

0 R 1725-8
Installation and Operation
Instructions

for

CATERPILLAR

REG. U.S. PAT. OFF.

NO. 4S
BULLDOZER

Straight Blade — Hydraulic

100
Serial Numbers

44" Gauge 2A 1001-up

60" Gauge 4A 2001-up

2600100
CATERPILLAR TRACTOR CO.

PEORIA

ILLINOIS

U. S. A.

Avoid Accidents

Most accidents, whether they occur in the air, in industry, on the farm, at home, on the highways, or at sea, are caused by someone's failure to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A careful operator is the best insurance against an accident.

The complete observance of one simple rule would prevent many thousands of serious injuries each year. That rule is: "Never attempt to clean, oil or adjust a machine while it is in motion."

Foreword

"Caterpillar" products are a combination of advanced engineering, skilled manufacturing, and the finest materials metallurgical science can select. Thousands of satisfying, economical working hours are built into each machine.

Whether or not the owner derives the maximum of service from his machine depends largely on the care exercised in its operation and maintenance. This book is written to give the operator essential information regarding the day-to-day operation, lubrication and adjustment of the machine. Careful adherence to these instructions will result in assured economy.

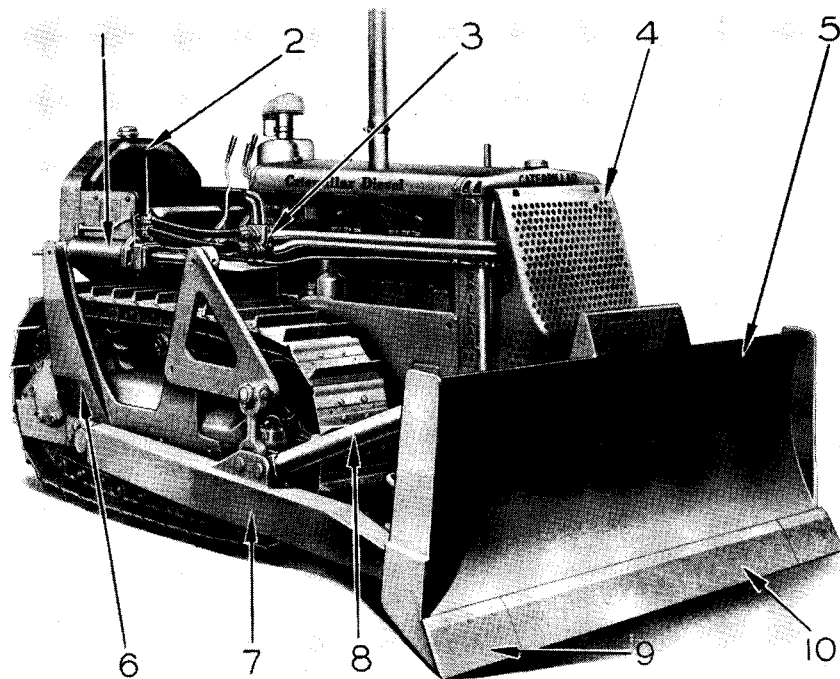
A great many "Caterpillar" owners depend upon their dealer for service other than the care and adjustments described in this book. This practice is recommended because "Caterpillar" dealers have stocks of genuine "Caterpillar" parts and are equipped with tools designed and built by "Caterpillar". Their servicemen are factory-trained and are kept closely informed by the factory regarding advanced methods of servicing "Caterpillar" products — thus, in all ways they are equipped to render the best of service.

Table of Contents

	Page
INTRODUCTION	4
INSTALLATION INSTRUCTIONS	5-13
Bulldozer Cross Pipe Installation — Hydraulic Control Guard Installation — Bulldozer Group Installation — Installing the Hydraulic Cylinder Group — Installing the Bulldozer Blade Group	
LUBRICATION INSTRUCTIONS	14-17
General Lubrication Information — Crankcase Lubricat- ing Oil — Ball and Roller Bearing Lubricant — Lubrica- tion Chart	
OPERATION INSTRUCTIONS	18-21
Preparation for Use — Bulldozer Operation — Daily Care — Operating Adjustments	
MAINTENANCE INSTRUCTIONS	22-27
Trunnion Assembly — Ball and Socket — Cutting Edge and End Bit Replacement — Care of the Hydraulic Sys- tem — Track Adjustment	
INDEX	28
CAPACITIES	Inside Back Cover
LOCATION OF SERIAL NUMBER	Inside Back Cover

NO. 4S BULLDOZER MOUNTED ON D4 TRACTOR

1. Hydraulic cylinder.
2. No. 44 hydraulic control lever.
3. Crossover valve.
4. No. 44 hydraulic control pump guard.
5. Blade.
6. Trunnion assembly.
7. Side arm.
8. Tilting brace.
9. End bit.
10. Cutting edge.



T12166

Introduction

The hydraulic system is designed to give long life when operated with clean oil. Special attention is given during manufacturing and shipping at the factory to insure an absolutely clean system.

The metal parts of the hydraulic system are treated with a special acid solution to remove any dirt, scale or abrasive material, then a corrosion resistant coating is applied to guard against undesirable oxidation. Suitable covers are used for shipping to cover the openings of the hydraulic control, cylinders, hoses and lines to exclude dirt and moisture. Keep the covers so they can be used again to protect the openings in the hydraulic system if the equipment is disassembled or removed for any reason.

To obtain maximum service, cleanliness must be the rule. Be careful to avoid introducing dirt into the hydraulic system when installing, filling with oil and replacing lines or hoses during any maintenance operation.

Retighten the clamp bolts on all hose connections about two weeks after the hose is placed in service so there will be compensation for the initial set of the rubber and a tight joint will result.

"KEEP IT CLEAN"

Installation Instructions

The bulldozer may be partially mounted on the tractor at the factory or it may be shipped not installed and processed for shipping. If it is received disassembled and processed for shipping the dirt sealing and rust proofing applications should be carefully removed.

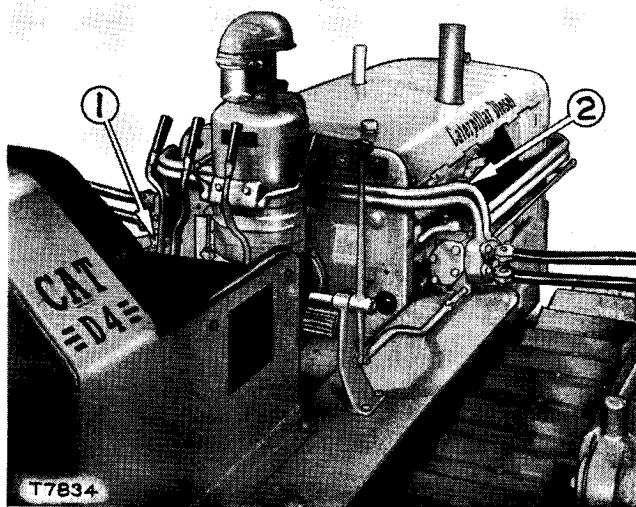
BULLDOZER CROSS PIPE INSTALLATION

This group can be installed on the tractor after the installation of the hydraulic control, basic hydraulic pipe and control lever as instructed in the No. 44 HYDRAULIC CONTROL INSTRUCTION BOOK.

Effective With Tractors 6U1 and 7U1: Remove the cover from the right side of the crossover valve and clean off any sealing materials, dirt or paint from around the openings in the cross pipe connections. Remove the entire air cleaner from the air inlet pipe by removing the four stud nuts at the connection. Insert the ring seals in the grooves in the crossover valve and fasten the cross pipe (2) to the valve by clamping it between the hydraulic hose flange connections and the crossover valve. A light coating of grease on the seals will hold them in the grooves.

When the adapter plate is furnished on the cross pipe it should be placed between the hose flanges and cross pipe with seal toward the cross pipe.

Fasten the bracket (1) to the left end of the cross pipe and drill one 13/32 inch (10.3 mm.) hole in the left fender using the bracket for a



CROSS PIPE INSTALLATION

1—Bracket. 2—Cross pipe.

