

BSM # 821B

**POWER WINCHES
MAINTENANCE**

CONTENTS	PAGE
1. GENERAL	1
2. DESCRIPTION OF WINCHES	1
3. LUBRICATION	10
4. WINCH DRUM, WORM WHEEL AND DRUM SHAFT	13
5. WINCH CLUTCH AND BRAKE	15
6. WINCH WORM AND WORM BRAKE	18
7. ORDERING REPAIR PARTS	25

1. GENERAL

1.01 This section contains information covering the maintenance of A. T. & T. winches.

1.02 The models of winches covered in this section are:

- L-12* Winch
- L-18* Winch
- D Single-Drum* (Divided Drum) Winch
- UG Single-Drum* Winch
- Double-Drum* Winch
- EB* (HC-EB) Winch
- (HD-EB)
- SDDD* Winch

2. DESCRIPTION OF WINCHES

2.01 In general, the A. T. & T. winches are similar in the construction of their main elements. (See Figs. 1 to 11 inclusive.)

2.02 Each of the above-mentioned models is designed for a maximum 10,000-pound pull at low speeds.

2.03 These winches are mounted upon truck chassis, and consist of a steel drum mounted on a shaft, which in turn is supported by a winch drive housing and a bearing hanger

bolted to an I-beam which is fastened to the truck frame by two winch mounting brackets.

2.04 The winch drive housing encloses a steel worm gear which drives the bronze worm wheel mounted on the drum shaft. The housing helps support the drum shaft, protects the gears against damage from external sources, and serves to hold the winch worm gear lubricant. (See Fig. 18.)

2.05 The worm gear shaft ends project from both ends of the winch drive housing. One end of this shaft has the chain drive sprocket on it, while the other end carries the automatic winch worm brake. This brake is designed to stop the winch from overrunning due to a load, such as a pole suspended on the winch line from the pole derrick, causing the worm wheel to drive the worm gear in reverse when power is released from the winch. (See Figs. 18 to 21 inclusive.)

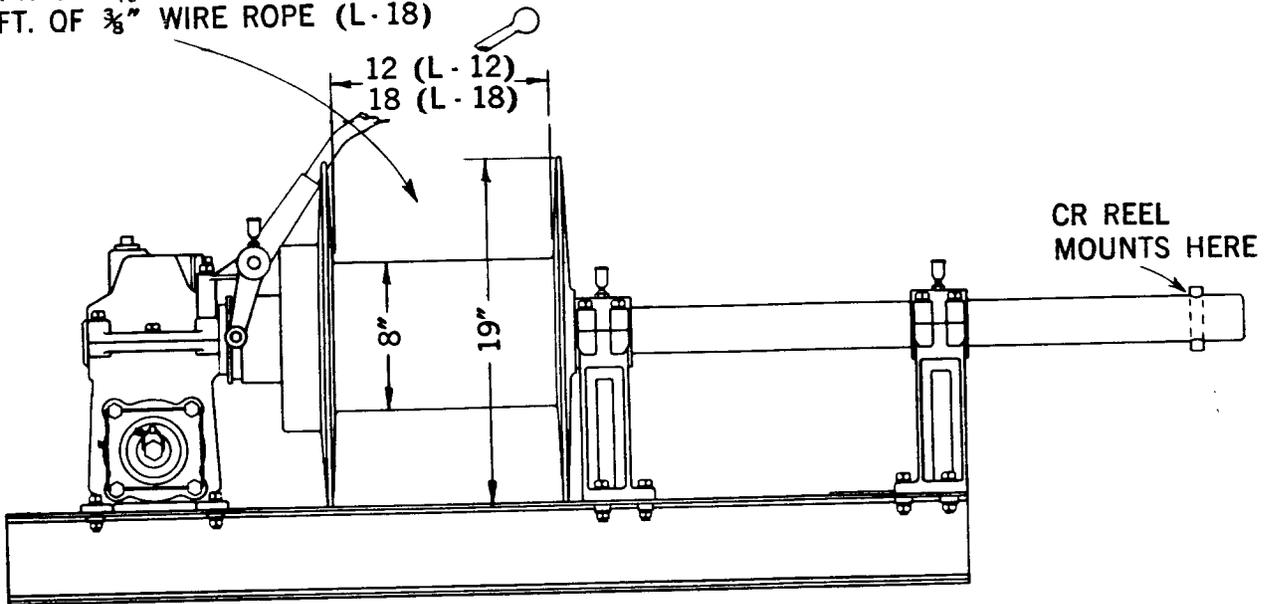
2.06 The winches are, in general, equipped with a combination winch clutch and brake. This device is designed to free the drum so that it can revolve on the shaft when the clutch is released. The brake, operated by the same lever, is designed only to retard the rotation of the drum, and **will not hold the drum against a load.** (See Figs. 16 and 17.)

2.07 Not all truck-mounted winches were made with the winch clutch and brake mechanism. For example, some of the older models of the following types may be found in the field which do not have the winch clutch and brake: L-12 and L-18 winches, and the large drums of some of the older type double-drum winches. The following types of winch drums are not equipped with the winch clutch and brake mechanism: **The small drum of all double-drum winches;** the small drums of the HC-EB and HD-EB winches.

2.08 The various models of winches described in this section are shown in Figs. 1 to 11.

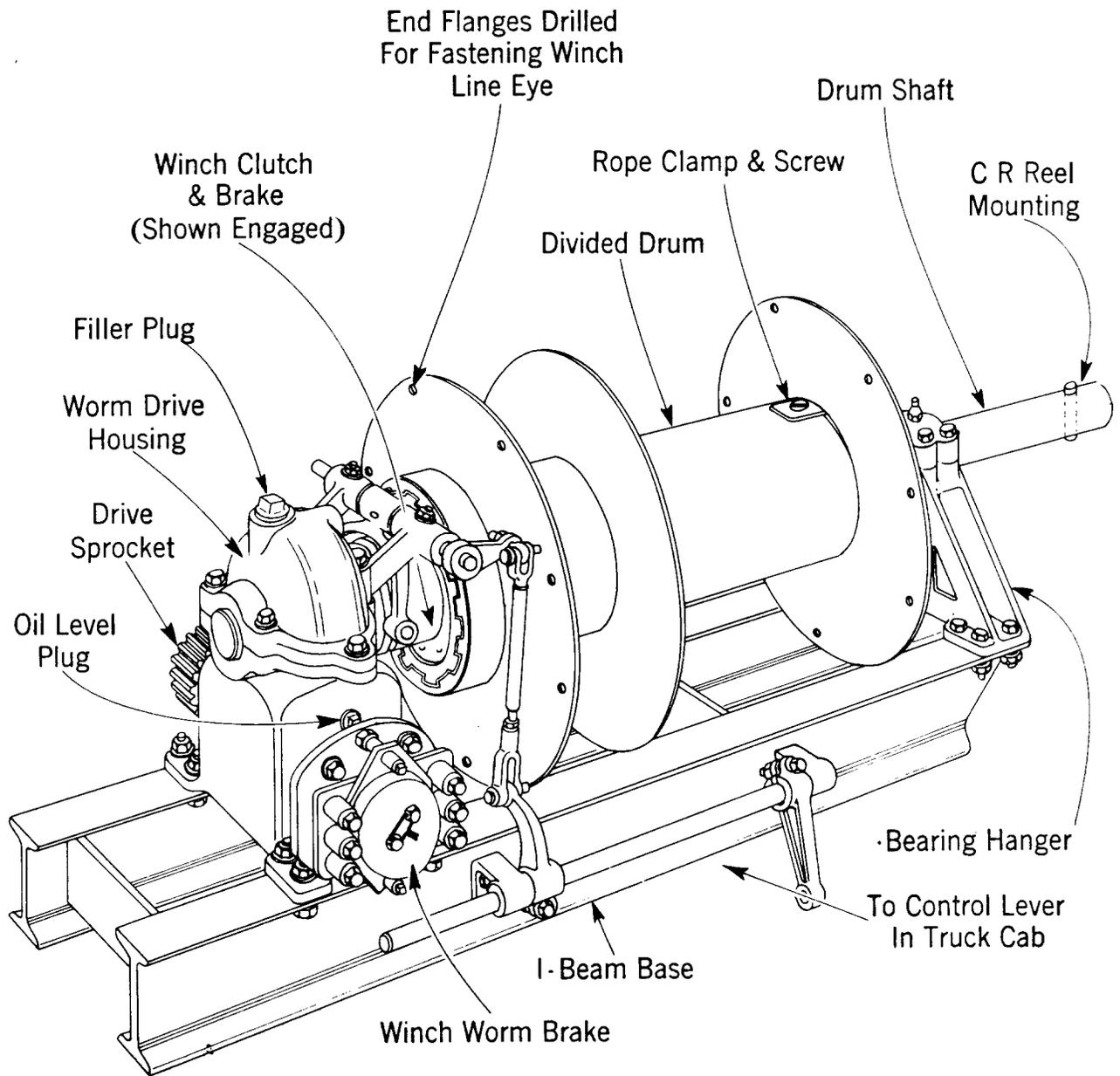
CAPACITY OF DRUM

- 750 FT. OF $\frac{7}{16}$ " WIRE ROPE (L-12)
- 1000 FT. OF $\frac{3}{8}$ " WIRE ROPE (L-12)
- 1125 FT. OF $\frac{7}{16}$ " WIRE ROPE (L-18)
- 1475 FT. OF $\frac{3}{8}$ " WIRE ROPE (L-18)



L 12 OR L 18 SINGLE-DRUM WINCH

Fig. 1



D SINGLE-DRUM WINCH
(DIVIDED DRUM)

