(No Model.)

F. W. MANGER & O. H. HUEBEL.

ELECTRIC BELL.

No. 494,278. Patented Mar. 28, 1893.

FIG. 1.

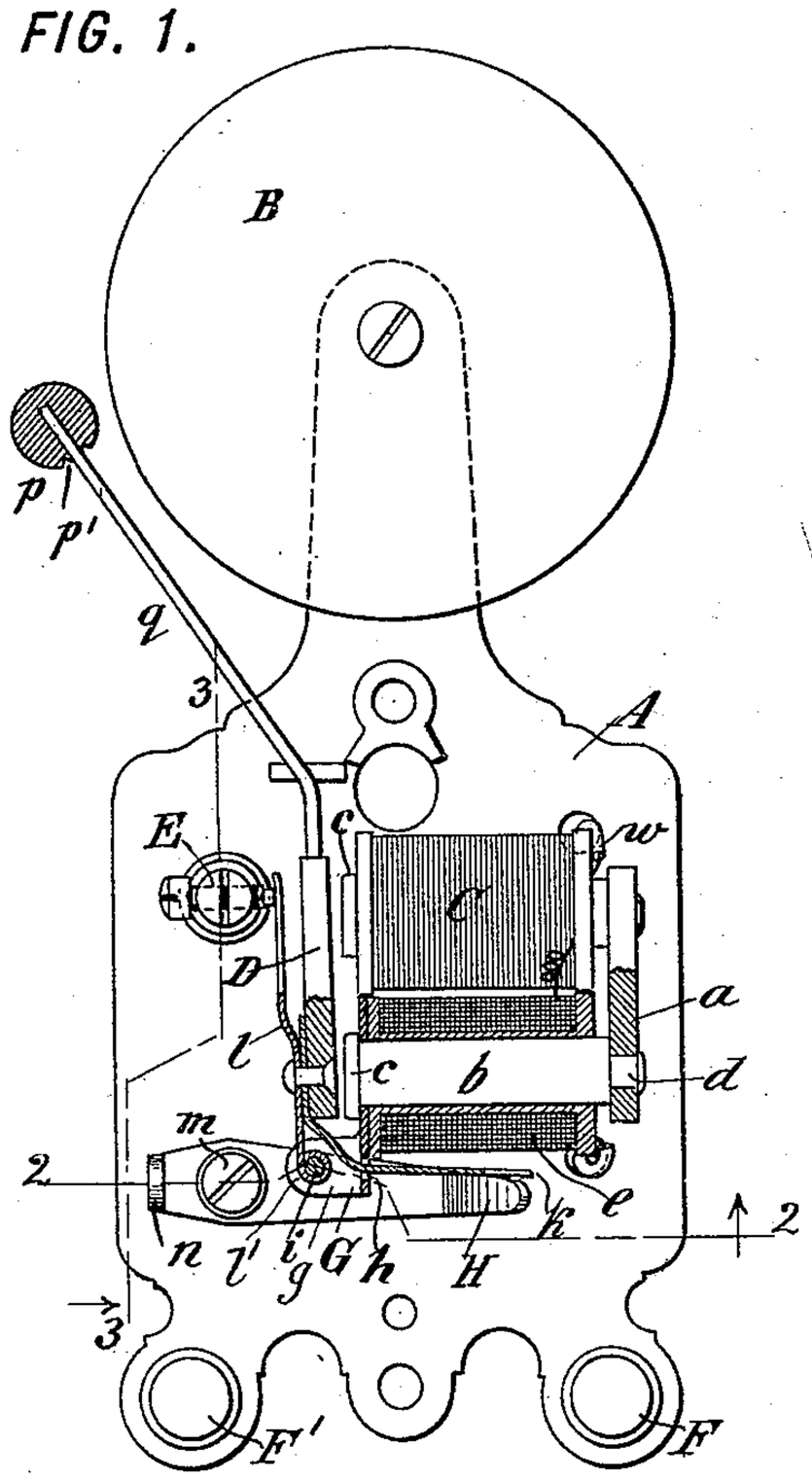


FIG. 4.

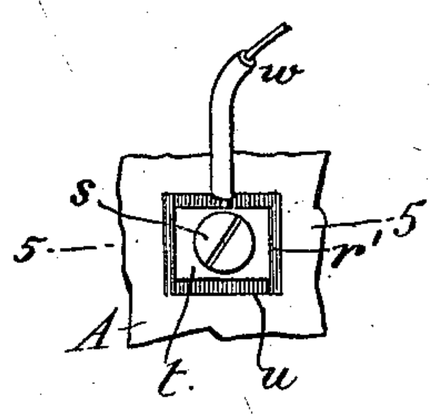


FIG. 3.

