MODEL 36

OPERATING, SERVICE AND PARTS MANUAL

CARCO®
WINCH PRODUCTS

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CARCO®

WINCH PRODUCTS

WARRANTY

This warranty becomes effective only if the dealer files the following report, properly completed, within thirty days of retail delivery:

Form PCF-RN-1179A, CARCO Delivery Report

Pacific Car and Foundry Company, hereinafter called the Company, warrants the property to be free from defects of material and workmanship, when properly installed, and should any part of the same be found, under normal use and service within six months from the date of retail delivery, or 500 hours of normal usage (whichever terminates first), to have been defective in this regard when shipped, the Company will repair or replace said part, f.o.b. Renton, Washington, USA, provided such defective part is returned to the Company at Renton, Washington, charges prepaid, and provided inspection of the original part establishes the claimed defect to the satisfaction of the Company.

The Company's liability under this warranty is limited to such repair or replacement, subject to the conditions stated, and the Company shall not in any event be held liable for any damage or delay caused by defective material or workmanship, and no allowances will be made for repairs, replacements or alterations unless made with the Company's written approval.

THE COMPANY SHALL NOT BE LIABLE FOR ANY GUARANTEES OR WARRANTIES EXPRESS OR IMPLIED, WARRANTY OF MERCHANTABILITY, OR WARRANTY OF FITNESS FOR PARTICULAR PURPOSE EXCEPT THOSE SPECIFICALLY SET FORTH HEREIN. The Company shall not in any event be liable for any consequential or contingent damages, secondary charges, expenses for erection or disconnecting or any other damages, loss, attorney's fees or expense resulting from any alleged defect in said property.

To the extent any provision of this warranty contravenes the law of any jurisdiction, such provision shall be inapplicable in such jurisdiction, and the remainder of the warranty shall not be affected thereby.

DESCRIPTION

The Model 36 winch is a mechanically driven winch designed to give long, trouble free service. The design features are the result of many years experience in the tractor winch business.

The Model 36 is sealed and would normally be fitted on a crawler tractor.

These winches are powered from the tractor P.T.O. through a ring gear and pinion set. The ring gear is rigidly supported by the ring gear carrier. The cable drum is connected to the ring gear through a high capacity, self energizing friction clutch. The clutch bands have a large contact area and are designed with positive location and adjustment features.

During towing operations, the cable drum is held by a self energizing, heavy duty brake band. When the brake is released, the drum will "free spool" with just enough resistance to prevent the cable drum from unspooling more cable than is required. The clutch and brake compartment on the Model 36 is completely sealed from mud and water.

The winch is controlled by a single lever which operates a master control unit. When the control handle is in the neutral position, the brake is spring applied for towing operations. When the control handle is pulled to engage the clutch, the master control unit supplies hydraulic fluid to a slave cylinder in the clutch for the "winching in" operation. The harder the operator pulls on the control handle, the greater will be the clutching effort. When the control handle is moved to its full extent in the brake release direction it will remain in that position, releasing the brake for "free spooling". The clutch and brake hydraulic cylinders are each connected to an independent master cylinder in the master control unit and operate in the same manner as an automobile's master cylinder which is connected to the wheel brakes.

These winches are manufactured with a standard main housing for the basic winch. Adapter assemblies are designed specifically for each make and model of tractor. In this way, 95% interchangeability of parts is achieved.

When Model 36 winch is mounted on the rear of a crawler tractor, the adapter housing is installed between the winch and the tractor. The adapter housing contains a gear train which is designed to suit the P.T.O. speed and rotation to provide the maximum rated line pull at the winch drum.

OPERATING INSTRUCTIONS

Operation Ref. Fig. 'A'

To engage the clutch, pull the handle of the master control in the "engage clutch" direction (See Fig. 'A'). To apply the brake, release the handle from the clutching position and allow it to return to the neutral position. To release the brake, move the handle in the "release brake" direction until the degree of brake release required is obtained. To lock the brake in full release for "free spooling", move the handle to the end of its travel in the "release brake" direction. The handle will remain in this position until released manually.

IMPORTANT: When "winching in" do not allow the clutch to slip. The heavier the load, the harder it is necessary to pull the master control handle.

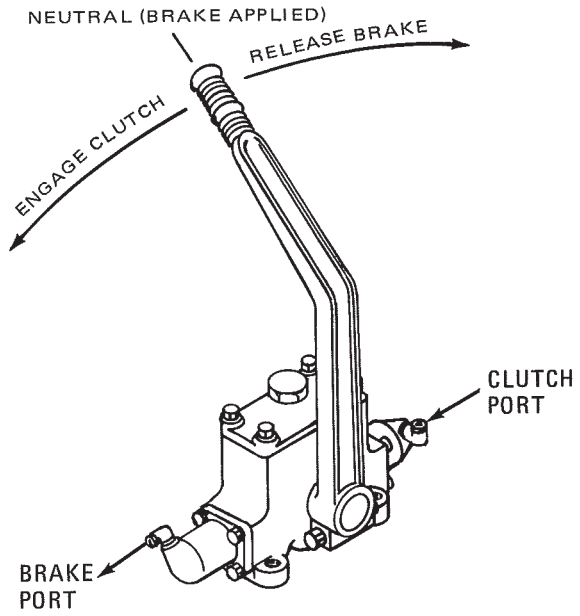


FIGURE A

General Note: When a new winch has just been installed or if the pinion shaft has been removed, run the tractor engine at idle with the winch drive engaged for 10 minutes. This will ensure that oil will be fed into the pinion bearings before the pinion shaft is driven at maximum R.P.M.

After 40 hours of operation, drain and replace the gear oil. Repeat every 600 hours of winch operation.

IMPORTANT: Check oil weekly.

AMBIENT TEMP.	GEAR LUBRICANT	MASTER CONTROL
-10° to 70°F (-23° to 21°C)	SAE 80W-90	Standard automotive hydraulic brake fluid
20° to 120°F (-7° to 48°C)	SAE 85W-140	

Gear Oil Spec: Use multipurpose type gear lubricant API-GL-5 for winch and adapter.

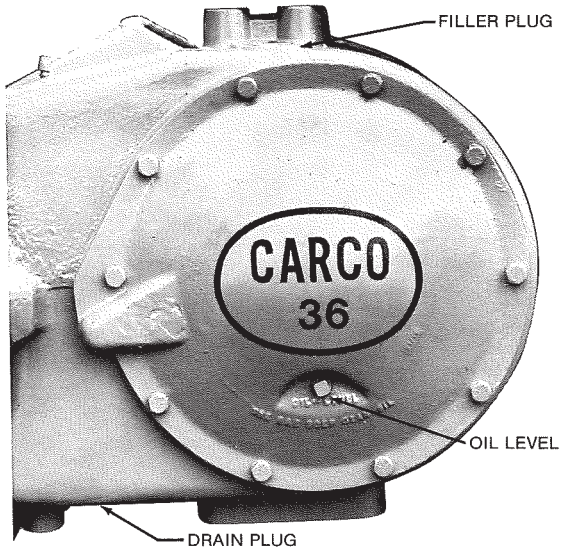


FIGURE B

Lubrication Ref. Fig. 'B'

Winches With a Filler Hole in the Adapter

Remove the filler and oil level plugs from the ring gear end of the winch and the adapter assembly. Fill winch gear compartment to the oil level plug (approx. 6 qts.) and the adapter compartment to oil level plug (approx. 7 qts.).

Bleeding Hydraulic System

The P56098 master control is shipped from the factory filled with hydraulic brake fluid.

When the master control unit has been installed, remove the red sealing tape covering the vent hole in the filler plug (See Fig. 'C'). Set the

tractor engine at idle with the P.T.O. engaged. Move the master control handle through its entire stroke several times. Move the control handle to the brake release position (see Figure "A", page 7) and loosen the brake line at the brake cylinder on the winch, to allow the air to escape. Tighten the fitting and return the control to neutral. Repeat this process until all the air has been removed.

Repeat this procedure for the clutch line by moving the lever into the clutch position several times, hold the lever in the clutch-on position and loosen the clutch line connector at the clutch cover allowing the air to escape. Tighten the fitting and return the control to neutral.

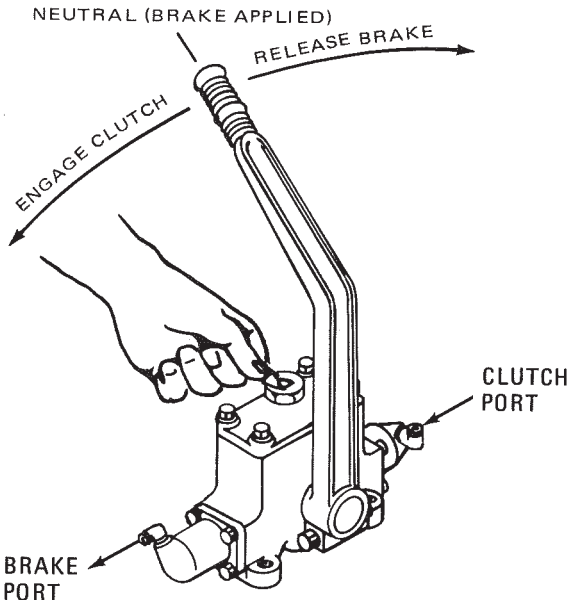


FIGURE C

If possible the clutch should be rotated to several different positions during this procedure. When all the air has been removed the winch should freespool properly in the brake release position. The clutch handle should feel solid after a short movement, with a force of 40-50 pounds.

To assure proper operation, the fluid level in the master control reservoir should be checked once weekly, as described in the Preventive Maintenance instructions, page 17.

CAUTION: On machines having hydraulically, mechanically and/or cable controlled equipment, be certain the equipment is either lowered to the ground or blocked securely before servicing, adjusting and/or repairing the winch. Always apply tractor parking brakes and lower all equipment before dismounting the tractor. To safely operate the winch, **READ AND UNDERSTAND** the Operator's Section of the Winch Service Manual before beginning any operations.

BEFORE OPERATING WINCH IN CLUTCH POSITIONS, BE SURE WIRE ROPE IS REMOVED OR SECURED IN A MANNER WHICH WILL ALLOW CABLE DRUM TO TURN WITHOUT INTERFERENCE OR DAMAGE TO WINCH AND WIRE ROPE.

IMPORTANT: Do not use any fluid other than automotive hydraulic brake fluid. The correct fluid can be obtained from any service station.

SERVICE INSTRUCTIONS

The following service instructions have been arranged to provide the best methods for assembly and disassembly of the CARCO Model 36. It is suggested that before any work is done on this unit, all the steps for disassembly and assembly should be read and understood.

Expendable parts such as gaskets, oil seals, cylinder cups and 'O' rings, should never be re-used even though inspection may show these items as being serviceable for future use. The cost of these items is negligible compared to the labor involved in replacing such items if they do not function properly.

All replacement parts should be given a final inspection to insure that no damage has resulted after the final factory inspection was made.

Cleanliness is of prime importance when any part of the winch is to be assembled or disassembled. Before commencing disassembly of components used in the hydraulic circuit be sure that a clean work area with a dust and grit free work bench is available.

Before reassembly of the winch be sure that all parts are perfectly clean, and that all machined surfaces of the winch parts are in good condition and free from damage or excessive wear.

Brake Disassembly

Ref. Fig. 1, page 22, Fig. 2, page 24, and Fig. 3, page 26.

Remove the drag adjustment screw and the drag spring from the top of the main housing.

Remove the capscrews and the end cap. Remove the hydraulic tube from the end of the drum shaft (See Fig. 'D').

Place the hydraulic tube, still connected to the hydraulic line, at a point above the master control unit so that the brake fluid will not leak out of the line. Remove the clutch cover.

Remove the spring cap and the spring will drop out. Now remove the primary brake band by gripping it at the ends and slide the band off the brake levers using a rocking motion if necessary. The lever block and push rod can now be removed as one unit (See Fig. 'E'). Remove the brake anchor pin and rotate the brake band clockwise until it can be removed as explained for removing the primary brake band.