Fig. 2

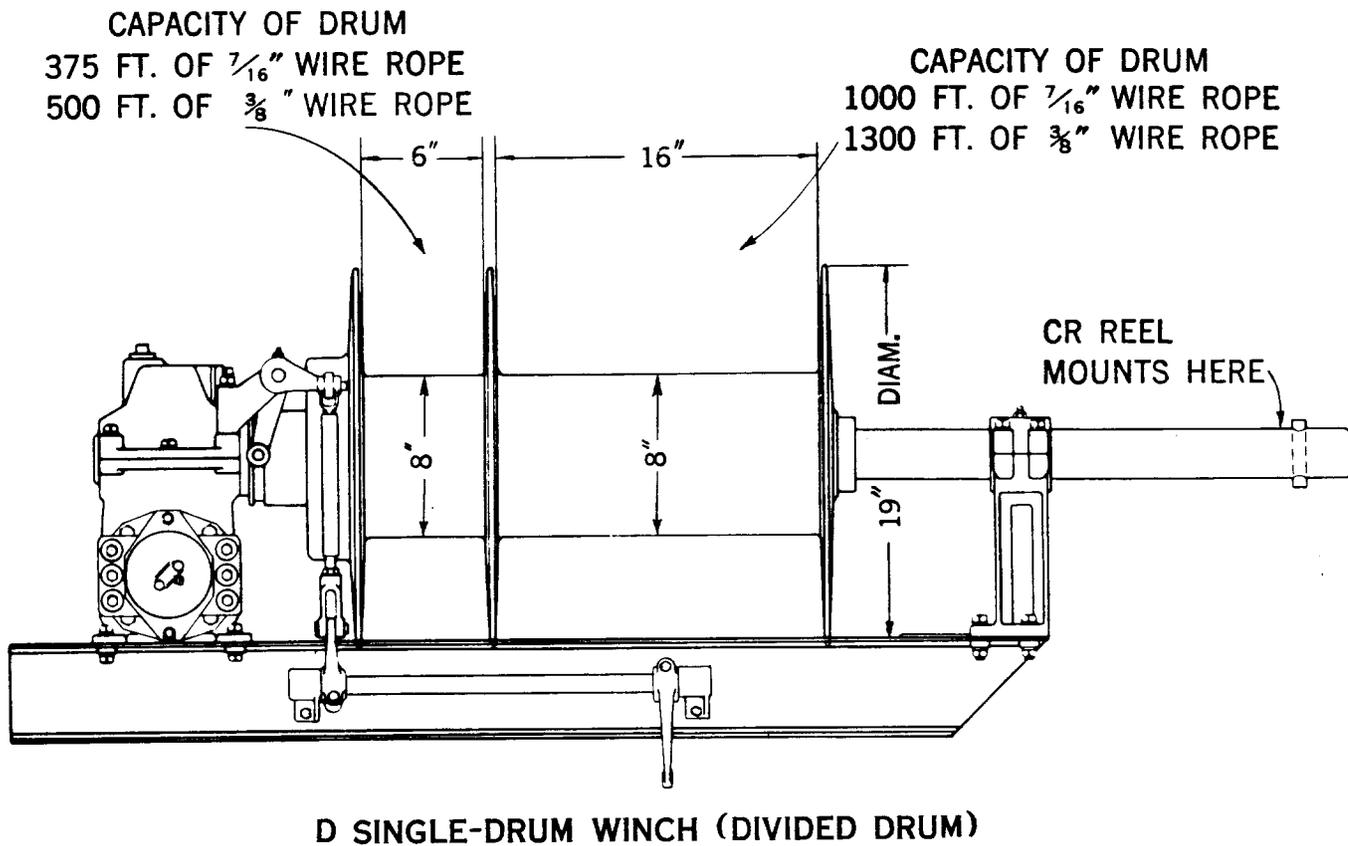
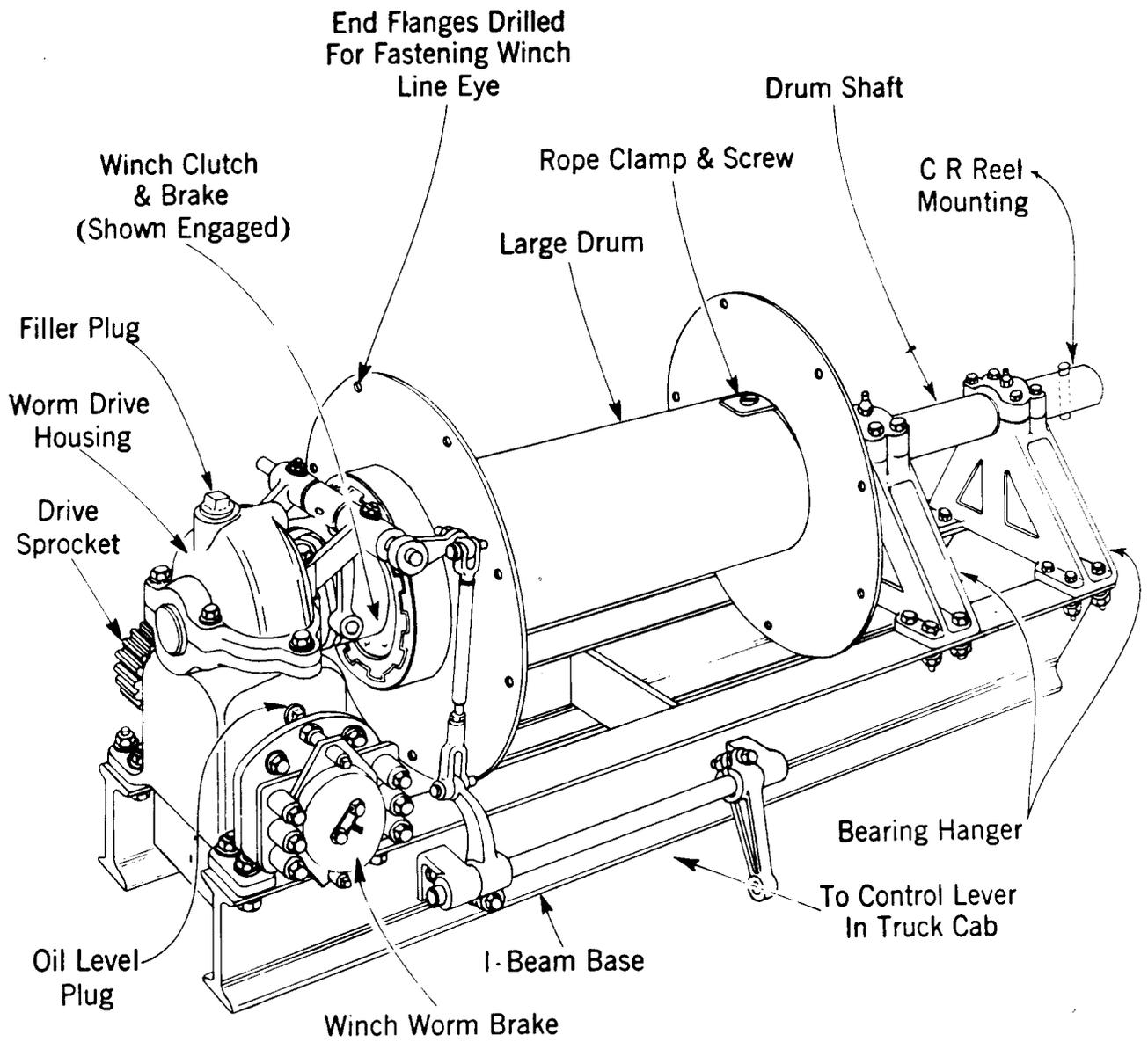


Fig. 3



UG SINGLE-DRUM WINCH

Fig. 4

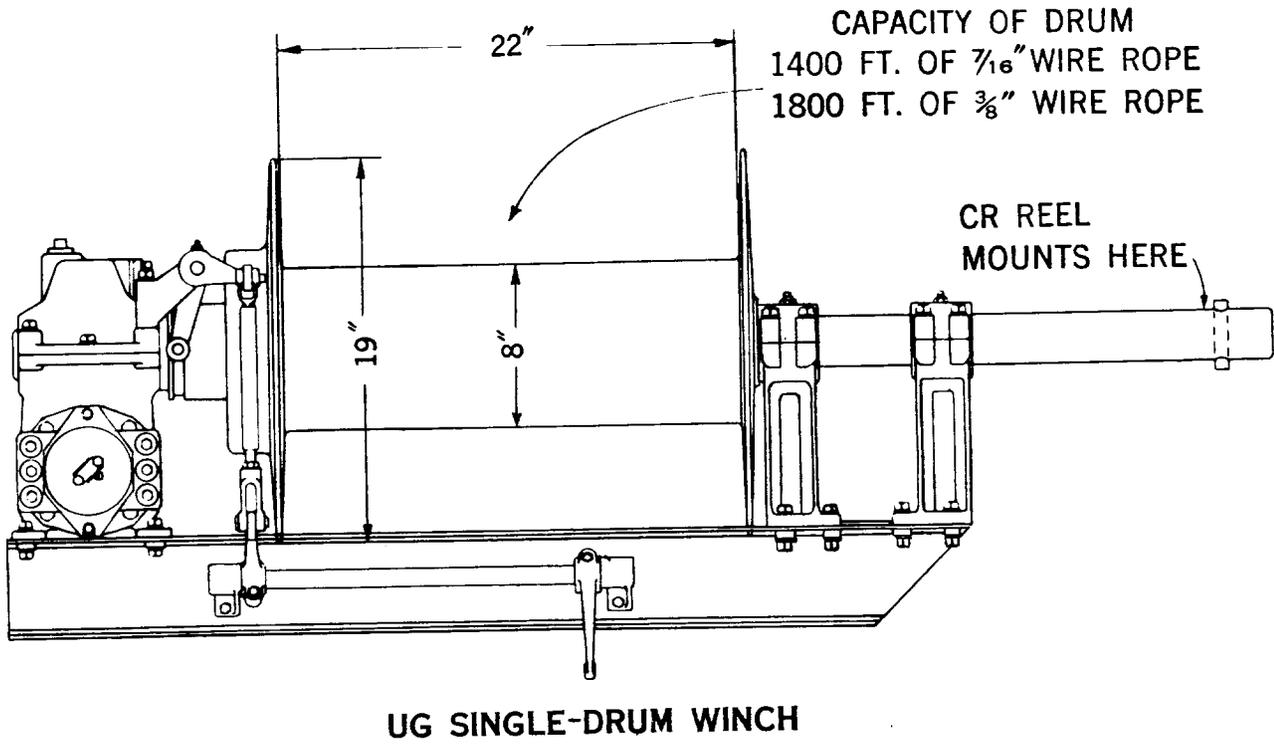
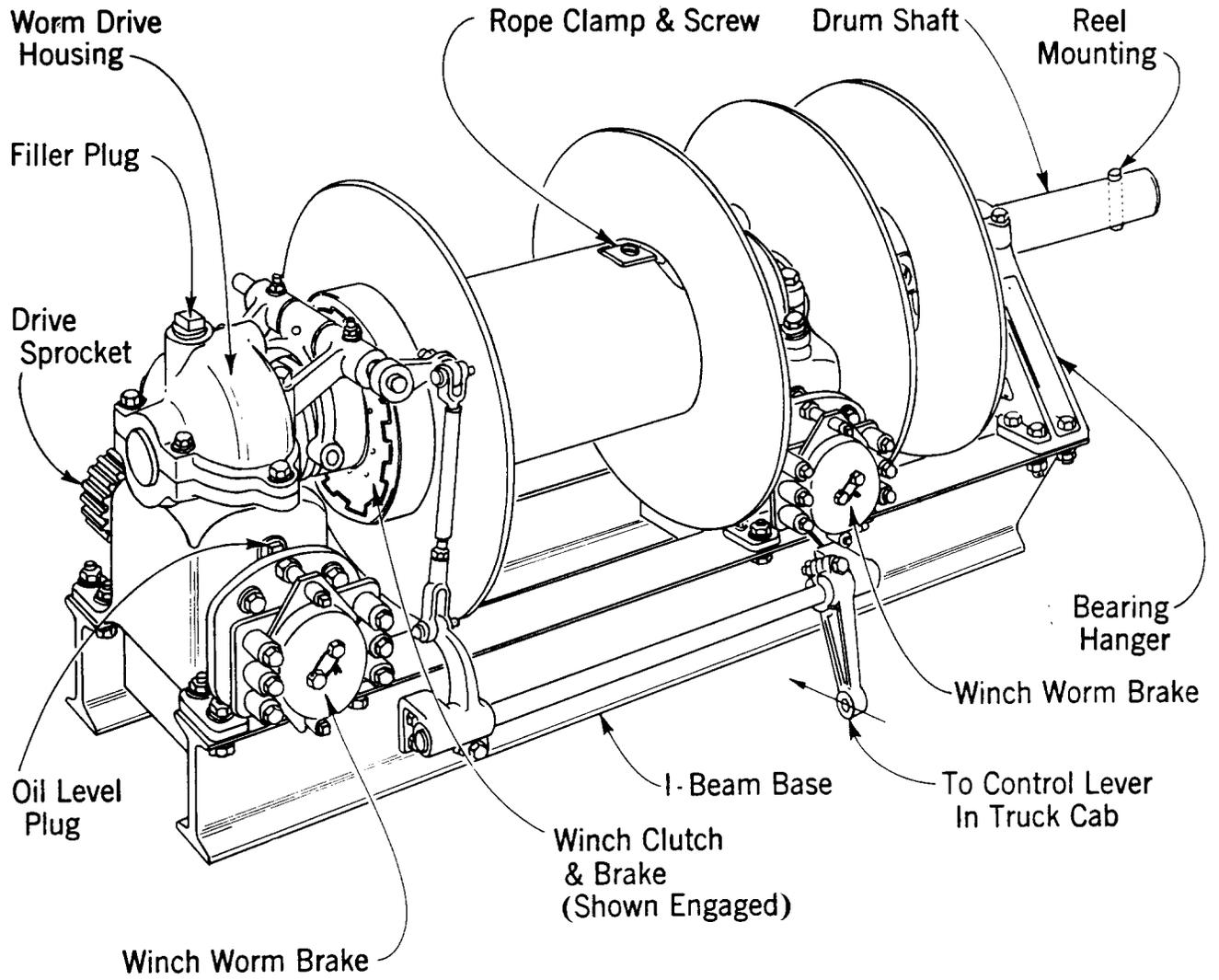


