

B. A. J. O. L.



TM 5-1036

WAR DEPARTMENT TECHNICAL MANUAL

GEREGISTREERD
4 JAN. 1956

NZ-108

GRADER, ROAD, TOWED-TYPE
LEANING-WHEEL
HAND-CONTROLLED
10-FT. MOLDBOARD, ADAMS
MODEL 104, WITH SCARIFIER

WAR DEPARTMENT TECHNICAL MANUAL
TM 5-1036

GRADER, ROAD, TOWED-TYPE
LEANING-WHEEL
HAND-CONTROLLED
10-FT. MOLDBOARD, ADAMS
MODEL 104, WITH SCARIFIER



WAR DEPARTMENT

• 6 MARCH 1944

United States Government Printing Office

Washington : 1947

WAR DEPARTMENT
Washington 25, D. C., 6 MAR 44

TM 5-1036, GRADER, ROAD, TOWED-TYPE, LEANING-
WHEEL, HAND-CONTROLLED, 10-FT MOLDBOARD, ADAMS, MODEL 104,
WITH SCARIFIER, is published for the information and guidance of all concerned.

A. G. 062.11 (26 APR 41)

By order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

DISTRIBUTION:

X (For Explanation of Symbol see FM 21-6)

INDEX

Operation Section

	Page Nos.
Ball and Socket Connections, Adjustment of	22-23
Bank Sloping, Adjustments for	11-12
Blade, Side Shift of on Circle Legs	9
Blade, Adjusting Pitch of	9
Circle Adjustments of	24-25
Controls and Their Use	7
Cutting Ditches	10
Cutting Banks and Bank Sloping	11-12
Cutting Shoulders, Wide Reach	12
Ditch Cuts, Adjustment for	10
Frame, Side Shift on Rear Axle	8
General Inspection	25
Leaning Wheels, Use of	14-16
Lubrication	18-21
Putting Machine Into Service	26
Scarifier, Use of	17
Shipping, Suggestions for	26-28
Specifications	1
Steerable Tongue, Use of	13
Storing, Suggestions for	26
Surface Work, Spreading, etc.	12
Thrust Bearings in Gear Housings, Adjustment of	22-23
Use of Leaning Wheel Grader	2-5

Maintenance Section

Axle, Front	7-10
Axle, Rear	21-24
Blade Lift Springs	29-30
Blade Lift Mechanism	27-29
Blade Lateral Shift	30-32
Circle	17-20
Circle Reverse and Transfer Gears	17-20
Circle Reverse Control Rods	35-36
Circle Unlocking Rod	37
Drawbar	17-20
Frame, Side Shift on Rear Axle	23-24
Frame, Main	38-39
Leaning Wheel Control, Front	34-35
Leaning Wheel Control, Rear	22-23
Moldboard	17-20
Operator's Platform	39-40
Scarifier	11-16
Scarifier Control Rods	36
Tongue	2-6

Maintenance Section (Continued)

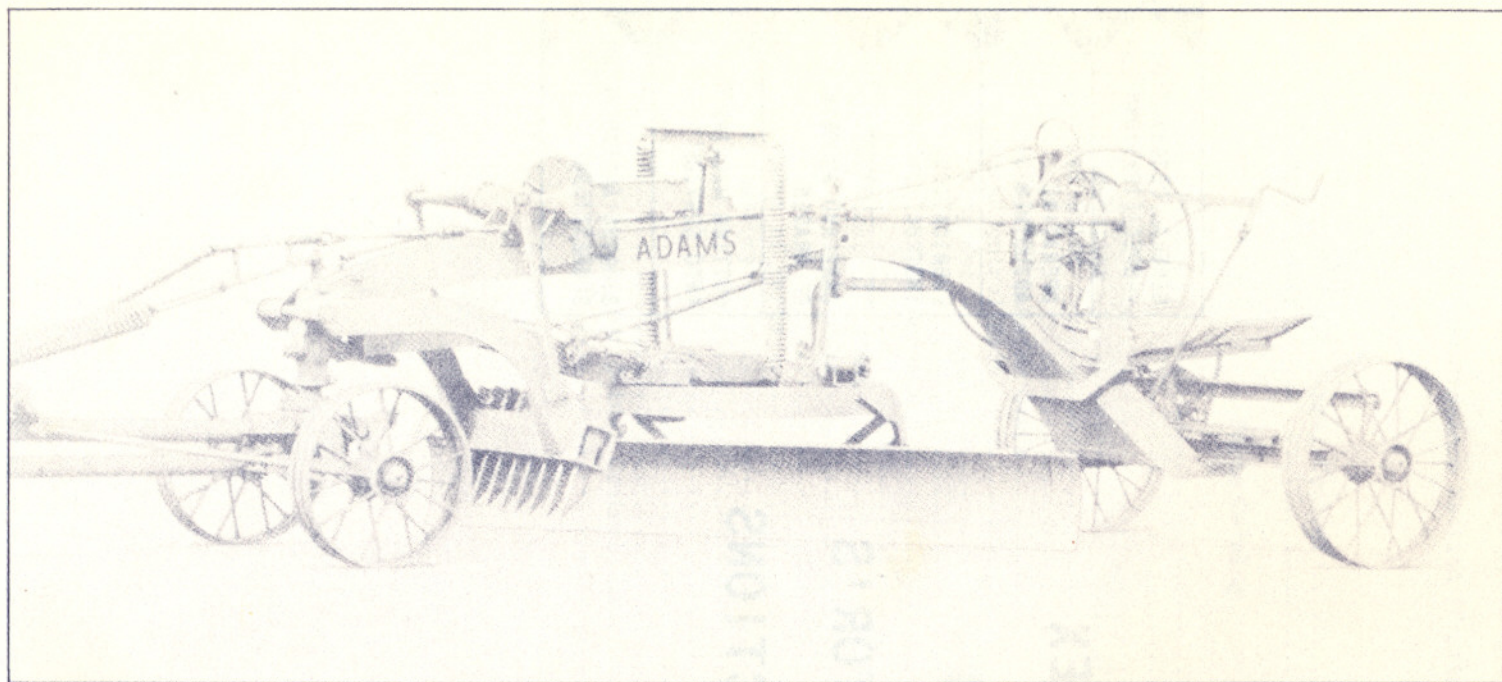
	<u>Page</u> <u>Nos.</u>
Transmission Assembly for 3-in-1 Control	33-34
Wheels, Front and Rear	25-26

Parts Catalog

Axle, Front	8-10
Axle, Rear	26-27
Blade Lift Springs	35
Blade Lift Mechanism	32-34
Blade Lateral Shift	36-37
Circle	20-21
Circle Reverse and Transfer Gears	22-23
Circle Reverse Control Rods	40-41
Circle Unlocking Rod	40-41
Drawbar	18-19
Frame, Side Shift on Rear Axle	30
Frame, Main	42-43
Leaning Wheel Control, Front	39
Leaning Wheel Control, Rear	28-29
Moldboard	24-25
Numerical Index of Parts	46-50
Operator's Platform	44
Scarifier	12-17
Scarifier Control Rods	40-41
Tongue	2-7
Tools	45
Transmission Assembly for 3-in-1 Control	38
Wheels, Front and Rear	31

INDEX TO OPERATOR'S INSTRUCTIONS

GENERAL DESCRIPTION --SPECIFICATIONS	1
OPERATING ADJUSTMENTS	2
LUBRICATION INSTRUCTIONS	3
CARE AND ADJUSTMENT OF GRADER	4
PUTTING MACHINE INTO SERVICE	5
STORING AND SHIPPING SUGGESTIONS	6



ADAMS LEANING WHEEL GRADER NO. 104 WITH 10 FT. BLADE AND SCARIFIER

The No. 104 is a general grading machine ordinarily pulled by tractors of 40 to 50 drawbar H.P. It has been carefully designed and built to give years of service. Only quality materials and workmanship have been employed throughout. The suggestions and instructions outlined in this book have a direct and positive bearing on the cost of operation and maintenance of the machine. The care with which these instructions are carried out will determine the maintenance cost and success of operation.

SEC. I - GENERAL DESCRIPTION

BRIEF SPECIFICATIONS

WEIGHT (APPROX.) - - - - - 8765 LBS.

DIMENSIONS

Length, overall - - - - - 30'-0"
Width, overall - - - - - 8'-7"
Height, overall - - - - - 7'-7"
Wheelbase - - - - - 15'-5"

MOLDBOARD (BLADE)

Length - - - - - 10'-0"
Width (along arc) (includes cutting edge) - - - - - 21"
Thickness - - - - - 9/16"
Cutting edge - - - - - 6"x5/8"

BLADE RANGE OF ADJUSTMENT

Blade lift, above ground - - - - - 16"
Reach outside line of wheels (with blade shifted) - - - - - 5'-11"
Bank cutting max. angle of blade with horizontal (degrees) - 90

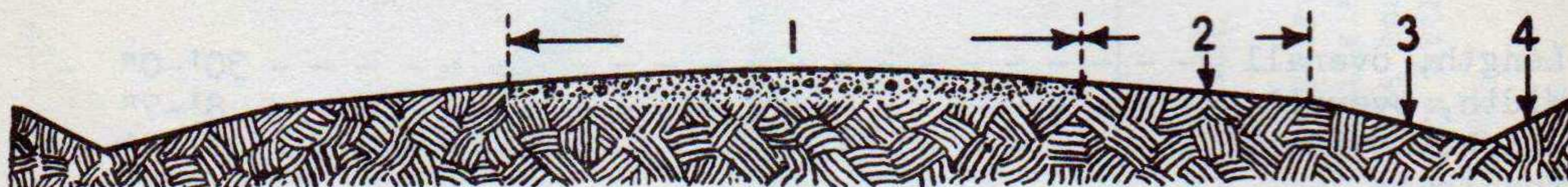
SCARIFIER

Scarifier teeth, number - - - - - 7
Scarifier teeth, size - - - - - 3"x1"x23½"
Width of cut - - - - - 37"

SEC. I - GENERAL DESCRIPTION

THE LEANING WHEEL GRADER AND ITS USE

The leaning wheel grader is a general grading machine usually pulled by a crawler-type tractor and operated from the platform at the rear from which all operating adjustments are made by means of hand wheels, cranks, etc. It was designed primarily to build roads but it can be used on any ground leveling job where the dirt does not have to be moved any great distance and where there is room for both tractor and grader to maneuver. Typical of such jobs is the leveling of airports, building sites, the cutting of drainage ditches, etc. The leaning wheel grader is used also for mixing and laying out surfacing materials such as gravel, stone, sand, etc. into which is mixed such stabilizing materials as tar, asphalt, road oils, cement, and calcium chloride.



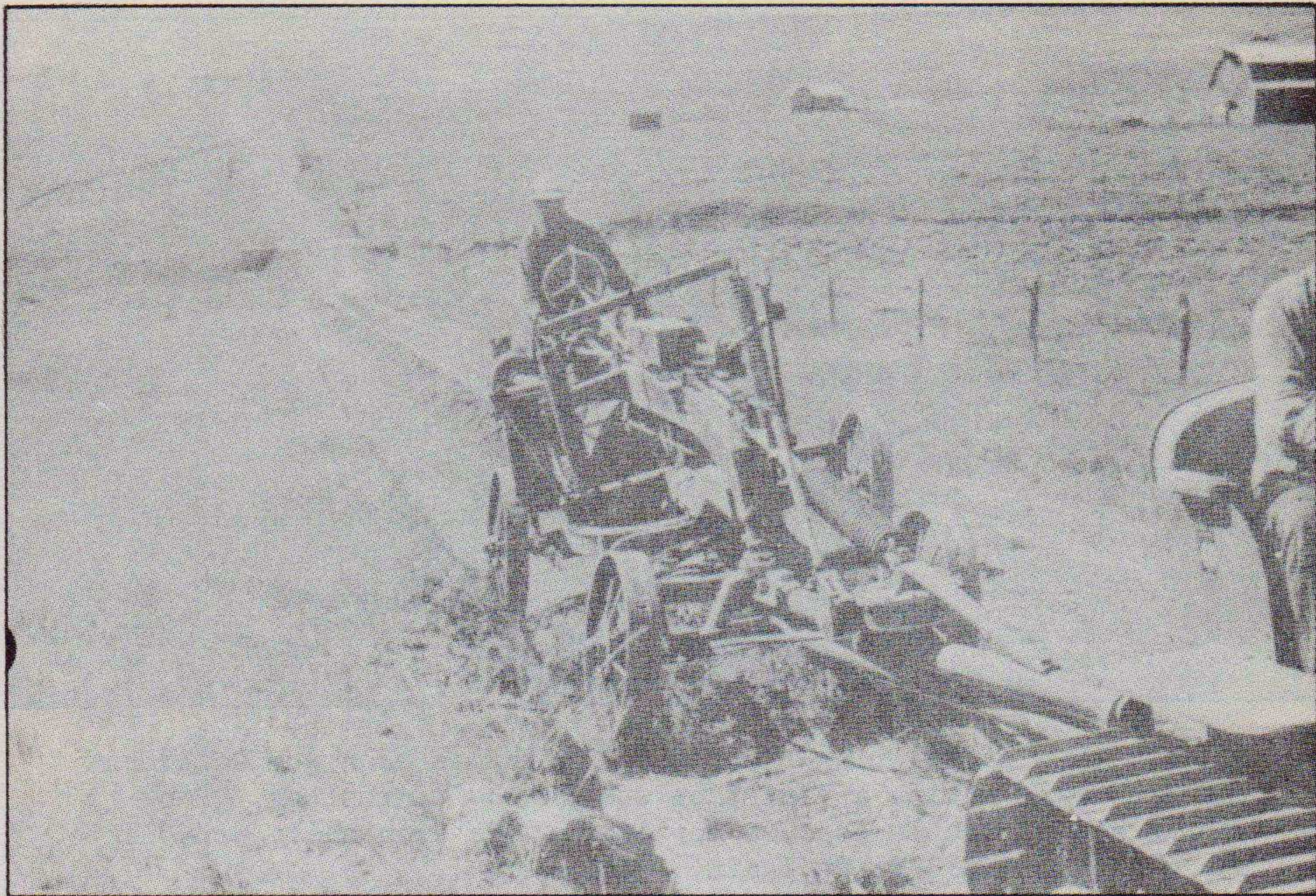
Illust. 1

Since most leaning wheel graders are used most extensively on the building of roads and maintaining road surfaces there is given in Illust. 1 a cross section of a typical road and you should familiarize yourself with the common terms applied to the various parts of a road. No. 1 shown in Illust. 1 is the traveling surface of the road, commonly called the crown. This traveling surface is usually covered, wherever possible, with gravel, crushed stone, blacktop or concrete to make an all-weather traveling surface. No. 2 represents the shoulder or that portion of the road between the traveling surface and the inside ditch slope. No. 3 represents the inside ditch slope and No. 4 the outside slope, or bank slope. Of course these terms apply equally to both sides of the road.

The sketch above is drawn to indicate a 20 ft. traveling surface, 8 ft. shoulders and 2 ft. ditches with 3 to 1 inside slopes and 2 to 1 outside slopes. The depth of ditches should be determined by the drainage required where the road is to be built. The flatness or steepness of the ditch slopes is determined frequently by the right-of-way available. Generally the flatter the ditch slopes, the better, provided they do not reduce the crown and shoulder widths. Flat slopes are easier to maintain and offer better going for a mower to cut down weeds. Also they are less dangerous if a car runs off the road.

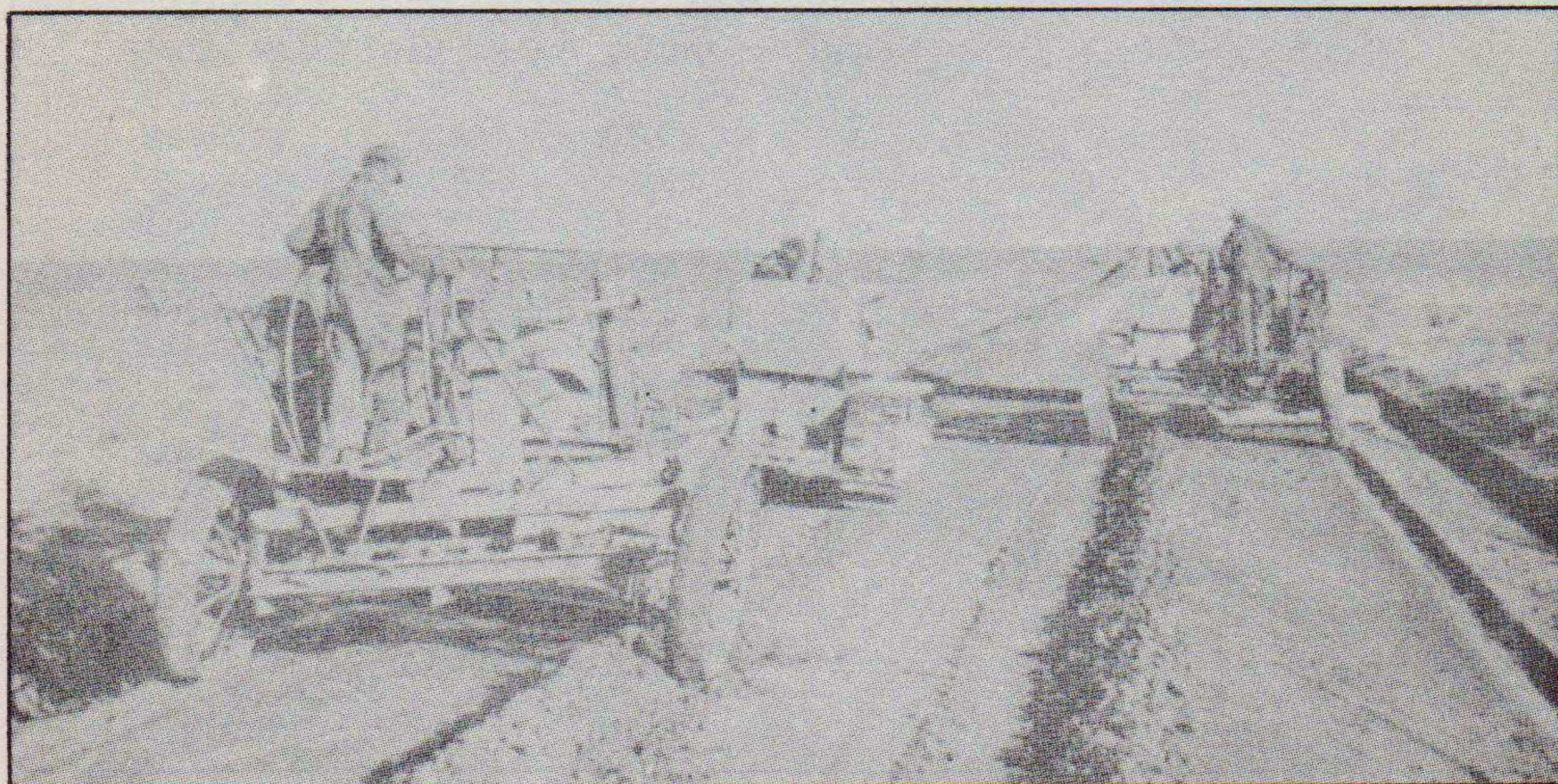
On the following pages are illustrations showing various types of work done with a leaning wheel grader on a road job.

SEC. I - GENERAL DESCRIPTION



Illust. 2 -- Ditching. A single machine in the early stages of building side ditches for a new road. This machine is ditching "right handed" -- that is, the ditching is being done with the right hand end of the blade as seen by the operator.

Illust. 3 -- Surface Work. Here are two machines (one working left handed and the other right handed) spreading over the crown of the road the material taken out of the ditches. Further ditch cuts will be made and the road will approximate the cross section shown in Illust. 1.

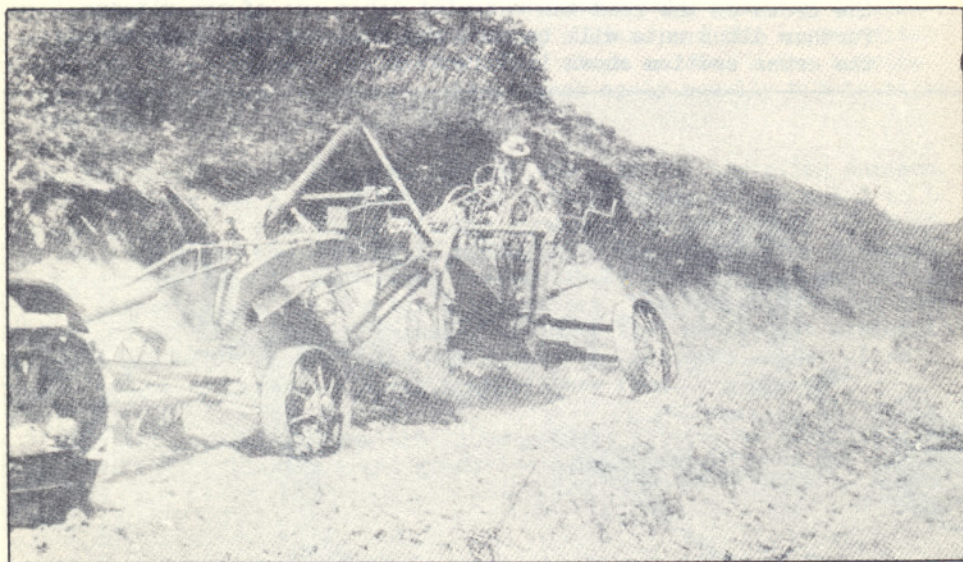


SEC. I - GENERAL DESCRIPTION



Illust. 4 -- Banksloping. Here the ditch has been completed and the grader is making a finishing cut on the bank slope. Bank slopes are desirable because vertical banks eventually erode into the ditch and fill it up again.

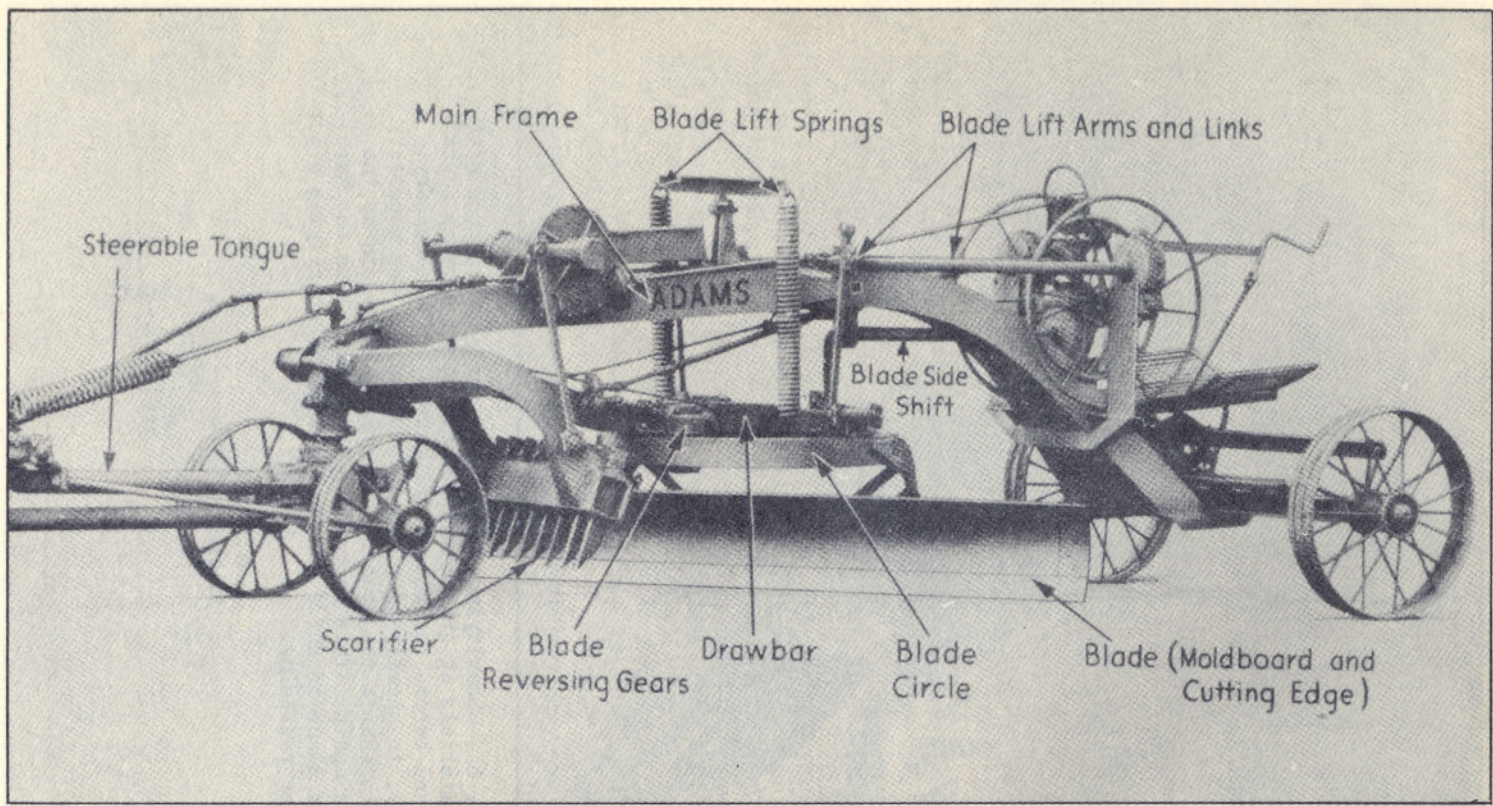
Illust. 5 -- Cutting Banks. Frequently in order to get roads of desired width, it is necessary to cut back adjoining banks as is being done here. This cut is similar to that in Illust. 4 except that it is usually higher and successive cuts are made to cut the banks back as desired whereas the cut in Illust. 4 is primarily a finishing cut...Dirt cut out of a bank sometimes can be used on the road bed if there is not too much of it; otherwise, it can be cast over an embankment if the road is on a hillside or moved endwise by scrapers to low spots.



SEC. I - GENERAL DESCRIPTION



Illust. 6 -- Scarifying. When road surfaces covered with such materials as gravel and crushed stone develop chuck holes and become too rough for travel, it is necessary, usually, to scarify (rip up) the surface to the necessary depth to enable the grader to regrade and smooth up the surface again. This is because the material is too hard for the blade to cut. Here the grader is scarifying a surface for regrading.



Illust. 7 — The illustration above points out the most commonly referred to parts of a leaning wheel grader and gives their common names. Familiarize yourself with these terms.

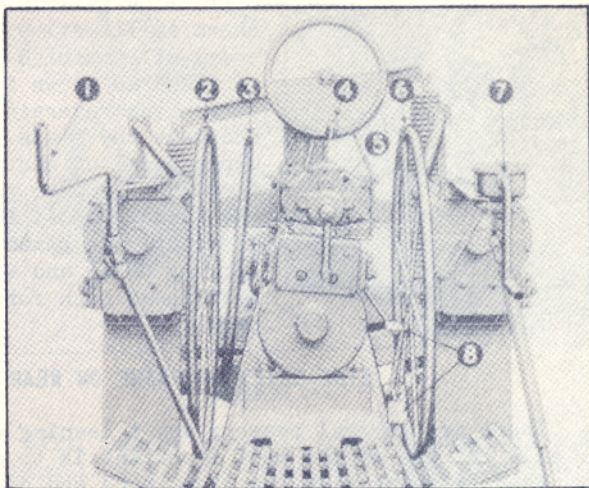
SEC. 2 - OPERATING ADJUSTMENTS

It will simplify your understanding of all that follows in this book if you will, at this point, familiarize yourself with the common names of various parts of the grader. The names of some of the parts which are not obvious are given in Illust. 7.

THE CONTROLS

If you are not familiar with a leaning wheel grader, the first thing to do (after the machine has been thoroughly greased) is to get up on the platform and operate the controls to learn their functions. Illust. 8 shows the operating controls as seen from the operator's platform. They are identified and their functions explained as follows:

- 1 - Shifts and positions the frame on the long rear axle.
- 2 - Raises and lowers the left end of blade.
- 3 - Shifts the blade outward to either side to get wider reach outside the line of wheels or to get sharp plowing positions behind the front wheels.
- 4 - Operates the steerable tongue.
- 5 - Is a 3-in-1 control with a crank, the shaft of which



Illust. 8

- is adjustable backward and forward to three positions. With crankshaft pushed in (forward) this control leans the front wheels; pulled out to center position the control raises and lowers the scarifier and pulled out as far as possible, the control rotates the blade circle to adjust the angularity of the blade.
- 6 - Raises and lowers the right hand end of blade.
- 7 - Leans the rear wheels.
- 8 - Is a foot pedal which locks and unlocks the blade circle.

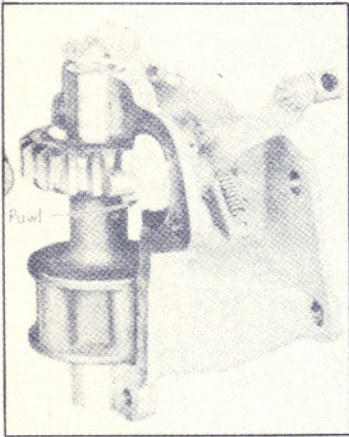
BLADE LIFT SPRINGS

These springs, pointed out in Illust. 7, balance the weight of the blade assembly and assist in raising or lifting the blade out of the ground. Being attached to a rocker arm overhead they are equalizing in action and therefore, are effective through a wide range of adjustments. They need no adjustments and therefore, no attention from the operator.

SEC. 2 - OPERATING ADJUSTMENTS

BLADE CIRCLE LOCKING DEVICE

To permit setting the blade at various angles it is attached to a circle which is rotated by the "blade reversing gears" mounted on the side of the drawbar (see Illust. 7). These gears, operated by control 5 in Illust. 8, turn a large pinion which engages a rack mounted on the inside of the circle.



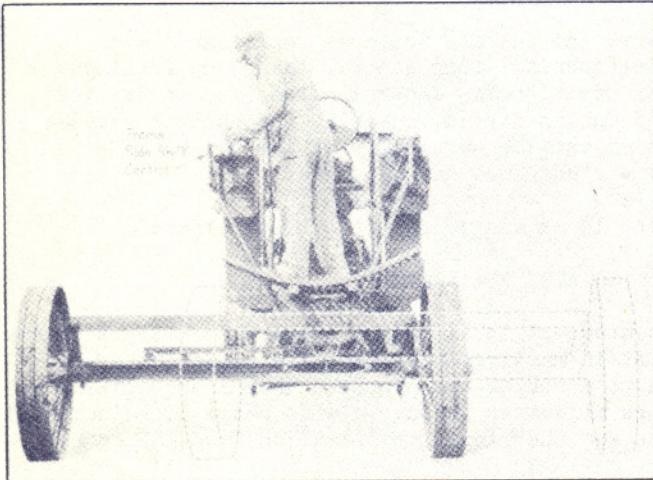
Illust. 9

When the blade has been rotated to the proper position it is necessary to lock it in that position before using it and that is the function of control 8 in Illust. 8. This control operates a rod which in turn operates a pawl in the reverse gear housing shown in Illust. 9. Stepping on the lower pedal of control 8 pulls the pawl back into position as shown in Illust. 9 in which position the reversing gear is free to operate and move the blade. Pressing forward on the upper pedal of control 8 rotates the pawl forward to engage the gear and that locks the blade in position. Always remember -- to rotate the blade first step on the unlocking pedal and after the blade has been positioned push forward on the locking pedal.

SIDE SHIFT OF FRAME ON REAR AXLE

There are several reasons why a leaning wheel grader has a long rear axle but one of the most important is to give the rear end stability. When ditching with the right hand end of the blade (as seen from the operator's platform) the frame should be shifted to the right end

of the rear axle so that front and rear wheels and point of blade line up. If it is desirable to ditch with the left end of the blade, then the frame must be shifted to the left end of the axle as indicated by dotted lines in Illust. 10. When scarifying, place the frame at the center of the axle.



Illust. 10

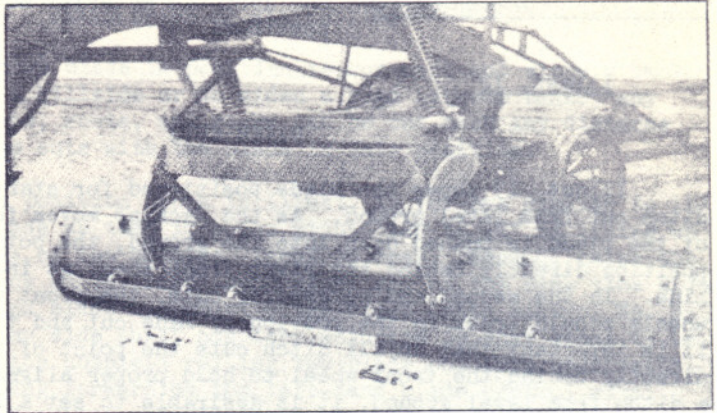
SEC. 2 - OPERATING ADJUSTMENTS

SHIFTING BLADE ON BLADE CIRCLE LEGS

The moldboard or blade has three sets of brackets for connection to the blade circle legs as shown in Illust. 11. For all average surface, ditch and bank work the circle should be connected at the center set of brackets but when it is desirable to get the blade farther outside the line of wheels for drifting dirt over soft embankments, etc. or to increase the reach in cutting down high banks, the moldboard may be shifted to connect to one of the other sets of brackets.

To shift the blade to the right set the blade crosswise of the grader, shift it as far to the right as possible with the side shift control, and then lower the full length to the ground.

As the blade is lowered, place a 4x4 (brick, boulder, or other object) under the reinforcer on the rear of the blade to hold the blade up-



Illust. 11

right when disconnected. Next, remove the four bolts connecting the blade to the circle legs (see Illust. 11), side shift the circle to the left sufficiently to uncouple the ball and socket joints and then raise the circle. Now side shift circle to left, lower it until balls on circle legs line up with sockets in left hand connections, shift circle to right slightly to engage balls in sockets and replace all bolts. Before tightening bottom bolts, connect the pitch adjusting links and get the desired blade pitch adjustment. After this is done, draw all bolts up tightly and insert cotter pins.

ADJUSTING PITCH OF BLADE

As explained above the blade connects to the bottom of the blade circle legs by ball and socket pivot connections. Notched links are provided at the top of the blade to permit pitching the blade forward or backward with relation to the circle legs as shown in Illust. 12. Generally speaking, the pitch of the blade should be such as to give the cutting edge at the bottom proper penetration while at the same time keeping the dirt rolling or scouring off the blade freely. If the blade is pitched too far forward, the cutting edge at the bottom does not have the proper cutting angle and will drag the ground instead of entering it easily. If the blade is pitched too far backward, the material will hang in the blade and be dragged forward instead of rolling



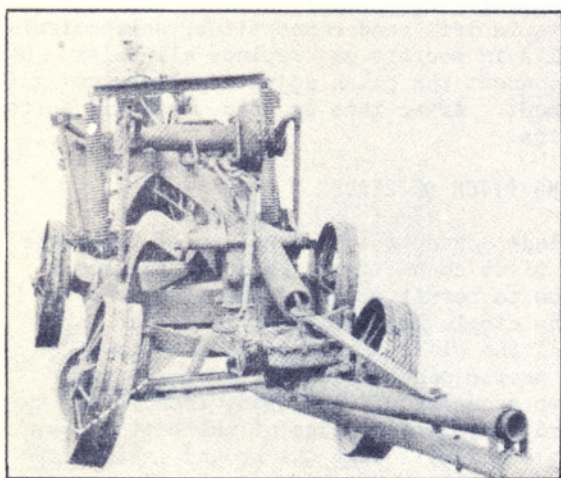
Illust. 12

off the blade freely. Deep ditch cuts require more forward pitch than does surface work and, wet sticky materials that come up in great rolls require more backward pitch than do dry, granular materials...Pitch adjustments need not be made frequently -- note your soil conditions, type of cuts most generally made, action of the dirt on the blade, and set the blade to the best pitch to get the cutting action necessary and keep the material moving as freely as possible.

DITCH CUTS

Illust. 13 shows the blade positioned for starting a right-hand ditch cut from level ground. As the machine moves forward and the point of the blade is pushed down into the ground, the point should assume a position directly behind the right front wheel as indicated by dotted line. In the second and succeeding cuts, the front as well as the rear wheels should track in the previously made cut and to accomplish this, it is important that in all ditch cuts the point of the blade be placed directly behind the front wheel to hold proper alignment...In starting a ditch from level ground, it is desirable to set a line of stakes to follow in making the first cut so as to get the proper alignment.

To get the blade position shown in Illust. 13 rotate the blade to proper angle (using control 5 in Illust. 8) putting the point behind the right front wheel. Force the point down with right hand wheel and raise heel of blade with left hand wheel, to get good plowing position.



Illust. 13

In hard-to-cut material, use a sharp plowing angle by shifting the drawbar and blade assembly to the right with the side shift control (No. 3 in Illust. 8)...To make left hand ditch cuts, just reverse the foregoing and in addition shift frame to left end of rear axle...In both cases moldboard or blade should be connected to center set of brackets.

For use of leaning wheel feature see text accompanying Illust. 17 to 19.

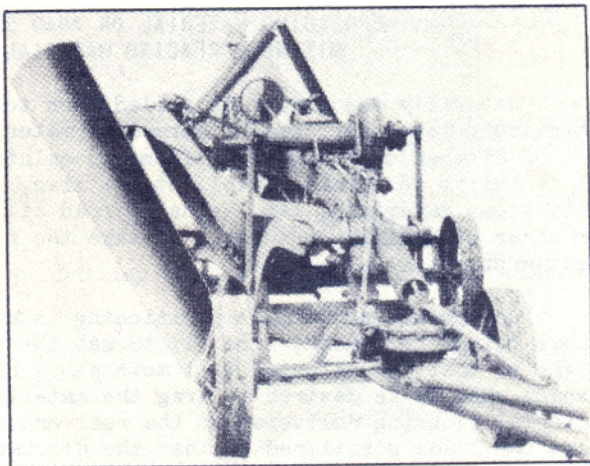
SEC. 2 - OPERATING ADJUSTMENTS

NOTE: On all grading work the blade should be set to discharge the dirt either inside or outside the rear wheels. If rear wheels have to run over discharged dirt the cut is apt to be irregular...Also where the use of the scarifier is not involved, it is recommended that the scarifier teeth be removed and stored inside the scarifier block as shown in Illust. 21. This prevents trash hanging up on the teeth... During all grading operations the scarifier should be placed at such height that there is no interference between the grader drawbar and the scarifier drawbars and block.

BANKSLOPING OR BANKCUTTING

Illust. 14 shows blade in position to cut back and slope a bank. To widen a road on a hillside or to widen a road between banks, any bank free from stumps, roots, and rocks can be cut back any distance by making successive cuts with the blade in this position.

To obtain the position shown in Illust. 14 (or one similar to it) first rotate the blade so that it comes within 12" to 18" of lining up with the center line of the machine, front to rear. Second, raise the blade by pulling back on the right hand wheel and at the same time side shift the drawbar and blade assembly to the right (with control No. 3 in Illust. 8). After side shift has been adjusted to what seems to be the necessary position complete rolling the blade out from underneath the machine by pushing forward on the left-hand blade control wheel. (Before the limit of adjustments has been reached on the right-hand blade lift and the lateral shift, it will probably be necessary to interject a movement of the left-hand wheel a time or two to avoid interference between the left-hand lift link and the main frame)..If necessary to get the desired reach place ball of left-hand lift arm in end socket of left-hand lift link...After the blade assembly has been rolled out from underneath the machine as just described, rotate the blade to drop the heel to the ground after which readjustments have to be made to get the desired slope to the blade and to get the heel in proper position with relation to the wheels. On all bank cuts the heel (or rear end) of the blade should be carried down hard against the ground and positioned so that the dirt discharges just inside the rear wheel ...For use of leaning wheel feature, refer to Illust. 17 to 19.

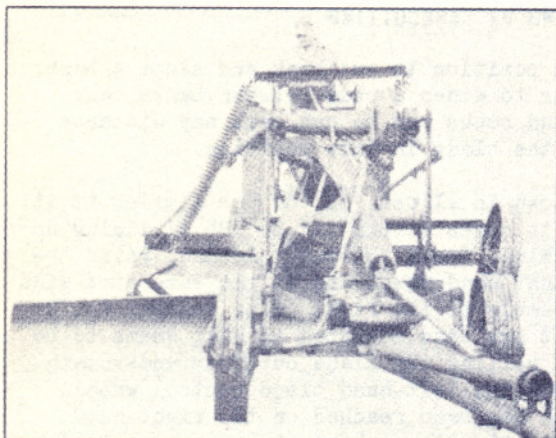


Illust. 14

SEC. 2 - OPERATING ADJUSTMENTS

LOW BANK SLOPES

Illust. 14 shows positioning the blade to make high bank cuts. A wide variety of slope angles can be obtained and the reach of the blade may be high or low by getting the proper combination of adjustments between the two blade control hand wheels, the side shift control and blade rotation. This all comes with experience. To cut the outside slope of a ditch as in Illust. 1 the blade would be rotated to have the point much lower with the heel still in the ground and the extreme adjustments with the blade hand wheels used in Illust. 14 would not be necessary.



Illust. 15

WIDE REACH OUTSIDE LINE OF WHEELS

For extra reach for maintaining soft shoulders or reaching out over embankments, adjust the left-hand lift link to the long position as shown in Illust. 15, side shift the drawbar and blade assembly to the right as far as possible, rotate the blade to the desired angle and then lower with blade control wheels. Additional reach can be obtained by shifting the blade on the circle legs but this is seldom necessary...For use of

leaning wheel feature see Illust. 17 to 19.

SPREADING MATERIAL ON ROAD SURFACES, MIXING SURFACING MATERIAL, ETC.

Naturally the grader is called upon to do a lot of work on comparatively level surfaces -- spreading material cut off of banks and out of ditches on the road surface; to maintain the road surface after it is built; to spread gravel, stone, slag, etc., and possibly to mix with these materials, tar, asphalt, road oil, cement, calcium chloride, or other stabilizing materials to make the road surface dustless and weatherproof.

On surface work blade positioning is not difficult. The two principal things to remember are (1) to set the blade at a sharp enough angle so that the material will move along or scour freely on the blade except when it is desired to drag the material forward, and, (2) if the material is being delivered at the rear end of the blade in a windrow have the blade positioned so that the discharge of dirt is inside or outside the rear wheel and not placed so that the rear wheel has to run over it.

