AT-8467 WINCHES

MAINTENANCE

CONTENTS PAGE

1. GENERAL

1.01 This section contains information necessary for the maintenance of the AT-8467 continuous duty winches.

1.02 These winches are designed for truck mounting and are driven by an integrally mounted hydraulic motor. The hydraulic motor is automatically modulated by system pressure to provide approximately constant horsepower. This eliminates the chain drive, mechanical transmission, and manual gear shifting associated with variable speed mechanical transmissions.

2. DESCRIPTION

2.01 The AT-8467 L1A and L2A winches are continuous duty, truck-mounted winches and are nominally rated at 10,000 pounds. They are identical except for drum length. The drums are 8 inches in diameter and the flanges are 19 inches in diameter. The AT-8467 L1A Winch has a drum length of 22-1/2 inches and will accommodate 2100 feet of 7/16-inch wire rope wound with a winch rope winder. The AT-8467 L2A Winch which has a drum length of 16 inches and will accommodate 1400 feet of 7/16-inch wire rope wound with a winch rope winder. The AT-8467 L3A and L4A extension shafts, which comprise a shaft with a hub and pin assembly on one end for attachment to the winch and a pin at the other end for mounting a power reel, are available and may be ordered separately.

2.02 The winches consist of a drum, drum shaft, hanger assembly, winch clutch and brake assembly, final drive assembly, and a drive and safety brake assembly. The drum and drum shaft are supported by the hanger assembly and the final drive assembly. The winch clutch and brake assembly is mounted on the drum shaft next to the hanger assembly, and the drive and safety brake assembly is part of the final drive assembly. The safety brake itself is enclosed in a separate housing above the drive assembly. The winch components are mounted on an H-beam winch frame assembly for mounting on the truck frame.

2.03 ***The winch clutch and brake assembly*** consists of a flanged collar (clutch and brake plate) and an outer sleeve. Teeth in the edge of the clutch and brake plate (the flange) match similar teeth in a projection on one drum flange. In addition, the clutch and brake plate is faced with brake lining. The outer sleeve (detent sleeve) slides on the collar of the clutch and brake plate to release the detent which locks the clutch and brake assembly in the clutch engaged position. Application of the brake is accomplished by moving the clutch assembly toward the winch drum to the limit of travel to bring the brake lining against the machined face on the drum flange. Pressure must be maintained on the clutch assembly to keep the brake on. Release of pressure permits a heavy coil spring to push the brake away from the drum to the free drum position. The ***brake*** serves to slow down or stop free rotation and ***is not designed to hold a load.***

2.04 ***The drive and safety brake assembly*** includes a double-thread worm and wheel, and overrunning clutch, and a multiple-disc friction brake, which operates in an oil bath to aid in heat dissipation. When the winch is operated in the take-up direction, the brake is inoperative because

the input shaft freewheels in the overrunning clutch. When take-up power is off, the load attempts to drive the winch in the reverse direction which engages the clutch and causes the worm wheel to attempt to drive the worm. The natural braking action of driving a worm in reverse is augmented by a multiple-disc brake to give positive braking of the worm and wheel. When the winch line is being payed out, the winch drive overcomes the braking action.

3. PRECAUTIONS

3.01 Standard eye protection should be worn when performing the maintenance operations covered in this section.

3.02 If a break should occur in a hydraulic pressure line, stay clear. Do not attempt to slow or stop the leak with any kind of physical resistance. Shut down the system as soon as the leak is detected.

3.03 When making settings or adjustments that must be made with the truck engine or winch in operation, use caution to avoid accidental contact with moving parts.

4. PREPARATION PRIOR TO PLACING WINCH IN SERVICE

4.01 Before placing the winch into service initially and following repairs or overhaul, check the following:

(a) Be certain that all gear housings are filled to the correct level with the proper lubricant. (See Part 5).

(b) Be certain that the hydraulic system is filled with proper grade of oil and that the reservoir shut-off valve is open. Fill the hydraulic reservoir with a good grade multiviscosity automotive engine oil ***with an MS rating.***

(c) Disconnect the hydraulic motor drain line from the tank and pour hydraulic oil into the drain line to flood the motor casing. Reconnect the drain line.

Caution: On initial start or following motor replacement, the motor must not be started without being flooded through the drain lest metal pickup of pistons and bore will result.

(d) Engage the hydraulic pump and allow the oil to circulate for a few minutes before operating the motor.

5. LUBRICATION

5.01 ***Safety Brake Housing (Drive and Safety Brake Assembly)***—To check the lubricant level, remove the level plug in the side of the housing. The lubricant in the housing should be kept to the height of the level plug. To add lubricant: With the level plug removed, remove the filler plug in the brake housing cover and add SAE20 engine oil or same type of oil as used in the hydraulic system to fill the housing to the proper level. The level plug should always be removed before adding lubricant to prevent overfilling. Drain the housing and replace with new lubricant at least once each year.

5.02 ***Final Drive Housing and Drive Housing (Drive and Safety Brake Assembly)***—The lubricant level in these housings will be the same because of the flow-through of lubricant from one housing to the other. To check the lubricant level, remove the level plug on the front of the final drive housing. The lubricant should be kept to the height of the level plug. To add lubricant: With the level plug removed, remove the filler plug in either the final drive housing or the drive housing cover and add SAE90 mild, noncorrosive, extreme pressure lubricant to fill the housing to the proper level. The level plug should always be removed before adding lubricant to prevent overfilling. Be sure the lubricant has time to equalize its level between the housings. Drain the housings and replace with new lubricant at least once each year. To completely drain the housings, the drain plugs in both housings must be removed.

5.03 Use chassis grease to lubricate the winch hanger bearing (one fitting) and the clutch shaft (two fittings) every 75 hours of operation.

5.04 Apply cup grease sparingly to the drum clutch splines every 75 hours of operation.

5.05 Apply a few drops of engine oil, as required, to the pivot points in the clutch and brake linkage to assure free operation and to minimize wear.

6. MAINTENANCE

SETTINGS AND ADJUSTMENTS

6.01 When the power take-off is engaged to operate the hydraulic pump, the truck engine throttle shall be set to limit the hydraulic pump flow rate to 22 gpm.

6.02 The winch motor pressure relief valve setting shall be set at 2750 psi.

6.03 The pressure relief setting determines the maximum pull that can be developed by the winch. The compensator setting determines the point at which the winch speed will slow. This point of " slow down" should occur at a system line pressure of about 2000 psi. Set the compensator screw on the motor in the following manner: If the bare drum line pull is less than 13,000 pounds, turn the compensator screw 1/4 turn clockwise. Recheck and adjust as required. If the winch does develop a pull of 13,000 pounds or more, but slows down when the system pressure is less than 2000 psi, turn compensator screw counterclockwise to increase winch speed.

6.04 The compensator setting can be readily adjusted by placing a simulated load on the winch. This is done by creating an artificial back pressure which eliminates the need for measuring the winch line pull. The 2000 psi setting of the compensator can be established by means of a needle valve and a pressure gauge installed as shown in Fig. 1.
To make the test: With the winch operating in the take-up direction with a load of about 1000 pounds on the winch line, partially close the needle valve to obtain a pressure reading of 2000 psi on the gauge. The compensator should engage as the pressure reaches 2000 psi. If the compensator does not engage at 2000 psi, stop the winch, turn the compensator adjustment screw approximately 1/4 turn, and retest. When the test has been completed, fully open the needle valve for normal operation.

6.05 The safety brake should be set so the winch will support a 5000 pound load with a near full drum of winch line. The brake plates can be set by applying equal torque to the four brake spring nuts until the correct braking action is obtained. Unequal torque will cause erratic braking action. After setting the brake, be sure the winch can pay out winch line without a load on the line.

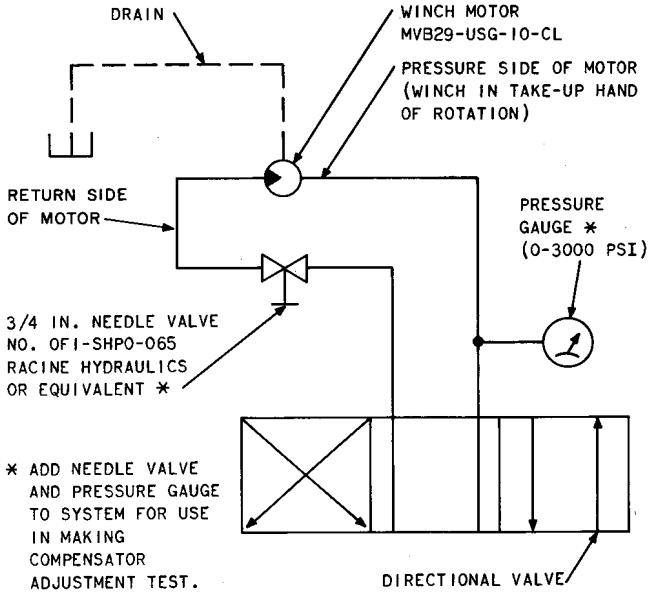


Fig. 1—Hydraulic Schematic For CD Winches (AT-8467) Compensator Adjustment Test

DISASSEMBLY PROCEDURE

6.06 The following information is based upon complete disassembly of the unit. However, in any specific instance only the part or parts requiring attention should be disassembled.

6.07 No disassembly or assembly procedure is specified for hardware items or other parts where the procedure consists of a simple operation. Numbers in parenthesis following a part name in the disassembly procedures of this section refer to the line number of the part as shown in the table on the appropriate repair parts form. The disassembly procedures given are applicable to the AT-8467 L1A and L2A winches.

