54291	EQ60F	.25	2	**Ell (Between manifold and gauge)**	90°, ¼"
M1571	EQ59A	...	3	**Ell (Between rear main bearing and crank case)**	45°, ⅜"
54343	EQ60B	.03	2	**Ell, st. (One used timing gear case; one used between manifold and gauge)**	¼"
54255	EQ87C	.05	1	**Nipple, short (Between manifold and gauge)**	¼" x 1½"
M12269	EQ87B	.05	1	**Nipple (Between manifold and gauge)**	¼" x 1⅝"
56551	EQ87A	.10	2	**Nipple (One between manifold and gauge)**	¼" x 3"
100447	EQ60E	.19	1	**Nipple (Between manifold and gauge)**	¼" x 7¼"
M5138	EQ59C	.05	2	**Nipple, close (Rear main bearing to crank case)**	⅜" x 1¼"
M2831	EQ105D	...	3	**Nipple (Timing gear case to crank case)**	⅜" x 1"
7420	EQ58A	.07	1	**Nipple (Rear main bearing to crank case)**	⅜" x 1½"
100374	EQ59B	.09	1	**Nipple (Rear main bearing to crank case)**	⅜" x 1¾"
M1826	EQ88A	...	1	**Nipple (Timing gear case to crank case)**	⅜" x 2¼"
M11954	.....	.75	3	**Nipple (Crank case oil piping)**	¾" x 8½"
M10660	.....	.71	3	**Nipple (Crank case oil piping)**	¾" x 7¼"
100986	EQ16B	...	2	**Pipe bushing (One used timing gear case to crank case; one used rear main bearing to crank case)**	⅜" x 1"
100699	EQ52A	...	1	**Pipe cross (Manifold to oil gauge)**	¼"
56423	8A	.08	1	**Plug pipe (Crank case oil piping)**	¼"
54912	EQ60C	.50	3	**Tee, pipe (Two used manifold to gauge; one used timing gear case)**	¼" x ¼" x ¼"
M10662	EQ114D	.50	3	**Tee, pipe (Crank case oil piping)**	¾" x ¾" x ¼"
M11956	EQ87D	.05	1	**Tubing, copper, annealed (Manifold to gauge)**	No. 21 Stubb's Ga. ⅜" O.D. x 3½"
102161	EQ105A	.87	2	**Tubing, copper, annealed (Timing gear case)**	No. 21 Stubb's Ga. ⅜" O.D. x 10"
M10658	EQ41A	.83	3	**Tubing, copper, annealed (Crank case oil piping)**	No. 21 Stubb's Ga. ⅜" O.D. x 11"
56397	EQ60D	.25	1	**Union, black pipe (Manifold to gauge)**	¼"
AM1660	EQ60A	.37	4	**Union, flared tubing (Three used timing gear case; one used manifold to gauge)**	¼" pipe, ⅜" tube
160128	EQ52C	.50	2	**Union, railroad (Timing gear case to crank case)**	⅜"
AM1661	EQ16A	.37	8	**Union ell, flared tubing (One used timing gear case; one used manifold to gauge)**	¼" pipe, ⅜" tube
				PISTON GROUP Illustrated on pages 36, 38 and 40	
AM1320	.....	13.16	4	**Piston assembly, consisting of 1—Z676, 2—M11429 and 3—M2292**	
Z676	EQ98A	12.12	4	**Piston**	6½"

M11429	EQ31F	.04	8	**Piston pin lock (steel wire)**	No. 7, B&S. Ga. x 6" long
M2292	EQ33B	.32	12	**Piston ring**	3/8" x 6 1/2"
M11850	EQ31C	1.50	4	**Piston pin**	2" x 5 1/2"
M11849	EQ31E	.16	4	**Piston pin screw, set (square head)**	1/2" x 2 3/16"
				STANDARD PARTS FOR PISTON GROUP	
M1587	EQ68B	...	4	Nut, lock (On piston pin set screw)	1/2"
M1538	.....	...	4	Washer, lock (On piston pin set screw)	1/2"
				PRIMING CUP GROUP Illustrated on pages 30 and 38	
AM1522	.....	.35	4	Priming cup	Brass
M1144	EQ99G	.60	1	Priming cup lever	1/8" x 1/2" x 32"
M2056	EQ99B	.007	4	Priming cup rivet (drilled)	3/16" x 5/8"
				STANDARD PARTS FOR PRIMING CUP GROUP	
56851	.....	.001	4	Pin, split (Through end of rivets)	1/16" x 1/2"
				SPARK PLUG GROUP Illustrated on page 88	
AM1509	EQ102B	.25	4	**Spark plug**	7/8" S.A.E.
100124	EQ102A	...	4	**Spark plug protector**	Sheet metal
				TIMING GEAR CASE GROUP Illustrated on page 30	
100138	EQ79B	34.50	1	**Timing gear case (rear)**	Cast iron
				Timing Gear Case Check Bushing (See Oiler Group)	
100142	EQ79A	24.00	1	**Timing gear case (front)**	Cast iron
101691	EQ85D	2.50	1	Timing gear case cover	Cast iron
M11454	EQ92B	...	1	Timing gear case cover gasket	1/32" x 5 3/4" x 5 3/4"
100302	EQ23C	.06	2	Timing gear case gasket, sheet packing	1/64" x 16" x 30"
M12119	EQ23E	.55	3	Timing gear case stud	5/8" x 6 5/8" S.A.E.
M11445	EQ23A	.006	1	**Timing gear case washer, felt (built-up cam shaft)**	1/2" x 2 1/2"
100291	EQ85A	...	1	**Timing gear case washer, felt (for integral cam shaft)**	1/2" x 1 1/2" I.D. x 2 1/2" O.D.
Z717	EQ23B	.37	1	**Timing gear case washer retainer (Cam shaft)**	Cast iron
M11447	EQ92C	1.00	1	**Timing gear case washer, felt (Crank shaft)**	1/2" x 4 1/8 x 5 1/8"
Z718	EQ92D	.42	1	**Timing gear case washer retainer (Crank shaft)**	Cast iron
102364	EQ85C	.30	7	Timing gear case washer retaining screw, cap (drilled) hex	1/4" x 1 3/8"
				STANDARD PARTS FOR TIMING GEAR CASE GROUP	
M1616	EQ97A	...	1	Cock, air (Timing gear case, front)	1/4"
160071	EQ118B	...	1	Cock, air (Timing gear case, front)	3/8"
54236	EQ68C	.25	1	Grease cup (Timing gear case, for magneto shaft)	1/4"

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Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR TIMING GEAR CASE GROUP—Continued	
53170	.....	.16	3	Nut, castle (On gear case studs)	5/8" S.A.E.
53502	.....	.005	3	Pin, split (Through ends of valve studs)	1/8" x 1 1/4"
100031	EQ85B	.30	3	Screw, cap (Timing gear case cover)	3/8" x 3/4"
50529	EQ69B	.03	9	Screw, cap (Hold timing gear case halves together)	1/4" x 1"
M7648	.....	...	16	Washer, lock (Seven used on 102364 screws, nine used on 50529 screws)	1/4"
53443	EQ23F	.04	3	Washer, wrought (On timing gear case studs)	5/8"
M12129	EQ85E	.06	1	Wire (On cam shaft washer retainer)	No. 14 B.&S. Ga. x 11" long
M12128	EQ32B	.02	1	Wire (On crank shaft washer retainer)	No. 14 B.&S. Ga. x 18" long
56423	EQ117F	...	1	Pipe plug (Timing gear case)	1/4"
				VALVE GROUP Illustrated on pages 36 and 38	
				Valve (See Cylinder Head Group)	
				Valve Guide (See Cylinder Head Group)	
				Valve Spring (See Cylinder Head Group)	
				Valve Spring Collar (See Cylinder Head Group)	
				Valve Spring Collar Keeper (See Cylinder Head Group)	
160286	.....	10.81	4	**Valve rocker arm and bracket assembly, consisting 2—Z669, 1—Z670, 1—M2162, 1—M2503, 2—M2504, 1—53106, 1—53503, 2—53539 and 1—50563**	
M11453	EQ108A	2.35	8	**Valve rocker arm**	Drop forged steel
Z670	EQ80A	4.50	4	**Valve rocker arm bracket**	Malleable iron
M2162	EQ108E	.06	4	**Valve rocker arm bracket stud**	3/8" x 2"
M2503	EQ108C	1.10	4	**Valve rocker arm pin**	1/2" x 5 7/8"
M2504	EQ108G	.19	8	**Valve rocker arm pin washer**	1 1/8" O.D. x 1/16" T.
ZH31	EQ77E	1.63	8	**Valve tappet**	Cast iron
Z672	EQ77A	5.00	4	**Valve tappet guide**	Cast iron
M12018	EQ110A	.002	4	**Valve tappet guide gasket (paper)**	2 3/4" x 7 3/8"
160826	.....	2.43	8	**Valve tappet rod assembly, consisting of 1—102295, 1—102195, 1—102197 and 1—10296**	
102295	112A	.93	8	**Valve tappet rod**	
102195	EQ91B	.30	8	**Valve tappet rod adjusting nut**	
102197	EQ91A	1.20	8	**Valve tappet rod dust cap**	1 1/8" x 1 1/2"
102196	EQ112B	...	8	**Valve tappet rod, half nut (special)**	3/4" S.A.E
				STANDARD PARTS FOR VALVE GROUP	
53106	.....	.03	4	Nut, semi fin. hex. (On rocker arm bracket stud)	3/8"
102283	.....	.05	8	Nut, semi fin. hex. (On valve tappet rods)	7/16"

53539	.....	.01	8	Pin, split (On valve rocker arm pin)	⅛" x 1¾"
M10468	EQ80B	.10	4	Screw, cap (On valve rocker arm bracket)	⅜" x 1½"
50566	EQ77B	.14	8	Screw, cap (On valve tappet guide)	⅜" x 1¾"
M2269	.....	...	8	Washer, lock (On valve tappet guide)	½"
				VACUUM SYSTEM (See Fuel Supply Group) Illustrated on page 76	
				Nomenclature of Chassis Parts	
				ARMOR, ENGINE **Illustrated on pages 170 and 171**	
.....	12Q	...	1	Angle, front lower	¼" x 2" x 2" x 37"
				Angle, front upper	¼" x 2" x 2" x 33"
.....	11A	...	1	Angle, side, front	¼" x 2" x 2" x 33⅝"
.....	11C	...	2	Angle, side, rear left	¼" x 2" x 2" x 42⅞"
.....	11G	...	1	Angle, side, rear right	¼" x 2" x 2" x 42⅞"
.....	11F	...	1	Angle, side, upper left	¼" x 2" x 2" x 63¼"
.....	11K	...	1	Angle, side, upper right	¼" x 2" x 2" x 63¼"
.....	11H	...	1	Ax pocket	
.....	HB14G	...	1	Ax handle support	
.....	C47F	...	1	Baffle plate	¼" x 6" x 37"
.....	10D	...	2	Baffle plate clip, left	
.....	NH1B	...	2	Baffle plate clip, right	
.....	NH1A	...	2	Bearing strip	
.....	NH1E	...	4	Bolt, clamping	
.....	FF40D	...	1	Brace, top	
.....	11N	...	2	Channel, side, left	Flange steel ⅜" thick
.....	11E	...	1		3.4 lb. channel 42⅜" long
.....	11D	...	1	Channel, side, right	3.4 lb. channel 42⅜" long
.....	9A	...	1		
.....	9D	...	1	Door, front left	¼" x 9⅜" x 36⅜"
.....	9C	...	1	Door, front right	¼" x 9⅜" x 36⅜"
.....	10A	...	2	Door, oiler	¼" x 5" x 8¼"
.....	10C	...	1	Door, side, lower	¼" x 10⅞" x 48"
.....	10B	...	1	Door, side, upper left	¼" x 10⅞" x 48"
.....	NH1C	...	2	Door, side, upper right	¼" x 10⅞" x 48"
.....	NH1D	...	2	Door, top	
.....	GB3L	...	5	Door bracket, side	
.....	GB3J	...	5	Door hinge	
.....	GB3K	...	5	Door hinge, upper	
.....	GB2R	...	16	Door hinge pin	
.....	GB7B	...	4	Door hinge pin	
				Door hinge upper filler	.15 thick
.....	GB7D	...	1	Door hinge upper filler	.25 thick
.....	12N	...	1	Door lap, front	
.....	12M	...	1	Door lap, side, left	

Heavy type indicates that item is on spare and reserved parts list

Makers' No. Part	Ord. Mark Piece	Pounds	No. Rqd. Tractor per	NAME	SPECIFICATIONS
				ARMOR, ENGINE—Continued	
.....	12L	...	1	Door lap, side, right	
.....	FF10B	...	3	Door latch bearing, left	
.....	FF10A	...	3	Door latch bearing, right	
.....	JB23A	...	2	Door latch bearing filler	3/32" thick
.....	JB23C	...	4	Door latch bearing filler	9/32" thick
.....	HB2F	...	2	Hatchet blade bracket, right	
.....	HB2G	...	2	Hatchet handle fastener	
.....	HB2L	...	2	Hatchet handle rest, right	
.....	GB2T	...	16	Hinge, shield female	
.....	GB2S	...	16	Hinge, shields, male	
.....	GB7A	...	16	Hinge filler, male	
.....	FF48A	...	1	Lamp bracket, searchlight	Bronze
.....	HB1B	...	2	Lantern bracket body	
.....	HB1A	...	2	Lantern bracket bottom	
.....	HB1C	...	4	Lantern strap fastener	
.....	FF40F	...	1	Lever nut	
.....	JB22A	...	6	Lock bar	
.....	JB23D	...	12	Lock bar filler	
.....	GB4F	...	12	Lock bar hinge, left	
.....	GB7C	...	2	Lock bar hinge filler	
.....	FF43KB	...	1	Name plate	
.....	JB1Q	...	6	Nut, wing	
.....	JB4F	...	6	Nut pin, wing	
.....	JB1T	...	6	Nut pin washer, wing	
.....	HB4H	...	3	Oil can support latch	
.....	HB4E	...	3	Oil can support latch spring	
.....	HB12D	...	1	Pick handle rest	
.....	HB59H	...	1	Pick—Mattock bracket	
.....	HB4C	...	3	Pin	1/4" x 1 3/8"
.....	7G	...	1	Plate, front	1/4" x 4" x 37 1/4"
.....	8F	...	1	Plate, front, left	1/4" x 9 1/2" x 36 1/2"
.....	8E	...	1	Plate, front, right	1/4" x 9 1/2" x 36 1/2"
.....	8A	...	1	Plate, rear	1/4" x 30 5/8" x 37 1/2"
.....	7B	...	1	Plate, side,forward left	1/4" x 13.2" x 20 1/2" x 44 7/8"
.....	7F	...	1	Plate, side, lower left	1/4" x 13" x 47"
.....	7E	...	1	Plate, side, lower right	1/4" x 13" x 47"
.....	7D	...	1	Plate, side, upper left	1/4" x 11 3/8" x 47"
.....	7A	...	1	Plate, side, forward right	1/4" x 13.2" x 20 1/2" x 44 7/8"
.....	7C	...	1	Plate, side, upper right	1/4" x 11 3/8" x 47"

.....	8G	...	1	Plate stiffener, rear	¼" x 2" x 2" x 33"
.....	16K	...	1	Plate stiffener, top	¾ lb. channel 33 long
.....	8C	...	1	Plate, top	15 x 38" x 68¼"
.....	JB13B	...	3	Shot bolt, left	
.....	JB13A	...	3	Shot bolt, right	
.....	JB13D	...	3	Shot bolt bracket, left	
.....	JB13C	...	4	Shot bolt bracket, right	
.....	JB23B	...	2	Shot bolt eye, front	Forged steel
.....	16F	...	2	Shot bolt eye, side	
.....	JB13H	...	2	Shot bolt fastening	
.....	GB3C	...	7	Shot bolt filler piece	
.....	JB13E	...	7	Shot bolt stop	
.....	HB8M	...	2	Shovel blade bracket	
.....	HB5A	...	2	Shovel handle bracket	
.....	NB1L	...	9	Strap fastener	Style No. 10
.....	16A	...	2	Support, front	⅜" x 3" x 24"
.....	12G	...	1	Support, rear right	
.....	12K	...	4	Support, side	
				STANDARD PARTS FOR ENGINE ARMOR	
.....	11P	...	4	Bolt (Used on top braces)	⅜" x 1¼"
.....	FF48B	...	7	Bolt (6 used on side lamp bracket; 1 used on searchlight bracket)	⅜" x 1 3/16"
.....	FF48C	...	2	Bolt (Used on searchlight bracket)	⅜" x 1 7/16"
.....	.....	...	12	Nut, plain hex. (Used on rear plate)	190"
.....	Q6C	...	25	Nut, plain hex. (2 used on front plate; 6 used on rear plate; 3 used on searchlight bracket; 6 used on side lamp brackets; 4 used on top braces; 4 used on top plate)	⅜"
.....	8H	...	12	Screw, round head (Used on rear plate)	.190" x ¾"
.....	8D	...	4	Screw, countersunk head (Used on top plate)	⅜" x 1"
.....	7H	...	8	Screw, countersunk head (2 used on front plate; 6 used on rear plate)	⅜" x 1 1/16"
.....	.....	...	12	Washer, lock (Used on rear plate)	3/16"
.....	Q6HC	...	25	Washer, lock (2 used on front plate; 6 used on rear plate; 3 used on searchlight bracket; 6 used on side lamp brackets; 4 used on top braces; 4 used on top plate)	⅜"
				ARMOR, FUEL TANK	
				Illustrated on page 172	
.....	15C	...	2	Angle, bottom, corner	3/16" x 1½" x 1½" x 13⅞"
.....	15B	...	1	Angle, bottom, left	3/16" x 1½" x 1½" x 42⅞"
.....	15A	...	1	Angle, bottom, right	3/16" x 1½" x 1½" x 42⅞"
.....	15D	...	4	Angle, corner	3/16" x 1½" x 1½" x 18⅝"
.....	HB9D	...	1	Bucket holder body	
.....	LB1KA	...	1	Chain, prop	
.....	LB1BA	...	1	Chain button, prop	
.....	LB1AA	...	1	Chain button rivet, prop	
.....	EB75C	...	2	Chain catch	
.....	LB1P	...	1	Chain handle, prop	
.....	LB2E	...	1	Chain eye, prop	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				ARMOR, FUEL TANK—Continued	
.....	EB75B	...	1	Clevis fastener	
.....	EB75A	...	1	Foot rest	
.....	EB75D	...	1	Foot rest fastener	
.....	C16W	...	2	Hand rail	
.....	C16T	...	4	Hand rail bracket	
.....	GB2D	...	2	Hinge, cover	
.....	GB2F	...	2	Hinge bracket, cover	
.....	14A	...	1	Lid	.15 x 17¼" x 48"
.....	15M	...	6	Lid angle	⅛" x 1½" x 1½" x 4"
.....	15L	...	6	Lid fastener	¼" x 3" x 4"
.....	FF43LB	...	1	Name plate	
.....	16C	...	1	Plate, bottom	⅛" x 17⅞" x 48¾"
.....	14B	...	1	Plate, front end	¼" x 17⅜" x 19"
.....	14C	...	1	Plate, rear end	¼" x 17⅜" x 19"
.....	14E	...	1	Plate, side, left	¼" x 19" x 48¾"
.....	14D	...	1	Plate, side, right	¼" x 19" x 48¾"
.....	15N	...	1	Shield, ventilator	¼" x 2¼" x 2¼" x 37"
.....	JB13A	...	1	Shot bolt, right	
.....	NB1B	...	2	Strap fastener	Style No. 2
.....	NB1L	...	2	Strap fastener	
				STANDARD PARTS FOR FUEL TANK ARMOR	
.....	.....	...	6	Nut, plain hex. (On rear end plate)	¼"
.....	Q6C	...	95	Nut, plain hex. (On angles and plates)	⅜"
.....	Q6E	...	4	Nut, plain hex. (On angles and plates)	½"
.....	Q6G	...	10	Nut, plain hex. (On angles and plates)	⅝"
.....	14F	...	6	Screw, round head (On rear end plate)	¼" x ⅜"
.....	15E	...	54	Screw, hex. head cap	⅜" x 1"
.....	15F	...	41	Screw, hex. head cap	⅜" x 1⅛"
.....	15G	...	2	Screw, hex. head cap	½" x 1¼"
.....	15H	...	2	Screw, hex. head cap	½" x 1¾"
.....	15J	...	10	Screw, hex. head cap	⅝" x 1⅛"
.....	.....	...	6	Washer, lock (On rear end plate)	¼"
.....	Q6HC	...	95	Washer, lock (On angles and plates)	⅜"
.....	Q6LC	...	4	Washer, lock (On angles and plates)	½"
.....	Q6NC	...	10	Washer, lock (On angles and plates)	⅝"
				BRAKE GROUP	
				Illustrated on page 160	
10301	.....	...	2	**Brake band assembly, consisting of 1—6815, 1—7252, 1—6782, 1—7229, 1—6814, 28—51000, 4—51055 and 9—7068**	

6815	HM134C	22.00	2	**Brake band**	No. 16 U.S. Ga. x 3" 55½"
7252	HM134A	.50	2	**Brake band bracket, adjusting**	
6782	HM138B	.37	2	**Brake band end**	
7229	HM145A	.25	2	**Brake band guide**	⅛" x 1" x 4½"
6814	HM132A	.25	2	**Brake band lining (raybestos)**	3/16" x 3" x 51⅛"
7217	HM135A	.25	2	**Brake band adjusting nut**	
7244	HM135B	.68	2	**Brake band adjusting rod assembly**	
6812	HM135F	.10	2	Brake band adjusting rod pin	
6812	HM135F	.10	2	Brake band end pin	
7274	HM145C	...	2	Brake band guide brace	
53302	HM149C	...	2	Brake band guide brace bolt (drilled)	1" x 4"
7260	HM136E	.68	2	**Brake bell crank**	
6777	HM145B	1.75	2	Brake bell crank bar	½" x 4½"
6786	HM133A	3.00	2	Brake bell crank bracket	½" x 1½" x 8¼"
7296	HM133B	.17	4	Brake bell crank bracket stud	
6754	HM138C	1.31	1	Brake equalizing bar	
7261	HM138B	1.62	1	**Brake equalizing lever**	¾" hex. x 1½" long
				Brake Equalizing Lever Bracket (See Steering Clutch Group)	
6781	HM138A	.13	1	Brake equalizing pin	
7273	HM139A	1.37	2	**Brake foot lever pedal**	
7264	HM137E	...	1	Brake foot lever pedal connecting rod assembly	
6813	HM136B	.37	1	Brake foot lever pedal connecting rod end	
6812	HM135F	.10	2	Brake foot lever pedal connecting rod end pin	
6747	HM139B	1.31	2	**Brake foot lever pedal pad**	
8389	HM139D	.12	2	Brake foot lever pedal pad pin	9/16" x 1⅝"
6798	HM139C	2.31	1	Brake foot lever pedal shaft	1" x 10"
7268	HM149A	5.00	1	**Brake hand lever**	
6806	HM138D	.43	2	**Brake hand lever connecting link**	
6812	HM135F	.10	2	Brake hand lever connecting link pin	
6753	HM142A	.25	1	**Brake hand lever latch**	
6750	HM142C	.03	1	Brake hand lever latch pin	⅜" x 1 5/32"
6746	HM142L	.11	1	**Brake hand lever latch release rod**	3/16" x 15"
6748	HM149D	.10	1	Brake hand lever latch release rod button	⅝" x 13/16"
6744	HM142K	.05	1	**Brake hand lever latch release rod end**	
6752	HM142D	.01	1	**Brake hand lever latch release rod end pin**	
6764	HM149B	.75	2	**Brake hand lever quadrant**	3/16" x 3" x 6¾"
53217	HM149C	.07	2	Brake hand lever quadrant bolt (drilled)	⅜" x 1½"—24 U.S.F.
6749	HM142B	.06	1	Brake hand lever quadrant spacing pin	½" x 1 1/32"
6658	TM77C	.003	1	**Break hand lever spring**	
7262	HM137B	1.22	2	Brake hand lever and steering column bracket (See Steering Clutch Group)	
8375	HM137D	2.12	1	Brake rocker lever	
8374	HM136A	...	1	**Brake rod assembly (left)**	
6813	HM136B	.37	2	**Brake rod assembly (right)**	
6812	HM135F	.10	4	**Brake rod end**	
10165	HM142E	...	2	Brake rod end pin	
10164	HM142G	...	2	Brake rod spring	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				BRAKE GROUP—Continued	
6860	HM137A	5.87	1	Brake rod spring collar	
7241	HM136C	3.00	1	Brake shaft	1" x 27"
10572	HM129A	.01	2	Brake shaft bearing (outer)	
10573	HM129B	.01	1	Brake shaft bearing shim (outer)	No. 28 U.S.Ga.
10574	HM129C	.02	1	Brake shaft bearing shim (outer)	No. 22 U.S.Ga.
50361	HM131C	...	2	Brake shaft bearing shim (outer)	No. 16 U.S.Ga.
				STANDARD PARTS FOR BRAKE GROUP	
53166	.....	.03	2	Key, Woodruff (Used on brake shaft)	No. 15
53168	.....	...	4	Nut, semi fin. hex. (castle) (Used on lever quadrant bolt)	⅜"—24 U.S.F.
53170	.....	.10	2	Nut, semi fin. hex. (castle) (Used on bell crank bracket)	½"—20 T.
53106	.....	...	2	Nut, semi fin. hex. (castle) (Used on adjusting rod)	⅝"—18 U.S.F.
53108	.....	.06	2	**Nut, semi fin. hex. (Used on adjusting rod)**	⅜"
53153	.....	...	2	Nut, semi fin. hex. (One used on foot pedal connecting rod; one used on left brake rod)	½"—13 U.S.F.
53486	.....	.002	2	Pin, split (Used on foot pedal pad pins)	½"—20 U.S.F.
53487	.....	...	6	Pin, split (Four used on bell crank bracket; two used on lever quadrant bolt)	3/32" x ¾" 3/32" x 1"
53538	.....	...	12	Pin, split (Used on No. 6912 pins)	3/16" x 1½"
53566	.....	...	2	Pin, split (Used on foot lever pedal shaft)	¼" x 1½"
50426	HM133F	...	2	Pin, taper (Used on brake bell crank)	No. 4 x 1¾"
50427	HM137C	.03	2	Pin, taper (Used on brake rocker lever)	No. 4 x 2"
51000	.....	.008	56	**Rivet, copper (Used on brake band lining)**	No. 9 x ½"
7068	.....	.03	18	**Rivet, tank (oval head) (Used on brake band)**	¼" x ½"
51055	.....	.005	8	**Rivet, flat head (Used on brake band guide)**	No. 4
50565	.....	.14	2	Screw, cap, hex. head (Used on brake shaft bearing)	½" x 1½"—13 U.S.F.
50538	GM3C	.04	4	Screw, cap, hex. head (Used on brake band guide brace)	⅜" x ¾"—16 U.S.F.
51308	HM142H	...	2	Screw, set, square head (cup point) (Used on hand lever quadrant)	⅜" x 1"
53474	.....	.01	2	Washer, lock, plain heavy (Used on brake shaft bearing)	½"
53472	.....	.004	4	Washer, lock, plain heavy (Used on brake band guide brace)	⅜"
				CANOPY GROUP Illustrated on page 166	
.....	RH40C	...	6	Canopy bracket	No. 11 U.S.S. steel plate
.....	RH39D	...	7	Canopy corner brace	No. 11 U.S.S. steel plate
.....	RH31B	...	1	Canopy cover, top	Dupont Fabrakoid
.....	RH27E	...	2	Canopy cover strap, top	1½" cotton webbing
.....	RH35G	...	1	Canopy curtain, front	
.....	RH35A	...	1	Canopy curtain, rear	
.....	RH34A	...	1	Canopy curtain, side, left front	