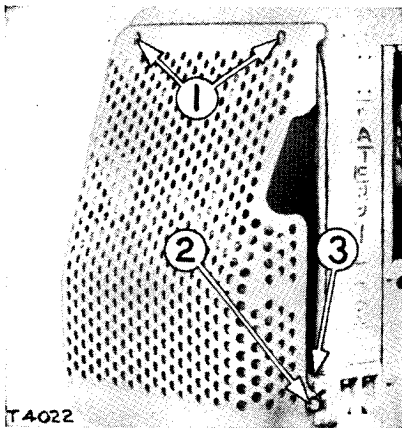
templet. Fasten the bracket to the fender with bolt lock washer and nut supplied with the group. Reinstall the air cleaner.

Tractors Before 6U1 and 7U1: Installation is the same as for the above tractors except that the Diesel engine air cleaner does not have to be removed.

HYDRAULIC CONTROL GUARD INSTALLATION

The pump guard is furnished with the hydraulic control for bulldozer application and is available as an attachment for other applications.

Remove the capscrews which hold the radiator screen to the radiator top tank and raise the pump guard into position. Insert capscrews (1) through the guard, spacer and screen then fasten them securely to the radiator top tank. Insert the capscrews (2) through the side of the guard into the brackets (3) and tighten them.



PUMP GUARD INSTALLATION

- 1—Capscrews. 2—Capscrew fastening pump guard to bracket.
3—Mounting bracket.

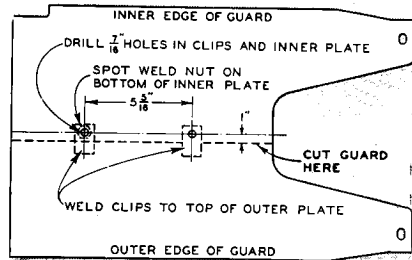


BULLDOZER GROUP INSTALLATION

Installing The Support Group: The trunnion assembly (2) mounts on the track roller frame outer channel. Clean the mating surfaces of the frame channel and the trunnion assembly. On tractors after 2T8270 remove the screws which hold the track roller frame rear guard plate to the track roller frame outer bearing. Lift the trunnion assembly into position installing and tightening the eight screws (3 and 4) as tight as possible.

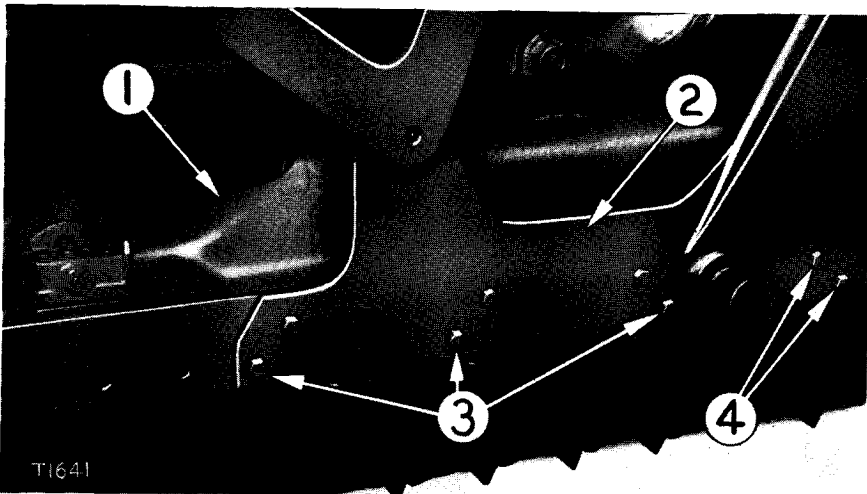
On tractors before 5T6473 remove the guard (1) over the track adjusting screw and rework the guard as shown. Remove the front three track rollers and hold the tapping strips (three for each side) on the inside of the track roller frame outer channels as the trunnion assembly fastening screws (3) are installed and tightened. These strips can be welded into

TRACK ADJUSTING SCREW GUARD REWORKING DRAWING



T1660

place after the screws are tightened with four $\frac{3}{8}$ inch (9.5 mm.) fillets $1\frac{1}{2}$ inch (3.8 cm.) long at the ends on both sides of the strips. The tapping strips for screws (4) are already in the frames.



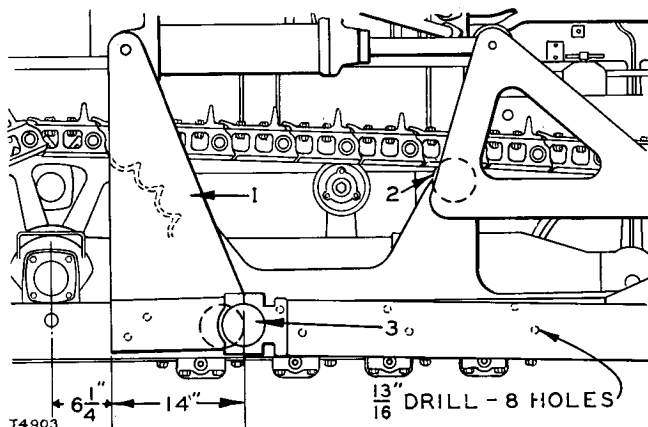
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SUPPORT GROUP INSTALLATION

1—Track adjusting screw split guard. 2—Trunnion assembly. 3—Screw (later tractors have tapping strips in place). 4—Screw (all tractors have tapping strips in place).

Rework Track Roller Frame On Earlier Tractors To Install Support Group: On tractors before 7J7319 without holes in the track roller frames, locate trunnion assembly (1) $6\frac{1}{4}$ inches (15.875 cm.) from the center of the track roller frame outer bearing as shown. Drill $\frac{13}{16}$ inch (20.6 mm.) holes in each frame using the trunnion assembly (1) and inner plate (2) for a template. It will be necessary to weld nuts or tapping strips on the back side of the channels.

On all tractors before 7J5104, remove the trunnions (3) from the trunnion support and weld two inches forward of the original position. This will give a distance of 14 inches (35.56 cm.) from the rear of the trunnion assembly (1) to the center of the trunnion (3) as shown.



TRACK ROLLER FRAME REWORKING INFORMATION

1—Trunnion assembly. 2—Inner plate. 3—Trunnion.

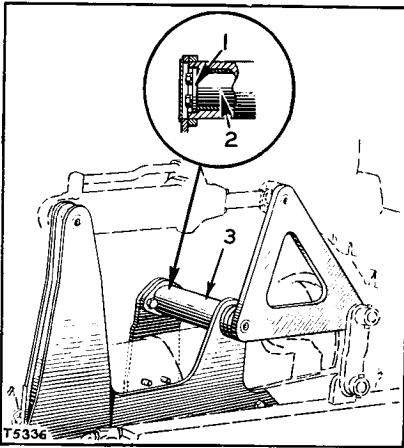
If the tractor is equipped with two carrier rollers for each track it will be necessary to move the forward rollers to the rear far enough to provide clearance for the inner plate assembly (2).

Complete the remainder of the installation as instructed for later tractors.

Assemble The Crank And Trunnion Assemblies: Remove all paint from the seal counterbore in the tube assembly (3) and clean the dirt or paint from the tube bushings and bore. Fill the grease cavity between the two bushings in the tube, a 1/4 inch (about 5 mm.) thick coating should be sufficient. Install a lubricant fitting in the tapped opening in the crank assembly and force lubricant out of the opening in the middle of the shaft (2). Clean the outside of the shaft of any paint or dirt and install the dust seal (4) on the shaft with the lip turned to the outside. Avoid damaging the seal when starting it over the end of the shaft.

