

NORTH SURREY, B.C., CANADA

**MODEL 19**  
**INSTRUCTION AND**  
**PARTS MANUAL**

**gearmatic**

7400-132<sup>nd</sup> STREET



MAILING ADDRESS.....7400 - 132nd STREET, NORTH SURREY, B.C., CANADA

PHONE EXCHANGE.....NEWTON, B.C., CANADA

WIRE ADDRESS.....GEARMATIC, NEW WESTMINSTER, B.C.

CHICAGO PARTS DEPOT:

MAILING ADDRESS.....4401 WEST 44th PLACE, CHICAGO, ILLINOIS, U.S.A.

TORONTO PARTS DEPOT:

MAILING ADDRESS.....47 MAPLE AVENUE, THORNHILL, ONT.

## WARRANTY

The parts manufactured by Gearmatic Co. Ltd. are warranted to be free from defects in workmanship or materials for a period of ninety days from commencement of operation or one year from date of original purchase from Gearmatic Co. Ltd., whichever shall be first.

Any parts found defective within the above period will be replaced free of charge f.o.b. factory.

Gearmatic Co. Ltd. is not responsible for any undertaking or representation other than stated herein.

## HOW TO ORDER PARTS

Order parts from your nearest authorized distributor. Order by part number only and state serial number of the winch. The Serial Number is stamped on the manufacturer's name plate attached to the top of the main housing.

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# DESCRIPTION

The model 19 winch is a mechanically driven winch designed to give long, trouble free service. The design features introduced in this winch are the result of many years experience in the tractor winch business.

The model 19 winch is 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 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.

The model 19 winch is 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 the model 19 winch is mounted on the rear of a 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 and provide the maximum rated line pull at the winch drum.

# OPERATING INSTRUCTIONS

## Operation Ref. Fig. 'A'

The tractor engine must be running and the P.T.O. must be engaged to furnish power to the winch.

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.

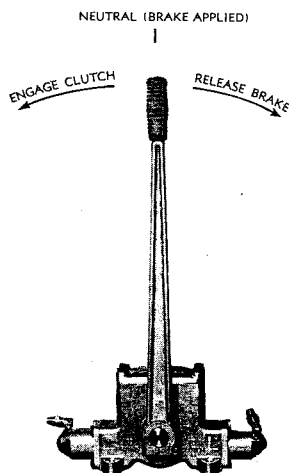


FIGURE A

## Lubrication Ref. Fig. 'B'

Remove the filler plug and the oil level plug from the ring gear end of the winch and fill to the plug level. If the winch is equipped with an adapter, remove the filler plug and fill the adapter to the filler plug level.

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.

Under normal temperature conditions the ring gear compartment of the winch and the adapter housing are to be filled with a good quality SAE 90 EP gear oil (MIL-L-2105B or better).

When temperatures are below zero SAE 75 EP gear oil should be used in both gear compartments.

**IMPORTANT:** Check the oil level weekly.

## Bleeding Hydraulic System

The X 710B master control for the model 19 winch is shipped from the factory filled with hydraulic brake fluid.

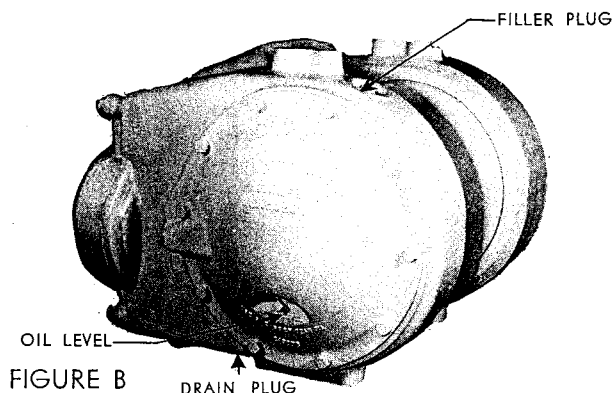


FIGURE B

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 as far as it will go in the brake release direction (See Fig. 'A'), and slacken off a fitting in the brake line at the highest point in that line so that air may escape. Tighten the fitting and return the control handle to neutral. After a slight pause, repeat this process until all the air has been removed. Repeat this procedure for the clutch end of the master control until all air has been expelled from the clutch line.

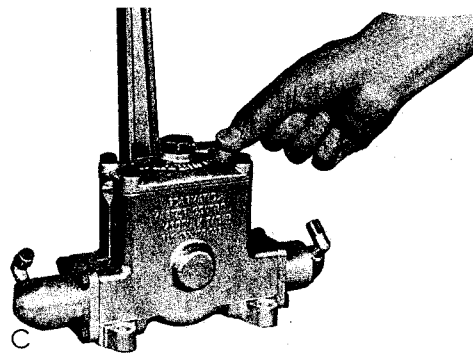


FIGURE C

When all the air has been expelled from the system, move the master control handle to the end of its travel in the brake release direction. The cable drum should now spool freely. To check the clutch engagement, move the master control handle to engage the clutch. After a short distance of travel, the control handle should feel solid when 40-50 lbs. force is applied at the handle. If the drum does not "free spool" when the control handle is in the brake release position or if the control feels "spongy" in the clutch engaged position, repeat the above instructions for bleeding the system.

Check the level of the brake fluid in the master control housing and fill to within one to two inches of the top if necessary.

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

# TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
<p>A.</p> <p>Clutch slipping</p>	<ol style="list-style-type: none"> <li>1. If the winch or master control has recently been installed, there may be air in the clutch line.</li> <li>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.</li> <li>3. The clutch may require to be adjusted. If the clearance between the clutch drum and the clutch bands has become excessive due to wear, the master control handle will have greater than normal travel when moved for clutch engagement.</li> <li>4. The clutch bands may have become soaked by brake fluid.</li> <li>5. The clutch may have become hot from excessive slippage under heavy pulls.</li> <li>6. The clutch bands may be worn and require to be replaced.</li> </ol>	<p>See "Bleeding Hydraulic System" on page 4.</p> <p>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 <math>\frac{1}{8}</math>" N.P.T. pipe plug. If the control handle still moves when a constant load is applied, the cup (Item 14, Fig. 6) 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.</p> <p>Remove the clutch cover from the winch and adjust the clutch bands. See "Clutch Adjustment" on page 10.</p> <p>Remove the clutch bands and replace them with new parts.</p> <p>Allow the winch to cool for 10 - 15 minutes.</p> <p>Remove the clutch bands and replace them with new parts.</p>
<p>B.</p> <p>Brake will not hold a load.</p>	<ol style="list-style-type: none"> <li>1. If the winch is new, the brake may require to be "run in".</li> <li>2. The brake drum may have become over heated due to the clutch slipping under heavy loads.</li> <li>3. The brake bands may have become soaked by brake fluid.</li> <li>4. The brake bands may be worn.</li> </ol>	<p>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.</p> <p>Allow the winch to cool for 10 - 15 minutes.</p> <p>Remove the brake bands and replace them with new parts.</p> <p>Check that the brake levers (Items 15 and 16, Fig. 3) are properly engaged in the brake band ends and that they have clearance to permit them to move in the direction of engagement. If the brake bands are worn and the brake levers are free to travel in the direction of engagement, turn the spring cap over (Item 23, Fig. 2), so that the counter bore is away from the spring. This will give an increase in spring load. If the brake still does not hold a load, replace the brake bands with new parts.</p>

TROUBLE	PROBABLE CAUSE	REMEDY
<p>C.</p> <p>Clutch slipping and brake will not hold.</p>	<p>1. Water or brake fluid may have leaked into the clutch and brake compartment.</p>	<p>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.</p>
<p>D.</p> <p>Brake will not release or stay released.</p>	<p>1. The cup in the master control cylinder which is connected to the winch brake cylinder may be leaking.</p> <p>2. The cup in the winch brake cylinder may be leaking.</p>	<p>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) 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) in the winch brake cylinder and install a new cup (Item 5, Fig. 2) in this cylinder also.</p> <p>Remove the brake cylinder (Item 3, Fig. 2) 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.</p>
<p>E.</p> <p>Drum will not rotate when clutch is engaged with no load on the cable.</p>	<p>1. The tractor P.T.O. may not be engaged.</p> <p>2. The master control unit may require to be filled with fluid.</p>	<p>Check P.T.O. engagement.</p> <p>Fill with automotive brake fluid.</p>

# FOREWORD TO SERVICING

The following service instructions have been arranged to provide the best methods for assembly and disassembly of the Gearmatic Model 19 winch. 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 labour 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.

## GENERAL

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.

In the following assembly, disassembly and inspection instructions, the numbers in brackets refer to the item numbers on the exploded parts drawing illustrated in the reference page stated below the heading for each section.



# SERVICE INSTRUCTIONS

## Brake Disassembly

Ref. Fig. 1, 2 and 3

Remove the drag adjustment screw (10) and the drag spring (11) from the top of the main housing (12).

Remove the capscrews (21) and the end cap (19) Fig. 2. Remove the hydraulic tube (18) Fig. 2 from the end of the drum shaft (See Fig. 'D').

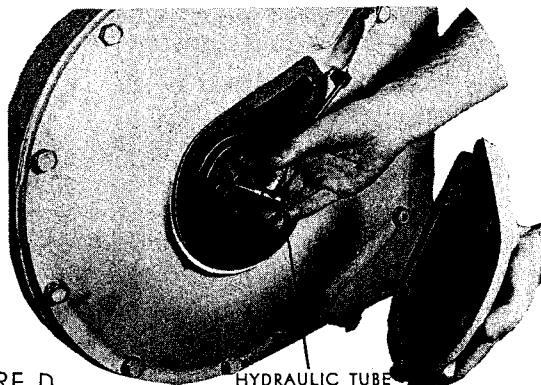


FIGURE D

HYDRAULIC TUBE

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 (20).

Remove the spring cap (23) and the spring (22) Fig. 2 will drop out. Now remove the primary brake band (17) by gripping it at the ends and slide the band off the brake levers (15 and 16) Fig. 3, using a rocking motion if necessary. The lever block assembly (18, 19, 20) and push rod (12) Fig. 3 can now be removed as one unit (See Fig. 'E'). Remove the brake anchor pin (14) and rotate the brake band clockwise until it can be removed as explained for removing the primary brake band.

