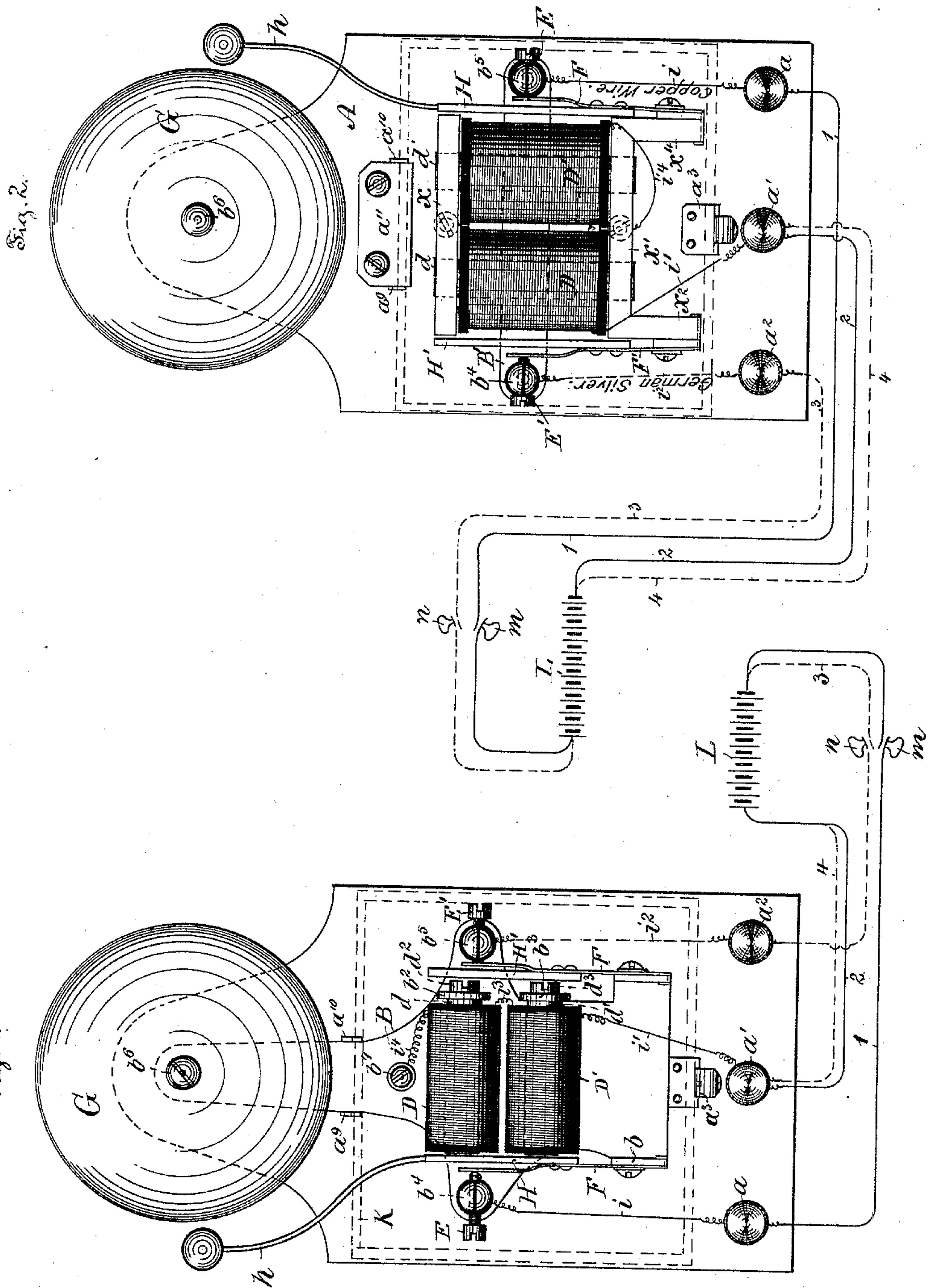


(No Model.)

J. GEARY.
ELECTRO MAGNETIC BELL.

No. 436,410.

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UNITED STATES PATENT OFFICE.

JOHN GEARY, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRO-MAGNETIC BELL.

SPECIFICATION forming part of Letters Patent No. 436,410, dated September 16, 1890.

Application filed December 18, 1889. Serial No. 334,205. (No model.)

To all whom it may concern:

Be it known that I, JOHN GEARY, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electro-Magnetic Devices, of which the following is a specification.

My invention relates to an electro-magnetic device especially adapted for use in connection with and for actuating alarms, annunciators, signals, and buzzers, while at the same time susceptible of being applied to other electrical appliances or apparatus for permitting of their actuation.

Heretofore in the application of electro-magnetic devices to signals and other somewhat similar appliances but one pole of the electro-magnet, having a soft-iron core and a surrounding coil of wire or two parallel soft-iron cores with surrounding coils of wire and connected together by a stationary yoke, was applied to an armature adapted to actuate a bell or other signaling device. The application of but one of the poles of an energized electro-magnet to an armature for signaling purposes possessed several disadvantages, among them being, principally, that when the electro-magnet was alternately included in two or more circuits and energized it actuated the armature in such manner as to give the same identical signal in all instances, and, second, it was necessary to employ as many magnets as there were different signals to be given, which was not only expensive, but compelled the running of a considerable number of lines.

