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HANDBOOK OF THE
SIX-TON SPECIAL TRACTOR
MODEL 1917

(NINETY-FIVE - PLATES)

JULY 15, 1918



533-3

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(NINETY-FIVE - PLATES)

JULY 15, 1918



WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ORDNANCE,
WASHINGTON, July 15, 1918.

This manual is published for the information and government of the Regular Army, National Guard, and National Army of the United States.

By order of the Secretary of War:

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

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Aug 9 '37 g C E. Babbit

7/1/37 SIMMONS

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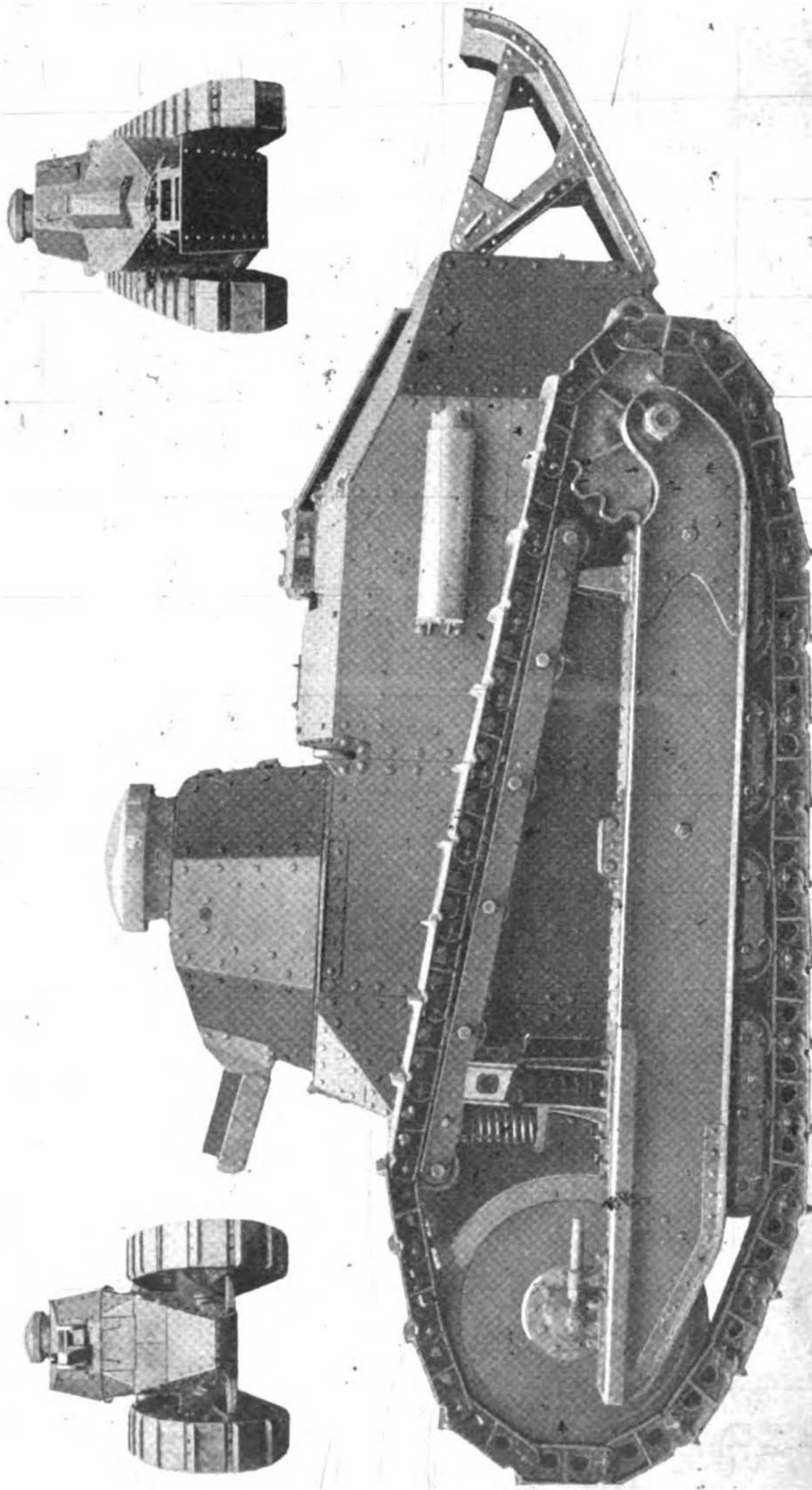
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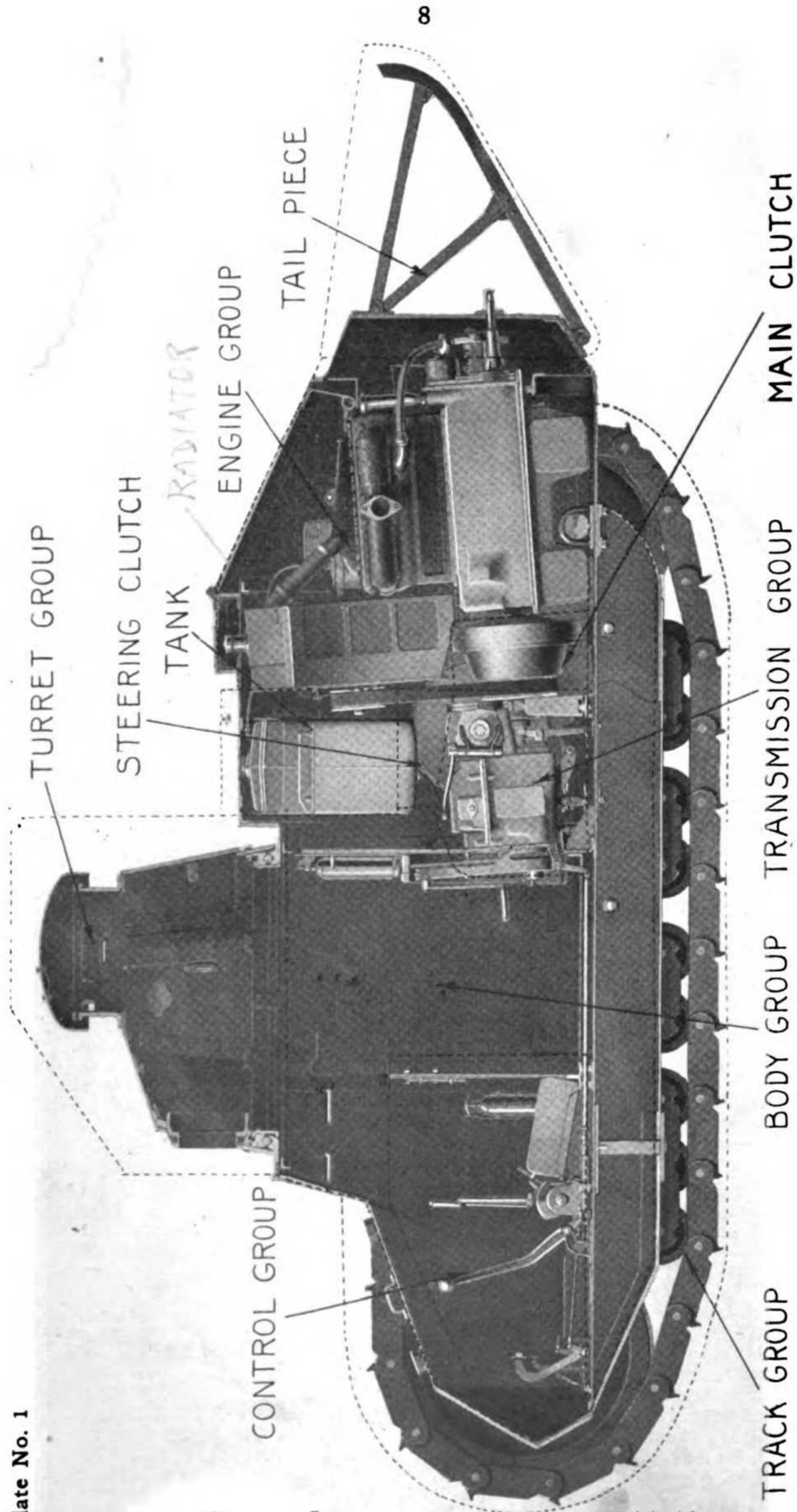


FRONTISPIECE—COMPLETE SIDE VIEW OF 6-TON SPECIAL TRACTOR MODEL 1917 WITH 37 m. m. GUN MASK
 IN POSITION. UPPER LEFT—FRONT VIEW. UPPER RIGHT—REAR VIEW.

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Plate No. 1



SECTION THROUGH 6-TON SPECIAL TRACTOR MODEL 1917 SHOWING RELATIVE LOCATION OF PRINCIPAL PARTS AND THE MAIN GROUP ASSEMBLIES

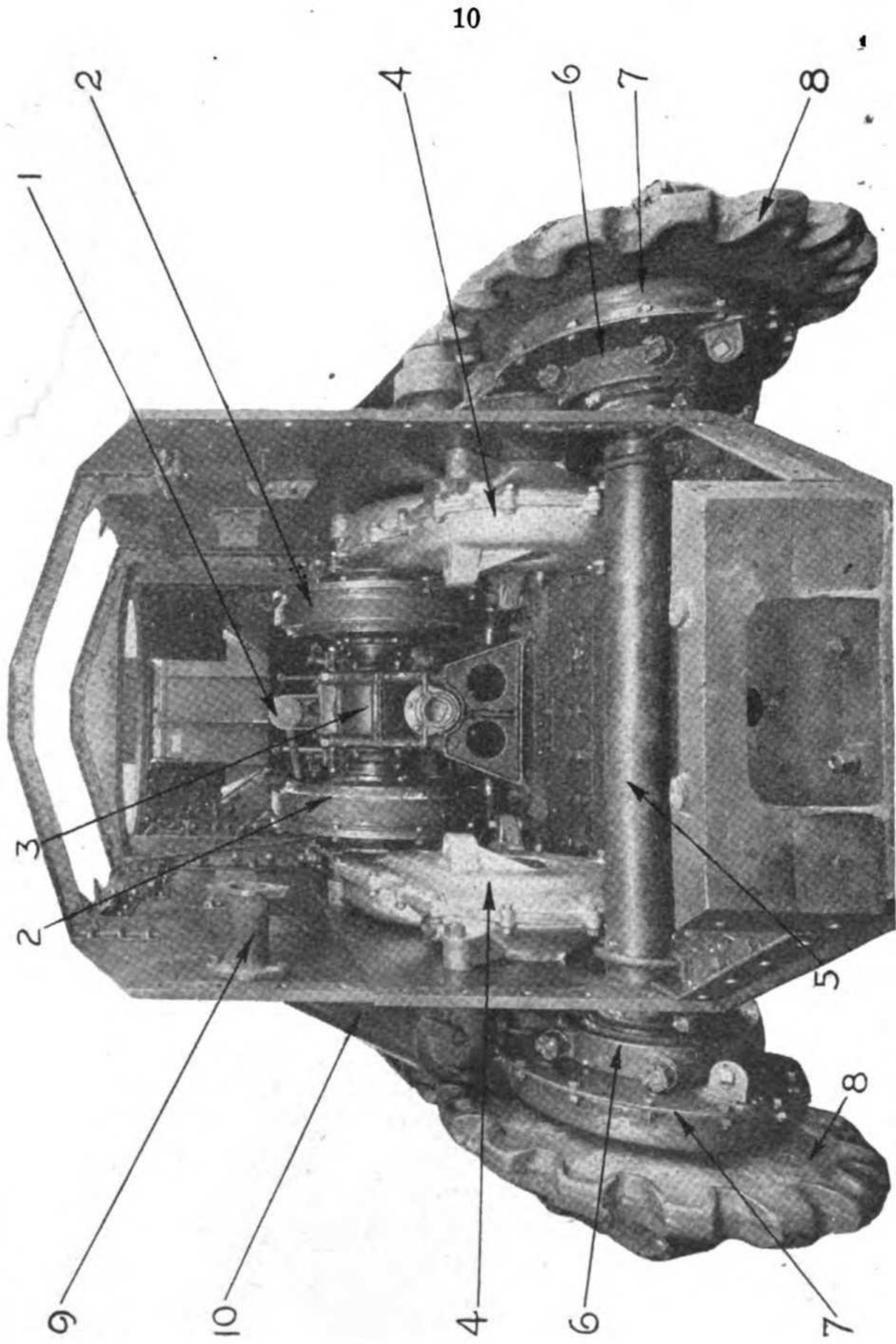
HANDBOOK OF THE SIX-TON SPECIAL TRACTOR, MODEL 1917

CHAPTER I

GENERAL DESCRIPTION AND INSTRUCTIONS

GENERAL WEIGHTS AND SPECIFICATIONS

Weight.....	6 tons
Length overall.....	15 ft. 7 in.
Height overall.....	7 ft. 6.5 in.
Width overall.....	5 ft. 9 in.
Type of drive.....	Track-laying or crawler
Type of engine.....	L-head gasoline type
Number of cylinders.....	Four
Bore.....	4 $\frac{1}{4}$ in.
Stroke.....	5 $\frac{1}{2}$ in.
Main clutch.....	Inverted cone
Transmission gearset.....	Four forward speeds, one reverse, selective
Reduction gears.....	Spur train
Armament.....	One 37 mm. gun or Marlin machine gun
Personnel.....	Two, driver and gunner
Turning diameter.....	14 ft.
Width of single track shoe.....	13 $\frac{1}{2}$ in.
Road clearance under body.....	16 $\frac{3}{16}$ in.
Height of towing hooks from ground.....	22 in.
Radiator.....	Tubular type mounted in front of engine in body
Ignition.....	Eisemann high tension variable spark magneto type G 4/2 driven by timing gear
Carbureter.....	Wheeler-Schebler Model A.
Gasoline feed.....	Vacuum system, 30 gal. tank hung in front of radiator
Governor.....	Flyball type mounted on magneto drive gear controlling throttle
Steering.....	By track control through inverted cone steering clutches
Control.....	Steering through steering clutch levers on either side of driver's seat. Left clutch pedal, right brake pedal, spark and throttle levers, accelerator pedal, gear- shift lever



1. Inside starter sprocket.
2. Brake on exterior of steering clutch.
3. Transmission housing.
4. Spur gear reduction case.
5. Rear axle.
6. Cap on extension of track frame.
7. Final reduction casing.
8. Track drive sprocket.
9. Exhaust extension.
10. Muffler.

This view shows the general layout of many of the assemblies.

SIX-TON SPECIAL TRACTOR MODEL 1917 WITH POWER PLANT AND SEVERAL OTHER BODY PARTS REMOVED

Equipment Speedometer, Pyrene fire extinguisher, electric lantern, oil pressure gauge, kick switch, long handled shovel, short handled shovel, oil and kerosene cans, towing cable and hook, tools, including bolt clippers, 4 cleansing brushes, cope chisel, cold chisel, cotter pin extractor, drifts, 2 funnels, 3 files and handle, grease gun and extension, gasoline measuring stick, machinists' hammer, hoisting chain, jack, 2 oilers, punch, pliers, pick, 3 scrapers, 2 screw drivers, gasoline strainer, 24 wrenches, and valve lifter.

GENERAL DESCRIPTION

The 6-ton special Tractor Model 1917, is an armored two-man type equipped with a turret and either a Marlin machine gun or a 37-mm. gun. It is driven by a four-cylinder gasoline engine which imparts the drive through a transmission gearset and reduction gearing to a track-laying or crawler traction mechanism.

The power plant is located in the rear and the operator is at the forward end in a compartment inside the main body of the tractor. The gunner's compartment is in the center and this is surmounted by the turret which is mounted on a ball race on which it is capable of rotation. The entire tractor is enclosed in armor plate capable of withstanding machine gun or rifle fire.

The engine delivers its drive through an inverted cone clutch housed behind the fly-wheel. From this point the drive is taken through a universal joint to a four speed selective sliding gearset and thence through bevel gears to a transverse shaft which carries the drive outboard to a set of spur reduction gears which operate the track. Interposed between the transmission gear and the spur gear reduction is a clutch on either side of the tractor. These clutches serve to free the track on either side desired thus acting as a means for steering.

Operation of the track is effected by a large driving sprocket actuated by the spur reduction train from within the body of the tractor. [This driving sprocket is at the rear end and at the forward end there is a large idler blank sprocket which serves to maintain the tension on the track chain. The tractor has a nominal forward speed of between 6 and 7 miles an hour and due to its great gear reduction and the peculiarities of its track laying propulsion it is capable of obtaining traction up to any tractive angle and over ground of unusual difficulty such as would be encountered in territory marked by shell craters.

Structurally the tractor consists of a main armored body which is hung between two track-carrying frames. Surmounted on the body is the revolving turret supported on a ball-bearing raceway. The track structure includes the traveling track chain and consists of a built-up inverted U-beam, in which is carried the track roller mechanism. The track structure is bracketed to the armored body which forms the backbone of the structure.

INSTRUCTIONS CAREFULLY FOLLOWED

It is of the highest importance that the instructions in this manual be carefully followed if the tractor is to be maintained at its highest efficiency. Inspection in accordance with these rules should be made a matter of routine.

OPERATING INSTRUCTIONS

PREPARATORY TO RUNNING

Thoroughly clean entire machine with kerosene, removing grease or slush coat applied for protection in shipment.

Fill radiator with clean water.

Pour 4 gallons of cylinder oil into engine crank case through filler.
(See page 19.)

Fill gasoline tank.

Lubricate entire tractor in accordance with chart and instructions.
(See pages 20 and 21.)

Unpack and place all tools in proper locations.

TO START ENGINE

Put gear lever in neutral. (See page 105.)

Open throttle one third. (See page 107.)

Retard spark half way. (See page 108.)

Turn on ignition switch.

Pull air choke on carbureter.

Crank engine rapidly either with outside crank or inside starter.
(See page 108.)

Prime engine through priming cups if starting is difficult.

AFTER ENGINE IS STARTED

Advance spark.

Retard throttle lever allowing engine to idle slowly.

TO START TRACTOR

Release brake, if it is engaged.

Depress left pedal releasing main clutch.

Increase engine speed slightly by depressing accelerator pedal.
Engage first speed. (See page 107.)
Slowly allow clutch to engage.

GEAR CHANGES

As tractor gains momentum depress main clutch pedal; close throttle, shift to second speed, release clutch and open throttle. Repeat operation to reach third and fourth speeds, after which speed can be controlled by foot throttle or hand gas lever.

GEAR CHANGES TO LOWER SPEEDS

In changing to lower speed, disengage main clutch, do not retard throttle, instantly shift to lower gear and open throttle to gain speed.

TO REVERSE TRACTOR

Reduce engine speed, release main clutch, apply foot brake.
When truck has stopped engage reverse gear, release brake and engage clutch.
Never engage reverse gear when tractor is moving forward.

TO STOP TRACTOR

Reduce engine speed, release main clutch, apply brake, place gear shift lever in neutral.

TO STOP ENGINE

Turn off ignition switch.
While engine still rotates, advance gas lever slightly to supply initial charge to assist starting.

GENERAL DRIVING INSTRUCTIONS

The spark control lever should be maintained in as advanced a position as possible without causing the engine to knock. It must be retarded under loads severe enough to cause a knock.

Since both the hand throttle control lever on the steering column and the foot accelerator on the floor plate control the throttle opening of the carbureter, either may be used, the choice being largely a matter of preference, although it is good practice to set the hand lever at the desired position when the tractor encounters a long hard pull, and to use the foot accelerator when roads or tractive conditions are such as to make necessary a more flexible means of control.

If the engine should be excessively stiff investigate before attempting to crank it to ascertain whether the pump has been frozen through failure to drain. Should it have frozen it will be necessary to thaw out the cooling system before attempting to start the engine.

Shift gears when necessary to prevent needless laboring of the engine. If the spark control lever has been retarded during the climbing of a hill, be sure to advance it after the hill has been negotiated, for to run with a retarded spark will cause the engine to overheat.

When steep depressions or ridges are encountered allow the tractor to enter them slowly, momentarily slipping the main clutch. As the track itself will climb the ridges it is not necessary to rush the hole. With very severe depressions it is best to enter low gear beforehand.

The same instructions as before given for climbing hills are applicable when the tractor must negotiate soft roads, mud, sand, or snow. Under these conditions shift to the lower gears before the engine begins to labor else the engine may overheat or stall.

Should there be great resistance when starting such as that due to an excessive grade or exceptionally soft ground, speed the engine by depressing the accelerator pedal just as the clutch is engaged, thus allowing the engine to utilize its fully energy to start the tractor.

TO NEGOTIATE STEEP GRADES

This tractor will readily negotiate either downward or upward grades, which are practically up to the limit of traction. For descending steep grades, put the tractor into low gear and let it take its own way over the edge of the shell crater or other hole, and it will readily manage itself in this manner. For negotiating a very steep grade, a little experience will teach the operator a great many valuable lessons, as to manipulation at the top of the grade. If the top comes up very steeply, the tractor will point vertically upward, and is apt to drop forward with a severe pitch if the operator is not skillful in manipulating it. After experience the operator will be able to slip the steering clutches slightly, letting the tractor resume a horizontal position easily instead of with a severe jolt. Care must be taken in slipping the steering clutches not to apply the brakes, as this would stall the engine and would allow the tractor to roll backwards down the hill, if the operator were not watchful.

CROSSING STEEP TRENCHES

Trenches too wide to be spanned and too steep to be descended can be negotiated by towing train formation. The tractors are connected by towing cable, the second tractor lowering the first over the edge gradually until it is able to secure traction on the bottom of the hole. The third tractor assists the second in the same way until the last tractor reaches the edge. The last will have to drop from the line allowing the

others to go on, unless by that time the ground on the edge of the trench is worn to such a degree that it is able to go over the edge.

TRANSPORTING TRAILER

For transportation of the tractor from point of operations to another there is a 10-ton trailer which is briefly described on pages 129 to 131. For complete details see Ordnance Hand Book on 10-ton trailer.

LUBRICATION INSTRUCTIONS

Careful attention to the lubrication of the tractor is highly essential.

ENGINE LUBRICATION

For the engine, use the general specifications for engine oils and greases as specified by the Signal Corps and the Ordnance Corps. This oil will be specified as the medium grade and an allowance of 5 gallons is made for use in running in and testing the engines on 6-ton tractors. Any manufacturer's oil meeting these specifications will be accepted.

LUBRICANT SPECIFICATIONS

General

1. The oils for the lubrication of the gasoline engines of engine equipped vehicles must consist of refined and filtered mineral oils or mixtures of same and must be suitable in every way for satisfactory use in internal combustion engines.

Use

2. The medium oil shall generally be for use in winter and upon the engines of new tractors at other times. The heavy oil shall be for use in summer and for old engines.

Viscosity of Engine Oil

3. The viscosity in seconds on the Saybolt Universal Viscosimeter at 100 degrees F. shall come within the following limits:

Engine oil, medium.....	270 to 330 Sec.
Engine oil, heavy.....	470 to 530 Sec.
Engine oil, extra heavy.....	730 to 780 Sec.

Test

4. The engine oil medium must not congeal in a 4-oz. bottle at a temperature of 25 degrees F.

The engine oil heavy must not congeal in a 4-oz. bottle at a temperature of 35 degrees F.

The engine oil extra heavy must not congeal in a 4-oz. bottle at a temperature of 45 degrees F.

Carbon Content of Oil

5. The carbon residue test by the Conradson Method must be less than 0.4 per cent for the medium oil, 0.6 per cent for the heavy oil, and 0.8 per cent for the extra heavy oil.

6. The following characteristics of oil bid upon must be stated in proposal: Viscosity tests on the Saybolt Universal Viscosimeter at temperatures of 70 degrees F., 100 degrees F., 130 degrees F., 212 degrees F., and 300 degrees F., Gravity, Beaume at 60 degrees F.

TRANSMISSION LUBRICANT

For transmission and reduction gears will be governed by the specifications for non-fluid transmission lubricant as approved by the Signal Corps and Quartermaster's Department, also Medical Corps and U. S. Navy. Sixty-five pounds of this lubricant will be specified for the testing and running in of each 6-ton tractor and to remain in the transmission and reduction gear cases of this 6-ton tractor when shipped.

TRANSMISSION LUBRICANT SPECIFICATIONS

General

1. This lubricant shall be a well manufactured product composed of calcium soap and mineral oil, and must be suitable in every way for the lubrication of the axles and transmissions of engine equipment.

Consistency of Transmission Lubricant

2. The lubricant shall be equal in consistency to a standard sample of No. 00 non-fluid lubricant.

Moisture Content

3. The lubricant shall be of a boiled grease, containing not less than 1 per cent nor more than 1.5 per cent of moisture when finished.

Mineral Oil Base

4. The mineral oil used in reducing the soaps shall be at least 180 seconds viscosity at 100 degrees F. on a Saybolt Universal Viscosimeter.

Saponifiable Fat Base

5. Not over 10 per cent of either pure tallow oil, Neats Foot oil, lard oil or horse oil, singly or in combination, to be used as a fat base.

Acidity

6. When applied to polished copper, there shall be no reaction after a period of 48 hours.

Heat Test

7. When 2 oz. of the grease are heated to 212 degrees F. or until the entire mass becomes liquid and then allowed to cool, there shall be no separation of the soaps from the oil.

Fillers

8. The grease shall not contain fillers of any kind, such as resin, resinous oils, soap stone, wax, talc, powdered mica, lamp black, sulphur, clay, asbestos or any other artificial thickening.

CUP GREASES

Specifications for medium cup greases, as specified and approved by the Signal Corps, Ordnance Department, Quartermaster's Corps and U. S. Navy, are endorsed for use on this 6-ton tractor, 10 pounds of this grease herewith specified for use on 6-ton tractor. This grease will be left in cups and oiling devices when shipment is made.

CUP GREASE SPECIFICATIONS

General

1. This grease shall be a well manufactured product, composed of calcium soap and mineral oil and must be suitable in every way for the lubrication of such parts of engine equipment and other machinery as are lubricated by means of compression cups.

Consistency

2. The grease shall be a medium cup grease similar in consistency to a standard sample of No. 3 grease.

Moisture

3. The grease shall be a boiled grease, containing not less than 1 per cent nor more than 3 per cent of moisture when finished.

Saponifiable Fat Base

4. From 15 per cent to 20 per cent of either pure tallow oil, Neat's Foot oil, lard oil, or horse oil, singly or in combination, to be used as a fat base.

Mineral Oil Base

5. The mineral oil used in reducing the soaps shall be at least 180 seconds viscosity at 100 degrees F. on a Saybolt Universal Viscosimeter.

Acidity

6. When applied to polished copper, there shall be no reaction after a period of 48 hours.

Heat Test

7. When 2 ounces of the grease are heated to 212 degrees F. or until the entire mass becomes liquid and then allow to cool, there shall be no separation of the soaps from the oil.

Fillers

8. The grease shall not contain fillers of any kind such as resin, resinous oils, soapstone, wax, talc, powdered mica, lamp black, sulphur, clay, asbestos or any other artificial thickening.

TRACK

The following specifications on oils to be used on oiling track rollers, track links and track pins on the 6-ton tractor will be governed by the specifications for gear chain and wire rope lubricant as specified and approved by the Signal Corps and Quartermaster's Department. Six gallons of this lubricant are hereby specified for running in.

SPECIFICATIONS OF TRACK LUBRICANT

General

1. This lubricant must be a very adhesive, heavy bodied, straight mineral oil, suitable in every way for lubrication and protection.

Character

2. The oil must be a hydro-carbon product only, without the mixture of vegetable or animal oils, products or residues or fats of any kind, and entirely free from fillers such as talc, resin, tar or materials of similar or other nature not related to the original product.

Viscosity

3. The viscosity in seconds on the Saybolt Universal Viscosimeter at 212 degrees F. shall come within the following limits: 900 seconds to 1100 seconds.

Quality

4. The quality shall be similar to that of a standard sample of crater compound No. 1.

Adhesiveness

5. As this is one of the most necessary qualifications for this oil and there is no laboratory method for suitably indicating the value of this characteristic, the adhesiveness will be determined by applying the lubricant to a track operating under practical conditions, the effect produced by the lubricant as compared to the effect produced by the standard sample of Texaco crater compound to be taken as a basis of comparison.

Corrosion Test

6. When the lubricant is applied to a plate of polished steel, the steel is to be protected for a period of 30 days from vapors from chemicals and from the action of salt or fresh water and of solutions of water containing from 10 to 25 grains of sulphuric acid per unit, the water and solutions to be at 60 degrees F.

LUBRICATION INSTRUCTIONS

Every point indicated on the lubrication chart should be attended to with the frequency indicated in the following instructions.

After each part mentioned on the lubricating instructions and indicated on lubrication chart will be found a figure, which indicates the kind of oil or grease best suited to the lubricating needs of each part. The meaning of the various letters is as follows:

- 2—Gasoline engine oil, Specification 3502.
- 5—Non-fluid transmission lubricant, Specification 3505.
- 4—Transmission lubricant, Specification 3504
- 6—Medium cup grease, Specification 3506.

ENGINE

CAPACITY FOUR GALLONS—NO. 2, DAILY ATTENTION

The oil supply is carried in the crankcase which has a capacity of 4 gallons. The oil is poured in the combination breather and filler opening. There is a rod gauge on the right side of the engine which is pulled out by the handle, wiped off and re-inserted after which it is again pulled out to determine the oil level. There is an indicating mark for full, and another for empty. When full the crankcase contains 4 gallons. When the empty mark is indicated there are $1\frac{1}{2}$ gallons in the crankcase.

In filling the crankcase open the upper try cock on the priming sump of the crank case and pour in oil until it starts to flow from this cock. Then shut cock and replace cap on filler opening.

Too much oil should be guarded against as well as too little. Too much will foul the cylinders and dirty the plugs causing misfiring and carbon formation in the combustion chamber.

Once a month the drain plug on the bottom of each of the two crank case sumps should be removed and all the oil allowed to drain out. Before refilling with fresh oil it is desirable that the crank case be flushed with kerosene. To do this, close drain plugs, pour in 3 gallons of kerosene through filler, run engine slowly for 15 seconds, *but not longer*, then drain crank case again and put in 4 gallons fresh oil.

MAIN CLUTCH

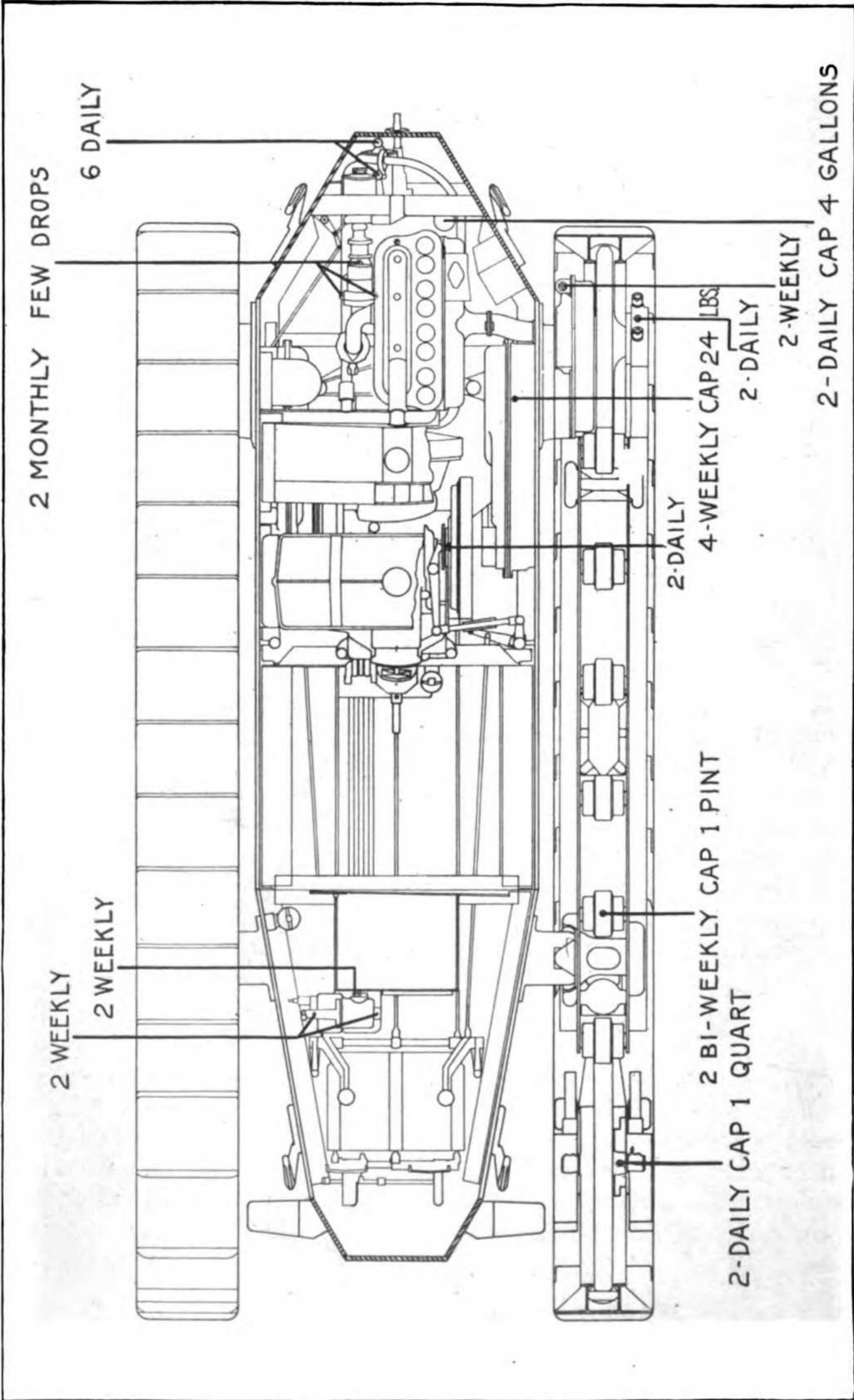
CAPACITY FOUR OUNCES—NO. 2 WEEKLY

The main clutch has an oil opening in the housing or face which supplies a wick feed to the ball thrust bearing at the forward end. This should be kept supplied as this bearing takes the thrust load of the clutch spring. A thin wire inserted in the hole will aid in the injection of the oil. The driving member also rotates on this bearing in relation to the driven member when the clutch is slipped.

MAIN CLUTCH THROWOUT

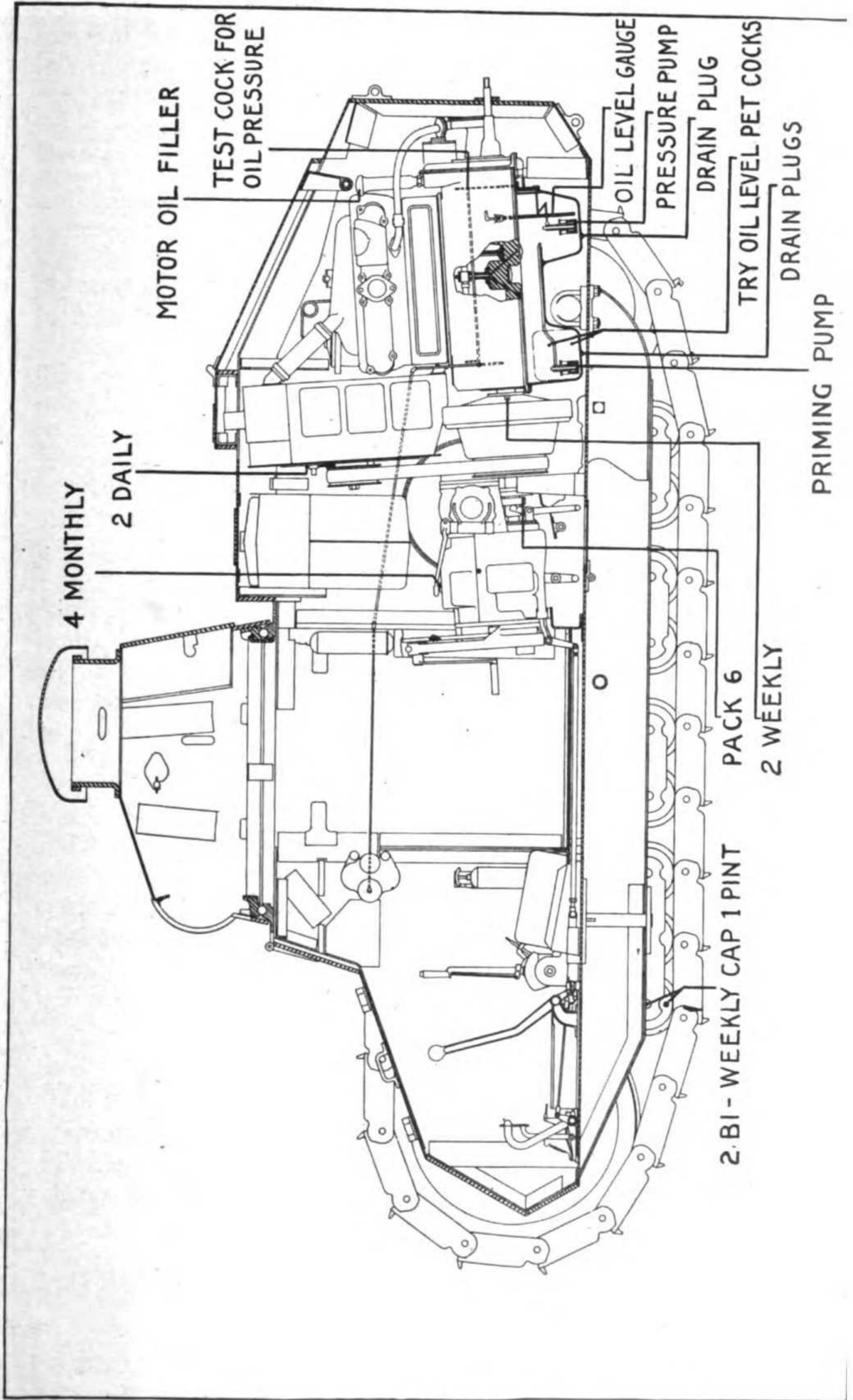
PACK WITH NO. 6—MONTHLY

The clutch throwout should be kept packed in grease. It is located just behind the main clutch assembly and must take the load when the



OILING DIAGRAM, PLAN VIEW, SHOWING SPECIFICATION OF LUBRICANT TO BE USED AND FREQUENCY FOR ADDITIONAL POINTS SEE ELEVATION

Plate No. 4



clutch is slipped. There is a ball thrust against which the throwout bears. To repack remove bolts holding universal in place and separate parts far enough to introduce grease with gun.

MAIN CLUTCH ALIGNMENT JOINT

This joint is located between the clutch and transmission. Its forward end is lubricated by the oil placed in the clutch lubricator which flows through the hollow shaft of the clutch and thence to the joint. The rear end is oiled by the lubricant which works its way from the forward end; hence a plentiful supply of oil applied in the clutch oilers will take care of these parts.

TRANSMISSION

NO. 4 MONTHLY

The gearset runs on ball bearings throughout which are lubricated along with the gears themselves by the distributing action of the rotating gears in the lubricant. The case is supplied by removing the plug in the cover plate. Fill to level of lower or main shaft.

If too much lubricant is used it will heat from the friction of churning and the oil will become thin and work out the ends of the bearings. Every month the lubricant should be drained out, the drain plug replaced, kerosene put in and the transmission run for five minutes in neutral to thoroughly wash it out, then drain and refill with fresh lubricant.

STEERING CLUTCHES

NO. 2 DAILY

The steering clutches are similar to the main clutch, being inverted cones and are lubricated in the same manner by means of oilers placed in the housing. The transverse shaft carrying the driving member of the clutch runs on ball bearings. The connection to the driving member is through a splined shaft. The oiler takes care of the entire unit.

SPUR GEAR REDUCTION

NO. 2 WEEKLY

Two oil holes are provided on the spur gear reduction which carries the drive from the steering clutches outboard to the track. The reduction gears operate in a case inside the armor plate and another outside and the oil holes take care of each of these cases.

TRACK SPROCKET

NO. 2 DAILY

An oil hole closed by a plug is provided on each track drive sprocket. The oil level should be kept just below the shaft which drives the track

and which carries the sprocket. The oil takes care of the plain bearing upon which the sprocket is mounted and also the engaging faces of the sprocket wheel.

TRACK ROLLERS

NO. 2 BI-WEEKLY ATTENTION

A point for lubrication is provided on each track roller, at the center axis of the roller. These oil holes take care of the bearing about which the roller revolves.

Distribution on the roller is secured by a hole drilled to the center through the middle of the track gudgeon. A hole is then bored diametrically in the middle of the roller to meet the other hole. This provides ample lubrication and must be taken care of regularly because the entire weight of the tractor is distributed over these bearings.

TRACK RAIL

OIL BATH DAILY

No provision is made on the track itself for lubrication between the roller and the rail. At a base where a number of the tractors are permanently stationed or at an assembly base an oil pond makes a quick and advantageous method of handling the work efficiently.

TRACK OIL POND

The pond should be thirty feet in length and at least 7 feet wide and 8 inches deep. The tractors can be run through this in succession, thus cleansing and oiling in one operation. Where the pond plan is not possible swabbing will have to be relied upon. The specifications for track lubrication have been outlined on page 18.

TRACK IDLER

NO. 2 DAILY

Oil plugs are provided on the hubs of the front idler or blank sprocket. These are on the outside of the idler hubs and supply a reservoir surrounding the axle, providing a lubrication for the bearing which carries the wheel.

CONTROL UNITS

NO. 2 WEEKLY

Three oil holes are provided in the control set to the right of the driver's seat. These lubricate the shifter mechanism.

ENGINE ACCESSORIES

FAN

NO. 2 DAILY

The fan is oiled through a tube just above the upper fan pulley.

MAGNETO

2 DROPS, NO. 2 MONTHLY

Two drops only of a light, clean oil, injected into the oil wells every month or so will be sufficient. One of these oil wells is located on the distributor housing, oiling the armature ball bearing, the distributor plain bearing and oil well in the timing lever body. The other oil well is located on the extension of the end plate near the driving shaft and lubricates the ball bearing on the end of the magneto.

WATER PUMP

NO. 6 DAILY

There is a grease cup located on each side of the water pump. These should be given two turns daily and refilled when necessary.

MAINTENANCE ROUTINE

It is essential for the proper care and maintenance of the 6-ton tractor that the following maintenance routine schedule be rigidly adhered to. Preparedness for emergencies can only be obtained by keeping these tractors in excellent condition and this necessitates a regular maintenance routine.

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

DAILY MAINTENANCE ROUTINE

ENGINE

Examine all wiring terminals for tightness.

Clean magneto externally.

Note tension of fan belt.

Inspect oil pump for performing its function, by means of pump pressure cock.

Inspect radiator water supply.

Inspect gasoline tank for proper fuel supply.

Inspect pipe line and all connections for leaks.

GENERAL

Inspect and thoroughly clean all track parts and exterior. See that tools are in place.

CONTROLS

Inspect controls for proper functioning.

WEEKLY MAINTENANCE ROUTINE**ENGINE**

Inspect all wires for proper support and freedom from damage.

Thoroughly clean engine externally.

Inspect for oil leaks.

Try oil pressure cock for pump action.

Inspect control connections.

Try governor for accurate functioning.

Inspect all water connections for leaks.

Keep engine free from carbon, inject a tablespoonful of kerosene into each cylinder through the spark plug holes. This should be inserted when the motor is hot and left standing over night.

Remove, clean and adjust all spark plugs.

Remove magneto distributor cover and clean with gasoline.

Operate engine at low speed and with one wire at a time separate it from spark plug, inspect the spark given for length and apparent hotness.

Drain water and dirt from water trap in gasoline line.

Inspect carbureter control connections and connections with governor.

Do not attempt to alter adjustment of carbureter or governor unless this is shown to be necessary when tractor is in service.

Inspect motor oil drain cocks and drain plugs for loss of oil.

BRAKES

Inspect and thoroughly clean all brake connections.

CLUTCH

Inspect main and steering clutches for wear and proper operation and adjustment.

MONTHLY MAINTENANCE ROUTINE**MAIN CLUTCH**

Thoroughly clean and inspect all pedal connections.

TRANSMISSION

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

STEERING

Thoroughly clean and inspect all steering clutch linkage.
Try action to ascertain damage if any.

TRACK

Check over all track parts for tightness. See that rollers revolve freely and that the dirt is removed from shoes. Examine for pin wear.

GENERAL

Inspect speedometer drive for reliability, also gauges.

IGNITION

Clean magneto collector ring, drain and adjust breaker points.
Inspect cam spark lever for correct advance.

ENGINE

Inspect cylinders for carbon.
Inspect valves and grind if necessary.
If engine has had unusual amount of use, remove and inspect engine bearing.
Clean oil pump screens.
Drain carbureter and clean screen.

TURRET

See that turret rotates freely.
Inspect turret brake for wear.

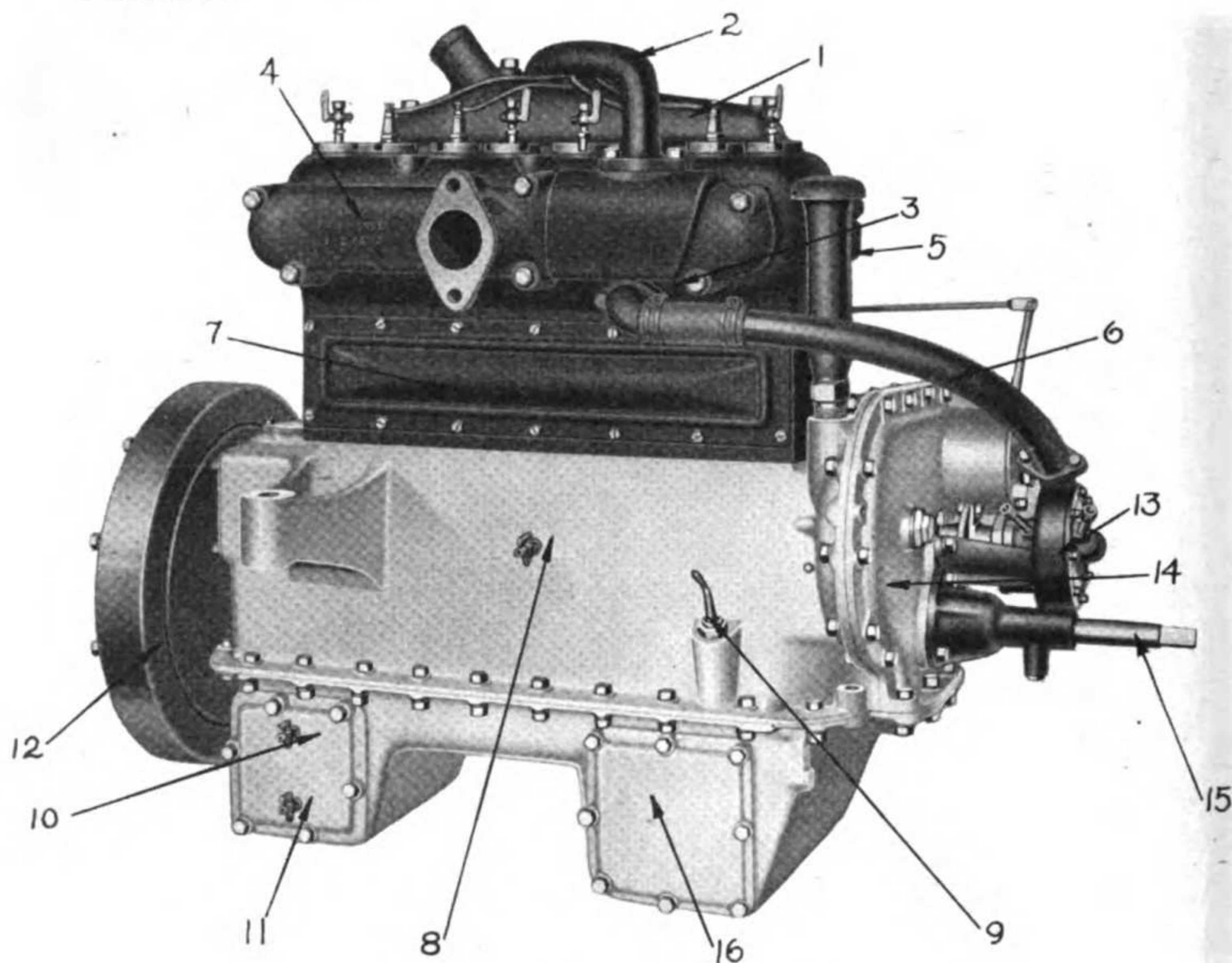
CHAPTER II

ENGINE GROUP

GENERAL SPECIFICATIONS

Engine type	Four cycle
Number of cylinders	Four
Cylinder shape	L-head
Bore	4 $\frac{1}{4}$ inches
Stroke	5 $\frac{1}{2}$ inches
Piston displacement	312 cubic inches
Brake horsepower	40 at 1300 r. p. m.
Cylinders cast	In block
Cylinder material	Grey iron
Piston material	Grey iron
Piston length	5 $\frac{3}{8}$ inches
Piston clearance at top land02 inch
Piston clearance second land012 inch
Piston clearance at skirt004 inch
Spare pistons04 inch over size
Number of piston rings	Three per piston
Type of ring	Eccentric
Piston pin	Steel tube
Piston pin diameter	1 $\frac{1}{8}$ inch
Piston pin length	4.3 inch
Connecting rod	I-beam forging
Connecting rod length	12 $\frac{1}{4}$ inch
Upper rod bearing	1 $\frac{1}{8}$ inch diameter x 2 $\frac{1}{8}$ inch length
Lower rod bearing	2 $\frac{1}{8}$ inch diameter x 2 $\frac{1}{2}$ inch length
Camshaft	Drop forging
Number of camshaft bearings	Three
Front camshaft bearing	2 $\frac{1}{2}$ inch diameter x 2 $\frac{1}{16}$ inch long
Center camshaft bearing	2.379 inch diameter x 1.5 inch long
Rear camshaft bearing	1.878 inch diameter x 1.5 inch long
Crankshaft bearings	Three
Front crankshaft bearing	2 $\frac{1}{8}$ inch diameter x 3 $\frac{1}{8}$ inch long
Center crankshaft bearing	2 $\frac{1}{4}$ inch diameter x 2 $\frac{3}{4}$ inch long
Rear crankshaft bearing	2 $\frac{3}{8}$ inch diameter x 4 inch long
Valve material	Tungsten steel
Valve type	Poppet

Plate No. 5



EXHAUST SIDE OF ENGINE

- | | |
|------------------------------|--------------------------------|
| 1. Water outlet. | 9. Oil level gauge. |
| 2. Hot air pipe. | 10. Oil level test cock, high. |
| 3. Water inlet from pump. | 11. Oil level test cock, low. |
| 4. Exhaust manifold. | 12. Flywheel. |
| 5. Oil filler and breather. | 13. Water pump. |
| 6. Water inlet pipe. | 14. Timing gear case. |
| 7. Valve action cover plate. | 15. Starting crankshaft. |
| 8. Oil pressure cock. | 16. Oil sump cover plate. |

ENGINE GROUP

GENERAL SPECIFICATIONS—Continued

Valve diameter	1 27/32 inch
Valve stems	7/16 inch diameter x 7 27/32 inch length
Oiling system	Pressure feed
Water circulation	Centrifugal pump
Gasoline feed	Vacuum
Radiator	Tubular type
Ignition	High tension magneto
Magneto type	Eiseman G4-2

ENGINE GROUP—GENERAL DESCRIPTION

ENGINE.

The engine is mounted longitudinally within the tractor body at the rear end. It is a specially designed four-cycle, four-cylinder type with block cast L-head cylinders having a bore of $4\frac{1}{4}$ and a stroke of $5\frac{1}{2}$ inches. The brake horsepower is approximately 52 at 1900 r. p. m. The piston displacement is 312 cubic inches.

The cylinder block, water header, crankcase and oil pan are all separate, the latter two being aluminum. The cylinders and water header are cast from grey iron. The engine assembly includes a governor, water pump and Eisemann Magneto, all driven from the timing gears, and a Wheeler-Schebler Carbureter.

PRINCIPLE OF FOUR-STROKE CYCLE.

The engine is of the four-cycle type. The four strokes of the cycle are popularly termed as follows: suction stroke, compression stroke, expansion or working stroke, and scavenging stroke.

1. The intake stroke is the downward motion of the piston which sucks the explosive charge into the cylinder through the intake valve.

2. The compression stroke is the upward stroke of the piston which compresses the charge in the upper part of the cylinder.

3. Ignition is caused by the spark at the spark plug igniting, the compressed charge in the upper part of the cylinder known as the combustion chamber. The expansion of the exploded gases forces the piston down to the bottom center, this being the power stroke.

4. Near the bottom center on the exhaust stroke, the exhaust valve opens, and as the piston moves upward it forces out the burned gases, clearing the cylinder in preparation for a repetition of the cycle.

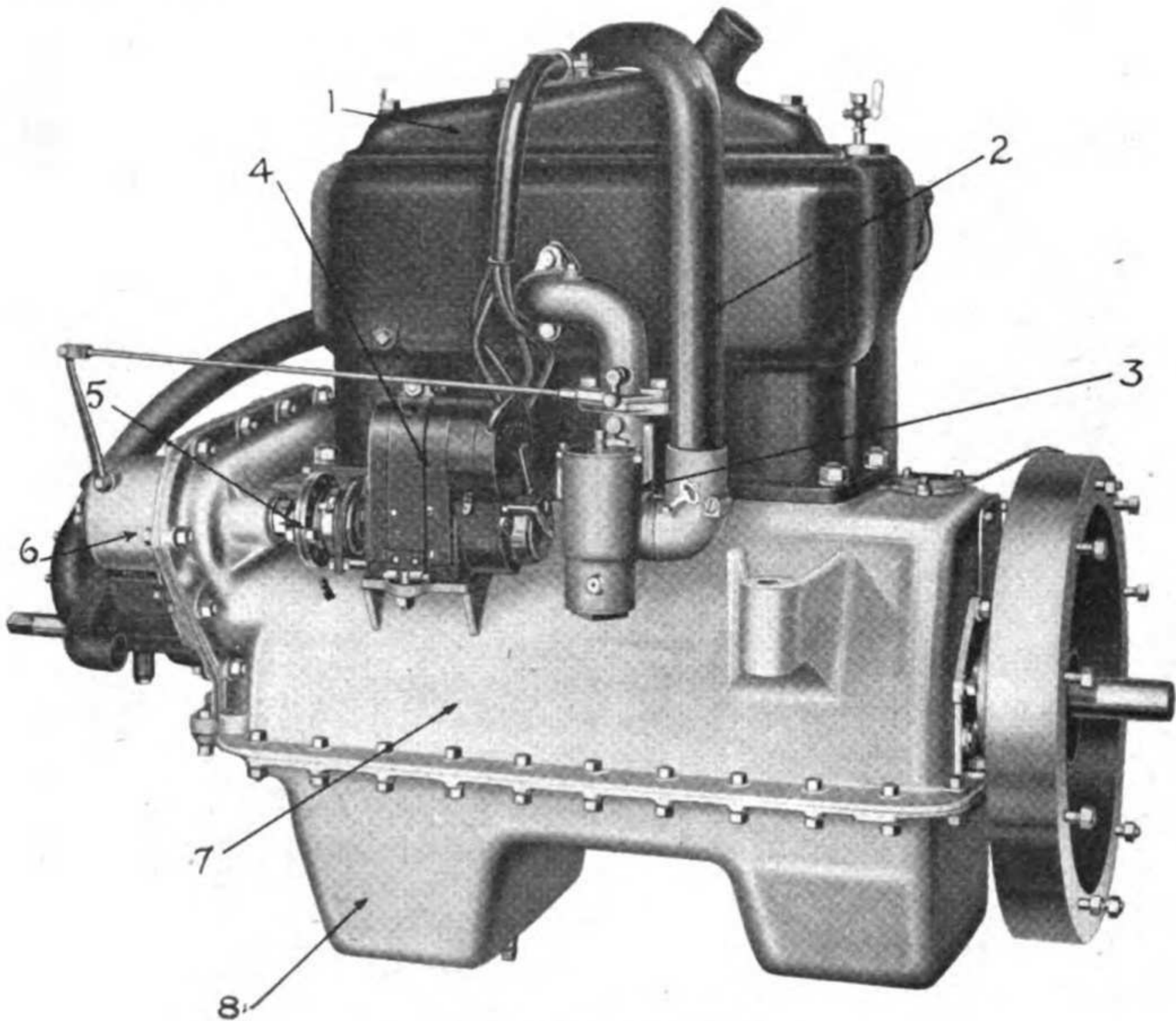
CYLINDERS.

The cylinders are cast in block, and are of grey iron. They are provided with water jackets cast integral with them.

PISTONS.

The pistons, of which there are four, are of cast iron, and are each $4\frac{1}{4}$ inches in diameter at the bottom and $5\frac{3}{8}$ inches long. The piston head is smaller in diameter than the piston skirt, because all the heat to which the piston is subjected is applied to the piston head, thus causing it to expand to a greater degree than the skirt.

The proper clearance between cylinder and piston at the top land is .02 inch at the second land .012 and at the skirt .004. The spare part pistons are .04 inch oversize.



ENGINE INTAKE SIDE .211

- | | |
|------------------|----------------------------|
| 1. Water header. | 5. Magneto drive coupling. |
| 2. Hot air pipe. | 6. Governor case. |
| 3. Carbureter. | 7. Crankcase. |
| 4. Magneto. | 8. Oil pan. |

TO REMOVE PISTON

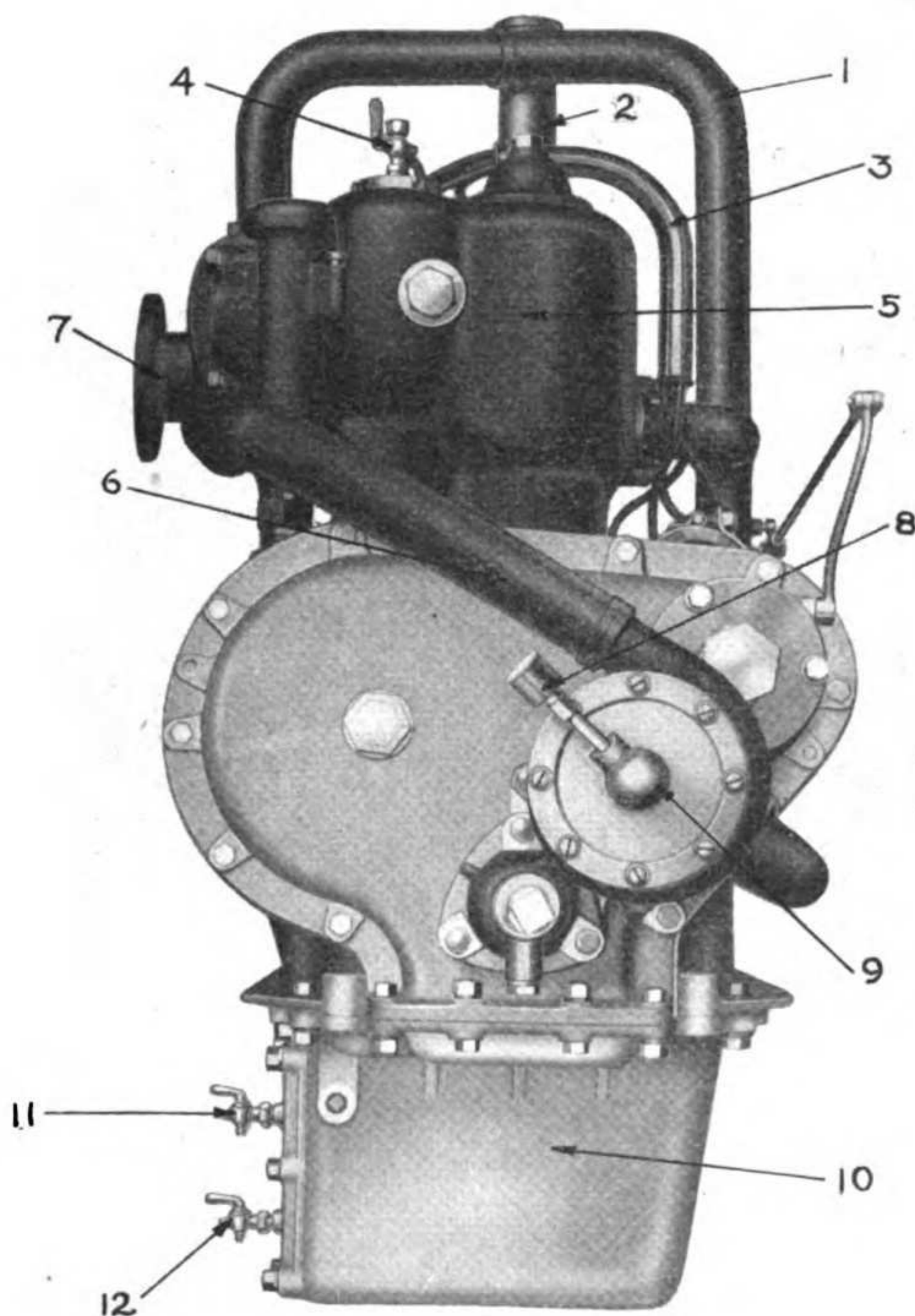
The pistons at the rear can be removed from the bottom through the engine crank case after taking off the oil pan by removing the flange bolts at the flywheel end; the front pistons can not be removed without first taking out the crankshaft. See page 46.

PISTON RINGS

To each piston there are three piston rings. These are of cast iron .249 inches wide, and are eccentrically machined. They are .1875 inches and .125 inches thick. They are split at an angle of 45 degrees.

The piston rings pack the piston, preventing the gases under pressure from leaking down into the crank case, between the cylinder and piston. They also prevent the lubricating oil from working up into the combustion chamber.

The proper gap between the ends of the top piston ring is .009 inch.



TIMING GEAR END OF ENGINE

- | | |
|-----------------------------|---------------------------|
| 1. Hot air pipe. | 7. Exhaust pipe. |
| 2. Water outlet pipe. | 8. Water pump grease cup. |
| 3. Wire conduit. | 9. Water pump. |
| 4. Petcock and priming cup. | 10. Oil pan. |
| 5. Cylinder casting. | 11. Oil level cock, high. |
| 6. Water inlet pipe. | 12. Oil level cock, low. |

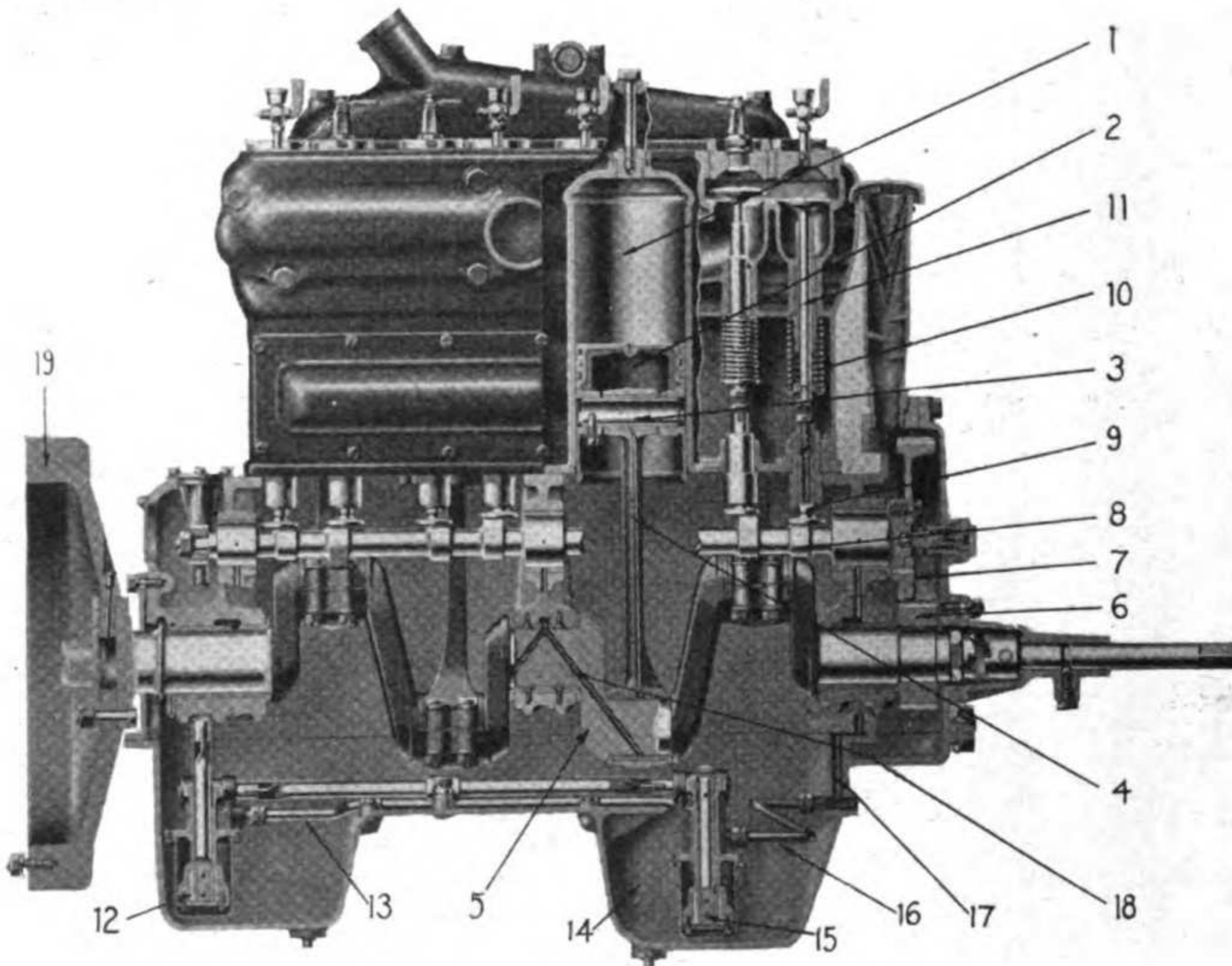
INSTALLATION OF PISTON RINGS

The piston rings should be placed up into the cylinder before they are applied to the piston, and fitted (filed) if necessary, to secure the proper gap between the ends of the ring.

Before the rings are installed on the piston they should be rotated around the piston in the piston ring groove to insure a proper clearance up and down which is about .001 of an inch.

The rings should be placed in grooves over skids made of three or four pieces of tin or very thin light gauge sheet iron about 2 inches long

Plate No. 8



PARTIAL LONGITUDINAL SECTION THROUGH ENGINE

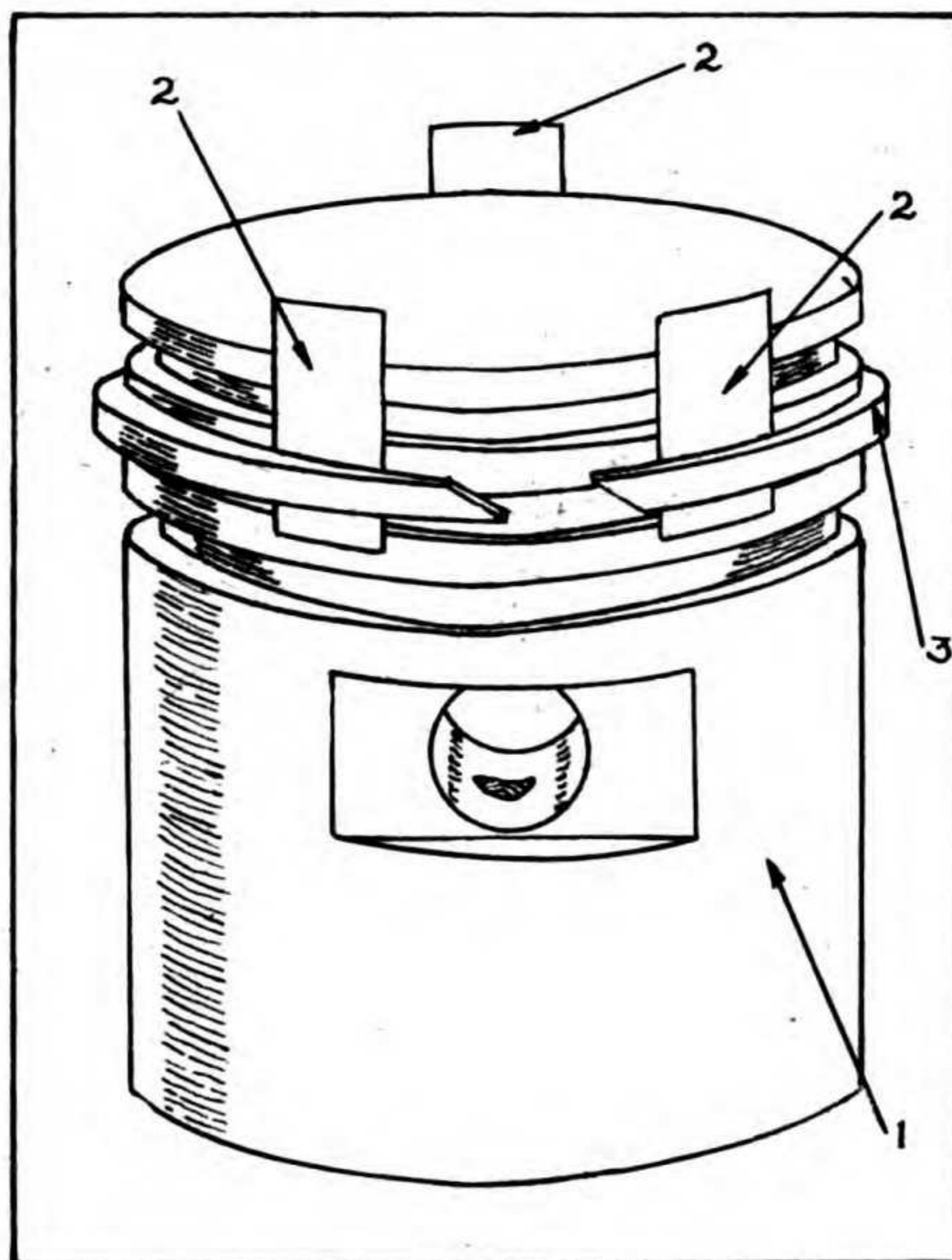
- | | |
|---------------------------------|----------------------------------|
| 1. Cylinder. | 11. Valve stem. |
| 2. Piston. | 12. Oil priming pump. |
| 3. Piston pin. | 13. Oil priming lead. |
| 4. Connecting rod. | 14. Oil delivery sump. |
| 5. Crankshaft. | 15. Oil delivery pump. |
| 6. Timing gear (crankshaft). | 16. Oil delivery pipe. |
| 7. Timing gear (camshaft). | 17. Oil delivery lead. |
| 8. Camshaft with cams integral. | 18. Oil lead through crankshaft. |
| 9. Valve push rod. | 19. Flywheel. |
| 10. Valve spring. | |

by $\frac{3}{8}$ inches wide, the rings being pushed down evenly all around to prevent any twisting of the rings which might result in distortion and uneven bearing on the cylinder wall.

PISTON RING TROUBLES

In fitting the piston into the cylinder, caution should be exercised not to push up the piston too high into the cylinder, for if this is done, the top ring will expand out into the combustion chamber, and the piston cannot be pulled down again.

If this happens, both valve caps should be removed and the piston ring compressed as much as possible with the aid of screw drivers or similar tools until the piston can be pulled down. In case it is



METHOD OF REMOVING AND REPLACING PISTON RINGS

1. Piston. 2. Metal Strips. 3. Piston ring.
 Strips are inserted beneath ring to enable ring to be slipped off readily.

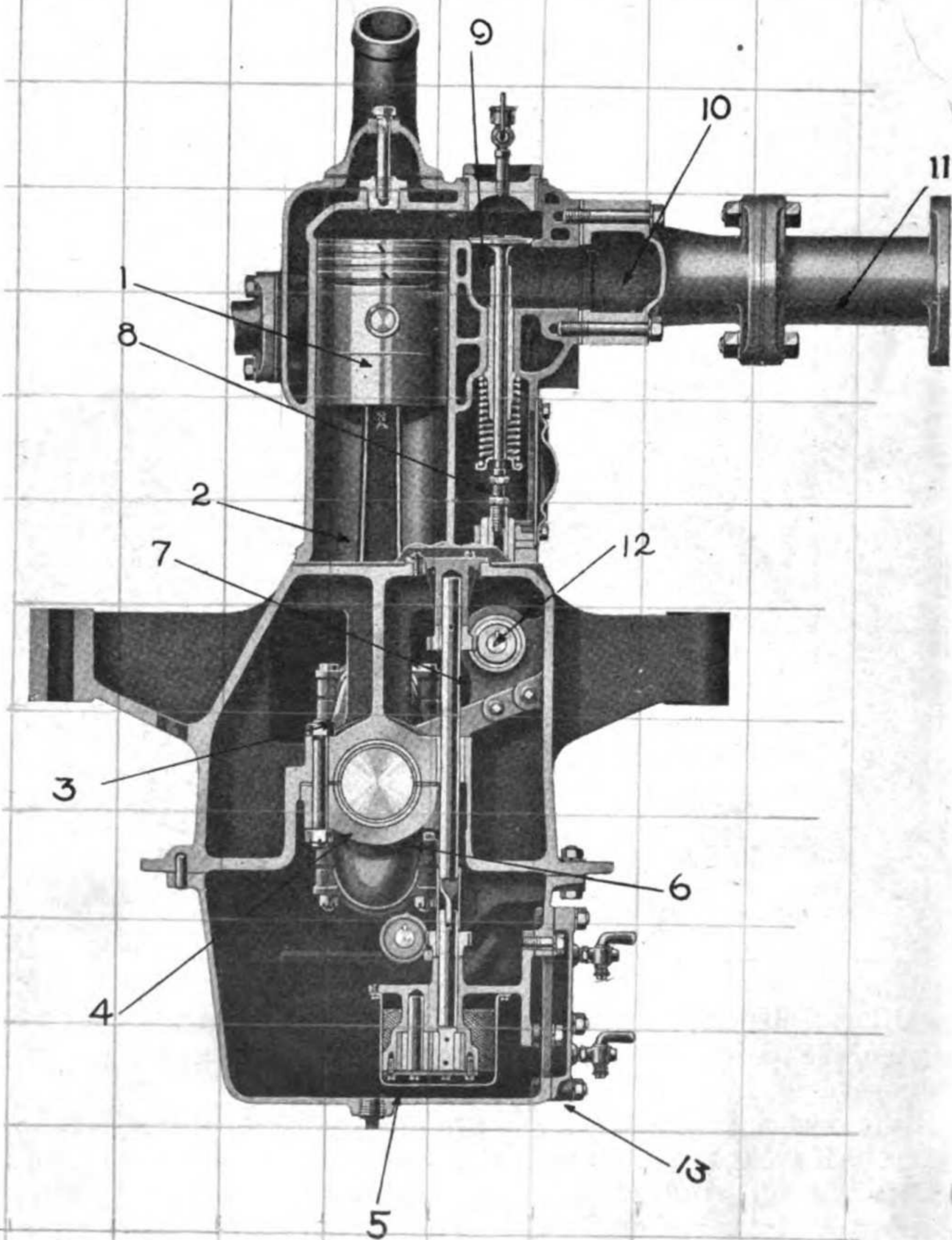
found impossible to compress the ring sufficiently to permit the removal of the piston down to its proper place again, the piston ring may be broken and the pieces removed.

If the rings are not stiff enough, or have insufficient wall pressure, the oil will work up past them into the combustion chamber. The bottom edge of the piston ring must in all cases be very sharp and square to scrape the oil off the cylinder wall as the piston comes down.

PISTON PIN

The piston pins are of steel tubing 1.125 inches in diameter and 4.3 inches long. In each piston boss there is $\frac{5}{16}$ inch set screw which holds the piston pin about which oscillates the upper connecting rod bearing.

Plate No. 10



TRANSVERSE SECTION THROUGH ENGINE

- | | |
|-----------------------------|----------------------------|
| 1. Piston. | 8. Valve adjustment point. |
| 2. Connecting rod. | 9. Exhaust valve and port. |
| 3. Connecting rod cap bolt. | 10. Exhaust header. |
| 4. Connecting rod cap. | 11. Exhaust extension. |
| 5. Oil pan. | 12. Camshaft. |
| 6. Crankshaft. | 13. Oil pump cover plate. |
| 7. Oil pump driveshaft. | |

TO LOCATE WEAR IN THE PISTON PIN BEARING

If the piston is in place in the engine and the lower crank case is down, remove a valve cap, turn engine over so that piston is on top dead center in such a position that a screw driver may be inserted in the valve cap pocket, then pry down on top of the piston, while with a bar the piston may be pushed upward from under the side of case, then by alternately moving piston up and down, any play may be detected.

In case the piston and rod have been removed from the engine, place the connecting rod in a vise and hold the piston in the same position in which it has always worked on the pin, then by trying to rock the piston in the direction of the length of the pin, wear may be detected.

PISTON PIN BEARING

The upper end of the connecting rod contains a bronze bushing in which the piston pin fits. This acts as the bearing surface. The bushing is driven in the upper end of the rod.

TO ALIGN PISTON AT RIGHT ANGLES TO CRANKSHAFT

With the cylinder removed and the connecting rod and piston in position a level may be used to ascertain parallelism between the top of the piston and the top of the crankcase, which is parallel to the center lines of the crankshaft. Or a pair of calipers may be used to determine uniformity of distance between the top of the crankcase and the under side of a piston ring on all sides of the piston. Or with a straight edge laid across the top of the piston lengthwise of the engine, the distance to the crankcase may be measured at its ends.

CONNECTING ROD

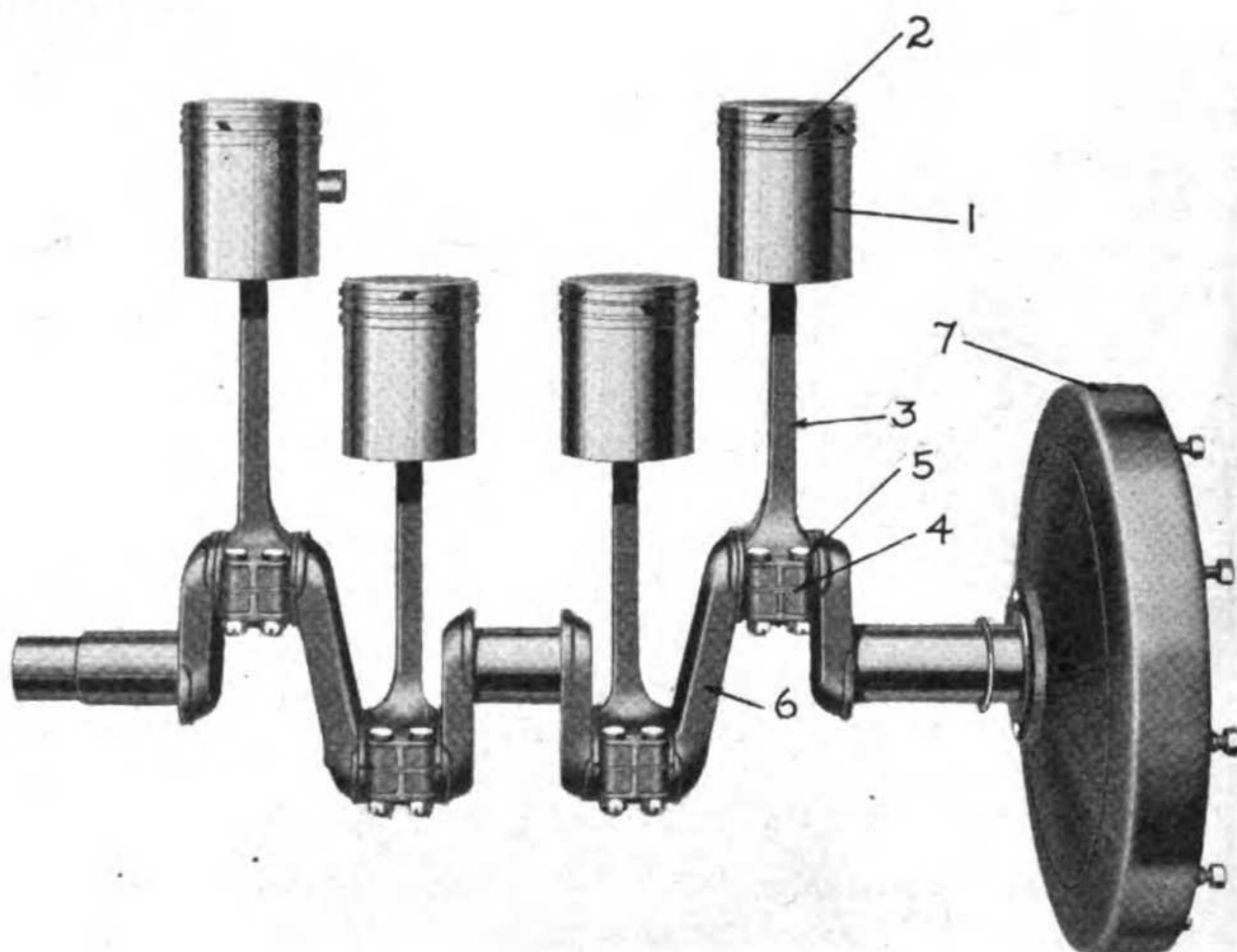
The connecting rod through which the force of the explosion is transmitted to the crankshaft is an I-shaped steel forging, $12\frac{1}{4}$ inches long from center to center of the bearings. The upper bearing contains the piston pin as described. It has a diameter of $1\frac{1}{8}$ inches and length of $2\frac{1}{8}$ inches.

The lower bearing is $2\frac{1}{8}$ inches in diameter and $2\frac{1}{2}$ inches long, and is lined with a babbitt metal bushing. The cap of the bearing is held in place by four bolts each $\frac{7}{16}$ inches in diameter.

TO ADJUST CONNECTING ROD BEARINGS

In replacing connecting rod bearings (if the crankshaft is out of the crankcase) it is best to place the crankshaft in a vise and adjust the bearings to the shaft while in this position, as the work can be done more readily.

The ends and round corners of the connecting rod bearings may be sized before they are placed in the rod or cap. In case an end flange



PISTON CONNECTING-ROD AND CRANKSHAFT ASSEMBLY

1. Piston.
2. Piston rings.
3. Connecting rod.

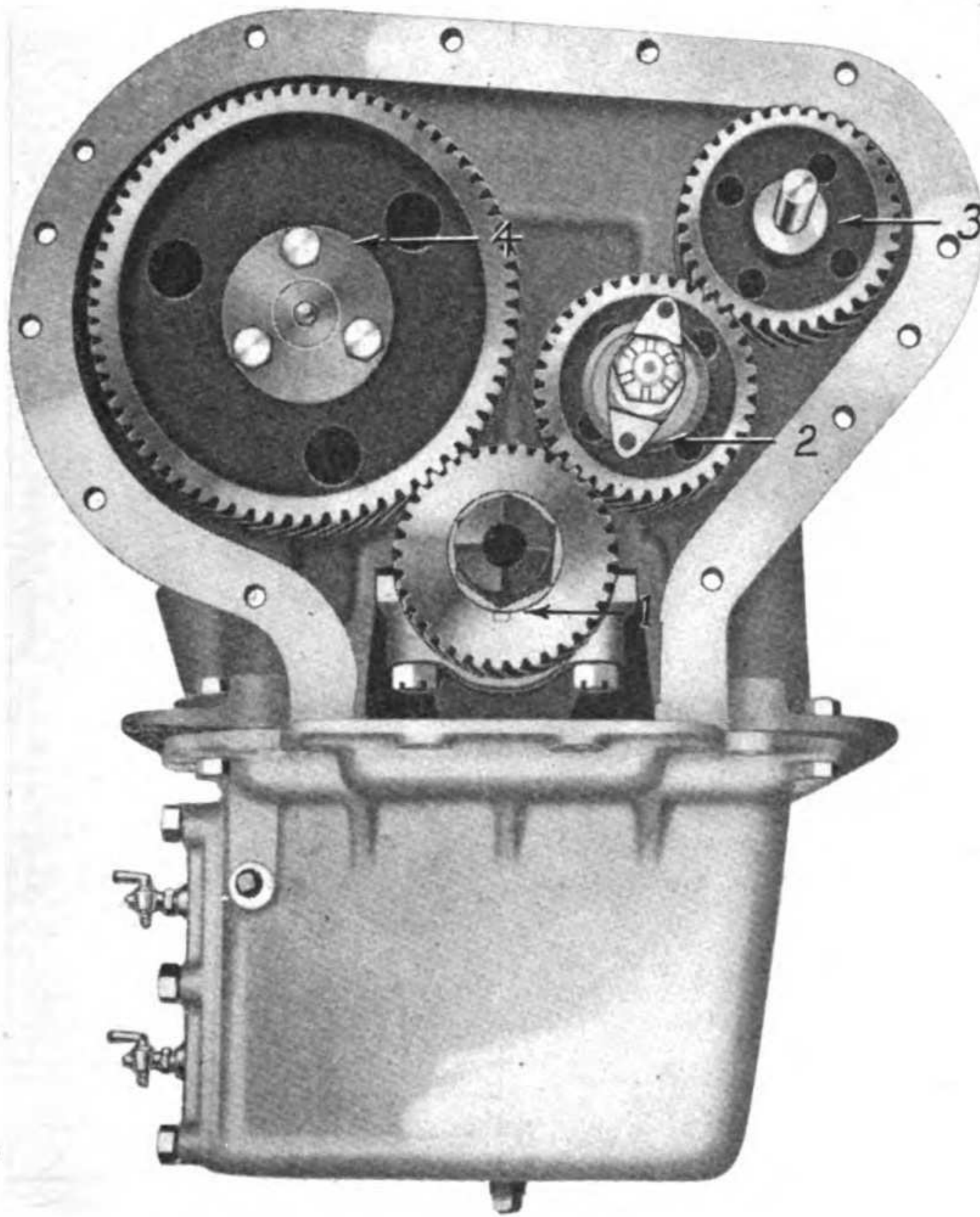
4. Connecting rod bearing shim.
5. Connecting rod cap bolts.
6. Crankshaft.

should be broken off the bearing liner, it may be soldered on with half and half solder, care being taken to prevent melting the bearing with the soldering iron.

The sides of the bearing liner next to the shaft should be filed or scraped down for a distance of about $\frac{1}{4}$ inch to $\frac{3}{8}$ inch to prevent contact with crankshaft and prevent side pressure also to aid lubrication.

After the connecting rod has been fitted, the piston should be lined up with the top of crankcase. When the bearing has been scraped in and bears well all over, it should be adjusted just so tight that the piston and rod, when same are at an angle of 45 degrees to the vertical, will just maintain their position and slight pressure down will cause them to fall.