6.08 ***AT-8467 L1A or L2A Winch:*** To disassemble the winch, refer to the appropriate repair parts form, Fig. 2 or 3, and proceed as follows: Drain the drive and safety brake assembly and the winch and final drive assembly. Remove the hydraulic motor. Remove the drive and safety brake assembly.

6.09 Remove the taper pin (42) and drum thrust collar (4) from end of the drum shaft. For L2A winch, first remove outer hanger assembly by removing eight hex head bolts that mount the

hanger assembly to the winch frame assembly. Remove the clutch lever rod assembly.

6.10 The next assembly to be removed is the winch clutch and brake assembly. Refer to 6.26 for proper procedure.

6.11 After the winch clutch and brake assembly has been removed, use blocks to support the drum, and remove the hanger assembly by removing the eight hex head bolts that mount the hanger assembly to the winch frame assembly.

6.12 Working through the hole in the drum assembly, remove the taper pin (42) from the drum thrust collar (8) and while supporting the drum shaft remove the drum, drum thrust collar (8), and thrust washer (9).

6.13 To remove the drum shaft assembly, remove the cover from the final drive assembly and remove the two retaining rings (33) from the shaft. The shaft may now be removed from the final drive assembly.

6.14 To reassemble the winch, reverse the disassembly procedure given in 6.08 through 6.13.

6.15 ***Drive and Safety Brake Assembly:*** Refer to Fig. 4, Drive and Safety Brake Assembly Repair Parts Form MV-5H844, for parts identification. To disassemble the drive and safety brake assembly, proceed as follows: Remove the safety brake housing cover (27). Remove the nuts (85) and washers (103) from the four studs (18). Remove the springs (19), spring thimbles (4), and pressure plate (37). Remove the brake lining plates (3) and the brake disc assemblies (15). Remove the brake sleeve and disc assembly (10) and remove the key (22) from the worm shaft (11).

6.16 Remove the safety brake housing (26) and the oil seal (81). Remove the bearing cap (17) at the lower end of the worm shaft. Remove the worm shaft and the bearing (72) on the top end of the shaft by lifting the shaft out of the housing. Push the lower bearing (72) out through the bottom of the housing.

6.17 Remove the cover (25) from the drive housing. Remove the bearing cap (16). Remove the bearing (68), sleeve (13), and worm gear (12).

6.18 From the opposite side of the housing, remove the bearing cap (39). Remove the nut (1) and washer (102) and push the drive shaft (28) into the housing so the bearing (70), retaining ring (78), shims (48-51), and spacer (29) can be removed. As the drive shaft is pushed into the housing from the driven gear end, the worm gear drive shaft and one-way clutch assembly (mounted on the opposite end of the drive shaft) will be moved clear of the housing. Push the shaft further into the housing so the driven gear (31) can be lifted out of the housing. Push the shaft through the housing and remove the pinion (32) and bearing (70). From the drive shaft (28), remove the worm gear drive shaft (14) and the one-way clutch assembly (20) and the sleeve (9).

6.19 With the hydraulic motor removed, remove the bearing cap (38) and shims (40-43). Remove the retaining ring (75) and push the drive gear (30) out of the housing. Remove the bearing (71).

6.20 From the final drive pinion shaft (52), remove the locknut (93) and lockwasher (95). Remove the spiral bevel gear (33) and spacer (8). Remove the retaining ring (77) and bearing (69).

6.21 Remove the pinion drive shaft (52) and remove the spacer (36) from the shaft.

6.22 To reassemble the drive and safety brake assembly, reverse the procedure given in 6.15 through 6.21 except that in 6.16 replace the bearing cap (17) immediately after replacing the lower bearing (72).

> ***Note:*** The spiral bevel pinion (32) and the spiral bevel gear (33) are a matched pair. During reassembly the tooth on the bevel gear that is marked with an X must come into mesh between the two pinion teeth that are each marked with an X.

6.23 ***Winch Final Drive Assembly:*** Refer to Fig. 5, Winch Final Drive Assembly Repair Parts Form MV-5H843, for parts identification. To disassemble the winch final drive assembly, proceed as follows: With the cover (10) removed and the drum shaft removed, as covered in 6.13, lift the helical gear (14) from the housing. Remove the thrust washers (1) and the set screw (30). Remove the bearings (20 and 21) and ring (2).

6.24 Remove the two bearing caps (5) and push out idler shaft (11) with the spacer (12) and bearing (19). Remove the remaining helical gear (13) and bearing (19).

6.25 To reassemble the winch final drive assembly, reverse the procedure given in 6.23 and 6.24.

6.26 ***Winch Clutch and Brake Assembly:*** Refer to Fig. 6, Winch Clutch and Brake Assembly, Repair Parts Form MV-4H917, for parts identification. To disassemble the winch clutch and brake assembly, proceed as follows: Remove the four capscrews (16) so the clutch shaft bracket (8), clutch operating fork (14), clutch shaft (2), and clutch yoke shaft lever (1) may be removed as an assembly.

6.27 Remove the detent sleeve capscrew (5) and the pipe plug (24) from the detent sleeve (11). Move the detent sleeve toward the drum to the free-drum position. Turn the detent sleeve (also the drum shaft, if necessary) to allow a steel ball (23) to drop out through the hole from which the pipe plug was removed. A detent (13), the detent spring (3), and the second detent must be remove at this time and through the same hole to avoid damaging the parts through movement of the detent sleeve. Turn the drum shaft approximately one-half turn, and align the hole in the detent sleeve to allow the second steel ball (23) to drop out.

6.28 Remove the capscrew (15) and move the detent sleeve as required to allow one of the steel balls (22) to drop out through the hole from which the capscrew was removed. Remove the second steel ball (22) in the same manner as the first.

6.29 Remove the clutch and brake plate (9) and the spring (10). Remove the four spring pins (21) and the stop ring (12) to allow the detent sleeve to be removed from the clutch and brake plate.

6.30 ***To reassemble the winch clutch and brake,*** place the detent sleeve over the hub of the clutch and brake plate and assemble the stop ring. The inner ends of the spring pins must be flush or underflush with inner surface of the clutch and brake plate. Place the drum shaft spring on the drum shaft. Place the clutch and brake plate on the shaft so that the holes in the clutch and brake plate hub will align with the hole in the drum shaft. Position the detent sleeve so that the pipe-plug hole is aligned with the large hole which is on the underside of the clutch and brake plate hub, and insert a steel ball (23). Turn the sleeve to retain the ball and register the pipe plug hole with the large hole on the upper side of the clutch and brake plate hub. Move the assembly on the drum shaft to align these holes with the hole in the drum shaft. Insert a detent with the ***rounded end down,*** the detent spring, and the other detent with the ***rounded end up.*** Place the second steel ball (23) through the pipe plug hole and turn the detent sleeve slightly to retain the ball. Replace the pipe plug (24).

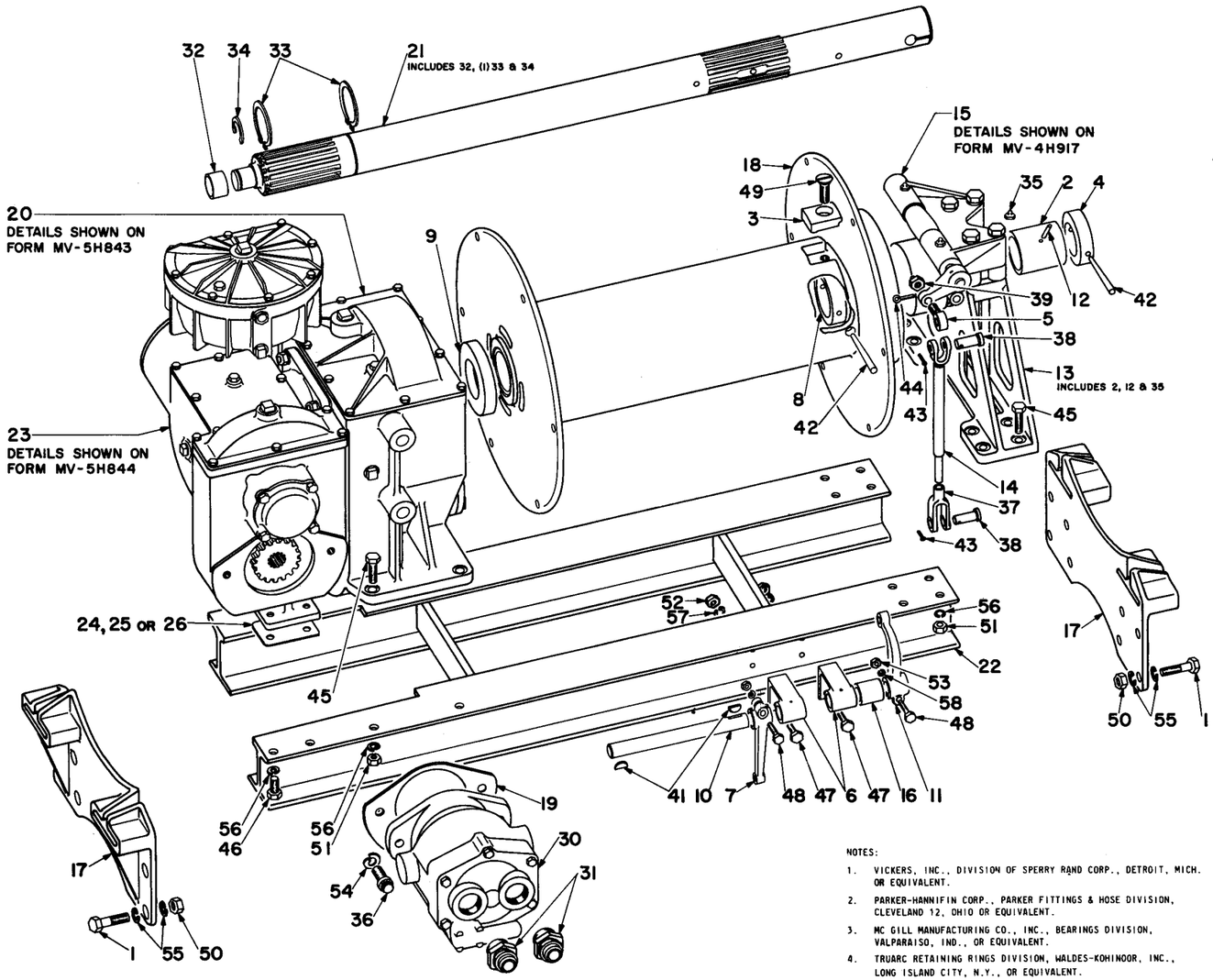
6.31 Align one of the small holes in the clutch and brake plate hub with the hole in the detent sleeve. Insert one of the steel balls (22), rotate the sleeve 180 degrees, insert the other steel ball (22), and replace the screw (15) and washer (19). Replace the detent sleeve capscrew (5) making sure it engages the slot in the clutch and brake plate hub.

