

SOLENOID TYPE MASTER SWITCHES

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 solenoid type master switches. It also covers approved procedures for replacing these parts and the master switch relays.

1.02 This section is reissued to amplify the piece part data for master switch wipers, driving segment, governor assembly and resistance coil and to amplify and revise the procedures for replacing the driving segment and associated parts, locking arm assembly and associated parts and wipers. 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 solenoid type master switches. 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 the other parts of the switch and the piece part numbers of the various parts together with their corresponding names.

2.02 When ordering parts for replacement purposes give the piece part number as well as the name of the part. For example: "D-30040A Governor Assembly." Do not refer to the BSP number or to any information shown in parenthesis following the piece part number.

2.03 Reference is made to position 1, 2, 3, etc. in the table of relays on page 5. The positions are shown by the designations 1, 2, 3 etc. on the relays in Fig. 1.

2.04 The master switches covered in this section are in most cases stamped with the following markings, and when ordering master switches for replacement purposes endeavor to specify the numbers marked on the switch. If the switch is not marked specify the number of the D or MD drawing which was

supplied when the switch was installed. In all cases indicate if the switch is a top or bottom switch.

Marking

<u>D-No.</u>	<u>Drawing No.</u>	<u>KS No.</u>
<u>Top</u>		
D-87249	-	KS-1706T
D-87261A	28036A1	KS-2118
D-87261B	28036A2	-
D-87261C	31564-011 Mod.	-
D-87265A	28037A	KS-2122
D-87269A	28038A1	KS-2120
D-87275A	-	KS-1706T or KS-2425
D-87277A	28127A	KS-2498
D-87279A	28038A2	-
D-87283A	ES-241882	KS-2497
D-87283B	ES-241882	-
D-87287A	ES-241832	-
D-87302A	ES-65083-01	KS-2425
D-87307A	ES-30472-01	-

Bottom

D-87250	-	KS-1706B
D-87262A	28036A1	KS-2119
D-87262B	28036A2	-
D-87262C	31564-011 Mod.	-
D-87266A	28037A	KS-2123
D-87270A	28038A1	KS-2121
D-87276A	-	KS-1706B or KS-2426
D-87278A	28127A	KS-2399
D-87280A	28038A2	-
D-87284A	ES-241882	KS-2398
D-87284B	ES-241882	-
D-87288A	ES-241832	-
D-87303A	ES-65083-01	KS-2426
D-87308A	ES-30472-01	-
D-87319A	31563-011	-

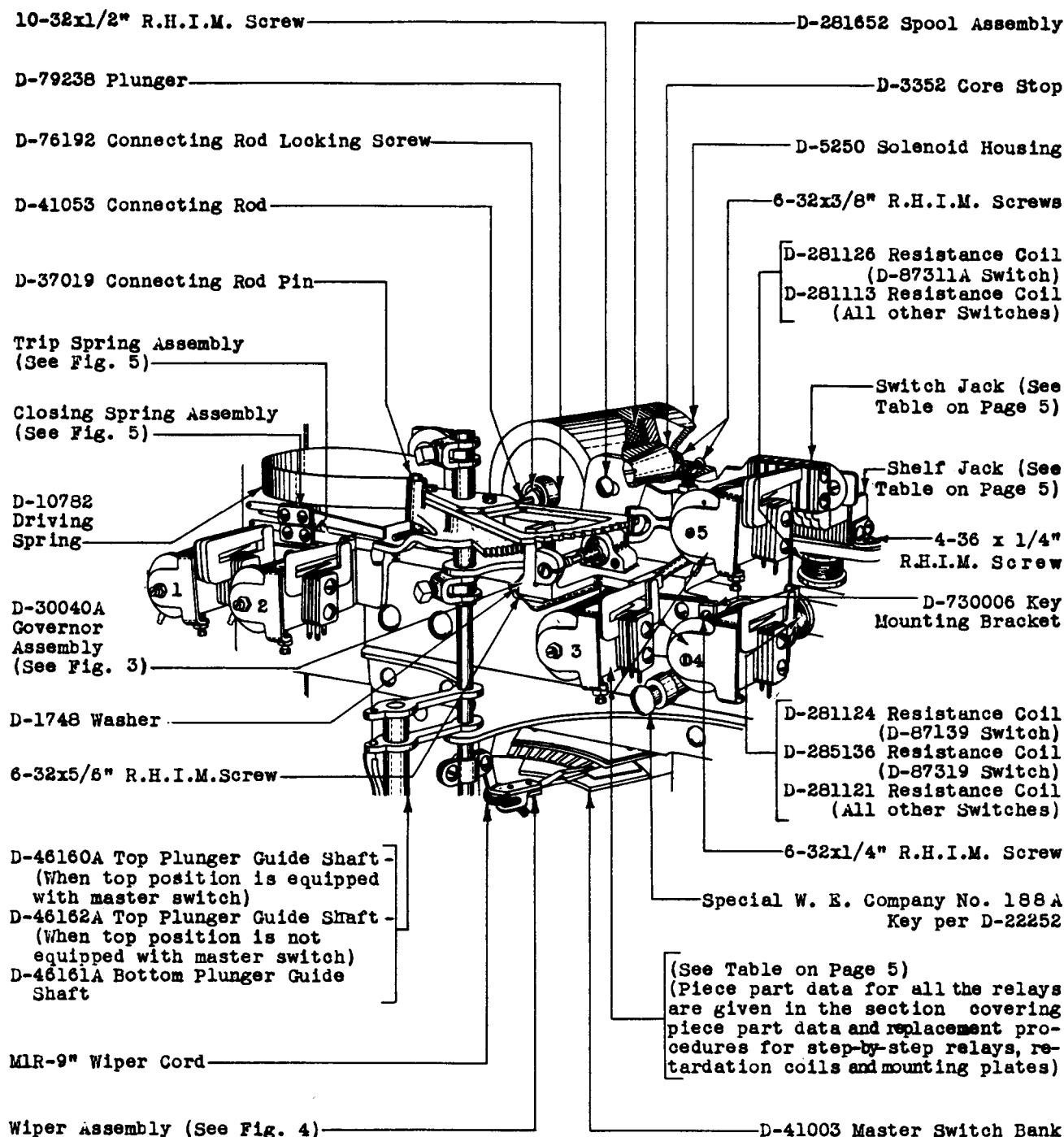
The following are the D numbers of switches for which no markings are assigned.

