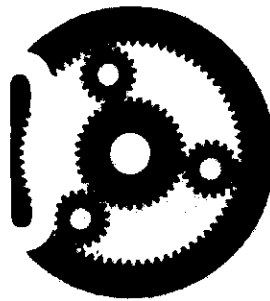


SURREY, B.C., CANADA

MODEL 9 INSTRUCTION AND PARTS MANUAL

CO. LTD.



7400-132nd STREET

No. J-152C



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WARRANTY

The products manufactured by Gearmatic Co. Ltd. are warranted to be free from defects in workmanship or materials for a period of 6 months 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 liable for any undertaking or representation other than stated herein.

The above is a brief summary of the Gearmatic Warranty Policy. A complete warranty policy statement may be secured from the factory upon request.

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.

Index of contents:

	Page
DESCRIPTION	3
 OPERATING INSTRUCTIONS	
Operation	4
Lubrication	4
Bleeding Hydraulic System	4
Trouble Shooting	5
 SPECIAL SERVICE PARTS	
	7
 SERVICE INSTRUCTIONS	
Brake Disassembly and Assembly	9
Brake Adjustment	9
Clutch Disassembly and Assembly	9-10
Clutch Adjustment	10
Drum Disassembly and Assembly	10-11
Ring Gear and Pinion Disassembly and Assembly	11
Tooth Contact	15
Torque Loading for Fasteners	14
Master Control	14
 PARTS SECTION	
Winch	15-25
Master Control	26-27
Fairlead	28-31
Preventive Maintenance	32
Index of Part Numbers	33

DESCRIPTION

The Model 9 winch is a mechanically driven winch designed to give long trouble free service. The unique features incorporated in this unit are the result of many years experience in the design and manufacture of tractor winches.

The Model 9 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 and a reinforced gear cover. 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 9 winch is manufactured with a standard main housing for the basic winch. Adapter assemblies are available for each make and model of tractor. In this way, 95% interchangeability of parts is achieved.

When the model 9 winch is mounted on the rear of a tractor the adapter housing is installed between the winch and the tractor mounting face. 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 of 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.

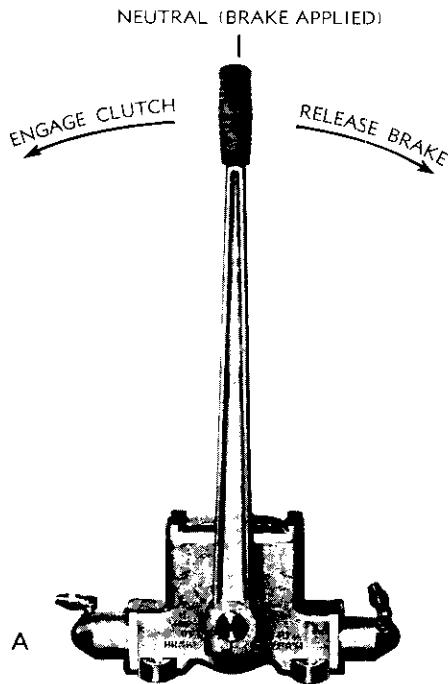


FIGURE A

Lubrication Ref. Fig. 'B'

Remove the filler plug from the top of the ring gear end of the winch. Add approximately $4\frac{1}{2}$ imperial quarts of oil through the filler hole. This should provide the required amount of oil for the ring gear compartment and the adapter assembly. This oil will pass through the winch housing into the adapter assembly.

Before running the winch check to see that oil has entered the adapter assembly. This can be done by slowly removing the drain plug from the adapter. If there is no oil in the adapter assembly, see the note below before proceeding.

When a new winch has just been installed or if the pinion shaft has been removed, run the

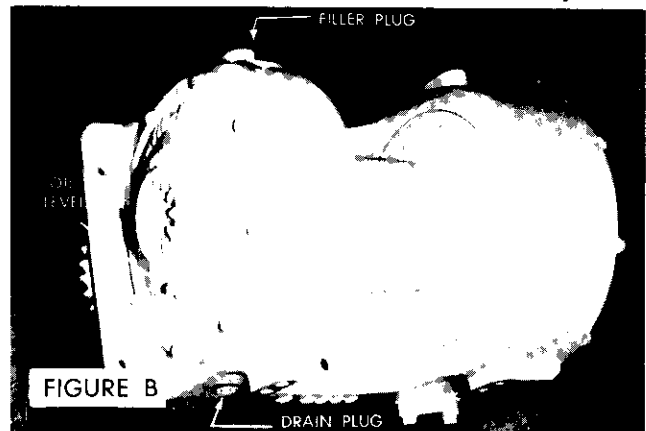
tractor engine at idle with the winch drive engaged for 10 minutes. This will ensure that oil will be fed into the pinion bearings before the pinion shaft is driven at maximum R.P.M.

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.

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

When oil has entered the adapter housing, run the winch for 15 minutes. Top up the oil level if necessary.

IMPORTANT: Check the oil level weekly.



Bleeding Hydraulic System

The X710C master control for the model 9 winch 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 as far as it will go in the brake release direction (see Fig. 'A'), slacken

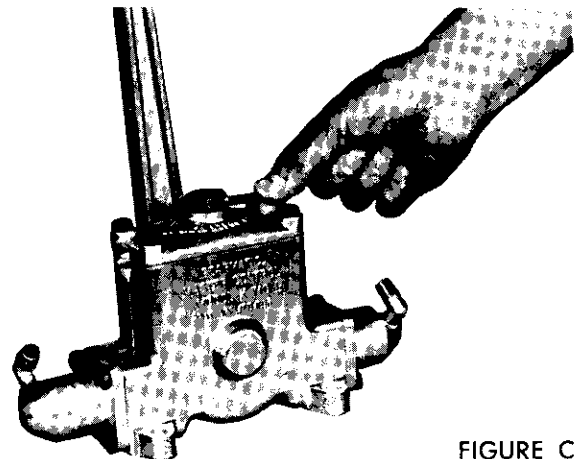


FIGURE C

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.

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 arrangement, 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. Clutch slipping.</p>	<ol style="list-style-type: none"> 1. If the winch or master control has recently been installed, there may be air in the clutch line. 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. 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. 4. The clutch bands may have become soaked by brake fluid. 5. The clutch may have become hot from excessive slippage under heavy pulls. 6. The clutch bands may be worn and require to be replaced. 	<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 $\frac{1}{8}$" N.P.T. pipe plug. If the control handle still moves when a constant load is applied, the cup (Item 14, Fig. 6) 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>

TROUBLE	PROBABLE CAUSE	REMEDY
<p>B. Brake will not hold a load.</p>	<ol style="list-style-type: none"> 1. If the winch is new, the brake may require to be "run in". 2. The brake drum may have become over heated due to the clutch slipping under heavy loads. 3. The brake bands may have become soaked by brake fluid. 4. The brake bands may be worn. 	<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 13 and 14, 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.</p>
<p>C. Clutch slipping and brake will not hold.</p>	<ol style="list-style-type: none"> 1. Water or brake fluid may have leaked into the clutch and brake compartment. 	<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. Brake will not release or stay released.</p>	<ol style="list-style-type: none"> 1. The cup in the master control cylinder which is connected to the winch brake cylinder may be leaking. 2. The cup in the winch brake cylinder may be leaking. 	<p>Remove the fittings from the end of the master control brake cylinder and install a $\frac{1}{8}$" 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 3 and 5, Fig. 2) in the winch brake cylinder and install a new cup (Item 6, Fig. 2) in this cylinder also.</p> <p>Remove the brake cylinder (Item 8, 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>

TROUBLE	PROBABLE CAUSE	REMEDY
	<ol style="list-style-type: none"> 3. The line from the master control is expanding excessively under pressure thus reducing the movement available for releasing the brake. 4. If the winch or master control has recently been installed there may be air in the brake line. 	<p>The recommended hose for this application is single wire braid hose (Stratoflex No. 225 or similar). Alternatively steel or copper tubing should be used.</p> <p>See "Bleeding Hydraulic System" on Page 4.</p>
E. Drum will not rotate when clutch is engaged with no load on the cable.	<ol style="list-style-type: none"> 1. The tractor P.T.O. may not be engaged. 2. The Master Control Unit may require to be filled with 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. 	<p>Check P.T.O. engagement.</p> <p>Fill with automotive brake fluid.</p> <p>If the gears are damaged or the rivets are sheared disassemble the winch and make the necessary repairs.</p>
F. Drum will not free spool.	<ol style="list-style-type: none"> 1. The base on which the winch is mounted may not be completely flat. 	<p>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.</p>

SPECIAL SERVICE PARTS

SERVICE KITS

Part No.	Description	Where Used
A 8055X	Field Conversion Kit	Conversion of X 710B Master Control to X 710C
A 9545X	Repair Kit	Master Control Cylinders
A 9546X	Repair Kit	Clutch Cylinder Assembly
A 9547X	Repair Kit	Brake Cylinder Assembly

MISCELLANEOUS

Part No.	Description	Where Used
M 285	Tru-Torque Oil (4 oz. bottle)	Lubricating Hydraulic Components
M 288	Spray Paint	Gearmatic Yellow, Touch Up Paint

FOREWORD TO SERVICING

The following service instructions have been arranged to provide the best methods for assembly and disassembly of the Gearmatic Model 9 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 & 3

Remove the drag adjustment screw (14) and the drag spring (15) from the top of the main housing (12). Remove the capscrews (19) and the end cap (18), Fig. 2. Remove the hydraulic tube (17), Fig. 2 from the end of the drum shaft. 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 (22) taking care not to disturb the setting of the adjusting nut (23), Fig. 1. Remove the spring cap (23) and the spring (24), Fig. 2 will drop out. Now remove the primary brake band (15) by gripping it at the ends and slide the band off the brake levers (13) and (14), Fig. 3, using a rocking motion if necessary. The lever block (16), and push rod (11), Fig. 3 can now be removed as one unit. Remove the brake anchor pin (17) and rotate the brake band clockwise until it can be removed as explained for removing the primary brake band. The secondary brake lever (13), Fig. 3 will be removed with the secondary band. With a hammer and punch, drive the pin (9) into the center of the brake lever (13) then remove the brake lever with the pin from the secondary brake band. Remove the brake cylinder assembly by removing the capscrews (10), Fig. 2.

Brake Cylinder Disassembly

Ref. Fig. 2

Remove the boot (2), piston (3), spring (4), primary piston (5), cup (6) and spring (7) from the brake cylinder (8). Discard the cup (6) 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 figure 2 so that the large end of spring (7) contacts the bottom of the brake cylinder (8). Spring (4) must be installed in the counter bore end of the primary piston (5) and must contact the flat end of piston (3).

