GRADER ☑
PLANER ☐
ROLLER ☐
CRANE ☐

Shop Manual F-11.50

DOUBLE REDUCTION TANDEM CASE

Applicable Models	Serial Numbers
T-500 A	02601 thru 02811
T-600 B	01736 thru 01822 w/Cummins Diesel
	01736 and 02535 w/Detroit Diesel
T-600 C	02536 & Up

CAUTION

ALL COMPONENTS MUST BE PROPERLY SUPPORTED DURING DISASSEMBLY AND ASSEMBLY.

ALL JACKING, HOISTING, AND GENERAL WORKSHOP EQUIPMENT REQUIRED FOR THIS OPERATION MUST BE IN GOOD WORKING ORDER.

EXTREME CAUTION TO BE OBSERVED AT ALL TIMES TO PREVENT INJURY.

SAFE WORKSHOP PRACTICES ARE A MUST.

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Galion | DRESSER

Galion Manufacturing Division
Dresser Industries, Inc., Galion, Ohio 44833, USA

GENERAL TORQUE VALUES

The following general torques are to be used in all cases where specific torques are not given.

HEAT TREATED MATERIAL SAE GRADE 5 & GRADE 8				
THREAD SIZE	NOTE: INCREASE VALUES 1/3 FOR DRY THREADS			
	GRADE 5 (3 radial dashes on bolt or cap screw head)		GRADE 8 (6 radial dashes on bolt or cap screw head)	
	Foot-Pounds	Metric Kgm	Foot-Pounds	Metric Kgm
1/4 - 20	6	0,8	9	1,2
1/4 - 28	7	0,9	11	1,5
5/16 - 18	13	1,8	18	2,5
5/16 - 24	15	2,1	21	2,9
3/8 - 16	24	3,3	34	4,7
3/8 - 24	27	3,7	38	5,3
7/16 - 14	38	5,3	54	7,5
7/16 - 20	42	5,8	60	8,3
1/2 - 13	58	8,0	82	11,3
1/2 - 20	65	8,9	90	12,4
9/16 - 12	84	11,6	120	16,6
9/16 - 18	93	12,9	132	18,2
5/8 - 11	115	15,9	165	22,8
5/8 - 18	130	17,9	185	25,6
3/4 - 10	205	28,3	290	40,1
3/4 - 16	230	31,8	320	44,2
7/8 - 9	305	42,2	455	62,9
7/8 - 14	335	46,3	515	71,2
1 - 8	455	62,9	695	96,1
1 - 14	510	70,5	785	108,5
1 1/8 - 7	610	84,3	990	136,9
1 1/8 - 12	685	94,7	1110	153,5
1 1/4 - 7	860	118,9	1400	193,6
1 1/4 - 12	955	132,0	1550	214,3
1 3/8 - 6	1130	156,2	1830	253,0
1 3/8 - 12	1290	178,3	2085	288,3
1 1/2 - 6	1500	207,4	2430	335,9
1 1/2 - 12	1690	233,7	2730	377,4
1 3/4 - 5	2370	327,7	3810	526,8
2 - 4 1/2	3550	490,8	5760	796,3

REMOVAL

The following procedure is only one method of obtaining a complete removal of the double reduction tandem case from the grader.

Park grader on a smooth, level surface where the tandem case(s) to be worked on will be within reach of a suitable lifting device having a 2 ton minimum lifting capacity. Place transmission in neutral and set parking brake. Lower moldboard onto blocking and shut-down engine.

CAUTION

IT IS RECOMMENDED FROM A SAFETY STANDPOINT THAT WORK BE PERFORMED ON ONLY ONE TANDEM CASE AT A TIME.

Remove covers from adjustment slots "B" and probe holes "A". Insert a probe wire in hole "A" and push automatic adjusting lever away from star wheel. Insert a brake adjustment tool in slot "B" and engage star wheel. Move the free end of brake tool upwards towards the axle to back off the brake shoes. Do this to both wheels on the tandem case to be worked on.

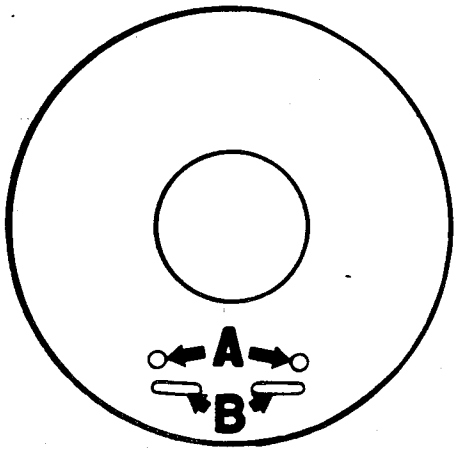

Figure 1

Start engine. Position moldboard (1) on blocking (2). Raise the tandem case/tires (3) which is to remain on the grader off the ground. Shut-down engine.

CAUTION

DO NOT OPERATE CONTROL LEVERS AFTER GRADER IS SHUT DOWN.

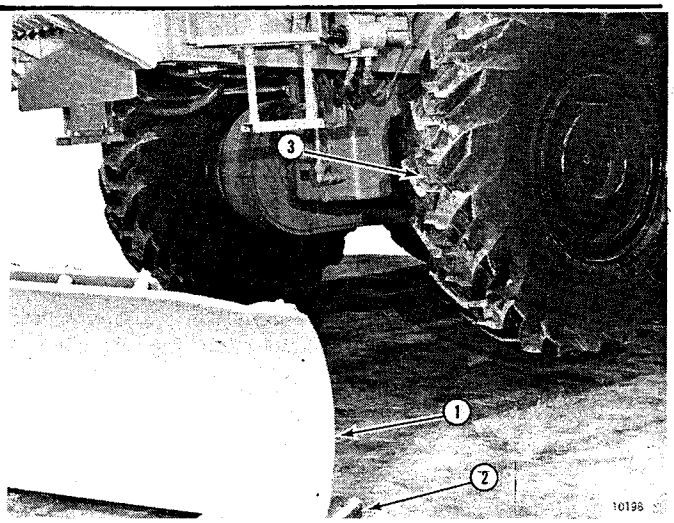

Figure 2

On tandem case being worked on, bend tab of rear axle lockwasher (1) back. Remove nut (2), lockwasher and retainer (3) from rear axle (4).

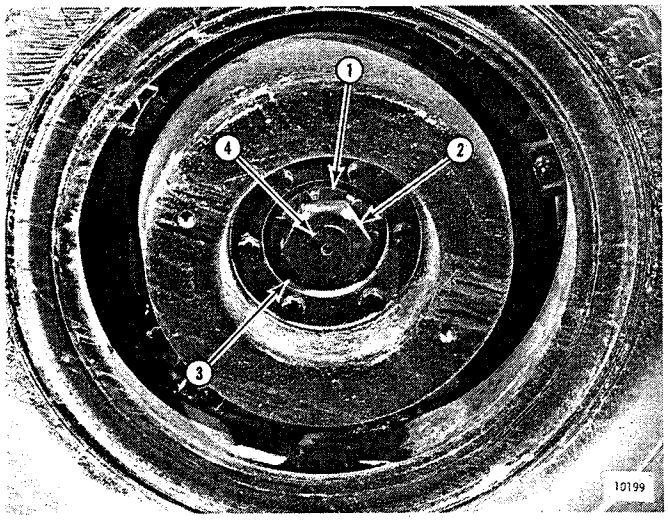

Figure 3

Screw wheel knocker (1) on rear axle. Be sure that knocker is tight against end of axle to prevent damage to threads. Strike knocker with sledge hammer.

NOTE: *After every hit with the hammer, retighten knocker against end of axle. Continue to hit knocker until wheel (2) comes against knocker. Refer to Special Tools section in this manual for manufacturing of wheel knocker.*

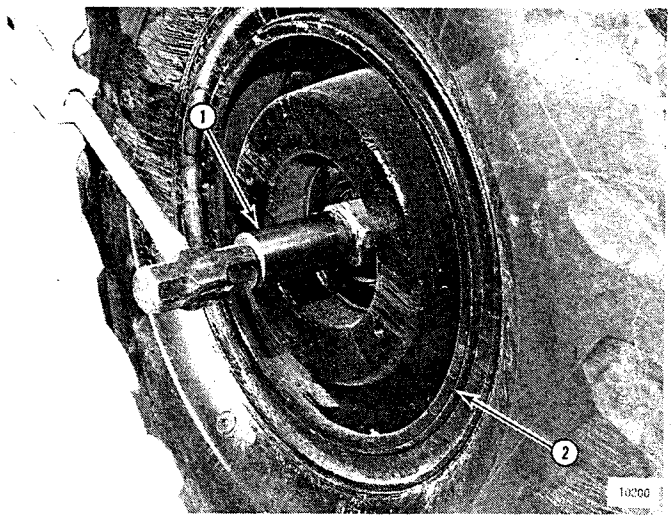

Figure 4

Leave wheel knocker (1) on axle. Start engine. Lower the opposite tandem case/tires back on to the ground. Position moldboard and blocking to lift tire/wheel assembly (2) off the ground.

Place blocking (3) under rear end of the tandem case (4). Lower tandem case onto blocking. Shut-down engine.

Unscrew wheel knocker from axle. Remove tire/wheel assembly from axle using a suitable lifting device.

NOTE: *Tire/wheel assembly weighs approximately 900 lbs.*

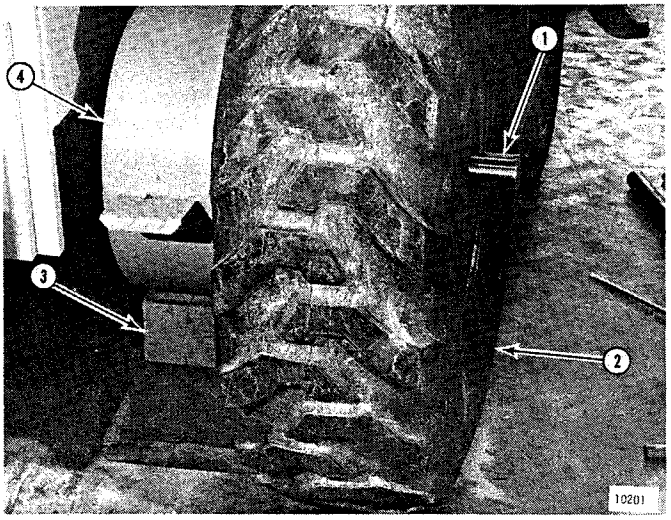

Figure 5

After tire/wheel assembly has been removed, leave blocking under end of tandem case. Start engine. Reposition moldboard and blocking to lift the tandem case/tires off the ground on the opposite side of the grader again. Shut-down engine.

Remove key (1) from axle (2).

NOTE: *Key may stay lodged in tire/wheel assembly and should be removed.*

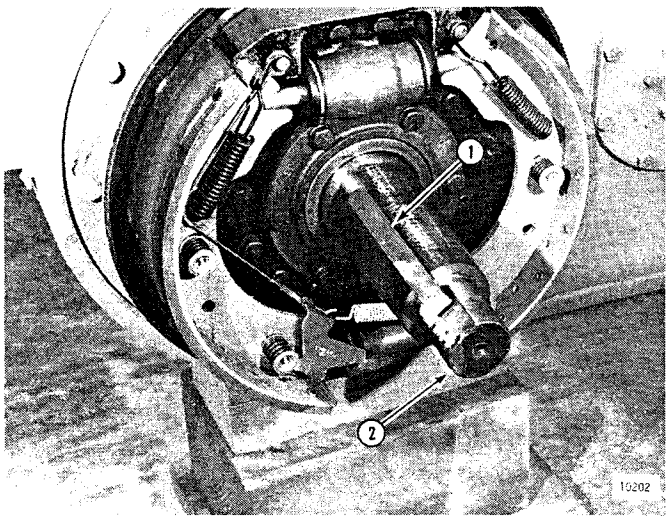

Figure 6

Bend tab on front axle lockwasher (1) back. Remove nut (2), lockwasher and retainer (3) from front tandem axle (4).

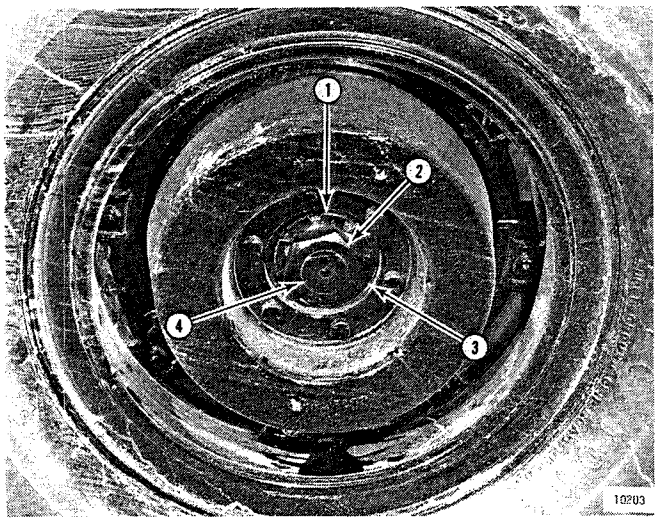

Figure 7

Screw wheel knocker (1) on front tandem axle. Be sure that knocker is tight against end of axle to prevent damage to threads. Strike knocker with sledge hammer.

