C. H. NORTH.

ELECTRIC BELL.

APPLICATION FILED APR. 22, 1905.

902,105.

Patented Oct. 27, 1908.

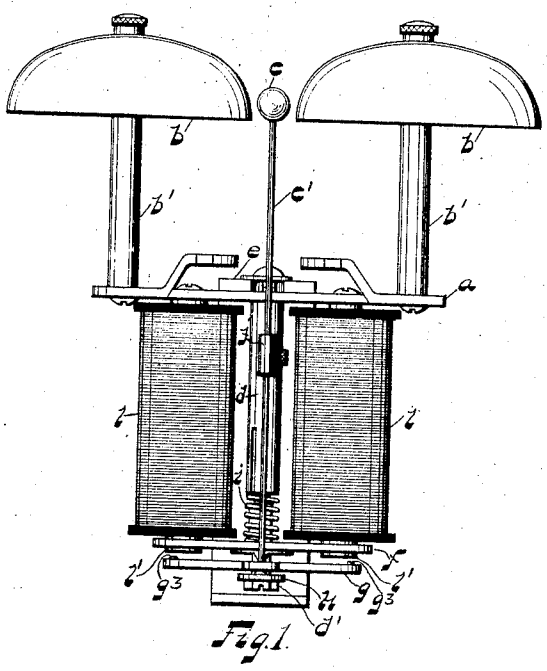


Fig. 1.

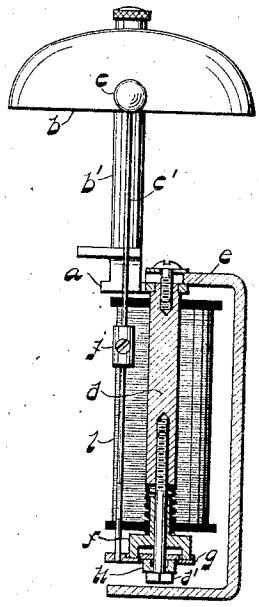


Fig. 2.

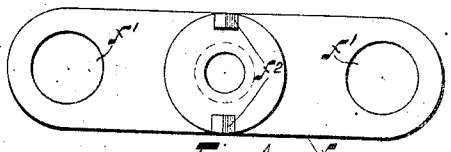


Fig. 4.

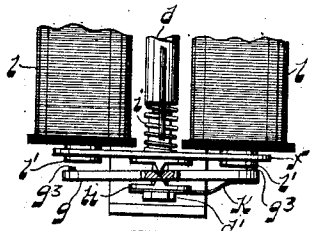


Fig. 3.

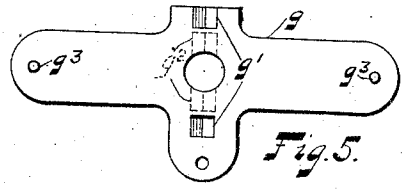


Fig. 5.

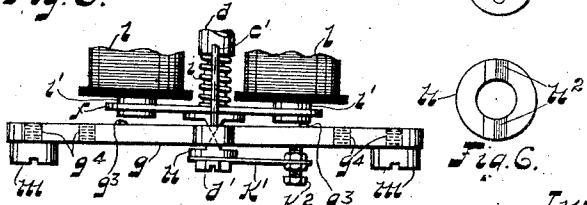


Fig. 7.

Fig. 6.

Witnesses:

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UNITED STATES PATENT OFFICE.

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ELECTRIC BELL.

No. 902,105. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed April 22, 1905. Serial No. 256,826.

To all whom it may concern:

Be it known that I, CHARLES H. NORTH, a citizen of the United States of America, and a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Electric Bells, of which the following is a specification.

My invention relates to improvements in electric bells, although some of the features thereof are not necessarily limited to this particular use.

In perfecting my invention, it has been my object to provide apparatus of extremely simple and cheap construction, and particularly adapted to meet the requirements of commercial use.

More in detail, it has been my aim to effect improvements in the mounting of the armature and associated bell-tapper or other parts, whereby the pivotal mountings of prior bells are avoided, and the device is made more sensitive in the response to suitable ringing currents.

In addition, certain features of its construction, render my improved bell one that is readily altered to serve as a biased ringer, and it may be adjusted to become responsive to selective signaling currents having given characteristics or periods.

My improvements will be seen to comprise the mounting of the armature directly upon scale-bearings, or preferably, upon sets of scale-bearings opposed by spring-actuated means, the same being accurately adjusted, to avoid any lost motion and minimize the friction. It has been common experience in the art that pivotally-mounted armature-parts do not present such advantages, and it has been my aim to overcome the inherent disadvantages found in such structures, and improve otherwise thereon.

