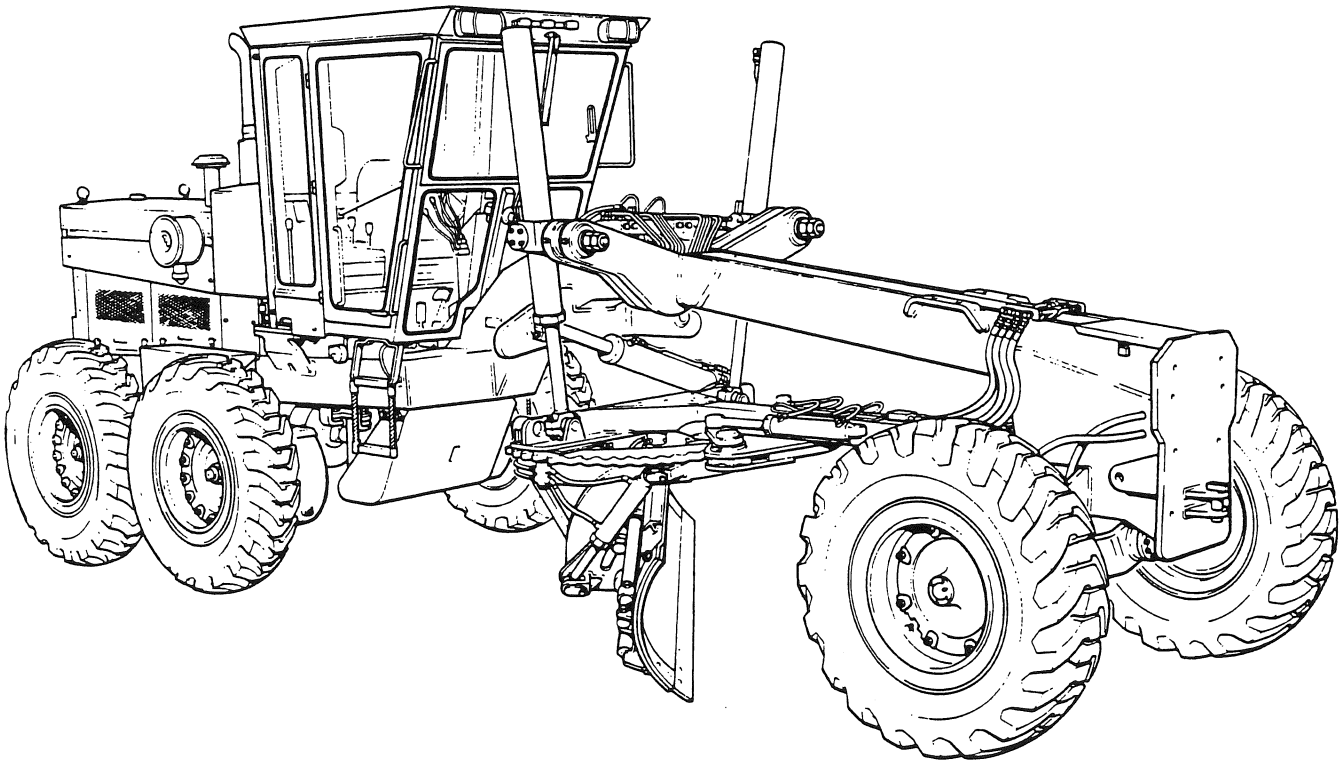
SECTION 12

STANDARD BRAKES AND TANDEMS



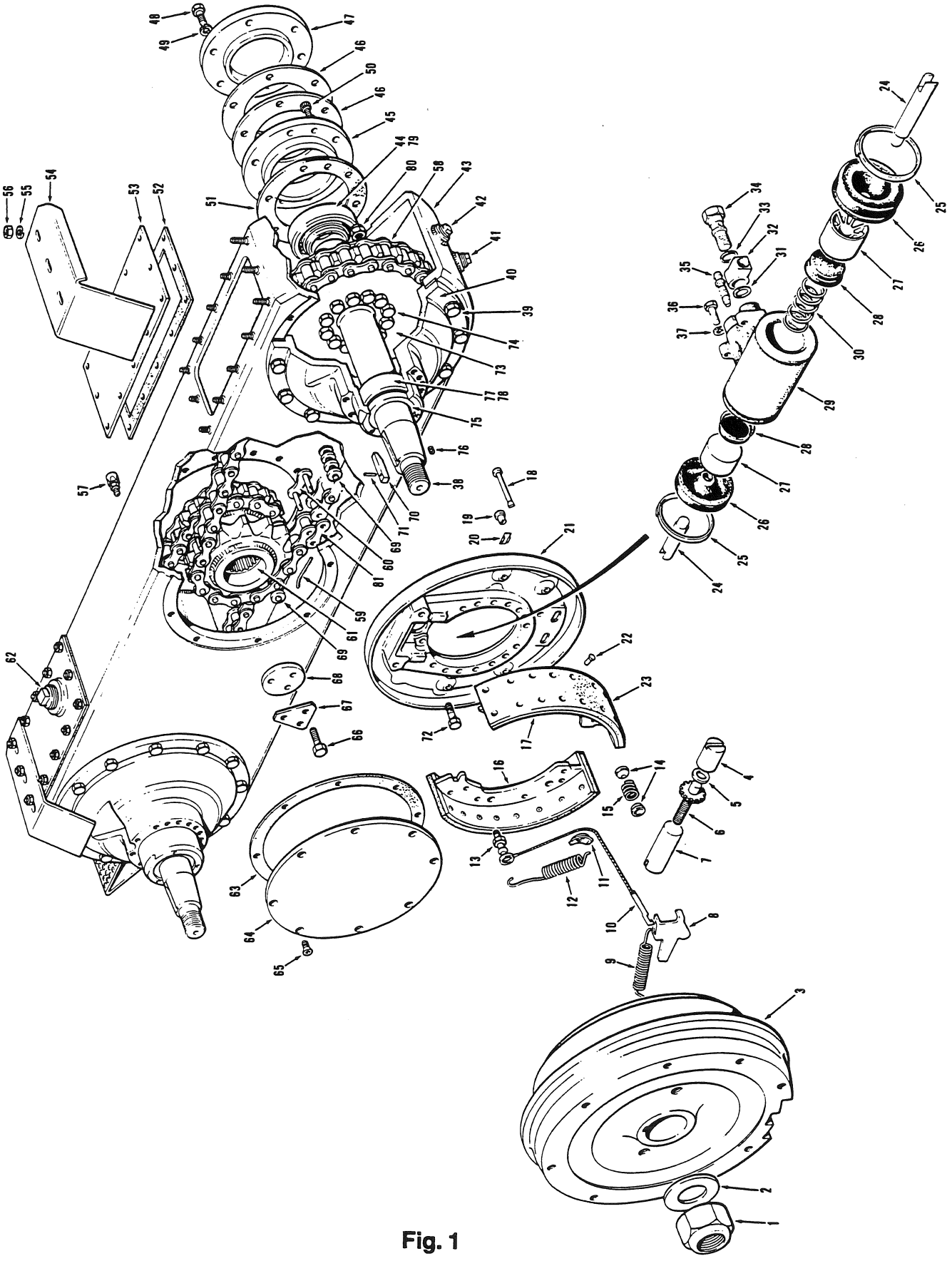


Fig. 1

Item	Description	Item	Description	Item	Description
1	Wheel nut	25	Strap	54	Shield-Brake line
2	Washer	26	Boot	55	Lockwasher
3	Wheel	27	Piston	56	Nut
4	Socket	28	Cup	57	Breather
5	Washer	29	Body	58	Chain-Drive
6	Adjusting screw	30	Spring	59	Cotter Pin
7	Pivot nut	31	Gasket-Inner	60	Link-Chain
8	Lever-Auto adjuster	32	Inlet fitting	61	Sprocket-double drive
9	Spring-Adjuster screw (white)	33	Gasket-Outer	62	Plug-Filler
		34	Bolt	63	Gasket
10	Cable assembly	35	Bleeder screw	64	Side plate cover
11	Cable guide-Auto adjuster	36	Bolt	65	Bolt
		37	Lockwasher	66	Bolt
12	Spring-Shoe return (black)	38	Stub axle	67	Washer-Tab
		39	Bolt and lockwasher	68	Plate-Retaining
13	Pin	40	Bearing housing-Stub axle	69	Plugs-Magnetic
14	Cup			70	Key
15	Spring-Shoe hold down	41	Drain plug	71	Pin-Key
		42	Level plug	72	Capscrews-Backing plate
16	Shoe and lining assembly (L.H.)	43	Tandem case		
		44	Bearing cup	73	Sprocket-Stub axle
17	Shoe and lining assembly (R.H.)	45	Bearing flange	74	Bolt
		46	Shim pack	75	Oil seal
18	Pin	47	Bearing cap	76	Set screws
19	Cover-Probe hole	48	Bolt	77	Bearing cup
20	Cover-Adjusting hole	49	Washer	78	Bearing cone
21	Backing plate	50	Socket head capscrews	79	Bearing cone
22	Rivet	51	Gasket	80	Nut-Sprocket
23	Lining-drilled	52	Gasket	81	Link-Chain
24	Link-Wheel cylinder	53	Cover plate		

Key to Fig. 1

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General

Before starting any service procedure, make sure the work area is clean and safe. A clean work area will reduce the chances of foreign matter entering the brakes and tandem causing damage. For a complete overhaul you will require a suitable lifting device, blocks and safety stands, a wheel puller, and a brake adjusting wrench.

Discard all oil seals, O rings, snap rings, and tabwashers. Clean and inspect brake and tandem components. Refer to the 700 Series Parts Manual when ordering replacement parts.

Refer to Lubrication Specifications detailed in the front of this manual for the recommended brake fluid and tandem lubricants.

ALWAYS PUT THE GRADER IN THE SERVICE POSITION BEFORE ATTEMPTING ANY OVERHAUL, MAINTENANCE OR INSPECTION PROCEDURE.

PARK THE GRADER ON A LEVEL SURFACE AND FULLY LOWER THE MOLDBOARD AND ALL ATTACHMENTS. IF IT IS NECESSARY TO ADJUST OR SERVICE THE MOLDBOARD OR ATTACHMENTS IN A RAISED POSITION, SUPPORT THEM WITH ADEQUATE STANDS OR BLOCKS. APPLY THE PARKING BRAKE. TURN THE IGNITION SWITCH TO THE "OFF" POSITION AND REMOVE THE KEY. OPERATE ALL HYDRAULIC CONTROLS TO ENSURE THAT NO ACCUMULATED PRESSURE REMAINS IN THE HYDRAULIC SYSTEM. INSTALL CHOCKS AT THE FRONT AND REAR WHEELS. TURN THE ISOLATION SWITCH TO THE "OFF" POSITION. THE ISOLATION SWITCH IS INSTALLED BEHIND THE LEFT FRONT ENGINE COVER. ON ARTICULATED MACHINES, INSTALL THE BLOCKING PINS ON BOTH SIDES OF THE HINGE. ALLOW THE ENGINE AND HYDRAULIC SYSTEM TO COOL BEFORE WORKING IN THESE AREAS. THE GRADER IS READY FOR SERVICING.

NOTE

Weights, measures and tolerances appear in Metric (SI), Imperial and U.S. quantities. Following the internationally accepted standard, the decimal point is denoted by a comma in all Metric measurements.

Description and Operation

Four wheel booster brakes are standard equipment on all 700 Series models except models 710 and 710A where two wheel rear mounted booster brakes are standard equipment. Power for the booster cylinder is supplied by oil in the return line of the steering system.

When the brake is depressed, a valve in the booster cylinder is closed and oil pressure builds up (relief), and presses on the push rod of the master cylinder. Brake fluid then is forced into all four wheel cylinders to expand the shoes against the brake drums.

The wheel brakes are self-adjusting drum type brakes. All four shoe sets are adjusted tight against the drums, then backed off four notches on the adjusting wheel. The linings should be replaced when worn to within 1/16 in. (1,59 mm) of the rivet heads retaining them to the shoes.

1/2 in. - 1 in. (12,70 mm. - 25,40 mm.) free travel on the pedal is required to ensure that the booster assembly is fully neutralized when the pedal is released.

The tandem assembly divides the power flow from a single floating drive axle (each side) to two tandem mounted axles and drive wheels. The tandem case is fabricated from steel plate, and is stress relieved before machining. Two plates are used to provide additional stiffness to the tandem assembly. This adds accuracy to the machining, which is done in a single jig, thus eliminating misalignment of the chains. The chains connect a double-drive sprocket on the final drive axle and the driven sprockets on the stub axles.

The shim pack under the inner bearing cap should be gauged so that a definite pre-load is felt when you turn the sprocket by hand. No provision is made for tightening the chains. A certain amount of slack is required and a slight rubbing of the chain on the bottom of the tandem case is normal and no cause for concern. However, a chain which has excessive slack and appears to require tightening may have a pitch of more than 2" (or 1.75" for the 710). If this is the case, it should be replaced as continued use will caused undue wear on the sprockets. For lubrication, the system oil should be changed once per year or every 2000 hours. At the same time, the two magnetic plugs in each tandem should be removed, cleaned and replaced.

Cleaning and Inspection

Cleaning - General

WARNING

ALKALI CLEANING SOLVENTS AND VAPORS ARE EXTREMELY HARMFUL AND CAN CAUSE SERIOUS INJURY TO EYES, LUNGS AND SKIN. ALWAYS WEAR PROTECTIVE CLOTHING, GOGGLES AND RESPIRATOR. USE UTMOST CARE WHEN HANDLING CHEMICALS.

CAUTION

YOU ARE RECOMMENDED TO WEAR COTTON GLOVES WHEN HANDLING BEARINGS. THIS PREVENTS SKIN ACIDS AND PERSPIRATION CONTAMINATING THE RACES AND ROLLING ELEMENTS.

Immerse small parts and machined components into a mild alkali cleaning solvent. Agitate the parts to remove all foreign matter.

Parts should remain in the solvent long enough to be thoroughly cleaned and heated. This will help evaporate the solvent and rinse water. Thoroughly rinse parts to remove all traces of cleaning solvent.

Cleaning - Bearings

After rinsing, immediately dry the parts using moisture-free compressed air. Lint-free, uncontaminated wiping rags can be used.

Immerse bearings in cleaning solvent. Rinse the cleaned bearings and dry with moisture-free compressed air while rotating them **slowly** by hand. **DO NOT** spin bearings when drying. Lubricate all bearings with system oil; wrap in clean, lint-free cloth or paper and store in a cool, dry place.

Inspection - General

A careful and thorough inspection of all parts is extremely important. Replace all parts showing indications of wear or damage.

Inspection - Bearings

Carefully inspect all rollers, cages and cups for wear, nicks or chipping. When replacing bearings, **ALWAYS** install new mating cups and cones. After inspection, lubricate all bearings with system oil; wrap in clean, lint-free cloth or paper and store in a cool, dry place.

Cleaning and Inspection (Continued)

Inspection - Oil Seals, O Rings and Snap Rings

Replace all oil seals, O rings and snap rings. Lubricant loss through a worn seal can cause expensive parts of the assembly to fail. Handle sealing components carefully, particularly when being installed. Cutting, scratching or curling of the seal lip seriously reduces efficiency.

Apply a thin coating of 'Permatex No. 2', or equivalent, onto the outer diameter of the oil seal carrier. This ensures an oil-tight fit in the bore. Lubricate all oil seal lips and O rings before installation.

