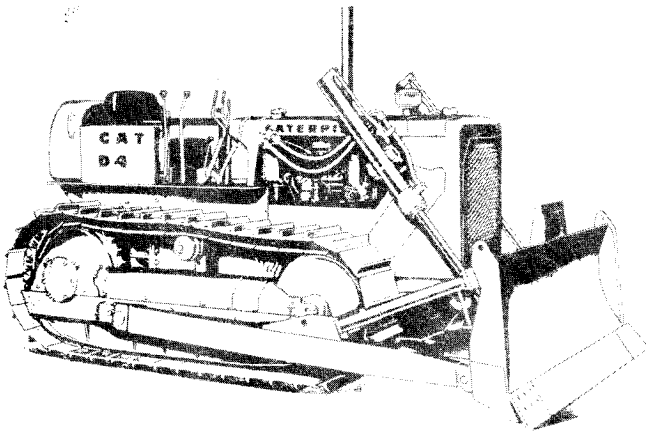


**OPERATION AND
MAINTENANCE
INSTRUCTIONS**

CATERPILLAR NO. 4S BULLDOZER

STRAIGHT BLADE HYDRAULIC



SERIAL NUMBERS

67E1-UP 60" GAUGE

67F1-UP 44" GAUGE

Caterpillar Tractor Co., General Offices, Peoria, Illinois. • Caterpillar Americas Co., Peoria, Illinois. • Caterpillar Overseas S.A., Geneva. • Caterpillar of Australia Pty. Ltd., Melbourne. • Caterpillar Brasil S.A., São Paulo. • Caterpillar Tractor Co. Ltd., Glasgow. • Caterpillar of Canada Ltd., Toronto. • Caterpillar France S.A., Grenoble. • Caterpillar (Africa) (Pty.) Ltd., Johannesburg. • Caterpillar Mexicana S.A. de C.V., Monterrey.

Warranty

Caterpillar Tractor Co. warrants products sold by it for six (6) months after date of delivery to the initial user, subject to the succeeding provisions hereof. This warranty is limited to the repair or replacement, as Caterpillar Tractor Co. may elect, at one of its factories designated by it, of such parts as shall appear to it, upon inspection, to have been defective in material or workmanship, but does not include any installation or transportation costs. No warranty is made with respect to items made by others (except items made by direct or indirect subsidiaries of Caterpillar Tractor Co.) when such items are warranted by their respective makers or when they are supplied by Caterpillar Tractor Co. on special order. No other warranty of any kind is made or authorized by Caterpillar Tractor Co., and no recommendation of items made by others shall imply or constitute any warranty with respect to such items.

Foreword

Caterpillar products are a result 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 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.

More and more Caterpillar owners are depending 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.

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."

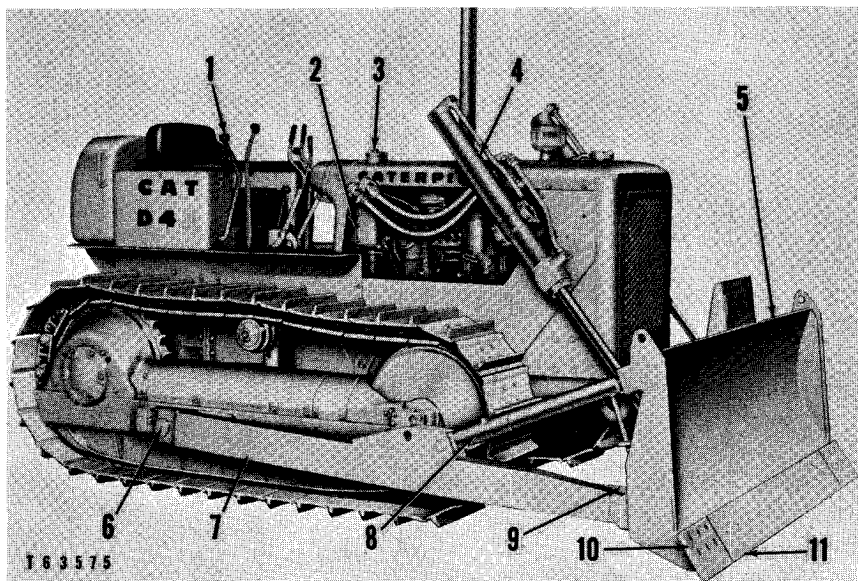
T24352

Railroad Loading Rules

For domestic customers within continental limits of the United States.

The loading rules and specifications published in Association of American Railroads Pamphlet No. MD-6, must be complied with when shipping Tractors, Road Grading, Road Making, and Farm Equipment Machinery, on open top cars. Contact the local railroad agent or inspector for these specifications.

