W. KAISLING.

TELEPHONE CALL BELL OR RINGER.

APPLICATION FILED AUG. 10, 1906.

1,106,655. Patented Aug. 11, 1914.

Fig. 1

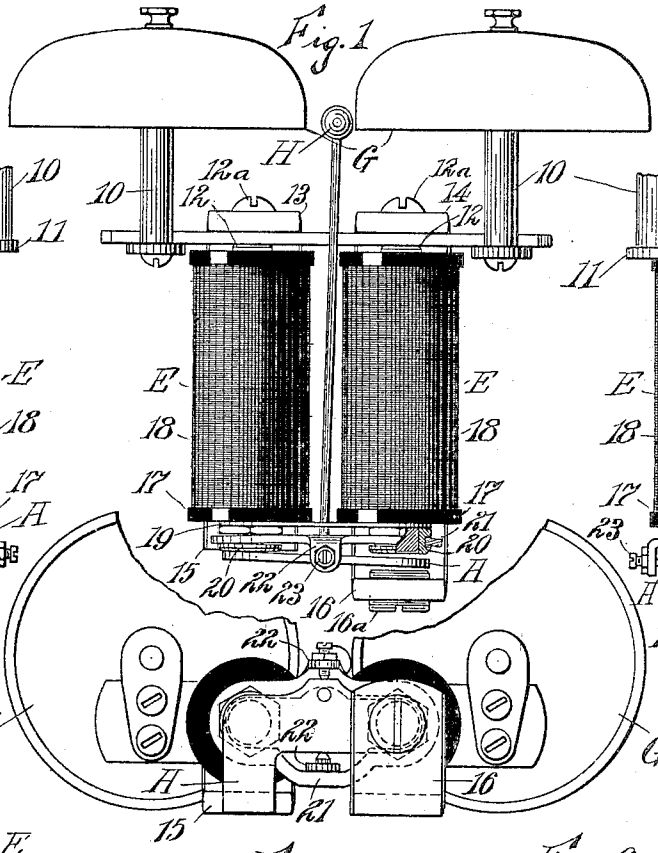


Fig. 2.

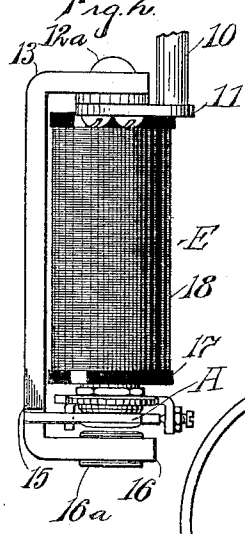


Fig. 3.

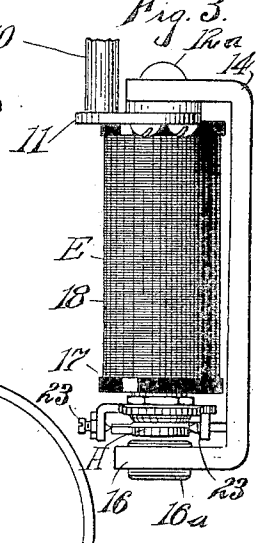


Fig. 4.

Fig. 5.

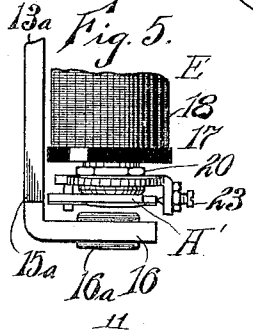


Fig. 6.

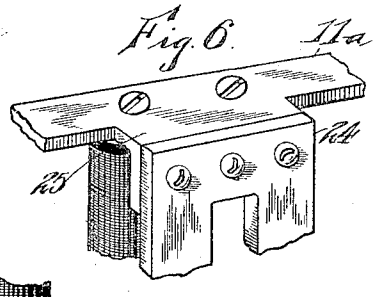


Fig. 7.