Inspection - Sprockets and Drive Shafts

If crack detection equipment is available, use the process to check parts. Examine teeth of all sprockets for wear, pitting, chipping, nicks, cracks and scores. If the sprocket teeth show spots where the case hardening has worn through or cracked, replace the sprocket.

Small nicks can be removed using a suitable grinding stone. Inspect shafts for signs of bent or twisted splines and replace any deformed drive axles.

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Torque Guide

Application			
Stub Axle Nut	3389,5 N.m	345,6 kgf.m	2500 lbf-ft
Rim Clamp Nuts	203,4 N.m	20,7 kgf.m	150 lbf-ft
Backing Plate Capscrews	74,6 N.m	7,6 kgf.m	55 lbf-ft
Final Drive Flange Capscrews	230,5 N.m	23,5 kgf.m	170 lbf-ft
Drive Sprocket Capscrews	108,5 N.m	11,1 kgf.m	80 lbf-ft
Bearing Cap Capscrews	108,5 N.m	11,1 kgf.m	80 lbf-ft
Bearing Housing Capscrews	216,9 N.m	22,1 kgf.m	160 lbf-ft
Sprocket Bolts & Lock Nuts	406,7 N.m	41,5 kgf.m	300 lbf-ft

Special Tools

The following tools are recommended when overhauling the standard brakes and tandems. The tools help you to remove and install precision-machined parts.

Champion Tool Part Number	Description
5726	Rear wheel puller plate
5727	Rear wheel puller screw
377	Brake ajusting wrench

Make sure proper tools are available and in good working order. Some tools required in this section may have to be manufactured, and are described within the text of this section.

Disassembly

Fig. 2
Turn the isolation switch to the "ON" position. Start the engine. Lower the moldboard onto blocks to raise one tandem. Place adequate blocks under the tandem, then lower the tandem onto the supports. Stop the engine. Turn the isolation switch to the "OFF" position. Apply the parking brake.

Fig. 3
Remove the nuts, rim clamps, tire and the rim.

Fig. 4
Remove the stub axle nut and the washer **(Ref. Fig. 1).**

NOTE

You may find it easier to loosen the nut before raising the machine to support the tandems.

Fig. 5
Attach a safe lifting device to the top wheel stud. Remove the wheel (3) with a rear wheel puller plate **(Special tool No. 5726)** and a rear wheel puller screw **(Special tool No. 5727)** from the stub axle.

NOTE

Check for signs of damage on the brake drum surface. If damage has occurred, replaced the wheel casting.

Fig. 6
Using a hammer and a metal pry bar remove the key (**70**) from the end of the stub axle (**38**).

Fig. 7
Place a container under the tandem drain plug (**41**). Remove the plug and drain the lubricating oil. Clean and install the drain plug.

NOTE

The tandem oil capacity for the short tandems is 30 litres (6.6 Imp. gal, 7.9 U.S. gal) and the long tandems is 32 litres (7.1 Imp. gal, 8.5 U.S. gal).

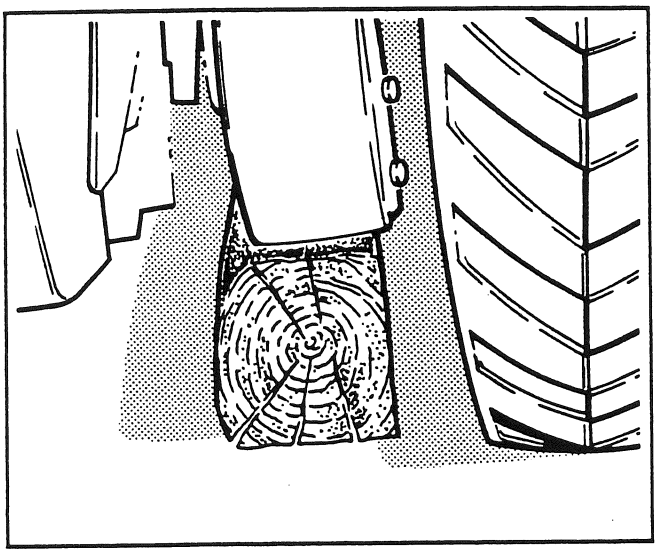
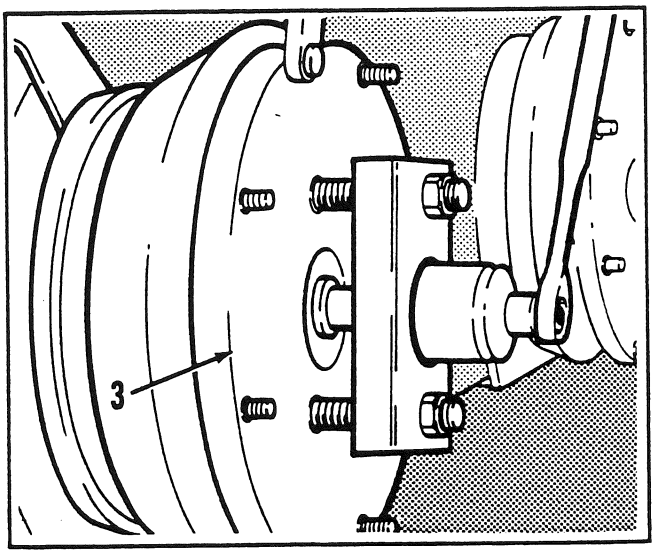


Fig. 2



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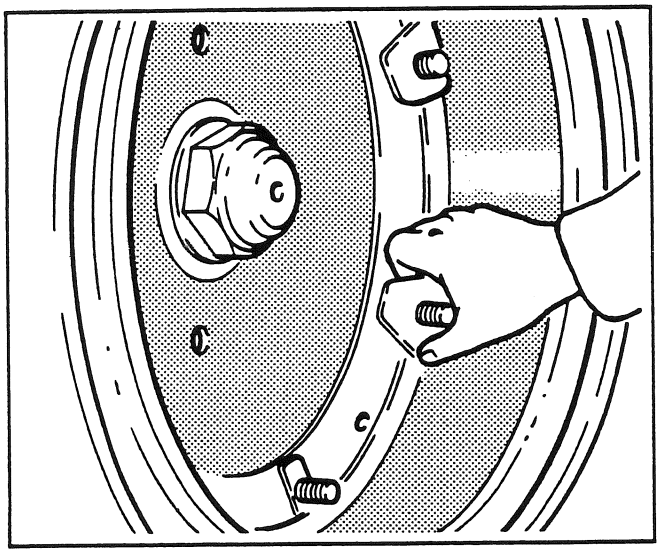

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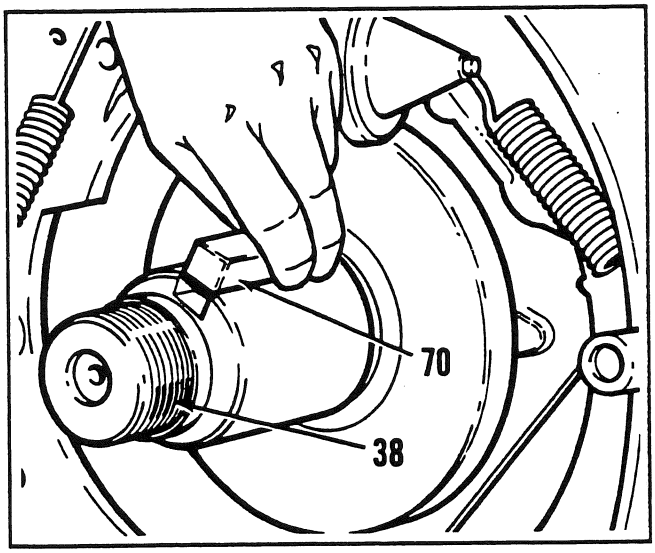

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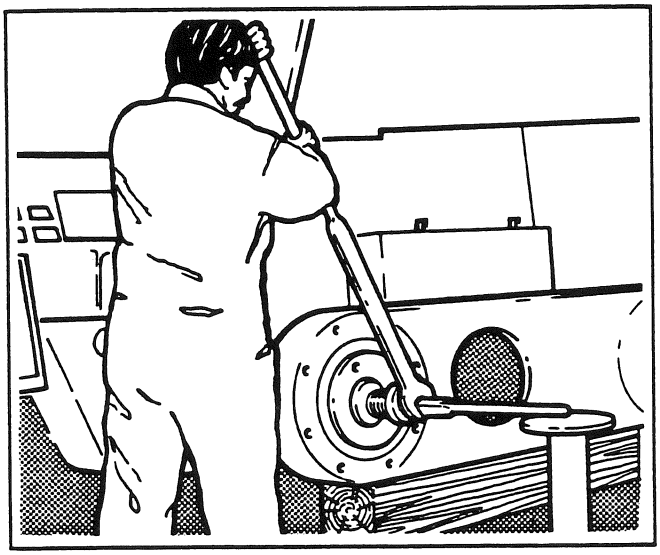

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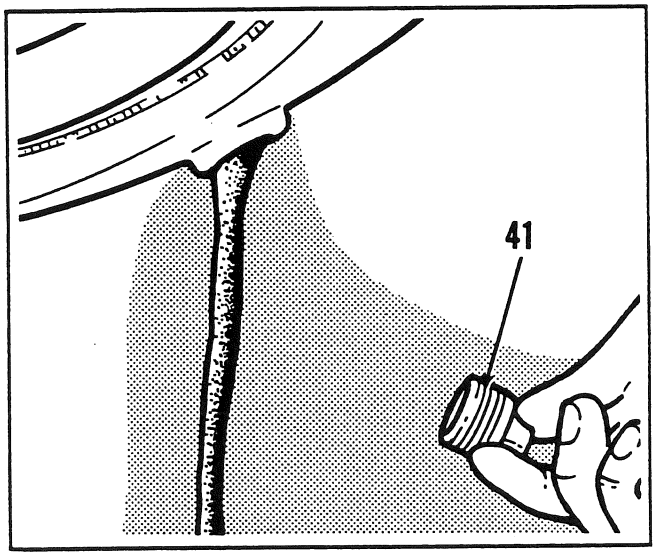

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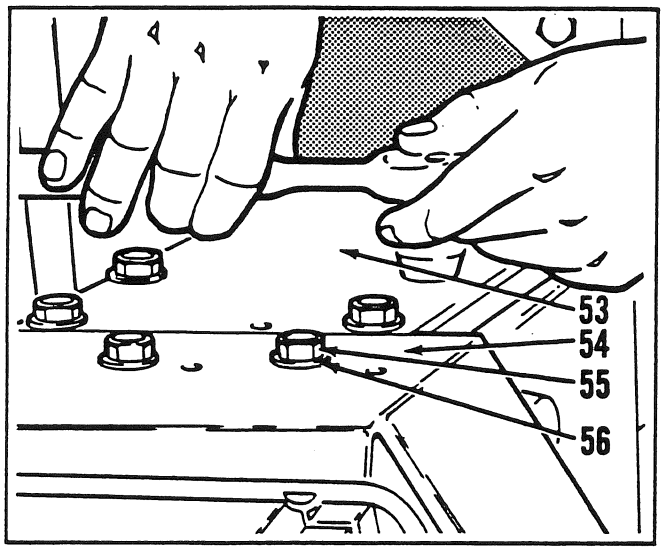

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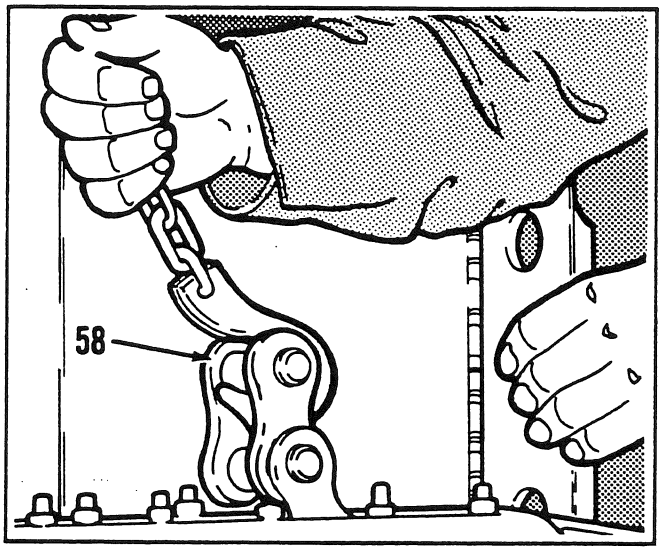

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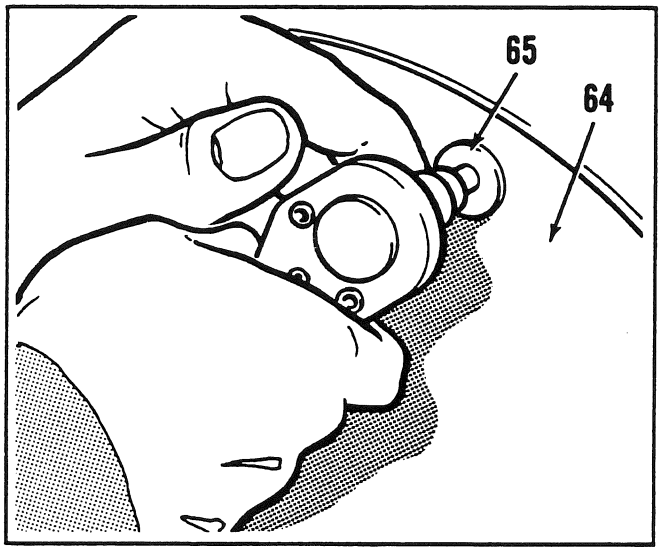
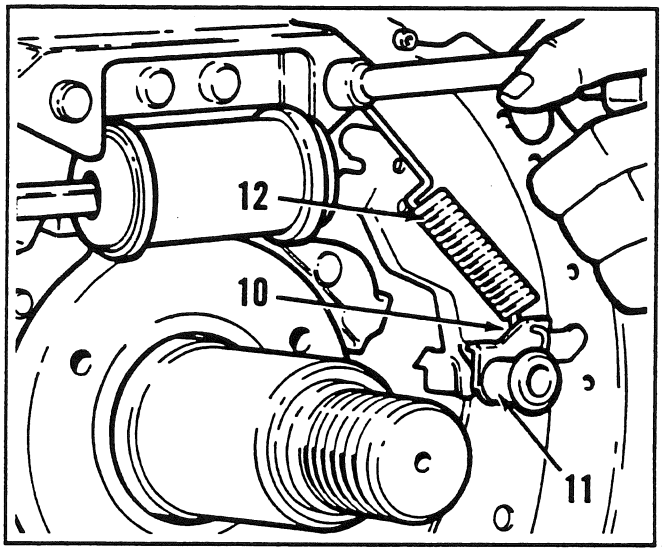


Fig. 9



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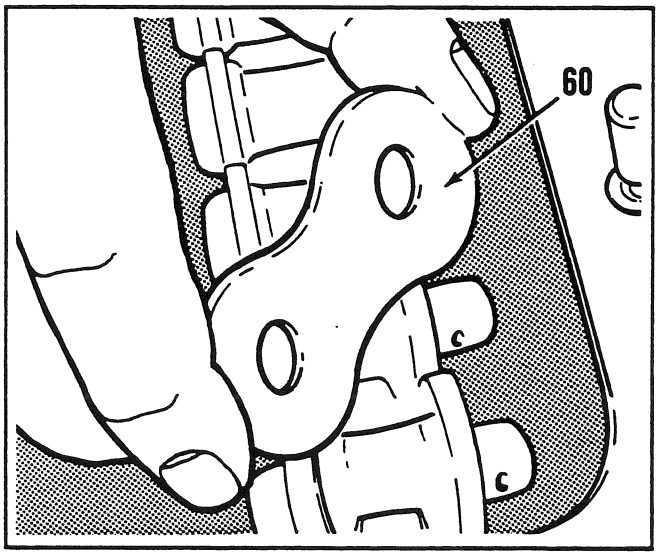

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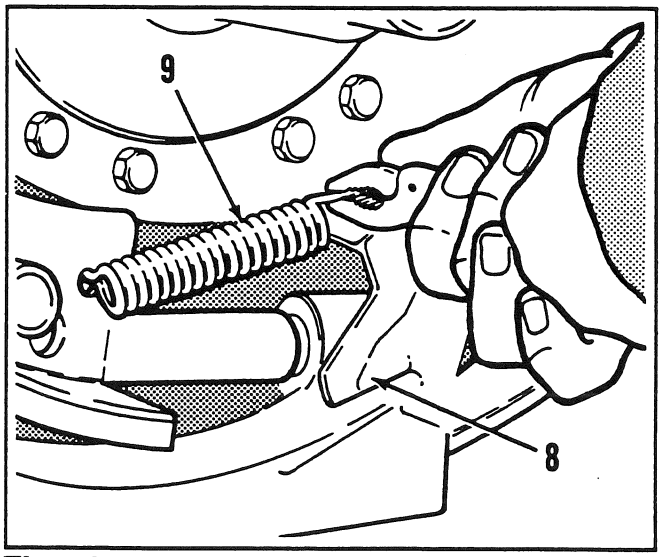


Fig. 13

Disassembly (continued)

Fig. 8
Remove the nuts (**56**) and lock washers (**55**) securing the cover plates and brake line shields. Remove the cover plates (**53**) and brake line shields (**54**) and discard the gasket (**Ref. Fig. 1**).