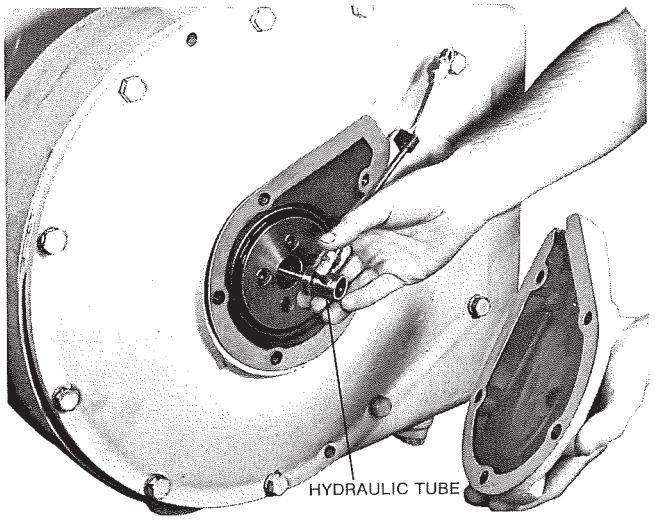


FIGURE D

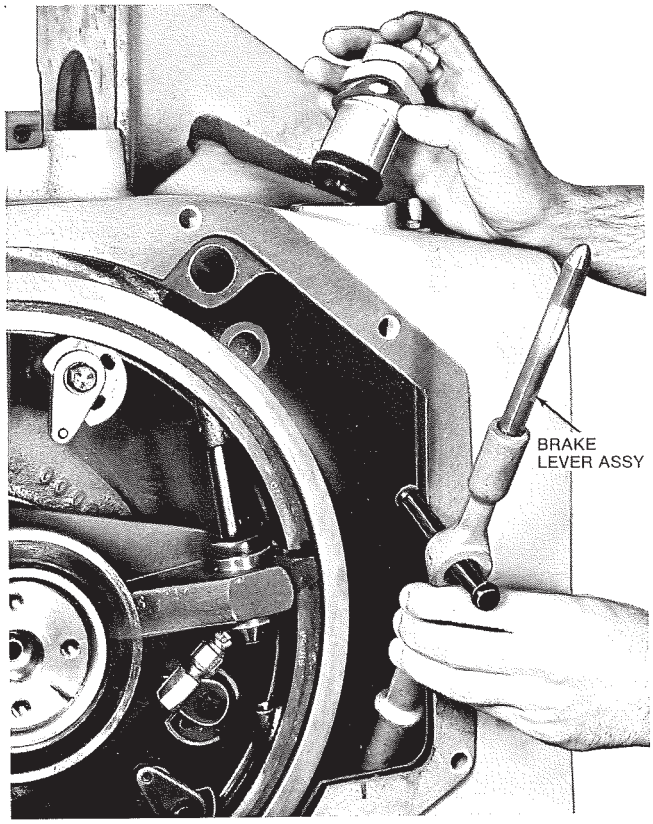


FIGURE E

The secondary brake lever will be removed with the secondary band. With a hammer and punch, drive the pin into the center of the brake lever then remove the brake lever with the pin from the secondary brake band. Remove the brake cylinder assembly by removing the capscrews (See Fig. 'E', page 9).

Brake Cylinder Disassembly and Assembly

Ref. Fig. 2, page 24.

Remove the boot, piston, spring, primary piston, cup and spring from the brake cylinder. Discard the cup and install a new part on reassembly. Inspect all parts for wear or damage and replace if necessary.

Clean the cylinder bore, if necessary, using extra fine emery cloth and wash all parts in clean brake fluid. Assemble all parts in the order shown so that the large end of spring (P/N P 50952) contacts the bottom of the brake cylinder. Spring (P/N PA 8044) must be installed in the counter bore end of the primary piston and must contact the flat end of piston.

Brake Assembly

Ref. Fig. 1, page 22, and Fig. 2, page 24.

To assemble the brake, proceed in the reverse order of disassembly. Replace the clutch cover, then hydraulic tube.

Secure the end cap in place using the capscrews.

Drag Adjustment

Adjust to set drum drag when Brake is in "Free Spool." Adjusting screw should be screwed clockwise to apply drag to brake or anticlockwise to relieve drag, depending on operator preference.

Brake Adjustment

Ref. Fig. 2, page 24.

No brake adjustment is required on this winch under normal operating conditions. When Brake Bands become worn and require replacing, inspect the brake spring and replace the spring if the free length is less than 6-29/32". If the winch is new and the brake does not hold the required load, the brake may require to be "run in". See Trouble 'B', cause 1, page 18 in Trouble Shooting section.

Clutch Disassembly

Ref. Fig. 4, page 28.

Remove the clutch cover as instructed for "Brake Disassembly". Release the adjusting cams by loosening the capscrews and rotating the cams until the flat side of each cam is towards the bands (See Fig. 'F'). Release the clutch push rod by depressing it into the clutch cylinder and releasing it from the primary clutch band socket. The primary clutch band can now be removed.

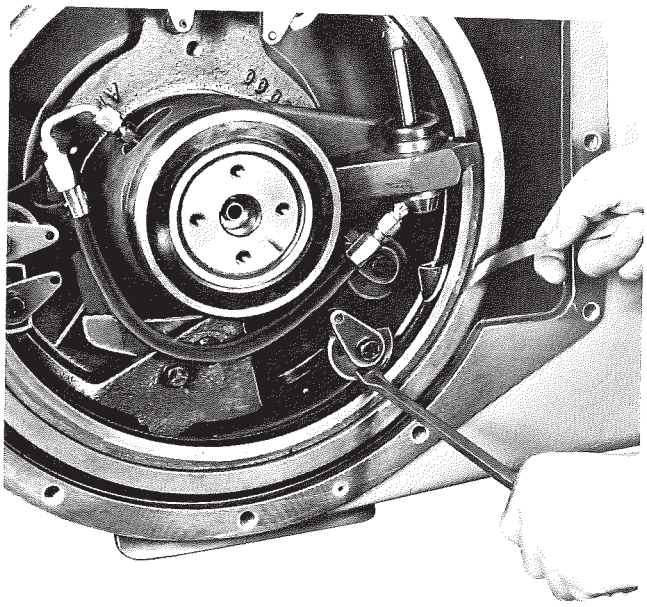


FIGURE F

To remove the secondary clutch band it is necessary to remove the clutch hub. Remove the clutch hub and clutch lever with the secondary clutch band attached as follows, Disconnect the hydraulic hose assembly at the hydraulic fitting, then remove the fitting from the drum shaft. Remove the four socket head capscrews from the gland cap. Remove the gland cap and shims being careful not to damage the seal diameter inside the bore of the drum shaft, Fig. 5, page 30. Using three ½" N.C. capscrews as jacks in the holes provided in the clutch hub, remove the clutch hub from the drum shaft, (CARCO tool Number PA 13154 can be supplied for this purpose) (See Fig. 'G', page 11). This procedure also removes the bearing. Now the secondary clutch band and clutch lever can easily be removed from the clutch hub by removing the snap ring and the spring and sliding the clutch lever off the clutch hub. Disconnect the hose assembly from the clutch cylinder and remove the clutch cylinder. Remove the pivot pin and lever arm.

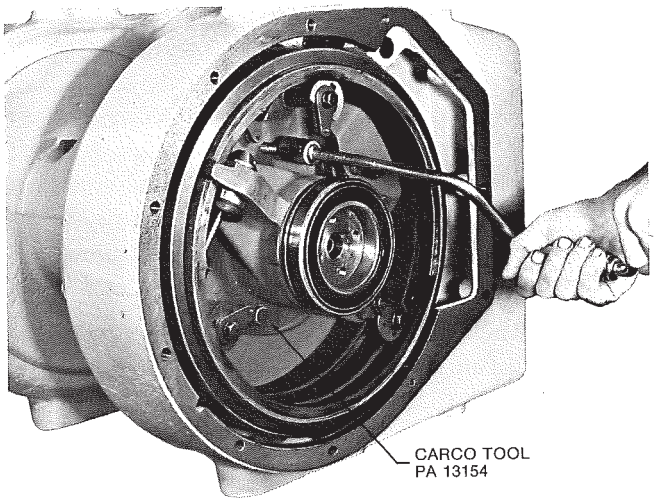


FIGURE G

Remove and discard the 'U' seal and 'O' ring from the gland cap and replace the 'U' seal and 'O' ring with new parts on reassembly. Inspect the bearing diameters of the hydraulic tube, Fig. 2, page 24, for wear. If wear is excessive, replace the hydraulic tube.

Clutch Cylinder Disassembly

Ref. Fig. 4, page 28.

Remove the push rod, boot, piston, cup and spring from the clutch cylinder. Discard the 'U' cup and install a new part on reassembly. Inspect all parts for wear and replace if necessary.

Clutch Cylinder Assembly

Clean the cylinder bore, if necessary, using extra fine emery cloth and wash all parts in clean brake fluid. Coat the bore of the cylinder with Tru-Torque Oil P51467 or equal. Assemble all parts in the order shown so that the large end of the spring contacts the bottom of the clutch cylinder and the flat side of the 'U' cup contacts the flat end of the piston.

Clutch Assembly

Ref. Fig. 1, page 22, Fig. 2, page 24, Fig. 3, page 26, Fig. 4, page 28, and Fig. 5, page 30.

Pack the grooves in the clutch lever with grease and install it on the clutch hub. Then install the snap ring. Install the lever arm, pivot pin, push rod and spring. Install the secondary clutch band. Install the clutch hub on the drum shaft so that the hole in the side of the clutch hub lines up with the 1/8 N.P.T. hole in the drum shaft. Install the bearing. Check that the clutch hub contacts the drum bearing and that the bearing contacts the clutch hub by installing the gland cap on the end of the drum shaft. Carefully tighten the capscrews one half turn at a time progressively around until the capscrews are secure. Remove the gland cap and, using a depth micrometer, measure the depth from the edge of the bearing to the end of the drum shaft, (See Fig. 'H'). Measure the length of the gland

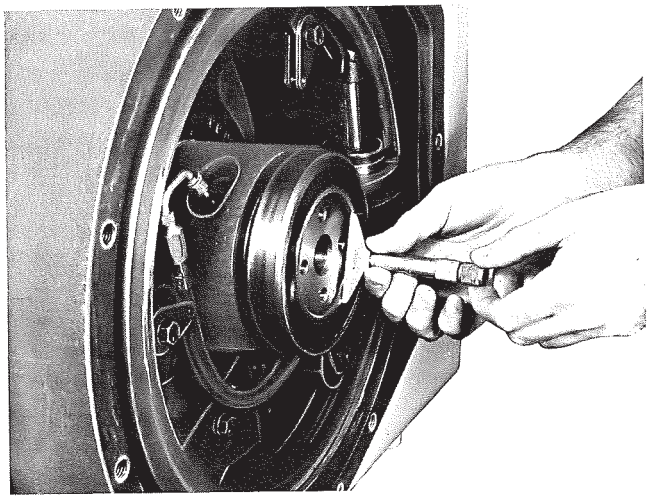


FIGURE H

cap pilot diameter with the depth micrometer (See Fig. 'J', page 12). Subtract this length from the depth already measured to establish the total thickness of shims required. Add an additional .025" shim to ensure clearance between the bearing and the gland cap. Install a new 'U' cup and O-Ring in the gland cap. Install the shims and the gland cap and tighten the capscrews one half turn at a time progressively around until the capscrews are secure. Torque to 18 lbs. ft. Using a heavy drift on the inside of the cable drum flange, drive the cable drum towards the clutch assembly. This will remove any pre-load imposed on the bearings while the shims were being established. Set the adjusting cams to give the required clearance between the clutch bands and the drum by following the instructions "To Adjust the Clutch". Install the clutch cover, hydraulic tube, elbow, tube assembly, the end cap and tighten all capscrews to the required torque.

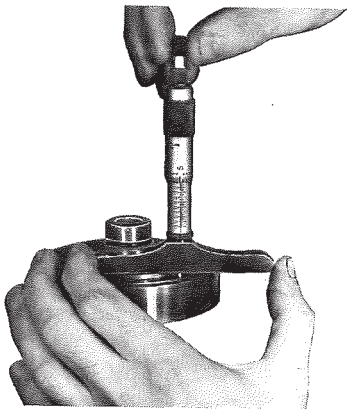


FIGURE J

Clutch Adjustment

With the primary clutch band removed and the adjusting cams engaged in the center groove of the secondary clutch band, adjust the secondary clutch band by turning the adjusting cams with a screw driver inserted in one of the slots provided in each cam (See Fig. 'F', page 10). Set all of the adjusting cams to give a clearance of .010" to .015". Adjust push rod so that no slack exists between the clutch lever (1) and clutch hub while maintaining the required clutch band clearance of .010"-.015". When the correct setting has been obtained tighten all capscrews to 25 lbs. ft. torque. Release the brake and check that the drum rotates freely.

