

YARD SHOP REPAIRS TO DRIVE SHAFTS: Refer to Figures 20 and 21. No repairs which might effect the balance of shaft will be made in the Districts.

Before removing any parts from a drive shaft, be sure that they are marked so that they may be replaced in the EXACT relationship that existed before removal; otherwise, an out-of-balance condition is likely to occur.

Bearings and Journals: Items 4 and 8. When bearings appear to be worn, it is advisable to replace both the bearings 4 and journal 8 to obtain the best results. To remove, bend down the locking lugs on strap 2 and remove screws 1 and bearing cap 3. The bearing 4 can now be removed by tapping lightly on the outside of the flange. The journal 8 can be removed by sliding to one side and tipping to clear the yoke. Cup assembly (22) should be tack welded to the journal. Before assembling the new parts, dip the bearings in light oil. Be sure all screws are tightened and locked.

Oil and Dust Seals: Items 14, 15, 16, 17, and 18. Parts for the oil and dust seals are split to provide an easy means of assembling around the shaft. To remove, pry loose locks and remove dust shield 51 and dust cap 52, then remove oil seals, 14 (or 15) and 17. If steel washers 15 (or 14), 16 and 18 are not damaged, they need not be removed. Insert new felt and cork washer and screw on dust shield and dust cap locking in place. Both the felt and cork washer should be soaked in light oil before assembling. Be sure to lubricate the universal joints and spline in accordance with instructions.

CLUTCH: There are two types of Spicer clutches, Safety and Automatic. Figure 22 shows the Safety type. Figure 23 shows the Automatic type. These clutches are interchangeable and are used to transfer the torque from drive shaft to the generator. They have tapered bore with keyway and are mounted on end of generator shaft. The safety clutch is a single plate friction clutch with the capacity controlled by spring pressure. The torque load is transferred from the drive shaft and through the clutch cover, housing, pressure plate and safety plate to driven disc, then through the hub to generator shaft. Release wedges are provided to release pressure plate when it is necessary to motor the generator. A safety overload feature is built in the clutch so that when clutch starts slipping at the friction surfaces, heat is generated in a safety plate. This heat transfers to soft metal safety plugs which melt and allow safety plate to move out of engagement. This clutch runs free on its bearings and no damage results. Figure 23 shows the details.

The Automatic clutch is similar to Safety Clutch and has the same safety overload feature. In addition, this clutch engages and releases automatically at 280 R.P.M. or car speed of 8 to 12 M.P.H., depending on ratio of drive. This feature eliminates starting load on the locomotive, permits quick motoring of generator in the yards; and in case of emergency, stops the high inertia load of the generator armature is not placed on the gear unit. Shock loads caused by coupling cars are also avoided. The engagement and disengagement of clutch is controlled by centrifugal force acting on fly weights balanced against retracting springs. The fly weights are limited in their travel, and the maximum capacity of the clutch is controlled by the retracting springs. The clutches operate the same for either rotation and are statically and dynamically balanced. Three inspection plugs are provided for checking position of the safety plate.

CLUTCH LUBRICATION: Safety clutch bearings are of the prepacked lubricated type and no provision is made for yard lubrication. Automatic clutch bearings require lubrication when the regular six month inspection is performed.

