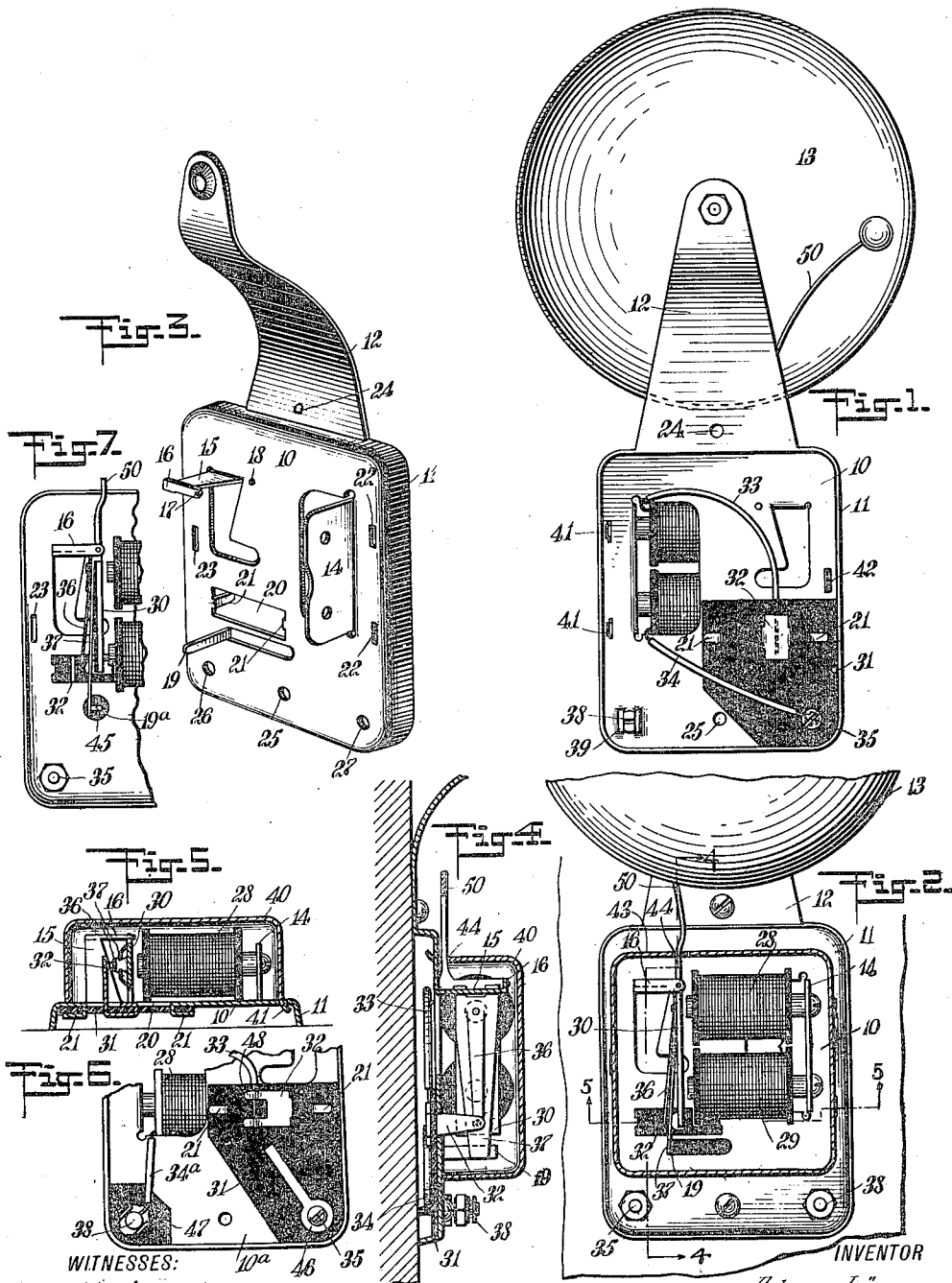


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ELECTRIC BELL.
APPLICATION FILED DEC. 4, 1909.

1,052,354.

Patented Feb. 4, 1913.



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ELECTRIC BELL.

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Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed December 4, 1909. Serial No. 531,323.