Drum Disassembly

Ref. Fig. 3, page 26.

Remove the brake bands and clutch assembly as outlined under "Brake Disassembly" and "Clutch Disassembly". The drum can now be removed by drifting carefully on the cable side of the drum flange next to the brake end. The brake drum and the seal flange will be removed with the cable drum as an assembly. After removing this assembly from the main housing, separate the drums using two 1/2 N.C. capscrews as jacks in the holes provided on the inside wall of the brake drum. After the drums are separated, remove and inspect the oil seal and O-Ring for damage or wear. Replace on reassembly.

Drum Assembly

If the brake drum has been removed from the cable drum, pack the oil seal, Fig. 3, page 26, completely full of grease in the cavity between the two oil seal lips (Fig. 'K'). Fill the space surrounding 'O' ring with grease and pack grease into the bore of the oil seals installed at the ring gear compartment end of the winch housing. The grease used in the oil seals, and 'O' ring should be of the water repellent type (Shell Darina Grease or equal). Assemble the cable drum, seal flange, oil seal and brake drum and install this assembly in the winch as a unit.

When the cable drum and brake drum assembly has been installed, then install the bearing on the drum shaft so that it contacts the shoulder in the brake drum bore.

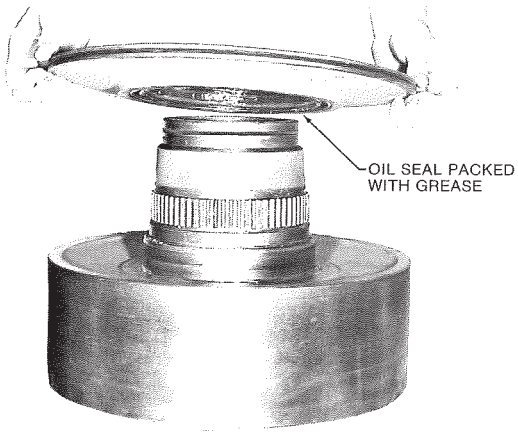


FIGURE K

Ring Gear and Pinion Disassembly

Ref. Fig. 1, page 22, and 5, page 30.

Remove the winch drum from the tractor, then remove the brake, clutch and drum assemblies from the winch, as outlined under the appropriate headings. Now remove the gear cover. Be careful not to damage the oil wiper. Remove the ball bearing from the drum shaft using a suitable bearing puller (CARCO Tool Number PC 13199 can be supplied for this purpose). (See Fig. 'M', page 13.)

Remove the lock key from the drum shaft. Unscrew the locknut from the drum shaft (CARCO Tool No. PC 13189 can be supplied for this purpose) (See Fig. 'N', page 13). Remove O-ring and replace with a new part on reassembly. Protecting the end of the drum shaft, drive it out of the main housing.

Remove the cotter pin, nut, washer, and the pinion gear or sprocket. Next remove the capscrews and, using two 5/8" N.C. capscrews as jacks

in the tapped holes provided in the bearing housing, remove the bearing housing, then shims. If the pinion bearings require to be replaced, remove the pinion by pressing it out of the assembly. A piece of 3/4" plate having a 3.625" diameter bored hole can be used to locate over the pinion and contact the outer race of the roller bearing while the pinion is pressed out of the assembly.

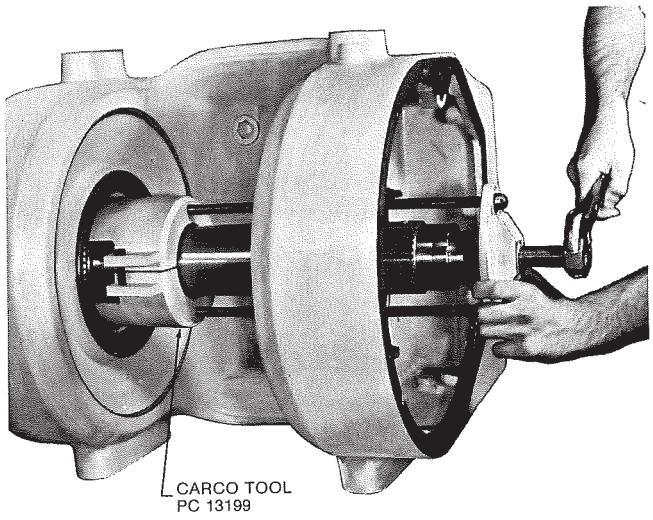


FIGURE M

Ring Gear and Pinion Assembly

Ref. Fig. 5, page 30.

If the pinion bearings are being replaced, it is necessary to re-adjust the shims for the correct preload, as follows. Press the outer races of the bearings in their ends of the bearing housing. Press the bearing, spacer sleeve and the inner race of the bearing on the pinion shaft as illustrated. Make sure that the large radius on the inside of the inner race goes onto the pinion shaft first. Place the pinion shaft in the bearing housing so that the outer race and inner race mate up. Then from the flange end of the bearing housing, install the bearing spacer. Place a piece of soft lead gauge wire on the end of the bearing spacer then press the inner race of the bearing on the pinion shaft. Install the preload bushing or gear previously removed, washer and nut. With this assembly held securely in a vise, proceed with preloading. Fasten a piece of string (12" to 18") to the bearing housing flange and wrap the excess around on the O.D. of the bearing housing, then attach the free end to a suitable spring balance. Tighten the nut until a reading of 6-1/2 to 10 pounds on the spring balance is required for continuous rotation of the bearing housing about the shaft. Remove the nut, washer, preload bushing and the inner race of the bearing. Carefully remove the lead gauge wire and measure the compressed thickness to determine the correct number and size of the shims. Install the shims placing the thinner shims between the thicker shims, then replace the inner race of the bearing, gear or previously removed washer and nut. Torque the nut to 250 – 300 lbs. ft. and check the preload using the spring balance (Fig. 'O'). Install the cotter pin. This assembly is now complete and ready for assembly in the main housing.

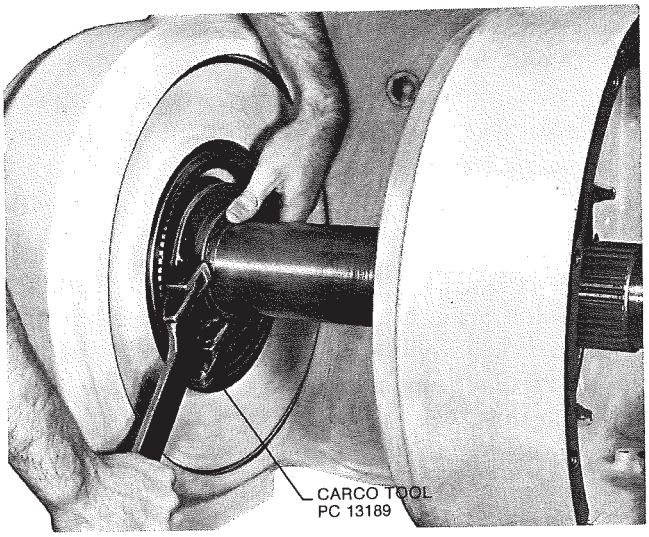


FIGURE N

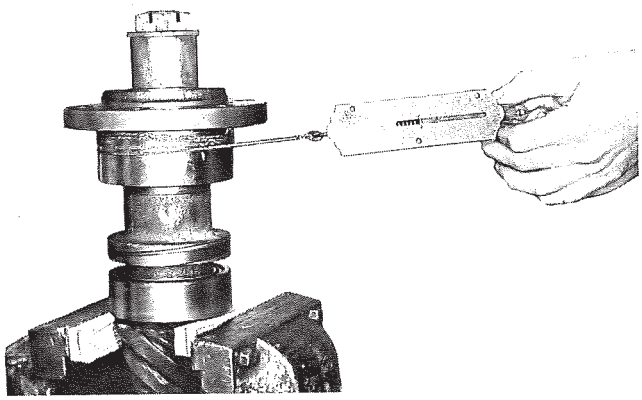


FIGURE O

Pre-load of Drum Shaft Bearings

Ref. Fig. 5, page 30.

If the roller bearings on the drum shaft are being replaced they require to be pre-loaded to 11-20 in. lbs. torque when the adjusting nut is tightened to 150 lbs. ft., making the bearing cones grip the bearing spacer.

To establish the correct spacer length use a bearing spacer that is approximately .025" shorter than the original bearing spacer. (CARCO Spacer Tool Number PA 13088 can be used for this purpose.) The length of each bearing spacer PA 19022 is marked with electric pencil on the I.D. of the spacer.

Assemble the bearings with Spacer Tool PA 13088 and a piece of soft lead gauge wire between the bearings. Tighten the adjusting nut until it requires 11-20 inch pounds to rotate the drum shaft against the bearing pre-load. Remove the Spacer Tool PA 13088 and gauge wire and measure the total thickness of the spacer tool and compressed gauge wire. This will be the exact length of the bearing spacer PA 19022 required.

Bearing Spacer PA 19022 is available in twenty four lengths which vary by .001 increments. The faces of spacer PA 19022 must be parallel within .0005.

To check the pre-load (11-20 lbs. inch), wrap a piece of string around the outside diameter of the drumshaft and attach the free end to a suitable spring balance. The correct pre-load will have been obtained when a reading of 5-9 lbs. on the spring balance is obtained for continous rotation of the drum shaft.

IMPORTANT: Shims must not be used between the bearing cones and the bearing spacer. A bearing spacer having the correct length for the required pre-load must be used.

Ring Gear and Pinion Adjustment

(See Fig. 5, page 30.)

The following instructions are to be followed whenever the ring gear and pinion setting has been disturbed due to disassembly of the winch or replacement of the pinion shaft bearings or drum shaft bearing.

1. Establish the total thickness of shims required under the flange of the pinion bearing housing, as follows: When the pinion bearings have been correctly preloaded, measure dimension "Y". See Figure 'P'. Place the bevel pinion assembly on a surface table so that it stands on the end of the pinion and use an inside micrometer to measure dimension "Y". Dimension "Z" is marked on the end of the bevel pinion. This dimension represents the distance from the end of the pinion shaft to the center of the ring gear. Dimension "X" is marked on the back of the winch housing. Add dimensions "Y" and "Z" and subtract dimension "X" from this total. The result will be that total thickness of shims PA 19015 required.

   TOTAL THICKNESS OF SHIMS = Y + Z – X inches.