Top

D-87105	D-87255	D-87289A	D-87299A
D-87198A	D-87257	D-87291A	D-87300A
D-87207	D-87259A	D-87293A	D-87304A
D-87221	D-87273A	D-87293B	D-87309A
D-87247A	D-87281A	D-87295A	D-87311A
D-87251A	D-87285A	D-87297A	D-87317

Bottom

D-87139B	D-87256A	D-87290A	D-87301A
D-87140	D-87258A	D-87292A	D-87305A
D-87203A	D-87260A	D-87292B	D-87310A
D-87213A	D-87274A	D-87294A	D-87312A
D-87222	D-87282A	D-87296A	D-87318
D-87252A	D-87286A	D-87298A	



Parts Not Illustrated

- 2-56x1/4" R.H.I.M. Screw (Special 188A Key Mounting Screw)
- 8-32x3/4" R.H.Br.M. Screw (Screw for Mounting Resistance Coil
on Master Switch Mounting Bracket)
- 6-32x7/8" R.H.I.M. Screw (Screw for Mounting Resistance Coil
on Relay Mounting Bracket)

Fig. 1 - Solenoid and Associated Parts, Relays, Jacks,
Wipers and Associated Parts

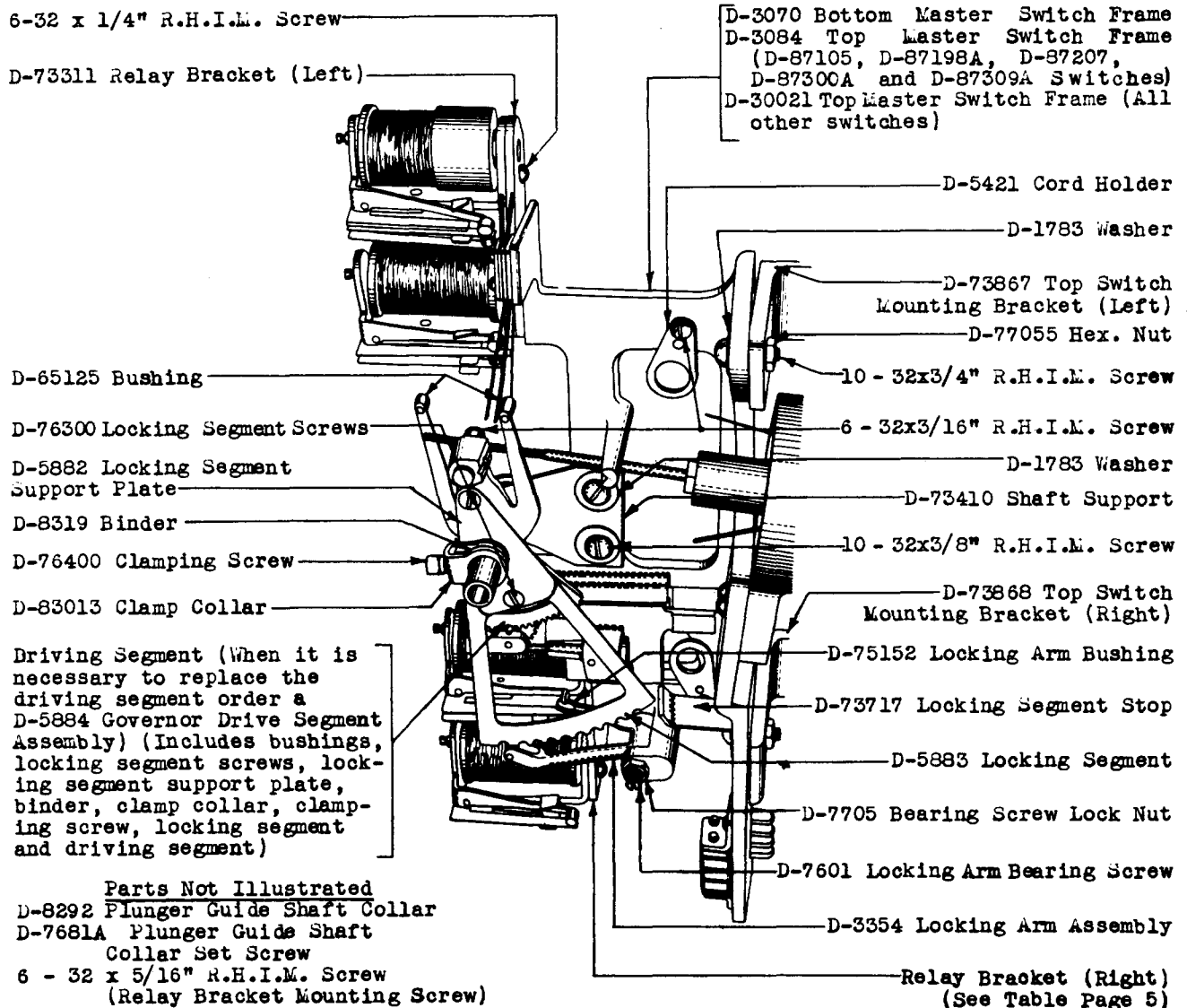


Fig. 2 - Frame, Driving and Locking Segments and Associated Parts

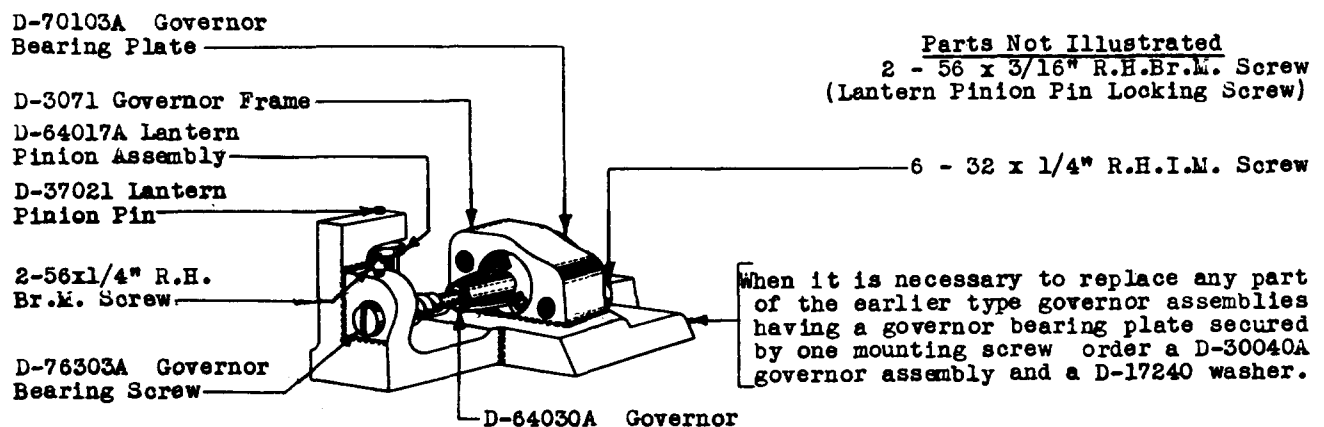
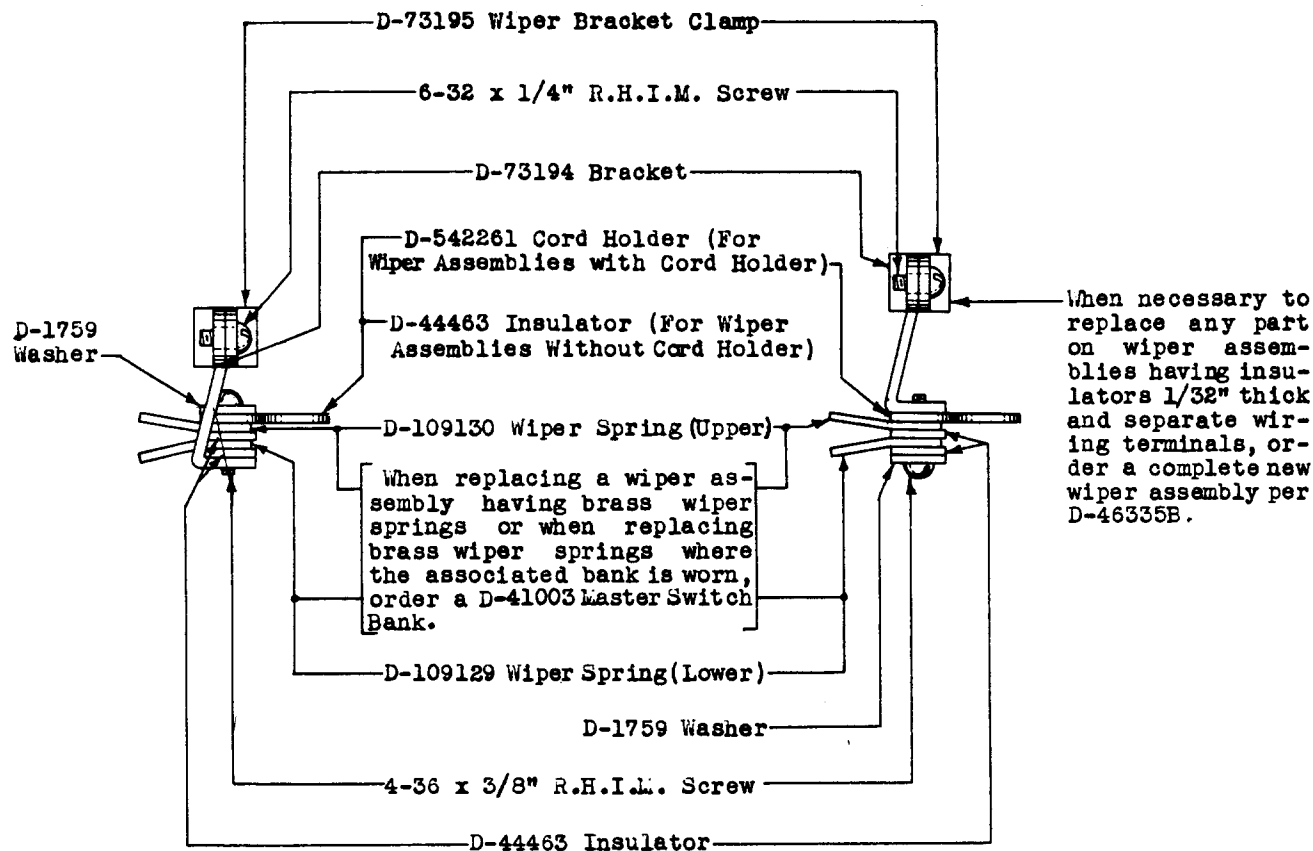


Fig. 3 - Governor Assembly



D-46147B Wiper Assembly
(With Cord Holder) (Used
where spring assembly is
mounted above bracket)
D-4633 Wiper Assembly
(Without Cord Holder)

D-46335B Wiper Assembly
(With Cord Holder) (Used
where spring assembly is
mounted below bracket)

