

NOS. 497A, 497B, AND D-159798 TOOLS  
(PORTABLE PLUG CLEANING MACHINES)  
PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of Nos. 497A (ac type), 497B (dc type), and D-159798 (universal type) tools. It also covers approved procedures for replacing these parts.

1.02 This section is reissued to add piece-part information for the D-159798 tool, to revise the piece-part data, list of tools, and the replacement procedures on the cleaner shaft and cleaner rotor assembly and to add a procedure for a felt strip and felt washer. Detailed reasons for reissue will be found at the end of the section.

1.03 Part 2 of this section covers the piece-part numbers and the corresponding names of the parts which it is practicable to replace in the field in the maintenance of the above apparatus. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Piece-part Data.

1.04 Part 3 of this section covers the approved procedures for the replacement of the parts covered in Part 2. This information is called Replacement Procedures.

2. PIECE-PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of the machine. The piece-part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company merchandise department. When these names differ from those in general use in the field, the latter names, in some cases, are shown in parentheses.

2.02 When ordering parts for replacement purposes, give the piece-part number as well as the name of the part. For example, P-469314 Washer. However, when ordering parts for which no part number is given, as in the case of the motor and gear reduction units (Figs. 8 and 9), give the name of the part followed by the piece-part number of the motor. For example, Worm for P-456362 Motor. Do not refer to the BSP number or to any information shown in parentheses following the piece-part numbers.

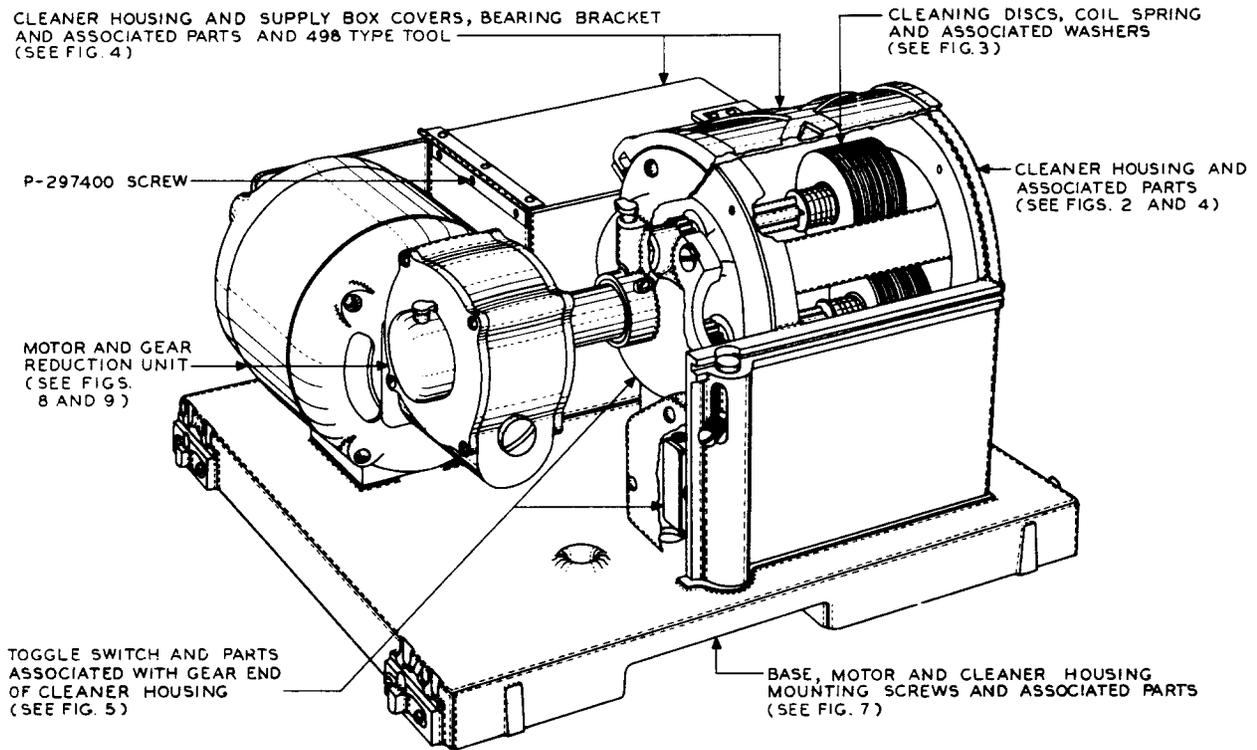


Fig. 1 - Nos. 497A, 497B, and D-159798 Tools (Portable Plug Cleaning Machine)