The principal object of my invention is to provide a compact, durable, and inexpensive electro-magnetic device positive in action in its application to a buzzer, bell, alarm, signal, and other appliance, and of a type in which different sounds, signals, or calls may be readily given in the appliance or device to which applied.

The nature and particular features of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a front elevation of a combined electro-magnetic buzzer and signaling device

with the housing concealing the internal parts thereof removed, and said view showing one form of appliance with an electro-magnet embodying the features of my invention shown in application; and Fig. 2 is a similar view of a slightly-modified form of a combined buzzer and signaling device with my invention applied thereto.

Referring to the drawings, A is a panel or base-plate made of wood or other preferred material and provided with binding-posts a , a' , and a^2 .

a^3 is a spring-catch suitably secured to the base-plate for retaining the housing (shown in dotted lines in Figs. 1 and 2) in position, and beneath which are concealed the operative parts of the electrical appliance.

B, Fig. 1, is a diamagnetic frame or plate having turned-up ears b and b' at the rear extremital portion thereof.

b^2 and b^3 are vertical side lugs secured to or formed integral with the plate B and support the electro-magnets D and D' in position.

b^4 , b^5 , and b^6 are posts.

b^7 is a binding-post.

The similar magnets D and D' are provided with soft-iron cores d and d' .

d^2 and d^3 are screws inserted through apertures in the vertical side lugs or ears b^2 and b^3 into the cores d and d' of the electro-magnets and retain said magnets rigidly in position.

E and E' are contact-screws provided with small points and supported by the lugs or posts b^4 and b^5 .

F and F' are thin or delicate springs suitably secured to the ears b and b' and normally contacting with the points of the contact-screws E and E'.

G is a gong or bell secured to the post b^6 .

H is a soft-iron armature secured to the spring F and provided with a hammer h , which is adapted to strike the gong or bell G.

H' is a soft-iron armature secured to the spring F' and arranged so as to form what is known as a "buzzer."

i is a wire or other conductor leading from the binding-post a to the contact-screw E.

i' is a wire or other conductor leading from the binding-post a' to the coil surrounding the electro-magnet D'.

i^2 is a wire or other conductor leading from

the binding-post a^2 to the contact-screw E' . This wire i^2 may have the same electrical conductivity as the wire i , or it may be of lower electrical conductivity. For example, if the wire i is made of copper, the wire i^2 is made of German silver, for a purpose to be hereinafter more particularly described.

i^3 is a wire connecting the coils of the electro-magnets D and D' .

i^4 is a wire or other conductor leading from the electro-magnet D to the binding-post b^7 .

K is a housing. (Shown in dotted lines in Fig. 1.) This housing is provided with slots in the upper end, in which is fitted the right-angular or other suitable form of projecting lugs a^9 and a^{10} , cast with or secured to the upper portion of the diamagnetic plate or frame B . The housing K not only conceals the principal parts of the device from view, but also prevents extraneous matter—such as dust or dirt—from collecting therein or the parts from any cause being injured.

1 and 2 are insulated wires or other suitable conductors leading from a battery L to the binding-posts a and a' .

m is a push-button or other preferred device for permitting of the battery-circuit being closed when required.

3 and 4 are insulated wires or conductors (illustrated in Fig. 1 as dotted lines) leading from the battery L to the binding-posts a' and a^2 .

n is a push-button or other device for closing the circuit when required, and which is represented by the dotted lines 3 and 4 of Fig. 1.

Before operating the device for the transmission of different positive signals, calls, or sounds the armatures H and H' should be adjusted, for example, so that the resistance offered by the armature H' will be less than that offered by the armature H to the influence or force of the electro-magnets D and D' . This adjustment of the armatures may be effected by means of the contact-screws E and E' or in any preferred manner.