NOTE: *After every hit with the hammer, retighten knocker against end of axle. Continue to hit knocker until wheel (2) comes against knocker.*

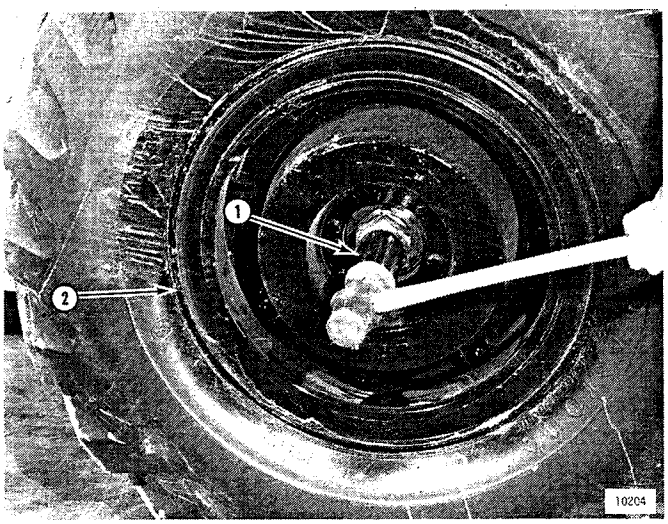

Figure 8

Leave wheel knocker (1) on axle. Start engine and lower the opposite tandem case/tires onto ground. Reposition moldboard and blocking to lift tandem case (2) off blocking. Position 28" of blocking (3) under frame (4) and rest grader on blocking as shown. Shut-down engine.

Position a jack (5) of a suitable lifting capacity under the end of tandem case. Raise tire/wheel assembly (6) off the ground.

Unscrew wheel knocker from axle. Remove tire/wheel assembly from axle using a suitable lifting device.

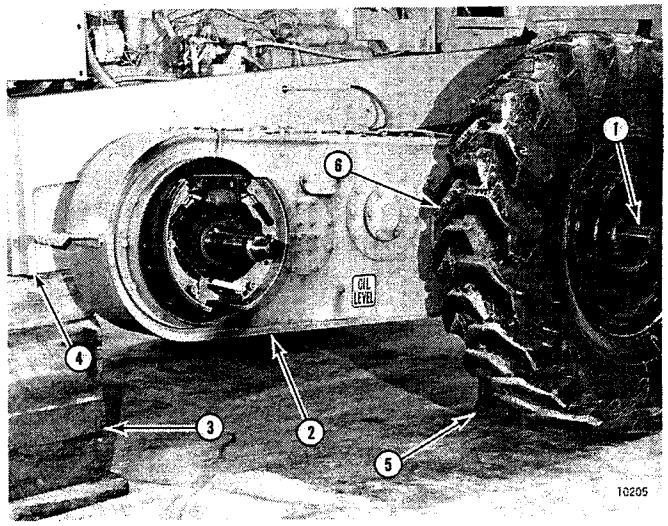

Figure 9

NOTE: *Tire/wheel assembly weighs approximately 900 lbs.*

CAUTION

AFTER TIRE/WHEEL ASSEMBLY HAS BEEN REMOVED, THE TANDEM CAN SEESAW. EXTREME CARE MUST BE TAKEN NOT TO GET HANDS, ARMS AND/OR OTHER PARTS OF YOUR BODY BETWEEN TANDEM CASE AND FRAME TO PREVENT INJURIES.

Remove key (1) from axle (2).

NOTE: *Key may stay lodged in tire/wheel assembly and should be removed.*

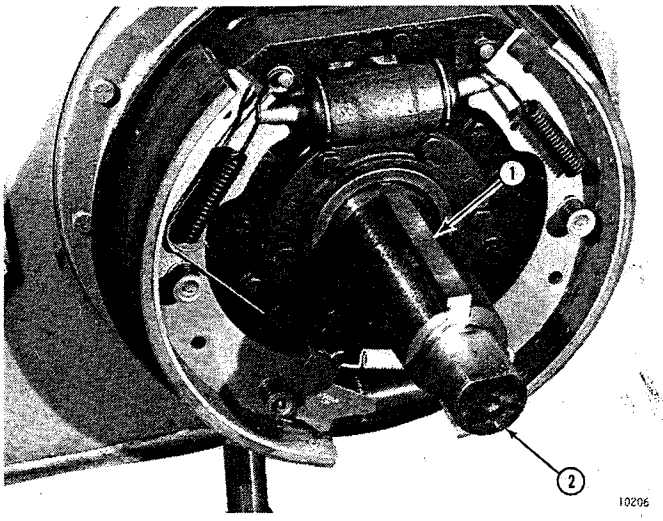

Figure 10

With tandem case (1) able to seesaw, remove drain plug (2) and drain oil.

NOTE: *There is approximately 8 U.S. Gals. of oil in case.*

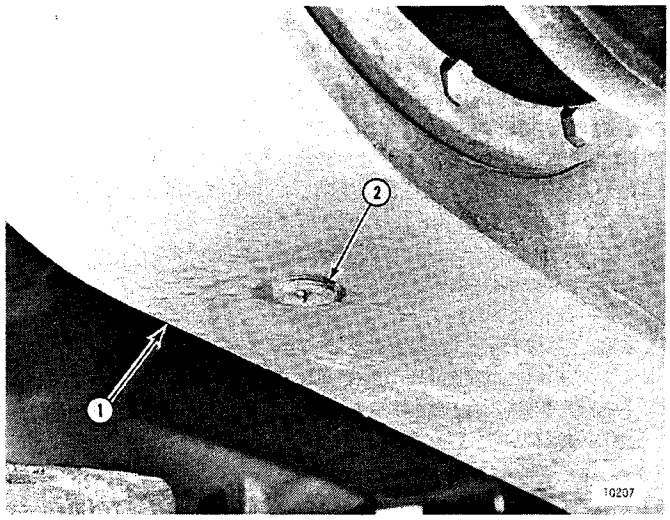

Figure 11

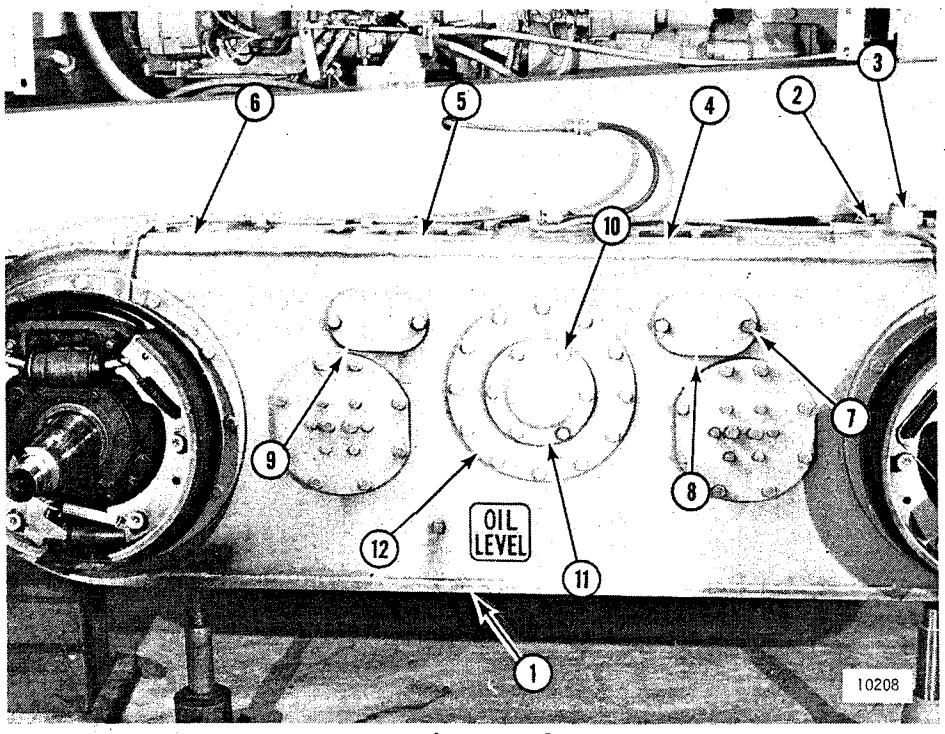

Figure 12

Position a pair of suitable jacks or blocking under tandem case (1) to keep top edge of case parallel to frame to prevent seesawing.

Remove six capscrews and lockwashers (2), filler cover (3) and gasket from case.

NOTE: *Remove access covers (4 thru 6) in the same manner.*

Remove two capscrews and lockwashers (7), side access cover (8), and gasket from tandem case.

NOTE: *Remove side access cover (9) and the other four covers located on the back side of the case in the same manner.*

Remove six capscrews and lockwashers (10), bearing cover (11), and gasket from axle bearing carrier (12).

Remove bearing retaining ring (1) from axle (2).

Remove twelve self-locking capscrews (3) from tandem case (4).

Install two 1/2" - UNC x 4" capscrews in holes "X" & "Y" to act as supports when removing axle bearing carrier (5).

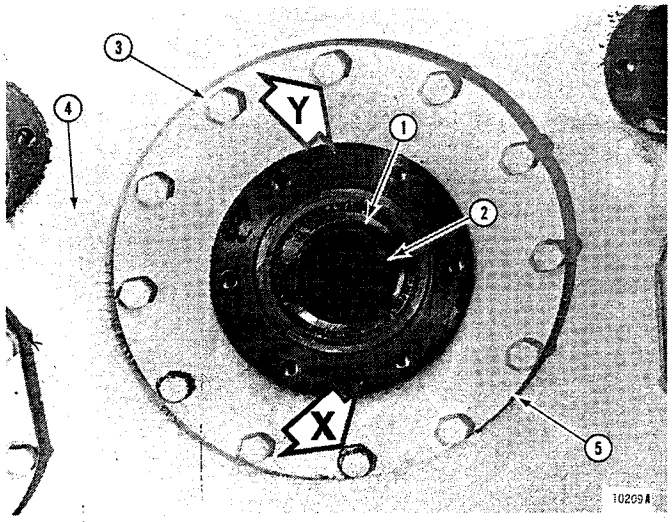

Figure 13

Using a suitable bearing puller, remove bearing carrier (1), bearing (2) and gasket from axle (3) and tandem case (4). Support bearing and carrier on capscrews (5 & 6).

CAUTION

TO COMPLETE REMOVAL OF BEARING CARRIER, CAREFULLY REMOVE CAPSCREWS AND BEARING CARRIER FROM TANDEM CASE.

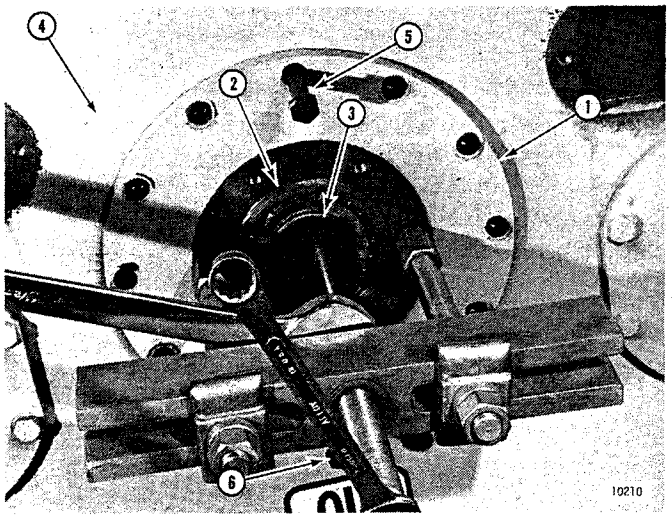

Figure 14

Remove gasket (1) from bearing carrier (2).

Remove bearing locating ring (3) and bearing (4) from bearing carrier.

NOTE: *Use a suitable adaptor and arbor press.*

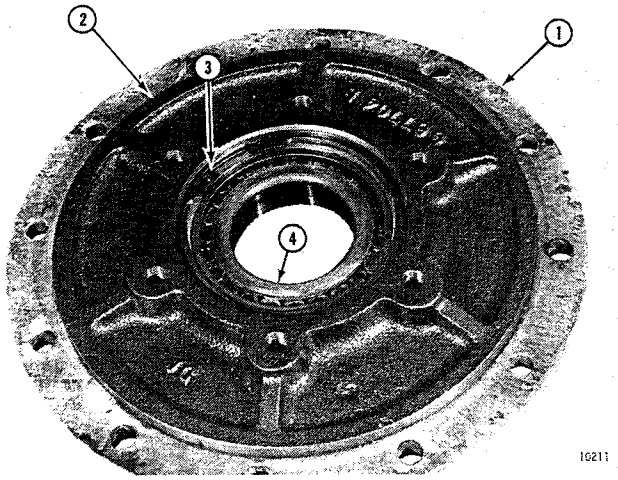

Figure 15

Remove sprocket retaining ring (1) from axle (2).