Brake Assembly

Ref. Fig. 2

To assemble the brake, proceed in the reverse order of disassembly. Install a new clutch cover gasket (21) on the clutch cover. Replace the

clutch cover (22) Fig. 1, then hydraulic tube (17) and tube assembly Fig. 2. Tighten the adjusting nut (23) Fig. 1 to contact the bearing (8) Fig. 3 and back off the adjusting nut (22) Fig. 1 one serration so that the cast lug in the end cap (18), Fig. 2, will locate in a notch of the adjusting nut (23), Fig. 1 (see Fig. D). Replace the gasket (11), Fig. 2. Secure the end cap (18), Fig. 2, in place using the capscrews (19), Fig. 2.

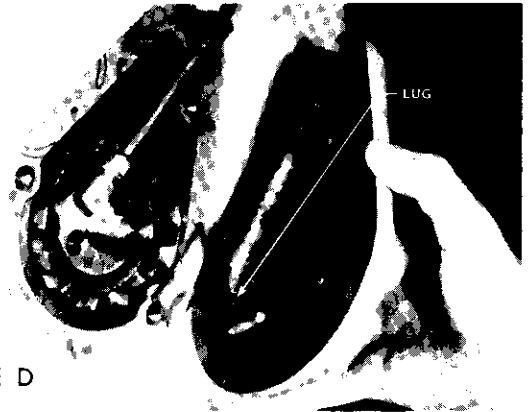


FIGURE D

Brake Adjustment

Ref. Fig. 2

No brake adjustment is required on this winch under normal operating conditions. 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 (22), Fig. 1, as instructed above for "Brake Disassembly". Release the adjusting cams (2) for the primary clutch band (15) by loosening the capscrews (5) and rotating the cams until the flat side of each cam is towards the band. Release the clutch push rod (6) by depressing it into the clutch cylinder (11) and releasing it from the primary clutch band socket. Place a clean rag under the hose (18) and the hydraulic fitting (19) disconnect the hose (18) at the fitting (19). Release the adjusting cams (2) for the secondary clutch band (14) as described for the primary clutch band. The primary and secondary clutch bands can now be removed.

If it is necessary to remove the clutch hub (1) and clutch lever (12), disconnect the hose assembly (18) at the fitting (19) then remove the fitting from the drum shaft. Using two 7/16" N.C. capscrews as jacks in the holes provided, pull the clutch hub (1) off the shaft. This procedure also removes the bearing (17) and the spacer (16). Now the clutch lever (12) can easily be removed from the clutch hub. Disconnect the hose assembly (18) from the connector (21). Remove the connector (21) from the clutch cylinder (11) and remove the cylinder.

If the hydraulic tube (17); Fig. 2, was found to be leaking before disassembly was started, remove the gland cap (27), Fig. 5, from the end of the drum shaft. Remove and discard the 'U' seal (29) and 'O' ring (28) from the gland cap (27) and replace the 'U' seal and 'O' ring with new parts on reassembly. Inspect the bearing diameters of the hydraulic tube (17), Fig. 2, for wear. If wear is excessive, replace the hydraulic tube.

Clutch Cylinder Disassembly

Ref. Fig. 4

Remove the push rod (6), boot (7), piston (8), cup (9) and spring (10) from the clutch cylinder (11). Discard the 'U' cup (9) and install a new part on reassembly. Inspect all parts for wear and replace if necessary.

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. Coat the bore of the cylinder (11) with Tru-Torque oil (Gearmatic Part Number M285). Assemble all parts in the order shown on figure 4 so that the large end of the spring (10) contacts the bottom of the clutch cylinder (11) and the flat side of the 'U' cup (9) contacts the flat end of the piston (8).

Clutch Assembly

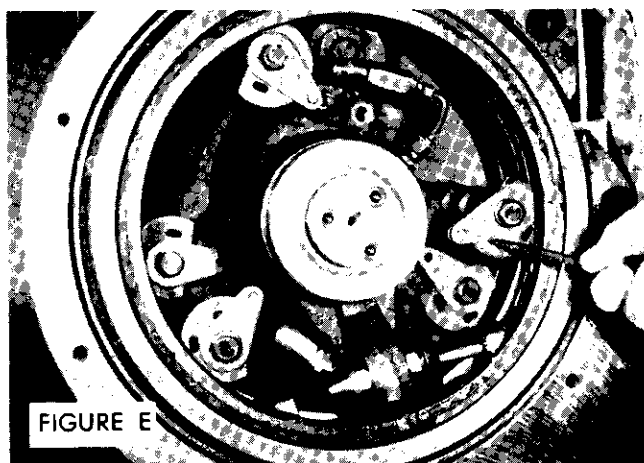
Ref. Fig. 1, 2, 3, & 4

Inspect the two felt strips (13) in the clutch lever (12). If the felt strips (13) are dry, soak them in SAE 30 engine oil. Squeeze the excess oil out of the felt strips (13) and install them in the internal groove of the clutch lever (12) so that their ends form a gap in way of the cast hole in the body of the clutch lever. Assemble the clutch in the reverse order of disassembly. Make sure that spacer (16), Fig. 4, is installed with its flat side in contact with the clutch hub (1). Replace the clutch cover (22), Fig. 1, then hydraulic tube (17), elbow (16), tube assembly (13), (14), (15), and adapter (12), Fig. 2. Tighten the adjusting nut (23), Fig. 1, to contact the bearing (8), Fig. 3 and back off the adjusting nut (23), Fig. 1, one serration so that the cast lug in the end cap (18), Fig. 2,

will locate in a notch of the adjusting nut (23), Fig. 1 (see Fig. D). Replace the gasket (11), Fig. 2. Secure the end cap (18), Fig. 2, in place, using the capscrews (19), Fig. 2.

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. E). Set all of the adjusting cams to give a clearance of .006" to .010" between the lining and the inside of the drum all around. Install the primary clutch band and adjust to the required clearance of .006" to .010". When the correct setting has been obtained, tighten all capscrews securely. Release the brake and check that the drum rotates freely.



Drum Disassembly

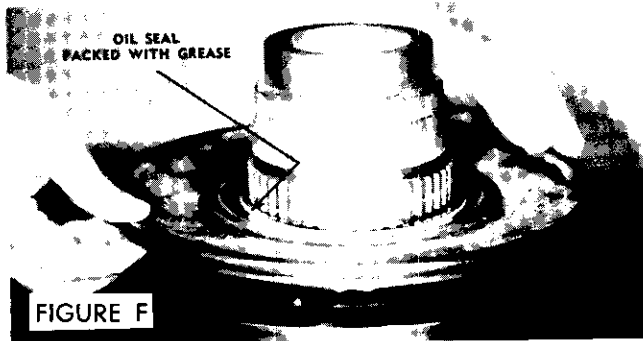
Ref. Fig. 3 & 5

Remove the brake bands and clutch assembly as outlined under "Brake Disassembly" and "Clutch Disassembly" on Pages 9 and 10. The Drum (2), Fig. 3, can now be removed by drifting carefully on the cable side of the drum next to the brake end. The brake drum (6) and the seal flange (4) will be removed with the cable drum (2) as an assembly. Remove the seal ring (23), Fig. 5, from the clutch end of the drum shaft so that it can be replaced after the brake drum has been assembled into the winch on reassembly. This will prevent the oil seal (7), Fig. 3, from being damaged if the seal ring (23), Fig. 5, is left on the drum shaft. After removing the drum assembly from the main housing, separate the drums (2) and (6), Fig. 3, using two 7/16" N.C. capscrews as jacks in the holes provided on the inside wall of the brake drum (6). After the drums are apart, inspect the oil seal (5) and 'O' ring (3), Fig. 3, for damage or wear. Replace the oil seal (5) and 'O' ring (3), if necessary.

Drum Assembly

If the brake drum (6) 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. F). Fill the space surrounding 'O' ring (3) with grease and pack grease into the bore of oil seal (1) at the clutch end of the brake drum (6). The grease used in the oil seals (5) and (7) and 'O' ring (3) 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 (6) and install this assembly in the winch as a unit.

When the cable drum (2) and brake drum (6) assembly has been installed and oil seal (7), Fig. 3, is in place, then install the seal ring (23), Fig. 5, using bearing (8), Fig. 3, to push the seal ring into location.



Ring Gear and Pinion Disassembly

Ref. Fig. 1 & 5

Remove the winch from the tractor, then remove the brake, clutch and drum assemblies from the winch as outlined under "Brake Disassembly", "Clutch Disassembly" and Drum Disassembly Pages 9 and 10. Now remove the gear cover (9), Fig. 1, using two $\frac{3}{8}$ " N.C. capscrews in the tapped holes as jacks. If the bearing (24), Fig. 5 remained on the shaft after removal of the drum, remove the snap ring (25) from the outside of the bearing. Remove the gland cap (27), Fig. 5 from the end of the drum shaft. Remove and discard the 'U' seal (29) and 'O' ring (28) from the gland cap (27) and install new parts on re-assembly. Then, protecting the end of the shaft (2), drive the shaft and ring gear out of the main housing.

Remove the cotter pin (17), nut (16), washer (15), and the pinion gear or sprocket. Next remove the socket head capscrews (13) and using two $\frac{3}{8}$ " N.C. capscrews in the tapped holes provided in the pinion housing (10), remove the bearing housing assembly then remove shims (9).

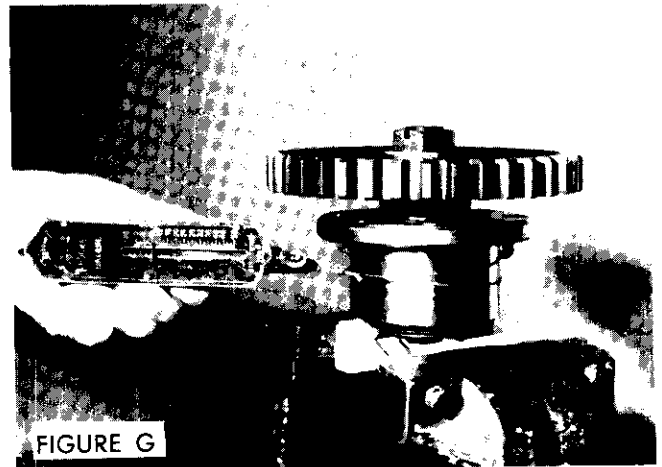
NOTE: The inner race of the bearing (18) will stay on the bevel pinion while the roller assembly will remain in the main housing of the winch and can be removed separately.