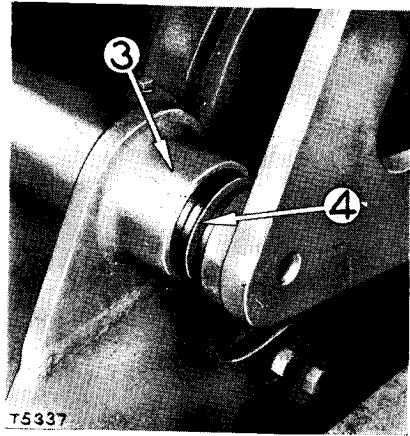
Insert the shaft in the tube and drive the seal into place. Fasten the retainer (1) on the end of the shaft with the lock washers and capscrews. The inner plate (5) should be installed with the end of the tube assembly (6) in the counterbore of the plate. Install the four capscrews (7) which hold the plate to the track roller frame inner channel and the two lock washers and capscrews (8) which fasten the tube assembly to the plate. Tighten all six capscrews and check them regularly to see that they are tight. Install the track rollers and guard.

On tractors from 7J7319 to 5T6473 drill four 13/64 inch (20.6 mm.) holes through the track roller frame inner channel using the holes in the plate



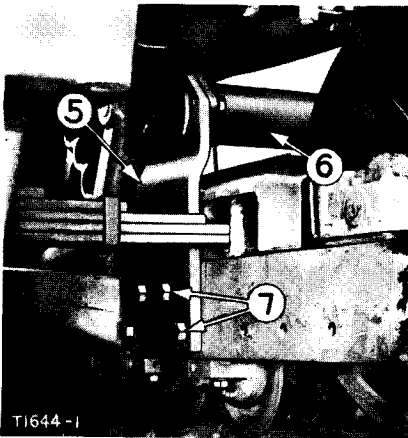
CRANK ASSEMBLY INSTALLATION

1—Retainer. 2—Shaft. 3—Tube assembly.



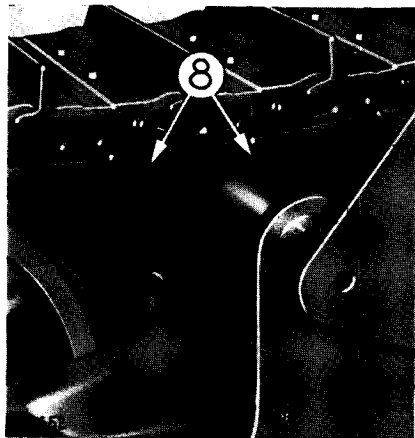
INSTALLING SEAL IN TUBE

(5) for a template. The tube assembly should center in the counterbore of the plate (5). Install the lock washers and capscrews (8) and tighten them. Drill the four holes. Hold the tapping strips in position on the inside of the track roller frame inner channel as the four screws (7) are installed.



INNER SUPPORT PLATE

5—Inner plate. 6—Tube assembly.
7—Capscrews.



TUBE ASSEMBLY FASTENED TO

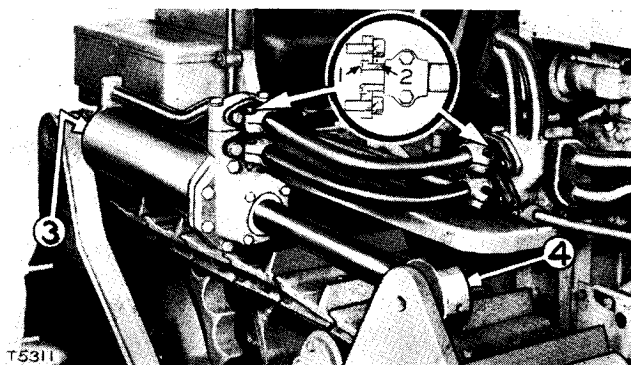
THE INNER PLATE
8—Capscrews.

INSTALLING THE HYDRAULIC CYLINDER GROUP

Place the hydraulic cylinder on the pins (4) of the crank assembly and pins (3) of the trunnion assembly. Install the retainers, lockwashers, and capscrews which hold the cylinders in place. Install the other cylinder, remove hose covers and clean off any sealing material, dirt or paint from around the openings in the hoses and cylinders. Remove plates from the cylinder hydraulic hose connection openings.

Place the seal (1) in the groove in the stem (2). Connect the hose from the cross pipe top opening to the top opening on the cylinder. The other hose connects to the cross pipe lower opening and cylinder lower opening.

Fill the Hydraulic System With Oil: See topic, LUBRICATION INSTRUCTIONS.

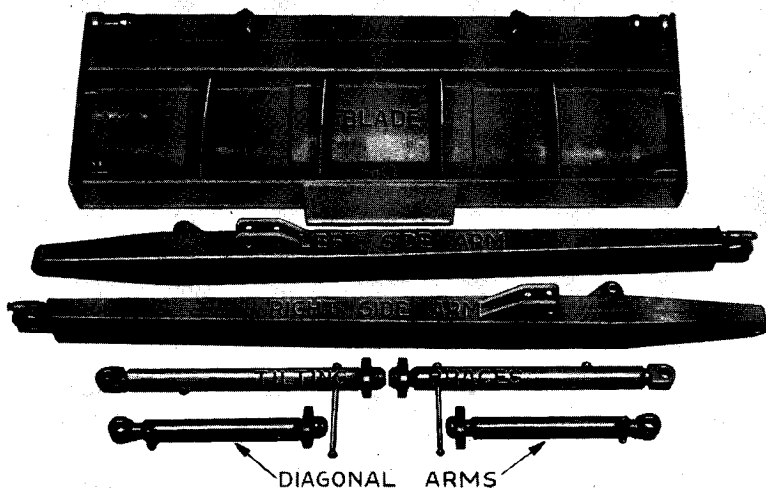


HYDRAULIC CYLINDER GROUP

1-Seal. 2-Stem. 3-Trunnion assembly pin. 4-Crank assembly pin.

INSTALLING THE BULLDOZER BLADE GROUP

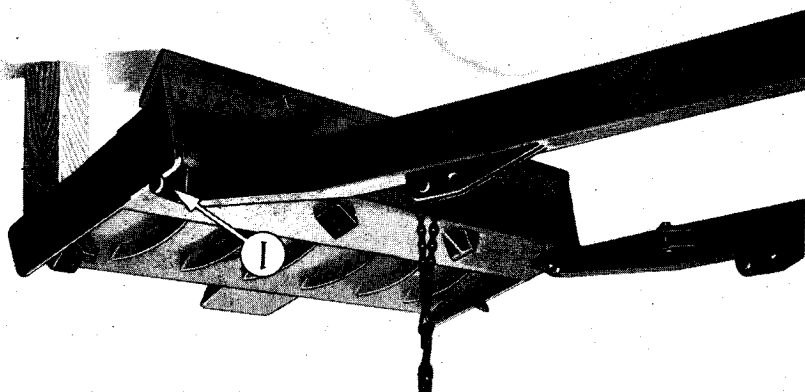
Assembling The Blade Group: Assemble the bulldozer blade group before installing it on the tractor.



BULLDOZER BLADE GROUP READY FOR ASSEMBLY

Raise the top of the bulldozer blade and block it securely as illustrated. Lift the side arms and place them in position as shown. Insert pins (1) and lock them with lock pins and cotter pins.

Put a chain or cable in each handle holding eye at the ends of the blade. Lift the blade with a hoist, hold in an upright position, and install the blade tilting braces.



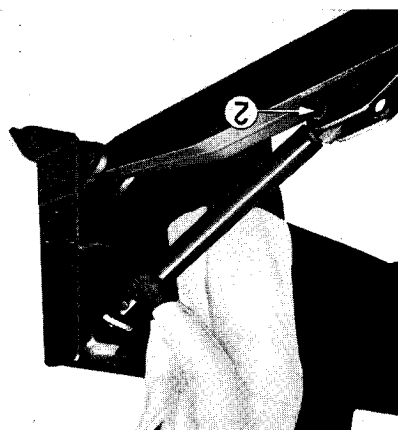
ASSEMBLING SIDE ARMS TO BRACE
1—Pin.

