

SECTION XIV — TRUCK FRAMES

Topic Title	Topic No.	Page No.
General Description	1	323
Truck Frames	2	324
Truck Wheels	3	326
Track Release	4	331
Track Support Rollers	5	333
Track Idlers	6	336

1. GENERAL DESCRIPTION

The major components of a truck frame assembly are: Truck frame, truck wheels, track support rollers, track release, and track idler. The truck frame is made of steel sections welded into a rigid "A" frame assembly. Each truck frame pivots at the rear on a pivot shaft and a sprocket shaft outboard bearing. The pivot shaft is secured to the bottom of the steering clutch and final drive housing by pivot shaft caps, the sprocket shaft outboard bearing is installed in the sprocket shaft outboard bearing cage, and the truck frame is attached to the outboard bearing cage by capscrews. The truck frames support the tractor main frame by the use of an equalizing spring, except on the models HD 16 FC and HD 16 GC tractors; these two models are supported by a rigid beam in place of the equalizing spring.

Each truck frame assembly on the models HD 16A and HD 16AC tractors incorporates four single flange and two double flange truck wheels. Each truck frame assembly on the models HD 16D, HD 16DC, and HD 16FC tractors incorporates five single flange and two double flange truck wheels. Each truck frame assembly on the model HD 16GC tractors incorporates six single flange and two double flange truck wheels. The truck wheels revolve on tapered roller bearings and have positive type grease seals. The truck wheels are lubricated for life at the time of assembly and no further lubricating service is required. The truck wheels are attached to the truck frames by capscrews inserted through the wheel attaching brackets and threaded into replaceable tapped blocks.

The track support roller and track idler assemblies contain tapered roller bearings and positive type grease seal assemblies and are lubricated for life at the time of assembly. Internally, their construction is much the same as that of the truck wheels. The track idler brackets are guided on the truck frames by replaceable upper and lower slide bars.

The track release is a coil spring mechanism connected to the track release yoke through a bellcrank and push rods. The track release spring and bellcrank assembly are enclosed in an oil tight housing which is an integral part of the truck frame.

Truck frame guard equipment is furnished as standard equipment on all model HD 16 tractors. The truck frame guard equipment consists of full length truck wheel guards, track idler inner and outer guards, and guards for the track sprocket. The guard equipment is attached by capscrews and is readily removable. *NOTE: Heavy-duty truck frame guard equipment is available for all models as special equipment.*

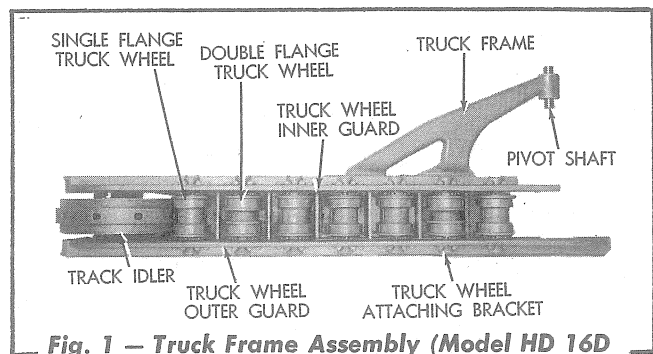


Fig. 1 — Truck Frame Assembly (Model HD 16D, HD 16DC, and HD 16FC Tractors)

2. TRUCK FRAMES

A. Maintenance

Maintenance of the truck frames consists of periodic inspection and the necessary corrections to obtain proper operating conditions. Truck frames sprung or twisted "out-of-line" will contribute to rapid wear of the truck wheels, track idlers, support rollers, track sprockets, and track assemblies, and should be repaired or replaced. Excessively worn pivot shaft bushings and shafts, or excessively worn sprocket shaft outboard bearings, may also cause misalignment of the truck frames and should be replaced immediately.

B. Removal of Truck Frame

1. Uncouple the track by removing the track master pin (refer to Section XVI, Topic 2, Paragraph B). Move the tractor backward until the top of the track is off the track sprocket.
2. Remove the truck frame pivot shaft caps (Fig. 2) located directly under the steering clutch and final drive housing. Remove the track sprocket guard. Remove the three capscrews attaching the outboard bearing cover to the sprocket shaft bearing cap, then remove the two capscrews attaching the sprocket shaft bearing cap to the truck frame and remove the cap. Remove the capscrews attaching the equalizing spring seat to the truck frame.
3. Raise the tractor off the truck frame, using a hoist or jack, and place suitable cribbing under the drawbar supporting plate and under the front of the tractor, to the rear of the front pull hook or under the equalizing spring. Remove the equalizing spring seat.
4. Move the truck frame as far forward as it will go and using suitable hoisting equipment, move the truck frame out from under the tractor.

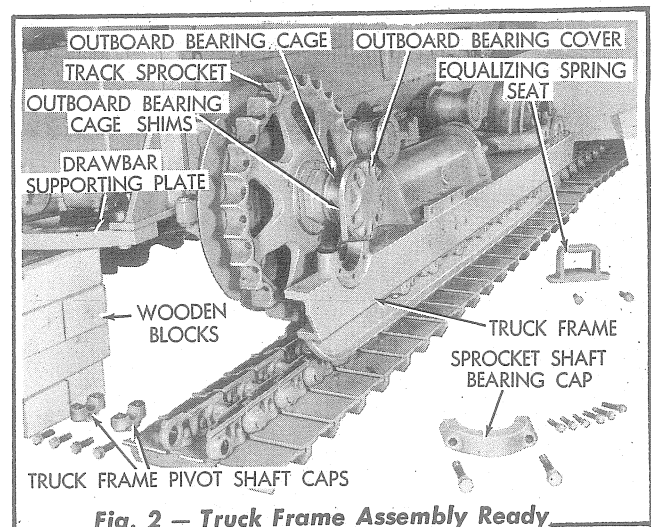


Fig. 2 — Truck Frame Assembly Ready for Removal

C. Pivot Shaft, Pivot Shaft Bushing, and Pivot Shaft Seals

1. Maintenance

Each pivot shaft and pivot shaft bushing is lubricated with oil from the bevel gear compartment by a lubricating wick assembly. No maintenance is necessary other than periodic checks to make certain that the truck frame pivot shaft cap attaching capscrews are tight (475 to 495 lbs. ft. torque) and that the bushing and the shaft are not excessively worn.

2. Removal of Pivot Shaft, Pivot Shaft Bushing, and Pivot Shaft Seals

- a. With the track uncoupled and the tractor raised off the truck frame as shown in Fig. 2; the pivot shaft may be removed from the truck frame. The pivot shaft is a slip fit (.006" to .010" loose) in the bore of the pivot shaft bushing, therefore, no special tools are necessary for removal of the pivot shaft.
- b. The pivot shaft bushing may be removed from the truck frame by using special tools similar to the ones shown in Fig. 3, after the seals have been removed from both ends of the bushing.

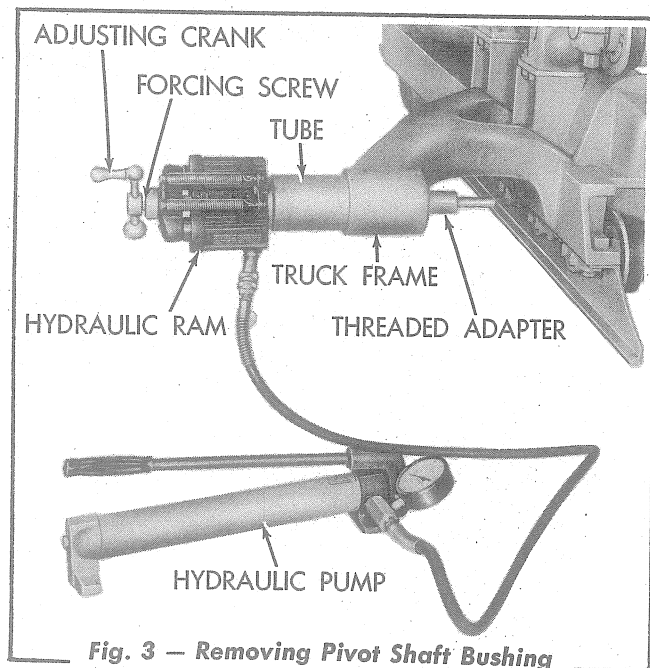


Fig. 3 — Removing Pivot Shaft Bushing

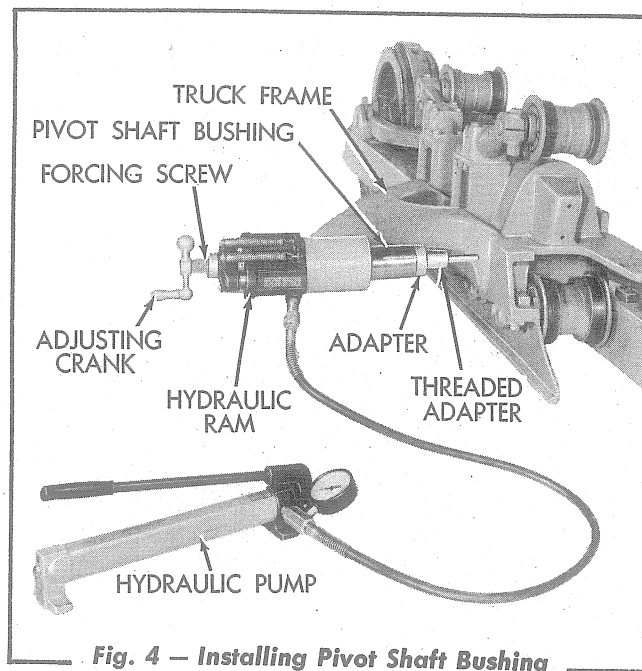


Fig. 4 — Installing Pivot Shaft Bushing

3. Installation of Pivot Shaft, Pivot Shaft Bushing, and Pivot Shaft Seals

- Lubricate the outer diameter of the pivot shaft bushing and start the bushing into place in the bore of the truck frame, making certain that the bore and the bushing are smooth and free of burrs.
- Using special tools similar to the ones shown in Fig. 4, install the bushing into position in the bore of the truck frame. When installed, make certain that the bushing is centered in the bore (each end of the bushing being approximately $\frac{17}{32}$ " in from the outer ends of the bore in the truck frame).
- Install a new pivot shaft seal at each end of the pivot shaft bushing as shown in Fig. 5, making certain the sealing lips of the seals are directed toward the outside. Lubricate the pivot shaft and install it into position in the bushing, making certain the sealing lips of the seals are not damaged and that the oil hole in the shaft will be to the inside of the tractor and positioned on the top as installed.

D. Installation of Truck Frame

Install the truck frame by a direct reversal of the removal procedure. **CAUTION:** Each truck frame

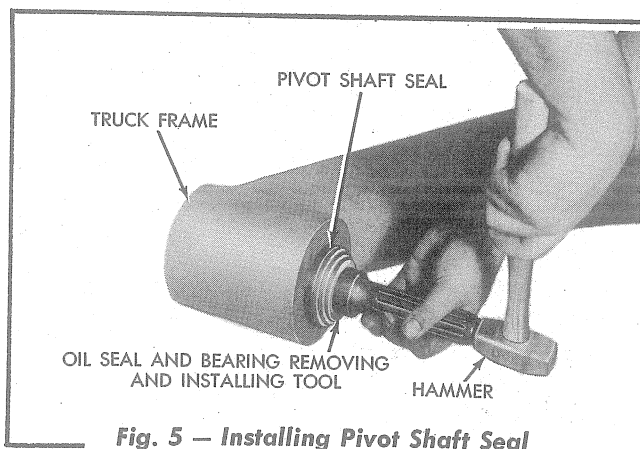


Fig. 5 — Installing Pivot Shaft Seal

pivot shaft and bushing is lubricated by a wick assembly that also serves as a dowel pin for locating the pivot shaft to the steering clutch and final drive housing. When lowering the tractor onto the pivot shaft, care **MUST** be used to prevent damaging the lubricating wick holder. Misalignment of the truck frame and abnormal wear of the pivot shaft and bushing will result from a damaged lubricating wick assembly.

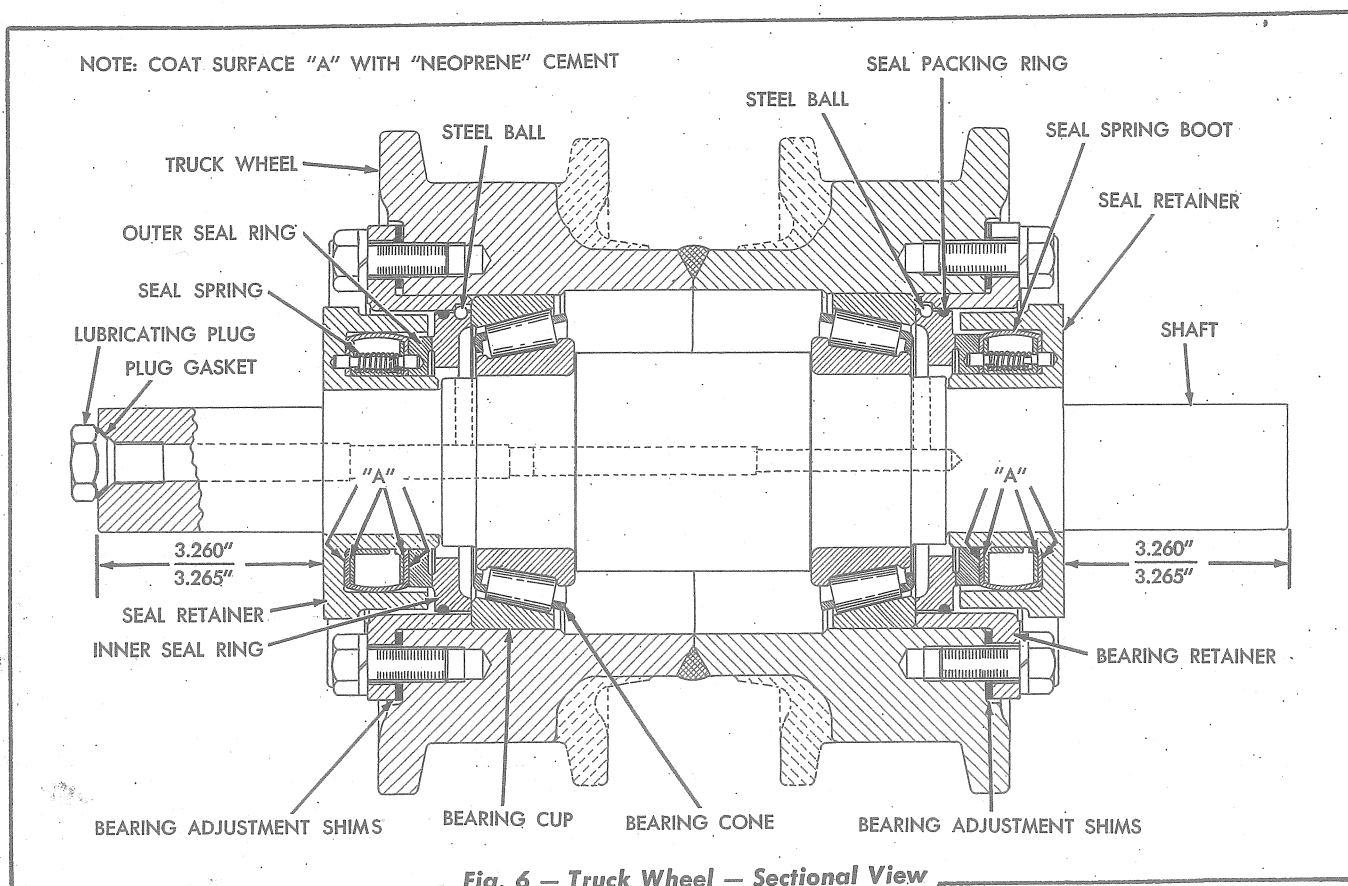
The truck frame pivot shaft caps and the pivot shaft brackets (welded to the steering clutch and final drive housing) are center punched on the rear side for identification, as the caps **MUST** be installed in their original positions.