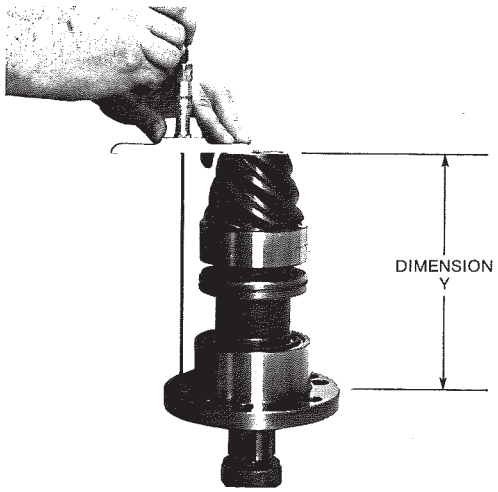
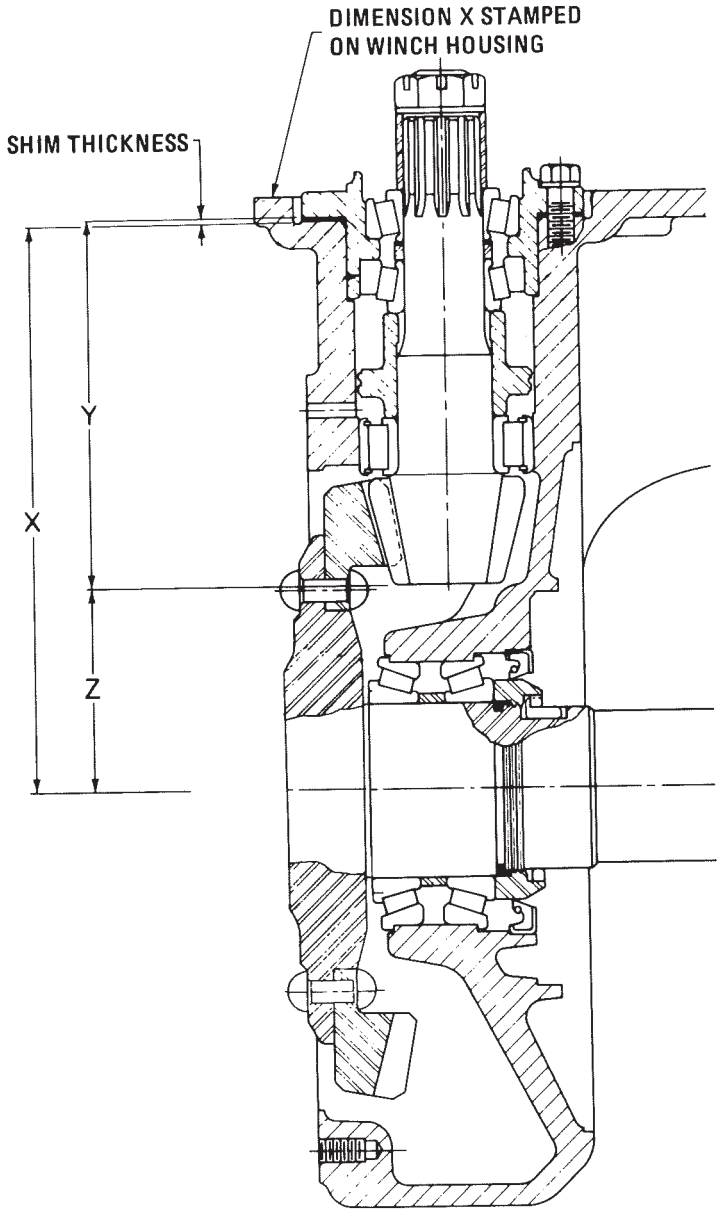


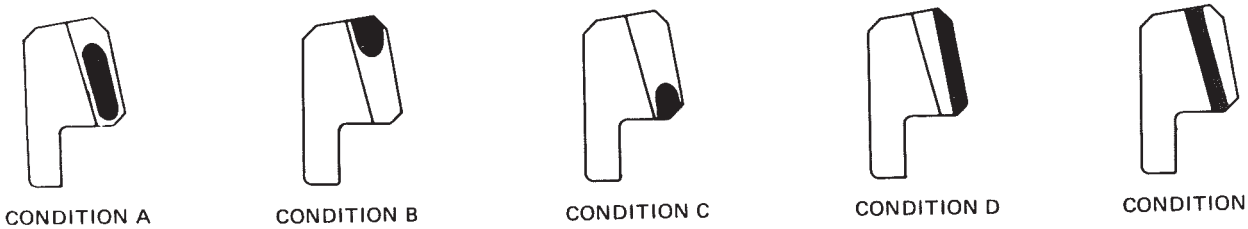
FIGURE P

2. Install the pre-assembled pinion assembly with shims and capscrews into the bore in the housing. Torque the capscrews as shown in the torque specifications. Check to see that the pinion shaft rotates freely.
3. Install the bearing cups in the main housing. Using a micrometer, measure the cups to insure that they are parallel.
4. Establish the thickness of spacer as follows. Wrap a piece of lead gauge wire around the drum shaft and install the bearing cone. Turn the main housing into an upright position and install the drum shaft so that it is vertical with the housing. Make sure the bearing cone seats in the cup. Using a dial indicator, measure the backlash between the pinion shaft and ring gear. The backlash should measure .010 to .015, if not, press the drum shaft down until this measurement is attained.
5. Remove the drum shaft from the housing. Remove the bearing cone from the drum shaft and measure the thickness of the lead gauge wire.

6. Install a spacer thickness as established in step (5) and bearing cone on the drum shaft.
7. Fit the drum shaft back into the housing. Make sure that the bearing cone seats in the cup.
8. Using a copper drift, drive the drum shaft into the housing, to ensure that the bearing cone is fully seated on the shaft. Install the spacer and the second bearing cone.
9. Grease and install the 'O' Ring and lock nut. Tighten the lock nut using CARCO Wrench Number PC 13189. Re-measure the backlash, it should measure .010 to .015.



TYPICAL VIEW OF WINCH



NOTE: FOR CORRECTIONS ON TOOTH CONTACT PATTERN'S SEE PAGE 16.

FIGURE Q

CORRECT TOOTH CONTACT: Remove the 1-1/2 N.P.T. barrel plug from the gear end of the winch housing and paint the face of each ring gear tooth with a light coating of marking paint. Red lead oxide mixed with a light grease will make an ideal paint for this purpose. To check the tooth contact, rotate the pinion shaft in a clockwise direction when viewed from the back of the winch. The correct tooth contact is illustrated at 'A'. If the thickness of shims has been established correctly and the backlash is correct, the correct tooth contact should be obtained. Illustrations B, C, D and E show incorrect tooth markings which must be corrected as follows:

CONDITION 'B' + 'E' illustrates a heavy heel mark. To correct this condition, the pinion must be moved into mesh and the ring gear further out of mesh. Remove the capscrews and lockwashers and pull the pinion housing out of the main housing. Remove one .010 shim from under the pinion housing flange. Replace the pinion housing in the winch and secure it. Remove the drum shaft and increase the thickness of spacer until the desired tooth contact is established.

CONDITION 'C' + 'D' illustrates a heavy toe mark. To correct this condition, the pinion shaft must be moved slightly out of mesh and the ring gear moved further into mesh. Remove capscrews and lockwashers and pull the pinion housing out of the main housing as outlined.

Add one .010" shim under the pinion housing flange. Replace the pinion housing in the winch and secure it. Remove the drum shaft and decrease the thickness of spacer until the desired tooth contact is established.

SPECIAL SERVICE PARTS

Service Kits

Part No.	Description	Where Used
PA 9545X	Repair Kit	Master Control Cylinders
PA 9546X	Repair Kit	Clutch Cylinder Assembly
PA 9547X	Repair Kit	Brake Cylinder Assembly

Tools

Part No.	Description	Where Used
PA 13154	Jack Screw	Removing Clutch Hub
PA 13088	Bearing Spacer	Adjustment of Drumshaft Bearings
PC 13189	Wrench	Adjusting Nuts on Drumshaft
PC 13199	Puller	Removing Bearing H 120 from Drumshaft

Miscellaneous

Part No.	Description	Where Used
25456-1	Ferrule	To Anchor 1/2 Cable to Drum
25456-2	Ferrule	To Anchor 5/8 Cable to Drum
55456-3	Ferrule	To Anchor 3/4 Cable to Drum
P 51467	Tru-Torque Oil (4 oz. bottle)	Lubricating Hydraulic Components
P 51469	Spray Paint	CARCO Yellow, Touch Up Paint

PREVENTIVE MAINTENANCE INSTRUCTIONS

The following recommendations are made with a view to providing long, trouble-free service from your CARCO winch. All steps are to be completed at the intervals stated.

Once a Week:

1. Check the level of brake fluid in the master control and top up as required. If brake fluid requires to be added frequently, investigate for leaks at all line connections, roto-seal, brake release cylinder and clutch cylinder. Ensure that only clean brake fluid is used.
2. Position the vehicle on level ground and check the oil level in the ring gear compartment by removing the oil level plug in the gear cover. On winches that have an oil level plug in the adapter gear housing, check the oil level in the adapter. Top up with SAE 90 oil as required. If oil requires to be added frequently, check for oil leaks.
3. Check for condensation and hydraulic leaks in the clutch compartment by removing the drain plug. If evidence of hydraulic brake fluid is found follow steps 2 and 3B under every six months.
4. Put the control handle in the brake release position and check that the drum will free-spool and will maintain the free-spool condition for at least 5 minutes. If the brake creeps on, there is an internal or external hydraulic leak; check at both the master control and brake release cylinders for damaged 'U' cups and check all hydraulic connections.
5. Check all mounting bolts and capscrews and tighten as required.
6. Check the two-way breather at the clutch end for damage. Remove and clean if necessary.

Every Month:

Machines in storage should have the winch operated for a period of fifteen minutes at least once per month.

Every Six Months:

On winches that are used regularly, otherwise once a year.

1. Disassemble the master control unit. Clean all parts thoroughly and replace all parts that have excessive wear. Lubricate the shaft and outboard bushing with Tru-Torque lubricant (P 51467) or equal. Using new 'U' cups and shaft 'O' ring, reassemble the master control unit as described in the parts and instruction manual for the winch. Fill with clean automotive brake fluid.
2. Remove and disassemble the brake release cylinder assembly. Clean all parts thoroughly. Lubricate the cylinder bore, pistons and springs with Tru-Torque lubricant. Using a new 'U' cup and boot, reassemble as described in the parts and instruction manual for the winch. Using a new gasket, replace the brake cylinder assembly.

3.a. Remove the end cap from the clutch cover. Remove the hydraulic tube and inspect for wear. If wear is excessive, replace the hydraulic tube.

b. Remove the clutch cover then remove and disassemble the clutch cylinder assembly. Clean all parts thoroughly and lubricate the cylinder bore and piston with Tru-Torque lubricant. Using a new 'U' cup and boot, reassemble as described in the parts and instruction manual.

c. Remove the primary and secondary clutch bands and check for free movement of clutch lever. Reinstall bands and adjust in accordance with the Parts and Instruction Manual. See Clutch Adjustment.

d. Remove brake bands and check for damage or wear and replace as required, lubricate linkages with non-drip grease. Inspect all hydraulic line connections for leaks and repairs as required. Check ball bearing on end of the drum shaft and replace if necessary.

e. Remove the gland cap from the end of the drum shaft. Clean the outside diameter of the gland cap and polish if necessary with fine emery cloth. Replace the 'U' seal and 'O' ring on the gland cap with new parts. Inspect the oil seal in the clutch cover and lubricate seal lip.

f. Reassemble all parts and use new gaskets between the clutch cover and winch housing and between the end cap and clutch cover.

TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
A. Clutch slipping	1. If the winch or master control has recently been installed, there may be air in the clutch line.	See "Bleeding Hydraulic System" on page 7.
	2. If the master control handle continues to move gradually when a constant force is applied to engage the clutch, there may be a leak in the clutch line, clutch cylinder in the winch or master control cylinder.	Check all fittings for escaping fluid. If no leak is visible, remove the fitting in the end of the master control clutch cylinder and install a 1/8" N.P.T. pipe plug. If the control handle still moves when a constant load is applied, the cup (Item 14, Fig. 6, page 32) in the master control cylinder is leaking. If the leak is not found by the above tests, remove the clutch cover from the winch and inspect all clutch line connections and the clutch cylinder.
	3. The clutch may require to be adjusted. If the clearance between the clutch drum and the clutch hands has become excessive due to wear, the master control handle will have greater than normal travel when moved for clutch engagement.	Remove the clutch cover from the winch and adjust the clutch bands. See "Clutch Adjustment" on page 12.
	4. The clutch bands may have become soaked by brake fluid.	Remove the clutch bands and replace them with new parts.
	5. The clutch may have become hot from excessive slippage under heavy pulls.	Allow the winch to cool for 10-15 minutes.
	6. The clutch bands may be worn and require to be replaced.	Remove the clutch bands and replace them with new parts.
B. Brake will not hold a load	1. If the winch is new, the brake may require to be "run in".	Attach the winch cable to a stump and drive the tractor away from the stump using low gear. Allow the brake to slip just enough to let the tractor move forward until all the cable has been run out from the drum. Repeat this operation until the tractor has travelled a total of 300 ft. under these conditions. Allow the winch to cool and check the holding power of the brake. Repeat if necessary.
	2. The brake drum may have become over heated due to the clutch slipping under heavy loads.	Allow the winch to cool for 10-15 minutes.
	3. The brake bands may have become soaked by brake fluid.	Remove the brake bands and replace them with new parts.
	4. The brake bands may be worn.	Check that the brake levers (Items 13 and 14, Fig. 3, page 26) are properly engaged in the brake band ends and that they have clearance to permit them to move in the direction of engagement. When Brake Bands become worn and require replacing, inspect the brake spring and replace the spring if the free length is less than 6-29/32".
	5. The brake spring may have taken a permanent set.	Replace the brake spring if free length is less than 6-29/32".