The tightness of the bearings is controlled by the thickness of the shims against which the caps are drawn up snug after a bearing has been properly scraped in and every nut must be tightened by drawing the caps against the shims solidly, but never strained. The shims are illustrated on page 41. If a castellated nut is tight when in such a position that cotter pin hole does not line up, the nut should be re-



TIMING GEAR SET

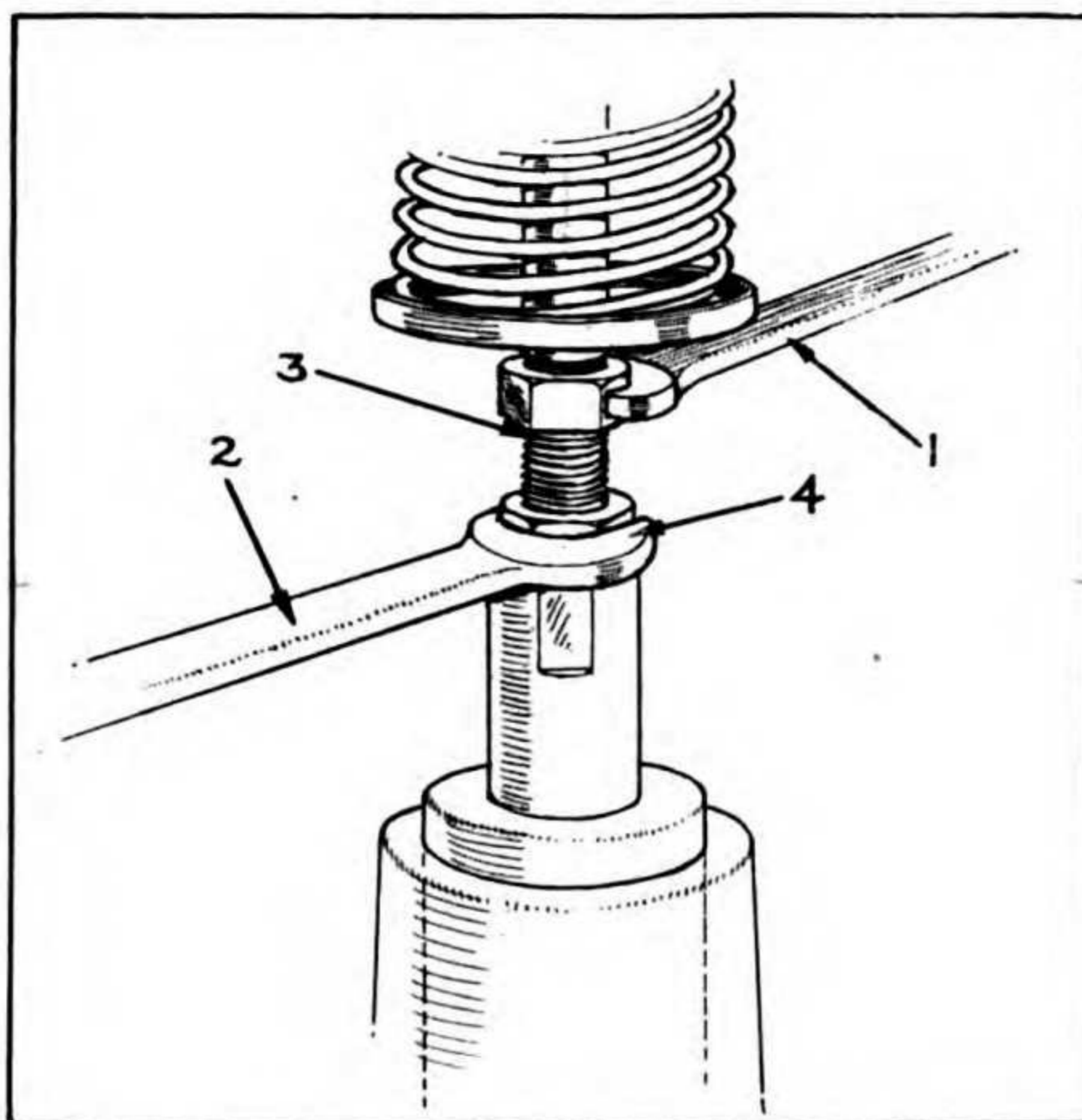
- | | |
|---------------------|-------------------------------------|
| 1. Crankshaft gear. | 3. Magneto and governor drive gear. |
| 2. Water pump gear. | 4. Camshaft or half time gear. |

moved and light cut taken off face of nut with a file permitting its being turned to a proper position so that the cotter pin can be inserted when tight.

CAMSHAFT

There is one camshaft actuating all intake and exhaust valves. The camshaft is driven by means of helical gears from the crankshaft, and is of forged steel, heat treated, hardened and ground, with the cams made integral with the shafts.

The front bearing is $2\frac{1}{2}$ inches in diameter by $2\frac{1}{16}$ inches long. The center bearing is 2.0312 inches in diameter and 1.5 inches long, while the rear bearing is 1.878 inches in diameter and 1.5 inches long.



METHOD OF VALVE ADJUSTMENT

- | | |
|--------------------------|---------------------------------|
| 1. Adjusting nut wrench. | 3. Threaded adjustment. |
| 2. Lock nut wrench. | 4. Lock nut to hold adjustment. |

CAMSHAFT BEARING WEAR

As a result of lack of support of the camshafts by center bearing, due to wear, there would be a tendency for the camshafts to spring down, as the high part of the cams passed under the tappet rollers because of the valve spring pressure. The valves would open a sufficient distance to permit of proper intake and exhaust. The bending of the shaft would cramp them at the end bearings, also wear and possibly cramp the teeth of the timing gears, on account of the misalignment.

TO REMOVE CAMSHAFT

It is first necessary to remove engine from the tractor, then remove the crankcase front cover, remove valve spring assemblies which relieves spring pressure on cams, then remove camshaft which is designed to come out of front end of engine as each bearing is smaller than the next allowing the shaft to come through.

VALVES

There are two valves of the poppet type in each cylinder, an intake valve and an exhaust valve, with functions as indicated by their names.

The valves are of tungsten steel, $1 \frac{27}{32}$ inches in diameter.

The valve stems are of machine steel electrically welded on to the heads. They are $7/16$ inches in diameter, and $7\ 27/32$ inches long overall. The stems move in cast iron guides. The guides are forced into place in the cylinder block in a manner that permits of their being knocked out when it becomes necessary to renew them.

TO GRIND AND FACE VALVES

In grinding valves, the valve tappet should always be screwed down, insuring sufficient clearance. To prevent the end of valve stem riding on any carbon or dirt on top of valve tappet, and to allow for the amount ground away. The valves should never be rotated around a complete revolution, being turned back and forth about a quarter turn, occasionally being raised up and dropped down in another position for the purpose of quickening the action.

If no valve grinding compound is at hand, emery or carborundum may be mixed with heavy oil, or very light cup grease, and a thin coat applied, it being better to put three or four coats of valve grinding compound on than to use an excess at the start.

A high spot on the valve seat will permit the valve head being ground bright all around, though the seat may yet be in improper condition, and vice versa. Therefore, both seat and valve must be examined to see that both have been ground bright. After the valves have been ground all grinding compound should be washed away with gasoline.

In case the valves are very badly pitted, and grinding until the pits were removed would grind the valve seats down too deeply, the valves should be faced off. They should also be faced in case a groove has been worn in the valve face by constant operation.

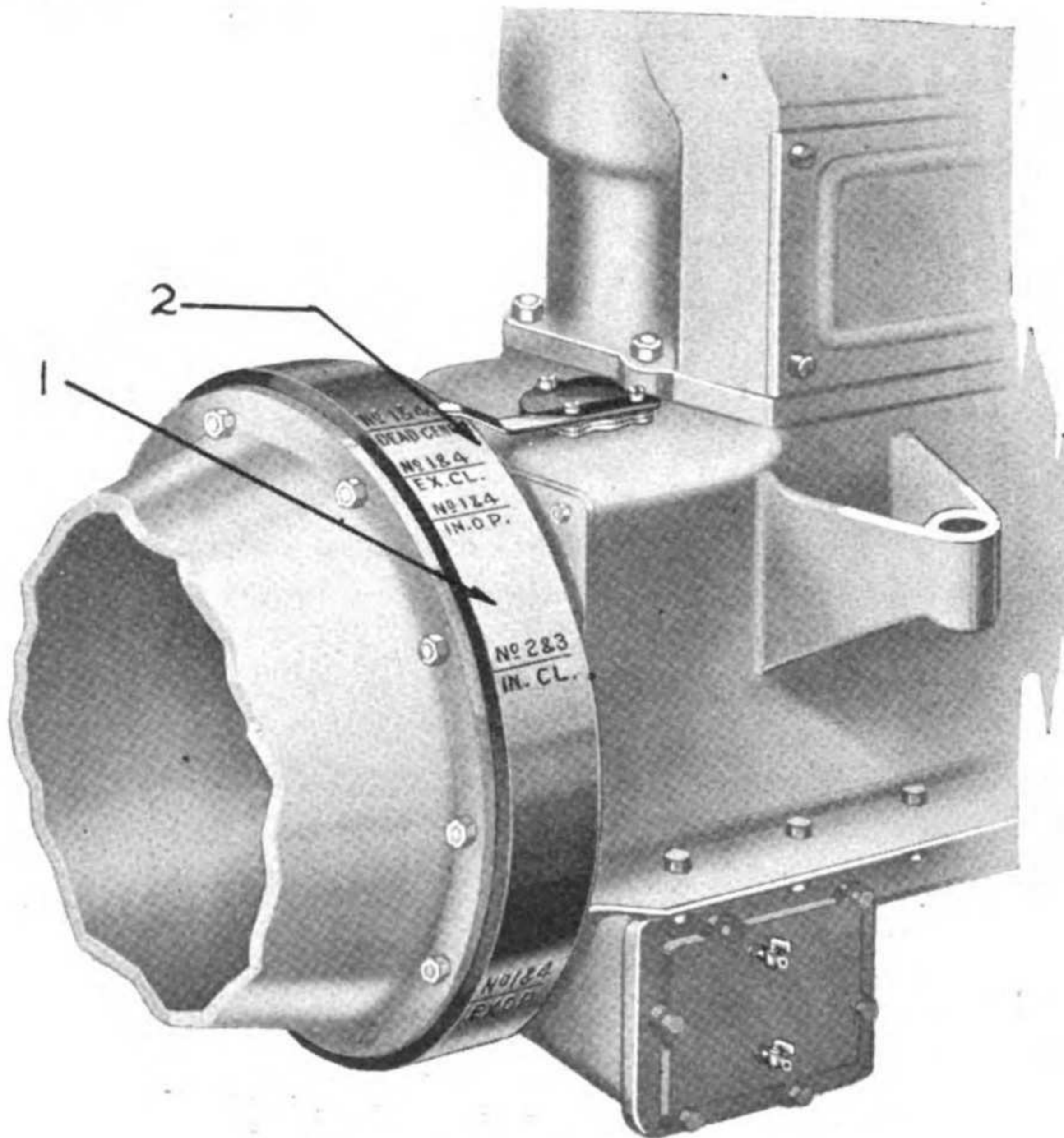
In case the valves are so hard that facing with a tool is impossible, they may be adjusted by use of a fine tooth file wetted with water, or, preferably, with turpentine. They must not be filed down beyond the groove, it serving as a guide.

Unscrew the valve cap and with the valve lifted, raise the valve spring without raising the valve by holding the valve down from the top.

The valve spring seat is locked to the valve stem with a key held in place by the cupped spring seat which fits over it. After removing this the valves may be lifted out through the valve cap opening by looping a string under the valve head.

VALVE SPRINGS

On each valve there is a 60 pound coil spring 5 inches long when free and $1\ 3/8$ inches outside diameter, made of 12 coils of wire. These springs are slipped over the valve stems, the lower end being held against the valve spring cup, the other end against the cylinder casting.



TIMING MARKINGS ON FLYWHEEL

1. Flywheel.

2. Indicator.

VALVE TAPPETS

Each valve is actuated by a tappet. These are adjustable as to length, with a flat circular face under their bottom ends, which rides on the cams. Their outside diameter is $\frac{5}{8}$ inches at the shank and $1 \frac{15}{32}$ inches on the circular face. Each valve tappet is supported by a bronze bearing.

VALVE TAPPET CLEARANCE

The proper clearance between valve stems and the tappet is .005 inches, for the intake valve, and .007 inches for the exhaust valve tappet. For practical purposes the clearance should be the thickness of two sheets of paper, the same as that used in this book.

It is important that the valve clearance be ample. An insufficient amount of clearance would prevent them closing freely and cause loss of compression.

VALVE TIMING

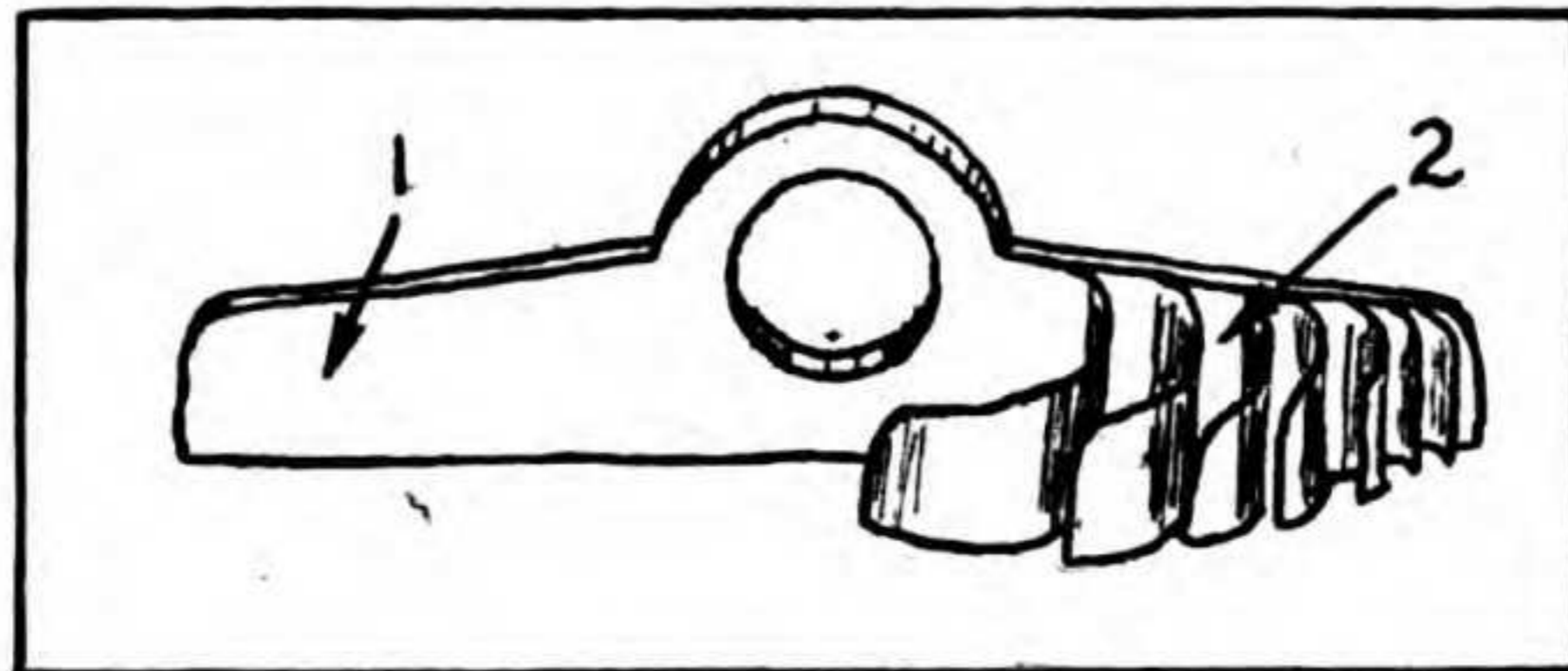
The proper operation of the engine demands that the valves open and close with reference to the location of the piston in its cycle of movement with considerable accuracy.

The rotation of the camshaft is timed with reference to the rotation of the crankshaft by means of a proper meshing of the gears which interconnect between the two. The inlet opens 15 degrees after top center and closes 40 degrees after lower center. Exhaust opens 45 degrees before lower center and closes 10 degrees after top center.

Timing the valves is accomplished, and also checked, by means of markings stamped into the periphery of the flywheel. When any one of these markings is put in alignment with the pointer which overhangs the top of the flywheel, a definite valve position as indicated by the following table should obtain:

- "EX. OP 1 and 4" (Exhaust valve of cylinder 1 or 4 begins to open.)
- "IN. CL 1 and 4" (Inlet valve of cylinder 1 or 4 finishes closing.)
- "EX. CL 1 and 4" (Exhaust valve of cylinder 1 or 4 finishes closing.)
- "IN. OP 1 and 4" (Inlet valve of cylinder 1 or 4 begins to open.)

Plate No. 15



ENGINE BEARING SHIM. THIS ILLUSTRATION SHOWS THE LAMINATED SHIM SYSTEM USED FOR ROD BEARINGS

1. Shim when solid. 2. Laminations to be peeled off for required thickness.

In case the camshaft gears are for any reason unmeshed from the idler gear, and crankshaft gear, the procedure of timing the camshafts is as follows:

Turn flywheel so that the marking "IN. OP 1 and 4" is in line with the flywheel pointer; then with the gear case cover of the engine and the idler gear removed, turn the intake camshaft in the direction it operates, until No. 1 intake valve is just beginning to open. This is determined by adjusting No. 1 intake valve tappet to just admit three thicknesses of paper loosely between it and the end of the valve, when the tappet is clear down, and then with but one piece of paper in place, turning camshaft until the paper is slightly gripped by the upward movement of the tappet. Replace idler gear, revolving the camshaft

either to the right or the left (whichever direction will admit of least turning) until it is possible to replace idler gear in mesh with both the camshaft gear and the crankshaft gear.

The proper location on the flywheel of the 1 and 4 "center marking" is indicated by the pointer when 1 and 4 pistons are at the tops of their stroke. The dead center is offset on the flywheel due to the location of the timing marker as shown on page 40. This can be accurately obtained as follows:

With No. 1 intake or exhaust valve cap removed, insert some light tool such as a screw driver until same contacts with the top of the piston, and by oscillating the flywheel slightly to the right or left, a flywheel position can be ascertained, at which the piston is at the top of its stroke and motionless during a small movement of the flywheel. Bisecting the length of this movement determines the proper location of this center marking.

PROPER CLEARANCE BETWEEN TIMING GEAR TEETH

Just enough clearance shall exist between timing gear teeth to prevent humming when new and properly oiled; never more than about .001 inches. If too much clearance exists timing is rendered inaccurate; whereas, if the clearance is insufficient, a steady humming noise, rapid wear, and deformation of the teeth will result. Ends of meshing gear teeth should not bottom.

NOTE—The contact between the gear teeth is a rolling one.

The most frequent causes for noise indicating trouble in timing gears are: front crankshaft bearing lining broken out, which causes improper meshing of teeth, chips or dirt on teeth, meshing too deeply, wear of teeth giving excessive clearances, gears loose on camshaft.

FLYWHEEL

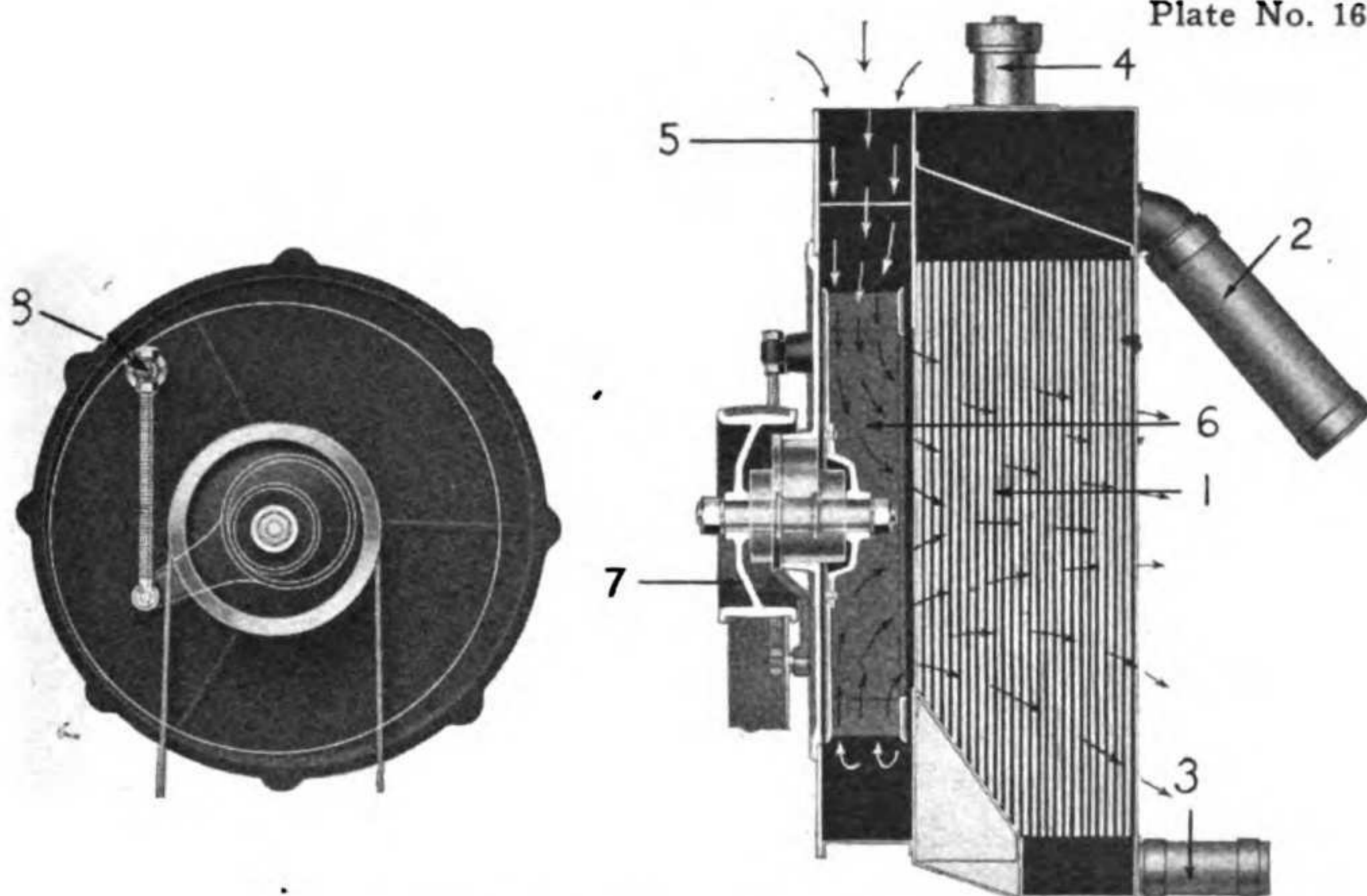
The flywheel is 17.5 inches in diameter. The width of its face is 2.5 inches. It is fastened to a flange on the crankshaft by six $\frac{1}{2}$ inch bolts. In the face of the flywheel are the two oil holes for the clutch. If the oil will not enter readily, thrust in a thin wire and let it run down.

TO REMOVE ENGINE

Take off the top armor plate, remove radiator and gasoline tank, unscrew the base bolts in the back and front of the engine, disconnect hose connections, control rods, etc., disconnect clutch and lift engine out.

FAN

The fan is of the 24 blade blower type. Each blade is of pressed steel. The outside dimension of the fan is 16 inches. It is driven by



RADIATOR AND COOLING SYSTEM

- | | |
|-------------------------|---|
| 1. Radiator. | 5. Fan housing. |
| 2. Radiator inlet. | 6. Blower fan. |
| 3. Radiator outlet. | 7. Fan pulley. |
| 4. Radiator filler cap. | 8. Fan pulley adjustment nut for taking up eccentric. |

a flat leather belt $69 \frac{9}{16}$ inches long and 2 inches wide by $\frac{1}{4}$ inch thick. It is driven off a 10 inch pulley, forming part of the main clutch housing. The fan or driven pulley is 7 inches in diameter.

ADJUSTING FAN

Adjustment of the fan is provided by an eccentric held in place by a threaded rod and nuts. The lock nut is loosened as shown above. The play in the belt is taken up on the adjusting nut and the lock nut is then tightened.

TO LACE FAN BELT

A fan belt can be laced by punching three small holes in each end of the belt (directly opposite each other) and lacing with a rawhide lace or a shoestring if necessary.

The joints should be laced double in case a single row of lacing will not hold.

REASONS WHY FAN BELT JUMPS OFF PULLEY

The fan belt may jump off a pulley if it is too loose, if two pulleys are not parallel with each other, or if the ends of the belt are not cut squarely, thus causing the belt to be curved.

TO DETECT IF FAN IS RUNNING AT PROPER SPEED

A fan will not run at proper speed if the belt is oiled or greasy, if the belt is too loose, or if the fan shaft is too tight in the bearing.

CRANKSHAFT

The crankshaft is of alloy steel. It is mounted on three bearings, the front one of which is 2.125 inches diameter and 3.125 inches long, the center 2.25 inches diameter by 2.75 inches long, while the rear bearing has a diameter of 2.375 inches and length of 4 inches.

The caps for the main bearings of the crankshaft are held in place by four 7/16 inch studs.

Both bearings and caps are provided with bronze backed bushings of babbitt metal. This arrangement affords an easy means of renewing the bearings when they become worn.

The bushings are held in place by pins fitting in holes in the main bearings. The bearings at the lower end of the connecting rods are oiled by pressure through the drilled crankshaft. A copper tube up the side of the rod carries the oil to the wrist pin.

Crankshaft end play is taken up on the center bearing and all end play fitted from that point. An end play of .004 to .006 inch should be allowed. About 1/32 inch clearance is allowed on the front and rear bearings to take care of expansion in the crankshaft.

KNOCKS IN BEARINGS

The center bearing is that most likely to develop looseness, because of the fact that it carries a greater load than the two other bearings. The bearing next most likely to show signs of wear is the front one, while the rear bearing shows longest life in service.

Should the crank bearings knock, usually the removal of metal shims placed between the bearing and the bearing cap returns them to proper adjustment. In removing the shims it is necessary that an equal number be taken from each side of the bearing cap.

If the shims are laminated one or more layers should be removed. If that be too much substitute a thin shim of paper for one of the metal layers removed. If the shims are solid, file them to necessary reduced thickness.

If the above is not successful it will be necessary to replace the bushing and scrape to a perfect bearing. A perfect bearing surface is important.

TO SCRAPE CRANKSHAFT BEARINGS

In scraping the bearings, the first consideration is the proper meshing of the timing gears, the front bearing controls the position of the crankshaft and its gear, consequently, it should be fitted and scraped

first, the other end bearing being lined up with it at the same time. Then the middle bearing fitted in line.

In scraping the crankshaft or connecting rod bearings, the area of contact of bearing surface is the important factor. If the shaft does not bear well, all over, the high spots are scraped and the cap will have to be tightened, but if the shaft bears well and evenly, the bearing need not clamp so tightly. One bearing should be adjusted at a time, then loosened and another bearing adjusted. In this way, any chance of one bearing being too tight and another too loose is avoided. Always relieve the bearings at the upper part at the sides to prevent binding. If a bearing must be raised up, thin shim stock or paper should be used. Bearing blue, in oil, should be rubbed on the shaft to mark its contact with the bearings while being scraped in. When the three main crankshaft bearings have been adjusted and tightened, one should be able to revolve the shaft by grasping firmly the flywheel.

CRANKSHAFT BEARING ADJUSTMENT

Because of the weight of the shaft, flywheel, and their inaccessibility it is not advisable to attempt to adjust crankshaft bearings from under the engine.

When the crankshaft bears evenly in its bearings, and a bearing cap becomes loose, the shaft will spring down and away under the impulse of the explosion, and on the return of the piston to the top dead center the shaft will spring back, hammering away or upsetting the bearing. The result of this is not only a wearing down or hammering out of the top bearing, but the wearing away and the hammering out of the bearing in the crankcase as well. This condition can only be remedied by the removal of the engine from the chassis. The shaft should be removed from the engine, the journals blued, scraped in and readjusted. Should it be found that a bearing is out of line, being high or low, shims may be removed or added under the bushings. The shaft should not be sprung when it is finally fixed in its bearings.

SHIMS MUST BE EVEN

If an equal thickness of shims is not always maintained on each side of the bearing cap, on refitting or readjusting, the shaft will not bear on the same place on which it bore before the adjustment. When the bolts are tightened the caps may be sprung and pinch the shaft.

CRANKCASE

The crankcase is of a cast aluminum and is made in two parts. The cylinders are bolted to the upper half which has four arms cast integral, providing means for fastening the engine to the frame. To the lower half there is bolted the oil base and oil pump.

PRIMING CUPS

A set of priming cups are placed on the engine, located above the cylinders, and used for priming the engine with gasoline.

They may be used to determine the compression stroke of the different cylinders to ascertain how the cylinder is firing.

REMOVING CRANKSHAFT

The crankshaft can be removed through the bottom of the case by dropping the pan and removing the starting crank bracket, which is bolted to the front of the timing gear case. Drop the oil pan, remove flywheel by taking out clutch, as described on Page 81, take out the six bolts which hold the flywheel and the crankshaft flange, remove the oil retainer plate at the flywheel end of the crank case, take off main connecting rod bearing caps and withdraw the crankshaft.

TIMING GEARS

Timing gears are contained in a case on the front end of the engine. There are four gears in the set—the driving gear being that which is attached to the crankshaft, which in turn drives the pump gear and finally the magneto gear. The camshaft gear is driven directly off the crankshaft gear.

All the timing gears are 10 pitch 20 degree pressure angle, involute teeth. Crankshaft gear is .20—.30 open hearth carbon steel. Water pump gear is cast iron. Magneto gear .20—.30 open hearth steel, and the camshaft gear cast iron.

The crankshaft gear has 35 teeth; camshaft gear 70 teeth; magneto gear 35 teeth, and the water pump gear 35 teeth.

LUBRICATION TIMING GEARS

The timing gears are lubricated by the internal lubricating system of the engine, a lead carrying the oil direct to the gears. The oil put in the filler pipe also flows over the gears on the way to the crank case.

REMOVAL OF GEARS

The crankshaft gear is keyed to the crankshaft. It can be removed by taking off the retaining nut and withdrawing key.

The pump gear comes off by removing the nut on the end of the stud which holds it in place. The magneto gear is keyed to the magneto drive shaft and carries the governor on the outside or forward end. To remove this gear it is necessary to take off the governor end plate, removing the entire governor assemblies, and then slipping the gear off the key. The camshaft gear is bolted to a flange on the end of the

camshaft by three bolts, and can be removed by taking out these three bolts, as the spring thrust which bears against the gear comes off with the timing gear cover plate.

CAUSES OF KNOCKS

The following are the most common causes of knocks:

- (a) Carbon
- (b) Broken rings
- (c) Loose piston pins
- (d) Loose connecting rod
- (e) Loose crankshaft bearings
- (f) Loose flywheel
- (g) Early spark
- (h) Overheated engine
- (k) Excessive valve tappet clearance
- (l) Chipped or cam roller
- (m) Burr or chip in gear teeth
- (n) Crankshaft end play
- (o) Camshaft end play

IDENTIFICATION OF ENGINE KNOCKS

(a) The carbon knock cannot be noticed when the engine is cold as it is entirely the result of carbon in the cylinders becoming heated to a temperature which will ignite the compressed charge prior to the occurrence of the ignition spark.

Carbon can be removed by speeding up the engine and pouring about one gallon of water into the air valve of the carbureter, a small quantity at a time, care being taken that the engine does not stop. After this is done it is a good plan to remove the spark plugs and see that they are clean, or the carbon can be scraped out through the valve plug holes.

(b) Broken piston rings will result in a lack of compression and permit oil to work up into combustion chamber. A light click at closed position of throttle may be noticed.

(c) The knock produced by loose piston pins is lighter than that of a crankshaft or connecting rod knock, and like a connecting rod knock is most noticeable when the engine is idling with a nearly closed throttle. This knock is not as indicative of danger as loose connecting rod or crankshaft bearing knocks. There is very little danger of bearings being rendered unserviceable by reasonable further use. Replacement of pin is necessary.

(d) The knock produced by a loose connecting rod, a rather heavy pound, is most noticeable at low engine speed with a closed throttle, but if the play is excessive this knock can be noticed at all speeds and

loads. It is the most common and the easiest to identify. It should be remedied immediately.

(e) A loose crankshaft bearing will knock most noticeably when the engine is working under a heavy load. If the front crankshaft bearing is very loose it may be detected by the excessive noise in the timing gear case due to improper meshing of timing gears.

(f) If the engine is speeded up suddenly and the throttle closed quickly, a knock resulting at the instant the throttle is closed will usually indicate a loose flywheel.

(g) The spark knock is a result of too early ignition, the spark being timed or advanced too far. It can be corrected by retarding the spark. It sounds like a carbon knock.

(h) Pre-ignition caused by overheated engine cylinders will result in lack of power, a heavy knock and excessive vibration.

(k) A knock produced by excessive valve tappet clearance is very light, being more of a click than a knock.

(l) A chipped cam or tappet roller may be detected by placing one's finger on the valve tappet while the engine is running, to determine if the tappet movement is smooth.

(m) After the front end flanges of the crankshaft bearings have been worn by the thrust of the clutch being released, the crankshaft will move lengthwise through the bearings, producing a knock as the limit of travel is reached. This knock may be located by pushing down clutch pedal, thereby pulling shaft back and holding it against the front flanges of bearings.

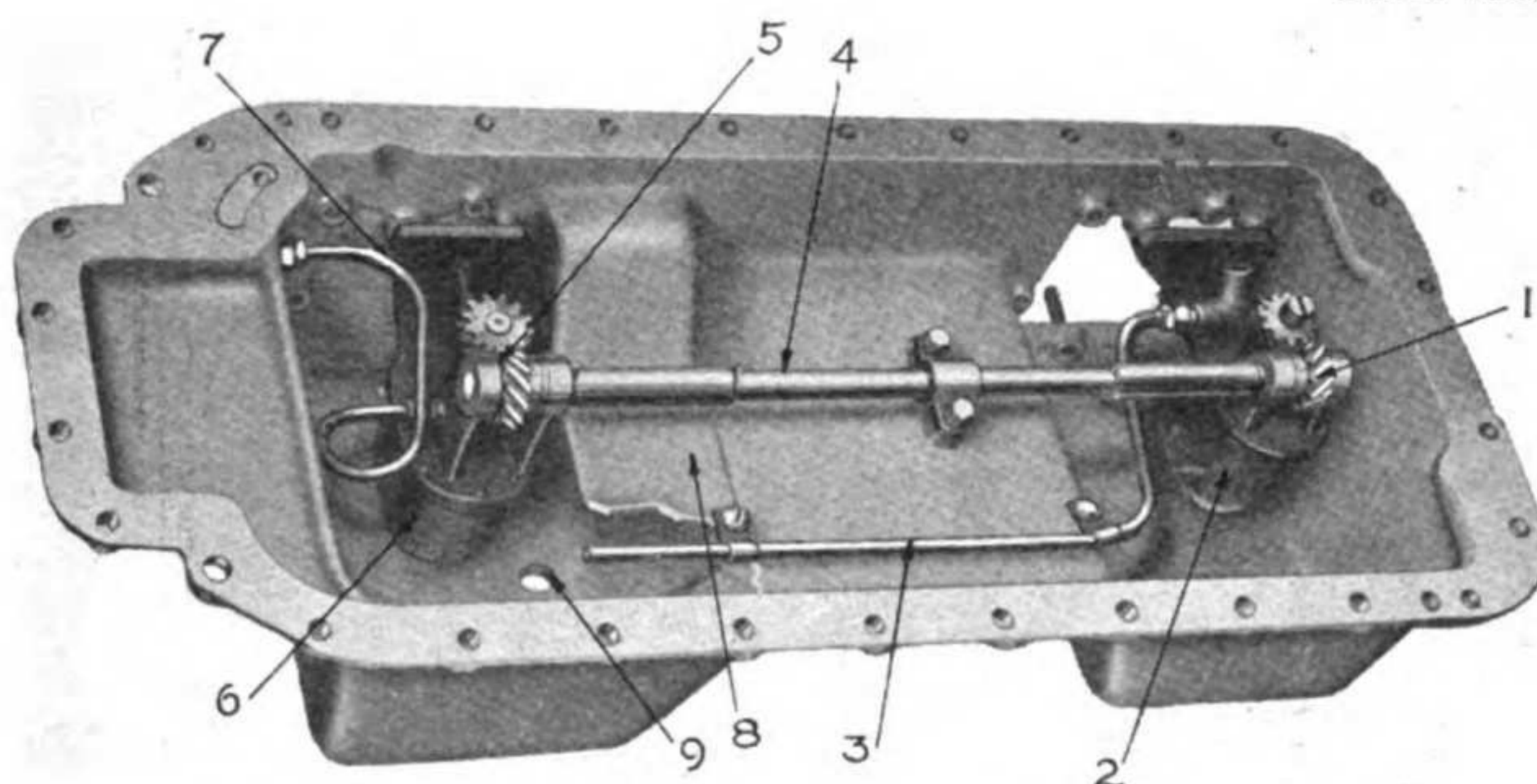
(n) A camshaft moving endwise will produce a knock somewhat similar to a light connecting rod knock. As the engine speed is increased, the camshaft is held in one position by the additional power required to drive it and the knock usually ceases. The camshaft gear plate may be removed and pressure exerted on the end of the shaft holding it back against the front flange of camshaft bearing, thereby determining if end play is producing the knock.

NOTE: The camshaft is driven by a helical gear.

(o) A burr or chip in the gear teeth will give a periodic knock.

OIL PUMPS

There are two gear oil pumps, one in each sump of the oil pan. The front pump is for priming and the forward pump delivers the feed to the pressure oiling system. The front pump is driven off the camshaft by a 45-degree spiral gear, 12-tooth, 12-pitch, through a vertical shaft. The drive for the rear pump is taken off this vertical shaft by a horizontal shaft through a set of spiral gears.



OIL PAN AND PUMPS

- | | |
|--------------------------------------|---|
| 1. Drive gears for oil priming pump. | 6. Oil delivery pump screen. |
| 2. Screen for oil priming pump. | 7. Oil delivery lead. |
| 3. Oil priming pipe. | 8. Oil retaining wall in delivery sump. |
| 4. Oil delivery pump driveshaft. | 9. Oil delivery sump drain hole. |
| 5. Oil delivery pump drive gears. | |

ACTION OF OIL PUMPS

The oil pump in the sump at the flywheel end of the engine delivers the oil through a feed pipe to the rear sump which it keeps supplied. This second sump has a horizontal shelf which keeps oil in it in spite of a severe tilt of the tractor. This pump forces the oil through a main lead to the rear end main bearing, where it enters the bearing, and also the crankshaft, which is drilled to receive it. The oil is forced through the crankshaft to each main bearing and then through the drilled cranks to each lower rod bearing. Up the side of the rod is a tube which carries the oil to the piston pins. The camshafts are lubricated by separate leads at each bearing. The pistons and cylinder walls are lubricated by the spray from the ends of the connecting rods.

TO CLEAN OILING SYSTEM

To properly clean the oiling system, the lower half of the crankcase must be removed as the dirty oil and sediment in the troughs beneath each of the four connecting rods cannot be properly cleaned otherwise. Before removing the lower half of the crankcase, the two plugs in the base of the case should be removed and the oil allowed to drain out. Then replace the two plugs and pour two gallons of kerosene oil into the crankcase through the oil filler (at the left front end of engine), start the engine and run it slowly for only twenty seconds, thereby flushing the oil ducts, pipes, bearing oil grooves, and entire interior of case, pistons, rods, etc. Drain off and discard this kerosene and refill with 4 gallons of new cylinder oil.

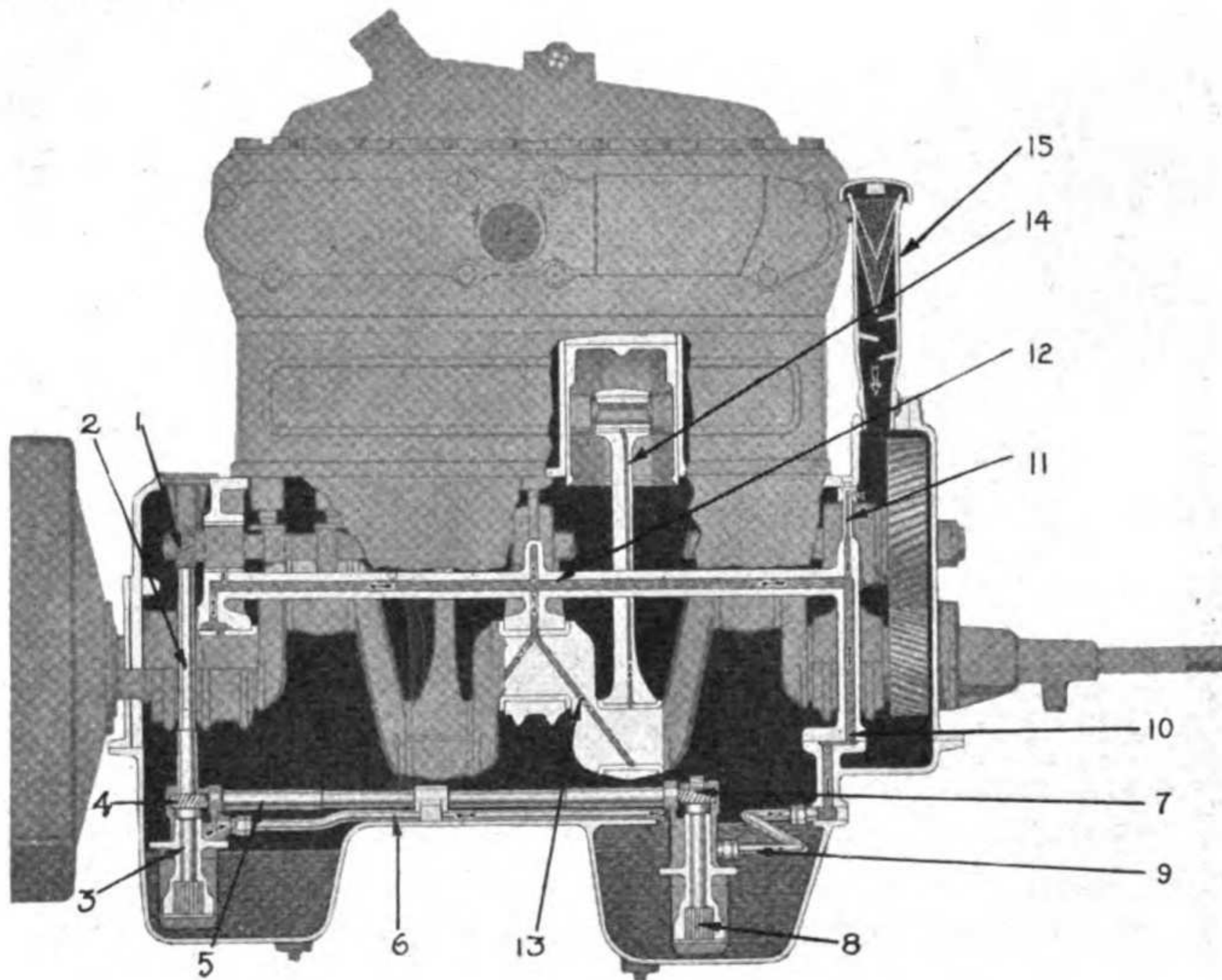


DIAGRAM OF OIL PASSAGE

- | | |
|---|-------------------------------------|
| 1. Priming pump drive gear on camshaft. | 9. Oil delivery pipe. |
| 2. Priming pump drive shaft. | 10. Oil delivery lead. |
| 3. Oil priming pump. | 11. Oil lead to timing gears. |
| 4. Oil delivery pump drive gear. | 12. Oil lead to main bearings. |
| 5. Oil delivery pump driveshaft. | 13. Oil lead to lower rod bearings. |
| 6. Oil priming lead. | 14. Oil lead to upper rod bearings. |
| 7. Oil delivery pump drive gear. | 15. Oil filler pipe. |
| 8. Oil delivery pump. | |

If more extensive cleaning is advisable remove the base and oil pump intake screen, clean thoroughly, but before replacing same, examine all bearings, nuts, bolts and cotters. The oiling system should never be cleaned or flushed with gasoline, as it will destroy the glaze on the surface of the bearing and the shafts, causing friction and damage.

OIL LEVEL GAUGE

The oil level gauge permits the driver to conveniently ascertain the quantity of oil held in the oil base of the engine.

It is fastened to the crankcase between the cylinders on the exhaust side of the engine. It is a rod which can be pulled out. It is marked for full and empty levels. It shows full when there are 4 gallons in the case and empty when there are $1\frac{1}{2}$ gallons.

BREATHER

The breather tube permits of the entrance of oil into the crankcase, and also affords a means of filling the oil base. It is aluminum casting bolted on to the top of the crankcase.

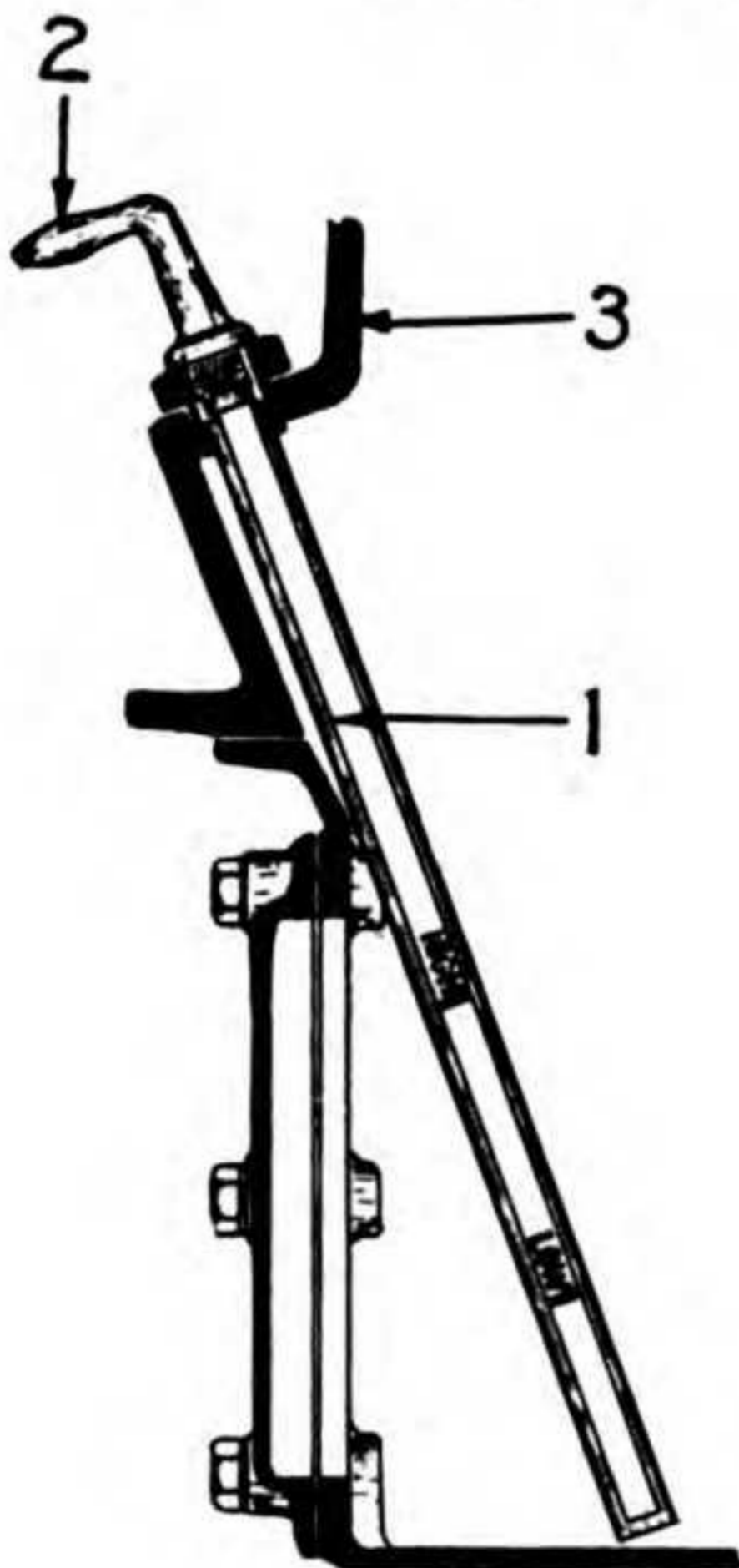
OIL TEST COCKS

Inasmuch as the outer end of the oil test cocks are in an exposed position, the outer end of the hole may become plugged with mud, preventing any oil being drained out to test oil level within the crankcase. The petcocks should be closed, and the mud then dug out with a wire. There is a cock for high, and another for low level on the priming pump sump. There is also a pressure test cock on the side of the case.

TO REMOVE OIL PUMPS

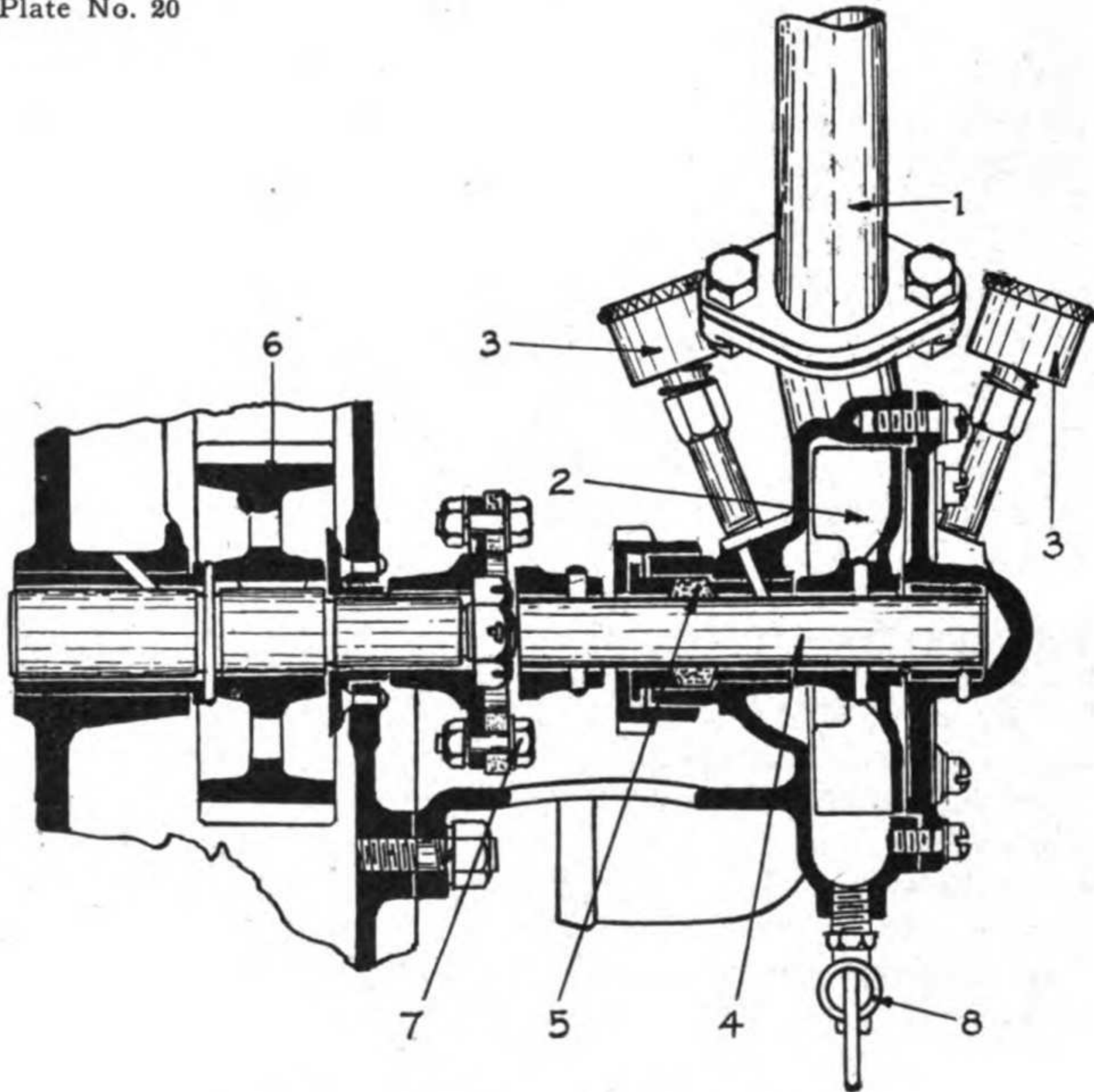
The oil pumps can be removed through the hand holes on the side of the sump. The six stud nuts which hold the cover plate in place are taken out, and the plate removed. This discloses the oil pump which is bolted to a web in the bottom pan. On removing the bolts from this web and lifting the vertical shaft which drives the pump, and also disconnecting the oil lead by loosening the union nut, pump can be taken out through the hand hole. To reinstall it, it is slipped back into place, the vertical shaft allowed to mesh into the driving notch or key way, the stud nuts replaced and finally the union to the pipe lead connected. The horizontal shaft which transmits the drive from the priming pump

Plate No. 19



OIL LEVEL GAUGE

1. Oil level gauge plug.
2. Oil level gauge handle.
3. Crankcase wall.



WATER PUMP AND WATER PUMP DRIVE

- | | |
|---------------------------|--------------------------------------|
| 1. Water delivery pipe. | 5. Water pump packing. |
| 2. Water pump impeller. | 6. Water pump drive gear. |
| 3. Water pump grease cup. | 7. Water pump drive flange coupling. |
| 4. Water pump shaft. | 8. Water pump drain cock. |

to the oil delivery pump can be removed through the hand hole also, by pulling out the broached ends of the shaft which form the driving connection. The guide for this horizontal shaft is bolted to the pan between the two sumps, by means of two studs. To remove this it is necessary to drop the pan.

PRESSURE TEST COCK

A pressure test cock is located on the side of the crankcase, in communication with the main oil pressure. This can be opened to test the flow through the engine lead. It should be cleaned before it is used.

WATER COOLING SYSTEM, CENTRIFUGAL PUMP

Water is circulated through the jackets of the engine and through the radiator, by a centrifugal pump, located on the timing gear case,

and driven off the timing gears. The pump impeller is a bronze casting 3 63/64 inches in diameter, with six blades, having a face width of 31/32 inch. The pump shaft is 3/4 inch in diameter, driving the impeller through a key. The water pump cover is cast iron, held in place by eight bolts. A manila paper gasket .008 inch is used to keep the cover water tight. A stuffing box is located integrally with the bearing on the pump shaft, and there are two grease cups, one in front of, and one behind the pump, which should be given daily attention.

OUTLET MANIFOLD

The outlet manifold is a casting bolted to the top of the cylinder blocks, and connected through a hose to the top of the radiator.

This manifold conveys the water from out the cylinder jackets into the top of the radiator.

INLET WATER MANIFOLD

The water pump by centrifugal action draws the water from the bottom of the radiator through a hose connection, forcing it through the inlet water manifold, which is located underneath the valves, into the water jackets of the cylinders. It has an inside diameter of 1 1/4 inch.

The water leaves the water jackets of the cylinders through the outlet casting bolted to the tops of the cylinders, and then goes back into the radiator through a hose connection.

TO PACK WATER PUMP GLANDS

The water pump gland (packing box of the shaft) should be packed with a good grade of waterproof asbestos or compounded packing. If asbestos loose twisted rope packing is available, untwist one strand, soak it thoroughly with cylinder oil, and cover with as much fine graphite as it will retain.

Always coil the packing around the shaft in the direction of rotation of the packing nut, so it will not tend to unwind when the packing nut is screwed on.

If only square or round braided packing of too large size is available, cut off a piece of about the desired length, place it between the jaws of a bench vise, squeeze it out flat, and then cut off a strip of the desired width with a pair of thin snips or heavy scissors.

The gland nut should not be tightened any more than necessary to prevent leakage of water.

RADIATOR

The radiator is a vertical tube type, in which an L shaped nest of copper tubes is housed within a pressed casing. The width of the

radiator is $32\frac{1}{4}$ inches. The total depth of the case, including the fan space, is $10\frac{7}{8}$ inches, and the depth of the center tube space $7\frac{11}{16}$ inches. The number of tubes is 1324. The case is of 16 gauge turned plate, and the tubes are $\frac{3}{16}$ inches overall diameter, by 20 B. W. G. seamless copper tubing. The vent tube is $\frac{3}{8}$ inches by 26 B. W. G. seamless copper tubing. The radiator is mounted in the body on angle strips, on which a rubber pad or strip is mounted to assist in absorbing the shocks. The rubber hose connection at the top of the radiator is 2 x 9 inches, ordnance standard, and at the bottom 2 x $1\frac{1}{2}$ inches, ordnance standard. The radiator inlet and outlet, on which the rubber hose is fastened, are cast brass.

TO REMOVE RADIATOR

To remove the radiator, first drain and disconnect the water leads, and then take out the bolts holding it to the two supporting angles. When these bolts are removed, the radiator can be lifted out of the tractor through opening made by removing the top armor plate.

TO FLUSH OUT COOLING SYSTEM

After an extended period of use, the entire cooling system must be flushed out by means of a forcible stream of water. This should flow through the system in the reverse direction from which water is forced through by the water pump during service.

To flush out the system, the connection from the water pump to the lower water pipe extension should be removed and a stream of water turned into the radiator through the unplugged hole in the front of the bottom radiator header. The water should flow upwards through the radiator and through the cylinders and pipes in the reverse direction from normal, thus flushing all loose sediment out through the water pump.

COOLING SYSTEM TROUBLES

A sheared water pump key, lack of sufficient water in cooling system, sediment, old hose lining obstructing the water passages, or a frozen water line, will all cause the engine to overheat.

TO TEMPORARILY REMEDY DEFECTIVE WATER PUMP

In case of a damaged or inoperative pump the water pump rotar should be removed from the pump to prevent its obstructing the passage as the water thermo syphons through the system. The cooling system must be full to insure circulation under these conditions, which are produced by the water boiling. Necessarily this is a temporary arrangement, as water is lost rapidly.

RUBBER HOSE CONNECTIONS

The two rubber hose connections between the water pump and water pipe and the water pipe and radiator, are 1.5 inches inside diameter and 4.5 inches long, with a wall .1875 inches thick.

The rubber hose connections between the upper water manifold and the top water pipe is 2 inches inside diameter by 9 inches long, with a wall .1875 inches thick.

A heavy walled hose is always used at the water pump intake to prevent the vacuum produced by the pump from pulling the hose in flat, thereby obstructing the flow of water and preventing the proper cooling of the engine. A brass tube No. 18 B. W. Ga. .049, $1\frac{1}{8}$ inches diameter, and 19.825 inches developed length connects the pump with the rubber intake hose.

TO DRAIN THE WATER SYSTEM

The water cooling system should be drained by opening the pet cock on the water pump and the plug on the bottom of the radiator.

TO PREPARE RADIATOR PARTS FOR SOLDERING

Before soldering copper, (of which the radiator, tubes and tube headers are made) the parts must be cleaned until bright, with a wire scratch brush, scraper, file or emery cloth, then they must be coated with a "soldering flux" to remove all grease and foreign material.

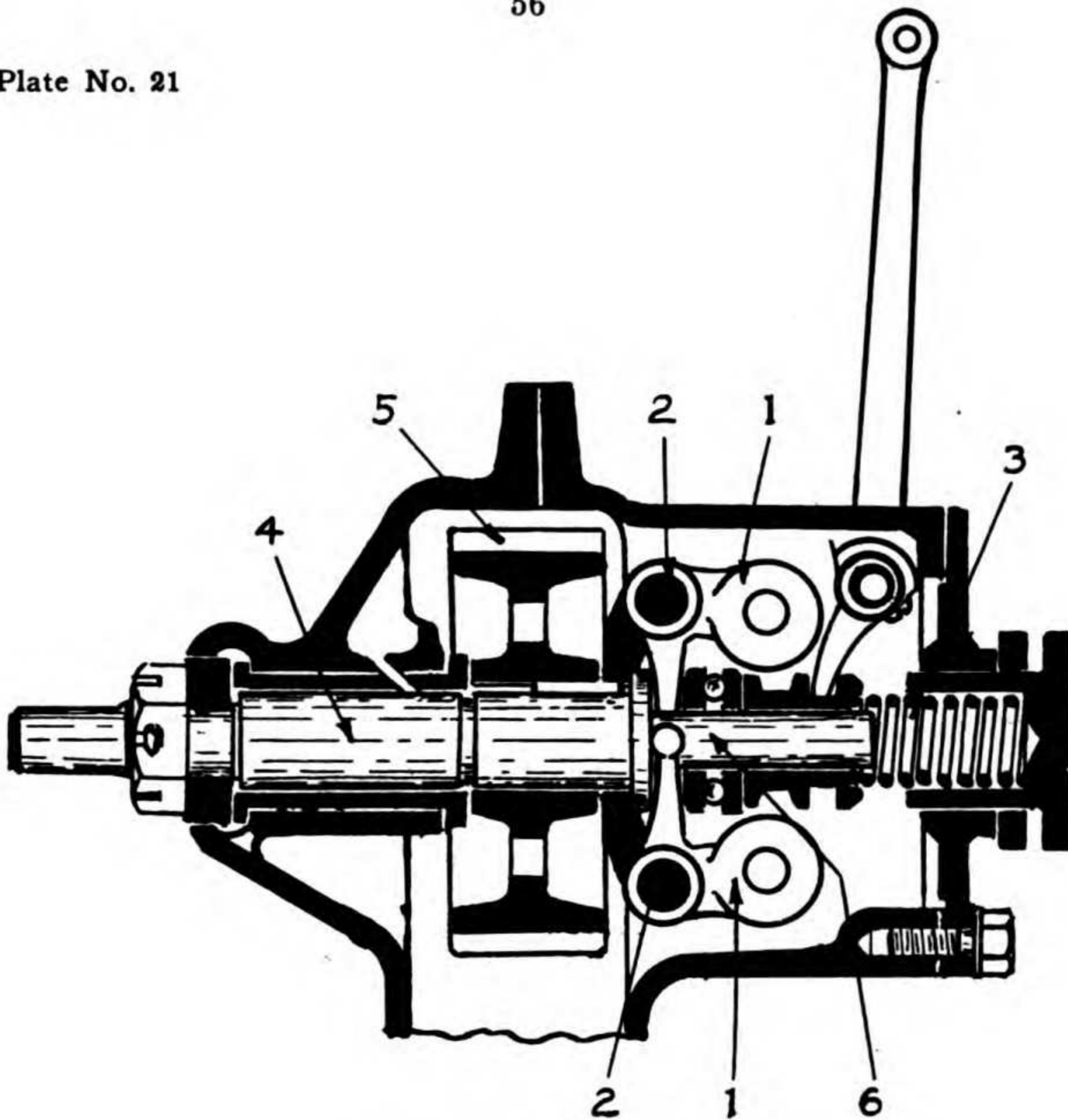
Soldering flux is sometimes referred to as "Cut Acid," since a very satisfactory flux can be prepared by dissolving zinc (from an old dry battery if necessary) in muriatic acid, until all gassing ceases. If extra strength muriatic acid is used in making cut acid, it should be diluted with about an equal volume of water before adding the zinc. If the gassing does not occur at once, heating the acid will assist the action.

In this connection, always pour acid into water, but never pour water into acid, as, if the acid is very strong, a rapid sputtering may throw acid.

Clean, bright tin can be soldered by using powdered resin for a flux, or tallow.

Cast iron, malleable iron, steel and black iron, or sheet iron, should be scraped bright, then cleaned with sulphuric acid before applying the cut acid. This being done, solder as for copper. In the case of cast iron, the parts being soldered must be heated.

The essentials of good soldering are sufficient heat, cleanliness of the parts to be soldered and of the soldering copper, or "iron" as it is usually called, and purity of flux or cut acid.



GOVERNOR ASSEMBLY

- | | |
|-------------------------------|----------------------------|
| 1. Governor weights. | 4. Governor shaft. |
| 2. Governor weight pivot. | 5. Governor driven gear. |
| 3. Governor adjusting spring. | 6. Governor shaft spindle. |

The soldering iron should be filed bright, then tinned with solder, after being cleaned with salamoniac. If this is unavailable cut acid will work fairly well.

Always have the soldering iron hot enough to heat the work, but never permit it to get red hot, since that will cause the solder to attack the copper, producing hard solder which only melts at near a red heat, and is useless for soldering purposes. In case an iron is burnt, file it freely.

The best solder for most jobs is known as half-and-half, being composed of equal parts of tin and lead.

TO THAW FROZEN PUMP

During cold weather, after an engine has been stopped for a sufficient time to permit any water in the cooling system to freeze, the engine should not be turned over with a crank until it is ascertained that no

water has collected in the water pump, and frozen the pump rotar to the pump housing. The pump may be warmed with a gasoline blow torch, hot water or cloths soaked with hot water may be applied to the pump.

GOVERNOR

The governor is a centrifugal type and is mounted on the magneto gear shaft, on the exterior of the timing gear case. Keyed to the magneto shaft is a spider, which revolves with it. Pivoted to this spider are bell cranks with weights on their extremities. As the speed increases the weights on these bell cranks tend to fly from the center, due to the influence of centrifugal force. As the weights move from the center, the bell crank swings about the pivot of the spider and the inner end of the bell crank moves along the shaft pushing a sleeve along the shaft, and in turn moving a lever which is linked to the throttle. This lever is pivoted and at its outer end is the linked connection to the throttle. The movement of the sleeve along the shaft is resisted by a coil spring, and the adjustment of this coil spring determines the speed at which the throttle is effected by the governor.

GOVERNOR DRIVE DETAILS

The magneto drive gear is a forging from .20 to .30 carbon steel. It is keyed to the magneto drive shaft, which is of .15 to .25 carbon open hearth steel $8\frac{1}{4}$ inches long. It runs in a phosphor bronze bushing, contained in the aluminum governor housing. The spider holds the lever weights on a pivot which is a drop forging. The weights are also forgings, and are heavy at their outside extremities, while at their inside extremities the bell crank arm works against a thrust bearing, which in turn pushes before it the lever sleeve. The lever sleeve is cast iron $1\frac{1}{8}$ inches long. It has a collar form, upon which to carry the throttle lever. The lower lever link is $1\frac{1}{2}$ inches long, and the upper $5\frac{1}{4}$ inches long. These throttle levers are forgings.

GOVERNOR ADJUSTMENT

Governor adjustment is secured by compressing the piano wire spring which resists the movement of the sleeve. The spring is under 30 pound load when compressed to $1\frac{1}{2}$ inches. When under no load it has a free length of $1\frac{1}{8}$ inches. It has a diameter of $\frac{7}{8}$ inches. There is a plug which screws into the spring retainer and provides the adjustment of this spring. When the plug is turned to the right it compresses the spring and raises the speed at which the governor comes into operation. The plug is of cold rolled steel with $1\frac{3}{8}$ —16 thread and a $1\frac{3}{4}$ inch nut on the end for adjusting. A $1\frac{3}{4}$ -inch cold rolled steel lock nut is also provided to hold the adjustment.

The magneto shaft is coupled to the gear shaft by means of a flexible coupling. It revolves in a clockwise direction.

PLATINUM CONTACTS

The platinum contacts of the make and break mechanism should be occasionally cleaned with gasoline, and thoroughly dried before starting the engine.

The proper break or gap between the breaker platinum points when they are at the point of maximum separation is .012 inches. This distance should be measured with a thickness gauge, one of which is supplied with the magneto.

SPARK PLUGS

The spark plugs are located over the intake valve so that they will be cooled and cleaned by the incoming charge, and being so located the fresh charge will ignite more readily than would the foul gases surrounding the exhaust valve. Spark plugs are of standard size and thread.

The proper width of gap between the spark plug points (in the cylinder) is between 1/64 and 1/32 inch.

If the spark plug gap is less or more than this, uncertain ignition results.

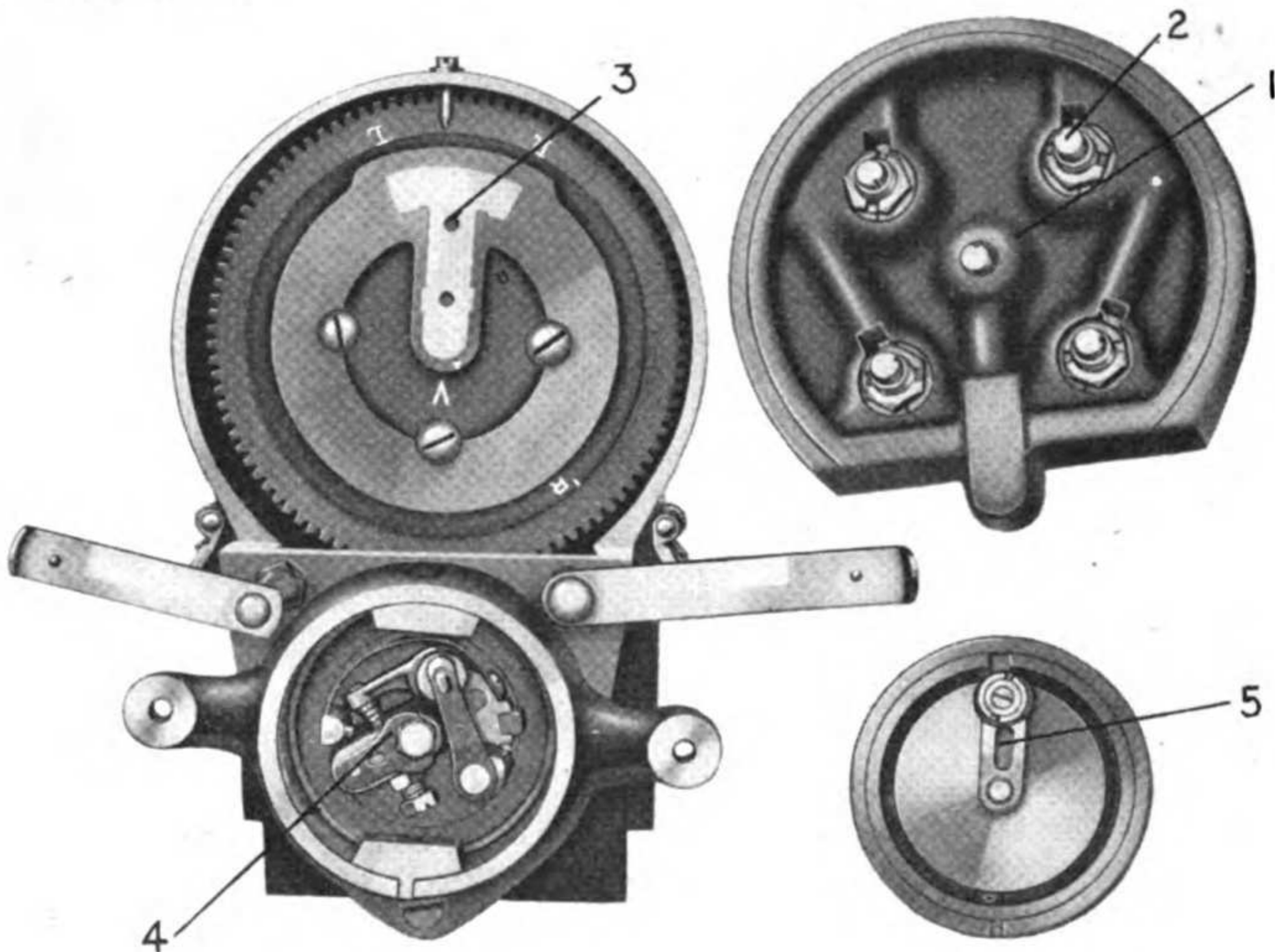
With the engine running and the spark plug gap wider than it should be, the engine will miss fire when attempting to accelerate same rapidly, or when running slowly with a wide open throttle and heavy load. Inasmuch as the strength of the spark increases with the speed of the engine, a gradual opening of the throttle may not cause failure of ignition from too wide a gap.

When the spark plug gap is too small the engine will probably start easily, but will apparently miss at extreme high speeds, especially if the load is light, as the spark though really strong is so short that it does not ignite the mixture properly. When the throttle is almost closed and the engine is idling, and the gas in the cylinder is not compressed, a comparatively larger spark is required to ignite the charge than at any other time.

TO CHARGE MAGNET

Ordinarily magnets will not become discharged except after a long period of service, or if they have been removed from the magneto without taking the precaution of placing an iron keeper or magnetic conductor across the two ends of the magnet.

When the magnet must be recharged and no electro-magnet for charging purposes is at hand, the work may be done with the aid of a storage battery and a length of insulated wire from 10 to 15 feet long, and of most any gauge between No. 8 and No. 18.



MAGNETO BREAKER AND DISTRIBUTOR

- | | |
|-----------------------------|-----------------------------|
| 1. Distributor cover plate. | 4. Breaker mechanism. |
| 2. Distributor brush. | 5. Breaker box cover plate. |
| 3. Distributor segment. | |

Attach one end of the insulated wire to the positive terminal of the storage battery and wind half the wire in the clockwise direction around the North pole of the magnet, and in an anti-clockwise direction around the negative end of the magnet (looking at the free ends of the magnet).

To charge the magnet, the free end of wire should be touched to the (negative) battery terminal for about two seconds (not longer), then withdrawn, this operation being repeated about a dozen times. Striking the magnet severely when the current is on with a light weight piece of steel such as a bolt or small wrench will materially assist in increasing the degree of magnetization that will be attained.

A keeper or cross section about equal to cross section of the magnet should be put across the ends of the magnet while charging and removing the wire. Do not remove the keeper until the magnet is mounted on the magneto with the armature in place.

TO PREVENT REVERSAL OF POLARITY

If the magnet is charged by above method, there will be no danger of a reversal of polarity, but if the magnet is to be recharged with an

electro-magnet it should be suspended above the electro-magnet by a string tied at the top or bend in the magnet so that the ends will hang down toward the ends of the electro-magnet. The magnet to be charged will assume its choice of position above the electro-magnet, the North pole of the electro-magnet attracting the South pole of the magnet to be charged. The current should be switched on and off about a dozen times. The magnet being tapped severely with a piece of steel as mentioned above.

TO TIME MAGNETO

To time the magneto, turn the crankshaft with the hand crank until the mark 1 and 4 top dead center appears under the pointer. Leave it in this position. As the spark occurs when the primary circuit is broken by the opening of the platinum contacts on the breaker mechanism, it is necessary that the magneto should be so timed that at full retard position of the timing lever body the platinum contacts just begin to open when the respective piston of the engine has reached its highest point on the compression stroke. Remove the distributor plate from the magneto and turn the driving shaft until the setting mark on the distributor disc is in line with the setting screw as shown on page 60. As magneto rotates clockwise use setting mark "R." With the armature in this position, the platinum contacts are just opening, and the metal insert of the distributor disc is in connection with carbon for No. 1 cylinder. The driving medium must now be fixed to the armature shaft without disturbing the position of the latter, and the cables connected to the spark plugs.

WIRING

The attaching of the cables to the spark plugs must be made in accordance with the firing order of the motor. For connection between switch and magneto, see page 58. The proper fastening of the cables is of great importance, in order to prevent water making a short-circuit between the connections. Page 58 illustrates how these cables should be attached. This internal method of attaching the cables is intended to protect the terminals and makes a water-tight and solid connection.

THE CONDENSER

The condenser is constructed of two insulated series of layers of tinfoil, connected in parallel across the platinum breaker points; each series consists of about 250 sheets of tinfoil insulated from each other, and alternating with the layers of the other series, the whole acting as a reservoir for the primary current.

The action of the condenser results in intensifying the secondary

current nearly 25 times by preventing an arc at the platinum breaker points when they are separated. An arc at the points acts as an electrical cushion to the interrupted flow of electricity, and thus the magnet would give a much weakened spark.

TO CLEAN DISTRIBUTOR

The distributor may be cleaned of carbon and dirt, with several drops of lubricating oil rubbed on, either with a finger or a bit of waste or cloth. This will loosen the carbon after which the distributor may be wiped clean with a small piece of waste.

TO TIME DISTRIBUTING FINGER

If the distributor wheel has been removed, it should be replaced with care. The distributing finger should be so timed that regardless of the amount of breaker box advance, or retard, the spark will always occur while the finger is under a carbon brush. This may be set by advancing the breaker box $\frac{1}{2}$ of its full travel and rotating armature shaft in the direction of rotation (anti-clockwise) until the platinum breaker points just begin to separate. The distributor wheel should then be replaced so that the center of the distributor finger comes directly under the center of a carbon brush.

TO INSTALL NEW PLATINUM POINTS

When the platinum points have been worn down by service or excessive filing, and new ones must be installed, if it is possible to secure them already mounted, such should always be done.

If unmounted points only can be secured for replacement, they are usually supplied with a small round teat $\frac{1}{16}$ inch diameter on the back of point. To mount point, drill a $\frac{1}{16}$ inch diameter hole $\frac{3}{32}$ inch deep in the mounting and solder point on (sweat on), filing off any excess solder. If soldering equipment is not at hand, the point may be mounted temporarily by squeezing teat out of round with a pair of pliers and forcing into hole.

The point should be soldered in at the first opportunity as it may work loose, and cause trouble which is very difficult to find. After the points have been mounted, they should be adjusted with a maximum break of .012 inches and the points must bear evenly all over on their face (i. e., in contact with each other), being filed if necessary to secure square contact.

If a platinum point cannot be obtained, a nickel or silver point produced from a coin will make it possible to run, but the engine will show very little power.

TO MAKE A TEMPORARY MAGNETO BRUSH

A temporary magneto brush can be made from a piece of carbon taken from the positive terminal of an ordinary dry battery or an old electric light carbon, or may be made from any soft metal or by rolling very tightly a small strip of brass wire cloth.

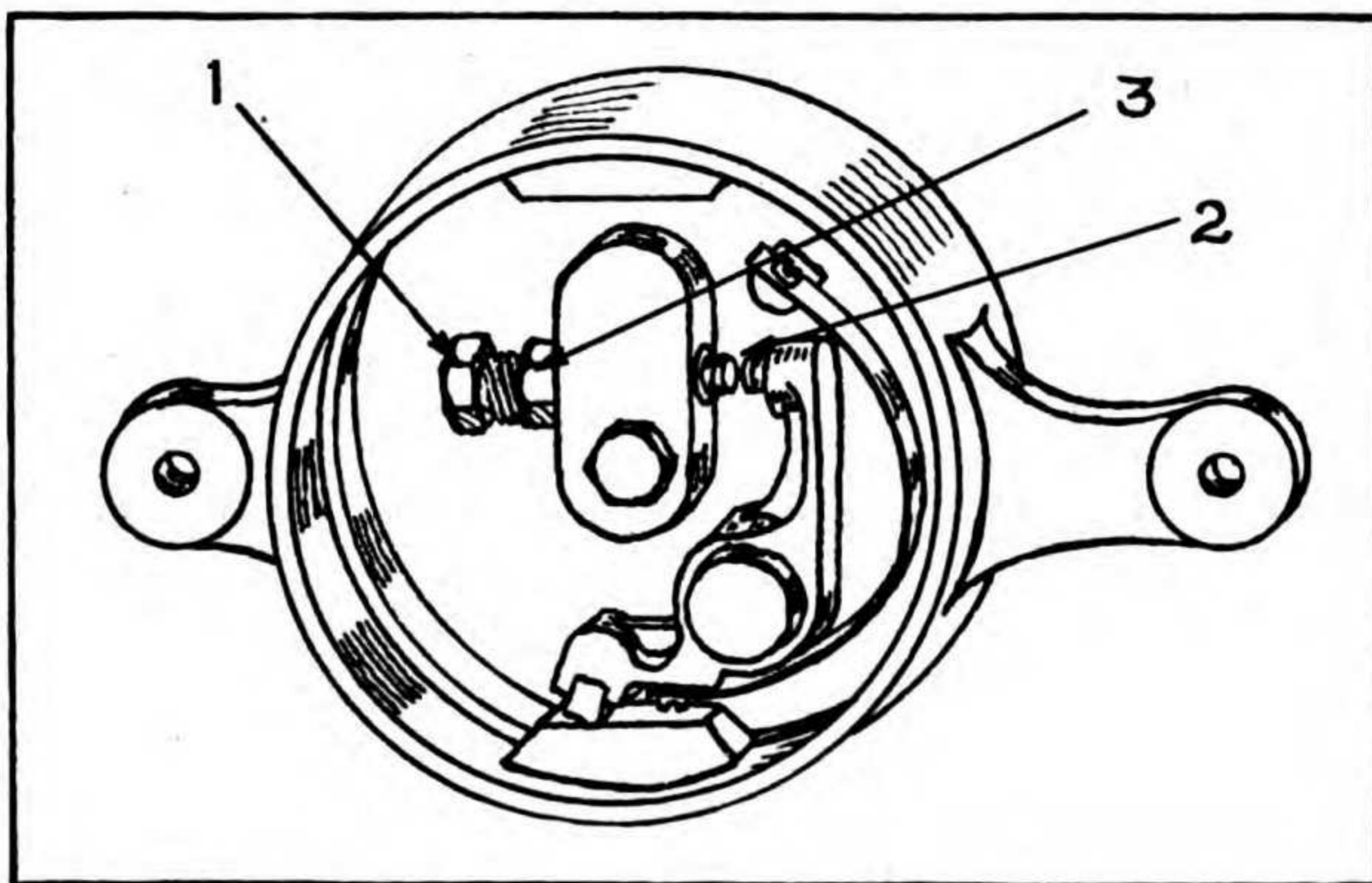
OILING MAGNETO

It is impossible to place too much importance on the judicious oiling of the magneto. Hence, remember that the following instructions are of vital importance to the efficiency of the instrument in general and to the life of the contact points in particular.

For lubricating the ball bearing at the breaker end, two oil wells with hinged covers are provided, one on each side of the housing, just back of the timing arm. Both of these lead to the same bearing and only the one which is the most accessible should be used. This well should positively not receive more than one drop every month or so. Good, clean cylinder oil will do, but **DO NOT OVER-OIL AT THIS POINT** if you wish to avoid trouble.

At the driving end two oil holes will be found. The larger one leads to the plain bearing carrying the distributor shaft and should be given about 15 drops every month or so. The smaller hole leads to the ball

Plate No. 24

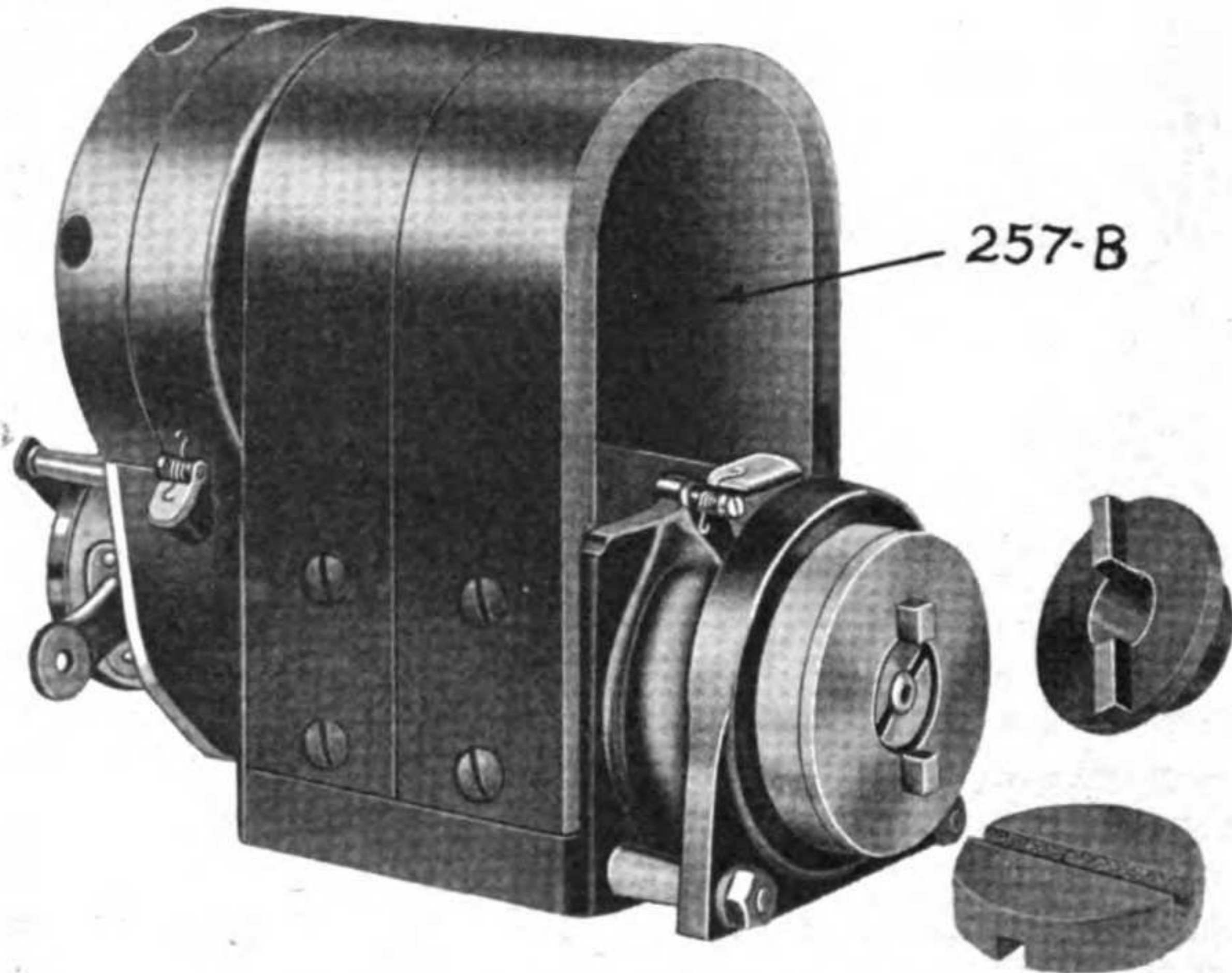


BREAKER ADJUSTMENT

1. Adjusting nut.

2. Breaker gap.

3. Adjustment lock nut.



MAGNETO WITH IMPULSE STARTER

bearing at the driving end, and should receive 4 or 5 drops in the same period.