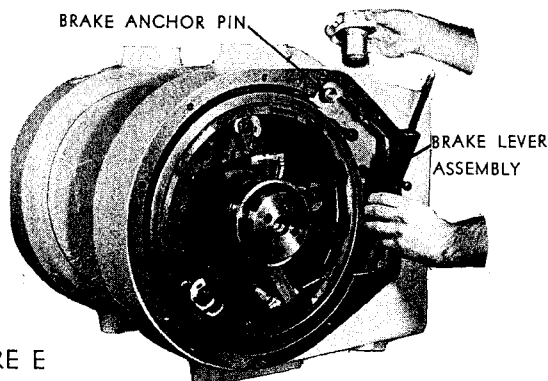


FIGURE E

The secondary brake lever (15) Fig. 3 will be removed with the secondary band. With a hammer and punch, drive the sel-lok pin (13) into the center of the brake lever (16) then remove the brake lever with the sel-lok pin from the secondary brake band. Remove the brake cylinder assembly by removing the capscrews (1) Fig. 2 (See Fig. 'E').

## Brake Cylinder Disassembly

Ref. Fig. 2

Remove the boot (9), piston (8), spring (7), primary piston (6), cup (5) and spring (4) from the brake cylinder (3). Discard the cup (5) and install a new part on reassembly. Inspect all parts for wear or damage and replace if necessary.

## Brake Cylinder Assembly

Ref. Fig. 2

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 on Fig. 2 so that the large end of spring (4) contacts the bottom of the brake cylinder (3). Spring (7) must be installed in the counter bore end of the primary piston (6) and must contact the flat end of piston (8).

## Brake Assembly

Ref. Fig. 2

To assemble the brake, proceed in the reverse order of disassembly. Install a new clutch cover gasket (17) on the clutch cover. Replace the clutch cover (20), Fig. 1, then hydraulic tube (18) and tube assembly Fig. 2. Install a new gasket (11), Fig. 2 and then replace the hydraulic tube (18) in the gland cap (20) on Fig. 4.

Secure the end cap (19), Fig. 2, in place using the capscrews (21), Fig. 2.

## Brake Adjustment

Ref. Fig. 2

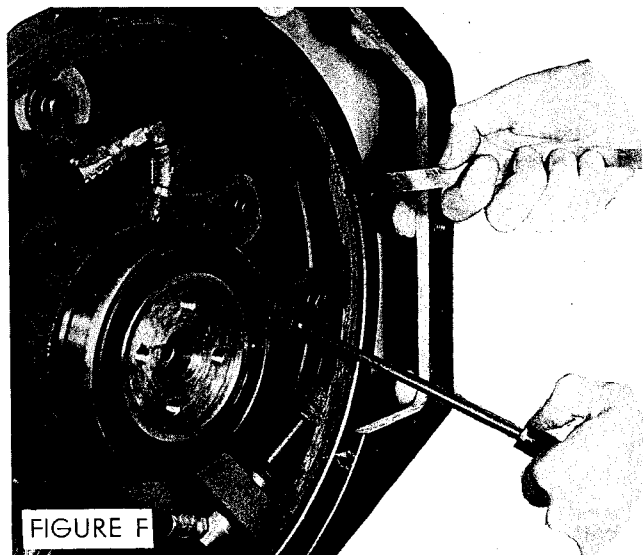
No brake adjustment is required on this winch under normal operating conditions. However, if the bands are worn to a point where more braking is required, the spring cap (23) may be turned over so that the counter bore is away from the spring to give an additional  $\frac{3}{8}$ " compression on the spring. 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 in Trouble Shooting section.

## Clutch Disassembly

Ref. Fig. 4

Remove the clutch cover (20), Fig. 1, as instructed above for "Brake Disassembly". Release the adjusting cams (9) by loosening the capscrews (11) and rotating the cams until the flat side of each cam is towards the bands (See Fig. 'F'). Release the clutch push rod (28) by depressing it into the clutch cylinder (23) and releasing it from the primary clutch band socket. The primary clutch band can now be removed.

To remove the secondary clutch band (29) it is necessary to remove the clutch hub (7). Remove the clutch hub (7) and clutch lever (22) with the secondary clutch band (29) attached as follows. Disconnect the hydraulic hose assembly at the elbow (13), then remove the fitting (14) from the drum shaft. Remove the four socket head capscrews (21) from the gland cap (20). Remove the gland cap (20) and shims (17) being



careful not to damage the seal diameter inside the bore of the drum shaft (22), Fig. 5. Using three  $\frac{1}{2}$ " N.C. capscrews as jacks in the holes provided in the clutch hub (7), remove the clutch hub from the drum shaft, (Gearmatic tool Number A13154 can be supplied for this purpose) (See Fig. 'G'). This procedure also removes the bearing (16). Now the secondary clutch band (29) and clutch lever (22) can easily be removed from the clutch hub by removing the snap ring (15) and the spring (2) and sliding the clutch lever off the clutch hub. Disconnect the hose assembly (12) from the clutch cylinder (23) and remove the clutch cylinder. Remove the pivot pin (4) and lever arm (1).

Remove and discard the 'U' seal (19) and 'O' ring (18) from the gland cap (20) and replace the 'U' seal and 'O' ring with new parts on reassembly. Inspect the bearing diameters of the hydraulic tube (18), Fig. 2, for wear. If wear is excessive, replace the hydraulic tube.

### Clutch Cylinder Disassembly

Ref. Fig. 4

Remove the push rod (28), boot (27), piston (26), cup (25) and spring (24) from the clutch cylinder (23). Discard the 'U' cup (25) and install a new part on reassembly. Inspect all parts for wear and replace if necessary.

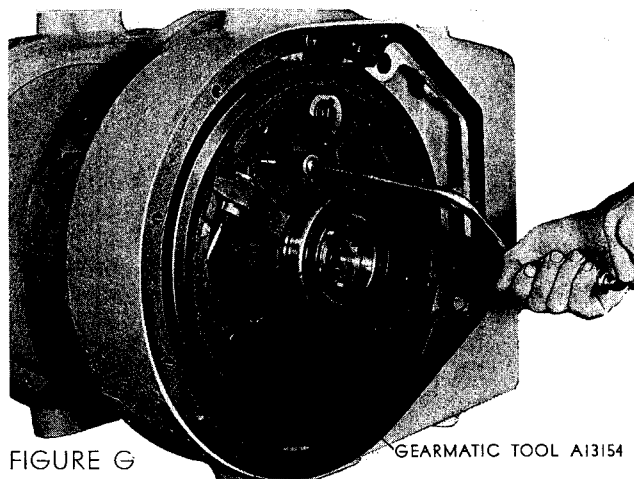


FIGURE G

### Clutch Cylinder Assembly

Ref. Fig. 4

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 on Fig. 4 so that the large end of the spring (24) contacts the bottom of the clutch cylinder (23) and the flat side of the 'U' cup (25) contacts the flat end of the piston (26).

### Clutch Assembly

Ref. Fig. 1, 2, 3 and 4

Pack the grooves in the clutch lever (22) with grease and install it on the clutch hub (7). Then install the snap ring (15). Install the lever arm (1), pivot pin (4), push rod (3) and spring (2). Install the secondary clutch band (29) and spring (2). Install the clutch hub (7) on the drum shaft (22) so that the hole in the side of the clutch hub (7) lines up with the  $\frac{1}{8}$  N.P.T. hole in the drum shaft (22). Install the bearing (16). Check that the clutch hub (7) contacts the drum bearing (9) and that the bearing (16) contacts the clutch hub (7) by installing the gland cap (21) on the end of the drum shaft and tighten capscrews (22) securely. Remove the gland cap (20) and, using a depth micrometer, measure the depth from the edge of the bearing (16) to the end of the drum shaft, (See Fig. H). Measure the length of the gland cap pilot diameter

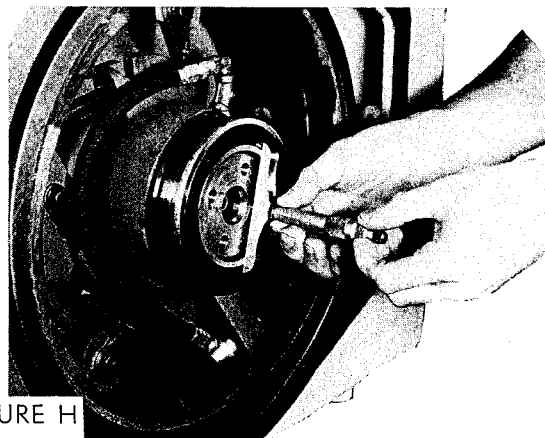


FIGURE H

with the depth micrometer (See Fig. J). Subtract this length from the depth already measured to establish the total thickness of shims (17) required. Add an additional .010" shim (17) to ensure clearance between the bearing (16) and the gland cap (20). Install a new 'U' cup (19) and O-Ring (18) in the gland cap (20). Install the shims (17) and the gland cap (20) and torque the capscrews (21) to 18 ft. lbs. Using a heavy drift on the inside of the cable drum flange, drive the cable drum (2) towards the clutch assembly. This will remove any pre-load imposed on the bearings while the shims (17) were being established. Set the adjusting cams (9) to give the required clearance between the clutch bands (29) and (30) and the drum (7) by following the instructions "To Adjust the Clutch". Install a new clutch cover gasket (17) and install the clutch cover (20), hydraulic tube (18), elbow (17), tube assembly, the end cap (19) and tighten all capscrews to the required torque.

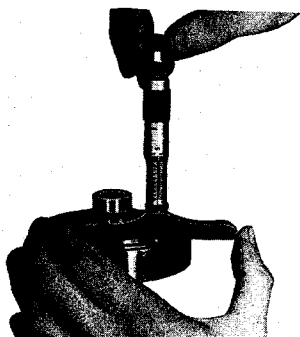


FIGURE J

## Clutch Adjustment

With the primary clutch band removed and the adjusting cams engaged in the centre 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'). Set all of the adjusting cams to give a clearance of .010" to .015" between the lining and the inside of the drum all around. Install the primary clutch band and adjust to the required clearance of .010" to .015". When the correct setting has been obtained, tighten all capscrews to 25 ft. lbs. torque. Release the brake and check that the drum rotates freely.

## Drum Disassembly

Ref. Fig. 3 and 5

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 (7) and the seal flange (4) will be removed with the cable drum (2) as an assembly. After removing this assembly from the main housing, separate the drums (2) and (7) using two 1/2 N.C. capscrews as jacks in the holes provided on the inside wall of the brake drum (7). After the drums are separated, remove and inspect the oil seal (5) and O-Ring (3) for damage or wear. Replace on reassembly.