TROUBLE	PROBABLE CAUSE	REMEDY
C. Clutch slipping and brake will not hold	1. Water or brake fluid may have leaked into the clutch and brake compartment.	Remove the clutch cover and inspect. If brake fluid is present, find the leak and make the necessary repairs. If water is present, inspect the clutch cover gasket and all seals for possible damage.
D. Brake will not release or stay released	1. The cup in the master control cylinder which is connected to the winch brake cylinder may be leaking.	Remove the fittings from the end of the master control brake cylinder and install a 1/8" N.P.T. pipe plug. If the master control handle can be moved gradually until it reaches the end of its stroke, the cup (Item 14, Fig. 6, page 32) in the master control cylinder is damaged. Replace this cup and remove and inspect the parts in the winch brake cylinder. If the cup in the master control cylinder requires to be replaced, clean the pistons (Items 6 and 8, Fig. 2, page 24) in the winch brake cylinder and install a new cup (Item 5, Fig. 2, page 24) in this cylinder also.
	2. The cup in the winch brake cylinder may be leaking.	Remove the brake cylinder (Item 3, Fig. 2, page 24) and inspect. If brake fluid has been leaking from this cylinder, replace the cup and clean the pistons in this assembly. Also remove the clutch cover and inspect the brake bands. Clean all excess fluid from the clutch and brake compartment and replace the brake bands if they are soaked with brake fluid.
	3. The line from the master control is expanding excessively under pressure thus reducing the movement available for releasing the brake.	The recommended hose for this application is a single wire braid hose (Stratoflex No. 225 or similar). Alternatively steel or copper tubing should be used.
	4. If the winch or master control has recently been installed there may be air in the brake line.	See "Bleeding Hydraulic System" on page 7.
E. Drum will not rotate when clutch is engaged with no load on the cable	1. The tractor P.T.O. may not be engaged.	Check P.T.O. engagement.
	2. The Master Control Unit may require to be filled with fluid.	Fill with automotive brake fluid.
	3. If the winch has been used to pull heavy loads, that are beyond the rated capacity of the winch, the ring gear in the winch may be broken or the ring gear rivets may have sheared.	If the gears are damaged or the rivets are sheared disassemble the winch and make the necessary repairs.
F. Drum will not free spool	1. The base on which the winch is mounted may not be completely flat.	Back the winch mounting bolts off. Check to see if there is a gap between the winch pads and base. If there is a gap, measure it with a feeler gauge. Shim the gap and retighten the mounting bolts.
	2. See Cause 'D' steps 3 and 4.	See Cause 'D' steps 3 and 4.

MASTER CONTROL SERVICE INSTRUCTIONS

Master Control Disassembly

Ref. Fig. 6, page 32.

Remove the master control assembly from the tractor, then remove the handle by loosening the nut and capscrew in the handle boss. Remove the cover by removing the capscrews and empty the housing of brake fluid. Slacken the socket head capscrew in the rocker arm and pull the shaft out of the housing. The rocker arm assembly can now be removed from the housing. Press the push rod pins out of the rocker arm and remove the push rods. Remove capscrews and remove the cylinder assemblies from the housing.

Cylinder Disassembly

Press the piston into the cylinder and remove the lock ring. The piston, cup, spring and foot valve assembly can now be removed from the cylinder.

Cylinder Assembly

Wash all parts in clean brake fluid. Do not use any other cleaning fluid as it may contaminate the hydraulic system. Inspect all parts to ensure that they are in good condition. Discard the used cup and replace with a new part. Check the rubber valve in the foot valve assembly and the rubber washer. If the rubber is swollen, replace the foot valve assembly. Lubricate all parts lightly with Tru-Torque Oil, or equal. Place the rubber washer in the bottom of the cylinder. Press the domed end of the foot valve into the large end of the spring and install the spring in the cylinder so that the foot valve contacts the rubber washer. Place the cup, open end down, on the spring and place the piston with its flat end against the cup. Press this assembly into the cylinder until the lock ring can be installed. Install the lock ring so that its gap is in line with the bleed hole on the outside diameter of the cylinder.

Master Control Assembly

Wipe all parts thoroughly with a clean cloth. Assemble the push rods and in the rocker arm using pins so that the short push rod is on the same side of the rocker arm as the capscrew. Make sure the push rods move freely on the pins. Place the rocker arm assembly in the housing so that the short push rod is in the brake end of the housing (marked on the outside of the housing).

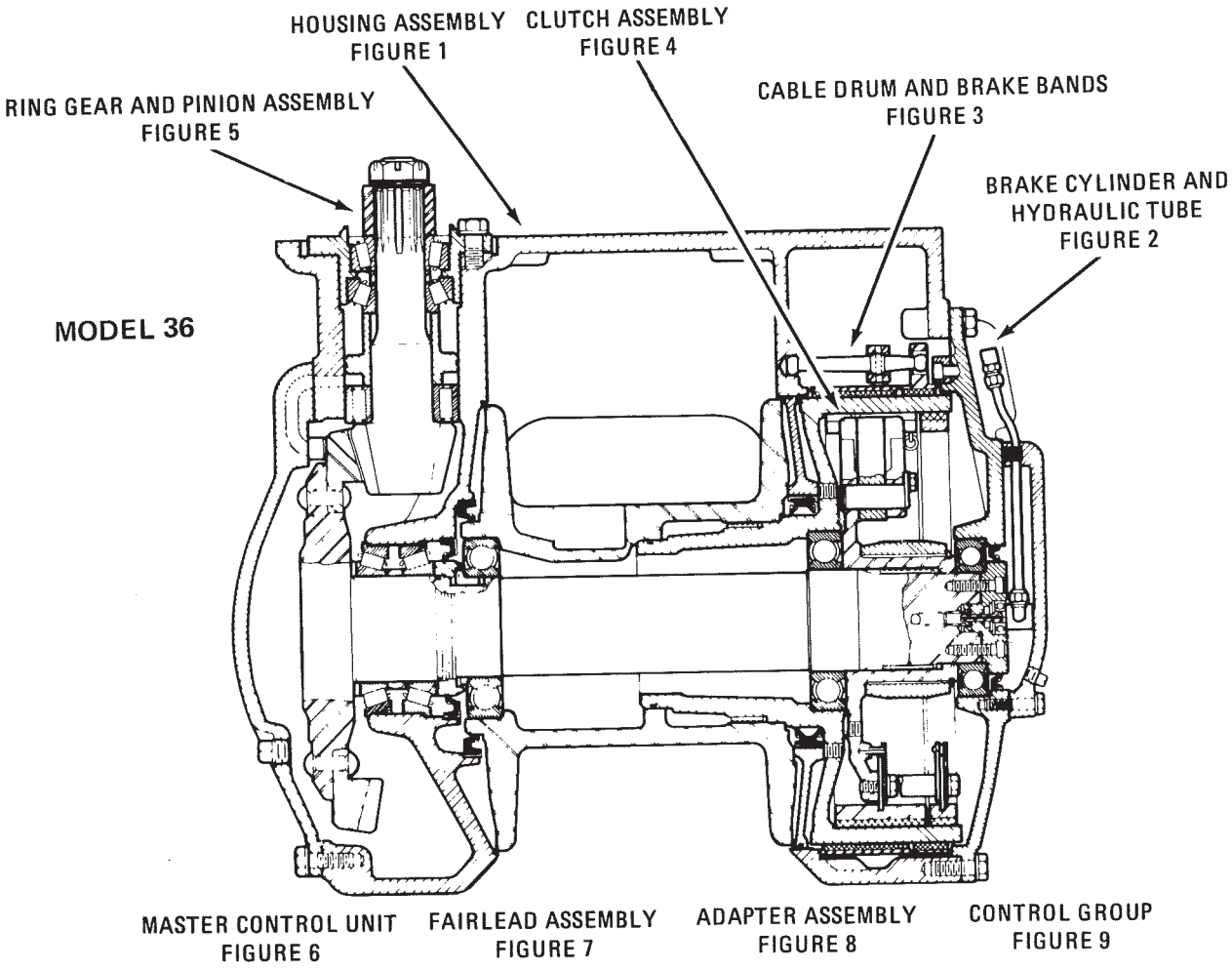
Install the 'O' ring in its groove on the shaft. Insert the shaft through the housing and into the rocker arm then tighten the capscrew in the rocker arm. Install the handle on the shaft with the counter bore towards the housing and tighten the capscrew in the boss of the handle. Install new gaskets on the cylinders. Replace the cylinder assemblies making sure the bleed holes are on top. Fasten the cover and new gasket in place and fill the housing with standard brake fluid.

TORQUE LOADING FOR FASTENERS

Part No.	Torque Load Lb. Ft.
P 50096	10
P 50103	200
P 50435	120
P 50521	25
P 50608	12
P 50610	55
P 50748	24
P 50767	25

Part No.	Torque Load Lb. Ft.
P 50794	10
P 51176	18
P 51177	25
P 51178	35
P 51563	18
P 53920	400-475
PA 11029	35
PA 19012	150

