M-8000 TROUBLE SHOOTING

In cases where the motor will not run or lacks power make the following checks before removing motor.

Check -

-Battery for state of charge, condition, and capacity (proper amperage rating).
-All connections for corrosion, being loose or shorting to ground.
-Condition of electrical cables, (pinched cable, cracked or cut insulating cover).
-Ground cable for proper installation from winch case to engine block or other common point.
-For faulty switch.

If none of the above problems exist, check for the following - (motor will have to be removed, when breaking motor down notice if governor has been installed correctly - chamfer of carrier assembly must be outward).

Symptom	Possible Cause
Motor will not run.	-screw that holds field coil end to terminal bolt is loose or missing. -spot weld to cross strap of field coils has broken loose. -brushes do not move freely in brush holder due to rust and corrosion.
Motor will not run and causes a direct short and/or cables or motor are hot.	-cross strap of field coils shorting to motor frame bolts. -brush spring shorting to motor frame bolt. -brush wire shorting to motor housing. -armature windings thrown or expanded. -field coils burned out or shorting to motor housing.
Motor runs but lacks power.	-motor governor installed backwards. -screw that holds field coil end to terminal is loose. -rust and corrosion in motor housing affecting coils and brushes. -bearing at either end of armature burned out allowing armature to rub against pole shoes. -armature has shorted or open windings.
Motor runs but makes noises	-armature rubbing against pole shoes. -faulty bearing at drive end of armature. -distorted teeth on armature shaft drive gear, or teeth on shifter gear. (This is common just after vehicle has been in an accident or motor has been hit hard.)

Remove the battery cable from the motor terminal.

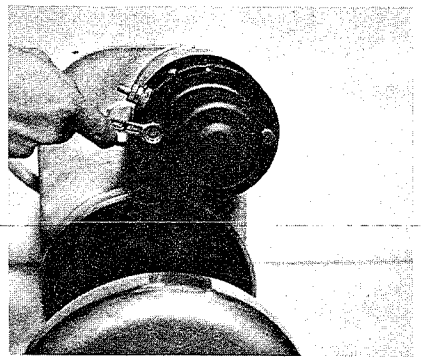

Fig. 1

Remove the motor Bolts.

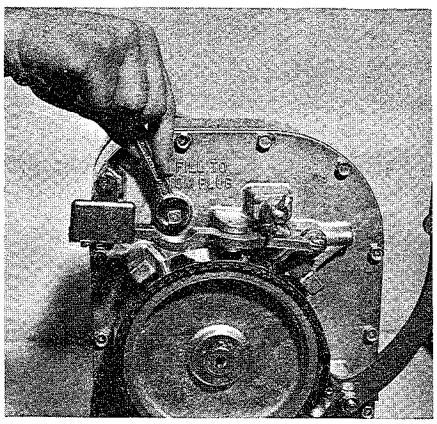

Fig. 2

Remove the fill hole plug from the case cover.

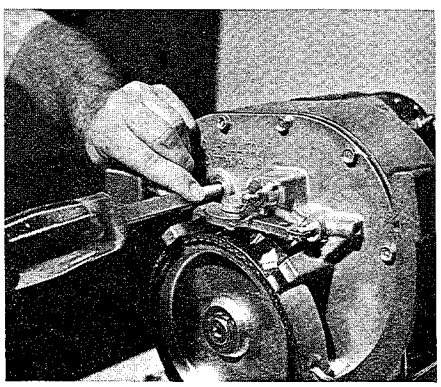

Fig. 3

Insert a long punch and tap gently to drive the armature shaft and bearing from the case. Be sure to support the motor as there is nothing remaining to hold it.

Lay the motor on a bench and remove the brake cap.