Insert pin (2) at the lower end of the tilting brace and fasten it with a lock pin and cotter pin. Lubricate the threads on the eyebolt and the ball and socket before installation.

Assemble the socket cap (4) of the blade tilting brace to the blade without shims (3) and tighten the capscrews evenly. Measure the existing space with the shims as illustrated and add one shim to provide clearance. Remove the socket cap and fasten the shims in place with screws

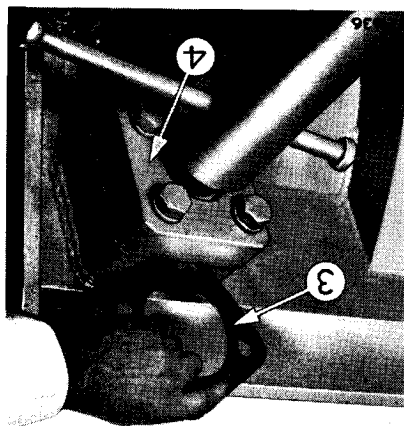
INSTALLING BLADE TILTING BRACE

2—Tilting brace pin.



MEASURING SPACE BETWEEN SOCKET AND SOCKET CAP

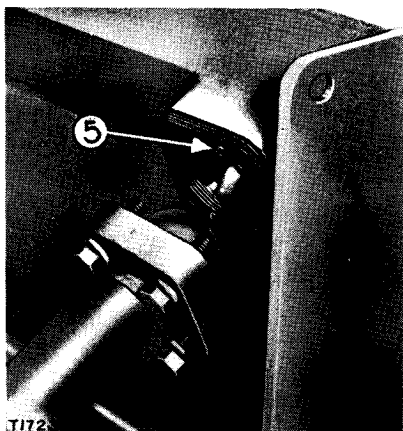
3—Shims. 4—Tilting brace socket cap.



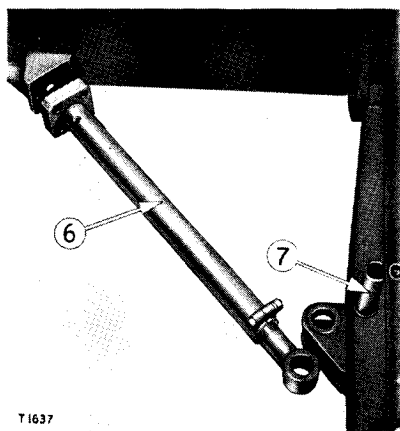
(5). Reinstall the socket cap so the shim screws fit in the counterbores. There must be clearance enough for the ball to move freely in the socket.

The diagonal arm (6) can be installed using the same procedure. Lubricate the sockets and adjusting threads before installation.

The diagonal arm ball and socket joints may be set tighter than the blade tilting brace socket joints and may be checked by moving them



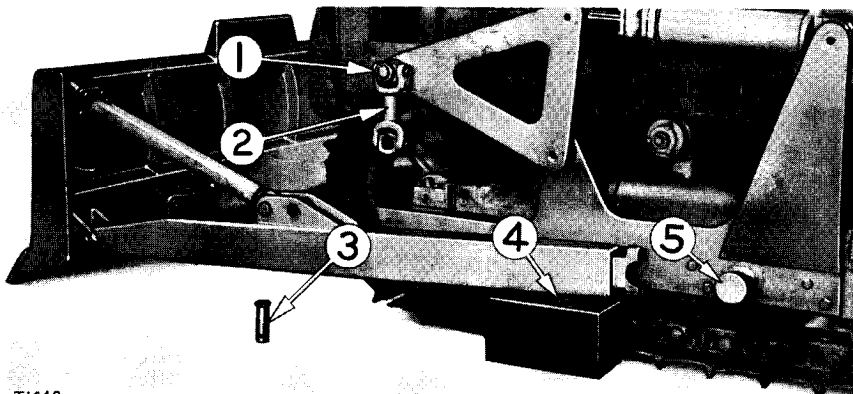
TILTING BRACE BALL AND SOCKET
5—Shim retainer screw.



DIAGONAL ARM INSTALLATION
6—Diagonal arm. 7—Diagonal arm pin.

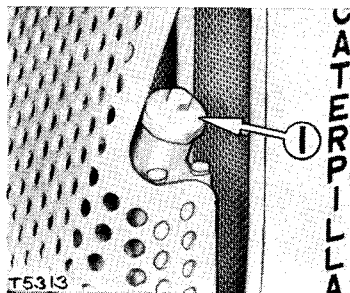
in their sockets. Do not install the pins (7) connecting the diagonal arms to the side arms until later. The function of the diagonal arms is to locate and hold the bulldozer blade and side arms evenly on the tractor.

Installing The Blade Group: Place blocks (4) under each arm just forward of the trunnion bearings.



INSTALLING BLADE GROUP
1—Collar. 2—Link. 3—Pin. 4—Block. 5—Trunnion.

CO Crankcase Lubricating Oil



HYDRAULIC CONTROL TANK

Check oil level every 60 hours when oil is warm and after the blade has been lowered to ground at full engine speed. Clean dirt from around filler neck cap (1) and remove cap. Oil level should be visible in filler neck.

DRAINING TANK

Every 900 hours drain the hydraulic system. Drive the front of the tracks up on 6" blocks so the pistons can move a complete stroke, completely raise the blade and block behind the tracks to prevent the tractor rolling. Stop the engine, loosen the oil filter plate (3) to relieve the pressure in the tank by allowing oil to drain.

Remove the drain plugs (2) and the filler neck cap. Remove the blocks from under the side arms and move the control lever forward to lower the blade. This will satisfactorily drain the system. Clean the magnetic drain plugs and be sure the ring seals are in place before installing the plugs.

OIL FILTER

Remove the filter element (4) at each oil change. Replace the element with a new element each time the oil is drained. Replace a damaged seal with a new one.

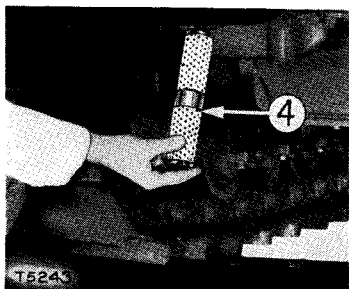
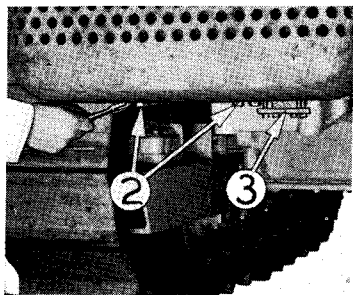
Effective with hydraulic controls 6W6048, 7W608, 8W5008 and 9W364 an element with a perforated metal cover is used. Earlier controls use an absorbent yarn type element.

FILLING HYDRAULIC SYSTEM

Fill the control tank with oil and install the filler neck cap loosely. Start the engine and run it at half speed. Pull back and hold the control lever until the blade begins to rise. Again fill the tank with engine running low idle speed. Install the cap loosely.

Raise the blade and hold the control lever in "hoist" position for five seconds. With the engine running at full governed speed lower the blade through full cylinder stroke, then raise the blade completely and back the tractor off the blocks. Lower the blade to the ground and fill the tank again.

Check to see that the filler neck cap gasket is in good condition and install the cap tightly.



Careful attention was given to the design of the hydraulic system to guard against oil leaks. Connections were eliminated where possible and metal to metal joints, with rubber ring seals are used instead of the usual pipe thread joints.

Oil leaks should not be neglected as the loss of oil is an unnecessary expense as well as a possible cause of damage to the hydraulic system.

The operator should take every precaution to prevent dirt getting into the hydraulic system to extend the life of the hydraulic pump.

BALL AND ROLLER BEARING LUBRICANT (Abbreviated BR)

(BR) This lubricant is a mixture of mineral oil and metallic soaps. Use No. 2 grade for most temperatures. For extremely low temperatures use No. 0 or No. 1 grade.

This grease can be applied to all bearing points — plain bushings, ball bearings and roller bearings—where equipped with hydraulic pressure fittings or when bearings are hand packed.