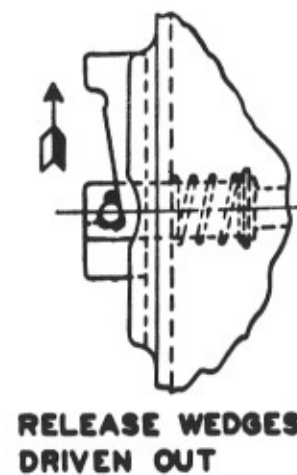
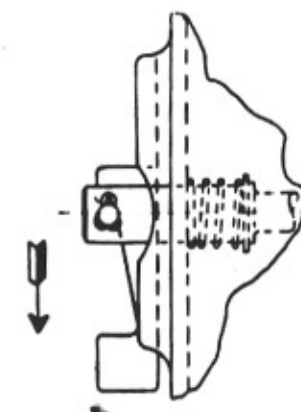
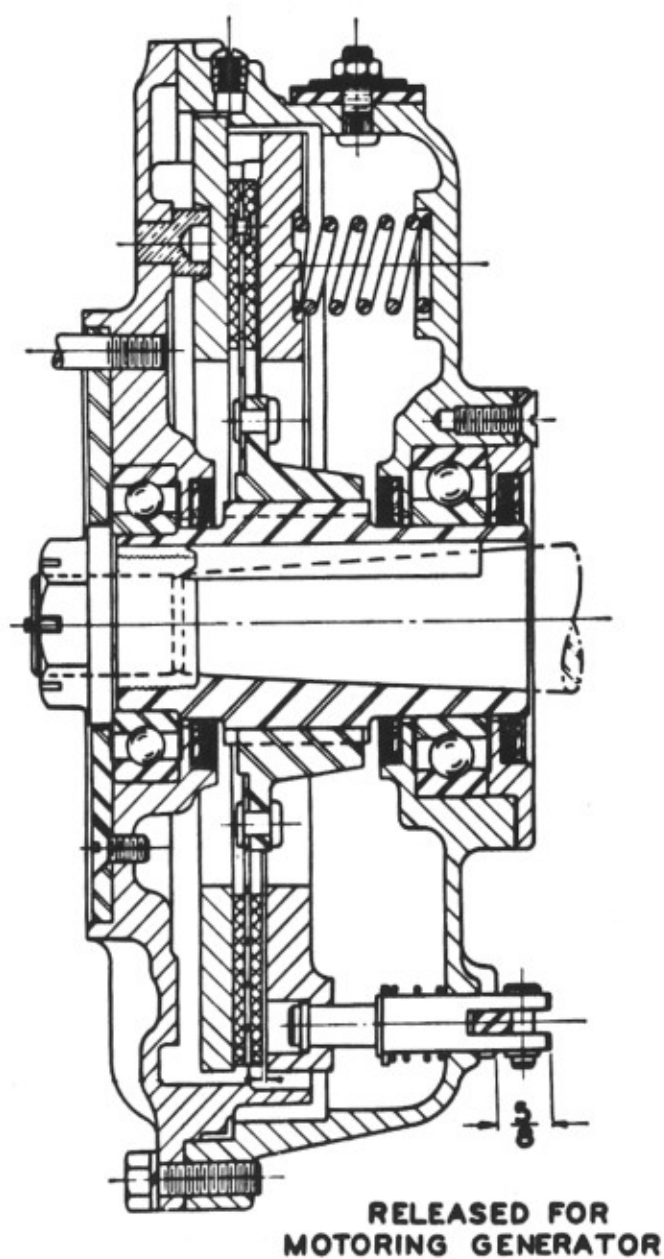
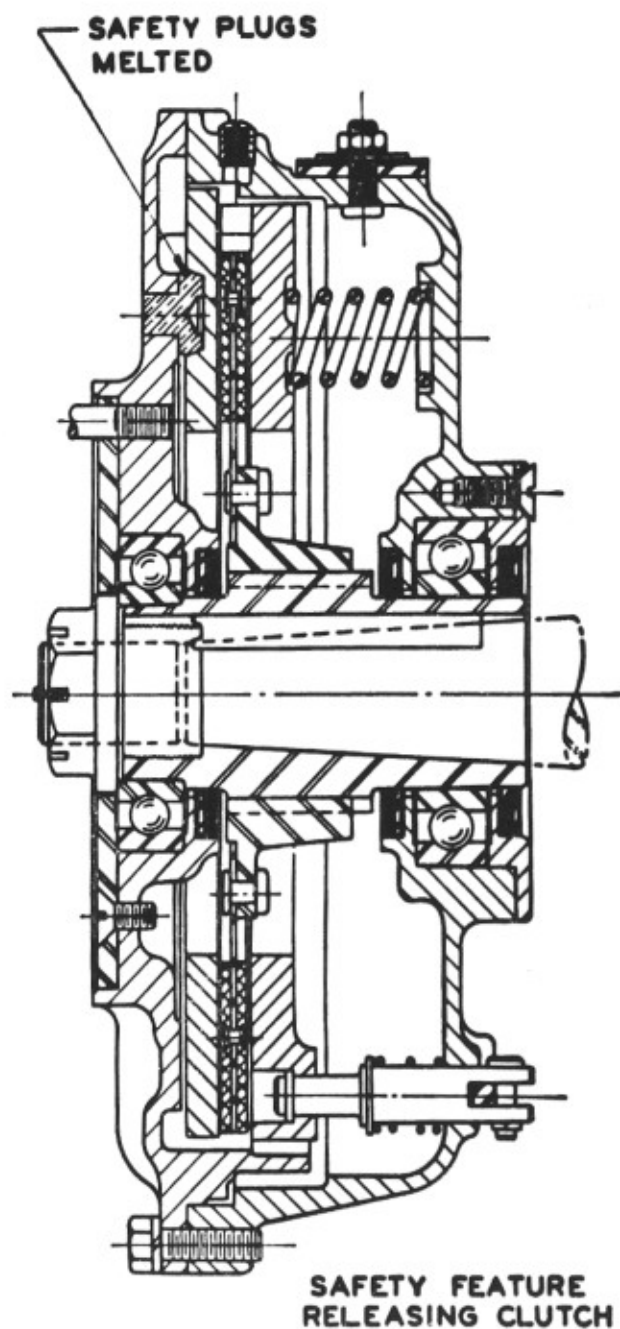
The automatic clutch should be removed from the generator and disassembled for bearing lubrication in the yard shop. Remove retainer plates No. 5 and 25 shown in Figure 24. Carefully pack each bearing one-third full of U.S. No. 508 grease. Do not put in any more than this amount. Otherwise the bearings will run hot and the excess lubricant will get on the facings, resulting in the failure of the clutch.

YARD REPAIRS TO AUTOMATIC CLUTCH:

No major repairs affecting balance will be made in the districts. The clutch is of disc type controlled by centrifugal force. It is disengaged with car standing still and up to speed of 8 to 12 M.P.H. Motor generator can therefore be motored in the yard without clutch interference. In all cases of motor generator trouble where clutch might be in operative, the inspection plug on side of clutch should be removed. If clearance between safety plate and disc is greater than $1/16$ " the safety plugs have probably melted and a new clutch should be installed. See Figure 23.

REMOVING THE AUTOMATIC CLUTCH.

1. Disconnect drive shaft.
2. Remove cotter pin and shaft nut.
3. Attach special puller and remove clutch. See Figure 25.