Ring Gear and Pinion Assembly

Ref. Fig. 5

If the pinion bearings (5), (6) and (11), (12) are being replaced, it will be necessary to re-adjust the shims (9) for the correct pre-load, as follows:

Press the outer races for bearings (5), (6) and (11), (12) into the ends of the bearing housing (10) and check that they are perfectly parallel by measuring over the end of the outer races with a micrometer. Install the inner race (5) of the bearing on the pinion shaft. Place the pinion shaft in the bearing housing so that the outer and inner races of the bearing (6) mate up. Then, from the flange end of the bearing housing, install the bearing spacer (7). Place a piece of soft lead gauge wire on the end of the bearing spacer and press the inner race of the bearing (11) on to the pinion shaft (4). Install the pinion gear or sprocket previously removed, washer (15) and nut (16). With this assembly held securely in a vice, proceed with pre-loading. 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 scale. (See Fig. G.) Tighten the nut (16) until a reading of $6\frac{1}{2}$ to 10 pounds on the spring scale is required for continuous rotation of the bearing housing about the pinion shaft. Remove the nut (16), washer (15), pinion gear or sprocket. Then remove the inner race of the bearing (11) by pressing the pinion shaft (4) out of the assembly. Carefully remove the lead gauge wire and measure the compressed thickness to determine the correct number and size of the shims (8) required. Replace the bearing spacer and shims on the pinion shaft (4) then reassemble the pinion shaft in the bearing housing (10) with the inner race of the bearing (11), pinion gear or sprocket, washer (15) and nut (16). This assembly is now complete and ready for assembly in the main housing. After installing this assembly in the winch, tighten the nut (16) to 60-80 lbs. ft. and install the cotter pin (17).

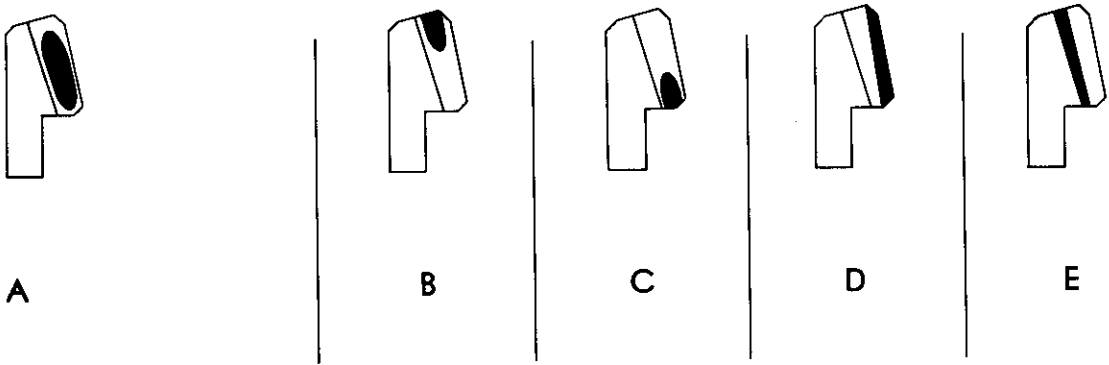
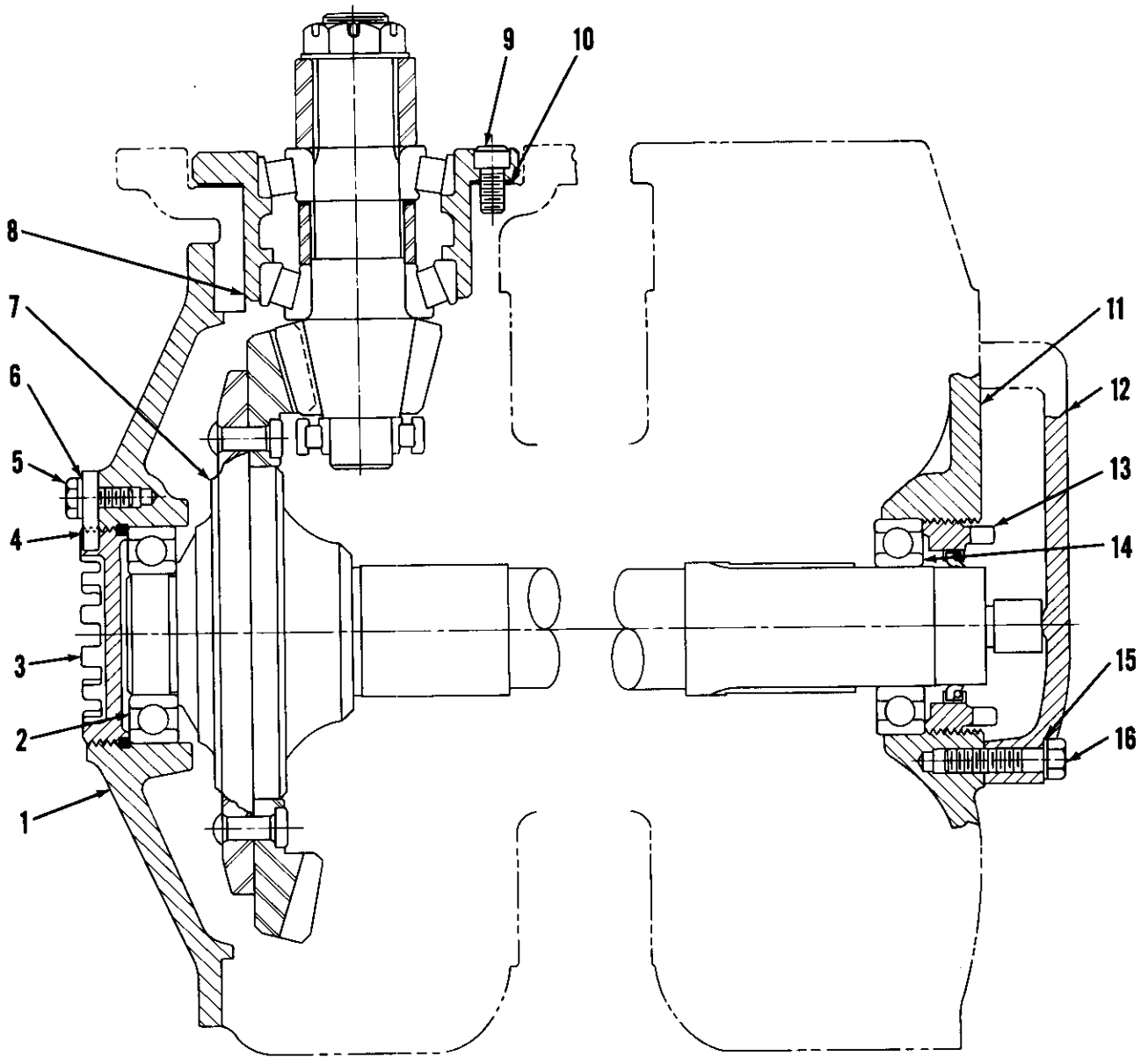


FIGURE H

Ring Gear and Pinion Adjustment

Ref. Fig. H

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. Remove barrel plug (11) Fig. 1 and use this hole for inspecting the tooth contact. Check that nut (16), Fig. 5 on the pinion shaft is tightened to the required torque.

BACKLASH. The ring gear and pinion must be adjusted to give the correct tooth contact with a back lash of .006" to .008" at the heel of the ring gear tooth.

Correct Tooth Contact

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', Fig. 'H'. 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 slightly out of mesh and the ring gear moved further into mesh. Remove the socket head capscrews (9) and use two capscrews to pull the pinion housing (8) out of the winch. Add one .010" shim (10) under the pinion housing flange; replace the pinion housing (8) in the winch and secure to place by tightening capscrews (9).

Remove items (4), (5) and (6) from the gear cover (1) and item (16), (15), and (12) from the clutch cover (11). Turn item (13) in the

clutch cover (11), counter-clockwise one serration. Now turn item (3), in the gear cover (1), one serration in a clockwise direction. In some cases it may be necessary to turn items (13) and (3) two serrations to obtain the correct marking and required backlash of .006" to .008".

CONDITION 'C'. 'C' illustrates a heavy toe mark. To correct this condition, the pinion must be moved into mesh and the ring gear further out of mesh. Remove the socket head capscrews (9) and use two capscrews to pull the pinion housing (8) out of the winch. Remove one .010" shim (10) from under the pinion housing flange; replace the pinion housing (8) in the winch and secure to place by tightening capscrews (9). Remove items (4), (5), and (6) from the gear cover (1) and items (16), (15) and (12) from the clutch cover (11). Turn item (3) in the gear cover (1), counter-clockwise one serration. Now turn item (13) in the clutch cover (11) one serration in a clockwise direction. In some cases it may be necessary to turn items (13) and (3) two serrations to obtain the correct marking and required backlash of .006" to .008".

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

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

IMPORTANT. When making the above adjustment, there must not be any clearance between the bearing screw cap (3) and the bearing (2) or between the bearing (2) and the shaft (7). When the ring gear and pinion have been correctly adjusted, tighten adjusting nut (13) to contact the bearing (14) and then back off the adjusting nut (13) one serration so that the cast lug in the end cover (12) will locate in a notch of the adjusting nut (13). Replace items (4), (5), (6), (12), (15) and (16) and tighten securely.

MASTER CONTROL SERVICE INSTRUCTIONS

Master Control Disassembly

Ref. Fig. 6

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 Tru-Torque Oil (Gearmatic Part No. M285). 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 (18) until the lock ring (12) can be installed. Install the lock ring (12) so that its grip 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).

Lubricate the O-ring groove in the shaft (25) and 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. Replace the cylinder assemblies making sure the bleed holes are on top. Fasten the cover (4) and gasket (5) in place and fill the housing with standard brake fluid.

