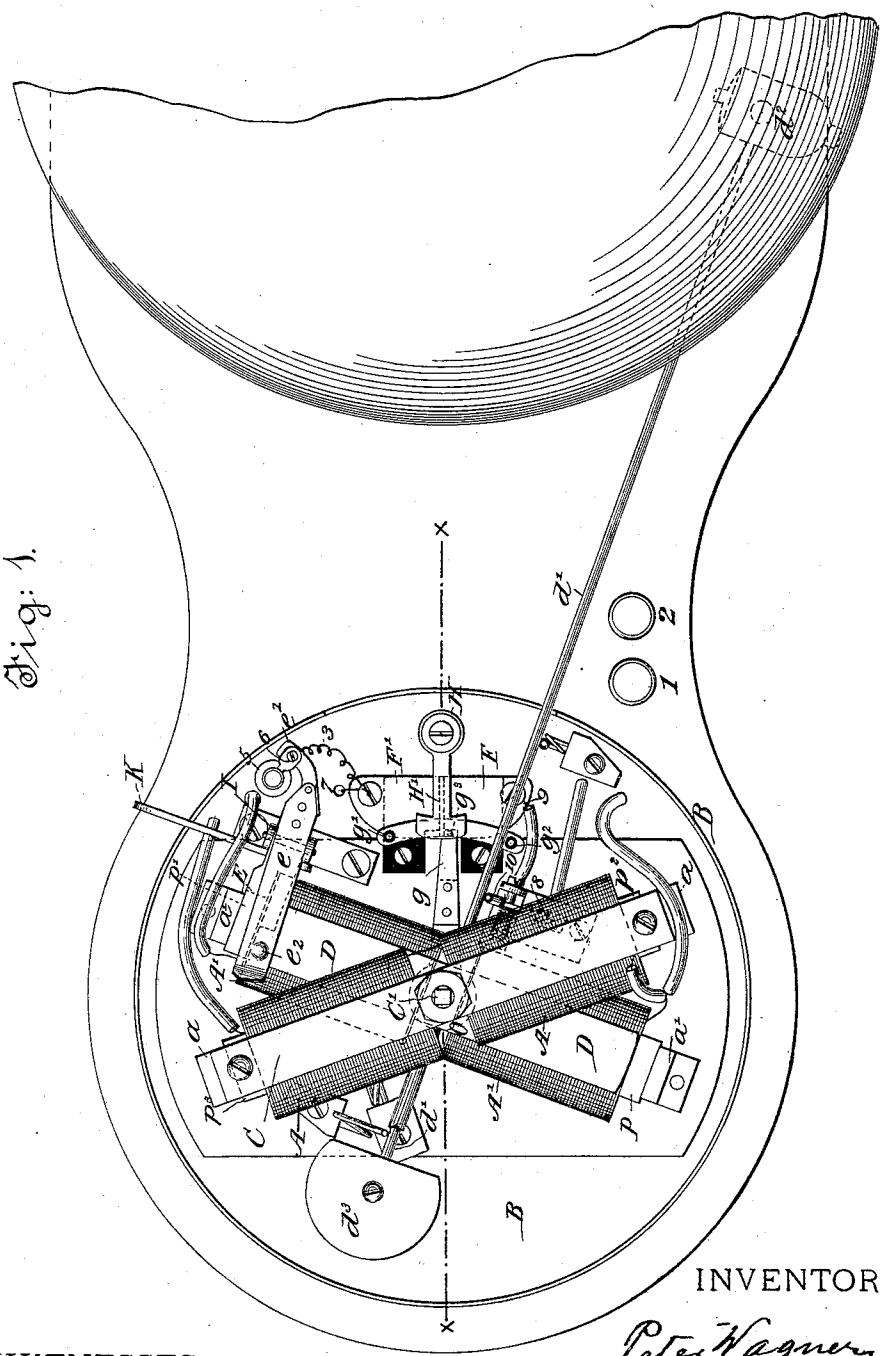
(No Model.) 3 Sheets—Sheet 1.

P. WAGNER.

ELECTRIC BELL.

No. 487,437. Patented Dec. 6, 1892.

Fig: 1.



INVENTOR:

Peter Wagner

WITNESSES:

William H. Johnson

John MacDonald.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

P. WAGNER.

ELECTRIC BELL.

No. 487,437. Patented Dec. 6, 1892.

Fig: 4.