## Drum Assembly

If the brake drum (7) has been removed from the cable drum (2), pack the oil seal (5), Fig. 3, completely full of grease in the cavity between the two oil seal lips (Fig. K). Fill the space surrounding 'O' ring (6) with grease and pack

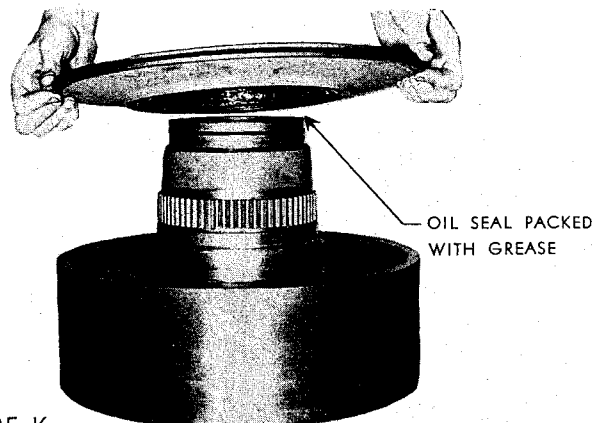


FIGURE K

grease into the bore of oil seals (15) and (16) installed at the ring gear compartment end of the winch housing (12). The grease used in the oil seals (15), (16), (5) and 'O' ring (6) should be of the water repellent type (e.g. Shell Darina Grease). Assemble the cable drum (2), seal flange (4), oil seal (5) and brake drum (7) and install this assembly in the winch as a unit.

When the cable drum (2) and brake drum (7) assembly has been installed, then install the bearing (9) on the drum shaft so that it contacts the shoulder in the brake drum bore.

## Ring Gear and Pinion Disassembly

Ref. Fig. 1 and 5

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 (3). Be careful not to damage the oil wiper (4) (See Fig. L). Remove the ball bearing (32) from the drum shaft using a suitable bearing puller (Gearmatic Tool Number C13199 can be supplied for this purpose). (See Fig. M.)

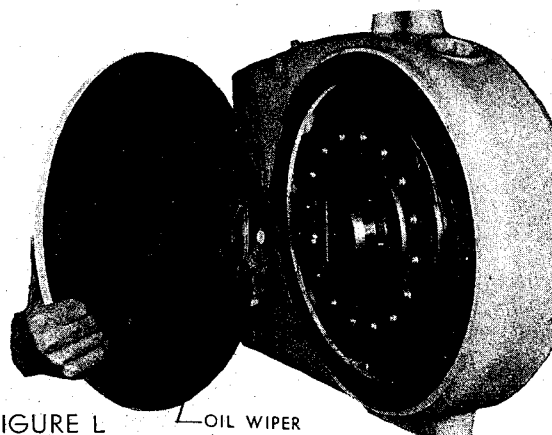


FIGURE L

OIL WIPER

Remove the lock key (7) from the drum shaft (22). Unscrew both the locknuts (26) from the drum shaft (Gearmatic Tool No. C13189 can be supplied for this purpose) (See Fig. N). Remove the adjusting pins (6) from the drum shaft flange. Remove O-ring (31) and replace with a new part on reassembly. Protecting the end of the drum shaft (22), drive the drum shaft and ring gear out of the main housing.

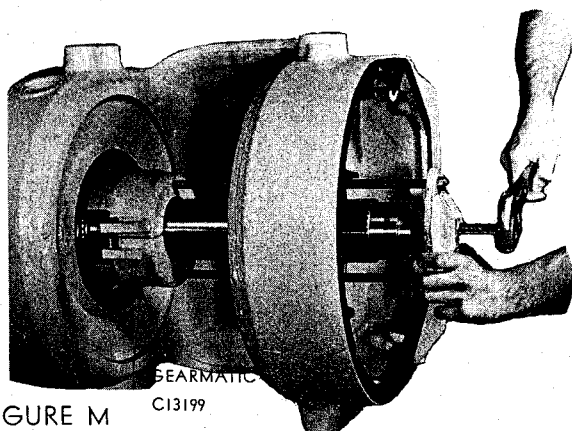


FIGURE M

Remove the cotter pin (1), nut (2), washer (3) and the pinion gear or sprocket. Next remove the capscrews (8) and, using two  $\frac{5}{8}$  N.C. capscrews as jacks in the tapped holes provided in the bearing housing (12), remove the bearing housing (12). Then shims (13). If the pinion bearings (10), (11), (16), (17) or (19) require to be replaced, remove the pinion (20) by pressing it out of the assembly. A piece of  $\frac{3}{4}$ " 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 (19) while the pinion (20) is pressed out of the assembly.

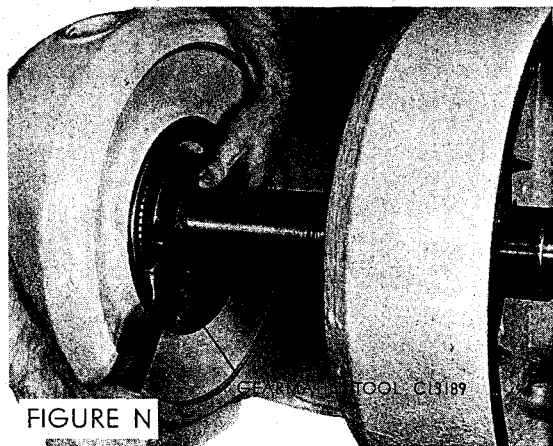
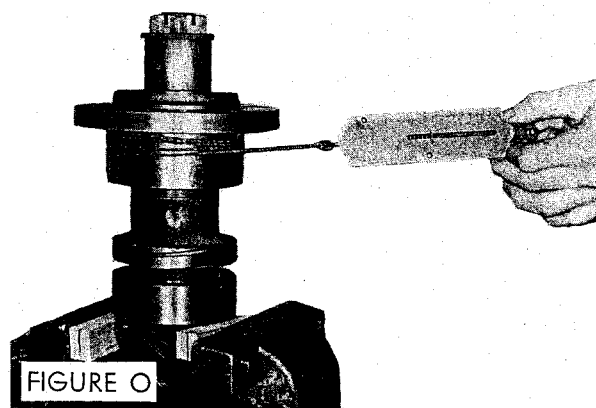


FIGURE N

### Ring Gear and Pinion Assembly Ref. Fig. 5

If the pinion bearings (10), (11), (16) and (17) are being replaced, it is necessary to re-adjust the shims (13) for the correct preload, as follows. Press the outer races of the bearings (11) and (16) in their ends of the bearing housing (12). Press the bearing (19), spacer sleeve (18) and the inner race of the bearing (17) on the pinion shaft as illustrated. Place the pinion shaft in the

bearing housing so that the outer race (16) and inner race (17) mate up. Then from the flange end of the bearing housing, install the bearing spacer (15). Place a piece of soft lead gauge wire on the end of the bearing spacer then press the inner race of the bearing (10) on the pinion shaft. Install the preload bushing (4) or sprocket or gear previously removed, washer (3) and nut (2). 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 (2) until a reading of  $6\frac{1}{2}$  to 10 pounds on the spring balance is required for continuous rotation of the bearing housing about the shaft. Remove the nut (2), washer (3), preload bushing (4) and the inner race of the bearing (10). Carefully remove the lead gauge wire and measure the compressed thickness to determine the correct number and size of the shims (14). Install the shims, then replace the inner race of the bearing (10), pinion gear or sprocket previously removed, washer (3), nut (2) and oil seal (5). Torque the nut to 100-120 ft. lbs. and check the preload using the spring balance (Fig. O). This assembly is now complete and ready for assembly in the main housing.



### Pre-load of Drum Shaft Bearings Ref. Fig. 5

If the roller bearings (28) and (29) on the drum shaft are being replaced they require to be pre-loaded to 11-20 in. lbs. torque when the adjusting nuts are tightened to 150 ft. lbs., making the bearing cones (28) grip the bearing spacer (30).

To establish the correct spacer length use a bearing spacer (30) that is approximately .025" shorter than the original bearing spacer. (Gearmatic Spacer Tool Number A13088 can be used for this purpose.) The length of each bearing spacer A19022 is marked with electric pencil on the I.D. of the spacer.

Assemble the bearings with Spacer Tool A13088 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 A 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 A 19022 required.

Bearing Spacer A 19022 is available in twelve lengths which vary by .002 increments. The faces of spacer A 19022 must be parallel within .0005.

To check the pre-load (11-20 inch lbs.), wrap a piece of string around the outside diameter of the adjusting nut 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 continuous rotation of the drum shaft (22) (See Fig. P.)

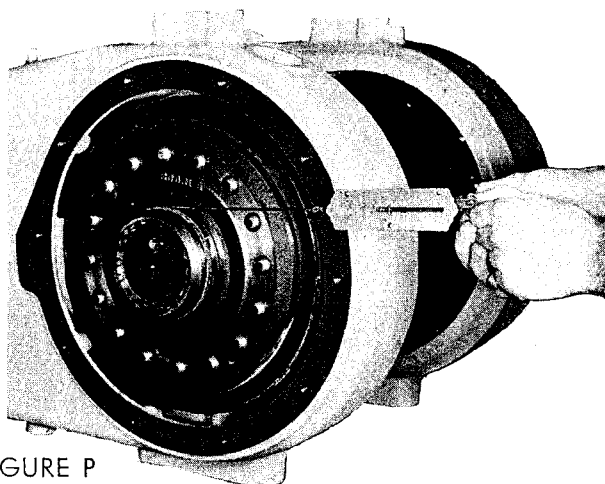


FIGURE P

**IMPORTANT:** Shims must not be used between the bearing cones (28) and the bearing spacer (30). A bearing spacer having the correct length for the required pre-load must be used.

## Ring Gear and Pinion Adjustment

Ref. Fig. Q

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 (7) and (8) or drum shaft bearing (6).

Establish the total thickness of shims (11) required under the flange of the pinion bearing housing (12), as follows. When the bevel pinion bearings have been correctly preloaded, as explained above, measure dimension 'Y' as shown on Fig. Q. 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 and dimension 'X' is marked on the back of the winch housing as indicated. Add dimensions 'Y' and 'Z' and subtract dimension 'X' from this total. The result will be the total thickness of shims (11) required.

**Total thickness of shims (11) = Y + Z - X inches.**

Install the bevel pinion assembly with shims (11) as established above and torque capscrews (9) to 120 ft. lbs.

**BACKLASH:** Adjust the position of the ring gear by adjusting nuts (4) and (14) to provide .010" to .015" backlash at the heel of the ring gear tooth. The correct backlash for each gear set is marked on the outside diameter of the ring gear with an electric pencil.