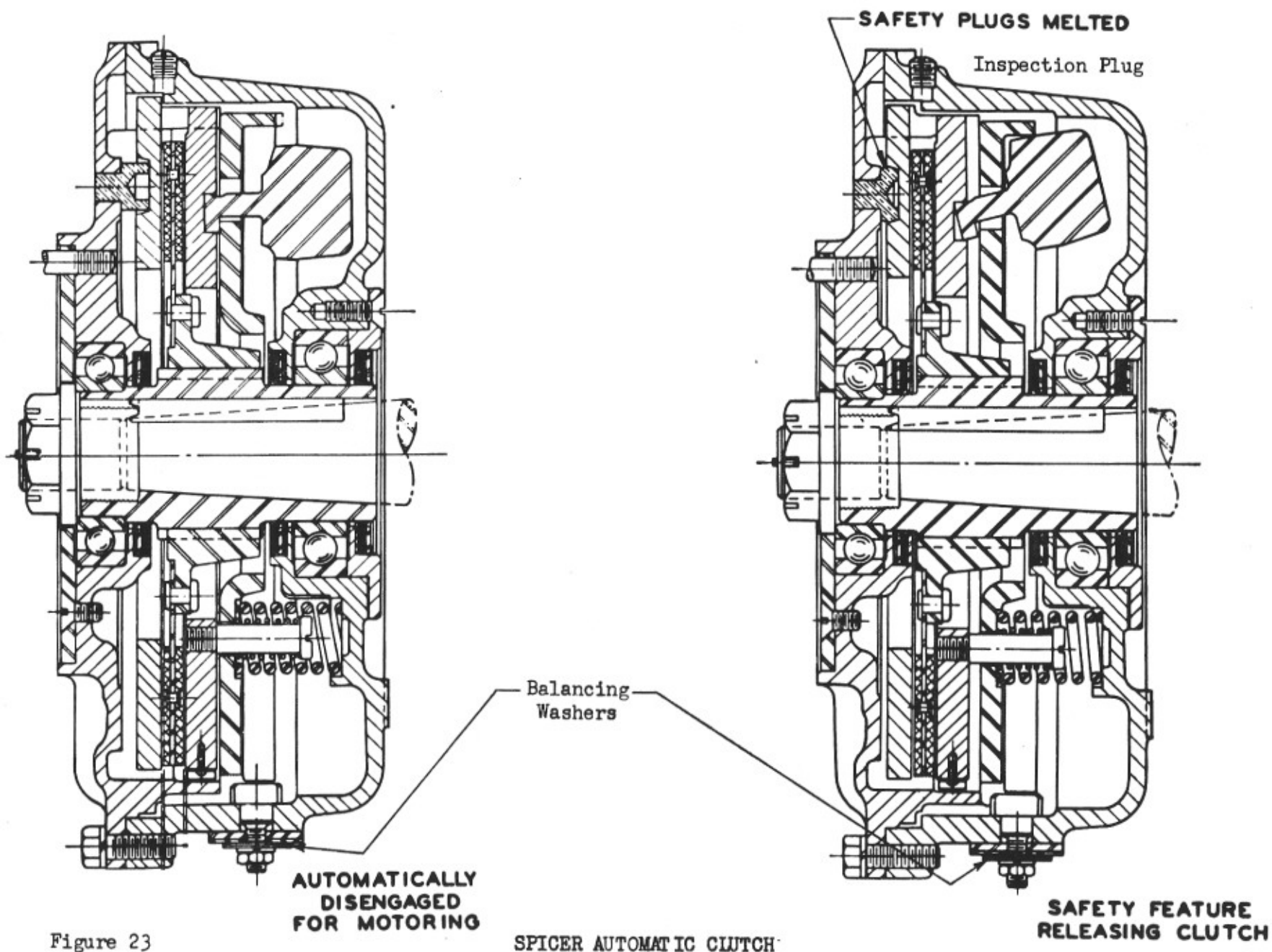


Figure 23

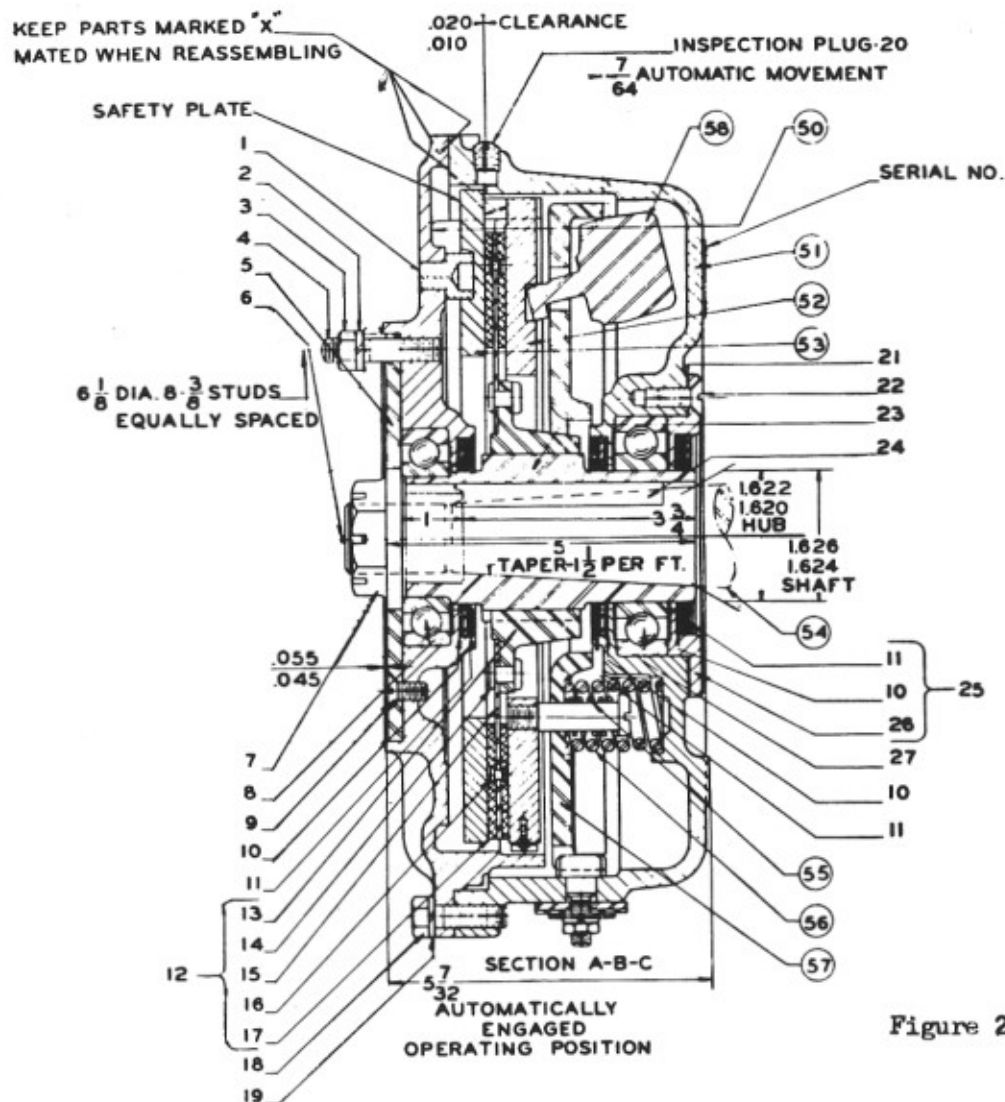
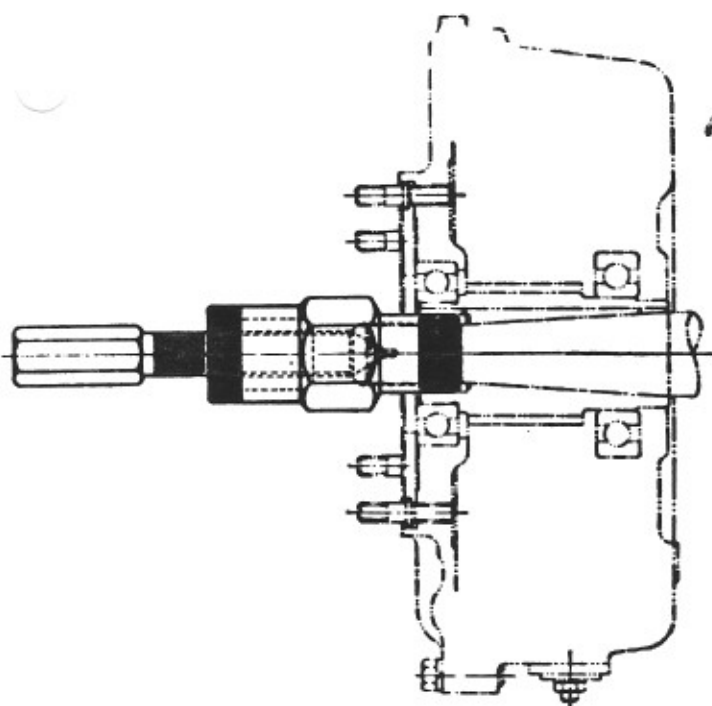