Install each pivot shaft cap in its original position, then tighten the cap attaching capscrews to a

torque of 475 to 495 lbs. ft. Check the clearance between the truck frame pivot arm and the pivot

shaft caps as described in Section XIII, Topic 4, Paragraph G, Step 5.

3. TRUCK WHEELS



A. Maintenance

Maintenance of the truck wheels consists of a periodic check for loose mounting, loose bearings, grease leakage, and excessive wear. The truck wheels are lubricated for life at the time of assembly and no further lubricating service is required except when the truck wheels are being reassembled after repair.

B. Checking and Removal of Truck Wheels

1. The truck wheels may be checked or removed without uncoupling the track or removing the truck frame. To check or remove a truck wheel assembly without uncoupling the track; loosen the capscrews in the track adjusting screw lock and turn the adjusting screw into the track release yoke as far as possible. Place blocks approximately 16" high in front of the track

and move the tractor forward until the blocks are under the first truck wheel. Then place blocks approximately 16" high just to the rear of the track and move the tractor backward until the weight is being carried by the track sprocket and the track idler. Lock the brake pedals in their applied position. With the tractor in this position, the slack will be at the bottom of the track (refer to Fig. 7). Check the truck wheels for bearing end play; if there is end play or indication of grease leakage, the truck wheel must be removed and inspected. If the truck frame is removed, it should be turned over for removal of truck wheels. NOTE: The truck wheels are attached to the truck frames by capscrews inserted through the attaching brackets and threaded into replaceable tapped blocks.

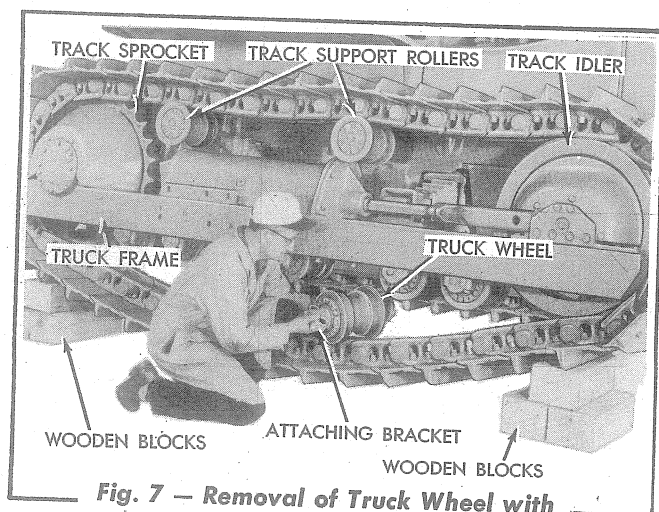


Fig. 7 — Removal of Truck Wheel with Track Installed

2. With the tractor placed on blocks as explained in Step 1 above, remove the truck wheel inner and outer guards. Reinstall the capscrews to hold the tapped blocks in position. Remove the capscrews attaching the truck wheel brackets to the truck frame and remove the truck wheel from the tractor. **NOTE:** Do not remove the tapped blocks from the truck frame.

C. Disassembly of Truck Wheels

IMPORTANT: When disassembling the truck wheels, keep the parts separated so that they can be reassembled in their original positions.

1. Clean the outside of the truck wheel thoroughly. Remove the attaching bracket from each end of the truck wheel shaft by turning the bracket approximately $\frac{1}{4}$ turn.
2. Remove the capscrews attaching the bearing retainers to the truck wheel. Remove the lubricating plug and gasket.
3. Three equally spaced tapped holes are provided in each bearing retainer for means of removal. Using special tools similar to the ones shown in Fig. 8, pull each bearing retainer and seal retainer (with seal assembly components) from the shaft. Tie the bearing adjustment shims to their respective retainer to prevent loss. **CAUTION:** Use care to avoid scratching and damage to the seal rings.

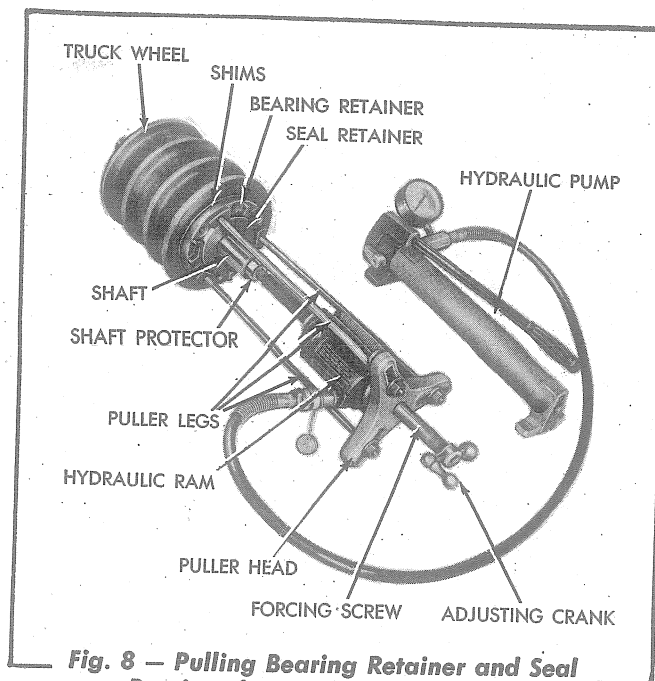


Fig. 8 — Pulling Bearing Retainer and Seal Retainer from Truck Wheel Shaft

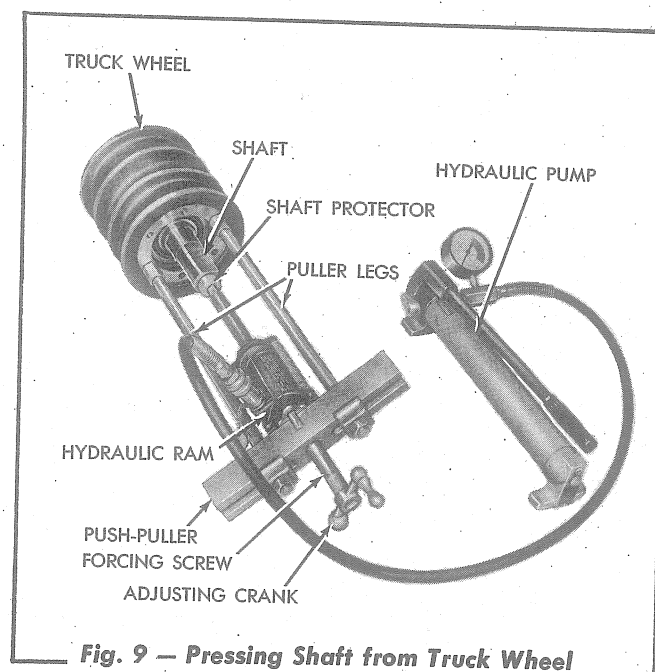


Fig. 9 — Pressing Shaft from Truck Wheel

4. Using special tools similar to the ones shown in Fig. 9, press on one end of the truck wheel shaft to remove the bearing cup from the opposite end. Press on the opposite end of the shaft and remove the other bearing cup and the shaft.
5. Using special tools similar to the ones shown in Fig. 10, remove the bearings from the truck wheel shaft.

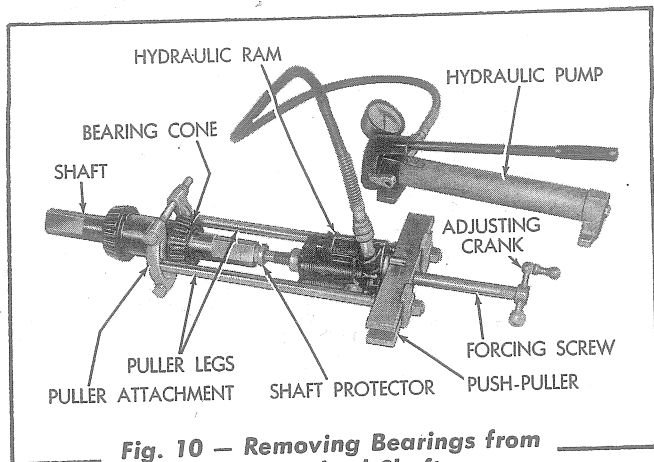


Fig. 10 — Removing Bearings from Truck Wheel Shaft

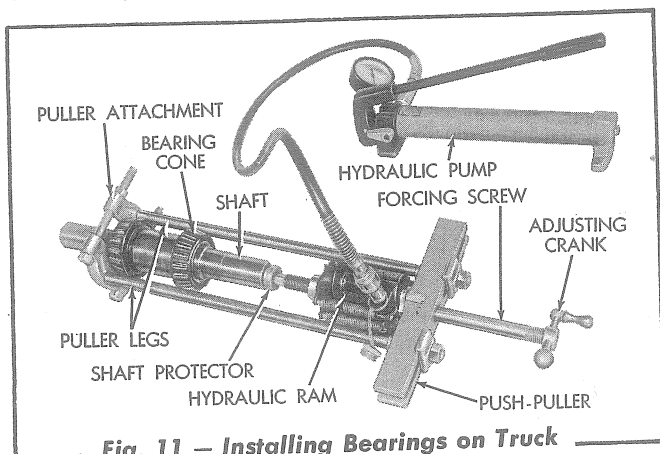


Fig. 11 — Installing Bearings on Truck Wheel Shaft

D. Inspection of Truck Wheels

1. Wash all parts thoroughly before inspection. Make certain that the grease passages in the truck wheel shaft are clean.
2. Make a visual inspection of the shaft and bearings. If the bearings or cups show excessive wear, or if they are pitted, they must be replaced. If the bearing cups are found to be loose in the bore of the truck wheel, replace the necessary parts.
3. Inspect the sealing surfaces of the mating seal rings for scratches, nicks, or burrs as these surfaces **MUST** be smooth and flat. If the sealing surfaces are scratched or damaged in any way, both mating seal rings must be replaced.
4. Examine the seal spring boot ("Neoprene") of each seal spring assembly and make certain that the seal boot is pliable and

each boot is in good condition. Also make certain the surfaces "A," Fig. 6, of the seal assembly components are firmly cemented together to avoid grease leakage.

Remove the inner seal rings from the bearing retainers and examine the seal packing rings. Replace the seal packing rings if the rings are not in good condition.

E. Assembly and Installation of Truck Wheels

Each truck frame on the models HD 16A and HD 16AC incorporate four single flange truck wheels and two double flange truck wheels, the double flange wheels are located in the Nos. 2 and 5 positions. The models HD 16D, HD 16DC and HD 16FC truck frames incorporate five single flange truck wheels and two double flange truck wheels, the double flange wheels are located in the Nos. 2 and 6 positions. Each truck frame assembly on the model HD 16GC tractor incorporates six single flange truck wheels and two double flange truck wheels, the double flange wheels are located in the Nos. 2 and 7 positions.

1. Make certain that all parts are clean, particularly the seal rings and the surfaces to be cemented.
2. If new seal assemblies are to be installed, the seal components should be installed at this time so that the "Neoprene" cement, used for cementing the assemblies in place will have sufficient time to dry. Refer to Figs. 6 and 12 and proceed as follows:
 - a. Place the seal retainer, outer face down, on a clean work bench.
 - b. Make certain the seal spring assembly, seal spring boot, and the outer seal ring are clean and dry. Install the boot on the seal spring assembly, lining up the holes in the boot with the protruding pins in the spring assembly. Hold each lip of the boot out away from the side of the spring assembly and coat the inside of each lip and each side of the seal spring assembly with "Neo-

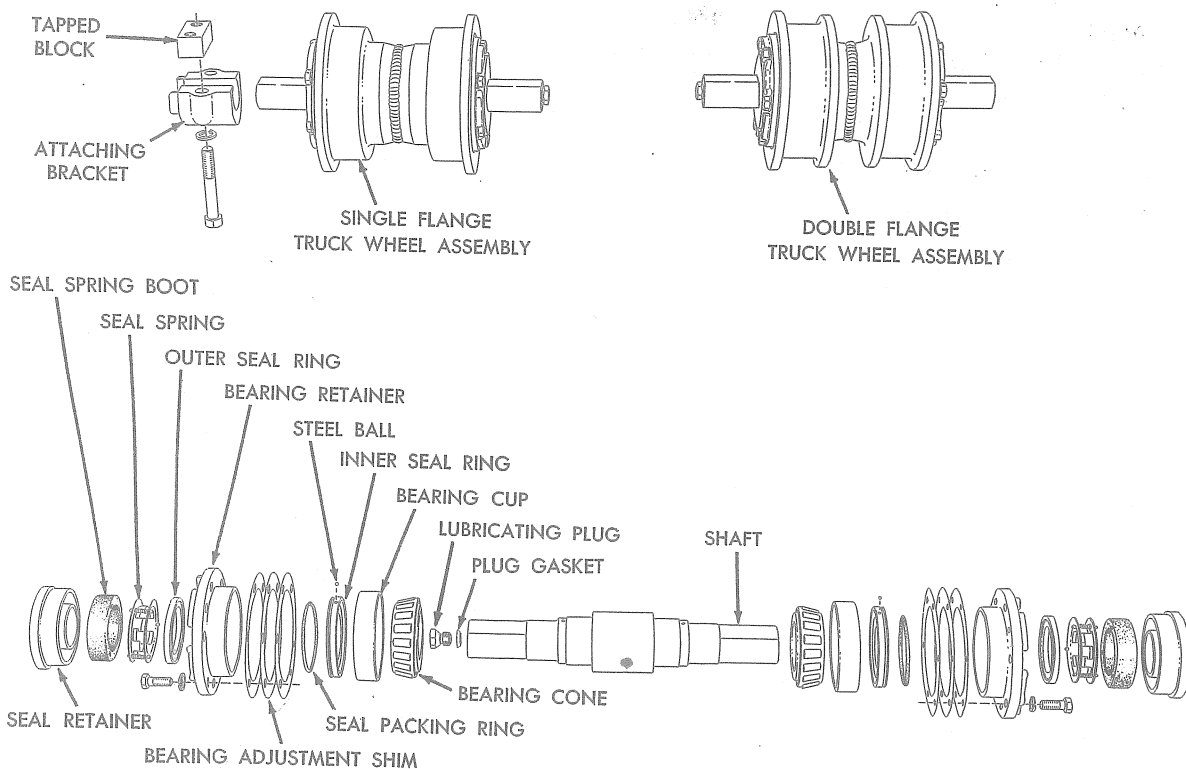


Fig. 12 — Truck Wheel Details

prene" cement. Press the lips back in place against the seal spring assembly.

- c. Coat the outer face of one lip of the boot and coat the machined face in the seal retainer (face in retainer that lip of boot contacts) with "Neoprene" cement. Immediately place the boot and spring assembly in position in the seal retainer, inserting the ends of the pins into the corresponding holes in the seal retainer.
- d. Coat the face of the other lip of the boot and the outer face of the outer seal ring with "Neoprene" cement. Immediately place the outer seal ring in position on the boot and spring assembly, inserting the ends of the pins into the corresponding holes in the seal ring.
- e. Place a weight on the outer seal ring, using a clean cloth between the weight and the seal ring, and allow the "Neoprene" cement to dry and set thoroughly. NOTE: When coating the

above parts with "Neoprene" cement, do not use an excessive amount. The "Neoprene" cement and solvent for thinning can be purchased from your "Allis-Chalmers" Construction Machinery Dealer.

- f. Install the seal packing ring in position in the ring groove of the inner seal ring. When installing, make certain that the seal packing ring is not "rolled" into position, thus twisting the ring in its groove.
 - g. Clean the bore in the bearing retainer. Place the steel ball in the ball recess in the seal ring, hold the steel ball in position, and install the inner seal ring (with seal packing ring) in position in the bearing retainer. When installing, start the side with the packing ring into the bore first, aligning the steel ball with the ball slot in the bearing retainer.
3. Press the bearings onto the truck wheel shaft until they are seated against the shoulders on the shaft (refer to Fig. 11).