CLEANING MAGNETO

The contact points of the breaker mechanism, and, in fact, the entire breaker itself, should be thoroughly cleaned with gasoline as often as they accumulate even a trace of oil or dirt. The distributor rotating disc, the carbon brushes and the collector ring should likewise be cleaned occasionally with a soft cloth moistened with gasoline. For obvious reasons all the parts should be allowed to dry before attempting to run. The contact points should be inspected occasionally to see that they are clean and flat, and also that the maximum gap between the points is in accordance with the gauge on the special adjusting wrench, or about 0.012 to 0.014 inch.

IGNITION TROUBLES

If the engine misfires or refuses to start, and the ignition is suspected, it should be found out first whether the trouble lies in the magneto or in the spark plugs. The latter should be examined first, as they are the most frequent cause of trouble.

SPARK PLUG TROUBLES

If the missing is in one cylinder only or in different cylinders, the corresponding spark plugs should be examined to see that the gap is

not too large. This gap between the electrodes should be between $1/64$ and $1/32$ of an inch. In no case should it exceed $1/32$ of an inch. On the other hand, a gap less than $1/64$ of an inch is liable to cause missing at low throttle opening. Also, the spark plug may be short-circuited through carbon or oil, or the insulation may be cracked. Cleaning with gasoline or replacing is the remedy.

CONTACT POINT TROUBLE

Clean same with gasoline until the contact surface appears quite white, or, if pitted, use a fine file—but very carefully—so that the surfaces remain square to each other. For this purpose a special file may be procured from us at a nominal cost. The correct gap of the contact points is .012 inch. As these contacts wear away in time, they should be regulated by giving the adjustable screw a forward turn, care being taken to securely tighten the lock nut. This can be accomplished, without removing the timing lever or breaker mechanism, by means of the combination wrench which is furnished with each magneto and which includes a gauge for the regulation of the gap between the contacts. It is very essential that this gauge be used as the gap is very deceptive when judged by eye alone.

If the contact riveted to the rocker-arm, or that of the adjustable screw should be worn down entirely, it would necessitate a change of either or both. When the adjustable screw is replaced or adjusted, care must be taken that the lock nut is securely tightened in place.

WIRING CHECK

The wiring should be carefully examined and checked in accordance with the firing order of the engine. If cables are cracked or chafed, they should be replaced. All connections must be kept clean and tight.

IMPULSE STARTER

Starting is accomplished by automatically compressing and releasing a powerful spiral spring which is a part of the driving mechanism, and which gives the armature a sharp twist and thus causes the spark to occur at the proper moment. The device does not have to be set by hand, and above 180 R. P. M. is automatically drawn out of action.

All working parts are hardened and fully enclosed. The device incorporates, at its driving end, a composition flexible Oldham style coupling which, however, is not essentially involved in the action of the impulse starter proper.

The mechanism consists of but five essential members (page 64)—a housing, which is attached to the magneto shaft; a driving member, which is itself driven by the engine; a spiral spring, hooked to the

housing and the shaft; a floating member or trigger; and a fixed bar which is mounted on the base of the magneto.

When the motor is slowly cranked, the trigger drops by gravity, engages with the bar and thus temporarily prevents rotation of the housing. As the cranking continues to turn, the spring is compressed or "wound up," until the cam strikes the wedge. This forces the trigger upwards until it slips off the lower bar, thus releasing the housing and allowing the heavy pressure stored in the spiral spring to give the armature a very sharp twist forward. This action causes the magneto to produce a powerful spark which should start the engine.

After the release and in the normal running position, stops are provided on the housing and the outer part for preventing the armature from being thrown past the normal position.

Should the impulse starter be rendered inoperative for any reason, an emergency locking device is provided for preventing the trigger from dropping into the notched bar and thus holding it locked into the driving notch. In this manner the engine may continue to operate with merely a temporary interruption, until repairs can be conveniently made.

CARE OF IMPULSE STARTER

The impulse starter needs no attention, beyond an occasional inspection to see that the notched cross bar at the bottom is free of dirt, gummed oil, etc.

Oiling is unnecessary for a period of almost two years, and, in any case, only a light, non-gumming oil, such as 3-in-One, should be used. *Under no circumstances must the internal mechanism be oiled with a heavy cylinder oil or packed with grease, as the device will immediately be put out of operation by such procedure.*

The emergency locking device may be engaged, when necessary, by proceeding as follows: Turn the engine until the heavy scratch mark, to be found on the edge of the driving member, comes to the top. Next, rotate the housing as far as possible in the normal running direction or until the hole for the trigger comes opposite the scratch mark). In this position the trigger should drop into the "locked" or running position. The screw fastening the small locking plate should now be loosened, the plate swung parallel to the center line of the magneto, and the screw securely tightened again. It will be found that the locking plate will now prevent the trigger from engaging with the notched bar and the impulse starter may be operated as an ordinary coupling.

MAGNETO TESTING

If, after following previous instructions, the engine refuses to start, the magneto should then be tested by removing the distributor plate

and resting a screw driver on the gear casing, holding same about $\frac{1}{8}$ inch from the collector ring. Then, if upon rotating the armature, a spark jumps across the $\frac{1}{8}$ -inch gap, it shows that the trouble does not lie in the magneto, but in some other part of the engine, possibly in the carbureter.

But if a spark *does not* jump across the $\frac{1}{8}$ -inch gap previously mentioned, the magneto should be sent to the nearest base equipped to make complicated electrical repairs.

EFFECT OF OIL IN CIRCUITS

In the primary circuit of the magneto, oil acts as an insulator. If oil works onto the platinum points, it will very materially weaken the spark given by the magneto, due to its interfering with the electrical operation of the points.

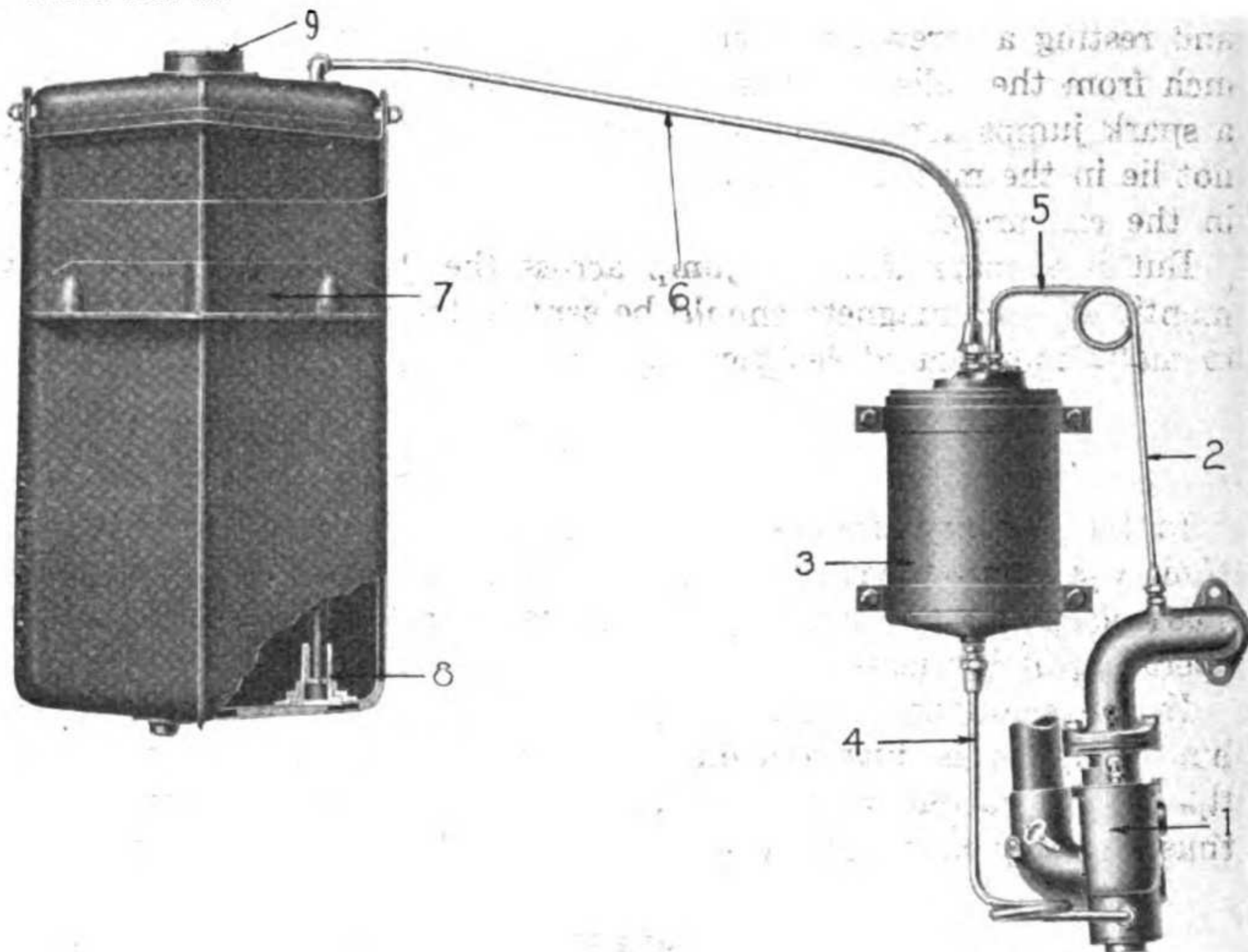
In the secondary circuit the oil itself will not act as a conductor, but inasmuch as dust and dirt is always collected on the surface of the oil, the current may flow over the dirt and dust held by the oil, thus effecting short circuit.

CARBURETER

The carbureter is a model A, Wheeler & Schebler, $1\frac{1}{2}$ inch type. The carbureter converts the gasoline into vapor, mixing it with the proper amount of air to produce a mixture that will rapidly ignite when in the combustion chamber of the engine. The air admitted to the carbureter is pre-heated by a stove surrounding the exhaust pipe, and then led through a pipe over the top of the engine to the carbureter intake. The gasoline is supplied through the carbureter by gravity from a vacuum tank, which will be explained later. (Explained in detail on page 73).

The carbureter is bolted to the intake manifold by means of a horizontal flange and two standard bolts. The gasoline feed in the carbureter itself is controlled by a float which holds the level of the gasoline to approximately $\frac{1}{8}$ of an inch below the jet level. Gasoline flows from the float chamber to the central jet, which projects upward into a venturi passage from the neck of the carbureter. By the suction of the engine a high vacuum is created in the venturi, which causes a spray of gasoline to issue from the jet, and a column of air to flow past the jet, picking up the spray of gasoline, and giving the desired mixture. The jet is so arranged that air enters the top, assisting in forcing the gasoline spray from the nozzle or jet. There is an idling jet in direct communication with the float chamber, which gives an additional supply of gasoline for idling as well as for high speed. This jet enters the neck of the carbureter above the throttle, and when the throttle is closed provides sufficient speed to allow the

Plate No. 26



DISTORTED DIAGRAM OF FLOW FROM GASOLINE TANK

- | | |
|-------------------------|-----------------------------|
| 1. Carbureter. | 6. Tank feed pipe. |
| 2. Vacuum pipe. | 7. Gasoline tank container. |
| 3. Vacuum gravity tank. | 8. Gasoline pipe screen. |
| 4. Gasoline feed pipe. | 9. Gasoline tank filler. |
| 5. Vacuum pipe. | |

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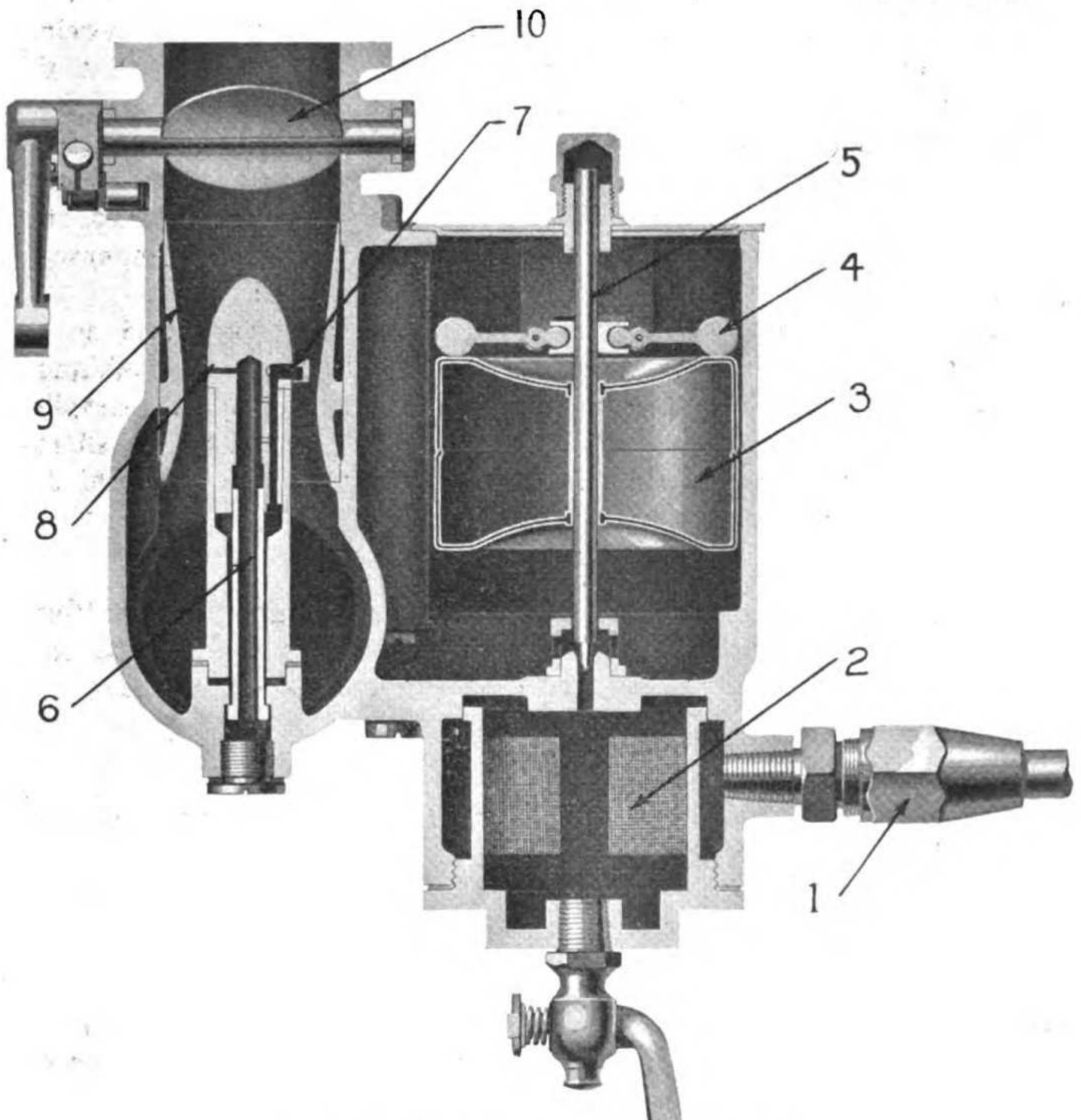
engine to idle. There are two adjustment points of the carbureter, one controls the flow through the idling jet, and the other controls the flow through the main jet. The adjustment of the main jet controls the running or high speed mixture. The float level is fixed at the factory, and need not be changed.

DUST CAP OUTLET

A small hole is drilled in the dust cap (over the float chamber) to allow free access of air above the gasoline or the escape of gasoline vapors in very hot weather. This hole must be kept free.

CAUSE OF FLOODING

The principal cause of the carbureter flooding is dirt or scale off the feed line or gasoline tank settling on the surface of the valve seat, preventing the valve from closing. This may be removed by un-



SECTION THROUGH CARBURETER

- | | |
|--------------------------------|---------------------------|
| 1. Gasoline feed pipe. | 6. Spray nozzle. |
| 2. Gasoline strainer screen. | 7. Air passage in nozzle. |
| 3. Float. | 8. Jet opening. |
| 4. Float weights. | 9. Venturi. |
| 5. Gasoline feed needle valve. | 10. Throttle. |

screwing the dust cap and lifting needle valve, permitting the gasoline to flow in and wash the dirt off the seat. A less frequent cause of the carbureter flooding is a leaky float and the most infrequent cause is the float mechanism sticking.

TO DETECT AND REMEDY A LEAKY FLOAT

A leaky float will be detected by observing the low position of the float in the gasoline when the gasoline level is at a proper height. To

remedy this, either a new float should be installed or an old float repaired. To repair heat the float slightly until the gasoline therein is expanded to a point where the pressure will force the vapor out of the very small hole, through which the gasoline has leaked into the float, thus identifying its location. As soon as this hole is found, enlarge same slightly so the gasoline may be drained out. After drying the float the hole should be soldered up, the outside filed off smooth. Avoid unbalancing or change of weight. For a temporary repair, soft soap or shellac may be used in place of solder.

If the float valve leaks, the trouble will probably be caused by a small dent in the float valve seat, preventing the float valve making contact over the entire surface of seat. To insure a good seat, simply remove dust cap and tap float valve one light fair blow. A short $\frac{1}{2}$ -inch bolt dropped $\frac{3}{4}$ inch is about the proper blow required to insure a good seat.

TO REMOVE NOZZLE

To remove the idling nozzle from the carbureter, first remove plug below it, then insert a screw driver up through the plug hole into the screw driver slot in the nozzle, and carefully unscrew the nozzle.

LOW SPEED CONTROL

The low speed adjustment of this type of carbureter is fixed by the idling nozzle aperture.

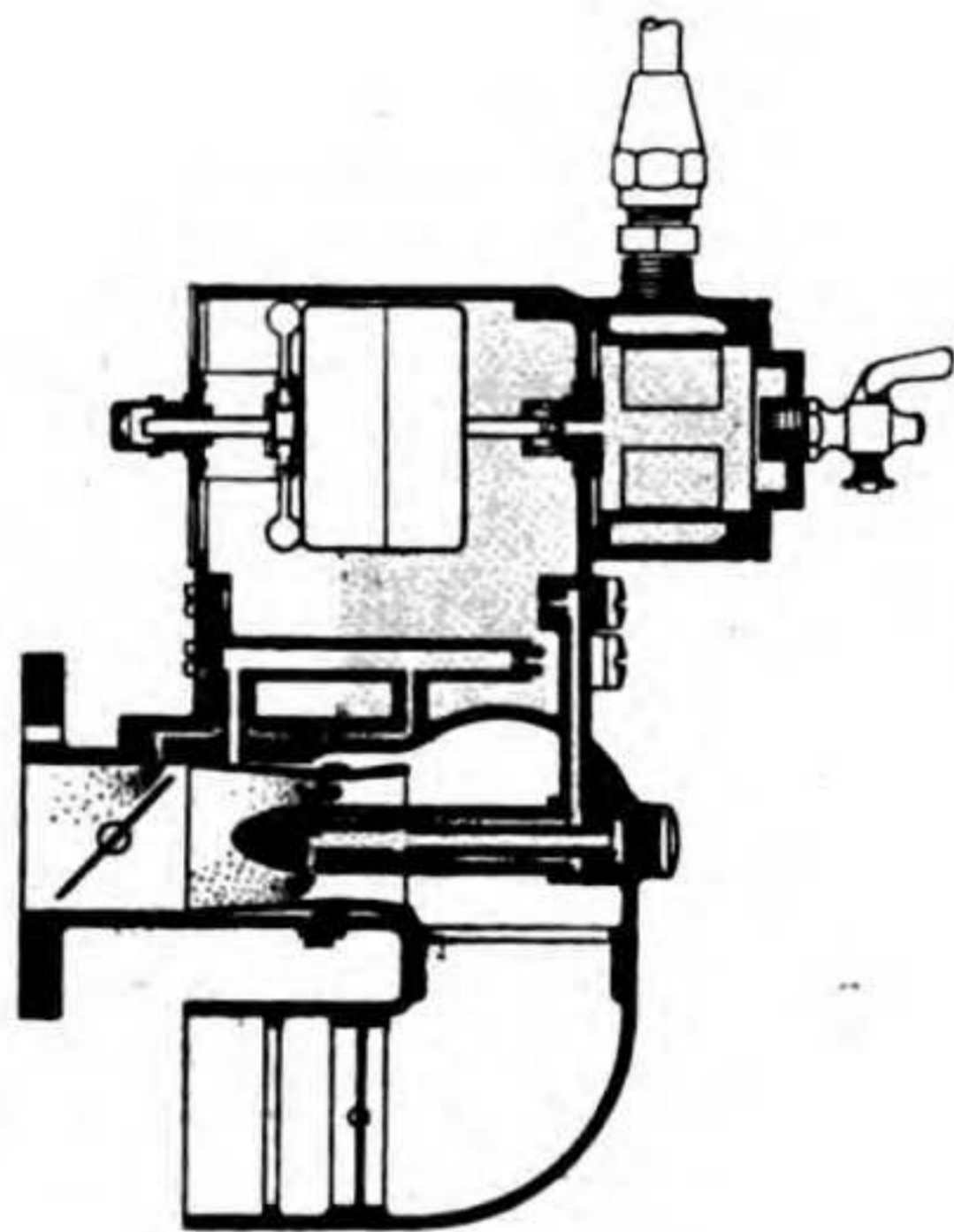
TO CORRECT HIGH SPEED ADJUSTMENT

When the spark is advanced to the normal running position if the engine back-fires or hesitates when the throttle is opened suddenly, it indicates too lean a mixture (provided the engine is thoroughly warm), and the high speed adjusting nut should be screwed up notch by notch until the back-firing ceases. The high speed is fixed by the size of the nozzle or main jet. To alter, a new jet must be inserted. Extra jets are carried on a boss on the side of the float bowl.

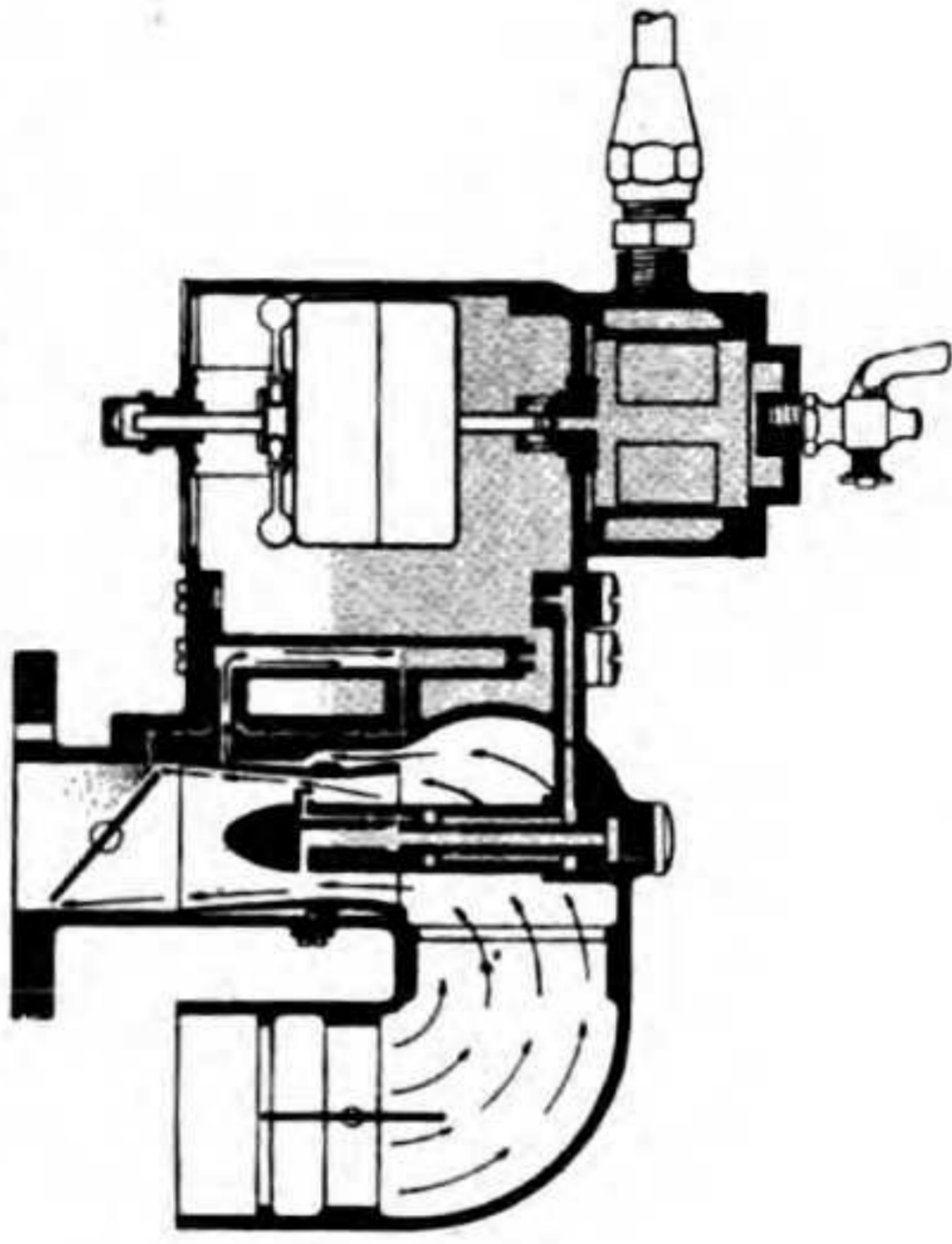
If the engine will not operate with the carbureter adjustments made as directed above, and no leaks exist at any point on the manifold, it is likely that one of the nozzles is plugged up. In this case both should be removed and examined, but under no consideration should the upper end of the nozzle be tampered with, or burred, as such action will seriously effect the operation of the instrument.

CAUSES OF BACKFIRE THROUGH CARBURETER WHEN MIXTURE IS TOO LEAN

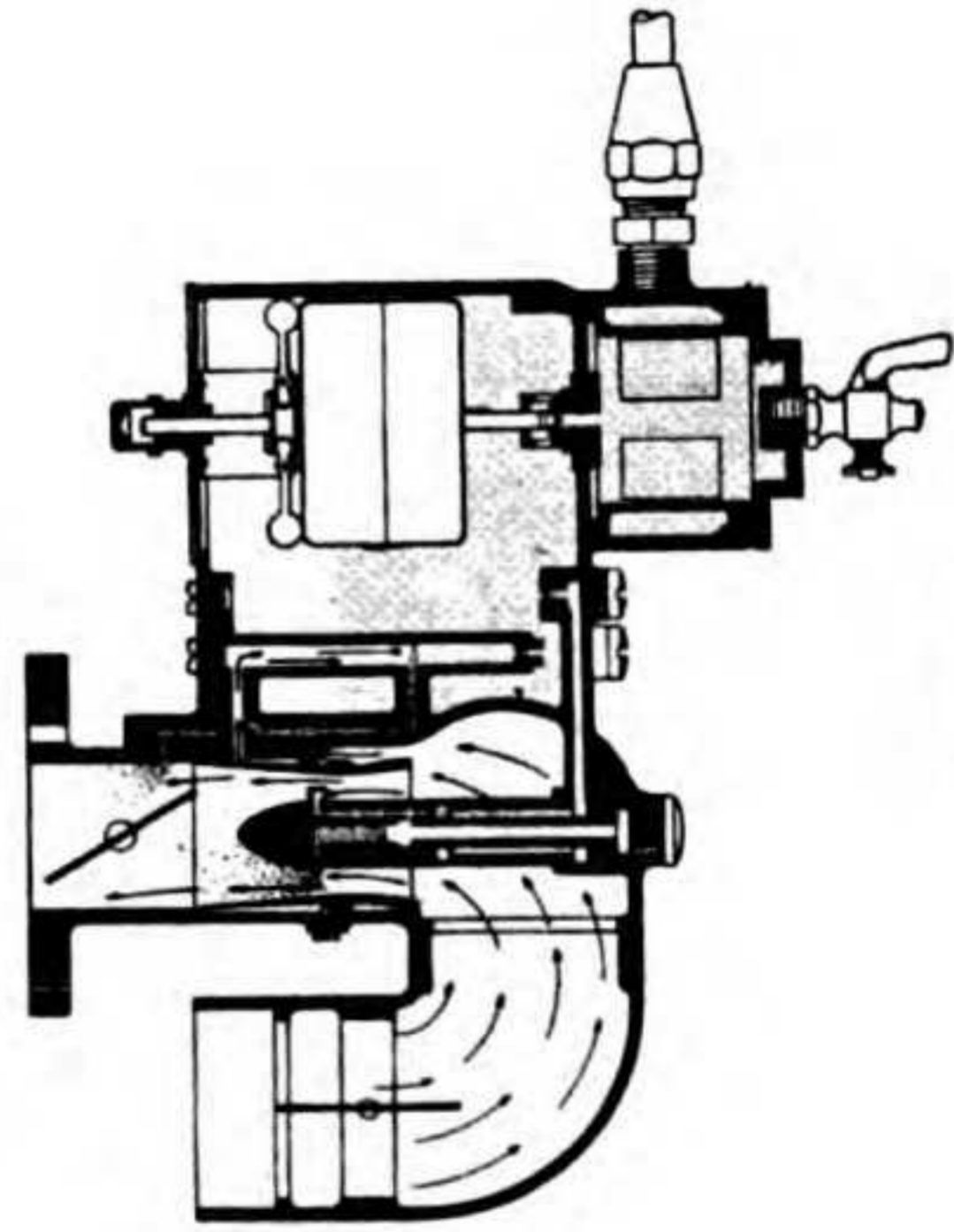
A lean mixture is slow burning. If the gases lingering in the cylinder continue to burn after the intake valve has opened they will ignite the



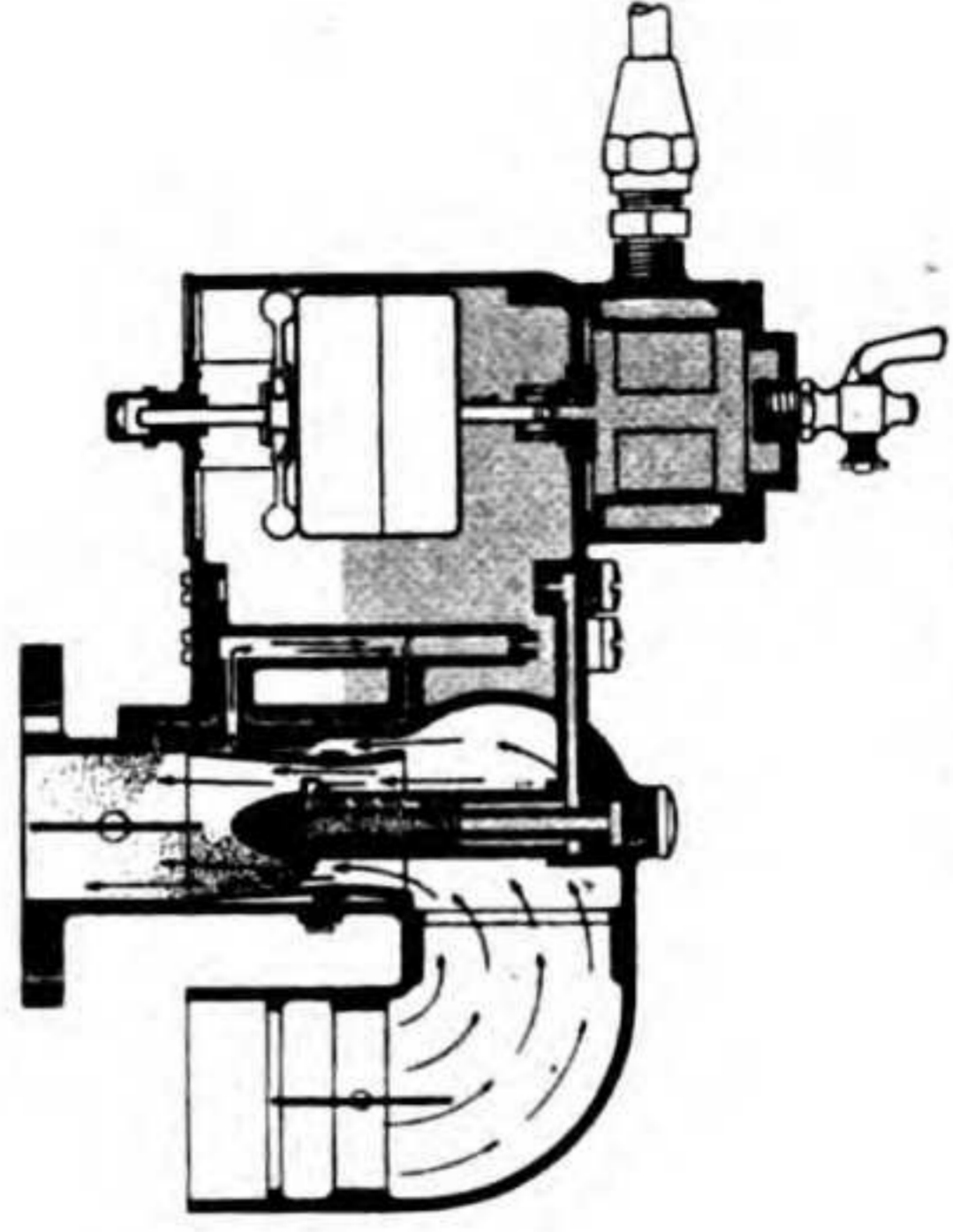
STARTING



IDLE RUNNING



PARTIAL LOAD



FULL LOAD

DIAGRAM OF CARBURETER. ACTION OF CARBURETER UNDER DIFFERENT OPERATING CONDITIONS

incoming mixture and explosions occur back past the intake valve into the manifold and carbureter.

HOW A TOO RICH MIXTURE AFFECTS THE EXHAUST

A rich mixture is slow burning and will cause a high temperature of the exhaust, a dark red flame at the priming cocks, if opened, a black smoke at the muffler outlet.

TO DETECT AND REMEDY INTAKE MANIFOLD LEAKS

If gasoline is applied to the leak while the engine is running, with a squirt can or thoroughly saturated piece of waste, enough gasoline will be sucked in to indicate that the leak exists at that point. Oil put on the leak will be sucked in and disappear. Intake joint gaskets should be shellacked or soaped with resin soap on both sides.

DETECTION OF AND RESULTS FROM INSUFFICIENTLY HEATED AIR

The incoming air which enters the carbureter through the air bend should always be heated as the hot air passing around the gasoline well, below the primary nozzle, will increase the temperature of the well, the primary nozzle, and the gasoline contained herein, thereby assisting the vaporization of the gasoline.

The incoming air is heated by the stove which receives hot air from around the outside of the exhaust pipe. Insufficiently heated air acts in the same manner as a lean mixture.

DETECTION OF WATER IN GASOLINE

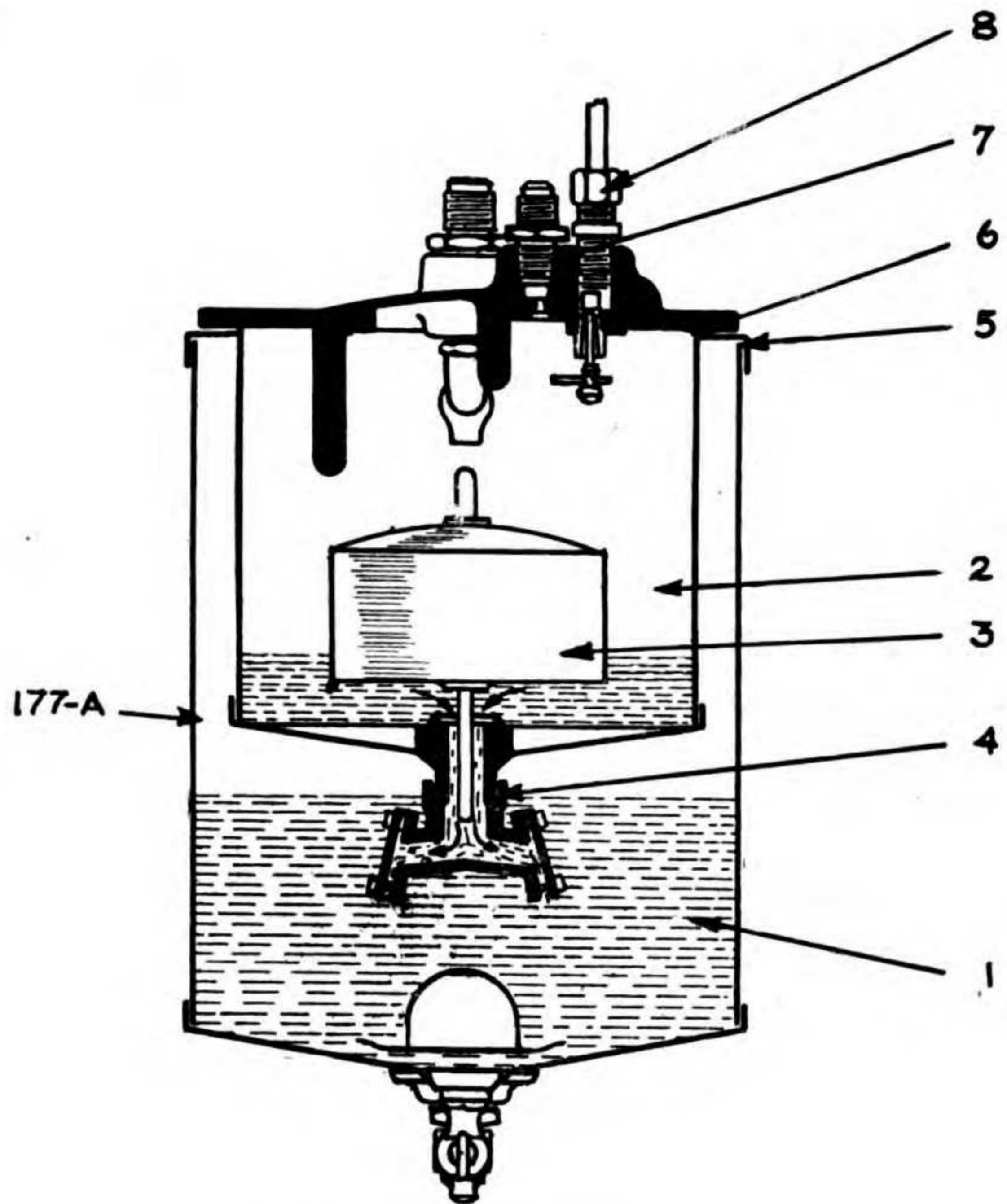
If the container is clean, the water will appear like large bubbles in the bottom of the container, as water and gasoline will not mix.

In the float chamber of the carbureter, water may be detected by the comparatively low gasoline level in the float chamber and on the float, as the float rides higher in water than in gasoline and closes the float valve quicker.

Any exposed iron in the gasoline tank will rust after a short time and discolor any gasoline coming in contact with it, aiding detection.

TO PREVENT WATER IN CARBURETER

The drain plug in the bottom of the carbureter should be opened occasionally, and any accumulated water drained out, preventing any possibility of trouble.



VACUUM TANK (PART 177 A)

- | | |
|------------------------|------------------------------|
| 1. Gasoline reservoir. | 5. Outer casing. |
| 2. Vacuum chamber. | 6. Interior casing. |
| 3. Float. | 7. Vent plug. |
| 4. Inlet to reservoir. | 8. Feed pipe from main tank. |

TO PREVENT WASTE OF GASOLINE BY CARBURETER FLOODING

Shut off the gasoline at the tank when the tractor is left standing on a steep grade, because the carbureter float may bind against the stud, due to the angle of the tractor and hold the needle valve open when the gasoline will leak out through the nozzles.

GASOLINE FEED SYSTEM

Gasoline is fed from a 30-gallon pressed steel tank, located within a felt strip lined housing mounted in the body between the fire screen and the radiator. The tank housing is supported by steel straps to the body and the tank fits into the housing. The gasoline is fed by vacuum

system to a Stewart vacuum tank strapped to the right side of the body close to the engine. The feed from this tank to the carbureter is by gravity. A horizontal loop in the feed pipe compensates for pipe length and eliminates air locks.

TO REMOVE GASOLINE TANK

First shut off the gasoline at the tank, disconnect the gasoline line, remove the bolt holding the tank supporting assembly to the body, after which the tank can be removed through the top, after the upper armor plate has been removed.

CARE OF VACUUM SYSTEM

Three points must be observed when installing a Stewart vacuum system in order to assure correct operation. They are:

1. That the top of the tank is above the level of the gasoline in the main supply tank, even when the car is descending a steep hill.
2. That the bottom of the tank is at least 3 inches higher than the carbureter.
3. That the tank is not installed over any electric equipment or terminals in which gasoline could leak, and cause a fire.

CARE AND REPAIR

After the system has been installed, it may be necessary to readjust the carbureter, especially if the tank replaces a pressure feed system. The vacuum feed should show the same rate of consumption as the gravity feed, and an increased consumption in this case may be from vent tube overflow or from gasoline leakage.

If the engine gallops, speeding up when the vacuum tank is drawing gasoline from the main tank, either the mixture is too rich, or the connections are so loose that air is being drawn into the intake manifold. No perceptible change in engine speed should be noted when the tank is operating correctly.

VENT TUBE OVERFLOW

Occasional overflow from the vent tube is not serious, but regular overflow is dangerous and wasteful, and should be stopped. One of the following is usually the cause:

1. The air hole in the main filler cap is either too small, or else is plugged up.
2. The vacuum tank may be mounted too close to the engine, heat causing the overflow. The remedy is to carry the overflow up to the highest point beneath the body plates, or else to set the tank away from the engine a few inches.

3. The bottom of the tank may not have been installed at least 3 inches above the carbureter, as directed.

4. If a pressure system was formerly used, the air pump connection may not have been disconnected.

With the exception of the vent tube, the only other places leaks can occur are through a hole in the outer wall of the tank; or through the carbureter connection or tubing.

TO TEST THE VACUUM SYSTEM

If the engine does not operate properly, and the vacuum system is suspected, it may be quickly tested by:

1. Removing the inner vacuum tank, and leaving only the outer shell which then serves as an auxiliary tank. In removing the top of the tank, the screws are first removed; and a knife blade run around between the cover and the body of the tank, separating the gasket so that it is not damaged.

2. Partially fill the outside tank with gasoline, and crank the engine. If the engine still fails to operate, the vacuum system is not at fault. On the other hand, if the engine then runs all right, the system should be examined to find the difficulty.

CAUSES OF FAULTY FEED

A leaky float is indicated by the engine choking, as the float becomes too heavy to rise and close the vacuum valve, and permits gasoline to be drawn into the manifold.

Whether this is the case may be quickly determined by removing the top of the tank, and taking out the float. However, the leak may be so small that it is difficult to locate, and make the necessary repair.

REPAIRING LEAKY FLOAT

1. Place the float in a pan of hot water. Bubbles will mark the point of leakage. Scratch an X-mark intersecting at this point.

2. Enlarge the leak by drilling and drill another small hole at the top or bottom of the float, and drain all of the gasoline from it.

3. Using as small an amount of solder as possible, solder up the two holes. If an excess amount of solder is used, the float will be too heavy for proper operation.

Care should be taken in doing this work not to bend the float guide. When this has been done, the action will be the same as when the float leaks, namely, the float cannot rise and close the vacuum valve, and gasoline is drawn into the intake manifold, choking the engine.

When on the road, or for a temporary repair, the effect of a leaky float may be overcome by removing the plug shown at the top of the tank, page 73. Ordinarily enough suction remains to draw gasoline

into the vacuum tank, but if not, the plug should be replaced until the tank is full, then removed, and the operation carried on until a repair can be effected. The car should run from $\frac{1}{4}$ to $\frac{1}{2}$ mile between each operation.

INTERMITTENT OPERATION

An obscure cause of intermittent engine operation is that in installing or in working of the system, the bushing over the atmosphere valve is screwed down too far, preventing the atmosphere valve from operation. When this has happened the engine will run for a few minutes, and then backfire and stop. After a minute it will start easily, only to repeat, as the gasoline cannot feed to the carbureter when the engine is running. The remedy is simply to turn back the bushing until the atmosphere valve can open.

TANK INOPERATIVE

The vacuum system will be thrown out of operation if a particle of dirt lodges beneath the flapper valve, shown on page 73. The test for this is to remove the tubing from the bottom of the tank, connecting it with the carbureter, and start the engine. When one finger is placed over the air vent, and another over the opening at the bottom of the tank, continuous suction indicates that there is either a leak in the connection between the tank and the main gasoline supply, or else that the flapper valve is stuck open.

DISLODGING DIRT

By striking the side of the tank with the flat of the hand any dirt beneath the valve can usually be dislodged. If not, it will be necessary to remove the tank cover and lift out the inside tank.

Three other things can cause a tank to be inoperative. They are loose manifold connection, plugged tubing or dirty gasoline strainer. The strainer is generally the cause of the trouble, and it should be examined first.

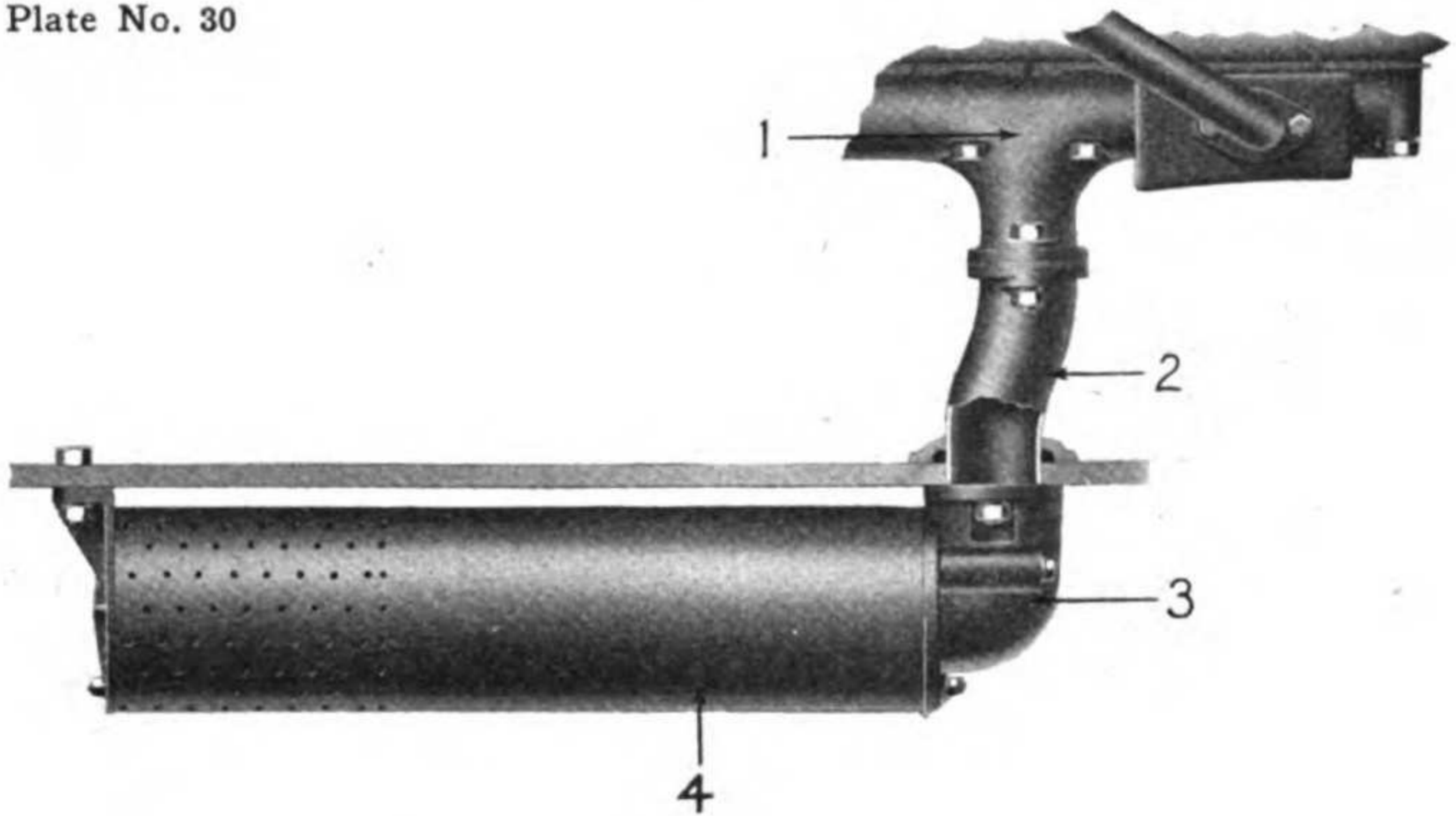
EXHAUST SYSTEM

The exhaust system conveys the exhaust gases from the engine and muffles the noise. It consists of a manifold, spacer, muffler, and their accompanying parts.

The spacer carries the exhaust from the manifold through the armor plate to the muffler by means of a stuffing box. The spacer is cast with a flange to attach it to the exhaust manifold.

The muffler is 27 inches long and 6.1 inches in diameter. It consists of a seamless steel tubing body, cast iron ends, and a series of interior

Plate No. 30



ENGINE EXHAUST PIPING

- | | |
|-----------------------|--------------------|
| 1. Exhaust manifold. | 3. Muffler header. |
| 2. Exhaust extension. | 4. Muffler. |

baffle plates. The plates are made of perforated sheet steel, so arranged that the holes of one plate are in a staggered position with reference to holes of next plate.

The muffler is suspended from the side of the body.

EXHAUST MANIFOLD

The exhaust manifold connects the exhaust passage cast in the cylinder block with the exhaust spacer to the muffler, and so affords an outlet to the burned gas. The spacer has a brass plug which is removed for insertion of smoke screen nozzle.

CHAPTER XII

MAIN CLUTCH GROUP

GENERAL SPECIFICATIONS

Clutch type	Inverted cone.
Location	Bolted to flywheel.
Cone diameter, large	13 inches.
Cone diameter, small	11.4 inches.
Projected face, width	4 $\frac{1}{8}$ inches.
Clutch facing	Woven Asbestos fabric.
Clutch spring, length	Under 1,000 lbs. load, 4 $\frac{2}{16}$ inches.
Clutch alignment joint	Steel knuckle type.
Clutch brake, diameter	4 inches.

GENERAL DESCRIPTION

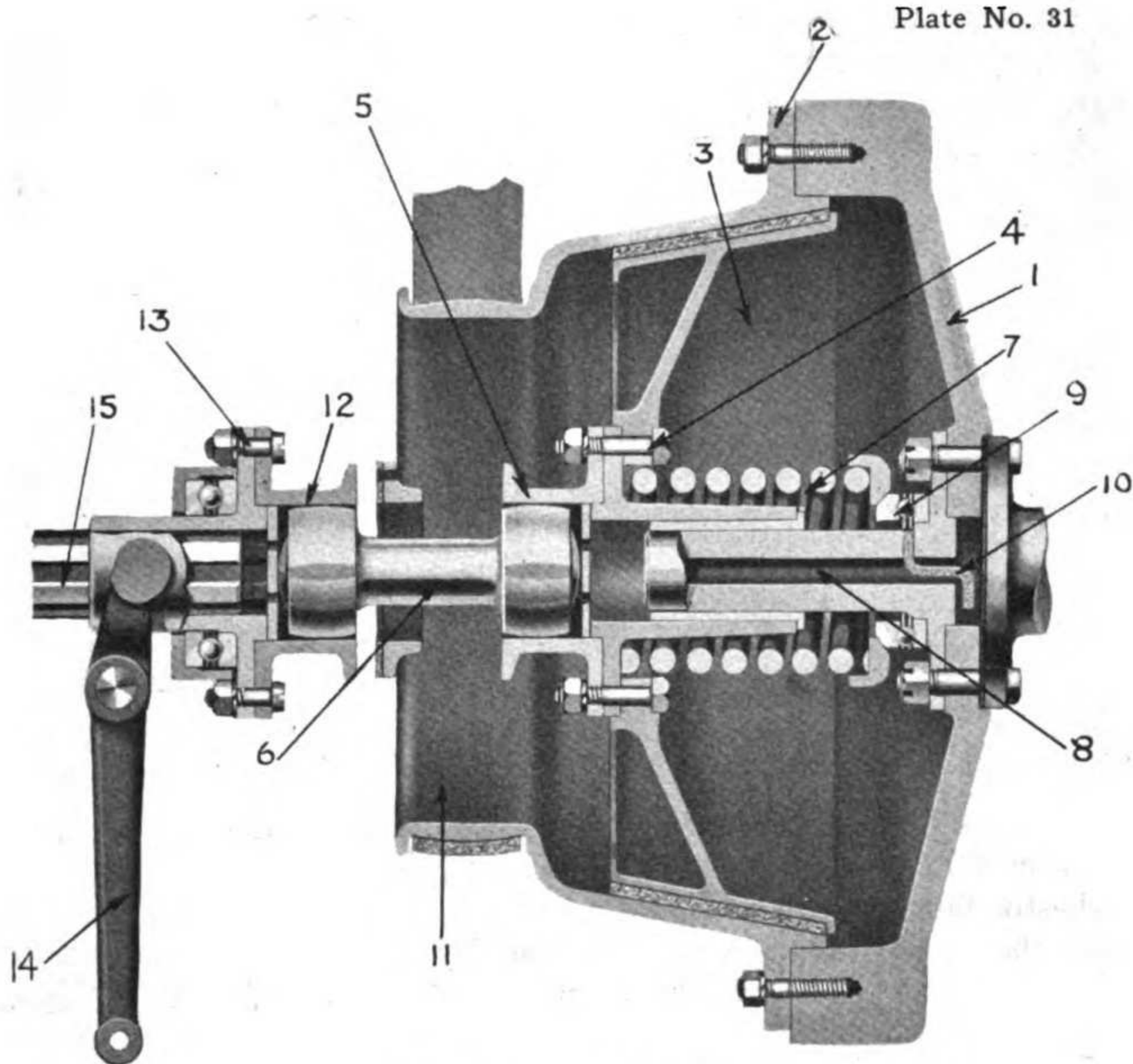
The drive from the engine is conveyed to the other tractor units through an inverted cone clutch. This clutch operates within the bell housing, which is bolted to the face of the flywheel, and which is the driving member. An extension of this rotating driving housing forms the fan pulley. The cone is an aluminum casting, carrying a facing of asbestos fabric. The frictional contact between this fabric faced cone and the cast iron housing causes the driving contact. The required amount of friction is maintained by means of a coil spring concentric with the clutch shaft. This spring bears against a retainer and a ball thrust at the engine end and against a flanged collar, connected with the clutch cone at the transmission end.

CLUTCH ALIGNMENT JOINT

In order to preserve alignment between the clutch and transmission, a knuckle joint is inserted, through which the drive passes on its way to the transmission members. This knuckle joint consists of a steel forging, of modified dumb bell shape, with squared ends, capable of imparting the driving torque to the transmission shaft. The joint is capable of operating under a slight misalignment, thereby equalizing any deviations or eccentricity of the clutch member.

CLUTCH ACTUATION

The clutch is actuated by a pedal from the driver's compartment, operated by the left foot of the driver. Depressing the pedal exerts a pull on the rod linkage, which in turn holds clutch throwout lever which slides the cone forward along the clutch stud shaft. This depresses the clutch spring and removes the clutch facing from contact with the surface of the housing which it drives. The clutch stud shaft



MAIN CLUTCH ASSEMBLY

- | | |
|---|---|
| 1. Flywheel. | 9. Ball thrust bearing. |
| 2. Clutch driving unit. | 10. Oil wick feed. |
| 3. Inverted cone or driven unit faced with leather. | 11. Fan belt pulley on clutch driving unit. |
| 4. Flange connection between clutch driven-unit and clutch shaft. | 12. Alignment joint driven unit. |
| 5. Clutch alignment joint driving unit. | 13. Flange connection of alignment joint to spline transmission shaft sleeve. |
| 6. Clutch alignment joint driving dumb-bell. | 14. Clutch throw-out lever. |
| 7. Clutch spring. | 15. Splined transmission shaft. |
| 8. Clutch stub shaft. | |

is $3\frac{3}{4}$ inches long and 1.498 inch in diameter, and has a flange $5\frac{1}{8}$ inches in diameter through which pass the bolts which connect the clutch mechanism with the flange on the end of the engine crankshaft. The stud shaft is of .20 carbon steel case hardened. It supports at the engine end the ball thrust bearing which takes the thrust off the clutch spring. This is a No. 1109 thrust bearing against which rests the retainer or thrust bearing cage. This retainer or cage is malleable casting $4\frac{9}{32}$ inches in diameter, and forms a cup in which the clutch spring rests. There is a bronze bushing, containing an oil groove, which surrounds the stud shaft, giving a bearing surface for the cone hub when the clutch is disengaged.

The throwout mechanism is on the transmission side of the universal

joint and contains a No. 1111 ball thrust, held in a cast iron retaining cage $3\frac{7}{8}$ inches in diameter, $1\frac{1}{8}$ inches wide, having a door of $2\frac{1}{4}$ inches. This truck or cage surrounds the sleeve which slides upon the splined shaft of the transmission. The sleeve is .20 carbon steel, $3\frac{1}{4}$ inches long, having a $5\frac{3}{8}$ inch flange, through which the bolts pass connecting this part with the driven member of the universal joint.

ALIGNMENT JOINT DETAILS

The front driving member of the universal is .20 carbon steel forging case hardened, having a diameter across the curved face of $2\frac{1}{16}$ inches and across the flats, 2 inches. The dumb bell member, which transmits the drive in .20 carbon steel forging, is $1\frac{3}{32}$ inches deep, having an overall length of $5\frac{9}{16}$ inches, and diameter at the dumb bell end, across the curved surface, of 2.485 inches. The throwout lever, which operates the sleeve on the spline transmission shaft, is .25 carbon steel forging, $6\frac{1}{2}$ inches between long centers and $2\frac{3}{16}$ inches between the short centers of the ball crank.

MAIN CLUTCH DRIVE

The way the drive is taken through the clutch, is first through the flange of the crankshaft to the flywheel, by means of the bolts through the crankshaft flange. The drive from the flywheel is transmitted to the cone housing by the studs in the flywheel face. From the housing it passes through the aluminum cone, by means of the friction facing, and thence through the bolts at the inner end of the cone through the driving member of the universal joint. It is then transmitted to the dumb bell through the driven member of the universal and then through a bolted flange to the sleeve which finally transmits the driving torque to the splined transmission shaft.

ADJUSTING MAIN CLUTCH BRAKE

No adjustment is provided on the clutch brake, but in case it engages too soon the driven member of the universal joint into the dumb bell bearings on the transmission side may be removed and faced off to the required distance. This will make the clutch brake engage later. In case the face of the clutch brake is too far away from that of its engaging face, this can be remedied by removing the driven member of the universal and placing the required number of shims, or paper leaves, between the universal member and the sleeve of the splined transmission shaft.

MAIN CLUTCH LUBRICATION

Lubrication of the clutch is provided by means of oil holes in the face of the flywheel. These are in direct communication with the space

beyond the end of the crankshaft which forms an oil well, permitting the lubricant to flow through the clutch stud shaft to all parts of the clutch and to the universal joint. A wick communicates with the ball thrust bearing from the oil well beyond the end of the crankshaft.

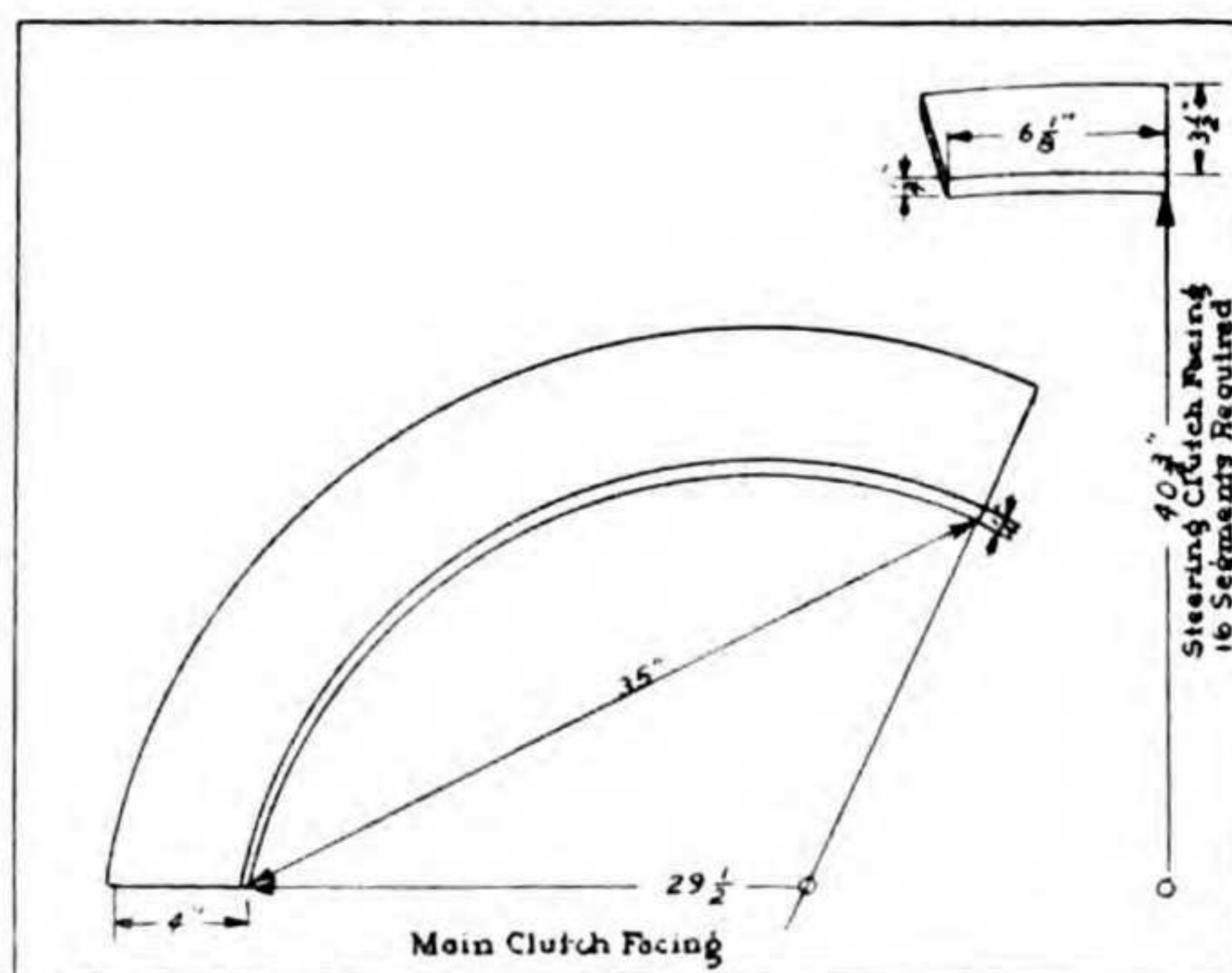
TO CLEAN THE CLUTCH FACING SURFACE

To clean the surface of the clutch facing, the clutch pedal should be locked in a depressed position throwing the cone out of communication and securely held. The fan belt should then be removed and the bell housing stud nuts removed, and the bell housing slipped back the necessary distance to provide access to the clutch facing. It will be necessary to remove the top armor plate, tank and radiator to secure the desired accessibility in working on any of the engine clutch or transmission parts. Care should be taken in removing the clutch, universal, or any of the parts which would allow freedom of the main clutch spring, to use two $\frac{3}{8}$ inch studs in the holes provided for them, thereby releasing the spring tension gradually. If these bolts are removed without gradually releasing the tension of the spring, injury may result to the operator. Kerosene can be used as a cleaning agent.

TO REMOVE CLUTCH

Remove the top armor plate, gasoline tank, radiator and transmission, and place two $\frac{3}{8}$ inch x 8 inch studs in the holes provided for them in the clutch housing. The purpose of these studs is to take the

Plate No. 32



PATTERN OF CLUTCH MATERIAL USED TO LINE CONE FACING

stress of the spring in removing the clutch. Remove the nuts holding the clutch housing to the flywheel then let out the clutch spring, by means of the stud nuts and the clutch can be taken out.

TO RE-LINE CLUTCH

Remove the old lining and chip off the rivets. New lining is provided cut to proper size. If this is not available, a lining can be cut, using page 81 as a pattern. New rivets should be put in in such a way that they are countersunk below the surface of the lining, so that the metal of the rivet will not bear against the metal clutch driven face. Or split rivets driven from inside are used.

CLUTCH ADJUSTMENT

There is no adjustment for tension of the clutch spring, but an adjustment for throwout is provided in the shape of a turnbuckle on the throwout pull rod. In case the clutch continues to drag when it is depressed to its fullest extent, increased throwout can be secured by taking up on the turnbuckle.

CHAPTER IV
TRANSMISSION GROUP
GENERAL SPECIFICATIONS

Gear box type	Sliding selective.
Number of speeds	Four and reverse.
Shaft mounting	Ball bearing.
Shaft material	Chrome nickel steel.
Transmission gears	Chrome nickel steel.
Gear face, width	$\frac{7}{8}$ inch.
Gear pitch	6.
Number of Splines	6.
Gear case	Cast aluminum.

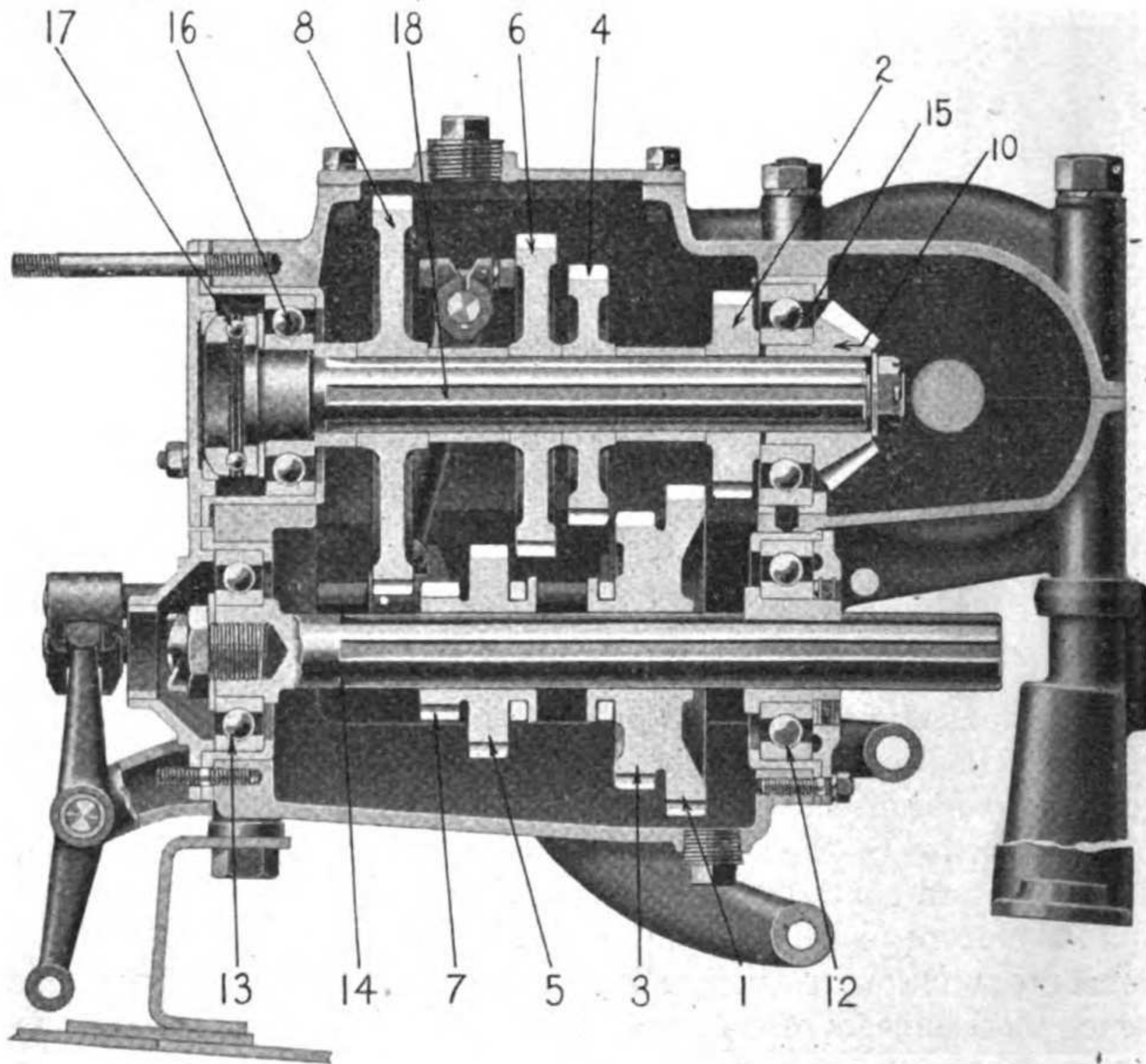
GENERAL DESCRIPTION

The transmission gear set has four forward reductions, and one reverse. It also contains a set of bevel gears for converting the drive to a transverse direction, necessary to carry it outward from the center of the tractor to the reduction gearing, which operates the track. The gears are contained in an aluminum cast housing, in which the splined chrome nickel steel shafts rotate on annular ball bearings. The gears are shifted in relation to one another by a shifter fork mechanism, which meshes gears of different diameters to secure the proper reductions. The main shaft of the gear set is in direct communication with the clutch shaft, through the medium of the universal or alignment joint described in Chapter III. The reductions in the box are 3.15, 4.54, .94 and .61 to 1. The fixed reduction through the track driving train is 30.58 to 1, giving total reductions between the engine and track sprocket of 95.5; 47; 28.78; and 18.6 to 1. The reduction on low speed and reverse are the same.

The transmission is a selective mesh type; the only gears being in mesh being those actually performing the function of reduction at the time. The main or engine transmission shaft is in the lower part of the gear box, and the countershaft is above it. The drive progresses from the rear or engine side forward along the main shaft, then upward to the countershaft, and back to the constant mesh bevel gears in the rear end of the box. These transmit the drive to the transverse shaft, which in turn carries the transmission to the spur gear reduction, through the steering clutch, and thence to a sprocket which actuates the driving track.

In high gear or fourth speed the drive progresses from the engine or main transmission shaft to the bevel gears through the gear 1 which meshes with gear 2. On third speed the drive passes from the main

Plate No. 33



TRANSMISSION SECTIONAL ASSEMBLY

- | | |
|------------------------------------|--|
| 1. Fourth speed main shaft gear. | 10. Bevel pinion. |
| 2. Fourth speed countershaft gear. | 11. Bevel gear not shown. |
| 3. Third speed main shaft gear. | 12. Annular ball bearing for main shaft (rear). |
| 4. Third speed countershaft gear. | 13. Annular ball bearing for main shaft (front). |
| 5. Second speed mainshaft gear. | 14. Transmission main shaft. |
| 6. Second speed countershaft gear. | 15. Ball bearing countershaft (rear). |
| 7. First speed main shaft gear. | 16. Ball bearing countershaft (front). |
| 8. First speed countershaft gear. | 17. Countershaft ball thrust bearing. |
| 9. Reverse idler not shown. | 18. Countershaft. |

shaft to the upper or lay shaft by means of the gear 3 which meshes with gear 4. On second speed the drive is transmitted from gear 5 which meshes with gear 6. On first speed the gear 7 meshes with gear 8. To secure reverse there is an idler gear 9, which is a wide gear meshing with gears 7 and 8, so that the drive in reverse passes from the main shaft to the lay shaft, by means of gear 7, which meshes with gear 9, and then from gear 9 to gear 8.

MAIN TRANSMISSION SHAFT

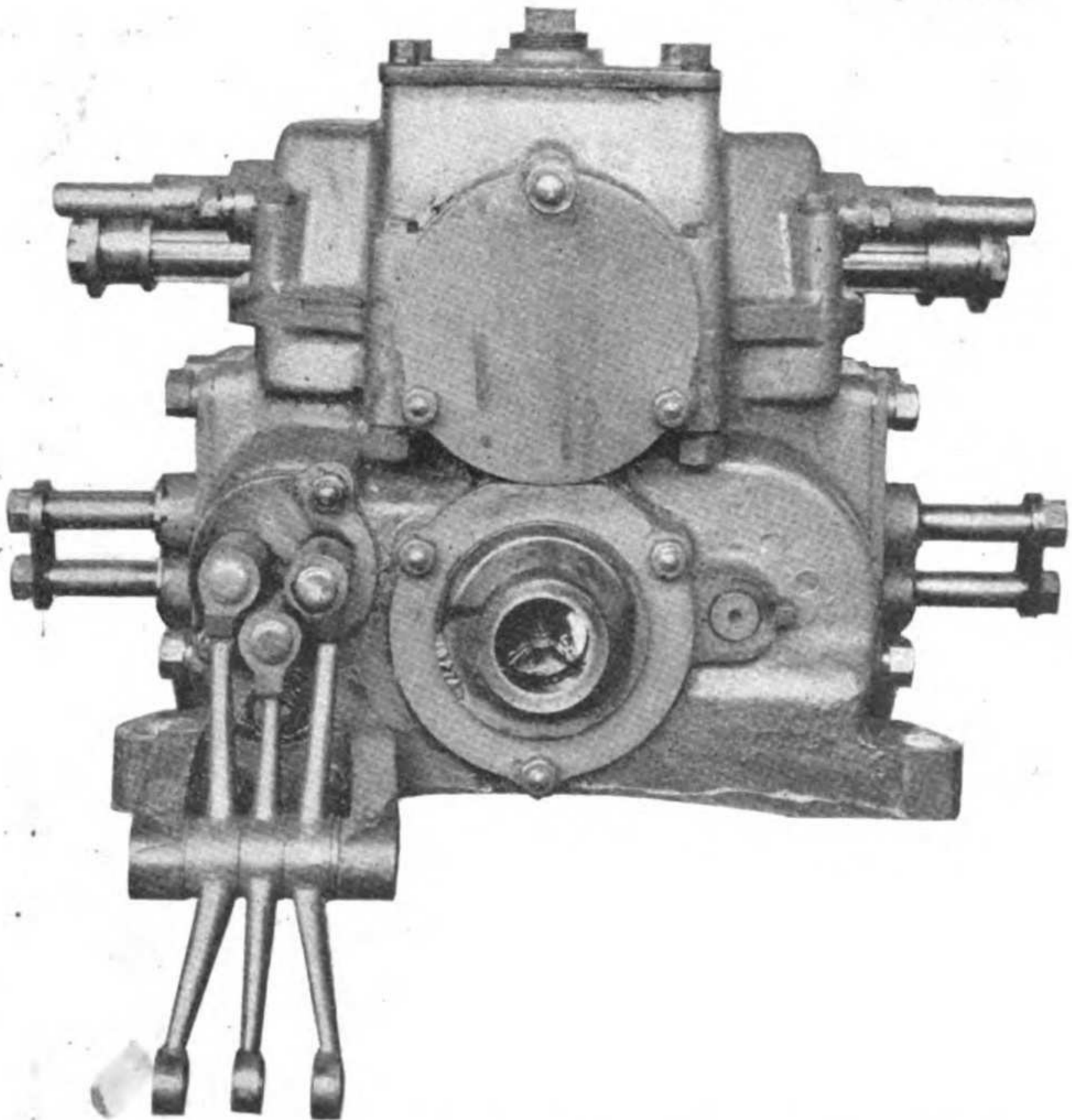
The main transmission shaft is a continuous splined shaft $16\frac{3}{4}$ inches long by 1.61 inches in diameter. It is of chrome nickel steel,

mounted on annular ball bearings at each end. All the drive passes through this shaft, and is communicated from it to the countershaft above by means of the meshing of various gears, as previously explained.

COUNTERSHAFT

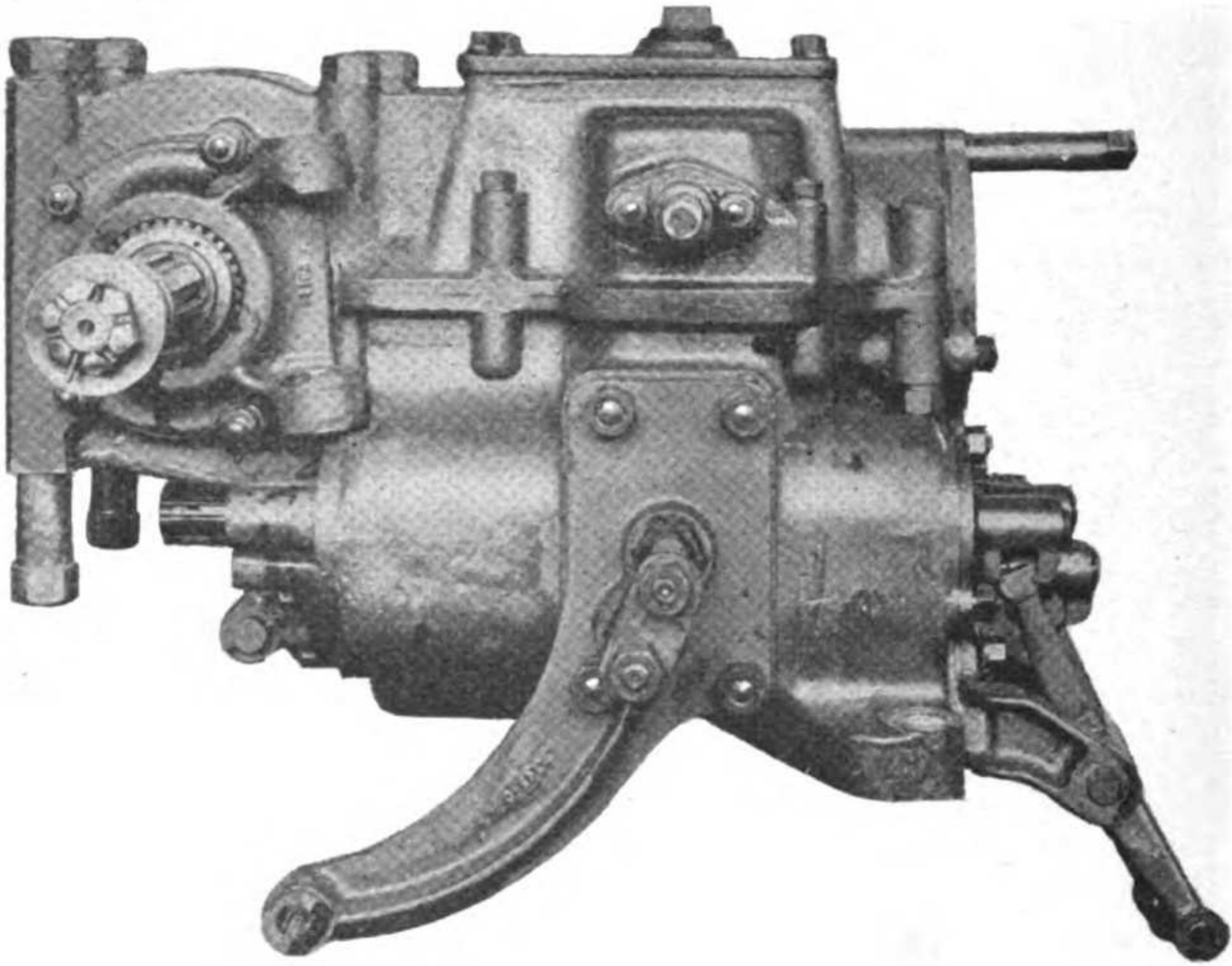
The transmission countershaft is a six splined chrome nickel steel shaft 23.30 inches long, 1.61 inches in outside diameter. It is mounted on annular ball bearings at each end. The rear end of the shaft carries the bevel pinion for the bevel gear drive, and, at the forward end, in addition to the annular bearing, there is a ball thrust mounted in a cage. This shaft receives the drive from the main shaft by means of the inter-meshing gears. The bevel pinion is carried on the splines and is held in place by a castellated nut.

Plate No 34



TRANSMISSION END VIEW SHOWING GEAR SHIFTER LEVERS

Plate No. 35



SIDE VIEW OF TRANSMISSION SHOWING HOUSING AND TRANSVERSE SHAFT

TRANSMISSION GEARS

There are nine gears in the transmission case, four of them being on the main shaft and four on the countershaft, while the reverse idler gear is mounted on a stud mounted in the transmission.

FOURTH SPEED GEAR

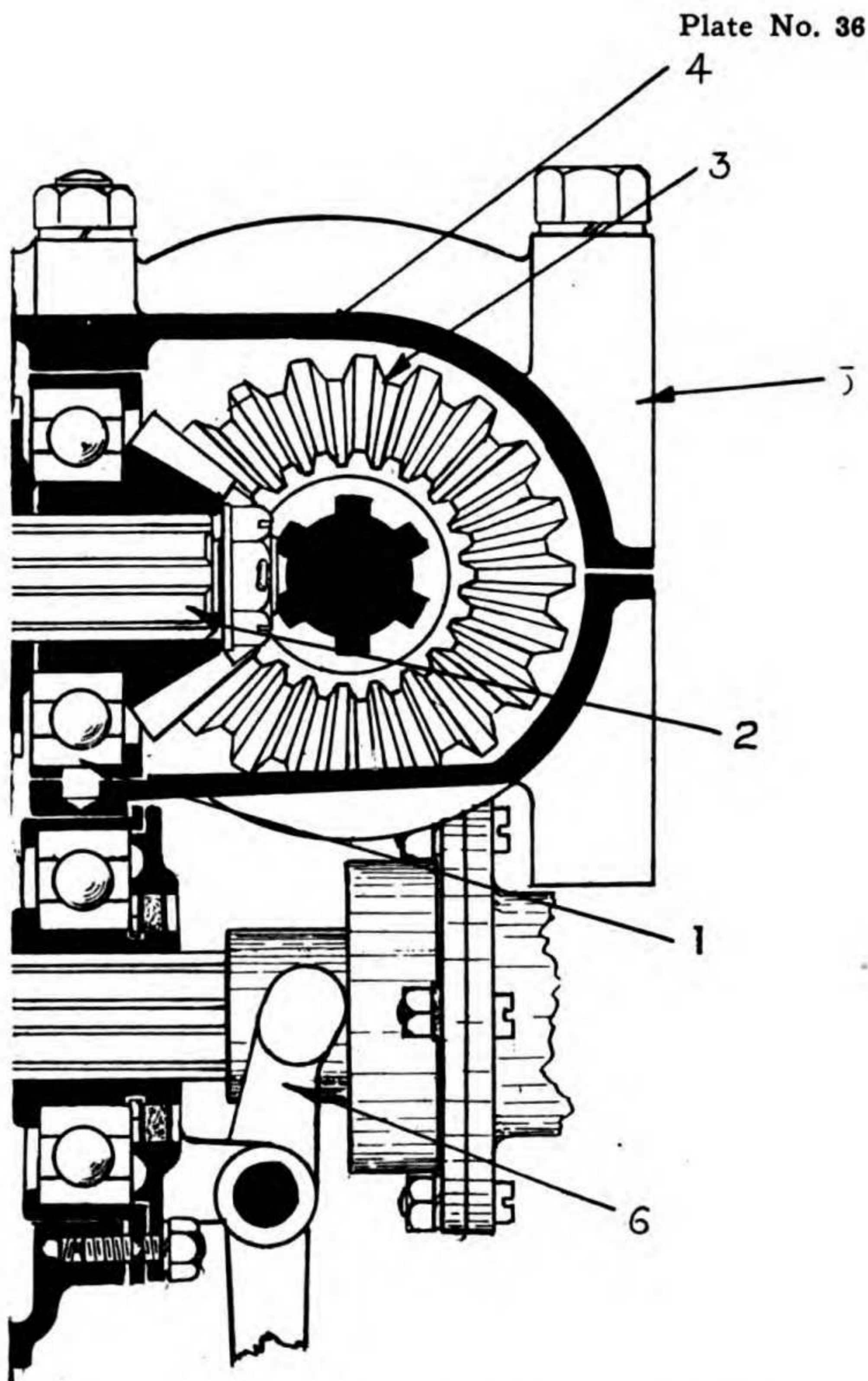
The fourth speed gear, which is that nearest the engine end of the main shaft, is chrome nickel steel, has 41 teeth, is 6 pitch and has a diameter of 7.166 inches. This gear is integral with the third speed gear 3, and slides on the splines of the transmission main shaft.

FOURTH SPEED COUNTERSHAFT GEAR

The fourth speed, or high gear countershaft gear, is on the engine end of the lay shaft, and meshes with the high speed main shaft gear. This gear 2 has 25 teeth, is 6 pitch and has a diameter of $4\frac{1}{2}$ inches. It is fixed in position, as are all the countershaft gears, by means of a spacer between it and the adjacent gear. The gear is chrome nickel steel, cut from a forged blank.

OTHER DRIVING GEARS

The other reduction gears, as indicated on page 84, secure their relative mesh by sliding on the splines of the main shaft. Third speed gear 3 has 34 teeth and is $5\frac{7}{8}$ inches in diameter, 6 pitch. It meshes with the second speed countershaft gear 4, which has 32 teeth, and is 5.66 inches in diameter. Second speed main shaft gear 5 has 26 teeth and is 4.66 inches in diameter, and meshes with second speed counter-



TRANSVERSE DRIVE FROM TRANSMISSION

- | | |
|--|-------------------------------------|
| 1. Ball bearing supporting rear of countershaft. | 4. Bevel gear housing. |
| 2. Countershaft and pinion. | 5. Upper half of transmission case. |
| 3. Bevel gear. | 6. Clutch throw-out lever. |

shaft gear 6, which has 40 teeth and is 7 inches in diameter—all being of 6 pitch. The first speed main shaft gear 7 has 16 teeth, is $3\frac{1}{8}$ inches in diameter, and meshes with the first speed countershaft gear, which has 50 teeth and is 8.66 inches in diameter. The reverse idler 9 has 28 teeth, is 5 inches in diameter, and has a face width of $1\frac{7}{8}$ inches in diameter, which allows it to mesh with both 7 and 8, thereby reversing the drive. All these gears are chrome nickel steel, having 6 pitch.

TO REMOVE MAIN TRANSMISSION SHAFT

Remove the inside starter bolts which also hold the main shaft ball bearing retainer, and take off the front retainer cover. Remove the transmission cover studs and bolts, after which the top half of the gear case can be lifted off. When this is done the lay shaft and gears can be lifted out as a unit. The cross shaft also lifts out, and the main shaft can be pulled out through the end of the box, after having removed the front and rear bearing retainers. Care should be taken in removing this shaft not to burr the splines. If the shaft is driven out it should be done with a soft hammer, or a block of wood should be inserted between the hammer and the shaft. The gears are shifted by two forks of malleable iron. As stated, the shifting is all done on the upper or countershaft.

GEAR SHIFT INTERLOCK

To prevent the gears from slipping at the mesh, there is a spring plunger arrangement held in a cap on the gear case. The plunger fits into the notch of the rod, preventing the gears from sliding out of mesh. There are three of these rods actuating the gears on the countershaft, and each is held by a spring plunger or case hardened pin $\frac{3}{4}$ inch in diameter. As these plungers are wedge shaped or beveled at the bottom they ride up on the shifter rod when it is moved through the lever, but exert sufficient force to retain the rod in place under the stresses of driving mesh.