TORQUE LOADING FOR FASTENERS

Part No.	Torque Load Ft. Lbs.
N 10	24
S 121	17
L 124	17
S 124	10
S 125	17
L 146	19
L 165	30
S 165H	30
S 167	30
S 187H	35
S 188	18
S 323H	150
S 813	10
A 884	60-80
A 9505	50

PARTS SECTION

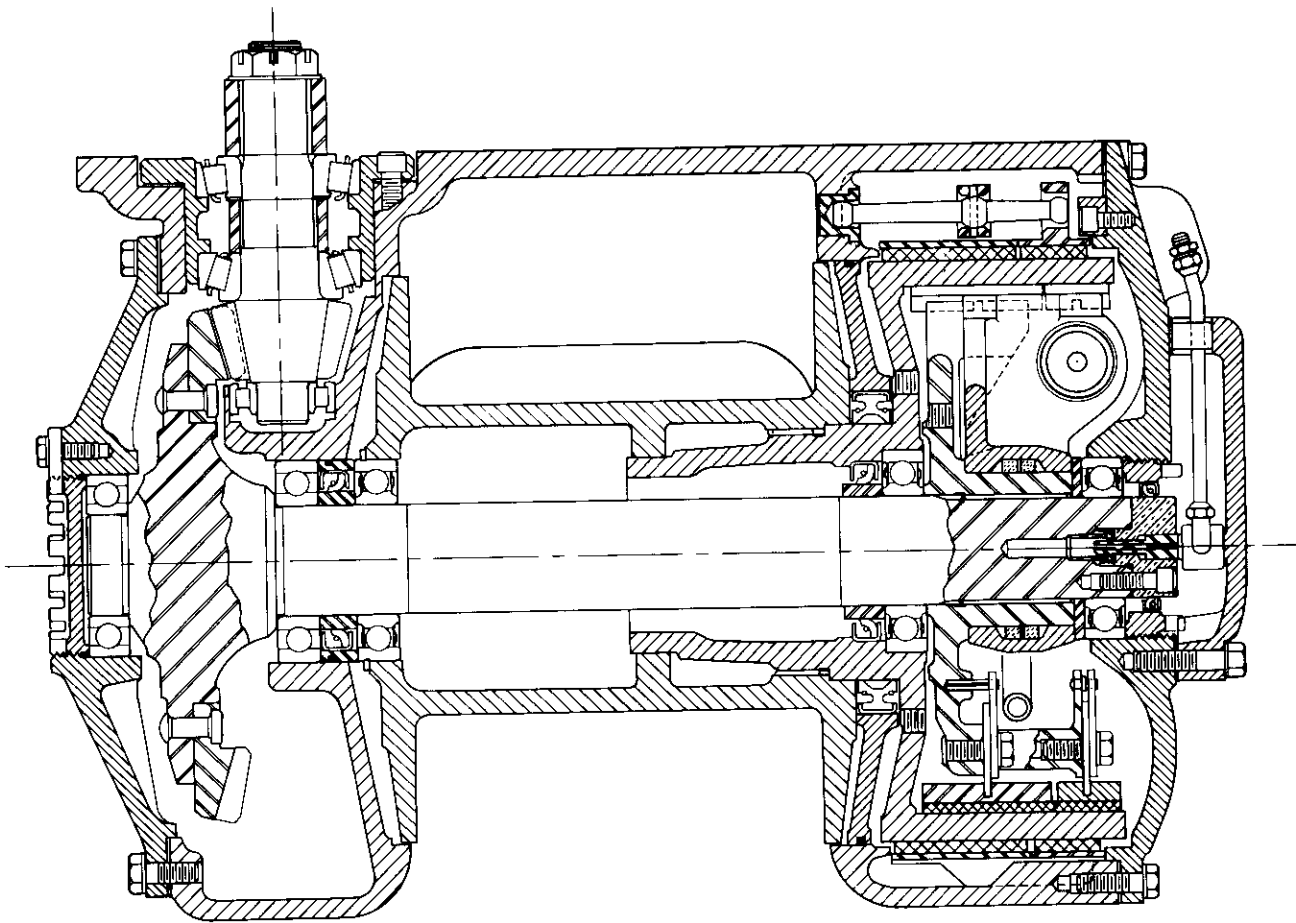
RING GEAR
PINION & SHAFT
Fig. 5

HOUSING
ASSY.
Fig. 1

DRUM &
BRAKE BANDS
Fig. 3

CLUTCH
ASSY.
Fig. 4

CLUTCH
HYDRAULIC TUBE
Fig. 2



CONTROL VALVE
ASSY.
Fig. 6

FAIRLEAD
ASSY.
Fig. 7 & 8

ADAPTER
ASSY.
Fig. 9

CONTROL GROUP
ASSY.
Fig. 10

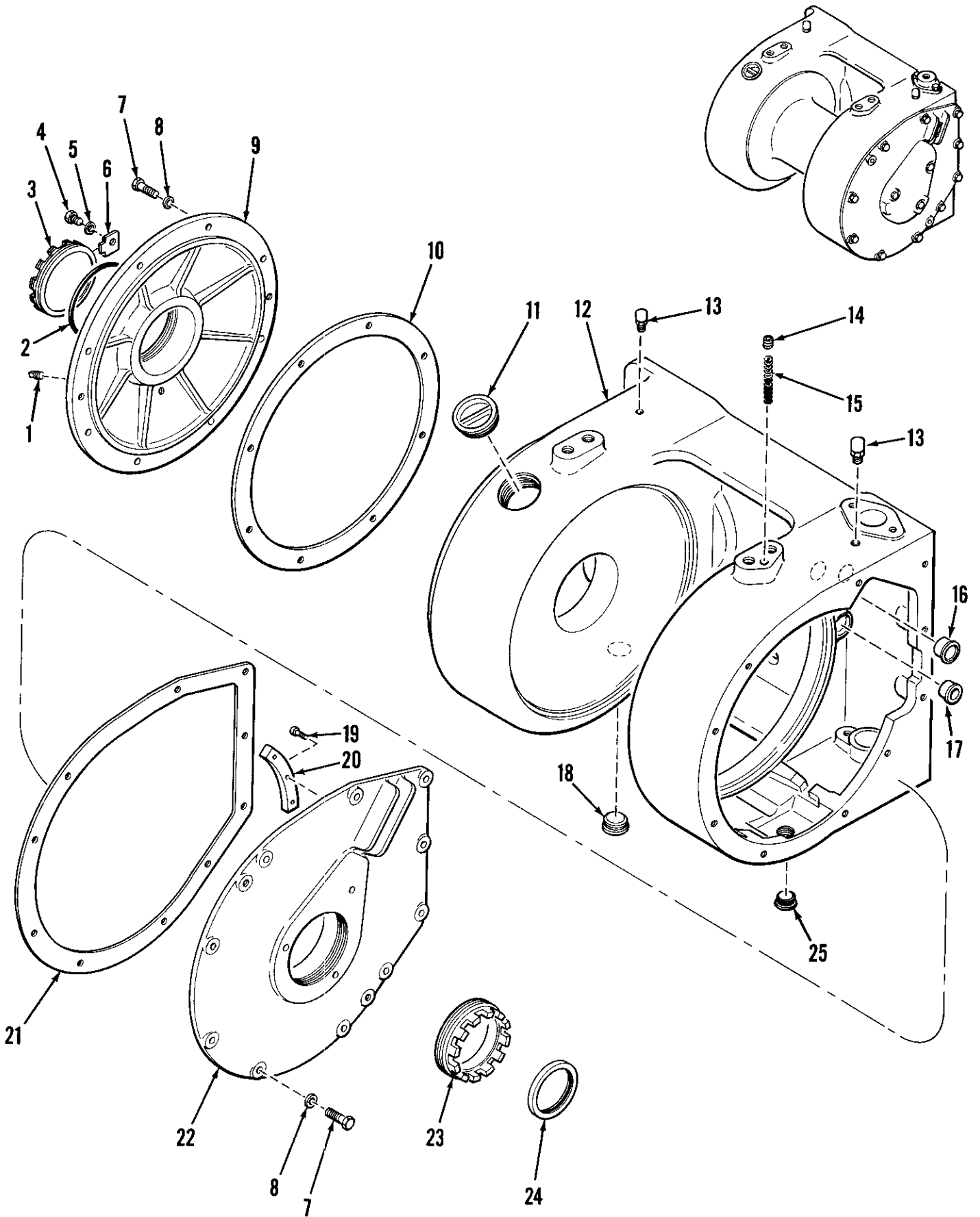


FIGURE 1

HOUSING ASSEMBLY

Part of Assembly No. E 9500X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	F 55	Pipe Plug	1	0	0.5
2	G 237	'O' Ring	1	—	
3	A 816A	Bearing Screw Cap	1	1	0
4	S 121	Capscrew ($\frac{5}{16}$ N.C. x $\frac{1}{2}$ Hex. Hd.)	1	—	
5	W 9	Washer ($\frac{5}{16}$)	1	—	
6	A 836A	Lock	1	—	
7	S 165H	Capscrew ($\frac{3}{8}$ N.C. x 1 Hex. Hd.)	18	0	0.6
8	W 10	Washer ($\frac{3}{8}$)	18	—	
9	C 9511	Gear Cover	1	17	8
10	B 738A	Gasket	1	—	
11	F 8	Barrel Plug	1	0	4
*12	D 9501	Winch Housing	1	130	0
13	M 84	Vent	2	—	
14	T 27	Set Screw	1	—	
15	A 9536	Spring	1	—	
16	A 9513	Lever Plug	1	0	2
17	A 9551	Lever Plug	1	0	2
18	F 5	Barrel Plug	1	0	1.5
19	L 124	Capscrew ($\frac{5}{16}$ N.C. x $\frac{3}{4}$ Sc. Hd.)	3	—	
20	B 9512	Guide Ring	1	0	3
21	B9506	Gasket	1	—	
22	C 9507A	Clutch Cover	1	21	0
23	A 9507	Adjusting Nut	1	0	14.5
24	U 86	Oil Seal	1	0	1
25	F 62	Pipe Plug	1	0	0.7

* Winches Serial Number 9-1375 and up use D9501.

* Winches Serial Number 9-1374 and down have D9500 installed.

If D9500 is being replaced order D9501, Set Screw T15, Spring A9535, Anchor Pin A9530 and Secondary Brake Band C9515X.