.....	RH35F	...	1	Canopy curtain, side, left rear	
.....	RH36A	...	1	Canopy curtain, side, right front	
.....	RH36B	...	1	Canopy curtain, side, right rear	
.....	RH34D	...	88	Canopy curtain eyelets	
.....	RH34E	...	9	Canopy curtain fastener, single clinch base	
.....	RH33B	...	43	Canopy curtain fastener, single rivet base	
.....	RH26E	...	9	Canopy curtain fastener, double wood screw base	
.....	RH26D	...	26	Canopy curtain fastener, single wood screw base	
.....	RH40D	...	2	Canopy curtain fastener strap, side	1/8" leather
.....	RH41B	...	1	Canopy curtain pocket, left	
.....	RH41A	...	1	Canopy curtain pocket, right	
.....	RH40B	...	1	Canopy curtain support, bottom front	1/4" x 1" steel
.....	RH40A	...	1	Canopy curtain support, bottom rear	3/16" x 1 1/4 x 1 1/4" angle
.....	RH38B	...	1	Canopy curtain support, side front	3/16" x 1 1/4 x 1 1/4" angle
.....	RH38A	...	1	Canopy curtain support, side rear	3/16" x 1 1/4" x 1 1/4" angle
.....	RH39A	...	2	Canopy curtain support gusset plate, bottom rear	No. 11 U.S.S. steel plate
.....	RH31C	...	1	Canopy curtain support plate, side front	No. 11 U.S.S. steel plate
.....	RH31A	...	1	Canopy curtain support plate, side rear	No. 11 U.S.S. steel plate
.....	RH28A	...	1	Canopy filler strip, front	Oak
.....	RH28C	...	1	Canopy filler strip, rear	Oak
.....	RH42B	...	1	Canopy frame brace, center	Oak
.....	RH30A	...	1	Canopy frame brace, front	Oak
.....	RH42A	...	2	Canopy frame, brace, outer left and right	Oak
.....	RH26F	...	1	Canopy frame side strip, left	Oak
.....	RH26A	...	1	Canopy frame side strip, right	Oak
.....	RH29D	...	1	Canopy frame strip, front	Oak
.....	RH29A	...	1	Canpoy frame strip, rear	Oak
.....	RH37A	...	1	Canopy post, front left	1/4" x 2" x 2" angle
.....	RH37B	...	1	Canopy post, front right	1/4" x 2" x 2" angle
.....	RH33A	...	1	Canopy post, rear left	1/4" x 2" x 2" angle
.....	RH33D	...	1	Canopy post, rear right	1/4" x 2" x 2" angle
.....	RH27D	...	1	Canopy post bracket, rear left	No. 7 U.S.S. steel plate
.....	RH27A	...	1	Canopy post bracket, rear right	No. 7 U.S.S. steel plate
.....	RH27C	...	2	Canopy post spacer, rear	
.....	RH32A	...	6	Canopy slats	Oak
.....	RH32C	...	2	Canopy top moulding, end	Oak
.....	RH32D	...	2	Canopy top moulding, side	Oak
.....	RH39B	...	4	Canopy top support gusset plate, left	No. 11 U.S.S. steel plate
.....	RH39C	...	4	Canopy top support gusset plate, right	No. 11 U.S.S. steel plate
				STANDARD PARTS FOR CANOPY GROUP	
.....	RH26B	...	36	Bolt, carriage, with nut (13 used on corner braces, 2 used on front side curtain support, 18 used on gusset plates, 3 used on side rear curtain support)	5/16" x 1 1/2"
.....	RH29E	...	8	Bolt, carriage, with nut (1 used on corner brace, 1 used on front side curtain support, 6 used on gusset plates)	5/16" x 1 3/4"
.....	RH29B	...	16	Bolt, carriage, with nut (10 used on canopy braces, 6 used on gusset plates)	3/8" x 1 1/2"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR CANOPY GROUP—Continued	
.....	RH29C	...	14	Bolt, machine, square head, with nut (6 used on canopy brackets, 8 used on gusset plates)	3/8" x 1 3/4"
.....	RH30C	...	2	Bolt, machine, square head, with nut (2 used on gusset plates)	3/8" x 2"
.....	.....	...	60	Brads (Used on top moulding strips)	1 1/4" long
.....	.....	...	32	Nails (26 used on curtain pockets, 6 used on side curtain fastener straps)	Upholstering
.....	.....	...	18	Nut, semi fin. hex. (10 used on canopy posts, 8 used on canopy post brackets)	3/8"
.....	.....	...	31	Rivet, button head (20 used on canopy posts, 11 used on curtain supports)	3/8" x 5/8"
.....	.....	...	6	Rivet, button head (4 used on canopy post brackets, 2 used on front curtain supports)	3/8" x 3/4"
.....	.....	...	8	Screw, cap, hex. head (Used on canopy post brackets)	3/8" x 1"
.....	.....	...	2	Screw, cap, hex. head (Used on rear canopy posts)	3/8" x 1 1/4"
.....	.....	...	8	Screw, cap, hex. head (Used on front canopy posts)	3/8" x 1 1/2"
.....	.....	...	42	Screw, wood (Used on canopy slats)	No. 10 x 1 1/8"
.....	.....	...	6	Screw, wood (Used on filler strips)	No. 10 x 1 3/4"
.....	.....	...	20	Screw, wood (6 used on frame strips, 14 used on side strips)	No. 10 x 2"
.....	.....	...	18	Washer, lock (10 used on canopy posts, 8 used on canopy post brackets)	3/8"
.....	.....	...	44	Washer, wrought (14 used on corner braces, 6 used on curtain supports, 24 used on gusset plates)	3/8"
.....	.....	...	24	Washer, wrought (16 used on canopy brackets, 8 used on gusset plates)	7/16"
				CAPSTAN GROUP Illustrated on pages 175, 176, 178 and 179	
.....	BM56B	...	6	Capstan adjusting shim, lower	Sheet steel
.....	BM56C	...	6	Capstan adjusting shim, upper	Sheet steel
.....	BM49C	...	1	Capstan ball thrust bearing adapter	Steel
.....	BM55B	...	1	Capstan clutch ball bearing	S.K.F. No. 1404
.....	BM69C	...	1	Capstan clutch ball race retainer	Steel wire
.....	BM58G	...	1	Capstan clutch bearing oil pipe	
.....	BM58L	...	1	Capstan clutch bearing oil pipe cap	
.....	BM50D	...	1	Capstan detent screw	
.....	BM50C	...	1	Capstan detent spring	Piano wire
.....	BM69A	...	1	Capstan drive gear shaft	S.A.E. 2345
.....	BM47D	...	1	Capstan drive gear shaft bushing	S.A.E. No. 26—Bronze
.....	BM58E	...	1	Capstan drive gear shaft end cover	Cast steel
.....	BM47A	...	1	Capstan drive gear shaft end cover gasket	Paper
.....	BM59C	...	1	Capstan drive gear shaft roller bearing	Hyatt No. 17030
.....	BM47C	...	1	Capstan drive gear shaft spur gear	S.A.E. 2320
.....	BM60B	...	1	Capstan drive gear shaft spur gear key	1/2" x 1/2" x 2 5/8"

.....	BM47B	...	2	Capstan drive gear shaft thrust washer	S.A.E. 1020
.....	BM61A	...	1	Capstan drum	Cast steel
.....	BM70C	...	1	Capstan drum cover	Cast iron
.....	BM59B	...	1	Capstan drum roller bearing, lower	Hyatt No. 40561
.....	BM59A	...	1	Capstan drum roller bearing, upper	Hyatt No. 40510
.....	BM52C	...	2	Capstan drum roller bearing dowel pin	⅜" x ⅞"
.....	BM52B	...	1	Capstan drum roller bearing retainer, lower	S.A.E. 1045
.....	BM52A	...	1	Capstan drum roller bearing retainer, upper	S.A.E. 1045
.....	BM66C	...	1	Capstan drum roller bearing thrust washer, lower	Bronze S.A.E. No. 26
.....	BM63A	...	1	Capstan drum shaft	S.A.E. 1045
.....	BM55D	...	1	Capstan drum roller ball thrust bearing	S.K.F. No. 915
.....	BM52D	...	1	Capstan drum roller shaft cap, bottom	S.A.E. 1045
.....	BM52F	...	1	Capstan drum roller shaft cap, top	S.A.E. 1045
.....	BM46A	...	1	Capstan dust ring	Cast iron
.....	BM66B	...	1	Capstan dust ring	Hard felt
.....	BM66A	...	1	Capstan dust ring expander	Spring steel
.....	BM56A	...	1	Capstan dust ring gasket	Paper
.....	BM48B	...	2	Capstan gear case stud, lower	
.....	BM48A	...	2	Capstan gear case stud, upper	
.....	BM49D	...	2	Capstan housing and bracket shim, thick	Strip steel
.....	BM69B	...	4	Capstan housing and bracket shim, thin	Black steel
.....	BM58A	...	1	Capstan oil filler	Cast iron
.....	BM58D	...	1	Capstan oil filler gasket	Paper
.....	BM65A	...	1	Capstan pawl	Forged steel
.....	BM65G	...	1	Capstan pawl pivot pin	Cold rolled steel
.....	BM65D	...	1	Capstan pawl release cam	Cast iron
.....	BM65F	...	1	Capstan pawl release cam gasket	Paper
.....	BM62E	...	1	Capstan pawl release pin	Cold rolled steel
.....	BM65B	...	1	Capstan pawl release rod	Forged steel
.....	BM62A	...	1	Capstan pawl release rod handle	Malleable iron
.....	BM62B	...	1	Capstan pawl release rod handle washer	Sheet steel
.....	BM65C	...	1	Capstan pawl release rod key	
.....	BM62C	...	1	Capstan pawl spring plunger	Cold rolled steel
.....	BM62D	...	1	Capstan pawl spring plunger spring	Spring steel
.....	BM53A	...	1	Capstan pintle bracket	Cast steel
.....	BM70A	...	1	Capstan shifter cover	Malleable iron
.....	BM70B	...	1	Capstan shifter cover ball	½" diameter
.....	BM70E	...	1	Capstan shifter cover gasket	Felt
.....	BM54B	...	1	Capstan shifter fork	Manganese bronze
.....	BM57E	...	1	Capstan shifter lever	Cold rolled steel
.....	BM57D	...	1	Capstan shifter lever clevis	Malleable iron
.....	BM57C	...	1	Capstan shifter lever clevis pin	Cold rolled steel
.....	BM50A	...	1	Capstan shifter lever swivel	Cold rolled steel
.....	BM57F	...	1	Capstan shifter rod	Machine steel
.....	BM57A	...	1	Capstan shifter rod bracket	Strip steel
.....	BM50E	...	1	Capstan shifter shaft	Cold rolled steel
.....	BM54A	...	1	Capstan sliding clutch	S.A.E. 1045
.....	BM66D	...	6	Capstan spindle hub shim	

Heavy type indicates that item is on spare and reserved parts list.

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CAPSTAN GROUP—Continued	
.....	BM63D	...	1	Capstan spline shaft	S.A.E. 3120
.....	BM54D	...	1	Capstan spline shaft coupling	S.A.E. 3120
.....	BM54E	...	1	Capstan spline shaft coupling dowel pin	⅜" x ¾"
.....	BM67A	...	1	Capstan spur gear case cover	Steel casting
.....	BM48D	...	2	Capstan spur gear case cover dowel pin	
.....	BM67C	...	1	Capstan spur gear case gasket	Paper
.....	BM60B	...	1	Capstan spur gear key	½" x ½" x 2⅝"
.....	BM51A	...	1	Capstan worm	Timken No. 10758
.....	BM55A	...	1	Capstan worm ball bearing	New Departure No. 1411
.....	BM55C	...	1	Capstan worm ball thrust bearing	S.K.F. No. 513
.....	BM68C	...	1	Capstan worm ball thrust bearing cap	Cast steel
.....	BM68A	...	1	Capstan worm ball thrust bearing cap gasket	Paper
.....	BM49B	...	1	Capstan worm shaft nut	
.....	BM49A	...	1	Capstan worm shaft roller bearing retainer	S.A.E. 1020
.....	BM60A	...	1	Capstan worm shaft spur gear	S.A.E. 2320
.....	BM60C	...	1	Capstan worm shaft spur gear sleeve	S.A.E. 2320
.....	BM59D	...	1	Capstan worm shaft spur gear sleeve roller bearing	Hyatt No. 17034
.....	BM59E	...	1	Capstan worm shaft spur gear sleeve roller bearing	Hyatt No. 17088
.....	BM68E	...	1	Capstan worm shaft spur gear sleeve end bearing cover	Cast iron
.....	BM68B	...	1	Capstan worm shaft spur gear sleeve end bearing cover gasket	Paper
.....	BM64A	...	1	Capstan worm wheel	Timken No. 10757
.....	BM44A	...	1	Capstan worm wheel and gear case	Cast steel
.....	BM48C	...	12	Capstan worm wheel stud	
				STANDARD PARTS FOR CAPSTAN GROUP	
.....	BM67B	...	4	Bolt, machine, hex. head (4 used on spur gear case cover)	½" x 2½"—20 U.S.F.
.....	BM44C	...	4	Bolt, machine, hex. head (4 used on worm wheel and gear case)	⅞" x 3¼"—14 U.S.F.
.....	BM44D	...	1	Bolt, machine, hex. head (1 used on worm wheel and gear case)	⅞" x 3½"—14 U.S.F.
.....	BM44E	...	1	Bolt, machine, hex. head (1 used on worm wheel and gear case)	⅞" x 6¼"—14 U.S.F.
.....	.....	...	4	Nut, castle (4 used on spur gear case cover)	½" S.A.E.
.....	.....	...	12	Nut, castle (12 used on worm wheel studs)	⅝" S.A.E.
.....	.....	...	10	Nut, castle (4 used on capstan gear case; 6 used on worm wheel and gear case)	⅞" S.A.E.
.....	.....	...	1	Nut, semi fin. hex. (1 used on shifter rod)	½" S.A.E.
.....	.....	...	1	Pin, split (1 used on shifter lever clevis pin)	5/32" x 1"
.....	.....	...	4	Pin, split (4 used on spur gear case cover)	3/32" x 1¼"
.....	.....	...	1	Pin, split (1 used on pawl release rod)	⅛" x 1"
.....	.....	...	12	Pin, split (12 used on worm wheel studs)	⅛" x 1½"
.....	.....	...	10	Pin, split (4 used on capstan gear case; 6 used on worm wheel and gear case)	⅛" x 1¾"
.....	.....	...	1	Pin, split (1 used on worm shaft nut)	1/32 x 2½"

.....	.....	...	1	Pin, taper (1 used on shifter lever swivel)	No. 4 x 2"
.....	.....	...	1	**Pin, taper (1 used on shifter fork)**	No. 5 x 1¾"
.....	.....	...	1	Pipe elbow, reducing (1 used on clutch bearing oil pipe)	½" to ⅛"
.....	.....	...	1	Pipe elbow, street 45 degree (1 used on clutch bearing oil pipe)	½"
.....	.....	...	1	Pipe plug (1 used on drum cover)	⅜"
.....	.....	...	3	Pipe plug (2 used on spur gear case cover; 1 used on worm wheel end gear case)	½"
.....	.....	...	1	Pipe plug (1 used on oil filler)	¾"
.....	.....	...	6	Screw, cap, hex. head (6 used on spur gear sleeve end bearing)	5/16" x ¾"—18 U.S.F.
.....	.....	...	14	Screw, cap, hex. head (14 used on dust ring)	5/16" x ⅞"—18 U.S.F.
.....	.....	...	7	Screw, cap, hex. head (4 used on drive shaft end cap; 3 used on drum cover)	5/16" x 1"—18 U.S.F.
.....	.....	...	4	Screw, cap, hex. head (4 used on oil filler)	5/16" x 1⅛"—18 U.S.F.
.....	.....	...	18	Screw, cap, hex. head (12 used on drum shaft caps; 2 used on pawl release cam; 4 used on shifter cover)	⅜" x 1"—16 U.S.F.
.....	.....	...	10	Screw, cap, hex. head (2 used on shifter rod bracket; 8 used on worm thrust bearing cap)	½" x 1¼"—13 U.S.F.
.....	.....	...	31	Washer, lock (4 used on drive shaft end cap; 3 used on drum cover; 14 used on dust ring; 4 used on oil filler; 6 used on spur gear sleeve end bearing)	5/16"
.....	.....	...	18	Washer, lock (12 used on drum shaft caps; 2 used on pawl release cam; 4 used on shifter cover)	⅜"
.....	.....	...	10	Washer, lock (2 used on shifter rod bracket; 8 used on worm thrust bearing cap)	½"
.....	.....	...	2	Washer, wrought (2 used on spindle hub)	⅞"
				CLUTCH GROUP (MASTER)	
7208	.....	200.00	1	**Clutch assembly (master) consisting of 1—6667, 1—6664, 1—6657, 1—6662, 1—7766, 1—6659, 1—7723, 1—6666, 1—6843, 1—6800, 1—6799, 1—7721, 1—6284, 1—8570, 1—1631, 1—1630, 1—1632, 1—6669, 1—1633, 1—6670, 1—6998, 1—6999, 3—6995, 3—6654, 1—6668, 1—6660, 1—6663, 3—6653, 9—6661, 4—2306, 1—1410, 6—2307, 1—6665, 1—6671, 1—53225, 1—56371, 1—56551, 2—53166, 6—53128, 3—53170, 9—53502, 2—53488, 9—53536, 1—56423, 2—55958, 6—50981, 4—52836 and 4—53472**	
6667	TM78A	.25	1	**Clutch adjusting collar**	Cast iron
6664	TM75E	.13	1	**Clutch adjusting collar spacer**	Cast iron
6657	TM77D	.25	1	**Clutch adjusting plunger**	
6662	TM77E	.007	1	**Clutch adjusting plunger knob**	
6658	TM77C	.003	1	**Clutch adjusting plunger spring**	
7766	TM75D	.98	1	**Clutch bearing**	S.K.F. No. 1207
6659	TM74A	.10	1	**Clutch bearing spacer**	S.K.F. No. 1207
7723	TM72C	.007	1	**Clutch bearing spacer ring (felt)**	1⅝" D. x 5/16"
6666	TM78B	.12	1	**Clutch brake disk (fibre)**	2¼" D. x ¼" thick
6843	TM72A	15.25	1	**Clutch coupling (male half)**	
6800	TM74B	.66	1	**Clutch coupling key (long)**	
6799	TM74C	.38	1	**Clutch coupling key (short)**	
7721	TM72B	.05	1	**Clutch coupling ring (leather)**	3⅝" x 1"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CLUTCH GROUP (MASTER)—Continued	
6284	TM78E	3.00	1	**Clutch coupling ring retainer**	
8570	.....	6.62	1	**Clutch coupling spacer, assembly, consisting of 1—6656, 1—6655, 2—9475, 2—53168 and 2—53488**	
6656	TM75C	3.00	1	**Clutch coupling spacer half (with keyway)**	
6655	TM75B	3.00	1	**Clutch coupling spacer half (with plunger hole)**	
9475	TM72B	.24	2	**Clutch coupling spacer bolt, hex. head (special)**	½"—20 U.S.F. x 3"
1631	TM81D	11.25	1	**Clutch disc, inner**	Bronze
1630	TM81B	11.50	1	**Clutch disc, outer**	Bronze
1632	TM81C	11.75	1	**Clutch disc, center**	Cast iron
6669	TM79A	35.00	1	**Clutch disc, inner**	Cast iron
1633	TM81A	13.00	1	**Clutch disc, outer**	Cast iron
6670	TM80A	27.00	1	**Clutch disc hub**	Cast iron
6998	TM77A	...	4	**Clutch disc hub shim**	No. 22 U.S.Ga. x 3⅜" D.
6999	TM77B	.01	4	**Clutch disc hub shim**	No. 22 U.S.Ga. x 3⅜" D.
6995	TM76A	.16	3	**Clutch disc stud**	⅝" x 2"
6654	TM73D	1.12	3	**Clutch dog**	
6668	TM73B	6.87	1	**Clutch dog holder**	Steel
6660	TM76C	.15	1	**Clutch dog holder driving pin**	⅝" x 1⅝"
6663	TM75A	1.00	1	**Clutch dog holder spring**	
6653	TM73E	.68	3	**Clutch link, toggle**	
6661	TM76B	.02	9	**Clutch pin, link (hex. head)**	
2306	TM74E	1.87	4	**Clutch pin, flywheel**	
1410	TM73C	23.00	1	**Clutch retaining ring**	Steel
2307	TM74D	.31	6	**Clutch retaining ring stud**	
6665	TM73A	9.00	1	**Clutch shifter**	Cast iron
6671	TM78C	6.37	1	**Clutch shifter collar (half)**	Malleable iron
11565	.....	...	1	**Clutch shifter collar (half)**	Malleable iron
53225	TM78D	.13	2	**Clutch shifter collar bolt (drilled)**	⅜" x 3½"—24 U.S.F.
				STANDARD PARTS FOR CLUTCH GROUP	
56371	8G	.06	1	**Coupling pipe (Used on inner disc hub)**	¼"
56551	8F	.10	1	**Nipple, pipe (Used on inner disc hub)**	¼" x 3"
53166	.....	.03	4	**Nut, castle (Used on shifter collar bolts)**	⅜"—24 U.S.F.
53128	.....	.10	6	**Nut (hex.), slotted (Used on retaining ring studs)**	⅝" U.S.F.
53168	.....	.06	2	**Nut (hex.), castle (Used on half spacer bolts)**	½"—20 U.S.F.
53170	.....	.16	3	**Nut (hex.), castle (Used on clutch disc studs)**	⅝"—18 thread U.S.F.
53502	.....	.01	9	**Pin, split (Used in clutch disc studs and retaining ring studs)**	¼" x 1¼"
53488	.....	.003	4	**Pin, split (Used in half spacer and shifter collar bolts)**	3/32" x 1¼"
53536	.....	.07	9	**Pin, split (Used in link pins)**	1/16" x 1"
b6423	8A	.03	1	**Plug, pipe (Used in inner disc oil pipe)**	¼"
55958	.....	.05	2	**Rivet, countersunk tank (Used in clutch coupling keys)**	¼" x 3"