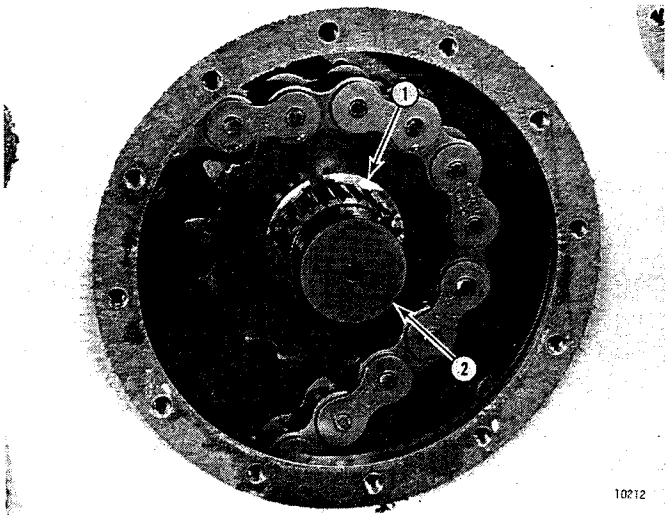

Figure 16

Using a suitable lifting device having a two ton minimum lifting capacity sling tandem case (1) as shown.

Jacks or blocking can be removed from under tandem case at this time.

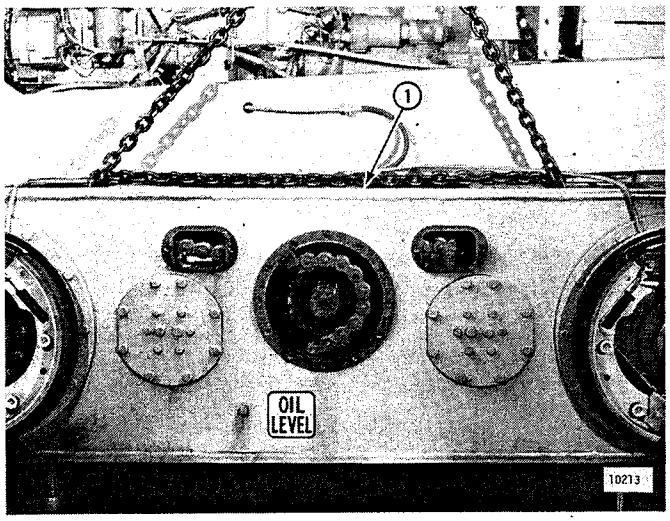

Figure 17

Disconnect brake line (1) from brake tube fitting (2).

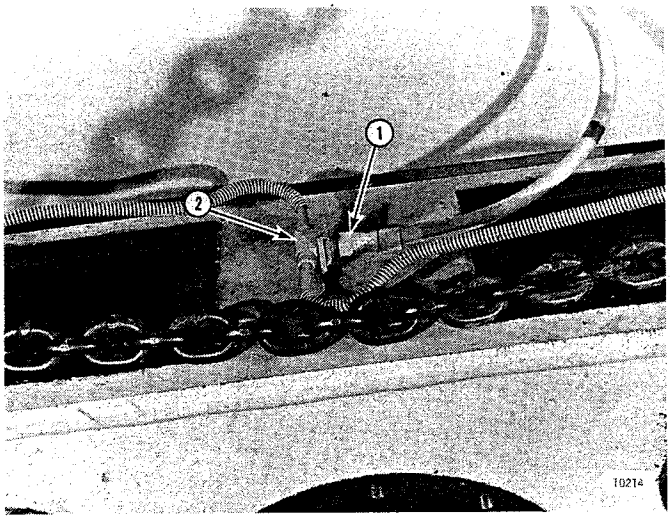

Figure 18

Both sprockets (1) and chains (2 & 3) will have to be slid off axle shaft (4) as tandem case (5) is removed as detailed in the following Figure 20.

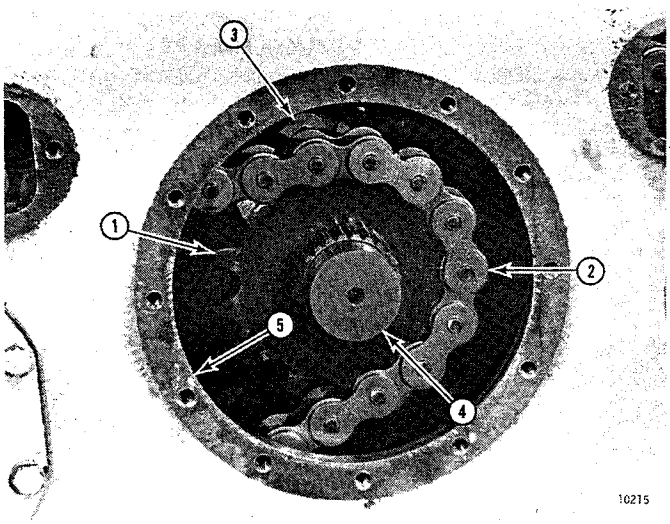

Figure 19

Remove twenty-eight capscrews and lockwashers (1) from tandem case (2).

Remove tandem case and axle sleeve gasket (3) from axle housing sleeve (4).

Lay tandem case on its back side, on suitable blocking or skid.

NOTE: *Remove sprockets from chains mentioned in the preceding Figure 19.*

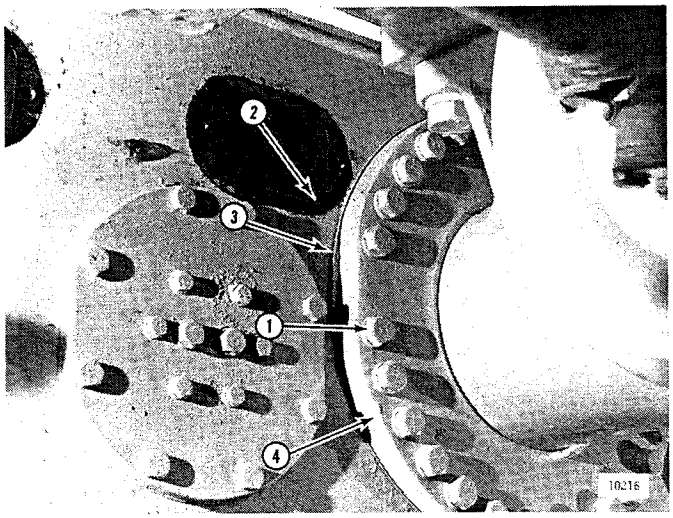

Figure 20

DISASSEMBLY

The following procedure is only one method of obtaining a complete disassembly of the double reduction tandem case. Both front and rear axle assemblies within the tandem case are the same except for the location of the sprockets on the axle shafts. Disassembly will be the same for both axles.

Disconnect tandem drive tube fittings (1 & 2) from fitting (3).

Remove clip (4) from fitting (3) and fitting from bracket (5).

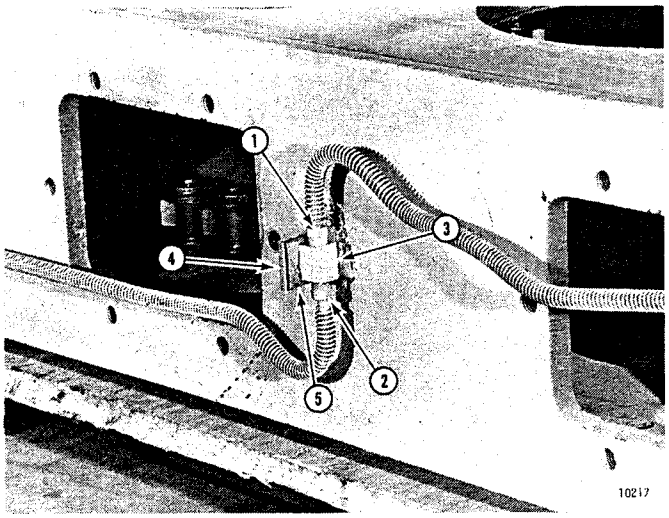

Figure 21

Using a screw driver, position wheel cylinder links (1 & 2) on top of brake shoes (3 & 4).

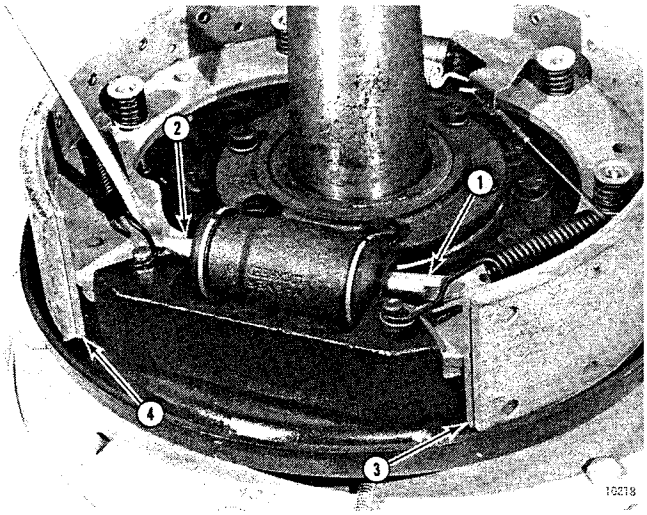

Figure 22

Disconnect brake tube fitting (1) from inlet fitting (2).

Remove two capscrews and lockwashers (3 & 4) from wheel cylinder (5).

Remove wheel cylinder from brake assembly (6).

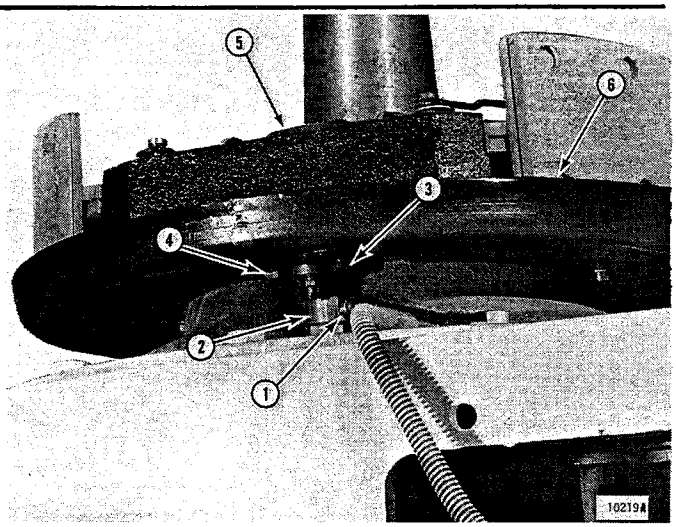

Figure 23

Remove thirteen capscrews and washers (1), and brake assembly (2) from axle bearing & brake housing (3).

Remove six capscrews and lockwashers (4), wheel bearing retainer (5), and shims (6) from axle bearing & brake housing.

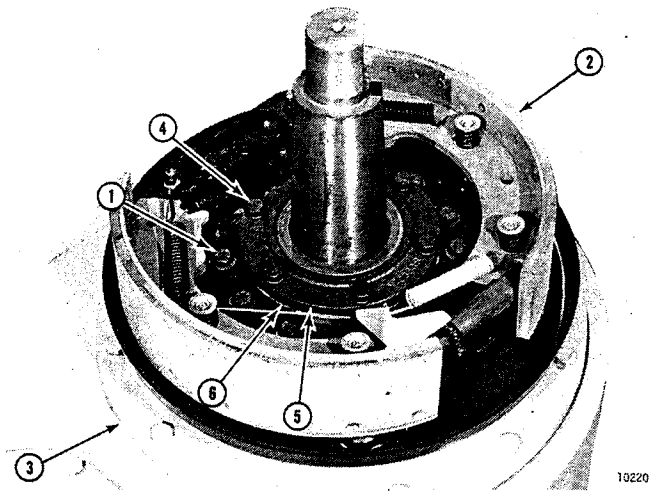

Figure 24

Remove seal (1) from wheel bearing retainer (2).

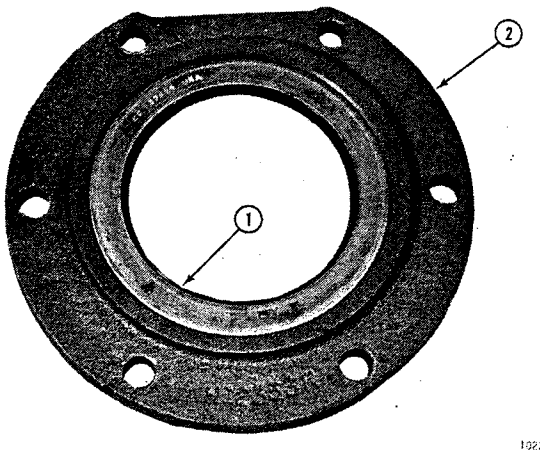

Figure 25

Remove two cotter pins (1), connecting link (2) and pin link (3) from both drive-sprocket-to-countershaft-chains (4 & 5).