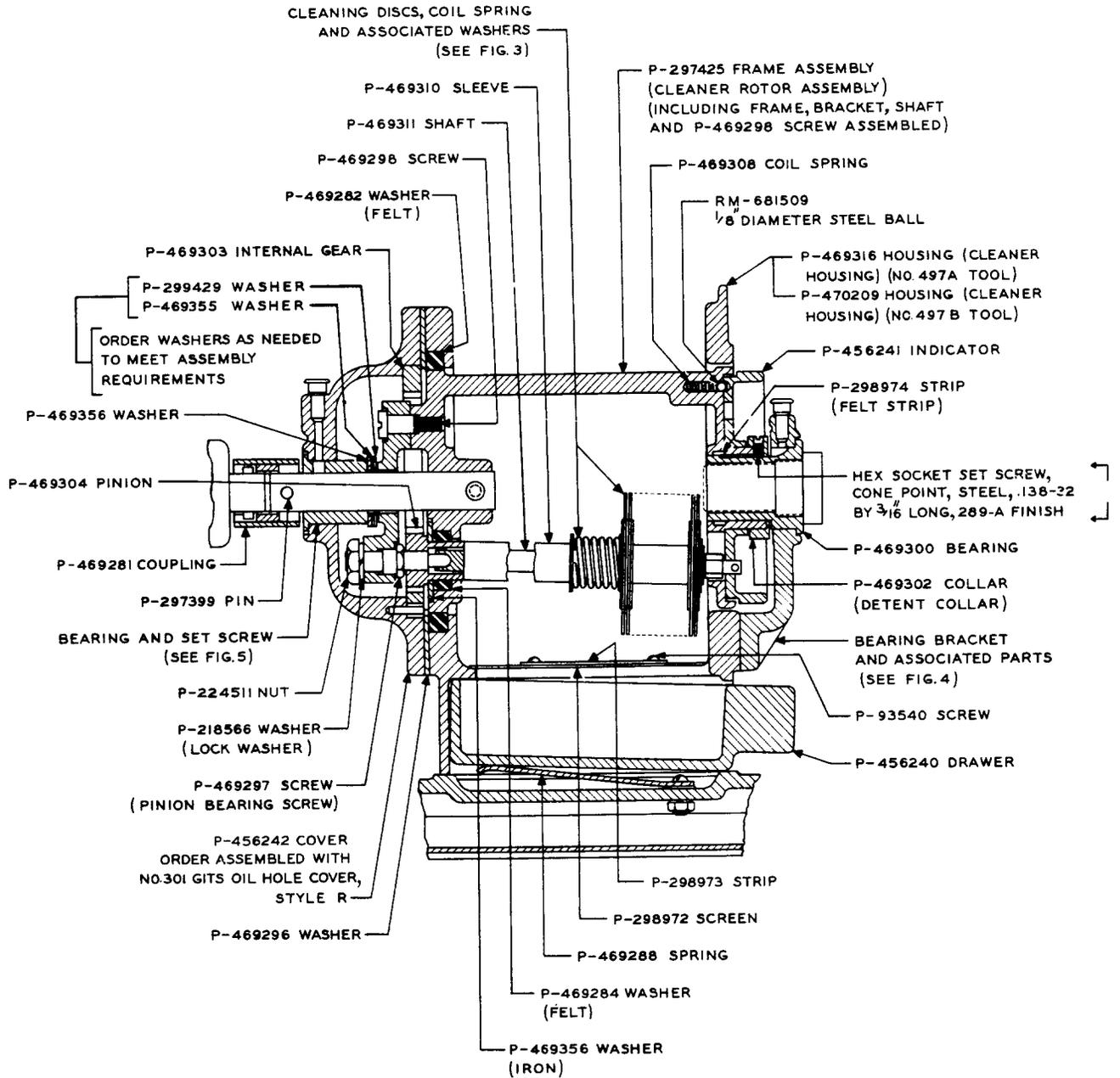


Fig. 2 - Cross-section View of Cleaner Housing Showing Gears, Bearings, Indicator, and Associated Parts