Fig. 9
Remove the countersunk capscrews (**65**) the side cover plate (**64**) and discard the gasket.(**Ref. Fig.1**)

NOTE

With the grader in neutral release the emergency brake and operate the moldboard to raise the opposite tandem. Turn off the engine and rotate the opposite side tires to turn the tandem chain connector links into position. When the links are accessible throught the inspection ports, start the engine and lower the opposite tandem to the ground. Apply the emergency brake.

Fig. 10
Remove the cotter pins (**Ref. Fig. 1**) and the connector link (**60**) from each chain.

Fig. 11
Using a safe lifting device remove the tandem chains (**58**) through the inspection ports.

NOTE

Although the brakes are left-hand and right-hand assemblies, the disassembly and reassembly procedures remain the same. If both left and right-hand assemblies are removed and disassembled at the same time, take care to keep left and right-hand components separate.

Fig. 12
Using a brake lever, remove the brake shoe return springs (**12**), the auto-adjuster cable (**10**) and the cable guide (**11**).

Fig. 13
Using pliers, remove the adjusting springs (**9**), and the auto-adjuster lever (**8**).

Disassembly (continued)

Fig. 14
Using pliers, push in and rotate the brake shoe hold-down spring cup (**14**) until the slot aligns with the flat end of the hold-down pin (**18**). After this is accomplished, the brake shoe hold-down cups (**14**), springs (**15**)(6 required to be loosened) and the brake shoes (**16,17**) should be removed.

NOTE

Examine the brake shoes for wear. A shoe must be replaced or relined if the rivet head is less than 1,5 mm or 1/16 of an inch below the lining surface.

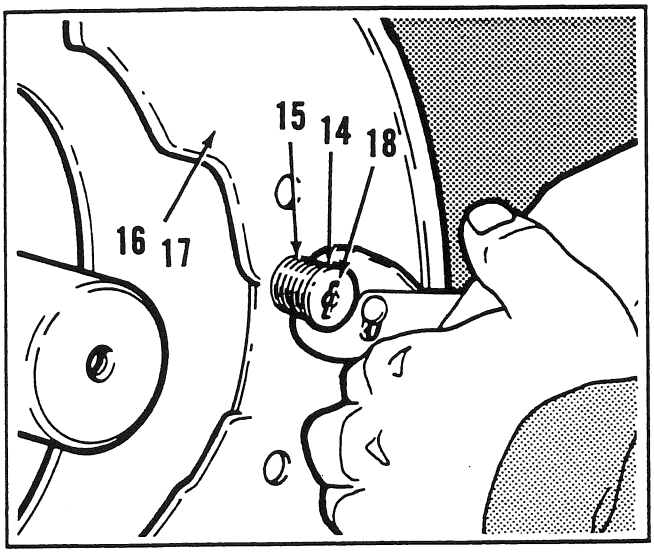
Fig. 15
Remove the hold-down pins (**18**).

Fig. 16
Disconnect the brake line from the wheel cylinder found between the backing plate (**21**) and the stub axle housing (**40**). Plug the brake line and wipe up any spilled fluid.

Fig. 17
Remove the capscrews (**36**) and lockwashers retaining the wheel cylinder (**Ref. Fig. 1**). Remove the wheel cylinder from the backing plate and remove the wheel cylinder links (**Ref. Fig. 1**).

Fig. 18
Disassemble the wheel cylinder on a clean workbench by first removing the metal strap (**25**).

Fig. 19
Remove the boot (**26**).



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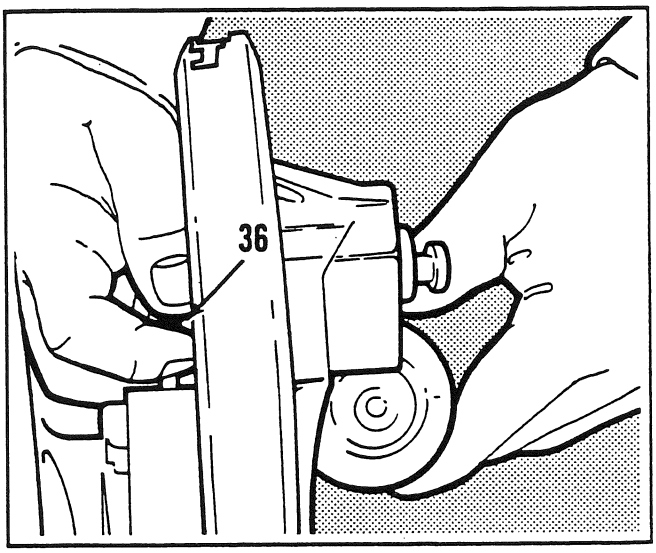

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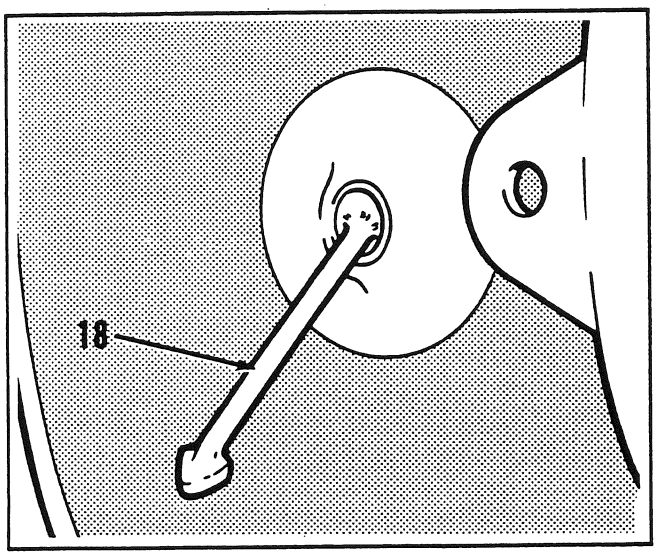

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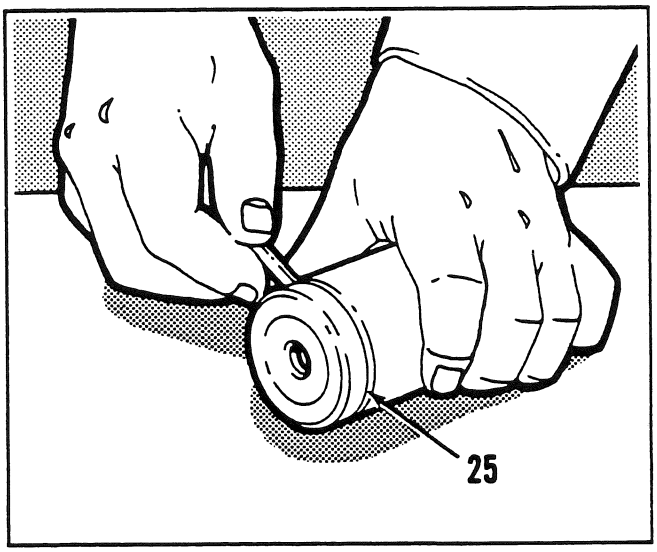

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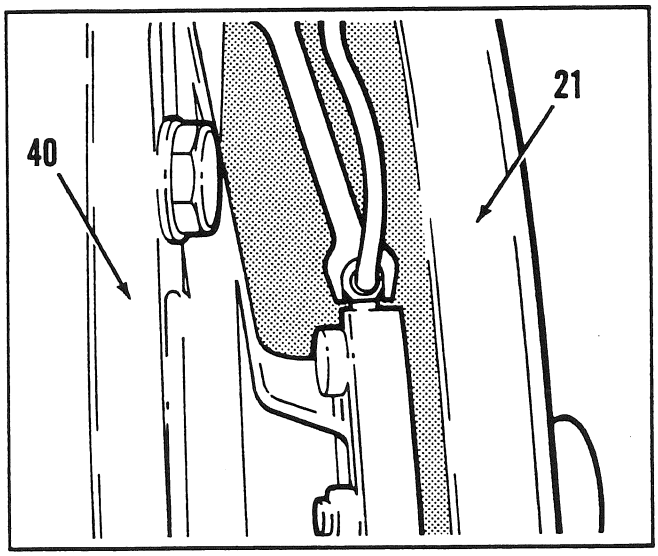

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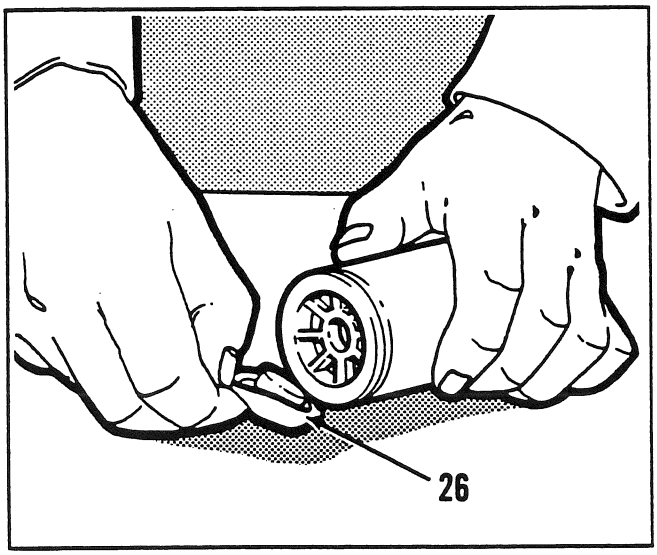

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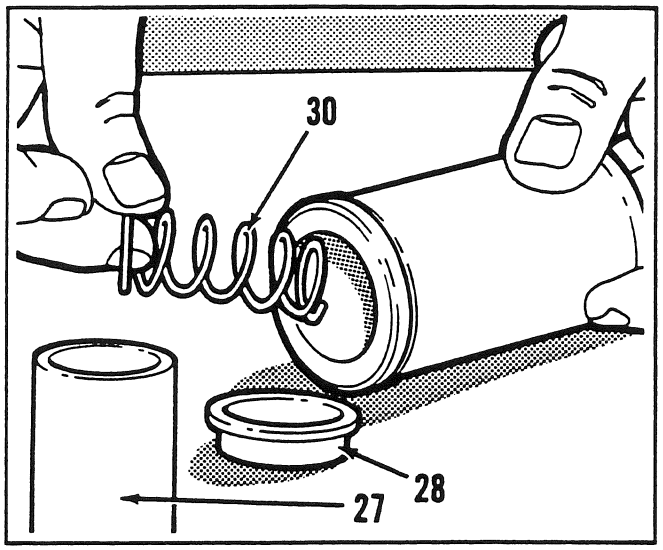

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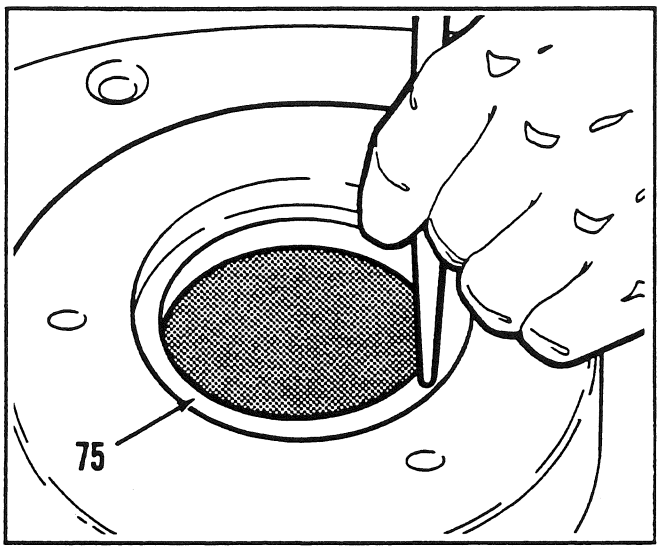

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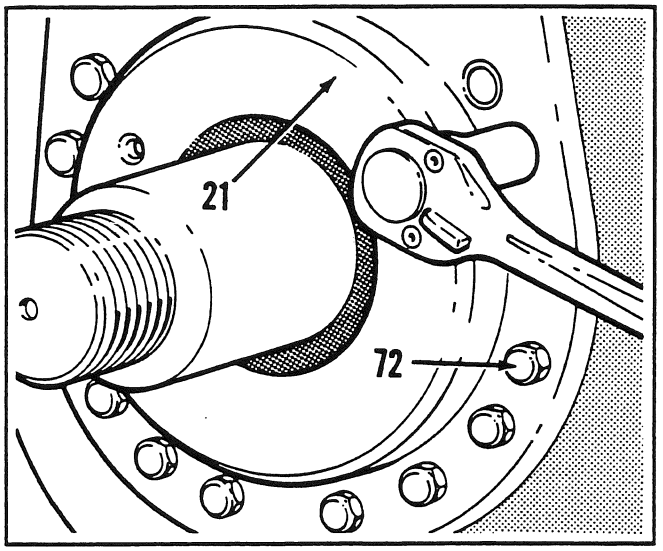