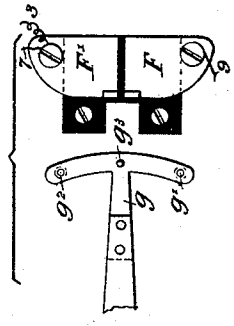


Fig: 2.

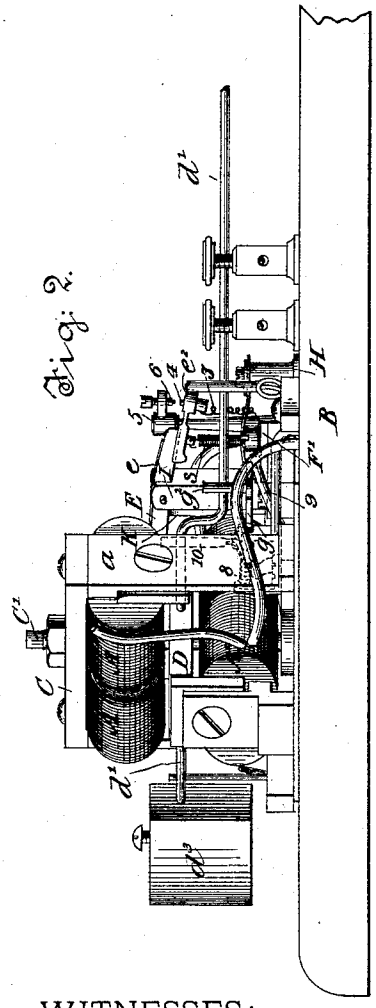
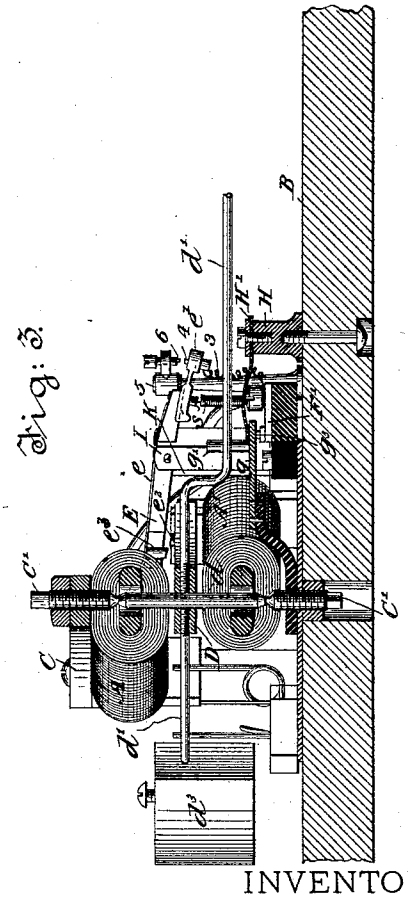


Fig: 3.



WITNESSES:

William H. Johnson

John Macdonald

INVENTOR:

Peter Wagner

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

P. WAGNER.

ELECTRIC BELL.

No. 487,437. Patented Dec. 6, 1892.

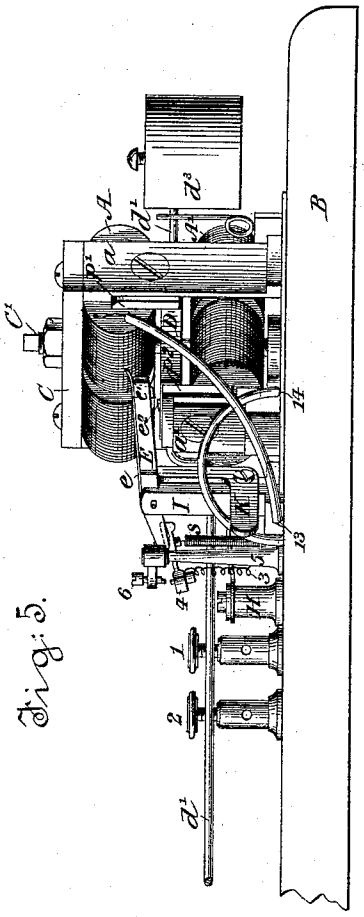


Fig. 5.