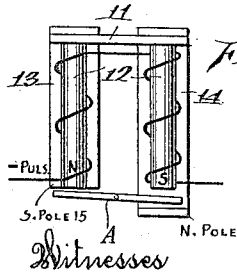
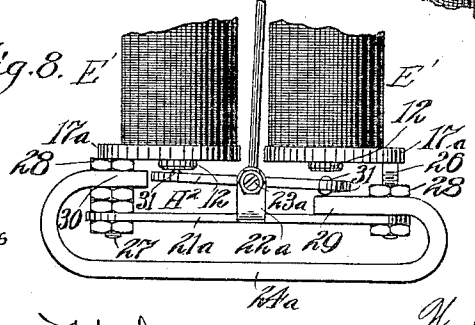


Fig. 8.



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TELEPHONE CALL-BELL OR RINGER.

1,106,655. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed August 10, 1906. Serial No. 330,033.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Telephone Call-Bells or Ringers, of which the following is a specification.

The present invention relates to biased bells or ringers of the type commonly employed in the telephone art.

Telephone ringers in common use consist usually of a pair of substantially parallel electromagnets projecting from a supporting frame carrying the gongs of the ringer and having their projecting cores joined by a yoke which, at an intermediate point, pivotally supports an armature which in turn carries the bell-hammer, while a permanent magnet secured to the frame and presenting a pole adjacent to the center of the armature is instrumental in polarizing the latter. In biasing such ringers, it has been the practice heretofore to employ a light spiral spring by which the armature and hammer are held in their biased position; but with such biasing means, constant trouble with a consequent loss of time and money is experienced because of the inconstancy of the tension springs and because of the tendency of troublemen to at once vary the tension of the biasing spring whenever attempting to overcome any trouble presumably associated with the ringer.

The object of the present invention is to provide some means for biasing a ringer of this type, which cannot be readily disturbed and which will be efficient in operation and simple in construction. To this end, I replace the spring of the prior art by magnetic means which acts upon the armature, or a part movable therewith, to yieldingly hold it in its biased position.

The character and advantages of the invention will be more fully understood upon reference to the following description taken in connection with the accompanying drawing, in which—

Figure 1 is a front elevation of one form of call-bell or ringer constructed in accordance with my invention; Fig. 2 is a side elevation of a portion of the same, viewed from the left; Fig. 3 is a similar elevation viewed from the right; Fig. 4 is a partial bottom plan view; Fig. 5 is a view similar to Fig. 2, illustrating a modified arrangement of the biasing magnet and the associated armature; Fig. 6 is a perspective view of a modification in which the previous polarizing and biasing magnets are united in a single member; and Fig. 7 illustrates a still further modification in which a single polarizing and biasing magnet lies distant from the magnetic circuit of the electromagnets of the ringer. Fig. 8 illustrates diagrammatically the poling of the permanent magnets, and the direction of the windings around the cores of the electromagnets.

Throughout these views, like characters refer to like parts.

The call-bell or ringer illustrated belongs in general to a well-known type and comprises electromagnets E, coöperating with an armature A to cause the hammer H, carried by the armature, to strike against the gongs G. These gongs are carried upon posts 10 projecting from a supporting plate 11, preferably of iron, to the under side of which the downwardly projecting iron magnet cores 12 are secured by screws 12^a, which also pass through the permanent magnets 13 and 14 at their upper ends. These magnets extend along the electromagnets and terminate near the lower ends of the cores 12 in poles 15 and 16, the pole 16 extending opposite the pole-face of one of the electromagnets and beneath one end of the armature A. This pole is preferably provided with an adjustable iron pole-piece 16^a, by which the air-gap between the permanent magnet 14 and the armature A may be varied.