Remove chains from sprockets and tandem case.

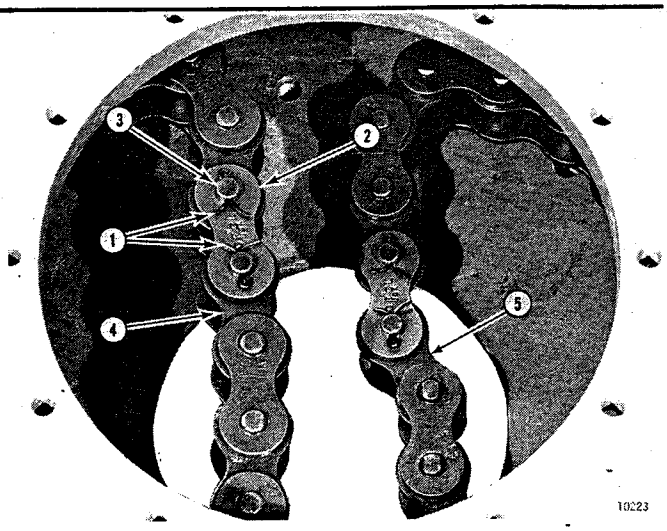

Figure 26

Find the master link in both the countershaft-to-driven-sprocket-chains (1).

Using a suitable hose clamp (2), wrap it around both ends of the chain to relieve tension on roller link (3).

Remove two cotter pins (4), connecting link (5) and roller link from chain.

Loosen and remove hose clamp from ends of chain. Remove chain from sprockets and tandem case (6).

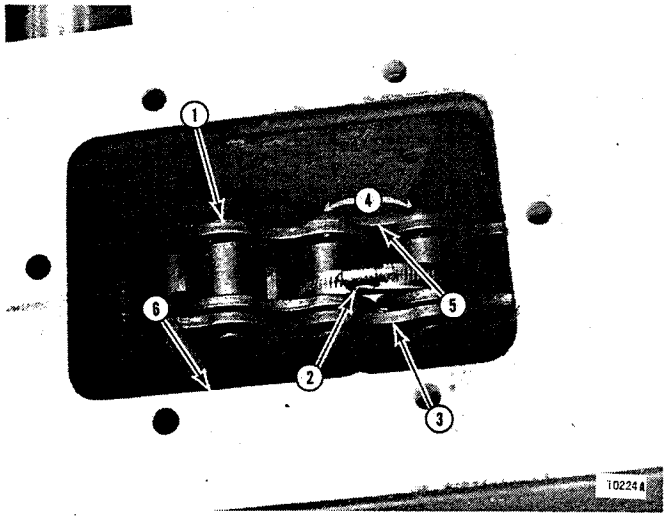

Figure 27

Install two 1/2" - 13 UNC x 1" eye bolts (1 & 2) in axle bearing & brake housing (3).

Using a suitable lifting device, sling eye bolts as shown.

Remove twelve self-locking capscrews (4), axle bearing & brake housing and gasket (5) from tandem case (6).

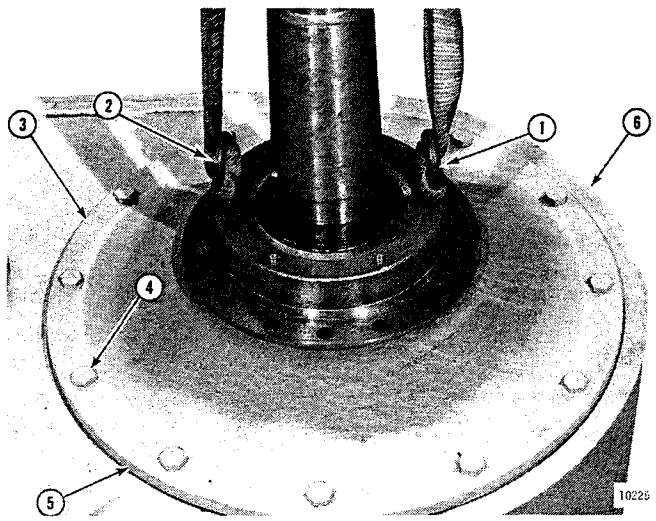

Figure 28

Using suitable bearing driver, remove bearing cup (1) from axle bearing & brake housing (2).

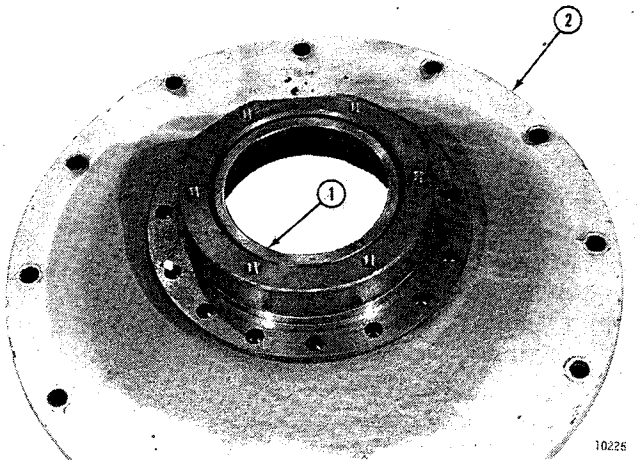

Figure 29

Screw axle lifter on axle and sprocket (1). Using a suitable lifting device, remove axle and sprocket from tandem case (2). Remove axle lifter from axle and sprocket.

NOTE: *Refer to Special Tool section in this Manual for manufacturing details of axle lifter.*

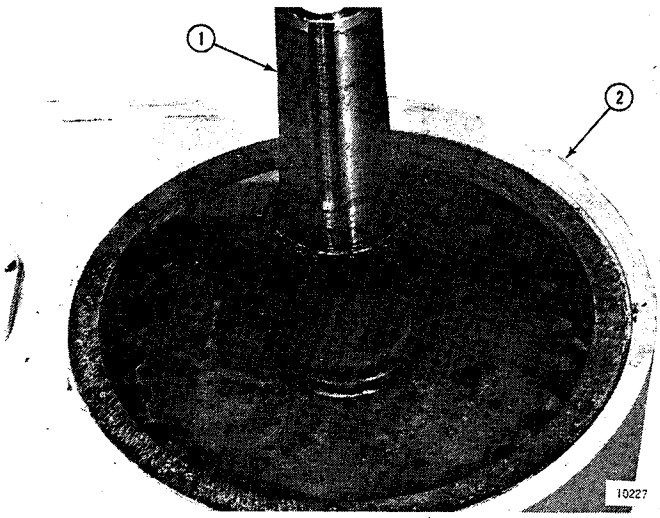

Figure 30

Use suitable bearing puller to remove bearing cones (1 & 2) from axle & sprocket (3).

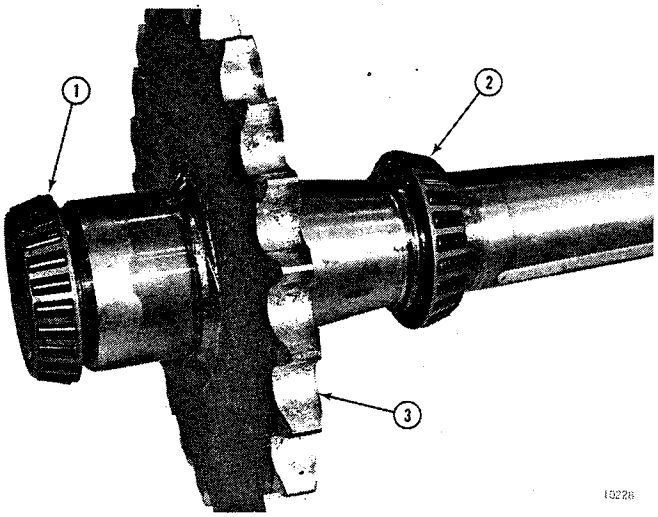

Figure 31

Using suitable lifting device, position tandem case (1) in an upright position and sling countershaft sprocket weldment (2) thru top access holes.

Remove two capscrews and lockwashers (3 & 4) from countershaft.

Remove eight self-locking capscrews (5), countershaft carrier cover assembly (6) and thrust washer from tandem case and countershaft. Gasket (7) is attached to countershaft carrier cover assembly.

NOTE: *Countershaft will be removed from other side of tandem case in the following step.*

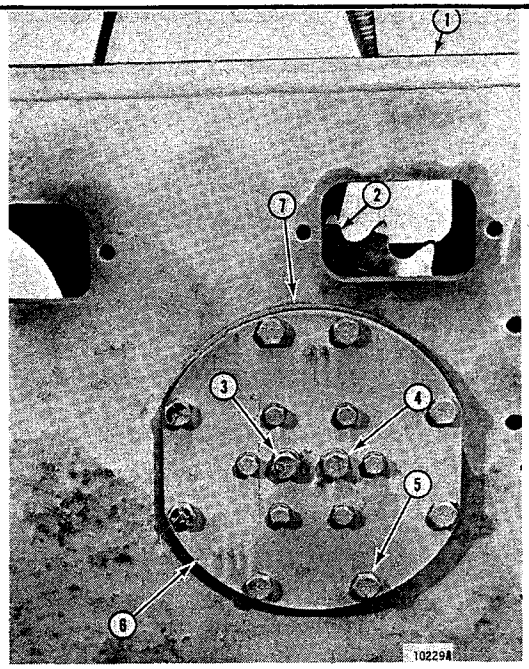

Figure 32

From the other side of tandem case (1), remove eight self-locking capscrews (2).

Slide countershaft carrier cover assembly (3), with countershaft attached, out of tandem case and countershaft sprocket weldment.

NOTE: *While removing countershaft carrier cover assembly and countershaft, remove thrust washer, inner bearing races, and spacer along with shaft. Gasket (4) is attached to countershaft carrier cover.*

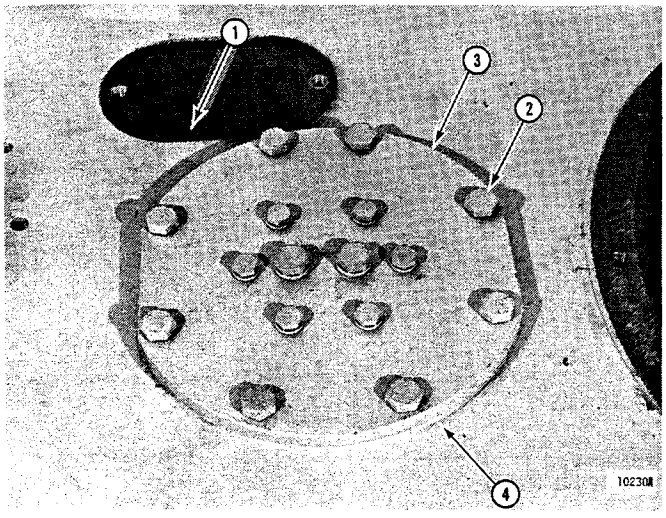

Figure 33

Remove countershaft sprocket weldment from tandem case.

NOTE: *Record the location of the small sprocket on each of the countershaft weldments. One will be located near the front side and the other will be located near the back side of the tandem case.*

Remove inner bearing race (1), spacer (2), inner bearing race (3) and thrust washer (4) from countershaft (5).

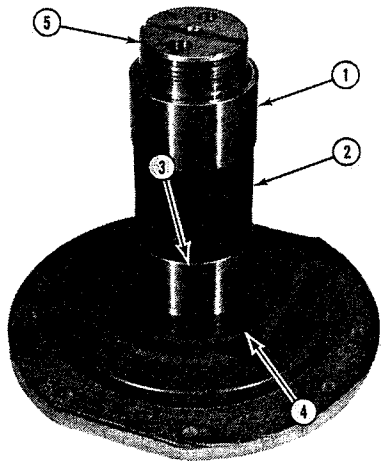

Figure 34

Remove two capscrews and lockwashers (1 & 2) from countershaft (3).

Remove countershaft from countershaft carrier cover assembly (4).

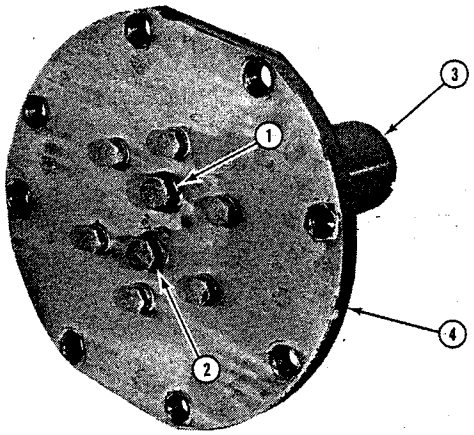

Figure 35

Remove six capscrews and lockwashers, countershaft carrier cover (1) and gasket (2) from each inner countershaft carrier (3).