Use only a high grade Ball and Roller Bearing Grease of short fiber. This grease must be satisfactory in anti-friction bearings at speeds up to 3000 RPM at a maximum temperature of 300° F. It is a grease with sufficient adhesive qualities to cling to the bearings in all extremes of high and low operating temperatures. Greases of this kind have been classified by grades by the N.L.G.I. (National Lubricating Grease Institute) designated in order of "worked" penetration or consistency.

Key To Lubricants

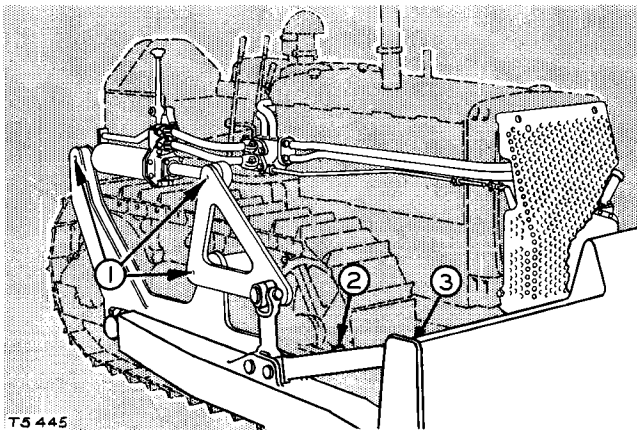
CO Crankcase Lubricating Oil.

BR Ball And Roller Bearing Lubricant.

Identification Of Points Of Lubrication, Lubricants To Apply and Interval Of Service

Point	Identification	Lubri- cant.	Every 20 HRS.	Every 60 HRS.	Every 120 HRS.	Every 900 HRS.
	Hydraulic Control	CO		X		X
1	Crank, Crank pin and Trunnion Assembly Pin Bushings	BR	X			
2	Blade Tilting Brace Threads	BR			X	
3	Blade Tilting Brace Ball and Socket	BR			X	

Location Of Points Of Lubrication



T5 445

LUBRICATION CHART

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NO. 4S BULLDOZER

Straight Blade — Hydraulic

The folded page is arranged to serve two purposes:

First, it is a complete outline of all the information required to lubricate the bulldozer.

Second, the illustration and identification of points of lubrication can be used with the detailed illustrations and information on the pages following the chart as a reference for lubrication and service information.

Lubrication Instructions

GENERAL LUBRICATION INFORMATION

Detailed instructions regarding the lubrication of the bulldozer and hydraulic control are given in the lubrication chart and in the illustrations following. The lubrication chart specifies the points to be serviced, the hourly intervals, and the type of lubricant to be used. Hourly intervals are to be interpreted as those recorded on the "Hour Meter" of the tractor. The hours indicated are for normal service. For operating conditions of extreme water, dust and mud lubricate more frequently where hydraulic fittings are used. Clean the fittings before lubricating so that dirt will not be carried in with the lubricant.

Careful attention to the following information on lubricants and their proper selection will add much to performance, economy and long life of the bulldozer.

When checking and refilling the hydraulic control, do so with the tractor on level ground.

Use the brush supplied in the tractor tool equipment when removing dirt from fittings and when cleaning around the filler opening and covers. Lubricate all miscellaneous points, not equipped with fittings, with crankcase lubricating oil every 60 hours.

The following topic recommends the types, viscosities and grades of lubricants best suited for use in the bulldozer and hydraulic control for various operating temperatures. The S.A.E. (Society of Automotive Engineers) and N.L.G.I. (National Lubricating Grease Institute) numbers refer only to the viscosity or consistency of the lubricant and has reference to no other characteristic or property.

CRANKCASE LUBRICATING OIL (Abbreviated CO)

(CO) Use **only** straight mineral crankcase lubricating oil in the hydraulic control tank. For temperatures above 0°F. use S.A.E. No. 10W oil. For temperatures below 0°F. dilute S.A.E. No. 10W oil with kerosene up to 25% to maintain fluidity.

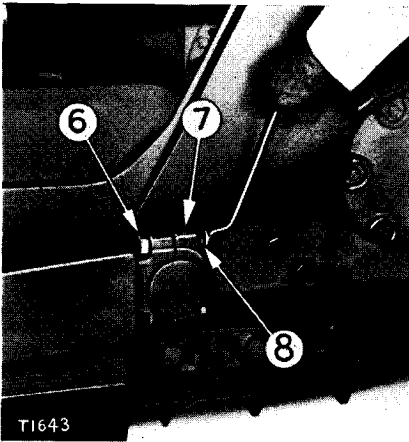
Straight mineral oil will provide a better protection to seals and hydraulic hoses and only the best quality oil purchased from a reputable manufacturer is recommended.

It is extremely important in handling the oil to keep it clean. Every precaution should be taken to use only clean filler cans and to be sure that all dirt is removed from the filler cap for the hydraulic control before it is taken off for filling.

Remove the trunnion bearing caps and drive the tractor between the side arms until trunnion journals (5) fit into the trunnion bearings.

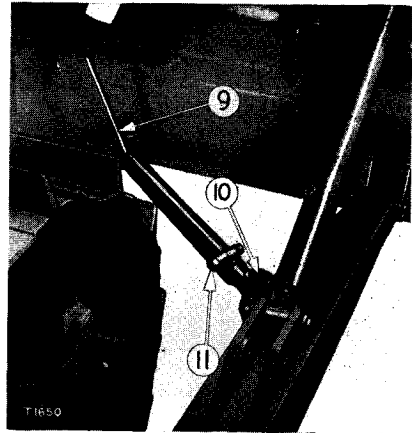
Fasten the caps (7) in place using the lockwasher (8) under the head of the bolt and the chamfer of the nut (6) toward the rear of the tractor.

Fasten link (2) to the crank assembly with collar (1), bolt, lockwasher and nut as shown. Install the pin (3) through the holes in the tilting brace bracket and in the lower end of the link (2). Fasten it with the locking pin and cotter.



**INSTALLING TRUNNION
BEARING CAP**

6—Nut. 7—Bearing cap. 8—Bolt.



ADJUSTING DIAGONAL ARM

9—Bar. 10—Hole for diagonal arm pin.
11—Clamp bolt.

Locating The Side Arms: Use a bar or hoist to space the side arms equally from each of the track roller frames.

Loosen the clamp bolt (11) on the diagonal arm and use bar (9) to adjust its length. With the pins removed, adjust the arms as long as possible still permitting installation of the pins in hole (10). This will allow more freedom for oscillation of the track roller frames and will permit tilting of the blade. Install the arm pin from under the arm bracket and fasten it with the lock pin and cotter.

Do not make the diagonal arm adjustment with the diagonal arm pin in place.

Repeat this procedure for the other arm.

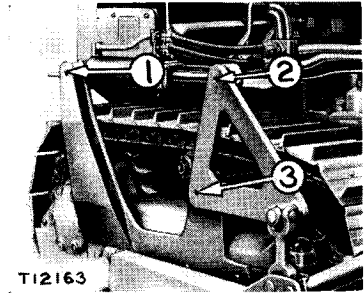
If it is possible, retain this adjustment and have the adjusting clamp bolts (11) up so they will not be damaged by rocks striking them from below. Tighten the adjusting screw clamp bolt on each arm.

BR Ball and Roller Bearing Lubricant

1

CRANK, CRANK PIN AND TRUNNION ASSEMBLY PIN BUSHINGS

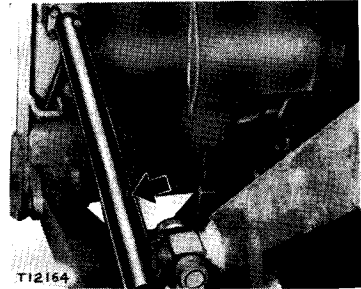
Lubricate bushings for crank assembly (3), crank pin (2) and trunnion assembly (1) every 20 hours through a fitting for each point on both sides of the bulldozer.