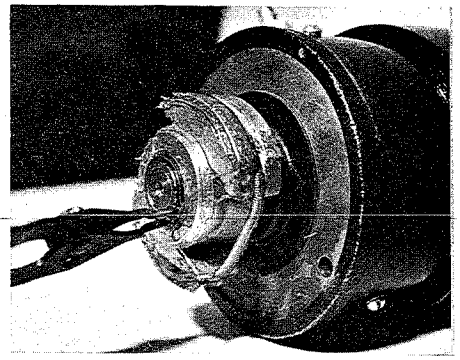

Fig. 4

Remove the retaining ring holding the centrifugal brake assembly on the armature shaft.

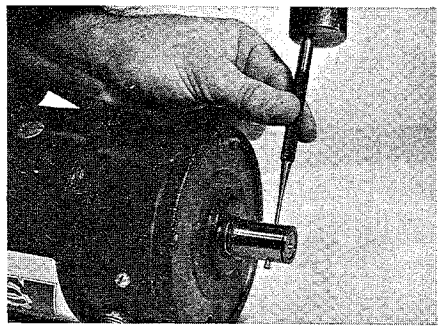

Fig. 5

Use a pin punch to drive the roll pin through the sleeve and armature shaft.

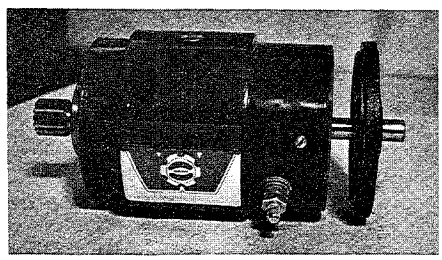

Fig. 6

The end plate can now be removed. Do not remove the armature until the next step is completed or brush damage can result.

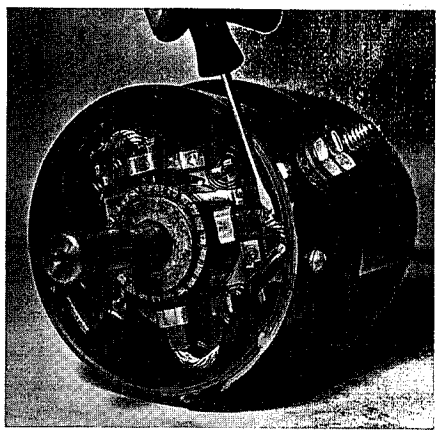

Fig. 7

Use a small screwdriver to release the brush springs and hook them to the brush plate.

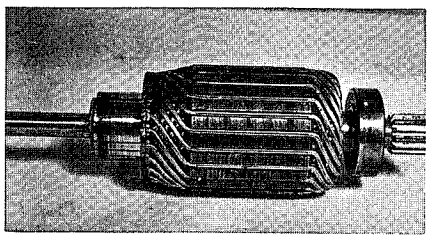

Fig. 8

The armature assembly can now be removed. It should be cleaned and visually inspected for wear or open solder joints on the comutator. Inspect the windings to see if they have expanded from centrifugal force and are rubbing the field coils or shoes. This is caused by pulling cable out with the winch clutch engaged. Check for opens or grounds. Inspect the gear and also bearing surface area on the comutator end of the shaft.

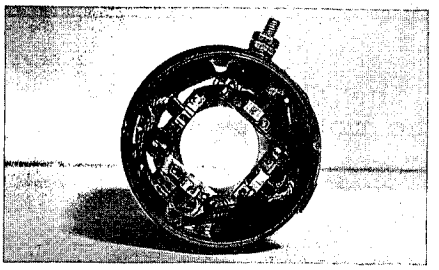

Fig. 9

Clean thoroughly and check the motor housing for opens and grounds in the field coils and wiring. Check the brush plate to be sure it is flat. Check the brush spring tension. It should be 42-53 ounces. Replace the springs if the tension is not within limits.

Check the brushes for wear. The manufactured length is .62" and they should be replaced when worn to half size.

With all worn and damaged parts repaired or replaced, the motor is ready for assembly. Open bearings on the armature shaft and in the end plate should be lubricated with high temperature grease. Place the armature into the motor housing and release the brush springs. Center them carefully on the brushes. Place the fiber washer on the armature shaft and slide on the end plate. Install the centrifugal brake sleeve and drive in the roll pin.