7. ORDERING REPAIR PARTS

7.01 The requisition for repair parts must completely identify the part. To completely identify a part, furnish the item description and part number taken from the repair parts form, the repair parts form number, and the information on the name plate that is attached to the equipment or the AT-specification list number of the equipment. Refer to Section 649-020-111 for additional information on ordering repair parts.

FORM MV-5H841

REPAIR PARTS
WINCH
AT-8467 LIA



NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE

NOTES:

1. VICKERS, INC., DIVISION OF SPERRY RAND CORP., DETROIT, MICH. OR EQUIVALENT.
2. PARKER-HANNIFIN CORP., PARKER FITTINGS & HOSE DIVISION, CLEVELAND 12, OHIO OR EQUIVALENT.
3. MC GILL MANUFACTURING CO., INC., BEARINGS DIVISION, VALPARAISO, IND., OR EQUIVALENT.
4. TRUARC RETAINING RINGS DIVISION, WALDES-KOHINOOR, INC., LONG ISLAND CITY, N.Y., OR EQUIVALENT.
5. ALEMITE, DIVISION OF STEWART-WARNER CORP., CHICAGO, ILL., OR EQUIVALENT.
6. THE FERRY CAP & SET SCREW COMPANY, CLEVELAND, OHIO OR EQUIVALENT.

WHEN ORDERING, IDENTIFY PARTS BY MV-NUMBERS WHERE GIVEN, OTHERWISE BY ITEM DESCRIPTION.

LINE NO.	PART NO. MV-	ITEM DESCRIPTION		NO. REQ
1	1H157	BOLT, MOUNTING		14
2	1H180	BUSHING, DRUM SHAFT HANGER		1
3	1H196	ROPE CLAMP		1
4	1H198	DRUM THRUST COLLAR		1
5	1H203	CLUTCH YOKE SHAFT LEVER ROD END		1
6	1H206	CLUTCH LEVER SHAFT BRACKET		2
7	1H207	CLUTCH ROD LEVER		1
8	4H815	DRUM THRUST COLLAR		1
9	4H816	THRUST WASHER		1
10	4H817	CLUTCH LEVER SHAFT		1
11	4H818	CLUTCH ROD SHAFT LEVER		1
12	4H830	PIN, DOWEL		1
13	4H833	HANGER ASSEMBLY		1
14	4H834	ROD ASSEMBLY, CLUTCH LEVER		1
15	4H841	WINCH CLUTCH AND BRAKE ASSEMBLY		1
16	4H863	SPACER		1
17	4H904	WINCH MOUNTING BRACKET		2
18	5H182	DRUM ASSEMBLY		1
19	5H787	GASKET		1
20	5H788	WINCH FINAL DRIVE ASSEMBLY		1
21	5H789	DRUM SHAFT ASSEMBLY		1
22	5H791	WINCH FRAME ASSEMBLY		1
23	5H794	DRIVE AND SAFETY BRAKE ASSEMBLY		1
24	5H837	SHIM	19 GA (.0418)	AS REQ
25	5H838		20 GA (.0359)	
26	5H839		32 GA (.0097)	
27				
28				
29				
30	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	VARIABLE DISPLACEMENT MOTOR WITH PRESSURE COMPENSATOR NO. M-MVB29-USG-10-CL-10-074	SEE NOTE 1	1
31		CONNECTOR, STRAIGHT THREAD TRIPLE-LOK 16-20 F50X-S	SEE NOTE 2	2
32		BEARING, GUIDEROL INNER RING MI-20-N	SEE NOTE 3	1
33		RING, EXT. 5100-275	SEE NOTE 4	2
34		RETAINING, EXT. 5103-125		1
35		FITTING, HYDRAULIC NO. 1610	SEE NOTE 5	1
36		SCREW, 12 POINT FLANGED CAP, 5/8-11 X 1-1/2	COUNTR-BOR SEE NOTE 6	2
37		YOKE, ADJUSTABLE, 1/2-20 SAE STD		1
38		CLEVIS PIN 1/2 SAE STD		2
39		NUT, FIN. HEX. CASTLE, STL, .500-20 SAE STD		1
40				
41	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	KEY, WOODRUFF 1/4 X 7/8		2
42		TAPER PIN - STL - NO. 7 X 4		2
43		PIN, STD COTTER - STL -	.125 X 7/8	2
44			.094 X 1	1
45		BOLT, REG HEX. H - STL -	.500-20 X 1-3/4	13
46			.500-20 X 1	2
47			.375-24 X 1-1/4	4
48			.312-24 X 1-3/4	2
49		SCREW, F H CAP - STL -	.625-11 X 1-1/2	1
50		NUT, HEX. - STL -	.625-18	14
51			.500-20	13
52			.375-24	4
53			.312-24	2
54		LOCKWASHER, SPG - STL -	5/8 HVY	2
55			5/8 MED	28
56			1/2 MED	15
57			3/8 MED	4
58			5/16 MED	2

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Fig. 2—AT-8467 L1A Winch Repair Parts Form, Sheet 1