**CORRECT TOOTH CONTACT:** Remove the 1½ 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'—**'B' 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 (9), lockwashers (10) and pull the pinion housing (12) out of the main housing. Remove one .010 shim (11) from under the pinion housing flange. Replace the pinion housing (12) in the winch and secure it. Remove items (1, 2, 3 and 15) from the drum shaft (5). Turn item (4) clockwise one serration. Now turn item (14) counter clockwise one serration. In some cases it may be necessary to turn items (4) and (14) two serrations to obtain the correct marking and required backlash of .010 to .015. When adjustments have been made, tighten nuts (4) and (14) securely and replace items (1), (2), (3) and (15). Note that two keyways are provided in the drum shaft for the key (7) (Fig. 5) in case it is necessary to turn the lock nuts through half a serration.

**CONDITION 'C'—**'C' 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 (9), lockwashers (10) and pull the pinion housing (12) out of the main housing as outlined.

Add one .010" shim (11) under the pinion housing flange. Replace the pinion housing in the winch and secure it. Remove items (1), (2), (3) and (15) from the drum shaft (5). Turn item (4) counter clockwise one serration. Now turn item (14) one serration in a clockwise direction. In some cases it may be necessary to turn the adjusting nut two serrations to obtain the correct marking and required backlash of .010" to .015". When adjustments have been made, tighten nuts (4) and (14) securely and replace (1), (2), (3) and (15). Note that two keyways are provided in the drum shaft for the key (7) (Fig. 5) in case it is necessary to turn the lock nuts through half a serration.

**CONDITION 'D'—**This can be corrected by following the procedure stated under condition 'C'.

**CONDITION 'E'—**This can be corrected by following the procedure stated under condition 'B'.

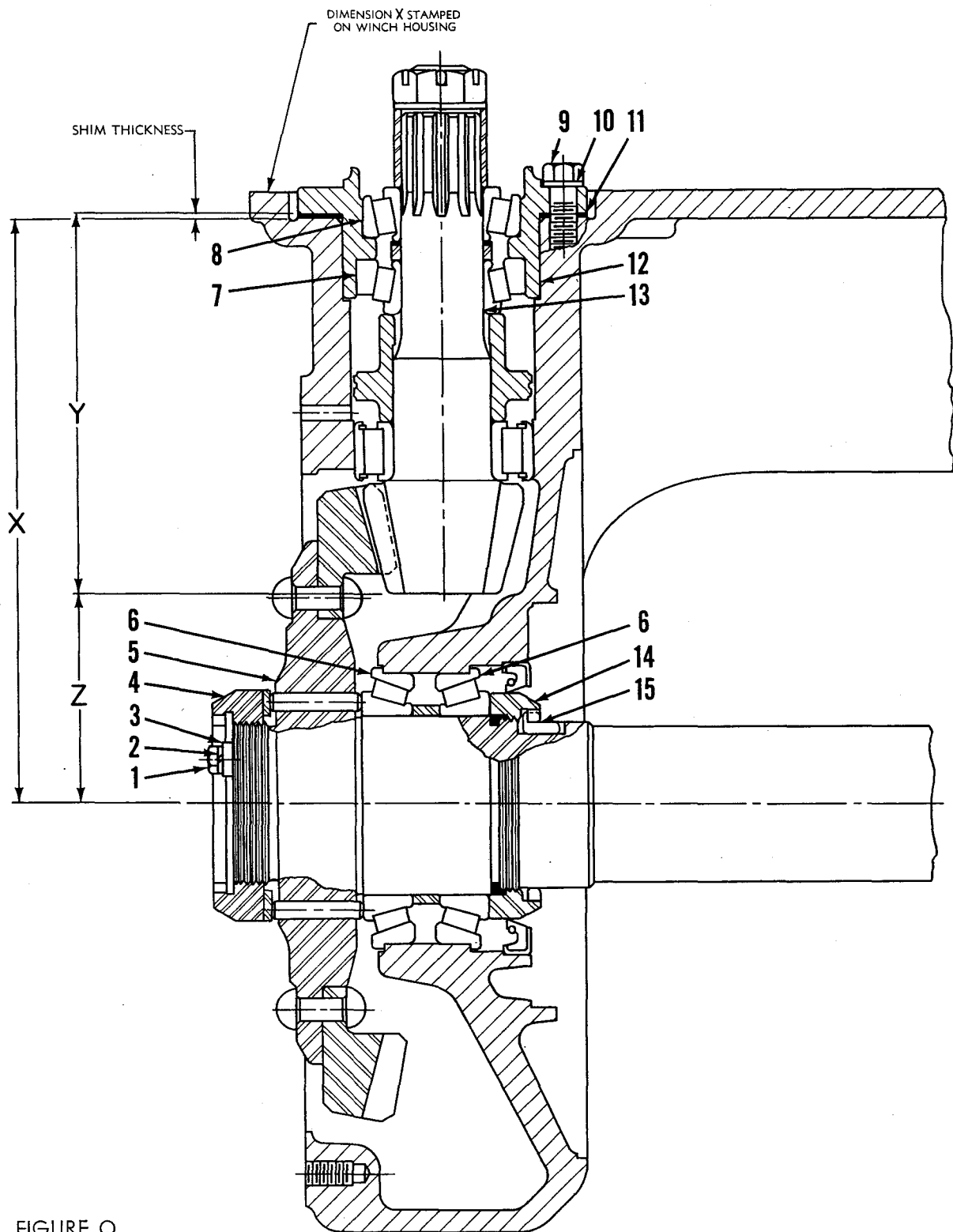
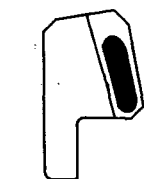


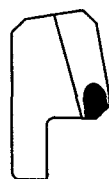
FIGURE Q



CONDITION A



CONDITION B



CONDITION C



CONDITION D



CONDITION E

# MASTER CONTROL SERVICE INSTRUCTIONS

## Master Control Disassembly

Ref. Fig. 6

Remove the master control assembly from the tractor, then remove the handle by loosening the nut (23) and capscrew (24) in the handle boss. Remove the cover (4) by removing the capscrews (3) and empty the housing (9) of brake fluid. Slacken the socket head capscrew (10) in the rocker arm (6) and pull the shaft (25) out of the housing (9). The rocker arm assembly can now be removed from the housing (9). Press the push rod pins (7) out of the rocker arm (6) and remove the push rods (8) and (11). Remove capscrews (3) and remove the cylinder assemblies from the housing.

## Cylinder Disassembly

Press the piston (13) into the cylinder (18) and remove the lock ring (12). The piston (13), cup (14), spring (15) and foot valve assembly (16) and (17) 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 (14) and replace with a new part. Check the rubber valve in the foot valve assembly (16) and the rubber washer (17). If the rubber is swollen, replace the foot valve assembly. Lubricate all parts lightly with brake fluid. Place the rubber washer (17) in the bottom of the cylinder (18).

Press the domed end of the foot valve (16) into the large end of the spring (15) and install the spring (15) in the cylinder so that the foot valve (16) contacts the rubber washer (17). Place the cup (14), open end down, on the spring (15) and place the piston (13) with its flat end against the cup (14). Press this assembly into the cylinder (19) until the lock ring (12) can be installed. Install the lock ring (12) 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 (8) and (11) in the rocker arm (6) using pins (7) so that the short push rod (8) is on the same side of the rocker arm (6) as the capscrew (10). Make sure the push rods (8) and (11) move freely on the pins (7). Place the rocker arm assembly in the housing (9) so that the short push rod (8) is in the brake end of the housing (9) (marked on the outside of the housing).

Install the 'O' ring (26) in its groove on the shaft (25). Insert the shaft (25) through the housing (9) and into the rocker arm (6) then tighten the capscrew (10) in the rocker arm. Install the handle (22) on the shaft (25) with the counter bore towards the housing and tighten the capscrew (24) in the boss of the handle. Install new gaskets (19) on the cylinders. Replace the cylinder assemblies making sure the bleed holes are on top. Fasten the cover (4) and new gasket (5) in place and fill the housing with standard brake fluid.

## TORQUE LOADING FOR FASTENERS

Part No.	Torque Load Ft. Lbs.
N10	24
S121	10
S122	12
S124	10
L163	18
S165H	25
S183	25
L186	25
S188	18
S206	35
S245H	55
S324H	120
S365H	200
S813	10
A11029	35
A19010	100-120
A19012	150