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

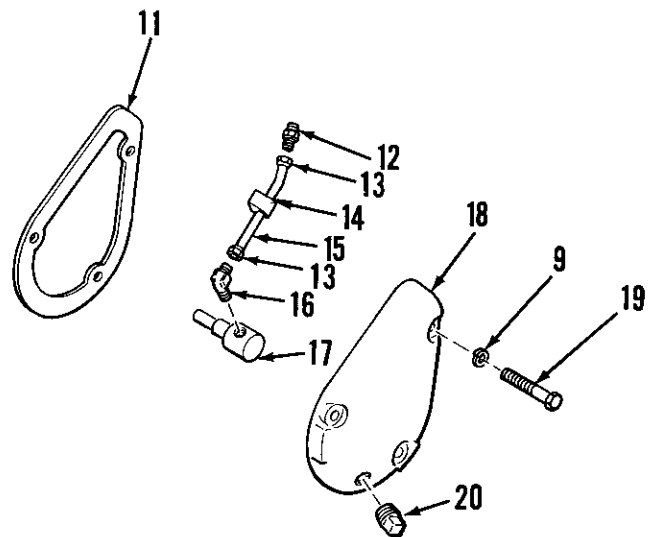
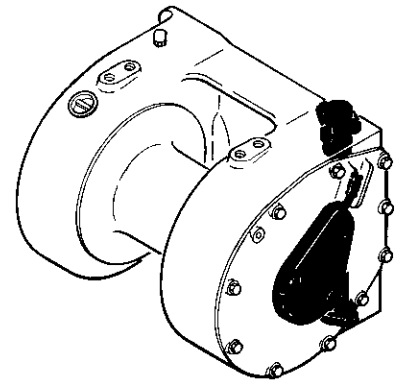
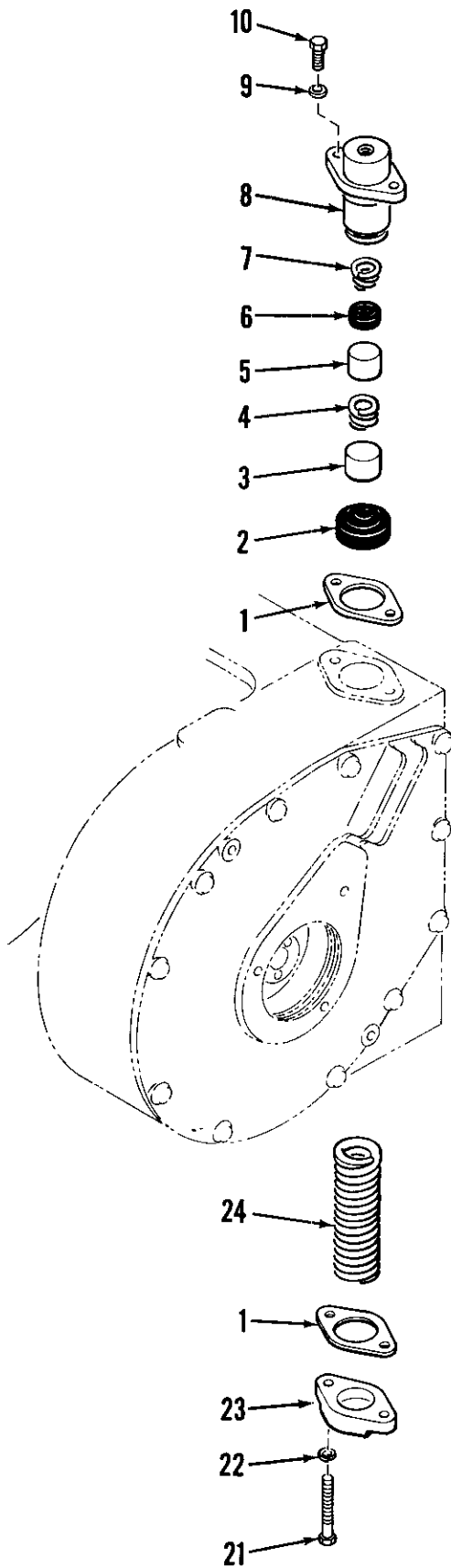


FIGURE 2

BRAKE CYLINDER AND HYDRAULIC TUBE

Part of Assembly No. E 9500X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	A 9526	Gasket	2	—	
Sub Ass'y	A 839BX	Brake Cylinder Ass'y (Includes Items 2 to 8)	1	0	15.5
2	M 294	Boot	1	—	
3	M 291	Piston	1	0	0.5
4	A 8044	Spring	1	—	
5	A 8043	Primary Piston	1	0	0.5
6	M 290	'U' Cup	1	—	
7	A 857A	Spring	1	—	
8	A 839B	Brake Cylinder	1	0	12
9	W 10	Washer ($\frac{3}{8}$)	5	—	
10	S 165H	Capscrew ($\frac{3}{8}$ N.C. x 1 Hex. Hd.)	2	0	0.6
11	B 9507	Gasket	1	—	
12	F 632	Adapter	1	—	
Sub Ass'y	A 9528X	Tube Ass'y (Includes Items 13, 14 & 15)	1	0	1.5
13	F 633	Nut	2	—	
14	A 9518	Gromet	1	—	
15	F 511	Tube	1	0	1
16	F 168	Elbow	1	0	1
17	A 9502	Hydraulic Tube	1	0	3
18	B 9500X	End Cap (Includes Item 20)	1	3	5
19	S 167	Capscrew ($\frac{3}{8}$ N.C. x $1\frac{1}{2}$ Hex. Hd.)	3	0	0.9
20	F 53	Pipe Plug (part of Item 18)	1	—	
21	A 9505	Capscrew	2	0	2
22	W 11	Washer ($\frac{7}{16}$)	2	—	
23	A 9558	Spring Cap	1	0	10
24	A 9519	Brake Spring	1	0	10
Service Kit	A 9547X	Repair Kit (Includes Items 1 to 7 and 1 Capsule of M 286 Lubricating Fluid)	1	—	

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

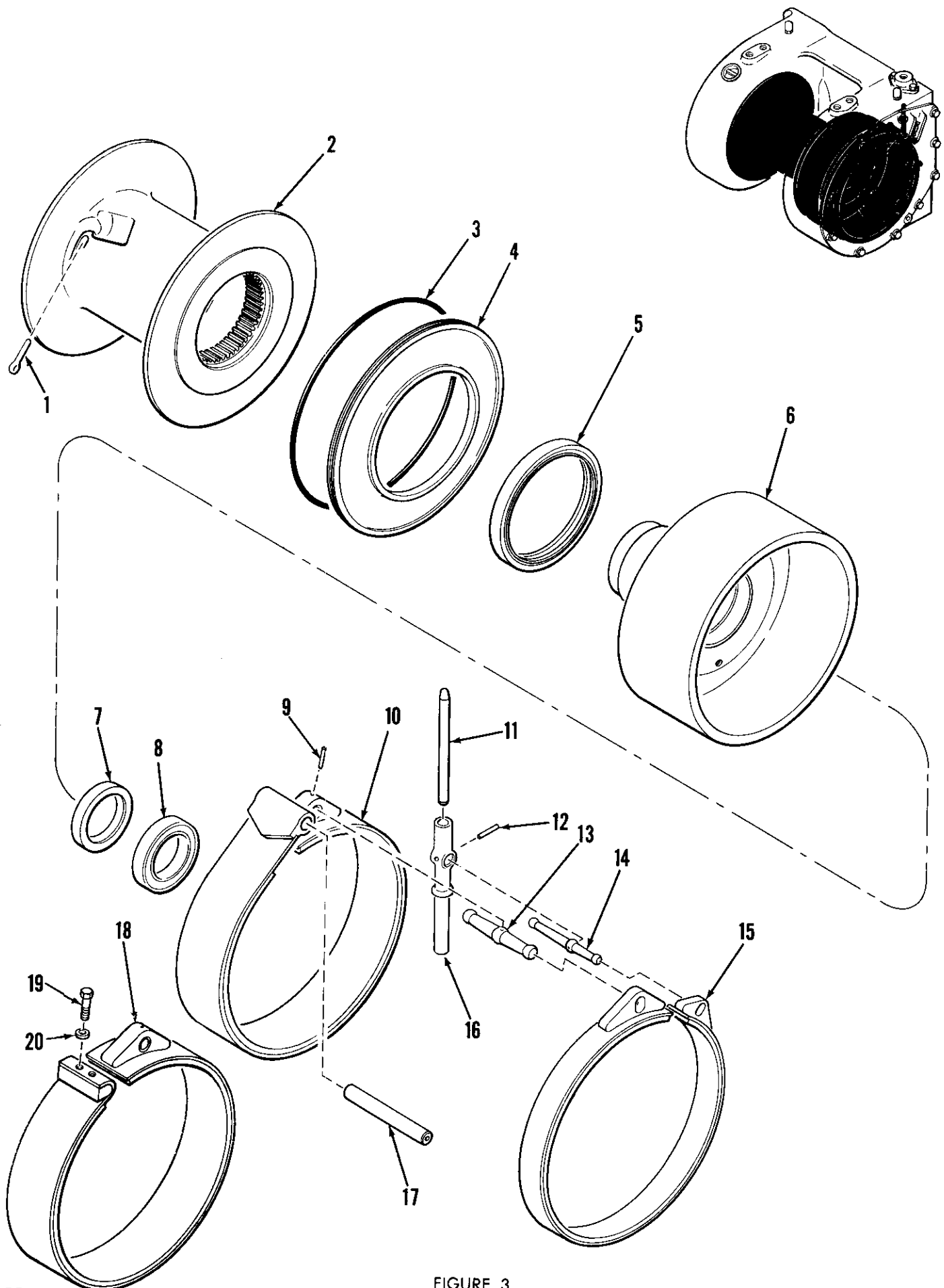


FIGURE 3

DRUM & BRAKE BANDS

Part of Assembly No. E 9500X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	P 421	Pin	1	0	8
① 2	C 9516	Drum	1	39	0
3	G 275	'O' Ring	1	—	
4	B 9501	Seal Flange	1	8	0
5	U 180	Oil Seal	1	0	8
6	C 9501A	Brake Drum	1	38	8
7	U 135	Oil Seal	1	0	3.5
8	H 87	Ball Bearing	1	1	8
9	P 223	Pin	1	—	
② 10	C 9515X	Secondary Brake Band	1	6	0
11	A 9515	Push Rod	1	0	4.5
12	P 224	Pin	1	—	
13	A 9511	Secondary Brake Lever	1	0	8
14	A 9512	Primary Brake Lever	1	0	3
15	C 9510X	Primary Brake Band	1	3	0
16	B 9515	Lever Block	1	0	8
② 17	A 9530	Anchor Pin	1	0	8
Not Shown	M 249	Wire (Shipping Only)	1	—	

Winches Serial Number 9-1375 and up use all parts listed above.

① Winches Serial Number 9-7699 and down, use Cable Drum C9500 in place of C 9516. Drum C 9516 is completely interchangeable with C 9500.

② Winches Serial Number 9-1374 and down, use all parts listed above except items 10 and 17 are replaced by items 18, 19 and 20 as listed below.