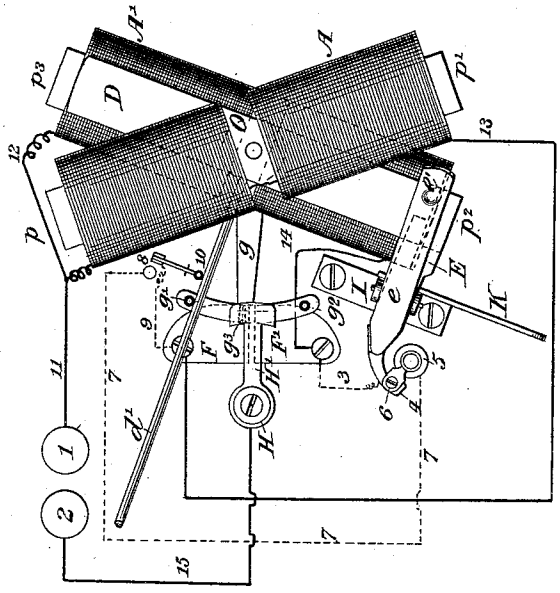


Fig. 6.

Witnesses:
John A. Rennie
Joseph W. Oakman

Inventor:
Peter Wagner

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PETER WAGNER, OF NEW YORK, N. Y.

ELECTRIC BELL.

SPECIFICATION forming part of Letters Patent No. 487,437, dated December 6, 1892.

Application filed October 2, 1891. Serial No. 407,501. (No model.)

To all whom it may concern:

Be it known that I, PETER WAGNER, a citizen of the United States, residing in the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Bells, of which the following is a specification.

This invention relates to that class of bells where electrical means are employed to cause the hammer to sound specific and general alarms upon a gong; and the improvements have for their object to cheapen and simplify the construction and at the same time materially improve the operation.

There is a large class of electric bells in which a make and break of the electric current causes the armature, to which a hammer is attached to be alternately attracted and released by an electro-magnet. In all of these electric bells the travel of the hammer is very short, and the result is not commensurate with the amount of battery-power used, first, because the hammer has not sufficient swing to give a full and powerful blow, and also as bells of this class all have a spring attached to the hammer this spring has to be brought into a certain tension so as to pull or throw the hammer back from the bell and also to make contact for the new blow. Therefore the force of the electro-magnet has to overcome the tension of this spring, the result being that considerable power is lost before the hammer can strike the bell.

My improvements have been made chiefly with the view of giving the hammer more swing, as well as to do away with the retaining-spring. Therefore the main and most essential feature is a new arrangement of magnet and armature, which is intended more especially for the purpose stated, although the same essential principle may also be applied to other electro-magnetic instruments where substantially the same function is to be performed.

Certain other novel features of construction and combinations of parts are also included in my invention, for full comprehension of which reference must be had to the accompanying drawings, forming a part of this specification.

In said drawings, Figure 1 is a plan view of my improved electric-bell apparatus. Fig. 2 is a side elevation of same with casing removed. Fig. 3 is a cross-section taken on the line $x\,x$, Fig. 1. Fig. 4 is a detail of switch, &c. Fig. 5 is a side elevation looking in a direction opposite that of Fig. 2, and Fig. 6 is a diagram view showing the course of the current when effecting a continuous or single stroke of the hammer.

Similar letters and figures of reference indicate like parts.

On a base-plate B of metal or wood are arranged two electro-magnets A A′, preferably of the shape shown, one above the other, crossing each other, their centers coinciding and of such an angle toward each other as required to allow the armature D, which lies between them, the fullest amount of swing from the poles of one magnet to the poles of the other. To the poles p p' p^2 p^3 of said magnets are fastened suitable uprights of brass or other non-magnetic metal a a a' a', whereby aforesaid magnets are held in position and secured to the base-plate B. A top cross-bar C of metal is screwed to the uprights a a of the upper magnet, and said bar carries a screw-bearing C′ for the upper end of armature spindle or shaft d, its lower bearing being similar and carried by the base-plate B. The electro-magnets are wound in such a manner that at the center of each a space O is left naked or unwound, of such a width as to allow the armature-shaft d to pass freely through, the iron cores of the electro-magnets having holes bored through them at that point for the purpose. A rod d' is secured to the armature D, one end carrying the striker or hammer d^2. The other end carries a suitable counterweight d^3, as shown in Fig. 1. A second armature E is placed over one pole p' p^2 of magnet A′, and to the upper side of said second armature E is fastened a spring e, having a hook or catch e', the body of the armature being cut away to allow said catch to project slightly below. A pin e^2 is fastened into and projects above the surface of armature D at the end nearest the armature E in position to engage with the catch e', as will be further explained.