Fig. 4 - Wiper Assemblies

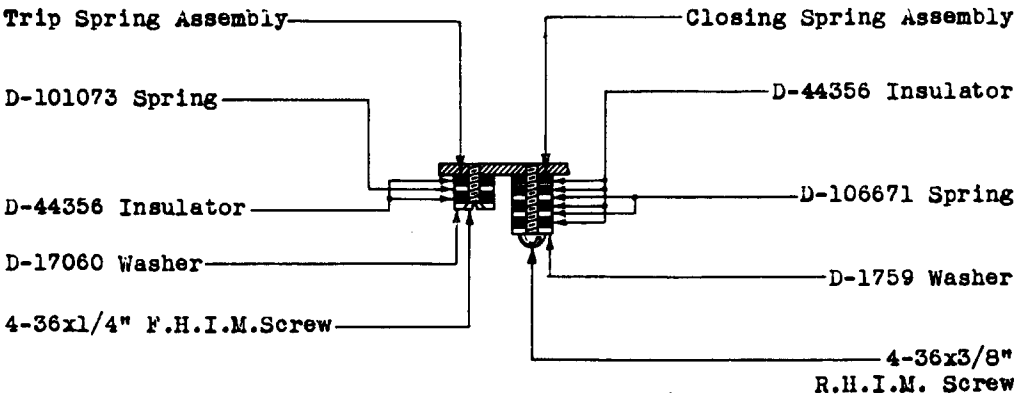


Fig. 5 - Trip and Closing
Spring Assemblies

Relays (See Fig. 1 For Relay Position)						Relay Bracket (Right)	Switch Jack (See Fig. 1)	Shelf Jack (See Fig. 1)
Switch	Position 1	Position 2	Position 3	Position 4	Position 5	(See Fig. 2)	(See Fig. 1)	(See Fig. 1)
D-87105		D-811066	D-810458			D-73311	D-42120	D-42121
D-87139B		D-810459	D-811134	D-810460		D-73767	D-42120	D-42121
D-87140		D-811066	D-810458	D-811040		D-73311	D-42120	D-42121
D-87198A		D-81934	D-81933	D-810368		D-73767	D-42120	D-42121
D-87203A		D-811066	D-810458	D-810460		D-73767	D-42120	D-42121
D-87207		D-811066	D-810458	D-811040		D-73311	D-42120	D-42121
D-87213A	D-811289	D-811286	D-811287	D-811040	D-811042	D-730026	D-42120	D-42121
D-87221	D-811022	D-811066	D-811034	D-810460		D-73767	D-42138	D-42121
D-87222	D-811022	D-811066	D-811034	D-810460		D-73767	D-42120	D-42121
D-87247A	D-811289	D-811286	D-811287	D-811040	D-811042	D-730026	D-42138	D-42121
D-87249	D-811158	D-810991	D-810998	D-810999	D-811154	D-730026	D-42174	D-42173
D-87250	D-811158	D-810991	D-810998	D-810999	D-811154	D-730026	D-42175	D-42173
D-87251A	D-811022	D-811066	D-811034	D-811040		D-73311	D-42138	D-42121
D-87252A	D-811022	D-811066	D-811034	D-811040		D-73311	D-42120	D-42121
D-87255	D-811289	D-811286	D-811287	D-811264	D-811288	D-730026	D-42188	D-42136
D-87256A	D-811289	D-811286	D-811287	D-811264	D-811288	D-730026	D-42187	D-42136
D-87257	D-811289	D-811066	D-811290			D-73311	D-42138	D-42121
D-87258A	D-811289	D-811066	D-811290			D-73311	D-42120	D-42121
D-87259A		D-811066	D-811290			D-73311	D-42138	D-42121
D-87260A		D-811066	D-811290			D-73311	D-42120	D-42121
D-87261A B&C	D-811289	D-811328	D-811290			D-73311	D-42138	D-42121
D-87262A B&C	D-811289	D-811328	D-811290			D-73311	D-42120	D-42121
D-87265A		D-811328	D-811290			D-73311	D-42138	D-42121
D-87266A		D-811328	D-811290			D-73311	D-42120	D-42121
D-87269A	D-811289	D-811329	D-811330	D-811264	D-811288	D-730026	D-42188	D-42136
D-87270A	D-811289	D-811329	D-811330	D-811264	D-811288	D-730026	D-42187	D-42136
D-87273A	D-811022	D-811328	D-811330	D-811040		D-73311	D-42138	D-42121
D-87274A	D-811022	D-811328	D-811330	D-811040		D-73311	D-42120	D-42121
D-87275A	D-811158	D-811328	D-811330	D-810999	D-811154	D-730026	D-42174	D-42173
D-87276A	D-811158	D-811328	D-811330	D-810999	D-811154	D-730026	D-42175	D-42173
D-87277A	D-811289	D-811329	D-811330	D-811264	D-811343	D-730026	D-42188	D-42136
D-87278A	D-811289	D-811329	D-811330	D-811264	D-811343	D-730026	D-42187	D-42136
D-87279A	D-811289	D-811329	D-811330	D-811264	D-811288	D-730026	D-42188	D-42136
D-87280A	D-811289	D-811329	D-811330	D-811264	D-811288	D-730026	D-42187	D-42136
D-87281A	D-811289	D-811286	D-811287	D-811040	D-811042	D-730026	D-42138	D-42121
D-87282A	D-811289	D-811286	D-811287	D-811040	D-811042	D-730026	D-42120	D-42121
D-87283A&B	D-811289	D-811328	D-811290			D-73311	D-42188	D-42136
D-87284A&B	D-811289	D-811328	D-811290			D-73311	D-42187	D-42136
D-87285A	D-811289	D-811329	D-811330	D-811040	D-811343	D-730026	D-42138	D-42121
D-87286A	D-811289	D-811329	D-811330	D-811040	D-811343	D-730026	D-42120	D-42121
D-87287A	D-811289	D-811329	D-811330	D-811264	D-811398	D-730026	D-42188	D-42136
D-87288A	D-811289	D-811329	D-811330	D-811264	D-811398	D-730026	D-42187	D-42136
D-87289A	D-811289	D-811286	D-811287	D-810460	D-811398	D-730026	D-42138	D-42121
D-87290A	D-811289	D-811286	D-811287	D-810460	D-811398	D-730026	D-42120	D-42121
D-87291A	D-811289	D-811286	D-811287	D-810460	D-811398	D-730026	D-42138	D-42121
D-87292A&B	D-811289	D-811328	D-811290			D-73311	D-42187	D-42136
D-87293A&B	D-811289	D-811328	D-811290			D-73311	D-42188	D-42136
D-87294A	D-811289	D-811329	D-811330	D-811264	D-811398	D-730026	D-42175	D-42173
D-87295A	D-811289	D-811329	D-811330	D-811264	D-811398	D-730026	D-42174	D-42173
D-87296A	D-811289	D-811286	D-811287	D-810460	D-811398	D-730026	D-42120	D-42121
D-87297A	D-811289	D-811286	D-811287	D-810460	D-811398	D-730026	D-42138	D-42121
D-87298A	D-811289	D-811286	D-811287	D-811040	D-811398	D-730026	D-42120	D-42121
D-87299A	D-811289	D-811286	D-811287	D-811040	D-811398	D-730026	D-42138	D-42121
D-87300A	D-811398	D-811329	D-81933	D-810368		D-73767	D-42120	D-42121
D-87301A	D-811398	D-811329	D-810458	D-810460		D-73767	D-42120	D-42121
D-87302A	D-811158	D-811328	D-811330	D-810999	D-811154	D-730026	D-42174	D-42173
D-87303A	D-811158	D-811328	D-811330	D-810999	D-811154	D-730026	D-42175	D-42173
D-87304A	D-811158	D-811328	D-811330	D-810999	D-811289	D-730026	D-42174	D-42173
D-87305A	D-811158	D-811328	D-811330	D-810999	D-811289	D-730026	D-42175	D-42173
D-87307A		D-811328	D-811290			D-73311	D-42188	D-42136
D-87308A		D-811328	D-811290			D-73311	D-42187	D-42136