4. Install a bearing cup in one end of the truck wheel. Lubricate the bearings, insert the shaft with the bearings into the truck wheel, and install the remaining bearing cup.
5. Install one of the bearing retainers, complete with seal components and the original amount of bearing adjustment shims, on the truck wheel and tighten the attaching capscrews securely.
6. Install the other bearing retainer, complete with seal components and the original amount of bearing adjustment shims, on the truck wheel. When tightening the attaching capscrews, turn the shaft occasionally to make certain that an excessive pre-load is not being placed on the bearings. After the attaching capscrews are tightened, strike the ends of the shaft with a soft hammer to properly seat the bearings. The bearings are properly adjusted when a slight drag (15 to 45 lbs. in. pre-load) can be felt when turning the shaft by hand.

If the bearings are too tight or too loose, it will be necessary to add or remove the necessary adjustment shims. To do this, remove the bearing retainers, then add or remove the estimated number of shims required, and reassemble. Follow this procedure until the proper pre-load of the bearings is obtained. Strike the ends of the shaft with a soft hammer before checking the bearing pre-load, to make certain the bearings are properly seated.

IMPORTANT: When adding or removing shims, do not add or remove shims on one side only. The total thickness of the shims required to adjust the bearings should be divided as evenly as possible between the two sides.

7. Coat the mating surfaces of the seal rings with oil. Press the seal retainers, with seal components, on each end of the shaft as shown in Fig. 13. Press the seal retainers onto the shaft until the outer faces of the seal retainers are 3.260" to 3.265" in from the end of the shaft (Fig. 6).

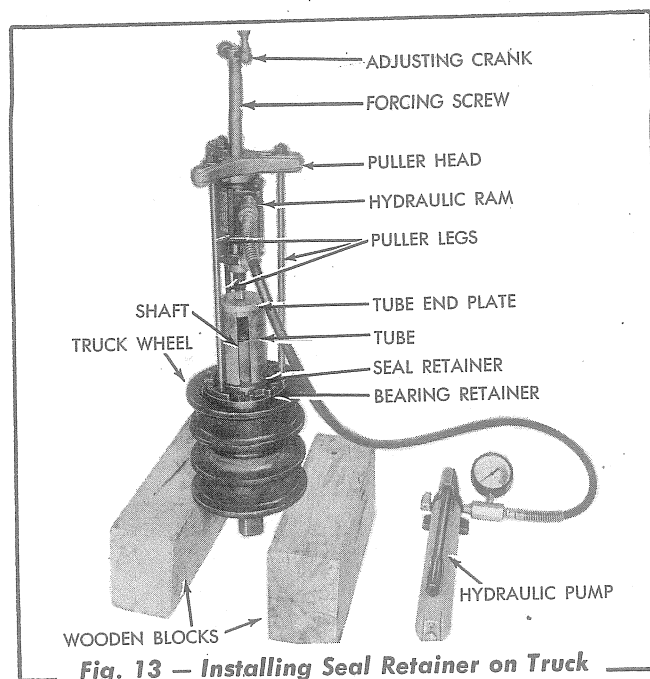


Fig. 13 — Installing Seal Retainer on Truck Wheel Shaft

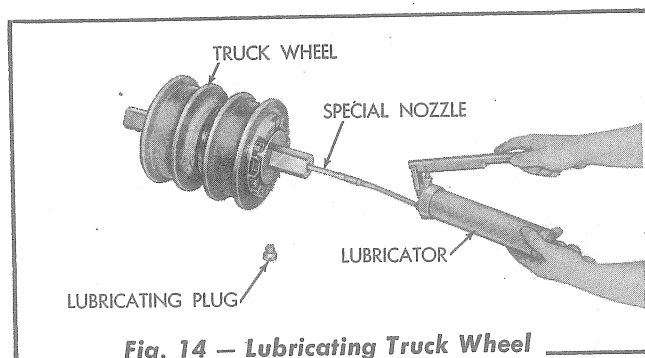


Fig. 14 — Lubricating Truck Wheel

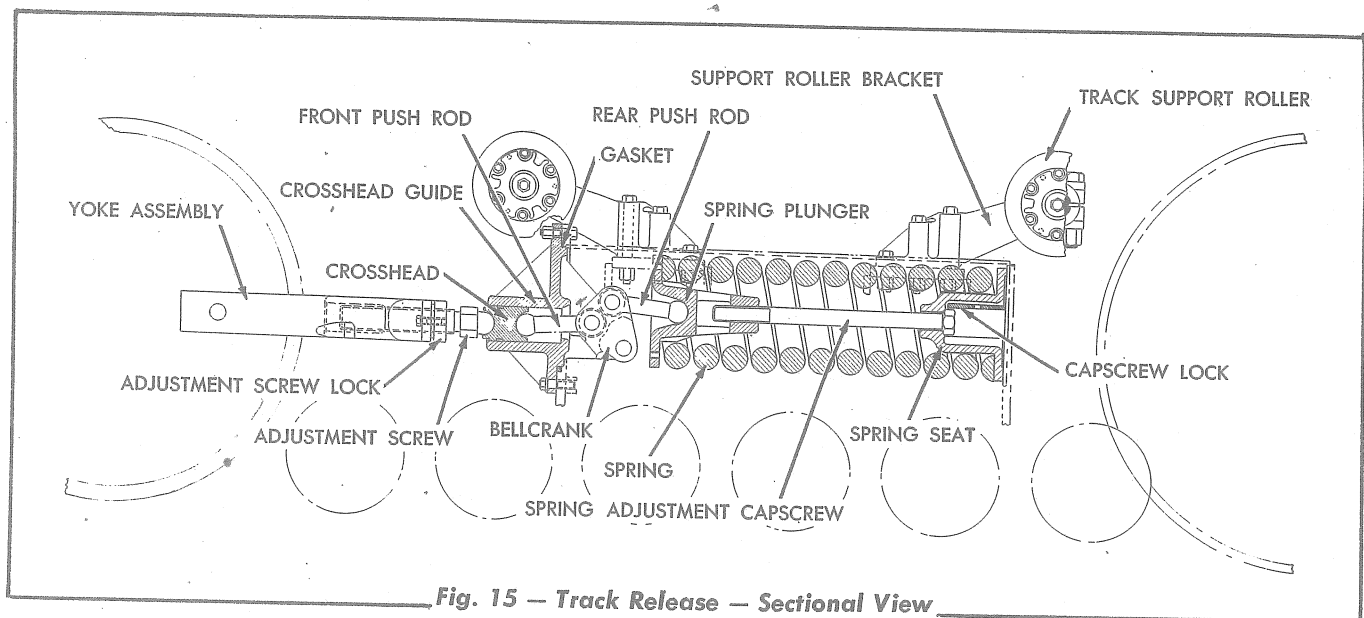
8. Using a hand lubricator and special lubricating nozzle as shown in Fig. 14, fill the truck wheel assembly with the specified grease. Pump the grease in slowly, while holding the nozzle firmly against its seat in the shaft, until grease is forced out the end of the shaft around the nozzle. This will indicate the truck wheel is full. Approximately 1 $\frac{3}{4}$ pounds of grease is required to fill each truck wheel. Install the lubricating plug and gasket and tighten the plug to a torque of 100 lbs. ft. Install the two attaching brackets in position on the truck wheel shaft.
9. Install the truck wheel in its proper location on the truck frame, making certain that the lubricating plug in the end of the truck wheel shaft is to the outside and that the flat surfaces on the shaft are turned up

against the bottom of the truck frame. Install the inner and outer truck wheel guards.

10. Drive the tractor forward until the blocks

used under the rear of the track can be removed. Back the tractor off the blocks used under the front of the track. Refer to Section XVI, Topic 2 and adjust the track.

4. TRACK RELEASE



A. Maintenance

Remove the oil filler and level plug from the track release housing and inspect the lubricant for contamination and proper level after every 200 hours of operation. The oil level should be even with the bottom of the tapped hole for the filler plug. If the oil has become contaminated by water or dirt, drain and refill with the specified lubricant. Since there is no drain plug provided, it is necessary to use a suction pump to remove the oil from the housing.

Periodic checks should be made to assure that the track release mechanism functions properly. Remove any accumulation of dirt and debris from around the track idler yoke and track adjustment screw.

B. Removal of Track Release

1. Uncouple the track and remove the track idler as explained in Topic 6, Paragraph C, in this Section. Remove the track release yoke and adjustment screw as an assembly.
2. Drain the track release housing by removing the oil filler and level plug, and using a

suction type pump, draw the oil from the housing.

3. Remove the lower capscrews attaching the crosshead guide to the track release housing.
4. Loosen the remaining capscrews and high nuts uniformly until the crosshead guide is noticeably loose on the capscrews. If the spring tension is not relieved after loosening these capscrews approximately $\frac{3}{8}$ ", it is an indication that the spring adjustment cap-screw (Fig. 15) is either broken or out of adjustment, and 1" longer capscrews must be substituted, one at a time, in order to relieve the force on the crosshead guide.
5. Remove the crosshead guide assembly and the spring assembly from the housing for inspection.

C. Inspection of Track Release

1. Clean and inspect all parts thoroughly.
2. The bellcrank may be disassembled by removing the push rod pins which are a press

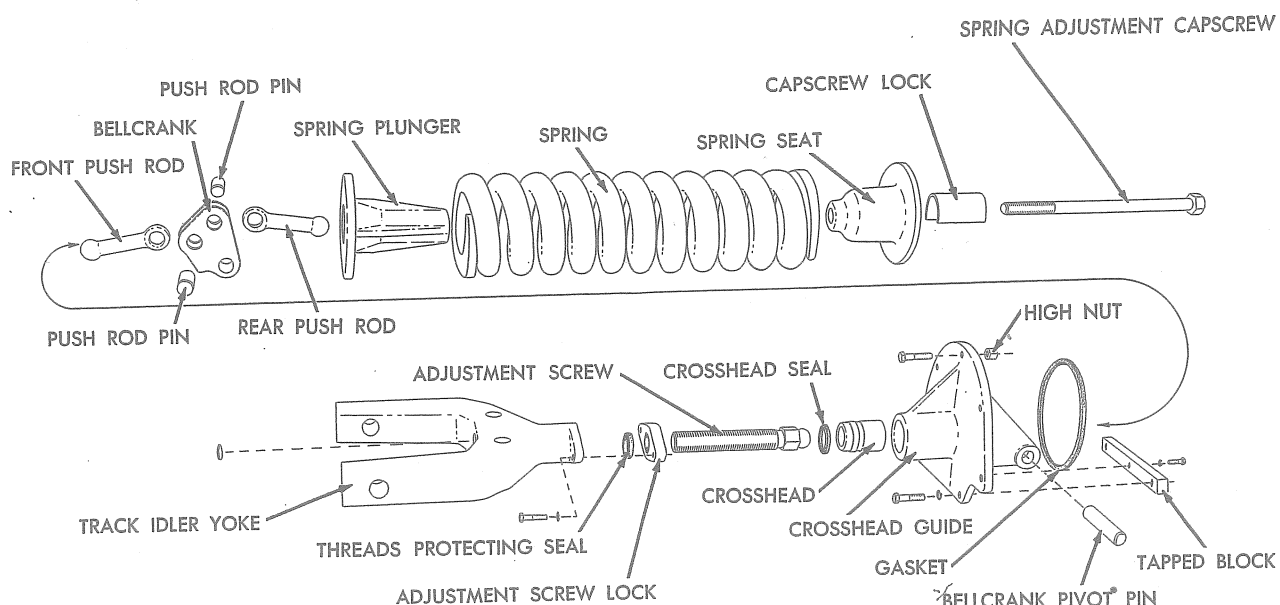


Fig. 16 — Track Release Details

fit in the bellcrank. Worn push rod pins or worn bores in the push rods and in the bellcrank will affect proper functioning of the track release mechanism. Replace any worn or damaged parts.

3. The spring assembly may be disassembled by compressing the spring sufficiently to relieve the tension on the spring adjustment capscrew, and removing the capscrew. If no means for compressing the spring is available, clamp the spring assembly to hold it from turning, then remove the capscrew.
4. If the crosshead or the bore in the crosshead guide show excessive wear, replace the necessary parts.
5. Inspect the spring seat, spring plunger, and spring for cracks and replace the necessary parts.

D. Installation of Track Release

The installation of the track release may be accomplished by a direct reversal of the removal procedure, however, special attention should be given to the following parts:

1. The spring assembly must be compressed so that the assembled length of the spring is $26\frac{23}{32}$ ".
2. Make certain that the capscrew lock is in position over the head of the spring adjustment capscrew when installing the spring assembly in position in the housing.
3. Cement the crosshead guide gasket to the counterbore in the track release housing.
4. When installing the crosshead guide and crosshead, make certain that the ends of the push rods are properly seated in the spring plunger and the crosshead.
5. Install the track release yoke and the track idler assembly (refer to Topic 6, Paragraph G in this Section).
6. Couple and adjust the track as outlined in Section XVI, Topic 2.
7. Fill the track release housing to the proper level with the specified lubricant. Install and tighten the oil filler and level plug.

5. TRACK SUPPORT ROLLERS

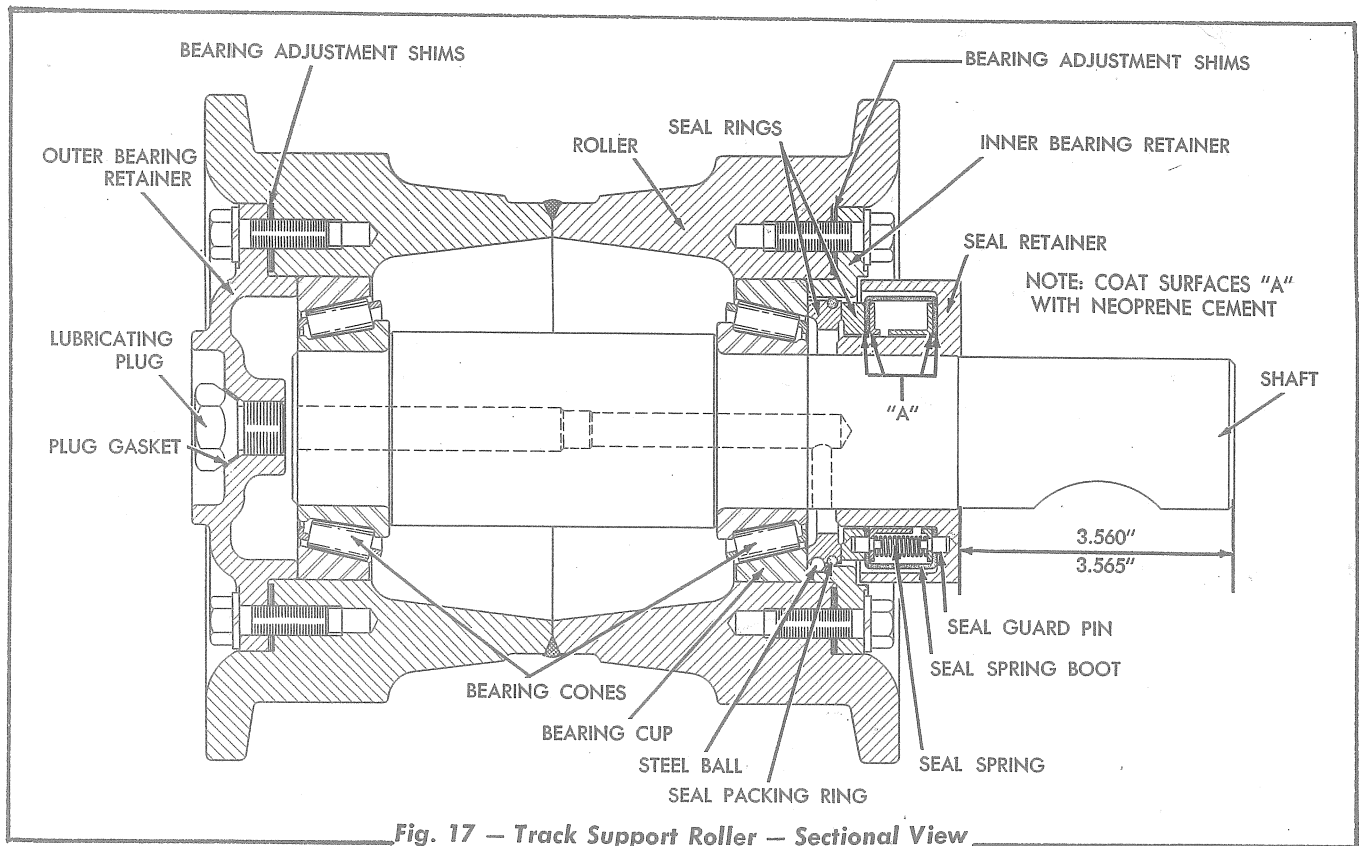


Fig. 17 - Track Support Roller - Sectional View

A. Maintenance

Maintenance of the track support rollers consists of a periodic check for loose mounting, loose bearings, grease leakage and excessive wear. The track support rollers are lubricated for life at the time of assembly and no further lubricating service is required except when the track support rollers are being reassembled after repair.