Figure 24

REPAIR PARTS

Item No.	Description	Part No.	Pullman No.	Item No.	Description	Part No.	Pullman No.
1	Safety Plug	55153-3		14	Hub Rivet	110-R	
2	Lockwasher	6-75-29		15	Driven Disc	55123	
3	Nut	294-J		16	Facing Rivet	224-R	
4	Stud	S-970		17	Facing	55103-6	
5	Bearing Retainer	55196		18	Screw	3-D	
6	Cotter Pin	8-72-19		19	Lock Washer	6-75-29	
7	Nut 1 1/8" x 12 Thds.	S-884		20	Inspection Plug	98-78-5	
7	Nut 1 1/8" x 7 Thds.	S-887		21	Gasket	55200	
8	Bearing in Cover	55201		22	Screw	S-1141	
9	Screw	S-971		23	Driving Hub	55207	
10	Gasket	55195		24	Key	S-945	
11	Oil Seal	55194		25	Bearing Retainer Assy.	55208-X	
12	(13,14,15,16			26	Bearing Retainer	55213	
17	Driven Disc Assembly	52009-X		27	Bearing in Housing	55202	
13	Driven Disc Hub	55205					



CLUTCH PULLER

Figure 25

This CLUTCH PULLER is used to remove the clutch from the generator shaft. It can be used for any type or model of Spicer automatic or safety clutches. It should be used whenever a clutch has to be removed, as driving the clutch off is likely to damage both the clutch and generator. To use the puller, back off the puller screw and screw the puller into the internal thread of the clutch hub as far as it will go. Now turn the screw clockwise and continue until the clutch is free.

APPLYING NEW AUTOMATIC CLUTCH:

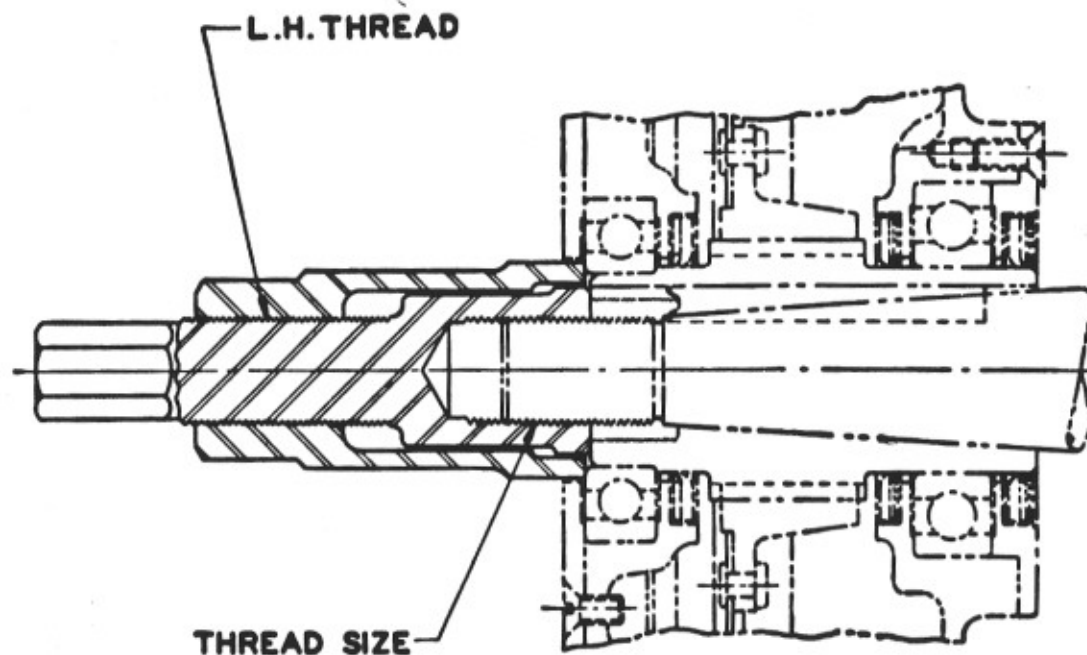
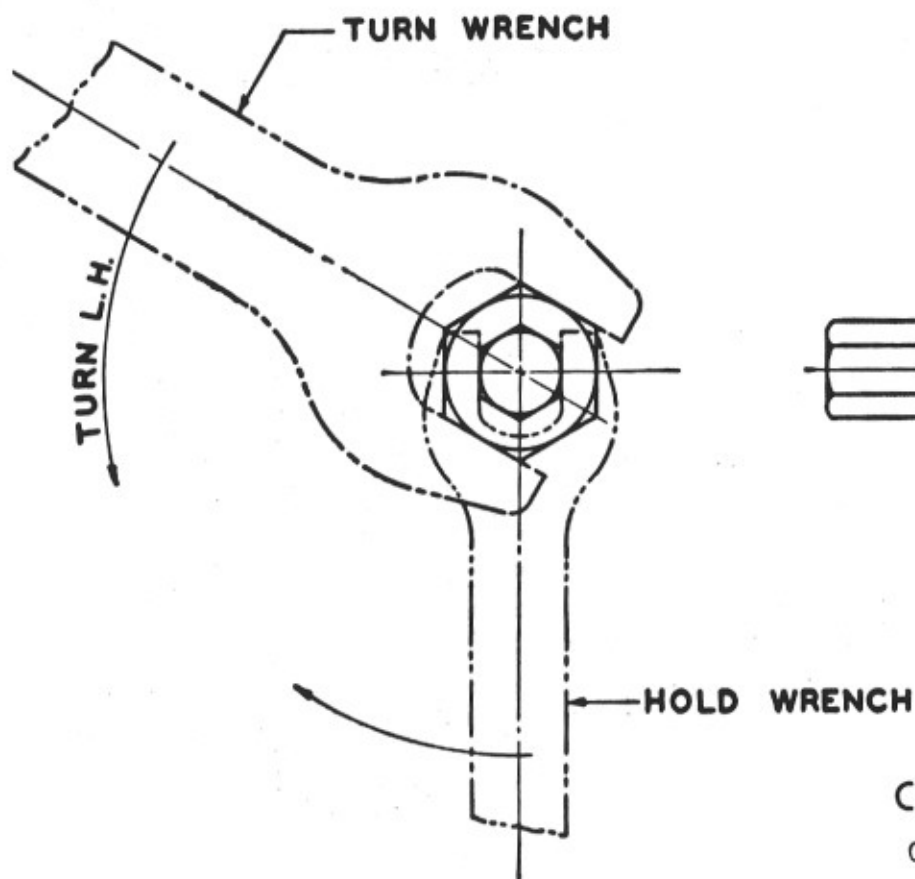
CAUTION: In order to insure a perfect fit of the clutch to shaft, the bore of the clutch and the surface of the shaft and the keyway must be absolutely free of burrs, filings and grit.