# PARTS SECTION

RING GEAR AND  
PINION ASSEMBLY

Figure 5

HOUSING  
ASSEMBLY

Figure 1

CLUTCH  
ASSEMBLY

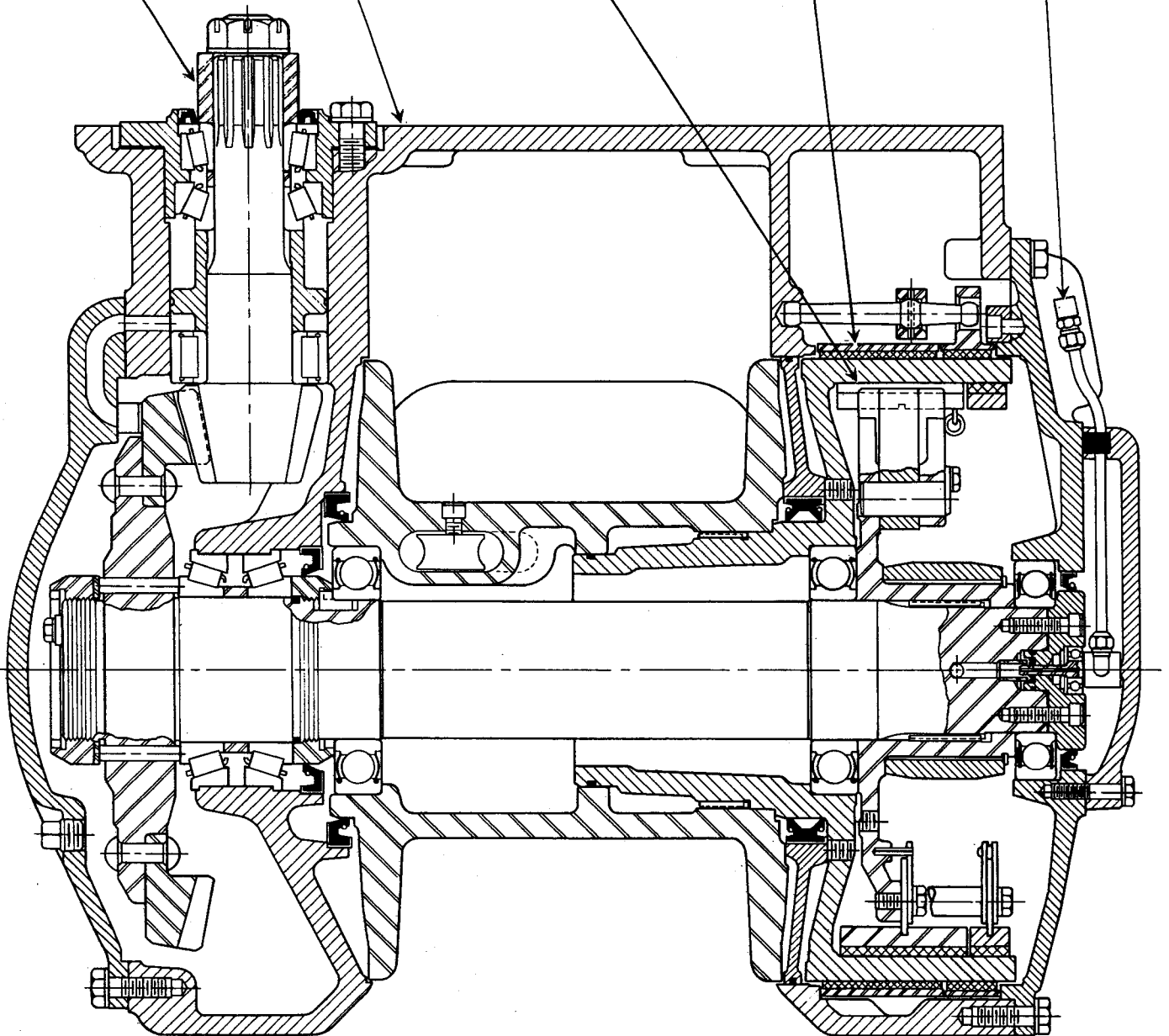
Figure 4

CABLE DRUM AND  
BRAKE BANDS

Figure 3

BRAKE CYLINDER  
AND HYDRAULIC TUBE

Figure 2



MASTER CONTROL  
UNIT

Figure 6

FAIRLEAD  
ASSEMBLY

Figure 7

ADAPTER  
ASSEMBLY

Figure 8

CONTROL  
GROUP

Figure 9



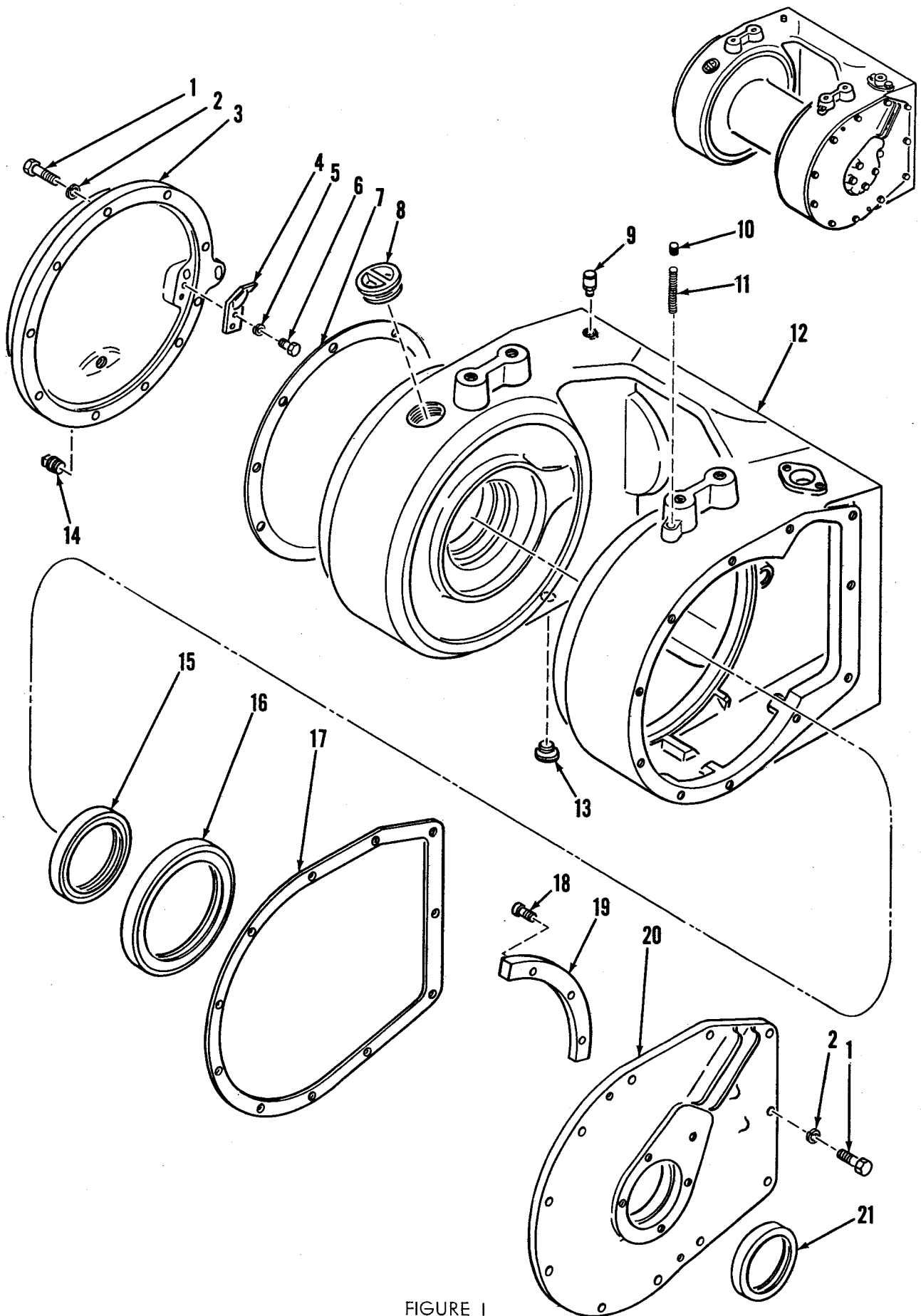


FIGURE 1

# HOUSING ASSEMBLY

## Part of Assembly No. E 19001X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	S 245H	Capscrew ( $\frac{1}{2}$ N.C. x $1\frac{1}{2}$ Hex. Hd.)	21	0	1.7
2	W 12	Lockwasher ( $\frac{1}{2}$ )	21	—	
3	C 19008	Gear Cover	1	33	0
4	A 19033	Oil Wiper	1	0	0.7
5	W 9	Lockwasher ( $\frac{5}{16}$ )	2	—	
6	S 122	Capscrew ( $\frac{5}{16}$ N.C. x $\frac{5}{8}$ Hex. Hd.)	2	—	
7	B 19010	Gasket	1	—	
8	F 10	Barrel Plug	1	0	3
9	M 84	Vent	1	0	0.5
10	T 27	Set Screw	1	0	0.5
11	A 9535	Spring	1	—	
12	E 19000	Housing	1	350	0
13	F 5	Barrel Plug	1	0	1
14	F 60	Pipe Plug	1	0	1.5
15	U 177	Oil Seal	1	0	12
16	U 185	Oil Seal	1	1	1
17	C 19009	Gasket	1	—	
18	L 163	Capscrew ( $\frac{3}{8}$ N.C. & $\frac{3}{4}$ Sock. Hd.)	3	0	0.7
19	B 19014	Guide Ring	1	1	2
20	C 19003	Clutch Cover	1	50	0
21	U 169	Oil Seal	1	0	4.5

Winches Serial Number 19-1065 and down use parts as listed above.

Winches Serial Number 19-1066 and up use parts as listed above except Item 8 changes to F8.