The following checks should be made periodically.

1. Raise the track off the support rollers.
2. Grasp the roller and check for end play. If end play is found, the roller assembly should be removed immediately and disassembled, inspected and repaired.

NOTE: If grease leakage through the seal assembly is noted, the support roller should be removed, disassembled, and inspected. Grease leakage is an indication of loose bearings or damaged or worn seals.

B. Removal of Track Support Roller

1. Raise and block the track so that it clears the support roller.
2. Remove the bolt clamping the support roller shaft in position in the bore of the support roller bracket. Drive a broad faced chisel, or similar tool, into the clamping slot of the bracket to open the bracket thus freeing the support roller shaft. Remove the support roller assembly.

C. Disassembly of Track Support Roller

1. Thoroughly clean the outside of the support roller assembly. Remove the lubricating plug and gasket.
2. Remove the capscrews attaching the inner bearing retainer to the roller. Using special tools similar to the ones shown in Fig. 18, pull the inner bearing retainer and seal retainer assembly from the shaft. Tie the

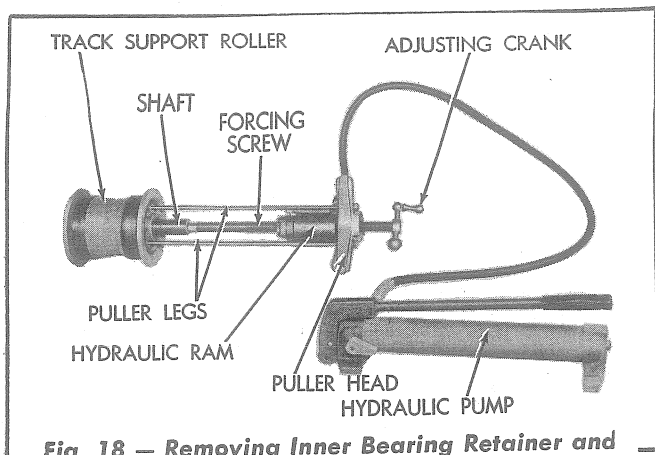


Fig. 18 — Removing Inner Bearing Retainer and Seal Retainer from Track Support Roller

bearing adjustment shims to the bearing retainer to prevent loss.

3. Remove the capscrews attaching the outer bearing retainer to the roller. Using special tools similar to the ones shown in Fig. 9, press on the inner end of the shaft to remove the outer bearing retainer and outer bearing cup. Tie the bearing adjustment shims to the bearing retainer to prevent loss.
4. Place the shaft back into position in the roller and press on the outer end of the shaft to remove the inner bearing cup. Remove the shaft from the roller.

CAUTION: When disassembling the track support roller, keep the parts separated so that they can be reinstalled in their original positions.

5. Using tools similar to the ones shown in Fig. 10, remove the bearings from the shaft.

D. Inspection of Track Support Roller

1. Thoroughly wash and clean the track support roller components before inspecting. Make certain that the grease passages in the shaft are open.
2. Make a visual inspection of the shaft and bearings. If the bearings and cups show excessive wear, or if they are pitted or chipped, they must be replaced. If the bearing cups are found to be loose in the bore of the support roller, replace the necessary parts.

3. Inspect the sealing surfaces of the seal rings for scratches, nicks, or burrs, as these faces **MUST** be smooth and flat. If the sealing surfaces are scratched or damaged, both mating seal rings must be replaced.
4. Examine the seal spring boot (Neoprene) of the seal spring assembly and make certain that the seal boot is pliable and the boot is in good condition. Also make certain that the surfaces "A," Fig. 17, of the seal assembly components are firmly cemented together to avoid grease leakage.

Remove the inner seal ring from the bearing retainer and examine the seal packing ring. Replace the seal packing ring if the ring is not in good condition.

E. Assembly of Track Support Roller

1. Make certain that all parts are clean, particularly the seal rings and the surfaces to be cemented.
2. If a new seal assembly is to be installed, the seal components should be installed at this time so that the "Neoprene" cement, used for cementing the assembly in place will have sufficient time to dry. Refer to Figs. 17 and 19 and proceed as follows:
 - a. Place the seal retainer, outer face downward, on a clean work bench.
 - b. Make certain the seal spring assembly, seal spring boot, and the outer seal ring are clean and dry. Install the boot on the seal spring assembly, lining up the holes in the boot with the protruding pins in the spring assembly. Hold each lip of the boot out away from the side of the spring assembly and coat the inside of each lip and each side of the seal spring assembly with "Neoprene" cement. Press the lips back in place against the seal spring assembly.
 - c. Coat the outer face of one lip of the boot and coat the machined face in the seal retainer (face in retainer that lip of boot contacts) with "Neoprene"

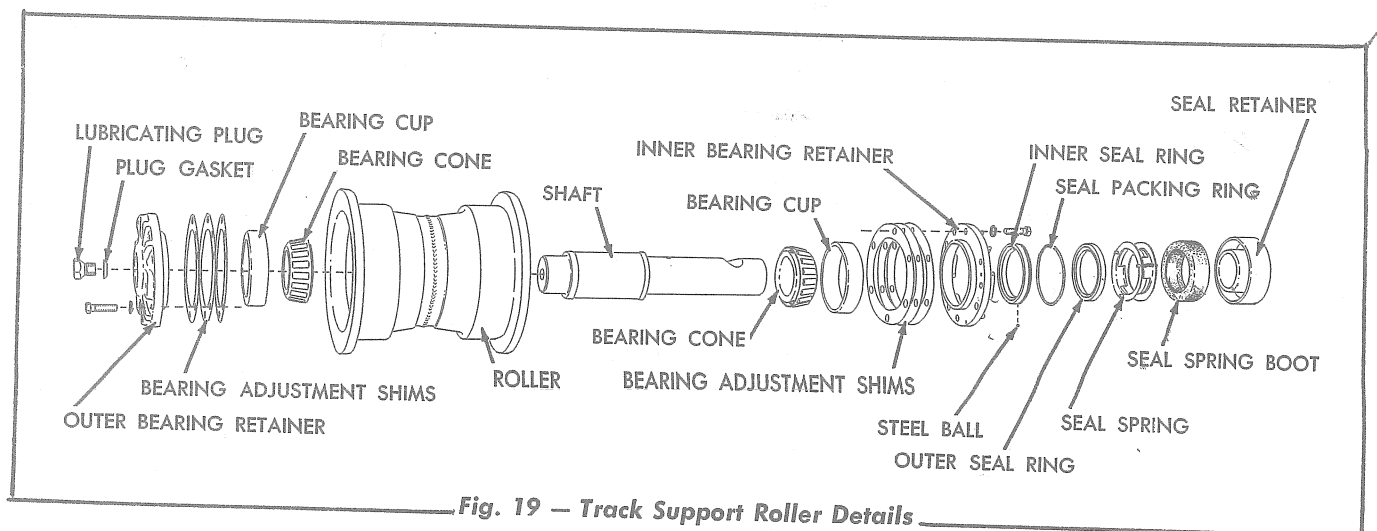


Fig. 19 — Track Support Roller Details

cement. Immediately place the boot and spring assembly in position in the seal retainer, inserting the ends of the pins into the corresponding holes in the seal retainer.

- d. Coat the face of the other lip of the boot and the outer face of the outer seal ring with "Neoprene" cement. Immediately place the outer seal ring in position on the boot and spring assembly, inserting the ends of the pins into the corresponding holes in the seal ring.
- e. Place a weight on the outer seal ring, using a clean cloth between the weight and the seal ring, and allow the "Neoprene" cement to dry and set thoroughly. *NOTE: When coating the above parts with "Neoprene" cement, do not use an excessive amount. The "Neoprene" cement and solvent for thinning can be purchased from your "Allis-Chalmers" Construction Machinery Dealer.*
- f. Install the seal packing ring in position in the ring groove of the inner seal ring. When installing, make certain that the seal packing ring is not "rolled" into position, thus twisting the ring in its groove.
- g. Clean the bore in the bearing retainer. Place the steel ball in the ball recess in the seal ring, hold the steel ball in position, and install the inner seal ring (with seal packing ring) in position in the inner bearing retainer. When installing, start the side with the packing ring into the bore first, aligning the steel ball with the ball slot in the bearing retainer.
3. Using special tools similar to the ones shown in Fig. 11, press the bearings onto the shaft until they are seated against the shoulders on the shaft.
4. Install a bearing cup into one end of the bore of the track support roller. Insert the shaft (with the bearings) into the support roller and install the other bearing cup. Lubricate the bearings with clean oil.
5. Install the inner bearing retainer and the original amount of bearing adjustment shims in position on the support roller and tighten the attaching capscrews securely.
6. Install the outer bearing retainer and the original amount of bearing adjustment shims in position on the track support roller. When tightening the attaching capscrews, turn the shaft occasionally to be certain that an excessive pre-load is not being placed on the bearings. After the attaching capscrews are tightened, tap the end of the shaft and the outer bearing retainer with a soft hammer to properly seat the bearings. The bearings are properly adjusted when a slight drag (15 to 45 lbs. in.

pre-load) can be felt when turning the shaft by hand.

If the bearings are too tight or too loose, it will be necessary to add or remove adjustment shims as needed. To do this, remove the bearing retainers, then add or remove the estimated number of shims required and reassemble. Follow this procedure until the proper pre-load of the bearings is obtained. **IMPORTANT:** When adding or removing shims, do not add or remove shims on one side only. The total thickness of the shims required to adjust the bearings should be divided as evenly as possible between the two sides.

7. Coat the mating surfaces of the seal rings with clean oil. Using tools similar to those shown in Fig. 13, press the seal retainer assembly (with the outer seal ring cemented in place) onto the shaft until the outer face

of the seal retainer is 3.560" to 3.565" in from the end of the shaft (Fig. 17).

8. Use a hand lubricator and the special lubricating nozzle as shown in Fig. 14 and fill the support roller assembly with the specified lubricant. Pump the lubricant in slowly, while holding the nozzle firmly against its seat in the shaft, until grease is forced out the end of the shaft around the nozzle; this will indicate the roller is full. Approximately one pound of grease is required to fill the track support roller assembly. Install the lubricating plug and gasket and tighten the plug to a torque of 100 lbs. ft.
9. The track support roller may now be installed on the tractor by inserting the end of the shaft in position in the bore of the support roller bracket, and install the clamping bolt and tighten securely.

6. TRACK IDLER

A. Maintenance

Maintenance of the track idlers consists of a periodic check for loose bearings, grease leakage, and excessive wear. The track idlers are lubricated for life at the time of assembly and no further lubricating service is required except when the track idlers are being reassembled after repair.

The following checks should be made periodically.

1. Loosen the capscrews in the track adjusting screw lock and turn the adjusting screw into the track release yoke to loosen the track.
2. Place a block of wood in front of the track and move the tractor forward until the block is under the first truck wheel. This will assure that no load is being carried on the track idler, other than the section of track which it supports.
3. Remove the track idler guards. Using a bar approximately five feet long, pry against the track idler bearing retainer and check for end play. If any end play is found, the idler assembly must be removed from the

tractor, disassembled, inspected, and repaired. *NOTE: If at any time grease is noted leaking from the seals, the track idler should be removed, disassembled, inspected, and repaired. Grease leakage is an indication of loose bearings or damaged or worn seals.*

B. Track Idler Slide Bars and Alignment

The holes for attaching capscrews in the lower slide bars are offset from the longitudinal center line of the slide bar and the slide bars must be installed on the truck frame as shown in Fig. 21. Also, note that the lower slide bars are tapered slightly (2°) on one side only to compensate for the taper of the truck frame channels. The lower slide bars are installed on the truck frames so that the thicker side of each bar is positioned next to the track idler and the lower face of each slide bar is parallel with the upper face of the respective upper slide bar.

1. Inspect the upper and lower track idler slide bars. If they are worn excessively, they may be turned end for end and moved to the opposite side of the truck frame, or

