RINGING MACHINES—SMALL CAPACITY
KS-5510, KS-5546, AND KS-5659
REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering the parts to be used in the maintenance of the KS-5510 25-watt ringing machines, KS-5546 code ringing machines, and the KS-5659 0.6-ampere regulated-type ringing machines.

1.02 This section is reissued to include information on the redesign of the KS-5546 ringing machine.

1.03 ▶The KS-5546 L1 through L7 and L11 through L15 ringing machines have been redesigned to improve operating reliability and ease of maintenance. The new design ringing machine retains the output and input requirements of the former KS-5546 ringing machine. The new design ringing machine utilizes an approved commercial brush holder which eliminates the need for the Teflon* tube brush liner. All list numbers of the new design ringing machine are equipped with nylon cam and cam followers and stainless steel worm and bronze worm gear assemblies. The size and shape of the new design ringing machine enable the machine to be located in approximately the same space as the old design ringing machine. The new design ringing machine is manufactured by the Holtzer-Cabot Corporation. The TYPE designation is used to distinguish between the old and new design. The TYPE designation appears on the ringing machine nameplate. The new design ringing machine is designated TYPE MG. The old design ringing machine is designated TYPE CWD or TYPE CBD.◀

* Registered trademark of the Du Pont Corporation.

1.04 The old design KS-5546 ringing machine may be converted from L4 to L6 and from L3 to L7. Parts 3.06 and 3.07 cover the approved procedures for the conversion.

1.05 Machines manufactured after approximately November 1, 1941 will be marked (probably on the nameplate) with the letter "G" to indicate that they have precision cut bronze gears. These improved gears should have less tendency to wear. In case of excessive wear of bronze gears (see Fig. 6), it is suggested that the machines be replaced promptly and returned for repairs, as the failure of the low-speed interrupter is not covered by an alarm. Machines so repaired will be marked (probably on the nameplate) with the letter "R".

1.06 Refer to Fig. 1 for a photograph of the old design KS-5546 L2 ringing machine and to Fig. 2 for a photograph of the KS-5659 L1 ringing machine illustrating nylon cams. ▶Refer to Fig. 3 for a photograph of the new design KS-5546 L14 ringing machine and to Fig. 4 for a photograph of the new design KS-5546 L14 ringing machine with the interrupter cover removed.◀

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus together with their corresponding names.

2.02 When ordering parts for replacement purposes, give the name of the part as shown in the figures of this section and, also, the complete nameplate data of the machine, including the serial, KS, and list numbers and the manufacturer's name. Do not give the BSP number. For example, one bumper wheel for the KS-5546 L5 ringing machine having the following nameplate data: Holtzer-Cabot, type-CWD-2720, 45 to 52 volts dc, 2.5 amperes, 1110 to 1380 rpm, 17 to 23 cycles, serial No. 123456.

2.03 Information enclosed by parentheses ( ) is not ordering information. This information may be references to notes, parts referred to in other portions of this section and not considered replaceable, or part names in general use in the field if these names differ from those assigned by the manufacturer.