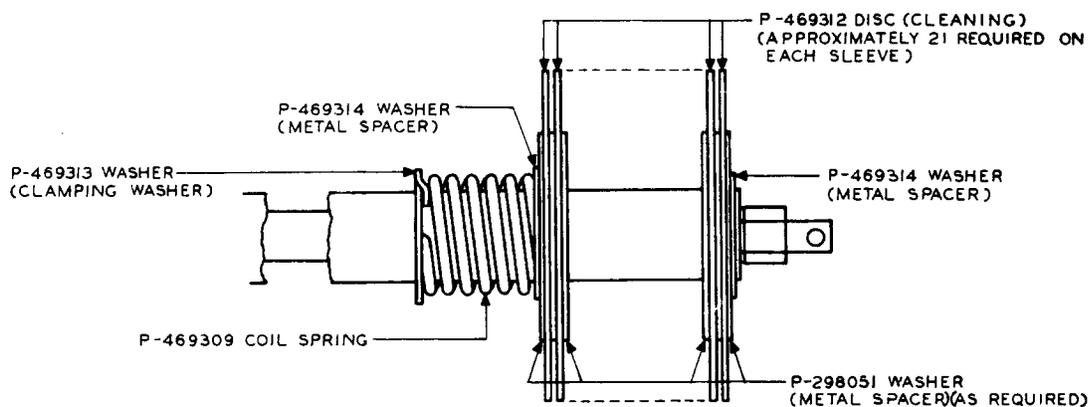


Fig. 3 - Cleaning Discs, Coil Spring, and Associated Washers

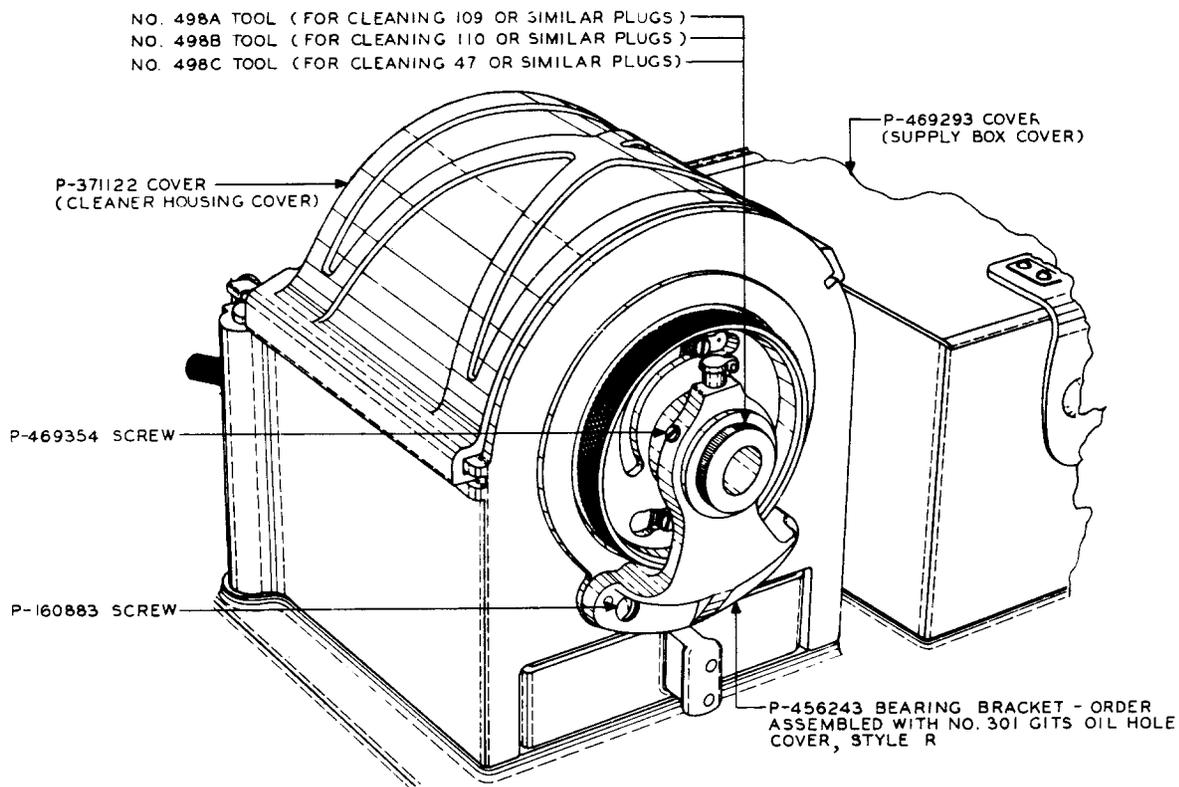


Fig. 4 - Cleaner Housing Cover, Supply Box Cover, Bearing Bracket and Associated Parts, and 498-type Tool