SEC. 2 - OPERATING ADJUSTMENTS

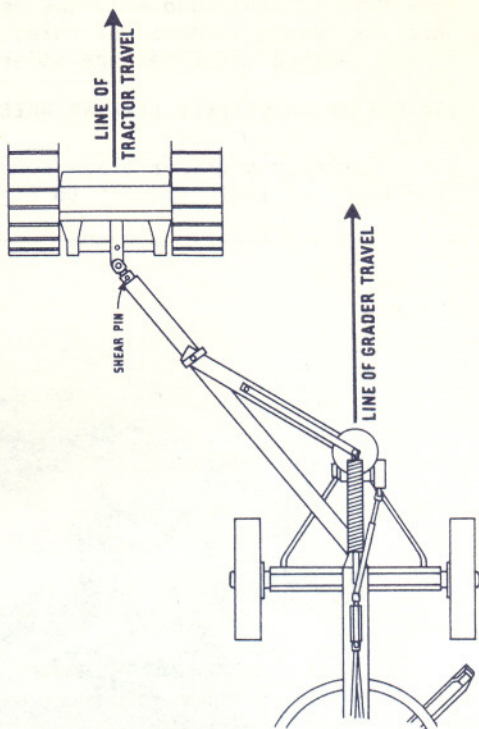
USE OF STEERABLE TONGUE

By use of the steering wheel at the operator's platform, the tongue of the grader may be offset to either side of the center line to permit offsetting the grader from the tractor pulling it (see Illust. 16). This permits putting the grader down in a ditch or up on a bank while the tractor travels a parallel course on better ground for traction...Where there is not much occasion for offset, the tongue is hooked directly to the tractor drawbar; where there is occasion to use a considerable offset, a pull cable or chain can be used between the end of the tongue and the tractor.

Another advantage of the steerable tongue is that since the grader operator has his own steering device, he can hold to a straight cut regardless of whether or not the tractor operator maintains a perfectly straight course.

SHEAR PINS FOR END OF TONGUE

The clevis at the end of the tongue is held into the tongue proper by a comparatively soft vertical shear pin (see Illust. 16). This pin will stand all of the steady pull required to work the grader to capacity but if the grader is subjected to a severe shock by a lunging tractor the pin will shear thereby protecting the grader from damage. If the pin shears it's an easy matter to drop in a new one and Adams shear pins (or their equivalent) should always be used in place of harder pins which do not have the same shearing quality. In fact, Adams disclaim any responsibility for parts broken due to pulling shocks if standard shear pins are not used.



Illust. 16

SEC. 2 - OPERATING ADJUSTMENTS

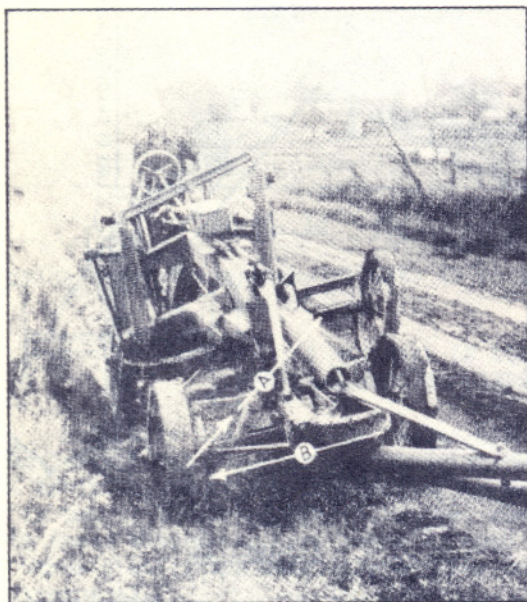
USE OF LEANING WHEEL FEATURE

Adjustable leaning wheels at the front and rear of the grader are such a distinct help to the operator in keeping the travel of his machine under control that he should see that the wheels are properly adjusted for every cut he makes. The wheels are easily and quickly leaned to any degree desired, right or left, by controls at the operator's platform.

The simple rule for using the adjustable leaning wheels, regardless of whether the machine is on level surface, in a ditch, or on a bank, is this -- whenever either end of the machine tends to veer out of line, lean the wheels in the opposite direction just enough to overcome that tendency and hold the machine in line. If you will remember this one simple fundamental rule, you will know how to take advantage of the leaning wheel feature under any conditions.

THE WHY OF ADJUSTABLE LEANING WHEELS

Normally a grader blade works at an angle cutting or moving dirt from right or left (or left to right) as indicated by "A" in Illust.17.



Illust. 17

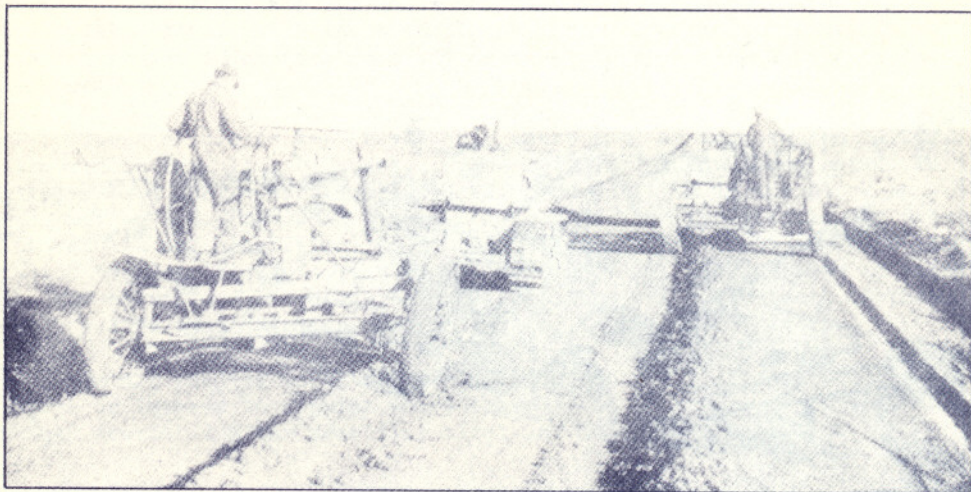
The resistance of the dirt to being cut or of the load to being moved sidewise, constitutes a sideload against the blade in the direction indicated by arrow "B" in Illust. 17. If the front wheels are not properly leaned the side load against the point of the blade or the tendency of the point to suck into a bank, for instance, will cause the front end of the grader to skid or crawl sidewise away from the load in the direction of arrow "B". If the rear wheels are not properly leaned, the load against the rear half of the blade tends to cause the rear of the machine to skid or crawl away from the side load.

The function of the adjustable leaning wheels is to offset this tendency so that the operator can hold his machine to a straight course. If the front tends to veer toward the right, the operator leans the wheels to the left just enough to overcome this tendency; if it tends to veer to the left the operator leans the wheels to the right just enough to hold the machine in line.

SEC. 2 - OPERATING ADJUSTMENTS

ON SURFACE WORK

Start with the wheels vertical and then lean them just enough, front and rear, to offset the side load. With a light load against the blade, very little leaning is necessary; with a big load of heavy material more lean will be necessary. Illust. 18 shows two machines working on a road surface. The left hand machine is moving dirt to the right so wheels, front and rear, are leaned slightly to the right to offset the side load against the blade. The right hand machine is moving dirt to the left so wheels are leaned slightly to the left to offset the side load.



Illust. 18

IN DITCH WORK

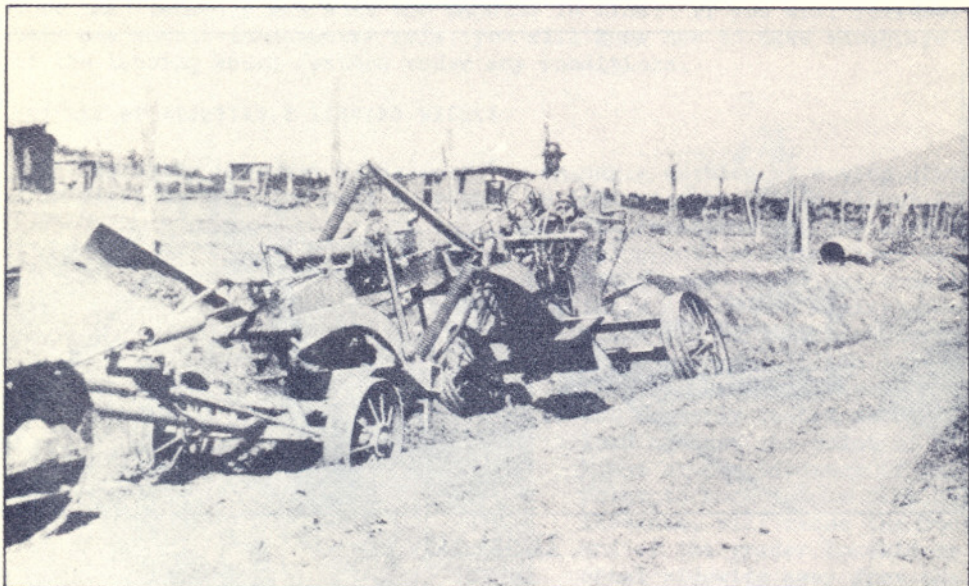
When working in a ditch, the machine is usually working on a slope. A good rule to follow is to adjust the wheels to be vertical (in line with the force of gravity) and then lean them as necessary to offset the side load against the blade and hold the machine in line. In Illust. 17 the front wheels are set to offset the load against the forward half of the blade and the rear wheels are leaned to offset the load against the rear half of the blade. Although the load against the front half of the blade is heavier than that against the rear half, the front wheels are not leaned as much because the front end of the machine has the benefit of a side pull from the tractor (running in offset position) which largely offsets the load on the forward half of the blade.

ON BANK WORK

Illust. 19 shows a grader sloping a bank. The lean of wheels on bank work varies considerably according to conditions. A heavy load on the blade in this extended position tends to cause the rear end of the grader to skid or crawl away from the bank so the wheels are usually leaned toward the bank as shown in the illustration to keep the rear end

SEC. 2 - OPERATING ADJUSTMENTS

in line. If the ground is of such character that the blade has a tendency to suck into the bank, usually the front wheels must be leaned away from the bank, or if the ground is hard to cut and the blade must be forced into it, it is usually necessary to lean the front wheels toward the bank, particularly if there is a counteracting side pull from the tractor. In Illust. 19 the front wheels are about vertical indicating that the side pull of the tractor is equalling the suction of the blade. Again -- the rule is to lean the front and rear wheels in the proper direction and just enough to counteract any side force which tends to cause either end of the grader to get out of line.



Illust. 19

SIDE PULL OF TRACTOR AFFECTS LEAN OF FRONT WHEELS

If the tongue of the grader is adjusted to permit the tractor to run in an offset position to the left of the grader (as in right hand ditching), the tractor will exert a constant side pull on the front end of the machine which affects the amount of lean required in the front wheels. If the side pull of the tractor equals the side load on the blade at the front of the machine, the wheels will be set vertically or in "neutral" position as in Illust. 19. If the side pull of the tractor does not equal the side load on the front end of the machine, the wheels must be leaned against the load. On the other hand if the side pull of the tractor exceeds the side load on the front end of the machine, the wheels will have to be leaned somewhat in the opposite direction. Because of tractor side pull, the front wheels would not be leaned as much as the rear wheels even though the load were equal against the front and

SEC. 2 - OPERATING ADJUSTMENTS

rear ends of the machine. Always think of the front and rear ends of the machine independently. Rarely are the front and rear wheels leaned to the same degree and there are occasions when they will be leaned in opposite directions, particularly on bank cuts.

USE OF SCARIFIER

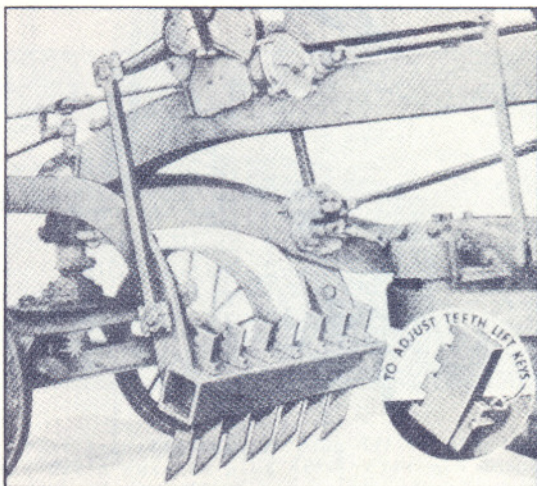
As explained earlier in the book, the purpose of the scarifier is to rip open material which is too hard for the blade to cut. If the purpose is to reshape the surface of a gravel or stone road, the material should be scarified just to the depth necessary to get below the bottom of and eradicate the chuck holes. If the purpose is to break up the crust entirely, the teeth should be forced down at the beginning of the cut to get under the crust and break it up by prying action from underneath.

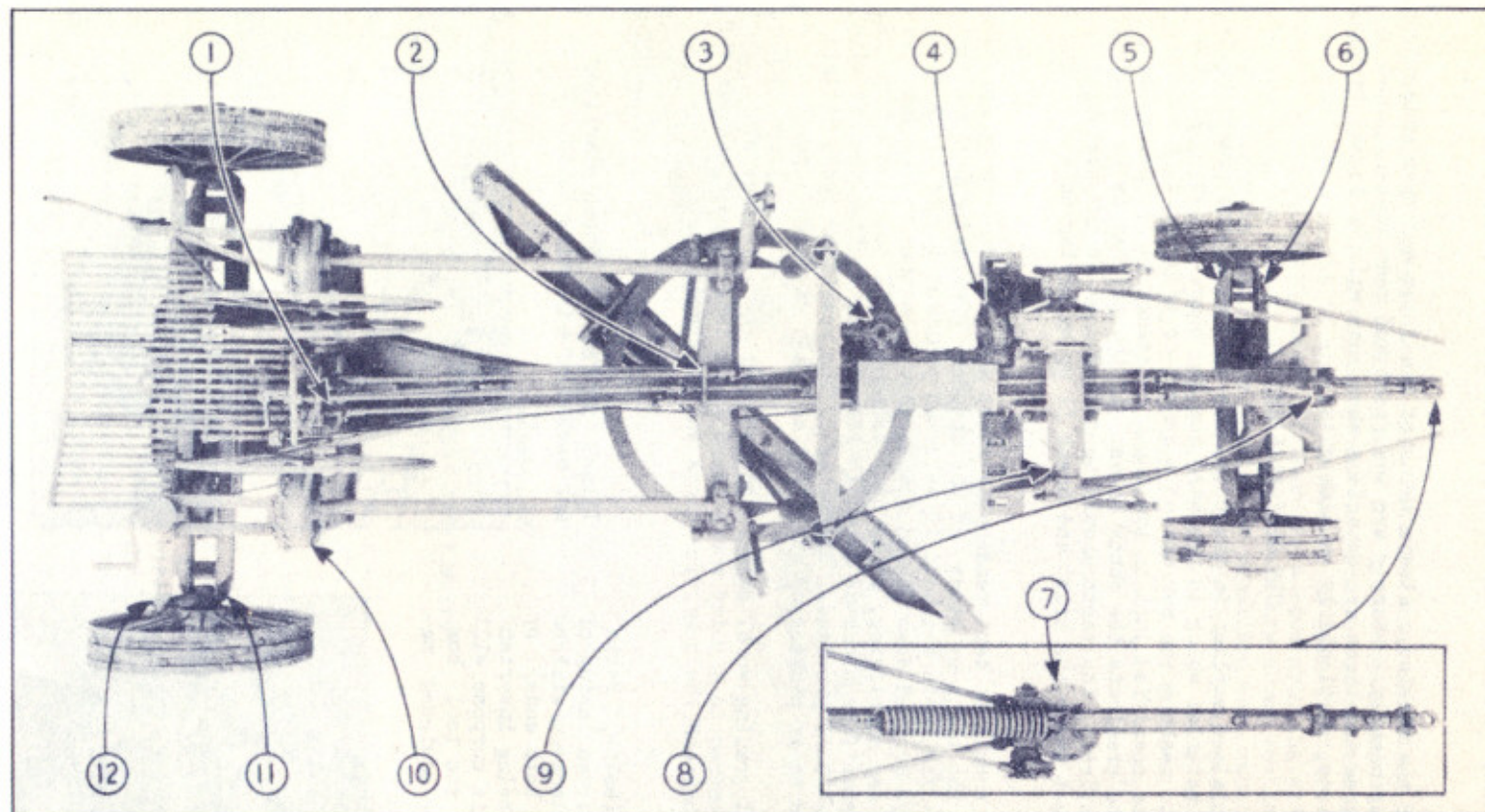
Teeth should be kept reasonably sharp and, as worn, can be adjusted downward in the block by means of the notches provided and shown in Illust. 20. The teeth are held in selected position in the block by means of keys dropped down behind the teeth. When the grading job does not require any scarifying, it is best to remove all teeth and store them inside the scarifier block as shown in Illust. 21, locking them in with the two short bars provided. Disposing of the scarifier teeth in this way prevents their picking up and dragging trash on rough work.

On all grading work, be sure to see that the scarifier block is raised or lowered to a point where there is no interference between the grader drawbar and the scarifier block and drawbars.

Illust. 21 (Below) Teeth have been stored inside of scarifier block and will be held in (at both ends) by short bars being inserted. Bars for this purpose will be found in the tool box of scarifier-equipped machines.

Illust. 20 (Below) Shows scarifier and method of adjusting teeth.





LUBRICATION REFERENCE CHART

Illust. 22 -- Familiarize yourself as soon as possible with all points on the grader which should be lubricated. The reference chart above will help you. The numbers on the chart indicate general locations of lubrication points -- for detailed instructions see illustrations on following pages which are identified by corresponding numbers.

SEC. 3 - LUBRICATION INSTRUCTIONS

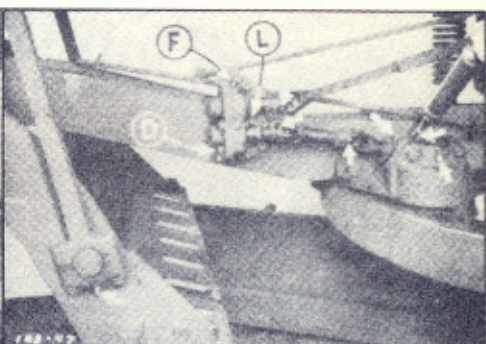
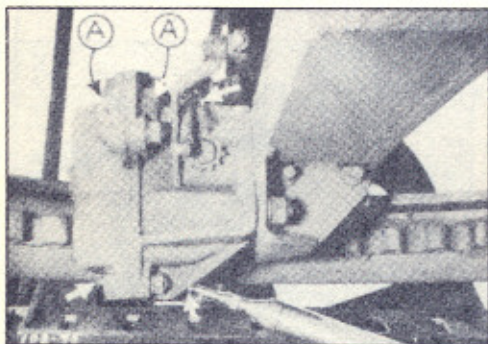
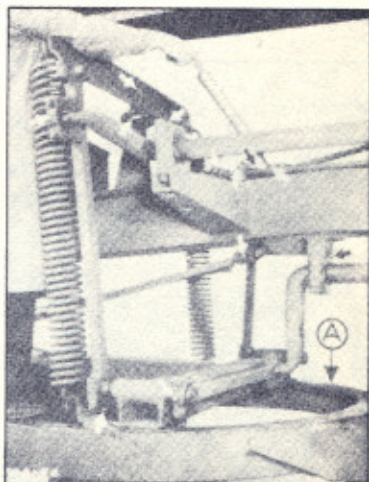
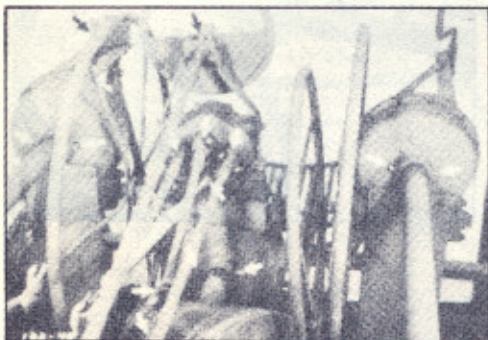
Correct lubrication is of paramount importance in maintaining proper performance and satisfactory operation from any machine. If the lubrication instructions are followed not only will the machine operate much easier, but premature wear and costly repairs will be avoided.

In the lubrication instructions which follow, the letter "D" represents drain plugs. The letter "F" represents filler plugs. The letter "L" represents level plugs. The letters "LF" represent level and filler plugs. In each case they refer to the specific housings to which the arrows point...All plain arrows refer to pressure gun lubrication fittings.

	Manufacturer's Recommendation	Army Symbol
All housings with filler & level plugs	EP140	G0-90 or) G0-80)
All pressure gun fittings	(Pressure (Gun Grease	CG-1 or CG-0

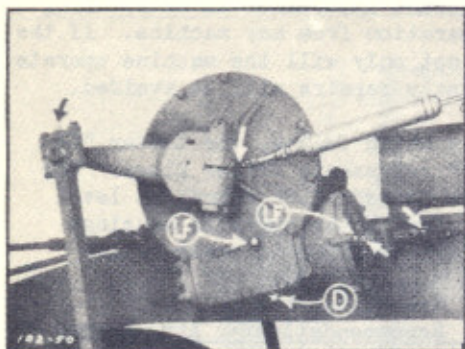
(1) (Below) Flush fittings every 16 hours.

(2) (Right) Flush fittings every 16 hours. Clean dirt off circle flange (A) every 8 hours and lubricate with OE-10 diluted with 50% Diesel fuel.

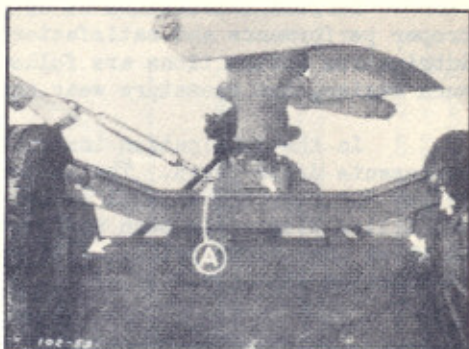


(3) Flush fittings every 16 hours. Fill transfer case at plug (F) to plug (L). Check oil level every 64 hours. Drain case at plug (D). Fill oil holes (A) every 16 hours with OE-30.

SEC. 3 - LUBRICATION INSTRUCTIONS

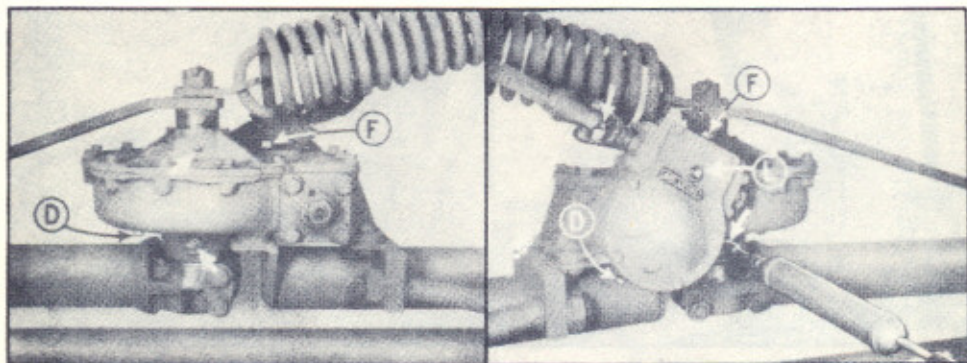
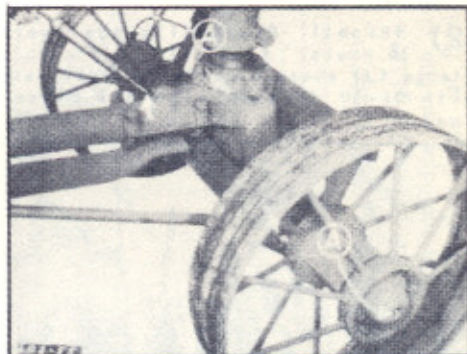


(4) Flush fittings every 8 hours with CG. Fill housings at plugs (LF) with GO. Check oil levels every 64 hours. Drain lift housing at (D) every 1,024 hours.



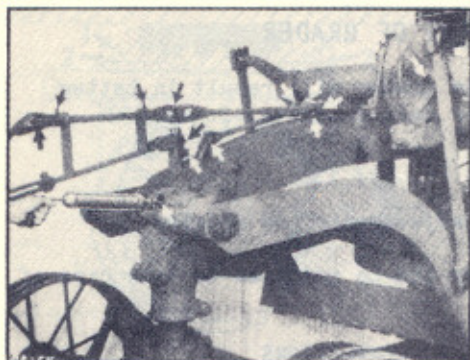
(5) Flush fittings every 8 hours with CG. Flush fitting (A) every 64 hours with CG.

(6) Flush fittings every 8 hours with CG. Flush fittings (A) every 64 hours with CG.

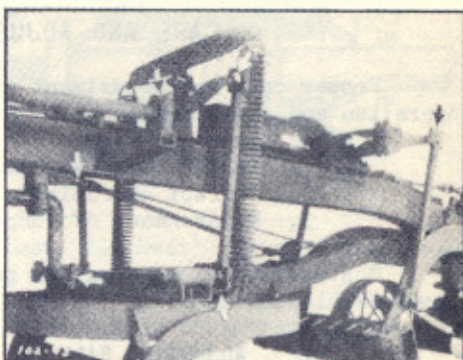


(7) Flush fittings every 8 hours with CG. Fill housings at plugs (F) with GO. Check oil levels of reduction housing at (L) every 64 hours. Drain housings at (D) every 1,024 hours.

SEC. 3 - LUBRICATION INSTRUCTIONS

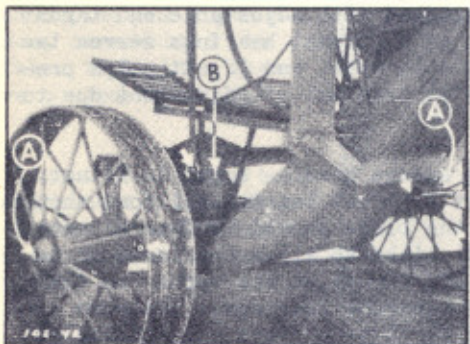
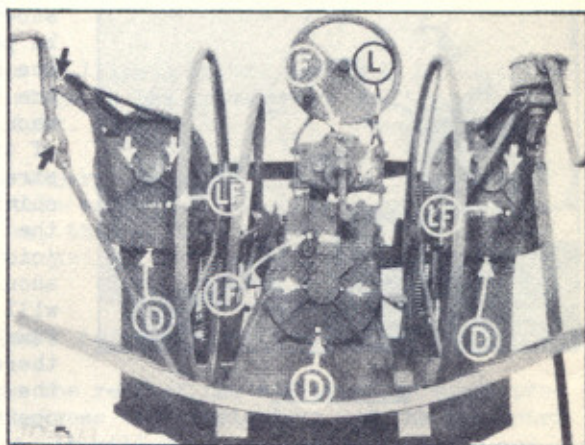


(8) Flush fittings every 8 hours with CG.



(9) Flush fittings every 8 hours with CG.

(10) Flush fittings every 8 hours with CG. Fill blade lift and lateral shift housings through level and filler plugs (LF). Fill transmission at (F) to oil level plug (L). Drain housings at plugs (D) every 1,024 hours. Use G0 in all housings. Check oil levels in all housings every 64 hours.



(11) Flush fittings every 8 hours with CG. Flush fittings (A) and (B) every 64 hours with CG.



(12) Flush fittings every 8 hours with CG. Flush fitting (A) every 64 hours with CG.

SEC. 4 - CARE AND ADJUSTMENT OF GRADER

CARE AND ADJUSTMENT OF GRADER

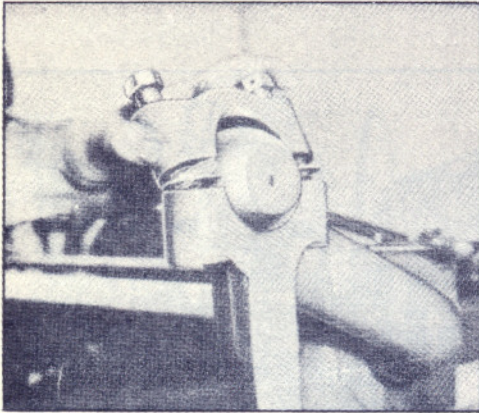
Proper care and adjustment of the grader will result in better operation and fewer breakdowns. Proper care consists of:

1. Proper lubrication.
2. Correct operation.
3. Maintenance of correct adjustments and repairs.

Most points of wear on the grader can be adjusted to take care of excessive looseness.

ADJUSTING BALL AND SOCKET CONNECTIONS

All ball and socket joints on the lift links for the scarifier and blade and on the side shift link of the circle are adjustable for wear. As shown in Illust. 23, these joints are equipped with laminated shims



Illust. 23

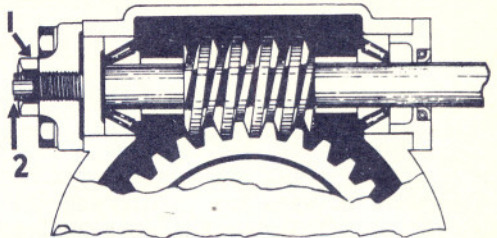
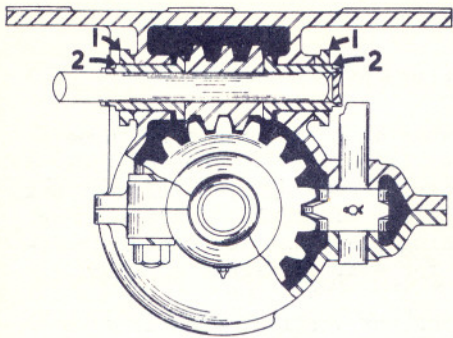
on each side. When looseness in the joint occurs, the cap screws and cap should be removed as shown. Layers of shims may then be peeled off with a knife to make the adjustment. Approximately the same amount of shim stock should be removed from each side of the joint to keep the cap straight. Do not remove any more shims than necessary to remove the free play in the joint. The joint should never bind, but should always work freely. It will be found that these joints wear slightly egg-shaped and, therefore, should be adjusted in the position in which they will operate.

ADJUSTING THRUST BEARINGS IN GEAR HOUSINGS

All control gear housings are equipped with adjustable end thrust bearings against the worm. Adjustment of the thrust bearings serves two purposes: (1) it allows for take-up due to wear, and (2) it helps prevent "coasting" (tendency of the gears to turn out of adjustment due to back pressure).

There are two types of adjusting screws used -- shown in Illust. 24 and 25. Before attempting to adjust a thrust bearing, all load should be taken off the gears. For example, the blade should be lowered until sufficient weight is taken off the lift links to allow the links to be turned by hand. This will remove all end thrust on the worms in the blade lift housings. When adjusting the thrust bearings, the worm should be continually rotated back and forth to prevent any binding of the worm and to assist in determining when the thrust bearing has been drawn up tight enough.

SEC. 4 - CARE AND ADJUSTMENT OF GRADER



Illust. 24 (Left) Type of gear housing used on circle reverse.

Illust. 25 (Above) Type of housing used elsewhere throughout grader.

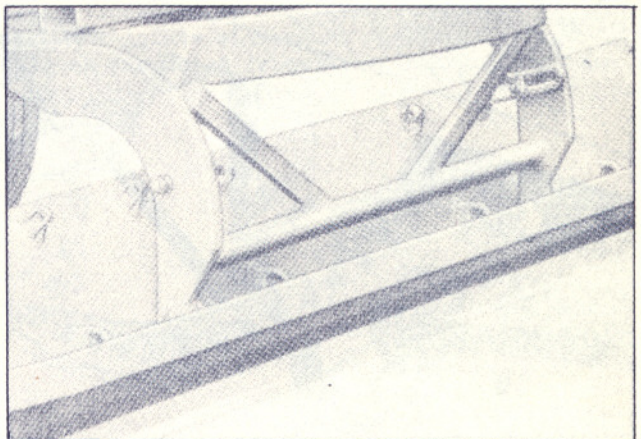
The thrust bearings shown in Illust. 24 should be tightened equally on both ends, and are designed for adjustment with a wrench. The thrust bearing shown in Illust. 25 is designed for adjustment with an Allen wrench. To tighten either type thrust bearing, loosen the lock nut (1) and tighten the adjusting screw (2), turning in a clockwise direction until it comes up tight. Then loosen the adjusting screw approximately 1/16 of a revolution. Hold in this position and tighten the locking nut securely.

The thrust bearings shown in Illust. 24 are used only in the blade reversing gears; all other housings on the grader are equipped with thrust bearings as shown in Illust. 25.

If additional trouble is experienced with "coasting" after the above outlined adjustment has been made, the thrust bearings must be tightened still tighter, however, the bearings should never be tightened more than necessary to prevent coasting; excessive tightness will cause rapid wear.

KEEPING BLADE CONNECTIONS TIGHT

Ball and socket joints on the rear of the moldboard or blade provide a very secure connection between the circle legs and the moldboard. If they are kept drawn up tight, it will prevent blade chattering and excessive wear. Whenever these ball and socket joints, shown in Illust. 26, are loosened or uncoupled for any reason, care should be taken to tighten them very securely again.



Illust. 26. Shows ball and socket connections on back of moldboard which should be kept tight.

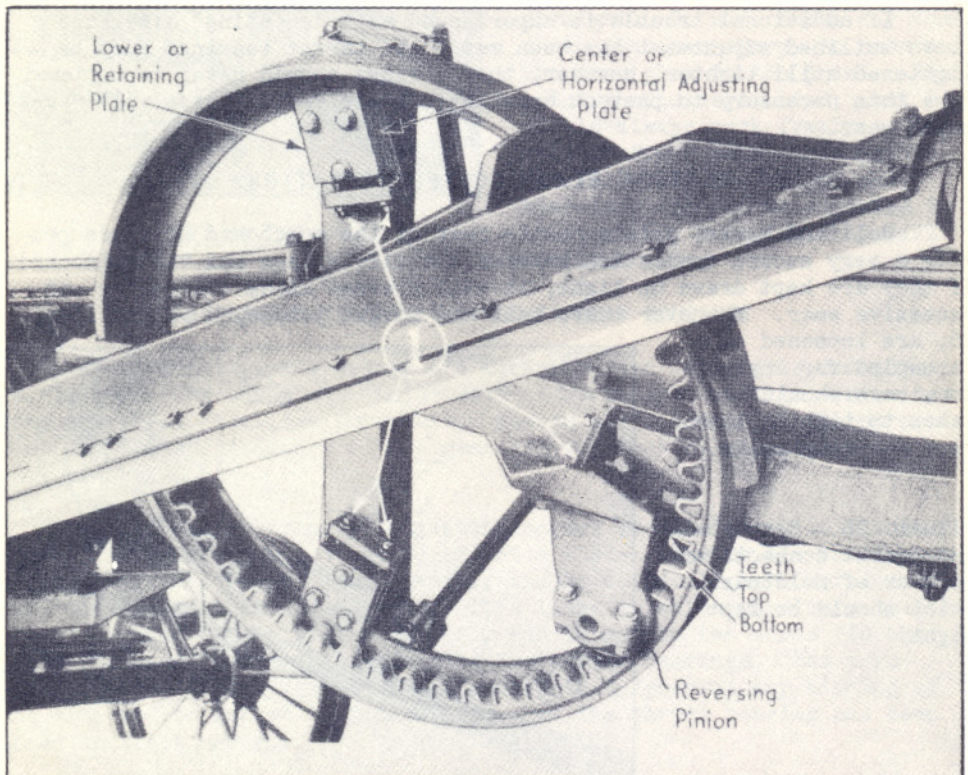
CIRCLE ADJUSTMENTS

The circle is attached to the drawbar at three points by three sets of adjusting and wearing plates (see Illust. 27). The vertical clearance between the circle and the upper or wearing plate of each set should be $1/16''$ when blade is suspended clear of ground. Shim washers are provided between the lower or retaining plate and the center or adjusting plate of each set to compensate for wear in excess of $1/16''$.

When all shims have been removed and the vertical clearance is greater than $1/16''$, the lower or retaining plate of each set can be turned over with the unworn side against the circle, and sufficient shim washers replaced between it and the center or adjusting plate of each set to obtain the $1/16''$ clearance between the circle and the top or wearing plate.

The center or horizontal adjusting plate of each set can be adjusted by set screws (1) in Illust. 27 against the inside edge of the circle to remove horizontal play due to wear. The clearance at these points should be $1/16''$.

Illust. 27



SEC. 4 - CARE AND ADJUSTMENT OF GRADER

CENTERING CIRCLE ON DRAWBAR

When any new parts are installed or adjustments made on the circle, the circle must be checked and centered, if necessary, to get the correct mesh of the circle reverse pinion and the circle rack on the inside of the circle.

Set the horizontal adjusting blocks so the circle can be rotated from stop to stop. Turn circle, and, by sight, note where the pinion meshes deepest in the gear rack. With circle in this position, push it in so that it contacts the front and left horizontal adjusting plates, or adjust plates to meet the circle, being sure to leave a minimum clearance of $1/8$ " between the top of the pinion tooth and the bottom of the tooth in the gear rack. This minimum clearance can be checked by making two right angle bends in a $1/8$ " rod so that rod can be placed between the top and the bottom of the teeth. Set the adjusting block to obtain the correct clearance.

NOTE: There must be at least $1/8$ " clearance between the top of each tooth on the gear rack and the left side of the circle reverse housing. To increase the clearance, the two rear adjusting blocks should be adjusted. The right rear block should be slacked back toward the center of the circle and the left rear block pushed out. This will cause a side shifting of the circle in relationship to the drawbar. It will then be necessary to readjust the pinion mesh with the circle rack as outlined above.

Rotate the circle from stop to stop and check clearance between the top of each pinion tooth and the bottom of the tooth in the rack. This clearance should run from $1/8$ " minimum to $1/2$ " maximum. Under no conditions should the circle be operated under load when the maximum clearance between the teeth is more than $1/2$ " as this will damage the circle reverse gear mechanism.

GENERAL INSPECTION

The operator should make a thorough inspection of the entire machine daily, tightening any loose bolts and inspecting for worn parts. Loose or worn universal joints will cause difficult operation. The universal joints should be inspected frequently and replaced when they become badly worn.

SEC. 5 - PUTTING MACHINE INTO SERVICE

PUTTING MACHINE INTO SERVICE

When a machine is to be put into service, there are several points which should be checked...The entire machine should be lubricated as described under "Lubrication Instructions"...Any grease fittings which are missing should be replaced and any loose bolts tightened...Any damaged parts should be replaced or repaired and all adjustments at points of wear on the machine should be carefully checked.

It is always advisable to carry an extra quantity of shear pins for the tongue so that in case a pin should shear, another pin will be immediately available.

STORING AND SHIPPING SUGGESTIONS

STORING

Whenever the grader is to be stored for a period of time, the following suggestions should be carried out:

The grader should be lubricated thoroughly as instructed in the "Lubrication Instructions". Any grease fittings which are missing should be replaced.

Any places on the grader where the paint has been skinned off should be touched up to prevent rust starting.

The blade should be greased with a heavy axle-type grease to prevent rusting.

The machine should not be stored out of doors and the wheels should never be allowed to stand (in storage) on dirt. Rubber-tired graders should be blocked-up to take the weight off the tires and steel wheel graders should be rolled onto boards to prevent tire rust.

SHIPPING

When the grader is to be shipped by railroad or truck, a few precautions should always be observed:

Always lubricate the entire machine and replace any missing grease fittings or other damaged or missing parts before shipping the grader.

If the grader is to be in transit for several days, grease the blade as described under suggestions for "Storing".

The total length of the grader can be materially reduced for loading by turning the front axle completely around so that the tongue extends back under the frame of the grader. In order to accomplish this it is necessary to uncouple the holdup spring.

SEC. 6 - STORING AND SHIPPING SUGGESTIONS

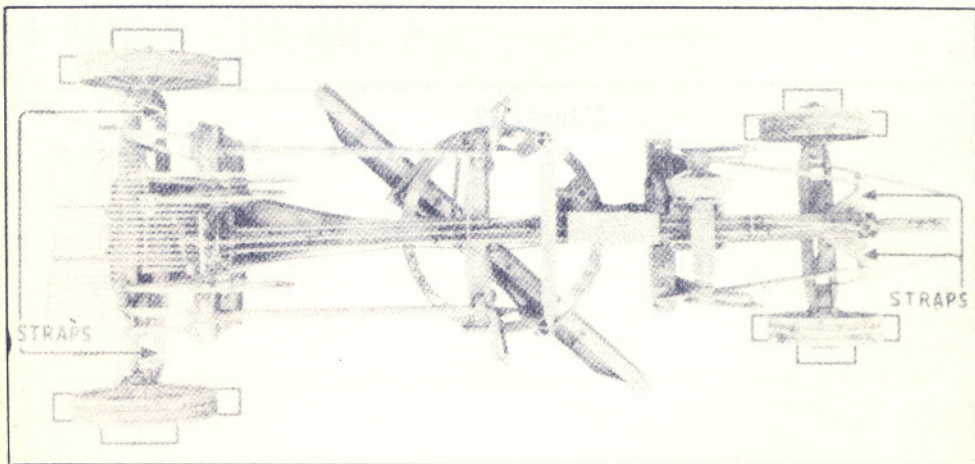
If the blade is to be left attached to the circle, it should be turned so that it does not extend out past the width of the car or truck bed. Lower the blade to the bed of the car or truck as this will materially lessen the vibration of the machine during transit.

The operator's platform should be tied down to the rear axle in order to prevent any vibration in the platform spring.

The blade lift wheels should be tied in place so that there will be no danger of their "coasting" out of the desired setting.

If shipment is by flat car, heavy blocks should be placed at front and rear sides of each wheel as shown in Illust. 28. The blocks should be at least 10" high and sawed to fit the wheel. Also place blocks outside of each wheel and nail all blocks down securely.

Use heavy-gauge wire, steel straps, cables, or chains to tie the grader to the car. The front and rear axles should be tied down at the points indicated in Illust. 28.



Illust. 28

HOISTING ABOARD SHIP -- CUBIC MEASUREMENT

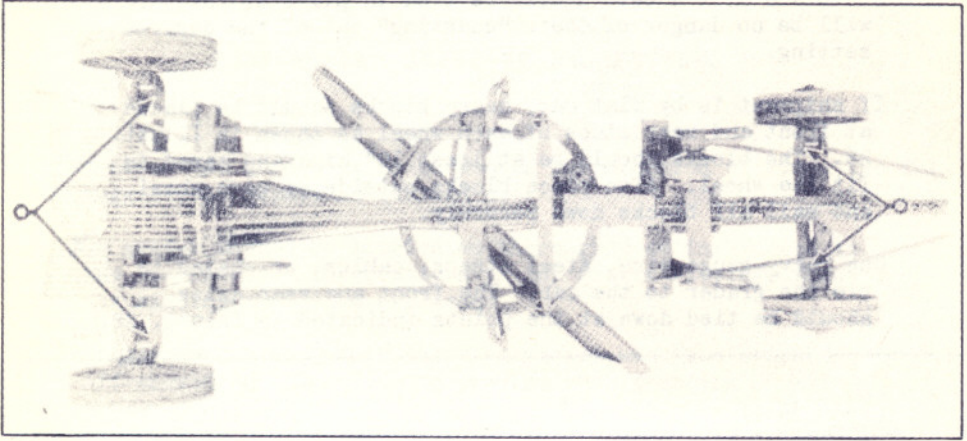
When hoisting the grader aboard ship the crane should be attached to the points shown in Illust. 29. The crane used should have a capacity of not less than 8000 lbs. The following dimensions will be of help when loading the grader aboard ship:

The overall length can be reduced from 30' to 18'6" by unhooking the tongue holdup spring and turning the tongue back under the frame. The width of the grader is 8'7"

SEC. 6 - STORING AND SHIPPING SUGGESTIONS

and the overall height is 7'7". Therefore, with the tongue turned back under the frame, the machine will occupy approximately 1200 cu. ft. of space.

CAUTION: When hoisting the grader with a crane, it is advisable to turn the tongue back under the frame of the grader (after unhooking the holdup spring) and tie the tongue to the grader frame to prevent the tongue from swinging free and uncontrolled.