Relays (See Fig. 1 For Relay Position)						Relay Bracket (Right)	Switch Jack	Shelf Jack
Switch	Position 1	Position 2	Position 3	Position 4	Position 5	(See Fig. 2)	(See Fig. 1)	(See Fig. 1)
D-87309A	D-811398	D-811329	D-810417	D-810460		D-73767	D-42120	D-42121
D-87310A	D-811398	D-811329	D-810417	D-810460		D-73767	D-42120	D-42121
D-87311A	D-811289	D-811329	D-811290	D-811040	D-811563	D-730026	D-42138	D-42121
D-87312A	D-811130	D-811041	D-810417	D-810460	D-811129	D-730026	D-42120	D-42121
D-87317	D-811289	D-811328	D-811290			73311	42188	42136
D-87318	D-811289	D-811328	D-811290			73311	42187	42136
D-87319	D-811289	D-811329	D-811330	D-811398		730026	42187	42136

3. REPLACEMENT PROCEDURES

3.01 List of Tools and Materials

Code or Spec. No.	Description
<u>Tools</u>	
102	3/8" Hex. Single End Socket Wrench
206	30° Offset Screwdriver
207	90° Offset Screwdriver
254	1/4" Square Single End Socket Wrench
418A	5/16" and 7/32" Hex. Open Double End Flat Wrench
KS-6854	3-1/2" Screwdriver
☐ R-1502	Short Nose Pliers
R-1776	10" Smooth Flat File
-	5-1/2" Adjustable Jaw Cut Nippers
-	5" Diagonal Pliers
-	6-1/2" P-Long Nose Pliers
-	3" Cabinet Screwdriver
-	4" Regular Screwdriver

3.02 Preparation of Switch: Before removing any part of a master switch take the switch out of service in accordance with approved procedures.

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

3.04 If it is necessary to remove a switch from the frame in order to replace any part, it should be done as outlined in the section covering this apparatus.

☐ 3.05 After making any replacements of parts of a switch the part or parts replaced shall meet the readjust requirements involved as specified in the section covering this apparatus. Other parts whose adjustments may have been disturbed by the replacing operations shall be checked to the test requirements, and an overall operation check shall be made of the switch before restoring the circuit to service.

Plunger Guide Shaft and Clamp Collar

3.06 Bottom Plunger Guide Shaft: Remove the wiper bracket clamping screws with the 3" cabinet screwdriver, remove the bracket clamp, turn the bracket to the right or left so that the wipers clear the bank, and remove the wiper assembly from the plunger guide shaft. Loosen the clamping screw in the clamp collar at the top of the bottom plunger guide shaft with the No. 254 wrench, loosen the set screw in the bottom plunger guide shaft collar with the KS-6854 screwdriver and slide this collar from the shaft. Disengage the line switch plungers from the shaft and then rotate the shaft to the extreme right or left. Lower and remove the plunger guide shaft exercising care not to damage any of the line switch plungers. Substitute the new part, set all the parts in their correct relationship, and securely tighten the set screw and clamping screws.

3.07 Top Plunger Guide Shaft Driven by Top Master Switch: Before the plunger guide shaft can be removed from the top master switch, the master switch unit must first be removed as described in 3.04. Then loosen the wiper bracket clamping screws with the 3" cabinet screwdriver, turn the wiper assembly to the right or left so that the wipers clear the bank, and remove the wiper assembly from the plunger guide shaft. Loosen the clamping screw in the clamp collar at the bottom of the top plunger guide shaft with the No. 254 wrench. Disengage the line switch plungers from the shaft and then rotate the shaft to the extreme right or left. Raise and remove the plunger guide shaft exercising care not to damage any of the line switch plungers. Substitute the new part, set all the parts in their correct

3.07 (Continued)

relationship, remount the master switch and securely tighten the set screws and clamping screws.

3.08 Top Plunger Guide Shaft Driven by Bottom Master Switch: Where the top plunger guide shaft is controlled by the bottom master switch and not top master switch is installed, loosen the clamping screw in the clamp collar at the bottom of the top guide shaft with the No. 254 wrench, disengage the line switch plungers from the shaft and then rotate the shaft to the extreme right or left. Remove the top guide shaft. Substitute the new part, and set all the parts in their correct relationship. Securely tighten the clamping screw.

3.09 Clamp Collar on Bottom Guide Shaft: To replace the clamp collar on the top of plunger guide shaft, remove the bottom master switch as covered in 3.04. Then remove the clamp collar from the sleeve of the driving segment assembly. Substitute the new part, remount the switch and set the parts in their correct relationship, as covered in 3.06.

3.10 Clamp Collar on Top Guide Shaft: To replace the clamp collar at the bottom of the top plunger guide shaft, remove the bottom master switch as covered in 3.04. Substitute the new clamp collar, remount and reset the parts in their correct relationship.

3.11 To replace the clamp collar at the top of the top plunger guide shaft remove the top plunger guide shaft as covered in 3.07. Substitute the new clamp collar and remount the parts as covered in 3.07.

Connecting Rod Pin, Connecting Rod, Connecting Rod Locking Screw and Plunger

3.12 Connecting Rod Pin: Remove the driving spring. Set and lock the locking segment in the position to operate the closing springs, and loosen the connecting rod set screw with the 3" cabinet screwdriver. Unscrew the connecting rod from the connecting rod pin. Substitute the new pin and screw the connecting rod into the new pin. Tighten the set screw securely and replace the driving spring.