Fig. 5

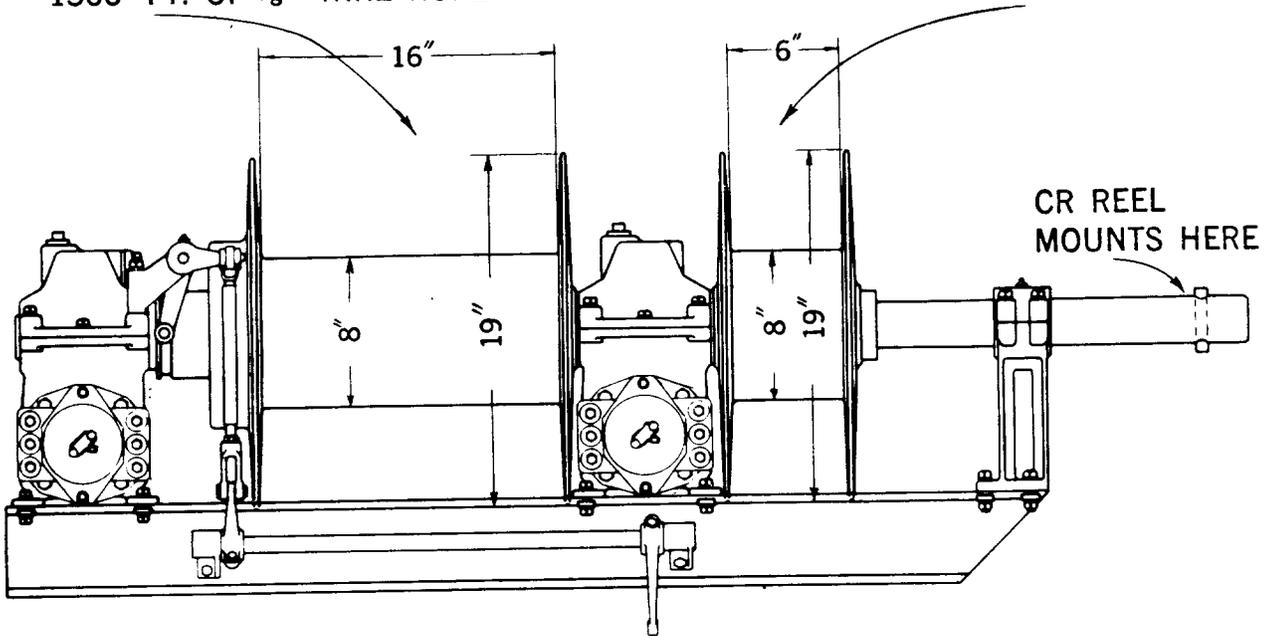


DOUBLE-DRUM WINCH

Fig. 6

CAPACITY OF DRUM
1000 FT. OF $\frac{7}{16}$ " WIRE ROPE
1300 FT. OF $\frac{3}{8}$ " WIRE ROPE

CAPACITY OF DRUM
300 FT. OF $\frac{1}{2}$ " WIRE ROPE



NOTE:

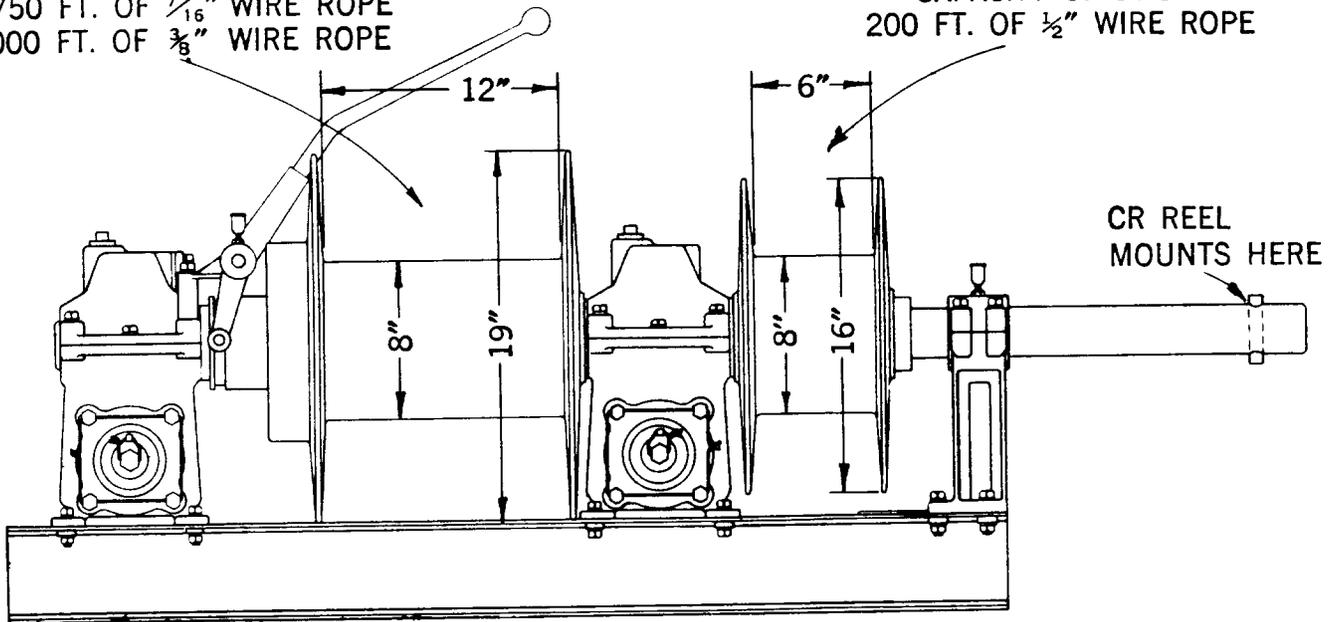
The SP DOUBLE DRUM WINCH is similar to the winch above, except it has 12 in. and 3 in. wide drums. The flange dia. of the small drum is 16 in.

DOUBLE-DRUM WINCH

Fig. 7

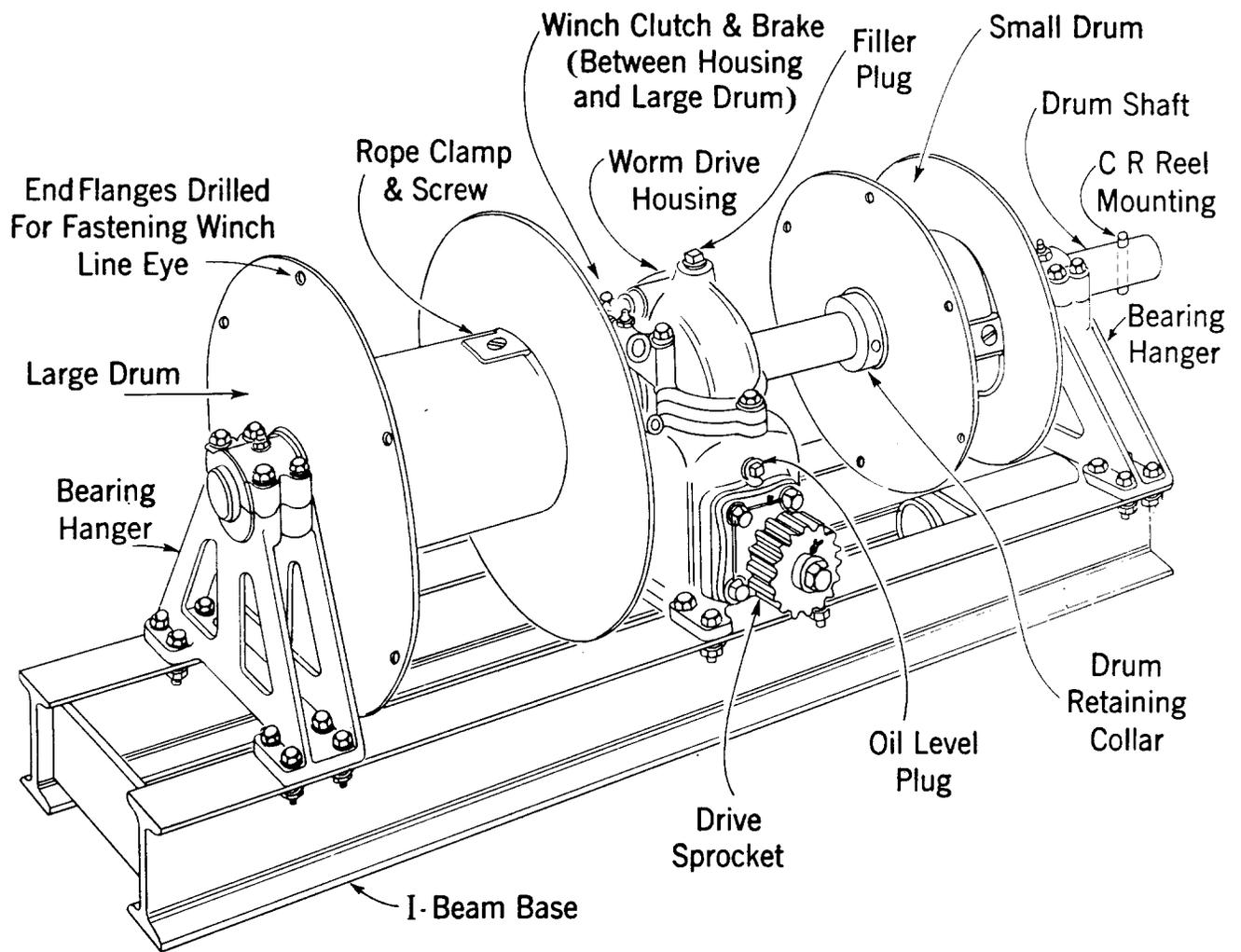
CAPACITY OF DRUM
750 FT. OF $\frac{7}{16}$ " WIRE ROPE
1000 FT. OF $\frac{3}{8}$ " WIRE ROPE