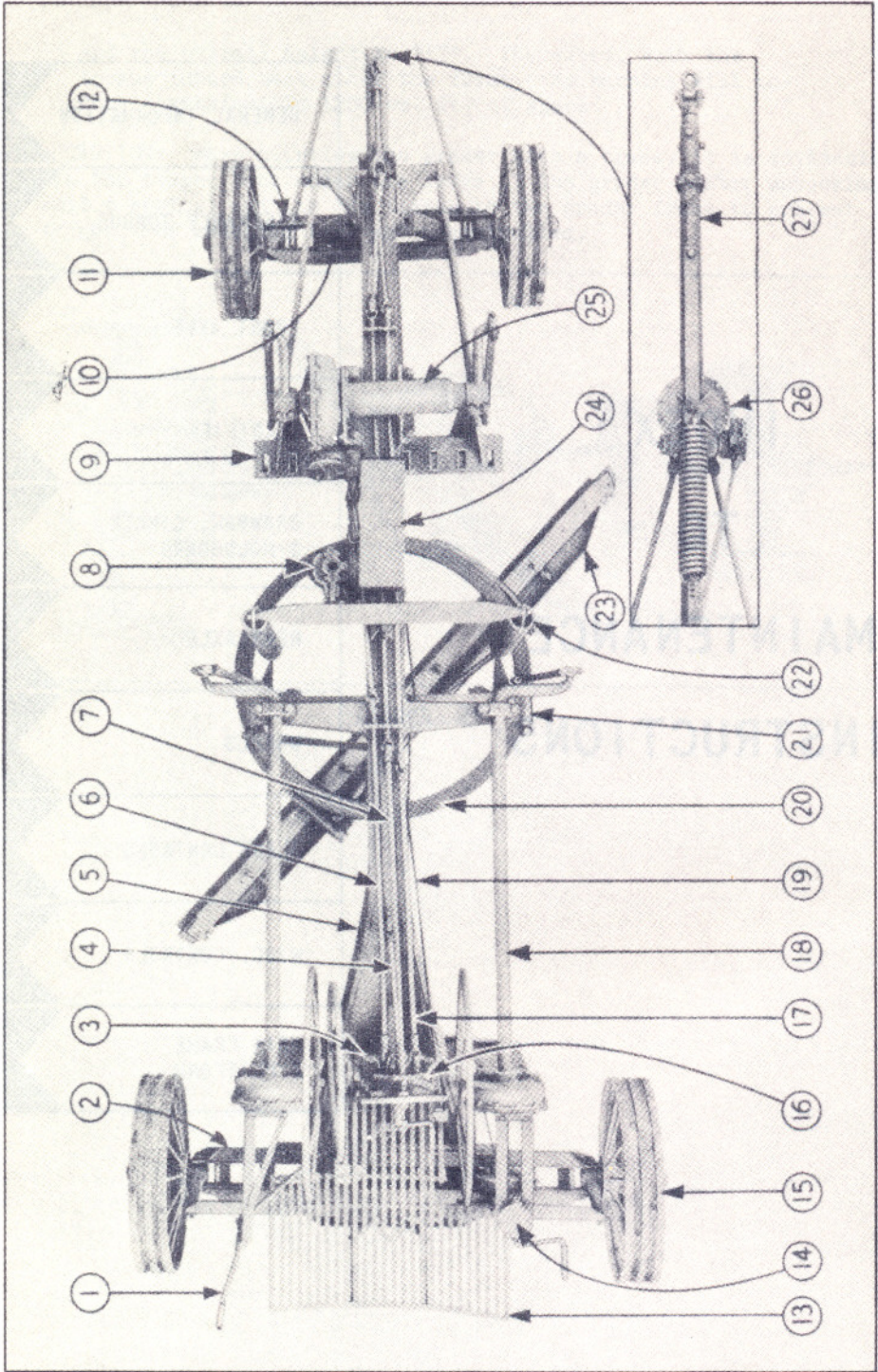


Illust. 29

INDEX
TO
MAINTENANCE
INSTRUCTIONS

GENERAL INFORMATION	1
STEERABLE TONGUE	2
FRONT AXLE	3
SCARIFIER	4
DRAWBAR, CIRCLE & MOLDBOARD	5
REAR AXLE	6
WHEELS	7
BLADE CONTROLS	8
MISC. CONTROLS	9
MAIN FRAME & PLATFORM	10

SEC. I - GENERAL INFORMATION



Illust. 1

SEC. I - GENERAL INFORMATION

This maintenance manual is intended for the instruction of those men or organizations who have the responsibility of repairing and maintaining this machine. The reference numbers in Illust. 1 (opposite page) refer to the index below showing numbers of pages on which will be found instructions for the assemblies pointed out in the illustration. The reference numbers in the illustrations through this book correspond to the reference numbers in illustrations in Parts List.

In each section instructions are given for disassembly, inspection, and reassembly. When the method of disassembly and reassembly is obvious instructions are given only for special points that should be watched.

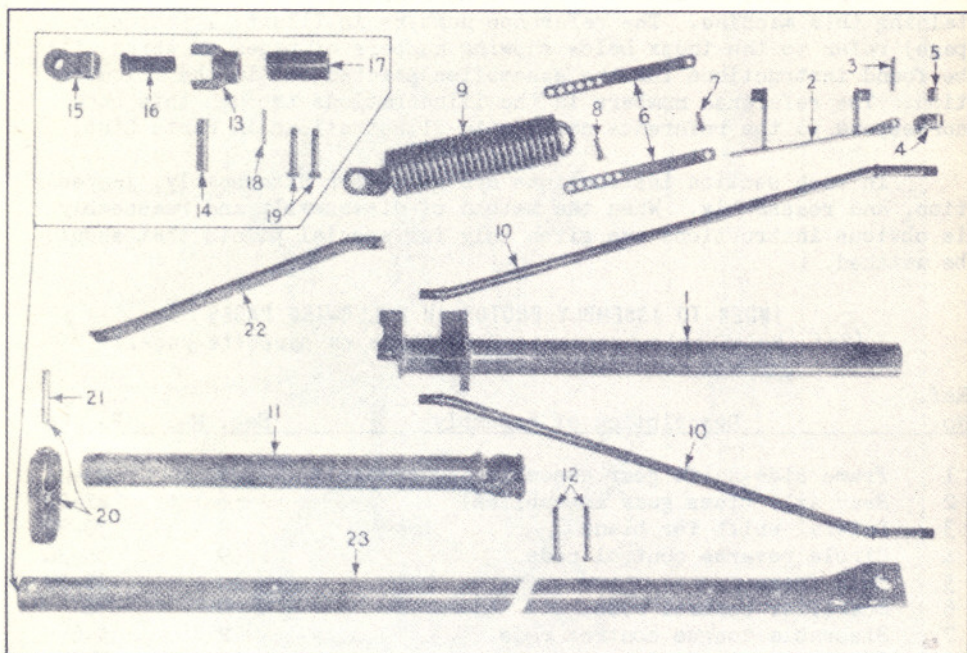
INDEX TO ASSEMBLY PHOTOS IN FOLLOWING PAGES

(Ref. No.'s. below correspond to those on opposite page.)

Ref. No.	Description of Assembly	Sec. No.	Pg. No.
1	Frame side-shift gear assembly and controls	6	23-24
2	Rear axle (less gear assemblies)	6	21-22
3	Lateral shift for blade	8	30-32
4	Circle reverse control rods	9	35-36
5	Main frame	10	38-39
6	Scarifier control rods	9	36
7	Steerable tongue control rods	2	5-6
8	Circle reverse and transfer gears	5	17-20
9	Scarifier block	4	13-16
10	Front leaning wheel gear assembly	3	9-10
11	Wheels (front)	7	25-26
12	Front axle (less gear assembly)	3	7-9
13	Operator's platform	10	39-40
14	Rear leaning wheel gear assembly	6	22-23
15	Wheels (rear)	7	25-26
16	Transmission assembly for 3 in 1 control	9	33-34
17	Front leaning wheel control rods	9	34-35
18	Blade lift mechanism (right and left)	8	27-29
19	Circle unlocking rod	9	37
20	Circle	5	17-20
21	Drawbar	5	17-20
22	Blade lift springs	8	29-30
23	Moldboard	5	17-20
25	Scarifier lift mechanism	4	11-13
26	Steerable tongue gear assemblies	2	3-5
27	Steerable tongue (less gear assemblies)	2	2-3

SEC. 2 - STEERABLE TONGUE

STEERABLE TONGUE (LESS GEAR ASSEMBLIES)



Illust. 2 Steerable Tongue (Less Gear Assemblies)

The steerable tongue (disassembled) shown in Illust. 2 is complete with the exception of the gear assemblies which are shown in following pages.

DISASSEMBLY

The disassembly of the steerable tongue is so simple and obvious that it needs no explanation. However, in case of a complete disassembly of the tongue it is necessary to unhook the hold-up spring.

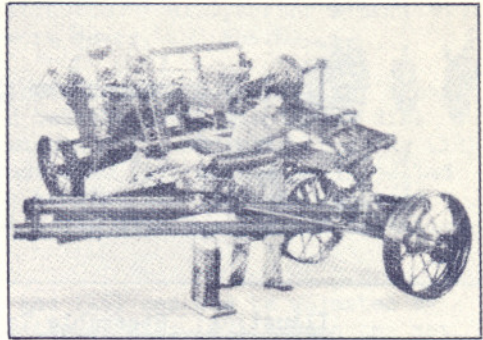
If a chain hoist is available the hold-up spring may be unhooked by hooking a chain around the end of the tongue and raising it to a sufficient height to relieve all tension on the spring (9) Illust. 2, and then remove the drilled bolt (8). However, if a chain hoist is not available, this operation can be performed as shown in Illust. 3. In order to get the grader in the position shown in the illustration, the tongue should first be turned to a 90° angle to the main frame. Then raise the tongue and place a block approximately 20" high about half-way back under the tongue. The frame should be side-shifted on the rear axle to the extreme right hand position. All wheels should be in vertical position. Turn the blade crosswise to the machine and raise the left end as high as possible. Place a block 18" high under the left end of the blade. Now by lowering the left end of blade,

SEC. 2 - STEERABLE TONGUE

the left rear wheel can be raised to a height of 30" above the ground. This will lean the frame as shown in the illustration and relieve all tension on the hold-up spring so that the drilled bolt then may be removed.

INSPECTION

On an overhaul job all parts should be carefully inspected for excessive wear or damage. The hole in the rear end of the pull pipe (23) Illust. 2, should be inspected to determine if it has become elongated to a point where there may be danger of the end pulling out. The rivets which hold the housing (1) Illust. 4, to the stub tongue (11) Illust. 2, should be inspected to make sure that they are not loose in the holes. All bolt holes and pin holes should be inspected to make sure that the bolts and pins fit without excessive looseness; replace parts which are badly worn. All parts which are bent should be straightened or replaced.



Illust. 3

REASSEMBLY

The reassembly of the steerable tongue is just as simple as the disassembly and therefore requires no explanation. However, when reassembling care should be taken in installing guiding arm with hub (11) so as to have the slight offset in hub on top. This is necessary to line up guiding arm with the stub tongue (1).

The tongue hold-up spring should be coupled up again in the same manner in which it was uncoupled. On new machines the drilled bolt (8) is installed in the third hole from the end of the swinging loop extensions (6). If the hold-up spring (9) has become stretched, it will be necessary to install the bolt in the fourth, fifth, or possibly sixth hole from the end.

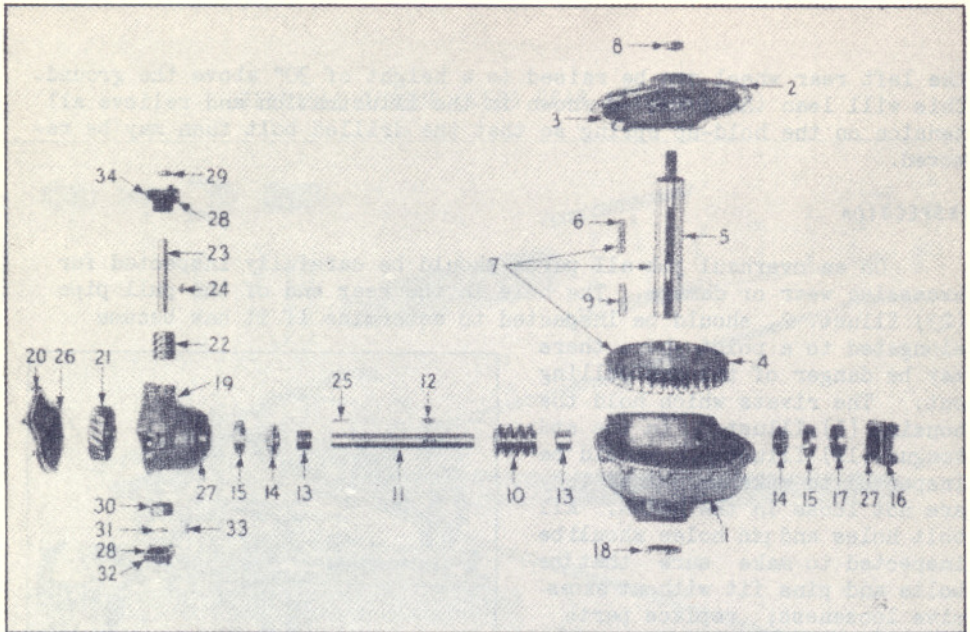
STEERABLE TONGUE GEAR ASSEMBLIES

The steerable tongue gear assemblies are shown in the exploded view, Illust. 4. The assemblies consist of two reduction worm-and-gear units mounted in separate housings.

DISASSEMBLY

The disassembly of the gear assemblies is very simple and the point to which the disassembly must be carried depends entirely on the work to be done. Complete disassembly of both housings is necessary only in case of major repair to the units. In case of complete disassembly, the general order in which the parts should be removed is

SEC. 2 - STEERABLE TONGUE



Illust. 4 Steerable Tongue Gear Assemblies

as follows:

The worm and shaft should be removed from the reduction housing (19), next removing the gear (21) and reduction housing (19). The spiral gear (21) can be removed from the shaft (11) with a bar puller. Two holes are provided in the spiral gear with 5/16" N.C. thread (18 threads per inch) for installation of studs or cap screws. The worm and shaft assembly may then be removed from the main housing (after removing the main housing cover (2)). The worm gear and shaft assembly (7) may then be removed from the housing (1). The worm gear (4) can be removed from the shaft (5) with a press. The worm (10) can be removed from the shaft (11) by supporting the worm in a press and pressing out the shaft. The spiral pinion (22) is removed from the shaft (23) in the same manner.

INSPECTION

All parts should be inspected for excessive wear, breakage, or other bad conditions. Worms, worm gears, shafts, and bearings, will sometimes seize and score due to insufficient lubricant or improper lubricant being used. Therefore, a close inspection of these parts should be made to determine if damage of this type has occurred. Parts which are damaged in this manner should be replaced with new ones. It is always advisable to replace both worm and worm gear if either has to be replaced on account of damage or wear.

REASSEMBLY

When reassembling the steerable tongue housings new gaskets

SEC. 2 - STEERABLE TONGUE

and seals should be installed throughout. The seal (18) should be installed in the housing (1) with the sharp edge of the seal pointing toward the inside of the housing. The seal (29) should be installed in the bearing (34) with the sharp edge of the seal pointing in toward the inside of the housing. New gaskets (27), (3), (28), and (26), should be installed. If the worm gear (4) has been removed from the shaft (5) it should be reinstalled with the long end of the gear hub on top. Reassembly of the housing is the reverse of the procedure outlined in the disassembly. Coat all wearing surfaces with grease specified in "Lubrication Instructions" of Operator's Manual. This includes all bearings, worms, worm gears, and shafts.

After the worm (10) has been installed on the shaft (11) along with the spacers, bearing cones, and bearing cups, the thrust disc (17) should be installed in the housing and the reduction housing (19) bolted to the housing (1). The thrust disc (17) should be installed with the flat side out. The outside bearing cap (16) should be installed and the flat-point Allen set screw with hex jam nut installed in the cap.

The worm thrust bearings (14) and (15) can now be adjusted by turning the set screw in against the thrust disc (17). Turn the set screw in (to the right) until it comes up tight. Then back the set screw off about 1/16 of a revolution, hold in this position and tighten the hex jam nut.

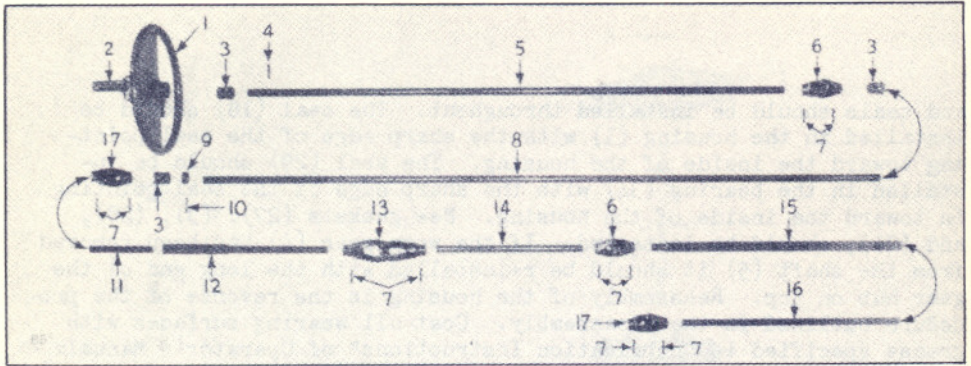
The spiral pinion (22) with shaft (23) should be installed in the reduction housing after the spiral gear (21) has been installed. When installing the worm thrust bearing (30) care must be taken to install the adjusting spacer (31), the thrust bearing pin (33) and the bearing adjusting cap (32). The pin (33) slides into holes in the worm thrust bearing and the bearing adjusting cap. The flat-point Allen head set screw should be installed in the bearing adjusting cap and the hex jam nut installed on the set screw. The adjustment of the worm thrust bearings is the same as previously described for the main housing.

Caution: When sliding the shaft (5) through the seal (18) and when sliding the shaft (23) through the seal (29), see that the edge of the seal is not turned down, torn, broken, or damaged in any other way.

STEERABLE TONGUE CONTROL RODS

The steerable tongue control rods are shown laid out in their proper order in Illust. 5. The steering wheel assembly (1) is mounted directly in front of the operator and the remainder of the shafts and universal joints are mounted on top of the frame and lead to the steerable tongue gear assemblies, shown in Illust. 4.

SEC. 2 - STEERABLE TONGUE



Illust. 5 Steerable Tongue Control Rods

DISASSEMBLY

The disassembly of the steerable tongue control rods is a very simple process which requires no explanation. The three control rod bearings (3) Illust. 5, are held in bearing blocks on top of the main frame. Shafts and universal joints are held together by the pins (7).

INSPECTION

A close inspection of all universal joints should be made occasionally to determine if any of the joints are worn to the point where the efficiency of the controls is impaired. Universal joints which are worn badly should be replaced and if any of the control shafts become bent or worn at the bearings or on the ends they should be immediately straightened or replaced.

REASSEMBLY

The reassembly of the control rods is a very simple process involving very few special instructions. The shaft (8) is passed through the hole in the base of the rocker bar support.

When assembling the square shaft (11) in the hollow square with shaft (12), and the square shaft (16) into the hollow square with shaft (15), see that the fingers on the universal joints lie in the same relative plane. The proper assembling of the square shafts into the hollow squares is shown in Illust. 6.

The collar (9), bearing (3), and universal joint (17) are mounted on the shaft (8). The collar and the universal joint bear against each end of the bearing to hold against end thrust on the shaft.

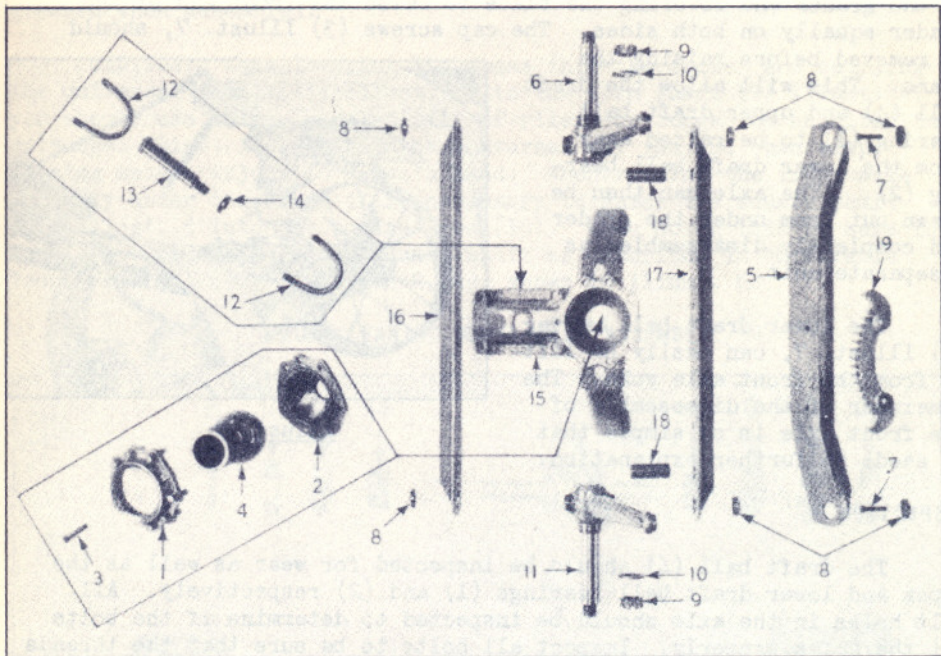
Universal joints (17) are made to fit a 1" shaft on one end and a 7/8" shaft on the other end. All other universals are for 1" shafts on both ends. Universal joint (13) is designed for an extreme "break" which is necessary when turning the grader around.



Illust. 6

SEC. 3 - FRONT AXLE

FRONT AXLE (LESS GEAR ASSEMBLY)



Illust. 7 Front Axle (Less Gear Assembly)

The front axle is shown in the exploded view of Illust. 7. The front leaning wheel gear assembly is not shown in this view but is covered later in this section. The front axle is of very simple construction which requires very infrequent repairs.

DISASSEMBLY

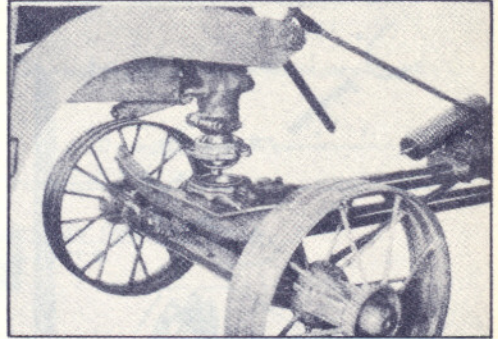
Although it is not absolutely necessary to remove the front axle assembly from the grader in order to repair it, it will be found advantageous from a standpoint of convenience. This, of course, holds true only in a case of complete disassembly. Minor repairs can be made to the axle while it is attached to the grader without any great difficulty.

However, if it is decided to remove the front axle assembly from the grader it should be done in the manner shown in Illust. 8. The first step is to uncouple the tongue hold-up spring as shown in Illust. 3 and described under "Steerable Tongue (Less Gear Assemblies)" in Section 2. If the grader is equipped with a scarifier, the front end of the frame may be raised by lowering the scarifier against the ground thus raising the frame. If the grader is not equipped with a scarifier this same operation may be done by turning the blade crosswise

SEC. 3 - FRONT AXLE

to the grader and lowering the blade to raise the front end of the grader equally on both sides. The cap screws (3) Illust. 7, should be removed before raising the frame. This will allow the draft ball (4) and upper draft ball bearing (1) to be raised away from the lower draft ball bearing (2). The axle can then be drawn out from under the grader and completely disassembled as a separate unit.

The lower draft ball bearing (2) Illust. 7, can easily be lifted from the front axle yoke. The remainder of the disassembly of the front axle is so simple that it needs no further explanation.



Illust. 8

INSPECTION

The draft ball (4) should be inspected for wear as well as the upper and lower draft ball bearings (1) and (2) respectively. All bolt holes in the axle should be inspected to determine if the bolts fit the holes properly. Inspect all bolts to be sure that the threads on the bolts and in the nuts are in good condition.

If the front spindle assemblies (11) and (6) have been removed it is assumed that the wheels have also been removed from the spindles. If the wheels have been removed, the nuts (9) and washers (10) should be put back on the spindles to protect the threads. (For suggestions on wheel inspection see Section 7.)

REASSEMBLY

In order to reassemble the axle you should reverse the procedure followed in disassembly. The four bolts which hold the front and rear angles to the front axle yoke with legs should be installed from the inside out, placing the heads of the bolts on the inside of the leg on the front axle yoke (15). A machined lock washer is placed under the head of each of these four bolts. The right and left hand tongue braces (10) Illust. 2 pass through the front angle (16), the spacers (18) and the rear angle (17).

The front and rear angles fit onto the bosses on the side of the spindle assemblies and are held in place by bearing caps (8) and two long bolts which pass completely through the body of the spindle assembly. The vibrating angle (5) is held on the spindles in the same manner by the bolts (7) as previously explained.

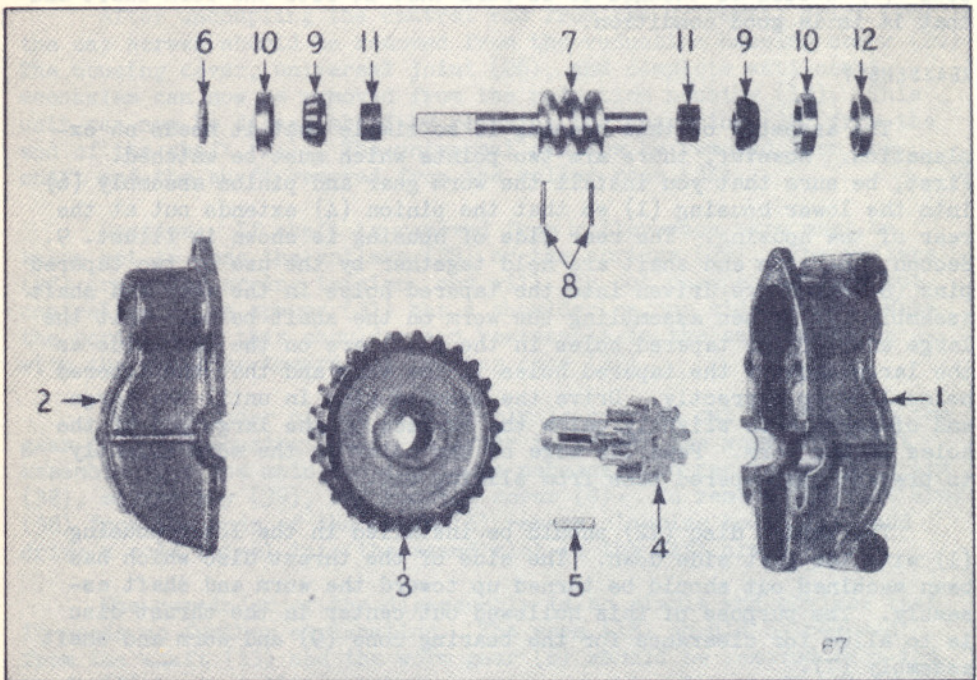
The front axle assembly is reinstalled on the grader by reversing the procedure outlined for disassembly. All wearing parts should be

SEC. 3 - FRONT AXLE

greased when assembled.

CAUTION: When lowering the frame into the socket and coupling the universal joint (11) Illust. 32 to the worm shaft (7) Illust. 9, you should use a long handled pair of pliers or tongs for handling the universal joint. Otherwise, the universal may jam and then slip, causing severe injury to a man's hand. When rolling the front axle assembly under the frame it is necessary to guide the square shaft (16) Illust. 5 into the square tube (15). When doing this be sure to couple the square tube and square shaft as described in "Steerable Tongue Control Rods", Section 2, and shown in Illust. 6.

FRONT LEANING WHEEL GEAR ASSEMBLY



Illust. 9 Front Leaning Wheel Gear Assembly

The front leaning wheel gear assembly is shown in disassembled form in Illust. 9. This assembly is mounted between two angles in the front axle.

DISASSEMBLY

It is necessary to at least partially disassemble the front axle in order to remove the front leaning wheel gear assembly from the axle. The proper disassembly of the front axle has been covered

SEC. 3 - FRONT AXLE

in previous paragraphs in this same section. After the gear assembly has been removed from the axle it can be quickly and easily disassembled by removing the upper half of gear housing (2) and lifting out the worm and shaft assembly, and the worm gear and pinion (3), (4), and (5). If it is desired to remove the bearing cone (9) and bearing spacer (11) which are between the worm and the square end of the worm shaft it is necessary to drive out the two tapered pins (8). The worm can then be removed from the shaft and the spacer and bearing pressed off.

INSPECTION

All bearings, gears, shafts, and worms should be carefully inspected for excessive wear, breakage or other damage. The rubber water seal (6) should be checked to be sure that it fits the worm shaft and that it is in good condition.

REASSEMBLY

The assembly of this housing is so simple that it needs no explanation. However, there are two points which must be watched. First, be sure that you install the worm gear and pinion assembly (6) into the lower housing (1) so that the pinion (4) extends out at the rear of the housing. The rear side of housing is shown in Illust. 9. Second, the worm and shaft are held together by the use of two tapered pins (8) which are driven into the tapered holes in the worm and shaft assembly (7). When assembling the worm on the shaft be sure that the large ends of the tapered holes in the shaft are on the same side as the large ends of the tapered holes in the worm and that the tapered holes line up correctly. Drive the tapered pins in until the large end of the pin is slightly below the surface of the large end of the holes in the worm. Peen the edge of the holes in the worm slightly to prevent the tapered pins from sliding out.

The thrust disc (12) should be installed in the lower housing (1) with the flat side down. The side of the thrust disc which has been machined out should be turned up toward the worm and shaft assembly. The purpose of this hollowed out center in the thrust disc is to allow for clearance for the bearing cone (9) and worm and shaft assembly (7).

All wearing parts and surfaces, such as bearings, gears, and shafts should be well greased when assembled.

The bearing adjustment on the worm and shaft assembly is made in the same manner as previously described for the steerable tongue gear assemblies. The Allen-head, flat-point set screw with lock nut should be installed in the lower housing. The adjustment of the bearings can be made either before or after assembly into the front axle. In either event the set screw should be turned in (to the right) until it comes up tight, then back it off about 1/16 of a revolution. Hold in this position and tighten the locking nut securely.

SEC. 4 - SCARIFIER

SCARIFIER LIFT MECHANISM

The scarifier lift mechanism is shown in disassembled form in Illust. 10 on following page. The remainder of scarifier is shown in Illust. 11 on page 14. An anti-coast mechanism is included in the small reduction housing.

DISASSEMBLY

The extent to which the mechanism has to be disassembled depends upon the work to be done. In case the mechanism is to be completely disassembled, the general order in which the parts should be removed is as follows:

After uncoupling the control rod from the universal joint (26), the cap screws should be removed from the reduction housing cover (20). The housing cover, universal joint (26), and complete anti-coast mechanism can now be removed from the reduction housing (19). This unit can now be disassembled by removing the snap ring (36) from the end of the shaft (24). The universal can now be removed from the shaft and the shaft removed from the roller race (34).

Caution: If shaft is removed from roller race care must be taken not to lose the rollers (28) or the springs (29). The rollers (28) are under spring tension, and will fly out unexpectedly if not controlled...The spacer (31) has a shoulder on one side of it. Note the position of this shoulder and reassemble in the same position -- with the shoulder toward the bearing cone (32).

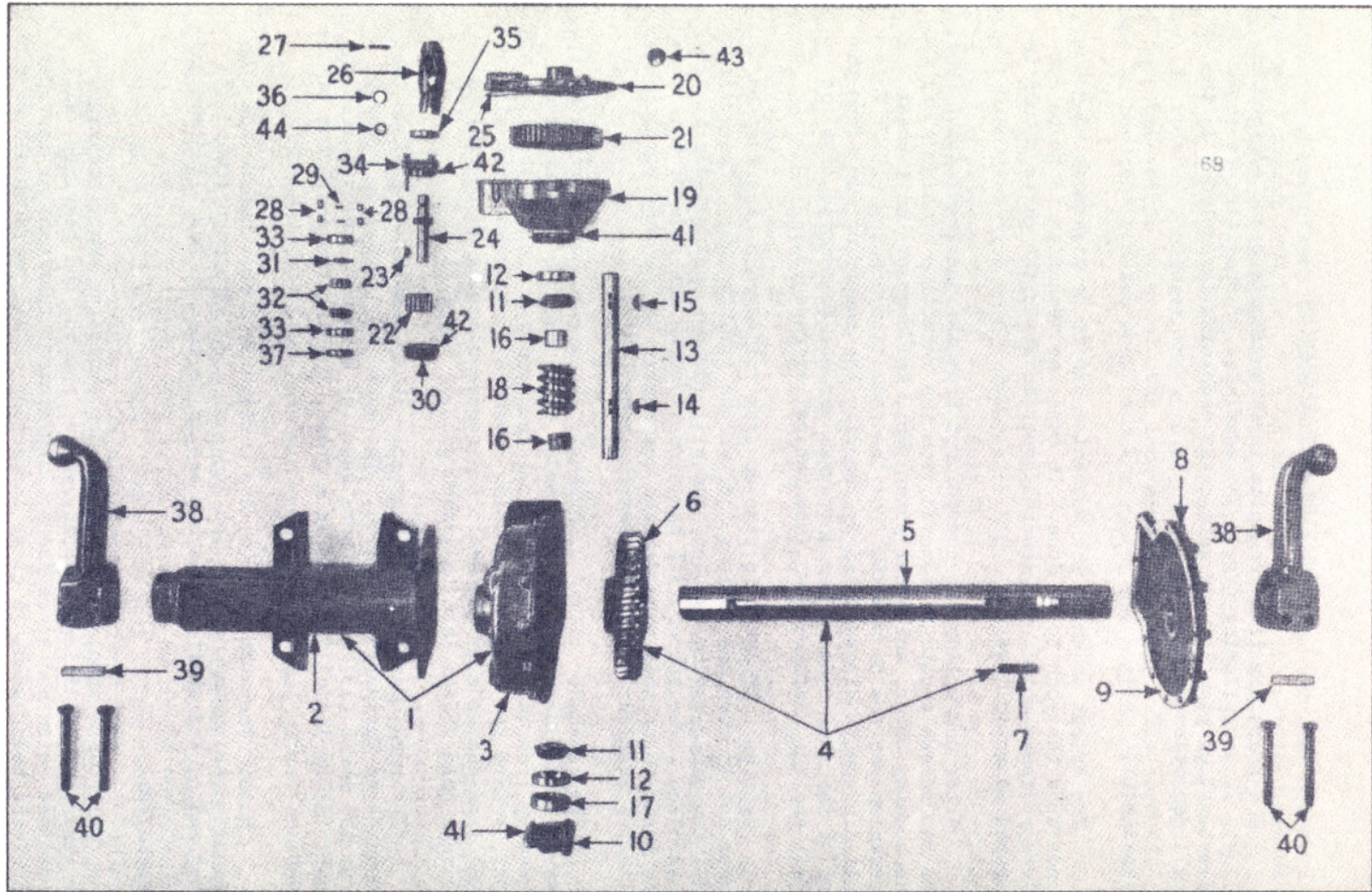
The remainder of the disassembly is carried out by removing the gear (21) and housing (19). In order to remove the worm and shaft assembly from the main housing it is necessary to remove the lift arm (38), square key (39), and housing cover (8). To remove the lift arms (38) from the ends of the shaft (5) remove clamping bolts (40) and drive a cold chisel into the sawed slot in the lift arm.

The remainder of the disassembly is so simple and obvious that it needs no further explanation. The worm (18) should be removed from the shaft (13) and the worm gear (6) should be removed from the shaft (5) by installing each in a press, pushing the shaft out of the gear.

Note: The worm gear (6) has a slightly longer hub on one side than it does on the other. The long hub side should go toward the long end of the shaft. This can easily be seen in the illustration.

INSPECTION

All parts should be inspected for excessive wear, breakage, or other bad conditions. Worms, gears, shafts, and bearings, will sometimes seize and score due to insufficient lubricant or improper lubricant being used. A close inspection of all parts should be made



Illust. 10 Scarifier Lift Mechanism

SEC. 4 - SCARIFIER

to determine if damage of this type has occurred. If seizing or scoring occurs both parts involved should be replaced. In other words, if for example a worm and worm gear should score both the worm and the worm gear should be replaced.

REASSEMBLY

When reassembling the mechanism all wearing surfaces should be coated with grease as specified in "Lubrication Instructions" of the Operator's Manual. New gaskets and seals should be installed throughout the entire assembly. The seal (35) should be installed in the roller race (34) with the sharp edge of the seal pointing toward the inside of the housing. If a new Welch plug (43) is to be installed in the housing cover (20) the edge of the plug should be coated with gasket shellac or some other type of sealing compound.

After installing the Welch plug it should be driven down slightly in the center to expand it into the housing cover thus forming a tight seal.

After assembling the worm (18) and shaft (13) with related parts in the housing (3) the end thrust adjustment should be made. When assembling the thrust disc (17) into the housing (3) be sure to get the flat side of the thrust disc toward the outside of the housing. The flat point Allen-head set screw with hex jam nut should be installed in the cap (10). To adjust the worm thrust bearings, turn the set screw in (to the right) until it comes up tight; then back off about 1/16 of a revolution; hold in this position and tighten the hex jam nut.

When installing the lift arms (38) on shaft (5) drive a cold chisel into the sawed slot to spread the lift arms slightly. The keys (39) should be driven in flush with the end of the shaft after the lift arms have been installed.

The remainder of the lift mechanism is assembled by reversing the disassembly instructions. When reassembling the rollers (28) into the roller race (34) be sure to install them with the round end of the roller toward the universal joint. The felt oil seal (44) is installed in the groove in the shaft (24). The bearing adjustment on this shaft is carried out in the same manner previously outlined for the main housing worm and shaft assembly.

SEC. 4 - SCARIFIER

SCARIFIER BLOCK

The complete scarifier block assembly shown in Illust. 11 requires very little attention or repair. The main attention necessary is occasional sharpening and tempering of the teeth (13).

DISASSEMBLY

The disassembly of the scarifier block is so simple that it needs no explanation. The lift link bearings (3) are a drive fit in the holes of the scarifier block (1). Instructions for adjustment of the ball and socket joints are given in the Operator's Manual.

INSPECTION

The ball and socket joints should be inspected occasionally to determine if there is any looseness. If the grader has been turned around with the scarifier teeth imbedded in the ground, the drawbars on the scarifier block may have become sprung out of line. This should be checked and if necessary, drawbars should be straightened. Occasionally the scarifier teeth (13) should be inspected for wear and should be sharpened when necessary by following the instructions outlined below.

REASSEMBLY

The reassembly of the scarifier block is the reverse of the disassembly. The right and left hand scarifier draft brackets (9) and (10) are bolted to each side of the frame directly above the front bolster. The eight bolts used should be inserted from the inside out, installing the nuts on the outside.

SHARPENING SCARIFIER TEETH

When it becomes necessary to sharpen the scarifier teeth, follow the instructions below.

HEATING AND REPOINTING

When heating the teeth for repointing in an oil or electric furnace, heat six inches of the pointed end of the tooth to between 1800 and 1900 degrees F. If heating in a forge, pre-heat six inches of the point end in the coals near the direct draft of the forge to between 1000 and 1100 degrees F. or when the color of the tooth starts to change from blue to dark red. Then place pre-heated end direct in the draft of the forge, using just enough air through it to keep the coals bright. Heat to between 1800 and 1900 degrees F. or an orange red to a yellow color.

Forge to the point desired. During the repointing operation keep six inches of the point end of the tooth above 1525 degrees F. or a cherry red. After this operation is completed, lay the tooth near the fire or bury it in dry ashes until it is cool to the hands.

SEC. 4 - SCARIFIER

HARDENING

When heating the tooth for hardening in an oil or electric furnace, heat six inches of the pointed end again to between 1525

and 1575 degrees F. or a cherry red to bright cherry red.

If heating in a forge, pre-heat six inches again in the coals near the direct draft of the forge to between 1000 and 1100 degrees F., or when the color of the tooth starts to change from blue to dark red. Then place the pre-heated end of the tooth in the direct draft of the forge, using just enough air through it to keep the coals bright. Heat the pointed end of the tooth to between 1525 and 1575 degrees F., or a cherry red to bright cherry red.

The tooth should be quenched in quenching oil until cold. Never quench when above 1575 degrees or a bright cherry red. The Brinell hardness should range from 375 to 477 from the point of the tooth back three inches.

SEC. 5 - DRAWBAR, CIRCLE AND MOLDBOARD

DRAWBAR, CIRCLE, CIRCLE REVERSE, AND MOLDBOARD

The drawbar, circle, circle reverse and transfer housings, and moldboard are shown in Illust. 12, 13, 14 and 15 in the following pages. Due to the close relationship of the parts shown in these illustrations they will be discussed as a group rather than individually.

DISASSEMBLY

The extent to which these units are disassembled depends entirely upon the work to be done. Any one group of parts as shown in the illustrations can be removed and disassembled without disturbing any of the other groups. In other words, the circle assembly shown in Illust. 13 can be removed without disturbing the circle reverse and transfer housings shown in Illust. 14. The reverse is also true.

The removal of the circle reverse and transfer housings can be accomplished quite easily without disturbing any of the remaining parts on the drawbar assembly. Here again the method of removal is obvious and requires no explanation. To disassemble the circle reverse housing, first remove the cover plate (2) and the reverse gear and pinion (3), Illust. 14. After removing the spring (13) and pins (10) and (20) the shaft (14) can be removed from the lever (15), housing (1), and the locking pawl (16). Now by driving out the two tapered pins (19) the worm and shaft assembly (18) can be disassembled and removed. The remainder of the disassembly of the circle reverse housing is a very simple process.

To disassemble the transfer housing, remove the four cap screws which hold the cover (22) to the housing (21) and remove the gear and shaft assemblies.