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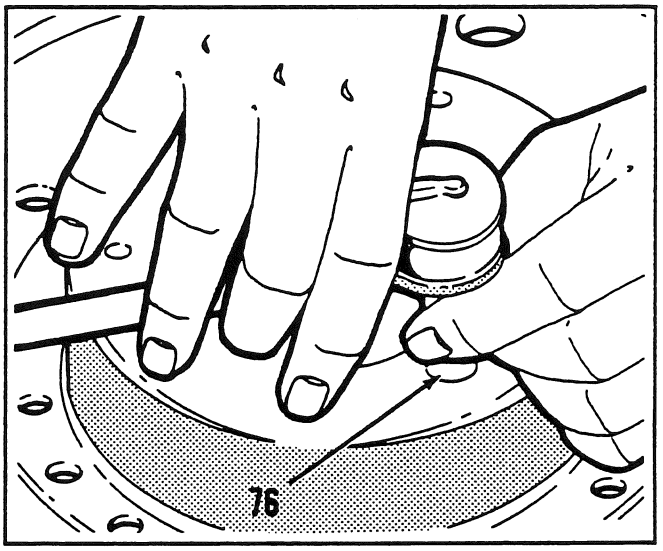

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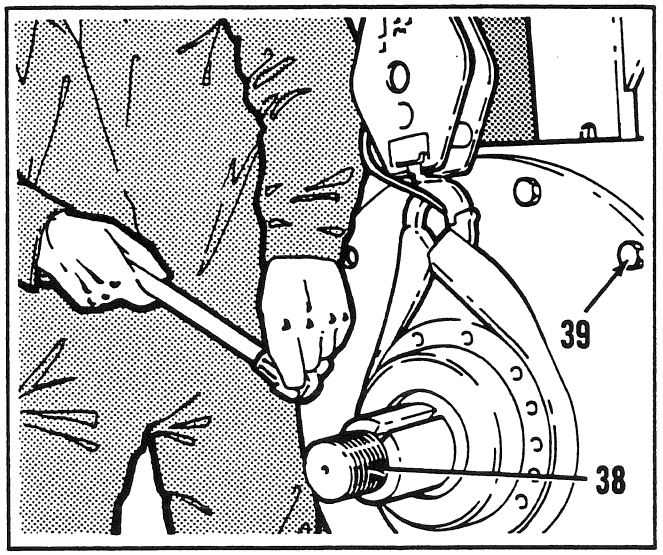

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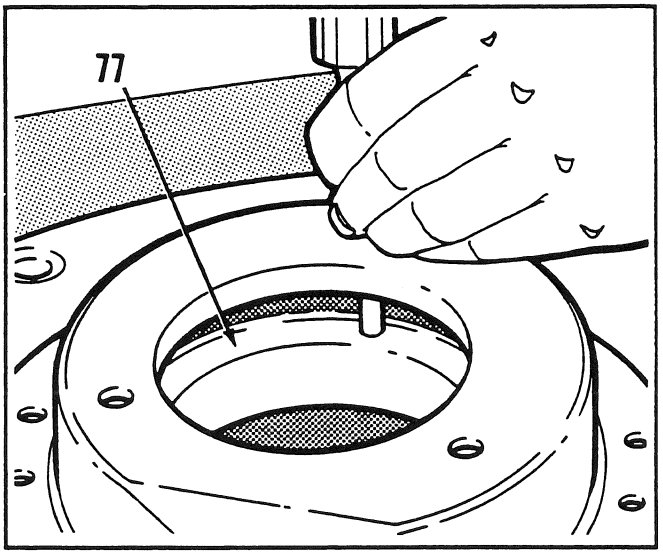


Fig. 25

Disassembly (continued)

Fig. 20
Remove the piston (**27**), piston cup (**28**) and return spring (**30**). Do the same procedure for the other end of the wheel cylinder using instructions from **Fig. 18** to **Fig. 20.**

NOTE

Inspect the boots, spring, piston cups and cylinder links for signs of damage and wear. Also inspect the wheel cylinder casting for scoring. If the scoring is too deep then the cylinder casting cannot be honed properly and should be replaced.

Fig. 21
Remove the capscrews (**72**) and the backing plate (**21**).

Fig. 22
Insert 2 wooden planks through the inspection port of the tandem to support the sprocket (**Ref. Fig. 1**) and stub axle (**38**). Secure a safe lifting device to the bearing housing (**40**) as illustrated and remove the bolts (**39**) retaining the housing. Lift the bearing housing away from the tandem.

Fig. 23
Using a suitable drift and a hammer remove the oil seal (**75**) from the bearing housing (**40**).

Fig. 24
Remove the three socket head set screws (**76**).

Fig. 25
Using a hammer and brass drift remove the bearing cup (**77**).

Disassembly (continued)

Fig. 26
Secure a safe lifting device to the stub axle assembly. Remove the two planks of wood supporting the sprocket and the stub axle (**Ref. Fig. 1**) and lift the stub axle out of the tandem. Use a split-type bearing puller to remove both bearing cones (**Ref. Fig. 1**).

Fig. 27
Remove the nuts (**80**) and bolts (**74**) retaining the sprocket (**73**) to the stub axle (**38**).

Fig. 28
Stand the stub axle (**38**) upright and lift off the sprocket (**73**).

Fig. 29
Remove the capscrews (**48**), washers (**49**) and the bearing cap (**47**) from the bearing flange (**45**).

Fig. 30
Remove the shims (**46**) from the bear-cap (**47**).

Fig. 31
Remove the two socket head capscrews (**50**) retaining the bearing flange (**45**) to the tandem case. Use a hammer and brass drift to remove the assembly.

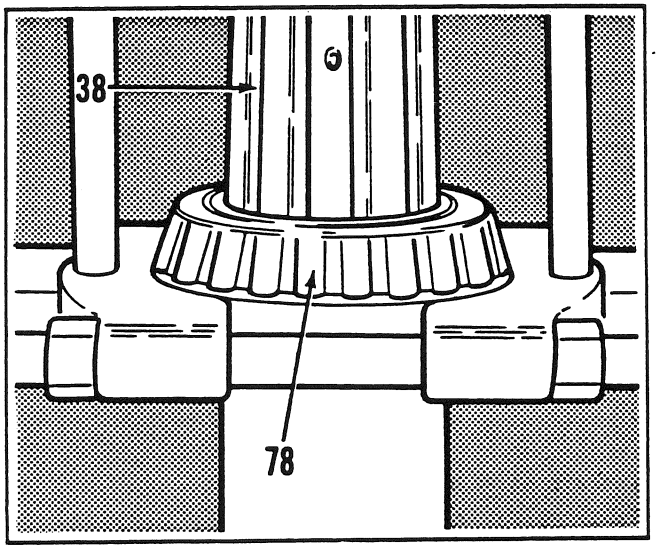


Fig. 26

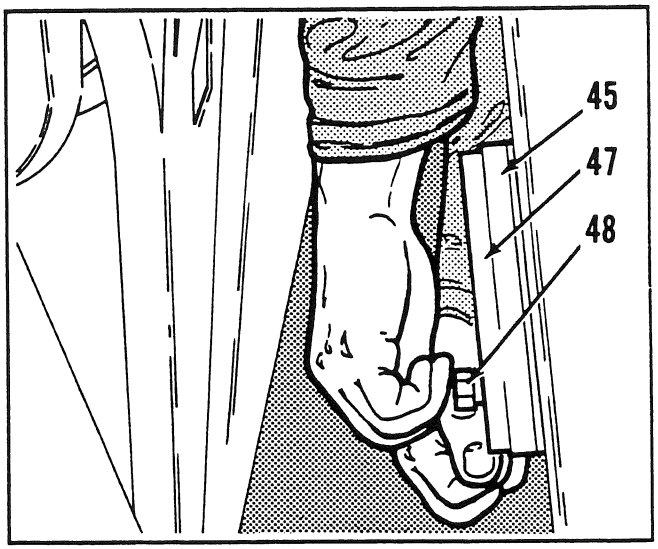


Fig. 29

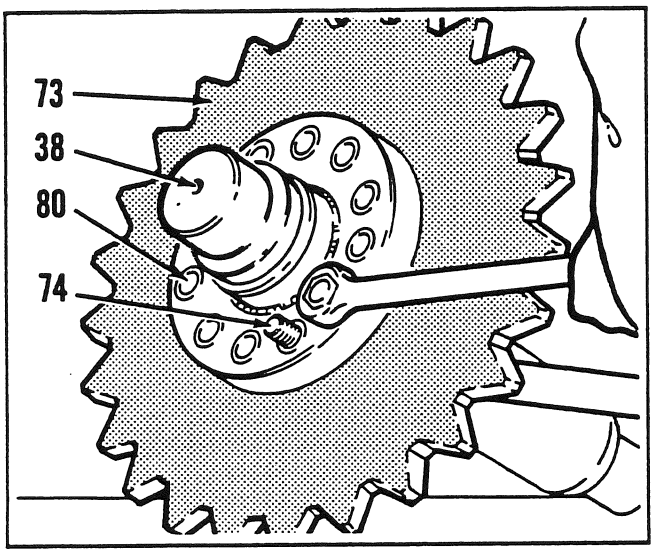
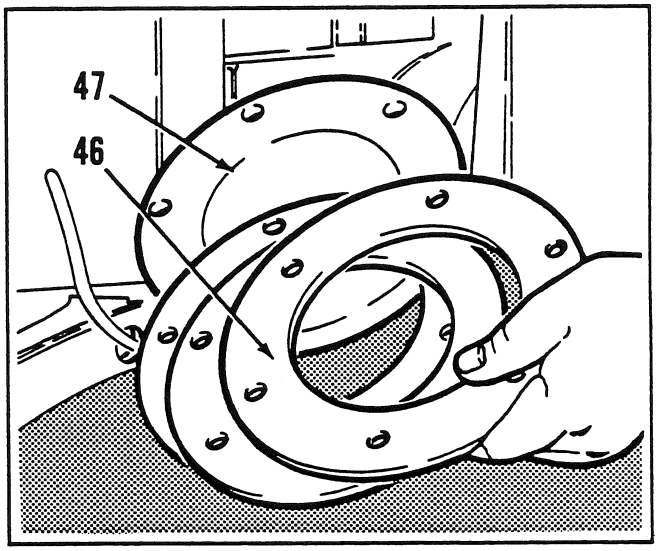


Fig. 27



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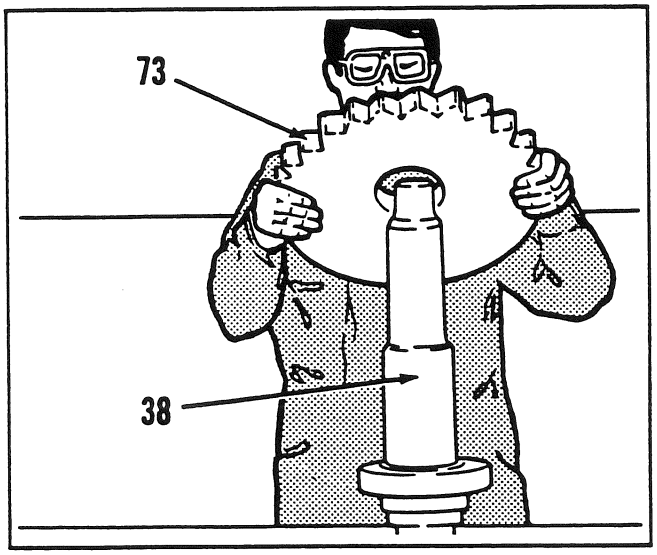

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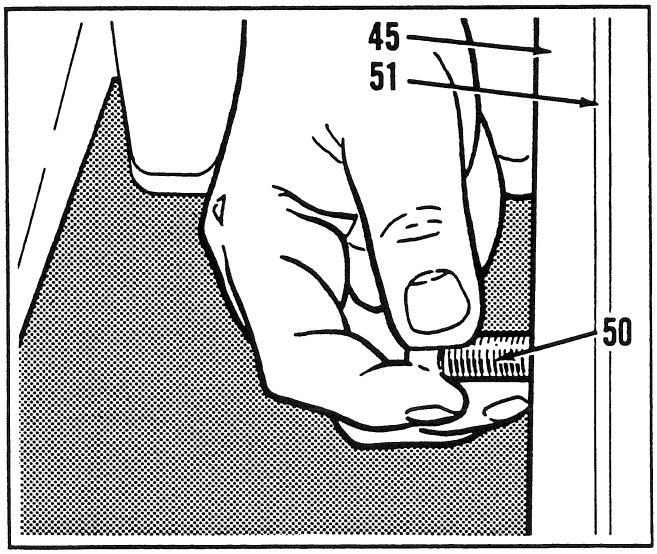

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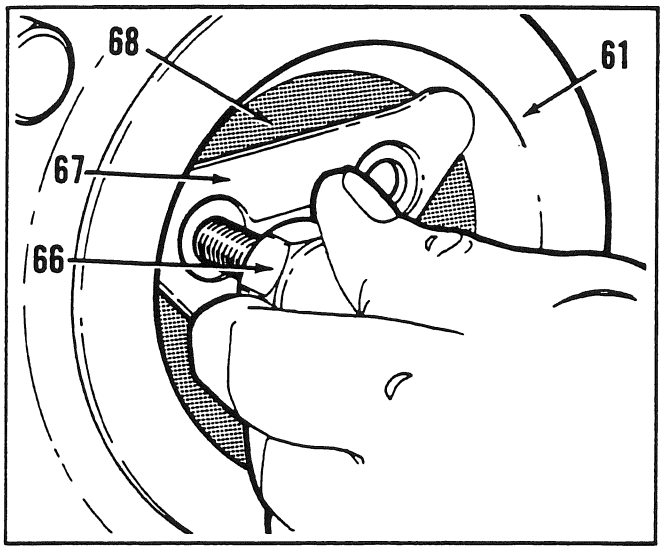

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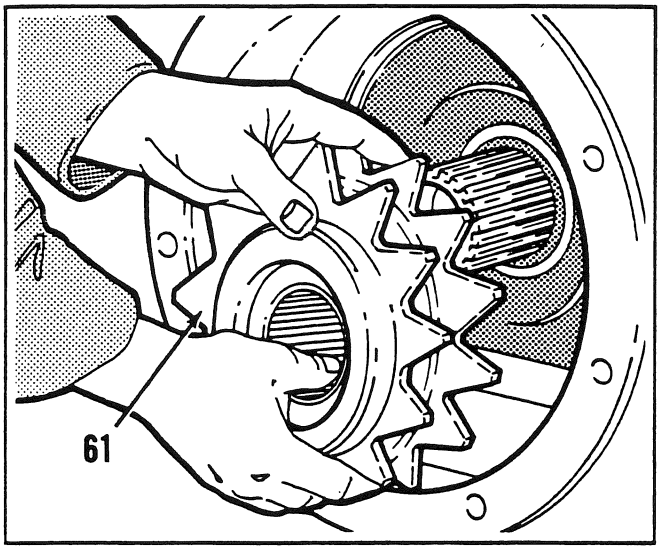