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

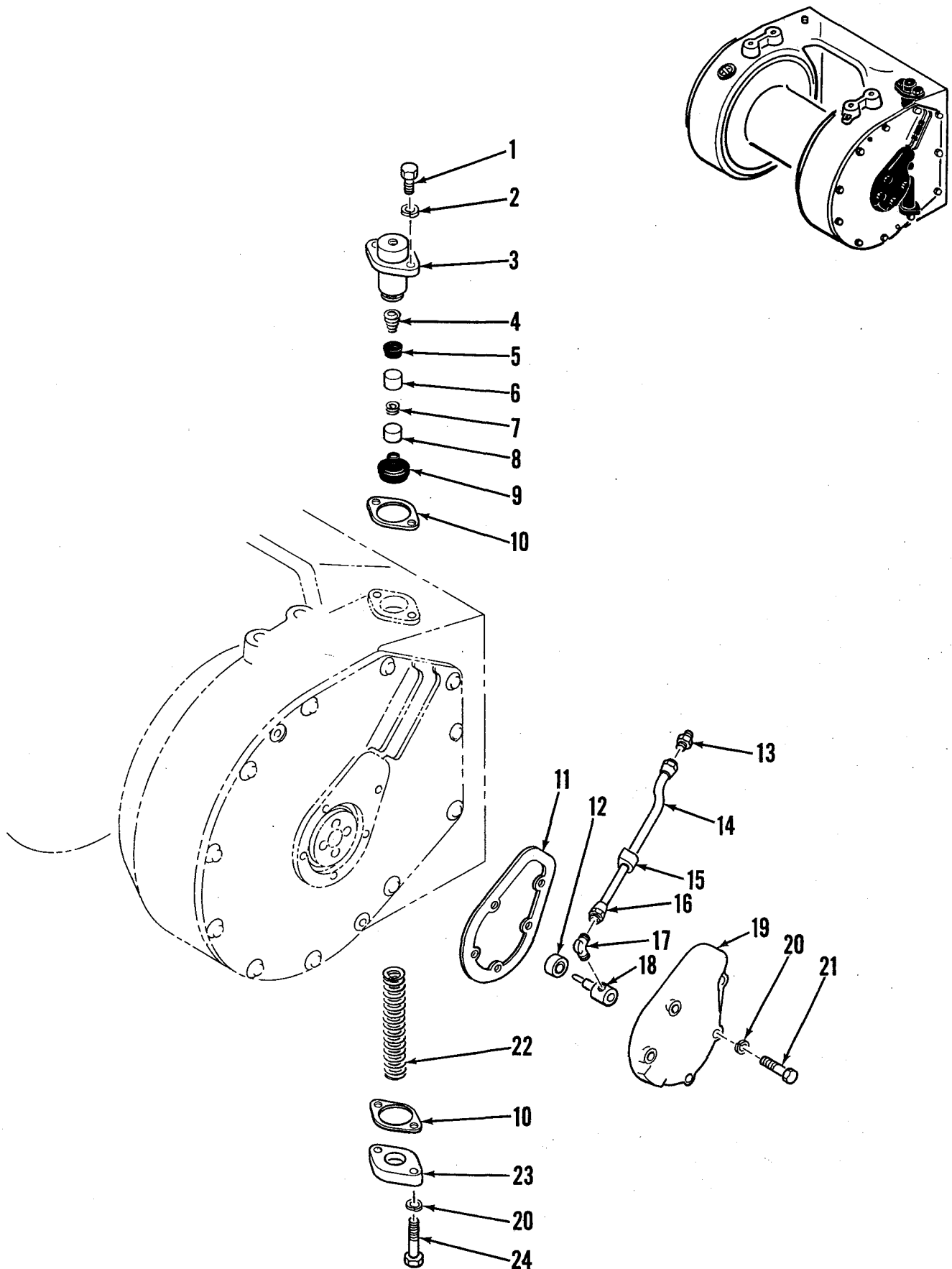


FIGURE 2

# BRAKE CYLINDER AND HYDRAULIC TUBE

## Part of Assembly No. E 19001X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	S 165	Capscrew ( $\frac{3}{8}$ N.C. x 1 Hex. Hd.)	2	0	0.7
2	W 10	Lockwasher ( $\frac{3}{8}$ )	2	—	
Sub Assy	A 839BX	Brake Cylinder Ass'y (Consists of Items 3 to 9)	1	0	15.2
3	A 839B	Brake Cylinder	1	0	11.5
4	A 857A	Spring	1	—	
5	M 290	'U' Cup	1	—	
6	A 8043	Piston	1	0	0.5
7	A 8044	Spring	1	—	
8	M 291	Piston	1	0	0.5
9	M 294	Boot	1	—	
10	A 9526	Gasket	2	—	
11	B 19007	Gasket	1	—	
12	H 1	Bearing	1	0	1.2
13	F 632	Adapter	1	0	0.5
Sub Ass'y	A 19037X	Tube Ass'y (Consists of Items 14, 15 and 16)	1	0	2.5
14	F 510	Copper Tubing	1	0	0.7
15	A 9518	Gromet	1	—	
16	F 633	Nut	2	—	
17	F 168	Elbow	1	0	1
18	A 19018	Hydraulic Tube	1	0	2.7
19	C 19007	End Cap	1	8	0
20	W 11	Lockwasher (7/16)	7	—	
21	S 206	Capscrew (7/16 N.C. x $1\frac{3}{4}$ Hex. Hd.)	5	0	1.5
22	A 9519	Brake Spring	1	0	11
23	A 9517	Spring Cap	1	0	11
24	A 11029	Capscrew	2	0	1.5

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

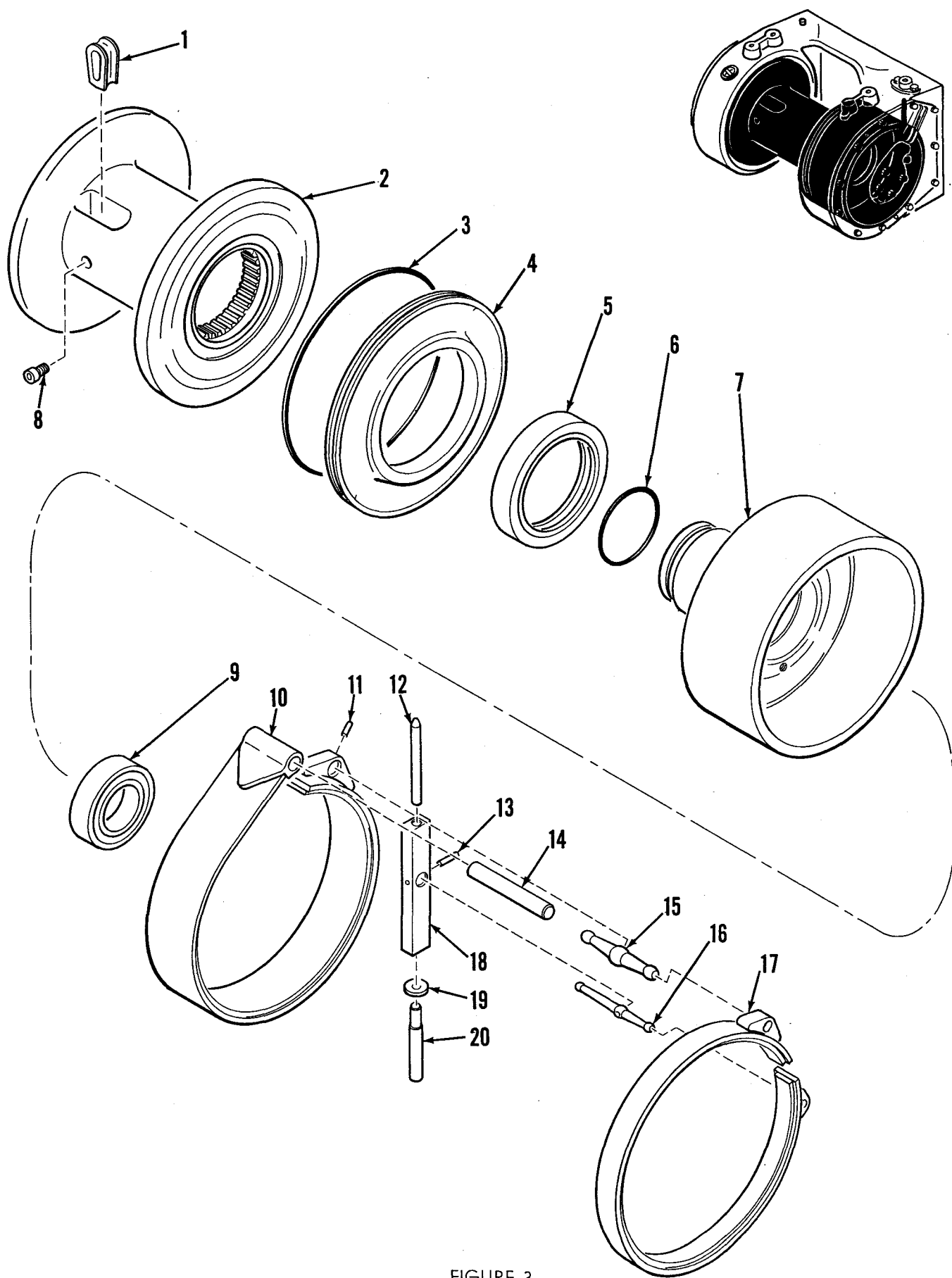


FIGURE 3

# DRUM AND BRAKE BAND

## Part of Assembly No. E 19001X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	A 22014	Hondu	1	0	7.7
2	C 19006	Cable Drum	1	125	0
3	G 281	'O' Ring	1	—	
4	B 19002	Oil Seal Housing	1	15	2
5	U 184	Oil Seal	1	0	13
6	G 255	'O' Ring	1	—	
7	C 19005	Brake Drum	1	83	0
8	L 163	Capscrew ( $\frac{3}{8}$ N.C. x $\frac{3}{4}$ Sock. Hd.)	1	0	0.7
9	H 120	Bearing	1	4	13
10	C 19001X	Secondary Brake Band	1	12	8
11	P 227	Sel-lok Pin	1	—	
12	A 9515	Push Rod	1	0	5
13	P 225	Sel-lok Pin	1	—	
14	A 19027	Anchor Pin	1	1	2
15	A 19017	Brake Lever	1	0	11.5
16	A 19003	Brake Lever	1	0	5.2
17	C 19000X	Primary Brake Band	1	4	8
Sub Ass'y	A 19019X	Lever Block Ass'y (Consists of Items 18, 19 and 20)	1	2	12
18	A 19019	Lever Block	1	1	15
19	W 65	Flat Washer ( $\frac{1}{2}$ )	1	0	0.5
20	A 9516	Guide Rod	1	0	8.2