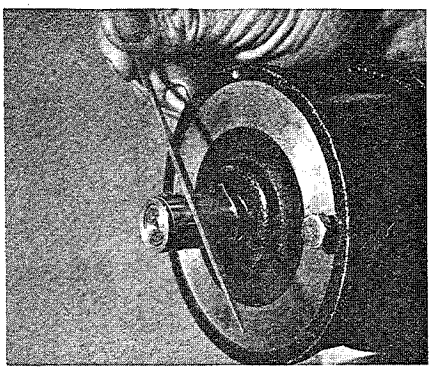

Fig. 10

The roll pin must not protrude. Dress with a smooth file as necessary.

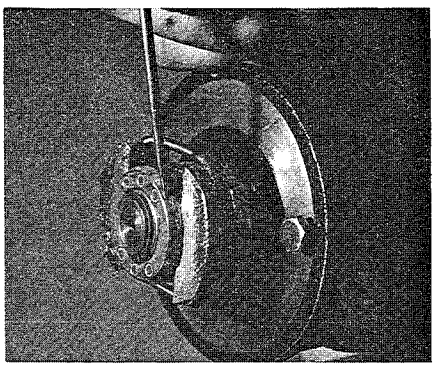

Fig. 11

Slide the centrifugal brake assembly into the sleeve and install snap ring. The tapered edge of the carrier must be outboard as illustrated. If it is installed backward the brake will actuate when the motor is turned on. Do not install the brake cap at this time.

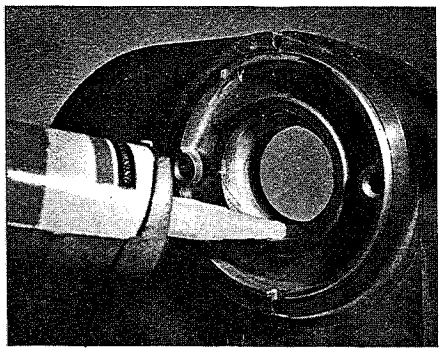

Fig. 12

Lay a bead of silicone sealant around the inside corner of the bearing bore in the case. Align the motor and install carefully. It may be necessary to tap on the end of the armature shaft to drive the bearing into the bore. Use an aluminum or brass drift to avoid damage. Do not force the motor housing or attempt to pull the motor into place with the mounting bolts. This will bend the brush plate and possibly strip the screw holes.

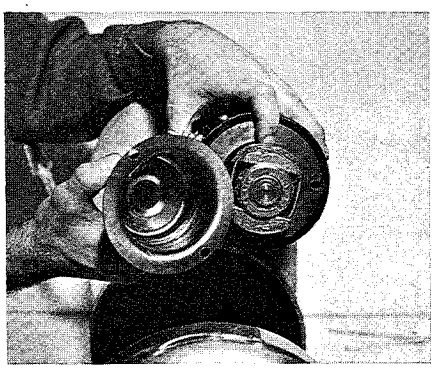

Fig. 13

When the motor is in place, put a generous amount of high temperature grease on the brake cap and install the cap on the motor.

Align the motor and install the motor bolts. Torque to 150 inch pounds.

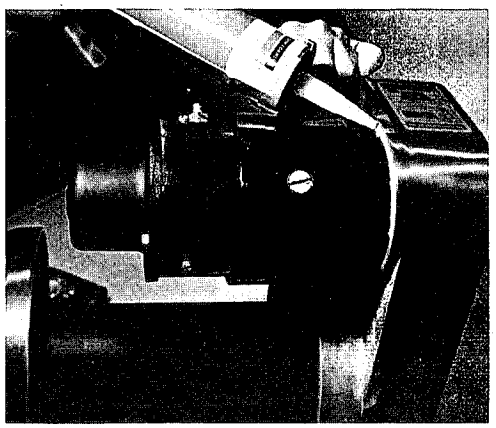

Fig. 14

Put a bead of silicone sealant around the top half of the motor where it joins the case. Repeat this where the end plate joins the motor housing. This will help keep water out of the motor. Replace the battery cable to the motor terminal. Put the winch clutch out of gear and check the motor for amp. draw while spinning freely. It should not exceed 70 amps.