INSPECTION

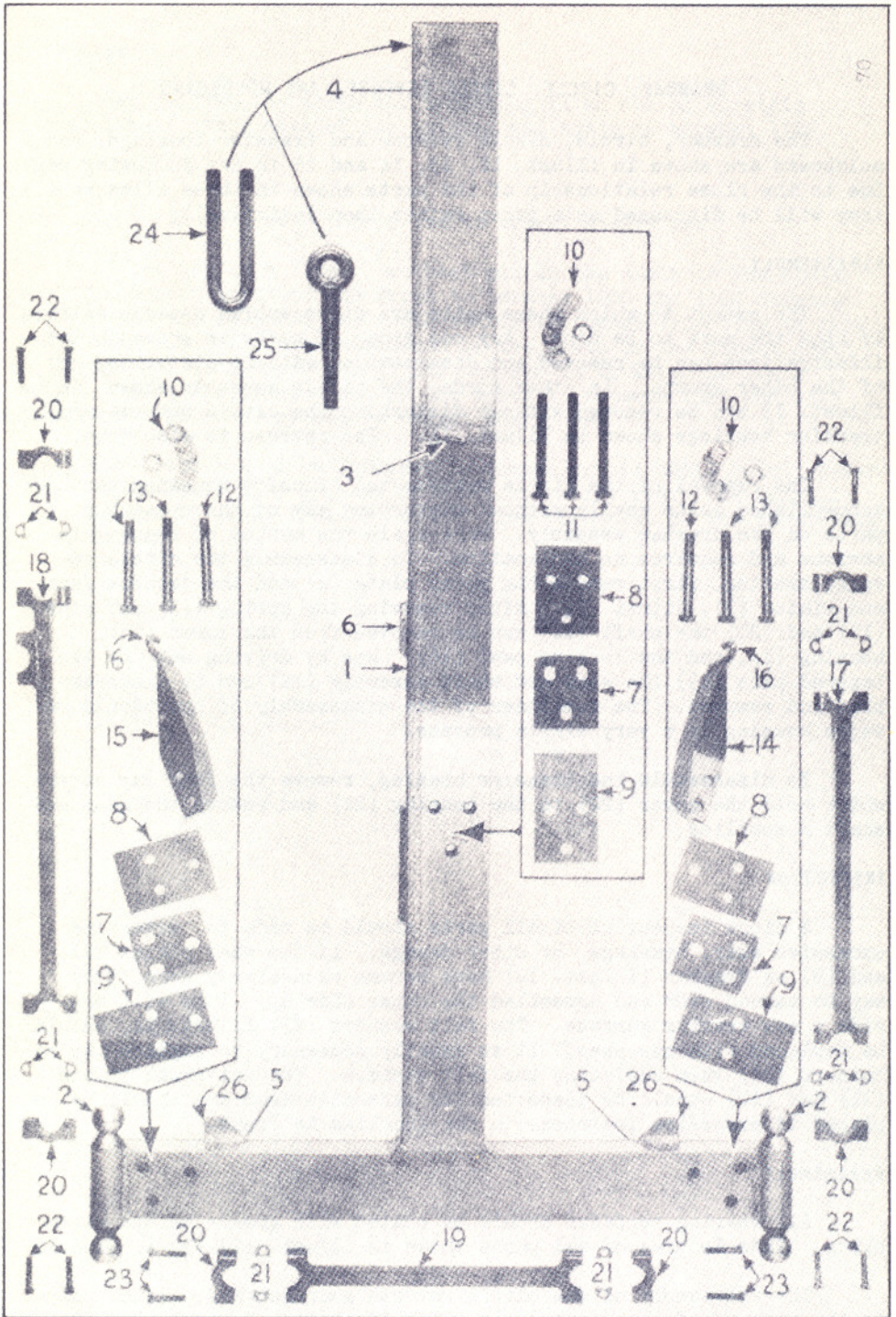
A close inspection of all parts should be made to determine excessive wear, breakage, or other damage. If the wear plates (8) and (9) on drawbar (Illust. 12) have become excessively worn, they may be turned over and assembled the other side up. This will provide a new wearing surface. The felt washers (23) Illust. 14, should be replaced with new ones. It is usually necessary to replace the retainers (24) when replacing the felt washers. The universal joints (11) and (12) should be inspected for excessive wear and should be replaced if excessive looseness in the knuckles is found.

REASSEMBLY

All wearing surfaces should be coated with grease before assembling. This is true of all parts shown in Illust. 12, 13, 14, and 15.

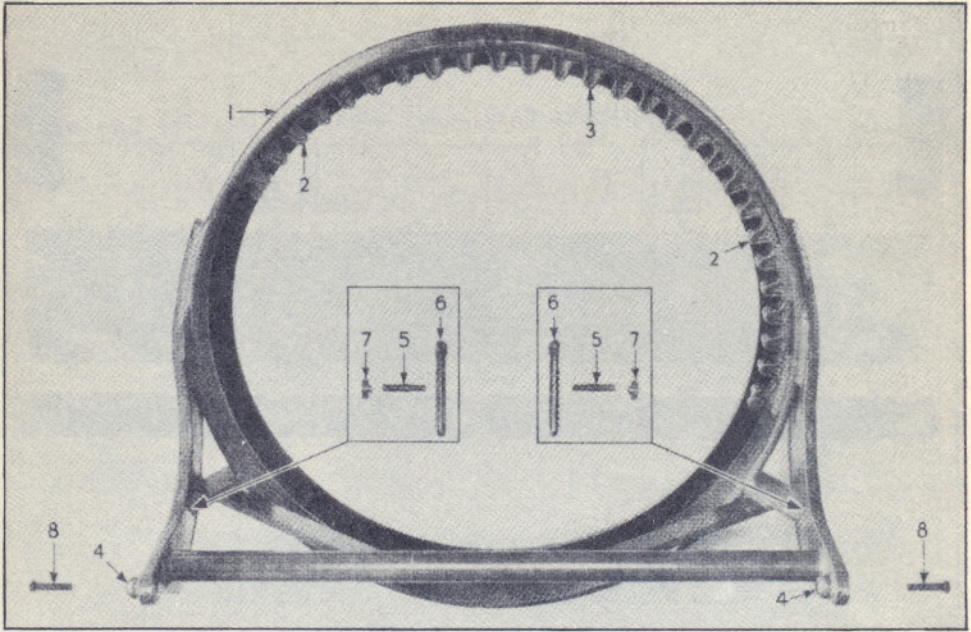
The reassembly of the circle reverse gear housing, Illust. 14, is the reverse of the disassembly. The first step is to install the

SEC. 5 - DRAWBAR, CIRCLE AND MOLDBOARD



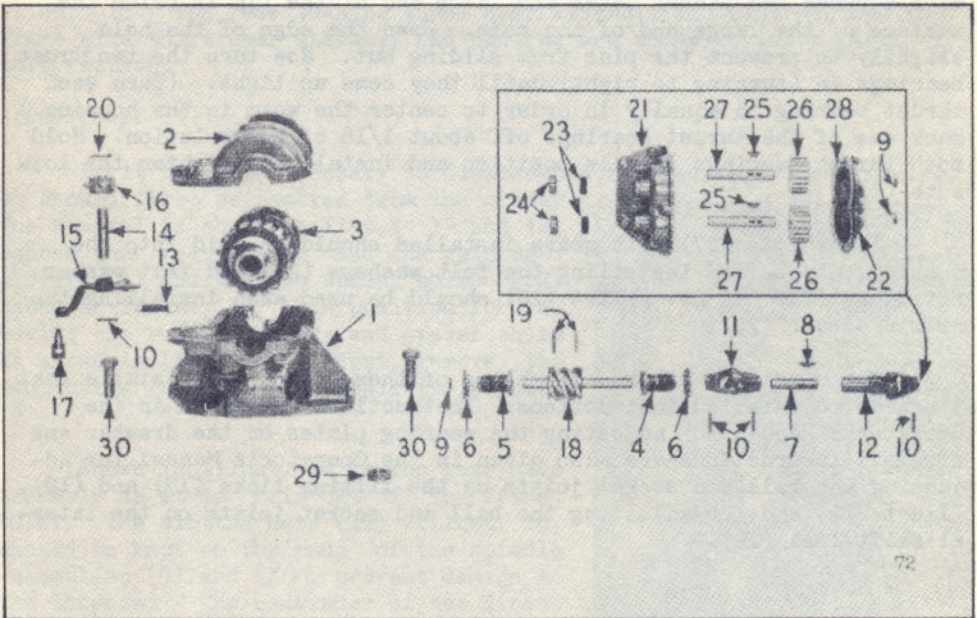
Illust. 12 Drawbar

SEC. 5 - DRAWBAR, CIRCLE AND MOLDBOARD



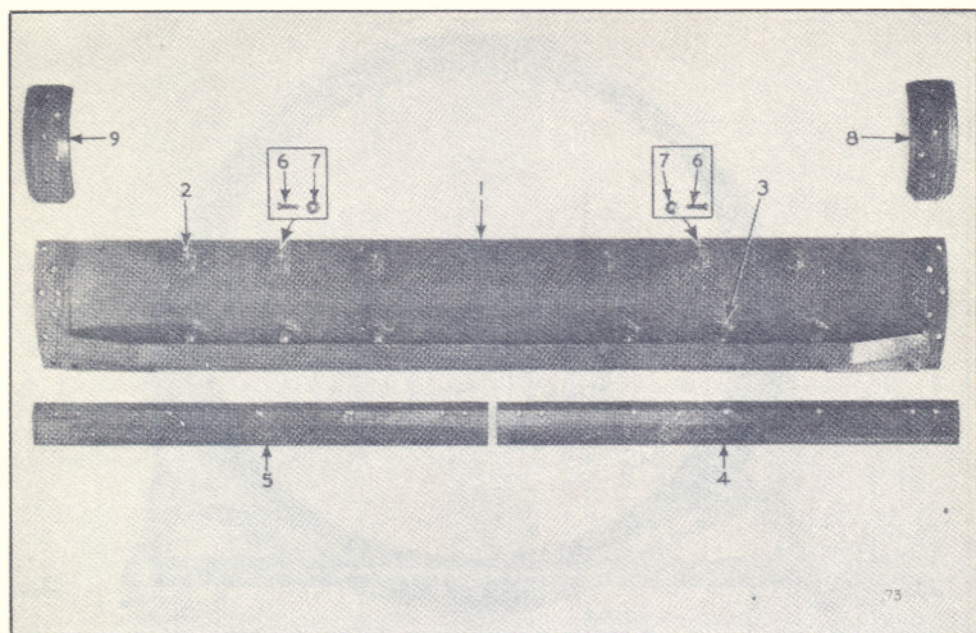
Illust. 13 Circle

thrust bearings (5) and (4). After these thrust bearings have been installed in the housing (1), install the worm and shaft assembly (18). Care must be taken to assemble the worm on the shaft so that the large



Illust. 14 Circle Reverse and Transfer Housings

SEC. 5 - DRAWBAR, CIRCLE AND MOLDBOARD



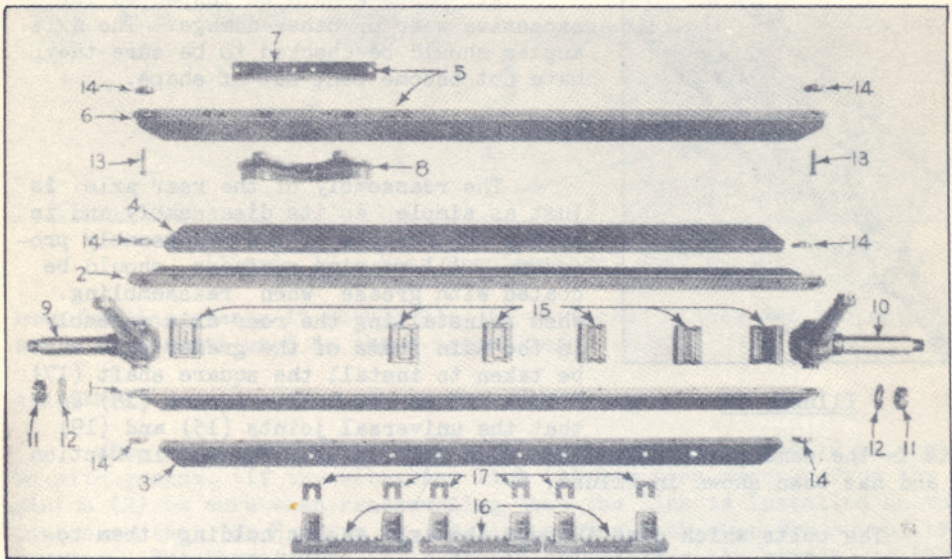
Illust. 15 Moldboard

end of the tapered pin hole in the shaft is on the same side as the large end of the tapered pin hole in the worm. Be sure that the holes line up properly. Install the tapered pins (19) and drive them in with a punch and hammer until the large end of the pin is below the surface of the large end of the hole. Peen the edge of the hole slightly to prevent the pins from sliding out. Now turn the two thrust bearings in (turning to right) until they come up tight. (Turn each thrust bearing in equally in order to center the worm in the housing.) Back one of the thrust bearings off about 1/16 of a revolution. Hold both thrust bearings in this position and install and tighten the lock nuts (6).

The shafts (27) with gears installed should be slid into the housing (21) before installing the felt washers (23) and felt washer retainers (24). A new gasket (28) should be used when installing the housing cover (22).

The remainder of the assembling of these parts is so simple that it needs no detailed instructions. Instructions are given in the Operator's Manual for adjusting the wearing plates on the drawbar and circle. Instructions are also given in the Operator's Manual for adjusting the ball and socket joints on the lifting links (17) and (18), Illust. 12, and for adjusting the ball and socket joints on the lateral shift link (19).

REAR AXLE (LESS GEAR ASSEMBLIES)



Illust. 16 Rear Axle (Less Gear Assemblies)

The rear axle, less gear assemblies, is shown disassembled in Illust. 16. The rear leaning wheel gear assembly and control, and the frame side shift gear assembly and control are shown in later pages of this section.

DISASSEMBLY

If it becomes necessary to disassemble the rear axle completely, it should first be removed from the grader. The removal is shown in Illust. 17 and 18. Remove the rear wheels and the guiding blocks (21) and the two spacer shims (22) shown in Illust. 36. The position for removing the guiding blocks and spacer shims is shown in Illust. 17. Next, remove the stop bolts from the axle angle (2), Illust. 16.

Shown in Illust. 18 is the rear axle assembly as it is slid out of the frame. NOTE: The slotted nuts (11) Illust. 16, should be kept on the ends of the spindle assemblies (9) and (10) to prevent damage to the threads. The remainder of the disassembly is so simple that it needs no further explanation.



Illust. 17

SEC. 6 - REAR AXLE



Illust. 18

INSPECTION

All parts should be inspected for excessive wear or other damage. The axle angles should be checked to be sure they have not become bent out of shape.

REASSEMBLY

The reassembly of the rear axle is just as simple as its disassembly and is merely the reverse of the disassembly procedure. All wearing surfaces should be coated with grease when reassembling. When reinstalling the rear axle assembly in the main frame of the grader care must be taken to install the square shaft (17) Illust. 19 in the hollow square (18) so that the universal joints (15) and (19)

lie in the same plane. This has been previously discussed in Section 2 and has been shown in Illust. 6.

The bolts which pass through the axle angles holding them together should be installed from front to rear with the nuts on the back side.

REAR LEANING WHEEL GEAR ASSEMBLY

The rear leaning wheel gear assembly with control is shown disassembled in Illust. 19.

DISASSEMBLY

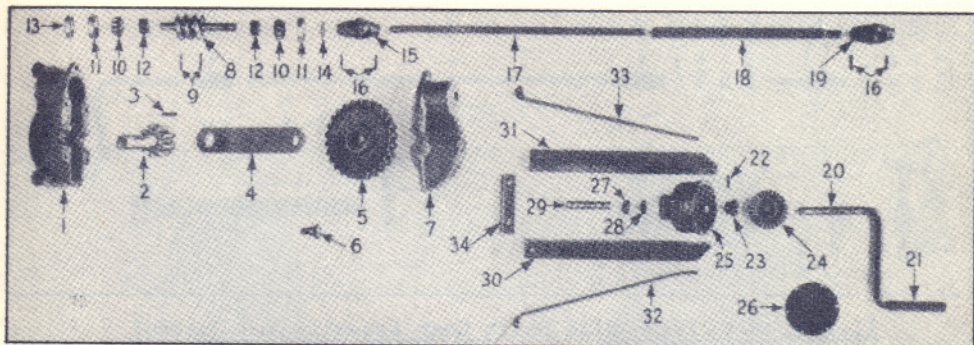
In order to disassemble the rear leaning wheel gear assembly it should be removed from the rear axle. After removing the five bolts which hold the upper and lower housings together, the complete assembly can be lifted apart. It is not necessary to disassemble the worm and shaft assembly (8). The worm gear (5) can be removed from the pinion (2) by supporting the worm gear in a press and pressing out the pinion.

The control housing is disassembled by driving out the taper pin (22) and removing the pinion (23) and crank assembly (20). The remainder of the disassembly needs no further explanation.

INSPECTION

All parts should be closely inspected for excessive wear and any parts which are found to be in badly worn condition should be replaced. The universal joints (15) and (19) should be carefully checked for wear. If the water seal (14) has deteriorated or if it fits the shaft loosely it should be replaced. If the felt seal (28) is badly worn or has

SEC. 6 - REAR AXLE



Illust. 19 Rear Leaning Wheel Gear Assembly

been leaking grease it should also be replaced. These are the only seals or gaskets used in these assemblies.

REASSEMBLY

When reassembling this unit all wearing surfaces should be coated with grease. If the vibrating link (4) has been removed from the pinion (2) be sure when reassembling that the link is installed on the pinion so that the S curve in the link curves back over the top of the housing. The thrust disc (13) should be put into the bottom of the lower housing (1) with the flat side down. The bolts which hold the upper and lower housings together should be put in from the bottom with the nuts on top.

After assembling, the bearings on the worm shaft should be adjusted by turning the flat-point Allen head set screw in until the screw comes up tight. Then back the set screw off about 1/16 of a revolution, hold in this position, and tighten the locking nut.

If the shaft (29) has been removed from the beveled gear (24) be sure when reinstalling that the rivet in the beveled gear and shaft is ground down sufficiently to provide ample clearance between the rivet and the housing (25). The felt washer (28) and retainer (27) should not be installed on the housing (25) until after the shaft (29) has been installed in the housing. When assembling the pinion (23) on the crank assembly (20) see that the tapered hole in the crank and the pinion lines up. After lining up hole drive the taper pin (22) into hole and rivet slightly on the opposite end. Be sure to line up the universal joints as shown in Illust. 6, Section 2. The remainder of the reassembly is so simple that it needs no further explanation.

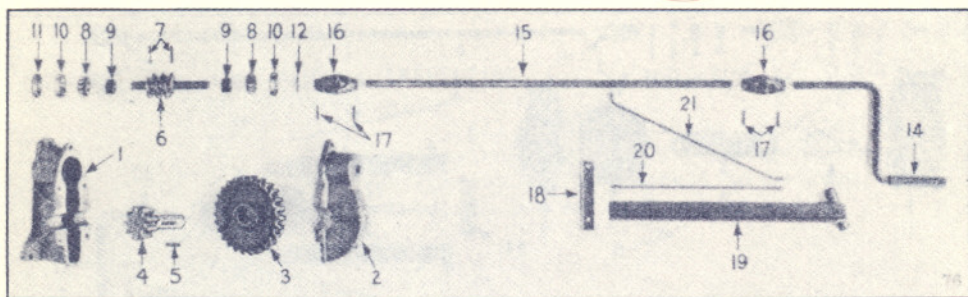
FRAME SIDE-SHIFT GEAR ASSEMBLY AND CONTROL

A disassembled view of the frame side-shift gear assembly and control is shown in Illust. 20.

DISASSEMBLY

In order to disassemble the gear assembly it is necessary to re-

SEC. 6 - REAR AXLE



Illust. 20 Frame Side Shift Gear Assembly and Control

move the entire assembly from the grader frame. It is then very easy to disassemble by removing the five bolts which hold the upper and lower housings together and lifting out the parts. It is not necessary to remove the taper pins (7) from the worm and shaft (6) in order to disassemble the unit.

INSPECTION

All parts should be inspected for excessive wear, breakage or other damage. If the water seal (12) has deteriorated or does not fit the shaft tightly it should be replaced. The universal joints (16) should be inspected carefully and if excessive wear is found they should be replaced.

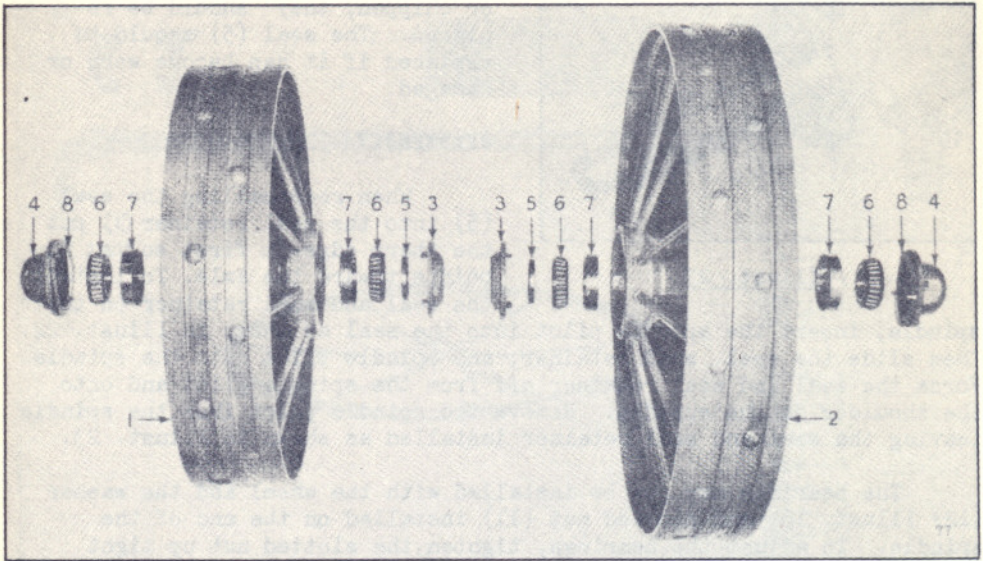
REASSEMBLY

When reassembling all wearing surfaces should be coated with grease. The thrust disc (11) should be installed in the lower housing (1) with the flat side down.

After the housing has been assembled, the worm and shaft end bearing adjustment can be made by turning the flat-point Allen head set screw in until it comes up tight; then back the set screw off about 1/16 of a revolution, hold in this position and tighten the hex jam nut securely.

The remainder of the assembly is very simple and needs no detailed instructions.

WHEELS



Illust. 21 Wheels

The wheels with bearings and related parts are shown in Illust. 21.

DISASSEMBLY

Removing wheels is easiest accomplished by raising the axles through forcing the blade down against hard ground. To raise front wheels, the blade should be turned crosswise to the grader and forced down until wheels clear ground. If a rear wheel is to be removed, the blade should be pointed toward the wheel to be raised and that end of blade forced down.

Remove the four cap screws which hold the seal retainer (3) to the wheel hub. Remove the hub cap (4), nut and washer. Wheel can now be removed from the spindle. The extent to which the remainder of the disassembly is carried depends upon the condition of the parts.

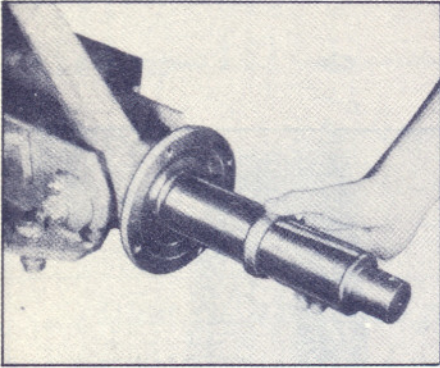
INSPECTION

All parts should be carefully inspected for excessive wear or other damage. If either the



Illust. 22

SEC. 7 - WHEELS



Illust. 23

spindle, insert the spindle pilot into the seal as shown in Illust. 22. Then slide the seal, seal retainer, and spindle pilot onto the spindle. Force the seal and seal retainer off from the spindle pilot and onto the shoulder on the spindle. Remove the spindle pilot from the spindle leaving the seal and seal retainer installed as shown in Illust. 23.

The bearings may now be installed with the wheel and the washer (12) Illust. 16, and slotted nut (11) installed on the end of the spindle. To adjust the bearings, tighten the slotted nut up tight (turning to the right) then back it off (turning to the left) one slot in the nut. Install the cotter pin. Install the hub cap (4) Illust. 21 with a new gasket (8). There is no gasket used with the seal retainer (3). The bearings should be coated with grease when installed and should be greased after installation as described in "Lubrication Instructions" in the Operator's Manual.

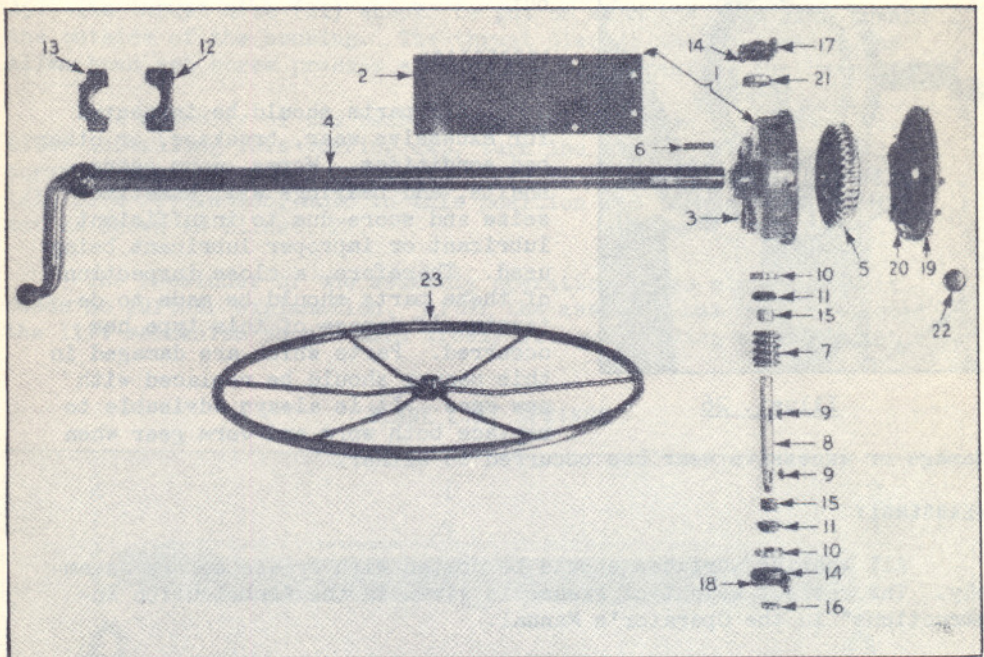
bearing cones (6) or the bearing cups (7) appear to be badly worn or chipped, they should be replaced. The seal (5) should be replaced if it has become worn or damaged.

REASSEMBLY

When reassembling the seal (5) into the seal retainer (3) put the sharp edge in first so that it points toward the axle. To install the seal and seal retainer on the

SEC. 8 - BLADE CONTROLS

BLADE LIFT MECHANISM (RIGHT AND LEFT)



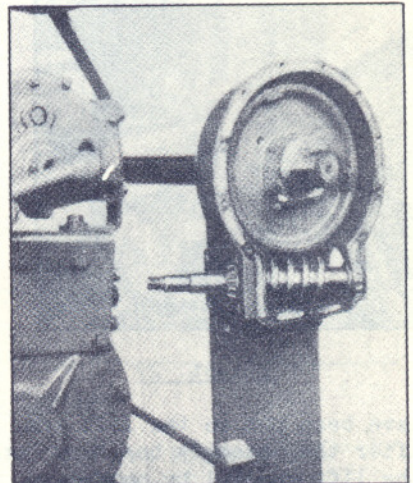
Illust. 24 Blade Lift Mechanism (Right and Left)

The right hand blade lift mechanism is shown disassembled in Illust. 24. The only difference between the right and left lift mechanisms is in the worm (7) and the worm gear (5). These parts are made in rights and lefts.

DISASSEMBLY

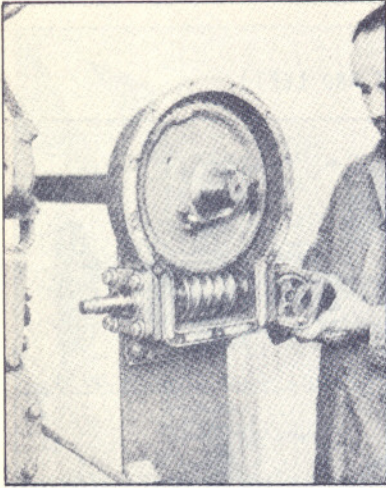
The extent to which the blade lift mechanism is to be disassembled depends upon the work to be done. An inspection of the gears and bearings can be made by removing the cover (19). The worm and shaft can be removed from the housing as shown in Illust. 25. It is not necessary to remove the bearing cones (11) Illust. 24, in order to remove the worm and shaft assembly.

If the worm gear (5) must be removed, a bar puller should be used. Two holes are provided in the worm gear with 3/4" N.C. threads (10 threads per inch) for attaching the puller to the worm gear. In order to remove the worm (7)



Illust. 25

SEC. 8 - BLADE CONTROLS



Illust. 26

from the shaft (8) it should be supported in a press and the shaft pressed out.

INSPECTION

All parts should be inspected for excessive wear, breakage, or other bad conditions. Worms, worm gears, shafts, and bearings will sometimes seize and score due to insufficient lubricant or improper lubricant being used. Therefore, a close inspection of these parts should be made to determine if damage of this type has occurred. Parts which are damaged in this manner should be replaced with new ones. It is always advisable to replace both worm and worm gear when

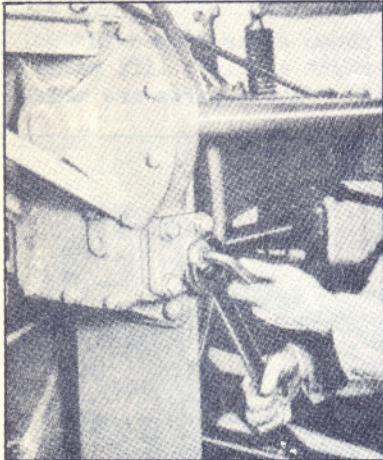
damage or excessive wear has occurred to either.

REASSEMBLY

All wearing surfaces should be coated with grease before assembly. The correct weight of grease is given in the "Lubrication Instructions" in the Operator's Manual.

New gaskets and seals should always be used when reassembling

the blade lift mechanism. The seal (16) should be installed in the bearing cap (18) with the sharp edge of the seal pointing toward the inside of the housing. Care must be taken when installing this seal on the worm shaft (8) so that damage to the seal will not occur when it is slid over the shoulder on the shaft. If a new Welch plug (22) is to be installed in the cover (19), the edge of the Welch plug should be coated with gasket shellac or some other sealing compound before it is installed. After the Welch plug has been put in the cover the center of the plug should be driven in slightly to tighten the plug in the cover.



Illust. 27

Install the worm gear (5) on the lift arm (4) before inserting the square key (6). After the worm gear and key

have been put on the lift arm, install the set screw and hex jam nut. After the assembly has been completed it should be possible to turn the lift arm (4) by hand.

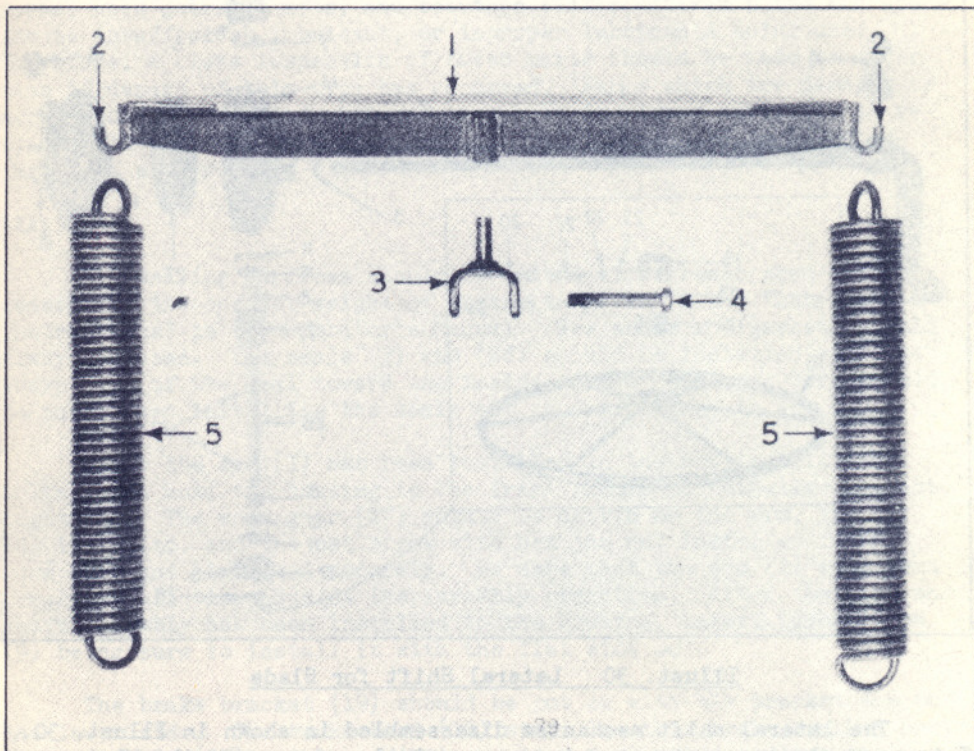
SEC. 8 - BLADE CONTROLS

The worm and shaft assembly can be installed as shown in Illust. 25. The thrust disc (21) should be put on with the flat side toward the outside of the housing. The thrust disc is the part which the Allen head set screw presses against for adjustment of the bearings.

The assembly of the bearing cap (17) is shown in Illust. 26. After installing this bearing cap, turn the flat-point Allen-head set screw in until it comes up tight. Then back the set screw off about 1/16 of a revolution, hold in this position and tighten the hex jam nut as shown in Illust. 27.

The remainder of the assembly operation is so simple that it needs no further explanation. After the assembly has been completed the lift mechanism should turn freely without binding at any point.

BLADE LIFT SPRINGS

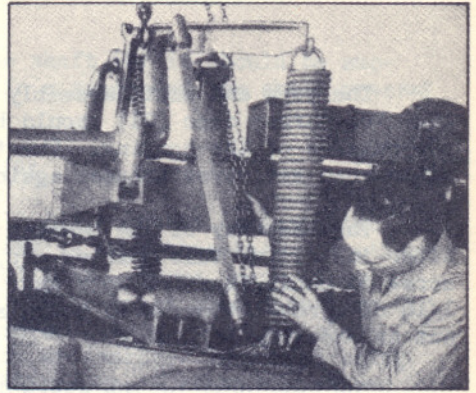


Illust. 28 Blade Lift Springs

The blade lift springs, rocker bar, and yoke are shown in Illust. 28. The disassembly, inspection, and reassembly of the blade lift springs are so simple and obvious that they need no detailed explanation. In order to remove or install the blade lift springs, a

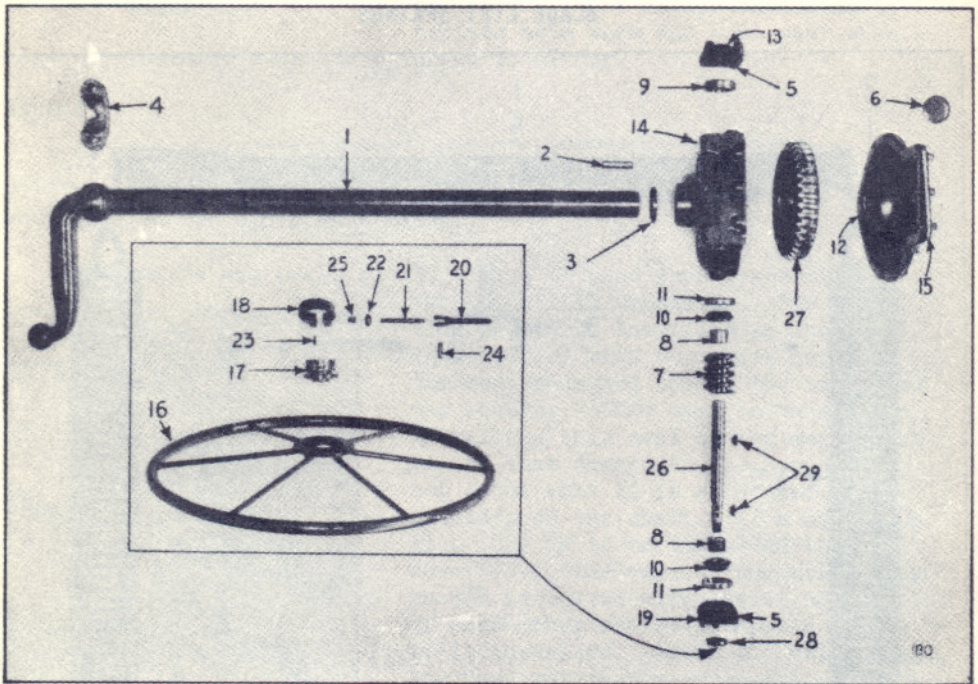
SEC. 8 - BLADE CONTROLS

chain hoist should be attached to one of the springs as shown in Illust. 29. Then by lifting with the hoist, one spring will be stretched sufficiently to allow the opposite spring to be unhooked or hooked as shown in the illustration.



Illust. 29

LATERAL SHIFT FOR BLADE



Illust. 30 Lateral Shift for Blade

The lateral shift mechanism disassembled is shown in Illust. 30. This assembly is constructed in a very similar manner to the blade lift housings -- in fact, many of the parts are interchangeable.

DISASSEMBLY

The disassembly of this unit is carried out in a very similar manner to that described for the blade lift mechanism in the preceding

SEC. 8 - BLADE CONTROLS

pages. The extent to which the disassembly is carried depends entirely upon the work to be done. The worm and shaft assembly can be removed in the same manner as shown for the blade lift mechanism in Illustr. 25. To remove the worm (7) from the shaft (26) support the worm in a press and press out the shaft. In order to remove the worm gear (27) from the lateral shift arm (1) a bar puller should be used. Two $\frac{3}{4}$ " holes with N.C. threads (10 threads per inch) are provided in the worm gear for attaching the puller.

The lateral shift arm may be removed from the housing by either unbolting the housing from the main frame and sliding it off of the arm or by removing the lower bearing bracket (4) and sliding the arm out of the housing.

INSPECTION

All parts should be inspected for excessive wear or breakage. Worms, worm gears, shafts, and bearings will sometimes seize and score due to insufficient lubricant, or improper lubricants being used. Therefore, a close inspection of these parts should be made to determine if damage of this type has occurred. Parts which are damaged or worn should be replaced with new ones. It is always advisable to replace both worm and worm gear when damage or excessive wear has occurred to either.

REASSEMBLY

All wearing surfaces should be coated with grease when they are assembled; the correct weight of grease is given in the "Lubrication Instructions" in the Operator's Manual. New seals and gaskets should always be used. The seals (3) and (28) should be installed with the sharp edge of the seal toward the inside of the housing. Care should be taken when installing the seals not to damage them in any way.

After the arm (1) has been installed in the housing (14) the bolts which hold the housing to the frame should be installed but not tightened. The worm gear (27) should be driven on the arm, the key (2) installed, and the set screw with hex jam nut installed in the worm gear and tightened securely. Be sure that the arm (1) will turn freely at all times during the assembly operation. After the worm and shaft assembly has been installed in the housing, insert thrust disc (9) being sure to install it with the flat side out.

The brake bracket (19) should be put on with the bracket arm on the lower side. The brake band (18) straddles this brake bracket arm. The draw bolt (21) and lever (20) should be assembled so that the lever points up when the brake is released.

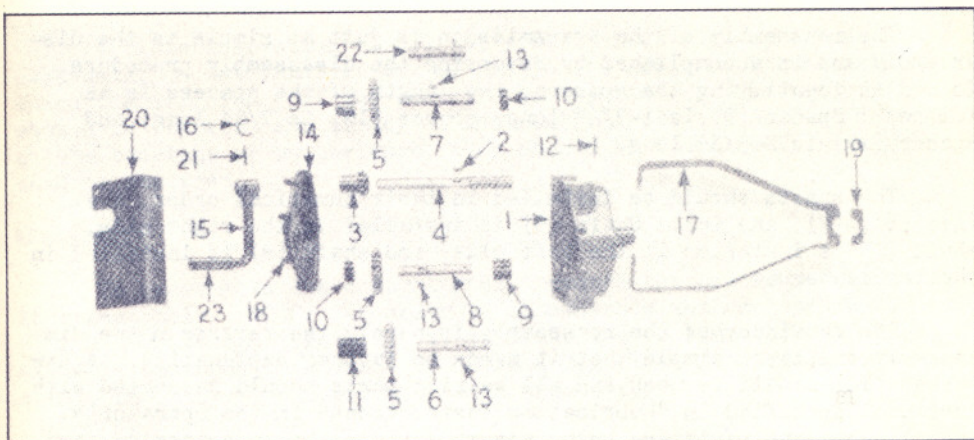
After the end cap (13) has been put on the flat-point Allen-head set screw should be installed and tightened until it comes up tight; then back it off about $\frac{1}{16}$ of a revolution, hold in this position and tighten the hex jam nut securely.

SEC. 8 - BLADE CONTROLS

If a new Welch plug (6) is to be put in the housing cover (15) the edge of the plug should be coated with gasket shellac or some other sealing compound before it is installed. After installing the Welch plug in the cover, the center of the plug should be driven down slightly in order to tighten the plug in the cover. After the cover (15) has been put on the housing (14) the bolts which hold the housing to the main frame can be tightened. By not tightening these bolts until after the assembly has been completed, correct alignment of the shaft and housing is obtained.

SEC. 9 - MISCELLANEOUS CONTROLS

TRANSMISSION ASSEMBLY FOR 3-IN-1 CONTROL



Illust. 31 Transmission Assembly for 3-in-1 Control

This transmission disassembled and with brackets is shown in Illust. 31. This 3-in-1 control operates the front leaning wheel gear assembly, the circle reverse, and the scarifier lift mechanism. If the grader is not equipped with a scarifier the dummy shaft (22) is used in place of the gear and shaft for this control.

DISASSEMBLY

When it becomes necessary to disassemble the transmission it is not necessary to remove it from the grader. All of the work can be done while the transmission case (1) is attached to the support bracket (17).

The extent to which the transmission is to be disassembled depends upon the work to be done. If the shaft (4) is to be removed from the case, first remove the 1/4" lubrication fitting on the lower front side of the housing. Care should be taken when removing this fitting not to lose the spring (12) or the steel ball on top of the spring. (The steel ball is 13/32" in diameter.) The crank assembly (15) is removed from the end of the shaft (4) by removing the snap ring (16) and the pin (21). The remainder of the disassembly of the transmission is so simple that it needs no further explanation.

INSPECTION

Inspect all gears and shafts for excessive wear or other damage. Any parts which are found to be in bad condition should be replaced. Inspect the hole through the end of each shaft to determine if excessive wear has occurred.

SEC. 9 - MISCELLANEOUS CONTROLS

REASSEMBLY

The reassembly of the transmission is just as simple as the disassembly and is accomplished by reversing the disassembly procedure. To aid in identifying the spacers, the length of the spacers is as follows: Spacer (9) is 1-3/4" long; spacer (10) is 7/8" long; and spacer (11) is 2-5/8" long.

The shafts should be installed in their numerical order, i.e. (4), (6), (7), and (8). Shaft (6) is installed in the right side, shaft (7) is installed in the left side, and shaft (8) is installed in the top center.

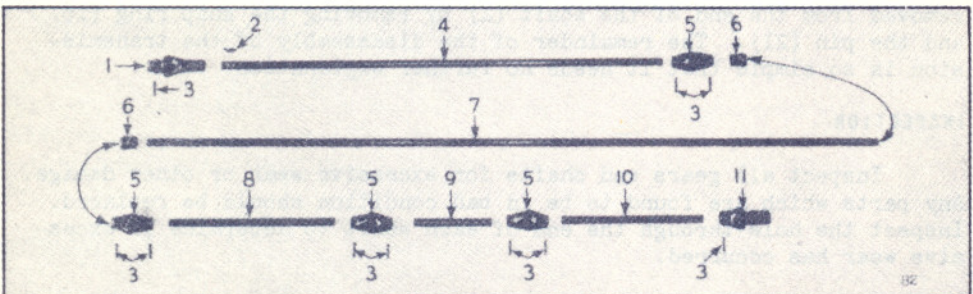
The remainder of the reassembly is merely the reverse of the disassembly and is so simple that it needs no further explanation. A new gasket (14) should be used and all wearing parts should be coated with lubricant specified in "Lubrication Instructions" in the Operator's Manual, when the parts are being assembled into the transmission case.