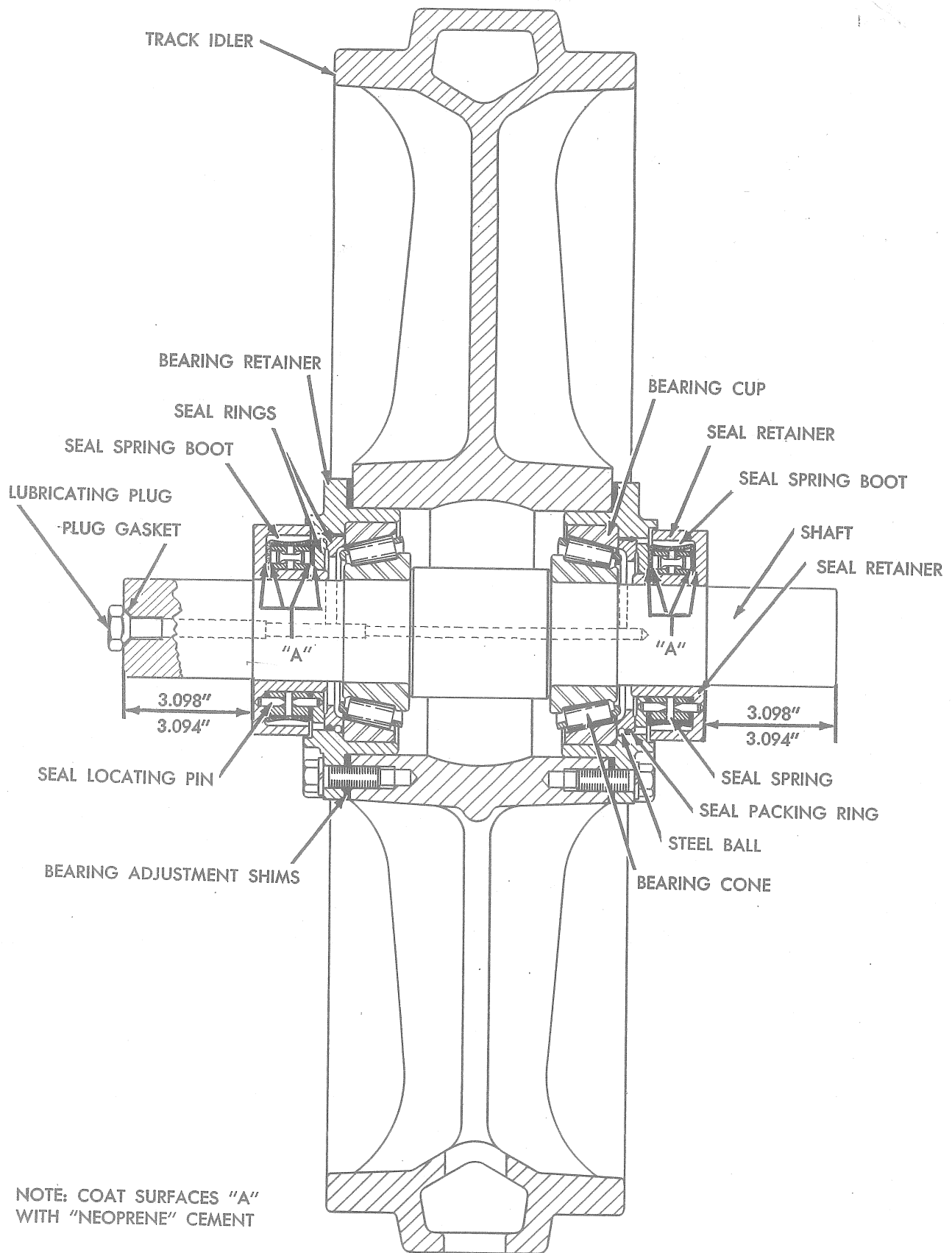


Fig. 20 — Track Idler — Sectional View

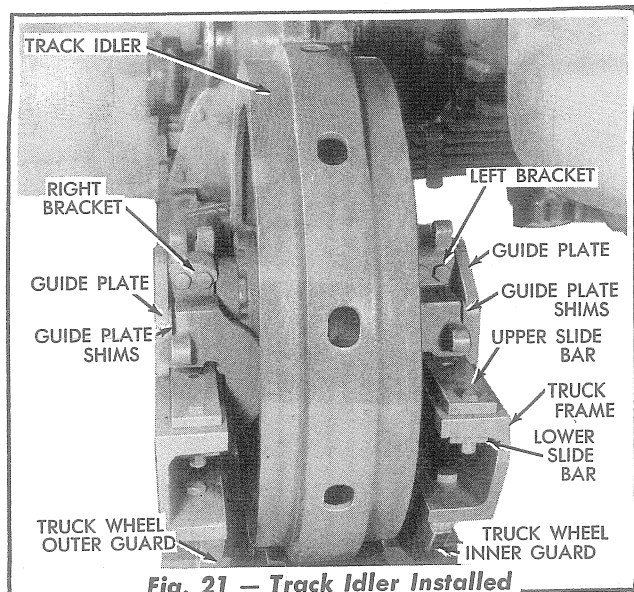


Fig. 21 — Track Idler Installed

they may be replaced. Add or remove shims between the lower slide bars and the truck frames to provide a sliding fit ($\frac{1}{32}$ " clearance) between the track idler brackets and the lower slide bars.

2. Check the clearance between the guide plates and the upper slide bars. Add or remove guide plate shims to provide a sliding fit ($\frac{1}{32}$ " clearance) between the guide plates and the upper slide bars.

C. Removal of Track Idler

1. Uncouple the track by removing the track master pin (refer to Section XVI, Topic 2). Move the tractor backward until the top of the track is free of the track idler.
2. Slide the track idler assembly forward from the truck frame.

D. Disassembly of Track Idler

1. Thoroughly clean the outside of the track idler assembly.
2. Remove the track idler guide plates and tie the guide plate shims to the plates to facilitate alignment of the track idler when reinstalling.
3. Remove the clamping capscrews from the track idler bracket assemblies. Spread the

track idler brackets using a broad faced chisel and remove the brackets from the track idler shaft.

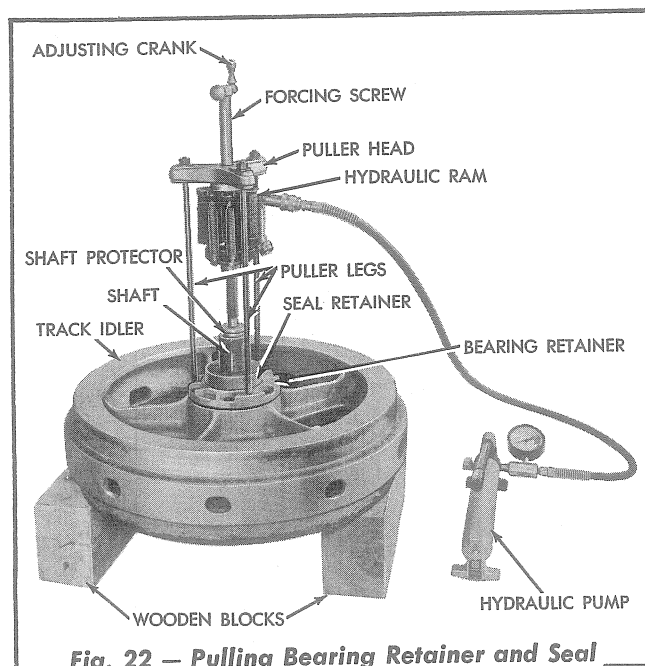


Fig. 22 — Pulling Bearing Retainer and Seal Retainer from Track Idler Shaft

4. Remove the capscrews attaching the bearing retainers to the track idler. Remove the shaft lubricating plug and gasket.
5. Three equally spaced tapped holes are provided in each bearing retainer for means of removal. Using tools similar to the ones shown in Fig. 22, pull each bearing retainer and seal retainer (with seal assembly components) from the shaft. Tie the bearing adjustment shims to their respective retainer. **CAUTION:** Use care to avoid scratching and damage to the seal rings.
6. Using tools similar to the ones shown in Fig. 9, press on one end of the track idler shaft to remove the bearing cup from the opposite end. Press on the opposite end of the shaft and remove the other bearing cup and the shaft.
7. Using tools similar to the ones shown in Fig. 10 remove the bearings from the track idler shaft.

E. Inspection of Track Idler

1. Thoroughly wash all parts before inspection. Make certain that the grease passages in the track idler shaft are clean.
2. Make a visual inspection of the shaft and bearings. If the bearings or the bearing cups show excessive wear or if they are pitted, they must be replaced. If the bearing cups are found to be loose in the bearing retainers, replace the necessary parts.
3. Inspect the sealing surfaces of the seal rings for scratches, nicks, or burrs, as these surfaces **MUST** be smooth and flat. If the sealing surfaces are scratched or damaged, both mating seal rings must be replaced.
4. Examine the seal spring boot ("Neoprene") of each spring assembly and make certain that the seal boot is pliable and each boot is in good condition. Also make certain that the surfaces "A," Fig. 20 of the seal assembly components are firmly cemented together to avoid grease leakage.

Remove the inner seal rings from the bearing retainers and examine the seal packing rings. Replace the seal packing rings if the rings are not in good condition.

F. Assembly of Track Idler

1. Make certain that all parts are clean.
2. If a new seal assembly is to be installed in the seal retainers, the seals should be installed at this time so that the "Neoprene" cement, used for cementing the assembly in place, will have sufficient time to dry.
NOTE: The installation of a new seal assembly in the track idler may be accomplished by referring to the procedure described in Topic 5, Paragraph E, Step 2, in this Section.
3. Using tools similar to the ones shown in Fig. 11, press the bearings onto the shaft until they are seated against the shoulders on the shaft.

NOTE: The outer end of the shaft is marked

with a chisel mark in alignment with the cross drilled grease holes in the shaft. If a new shaft is to be installed, mark the location of the grease holes in a similar manner so that their location can be determined after the shaft is installed in the track idler.

4. Install a bearing cup in one end of the idler hub. Lubricate the bearings and insert the shaft with the bearings in place into the idler hub. Install the other bearing cup.
5. Install one of the bearing retainers, complete with seal assembly and the original amount of bearing adjustment shims, in position on the track idler and tighten the attaching capscrews securely.
6. Install the other bearing retainer, with the original amount of bearing adjustment shims, in position on the idler. When tightening the attaching capscrews, turn the shaft occasionally by hand to be certain that an excessive pre-load is not being placed on the bearings. After the attaching capscrews are tightened, tap each end of the shaft with a soft hammer to properly seat the bearings. The bearings are properly adjusted when a slight drag (15 to 45 lbs. in. pre-load) can be felt when turning the shaft by hand.

If the bearings are too tight or too loose, it will be necessary to remove or add the necessary adjustment shims. To do this, remove the bearing retainer, add or remove the estimated number of shims required and reassemble. Follow this procedure until the proper pre-load of the bearings is obtained.

IMPORTANT: When adding or removing bearing adjustment shims, do not add or remove shims on one side only. The total thickness of the shims required should be divided as evenly as possible between the two sides.

7. Coat the mating surfaces of the seal rings with clean oil. Using tools similar to the ones shown in Fig. 24, press the seal retainers, with the outer seal ring in place,

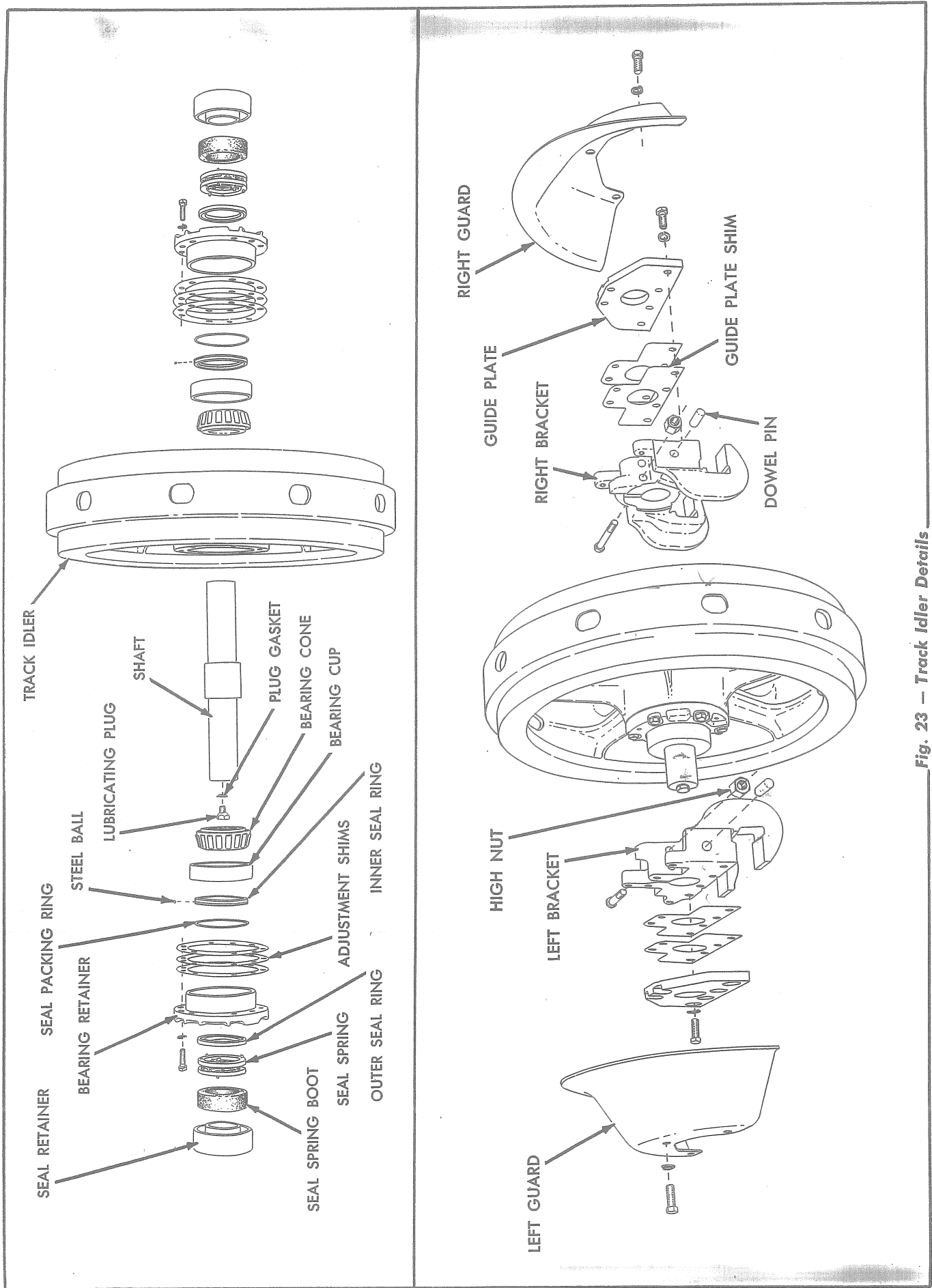


Fig. 23 — Track Idler Details

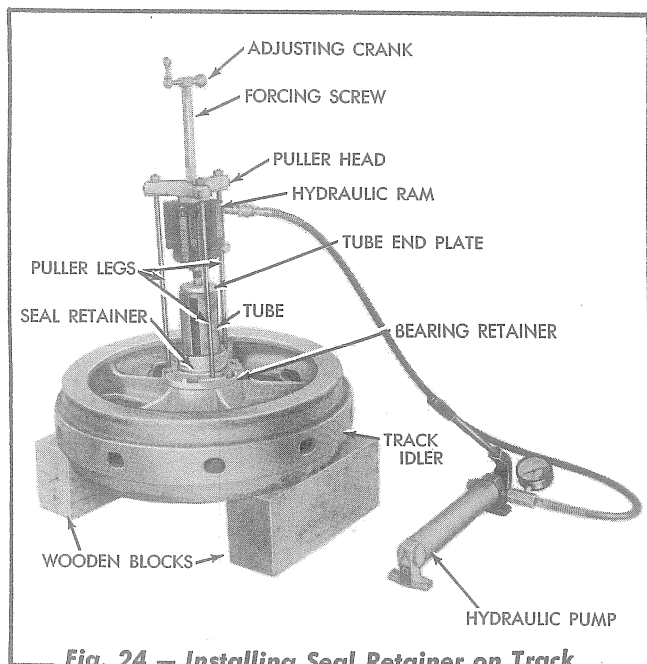


Fig. 24 — Installing Seal Retainer on Track Idler Shaft

onto the shaft so that the distance from the end of the shaft to the outer face of the retainer is 3.094" to 3.098".

8. **NOTE:** Determine on which side of the tractor the idler is to be used so that the lubricating plug will be to the outside and the dowel pin end of the idler brackets will be toward the rear when the idler is installed on the truck frame. Spread the track idler brackets using a broad faced chisel in the slot in the bracket. Install one of the brackets in position on the shaft, making certain that the chisel mark on the end of the shaft is toward the top of the idler when the bracket is installed. Position the bracket on the shaft so that the distance from the end of the shaft to the outer face

of the bracket is approximately $\frac{7}{16}$ ". Install the bracket clamping capscrews and high nuts and tighten securely.

9. Install the other track idler bracket on the shaft in the same manner as above. **IMPORTANT:** When installing this bracket make certain that the lower machined surfaces of the brackets are parallel to each other.
10. Using a hand lubricator and a special nozzle, fill the track idler assembly with the specified lubricant. Pump the lubricant in slowly, while holding the nozzle firmly against its seat in the shaft, until lubricant is forced out the end of the shaft around the nozzle; this will indicate the track idler is full. Approximately 4 pounds of lubricant is required to fill the track idler. Install the lubricating plug and gasket and tighten the plug to a torque of 100 lbs. ft.

G. Installation of Track Idler

1. Install the track idler in position on the truck frame.
2. Install the track idler guide plates in their original positions using the original amount of guide plate shims. Check the track idler slide bars and the track idler alignment (refer to Topic 6, Paragraph B, in this Section).
3. Couple and adjust the tracks (refer to Section XVI, Topic 2). Install the track idler guards.

SECTION XV — DRAWBAR

Topic Title	Topic No.	Page No.
General Description	1	342
Service of Drawbar	2	343

1. GENERAL DESCRIPTION

The drawbar assembly consists of a drawbar, hinge pin, hinge pin bracket, hinge pin retaining plate, locking pin, coupling pin, locking arm shaft and arm assembly, two wear shoes, supporting plate, and two supporting plate brackets.