External parts such as the levers and brake components can be removed without taking the winch off the vehicle, on most installations.

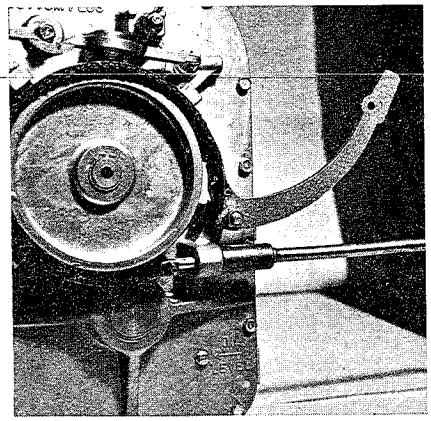

Fig. 1

Remove the nut from the brake anchor eye bolt

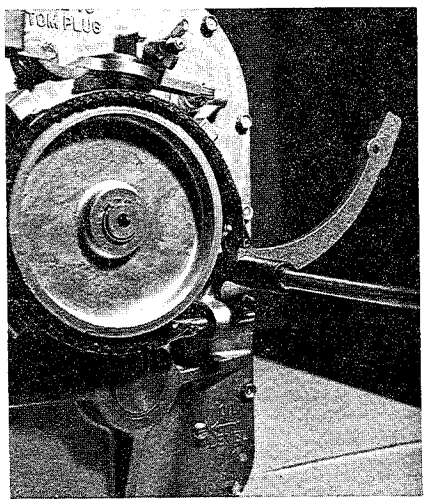

Fig. 2

Remove the nut from the brake lever stud.

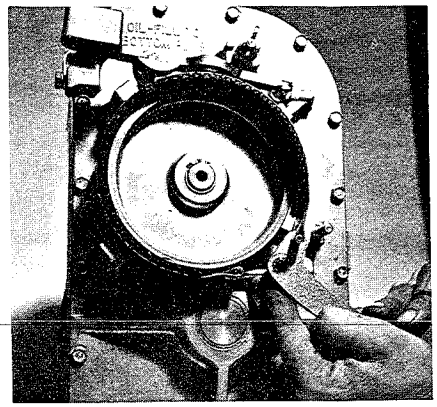

Fig. 3

Slide the brake lever off the stud. Roll the band clockwise and wiggle the anchor eye bolt until it clears it's mounting hole.

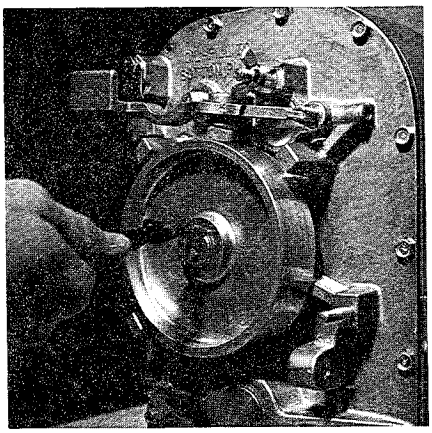

Fig. 4

Remove the retaining ring. Early models have a set screw instead of the ring.

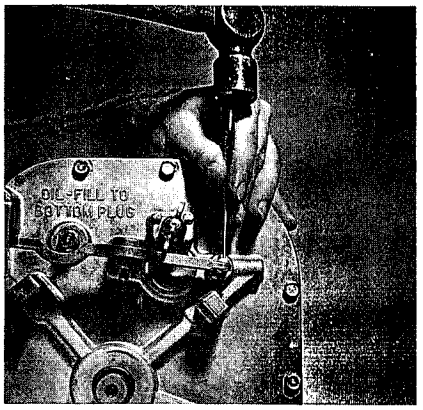

Fig. 5

Drive the roll pin thru the shifter shaft and the clutch lever.