PARTS SECTION



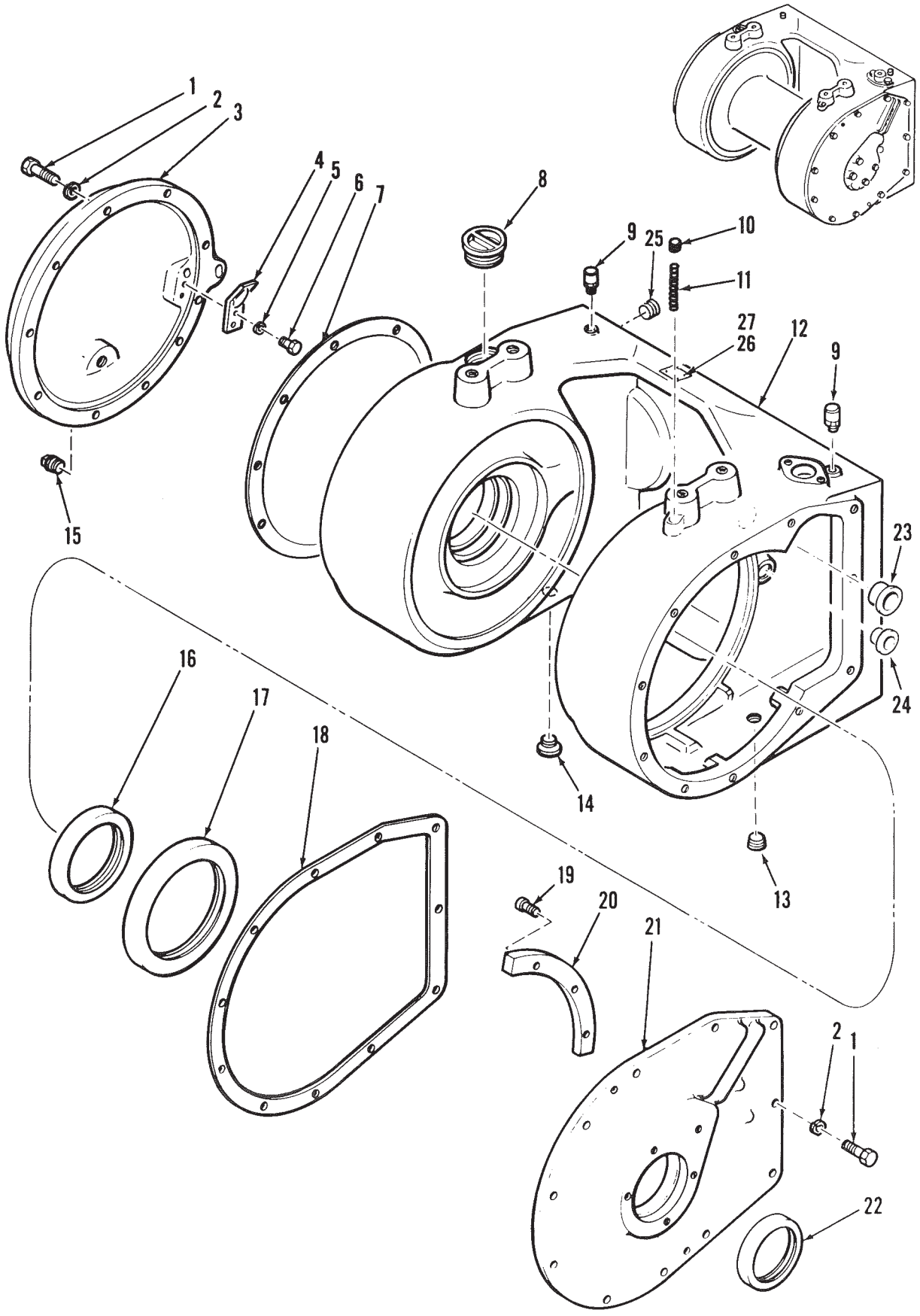


FIGURE 1

HOUSING ASSEMBLY

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Weight Ozs.
1	P 50610	Capscrew (1/2 N.C. x 1-1/4 Hex. Hd.)	21	0	1.7
2	P 50100	Lockwasher (1/2)	21	–	
3	55179	Gear Cover	1	33	0
4	PA 19033	Oil Wiper	1	0	0.7
5	P 50097	Lockwasher (5/16)	2	–	
6	P 50608	Capscrew (5/16 N.C. x 5/8 Hex. Hd.)	2	–	
7	PB 19010	Gasket	1	–	
8	P 50782	Barrel Plug	1	0	3
9	P 50742	Vent	2	0	0.5
10	P 52263	Set Screw	1	0	0.5
11	PA 9536	Spring	1	–	
12	52348	Winch Assembly	1		
	PE 19000	Housing	1		0
13	P 50587	Pipe Plug	1	–	
14	P 51174	Barrel Plug	1	0	1
15	P 50513	Pipe Plug	1	0	1.5
16	P 51426	Oil Seal	1	0	12
17	P 51431	Oil Seal	1	1	1
18	PC 19009	Gasket	1	–	
19	P 51176	Capscrew (3/8 N.C. x 3/4 Sock. Hd.)	3	0	0.7
20	PB 19014	Guide Ring	1	1	2
21	PC 19003	Clutch Cover	1	50	0
22	P 50482	Oil Seal	1	0	4.5
23	PA 19092	Lever Plug (Secondary)	1	0	0.5
24	PA 19091	Lever Plug (Primary)	1	0	0.5
25	P 50428	Pipe Plug	1	–	
26	52168	Serial Number Plate	1	–	
27	16055-5	Tapping Screw, No. 10 x 3/8 Type U	4		

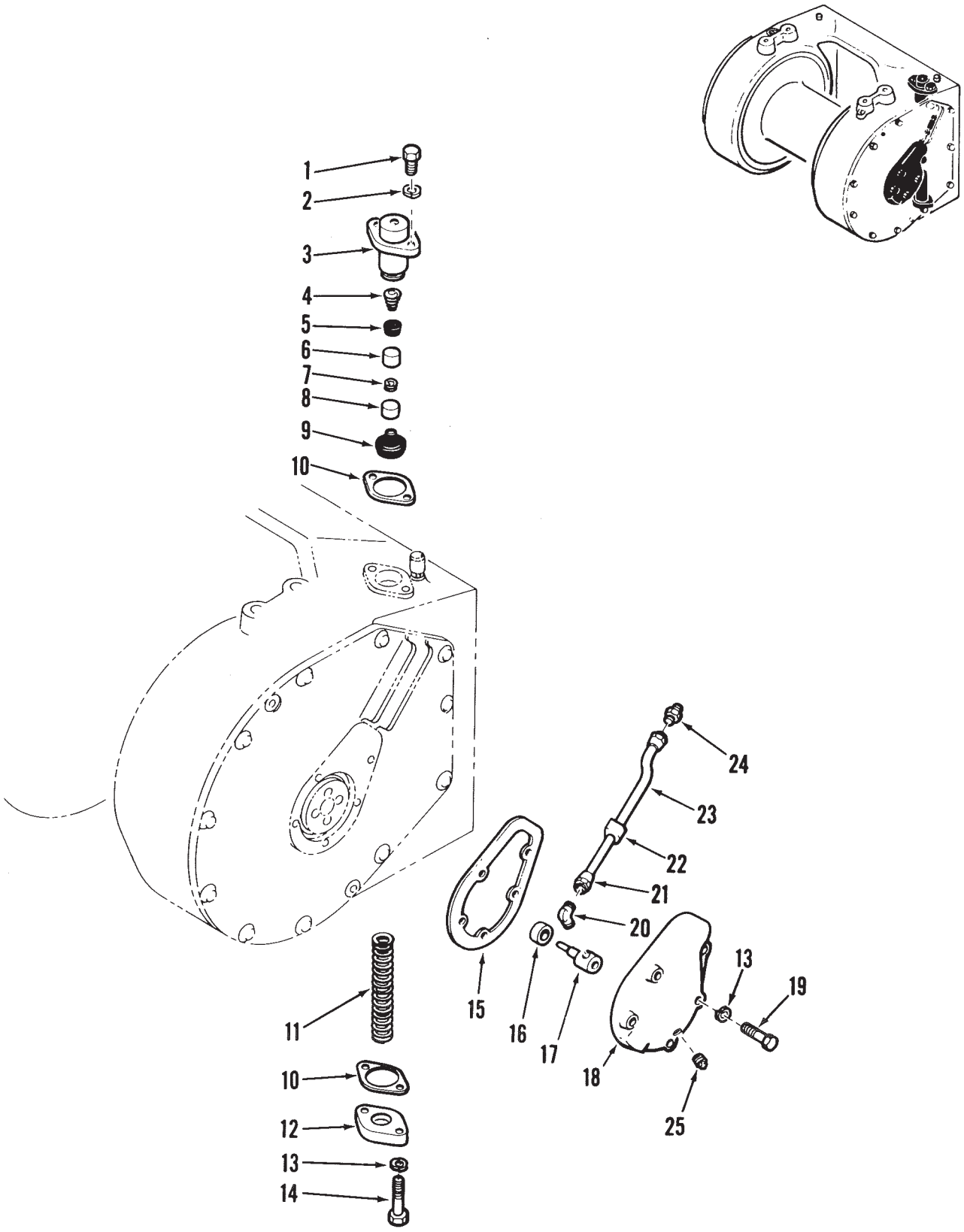


FIGURE 2

BRAKE CYLINDER AND HYDRAULIC TUBE

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Weight Ozs.
1	P 50521	Capscrew (3/8 N.C. x 1 Hex. Hd.)	2	0	0.7
2	P 50192	Lockwasher (3/8)	2	—	
Sub Ass'y	PA 839BX	Brake Cylinder Ass'y (Consists of Items 3 thru 9)	1	0	15.2
3	PA 839B	Brake Cylinder	1	0	11.5
4	P 50952	Spring	1	—	
5	P 51470	'U' Cup	1	—	
6	PA 8043	Piston	1	0	0.5
7	PA 8044	Spring	1	—	
8	P 51471	Piston	1	0	0.5
9	P 51474	Boot	1	—	
10	PA 9526	Gasket	2	—	
11	P 54293	Brake Spring	1	0	11
12	PA 9517	Spring Cap	1	0	11
13	P 50398	Lockwasher (7/16)	7	—	
14	PA 11029	Capscrew	2	0	1.5
15	PB 19007	Gasket	1	—	
16	P 50956	Bearing	1	0	1.2
17	PA 19018	Hydraulic Tube	1	0	2.7
18	PC 19007X	End Cap (Includes Item 25)	1	8	0
19	P 51178	Capscrew (7/16 N.C. x 1-1/2 Hex. Hd.)	5	0	1.5
20	P 50528	Elbow	1	0	1
Sub Ass'y	PA 19037X	Tube Ass'y (Consists of Items 21, 22 and 23)	1	0	2.5
21	P 51361	Nut	2	—	
22	PA 9518	Gromet	1	—	
23	P 51337	Copper Tubing	1	0	0.7
24	P 50644	Adapter	1	0	0.5
25	P 50531	Drain Plug (Part of Item 18)	1	—	
Service Kit	PA 9547X	Repair Kit (Includes Items 4 thru 10 and 1 Capsule of P 51467 Lubricating Fluid)	1		

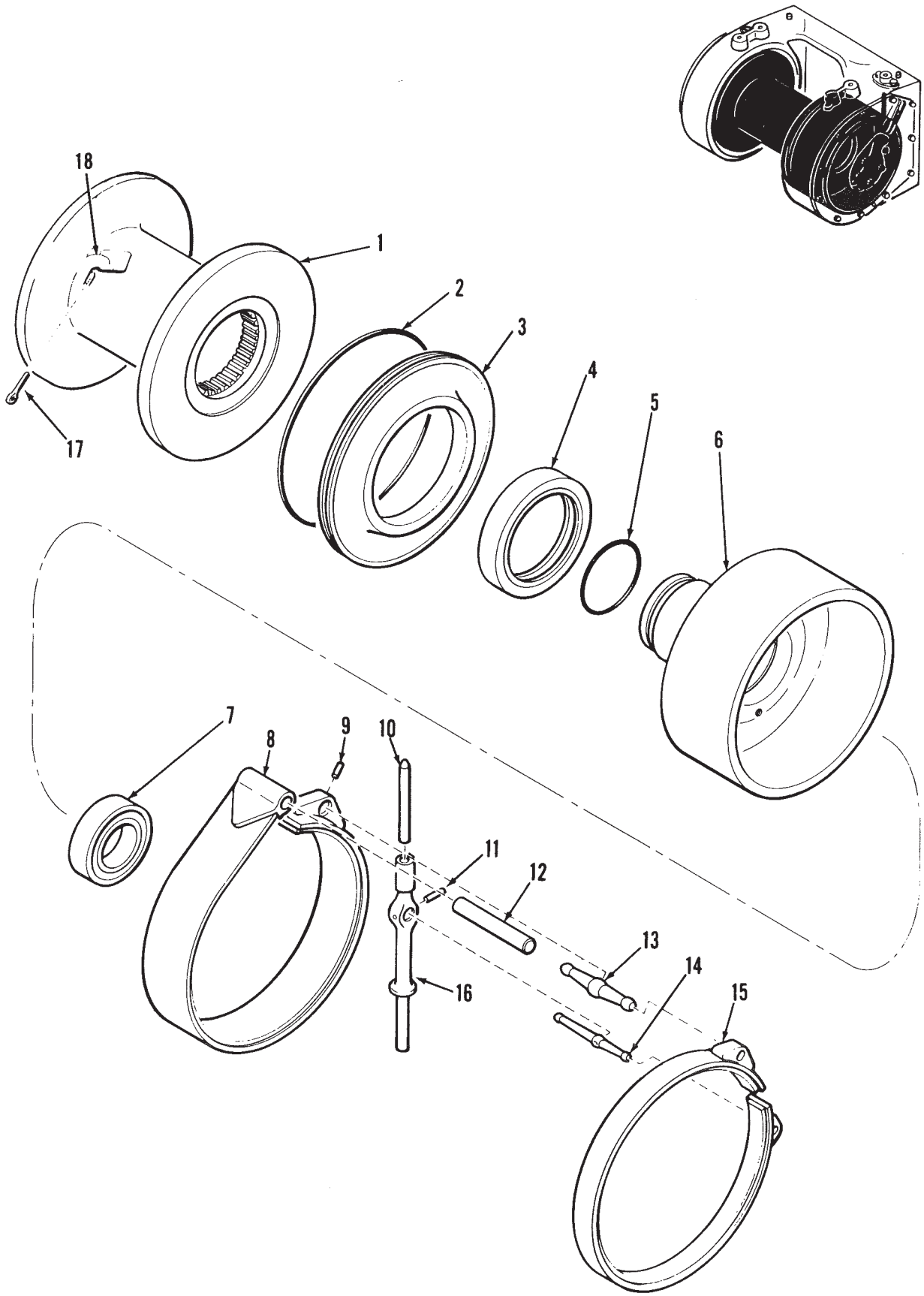


FIGURE 3

DRUM AND BRAKE BAND

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Weight Ozs.
1	P 54405	Cable Drum	1	125	0
2	P 50347	'O' Ring	1	–	
3	PB 19002	Oil Seal Housing	1	15	2
4	P 51430	Oil Seal	1	0	13
5	P 50331	'O' Ring	1	–	
6	PC 19005	Brake Drum	1	83	0
7	P 50793	Bearing	1	4	13
8	PC 19001X	Secondary Brake Band	1	12	8
9	P 50573	Pin	1	–	
10	PA 9515	Push Rod	1	0	5
11	P 51179	Pin	1	–	
12	PA 19027	Anchor Pin	1	1	2
13	PA 19017	Brake Lever	1	0	11.5
14	PA 19003	Brake Lever	1	0	5.2
15	PC 19000X	Primary Brake Band	1	4	8
16	PB 19019	Lever Block	1	0	8
17	P 50514	Cotter Pin (Part of Item 1)	1	–	
18	25456-1	Ferrule for 1/2 Wirerope	1		
	25456-2	Ferrule for 5/8 Wirerope	1		
	25456-3	Ferrule for 3/4 Wirerope	1		