1. Apply key in armature shaft.
2. Clean armature shaft and bore in clutch.
3. Slide clutch into position and force up on taper.
4. Attach special pusher tool and press clutch *all the way* on the armature shaft. See Figure 26.
5. Apply nut and cotter key to armature shaft.
6. Re-Connect drive shaft.

NOTE: Too much emphasis cannot be placed on the necessity of making sure that the clutch is completely seated on the shaft.

REPLACING SAFETY PLUGS:

1. Mark parts in order to re-assemble in same position.
2. Remove cap screws in front cover.
3. Pry off front cover.
4. Lift out safety plate to expose safety plugs in front cover.
5. Drive out old safety plugs and clean out the melted material.
6. Drive in new set of safety plugs. (Use special driving tool and do not drive against face of plugs). See Figure 29.
7. Re-assemble safety plate and front cover.



CLUTCH PUSHER

Cat. No. Q 1620

Figure 26

This CLUTCH PUSHER is a combination tool to hold the armature shaft and push the clutch securely on the taper. It can be used for both the safety and automatic clutches, but not the 50003 Safety Clutch. It is particularly adapted for the automatic clutches as these cannot be held by other means. To use the pusher,

first push the clutch on the taper then screw the small nut on to the threaded end of the shaft as far as it will go. Hold this nut from turning and turn the large nut in a counter-clockwise direction (Left Hand) forcing the clutch securely on the taper. Now remove the pusher and apply the regular nut and cotter.

MECHANIC'S SHOP REPAIRS TO AUTOMATIC CLUTCH

GENERAL DISASSEMBLY: See Figures 27 and 28.

1. Mark front cover plate with relation to housing. (If not previously factory marked). Both parts should be marked with an 'X'. Figure 29 shows front and back view of the front cover plate.
2. Remove six cap screws and lockwashers, loosening each in turn, around the circumference. This method will allow spring pressure to raise cover.
3. Pry cover the remaining distance to clear, if necessary.
4. Mark safety plate shown in Figure 30 (with relation to housing and pressure plate). Lift out safety plate.
5. Lift out driven disc hub assembly, shown in Figure 31.
6. Mark pressure plate (with relation to housing) and lift out pressure plate assembly. Figure 32 shows front and rear view of pressure plate. Both parts should be marked with an 'X'.
7. Lift out six compression springs, shown in Figure 33.

NOTE: Repair parts listed on Figure 24 may be exchanged. If parts not shown on this list require renewal, clutch must be re-assembled and turned over to storekeeper for disposition. Driven discs should be fastened to hub by 16 rivets. Should dis-assembly reveal an old style 8 rivet disc assembly it should be replaced with new style 16 rivet assembly.

8. Re-assemble by reversing the above procedure keeping marked parts mated.

RENEW - FRONT COVER BEARING:

1. Dis-assemble clutch as outlined above.
2. Remove four flat head screws from bearing retainer and remove retainer. See Figure 29.
3. Force hub out of front cover plate.
4. Force bearing out from back to front.
5. Force seal out from front to back.
6. Remove gasket.
7. Clean parts and re-assemble using new gasket by reversing procedures 3, 4 and 5.

NOTE: Apply seal as shown in Figure 34.

CAUTION: Extreme care must be exercised to apply the seal with the long edge against the bearing. This can be quickly determined by putting the rolled edge of the seal housing against the bearing.

8. Pack bearing 1/3rd full with K-13666 and apply new paper gasket and the retainer.

RENEW - HOUSING BEARING.

1. Dis-assemble clutch as outlined above.
2. Remove six flat head screws from bearing retainer and pry out. See Figure 33.
3. Force out bearing from back to front.
4. Force out seal from front to back.
5. Remove gasket.
6. Clean parts and re-assemble (using new gasket).

7. Repack bearing 1/3rd full with K-13666.
8. Renew seal in retainer.
9. Apply new gasket and retainer.

NOTE: Apply seal as shown in Figure 34. #

CAUTION: Extreme care must be exercised to apply the seal with the long edge against the bearing. This can be quickly determined by putting the rolled edge of the seal housing against the bearing.

RENEW - CLUTCH FACING:

1. Disassemble clutch as outlined above.
2. Remove facing rivets (12) and facings by drilling out rivets. See Figure 31.
3. Apply new facings and rivets. Reverse alternate rivets.

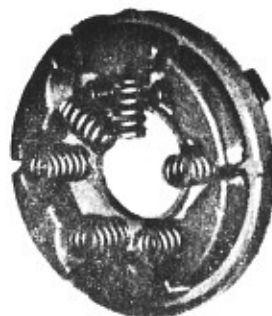
RENEW DRIVEN DISC OR HUB: No repairs are to be made to the driven disc or hub. The assembly should be renewed as a unit.

BALANCING: The housing and the front cover plate must be dynamically balanced individually before assembling. The pressure plate, driven disc and hub assembly and the safety plate are to be statically balanced individually.

After assembly the clutch must be dynamically balanced at full speed range of the balancing machine.