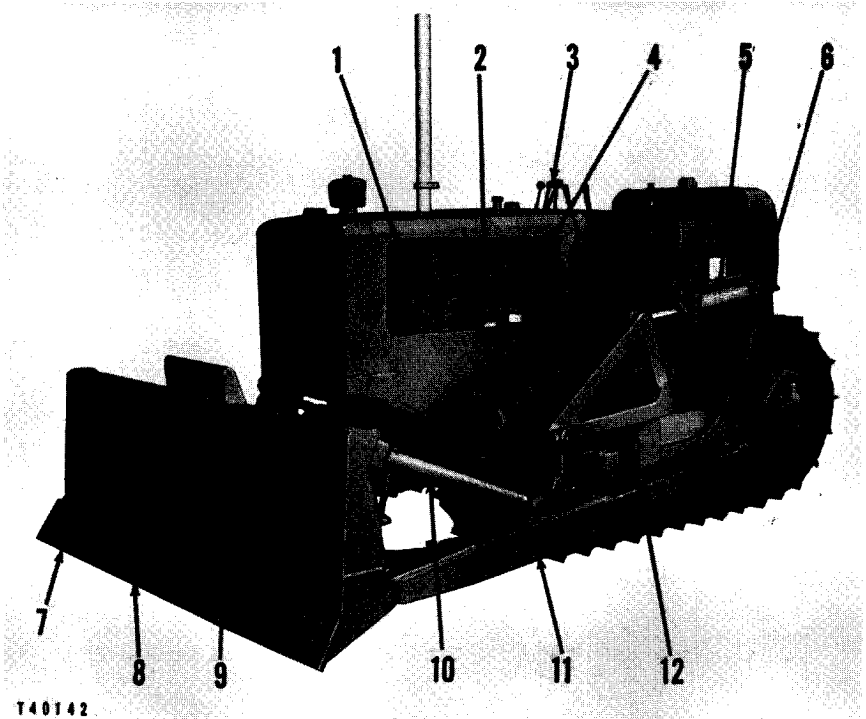
T24353



NO. 4S BULLDOZER WITH 143 HYDRAULIC CONTROL

- 1—Control lever. 2—Hydraulic control tank. 3—Hydraulic control filter. 4—Hydraulic cylinder. 5—Bulldozer blade. 6—Trunnion. 7—Push arm. 8—Tilting brace. 9—Diagonal brace. 10—End bit. 11—Cutting edge.

Single Cylinder Bulldozer Illustrated on Page 23



T40142

NO. 4S BULLDOZER WITH 143 HYDRAULIC CONTROL

1-Hydraulic control pump. 2-Hydraulic control oil filter. 3-Hydraulic control lever. 4-Hydraulic control tank. 5-Hydraulic cylinders. 6-Trunnion assembly. 7-End bit. 8-Cutting edge. 9-Blade. 10-Tilting brace. 11-Push arm. 12-Crank assembly.

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Lubrication Instructions

SERVICE METER

Detailed instructions regarding the lubrication of the bulldozer and hydraulic control system are given in the lubrication chart and in the illustrations following. The established intervals in the lubrication chart and maintenance instructions are given in service hours. Service hours are to be interpreted as those recorded on the Service Meter of the tractor. The intervals 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.

GENERAL LUBRICATING INFORMATION

Naturally, any precautions taken during cold weather to keep the tractor and hydraulic system warm will reduce the need for diluting the hydraulic system oil.

Lubricate all miscellaneous points, not equipped with fittings, with crankcase lubricating oil every 50 service hours.

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.

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 before it is taken off for filling. The operator should take every precaution to prevent dirt getting into the hydraulic system to extend the life of the hydraulic control.

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

The lubrication chart specifies the lubricants to be used, the points to be serviced and the intervals of servicing according to service hours.

DESCRIPTION OF LUBRICANTS

The lubricants recommended for use in this bulldozer and hydraulic control system can be identified by the sub-heading preceding their descriptions that follow: The proper selection of oil and SAE grade of oil can be made from the information in the topic, TYPE OF LUBRICANTS AND SAE GRADES TO USE.

LUBRICATION CHART
CATERPILLAR
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.

Identification Of Points Of Lubrication, Lubricant To Apply And Interval Of Service

Point and Identification	Lubri- cant	SERVICE HOURS				
		10	50	125	500	1000
HYDRAULIC CONTROL SYSTEM	CO		X			D
FILTER				*C	C	
1 CRANK, CRANK PIN AND TRUNNION ASSEMBLY PIN BEARINGS	BR	L				
2 CONTROL LEVER AND LINKAGE	BR		L			
3 CYLINDER SUPPORT BEARINGS	BR		L			
4 CYLINDER UPPER TRUNNION BEARINGS	BR		L			
5 BLADE TILTING BRACE THREADS AND BRACE BALL AND SOCKET	BR			L		
CYLINDER ROD END BEARING (SINGLE CYLINDER BULLDOZER—SEE PAGE 8)	BR	L				

Key to Lubricants:

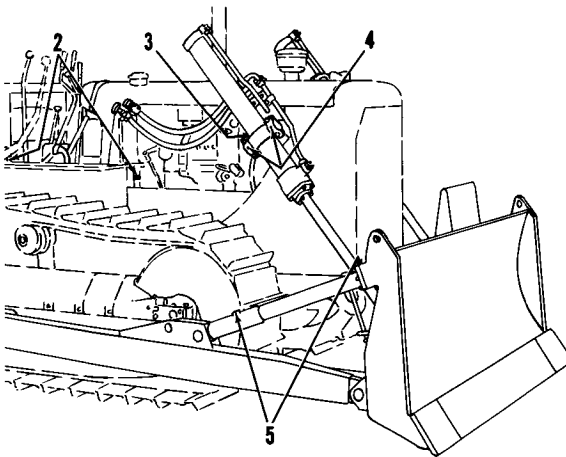
CO CRANKCASE LUBRICATING OIL BR BALL AND ROLLER BEARING LUBRICANT

Key to Symbols:

C — CHANGE D — DRAIN L — LUBRICATE X — CHECK, ADD OIL WHEN NEEDED

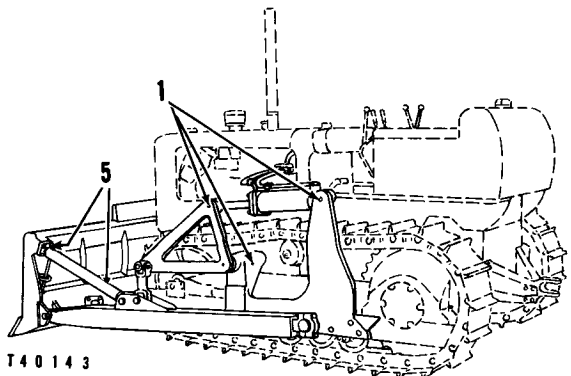
*ONLY AFTER THE FIRST 125 SERVICE HOURS OF OPERATION OF A NEW OR RECONDITIONED SYSTEM.

Location Of Points Of Lubrication



T 63576

(Early Bulldozers)



Crankcase Lubricating Oils

Superior Lubricants (Series 3): These are additive type oils that have been identified as meeting a rigid, high quality standard and certified for use in all Caterpillar diesel engines. See your Caterpillar dealer for brand names of products conforming to this specification.