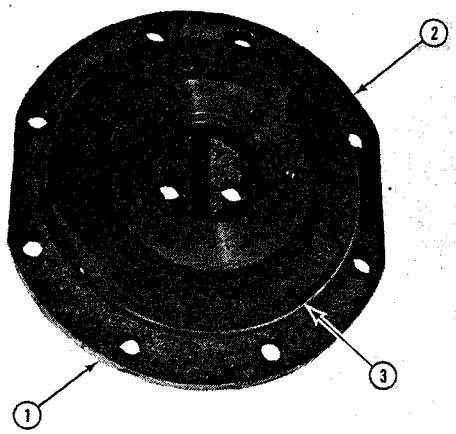

Figure 36

Using suitable bearing puller, remove countershaft bearings (1 & 2) from sprocket weldment (3).

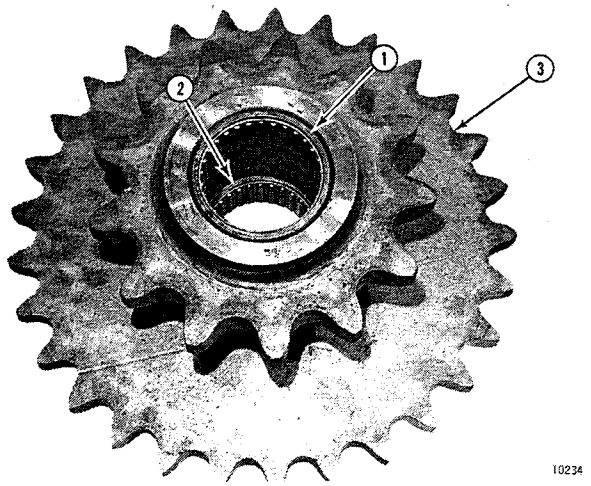

Figure 37

From back side of tandem case (1) remove twelve self-locking capscrews (2), inner axle bearing retainer (3) with gasket and shim(s).

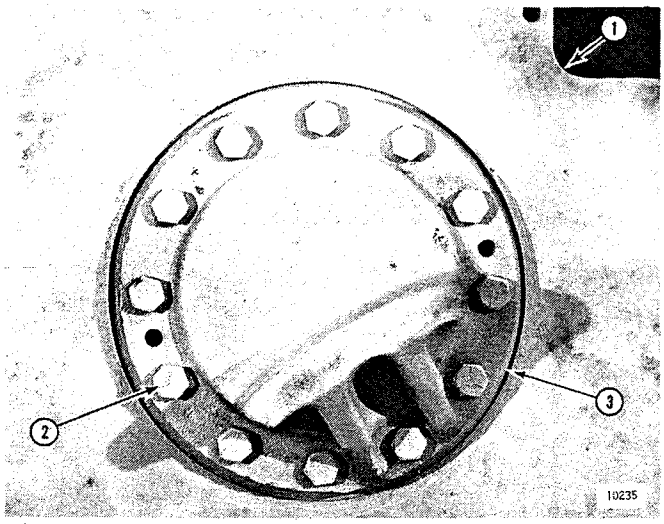

Figure 38

Remove gasket (1) from inner axle bearing retainer (2).

Using a suitable bearing puller remove bearing cup (3) from retainer.

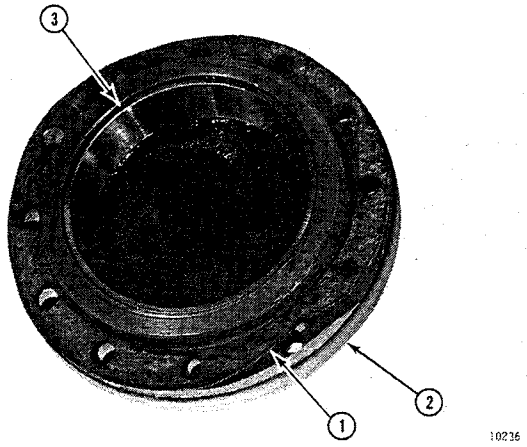

Figure 39

CLEANING & INSPECTION

A. Clean all metal parts thoroughly using a suitable type cleaning fluid. It is recommended that parts being immersed in cleaning fluid be moved up and down slowly until all lubricating oil and foreign material is dislodged and parts are thoroughly cleaned.

CAUTION

CARE SHOULD BE EXERCISED TO AVOID SKIN CONTACT, FIRE HAZARDS, AND/OR INHALATION OF VAPORS WHEN USING SOLVENT TYPE CLEANERS.

B. Inspect all components to be certain they are thoroughly cleaned and that mating surfaces, bores, etc. are free from nicks or burrs. Check all parts carefully for evidence of cracks or conditions which would cause subsequent oil leaks or failures. If available, use magnaflux process in checking for cracks that may not be visible to the naked eye.

C. Replace gaskets and seals. It is economical when the tandem case is disassembled to replace high mortality parts to prevent premature failure. Refer to parts book for replacement items. Be extremely careful when installing sealing members to avoid cutting or scratching. Curling under of any seal lip will seriously impair its effeciency. Apply a thin coat of oil on the seals and parts to help insure proper installation.

D. Clean bearings in a suitable type cleaning fluid. Follow cleaning instructions mentioned in paragraph "A". Remove bearings from cleaning fluid. Strike bearings flat against a block of wood to dislodge solidified particles of lubricant. Immerse again in cleaning fluid to flush out particles. Repeat above operation until bearings are thoroughly clean. Dry bearings using moisture free compressed air. Be careful to direct air stream across bearing to avoid spinning. Do not spin bearings when drying. Bearings may be rotated slowly by hand to facilitate drying process.

E. Carefully inspect all bearing rollers, and cups for wear, chipping or nicks to determine condition. Do not replace a bearing cone or cup individually without replacing the mating cup or cone at the same time. After inspection, coat bearings with oil (see Shop Manual J-1 for proper tandem case lubricant).

F. Sprockets should be checked for evidence of chain climbing on the teeth. If an excessive amount of climbing is noticeable, sprockets should be replaced.

REASSEMBLY

The following procedure is only one method of obtaining a complete reassembly of the double reduction tandem case. Both front and rear axle assemblies within the tandem case are the same except for the location of the sprockets on the axle shafts. Reassembly will be the same for both ends of the tandem case.

Using suitable adaptor and arbor press, install bearing cup (3) in inner axle bearing retainer (2).

Position gasket (1) on retainer.

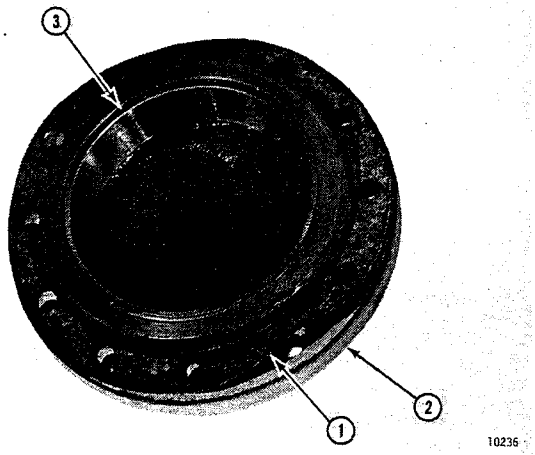

Figure 40

Align holes and position shim(s) and inner axle bearing retainer (3) with gasket against tandem case (1) and install twelve self-locking capscrews (2).

NOTE: *The shim pack thickness is determined at the factory. Only the equivalent amount of shims that were removed at disassembly are to be installed. When installing retainers be sure to offset tandem case stops one hole from a horizontal opsition towards the center of the case. Torque capscrews to 75 FT.LBS., dry.*

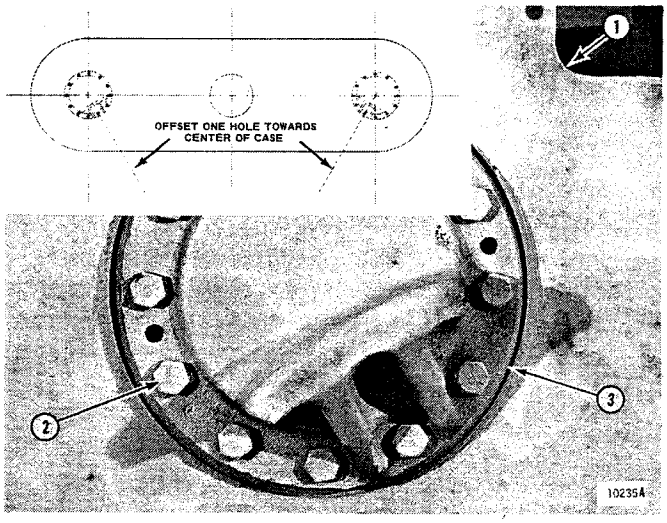

Figure 41

Using suitable bearing driver, install countershaft bearings (1 & 2) in countershaft sprocket weldment (3).

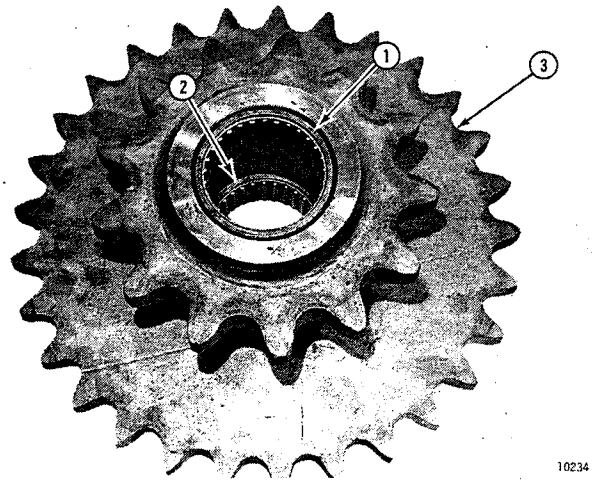

Figure 42

Align holes and position gasket (2) and countershaft carrier cover (1) against inner countershaft carrier (3) and install six capscrews and lockwashers.

NOTE: *Oil cavity should be facing in the same direction as the pair of holes (4 & 5) that are closest together.*

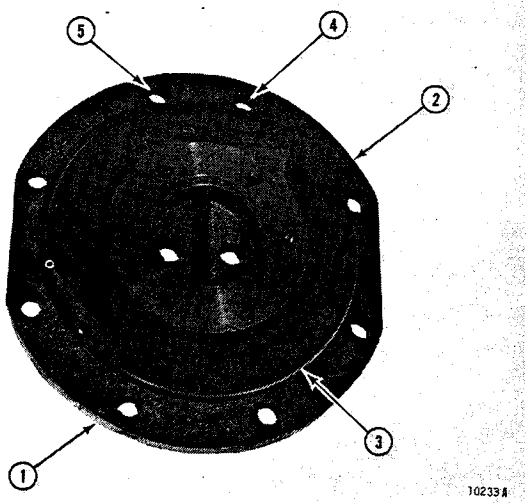

Figure 43

Align holes and slide countershaft (3) into countershaft carrier cover assembly (4).

Install two capscrews and lockwashers (1 & 2) in countershaft.

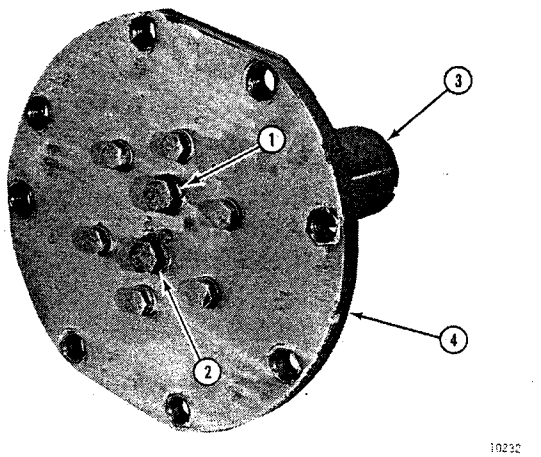

Figure 44

Slide thrust washer (4), inner bearing race (3), spacer (2) and inner bearing race (1) onto countershaft (5).

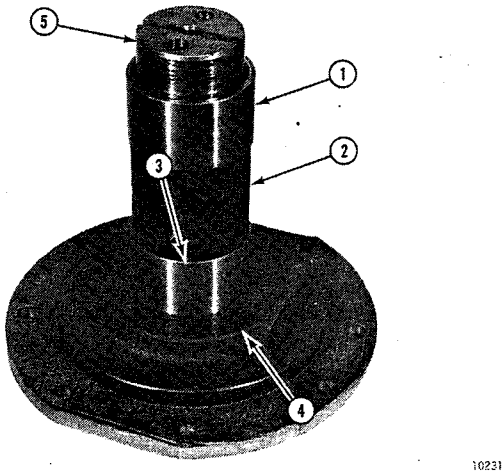

Figure 45

Using a suitable lifting device, sling countershaft sprocket weldment (1) and position inside tandem case (2).

NOTE: *Be sure that small sprocket is in the same position as noted at removal.*

Align sprocket weldment with countershaft carrier cover and shaft assembly (3) from preceding step and slide together.