TRANSMISSION TROUBLES

Owing to the nature of the service of the 6-ton special tractor, little or no transmission trouble is anticipated. However, it should be made a point, when draining the transmission case, as explained on page 22, to examine the old lubricant for metal chips which would indicate broken gears. By replacing worn parts indicated in this way, and by keeping the lubricant up to the standard of requirements mentioned on page 19, no mechanical trouble should be found. Drive is imparted to the steering clutch through the splined transverse shaft which receives in turn its drive from the bevel gears on the transmission. The entire steering clutch is concentric about this shaft, which is $23\frac{3}{10}$

inches long and $1\frac{5}{8}$ inches in diameter. It is of nickel steel and is mounted on a bearing of large annular ball bearings at its inner end on either side of the bevel gears, and on four ball thrust bearings to take care of the transverse stresses imparted by the drive and by the clutch spring.

TO REMOVE TRANSMISSION

Take off top armor plate, remove gasoline tank and radiator, and take out the two large bolts on top of the transmission. Remove the two bolts from the front of the transmission base, and take out the spacer on one side. Disconnect the control lines and the transmission then lift transmission with steering clutches straight out. See that steering clutches are turned to give a slight forward pull to disconnect the Oldham couplings.

CHAPTER V
STEERING CLUTCH AND BRAKE
GENERAL SPECIFICATIONS

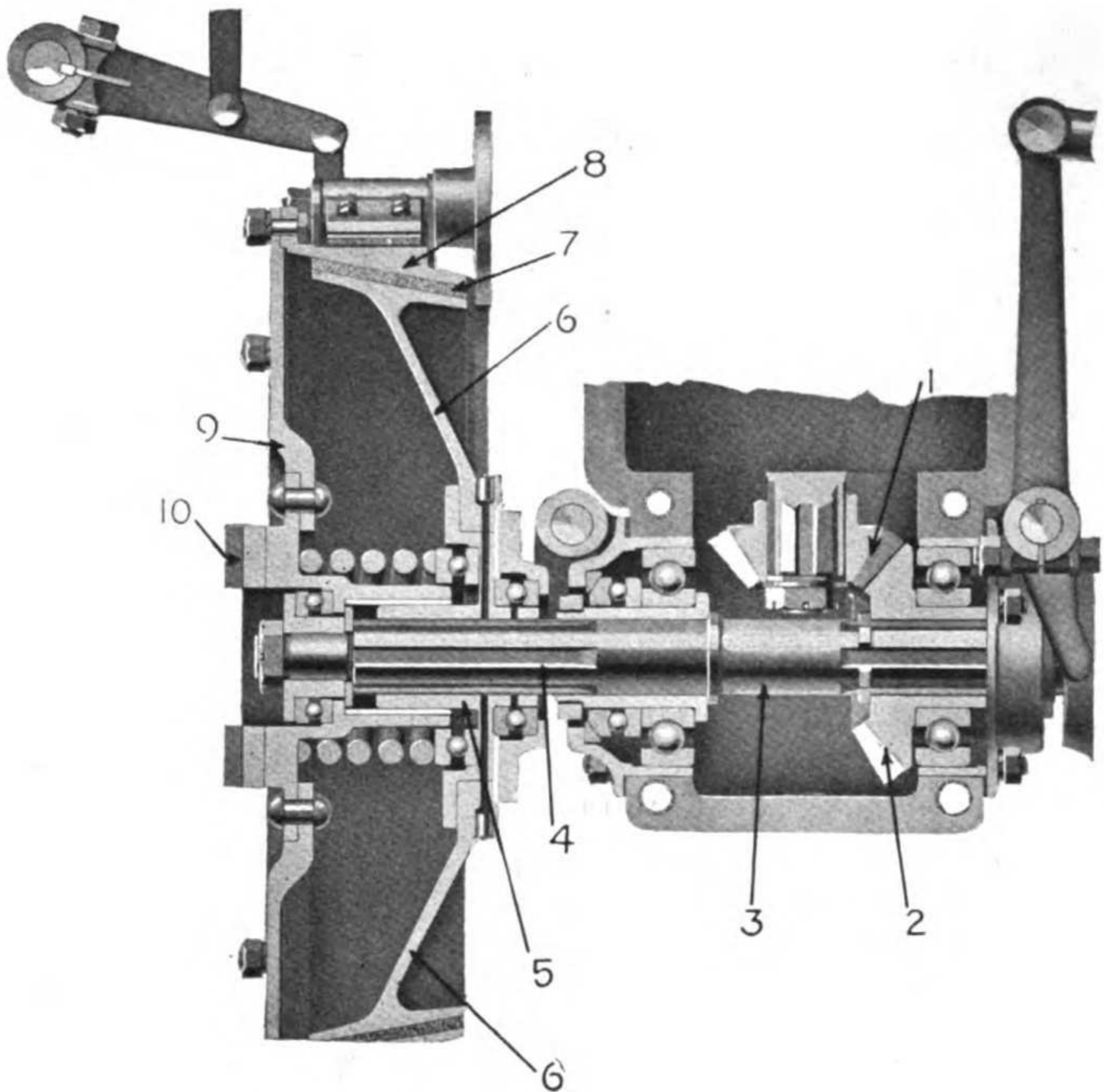
Clutch type	Inverted cone
Location	On transverse transmission shaft
Cone diameter, large	17 ⁵ / ₈ inches
Cone diameter, small	16 inches
Projected face, width	3 ¹ / ₈ inches
Clutch facing	Woven asbestos fabric
Clutch spring, length	2 ⁷ / ₈ inches under load of 1400 pounds
Clutch mounting	On splined transverse shaft
Brake type	Contracting
Brake diameter	17 ⁷ / ₈ inches
Brake face, width	2 ³ / ₈ inches
Brake material	Asbestos fabric
Brake control	Through steering clutch lever or pedal
Brake location	Drum surrounding steering clutch

GENERAL DESCRIPTION

The steering clutch unit comprises the inverted cone clutch, which connects the transmission with the reduction gear that drives the track, and also includes a brake mounted on the exterior of the driven clutch unit. The steering clutch and the brake are controlled by the steering lever, which first disengages the clutch, and, then upon further application, engages the brake. The entire unit, comprising both the steering clutch and brake, is mounted on the splined transverse shaft which takes the drive from the transmission and carries it outward from the center line of the tractor to the spur gear reduction and the track. The clutch spring is a single coil, mounted concentrically around the spline shaft. There is a ball thrust at each end of the clutch to take the spring which is loaded to 1400 pounds.

The steering clutch is oiled by means of oil cups in the inner clutch housing face. The oil channels lead directly to the splined shaft, and from this point pass to the bearing surfaces of the steering clutch. The clutch is faced with asbestos fabric, and the facing is mounted on a cast iron cone, which engages with a cast iron driven face. The brake is mounted on a drum placed on the outside of the driven clutch member, and has a diameter of 17⁷/₈ inches. It is actuated by linkage which contracts the asbestos band about the drum, bringing to rest one of the tracks, while the other may be free to move, thus enabling the tractor to turn about in a radius but a little over the width of the tractor.

Plate No. 37



STEERING CLUTCH AND BRAKE ASSEMBLY

- | | |
|---|--|
| 1. Bevel pinion on transmission countershaft. | 6. Inverted cone clutch drive member. |
| 2. Bevel gear on transverse shaft. | 7. Asbestos fabric material. |
| 3. Transverse shaft. | 8. Clutch driven member and brake drum. |
| 4. Splined end of transverse shaft. | 9. Clutch cover plate taking drive to Oldham coupling. |
| 5. Clutch driving collar. | 10. Oldham coupling. |

TO RE-LINE CLUTCH

Remove the old lining and chip off the rivets. New lining is cut to proper size. If this is not available, a lining can be cut, using page 81 as a pattern. New rivets should be put in in such a way that they are countersunk below the surface of the lining, so that the metal of the rivet will not bear against the metal clutch driven face, or split rivets driven in from the inner side. The lining is in 16 segments. See page 81.

TO REMOVE STEERING CLUTCH

Remove the top armor plate, gasoline tank, radiator and transmission, take off nut from end of splined shaft and slide entire clutch unit off the spline shaft. As the spring tension is not excessive on the steering clutches, disassembling can be done without using spring relief studs, if handled carefully.

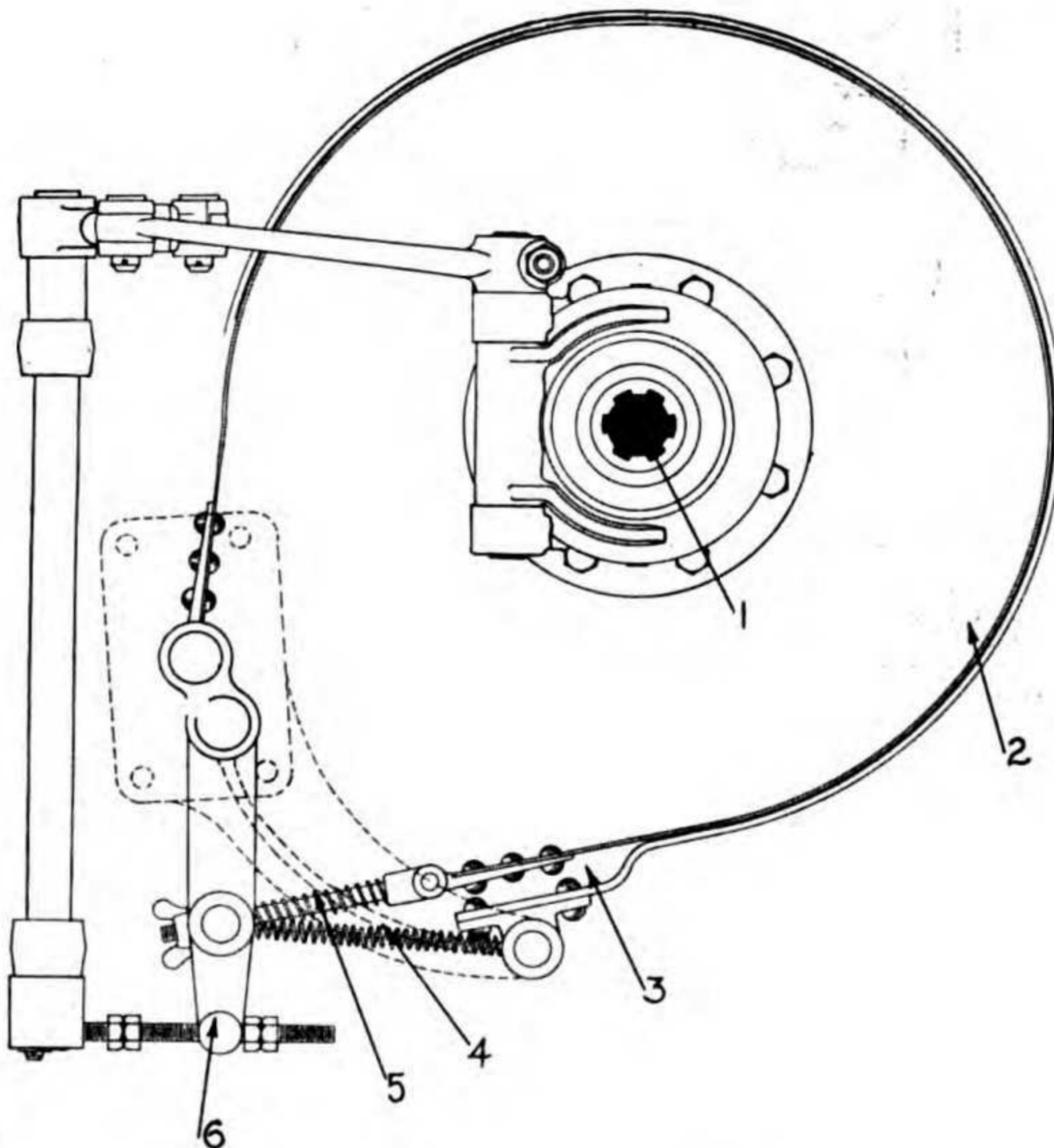
STEERING CLUTCH ADJUSTMENT

No adjustment is provided on the steering clutch for spring tension. There is an adjustment, however, on the steering clutch pull rod, to take care of the engagement and disengagement of the clutch. This turn buckle regulates the amount of throwout when the starting clutch lever is pulled, and will seldom require attention.

STICKING STEERING CLUTCH

To prevent the steering clutch from sticking, the driver, after stopping the tractor, should release the steering clutch with the hand reverse a few times to keep from sticking.

Plate No. 38



BRAKE ADJUSTMENT PROVISION

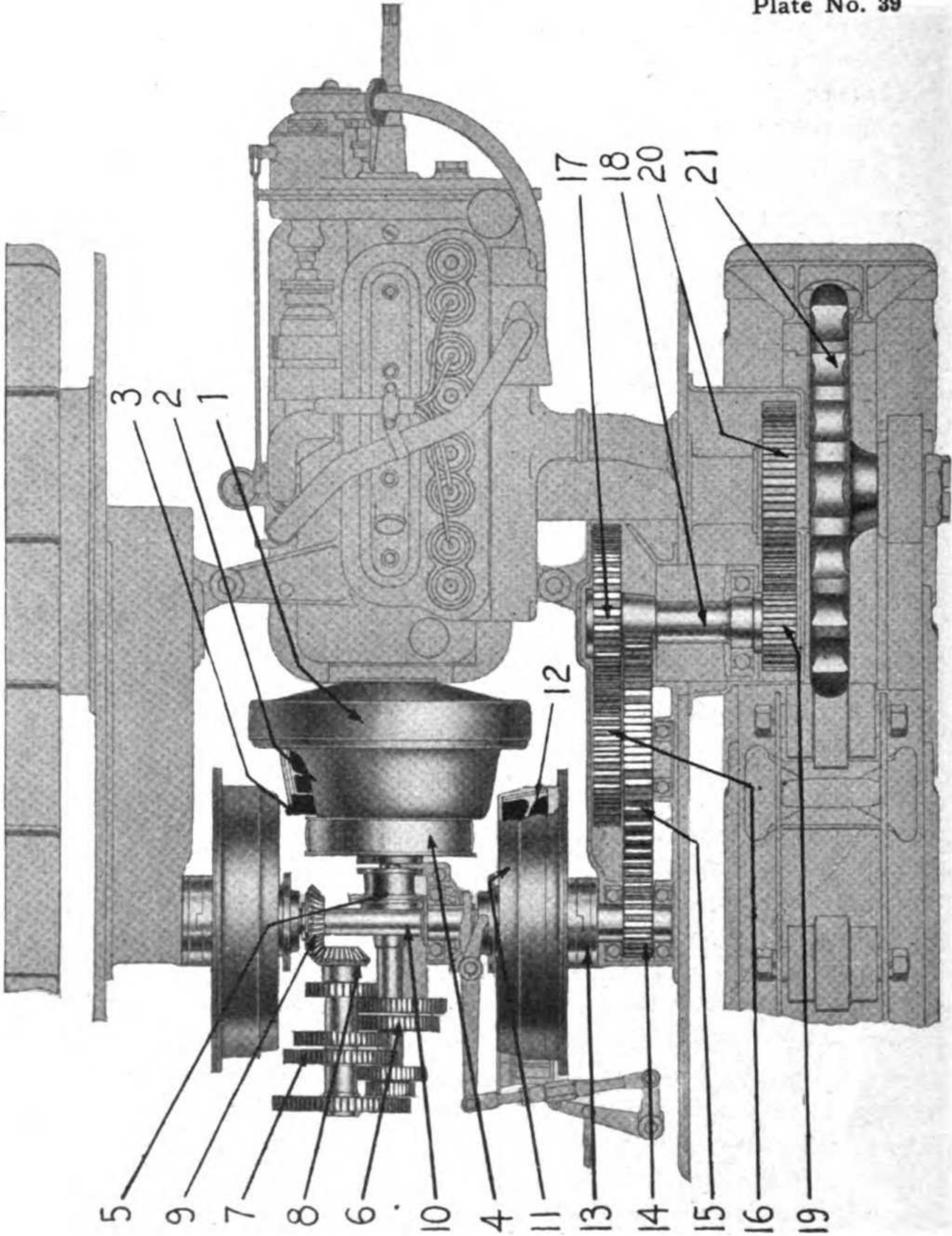
- | | |
|-----------------------------|---|
| 1. Transverse spline shaft. | 4. Brake release spring. |
| 2. Brake band. | 5. Brake adjustment tension spring. (Adjustment made on wing nut at end of this rod.) |
| 3. Brake band and clamp. | 6. Brake actuating lever. |

CHAPTER VI
SPUR GEAR REDUCTION
GENERAL SPECIFICATIONS

Total reduction.....	22.8
Type of gears.....	Spur
Drive.....	Through Oldham coupling
Tooth form.....	Generated, involute
Pitch.....	4
Gear material.....	3½% nickel steel
Oldham coupling diameter.....	5⅝ inches
Number of teeth first pinion.....	15
Number of teeth first gear.....	63
Number of teeth second pinion.....	23
Number of teeth second gear.....	42
Number of teeth third pinion.....	13
Number of teeth third gear.....	37
Gear face width.....	1¾ inches
Back lash.....	.012—.025
Reduction gear housing.....	Aluminum casting

GENERAL DESCRIPTION

A spur gear reduction is mounted on each side of the tractor, giving a fixed reduction of 22.8-1. These gears are driven from the transverse shaft of the transmission through the steering clutch, by means of an Oldham coupling. They are contained within aluminum cast casings, and are the intermediate transmission members between the steering clutches and the sprocket which operates the track. The first pinion which receives the drive from the Oldham coupling is mounted on a 6 spline shaft, and has 15 teeth of 4 pitch, and meshes with a 63 toothed gear, which carries a 23 toothed pinion. This in turn meshes with a 42 toothed gear, carrying a 13 toothed pinion, which transmits the drive to the final reduction, which has a 37 toothed pinion. The face width of the spur gear reduction teeth is 1¾ inches, with the exception of the final reduction gear, which has a face width of 2⅝ inches, as has also the pinion which drives it. The first and second reduction gears, and the second and third pinions, which are mounted upon them are idlers, and are carried on annular ball bearings. The final reduction gear is directly connected to the track sprocket, being mounted on the rear axle and keyed to the track driving sprocket. The pressed cover plate for the spur gear case passes between the final reduction gear and the sprocket, and is held oil tight by a packing ring on the hub of the final reduction gear. The shaft which carries the



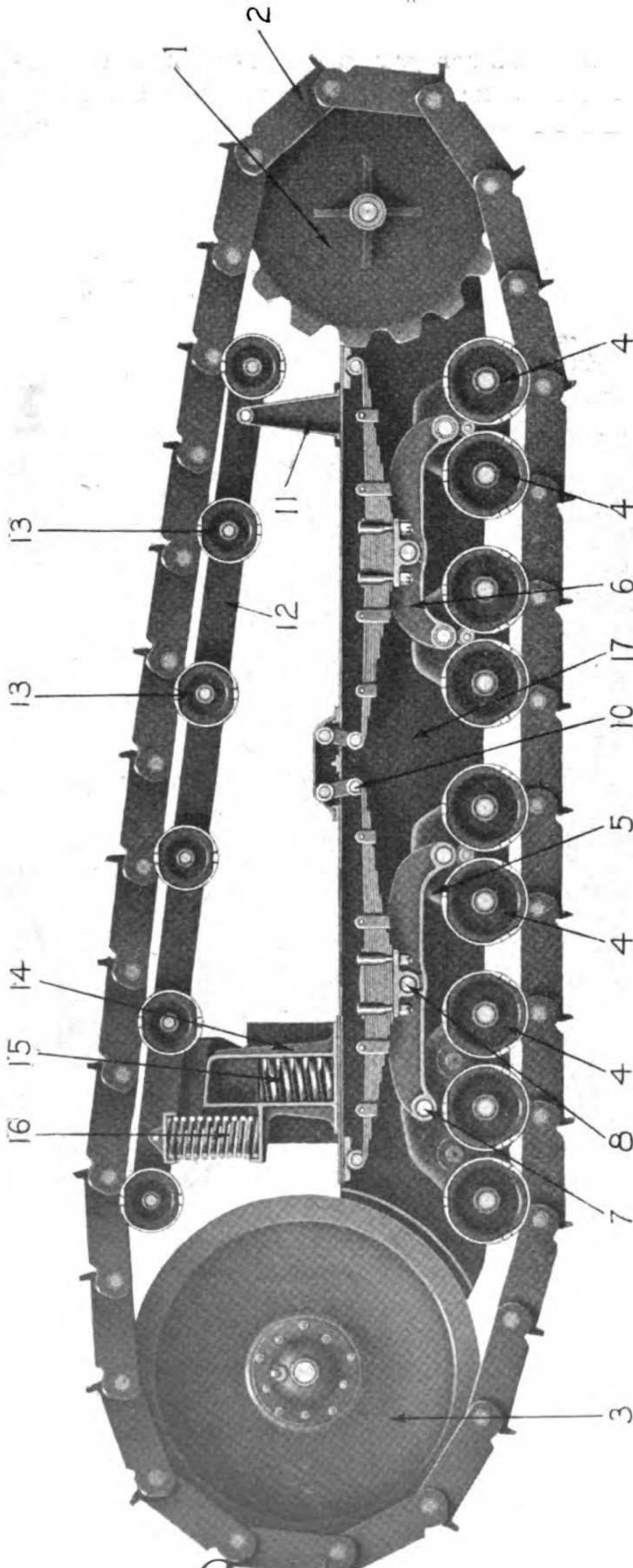
**PROGRESSION OF DRIVE
THROUGH REDUCTION
GEARING**

1. Main clutch driving member.
2. Main clutch driven member
3. Main clutch housing.
4. Fan belt pulley.
5. Alignment joint.
6. Transmission main shaft.
7. Transmission countershaft.
8. Bevel pinion.
9. Bevel gear.
10. Transverse shaft.
11. Steering clutch driving member.
12. Steering clutch driven member.
13. Oldham coupling.
14. Spur reduction gear.
15. Spur reduction gear.
16. Spur reduction gear.
17. Spur reduction gear.
18. Sprocket drive shaft.
19. Spur reduction gear.
20. Final spur reduction gear.
21. Track drive sprocket.

drive from the second reduction gear to the third or final reduction pinion is splined, and, as in the case of the reduction gears, except the final one, runs on annular ball bearings. The teeth on the reduction gear are 4 pitch.

TO REMOVE SPUR GEAR REDUCTION

The spur gear reduction is the last part to disassemble in taking down the tractor. To remove it, take off top armor plate, remove gasoline tank, radiator, and engine; take out the two large bolts on the top of the transmission. Remove the two bolts from the front of the transmission base, and take out the spacer on one side. Disconnect the control lines and Oldham couplings and pull out transmission. Remove track sprocket assembly and then take out all bolts through the spur gear reduction case, after which reduction case can be removed.



TRACK ASSEMBLY

- | | |
|---------------------------------------|---------------------------------------|
| 1. Track drive sprocket. | 10. Spring shackle, |
| 2. Track link. | 11. Upper roller frame pivot bracket. |
| 3. Track idler. | 12. Upper roller frame. |
| 4. Track roller. | 13. Upper roller. |
| 5. Track roller frame. | 14. Track frame supporting bracket. |
| 6. Roller truck. | 15. Track supporting bracket spring. |
| 7. Roller truck equalizer pivot. | 16. Track tension spring. |
| 8. Roller truck supporting pivot pin. | 17. Track frame. |

CHAPTER VII

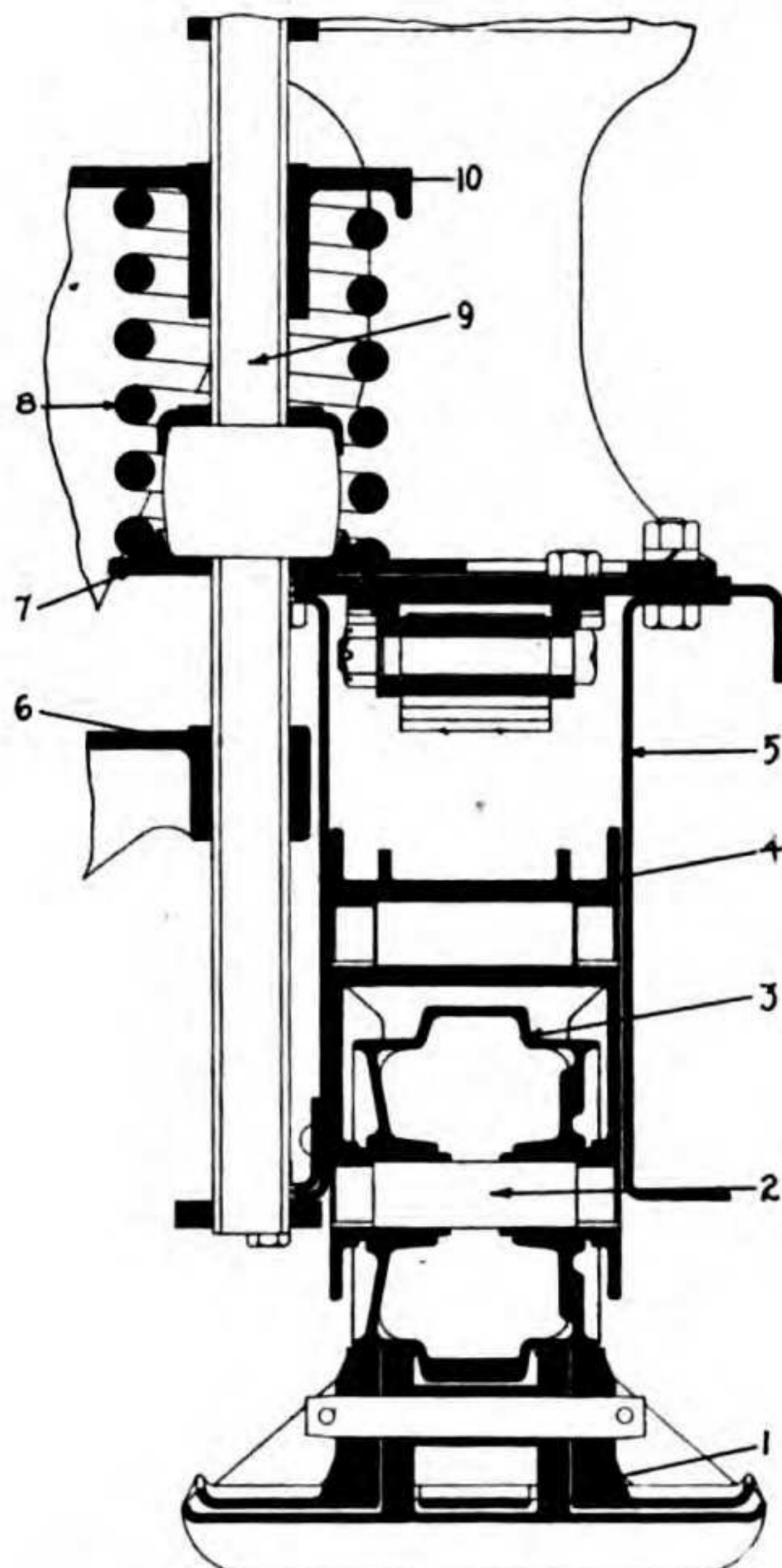
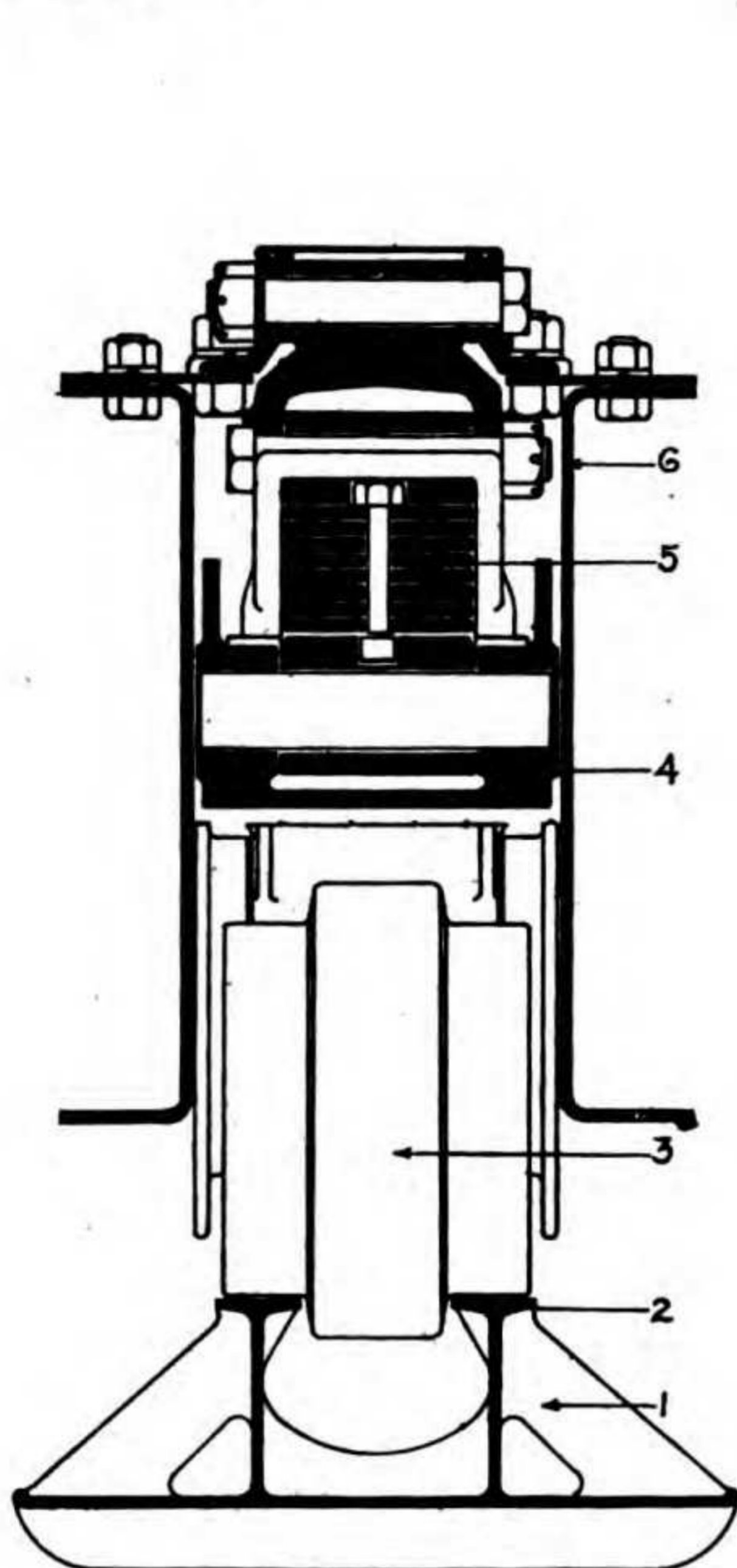
TRACK GROUP

GENERAL SPECIFICATIONS

Type of track.....	Link chain
Number of links.....	32 per track
Number of tracks.....	2
Tract drive.....	By sprocket
Track rollers, bottom.....	9 per track
Track rollers, top.....	6 per track
Track tension.....	By coil spring and idler location
Track guide.....	Roller idler
Track tread.....	Growser type
Roller diameter, bottom.....	7 inches
Roller diameter, top or supporting.....	4 $\frac{3}{4}$ inches
Track suspension.....	Coil spring
Roller truck suspension.....	Leaf spring
Track link length, center to center.....	9.842 inches
Link width.....	12 $\frac{3}{4}$ inches
Track pin diameter, growser end.....	1 $\frac{3}{8}$ inches
Track pin diameter, plain end.....	1 inch
Link material.....	Cast steel
Roller material.....	Cast steel
Front idler material.....	Pressed steel
Truck leaf spring.....	11 leaf
Main leaf material.....	Vanadium steel
Supporting leaves.....	Carbon steel
Track tightener spring.....	Coil carbon steel
Growser depth.....	1 $\frac{3}{16}$ inches
Track roller bushing.....	Bronze

GENERAL DESCRIPTION

The tractor rolls upon a track which is laid by itself in the form of a continuous chain. The chain linkage places the track down in front of the rollers, upon which the tractor moves, and picks it up behind the rollers, carrying it over the top of the track frame and back again to the forward end where the operation is continuously repeated. There are 32 links in the track chain, and the track is driven by a sprocket at its rear end, and carried over an idler sprocket at its front end. To hold the track rigidly in its correct pathway, there is a set of track-carrying rollers mounted upon a bar underneath the top of the chain. This bar is pivoted at its rear end, and is forced vertically upward by a coil spring at its front end.



TRACK FRAME ASSEMBLY

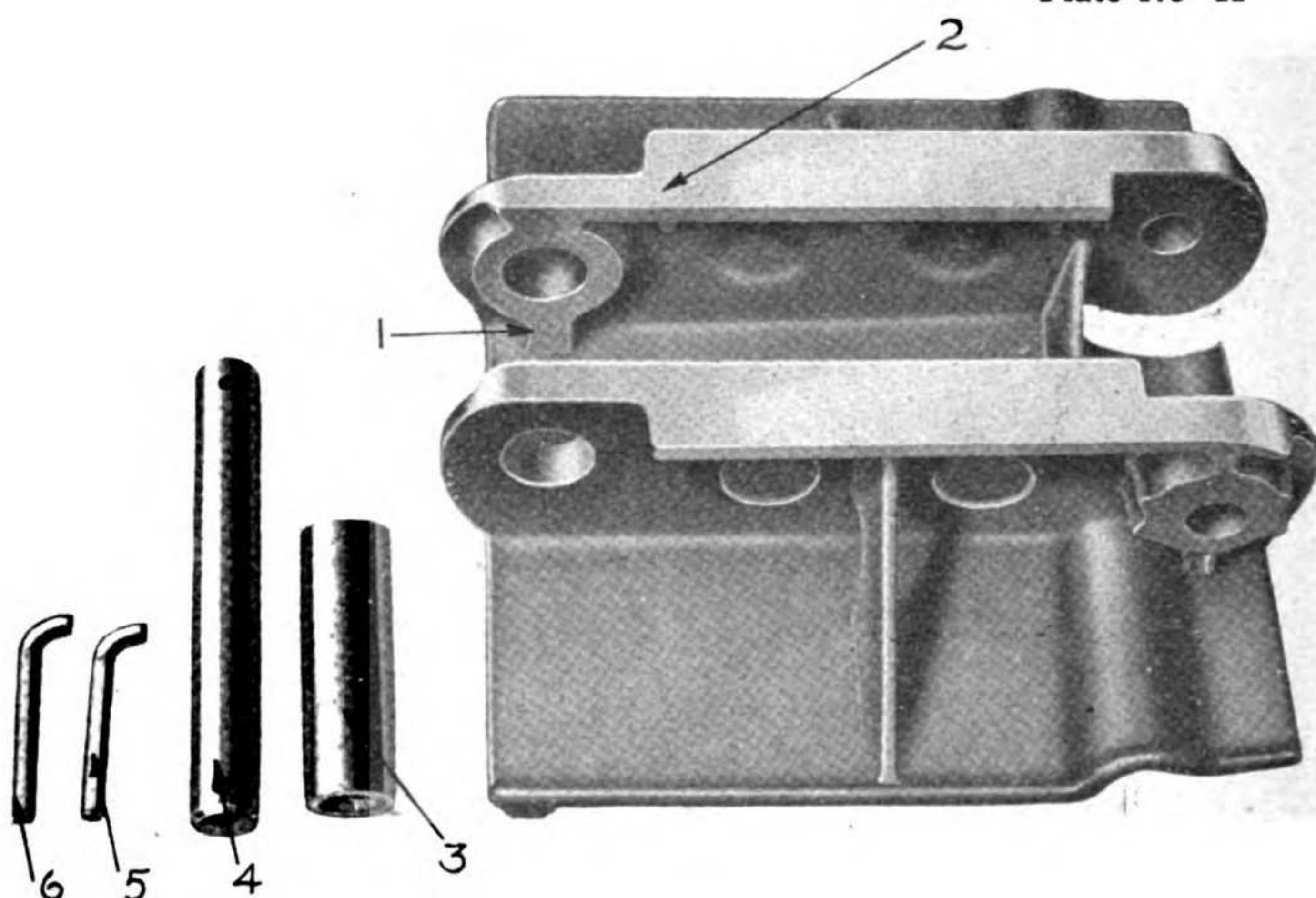
- | | |
|------------------------|-------------------------------------|
| 1. Track shoe. | 6. Tractor body supporting lug. |
| 2. Track roller pin. | 7. Track frame bracket. |
| 3. Track roller. | 8. Track supporting bracket spring. |
| 4. Track roller frame. | 9. Track supporting bracket guide. |
| 5. Track frame. | 10. Track supporting bracket. |

TRACK SUPPORTING BRACKET

- | | |
|------------------|-----------------------------|
| 1. Track shoe. | 4. Track frame pivot pin. |
| 2. Track rail. | 5. Track suspension spring. |
| 3. Track roller. | 6. Track frame. |

links has an integrally cast steel hook or growser, with which it is capable of obtaining a grip on the ground, greatly increasing the climbing ability of the tractor.

Structurally, the entire track mechanism is supported in an inverted "U" beam, which is bracketed to the bar on the tractor by means of spring mounted bracket previously mentioned. The drive is transmitted directly from the spur gear reduction through the driving sprocket of the track. The final reduction gear is keyed to the sprocket, which, in turn, transmits its drive by the meshing of the track link bushings between the sprocket teeth. As the track is moved around the track mechanism by the sprocket, the growsers obtain a grip on the



TRACK PARTS

- | | |
|------------------------|------------------------|
| 1. Track link. | 4. Track pin (long). |
| 2. Track rail surface. | 5. Track pin retainer. |
| 3. Track pin (short). | 6. Track pin retainer. |

ground, hold the chain stationary, allowing the sprocket to obtain a grip on the bushings thus propelling the tractor forward. The propulsion is secured by the tendency of the sprocket to roll forward on the chain, thus communicating its drive to the sprocket axle, the axle pushes the tractor ahead and causes the rollers to travel over the rail which is carried by the chain. The trucks supporting the track rollers are pivoted at their centers, giving flexibility to the entire truck, and are also pivoted at the forward and rear ends of the roller frame. The linear speed of the track is the same as the linear speed of the drive sprocket, and since the grousers prevent slippage of the track on the ground, the linear speed on the tractor is the same as that on the chain. For the reductions of the various speeds see page 83. The quality of the track to accommodate itself to inequalities of the ground is given by the complete pivoting system, and also by the shackle arrangement of the semi-elliptic springs which support the trucks. These being pivoted at one end and shackled at the other are free to rise and fall to a small angle, while the rollers themselves can swing about on the equalizers at the pivot points.

TRACK LINK

The links which go to make up the tractor chain, and which carry on one side the growser that digs into the ground to secure traction, and on the other side the rail upon which the rollers operate, are cast steel. They are 9.84 inches long between pin centers and $12\frac{3}{4}$ inches wide. The growser flanges are on the forward end of the track links, when they are in their bottom position. The width of the track flange, upon which the rollers run, is $1\frac{9}{16}$ inches on each side, giving a total of $3\frac{1}{8}$ inches of track width on each link. The link pins are of nickel steel, hardened and ground; they are $7\frac{3}{4}$ inches in length, and have a diameter of one inch. The link pin bushings are $1\frac{3}{8}$ inches seamless steel tube hardened.

TRACK IDLER SPROCKET.

The front idler or blank sprocket, which forms a guide at the forward end of the tractor, to carry the chain over from the top to the bottom when the tractor is in operation, is of pressed steel $33\frac{1}{16}$ inches in diameter and $\frac{5}{32}$ inch thick. It is mounted on a movable bracket frame, which is held in its position on a groove seat. The track tightening adjustments are made by moving the idler wheel forward by means of a nut which moves a stud locating the position of the axis.

TRACK FRAME

The track frame is an inverted U beam, built up of commercial steel stock with cast steel extension. It has an inside width of $6\frac{3}{4}$ inches and depth of $13\frac{3}{4}$ inches. It is made of $\frac{3}{16}$ inch stock. This track frame is bracketed to the body of the tractor at the forward end, the bracket being spring supported by means of a coil spring which takes up the shocks transmitted to the frame through the track. The track frame is pivoted at its rear end by the axle which passes through the center of the track driving sprocket, and a bushing at this point takes the wear due to the oscillation of the track frame. The bearing is capped, and each cap is secured by studs which pass through on each side of the bearing.

TRACK DRIVING SPROCKET

The track-driving sprocket receives its drive from the final gear of the spur gear reduction, as has been described. The design of the two driving sprockets, one for each chain, is similar. The sprockets have 15 teeth and are of .40 carbon cast steel. The teeth of the sprocket mesh with the bushings on the track links, thereby transmitting the drive to the track.

REAR AXLE

The rear axle is of hot rolled steel, and is $17\frac{7}{8}$ inches over all, with diameter of $3\frac{11}{16}$ inches. On either end there is a spindle $12\frac{3}{16}$ inches in length, upon which rotates the final gear of the spur gear reduction, and also the chain driving sprocket. The end of the track frame is also pivoted on the outside end of the rear axle. The rear axle can be driven out by removing one track group and driving sprocket unit, then taking off the nuts from the U bolts which hold it in place, and taking out the fillers from beneath the U bolts, then driving the axle through, after removing the rear axle nut from one end.

ROLLER TRUCKS

The trucks for carrying the track rollers are the carrying members of the track construction; in other words, they support the wheels upon which the tractor runs. The trucks carry a semi-elliptic spring, pivoted at the center on the equalizer and supporting at the ends the track frame. The equalizers and roller frames are of cast steel. The front trucks each carry five rollers and the rear four rollers. Equalizers are pivoted at the center, and at each end carry the roller frames. On the front truck the forward pivot point carries three rollers and the rear two. On the rear truck the forward pivot carries three rollers and the rear two. All of these pivots are bushed with graphite lined bronze bushings, $1\frac{1}{2}$ inches in diameter.

TRUCK LEAF SPRINGS

The semi-elliptic springs which carry the track frame are pivoted at their center on the equalizer bars, and pivoted at their outside ends to the track frame. They are shackled at the inside end to allow for flexure in traveling over obstacles on the ground. The springs are all interchangeable, having a main link length, center to center, of $35\frac{1}{2}$ inches when loaded. The main leaves are vanadium steel, and the other leaves are of carbon steel. They have a camber of $3\frac{1}{8}$ inches when not loaded, and $\frac{7}{8}$ inch when under 4,000 pounds load. The springs have eleven leaves. The shackles are forged steel 20—30 carbon, shackle bushings being graphite iron bronze.

TRACK TENSION SPRING

To maintain the proper tension on the track links, a coil spring is inserted beneath the track suspension frame carrying the upper rollers. This frame is pivoted at its front end and the spring tends to spread the bar carrying the upper rollers and the track frame apart. The spring is a coil type of $4\frac{1}{8}$ inches diameter and is 9 inches long when loaded to 1,050 pounds. It is supported on a flange of the bracket which connects the track frame to the body.

ADJUSTING THE TRACK

The track adjustment is accomplished by moving the idler sprocket forward to increase the tension, or backward to decrease the tension; in other words, moving the idler sprocket forward is increasing the center distance of the chain sprockets, thereby drawing the chain tighter. The adjustment is accomplished by taking up the nuts on each side of the idler, forcing the idler sprocket forward. It will be of assistance in doing this work to apply the track spring compressing tool, so as to relieve the track of some of its tension before moving the idler forward. This relieves the tension from the track. The bolts holding the idler support bracket to the track frame must first be loosened.

TO REMOVE TRACK

Cut the track link pin about four links back from the front of the idler sprocket. Use the track link changing tool to loosen the chain, by compressing the track tension spring. This tool is shown on page 126. It compresses the track tension spring. Set the jack under one of the growers in front of the idler sprocket, and jack up the chain to help take up the slack, so that the pin which was cut will readily come out. If this is not done, the track will bind the pin, rendering it difficult to drive out, and perhaps causing it to jam in a slanting direction when the pin is half way out. Drive out the pin with one of the drifts contained in the tool box, remove the jack and let the front end of the track chain fall forward. Use a pinch bar to start the chain drive sprocket rotating, so that the chain will roll off clear at the back end.

TO REMOVE FRONT IDLER

After removing the track, loosen adjusting nuts, take out the vertical bolts on each side of the idler shaft support, and lift the idler, together with the bracket, out of the grooved plate. To take the idler out of the bracket, remove the nut on each side of the idler.

TO REMOVE DRIVE SPROCKET

After removing track, remove rear axle end nut, remove cap from track frame extension, remove reduction gear case cover bolts, remove bolts holding body supporting bracket to track frame, pull off sprocket unit which will slip off rear axle after pulling frame forward.

TO CHANGE TRACK SHOE

Release tension on chain with special tension spring compressing tool, jack up under growser on track near ground in front of idler. Take out the two pins on each side of the shoe and slip the new shoe in place.

LINK BUSHING WEAR

Watch for wear on the steel pin bushings on the track shoes. Replace them when wear is found. These will wear rapidly in gritty soil and under severe service conditions. The method of changing bushing is the same as that to be followed in changing the track shoes, except the shoes can remain in place and only the pins be removed.

TO REPLACE TRACK

To replace track the general procedure is exactly opposite to that of removing it, as given in the directions, under the head of "To Remove Track." It is possible to replace the track without jacking up the tractor by proceeding with the dismantling of the old track as indicated, and then spreading the old track upon the ground in the path of the machine. The new track is then spread out beyond the old, and the first link of the new track is pinned to the last link of the old track. The tractor is then run under its own power and it will run over the old track and onto the new one, which can be brought over the driving and idler sprockets, and then pinned together. In order to bring the linkage together, with sufficient slack to make it possible to pin the track, a jack should be placed under one of the growlers, close to the ground at the front end of the idler sprocket. Jacking up this growler will stretch the track to a sufficient degree and readily enable it to be pinned.

BODY SUSPENSION BRACKET

The body is suspended between the tracks on coil springs. These coil springs act between a cast steel bracket on the frame and another cast steel bracket on the body, thus giving a flexible suspension of the body capable of oscillating in accordance with the movement of the coil spring. The body suspension bracket is bolted to the side of the body. The frame suspension bracket is bolted on the flat surface on the top of the track frame. Each of these two brackets are designed to seat the spring which supports the body. The spring has a free height of $10\frac{1}{2}$ inches, and, when assembled under a load of 2500 pounds, has a height of 8 inches. The spring retaining members are part of the body and frame brackets, and mounted on the frame bracket is a rubber cushion 3 inches thick to absorb the shock, should the spring be compressed to its limit.

Vertically through the axis or center of the coil spring is a suspension bar which guides the upward and downward motion of the body on the suspension member. This bar is guided by means of its passage through square lugs on the body and track suspension brackets.

CHAPTER VIII CONTROL GROUP

GENERAL SPECIFICATIONS

Gear control.....	Selective sliding
Number of forward speeds.....	Four
Number of reverse speeds.....	One
Main clutch control.....	Left pedal
Brake control.....	Right pedal or steering clutch levers
Steering control.....	By steering clutch levers
Throttle control.....	Foot accelerator and hand lever
Spark control.....	Manual
Starting.....	By external crank handle or inside starter.

GENERAL DESCRIPTION

The control of the tractor is, in most respects, similar to that of a motor truck or passenger car, with the exception that steering, instead of being accomplished by a wheel, is controlled by tightening and releasing on the tracks through the medium of the steering clutches.

STEERING LEVERS

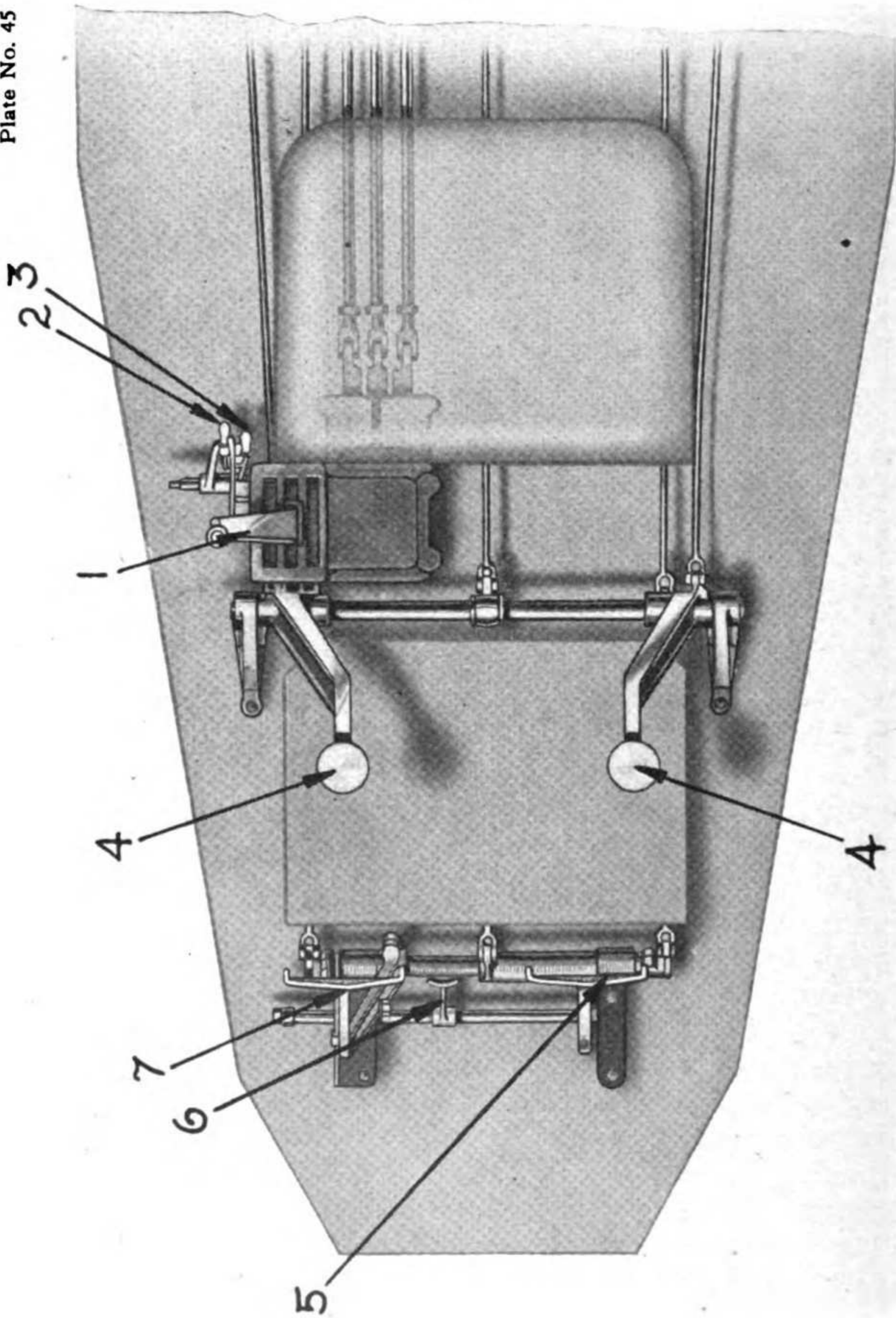
There are two malleable iron levers, one on each side of the driver. These are $16\frac{7}{8}$ inches long above the pivot and $2\frac{1}{8}$ inches below the pivot, with ball handled grips each controlling the steering clutch on a track, one taking care of the right side of the tractor and the other taking care of the left. When one of these levers is pulled back, it first disengages the clutch on that particular track, and, upon further application, engages the brake which locks the track on that side against motion. As soon as the track is freed from the driving mechanism by the disengagement of the clutch, the power is all transmitted to the track on the other side, thus causing the tractor to be swung around and rendering possible the steering of the machine.

If one track is locked against motion by the application of the brake on that side, the other track will propel the tractor in a circular path, having a radius very little greater than the width of the tractor itself. The turning diameter is approximately 14 feet, whereas the width over all is $5\frac{3}{4}$ feet.

CHANGING GEARS

Gears are changed in the conventional manner—the main clutch pedal first being depressed, allowing the relative motion of the gears to stop, and the shift is then made by means of the gear shifter lever,

Plate No. 45



CONTROL GROUP

1. Gear shifter lever.
2. Spark lever.
3. Throttle lever.
4. Steering clutch levers.
5. Clutch pedal.
6. Accelerator pedal.
7. Brake pedal.

which works within a gate. Four forward speeds and one reverse are provided in this gate. The four forward speeds are arranged in the gate in the shape of the letter H. The first speed is located at the rear inside leg of the H, looking from the driver's seat; the second speed is inside forward; the third speed outside back, and the fourth or high speed outside forward. Reverse speed is secured by depressing the latch on top of the lever, permitting the lever to pass through into the lever's gate, which is to the extreme left of the gate and forward. The shifter lever is a malleable casting $16\frac{3}{4}$ inches long, keyed to the shaft. The shifter gate is cast iron, and the shaft is of cold rolled steel $7\frac{3}{4}$ inches long by $\frac{7}{8}$ inches in diameter. The control shaft shifter lever is malleable iron, and the control rod and linkage is $36\frac{9}{16}$ inches long, of No. 8 gauge steel tube. The yoke end is welded in place and is a forged yoke and clevis which transmits the motion.

CLUTCH DISENGAGEMENT

Disengagement of the main clutch is secured by depressing the left pedal. This in turn moves a pull rod, which pulls forward the clutch lever. The clutch spring is thus compressed, and the driving face brought out of engagement with the driven face. The clutch pedal is malleable iron, having a lever arm $8\frac{3}{4}$ inches long.

BRAKE CONTROL

The brake is actuated by the right pedal. The brakes are located on the exterior drums mounted on the steering clutches. Depressing the pedal pulls the linkage, which in turn operates a toggle joint and contracts the brake band about the drum. The brake diameter is $17\frac{7}{8}$ inches and it has a face width of $2\frac{3}{8}$ inches. It is faced with asbestos fabric, and is controlled either by this pedal or by means of the steering clutch levers. In the operation of this tractor the service brakes are the hand brakes and the emergency brake is the foot brake, as compared with motor truck or passenger car brakes. In ordinary driving the braking would be accomplished with the two steering levers. If it is desired to lock the tractor on the side of a steep slope, however, the pedal could be applied as it is equipped with a ratchet lock which is applied as the pedal is depressed. The ratchet is disengaged by a release piece pivoted at the lower part of the pedal shank, and the release can be secured by kicking down this latch. The brake pedal is malleable iron, having a lever arm of $8\frac{3}{4}$ inches, and is clamped to the pedal shaft oscillating upon a graphite-lined bronze bushing.

THROTTLE CONTROL

The throttle is controlled either by an accelerator pedal or by hand throttle lever, as desired. The accelerator pedal is mounted between

the clutch and brake levers, and the spark control is located on a sector to the right of the driver's seat, just outside of the shifter gate. The accelerator pedal and the throttle lever are linked together in the usual manner, that is the throttle lever can be moved to any stationary location desired, thus fixing the minimum speed of the engine, and when moved will depress the accelerator pedal to a corresponding degree. The movement of the throttle lever carries with it the accelerator pedal, while the accelerator pedal itself, when actuated, has no influence on the location of the throttle lever. The throttle lever is malleable iron and is $5\frac{1}{2}$ inches long. The accelerator pedal is also malleable with lever link $6\frac{1}{4}$ inches.

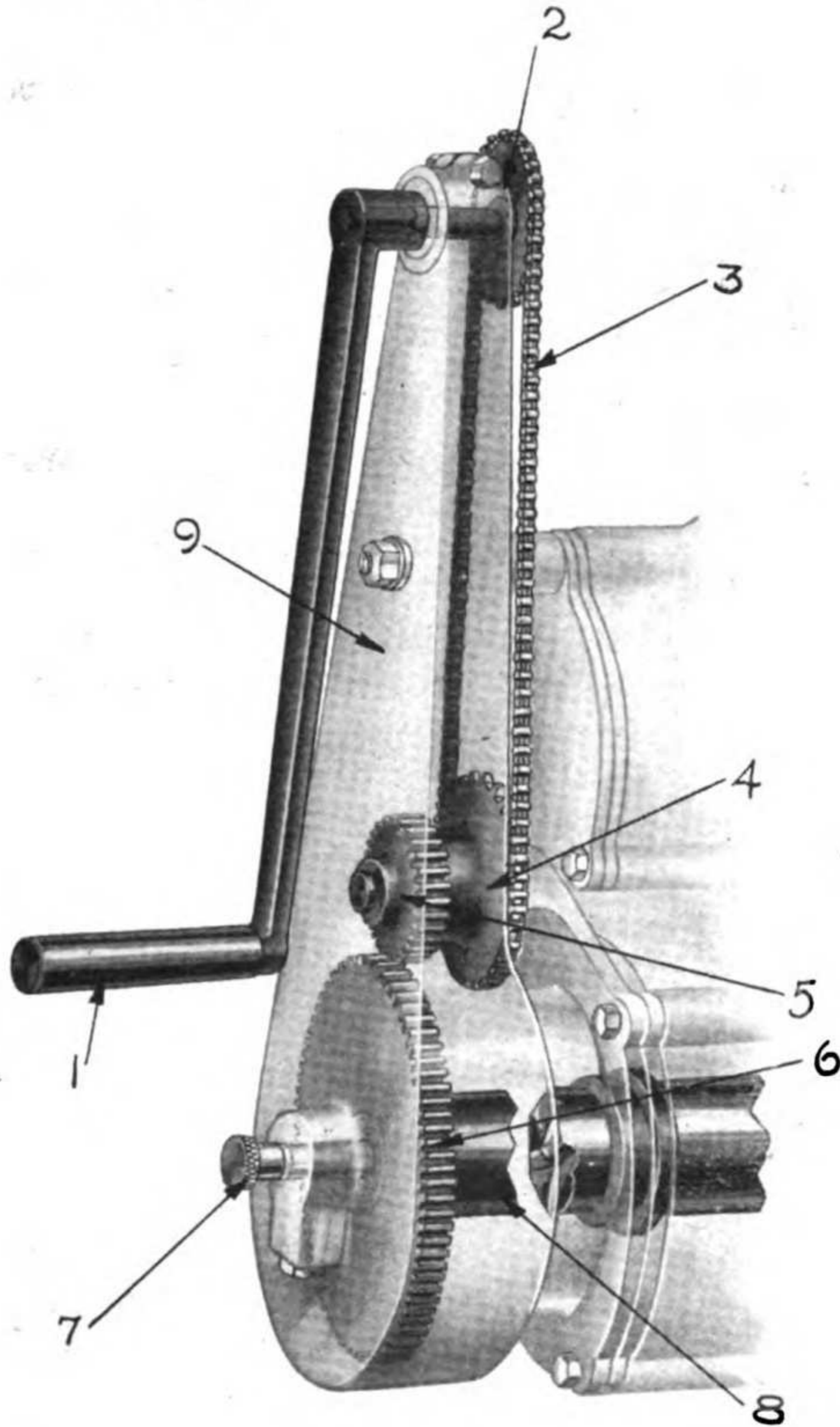
SPARK LEVER

The spark lever is mounted on the same bracket as the throttle lever, and is the shorter of the two. It controls through a series of linkage the breaker box cover of the magneto which fixes the time for the spark. The advance of the spark is controlled through manual operation, and should always be as far advanced as it is possible to have it without securing a knock from the engine. The engine should at all times be kept sufficiently free from carbon to permit the spark to be kept at maximum advance under all normal working conditions. Inability to maintain the spark at full advance, when operating on ground or uphill, which are not excessive, is an indication of carbon deposit in the cylinders. This should be immediately removed, in accordance with the directions furnished on page 47. The spark lever is malleable iron and is $4\frac{3}{4}$ inches in length. The throttle and spark levers are each mounted on the same malleable iron bracket, and operate on a sheet steel sector.

INSIDE STARTER

The starter is located in the gunner's compartment for starting the engine from within the tractor. This starter is mounted on the fire screen which separates the gunner's compartment from the rear of the tractor. The starting crank lever is .25 carbon steel forging, 10 inches in length, hung on a starting lever crank shaft $3\frac{7}{16}$ inches long x 1 inch in diameter, having a flange $2\frac{1}{4}$ inches in diameter. This crank shaft carries the upper sprocket for the starting chain. The upper sprocket has 24 teeth, taking a $\frac{1}{2}$ pitch chain—the pitch diameter of this sprocket being 3.831 inches. The chain is 32 inches long and has 64 links. The roller diameter is .306 inches and the width $\frac{1}{4}$ inch. The bottom sprocket is similar to the upper, having 24 teeth, but carrying integral with it a 6 pitch gear, which in turn is connected through a dog clutch with the transmission shaft. The two bottom gears are at the mesh in normal position, but can be kicked into mesh by means of a gear shifting device, which is

Plate No. 46



INSIDE STARTER

- | | |
|-----------------------------------|---------------------------|
| 1. Inside starting crank handle. | 5. Inside starter pinion. |
| 2. Starter sprocket. | 6. Inside starter gear. |
| 3. Inside starting chain. | 7. Engaging plunger. |
| 4. Lower inside starter sprocket. | 8. Starter jaw clutch. |

simply a plunger of cold rolled steel, which, when pressed forward, engages the gears and also the dog clutch with the transmission shaft. The details of the inside starter are shown on page 109.

TO REMOVE CONTROL PEDALS

To remove the control pedals the floor plates should be taken up, exposing the pedal shafts and linkage. The clutch pedal and the other control pedals can be taken off by removing the brake levers at either end. These are pinned to the control shaft, and when these are taken out and bushing removed the pedals can readily be disassembled by withdrawing the bolts through the clamps.

TO REMOVE INSIDE STARTER

To remove inside starter the bolts should be removed from the clamp holding the starter crankshaft, and the bolts removed from the inside starter case, which hold it to the fire screen. The shaft for the lower sprocket can be removed by withdrawing the cotter pin which secures it to the transmission case. With the case removed the gears can be readily disassembled by taking them from their respective shafts.

CHAPTER IX

BODY GROUP

GENERAL SPECIFICATIONS

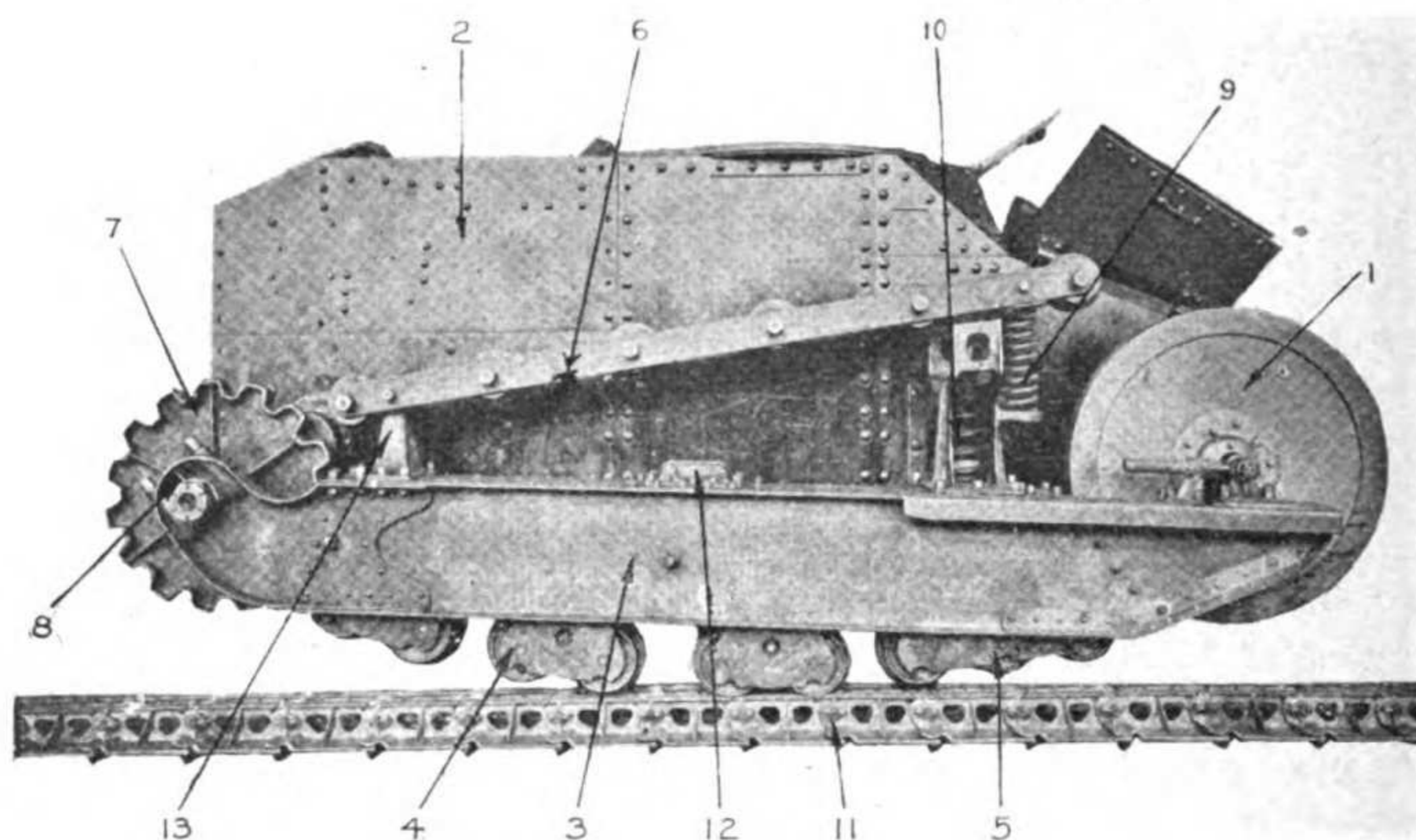
Material	Armor steel
Body, length	122 inches
Width	38½ inches
Suspension	By spring from track frame
Plating, thickness	6/10 inch Armor
Bottom plating	¼ inch Armor
Roof plating	5/16 inch Armor
Covering plates	5/16 inch Armor
Fire screen	¼ inch sheet steel
Connections	Commercial angle iron.

GENERAL DESCRIPTION

The entire working apparatus of the tractor, with the exception of the track group, is mounted within the armored body. This body is built to enclose all the vital working parts, as well as the driver and gunner. It is swung between the two track groups and is surmounted by a turret carrying either a Marlin machine gun or a 37 M. M. rifle. The main structure of the body is made up of .6-inch armor plates—the various plates being connected with one another by commercial angle iron. The body is shaped to slope downward at the forward end, ending in a peaked nose of .6 inch armor steel, the two ends of the nose plates being connected by 2½ x 2½ x ¼ inch angle iron. There is a door at the front, opening upward from the driver's compartment with an additional vertical spring door which also swings upward above the driver's compartment. Around the main part of the body, on a level with the eyes of the driver, are a series of horizontal slits protected by special provisions. The doors at the rear are over the engine compartment and swings upward giving access to the engine.

FIRE SCREEN

Within the body there is a fire screen which passes transversely, partitioning the body at the rear of the observer's or gunner's compartment, shutting the gunner off from the power plant, gasoline tank and other propelling units. The riveting work of the body main members where the .6 inch armor plate is used is taken care of by 5/8 inch key bolts. The fire screen is ¼-inch sheet steel. The main structures of the body are connected by bolts which permit the body to be readily disassembled by removal. The principal accessories and auxiliary devices, such as



BODY AND TRACK UNITS

- | | |
|--------------------------------|---|
| 1. Track idler. | 8. Track frame extension. |
| 2. Body armor. | 9. Track tension spring. |
| 3. Track frame. | 10. Track supporting spring. |
| 4. Track rollers. | 11. Track links. |
| 5. Track roller frame. | 12. Leaf spring shackle supports. |
| 6. Track roller frame (upper). | 13. Upper track roller frame pivot bracket. |
| 7. Track drive sprocket. | |

the gasoline tank, radiator, fire extinguisher, etc., are supported by brackets to the body. The ammunition racks and trays are also carried in the same manner.

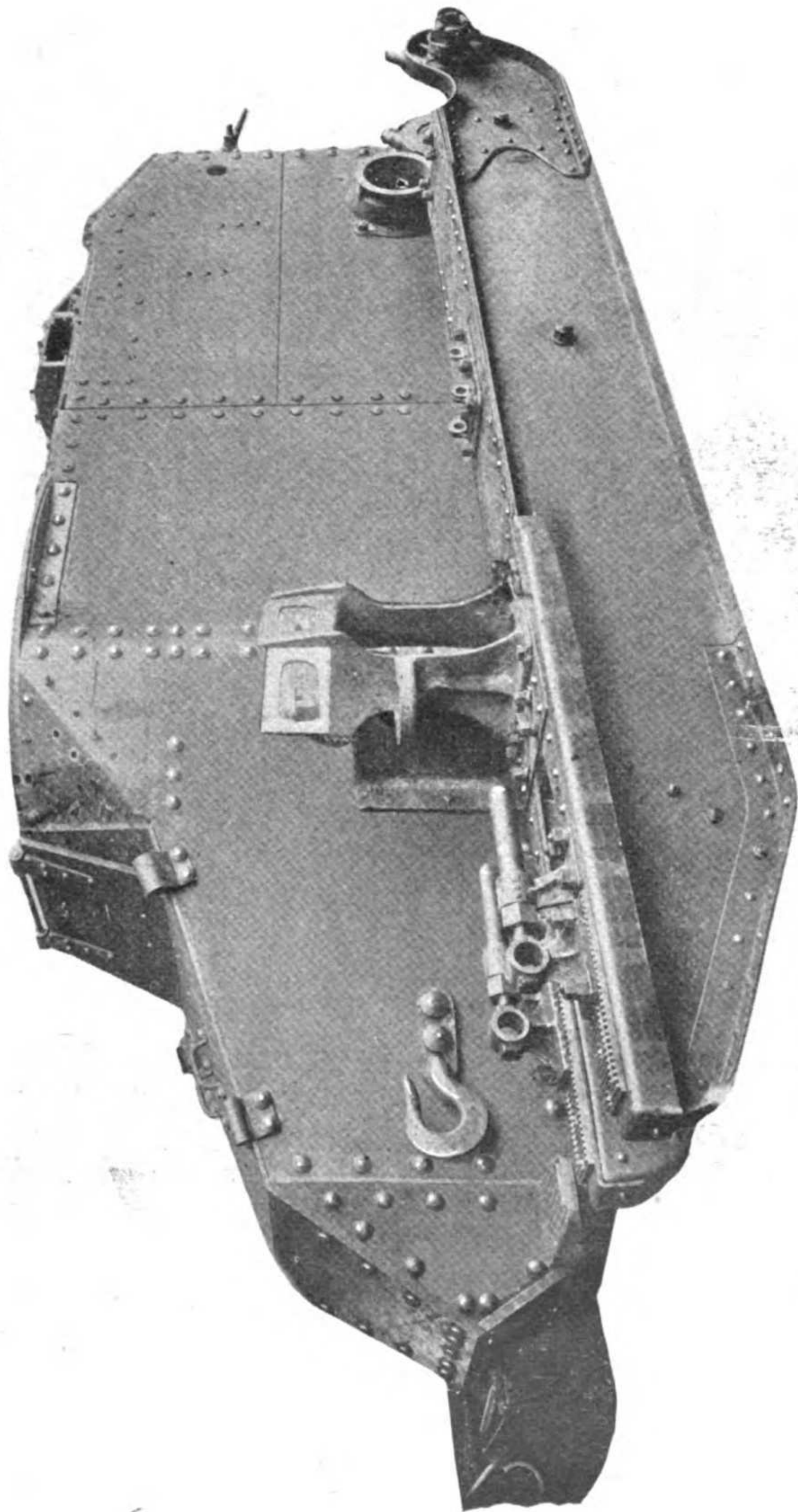
FRONT DOORS

Entrance to the tractor is secured through the front end. There are three front doors. There is a door which is swung from the top of the body hanging vertically downward and kept tightly closed by two coil springs. These springs are wound about the hinge and have one end secured to the hinge and the other to the door. The other two doors open upward and outward and close by gravity.

ENGINE COMPARTMENT DOORS

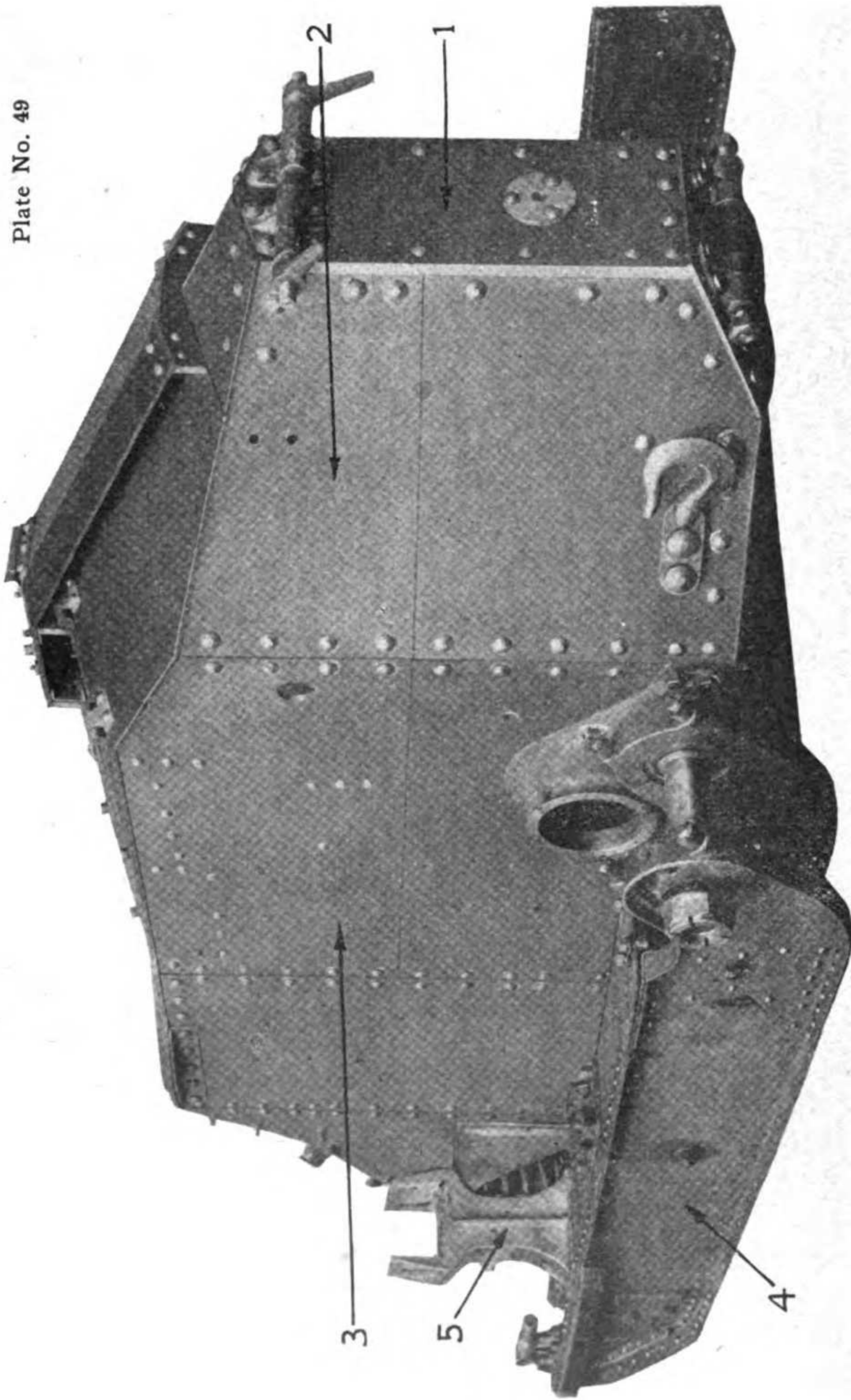
The door over the engine at the rear end is locked from within. There is an air space divided by double door arrangement above the engine, one overlapping the other to a slight degree, so as not to provide a direct opening into the engine compartment. The outer cover can be swung back vertically allowing access to the engine. The door above the engine, known as the rear top plate, is latched

Plate No. 48



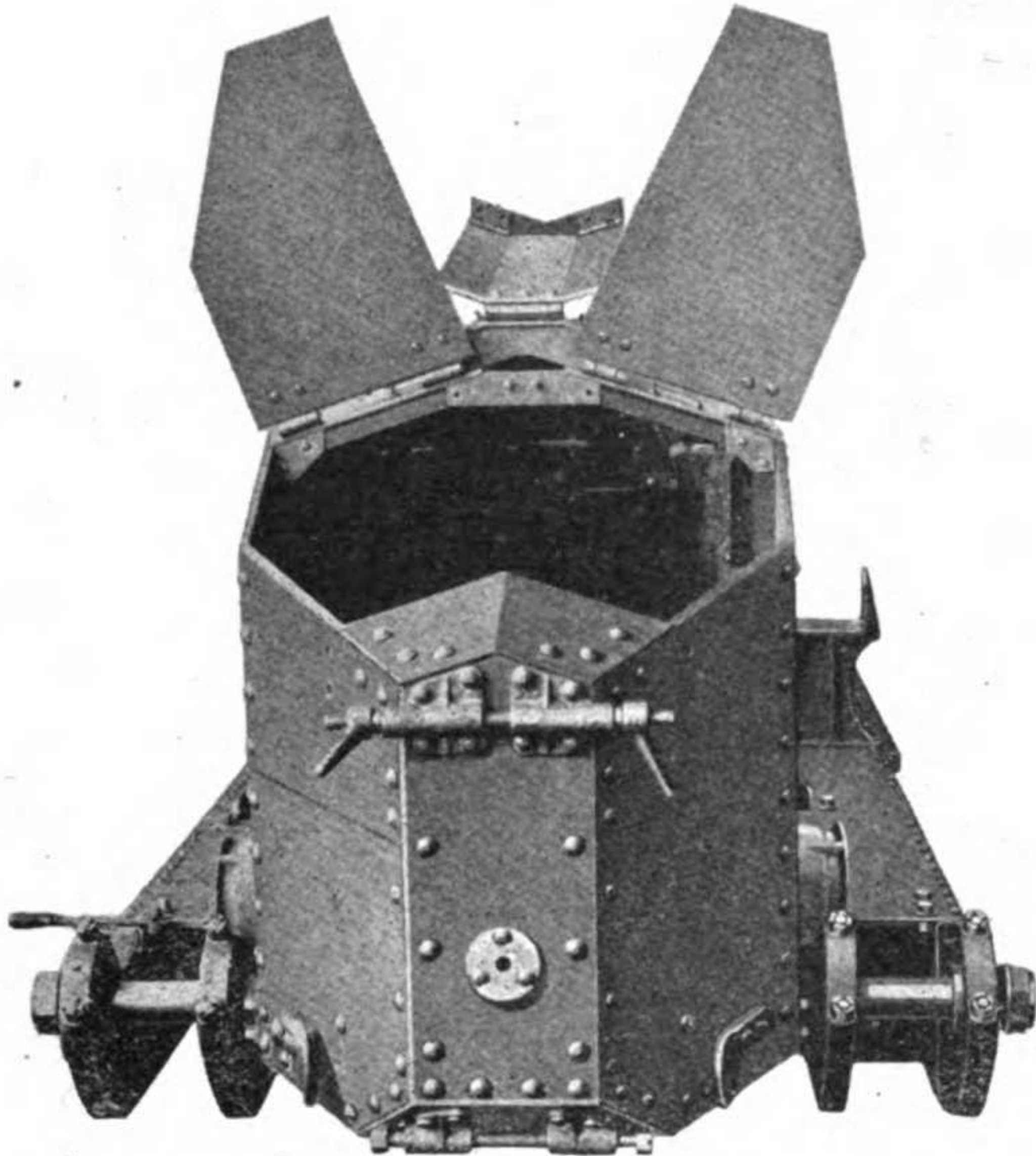
VIEW OF MAIN BODY WITH PART OF TRACK FRAME

Plate No. 49



THREE-QUARTER REAR VIEW OF BODY WITH TRACK FRAME ATTACHED

- 1. Rear plate.
- 2. Side armor plate.
- 3. Side armor plate.
- 4. Track frame.
- 5. Track supporting bracket.



REAR END OF BODY SHOWING DOOR OPENINGS

from the inside of the tractor. This is accomplished by linkage from the gunner's compartment, which, when pulled, releases the latch by a toggle arrangement. This permits the door or top plate to be swung upward.

Above the tank and radiator are removable plates, which must be unbolted and removed whenever it is desired to obtain access to the engine and transmission parts, as well as to the radiator and gasoline system. Removable covers or hand hole cover plates are provided over the radiator cap and over the tank filler cap, to permit of filling the radiator and the tank. The rear door plates over the engine cannot be lifted up until the outer cover is first raised.

The upper part of the front end of the body, upon which the turret is mounted, is known as the cupola. It is upon the cupola that the vertical front door with the springs is fastened. Within this door there is a folding jointed toggle or connecting rod, which can hold the door open, if desired.

TAIL PIECE

On the rear end of the body there is a tail piece, which forms a rest in case the tractor is ascending a hill steep enough to allow it to tend to lean over backward, or to prevent it from tipping over if it should slide backward. This tail piece is made up of angle bar construction. The bottom piece is 48 $\frac{5}{16}$ inches long, braced by angle struts, the lower of which are 20 $\frac{11}{16}$ inches long, and the upper 28 $\frac{3}{16}$ inches. The projected length of the tail piece is 36 $\frac{1}{8}$ inches from the center of the bottom hole for the supporting pin to the rear end. The height from the center of the bottom hole to the tip of the tail is 28 $\frac{1}{4}$ inches. The angle iron used is $\frac{1}{4}$ inch stock, and is mounted on the rear end of the body by putting it over pins on the rear end plate on both top and bottom. The top fastening is through a slotted eye and the bottom fastening is a solid eye. The distance from center to center of these eyes is 27.334 inches.

TO DISASSEMBLE

BODY GROUP

To disassemble the body it is only necessary to remove the key bolts holding it together. These key bolts pass through the armor plate, and the method of removal or taking down the body is self-evident.

37 M. M. AMMUNITION RACK

GENERAL SPECIFICATIONS

Capacity per rack	100—37 M. M. shells
Smoke shell rack capacity	13—37 M. M. smoke shells
Location	On side of body in gunner's compartment
Length of rack	26.5 inches
Height of rack	32 $\frac{9}{16}$ inches
Width of rack, top and bottom hinge plates	4 $\frac{3}{16}$ inches
Width of intermediate hinge plate	3 $\frac{15}{16}$ inches
Construction material	$\frac{1}{16}$ inch sheet steel
Number of ammunition racks	Two
Number of smoke shell racks	One

GENERAL DESCRIPTION

Hung within the body, on both sides of the gunner's compartment, is an ammunition rack for the 37 M. M. shells. Each of these racks has a capacity of 100 shells, and, in addition, there is a smoke shell rack supported from one of the ammunition racks. The smoke shell rack has a capacity of thirteen smoke shells.

The racks are arranged with holes in which the shells fit. The top plates of each of the three rows of ammunition are hinged with a spring hinge. As soon as the last shell is removed from one division of the rack the hinge plate swings up allowing the next row of ammunition to be readily reached. The weight of one shell is sufficient to hold the hinge plate down, and as soon as the last shell is lifted out it swings up automatically allowing the gunner to have access to the second row. The shells are placed vertically in the rack and are readily accessible to the gunner. The idea of the plan is that the shells on the tray in the turret will be exhausted first, and after this a supply will be drawn from the rack within the body.

TO REMOVE AMMUNITION RACK

To remove ammunition rack the turret will have to be lifted off, in accordance with the directions on page 120. The ammunition rack can then be lifted off the pins from which it is hung, and out of the brackets at the bottom.

MACHINE GUN AMMUNITION RACK

The machine gun ammunition is carried on belts which are rolled on reels. These reels are hung on pins in racks mounted on the sides of the body. The belt can be fed continuously by starting the end of it through the mechanism of the gun, allowing the ammunition belt to unwind itself from the reel or drum as it is fired. In addition to the reels on the side of the body, there is also a rack at the door which swings away from the opening allowing of easy entrance into the body of the tractor.

CHAPTER X TURRET GROUP

GENERAL SPECIFICATIONS

Turret form	Octagonal
Total height to outer top	31 inches
Mounting	Ball bearing
Ball race diameter outside the ball	39 $\frac{1}{4}$ inches
Ball diameter	1 $\frac{3}{16}$ inches
Number of balls	18
Race material	Cast steel
Turret material	$\frac{6}{10}$ inch armor plate
Height of tower	6 $\frac{3}{8}$ inches
Diameter of tower	20 $\frac{1}{16}$ inches
Turret tower cover diameter	20 $\frac{1}{4}$ inches
Turret tower cover material	$\frac{5}{16}$ inch armor
Gunner's seat	Hung within turret
Ammunition tray capacity	32—37 M. M. shells or machine gun ammunition

GENERAL DESCRIPTION.