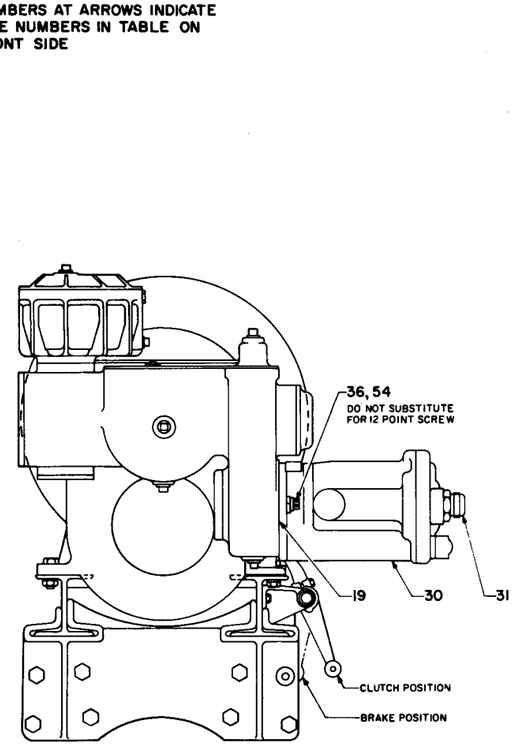
FORM MV-5H841

REPAIR PARTS

WINCH

AT-8467 LIA

NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE ON FRONT SIDE



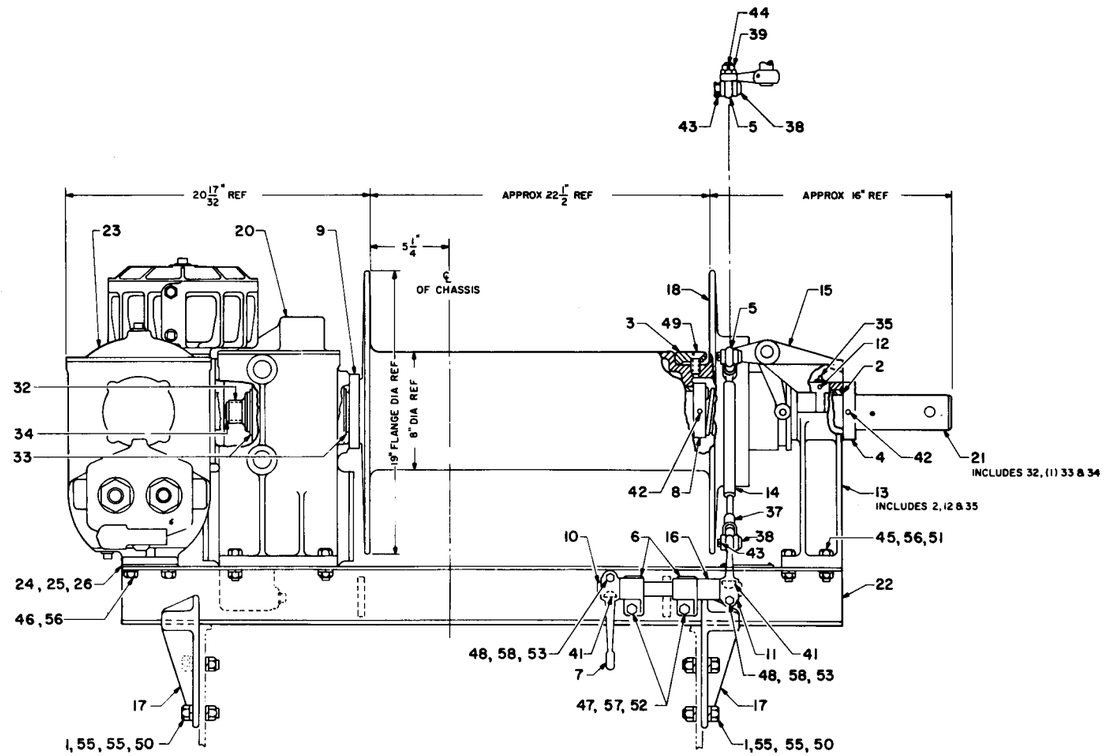


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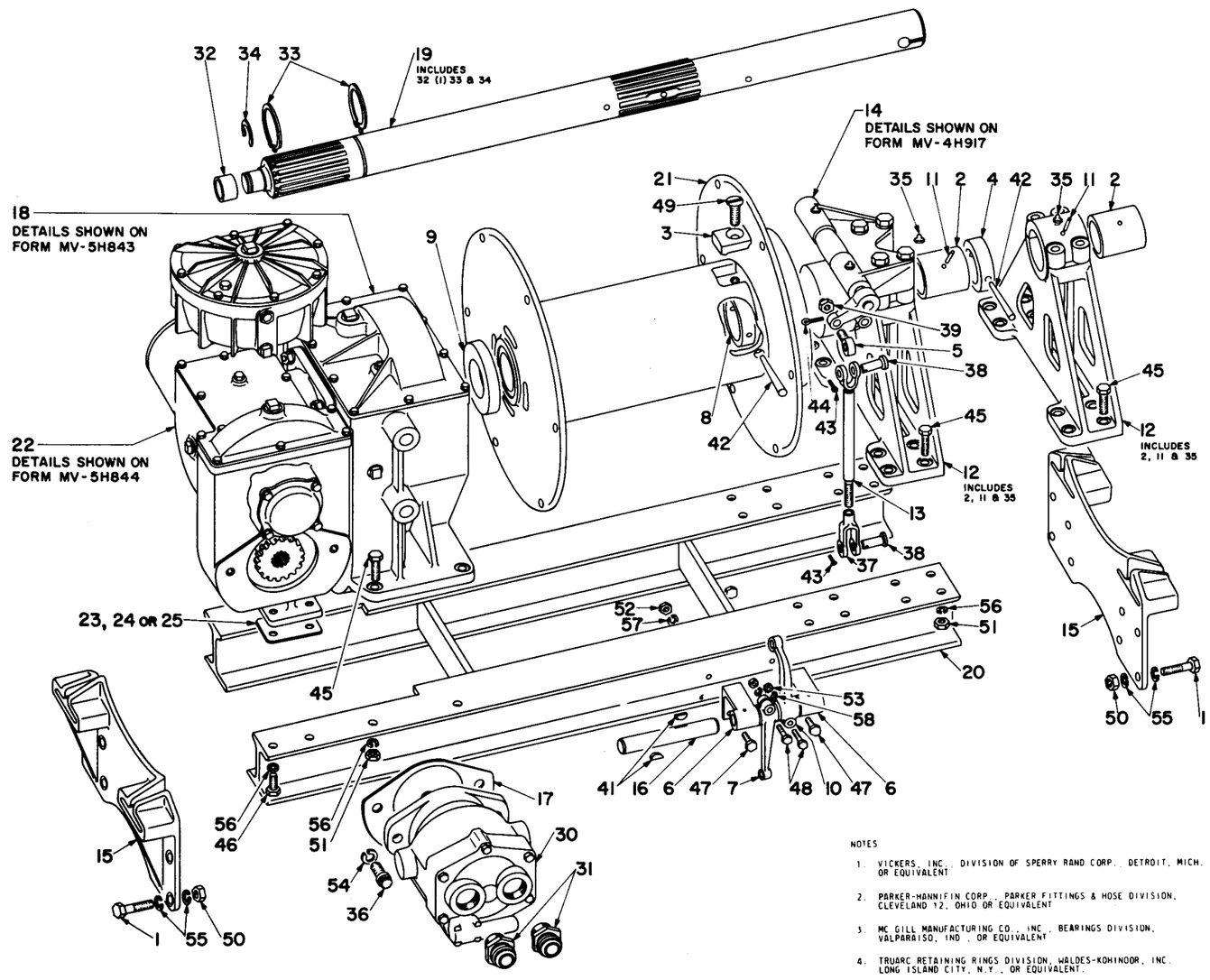
Fig. 2—AT-8467 L1A Winch Repair Parts Form, Sheet 2

FORM MV-5H842

REPAIR PARTS
WINCH
AT-8467 L2A



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NOTES

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2. PARKER-HANNIFIN CORP., PARKER FITTINGS & HOSE DIVISION, CLEVELAND 12, OHIO OR EQUIVALENT
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2	1H180	BUSHING, DRUM SHAFT HANGER		2
3	1H196	ROPE CLAMP		1
4	1H198	DRUM THRUST COLLAR		1
5	1H203	CLUTCH YOKE SHAFT LEVER ROD END		1
6	1H206	CLUTCH LEVER SHAFT BRACKET		2
7	1H207	CLUTCH ROD LEVER		1
8	4H815	DRUM THRUST COLLAR		1
9	4H816	THRUST WASHER		1
10	4H818	CLUTCH ROD SHAFT LEVER		1
11	4H830	PIN, DOWEL		2
12	4H833	HANGER, ASSEMBLY		2
13	4H834	ROD ASSEMBLY, CLUTCH LEVER		1
14	4H841	WINCH CLUTCH AND BRAKE ASSEMBLY		1
15	4H904	WINCH MOUNTING BRACKET		2
16	5H786	CLUTCH LEVER SHAFT		1
17	5H787	GASKET		1
18	5H788	WINCH FINAL DRIVE ASSEMBLY		1
19	5H790	DRUM SHAFT ASSEMBLY		1
20	5H792	WINCH FRAME ASSEMBLY		1
21	5H793	DRUM ASSEMBLY		1
22	5H794	DRIVE AND SAFETY BRAKE ASSEMBLY		1
23	5H837	SHIM	19 GA (.0418)	AS REQ.
24	5H838		20 GA (.0359)	
25	5H839		32 GA (.0097)	
26				
27				
28				
29				
30	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	VARIABLE DISPLACEMENT MOTOR WITH PRESSURE COMPENSATOR NO. M-MVB29-USG-10-CL-10-074	SEE NOTE 1	1
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32		BEARING, GUIDEROL INNER RING MI-20-N	SEE NOTE 3	1
33		RING, EXT. 5100-275	SEE NOTE 4	2
34		RETAINING, EXT. 5103-125		1
35		FITTING, HYDRAULIC NO. 1610	SEE NOTE 5	2
36		SCREW, 12 POINT FLANGED CAP, 5/8-11 X 1-1/2	COUNTR-BOR SEE NOTE 6	2
37		YOKE, ADJUSTABLE, 1/2-20 SAE STD		1
38		CLEVIS PIN 1/2 SAE STD		2
39		NUT, FIN. HEX. CASTLE, STL, .500-20 SAE STD		1
40				
41	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	KEY, WOODRUFF 1/4 X 7/8		2
42		TAPER PIN - STL - NO. 7 X 4		2
43		PIN, STD COTTER - STL -	.125 X 7/8	2
44			.094 X 1	1
45		BOLT, REG HEX. H - STL -	.500-20 X 1-3/4	13
46			.500-20 X 1	2
47			.375-24 X 1-1/4	6
48			.312-24 X 1-3/4	2
49		SCREW, F H CAP - STL -	.625-11 X 1-1/2	1
50		NUT, HEX. - STL -	.625-18	14
51			.500-20	13
52			.375-24	4
53			.312-24	2
54		LOCKWASHER, SPG - STL -	5/8 HVY	2
55			5/8 MED	28
56			1/2 MED	15
57			3/8 MED	4
58			5/16 MED	2

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Fig. 3—AT-8467 L2A Winch Repair Parts Form, Sheet 1