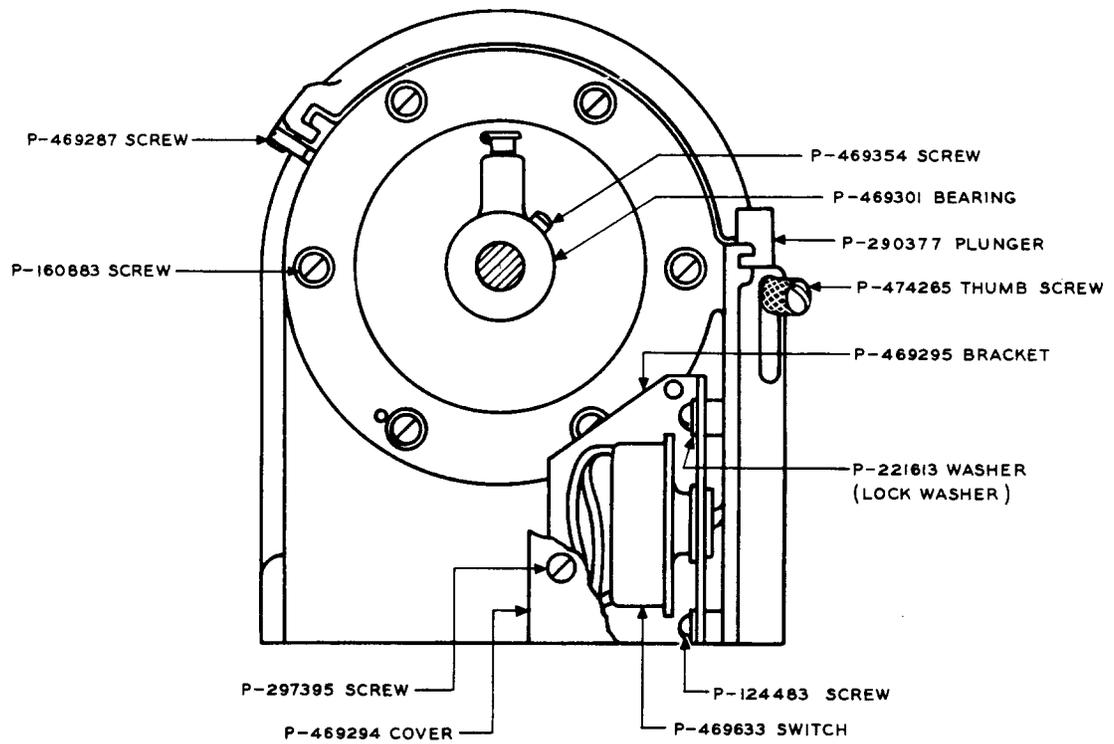


Fig. 5 - Toggle Switch and Parts Associated with the Gear End of the Cleaner Housing