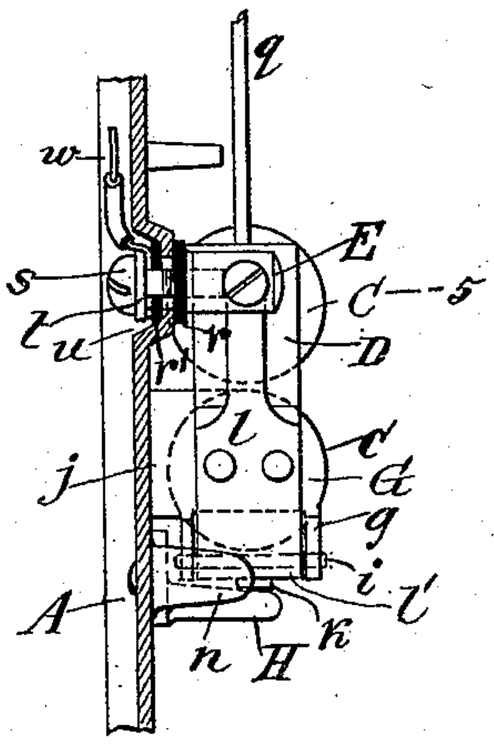


FIG. 5.

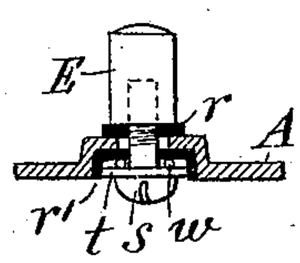


FIG. 2.

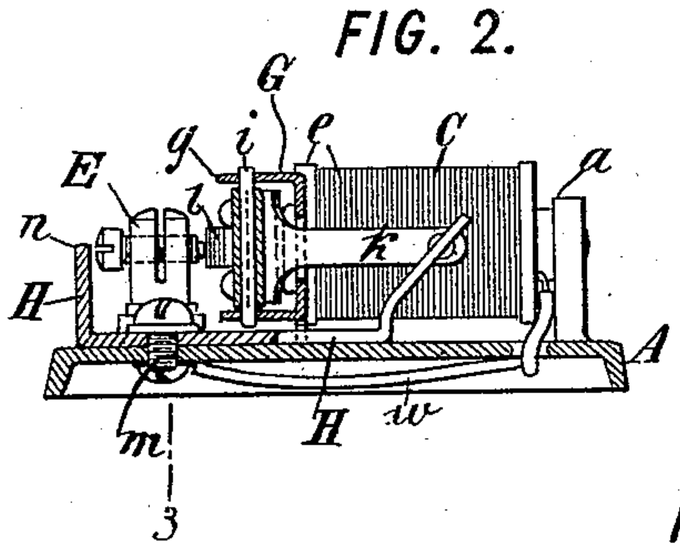


FIG. 6.

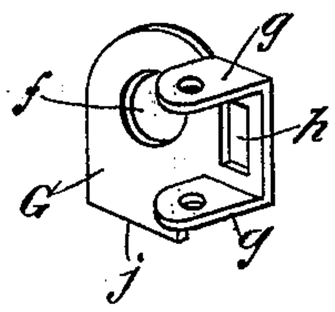


FIG. 8

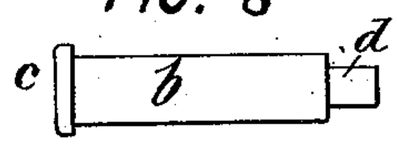
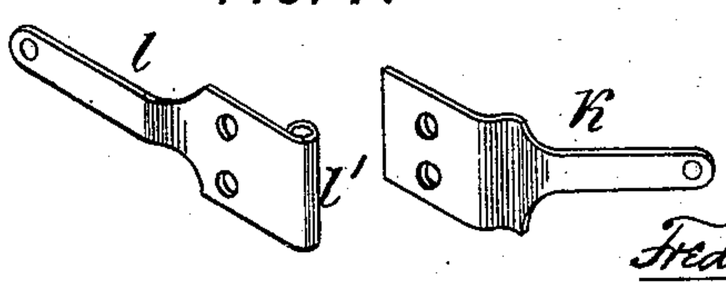


FIG. 7.



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UNITED STATES PATENT OFFICE.

FREDERICK W. MANGER AND OTTO H. HUEBEL, OF BROOKLYN, NEW YORK.

ELECTRIC BELL.

SPECIFICATION forming part of Letters Patent No. 494,278, dated March 28, 1893.

Application filed June 8, 1892. Serial No. 436,016. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK W. MANGER and OTTO H. HUEBEL, both citizens of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Bells, of which the following is a specification.

This invention provides certain improvements applicable to rheotomic electric bells and other analogous electric instruments.