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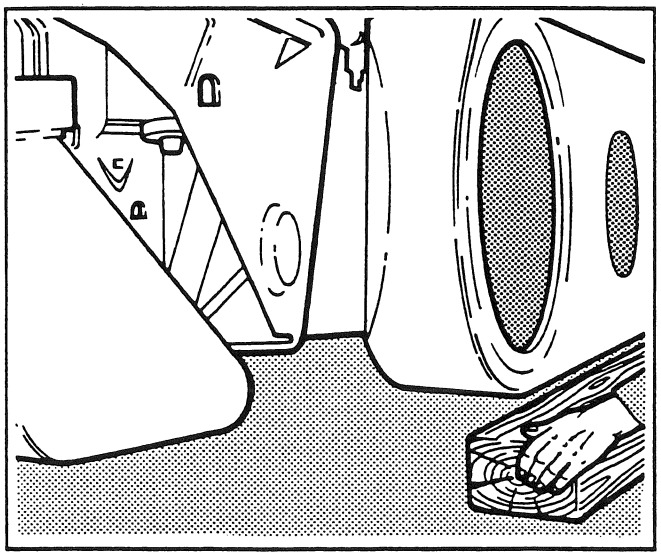
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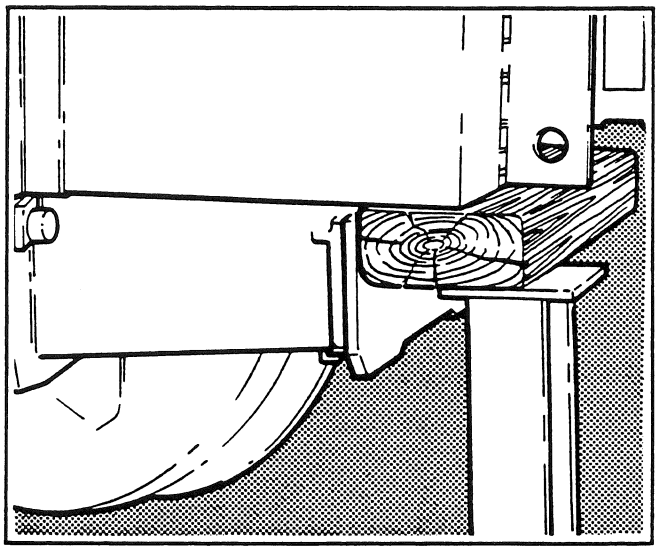
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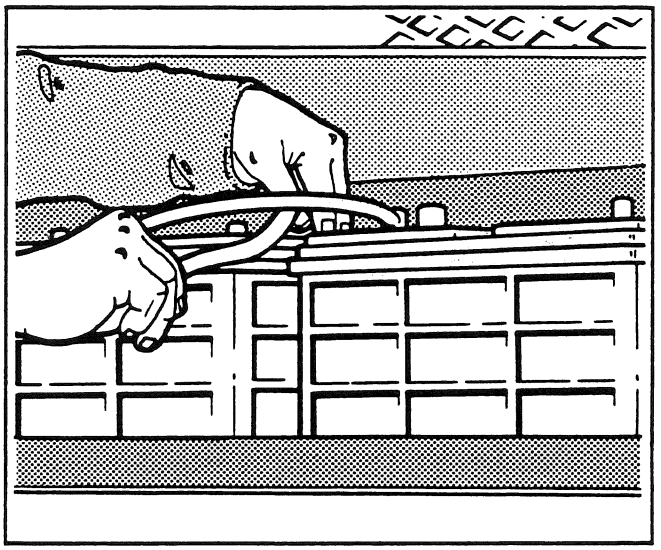
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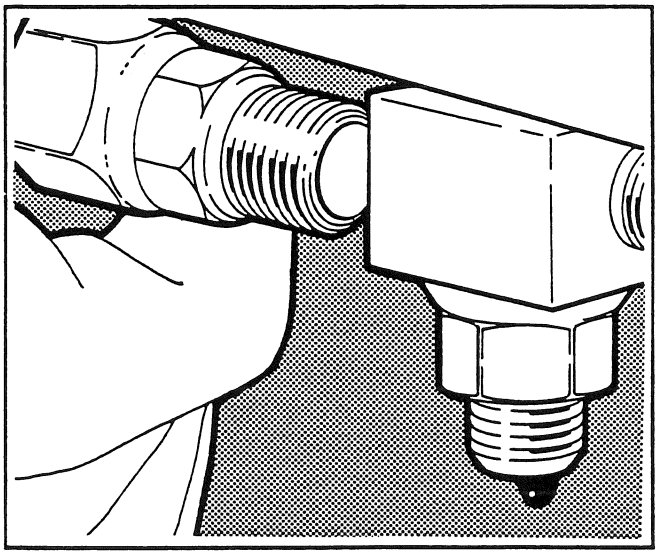


Fig. 37

Disassembly (continued)

Fig. 32
Using a hammer and a drift bend back the three tabs locking the bolts (**66**) securing the drive sprocket (**61**). Remove the bolts, tabwasher (**67**) and the retaining plate (**68**). Discard the tabwasher.

Fig. 33
Remove the drive sprocket (**61**).

Fig. 34
Before removing the tandem, start the engine, release the emergency brake, and lower the moldboard to raise the tandem. Remove the blocks.

Fig. 35
Place safe, adequate stands under the rear frame and lower the grader onto the stands. Shut off the engine and apply the emergency brake.

Fig. 36
When working on the tandem carrying the batteries, remove the battery box cover, disconnect the battery cables and remove the batteries with the battery box.

Fig. 37
Disconnect the brake line at the tee fitting located under the frame near the final drive hanger brackets.

Disassembly (continued)

Fig. 38
Inspect all hydraulic tubes and hoses for leakage and corrosion. Check anchorage points are secure.

Fig. 39
Using a safe lifting device to support the weight of the tandem.

Fig. 40
Remove the capscrews retaining the final drive sleeve to the tandem and lift the tandem away from the drive sleeve.

NOTE

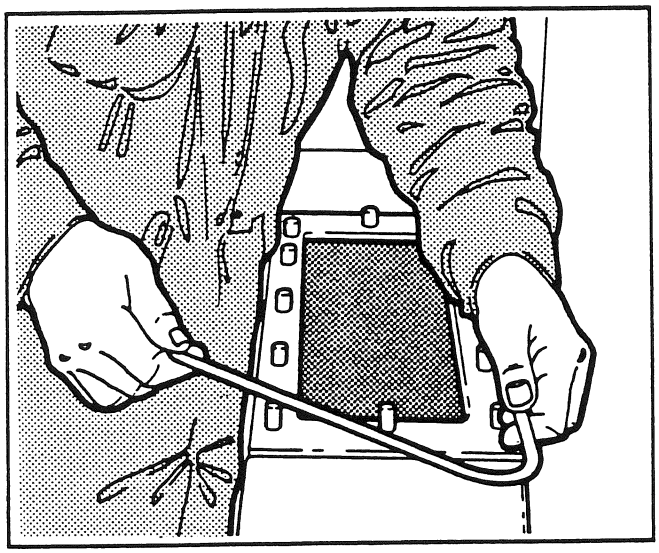
Clean and inspect all bearings for signs of cracking or over heating. Check the sprockets for abnormal tooth wear. Remove and clean the deep reach magnetic plugs from the tandem. Replace any damaged or worn components. Also remove all old gasket eliminator with "liquid chisel" from all tandem openings.

Fig. 41
While the tandem is removed, inspect the seal on the flange sleeve of the final drive. Replace the seal if damage is evident.

Reassembly

Fig. 42
Begin reassembly by applying gasket eliminator, Champion part number **25303** or 'Loctite' 515 to the final drive mounting face. Use a safe lifting device to position the tandem onto the final drive.

Fig. 43
Install special nyloc capscrews retaining the tandem to the final drive flange sleeve. Tighten the bolts uniformly in a diagonal sequence to the specified torque. Perform monthly maintenance checks on these bolts.



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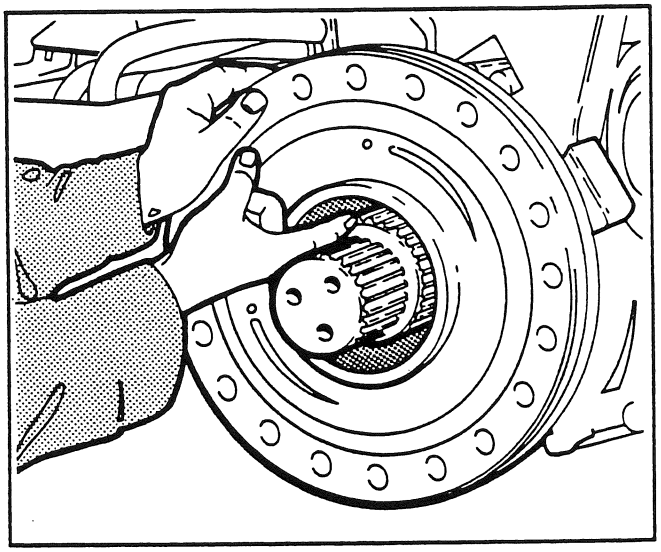

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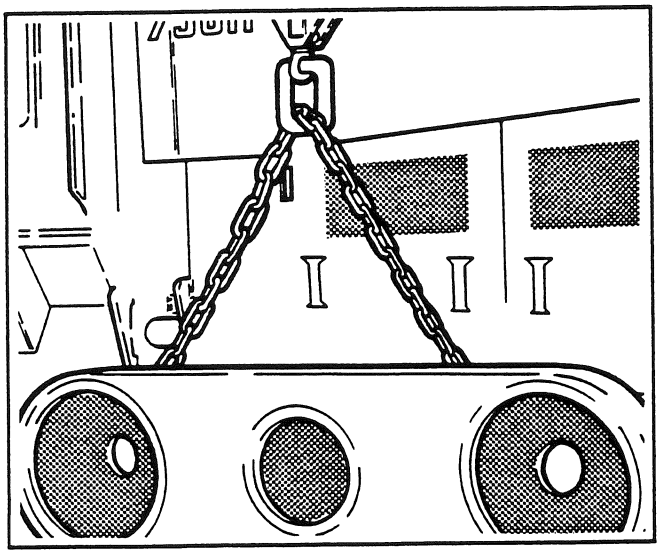

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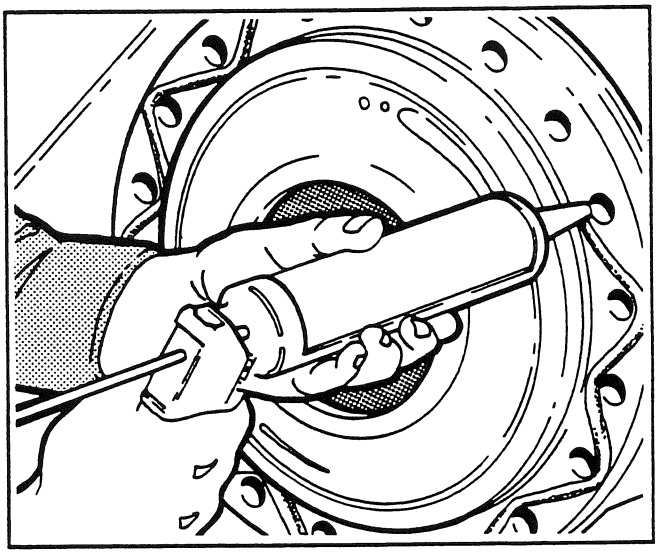
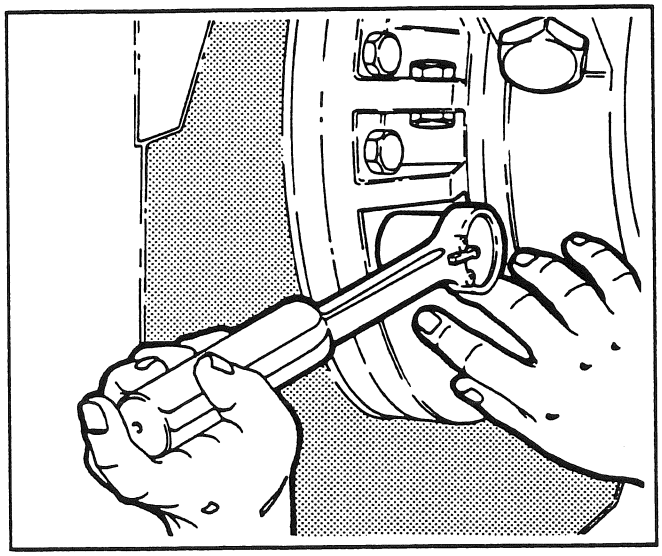


Fig. 42



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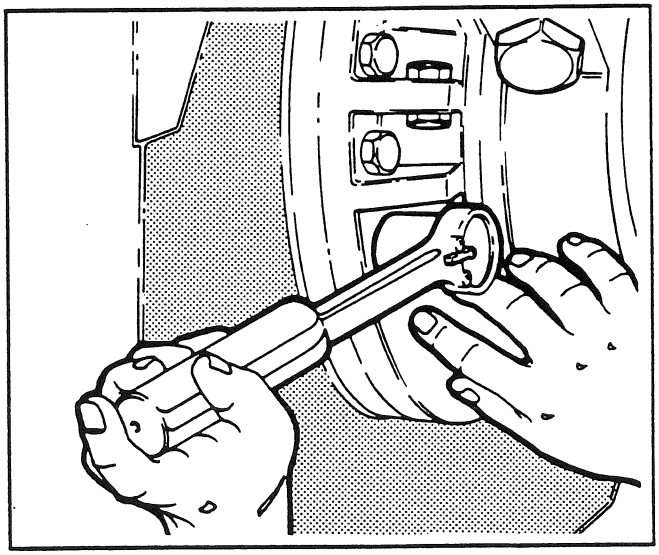

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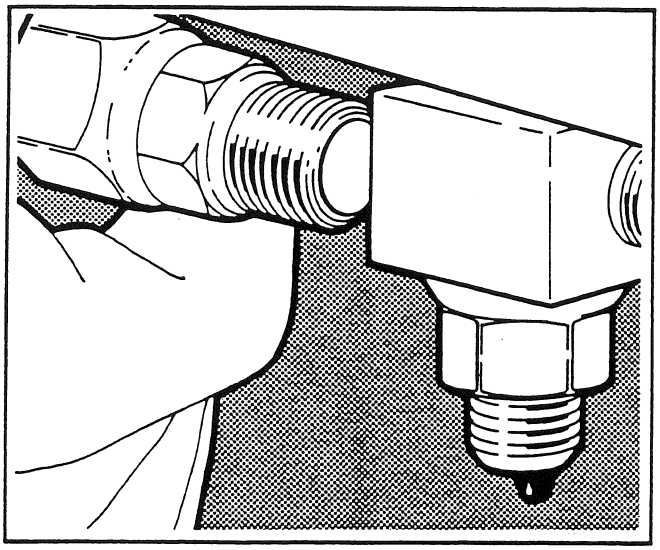