50981	.....	.008	6	**Rivet, copper (Used in clutch brake disc)**	No. 7 x 5/8"
52836	TM78F	.05	4	**Screw, cap (hex. head) (Used in clutch coupling retainer)**	3/8" x 1"—24 U.S.F.
53472	.....	.004	4	**Washer, lock, plain heavy (Used in above screws)**	5/8"
				CLUTCH CONTROL GROUP (MASTER) Illustrated on page 107	
7269	HM158D	3.18	1	**Clutch hand lever**	Steel
7242	HM161B	.31	2	**Clutch hand lever handle**	
7287	HM160F	.01	2	**Clutch hand lever handle pin**	
7219	HM159E	.25	2	**Clutch hand lever pawl**	
7228	HM160C	.37	2	**Clutch hand lever pawl guide**	
6763	HM156C	.25	1	**Clutch hand lever pin**	
				CLUTCH HAND LEVER QUADRANT (See Selective Plate, Gear Shifting Group)	
7223	HM160B	.06	1	**Clutch hand lever rod**	1/4" x 6 3/8"
7243	HM160H	.18	2	**Clutch hand lever rod end**	
7288	HM160G	.01	2	**Clutch hand lever rod end pin**	
7230	HM160E	.003	1	**Clutch hand lever spring**	
7239	HM160D	.006	1	**Clutch hand lever washer**	
7277	HM157E	5.00	1	**Clutch shifter fork**	Bronze
7254	HM157D	1.25	1	**Clutch shifter fork rod**	
7233	HM156B	.87	1	**Clutch shifter fork rod end**	
6811	HM156D	.25	1	**Clutch shifter fork rod end pin**	
7227	HM156A	1.25	1	**Clutch shifter shaft**	3/4" x 10 1/2"
7272	TM76D	2.62	1	**Clutch shifter shaft support**	
				STANDARD PARTS FOR CLUTCH CONTROL GROUP	
7149	HM157B	.13	1	**Grease cup (Used on shifter fork)**	No. 0 x 1/8"
53546	.....	...	2	**Pin, split (Used in hand lever rod end pin)**	3/16" x 1"
53502	.....	.01	2	**Pin, split (Used in shifter shaft)**	1/4" x 1 1/4"
54974	.....	.003	5	**Pin, split (Used on hand lever pawl and hand lever pin)**	1 1/8" x 7/8"
56369	HM157C	.06	1	**Pipe coupling (Used in shifter fork)**	1/8"
54254	HM157A	.02	1	**Pipe nipple (Used in shifter fork)**	1/8" x 1 1/2"
9017	.....	.008	4	**Rivet, countersunk (Used on hand lever pawl guide)**	3/32" x 1"
50590	TM76E	.22	2	**Screw, cap (hex.) (Used on shifter shaft support)**	5/8" x 1 1/4"—11 U.S.F.
53476	.....	.03	2	**Washer, lock (plain heavy) (Used on shifter shaft support)**	5/8"
				Clutch, Steering (See Steering Clutch Group)	
				CRANK CASE GUARD GROUP Illustrated on page 173	
10447	MM85A	...	1	Crank case guard	3/8" x 18" x 46"
10444	MM86D	...	1	Crank case guard hanger (front)	
10443	MM86A	...	2	Crank case guard hanger (rear)	
10446	MM85B	...	1	Crank case guard hanger U bolt (front)	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				CRANK CASE GUARD GROUP—Continued	
10440	MM86E	...	4	Crank case guard hinge	
10442	MM85E	...	1	Crank case guard hinge pin (front)	
11221	MM87A	...	1	Crank case guard hinge pin (rear)	
10441	MM85C	...	2	Crank case guard stop (rear)	
10445	MM86C	...	2	Crank case guard support (center)	
53299	WK143F	...	2	Crank case guard stop bolt (drilled)	5/8" x 2"—18 U.S.F.
				STANDARD PARTS FOR CRANK CASE GUARD GROUP	
53170	.....	...	4	Nut, semi fin. (castle) (Used on U bolt and stop bolts)	5/8"—18 U.S.F.
53503	.....	...	4	Pin, split (Used on U bolt and stop bolts)	1/8" x 1 1/2"
53538	.....	.09	4	Pin, split (Used on hinge pins)	3/16" x 1 1/2"
56033	.....	.07	12	Rivet, button head (structural) (Used on hinges and supports)	1/2" x 1 3/4"
50596	NM86B	.26	4	Screw, cap (hex. head) (Connects rear hinges to frame)	5/8" x 2 3/4"—11 U.S.F.
53476	.....	.03	4	Washer, lock (plain heavy) (Used on above screws)	5/8"
				DRIVE GEAR AND SPROCKET GROUP Illustrated on pages 130 and 131	
10351	.....	...	1	**Drive gear assembly (left), consisting of 1—6253, 1—6793, 1—8365, 1—6307, 1—6958, 1—6792, 1—6334, 2—7773, 2—10352, 2—10340, 2—6375, 4—7062, 13—53106, 4—53111, 1—5103, 9—7331, 4—55987, 1—11182, 1—50538, 13—50539, 1—50540, 17—10183 and 4—54378**	
6253	MM81A	190.00	1	**Drive gear**	57 tooth
6793	MM82A	.50	1	**Drive gear key (straight)**	3/4" x 3/4" x 3 3/4"
8365	.....	...	1	**Drive gear dust guard assembly (left), consisting of 1—6309, 1—6373, 1—9978, 1—6308, 1—10418, 1—6374, 1—51031, 9—7331 and 4—55987**	
6309	MM76A	...	1	**Drive gear dust guard (left)**	Pressed steel
6373	MM80A	.01	1	**Drive gear dust guard gasket**	
9978	MM82F	7.00	1	**Drive gear dust guard mud deflector**	
6308	MM74A	1.75	1	**Drive gear dust guard oil ring**	
10418	MM79A	.01	1	**Drive gear dust guard oil ring gasket**	
6374	MM81C	1.00	1	**Drive gear dust guard pipe flange**	
6307	MM78A	.175	1	**Drive gear dust guard dust ring**	
6958	WK122A	1.58	1	**Drive sprocket**	19 tooth
6792	MM82B	.87	1	**Drive sprocket key (straight)**	3/4" x 3/4" x 5"
6334	MM81B	55.00	1	**Drive sprocket sleeve hub**	
7773	MM77E	13.62	2	**Drive sprocket sleeve hub bearing, Hyatt No. 16111**	
10355	.....	...	1	**Drive gear assembly (right), consisting of 1—6253, 1—6793, 1—8366, 1—6307, 1—6958, 1—6792, 1—6334, 1—7773, 1—6375, 4—7062, 13—53106, 4—53111, 1—51031, 9—7331, 4—55987, 1—11182, 1—50538, 13—50539, 1—50541, 17—10183 and 4—54378**	

6253	MM81A	190.00	1	**Drive gear**	57 tooth
6793	MM82A	.50	1	**Drive gear key (straight)**	¾" x ¾" x 3¾"
8366	.....	...	1	**Drive gear dust guard assembly (right), consisting of 1—6309, 1—6306, 1—6308, 1—10418, 1—6374, 1—6373, 1—51031, 4—55987, 9—7331 and 4—55987**	
6309	MM76A	45.00	1	**Drive gear dust guard (right)**	Pressed steel
6373	MM80A	.01	1	**Drive gear dust guard gasket**	
6306	MM74B	7.00	1	**Drive gear dust guard mud deflector**	
6308	MM74A	1.75	1	**Drive gear dust guard oil ring**	
10418	MM79A	.01	1	**Drive gear dust guard oil ring gasket**	
6374	MM81C	1.00	1	**Drive gear dust guard pipe flange**	
6307	MM78A	.175	1	**Drive gear dust guard dust ring**	
6958	WK122A	158.00	1	**Drive sprocket**	19 tooth
6792	MM82B	.87	1	**Drive sprocket key (straight)**	¾" x ¾" x 5"
6334	MM81B	.55	1	**Drive sprocket sleeve hub**	
7773	MM77E	13.62	2	**Drive sprocket sleeve hub bearing, Hyatt No. 16111**	
6375	MM78D	3.00	2	**Drive sprocket thrust washer (inner)**	
10350	.....	...	1	**Drive gear dust guard cover plate assembly (left), consisting of 1—6767, 8—53261, 1—10186, 1—6374, 1—6373, 1—53106, 8—53168, 8—53487, 1—51031, 3—7331, 1—50540 and 1—53472**	
6767	MM75A	35.00	1	**Drive gear dust guard cover plate**	½" x 1½"—20 U.S.F.
53261	MM75B	.14	8	**Drive gear dust guard cover plate bolt (drilled) (6767 to 6927)**	
10186	MM82C	.01	1	**Drive gear dust guard cover plate gasket paper**	
6374	MM81C	1.00	1	**Drive gear dust guard cover plate pipe flange**	
6373	MM80A	.01	1	**Drive gear dust guard cover plate flange gasket**	
10349	.....	...	1	**Drive gear dust guard cover plate assembly (right), consisting of 1—6767, 8—53261, 1—10186, 1—6374, 1—6373, 1—53106, 8—53168, 8—53487, 1—51031, 3—7331, 1—50540 and 1—53472**	
6767	MM75A	35.00	1	**Drive gear dust guard cover plate**	½" x 1½"—20 U.S.F.
53261	MM75B	.14	8	**Drive gear dust guard cover plate bolt (drilled) (6767 to 6927)**	
10186	MM82C	.01	1	**Drive gear dust guard cover plate gasket**	Paper
6374	MM81C	1.00	1	**Drive gear dust guard cover plate pipe flange**	
6373	MM80A	.01	1	**Drive gear dust guard cover plate pipe flange gasket**	
11068	MM79B	.01	2	**Drive gear dust guard cover plate gasket**	
6926	MM77A	185.00	1	**Drive sprocket shaft**	3½" x 74⅝" long
6918	MM78B	1.75	2	**Drive sprocket shaft dust cover**	Pressed steel
6917	MM78E	.75	2	**Drive sprocket shaft end washer**	
7013	MM77D	...	..	**Drive sprocket shaft end washer stud**	⅞" x 2¼"
10340	.....	...	2	**Drive sprocket shaft thrust rod and bushing assembly, consisting of 16925 and 1—6369**	
6925	MM23A	27.00	2	**Drive sprocket shaft thrust rod**	Cast steel
6369	MM83E	2.75	2	**Drive sprocket shaft thrust rod bushing**	Bronze
10352	.....	...	2	**Drive sprocket thrust rod dust washer assembly, consisting of 1—6372, 1—6365, 1—54345, 1—56425 and 4—54817**	
6372	MM83C	.25	2	**Drive sprocket thrust rod dust washer**	
6365	MM83B	1.50	2	**Drive sprocket thrust rod thrust washer**	
10354	.....	...	1	**Drive sprocket shaft thrust rod mud guard assembly (left), consisting of 1—7001, 2—7000, 2—8977, 2—5326, 4—53166, 4—53487 and 4—7179**	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				DRIVE GEAR AND SPROCKET GROUP—Continued	
7001	MM80D	10.00	1	**Drive sprocket shaft thrust rod mud guard**	
7000	MM80B	.68	2	**Drive sprocket shaft thrust rod mud guard support**	
8977	MM82D	.12	2	**Drive sprocket shaft thrust rod mud guard support bolt (drilled)**	3/8" x 1 1/4"—24 U.S.F.
53217	MM80C	...	2	**Drive sprocket shaft thrust rod mud guard support bolt (drilled)**	3/8" x 1 1/2"—24 U.S.F.
10353	.....	...	1	**Drive sprocket shaft thrust rod mud guard assembly (right), consisting of 1—7001, 2—7000, 2—8977, 2—53216, 4—53216, 4—53166, 4—53487 and 4—7179**	
7001	MM80D	10.00	1	**Drive sprocket shaft thrust rod mud guard**	
7000	MM80B	.68	2	**Drive sprocket shaft thrust rod mud guard support**	
8977	MM82D	.12	2	**Drive sprocket shaft thrust rod mud guard support bolt (drilled)**	3/8" x 1/2"—24 U.S.F.
53217	MM80C	.06	2	**Drive sprocket shaft thrust rod mud guard support bolt (drilled)**	3/8" x 1 1/2"—24 U.S.F.
6372	MM83C	.25	1	**Drive sprocket shaft thrust rod dust washer**	Leather
6365	MM83B	1.50	1	**Drive sprocket shaft thrust rod thrust washer**	
6375	MM78D	3.00	2	**Drive sprocket shaft thrust washer (inner)**	
8428	MM80E	.03	2	**Drive sprocket shaft thrust washer dowel pin**	3/8" x 5/8"
				STANDARD PARTS FOR DRIVE GEAR AND SPROCKET GROUP	
7062	.....	1.22	8	**Bolt, machine (In drive sprocket hubs)**	3/4" x 7 1/2"—10T
53166	.....	.03	4	**Nut, semi fin. hex. (castle) (On mud guard supports)**	3/8"—24 U.S.F.
53168	.....	.03	16	**Nut, semi fin. hex. (castle) (On drive gear cover plate)**	1/2"—20 U.S.F.
53173	.....	.28	2	**Nut, castle (On drive shaft studs)**	7/8"—14 U.S.F.
53150	.....	.02	8	**Nut, semi fin. hex. (On drive shaft dust cover)**	5/16"—24 U.S.F.
53106	.....	.03	26	**Nut, semi fin. hex. (12 used on left, 12 used on right drive gear dust covers, 2 used on cover plates)**	3/8"—16 U.S.F.
53111	.....	.19	10	**Nut, semi fin. hex. (2 used on drive shaft set screws, 8 used on drive sprocket hub bolts)**	3/4"—10 U.S.F.
53487	.....	.003	24	**Pin, split (8 used on mud guard supports, 16 used on cover plates)**	3/32" x 1"
53503	.....	.006	2	**Pin, split (On drive shaft studs)**	1/8" x 1 1/2"
54345	8D	.05	2	**Pipe ell (street) (On rear end of thrust rods)**	3/8"
56425	8B	.05	2	**Pipe plug (In above elbows)**	3/8"
51031	9H	.18	4	**Pipe plug (socket head) (In drive gear dust covers and plates)**	1"
7331	.....	.04	24	**Rivet (button head tank) (Used on mud deflectors and pipe)**	3/8" x 1"
7179	.....	.04	8	**Rivet (round head tank) (On thrust rod mud guard)**	3/8" x 3/4"
55987	.....	.05	8	**Rivet, round head (structural) (On drive gear dust covers)**	3/8" x 1 1/4"
53558	MM78C	.04	8	**Screw, cap, hex head (On drive shaft dust cover)**	5/16" x 1 1/4"—24 U.S.F.
11182	MM80C	.03	4	**Screw, cap, hex. head (On drive gear dust cover)**	3/8" x 1/2"—24 U.S.F.
50539	RH27B	.05	26	**Screw, cap, hex. head (On drive gear dust cover)**	3/8" x 1" —16 U.S.F.
50540	MM81D	.06	4	**Screw, cap, hex. head (On drive gear dust cover and plates)**	3/8" x 1 1/4"—16 U.S.F.
50541	MM75E	.07	2	**Screw, cap, hex. head (On drive gear dust covers)**	3/8" x 1 1/2"—16 U.S.F.
54817	MM83D	...	8	**Screw, machine (On thrust rod dust washers)**	No. 14 x 1"
51469	MM77B	.31	2	**Screw, set, square head (oval point) (Hold drive shaft in place)**	3/4" x 3"—10 thread
53471	.....	.03	8	**Washer, lock (plain heavy) (On drive shaft dust cover)**	5/16"

53472	.....	...	2	**Washer, lock (plain heavy) (On drive gear cover plates)**	⅜"
10183	.....	.004	34	**Washer, lock (positive light) (On drive gear covers)**	⅜"
53478	.....	.05	8	**Washer, lock (plain heavy) (On drive sprocket hub bolts)**	¾"
				ENGINE CONTROL GROUP	
7221	HM141C	.09	2	**Engine control ball joint**	No. 5, Style B
7224	HM141G	.50	1	**Engine control bell crank (spark)**	
8564	HM146B	.25	1	**Engine control bell crank (throttle)**	
7231	HM141E	.08	1	**Engine control bell crank pin**	
7253	HM141A	.62	1	**Engine control bell crank support**	
10425	HM128A	2.25	1	Engine control bracket	
53219	HM159B	.08	1	Engine control bracket bolt (drilled)	⅜"—24 U.S.F. x 2"
7235	HM144B	.87	1	**Engine control connecting rod (spark)**	
7255	HM141D	.50	1	**Engine control connecting rod (throttle)**	
7218	HM144C	.12	2	**Engine control connecting rod end**	
7263	HM141F	1.18	4	**Engine control connecting rod end pin**	
6801	HM140A	.62	1	**Engine control hand lever (spark)**	
7290	HM172A	.56	1	**Engine control hand lever (throttle)**	
6802	HM172D	.05	2	**Engine control hand lever spider**	
8771	HM146E	.003	2	Engine control hand lever washer	
7232	HM140C	.25	1	Engine control lever, spark (lower)	
7234	HM172C	.09	1	Engine control lever (throttle)	
7259	HM140D	1.10	1	Engine control lever rod (spark)	
7258	HM172B	.87	1	Engine control lever rod (throttle)	
8374	HM136A	1.75	1	Engine control rod	
7240	HM141B	.25	1	**Engine control rod (magneto)**	
				STANDARD PARTS FOR ENGINE CONTROL GROUP	
53151	.....	.03	4	Nut, semi fin. hex. (On control lever rods)	⅜"—24 U.S.F.
53166	.....	.03	1	Nut, castle, semi fin. hex. (On control bracket bolt)	⅜"—24 U.S.F.
53150	.....	.02	2	**Nut, semi fin. hex. (On control connecting rods)**	5/16"—24 U.S.F.
53153	.....	...	1	Nut, semi fin. hex. (On throttle control rod)	½"—20 U.S.F.
53487	.....	.003	1	Pin, split (In control bracket bolt)	3/32" x 1"
50395	HM140B	.01	4	Pin, taper (In control levers and hand levers)	No. 0 x 1"
50564	HM141H	.11	2	Screw, cap (On bell crank support)	½"—13 U.S.F. x 1¼"
53474	.....	.01	2	Washer, lock, plain heavy (On bell crank support)	½"
				EQUALIZER BAR GROUP Illustrated on page 140	
7129	.....	407.66	1	**Equalizer bar assembly, consisting of 1—7009, 2—7020, 2—7011, 2—7023, 1—7024, 1—7022, 2—6537, 2—6539, 2—7008, 2—7007, 12—9995, 4—7021, 2—7017, 2—6536, 2—7014, 1—7019, 1—7010, 4—53346, 6—53172, 4—53173, 4—53177, 10—53502, 4—53502, 4—53561, 2—56423, 1—56425, 12—50564, 2—50591, 12—53474 and 2—53476**	
7009	WK147A	213.00	1	**Equalizer bar**	Cast steel
7020	WK149C	8.25	2	**Equalizer bar end ball**	Steel, case hardened
7011	WK148A	11.00	2	**Equalizer bar end cap**	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				EQUALIZER BAR GROUP—Continued.	
7023	WK149E	4.12	2	**Equalizer bar** end pin	1¾" x 9¾"
7024	WK149D	11.00	1	**Equalizer bar** king pin	2½" x 10½"
7022	WK146A	.18	1	**Equalizer bar** king pin retainer	
6537	WK145B	5.00	2	**Equalizer bar** recoil spring	
6539	WK145D	.37	2	**Equalizer bar** recoil spring washer	
7008	WK147B	27.00	2	**Equalizer bar** spring support	Cast steel
7007	WK147C	4.50	2	**Equalizer bar** spring support cap	Cast steel
9995	WK146E	.12	12	**Equalizer bar** spring support cap **shim**	¾" x 4½"
7021	WK146D	.50	4	**Equalizer bar** spring support cap **stud**	
7017	WK146B	4.25	2	**Equalizer bar** spring support (or **bracket) pin**	
6536	WK145A	1.62	2	**Equalizer bar** support spring	1 1/16" x 1 5/16"
7014	WK145C	1.37	2	**Equalizer bar** support spring bolt	
7019	WK146C	10.25	1	**Equalizer bar** swivel block	
7010	WK149A	28.00	1	**Equalizer bar** swivel block plate	
53346	MM90C	.84	4	**Equalizer bar** swivel block plate **bolt**	⅞"—14 U.S.F. x 3"
				STANDARD PARTS FOR EQUALIZER BAR GROUP	
53172	.....	.21	6	**Nut, castle (On support cap studs and spring bolts)**	¾"—16 U.S.F.
53173	.....	.28	4	**Nut, castle (On swivel block plate bolts)**	⅞"—14 U.S.F.
53177	.....	1.12	4	**Nut, castle (On end pins and support pins)**	1⅜"—12 U.S.F.
53502	.....	.005	10	**Pin, split (In spring bolts, swivel block plate bolts and support studs)**	⅛" x 1¼"
53561	.....	.02	4	Pin, split (In support pins and end pins)	7/32" x 2½"
56423	8A	.03	2	**Plug, pipe (In end pins)**	¼"
56425	8B	.05	1	Plug, pipe (In king pin)	⅜"
50564	WK148B	.11	10	Screw, cap (On end caps)	½" —13 U.S.F. x 1¼"
50591	WK146F	...	2	Screw, cap (hex. head) (On king pin retainer)	⅝" x 1½"—11 U.S.F.
53474	.....	.01	10	Washer, lock, plain heavy (On end caps)	½"
53476	.....	...	2	Washer, lock, plain heavy (On king pin retainer)	⅝"
				FENDER GROUP Illustrated on page 10	
7580	.....	48.02	1	**Fender assembly (left), consisting of 1—7579, 1—7573, 1—7577, 1—7576, 9—53151, 4—53153, 30—7068, 6—52835, 3—52864, 1—52865, 3—52837, 4—50538, 13—53472 and 4—53474**	
7579	GM4A	7.00	1	**Fender angle**	1" x 1" x ⅛" x 94½"
7573	GM2C	1.50	2	**Fender brace**	
7577	GM3A	28.00	1	**Fender plate, side**	
7576	GM2A	10.00	1	**Fender plate, top**	81½" x 12¼"