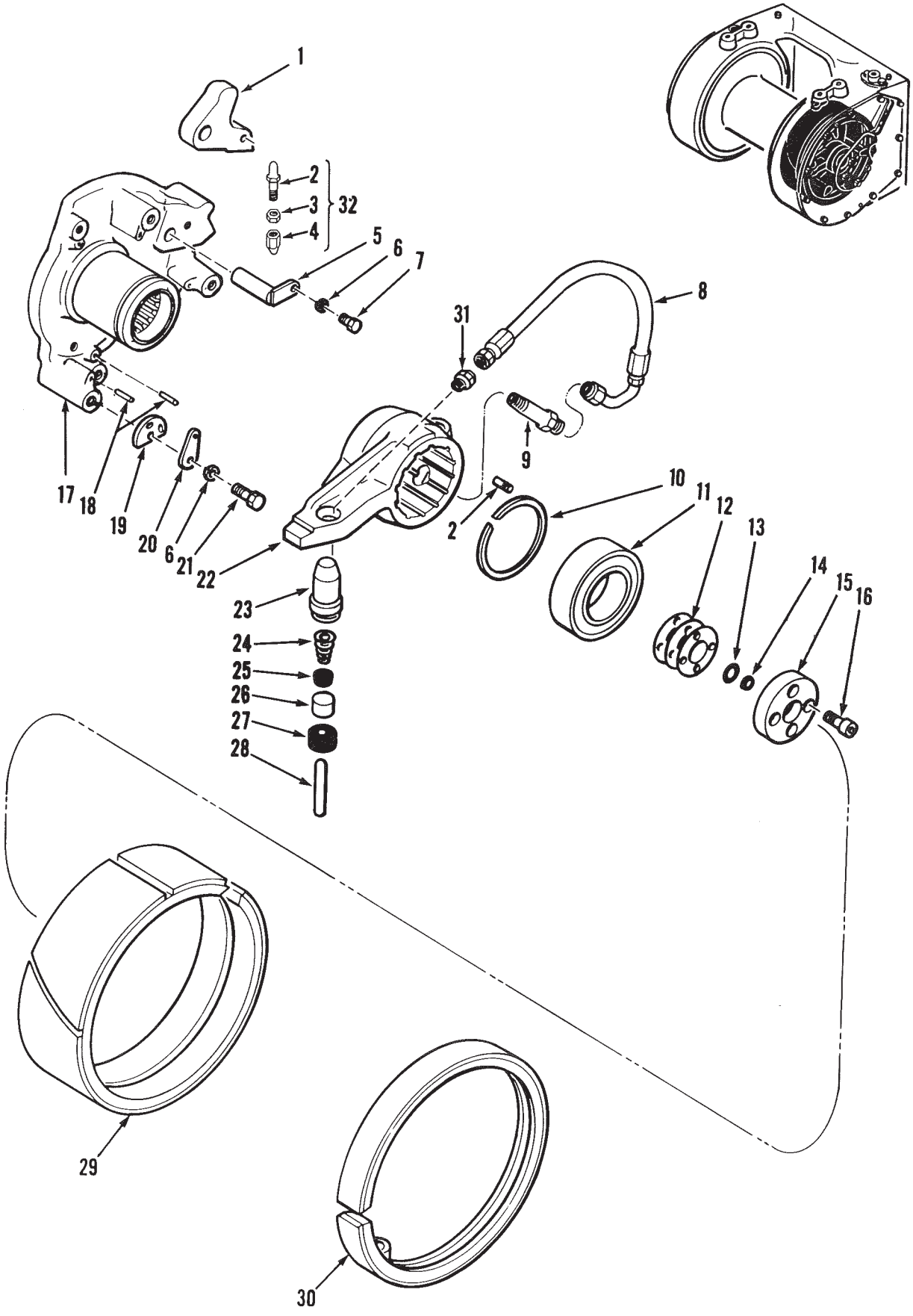

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FIGURE 4

CLUTCH ASSEMBLY

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Weight Ozs.
1	P 51626	Lever Arm (Includes 1 of P51220 Pin)	1	1	8
2	P 51158	Adjusting Screw	1	–	
3	P 52065	Locknut	1	0	0
4	P 51159	Adjusting Nut	1	0	0
5	PA 19005	Pivot Pin	1	0	6.5
6	P 50192	Lockwasher (3/8)	7	–	
7	P 53009	Capscrew (3/8 N.F. x 1/2 Hex. Hd.)	1	0	0.7
8	P 51175	Hose Assembly	1	0	5.5
9	PA 19158	Hydraulic Fitting	1	–	
10	P 50833	Snap Ring	1	0	1
11	P 50792	Bearing	1	3	4
12	PA 19024	Shim Set	1	–	
13	P 50408	'O' Ring	1	–	
14	P 51181	'U' Seal	1	–	
15	PA 19006	Gland Cap	1	2	9
16	P 51177	Capscrew (3/8 N.F. x 1-1/4 Sock. Hd.)	4	0	0.7
17	P 54301	Clutch Hub	1	20	8
18	P 51180	Pin	3	–	
19	PA 19180	Adjusting Cam	6	0	1.2
20	PA 9504	Lock Plate	6	0	1
21	P 50521	Capscrew (3/8 N.C. x 1 Hex. Hd.)	6	0	0.7
22	P 51627	Clutch Lever	1	9	8
Sub Ass'y	PA 825AX	Clutch Cylinder Assembly (Includes Items 23 thru 27)	1	0	8
23	P 51063	Cylinder	1	0	6.7
24	P 50952	Spring	1	–	
25	P 51473	'U' Cup	1	–	
26	P 51472	Piston	1	–	
27	P 51475	Boot	1	–	
28	PA 19025	Push Rod	1	0	1.5
29	P 52894	Secondary Clutch Band	1	17	8
30	PB 19050	Primary Clutch Band	1	6	0
31	P 50644	Connector	1	–	
32	P 51160	Adjusting Screw Assembly (Consists of Items 2, 3 and 4)	1	–	
Service Kit	PA 9546X	Repair Kit (Includes Items 24 thru 27 and 1 capsule of P 51467 Lubricating Fluid)			

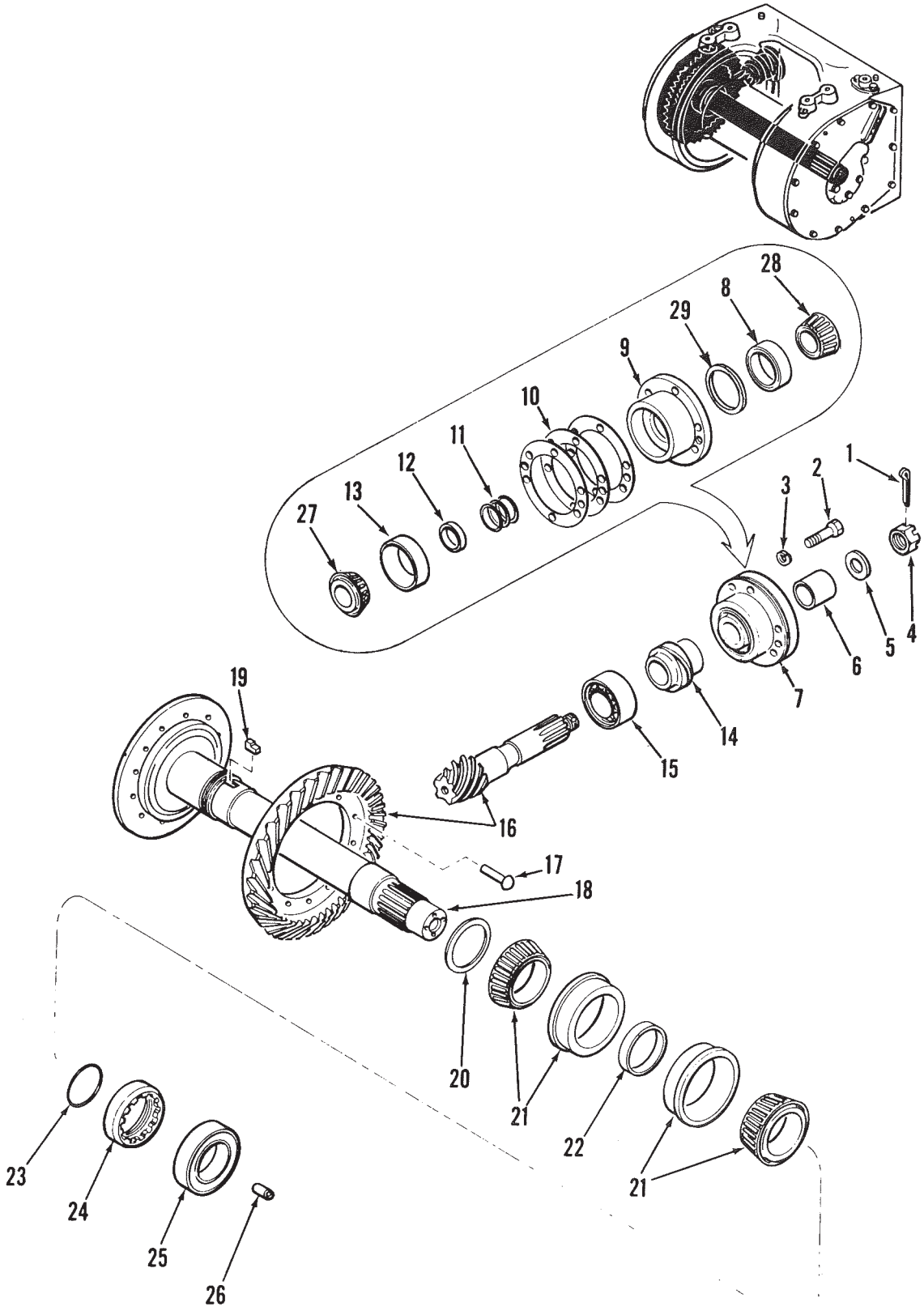
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FIGURE 5

RING GEAR, PINION AND SHAFT

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Ozs.
1	16288-548	Cotter Pin, 5/32 x 3	1	–	
2	P 50435	Capscrew (5/8 N.C. x 1-3/4 Hex. Hd.)	6	0	3.2
3	P 50098	Lockwasher (5/8)	6	0	0.7
4	P 53920	Nut	1	0	4.7
5	PA 19026	Washer	1	0	1
*6	PA 19011	Bushing (Shipping Only)	1	1	9
7	PB 19011X	Bearing Housing Assembly (Includes Items 8 thru 13, 27, 28, and 29)	1	6	12
8	P 50808	Bearing Cup	1	1	11
9	PB 19004X	Bearing Housing (Includes Items 13 and 8)	1		
10	PA 19015	Shim Set	1	–	
11	PA 19021	Shim Set	1	–	
12	PA 19020	Bearing Spacer	1	0	2
13	P 50806	Bearing Cup	1	2	2
14	PA 19013	Spacer Sleeve	1	2	9
15	P 50810	Bearing	1	2	8
Sub Ass'y	P 53348	Gear Pinion and Shaft Assembly (Includes Items 16, 17 and 18)	1	136	14
16	P 53342	Ring Gear and Pinion Assembly (Matched Set Includes Item 17)	1	41	6
17	P 50890	Rivet	16	0	1
18	PC 19071X	Drum Shaft (Includes Item 26)	1	95	8
19	PA 19009	Lock Key	1	–	
② 20	PA 17014	Spacer (Specify Length Req'd.)	1	–	
21	P 50910	Bearing Assembly	2	4	8
① 22	PA 19022	Bearing Spacer (*Specify Length Req'd.)	1	0	9.7
23	P 50318	O-Ring	1	–	
① 24	PA 19012	Locknut	1	1	10
25	P 50793	Bearing	1	4	13
26	PA 9506	Cup Retainer (Part of Item 18)	1	–	
27	P 50809	Bearing Cone	1	–	
28	P 50807	Bearing Cone	1	–	
29	P 50454	Oil Seal	1	–	

*This item is used for shipping purposes only when Winch supplied without the adapter assembly.