The features of my improvements will be more readily grasped, by making reference to the accompanying sheet of drawings, illustrating in detail an electric bell mechanism constructed in accordance with my invention, wherein;—

Figure 1 is a view in elevation of the said bell. Fig. 2 is a vertical sectional view through the center thereof. Fig. 3 is a detail of the lower portion, partially broken away and sectioned, better to illustrate the bearing, and showing as well a biasing spring. Fig. 4 is a plan view of the supporting-yoke and bearing. Fig. 5 is a similar view of the armature; and, Fig. 6 shows the co-acting portion of the scale-bearing; the last three figures being drawn upon an enlarged scale. Fig. 7 is another detail showing some modifications of my improved construction.

Throughout these figures of the drawings, I have employed the same character of reference to indicate similar parts, in order to avoid any misconception or confusion.

An upper mounting-plate or frame *a* serves to carry the several parts of the structure. From this, uprights or posts *b'* support the bells or gongs *b*, in position to be sounded by the intermediately-positioned bell-tapper *c*, under the influence of exciting electro-magnets. To the upper end of the central depending post *d*, is secured the permanent polarizing magnet *e*, which surrounds the operative parts of the bell, as best shown in Fig. 2. The lower portion of said post *d* adjustably supports the yoke *f*, the armature *g*, and the outer scale-bearing *h*. The adjustment is obtained by means of the screw *d'*, which enters said post, and forces these parts together against the tension of an interiorly-positioned coiled spring *i*. Upon the armature is carried the said bell-tapper *c*, mounted by means of its stem *c'* on a laterally-projecting portion of the armature. An adjustable weight *j* is positioned upon the stem *c'*, being secured in place by a small screw. This weight may be used for adapting the bell to the purpose of selective signaling, to increase the impact of the bell-tapper, or it may be omitted altogether.

Beneath the head of the screw *d'*, I may secure a spring *k*, bearing upon one side or the other of the oscillating armature, and thereby provide the simple means shown in Fig. 3 for giving bias to the bell. This flat spring *k* may be swung beneath the screw head, so as to bear upon either end of the armature, and adjust the bias thereof to either side, thus avoiding any change or crossing of the connections after the bell is installed. In Fig. 7, I have shown a modified biasing-spring *k'*, which is provided with an adjusting-screw k^2, adapted to vary the tension of said spring as required.

In addition, there are shown further modified features in that the armature itself is

employed to secure selective actuation. Said armature is made much larger and heavier, and is tapped at g^4 to receive weights m, which may be adjusted in different positions along its length. This bell is adapted for use with heavy signaling currents, and some of its parts, including the spring i, are made heavier to adapt the bell thereto.

It will be understood that the weights j and m may be made heavier or lighter to suit given conditions, and may be used together or alternat vely, as desired.

Each of the figures of the drawings illustrates some features of the improved support or mounting for the bell-armature, which I will refer to a little more in detail. The armature g is provided with off-set V-shaped recesses g' g^2 in its upper and lower faces, which are in exact alinement. The usual pins g^3 are inserted in its extremities for overcoming the tendency to stick to the magnet poles. The yoke f affords two openings f', which slip loosely over the poles l' of the electro-magnets l; said yoke being provided midway with two acute-angled or V-shaped bearing-points f^2. Similar bearing-points h^2 are provided upon the outer scale-bearing h. These bearing-points respectively register with the recesses provided in the armature, and mount the latter in an extremely sensitive manner before the opposing poles of the electro-magnet, and within the field of the permanent magnet, so that the armature may be oscillated under the influence of a minimum current.

The screw d' opposing the force of the coiled spring i, operatively and adjustably secures these parts together in a manner avoiding any lost motion, and at the same time preventing the loosening of the armature. Moreover, the scale-bearings are held firmly in alinement by the spring, and the bell-tapper is thus afforded a rigid, yet easily actuated mounting, wherein to oscillate under the influence of the energized electro-magnets. Other means, however, may be employed instead of the spring, for holding the bearings securely in alinement and in close engagement with the armature.

The structure described will be found very advantageous, used either with the biasing spring, with the adjustable weight, or with these parts altogether omitted; depending upon the character of the circuit and ringing current employed in conjunction therewith. It will be appreciated from a consideration of the foregoing, that the improved mounting for the armature set forth, is one permitting the freest play or oscillation thereof in any bell or similar electro-magnetic appliance.

Having now described the preferred embodiment of my invention, and the construction and operation thereof, I claim as new, and desire to secure by Letters Patent, together with such modifications as may be made by mere skill, the following:—

1. In an electro-magnetic appliance, the combination with the electro-magnet thereof, of an oscillating armature positioned to be actuated thereby, co-acting scale-bearings therefor, a spring and opposing means acting upon the armature at its point of engagement with said scale-bearings for retaining said parts in operative relation to each other, substantially as set forth.