FRONT LEANING WHEEL CONTROL RODS

The front leaning wheel control rods are shown laid out in their proper order in Illust. 32. These control rods are operated by the transmission assembly shown in Illust. 31, and operate the front leaning wheel gear assembly shown in Illust. 9, Section 3.

DISASSEMBLY

The disassembly of the control rods is a very simple process which requires no explanation. The two rod bearings (6) are mounted in the rear bearing block on top of the main frame and in the right hand hole of the front bearing block on the main frame. The rod (9) is mounted in the bearing (10) Illust. 36. The universal joints (5) are all the same and are made to fit a 1" shaft on either end. All control rods and universal joints are held together by the pins (3). The universal joint (11) is made to fit the 1" rod on one end and a square shaft on the other. The Woodruff key (2) fastens the sliding coupling of the universal joint (1) to the rod (4). Universal joint (1) is mounted on shaft (6) Illust. 31.



Illust. 32 Front Leaning Wheel Control Rods

SEC. 9 - MISCELLANEOUS CONTROLS

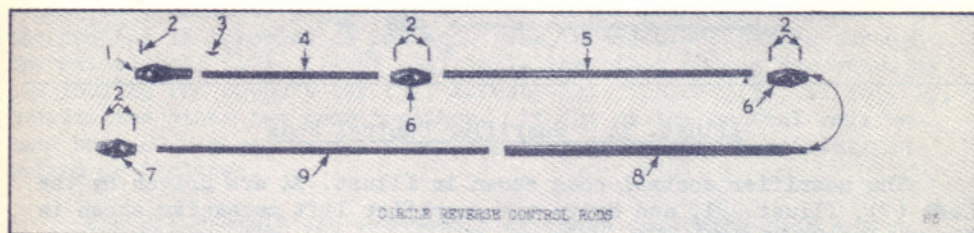
INSPECTION

A close inspection of all universal joints should be made occasionally to determine if any of the joints are worn to the point where the efficiency of the controls is impaired. Those badly worn should be replaced and if any of the control rods become bent or worn at the bearings or on the ends, they should be immediately straightened or replaced.

REASSEMBLY

To reassemble the control rods, reverse the procedure followed in disassembly. NOTE: In order to disassemble and reassemble the rod (10) and universal joint (11) it is necessary to remove the front axle assembly as shown in Illust. 8, Section 3. The universal joints should be lubricated thoroughly when assembled.

CIRCLE REVERSE CONTROL RODS



Illust. 33 Circle Reverse Control Rods

The circle reverse control rods are shown laid out in their proper order in Illust. 33. These rods are driven by the transmission assembly shown in Illust. 31, and drive the circle reverse transfer case shown in Illust. 14, Section 5.

DISASSEMBLY

The disassembly procedure is so obvious that it requires no detailed explanation. The universal joint (1) is attached to the shaft (8), Illust. 31. The universal joints (6), Illust. 33, are exactly the same and are made to fit a 1" rod on either end. The rod (5) is installed in the bearing (11), Illust. 36, and passes completely through the main frame. Universal joint (7), Illust. 33, is made to fit a 1" shaft on one end and a 7/8" shaft on the other. The Woodruff key (3) is installed in the rod (4) for attaching the sliding coupling on the universal joint (1).

INSPECTION

Inspection of all universal joints should be made occasionally to determine if any of the joints are worn to the point where the efficiency of the controls is impaired. Any worn badly should be re-

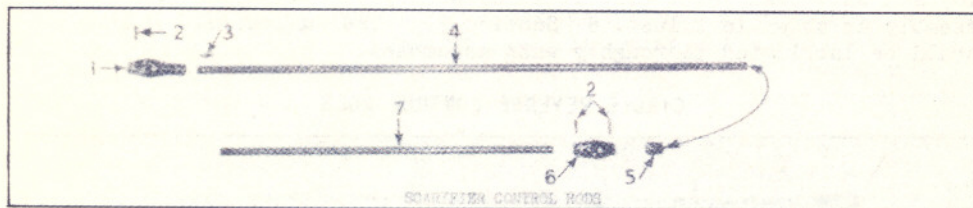
SEC. 9 - MISCELLANEOUS CONTROLS

placed and if any of the shafts become bent or worn at the bearings or on the ends, they should be immediately straightened or replaced.

REASSEMBLY

Reassembling the control rods is a simple process requiring only the reversing of the disassembly procedure. NOTE: When assembling the square shaft (9) into the hollow square (8), care should be taken to assemble them so that the universal joints lie in the same plane. This is discussed in Section 2, under "Steerable Tongue Control Rods" and is shown in Illust. 6.

SCARIFIER CONTROL RODS



Illust. 34 Scarifier Control Rods

The scarifier control rods shown in Illust. 34 are driven by the shaft (7), Illust. 31, and drive the scarifier lift mechanism shown in Illust. 10, Section 4.

DISASSEMBLY

The disassembly of the scarifier control rods is a very simple matter. The universal joint (1), Illust. 34, is attached to the front end of the shaft (7), Illust. 31. The Woodruff key (3), Illust. 34, fastens the control rod (4) to the sliding coupling of the universal joint (1). The universal joint (6) is made to fit a 1" shaft on both ends. The bearing (5) is mounted in the left hand hole of the rear bearing block (14), Illust. 36.

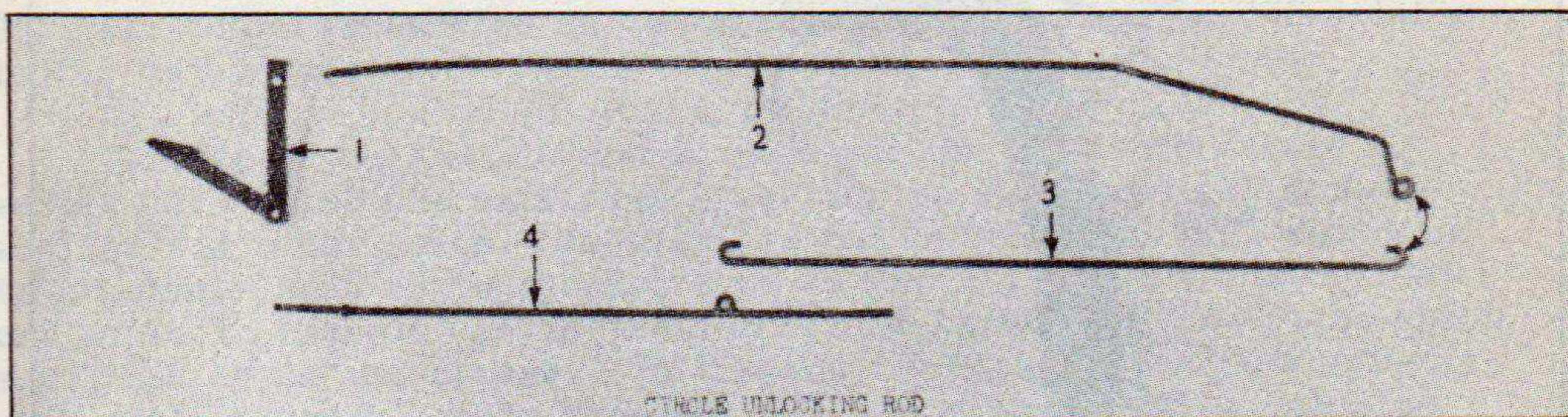
INSPECTION

Inspect all universal joints occasionally to determine if any of the joints are worn to the point where the efficiency of the control is impaired. Those worn badly should be replaced and if any of the control shafts become bent or worn at the bearings, or on the ends they should be immediately straightened or replaced.

REASSEMBLY

The reassembly procedure is the reverse of the disassembly and requires no detailed explanation. The universal joints and control rods are held together with the pins (2).

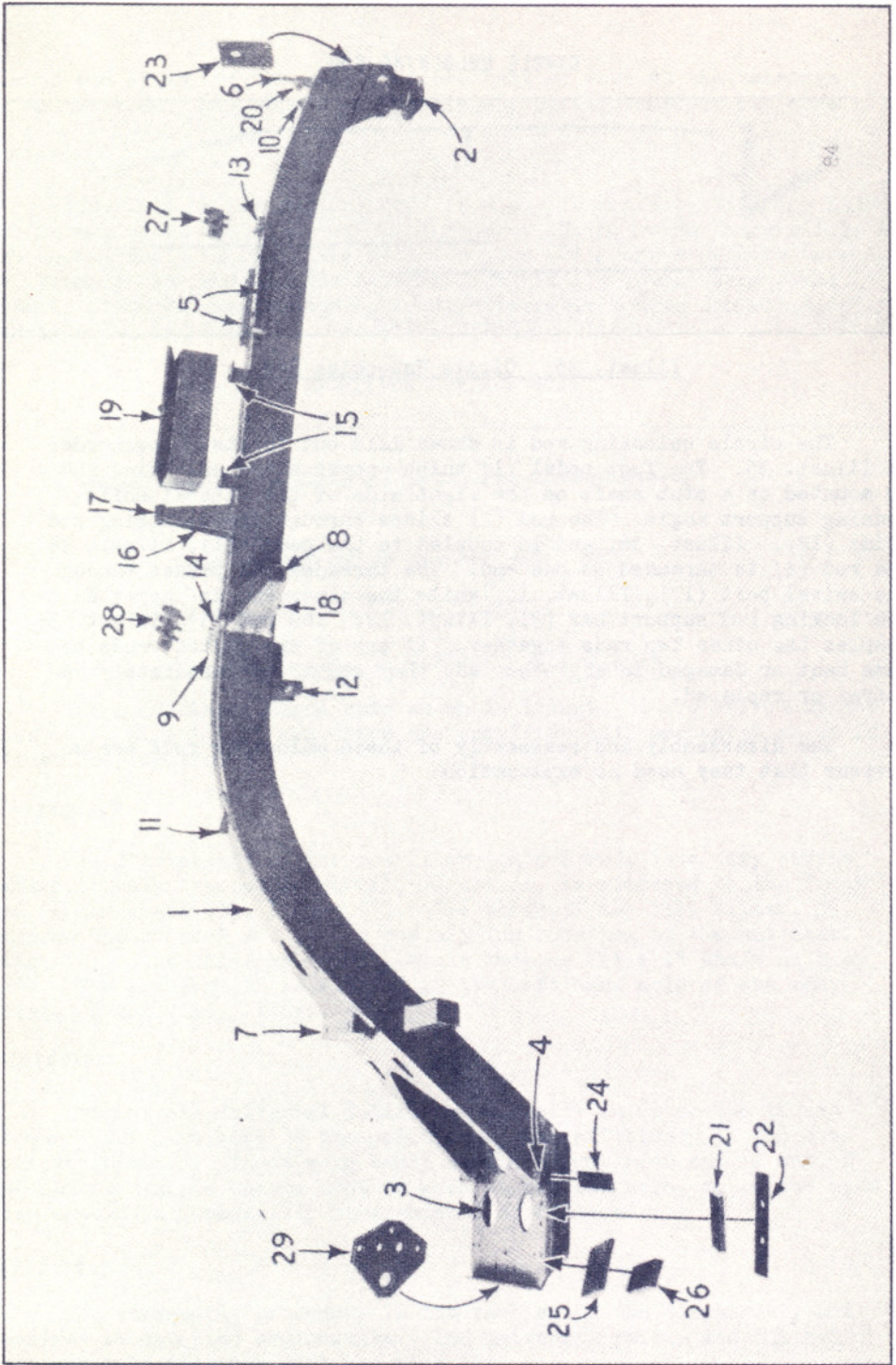
CIRCLE UNLOCKING ROD



Illust. 35 Circle Unlocking Rod

The circle unlocking rod is shown laid out in its proper order in Illust. 35. The foot pedal (1) which operates the unlocking rod is mounted on a stub shaft on the right side of the lateral shift housing support angle. The rod (2) slides through the unlocking rod guide (18), Illust. 36, and is coupled to the pedal (1), Illust. 35. The rod (4) is threaded on one end. The threaded end passes through the swivel bolt (17), Illust. 14, while the other end is supported by the locking rod support bar (3), Illust. 12. The rod (3), Illust. 35, couples the other two rods together. If any of the control rods become bent or damaged in any other way they should be immediately repaired or replaced.

The disassembly and reassembly of these unlocking rods are so obvious that they need no explanation.



SEC. 10 - MAIN FRAME AND PLATFORM

MAIN FRAME

The main frame assembly with related parts is shown in Illust. 36. All other assemblies on the grader are assembled on, or attached to the main frame.

Little or no trouble should be experienced with breakage of welds. All welds are sufficiently strong to withstand all normal working and shock loads. However, if the machine has been subjected to abnormal loads or to shocks, such as falling off a truck or flat car while in transit, an inspection should be made of the parts which sustained shock and damage. To inspect welds, clean them thoroughly with a steel brush. Weld breakage will first appear as a hairline crack and will progress into ultimate breakdown.

If weld breakage occurs, the old weld should be trimmed out with a cold chisel or acetylene torch. Reweld with a 1/8" shielded electrode, peening the weld after each pass until it has been built up to its original height.

Although the main frame assembly is welded together, the welded parts may be replaced. However, it is very seldom necessary to replace any of the welded parts on the main frame. Points of wear are equipped with replaceable wearing plates. The draft plate (29) is bolted securely to the rear axle carrier plate (3) by three bolts which are installed from the bottom up with the nuts on top. The bolts which hold the rear axle clips (25) and the spacers (26) to the rear axle carrier plate (3) should be installed from the bottom up with the nuts on top.

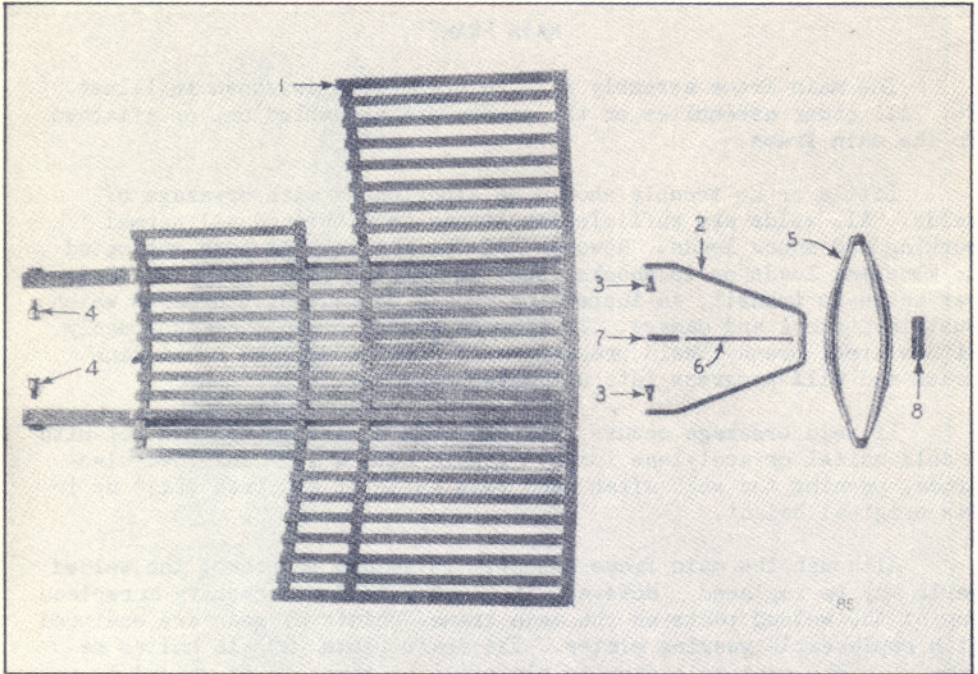
OPERATOR'S PLATFORM

Illust. 37 (on the following page) shows view of the operator's platform with spring disassembled. The platform is attached to the main frame of the grader and the rear end is supported by the platform support bar (2) and the spring assembly (5). Rebound of the platform is absorbed by the coil spring (7) and bolt (6). The platform assembly (1) is attached to its support brackets by the four shoulder bolts (4) and (3).

The spring (5) is attached to the support bar (2) by two machine bolts. These bolts are installed from the inside of the spring up, with the square nuts on top of the support bar. The spring is held to the rear axle carrier plate by two bolts which pass down through the spring, the spacer block (8), and the rear axle carrier plate. Hex nuts are installed on the lower side of the carrier plate.

The drilled bolt (6) is inserted from the bottom up through the lower and upper sections of the spring and through the support bar (2). The coil spring (7) is held in place by putting two hex jam nuts on the end of the bolt.

10



Illust. 37 Operator's Platform

INDEX TO PARTS LIST

WARNING

SPARE PARTS can be supplied promptly and accurately only if positively identified by correct part number and correct part name.

FURNISH THIS INFORMATION ON ALL REQUISITIONS. WITHOUT FAIL, on all requisitions, give name of machine, name of manufacturer, model or size, manufacturer's serial number of each machine and subassemblies attached to machine, and components and accessories for which spare parts are required.

List spare parts for only one make or kind of machine on each requisition.

Requisitions must be double spaced to provide room for office notations when necessary.

GENERAL INFORMATION	1
STEERABLE TONGUE	2
FRONT AXLE	3
SCARIFIER	4
DRAWBAR, CIRCLE & MOLDBOARD	5
REAR AXLE	6
WHEELS	7
BLADE CONTROLS	8
MISC. CONTROLS	9
MAIN FRAME & PLATFORM	10
TOOLS	11
NUMERICAL INDEX	12

On this page is shown a sample spare parts requisition on QMC Form No. 400 which conforms to the latest revisions. The marginal notes give instructions for preparing a requisition for spare parts for Engineer equipment.

The revised QMC Form 400 has new column headings. Until new forms are available use the present form and type or write in corrections in column headings as shown below.

Under revised heading "Nomenclature" and "Unit" list the article and the unit (ea for each; lb for pound; etc.). Under heading "Maximum or Authorized Level" list the authorized organizational allowances or depot stock levels given in ENG 7 and ENG 8 of the ASF

Engineer Supply Catalog (superseding Part III, Corps of Engineers Supply Catalog). The total number on hand for each item is listed under "On Hand". In column headed "Due In" enter the total quantity previously requisitioned but not delivered. Column headed "Required" is to be changed to read "Quantity Desired" and column headed "Approved" is to read "Remarks." For "Initial" and "Replenishment" requisitions, the sum of "Quantity Desired", "Due In", and "On Hand" should equal "Maximum or Authorized Level."

(Additional details on this subject are covered in ENG 1 of the ASF Engineer Supply Catalog which incorporates information formerly contained in Section AA-1, Part III, Engineer Supply Catalog.)

State PERIOD designation by use of one of the following terms:

- (1) "INITIAL"—first requisition of authorized allowances.
- (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.
- (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.

Type "SPARE PARTS" in upper right hand corner of requisition.

Address requisitions to Engineer Field Maintenance Office, P. O. Box 1679, Columbus, Ohio (except for spare parts for searchlights and barrage balloons which are addressed to Schenectady, N. Y. or Ogden, Utah ASF depots).

Give complete shipping instructions. Special instructions for packing, marking, routing, etc., should be given at bottom of requisition.

State proper nomenclature of machine, also make, model, machine serial number and U. S. A. registration number.

Prepare a separate requisition for each different machine.

State basis or authority and date delivery is required, immediately below description of machine.

Double space between items.

Group parts required under group headings as shown in manufacturers' parts catalogs (Technical Manuals).

State OCE stock numbers, manufacturers' parts numbers and nomenclature accurately and completely. Do not use abbreviations.

WAR DEPARTMENT
Q. M. C. FORM NO. 400
(REVISED 15 AUG. 1942)

(SAMPLER)
REQUISITION

SPARE PARTS

To: Engineer Field Maintenance Office No. of Sheets 1 Sheet No. 1
P. O. Box 1679, Columbus, Ohio
Requisition No. E-90R-4-44 Date 10 Jan 1944 Period Replenishment

SHIP TO Engineer Property Officer, FORT LEWIS, WASHINGTON

MARKED FOR: Supply Officer, 150th Engr. Regiment, FORT LEWIS, WASHINGTON

Recommended By (show Signature, Rank, Organization, Destination. If different from "mark to" include address):
Robert E. Roe
Robert E. Roe,
Major, C. E.,
Engineer Property Officer

Approved For the Commanding Officer:
John F. Doe
John F. Doe,
Col., C. E.,
Executive Officer

QMC STOCK NO.	NOMENCLATURE AND UNIT	AUTH. OR MAX. LEVEL	ON HAND	DUE IN	QUANTITY DESIRED	REMARKS
	PARTS FOR GRADER, ROAD, TOWED-TYPE, LEANING-WHEEL, HAND-CONTROLLED, 10-FT MOLDBOARD, ADAMS, MODEL 104, WITH SCARIFIER					
	BASIS: to replenish second echelon set					
	DELIVERY: by 5 Feb 1944					
	<u>ADAMS</u> <u>Part Nos</u>					
551297	LIFT BALLS ea	4	3	0	1	
350718	LIFT SPRING HOOK ea	2	1	0	1	
	<u>CYCLER</u>					
DP780	PITCH ADJUSTING LINK ea	2	1	0	1	
AA747	PITCH ADJUSTING LINK LOCK ea	2	1	0	1	
	<u>MOLDBOARD</u>					
152313	MOLD HANGER BRACKET ea	2	1	0	1	
320443	R. H. BOOT ea	1	0	0	1	

*Nonexpendable items such as tools must be accounted for, when requisitioned, by a statement that they have been placed on REPORT OF SURVEY or STATEMENT OF CHARGES.

Emergency requisitions sent by telephone, teletype, cablegram, telegraph or radio must be confirmed immediately with requisition marked: "Confirming (state identifying data)."

PREPARATION OF REQUISITIONS

A sample requisition in the correct form for submission by the Engineer Property Officer is shown on the opposite page.

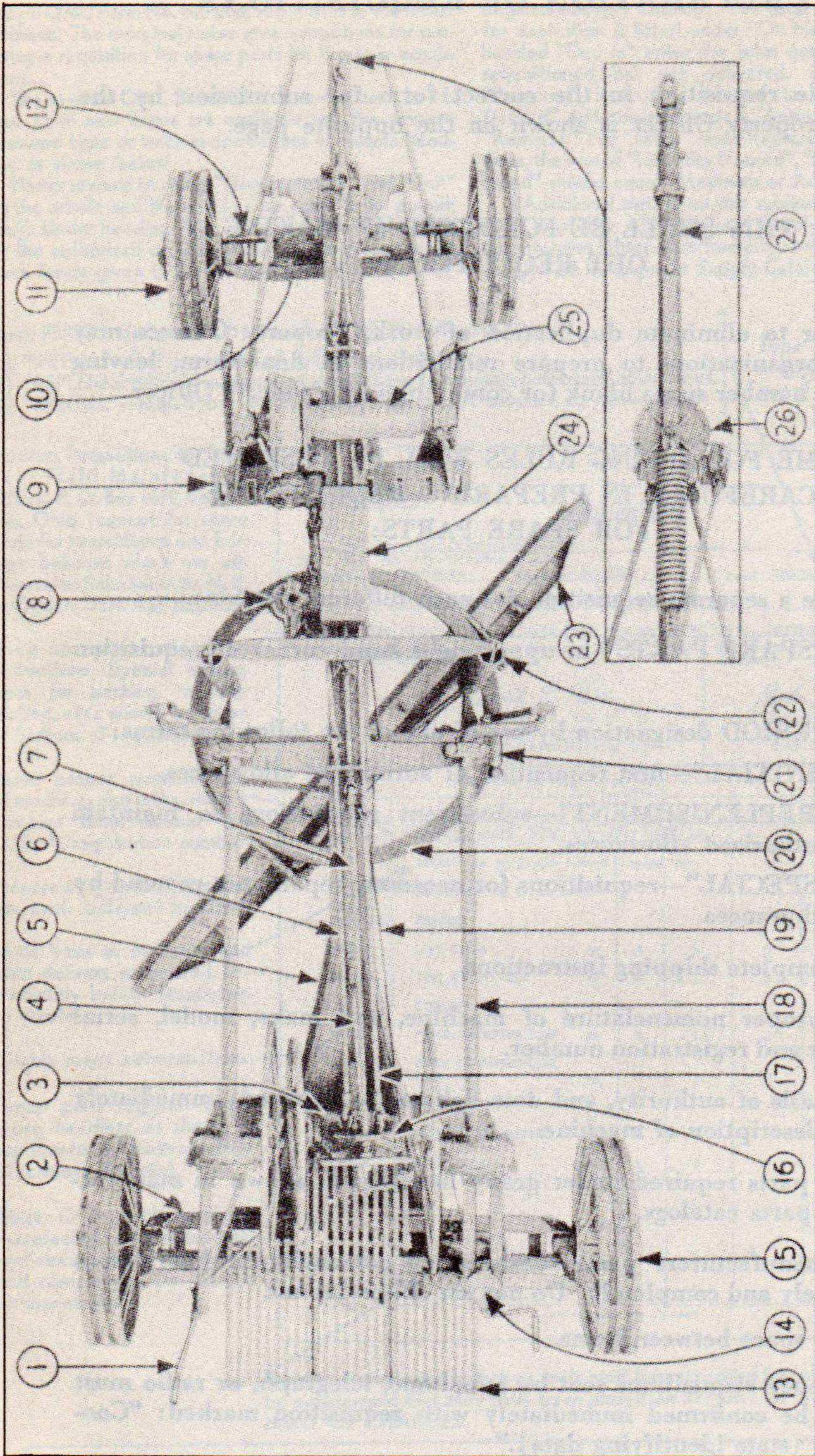
THIS SHALL BE FOLLOWED IN MAKING OUT REQUISITIONS

In order to eliminate duplication of work, Property Officers may authorize organizations to prepare requisitions in final form, leaving requisition number space blank for completion by Property Officer.

THE FOLLOWING RULES WILL BE OBSERVED CAREFULLY IN PREPARING REQUISITIONS FOR SPARE PARTS:

- a. Prepare a separate requisition for each different machine.
- b. Type "SPARE PARTS" in upper right hand corner of requisition form.
- c. State PERIOD designation by use of one of the following terms:
 - (1) "INITIAL"—first requisition of authorized allowances.
 - (2) "REPLENISHMENT"—subsequent requisitions to maintain authorized allowances.
 - (3) "SPECIAL"—requisitions for necessary repairs not covered by allowances.
- d. Give complete shipping instructions.
- e. State proper nomenclature of machine, and make, model, serial number and registration number.
- f. State basis of authority, and date delivery is required, immediately below description of machine.
- g. Group parts required under group headings as shown in manufacturer's parts catalogs.
- h. State manufacturers' parts numbers and nomenclature descriptions accurately and completely. Do not use abbreviations.
- i. Double space between items.
- j. Emergency requisitions sent by telephone, telegraph, or radio must always be confirmed immediately with requisition marked: "Confirming (state identifying data)."
- k. Nonexpendable items must be accounted for.

SEC. I - GENERAL INFORMATION



REFERENCE CHART IDENTIFYING MAIN ASSEMBLIES

To locate the part you want, first locate the main assembly in which part is used in above illustration. Then refer to index on opposite page, which will tell you the page, or pages on which the part, description, and part number will be found.

SEC. I - GENERAL INFORMATION

HOW TO USE THIS PARTS LIST

First refer to illustration on opposite page to obtain reference number of the main assembly on which part wanted is used; then refer to reference number in index below which will give you page numbers on which the main assembly is illustrated and described. After locating the illustration of the assembly, identify the part wanted; then refer to the reference number of the part on description page following the illustration to obtain the part number, description, and number used.

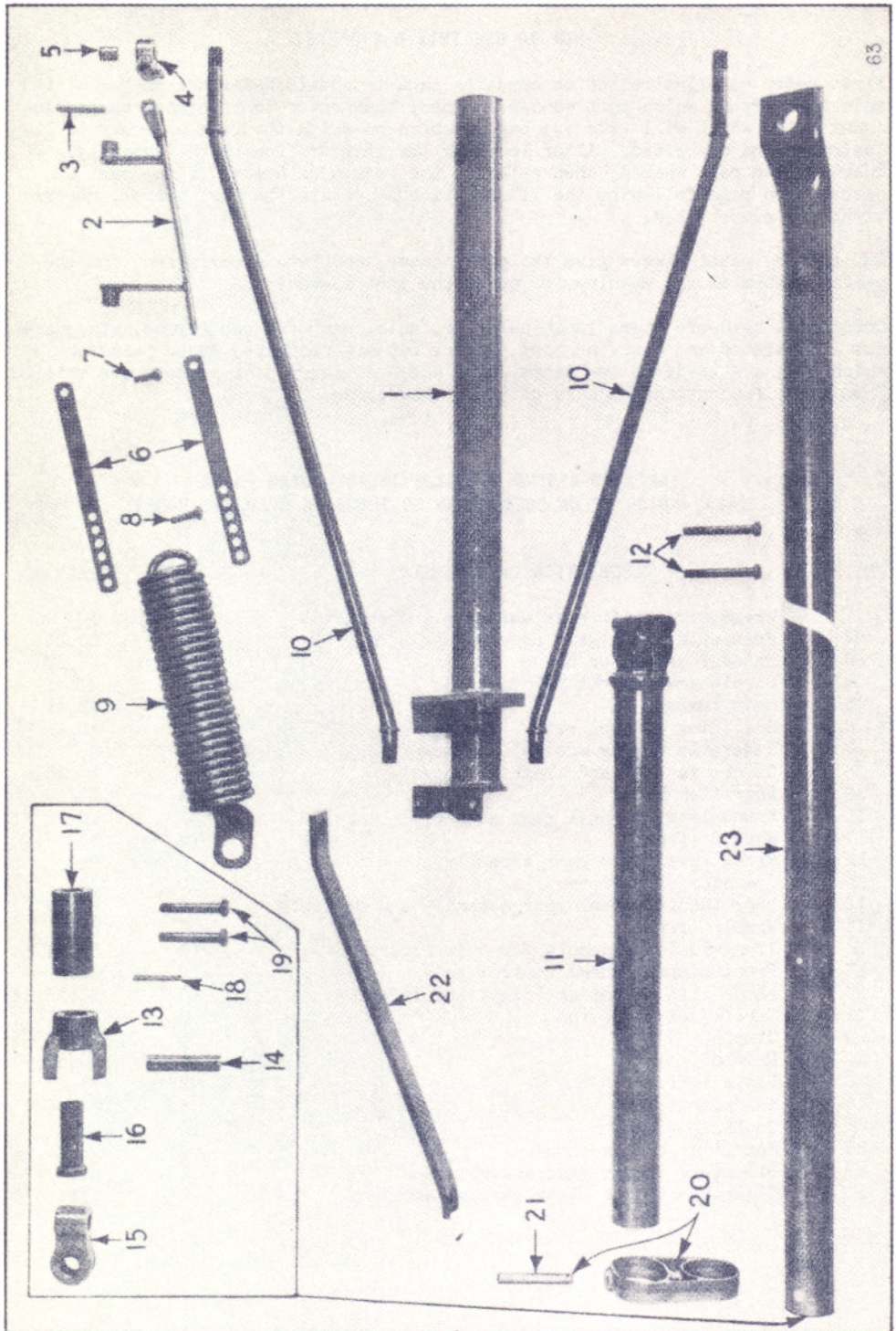
In ordering parts always give the part number, complete description, and the serial number of the machine for which the part is wanted.

Commercial hardware items (such as bolts, nuts, washers, cap screws, etc.) are not illustrated and carry no. part numbers but are described under parts on which they are used. A few Adams parts which do carry part numbers are omitted from the illustrations because of their small size.

INDEX TO ASSEMBLY PHOTOS IN FOLLOWING PAGES (REF. NO'S. BELOW CORRESPOND TO THOSE ON OPPOSITE PAGE)

REF.NO.	DESCRIPTION OF ASSEMBLY	SEC.NO.	PAGE NO.
1	Frame side-shift gear assembly and controls	6	30
2	Rear axle (less gear assemblies	6	26,27
3	Lateral shift for blade	8	36,37
4	Circle reverse control rods	9	40,41
5	Main frame	10	42,43
6	Scarifier control rods	9	40,41
7	Steerable tongue control rods	2	6,7
8	Circle reverse and transfer gears	5	22,23
9	Scarifier block	4	16,17
10	Front leaning wheel gear assembly	3	10
11	Wheels (front)	7	31
12	Front axle (less gear assembly)	3	8,9
13	Operator's platform	10	44
14	Rear leaning wheel gear assembly and controls	6	28,29
15	Wheels (rear)	7	31
16	Transmission assembly for 3 in 1 control	9	38
17	Front leaning wheel control rods	9	39
18	Blade lift mechanism (right and left)	8	32,33,34
19	Circle unlocking rod	9	40,41
20	Circle	5	20,21
21	Drawbar	5	18,19
22	Blade lift springs	8	35
23	Moldboard	5	24,25
24	Tools	11	45
25	Scarifier lift mechanism	4	12,13,14
26	Steerable tongue gear assemblies	2	4,5
27	Steerable tongue (less gear assemblies)	2	2,3

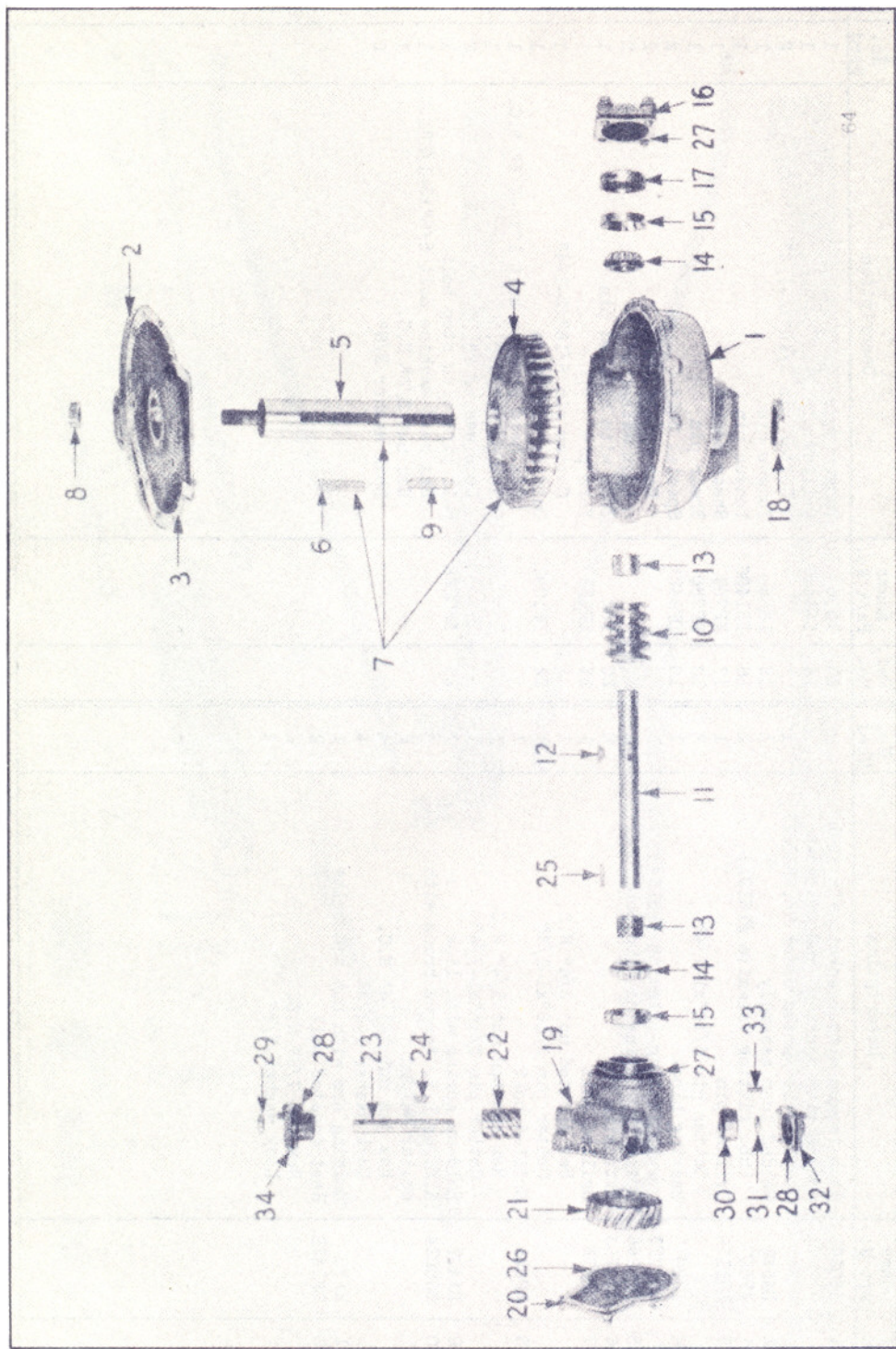
SEC. 2 - STEERABLE TONGUE
STEERABLE TONGUE (LESS GEAR ASSEMBLIES)



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330291	Stub tongue with brackets (If stub tongue with housing and brackets complete is wanted order No. 330221)		13	1856	Tongue yoke	1
				14	551409	Drilled pin	1
			1			Cotter pin 3/16"x2-1/4"	2
2	DA552	Welded loop assembly	1	15	1855	Tongue eye	1
	4P567	Lub. fitting (Alemite #1610A)	2	16	551406	Tongue pin	1
3	DP1176	Drilled pin	1	17	KP759	Shear socket	1
		Cotter pin 3/16"x1-1/4"	2	18	KP760	Shear pin	1
4	1280	Bearing block	1	19	DP942	Special bolt	2
	350773	Lub. fitting (Alemite #1613A)	1			Hex nut 1" N.C.	2
5	DP1946	Spacer for swinging loop post	1			Lock washer 1"	2
6	350763	Extension bar	2	20	D62	Yoke with drilled pin	1
7	DP273	Drilled bolt	1	21	DP853	Yoke pin	1
		Hex slotted nut 3/4" N.C.	1			Cotter pin 5/16"x2-1/4"	1
		Cotter pin 3/16"x1-1/4"	1	22	DP1092	Guiding arm brace	1
8	2P626	Drilled bolt	1			Hex head machine bolt 1"x6-3/4" N.C.	1
		Hex slotted nut 3/4" N.C.	1			Hex nut 1" N.C.	1
		Cotter pin 3/16"x1-1/4"	1			Lock washer 1"	2
9	DA401	Hold-up spring with link	1	23	330225	Pull pipe with stop bolt	1
10	330224	R.H. or L.H. tongue brace with collar welded	2			Hex head machine bolt 5/8"x5-1/2"N.C.	1
		Hex jam nut 1-1/4" N.C.	4			Hex nut 5/8" N.C.	1
		Lock washer 1-1/4"	4			Lock washer 5/8"	2
11	K170	Guiding arm with hub and bolts	1				
12	DP1436	Heat treated bolt	2				
		Hex nut 7/8" N.C.	2				
		Lock washer 7/8"	4				

SEC. 2 - STEERABLE TONGUE
STEERABLE TONGUE (LESS GEAR ASSEMBLIES)

SEC. 2 - STEERABLE TONGUE
 STEERABLE TONGUE GEAR ASSEMBLIES

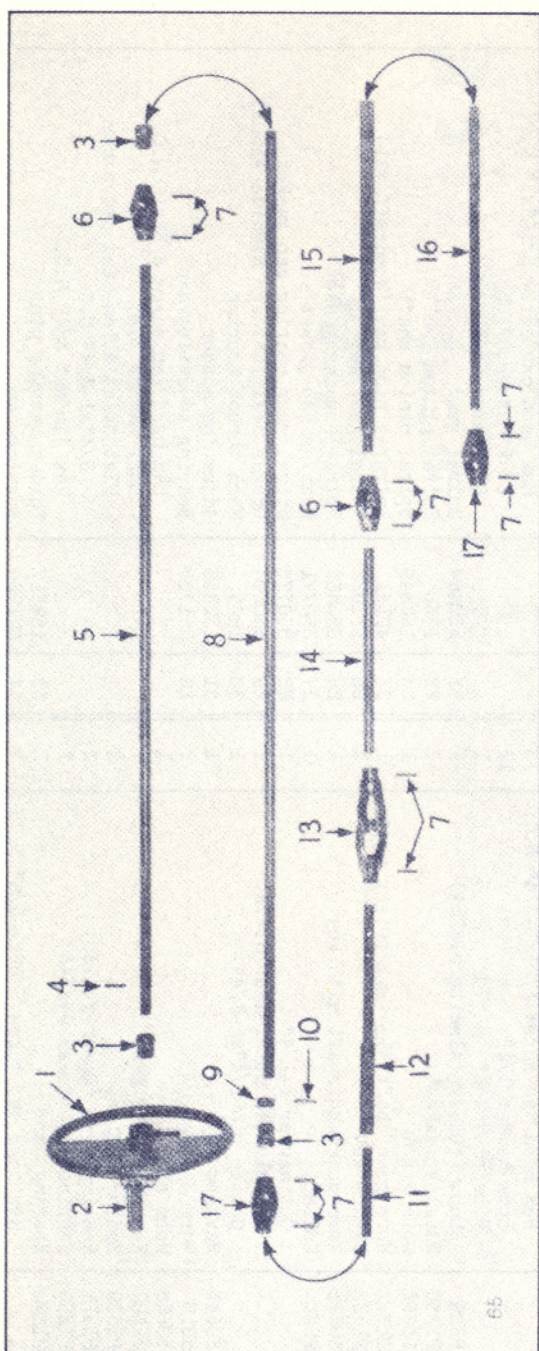


Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330222	Housing with brackets (If housing with stub tongue and brackets complete is wanted, order No. 330221)		17	DP1312	Thrust disc	1
	4P567	Lub. fitting (Alemite #1610A)	1	18	DP1648	Grease seal (Chicago Rawhide #4003)	1
		Pipe plug 1/2"	2	19	691727	Spiral gear housing	1
2	691408	Housing cover	1			Hex head cap screw 5/8"x1-3/4" N.C.	4
		Hex head cap screw 1/2"x1-1/4" N.C.	13	20	671729	Machined lock washer 5/8" N.C.	4
		Lock washer 1/2"	13			Spiral gear housing cover	1
		Pipe plug 1/2"	1			Hex head cap screw 5/16"x1" N.C.	6
	4P568	Lub. fitting (Alemite #1612A)	1			Lock washer 5/16"	6
3	DP1330	Housing gasket	1	21	350484	Pipe plug 1/4"	3
4	350652	Worm gear	1	22	1738	Spiral gear	1
5	330366	Worm gear shaft (Includes DP1333 key)	1	23	152349	Spiral pinion	1
6	DP1333	Square key	1	24	4P151	Spiral pinion shaft	1
7	330223	Worm gear and shaft with key	1	25	DP1922	Spiral pinion key (Woodruff #21)	1
8	DP836	Collar	1	26	350483	Spiral gear key	1
		Cut washer 1-1/4"	1	27	350771	Spiral housing gasket	1
		Hex slotted nut 1-1/4" S.A.E.	1	28	350778	Bearing cap gasket	2
		Cotter pin 1/4"x2-1/4"	1	29	350504	Spiral gear bearing cap gasket	2
9	350543	Beveled key	1	30	1969	Grease seal (Chicago Rawhide #1501)	1
10	AB813	Worm	1	31	152356	Worm thrust bearing	1
11	350528	Worm shaft	1	32	661731	Adjusting spacer	1
12	425382	Key (Woodruff #25)	1			Bearing adjusting cap	1
13	DP1309	Spacer collar	2			Hex head cap screw 3/8"x1" N.C.	4
14	DP1551	Bearing cone (Bower #44150)	2			Lock washer 3/8"	4
15	DP1552	Bearing cup (Bower #44348)	2			Flat point Allen-head set screw 3/4"x1-3/4" N.C.	1
16	401047	Bearing cap	1			Hex jam nut 3/4" N.C.	1
		Hex head cap screw 5/8"x1-3/4" N.C.	4	33	152357	Thrust bearing pin	1
		Lock washer 5/8"	4	34	671730	Bearing cap	1
		Flat point Allen-head set screw 1"x2-1/4" N.C.	1			Hex head cap screw 3/8"x1-1/4" N.C.	4
		Hex jam nut 1" N.C.	1			Lock washer 3/8"	4