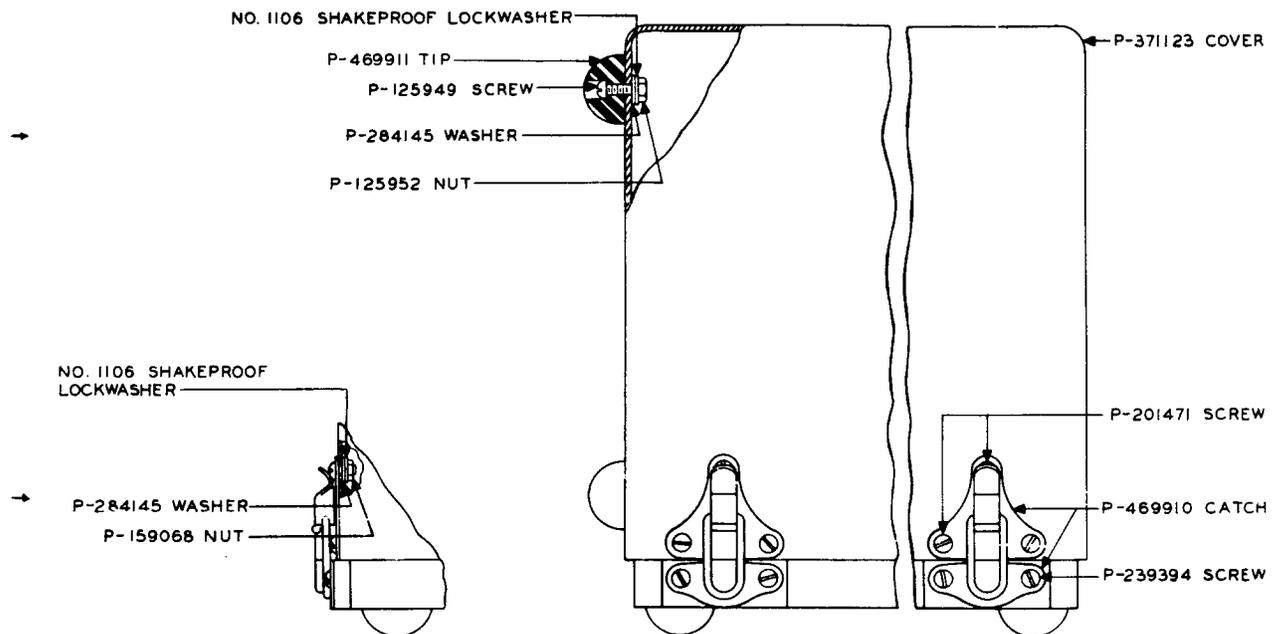


Fig. 6 - Cover and Associated Parts

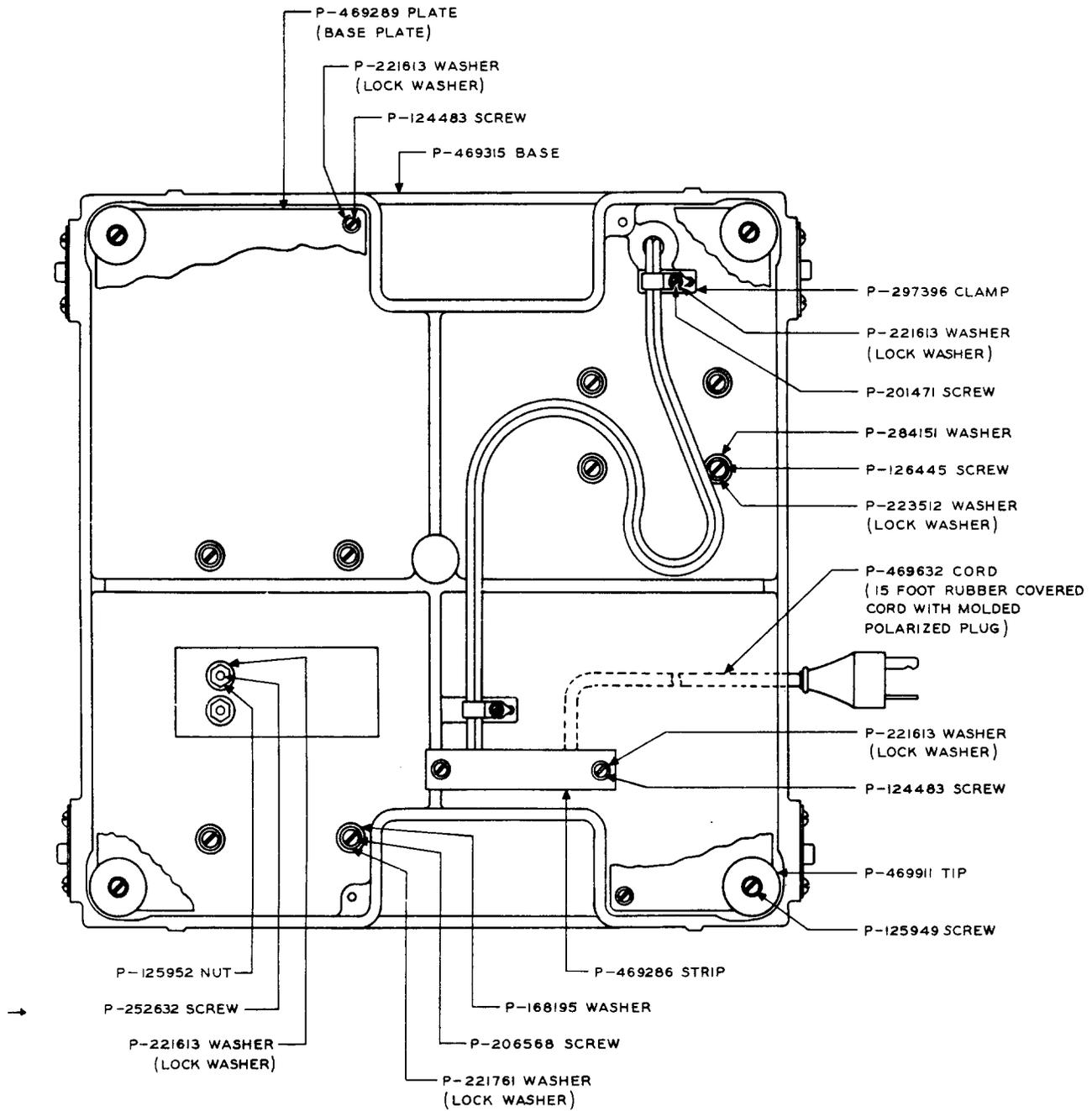


Fig. 7 - Base, Motor, and Cleaner Housing Mounting Screws and Associated Parts



3. REPLACEMENT PROCEDURES3.01 List of Tools and Materials

<u>Code or Spec No.</u>	<u>Description</u>
<u>Tools</u>	
46	3/8-in. Hex. Single-end Socket Wrench
206	30-degree Offset Screwdriver
207	90-degree Offset Screwdriver
236	9/16-in. Hex. Open Single-end Offset Wrench
KS-6854	3-1/2-in. Screwdriver
KS-14164	Brush
KS-14220 (or replaced 367 Tool)	Wrench List 1, T Handle List 7, 6-in. Extension Bar List 14, 7/16-in. Socket
R-2959	Allen Socket-screw Wrench
-	No. 6 Bristo Setscrew Wrench
-	6-1/2-in. P-long-nose Pliers
-	3-in. Cabinet Screwdriver
-	4-in. Regular Screwdriver
<u>Materials</u>	
KS-2423	Cloth
KS-7860	Petroleum Spirits
KS-14666 (or replaced D-98063)	Cloth
-	Block of Wood
-	Petrolatum
-	Sandpaper No. 4/0

3.02 Whenever the cleaner housing cover and cover stop are removed, make sure that they are replaced before the machine is put back into service. The cover stop is a protection against injury from the revolving cleaner rotor in the cleaner housing.