CAPACITY OF DRUM
200 FT. OF $\frac{1}{2}$ " WIRE ROPE



DOUBLE-DRUM WINCH (OLD TYPE)

Fig. 8



EB WINCH

Fig. 9

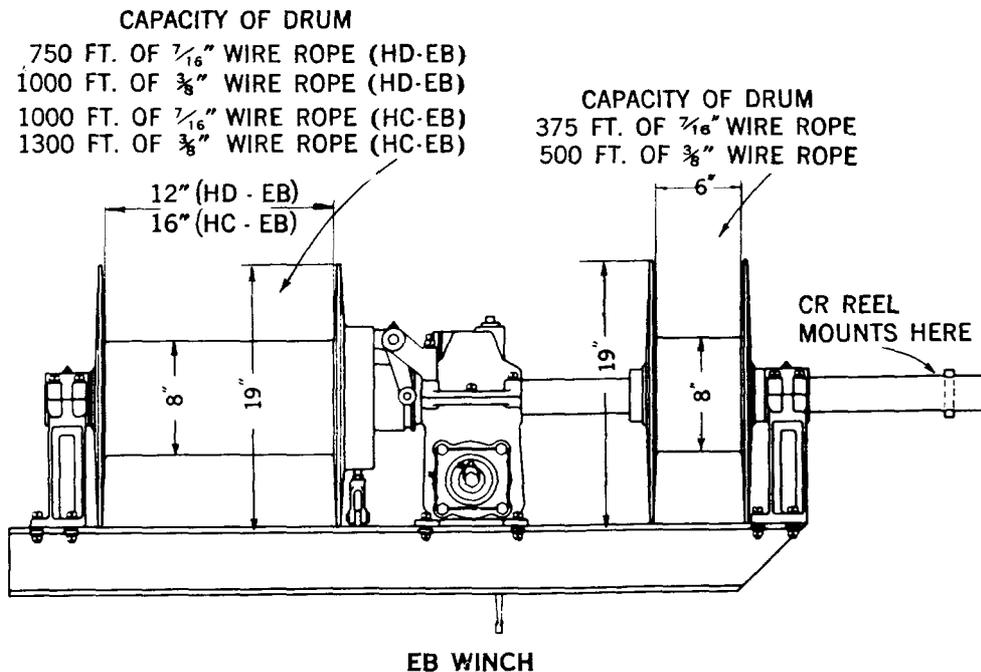


Fig. 10

3. LUBRICATION

3.01 Lubrication of these winches consists mainly in placing the required amount of the approved lubricant in the winch drive housing and applying lubricant at the pressure fittings provided at various points on the winch and its control lever linkages, and lubricating the winch drive chain.

3.02 Extreme pressure lubricant of an approved type should be used in the winch drive housing for lubricating the worm gear and worm wheel. This type of lubricant consists of a high grade heavy oil, loaded with a lead soap or other compound suspended in it. Heat is conducted away from the parts by such a lubricant more readily than by a plain oil and it maintains its lubricating qualities at relatively high temperatures due to a chemical reaction at the bearing surfaces of the gears.

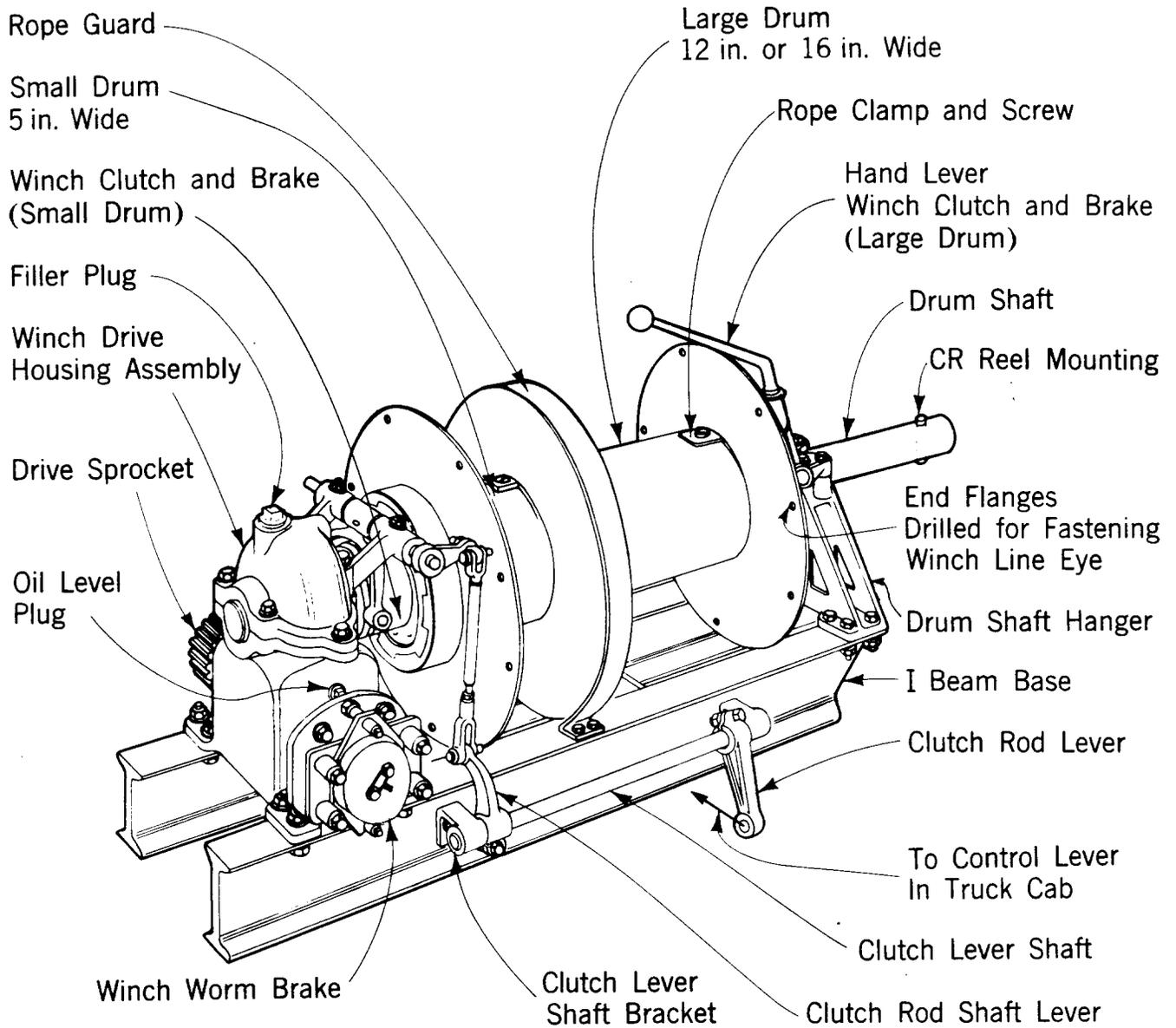
3.03 *The lubricant should be maintained by the truck operator at the proper height in the winch drive housing at all times.* The level height is tested by removing one of the two oil level plugs in the housing. (See Fig. 18.) If the oil does not flow out of the plug opening, either the lubricant is low in the housing, or the vent in the filler plug at the top of the housing is clogged. If the

vent is clogged, the filler plug should be removed and the vent cleaned. Should the oil begin to flow when the filler plug is removed, the lubricant is at the proper level and the level plug should be replaced. If the lubricant needs replenishing, additional lubricant should be poured in at the filler plug opening until it runs out at the level plug opening. Replace the filler plug after cleaning the vent.

3.04 If the lubricant is to be replaced, the drain plug in the bottom of the housing should be removed to drain the lubricant. *The housing should not be flushed with flushing oil or solvent of any kind.* Flushing of the housing will result in contamination of the new lubricant with consequent loss of lubricating quality. Simply add new lubricant to the proper level. *A complete filling to this level will require approximately four pounds of lubricant.*

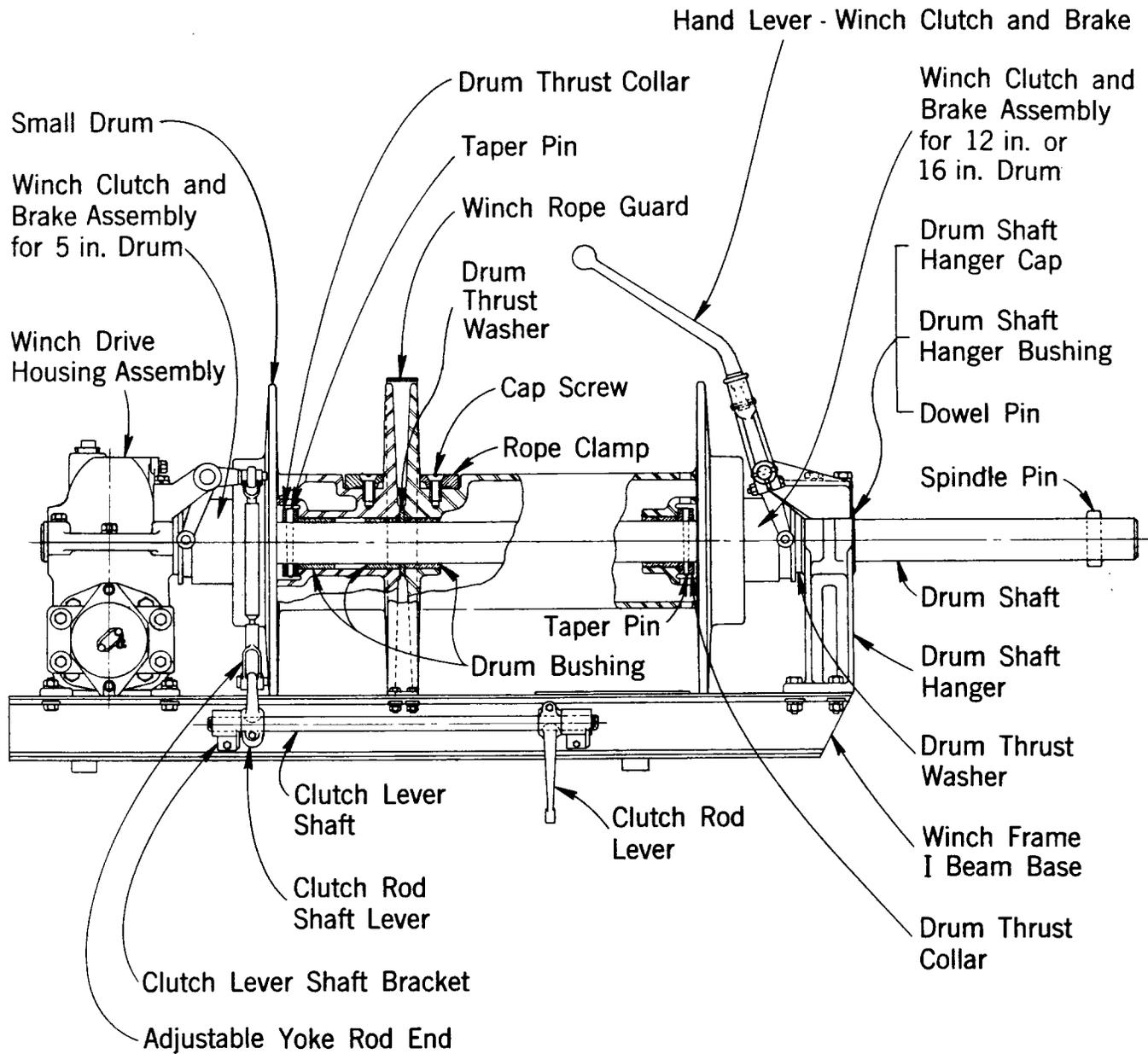
3.05 The winch drive chain should be lubricated either with engine oil, or with the same lubricant as is used in the winch drive housing. The lubricant may be applied with a brush, and should be applied to the inside, or tooth side, of the chain. This will cause the lubricant to be forced through the chain when the winch is in operation.