The front end of the drawbar attaches to the lower front face of the steering clutch and final drive housing by means of a hinge pin bracket and hinge pin; the rear end of the drawbar, which incorporates the locking pin, coupling pin, locking arm shaft and arm assembly, and wear shoes is supported by a supporting plate. The supporting plate is attached to supporting plate brackets, which are attached to the rear face of the steering clutch and final drive housing.

The drawbar is of the swinging type (equipped with wear shoes) and can be swung from side to side on the supporting plate, or can be held stationary in various positions by a series of holes provided in the supporting plate and the use of

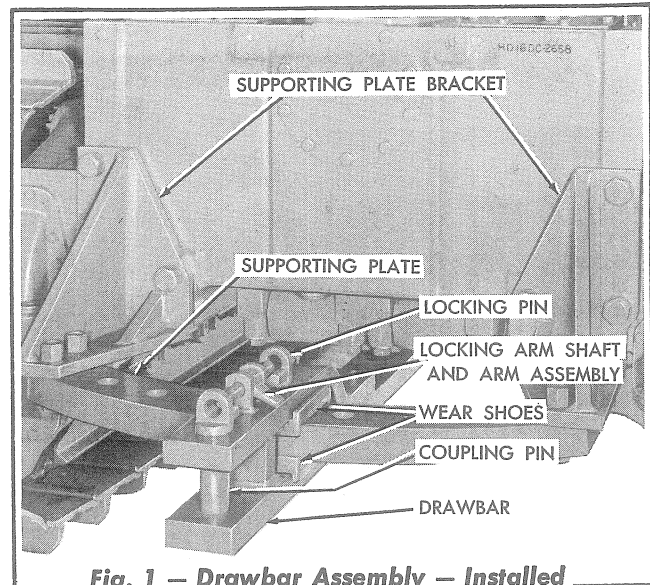


Fig. 1 — Drawbar Assembly — Installed

the drawbar locking pin. Both the drawbar locking pin and the coupling pin are held in position on the drawbar by the locking arm shaft and arm assembly.

2. SERVICE OF DRAWBAR

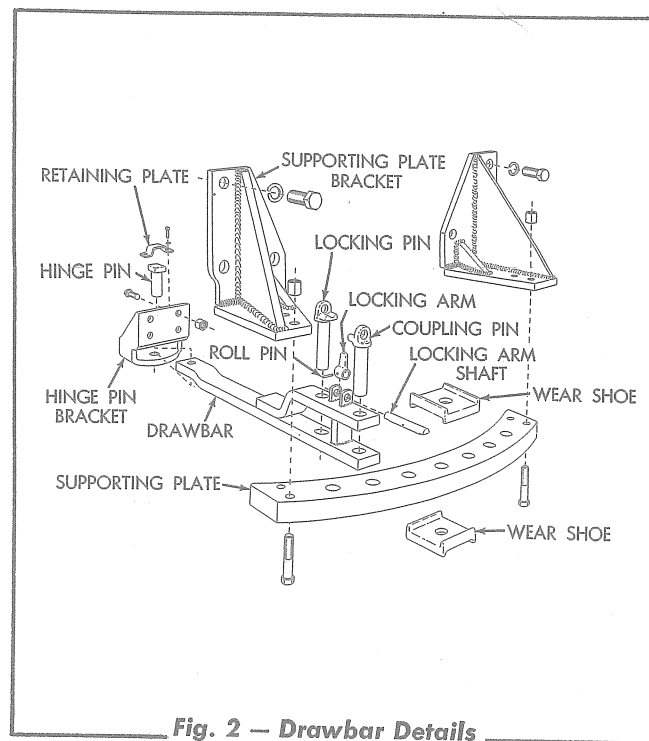
The $1\frac{1}{4}$ " bolts attaching the supporting plate brackets to the steering clutch housing should be checked periodically and tightened to a torque of 800 to 900 lbs. ft. and the 1" bolts and nuts attaching the hinge pin bracket to the steering clutch housing and the supporting plate to the supporting plate brackets should be tightened to a torque of 685 to 695 lbs. ft.

A. Removal and Inspection of Drawbar

1. Disconnect the drawbar from the hinge pin bracket by removing the hinge pin retaining plate and the hinge pin.
2. Remove the drawbar and supporting plate by removing the capscrews attaching each end of the supporting plate to the supporting plate brackets. Replace or repair any parts that show excessive wear.

B. Installation of Drawbar

The drawbar assembly may be installed by a direct reversal of the removal procedure. Tighten the



$1\frac{1}{4}$ " bolts to the specified torque of 800 to 900 lbs. ft. and the 1" bolts and nuts to the specified torque of 685 to 695 lbs. ft.

SECTION XVI — TRACKS

Topic Title	Topic No.	Page No.
General Description	1	344
Service and Inspection of Tracks	2	345

1. GENERAL DESCRIPTION

The track rail assemblies for the HD 16 tractor consist of the following number of track links (each track):

Models HD 16A and HD 16AC	38 Links
Models HD 16D, HD 16DC, and HD 16FC	41 Links
Model HD 16GC	43 Links

Each track rail assembly is made up of side bars (right and left), pins, bushings, and grouser shoes. The master link, for coupling or uncoupling the track, has a $1\frac{1}{6}$ " shorter master bushing with a .503" to .518" thickness spacer at each end; a master pin, which is $\frac{1}{4}$ " longer and has a smaller diameter than the other pins, has been provided to facilitate the coupling and uncoupling of the track.

The model HD 16A, HD 16AC, HD 16D, HD 16DC, and HD 16FC tractors are equipped with 20" integral grouser shoes as standard equipment. The model HD 16GC tractor is equipped with 20" semi-grouser shoes as standard equipment.

Several different types and widths of track shoes are available, each adapted to a particular application. The most common or standard shoe is essentially a flat plate, having one cleat, or grouser, rolled integral with the plate and extending its full width. Extra wide shoes materially decrease the life of any track assembly; 26" shoes should be used only where requirements will justify the resulting decreased life of the track assembly. **NOTE:** Track shoes over 20" wide cannot be used on the Model HD 16GC Tractor.

The model HD 16GC tractor is equipped with 20"

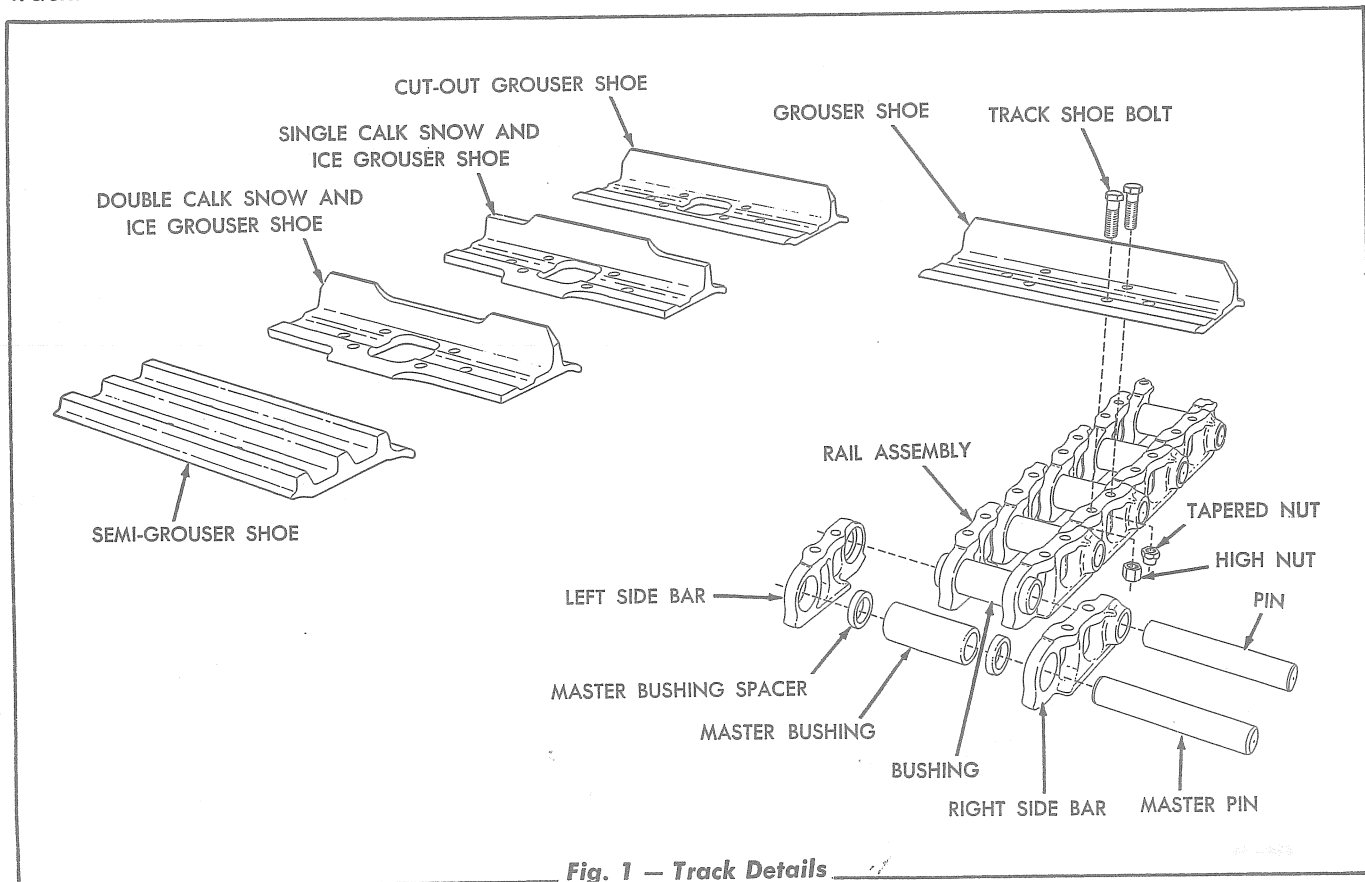


Fig. 1 — Track Details

semi-grouser track shoes as standard equipment. In the majority of conditions, this type track shoe will provide sufficient traction to properly load the bucket but will slip before the torque converter stalls when the digging load becomes too great.

2. SERVICE AND INSPECTION OF TRACKS

Periodic care of the tracks will materially prolong their useful life. Because of the simplicity of the track, the average owner and operator gives very little thought to the factors that tend to affect its life.

Of utmost importance is the matter of keeping the track properly adjusted and the track shoe bolts properly tightened; the bolts should be kept tightened to a torque of 380 to 390 lbs. ft.

The side bars have only one wearing surface, that being the surface which contacts the truck wheels, track idler, and the track support rollers. Usually it becomes necessary to replace the pins and bushings before the rail assemblies wear out, and it is a matter of judgment then as to whether or not the side bars are good enough to justify the installation of a new set of pins and bushings.

The pins and bushings, and their relation to each other and to the sprockets, constitute the most important factor in track life. Since only the external wear on the bushings is apparent, some means other than casual inspection must be used to determine the amount of wear on the pins and in the bore of the bushings. The amount of "stretch" in the track, as indicated by the take-up of the track adjusting screw, is usually regarded as an index to the condition of the interior wear on the bushings and the wear on the pins. However, this must be considered in connection with the external wear on the bushings in order to determine the proper time for turning the pins and bushings.

When the pins and bushings are pressed out of the track, turned 180 degrees and reinstalled, new contact surfaces are brought into play between the pins and the bushings, and between the bushings and the sprocket. If this operation is performed at the right time, track life will be prolonged.

Full grouser shoes (20" max.) are recommended only for very extreme traction conditions such as snow or ice. The slippage of track is desirable because it enables the operator to adjust the digging depth without stalling the torque converter.

As the tracks wear and the pitch length (distance between centers of adjacent track pins) increases, the point of contact of the bushings on the sprocket teeth changes. Any appreciable wear at the base of the sprocket tooth tends to decrease its pitch, whereas, wear on the track increases the track pitch length. As a result, the track bushings will ride higher on the sprocket teeth. When the combined wear becomes excessive, the sprocket will finally spin in the track. Under no condition should the combined wear of the sprocket and track be allowed to reach the stage where such spinning of the sprocket can occur. This causes severe repeated shock to the tractor and may result in serious damage. New sprockets should always be installed with new tracks. However, if the sprockets are not too badly worn, the right and left sprockets may be interchanged, thus presenting the better side of the sprocket teeth to the track bushings.

The pitch length (distance between centers of adjacent track pins) of a new track is $7\frac{27}{32}$ " and the maximum allowable pitch length for a used track is $8\frac{1}{32}$ ".

Some owners have erroneously adopted the practice of removing one track link in order to bring the track again within the range of the track adjusting screw. This should never be done, as a track worn badly enough to take up the length of one link will be so far out of pitch that the increased wear on the sprocket will more than counteract the savings that may be obtained by further life of the track. Under extreme abrasive conditions, the sprocket teeth may wear deep enough into the bushings to justify turning the pins and bushings before appreciable wear shows on the inside of the bushings and on the pins. In other words, the pitch length of the track may only slightly exceed the pitch length when new. In any case, the remaining thickness of the bushings is the determining factor. Pins and bushings must be turned before the bushing wears through and the

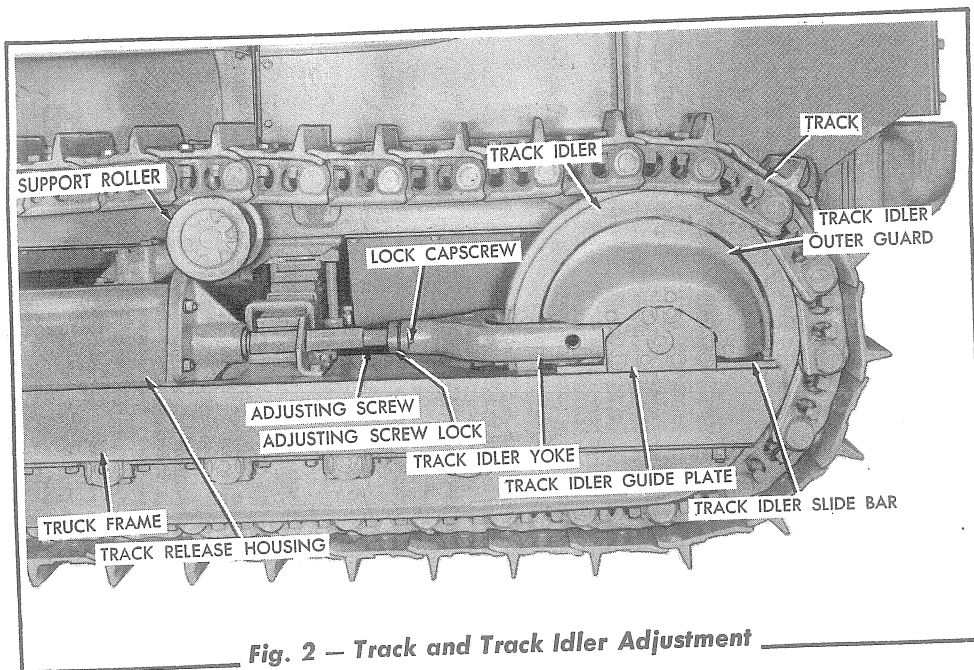


Fig. 2 — Track and Track Idler Adjustment

pin is damaged, or before the bushing becomes thin enough to allow it to crack in service.

A. Adjustment of Track

The tracks are correctly adjusted when the upper part of the tracks can be lifted $1\frac{1}{2}$ " to 2" above the support rollers with the use of a pry bar. **IMPORTANT:** Run the tractor backward and forward a few times before checking the adjustment of the track. Proper adjustment is important because rapid wear of the tracks and other affected parts will occur if the tracks are too tight or too loose.

