TELEPHONE RINGERS

1. GENERAL

1.01 This practice provides general information on all types of single-gong and two-gong ringers. Specific information and special adjustments are given in the individual practices.

1.02 Each ringer consists of a cast, non-magnetic, alloy frame on which all the component parts are mounted. A typical ringer is illustrated in Figure 1. A laminated soft-iron core carries the single coil and is clamped to the soft-iron yoke which is bolted to the frame. The armature and clapper assembly is spring mounted to the frame so that the clapper may be vibrated by the armature, due to the magnetic field produced by the coil and yoke, to strike the gong(s). Increased sensitivity is provided by biasing the armature by means of a small permanent magnet clamped in the frame. A mechanical volume control is fitted on most types of ringer so that the user may adjust the sound output level. The coil is provided with flexible wire leads for connection to the other components in the telephone.

1.03 The ringers are designed to function from an alternating current source. Units are available for all the standard ringing frequencies from 16 to 66-2/3 cycles per second. The sensitivity is such that satisfactory operation is obtained on the longest circuits, and the high impedance prevents excessive bridging and unbalance losses on multi-party lines. A three point, anti-vibration mounting to the telephone base is provided.

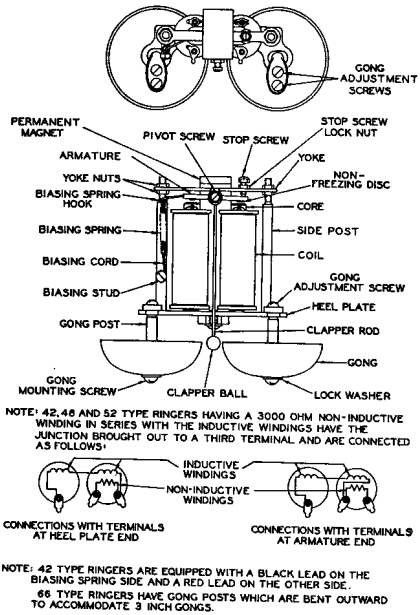

Fig. 1 — Typical Numbered Ringers

2. DISASSEMBLY AND ASSEMBLY

2.01 The gongs and resonators, if fitted, are removed by unscrewing their lockwasher mounting screws. Note that earlier models of some ringers had the resonators riveted to the frame. The gong mounting control wheels of the frequency selective ringers are removed by unscrewing the hexagonal head, lockwasher screws.

CAUTION: The strength of the permanent magnet is adjusted after assembly of the ringer. Disassembly of any of the parts of the magnetic circuit may adversely affect the performance of the ringer. Special equipment is necessary to remagnetize and adjust the strength of the magnet in order to obtain optimum performance.

2.02 In order to remove the magnet from a BA type ringer, first remove the armature and clapper assembly then slide the magnet out of the frame. Do not strain the tab of the frame holding the magnet, as it may break off. The magnet of a frequency selective type ringer may be lifted out after the screws and clamping plate are removed.

2.03 The coil is removed from a BA type ringer by unscrewing the lamination clamping screws, and from a frequency selective type ringer by loosening the shunt bar and slide plate clamping screws.

2.04 Reassembly is a reversal of the procedures given for disassembly. The following points must be noted:

a. All Ringers

(1) The end of the magnet nearest the armature must repel the north seeking pole of a compass and the opposite end of the magnet must be tight against the pole piece assembly.

(2) When facing the gong end of a two-gong ringer and with the frame facing downwards, gong "B" is on the left and gong "A" is on the right.

b. BA Type Ringers

(1) When replacing the armature, the end of the bias spring must be located in its adjusting slot in the bracket on the frame.

(2) When replacing the coil, the number of core laminations used should result in the coil core being comfortably filled but not force fitted. A minimum weight of 16 grams of laminations must be used.

3. LUBRICATION

3.01 Ringers without volume controls do not require lubrication.

3.02 First clean away all existing lubricant from the volume control mechanism then apply a light film of Lubriplate or similar non-drying lubricant to all rubbing surfaces of the volume control parts. Take care to avoid excessive lubrication.