Drum Capacities in Feet of Wire Rope					
Length of Drum	1/4 in.	5/16 in.	3/8 in.	7/16 in.	1/2 in.
5	950	610	420	310	240
6	1050	675	500	375	300
12	2100	1350	1000	750	
16	2800	1500	1300	1000	



**SDDD 12 AND 5 OR 16 AND 5 WINCH
(SINGLE DRIVE DOUBLE DRUM)**

Fig. 11



SDDD 12 AND 5 OR 16 AND 5 WINCH
(SINGLE DRIVE DOUBLE - DRUM)

Fig. 12

5. WINCH CLUTCH AND BRAKE

(Figs. 16 and 17)

5.01 The combination winch clutch and brake is designed to permit the drums of single-drum winches, and the large drums of the double-drum and —EB winches, to be freed by disengaging the clutch so that they may rotate independently on their shafts, and the speed of such independent rotation may be controlled by the brake.

5.02 The clutch part of the mechanism has large teeth cut on the flange of the clutch and brake plate, which engage matching teeth cut in a projection on one flange of the winch drum. The brake consists of a brake lining riveted to the face of the clutch and brake plate which can be brought into contact with a machined face on the winch drum.

5.03 The winch clutch and brake is mounted on the drum shaft between the winch drive housing and the winch drum, and is operated by means of a clutch operating fork attached to control rods or cables leading to a single lever near the truck operator's seat in the cab. (On old type winches the lever was mounted directly on the winch.) The clutch and brake assembly contains 4 steel balls, two large and two small, each pair being carried in sockets in the clutch and brake plate hub. The detent sleeve which is mounted on the clutch and brake plate hub has two grooves cut on its inside into which the balls project. A hole is drilled through the drum shaft, in which are located two detents, or locking pins, separated by a coil spring.

5.04 With the clutch teeth engaged, the detent sleeve is against the stop ring on the clutch and brake plate hub. In this position the small balls are up in the groove in the sleeve. Because the balls are positioned over the detents and move up in the groove, the detents tend to follow due to the pressure of the detent spring, and since they project into the small ball sockets the clutch is locked in the clutch engaged position. With a load on the winch line, ***the pressure against the clutch teeth is so great that the clutch and brake plate cannot be moved to disengage the teeth***, because sufficient pressure cannot be exerted on the control lever to push the assembly toward the drum.

5.05 ***When there is no load on the winch line the clutch and brake mechanism can readily be moved.*** The action in moving the clutch and brake plate from left to right is as follows: The control lever, through the control links, moves the clutch operating fork which first pushes the detent sleeve along the clutch and brake plate hub toward its flange. This initial movement of the sleeve forces the small balls down, which in turn push the detents into the shaft hole, permitting continued pressure on the sleeve to act on the clutch and brake hub and so move the entire assembly toward the drum. This movement disengages the clutch teeth, and starts compressing the drum shaft spring between the winch drum and the winch clutch and brake assembly. As soon as the teeth are disengaged the assembly has moved sufficiently far for the detents to come up into the large ball sockets, locking the assembly against being pushed back into clutch engagement by the drum shaft spring. The control lever can now be released, and the assembly will remain disengaged in the "Free Drum" position.

5.06 To apply the brake it is necessary to apply pressure to the control lever and so push the clutch and brake assembly toward the drum to bring the brake lining against the drum flange. ***The brake is not designed to hold the drum against a load. Because of the design of the mechanism, the brake cannot be brought into action without disengaging the winch clutch*** and, as explained in 5.04, this clutch cannot be disengaged while the winch line has a load on it. To keep the brake on, it is necessary to keep pressure on the control lever. If the control lever is released, the shaft spring will instantly return the mechanism to the "Free Drum" position.

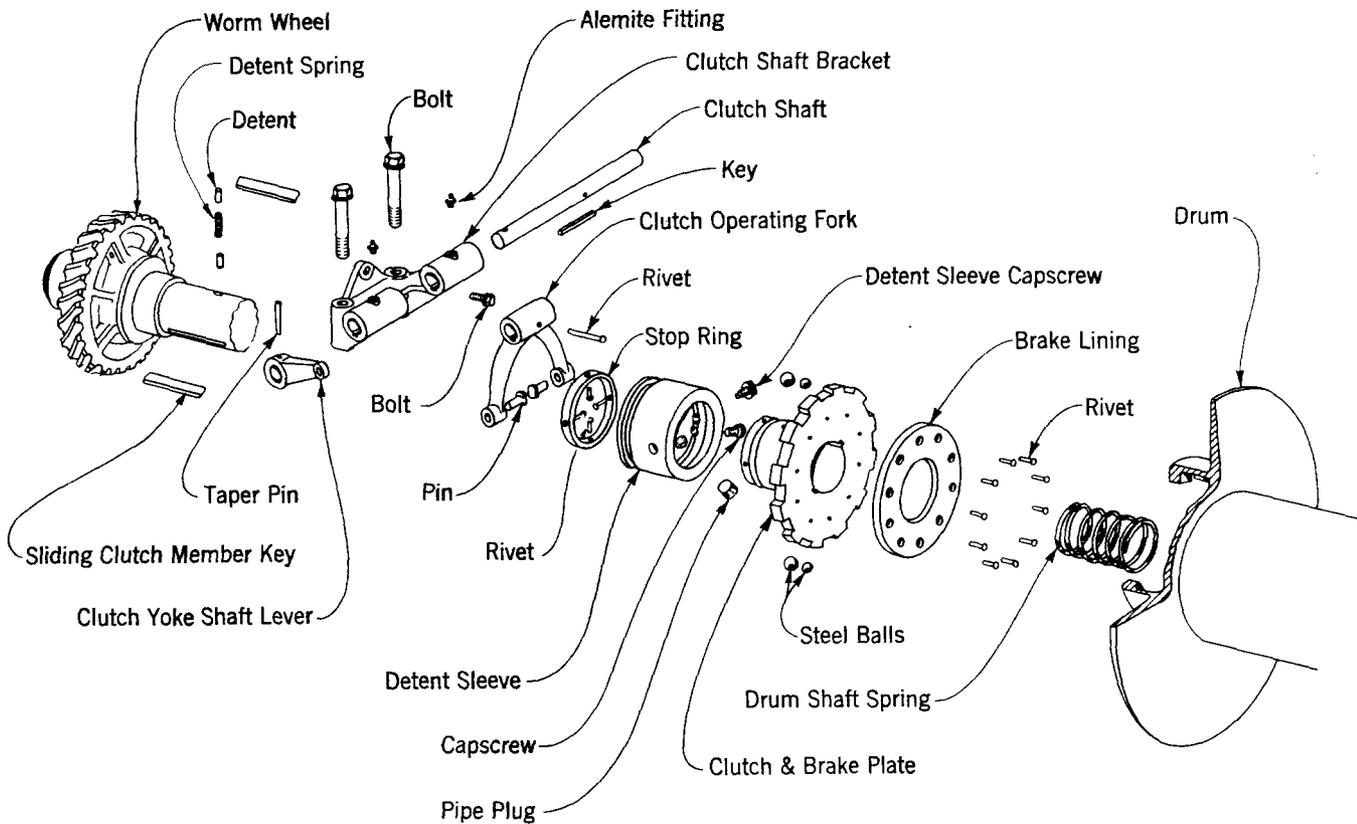
5.07 To return the mechanism to the "Clutch In" position the detent sleeve is moved lengthwise on the clutch and brake plate hub away from the clutch and brake flange. This causes the large balls to be pushed down because of the shape of the groove in which these balls rest, and these balls push the detents back into the drum shaft. This removes the restraint against moving the clutch and brake assembly along the shaft away from the drum. The shaft spring immediately pushes the assembly so that the small balls can be pushed outward into their groove by the detents as they enter the small ball

sockets. The action of the spring is so strong that when the clutch teeth are properly registered the clutch snaps into engagement with a characteristic clanging sound. If the teeth do not engage properly the first time, it is necessary only to slightly turn the drum manually or turn the drum shaft by power until they do register, when the clutch will snap into engagement.

5.08 *The combination winch clutch and brake can be removed from the drum shaft only after the clutch operating fork has been removed, the shaft taken out of the drum, and the*

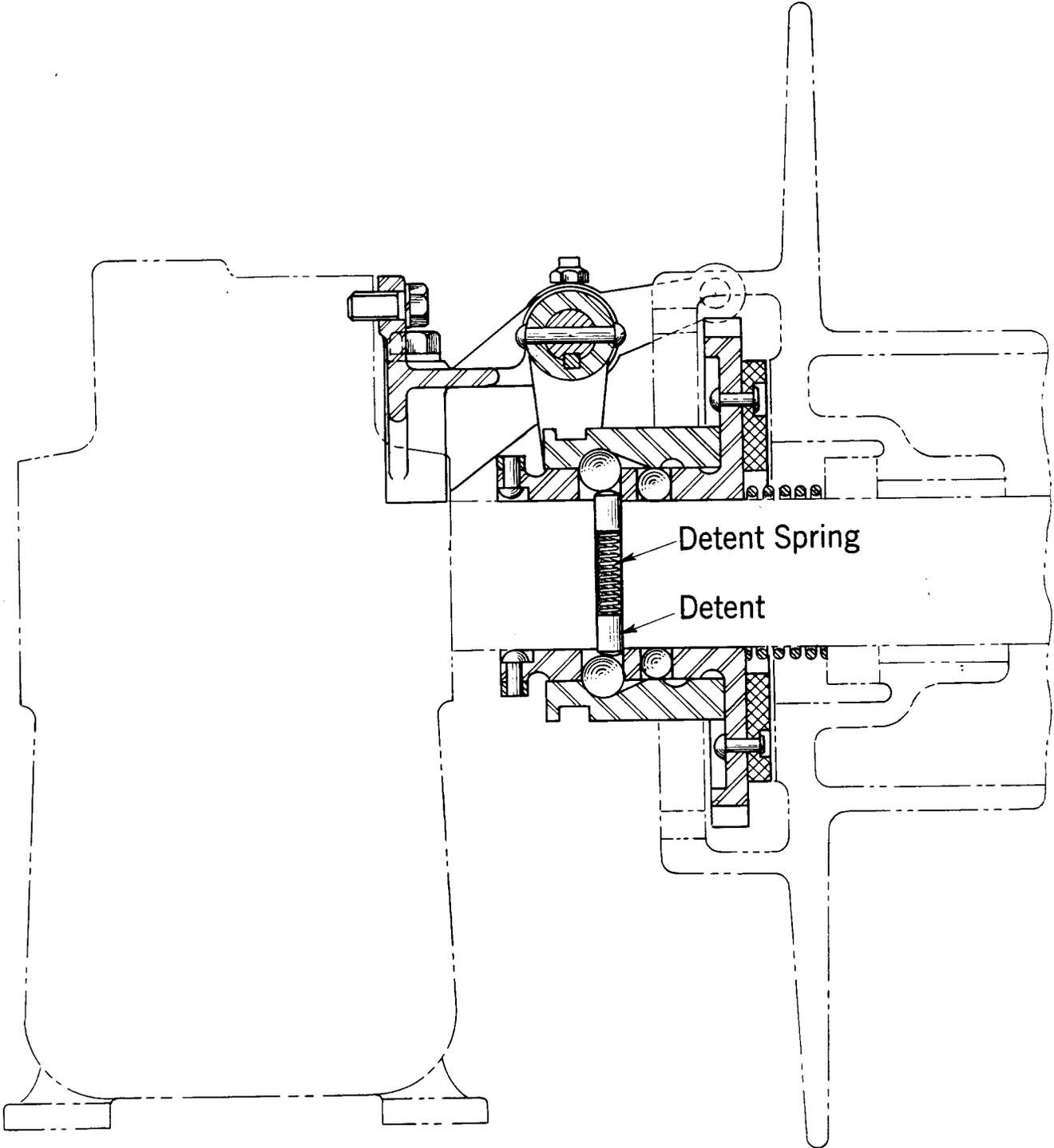
drum thrust collar removed from the shaft. The worm wheel, cover bushings and thrust washers need not be removed from the shaft unless they require repair or replacement.