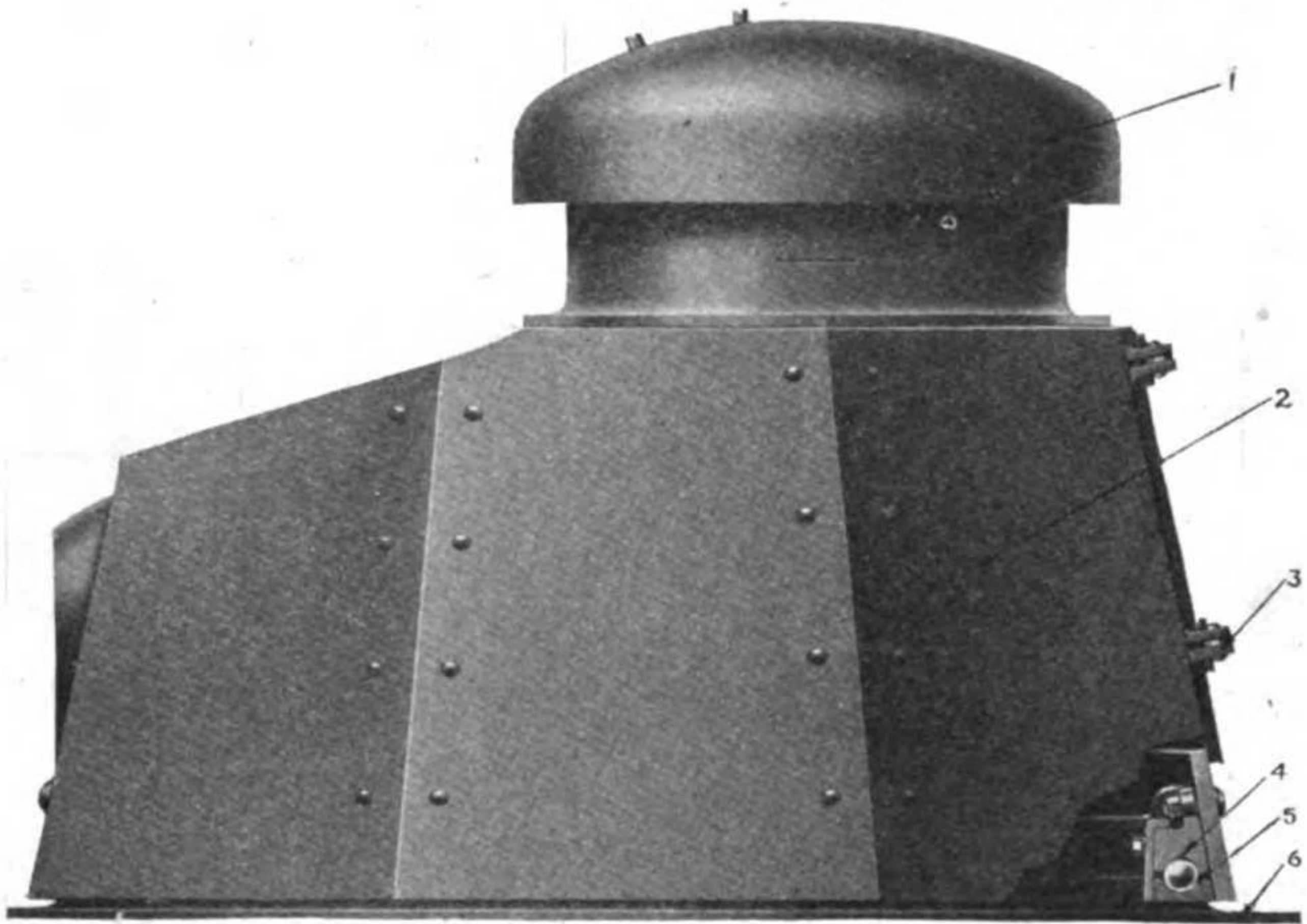
Surmounting the body is an octagonal turret capped by a cylindrical tower, which is covered by a dome-shaped hinged plate. The turret is free to rotate on the ball bearings upon which it is mounted, but can be locked in any position by a clamp which jams the ball race when a small lever is moved. The turret is made up of eight corner plates of .6 inch armor steel, fastened together with angle strips at each of the corners. The turret is narrower at the top than it is at the bottom and has a cover plate over its front portion and a cylindrical tower mounted on the rear of the octagonal turret structure. The observer's slits are cut in the tower, permitting of observation.

TURRET TOWER

The tower is 20 $\frac{1}{16}$ inches in diameter, 6 $\frac{3}{8}$ inches high, and is made up of .6-inch armor plate. Surmounting the tower is a hinged cover, which can be thrown back by pulling straight back on the inside latch which disengages the cover and allows it to swing backward on a hinge.

GUNNER'S SEAT

The turret contains the gunner's seat, which is simply a canvas strap suspended on two hooks on opposite sides of the turret, allowing the straps to be swung between them. The strap itself is 4 inches wide and $\frac{1}{8}$ inch thick canvas. At the ends of this is secured a $\frac{3}{16}$ -inch leather strap with a buckle at one end permitting adjustment for length. The leather is in turn fastened to a loop of $\frac{3}{16}$ inch diameter



EXTERIOR AND PARTIALLY CUTAWAY VIEW OF TURRET

- | | | |
|-------------------|-----------------|-------------------|
| 1. Tower | 3. Door hinge | 5. Lower race |
| 2. Turret plating | 4. Ball bearing | 6. Body top plate |

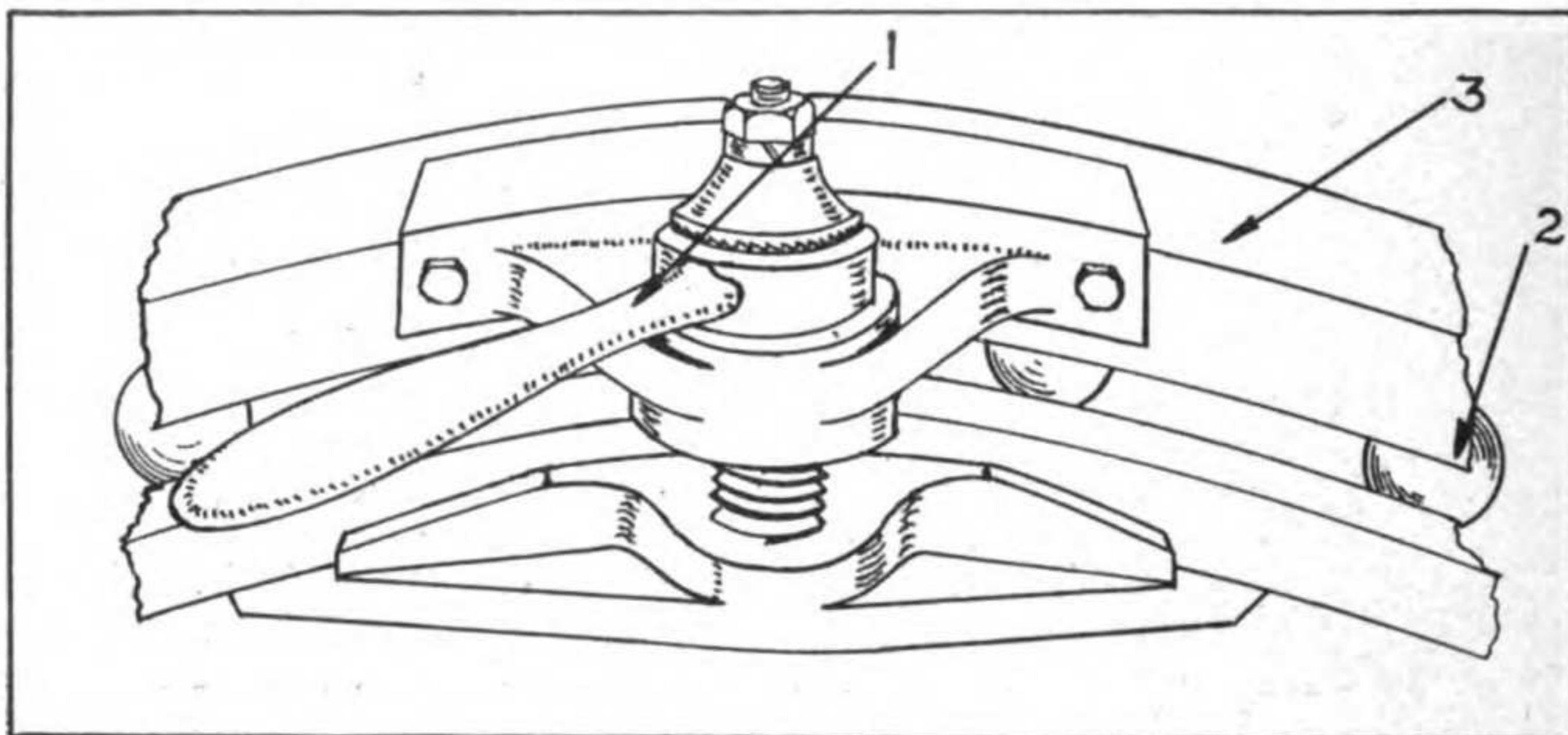
steel stock which engages with the hook. To adjust the length of the strap, or, in other words, to provide for the proper height of the gunner, it is only necessary to take up at the buckle.

OBSERVATION SLITS

The seat hooks are so placed that when the proper adjustment is secured the gunner sits with his eyes on a level with the observation slits in the tower. These slits are protected (slit protection means still to be decided at time of going to press with first edition).

TURRET BRAKE OR CLAMP

The turret can be secured in any position around the circumference of the circle by means of a turret brake. This clamps the ball race and is operated by a handle on the squared end of a threaded spindle. When the handle is turned the clamp is brought together jamming the race down on the balls and locking the turret in position. The handle is a drop forge piece of 20 .20—30 carbon on the squared end of the spindle, which is of steel secured stock and $5\frac{7}{16}$ inches long. The thread on which the brake shoe is brought up in engagement with the ball race is 1-inch 8 U. S. standard. Holding the handle in position on the squared spindle is a forged steel collar serrated to engage with cor-



TURRET BRAKE CLAMP FOR HOLDING TURRET IN ANY GIVEN POSITION

1. Actuating lever. 2. Ball. 3. Upper race.
Turn of lever clamps race, binding balls and locking turret.

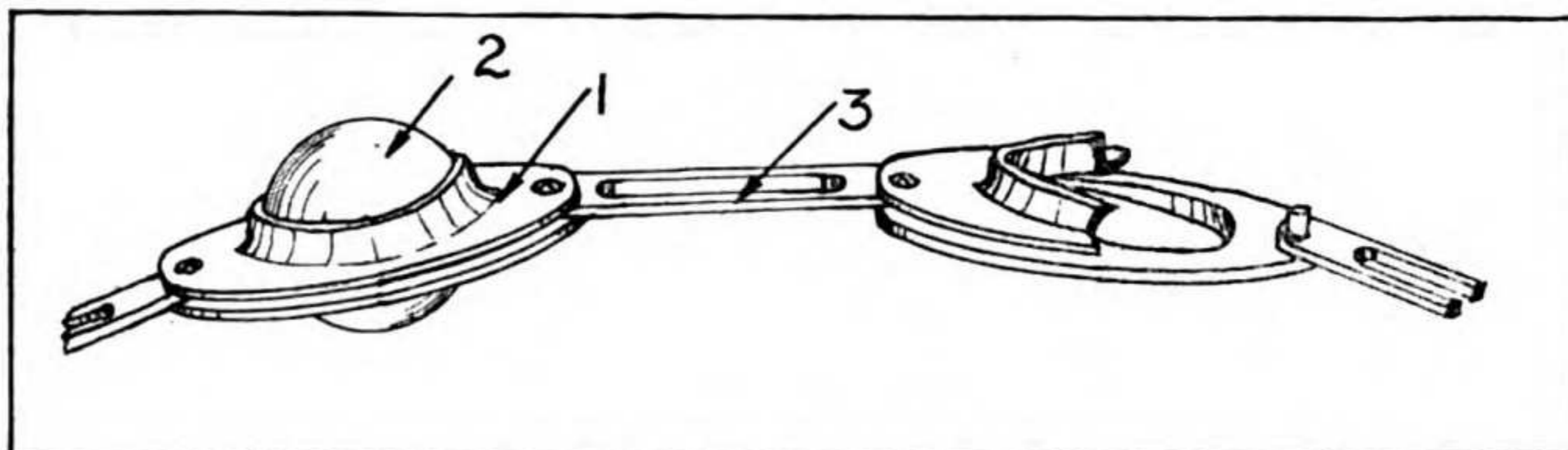
responding serrations in the handle. Above the collar is a nut holding it in position on the end of the spindle. The brake shoe and the brake bearing are cast steel.

37 M. M. AMMUNITION TRAY

An ammunition tray, capable of holding 32—37 M. M. shells, is bolted within the turret. This tray is $7\frac{3}{4}$ inches wide and $19\frac{1}{2}$ inches across the chord. It holds four rows of shells, ten in the outside row, eight in the second row, eight in the third row and six in the row next to the turret plate. The tray is $5\frac{1}{4}$ inches deep and the shells are placed vertically within it. There is an ammunition rack also in the body. (See Page 116.)

TO REMOVE TURRET

Take out the turret retaining clamp bolts, which hold turret in position. These are lugs which fit underneath the lower ball race. When these



TURRET BALL RACE

1. Ball retainer. 2. Ball. 3. Retainer ring.

bolts are taken out, the entire turret can be lifted off. The turret ball bearings can then be lifted out, and, if it is desired to remove the races these can be taken off after the turret has been lifted out.

37 M.M. ARMAMENT GENERAL SPECIFICATIONS

Location of mask	Front end of turret.
Gun mask material	Cast steel
Gun mask direction of swing	Vertical
Gun cradle location	Within mask
Gun cradle swing	Horizontal
Gun cradle material	Cast steel

MACHINE GUN ARMAMENT GENERAL SPECIFICATIONS

Type of machine gun	Marlin
Location of mask	Front end of turret
Gun mask material	Cast steel
Gun mask direction of swing	Vertical
Gun cradle location	Within mask
Gun cradle-swing	Horizontal
Gun cradle material	Cast steel

MACHINE GUN MOUNT

The 37 Millimeter and machine gun mounts are very similar in operation, are interchangeable in the turret, and differ in construction only in the space required and the mounting of the different guns.

The mounts are each composed of two moving parts, the mask and the cradle. The mask pivots on horizontal trunnions mounted in brackets which are bolted to the turret on either side of mask. The cradle pivots on vertical trunnions mounted in the mask. This gives a universal movement, the mask swinging in a vertical plane and the cradle in a horizontal one.

TO MOUNT 37 MM. GUN

To mount 37 MM. Puteaux gun, pull crosshead out to left, unhooking gun barrrel from recoil cylinder; push recoil cylinder forward into cradle as far as it will go, drop rear end onto the gun heel block, tighten up nut on heel block screw until recoil cylinder is firmly in place; slide gun barrel forward in groove on recoil cylinder until crosshead eye matches with square hole in breech of gun; push crosshead into place and gun is ready to load and fire.

To dismount 37 MM. gun the operation is reversed.

TO MOUNT MACHINE GUN

To mount machine gun, push gun forward into cradle as far as it will go, line up hole in gun with hole in cradle casting, push gun mounting pin through hole with handle parallel to barrel. When all the way in, turn handle down to a vertical position. This last turn locks the pin in place, and to remove gun pin it is necessary to turn handle to the horizontal position. With gun pin in place, tighten up on gun heel screw until gun is firm and will not shake in cradle.

GUN MOUNT TROUBLES

Should the mount become jammed by a bullet or any way, first determine which member is bound, the mask or cradle. If the mask is bound the mount will not move up and down, and will not move from side to side if cradle is bound in mask. To free the mask it is necessary to unscrew the set screws, holding the mask trunnions; drive the trunnions out until mask drops down on ball race of turret. If cradle is jammed, remove gun, unscrew set screw holding upper trunnions, pull out trunnion (with special trunnion puller), and pull cradle back far enough to get at the obstruction.

Due to the weight of the gun and mount, the gunner should take precaution to support the shoulder rest on the seat strap, letting the gun armor support the front while at work to free the mount from jams.

CHAPTER XI

EQUIPMENT

GENERAL DESCRIPTION

The equipment of the 6-ton special tractor consists, in addition to the gun and ammunition fittings and supplies, a speedometer, oil gauge and a complete set of tools and such accessories as fire extinguishers, gasoline measuring sticks, oilers, etc. The complete list of tools is given in the chapter on parts nomenclature on page 132. The speedometer is driven from the transmission by means of a spur gear connection, as shown on page 125, and through a flexible tube to the instrument which is mounted in the driver's compartment. It has a 15-mile per hour dial and also an odometer for load trip and total showing the distance traveled in miles. There is a resetting device which sets the trip mileage back to 0 when desired.

The oil gauge is an oil pressure gauge in direct communication with the oil feed pump and shows the pressure on the system. This oil gauge is mounted on the same instrument plate with the speedometer and is in plain view of the driver.

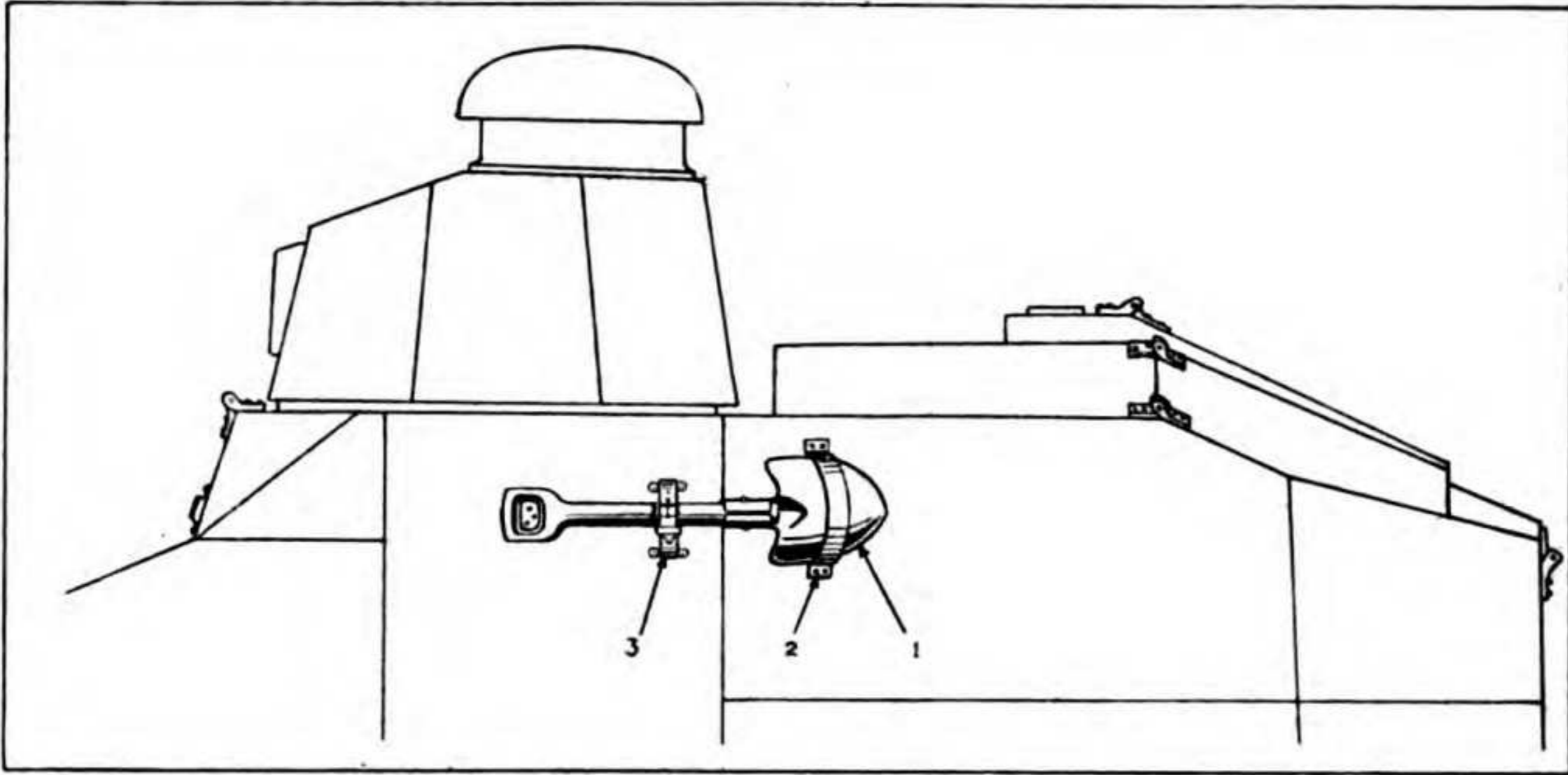
NOTE ON WIRELESS TRACTOR

On some of the 6-ton tractors the gunner is replaced by a wireless operator and the gun equipment is replaced by wireless apparatus. At the time of going to press with this book, full details have not been settled on the design of the wireless apparatus, but this will be equipped with a motor-driven generator which will supply current to the wireless apparatus housed within the turret. The driver's compartment and method of control will be the same as that used for the gun-equipped tractors, but in place of the gunner and gun apparatus, the sending and receiving apparatus will be installed.

OBSERVER'S SLIT PROTECTION

The slits through which the driver and gunner make their observations are protected glass of such thickness and such design, that while it is transparent, it can withstand the effects of machine gun fire and thus furnish protection against direct hits, as well as offset the possibility of lead splash. The splash of molted lead finds its way through crevices, and these should be kept sealed by the operators. The heavy glass protection is designed for this purpose and is housed within the container of such design that the glasses can be readily changed when desired. (The observer's slit protection is tentative and may be changed.)

Plate No. 54



SHORT-HANDLED SHOVEL LOCATION

1. Shovel. 2. Front strap. 3. Strap for handle.

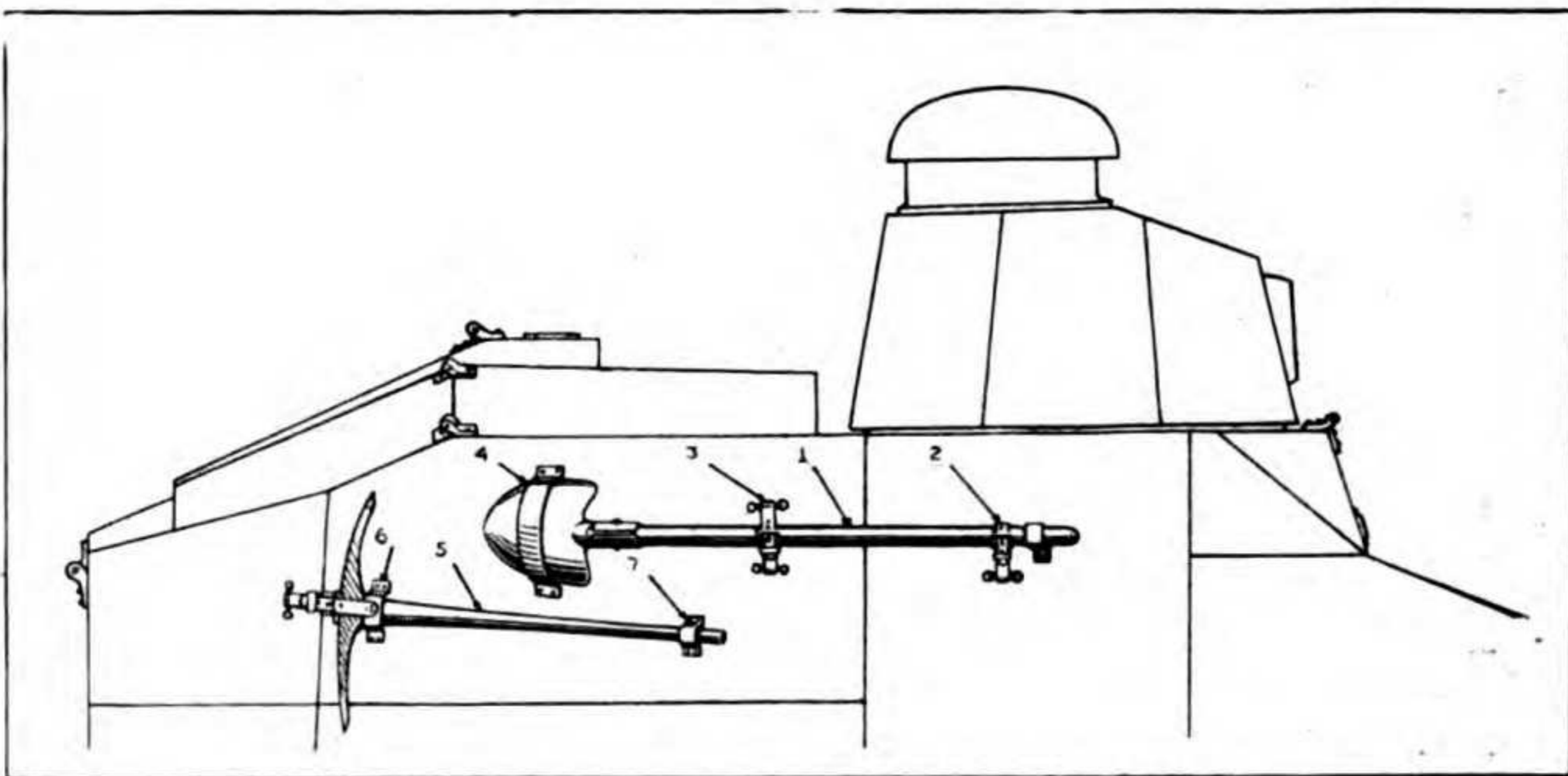
PAINT SPECIFICATIONS FOR 6-TON. SPECIAL TRACTOR

A—One priming coat of reinforced red lead paint before assembling as follows:

REINFORCED RED LEAD

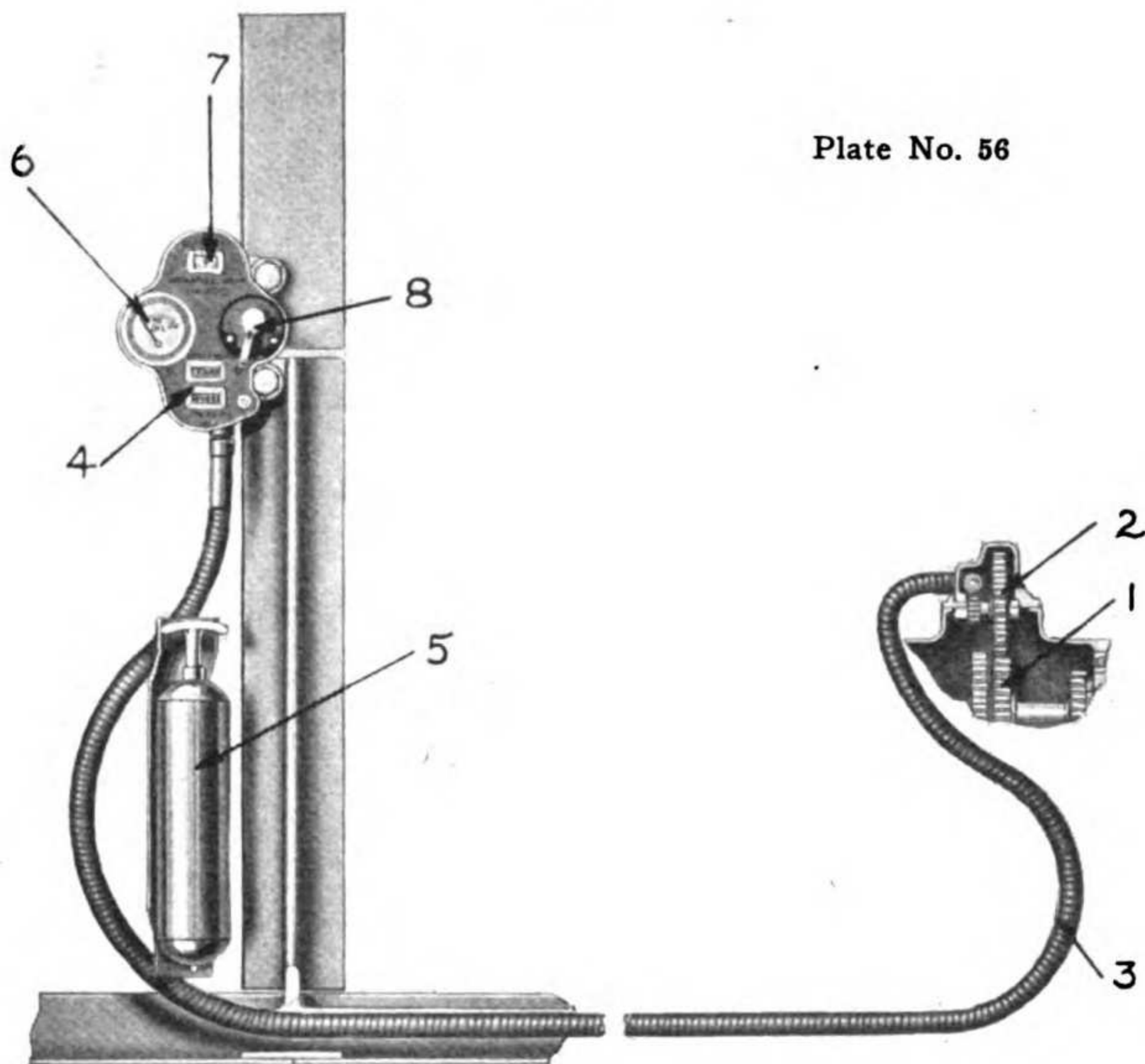
1. This paint shall weigh not less than 16 pounds per gallon and shall contain not less than 64 per cent pigment.

Plate No. 55



LONG-HANDLED SHOVEL AND PICK RETAINERS

1. Long-handled shovel. 5. Pick.
 2. Strap buckle (rear). 6. Pick head retaining buckle.
 3. Strap buckle (center). 7. Pick handle retaining clip.
 4. Retaining clip.



SPEEDOMETER DRIVE AND ACCESSORIES

- | | |
|----------------------------|------------------------|
| 1. Transmission gear. | 5. Fire extinguisher. |
| 2. Speedometer drive gear. | 6. Oil pressure gauge. |
| 3. Flexible shaft. | 7. Speedometer. |
| 4. Odometer. | 8. Ignition switch. |

2. The pigment portion shall contain 60 per cent red lead and 40 per cent silicious matter such as magnesium or aluminum silicate, or silica, or a mixture thereof. The red lead used shall contain not less than 85 per cent Pb_3O_4 , the balance to be PbO .

3. The liquids shall consist of 90 per cent linseed oil and 10 per cent combined drier and thinner. The thinner shall be turpentine.

4. When applied to a smooth iron surface, the paint must be dry in 12 hours without running, streaking or sagging.

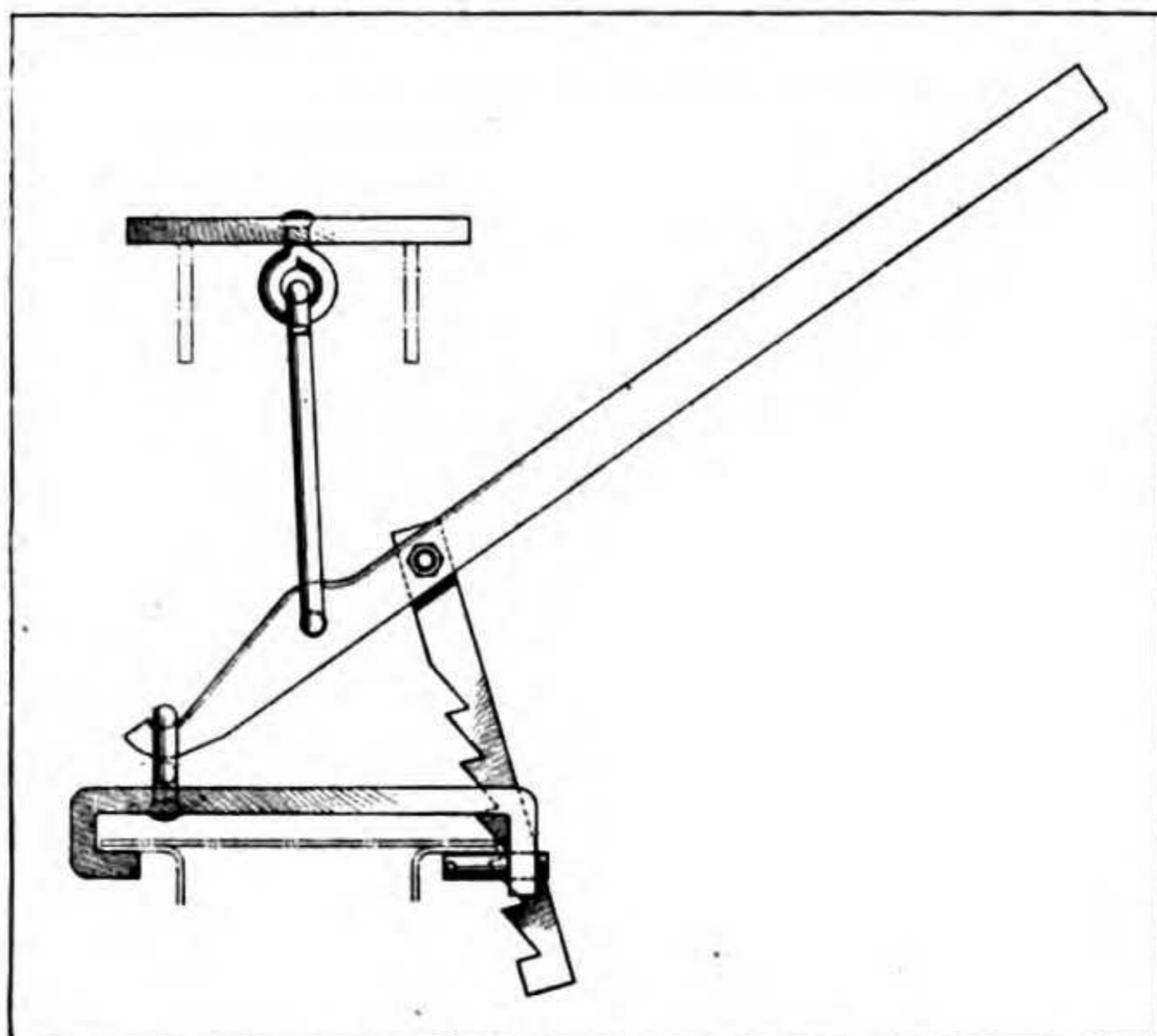
5. Prescribed by the C. of O. Dec. 7, 1917. (Specifications prepared in consultation with National Research Committee Council National Defense.)

B—Two coats quick drying white for interior work after assembly as follows:

QUICK DRYING WHITE

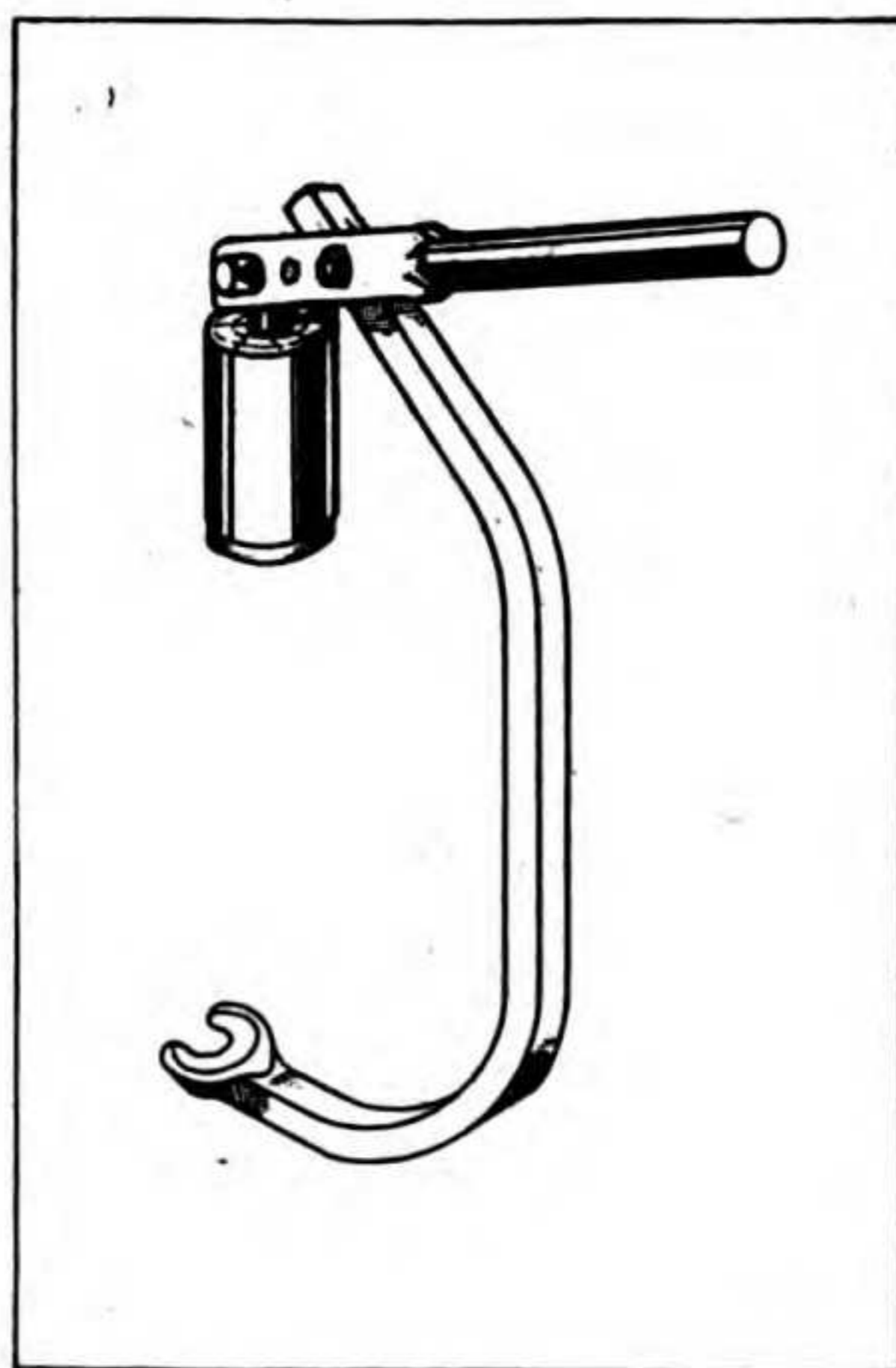
1. This paint shall contain 60 per cent pigment and 40 per cent liquids.

Plate No. 57



TRACK TENSION RELEASING TOOL

Plate No. 58



VALVE SPRING COMPRESSING TOOL FOR REMOVING VALVE SPRING
RETAINER PARTS.

2. The pigment portion shall consist of 45 per cent white lead (basic carbonate—basic sulphate—or a mixture thereof), 35 per cent zinc oxide, and 20 per cent of combined magnesium or aluminum silicate and tinting color—tinting changed to be nearly white.

3. The liquids shall consist of 35 per cent of pure linseed oil and pure Chinese wood oil (heat treated), 7 per cent of resinates, and 58 per cent of combined thinner and drier.

4. The thinner shall be turpentine or mineral spirits, or a mixture thereof.

5. This paint shall dry in six hours.

C—Two coats of quick drying olive drab for exterior work after assembly as follows:

QUICK DRYING OLIVE DRAB

1. This paint shall contain 60 per cent pigment and 40 per cent liquids.

2. The pigment portion shall consist of 45 per cent white lead (basic sulphate, basic carbonate, or a mixture thereof), 35 per cent zinc oxide, and a total of not over 20 per cent combined magnesium or aluminum silicate and tinting color.

3. The liquid shall consist of 35 per cent pure linseed oil and pure Chinese wood oil (heat treated), 7 per cent resinates, and 58 per cent combined thinner and drier. The thinner shall be turpentine or mineral spirits or a mixture thereof.

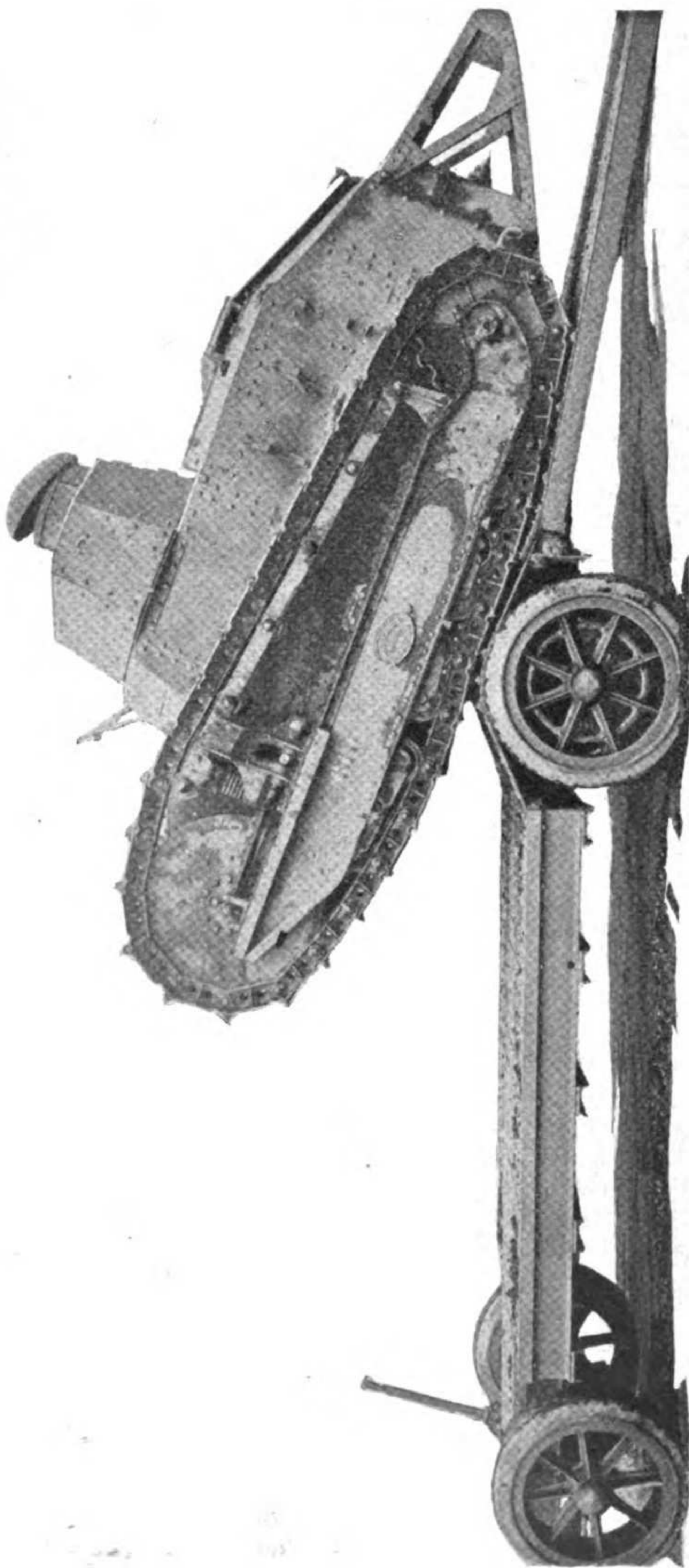
4. The paint shall have a flash point of not less than Ninety-Five (95°) degrees F. It must be suitable for application by spraying and when applied must dry rapidly to a hard, durable, non-cracking, water resisting firm. It must dry in six (6) hours time. It must be satisfactory in every respect, including body, working properties, hiding power, color and durability. It must show no undue settling or hardening in the can.

5. The standard olive drab paint has better durability than the special quick-drying olive drab. The standard olive drab should, therefore, be used in all cases when there is proper time for drying.

6. For metal work, one coat of red lead should first be applied and then one or two coats as may be desired of special quick-drying olive drab.

7. On wood two coats of special quick-drying olive drab should be sufficient.

8. Quick drying white and quick drying olive drab specifications are identical except for tinting, and are taken from E. M. E. specifications 2232



METHOD OF LOADING A TRACTOR SIMILAR TO THAT OF THE 6-TON ON THE 10-TON TRAILER BY MEANS OF SPECIAL RAMPS PROVIDED FOR THE PURPOSE

CHAPTER XII
SUMMARY OF TEN-TON TRAILER FOR SIX-TON
TRACTOR

GENERAL SPECIFICATIONS

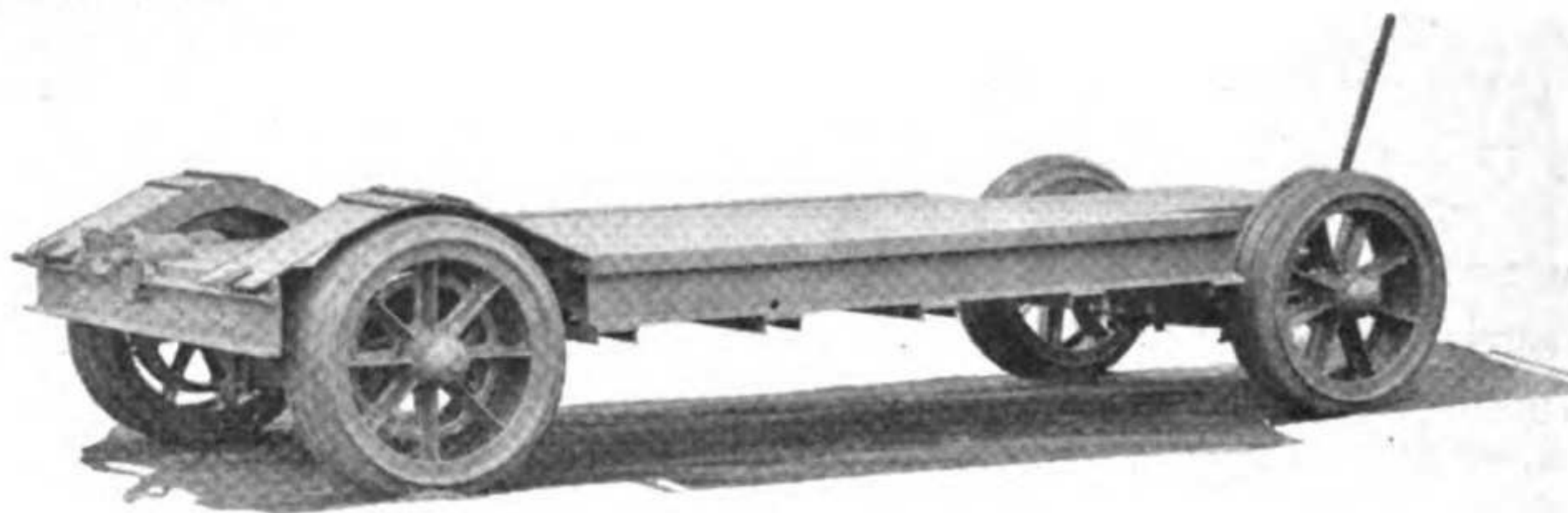
Capacity.....	10 ton
Wheel base.....	166 inches
Track width.....	68½ inches
Frame width.....	78½ inches
Frame length.....	212 inches
Wheel size.....	36 inches
Tire size.....	36 x 10 inches
Tire type.....	36 x 10 single S. A. E. solid (pressed on)
Brake.....	Internal expanded
Tractor retainer.....	6 chains with turn buckles
Trailer pintle.....	Standard ordnance design
Frame.....	Channel beam
Floor.....	Oak plank
Front springs.....	36 x 4 x 7¼ inches
Rear springs.....	36 x 4 x 7¼ inches
Front axle.....	I-beam
Rear axle.....	Rectangular
Axle bearings.....	Timken
Painting.....	Standard camouflage
Equipment.....	Wheel guards; loading ramps; standard oil tail lamp; tool box; com- plete set of tools in- cluded
Draw bar length.....	30⅛ inches.

GENERAL DESCRIPTION

A special trailer is provided having a capacity of ten tons, which permits the six ton special tractor to be transported more rapidly than its own normal speed, thereby greatly increasing its mobility. This trailer is completely described in detail and its maintenance outlined in a separate book. The following few notes, however, will give a general idea of its principal characteristics.

The wheel base of the trailer is 166 inches. Its track width 68½ inches, and the width of its frame 78½ inches. The frame length is 212 inches. The trailer is equipped at its rear end with the standard Ordnance Department trailer pintle and housing, and at the front end it is equipped with the standard draw bar and lunette illustrated on page 130.

Plate No. 60



TEN-TON TRAILERS USED FOR TRANSPORTING 6-TON SPECIAL TRACTOR

The trailer is simple in construction, being built up on a pair of channel bars, spring supported at each end. The front axle is the steering axle, while the rear axle is fixed. The tractor is carried on metal wheels provided with 36 x 10 inch solid rubber, pressed-on tires. A brake of the internal expanding type is mounted on the rear wheel and is operated by a hand lever from the front end.

LOADING RAMPS

For loading the 6-ton special tractor on the trailer there is a pair of loading ramps as shown in page 128. These ramps are built up of heavy channel section sufficient to carry the load of the 6-ton tractor and they are wide enough to permit the tractor to be run up onto the platform of the trailer, under its own power. The length of the platform of the trailer is sufficiently long to permit the 6-ton tractor to rest upon it without interfering.

The front axle is a drop forged I beam, the depth of the beam being $5\frac{1}{2}$ inches and the width $3\frac{3}{4}$ inches. The width of the web is $\frac{7}{8}$ inch. This axle has a steering knuckle in which there is a forged steel spindle of $3\frac{1}{2}$ per cent nickel steel. The bearings provided at the steering knuckle are Timken Roller type, the bearings are No. 6520 inner cup and No. 6564 inner cone and No. 6320 outer cup and No. 6353 outer cone. The wheels are provided with guards at the front and rear. The rear axle is a drop forge beam of rectangular section. As it is a dead member the spindles for the wheels are turned down directly upon it at each end. The depth of the rectangular section is $4\frac{3}{8}$ inches and the width $2\frac{3}{4}$ inches.

DRAW BAR

The trailer is provided with a draw bar pivoted to give correct trackage, the draw bar is pivoted just before the front axle and its rear end connects to each of the steering cross arms which in turn are connected by ball and socket joint to the steering levers. The rear end connections of the draw bar with the steering cross arms are also

pivoted to give the correct steering. The front end of the draw bar has a yoke joint which enables the eyes to be raised to the desired height for engagement with the hook. Within the draw bar there is a double spring to absorb draw shocks. The connection between the draw bar and steering bar yoke is by an alloy steel pin which takes the towing stresses.

The front and rear springs are interchangeable, they are 36 inches long, 4 inches wide and $7\frac{1}{2}$ inches deep. The main leaf is of vanadium steel and the balance of the leaves are of carbon steel.

SIDE BOARD BODY

In addition to the plain platform body this trailer is also supplied with a stake and removable side board body. The sides are 36 inches high, and are provided with end gates which are hooked to the side boards. The boards and gates are secured by stakes which set into sockets provided for them along the side of the main channel and at the front and rear end.

CHAPTER XIII

NOMENCLATURE

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NOMENCLATURE OF PARTS

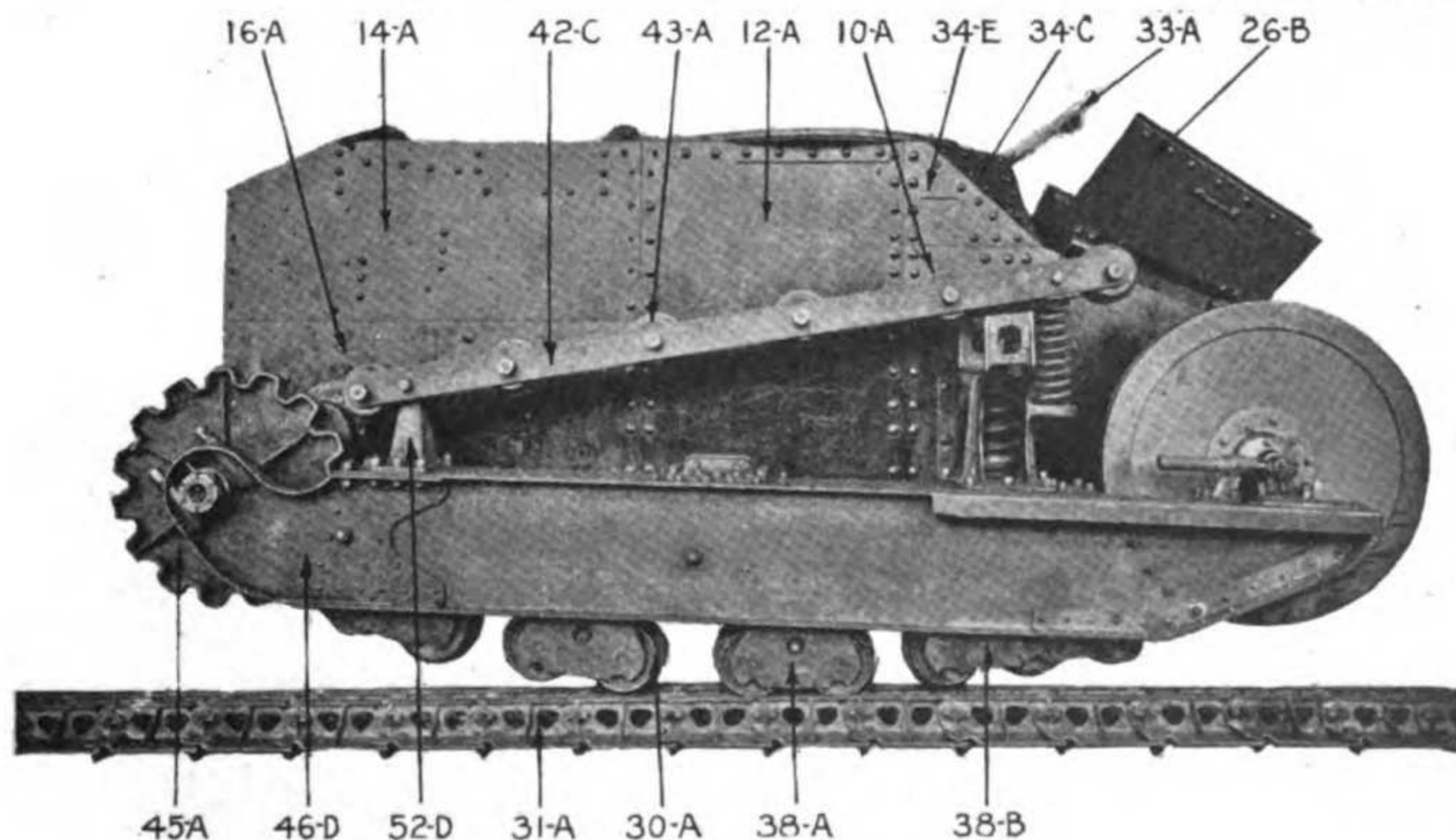
Property Classification—Class 4, Division 11

Part No.	No. Per Tractor	Name of Part	Location
BODY GROUP			
<i>Body—Armor Plate Parts</i>			
(See illustrations on pages 137, 139, 141, 143)			
20A	1	Bottom plate, front	Fastened to side plates.
22A	1	Bottom plate, front center	Fastened to side front int.
21A	1	Bottom plate, front intermediate	Fastened to side plates.
20B	1	Bottom plate, rear	Fastened to side plate, rear, lower.
23A	1	Bottom plate, rear center	Fastened to side plate, rear int. lower.
24A	1	Bottom plate, rear intermediate	Fastened to side plate, rear lower.
88L	1	Cover plate, gasoline tank	Fastened to R. H. roof plate.
88F	2	Cover plate, motor drainage	Fastened to bottom plates, rear int.
88C	1	Cover plate, radiator	Fastened to middle top plate.
34B	1	Cupola corner plate, R. H.	
34C	1	Cupola corner plate, L. H.	
33A	1	Cupola door plate	
34D	1	Cupola front plate, R. H.	
34E	1	Cupola front plate, L. H.	
34F	1	Cupola side plate, R. H.	
34G	1	Cupola side plate, L. H.	
34A	1	Cupola top plate	
26B	1	Door plate, front, R. H.	Hinged to front side plate.
26A	1	Door plate, front, L. H.	Hinged to front side plate.
88A	1	Door, transmission inspection	Bolted to bottom plate, rear center.
27B	1	Door plate, rear, R. H.	Hinged to roof plates.
27A	1	Door plate, rear, L. H.	Hinged to roof plates.
32A	1	End plate, rear	
28G	1	Nose plate, lower front	Spliced to floor and side plates.
28H	1	Nose plate, side, R. H.	Spliced to floor and side plates.
28K	1	Nose plate, side, L. H.	Spliced to floor and side plates.
28A	1	Nose plate, upper front	Spliced to floor and side plates.
29C	2	Patch plate	Extra part furnished with every tractor.
25B	1	Roof plate, R. H.	Attached to roof truss plate, R. H.
25A	1	Roof plate, L. H.	Attached to roof truss plate, R. H.
32B	1	Roof plate, rear	Attached to roof truss plate, R. H.
57C	1	Roof truss plate	Attached to roof truss plate, R. H.
57D	1	Roof truss plate, R. H.	Attached to roof truss plate, R. H.
57E	1	Roof truss plate, L. H.	Attached to roof truss plate, R. H.
10A	1	Side plate, front, R. H.	
11A	1	Side plate, front, L. H.	
12A	1	Side plate, front intermediate, R. H.	
13A	1	Side plate, front intermediate, L. H.	
16A	1	Side plate, rear intermediate, lower, R. H.	
17A	1	Side plate, rear intermediate, lower, L. H.	
14A	1	Side plate, rear intermediate, upper, R. H.	
15A	1	Side plate, rear intermediate, upper, L. H.	
18A	1	Side plate, rear, lower, R. H.	
18B	1	Side plate, rear, lower, L. H.	
19A	1	Side plate, rear, upper, R. H.	
19B	1	Side plate, rear, upper, L. H.	Attached to roof plate, R. H.
61B	2	Support, middle top plate	Attached to rear top plate.
61A	1	Support, rear top center plate	
29B	1	Top plate, middle	Fastened to support.
29A	1	Top plate, rear	Hinged to middle top plate.
<i>Body—Flange and Sheet Steel Parts</i>			
(See illustrations on pages 137, 139, 141, 143)			
61E	1	Angle, rear bottom	Fastens rear end plate to bottom rear plate.
61F	1	Angle, rear top center plate, R. H.	Fastens support to top plate.
61G	1	Angle, rear top center plate, L. H.	Fastens support to top plate.
68A	1	Angle, vertical, rear corner, R. H.	Fastens rear end plate to rear side plates.
68B	1	Angle, vertical, rear corner, L. H.	Fastens rear end plate to rear side plates.
154E	1	Bottom plate, fire screen	Fastens to front trans. support.
155D	1	Bottom slide stop, fire screen, R. H.	Part of fire screen partition.
155N	1	Bottom slide stop, fire screen, L. H.	Part of fire screen partition.
161A	1	Bracket, front, ammunition carrier, R. H.	Bolts to front intermediate side plate.
161B	1	Bracket, front, ammunition carrier, L. H.	Bolts to front intermediate side plate.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Flange and Sheet Steel Parts—Continued</i> (See illustrations on pages 137, 139, 141, 143)			
169A	1	Bracket, oil and kerosene can	Fastens to front intermediate side plate.
161C	1	Bracket, rear, ammunition carrier, R. H.	Bolts to front intermediate side plate.
161D	1	Bracket, rear, ammunition carrier, L. H.	Bolts to front intermediate side plate.
138G	2	Bracket roof plate	Bolts to rear upper intermediate side plate.
138F	1	Catch, front door latch	Fastens to front door.
153A	1	Center plate, fire screen	Forms partition from engine to operator.
68C	1	Connecting angle, front, bottom	Bolts nose plate and front bottom plate.
68D	1	Connecting angle, rear, bottom, R. H.	Bolts right bottom plate and right lower side plate.
68E	1	Connecting angle, rear, bottom, L. H.	Bolts right bottom plate and right lower side plate.
68F	1	Connecting angle, rear, top, R. H.	Bolts right roof plates and upper right side plates.
68G	1	Connecting angle, rear, top, L. H.	Bolts right roof plates and upper right side plate.
101E	1	Connecting rod, cupola door	Connect cupola front plate and door.
101D	1	Connecting rod, female, cupola door	Connect cupola front plate and door.
33B	1	Cupola angle, R. H.	Fastens cupola top plate to R. H. center plate.
33C	1	Cupola angle, L. H.	Fastens cupola top plate to L. H. center plate.
33D	1	Cupola angle, R. H.	Fastens cupola top plate to cupola door plate.
33E	1	Cupola angle, L. H.	Fastens L. H. side plate to L. H. corner plate.
33F	1	Cupola angle, R. H.	Fastens cupola R. H. corner plate to R. H. front plate.
33G	1	Cupola angle, L. H.	Fastens cupola L. H. corner plate to L. H. front plate.
33H	1	Cupola angle, R. H.	Fastens cupola body side plate.
33K	1	Cupola angle, L. H.	Fastens cupola body side plate.
33M	2	Front door stop	Fastens cupola front cupola plates.
175G	1	Driver's back rest support, R. H.	Back of driver's seat.
175H	1	Driver's back rest support, L. H.	Back of driver's seat.
154A	1	Door cover, fire screen	Fastens to door flange.
154B	1	Door flange, fire screen	Fastens to fire screen center plate.

Plate No. 61

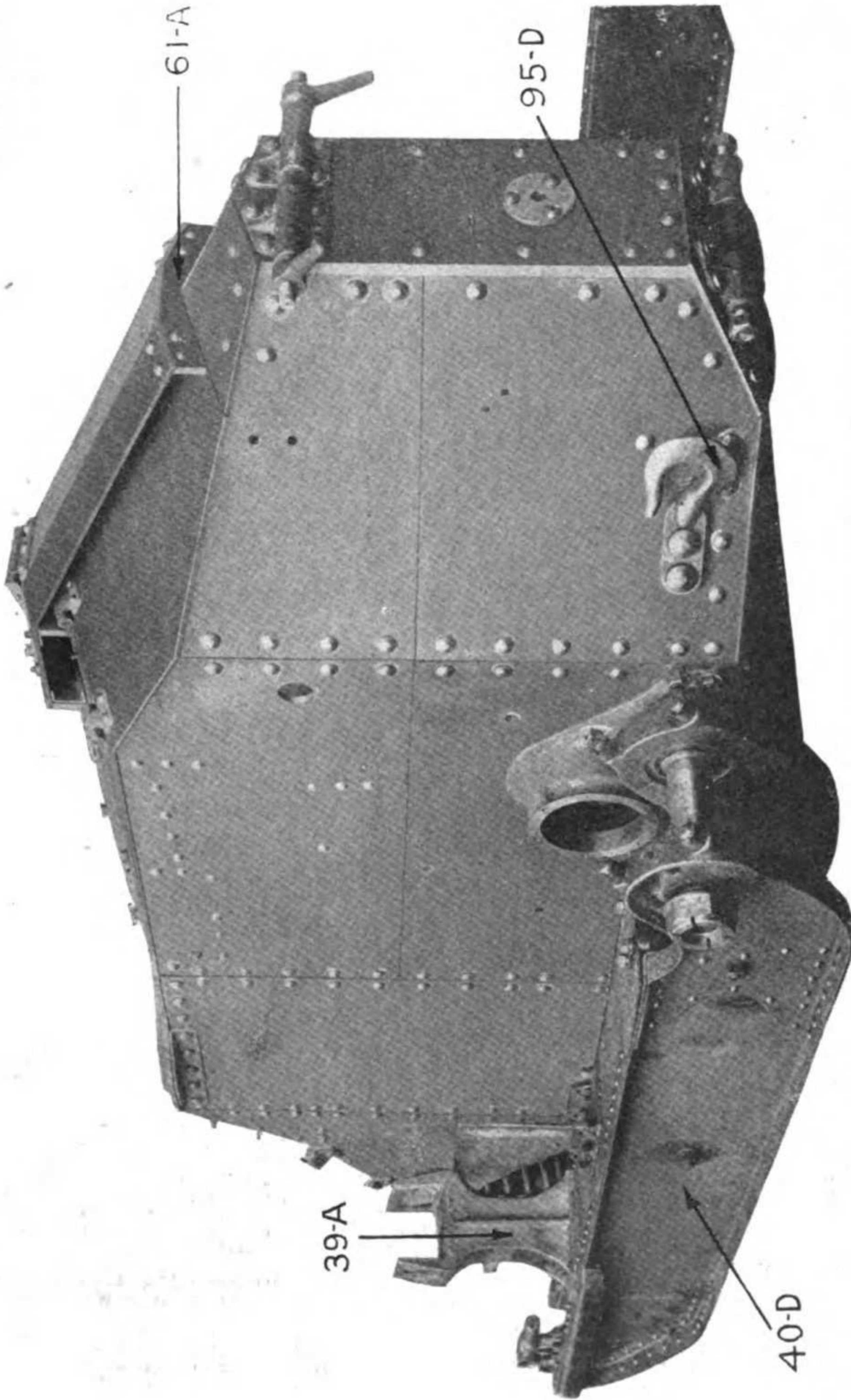


BODY AND TRACK UNITS

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Flange and Sheet Steel Parts—Continued</i> (See illustrations on pages 137, 139, 141, 143)			
94H	1	Door plate strap	
154K	1	Filler plate, fire screen	Used between fire screen and bottom plate.
104A	1	Floor plate, center	Raised above bottom plate of front end of job.
105A	1	Floor plate, side, R. H.	Raised above bottom plate of front end of job.
105B	1	Floor plate, side, L. H.	Raised above bottom plate of front end of job.
155P	1	Guide plate, fire screen, R. H.	Part of fire screen assembly.
155Q	1	Guide plate, fire screen, L. H.	Part of fire screen assembly.
155R	2	Guide plate, fire screen	Part of fire screen assembly.
94L	1	Gusset plate, front, L. H.	Bolts floor support to connecting angle.
94E	1	Gusset plate, front, R. H.	Bolts floor support to connecting angle.
94C	1	Gusset plate, front, R. H.	Bolts floor support to connecting angle.
94D	1	Gusset plate, front, L. H.	Bolts floor support to connecting angle.
94F	1	Gusset plate, rear, R. H.	Bolts front intermediate side plate and connecting angle.
94G	1	Gusset plate, rear, L. H.	Bolts front intermediate side plate and connecting angle.
102A	2	Hinge stop	Fastens on hinge of front door.
154L	2	Hook, fire screen	Fastens to fire screen door flange.
28B	1	Nose plate angle, front	Bolts on front nose plates.
28C	1	Nose plate angle, lower front, R. H.	Fastens side nose plate and lower nose plate.
28D	1	Nose plate angle, lower front, L. H.	Fastens side nose plate and lower nose plate.
28E	1	Nose plate angle, upper front, R. H.	Fastens upper nose plate and side nose plate.
28F	1	Nose plate angle, upper front, L. H.	Fastens upper nose plate and side nose plate.
155B	1	Perforated shutter, fire screen, R. H.	Part of fire screen assembly.
155A	1	Perforated shutter, fire screen, L. H.	Part of fire screen assembly.
66G	4	Plate, radiator clamp	Bolts to short vertical angle on side plate.
161F	4	Retainer bracket	
66H	4	Reinforcing block, fuel tank support	Welded to fuel tank support.
66K	4	Reinforcing block, radiator support angles	Welded to radiator support angles.
169B	1	Retainer, oil and kerosene can	
32C	1	Roof plate rear bracket, R. H.	Connects right end plate and right roof plate.
32D	1	Roof plate rear bracket, L. H.	Connects right end plate and right roof plate.
57F	4	Roof truss filler block	Used with roof.
58C	2	Roof truss plate, rear	Fastens to roof truss corners.
58D	1	Roof truss plate, rear	Fastens to roof truss at top.
155L	1	Shutter, fire screen, R. H.	Part of fire screen assembly.
155K	1	Shutter, fire screen, L. H.	Part of fire screen assembly.
154C	1	Side plate, fire screen, R. H.	Part of fire screen assembly.
154D	1	Side plate, fire screen, L. H.	Part of fire screen assembly.
155F	2	Slide plate, fire screen	Part of fire screen assembly.
64C	1	Splice plate, center, intermediate, bottom	Connects front center and right center bottom plate.
64D	1	Splice plate, front bottom	Connects front and front center bottom plates.
64A	1	Splice plate, front, intermediate, bottom	
64B	1	Splice plate, rear, intermediate, bottom	Connects right center and right intermediate bottom plates.
65D	1	Splice plate, vertical front, R. H.	Bolts front side plate and nose plate.
65E	1	Splice plate, vertical front, L. H.	Bolts front side plate and nose plate.
64E	1	Splice plate, vertical, intermediate, R. H.	Bolts front intermediate side plate and cupola corner plates.
64F	1	Splice plate, vertical intermediate, L. H.	Bolts front intermediate side plate and cupola corner plate.
65C	2	Splice plate, rear vertical	
105E	4	Support bracket, floor plate	Between bottom plate and floor.
55B	1	Support, fire extinguisher	One on fire screen and one on right side plate.
94A	2	Support, middle top plate	Bolts on roof plates.
94B	2	Support, middle top plate	Bolts on roof plates.
104C	1	Support, floor plate center	Between bottom plates and floor.
105D	2	Support strip, floor plate	Fastened to side walls.
55A	2	Support, vacuum tank	Bolts on body side plate, R. H.
94K	2	Tie roof plate	Connects right to left hand roof plates.
155C	1	Top slide stop, fire screen, R. H.	Part of fire screen assembly.
	1	Top slide stop, fire screen, L. H.	Part of fire screen assembly.
	1	Transmission support, front	Bolts on splice piece on floor.

Plate No. 62

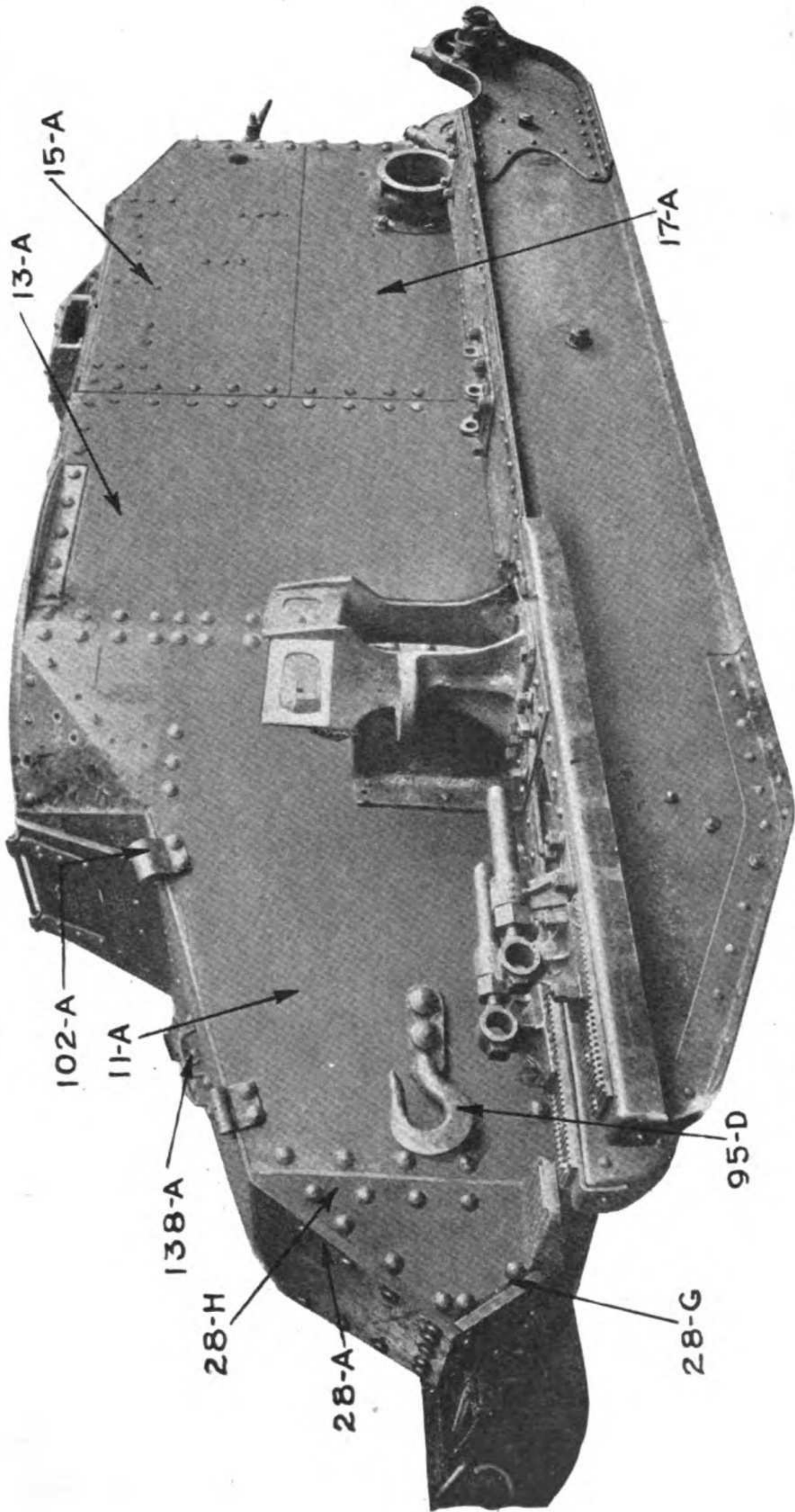


THREE-QUARTER FRONT VIEW OF BODY WITH TRACK FRAME ATTACHED

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		<i>Body—Flange and Sheet Steel Parts—Continued</i> (See illustrations on pages 137, 139, 141, 143)	
56B	1	Transmission support, front bracket, R. H.	Brace for transmission support to floor.
56C	1	Transmission support, front bracket, L. H.	Brace for transmission support to floor.
59G	2	Transmission support, rear reinforcing plate.	Riveted to transmission support channel.
138D	1	Washer, front door latch.	Fastens to latch.
		<i>Body—Structural Steel Parts</i> (See illustrations on pages 137, 139, 141, 143)	
59A	2	Angle, end, transmission support, rear.	Reinforcement for transmission right support.
59B	2	Angle, end, transmission support, rear.	Reinforcement for transmission right support.
66E	1	Angle, fuel tank support, R. H.	Bolted to rear intermediate upper side plate.
66D	1	Angle, fuel tank support, L. H.	Bolted to rear intermediate upper side plate.
59C	1	Angle, middle, front transmission support, rear, R. H.	Bolted to rear center bottom plate.
59D	1	Angle, middle, front transmission support, rear, L. H.	Bolted to rear center bottom plate.
66F	4	Angle, radiator clamp.	Bolted to rear intermediate upper side plate.
66C	1	Angle, radiator support, R. H.	Bolted to rear intermediate upper side plate.
66B	1	Angle, radiator support, L. H.	Bolted to rear intermediate upper side plate.
59E	1	Angle, middle rear transmission support, rear.	Bolted to rear center bottom plate.
66A	2	Angle, turret race outside.	Bolted to front intermediate side plate.
60C	1	Angle, rear vertical splice plate, R. H.	Fastens upper rear side plate to right intermediate side plate.
60L	1	Angle, rear vertical splice plate, L. H.	Fastens upper rear side plate to right intermediate side plate.
59F	1	Channel, transmission support, rear.	Bolted to rear center bottom plate.
65A	1	Connecting angle, floor and side plates, R. H.	Corner angle for side plates and bottom.
65B	1	Connecting angle, floor and side plates, L. H.	Corner angle for side plates and bottom.
60E	1	Connecting angle, rear side plate, R. H.	Used where fire screen fastens to side wall.
60F	1	Connecting angle, rear side plates, L. H.	Used where fire screen fastens to side wall.
60M	1	Connecting angle, rear side plates, R. H.	Used as support for fire screen.
60N	1	Connecting angle, rear side plates, L. H.	Used as support for fire screen.
60A	1	Connecting tee, front half, R. H.	Bolts gusset plate to front side plates.
60B	1	Connecting tee, front half, L. H.	Bolts gusset plate to front side plates.
60G	1	Connecting tee, rear half, R. H.	Bolts gusset plate to front intermediate side plates.
60H	1	Connecting tee, rear half, L. H.	Bolts gusset plate to front intermediate side plates.
60D	1	Connecting tee (floor plate), front half.	Support for floor plate from bottom.
60K	1	Connecting tee (floor plate), rear half.	Support for floor plate from bottom.
61C	1	Corner angle, turret race, R. H.	Bolts race to front intermediate side plates.
61D	1	Corner angle, turret race, L. H.	Bolts race to front intermediate side plate.
33L	1	Cupola angle.	Bolts to top plate.
57A	1	Roof truss front angle, R. H.	Bolts right intermediate upper side plate to roof plate.
57B	1	Roof truss, front angle, L. H.	Bolts right intermediate upper side plate to roof plate.
58A	1	Roof truss, rear angle, R. H.	Bolts right intermediate upper side plate to roof plate.
58B	1	Roof truss, rear angle, L. H.	Bolts right intermediate upper side plate to roof plate.
155G	1	Slide angle, fire screen, R. H.	Fastens to fire screen assembly.
155H	1	Slide angle, fire screen, L. H.	Fastens to fire screen assembly.
105C	1	Support angle, floor plate, center.	Fastens to front center bottom plate.
155E	1	Top angle, fire screen.	Part of fire screen assembly.
		<i>Body—Forgings</i> (See illustrations on pages 137, 139, 141, 143)	
138E	1	Bracket, front door latch.	Fastened on front door.
93A	1	Hinge, female, cupola door, R. H.	Fastened to cupola top plate.
93B	1	Hinge, female, cupola door, L. H.	Fastened to cupola top plate.
93C	2	Hinge, male, cupola door.	Fastened to cupola door.
102B	4	Hinge, female, front door.	Fastened to side plate.

Plate No. 63



VIEW OF MAIN BODY WITH PART OF TRACK FRAME

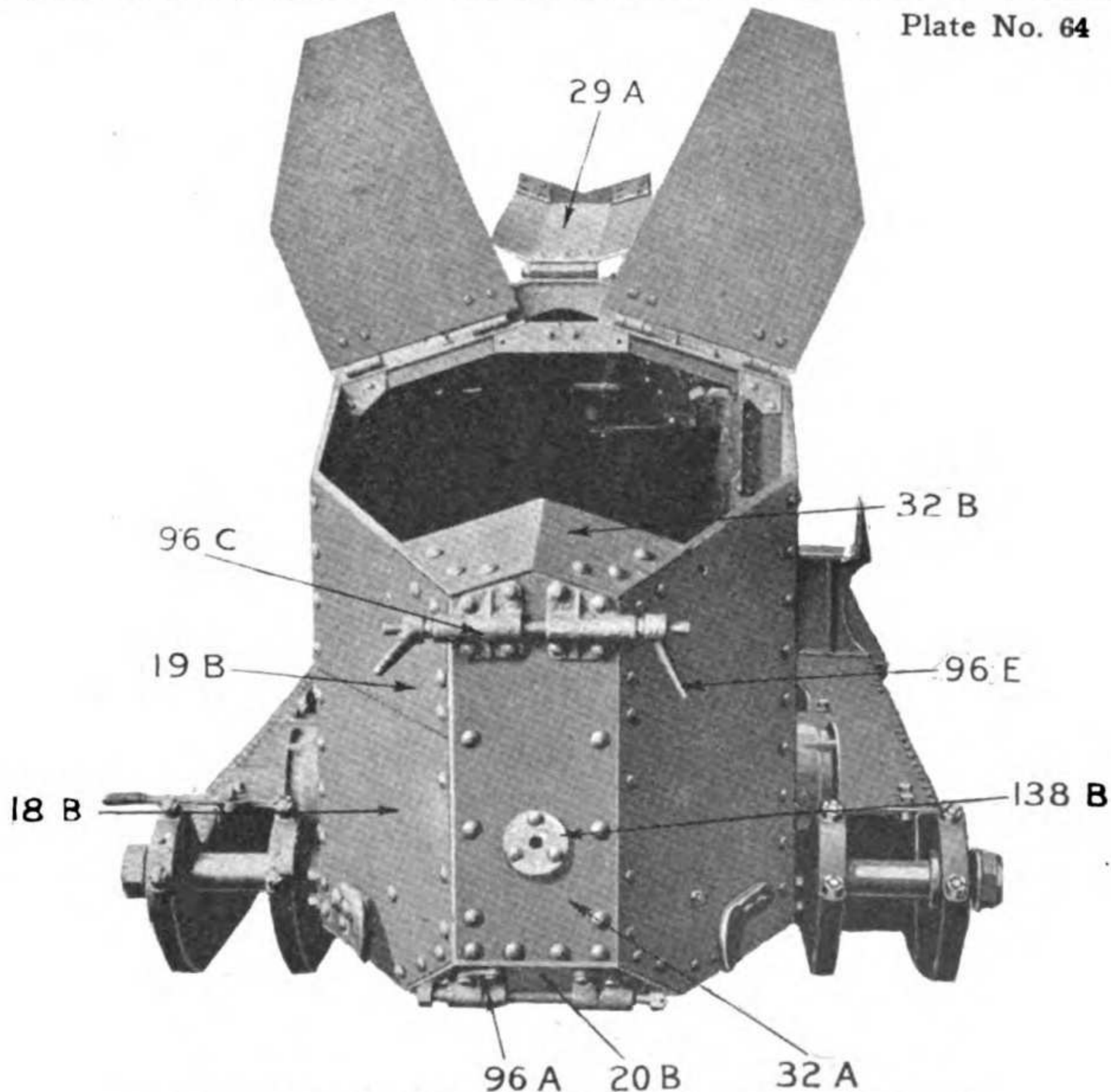
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Forgings—Continued</i>			
(See illustrations on pages 137, 139, 141, 143)			
102C	4	Hinge, male, front door	Fastened to door.
102D	4	Hinge, female, rear door	Fastened to roof plate.
102E	4	Hinge, male, rear door	Fastened to door.
98E	1	Hinge, female, rear top plate	Fastens to middle top plate.
98F	1	Hinge, rear top plate	Fastens to rear top plate.
176G	1	Lifting hook, body, R. H.	Bolts to side plates at top.
176H	1	Lifting hook, body, L. H.	Bolts to side plates at top.
95C	2	Towing hook, R. H.	Bolts to side plates, front and back.
95D	2	Towing hook, L. H.	Bolts to side plates, front and back.
<i>Body—Castings</i>			
(See illustrations on pages 137, 139, 141, 143)			
79A	1	Ball race, lower turret	Bolts to cupola top plate.
151D	1	Bracket, rear top plate latch	Fastens to rear top plate.
101F	1	Bracket, cupola door rod	Fastens to cupola front plate.
142B	1	Cross member, rear upper	Bolts to rear side plates, upper.
142A	1	Cross member, rear lower	Bolts to rear side plates, lower.
151A	1	Guide, rear top plate latch	Bolts to right rear intermediate side plate, upper.
138A	2	Handle, front door	Bolts on front doors.
98B	2	Hinge, transmission inspection door, male	Fastens to floor plate.
98A	2	Hinge, transmission inspection door, female	Fastens to inspection cover.
138C	1	Latch, front door	Used on front door.
95A	1	Step, R. H.	Bolts to right nose plate.
95B	1	Step, L. H.	Bolts to left nose plate.
138B	1	Support, rear crank	Bolts to rear end plate.
144A	1	Transmission support bracket	Fastens to rear transmission support.
<i>Body—Cold Rolled Steel</i>			
(See illustrations on pages 137, 139, 141, 143)			
101H	1	Clevis, cupola door	Fastens to cupola door.
101B	1	Clevis pin, cupola door	Used with cupola door clevis.
182C	1	Clevis pin, rear top plate latch	Upper right hand of body.
192H	2	Clevis pin, rear top plate latch	Upper right hand of body.
151F	1	Connecting rod, rear top plate latch	Upper right hand of body.
151C	1	Guide rod, rear top plate latch	Upper right hand of body.
151M	1	Handle, rear top plate latch	Upper right hand of body.
104B	1	Handle, floor plate	Used for lifting floor plates.
151L	1	Handle rod, rear top plate latch	Upper right side of body.
93E	2	Hinge pin, cupola door	Fastens hinge rod to hinge.
98C	10	Hinge pin	
98G	1	Hinge pin, rear top plate	Used with rear top plate hinge.
93D	1	Hinge rod, cupola door	Used in cupola door hinges.
88M	1	Hinge stud, gas tank cover plate	Located on roof plate.
88E	1	Hinge stud, radiator cover plate	Located on roof plate.
88H	2	Hinge stud, motor drainage cover plate	Located on rear intermediate bottom plate.
88K	5	Knob, cover plate	Used on different cover plates on roof.
154G	2	Knob, fire screen door hook	Fastens to fire screen door cover.
<i>Body—Cold Rolled Steel</i>			
(See illustrations on pages 137, 139, 141, 143)			
155S	2	Knob, fire screen shutter latch	Part of fire screen assembly.
101L	1	Latch, cupola door	Bolted to cupola corner plate.
101K	1	Latch fastener, cupola door	Bolted to cupola door.
151B	1	Latch pin, rear top plate latch	Upper right hand side of body.
151E	2	Lever arm, rear top plate latch	Upper right hand side of body.
88N	1	Lock stud, gas tank cover plate	Located on roof plate.
88G	2	Lock stud, motor drainage cover plate	Located on roof plate.
88D	1	Lock stud, radiator cover plate	Located on roof plate.
88B	1	Lock stud, transmission inspection door	Located on roof plate.
101A	1	Pin, cupola door connecting rod	Part of cupola door latch assembly.
101G	1	Pin, cupola door connecting rod	Part of cupola door latch assembly.
151H	3	Pin, rear top plate latch	Upper right hand side of body.
98D	11	Pin, retainer	
101C	1	Pivot latch, cupola door	Cupola door.
161E	8	Post, ammunition carrier	Part of ammunition bracket.
151G	1	Reach rod, rear top plate latch	Upper right hand side of body.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Cold Rolled Steel—Continued</i>			
(See illustrations on pages 137, 139, 141, 143)			
93H	2	Retainer, cupola door spring.....	Used on cupola door.
151K	1	Rod, rear top plate latch.....	Upper right hand side of body.
21B	2	Special cap screw, bottom plate.....	Bottom plate.
154F	4	Stud, fire screen.....	Used with fire door screen assembly.
154H	2	Stud, fire screen door hook.....	Used with fire door hook.
192G	1	Turn buckle, rear top plate latch.....	Upper right hand side of body.
<i>Body—Key Bolts</i>			
(See illustrations on pages 137, 139, 141, 143)			
35DA	11	1/2" (.5)—13 U. S. S. x 1 1/8" (1.125) key bolt . . .	
35DB	22	1/2" (.5)—13 U. S. S. x 1 1/4" (1.25) key bolt . . .	
35DD	3	1/2" (.5)—13 U. S. S. x 1 3/8" (1.375) key bolt . . .	
35DC	70	1/2" (.5)—13 U. S. S. x 1 1/2" (1.5) key bolt . . .	
35DE	7	1/2" (.5)—13 U. S. S. x 1 3/4" (1.75) key bolt . . .	
35DF	2	1/2" (.5)—13 U. S. S. x 2" (2) key bolt . . .	
35DG	2	1/2" (.5)—13 U. S. S. x 2 3/4" (2.75) key bolt . . .	
35CA	105	5/8" (.625)—11 U. S. S. x 1 1/4" (1.25) key bolt . . .	
35CB	6	5/8" (.625)—11 U. S. S. x 1 3/8" (1.375) key bolt . . .	
35CC	42	5/8" (.625)—11 U. S. S. x 1 1/2" (1.5) key bolt . . .	
35CD	241	5/8" (.625)—11 U. S. S. x 1 5/8" (1.625) key bolt . . .	
35CE	30	5/8" (.625)—11 U. S. S. x 1 3/4" (1.75) key bolt . . .	
35CF	26	5/8" (.625)—11 U. S. S. x 1 7/8" (1.875) key bolt . . .	
35CG	10	5/8" (.625)—11 U. S. S. x 2" (2) key bolt . . .	
35CH	6	5/8" (.625)—11 U. S. S. x 2 7/8" (2.875) key bolt . . .	