3.13 Connecting Rod, Connecting Rod Locking Screw or Plunger: Remove the connecting rod pin as described in 3.12. Remove the solenoid mounting screws with the 4" regular screwdriver and remove the solenoid assembly from the frame but do not remove the wires connected to the terminals of the solenoid. This will permit the plunger to be removed from the solenoid. Temporarily remount the solenoid. While grasping the plunger firmly, remove the connecting rod locking screw with the No. 418A wrench. Replace the con-

necting rod, connecting rod locking screw, or plunger, as required, reassemble the parts and securely tighten the connecting rod locking screw. Remove the solenoid, insert the plunger in it and remount the solenoid on the frame. Remount the connecting rod pin as in 3.12.

Solenoid Housing, Solenoid Spool Assembly and Core Stop

3.14 Unsolder the leads from the solenoid terminals, remove the solenoid mounting screws with the 4" regular screwdriver, withdraw the plunger and remove the solenoid from the frame. If a new core stop is required, remove the core stop mounting screw and substitute the new stop and securely tighten the mounting screw.

3.15 Remove the spool assembly mounting screws with the 3" cabinet screwdriver and remove the spool assembly. Insert the new spool assembly in the solenoid housing and securely tighten the mounting screws. Insert the plunger in the solenoid and securely remount the solenoid assembly on the frame. Resolder the leads to the coil terminals.

Driving Spring, Driving Segment, Locking Segment, Locking Segment Support Plate, Shaft Support, Governor Driving Segment, Assembly, Trip and Closing Finger Bushings, Clamp Collar and Binder

3.16 Driving Spring: To replace the driving spring remove it from the notches in the driving segment and in the post on the frame. Mount the new driving spring in position with the end having the rounded bend inserted into the notch in the driving segment. The driving spring should be seated in the notches and should hold the connecting rod pin in its correct vertical position in accordance with the section covering solenoid type master switches. If the driving spring finger does not fit properly into the slot in the connecting rod pin remove the spring and cut off the driving spring finger with the 5-1/2 inch adjustable jaw cut nippers or the 5 inch diagonal pliers so that the driving spring finger is just over 1/16 inch in length. Smooth off the end of the driving spring finger with an R-1776 file. Remount the spring on the master switch making sure that the spring is seated properly in the notches and that the driving spring finger fits properly into the slot in the connecting rod pin. If the driving spring finger is too short to permit it to hold the connecting rod pin in position it may be necessary to file the shoulder of the driving spring.

Top Master Switch

3.17 Locking Segment, Locking Segment Support Plate, Clamp Collar and Binder. Remove the driving spring. If there is a clamp collar on the sleeve of the driving

3.17 (Continued)

- segment just above the locking segment loosen the clamping screw in the clamp collar with the No. 254 wrench and remove the clamp collar from the driving segment. Remove the locking segment screws with the 4" regular screwdriver. The locking segment and locking segment support plate (if equipped) can now be removed from the driving segment, and replaced. Remount the parts in the reverse order and replace the driving spring as covered in 3.16.

3.18 Driving Segment, Governor Drive Segment Assembly and Shaft Support: If it is necessary to replace the driving segment replace the entire governor drive segment assembly consisting of the locking segment, driving segment, clamp collar, clamping screw binder, locking segment support plate, locking segment screws and bushings as follows.

3.19 Remove the driving spring. Loosen the clamp collars on the sleeve of the top master switch locking segment as described in 3.17. Remove the connecting rod pin as described in procedure 3.12. Remove the governor assembly locking screw and washer with the 3" cabinet screwdriver and pull the entire governor assembly forward out of the master switch frame. Lift the driving segment and locking segment as an assembly from its position. If necessary loosen the shaft support mounting screws with the 4" regular screwdriver and remove the shaft support. Replace the shaft support if necessary.

3.20 Substitute the new governor driving segment assembly for the old one. Reset the clamp collars and binders in position and securely tighten the clamping screws. Set the connecting rod and connecting rod pin in their correct position. Remount the driving spring as covered in 3.16, making sure that it is seated properly. If it does not seat properly cut off the driving spring finger or file the shoulder, if necessary as described in 3.16. Remount the governor assembly, governor assembly locking screw and washer and securely tighten the screw.

3.21 Closing Finger Bushing: Remove the driving segment as described in 3.18 and then remove the old bushing by cutting it with the diagonal pliers. Place the new bushing on the closing finger, and force it into position with the long nose pliers as shown in Fig. 6, taking care not to mar the finish on the finger or to break the bushing. If difficulty is experienced in forcing the bushing on the finger, the finger may be heated slightly with a soldering iron which will soften the bushing sufficiently to permit it to be forced into position.

3.22 Trip Finger Bushing: Replace the trip finger bushing as outlined in 3.21 above, except that it is unnecessary to remove the driving segment to replace the bushing.

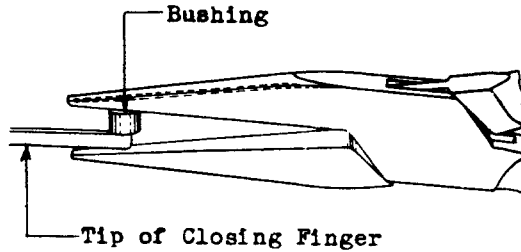


Fig. 6 - Method of Replacing Trip or Closing Finger Bushing

Bottom Master Switch

3.23 To replace the locking segment, locking segment support plate, the driving segment or closing finger bushing for the bottom master switch first remove the switch from the frame as outlined in 3.04, and then proceed as outlined in 3.16 to 3.20 inclusive. To replace the trip finger bushing proceed as outlined in 3.22 without removing the master switch.

Locking Arm Assembly, Locking Arm Bushing, Locking Arm Bearing Screws and Lock Nuts

3.24 Locking Arm Assembly and Locking Arm Bearing Screws and Lock Nuts: In those cases where the top or bottom line switches interfere with the removal of the locking arm bearing screw it will be necessary to remove the switch as outlined in 3.04.