5.09 The detent sleeve on the assembly is held in position by the dog-pointed detent sleeve capscrew and the stop ring. The detent sleeve capscrew should be removed from the sleeve, and the pipe plug, which closes the large ball removal opening, unscrewed. The sleeve should be turned until one large steel ball is dropped out. It will be followed by a locking pin or detent,



WINCH CLUTCH AND BRAKE ASSEMBLY

Fig. 16



WINCH CLUTCH AND BRAKE ASSEMBLY
(CROSS SECTION)

Fig. 17

the detent spring and a second detent. The detent sleeve should not be permitted to turn until these parts are removed from the assembly since they may be damaged by being caught if the sleeve turns. The sleeve should then be turned 180 degrees to permit removing the second large steel ball. The sleeve should then be moved lengthwise on the hub of the clutch and brake plate so that the two small steel balls can be removed through the small hole in the sleeve, after removing the capscrew that closes this opening. To remove the small balls, the sleeve must be rotated through 180° on the clutch and brake plate hub in the same fashion as described for removing the large steel balls.

5.10 The clutch and brake plate and the detent sleeve can now be removed from the drum shaft, together with the shaft spring. The four rivets holding the stop ring on the hub of the clutch and brake plate can be removed, and the ring and sleeve taken off.

5.11 The brake lining can be removed if necessary by drilling out the tubular rivets fastening it to the clutch and brake plate. New brake lining must be exactly 1/4 inch in thickness to have the brake work properly, because the amount of movement of the clutch and brake mechanism is limited by the difference in diameters between the large ball sockets and the detents.

5.12 *To reassemble the combination clutch and brake*, after relining the brake flange, slide the sleeve over the hub of the clutch and brake plate, replace the stop ring and rivets and start the assembly on the shaft. The four rivets should be inserted in the hub of the clutch and brake plate and the stop ring with the heads toward the shaft center just before placing the assembly on the drum shaft. Pushing the assembly completely on the shaft will retain the rivets in position. Slide the shaft spring on the shaft against the lined flange of the clutch and brake plate. Move the assembly over the keys which have previously been inserted in their respective keyways.

5.13 Turn the sleeve so that the pipe plug hole registers with the large hole in the clutch and brake plate hub on the under side. Insert a large ball in this opening and immediately turn the sleeve to prevent the ball from dropping out of its socket. Register the pipe plug hole with the hole on the upper side. The assembly should then be moved on the drum shaft so that the hole in the

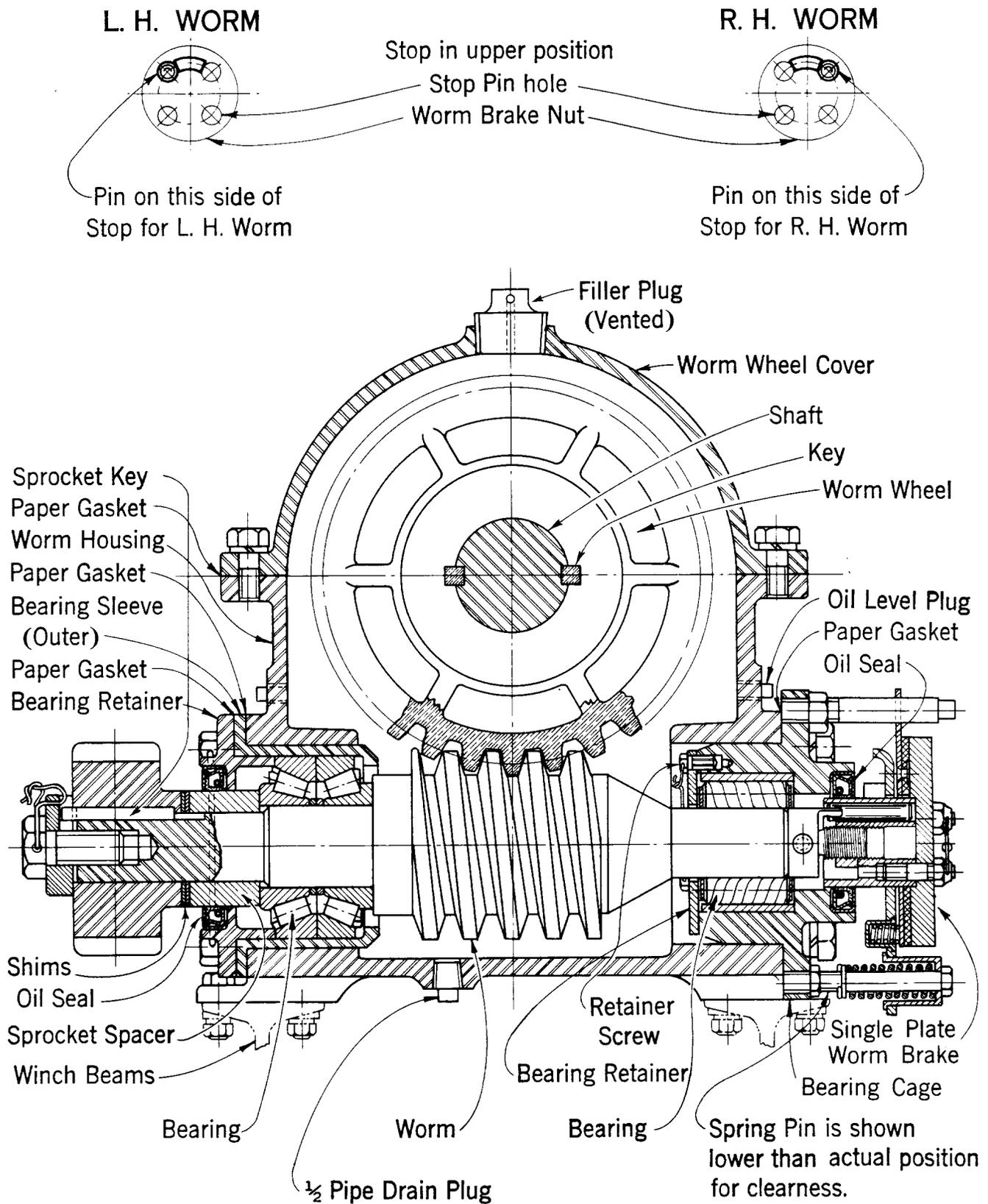
drum shaft can be seen through the pipe plug hole. In this shaft hole place a detent, *round end down*, the detent spring and then the second detent, *round end up*. The second large ball should be placed in its socket and pushed down. The sleeve should then be turned slightly to retain the ball in position, and the pipe plug screwed into its opening. The two small balls can be placed in their sockets by registering the small hole in the detent sleeve with the sockets in the clutch and brake plate hub and placing the balls into their respective sockets, turning the detent sleeve through 180° as when installing the large balls. Replace the capscrew thus closing the opening. The detent sleeve capscrew should be restored so that its dog-point engages in the slot in the clutch and brake plate hub.

5.14 The left drum thrust collar should be placed on the drum shaft and fastened in place with the No. 7 taper pin.

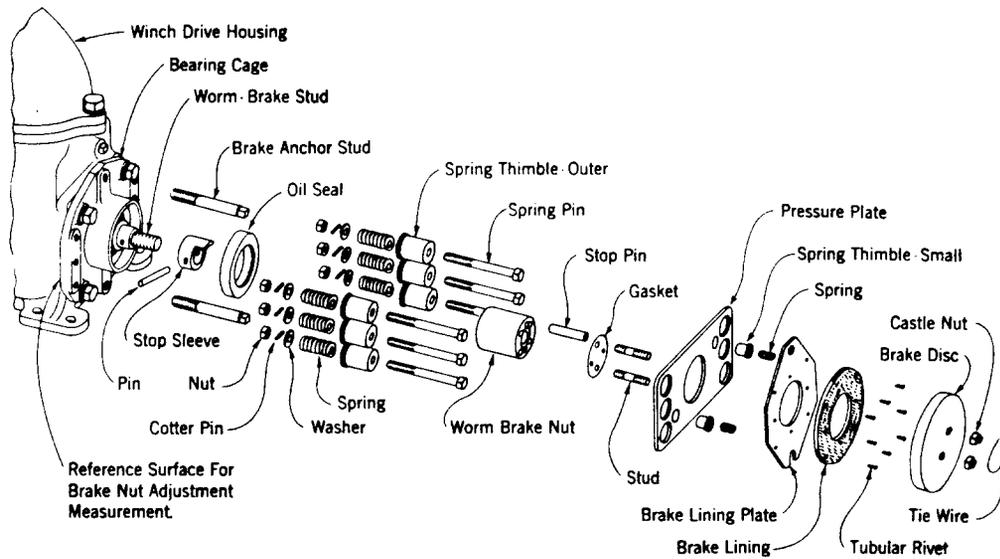
5.15 Referring to the D Single Drum Winch, as an example of reassembly, the winch drum should have the shaft inserted in it, and the clutch teeth engaged by hand, (see Page 11). The right drum thrust collar should be pinned on the shaft. The spindle pin should be replaced in the drum shaft. The drum and its shaft can then be returned to its proper position in the winch and the housing and bearing caps refastened, taking care not to reverse them. Care must be taken to see that the bearing dowel pins are properly located in their matching holes in the bronze bushings on the shaft, and that no dirt remains in the bearings. Restore the clutch operating fork assembly and attach the control links. The clutch and brake mechanism should be operated several times to make sure that the clutch engages and disengages and the brake operates properly.