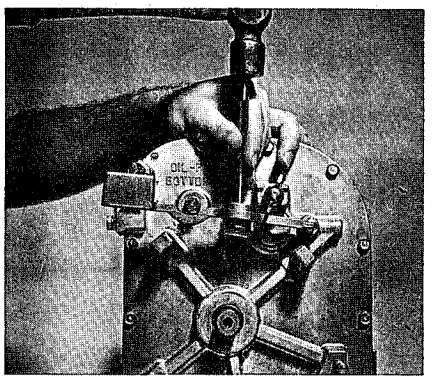

Fig. 6

Drive the pivot roll pin thru the mounting boss and the clutch lever.
Installation of these parts is accomplished by following the steps in reverse order.

Further disassembly will require that the winch be removed from the vehicle.
Disconnect all control cables, battery cable, ground cable, mounting bolts and cable hook.
Remove the winch and clean the exterior as necessary.
It is not necessary to remove any levers or brake parts on the case cover to disassemble the winch case.

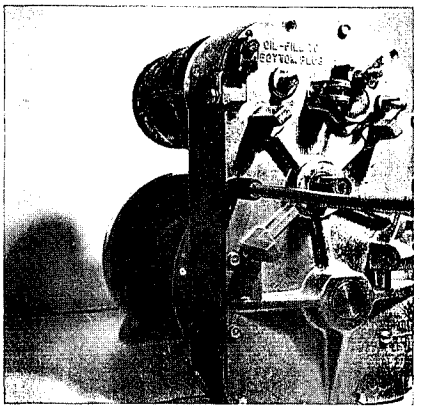

Fig. 7

Remove all capscrews on the perimeter of the gear case including the long one that holds the clamp for the brake control cable. The oil will run out of the case as the capscrews are loosened.

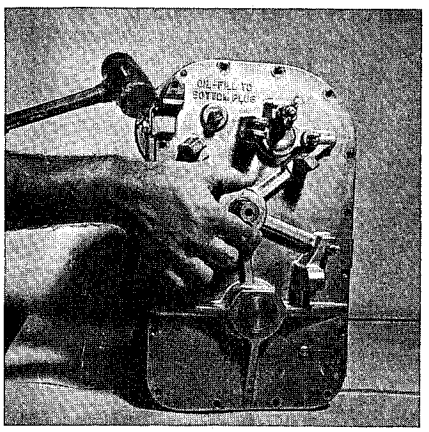

Fig. 8

It may be necessary to tap the cover with a soft face hammer to loosen it. Do not pry with screwdrivers between the case and cover. This will damage the seal area.

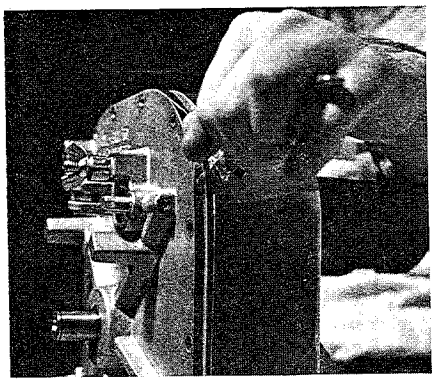

Fig. 9

Run a thin blade between case and cover to cut the silastic if necessary.

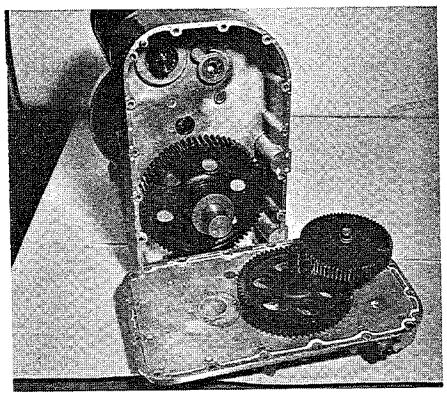

Fig. 10

The parts will separate as shown.