The manner of using the combined buzzer and signaling appliance with my invention applied thereto and its operation may be explained as follows: The panel or plate A is suitably attached to, say, the wall. The push-buttons m and n are located at the required point or points, and the line-connections 1 , 2 , 3 , and 4 made from the battery L to the instrument or appliance in the manner illustrated in the drawings or in any other preferred manner. By pressing the push-button n the dotted lines or circuit 3 and 4 is completed or closed from the battery to the combined buzzer and signaling device, and the battery-current passes along or over the wire or conductor 3 to the wire i^2 , then to the spring F' , plate B , wire or conductor i^4 , and around the coils of the electro-magnets D and D' , which attract the armatures H and H' . As soon as the armature H' is attracted forward the circuit is broken at the contact-screw E' by the spring F' being released from its contact with the point of the screw E' . The circuit being broken at this point, the electro-magnets D and D' cease to attract the armatures H and H' . The armatures therefore fall back and the armature H' again establishes contact at the screw E' , whereupon the armatures H and H' are once more attracted forward. These rapid vibrations of the armature H' cause an audible, distinct, or positive buzz or signal to be given. As before remarked, the armatures H and H' are adjusted so that the armature H' is more susceptible than the armature H to the influence of the electro-magnets D and D' . Consequently the armature H and the hammer h are not sufficiently attracted by the energized magnets to cause said hammer to contact with the gong G , although the armature H' , vibrating rapidly under the influence of the magnets D and D' , is given an audible buzz or signal. By pressing the push-button m the full line-circuit is completed, and the current passes along or over the wires 1 and 2 and the wire or conductor i , spring F , frame or plate B , the wire or conductor i^4 , and around the electro-magnets D and D' , which become energized and attract the armatures H and H' until the hammer h strikes the bell or gong G . The circuit is broken at the contact-screw E by the spring F being released from its contact with the point of the screw E . When the circuit is broken and the electro-magnets D and D' cease to attract the armatures H and H' , they fall back and the armature H again establishes contact at the screw E , whereupon the armatures H and H' are once more attracted forward. The rapid vibrations of the armature H cause a series of blows to be delivered in rapid succession by the hammer h upon the gong or bell G , thereby giving an audible signal, which can be readily distinguished from the buzz or signal given when the push-button n is pressed, and the circuit is closed and broken, respectively, by the vibrating of the armature H' .

In Fig. 2 is illustrated a modified form of an electro-magnetic device of my invention as applied to a combined buzzer and signaling appliance. To the panel or base-plate A is mounted on a post b^6 a gong or bell G . Binding-posts a , a' , and a^2 are secured into the lower extremal portion of the panel or plate in any preferred manner. A spring-catch a^3 is secured to said plate A for holding the housing (indicated by the dotted lines in said figure) in its normal position, concealing the several parts of the appliance. To the upper part of the panel or plate A is secured a clamp-plate a^{11} , with right-angular or other preferred form of projecting lugs a^9 and a^{10} , and arranged so that the slots formed in the upper end wall of the housing will fit over or onto said lugs, and thereby aid in holding said housing in its required position. b^4 and b^5

are side binding-posts secured into a metal strip B' and properly insulated therefrom. The electro-magnets D and D' are mounted with their cores d and d' secured into yokes or pole-pieces x and x' . The springs F and F' are secured to lugs x^2 and x^4 , attached to or formed integral with the yoke x' . The wire or conductor i^4 leads from the yoke x' to the coils surrounding the electro-magnets D and D' instead of from the diamagnetic plate or frame B, as in Fig. 1, to the coils of the magnets.

The mode of operation of the device illustrated in Fig. 2 is identical with that illustrated in Fig. 1, with the following exceptions: First, the current passes from the spring F or F', as the case may be, to the coils of the electro-magnets D and D', through the yoke x' instead of through the diamagnetic plate B of Fig. 1, and, second, the cores d and d' of the electro-magnets energize the yoke x when the circuit is closed, which actuates the armatures H and H'.

Throughout the foregoing description of the mode of operation of the invention it has been assumed that the wires i and i^2 are of like electrical conductivity; but if these are not of like electrical conductivity—for example, if the wire i is composed of copper and the wire i^2 of German silver—the operation of the devices is as above set forth, except that the electro-magnets D and D' are more strongly energized by the bell-circuit than by the buzzer-circuit.

It is obvious that my invention in its application to appliances somewhat similar to those hereinbefore described may be modified without materially departing from the spirit of the invention, and therefore I do not limit myself to the precise arrangement of the parts of the device hereinbefore explained.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an electro-magnetic device, of a magnet having two armatures differently adjusted, two circuits, a battery, and conductors of unlike resistance permitting

variation in the strength of said magnet, substantially as and for the purposes set forth.

2. The combination, in an electro-magnetic device, of a magnet having two armatures differently adjusted, one of said armatures provided with a bell and the other with a buzzer, two circuits, a battery, automatic circuit-breakers secured to said armatures and included in said circuits, and conductors of unlike resistance permitting of variation in the strength of said magnet, substantially as described.

3. The combination, in an electro-magnetic device, of a magnet provided with pole-pieces or yokes, two armatures supported by springs attached to one of said pole pieces or yokes and differently adjusted, two circuits, a battery, and an automatic circuit-breaker secured to each of said armatures and interposed in said circuits, substantially as and for the purposes described.

4. The combination, in an electro-magnetic device, of a magnet provided with two yokes or pole-pieces, two armatures mounted on springs attached to one of said yokes or pole-pieces and differently adjusted, two circuits, a battery, an automatic circuit-breaker secured to each of said armatures, and means, substantially as described, for permitting of the variation of the strength of said magnet, substantially as and for the purposes described.

5. The combination, in an electro-magnetic device, of a single pair of magnets provided with two armatures supported by springs and differently adjusted, said armatures provided with signaling appliances, two circuits, two circuit-closers therein, a battery, and two automatic circuit-breakers secured to said armatures and interposed in said circuits, substantially as described.

In witness whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN GEARY.

Witnesses:

THOMAS M. SMITH,
HERMANN BORMANN.