18	C 9509X	Secondary Brake Band	1	5	8
19	S 187H	Capscrew ($\frac{3}{8}$ N.F. x $1\frac{1}{2}$ Hex. Hd.)	2	0	0.9
20	W 110	Washer ($\frac{3}{8}$ copper)	2	—	

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

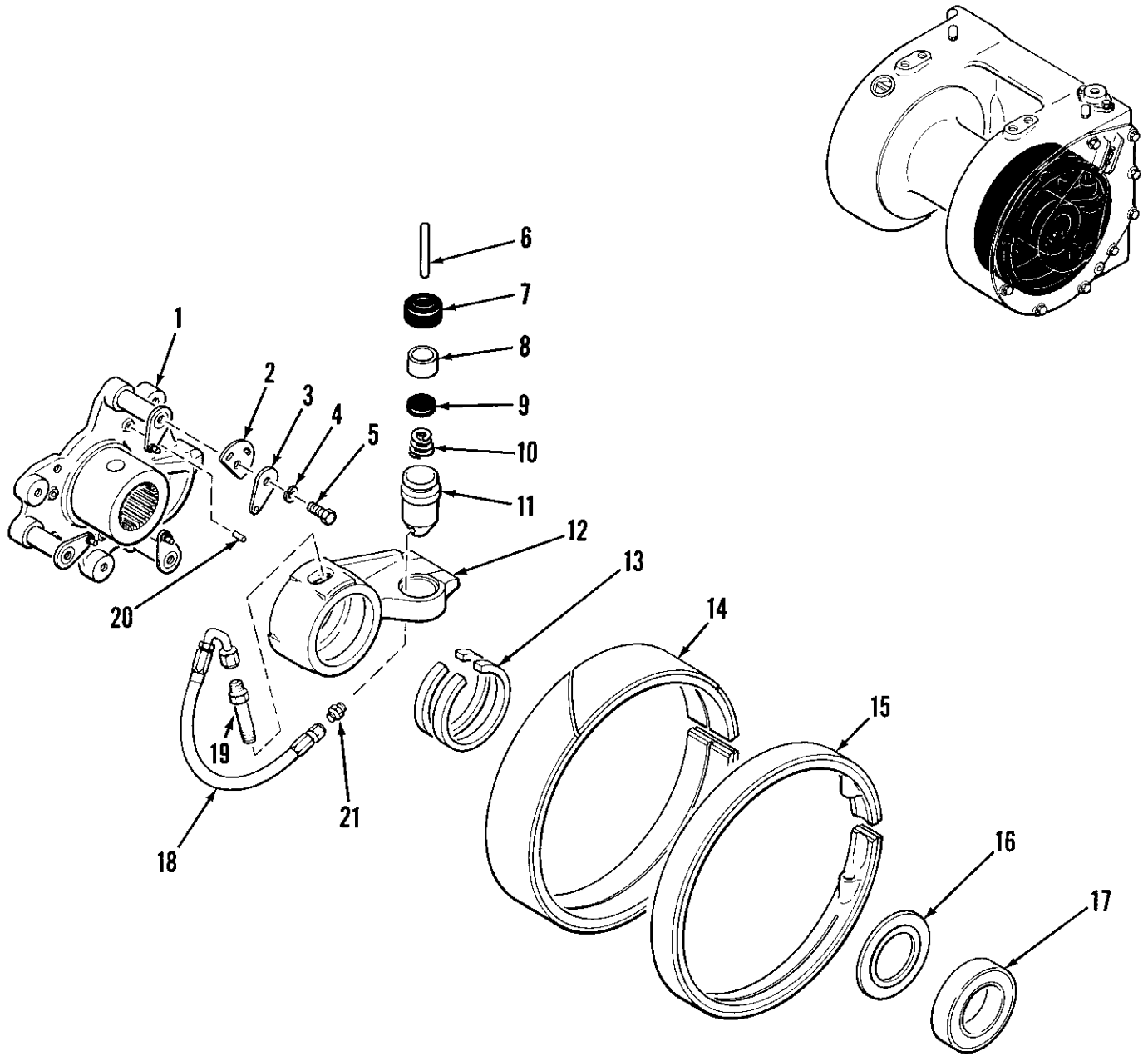


FIGURE 4

CLUTCH ASSEMBLY

Part of Assembly No. E 9500X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	C 9502	Clutch Hub	1	9	8
2	A 9503	Adjusting Cam	6	0	1.5
3	A 9504	Lock Plate	6	0	1
4	W 10	Washer ($\frac{3}{8}$)	6	—	
5	S 165H	Capscrew ($\frac{3}{8}$ N.C. x 1 Hex. Hd.)	6	0	0.6
6	A 833A	Push Rod	1	0	1.5
Sub Ass'y	A 825AX	Clutch Cylinder Assembly (Includes Items 7 to 11)	1	0	8.5
7	M 295	Boot	1	—	
8	M 292	Piston	1	0	0.5
9	M 293	'U' Cup	1	—	
10	A 857A	Spring	1	—	
11	A 825A	Clutch Cylinder	1	0	7
12	B 9502	Clutch Lever	1	3	8
13	A 8019	Felt	2	—	
14	C 9505	Secondary Clutch Band	1	7	0
15	B 9503	Primary Clutch Band	1	4	0
16	A 9500	Spacer	1	0	4
17	H 56	Ball Bearing	1	1	0
* 18	X 39-115	Hose Ass'y	1	0	5
* 19	A 19158	Hydraulic Fitting	1	0	0.5
20	P 228	Pin	3	—	
* 21	F 267	Connector	1	—	
Service Kit	A 9546X	Repair Kit (Includes Items 7, 8, 9, 10 and 1 Capsule of M 286 Lubricating Fluid)	1		

* When replacing these parts on Winches Serial Number 9-8861 and down, order X11 Hose Assembly and B9516 Hydraulic Fitting. Item 21 is not required.

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

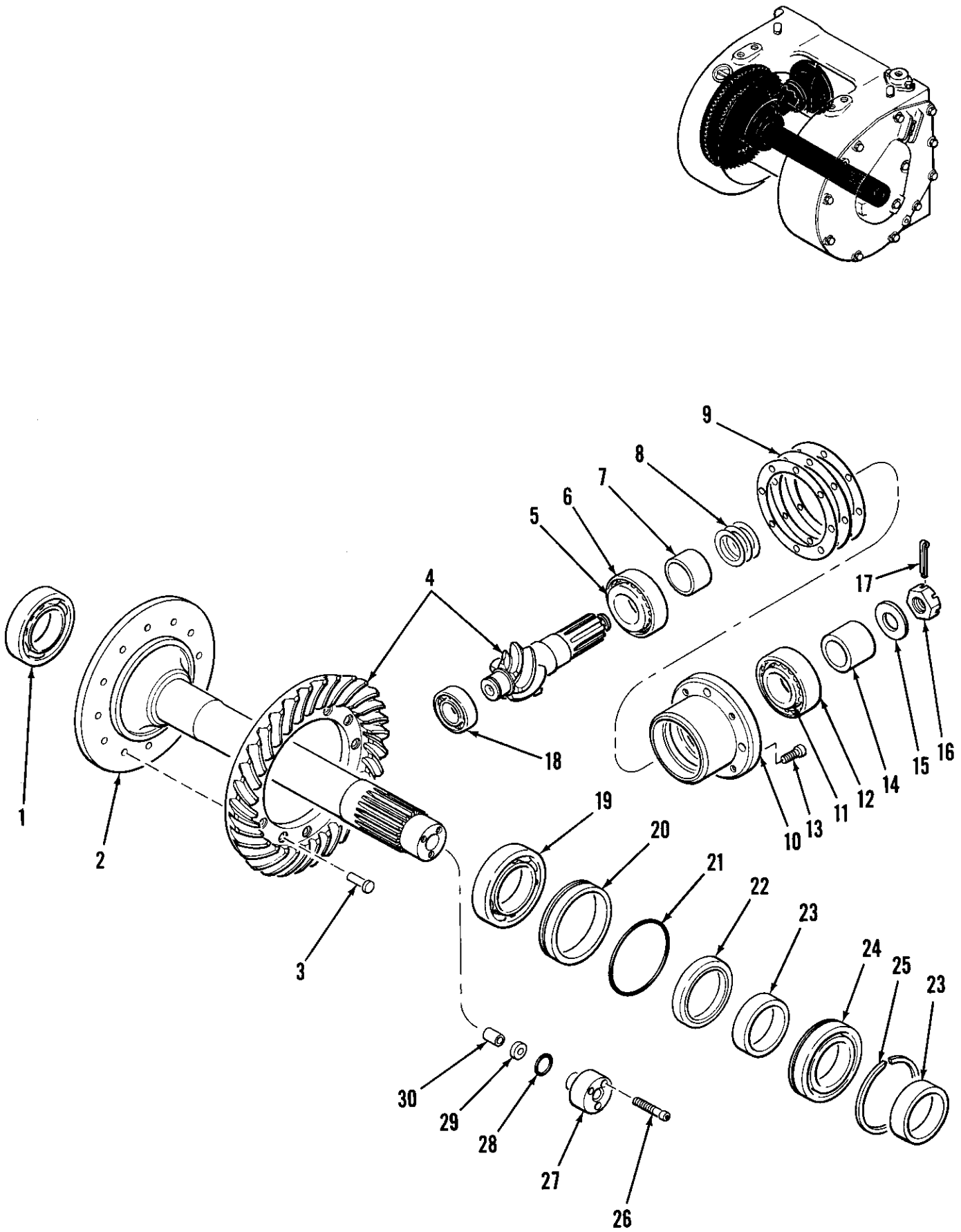


FIGURE 5

RING GEAR, PINION & SHAFT

Part of Assembly No. E 9500X

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
1	H 54	Ball Bearing	1	1	4
Sub Ass'y	C 9512X	Ring Gear, Pinion & Shaft Ass'y (Includes items 2, 3 & 4)	1	54	0
2	C 9506AX	Drum Shaft (Includes item 30)	1	32	0
Sub Ass'y	B 781X	Ring Gear Pinion & Rivet Ass'y (Includes items 3 & 4)	1	22	0
†3	V 35	Rivet	16	0	0.7
4	B 734X	Ring Gear & Pinion (matched set)	1	13	0
Sub Ass'y	B 9505X	Bearing Housing Ass'y (Includes items 5, 7, 8, 9, 10 & 11)	1	6	0
5	H 350B	Timken Cone	1	0	13
6	H 350A	Timken Cup (Part of item 10)	1	0	7
7	A 8029	Bearing Spacer	1	0	5.5
8	A 8030	Shim Set	1	—	
9	A 757A	Shim Set	1	—	
Sub Ass'y	B 701X	Bearing Housing Ass'y (Includes items 5, 10 & 11)	1	6	3
10	B 701	Bearing Housing (Includes cups—items 6 & 12)	1	3	12
11	H 286B	Timken Cone	1	0	14
12	H 286A	Timken Cup (Part of item 10)	1	0	7.5
13	L 165	Capscrew (3/8 N.C. x 1 Sc. Hd.)	4	0	0.5
*14	A 835	Preload Bushing (Shipping only)	1	0	4.5
15	A 864	Washer	1	—	
16	A 884	Nut	1	0	2.5
17	P 420	Cotter Pin	1	—	
18	H 250	Roller Bearing	1	0	5
19	H 80	Ball Bearing	1	1	8
20	A 820A	Seal Housing	1	2	9
21	G 239	'O' Ring	1	—	
22	U 135	Oil Seal	1	0	3.5
23	A 819A	Bearing Spacer	2	0	7
24	H 86	Ball Bearing (Includes item 25)	1	1	8
25	R 87	Snap Ring (Included in item 24)	1	—	
26	L 146	Capscrew (1/16 N.F. x 1 Sc. Hd.)	3	—	
27	A 9501	Gland Cap	1	0	10
28	G 115	'O' Ring	1	—	
29	U 250	'U' Seal	1	—	
30	A 9506	Cup Retainer (Part of item 2)	1	—	

†Winches Serial Number 9-1258 and down, No. Req'd. was 12.