2

BLADE TILTING BRACE THREADS

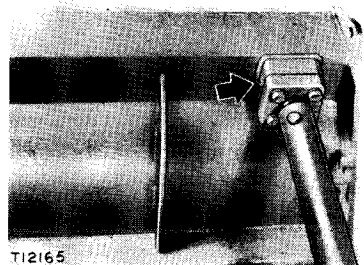
Lubricate through one fitting on each side of the bulldozer every 120 hours.



3

BLADE TILTING BRACE BALL AND SOCKET

Lubricate through one fitting on each side of the bulldozer every 120 hours.



Operation Instructions

PREPARATION FOR USE

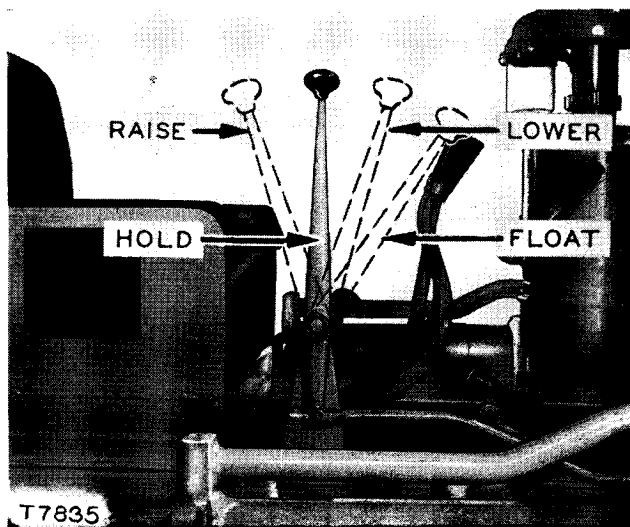
The first duty of any one charged with the care and operation of a hydraulic bulldozer is to give it a detailed inspection to see if all bolts, nuts, capscrews and pins are tight or properly locked in position. All points should be lubricated as indicated in the lubrication chart.

Check the movement of the bulldozer by raising and lowering the blade. In this manner the operator acquaints himself with the control.

BULLDOZER OPERATION

The bulldozer is operated by a front mounted hydraulic control. The control lever is located to the right and in front of the operator's seat. When the engine is running the hydraulic control is always ready to operate the bulldozer.

Control Lever: Always operate the hydraulic control with quick full movements of the control lever with the engine running at full governed speed.



HYDRAULIC CONTROL

Raise the blade by pulling the lever back. Release the lever as the blade approaches its extreme upward travel.

The blade can be held in any position by releasing the lever allowing it to return to the neutral or hold position. On later bulldozers with float position in the valve it is necessary to pull the control lever out of float position then release it to allow it to return to neutral or hold position.

Lower the blade by pushing the control lever forward until resistance is felt in the control lever. Release the lever when the blade approaches the extreme downward travel.

When the pistons have reached the limit of their strokes, either raise or lower, it will be apparent by the chattering sound caused by oil by-passing through the valves. Release the control lever as soon as the chattering sound is noticed to stop the oil by-passing the valves and also to reduce heat and wear.

Float the blade, on later bulldozers, by pushing the control lever forward through lowering position. At this point, a noticeable resistance will be felt on the lever. Continue to push it forward to the float position. The control lever will remain in float position until it is pulled back and released to return to the hold position.

Crossover Valve: The crossover valve installed on the right fender of the D4 Tractors is designed to operate with the crossover valve lever in one of two positions.

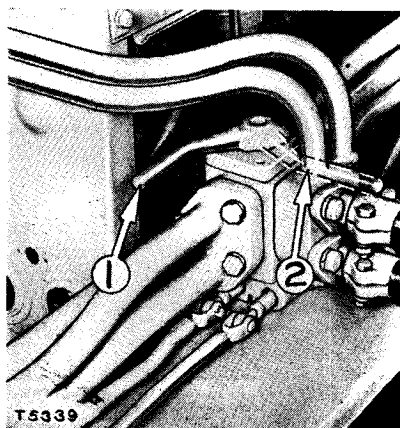
The valve lever should be turned to position (1) when operating the bulldozer or No. 42 Tool Bar. With the lever in this position the oil passages to the rear are blocked and the passage is then turned to the right side of the valve.

In both the bulldozer and the No. 42 Tool Bar applications the cross pipe fastens to the crossover valve as shown and provides oil passages to, and connections for, the hydraulic cylinders on both sides of the tractor.

The valve lever should be turned 90° to the right as shown at (2) for either No. 64 Tool Bar, One Implement, Two Implement or the No. 40 Scraper operation. With the valve lever in this position, the oil passages are straight through the valve from front to rear. In either the Scraper, Two Implement, No. 64 Tool Bar or One Implement applications, the short hydraulic pipe fastens to the crossover valve rear opening.

CROSSOVER VALVE LEVER POSITIONS

1—Lever position for bulldozer or No. 42 Tool Bar operation. 2—Lever position for No. 64 Tool Bar, scraper, two implement and one implement operation.



DAILY CARE

A daily check of the bulldozer should be made to see if there are any loose nuts, bolts, capscrews, or parts worn to such an extent that they are no longer serviceable. If corrective steps are taken immediately upon discovery of loose or worn parts, fewer enforced stops and more economical operation will result.

Dirt should not be allowed to accumulate and pack on the bulldozer. A few minutes spent daily in keeping it clean are well repaid in greater ease and safety of operation.

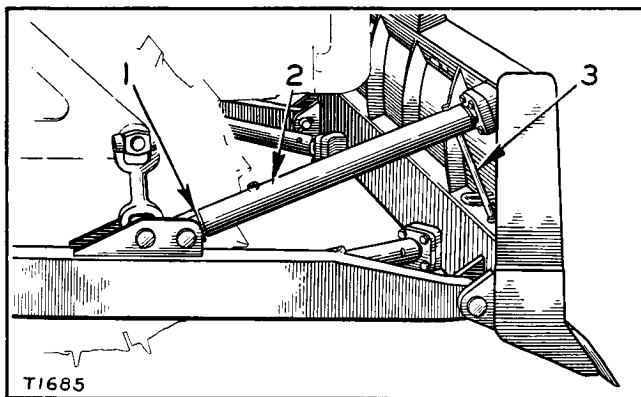
Connections in the hydraulic system should be checked for looseness that might result in leakage. The hydraulic hoses should be inspected for signs of leakage or wear because hoses move and can rub against each other as well as against parts of the tractor during operation. Replace the hoses showing signs of leakage or signs of sufficient wear to permit leakage or breakage. See the topic, CARE OF THE HYDRAULIC SYSTEM. This inspection can be made more easily by keeping the bulldozer and tractor clean.

OPERATING ADJUSTMENTS

All adjustments should be made with the blade raised.

Tilting The Blade: The blade may be tilted a maximum of 8 inches (20.32 cm.). Make the adjustment by using the handle (3) to shorten the brace (2) on the side which is to be low. Lengthen the opposite brace.

In normal level blade operation the measurement at (1) between the shoulder on the eye bolt and the end of the tube should be approximately $\frac{3}{4}$ inch (1.90 cm.).



BULLDOZER BLADE ADJUSTMENTS

1—Measurement between shoulder on eye bolt and end of tube should be $\frac{3}{4}$ inch (1.90 cm.) for normal blade position. 2—Tilting brace tube. 3—Handle.

NOTE

Do not operate the bulldozer with any of the threads on the tilting brace eye bolts exposed.

Tipping The Blade: Tipping the top of the blade back increases the digging angle. To tip the blade back, shorten both the tilting braces or decrease the space at **(1)**. To tip the blade forward or decrease the digging angle, lengthen both tilting braces or increase the space at **(1)**.