Plate No. 64



REAR END OF BODY SHOWING DOOR OPENINGS

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		<i>Body—Key Bolts—Continued</i>	
		(See illustrations on pages 137, 139, 141, 143)	
35CK	6		
35CL	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $2\frac{3}{8}$ " (2.375) key bolt . . .	
35CM	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $2\frac{5}{8}$ " (2.625) key bolt . . .	
35BA	6	$\frac{5}{8}$ " (.625)—11 U. S. S. x $2\frac{1}{4}$ " (2.25) key bolt . . .	
355	8	$\frac{5}{8}$ " (.625)—11 U. S. S. x $3\frac{5}{8}$ " (3.625) key bolt . . .	
		$\frac{5}{8}$ " (.625)—11 U. S. S. x $2\frac{5}{8}$ " (2.625) key bolt . . .	
		<i>Body—Miscellaneous</i>	
		(See illustrations on pages 137, 139, 141, 143)	
93K	1	Handle, cupola door	Cupola assembly.
155T	2	Latch spring, fire screen	Fire screen assembly.
138H	8	Spacer, connecting angle	Between floor and bottom plate.
93F	1	Spring, cupola door, R. H.	Cupola assembly.
93G	1	Spring, cupola door, L. H.	Cupola assembly.
		<i>Body—Standard Parts</i>	
		(See illustrations on pages 137, 139, 141, 143)	
	7	$\frac{1}{4}$ " (.25)—20 U. S. S. x 5 (5) hex. head bolt	
	4	$\frac{3}{8}$ " (.375)—16 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt	
	8	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head bolt	
	4	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head bolt	
	4	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head bolt	
	1	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head bolt	
	1	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{8}$ " (1.375) hex. head bolt	
	1	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{8}$ " (1.375) hex. head bolt	
	1	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{5}{8}$ " (1.625) hex. head bolt	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) hex. head bolt	
	1	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{7}{8}$ " (1.875) hex. head bolt	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x 2" (2.) hex. head bolt	
	4	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{5}{8}$ " (1.625) hex. head bolt	
	2	$\frac{3}{8}$ " (.375)—16 U. S. S. x $\frac{7}{8}$ " (.875) flat head cap screw	
	2	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) flat head cap screw	
	1	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) flat head cap screw	
	4	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{2}$ " (1.5) flat head cap screw	
	6	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{2}$ " (1.5) flat head cap screw	
	7	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{2}$ " (1.5) flat head cap screw	
	4	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{1}{2}$ " (1.5) flat head cap screw	
	4	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{5}{8}$ " (1.625) flat head cap screw	
	5	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{5}{8}$ " (1.625) flat head cap screw	
	4	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{5}{8}$ " (1.625) flat head cap screw	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	3	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	4	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	
	6	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{4}$ " (1.75) flat head cap screw	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Standard Parts—Continued</i>			
(See illustrations on pages 137, 139, 141, 143)			
2		5/8" (.625)—11 U. S. S. x 3" (3) flat head cap screw	
2		3/8" (.375)—16 U. S. S. x 1 3/8" (1.375) hex. head cap screw	
2		1/2" (.5)—13 U. S. S. x 1" (1) hex. head cap screw	
2		1/2" (.5)—13 U. S. S. x 1 1/4" (1.25) hex. head cap screw	
2		1/2" (.5)—13 U. S. S. x 1 1/4" (1.25) hex. head cap screw	
2		3/4" (.75)—10 U. S. S. x 2 1/4" (2.25) hex. head cap screw	
8		3/8" (.375)—16 U. S. S. x 1 1/4" (1.25) fill. head cap screw	
1		1/2" (.5)—13 U. S. S. x 1 3/8" (1.375) fill head cap screw	
2		1/4" (.25)—20 U. S. S. x 3/8" (.375) button head cap screw	
1		1/4" (.25)—20 U. S. S. x 1/2" (.5) button head cap screw	
6		1/4" (.25)—20 U. S. S. x 1/2" (.5) button head cap screw	
2	2	1/4" (.25)—20 U. S. S. semi-finished hex. nut	
2	2	1/4" (.25)—20 U. S. S. semi-finished hex. nut	
7		1/4" (.25)—20 U. S. S. semi-finished hex. nut	
4		1/4" (.25)—20 U. S. S. semi-finished hex. nut	
4		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
1		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
8		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
1		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
1		3/8" (.375)—16 U. S. S. semi-finished hex. nut	
6		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
4		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
119		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
2		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
8		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
7		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
2		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
2		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
4		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
4		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
476		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
3		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
4		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
4		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
5		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
4		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
10		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
4		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
1		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
2		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
4		5/8" (.625)—11 U. S. S. semi-finished hex. nut	
6		3/4" (.75)—10 U. S. S. semi-finished hex. nut	
8		1 1/8" (.125)—U. S. S. semi-finished hex. nut	
4		3/8" (.375)—16 U. S. S. wing nut	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut	
9	2	1 1/4" (.25) Lock washer S. A. E. heavy	
4		1 1/4" (.25) Lock washer S. A. E. heavy	
4		3/8" (.375) Lock washer S. A. E. heavy	
2		3/8" (.375) Lock washer S. A. E. heavy	
1		3/8" (.375) Lock washer S. A. E. heavy	

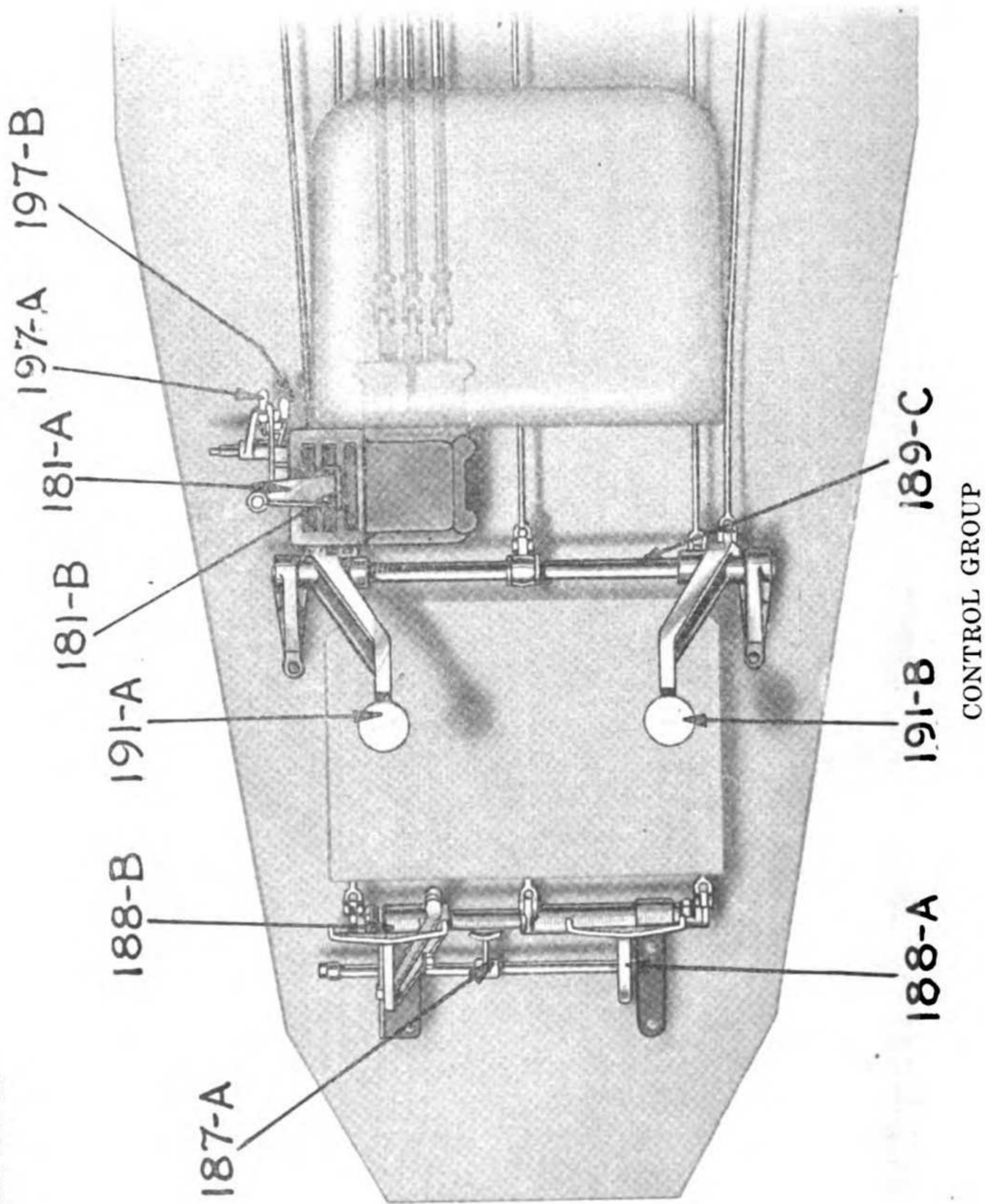
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Body—Standard Parts—Continued</i>			
(See illustrations on pages 137, 139, 141, 143)			
2	3/8"	(.375) Lock washer S. A. E. heavy.....	
2	3/8"	(.375) Lock washer S. A. E. heavy.....	
1	3/8"	(.375) Lock washer S. A. E. heavy.....	
2	3/8"	(.375) Lock washer S. A. E. heavy.....	
2	1/2"	(.5) Lock washer S. A. E. heavy.....	
6	1/2"	(.5) Lock washer S. A. E. heavy.....	
4	1/2"	(.5) Lock washer S. A. E. heavy.....	
2	1/2"	(.5) Lock washer S. A. E. heavy.....	
8	1/2"	(.5) Lock washer S. A. E. heavy.....	
7	1/2"	(.5) Lock washer S. A. E. heavy.....	
1	1/2"	(.5) Lock washer S. A. E. heavy.....	
2	1/2"	(.5) Lock washer S. A. E. heavy.....	
4	1/2"	(.5) Lock washer S. A. E. heavy.....	
4	1/2"	(.5) Lock washer S. A. E. heavy.....	
1	1/2"	(.5) Lock washer S. A. E. heavy.....	
2	1/2"	(.5) Lock washer S. A. E. heavy.....	
1	1/2"	(.5) Lock washer S. A. E. heavy.....	
1	1/2"	(.5) Lock washer S. A. E. heavy.....	
4	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
3	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
4	5/8"	(.625) Lock washer S. A. E. heavy.....	
4	5/8"	(.625) Lock washer S. A. E. heavy.....	
5	5/8"	(.625) Lock washer S. A. E. heavy.....	
4	5/8"	(.625) Lock washer S. A. E. heavy.....	
10	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
4	5/8"	(.625) Lock washer S. A. E. heavy.....	
1	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	5/8"	(.625) Lock washer S. A. E. heavy.....	
2	3/4"	(.75) Lock washer S. A. E. heavy.....	
<i>Body—Plain Washers</i>			
(See illustrations on pages 137, 139, 141, 143)			
8	3/8"	(.375) Plain washers.....	
<i>Body—Cotter Pins</i>			
(See illustrations on pages 137, 139, 141, 143)			
1	1/8"	(.062) x 3/4" (.75) Cotter pin.....	
1	1/8"	(.062) x 3/4" (.75) Cotter pin.....	
1	1/8"	(.062) x 3/4" (.75) Cotter pin.....	
1	1/8"	(.062) x 3/4" (.75) Cotter pin.....	
1	1/8"	(.062) x 3/4" (.75) Cotter pin.....	
3	3/8"	(.093) x 1" Cotter pin.....	
<i>Body—Rivets</i>			
(See illustrations on pages 137, 139, 141, 143)			
4	3/8"	(.187) x 1/2" (.5) Button head rivets.....	
2	1/4"	(.25) x 1/4" (.25) Button head rivets.....	
6	1/4"	(.25) x 1/2" (.5) Button head rivets.....	
12	1/4"	(.25) x 5/8" (.625) Button head rivets.....	
2	1/4"	(.25) x 3/4" (.75) Button head rivets.....	
20	1/4"	(.25) x 3/4" (.75) Button head rivets.....	
16	3/8"	(.375) x 1 1/4" (1.25) Button head rivets.....	
2	3/8"	(.375) x 1 1/4" (1.25) Button head rivets.....	
2	3/8"	(.375) x 1 1/4" (1.25) Button head rivets.....	
4	3/8"	(.375) x 1 3/8" (1.375) Button head rivets.....	
4	3/8"	(.375) x 1 3/8" (1.375) Button head rivets.....	
4	3/8"	(.375) x 1 1/2" (1.5) Button head rivets.....	
2	3/8"	(.375) x 1 5/8" (1.625) Button head rivets.....	
6	3/8"	(.375) x 1 3/4" (1.75) Button head rivets.....	
4	1/2"	(.5) x 1 3/8" (1.375) Button head rivets.....	
4	1/2"	(.5) x 1 1/2" (1.5) Button head rivets.....	
3	1/2"	(.5) x 1 1/2" (1.5) Button head rivets.....	
4	1/2"	(.5) x 1 1/2" (1.5) Button head rivets.....	
8	1/2"	(.5) x 1 1/2" (1.5) Button head rivets.....	
8	1/2"	(.5) x 1 1/2" (1.5) Button head rivets.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		<i>Body—Rivets—Continued</i>	
		(See illustrations on pages 137, 139, 141, 143)	
	4	1/2" (.5) x 1 1/2" (1.5) Button head rivets	
	6	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	6	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	4	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	6	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	8	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	12	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	4	1/2" (.5) x 1 3/4" (1.75) Button head rivets	
	6	1/2" (.5) x 2" Button head rivets	
	5	5/8" (.625) x 1 1/2" (1.5) Button head rivets	
	4	5/8" (.625) x 1 1/2" (1.5) Button head rivets	
	8	5/8" (.625) x 2 1/8" (2.125) Button head rivets	
	2	1/4" (.25) x 5/8" (.625) C'T'R Sunk head rivets	
		3/8" (.375) x 1 1/4" (1.25) C'T'R Sunk head rivets	
		<i>Body—Tail Piece</i>	
		(See illustration on page 8)	
96A	1	Bearing lower tail piece, R. H.	Fastens to bottom rear plate.
96B	1	Bearing lower tail piece, L. H.	Fastens to bottom rear plate.
96C	1	Bearing upper tail piece, R. H.	Fastens to rear end plate.
96D	1	Bearing upper tail piece, L. H.	Fastens to rear end plate.
97F	1	Bottom tail piece	Riveted to angles.
96H	2	Bracket, lower tail piece	Bolts to rear plate of tractor.
96G	2	Bracket, upper tail piece	Fastens to rear plate.
97A	1	Cross angle, tail piece	Rivets sides and angles.
96E	2	Lock nut, tail piece	Used on tail piece shaft.
97D	2	Lower angle, tail piece	Rivets to side angles and lower angles
97E	2	Lower angle, tail piece	Rivets to side angles and lower angles
96F	1	Shaft, tail piece	Connection for tail and body.
97G	2	Side angle, tail piece	Rivets to upper and lower angles.
97B	2	Upper angle tail piece	Rivets to side angles.
97C	2	Upper angle tail piece	Rivets to side angles.
		<i>Body—Tail Piece Standard Parts</i>	
	1	1" (1)—8 U. S. S. x 16 hex. head bolt	
	1	1" (1)—8 U. S. S. Castellated nut	
	1	1/8" (.125) x 1 1/2" (1.5) Cotter pin	
	2	1/8" (.125) x 1 1/2" (1.5) Cotter pin	
	2	1/8" (.187) x 2 1/4" (2.25) Cotter pin	
	16	1/2" (.5) x 1 3/4" (1.75) Button head rivet	
	6	1/2" (.5) x 1 5/8" (1.625) Button head rivet	
	50	1/2" (.5) x 1 1/2" (1.5) Button head rivet	
		CONTROL GROUP	
		<i>Control—Pedals</i>	
		(See illustration on page 148)	
192K	6	Adjustable yoke end	Assembled with control rods to lever.
187C	1	Bracket, pedal, R. H.	Bolts to floor plate at front end of body.
187D	1	Bracket, pedal, L. H.	Bolts to floor plate at front end of body.
187E	2	Bushing, accelerator shaft	Assembled with shaft.
187G	2	Bushing, pedal, shaft	Assembled with shaft.
189E	5	Bushing, lever, short	Assembled with shaft.
189F	2	Bushing, lever, long	Assembled with shaft.
192H	16	Clevis pin	Assembled with shaft lever.
189C	1	Countershaft	Pedal control.
80A	1	Floor, over control rods	Above bottom plates and in front of body.
189H	1	Latch, brake pedal	Fastens to brake pedal.
187B	1	Lever, accelerator shaft	Right side of pedal control assembly.
189M	2	Lever, brake pedal shaft	Clamped to pedal shaft.
189B	2	Lever, countershaft brake	Part of control.
189A	1	Lever, countershaft main clutch	Part of control.
187A	1	Pedal accelerator	Center of body at front end clamped to crankshaft.

Plate No. 65



NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Control—Pedals—Continued</i> (See illustration on page 148)			
188B	1	Pedal, brake.....	Clamped to shaft at front end of body.
188A	1	Pedal, clutch.....	Clamped to shaft at front end of body.
189G	1	Plate, brake pedal latch.....	Bolted to bottom plate with shaft bracket.
189L	1	Pin, brake pedal latch.....	Assembled with latch.
192C	3	Rod, countershaft to turnbuckle.....	Under floor plates.
192B	2	Rod, hand lever to turnbuckle.....	Under floor plates.
192D	3	Rod, pedal to countershaft.....	Under floor plates.
192E	1	Rod, turnbuckle to main clutch throwout.....	Under floor plates.
192F	2	Rod, turnbuckle to main brake.....	Under floor plates.
192A	2	Rod, turnbuckle to steering clutch.....	Under floor plates.
187F	1	Shaft, accelerator pedal.....	
189K	1	Shaft, clutch and brake pedal.....	Front end of body fastened to bottom plates.
189M	1	Spring, brake pedal latch.....	Used on brake pedal latch.
192G	5	Turnbuckle.....	Connection for rods under floor plates.
189D	5	Washer, lever retaining.....	Used with levers.
<i>Control—Steering</i> (See illustration on page 148)			
191C	1	Bracket countershaft, R. H.....	Bolted to bottom plates.
191D	1	Bracket countershaft, L. H.....	Bolted to bottom plates.
191A	1	Hand lever, steering clutch, R. H.....	In front of control lever, one on each side of driver's seat.
191B	1	Hand lever, steering clutch, L. H.....	In front of control lever, one on each side of driver's seat.
<i>Control—Change Speed</i> (See illustration on page 148)			
185A	1	Bracket, change speed.....	Bolted to shaft bracket.
184A	1	Bracket, change speed shaft.....	Bolted to bottom plate at front end.
183B	2	Bushing, control lever shaft.....	Assembled in change speed bracket.
181D	1	Button, reverse latch.....	Handle of control lever.
182C	6	Clevis pin, connecting link.....	Assembled with yoke end and change speed shaft.
181E	1	Clevis pin, connecting latch.....	Assembled with control lever.
182D	3	Connecting link, speed control.....	Under floor plate.
183C	2	Dowel, control lever shaft bushing.....	Fastens bushing in change speed bracket.
181C	1	Latch, control lever reverse.....	Pin to control lever.
181A	1	Lever, control.....	Right hand of body in front of driver's seat.
181B	1	Rod, reverse latch.....	Assembled to control lever.
183G	1	Shaft, change speed reverse.....	Assembled in bracket.
183E	1	Shaft, change speed first and second speed.....	Assembled in bracket.
183F	1	Shaft, change speed third and fourth speed.....	Assembled in bracket.
183A	1	Shaft, control lever.....	Assembled in bracket.
183D	1	Shift lever, control shaft.....	Assembled in change speed bracket.
181F	1	Spring, reverse latch.....	In handle of change speed lever.
185C	1	Stop pin, change speed bracket.....	Assembled in bracket.
185B	4	Stud, change speed bracket.....	Fastens bracket to bottom plate.
182B	3	Yoke end, connecting link, front.....	Under floorplates and connects shafts to rods.
182A	3	Yoke end, connecting link, rear.....	Under floorplates and connects shafts to rods.
<i>Control—Spark and Throttle</i> (See illustration on page 148)			
172A	1	Accelerator rod, pedal to turnbuckle.....	Right hand side of body.
172B	1	Accelerator rod, turnbuckle to bell crank.....	Right hand side under floor.
172L	10	Ball joint.....	On ends of rods.
197H	2	Ball, lever.....	
173C	1	Bell crank, lever support bracket.....	Pin to support bracket.

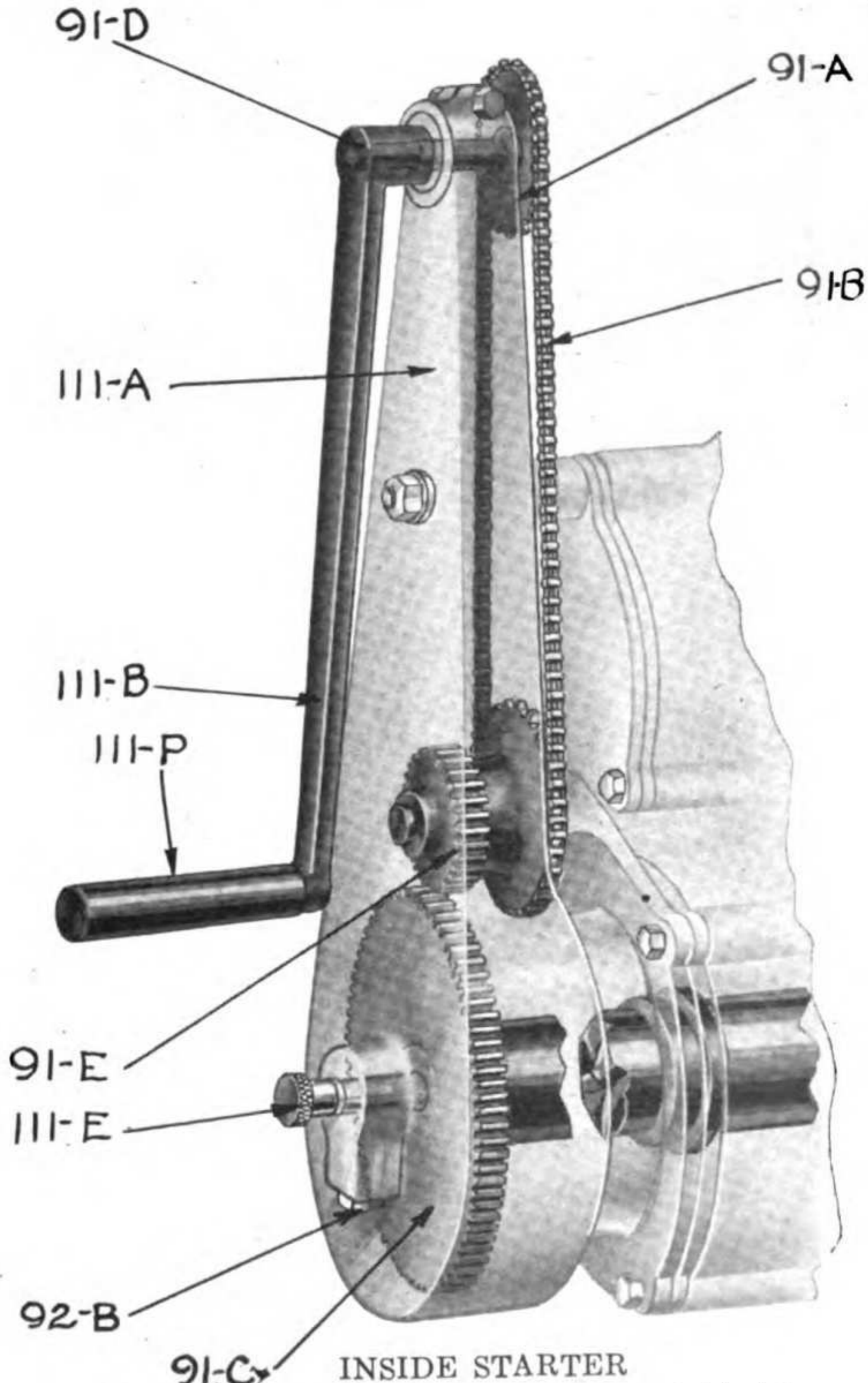
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Control—Spark and Throttle—Continued</i>			
(See illustration on page 148)			
173E	1	Bell crank, magneto.....	Bolted to upper crank case of engine.
173A	1	Bracket, lever support.....	Bolted to transmission support.
197C	1	Bracket, spark and throttle lever.....	Bolts to bottom plate at front end.
173L	1	Clevis pin.....	Used in lever.
173D	1	Lever, lever support bracket.....	Pin to support bracket in rear transmission support.
197B	1	Lever, spark.....	Right side of driver's seat on sector.
197A	1	Lever, throttle.....	Right side of driver's seat on sector.
173G	1	Lever, spark and throttle shaft.....	Right side of body clamped to end of shaft.
197D	1	Sector spark and throttle lever.....	Right side of body clamped to end of shaft.
173H	1	Lever, spark and throttle shaft.....	Assembled with lever.
173B	3	Pin, lever.....	Assembled with sector bracket.
197E	1	Shaft, spark lever.....	Assembled with sector bracket.
197F	1	Shaft, throttle lever.....	Used on accelerator rod.
173K	1	Sleeve, lever to accelerator rod.....	Right hand of body at rear.
172F	1	Spark rod, bell crank to carburetor.....	Right hand of body at rear.
172H	1	Spark rod, bell crank to magneto.....	R. H., front of body.
172C	1	Spark rod, lever to turnbuckle.....	R. H., rear of body.
172E	1	Spark rod, rocker arm to bell crank.....	R. H., under floor plate.
172D	1	Spark rod, turnbuckle to rocker arm.....	Accelerator lever to bottom plate.
172M	1	Spring, accelerator lever.....	In side spark and throttle levers.
197G	2	Spring, lever.....	Bolts to upper crank case of engine.
173F	1	Support, magneto bell crank.....	Right hand side, front of body.
172G	1	Throttle rod, lever to accelerator rod.....	Connected under floor plates.
172K	1	Turnbuckle.....	
<i>Control—Standard Parts</i>			
(See illustration on page 148)			
2		1/4" (.25)—20 U. S. S. x 1/2" (.5) hex. head bolt..	
1		1/4" (.25)—20 U. S. S. x 1 1/8" (1.187) hex. head bolt.....	
2		1/4" (.25)—20 U. S. S. x 1 1/8" (1.187) hex. head bolt.....	
3		5/16" (.312)—18 U. S. S. x 1" (1) hex. head bolt..	
2		5/16" (.312)—18 U. S. S. x 1 1/4" (1.25) hex. head bolt.....	
1		3/8" (.375)—16 U. S. S. x 1 3/4" (1.75) hex. head bolt.....	
1		1/2" (.5)—13 U. S. S. x 2 1/8" (2.125) hex. head bolt.....	
1		1/2" (.5)—13 U. S. S. x 1 3/4" (1.75) hex. head cap screw.....	
2		No. 14—20 x 5" button head machine screw.....	
10		1/4" (.25)—20 U. S. S. semi-finished hex. nut.....	
2		1/4" (.25)—20 U. S. S. semi-finished hex. nut.....	
1		1/4" (.25)—20 U. S. S. semi-finished hex. nut.....	
3		5/16" (.312)—18 U. S. S. semi-finished hex. nut.....	
2		5/16" (.312)—18 U. S. S. semi-finished hex. nut.....	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut.....	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut.....	
6		3/8" (.375)—16 U. S. S. semi-finished hex. nut.....	
6		3/8" (.375)—16 U. S. S. semi-finished hex. nut.....	
1		1/2" (.5)—13 U. S. S. semi-finished hex. nut.....	
8		1/2" (.5)—13 U. S. S. semi-finished hex. nut.....	
3		1/2" (.5)—13 U. S. S. semi-finished hex. nut.....	
2		1/4" (.25) Lock washer, S. A. E., light.....	
2		1/4" (.25) Lock washer, S. A. E., light.....	
3		5/16" (.312) Lock washer, S. A. E., light.....	
2		5/16" (.312) Lock washer, S. A. E., light.....	
2		3/8" (.375) Lock washer, S. A. E., light.....	
1		1/2" (.5) Lock washer, S. A. E., light.....	
8		1/2" (.5) Lock washer, S. A. E., light.....	
1		1/2" (.5) Lock washer, S. A. E., light.....	
1		1/4" (.25) Lock washer, S. A. E., heavy.....	
2		1/4" (.25) Lock washer, S. A. E., heavy.....	
4		1/2" (.5) Lock washer, S. A. E., heavy.....	
4		1/2" (.5) Lock washer, S. A. E., heavy.....	
1		1/8" (.062) x 1/2" (.5) Cotter pin.....	
1		1/8" (.062) x 1/2" (.5) Cotter pin.....	
1		1/8" (.062) x 5/8" (.625) Cotter pin.....	
1		3/16" (.093) x 5/8" (.625) Cotter pin.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Control—Standard Parts—Continued</i> (See illustration on page 148)			
3	3	$\frac{1}{8}$ " (.093) x $\frac{5}{8}$ " (.625) Cotter pin.....	
18	18	$\frac{1}{8}$ " (.093) x $\frac{5}{8}$ " (.625) Cotter pin.....	
7	7	$\frac{1}{8}$ " (.093) x $\frac{7}{8}$ " (.875) Cotter pin.....	
1	1	$\frac{1}{8}$ " (.125) x 1" Cotter pin.....	
2	2	$\frac{1}{8}$ " (.187) x $\frac{3}{4}$ " (.75) Cotter pin.....	
2	2	$\frac{1}{8}$ " (.187) x $1\frac{1}{4}$ " (1.25) Cotter pin.....	
4	4	$\frac{1}{8}$ " (.187) x $1\frac{1}{4}$ " (1.25) Cotter pin.....	
2	2	$\frac{1}{8}$ " (.187) x $1\frac{3}{4}$ " (1.75) Cotter pin.....	
2	2	No. 11 Woodruff key.....	
3	3	No. 11 Woodruff key.....	
1	1	$1\frac{1}{4}$ " (1.25) Countersunk pipe plug.....	

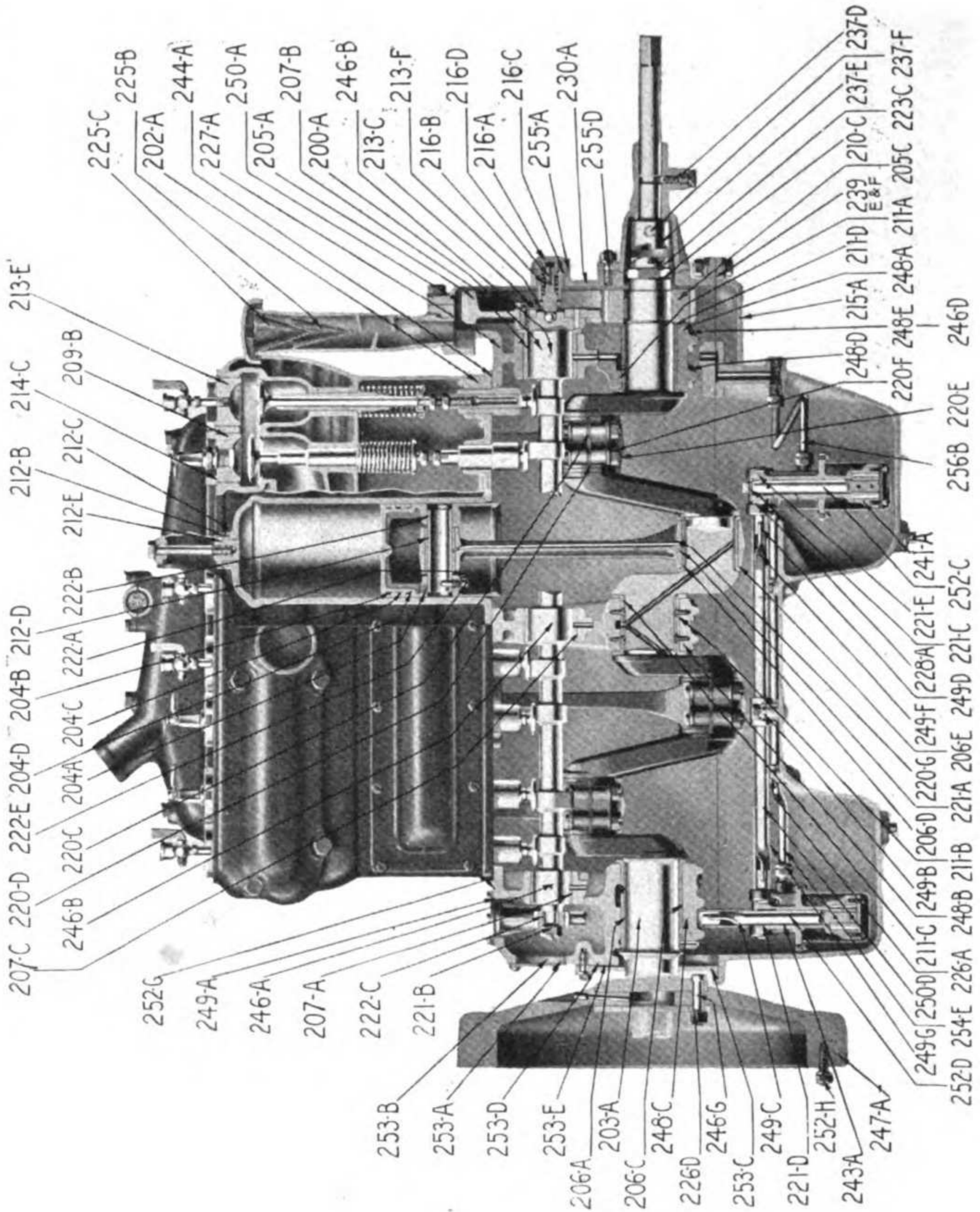
Plate No. 66



NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Control—Inside Starter</i>			
(See illustration on page 151)			
92A	1	Bushing, inside starter eccentric	Assembled with inside starter.
92C	1	Bushing, inside starter gear housing	Assembled with inside starter.
92D	1	Bushing, inside starter small gear	Assembled with inside starter.
91D	1	Crank shaft, inside starter	Assembled in gear housing of inside starter.
92F	1	Eccentric, inside starting crank	Assembled in gear housing of inside starter.
111A	1	Gear housing, inside starter	Bolted to front of transmission.
91C	1	Gear, large, inside starter	Assembled to inside starter gear shift.
91E	1	Gear, small, inside starter	Assembled in inside starter.
111E	1	Gear, shift, large inside starter	Assembled in lower part of inside starter.
111D	2	Handle, starting crank	Starting crank assembly.
111C	2	Pin, starting crank handle	Starting crank assembly.
91B	1	Roller chain, 32 long .5" pitch	Operates transmission and small starter gear.
92B	1	Screw, large gear shaft spring	Assembled in lower part of inside starter.
92E	1	Shaft, inside starter, small gear	Assembled in inside starter.
111F	1	Spring, large gear shift	Assembled in lower part of inside starter.
91A	1	Sprocket, inside starter, upper	Mounted on inside starter crank shaft.
111B	2	Starting crank lever	Is removable from shaft.
<i>Control—Inside Starter—Standard Parts</i>			
(See illustration on page 151)			
	1	$\frac{3}{8}$ " (.375)—16 U. S. S. x $2\frac{7}{8}$ " (2.875) hex. head bolt	
	1	$\frac{3}{8}$ " (.375)—16 U. S. S. semi-finished hex. nut	
	1	$\frac{3}{8}$ " (.375) Lock washer, S. A. E. heavy	
	1	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. heavy	
	1	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. light	
	4	$\frac{3}{32}$ " (.093) x $1\frac{3}{4}$ " (1.75) Cotter pin	
	1	$1\frac{5}{8}$ " No. 4 x $1\frac{5}{8}$ " (1.625) Taper pin	
	1	$\frac{1}{8}$ " (.187) x $\frac{5}{8}$ " (.625) Button head rivet	
	1	$\frac{3}{8}$ " (.375) Steel ball	
ENGINE GROUP			
<i>Engine—Cam Shaft</i>			
(See illustration on page 153)			
200A	1	Cam shaft	
207C	1	Cam shaft center bearing	
221B	1	Cam shaft end nut	
207B	1	Cam shaft front bearing	
246B	2	Cam shaft front and center bearing dowel pin	
213G	1	Cam shaft gear cap screw wire	
205A	1	Cam shaft gear	
213G	3	Cam shaft gear cap screw	
213F	1	Cam shaft gear locking plate	
207A	1	Cam shaft rear bearing	
246A	1	Cam shaft rear bearing dowel pin	
216D	1	Cam shaft thrust plunger	
216B	1	Cam shaft thrust spring	
216C	1	Cam shaft thrust spring housing	
216A	1	Cam shaft thrust spring nut	
255A	1	Cam shaft thrust spring nut washer	

Plate No. 67

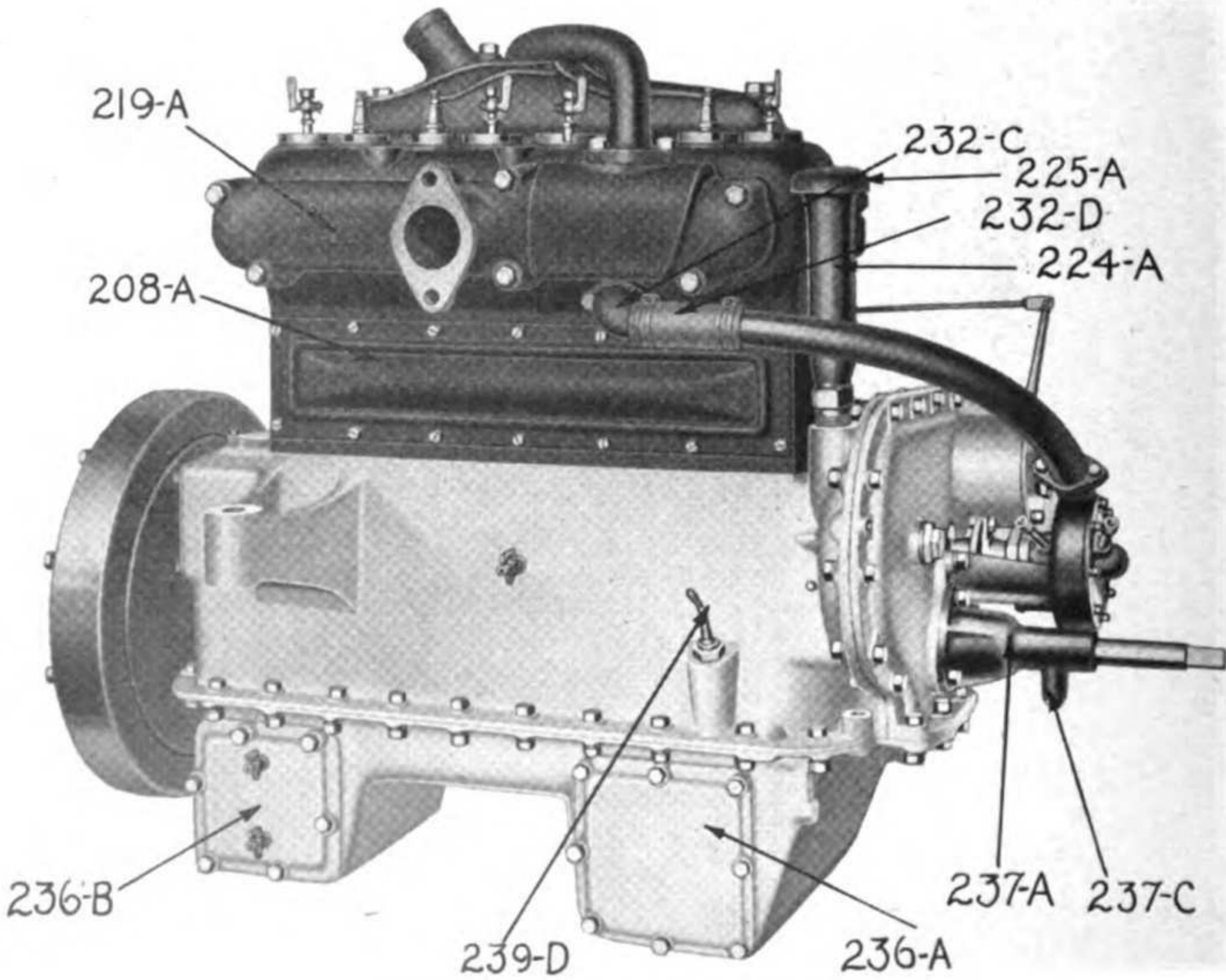


PARTIAL LONGITUDINAL SECTION THROUGH ENGINE

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Connecting Rod</i>			
(See illustration on page 153)			
340A	1	Carbureter hot air pipe.....	From carbureter to exhaust manifold. Secures hot air pipe to top of engine.
340C	1	Carbureter hot air pipe clip.....	
340D	1	Carbureter hot air pipe flange.....	
<i>Engine—Attachments for Carbureter</i>			
(See illustration on page 155)			
201A	4	Connecting rod.....	
212D	4	Connecting rod bushing, upper.....	
206D	4	Connecting rod bearing, upper half.....	
206E	4	Connecting rod bearing, lower half.....	
220E	16	Connecting rod bolt.....	
220F	16	Connecting rod bolt nut.....	
220D	8	Connecting rod laminated shim.....	
220G	4	Connecting rod oil tube.....	
220C	8	Connecting rod shim.....	
201B	8	Connecting rod wire.....	

Plate No. 68

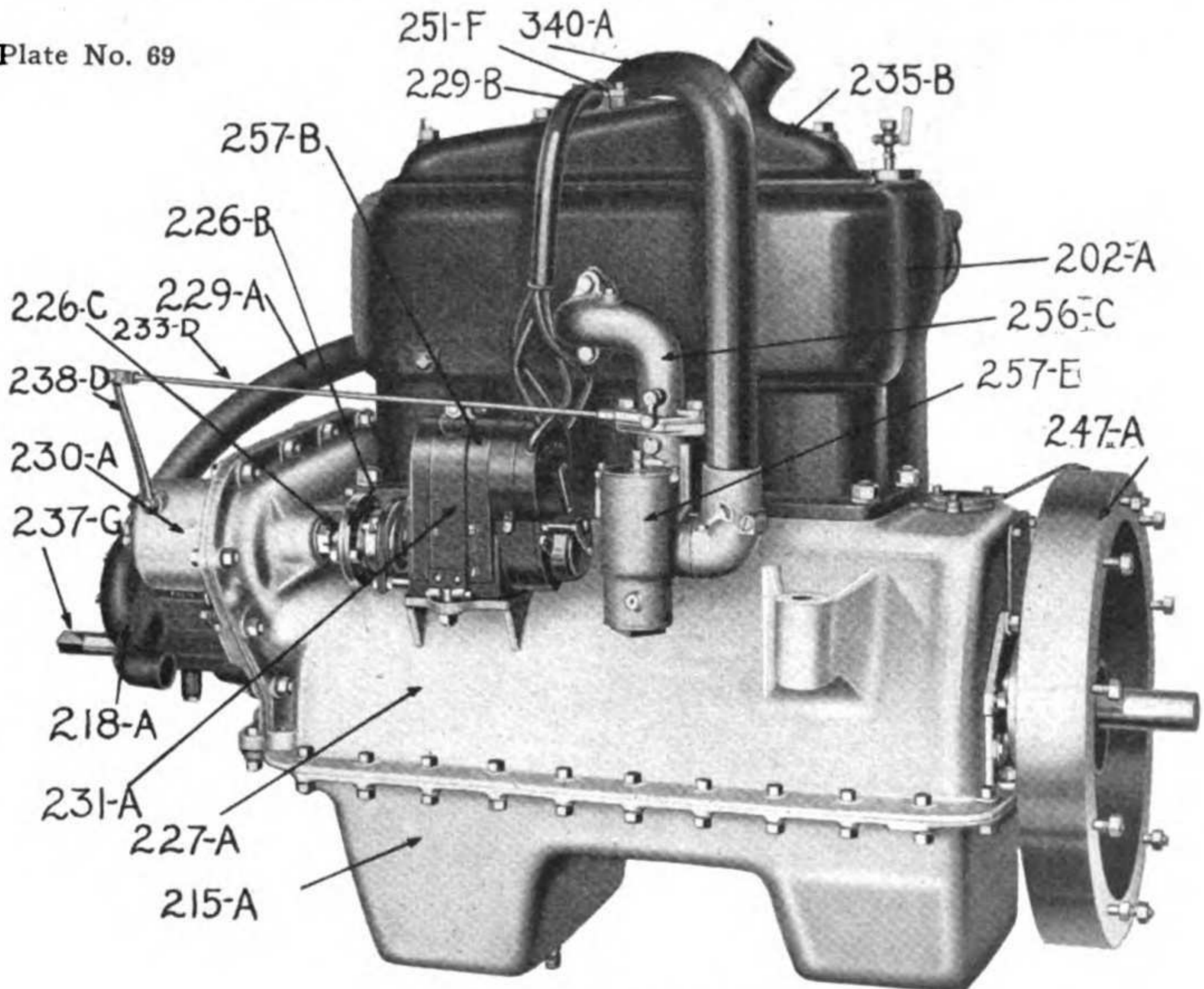


EXHAUST SIDE OF ENGINE

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Crank Case</i>			
236A	1	Crank case front cover.....	
231A	1	Crank case front cover gasket.....	
239E	1	Crank case gasket, L. H.....	
239F	1	Crank case gasket, R. H.....	
215A	1	Crank case, lower half.....	
246F	14	Crank case, lower half cover stud.....	
236B	1	Crank case rear cover.....	
231B	1	Crank case rear cover gasket.....	
253A	1	Crank case spiral gear cover plate.....	
253B	1	Crank case spiral gear cover plate gasket.....	
227A	1	Crank case, upper half.....	
246C	2	Crank case, upper half dowel pin.....	
253C	1	Crank case, upper half rear end plate, lower.....	
253D	1	Crank case upper half rear end plate gasket.....	
253E	1	Crank case upper half rear end plate, upper.....	
<i>Engine—Crank Shaft</i> (See illustration on page 158)			
203A	1	Crank shaft.....	
248B	8	Crank shaft bearing bolt.....	
248B	1	Crank shaft center bearing cap.....	
251B	2	Crank shaft center bearing laminated shim.....	
211B	1	Crank shaft center bearing, lower half.....	

Plate No. 69

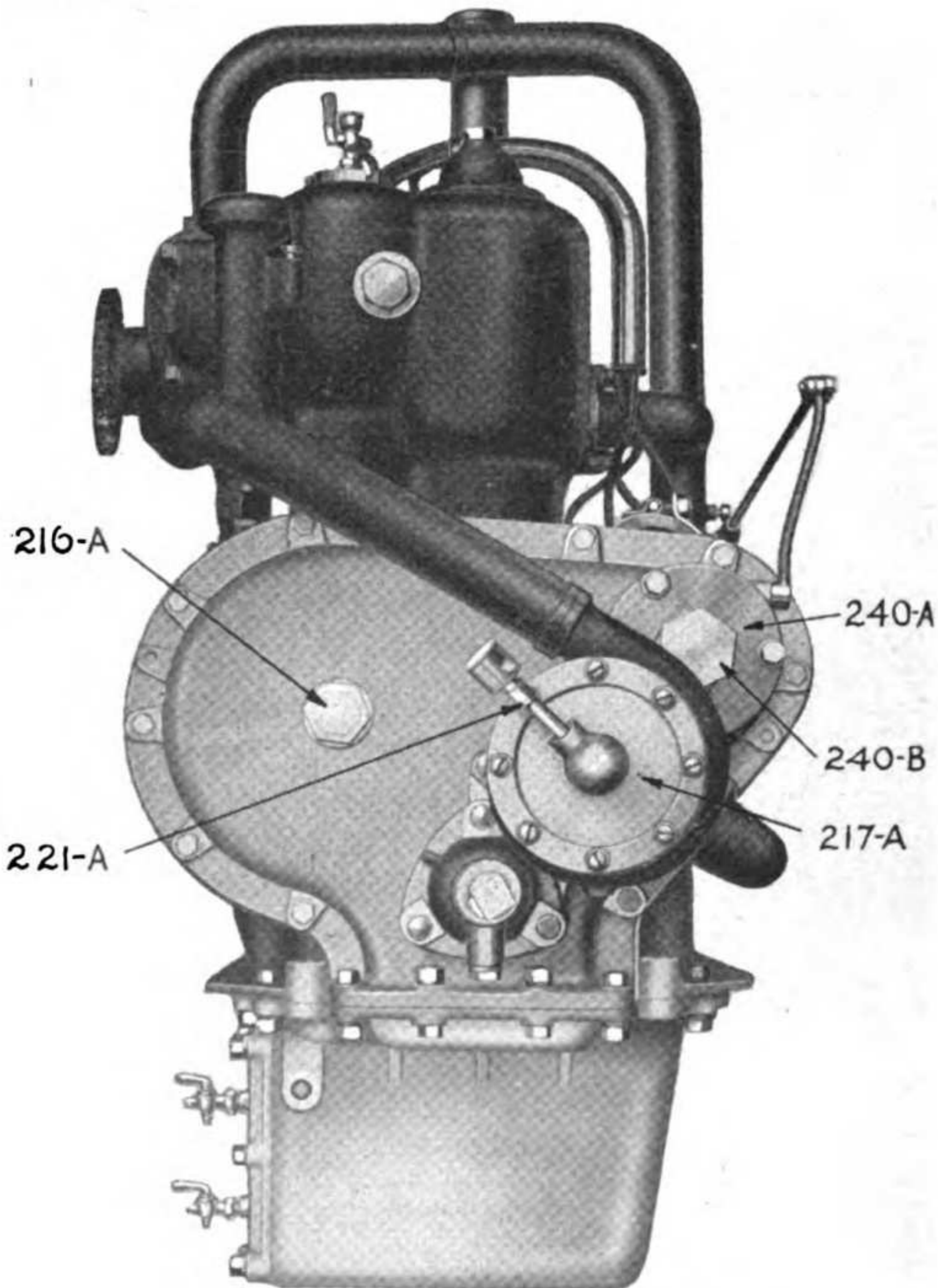


ENGINE INTAKE SIDE

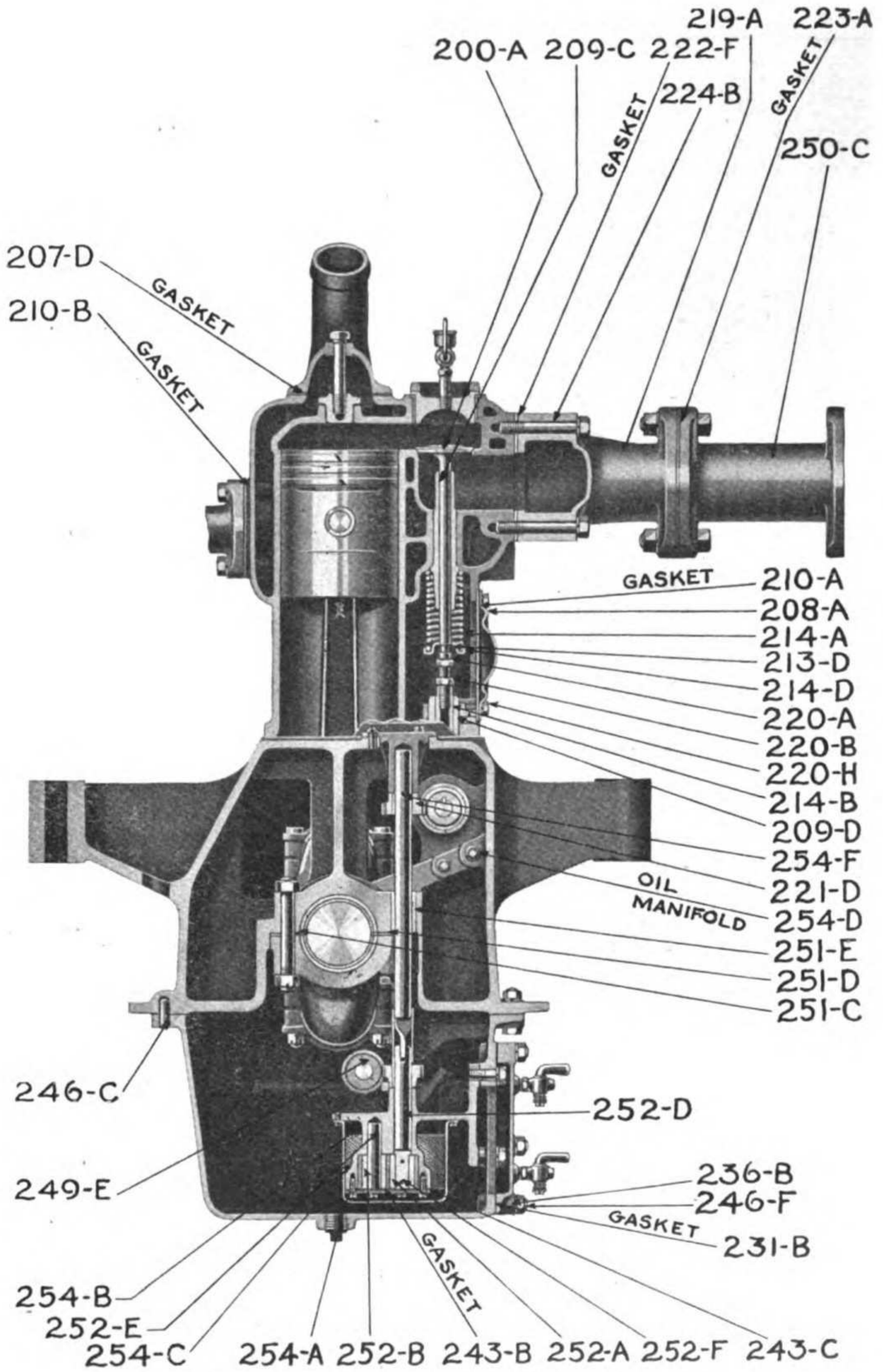
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Crank Shaft—Continued</i> (See illustration on page 158)			
248F	2	Crank shaft bearing bolt.....	
211C	1	Crank shaft center bearing, upper half.....	
248A	1	Crank shaft front bearing cap.....	
251A	2	Crank shaft front bearing laminated shim.....	
211D	1	Crank shaft front bearing, lower half.....	
248E	2	Crank shaft front bearing stud.....	
246D	2	Crank shaft front bearing stud dowel pin.....	
211A	1	Crank shaft front bearing, upper half.....	
205C	1	Crank shaft gear.....	
248C	1	Crank shaft rear bearing cap.....	
251C	1	Crank shaft rear bearing laminated shim, L. H..	
251D	1	Crank shaft rear bearing laminated shim, R. H..	
206C	1	Crank shaft rear bearing, lower half.....	
206A	1	Crank shaft rear bearing, upper half.....	
210C	2	Crank shaft shim.....	

Plate No. 70



TIMING GEAR END OF ENGINE

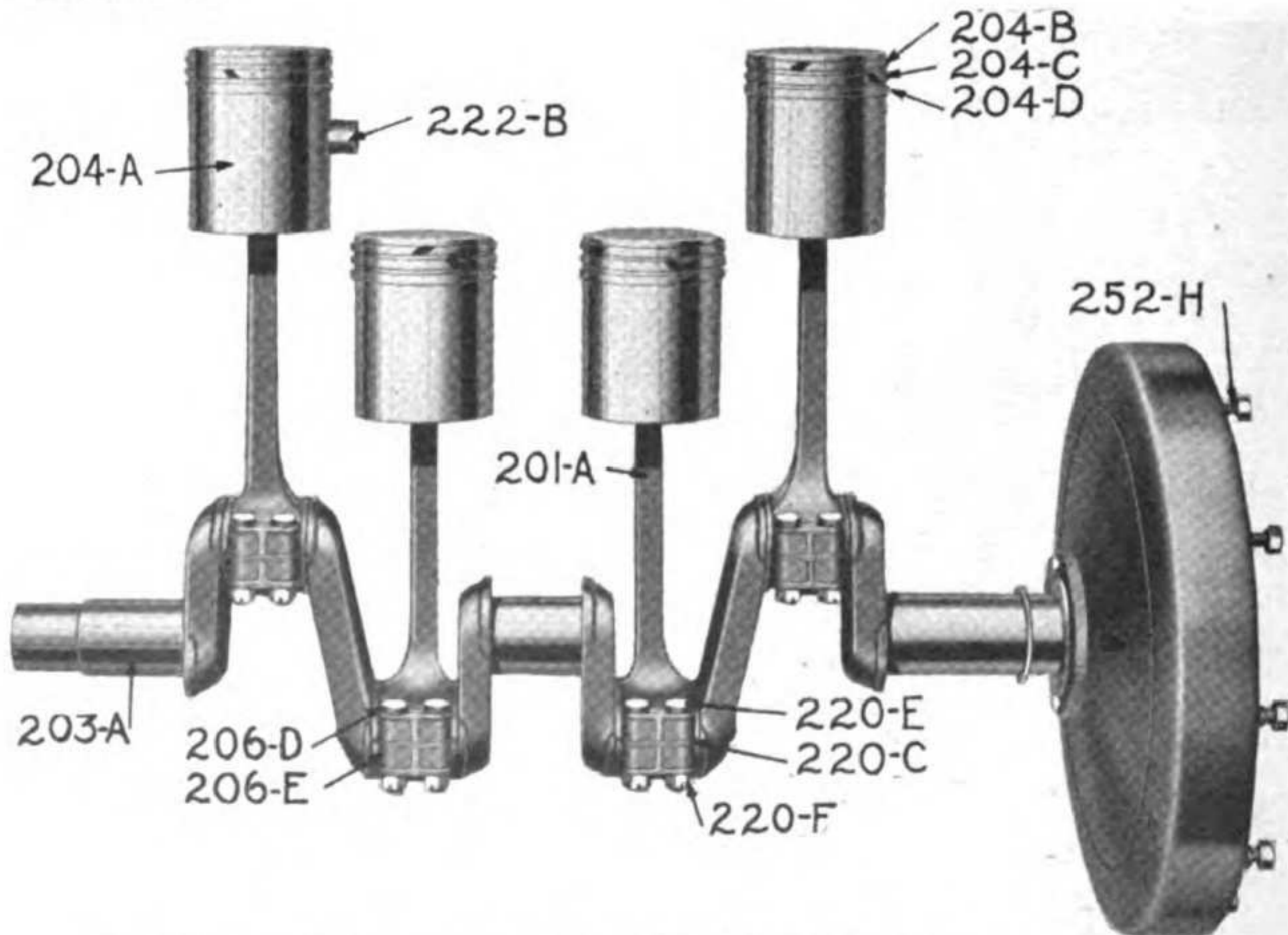


TRANSVERSE SECTION THROUGH ENGINE

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Cylinder</i>			
(See illustration on page 157)			
202A	1	Cylinder block.....	
212A	1	Cylinder fan bracket stud hole plug.....	
212E	4	Cylinder head plug.....	
212C	8	Cylinder head plug dowel.....	
212B	4	Cylinder head plug gasket, large.....	
213B	3	Cylinder stud, long.....	
213A	7	Cylinder stud, short.....	
244A	1	Cylinder to crank case gasket.....	
232C	1	Cylinder water inlet connection.....	
232D	1	Cylinder water inlet connection hose.....	
246E	2	Cylinder water inlet connection stud.....	
221C	2	Cylinder water pipe connection gasket.....	
<i>Engine—Exhaust System</i>			
(See illustration on page 157)			
219A	1	Exhaust manifold.....	Right side of engine.
224B	8	Exhaust manifold cap screw.....	Right side of engine.
250C	1	Exhaust manifold extension pipe.....	Right side of engine.
223A	4	Exhaust manifold extension pipe gasket.....	Right side of engine.
222F	4	Exhaust manifold gasket.....	Right side of engine.
250E	1	Exhaust manifold extension pipe flange.....	Right side of engine.
250F	1	Exhaust manifold extension pipe flange packing.....	Right side of engine.
<i>Engine—Fly Wheel</i>			
(See illustration on page 155)			
247A	1	Fly wheel.....	Mounted on rear of engine.
246G	6	Fly wheel bolt.....	Mounted on rear of engine.
226D	6	Fly wheel bolt nut.....	Mounted on rear of engine.
252H	10	Fly wheel clutch stud.....	Mounted on rear of engine.
340B	1	Fly wheel timing indicator.....	Top of crank case, rear end.

Plate No. 72

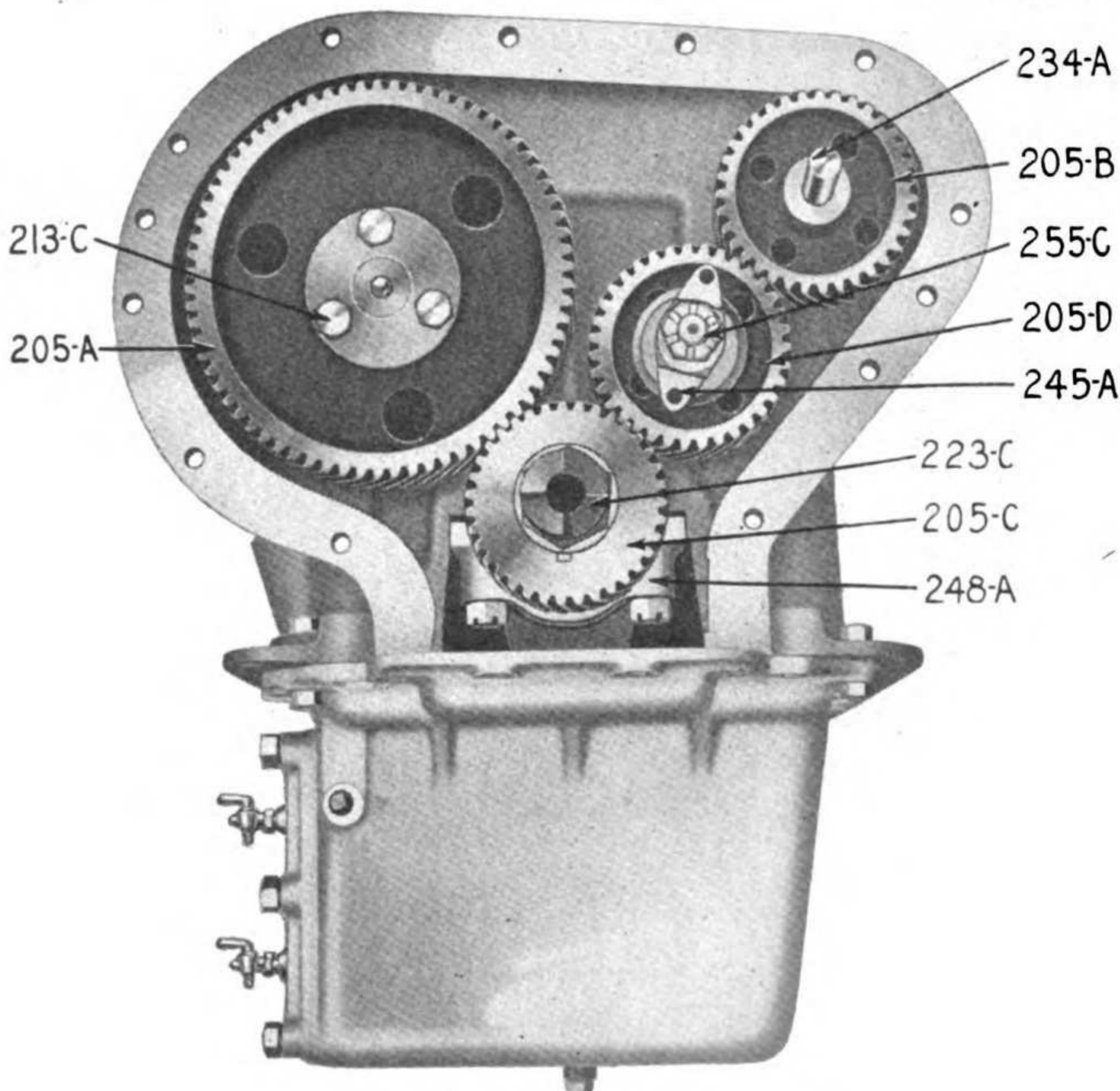


PISTON CONNECTING ROD AND CRANKSHAFT ASSEMBLY

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Magneto Shaft and Governor</i> (See illustration on page 81)			
234F	1	Governor and magneto oil retainer	Mounted on front of engine.
234A	1	Governor and magneto shaft	Mounted on front of engine.
234C	2	Governor and magneto shaft bushing	Mounted on front of engine.
234G	1	Governor and magneto shaft nut	Mounted on front of engine.
234E	4	Governor and magneto shaft shim	Mounted on front of engine.
233A	1	Governor butterfly valve	Mounted on front of engine.
233C	1	Governor butterfly valve lever	Mounted on front of engine.
233B	1	Governor butterfly valve shaft	Mounted on front of engine.
233D	1	Governor control rod	Mounted on front of engine.
233E	1	Governor control rod end	Mounted on front of engine.
233F	2	Governor control rod pin	Mounted on front of engine.
240A	1	Governor housing cover	Mounted on front of engine.
234D	1	Governor housing cover gasket	Mounted on front of engine.
238B	1	Governor lever—lower	Mounted on front of engine.
240F	1	Governor lever, shaft	Mounted on front of engine.
234B	1	Governor lever sleeve	Mounted on front of engine.
238D	1	Governor lever, upper	Mounted on front of engine.

Plate No. 73

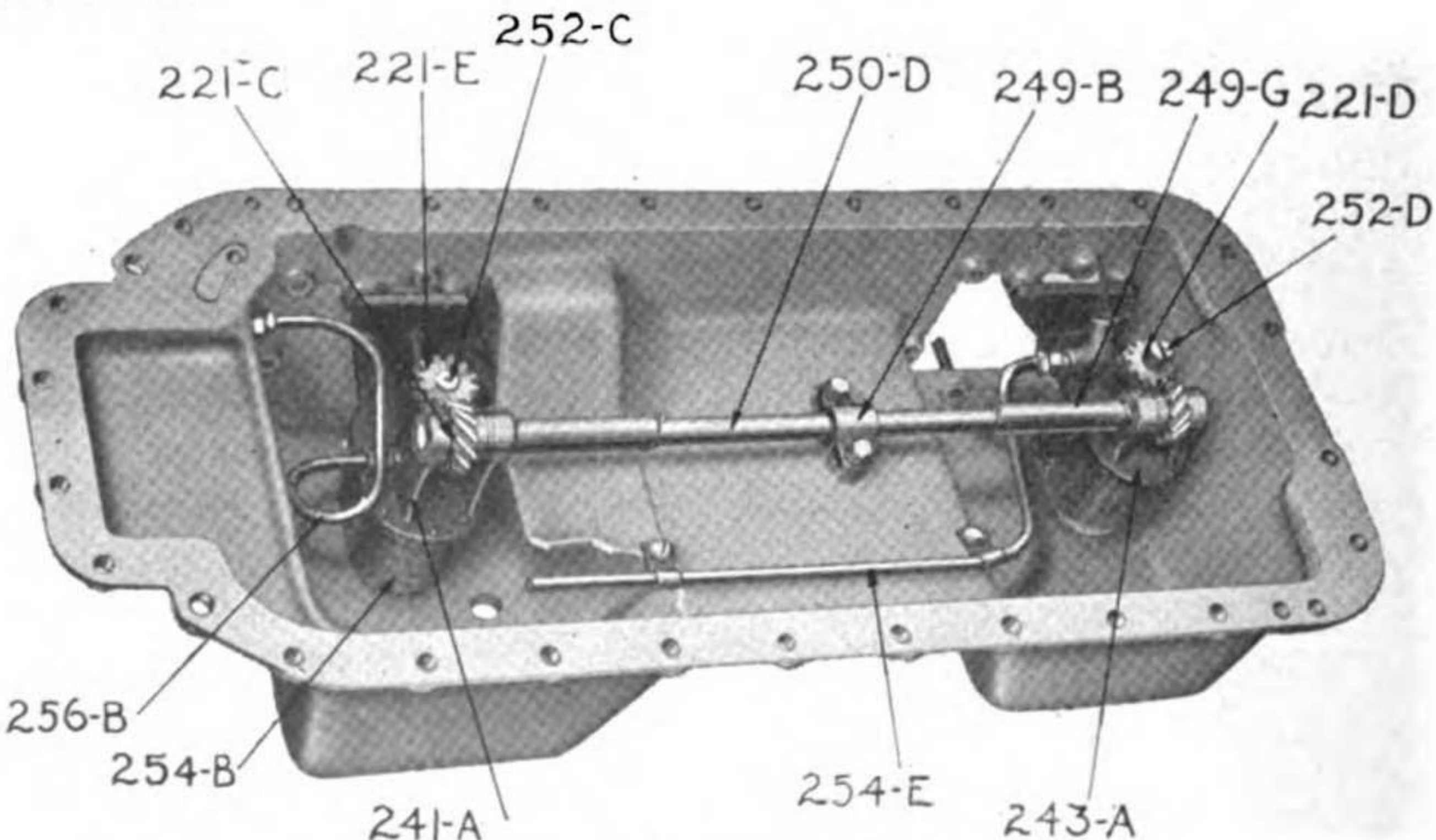


TIMING GEAR SET

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Magneto Shaft and Governor—Continued</i> (See illustration on page 81)			
238A	1	Governor spider	Mounted on front of engine.
240C	1	Governor spring	Mounted on front of engine.
240B	1	Governor spring adjusting plug	Mounted on front of engine.
240D	1	Governor spring adjusting plug lock nut	Mounted on front of engine.
238C	2	Governor weight	Mounted on front of engine.
240E	2	Governor weight pivot pin	Mounted on front of engine.
<i>Engine—Miscellaneous</i> (See illustration on page 157)			
210B	2	Gas intake pipe gasket	Mounted on front of engine.
256C	1	Gas intake manifold	Mounted on front of engine.
230A	1	Gear case cover	Front of engine.
246C	2	Gear case cover dowel	Mounted on front of engine.
250A	1	Gear case cover gasket	Mounted on front of engine.
255D	3	Gear case stud for water pump body	Mounted on front of engine.
255D	3	Gear case stud for starting crank	Mounted on front of engine.
229B	1	Ignition cable tube	Top of engine.
226C	1	Magneto coupling flange, front	Left side of engine.
226B	1	Magneto coupling flange, rear	Left side of engine.
231F	2	Magneto dowel	Left side of engine.
205B	1	Magneto shaft gear	Left side of engine.
231C	1	Magneto strap clamp	Left side of engine.
231D	3	Magneto strap clamp screw	Left side of engine.
232A	1	Magneto strap, long	Left side of engine.
231E	3	Magneto strap pin	Left side of engine.
232B	1	Magneto strap, short	Left side of engine.
<i>Engine—Oiling System</i> (See illustrations on pages 153, 160, 164)			
228C	1	Oil pressure regulating screw	Front end of engine in upper crank case.
228D	1	Oil pressure regulating screw adjusting washer No. 21 B. W. Ga. equals (.032)	Front end of engine in upper crank case.
228E	4	Oil pressure regulating screw adjusting washer No. 28 B. W. Ga. equals (.014)	Front end of engine in upper crank case.
228B	1	Oil pressure regulating valve seat	Front end of engine in upper crank case.

Plate No. 74

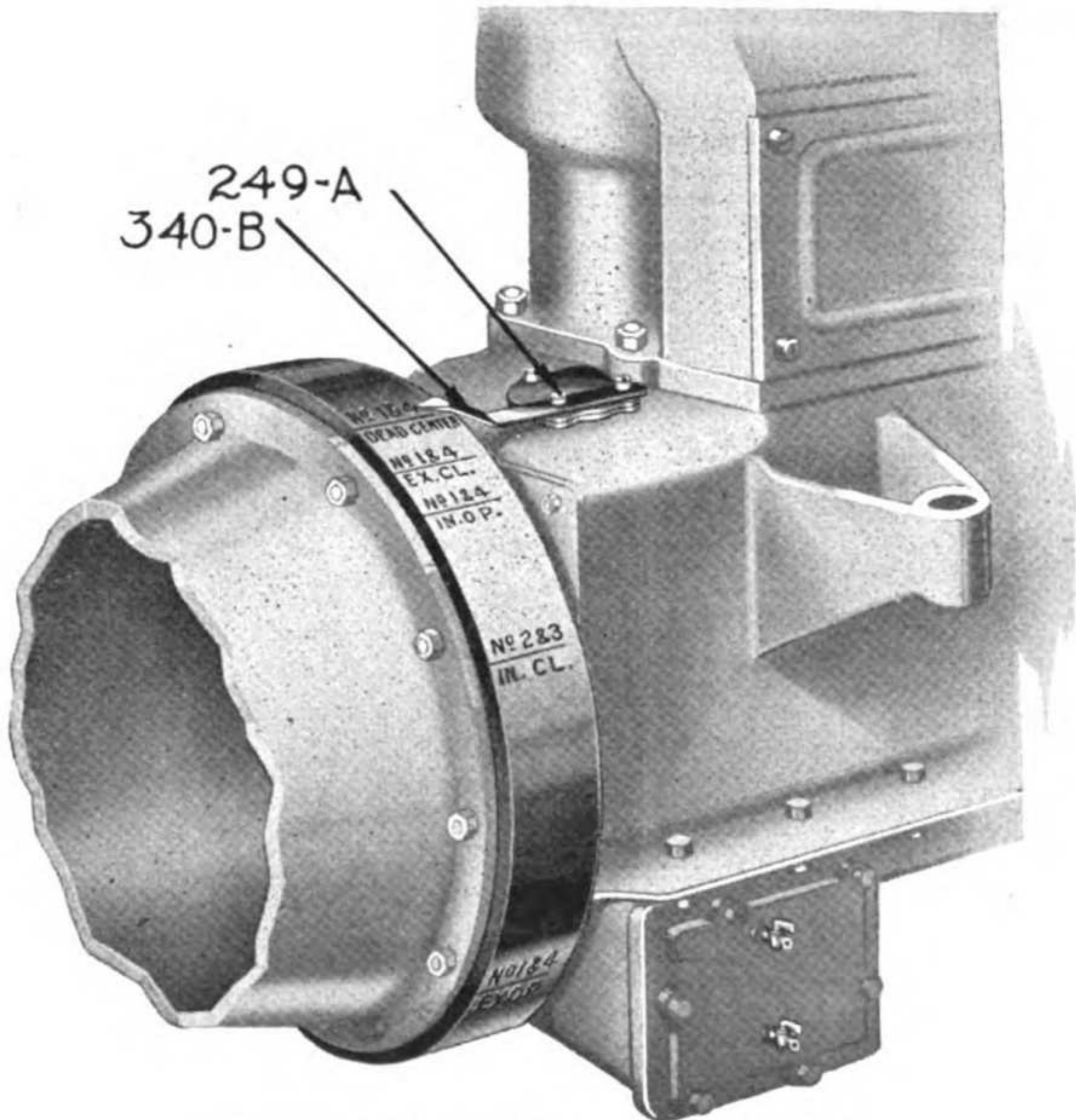


OIL PAN AND PUMPS

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Oiling System—Continued</i> (See illustration on page 153, 160, 164)			
228G	1	Oil pressure regulating valve spring	Front end of engine in upper crank case.
228F	1	Oil pressure regulating valve spring washer	Front end of engine in upper crank case.
256B	1	Oil pressure pump outlet pipe	Upper crank case.
254D	1	Oil distributing manifold	
254E	1	Oil priming pump and outlet tube	
249G	2	Oil pump connecting shaft coupling tube	
250D	1	Oil pump connecting shaft, long	
249B	1	Oil pump connecting shaft, long, bearing	
249D	2	Oil pump connecting shaft, short	
249E	2	Oil pump connecting shaft, short, drive key	
249F	3	Oil pump drive coupling	
249C	1	Oil pump drive shaft coupling tube	
249A	1	Oil pump drive shaft bearing	Oil pumps in bot. of lower crank case.
252G	1	Oil pump drive shaft bearing gasket	
228A	4	Oil pump drive shaft, short, bushing	
252F	4	Oil pump driver gear pin	
254F	1	Oil pump driving shaft	
252C	1	Oil pump driving shaft, long	
252D	1	Oil pump driving shaft, short	
251E	1	Oil pump driving shaft bushing	
252B	2	Oil pump gear, driven	

Plate No. 75

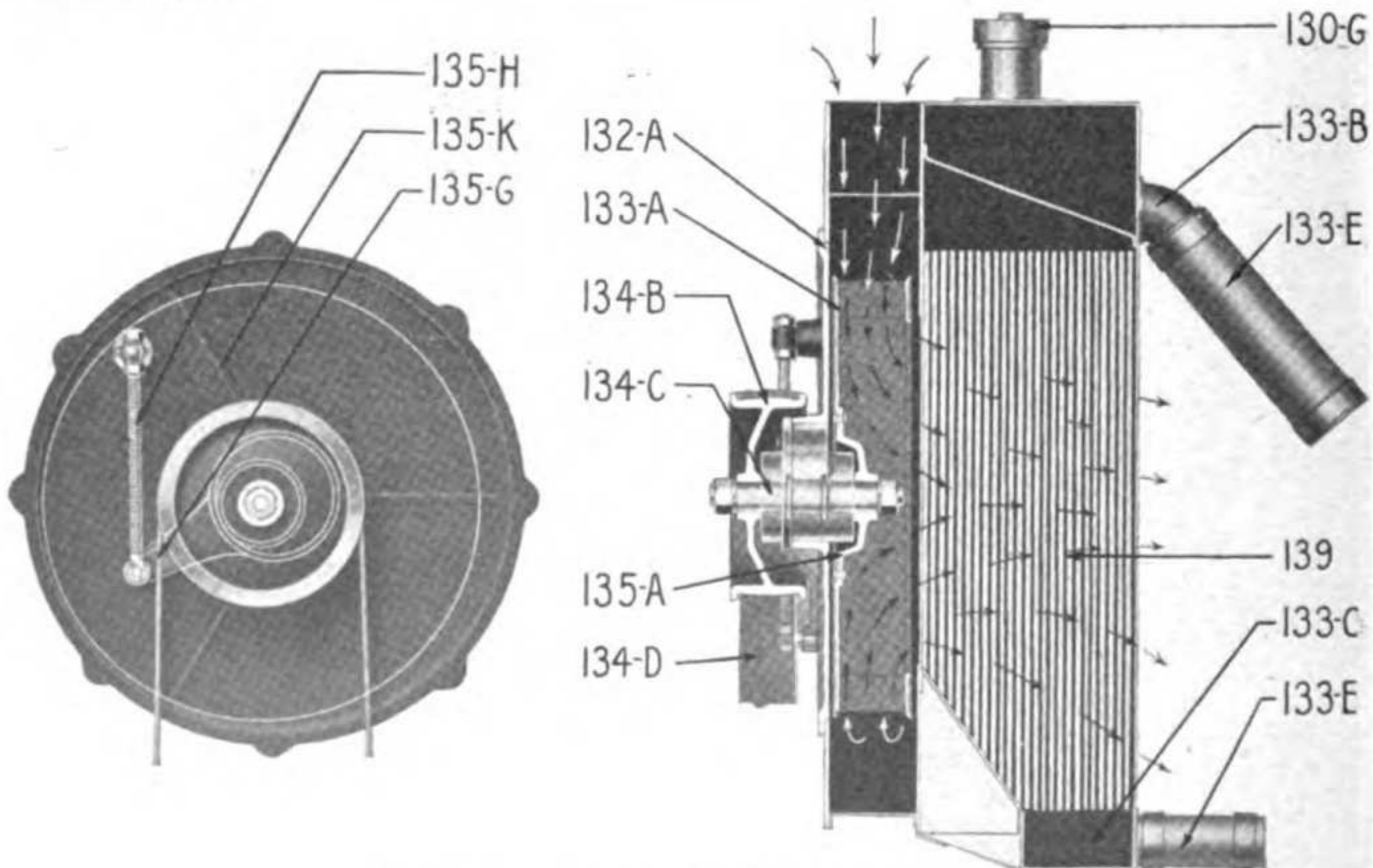


TIMING MARKINGS ON FLYWHEEL

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Oiling System—Continued</i> (See illustrations on pages 153, 160, 164)			
252E	2	Oil pump gear (driven) shaft.....	Oil pumps in bot. of lower crank case.
252A	2	Oil pump gear, driver.....	Oil pumps in bot. of lower crank case.
254A	2	Oil pump oil strainer bottom.....	Oil pumps in bot. of lower crank case.
254B	2	Oil pump oil strainer flange.....	Oil pumps in bot. of lower crank case.
254C	2	Oil pump oil strainer gauge.....	Oil pumps in bot. of lower crank case.
243B	2	Oil pump priming and pressure body gasket.....	Oil pumps in bot. of lower crank case.
243C	2	Oil pump priming and pressure body plate.....	Oil pumps in bot. of lower crank case.
243A	1	Oil pump (priming) body.....	Oil pumps in bot. of lower crank case.
226A	2	Oil pump priming tube clip.....	Oil pumps in bot. of lower crank case.
221E	2	Oil pump spiral gear driven (pressure).....	Oil pumps in bot. of lower crank case.
221D	3	Oil pump spiral gear driven (priming).....	Oil pumps in bot. of lower crank case.
222C	1	Oil pump spiral gear driver.....	Oil pumps in bot. of lower crank case.
241A	1	Oil pump pressure body.....	Right side of engine.
239A	1	Oil level gauge tube.....	Right side of engine.
239B	1	Oil level gauge tube nut.....	Right side of engine.
239C	1	Oil level gauge blade.....	Right side of engine.
239D	1	Oil level gauge blade handle.....	Right side of engine.
<i>Engine—Piston</i> (See illustration on page 158)			
204A	4	Piston.....	
222B	4	Piston pin.....	
222E	4	Piston pin set screw.....	
222A	4	Piston pin set screw locking washer.....	
204C	4	Piston ring, L. H.....	
204D	4	Piston ring, R. H.....	
204B	4	Piston ring top.....	
<i>Engine—Starting Crank</i> (See illustration on page 151)			
237A	1	Starting crank bracket.....	Front of engine.
237B	1	Starting crank bracket gasket.....	Front of engine.
237D	1	Starting crank bracket spring.....	Front of engine.
237C	1	Starting crank bracket spring retaining screw.....	Front of engine.

Plate No. 76

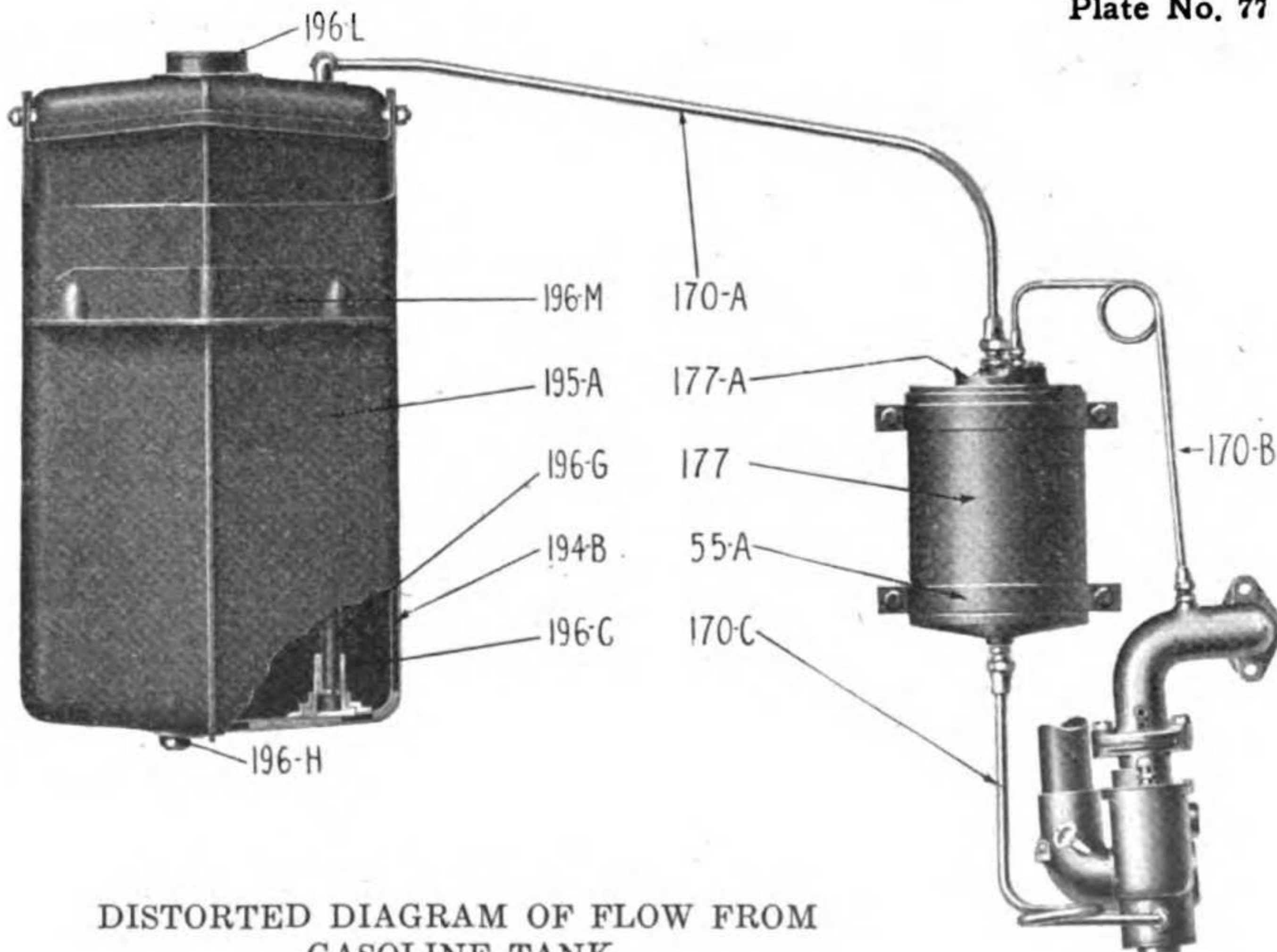


RADIATOR AND COOLING SYSTEM

NOMENCLATURE OF PARTS—Continued.