To adjust each track, remove any accumulation of dirt and debris from around the track idler yoke and track adjustment screw. Loosen the lock capscrews in the adjusting screw lock, then turn the adjusting screw out of the track idler yoke as necessary to force the track idler ahead to tighten the track, or turn the screw into the yoke as necessary to loosen the track. Drive the tractor forward and backward a few times, then check the adjustment of the track. When the correct adjustment of the track is obtained, tighten the lock capscrews in the adjusting screw lock.

B. Removal of Track

1. Uncoupling of Track Using Special Tools

a. Move the tractor until the track master pin

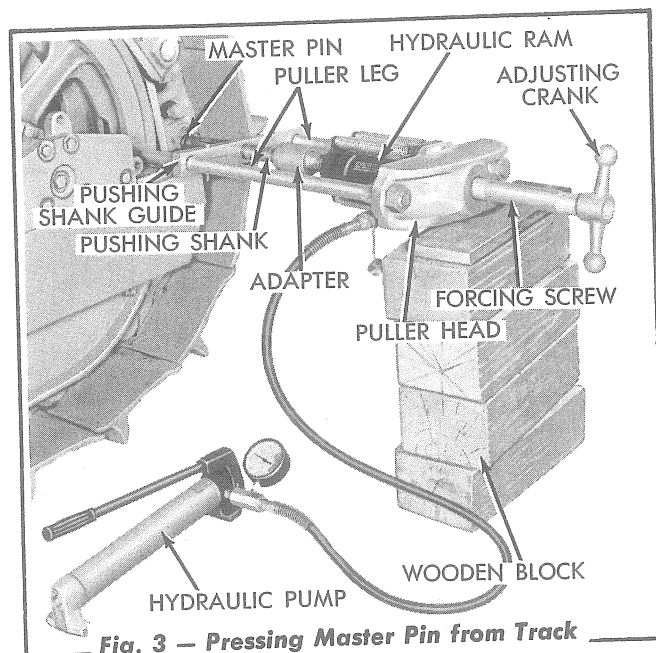


Fig. 3 — Pressing Master Pin from Track

is at the front face of the track idler. The master pin can be identified as being longer than the standard pins and protrudes approximately $\frac{1}{8}$ " beyond the boss in the side bar.

b. Loosen the lock capscrews in the adjusting screw lock and turn the adjusting screw into the track idler yoke until the track is loose. Remove the track idler guards.

c. Using special tools similar to the ones shown in Figs. 3 and 4, remove the master pin from the track as follows:

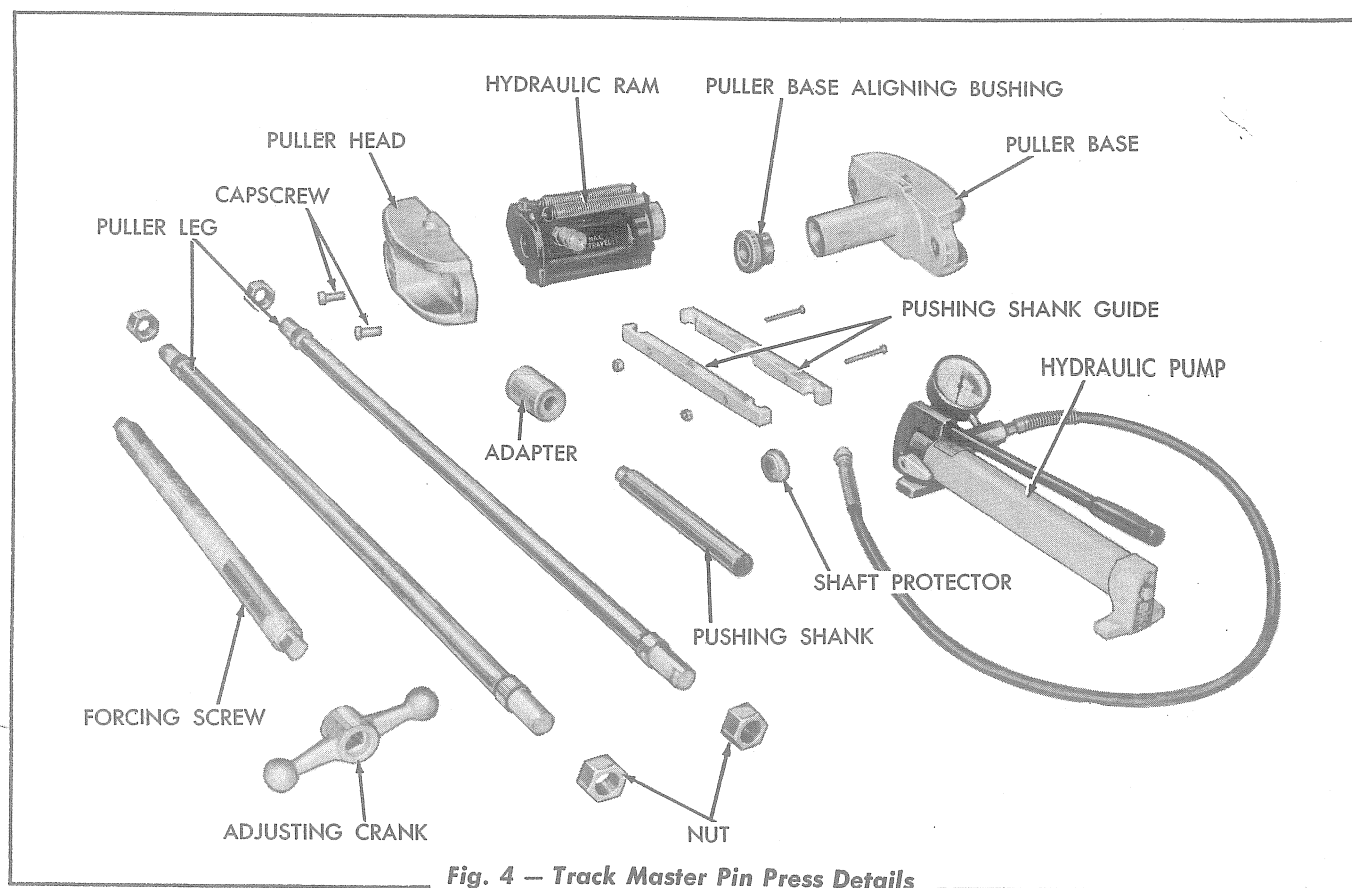


Fig. 4 — Track Master Pin Press Details

- (1) Install each puller leg in position in the puller head and secure with nuts.
- (2) Install the puller head with one leg through the track idler and one leg to the outside of the track as shown in Fig. 3.
- (3) Insert the puller base aligning bushing into the end of the puller base. Attach the puller base to the inner end of the puller legs with two nuts, making certain the aligning bushing is centered around the inside end of the master pin.
- (4) Attach the hydraulic ram to the puller head with the two attaching capscrews. Turn the forcing screw into position in the puller head and hydraulic ram.
- (5) Turn the pushing shank adapter onto the inner end of the forcing screw and turn the pushing shank into position in the adapter.
- (6) Install the pushing shank guide as shown in Fig. 3 to align the pushing shank with the track master pin.
- (7) Using the adjusting crank, turn the forcing screw in until the pushing shank contacts the end of the master pin. Support the outer end of the press assembly on blocks as shown in Fig. 3.
- (8) Connect the hydraulic pump to the hydraulic ram and actuate the pump handle until the ram has extended its full length, then remove the pushing shank guide. Slowly release the pressure from the hydraulic pump and at the same time, turn the adjusting crank to move the forcing screw forward until the pistons are fully retracted into the ram cylinders. Close the actuating valve on the hydraulic pump and continue the above operation until the master pin is pressed out of the track rail assembly. Remove the press assembly.

2. Removal of Track from Under Truck Frame

- a. Uncouple the track and move the tractor backward until the track is free of the track sprocket.
- b. Using a suitable hoist or jacks, raise the tractor until the truck frame is free of the track and pull the track out from under the truck frame.

C. Installation of Track

1. Place the track under the truck frame with the bushing end of the track links to the front of the tractor.
2. Place an 8" block under the first track shoe.
3. Place a bar in the track pin hole in the rear end of the track.
4. Move the tractor backward until the bar may be hooked over a tooth of the track sprocket. Move the tractor forward, holding the bar firmly in place on a sprocket tooth, so that the track will follow the sprocket.
5. Hold the end of the track up so it will pass over the track support rollers and the track

idler as the tractor is moved forward.

6. Remove the bar and line up the track pin holes in both ends of the track; make certain that the master bushing spacers (used at each end of the master bushing) are in position with the chamfered side of the spacer toward the counterbore in the side bars.
7. Using special tools similar to the ones shown in Figs. 4 and 5, install the master pin as follows:
 - a. Install each puller leg in position in the puller head and secure with nuts.
 - b. Refer to Fig. 5 and install the puller head with one leg through the track idler and one leg to the outside of the track.
 - c. Insert the puller base aligning bushing into the end of the puller base. Attach the puller base to the inner end of the puller legs with two nuts, making certain the hole in the aligning bushing

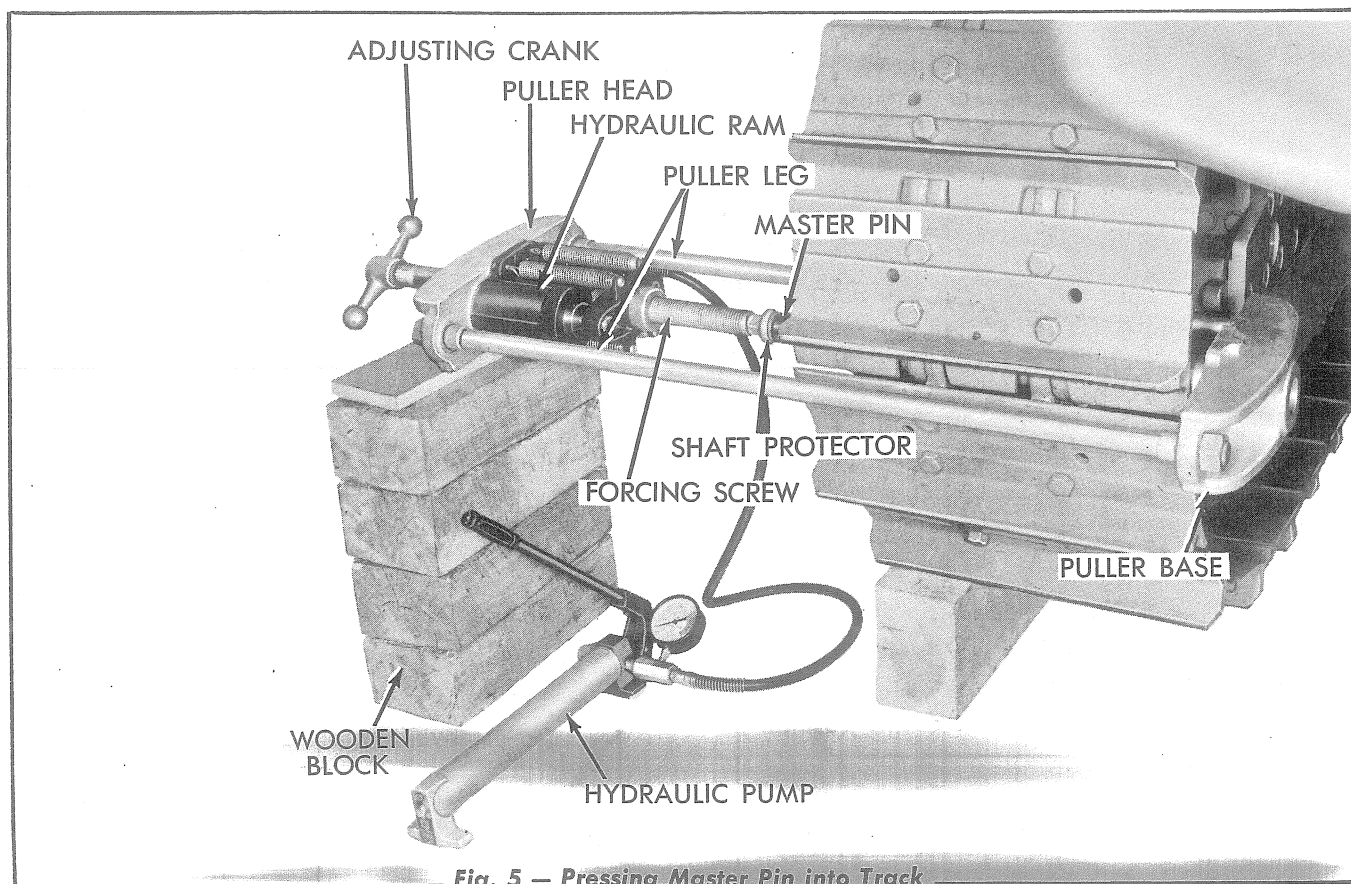


Fig. 5 — Pressing Master Pin into Track

is aligned with the track pin hole in the side bar.

- d. Attach the hydraulic ram to the puller head with the two attaching capscrews.
- e. Lubricate the track master pin and start it into position in the side bar. Using the adjusting crank, turn the forcing screw in until the shaft protector contacts the end of the master pin as shown in Fig. 5. Support the outer end of the press assembly on blocks as shown.
- f. Connect the hydraulic pump to the hydraulic ram and actuate the pump

handle until the ram has extended to its full length. Slowly release the pressure from the hydraulic pump, and at the same time, turn the adjusting crank to move the forcing screw forward until the pistons are fully retracted into the ram cylinders. Close the actuating valve on the hydraulic pump and continue the above operation until the master pin is pressed into position and is centered in the track rail assembly. Remove the press assembly.

8. Adjust the track (refer to Topic 2, Paragraph A in this Section).

SECTION XVII — MAIN FRAME AND EQUALIZING SPRING

Topic Title	Topic No.	Page No.
General Description	1	350
Main Frame	2	350
Crankcase Guard	3	351
Equalizing Spring	4	351
Rigid Beam	5	353

1. GENERAL DESCRIPTION

A. Main Frame

The main frame is a one piece welded steel structure. The rear end of the main frame is bolted to the steering clutch and final drive housing, and is attached to, and supported by, an equalizing spring.

B. Crankcase Guard

The engine crankcase guard is a pressed steel plate bolted to the main frame for protection of the engine crankcase and the underside of the tractor. Two removable cover plates are provided in the guard for draining of the engine lubricating oil and the engine coolant.

C. Equalizing Spring

The equalizing spring is a leaf type spring which pivots on a pin installed in the bottom of the main frame. The weight of the front end of the tractor is transmitted to the truck frames through the equalizing spring.

The spring stabilizes the tractor and its mounted equipment by permitting the truck frames to oscillate. Oscillating truck frames provide more uniform traction and minimize the shock imposed on the tractor when operating over rough terrain.

D. Rigid Beam

A rigid beam is used in place of the equalizing spring on Models HD 16FC and HD 16GC Tractors which have longer truck frames and are specially designed for mounting front end equipment. The rigid beam tends to stabilize the tractor and is used where track oscillation is not required.

The rigid beam assembly consists of a welded beam, saddle assembly, pivot pin, spacing shims, and the necessary hardware to complete the assembly. Each end of the welded beam assembly is bolted securely to the top of the truck frames. Shims are provided for use between the top of the rigid beam and the bottom of the main frame side members.