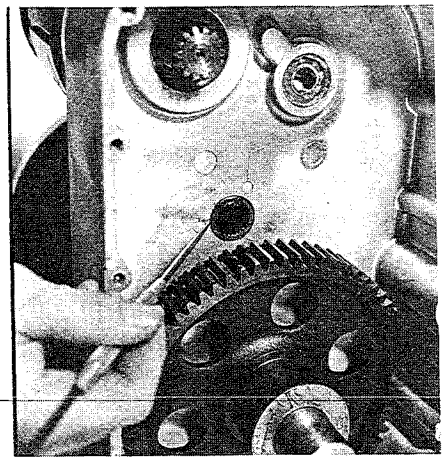

Fig. 11

The needle bearing in the case should have a plug put in it to keep the needles from falling out. Put some grease in the bearing and push in a clean socket or similar item of the correct size to retain them.

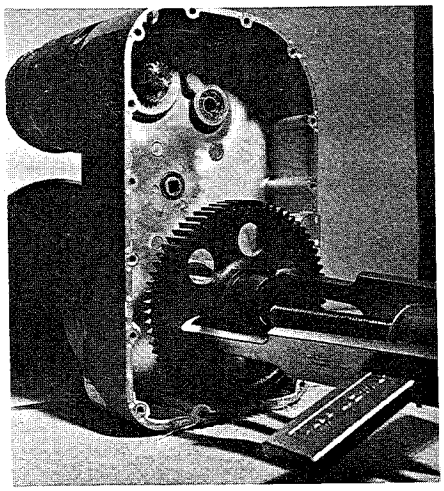

Fig. 12

Put a punch mark in the center of the main shaft for the puller. Do not try to drive the shaft thru the case.

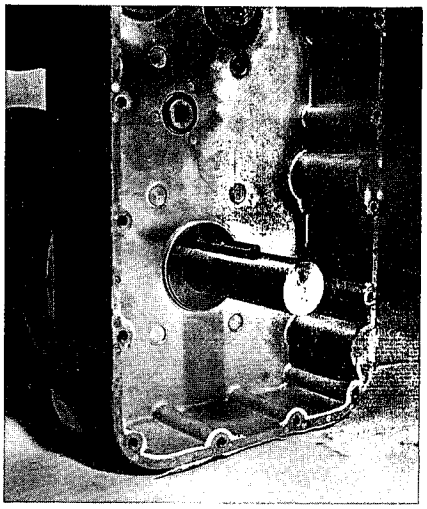

Fig. 13

The gear and key must be removed before the shaft can go thru the case without damage.

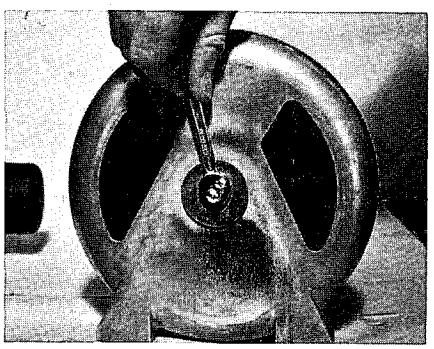

Fig. 14

Remove the grease fitting from the support bracket.

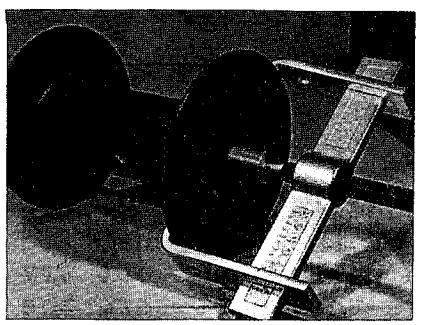

Fig. 15

Measure the shaft length on one end of the drum. Use an arbor press or puller to remove the shaft from the drum. Check the keyways for twist and the shaft for being straight. Replace the shaft with the same length extended from the drum.

Replace the bushings in the drum support bracket, case, and cover. Grease them and install the drum assembly into the drum support bracket and the case. Be sure a thrust washer is on each side of the main gear when installed.