*Shipped only when winch does not have a pinion gear or sprocket.

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

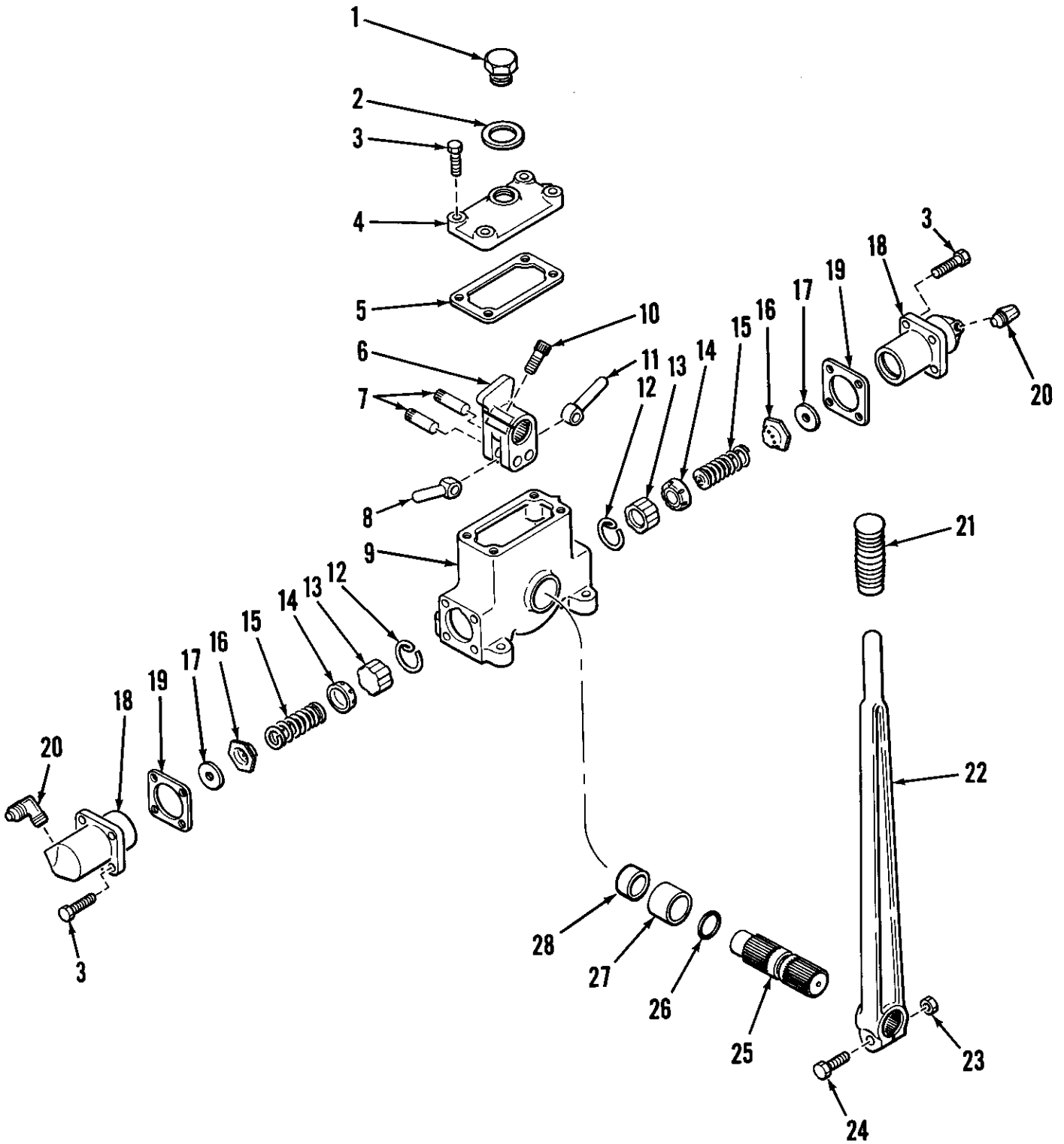


FIGURE 6

MASTER CONTROL UNIT

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
① Assembly	X 710C	Master Control Assembly (Includes items 1 to 27)	1	7	8
1	A 797	Filler Cap	1	0	2
2	W 166	Washer	1	—	
3	S 124	Capscrew ($\frac{3}{16}$ N.C. x $\frac{7}{8}$ 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 8053	Short Push Rod	1	0	1
9	C 709X	Housing (Includes Items 27 and 28)	1	2	0.5
10	S 813	Capscrew	1	0	0.5
11	A 8054	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 item 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 ($\frac{3}{8}$ N.F.)	1	—	
24	S 188	Capscrew ($\frac{3}{8}$ N.F. x $1\frac{3}{4}$ Hex. Hd.)	1	0	1
25	A 772	Shaft	1	0	14
26	G 210	'O' Ring	1	—	
27	A 855A	Bushing (Part of Item 9)	1	0	1.5
② 28	A 8051	Bushing (Part of Item 9)	1	0	1
Service Kit	A 9545X	Repair Kit (Includes Items 12, 13, 14, 15, 16, 17, 19 and 1 Capsule of M 286 Lubricating Fluid)	2	—	

① Master Control X710B is now replaced by X710C. X710B is no longer available as a spare part. To convert an X710B Master Control to an X710C order Field Conversion Kit A8056X.