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

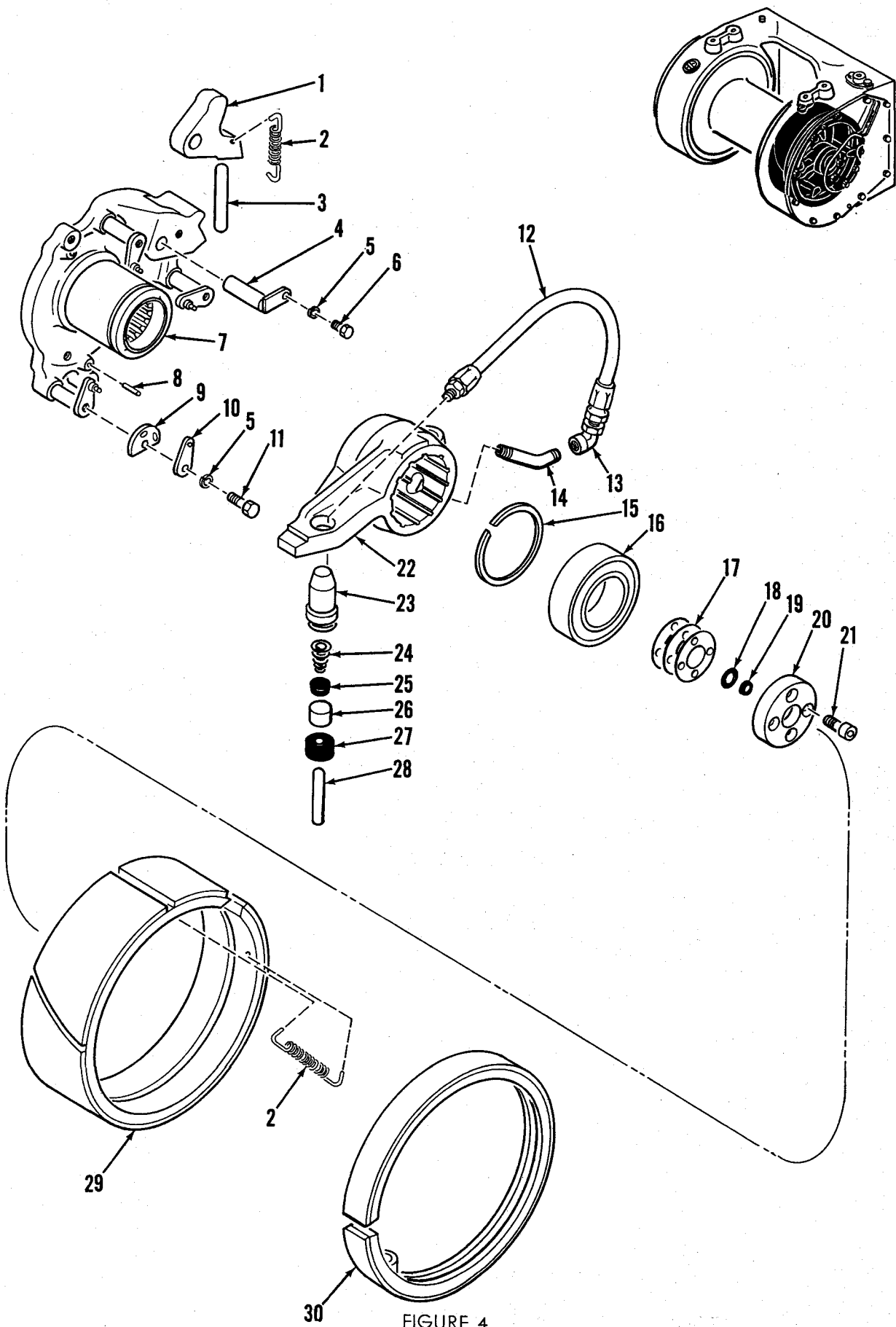


FIGURE 4

# CLUTCH ASSEMBLY

Part of Assembly No. E 19001X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	A 19004	Lever Arm	1	1	8
2	A 19036	Spring	2	0	0.7
3	A 19016	Push Rod	1	0	3
4	A 19005	Pivot Pin	1	0	6.5
5	W 10	Lockwasher ( $\frac{3}{8}$ )	7	—	
6	S 183	Capscrew ( $\frac{3}{8}$ N.F. x $\frac{3}{4}$ Hex. Hd.)	1	0	0.7
7	D 19000	Clutch Hub	1	20	8
8	P 228	Sel-lok Pin	3	—	
9	A 9503	Adjusting Cam	6	0	1.2
10	A 9504	Lock Plate	6	0	1
11	S 165	Capscrew ( $\frac{3}{8}$ N.C. x 1 Hex. Hd.)	6	0	0.7
12	X 17	Hose Assembly	1	0	5.5
13	F170	Elbow	1	0	1
14	A9539	Hydraulic Fitting	1	0	0.7
15	R 90	Snap Ring	1	0	1
16	H 112	Bearing	1	3	4
17	A 19024	Shim Set	1	—	
18	G 117	'O' Ring	1	—	
19	U 250	'U' Seal	1	—	
20	A 19006	Gland Cap	1	2	9
21	L 186	Capscrew ( $\frac{3}{8}$ N.F. x $1\frac{1}{4}$ Sock. Hd.)	4	0	0.7
Sub Ass'y	A 825AX	Clutch Cylinder Assembly (Includes Items 22 to 27)	1	0	8
22	C 19004	Clutch Lever	1	9	8
23	A 825A	Cylinder	1	0	6.7
24	A 857A	Spring	1	—	
25	M 293	'U' Cup	1	—	
26	M 292	Piston	1	—	
27	M 295	Boot	1	—	
28	A 19025	Push Rod	1	0	1.5
29	B 19001	Secondary Clutch Band	1	17	8
30	B 19000	Primary Clutch Band	1	6	0

Winches Serial Number 19-1255 and up use Items 13 and 14 as listed above.

Winches Serial Number 19-1254 and down use F153 Elbow and F216 Nipple in place of A9539 and F168 in place of F170.

If F153 Elbow and F216 Nipple are replaced by A9539, F168 must also be replaced by F170.

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



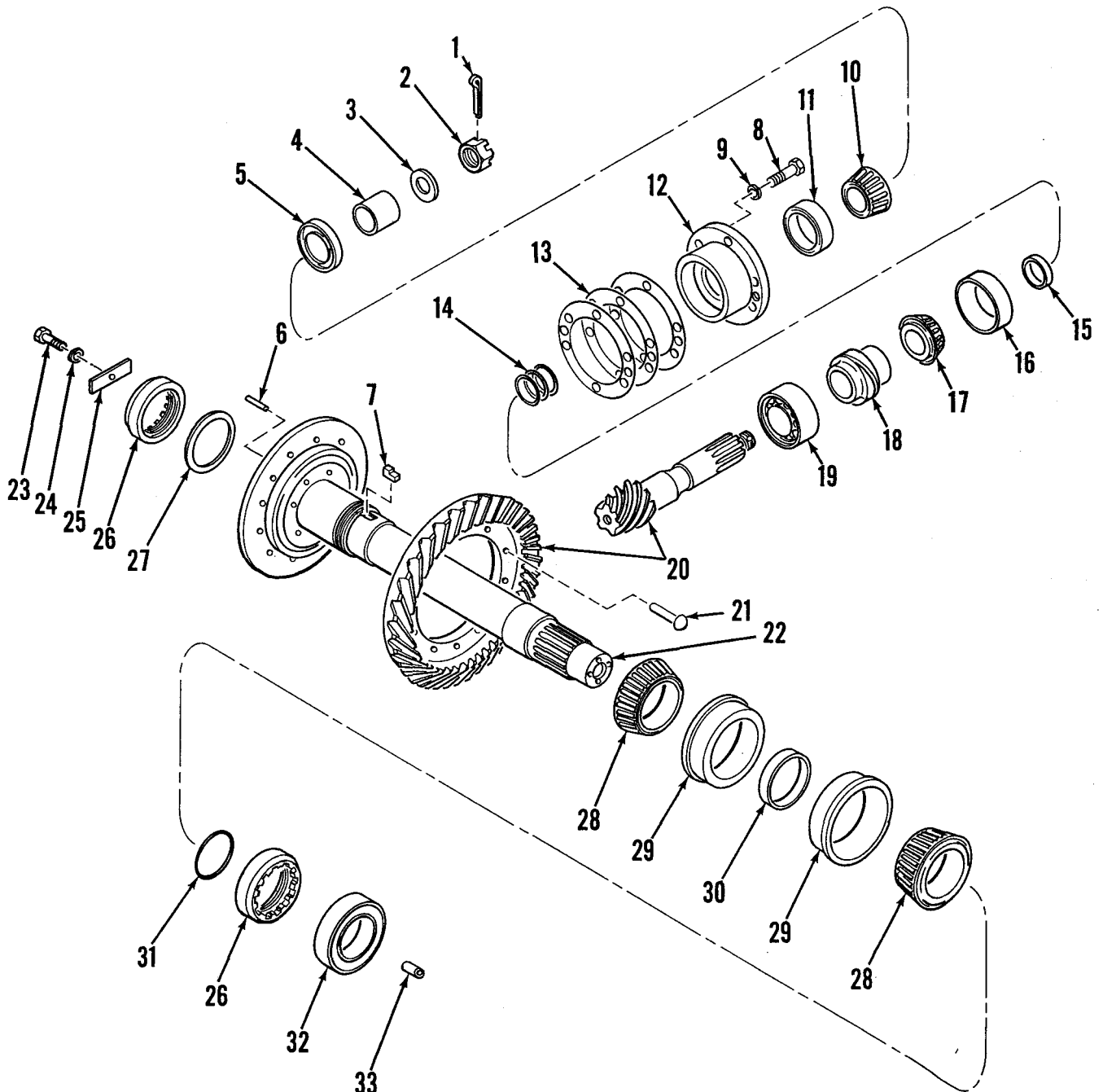
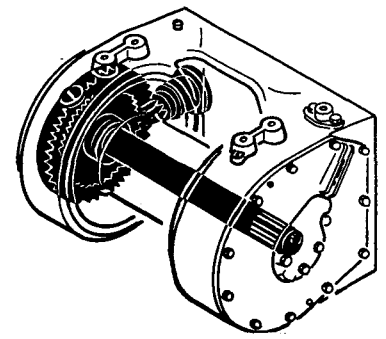


FIGURE 5

# RING GEAR, PINION AND SHAFT

## Part of Assembly No. E 19001X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	P 425	Cotter Pin	1	—	
2	A 19010	Nut	1	0	4.7
3	A 19026	Washer	1	0	1
* 4	A 19011	Bushing (Shipping Only)	1	1	9
5	U 141	Oil Seal	1	0	2.2
6	A 19014	Pin	6	0	1
7	A 19009	Lock Key	1	—	
8	S 324H	Capscrew ( $\frac{5}{8}$ N.C. x $1\frac{3}{4}$ Hex. Hd.)	6	0	3.2
9	W 14	Lockwasher ( $\frac{5}{8}$ )	6	0	0.7
Sub Ass'y	B 19011X	Bearing Housing Assembly (Consists of items 10 to 17)	1	8	14
10	H 335B	Timken Cone	1	1	0
11	H 335A	Timken Cup	1	0	11
12	B 19004X	Bearing Housing (Includes items 11 and 16)	1	6	12
13	A 19015	Shim Set	1	—	
14	A 19021	Shim Set	1	—	
15	A 19020	Bearing Spacer	1	0	2
16	H 336A	Timken Cup	1	0	13
17	H 336B	Timken Cone	1	1	5
18	A 19013	Spacer Sleeve	1	2	9
19	H 337	Bearing	1	2	8
Sub Ass'y	C 19011X	Gear Pinion and Shaft Assembly (Includes items 20, 21 and 22)	1	106	0
20	C 19010X	Ring Gear and Pinion Assembly (Matched set includes item 21)	1	127	12
21	V 45	Rivet	16	0	1
22	C 19002X	Drum Shaft (Includes item 33)	1	95	8
23	S 183	Capscrew ( $\frac{3}{8}$ N.F. x $\frac{3}{4}$ Hex. Hd.)	1	0	0.7
24	W 10	Lockwasher ( $\frac{3}{8}$ )	1	—	
25	A 19007	Lock Plate	1	0	1.7
26	A 19012	Locknut	2	1	10
27	A 19008	Thrust Spacer	1	0	3.5
28	H 365B	Timken Cone	2	2	11
29	H 365A	Timken Cup	2	1	11
30	A 19022	Bearing Spacer	1	0	9.7
31	G 237	'O' Ring	1	—	
32	H 120	Bearing	1	4	13
33	A 9506	Cup Retainer (Part of item 22)	1	—	