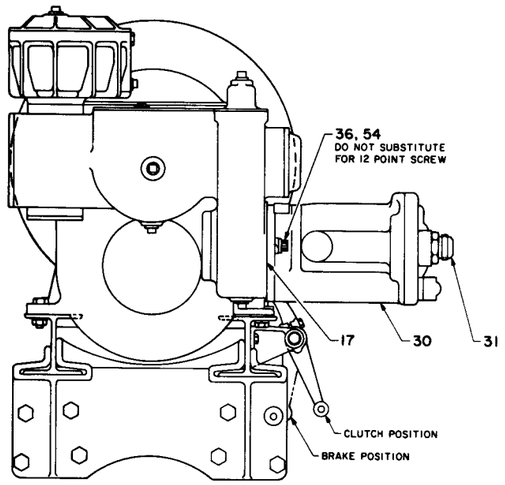
FORM MV-5H842

REPAIR PARTS

WINCH

AT-8467 L2A

NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE ON FRONT SIDE



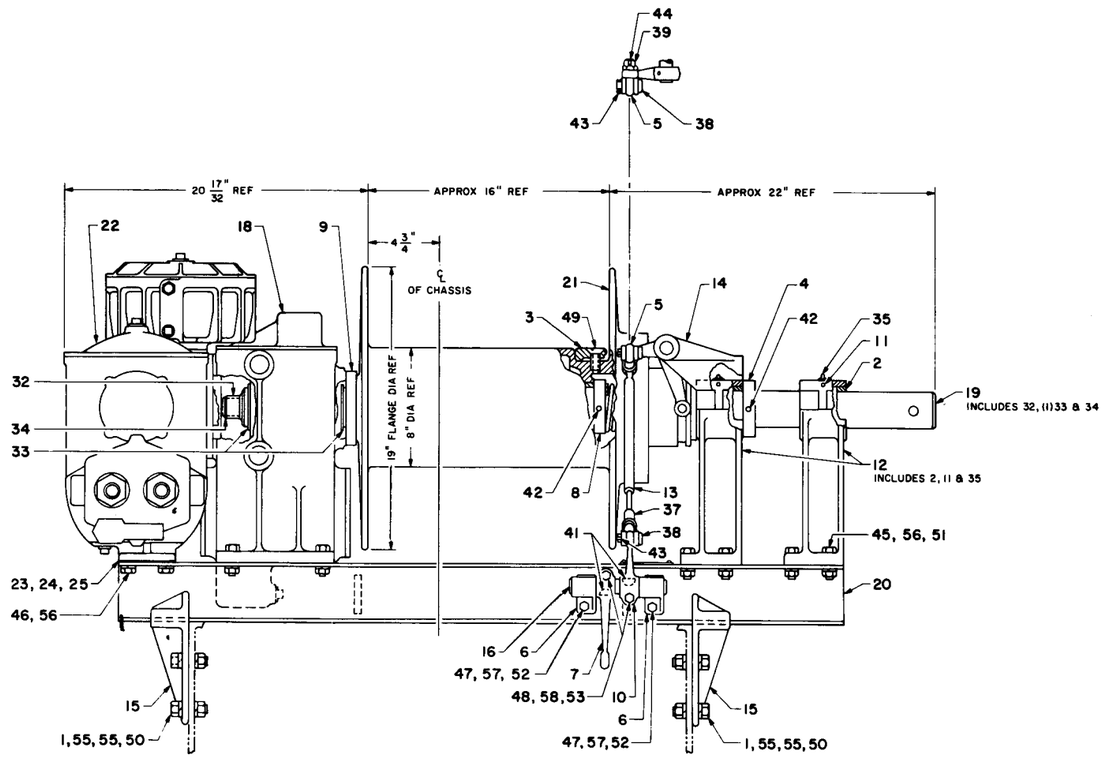


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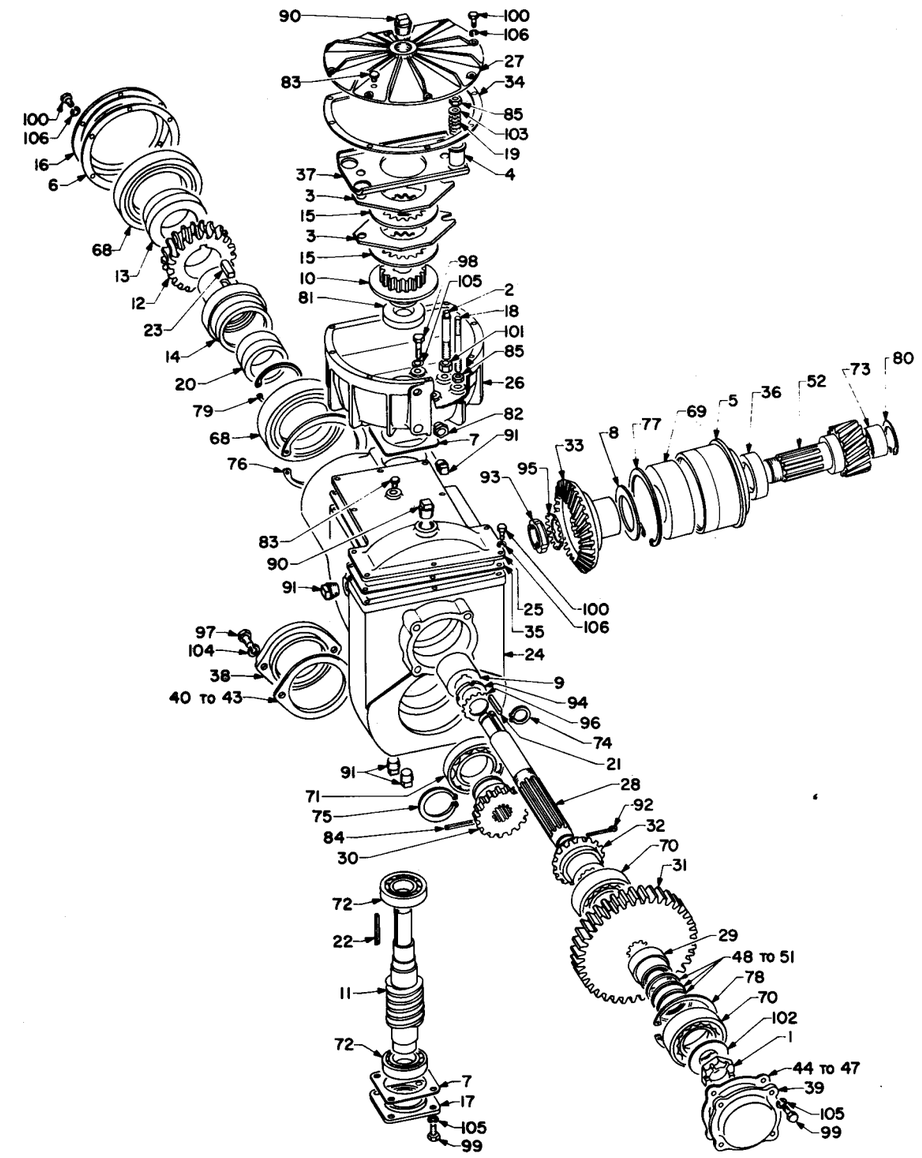
Fig. 3—AT-8467 L2A Winch Repair Parts Form, Sheet 2

FORM MV-5H844

REPAIR PARTS
DRIVE AND SAFETY BRAKE
MV-5H794



WHEN ORDERING, IDENTIFY PARTS BY MV-NUMBERS WHERE GIVEN, OTHERWISE BY ITEM DESCRIPTION

LINE NO.	PART NO. MV-	ITEM DESCRIPTION			NO. REQ.
68	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	BEARING, BALL	NO. 0L18	NOTE 1	2
69			NO. 5213		1
70			NO. 5211		2
71			NO. 3211		1
72			NO. 20207		2
73		BEARING, GUIDEROL OUTER RING & ROLLER ASSEMBLY, GR-24-N		NOTE 2	1
74		RING, RETAINING	EXT. 5100-112	NOTE 3	1
75			EXT. 5100-215		1
76			INT. N5000-550		1
77			INT. N5000-475		1
78			INT. N5000-393		1
79			INT. N5000-281		1
80			INT. N5000-206		1
81		OIL SEAL, NO. 12637		NOTE 4	1
82		PLUG, OIL GAGE, BH-4040 3/8 - 18 NPT		NOTE 5	1
83		FITTING, RELIEF NO. 47200,		NOTE 6	2
84		ROLLPIN, ESNA NO. 59-032-156-2500			1
85		NUT, FIN. HEX. - .375-24, SELFLOCKING, - ESLOK NUT 10005		NOTE 7	8
86					
87					
88					
89					
90		PLUG, PIPE - STL -	3/4 - 14 NPT		2
91			1/2 - 14 NPT		4
92		PIN, STD COTTER - STL - .125 X 1-3/4			1
93		LOCKNUT,	BR-N-08	NOTE 8	1
94			BR-N-07		1
95		LOCKWASHER	W-08 AFBMA STD		1
96			W-07 AFBMA STD		1
97		SCREW, HEX. H CAP - STL -	.500-20 X 3/4		2
98			.375-24 X 1-1/2		4
99			.375-24 X 3/4		12
100			.250-28 X 3/4		26
101		NUT, HEX. - STL -	.500-20		2
102		WASHER, PLAIN - STL -	1-1/4 - 2-3/4 X .192		1
103			3/8 - 3/4 X .080		4
104		LOCKWASHER, SPG - STL -	1/2 MED		2
105			3/8 MED		12
106			1/4 MED		26
107					
108					
109					
110					

NOTES:

1. NEW DEPARTURE, DIVISION OF GENERAL MOTORS CORP., BRISTOL, CONN., OR EQUIVALENT.
2. MCGILL MANUFACTURING CO., INC., BEARING DIVISION, VALPARAISO, IND., OR EQUIVALENT.
3. TRUARC RETAINING RINGS DIVISION, WALDES-KOHINOOR, INC. LONG ISLAND CITY, N.Y. OR EQUIVALENT.
4. CHICAGO RAWHIDE MANUFACTURING COMPANY, ELGIN, ILL., OR EQUIVALENT.
5. GITS BROS. MFG. CO., CHICAGO, ILL., OR EQUIVALENT.
6. ALEMITE, DIVISION OF STEWART WARNER CORP., CHICAGO, ILL., OR EQUIVALENT.
7. ELASTIC STOP NUT CORP OF AMERICA, UNION, N.J., OR EQUIVALENT
8. THE NYLOK CO., PARAMUS, N.J. OR EQUIVALENT.