6. WINCH WORM AND WORM BRAKE (Fig. 18)

6.01 *The worm* is supported in the winch drive housing in bearings at either end. One end of the worm gear shaft is equipped with a drive sprocket and the other end is equipped with a worm brake. *The worm is available with either right- or left-hand threads, and may be found assembled with the sprocket either to the front or to the rear, depending upon the winch installation requirements. In general, the worm gears most in use are right-hand; left-hand worm gears were used mainly in special installations only.*



**WINCH DRIVE HOUSING ASSEMBLY
(SPROCKET TO FRONT)**



SINGLE PLATE WINCH WORM BRAKE
PART OF WINCH DRIVE HOUSING ASSEMBLY
(SPROCKET TO FRONT)

Fig. 19

6.02 In some cases where sufficient space is available, the worm can be removed from the housing without removing the winch from the truck. The worm can be removed without removing the drum and shaft from the winch. This can be done by taking the worm brake assembly or the sprocket off one end of the shaft and removing the bearing assembly at that end, and then pulling the other bearing retainer and the worm out of the housing. If the worm wheel is in place, the worm gear must be turned until the worm thread is free of the worm wheel teeth, after which the gear can be pulled out. The worm can also be removed from the housing, after disassembly of the winch and removal of the drum, shaft and worm wheel, without interference by the worm wheel.

6.03 The bearing retainer and sleeve on the sprocket end of the gear contain a shaft oil seal, and two tapered roller bearings placed back to back. The cage on the brake end contains an oil seal and a straight roller bearing. This bearing is held in the cage by a retaining ring fastened to the cage body by three small cap-screws which are prevented from turning by a locking wire.

6.04 The end play of the worm is adjusted at the factory, by means of the bearing retainer construction, to be from 0.187 to 0.250 inch.

6.05 *The worm brake* is a device designed to prevent the winch from overrunning due to a load on the winch line, when power is released from the winch. (See Figs. 18 and 19.) It consists of a worm brake nut and brake disc mounted on a double-threaded stud projecting from the end of the worm shaft, and a brake lining plate mounted on two brake anchor studs, backed up by a pressure plate supported on six spring pins screwed into the bearing cage on the worm drive housing. (See Figs. 18 to 22 inclusive.)

6.06 The worm has end play of from 0.187 to 0.250 inch, which permits the worm to move longitudinally in its bearings in the direction opposite to the rotation of the winch drum, if there is no load on the winch line. When lowering a load, the worm moves to the limit of its end play in the forward direction and the worm brake nut brings the worm brake disc and the lining plate against the pressure plate. At all other times the lining plate is held $1/32$ inch away from the pressure plate by the two small springs mounted in thimbles in the pressure plate.

6.07 The brake action is as follows: Power is applied to the winch to drive the drum forward, or "winding up." The resistance of the load being hoisted, or moved, causes the winch

worm to move forward to the limit of its end play, and this action maintains a light contact between the brake disc and the brake lining on the brake plate. When the winch is stopped, the pull of the load on the line tends to turn the drum backwards and this in turn tends to drive the worm in reverse. Any tendency of the worm to turn in the reverse direction causes the brake disc to be pulled more tightly against the brake lining by the worm brake stud. The worm shaft, stop sleeve and worm brake stud are a unit which may turn approximately one revolution without turning the worm brake nut and the brake disc attached to it, due to the nut and disc being held stationary by the initial light contact between the brake disc and the brake lining. By the time the stop sleeves strikes the stop pin in the worm brake nut thus starting the brake disc to turning against the brake lining, the worm brake stud has screwed itself into the nut to the limit of the thread, thus applying full braking effort. The application of the full braking effort is due to the fact that the turning of the stud into the nut has drawn the nut with its disc, together with the brake lining plate, against the spring loaded pressure plate mounted on the spring thimbles which are on the spring pins.

6.08 The winch worm brake, due to the action of the worm brake nut and the springs incorporated in the brake mechanism, operates to provide a drag in the worm rotation *only when the winch is driven in reverse and there is a considerable pull on the winch line. The brake is inoperative when there is a light winch line load in reverse, and also under all conditions of forward winch motion (winding up).*

6.09 *To dismantle the worm brake*, first cut the locking wire on the two castle nuts on the brake disc studs and remove the nuts. (See Figs. 18 to 22 inclusive.) The brake disc and gasket can then be removed. (On winches with the sprocket to the rear, the worm brake nut has an integral brake disc.) Slide the lining plate off the brake anchor studs. The lining can be removed from the plate by drilling out the rivets. Remove the stop pin from the worm brake nut by screwing a temporary stud into stop pin threads. Unscrew the nut from the worm brake stud. Take the pressure plate off the outer spring thimbles on the six spring pins, and remove the two small inner springs and the small spring thimbles from the plate. The spring pins can be unscrewed from

the housing. The thimbles, springs, washers, nuts and cotter pins can be taken off the spring pins after removing the spring pins from the housing. Other small parts can now be readily disassembled.

6.10 *To assemble the brake*, after the worm gear has been installed in the housing, assemble the outer springs and thimbles, and the washers, cotter pins and nuts on the spring pins. Install the spring pins in the winch drive housing bearing cage, screwing them into place about 1/4 inch. Turn the worm gear in its bearings so that the lug or projection on the stop sleeve is on top and push the worm into the housing as far as it will go toward the sprocket end. Screw the worm brake nut on the worm brake stud all the way. Then, *without permitting the worm gear to turn*, screw the worm brake nut *away from the winch* until the *outer face of the nut* is 2-25/32 inches *away from the rear face of the bearing cage flange*, where it abuts the winch drive housing. Then, for a *right-hand* worm, place the stop pin in one of the two holes to the *right of the stop sleeve lug*, which was previously positioned on top. Place stop pin with threaded end out to permit pulling it in future. (For a *left-hand* worm, the stop pin should be placed in one of the two holes to the *left of the stop sleeve lug*. See Fig. 18). *The above procedure is for a winch with the sprocket to the front.*

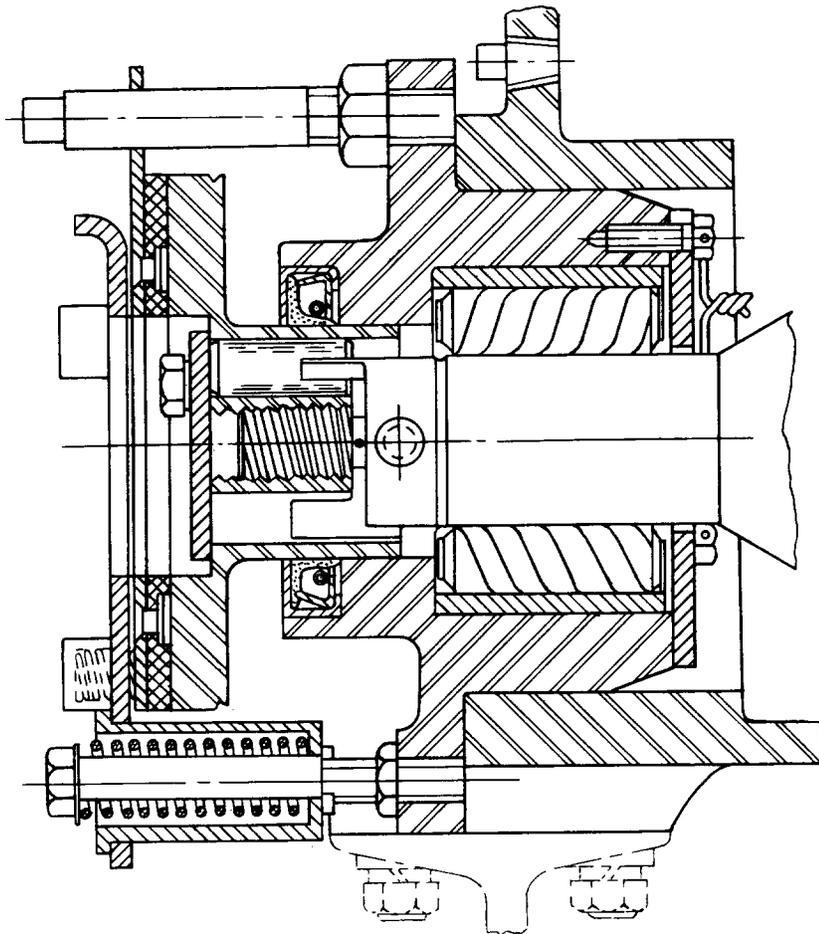
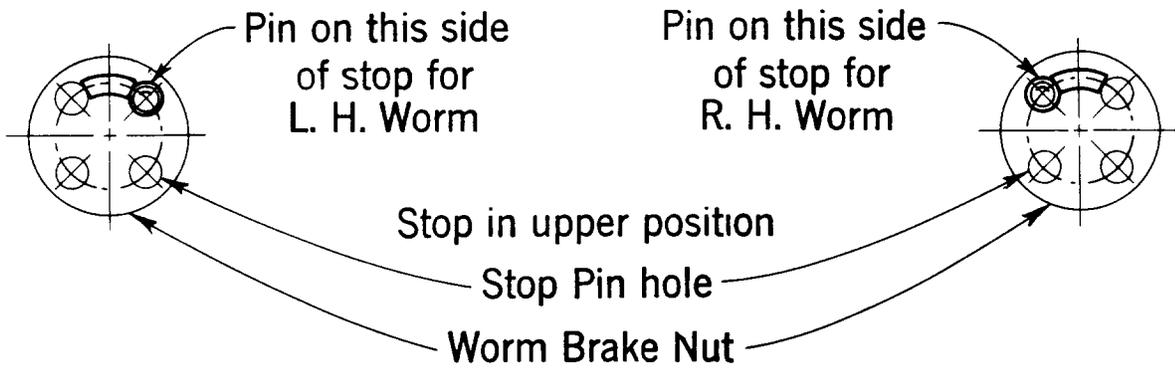
6.11 Place the pressure plate over the outer spring thimbles and insert the small springs and their thimbles in the plate. Replace the brake lining on the lining plate, and mount the plate on the brake anchor studs. Replace the brake disc studs in the brake nut and replace the gasket. Then mount the brake disc on the two studs projecting from the nut and fasten with the castle nuts. Replace the tie wire.

6.12 *On those winches on which the sprocket is to the rear* the worm brake is between the winch and the back of the truck cab. There is a slight difference in this type of worm brake due to the fact that instead of the brake disc being *drawn* against the brake lining and the pressure plate, it is pushed against the lining.

