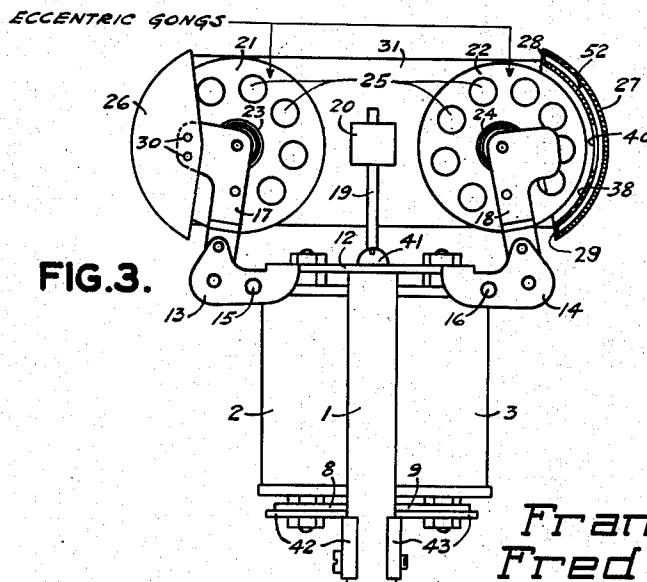
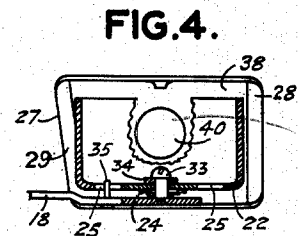
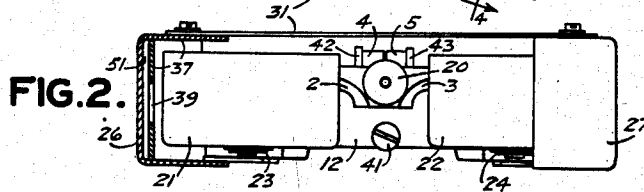
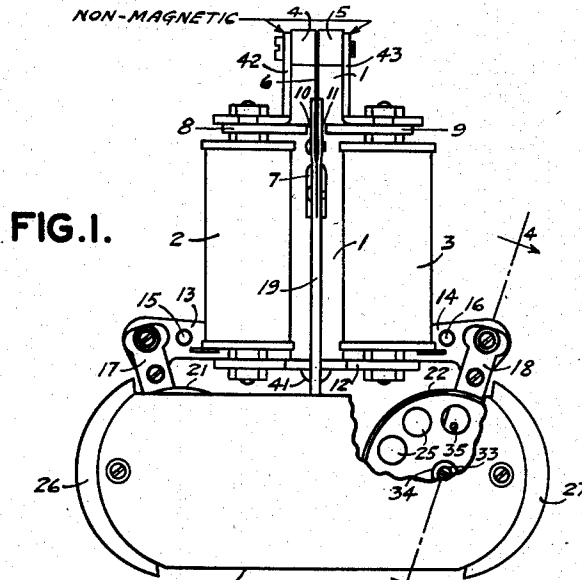


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TELEPHONE SUBSTATION RINGER

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TELEPHONE SUBSTATION RINGER

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3 Claims. (Cl. 116—149)

This invention relates to telephone substation ringers. The general object is to provide a satisfactory ringer sufficiently compact to enable it to be housed in the space available in self-contained telephone sets not using a separate ringer box, which is nevertheless capable of giving a sufficiently loud signal.

One specific object is to provide new and improved devices for intensifying the sound emitted by the comparatively small gongs of the compact ringer.

Another specific object is to provide means for reliably maintaining the rotational adjustment of the loosely mounted eccentric gongs.

In attaining the first-named specific object of the invention, applicants have provided a new and improved device which they have termed a reflector-resonator, in which the sound-intensifying effect of a reflector of the general type disclosed in Eaton Patent No. 2,156,842, issued May 2, 1939, is combined with a closed-chamber resonator having its operative opening at the bottom of the pocket comprising the reflector. One example of a simple closed-chamber resonator is disclosed in the Morton Patent No. 2,216,956, issued October 8, 1940.

In carrying out the second-named specific object of the invention, applicants have provided a resilient, rockable mounting arrangement for each of the gongs, and have provided a fixed pin which, when the gong is in a desired position of adjustment, extends a short distance into one hole of a circular row in the base of the gong. The gong is thus effectively retained against rotation, but may be turned readily to a desired new position by tipping the gong sidewise about its resilient mounting to enable the above-mentioned retaining pin to clear the bottom of the gong.