LINE NO.	PART NO. MV-	ITEM DESCRIPTION		NO. REQ.
1	1H021	NUT		1
2	1H095	BRAKE ANCHOR STUD		2
3	1H097	BRAKE LINING PLATE		2
4	1H137	SPRING THIMBLE		4
5	4H478	SLEEVE		1
6	4H859	GASKET		1
7	4H862	GASKET		2
8	4H865	SPACER		1
9	4H868	SLEEVE		1
10	4H872	BRAKE SLEEVE & DISC ASSEMBLY		1
11	4H873	WORM SHAFT		1
12	4H874	WORM GEAR		1
13	4H875	SLEEVE		1
14	4H876	SHAFT, WORM GEAR DRIVE		1
15	4H877	BRAKE DISC ASSEMBLY		2
16	4H878	CAP, BEARING		1
17	4H880	CAP, BEARING		1
18	4H888	STUD		4
19	4H889	SPRING		4
20	4H890	ONE-WAY CLUTCH ASSEMBLY		1
21	4H892	KEY		1
22	4H893	KEY		1
23	4H894	KEY		1
24	5H803	HOUSING		1
25	5H804	COVER		1
26	5H805	HOUSING, SAFETY BRAKE		1
27	5H806	COVER, SAFETY BRAKE HOUSING		1
28	5H807	DRIVE SHAFT		1
29	5H808	SPACER		1
30	5H809	DRIVE GEAR		1
31	5H810	DRIVEN GEAR		1
32	5H811	SPIRAL BEVEL PINION		1
33	5H812	SPIRAL BEVEL GEAR		1
34	5H814	GASKET		1
35	5H815	GASKET		1
36	5H816	SPACER		1
37	5H817	PRESSURE PLATE		1
38	5H818	CAP, BEARING		1
39	5H819	CAP, BEARING		1
40	5H820	SHIM	16 GA (.0625)	AS REQ.
41	5H821		22 GA (.0312)	
42	5H822		28 GA (.0156)	
43	5H823		32 GA (.0101)	
44	5H824	SHIM	16 GA (.0625)	AS REQ.
45	5H825		22 GA (.0312)	
46	5H826		28 GA (.0156)	
47	5H827		32 GA (.0101)	
48	5H828	SHIM	16 GA (.0625)	AS REQ.
49	5H829		22 GA (.0312)	
50	5H830		28 GA (.0156)	
51	5H831		32 GA (.0101)	
52	5H833	SHAFT DRIVE PINION		1
53				
54				
55				
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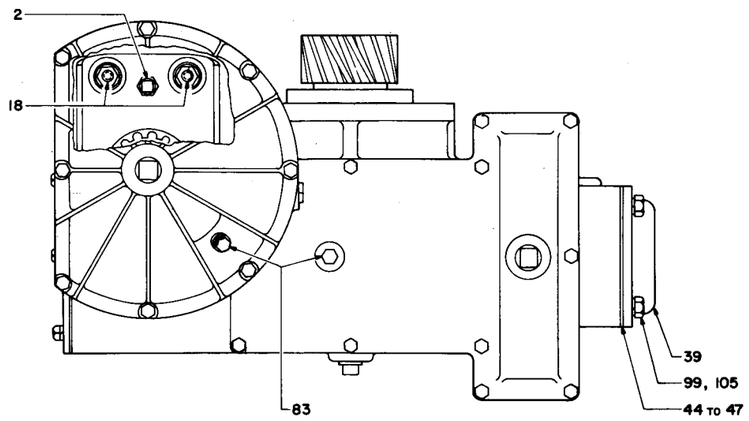
Fig. 4—Drive and Safety Brake Assembly Repair Parts Form, Sheet 1

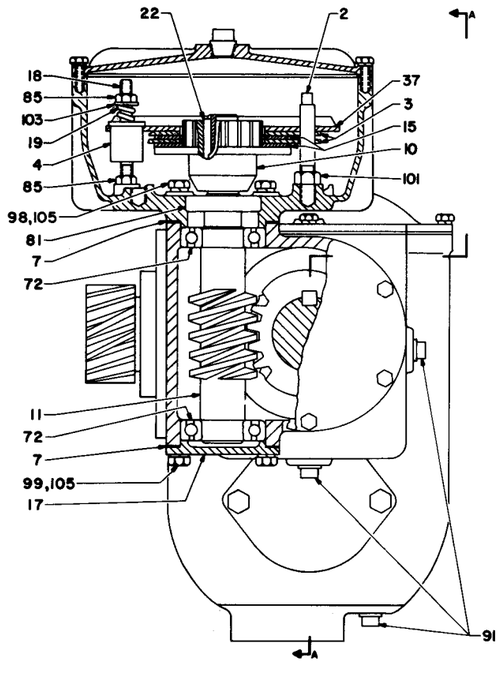
FORM MV-5H844

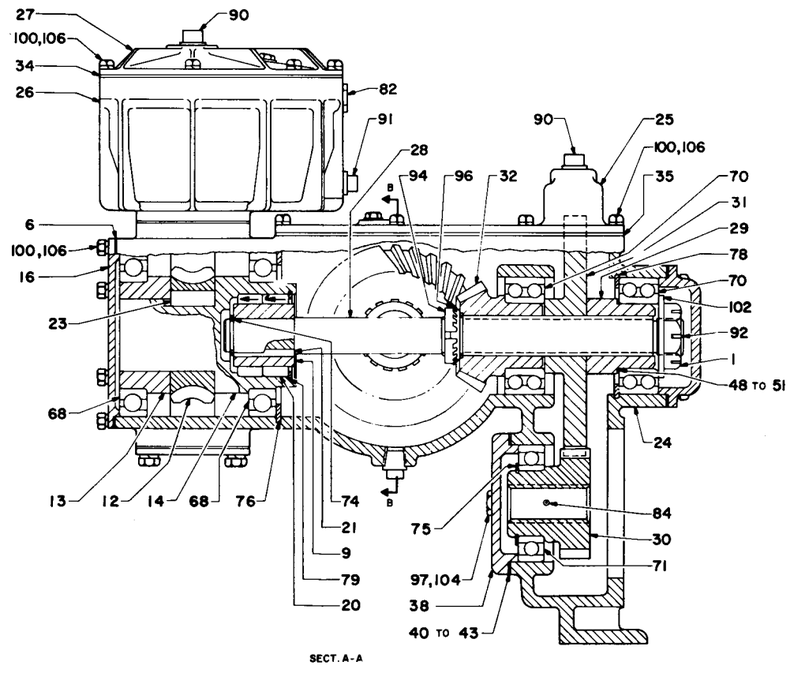
REPAIR PARTS

DRIVE AND SAFETY BRAKE
MV-5H794

NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE ON FRONT SIDE







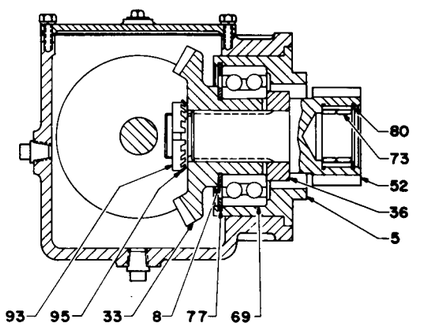


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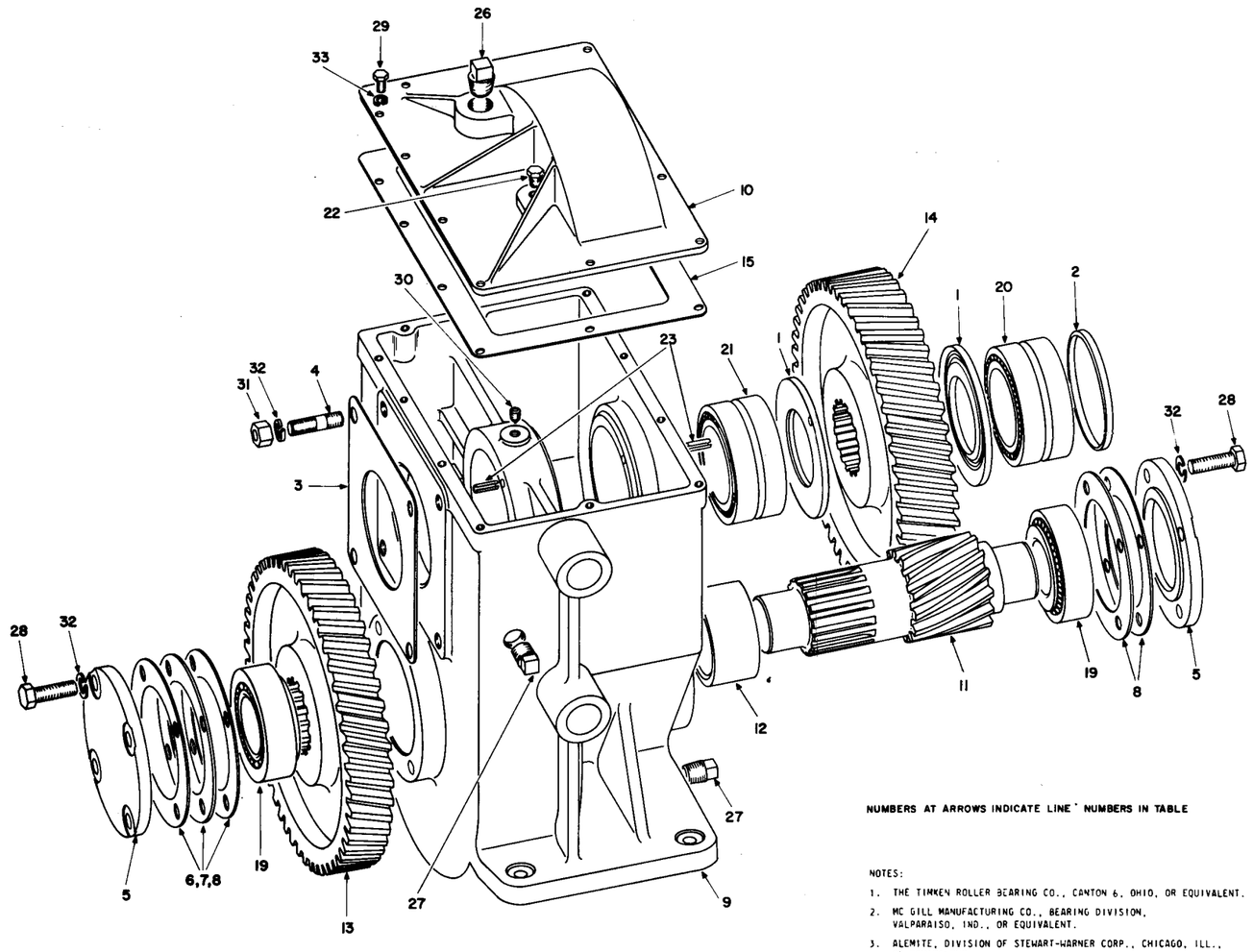
Fig. 4—Drive and Safety Brake Assemby Repair Parts Form, Sheet 2