2. In an electro-magnetic appliance, the combination with the electro-magnet thereof, of an oscillating armature positioned before its poles, scale-bearing parts engaging the outer and inner faces of said armature, an adjusting screw, and an opposing spring maintaining said parts in operative relation, substantially as set forth.

3. In an electro-magnetic bell, the combination with the actuating electro-magnet, of an armature mounting the bell-tapper, a mounting for the armature avoiding lost motion and permitting its free oscillation under the impulse of the electro-magnet, and an adjustable weight slidably mounted upon the bell-tapper for adapting the bell to selective actuation by predetermined currents, substantially as set forth.

4. In an electric bell of the class described, the combination with its electro-magnet, of an armature positioned before the pole pieces thereof and carrying the bell-tapper, and a mounting for said armature comprising inner and outer scale-bearings engaging the armature, and a spring for retaining the parts in close engagement and avoiding lost motion, substantially as set forth.

5. In an electric bell of the class described, the combination with the actuating electro-magnet, of an oscillating armature positioned before its pole-pieces, a bell-tapper carried by the armature, inner and outer scale-bearings, and a spring and opposing adjusting-screw for maintaining the armature and its bearing-parts in close engagement, substantially as set forth.

6. The combination in a selectively-actuated electric-bell, with the electro-magnet traversed by the selective signaling current, an armature, a bell-tapper carried thereby, an adjustable weight associated with the bell-tapper, and a rigid oscillating-mounting for the armature, comprising inner and outer scale-bearings, an adjusting-screw and an opposing spring maintaining the parts in close engagement, substantially as set forth.

7. The combination in a selectively-actuated electric-bell, with the electro-magnet traversed by selective signaling currents, of a relatively heavy armature, a bell-tapper carried thereby, an adjustable weight associated therewith and also carried upon the armature, and elevated scale-bearing parts and opposing means for mounting the armature

before the electro-magnet to be actuated thereby, substantially as set forth.

8. In an electro-magnetic appliance, the combination with electro-magnets, of an armature mounted before the same, and a bearing for said armature, comprising outer and inner alined scale-bearing parts permitting the free oscillation of the armature before the poles of the magnet, while holding it firmly in place, substantially as set forth.

9. In a biased electro-magnetic appliance, the combination with the electro-magnet thereof, of an oscillating armature positioned before its poles, scale-bearing parts engaging the outer and inner faces of said armature, a biasing spring adapted to be brought into engagement with either end of said armature, and means for securing said parts in close operative engagement, substantially as set forth.

10. In a selectively-actuated signaling bell, the combination with its actuating electro-magnet, of a relatively heavy armature positioned before the same, a bell-tapper carried thereby, adjustable weights adapted to be secured along the armature, and scale-bearing parts engaging the outer and inner faces of said armature to permit its free oscillation before the electro-magnet, substantially as set forth.

11. In an electro-magnetic appliance, the combination with the actuating electro-magnet, of a vibrating armature positioned before said electro-magnet, scale-bearing parts engaging the inner and outer faces of said armature, and means for retaining the scale-bearings and armature closely in engagement and alinement, substantially as set forth.

12. In an electro-magnetic appliance of the class described, the combination with the actuating electro-magnet thereof, of an oscillating armature positioned before its poles and centrally grooved or recessed, outer and inner scale-bearing parts engaging the recessed armature, and means for maintaining the armature and scale-bearings closely in engagement and in proper alinement, substantially as set forth.

13. In an electro-magnetic appliance, the combination with the double-pole electro-magnet thereof, of an oscillating armature positioned before its poles, a scale-bearing for the armature, and a spring-mounting engaging said armature centrally to hold it securely in position, but permitting its free oscillation, substantially as set forth.

14. In an electric bell adapted for alternating currents, the combination with its electro-magnet, of an armature positioned before the poles thereof, and carrying a bell-tapper, and a mounting for said armature, provided with scale-bearing parts, engaging said armature upon one of its faces at distant points approximating its full width and bearing upon the other face as well, for holding the armature securely in position, substantially as set forth.

15. In an electric bell of the class described, the combination with the actuating electro-magnet, of an oscillating armature positioned before its pole-pieces, a bell-tapper carried by the armature, inner and outer alined scale-bearings engaging said armature upon one or the other of its faces substantially throughout its entire width, and means for maintaining said armature and its bearing-parts in close engagement, substantially as set forth.

Signed at Cleveland, this 20th day of April, A. D. 1905, in the presence of two subscribing witnesses.

CHARLES H. NORTH.

Witnesses:

CLARE P. JOHNSON,

ALBERT LYNN LAWRENCE.