Other objects and features of the invention will become more apparent as the description progresses.

Referring now to the accompanying drawing comprising Figs. 1 to 4, they show different views of a telephone substation ringer constructed in accordance with the features of the invention to enable the invention to be understood.

Fig. 1 is a top view of the improved ringer;

Fig. 2 is a front view;

Fig. 3 is a bottom view; and

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 1.

The driving assembly of the ringer includes a permanent magnet 1, seen best in Fig. 3, and a pair of electromagnets 2 and 3, seen best in Fig.

1. Pole pieces 4 and 5 are held against the rear of magnet 1 by the non-magnetic brackets 42 and 43, retained by screws passing through the pole pieces 4 and 5. The other ends of the brackets 42 and 43 are secured to the rear ends of electromagnets 2 and 3, as seen best in Fig. 1.

The front ends of electromagnets 2 and 3 are held together by the return yoke 12, as seen best in Fig. 3. The return yoke 12 has the mounting brackets 13 and 14 formed integrally therewith, and provided with tapped openings 15 and 16, through which the ringer can be secured in place.

The front end of permanent magnet 1 is held fixedly to the return yoke 12 by screw 41.

The ringer disclosed is of the so-called tuned type. It has a clapper 20 attached to the front end of the clapper rod 19, assembled with armature 7. Armature 7 is clamped to the front end of steel mounting spring 6, the rear end of which is clamped between the permanent-magnet pole pieces 4 and 5.

Armature 7 is acted upon by electromagnets 2 and 3, through pole pieces 8 and 9, across the illustrated air gaps 10 and 11 to cause a comparatively vigorous movement of rod 19 and clapper 20 when the electromagnets are supplied with current of the desired frequency.

The gongs 21 and 22 are termed eccentric because of the slightly off-center location of the mounting opening through the base portion of each. They are mounted on the front of brackets 17 and 18, attached by screws, to the bracket extensions 13 and 14 of return yoke 12. The rear portion of each of the brackets 17 and 18 is widened somewhat to permit the opening there-through (not shown) to be slotted longitudinally to permit the average spacing between the eccentric gongs 21 and 22 to be varied according to the size of the clapper 20 used in a given case and according to the desired stroke of the clapper. The adjustment thus obtained is approximate and is set during manufacture by the tightening of the screws holding the brackets 17 and 18 and does not need to be changed thereafter because of the ready adjustment which may be made of the eccentric gongs without use of tools, as will be pointed out hereinafter.

The resilient, rockable mounting provided for the gongs is shown best in connection with gong 23 in Fig. 4. A shoulder screw 33, on which a washer 34 is first placed, is passed through the somewhat eccentric opening in the bottom of gong 22, and thence through the spiral spring 24, and is turned into the tapped opening in bracket 18 until it comes to a stop against its shoulder por-

tion. Spring 24 normally holds the gong 22 in the illustrated level position against washer 34. It has been found that a loose mounting of this general character permits a gong to vibrate more vigorously and more enduringly than does the same gong when clamped tightly, as by an ordinary screw mounting.

It has been found that when the strength of the spring 24 is just reliably sufficient to hold the gong in place without compressing it too tightly, the gong tends to rotate out of its adjusted position. Such rotation is effectively prevented in the disclosed structure by providing each of the brackets 17 and 18 with a short pin extending into one of the holes 25 in the bottom of the gongs 21 and 22. The retaining pin 35 for the gong 22 is shown in Figs. 1 and 4. This pin is sufficiently long to effectively engage the gong and prevent its rotation during the ringing action, but is sufficiently short that the bottom of the gong 22 clears the upper end of the pin when the gong is rocked, or tipped, sideways against the leveling action of spring 24. The gong 22 may thus be rotated to bring the side of it nearer to or farther from the normal position of clapper 20, by virtue of the somewhat eccentric location of its mounting hole through which screw 33 passes.

When the desired new position of the gong 22 is reached, the gong is released and the pin 25 allowed to pass freely into the nearest of the sound-escape openings 25 in the base of the gong, whereby the gong is effectively held against rotation out of the desired new position of adjustment.

The gongs 21 and 22 are provided with the sound-intensifying reflector-resonators 26 and 27. Reflector-resonator 26 is shown in front sectional view in Fig. 2; device 27 is shown in bottom sectional view in Fig. 3; and device 27 is shown in side view in Fig. 4, taken along the line 4-4 of Fig. 1.