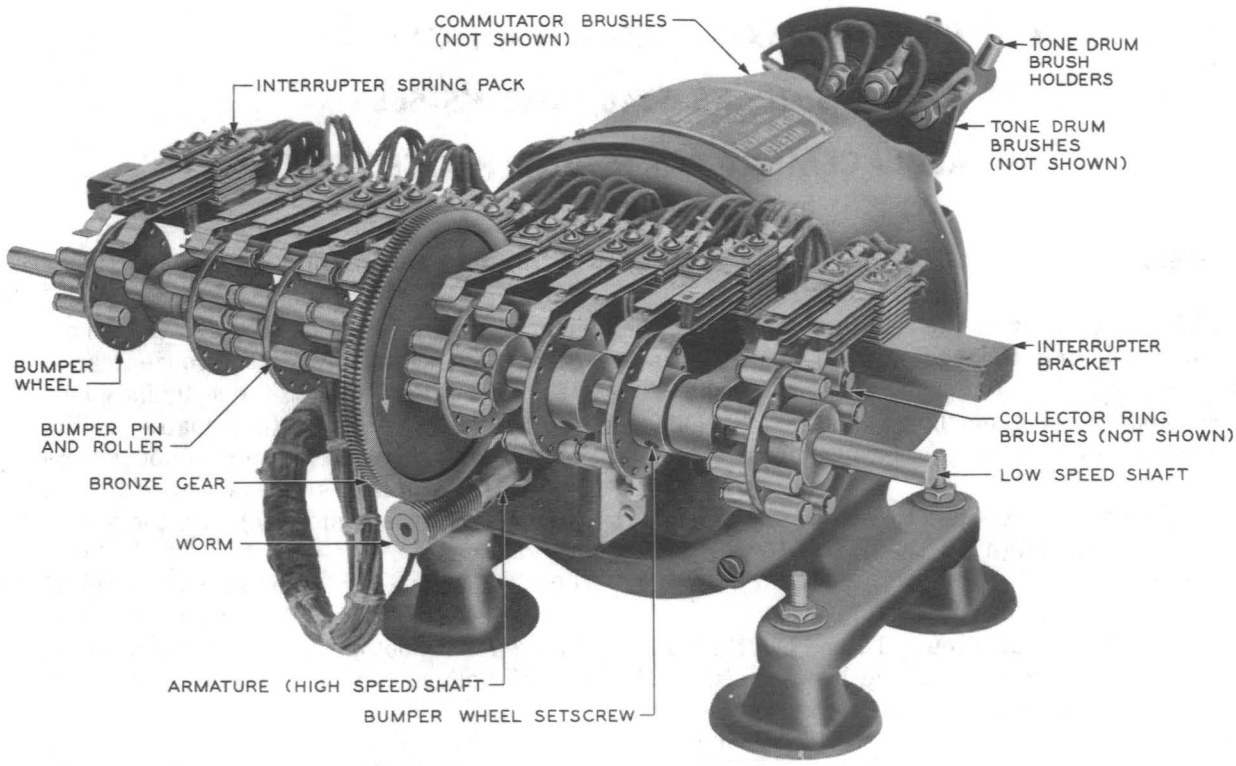

Fig. 1—KS-5546 L2 Ringing Machine (Old Design)

2.04 Complete replacement machines of the type arranged for plug-in connection should be ordered by the J specification list number rather than by the KS number in order to get the plug and associated wiring. Reuse of an old slow-speed interrupter assembly and associated wiring on a new machine is not recommended.

2.05 Brush replacements shall be ordered in accordance with Section 171-110-802.

2.06 Orders for interrupter spring packs shall indicate the specific location on the low speed shaft by designating the spring pack position number with which it will be used and shall give complete nameplate data as covered in 2.02. If these spring packs are to be used on a machine equipped with nylon cams, the order shall state that they are for use on a machine equipped with nylon cams and nylon followers.

2.07 In ordering a nylon cam, indicate the specific location on the low-speed shaft by designating the spring pack position number with which it will be used and give complete nameplate data as covered in 2.02.