Align bolt holes of cover and shaft assembly with tandem case. Install eight self-locking capscrews (4) in case.

NOTE: *Torque capscrews to 75 FT.LBS., dry.*

Leave sling attached to sprocket weldment.

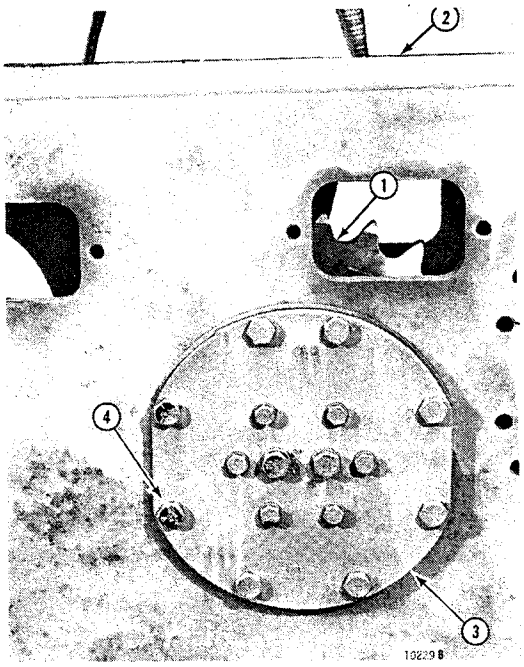

Figure 46

Slide thrust washer onto countershaft.

Position countershaft carrier cover assembly (1) against countershaft and tandem case (2). Install two capscrews and lockwashers (3) and eight self-locking capscrews (4).

NOTE: *Torque self-locking capscrews to 75 FT.LBS., dry.*

Remove sling.

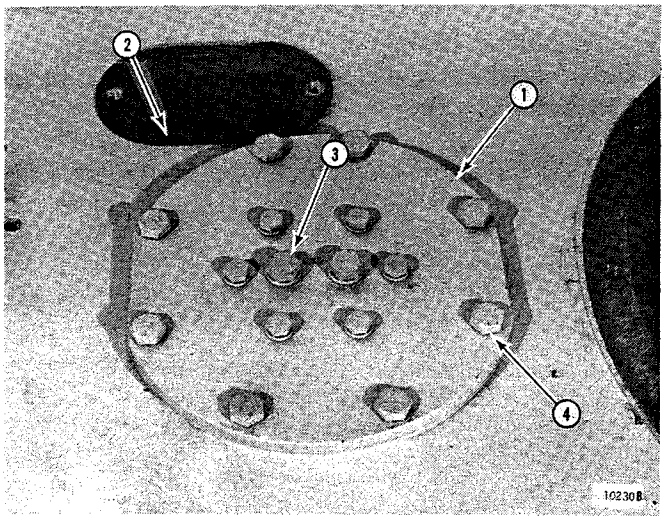

Figure 47

Using suitable bearing driver, install bearing cones (1 & 2) on axle & sprocket (3).

NOTE: *Suspending bearing cones in a hot oil bath of ATF will ease installation. Keep oil bath between 275 to 300°F.*

CAUTION

FLASH POINT OF ATF IS 375°F.

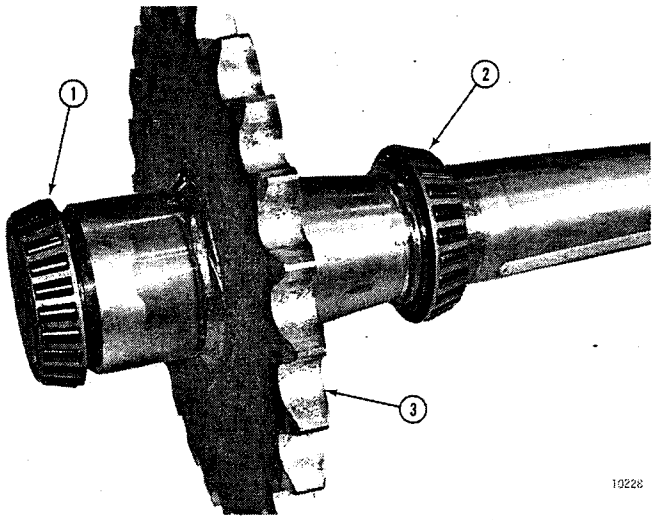

Figure 48

Lay tandem case (2) on its back side, on suitable blocking or skid.

Screw axle lifter on axle and sprocket (1). Position axle and sprocket in tandem case.

NOTE: *Be sure the sprocket lines up with the small sprocket in countershaft sprocket weldment.*

Remove axle lifter from axle and sprocket.

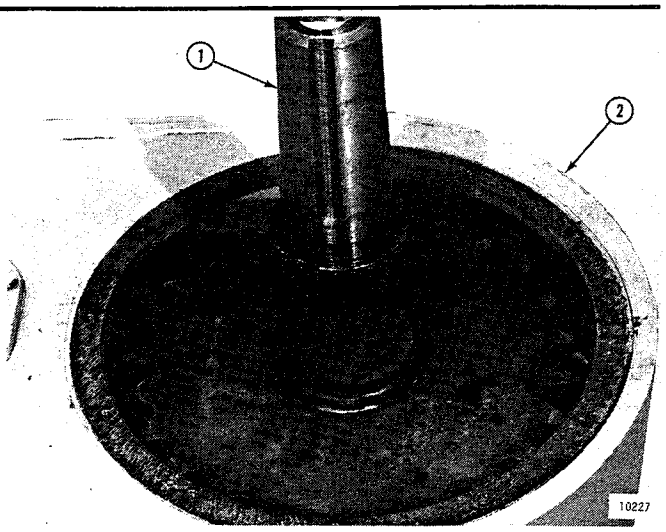

Figure 49

Using suitable bearing driver, install bearing cup (1) in axle bearing & brake housing (2).

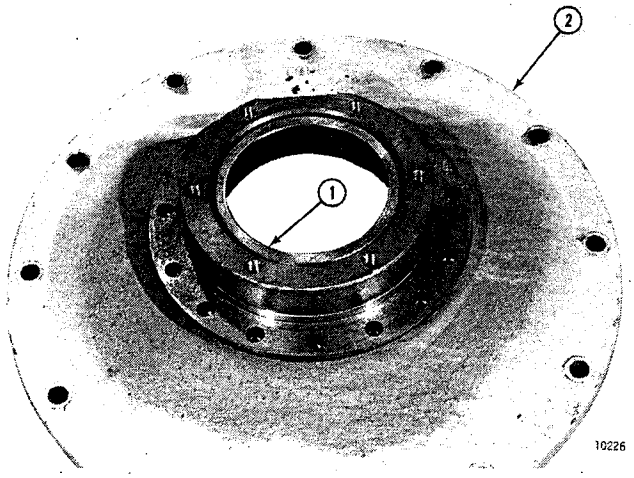

Figure 50

Install two 1/2" - 13 UNC x 1" eye bolts (1 & 2) in axle bearing & brake housing (3).

Using suitable lifting device, sling eye bolts as shown.

Position gasket (5) and axle bearing & brake housing on tandem case (6) and align holes.

Install twelve self-locking capscrews (4) in tandem case.

NOTE: *Torque capscrews to 75 FT.LBS., dry.*

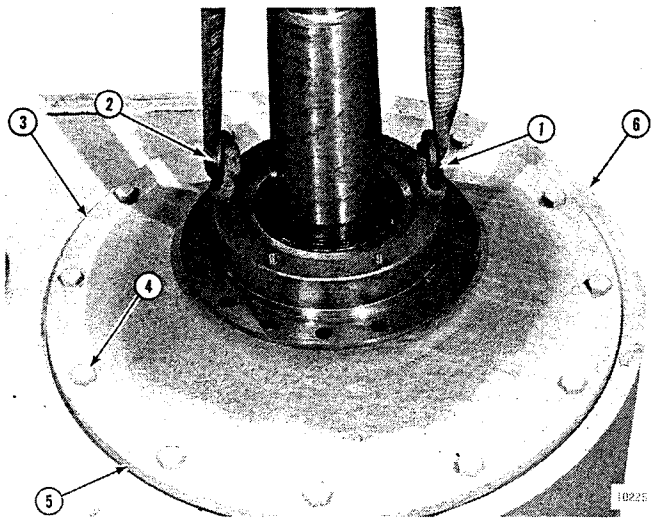

Figure 51

Feed countershaft-to-driven-sprocket chain(s) (1) thru access holes and position on sprockets.

Use suitable hose clamp (2) to draw ends of chain together. Install roller link (3), connecting link (5) and two cotter pins (4).

Remove hose clamp from chain(s).

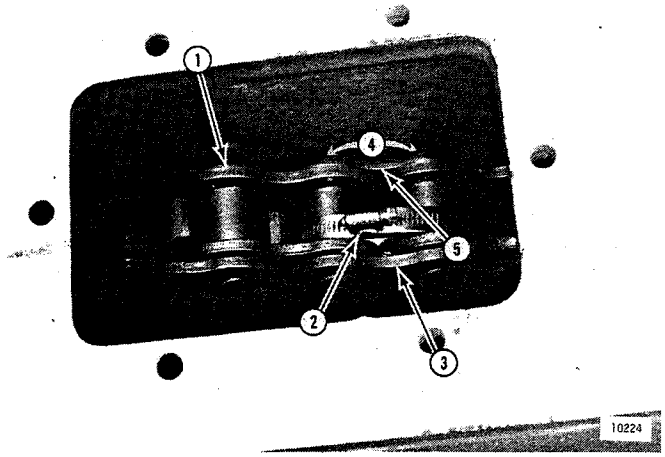

Figure 52

Feed drive-sprocket-to-countershaft chains (4 & 5) thru access holes onto countershaft sprockets.

Connect ends of each chain by installing pin link (3), connecting link (2) and two cotter pins (1).

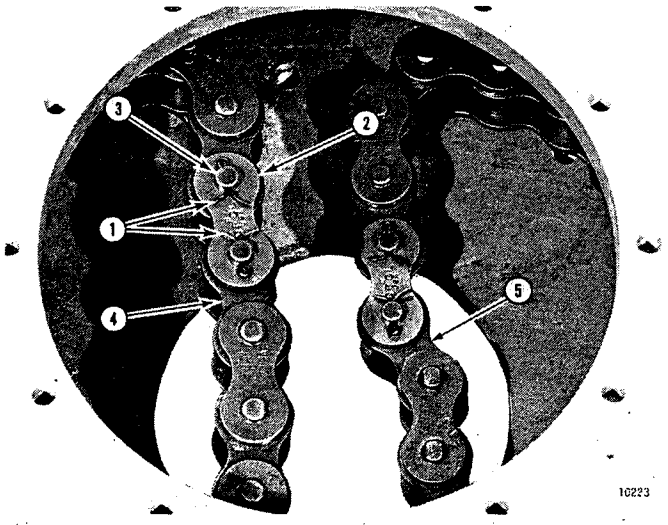

Figure 53

Using an arbor press and suitable adaptor, install seal (1) in wheel bearing retainer (2).

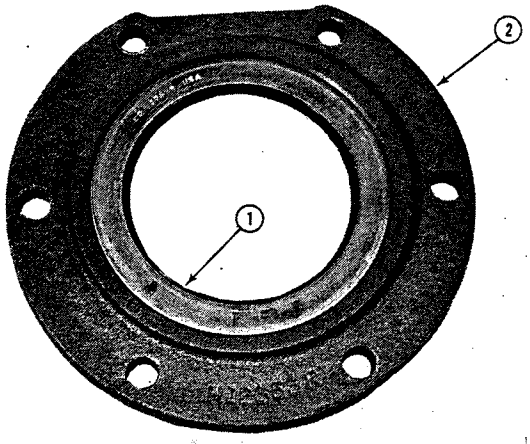

Figure 54

Position wheel bearing retainer (1) on axle bearing & brake housing (2). Install six capscrews and lockwashers (3) and tighten evenly to 35 FT.LBS., dry. Turn axle & sprocket in both directions to be sure bearings are seated properly.

NOTE: *Shocking end of axle with a hammer will also help seat bearings.*

Recheck bolt torques and measure gap between retainer and housing. Add 0.005" to this measurement to obtain shim pack thickness.

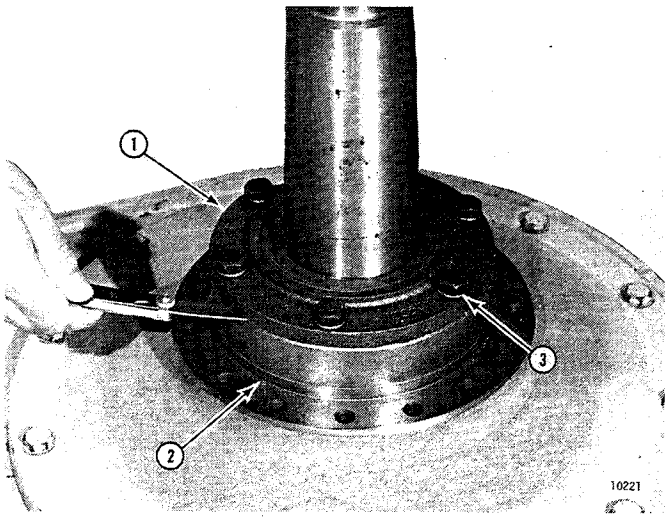

Figure 55

NOTE: *Shims come in 0.005", 0.015" and 0.030" sizes. If combinations of these shims can not make desired thickness, go to the closest higher combination. If there is no measurable gap between retainer and housing, a 0.0598" shim should be installed between retainer and bearing cup to obtain a gap.*

Remove capscrews, lockwashers and retainer after shim pack value is determined, from housing.