7581	.....	48.02	1	**Fender assembly (right) consisting of 1—7578, 1—7573, 1—7593, 1—7575, 9—53151, 4—53153, 31—7068, 6—52835, 2—52864, 1—52865, 3—52837, 4—50538, 13—53472 and 4—53474**	96¼" x 6"
7578	GM4B	7.00	1	**Fender angle**	1" x 1" x ⅛" x 94½"
7573	GM2C	1.50	2	**Fender brace**	
7593	GM5A	28.00	1	**Fender plate, side**	81½" x 12¼"
7575	GM2B	10.00	1	**Fender plate, top**	96¼" x 6"
				STANDARD PARTS FOR FENDER GROUP	
53151	.....	.03	18	**Nut, semi fin. hex.**	⅜" U.S.F.
53153	.....	.06	8	**Nut, semi fin. hex.**	½"—20 U.S.F.
7068	.....	.01	61	**Rivet, oval head, tank**	¼" x ½"
52835	GM3B	.04	12	**Screw, cap**	⅜" x ¾"—20 U.S.F.
52864	GM2D	.16	6	**Screw, cap**	½" x 2"—20 U.S.F.
52865	GM2E	...	2	**Screw, cap**	½" x 2¼"—20 U.S.F.
52837	GM3D	.06	6	**Screw, cap**	⅜" x 1¼"
50538	GM3C	.04	8	**Screw, cap**	⅜" x ¾"—16 U.S.F.
53472	.....	.004	26	**Washer, lock (plain heavy)**	⅜"
53474	.....	.01	8	**Washer, lock (plain heavy)**	½"
				FRAME AND BRACKET GROUP Illustrated on page 134	
7209	.....	2316.13	1	**Frame assembly (main) consisting of 1—9844, 1—10194, 1—10166, 1—6305, 1—6304, 2—10178, 16—7012, 2—7040, 2—6533, 4—8918, 8—8919, 2—53168, 4—53170, 16—53173, 8—53172, 3—53159, 4—53502, 24—53503, 2—53488, 4—53596, 3—53082, 3—53082, 3—57108, 8—11201, 2—53476 and 3—52823**	
9844	MM68A	1950.00	1	**Frame**	Open hearth steel
10194	MM71A	...	1	**Frame bracket, draw bar clevis**	
10166	HM70A	3.50	1	**Frame bracket, gas generator**	
6305	MM72A	153.00	1	**Frame bracket, spring (left)**	
6304	MM73B	153.00	1	**Frame bracket, spring (right)**	
10178	MM70B	...	2	**Frame bracket, gas generator stud**	½"
				FRAME BRACKET, PINTLE (See Pintle Group)	
7012	MM73A	.31	16	**Frame bracket, spring, stud**	⅞" x 3"
.....	.....	...	..	**Frame Name Plate (See Name Plate Group)**	
.....	.....	...	..	**Frame Patent Plate (See Name Plate Group)**	
.....	.....	...	..	**Frame Trade Mark Plate (See Name Plate Group)**	
7040	WK134A	14.12	2	**Frame slide link**	
6533	WK139C	8.50	2	**Frame slide link pin**	2" x 9⅝"
11201	WK130B	.03	8	**Frame slide link pin washer**	
8918	MM70C	.18	4	**Frame stud, armor plate**	⅝" x 2"
8919	MM70E	...	8	**Frame stud, engine hanger**	¾" x 2½"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR FRAME AND BRACKET GROUP	
53168	.....	.06	2	**Nut, castle (On generator bracket studs)**	½"—20 U.S.F.
53170	.....	.15	4	**Nut, castle (On armor plate studs)**	⅝"—18 U.S.F.
53173	.....	.28	16	**Nut, castle (On spring bracket studs)**	⅞"—14 U.S.F.
53172	.....	.21	8	**Nut, castle (On armor plate studs)**	¾"—16 U.S.F.
53159	.....	.50	3	**Nut, semi fin. hex. (On clevis bracket)**	1"—16 U.S.F.
53502	.....	.005	4	**Pin, split (In armor plate studs)**	⅛" x 1¼"
53503	.....	.005	24	**Pin, split (In engine hanger and spring bracket studs)**	⅛" x 1½"
53488	.....	.001	2	**Pin, split (In generator bracket studs)**	3/32" x 1½"
53596	.....	.10	4	**Pin, split (In slide link pins)**	⅛" x 3"
53082	MM69B	.14	2	**Screw, cap, hex. head (On armor plate supports)**	⅝" x 1½"—18 U.S.F.
57108	MM71B	1.10	3	**Screw, cap hex. head (In clevis bracket)**	1" x 3¼"—14 U.S.F.
53476	.....	.03	2	**Washer, lock, plain heavy (On armor plate studs)**	⅝"
52823	.....	.06	3	**Washer, lock, positive heavy (On clevis bracket)**	1"
				FUEL SUPPLY GROUP Illustrated on pages 74 and 76	
7590	WM72D	2.50	1	Fuel supply pipe guard	9¼" x 11"
7585	WM76D	.25	1	Fuel supply pipe hanger	1" x 4⅜"
8669	WM87C	10.25	1	**Fuel supply pipe strainer (auxiliary tank)**	
7842	WM76A	1.50	1	**Fuel supply pipe guard (main tank)**	
8583	WM86C	17.00	1	**Fuel supply tank assembly (auxiliary) consisting of tank shell, 1—8582, 1—8581 and 1—8580**	
8582	WM86B	.50	1	Fuel supply tank flange, filler	
8581	WM86A	8.00	1	Fuel supply tank flange, outlet	
8580	.....	.80	1	Fuel supply tank flange cap	
7109	.....	70.00	1	**Fuel supply tank assembly (main), consisting of tank shell, 1—7586, 1—7583, 1—7582, 1—5242 and 5244**	
8164	WM74C	4.25	1	Fuel supply tank flange, filler	
7583	WM74A	.75	1	**Fuel supply tank flange, outlet**	
7582	WM74B	.25	1	**Fuel supply tank flange reserve**	
5242	WM73A	2.50	1	**Fuel supply tank plug**	
5244	WM73B	.93	1	**Fuel supply tank plug plate**	
7588	WM72A	12.00	1	Fuel supply tank board	1" x 15¼" x 45"
8678	WM88D	27.00	2	**Fuel supply tank bracket (auxiliary)**	
8673	WM88E	.50	4	Fuel supply tank bracket bolt (auxiliary) (drilled)	½"—20 U.S.F. x 6¼"
8560	WM71A	16.50	2	**Fuel supply tank bracket (main), outer**	
6625	WM70H	.75	2	**Fuel supply tank bracket (main), inner**	
53343	WM70B	.75	1	Fuel supply tank bracket bolt (main) (drilled)	⅞" x 2¼"
53301	WM71B	.12	4	Fuel supply tank bracket bolt (main) (drilled)	⅝" x 2½"
8920	HM142F	.43	1	Fuel supply tank bracket stud	⅞"—14 U.S.F. x 2½"

8677	WM88A	2.50	2	**Fuel supply tank strap (auxiliary)**	
7589	.....	1.87	2	Fuel supply tank strap (main)	
				FUEL SUPPLY VACUUM TANK	
9741	WM89A	4.10	..	**Fuel supply vacuum tank (Stewart Warner No. 146-A)**	
8445	.....	.001	1	Fuel supply vacuum tank atmospheric valve stem (Stewart Warner No. 10245)	
8455	.....	.43	2	Fuel supply vacuum tank band bracket (Stewart Warner No. 4694)	
8456	.....	.21	2	Fuel supply vacuum tank band bracket (Stewart Warner No. 4697)	
8462	.....	.001	1	Fuel supply vacuum tank cover assembly (Stewart Warner No. 10248)	
8460	.....	.001	1	Fuel supply vacuum tank cover gasket (Stewart Warner No. 10261)	
8461	.....	.001	1	Fuel supply vacuum tank cover gasket (Stewart Warner No. 10262)	
8453	.....	.001	3	Fuel supply vacuum tank flapper (Stewart Warner No. 1471)	
8450	.....	.16	1	Fuel supply vacuum tank flapper valve (Stewart Warner No. 10229)	
8452	.....	.001	3	Fuel supply vacuum tank flapper valve hinge screw (Stewart Warner No. 1118)	
8451	.....	.001	3	Fuel supply vacuum tank flapper valve stop screw (Stewart Warner No. 1116)	
9851	.....	.002	1	Fuel supply vacuum tank float lever (Stewart Warner No. 1464)	
9852	.....	.001	1	Fuel supply vacuum tank float lever pin (Stewart Warner No. 1465)	
8454	.....	.004	1	Fuel supply vacuum tank gasoline inlet bushing (Stewart Warner No. 2292)	¼"
8448	.....	.06	1	Fuel supply vacuum tank gasoline inlet check valve (Stewart Warner No. 10237)	
9855	.....	.002	1	Fuel supply vacuum tank lever connection link (Stewart Warner No. 1475)	
9856	.....	.001	3	Fuel supply vacuum tank lever connection link pin (Stewart Warner No. 1476)	
55147	.....	.001	10	Fuel supply vacuum tank machine screw (fillister head) (Stewart Warner No. 7000)	No. 8—32 x ½"
8442	.....	2.87	1	Fuel supply vacuum tank outside shell assembly (Stewart Warner No. 10255)	
8443	.....	.07	1	Fuel supply vacuum tank pet cock (Stewart Warner No. 10263)	
9848	.....	.002	1	Fuel supply vacuum tank pipe plug, hex. (Stewart Warner No. 4648)	⅛"
9853	.....	.001	1	Fuel supply vacuum tank spring lever (Stewart Warner No. 1473)	
8447	.....	.12	1	Fuel supply vacuum tank stem, washer and float assembly (Stewart Warner No. 10242)	
8444	.....	.001	1	Fuel supply vacuum tank strainer and outlet assembly (Stewart Warner No. 10258)	
8459	.....	.07	1	Fuel supply vacuum tank tube fitting (Stewart Warner No. 10259)	⅜" S.A.E.
9857	.....	.001	1	Fuel supply vacuum tank vacuum lever stem (Stewart Warner No. 793)	
8458	.....	.03	1	Fuel supply vacuum tank valve nipple (Stewart Warner No. 10260)	⅝" S.A.E.
9858	.....	.001	2	Fuel supply vacuum tank valve stem collar (Stewart Warner No. 1243)	
9854	.....	.002	1	Fuel supply vacuum tank valve stem lever (Stewart Warner No. 1474)	
9860	.....	.001	1	Fuel supply vacuum tank valve stem lever pin (Stewart Warner No. 1487)	
8446	.....	.001	1	Fuel supply vacuum tank valve stem sleeve (Stewart Warner No. 10243)	

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Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				FUEL SUPPLY VACUUM TANK—Continued	
7559	.....	.001	2	Fuel supply vacuum tank valve tension spring (Stewart Warner No. 1485)	
8457	.....	.001	1	Fuel supply vacuum tank vent filling (Stewart Warner No. 10068)	
10427	WM82A	6.10	1	**Fuel supply vacuum tank bracket**	
10430	.....	...	2	Fuel supply vacuum tank bracket elevating strip	
10424	WM82C	.16	2	Fuel supply vacuum tank tube clamp	
3077	WM84D	.16	2	Fuel supply vacuum tank tube clamp	
10608	WM84A	.16	1	Fuel supply vacuum tank tube clip	
11184	WM84C	.16	1	Fuel supply vacuum tank tube clip	
11281	WM96C	...	1	Fuel supply vacuum tank tube clip	
11385	WM96A	...	2	Fuel supply vacuum tank tube clip, lower (carburetor tube)	
11384	WM96B	...	2	Fuel supply vacuum tank tube clip, upper (carburetor tube)	
10586	WM84B	...	9	Fuel supply vacuum tank tube clip strip	
				STANDARD PARTS FOR FUEL SUPPLY GROUP	
53773	WM72E	.08	9	Bolt, carriage (One on 3077 clip, eight on tank board)	⅜" x 1½"
52560	WM82B	.02	1	Bolt, machine, square head (On 3077 clip)	¼"—24 U.S.F. x 1"
52561	WM82D	.02	4	Bolt, machine (On 10427 bracket)	¼" x 1¼"—20 U.S.F.
8673	WM88E	...	4	Bolt, machine, hex. head (On auxiliary tank)	½" x 6¼"—20 U.S.F.
8902	WM83D	.12	1	**Cock, shutoff (Between auxiliary tank and vacuum tank)**	Imperial Brass Co. No. 57 S.A.E.
8675	WM88C	.09	2	Lining, cotton webbing (On auxiliary tank brackets)	⅛" thick x 1½" wide x 10½" long
8676	WM88B	.17	2	Lining, cotton webbing (On auxiliary tank straps)	⅛" thick x 1½" wide x 18½" long
53168	.....	.06	4	Nut, castle (On auxiliary tank brackets)	½"—20 U.S.F.
53170	.....	.16	4	Nut, castle (On main tank brackets)	⅝"—18 U.S.F.
53173	.....	.28	2	Nut, castle (On main tank brackets)	⅞"—14 U.S.F.
53104	.....	.01	5	Nut, semi fin. hex. (One on 3077 clip; four on vacuum tank bracket)	¼"—20 U.S.F.
53106	.....	.03	8	Nut, semi fin. hex. (On fuel tank board)	⅜"—16 U.S.F.
53153	.....	.06	8	Nut, semi fin. hex. (On main fuel tank brackets and straps)	½"—20 U.S.F.
53502	.....	.005	4	Pin, split (On main tank bracket bolts)	⅛" x 1¼"
53503	.....	.006	2	Pin, split (On main tank bracket)	⅛" x 1½"
53488	.....	.004	4	Pin, split (On auxiliary tank bracket)	3/32" x 1¼"
8321	WM76C	1.00	1	Pipe, brass (On auxiliary tank outlet flange)	¾" x 9¾"
56349	7B	.03	1	Pipe bushing, reducing (In reserve tank flange)	⅜" x ¼"
54948	7C	.07	1	Pipe ell (brass) (for flared tubing) (In 7590 guard)	¼" pipe x ⅝" U.S.F.
8322	WM76E	.05	1	Pipe ell, reducing (brass) (Main tank assembly)	½" x ¾"
54341	WM87E	...	1	Pipe ell, st. (Top of vacuum tank)	⅛"
54343	9F	...	1	Pipe ell, st. (Top of vacuum tank)	¼"
8897	.....	...	15	Rivet, oval head (tank) (In main tank outlet flange)	5/16" x ½"

11555	.....	...	8	Rivet, oval head (tinned) (In main tank filler flange)	¼" x ½"
51074	.....	...	1	**Rivet, round head (In main tank filler flange)**	5/16" x 2½"
52864	WM71C	.17	2	Screw, cap, hex. head (On main tank outer brackets)	½" x 2"—20 U.S.F.
54065	WM72C	.01	12	Screw, wood, flat head (In main tank board)	No. 10 x 1½"
8320	WM76B	1.12	1	**Tubing, brass, seamless (Reserve tank partition)**	No. 20 U.S. Ga. ⅜" O.D. x 14"
9739	WM83B	.25	1	**Tubing, brass, seamless (Manifold to vacuum tank)**	No. 22 U.S. Ga. ¼" O.D. x 42"
9738	WM83A	3.36	1	**Tubing, brass, seamless (Vacuum tank to carburetor)**	No. 20 U.S. Ga. ⅜" O.D. x 42"
8674	WM87F	4.32	1	**Tubing, brass, seamless (Auxiliary tank to carburetor)**	No. 20 U.S. Ga. ⅜" O.D. x 54"
9740	WM83C	10.56	1	**Tubing, brass, seamless (Main tank to vacuum tank)**	No. 20 U.S. Ga. ⅜" O.D. x 132"
54941	7D	.07	1	**Tubing union (On 9740 tube)**	⅜"
54925	WM84F	.04	2	**Tubing union, half (On ends of above tubes)**	(For ¼" O.D. tubing x 7/16"—20 U.S.F. x ⅛" pipe thread)
54939	9C	.03	2	**Tubing union nut (On ends of above tubes)**	(For ¼" O.D. tubing x 7/16"—20 U.S.F.)
8670	WM87D	.10	1	**Valve, three way (Auxiliary tank to carburetor)**	(For ⅜" O.D. tubing)
53470	.....	.004	9	Washer, lock, plain heavy (On tube clips)	¼"
53472	.....	.004	8	Washer, lock, plain heavy (On main tank board)	⅜"
53474	.....	.01	8	Washer, lock, plain heavy (On main tank brackets, straps and studs)	½"
				GEAR SHIFTING GROUP	
7270	HM158A	5.50	1	**Gear shifting lever**	
53223	HM158C	.13	1	**Gear shifting lever bolt (drilled)**	⅜"—24 U.S.F. x 3"
7242	HM161B	.25	1	**Gear shifting lever handle**	
7287	HM160F	.01	1	**Gear shifting lever handle pin**	
7219	HM159E	.25	1	**Gear shifting lever pawl**	½" x 4½"
7228	HM160C	.37	1	**Gear shifting lever pawl guide**	
6291	HM159C	1.25	1	**Gear shifting lever pin**	⅝" x 2"
6289	HM159F	.43	1	**Gear shifting lever pivot block**	
6290	HM159D	.37	1	**Gear shifting lever pivot block pin**	¾" x 2⅞"
7222	HM160A	.06	1	**Gear shifting lever rod**	¼" x 7"
7243	HM160H	.18	2	**Gear shifting lever rod end**	
7288	HM160G	.01	2	**Gear shifting lever rod end pin**	
7230	HM160E	1.25	1	**Gear shifting lever spring**	No. 16 B.&S. Ga., 8 coils
6601	HM159A	.09	2	**Gear shifting lever spring**	1" x 5" (flat)
53219	HM159B	.09	1	**Gear shifting lever spring bolt (drilled)**	⅜"—24" x 2" U.S.F.
7239	HM160D	.006	1	**Gear shifting lever washer**	No. 13 U.S. Ga.
7275	HM161C	5.00	1	**Gear shifting selective plate**	
7238	HM161A	.18	2	**Gear shifting lever plate stud**	
				Gear Shifting Shaft (See Transmission Group)	
				Gear Shifting Shaft Fork (See Transmission Group)	

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Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR GEAR SHIFTING GROUP	
53168	.....	.05	2	**Nut, castle (On selective plate studs)**	½"—20 U.S.F.
53166	.....	.03	2	**Nut, castle (On gear shifting lever bolts)**	⅜"—24 U.S.F.
53149	.....	...	4	**Nut, semi fin. hex. (On gear shifting lever rod)**	¼"—28 U.S.F.
54974	.....	.003	2	**Pin, split (In lever pawl)**	⅛" x ⅞"
53502	.....	.005	2	**Pin, split (In selective plate studs)**	⅛" x 1¼"
53486	.....	.002	3	**Pin, split (In shifting lever bolt, lever, spring and lever spring bolt)**	3/32" x ¾"
53546	.....	.01	1	**Pin, split (In pivot block pin)**	13/64" x 1"
9017	.....	.01	2	**Rivet, countersunk (Hold pawl guide to lever)**	3/16" x 1"
51602	HM158B	.005	1	**Screw, set headless (Holds shifting lever pin)**	¼" x ½"—20 U.S.F.
				GROUSER BOX AND BRACKET GROUP Illustrated on page 168	
10204	.....	...	1	**Grouser box assembly, consisting of all structural steel parts riveted, 2—10316, 1—10315, 1—10314, 6—53262, 3—7128, 2—10325, 2—10412, 2—10413, 4—10423, 2—10415, 2—10417, 2—10416, 2—10421, 2—10422, 6—53168, 3—53170. 2—53172, 8—53153, 5—53503, 6—53488, 14—55986, 8—52862 and 8—53474**	
10316	MM88A	...	2	**Grouser box bracket, lower**	
10315	MM89C	...	1	**Grouser box bracket (upper, front)**	
10314	MM89A	...	1	**Grouser box bracket (upper, rear)**	
53262	MM89B	...	6	**Grouser box bracket bolt (drilled)**	½" x 1¾"—20 U.S.F.
7128	WK140A	1.44	3	**Grouser box bracket stud (upper, front)**	⅝" x 2"
10325	AM161C	.48	2	**Grouser box bracket stud (rear, upper)**	¾" x 3½"
10412	.....	...	2	**Grouser box door hinge (female)**	
10413	.....	...	2	**Grouser box door hinge (male)**	
10423	JB26E	...	4	**Grouser box door hinge pin**	
10415	JB26A	...	2	**Grouser box latch (female half)**	
10417	JB26B	...	2	**Grouser box latch (male half)**	
10414	.....	...	2	**Grouser box latch wing nut**	
10421	JB26C	...	2	**Grouser box wing nut pin**	
10422	JB26D	...	2	**Grouser box wing nut pin washer**	
				STANDARD PARTS FOR GROUSER BOX AND BRACKET GROUP	
53168	.....	...	6	**Nut, castle (On bracket bolts)**	½"—20 U.S.F.
53170	.....	...	3	**Nut, castle (On front upper bracket studs)**	⅝"—18 U.S.F.
53172	.....	.12	2	**Nut, castle (On rear upper bracket studs)**	¾"—16 U.S.F.
53153	.....	...	8	**Nut, semi fin. hex. (On grouser box cap screws)**	½"—20 U.S.F.
53503	.....	.005	5	**Pin, split (In upper bracket studs)**	⅛" x 1½"
53488	.....	...	6	**Pin, split (In bracket bolts)**	3/32" x 1¼"
55986	.....	...	14	**Rivet, countersunk head tank (In hinges and latches)**	37/8" x 1"

52862	MM89D	...	8	**Screw, cap (hex. head) (Hold grouser box on brackets)**	½" x 1½"—20 U.S.F.
53474	.....	...	8	**Washer, lock (plain heavy) (On above cap screws)**	½"
				HAND ENGINE STARTER GROUP	
				Illustrated on page 86	
9980	EQ69A	8.00	1	**Hand engine starter bracket**	
8920	HM142F	.43	..	**Hand engine starter bracket stud**	⅞" x 2½"—14 U.S.F.
7403	EQ70A	2.12	1	**Hand engine starter chain**	No. 149 diamond chain
9477	EQ71A	4.12	1	**Hand engine starter chain adjuster**	
9475	TM72D	.24	1	**Hand engine starter chain adjuster bolt (drilled)**	½" x 3"—20 U.S.F.
11461	EQ72A	...	1	**Hand engine starter crank**	
53220	EQ72B	.10	1	**Hand engine starter crank bolt (drilled)**	⅜" x 2¼"—24 U.S.F.
11462	EQ72D	...	1	**Hand engine starter crank handle**	
11463	EQ72C	...	1	**Hand engine starter crank handle pin**	
9476	EQ70B	1.50	1	**Hand engine starter crank pin**	1¼" x 6⅝"
9747	EQ73A	5.50	1	**Hand engine starter gear**	37 tooth
.....	EQ74D	...	1	**Hand engine starter gear stop pin**	
.....	EQ74C	...	1	**Hand engine starter gear stop pin spring**	
.....	EQ75A	...	1	**Hand engine starter retarder pin**	
.....	EQ75C	...	1	**Hand engine starter retarder pin button**	
.....	EQ75F	...	1	**Hand engine starter retarder pin case**	
.....	EQ75D	...	1	**Hand engine starter retarder pin case lock nut**	
.....	EQ75B	...	1	**Hand engine starter retarder pin spring**	
.....	EQ75E	...	1	**Hand engine starter retarder pin case support**	
.....	EQ74A	...	1	**Hand engine starter screw shaft**	
.....	EQ73B	...	2	**Hand engine starter sprocket**	22 tooth
.....	EQ74B	...	1	**Hand engine starter sprocket locks screw**	
				STANDARD PARTS FOR HAND ENGINE STARTER GROUP	
54234	EQ117E	.13	2	**Grease cup, plain compression (For screw shaft and crank pin)**	No. 00 x ⅛"
50356	EQ70C	.01	2	**Key, Woodruff (On crank pin for crank and sprocket)**	No. 11
53166	.....	.03	1	**Nut, castle (On starter crank bolt)**	⅜"—24 U.S.F.
53168	.....	.06	1	**Nut, castle (On chain adjuster bolt)**	½"—20 U.S.F.
53172	.....	.21	1	**Nut, castle (On starter crank pin)**	¾"—16 U.S.F.
53173	.....	.28	2	**Nut, castle (On starter bracket studs)**	⅞"—14 U.S.F.
53487	.....	.003	2	**Pin, split (In starter crank and chain adjuster)**	3/32" x 1"
53503	.....	.006	1	**Pin, split (In starter crank pin)**	⅛" x 1½"
53504	.....	.007	2	**Pin, split (In starter bracket studs)**	⅛" x 1¾"
50529	BM58F	.03	2	**Screw, cap (Hold pin support to bracket)**	5/16" x 1"—18 U.S.F.
52814	.....	.004	2	**Washer, lock, positive heavy (On above screws)**	5/16"
				LAMP GROUP	
9827	.....	4.37	2	**Lamp, side**	
9881	.....	2.75	1	**Lamp, tail**	Deitz Champion
5299	.....	.25	2	**Lamp bracket, side**	Deitz Champion
5326	FF219A	2.00	1	**Lamp bracket, tail**	
53216	11P	.06	6	**Lamp bracket bolt**	⅜" x 1¼"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR LAMP GROUP	
53166	.....	.03	6	**Nut, castle (On bracket bolts)**	3/8"
53487	.....	.003	6	**Pin, split (In bracket bolts)**	3/32" x 1"
7826	.....	.002	4	**Rivet, oval head (In tail lamp bracket)**	1/4" x 3/4"
				NAME PLATE GROUP	
7544	FF218D	.06	1	**Plate, Ordnance Department**	
6691	FF218A	.06	1	**Plate, patent and name**	
6692	FF218B	.06	1	**Plate, trade mark**	
6693	FF218C	.06	1	**Plate, U. S. patent**	
				STANDARD PARTS FOR NAME PLATE GROUP	
7743	.....	.001	12	**Pin, escutcheon (4) each used on 6691, 6692 and 6693 plates)**	No. 11 x 1/2"
55947	.....	.03	2	**Rivet, round head, structural (On Ordnance Department plate)**	1/4" x 1 3/4"
				PINTLE GROUP Illustrated on pages 163, 164 and 165	
7671	.....	...	1	**Pintle assembly (front), consisting of 1—7198, 1—7668, 3—10419, 1—7667, 1—6737, 1—6736, 1—6735, 1—7666, 1—4605, 1—7665, 3—53174, 1—53136, 3—53504, 1—53536, 1—53563 and 1—56425**	
7198	FF216A	63.60	1	**Pintle**	
7668	FF217C	9.13	1	**Pintle housing**	
10419	FF217D	1.35	3	**Pintle housing bolt**	1" x 3 3/4" S.A.E.
7667	FF215A	10.62	1	**Pintle housing cap**	
6737	AB19B	1.12	1	**Pintle latch**	
6737	AB19D	...	1	**Pintle latch pin**	
6735	AB19C	...	1	**Pintle latch spring**	
7666	FF217B	6.12	1	**Pintle sleeve**	
4605	FF215B	10.25	1	**Pintle spring**	
7665	FF217A	2.37	1	**Pintle spring washer**	
7197	.....	...	1	**Pintle assembly (rear), consisting of 1—7198, 1—7669, 4—53346, 2—53347, 1—7668, 3—10419, 1—7667, 1—6737, 1—6736, 1—6735, 1—7666, 1—4605, 1—7665, 6—53173, 3—53174, 1—53136, 9—53504, 1—53536, 1—53563 and 1—56425**	
7198	FF216A	63.60	1	**Pintle**	
6769	MM90A	...	1	**Pintle bracket**	Cast steel
53346	MM90C	...	4	**Pintle bracket bolt (drilled)**	7/8" x 3" —14 U.S.F.
53347	MM90B	...	2	**Pintle bracket bolt (drilled)**	7/8" x 3 1/4"—14 U.S.F.
7668	FF217C	...	1	**Pintle housing**	