3.25 Loosen the bearing screw lock nuts with the No. 418A wrench and back away the bearing screws with the KS-6854 screwdriver sufficiently to free the locking arm assembly. Withdraw the locking arm assembly exercising care not to damage the springs of the locking relay. Before mounting the new locking arm assembly, check that the shapes of the roller locking arm and the locking arm which is operated by the locking relay are the same shapes as the arms on the assemblies being replaced. If not, adjust the arms on the new assemblies with the R-1502 short nose pliers until the shape of these arms is the same as those of the assembly being replaced. Position the new locking arm taking care that the locking arm bushing is held between armature of the relay in position 3 and the operating spring. Place the bearing screw lock nut on the bearing screw, position the bearing screw and then securely tighten the lock nut. When the locking arm assembly is mounted, check the requirements for the relation of the locking arm roller to the locking segment and the relation between the locking arm and the locking relay as covered in the section covering solenoid master switches. It may be necessary to readjust the locking arm to insure proper op-

3.25 (Continued)

eration. If so, proceed in accordance with the appropriate section.

3.26 Locking Arm Bushing: Remove the locking arm as outlined in 3.24 and 3.25 and then remove the old bushing by cutting it with the diagonal pliers. Place the new bushing on the arm and force it in position with the long nose pliers, taking care not to mar the finish of the locking arm or to break the bushing. If difficulty is experienced in forcing the bushing on the arm, the arm may be heated slightly with a soldering iron which will soften the bushing sufficiently to permit it to be forced into position. Remount the locking arm as described in 3.25.

Governor, Governor Assembly, Governor Bearing Plate, Lantern Pinion Assembly, Lantern Pinion Pin and Governor Frame

3.27 General: Remove the governor assembly locking screw and washer with the 3" cabinet screwdriver and draw the assembly forward out of the master switch frame.

3.28 Governor Assembly: Insert the new governor assembly into the master switch frame. If a governor assembly having a bearing plate secured by one mounting screw is replaced by one having a bearing plate secured by two mounting screws discard the old locking washer. Place the new locking washer under the locking screw in such a position that the bent offset tip will bear against the governor unit. Tighten the locking screw securely so as to hold the governor assembly securely in position.

3.29 Governor and Governor Bearing Plate: Remove the governor assembly as outlined in 3.27. Remove the bearing plate mounting screws with the 3" cabinet screwdriver, and remove the bearing plate from its position. If the bearing plate requires replacing, do so at this time. With the bearing plate removed, remove the governor and place the new governor in position. Remount the bearing plate and tighten the bearing plate mounting screws securely. Replace the governor assembly in its position in the master switch frame making sure the teeth of the lantern pinion engage with the teeth on the driving segment. Replace the governor assembly locking screw and washer and tighten the locking screw securely.

3.30 Lantern Pinion Assembly and Lantern Pinion Pin: Loosen the lantern pinion pin locking screw with the KS-6854 screwdriver. Withdraw the pin with the P-long nose pliers. Replace the pin at this time if a new one is required. Withdraw the lantern pinion assembly from the frame and replace it with the new one. Reset the pin making sure that the end of the pin adjacent to its locking screw does not extend from

the bearing of the frame far enough to interfere with the movement of the locking segment. Securely tighten the lantern pinion pin locking screw.

3.31 Governor Frame: Remove the governor bearing plate, governor, and lantern pinion pin and assembly covered in 3.29 and 3.30. Remove the governor bearing set screw with the KS-6854 screwdriver. Remount the governor bearing screw in the new frame. Remount the other parts in the new frame as described in 3.29 and 3.30.

Locking Segment Stop

3.32 On Top Master Switch: Open the gate on which the master switch is mounted and loosen the nut which fastens the master switch mounting screw with the No. 102 wrench. Remove the mounting screw with the 4" regular screwdriver. Substitute the new locking segment stop and securely tighten the master switch mounting screw and nut.

3.33 On Bottom Master Switch: Remove the master switch mounting screw and washer which secures the locking segment stop with the 4" regular screwdriver. Remove the stop and substitute the new part. Securely tighten the master switch mounting screw.

Switch Jack Assembly and Shelf Jack Assembly

3.34 Switch Jack Assembly: When the mounting screws of the switch jack assembly are not accessible from the front or not accessible from the rear, open the gate on which the master switch is mounted. Unsolder the wires from the jack terminals and remove the mounting screws with the KS-6854 screwdriver. Substitute the new assembly and replace and tighten the mounting screws securely. Resolder the wires previously removed.

3.35 Shelf Jack Assembly Mounted on Master Switch Mounting Bracket: First revolve the gate, on which the master switch is mounted, forward. Unsolder the wires from the jack terminals. If the shelf jack assembly is on a left master switch remove the jack mounting screws with the KS-6854 screwdriver. If the shelf jack assembly is mounted on a right master switch remove the jack mounting screws with the Nos. 206 and 207 offset screwdrivers. Substitute the new assembly and replace and tighten the jack mounting screws securely. Resolder the wires to the jack terminals.

3.36 Shelf Jack Assembly Mounted on Frame of Gate: First unsolder the wires from the jack terminals. Open both the right and left gates to obtain access to the terminals if the jack involved is mounted on the right gate, or open only the left gate if the jack involved is mounted on the left gate. If the jack is mounted on the left gate, with the gate open remove the jack

3.36 (Continued)

mounting screws with the KS-6854 screwdriver. If the jack is mounted on the right gate, with the gate closed, remove the jack mounting screws with the Nos. 206 and 207 offset screwdrivers. If the jack mounting screws cannot be removed due to their inaccessibility, remove the switch as covered in procedure 3.04. Substitute the new jack assembly, replace and tighten the mounting screws securely. Resolder the wires. Remount the switch, if it was removed.

Master Switch Mounting Bracket

3.37 Open the gate on which the master switch is mounted and remove the nut associated with the bracket to be removed with the No. 102 wrench. Remove the master switch mounting screw with the 4" regular screwdriver. The removal of this screw will free the locking segment stop if the bracket is at the right side of the master switch. If the bracket at the right side of the switch is being replaced, also dismount the shelf jack. Remove the bracket mounting screw with the 4" regular screwdriver. Remove the bracket. Remount the shelf jack on the new master switch mounting bracket. Place the mounting bracket in position and insert the shelf jack in the switch jack. Remount the switch mounting bracket and securely tighten the mounting screws. Remount the locking segment stop if one was removed, and securely tighten the master switch mounting screw and nut.