MIL-L-2104A Specification Oils: These oils are additive type but are milder than Superior Lubricants (Series 3) Oils. They can be used as specified satisfactorily. Your oil supplier is familiar with those oils meeting the MIL-L-2104A Specification.

Type of Lubricants and SAE Grades to Use

The grade of oil is classified in terms of viscosity (fluidity or flow ability) and is identified with numbers called SAE numbers. The lower SAE numbers are more fluid and flow more readily than do those with the higher numbers.

OIL SPECIFICATION CHART

Compartment	SAE GRADE OF OIL TO USE AT STARTING ATMOSPHERIC TEMPERATURE			
	Above +32°F.	+32°F. to +10°F.	+10°F. to -10°F.	-10°F. and Lower
Hydraulic Control System	Superior Lubricants (Series 3), or MIL-L-2104A Oils			
	SAE 10W	SAE 10W	*Dilute SAE 10W	*Dilute SAE 10W

*For temperatures below +10°F. dilute the oil with kerosene so it will be fluid enough to insure free circulation. Begin dilution of the oil at +10°F. and increase the amount of kerosene up to a maximum of 25% of the volume of oil at temperatures of -10°F. and lower.

To determine if the oil in the hydraulic control will flow in cold weather, remove the oil filler cap and dip a clean rod into the oil before starting, and if the oil will flow off, the oil is fluid enough to circulate properly.

The oil in the hydraulic system should be drained and replaced with undiluted SAE 10W oil at the end of the cold season when dilution of the oil is no longer required.

Lubricating Grease

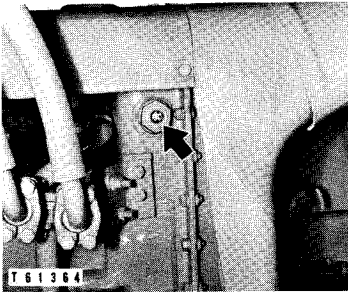
Ball and Roller Bearing Lubricant: This lubricant is a mixture of mineral oil and metallic soaps. Use No. 2 grade for most temperatures. For extremely low temperatures use No. 0 or No. 1 grade.

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

CO Crankcase Lubricating Oil

143 HYDRAULIC CONTROL PICTURED ON D4 TRACTOR
LATER BULLDOZERS



CHECKING HYDRAULIC CONTROL SYSTEM

Check oil level every 50 service hours when the oil is cool. Lower the bulldozer so the hydraulic cylinder rods are extended and the bulldozer is on level ground.

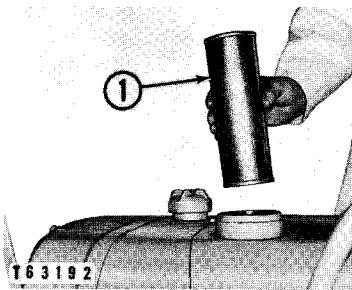
The sight gauge on the side of the oil supply tank provides a convenient means of checking for adequate oil in the system. If oil is visible in the sight gauge there is adequate supply of oil in the system, however, whenever any doubt exists check the oil level in the filler opening. Oil should be visible in the filler opening.

HYDRAULIC CONTROL SYSTEM OIL FILTER

Replace the filter element after the first 125 service hours of operation and every 500 service hours thereafter, however, see the topic, "Draining Hydraulic Control System," when the filter element change periods coincide with the hydraulic system drain periods. At intervals not coinciding with the hydraulic control system drain periods lower the bulldozer blade so the hydraulic cylinder rods are extended.

Service the filter by removing the filter cover assembly and the used filter element. Replace the filter element (1) with a new Caterpillar filter element. Replace the seal in the cover and install the cover.

At intervals other than at 1000 service hour drain periods, open the bleeder valve on the filter cover, start the engine and fill the hydraulic system with oil. When oil flows from the bleeder valve without air bubbles, close the valve. See the topic, "General Information on Filling Hydraulic Control System."

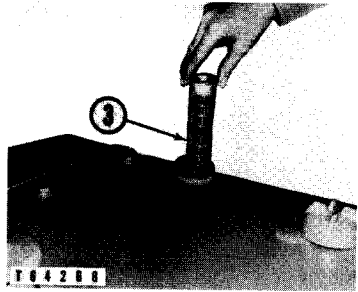
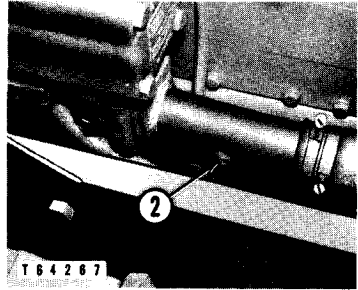


CO Crankcase Lubricating Oil

DRAINING HYDRAULIC CONTROL SYSTEM

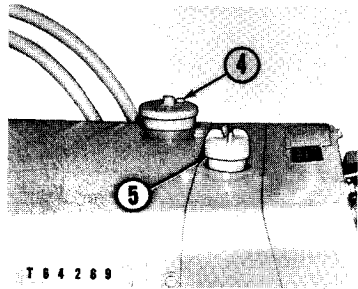
Every 1000 service hours drain the hydraulic system. Drive the front of the tracks up on 6" blocks so the pistons can move a complete stroke, completely raise the blade and block under the push arms to prevent the blade falling. Apply the brakes and block behind the tracks to prevent the tractor rolling. Stop the engine.

Remove the drain plug (2) and the filler cap. Remove the blocks from under the push arms and move the control lever forward to lower the blade. This will satisfactorily drain the system. Service the hydraulic system filter and clean the filler strainer (3) at each oil change period. Install the drain plug.