① For correct length see pre-load of drum shaft bearings page 13. When ordering replacement parts, order PA 17014 Spacer and see "RING GEAR AND PINION ADJUSTMENT" for tooth contact instructions.

②For correct length of spacers see Ring Gear and Pinion Adjustment on page 14.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

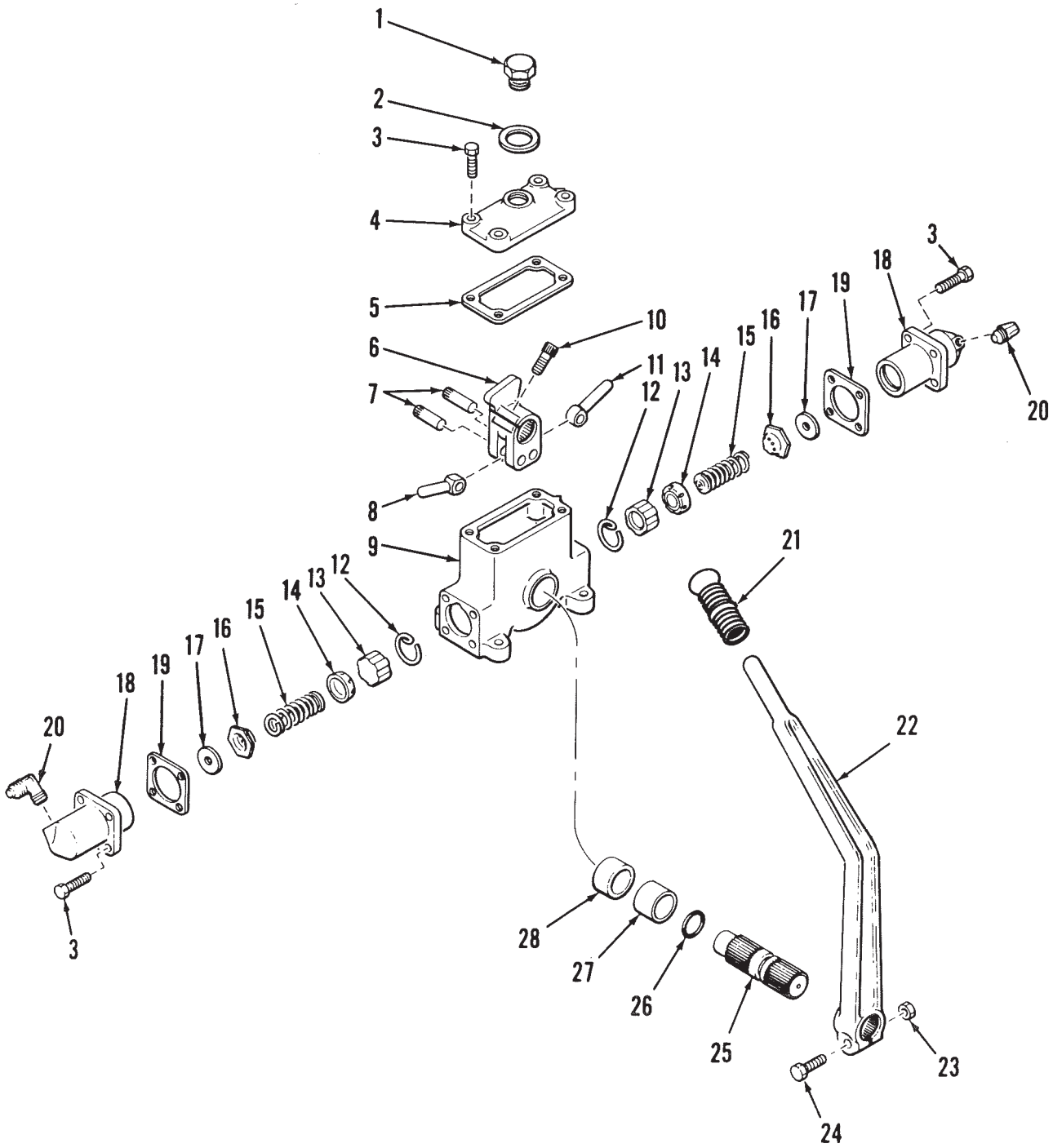

FIGURE 6

MASTER CONTROL UNIT

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Weight Ozs.
* Assembly	P56098	Master Control Assembly	1	7	8
1	PA 797	Filler Cap	1	0	2
2	P 51162	Washer	1	–	
3	P 50794	Capscrew (5/16 N.C. x 7/8 Hex. Hd.)	12	–	
4	PA 771	Cover	1	0	5
5	PA 794	Gasket	1	–	
6	PA 769	Rocker Arm	1	0	5
7	PA 785	Push Rod Pin	2	0	0.5
8	PA 8053	Short Push Rod	1	0	1
9	PC 709X	Housing (Includes Items 27 and 28)	1	2	0.5
10	P 50518	Capscrew	1	0	0.5
11	PA 8054	Long Push Rod	1	0	1.5
Sub Ass'y	PB 765X	Cylinder Assembly (Includes Items 12 thru 18)	2	0	11.5
12	P 50815	Lock Ring	2	–	
13	PA 830A	Piston	2	0	0.5
14	P 51477	Cup	2	–	
15	P 51478	Spring	2	–	
16	P 51476	Valve Assembly (Includes Item 17)	2	–	
17	P 51145	Washer (Part of Item 16)	2	–	
18	PA 770	Cylinder	2	0	8.5
19	PA 793	Gasket	2	–	
20	P 50528	Elbow	2	0	0.7
21	PA 798	Hand Grip	1	0	1.5
22	P 56097	Control Handle	1	1	0
23	P 50748	Nut (3/8 N.F.)	1	–	
24	P 51563	Capscrew (3/8 N.F. x 1-3/4 Hex. Hd.)	1	1	1
25	PA 772	Shaft	1	0	14
26	P 50301	'O' Ring	1	–	
27	PA 855A	Bushing (Included in Item 9)	1	0	1.5
28	PA 8051	Bushing (Included in Item 9)	1	0	1
Service Kit	PA 9545X	Repair Kit (Includes Items 12, 13, 14, 15, 16, 17, 19 and 1 Capsule of P 50816 Lubricating Fluid)	2		

*P56098 master control is same as PX170C and 52412-1. They incorporate updated control handle as shown.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

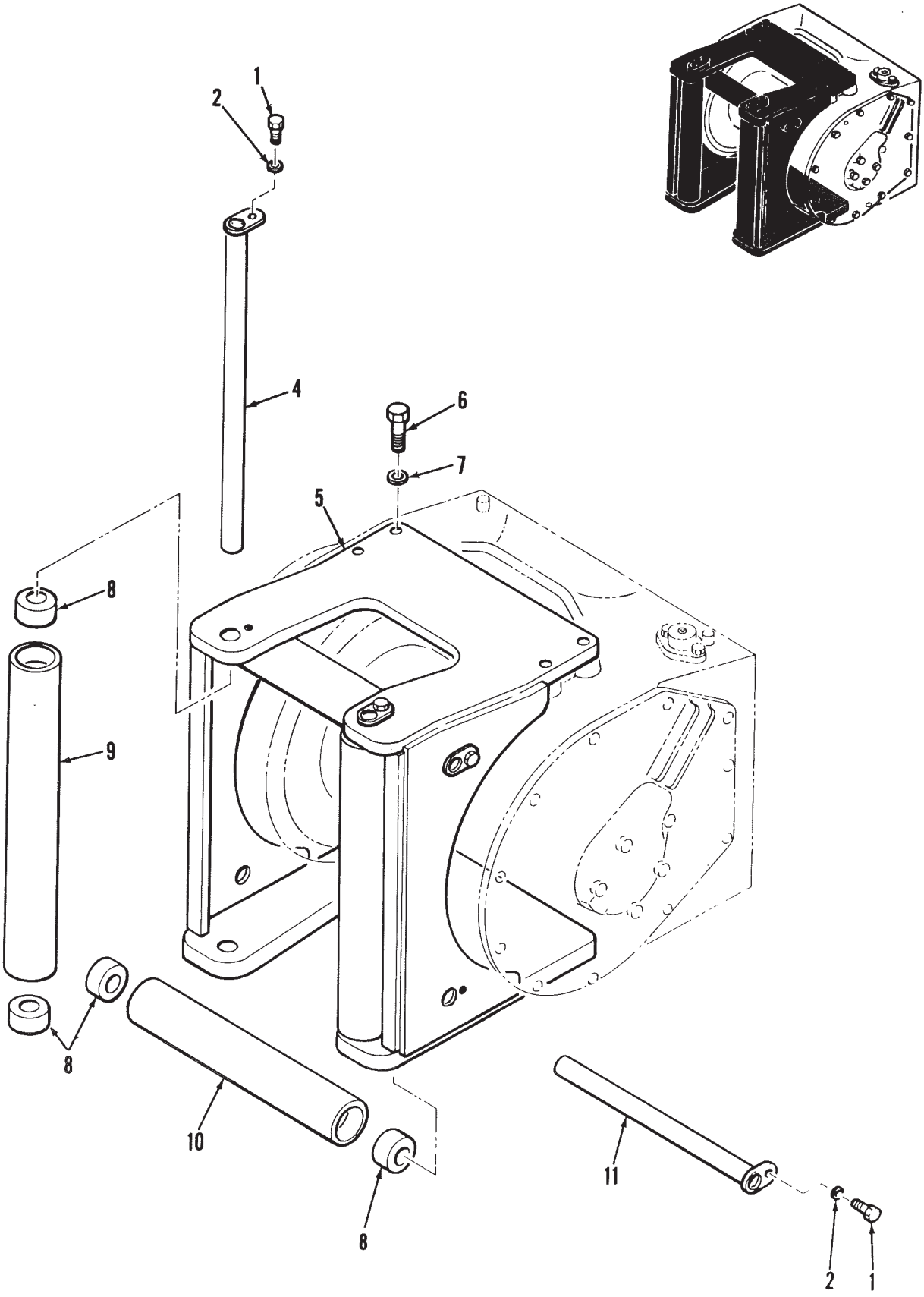

FIGURE 7

FAIRLEAD ASSEMBLY FOR CRAWLER TRACTOR

Item No.	Part No.	Description	No. Req'd	Weight Lbs.	Ozs.
Assembly	P 50086	4-Roller Fairlead Assembly	1	200	0
1	P 50096	Capscrew (5/16 N.C. x 1/2 Hex. Hd.)	4	—	
2	P 50097	Lockwasher (5/16)	4	—	
4	P 50080	Long Roller Shaft	2	10	0
5	P 50085	Fairlead Body	1	106	0
6	P 50103	Capscrew (3/4 N.C. x 1-3/4 Hex.)	10	0	5.5
7	P 50104	Lockwasher (3/4)	10	—	
Sub Ass'y	P 50078	Long Roller Assembly (Consists of Items 8 and 9)	2	22	14
8	P 50081	Bushing	8	1	6
9	P 50076	Long Roller	2	20	2
Sub Ass'y	P 50093	Short Roller Assembly (Consists of Items 8 and 10)	2	14	6
10	P 50095	Short Roller	2	11	10
11	P 50091	Short Roller Shaft	2	6	0
Sub Ass'y	P 52849	Short Roller and Shaft Assembly (Consists of 1 of Item 1, 1 of Item 2, 2 of Item 8, 1 of Item 10, 1 of Item 11)	2	20	8

(For 3 Roller Fairlead Assembly use parts as listed above under 4 Roller Fairlead Assembly and omit 1 of P 52849 and change the assembly number to P 50891.)

INSTALLATION INSTRUCTIONS

The CARCO Model 36 winch is provided with four bosses, two on the top of the winch housing and two on the bottom. The fairlead assembly is fastened to these bosses with capscrews (6) and lockwashers (7). Capscrews (6) should be tightened to 100 ft. lbs. torque.

The fairlead assembly can be supplied with three or four rollers.

WHEN ORDERING PARTS, BE SURE TO STATE THE SERIAL NUMBER OF WINCH

NUMERICAL INDEX OF PARTS