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11.	
		Name of Part.	Location.
<i>Engine—Starting Crank—Continued</i> (See illustration on page 151)			
237E	1	Starting crank clutch	Front of engine.
237F	1	Starting crank clutch pin	Front of engine.
223C	1	Starting crank jaw, female	Front of engine.
237G	1	Starting crank shaft	Front of engine.
<i>Engine—Valve System.</i> (See illustration on page 157)			
209B	4	Valve chamber plug	
213E	4	Valve chamber plug	
214C	8	Valve chamber plug gasket	
206B	1	Valve chamber plug wrench	
208A	1	Valve enclosure cover	
220H	14	Valve enclosure cover cap screw	
210A	1	Valve enclosure cover gasket	
209A	8	Valve inlet and exhaust	
214B	8	Valve push rod	
220A	8	Valve push rod adjusting screw	
220B	8	Valve push rod adjusting screw nut	
209D	8	Valve push rod guide bushing	
214A	8	Valve spring	
214D	8	Valve spring cup	
213D	8	Valve spring cup retainer	
209C	8	Valve stem guide	
224A	1	Vent tube	Upper right hand side of engine.
225A	1	Vent tube cap	Upper right hand side of engine.
225E	1	Vent tube cap hinge pin	Upper right hand side of engine.
225B	1	Vent tube lower screen	Upper right hand side of engine.
224C	1	Vent tube plunger	Upper right hand side of engine.
225D	1	Vent tube plunger spring	Upper right hand side of engine.
225C	1	Vent tube upper screen	Upper right hand side of engine.

Plate No. 77

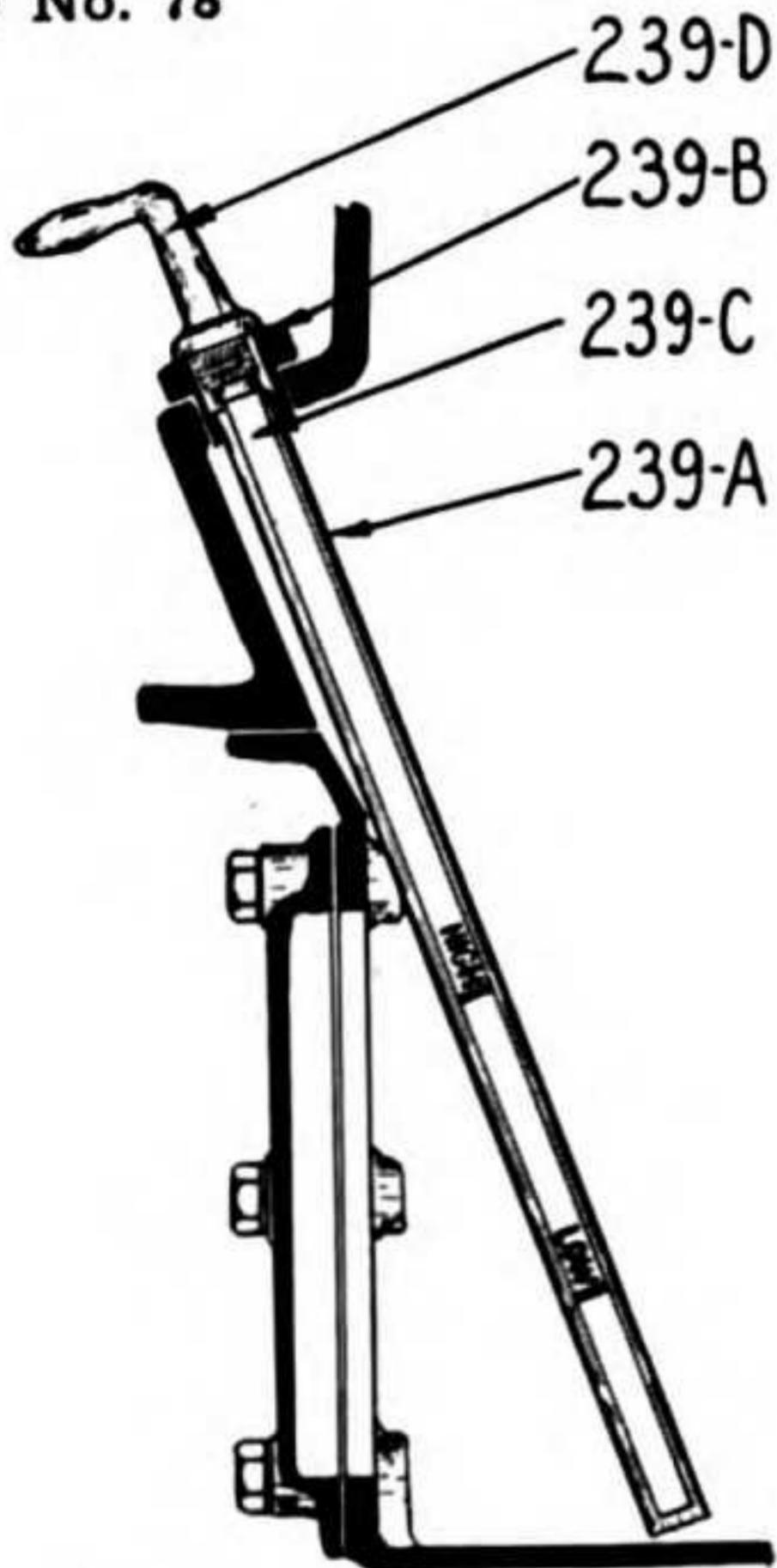


DISTORTED DIAGRAM OF FLOW FROM GASOLINE TANK

NOMENCLATURE OF PARTS—Continued

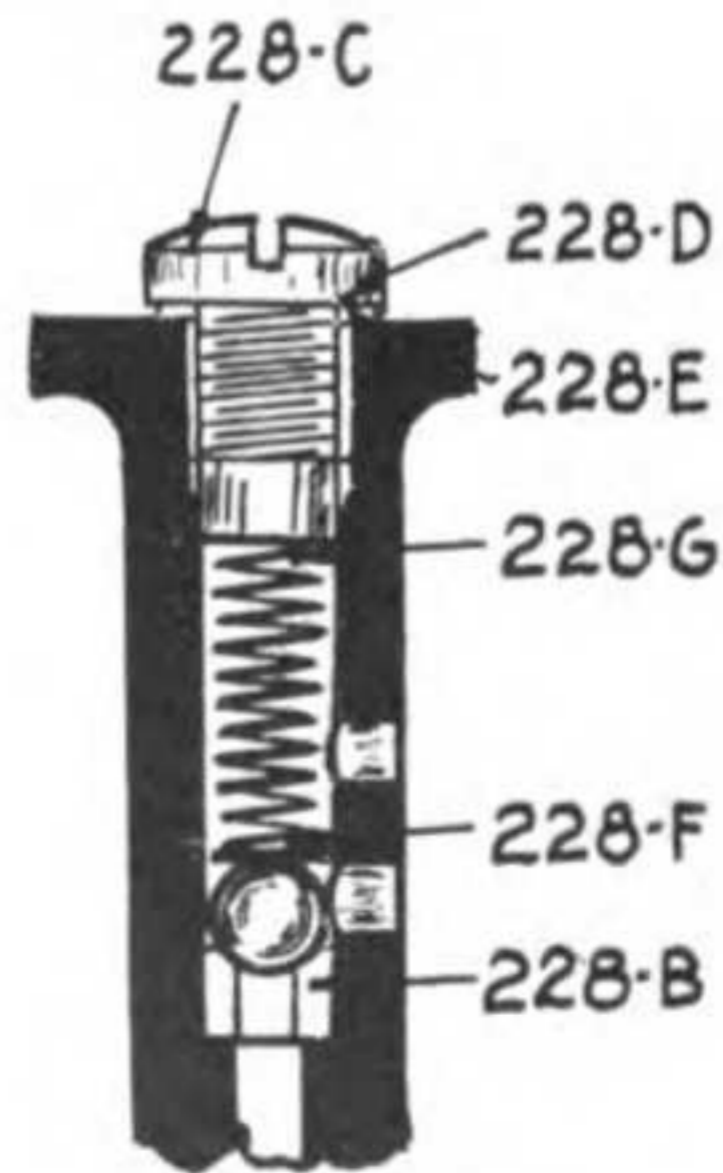
Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Water System</i> (See illustrations on pages 162, 165)			
235A	1	Water jacket cover.....	Top of engine.
251F	1	Water jacket cover cap for ignition tube.....	
222D	4	Water jacket cover cap screw gasket.....	
244D	1	Water jacket cover cap screw, long.....	
244B	1	Water jacket cover cap screw, medium.....	
244C	2	Water jacket cover cap screw, short.....	
251H	2	Water jacket cover cap shim for ignition tube.....	
207D	1	Water jacket cover gasket.....	
218A	1	Water pump body.....	Pump mounted on front of engine.
242D	1	Water pump body shaft bearing pin.....	Pump mounted on front of engine.
256A	1	Water pump connection to radiator.....	Pump mounted on front of engine.
245B	1	Water pump coupling disc.....	Pump mounted on front of engine.
217A	1	Water pump cover.....	Pump mounted on front of engine.
217C	1	Water pump cover gasket.....	Pump mounted on front of engine.
242E	1	Water pump cover shaft bearing pin.....	Pump mounted on front of engine.
246A	2	Water pump dowel pin.....	Pump mounted on front of engine.
245C	1	Water pump drive shaft.....	Pump mounted on front of engine.
250B	1	Water pump drive shaft bushing.....	Pump mounted on front of engine.
221F	1	Water pump gland.....	Pump mounted on front of engine.
245A	2	Water pump gear shaft coupling flange.....	Pump mounted on front of engine.
242A	1	Water pump gear shaft oil thrower.....	Pump mounted on front of engine.
242B	1	Water pump gear shaft spacing collar.....	Pump mounted on front of engine.
242C	1	Water pump gear shaft thrust washer.....	Pump mounted on front of engine.
221A	2	Water pump grease cup extension.....	Pump mounted on front of engine.
217B	1	Water pump impeller.....	Pump mounted on front of engine.
229A	1	Water pump outlet pipe.....	Pump mounted on front of engine.
221G	1	Water pump packing.....	Pump mounted on front of engine.
245D	1	Water pump shaft.....	Pump mounted on front of engine.
217D	1	Water pump shaft bearing (cover).....	Pump mounted on front of engine.
223D	1	Water pump shaft front packing nut.....	Pump mounted on front of engine.
205D	1	Water pump shaft gear.....	Pump mounted on front of engine.
255B	1	Water pump body shaft bushing.....	Pump mounted on front of engine.
255C	1	Water pump gear shaft nut.....	Pump mounted on front of engine.
256D	1	Water pump body inlet connection hose.....	Pump mounted on front of engine.

Plate No. 78



OIL LEVEL GAUGE

Plate No. 79

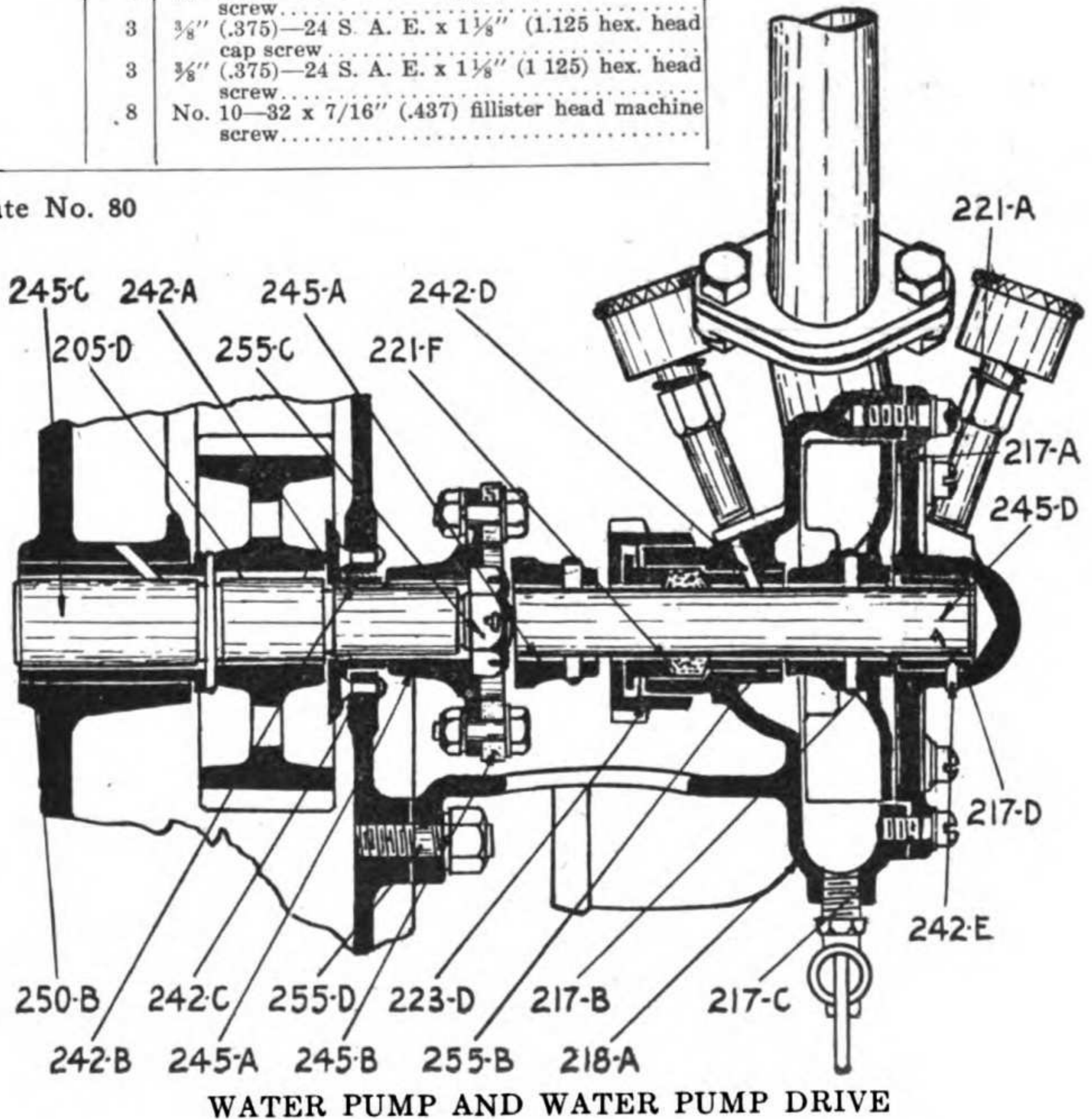


OIL RELIEF

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Standard Parts</i>			
1		Thrust bearing equivalent to 1103 F Hess Bright	
21		$\frac{3}{8}$ " (.375)—24 S. A. E. x 1.437" hex. head bolt	
1		$\frac{3}{8}$ " (.375)—24 S. A. E. x 1.875" hex. head bolt..	
4		$\frac{1}{4}$ " (.25)—20 U. S. S. x .75" hex. head bolt.....	
2		$\frac{5}{16}$ " (.312)—18 U. S. S. x $\frac{11}{16}$ " (.812) hex. head bolt.	
2		$\frac{5}{16}$ " (.312)—18 U. S. S. x $1\frac{1}{8}$ " (1.125) hex. head bolt.....	
2		$\frac{3}{8}$ " (.375)—16 U. S. S. x 1.437" ($1\frac{1}{16}$) hex. head bolt.....	
15		$\frac{3}{8}$ " (.375)—16 U. S. S. x $1\frac{1}{8}$ " (1.125) hex. head bolt	
2		$\frac{1}{2}$ " (.5)—13 U. S. S. x 2." hex head bolt.....	
2		$\frac{1}{4}$ " (.25)—20 U. S. S. x $\frac{3}{4}$ " (.75) hex. head cap screw.....	
2		$\frac{5}{16}$ " (.312)—18 U. S. S. x $\frac{3}{4}$ " (.75) hex. head cap screw.....	
3		$\frac{5}{16}$ " (.312)—18 U. S. S. x $\frac{7}{8}$ " (.875) hex. head cap screw.....	
2		$\frac{3}{8}$ " (.375)—16 U. S. S. x $\frac{3}{4}$ " (.75) hex. head cap screw.....	
2		$\frac{3}{8}$ " (.375)—16 U. S. S. x $\frac{7}{8}$ " (.875) hex. head cap screw.....	
3		$\frac{3}{8}$ " (.375)—16 U. S. S. x $\frac{7}{8}$ " (.875) hex. head cap screw.....	
4		$\frac{3}{8}$ " (.375)—16 U. S. S. x $1\frac{1}{2}$ " (1.5) hex. head cap screw.....	
3		$\frac{3}{8}$ " (.375)—24 S. A. E. x $1\frac{1}{8}$ " (1.125) hex. head cap screw.....	
3		$\frac{3}{8}$ " (.375)—24 S. A. E. x $1\frac{1}{8}$ " (1.125) hex. head screw.....	
8		No. 10—32 x $\frac{7}{16}$ " (.437) fillister head machine screw.....	

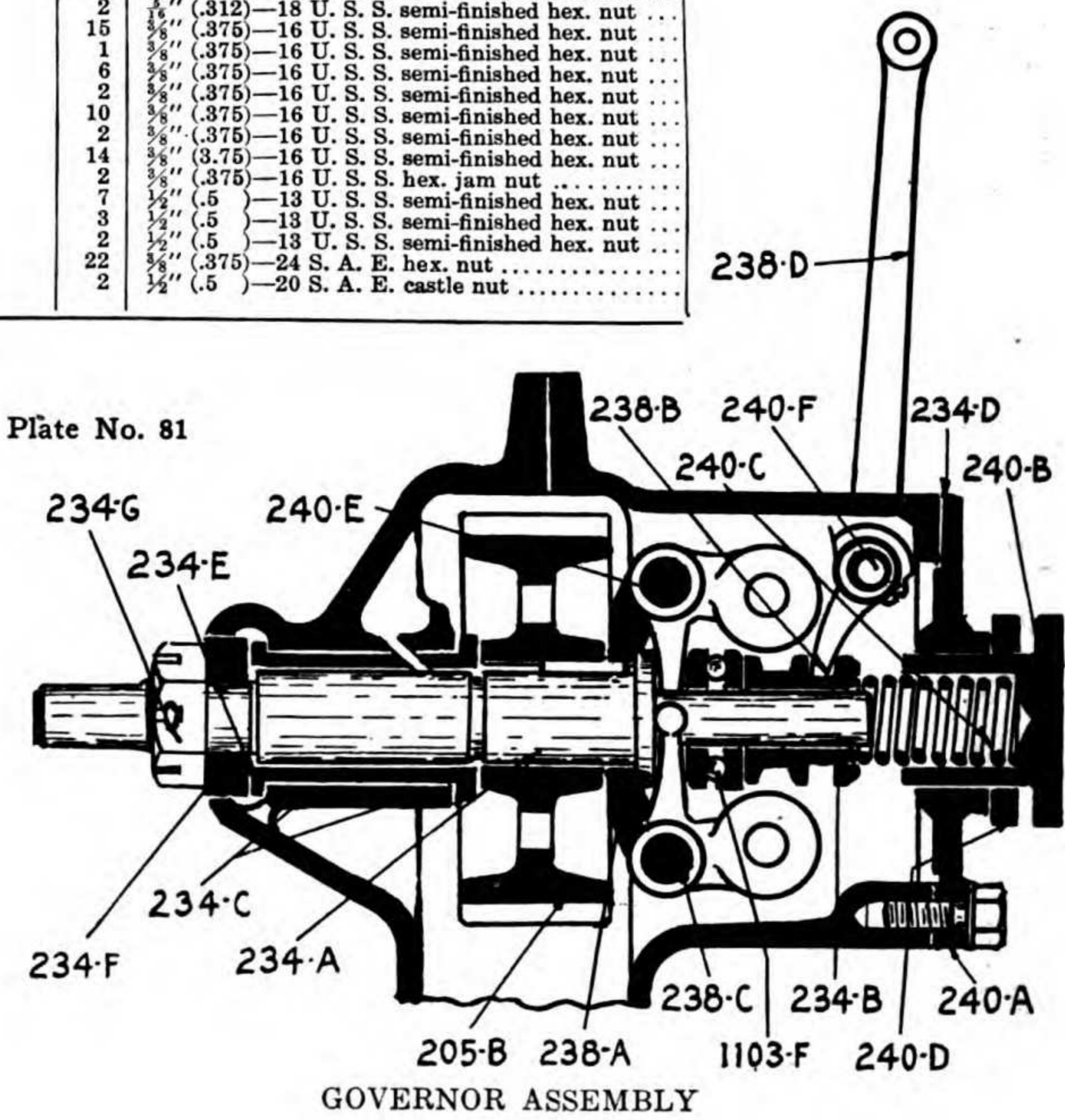
Plate No. 80



WATER PUMP AND WATER PUMP DRIVE

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Standard Parts—Continued</i>			
12		No. 10—32 x 9/16" (.562) fillister head machine screw.....	
8		1/4" (.25)—20 U. S. S. x 3/4" (.75) fillister head machine screw.....	
2		No. 5—40 x 1/4" (.25) thin button head machine screw.....	
1		No. 5—40 x 3/8" (.375) button head machine screw.....	
1		No. 10—24 x 7/16" (.437) button head machine screw.....	
4		1/4" (.25)—20 x 5/8" (.625) button head machine screw.....	
3		1/4" (.25)—20 x 5/8" (.625) button head machine screw.....	
2		1/8" (.312)—18 x 5/8" (.625) button head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		No. 10—24 x 1/2" (.5) flat head machine screw.....	
32		No. 10—24 x 1/2" (.5) flat head machine screw.....	
4		1/4" (.25)—20 U. S. S. semi-finished hex. nut ..	
2		1/8" (.312)—18 U. S. S. semi-finished hex. nut ..	
2		1/8" (.312)—18 U. S. S. semi-finished hex. nut ..	
15		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
1		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
6		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
10		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
2		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
14		3/8" (.375)—16 U. S. S. semi-finished hex. nut ..	
2		3/8" (.375)—16 U. S. S. hex. jam nut ..	
7		1/2" (.5) —13 U. S. S. semi-finished hex. nut ..	
3		1/2" (.5) —13 U. S. S. semi-finished hex. nut ..	
2		1/2" (.5) —13 U. S. S. semi-finished hex. nut ..	
22		3/8" (.375)—24 S. A. E. hex. nut ..	
2		1/2" (.5) —20 S. A. E. castle nut ..	



NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Standard Parts—Continued</i>			
8	1/2"	(.5)—20 S. A. E. castle nut	
2	1/2"	(.5)—20 S. A. E. castle nut	
12	1/8"	(.187) Lock washer, light.....	
8	1/8"	(.187) Lock washer, light.....	
14	1/4"	(.25) Lock washer, light.....	
8	1/4"	(.25) Lock washer, light.....	
1	1/4"	(.25) Lock washer, light.....	
4	1/4"	(.25) Lock washer, light.....	
3	1/4"	(.25) Lock washer, light.....	
2	1/4"	(.25) Lock washer, light.....	
4	1/4"	(.25) Lock washer, light.....	
2	5/8"	(.312) Lock washer, S. A. E., light.....	
2	5/8"	(.312) Lock washer, S. A. E., light.....	
2	5/8"	(.312) Lock washer, S. A. E., light.....	
3	5/8"	(.312) Lock washer, S. A. E., light.....	
2	5/8"	(.312) Lock washer, S. A. E., light.....	
22	3/8"	(.375) Lock washer, S. A. E., light.....	
2	3/8"	(.375) Lock washer, S. A. E., light.....	
15	3/8"	(.375) Lock washer, S. A. E., light.....	
1	3/8"	(.375) Lock washer, S. A. E., light.....	
3	3/8"	(.375) Lock washer, S. A. E., light.....	
3	3/8"	(.375) Lock washer, S. A. E., light.....	
2	3/8"	(.375) Lock washer, S. A. E., light.....	
14	3/8"	(.375) Lock washer, S. A. E., light.....	
3	3/8"	(.375) Lock washer, S. A. E., light.....	
4	3/8"	(.375) Lock washer, S. A. E., light.....	
6	3/8"	(.375) Lock washer, S. A. E., light.....	
4	3/8"	(.375) Lock washer, S. A. E., light.....	
1	1/2"	(.5) Lock washer, S. A. E., light.....	
10	3/8"	(.375) Lock washer, S. A. E., heavy.....	
8	1/8"	(.437) Lock washer, S. A. E., heavy.....	
3	1/2"	(.5) Lock washer, S. A. E., heavy.....	
7	1/2"	(.5) Lock washer, S. A. E., heavy.....	
2	1/2"	(.5) Lock washer, S. A. E., heavy.....	
4	1/4"	(.25) Plain washer 1/8" (.062) thick.....	
1	3/8"	(.375) Plain washer, 1/8" (.062) thick.....	
2	1/8"	(.062 x 1/2" (.5) Cotter pin.....	
3	1/8"	(.062 x 1/4" (.687) Cotter pin.....	
1	1/8"	(.062 x 3/4" (.75) Cotter pin.....	
2	3/32"	(.093 x 7/8" (.875) Cotter pin.....	
1	3/32"	(.093 x 1" (1.) Cotter pin.....	
16	3/32"	(.093 x 1" (1.) Cotter pin.....	
6	3/32"	(.093 x 1" (1.) Cotter pin.....	
2	3/32"	(.093 x 1 1/4" (1.25) Cotter pin.....	
8	3/32"	(.093 x 1 1/4" (1.25) Cotter pin.....	
1	3/32"	(.093 x 1 3/8" (1.375) Cotter pin.....	
1	3/32"	(.093 x 1 5/8" (1.625) Cotter pin.....	
2	3/32"	(.093 x 1 1/4" (1.25) Cotter pin.....	
1		No. 1 x 5/8" (.625) Taper pin.....	
2		No. 2 x 1" (1.) Taper pin.....	
3		No. 2 x 1" (1.) Taper pin.....	
1		No. 2 x 1 1/8" (1.125) Taper pin.....	
1		No. 2 x 1 1/2" (1.5) Taper pin.....	
1		No. 3 x 1" (1.) Taper pin.....	
1		No. 3 x 1" (1.) Taper pin.....	
1		No. 6 x 3/4" (.75) Taper pin.....	
5	1/8"	(.125) Pipe plug.....	
1	1/4"	(.25) Pipe plug.....	
1	1/4"	(.25) Pipe plug.....	
2	1/4"	(.25) Pipe plug.....	
2	1/2"	(.5) Pipe plug.....	
1	1/8"	(.125) Pipe thread No. 159 Lunkenheimer drain cock.....	
4	1/8"	(.125) Pipe thread No. 0-361 brass priming cup.....	
2	1/8"	(.125) Pipe thread No. 159 Lunkenheimer drain cock.....	
1	1/8"	(.125) Pipe thread No. 159 Lunkenheimer drain cock.....	
2	1/8"	(.125) Pipe thread No. 00 Bowen grease cup with C. K. valve.....	
1	1/4"	(.25) Dole pipe connecting A-3, body and screw	
2	1/4"	(.25) Dole pipe connecting A-3, body and screw	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Engine—Standard Parts—Continued</i>			
	1	No. 3 Woodruff key	
	1	No. 5 Woodruff key	
	1	No. 5 Woodruff key	
	1	No. 5 Woodruff key	
	1	No. 5 Woodruff key	
	1	No. 5 Woodruff key	
	2	No. 9 Woodruff key	
	2	No. 9 Woodruff key	
	1	No. 11 Woodruff key	
	4	$\frac{1}{8}$ " (.125) Steel ball	
	1	$\frac{3}{8}$ " (.375) Steel ball	
	1	$\frac{1}{2}$ " (.5) Steel ball	
	2	Sherman hose clamp galvanized steel for 1.25 I. D. hot water 3 ply hose	
	3	$\frac{1}{8}$ " (.125) x $\frac{5}{16}$ " (.312) flat head rivets	
	2	$\frac{1}{8}$ " (.125) x $\frac{9}{16}$ " (.562) flat head rivets	
	1	$\frac{1}{2}$ " (.5) Hubbard plug	
	1	$\frac{1}{2}$ " (.5) Hubbard plug	
	3	$\frac{3}{8}$ " (.375) Hubbard plug	
	5	$1\frac{1}{2}$ " (1.25) Hubbard plug	
	2	No. 1A. Winkley oil hole cover	
	1	Hose clamp to fit $1\frac{1}{2}$ " (1.5) 1 D 3-ply hot water hose	
	4	$\frac{7}{8}$ " (.875)—16 Spark plug	
CARBURETER			
257E	1	Carbureter	Mounted on left side of engine.
MAGNETO			
257B	1	Magneto	Mounted on left side of engine.
257D	2	Magneto high tension cable, long	Mounted on left side of engine.
257C	2	Magneto high tension cable, short	Mounted on left side of engine.
257A	1	Magneto impulse starter	Mounted on left side of engine.
EQUIPMENT AND ACCESSORIES			
<i>Equipment—Oil and Kerosene Cans</i>			
168B	2	Cap, kerosene can filler	Part of kerosene can.
168E	2	Chain, cap retaining	Part of kerosene can.
168C	2	Filler, kerosene can	Part of kerosene can.
168A	1	Kerosene can	Strapped to upper left side of body at rear.
169C	1	Oil can	Strapped to upper left side of body at rear.
168D	2	Washer, filler cap	Part of can.
<i>Equipment—Driver's Seat</i>			
175A		Driver's seat bottom	Front end of body.
175F	1	Driver's seat support	Front end of body.
174A	1	Driver's seat cushion	Front end of body.
	1		
<i>Equipment—Driver's Seat—Standard Parts</i>			
	3	$\frac{3}{8}$ " (.375) x 16 U.S.S. x $\frac{1}{8}$ " (.875) hex. head. bolts	
	3	$\frac{1}{4}$ " (.25) x 20 U. S. S. countersunk head cap screw	
	3	$\frac{1}{4}$ " (.25) x 20 U. S. S. hex. nuts	
	3	$\frac{3}{8}$ " (.375) x 16 U. S. S. hex. nuts	
	3	$\frac{1}{4}$ " (.25) Lock washers S. A. E., heavy	
	3	$\frac{3}{8}$ " (.375) Lock washers S. A. E., heavy	
	3	$\frac{1}{4}$ " (.25) x .65" button head rivets	

NOMENCLATURE OF PARTS—Continued

Part No.	Tractor No. Per	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Equipment—Driver's Back Rest</i>			
175C	1	Driver's back rest.....	In back of seat.
175E	3	Driver's back rest adjusting strap.....	In back of seat.
175B	1	Driver's back rest end plate, R. H.....	In back of seat.
175D	1	Driver's back rest end plate, L. H.....	In back of seat.
<i>Equipment—Driver's Seat Back Rest—</i>			
<i>Standard Parts</i>			
	6	No. 8 x $\frac{5}{8}$ " (.625) Copper belt rivets	
	6	No. 8 x $\frac{3}{4}$ " (.75) Copper belt rivets.....	
	9	No. 8 Copper burr.....	
	6	No. 8 Copper burr.....	
	3	$\frac{7}{8}$ " (.875) Barrel roller harness buckle.....	
	3	$\frac{7}{8}$ " (.875) Strap for leather loops.....	
<i>Equipment—Implement Fastenings</i>			
NB1T	3	Loop.....	
HB12D	1	Pick handle rest.....	
C42K	1	Pick mattock bracket.....	
HB8M	2	Shovel blade bracket.....	
HB5A	1	Shovel handle bracket.....	
HB12E	1	Shovel handle rest.....	
ZB1E	2	Strap fastener.....	
NB1L	6	Strap fastener.....	
NB1B	1	Strap fastener.....	
FF39A	2	Fire extinguisher bracket.....	
333A	1	Tool box bracket.....	
333B	1	Tool tray angle, rear.....	
333C	1	Tool tray.....	
333D	1	Tool tray end, rear.....	
333E	1	Tool tray end, front.....	
333F	1	Tool tray angle, front.....	
331A	1	Bracket for spark plugs.....	
331B	1	Stop for bolt clippers.....	
331C	1	Bracket for bolt clippers.....	
331D	1	Bracket for wrench.....	
331E	1	Strap for belt.....	
341B	2	Clip for buggy bar.....	
<i>Equipment—Implement Fastenings—</i>			
<i>Standard Parts</i>			
	4	$\frac{1}{4}$ " (.25)—20 U. S. S. x .625" hex. head bolts...	
	2	$\frac{3}{8}$ " (.375)—16 U. S. S. x 1." hex. head bolts...	
	2	$\frac{1}{2}$ " (.312) x 18 U. S. S. x 2." hex. head bolts...	
	2	$\frac{3}{8}$ " (.375)—16 U. S. S. x 1." hex. head bolts...	
	4	$\frac{1}{4}$ " (.25) x 20 U. S. S. hex. nuts.....	
	2	$\frac{3}{8}$ " (.375) x 16 U. S. S. hex. nuts.....	
	2	$\frac{3}{8}$ " (.375) x 16 U. S. S. hex. nuts.....	
	2	$\frac{1}{2}$ " (.312) x 18 U. S. S. iron thumb nuts.....	
	4	$\frac{1}{4}$ " (.25) S. A. E., lock washers, heavy.....	
	2	$\frac{3}{8}$ " (.375) S. A. E., lock washers, heavy.....	
	2	$\frac{3}{8}$ " (.375) S. A. E., lock washers, heavy.....	
	4	$\frac{1}{16}$ " (.312) x (.625) x $\frac{1}{16}$ " (.062) plain washers..	
	2	$\frac{1}{16}$ " (.187) x $\frac{3}{4}$ " (.75) countersunk head rivets...	
	14	$\frac{1}{16}$ " (.187) x $1\frac{1}{8}$ " (1.125) button head rivets....	
	4	$\frac{1}{16}$ " (.187) x $1\frac{1}{4}$ " (1.25) button head rivets.....	
	8	$\frac{1}{4}$ " (.25) x $1\frac{1}{4}$ " (1.25) button head rivets.....	
	2	$\frac{1}{4}$ " (.25) x $1\frac{3}{8}$ " (1.375) button head rivets.....	
	2	$\frac{3}{8}$ " (.375) x 1.375" button head rivets.....	
	10	$\frac{1}{16}$ " (.187) x $\frac{3}{4}$ " (.75) flat head stove bolts for fire extinguisher bracket with 2 nuts each	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Equipment—Speedometer Fittings</i>			
287B	1	Speedometer head	Right hand of driver's seat.
287C	1	Speedometer shaft	Runs from speedometer to trans. shaft
287D	1	Speedometer shaft support.....	Used with speedometer.
287E	1	Wire, soft iron 4 ft.....	Used on speedometer cable.
<i>Equipment—Speedometer—Standard Parts</i>			
	3	No. 8—32 U. S. S. x 5/8" (.625) round head machine screw	
	3	No. 8—32 U. S. S. machine screw nuts	
	3	1/8" (.187) Lock washers, S. A. E., light.....	
<i>Equipment—Kick Switch Parts</i>			
270C	1	Kick switch.....	Right hand of driver's seat.
270D	1	Magneto ground wire	Magneto to switch.
171C	1	Special key bolt.....	At fire screen.
171D	4	Magneto wire clip	Fastens the wire to body.
<i>Equipment—Kick Switch—Standard Parts</i>			
	2	No. 8—32 U. S. S. x 5/8" (.625) round head machine screw	
	2	1/8" (.187) lock washers S. A. E., light.....	
	2	No. 8—32 U. S. S. Machine screw hex. nuts.....	
<i>Equipment—Carbureter Choke Parts</i>			
286A	1	Carbureter choke sleeve.....	Right hand of fire screen.
286B	1	Carbureter choke wire	Fire screen to carbureter.
286C	1	Carbureter choke tube	Used at fire screen.
286D	1	Carbureter choke tube nut.....	Used at fire screen.
171C	1	Special key bolt	Used at fire screen.
	1	1/4" (.25) x 28 S. A. E. plain hex. nut	
<i>Equipment—Hand Horn</i>			
341A	1	Hand horn Stewart No. 114-A or equal.....	
<i>Equipment—Hand Horn—Standard Parts</i>			
	1	3/8" (.375)—16 U. S. S. x 7/8" (.875) hex. head bolt.....	
	1	3/4" (.375)—16 U. S. S. semi-finished hex. nut....	
	1	1/2" (.406) x 1 1/4" (1.25) x 1 1/4" (1.25) Washer...	
	1	3/8" (.375) Lock washer S. A. E., light.....	
<i>Equipment—Tools</i>			
U384A	1	Bar, pinch.....	Right hand of body at front.
	1	Bolt clippers.....	Right hand side of body at rear.
		Brushes—	
MC25C	1	Handled.....	
MC25D	1	Cleaning.....	
MC25A	1	Engine cleaning	
MC25B	1	Spoke.....	
	1	Bucket, water, canvas.....	
MC31D	1	Chisel, cape.....	Tool box.
U127B	1	Chisel, cold, 8-inch.....	Tool box.
MC23C	1	Cotter pin extractor.....	Tool box.
MC23A	1	Drift.....	Tool tray.
MC23B	1	Drift.....	Tool tray.
MC8A	1	Fire extinguisher.....	Fire screen and right hand wall.
U46E	1	Funnel, small.....	
MC28B	1	Funnel, large.....	
		Files—	
MC27A	1	Flat bastard, 16-inch.....	Tool tray.
MC27B	1	Round bastard, 14-inch.....	Tool tray.
MC27C	1	Three square bastard, 12-inch.....	Tool tray.
MC22K	1	Magneto.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Equipment—Tools—Continued</i>			
U130D	3	File, handle	
U404C	1	Grease gun	Tool box.
U404A	1	Grease gun tip	Tool box.
U404B	1	Grease gun oil tip	
		Hammer—	
U 57B	1	Cross peen	Tool box.
	1	Interphone	
	1	Lantern, electric, hand, complete	
	1	Lifting jack (10-ton capacity)	
MC29B	1	Measuring stick, gasoline	
U46L	1	Oiler, locomotive	
U46J	1	Oiler, steel	
U126A	1	Punch, hand	Tool box.
	1	Pliers, combination, 8-inch	Tool box.
U52C	1	Pick, mattock	Right hand side of body, outside.
	1	Paulin, 20 x 30 feet	
MC22H	1	Rule, folding, 12-inch	
U52A	1	Shovel, long handled	Right side of body, on outside.
U51C	1	Shovel, short handled	Left side of body on outside.
MC31A	1	Scraper	Tool tray.
MC31B	1	Scraper	Tool tray.
MC31C	1	Scraper	Tool tray.
		Scrapers, carbon—	
	1	Curved end	
	1	Out-turn end	
	1	In-turn end	
	1	Strap, long handled shovel, 12-inch	
	1	Strap, long handled shovel, 15-inch	
	1	Strap, short handled shovel	
	1	Strap, pick mattock head	Left hand side at rear inside.
	1	Strap, oil and kerosene can	
MC29A	1	Strap, tool retaining	
MC29C	2	Strap, tool roll	
MC22D	1	Screw driver, 9 1/2-inch (9.5)	Tool box.
U100E	1	Screw driver, 3-inch	Tool box.
MC28A	1	Strainer	Used with funnel.
	1	Sledge	
	1	Tool bag	
	1	Towing cable	
	1	Turret lifting tackle	
	1	Tape, friction, 3/4" (.75)	
	1	Valve spring lifter	Tool box.
	1	Waste, white cotton, pound	
	1	Wire, copper, No. 16 B. & S. spool	
	1	Wire, soft steel, No. 16 B. & S. spool	
		Wrenches—	
MC38A	1	Engineer's	Tool box.
MC38B	1	Engineer's	Tool box.
MC38C	1	Engineer's	Tool box.
MC38D	1	Engineer's	Tool box.
MC38E	1	Engineer's	Tool tray.
	1	Pipe, 18"	Tool tray.
	1	Adjustable S, 8"	Tool box.
	1	Adjustable S, 6"	Tool box.
	1	Adjustable, 7"	Tool box.
	1	Monkey, 15"	Tool box.
MC33D	1	Track roller	Tool box.
MC26B	1	Track, adjusting nut	Tool box.
MC33E	1	Track, frame extension nut	Tool box.
MC26A	1	Rear axle nut	Right hand side of body at rear.
MC33F	1	Offset handle socket	Tool box.
MC33A	1	T-handle, socket	Tool box.
MC33B	1	T-handle, socket	Tool box.
MC33C	1	T-handle, socket	Tool box.
MC26C	2	Push rod	Tool box.
MC37A	1	Gear lock nut	Tool box.
MC37B	1	Track support roller	Tool box.
MC37C	1	Pipe plug	Tool box.
	1	Spark plug	Tool box.
MC26D	1	Spanner	Tool box.
TRACK REPAIR TOOL			
335C	1	Track repair bar	Right hand side of body at rear.
335A	1	Track repair clamp	Tool bar.
335B	1	Track repair clamp pin	Tool bar.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track Repair Tool—Continued</i>			
335F	1	Track repair hook.....	Tool bar.
335D	1	Track repair lever.....	Tool bar.
335E	1	Track repair ratchet.....	Right hand side of body at rear.
	1	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt.	
	1	$\frac{1}{2}$ " (.5) x 13 U. S. S. hex. nut.....	
	2	$\frac{1}{8}$ " (.125) x 1" Button head iron rivet.....	
FAN			
135D	2	Cup, fan bearing shield.....	Assembled with fan.
135B	2	Disc, fan bearing shield.....	Assembled with fan.
135E	1	Eye, fan adjusting.....	Assembled with fan.
133A	1	Fan.....	Front of radiator assembly.
135A	1	Flange, fan hub.....	Riveted to fan.
135G	1	Housing, fan bearing.....	Assembled with fan.
134D	1	Leather belting.....	Front of fan.
135K	1	Oil pipe, fan.....	Assembled with fan.
135N	1	Oil pipe clip.....	Assembled with fan.
135F	1	Pin, fan pulley adjusting rod.....	Assembled with fan.
134B	1	Pulley, fan.....	Front of fan.
135H	1	Rod, fan pulley adjusting.....	In front of fan.
135L	1	Screw, housing retainer.....	Assembled with fan.
134C	1	Spindle, fan.....	Assembled with fan.
132A	1	Support, fan.....	Front of fan.
135C	2	Washer, fan bearing shield.....	Assembled with fan.
<i>Fan—Standard Parts</i>			
(See illustration on page 162)			
	1	No. 207 Radial bearing, Hess Bright or equal...	
	1	No. 207 Radial bearing, Hess Bright or equal...	
	1	No. 25, Alligator steel belt lacing.....	
	1	$\frac{1}{8}$ " (.125) Rawhide rocker pin for No. 25 lacing..	
	2	$\frac{3}{8}$ " (.375)—16 U. S. S. semi-finished hex. nuts..	
	2	$\frac{5}{8}$ " (.625)—11 U. S. S. semi-finished hex. nuts..	
	2	$\frac{5}{8}$ " (.625) Lock washers, S. A. E. heavy.....	
	2	$\frac{3}{8}$ " (.375) Lock washers, S. A. E. light.....	
	1	No. 10—32 x $\frac{3}{8}$ " (.375) Button head machine screw.....	
	2	No. 8 Woodruff keys.....	
	1	$\frac{3}{32}$ " (.093) x $\frac{3}{4}$ " (.75) Cotter pin.....	
	1	$\frac{1}{8}$ " (.125) x $\frac{1}{8}$ " (.125) Cotter pin.....	
	48	$\frac{3}{16}$ " (.187) x $\frac{3}{8}$ " (.375) Button head rivets.....	
	24	$\frac{3}{16}$ " (.187) x $\frac{1}{2}$ " (.5) Button head rivets.....	
GASOLINE TANK			
(See illustration on page 163)			
170C	1	Carbureter gasoline tube.....	Vacuum tank to carbureter.
170D	1	Carbureter gasoline tube connection.....	Vacuum tank to carbureter.
170B	1	Carbureter vacuum tube.....	Between carbureter manifold and vacuum tank.
196H	1	Drain flange, gasoline tank.....	Gas tank.
196D	1	Ell, gasoline tank outlet.....	Gas tank.
195C	4	Felt strip, 1" x $\frac{1}{4}$ " (.25) x 18" (18) long.....	Riveted to gasoline tank housing.
195D	2	Felt strip, 1" x $\frac{1}{4}$ " (.25) x 20 $\frac{3}{8}$ " (20.375) long..	Riveted to gasoline tank housing.
195E	4	Felt strip, 1" x $\frac{5}{8}$ " (.625) x 34 $\frac{1}{4}$ " (34.25) long..	Riveted to gasoline tank housing.
195F	8	Felt strip, 1" x $\frac{1}{4}$ " (.25) x 13" (13) long.....	Riveted to gasoline tank housing.
195G	4	Felt strip, 1" x $\frac{5}{8}$ " (.625) x 5 $\frac{1}{4}$ " (5.25) long....	Riveted to gasoline tank housing.
195H	4	Felt strip, 1" x $\frac{5}{8}$ " (.625) x 13" (13) long.....	Riveted to gasoline tank housing.

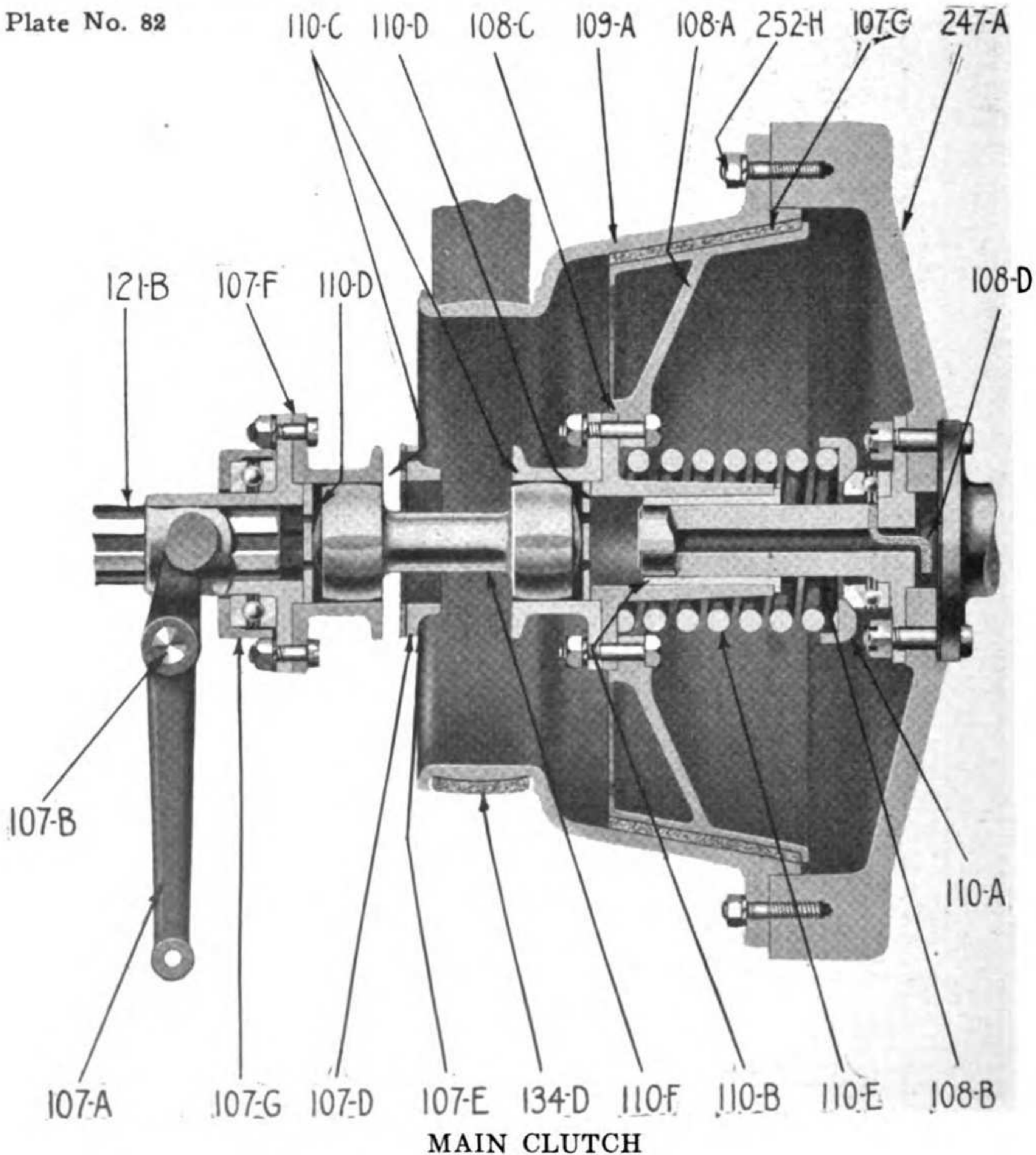
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Gasoline Tank—Continued</i>			
(See illustration on page 163)			
196K	1	Filler cap flange, gasoline tank	Riveted to top of gasoline tank.
196L	1	Filler cap, gasoline tank	Screws in filler cap.
196A	2	Flange, gasoline tank outlet pipe	Riveted to bottom gasoline tank pad
196M	1	Gasket, filler cap	Used with cap.
194A	1	Gasoline tank	In gasoline tank housing.
195A	1	Gasoline tank housing	Located between radiator and fire screen.
170A	1	Gasoline tank outlet tube	Top of gas tank.
194B	2	Pad, gasoline tank	Bottom gas tank.
196E	1	Pipe, gasoline tank outlet	Bottom gas tank.
196F	1	Plug, outlet pipe flange	Top of gas tank.
170E	1	Rubber hose, gasoline line	Gas system.
196C	1	Strainer screen, gasoline tank outlet	Bottom of gas tank.
196B	1	Stud, outlet pipe flange	Bottom of gas tank.
196M	2	Support bracket, gasoline tank	Riveted to ends of tank.
195B	2	Top strap	Riveted to top of tank.
196G	2	Washer, filler pipe	Bottom of gas tank.
177A	1	Vacuum tank	Bolted to right hand side of body.
55A	2	Vacuum tank support	Fastens tank to right hand side of body.
	4	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt	
	4	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nuts	
	4	$\frac{1}{8}$ " (.312)—18 U. S. S. x $\frac{3}{4}$ " (.75) hex. head bolt	
	4	$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{3}{4}$ " (1.75) hex. head cap screw	
	4	$\frac{1}{8}$ " (.312)—18 U. S. S. hex. nut	
	4	$\frac{1}{8}$ " (.312) Lock washer, S. A. E. light	
	4	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. light	
	4	$\frac{1}{2}$ " (.5) Plain washer	
	4	$\frac{1}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Button head rivet	
	8	$\frac{1}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Button head rivet	
	12	$\frac{1}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Button head rivet	
	36	$\frac{1}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Button head rivet	
	8	$\frac{3}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Copper tubular rivet	
	86	$\frac{1}{8}$ " (.187) x $\frac{1}{2}$ " (.5) Copper tubular rivet	
	1	$\frac{1}{4}$ " (.25) S. A. E. Standard flared tube union, male	
	2	$\frac{1}{4}$ " (.25) S. A. E. Standard flared tube union, female	
	1	$\frac{3}{8}$ " (.375) S. A. E. Standard flared tube union, female	
	2	$\frac{3}{8}$ " (.375) S. A. E. Standard flared tube union, female	
	2	$\frac{1}{2}$ " (.5) Hose clamps 100 feet of low tension wire for each 100 machines. 50 feet of high tension wire for each 100 machines.	
MAIN CLUTCH			
(See illustration on page 174)			
107E	1	Clutch brake	Between transmission and clutch.
107D	1	Clutch brake facing	Riveted to clutch brake.
110A	1	Clutch bearing cage	Inside clutch housing.
110B	1	Clutch bushing	Inside clutch housing.
108A	1	Clutch cone	Inside of clutch housing.
107C	1	Clutch facing	Between cone and housing.
109A	1	Clutch housing	Bolts to engine flywheel.
108C	1	Clutch hub	Bolts to cone.
110F	1	Clutch knuckle joint	Between main clutch and transmission.
110C	2	Clutch knuckle joint flange	Retainer for knuckle joint.
107A	1	Clutch lever	Between transmission and clutch.
107B	1	Clutch lever bushing	In the clutch lever hub.
110E	1	Clutch spring	Inside clutch housing.
108B	1	Clutch stub shaft	Bolts to crankshaft, inside clutch housing.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Main Clutch—Continued</i> (See illustration on page 174)			
107F	1	Clutch thrust bearing flange.....	Support for transmission lower shaft. Between transmission and clutch. 1 inside the clutch housing and 1 inside flange.
107G	1	Clutch thrust bearing cage.....	
110D	2	Knuckle retainer.....	
108D	1	Square felt .187" (3/16) square x 2" long.....	In clutch stub shaft.
<i>Main Clutch—Standard Parts</i>			
	1	Thrust bearing equivalent to Hess Bright No.1109	
	1	Thrust bearing equivalent to Hess Bright No.1111F	
	6	3/8" (.375) x 16 U. S. S. x 1.75 hex. head bolt....	
	6	3/8" (.375) x 16 U. S. S. x 1.25 fillister head bolt	
	6	3/8" (.375) x 16 U. S. S. semi-finished hex. nuts.	
	6	3/8" (.375) v 16 U. S. S. semi-finished hex. nuts.	

Plate No. 82



NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Main Clutch—Standard Parts—Continued</i>			
	6	$\frac{3}{8}$ " (.375) Lock washers S. A. E., light.....	
	6	$\frac{3}{8}$ " (.375) Lock washers S. A. E., light.....	
	26	$\frac{3}{16}$ " (.187) x $\frac{5}{8}$ " (.625) flat head rivets.....	
	5	$\frac{3}{16}$ " (.187) x $\frac{5}{8}$ " (.625) copper countersunk head rivets.	
MUFFLER			
(See illustration on page 157)			
90A	1	Muffler complete.....	Bolted upper rear end of body.
90B	1	Muffler inlet.....	Part of assembly.
	2	$\frac{1}{2}$ " (.5)—13 U. S. S. x 2" (2.) hex. head bolt.....	
	2	$\frac{1}{2}$ " (.5)—13 U. S. S. x 2 $\frac{1}{4}$ " (2.25) hex. head bolt.....	
	4	$\frac{1}{2}$ " (.5)—13 U. S. S. semi-finished hex. nut.....	
	4	$\frac{1}{2}$ " (.5) Lock washer S. A. E., light.....	
	2	Plain washer $\frac{1}{2}$ " (.551) hole, 1 $\frac{1}{8}$ " (1.125) O. D. $\frac{1}{8}$ " (.062) thick.....	
OIL PRESSURE GAUGE			
171A	1	Oil pressure gauge.....	Right hand side of driver's seat.
171B	1	Oil pressure gauge tube.....	Right hand inside of body.
171D	7	Oil pressure gauge tube clip.....	Right hand inside of body.
171C	3	Special keybolt.....	
<i>Oil Pressure Gauge—Standard Parts</i>			
	3	No. 8—32 x $\frac{1}{2}$ " (.5) machine screw.....	
	3	No. 8—32 Machine screw nut.....	
	1	$\frac{1}{4}$ " (.25) S. A. E. Standard flared tube union, male.....	
	2	$\frac{1}{4}$ " (.25) S. A. E. Standard flared tube union, female.....	
RADIATOR			
130G	1	Cap radiator filler.....	Top of radiator.
136A	1	Fan housing.....	Fastened to radiator casing.
130F	1	Collar radiator filler.....	Top of radiator.
131B	1	Deflector radiator air inlet.....	Part of radiator assembly
130E	1	Filler neck radiator.....	Top of radiator.
133D	1	Flange radiator drain.....	Bottom of radiator on front side.
130H	1	Gasket, radiator filler cap.....	Top of radiator.
131A	1	Plate, radiator front.....	Part of casing assembly.
130A	1	Plate, radiator side, right.....	Part of radiator casing.
130B	1	Plate, radiator side, left.....	Part of radiator casing.
300B	1	Radiator bottom tie.....	Part of casing assembly.
300A	1	Radiator spacer plate.....	Part of casing assembly.
299E	1	Radiator baffle plate, front.....	Part of assembly.
299A	2	Radiator upper tank stud reinforcement.....	Part of assembly.
299B	1	Radiator baffle plate, rear.....	
297A	1	Radiator tank, upper.....	Upper casing of radiator.
298A	1	Radiator tank, lower.....	Lower casing of radiator.
135M	2	Radiator support pad.....	Between radiator and side plate.
133B	1	Radiator, inlet.....	Upper part of casing.
133C	1	Radiator, outlet.....	Lower part of casing.
296B	1324	Radiator tubes.....	Radiator casing.
295A	1	Radiator tube sheet, lower.....	Parts of radiator casing assembly.
296A	1	Radiator tube sheet, upper.....	Parts of radiator casing assembly.
299C	1	Radiator upper tank brace, R. H.....	Parts of radiator casing assembly.
299D	1	Radiator upper tank brace, L. H.....	Parts of radiator casing assembly.
133E	2	Rubber hose, inlet.....	On the radiator inlet.
133F	2	Rubber hose outlet.....	On the radiator outlet.
300C	3	Radiator lower brace.....	On casing assembly.
134E	8	Stud, fan support plate.....	
134A	1	Support plate, fan.....	
130C	1	Support radiator, R. H.....	On radiator casing.
130D	1	Support radiator, L. H.....	On radiator casing.
296C	1	Vent tube.....	On radiator casing.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Radiator—Standard Parts</i>			
	6	$\frac{1}{8}$ " (.312) x 18 U. S. S. x $\frac{1}{2}$ " (.5) hex. head cap screws	
	3		
	4	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{2}$ " (1.5) hex. head bolts	
	4	$\frac{3}{8}$ " (.375) Lock washers, S. A. E. heavy	
	1	$\frac{1}{2}$ " (.5) Pipe plug	
	4	$1\frac{7}{8}$ " (1.875) Diameter Sherman hose clamp, galvanized steel	
	4	$2\frac{3}{8}$ " (2.375) Diameter Sherman hose clamp, galvanized steel	
	8	$\frac{3}{8}$ " (.375) x 24 U. S. F. semi-finished hex. nut	
	8	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut	
	4	$\frac{1}{8}$ " (.125) x $\frac{1}{4}$ " (.25) Flat head copper rivets	
	4	$\frac{3}{8}$ " (.125) x $\frac{1}{4}$ " (.25) Flat head copper rivets	
	5	$\frac{1}{8}$ " (.125) x $\frac{1}{4}$ " (.25) Flat head copper rivets	
	5	$\frac{1}{8}$ " (.125) x $\frac{3}{8}$ " (.375) Flat head copper rivets	
	4	$\frac{1}{8}$ " (.125) x $\frac{3}{8}$ " (.375) Flat head copper rivets	
	6	$\frac{1}{8}$ " (.125) x $\frac{3}{8}$ " (.375) Flat head copper rivets	
	10	$\frac{1}{8}$ " (.125) x $\frac{3}{8}$ " (.375) Flat head copper rivets	
	6	$\frac{1}{8}$ " (.125) x $\frac{1}{4}$ " (.25) Flat head copper rivets	
	6	$\frac{1}{8}$ " (.125) x $\frac{1}{4}$ " (.25) Flat head copper rivets	
	7	$\frac{3}{8}$ " (.187) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	14	$\frac{3}{8}$ " (.187) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	6	$\frac{3}{8}$ " (.187) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	6	$\frac{1}{4}$ " (.25) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	25	$\frac{1}{8}$ " (.187) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	6	$\frac{1}{8}$ " (.125) x $\frac{3}{8}$ " (.375) Flat head iron rivets	
	8	$\frac{3}{8}$ " (.375) Lock washers, S. A. E. heavy	
SPUR GEAR REDUCTION			
89A	2	Bearing cage, intermediate	Used in inside gear reduction case.
89D	6	Bearing cage, closed small	Used in inside gear reduction case
89C	2	Bearing cage, open large	Used in inside gear reduction case
89E	2	Bearing cage, open small	Used in inside gear reduction case.
141C	1	Cover, reduction gear case, inside R. H.	Bolts to reduction case.
141D	1	Cover, reduction gear case, inside L. H.	Bolts to reduction case.
89H	2	Dowel, cage	Gear reduction.
82B	2	Flange driven Oldham coupling	Drive between steering clutch and gear reduction.
128B	2	Gasket reduction gear case, inside	Between two reduction cases.
71A	2	Gear, first reduction	Gear reduction case.
87A	2	Gear, second reduction	Gear reduction case.
81C	2	Lock washer, second reduction gear	Gear reduction case.
81B	2	Lock nut, second reduction gear	Gear reduction case.
82D	2	Oldham coupling disc	Drive between steering clutch and gear reduction.
82A	2	Pinion, first reduction	Gear reduction case.
70B	2	Pinion, second reduction	Gear reduction case.
70A	2	Pinion, final reduction	Gear reduction case.
140A	1	Reduction gear case, inside, R. H.	Bolts to body side plates.
140B	1	Reduction gear case, inside, L. H.	Bolts to body side plates.
89B	4	Shim, Oldham coupling	Drive between steering clutch and gear reduction.
81A	2	Spacing collar, second reduction gear	In reduction case on intermediate shaft.
89G	2	Spacing collar, Oldham coupling, R. H.	Drive between steering clutch and gear reduction.
89F	2	Spacing collar, Oldham coupling, L. H.	Drive between steering clutch and gear reduction.
140C	2	Stud, spur gear case	Gear reduction case.
140D	2	Stud, spur gear case	Gear reduction case.
141A	2	Washer	Spacer between engine and gear reduction case.
141B	2	Washer	Spacer at front end of engine.

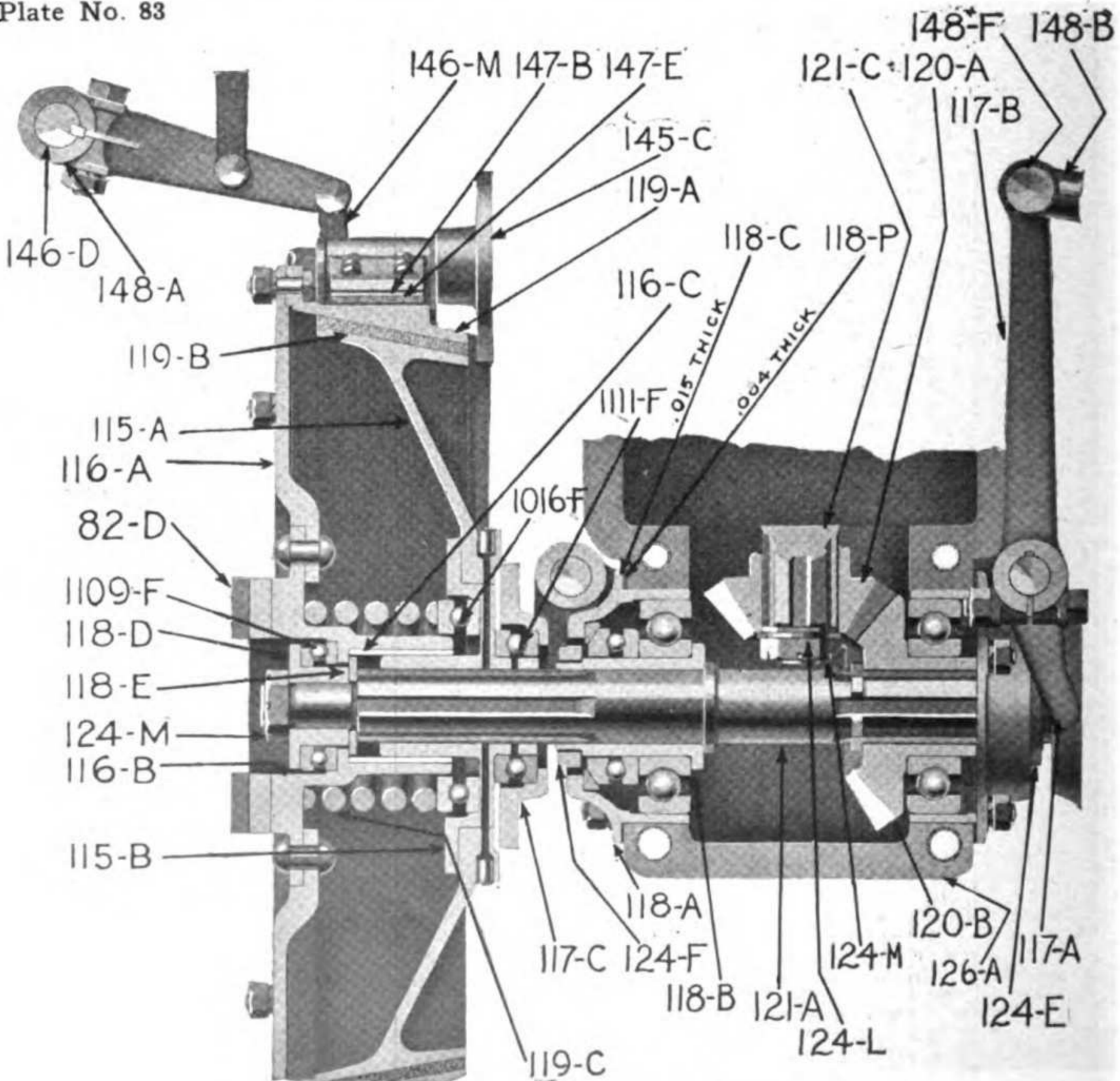
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Spur Gear Reduction—Standard Parts</i>			
	2	Radial ball bearing No. 217.....	
	4	Radial ball bearing No. 311.....	
	4	Radial ball bearing No. 311.....	
	2	Radial ball bearing No. 316.....	
	26	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{3}{4}$ " (1.75) hex. head bolt	
	2	$\frac{3}{4}$ " (.75) x 10 U. S. S. x $6\frac{1}{4}$ " (6.25) hex. head bolt	
	2	$\frac{3}{4}$ " (.75) x 10 U. S. S. x $3\frac{1}{8}$ " (3.875) hex. head cap screw, 1.5" length of thread.....	
	4	$\frac{1}{4}$ " (.25) x 20 U. S. S. x $3\frac{1}{2}$ " (3.5) fillister head cap screw.....	
	4	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut.....	
	26	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut.....	
	2	$\frac{3}{4}$ " (.75) x 10 U. S. S. semi-finished hex. nut, castellated.....	
	4	$\frac{3}{8}$ " (.375) Lock washer S. A. E., heavy.....	
	26	$\frac{3}{8}$ " (.375) Lock washer S. A. E., heavy.....	
	2	$\frac{3}{4}$ " (.75) Lock washer S. A. E., heavy.....	
	2	$\frac{3}{8}$ " (.156) x $1\frac{1}{2}$ " (1.5) Cotter pin.....	
	2	$\frac{3}{4}$ " (.75) Pipe plug.....	
	2	$1\frac{1}{4}$ " (1.25) Pipe plug.....	
	12	$\frac{5}{8}$ " (.625) x $2\frac{1}{4}$ " (2.25) Countersunk head rivet	
STEERING CLUTCH GROUP			
(See illustration on page 178)			
147B		Brake band, steering clutch.....	Assembled to steering clutch
147A	2	Brake guard, steering clutch.....	Assembled to steering clutch
147C	4	Brake guard, end, steering clutch.....	Assembled to steering clutch
146L	4	Bushing, operating shaft bracket.....	Used in operating shaft bracket.
116C	2	Bushing, steering clutch.....	Assembled in steering clutch drum.
146E	4	Bracket, steering clutch operating shaft.....	Bolts to body side plate.
115A	2	Clutch, cone, steering.....	In steering clutch drum.
148F	4	Clevis pin, steering clutch operating rod end.....	Steering clutch operating rod end.
119A	2	Drum, steering clutch.....	Between transmission and gear reduction.
147F	2	End, steering clutch brake band, upper.....	Riveted to steering clutch brake band.
147D	2	End, steering clutch brake band, lower.....	Riveted to steering clutch brake band
115B	2	Hub, steering clutch cone.....	Assembled in steering clutch.
116B	2	Hub, steering clutch drum.....	Assembled in steering clutch.
147E	2	Lining, steering clutch brake.....	Assembled to brake drum.
148E	2	Lever, steering clutch operating shaft, upper.....	Clamped to operating shaft.
146G	2	Lever, steering clutch brake.....	Clamped to operating shaft.
148A	2	Lever, steering clutch operating shaft, lower.....	Clamped to operating shaft.
117B	2	Lever, steering clutch release.....	Clamped to release yoke shaft.
<i>Steering Clutch—Standard Parts</i>			
(See illustration on page 178)			
	8	$\frac{1}{8}$ " (.312) x $\frac{1}{8}$ " (.875) Button head rivet.....	
	12	$\frac{1}{4}$ " (.25) x $\frac{5}{8}$ " (.625) Button head rivet.....	
	12	$\frac{1}{4}$ " (.25) x $\frac{5}{8}$ " (.625) Button head rivet.....	
	16	$\frac{1}{2}$ " (.5) x $1\frac{1}{4}$ " (1.25) Button head rivet.....	
	8	$\frac{1}{8}$ " (.312) x $\frac{3}{8}$ " (.375) Countersunk heat rivet.....	
	60	$\frac{1}{8}$ " (.187) x $\frac{3}{8}$ " (.375) Copper countersunk head rivet.....	
	32	$\frac{1}{8}$ " (.312) x $\frac{3}{4}$ " (.75) Copper countersunk head rivet.....	
	48	$\frac{1}{8}$ " (.312) x 1" Copper countersunk head rivet.....	
	6	No. 13 Woodruff key.....	
	4	No. 15 Woodruff key.....	
	4	2A Winkley oil hole cover.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Steering Clutch Group</i> (See illustration on page 178)			
146F	2	Pin, steering clutch brake lever.....	In clutch brake lever.
116A	2	Plate, steering clutch drum.....	Bolts to drum.
117C	2	Plate, steering clutch pressure.....	Assembled to cone.
148B	2	Rod end, steering clutch operating, R. H.....	Connection between steering [clutch operating lever.
148C	2	Rod end, steering clutch operating, L. H.....	Connection between steering [clutch operating lever.
146A	2	Screw, steering clutch brake band, adjusting.....	Assembled on brake.
146K	2	Spring, steering clutch brake release.....	Assembled on brake.
119C	2	Spring, steering clutch.....	Inside clutch.
119B	16	Steering clutch lining.....	Between cover and drum.
146C	1	Shaft, steering clutch operating, R. H.....	Between brake and operating levers.
117D	2	Shaft, steering clutch release yoke.....	Assembled in transmission.
146D	1	Shaft, steering clutch operating, L. H.....	Between brake and operating levers.
146H	2	Spring, brake band, adjusting.....	Fastened on brake adjusting screen.

Plate No. 83



STEERING CLUTCH AND BRAKE ASSEMBLY

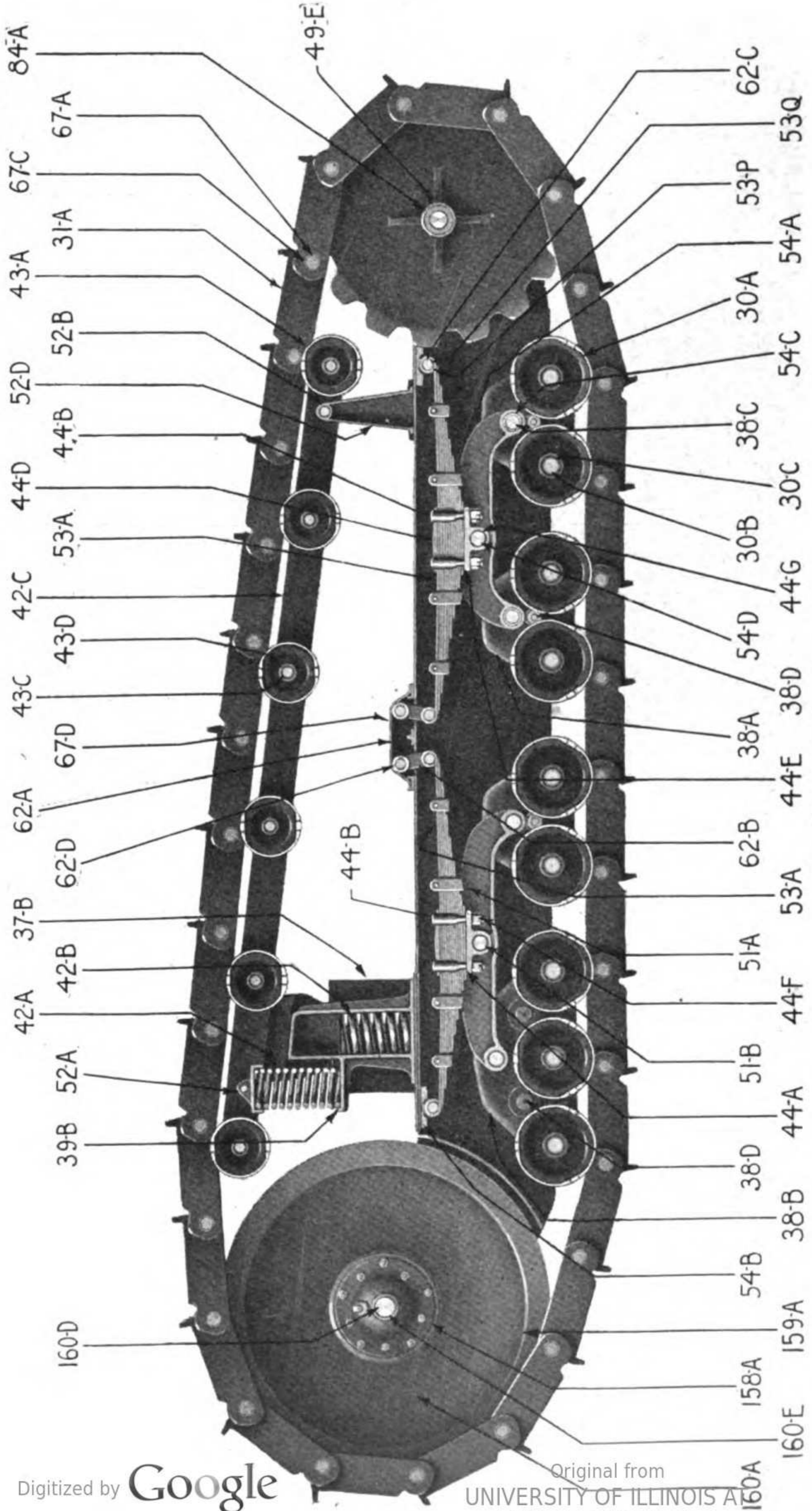
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Steering Clutch Group—Continued</i>			
(See illustration on page 178)			
148G	2	Spacer, steering clutch lever, upper.....	Assembled on shaft.
148D	2	Turnbuckle, steering clutch operating.....	Used on steering clutch.
146B	2	Wing nut, brake band adjusting.....	On brake.
146M	2	Yoke end, brake operating.....	Assembled to brake.
117A	2	Yoke, steering clutch release.....	Assembled in steering clutch.
<i>Steering Clutch—Standard Parts</i>			
(See illustration on page 178)			
	2	Thrust bearing, equivalent to Hess Bright 1109F.	
	2	Thrust bearing, equivalent to Hess Bright 1111F.	
	2	Thrust bearing, equivalent to Hess Bright 1016F.	
	16	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{8}$ " (1.125) hex. head bolt.....	
	16	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{8}$ " (1.125) hex. head bolt.....	
	2	$\frac{1}{8}$ " (.437) x 14 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt.....	
	2	$\frac{1}{8}$ " (.437) x 14 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt.....	
	2	$\frac{1}{8}$ " (.437) x 14 U. S. S. x $2\frac{1}{4}$ " (2.25) hex. head bolt.....	
	16	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut.....	
	8	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut.....	
	2	$\frac{1}{8}$ " (.437) x 14 U. S. S. semi-finished hex. nut.....	
	2	$\frac{1}{8}$ " (.437) x 14 U. S. S. semi-finished hex. nut.....	
	2	$\frac{5}{8}$ " (.625) x 11 U. S. S. semi-finished hex. nut.....	
	4	$\frac{3}{4}$ " (.75) x 10 U. S. S. semi-finished hex. nut.....	
	16	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut, castellated.....	
	16	$\frac{3}{8}$ " (.375) Lock washer S. A. E. heavy.....	
	4	$\frac{3}{8}$ " (.375) Lock washer S. A. E. heavy.....	
	2	$\frac{1}{8}$ " (.437) Lock washer S. A. E. light.....	
	2	$\frac{1}{8}$ " (.437) Lock washer S. A. E. light.....	
	2	$\frac{1}{8}$ " (.437) Lock washer S. A. E. light.....	
	4	$\frac{3}{16}$ " (.093) x $\frac{1}{8}$ " (.875) Cotter pin.....	
	16	$\frac{3}{16}$ " (.093) x 1" Cotter pin.....	
TRACK GROUP.			
<i>Track—Front Idler</i>			
(See illustration on page 181)			
160E	2	Bushing, front idler.....	Through idler hub.
160B	4	Gasket washer, front idler.....	Between hub and brackets.
158A	2	Hub, front idler, outside.....	Bolt to idler web.
158B	2	Hub, front idler, inside.....	Bolt to idler web.
159A	2	Rim, outer, front idler.....	Fastened to web.
159B	2	Rim, inner, front idler.....	Fastened to web.
160A	2	Web, front idler.....	Used in front end of track.
<i>Track—Standard Parts (for Front Idler)</i>			
	20	$\frac{1}{2}$ " (.5)—13 U. S. S. x 2" hex. head bolt.....	
	20	$\frac{1}{2}$ " (.5)—13 U. S. S. semi-finished hex. nuts.....	
	2	$\frac{1}{2}$ " (.5) Pipe plug.....	
	64	$\frac{5}{16}$ " (.312) x 1.25" Button head rivet.....	
	64	$\frac{5}{16}$ " (.312) x 1.375" Button head rivet.....	
<i>Track—Frame</i>			
(See illustration on page 181)			
46B	2	Bushing, track frame extension, inside.....	Bushing for rear axle.
47A	2	Bushing, track frame extension, outside.....	Bushing for rear axle.
67D	2	Cover, spring shackle support.....	Bolted to top of track frame.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track Frame—Continued</i> (See illustration on page 181)			
49C	2	Cup, track frame extension oil retainer.....	Oil retainer at drive sprocket.
46A	4	Dowel, bushing.....	Bushing for rear axle.
85B	2	Dust guard washer, track frame extension.....	Used at drive sprocket.
40A	1	Front reinforcing angle, inner, R. H.....	Part of track frame.
40B	1	Front reinforcing angle, inner, L. H.....	Part of track frame.
40C	1	Front reinforcing angle, outer, R. H.....	Part of track frame.
40S	1	Front reinforcing angle, outer, L. H.....	Part of track frame.
40D	2	Idler guard channel.....	Stiffener at front idler.
47E	8	Nut, track frame extension.....	On track frame extension.
41A	4	Plate, track adjusting.....	Bolted to top track frame at front.
50D	2	Plate, track suspension shaft.....	Bolts to bottom of track frame.
85E	2	Retainer, dust guard washer.....	Used on extension at drive sprocket.
47B	8	Stud, track frame extension.....	Secures cap to extension at drive sprocket.
62A	2	Support, spring shackle.....	On top of track frame.
40E	1	Track frame, top plate, front, R. H.....	Side members supporting body.
40F	1	Track frame, top plate, front, L. H.....	Side members supporting body.
40N	1	Track frame, top plate, rear, R. H.....	Side members supporting body.
40R	1	Track frame, top plate, rear, L. H.....	Side members supporting body.
40H	1	Track frame, side, inner, R. H.....	Side members supporting body.
40K	1	Track frame, side, inner, L. H.....	Side members supporting body.
40L	1	Track frame, side, outer, R. H.....	Side members supporting body.
40M	1	Track frame, side, outer, L. H.....	Side members supporting body.
40G	4	Track frame spacer.....	Part of track frame.
46C	1	Track frame extension, inside, R. H.....	Bolted to track from side members.
46D	1	Track frame extension, inside, L. H.....	Bolted to track from side members.
47C	1	Track frame extension, outside, R. H.....	Bolted to track from side members.
47D	1	Track frame extension, outside, L. H.....	Bolted to track frame side members.
48A	2	Track frame extension cap, outside.....	Swings on rear axle bracket.
48B	2	Track frame extension cap, inside.....	Swings on rear axle bracket.
49B	2	Washer, track frame extension oil retainer.....	Used on extension cap.
<i>Track Frame—Standard Parts</i> (See illustration on page 181)			
	4	$\frac{3}{8}$ " (.875)—9 U. S. S. x $8\frac{3}{4}$ " (8.75) square head bolt.....	
44		$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head bolt.....	
28		$\frac{3}{8}$ " (.375) x (.875) button head rivet.....	
32		$\frac{3}{8}$ " (.375) x 1 counter sunk head rivet.....	
114		$\frac{3}{8}$ " (.375) x $1\frac{1}{8}$ " (1.125) button head rivet.....	
68		$\frac{3}{8}$ " (.375) x $1\frac{1}{4}$ " (1.25) button head rivet.....	
24		$\frac{3}{8}$ " (.375) x $1\frac{3}{8}$ " (1.375) button head rivet.....	
8		$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{3}{4}$ " (1.75) hex. head bolt.....	
20		$\frac{1}{2}$ " (.5)—13 U. S. S. x $1\frac{1}{2}$ " (1.5) flat head cap screw.....	
2		$\frac{3}{8}$ " (.375) Pipe plug.....	
12		$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{8}$ " (1.375) hex. head bolt.....	
4		$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{1}{4}$ " (1.75) hex. head bolt.....	
4		$\frac{5}{16}$ " (.312)—18 U. S. S. x $\frac{3}{8}$ " (.375) fillister head cap screw.....	
20		$\frac{1}{2}$ " (.5)—13 U. S. S. semi-finished hex. nut.....	
44		$\frac{1}{2}$ " (.5)—13 U. S. S. semi-finished hex. nut.....	
8		$\frac{1}{2}$ " (.5)—13 U. S. S. semi-finished hex. nut.....	
4		$\frac{5}{8}$ " (.625)—11 U. S. S. semi-finished hex. nut.....	
12		$\frac{5}{8}$ " (.625)—11 U. S. S. semi-finished hex. nut.....	
4		$\frac{7}{8}$ " (.875)—9 U. S. S. semi-finished hex. nut castellated.....	
20		$\frac{1}{2}$ " (.5) lock washers, S. A. E. heavy.....	
44		$\frac{1}{2}$ " (.5) lock washers, S. A. E. heavy.....	
8		$\frac{1}{2}$ " (.5) lock washers, S. A. E. heavy.....	
4		$\frac{5}{8}$ " (.625) lock washer, S. A. E. heavy.....	
12		$\frac{5}{8}$ " (.625) lock washer, S. A. E. heavy.....	
8		1" (1) lock washer, S. A. E. heavy.....	
4		$1\frac{1}{8}$ " (.937) x 2 x $\frac{1}{4}$ " (.25) Plain washer.....	
4		$1\frac{3}{4}$ " (1.25) x $1\frac{1}{4}$ " (1.75) cotter pin.....	
4		$\frac{1}{8}$ " (.312) lock washer, S. A. E. heavy.....	