GENERAL INFORMATION ON FILLING HYDRAULIC CONTROL SYSTEM

Before starting the engine open the bleeder valve (4), fill the hydraulic control tank (5) and close the bleeder valve. Install the filler cap finger tight. Start and run the engine at low idle speed. Open the bleeder valve. Close the valve when the oil flowing from it contains no air bubbles. With the engine running at half speed, operate the control lever to fill the lines and cylinder. Move the hydraulic cylinder pistons a small amount, then fill the tank to prevent aeration of the oil. Repeat this procedure until the system is filled and oil level is visible in the sight gauge on the side of the hydraulic control tank. Tighten the filler cap. With the engine running at low idle speed open the bleeder valve (4). Close the bleeder valve when the oil flowing from it contains no air bubbles.

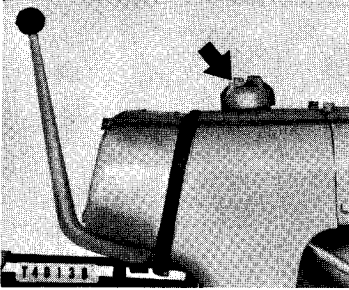


Check oil level several times during the first day of operation after filling. Be careful when removing the filler cap when the oil is warm because pressure in the tank may force out oil when the cap is removed.

Make sure the filler cap gasket is in good condition and install the cap tightly.

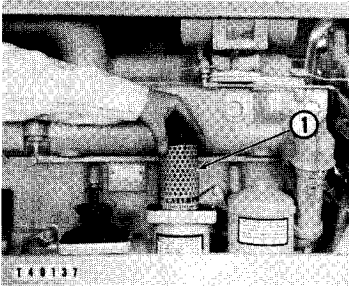
CO Crankcase Lubricating Oil

143 HYDRAULIC CONTROL PICTURED ON D4 TRACTOR
EARLY BULLDOZERS



CHECKING HYDRAULIC CONTROL SYSTEM

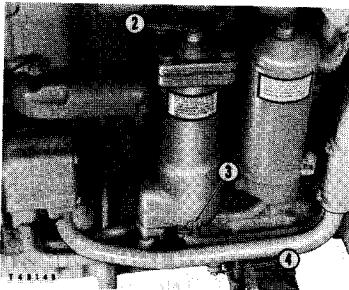
Check oil level every 50 service hours when the oil is cool. Lower the bulldozer blade so the cylinder pistons are extended and the bulldozer blade is resting on level ground. Clean dirt from around filler cap and remove cap. Oil should be visible in the filler opening.



HYDRAULIC CONTROL SYSTEM OIL FILTER

Replace the filter element after the first 125 service hours of operation and every 500 service hours thereafter, however, see the topic, "Draining Hydraulic Control System," when the filter element change periods coincide with the hydraulic system drain periods.

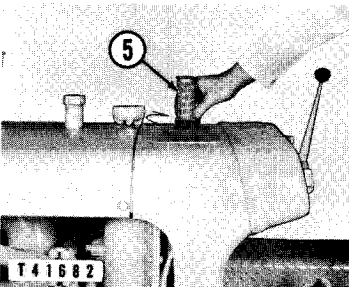
At intervals not coinciding with the hydraulic control system drain periods lower the bulldozer blade so the pistons are extended. Service the filter by removing the drain plug (3) from the filter base to drain the oil from the filter housing. Remove the filter cover assembly and the used filter element. Replace the filter element (1) with new Caterpillar filter element. Replace the seal in the cover and install the cover. Install the drain plug in the filter base.



At intervals other than at 1000 service hour drain periods, open the bleeder valve (2) on the filter cover, start the engine and fill the hydraulic system with oil. When oil flows from the bleeder valve without air bubbles, close the valve. See the topic, "General Information on Filling Hydraulic Control System."

DRAINING HYDRAULIC CONTROL SYSTEM

Every 1000 service 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 under the side arms to prevent the blade falling. Apply the brakes and block behind the tracks to prevent the tractor rolling. Stop the engine.

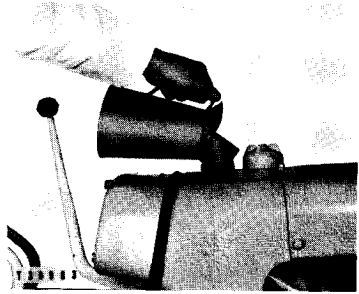


Remove the drain plugs (3) and (4) and the filler cap. Remove the blocks from under the side arms and move the control lever forward to lower the blade. This will satisfactorily drain the system. Service the hydraulic system filter and clean the filler strainer (5). Install the drain plugs.

CO Crankcase Lubricating Oil

GENERAL INFORMATION ON FILLING HYDRAULIC CONTROL SYSTEM

Before starting the engine open the bleeder valve (2), fill the hydraulic control tank and close the bleeder valve. Install the filler cap finger tight. Start and run the engine at low idle speed. Open the bleeder valve. Close the valve when the oil flowing from it contains no air bubbles. With the engine running at half speed, operate the control to fill the lines and cylinder. Move the pistons a small amount, then fill the tank to prevent aeration of the oil.



Raise the blade and hold the control lever in "raise" 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.

Tighten the filler cap. With the engine running at low idle speed open the bleeder valve. Close the bleeder valve when the oil flowing from it contains no air bubbles. Check oil level several times during the first day of operation after filling. Be careful when removing the filler cap when the oil is warm because pressure in the tank may force out oil when the cap is removed.

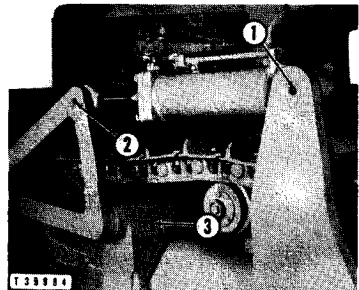
Make sure the filler cap seal is in good condition and install the cap tightly.