2. MAIN FRAME

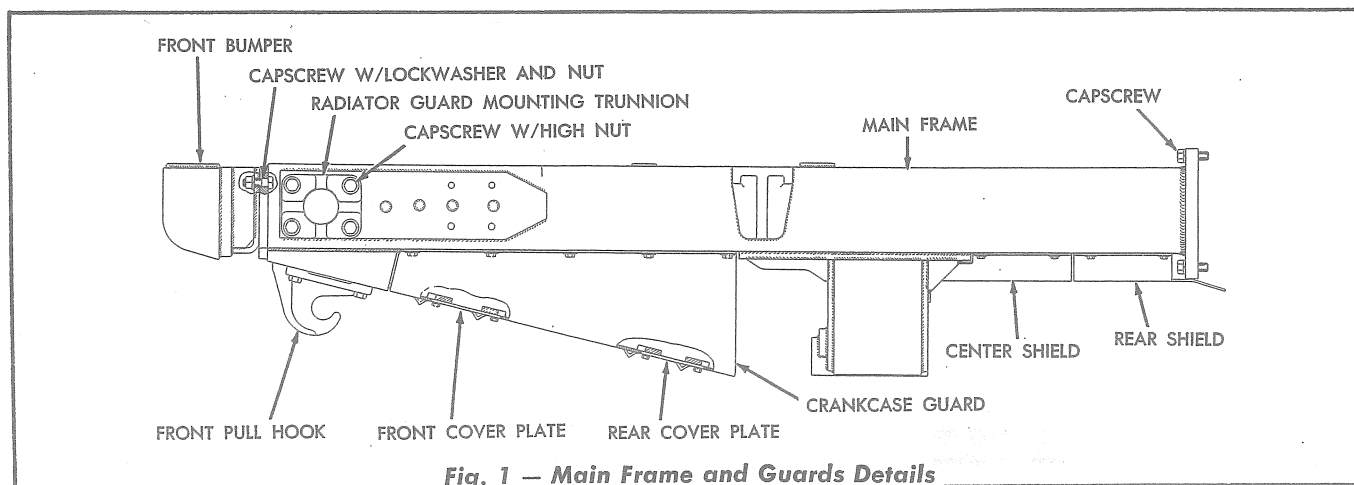


Fig. 1 — Main Frame and Guards Details

A. Maintenance and Inspection of Main Frame

The main frame should be checked periodically for loose bolts, cracked welds, bending, and misalignment. Any of the above conditions should be corrected immediately. The main frame-to-steering clutch housing capscrews must be tightened to a torque of 685 to 695 lbs. ft.

B. Repair of Main Frame

If the main frame becomes cracked or broken due to unusually rough working conditions, it may be practical to weld and reinforce the frame with suitable steel plates. Before welding the frame, it should be checked for alignment and straightened if necessary.

If it is not practical or desirable to straighten or weld the frame, it must be replaced.

3. CRANKCASE GUARD

A. Maintenance and Inspection of Crankcase Guard

The crankcase guard should be checked periodically for loose bolts and dents. If the crankcase guard becomes dented, it should be removed and straightened or replaced. Never operate the tractor without the crankcase guard in place, as it is essential that the oil pan be guarded at all times against obstructions.

B. Removal of Crankcase Guard

Support the crankcase guard with suitable cribbing or jacks and remove the capscrews, lockwashers, plain washers and nuts attaching the crankcase guard to the main frame. Lower the crankcase guard and pull the guard under the tractor.

C. Installation of Crankcase Guard

The crankcase guard may be installed by a direct reversal of the removal procedure.

4. EQUALIZING SPRING

A. Maintenance and Inspection of Equalizing Spring

Maintenance of the equalizing spring consists of periodic checks for loose bolts and excessive wear of the equalizing spring seats and the spring saddle assembly. The specified torque for tightening the spring saddle capscrews is 1000 to 1100 lbs. ft. If the saddle capscrews are broken or will not tighten, they should be replaced. Broken spring leaves should be replaced immediately. The spring assembly must be removed when installing new spring leaves.

B. Removal of Equalizing Spring

1. Apply the tractor brakes and lock them in the applied position.
2. Remove the crankcase guard.
3. Remove the capscrews attaching the spring seats to the truck frame.

4. Remove the capscrews attaching the pivot pin retaining plate to the rear end of the pivot pin and to the main frame and remove the retaining plate.

5. Using a hoist or jack, raise the front end of the tractor until the weight of the tractor is off the equalizing spring, and remove the spring seats. Lower the front of the tractor until the ends of the spring contact the truck frame and the weight of the spring is off of the pivot pin. Block the main frame using suitable cribbing.

6. Using a slide hammer puller as shown in Fig. 2, remove the pivot pin from the main frame and saddle assembly. *NOTE: On earlier model tractors it will be necessary to remove the pivot pin washer from the front end of the pivot pin.*

7. Raise the front end of the tractor as needed for the equalizing spring to clear the oil

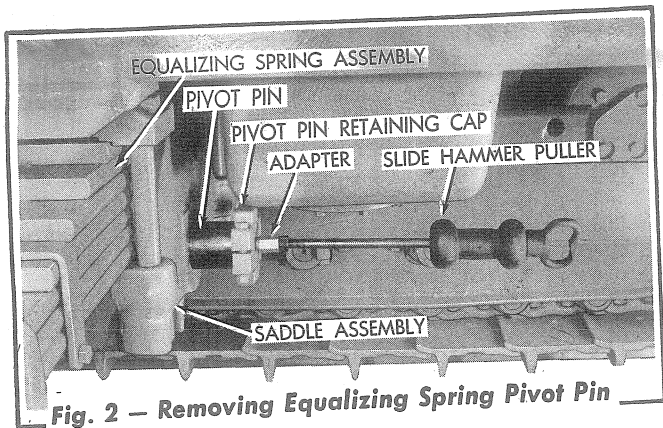


Fig. 2 — Removing Equalizing Spring Pivot Pin

pan and block under the main frame. Using a suitable pry bar, move the spring to one side and push one end of the spring off the truck frame. Remove the spring from under the tractor.

C. Disassembly of Equalizing Spring

1. Remove the bolt and spacer from each spring rebound clip.

2. Remove the high nuts from the spring saddle capscrews and remove the cap-screws and the spring saddles.

3. Remove the spring from the saddle assembly. Place the spring in a suitable press and remove the center bolt. Disassemble the spring.

4. Clean all the mating surfaces of the spring leaves, seats, and saddle assembly with a wire brush. Clean all parts before assembling. Do not lubricate the spring leaves. Inspect the pivot pin and the saddle bushings for wear and replace if necessary.

NOTE: When removing the saddle bushings with the equalizing spring installed in the spring saddle, the bushings must be driven out of the saddle toward the outside as the head of the spring center bolt will not allow them to be pressed through the bore in

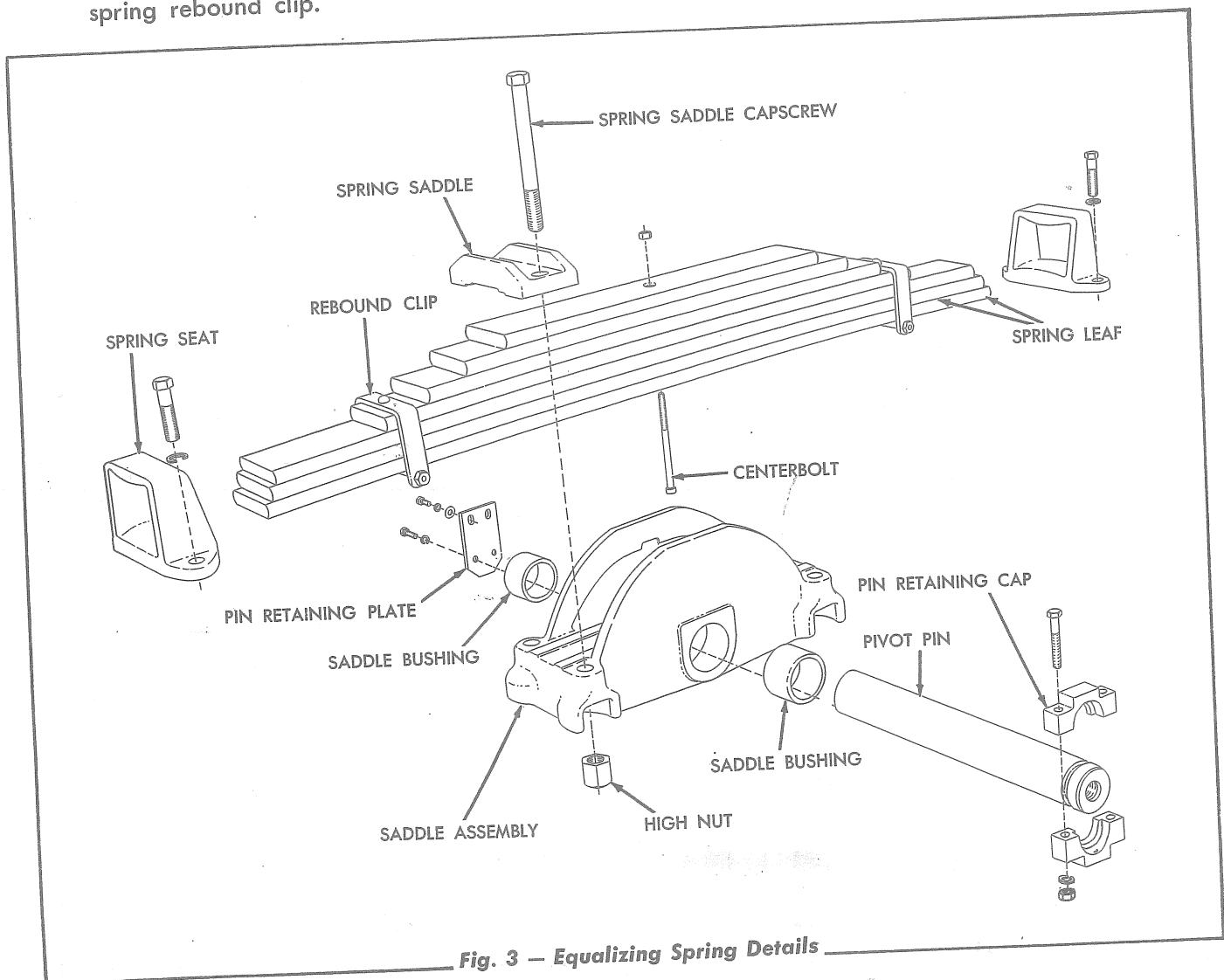


Fig. 3 — Equalizing Spring Details

the spring saddle.

D. Assembly of Equalizing Spring

1. Using a guiding pin in place of the center-bolt, assemble the spring leaves in a suitable press. Compress the spring leaves fully and remove the guiding pin. Install the centerbolt and tighten securely.
2. Compress the spring as necessary and install each rebound clip spacer, bolt, and nut.
3. Remove the assembled spring from the press and install the saddle assembly on the spring, making certain the saddle assembly is properly positioned on the spring. Install the spring saddle capscrews, spring saddles, and high nuts and tighten to a torque of 1000 to 1100 lbs. ft.

E. Installation of Equalizing Spring

1. Place the equalizing spring assembly in

position on the truck frames.

2. Using a suitable hoist or jack, raise the front end of the tractor until the cribbing can be removed from under the main frame. Lower or raise the tractor until the pivot pin can be inserted into the bore of the spring saddle and the main frame. Install the pivot pin, making certain the end of the pin having the tapped hole is toward the front of the tractor.
3. Install the capscrews attaching the pivot pin retaining plate to the rear of the pivot pin and to the main frame. Install the pivot pin retaining cap (pivot pin washer on earlier model tractors). Place the spring seats in position on the spring. Lower the tractor and install the capscrews to secure the spring seats to the truck frames. Tighten the attaching capscrews securely.

4. Install the crankcase guard.

5. RIGID BEAM

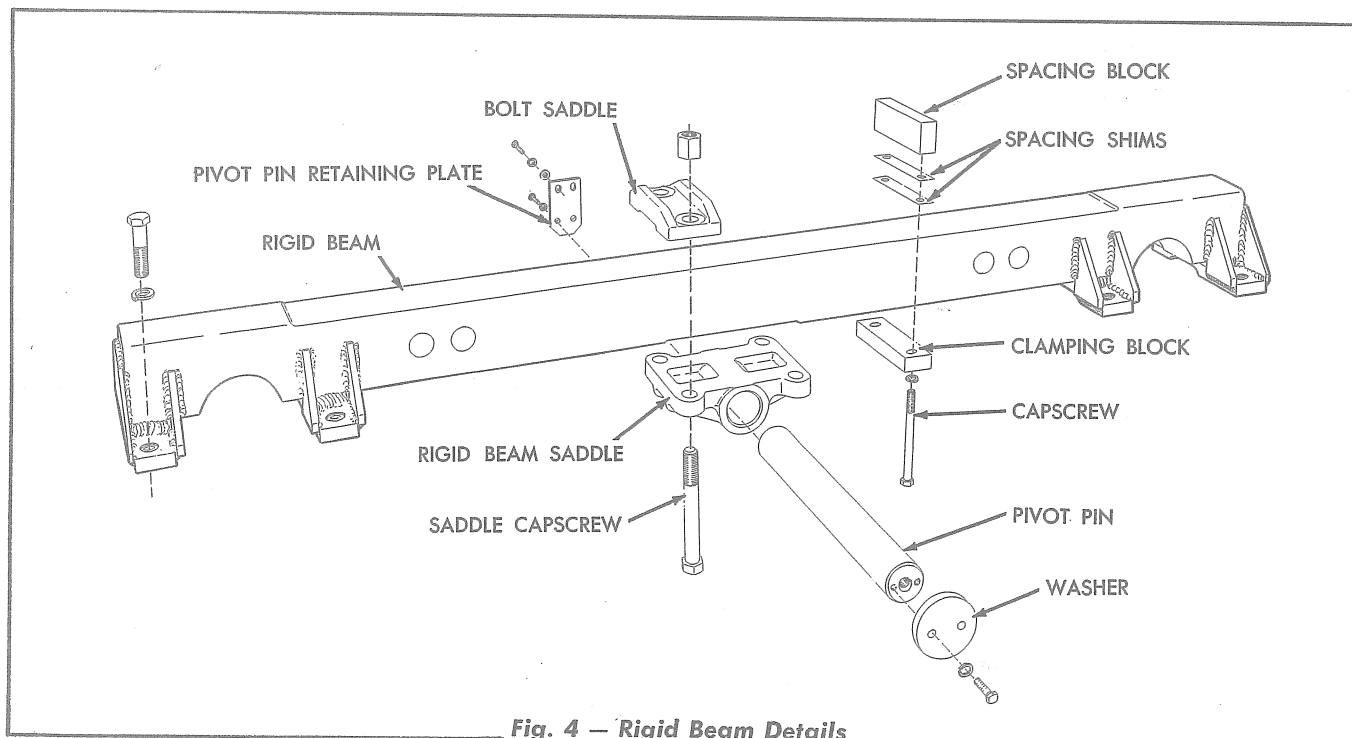


Fig. 4 — Rigid Beam Details

A rigid beam is used in place of the equalizing spring on Models HD 16FC and HD 16GC Tractors which have longer truck frames and are especially designed for mounting front end equipment. The rigid beam must be checked periodically for loose

bolts, cracked welds, bending and misalignment. Should any of the above conditions exist, they must be corrected. The specified torque for tightening the beam saddle capscrews is 1000 to 1100 lbs. ft.

SECTION XVIII — FENDER AND SEAT GROUP

Topic Title	Topic No.	Page No.
Fenders	1	354
Seat	2	354

1. FENDERS

A. Front Fenders

Two front fenders are provided to protect the lower sides of the engine and serve as mountings for the hood side plates or engine side screens, which may be obtained as special equipment. The front fenders may be removed by removing the bolts attaching the fenders to the cowl, main frame, and the fender attachment brackets.

B. Rear Fenders

The rear fender group protects the operator, seat, fuel tank, and battery boxes from debris carried by the tracks. The fenders serve as a mounting for the battery boxes and fuel tank supporting channels. With the fuel tank removed, the rear fenders may be removed with or without the battery boxes attached; or the rear fender group, battery boxes, and the fuel tank may be removed as a unit after removing the attaching capscrews.

2. SEAT

The tractor is provided with a divided, removable seat. The left half of the seat is adjustable to four different heights and the right half is in a fixed position. Arm cushions are provided which also serve as battery box covers. The seat cushions, back cushions, and arm cushions are covered with

weather resistant material and are replaceable.

Reasonable care should be taken to avoid damaging the cushions with sharp or heavy objects, unnecessary exposure, battery acids, oil, and grease.