SEC. 2 - STEERABLE TONGUE
STEERABLE TONGUE GEAR ASSEMBLIES

SEC. 2 - STEERABLE TONGUE

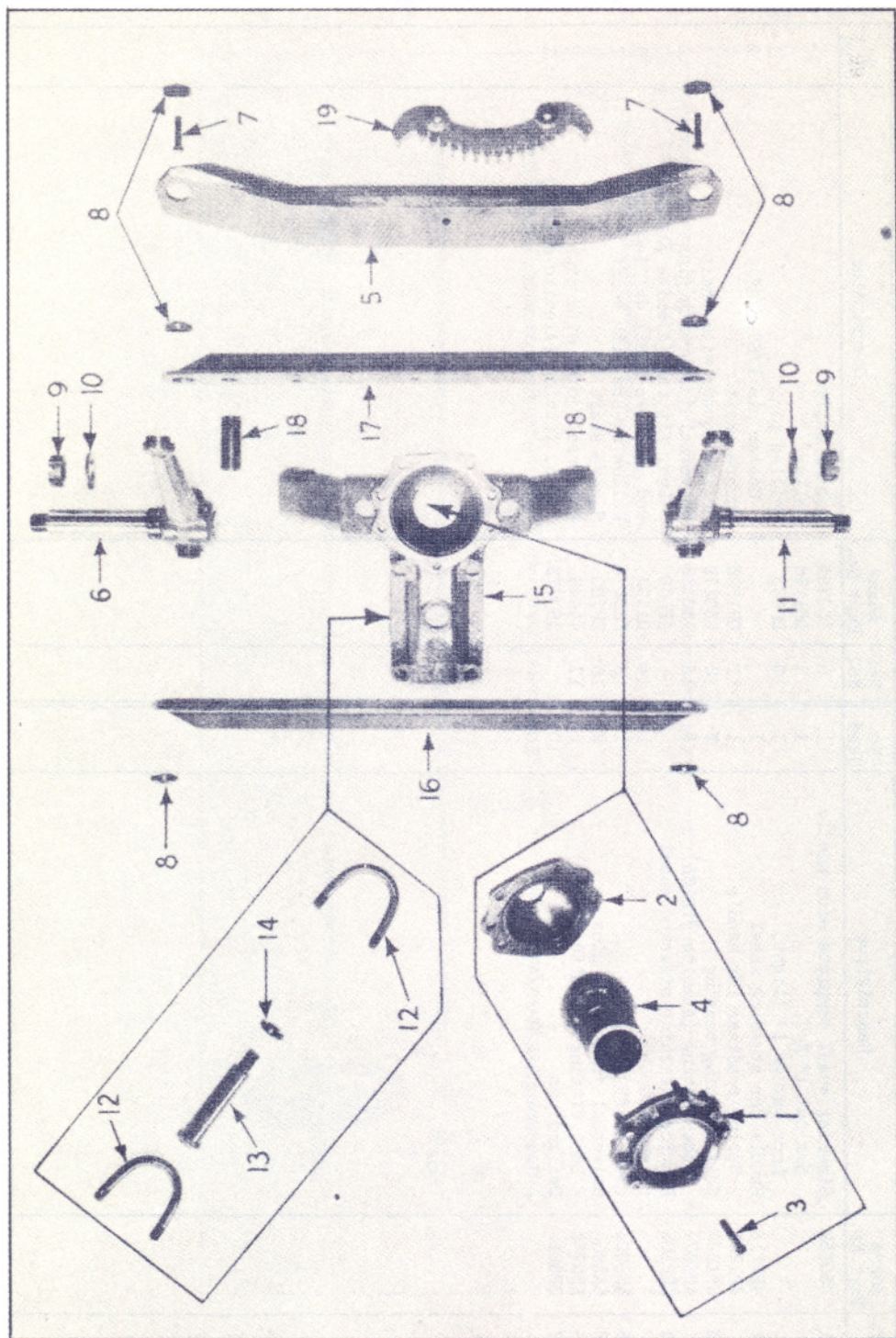
STEERABLE TONGUE CONTROL RODS



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330352	Steering wheel complete with handle	1	8	350764	Center shaft	1
		Hex nut 1" N.C.	1	9	DP1796	Collar	1
		Lock washer 1" (Light)	1	10	DP623	Drilled pin	1
2	4P1218	Handle for steering wheel	1			Cotter pin 1/8"x3/4"	2
	4P1221	Spring retainer for handle	1	11	DP1523	Square shaft	1
3	661658	Self-aligning bearing	3	12	330279	Hollow square with shaft	1
	4P567	Lub. fitting (Alemite #1610A)	3	13	130432	Universal joint with pins	1
4	CRP105	Pin for attaching steering wheel to shaft	1		4P568	Lub. fitting (Alemite #1612A)	1
5	350804	Rear shaft	1	14	DA392	Rod with two DP621 drilled pins	1
6	5A395	Universal joint with pins	2	15	330274	Hollow square with shaft	1
	350773	Lub. fitting (Alemite #1613A)	2	16	2P700	Square shaft	1
7	DP621	Drilled pin	10	17	4A449	Universal joint with pins	2
		Cotter pin 1/8"x3/4"	20		350773	Lub. fitting (Alemite #1613A)	2

SEC. 2 - STEERABLE TONGUE
STEERABLE TONGUE CONTROL RODS

SEC. 3 - FRONT AXLE
FRONT AXLE (LESS GEAR ASSEMBLY)

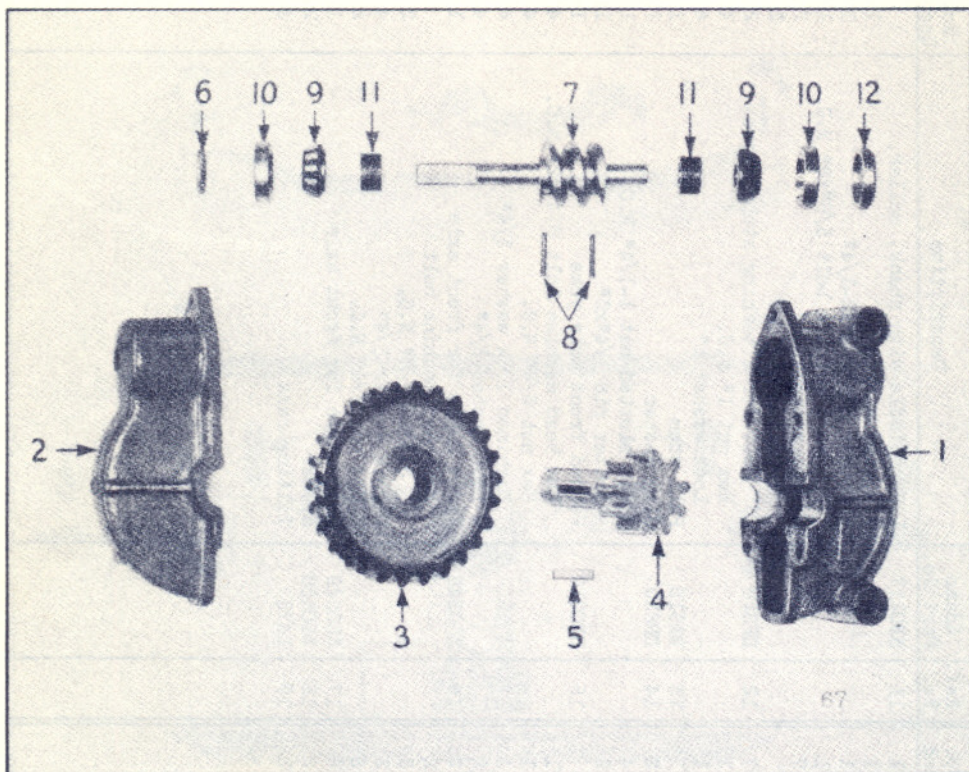


Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	1477	Upper draft ball bearing	1	11	330217	L.H. spindle with shank, collar, nut, and washer	1
	4P567	Lub. fitting (Alemite #1610A)	1			Cotter pin 3/8"x2-1/4"	1
	4P568	Lub. fitting (Alemite #1612A)	1			Hex head machine bolt 5/8"x8" N.C.	1
2	1478	Lower draft ball bearing	1			Lock washer 5/8"	2
3	350809	Draft ball bearing cap screw	7			Hex nut 5/8" N.C.	2
		Lock washer 5/8"x3/16"x5/32" (special)	7	12	DP828	"U" bolt for attaching stub tongue	2
4	1946	Draft ball	1			Hex nut 1" N.C.	4
5	350550	Vibrating angle	1			Lock washer 1"	4
		Hex head machine bolt 3/4"x2-1/2" N.C.	2	13	DA513	Pull stem	1
		Lock washer 3/4"	4	14	DP830	Slug washer	1
		Hex nut 3/4" N.C.	2			Hex slotted nut 1-1/4" N.C.	1
6	330216	R.H. spindle with shank, collar, nut, and washer	1	15	330219	Welded front axle yoke	1
		Cotter pin 3/8"x2-1/4"	1			Hex head machine bolt 3/4"x2" N.C.	4
		Hex head machine bolt 5/8"x8" N.C.	1			Hex nut 3/4" N.C.	4
		Lock washer 5/8"	2			Machined lock washer 3/4"	4
		Hex nut 5/8" N.C.	2			Lock washer 3/4"	4
7	1P414	Drilled bolt	2	16	350548	Front angle for front axle	1
		Hex slotted nut 5/8" N.C.	2			Hex head machine bolt 3/4"x6-1/2" N.C.	2
		Cotter pin 3/16"x1-3/4"	2			Lock washer 3/4"	4
8	AB1239	Bearing cap for pivot bolts	6			Hex nut 3/4" N.C.	2
	4P567	Lub. fitting (Alemite #1610A)	6	17	350549	Rear angle for front axle	1
9	4P929	Spindle nut	2	18	350658	Spacer	2
10	4P930	Spindle washer	2	19	1475	Tilting rack	1

FRONT AXLE (LESS GEAR ASSEMBLY)

SEC. 3 - FRONT AXLE

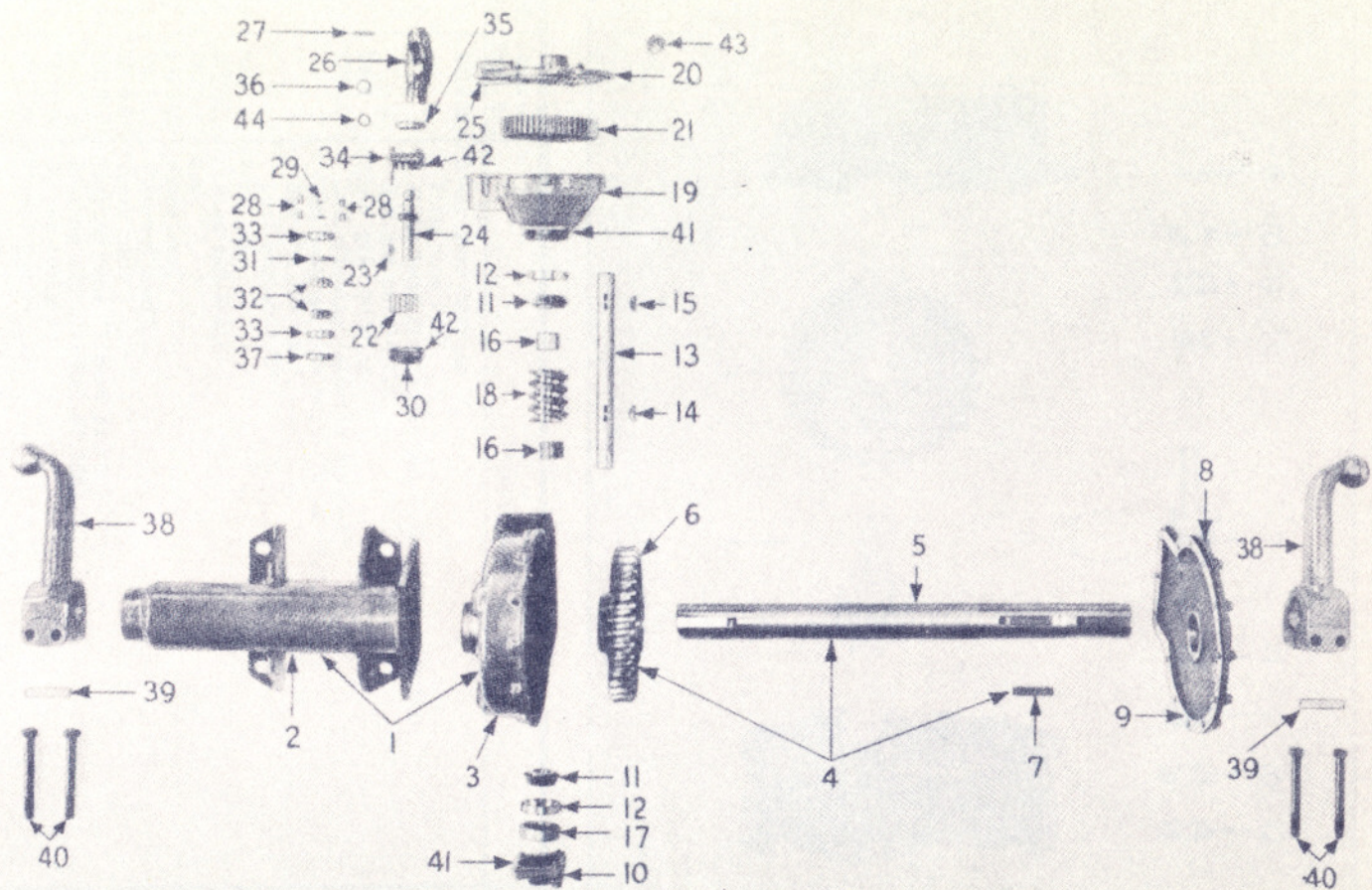
SEC. 3 - FRONT AXLE
FRONT LEANING WHEEL GEAR ASSEMBLY



67

Ref. No.	Adams Part No.	Description	No. Used
1	ABL463	Lower gear housing	1
		Pipe plug 1/4"	1
		Allen-head flat point set screw 1"x1-3/4" N.C.	1
		Hex jam nut 1" N.C.	1
2	1464	Upper gear housing	1
	KP805	Lub. fitting (Alemite #1638-A)	1
		Hex head machine bolt 1/2"x2" N.C.	5
		Hex nut 1/2" N.C.	5
		Lock washer 1/2"	10
3	826	Worm gear	1
4	DP732	Pinion and shaft	1
5	DP736	Key	1
6	152343	Water seal	1
7	KA254	Worm and shaft	1
8	DP734	Taper pin	2
9	DP1553	Bearing cone (Timken #41100)	2
10	DP1554	Bearing cup (Timken #41286)	2
11	DP1305	Spacer collar	2
12	DP1304	Thrust discs	1

SEC. 4 - SCARIFIER
 SCARIFIER LIFT MECHANISM



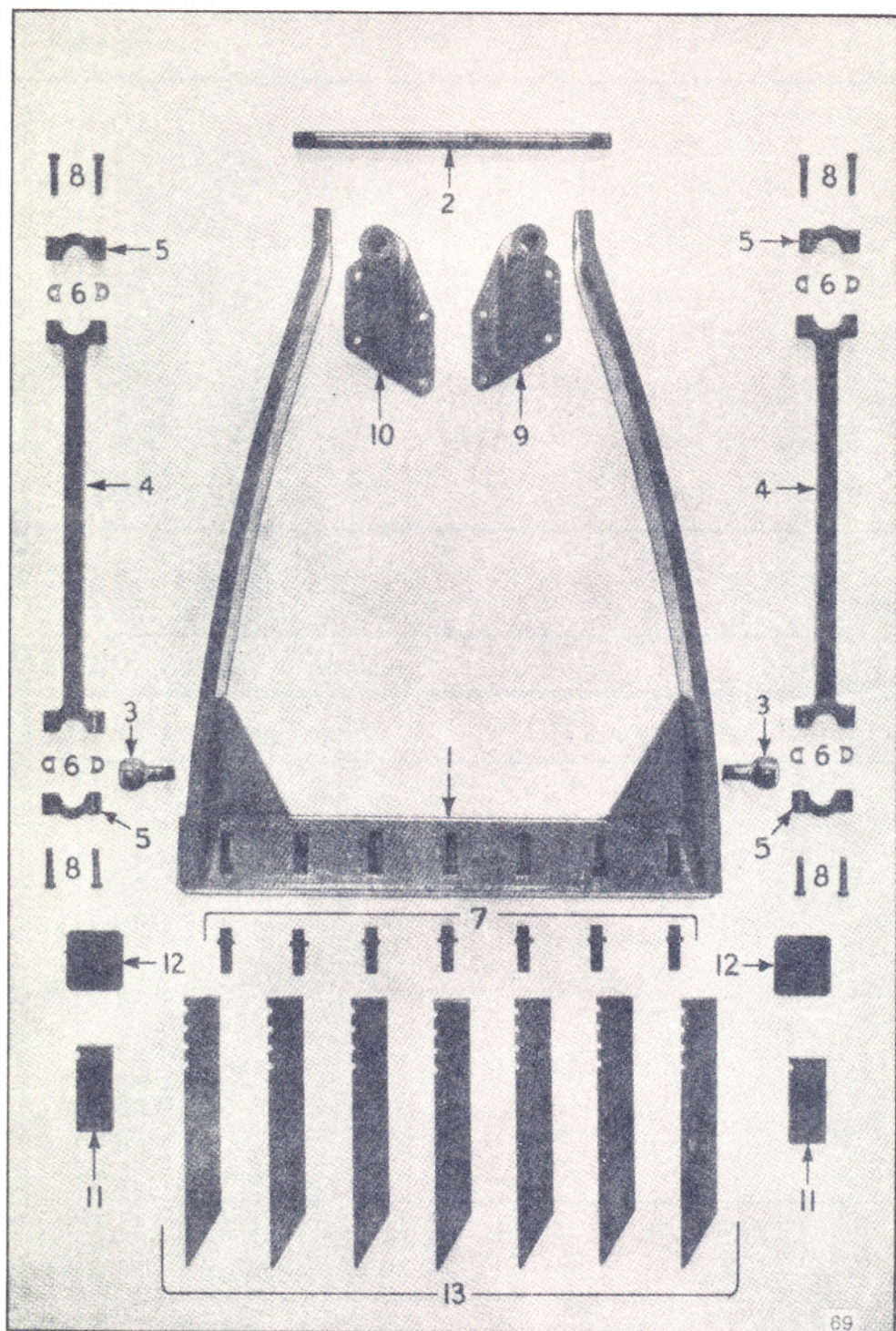
SEC. 4 - SCARIFIER
SCARIFIER LIFT MECHANISM

Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330256	Scarifier housing with support tube	1	14	DP1282	Woodruff key	1
		Hex head machine bolt 1"x3" N.C.	4	15	425382	Key (Woodruff #25)	1
		Hex nut 1" N.C.	4	16	DP1309	Spacer collar	2
		Lock washer 1"	8	17	DP1312	Thrust disc	1
		Lub. fitting (Alemite #1610A)	1	18	AB813	Lift worm	1
2	330258	Lub. fitting (Alemite #1613A)	1	19	661739	Reduction gear housing	1
		Scarifier support tube assembly	1			Hex head cap screw 5/8"x1-3/4" N.C.	4
3	4P567 1749 350773 350768 4P567	Hex head machine bolt 1"x3" N.C.	4			Lock washer (light) 5/8"	4
		Hex nut 1" N.C.	4		350541	Dowel pin	2
		Lock washer 1"	8	20	1740	Reduction gear housing cover	1
		Rd. head rivet 3/4"x2-1/2"	4			Hex head cap screw 3/8"x1-1/4" N.C.	5
		Lub. fitting (Alemite #1610A)	1			Lock washer 3/8"	5
		Gear housing	1			Pipe plug 1/8"	1
		Lub. fitting (Alemite #1613A)	1		4P567	Lub. fitting (Alemite #1610A)	1
		Pipe elbow	1	21	AA869	Spur gear	1
		Lub. fitting (Alemite #1610A)	1	22	4A158	Spur pinion with Woodruff key	1
		Rd. head rivet 3/4"x2-1/2"	4	23	4P151	Key (Woodruff #21)	1
4	330257	Scarifier lift gear and shaft w/ key	1	24	330347	Pinion shaft (Incl. 424269 Felt washer)	1
		Lift shaft	1	25	350500	Gasket	1
5	350650	Lift shaft	1	26	330293	Universal joint with drilled pin	1
6	350652	Lift gear, cut L.H.	1		4P568	Lub. fitting (Alemite #1612A)	1
7	DP1333	Square key	1	27	DP621	Drilled pin	1
8	1408 4P567	Cover plate	1			Cotter pin 1/8"x3/4"	2
		Lub. fitting (Alemite #1610A)	2	28	350491	Roller	4
		Hex head cap screw 1/2"x1-1/4" N.C.	13	29	350492	Spring	2
		Lock washer 1/2"	13	30	661731	Bearing cap	1
		Pipe plug 1/2"	1			Hex head cap screw 3/8"x1" N.C.	4
9	DP1330	Gasket	1			Lock washer 3/8"	4
10	401047	Bearing cap	1			Allen-head flat point set screw 3/4"x1-3/4" N.C.	1
		Hex head cap screw 5/8"x1-3/4" N.C.	4			Hex jam nut 3/4" N.C.	1
		Lock washer 5/8" N.C.	4			Spacer	1
		Allen-head flat point set screw 1"x2-1/4" N.C.	1	31	350526	Bearing cone (Bower #1986)	2
		Hex jam nut 1"	1	32	350505	Bearing cup (Bower #1931)	2
11	DP1551	Bearing cone (Bower #44150)	2	33	350506		2
12	DP1552	Bearing cup (Bower #44358)	2				
13	KP729	Worm shaft	1				

Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
34	350508	Roller race	1	39	KP730	Key	2
		Hex head cap screw 3/8"x1-1/4" N.C.	2	40	KP731	Heat treated bolt	4
		Hex head cap screw 3/8"x3" N.C.	2			Hex nut 7/8" N.C.	4
		Lock washer 3/8"	4			Lock washer 7/8"	8
35	350503	Grease seal (Chicago Rawhide #262128)	1	41	350771	Gasket	2
36	350529	Snap ring	1	42	350778	Gasket	2
37	350527	Thrust disc	1	43	1P450	Welch plug	1
38	KP620	Lift arm	2	44	424269	Felt washer	1

SEC. 4 - SCARIFIER

SCARIFIER BLOCK



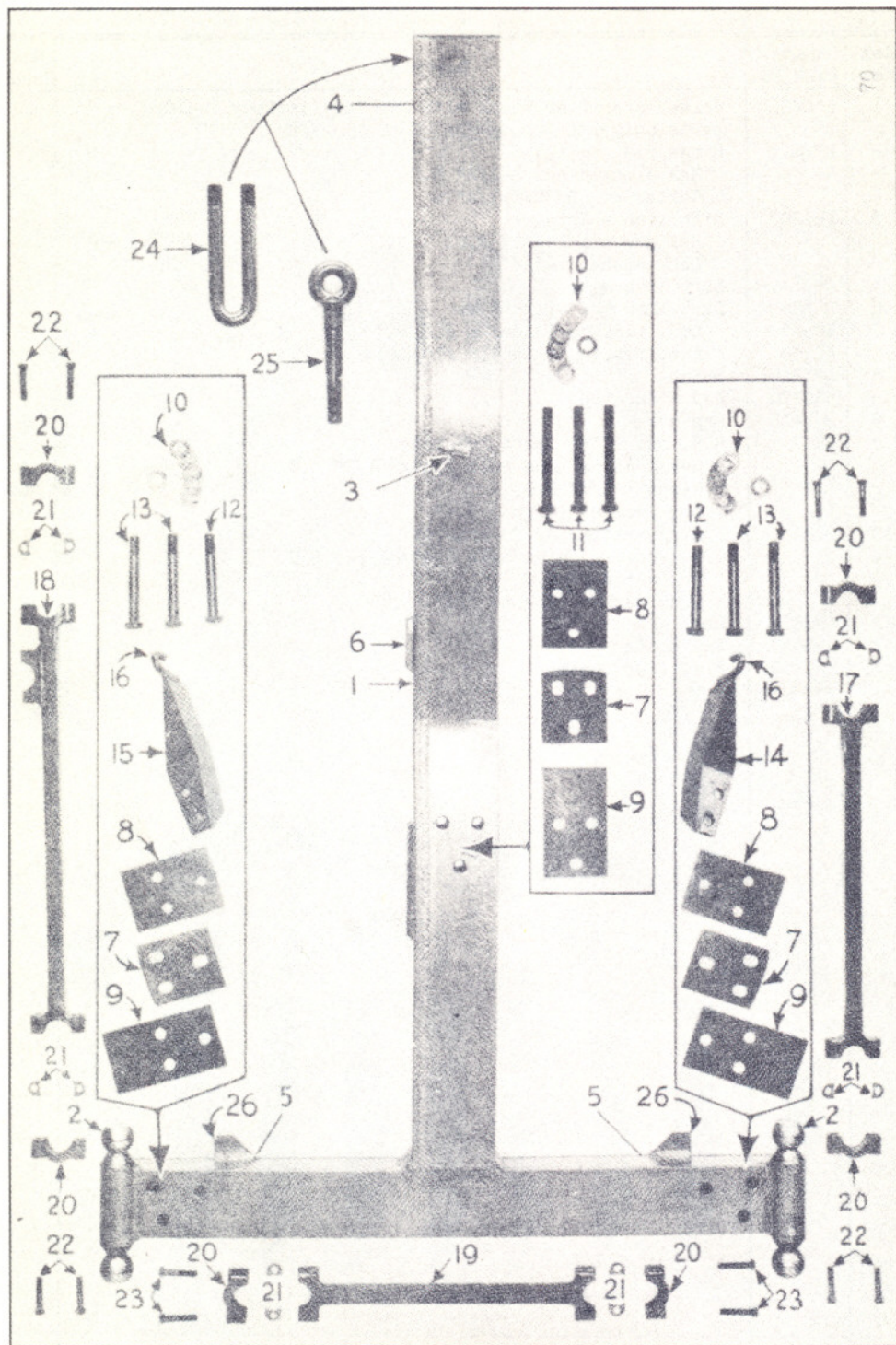
SEC. 4 - SCARIFIER

SCARIFIER BLOCK

Ref. No.	Adams Part No.	Description	No. Used
1	330265	Welded scarifier block with drawbar (includes welded parts only)	1
2	KP651	Hinge rod Hex slotted nut 1-1/2" N.C. Cotter pin 3/8"x2-1/2"	1 2 2
3	DP1367	Lift link bearing Hex jam nut 1-1/4" N.C. Lock washer 1-1/4"	2 2 2
4	KA361	Lift link with shims	2
5	DA588	Lift link cap with shims	4
	4P567	Lub. fitting (Alemite #1610A)	2
	4P568	Lub. fitting (Alemite #1612A)	2
6	DP1658	Shim	8
7	330270	Key with stop	7
8	DP1433	Cap screw	8
9	1687	R.H. scarifier draft bracket Hex head machine bolt 3/4"x2-1/2" N.C. Hex nut 3/4" N.C. Lock washer (light) 3/4"	1 4 4 8
10	1688	L.H. scarifier draft bracket Hex head machine bolt 3/4"x2-1/2" N.C. Hex nut 3/4" N.C. Lock washer (light) 3/4"	1 4 4 8
11	350656	Lock bar	2
12	350657	End plate	2
13	KP1239	Scarifier tooth	7

SEC. 5 - DRAWBAR, CIRCLE & MOLDBOARD

DRAWBAR



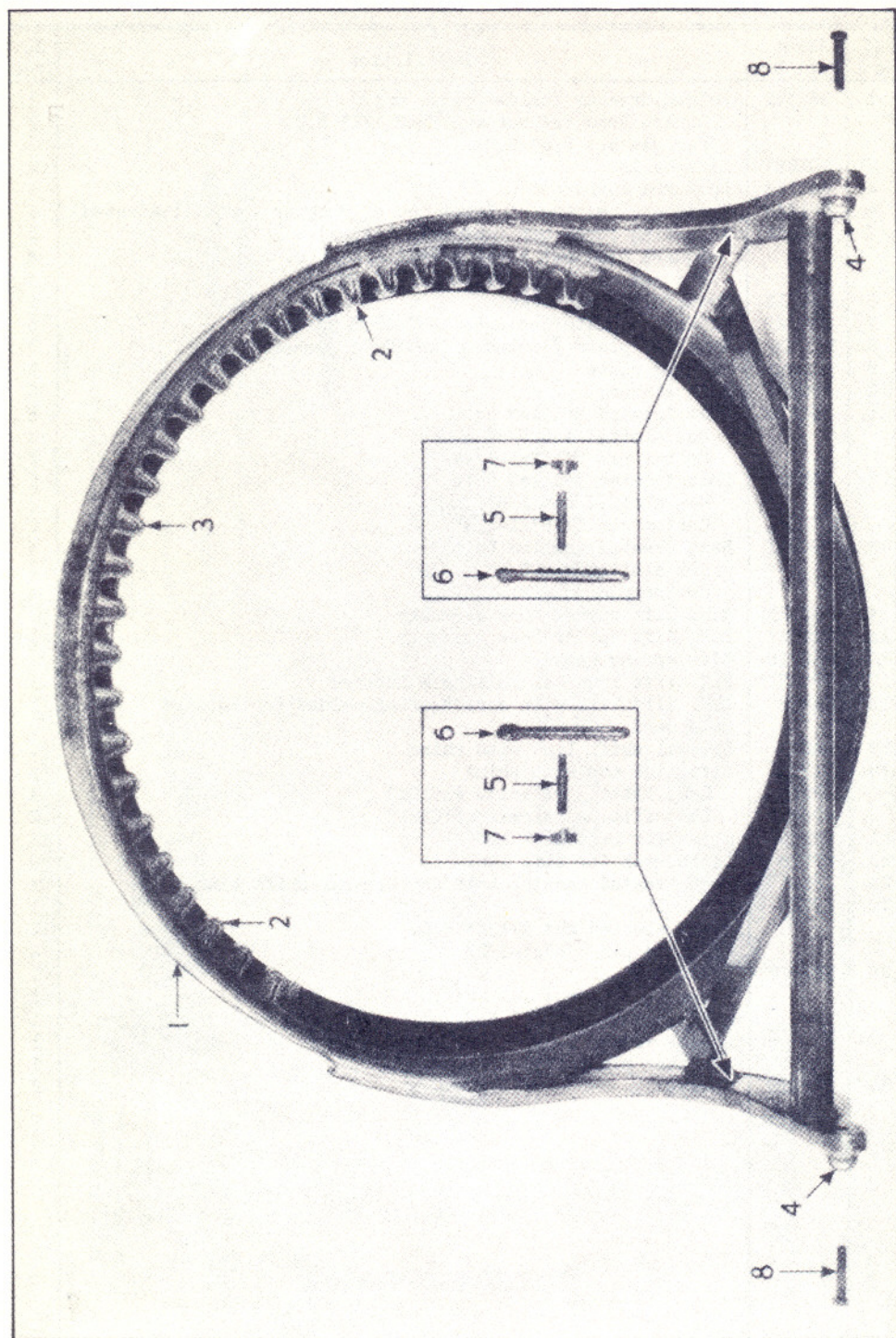
SEC. 5 - DRAWBAR, CIRCLE & MOLDBOARD

DRAWBAR

Ref. No.	Adams Part No.	Description	No. Used
1	330322	Welded drawbar (welded parts only) Square head set screw 5/8"x2-1/2" N.C. Hex jam nut 5/8" N.C.	1 2 2
2	551297	Lift balls	2
3	350734	Lock rod support	1
4	DP1249	Draft eye bearing at front end of drawbar (not illustrated)	1
5	350462	Adjusting screw bar (not illustrated) Square head set screw 5/8"x2-1/2" N.C. Hex jam nut 5/8" N.C.	2 4 4
6	551313	Transfer case bracket	1
7	330329	Adjusting plate (Includes 12#350833 washers)	3
8	330359	Retainer plate (Includes 12#350833 washers)	3
9	350460	Wearing plate	3
10	350833	Shim washer	36
11	350819	Heat treated drilled bolt Hex slotted nut 5/8" SAE Cotter pin 3/16"x1-3/4"	3 3 3
12	350820	Heat treated drilled bolt Hex slotted nut 5/8" SAE Cotter pin 3/16"x1-3/4"	2 2 2
13	350821	Heat treated drilled bolt Hex slotted nut 5/8" SAE Cotter pin 3/16"x1-3/4"	4 4 4
14	330323	R.H. lift spring hook assembly	1
15	330324	L.H. lift spring hook assembly	1
16	350718	Lift spring hook	2
17	KP763	R.H. lift link for raising moldboard	1
18	KA456	L.H. lift link with side bearing welded for raising moldboard	1
19	GA227	Lateral shift link with shims	1
20	DA590	Lift link cap with shims	6
	4P567	Lub. fitting (Alemite #1610A)	4
	4P568	Lub. fitting (Alemite #1612A)	2
21	DP1659	Shims for lift link cap	12
22	KP726	Cap screws for lift link	8
23	JP361	Heat treated machine bolt for lateral shift link	4
24	KP725	"U" bolt Hex slotted nut 1-1/2" N.C. Cotter pin 3/8"x2-1/2"	1 2 2
25	DP1432	Draft eye Hex slotted nut 1-1/2" N.C. Hex jam nut 1-1/2" N.C. Lock washer 1-1/2" Cotter pin 3/8"x2-1/2"	1 1 1 1 1
26	551310	Gusset	2

SEC. 5 - DRAWBAR, CIRCLE & MOLDBOARD

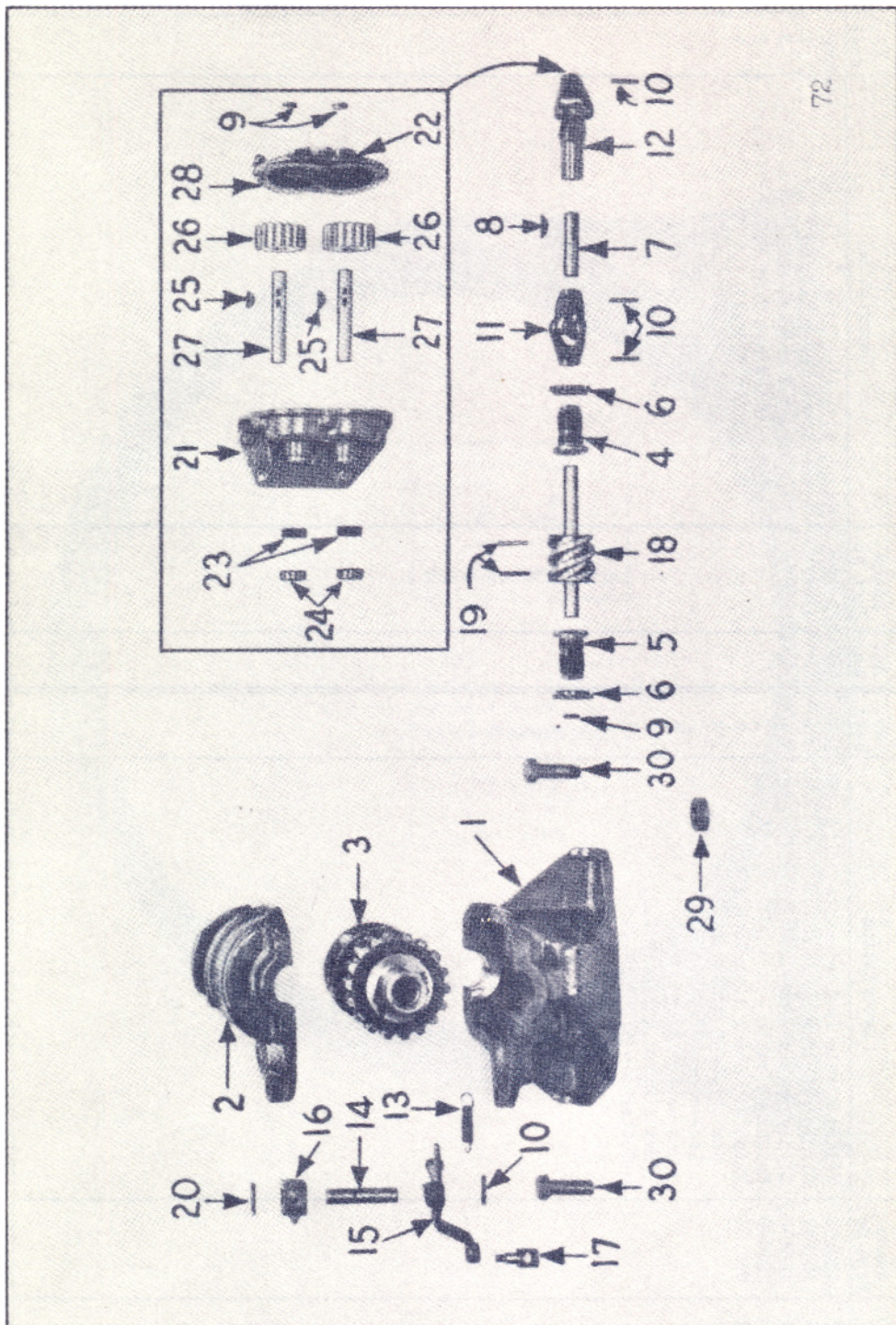
CIRCLE



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330194	Welded circle (welded parts only)	1	6	DP730	Pitch adjusting link	2
2	350547	Circle rack segment	2	7	AA747	Pitch adjusting link lock	2
3	425495	Circle rack segment	1	8	350774	Heat treated drilled bolt	2
4	350648	Moldboard ball	2			Hex slotted nut 7/8" N.C.	2
5	DP1186	Pitch adjusting link lock stud	2			Cotter pin 1/4"x2"	2
		Hex nut 7/8" N.C.	2				
		Lock washer 7/8"	2				
		Cut washer 3/4"	2				
		Hex slotted nut 3/4" N.C.	2				
		Cotter pin 3/16"x1-1/4"	2				

SEC. 5 - DRAWBAR, CIRCLE & MOLDBOARD

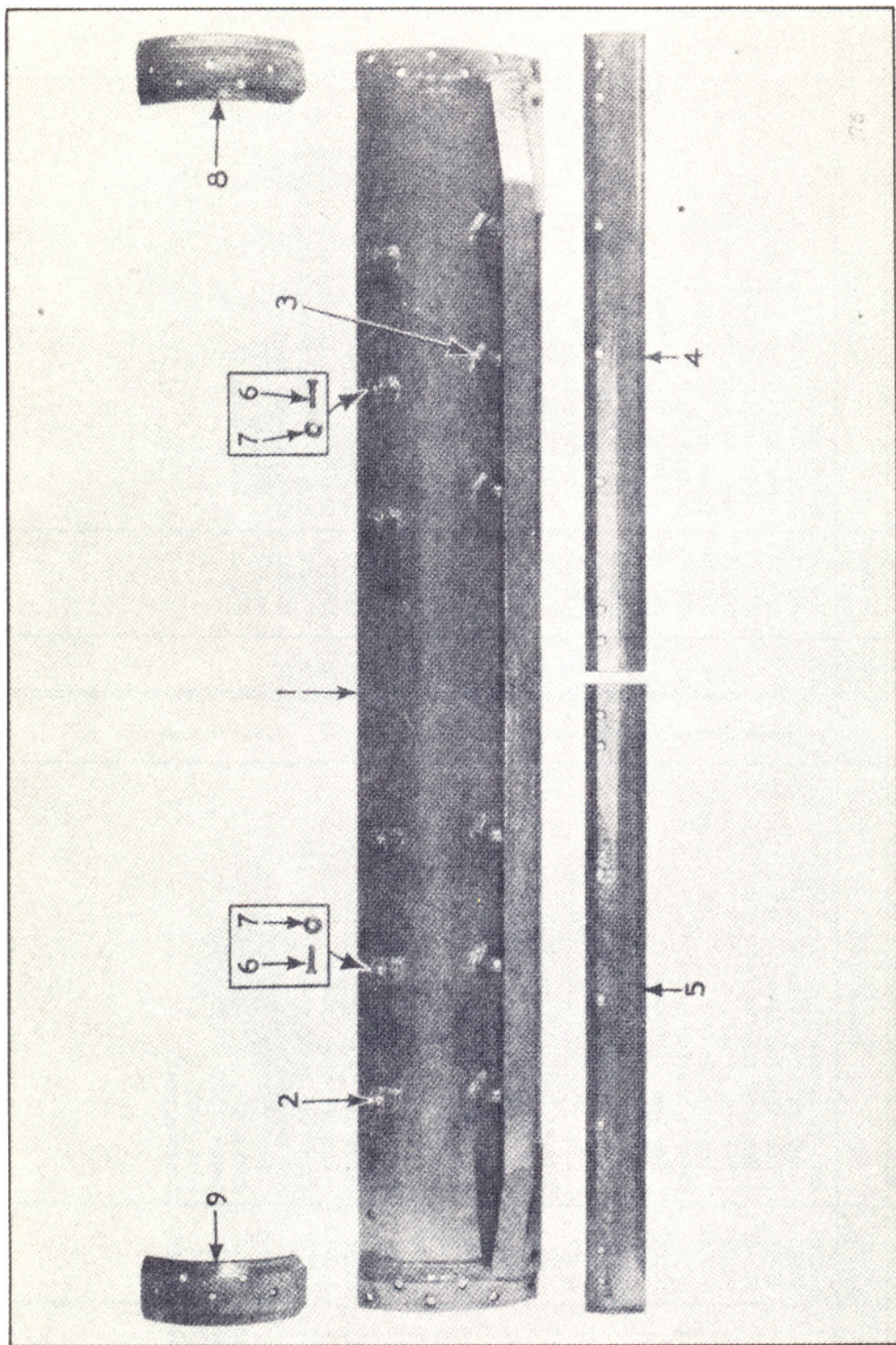
CIRCLE REVERSE AND TRANSFER GEARS



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	130584	Reverse housing(Incl.two 152361 bolts)	1	17	350732	Swivel bolt	1
	4P567	Lub. fitting (Alemite #1610A)	1		903104	Cut washer 1/2"	1
	4P568	Lub. fitting (Alemite #1612A)	3		901536	Hex slotted nut 1/2" N.C.	1
	901138	Hex head machine bolt 1"x10" N.C.	2		902158	Cotter pin 1/8"x1-1/4"	1
	901576	Hex nut 1" N.C.	2	18	330211	Worm and shaft with taper pins	1
	900769	Lock washer 1"	4	19	4P2536	Taper pin	2
2	1678	Reverse housing cover	1	20	DP622	Drilled pin	1
	901047	Hex head machine bolt 3/4"x3-1/4" N.C.	5	21	902156	Cotter pin 1/8"x3/4"	2
	901560	Hex nut 3/4" N.C.	5		2011	Transfer housing	1
	900717	Lock washer (light) 3/4"	10		900076	Hex head cap screw 1/2"x1-1/4" N.C.	2
	4P567	Lub. fitting (Alemite 1610A)	2		900078	Hex head cap screw 1/2"x1-1/2" N.C.	2
3	1682	Reverse gear and pinion	1		900763	Lock washer 1/2"	4
4	661314	Worm thrust bearing	1	22	903002	Pipe plug 1/4"	2
5	661314	Worm thrust bearing	1		2012	Transfer housing cover	1
6	2P783	Lock nut	2		900076	Hex head cap screw 1/2"x1-1/4" N.C.	4
7	350754	Control shaft	1		900763	Lock washer 1/2"	4
8	5P1575	Key (Woodruff #27)	1	23	903001	Pipe plug 1/8"	1
9	2P782	Bearing plug	3	24	DP993	Felt washer	2
10	DP621	Drilled pin	4	25	DP973	Felt washer cup	2
	902156	Cotter pin 1/8"x3/4"	8	26	4P151	Key (Woodruff #21)	2
11	5A395	Universal joint with drilled pins	1	27	350533	Spur gear	2
	350773	Lub. fitting (Alemite #1613A)	1	28	350534	Spur gear shaft	2
12	5A396	Universal joint with drilled pin and key	1	29	350496	Gasket between housing and cover	1
	350773	Lub. fitting (Alemite #1613A)	1	30	350859	Spacer between housing and drawbar	1
13	350735	Spring	1		152361	Heat treated bolt	2
14	350731	Lever shaft	1		901576	Hex nut 1" N.C.	2
15	1746	Lock lever	1		900769	Lock washer 1"	4
16	350667	Locking pawl	1				