BR Ball and Roller Bearing Lubricant

1

CRANK, CRANK PIN AND TRUNNION ASSEMBLY PIN BEARINGS (Early Bulldozers)

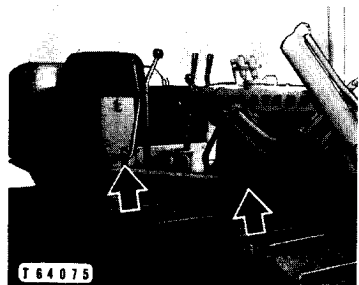
Lubricate bearings for crank assembly (3), crank pin (2) and trunnion assembly (1) every 10 service hours through a fitting for each point on both sides of the bulldozer.



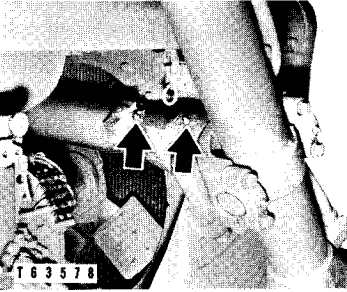
2

CONTROL LEVER AND LINKAGE BEARINGS

Lubricate every 50 service hours through the fittings provided.



BR Ball and Roller Bearing Lubricant

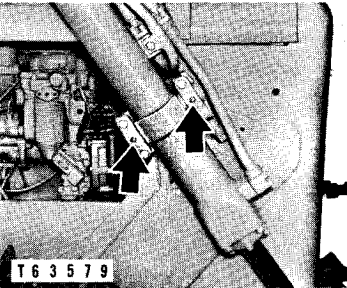


3

CYLINDER SUPPORT BEARINGS

(Later Bulldozers)

Lubricate every 50 service hours through two fittings located near each end of the cylinder cross tube support.

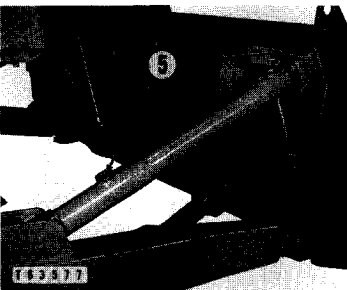


4

CYLINDER UPPER TRUNNION BEARINGS

(Later Bulldozers)

Lubricate every 50 service hours through fittings, one located in each bearing cap (four fittings).

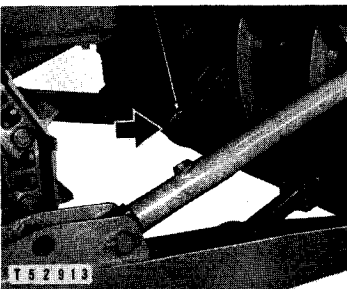


5

BLADE TILTING BRACE THREADS AND BRACE BALL AND SOCKET

(Single Cylinder Bulldozer Shown)

Lubricate through two fittings on each side of the bulldozer every 125 service hours.



CYLINDER ROD END BEARING

(Single Cylinder Bulldozer Only)

Lubricate bearing through fitting every 10 service hours.

NOTE

The pivot mounting of the single cylinder on the support guard does not require lubrication.

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, and pins are tight or properly locked in position. All points should be lubricated as indicated in the lubrication chart.

BULLDOZER OPERATION

The bulldozer is operated by a dash 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.

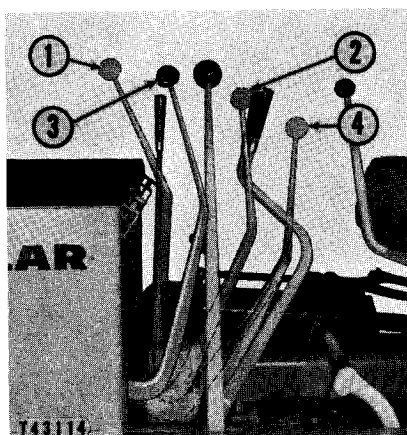
Raise the blade by pulling the lever back to the raise position (1). Release the lever as the blade approaches its extreme upward travel.

Hold the blade in any position, by releasing the lever allowing it to return to the neutral or hold position (3).

Lower the blade by pushing the control lever forward to the lower position (2) until resistance is felt in the control lever. Release the lever when the blade approaches the extreme downward travel.

HYDRAULIC CONTROL LEVER POSITIONS

1-Raise. 2-Lower. 3-Hold. 4-Float.



Float the blade, by pushing the control lever forward through lower position. At this point, a noticeable resistance will be felt on the lever. Continue to push it forward to the float position (4). The control lever will remain in float position until it is pulled back and released to return to the hold position.

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

DAILY CARE

Attention should be given to the operations mentioned in this topic, every 10 service hours or daily whichever occurs first.

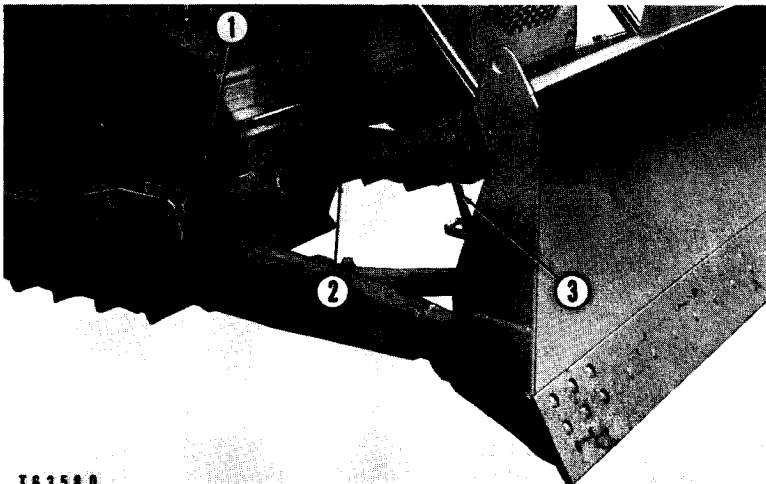
A daily check of the bulldozer should be made to see if there are any loose nuts, bolts, or parts worn to such an extent that they are no longer serviceable. If corrective steps are taken immediately upon discovery of loose or worn parts, fewer enforced stops and more economical operation will result.

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 blade raised.