Maintenance Instructions

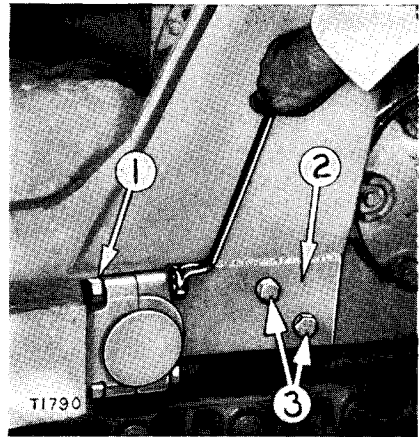
"Caterpillar" Hydraulic Bulldozers have been constructed so that very few adjustments are necessary. If they are properly maintained they will give an unlimited amount of trouble free service. Maintenance of the ball and socket joints, replacement of cutting edge and end bits, and care of the hydraulic system will be covered in the following topics.

TRUNNION ASSEMBLY

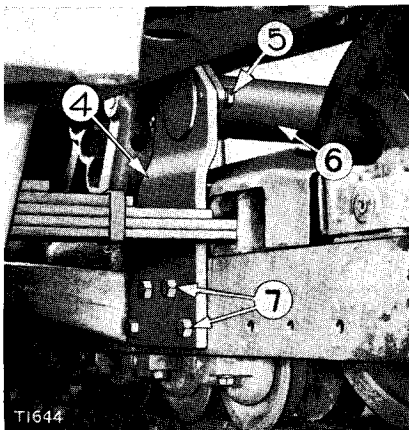
The bearing cap bolt nuts (1) and the screws (3) fastening the trunnion plate (2) to the track roller frame should be inspected frequently and kept

TIGHTENING TRUNNION BEARING BOLTS

1—Nut. 2—Trunnion assembly. 3—Screws.



tight. The capscrews (5) which hold the crank tube assembly (6) to the plate assembly (4) and screws (7) which hold the plate assembly to the track roller frame inner channel should also be inspected at frequent intervals and tightened if necessary.



INNER SUPPORT PLATE

4—Plate assembly. 5—Capscrews.
6—Crank tube assembly. 7—Screws.

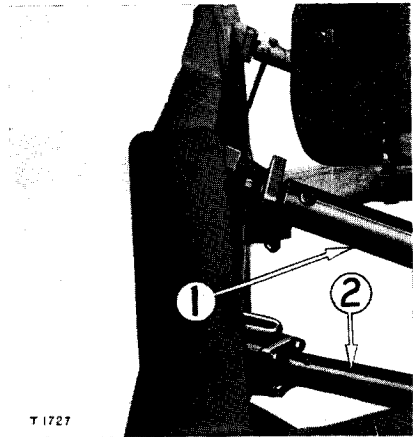
BALL AND SOCKET

Adjustment of the ball and socket joints should be made when looseness affects operation.

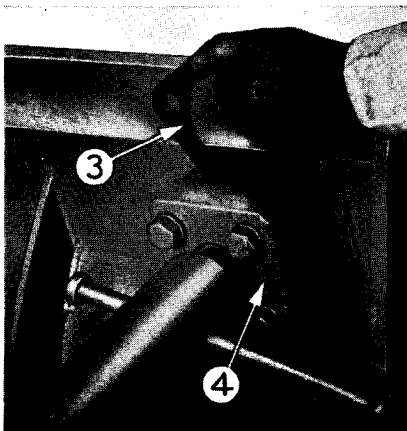
Remove the shims from the ball and socket joint of the tilting brace (1) by removing the socket cap and the shim retainer screws. Then tilt the blade forward with brace on the opposite side until the ball clears the edge of the socket.

BALL AND SOCKET ADJUSTMENT

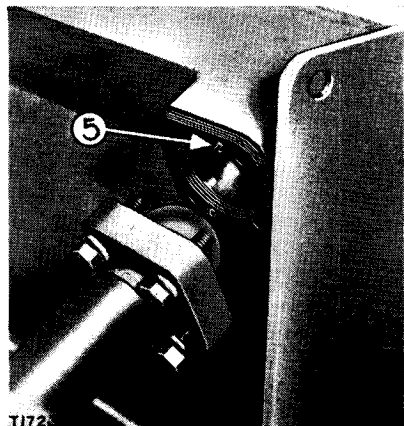
1—Tilting brace. 2—Diagonal arm.



Clean and lubricate the shims, ball and socket. Assemble the socket cap (4) on the socket without shims (3) and tighten the capscrews evenly on the cap. Measure the existing clearance with the shims. When the



MEASURING SPACE BETWEEN
SOCKET AND SOCKET CAP
3—Shims. 4—Tilting brace socket cap.



BALL AND SOCKET SEPARATED
TO SHOW RETAINING SCREW
5—Shim retaining screw.

number of shims has been determined add one shim to provide clearance. Remove the cap and fasten the shims with the screws (5). Reinstall the socket cap so the shim screws fit into the counterbores.

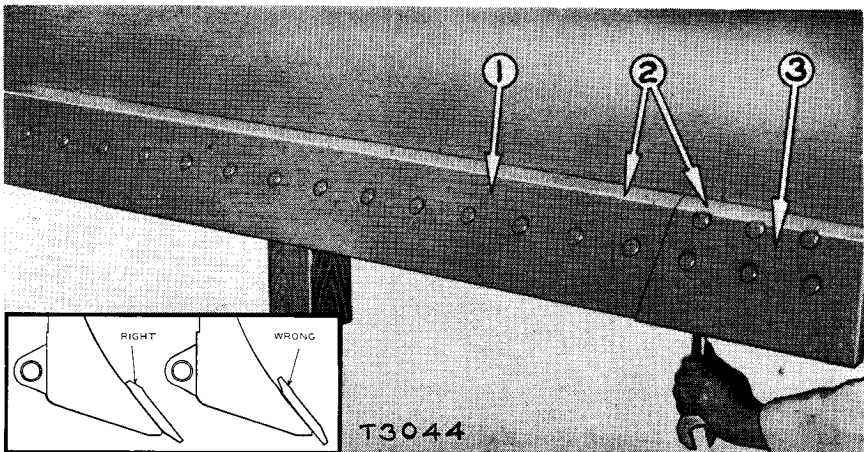
Remove the cotter pin, lock pin and the pin which hold the diagonal arm (2) in place. The socket cap and shims can then be removed.

Do not adjust the diagonal arms with the pins in place. To do so may cause high stresses on the side arms during operation because of improper adjustment. Adjust the arms as long as possible but still permitting installation of the pin.

CUTTING EDGE AND END BIT REPLACEMENT

Raise the blade high enough to be able to conveniently reach the nuts on the blade base with a wrench. Block up under the side arm to prevent the blade from dropping in case the hydraulic control should be accidentally released. Remove the bolts that hold the cutting edge (1) or end bits (3) to the blade. Turn the cutting edge from top to bottom if it is worn on only one edge. The end bits are not reversible.

Before installing the cutting edge or end bit, clean the contacting surfaces of the blade and cutting edge or end bit. Install the bevel (2) to the front on the top edge of a new cutting edge or end bit. Install the bolts and tighten the nuts. After several hours of operation again tighten the nuts.



REMOVAL OF CUTTING EDGE AND END BITS

1—Cutting edge. 2—Beveled edge. 3—End bit.

CARE OF THE HYDRAULIC SYSTEM

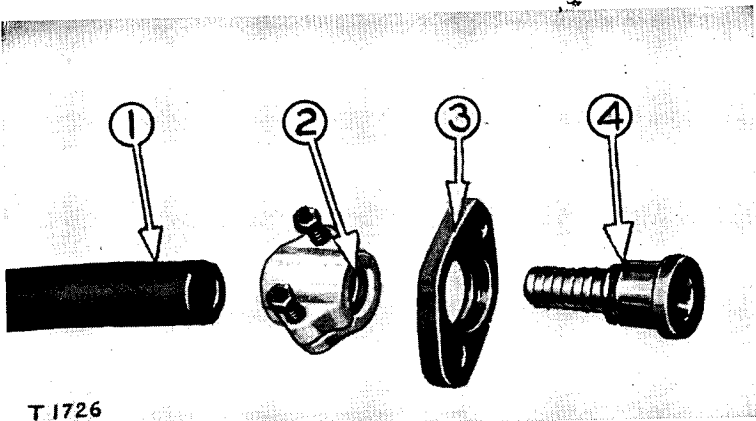
The hydraulic system is designed so that no adjustments are necessary. There are however a few precautionary measures which should be followed. Cleanliness is of great importance in the hydraulic system and great care should be taken to keep dirt out.