10419	FF217D	...	3	**Pintle housing bolt (drilled)**	1" x 3¾"—14 U.S.F.
7667	FF215A	...	1	**Pintle housing cap**	
6737	AB19B	...	1	**Pintle latch**	
6736	AB19D	...	1	**Pintle latch pin**	1" x 2⅝"
6735	AB19C	...	1	**Pintle latch spring**	
7666	FF217B	...	1	**Pintle sleeve**	
4605	FF215B	...	1	**Pintle spring**	
7665	FF217A	...	1	**Pintle spring washer**	
				STANDARD PARTS FOR PINTLE GROUP	
53173	.....	...	6	**Nut, castle (On pintle bracket bolts)**	⅞"—14 U.S.F.
53174	.....	...	6	**Nut, castle (On pintle housing bolts)**	1"—14 U.S.F.
53136	.....	...	2	**Nut, semi fin. hex. (slotted) (On ends of pintles)**	1⅝"—5½ U.S.F.
53536	.....	...	2	**Pin, split (In pintle latch pins)**	3/16" x 1"
53504	.....	...	12	**Pin, split (In bracket and housing bolts)**	⅛" x 1¾"
53563	.....	...	2	**Pin, split (In pintles)**	7/32" x 3"
56425	8B	...	2	**Pipe plug (In pintle housing)**	⅜"
				PLATFORM GROUP	
8124	GM7B	18.00	1	**Platform (left)**	⅛" T.
8112	GM7A	18.00	1	**Platform (right)**	⅛" T.
8975	GM8A	5.50	1	**Platform angle (front)**	1½" x 1⅛" x ¼" x 41¾"
8969	GM9C	2.25	4	**Platform angle support**	1½" x 1½" x ⅛" x 27¾"
8973	GM8C	1.75	1	**Platform door**	
8974	GM8D	.12	1	**Platform support (center, left)**	1½" x 1½" x ¼"
8972	GM9G	.12	1	**Platform support (center, right)**	1½" x 1½" x ¼"
8122	GM9B	.12	1	**Platform support (rear)**	1½" x 1½" x ¼"
8123	GM9E	5.00	1	**Platform flywheel cover plate**	
8117	GM7C	13.00	1	**Platform flywheel hood**	
8120	.....	.06	1	**Platform flywheel hood angle**	1" x 1" x ⅛"
8971	GM7D	1.12	1	**Speedometer guard**	
				STANDARD PARTS FOR PLATFORM GROUP	
8970	GM8B	1.25	1	**Hinge (standard narrow butt) (On platform door)**	3"
53106	.....	.03	19	**Nut, semi fin. hex. (On various cap screws in assembly)**	⅜"
55987	.....	.05	2	**Rivet (button head structural) (In right center support)**	⅜" x 1¼"
7331	.....	.04	1	**Rivet (button head tank) (In front angle support)**	⅜" x 1"
59988	.....	.05	3	**Rivet (countersunk head) (In front angle support)**	⅜" x 1¼"
10510	.....	.007	3	**Rivet (oval head tank) (In door hinge)**	¼" x ⅜"
7068	.....	.008	3	**Rivet (oval head tank) (In door hinge)**	¼" x ½"
50539	GM9D	.05	12	**Screw, cap, hex. head (8 used in front angle, 4 in angle support)**	⅜" x 1" —16 U.S.F.
50540	GM9F	.06	5	**Screw, cap, hex. head (4 used in flywheel hood, 1 in right center support)**	⅜" x 1¼"—16 U.S.F.
50542	GM7E	.08	2	**Screw, cap, hex. head (In speedometer guard)**	⅜" x 1¾"—16 U.S.F.
53472	.....	.004	19	**Washer, lock (plain heavy) (On various cap screws in assembly)**	⅜"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				RADIATOR (See Water Circulating Group)	
				ROLLER FRAME GROUP	
				Illustrated on pages 136, 138, 140, 143, 144 and 145	
9882	WK125	...	1	**Roller frame assembly, consisting of 1—10640, 1—10639, 1—7036, 1—7110, 36—53300, 2—7037, 2—7038, 2—7043, 2—7044, 2—7130, 2—6338, 4—4314, 8—7819, 4—8900, 2—7041, 1—6532, 2—4120, 4—1900, 4—1899, 2—7042, 2—7039, 2—6921, 6—10303, 2—8463, 8—53298, 8—53304, 8—10158, 16—7128, 12—8158, 8—6545, 48—53299, 92—8534, 10—54236, 2—53462, 68—53170, 16—53155, 8—53501 and 68—53502**	
10640	WK133A	...	1	**Roller frame casting (front, left)**	Cast steel
10639	WK135A	...	1	**Roller frame casting (front, right)**	Cast steel
7036	WK129A	174.00	1	**Roller frame casting (rear, left)**	Cast steel
7110	WK131A	174.00	1	**Roller frame casting (rear, right)**	Cast steel
53300	WK129B	.31	44	**Roller frame casting bolt (drilled)**	5/8" x 2 1/4"—18 U.S.F.
7037	WK128A	59.00	2	**Roller frame channel, inner left and outer right (front)**	6" channel—13# ft., 56 1/2" long
7038	WK128C	59.00	2	**Roller frame channel, inner right and outer left (front)**	6" channel—13# ft., 56 1/2" long
7034	WK128D	35.00	2	**Roller frame channel, inner left and outer right (rear)**	6" channel—13# ft., 32 1/8" long
7044	WK128B	35.00	2	**Roller frame channel, inner right and outer left (rear)**	6" channel—13# ft., 32 1/8" long
7130	.....	206.00	2	**Roller frame blank sprocket assembly, consisting of 1—6333, 2—7054, 1—6368, 2—6371, 2—8775, 4—6922, 4—6345, 4—53501 and 1—56425**	
6333	WK124A	183.00	2	**Roller frame blank sprocket**	1/2" x 4"
7054	WK130A	1.56	4	**Roller frame blank sprocket gudgeon**	Cast steel
6368	WK124B	13.25	2	**Roller frame blank sprocket bearing**	Hyatt No. 49480
6371	WK127E	.25	4	**Roller frame blank sprocket gudgeon pin**	2 1/4" x 16 3/4"
8775	.....	.87	4	**Roller frame blank sprocket washer (dust) assembly, consisting of 1—6350, 1—6346 and 1—6347**	
6350	WK142F	.03	1	**Roller frame blank sprocket washer, dust**	Leather
6346	WK143A	1.12	1	**Roller frame blank sprocket washer retainer, dust**	No. 12—5 1/2" x 5 1/2"
6347	WK142C	1.25	1	**Roller frame blank sprocket washer retainer, dust**	No. 12—4 3/4" x 4 1/2"
6922	WK123A	.87	4	**Roller frame blank sprocket washer, thrust, inner**	Steel
6345	WK124C	1.00	4	**Roller frame blank sprocket washer, thrust, outer**	Steel
6338	WK126A	50.00	2	**Roller frame blank sprocket fork**	Cast steel
4314	WK132D	2.37	4	Roller frame blank sprocket fork clamp	
7819	WK134B	.12	8	Roller frame blank sprocket fork clamp bolt	5/8"—18 U.S.F. x 5 3/4"
8900	WK136A	1.00	4	Roller frame blank sprocket mud guard	
				Roller Frame Equalizer Bar (See Equalizer Bar Group)	
7041	WK127C	6.87	2	Roller frame pin (for slide link)	1 7/16" x 14 1/2"

6532	WK127A	76.00	1	**Roller frame shaft**	$2\frac{3}{16}$" x $74\frac{1}{2}$"
4120	WK132C	.37	2	Roller frame shaft washer	
1900	WK132A	6.00	4	**Roller frame spring, core**	$\frac{5}{8}$" square stock
1899	WK132B	10.50	4	**Roller frame spring, outer**	$\frac{3}{4}$" square stock
7042	WK126C	14.50	2	Roller frame thrust rod	$1\frac{3}{4}$" x $24\frac{1}{4}$"
7039	WK126B	2.25	2	Roller frame thrust rod nut	$1\frac{3}{4}$" hex.
6921	WK127B	2.31	2	Roller frame thrust rod pin	$1\frac{7}{16}$" D. x $5\frac{3}{16}$" long
10303	.....	...	6	**Roller frame track supporting roller assembly (front), consisting of 2—10283, 1—10282, 1—10284, 1—10296, 2—11273, 1—11611, 1—54236, 2—53174, 2—53505 and 2—53480**	
10283	WK138B	...	6	**Roller frame track supporting roller**	Chilled cast
10282	WK139A	...	12	**Roller frame track supporting roller bracket**	
10284	WK138A	...	6	**Roller frame track supporting roller shaft**	$1\frac{1}{4}$" x $10\frac{15}{16}$"
10296	WK138C	...	6	**Roller frame track supporting roller spacer**	Cast iron
11273	WK138D	...	12	**Roller frame track supporting roller spacing washer**	
11611	WK140B	...	6	**Roller frame track supporting roller spacing washer**	
8158	.....	...	12	**Roller Frame Track Supporting Roller, Rear (See Track Supporting Roller Group)**	
6377	WK143C	...	12	**Roller frame truck wheel assembly, consisting of 1—6377, 2—7769, 1—6534, 2—6535, 1—6349, 2—8775, 2—6351, 2—6348 and 1—56425**	
7769	WK142A	...	24	**Roller frame truck wheel, double flanged**	Semi steel
6534	WK142D	...	12	**Roller frame truck wheel bearing**	Hyatt No. 49400
6535	WK142E	...	24	**Roller frame truck wheel bearing spacing strip**	
6349	WK143D	...	12	**Roller frame truck wheel bearing spacing strip washer**	
6545	WK143E	15.00	8	**Roller frame truck wheel gudgeon**	2" x $16\frac{1}{4}$"
53299	WK143F	.29	48	**Roller frame truck wheel gudgeon bracket**	Cast steel
8775	.....	.87	24	**Roller frame truck wheel gudgeon bracket bolt (drilled)**	$\frac{5}{8}$"—18 U.S.F. x 2"
6350	WK142F	.03	24	**Roller frame truck wheel washer (dust) assembly, consisting of 1—6350, 2—7769, 1—6346, 1—6347 and 1—56425**	
6346	WK143A	1.12	24	**Roller frame truck wheel washer, dust**	
6347	WK142C	1.25	24	**Roller frame truck wheel washer retainer, dust**	No. 12—$5\frac{1}{2}$" x $5\frac{1}{2}$"
6351	WK142B	.87	24	**Roller frame truck wheel washer retainer, dust**	No. 12—$4\frac{3}{4}$" x $4\frac{3}{4}$"
6348	WK143B	1.12	24	**Roller frame truck wheel washer, thrust (inner)**	Steel
8534	WK127D	.06	92	**Roller frame truck wheel washer, thrust (outer)**	Steel
				Roller frame washer, channel and 1 beam	$\frac{5}{8}$"
				STANDARD PARTS FOR ROLLER FRAME GROUP	
54236	9B	.25	16	**Grease cup (plain compression) (6 on supporting roller brackets, 10 on roller frame shaft)**	No. 1 x $\frac{1}{4}$"
53462	.....	1.00	2	Nut, jam, hex. (On thrust rods)	$1\frac{3}{4}$"—5 U.S.F.
53174	.....	...	12	**Nut, semi fin. hex. (castle) (On supporting roller shafts)**	1"—14 U.S.F.
53170	.....	.16	92	Nut, semi fin. hex. (castle) (On gudgeon bracket and top casting bolt)	$\frac{5}{8}$"—18 U.S.F.
53155	.....	.12	16	Nut, semi fin. hex. (On blank sprocket fork bolts)	$\frac{5}{8}$"—18 U.S.F.
53501	.....	.004	12	Pin, split (In blank sprocket fork bolts and gudgeon pins)	$\frac{1}{8}$" x 1"
53502	.....	.005	92	Pin, split (In gudgeon bracket and top casting bolts)	$\frac{1}{8}$" x $1\frac{1}{4}$"
53505	.....	...	12	**Pin, split (In track supporting roller shafts)**	$\frac{1}{8}$" x 2"
53567	.....	...	4	Pin, split (In thrust rod pins)	$\frac{1}{4}$" x $1\frac{3}{4}$"
53618	.....	...	2	Pin, split (In end of roller frame shaft)	$\frac{1}{2}$" x $3\frac{1}{2}$"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR ROLLER FRAME GROUP—Continued	
53581	.....	...	2	Pin, split (In side link pins)	⅛" x 2"
54343	9F	...	2	Pipe ell, st. (In top castings for roller frame shaft)	¼"
56425	8B	...	14	**Pipe plug (In ends of gudgeons)**	⅜"
				SEAT GROUP Illustrated on page 10	
9870	.....	126.00	1	**Seat assembly**	
8531	.....	37.65	1	**Seat with box**	
10224	.....	2.75	1	**Seat arm rest, center**	
8527	PM25B	4.75	2	**Seat arm rest, end**	
8528	PM23B	8.15	1	**Seat back cushion**	
8530	PM25F	3.15	3	**Seat back cushion supporting iron**	
10460	PM23F	...	1	**Seat block, wood (tool box)**	
10461	PM23H	...	1	**Seat block, wood (tool box) (outer)**	
57087	PM23E	...	8	**Seat coupling bolt (drilled) (seat to fender)**	½" x 1"—20 U.S.F.
8526	.....	7.06	1	**Seat cover, tank**	
8520	.....	3.68	1	**Seat cover, tool box**	
8521	PM26F	.16	2	**Seat cover tool box hinge**	
8529	PM23A	7.00	2	**Seat cushion**	
8522	PM18A	.25	2	**Seat cushion strap (long)**	
8524	PM24D	.31	2	**Seat cushion strap (short)**	
8523	PM25K	.09	2	**Seat cushion strap loop**	
8532	PM23C	...	4	**Seat leg**	
10462	PM20G	...	2	**Seat strip**	
				STANDARD PARTS FOR SEAT GROUP	
53776	PM20H	...	4	**Bolt, carriage (In seat assembly)**	⅜" x 3"
53168	.....	...	8	**Nut, castle (On seat coupling bolts)**	½"—20 U.S.F.
9479	.....	...	4	**Nut, square (hot pressed) (In seat assembly)**	⅜"
53487	.....	...	8	**Pin, split (On seat coupling bolts)**	⅛" x 1"
10480	RH26C	...	4	**Screw wood (flat head) (In tool box, seat blocks)**	No. 14 x 2"
				SPEEDOMETER GROUP	
7371	AM136A	14.19	1	**Speedometer assembly, consisting of 1—7687, 1—8738, 1—7679, 4—7294, 1—7678, 1—7677, 1—7675, 0—10143, 1—7676, 1—7682, 1—7271, 1—7683, 2—50348, 1—53168, 1—53153, 2—7685, 1—7690, 3—53469, 1—53474, 1—53440 and 1—7831**	
7687	.....	4.12	1	**Speedometer bracket**	
8738	AM163F	.001	1	**Speedometer bracket gasket**	
7679	.....	.28	1	**Speedometer bracket plug**	

7294	AM161E	.05	4	**Speedometer** bracket screw, cap (drilled)	⅜"—16 U.S.F. x 1"
7678	.....	3.00	1	**Speedometer** driven gear	¾" rd.
7677	.....	1.75	1	**Speedometer** driven gear shaft	⅝"
7675	.....	.07	1	**Speedometer** driven gear shaft bushing	
				Speedometer Guard (See Platform Group)	
10143	.....	2.00	1	**Speedometer** head (Stewart Warner model **26-J**)	
7682	.....	.13	1	**Speedometer** spiral gear	
7271	AM177C	2.25	1	**Speedometer** spur gear	
7683	.....	.57	1	**Speedometer** spur gear shaft	
7676	.....	.01	1	**Speedometer** spur gear shaft washer	No. 16 Ga. x 7/16 x 1"
				STANDARD PARTS FOR SPEEDOMETER GROUP	
50348	.....	.006	2	**Key, Woodruff (On spur gear shaft**	No. 3
53168	.....	.06	1	**Nut, castle (On spur gear shaft)**	½"—20 U.S.F.
53153	.....	.06	1	**Nut, semi fin. hex. (On spur gear shaft)**	½"—20 U.S.F.
7685	.....	.005	2	**Screw, machine, fillister head (In bracket)**	No. 10—32 x 7/16"
7690	.....	.07	1	**Screw, machine, fillister head (On bracket)**	No. 10—32 x ¾"
53469	.....	.003	3	**Washer, lock, plain heavy (On bracket)**	3/16"
53474	.....	.01	1	**Washer, wrought (On bracket)**	7/16"
7831	AM161E	.005	1	**Wire (On bracket screws)**	No. 16 W.&M. Ga. x 13"
				STEERING CLUTCH GROUP Illustrated on pages 124 and 126	
7200	.....	203.98	2	Steering clutch assembly, consisting of 4—6893, 8—6895, 5—6894, 8—6485, 8—6886, 2—6883, 1—6889, 1—6888, 1—6879, 1—6899, 1—6881, 1—6898, 3—6897, 1—6969, 1—6885, 2—6884, 1—6896, 1—7763, 1—6882, 8—7210, 1—6880, 9—6900, 9—6902, 9—6959, 9—6901, 1—6324, 1—56369, 1—7149, 1—10141, 8—9025, 32—55946, 6—7822, 96—9015, 1—51604, 8—7153, 8—53470 and 1—7823	
6893	HM125B	5.00	8	**Steering clutch disk, driven**	18¼" D. x ⅛" thick
6895	HM123C	.56	16	**Steering clutch disk, driven friction lining**	18⅜" D. x ⅛" thick
6894	HM125A	4.50	10	**Steering clutch disk, driving**	17⅜" D. x ⅛" thick
6485	HM153D	.56	16	**Steering clutch disk, key for housing**	¾" x 9/16" x 2½"
6886	HM153C	.40	16	**Steering clutch disk, key for retainer**	¾" x 9/16" x 2½"
6887	HM152B	.18	4	**Steering clutch dust washer (leather)**	¼" thick x 4" D.
6883	HM152C	.12	4	Steering clutch dust washer retainer	No. 16 U.S. Ga. x 4" D. x 5/16"
6889	HM124C	90.00	2	**Steering clutch housing**	Cast iron
6888	HM125C	6.56	2	**Steering clutch housing dust guard**	Pressed steel
6879	HM152A	.31	2	Steering clutch housing dust guard gasket	
6899	HM124A	41.50	2	Steering clutch pressure ring	Cast iron
6881	HM154C	.87	2	**Steering clutch pressure ring nut**	
11642	HM154E	...	..	Steering clutch pressure ring nut lock screw	⅜" x ⅝"
6898	HM124B	47.50	2	**Steering clutch retainer**	
6897	HM153A	.12	6	Steering clutch retainer dowel pin	⅝" x 2 1/16"
6969	HM153B	.25	2	**Steering clutch retainer key**	⅝" x ⅝"
6885	HM151C	.37	2	**Steering clutch retainer (or shaft) nut**	2¾" hex. x ½" long

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STEERING CLUTCH GROUP—Continued	
6884	HM152D	.06	2	**Steering clutch retainer (or shaft) washer, lock**	
				Steering Clutch Shaft (See Transmission Group)	
6896	HM154A	4.00	2	**Steering clutch shifter ring**	
7763	HM154D	2.00	2	**Steering clutch shifter ring bearing**	Gurney No. 212
6882	HM154B	.87	2	**Steering clutch shifter ring cover**	
10102	HM153E	...	2	Steering clutch shifter ring cover gasket	
7210	HM151B	.009	16	Steering clutch shifter ring cover screw cap	¼"—20 U.S.F. ½"
6880	HM150C	.28	2	**Steering clutch shifter ring spacer**	
6900	HM123D	.81	18	**Steering clutch spring**	
6902	HM150B	.06	18	**Steering clutch spring retainer**	
6959	HM151F	.05	18	**Steering clutch spring retainer stop**	**⅞" D. x ¼" T.**
6901	HM151D	.37	18	**Steering clutch spring stud**	⅞" x 5 5/16"
6324	HM123B	.37	2	Steering clutch thrust washer	Bronze
10431	HM147A	11.00	1	Steering clutch control column or brake lever bracket	
53302	HM147B	.37	2	Steering clutch control column or brake bolt (drilled)	⅝" x 2¾"—18 U.S.F.
8920	HM142F	.43	2	Steering clutch control column or brake lever bracket stud	⅞"
6910	HM131A	3.12	1	**Steering clutch control column gear segment**	
6915	HM131E	6.00	1	**Steering clutch control column shaft**	1" x 32"
6949	HM144A	.18	1	Steering clutch control column sleeve	
7226	HM144D	.31	2	Steering clutch control column sleeve bushing	
6909	HM130A	3.12	1	**Steering clutch control lever, hand**	
6911	HM131B	7.00	1	**Steering clutch control shaft**	1" x 33⅝"
6904	HM133C	3.00	2	Steering clutch control shaft bracket	
9491	HM133D	.24	4	Steering clutch control shaft bracket screw, cap	⅝"—11 U.S.F. x 1½"
8844	HM146A	2.00	1	**Steering clutch control shaft crank, slotted**	
6913	HM131D	4.00	1	**Steering clutch control shaft gear segment**	11 tooth
6947	HM143E	5.00	1	Steering clutch control shaft gear segment pressure bolt (drilled)	
6946	HM143B	.06	1	Steering clutch control shaft washer	1⅜" D. x ⅛" T.
6976	HM150A	.12	2	**Steering clutch control shifter fork**	
6912	HM132C	2.25	2	Steering clutch control shifter fork pin	⅞" x 13"
6916	HM135C	1.75	4	**Steering clutch control shifter fork screw pin**	
6972	HM135D	.06	4	**Steering clutch control shifter fork screw pin lock washer**	
6914	HM132B	3.50	4	**Steering clutch control shifter rod (left)**	
6906	HM143C	.87	1	**Steering clutch control shifter rod (right)**	
6908	HM143A	.25	2	**Steering clutch control shifter rod end**	
6907	HM135E	.28	4	**Steering clutch control shifter rod end pin**	⅞" x 2⅝"
				STANDARD PARTS FOR STEERING CLUTCH GROUP	
7149	HM157B	.13	2	Grease cup, plain (For shifter rings)	No. 0 x ⅛"
50361	HM131C	.02	4	Key, Woodruff (In control crank, gear segments and hand lever)	No. 15
53172	.....	.21	3	Nut, castle (On steering column and control shafts)	¾"—16 U.S.F.