T63580

BULLDOZER BLADE ADJUSTMENTS

1-Tilting brace measurement. 2-Tilting brace tube. 3-Handle.

Tilting the Blade: The blade may be tilted a maximum of 13 inches (30.02 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.

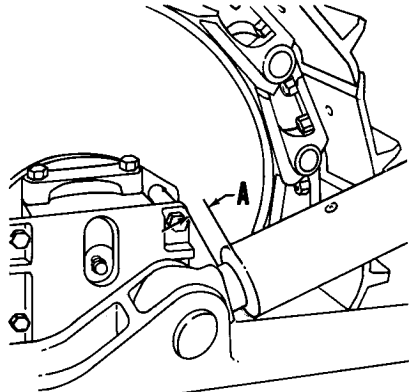
Tipping the Blade: Tipping the top of the blade back increases the digging angle. To tip the blade back, shorten both the tilting braces or decrease the space at (1). To tip the blade forward or decrease the digging angle, lengthen both tilting braces or increase the space at (1).

For normal level blade operation, the measurement between the shoulder on the adjusting screw and the end of the brace tube on each brace should be approximately 1 inch (2.54 cm.) as shown at (A).

A maximum measurement of $3\frac{1}{4}$ inches (8.25 cm.) should not be exceeded on either or both braces between the shoulder on the adjusting screw and the end of the brace tube. Exceeding this measurement will expose threads of the adjusting screw subjecting them to damage.

TILTING BRACE ADJUSTMENT

A—Point of measurement to indicate normal (or maximum) blade setting.



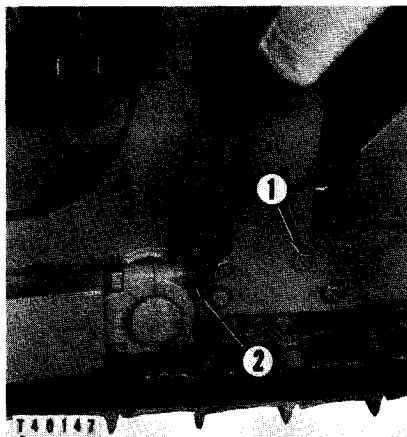
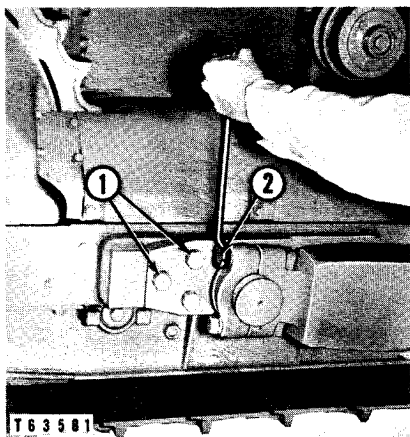
T56407

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 trunnion plate bolts (1) and bearing cap bolts (2) should be inspected frequently and kept tight.



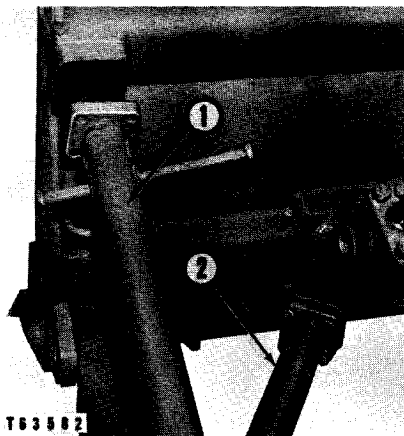
(Later Bulldozers) (Early Bulldozers)
TIGHTENING TRUNNION PLATE BOLTS AND BEARING CAP BOLTS
 1-Trunnion plate bolts. 2-Bearing cap bolts.

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.

Clean and lubricate the shims, ball and socket. Assemble the socket cap (4) on the socket without shims (3) and tighten the bolts evenly on the cap. Measure the existing clearance with the shims. When the number of shims has been determined add one shim to provide clearance. Remove the cap and fasten the shims with the screws. Reinstall the socket cap so the shim screws fit into the counterbores.

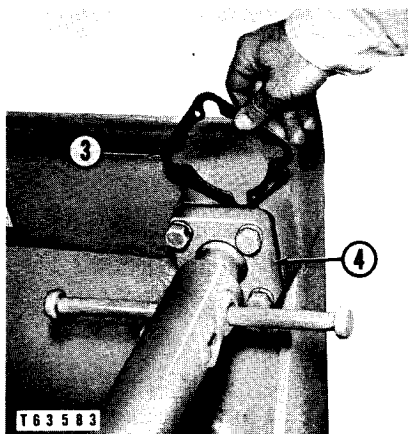


BALL AND SOCKET ADJUSTMENT

1—Tilting brace. 2—Diagonal arm.

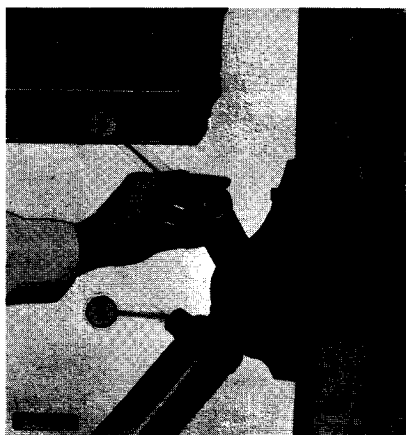


The ball and socket shim adjustment should be made on each tilt brace and diagonal arm in the same manner. Before adjusting the diagonal arm, remove the lock pin (7) and the pin (6) that holds the arm to the push arm. This will permit the ball to move in the socket freely and a correct shim adjustment made. After the correct ball and socket adjust-



MEASURING SPACE BETWEEN SOCKET AND SOCKET CAP

3—Shims. 4—Tilting brace socket cap.



ADJUSTING DIAGONAL ARM

6—Diagonal arm pin. 7—Lock pin.
8—Clamping bolt.