FORM MV-5H843

REPAIR PARTS
WINCH FINAL DRIVE
MV-5H788



NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE

NOTES:

1. THE TIMKEN ROLLER BEARING CO., CANTON 6, OHIO, OR EQUIVALENT.
2. MC GILL MANUFACTURING CO., BEARING DIVISION, VALPARAISO, IND., OR EQUIVALENT.
3. ALEMITE, DIVISION OF STEWART-WARNER CORP., CHICAGO, ILL., OR EQUIVALENT.
4. ELASTIC STOP NUT CORP. OF AMERICA, UNION, N.J., OR EQUIVALENT.

WHEN ORDERING, IDENTIFY PARTS BY MV-NUMBERS WHERE GIVEN, OTHERWISE BY ITEM DESCRIPTION

LINE NO.	PART NO. MV-	ITEM DESCRIPTION			NO. REQ.
1	4H491	THRUST WASHER			2
2	4H847	RING			1
3	4H848	GASKET			1
4	4H849	STUD			4
5	4H850	CAP, BEARING			2
6	4H905	SHIM,	.020		AS REQ
7	4H906		.007		
8	4H907		.005		
9	5H795	HOUSING, FINAL DRIVE			1
10	5H796	COVER			1
11	5H797	SHAFT, IDLER			1
12	5H798	SPACER			1
13	5H799	HELICAL GEAR, DRIVEN			1
14	5H800	HELICAL GEAR, DRIVEN			1
15	5H801	GASKET			1
16					
17					
18					
19	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	BEARING, TAPER ROLLER	CONE NO. 49585 CUP NO. 49520	SEE NOTE 1	2
20		BEARING, ROLLER GUIDEROL	OUTER RING GR-92-RS INNER RING M1-44	SEE NOTE 2	1
21			OUTER RING GR-52 INNER RING M1-44		1
22		FITTING, RELIEF NO. 47200		SEE NOTE 3	1
23		ROLLPIN, ESNA NO. 52-062-312-0750		SEE NOTE 4	2
24					
25					
26	MATERIAL TO BE ORDERED BY ITEM DESCRIPTION	PLUG, PIPE - STL -	3/8-14 NPT		1
27			1/2-14 NPT		2
28		SCREW, HEX.H CAP - STL -	.500-20 X 1-1/2		8
29			.250-20 X 1/2		11
30		SCREW, HEX.SOCKET SET, CONE PT - STL - .312-24 X 1/2			1
31		NUT, HEX. - STL -	.500-20		4
32		LOCKWASHER, SPG - STL	1/2 MED		12
33			1/4 MED		11

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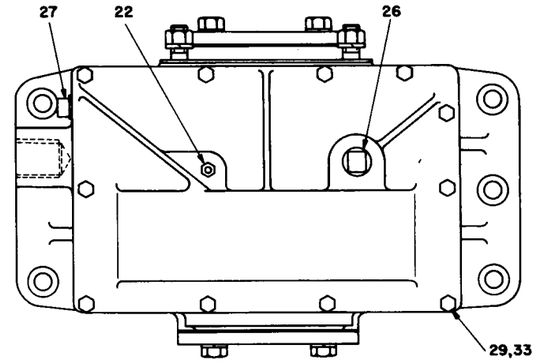
Fig. 5—Winch Final Drive Assembly Repair Parts Form, Sheet 1

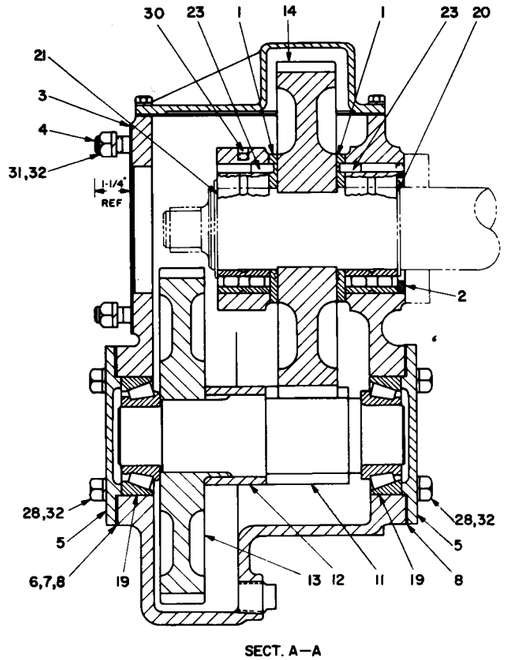
FORM MV-5H843

REPAIR PARTS

WINCH FINAL DRIVE
MV-7H788

NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE ON FRONT SIDE





SECT. A—A

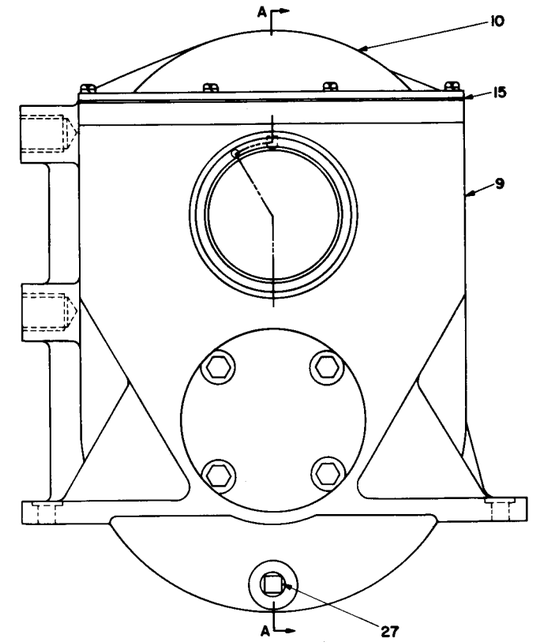


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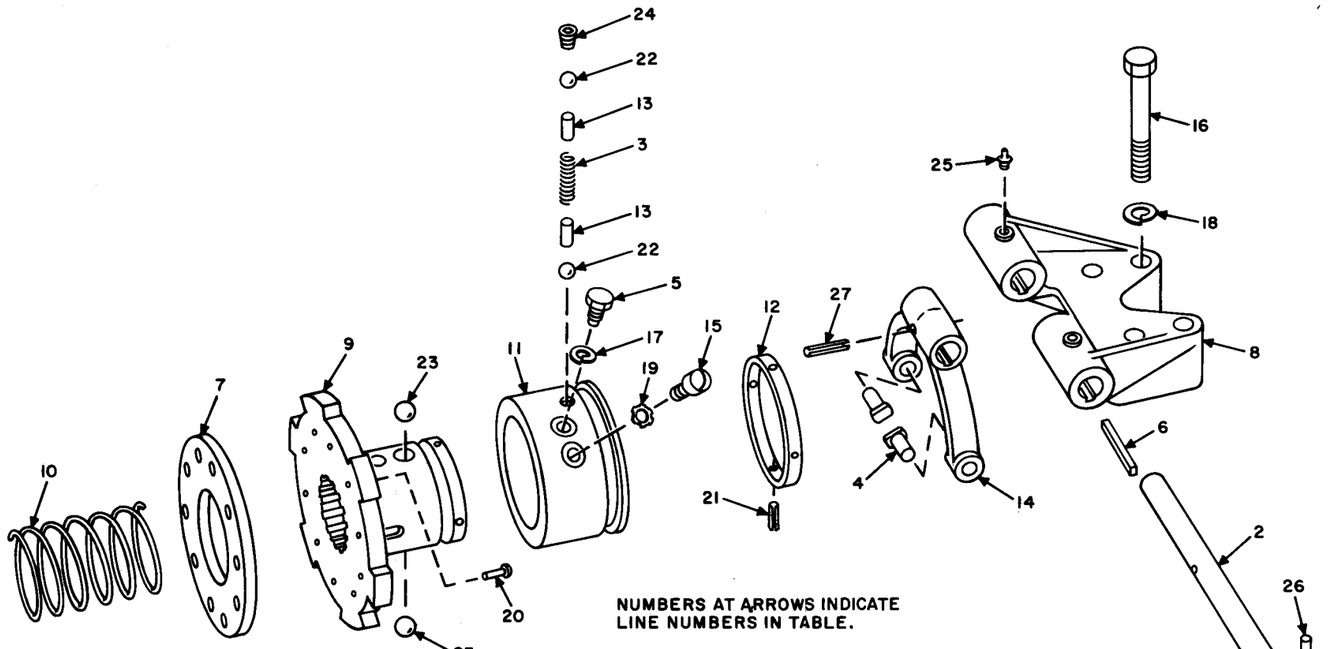
Fig. 5—Winch Final Drive Assembly Repair Parts Form, Sheet 2

FORM MV-4H917 7-63

REPAIR PARTS
WINCH CLUTCH AND BRAKE
MV-4H841



NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE.