The members 13 and 14 whether separate pieces as in the modification of Fig. 1, or as an integral member 24 as in Fig. 6, may be considered as a permanent magnetic structure having its poles presented to opposite ends of the armature. Thus this permanent magnet performs the biasing function heretofore performed by a light spring, as previously stated. That is, the effect of this permanent magnet is to always restore the armature to a definite normal bias. The magnet spools 17 are carried upon the cores 12 and receive the magnet windings 18. The cores 12 are preferably spaced at their lower ends by means of a strip 19 of brass or other suitable material, which is suitably apertured for the reception of the lower ends of the cores. The ends of the cores

projecting through this strip 19 are threaded for the reception of the supporting and adjusting nuts preferably of brass or like material, and each of these is provided with a peripheral groove which forms a bearing for one end of a supporting yoke 21. This yoke, which is also preferably composed of brass, is provided with downwardly projecting ears 22 carrying the pivot pins or screws 23 which form a pivotal support for the armature A. As clearly illustrated in Fig. 4, the yoke 21 has a large central opening into which the adjusting nuts 20 may be passed, and narrower extensions of said opening whose walls are adapted to project into the grooves on the nuts 20 when the parts are assembled. In assembling, the nuts are first placed in position in the yoke. This is done by passing each nut into the enlarged central opening in the yoke until the plane of its groove is co-incident with the yoke and then shifting the nut in said plane to its final engaging position at the end of the yoke. With the nuts thus positioned in the yoke and the yoke carried to the ends of the cores, the nuts may be readily screwed into place on the core ends, and the armature A, hammer H and the permanent magnets 13 and 14 afterward put in place. By the adjustment of the nuts 20, it will be observed that any desired adjustment of the hammer H may be obtained, and also any desired adjustment of the armature A with respect to the pole-pieces.

In Fig. 8 I have illustrated one form of poling the permanent magnets 13 and 14 and winding the cores 12 of the electromagnets whereby when negative pulsations are impressed upon the terminal of left hand core 12, armature A is vibrated. With the ringer constructed according to Fig. 8 the pole 15 of permanent magnet 13 is made a south pole, while the pole 16 of permanent magnet 14 is made a north pole. Then by impressing negative pulsations upon the terminal of left hand core 12 a north pole will be created at the lower end of the left core 12 as indicated by N and a south pole will be created at the lower end of right hand core 12 as indicated by S, and due to the strong north pole N of left core 12 tending to neutralize the action of north pole 16, and also due to the attraction of south pole S of right core 12, the direction of magnetic flow in the armature is reversed and it is moved responsive to each such pulsation.

In the normal position of the parts and without any current flowing through the electromagnet windings, the biasing magnet 13 will have the effect of holding the hammer in the position illustrated. At this time, if it be assumed that the polarizing magnet 14 presents a north pole 16, the biasing permanent magnet 13 will present a south pole 15 and the greater number of magnetic lines of force will thread through the armature A from the north pole 16 to the south pole 15 and adjacent core 12. The lines of force thus traversing the armature A tend to hold it in the position illustrated and to return it to such position whenever it is moved therefrom. If, now, current be passed through the windings of the electromagnets so as to present a north pole at the lower end of the right-hand core 12, and a south pole at the lower end of the left-hand core 12, there will be no movement of the armature A and the hammer H. On the other hand, if current be passed through the winding of the electromagnets tending to produce a stronger south pole at the lower end of the right-hand core 12, and a north pole at the lower end of the left-hand core 12, the right-hand end of the armature will be drawn upwardly and the hammer will strike against the left-hand gong. As soon as this current supply ceases, the normal effect of the lines of force threading between the poles 16 and 15 will be free to again restore the armature to the position illustrated. In this connection, it will be noted that the nuts 20, which are composed of brass or other non-magnetic material, extend slightly beyond the ends of the cores 12, as shown in Fig. 1, thereby preventing the armature from sticking to the pole-faces.