To all whom it may concern:

Be it known that I, ADAM LÜNGEN, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county and State of New York, have invented a new and Improved Electric Bell, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in electric bells of the type in which the hammer is vibrated by the vibration of the armature of an electromagnet. In certain bells of this kind, it is common to provide a cover or casing to protect and conceal the operating parts which vibrate the hammer, and one object of my invention is to so construct these parts in respect to the cover that the cover will more effectively exclude dust, dirt and insects from said parts. By pivoting the hammer at a point closely adjacent the side wall of the casing through which said hammer extends, the opening in the wall may be made only very slightly larger than the hammer, as the hammer will move an almost negligible distance at this point during its oscillation.

A further object of the invention is to facilitate the assembling of the parts of the bell, by forming the body and the supports for all of the operating parts, from a single piece of sheet metal. The base is formed with various extensions integral therewith and accurately formed by dies, so that they constitute supports for all of the working parts. In assembling the bell, it is unnecessary to perform delicate adjustments by hand or exercise care in the positioning of the parts, as the positions of the supports are accurately and automatically determined by the dies used in stamping out the base.

A further object of my invention is to simplify the armature-retaining spring and circuit-breaking device, by forming both of these members as springs secured to the armature adjacent the pivotal point of the latter, and contacting at their free ends with stops insulated from each other and extending up from the base. The two springs may be made of a single piece of metal secured in place by a single operation, and at a single point.

The invention involves various other features of construction, all of which will be set forth more fully hereinafter and pointed out particularly in the claim.

It is of course understood that the two specific forms illustrated and described in detail, are merely two embodiments which my invention may assume, and that various changes may be made in the construction and arrangement of the parts without departing from the spirit of my invention.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a rear view of a bell constructed in accordance with my invention; Fig. 2 is a front view, the casing being shown in section; Fig. 3 is a perspective view of the base and the parts formed integral therewith; Fig. 4 is a longitudinal section on the line 4—4 of Fig. 2; Fig. 5 is a transverse section on the line 5—5 of Fig. 2; Fig. 6 is a rear view similar to a portion of Fig. 1, but showing a bell having the circuit insulated from the base; and Fig. 7 is a front view of a portion of the bell shown in Fig. 6, the parts not shown being similar to the corresponding parts employed in the form illustrated in Figs. 1 to 5, inclusive.

In the bell illustrated in Figs. 1 to 5, inclusive, I employ a base 10, formed of sheet metal and having the supports for the various operating parts of the bell formed integral with said base. About the periphery of the base is a supporting flange 11, for holding the body portion of the base out of engagement with the supporting wall, the flange being unbroken throughout its length, so that when the base is placed against a wall, no dust, dirt or foreign bodies can gain access to the space behind the base. At one edge of the flange there is a tongue 12 having the portion adjacent the flange lying in the plane of the edge of the flange, so as to contact with the supporting surface or wall, and having the outer or free end of the tongue bent upwardly and outwardly from said plane as illustrated particularly in Fig. 3. The free end of the tongue is formed in any suitable manner to adapt it to support a gong 13, so that the free edge of the gong will come adjacent to but spaced from the edge of the base.

The body of the base adjacent one edge thereof is provided with a U-shaped slot which defines a tongue or flange 14, struck up, so as to stand at right angles to the plane

of the base, and parallel to one side thereof to constitute a support for the electromagnets. Adjacent the opposite side another slot is formed to define a tongue or flange 15, struck up to stand at right angles to the plane of the base and in a plane at right angles to the plane of the flange 14. This flange 15 has a terminal flange 16, bent to lie parallel to the base 10 and having one end extending out beyond the edge of the flange 15. This terminal portion of the flange 16 is provided with an opening 17, and the base is provided with a similar opening 18 adjacent one edge of the base of the flange 15. The two openings 17 and 18 are in axial alinement, and a line through the two openings is at substantially right angles to the plane of the base, and they constitute a bearing for the armature and hammer hereinafter referred to.

At another point on the base and adjacent the side opposite to the tongue 12, a tongue or flange 19 is struck up at right angles from the base to constitute a stop for the armature-retaining spring. Intermediate the flanges 15 and 19, the base is provided with an opening 20 formed with tongues 21 adjacent each end thereof. These tongues are bent downwardly from the base rather than upwardly, as are the other tongues, and they serve to hold in place a strip or plate of insulating material. Adjacent one side of the base, there are provided two slots or openings 22, and at the opposite side there is a slot or opening 23, by means of which the cover or casing is secured in place. The base portion of the tongue 12 is provided with an opening 24, and the base 10 adjacent the side thereof opposite to said tongue is provided with an opening 25, through which suitable screws may extend to fasten the bell to the supporting wall. At the lower corners of the base, there are suitable openings 26 and 27, within which are secured the two binding posts of the bell.