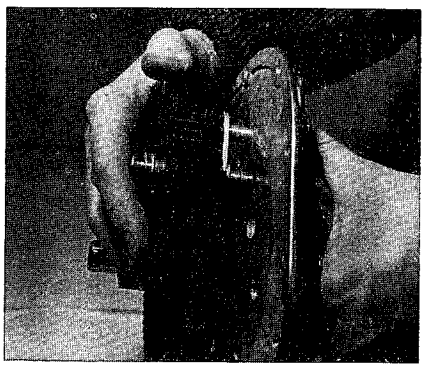

Fig. 16

Grasp the shifter gear and pull the clutch lever away from the case. The pinion gear will easily disengage from the shift fork.

Remove the brake drum and key. Slide the shaft out slowly and put in heavy grease and a plug as in Fig. 11 to retain the bearing needles.

Remove and replace the seal on the outer end of the bearing. Install the brake shaft taking care not to damage the seal. Replace the key, brake drum, and snap ring. Replace shifter gear.

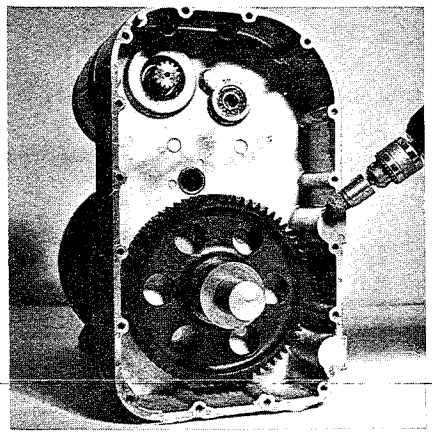

Fig. 17

The mating surfaces of the case and cover can easily be cleaned with a rotary brush. Clean out all screw holes on the perimeter of the case. This is necessary so that correct torque readings may be obtained.

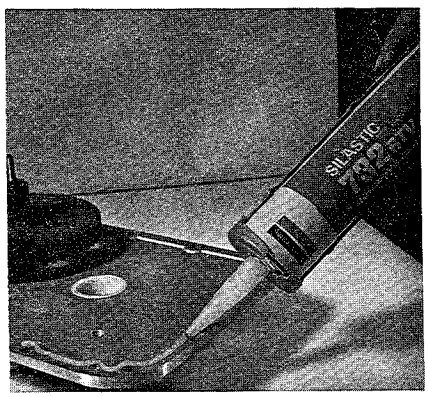

Fig. 18

Lay a bead of silicone sealant around the mating surface of the cover. Be certain to stay inside the bolt holes. Fit the cover to the case. Be certain the dowel pins in the upper left hand and lower right hand corners are in place.

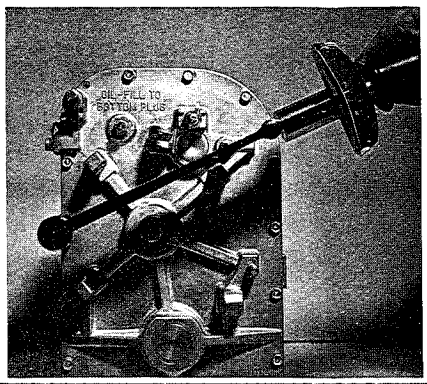

Fig. 19

Install the capscrews and torque to 150 inch lbs.

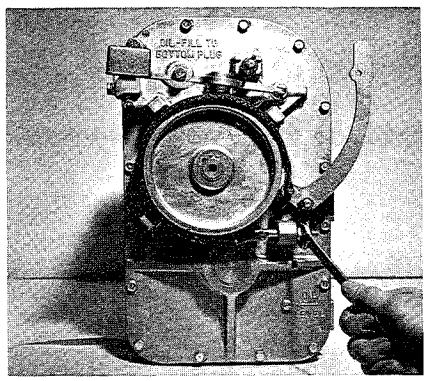

Fig. 20

Install clutch lever and brake band assembly. Adjust to a position where the brake holds firmly and when released, the drum turns freely. Shift the clutch lever to the free position and rotate the drum. If it does not turn freely, find the cause befor applying power to the winch.