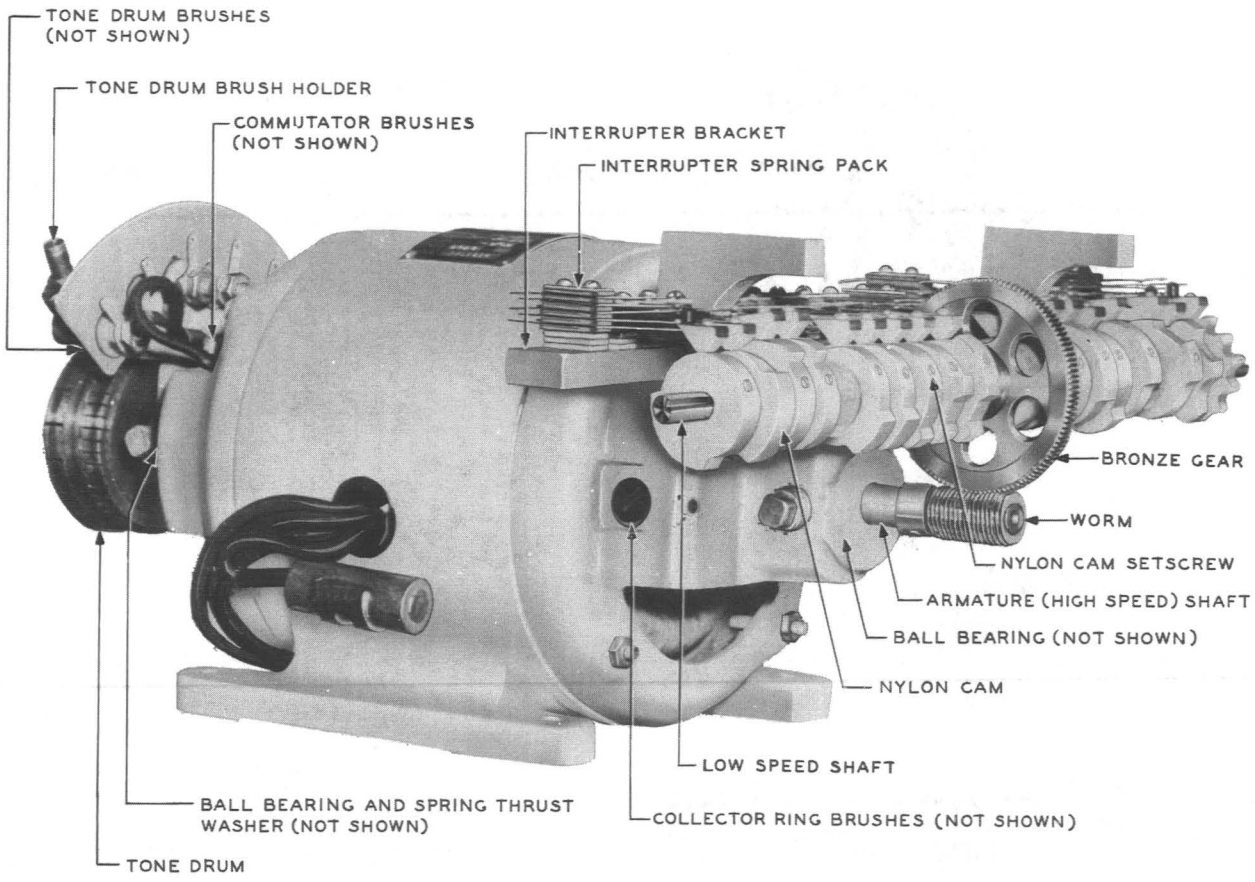

Fig. 2—KS-5659 L1 Ringing Machine Illustrating Nylon Cams

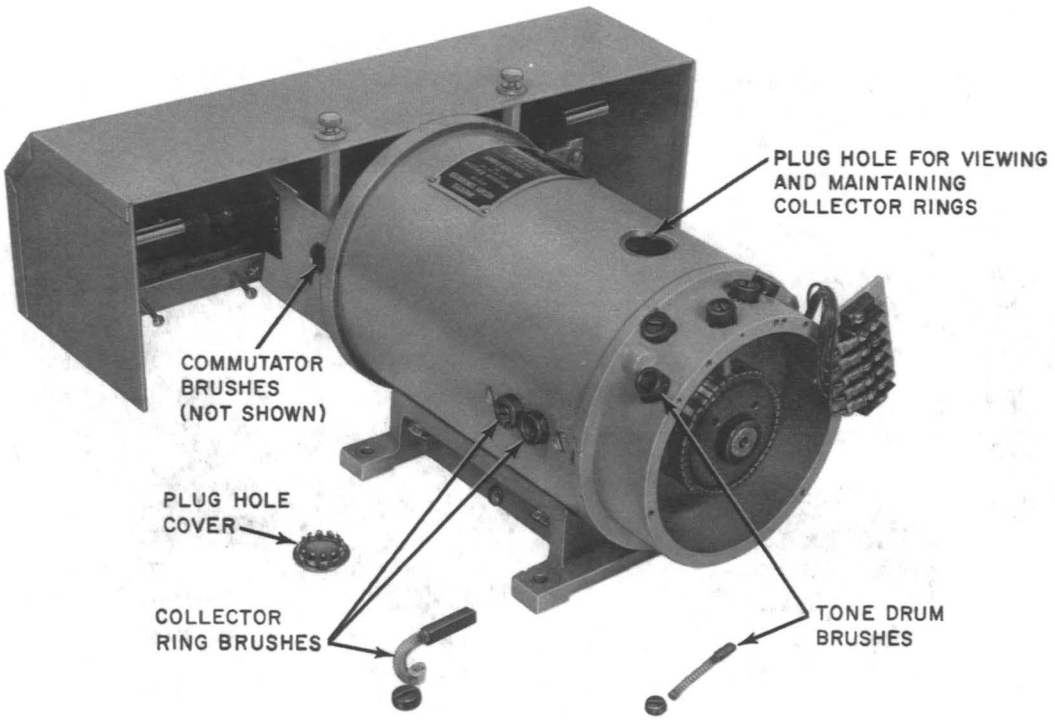

Fig. 3—KS-5546 L14 Ringing Machine—New Hotlzer-Cabot Design

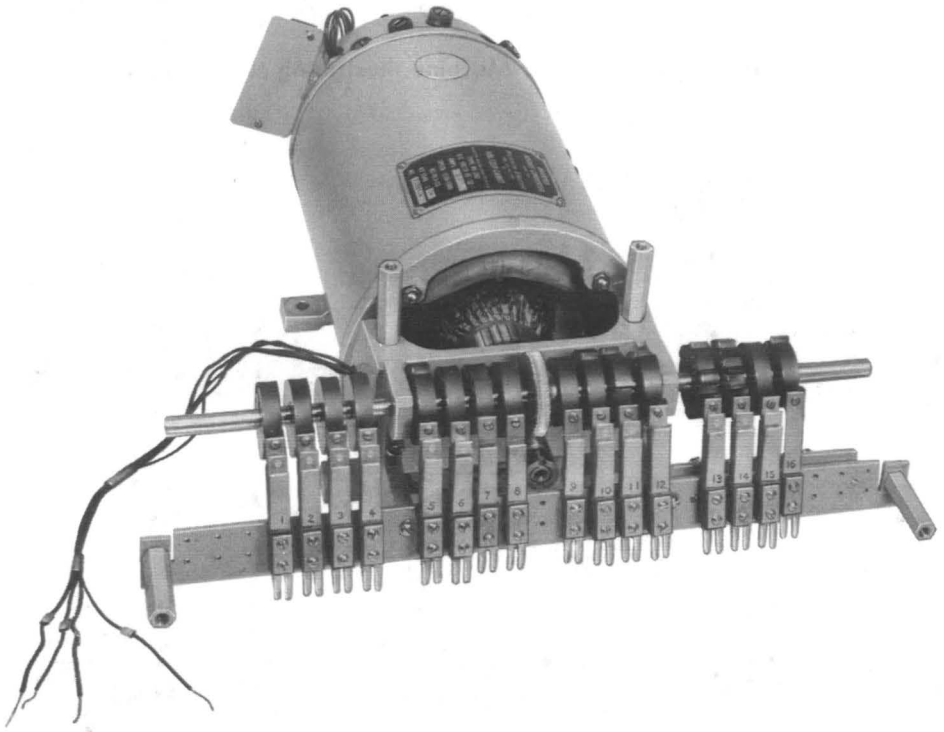

Fig. 4—KS-5546 L14 Ringing Machine—New Holtzer-Cabot Design (Interrupter Cover Removed)

2.08 Metal spacing washers, to eliminate excessive armature end play on machines having sleeve bearings, may be covered by giving complete nameplate data as covered in 2.02 and may be designated in thickness as follows.

THICKNESS	DESIGNATION
0.012 inch	#HC-26-12
0.013 inch	#HC-26-13
0.015 inch	#HC-26-15

2.09 Orders for tone drum brush holders shall indicate the adjacent letter marking on the mounting bracket, in addition to giving the complete nameplate data as covered in 2.02.

2.10 Miscellaneous parts, such as screws, which are not named in the figures and which cannot be obtained locally shall be ordered by describing the part and giving complete nameplate data as covered in 2.02.