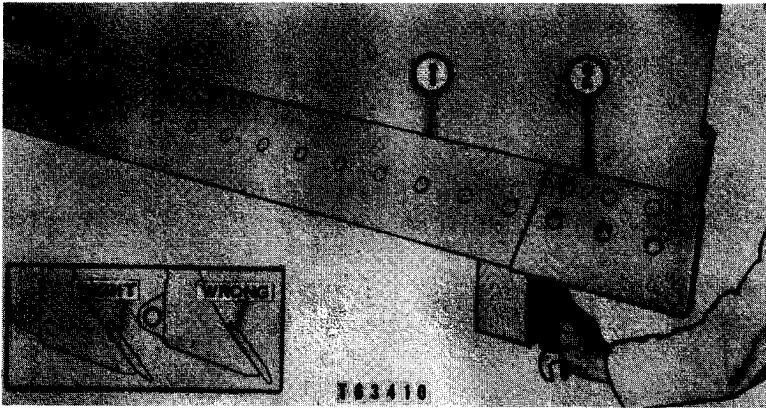
ment has been made for each diagonal arm, align the holes for the diagonal arm pin by loosening clamp bolt (8) on the diagonal arm and adjust its length as long as possible still permitting installation of the pin (6).

Do not adjust the diagonal arms with the pins in place. To do so may cause high stresses on the push arms during operation because of improper adjustment.

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 push 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 (2) to the blade. Turn the cutting edge end for end 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. Install the bevel on the top edge of the cutting edge to the rear. 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-End bit.

CARE OF THE HYDRAULIC SYSTEM

The hydraulic system is designed so that few 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 50 service 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.

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.

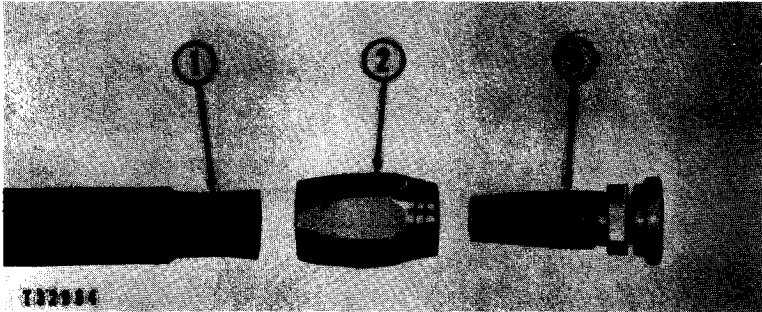
Hose Replacement

Socket Type Connection: Remove in the following manner:

1. Remove the damaged hose and cap all openings of the hydraulic system.
2. Place the socket (2) in a vise and unscrew the nipple (3) from the socket and the hose.
3. Leaving the socket in the vise, pull the hose out of the socket with a twisting movement.

If the fittings are not damaged they may be installed on the new hose in the following manner:

1. Strip the rubber covering from the end of a new hose a distance equal to the counterbore in the socket (2) down to the wire reinforcing-



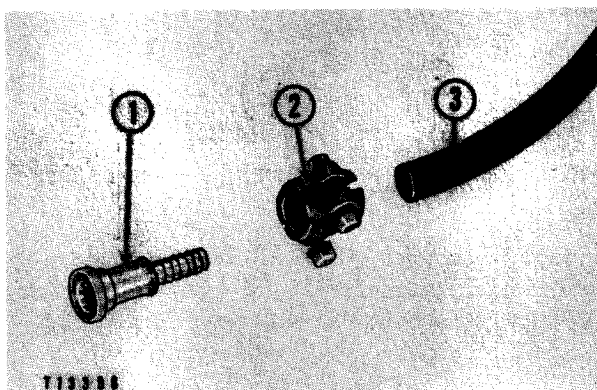
SOCKET TYPE HOSE CONNECTION
1-Wire reinforcing braid. 2-Socket. 3-Nipple.

- ing braid (1). Pull the rubber cover off and remove any excess rubber with a wire brush or wheel.
2. Put the socket (2) in a vise and push the hose into the socket turning counterclockwise until it bottoms.
3. Oil the nipple threads (3) and the inside of the hose liberally. Use SAE 30 or heavier oil.
4. Screw the nipple into the socket and hose.

Replace the ring seal at the end of the nipple. Before installing the hoses make sure the faces and seal seats are free from all dirt.

Clamp Type Connection: Remove the hose by disconnecting the flange connections at the cylinder and the 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 can be removed from the stem (1). It is necessary to cut only the wire braids in the hose. Cut the hose with an 18 teeth to the inch 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. Clean the cuttings from the hose before installing the stem.

Lubricating the stem with crankcase oil will make installation easier. Start the stem in the hose (3) 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 inch (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 flanges 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.



CLAMP TYPE HOSE CONNECTION

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

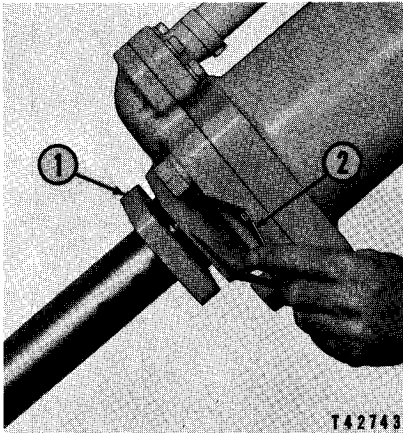
Later clamp type hose connections have two flanges that hold the stem in position with four bolts. Earlier clamp type hose connections have a one piece flange that holds the stem in position with two bolts.

Hydraulic Cylinder Packing: Hydraulic cylinder packing leakage can be caused by wear, cuts and/or distortion of the packing. Wear of the cylinder packing is caused from dirt or foreign material between the rod and packing. Cuts are the result of nicks, scratches or inclusions on the

piston rod. Distortion is caused by improper installation of packing or excessive tightening of the gland.

Adjustment: If the cylinder leaks around the rod, shims can be removed to tighten the packing around the rod.