In the form of the invention heretofore described, the air-gap between the pole 15 of the biasing magnet and the adjacent portion of the armature A is variable, being dependent upon the position of the armature. In Fig. 5, I have illustrated a modification of the invention in which the air-gap between the pole 15^a of the biasing magnet 13^a and the adjacent portion of the armature A′ is substantially constant. This, as will be apparent from the figure, is accomplished by arranging the pole 15^a so that it will project past the edge of the armature instead of having the armature project below the end of the pole, as in the previous form of the invention. Likewise in some instances it may be desirable to follow the general outline of the preferred form of the invention and still combine the functions of the polarizing and biasing magnets in a single magnet. Such a modification is illustrated in Fig. 6, wherein the permanent magnet 24 is of horseshoe shape and is secured to a flange 25 formed on the supporting member 11^a which is similar to the member 11 of the preferred form and is adapted to be associated with the other parts of the ringer in the same way. In this form, the poles of the magnet are adapted to occupy the same relative positions as those of the magnets 13 and 14 in Fig. 1. In still other instances, it may be desirable for mechanical reasons, or in order to separate the permanent and tem-

porary magnetic circuits, to provide a structure in which the permanent magnet is located distant from the magnetic circuit of the temporary magnet cores. Such a structure is illustrated in Fig. 7 wherein the armature A^2 is carried by a yoke 21^a having the usual lugs 22^a and pivot pins 23^a. In this instance, the heads of the spools 17^a adjacent to the armature A^2 are preferably composed of brass or other suitable non-magnetic material and carry at their outer ends the threaded stems 26—27 which are adapted to pass through openings in the opposite ends of the yoke 21^a and through similar openings in the opposite ends of the permanent magnet 24^a. By means of nuts 28, the yoke and permanent magnet are held in position on the stems and the relative position of the parts may be adjusted. As clearly illustrated, one pole 29 of the permanent magnet 24^a extends beneath one end of the armature A^2, while the other pole 30 extends adjacent to the end of said armature. In this case, in order to prevent sticking, the contacting portions of the armatures are provided with brass or other non-magnetic projections 31 which are adapted to engage the cores 12 of the electromagnets E′. The operation of this modified ringer is substantially the same as that heretofore described in connection with the preferred form of the invention.

Obviously in carrying out my invention, the magnetic circuits may be variously arranged and many other alterations and modifications may be made in the structures herein shown and described without departing from the spirit and scope of my invention. I therefore do not wish to be limited to the specific disclosure, but aim to cover by the terms of the appended claims all such alterations and modifications. However, in the said claims I have used the term "biased" to define those bells or ringers which are responsive to current impulses of one direction only, whether positive or negative, in contradistinction to the term "polarized" which is commonly used to define bells and ringers which respond to alternating current.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A biased telephone bell or ringer comprising substantially parallel electromagnets, an armature pivoted at an intermediate point between the poles of said magnets, and biasing means comprising a permanent magnet having its poles presented to the opposite ends of said armature.

2. A biased telephone bell or ringer comprising substantially parallel electromagnets having projecting cores, a yoke uniting the projecting portions of said cores, an armature pivoted at a point intermediate of its length to an intermediate point of said yoke, and a permanent magnet having its poles presented to the opposite ends of said armature so as to bias the latter.

3. A biased telephone bell or ringer comprising substantially parallel electromagnets having projecting cores, a yoke uniting the projecting portions of said cores, an armature pivoted at a point intermediate of its length to an intermediate point of said yoke, and a permanent magnet having one pole lying opposite the pole-face of one of said electromagnets so as to leave a space for one end of said armature and having its other pole lying adjacent to the other end of said armature.

4. A ringer comprising a pair of magnet cores, a rocking armature having its axis between the ends of said cores and disposed to be magnetically controlled thereby, and biasing means including permanent magnet means imparting a preponderating normal attractive stress to said armature always at the same side of its axis.

5. A ringer comprising a pair of magnet cores, a vibratory armature supported at an intermediate point in its length and having two free ends extending from its support, one to the end of each of said cores, permanent magnet means imparting a preponderating normal stress always to the same free end of said armature whereby said ringer has a definite normal bias, and energizing coils for said cores for rocking said armature.

6. A biased telephone bell or ringer comprising substantially parallel electromagnets, an armature pivoted at an intermediate point between the poles of said magnets, and biasing means for said armature comprising a permanent magnetic structure having its poles presented to the opposite ends of said armature.

In witness whereof, I hereunto subscribe my name this 7th day of August, 1906.

WILLIAM KAISLING.

Witnesses:
L. D. KELLOGG,
H. C. OLMSTEAD.