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

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

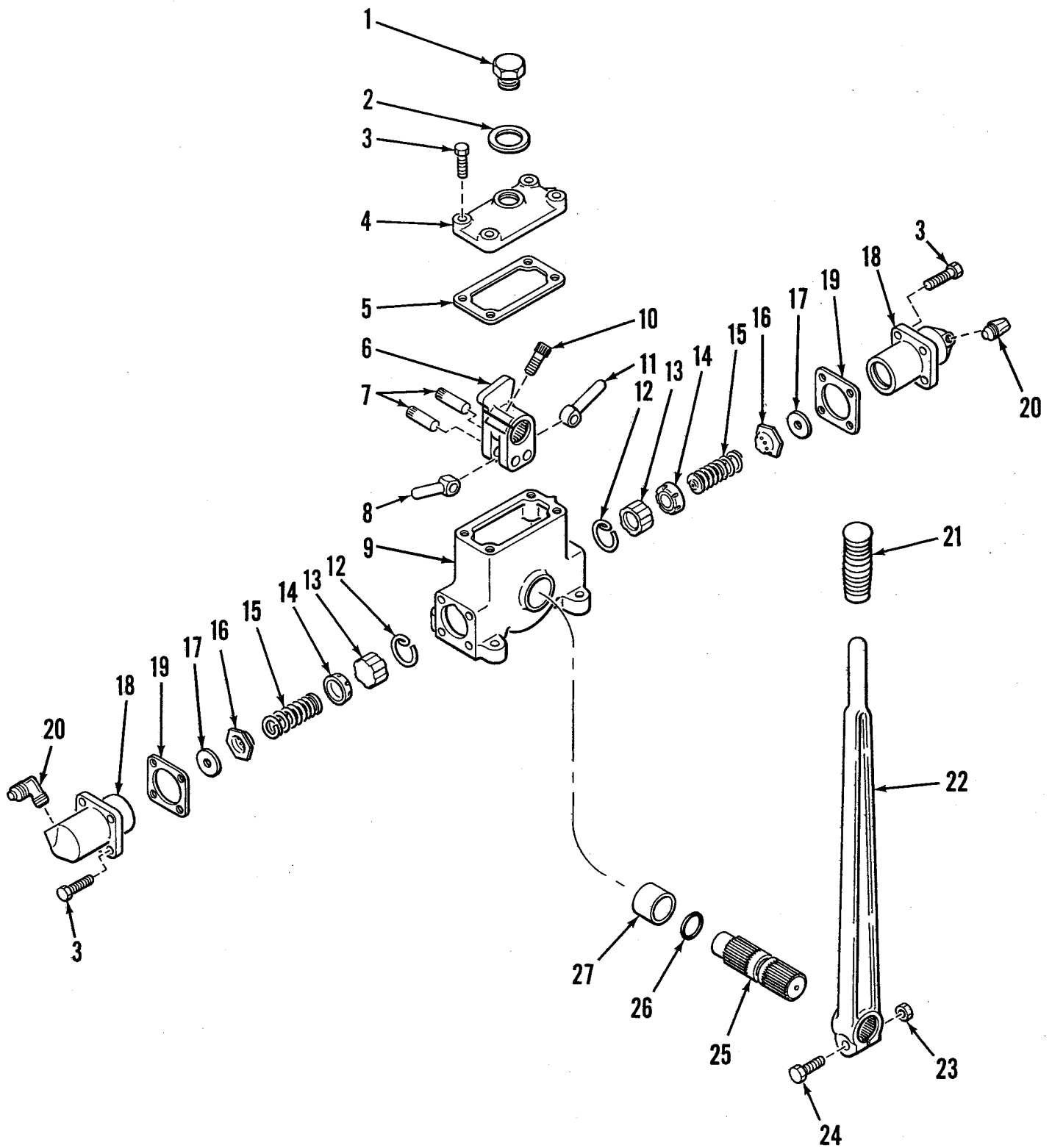


FIGURE 6

# MASTER CONTROL UNIT

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
Assembly	X 710B	Master Control Assembly	1	7	8
1	A 797	Filler Cap	1	0	2
2	W 166	Washer	1	—	
3	S 124	Capscrew (5/16 N.C. x 7/8 Hex. Hd.)	12	—	
4	A 771	Cover	1	0	5
5	A 794	Gasket	1	—	
6	A 769	Rocker Arm	1	0	5
7	A 785	Push Rod Pin	2	0	0.5
8	A 854B	Short Push Rod	1	0	1
9	C 709	Housing	1	1	14
10	S 813	Capscrew	1	0	0.5
11	A 774	Long Push Rod	1	0	1.5
Sub Ass'y	B 765X	Cylinder Assembly (Includes items 12 to 18)	2	0	11.5
12	A 784	Lock Ring	2	—	
13	A 830A	Piston	2	0	0.5
14	M 297	Cup	2	—	
15	M 298	Spring	2	—	
16	M 296	Valve Assembly (Includes items 17)	2	—	
17	W 196	Washer (Part of item 16)	2	—	
18	A 770	Cylinder	2	0	8.5
19	A 793	Gasket	2	—	
20	F 168	Elbow	2	0	0.7
21	A 798	Hand Grip	1	0	1.5
22	B 716	Control Handle	1	1	0
23	N 10	Nut (3/8 N.F.)	1	—	
24	S 188	Capscrew (3/8 N.F. x 1 3/4 Hex. Hd.)	1	1	1
25	A 772	Shaft	1	0	14
26	G 210	'O' Ring	1	—	
27	A 855A	Bushing	1	0	1.5

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

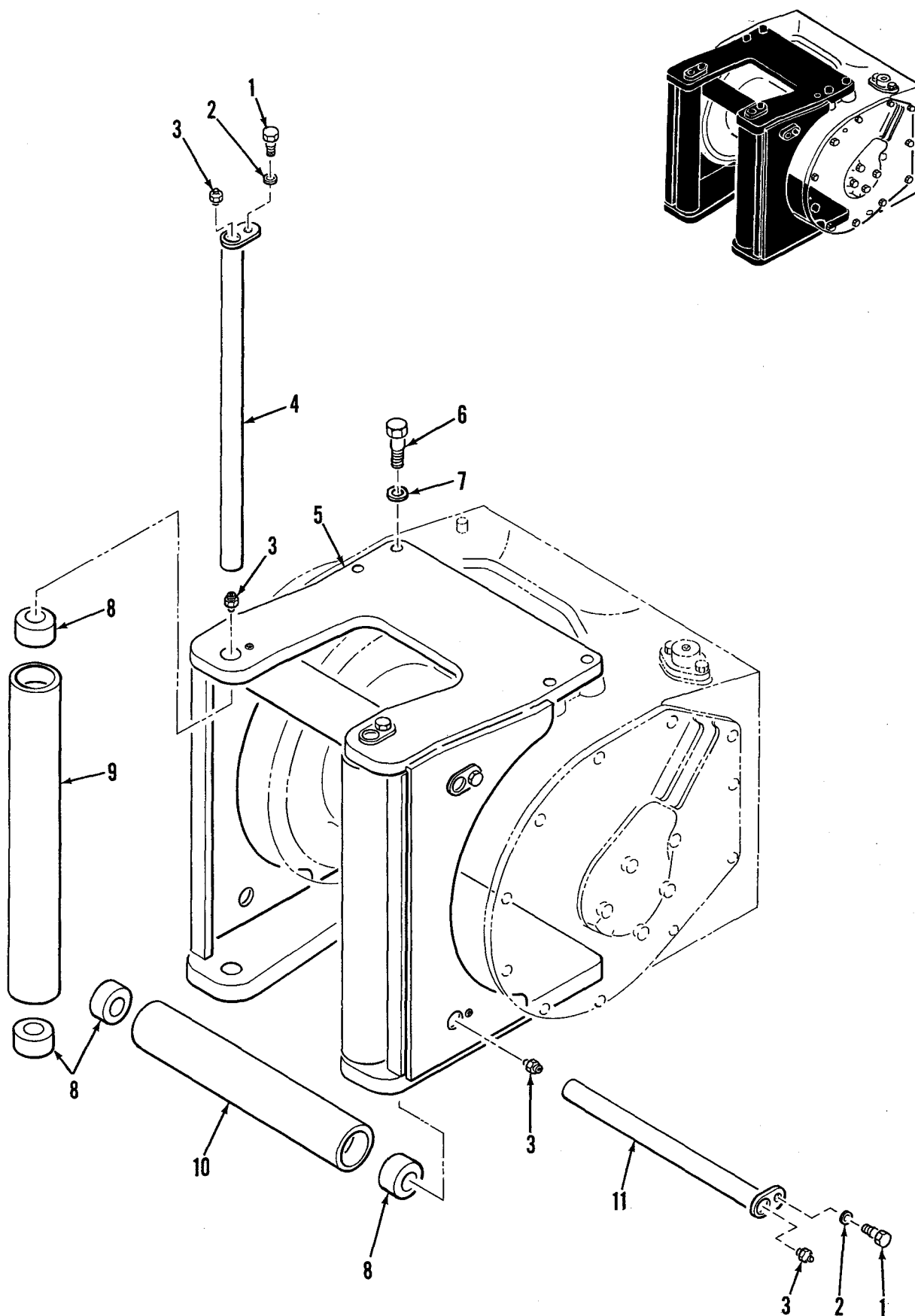


FIGURE 7

# FAIRLEAD ASSEMBLY FOR CRAWLER TRACTOR

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
Assembly	D 19004X-4	4-Roller Fairlead Assembly	1	200	0
1	S 121	Capscrew (5/16 N.C. x 1/2 Hex. Hd.)	4	—	
2	W 9	Lockwasher (5/16)	4	—	
3	M 5	Grease Fitting	8	—	
4	A 22058X	Long Roller Shaft	2	10	0
5	D 19003X	Fairlead Body	1	106	0
6	S 365H	Capscrew (3/4 N.C. x 1 3/4 Hex.)	10	0	5.5
7	W 16	Lockwasher (3/4)	10	—	
Sub Ass'y	A 22055X	Long Roller Assembly (Consists of items 8 and 9)	2	22	14
8	A 22052	Bushing	8	1	6
9	A 22055	Long Roller	2	20	2
Sub Ass'y	A 19030X	Short Roller Assembly (Consists of items 8 and 10)	2	14	6
10	A 19030	Short Roller	2	11	10
11	A 19031X	Short Roller Shaft	2	6	0
Sub Ass'y	A 19039X	Short Roller and Shaft Assembly (Consists of 1 of item 1, 1 of item 2, 2 of item 3, 2 of item 8, 1 of item 10, 1 of item 11)	2	20	8
Sub Ass'y	A 19040X	Long Roller and Shaft Assembly (Consists of 1 of item 1, 1 of item 2, 2 of item 3, 1 of item 4, 2 of item 8, 1 of item 9)	2	32	14

(For 3 Roller Fairlead Assembly use parts as listed above under 4 Roller Fairlead Assembly and omit 1 of A 19039X and change the assembly number to D 19004X-3.)

## INSTALLATION INSTRUCTIONS

The Gearmatic Model 19 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.

After installation of the fairlead assembly,

grease the roller assemblies daily. Note that the vertical roller assemblies have a grease fitting on top and bottom of the roller shaft and the horizontal roller assemblies have grease fittings on each end of the roller shaft.

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

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

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