Position shims (6) and wheel bearing retainer (5) on axle bearing & brake housing (3). Install six capscrews and lockwashers (4).

NOTE: *Torque capscrews to 75 FT.LBS., dry.*

Position brake assembly (2) on axle bearing & brake housing. Install thirteen capscrews and washers (1).

NOTE: *Torque capscrews to 100 FT.LBS., dry.*

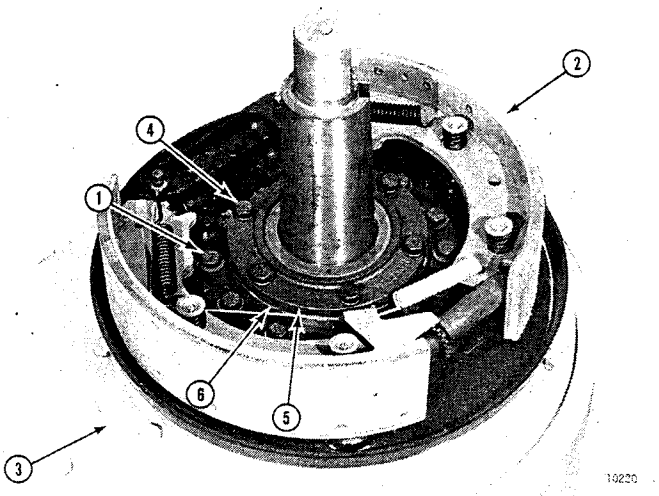

Figure 56

Position wheel cylinder (5) against brake assembly (6). Install two capscrews and lockwashers (3 & 4).

NOTE: *Torque capscrews to 180 - 200 IN. LBS., dry.*

Reconnect brake tube fitting (1) to inlet fitting (2).

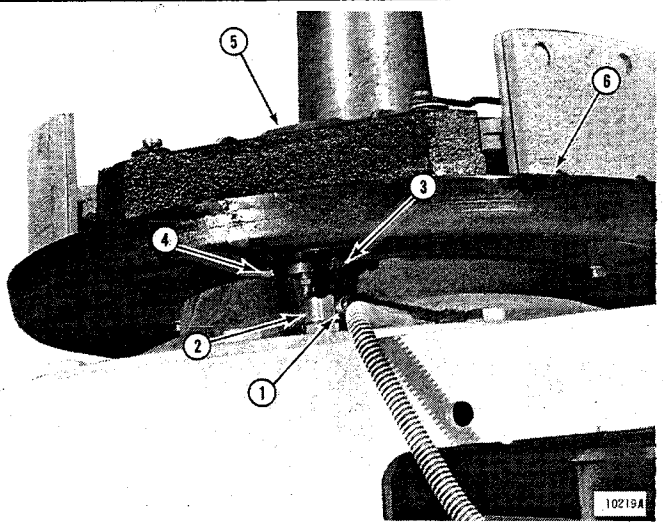

Figure 57

Using a screw driver, position wheel cylinder links (1 & 2) in notches of brake shoes (3 & 4).

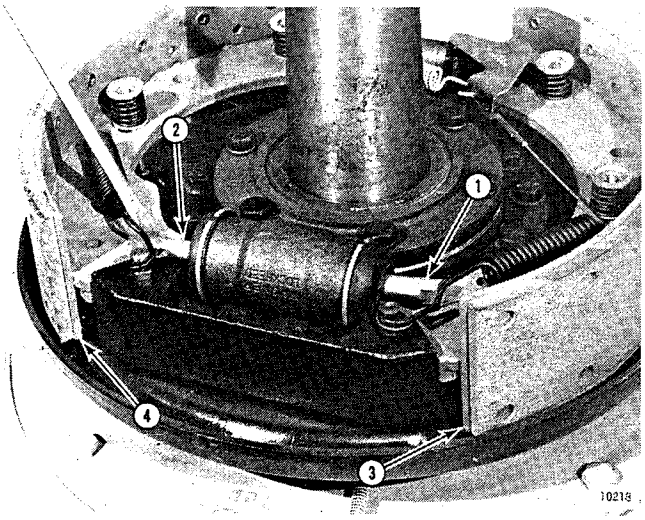

Figure 58

Position fitting (3) against bracket (5) and install clip (4).

Connect tandem drive tube fittings (1 & 2) to fitting (3).

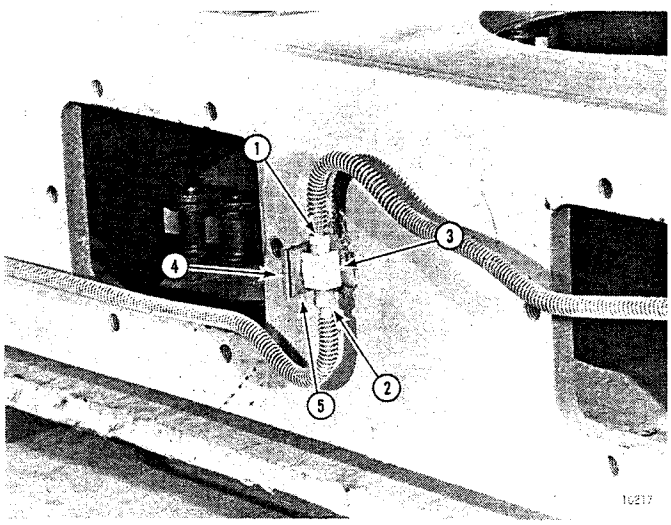

Figure 59

INSTALLATION

The following procedure is only one method of obtaining a complete installation of the double reduction tandem case.

Place axle sleeve gasket over axle shaft (4) and against axle housing sleeve.

Using suitable lifting device having a two ton minimum lifting capacity, sling tandem case (5) as shown in Figure 17.

Position sprockets (1) in chains (2 & 3). As tandem case is positioned against axle housing, align sprocket splines with axle shaft and slide into place.

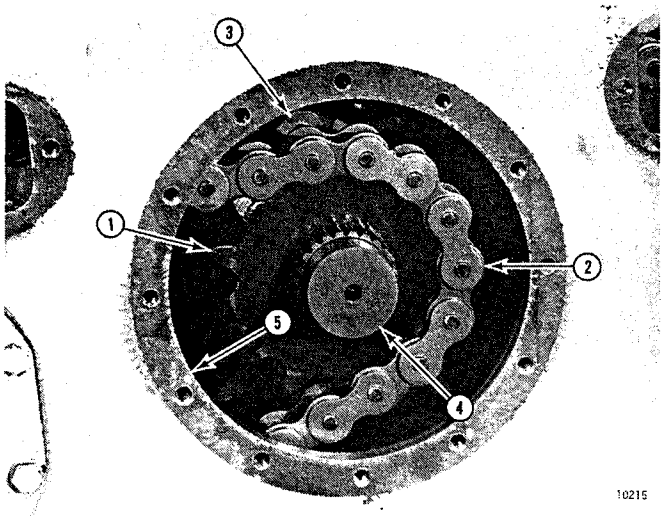

Figure 60

Align holes between tandem case (2), axle sleeve gasket (3), and axle housing sleeve (4). Install twenty-eight capscrews & lockwashers (1) in tandem case.

NOTE: *Torque capscrews to 130 FT.LBS.,dry.*

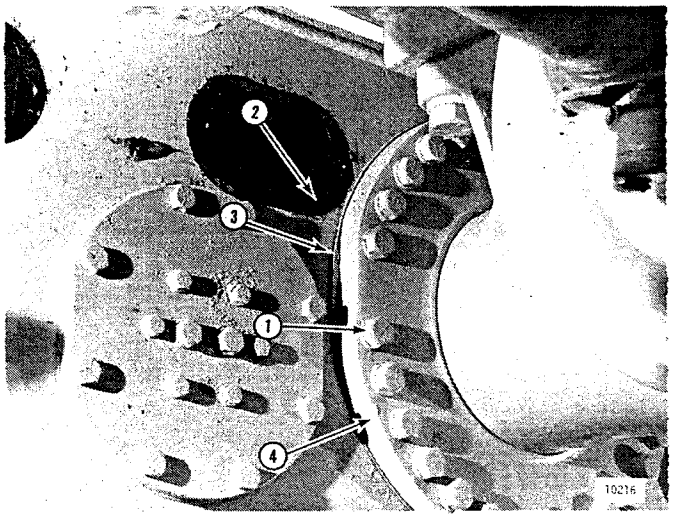

Figure 61

Connect brake line (1) to brake tube fitting (2).

Position a pair of jacks or blocking under tandem case (3) to prevent seesawing. Remove chains from tandem case.

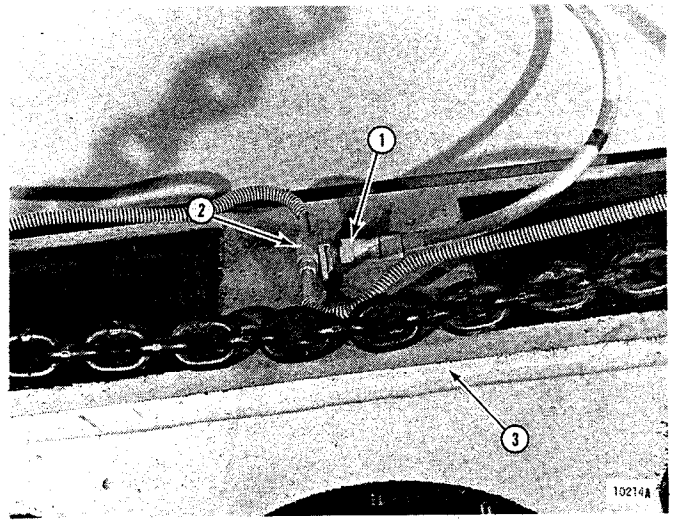

Figure 62

Install sprocket retaining ring (1) on axle (2).

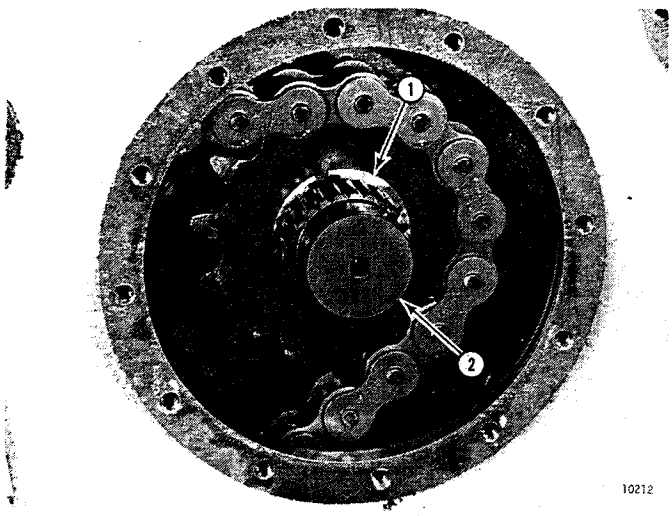

Figure 63

Position gasket (1) on bearing carrier (2).

Install bearing (4) and bearing locating ring (3) in bearing carrier.

NOTE: *Use suitable adaptor and arbor press to install bearing.*

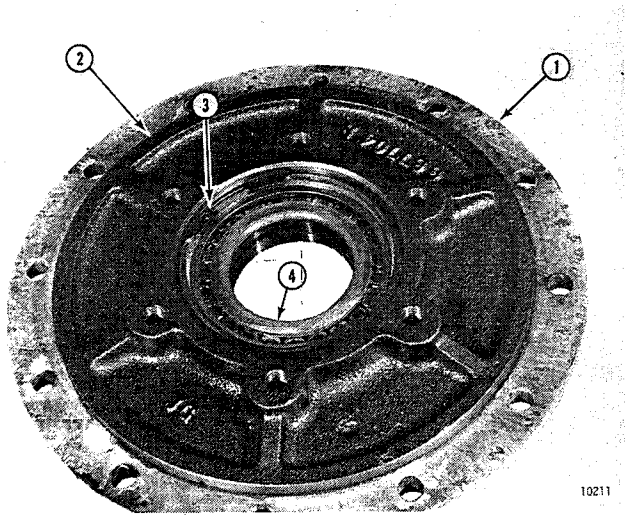

Figure 64

Position bearing carrier (5) on axle (2) and against tandem case (4). Install twelve self-locking capscrews (3) in tandem case.