Housing



Pressure Plate

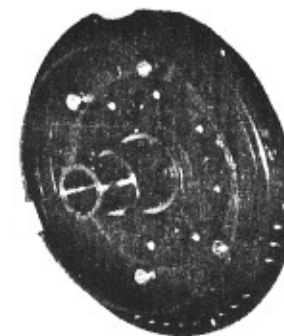


Figure 27

Driven Disc



Safety Plate



Cover Plate

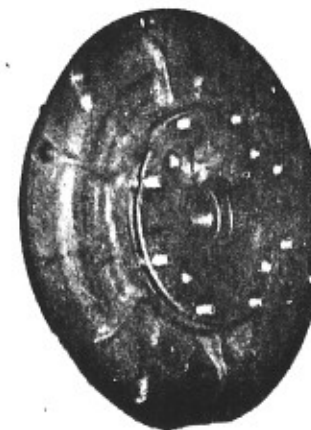
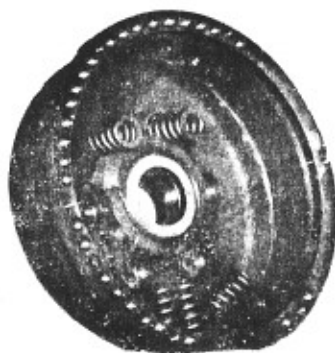
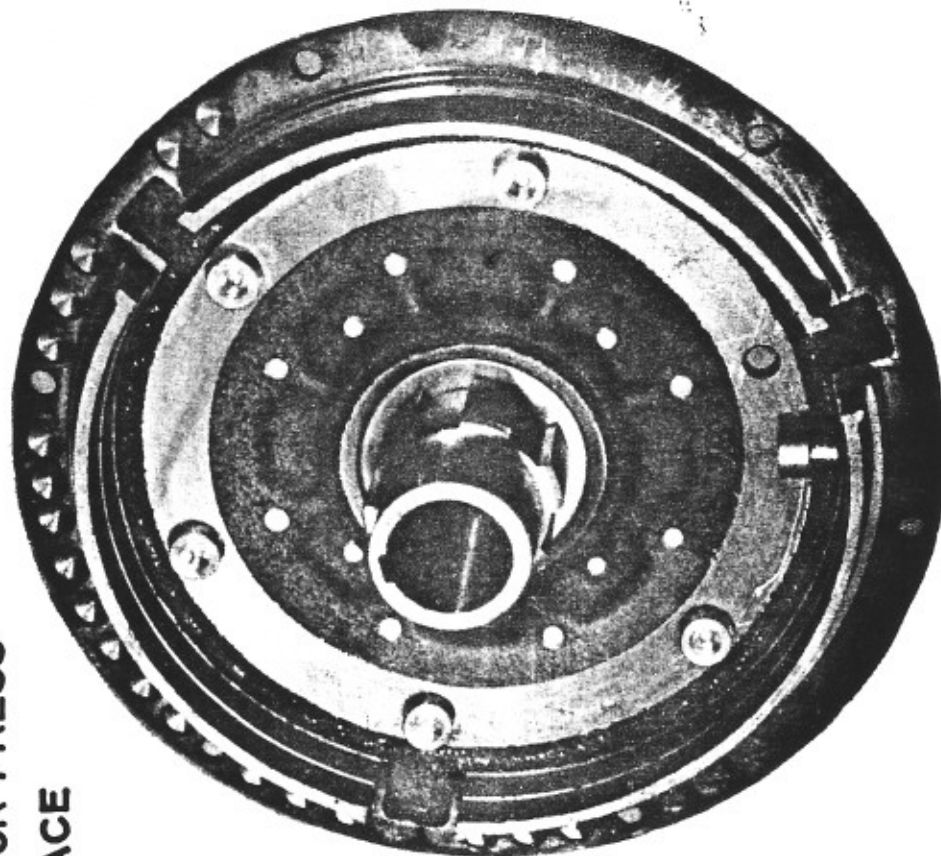
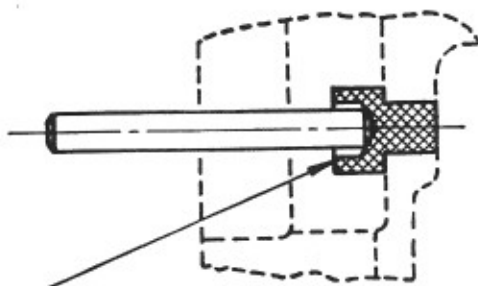


Figure 28

Exploded view of automatic clutch showing parts in assembly order.

FRONT COVER PLATE

DO NOT DRIVE OR PRESS
ON THIS FACE



(Front View)



(Back View)