② Used only in Master Controls manufactured after March, 1968

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

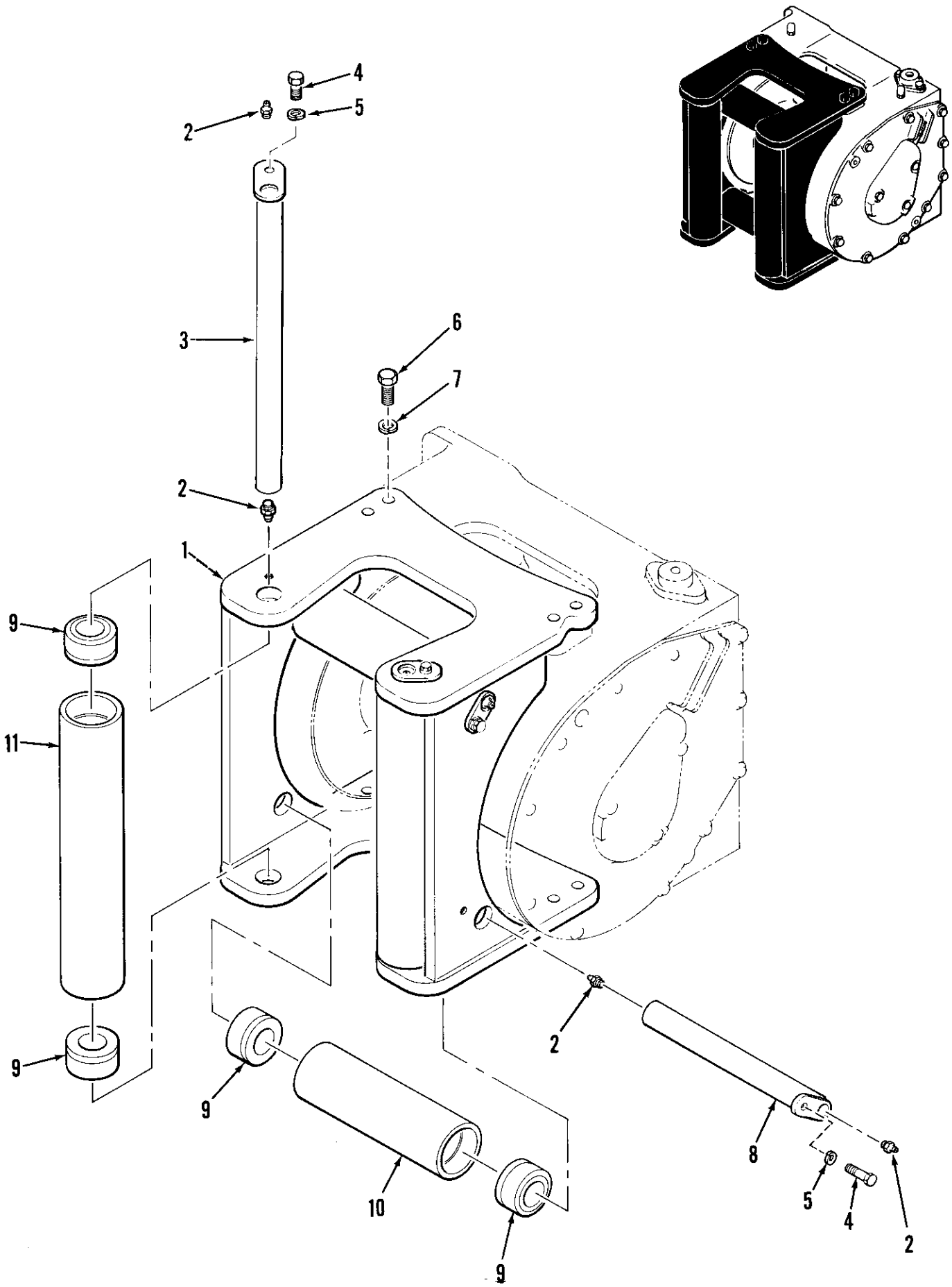


FIGURE 7

FAIRLEAD ASSEMBLY FOR CRAWLER TRACTORS

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
Assembly	C 9041X-4	4 Roller Fairlead Assembly (Includes Items 1 to 11)	1	101	0
1	C 9040X	Fairlead Body	1	47	0
2	M 5	Grease Fitting	8	—	
3	A 9102X	Roller Shaft (Long)	2	4	10
4	S 121	Capscrew (5/16 N.C. x 1/2 Hex. Hd.)	4	—	
5	W 9	Washer (5/16)	4	—	
6	S 323H	Capscrew (5/8 N.C. x 1 1/2 Hex. Hd.)	8	0	3
7	W 14	Washer (5/8)	8	—	
8	A 9107X	Roller Shaft (Short)	2	3	11
9	A 9034	Bushing	8	1	0
Sub Ass'y	A 9104X	Short Roller Assembly (Includes Items 9 and 10)	2	9	0
10	A 9104	Short Roller	2	7	0
Sub Ass'y	A 9039X	Long Roller Assembly (Includes Items 9 and 11)	2	10	8
11	A 9039	Long Roller	2	8	8
Sub Ass'y	A 9103X	Long Roller and Shaft Assembly (Includes 1 of Item 3, 2 of Item 9 and 1 of Item 11)	2	15	2
Sub Ass'y	A 9106X	Short Roller and Shaft Assembly (Includes 1 of Item 8, 2 of Item 9 and 1 of Item 10)	2	12	11
*Assembly	C 9041X-3	3 Roller Fairlead Assembly	1	90	0

*For 3 Roller Fairlead Assembly use parts as listed above under 4 Roller Fairlead Assembly and omit 1 of A 9106X.

INSTALLATION INSTRUCTIONS

The Gearmatic Model 9 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 150 lbs. ft. torque.

After installation of the fairlead assembly,

grease the roller assemblies daily. Note that the vertical roller assemblies have a grease fitting on the top and the 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

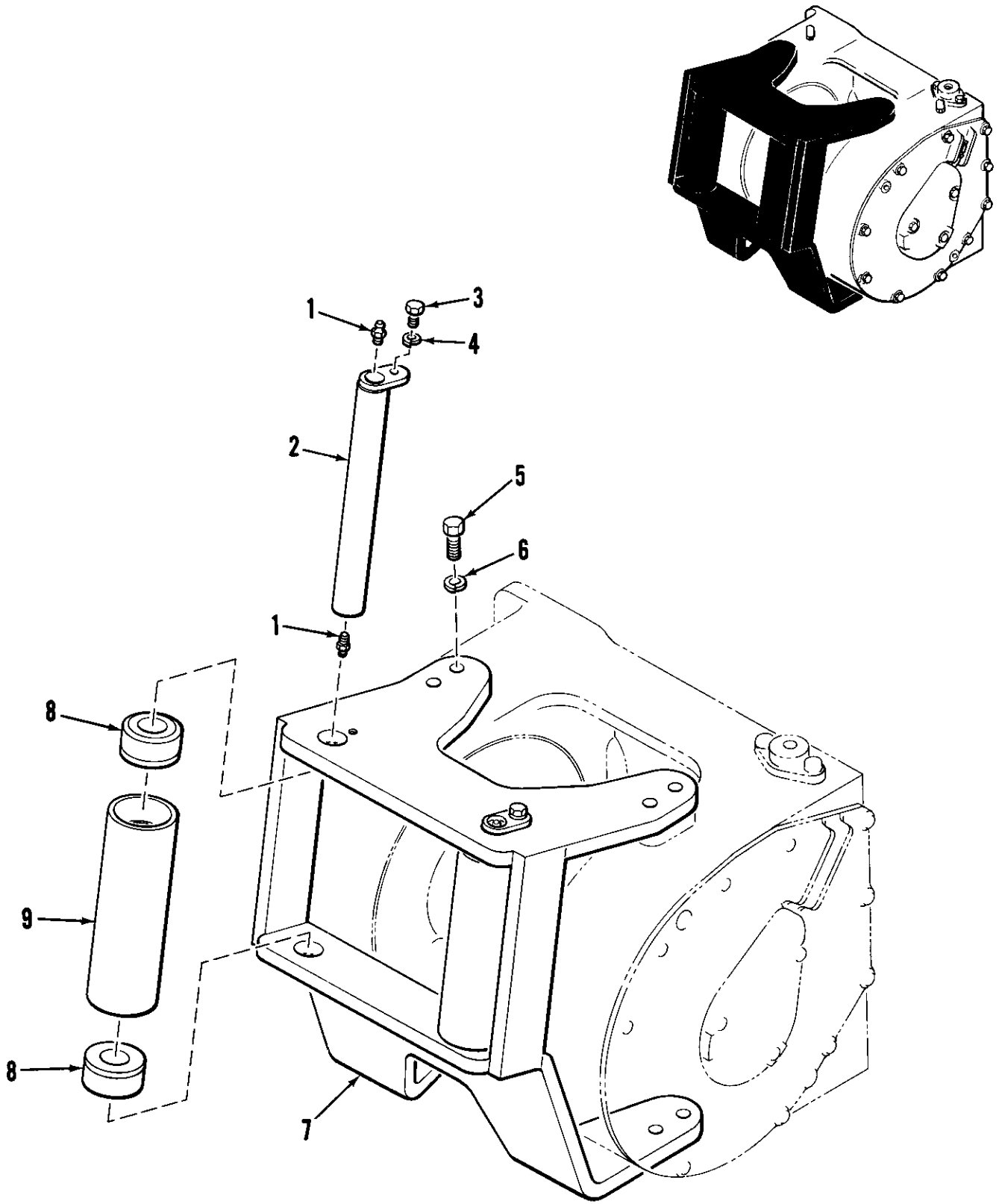


FIGURE 8

FAIRLEAD ASSEMBLY FOR SKIDDERS

Item No.	Part No.	Description	No. Req'd	Weight	
				Lbs.	Ozs.
Assembly	C 9037X	Fairlead Assembly (Includes items 1 to 9)	1	61	0
1	M 5	Grease Fitting	4	—	
2	A 9037	Roller Shaft	2	3	0
3	S 121	Capscrew (5/16 N.C. x 1/2 Hex. Hd.)	2	—	
4	W 9	Washer (5/16)	2	—	
5	S 323H	Capscrew (5/8 N.C. x 1 1/2 Hex. Hd.)	8	0	3
6	W 14	Washer (5/8)	8	—	
7	C 9036X	Fairlead Body	1	41	0
Sub Ass'y	A 9038X	Short Roller Ass'y (Includes items 8 and 9)	2	7	8
8	A 9034	Bushing	4	1	0
9	A 9038	Roller	2	5	8
Sub Ass'y	A 9098X	Short Roller and Shaft Ass'y (Includes 2 of item 1, 1 of item 2, 1 of item 3, 1 of item 4, 1 of A 9038X)	2	10	9

INSTALLATION INSTRUCTIONS

The Gearmatic Model 9 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 (5) and lockwashers (6). Capscrews

(5) should be tightened to 150 lbs. ft. torque.

After installation of the fairlead assembly, grease the roller assemblies daily. Note that the roller assemblies have a grease fitting on each end of the roller shaft.

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

PREVENTIVE MAINTENANCE FOR MODEL 9 WINCHES

The following recommendations are made with a view to providing long, trouble-free service from your Gearmatic 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 & 3B.
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 True-Torque lubricant—Gearmatic part #M285. 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 True-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.

NUMERICAL INDEX OF PARTS

Part No.	Page	Part No.	Page	Part No.	Page	Part No.	Page
F5	17	P240	29	S813	27	D9500	17
M5	29,31	M249	21	A816A	17	A9501	25
F8	16,17	H250	25	A819A	25	B9501	21
W9	17,29,31	U250	25	A820A	25	C9501A	21
N10	27	F267	23	A825A	23	D9501	17
W10	17,19,23	G275	21	A825AX	23	A9502	19
W11	19	H286A	25	A830A	27	B9502	23
X11	23	H286B	25	A833A	23	C9502	23
W14	29,31	M290	19	A835	25	A9503	23
T15	17	M291	19	A836A	17	B9503	23
T27	17	M292	23	A839B	19	A9504	23
V35	25	M293	23	A839BX	19	A9505	19
X39-115	23	M294	19	A854B	27	B9505X	25
F53	19	M295	23	A855A	27	C9505	23
H54	25	M296	27	A857A	19,23	A9506	25
F55	17	M297	27	A864	25	B9506	17
H56	23	M298	27	A884	25	C9506AX	25
F62	17	S323H	29,31	A8019	23	A9507	17
H80	25	H350A	25	A8029	25	B9507	19
M84	17	H350B	25	A8030	25	C9507A	17
H86	25	P420	25	A8043	19	C9509X	21
U86	17	P421	21	A8044	19	C9510X	21
H87	21	F511	19	A8051	27	A9511	21
R87	25	F632	19	A8053	27	C9511	17
W110	21	F633	19	A8054	27	A9512	12
G115	25	B701	25	A8056X	27	B9512	17
S121	17,29,31	B701X	25	A9034	29,31	C9512X	25
L124	17	C709X	27	C9036X	31	A9513	17
S124	27	X710C	27	A9037	31	A9515	21
U135	21,25	B716	27	C9037X	31	B9515	21
L146	25	B734X	25	A9038	31	C9515X	17,21
L165	25	B738A	17	A9038X	31	B9516	23
S165H	17,19,23	A757A	25	A9039	29	C9516	21
W166	27	B765X	27	A9039X	29	A9517	19
S167	19	A769	27	C9040X	29	A9518	19
F168	19,27	A770	27	C9041X	29	A9519	19
U180	21	A771	27	A9098X	31	A9526	19
S187H	21	A772	27	A9102X	29	A9528X	19
S188	27	A774	27	A9103X	29	A9530	17,21
W196	27	B781X	25	A9104	29	A9535	17
G210	27	A784	27	A9104X	29	A9536	17
P223	21	A785	27	A9106X	29	A9545X	27
P224	21	A793	27	A9107X	29	A9546X	23
P228	23	A794	27	A9500	23	A9547X	19
G237	17	A797	27	B9500X	19	A9551	17
G239	25	A798	27	C9500	21	A9558	19
						A19158	23