53170	.....	.16	2	Nut, castle (On steering column bracket)	5/8"—18 U.S.F.
53173	.....	.28	2	Nut, castle (On steering column bracket studs)	7/8" S.A.E.
53157	.....	.19	4	Nut, semi-fin. hex. (On shifter rods, column shaft and gear segment pressure bolt)	3/4"—16 U.S.F.
53501	.....	.004	4	Pin, split (In control shaft, column shaft and column bracket)	1/8" x 1"
53502	.....	.005	2	Pin, split (In column bracket bolts)	1/8" x 1 1/4"
53503	.....	.006	5	Pin, split (In rod end pins)	1/8" x 1 1/2"
54315	8C	...	2	Pipe ell, 45° (In shifter rings)	1/8"
56523	8E	...	2	Pipe nipple (In above elbows)	1/8" x 2 1/2"
9025	HM123A	.25	16	Plug, Hubbard (In clutch housings)	2" D.
10218	.....	.02	32	Rivet, tank countersunk head (In clutch housing keys)	1/4" x 1 3/8"
10217	.....	...	32	Rivet, tank oval head (In clutch retainer keys)	1/4" x 1 3/8"
7822	.....	.001	12	Rivet, tank oval head (In clutch housing dust guards)	1/8" x 3/8"
9015	HM152E	.02	192	Rivet, tubular copper (In clutch disk linings)	3/16" x 1/2"
7153	HM151A	.01	16	Screw, cap hex. head (Hold dust guards to housings)	1/4" x 1/2"—20 U.S.F.
53470	.....	.004	16	Washer, lock, plain heavy (On above screws)	1/4"
7823	HM151E	.002	2	Wire (On shifter ring cover screws)	No. 18 W.&M. Ga. x 18"
				TRACK GROUP	
				Illustrated on pages 151, 152 and 153	
8384	.....	530.15	2	**Track assembly, consisting of 29—8162, 29—7280, 29—7281, 29—8324, 29—3247, 29—7006, 29—2258, 29—53110, 29—53501, 29—53536 and 58—53476**	15"
8162	WK121D	5.50	58	**Track grouser**	Cast steel
7280	WK121A	.62	58	**Track grouser bolt, eye**	5/8" x 2"
7281	WK121C	.24	58	**Track grouser bolt rivet**	No. 11 U.S.Ga.
8382	WK121B	.05	58	**Track grouser bolt washer**	Cast steel
8324	WK119A	39.00	58	**Track link**	1 1/4" diameter, case hardened steel
3247	WK120C	3.25	58	**Track pin**	1/2" x 4"
7006	WK120B	.25	58	**Track pin keeper**	Case hardened steel
2258	WK120A	2.58	58	**Track space block**	
				STANDARD PARTS FOR TRACK GROUP	
53110	.....	.12	58	**Nut, semi fin. hex. (On grouser eye bolts)**	5/8"—11 U.S.F.
53501	.....	.004	58	**Pin, split (In grouser eye bolts)**	1/8" x 1"
53536	.....	.01	58	**Pin, split (In grouser eye bolt rivets)**	3/16" x 1"
53476	.....	.03	58	**Washer, lock, plain heavy (On grouser eye bolts)**	5/8"
				TRACK IDLER (See Roller Frame Group)	
				TRACK OILER GROUP	
				Illustrated on page 154	
7643	.....	29.50	1	Track oiler assembly, consisting of 4—7639, 3—7638, 1—9967, 1—7642, 1—1194, 1—7612, 1—10766, 1—9828, 2—53773, 2—9873, 2—9872, 2—9969, 4—9755, 2—53106, 4—53153, 2—53108, 2—9883, 2—9970, 2—7183,	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				TRACK OILER GROUP—Continued	
				2—9969, 1—9968, 2—56373, 8—54293, 3—54243, 3—56553, 2—56605, 6—56631, 2—9971, 1—56425, 1—56433, 6—7828, 8—8897, 3—54914, 2—56399, 2—53682, 2—53472, 6—53474 and 10—10345	
3534	NM80K	.31	4	Track oil pipe cap (drilled)	⅜"
7638	WM80F	...	3	Track oil pipe clamp	½" x 4¾"
9967	WM80E	...	1	Track oil pipe hanger	
7642	.....	18.00	1	**Track oil tank assembly**	
1194	WM78C	...	1	**Track oil tank filler flange**	
7612	WM80G	...	1	**Track oil tank outlet flange**	
10766	.....	...	1	**Track oil tank filler flange plug**	
9828	.....	.15	1	**Track oil tank strap assembly**	
10345	WM80H	...	4	Track oil tank strap washer	
				STANDARD PARTS FOR TRACK OILER GROUP	
53773	WM72E	.08	2	Bolt, carriage (On oil pipe hanger)	⅜" x 1½"—16 U.S.F.
9872	WM80C	.001	2	Felt strip (Under tank)	⅜" x 1½" x 10
9873	WM80D	.001	2	Felt strip (Between tank and straps)	⅜" x ½" x 17"
9969	WM80A	.50	2	**Hose (In pipe line)**	⅝" x 23"
9755	WM80B	.004	4	**Hose clamp (On above hose)**	For ⅝" 3-ply hose
53106	.....	.03	2	Nut, semi fin. hex. (On hanger bolts)	⅜"—16 U.S.F.
53153	.....	.06	4	Nut, semi fin. hex. (On tank straps)	½"—20 U.S.F.
53108	.....	.06	2	Nut, semi fin. hex. (On oil pipe clamps)	½"—13 U.S.F.
9883	WM79E	.10	2	**Pipe (Lower end of hose)**	⅜" x 2"
9970	WM79B	.20	2	**Pipe (Upper end of hose)**	⅜" x 4"
7183	WM79F	.27	2	**Pipe (Clamped to roller frame tops)**	⅜" x 5½"
9966	WM79C	.50	2	**Pipe (Between hose and roller frame)**	⅜" x 11¾"
9968	WM79D	1.50	1	**Pipe (Bottom of tank to left side of tractor)**	⅜" x 28¾"
56373	6E	.09	2	**Pipe coupling (In pipe line)**	⅜"
54293	6C	.01	10	**Pipe ell (In pipe line)**	⅜"
54243	7G	.04	3	**Pipe nipple (In pipe line)**	⅜" x 1"
56553	7F	.15	3	**Pipe nipple (In pipe line)**	⅜" x 3"
56605	7E	.16	2	**Pipe nipple (In pipe line)**	⅜" x 4"
56631	7H	.20	6	**Pipe nipple (Discharge nipples)**	⅜ x 6"
9971	WM79A	.33	2	**Pipe nipple (Upper of globe valves)**	⅜" x 6½"
56425	8B	...	1	**Pipe plug (Bottom of tank)**	⅜"
54914	6F	.06	3	**Pipe tee (In pipe line)**	⅜"
56399	7A	.12	2	**Pipe union (In pipe line)**	⅜"
7828	.....	...	6	Rivet, oval head tank (In outlet flange)	½" x ½"
8897	.....	...	8	Rivet, oval head, tank (In filler flange)	3/16" x ½"
53682	9D	.50	2	**Valve, globe (In pipe line)**	⅜"
53472	.....	.004	2	Washer, lock, plain heavy (On hanger bolts)	⅜"
53474	.....	.01	6	Washer, lock, plain heavy (On tank straps and clamp bolts)	½"

				TRACK SUPPORTING ROLLER GROUP
				Illustrated on page 145
				Track Supporting Roller, Front (See Roller Frame Group)
10304	.....	...	4	**Track supporting roller assembly, rear, consisting of 2—10283, 4—10286, 4—7128, or 4—10311, 1—10284, 1—10296, 2—11273, 1—54236, 4—53170, 2—53174, 4—53502 and 2—53505**
10283	WK138B	...	8	**Track supporting roller** — Chilled cast
10286	WK139B	...	4	**Track supporting roller bracket**
7128	WK140A	...	8	**Track supporting roller bracket stud (Used on left side of tractor)** — 5/8" x 2"
10311	WK138E	...	8	**Track supporting roller bracket stud (Used on right side of tractor)** — 5/8" x 2 5/8"
10284	WK138A	...	4	**Track supporting roller shaft** — 1 1/4" x 10 15/16"
10296	WK138C	...	4	**Track supporting roller spacer** — C.I.
11273	WK138D	...	8	**Track supporting roller spacing washer**
				STANDARD PARTS FOR TRACK SUPPORTING ROLLER GROUP
54236	9B	...	4	**Grease cup, compression (Screwed in brackets)** — No. 1 x 1/4"
53170	.....	...	16	**Nut, semi fin. hex. (castle) (On bracket studs)** — 5/8"—18 U.S.F.
53174	.....	...	8	**Nut, semi fin. hex. (castle) (On roller shafts)** — 1"
53502	.....	...	16	**Pin, split (In bracket studs)** — 1/8" x 1 1/4"
53505	.....	...	8	**Pin, split (In roller shafts)** — 1/8" x 2"
				TRANSMISSION GROUP
				Illustrated on pages 114, 116, 117, 118, 120, 121 and 122
7199	.....	2600.00	1	**Transmission complete**
6837	AM175A	12.62	1	**Transmission bevel pinion** — 17 tooth
7762	AM156E	5.50	1	Transmission bevel pinion bearing — Hyatt No. 56406
6868	AM174A	32.50	1	**Transmission bevel pinion bearing cap**
6964	AM168B	.37	4	**Transmission bevel pinion bearing cap stud** — 3/4" x 4"
6596	AM155E	.002	1	Transmission bevel pinion bearing dowel pin — 3/8" x 5/8"
6830	AM164B	.93	1	**Transmission bevel pinion key** — 1/2" x 1/2" x 4"
7774	AM158B	2.25	1	**Transmission bevel pinion thrust bearing S.K.F.** — No. 913
6279	AM162A	3.00	1	**Transmission bevel pinion thrust bearing washer** — 5/8" T. x 6 1/8"
6852	AM171B	19.50	1	**Transmission bevel pinion shaft** — 2 5/8" x 21 1/2"
7760	AM156F	1.81	1	**Transmission bevel pinion shaft bearing** — Hyatt No. 16326
6832	AM165F	.10	1	**Transmission bevel pinion shaft nut** — 1 7/16" x 3/8"
7293	AM169B	.01	1	Transmission bevel pinion shaft nut lock washer — 18 U.S.Ga. x 1 3/4" x 2 1/8"
7818	AM156G	.01	1	Transmission bevel pinion shaft bearing race holding screw — Hyatt No. 3974
6778	AM169C	.43	1	**Transmission bevel pinion shaft bearing washer** — 1/4" T. x 4 1/2" D.
6599	AM157D	.003	3	**Transmission bevel pinion shaft shim (adjusting)** — .005" x 4" D.
6597	AM157E	.01	3	**Transmission bevel pinion shaft shim (adjusting)** — 28 U.S.Ga. x 4" D.
6598	AM157F	.05	1	**Transmission bevel pinion shaft shim (adjusting)** — 22 U.S.Ga. x 4"
6236	AM176D	11.50	1	**Transmission bevel pinion shaft spur gear (sliding)** — 19 tooth
6237	AM176B	21.93	1	**Transmission bevel pinion shaft spur gear (sliding)** — 31 tooth
6856	AM153B	.06	1	**Transmission bevel pinion shaft thrust button**
7106	AM153C	.002	1	Transmission bevel pinion shaft thrust button pin — 1/8" x 3/4"
6833	AM165E	.03	1	**Transmission bevel pinion shaft washer** — 2" D. x 1/8" T.

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				TRANSMISSION GROUP—Continued	
6303	AM179A	640.00	1	**Transmission case (lower)**	Cast iron
7002	AM180A	420.00	1	**Transmission case (upper)**	Cast iron
8289	AM160E	.63	8	Transmission case bolt	¾" x 2¾"—16 U.S.F.
53416	AM180B	2.75	2	Transmission case bolt	1¼" x 3¼"—12 U.S.F.
7005	AM150B	2.31	1	**Transmission case breather**	
6344	AM163D	9.12	1	**Transmission case cover (top)**	
7105	AM163C	.09	1	Transmission case cover gasket	
6343	AM168A	4.68	1	**Transmission case cover plate (end)**	
6955	AM168D	.06	1	Transmission case cover plate gasket (end)	
7107	AM160C	.18	4	Transmission case cover plate screw	
6927	AM173A	16.50	2	**Transmission case drive sprocket shaft cap**	
10346	AM161D	...	4	Transmission case drive sprocket shaft cap shim	
6963	AM178G	.68	8	**Transmission case drive sprocket shaft cap stud**	⅞" x 5"—14 U.S.F.
7994	AM165B	.18	2	Transmission case eye bolt	
9997	AM160B	.001	1	**Transmission case gasket**	
9996	AM160F	.002	2	**Transmission case gasket**	
7215	AM178E	.25	6	**Transmission case stud**	¾" x 3"
6245	AM159A	37.50	1	**Transmission counter shaft (Integral, with 12 and 16 tooth gears)**	
7764	AM156D	3.18	2	**Transmission counter shaft bearing**	Hyatt No. 27032
7203	AM167B	6.50	1	**Transmission counter shaft bearing cap (front)**	
8737	AM163G	.001	1	Transmission counter shaft bearing cap gasket	
11188	AM157G	...	1	Transmission counter shaft bearing cap shim	
6869	AM166A	34.00	1	**Transmission counter shaft bearing cap**	
7212	AM160C	.06	7	Transmission counter shaft bearing cap screw, cap	½" x 1"—13 U.S.F.
6872	AM178A	.40	2	**Transmission counter shaft bearing cap stud**	⅝" x 5¾"
6873	AM178H	1.00	2	**Transmission counter shaft bearing cap stud**	⅝" x 7"
6874	AM178K	.15	1	**Transmission counter shaft bearing cap stud**	⅝" x 2¾"
6875	AM178C	.25	2	**Transmission counter shaft bearing cap stud**	⅝" x 3¾"
6968	AM169A	.15	1	Transmission counter shaft bearing washer	
6627	AM169E	.50	3	**Transmission counter shaft bearing washer**	Hyatt No. 18
6596	AM155E	.006	1	Transmission counter shaft bearing dowel pin	⅜" x ⅝"
6353	AM164E	1.00	1	**Transmission counter shaft key**	½" x ½" x 7¾"
6238	AM176C	13.81	1	**Transmission counter shaft spur gear**	28 tooth
6240	AM176A	13.37	1	**Transmission counter shaft spur gear**	23 tooth
7136	AM167C	2.25	1	**Transmission counter shaft thrust collar**	
11098	AM152C	12.50	1	**Transmission coupling (female half)**	
7762	AM156E	5.50	2	**Transmission coupling bearing**	Hyatt No. 56406
6864	AM149A	18.00	1	**Transmission coupling bearing cap**	
10893	AM152B	...	1	**Transmission coupling bearing end cap**	
6964	AM168B	.37	4	**Transmission coupling bearing cap stud**	¾" x 4"
6600	AM168C	.01	1	**Transmission coupling bearing collar gasket**	7¼" D. x ½"

10889	AM151D	.56	1	**Transmission coupling bearing collar packing ring**	
10892	AM151C	.37	1	Transmission coupling bearing collar washer (bronze)	
10888	AM151B	...	1	Transmission coupling bearing collar washer (steel)	
10890	AM151A	...	2	Transmission coupling bearing collar washer shim	
10887	AM152A	.006	1	Transmission coupling bearing dowel pin	⅜" x ⅝"
7213	AM163B	.03	1	**Transmission coupling bearing packing (felt)**	⅜" T. x 2" x 11"
6828	AM150A	4.62	1	Transmission coupling bearing spacer	
6356	AM153D	.56	1	Transmission coupling bearing washer	¼" T. x 4¾" D.
6280	AM153A	.43	1	**Transmission coupling equalizer ring**	
6831	AM164D	1.00	1	**Transmission coupling key**	½" x ½" x 4¾"
6841	AM171A	28.00	1	**Transmission coupling spur gear and shaft**	24 tooth
6595	AM153G	.02	1	Transmission coupling spur gear and shaft dowel pin	¼" x ¾"
6352	AM160D	.003	1	Transmission coupling spur gear and shaft washer (lock)	
6357	AM153E	.06	1	Transmission coupling spur gear and shaft washer (end)	
6876	AM172A	4.50	1	**Transmission gear shifter fork, high and direct**	
6877	AM172C	4.56	1	**Transmission gear shifter fork, low and reverse**	
6295	AM155A	8.50	2	**Transmission gear shifter shaft**	1 3/16" x 24¾"
6292	AM155B	.05	2	**Transmission gear shifter shaft interlock**	13/16" x ⅞"
7035	AM155C	.06	1	**Transmission gear shifter shaft interlock spring**	
6853	AM159B	45.50	2	**Transmission intermediate shaft**	3¼" x 21⅜"
7762	AM156E	5.50	2	**Transmission intermediate shaft bearing, inner**	Hyatt No. 56406
7761	AM156B	7.00	2	Transmission intermediate shaft bearing, outer	Hyatt No. 57654
7216	.....	.01	4	Transmission intermediate shaft bearing holding screw	
8385	AM163H	.001	10	**Transmission intermediate shaft bearing shim**	No. 32 U.S.Ga.
6623	AM150C	7.75	2	**Transmission intermediate shaft bearing spacer**	
6624	AM155D	.50	4	**Transmission intermediate shaft bearing thrust washer**	
6796	AM169D	1.43	2	**Transmission intermediate shaft bearing washer**	
6794	AM164C	.18	4	**Transmission intermediate shaft key**	⅝" x ⅝" x 3"
6621	AM165D	.50	4	**Transmission intermediate shaft nut**	2 5/16" hex. x ⅝"
6622	AM165C	.10	4	**Transmission intermediate shaft nut lock washer**	No. 18 U.S.Ga. x 3⅜"
6839	AM177B	25.00	2	**Transmission intermediate shaft spur drive pinion**	16 tooth
6840	AM177A	110.00	2	**Transmission intermediate shaft spur gear**	58 tooth
7368	AM144F	.81	1	Transmission oil pipe, intermediate	½" x 15¾"
7369	AM144E	1.12	1	Transmission oil pipe, lower	½" x 17¾"
7365	AM145C	1.18	1	Transmission oil pipe lower brace	
53216	AM145E	.09	2	Transmission oil pipe lower brace bolt (drilled)	⅜"—24 U.S.F. x 1¼"
53219	AM145D	.12	1	Transmission oil pipe lower brace bolt (drilled)	⅜"—24 U.S.F. x 2"
7367	AM144D	.93	1	Transmission oil pipe, top	½" x 15¼"
7363	AM144C	.06	1	Transmission oil pipe, reverse gear	⅛" x 7½"
7362	AM144B	.01	1	Transmission oil pipe cap (drilled)	½"
6973	AM144H	.06	1	Transmission oil pipe cap (drilled and threaded)	½"
9143	AM144A	.31	1	Transmission oil pipe elbow (side outlet)	½"
7299	AM144G	.18	1	Transmission oil pipe ell, st. (drilled)	½"
7300	AM145B	.01	1	Transmission oil pipe gasket	
7301	AM145F	.02	1	Transmission oil pipe washer	
7297	AM145A	.06	2	Transmission oil pipe hook bolt	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				TRANSMISSION GROUP—Continued	
7735	AM148A	5.86	1	**Transmission oil pump assembly, consisting of 1—8879, 1—8880, 1—8881, 1—8882, 1—8887, 1—8891, 1—8889, 1—8888, 1—8903, 1—8884, 1—8886 and 1—8885**	
8879	.....	2.25	1	Transmission oil pump case	
8880	.....	.62	1	Transmission oil pump cover	
8881	.....	.001	1	Transmission oil pump cover gasket	
8883	.....	.06	1	Transmission oil pump cover screw	
8882	.....	.002	1	Transmission oil pump cover washer	
8887	.....	1.25	1	Transmission oil pump drive gear	Carbon steel
8891	.....	.004	1	Transmission oil pump drive gear key	
8889	.....	1.50	1	Transmission oil pump drive gear shaft	
8888	.....	.12	1	Transmission oil pump drive gear shaft bushing (long)	Bronze
8903	.....	.06	1	Transmission oil pump drive gear shaft bushing (short)	Bronze
8884	.....	.12	1	Transmission oil pump idler gear	Bronze
8886	.....	.25	1	Transmission oil pump idler gear shaft	Bronze
8885	.....	.001	1	Transmission oil pump idler gear shaft pin	
7294	AM161E	.04	4	Transmission oil pump screw, cap	⅜" x 1"—16 U.S.F.
6861	AM167D	1.12	1	**Transmission oil pump spur gear**	13 tooth
7366	AM147A	3.25	1	**Transmission oil sump case**	
7364	AM147D	.12	1	Transmission oil sump case gasket	
7298	AM147C	.03	1	Transmission oil sump case screen	
7294	AM161E	.04	8	Transmission oil sump case screw, cap (drilled)	⅜"—16 U.S.F. x 1"
7361	AM147F	.56	1	Transmission oil sump case washer	
6842	AM167A	5.00	1	**Transmission reverse idler pinion**	16 tooth
7767	AM156H	3.50	1	**Transmission reverse idler pinion bearing**	Hyatt No. 27926
6867	AM165A	4.50	1	**Transmission reverse idler pinion shaft**	1½" x 7⅛"
				Transmission Speedometer (See Speedometer Group)	
				Transmission Steering Clutch (See Steering Clutch Group)	
6862	HM126B	.002	1	Transmission steering clutch adjusting nut lock washer	
7772	AM156C	1.00	2	**Transmission steering clutch bearing**	Hyatt No. 56355
7137	AM173B	11.00	2	**Transmission steering clutch bearing cap**	
7214	AM163A	.01	2	**Transmission steering clutch bearing packing (felt)**	⅜" x 1" x 12"
10307	AM161B	...	4	Transmission steering clutch bearing screw	⅜" x ¾"
6380	AM170D	.41	2	Transmission steering clutch bearing washer	¼" T. x 4¾" D.
7135	AM170A	.75	2	**Transmission steering clutch bearing washer**	3/16" T. x 6⅜" D.
6244	AM175B	19.50	2	**Transmission steering clutch spur gear**	21 tooth
6360	AM164A	.21	2	Transmission steering clutch spur gear key	⅝" x ⅝" x 2¾"
6870	AM158A	36.00	1	**Transmission steering clutch shaft**	2¾" x 36¼"
7770	AM156A	4.93	1	**Transmission steering clutch shaft bearing**	Hyatt No. 26632
6850	AM172E	1.43	1	**Transmission steering clutch shaft bearing cage**	
6851	AM172D	6.68	1	**Transmission steering clutch shaft bearing housing**	

6863	AM154B	1.62	1	**Transmission steering clutch shaft bearing housing adjusting nut**	
6848	AM157C	.01	1	**Transmission steering clutch shaft bearing housing shim**	No. 20 U.S. Ga. x 6⅝"
6847	AM157B	.03	1	**Transmission steering clutch shaft bearing housing shim**	No. 28 U.S. Ga. x 6⅝"
6845	AM157A	.006	3	**Transmission steering clutch shaft bearing housing shim**	No. 36 B.&S. Ga. x 6⅝"
6844	AM175C	25.75	1	**Transmission steering clutch shaft bevel gear**	35 tooth
7204	AM178E	.50	2	**Transmission steering clutch shaft bevel gear cap stud**	¾" x 5½"
6871	AM164F	.18	1	**Transmission steering clutch shaft bevel gear key**	⅝" x ⅝" x 2 3/16"
6594	AM164G	.002	2	Transmission steering clutch shaft bevel gear key dowel pin	
6849	AM154A	2.50	1	**Transmission steering clutch shaft collar, thrust**	
7134	AM170B	.06	2	**Transmission steering clutch shaft oil retainer ring (inner)**	
7132	AM170C	1.68	2	**Transmission steering clutch shaft oil retainer ring (outer)**	
7133	AM168E	.01	4	**Transmission steering clutch shaft oil retainer washer**	⅛" T. x 5⅝" D.
7765	AM158C	1.50	1	**Transmission steering clutch shaft thrust bearing**	S.K.F. No. 914
6858	AM154C	1.50	1	**Transmission steering clutch shaft thrust bearing adapter**	No. 11 U.S. Ga. x ⅞" x 15/16"
6846	HM126D	.009	1	Transmission steering clutch shaft thrust collar lock shim	
53225	HM126E	.12	1	Transmission steering clutch shaft thrust collar lock shim bolt	⅜" x 3½"—24 U.S.F.
10607	AM162B	1.00	2	**Transmission steering clutch shaft thrust washer**	3/16" T. x 4½" D.
6857	HM126A	.12	1	Transmission steering clutch shaft thrust washer spacer	