6.13 Reference to Figs. 20 and 21 will show the brake nut to have an integral disc, and the nut flange or disc is pushed against the lining plate because of the winch line load and by the

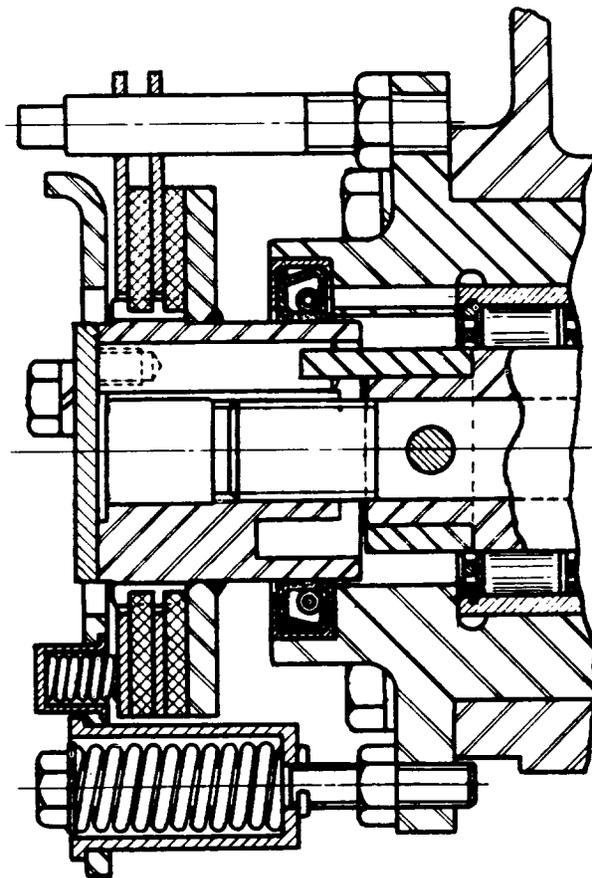
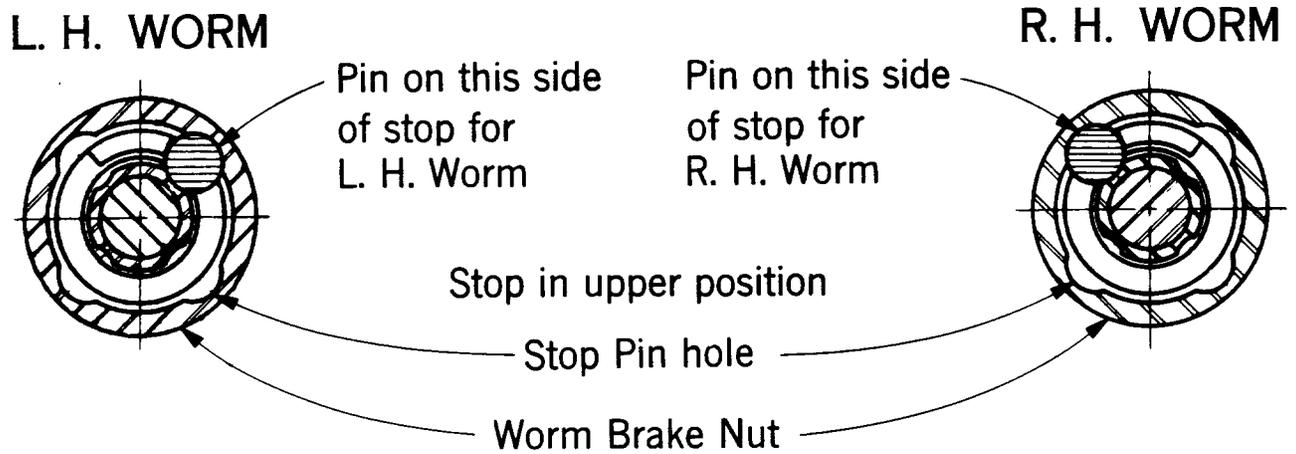
L. H. WORM

R. H. WORM



SINGLE PLATE WINCH WORM BRAKE ASSEMBLY
PART OF WINCH DRIVE HOUSING ASSEMBLY (SPROCKET TO REAR)

Fig. 20



DOUBLE PLATE WINCH WORM BRAKE ASSEMBLY
PART OF WINCH DRIVE HOUSING ASSEMBLY (SPROCKET TO REAR)

Fig. 21

action of the worm brake stud turning itself out of the worm brake nut. Viewing worm brake nut from outside with its cover removed, the stop pin is to be placed in the locations shown in Figs. 20 and 21 for a right-hand or a left-hand worm as required.

6.14 To assemble the worm brake on winches with the sprocket to the rear the worm brake nut should be placed on the worm brake stud and turned *toward the winch* until the distance from the outer face of the nut flange measures 2-1/2 inches to the rear face of the bearing cage flange where it abuts the winch drive housing. Then the stop pin may be placed in its proper location in the nut.

6.15 The brake lining plate should be placed on the brake anchor studs with the lining against the brake nut disc. The spring pins with the springs, thimbles, cotter pins, washers and nuts should be pushed through the holes in the pressure plate, the small springs and the small thimbles placed in the plate, and then the pins should be screwed into the winch drive housing.

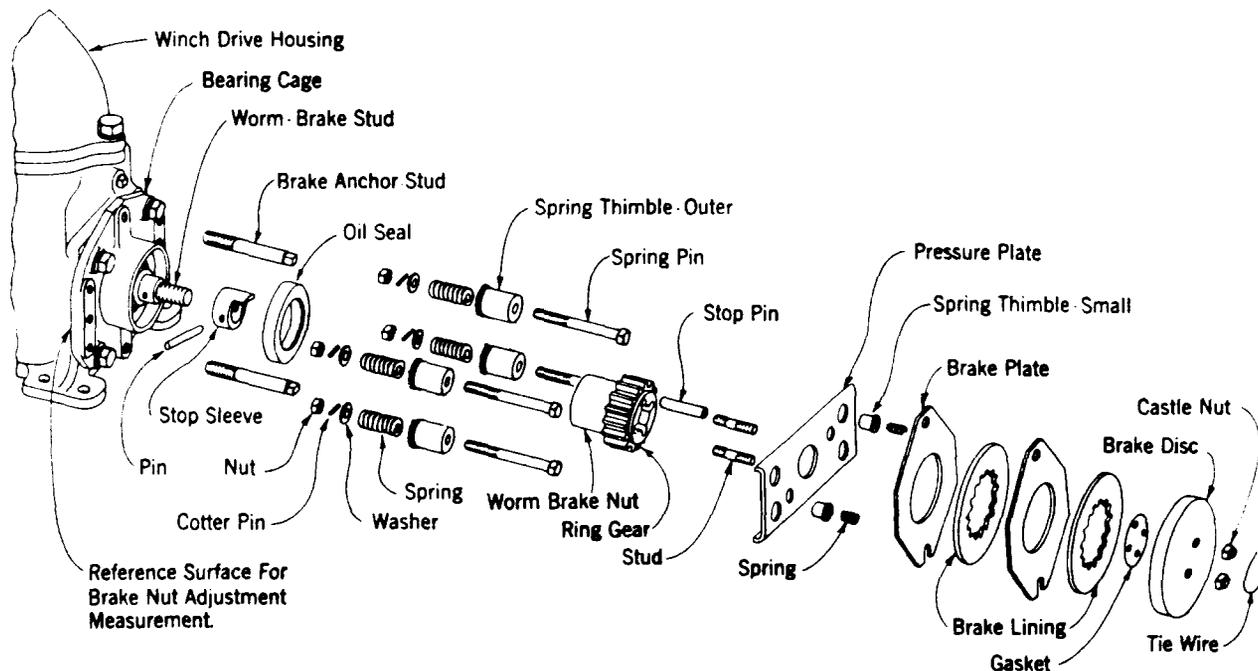
6.16 The worm brake should be adjusted after assembly. *On winches with the sprocket to the front*, turn the brake disc *away from the*

winch until the stop pin hits the stop sleeve. Force the worm to take up all of its end play by applying a load of about 1000 pounds to the winch line. While holding this load, adjust the spring pins until there is 1/32-inch clearance between the lining plate and the pressure plate. Screw the jam nuts against the bearing cage flange to hold the pins in position.

6.17 When adjusting the worm brakes *on winches* with the sprocket to the rear, turn the worm brake nut *toward the winch* until the stop pin hits the stop sleeve. Apply the 1000-pound load as described in 6.16 and adjust the spring pins to provide 1/32-inch clearance between the lining and pressure plates.

Double Plate Winch Worm Brake

6.18 In order to provide more positive braking action, a double plate winch worm brake is sometimes used. The parts of this brake which differ from the earlier model are the brake lining plates, the brake lining, and the worm brake nut. (See below.) The brake nut has a 15-tooth gear cut on it. The brake lining is not riveted to the lining plate, but has an internal spline cut in the inner hole which matches the worm brake nut gear. The lining floats on, and is driven by the nut. Two brake lining plates are provided and are held against turning by the brake anchor studs.



DOUBLE PLATE WINCH WORM BRAKE
PART OF WINCH DRIVE HOUSING ASSEMBLY
(SPROCKET TO FRONT)

The pressure plate has a larger diameter center hole to permit the nut to pass through.

6.19 The double plate brake, as seen in Fig. 22 provides three braking surfaces and is assembled with one lining positioned against the brake disc which is fastened to the brake nut with two studs. A brake plate is located between the first and second linings, while the second brake plate is between the second lining and the pressure plate.

6.20 Disassembly of the double plate worm brake is accomplished in the same way as described in 6.09.

6.21 The double plate winch worm brake is assembled as described in 6.10 and 6.11 up to the point where the pressure plate has been placed on the outer spring thimbles, and the small spring thimbles and springs mounted in the plate. Place a brake plate on the brake anchor studs. Then slip a brake lining over the gear of the brake nut against the plate, and place the second brake plate on the anchor studs. The second brake lining next is placed on the brake nut against the second brake plate, and the brake disc is then placed on the two studs projecting from the brake nut, and the castle nuts installed and locked with the locking wire.

6.22 The double plate worm brake is adjusted after placing the worm brake nut on the brake stud, before installing the stop pin as described in 6.10 except that the distance between the outer face of the brake nut teeth and the rear face of the bearing cage flange where it abuts the winch drive housing should measure 3-1/32 inches. With the worm held stationary, the projection of the stop sleeve in the upper position and the worm pushed as far as possible into the winch drive housing toward the sprocket end, turn the worm brake nut *away* from the winch until the measurement of 3-1/16 inches is reached. The stop pin can then be installed as described in 6.10 as shown on Page 21.

6.23 Adjustment of the double plate worm brake after assembly is identical with the procedure described in 6.16. The 1/32-inch clearance should be measured between the inner brake plate and the pressure plate.

7. ORDERING REPAIR PARTS

7.01 The final requisition for a repair part must completely identify the part by information taken from the drawings and specifications. The following suggestions should therefore be used as a guide by the field forces in placing their order on the office of the Telephone Company, where the requisition will be prepared.

7.02 When preparing field orders for a repair part, care should be taken to properly identify the part and to use the name and any other necessary description of the part as shown in the figures in this section.

7.03 *The information shown on the name-plate attached to each winch is important and should always be reported along with the name of the part to be ordered.*

7.04 The name-plate on the winch shows the manufacturer's name and address, the type of winch, the date of manufacture, the serial number, and the Drawing List and Issue numbers under which the winch was manufactured.

7.05 The Drawing List and Issue numbers, together with the date of manufacture and serial number of the equipment control the parts. *Including this information* when ordering repair parts *will insure that the latest improved interchangeable parts are furnished.*

7.06 On the older types of winches, the name-plate shows the assembly drawing number and the parts list number and issue. No DL number was assigned to these winches, and therefore, the Parts List and Issue numbers should be used when ordering parts.