3.03 No replacement procedures are specified for screws and other parts where the replacement consists of a simple operation.

3.04 At the time of making the replacements of parts, clean and lubricate them in accordance with Section 075-125-701. After

making any replacement of parts of a cleaning tool, the part or parts replaced shall meet the requirements involved as specified in Section 075-125-701. Other parts whose adjustments may have been directly disturbed by the replacing operations shall be checked to the requirements and an over-all operation check shall be made of the cleaning tool before restoring it to service.

Removal of Motor and Gear Reduction Unit

3.05 Remove the drawer from the cleaner housing. Remove the base plate mounting screws and the rubber tips with the 3-inch cabinet screwdriver and remove the base plate. Loosen the clamp holding the motor leads with the 3-inch cabinet screwdriver. Remove the motor mounting screws with the 4-inch regular screwdriver and remove the motor from the base. Pull the motor leads through the clamp so that there is sufficient slack to permit working on the motor. In case the motor as a whole is to be replaced, dismount the toggle switch as covered in 3.10 and disconnect the leads to the motor. Remount the motor as covered in 3.08 and 3.09.

Removal of Cleaner Housing From Base

3.06 Remove the drawer from the cleaner housing. Remove the toggle switch cover mounting screws with the 3-inch cabinet screwdriver and remove the toggle switch cover. Remove the base plate mounting screws and the rubber tips with the 3-inch cabinet screwdriver and remove the base plate. Remove the strip which protects the power and motor leads and loosen the clamp which holds the motor leads with the 3-inch cabinet screwdriver. Remove the cleaner housing mounting screws with the 4-inch regular screwdriver. Remove the cleaner housing sufficiently to permit the toggle switch bracket mounting screws to be removed with the 3-inch cabinet screwdriver. Remove the toggle switch and toggle switch bracket from the frame. Remove the coupling and coupling pin. Remount the cleaner housing as covered in 3.07 to 3.09, inclusive.

Remounting Motor and Gear Reduction Unit and Cleaner Housing

3.07 Place the cleaner housing in approximately its correct position on the base, connect the wiring to the proper terminals and insert and secure the housing mounting screws finger tight. Shift the housing until it is aligned with the scribed lines on the base, then tighten the mounting screws securely.

3.08 Insert the coupling pin in place in the housing shaft and place the coupling in position over the pin. Mount the motor approximately in its correct position,

engaging the shaft of the motor with the coupling. Insert and tighten the motor mounting screws finger tight. Align the motor with the scribed lines and tighten the mounting screws securely. Remove any excess grease from any of the parts with a KS-14666 cloth moistened with petroleum spirits. Remount the base plate securely in place.

3.09 If lines are scribed on the base but a new motor or cleaner housing has been substituted for a defective part, proceed as follows. Loosen the motor mounting screws and remove the cleaner housing mounting screws with the 4-inch regular screwdriver and remove the housing. Remove the coupling. Obliterate the scribed lines on the base. Remount the housing in place and secure the screws finger tight. Align the shafts and tighten the mounting screws securely and scribe new lines on the base to locate the parts. Remove the housing mounting screws and remove the housing. Mount the coupling in place and remount the housing securely in place and align it with the newly scribed lines on the base. Tighten the housing securely in position. Remount and securely tighten the base plate.

#### Toggle Switch, Toggle Switch Plugger, and Associated Parts

3.10 Toggle Switch Cover, Toggle Switch Bracket, and Toggle Switch: Remove the toggle switch cover mounting screws with the 3-inch cabinet screwdriver and remove the cover. Remove the toggle switch bracket mounting screws with the No. 206 or No. 207 offset screwdriver. Remove the toggle switch and toggle switch bracket from the frame and remove the wiring from the toggle switch. Remove the toggle switch mounting nut using the No. 236 offset wrench. Remove the toggle switch from the bracket. Remount the parts in the reverse order, making replacements as necessary, and tighten all parts securely.

3.11 Toggle Switch Plunger: Remove the toggle switch as covered in 3.10. Unscrew the toggle switch handle and lift the plunger out of the cleaner housing. Substitute the necessary part and lubricate the toggle switch handle bearing as covered in Section 075-125-701. Remount the parts in the reverse order, tightening all parts securely.

#### Cleaner Shafts, Shaft Sleeve, Cleaning Discs, and Associated Parts

3.12 Cleaner Shaft: Press the plunger to the limit of its stroke and slide the cleaner housing cover toward the rear as far as the cleaner housing cover stop will permit. Turn the indicator until the cleaner shafts are in line with the widened part of the groove in the indicator. Grasp the end of the cleaner shaft with the P-long-nose

pliers and turn the cleaner shaft to a position where it can be removed. Hold the assembly of the sleeve and cleaning discs to prevent them from falling and remove the cleaner shaft. Mount the new cleaner shaft in position, holding the sleeve and cleaning discs in position while inserting the shaft.