NOTE: *Use a suitable bearing driver to install bearing on axle. Torque capscrews to 75 FT.LBS., dry.*

Install bearing retainer ring (1) on axle.

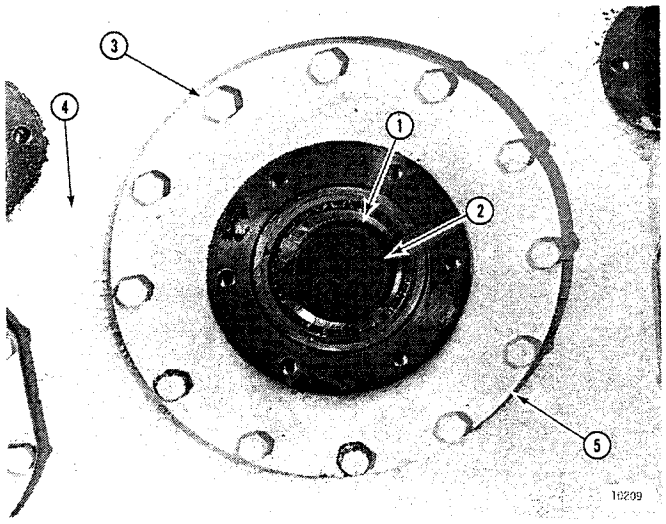

Figure 65

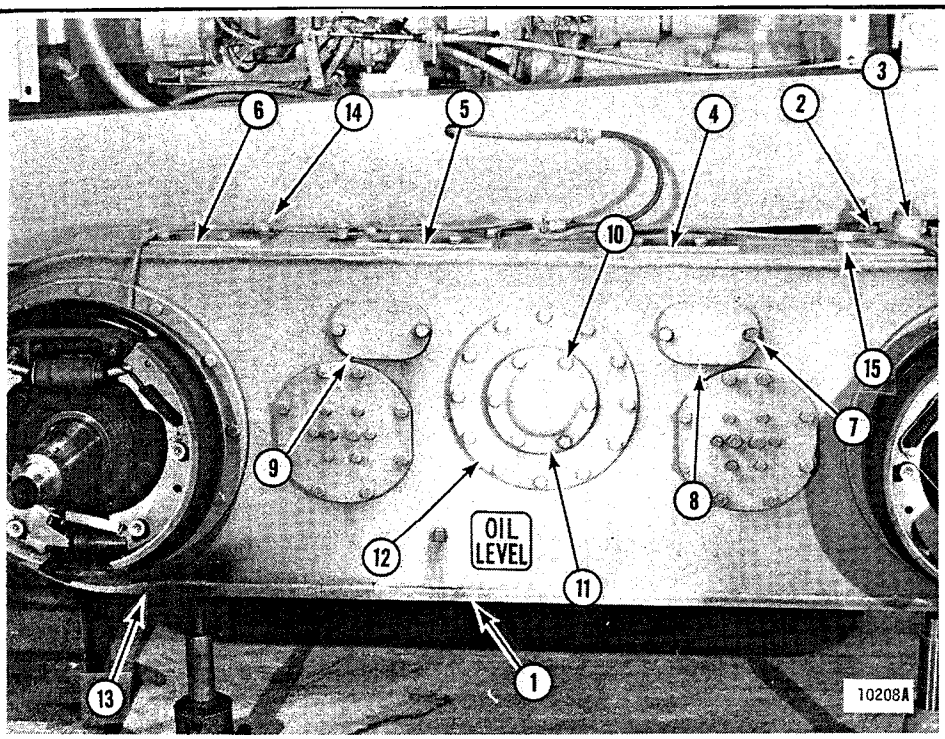

Figure 66

Position gasket and bearing cover (11) against axle bearing carrier (12) and install six capscrews and lockwashers (10).

Position gasket and side access cover (8) against tandem case (1) and install two capscrews and lockwashers (7).

NOTE: *Install side access cover (9) and the other four covers that are located on the back side of the case in the same manner.*

Install drain plug (13) in bottom of tandem case. Fill tandem case(s) with 8 U.S. Gallons of oil (See Shop Manual J-1 for proper tandem case lubricant).

Position gasket and filler cover (3) against tandem case and install six capscrews and lockwashers (2).

NOTE: *Install access covers (4 thru 6) in the same manner. Be sure tube clamps (14 & 15) are secured at the same time as covers (3 & 6).*

Position key (1) in axle (2).

Be sure that brake shoes (3 & 4) are centered and as close together as possible.

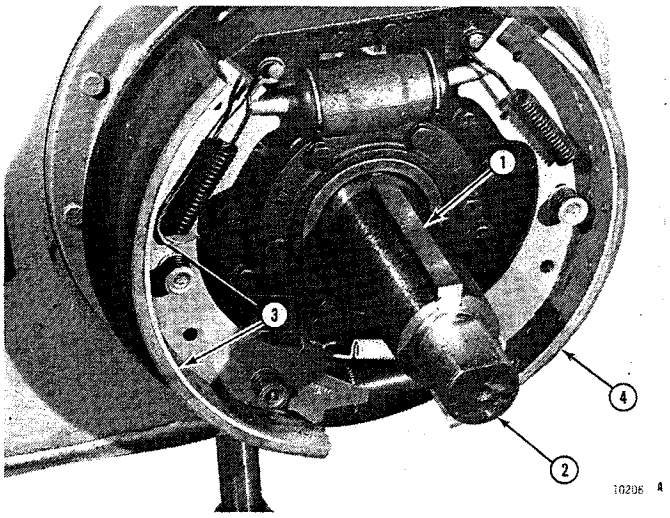

Figure 67

Using suitable lifting device, sling tire/wheel assembly (1), aligning the keyway with key in axle (2).

Slide tire/wheel assembly retainer (3), and axle lockwasher (4) onto axle.

Screw nut (5) on axle.

NOTE: *Using a multiplier and torque wrench, tighten nut to 1950 FT. LBS., dry.*

Bend one tab on axle lockwasher down to prevent nut from backing off.

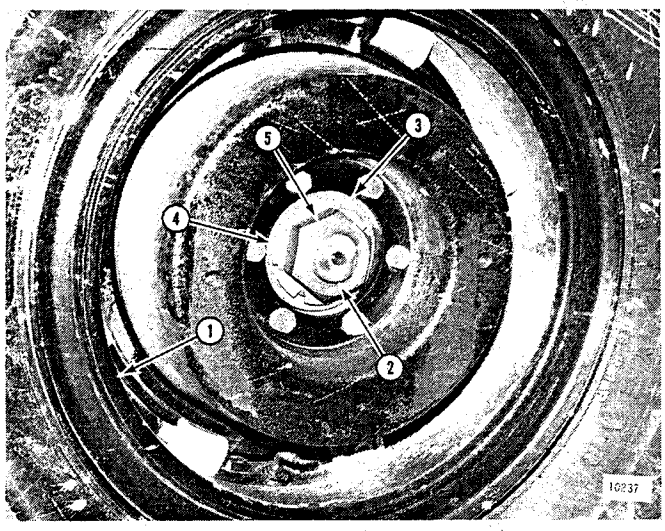

Figure 68

Perform all steps with Figures 67 and 68 for remaining tire/wheel assembly.

Start engine. Using moldboard, raise frame (1) and tandem case (2) to remove blocking (3) and jacks from under unit. Lower grader back down on the ground. Shut-down engine.

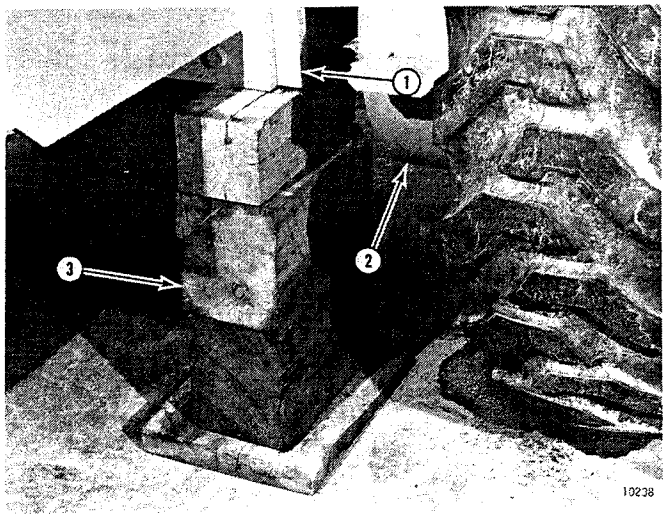

Figure 69

NOTE: *The brakes must be bled and brake shoes adjusted before unit is ready for Road Testing.*

BRAKE ADJUSTMENT & BLEEDING

BRAKE ADJUSTMENT

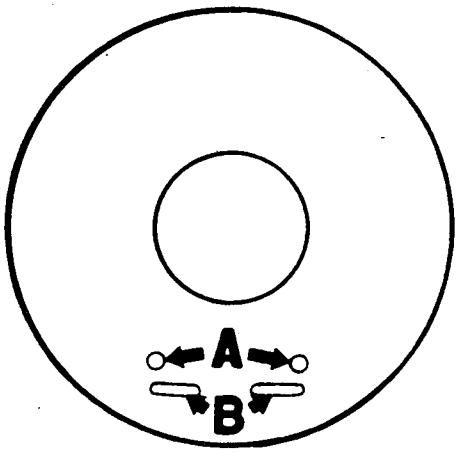

Figure 70

1. Insert brake adjusting tool in slot "B" and engage star wheel. Move the free end of the adjusting tool away from the axle (downard) to expand shoes to the drum. Continue expanding shoes until they are snug against the brake drum.

2. Insert wire probe in "A" and push automatic adjusting lever away from star wheel. Back off star wheel approximately 20 notches or 1 full turn.

NOTE: *Normal wear adjustment is automatically performed during working cycles. The adjustment takes place only during reverse brake application and only when sufficient lining has worn away to permit adjuster lever to pick up next tooth of adjusting screw to advance the adjusting screw slightly.*

3. Reinstall covers in probe holes and access slots.

BLEEDING

1. Attach a suitable bleeder ball to master brake cylinder. With valve on bleeder ball closed, bring pressure in ball up to 15 psi. Open valve on bleeder ball.

2. Start bleeding brake lines in the following order (See Figures 71 & 72):
   At (1) Transmission
   (2) Right rear wheel
   (3) Right front wheel
   (4) Left rear wheel
   (5) Left front wheel
   Open bleeder valve/plug (1) at transmission/wheel cylinders until all air is expelled from the line and then close. Do this at each location. After bleeding is completed, turn off bleeder ball valve.

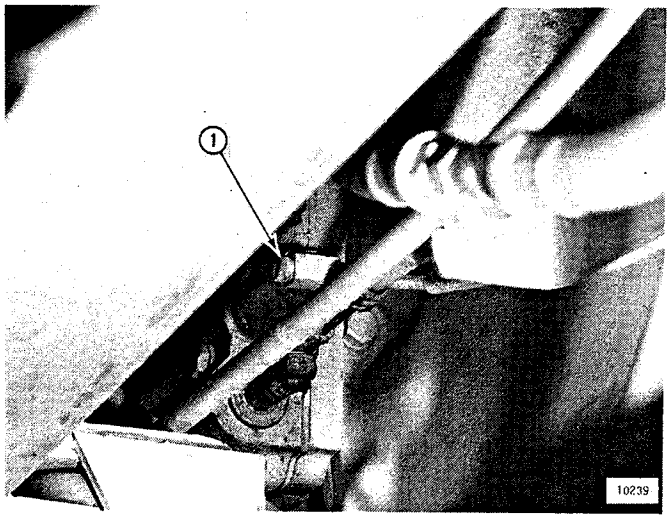

Figure 71

3. Start grader and pump brakes for approximately one minute. Shut-down unit.

4. Open bleeder ball valve and bleed brake lines again as in step 2.

5. Disconnect bleeder ball and close master brake cylinder.

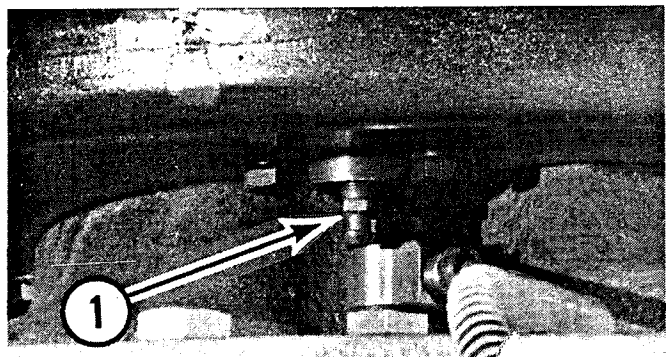

Figure 7

6. Wipe spilled brake fluid from lines. Have one person start grader and apply brake while another looks for leaks. If a leak is spotted, repair and repeat entire bleeding procedure.

ROAD TESTING

After the tandem case is reinstalled, brake shoes adjusted and lines bled, the grader is to be road tested to ensure that the tandem case and brakes are functioning properly before returning unit to service.