2.11 Kits are available for the ◗old◖ design KS-5546 Holtzer-Cabot ringing machines to convert the tone drum brush arrangement from wraparound Teflon liners to solid tube Teflon liners. The KS-5546 L100 kit (4 brushes) is used for the KS-5546 L5, L6, and L7 ringing machines. The KS-5546 List 101 kit (5 brushes) is used for the KS-5546 L11, L12, L13, L14, and L15 ringing machines. The KS-5546 List 101 kit (5 brushes) is also used in the KS-5546 L5, L6, and L7 ringing machines that have an additional high tone brush. When ordering the KS-5546 L100 or KS-5546 L101 kit, give complete nameplate data as covered in 2.02.

2.12 ◗Replacement parts for the old and new design KS-5546 Holtzer-Cabot ringing machine is available from the following sources:

Commercial Electric Products Corporation
1738 East 30th Street
Cleveland, Ohio 44114

or

Parts Dept.
Holtzer-Cabot Corporation
Tri-Boro Industrial Park
North Attleboro, Massachusetts 02760◖

3. REPLACEMENT PROCEDURES

3.01 *List of Tools, Gauges, and Materials*

CODE OR SPEC. NO.	DESCRIPTION
TOOLS	
474A	3/16- and 1/4-Inch Hex. Closed Double-End Offset Wrench
551A	1/8- and 3/16-Inch Combination Wrench
KS-6854	3-1/2-Inch Screwdriver
KS-8097	7/16- and 5/8-Inch 12-Point Offset Box Wrench
R-1542	6-Inch Adjustable Wrench
R-2670	Wrench
R-2958	Wrench
—	Puller, Grip-O-Matic, Owatonna Tool Co No. 1000-1/2-L
—	3-Inch C Screwdriver
—	4-Inch E Screwdriver
GAUGES	
R-8550 (2 reqd)	6-Inch Steel Scale
—	Micrometer Calipers, Outside, Brown and Sharpe No. 54 (0 to 4 inch)
	or
—	Micrometer Calipers, Inside, Brown and Sharpe No. 263 (1 to 2 inch)
	Note: A micrometer is required only for KS-5510, all lists, and KS-5546 L1 through L7, and L11 through L15.
MATERIALS	
KS-14666	Cleaning Cloth
→KS-19578 L1	Trichloroethane (1-pt bottle) ←

Warning: When doing any work on a ringing machine, disconnect the input power in any convenient manner to prevent unexpected starting that might result in personal injury.

Caution: When using trichloroethane for cleaning purposes in the power room, provide as much ventilation as possible. After using the trichloroethane, the commutators of all dc machines in the power room should be burnished in accordance with approved procedures for the machines involved. Fumes from trichloroethane may soften commutator film and therefore adversely affect commutation.

3.02 When replacing parts in the ringing machines, the parts should be adjusted in accordance with the requirements specified in Section 163-704-701. After replacing parts in the ringing machines, check the adjustments of all parts that might have been affected by the replacement procedures. Perform an overall operation check before returning the ringing machine to service.

3.03 ***Brushes***

(1) When removing brushes that will be reused, note their positions in the holders and mark them, if necessary, to insure replacement in the same holder and in the same position in the holder.

(2) ***Commutator Brush:*** To replace a commutator brush, proceed as follows.

(a) ***Brush with pigtail lead:*** Remove the screw which fastens the pigtail to the holder. Raise the brush spring and withdraw the old brush and pigtail. Insert a new brush and connect the pigtail.

(b) ***Brush with coil spring:*** Remove the screw cap using care to hold the spring and brush in the holder. Remove the old brush and spring from the holder. Install a new brush and spring and remount the screw cap.

(3) ***Collector Ring Brush:*** To replace a collector ring brush, remove the screw cap holding the brush and the coil spring in the holder. Remove the old brush and spring. Install a new brush and spring and remount the screw cap.

(4) ***Tone Drum Brush:*** To replace a tone drum brush, proceed as follows.

Note: No brush liner is required on the new design Holtzer-Cabot KS-5546 ringing machine.

Remove the screw cap using care to hold the spring and brush in the holder. Remove the old spring and brush, and Teflon liner if present. If the liner is the wraparound type, refer to 2.11. Install the liner and the brush and spring in the holder. Remount the screw cap.

(5) Brushes shall be fitted and cleaned as outlined in Section 163-704-701.

3.04 ***Tone Drum Brush Holders:***

Note: A faulty tone drum brush holder on the new design KS-5546 Holtzer-Cabot ringing machine will necessitate replacement of the entire tone drum brush assembly.