3.13 Clamping Washer, Coil Spring, Cleaning Discs, Spacing Washers, and Shaft Sleeve: Remove the cleaner shaft as covered in 3.12 and remove the shaft sleeve, cleaning discs, and associated parts from the cleaner housing. Turn the clamping washer which holds the coil spring and cleaning discs in position on the sleeve until it can be removed from the sleeve. Remove the coil spring which clamps the cleaning discs and remove the spacing washer and cleaning discs from the shaft sleeve.

3.14 Replace the necessary spacing washers and cleaning discs. Mount the parts on the sleeve in the reverse order taking care that the clamping washer is mounted with the embossed side toward the spring. When the cleaning discs, coil spring, and clamping washer have been securely assembled, remount the assembly with the hollow end of the cleaner shaft properly engaged with the pinion bearing screw.

#### 498-type Tool, Cleaner Rotor Bearing (Indicator End), Bearing Bracket, Detent Collar, Indicator, and Associated Parts

3.15 498-type Tool, Cleaner Rotor Bearing, and Bearing Bracket: Remove the 498-type tool by turning it in a clockwise direction, (it has a left-hand thread) and replace it if necessary. To replace the bearing remove the bearing setscrew with the KS-6854 screwdriver and remove the bearing. To replace the bearing bracket remove the bearing bracket mounting screws with the 4-inch regular screwdriver and remove the bearing bracket. Mount the bearing and 498-type tool in the new bearing bracket and remount the parts.

3.16 Detent Collar, Indicator, Detent Spring, and Ball Bearing: Remove the bearing bracket and associated parts as covered in 3.15. Remove the detent collar setscrew with the No. 6 Bristo setscrew wrench or the R-2959 Allen socket-screw wrench and remove the detent collar. Remove the indicator. Remove the ball bearing and detent spring and substitute the required part. Remount the parts in reverse order making replacements as necessary. Make sure that the ball bearing is properly seated between the detent spring and the indicator.

#### Cleaner Rotor Bearing (Gear End), Gear Cover, Internal Gear, Pinions, Pinion Bearing Screw, Cleaner Rotor Assembly, and Associated Parts

3.17 General: To replace any of the parts covered in the above subheading remove

the motor from the base as described in 3.05 and remove the toggle switch as described in 3.10. Remove the coupling and the coupling pin. Remove the gear cover mounting screw with a 4-inch regular screwdriver and remove the gear cover.

3.18 Internal Gear and Cleaner Rotor Bearing (Gear End): To remove the cleaner rotor bearing remove the bearing setscrew with the KS-6854 screwdriver and remove the bearing. To remove the internal gear from the gear cover, rock the gear slightly back and forth until it is free from the gear cover. Replace the necessary parts and remount them in the cover. Remount the gear cover on the cleaner housing.

3.19 Pinion, Pinion Bearing Screw, and Associated Washers: Remove the spacing washers. Remove the pinion clamping bracket mounting screws with the 4-inch regular screwdriver and remove the pinion clamping bracket. Remove the pinion bearing screw locknut with the KS-14220 wrench. Remove the lockwasher. To remove the pinion bearing screw from the pinion clamping bracket use the No. 46 wrench. Replace the lockwasher and the iron and felt washers at this time if necessary. Substitute the necessary parts and reassemble them in the reverse order.

3.20 Cleaner Rotor Assembly: To replace the cleaner rotor assembly remove the  
 → cleaner rotor bearing and bearing bracket  
 → as covered in 3.15 and then remove the cleaner rotor assembly including the pinions, the cleaning discs and associated washers, the indicator, and the detent collar from the cleaner housing. Remove the pinion and pinion bearing screw and associated washers from the cleaner rotor assembly as covered in 3.19 and mount them in the new cleaner rotor assembly. Remove the detent collar,  
 → indicator, ball bearing, and detent spring from the cleaner rotor assembly as covered in 3.16 and remount them in the new cleaner rotor assembly. Mount the cleaning discs, the coil spring, the cleaner shaft, and shaft sleeve in the new rotor cleaner housing as covered in 3.14. Remount the new cleaner rotor assembly with the assembled parts in  
 → the cleaner housing. Remount the bearing  
 → bracket, cleaner rotor bearing, and gear cover. Tighten all parts securely.

☐ Felt Strip in Cleaner Rotor Assembly (Indicator End) and Felt Washer in Cleaner Housing (Gear End)

3.21 Remove the cleaner rotor assembly as covered in 3.20. Replace the felt strip and felt washer as required. Lubricate the exposed bearing surface of the felt piece with a light coat of petrolatum using the KS-14164 brush. Reassemble the parts.