4. TEST AND ADJUSTMENT

4.01 Thorough checking of ringers requires the use of specialized test equipment which will not always be available in the field. These steps may be omitted at the cost of a reduction in the overall performance of the ringer. *Note that the strength of the permanent magnet will only be reduced by a small amount if care is taken not to disturb the armature, magnet and shunt bar or pole piece when changing a faulty coil.*

4.02 The ringer under test must be firmly mounted in a test fixture, such as a telephone base plate which has been weighted to the normal weight of a complete instrument, in order to carry out the tests and adjustments correctly.

4.03 For test and adjustment purposes, telephone ringers may be conveniently divided into the two general classifications of straight line and frequency selective types. The generalized test and adjustment procedures for these two groups are given in the following paragraphs. Reference must also be made to the individual practices for each type of ringer where specific sensitivity values and test and adjustment figures are quoted.

5. STRAIGHT LINE RINGERS

5.01 First check the individual practice in which the specific ringer is described, for details of any special tests or adjustments, then proceed as outlined below.

5.02 Mechanical Adjustments:

a. The residual plate must lie flat on the rear face of the armature. Reshape the plate if necessary.

b. With the bias spring set in the low notch, nearest the coil, the armature must be firmly tensioned against the rear pole face. Bend the bias spring near its base to adjust.

c. The clapper stem must be straight and in line with the armature. Reshape the clapper stem if necessary.

d. There must be a clearance of about 1/16" between the clapper and the "B", or single, gong when the armature is held against the rear pole face. Slightly bend the rear pole face to obtain this clearance. Note that on two gong ringers the identifying letter on the "B" gong must be positioned directly above the mounting screw before making this adjustment which should result in the clapper stem being approximately in line with the notch in the frame bridge piece.

e. With the armature resting against the rear pole face there must be a clearance of .045" to .050" between the armature stud and the front pole face. Slightly bend the front pole face, at the portion parallel to the length of the magnet, to obtain the required clearance.

f. If the ringer is fitted with a volume control check the stop rod, single gong ringer, two gong ringer, or rubber cam adjustment as detailed in the individual ringer subsection.

g. Slight readjustment of the "B" gong and/or clapper set may be required in order to obtain an even, good quality ring during the electrical tests. The final adjustments, however, must meet the requirements outlined above.

5.03 Electrical Tests: The objective of the electrical tests is to obtain optimum balance between the forces, acting on the armature, from the bias spring and the permanent magnet. Take care to avoid demagnetization of the magnet if magnetization equipment is not available.

6. FREQUENCY SELECTIVE RINGERS

6.01 First check the individual practice in which the specific ringer is described, for details of any special tests or adjustments. Then proceed as outlined below.

6.02 Mechanical Adjustments:

a. Slightly loosen the hexagonal head mounting screws and rotate the gongs away from the clapper, using a screwdriver through the slot in the control wheel, with its tip in one of the slots in the casting, as a lever.

b. The tuning stem must be parallel to the frame edge and the weight must be centered between the gongs of a two-gong ringer. Carefully adjust the stem near its base, if necessary.

c. If a separate clapper unit is fitted the ball must be centered between the gongs and be in line with their mounting screws on the two gong ringer or must rest 1/16" to 3/32" away from the gong and strike it within 1/8" of its edge on a single gong ringer. Slightly bend the clapper stem, forward of the angled section, to obtain these settings. Check that the clapper ball and stem are clear of the tuning weight by about 1/32". The clapper stem must rest against the rubber tubing on the tuning stem with a pressure within the range given in the individual ringer subsection. Slightly bend the clapper stem near its base to obtain this adjustment.

d. Check that the two arms of the armature are straight and parallel to the frame; and the gaps between the armature and laminations are about equal. Damaged armatures should be replaced and not readjusted.

e. Loosen the slide plate clamping screw and adjust the eccentric screw to about the mid-point of its range. Tighten the clamping screw.

6.03 Electrical Tests: The objective of the electrical tests is to adjust the ringer mechanism for mechanical resonance and to set the electrical sensitivity.