To replace a yoke type tone drum brush holder, remove the brush from the holder to be replaced. Remove the terminal nut and the terminal. Remove the mounting nut, metal washer, and insulating washer, and withdraw the brush holder stud from the mounting hole. Remove the insulating bushing from the mounting hole or brush holder stud and remove the insulating washer and metal washer from the brush holder stud. Inspect the insulating bushing and insulating washers and replace these parts, if necessary. Assemble a metal washer, and insulating washer, and the insulating bushing on the stud of the new brush holder. Install the brush holder stud in the mounting hole and assemble an insulating washer, a metal washer, and the mounting nut on the stud. Position the brush holder radially to the tone drum and tighten the mounting nut securely. Assemble the terminal removed for this replacement and the terminal nut, tightening the nut securely. Reinstall or replace the brush as necessary.

3.05 ***Interrupter Spring Packs:*** To replace an interrupter spring pack, remove the interrupter cover. Loosen the screws that mount the individual spring pack on the interrupter bracket. Mark or otherwise note the positions of the leads connected to the interrupter spring pack before unsoldering the connections, so that they may be resoldered in the same manner. Remove the mounting screws, being careful not to lose the washers. Replace the spring pack with the new spring pack and align the springs. Reassemble in the reverse order.

3.06 ***KS-5546 Interrupter Conversion From L4 to L6 (old design)***

(1) This conversion involves changing the position of the bumpers which operate the interrupter spring packs No. 7 and 9 so that the starting of these two codes will be delayed with respect to the other codes, as shown on the List 4 and 6 timing charts on the job drawing. It will be noted from the machine that each bumper wheel has bumpers on each side and that it operates two interrupter spring packs. Spring packs No. 7 and 8 operate from one wheel and 9 and 10 from the next wheel. No change is required in the position of the bumpers operating spring packs No. 8 and 10. Fig. 5 shows the relative positions of the bumpers for List 4 and for the change to List 6 as viewed from the bumper wheel end of the machine. There are 12 positions (tapped holes around each wheel). The vertical line represents the wheel, the long crosslines indicate bumpers on each side of the wheel, the shorter line a bumper on only one side, and the shortest line unused positions.

(2) Although no change is required in the position of the bumpers operating the No. 8 and No. 10 spring packs, long and short threaded pins (see Fig. 7) will have to be interchanged in some positions. The short threaded pin is used for positions of one bumper. The long threaded pin is used for positions having a bumper on each side of the wheel and extends through the wheel to engage the female pin of the opposite bumper. Two new short male thread pins are required for the conversion. The bumper wheels may be loosened and moved on the shaft to facilitate the work. They should be reset with the proper setscrew as covered in 3.09 The new timing should be checked.

3.07 ***KS-5546 Interrupter Conversion From L3 to L7 (old design):*** This conversion consists of replacing interrupter spring pack No. 6 with a new interrupter spring pack No. 6 for KS-5546 L7 machine, and moving the single bumper pin and roller, on the bumper wheel operating spring pack No. 6, back one position against the normal direction of rotation of the bumper wheel. (See Fig. 6.) No additional bumper pins are required for this conversion. The method of making such a conversion is covered in 3.06.

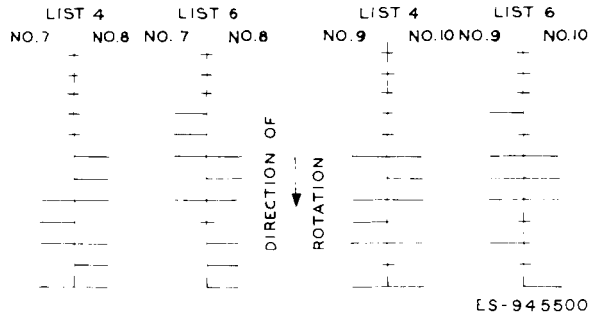

Fig. 5—Position of Bumpers on Bumper Wheels Involved in Converting KS-5546 L4 to L6 (Old Design)