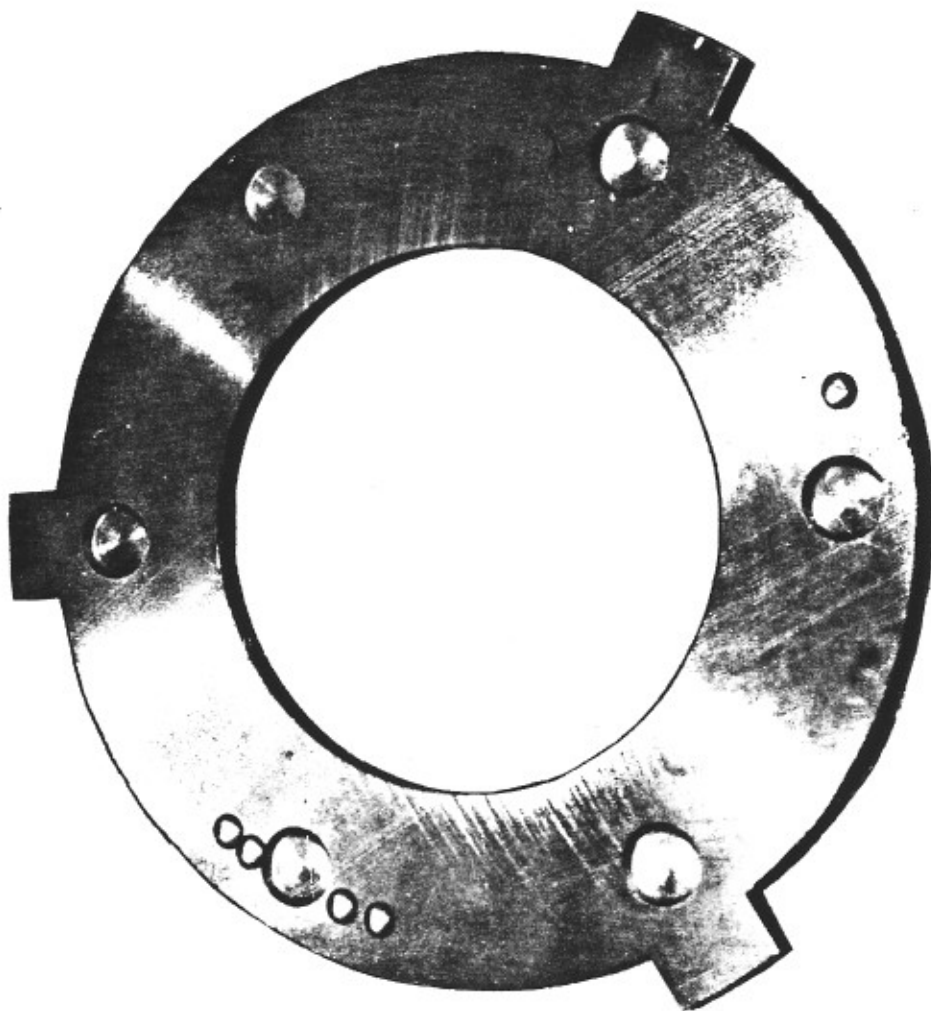


Figure 30

SAFETY PLATE

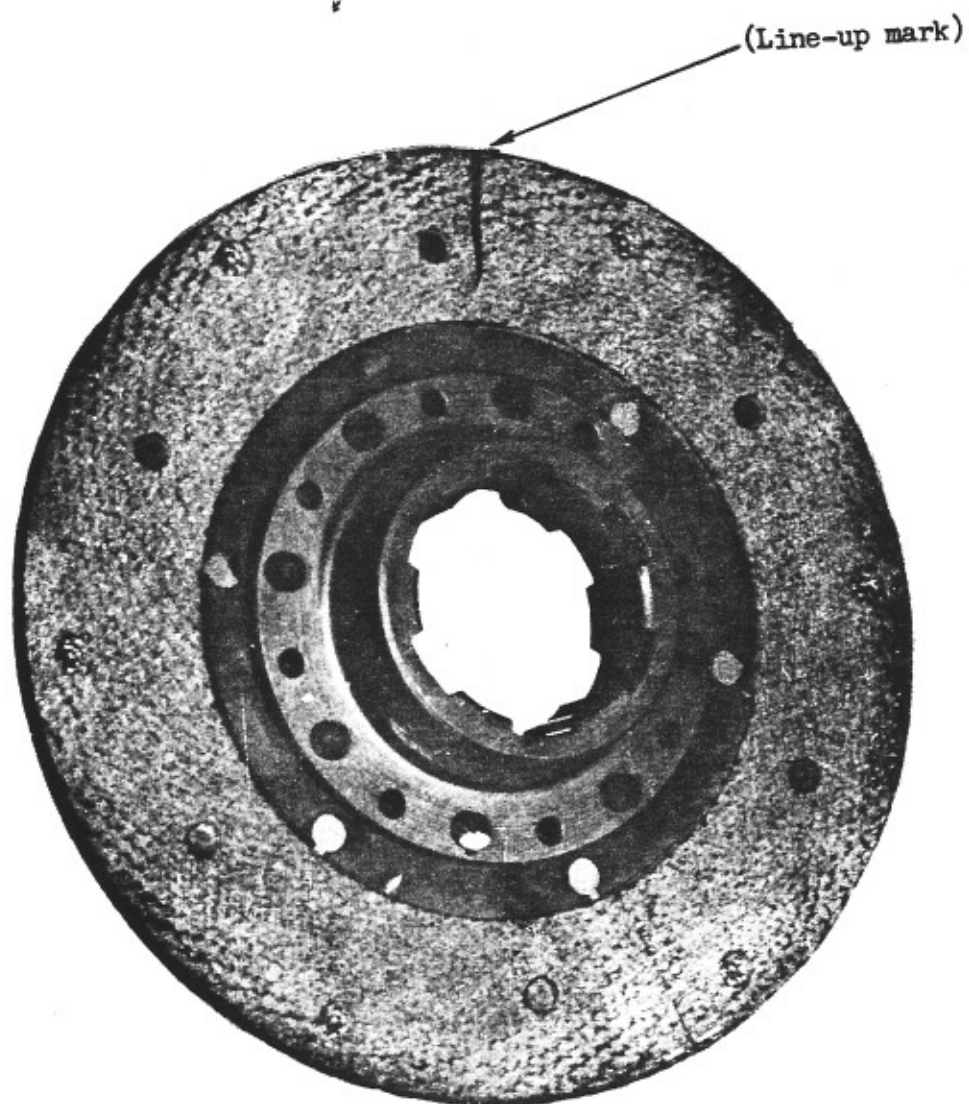
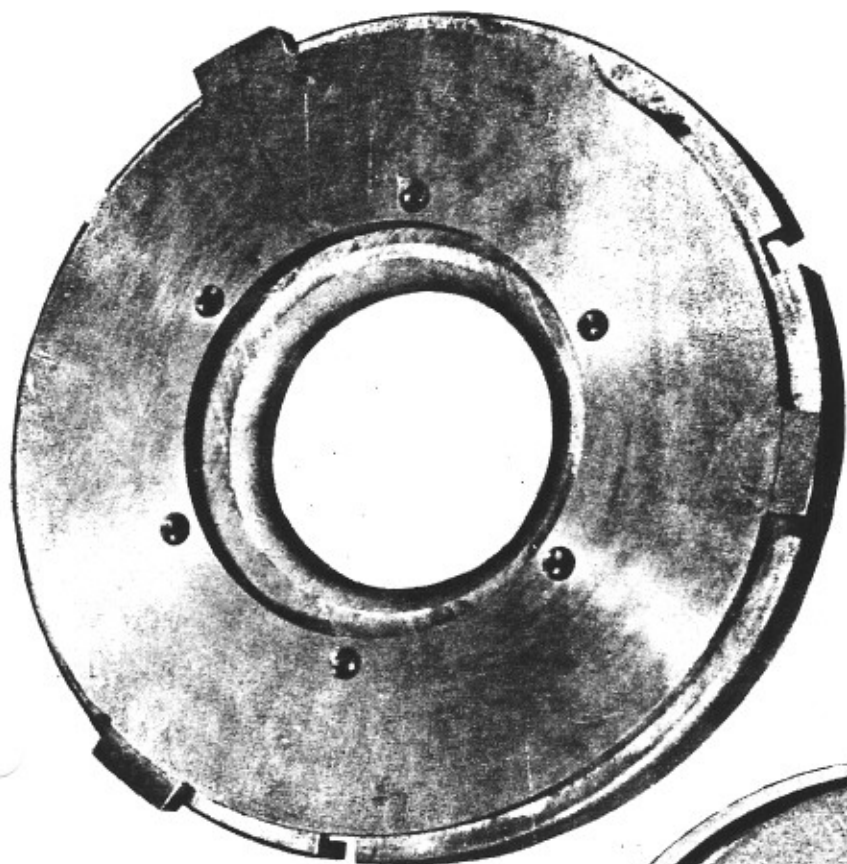
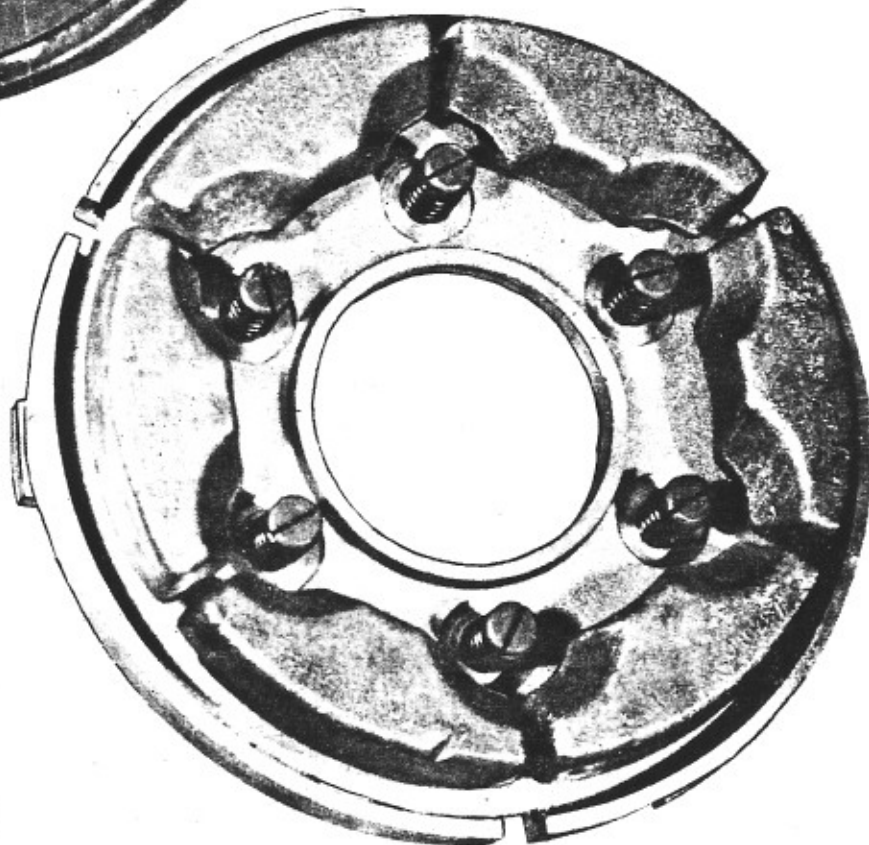