Each of the reflector-resonators comprises a main outer shell and an inner member cooperating with the main portion to define the reflector pocket and the resonating chamber. The inner portion 37 of the device 26 is shown in Fig. 2, while the inner portion 38 of the device 27 is shown in Figs. 3 and 4.

Each of the main body portions 26 and 27 forms a pocket encompassing a portion of the associated gong. It has an arcuate side portion comprising a part of a cylinder, together with two flat end portions. The end portions of device 27 are shown at 28 and 29 (Figs. 3 and 4).

Each of the inner members is essentially arcuate, and mounted substantially concentric with the arcuate portion of the corresponding outer member. As seen best in Fig. 3, the inner member 38 has its front and rear extremities bent outwardly to contact and overlie the corresponding portions of the main structure 27 to define an arcuate resonator chamber 52. All points of contact between inner member 38 and the main body portion 27 are preferably tightly sealed, as by solder or cement, closing the chamber 52 (Fig. 3) at all points except at the opening 40 (Figs. 3 and 4), which is located at the bottom of the reflector pocket. Similarly, the resonator opening 39 of the chamber 51 (Fig. 2) is located at the bottom of the reflector pocket of the reflector-resonator 26.

The devices 26 and 27 may be held in place on the side extensions at the front ends of the

brackets 17 and 18, as by being spot-welded, such as is intended to be indicated at 30 in Fig. 3 for the device 26.

The top plate 31 is useful in rigidifying the structure, in that it connects the devices 26 and 27 together. It also has some beneficial effect in directing the sound downwardly and outwardly through suitable openings in the base of the enclosure with which it is contemplated that the device be used in practice.

In practice, best results are secured when the reflector pocket encompasses about one-third of the perimeter of the associated gong and is located centrally about a point substantially opposite the point struck by the clapper. It is also desirable that the fundamental frequency emitted by the gong be substantially the frequency at which the associated chamber (51 or 52) is resonant. Under this condition, the reflector pocket collects and transmits sound to the associated resonator opening (39 or 40), whereupon that sound is greatly intensified by the action within the resonating chamber and the intensified sound is then delivered out of the reflector pocket to the general space surrounding the gongs. The volume of sound emitted during operation of the ringer is very much greater with the reflector-resonator combination disclosed than it is with either a reflector or with a resonator having no sound-pocketing reflector.

The actions of reflecting and resonating combine to aid each other. The reflector pocket tends to collect and return the in-phase sound waves emitted at one of the quadrants of the gong. The mouth of the resonating chamber, by being located at the "bottom" of the reflector, operates at the most intense point of sound within the reflector and thus the resonator is markedly more efficient than is one whose opening is not provided with already intensified sound waves. The sound waves reenforced by the resonant action of the resonating chamber are supplied into the reflector and are thereby caused to be returned from the reflector to the general area surrounding the gong, in phase with the directly reflected sound waves.

We claim:

1. A sound intensifier for use adjacent one side of a bell-shaped gong, said intensifier including an outer wall conforming generally to the contour of the adjacent side of said gong and located generally concentric with the axis of the gong, and an inner wall located between the gong and the outer wall and joined to the latter to form a chamber resonant to sound waves emitted by the gong, said inner wall having a sound-wave passage therethrough facing the gong and leading into the chamber.

2. A sound intensifier for use adjacent one side of a bell-shaped gong, said intensifier including an outer wall having a generally cylindrical side portion located generally concentric with the axis of the gong, said outer wall having end portions extending inwardly from the first-named portion toward said axis to completely encompass a side portion of the gong within the pocket formed by such wall, and an inner wall located between the gong and the first-named portion of the outer wall and joined to the outer wall to form a chamber resonant to sound waves emitted by the gong, said inner wall having a sound-wave passage therethrough facing the gong and leading into the chamber.

3. In a ringer, a bell-shaped gong and a strik-

er, a support, said gong being loosely and rockably mounted on said support for rotational adjustment about an axis eccentric with the axis of the gong, the gong having angularly spaced openings through the base thereof, and an adjustment-retaining pin fixed to said support and normally extending into any one of said openings to maintain the desired adjustment, the opening into which the pin extends depending

5 upon the rotational position of adjustment of the gong, said pin being sufficiently short that the gong clears the end of it when the gong is rocked about its said mounting pursuant to rotational adjustment to bring another opening into association with said pin.

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