Fig. 44

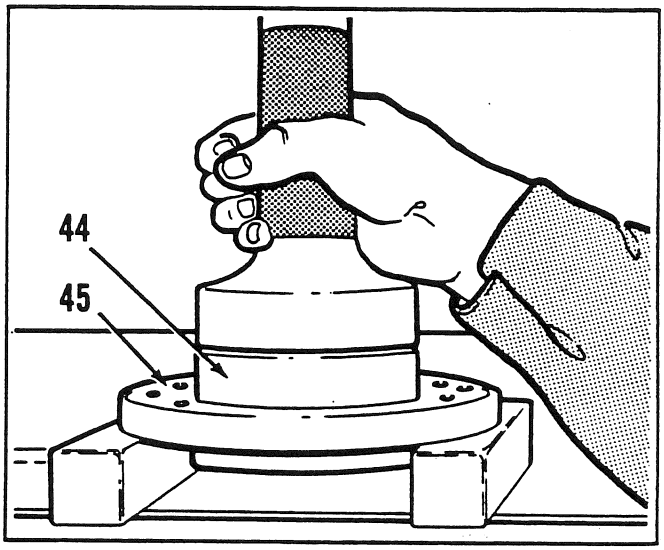
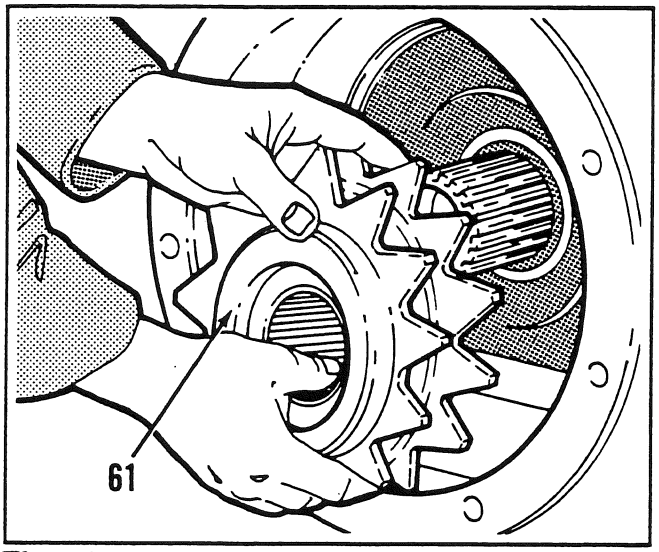


Fig. 47



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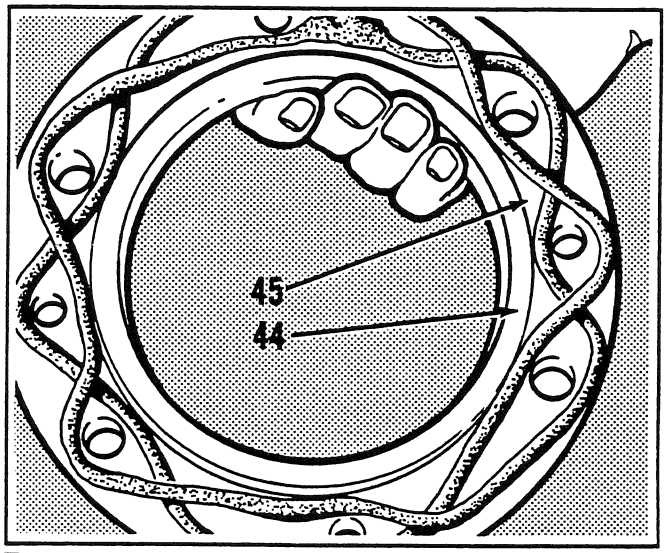

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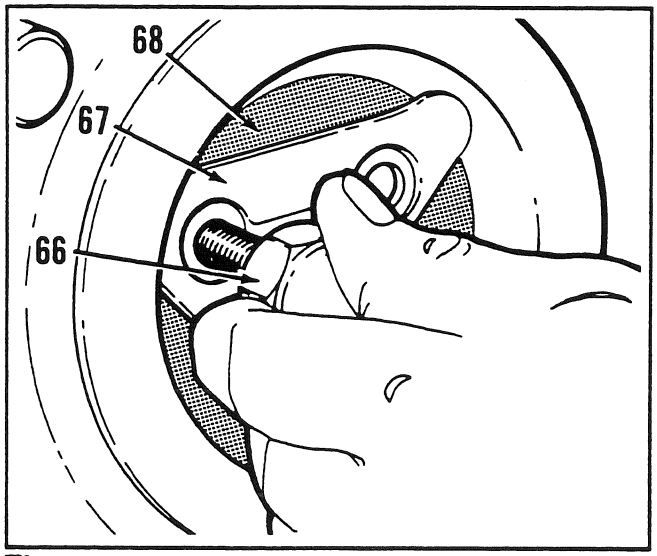

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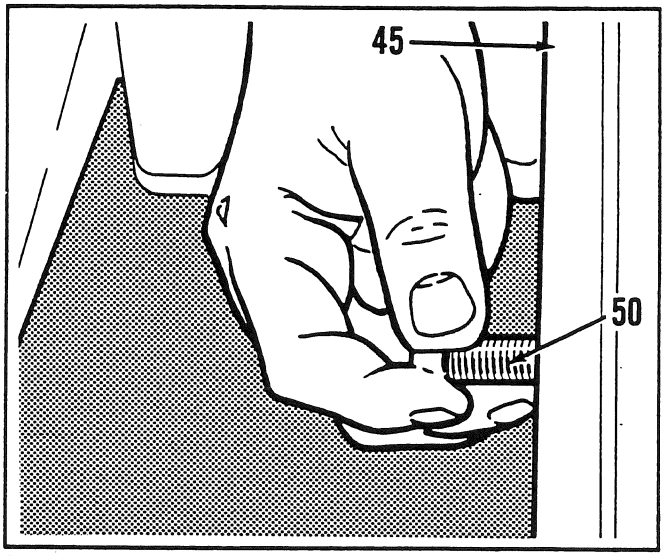


Fig. 49

Reassembly (continued)

Fig. 44
Reconnect the brake line to the tee fitting located under the machine on the frame near the final drive hangers.

Fig. 45
Install the drive sprocket (**61**) onto the drive axle.

Fig. 46
Install the retaining plate (**68**) a new tabwasher (**67**) and the capscrews (**66**).

Fig. 47
Using a press, install the bearing cup (**44**) into the bearing flange (**45**).

Fig. 48
Install a new gasket or use gasket eliminator Champion part number **25303** or 'Loctite' 515 on the bearing flange (**45**) and cup (**44**) assembly and install the assembly.

Fig. 49
Install the socket head capscrews (**50**) that retain the bearing flange (**45**) to the tandem. Tighten these capscrews.

Reassembly (continued)

Fig. 50
Install the bearing cap (**47**), the bolts (**48**), washers (**49**) and tighten them to finger tightness.

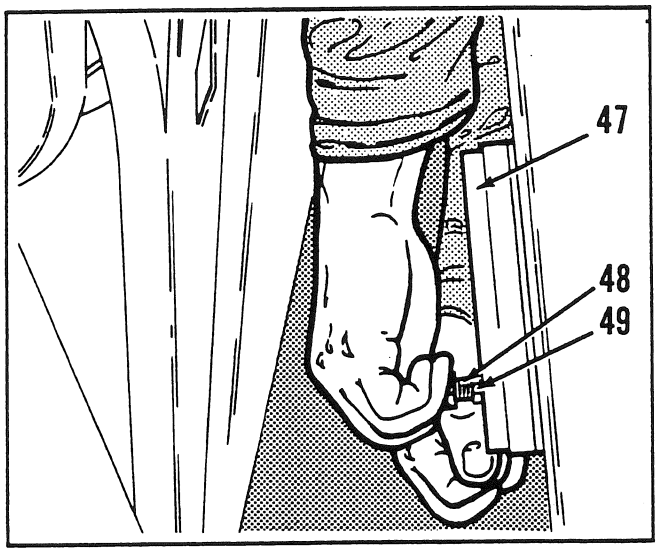
Fig. 51
Stand the stub axle (**38**) upright and install the sprocket (**73**) making sure the beveled surfaces unite. Install the nuts (**74**) and bolts (**Ref. Fig. 1**) and tighten them to the specified torque.

Fig. 52
Heat both bearing cones evenly in an oven or oil bath type heater to 121°C (250°F) maximum. **DO NOT** use an induction heater. Install them on the stub axle shaft and lubricate them with tandem oil.

Fig. 53
Apply grease to the bearing cup of the bearing flange. Using a safe lifting device, install the stub axle and retain it with two wooden planks.

Fig. 54
Install the bearing cup in the bearing housing and turn the housing over to insert three socket head capscrews.

Fig. 55
Apply silicone or gasket eliminator to the housing opening. Using a safe lifting device install the bearing housing with the V-notch at the top of the housing. Install the capscrews and remove the wooden planks. Tighten the capscrews in a diagonal sequence to the specified torque.



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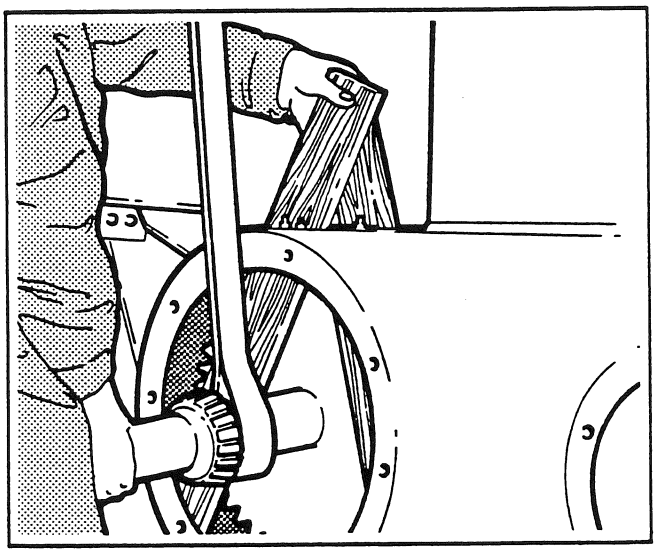
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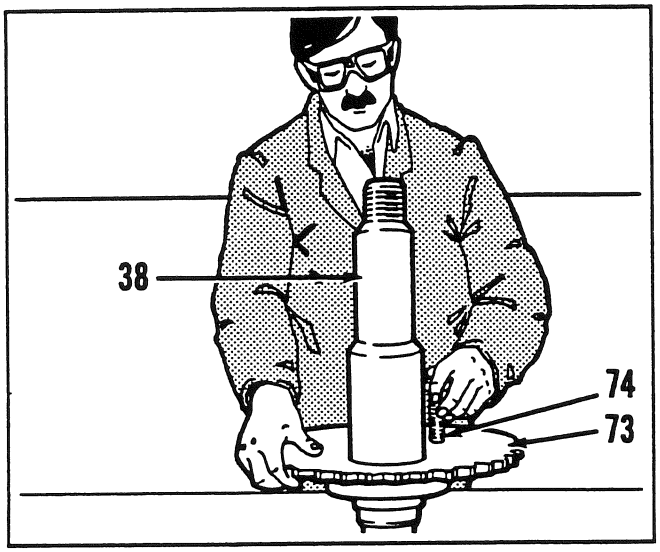

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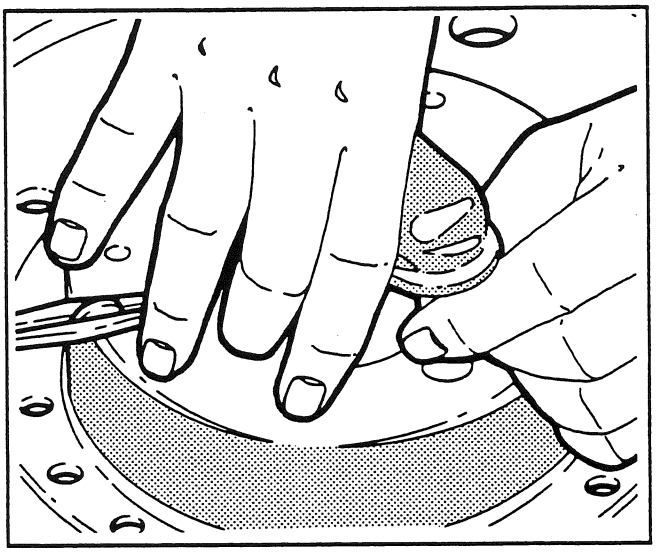
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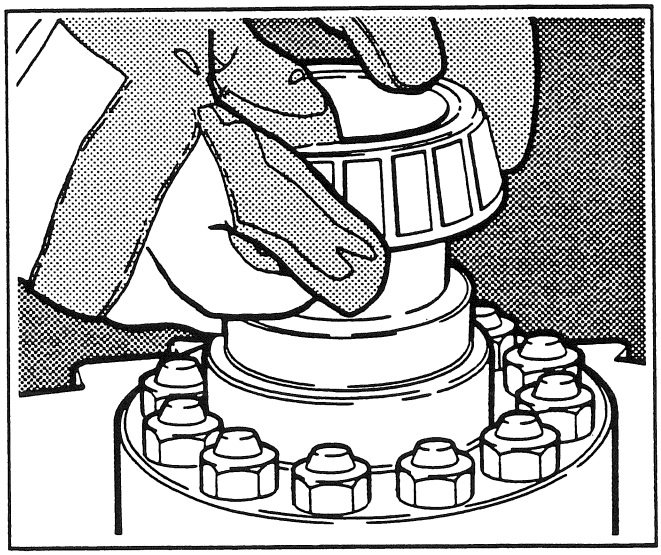
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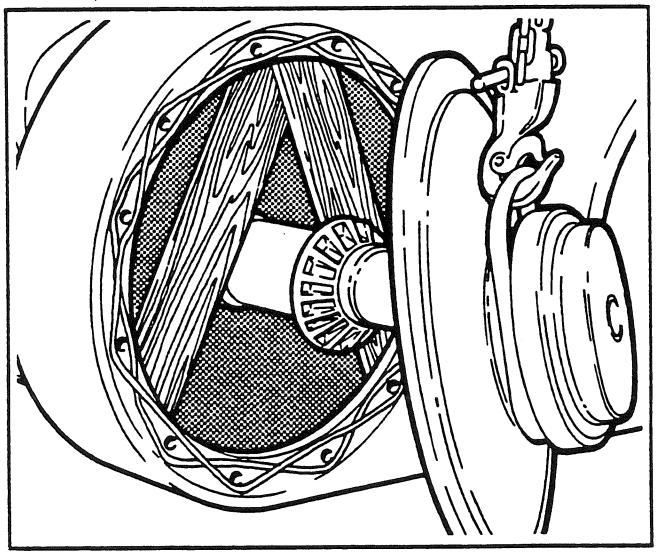
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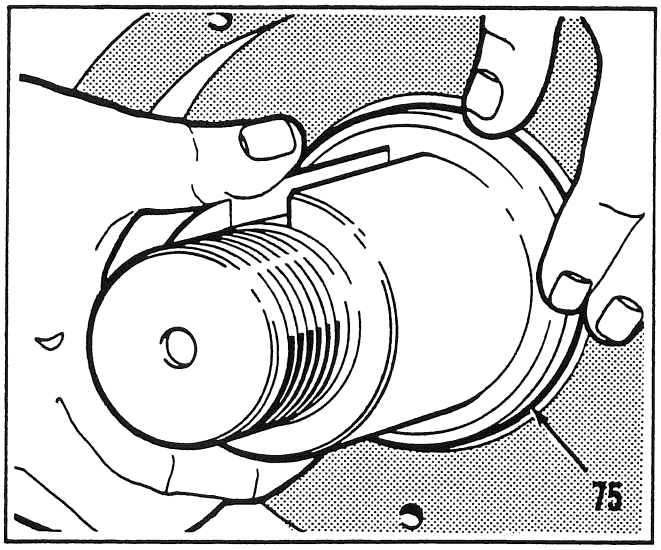