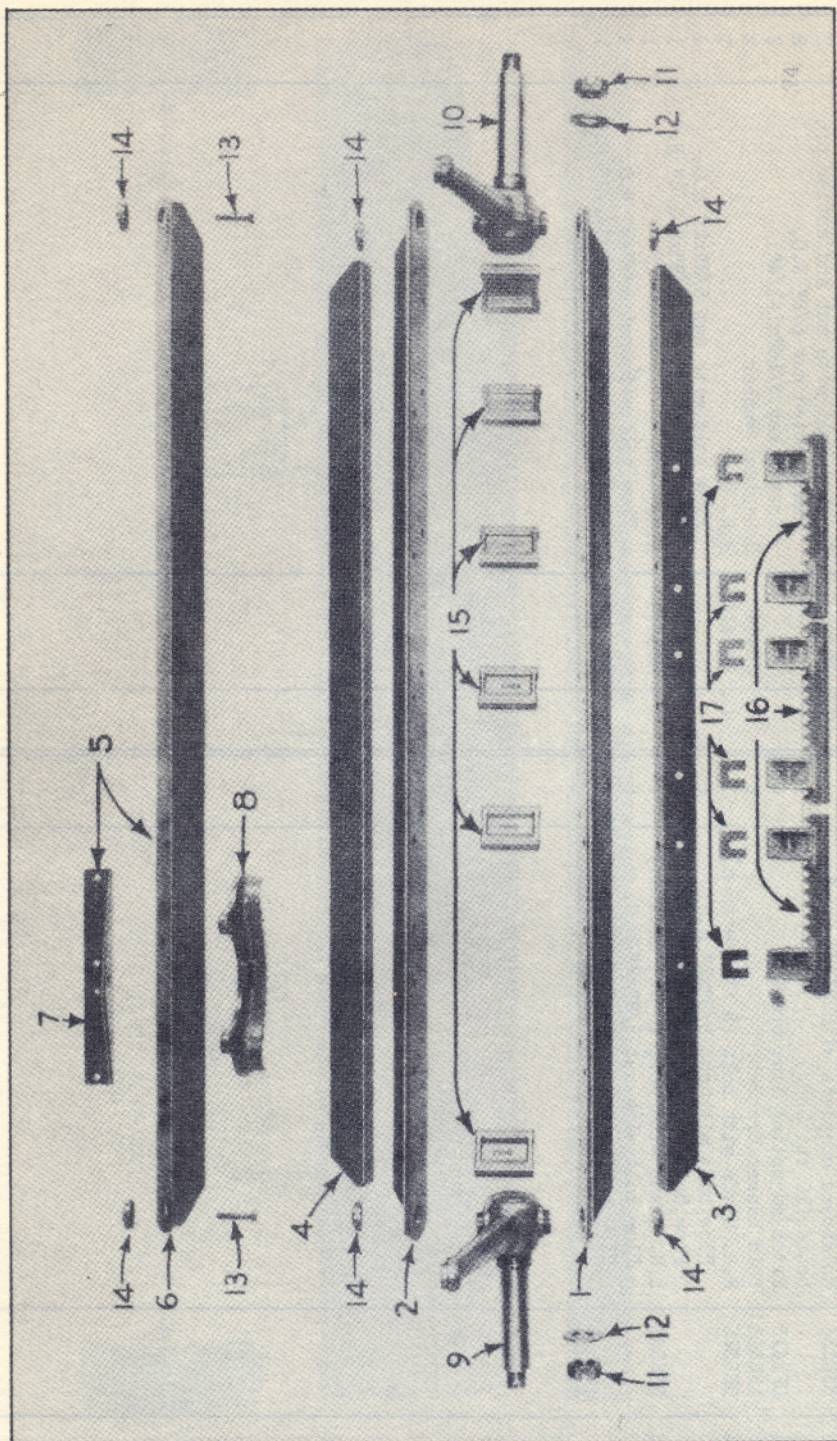
SEC. 5 - DRAWBAR, CIRCLE & MOLDBOARD

MOLDBOARD



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330236	Moldboard complete with blades and boots (10 ft. long)	1	6	8P465	Drilled bolt with nut and cotter pin	2
2	DP1413	Pitch adjusting link bracket	6			Hex slotted nut 5/8" N.C.	2
3	152313	Mold hanger bracket	6			Cotter key 3/16"x1-1/4"	2
4	BP5525	R.H. blade with bolt (5 ft. section)	1	7	JP444	Spherical washer	2
		Plow bolt with nut 5/8"x2" N.C.	6	8	320443	R.H. boot	1
		Plow bolt with nut 5/8"x2-1/2" N.C.	1			Plow bolt with nut 5/8"x2" N.C.	4
5	BP5535	L.H. blade with bolt (5 ft. section)	1	9	320444	Plow bolt with nut 5/8"x2-1/2" N.C.	1
		Plow bolt with nut 5/8"x2" N.C.	6			L.H. boot	1
		Plow bolt with nut 5/8"x2-1/2" N.C.	1			Plow bolt with nut 5/8"x2" N.C.	4
						Plow bolt with nut 5/8"x2-1/2" N.C.	1

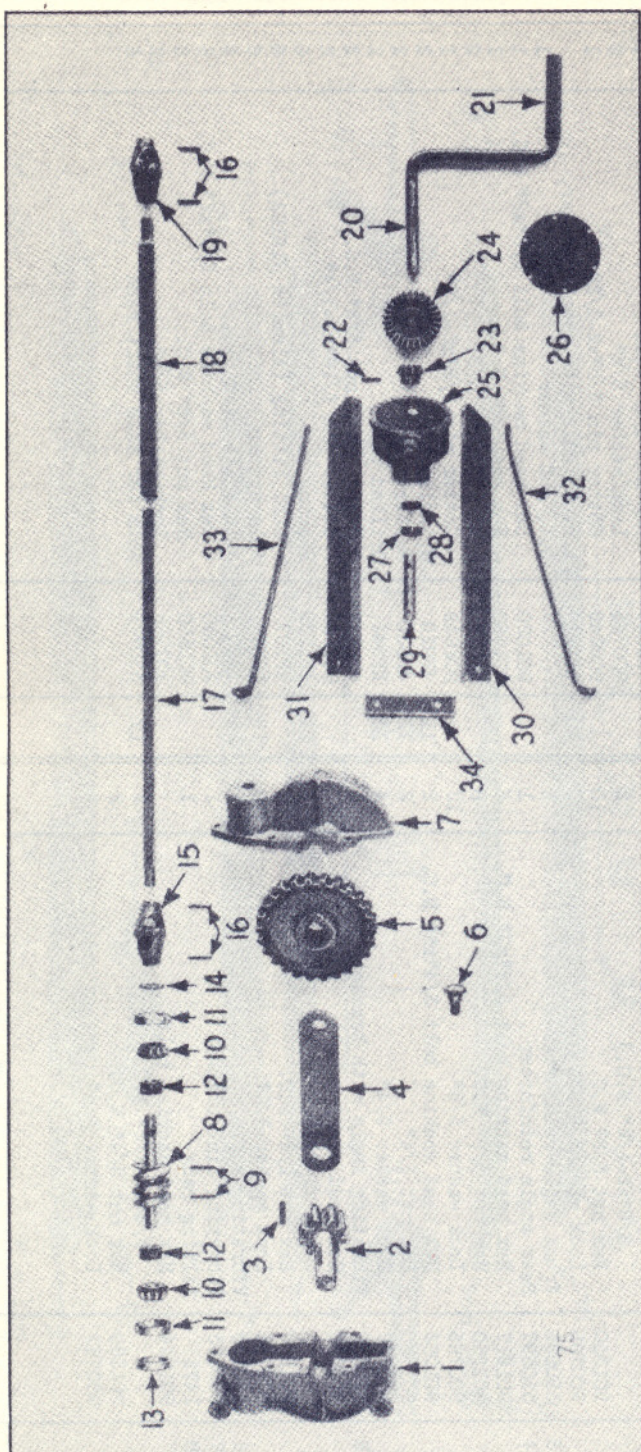
SEC. 6 - REAR AXLE
 REAR AXLE (LESS GEAR ASSEMBLIES)



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	350594	Front angle for rear axle	1	9	330216	R.H. Spindle with shank, collar, nut, and washer	1
2	350595	Rear angle for rear axle	1				1
	901015	Hex head machine bolt 5/8"x6-1/2"N.C.	6		901020	Hex head machine bolt 5/8"x8" N.C.	1
	901002	Stop bolt (hex head machine bolt 5/8"x2-1/2" N.C.)	2		901550	Hex nut 5/8" N.C.	1
	901550	Hex nut 5/8" N.C.	10		900765	Lock washer 5/8"	2
	900765	Lock washer 5/8"	20		902249	Cotter pin 3/8"x2-1/2"	1
3	350596	Front angle reinforcer	1	10	330217	L.H. Spindle with shank, collar, nut, and washer	1
4	350597	Rear angle reinforcer	1				1
	901017	Hex head machine bolt 5/8"x7" N.C.	6		901020	Hex head machine bolt 5/8"x8" N.C.	1
	901550	Hex nut 5/8" N.C.	6		901550	Hex nut 5/8" N.C.	1
	900765	Lock washer 5/8"	12		900765	Lock washer 5/8"	2
	901062	Hex head machine bolt 3/4"x8" N.C.	2		902249	Cotter pin 3/8"x2-1/2"	1
	901560	Hex nut 3/4"	2	11	4P929	Spindle nut	2
	900767	Lock washer 3/4"	4	12	4P930	Washer	2
5	330320	Vibrating angle with bracket	1	13	EP542	Drilled bolt	2
	900920	Hex head machine bolt 1/2"x1-3/4" N.C.	4		901552	Hex slotted nut 5/8" N.C.	2
	901534	Hex nut 1/2" N.C.	4		902192	Cotter pin 3/16"x1-1/4"	2
	900763	Lock washer 1/2"	8	14	AB1239	Bearing cap	6
6	350598	Vibrating angle	1		4P567	Lub. fitting (Alemite #1610A)	6
7	350653	Vibrating link bracket	1	15	1757	Axle spacer	6
8	1475	Tilting rack	1	16	1480	Axle shift rack	3
	901044	Hex head machine bolt 3/4"x2-1/2" N.C.	2		901000	Hex head machine bolt 5/8"x2" N.C.	6
	901560	Hex nut 3/4" N.C.	2		901550	Hex nut 5/8" N.C.	6
	900767	Lock washer 3/4"	4		900765	Lock washer 5/8"	12
				17	350779	Shim for axle shift rack	6

SEC. 6 - REAR AXLE

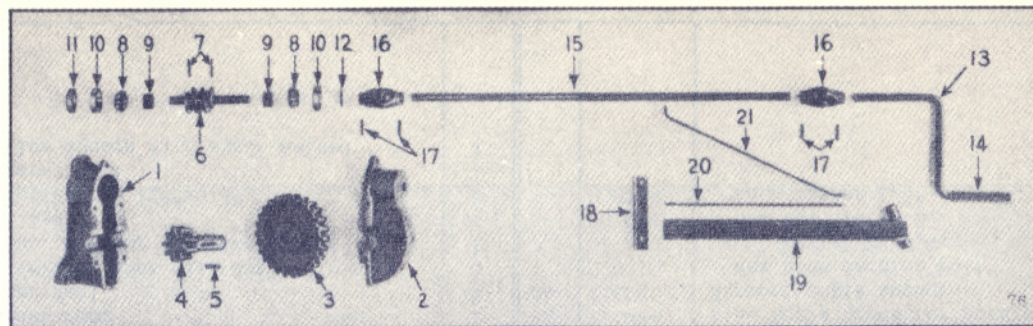
REAR LEANING WHEEL GEAR ASSEMBLY AND CONTROLS



75

Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	AB1463	Lower worm gear housing	1	19	5A395	Universal joint with drilled pins	1
	900614	Allen-head flat point set screw 1"x1-3/4" N.C.	1		350773	Lub. fitting (Alemite #1613A)	1
	901580	Hex jam nut 1" N.C.	1	20	KA505	Crank with handle	1
	903002	Pipe plug 1/4"	1	21	DP1780	Handle for crank	1
2	DP732	Pinion and shaft	1	22	4P1221	Spring retainer for crank handle	1
3	DP736	Square key	1	23	DP994	Taper pin for attaching crank to shaft	1
4	350646	Vibrating link	1	23	DA317	Bevel pinion with taper pin	1
	4P567	Lub. fitting (Alemite #1610A)	1	24	336	Bevel gear	1
5	826	Worm gear	1		902450	Round head rivet 3/8"x2"	1
6	350654	Shoulder bolt	1	25	DA318	Gear housing with bolts	1
*	901563	Hex slotted nut 3/4" N.F.	1		DP757	Drilled bolt	2
	902192	Cotter pin 3/16"x1-1/4"	1		901536	Hex slotted nut 1/2" N.C.	2
7	1464	Upper worm gear housing	1		902158	Cotter pin 1/8"x1-1/4"	2
	900923	Hex head machine bolt 1/2"x2-1/4" N.C.	5	26	4P567	Lub. fitting (Alemite #1610A)	1
	901534	Hex nut 1/2" N.C.	5		DP745	Housing cover	1
	900763	Lock washer 1/2"	10		900019	Hex head cap screw 5/16"x1/2" N.C.	6
	4P568	Lub. fitting (Alemite #1612A)	1	27	DP973	Felt washer cap	1
8	DA494	Worm and shaft with taper pins	1	28	DP993	Felt washer	1
9	DP734	Taper pin	2	29	DA366	Shaft with drilled pin	1
10	DP1553	Bearing cone (Timken #3982)	2		DP621	Drilled pin (not illustrated)	1
11	DP1554	Bearing cup (Timken #3920)	2		902156	Cotter pin 1/8"x3/4"	2
12	DP1305	Spacer	2	30	350721	R.H. Support angle for housing	1
13	DP1304	Thrust disc	1	31	350722	L.H. Support angle for housing	1
14	152343	Water seal	1	32	350723	R.H. Angle brace for housing	1
15	4A449	Universal joint with drilled pins	1	33	350724	L.H. Angle brace for housing	1
	350773	Lub. fitting (Alemite #1613A)	1	34	350720	Support angle anchor	1
16	DP621	Drilled pin	4		900919	Hex head machine bolt 1/2"x1-1/2" N.C.	2
	902156	Cotter pin 1/8"x3/4"	8		901534	Hex nut 1/2" N.C.	2
17	KP1278	Square shaft	1		900763	Lock washer 1/2"	4
18	DA644	Hollow square with shaft welded	1				

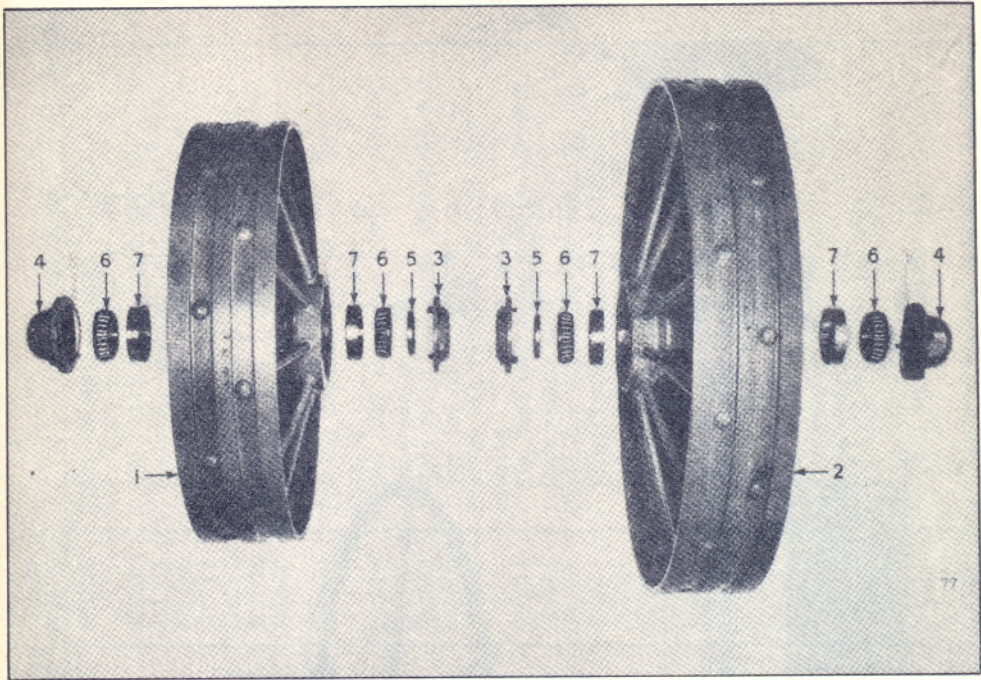
SEC. 8 - REAR AXLE
 REAR LEARNING WHEEL GEAR ASSEMBLY AND CONTROLS



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	1867	Lower worm gear housing	1	11	DP1304	Thrust disc	1
		Hex head machine bolt 5/8"x2-3/4" N.C.	3	12	152343	Water seal	1
		Lock washer 5/8"	6	13	530391	Crank and upper control shaft	1
		Hex nut 5/8" N.C.	3	14	DP1780	Handle for crank	1
		Allen-head flat point set screw 1"x1-3/4" N.C.	1		4P1221	Spring retainer for crank handle	1
		Hex jam nut 1" N.C.	1	15	350841	Lower control shaft	1
2	1464	Upper worm gear housing	1	16	5A395	Universal joint with drilled pins	2
		Hex head machine bolt 1/2"x2-1/4" N.C.	5		350773	Lub. fitting (Alemite #1613A)	2
		Hex nut 1/2" N.C.	5	17	DP621	Drilled pin	4
		Lock washer 1/2"	10			Cotter pin 1/8"x3/4"	8
	4P568	Lub. fitting (Alemite #1610A)	1	18	350720	Support angle anchor	1
3	826	Worm gear	1			Hex head machine bolt 1/2"x1-3/4" N.C.	1
4	DP790	Pinion	1			Hex head machine bolt 1/2"x1-1/2" N.C.	2
5	DP736	Square key	1			Hex nut 1/2" N.C.	3
6	DA494	Worm and shaft with taper pins	1			Lock washer	6
7	DP734	Taper pin	2	19	330327	Support angle with bearing welded for side shift crank	1
8	DP1553	Bearing cone (Timken #41100)	2		4P567	Lub. fitting (Alemite #1610A)	1
9	DP1305	Spacer	2	20	350725	Side shift tie bar	1
10	DP1554	Bearing cup (Timken #41286)	2	21	350724	Brace for rear axle shift control	1

SEC. 7 - WHEELS

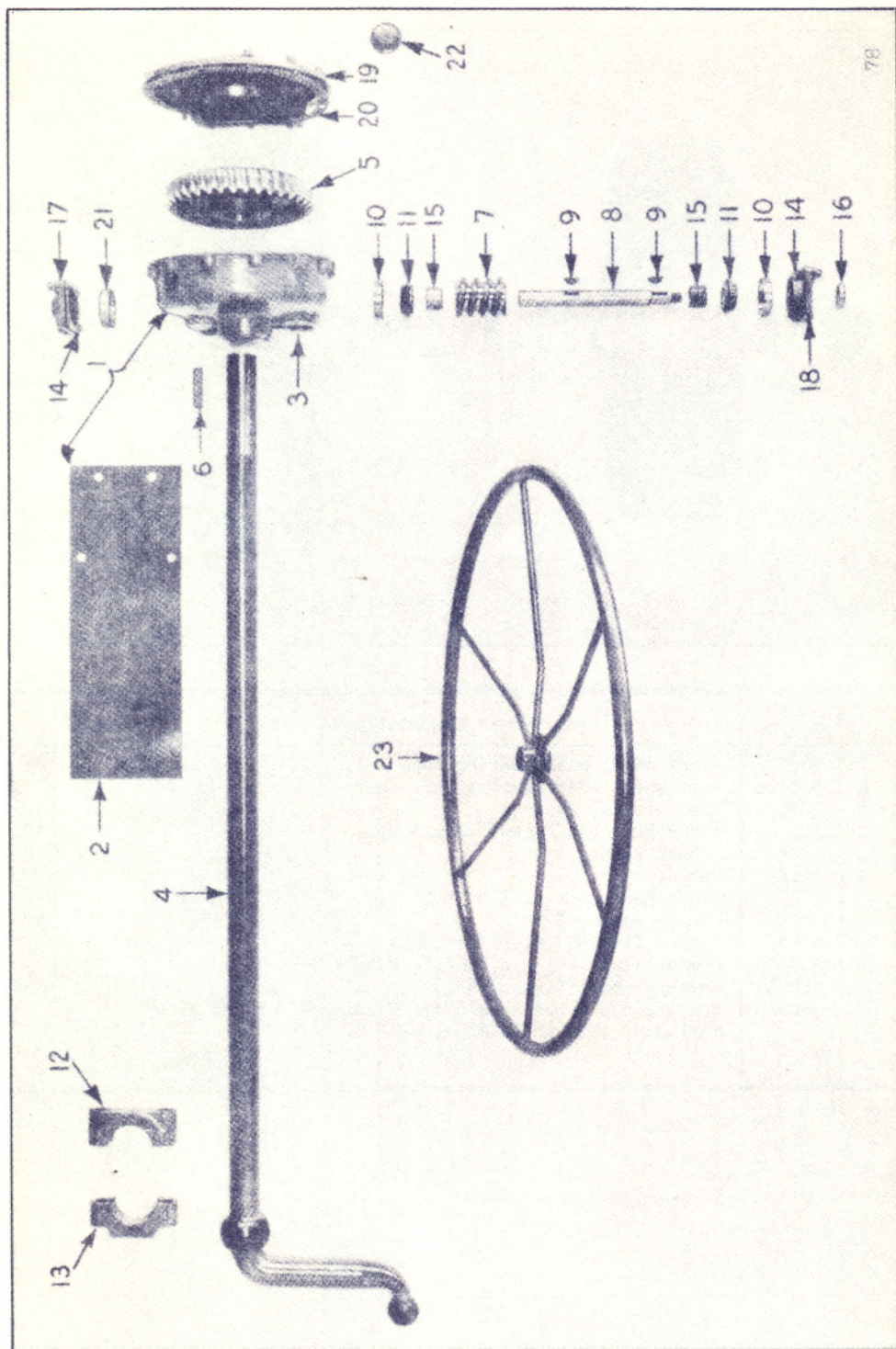
WHEELS



Ref. No.	Adams Part No.	Description	No. Used
1	350485	Front wheel with bearing cups only	2
2	350486	Rear wheel with bearing cups only	2
3	1692	Grease seal retainer Hex head cap screw 3/8"x1" N.C. Lock washer 3/8"	4 16 16
4	1512	Hub cap Hex head cap screw 3/8"x1" N.C. Lock washer 3/8"	4 16 16
	4P567	Lub. fitting (Alemite #1610A)	4
5	350535	Grease seal (Chicago Rawhide #375224)	4
6	350914	Bearing cone (Timken #462)	8
7	350915	Bearing cup (when wheels are furnished bearing cups are included) (Timken #453A)	8

7

SEC. 8 - BLADE CONTROLS
BLADE LIFT MECHANISM (RIGHT AND LEFT)



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330348	R.H. Lift housing with support plate	1	13	671837	Upper fulcrum bearing for R.H. or L.H. lift arm	2
	902422	Round head rivet 3/4"x2-1/2"	4				
1	330201	L.H. Lift housing with support plate	1		4P567	Lub. fitting (Alemite #1610A)	2
	902422	Round head rivet 3/4"x2-1/2"	4		901054	Hex head machine bolt 3/4"x6" N.C.	4
2	350870	R.H. Lift housing support plate	1		901560	Hex nut 3/4" N.C.	4
	902422	Round head rivet 3/4"x2-1/2"	4		900767	Lock washer 3/4"	8
2	350542	L.H. Lift housing support plate	1	14	350771	Gasket between housing and bearing cap	4
	902422	Round head rivet 3/4"x2-1/2"	4	15	DP1309	Spacer collar for R.H. or L.H. side	4
3	1725	R.H. or L.H. lift gear housing	2	16	350539	Grease seal for R.H. or L.H. side (Chicago Rawhide #237116)	2
	4P567	Lub. fitting (Alemite #1610A)	2	17	401047	Bearing cap for R.H. or L.H. lift housing	2
	4P568	Lub. fitting (Alemite #1612A)	2				
4	330202	R.H. or L.H. lift arm with bearing	1		900114	Hex head cap screw 5/8"x1-3/4" N.C.	8
5	350470	Lift gear for right hand side	1		900765	Lock washer 5/8"	8
	900626	Square head cup point set screw 5/8"x1-3/4" N.C.	1		900625	Flat point set screw 1"x2-1/4" N.C.	2
	901554	Hex jam nut 5/8" N.C.	1		901580	Hex jam nut 1" N.C.	2
5	350469	Lift gear for left hand side	1	18	661395	Bearing cap for R.H. or L.H. lift housing	2
	900626	Square head cup point set screw 5/8"x1-3/4" N.C.	1		900114	Hex head cap screw 5/8"x1-3/4" N.C.	8
	901554	Hex jam nut 5/8" N.C.	1		900765	Lock washer 5/8"	8
6	4P1128	Square key for lift gears	2	19	671693	Cover for R.H. lift gear housing	1
7	AA813	Lift worm for L.H. side	1		4P567	Lub. fitting (Alemite #1610A)	2
7	AB813	Lift worm for R.H. side	1		900042	Hex head cap screw 3/8"x1" N.C.	7
8	350619	Shaft for R.H. or L.H. lift worm	2		900044	Hex head cap screw 3/8"x1-1/4" N.C.	5
9	425382	Key (Woodruff #25)	4		900763	Lock washer 1/2"	12
10	DP1552	Bearing cup for R.H. or L.H. side (Bower #44348)	4	19	903005	Pipe plug 1/2"	1
					671693	Cover for L.H. lift gear housing	1
11	DP1551	Bearing cone for R.H. or L.H. side (Bower #44150)	4		4P567	Lub. fitting (Alemite #1610A)	2
					900042	Hex head cap screw 3/8"x1" N.C.	8
12	AB1483	Lower fulcrum bearing for R.H. or L.H. lift arm	2		900044	Hex head cap screw 3/8"x1-1/4" N.C.	4
					900763	Lock washer 1/2"	12
					903005	Pipe plug 1/2"	1

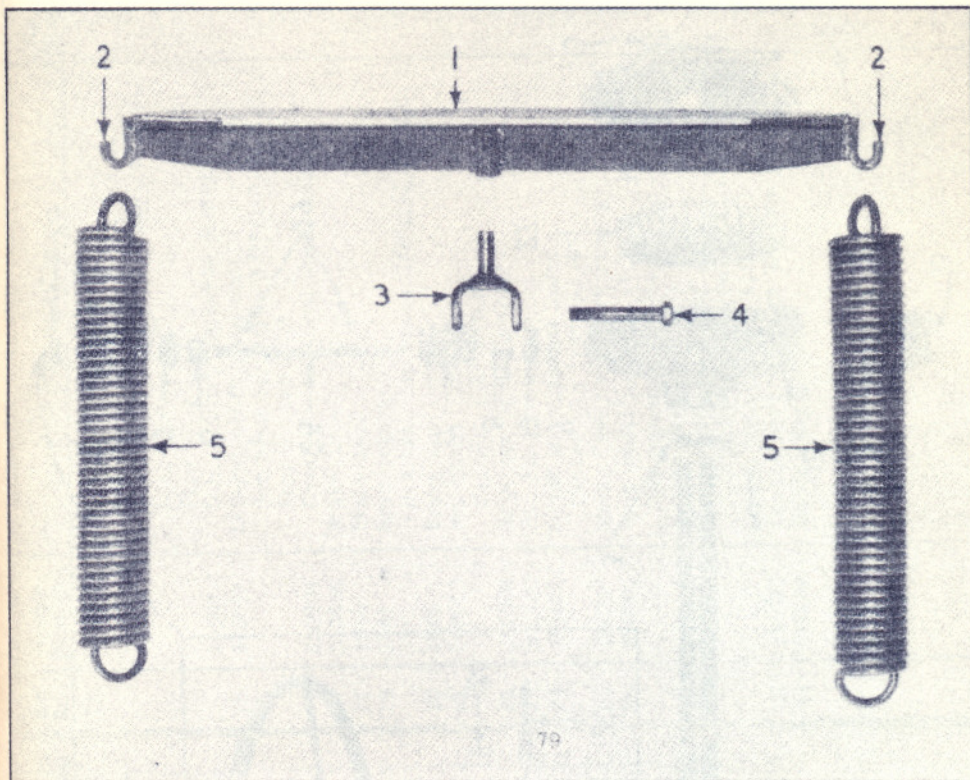
SEC. 8 - BLADE CONTROLS
BLADE LIFT MECHANISM (RIGHT AND LEFT)

SEC. 8 - BLADE CONTROLS
BLADE LIFT MECHANISM (RIGHT AND LEFT) (CONT'D)

Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
20	KP624	Gasket between gear housing and cover	2	23	330264	Hand wheel for R.H. or L.H. side	2
21	DP1312	Thrust disc	2			Hex jam nut 1" N.C.	2
22	350531	Welch plug	2			Lock washer 1"	2

SEC. 8 - BLADE CONTROLS

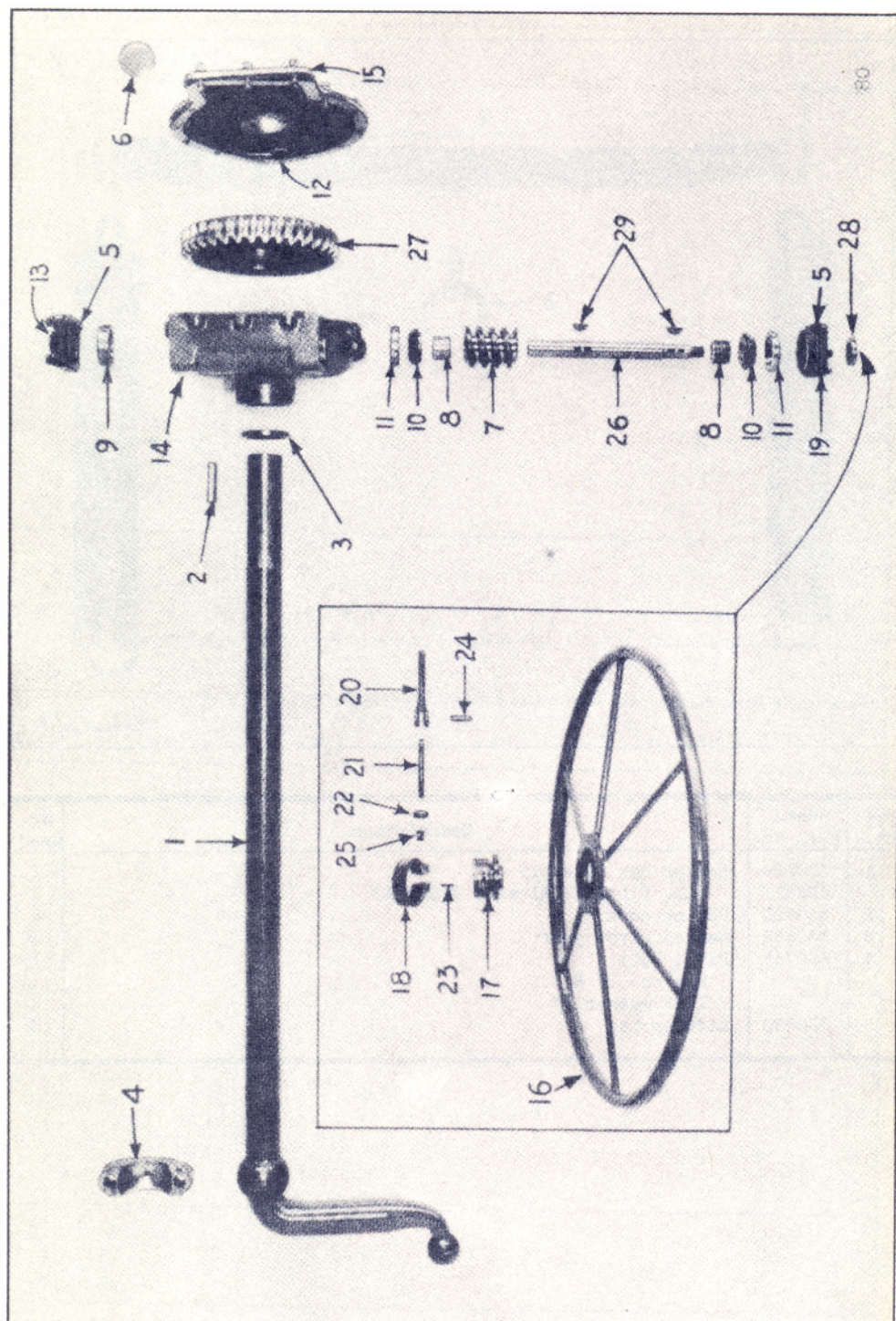
BLADE LIFT SPRINGS



Ref. No.	Adams Part No.	Description	No. Used
1	330266	Rocker bar assembly	1
	4P567	Lub. fitting (Alemite #1610-A)	1
2	350710	Spring hook	2
3	330268	Welded pivot yoke	1
4	350733	Pivot bolt	1
		Hex nut 1" N.C.	1
		Lock washer 1"	2
5	350880	Lift spring	2

SEC. 8 - BLADE CONTROLS

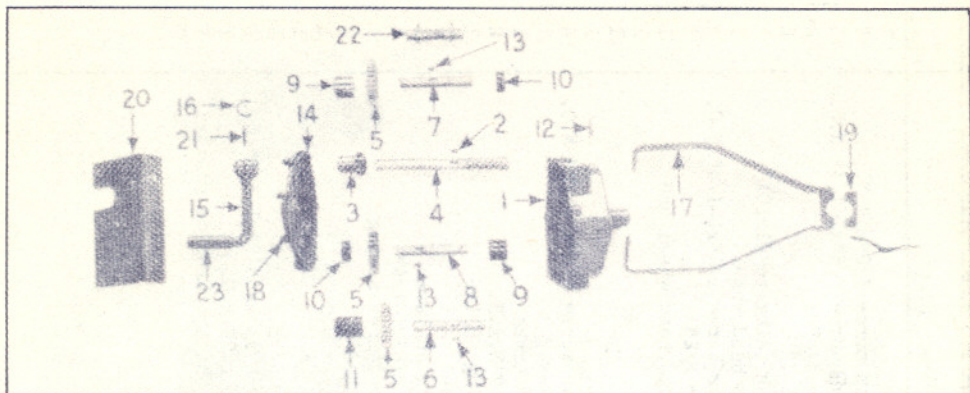
LATERAL SHIFT FOR BLADE



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330181	Lateral shift arm with bearing	1	15	661693	Housing cover	1
2	DP1333	Square key	1			Hex head cap screw 3/8"x1" N.C.	7
3	350502	Grease seal (Chicago Rawhide #375222)	1			Hex head cap screw 3/8"x1-1/4" N.C.	5
4	661791	Lower lateral shift fulcrum bearing	1			Lock washer 3/8"	12
		Hex head cap screw 1"x4" N.C.	2			Pipe plug 1/2"	2
		Machined lock washer 1"	2		4P567	Lub. fitting (Alemite #1610A)	1
5	350771	Bearing cap gasket	2	16	330353	Lateral shift hand wheel	1
6	350531	Welch plug	1			Hex head cap screw 1/2"x1-1/4" N.C.	3
7	AA813	Worm	1			Lock washer 1/2"	3
8	DP1309	Spacer	2		350806	Dowel pin for hand wheel hub	1
9	DP1312	Thrust disc	1	17	350896	Brake drum	1
10	DP1551	Bearing cone (Bower #44150)	2	18	1966	Brake band	1
11	DP1552	Bearing cup (Bower #44348)	2	19	1967	Brake bracket	1
12	KP624	Housing gasket	1			Hex head cap screw 5/8"x1-1/2" N.C.	4
13	401047	Bearing cap	1	20	1968	Brake cam lever	1
		Hex head cap screw 5/8"x1-3/4" N.C.	4	21	350900	Draw bolt for brake	1
		Lock washer 5/8"	4			Hex nut 1/2" S.A.E.	2
		Flat point Allen-head set screw 1"x2-1/4" N.C.	1	22	350902	Retainer spring collar	1
		Hex jam nut 1" N.C.	1	23	522140	Pin for brake	1
			1	24	5P1822	Pivot pin for cam lever	1
14	1726	Lateral shift housing	1			Cotter pin 1/8"x1-1/4"	2
		Hex machine bolt 3/4"x2-1/4" N.C.	2	25	4P604	Brake lever retainer spring	1
		Hex nut 3/4" N.C.	2	26	350895	Worm shaft	1
		Lock washer 3/4"	4			Hex jam nut 1" N.C.	1
	4P567	Lub. fitting (Alemite #1610A)	2			Lock washer 1"	1
				27	350475	Worm gear	1
						Cup point set screw 5/8"x1-3/4" N.C.	1
						Hex jam nut 5/8" N.C.	1
				28	350539	Grease seal (Chicago Rawhide #237116)	1
				29	DP1282	Woodruff key	2

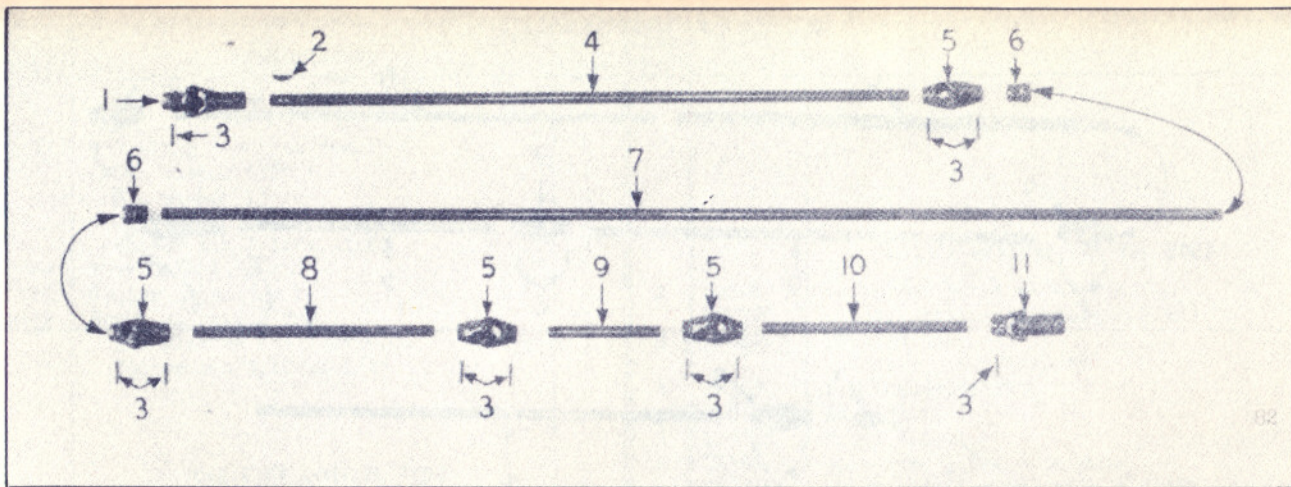
SEC. 9 - MISCELLANEOUS CONTROLS

TRANSMISSION ASSEMBLY FOR 3 IN 1 CONTROL



Ref. No.	Adams Part No.	Description	No. Used
1	1371	Housing	1
	DP1597	Lub. fitting (Alemite #1627-A)	1
	PP1114	Ball for engaging pinion shaft	1
2	PP1146	Key (Woodruff #A)	1
3	DP1408	Pinion	1
4	PP1262	Pinion shaft	1
5	PP1061	Spur gear	3
6	PP1215	Right spur gear shaft	1
7	DP1409	Left spur gear shaft	1
8	PP1213	Center spur gear shaft	1
9	PP1218	Left and center spacer collar	2
10	PP1058	Left and center spacer collar	2
11	PP1217	Spacer collar	1
12	PP1115	Spring	1
13	PP1080	Key (Woodruff #A)	3
14	DP1416	Housing gasket	1
15	D299	Crank with handle	1
	4P1221	Spring retainer for crank handle (not illustrated)	1
16	152235	Spring retainer for crank	1
17	330235	Transmission and steering rod support	1
		Hex head cap screw 3/8"x2" N.C.	2
		Lock washer 3/8"	2
		Hex head cap screw 5/8"x1-1/2" N.C.	4
		Lock washer 5/8"	4
18	1372	Housing cover	1
		Hex head cap screw 3/8"x1" N.C.	6
		Hex head cap screw 3/8"x2" N.C.	1
		Lock washer 3/8"	7
		Pipe plug 1/8"	2
19	350613	Steering rod bearing block	1
20	350921	Support plate for transmission	1
		Hex head machine bolt 5/8"x1-3/4" N.C.	2
		Hex nut 5/8" N.C.	2
		Lock washer 5/8"	4
21	152268	Pin for attaching crank to shaft	1
22	KP1209	Dummy shaft (used only when scarifier is not furnished)	1
		Cotter pin 3/16"x1-1/2"	2
23	4P1218	Crank handle	1