The base with all of its tongues, flanges, supports and openings, is formed from a single piece of sheet metal, and is preferably formed by the use of suitable dies in a stamping and forming press. In this manner, all of the parts will be positioned with absolute accuracy, and in attaching the operating devices to the base no particular care need be employed, as the several operating parts must come in proper position in respect to each other, as the supporting flanges of the base are comparatively immovable in respect to each other.

To the flange 14, I secure two electromagnets 28 and 29, so as to lie with their cores at right angles to the base. Each magnet is secured in place by a single screw extending through an opening formed in the flange 14. An armature 30 is provided with op-

positely-disposed trunnions or pivot pins which extend into the openings 17 and 18 and pivotally hold the armature adjacent to but spaced from the free ends of the magnet cores. The armature is formed integral with or rigidly secured to an arm 50 of the hammer, the head of which is disposed in operative relationship to the bell. As illustrated, the hammer is within the bell, although it is of course evident that the hammer may be placed outside if desired.

In engagement with the rear side of the base at one corner thereof, there is provided a sheet or plate of insulating material 31, held in place by the two tongues 21, which extend through the sheet of insulating material and are folded back into engagement with the under surface of the latter. The sheet 31 covers the opening 20 and serves to support the stop of the vibrator or circuit breaker. This stop is in the form of a middle tongue 32 extending through the sheet and upwardly therefrom substantially at right angles to the plate and through the opening 20. On the under side of the sheet, the stop is bent to lie along said under side and its opposite side is bent upwardly through a second opening in the sheet 31 and clenched into engagement with the upper surface again. This is most clearly shown in Fig. 5. The stop is thus supported entirely by the sheet and is insulated thereby and is substantially parallel to and adjacent the upwardly-extending tongue or stop 19. The operation of the stop 32 which is on the under side of the sheet 31, serves to firmly bind into engagement with the latter, the free and uninsulated end of a wire 33, so that the simple stamping operation of attaching the stop to the sheet, also serves to attach the wire to said stop. The free end of the wire 33 leads to one of the two coils which are wound in series, and the terminal of the other coil is connected by a wire 34 to a binding post 35, which extends through the sheet 31 and the opening 27, and is insulated from the base.

For controlling the movement of the armature and for making and breaking the circuit, I provide two springs 36 and 37. These two springs are formed from a single piece of metal secured to the armature by a single rivet adjacent the pivotal support of the armature. The spring 37 extends outwardly beyond the spring 36, and the last-mentioned spring is preferably formed as a tongue struck up from the center portion of the spring 37 and separated therefrom by two substantially parallel slits connected together at the end opposite to the pivot. The two springs extend between the two stops 32 and 19, and when the coil is deenergized and the parts are in the normal position, the spring 37 presses against one side of the stop 19, and the spring

36 presses against the opposed side of the stop 32. As the coil is energized to attract the armature, the springs are carried by the armature and the spring 36 is swung away from the stop 32, so as to break the circuit. The spring 37 is put under added stress, so that as soon as the current is broken and the magnet deenergized, this spring returns the armature to its normal position. The spring 37 serves not only as an armature-returning spring, but also serves as a conductor and as a part of the electric circuit. The circuit flows from the binding post 35 through the wire 34 to the coils and thence through the wire 33 to the stop 32. This stop is in normal contact with the spring 36, and the spring 37 which is integral with the spring 36, is in contact with the stop 19. This stop being integral with the base, is of course electrically connected to the other binding post 38. To prevent the turning of the binding post 38 during the tightening or loosening of the nut thereon, the head of the binding post is preferably in the form of a screw head with flat sides, as illustrated in the lower left-hand corner of Fig. 1, and the base is formed with ridges 39, between which this head is received. With the head in position, the nut on the binding post may be tightened or loosened at will, without possibility of rotating the body of the post. Upon closing the circuit outside of the bell, the current flows as above indicated, and the armature is attracted to strike the bell. This movement of the armature breaks the contact between the spring 36 and the stop 32, and the magnets become deenergized and the spring 37 returns the armature and reestablishes the complete circuit.