Cord Holders

3.38 Where the cord holder of a master switch is inaccessible due to interference of the line switches remove the master switch as outlined in paragraph 3.04. Otherwise, or after the removal of the master switch proceed as follows. Unsolder one end of the wires which pass through the cord holder, carefully designating them so that they may be replaced easily. Remove the cord holder mounting screw with the 3" cabinet screwdriver and remove the cord holder. Substitute the new cord holder and tighten the mounting screw securely. Insert the wires, which were removed, through the cord holder and resolder them to the terminals from which they were removed. Remount the switch, if it was removed.

Relays and Relay Brackets

3.39 To replace any of these relays first unsolder the wires from the coil and contact spring terminals, carefully designating them so that they may be replaced easily. In the case of relays mounted in position 1 on a switch which is mounted on the frame at the right, remove the relay mounting screw with the 3" cabinet screwdriver and remove the relay. In all other cases remove the relay bracket mounting screws with the 3" cabinet screwdriver and remove

the bracket. Remove the relay mounting screw with the 3" cabinet screwdriver and remove the relay. Substitute the new relay and tighten the mounting screw securely. If the bracket is to be replaced dismount the other relays from it and mount them on the new bracket. Resolder the wires.

Key and Key Bracket

3.40 To replace the key remove the bracket mounting screws from the frame with the 3" cabinet screwdriver and unsolder the wires from the key terminals. If the key bracket requires replacing do so at this time by removing the key mounting screws with the KS-6854 screwdriver, and remounting the key on the new bracket. Remount the key and bracket, tightening the mounting screws securely. Resolder the wires to the key terminals.

Closing Spring Assembly and Trip Spring Assembly

3.41 Unsolder the wires from the spring terminals of the spring assembly. Remove the spring assembly mounting screws with the KS-6854 screwdriver and remove the spring assembly. Substitute the new assembly and tighten the mounting screws securely.

Master Switch Frame

3.42 To replace the frame first remove the master switch as outlined in paragraph 3.04. Then remove all the parts as previously covered. Remount these parts on the new frame and remount the switch.

Wiper Cords, Wipers, Cord Guide and Banks

3.43 Wiper Cords: To replace the wiper cords unsolder and remove the cords to be replaced from the terminals of the wiper assembly and the terminals on the rear of the line switch frame. Open the gate to obtain access to the terminals on the rear of the line switch frame. Solder the new wiper cords to the terminals on the rear of the line switch frame, pass the cords through the cord holder on the wiper assembly as shown in Fig. 7, and solder them in position at the wiper terminals.

3.44 Wipers: When equipped with wiper cords unsolder and remove the wiper cords from the wiper terminals. Loosen the wiper bracket clamping screws with the 3" cabinet screwdriver in the case of the top master switch or remove the screws in the case of the bottom master switch, turn the wiper assembly to the right or left to clear the bank and remove the wiper assembly from the shaft. Place the new wiper assembly in position, check that the wipers line up with the bank level and check the alignment of wipers on the bank contacts as covered in the section covering solenoid type master switches.

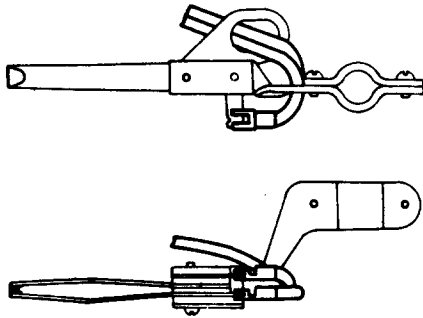


Fig. 7 - Method of Connecting Cords at Solenoid Master Switch Wipers

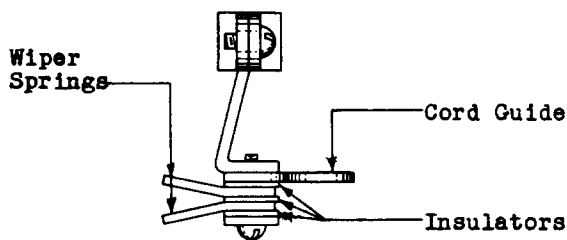


Fig. 8 - Earlier Type Wiper Assembly Having Thin Insulators Modified to Use Later Type Wiper Springs Having Wiper Terminals as Part of the Wiper Springs

3.45 If the wipers do not line up properly with the bank level or bank contacts, shift the wiper assembly as required. If the wiper assembly cannot be aligned properly with the bank level by shifting the assembly, remove the assembly from the shaft. Loosen the wiper assembly clamping screws with the 3" cabinet screwdriver and mount the spring assembly parts on the opposite side of the spring assembly bracket from which they were previously mounted. Mount the wiper assembly on the switch and align the wipers with the bank level and bank contacts.

3.46 If the wiper assembly still cannot be aligned properly with the bank level, it may be due partly to difference in thickness of the insulators on the old and new wiper assemblies. If the old wiper assembly has insulators 1/32 inch thick better alignment may be obtained by putting new springs on the old bracket using the old insulators. To do this loosen the assembly clamping screws on both the old and new wiper assemblies. Discard the separate terminals, the washer under the screw head and the old wiper springs and mount the new wiper springs in position, as shown in Fig. 8. In assembling the parts mount the cord guide under the mounting screw nearest the tip of the springs and between the assembly bracket and the first insulator. Tighten the spring assembly clamping screws securely. Mount the wiper assembly on the switch, align the wipers with the bank level and bank contacts and tighten the assembly mounting screws. Solder the wiper cords to the wiper assembly.

3.47 Cord Guide: When equipped with wiper cords unsolder the wiper cords from the wiper terminals and remove the wiper assembly from the shaft as in 3.44. Remove the wiper mounting screws with the 3" cabinet screwdriver. Remove the cord guide. Substitute the new cord guide. Replace and tighten the wiper mounting screws securely. Place the wiper assembly in position, tighten the wiper bracket clamping screws and resolder the wiper cords to the wiper terminals.

3.48 Banks: To replace master switch banks loosen the wiper bracket clamping screws as described in 3.44 and turn the wiper assembly to the right or left to clear the bank. Unsolder all wires from the bank terminals. Open the gate on which the bank is mounted and loosen the clamping collar screws with the 4" regular screwdriver. Remove the clamping collars from the bank frame. Remove the bank and place the new bank in position. Slip the clamping collars on the bank frame and tighten the clamping collar screws. Resolder the wires to the corresponding bank terminals from which they were removed and replace the bank wipers as described in 3.46.