Worm Gear Housing End Shield, Bearing, and Cap (Closed End)

3.22 Remove the worm gear housing end shield mounting screws from the closed end of the gear box with the 4-inch regular screwdriver and remove the end shield, bearing, and cap. Replace these parts as a unit and remount them securely.

Worm Gear Housing End Shield, Bearing, and Cap (Open End) and Worm Gear and Drive Shaft

3.23 Remove the motor from the base as covered in 3.05. Remove the worm gear housing end shield mounting screws from the coupling end of the gear box with the 4-inch regular screwdriver and remove the worm gear and drive shaft, and the end shield, bearing, and cap from the gear box. Remove the end shield bearing and cap from the shaft. When replacing the worm gear and shaft, examine the associated worm for wear and replace it, if necessary, as covered in 3.25.

3.24 Remount the worm gear and shaft in the gear box making sure that the worm and worm gear mesh properly. Pack the housing with ball-bearing grease as covered in Section 075-125-701. Mount the end shield, bearing, and cap on the shaft and tighten them securely in place on the gear box.

Worm, Rotor, and Associated Parts

3.25 Remove the motor from the base as covered in 3.05. Remove the worm gear as described in 3.23. On the dc or universal motor remove the brush caps and brushes as covered in 3.31. Mark each brush so that it may be remounted in the same position and in the same brush holder from which it was removed. Remove the end plate mounting screws with the 3-inch cabinet screwdriver and remove the end plate and thrust washers. Remove the end shield mounting screws with the 4-inch regular screwdriver from the nongear end of the motor. Remove the end shield mounting screws from the remaining end shield and remove the end shield, gear box, and rotor from the motor housing.

3.26 Remove the rotor and associated parts from the end shield by pressing firmly on the sides of the end shield. If necessary, tap lightly on the rim of the end shield with a block of wood so as to force the end shield from the bearing. Remove the worm locknut with a No. 46 socket wrench and remove the worm from the shaft. When replacing the worm, examine the associated worm gear for wear and replace it if necessary.

→ 3.27 Inspect the rotor bearings, the commutator on the dc or universal motor,

the centrifugal throwout switch on the ac motor if equipped with a switch, and the rotor to determine whether replacement is necessary. If the replacement of any of these parts is necessary, reassemble all the parts in the motor and return the motor to the factory for reconditioning and repairs.

3.28 If these parts do not require replacement, clean and lubricate them as covered in Section 075-125-701. Any slightly rough commutator surfaces may be smoothed with fine sandpaper before being wiped with a KS-2423 cloth. Excessively rough commutator surfaces will necessitate resurfacing. If this condition exists, give consideration to returning the motor to the manufacturer for refinishing the commutator.

**Note:** A bronze-colored highly polished commutator is very desirable and it should not be mistaken for a burned commutator. If a commutator presents this condition and is smooth, the commutator is satisfactory and should not be burnished.

3.29 Mount the worm on the rotor shaft, making sure that the groove in the worm engages the ridge on the motor shaft, and firmly tighten the worm locknut. Force the bearing at the worm end of the shaft into the end shield and gear housing assembly, rocking the rotor shaft back and forth in order to force the end shield into position.

3.30 In case of a tight fit, it may be necessary to dismount the end shield from the gear housing with a 4-inch regular screwdriver and to tap the flat surface of the end shield with a block of wood while holding the rotor in one hand. Remount the end shield on the gear housing, if it was removed, and remount the end shield and rotor

← on the motor. Insert and securely tighten the end shield mounting screws. Remount the other end shield, thrust cap and thrust washers, and end plate. Remount the brushes and brush caps as described in 3.31. Remount the worm gear, low-speed drive shaft, and associated parts as covered in 3.24.

#### Brushes (DC or Universal Motor Only) ←

3.31 Remove the brush caps and brushes. Remove the brushes from their holders, marking their position in the holders, and wipe them with a KS-2423 cloth moistened with petroleum spirits. If there are any rough projections, the edges of the brush may be smoothed with fine sandpaper before wiping. Replace any short brushes or brushes which are too loose in their holders. Replace the spring, if necessary. Untwist the pigtailed on the springs if they are twisted. In replacing the brushes, see that they are put back in the same holder and in the same position in which they were originally.

3.32 After the motor and cleaner housing have been remounted, check to make sure that all the requirements have been met. Run the machine without load for a few hours, if possible, in order to fit the brushes smoothly in position.

#### REASONS FOR REISSUE

1. To revise the piece-part data and the list of tools and materials, add information for a plug cleaning machine having a universal motor and change to standard screws and washers (1.01 and 3.01 and Figs. 2, 6, 7, and 8).
2. To revise replacement procedures on the cleaner shaft and the cleaner rotor assembly and to add a procedure for a felt strip and felt washer (3.12, 3.20, and 3.21).