NOTES:

1. WASHER, LOCK, EXTERNAL TYPE-STL 1/2: SHAKEPROOF INC., CHICAGO, ILL. CAT. NO. 1124, OR EQUIVALENT.
2. FITTING, STRAIGHT-STL 1/8 NPT: ALEMITE DIVISION OF STEWART-WARNER CORP., CHICAGO, ILL. CAT. NO. 1610, OR EQUIVALENT.
3. PIN, SPRING-STL .250 X 1-1/2: ELASTIC STOP NUT CORPORATION OF AMERICA, UNION, N. J., CATALOG NO. 59-048-250-1500, ROLL PIN, OR EQUIVALENT.
4. PIN, SPRING STL .250 X 5/8: ELASTIC STOP NUT CORPORATION OF AMERICA, UNION, N. J., CATALOG NO. 59-048-250-0625, ROLL PIN, OR EQUIVALENT.

WHEN ORDERING, IDENTIFY PARTS BY MV- NUMBERS WHERE GIVEN, OTHERWISE BY ITEM DESCRIPTION ONLY.

LINE NO.	PART NO. MV-	ITEM DESCRIPTION	NO. REQ
1	1H161	LEVER, CLUTCH YOKE SHAFT	1
2	1H162	SHAFT, CLUTCH	1
3	1H165	SPRING, DETENT	1
4	1H168	PIN	2
5	1H169	CAP SCREW, DETENT SLEEVE	1
6	1H170	KEY	1
7	1H174	BRAKE LINING	1
8	2H753	BRACKET, CLUTCH SHAFT	1
9	4H835	PLATE, CLUTCH AND BRAKE	1
10	4H836	SPRING, DRUM SHAFT	1
11	1H171	SLEEVE, DETENT	1
12	1H172	STOP RING	1
13	1H164	DETENT	2
14	1H167	FORK, CLUTCH OPERATING	1
15		SCREW, FIL-H-CAP.-STL 1/2-20 X 5/8	1
16		SCREW, HEX-H-CAP.-STL 5/8-18 X 4-1/2	4
17		WASHER, SPG LOCK-STL 1/2 MED	1
18		WASHER, SPG LOCK-STL 5/8 MED	4
19		SEE NOTE 1	1
20		RIVET, TUBULAR, OH-BRASS 3/16-X 3/4	10
21		SEE NOTE 4	4
22		BALL, HARDENED STL 17/32 DIA	2
23		BALL, HARDENED STL 11/16 DIA	2
24		PLUG, PIPE, CSK-STL 1/2-14 NPT	1
25		SEE NOTE 2	2
26		PIN, TAPER-STL NO. 6 X 1-1/2	1
27		SEE NOTE 3	1

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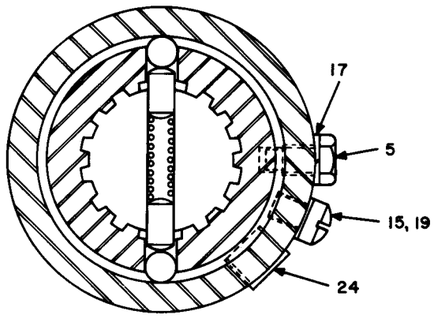
Fig. 6—Winch Clutch and Brake Assembly Repair Parts Form, Sheet 1

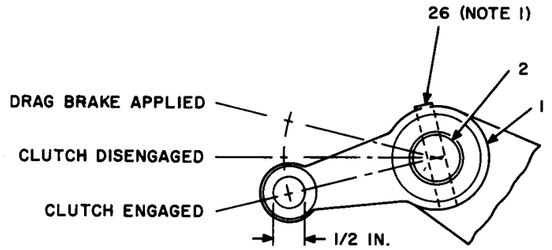
FORM MV-4H917

REPAIR PARTS
WINCH CLUTCH AND BRAKE
MV-4H841

NUMBERS AT ARROWS INDICATE LINE NUMBERS IN TABLE ON FRONT SIDE.



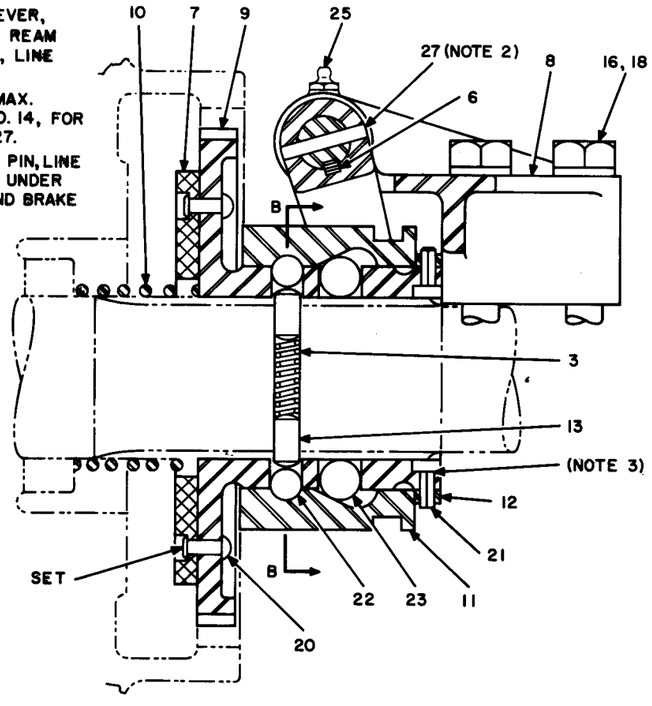
SECT. B-B



VIEW C-C

NOTES:

1. DRILL 5/16 HOLE IN LEVER, LINE NO. 1, AND TAPER REAM AT ASSEMBLY FOR PIN, LINE NO. 26.
2. DRILL .250 MIN-.256 MAX. HOLE IN FORK, LINE NO. 14, FOR SPRING PIN, LINE NO. 27.
3. INNER END OF SPRING PIN, LINE NO. 21. TO BE FLUSH OR UNDER FLUSH WITH CLUTCH AND BRAKE PLATE, LINE NO. 9.



SECT. A-A
SHOWN IN CLUTCH POSITION

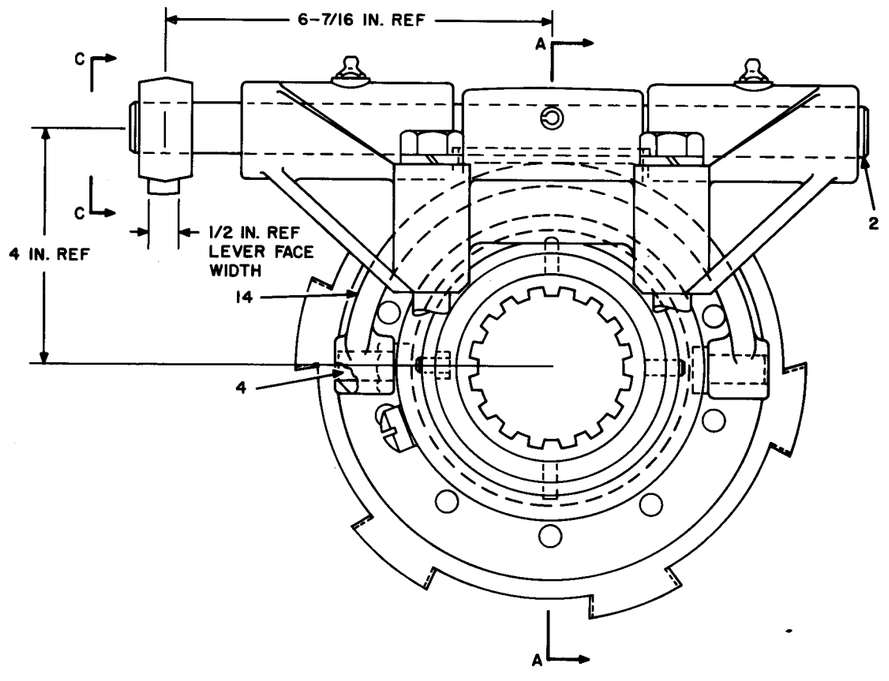


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Fig. 6—Winch Clutch and Brake Assembly Repair Parts Form, Sheet 2