The improvements relate to the construction of the electro-magnet cores, the mounting or pivoting of the vibrating lever, the adjustment of the tension of the retracting spring, the construction of the hammer, and the means for making the electric terminal connections.

Figure 1 of the accompanying drawings is a front elevation of an electric bell constructed according to our invention with the inclosing box or case removed. Fig. 2 is a horizontal section cut on the line 2—2 in Fig. 1. Fig. 3 is a side view partly in vertical section cut on the line 3—3 in Fig. 1. Fig. 4 is a fragmentary rear view showing the contact post fastening. Fig. 5 is a horizontal section thereof on the line 5—5 in Figs. 3 and 4. Fig. 6 is a perspective view of one of the details. Fig. 7 is a perspective of the contact and retracting springs respectively. Fig. 8 shows one of the magnet cores before being applied.

Let A designate the base-plate, which may be of cast iron as usual, B the bell, C the electro-magnet, D the armature thereof, E the contact post, and F F′ the binding posts.

The base-plate A is constructed with a raised portion or wall *a* as usual, to which the cores of the magnet are fastened. These cores, lettered *b*, are each formed with a polar end or head *c* of larger diameter, and at the opposite end with a neck *d* of smaller diameter, as shown in Fig. 8, the latter passing through a hole drilled in the wall *a*, and being riveted down thereto as shown in the sectional part of Fig. 1. The two cores are thus rigidly united to the wall *a*, which serves as the yoke of the magnet. The enlarged head *c* serves to strengthen the attractive force of the magnet by affording an extended surface in proximity to the armature D. It also serves to retain the magnet spool *e* in place. The magnet spools are wound and applied to the cores before the latter are connected to the flange *a*, instead of being afterward applied as has heretofore been usual.

Our invention provides a novel pivotal mounting for the vibratory armature. On one of the cores *b* is mounted a bracket piece G, shown detached in Fig. 6. This piece is preferably made of sheet metal by stamping it out with a hole *f* for the core, and with bent up ears *g g* having perforations for the pivot pin *i* (Fig. 2). The bracket piece is also provided with an opening *h*, which may be a closed slot as shown, or an open notch. The edge *j* of the bracket piece extends backward far enough to come against the flat face of the plate A, so that when the bracket piece is in place on the core its rotative displacement is prevented. In putting the magnet together, the bracket piece is first applied to the core and the wound spool is next applied thereto, so that when the core is riveted in place, the bracket piece shall be firmly held between the head and spool, and with its edge or foot *j* resting against the face of the base-plate. Thus the bracket-piece is held firmly in position. The armature D has two springs *k* and *l* riveted or otherwise fastened to it. Both these springs are made as leaf-springs by being struck up from elastic sheet metal. They are preferably of the shape shown in Fig. 7. The spring *k* constitutes the retracting spring for the armature, while the spring *l* constitutes the pivot for the armature and also the contact spring. The pivotal end of the spring *l* is coiled or rolled to form an eye, as shown at *l′*, and the pivot pin *i* is passed through this eye and the perforated ears *g g* of the bracket piece in the manner clearly shown in Fig. 2, thus forming a hinge joint constituting a pivotal mounting for the armature, as shown in Fig. 1. The opposite or elastic end of the tongue or spring *l* is extended along the armature in the position usual in electric bells in order to make and break contact with the contact screw carried by the contact post E.

Our invention provides improved means for adjusting electric bells, whereby this can be done from the face. The retracting spring *k* projects past the hinge connection, and preferably in the direction shown in Fig. 1, passing through the opening *h* in the bracket

piece. The free end of this spring bears against a movable adjusting piece H consisting of a metal plate mounted flat against the face of the base-plate, and fastened frictionally thereto by means of a pivot screw *m*. The plate H has an extended surface in frictional contact with the face of the base-plate, one end or tail being turned upwardly in order to bear against the end of the retracting spring *k*, while the other end is preferably also turned upwardly at *n*. The frictional attachment of this plate H is so firm that the tension of the spring *k* against it cannot displace it, while yet its position may be adjusted in order to vary the tension of the spring *k* by turning the plate H by hand. The plate H is easily turned by grasping its upturned ends and moving it rotatively in one direction or the other to bring its tail to bear more or less against the retracting spring, and thereby impart to the latter more or less tension. This adjusting device is quicker and easier of adjustment than an adjusting screw mounted on a screw post in the usual manner, and has the advantage of not requiring any set-nut or other such part to fasten in position, since when adjusted it will remain by reason of its friction in the position to which it is set.