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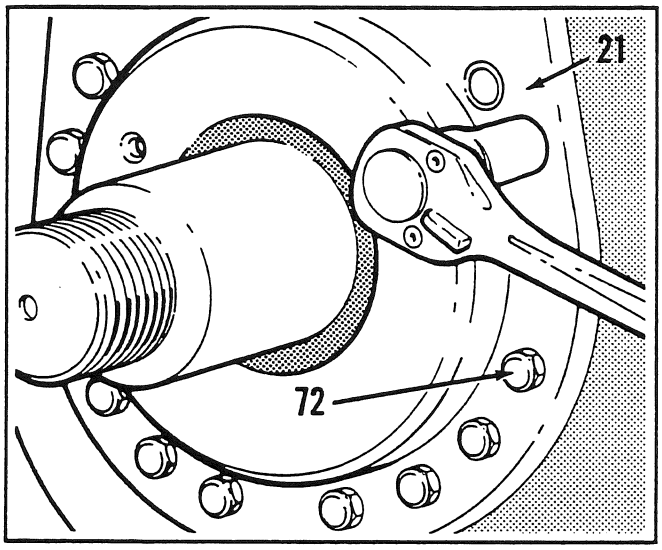
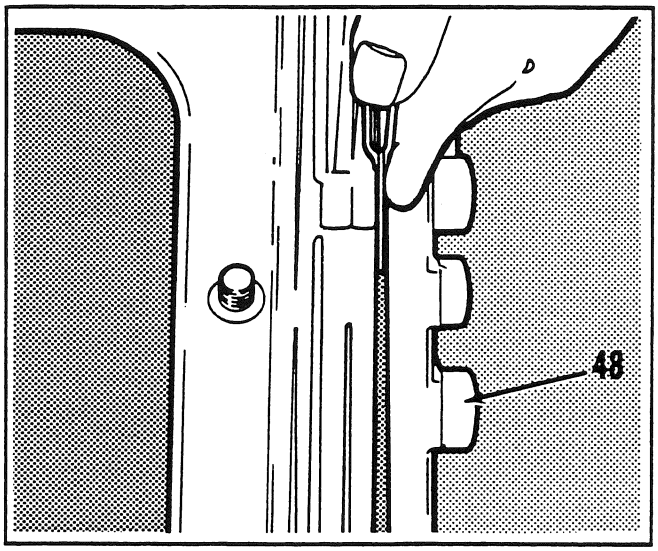


Fig. 59



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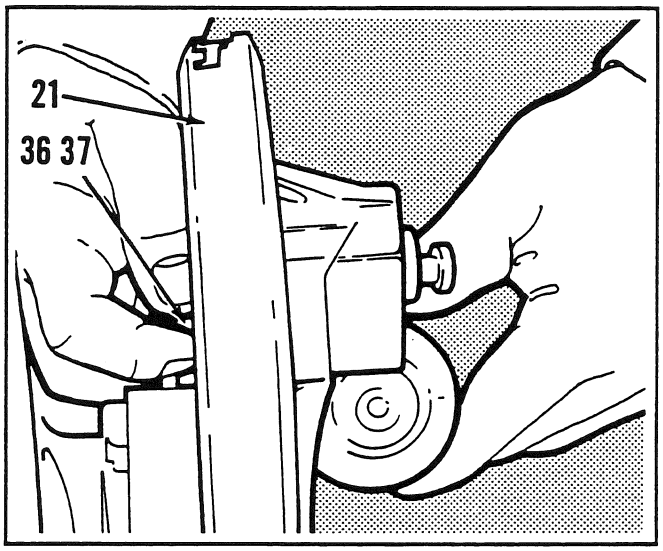

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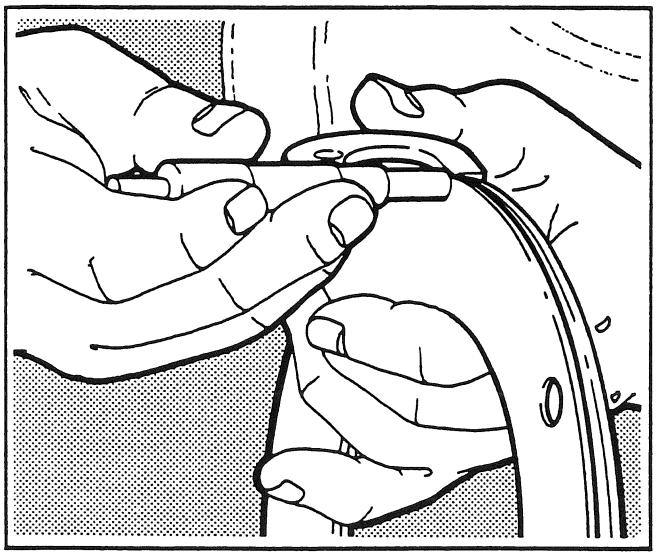


Fig. 58

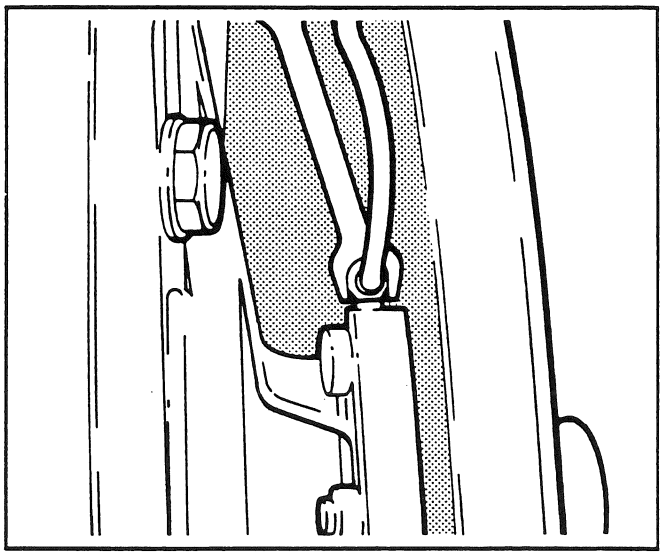


Fig. 61

Reassembly (continued)

Fig. 56
Lubricate and install a new stub axle seal (**75**).

Fig. 57
To set bearing pre-load, tighten the bearing cap capscrews (**48**) until a slight drag occurs when turning the large sprocket seen through the inspection port.
Using a feeler gauge, measure the gap between the bearing cap (**47**) and bearing flange (**45**).

Fig. 58
Using the measuement from Fig. 57, assemble a new shim pack (**46**) and install the bearing cap. Install the capscrews and tighten them to the specified torque. Check the rolling torque by rotating the large sprocket seen through the inspection port. The axle should rotate with a moderate pull. Add or remove shims as required.

Fig. 59
Install the backing plate (**21**) to the bearing housing (**Ref. Fig. 1**). Install the capscrews (**72**) and tighten them to the specified torque.

Fig. 60
Lubricate all brake wheel cylinder parts with clean fresh brake fluid. Reassemble and mount the wheel cylinder (**Ref. Fig. 1**) to the backing plate (**21**) with capscrews (**36**) and lockwashers (**37**).

Fig. 61
Reconnect the brake line to the wheel cylinder (**Ref. Fig. 1**).

Reassembly (continued)

Fig. 62
Install the hold-down pins (**18**).

Fig. 63
Apply white grease onto the backing plate around the hold-down pins in six places. This will prevent damage to the backing plate.

Fig. 64
Intall the brake shoes (**Ref. Fig. 1**) hold-down springs (**15**) and cups (**14**).

Fig. 65
Install the auto-adjuster lever (**8**) and adjusting screw spring (**9**).

Fig. 66
Install the auto-adjuster cable (**10**), cable guide (**11**) and both brake shoe return springs (**12**).

Fig. 67
Install the key (**70**) on the stub axle (**38**) and align the roll pin in the slot (**Ref. Fig. 1**).

NOTE

Repeat the preceding procedures for the assembly of the other brakes and stub axle assemblies.

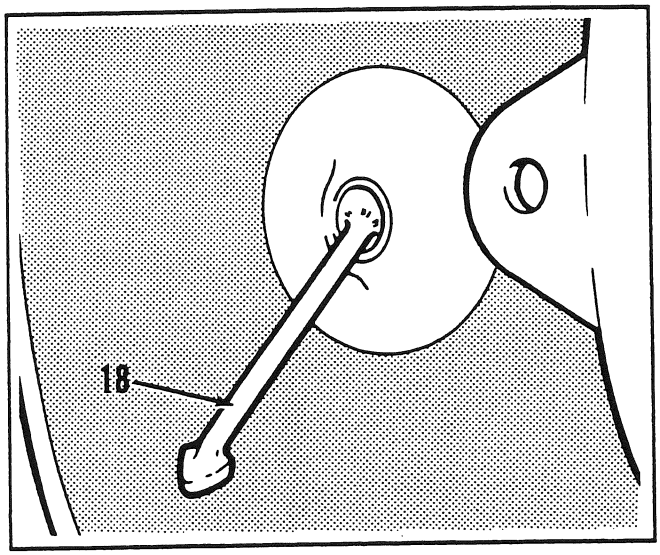


Fig. 62

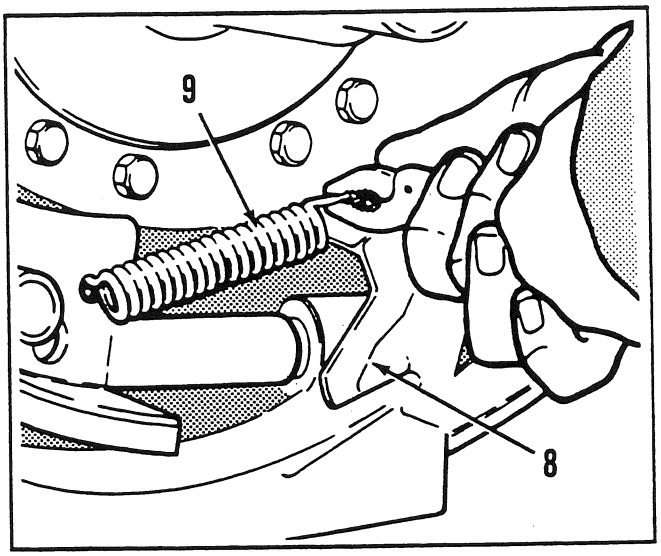


Fig. 65

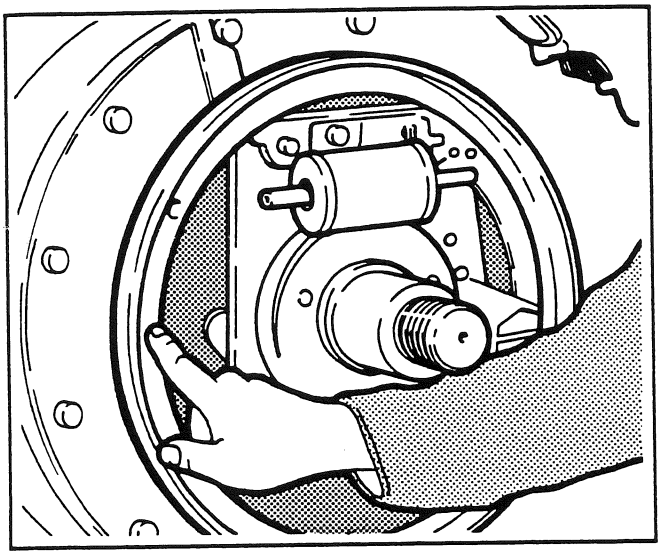


Fig. 63

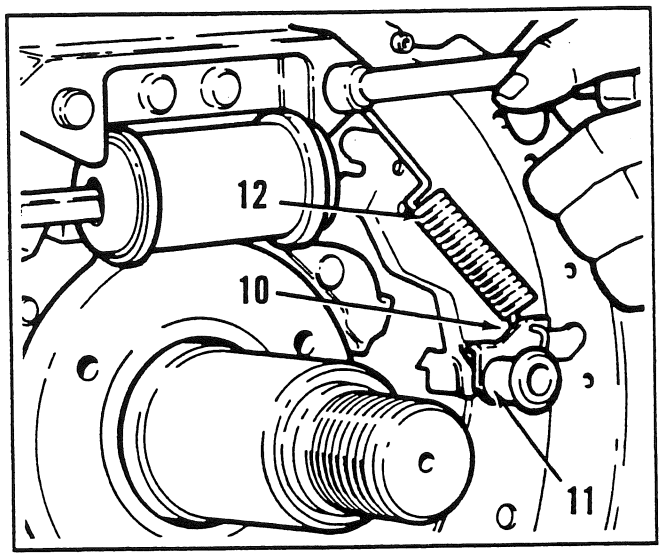
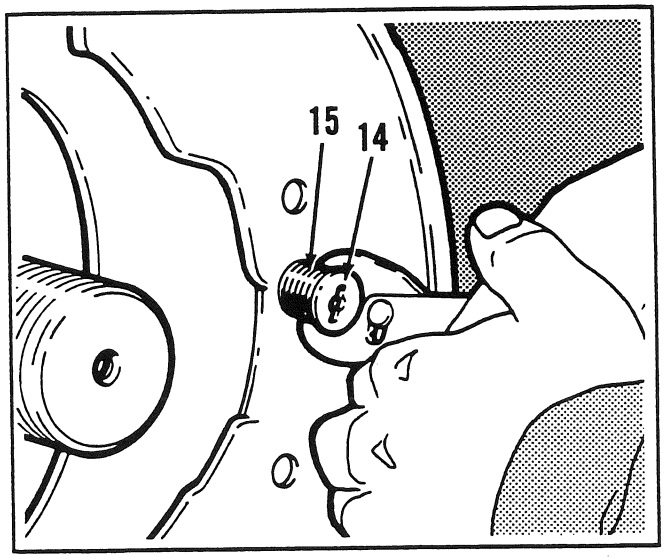


Fig. 66



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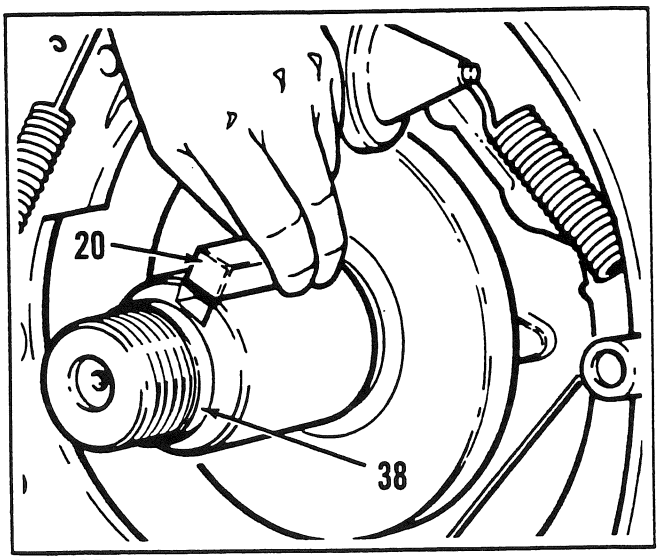

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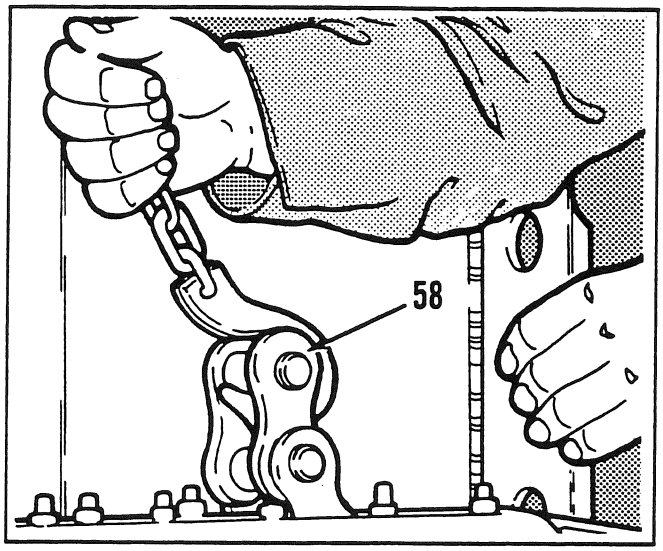