STANDARD PARTS FOR TRANSMISSION GROUP

51243	9G	.15	1	Cock, air, straight nose tee handle (Right front corner of transmission)	⅛"
50351	AM167E	.005	2	Key, Woodruff (In oil pump drive shaft)	No. 6
53166	.....	.03	6	Nut, castle (One used clutch shaft thrust collar; 2 on oil pipe hook bolts; 3 on oil pipe lower brace)	⅜"—24 U.S.F.
53170	.....	.16	7	Nut, castle (Used on counter shaft bearing studs)	⅝"—18 U.S.F.
53172	.....	.21	20	Nut, castle (Six used on transmission case studs; 2 on bevel gear cap studs; 4 on coupling bearing cap stud; 8 used on transmission case bolts)	¾"—16 U.S.F. ⅞"—14 U.S.F.
53173	.....	.28	8	Nut, castle (On drive sprocket shaft cap studs)	1¼"—12 U.S.F.
53176	.....	1.25	2	Nut, castle (On transmission case bolts)	½"—13 U.S.F.
53108	.....	.06	7	Nut, semi fin. hex. (On counter shaft bearing cap screws)	¾"—10 U.S.F.
53111	.....	.11	1	Nut, semi fin. hex. (On lower transmission case)	⅛" x 1¼"
53486	.....	.002	5	Pin, split (Seven used on counter shaft bearing cap screws; 28 used on ¾" bolts and studs)	3/32" x ¾"
53487	.....	.003	2	Pin, split (On oil pipe hook bolts and oil pipe lower brace bolt)	3/32" x 1"
53502	.....	.005	35	Pin, split (One used clutch shaft thrust collar bolt; 1 on speedometer shaft)	3/16" x 2¼"
53538	.....	.01	1	Pin, split (On transmission case bolts)	3/16" x 1½"
53541	.....	.01	2	Pin, split (Oil pump assembly)	No. 8 x 1¾"
50471	AM166B	.04	1	Pin, taper (Oil pump shaft)	No. 6 x 2½"
50449	NM172B	.09	2	Pin, taper (Hold shifter forks to shifter shaft)	⅛"
56447	AM146G	.04	1	Pipe cap (On reverse gear oil pipe)	¼"
9143	AM144A	.04	1	Pipe elbow (On top oil pipe)	½" 45°
54321	AM145G	.04	1	Pipe elbow (On side outlet of pump)	½" 45°
54373	AM146A	.04	2	Pipe ell, st. (On intermediate and top oil pipes)	½" 90°
54347	AM146B	.04	1	Pipe, ell, st. (On lower oil pipe)	½" x 1½"
54257	AM146F	.07	1	Pipe nipple (Right front upper corner transmission)	½" x 1⅛"
54244	AM146E	.05	2	Pipe nipple, close (On oil pump)	

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				STANDARD PARTS FOR TRANSMISSION GROUP—Continued	
7138	AM155F	.53	1	Pipe nipple, close (On breather)	2"
56477	AM146D	.01	1	Pipe nut, lock (On lower oil pipe)	½"
56433	6D	...	1	Pipe plug (Rear end of lower transmission case)	1¼"
56401	AM146C	.60	1	Pipe union (On intermediate oil pipe)	½"
7825	.....	.001	12	**Rivet, oval head tank (On steering clutch oil retainer washer)**	⅛" x ¾"
50613	AM179B	.67	1	Screw, cap hex. head (On lower transmission case)	¾" x 3½"—10 U.S.F.
52860	AM153F	.10	1	Screw, cap hex. head (On spur gear coupling end washer)	½" x 1"—20 U.S.F.
50528	AM168B	.02	1	Screw, cap (On steering clutch adjusting nut washer)	5/16" x ¾"—18 U.S.F.
50562	AM163E	.09	12	Screw, cap (On transmission case top cover)	½" x ¾"—12 U.S.F.
50563	AM168B	...	1	Screw, cap (On transmission case end cover)	½" x 1"—13 U.S.F.
52077	AM166C	.25	1	Screw, set, square head, cone point (On counter shaft bearing cap)	½" x 1¾"—13 U.S.F.
51602	AM172F	.01	1	Screw, set, headless, cup point (On clutch shaft center bearing cage)	¼" x ½"—20 U.S.F.
53471	.....	...	1	Washer, lock (plain heavy) (Drive sprocket shaft cap stud)	5/16"
53474	.....	.01	13	Washer, lock (plain heavy) (On transmission case top and end cover)	½"
7832	AM147E	.001	2	Wire (In oil pump cap screws)	No. 16 W.&M. Ga. x 5"
7833	AM147B	.002	1	Wire (For oil pump case cap screws)	No. 16 W.&M. Ga. x 17"
10339	AM178	...	2	Wire (For drive sprocket cap studs)	No. 12 W.&M. Ga. x 28"
				WATER CIRCULATING GROUP Illustrated on pages 64 and 66	
8980	.....	77.48	1	**Water circulating pump and idler assembly, consisting of 1—8947, 1—8959, 1—8960, 1—8957, 1—8911, 1—8956, 1—8955, 2—11193, 1—9975, 1—10297, 1—8958, 1—8923, 1—8917, 1—2151, 2—5316, 1—10171, 1—8912, 1—8924, 1—8922, 1—8948, 1—1640, 1—8965, 1—8963, 2—54267, 1—54289, 1—7149, 1—8976, 1—8967, 1—54254, 8—53153, 2—53155, 1—53142, 1—7155, 1—53501, 2—53566, 1—53569, 1—50427, 1—50428, 1—9973, 1—9974, 2—56421, 14—50982, 6—50529, 2—54487, 1—51308, 2—53470 and 4—53474**	
8947	NM99A	26.00	1	**Water circulating pump bracket**	
8959	NM96E	.11	4	**Water circulating pump bracket stud**	
8960	NM96D	2.50	1	**Water circulating pump bushing (front)**	
8957	NM97D	.37	1	**Water circulating pump bushing (rear)**	
8911	NM95A	12.00	1	**Water circulating pump case**	
8956	NM97C	...	1	**Water circulating pump case gasket**	
8955	NM97B	.68	1	**Water circulating pump gland**	½" x 3"
11193	NM91D	...	2	**Water circulating pump gland cap screw (special)**	
10297	NM92F	3.25	1	**Water circulating pump idler pulley**	
8958	NM92D	.18	1	**Water circulating pump idler pulley adjusting screw pin**	Bronze
8923	NM93F	1.00	1	**Water circulating pump idler bushing**	
8917	NM90A	1.00	1	**Water circulating pump idler pulley shaft**	
2151	NM92E	.31	1	**Water circulating pump idler pulley spring**	

5316	WM92A	.20	2	**Water circulating pump idler pulley spring seat**	
10171	NM92C	...	1	**Water circulating pump idler pulley spring seat nut**	
8912	NM98A	8.87	1	**Water circulating pump idler pulley yoke**	
8924	NM92A	1.50	1	**Water circulating pump idler pulley yoke adjusting rod**	
8922	NM94A	1.56	1	**Water circulating pump idler pulley yoke shaft**	
8948	NM93A	8.37	1	**Water circulating pump pulley**	
1640	NM97A	2.37	1	**Water circulating pump runner**	
8965	NM96A	2.62	1	**Water circulating pump runner shaft**	
8963	NM96B	.25	1	**Water circulating pump runner shaft collar**	
8377	.....	346.04	..	**Water Circulating Pump Belt (See Fan Group)**	
6826	NM83A	26.50	1	**Water circulating system radiator assembly, consisting of 1—6826, 1—6825, 1—6991, 1—9867, 1—7028, 1—7029, 1—7026, 1—7027, 2—6823, 4—8921, 1—5551, 1—6979, 1—9976, 1—10665, 1—10416, 1—10411, 6—7031, 2—8381, 28—8579, 28—1342, 28—3817, 58—7016, 4—4505, 2—3453, 1—7003, 8—53170, 4—53172, 8—53149, 28—53106, 1—53501, 12—53502, 2—50446, 4—7775, 4—51031, 1—51032, 8—50799, 1—50563, 2—50592 and 4—53476**	
6825	NM84B	26.50	1	**Water circulating system radiator column (left)**	
6991	NM73A	9.00	1	**Water circulating system radiator column (right)**	
9867	NM73	.74	1	**Water circulating system radiator fan housing**	
7028	NM82H	1.25	1	**Water circulating system radiator fan housing wire**	
7029	NM82K	.25	1	**Water circulating system radiator filler cap**	
7026	NM82F	.03	1	**Water circulating system radiator filler cap clamp**	
7027	NM82G	.25	1	**Water circulating system radiator filler cap gasket**	
6823	NM82E	4.81	2	**Water circulating system radiator filler cap lock screw**	
8921	NM86B	.25	4	**Water circulating system radiator foot**	
5551	NM84A	58.50	1	**Water circulating system radiator foot stud**	¾"
6979	NM85A	118.00	1	**Water circulating system radiator header (lower)**	
9976	NM86A	.03	1	**Water circulating system radiator header (upper)**	
10665	NM81B	...	1	**Water circulating system radiator header brace**	
10416	NM86D	...	1	**Water circulating system radiator header brace special nut**	
10411	NM86E	...	1	**Water circulating system radiator header brace spring**	
7031	NM87A	.18	6	**Water circulating system radiator header brace stud**	½" x 2½"
8381	NM82D	.25	2	**Water circulating system radiator header stud**	⅝" x 2¼"
8579	.....	4.00	28	**Water circulating system radiator header stud**	⅝" x 3"
3812	NM83C	1.37	28	**Water circulating system radiator section assembly, consisting of 1—3812, 1—3813 and 5—6827**	
3813	NM83B	.81	28	**Water circulating system radiator section header (lower)**	
6827	NM81A	.50	140	**Water circulating system radiator section header (upper)**	
1342	NM81E	.12	28	**Water circulating system radiator section tubes**	
3817	NM87C	.18	28	**Water circulating system radiator section header clamps**	
7016	NM81C	.001	56	**Water circulating system radiator section header clamp studs**	⅜" x 6⅞" U.S.S.
4505	NM82A	.62	4	**Water circulating system radiator section header gasket**	
3453	NM82B	.37	2	**Water circulating system radiator spring (supporting)**	
7003	NM87B	.03	1	**Water circulating system radiator spring collar**	1 11/16" D. x 1"
7111	NM101F	1.00	1	**Water circulating system radiator strainer**	
7015	NM101D	.006	1	**Water circulating system radiator connection flange (for radiator)**	
7658	NM101E	.09	2	**Water circulating system radiator connection flange gasket**	
				Water circulating system radiator connection flange stud	½" x 1½"

Heavy type indicates that item is on spare and reserved parts list

Makers' Part No.	Ord. Piece Mark	Pounds	No. Rqd. per Tractor	NAME	SPECIFICATIONS
				WATER CIRCULATING GROUP—Continued	
8103	NM102C	.50	1	**Water circulating system radiator drain pipe hanger**	½" x 2"—20 U.S.F.
53263	NM102D	.17	1	**Water circulating system radiator drain pipe hanger bolt**	
8869	NM102E	.27	1	**Water circulating system radiator drain pipe hanger plug**	
10817	NM86F	...	2	**Water circulating system radiator overflow tube clamp**	1¼"
3142	WM100C	.29	1	**Water circulating system radiator plug, pipe (drilled)**	
				STANDARD PARTS FOR WATER CIRCULATING GROUP	
7049	NM88A	.13	1	**Chain, sash (Riveted to drain plug)**	No. 2 x 9"
7149	HM157B	.13	1	**Grease cup (plain compression) (For front bushing in pump)**	No. 0 x ⅛"
8976	NM90B	.13	1	**Grease cup (with check valve) (Rear pump bushing)**	No. 0 x ⅛"
8962	NM102B	.45	1	**Hose (Pump to engine)**	3-ply, 1½" x 5½"
7645	NM100A	.83	1	**Hose (Radiator to pump)**	3-ply, 1½" x 10"
7644	NM101C	1.57	1	**Hose (Engine to radiator)**	3-ply, 1½" x 19"
7445	WM101A	.18	2	**Hose clamp (Engine to radiator)**	For 1½", 4-ply hose
9749	NM101B	...	4	**Hose clamp (Pump to engine, radiator to pump)**	For 1½", 3-ply hose
8967	NM93E	.75	1	**Lagging (leather) (Riveted to idler pulley)**	3/16" x 3½" x 14¼"
53168	.....	.06	3	**Nut, castle (On connection flange, hanger bolts and studs)**	½"—20 U.S.F.
53170	.....	.16	8	**Nut, castle (On radiator header studs)**	⅝"—18 U.S.F.
53172	.....	.21	4	**Nut, castle (On foot studs)**	¾"—16 U.S.F.
53149	.....	.01	8	**Nut, semi fin. hex. (On fan housing)**	¼"—28 U.S.F.
53106	.....	.03	28	**Nut, semi fin. hex. (On section header studs)**	⅜"—16 U.S.F.
53153	.....	.06	8	**Nut, semi fin. hex. (On pump bracket studs and pump gland screws)**	½"—20 U.S.F.
53155	.....	.12	1	**Nut, semi fin. hex. (On idler pulley adjusting rod)**	⅝"—18 U.S.F.
53142	.....	.03	1	**Nut, semi fin. hex. (jam) (On pump pulley set screw)**	⅜"—16 U.S.F.
54941	.....	...	1	**Nut, union (brass) (On radiator overflow tube)**	For ⅜" Q.D. tubing ⅝" U.S.F.
10506	.....	.04	1	**Packing (graphite) (In pump gland)**	5/16" x 11½"
53487	.....	.003	4	**Pin, split (Connection flange, hanger, bolts and header brace studs)**	3/32" x 1"
53501	.....	.004	2	**Pin, split (In filler cap lock screw and pump adjusting rod pipe)**	⅛" x 1"
53502	.....	.005	12	**Pin, split (In radiator foot and header studs)**	⅛" x 1¼"
53566	.....	.01	2	**Pin, split (In idler pulley yoke shafts)**	¼" x 1½"
53569	.....	.02	1	**Pin, split (In idler pulley shafts)**	¼" x 2¼"
50427	NM93B	.04	1	**Pin, taper (In pump pulley)**	No. 4 x 2"
50428	NM96C	.04	1	**Pin, taper (In pump runner shaft collar)**	No. 4 x 2¼"
50446	NM82C	.06	2	**Pin, taper (In radiator spring collars)**	No. 6 x 1¾"
11303	.....	.02	1	**Pipe (On pump bracket)**	⅛" x 6¾"
9974	NM94B	.10	1	**Pipe (On pump bracket)**	⅛" x 10"
8102	NM100B	.42	2	**Pipe (One used pump to engine; 1 used radiator to pump)**	1¼" x 2½"
9981	NM102A	2.67	1	**Pipe (Radiator to pump)**	1¼" x 15¾"
54267	NM91C	.03	2	**Pipe coupling (On pump bracket)**	⅛"
54948	7C	...	1	**Pipe, ell (brass) (On radiator overflow)**	¼" pipe thread x ⅝" U.S.F.

54289	NM91A	.05	1	**Pipe, ell (On pump bracket)**	1/8"
54301	6A	1.25	1	**Pipe ell (On drain pipe)**	1 1/4"
54257	AM146F	...	1	**Pipe nipple (Pump to engine)**	1/4" x 1 5/8"
54254	HM157A	.01	1	**Pipe nipple (short) (On pump bracket)**	1/8" x 1 1/2"
7451	8H	.42	1	**Pipe nipple (Radiator to drain pipe)**	1 1/4" x 2 1/2"
56421	EQ117	.01	1	**Pipe plug (In top of pump casing)**	1/8"
51031	9H	.18	4	**Pipe plug (countersunk head) (In lower radiator header)**	1"
51032	9A	.29	1	**Pipe plug (countersunk head) (In lower radiator header)**	1 1/4"
54922	6B	1.25	1	**Pipe tee (Radiator to pump)**	1 1/4"
7775	NM81D	.25	4	**Plug (Hubbard) (In upper radiator header)**	1 3/8"
50982	.....	.009	8	**Rivet, copper (belt) (In idler pulley legging)**	No. 7 x 3/4"
50799	NM73C	.02	8	**Screw, cap, hex. head (On fan housing)**	1/4" x 3/4—28 U.S.F.
50529	NM95B	.03	6	**Screw, cap, hex. head (On pump casing)**	5/16" x 1"—18 U.S.F.
50592	NM85B	.26	4	**Screw, cap, hex. head (On lower and upper radiator headers)**	5/8" x 1 3/4"—11 U.S.F.
54613	NM100D	.06	1	**Screw, machine, round head (brass) (In radiator drain plug)**	No. 10—32 x 1/2"
10818	NM86C	...	1	**Tubing, seamless brass (Radiator overflow)**	No. 20 U. S. Ga. x 3/8" O.D. x 52 L.
53476	.....	.03	4	**Washer, lock (plain heavy) (On lower and upper radiator headers)**	5/8"
53441	.....	...	1	**Washer, wrought (On header brace stud)**	1/2"

Heavy type indicates that item is on spare and reserved parts list

LIST OF STANDARD HARDWARE USED ON TEN-TON TRACTOR

Bolt, carriage.....5/16" x 1 1/2"
36 used canopy group.
Bolt, carriage.....5/16" x 1 3/4"
8 used canopy group.
Bolt, carriage.....3/8" x 1 1/2"—16 U.S.F.
9 used fuel supply group.
2 used track oiler group.
Bolt, carriage.....3/8" x 1 3/4"
10 used canopy group.
Bolt, carriage.....3/8" x 3"
4 used seat group.
Bolt, hex. head.....3/8" x 1 3/16"
7 used engine armor.
Bolt, hex. head.....3/8" x 1/4"
4 used engine armor group.
6 used lamp group.
Bolt, machine.....1/4" x 1"—24 U.S.F.
1 used fuel supply group.
Bolt, machine.....1/4" x 1 1/4"—20 U.S.E.
2 used air cleaner and heater group.
4 used fuel supply group.
Bolt, machine, hex. head.....1/4" x 6 1/4—20 U.S.F.
4 used fuel supply group.
Bolt, machine, hex. head.....1/2" x 2 1/2"—20 U.S.F.
4 used capstan group.
Bolt, machine.....5/8" x 6 1/2"
4 used crankcase group.
Bolt, machine.....3/4" x 7 1/2—10 U.S.F.
8 used drive gear and sprocket group.
Bolt, machine, hex. head.....7/8" x 3 1/4"—14 U.S.F.
4 used capstan group.
Bolt, machine, hex. head.....7/8" x 3 1/2"—14 U.S.F.
1 used capstan group.
Bolt, machine, hex. head.....7/8" x 6 1/4"—14 U.S.F.
1 used capstan group.
Bolt, machine, square head.....3/8" x 1 1/2
2 used canopy group.
Bolt, machine, square head.....3/8" x 1 3/4"
4 used canopy group.
Bolt, machine, square head.....3/8" x 2"
2 used canopy group.
Bolt, stove, with nut.....3/16" x 1 1/4"
1 used oiler group.
Brad.....1 1/4"
60 used canopy group.
Chain.....No. 14 B&S x 4"
1 used crankcase group.
Chain, sash.....No. 2 x 9"
1 used water circulating group.

Cock, air ..... 1/8"
1 used transmission group.
Cock, air ..... 1/4"
1 used oiler group.
1 used timing gear case group.
Cock, air ..... 3/8"
1 used timing gear case group.
Cock, shutoff ..... Imperial Brass Co. No. 57 S.A.E.
1 used fuel supply group.
Cock, test ..... 3/8"
2 used crankcase group.
Felt strip ..... 3/8" x 1 1/2" x 10"
2 used track oiler group.
Felt strip ..... 3/8" x 1/2" x 17"
2 used track oiler group.
Grease cup ..... 0 x 1/8"
1 used master clutch control group.
1 used steering clutch group.
1 used water circulating group.
Grease cup, with check valve ..... 0 x 1/8"
1 used water circulating group.
Grease cup ..... 00 x 1/8"
2 used engine hand starter group.
Grease cup ..... No. 1 x 1/4"
1 used magneto group.
16 used roller frame group.
1 used timing gear case group.
4 used track supporting roller group.
Hinge ..... 3"
1 used platform group.
Hose ..... 5/8" x 23"
2 used track oiler group.
Hose ..... 1 1/2" x 5 1/2"
1 used water circulating group.
Hose ..... 1 1/2" x 10"
1 used water circulating group.
Hose ..... 1 1/2" x 19"
1 used water circulating group.
Hose clamp ..... For 3 ply, 5/8" hose
4 used track oiler group.
Hose clamp ..... For 3 ply 1 1/2" hose
4 used water circulating group.
Hose clamp ..... For 4 ply 1 1/2" hose
2 used water circulating group.
Key, Woodruff ..... No. 3 1/8" x 1/2"
2 used speedometer.
Key, Woodruff ..... No. 5—1/8" x 5/8"
1 used magneto group.
1 used oiler group.
Key, Woodruff ..... No. 6—5/32" x 5/8"
2 used transmission group.
3 used timing gear case group.
16 used truck supporting roller group.
7 used transmission group.
8 used water circulating group.
Nut, castle ..... 3/4" S.A.E.
1 used camshaft group.
8 used connecting rod group.
1 used engine hand starter group.
8 used engine hanger bracket group.
6 used equalizer bar group.
1 used fan group.
6 used flywheel group.
8 used frame and bracket group.
2 used grouser box and bracket group.
3 used steering clutch group.
20 used transmission group.
4 used water circulating group.
Nut, castle ..... 7/8" S.A.E.
10 used capstan group.
2 used engine hand starter group.
4 used equalizer bar group.
16 used frame and bracket group.
2 used fuel supply group.
2 used drive gear and sprocket group.
6 used pintle group.
2 used steering clutch group.
8 used transmission group.
Nut, castle ..... 1" S.A.E.
6 used pintle group.
12 used roller frame group.
8 used track supporting roller group.
Nut, castle ..... 1 1/4" S.A.E.
2 used transmission group.
Nut, castle ..... 1 3/8" S.A.E.
4 used equalizer bar group.
Nut, lock ..... 1/2"
4 used piston group.
Nut, lock ..... 7/8"
1 used oiler group.
Nut, semi fin. hex ..... .190"
12 used engine armor group.
Nut, semi fin. hex ..... 1/4"—20 U.S.F.
2 used air cleaner and heater group.
5 used fuel supply group.
6 used fuel tank armor group.
Nut, semi fin. hex ..... 1/4" S.A.E.
4 used gear shifting group.
8 used water circulating group.
Nut, semi fin. hex ..... 5/16"—18 U.S.F.
4 used cable group.
3 used governor group.

Key, Woodruff.....No. 11—3/16" x 7/8"
2 used engine hand starter group.
Key, Woodruff.....No. 15—1/4" x 1"
2 used brake group.
8 used camshaft group, built up type.
4 used steering clutch group.
Key, Woodruff.....No. 22—1/4" x 1 3/8"
1 used fan group.
Key, Woodruff.....No. F—3/8" x 1 3/8"
1 used camshaft group, integral type.
Lagging, leather.....3/16" x 3 1/2" x 14 1/4"
1 used water circulating group.
Lining, cotton webbing.....1/8" x 1 1/2" x 10 1/2"
2 used fuel supply group.
Lining, cotton Webbing.....1/8" x 1 1/2" x 18 1/2"
2 used fuel supply group.
Nail, upholstering .....
32 used canopy group.
Nut, castle.....1/4" S.A.E.
2 used magneto group.
Nut, castle.....3/8" S.A.E.
2 used brake group.
4 used drive gear and sprocket group.
1 used engine control group.
1 used engine hand starter group.
2 used gear shifting group.
6 used lamp group.
4 used master clutch group.
6 used transmission group.
Nut, castle.....1/2"—S.A.E.
5 used brake group.
4 used capstan group.
16 used drive gear and sprocket group.
1 used engine hand starter group.
1 used fan group.
2 frame and bracket group.
4 used fuel supply group.
2 used gear shifting group.
6 used grouser box and bracket group.
2 used master clutch group.
1 used speedometer group.
3 used water circulating group.
Nut, castle.....5/8" S.A.E.
2 used brake group.
4 used crankcase guard group.
12 used crankshaft group.
4 used fan group.
4 used frame and bracket group.
4 used fuel supply group.
2 used grouser box and bracket group.
3 used master clutch group.
92 used roller frame group.
2 used steering clutch group.

Nut, semi fin. hex.....5/16"—S.A.E.
8 used drive gear and sprocket group.
2 used engine control group.
Nut, semi fin. hex.....3/8"—16 U.S.F.
2 used brake group.
18 used canopy group.
26 used drive gear and sprocket group.
8 used fuel supply group.
19 used platform group.
2 used track oiler group.
4 used valve group.
28 used water circulating group.
Nut, semi fin. hex.....3/8" S.A.E.
3 used air cleaner and heater group.
25 used engine armor group.
4 used engine control group.
18 used fender group.
95 used fuel tank armor group.
Nut, semi fin. hex., jam.....3/8"—16 U.S.F.
1 used water circulating group.
Nut, semi fin. hex.....7/16"—14 U.S.F.
8 used valve group.
Nut, semi fin. hex.....1/2"—13 U.S.F.
2 used brake group.
7 used crankcase group.
2 used track oiler group.
7 used transmission group.
Nut, semi fin. hex.....1/2" S.A.E.
2 used brake group.
1 used capstan group.
1 used engine control group.
8 used fender group.
8 used fuel supply group.
4 used fuel tank armor group.
8 used grouser box and bracket group.
4 used muffler group.
1 used speedometer group.
4 used track oiler group.
8 used water circulating group.
8 used seat group.
Nut, semi fin. hex.....5/8"—11 U.S.F.
28 used cylinder group.
4 used manifold group.
2 used muffler group.
58 used track group.
Nut, semi fin. hex.....5/8"—S.A.E.
10 used fuel tank armor group.
16 used roller frame group.
1 used water circulating group.
Nut, semi fin. hex.....3/4"—10 U.S.F.
10 used drive gear and sprocket group.
3 used muffler group.
1 used transmission group.