Check the oil every 60 hours and fill with fresh oil if necessary. If the oil is low make a thorough inspection of the hoses and connections for leaks. It should not be necessary to add oil if all the connections are tight and the hoses are in good condition. See the LUBRICATION INSTRUCTIONS for type of oil, draining, filter replacement and filling of hydraulic system.

The control levers and rods should be in correct adjustment at all times to prevent partial opening or closing of the control valves. The control lever should always operate freely and return to the "hold" position by spring action when released from either "raised" or "lower" position.

Hose Replacement: Check the hose daily for any signs of leakage or wear. Do not wait for actual breakage before replacing the hoses. Check the hose clamps frequently after installing new hoses, to make certain they are tight. A loose clamp could cause a separation of the hose from the stem. The loss of hydraulic system oil, due to a broken hose will cause unnecessary loss of time as well as damage to the hydraulic control.

Remove the hose by disconnecting the flange connections at the cylinder and crossover pipe assembly. Cap all openings of the hydraulic system when the hoses are removed. Remove the clamp (2) and cut half way around the hose at a 45° angle from the end of the hose until it



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HOSE CONNECTION

1-Hose. 2-Clamps. 3-Flange. 4-Stem.

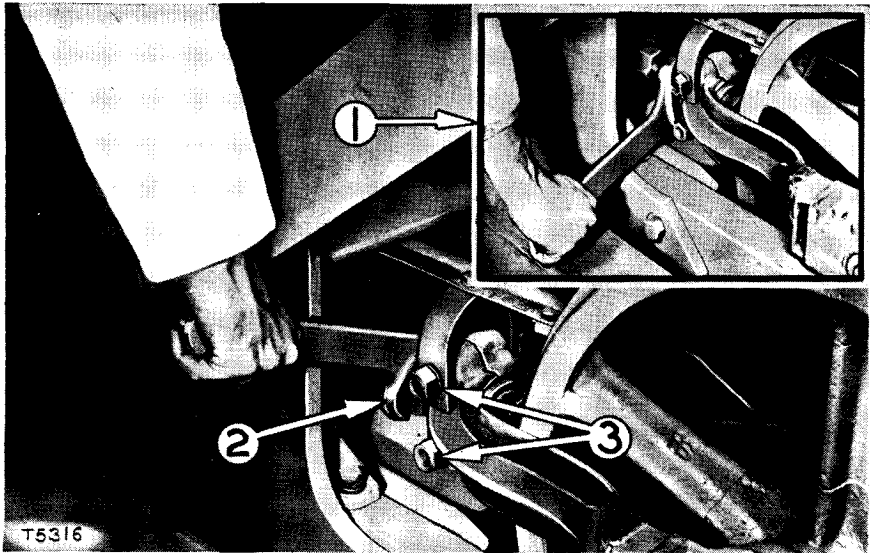
can be removed from the stem (4). It is necessary to cut only the wire braids in the hose. Cut the hose with an 18 teeth to the inch (2.5 cm.) hack saw by using short choppy strokes. Lift the blade slightly on the return stroke. If the stem is cut or burrs are noticed, remove the burrs or replace the stem with a new one. Replace the hose with new $\frac{3}{4}$ inch (1.90 cm.) two wire braid high pressure hydraulic hose the same length as the one being replaced. Clean the cuttings from the hose before installing the stem.

Place the flange (3) on the stem (4) next to the large shoulder on the stem. Lubricating the stem with crankcase oil will make installation easier. Start the stem in the hose (1) and be sure the stem is inside the inner covering, not next to the wire braid at any point. Push the hose over the stem until the end of the hose is approximately $1/16$ (1.6 mm.) from the stem shoulder. If a vise is not available, force the stem into the hose with a wooden block. Position the clamps (2) so that flange (3) can be easily fastened to the pipe connection. The lip on the inside of the clamp should fit into the large groove in the stem. Place the two bolts in the clamp and tighten them evenly until a slight bulge of the hose appears between the clamps. Replace the ring seal at the end of the stem. Before installing the hoses make sure the faces and seal seats are free from all dirt.

TRACK ADJUSTMENT

When track adjustment becomes necessary, access to the track adjusting nut can be obtained without difficulty. The crank assembly and the side arm limit the travel of the wrench as the adjusting nut is turned but by turning the wrench over, a full $1/12$ turn of the nut can be made between the limits of wrench travel.

Adjustment can best be made by lowering the bulldozer blade until it rests on the floor or ground. Additional drop of the blade over a ramp will be helpful by giving more room to turn the adjusting nut. Disconnect the link between the side arm and the crank assembly and raise the crank assembly to its extreme lift. Remove the guard assembly which covers the track adjusting nut and loosen the clamp bolts (3). Place the track adjusting wrench, supplied in the tractor tool equipment on the track adjusting nut, and turn the nut until the wrench strikes the side arm or the



ADJUSTING TRACK

1—Insert showing wrench position. 2—Wrench turned over. 3—Clamp bolts.

trunnion assembly, as shown in insert (1), or the crank assembly. Then turn the wrench over as shown at (2) and again turn the nut. Repeat this procedure until the track is properly adjusted. Tighten the clamp bolts, replace the guard and reconnect the link.

Index

	Page
Assembling the Blade Group	10
Assemble the Crank and Trunnion Assemblies	8
Ball and Roller Bearing Lubricant	15-17
Ball and Socket	23
Bulldozer Cross Pipe Installation	5
Bulldozer Group Installation	6
Bulldozer Operation	18
Capacities	Inside Back Cover
Care of the Hydraulic System	25
Control Lever	18
Crankcase Lubricating Oil	14-16
Crossover Valve	19
Cutting Edge and End Bit Replacement	24
Daily Care	20
Fill the Hydraulic System with Oil	10
General Lubricating Information	14
Hose Replacement	25
Hydraulic Control Guard Installation	6
Hydraulic System, Care of the	25
Installation Instructions	5
Installing the Blade Group	12
Installing the Bulldozer Blade Group	10
Installing the Hydraulic Cylinder Group	9
Installing the Support Group	6
Introduction	4
Locating the Side Arms	13
Lubrication Chart	15A
Lubrication Instructions	14
Lubrication of Miscellaneous Points	14
Maintenance Instructions	22
Model View	3
Oil Viscosity Recommendations	14
Operating Adjustments	20
Operation Instructions	18
Preparation for Use	18
Rework Track Roller Frame on Earlier Tractors to Install Support Group	7
Serial Number Location	Inside Back Cover
Table of Contents	2
Tilting the Blade	20
Tipping the Blade	21
Track Adjustment	26
Trunnion Assembly	22

Capacities

Approximate Quantities

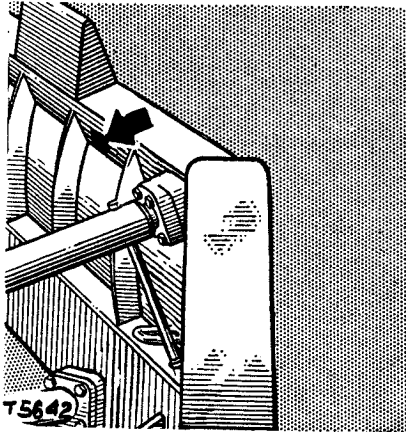
Hydraulic System Complete 8 U.S. Gal.

Includes:

No. 44 Hydraulic Control 3½ U.S. Gal.

No. 4S Bulldozer Hydraulic
System 4½ U.S. Gal.

Location Of Serial Number



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