The bell hammer *p* is carried on the end of an elastic arm *q* mounted on the armature D, so as to be vibrated thereby in the usual manner. Ordinarily the hammer head is soldered on this arm, or is simply forced onto it. The former method is expensive and troublesome, and the latter is unreliable, since the head is likely to come off. According to our invention we fasten the head on the arm or wire by swaging it. The head being made of soft brass and drilled with a hole loosely fitting the end of the wire, the latter is inserted in the hole and the head is then indented, as shown at *p'*, forming an annular groove around the wire, whereby the metal of the head is swaged or forced tightly against the wire making an extremely firm connection therewith. This swaging is done with a single blow of a suitably shaped tubular tool which is slipped over the wire, the operation being performed before the opposite end of the wire is attached to the armature.

In the construction of electric bells and similar instruments where binding or contact posts are employed such as the posts E and F, difficulty is often experienced by reason of the liability to twist off the connecting wire by which the current is carried to or from the post, during the act of tightening the screw by which the connection is made. This screw is usually the screw which also fastens the post in place against the base-plate. For example, referring to Fig. 3, where the connection of the contact post E is shown in section, it is seen that this post is insulated by washers *r r'* from the base-plate, and is fastened by a screw *s* applied from the rear. The connecting wire *w* is at its end formed into an eye coiled around the screw underneath the washer *t*. In the ordinary construction this washer is made circular, as are also the insulated washers *r r'*. In screwing up the screw *s*, the connecting wire *w* being held between the washers *t* and *r'* is liable to be pulled and torn or cut by the rotation of the washer *t*, which tends to turn with the screw by reason of the frictional contact. This difficulty is liable to occur not only in the original putting together of the instrument, but also subsequently in case by reason of the shrinkage of the insulating washers it should be necessary to again tighten the fastening screw. To overcome this difficulty our invention provides in lieu of the ordinary round washers *t* and *r'*, square washers seated in a square recess, so that the rotation of the washer *t* with the fastening screw is prevented. To this end, the plate A is made with a square recess *u* in its rear side, the washer *t* is made square, as shown in Fig. 4, and the washer *r'* is also made square and sufficiently large to be turned up at its ends or opposite edges and confined between the square or angular opposite sides of the washer *t* and the sides of the recess. It follows from this construction that the turning of the screw *s* does not turn the washer *t*, which is held firmly in position by reason of its opposite straight sides being confined within the square recess through the intervention of the turned up edges of the insulating washer. While a square washer and square recess are preferable, yet it will be understood that other shapes affording similar or equivalent opposite angular surfaces capable of such engagement as to prevent rotation may be employed instead. This construction is equally applicable to the contact post and to the insulated binding post F.

We claim as our invention the following defined novel features, substantially as hereinbefore specified, namely:

1. An electro-magnet having its core formed with an enlarged head, combined with a bracket piece confined between said head and the spool of the magnet, and serving as a support for the armature.

2. The combination with a base-plate A, electro-magnet C fixed thereto, and its armature D, of a bracket piece G for supporting the armature formed with an opening *f* embracing one of the magnet cores, and with a foot *j* resting against the base-plate.

3. An electro-magnet having an enlarged head on one of its cores, combined with a bracket piece G applied on said core and confined between said head and the spool of the magnet, and formed with projecting ears adapted to support the armature.

4. The combination of an electro-magnet C having an enlarged head on one of its cores, a bracket-piece G applied on said core and confined between its head and the spool of the magnet, formed with perforated ears *g g*, armature D having a metal plate fastened to it, and rolled at *l'* to form an eye, and a pin-

tle *i* passing through said perforated ears and eye to form a hinge connection for the armature.

5. The combination with an electro-magnet and its armature, of a retracting spring consisting of a leaf fastened to and projecting from the armature, combined with a movable adjusting piece against which said spring bears, frictionally attached to the base-plate and movable thereon at will to vary the tension of the retracting spring.

6. The combination with an electro-magnet and armature and its retracting spring *k*, of an adjusting piece H in frictional contact with the base-plate, and a fastening screw *m* for attaching it thereto, whereby said plate H may be displaced around said screw as a pivot to vary the adjustment of said retracting spring.

7. The combination with an electro-magnet and a retracting spring for its armature, of an adjusting piece H consisting of a metal plate pivotally connected to the base-plate and held frictionally thereagainst, and having its opposite ends turned up to facilitate its displacement to adjust the tension of said spring.

8. In an electric bell or analogous electric instrument, the combination with the base-plate of an insulated post or standard and a fastening therefor consisting of a fastening screw passing through the base-plate and engaging the post, an angular metal washer under the head of said screw, and an angular recess in the base-plate engaging opposite sides of said angular washer through the medium of an insulating washer, whereby the turning of said metal washer as the screw is tightened is prevented.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

FREDERICK W. MANGER.
OTTO H. HUEBEL.

Witnesses:
GEORGE H. FRASER,
CHARLES K. FRASER.