1. Lower the hydraulically controlled equipment to the ground to relieve cylinder pressure.
2. Remove the bolts holding the gland (1) to the cylinder head.
3. Pry or tap the gland lightly out far enough to permit cutting and removing shims (2).



REMOVING SHIMS

1-Gland. 2-Shim.



4. Remove one shim at a time. If, after removing two shims the cylinder still leaks, consult your Caterpillar dealer for installation of new packings.

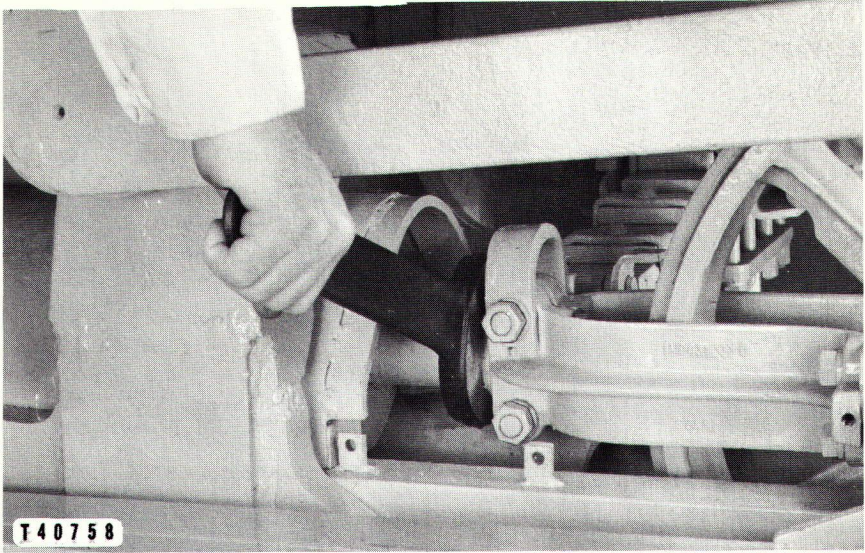
Do not continue to remove shims to tighten packing. Excessive gland pressure resulting from removing shims will only cause distortion of packing rings, reducing their efficiency and shortening their life.

TRACK ADJUSTMENT

(Bulldozers With Side Mounted Cylinders)

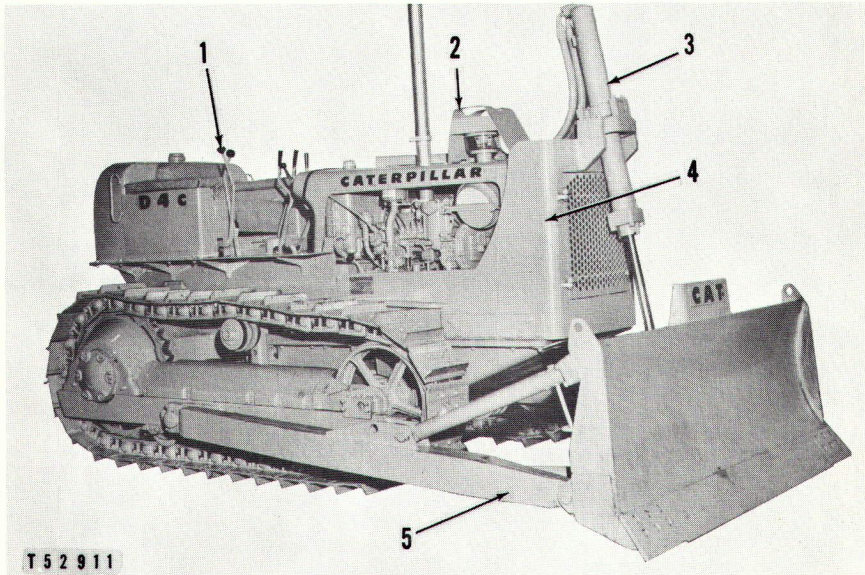
When track adjustment becomes necessary, access to the track adjusting nut can be obtained without difficulty. The crank assembly and the push arm limit the travel of the wrench as the adjusting nut is turned.

Adjustment can best be made by lowering the bulldozer blade until it rests on the floor or ground. Remove the guard assembly which covers the track adjusting nut and loosen the clamp bolts. 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 push arm or the crank assem-



ADJUSTING TRACK
(Early Bulldozers)

bly. Then turn the wrench over and again turn the nut. Repeat this procedure until the track is properly adjusted. Tighten the clamp bolts, replace the guard.



NO. 4S SINGLE CYLINDER BULLDOZER WITH 143 HYDRAULIC CONTROL
1-Hydraulic control lever. 2-Precleaner guard. 3-Hydraulic cylinder. 4-Cylinder support. 5-Push arm.



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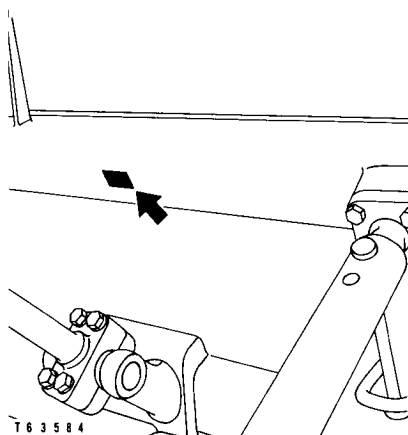
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Capacities

Approximate Quantities

	U.S. Measure (Gal.)	Imperial Measure (Gal.)	Metric Measure (Liters)
(Later Bulldozers)			
No. 4S Bulldozer and 143			
Hydraulic Control	8.5	7.2	32
(Early Bulldozers)			
No. 4S Bulldozer and 143			
Hydraulic Control	10.9	9.2	41,4
Total for Entire System for Single Cylinder Bulldozers ...	8.5	7.2	32

Location Of Serial Number



CATERPILLAR

**Diesel Engines - - - Tractors - - - Motor Graders
- - - - - Earthmoving Equipment - - - - -**

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