Plate No. 84

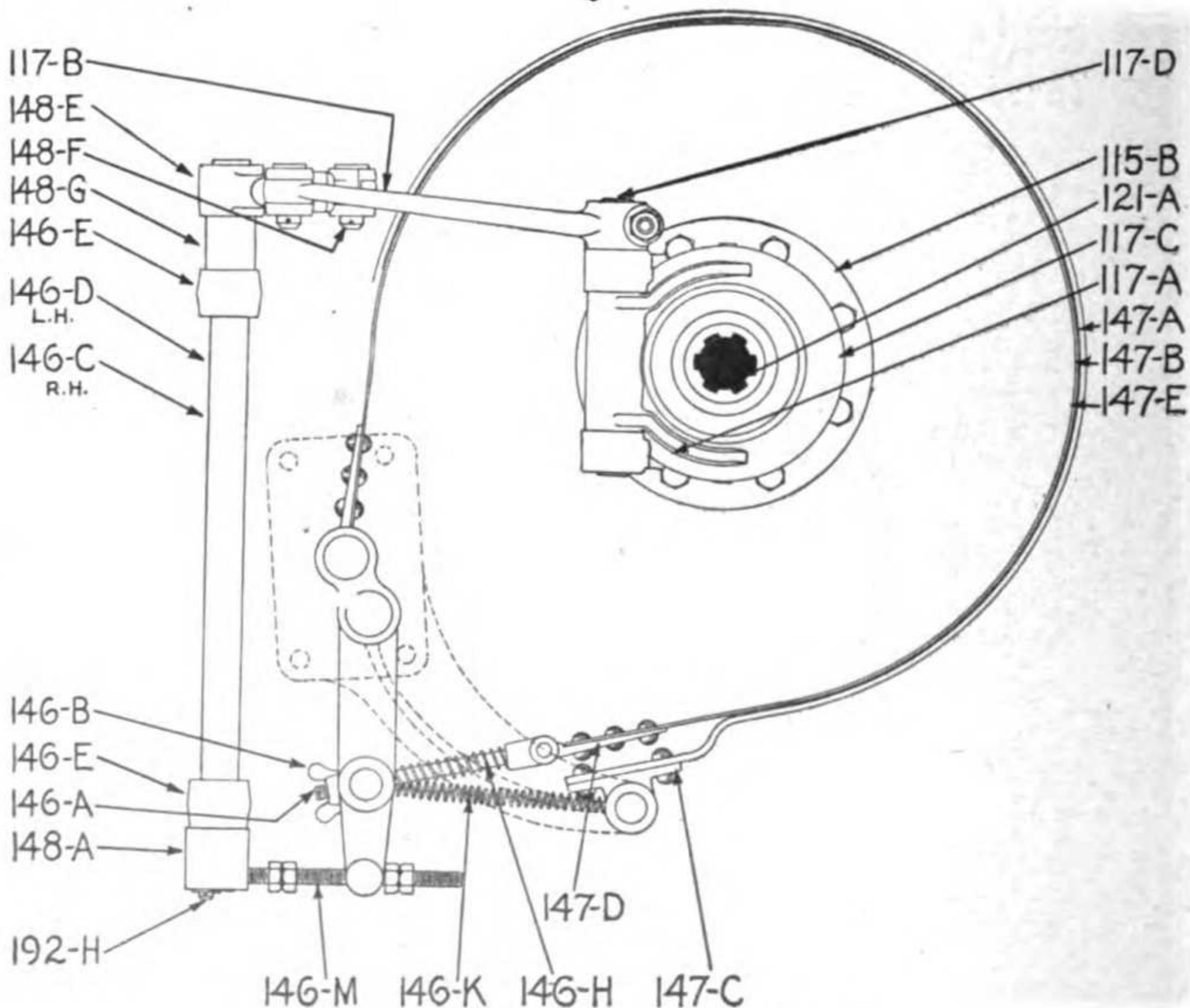


TRACK ASSEMBLY

NOMENCLATURE OF PARTS—Continued

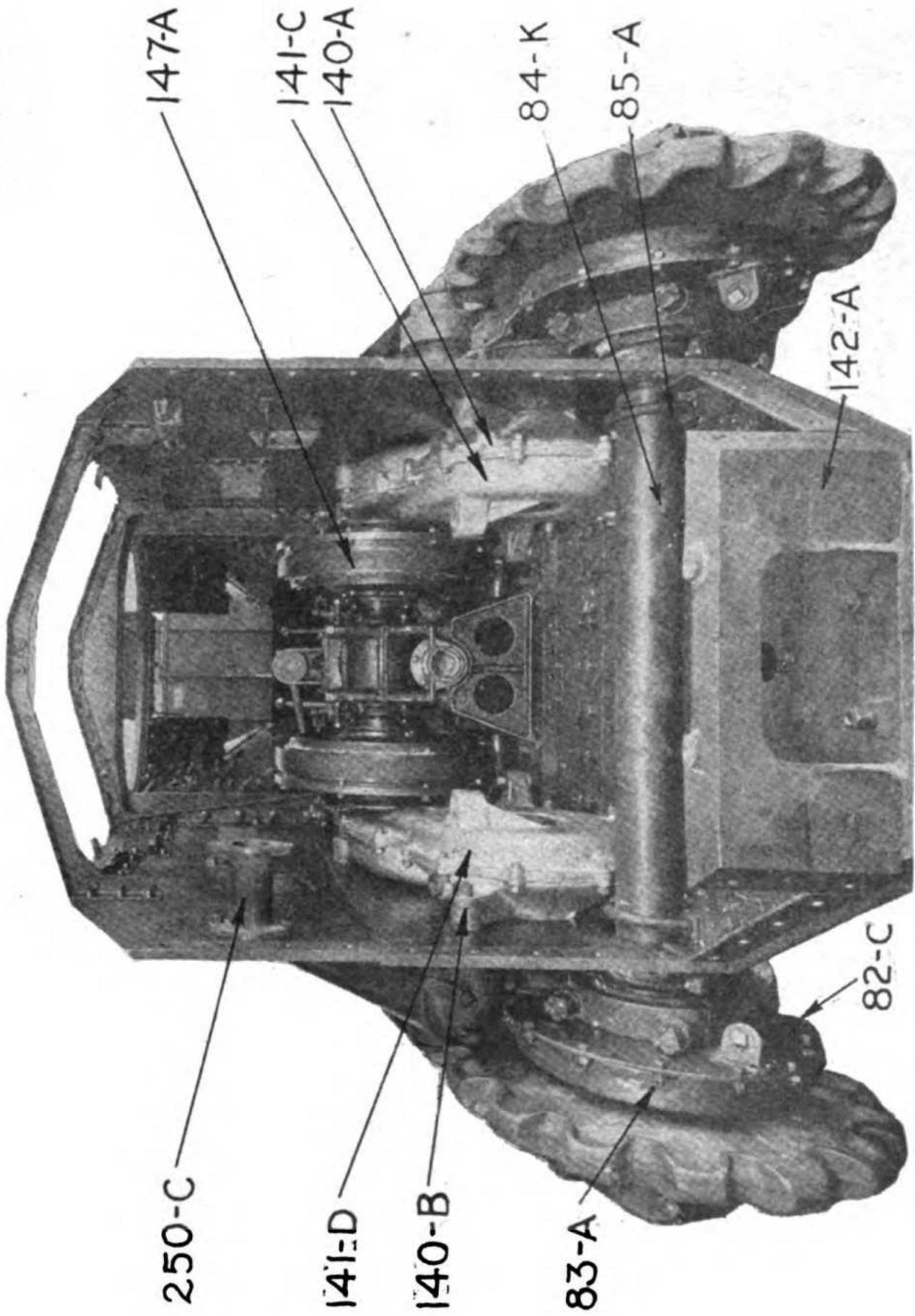
Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
Track—Front Truck			
(See illustrations on pages 181, 187, 188)			
53N	2	Bolt, spring	Bolts spring leaves together.
38D	6	Bolt, track roller frame	Front truck.
62C	6	Bolt, spring shackle	Used in springs.
54B	2	Bracket, spring	Fastened to top of track frame.
44G	2	Bushing, spring pad	Bolted to rear spring of front truck.
30C	20	Bushing, track roller	Used in all rollers.
62D	2	Bushing, spring shackle	Used in shackle.
54C	4	Bushing, equalizer end	Used front truck.
51A	2	Equalizer, front	Used between first two sets of rollers
30B	10	Gudgeon	Shaft for all rollers.
30D	10	Gudgeon plug	Screwed on each shaft.
51B	4	Pin, equalizer	Front truck.
54D	2	Pin equalizer, front and rear	Front truck
38C	4	Pin, track roller frame	Front truck.

Plate No. 85



BRAKE ADJUSTMENT PROVISION

Plate No. 86



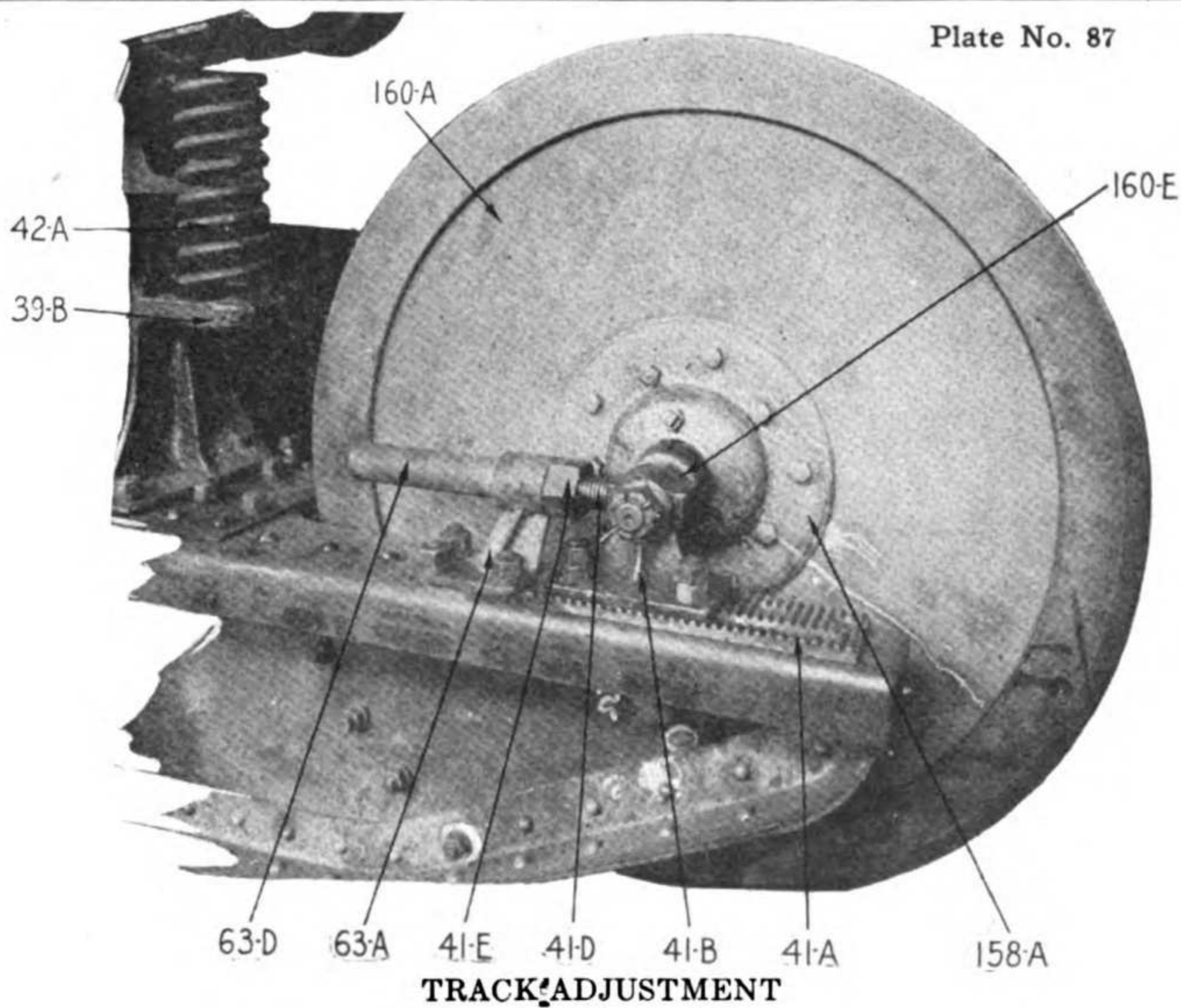
SIX-TON SPECIAL TRACTOR WITH POWER PLANT AND SEVERAL OTHER BODY PARTS REMOVED

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Front Truck—Continued</i> (See illustrations on pages 181, 187, 188)			
30A	10	Roller, track	Used in track.
53R	4	Rebound clip, spring, small	Part of spring.
53S	4	Rebound clip, spring, large	Part of spring.
53T	8	Spacer, rebound clip	
44E	2	Spring pad shim	Between spring and spring pad.
62B	2	Shackle, spring	Between springs and frame.
53P	4	Spring bushing, outside	Used in front spring shackle.
53Q	4	Spring bushing, inside	Used in rear spring shackle.
44A	2	Spring pad	Top of springs in track assembly.
44D	2	Spring plate	Used in elliptic springs.
44B	4	Spring clip	Fastens equalizers to spring.
44F	8	Spring clip nut	Fastens equalizers to spring.
53A	2	Spring leaf No. 1	Between equalizers and track frame.
53B	2	Spring leaf No. 2	Between equalizers and track frame.
53C	2	Spring leaf No. 3	Between equalizers and track frame.
53D	2	Spring leaf No. 4	Between equalizers and track frame.
53E	2	Spring leaf No. 5	Between equalizers and track frame.
53F	2	Spring leaf No. 6	Between equalizers and track frame.
53G	2	Spring leaf No. 7	Between equalizers and track frame.
53H	2	Spring leaf No. 8	Between equalizers and track frame.
53K	2	Spring leaf No. 9	Between equalizers and track frame.
53L	2	Spring leaf No. 10	Between equalizers and track frame.
53M	2	Spring leaf No. 11	Between equalizers and track frame.
38A	4	Track roller frame, small	Between equalizers and rollers.
38B	4	Track roller frame, large	Between equalizers and rollers.
<i>Track—Standard Parts (for Front Truck)</i> (See illustrations on pages 181, 187, 188)			
	8	$\frac{1}{4}$ " (.437)—14 U. S. S. x $4\frac{1}{8}$ " (4.562) hex. head bolt	
	8	$\frac{5}{8}$ " (.625)—11 U. S. S. x $1\frac{3}{8}$ " (1.375) hex. head tap bolt, thds. $1\frac{1}{8}$ " (1.125) long	
	2	$\frac{7}{16}$ " (.437)—14 U. S. S. semi-finished hex. nut	
	8	$\frac{1}{8}$ " (.437)—14 U. S. S. semi-finished hex. nut	
	6	$\frac{3}{4}$ " (.75)—10 U. S. S. semi-finished hex. nut, castellated	
	6	$\frac{5}{8}$ " (.625)—11 U. S. S. semi-finished hex. nut, castellated	
	8	$\frac{5}{8}$ " (.625) Lock washer, S. A. E. heavy	
	8	$\frac{1}{8}$ " (.125) x $1\frac{1}{2}$ " (1.5) Cotter pin	
	6	$\frac{1}{8}$ " (.125) x $1\frac{1}{2}$ " (1.5) Cotter pin	
	6	$\frac{1}{8}$ " (.125) x 2" (2) Cotter pin	
	4	$\frac{3}{8}$ " (.375) x $\frac{3}{4}$ " (.75) Button head rivet	
	4	$\frac{3}{8}$ " (.375) x $\frac{3}{4}$ " (.75) Button head rivet	
	30	$\frac{3}{4}$ " (.75) Pipe plug, countersunk head	
	20	$\frac{1}{4}$ " (.25) Pipe plug	
	20	No. A Woodruff key	
	8	No. A Woodruff key	
<i>Track—Link Assembly</i> (See illustration on page 189)			
67C	64	Bushing, track	Bushing for track pin.
67A	64	Pin, track	Used between track links.
67B	128	Retainer track, pin	
31A	64	Track link	Around frame.
<i>Track—Rear Truck</i> (See illustrations on pages 181, 187, 188)			
53N	2	Bolt, spring	Bolts spring leaves together.
54B	2	Bracket, spring	Part of track frame.
44G	2	Bushing, spring pad	Used with elliptic springs.
38D	4	Bolt, track roller frame	In track assembly.
30C	16	Bushing, track roller	Used in all rollers.
62C	6	Bolt, spring shackle	Used in springs.
62D	2	Bushing, spring shackle	Used in shackle.
54C	4	Bushing, equalizer end	Used in tracks.
54A	2	Equalizer, rear	Between second and third sets of rollers.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Rear Truck—Continued</i> (See illustrations on pages 181, 187, 188)			
30B	8	Gudgeon.....	Shaft for rollers
30D	8	Gudgeon plug.....	Used in each shop.
51B	4	Pin, equalizer.....	On rear truck.
54D	2	Pin, equalizer front and rear.....	On rear truck.
38C	4	Pin, track roller frame.....	On rear truck..
53R	4	Rebound clip, spring, small.....	Part of spring assembly.
53S	4	Rebound clip, spring, large.....	Part of spring assembly.
30A	8	Roller, track.....	Part of spring assembly.
53A	2	Spring leaf No. 1.....	Between equalizers and track frame.
53B	2	Spring leaf No. 2.....	Between equalizers and track frame.
53C	2	Spring leaf No. 3.....	Between equalizers and track frame.
53D	2	Spring leaf No. 4.....	Between equalizers and track frame.
53E	2	Spring leaf No. 5.....	Between equalizers and track frame.
53F	2	Spring leaf No. 6.....	Between equalizers and track frame.
53G	2	Spring leaf No. 7.....	Between equalizers and track frame.
53H	2	Spring leaf No. 8.....	Between equalizers and track frame.
53K	2	Spring leaf No. 9.....	Between equalizers and track frame.
53L	2	Spring leaf No. 10.....	Between equalizers and track frame.
53M	2	Spring leaf No. 11.....	Between equalizers and track frame.
53T	8	Spacer, rebound clip.....	Spring mounting parts in truck.
53P	4	Spring bushing, outside.....	Spring mounting parts in truck.
53Q	4	Spring bushing, inside.....	Spring mounting parts in truck.
44A	2	Spring pad.....	Spring mounting parts in truck.
44D	2	Spring plate.....	Spring mounting parts in truck.
44B	4	Spring clip.....	Spring mounting parts in truck.
44F	8	Spring clip nut.....	Spring mounting parts in truck.
44E	2	Spring pad shim.....	Spring mounting parts in truck.
62B	2	Shackle spring.....	Spring mounting parts in truck.
38A	8	Track roller frame, small.....	Between equalizers and rollers.



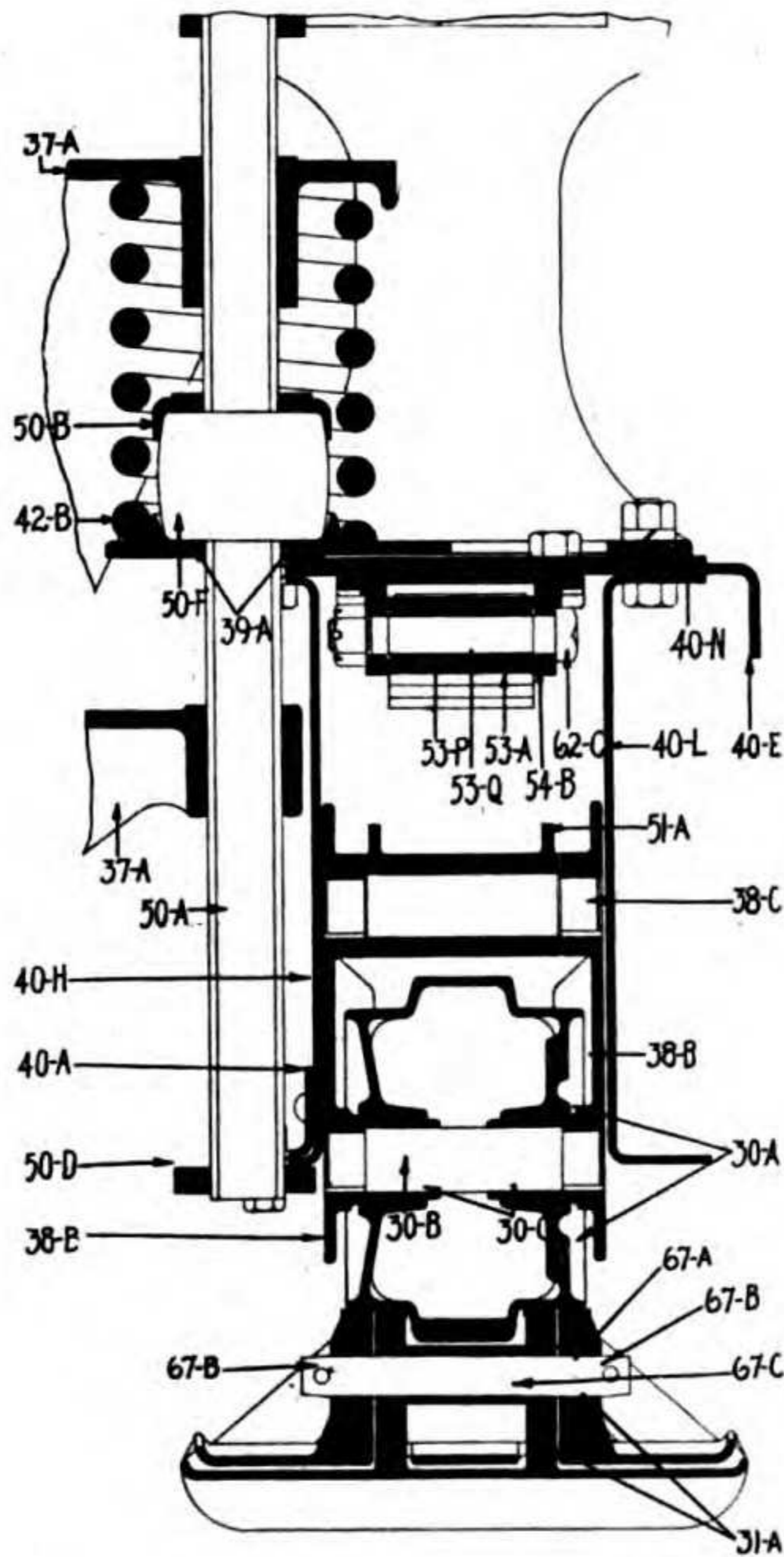
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		Track—Standard Parts for Rear Truck	
		(See illustrations on pages 181, 187, 188)	
	8	1/8" (.437) x 14 U. S. S. x 4 1/8" (4.562) hex. head bolt	
	8	5/8" (.625) x 11 U. S. S. x 1 3/8" (1.375) hex. head tap bolt	
	4	1 1/8" (1.125) length of thread	
	4	5/8" (.625) x 11 U. S. S. semi-finished hex. nut, castellated	
	2	1/8" (.437) x 14 U. S. S. semi-finished hex. nut	
	8	1/8" (.437) x 14 U. S. S. semi-finished hex. nut	
	6	3/4" (.75) x 10 U. S. S. semi-finished hex. nut castellated	
	8	5/8" (.625) lock washer S. A. E. heavy	
	8	1/8" (.125) x 1 1/2" (1.5) Cotter pin	
	4	1/8" (.125) x 1 1/2" (1.5) Cotter pin	
	6	1/8" (.125) x 2" (2) Cotter pin	
	4	3/8" (.375) x 3/4" (.75) Button head rivet	
	4	3/8" (.375) x 3/4" (.75) Button head rivet	
	24	3/4" (.75) Pipe plug countersunk head	
	166	1/4" (.25) Pipe plug	
	16	No. A Woodruff key	
	8	No. A Woodruff key	
		Track—Suspension Frame	
52B	2	Bushing, track tightener hinge bracket	Bolted to top of frame.
43E	24	Dust cap	Used on track tightener.
43D	24	Roller bushing	In roller.
43C	12	Roller pin	In roller.
42C	4	Track roller support	Part of supporting roller frame.
43A	12	Track supporting roller	Part of supporting roller frame.
52A	2	Track tightener spring retainer	Part of supporting roller frame
		Track—Standard Parts (for Suspension Frame)	
	4	5/8" (.625) x 11 U. S. S. x 1 5/8" (1.625) hex. head bolt	
	2	3/4" (.75) x 10 U. S. S. x 8 hex. head bolt	
	4	5/8" (.625) x 11 U. S. S. semi-finished hex. nuts	
	2	3/4" (.75) x 10 U. S. S. semi-finished hex. nuts	
	24	1" (1) x 8 U. S. S. semi-finished hex. nuts	
	4	5/8" (.625) Lock washer S. A. E. heavy	
	2	3/4" (.75) Lock washer S. A. E. heavy	
	24	1" (1) Lockwasher S. A. E. heavy	
	24	3/4" (.75) Pipe plug, countersunk	
		Track—Drive Sprocket	
		(See illustrations on pages 181, 187, 188)	
49A	2	Bushing, drive sprocket, inner	In hub of sprocket.
49E	2	Bushing, drive sprocket, outer	In hub of sprocket.
45A	2	Drive sprocket	Each end of rear axle.
83E	2	Dust guard, reduction gear case	In gear reduction case.
83F	2	Dust guard washer, final reduction gear	In gear reduction case.
82C	2	Filler, transmission	Rivets to case.
69A	2	Gear, final reduction	In gear reduction case.
128A	4	Gasket, reduction gear case	In gear reduction case.
69B	4	Key, final reduction	In gear reduction case.
83A	1	Reduction gear case, R. H.	Bolts to body.
83B	1	Reduction gear case, L. H.	Bolts to body.
83C	1	Reduction gear case cover, R. H.	Bolts to body.
83D	1	Reduction gear case cover, L. H.	Bolts to body.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Drive Sprocket Standard Parts</i>			
(See illustration on page 181)			
	12	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $\frac{7}{8}$ " (.875) flat head cap screw.....	
	28	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $\frac{7}{8}$ " (.875) hex. head cap screw.....	
	40	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nuts...	
	40	$\frac{3}{8}$ " (.375) Lock washer S. A. E. heavy.....	
	16	$\frac{1}{8}$ " (.187) x $\frac{5}{8}$ " (.625) button head rivet.....	
	16	$\frac{1}{8}$ " (.312) x $\frac{3}{4}$ " (.75) button head rivet.....	
	2	1" Pipe plug.....	

Plate No. 88

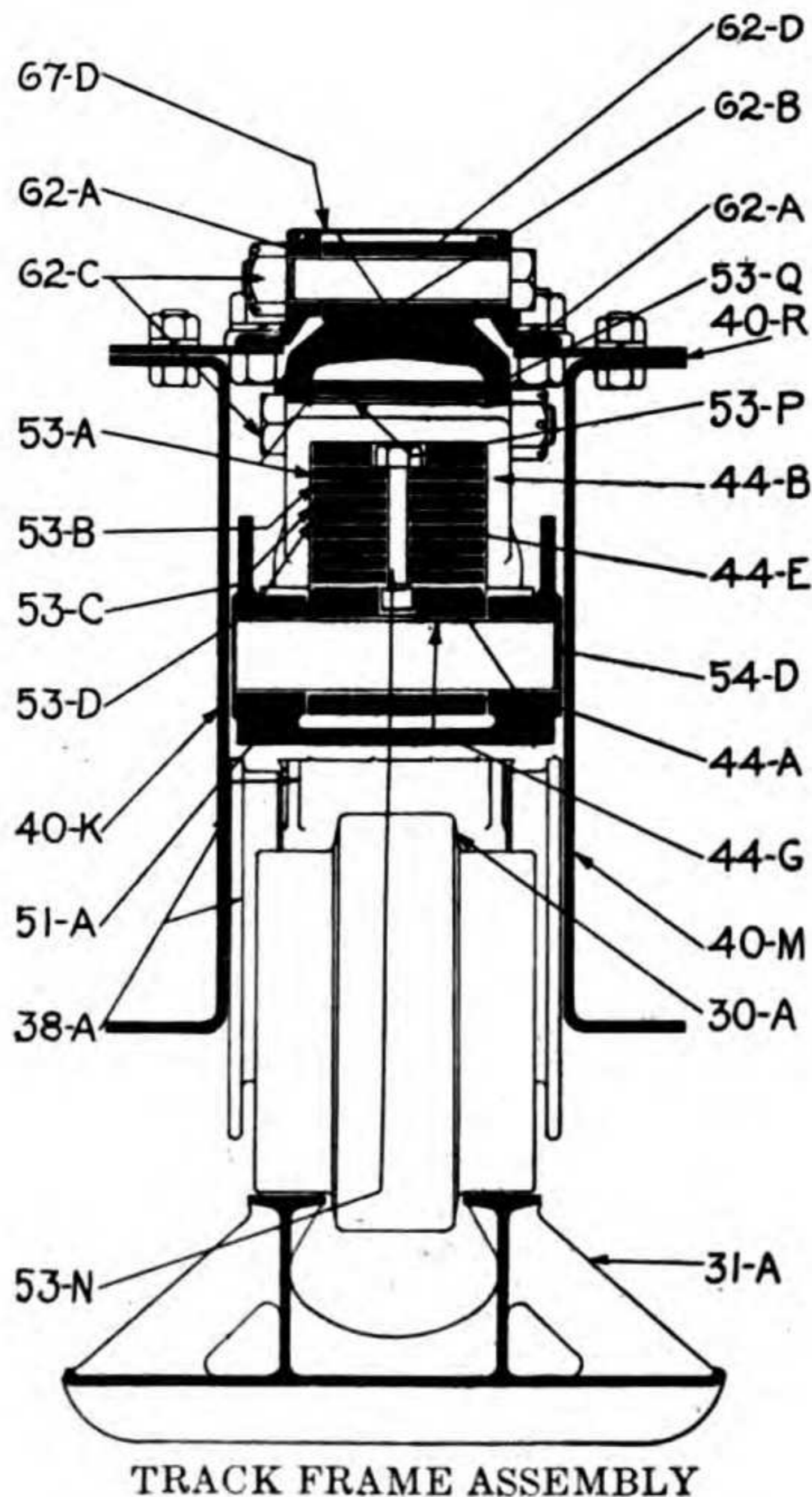


TRACK SUPPORTING BRACKET

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Miscellaneous</i>			
86A	1	Bracket, rear axle, R. H.	Supports axle at side walls of body.
86B	1	Bracket, rear axle, L. H.	Supports axle at side walls of body.
63A	2	Bracket, track adjusting, R. H.	Bolts to frame at front idler.
63B	2	Bracket, track adjusting, L. H.	Bolts to frame at front idler.
63E	4	Bearing plate, front idler bracket.	At front end of frame.
63F	4	Bearing plate, track adjusting bracket.	Used at front end with idler.
42B	2	Body supporting spring.	Above front truck.
41B	2	Bracket, front idler, R. H.	Bolts to frame at front end to support idler.
41C	2	Bracket, front idler, L. H.	Bolts to frame at front end to support idler.
63C	4	Cap, adjusting tube.	Part of front idler adjustment.
50F	2	Cushion, track suspension.	Above front truck.
85C	2	Filler block, U bolt rear axle.	Between axle and floor plate.
128C	2	Gasket, rear axle supporting bracket.	Between gear red. case and support. bracket.
49D	2	Nut, rear axle.	Rear axle shaft.
41E	4	Nut, track adjusting.	Front end idler.
85D	8	Shim, U bolt filler block.	

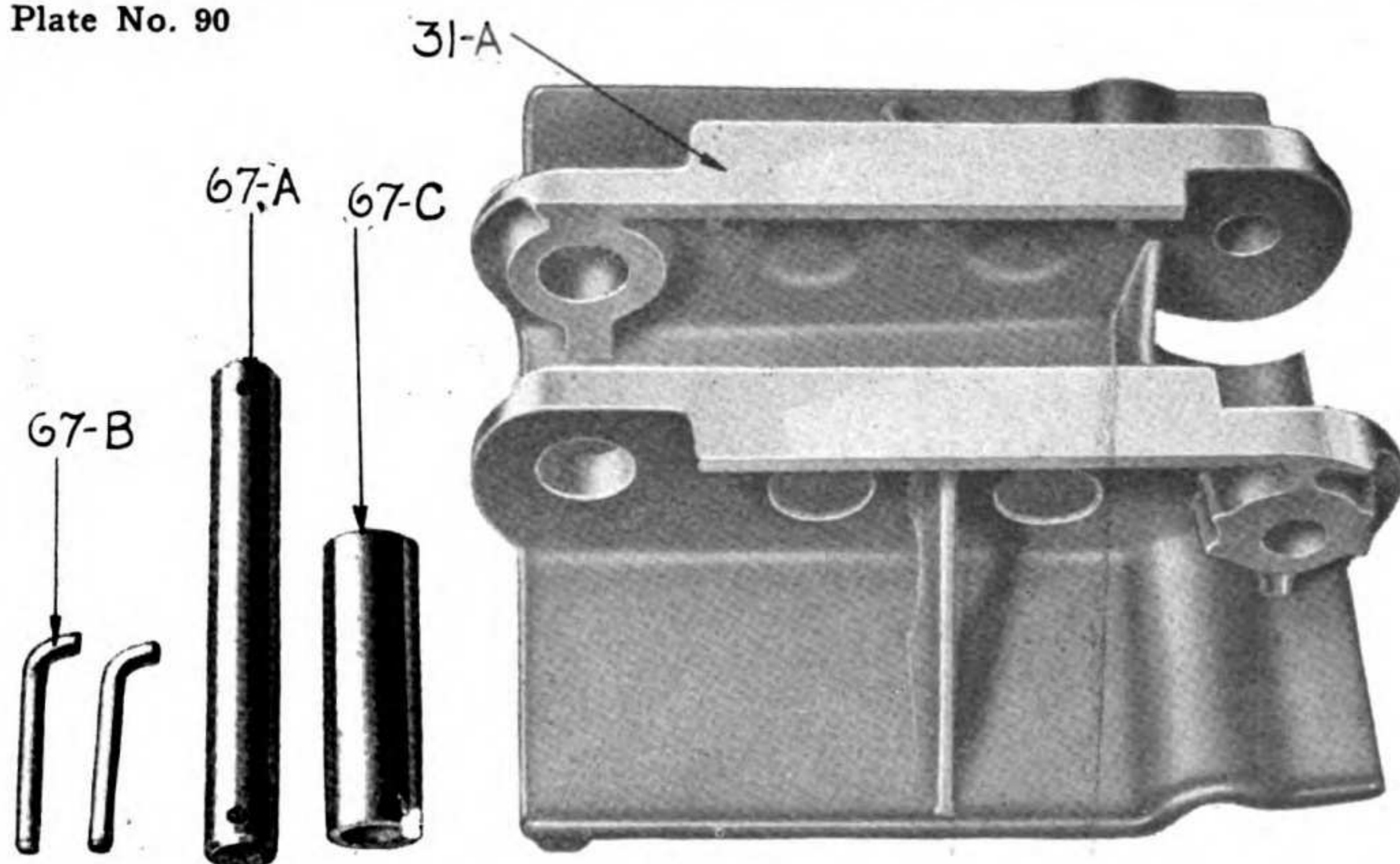
Plate No. 89



NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Miscellaneous—Continued</i>			
50B	2	Plate, track suspension cushion	Track assembly.
84A	1	Rear axle	Rear end.
85A	2	Rear axle U bolt	Fastens rear axle to floor.
41D	4	Screw track adjusting	With front idler.
160D	2	Shaft, front idler	In front idler.
50A	2	Shaft, track suspension	In front truck.
37A	1	Suspension bracket, body, R. H.	Bolts to side plate at front end.
37B	1	Suspension bracket, body, L. H.	Bolts to side plate at front end.
39A	1	Suspension bracket, frame, R. H.	Bolts to frame over front truck.
39B	1	Suspension bracket, frame, L. H.	Bolts to frame over front truck.
52D	2	Track tightener hinge bracket	Bolts to frame at rear end.
42A	2	Track tightener spring	Front end back of front idler.
63D	4	Tube, track adjusting screw	Used with front idler.
160C	4	Washer, large front idler	Used with front idler.
160F	4	Washer, small front idler	Used with front idler.
50C	4	Washer, track suspension shaft	Over front truck.
<i>Track—Standard Parts (Miscellaneous)</i>			
12		5/8" (.625) x 11 U. S. S. x 1 7/8" (1.875) hex. head bolt	
10		5/8" (.625) x 11 U. S. S. x 2" hex. head bolt	
12		5/8" (.625) x 11 U. S. S. x 2" hex. head bolt	
4		5/8" (.625) x 11 U. S. S. x 2 1/8" (2.125) hex. head bolt	
12		5/8" (.625) x 11 U. S. S. x 2 1/4" (2.25) hex. head bolt	
8		5/8" (.625) x 11 U. S. S. x 3" hex. head bolt	
4		5/8" (.625) x 11 U. S. S. x 2 1/4" (2.25) flat head cap screw	
6		3/4" (.75) x 10 U. S. S. x 2" flat head cap screw	
16		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	
12		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	
4		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	
12		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	
10		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	
16		5/8" (.625) x 11 U. S. S. semi-finished hex. nut	

Plate No. 90

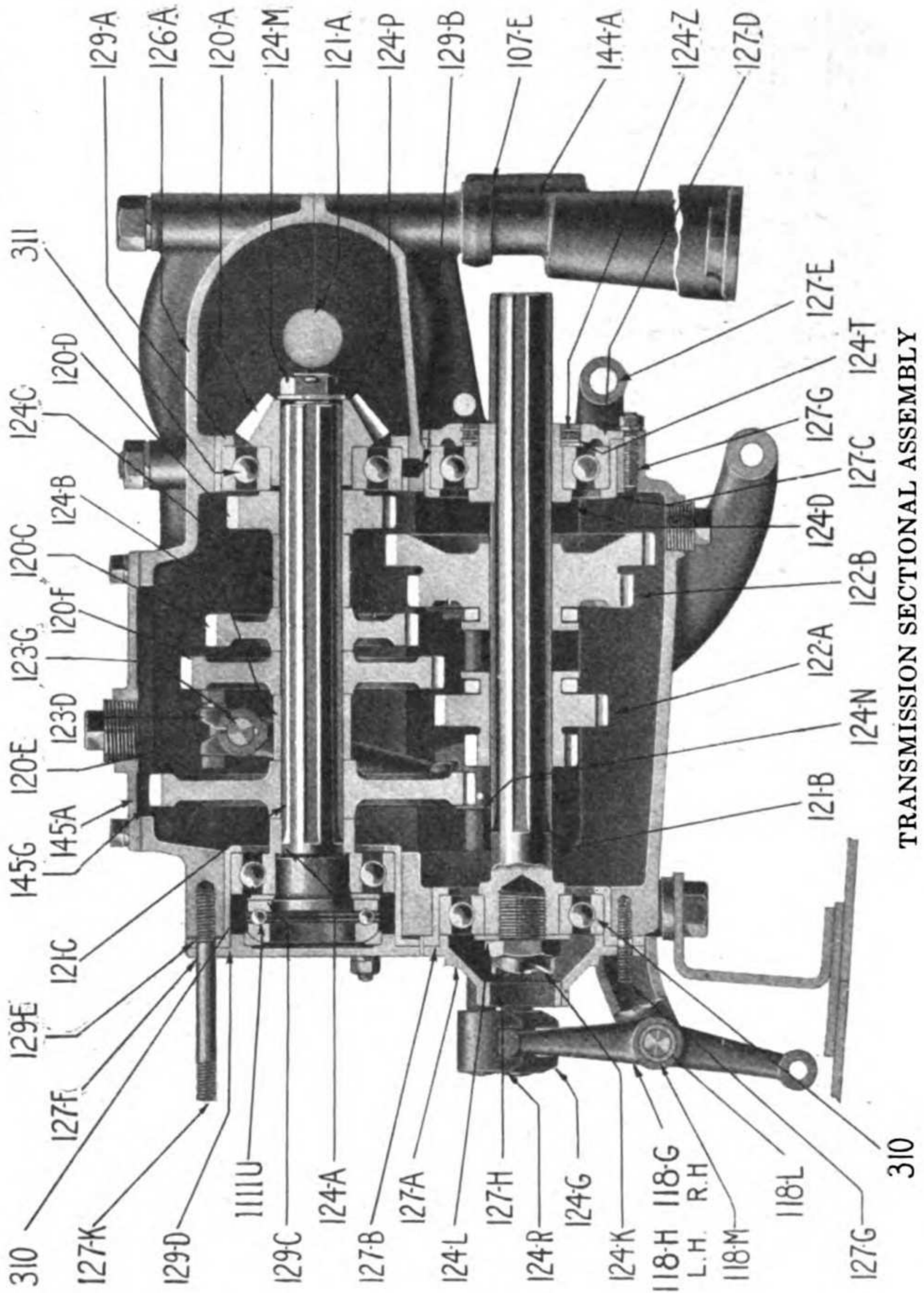


TRACK PARTS

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Track—Standard Parts (Miscellaneous)—Continued</i>			
	4	1" (1.) x 8" U. S. S. semi-finished hex. nut, castellated.....	
	2	1 1/2" (1.5) x 6" U. S. S. semi-finished hex. nut, castellated.....	
	6	3/4" (.75) x 10" U. S. S. semi-finished hex. nut, castellated.....	
	4	3/4" (.75) x 10" U. S. S. semi-finished hex. nut, castellated.....	
	12	5/8" (.625) Lock washer S. A. E., heavy.....	
	4	5/8" (.625) Lock washer S. A. E., heavy.....	
	12	5/8" (.625) Lock washer S. A. E., heavy.....	
	10	5/8" (.625) Lock washer S. A. E., heavy.....	
	16	5/8" (.625) Lock washer S. A. E., heavy.....	
	4	1/8" (.125) x 1 3/4" (1.75) Cotter pin.....	
	4	3/8" (.187) x 2 Cotter pin.....	
	2	1/4" (.25) x 2 3/4" (2.75) Cotter pin.....	
	2	1/4" (.25) x 4 1/2" (4.5) Cotter pin.....	
	6	1/8" (.125) x 1 1/2" (1.5) Cotter pin.....	
	2	1 1/2" (1.5) Pipe plug (Countersunk).....	
TRANSMISSION GROUP			
(See illustrations on pages 191, 192, 193, 194)			
118K	1	Bell crank speed gear operating rod, center.....	Front of transmission.
118G	1	Bell crank speed gear operating rod, right.....	Front of transmission.
118H	1	Bell crank speed gear operating rod, left.....	Front of transmission.
145B	1	Bracket, clutch brake transmission support, right	Bolted to transmission case.
145C	1	Bracket, clutch brake transmission support, left..	Bolted to transmission case.
129N	1	Bracket transmission bell crank lever.....	Front end of transmission.
118F	4	Bushing, bearing retainer.....	Assembled to transmission.
118M	3	Bushing, bell crank.....	Assembled to transmission.
118B	1	Bushing, cross shaft transmission case bearing...	Assembled in transmission.
122E	1	Bushing, transmission idler gear.....	Assembled in transmission.
123G	2	Bushing, transmission idler gear operating shaft..	Assembled in transmission.
127H	1	Bushing, transmission lower shaft front cap.....	Assembled in transmission.
125D	2	Cap screw, transmission housing to support bracket.....	Rear of transmission case.
178A	1	Cap, transmission gear operating rod, front.....	Assembled to transmission.
178B	1	Cap, transmission gear operating rod, rear.....	Assembled to transmission.
127A	1	Cap, transmission lower shaft, front.....	Front end of transmission.
127D	1	Cap, transmission lower shaft, rear.....	Front end of transmission.
127F	1	Cap, transmission upper shaft, front.....	Front end of transmission.
129B	1	Dowel pin, bearing retainer.....	Assembled inside of transmission.
129P	1	Dowel screw rear cap.....	Assembled inside of transmission.
124R	2	End, transmission gear operating rod.....	Used in front of transmission.
124G	1	End, transmission gear operating rod, center.....	Used in front of transmission.
145D	2	Gasket, clutch brake transmission support bracket	Used with transmission case.
145G	1	Gasket, transmission upper housing cover.....	Used with transmission case.
120E	1	Gear, first speed transmission.....	Assembled inside transmission case.
120F	1	Gear, second speed transmission.....	Assembled inside transmission case.
120C	1	Gear, third speed transmission.....	Assembled inside transmission case.
120D	1	Gear, fourth speed transmission.....	Assembled inside transmission case.
120B	1	Gear, transmission bevel.....	Assembled inside transmission case.
122C	1	Gear, transmission idler.....	Assembled inside transmission case.
125A	1	Housing, transmission lower sheet No. 1.....	Bolts to gear reduction cases.
125A	1	Housing, transmission lower sheet No. 2.....	Bolts to gear reduction cases.
125A	1	Housing, transmission lower sheet No. 3.....	Bolts to gear reduction cases.
126A	1	Housing, transmission upper sheet No. 1.....	Bolts to gear reduction cases.
126A	1	Housing, transmission upper sheet No. 2.....	Bolts to gear reduction cases.
124H	1	Jaw, transmission idler operating rod.....	Assembled to lower transmission shaft
123D	1	Lever, transmission idler gear operating.....	Assembled to transmission.
123H	2	Lockwire, transmission gear shift screw.....	Assembled to transmission.
134M	3	Nut transmission shaft.....	Upper transmission shaft.
124H	6	Oil retainer washers transmission.....	On lower shaft.
124T	3	Packing, transmission, lower shaft rear bearing..	On lower shaft.
145E	4	Pin, clutch brake transmission support bracket..	Assembled in transmission case.
127E	1	Pin, transmission cap lever.....	Assembled in transmission case.
124S	3	Pin, operating shaft.....	Assembled in transmission case.
122A	1	Pinion, first and second speed transmission.....	On transmission shaft.
122B	1	Pinion, third and fourth speed transmission.....	On transmission cross shaft.
120A	1	Pinion, transmission bevel.....	On transmission cross shaft.
145L	2	Pin, steering clutch brake guard end.....	

Plate No. 91

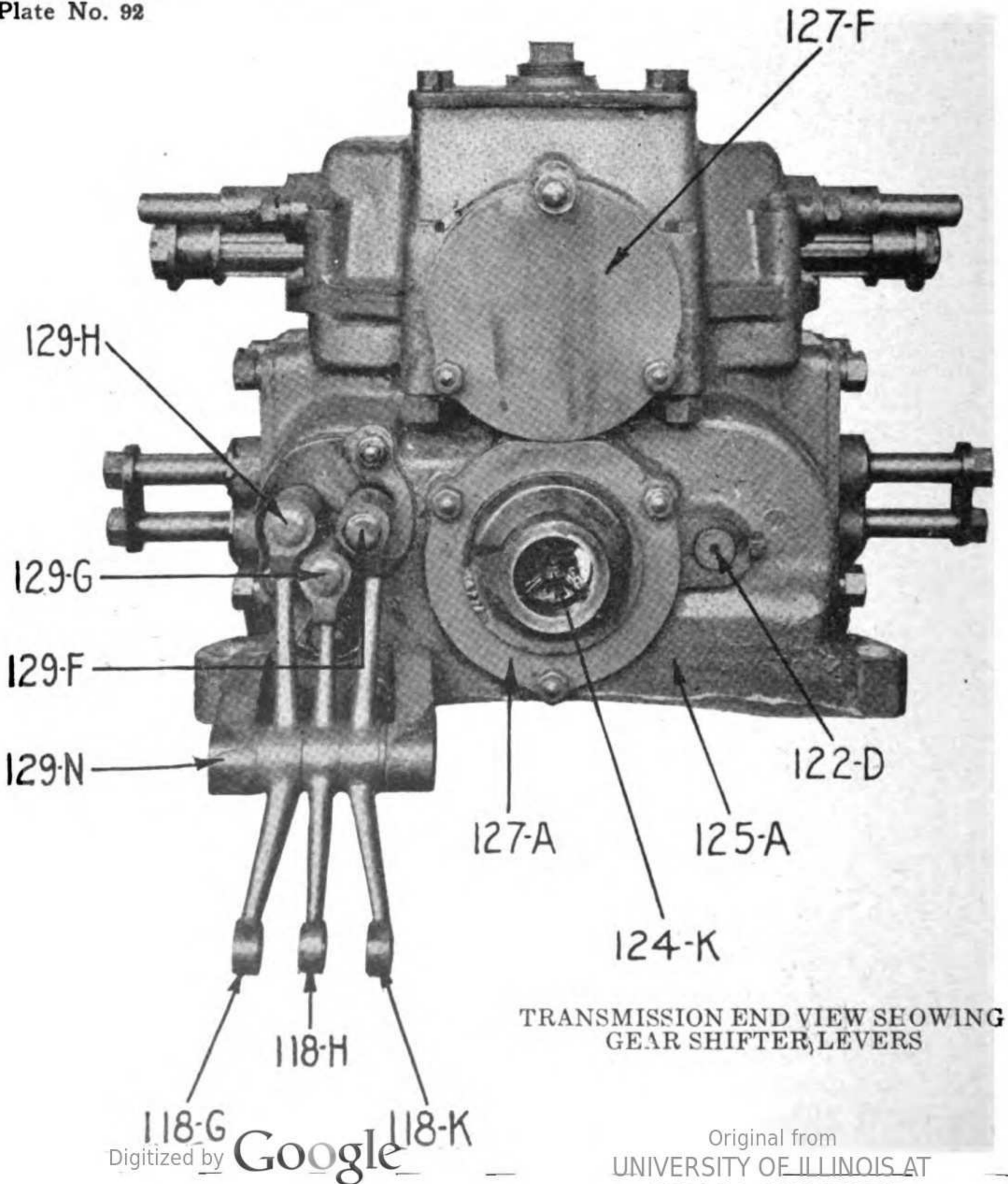


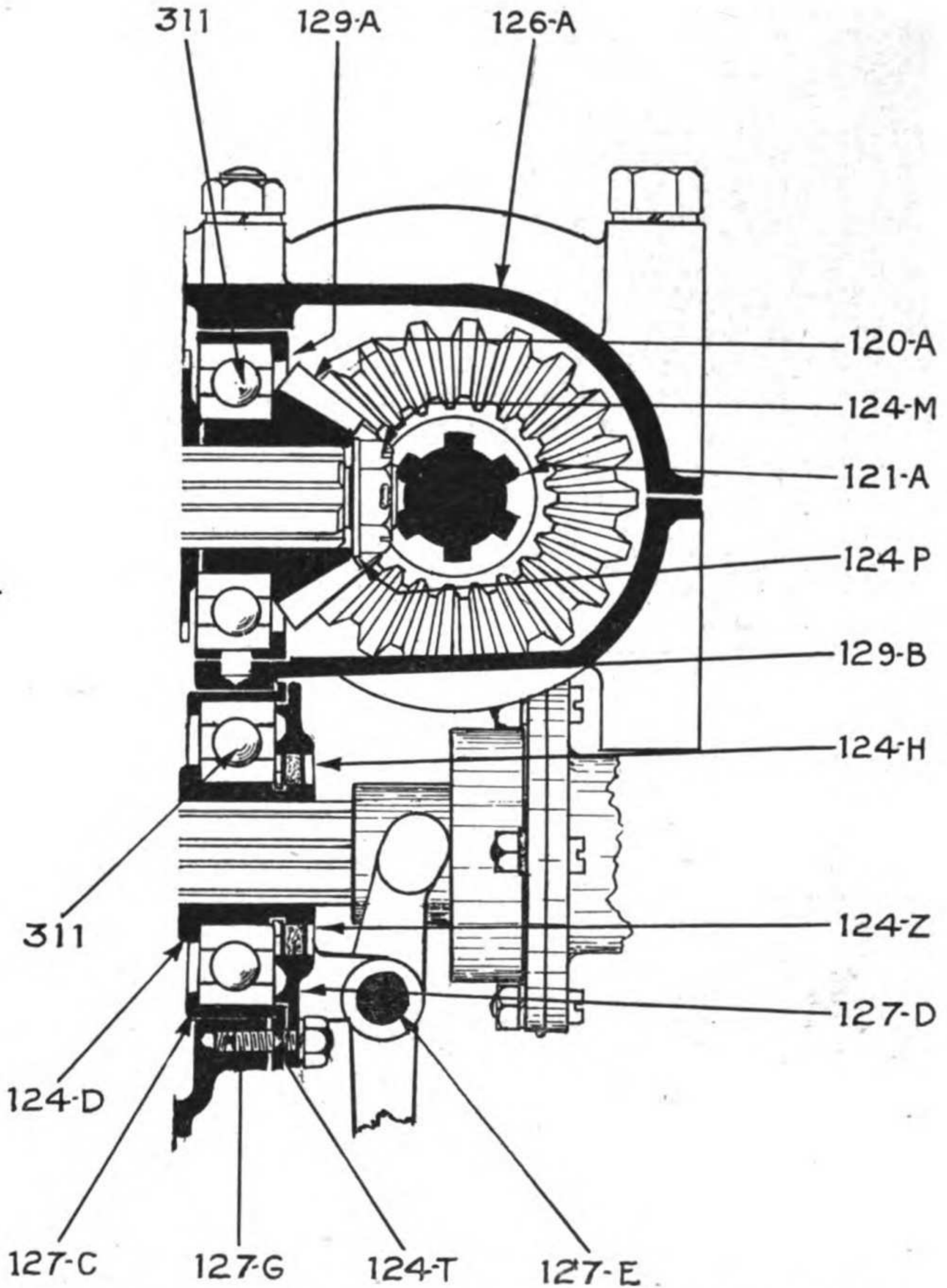
TRANSMISSION SECTIONAL ASSEMBLY

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Transmission Group—Continued</i> (See illustrations on pages 191, 192, 193, 194)			
118R	1	Retainer, cross shaft transmission case bearing, R. H.....	Assembled in transmission case.
118A	1	Retainer, cross shaft transmission case bearing, L. H.....	Assembled in transmission case.
129D	1	Retainer, transmission upper shaft bearing front.	Assembled in transmission case.
129A	1	Retainer, transmission upper shaft bearing, rear.	Assembled in transmission case.
127B	1	Retainer, transmission lower shaft bearing, front.	Assembled in transmission case.
127C	1	Retainer, transmission lower shaft bearing, rear.	Assembled in transmission case.
129G	1	Rod, transmission first and second gear operating.	Assembled to R. H. of transmission.
129F	1	Rod, transmission third and fourth gear operating.	Assembled to R. H. of transmission.
129H	1	Rod, transmission idler gear	Assembled to R. H. of transmission.

Plate No. 92



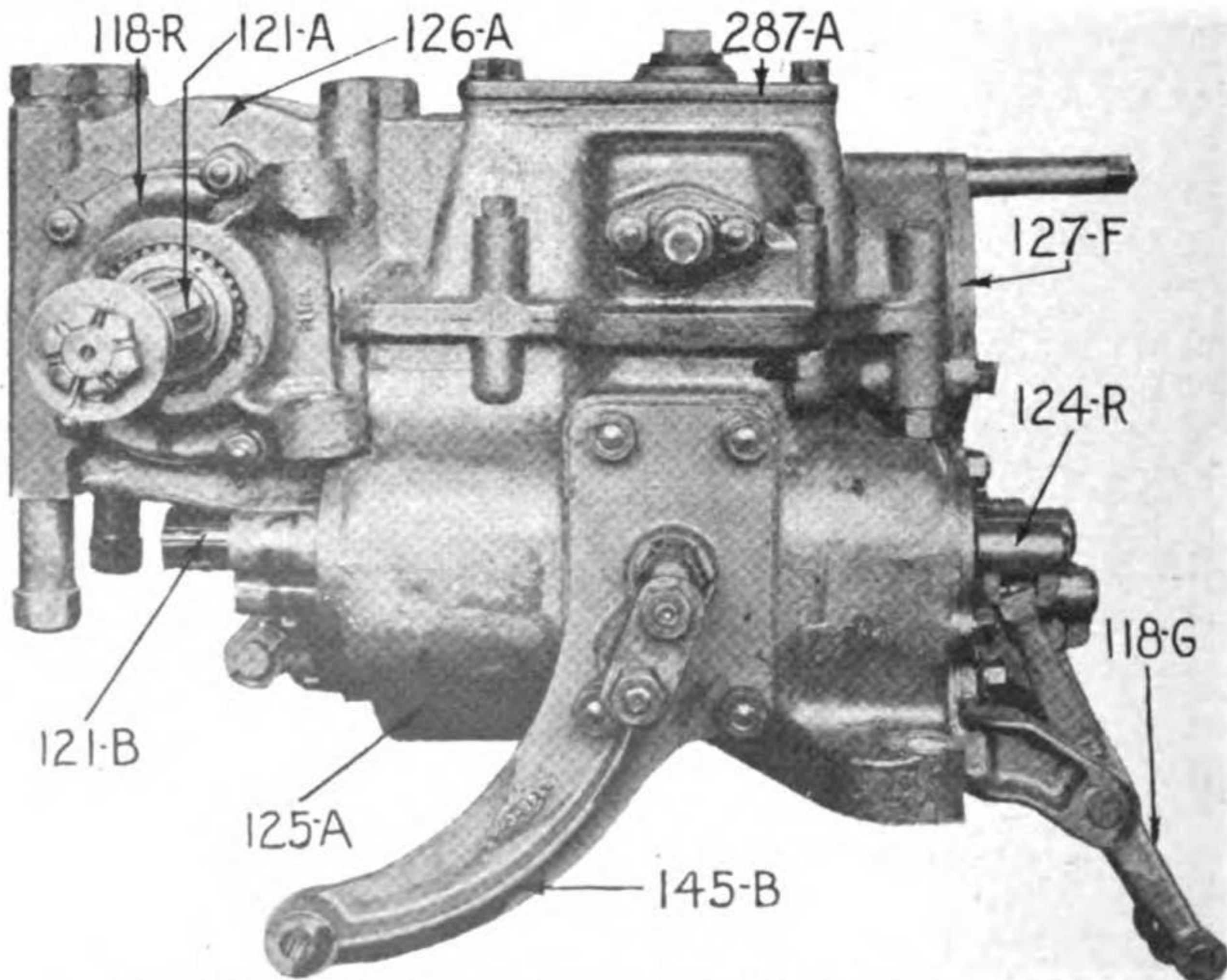


TRANSVERSE DRIVE BEVEL GEARS AND SHAFT MOUNTING

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Transmission Group—Continued</i> (See illustrations on pages 191, 192, 193, 194)			
123E	2	Screw, transmission gear shifter	Part of gear shifter assembly.
124K	1	Screw, transmission, lower	Part of gear shifter assembly.
124D	1	Seat, transmission, lower shaft rear bearing.....	Assembled to lower shaft at rear end.
118L	1	Shaft, bell crank.....	Shaft for speed gear operating bell crank.
123F	1	Shaft, idler gear operating	Transmission.
121A	1	Shaft, transmission cross	Drive between gear reduction case.
122D	1	Shaft, idler gear.....	Top of transmission.
121C	1	Shaft, transmission, upper.....	Assembled in transmission case.
121B	1	Shaft, transmission, lower	Assembled in transmission case.
178D	3	Transmission gear shift lock plunger	Assembled to transm'n gear shaft rod.
178E	3	Transmission shifting rod plunger spring.....	Assembled to transm'n gear shaft rod.
178C	3	Transmission gear shift lock plunger plug.....	Assembled to transm'n gear shaft rod.
123C	1	Shifter, idler gear.....	
123A	1	Shifter, first and second speed gear	Clamped to operating rods.
123B	1	Shifter, third and fourth speed gear.....	Clamped to operating rods.
129E	8	Shim, transmission upper shaft bearing front .004" thick.....	In assembly of transmission.
118P	8	Shim, cross shaft transmission case bearing, .004" thick	In assembly of transmission.
118C	6	Shim, cross shaft transmission case bearing .015" ($\frac{1}{4}$) thick	In assembly of transmission.
129M	4	Shim, transmission upper shaft bearing, front .015" ($\frac{1}{4}$) thick	In assembly of transmission.
145F	2	Spacer, clutch brake transmission support bracket.....	Assembled with transmission.
124B	1	Spacer, transmission upper shaft gear inter.....	Assembled with transmission.
118D	2	Spacer, steering clutch bearing	Assembled with transmission.
129C	1	Spacer, upper shaft front bearing.....	Assembled with transmission.
124C	1	Spacer, upper shaft gear, rear.....	Assembled with transmission.
124A	1	Spacer, transmission upper shaft gear, front.....	Assembled with transmission.
287A	1	Speedometer drive.....	Top of transmission.

Plate No. 94



SIDE VIEW OF TRANSMISSION SHOWING HOUSING AND TRANSVERSE SHAFT

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Transmission Group—Continued</i>			
(See illustration on page 191)			
125E	8	Stud, clutch brake support bracket to transmission case.....	Bolt support bracket to transmission case.
125C	2	Stud, gear operating rod caps to case.....	Front end of transmission.
125F	4	Stud, transmission lower to upper housing.....	Transmission.
125B	2	Stud, transmission lower to upper housing, rear..	Transmission.
127K	1	Stud, transmission upper shaft, front.....	Transmission.
127G	20	Stud, transmission shaft front cap.....	Transmission.
145H	2	Transmission bolt straps.....	Assembled to gear shaft rod.
129K	1	Transmission gear shift boot.....	Assembled to gear shaft rod.
129L	1	Transmission gear shift interlock plunger..	Used in transmission.
118N	2	Washer, ball crank thrust.....	Used in transmission.
118E	2	Washer, cross shaft thrust.....	Used in transmission.
145K	1	Washer, transmission upper shaft transmission bearing retainer.....	Used in transmission.
124L	1	Washer, transmission shaft, lower.....	Used in transmission.
124P	1	Washer, transmission shaft, upper.....	Used in transmission.
124Z	1	Washer, lower transmission shaft rear bearing retainer.....	Used in transmission.
<i>Transmission—Standard Parts.</i>			
(See illustrations on pages 191, 192, 193, 194)			
1		Radial bearing No. 310.....	
1		Radial bearing No. 310.....	
1		Radial bearing No. 311.....	
1		Radial bearing No. 311.....	
1		Radial bearing No. 311.....	
1		Radial bearing No. 311.....	
1		Radial bearing No. 311.....	
1		Thrust bearing equivalent to 1111U Hess Bright	
1		Thrust bearing equivalent to 1111U Hess Bright	
1		Thrust bearing equivalent to 1111U Hess Bright	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{8}$ " (1.875) hex. head bolt.....	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{8}$ " (1.875) hex. head bolt.....	
2		$\frac{1}{2}$ " (.5) x 16 U. S. S. x $4\frac{3}{8}$ " (4.375) hex. head bolt	
4		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head cap screw.....	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{4}$ " (1.25) hex. head cap screw.....	
2		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{3}{4}$ " (1.75) hex. head cap screw.....	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{7}{8}$ " (1.875) hex. head cap screw.....	
2		$\frac{3}{4}$ " (.75) length of thread.....	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut..	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut...	
1		$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut...	
4		$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut ..	
20		$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nut...	
8		$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nut. ..	
2		$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nut.....	
4		$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nut.....	
2		$\frac{5}{8}$ " (.625) x 11 U. S. S. semi-finished hex. nut...	
1		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
4		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
1		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
3		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
2		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
20		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
2		$\frac{3}{4}$ " (.75) Lock washer S. A. E., light.....	
4		$\frac{3}{8}$ " (.375) Lock washer S. A. E., light.....	
2		$\frac{1}{2}$ " (.5) Lock washer S. A. E., heavy.....	
8		$\frac{1}{2}$ " (.5) Lock washer S. A. E., heavy.....	
2		$\frac{5}{8}$ " (.625) Lock washer S. A. E., heavy.....	
10		$\frac{3}{8}$ " (.375) Lock washer S. A. E., heavy.....	
20		$\frac{1}{8}$ " (.125) x 1" Cotter pin.....	
20		$\frac{1}{8}$ " (.125) x 1" Cotter pin.....	
20		$\frac{1}{8}$ " (.125) x 1.75" Cotter pin.....	
2		$\frac{1}{8}$ " (.125) x 1" Cotter pin.....	
20		No. 2 x $1\frac{1}{2}$ " (1.5) Taper pin.....	
20		No. 3 x $1\frac{1}{2}$ " (1.5) Taper pin.....	
20		No. 11 Woodruff key.....	

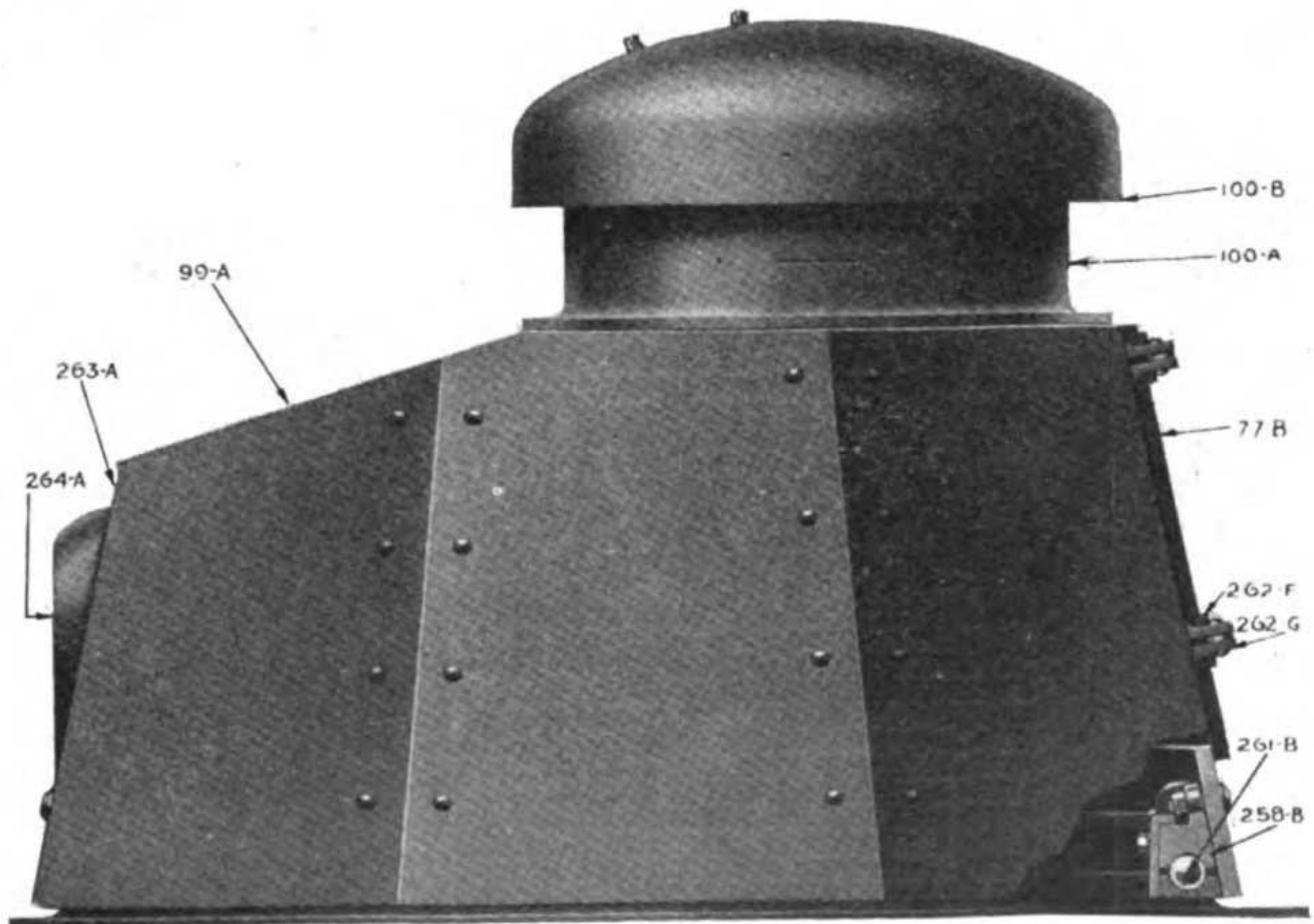
NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Transmission—Standard Parts—Continued</i>			
(See illustrations on pages 191, 192, 193, 194)			
20	1	1" Pipe plug.....	
100	1	Soft steel wire No. 18 B. W. G. equals (.049") x 11"	
10	1	Steel ball .656" ($\frac{11}{16}$) diameter.....	
2	2	$\frac{5}{8}$ " (.625) Lock washer S. A. E. heavy.....	
1	1	$\frac{3}{8}$ " (.375) Lock washer S. A. E. heavy.....	
2	2	$\frac{1}{8}$ " (.125) x 1" (1.) Cotter pin.....	
2	2	$\frac{1}{8}$ " (.125) x 1" (1.) Cotter pin.....	
3	3	$\frac{1}{8}$ " (.125) x $1\frac{3}{4}$ " (1.75) Cotter pin.....	
2	2	No. 2 x $1\frac{1}{2}$ " (1.5) taper pin.....	
2	2	No. 3 x $1\frac{1}{2}$ " (1.5) taper pin.....	
2	2	No. 11 Woodruff key.....	
1	1	1" Pipe plug.....	
1	1	Soft steel wire No. 18 B. W. G. equals (.049) x 11	
2	2	Steel ball (.656) $\frac{11}{16}$ " diameter.....	
TURRET GROUP			
<i>Turret—Armor Plate</i>			
(See illustration on page 197)			
75A	1	Corner plate,—front, R. H.....	
75B	1	Corner plate, front, L. H.....	
73A	1	Corner plate, rear, L. H.....	
77A	1	Door, R. H.....	Hanged to R. H. door plate.
77B	1	Door, L. H.....	Hanged to L. H. door plate.
76A	1	Door plate, R. H.....	
76B	1	Door plate, L. H.....	
318A	1	End plate, R. H.....	In turret.
318B	1	End plate, L. H.....	In turret.
313C	1	Guard plate.....	In turret.
76C	2	Loop hole cover.....	Turret side plate.
99A	1	Roof plate, front.....	Top of turret.
99B	1	Roof plate, rear.....	Top of turret.
313A	1	Roof plate reinforcement.....	In turret.
74A	1	Side plate, R. H.....	
74B	1	Side plate, L. H.....	
100A	1	Tower.....	Top of rear roof plate.
100B	1	Tower cover.....	Covers tower.
<i>Turret—Flange Steel</i>			
261H	1	Door latch.....	Assembled with doors.
261F	1	Door latch bracket.....	Assembled with doors.
315A	1	Baffle plate, turret.....	In turret.
261D	4	Retaining clamp.....	Holds turret to body.
260C	2	Roof and front corner plate connection, front.....	Assembled in turret.
260D	2	Roof and front corner plate connection, rear.....	Assembled in turret.
260E	2	Roof plate connection.....	Assembled in turret.
260A	3	Rear roof and side plate connection.....	Assembled in turret.
260F	2	Rear roof and side plate connection.....	Assembled in turret.
260B	2	Side plate connection.....	Assembled in turret.
<i>Turret—Forgings</i>			
78B	1	Brake collar.....	Assembled with brake assembly in turret.
78A	1	Brake handle.....	Assembled with brake assembly in turret.
262F	4	Hinge, male.....	Used with doors.
262G	4	Hinge, female.....	Used with doors.
<i>Turret—Castings</i>			
315B	1	Bracket, R. H., baffle plate.....	Fastens to baffle plate.
315C	1	Bracket, L. H., baffle plate.....	Fastens to baffle plate.
78C	1	Brake bearing.....	Used with brake assembly.
258A	1	Ball race, upper.....	Bottom of turret and bolted to turret plates.

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Turret—Castings—Continued</i>			
78D	1	Brake shoe.....	Used with brake assembly.
138A	1	Handle.....	Used with brake assembly.
259B	1	Tower cover hinge.....	Turret tower.
259C	1	Tower cover latch lug.....	Turret tower.
259A	1	Tower ring.....	Turret tower.
317A	1	Trunnion bracket, R. H.....	Fits in pinion.
317B	1	Trunnion bracket, L. H.....	Fits in pinion.
<i>Turret—Steel Stock</i>			
261G	1	Door latch pivot.....	In turret door latch.
314E	2	Mask trunnion.....	Fits in bracket.
<i>Turret—Screw Stock</i>			
78E	1	Brake spindle.....	Brake assembly.
161E	1	Door latch post.....	In turret door latch.
76E	2	Hinge bolt.....	Used with turret doors.
262H	4	Hinge pin.....	Used with turret doors.
76D	2	Lock stud.....	Loop hole cover.
317C	2	Set screw, mask trunnion.....	
259K	1	Tower cover hinge pin.....	Operates tower cover.
259F	1	Tower cover latch.....	Operates tower cover.

Plate No. 95



EXTERIOR AND PARTIALLY CUTAWAY VIEW OF TURRET

NOMENCLATURE OF PARTS—Continued

No. Per Tractor	Property Classification—Class 4, Division 11	
	Name of Part	Location
Turret—Sheet Steel		
(See illustration on page 197)		
36	Ball guide.....	Between turret and body.
32	Ball race shim.....	Between turret and body.
18	Ball spacer.....	Between turret and body.
Turret—Spring Steel		
1	Tower cover latch handle.....	Operates tower cover.
1	Tower cover latch spring.....	Operates tower cover.
1	Tower cover spring.....	Operates tower cover.
Turret—Key Bolts		
(See illustration on page 197)		
16	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{1}{4}$ " (1.25) key bolts.....	
4	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{3}{8}$ " (1.375) key bolts...	
34	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{1}{2}$ " (1.5) key bolts.....	
16	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{7}{8}$ " (1.625) key bolts...	
8	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $2\frac{1}{4}$ " (1.875) key bolts...	
Turret—Standard Parts		
2	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{3}{8}$ " (1.375) Flat head cap screw.....	
2	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{1}{4}$ " (1.25) Flat head cap screw.....	
10	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{1}{2}$ " (1.5) Flat head cap screw.....	
8	$\frac{3}{8}$ " (.375) x 16 U. S. S. x 1" (1) Hex. head cap screw.....	
2	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{2}$ " (1.5) hex. head cap screw.....	
6	No. 14 x 20 U. S. S. x 1" (1) Fillister head cap screw.....	
1	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $\frac{3}{4}$ " (.75) Fillister head cap screw.....	
6	$\frac{3}{8}$ " (.375) x 16 U. S. S. x $1\frac{1}{4}$ " (1.25) Fillister head cap screw.....	
5	No. 24 x 16 U. S. F. x $\frac{7}{8}$ " (.875) A. S. M. E., countersunk head machine screw.....	
6	No. 14 x 20 U. S. S. machine nut.....	
2	No. 24 x 16 U. S. F. x 1" (1) A. S. M. E., countersunk head machine screw.....	
2	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nuts..	
6	$\frac{3}{8}$ " (.375) x 16 U. S. S. semi-finished hex. nuts..	
1	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
2	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
10	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
2	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
2	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
1	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
4	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
102	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
2	$\frac{1}{2}$ " (.5) x 13 U. S. S. wing nut.....	
6	$\frac{3}{4}$ " (.25) Lock washer, S. A. E. light.....	
2	$\frac{3}{8}$ " (.375) Lock washer, S. A. E. light.....	
8	$\frac{3}{8}$ " (.375) Lock washer, S. A. E. light.....	
1	$\frac{3}{8}$ " (.375) Lock washer, S. A. E. heavy.....	
2	$\frac{3}{8}$ " (.375) Lock washer, S. A. E. heavy.....	
6	$\frac{3}{8}$ " (.375) Washer, commercial.....	
1	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. heavy.....	
10	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. heavy.....	
2	$\frac{1}{2}$ " (.5) Lock washer, S. A. E. heavy.....	
4	$\frac{3}{8}$ " (.375) x $1\frac{1}{4}$ " (1.25) Button head rivets.....	
2	$\frac{3}{8}$ " (.375) x $1\frac{1}{4}$ " (1.25) Button head rivets.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
<i>Turret—Standard Parts—Continued</i>			
	2	$\frac{3}{8}$ " (.375) x $1\frac{1}{4}$ " (1.25) Button head rivets.....	
	4	$\frac{3}{8}$ " (.375) x $1\frac{3}{4}$ " (1.75) Button head rivets.....	
	2	$\frac{1}{2}$ " (.5) x $1\frac{3}{4}$ " (1.75) Button head rivets.....	
	36	$\frac{1}{8}$ " (.187) Flat head tank rivets.....	
	5	$\frac{3}{8}$ " (.375) x 1" (1) countersunk head rivets.....	
<i>Turret—Gunner Seat</i>			
262B	1	Gunner seat strap.....	
262A	1	Gunner seat adjusting strap.....	Inside the turret.
262C	1	Gunner seat buckle loop.....	Inside the turret.
262D	2	Gunner seat loop.....	Inside the turret.
262E	2	Gunner seat strap hook.....	Inside the turret.
	4	$\frac{3}{8}$ " (.375) x $1\frac{1}{8}$ " (1.125) button head rivets.....	
	8	No. 8 x $\frac{1}{2}$ " (.5) belt rivets.....	
	8	No. 8 x $\frac{5}{8}$ " (.625) belt rivets.....	
	8	No. 8 x $\frac{5}{8}$ " (.625) belt rivets.....	
	8	No. 8 Burr.....	
	8	No. 8 Burr.....	
	8	No. 8 Burr.....	
	2	$1\frac{1}{4}$ " (1.25) Barrel roller harness buckle Eberhard Mfg. No. 50 Jap finished or equal.....	
	4	$\frac{1}{8}$ " (.062) x $\frac{5}{8}$ " (.625) cotter pin.....	
<i>Turret—Miscellaneous</i>			
93K	2	Door handle.....	Inside turret.
261B	18	Turret ball.....	Between turret and body.
93K	1	Tower cover handle.....	Used in tower.
259L	1	Tower cover spring bushing.....	Used in tower.
259M	1	Tower cover stop.....	Used in tower.
259E	1	Tower cover latch nut.....	Used in tower.
261E	3	Tower head rest, complete.....	
<i>Turret—Ammunition Tray—For 37 M. M. Gun</i>			
267D	1	Bottom plate.....	In turret.
267C	2	Spacer.....	In turret.
267B	2	Spacer.....	In turret.
267E	2	Support.....	
267A	1	Top plate.....	
35DC	4	$\frac{1}{2}$ " (.5) x 13 U. S. S. x $1\frac{1}{2}$ " (1.5) key bolts.....	
<i>Turret—Standard Parts—For Ammunition Tray</i>			
	8	$\frac{1}{4}$ " (.25) x $\frac{3}{8}$ " (.375) Button head rivet.....	
	4	$\frac{1}{2}$ " (.5) x 13 U. S. S. semi-finished hex. nuts.....	
<i>Turret—Armor Plate—37 M. M. Gun Mount and Equipment</i>			
322A	1	Gun armor.....	In turret.
322B	1	Gun armor, bottom plate.....	In turret.
322C	1	Gun armor, support plate, R. H.....	In turret.
322D	1	Gun armor, support plate, L. H.....	In turret.
316A	1	Mask armor, upper.....	In turret.
316B	1	Mask armor, lower.....	In turret.
321A	1	Mask armor, front plate, right.....	In turret.
321B	1	Mask armor, front plate, left.....	In turret.
321D	1	Mask armor, right side plate.....	In turret.
321E	1	Mask armor, left side plate.....	In turret.
313D	1	Turret, front plate.....	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		<i>Turret—Flange Steel</i>	
315D	1	Brace plate, Mask	In turret.
		<i>Turret—Castings</i>	
320A	1	Gun cradle	In turret.
326A	1	Gun armor support	In turret.
319A	1	Gun mask	In turret.
323B	1	Sight support, rear	Fastens to cradle.
		<i>Turret—Cold Rolled Steel</i>	
314B	1	Bolt for gun cradle heel	
314C	1	Cradle trunnion, upper	Between track and cradle.
314D	1	Cradle trunnion, lower	Between track and cradle.
314A	1	Heel for gun mount	In turret.
323C	1	Retainer pin for sight protector	
323F	1	Sight retainer	Catch to hold sight.
		<i>Turret—Sheet Steel</i>	
325B	1	Shield	Fits on brace.
325A	1	Shoulder brace	Fits tail of cradle.
324A	1	Shoulder brace stiffening plate	Fits on brace.
324C	1	Shoulder brace support	Fits on brace.
324B	2	Shoulder rest	Fits on brace.
		<i>Turret—Standard Parts—37 M. M. Gun Mount</i>	
	12	$\frac{5}{16}$ " (.312) x 18 U. S. F. x $\frac{3}{4}$ " (.75) hex. head bolts	
	2	$\frac{1}{4}$ " (.312) x 18 U. S. F. x 1" hex. head bolts	
	1	$\frac{3}{8}$ " (.375) x 16 U. S. S. x 1" hex. head bolts	
	2	$\frac{3}{8}$ " (.375) x 16 U. S. S. x 1 $\frac{13}{20}$ " (1.65) hex. head bolts	
	2	$\frac{3}{8}$ " (.375) x 16 U. S. S. x 1 $\frac{7}{8}$ " (1.875) hex. head bolts	
	4	$\frac{3}{8}$ " (.375) x 16 U. S. S. hex. head cap screw	
	1	No. 24—16 U. S. F. x $\frac{3}{4}$ " (.75) A. S. M. E. hex. head machine screw	
	1	No. 24—16 U. S. F. x 1" A. S. M. E. hex. head machine screw	
	2	No. 24—16 U. S. F. x 1" A. S. M. E. hex. head machine screw	
	2	No. 24—16 U. S. F. x 1" A. S. M. E. hex. head machine screw	
	2	No. 24—16 U. S. F. x 1" A. S. M. E. hex. head machine screw	
	1	No. 24—16 U. S. F. x 1" A. S. M. E. countersunk head machine screw	
	5	No. 24—16 x U. S. F. x $\frac{5}{8}$ " (.625) A. S. M. E. countersunk head machine screw	
	3	No. 24—16 U. S. F. x $\frac{3}{4}$ " (.75) A. S. M. E. countersunk head machine screw	
	4	No. 24—16 U. S. F. x $\frac{3}{4}$ " (.75) A. S. M. E. countersunk head machine screw	
	1	No. 24—16 U. S. F. x $\frac{3}{4}$ " (.75) A. S. M. E. countersunk head machine screw	
	4	No. 24—16 U. S. F. x 1" A. S. M. E. countersunk head machine screw	
	1	No. 24—16 U. S. F. x 1" A. S. M. E. countersunk head machine screw	

NOMENCLATURE OF PARTS—Continued

Part No.	No. Per Tractor	Property Classification—Class 4, Division 11	
		Name of Part	Location
		<i>Turret—Standard Parts—37 M. M. Gun Mount —Continued</i>	
	3	No. 24—16 U. S. F. x 1" A. S. M. E. countersunk head machine screw	
	4	No. 24—16 U. S. F. x 1" A. S. M. E. countersunk head machine screw	
	5	No. 24—16 U. S. F. x 1 1/4" (1.25) A. S. M. E. countersunk head machine screw	
	4	No. 30—14 U. S. F. x 1 3/8" (1.375) A. S. M. E. countersunk head machine screw	
	10	3/8" (.312) x 18 U. S. F. hex. nuts	
	2	No. 24 x 16 U. S. F., A. S. M. E. hex. nuts	
	2	No. 24 x 16 U. S. F., A. S. M. E. hex. nuts	
	4	No. 24 x 16 U. S. F., A. S. M. E. hex. nuts	
	2	No. 30 x 14 U. S. F., A. S. M. E. hex. nuts	
	4	3/8" (.375) x 16 U. S. S. hex. nuts	
	1	3/8" (.375) x 16 U. S. F. check nut	
	2	1/2" (.5) x 13 U. S. S. hex. nuts	
	4	3/8" (.375) Lock washer S. A. E., heavy	
	2	3/8" (.375) x 1 1/4" (1.125) countersunk head rivets	
	12	1/4" (.187) x 1/2" (.5) Button head rivets	
	12	1/4" (.25) x 3/4" (.75) Button head rivets	
	2	1/2" (.25) x 3/4" (.75) Button head rivets	
	7	1/4" (.25) x 3/4" (.75) Button head rivets	
	8	3/8" (.375) x 1 1/8" (1.125) Button head rivets	
	2	3/8" (.375) x 1 1/4" (1.25) Button head rivets	
		<i>Turret—Miscellaneous</i> (See illustration on page 197)	
326B	1	Handle, right hand	Fits on tail of cradle.
323A	1	Sight protector, front	Fits on sight.
323D	1	Sight retainer lanyard	Used with sight.
323E	1	Lock pin	Used with sight.
		<i>Turret—Ammunition Rack—For 37 M. M. Smoke Shells</i>	
308A	1	Front plate	Hooks on main rack.
308B	1	Guide plate, upper	Hooks on main rack.
308C	1	Guide plate, lower	Hooks on main rack.
	22	1/8" (.187) x 1/2" (.5) Button head rivets	
		<i>Turret—Ammunition Rack—For 37 M. M. Gun</i>	
309A	2	Back plate	Gunner's compartment.
307A	2	Bottom plate	Gunner's compartment.
310E	6	Front hinge plate support	Gunner's compartment.
305A	4	Guide plate, upper and lower intermediate	Gunner's compartment.
305A	4	Guide plate, upper intermediate and lower	Gunner's compartment.
310B	4	Hanger	Gunner's compartment.
310C	18	Hinge	Gunner's compartment.
310F	6	Hinge rod	Gunner's compartment.
303A	2	Hinge plate, intermediate	Gunner's compartment.
310A	4	Hook	Gunner's compartment.
310D	12	Side hinge plate support	Gunner's compartment.
310G	6	Spring	Gunner's compartment.
308D	8	Support plate	Gunner's compartment.
304A	4	Hinge plate, upper and lower	Gunner's compartment.
		<i>Turret—Standard Parts—For 37 M. M. Gun</i>	
		1/8" (.187) x 1/2" (.5) Button head rivets	
		1/8" (.187) x 3/8" (.625) Button head rivets	
		1/8" (.062) x 1/2" (.5) Cotter pins	

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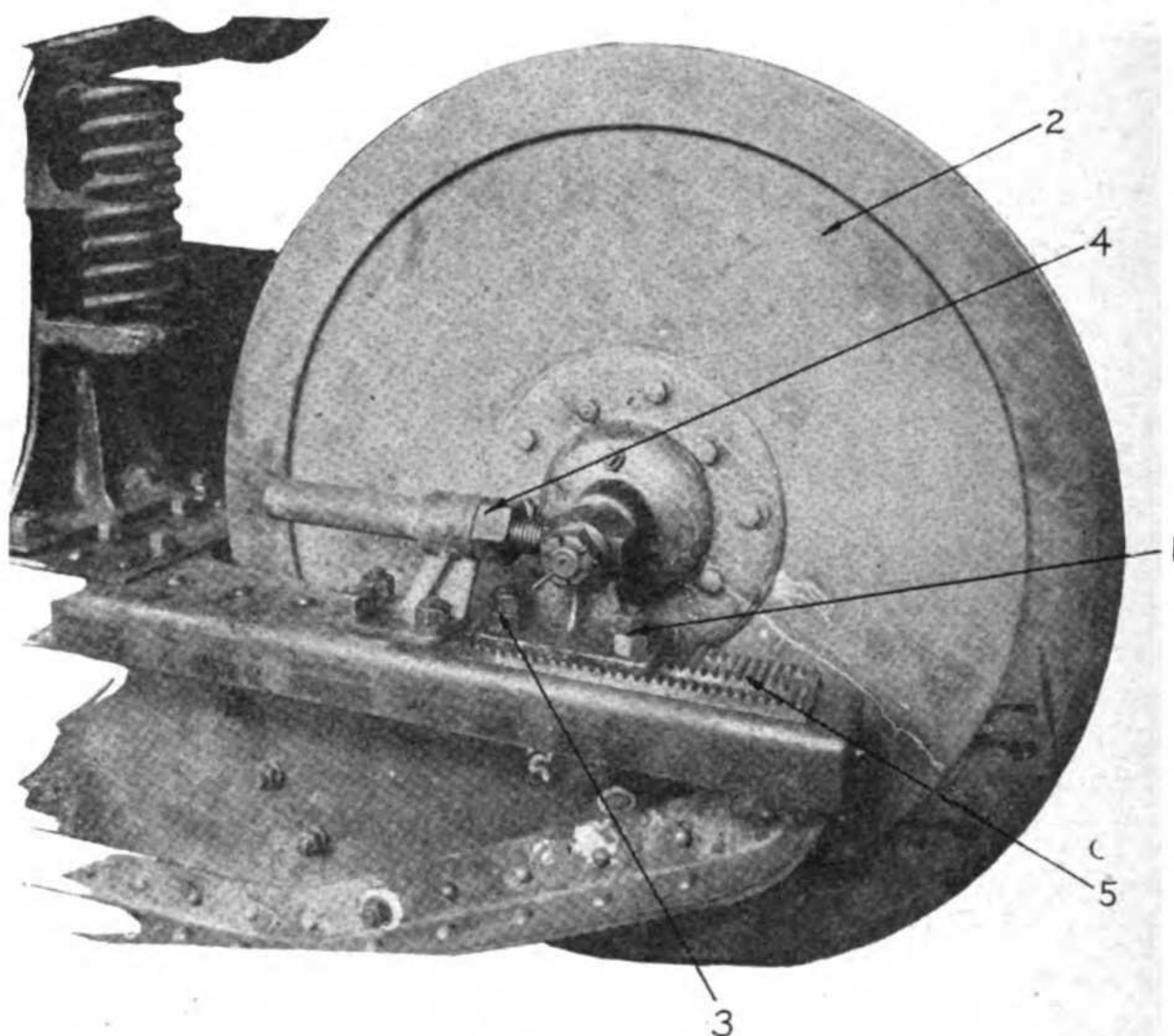
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TRACK ADJUSTMENT

- | | |
|---------------------------------------|--|
| 1. Track idler bracket bolts (front). | 4. Track adjusting nut. |
| 2. Track idler. | 5. Track idler support bracket locating rack |
| 3. Track idler bracket bolts (rear) | |

The bottom rollers are the wheels upon which the tractor rolls. There are nine of these on each track, and these nine are carried on two independent equalizers or trucks. The forward truck has a group of three at its forward end, and two at its rear end, and the rear truck has two groups of two. The roller trucks are suspended by flat leaf springs of semi-elliptic type, pivoted at the outer end, and shackled at the ends toward the center of the tractor. These leaf springs form the connection between the roller trucks and the track frame. The entire track group with its appendages consisting of the drive sprockets, trucks, roller frames, rollers, etc., is bracketed to the main body of the tractor by a spring supporting bracket in which a heavy coil spring supplements the shock absorbing qualities of the leaf springs. The use of two independent trucks, each carrying independent roller groups, gives a wide degree of flexibility to the track apparatus, and allows it to accommodate itself to the inequalities of the ground over which it is traveling.

The track links themselves are pinned at each end. Each of the