LIST OF STANDARD HARDWARE USED ON TEN-TON TRACTOR—(Continued)

Nut, semi fin. hex.....¾" S.A.E.
16 used cylinder group.
4 used steering clutch group.
Nut, semi fin. hex.....1"—S.A.E.
3 used frame and bracket group.
Nut, jam hex.....1¾"—5 U.S.F.
2 used roller frame group.
Nut, slotted.....⅝"—11 U.S.F.
6 used master clutch group.
Nut, slotted.....1⅝"—5½" U.S.F.
2 used pintle group.
Nut, square.....⅜"
4 used seat group.
Nut, union, brass.....For ⅜" tubing
1 used water circulating group.
Oiler, Winkley.....No. 23 K—⅛"
1 used fan group.
Packing, graphite.....$\frac{5}{16}$" x 11½"
1 used water circulating group.
Pin, escutcheon.....No. 11 x ½"
12 used frame name plate group.
Pin, riveting.....No. 11 B&S gauge x ⅞"
4 used governor group.
Pin, split.....$\frac{1}{16}$" x ½"
4 used compression release cock group.
2 used crankcase group.
6 used governor group.
1 used oiler group.
4 used priming cup group.
Pin, split.....$\frac{3}{32}$" x ¾"
2 used brake group.
3 used gear shifting group.
1 used governor group.
5 used transmission group.
Pin, split.....$\frac{3}{32}$" x 1"
6 used brake group.
1 used capstan group.
1 used crankcase group.
24 used drive gear and sprocket group.
1 used engine control group.
2 used engine hand starter group.
1 used fan group.
1 used governor group.
6 used lamp group.
8 used seat group.
2 used transmission group.
4 used water circulating group.
Pin, split.....$\frac{3}{32}$" x 1¼"
4 used capstan group.
4 used fuel supply group.
6 used grouser box and bracket group.
Pin, split.....⅛" x 3"
4 used frame and bracket group.
Pin, split.....$\frac{5}{32}$" x 3"
2 used air cleaner and heater group.
Pin, split.....$\frac{3}{16}$" x 1"
9 used master clutch group.
2 used master clutch control group.
2 used pintle group.
58 used track group.
Pin, split.....$\frac{3}{16}$" x 1½"
12 used brake group.
4 used crankcase guard group.
6 used crankshaft group.
1 used transmission group.
Pin, split.....$\frac{3}{16}$" x 1¾"
3 used muffler group.
8 used valve group.
Pin, split.....$\frac{3}{16}$" x 2¼"
2 used transmission group.
Pin, split.....$\frac{13}{64}$" x 1"
1 used gear shifting group.
Pin, split.....$\frac{13}{64}$" x 2½"
1 used capstan group.
Pin, split.....$\frac{7}{32}$" x 2½"
4 used equalizer bar group.
Pin, split.....$\frac{7}{32}$" x 3"
2 used pintle group.
Pin, split.....¼" x 1¼"
9 used master clutch group.
2 used master clutch control group.
Pin, split.....¼" x 1½"
2 used brake group.
2 used water circulating group.
Pin, split.....¼" x 1¾"
4 used roller frame group.
Pin, split.....¼" x 2¼"
1 used water circulating group.
Pin, split.....$\frac{5}{16}$" x 2"
2 used roller frame group.
Pin, split.....½" x 3½"
2 used roller frame group.
Pin, taper.....No. 0 x 1"
4 used engine control group.
Pin, taper.....No. 2 x 1⅛"
1 used magneto group.
Pin, taper.....No. 4 x 1¾"
2 used brake group.
Pin, taper.....No. 4 x 2"
2 used brake group.

4 used master clutch group.
Pin, split.....$\frac{3}{32}$"x1 ½"
2 used frame and bracket group.
Pin, split.....⅛" x ½"
1 used governor group.
Pin, split.....⅛" x ⅝"
1 used governor group.
Pin, split.....⅛" x ¾"
4 used governor group.
Pin, split.....⅛" x ⅞"
2 used gear shifting group.
5 used master clutch control group.
Pin, split.....⅛" x 1"
1 used capstan group.
12 used roller frame group.
4 used steering clutch group.
58 used track group.
2 used water circulating group.
Pin, split.....⅛" x 1¼"
1 used camshaft group.
8 used connecting rod group.
12 used crankshaft group.
10 used equalizer bar group.
4 used fan group.
4 used frame and bracket group.
4 used fuel supply group.
2 used gear shifting group.
1 used muffler group.
92 used roller frame group.
2 used steering clutch group.
3 used timing gear case group.
16 used track supporting roller group.
35 used transmission group.
12 used water circulating group.
Pin, split.....⅛" x 1⅜"
8 used engine hanger bracket group.
Pin, split.....⅛" x 1½"
4 used crankcase guard group.
2 used drive gear and sprocket group.
1 used engine hand starter group.
1 used fan group.
6 used flywheel group.
24 used frame and bracket group.
2 used fuel supply group.
5 used grouser box and bracket group.
5 used steering clutch group.
Pin, split.....⅛" x 1 ¼"
10 used capstan group.
2 used engine hand starter group.
12 used pintle group.
Pin, split.....⅛" x 2"
12 used roller frame group.
8 used track supporting roller group.
1 used capstan group.
1 used water circulating group.
Pin, taper.....No. 4 x 2¼"
1 used water circulating group.
Pin, taper.....No. 5 x 1¾"
1 used capstan group.
Pin, taper.....No. 6 x 1¾"
2 used water circulating group.
Pin, taper.....No. 6 x 2¼"
11 used camshaft group.
Pin, taper.....No. 6 x 2½"
2 used transmission group.
Pin, taper.....No. 8 x 1¾"
1 used transmission group.
Pipe.....⅛" x 6¾"
1 used water circulating group.
Pipe.....⅛" x 10"
1 used water circulating group.
Pipe.....⅜" x 2"
2 used track oiler group.
Pipe.....⅜" x 4"
2 used track oiler group.
Pipe.....⅜" x 5½"
2 used track oiler group.
Pipe.....⅜" x 11¾"
2 used track oiler group.
Pipe.....⅜" x 28¾"
1 used track oiler group.
Pipe.....1¼" x 2½"
2 used water circulating group.
Pipe, brass.....¾" x 9¾"
1 used fuel supply group.
Pipe bushing.....⅛" x ¼"
1 used oiler group.
Pipe bushing.....⅜" x 1"
2 used oiler group.
Pipe cap.....⅛"
1 used transmission group.
Pipe coupling.....⅛"
1 used master clutch control group.
2 used water circulating group.
Pipe coupling.....¼"
1 used master clutch group.
Pipe coupling.....⅜"
2 used track oiler group.
Pipe cross.....¼"
1 used oiler group.
Pipe elbow.....⅛"
1 used water circulating group.
Pipe elbow.....¼"
2 used oiler group.
Pipe elbow.....⅜"
10 used track oiler group.

Pipe elbow.....½"
1 used transmission group.
Pipe elbow.....1¼"
1 used water circulating group.
Pipe elbow, 45 degree.....⅛"
2 used steering clutch group.
Pipe elbow, 45 degree.....⅜"
3 used oiler group.
Pipe elbow, 45 degree.....½"
1 used capstan group.
1 used transmission group.
Pipe, elbow, brass.....¼" pipe x ⅝" U.S.F.
1 used fuel supply group.
1 used water circulating group.
Pipe elbow, reducing.....½" x ⅛"
1 used capstan group.
Pipe elbow, reducing, brass.....¾" x ½"
1 used fuel supply group.
Pipe elbow, street.....⅛"
1 used fuel supply group.
Pipe elbow, street.....¼"
1 used fuel supply group.
2 used oiler group.
2 used roller frame group.
Pipe elbow, street.....⅜"
2 used drive gear and sprocket group.
Pipe elbow, street.....½"
1 used transmission group.
Pipe elbow, street, 45 degree.....½"
2 used transmission group.
Pipe nipple.....⅛"
1 used master clutch control group.
1 used water circulating group.
Pipe nipple.....⅛" x 2½"
2 used steering clutch group.
Pipe nipple.....¼" x 1½"
1 used oiler group.
Pipe nipple.....¼" x 1⅝"
1 used oiler group.
1 used water circulating group.
Pipe nipple.....¼" x 3"
1 used master clutch group.
2 used oiler group.
Pipe nipple.....¼" x 7¼"
1 used oiler group.
Pipe nipple.....⅜" x 1"
3 used oiler group.
3 used track oiler group.
Pipe nipple.....⅜" x 1¼"
2 used oiler group.

Pipe plug.....1"
4 used crankcase group.
Pipe plug.....1¼"
1 used transmission group.
Pipe plug, countersunk.....⅜"
1 used crankshaft group.
Pipe plug, countersunk.....¾"
6 used crankcase group.
Pipe plug, countersunk.....1"
3 used crankcase group.
4 used drive gear and sprocket group.
4 used water circulating group.
Pipe plug, countersunk.....1¼"
1 used water circulating group.
Pipe tee.....¼" x ¼" x ¼"
3 used oiler group.
Pipe tee.....⅜"
3 used track oiler group.
Pipe tee.....¾" x ¾" x ¼"
3 used oiler group.
Pipe tee.....1¼"
1 used water circulating group.
Pipe union.....¼"
1 used oiler group.
Pipe union.....⅜"
2 used oiler group.
2 used track oiler group.
Pipe union.....½"
1 used transmission group.
Plug, Hubbard.....1⅜"
4 used water circulating group.
Plug, Hubbard.....2"
16 used steering clutch group.
Rivet, button head.....⅜" x ⅝"
31 used canopy group.
Rivet, button head.....⅜" x ¾"
6 used canopy group.
Rivet, copper.....No. 7 x ⅝"
6 used master clutch group.
Rivet, copper.....No. 7 x ¾"
8 used water circulating group.
Rivet, copper.....No. 9 x ½"
56 used brake group.
Rivet, copper, tubular.....3/16" x ½"
192 used steering clutch group.
Rivet, countersunk.....3/16" x 1"
2 used gear shifting group.
4 used master clutch control group.
Rivet, countersunk.....⅜" x 1¼"
3 used platform group.

Pipe nipple.....⅜" x 1½"
1 used oiler group.
Pipe nipple.....⅜" x 1¾"
1 used oiler group.
Pipe nipple.....⅜" x 2¼"
1 used oiler group.
Pipe nipple.....⅜" x 3"
3 used track oiler group.
Pipe nipple.....⅜" x 4"
2 used track oiler group.
Pipe nipple.....⅜" x 6"
6 used track oiler group.
Pipe nipple.....⅜" x 6½"
2 used track oiler group.
Pipe nipple.....½" x 1⅛"
2 used transmission group.
Pipe nipple.....½" x 1½"
1 used transmission group.
Pipe nipple.....¾" x 7¼"
3 used oiler group.
Pipe nipple.....¾" x 8½"
3 used oiler group.
Pipe nipple.....1¼" x 2½"
1 used transmission group.
Pipe nipple, close.....2"
1 used transmission group.
Pipe nut, lock.....½"
1 used trasmission group.
Pipe plug.....⅛"
4 used compression release cock group,
4 used cylinder group.
4 used cylinder head group.
1 used water circulating group.
Pipe plug.....¼"
1 used crankcase group.
2 used equalizer bar group.
1 used master clutch group.
1 used muffler group.
1 used oiler group.
1 used timing gear case group.
Pipe plug.....⅜"
1 used capstan group.
4 used crankcase group.
2 used drive gear and sprocket group.
1 used equalizer bar group.
2 used pintle group.
14 used roller frame group.
1 used track oiler group.
Pipe plug.....½"
3 used capstan group.
4 used cylinder group.
Pipe plug.....¾"
1 used capstan group.

Rivet, flat head.....No. 4
8 used brake group.
Rivet, oval head.....¼" x ¾"
4 used lamp group.
Rivet, round head.....$\frac{3}{16}$" x 2½"
1 used fuel supply group.
Rivet, structural, button head.....⅜" x 1¼"
2 used platform group.
Rivet, structural, button head.....½" x 1¾"
12 used crankcase guard group.
Rivet, structural, round head.....¼" x 1¾"
2 used frame name plate group.
Rivet, structural, round head.....⅜" x 1¼"
8 used drive and sprocket group.
Rivet, tank, button head.....⅜" x 1"
24 used drive gear and sprocket group.
1 used platform group.
Rivet, tank, countersunk head.....¼" x 1⅜"
32 used steering clutch group.
Rivet, tank, countersunk, head.....¼" x 3"
2 used master clutch group.
Rivet, tank, countersunk head.....⅜" x 1"
14 used grouser box and bracket group.
Rivet, tank, oval head.....⅛" x ⅜"
12 used steering clutch group.
Rivet, tank, oval head.....⅛" x ½"
6 used track oiler group.
Rivet, tank, oval head.....⅛" x ¾"
12 used transmission group.
Rivet, oval head.....$\frac{3}{16}$" x ½"
15 used fuel supply group.
8 used track oiler group.
Rivet, tank, oval head.....¼" x ⅜"
3 used platform group.
Rivet, tank, oval head.....¼" x ½"
18 used brake group.
61 used fender group.
3 used platform group.
Rivet, tank, oval head.....¼" x 1⅜"
32 used steering clutch group.
Rivet, tank, round head.....⅜" x ¾"
8 used drive gear and sprocket group.
Rivet, tinned, oval head.....¼" x ½"
8 used fuel supply group.
Screw, cap.....¼" x ½"
16 used steering clutch group.
Screw, cap.....¼ "x ¾" S.A.E.
2 used magneto group.
8 used water circulating group.
Screw, cap.....$\frac{5}{16}$" x ¾"—18 U.S.F.
6 used capstan group.
2 used governor group.
1 used transmission group.

LIST OF STANDARD HARDWARE USED ON TEN-TON TRACTOR—(Continued)

Screw, cap ..... 5/16" x 7/8"—18 U.S.F.
14 used capstan group.
Screw, cap ..... 5/16" x 1"—18 U.S.F.
7 used capstan group.
2 used engine hand starter group.
9 used timing gear case group.
6 used water circulating group.
Screw, cap ..... 5/16" x 1 1/8"
4 used capstan group.
Screw, cap ..... 5/16" x 1 1/4"—24 U.S.F.
8 used drive gear and sprocket group.
Screw, cap ..... 3/8" x 1/2"—24 U.S.F.
4 used drive gear and sprocket group.
Screw, cap ..... 3/8" x 3/4"—16 U.S.F.
4 used brake group.
8 used fender group.
3 used timing gear case group.
Screw, cap ..... 3/8" x 3/4"—24 U.S.F.
12 used fender group.
Screw, cap ..... 3/8" x 1"—16 U.S.F.
8 used canopy group.
6 used capstan group.
26 used drive gear and sprocket group.
4 used oiler group.
12 used platform group.
Screw, cap ..... 3/8" x 1"—24 U.S.F.
12 used capstan group.
54 used fuel tank armor group.
4 used master clutch group.
Screw, cap ..... 3/8" x 1 1/16"—24 U.S.F.
41 used fuel tank armor group.
Screw, cap ..... 3/8" x 1 1/4"—16 U.S.F.
2 used canopy group.
4 used drive gear and sprocket group.
5 used platform group.
Screw, cap ..... 3/8" x 1 1/4"—24 U.S.F.
6 used fender group.
Screw, cap ..... 3/8" x 1 1/2"—16 U.S.F.
8 used canopy group.
2 used drive gear and sprocket group.
1 used oiler group.
Screw, cap ..... 3/8" x 1 3/4"
2 used platform group.
Screw, cap ..... 3/8" x 2"
3 used air cleaner and heater group.
Screw, cap ..... 7/16" x 7/8"—14 U.S.F.
2 used governor group.
Screw, cap ..... 7/16" x 1"—14 U.S.F.
5 used magneto group.
Screw, cap ..... 7/16" x 1 1/4"—14 U.S.F.
2 used carburetor group.

Screw, machine ..... No. 14—24 x 1"
8 used drive gear and sprocket group.
Screw, machine, brass ..... No. 10—24 x 1/2"
1 used oiler group.
6 used engine name plate group.
Screw, machine, brass ..... No. 12—24 x 1/2"
6 used oiler group.
Screw, machine, countersunk head ..... 3/8" x 1"
4 used engine armor group.
Screw, machine, countersunk head ..... 3/8" x 1 1/16"
8 used engine armor group.
Screw, machine, fillister head ..... No. 10—32 x 7/16"
2 used speedometer group.
Screw, machine, fillister head ..... No. 10—32 x 3/4"
1 used speedometer group.
Screw, machine, round head brass ..... No. 10—32 x 1/2"
1 used water circulating group.
Screw, machine, round head ..... .190" x 3/4"
12 used engine armor group.
Screw, machine, round head ..... 1/4" x 3/4"
6 used fuel tank armor group.
Screw, set, headless ..... 1/4" x 1/4"
2 used governor group.
Screw, set, headless, cup point ..... 1/4" x 1/2"—20 U.S.F.
1 used gear shifting group.
1 used transmission group.
Screw, set, headless, cup point ..... 1/2" x 1 1/4"
2 used cam shaft group.
Screw, set, square head, cup point ..... 5/16" x 3/4"
2 used muffler group.
Screw, set, square head, cup point ..... 3/8" x 1"
2 used brake group.
Screw, set, square head, cup point ..... 1/2" x 1"
2 used air cleaner and heater group.
Screw, set, square head, cone point ..... 1/2" x 1 3/4"—13 U.S.F.
1 used transmission group.
Screw, set, square head, cup point ..... 3/4" x 3"
2 used cam shaft group.
Screw, set, square head, oval point ..... 3/4" x 3"—10 U.S.F.
2 used drive gear and sprocket group.
Screw, wood ..... No. 10 x 1 1/8"
42 used canopy group.
Screw, wood, flat head ..... No. 10 x 1 1/2"
12 used fuel supply group.
Screw, wood ..... No. 10 x 1 3/4"
6 used canopy group.
Screw, wood, flat head ..... No. 14 x 2"
20 used canopy group.
4 used seat group.
Tubing, brass ..... No. 22 U.S. gauge—1/4" x 42"
1 used fuel supply group.

Screw, cap ..... ½" x ¾"—12 U.S.F.
12 used transmission group.
Screw, cap ..... ½" x ⅞"
4 used magneto group.
Screw, cap ..... ½" x 1"—13 U.S.F.
2 used oiler group.
1 used transmission group.
Screw, cap ..... ½" x 1"—20 U.S.F.
1 used transmission group.
Screw, cap ..... ½" x 1¼"—13 U.S.F.
2 used capstan group.
7 used crankshaft group.
2 used engine control group.
10 used equalizer bar group.
Screw, cap ..... ½" x 1 5/16"—20 U.S.F.
2 used fuel tank armor group.
Screw, cap ..... ½" x 1½"
4 used valve group.
Screw, cap ..... ½" x 1½"—13 U.S.F.
2 used brake group.
Screw, cap ..... ½" x 1½"—20 U.S.F.
8 used grouser box and bracket group.
Screw, cap ..... ½" x 1 9/16".
2 used fuel tank armor group.
Screw, cap ..... ½" x 1¾"
8 used valve group.
Screw, cap ..... ½" x 1¾"—20 U.S.F.
4 used muffler group.
Screw, cap ..... ½" x 2"—20 U.S.F.
6 used fender group.
2 used fuel supply group.
Screw, cap ..... ½" x 2¼—13 U.S.F.
8 used capstan group.
Screw, cap ..... ½" x 2¼"—20 U.S.F.
2 used fender group.
Screw, cap ..... ⅝" x 1¼"—11 U.S.F.
2 used master clutch control group.
Screw, cap ..... ⅝" x 1 5/16"
10 used fuel tank armor group.
Screw, cap ..... ⅝" x 1½"—11 U.S.F.
2 used equalizer bar group.
Screw, cap ..... ⅝" x 1½"—18 U.S.F.
2 used frame and bracket group.
Screw, cap ..... ⅝" x 1¾"—11 U.S.F.
4 used water circulating group.
Screw, cap ..... ⅝" x 2¾"—11 U.S.F.
4 used crank case guard group.
Screw, cap ..... ¾" x 2½"—10 U.S.F.
1 used transmission group.
Screw cap ..... 1" x 3¼"—14 U.S.F.
3 used frame and bracket group.
Screw, machine ..... No. 14—24 x ½"
6 used crank case group.

Tubing, brass ..... No. 20 U.S. gauge—⅜" x 14"
1 used fuel supply group.
Tubing, brass ..... No. 20 U.S. gauge—⅜" x 42"
1 used fuel supply group.
Tubing, brass ..... No. 20 U.S. gauge—⅜" x 52"
1 used water circulating group.
Tubing, brass ..... No. 20 U.S. gauge—⅜" x 54"
1 used fuel supply group.
Tubing, brass ..... No. 20 U.S. gauge—⅜" x 132"
1 used fuel supply group.
Tubing, copper ..... No. 21 Stubbs gauge—⅜" x 3½"
1 used oiler group.
Tubing, copper ..... No. 21 Stubbs gauge—⅜" x 10"
2 used oiler group.
Tubing, copper ..... No. 21 Stubbs gauge—⅜" x 11"
3 used oiler group.
Tubing union ..... For ¼" pipe x ⅜" tube
4 used oiler group.
Tubing union ..... ⅜"
1 used fuel supply group.
Tubing union elbow ..... For ¼" pipe and ⅜" tubing
8 used oiler group.
Tubing union, half ..... For ¼" tubing
2 used fuel supply group.
Tubing union nut ..... For ¼" tubing
2 used fuel supply group.
Valve, globe ..... ⅜"
2 used track oiler group.
Valve, three-way ..... For ⅜" tubing
1 used fuel supply group.
Washer, lock ..... 3/16"
12 used engine armor group.
3 used speedometer group.
Washer, lock ..... ¼"
2 used air cleaner and heater group.
9 used fuel supply group.
6 used fuel tank armor group.
2 used magneto group.
16 used steering clutch group.
Washer, lock ..... 5/16"
31 used capstan group.
8 used drive gear and sprocket group.
2 used engine hand starter group.
1 used transmission group.
16 used timing gear case group.
Washer, lock ..... ⅜"
4 used brake group.
18 used canopy group.
18 used capstan group.
36 used drive gear and sprocket group.
25 used engine armor group.
26 used fender group.
8 used fuel supply group.

95 used fuel tank armor group.
1 used oiler group.
19 used platform group.
2 used track oiler group.
Washer, lock ..... 7/16"
2 used carburetor group.
2 used magneto group.
1 used speedometer group.
Washer, lock ..... 1/2"
2 used brake group.
10 used capstan group.
2 used engine control group.
10 used equalizer bar group.
8 used fender group.
8 used fuel supply group.
4 used fuel tank armor group.
8 used grouser box and bracket group.
5 used magneto group.
4 used muffler group.
4 used piston group.
6 used track oiler group.
13 used transmission group.
8 used valve group.
Washer, lock ..... 5/8"
4 used crank case group.
4 used crank case guard group.
2 used equalizer bar group.
2 used frame and bracket group.
10 used fuel tank armor group.
4 used master clutch group.
2 used master clutch control group.
3 used timing gear case group.
58 used track group.
4 used water circulating group.
Washer, lock ..... 3/4"
8 used drive gear and sprocket group.
3 used muffler group.
Washer, lock ..... 1"
3 used frame and bracket group.
Washer, wrought ..... 3/8"
44 used canopy group.
Washer, wrought ..... 7/16"
24 used canopy group.
Washer, wrought ..... 1/2"
1 used water circulating group.
Wire, lock ..... No. 11 B&S gauge—6" long
1 used crankshaft group.
Wire, lock ..... No. 12 B&S gauge—28" long
2 used transmission group.
Wire, lock ..... No. 14 B&S gauge—11" long
1 used timing gear case group.
Wire, lock ..... No. 14 B&S gauge—18" long
4 used connecting rod group.
1 used timing gear case group.
Wire, lock ..... No. 14 B&S gauge—48" long
1 used crank case group.
Wire, lock ..... No. 16 W&M gauge—5" long
2 used transmission group.
Wire, lock ..... No. 16 W&M gauge—13" long
1 used speedometer group.
Wire, lock ..... No. 16 W&M gauge—17" long
1 used transmission group.
Wire, lock ..... No. 18 W&M gauge—6" long
1 used fan group.
Wire, lock ..... No. 18 W&M gauge—13" long
1 used fan group.
Wire, lock ..... No. 18 W&M gauge—18" long
2 used steering clutch group.

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