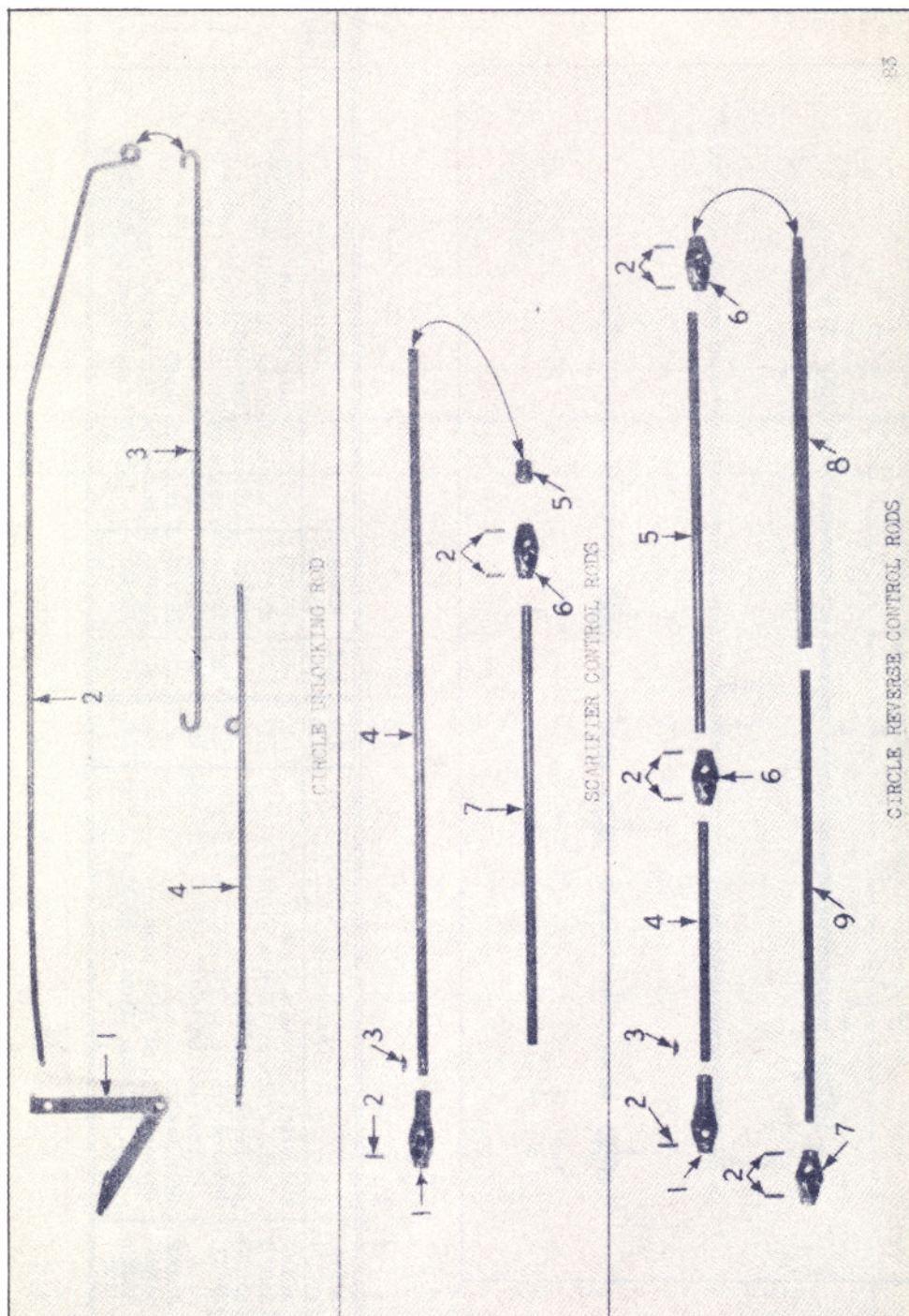
SEC. 9 - MISCELLANEOUS CONTROLS
FRONT LEANING WHEEL CONTROL RODS



Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	5A396	Universal joint with pins	1	6	661658	Self aligning bearing	2
	350773	Lub. fitting (Alemite #1613A)	1		4P567	Lub. fitting (Alemite #1610A)	2
2	5P1575	Key (Woodruff #27)	1	7	DP1116	Intermediate shaft	1
3	DP621	Drilled pin	10	8	350751	Angle shaft	1
		Cotter pin 1/8"x3/4"	20	9	350750	Angle shaft	1
4	350802	Rear shaft	1	10	350749	Vertical shaft	1
5	5A395	Universal joint with pins	4	11	DA446	Universal joint with pin	1
	350773	Lub. fitting (Alemite #1613A)	4		350773	Lub. fitting (Alemite #1613A)	1

SEC. 9 - MISCELLANEOUS CONTROLS

MISCELLANEOUS CONTROLS



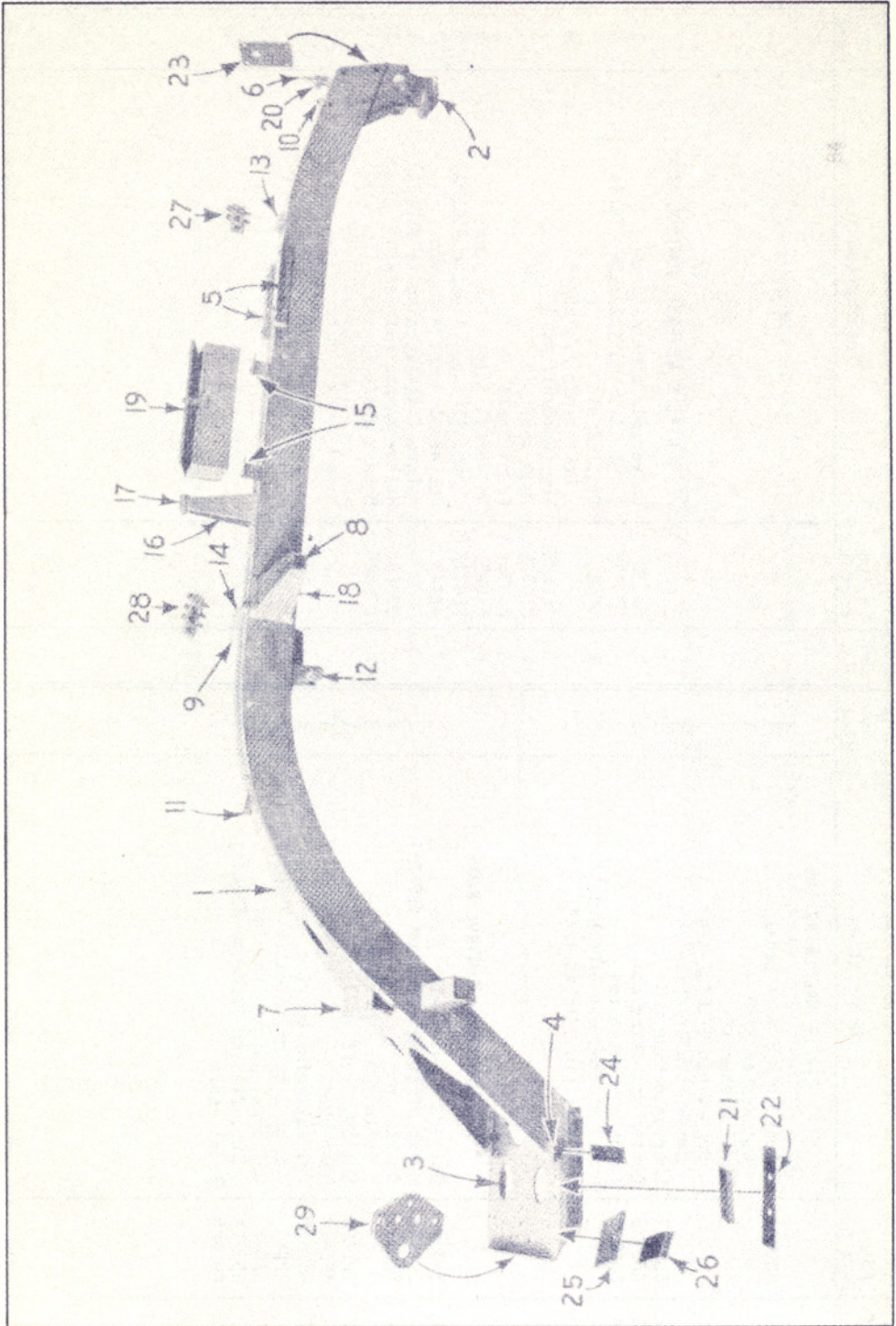
Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
CIRCLE UNLOCKING ROD							
1	330297	Unlocking rod foot pedal	1				
		Cut washer 5/8"	1				
		Cut washer 1"	1				
		Cotter pin 3/16"x1-1/4"	1				
		Cotter pin 3/16"x1-1/2"	1				
2	350729	Rear unlocking rod	1				
3	350728	Center unlocking rod	1	1	5A396	Universal joint with pins	1
4	330269	Front unlocking rod	1		350773	Lub. fitting (Alemite #1613A)	1
		Hex slotted nut 5/8" N.C.	1	2	DP621	Drilled pin	7
		Cotter pin 3/16"x1-1/4"	1			Cotter pin 1/8"x3/4"	14
SCARIFIER CONTROL RODS							
1	5A396	Universal joint with pins	1	3	5P1575	Key (Woodruff #27)	1
	350773	Lub. fitting (Alemite #1613A)	1	4	350759	Rear shaft	1
2	DP621	Drilled pin	3	5	350755	Front shaft	1
		Cotter pin 1/8"x3/4"	6	6	5A395	Universal joint with pins	2
3	5P1575	Key (Woodruff #27)	1		350773	Lub. fitting (Alemite #1613A)	2
4	4P1447	Rear shaft	1	7	4A449	Universal joint with pins	1
5	661658	Self-aligning bearing	1		350773	Lub. fitting (Alemite #1613A)	1
	4P567	Lub. fitting (Alemite #1610A)	1	8	330283	Hollow square with shaft	1
6	5A395	Universal joint with pins	1	9	DP1526	Square shaft	1
	350773	Lub. fitting (Alemite #1613A)	1				
7	DP1620	Front shaft	1				
CIRCLE REVERSE CONTROL RODS							

41

SEC. 9 - MISCELLANEOUS CONTROLS
 MISCELLANEOUS CONTROLS

SEC. 10 - MAIN FRAME AND PLATFORM

MAIN FRAME

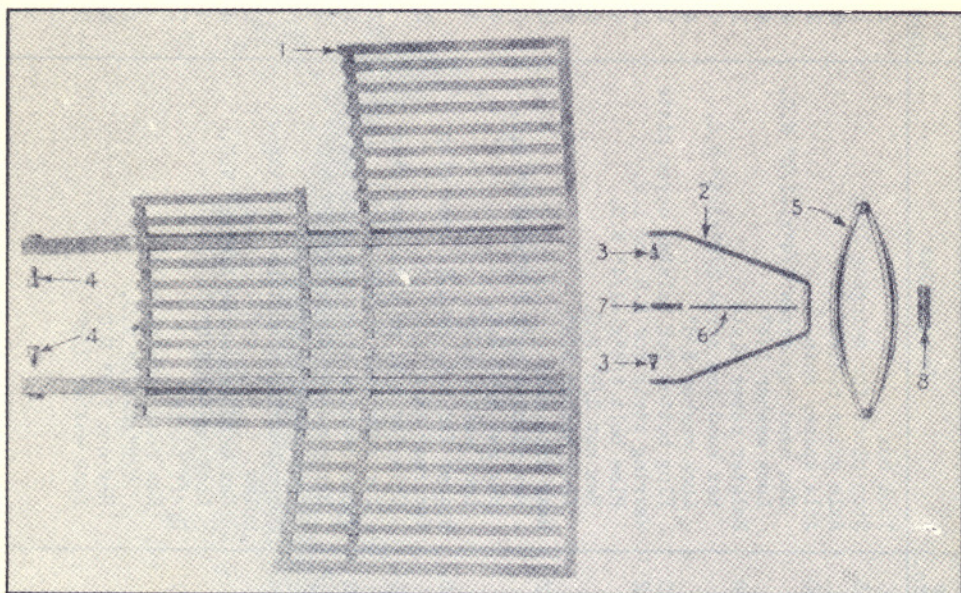


Ref. No.	Adams Part No.	Description	No. Used	Ref. No.	Adams Part No.	Description	No. Used
1	330337	Welded main frame (includes all welded parts except #350542 & #350870 housing support plates	1	19	DP400	Tool box	1
2	1677	Front draft bolster	1	20	152245	Stop block for swinging loop	1
		Hex head machine bolt	1	21	KP645	Axle guide block	2
		1"x6-1/4" N.C.	1	22	551350	Axle spacer shim	3
		Hex nut 1" N.C.	1			Hex head cap screw 3/4"x1-1/2" N.C.	4
		Lock washer 1"	2			Lock washer 3/4"	4
3	350829	Rear axle carrier plate	1	23	551488	Bolster cover plate	1
4	350831	R.H. or L.H. clip for rear axle	2			Hex head cap screw 3/8"x3/4" N.C.	4
5	350556	Scarifier lift support	2			Lock washer 3/8"	4
6	350558	Tongue chain support	1	24	350832	Plug button for bolster cover plate	1
		Hex slotted nut 1" N.C.	1			Wearing strip for R.H. or L.H.	2
		Cut washer 1"	1			Flow bolt 3/8"x1-1/4" N.C.	4
		Cotter pin 3/16"x2"	1			Hex nut 3/8" N.C.	4
7	350559	Lateral shift support	1	25	551348	Lock washer 3/8"	4
	4P568	Lub. fitting (Alemite #1612A)	1			Rear axle clip	2
8	330344	R.H. fulcrum bearing bracket	1			Hex machine bolt 5/8"x2-3/4" N.C.	4
9	330345	L.H. fulcrum bearing bracket	1			Hex nut 5/8" N.C.	4
10	350578	Bearing for front wheel tilting shaft	1	26	551349	Lock washer 5/8"	8
	4P567	Lub. fitting (Alemite #1610A)	1			Spacer for R.H. or L.H. rear clip for rear axle	2
11	350579	Bearing for circle reverse shaft	1		350830	Shim for R.H. or L.H. rear clip for rear axle (1/16" thick)	2
	4P567	Lub. fitting (Alemite #1610A)	2	27	350582	Upper bearing block cap with two holes	1
12	1868	Lateral shift fulcrum bearing	1			Hex head cap screw 3/8"x2" N.C.	3
13	350583	Lower bearing block with two holes	1			Lock washer 3/8"	3
14	350585	Lower bearing block with three holes	1	28	350584	Upper bearing block cap with three holes	1
15	551463	Tool box support	2			Hex head cap screw 3/8"x2" N.C.	4
		Hex head machine bolt				Lock washer 3/8"	4
		3/8"x1-1/4" N.C.	2			Draft plate	1
		Hex nut 3/8" N.C.	2	29	152291	Hex head machine bolt	
		Lock washer 3/8"	4			7/8"x2-1/2" N.C.	3
16	330267	Rocker bar support with bearing	1			Hex nut 7/8" N.C.	3
17	350714	Rocker bar support bearing	1			Lock washer 7/8"	6
	4P567	Lub. fitting (Alemite #1610A)	1				
18	350846	Unlocking rod guide	1				

SEC. 10 - MAIN FRAME AND PLATFORM
MAIN FRAME

SEC. 10 - MAIN FRAME AND PLATFORM

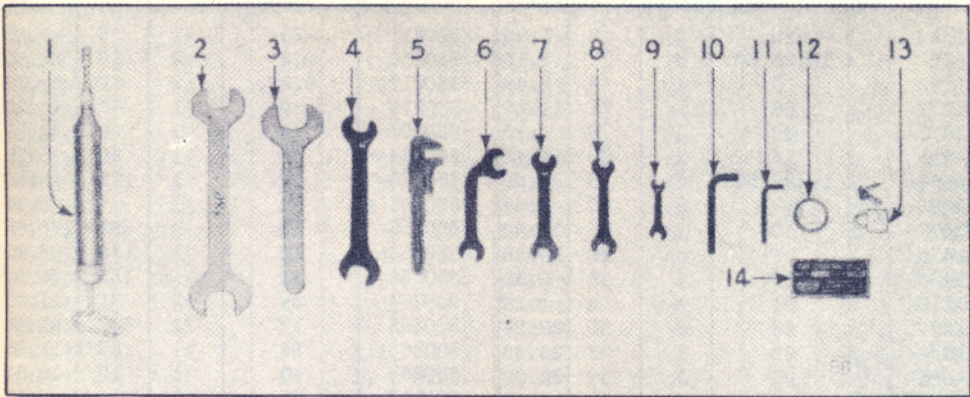
OPERATOR'S PLATFORM



Ref. No.	Adams Part No.	Description	No. Used
1	330817	Welded platform	1
2	350620	Platform support	1
3	DP1764	Shoulder bolt Hex slotted nut 1/2" N.C. Cotter pin 1/8"x1-1/4"	2
4	GP344	Shoulder bolt Hex slotted nut 5/8" N.C. Cotter pin 3/16"x1-1/4"	2
5	DA411	Platform spring Square head machine bolt 3/8"x2-3/4" N.C. Square head machine bolt 3/8"x2" N.C. Square nut 3/8" N.C. Hex nut 3/8" N.C. Lock washer 3/8"	2
6	152347	Platform snubber spring bolt Hex nut 3/8" N.C. Cut washer 3/8" Cotter pin 1/8"x3/4"	1
7	152344	Platform snubber spring	1
8	152290	Platform spring spacer	1

SEC. 11 - TOOLS

TOOLS



Ref. No.	Adams Part No.	Description	No. Used
1	424203	Grease gun (Stewart Warner Corp. #5257)	1
2	426261	Wrench 1-57/64"x2-17/64" openings	1
3	426260	Wrench 2-17/64" opening	1
4	DP1469	Wrench 1-5/16"x1-1/2" openings	1
5	DP1021	Monkey wrench 11"	1
6	DP411	Wrench 1"x1-1/8" openings	1
7	DP443	Wrench 13/16"x1" openings	1
8	DP1645	Wrench 3/4"x7/8" openings	1
9	DP1644	Wrench 1/2"x9/16" openings	1
10	DP1470	Wrench - Allen-head hex set screw 9/16" for 1" set screw	1
11	350769	Wrench - Allen-head hex set screw 3/8" for 3/4" set screw	1
12	350747	Spindle pilot	1
13	4P233	Laminated padlock with keys	1
14	350770	Name plate with drive screws	1

SEC. 12 - NUMERICAL INDEX

Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price	Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price
336	29	1	2	1.93	330211	23	1	5	6.60
826	10,29,30	3	17	9.13	330216	9,27	2	38	22.00
1280	3	1	3	2.48	330217	9,27	2	38	22.00
1371	38	1	21	11.25	330219	9	1	66	46.20
1372	38	1	8	4.13	330222	5	1	75	42.93
1408	13	1	30	13.42	330224	3	1	26	5.78
1464	10,29,30	3	16	6.00	330225	3	1	123	18.62
1475	9,27	2	10	4.59	330235	38	1	7	5.94
1477	9	1	15	12.38	330236	25	1	593	130.65
1478	9	1	20	14.58	330256	13	1	135	68.75
1480	27	3	13	5.39	330258	13	1	133	39.00
1512	31	4	4	1.10	330264	34	2	31	11.00
1677	43	1	35	28.52	330265	17	1	500	91.52
1678	23	1	23	25.99	330266	35	1	27	11.83
1682	23	1	37	32.07	330267	43	1	10	10.84
1687	17	1	21	13.81	330268	35	1	4	3.63
1688	17	1	22	14.58	330269	41	1	5	2.34
1692	31	4	2	2.31	330270	17	7	3/4	.55
1725	33	2	52	32.62	330274	7	1	6	2.67
1726	37	1	51	31.21	330279	7	1	6	2.20
1738	5	1	1	6.33	330283	41	1	7	3.19
1740	13	1	8	5.61	330291	3	1	79	22.03
1746	23	1	2	2.31	330293	13	1	3	5.34
1749	13	1	57	31.08	330297	41	1	4	5.39
1757	27	6	4	1.38	330317	44	1	105	35.15
1855	3	1	4	2.75	330320	27	1	68	12.82
1856	3	1	8	5.50	330322	19	1	790	169.90
1867	30	1	25	11.00	330323	19	1	7	5.23
1868	43	1	21	13.83	330324	19	1	7	5.23
1946	9	1	24	19.25	330327	30	1	9	5.01
1966	37	1	2	2.34	330329	19	3	8	3.08
1967	37	1	4	4.13	330337	43	1	1278	455.68
1968	37	1	1	1.10	330344	43	1	34	13.92
1969	5	1	1	3.71	330345	43	1	34	13.92
2011	23	1	11	12.65	330347	13	1	1	4.15
2012	23	1	5	6.46	330348	33	1	78	38.01
130432	7	1	2	4.02	330352	7	1	18	9.35
130584	23	1	63	31.90	330353	37	1	25	9.06
152235	38	1	1/8	.06	330359	19	3	13	2.89
152245	43	1	1/2	.28	330366	5	1	30	13.61
152268	38	1	1/2	.14	350460	19	3	4	1.32
152290	44	1	2	.66	350462	19	2	2	1.16
152291	43	1	15	3.03	350469	33	1	39	20.52
152313	25	6	4	1.38	350470	33	1	39	20.52
152343	10,29,30	3	1/16	.06	350475	37	1	38	20.49
152344	44	1	1/4	.14	350483	5	1	1/8	.03
152347	44	1	1/4	.19	350484	5	1	8	5.72
152349	5	1	2	1.38	350485	31	2	174	35.61
152356	5	1	1/16	.47	350486	31	2	204	39.27
152357	5	1	1/16	.28	350491	13	4	1/8	.06
152360	43	1	1/8	.06	350492	13	2	1/8	.03
152361	23	2	1	.30	350496	23	1	1/8	.03
320443	25	1	15	3.71	350500	13	1	1/8	.06
320444	25	1	15	3.71	350502	37	1	1/4	1.00
330181	37	1	117	38.50	350503	14	1	1/8	.65
330194	21	1	624	216.04	350504	5	1	1/8	.35
330201	33	1	77	34.10	350505	13	2	1/4	1.59
330202	33	2	104	32.73	350506	13	2	1/4	.95

SEC. 12 - NUMERICAL INDEX

Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price	Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price
350508	14	1	1	4.02	350733	35.	1	2	.47
350526	13	1	1/8	.91	350734	19	1	1/4	.61
350527	14	1	1/2	1.35	350735	23	1	1/8	.55
350528	5	1	8	3.08	350747	45	1	1/4	1.24
350529	14	1	1/8	.03	350749	39	1	3	.99
350530	34	2	1/8	.03	350750	39	1	2	.72
350531	37	1	1/8	.06	350751	39	1	5	1.05
350533	23	2	3	3.71	350754	23	1	3/4	.83
350534	23	2	1	1.38	350755	41	1	6	1.43
350535	31	4	1/4	1.00	350759	41	1	5	1.38
350539	33,37	3	1/8	.60	350763	3	2	3	.80
350541	13	2	1/8	.22	350764	7	1	16	2.48
350542	33	1	28	2.67	350768	13	1	1/4	.22
350543	5	1	1/2	.99	350769	45	1	1/4	.25
350547	21	2	19	6.19	350770	45	1	1/16	Free
350548	9	1	35	7.43	350771	5,14,33,37	10	1/8	.03
350549	9	1	35	7.43	350773	3,7,13,23,29,30,39,41	25	1/8	.11
350550	9	1	40	8.72	350774	21	2	3/4	.50
350556	43	2	12	2.59	350778	5,14	4	1/8	.06
350558	43	1	4	1.65	350779	27	6	1/8	.39
350559	43	1	13	1.27	350802	39	1	8	2.09
350578	43	1	2	2.72	350804	7	1	12	2.75
350579	43	1	1	2.15	350806	37	1	1/8	.33
350582	43	1	1	1.84	350809	9	7	1/4	.06
350583	43	1	1	2.34	350819	19	3	1	.19
350584	43	1	1	2.34	350820	19	2	1	.28
350585	43	1	2	2.75	350821	19	4	1	.28
350594	27	1	66	11.08	350829	43	1	135	16.72
350595	27	1	66	11.44	350830	43	2	1/4	.47
350596	27	1	40	6.35	350831	43	2	4	1.16
350597	27	1	40	5.83	350832	43	2	1	.77
350598	27	1	59	11.58	350833	19	36	1/8	.03
350613	38	1	1	1.79	350841	30	1	8	1.49
350619	33	2	7	3.49	350846	43	1	1/4	.39
350620	44	1	7	3.08	350859	23	1	1/2	.61
350646	29	1	6	3.03	350870	33	1	27	3.66
350648	21	2	1	2.04	350880	35	2	55	13.17
350650	13	1	44	17.16	350895	37	1	7	5.12
350652	5,13	2	44	20.30	350896	37	1	5	4.68
350653	27	1	2	1.65	350900	37	1	1/4	.58
350654	29	1	1/2	1.38	350902	37	1	1	.55
350656	17	2	6	3.30	350914	31	8	2	3.80
350657	17	2	1	.63	350915	31	8	1	2.64
350658	9	2	3/4	1.10	350921	38	1	8	2.61
350667	23	1	9	5.01	401047	5,13,33,37	5	4	3.30
350710	35	2	3/4	.63	424203	45	1	3	6.75
350714	43	1	2	1.84	424269	14	1	1/8	.06
350718	19	2	1/2	.58	425382	5,13,33	6	1/8	.06
350720	29,30	2	3	.74	425495	21	1	19	6.19
350721	29	1	5	1.07	425871	43	1	27	5.50
350722	29	1	5	1.07	426260	45	1	9	1.49
350723	29	1	2	1.24	426261	45	1	12	1.93
350724	29,30	2	2	1.24	522140	37	1	1/8	.11
350725	30	1	2	.77	551297	19	2	13	3.80
350728	41	1	5	1.38	551310	19	2	1	.39
350729	41	1	6	2.34	551313	19	1	6	1.79
350731	23	1	1	.50	551348	43	2	4	.96
350732	23	1	1/2	1.49					

SEC. 12 - NUMERICAL INDEX

Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price	Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price
551349	43	2	2	.52	DP745	29	1	3/4	.28
551350	43	2	2	.52	DP757	29	2	1/4	.19
551406	3	1	4	1.32	DP790	30	1	7	8.80
551409	3	1	2	.77	DP828	9	2	3	1.93
551428	30	1	5	3.41	DP830	9	1	1	.47
551463	43	2	2	1.05	DP836	5	1	1/4	.55
551488	43	1	3/4	.25	DP853	3	1	2	.55
661314	23	2	1	2.75	DP942	3	2	2	.44
661395	33	2	3	3.30	DP973	23,29	3	1/8	.08
661658	7,39,41	6	1/2	1.38	DP993	23,29	3	1/8	.08
661693	37	1	17	10.04	DP994	29	1	1/8	.06
661731	5,13	2	1	1.93	DP1021	45	1	2	.69
661739	13	1	15	14.74	DP1092	3	1	25	4.76
661791	37	1	7	5.83	DP1116	39	1	17	3.60
671693	33	2	17	9.35	DP1176	3	1	1/2	.39
671729	5	1	5	4.95	DP1186	21	2	3/4	1.61
671730	5	1	2	3.91	DP1249	19	1	14	4.57
671837	33	2	3	3.74	DP1282	13,37	3	1/8	.06
691408	5	1	30	16.12	DP1304	10,29,30	3	3/4	1.24
691727	5	1	16	19.64	DP1305	10,29,30	6	1/2	1.49
AA747	21	2	1/2	.44	DP1309	5,13,33,37	10	1/2	1.54
AA813	33,37	2	6	7.48	DP1312	5,13,34,37	5	2	1.65
AA869	13	1	9	6.60	DP1330	5,13	2	1/8	.11
AB813	5,13,33	3	6	7.48	DP1333	5,13,37	3	1/2	.55
AB1239	9,27	12	1/2	.44	DP1367	17	2	4	4.57
AB1463	10,29	2	32	11.00	DP1408	38	1	1	3.30
AB1483	33	2	4	3.52	DP1409	38	1	1	1.54
BP552	25	1	51	5.25	DP1413	25	6	1	1.10
BP553	25	1	51	5.25	DP1416	38	1	1/8	.06
BP5525	25	1	53	5.85	DP1432	19	1	11	8.09
BP5535	25	1	53	5.85	DP1433	17	8	1/4	.11
CRP105	7	1	1/8	.03	DP1436	3	2	1	.25
D62	3	1	10	5.50	DP1469	45	1	4	1.29
D299	38	1	4	4.95	DP1470	45	1	1/2	.25
DA317	29	1	1/2	1.24	DP1523	7	1	2	1.10
DA318	29	1	10	7.37	DP1526	41	1	7	1.46
DA366	29	1	1	.88	DP1551	5,13,33,37	10	1	3.30
DA392	7	1	4	1.35	DP1552	5,13,33,37	10	1/2	1.54
DA401	3	1	83	18.89	DP1553	10,29,30	6	1/4	2.85
DA411	44	1	10	3.91	DP1554	10,29,30	6	1/2	1.28
DA446	39	1	3	3.85	DP1597	38	1	1/8	.10
DA494	29,30	2	6	6.27	DP1620	41	1	8	1.65
DA513	9	1	8	4.29	DP1644	45	1	1/4	.30
DA552	3	1	10	7.54	DP1645	45	1	1	.58
DA588	17	4	2	2.86	DP1648	5	1	1/4	1.10
DA590	19	6	1	1.46	DP1658	17	8	1/8	.06
DA644	29	1	4	2.37	DP1659	19	12	1/8	.06
DP273	3	1	1/4	.33	DP1764	44	2	1/4	1.10
DP411	45	1	1	.58	DP1780	29,30	2	1	.77
DP443	45	1	1	.58	DP1796	7	1	1/8	.88
DP621	7,13,23,29,30,39,41	44	1/8	.14	DP1922	5	1	1/8	.19
DP622	23	1	1/8	.14	DP1946	3	1	1/8	.61
DP623	7	1	1/8	.14	EP542	27	2	1/4	.28
DP730	21	2	3	1.46	GA227	19	1	12	11.47
DP732	10,29	2	8	8.80	GP344	44	2	1/4	1.10
DP734	10,29,30	6	1/8	.11	JP361	19	4	1/4	.08
DP736	10,29,30	3	1/8	.19	JP444	25	2	1/8	.17
					KL70	3	1	71	26.81

SEC. 12 - NUMERICAL INDEX

Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price	Part No.	Page No.	Pcs. Per Mach.	Unit Wt. Lbs.	Unit Net Price
KA254	10	1	6	3.66	2P626	3	1	1/2	.39
KA361	17	2	24	17.30	2P700	7	1	6	1.98
KA456	19	1	18	13.67	2P782	23	3	1/8	.19
KA505	29	1	5	3.99	2P783	23	2	1/2	.83
KP620	14	2	34	27.83	4A158	13	1	1	3.85
KP624	34, 37	3	1/8	.08	4A449	7, 29, 41	4	2	2.75
KP645	43	2	2	1.10	4P151	5, 13, 23	4	1/8	.06
KP651	17	1	13	2.97	4P233	45	1	1/2	.88
KP725	19	1	11	3.63	4P567	3, 5, 7, 9, 13, 17, 19, 23, 27, 29, 30, 31, 33, 35, 37, 39, 41, 43	61	1/8	.05
KP726	19	8	1/4	.06					
KP729	13	1	8	2.26					
KP730	14	2	1/2	.44					
KP731	14	2	1	.39					
KP759	3	1	20	7.12	4P568	5, 7, 9, 13, 17, 19, 23, 29, 30, 33, 43	16	1/8	.10
KP760	3	1	1/4	Doz.. 33					
KP763	19	1	13	10.97					
KP805	10	1	1/8	.27	4P604	37	1	1/8	.08
KP1209	38	1	1	.88	4P929	9, 27	4	3/4	.44
KP1239	17	7	18	3.16	4P930	9, 27	4	1/2	.17
KP1278	29	1	6	.88	4P1128	33	2	1/2	.47
PP1058	38	2	1/2	.61	4P1218	7, 38	2	1/2	.61
PP1061	38	3	2	4.13	4P1221	7, 29, 30, 38	4	1/8	.03
PP1080	38	3	1/8	.14	4P1447	41	1	12	1.65
PP1114	38	1	1/8	.03	4P2536	23	2	1/8	.06
PP1115	38	1	1/8	.06	5A395	7, 23, 29, 30, 39, 41	13	2	2.67
PP1146	38	1	1/8	.06					
PP1213	38	1	2	1.40	5A396	23, 39, 41	4	3	3.03
PP1215	38	1	1	1.40	5P1575	23, 39, 41	4	1/8	.06
PP1217	38	1	2	.96	5P1822	37	1	1/8	.61
PP1218	38	2	2	.88	8P465	25	2	1/4	.25
PP1262	38	1	3	4.79					
1P414	9	2	1/4	.22					
1P450	14	1	1/8	.03					

PART NUMBERS, PRICES AND WEIGHTS OF STANDARD HARDWARE ITEMS

Note: Part numbers, prices, and weights of all bolts includes one nut.

Part No.	Page No.	Pcs. Per Mach.	Approx. Wt. Lbs. Per 100	Net Price Per 100	Part No.	Page No.	Pcs. Per Mach.	Approx. Wt. Lbs. Per 100	Net Price Per 100
900019	29	6	2	1.50	900132	43	4	35	14.10
900023	5	6	3	1.90	900169	37	2	132	55.00
900040	43	4	5	2.10	900577	19	6	24	10.35
900042	5, 13, 31, 33, 37, 38	68	5	2.30	900613	5, 13	2	20	20.92
900044	5, 13, 14, 33, 37	25	6	2.50	900614	10, 29, 30	3	65	28.40
900049	38, 43	10	8	3.30	900625	5, 13, 33, 37	5	73	34.00
900053	14	2	11	4.70	900626	33, 37	3	17	8.30
900076	5, 13, 23, 37	35	12	5.50	900665	5, 9	11	3	.80
900078	23	2	13	5.90	900667	9	4	6	1.20
900113	37, 38	8	23	9.80	900669	37	2	11	4.60
900114	5, 13, 33, 37	36	27	10.40	900676	7	1	12	4.60
					900715	13	4	3	1.40
					900717	17, 23	26	9	1.70
					900721	3, 17	6	14	12.50

SEC. 12 - NUMERICAL INDEX

Part No.	Page No.	Pcs. Per Mach.	Approx. Wt.Lbs. Per 100	Net Price Per 100	Part No.	Page No.	Pcs. Per Mach.	Approx. Wt.Lbs. Per 100	Net Price Per 100
900723	19	1	16	19.00	901550	3,9,27,			
900760	5	6	1/2	.35	901552	30,38,43	38	9	4.20
900761	5,13,14 31,37,38, 43,44	101	2	.45	901554	9,25,27, 41,44	9	7	5.50
900763	5,10,13, 23,27,29, 30,33,37	109	2	1.00	901560	19,33,37 9,17,23, 27,33,37	9	6	4.20
900765	3,5,9,13, 27,30,33, 37,38,43	104	4	1.50	901562	3,21	31	13	6.00
900767	9,27,33, 37,43	36	9	2.60	901563	19,29	4	18	8.40
900768	3,14,21, 43	20	11	4.25	901564	5,13	10	18	8.40
900769	3,9,13, 23,34,35, 37,43	39	12	6.00	901568	3,14,21, 43	2	9	6.00
900835	43	2	8	2.65	901570	21	11	20	9.00
900919	29,30	4	19	5.30	901576	21 3,7,9, 13,23, 35,43	2	20	12.00
900920	27,30	5	21	5.60	901578	43	3	29	13.00
900922	10	5	21	5.60	901580	5,10,13, 29,30, 33,34,37	1	24	17.00
900923	29,30	10	23	5.95	901594	9	11	19	13.00
900998	38	2	38	9.50	901595	5	1	59	32.00
901000	27	6	38	9.50	901596	3,17	1	59	32.00
901002	27	2	42	9.90	901610	17,19	6	41	24.00
901003	30,43	7	46	10.30	902156	7,13,23, 29,30, 39,41,44	5	88	54.00
901010	3	1	66	12.40	902158	23,29, 37,44	93	1/2	.15
901015	27	6	75	13.25	902192	3,21,25, 27,29, 41,44	7	1	.20
901017	27	6	79	13.65	902194	38,41	15	3	.35
901020	9,27	4	88	14.50	902195	9,19	3	3	.40
901042	9	4	56	12.35	902196	43	11	1	.45
901043	37	2	61	12.90	902197	3	1	4	.65
901044	9,17,27	12	62	12.90	902213	21	2	4	.85
901047	23	5	74	14.00	902214	5	2	4	.55
901054	33	4	111	16.70	902216	9	1	5	1.00
901057	9	2	117	17.25	902231	3	1	5	1.10
901062	27	2	129	18.85	902248	9	1	6	1.45
901084	43	3	91	19.60	902249	17,19,27	2	8	2.10
901125	43	1	190	34.85	902422	13,33	7	9	2.25
901128	3	1	204	35.80	902450	29	24	44	8.25
901138	23	2	282	41.55	903001	13,23,38	1	8	1.85
901285	13	8	139	28.15	903002	5,10,23, 29	4	2	3.00
901301	43	4	7	2.85	903005	5,13,33, 37	7	3	3.00
901311	25	20	29	12.10	903103	44	7	9	6.00
901313	25	4	33	12.90	903104	23	1	1	.15
901372	44	2	13	2.90	903105	41	1	4	.25
901390	44	2	11	2.40	903106	21	1	8	.45
901516	44	2	4	.80	903107	41,43	2	9	1.00
901518	43,44	10	2	1.30	903108	5	2	18	2.07
901534	10,27, 29,30	24	5	2.50			1	28	3.08
901535	37	2	5	2.50					
901536	23,29,44	5	4	3.10					
901538	19	1	4	2.50					
901548	25	24	15	2.80					

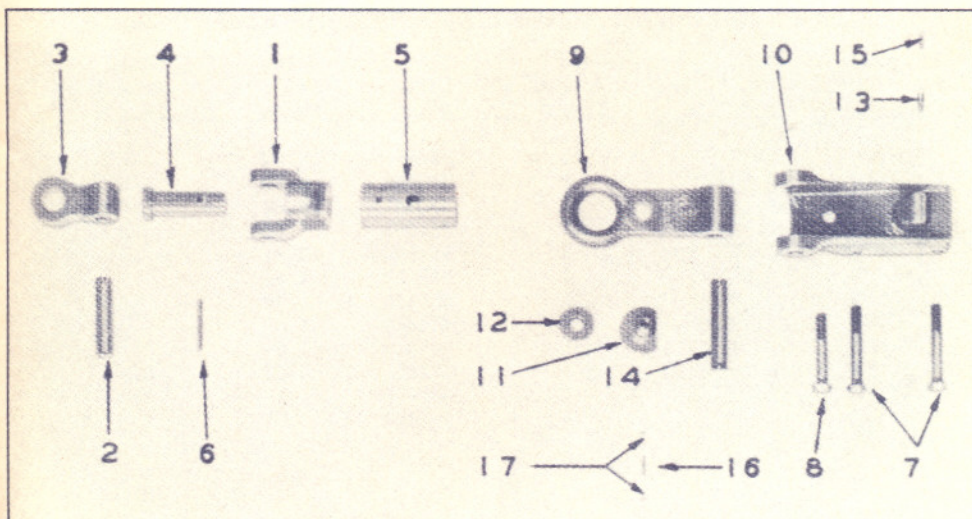
Supplement to TM5-1036 Technical Manual for Adams Model 104 Grader covering changes and additions necessary to adapt the TM5-1036 Manual for use with Adams Model 104-S Graders furnished Corps of Engineers on purchase order No. 20-1046 (Former No. CI-1923) Manufacturers serial Nos. 1350 to 1407, Incl.

STEERABLE TONGUE HITCH

Parts used on 104
Grader as shown on
pages 2 and 3

Corresponding parts
used on 104-S Grader
illustrated below

Ref. No.	Part No.	No. Used	Description	Ref. No.	Part No.	No. Used
13	1856	1	Tongue yoke	1	2274	1
14	551409	1	Drilled pin	2	152278	1
15	1855	1	Tongue eye	3	1896	1
16	551406	1	Tongue pin	4	351127	1
17	KP759	1	Shear socket	5	351126	1
18	KP760	1	Shear pin	6	Same as 104	
19	DP942	2	Special bolt	7	152379	2
23	330225	1	Pull pipe	8	152380	1
None used			Lunette	Not illustrated	330447	1
None used			Lunette lock bracket	9	2275	1
None used			Swivel lock	10	2276	1
None used			Swivel lock nut	11	152382	1
None used			Lunette plunger	12	152383	1
None used			Lunette pin	13	152384	1
None used			Lunette spring	14	424430	1
None used			Lunette compression spring	15	425088	1
None used			Lunette ball	16	5P1455	1
None used				17	5P1456	2



19 MRT. 1958



Added parts used only on the Model 104-S

Part No.	Description	No. Used
----------	-------------	----------

BLADE CARRYING BRACKETS

(Attached to rear axle)

330445	R.H. blade carrying bracket	1
330446	L.H. blade carrying bracket	1
901000	Hex head machine bolt 5/8" x 2" N.C.	6
901550	Hex nut 5/8" N.C.	6
900765	Lock washer 5/8"	12
152388	Blade stop block (for above brackets)	2
901044	Hex head machine bolt 3/4" x 2-1/2" N.C.	2
901560	Hex nut 3/4" N.C.	2
900767	Lock washer 3/4"	2
903106	Cut washer 3/4"	2

HAND WHEEL LOCKS

(Attached to rear of main frame)

530423	Hand wheel lock	2
JP293	Hand wheel lock spring	2
903104	Cut washer 1/2"	2
902158	Cotter pin 1/8" x 1-1/4"	2
351061	Block for attaching hand wheel locks (Welded to main frame)	2

LOADING LOOPS

(Welded to main frame)

152408	Loading loop (front)	2
351139	Loading loop (rear)	2

Prices and weights of parts not shown in the TM5-1036 Manual

Part No.	Unit Net Price	Unit Weight Lbs.	Part No.	Unit Net Price	Unit Weight Lbs.
1896	4.13	10	330445	6.60	20
2274	14.36	8	330446	6.60	20
2275	17.11	15	330447	18.62	123
2276	9.76	25	351061	.50	1/4
152278	1.10	3	351126	4.81	24
152379	.60	2	351127	4.95	7
152380	.58	1	351139	1.76	3
152382	5.78	4	424430	1.07	4
152383	3.19	1	425088	.30	1/16
152384	1.10	1	JP293	.14	1/8
152388	.55	1	5P1455	.19	1/8
152408	1.76	3	5P1456	.03	1/8
330423	1.51	2			