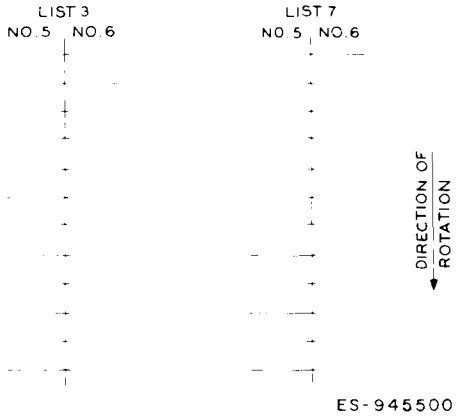

Fig. 6—Position of Bumpers on Bumper Wheels Involved in Converting KS-5546 L3 to L4 (Old Design)

3.08 ***Bumper Pin Rollers:*** In replacing rollers, the bumper wheels can be loosened (see 3.09) and moved on the shaft to allow the work to be performed. The wheels should be reset and the timing checked for all wheels moved.

3.09 ***Bumper Wheels***

(1) When a bumper wheel is loosened, note which of the two setscrews goes on the flat of the shaft. When a bumper wheel is removed from the shaft, note its position. The wheels are usually marked with their position number opposite the setscrew that goes on the flat side of the shaft, but this should be checked before disassembling.

the tone drum setscrews and remove the tone drum. Mark the bearing bracket and the end of the motor frame so that, in reassembly, the bearing bracket will be in the same position. Remove the four through bolts and the associated nuts, and remove the bearing bracket at the tone drum end of the machine. Do not loosen the screws which mount the commutator brush holder yoke on the bearing bracket and in no way try to change the relative position of the brush holder yoke on the bearing bracket. Loosen the worm setscrews and withdraw the armature from the machine. Order new ball bearings and install them on the new or reconditioned armature. Lubricate the bearings if they are not lubricated, in accordance with Section 163-704-701. Assemble in the reverse order. After the bearing bracket is in place and before the brushes are remounted, check to see if the shaft turns freely.

3.13 ***Armature Bearings***

(1) No attempt should be made to replace armature sleeve bearings in the field. It is recommended that the machine be returned for this replacement.

(2) To remove either ball bearing, remove the armature as covered in 3.12. Remove the miscellaneous parts, such as spacers and felt washer, from the armature shaft and lay them out in order so that they may be replaced in their proper positions. When replacing a bearing, the felt grease retaining washer should be replaced with a new felt washer. When a sealed ball bearing is used as a replacement part, no felt washer is required.

(3) Remove the bearing from the armature, using the 1000-1/2-L puller. Slip the new bearing on the shaft, and using a short piece of clean pipe which will slip over the shaft and push against the inner but not the outer race, tap the bearing gently into place against the shoulder on the shaft. New bearings are normally properly lubricated when received. Lubricate the bearings, if they are not lubricated, in accordance with Section 163-704-701. Clean the inside surface of the bearing chamber thoroughly with **trichloroethane** and wipe with a slight amount of grease. Reassemble the machine in the reverse order from that in which it was dismantled.

3.14 ***Low-Speed Shaft Bearings:*** The low-speed shaft bearings are made of materials that do not require lubrication. It is not expected that these bearings will require replacement during the life of the machine due to the light duty to which they are subjected. The replacement of these bearings is a difficult procedure and requires special tools not normally available in the field. Should the bearing require replacement due to mechanical failure brought about by shock, or by the excessive presence of oil, the matter should be referred to the supervisor as the machine may have to be returned for repairs.

3.15 ***Spacing Washers:*** To reduce end play on machines having sleeve bearings, remove the armature in a manner similar to that outlined in 3.12. Install the spacing washer or washers on the armature shaft in accordance with Section 163-704-701, up to the shoulder. Replace the armature, exercising care in sliding the shaft through the wool-packed bearing to avoid entangling the wool on the shaft, and reassemble the machine.

3.16 ***Spring Thrust Washer:*** To replace the spring thrust washer or coil spring, which prevents end play in machines having ball bearings, remove the tone drum brushes, the tone drum, and the bearing bracket, at the tone drum end of the machine, in a manner similar to that covered in 3.12. Remove the old spring thrust washer or coil spring from the bearing bracket. Install the new spring thrust washer or coil spring with the concave or cupped side toward the ball bearing. Assemble the machine in the reverse order.