For concealing and protecting the operating parts of the bell, that is, the magnets, armature and vibrating or circuit-closing spring 36, a casing 40 is provided, which has two tongues 41 for entry through the two openings 22 in the base, and a third tongue 42 for entry through the opening 23, so as to detachably hold the casing. One wall 43 of the casing, that is, the wall on the side of the operating parts toward the gong, is provided with an opening 44, through which extends the hammer 50. This wall, as will be noted from Figs. 2 and 4, comes closely adjacent the pivotal support of the hammer, and the hammer at this point is substantially in the form of a wire. At the pivotal support of the hammer and armature, there is no lateral movement, and the movement of the hammer at the point where the hammer passes through the opening 44, is so slight that the opening is made only very slightly larger than the hammer itself. The free space around the hammer is not sufficient to permit the entrance of any appreciable quantity of dust, and to pre-

vent the entrance of insects which often secrete themselves within the dark interior of electric bell casings. As this opening 44 is the only opening leading to the interior of the casing, and as the casing fits the base and the base fits the wall, it is evident that no foreign bodies can gain access to the interior of the casing to injuriously affect the operation of the bell.

In the bell illustrated in Figs. 1 to 5, inclusive, the casing itself forms a part of the electric circuit. It is often desirable to use a bell in such a position or so supported, that the electric circuit be completely insulated from the base on the supporting wall. In Figs. 6 and 7, I have illustrated a bell constructed substantially as above described, with the exception that the circuit is entirely insulated from the base. Instead of forming the stop 19 integral with the base, as illustrated in Fig. 3, I provide the base with an opening 45 adjacent to the opening 20. A stop 19^a extends up through the sheet of insulating material 31, concentric with the opening 45 and out of engagement therewith, as illustrated in Fig. 7, and the lower end of the stop extends in the form of a bar 46 along the under side of the sheet 31 to the corner binding post 35. The center bolt of this binding post not only serves to support the bar 46 and to hold it in place, but it is electrically connected to the bar and the holding of the bar in place holds the stop 19^a in place. A wire 34^a leading from the coil of the magnet instead of connecting to the binding post 35, leads to the binding post 38, which latter is insulated from the base 10^a of the bell by a sheet 47 of insulating material. This changing of the binding post does not affect the operation of the bell, except that it reverses the direction of the current if the wires leading to the bell be the same.

The spring 37 and the vibrator 36 are formed of the same piece of metal as in the form first described, but instead of being directly connected to the armature, I cover the side of the armature with a strip of insulating material, so that neither of the parts 36 or 37 is in electrical contact with the armature, but with the supporting parts 15 and 16.

By the construction illustrated in Figs. 6 and 7, the circuit is completely insulated from the base, and the base may thus be mounted on a metallic wall without danger of short circuit or loss of current. In the form shown in these figures, there is also embodied a slightly different means for securing the wire 33 to the stop 32. The base portion of the stop is provided with two prongs or fingers 48, having their free ends resiliently held in engagement with the under side of the insulation 31, and these spring fingers or prongs resiliently hold the

end of the wire 33. This permits the removal of the wire without loosening the stop 32.

Having thus described my invention, I
5 claim as new and desire to secure by Letters Patent:

In a device of the character described, a metallic base formed with a bent up stop, a bent up magnet support, a bent up journal
10 support, and a pair of holding fingers bent down from the base, a sheet of insulating material arranged on the under side of said base for covering the space from which said fingers are removed, said fingers extending
15 through said sheet of insulating material with parts thereof extending parallel with the insulation for holding the insulation against said base, an electromagnet supported by said magnet support, an armature

having a pivotal member journaled in said
20 journal support and said base, a spring formed with a tongue pressed therefrom rigidly secured at one end to one end of said armature and arranged so that the free end will engage the stop pressed up from said
25 base, a contact rigidly secured to said insulation adapted to normally engage the tongue pressed from said spring, and means defining a circuit for said magnet including
30 said spring and said contact.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ADAM LÜNGEN.

Witnesses:

LOUIS K. SPIER,
CHAS. F. ELLERMAN.