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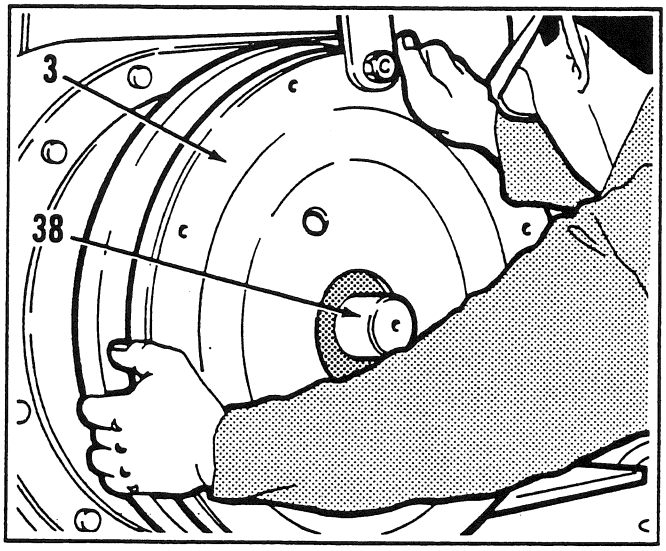

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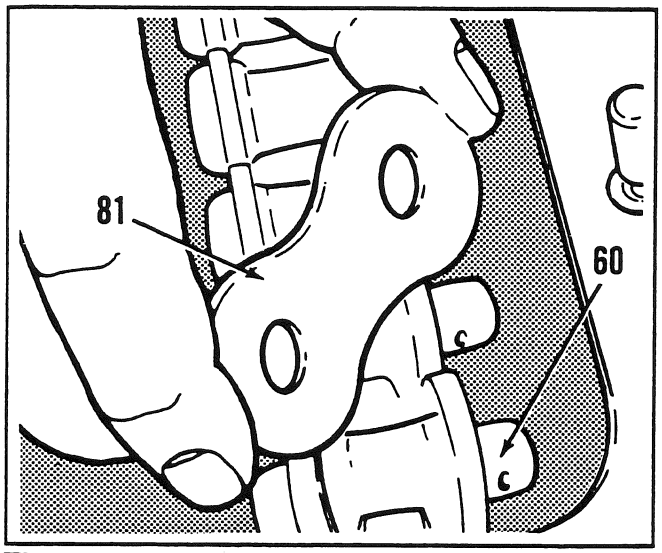

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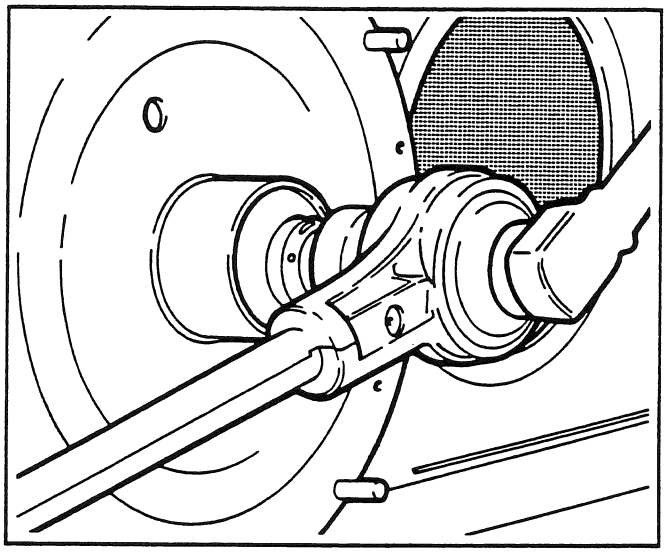

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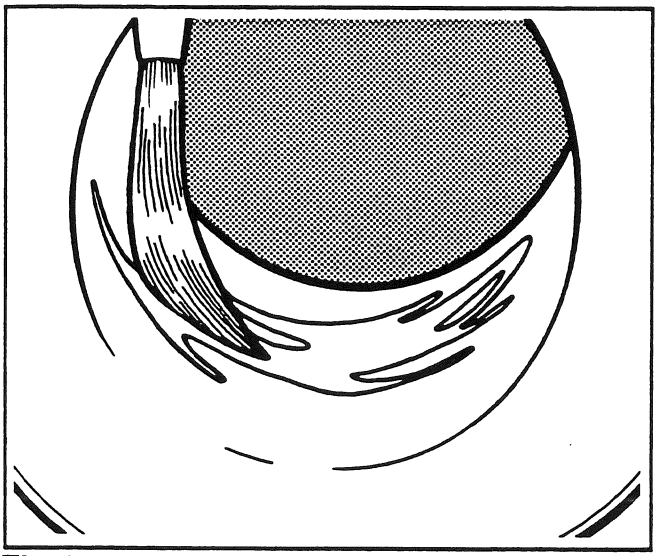

Fig. 70

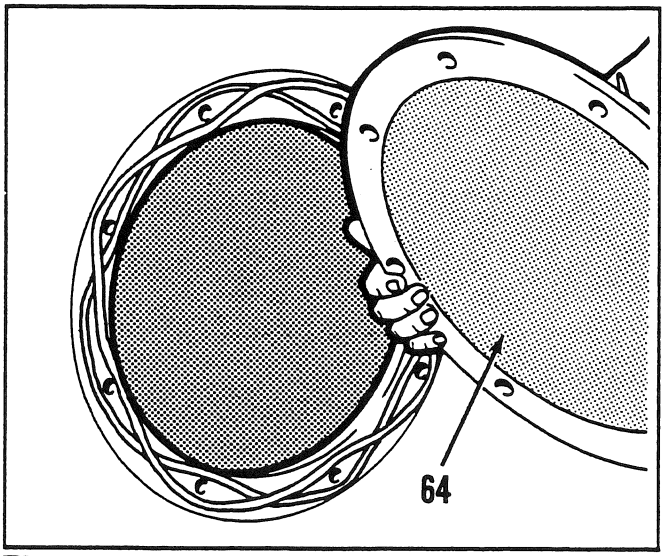

Fig. 73

Reassembly (continued)

Fig. 68
Using a safe lifting device, install lhe tandem chains (**58**) through the inspection ports.

NOTE

The pins of the connecting link and the holes of the side bar provide an interference fit. DO NOT under any circumstances, grind the pins or enlarge the holes.

Fig. 69
Connect the chains (**58**) using a lever and install both halves of the connector links (**60,81**) using new cotter pins (**Ref. Fig. 1**).

Fig. 70
Apply anti-seize compound to the stub axle opening of the wheel housing (**Ref. Fig. 1**).

Fig. 71
Using a safe lifting device, maneuver and install the wheel housing (**3**) and align the key (**Ref. Fig. 1**) of the stub axle (**38**) to the key slot in the wheel housing.

Fig. 72
Install the flat washer (**Ref. Fig.1**) and stub axle nut (**Ref. Fig. 1**) and tighten the nut to the specified torque.

Fig. 73
Apply silicone to the side cover openings of the tandems. Install the cover plate (**64**) with a new gasket (**63**) and retain the plate with eight countersunk head capscrews.
(**Ref. Fig. 1**)

NOTE

Install the tandem plugs and fill the tandems to the level check plug with new tandem oil through the inspection ports. The oil should be changed once a year or every 2000 hours.

Reassembly (continued)

Fig. 74
Apply a gasket sealant to the inspection port openings and install new gaskets (**Ref. Fig. 1**), inspection covers (**53**) and the brake line shields (**54**). Retain the covers and shields with lockwashers (**55**) and nuts (**56**). Tighten to the specified torque.

Adjusting the Brakes

Fig. 75
To adjust the brakes you must remove the rear spring clip cover and rubber plug (**Ref. Fig. 1**). Using an adjusting wrench (**special tool no. 377**) inserted in the lower slot, rotate the star wheel clockwise until the brake shoes contact the brake drum surface. Insert a suitable L-shaped bent rod [3/8 in.(9,5 mm) Dia. x 3 in. (7,6 mm) x 8 in.(20,0 mm) long] into the hole above the slot, depress the auto-adjuster lever until it releases from the star wheel. Using the adjusting wrench, rotate the star wheel counterclockwise **FOUR TEETH ONLY.** Remove both tools and replace the spring clip cover and rubber plug.

Fig. 76
Maneuver the tire and rim onto the wheel and place the rim clamps on the wheel studs and retain them with nuts. Tighten the nuts to the specified torque, in a diagonal sequence. Repeat these procedures for the other wheels.

Bleeding the Brakes

NOTE

The bleeding operation must be performed after the brakes have been adjusted.

Remove the filler cap from the master cylinder. Check the level of fluid and add fresh brake fluid if necessary.

NOTE

For graders equipped with a dual brake system, release the spring clip retaining the reservoir cap. Remove the cap. Replace the cap and secure it with the clip when bleeding of the brakes is completed.

Starting at the rear left-hand brake and connect a clean rubber tube to the bleeder screw and immerse the other end of the tube in a transparent container of clean, air bubble free brake fluid. Depress the brake pedal several times until minimized travel is obtained and maintain the pressure on the pedal. Release the bleeder screw with the tube connected and observe the air bubbles being released into the container. When the bubbles stop emitting into the container, tighten the bleeder screw.

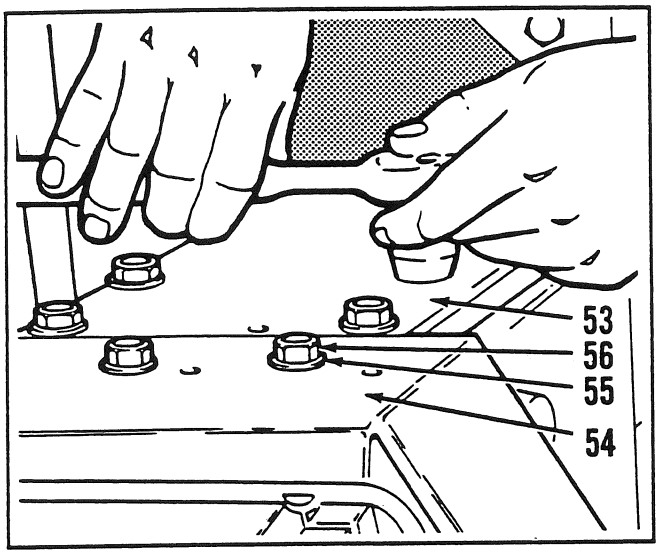

Fig. 74

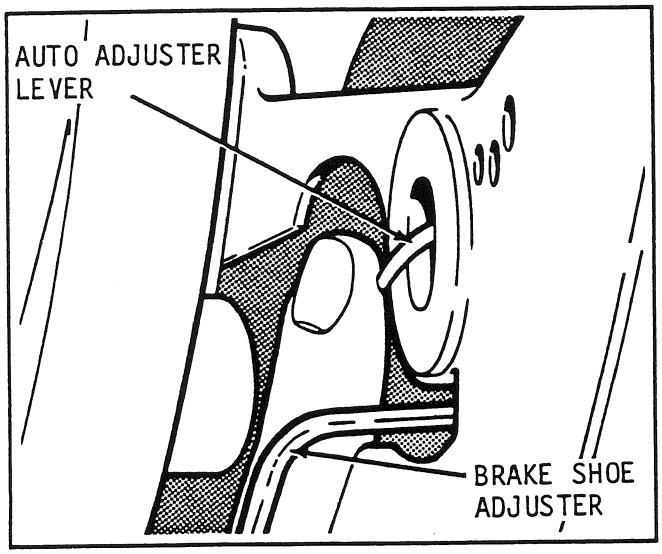

Fig. 75

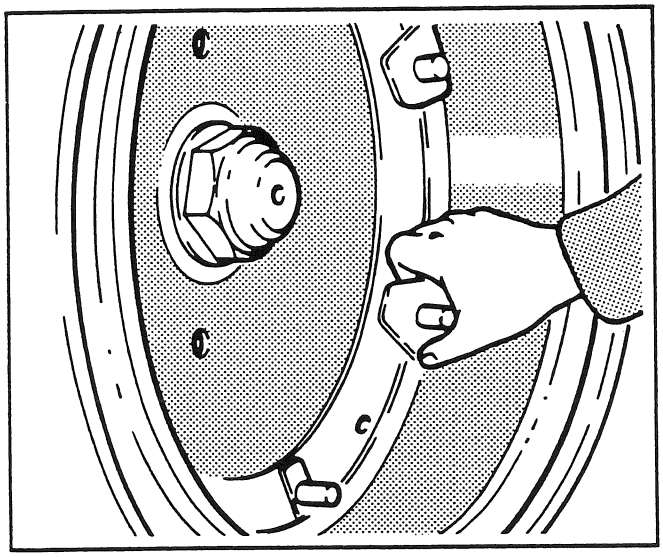
Fig. 76

Bleeding the Brakes (continued)

NOTE

It maybe necessary to repeat the procedures of depressing the brake pedal and releasing the brake screw several times before all the air is removed from the brake line system.

Refill the master brake cylinder to the required level with fresh brake fluid.

CAUTION

UNDER NO CIRCUMSTANCES SHOULD THE BRAKE FLUID CONTAINER BE SHAKEN TO REMOVE TRAPPED AIR BUBBLES. IF AIR BUBBLES REMAIN, ALLOW THE FLUID TO STAND UNTIL ALL OF THE AIR HAS DISSIPATED.

Repeat the preceding instructions for bleeding the brakes in the following sequence. Front left-hand, front right-hand and the rear right-hand brake. When you have completed the bleeding procedure, replace the filler cap on the master cylinder.

Turn the isolation switch to the "ON" position. Start the engine. Lower the moldboard to raise the rear end of the machine. Remove the supports. Raise the moldboard to lower the rear of the machine onto its wheels.

Road test the grader and check hydraulic brake hoses for leaks.

Bleeding the Brakes (continued)

NOTE

It maybe necessary to repeat the procedures of depressing the brake pedal and releasing the brake screw several times before all the air is removed from the brake line system.

Refill the master brake cylinder to the required fluid level with fresh brake fluid.

CAUTION

UNDER NO CIRCUMSTANCES SHOULD THE BRAKE FLUID CONTAINER BE SHAKEN TO REMOVE TRAPPED AIR BUBBLES. IF AIR BUBBLES REMAIN, ALLOW THE FLUID TO STAND UNTIL ALL OF THE AIR HAS DISSIPATED.

Repeat the preceding instructions for bleeding the brakes in the following sequence. Front left-hand, front right-hand and the rear right-hand brake.

When you have completed the bleeding procedure, replace the filler cap on the master cylinder.

Fig. 76

Maneuver the tire and rim onto the wheel and place the rim clamps on the wheel studs and retain them with nuts. Tighten the nuts to the specified torque, in a diagonal sequence. Repeat these procedures for the other wheels.

Turn the isolation switch to the "ON" position. Start the engine. Lower the moldboard to raise the rear end of the machine. Remove the supports. Raise the moldboard to lower the rear of the machine onto its wheels.

Road test the grader and check hydraulic brake connections for leaks.