Figure 31

DRIVEN DISC HUB ASSEMBLY



Front View



Rear View

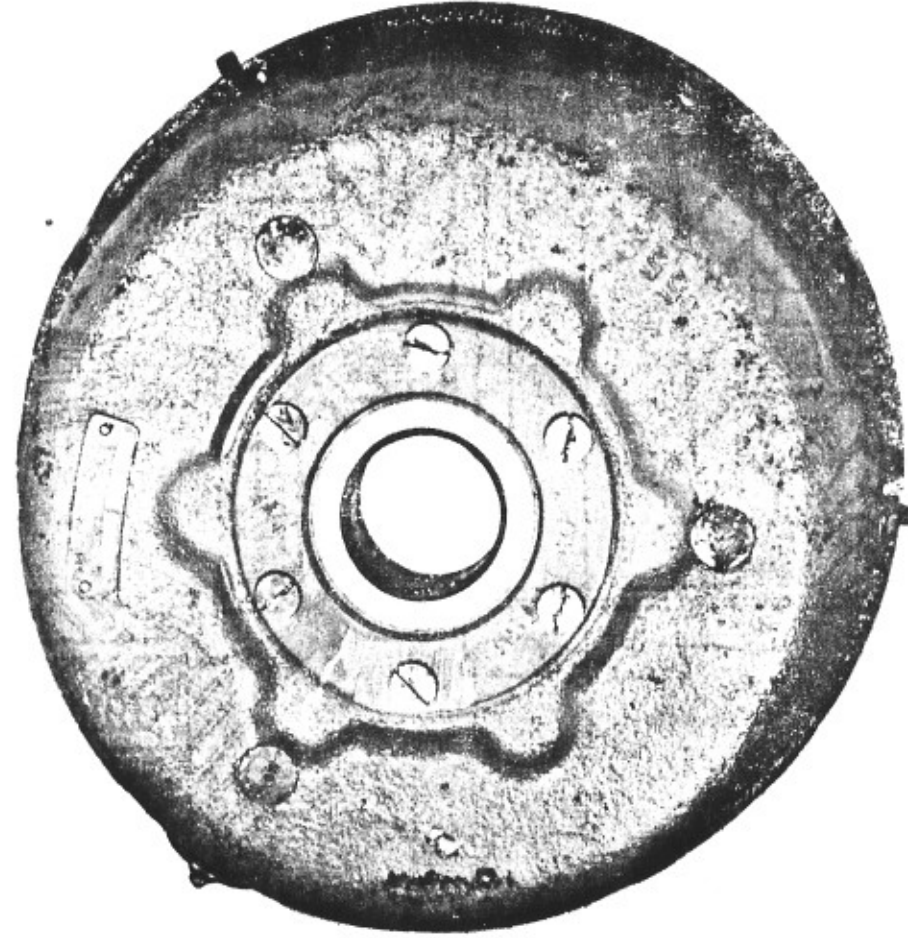
PRESSURE PLATE

Figure 32

Figure 33

CLUTCH HOUSING

Back View



Front View