The two terminals 11 and 12 of the magnets A and A′ are united and connected with the binding-post 1, and the other two terminals 13 and 14 are connected with two metal

plates F and F′. Said plates F and F′ are fastened to a piece of hard rubber, and a small open space is left between said plates. The terminal wire 13 is connected with F, and the terminal wire 14 is connected with plate F′.

A strip g of metal is pivoted to the bearing of the armature-spindle c' or to base-plate B, the other end extending into curved arms, one on either side, which carry upwardly-projecting pins or studs g' and g^2, and also a contact-piece g^3 on its under side, adapted to engage alternately with the plates F and F′.

A stud H by a copper wire 15, connected with binding-post 2, has a spring H′ fastened to its upper end, the free end of said spring bearing upon aforesaid strip g and pressing it down upon the plates F and F′. The plate F′ is also by a wire 3 connected with an extension e^2 of the armature E at 4, where a platinum-faced screw is fastened into a piece of hard rubber forming said extension, which is riveted to the armature E.

A small pillar or stud 5, fastened to the base-plate, has at its upper end a short arm 6 at a right angle, ending in a downward platinum-faced point or screw. Said point or screw is over and coinciding with aforesaid screw 4. The stud 5 is by a wire 7 connected with one terminal of a small switch 8, said switch being automatically opened and closed by the hammer-rod d' playing against a lever 10. The other terminal of the switch 8 is by wire 9 connected with the plate F.

A two-armed lever K is pivoted to the standard I, which supports armature E, one end projecting at a right angle through the casing and the other adapted to be brought under the armature E, so as to prevent said armature from closing down upon the pole of electro-magnet A′, over which it lies.

The operation of the invention is as follows: When it is desired to be used as a continuous alarm, the lever K is pressed down toward the base, thereby holding the armature E away from the pole of electro-magnet A′ and the electric circuit closed by a push-button or other device and the contact-piece g^3 of strip g being, after each performance, always left resting on the plate F, (by reason of its being pushed farther over to that side at every blow delivered.) The current passes from the binding-post 1 through the wire 11 to the magnet A, thence through wire 13 to plate F, whence it passes through the spring H′, stud H, and wire 15 to post 2. The armature D will then be attracted by the poles p and p' of the electro-magnet A, (the said magnet A is connected with the plate F of the cumulator, as described,) and when brought into or near a position midway between the aforesaid poles p and p' the hammer-rod d' strikes the pin g^2, thereby pushing strip g and the contact-piece g^3 on the under side thereof over onto the plate F′, thereby breaking connection with electro-magnet A and making connection through plate F′ and wire 14 with electro-magnet A′, the armature D being consequently released from A and attracted by A′. Now the pin g' by the rod d' is pushed back onto plate F and connection again established with electro-magnet A, and so on. In this manner a reciprocating motion of the armature D and hammer d^2 will be continued as long as the circuit is closed. If it is desired to have single blows struck upon the gong, the lever K is raised, whereby its inner end is brought out from under the armature E, allowing said armature E free play in connection with the adjacent pole, and the electric circuit is now closed. The armature D will, for reasons already explained, first be attracted by electro-magnet A and then by electro-magnet A′. The armature E will also be attracted by the pole of said electro-magnet A′, over which it is placed, and the point 4 now makes contact with the point 6 of stud 5, and through wire 7 connects the switch 8. The hammer-wire d' now strikes the upright arm 10 of aforesaid switch 8, closes same, and through wire 9 connects the two plates F and F′, and consequently both electro-magnets A and A′ are in the circuit. The spring e on armature E, with its hook or catch e' now engages with pin e^2 of the armature D and securely holds said armature D in a position between the poles p^2 and p^3 of the electro-magnet A′ until the electric circuit is broken. Then the armature E is pulled back by tension-spring s, the contact-points 4 and 6 are separated, and consequently the plates F and F′ are disconnected. The armature D is also released and drops back to a position between the four poles $p\ p'\ p^2\ p^3$, as shown, where it remains until the circuit is closed, when it again performs the same operation. From the above it will be seen that by every make and break of the electric circuit the hammer delivers a blow on the bell or gong.

Suitable stops are provided to check extra movement of armature D and hammer-rod d', as shown.

Many of the details of construction and arrangement may be varied and modified without departing from the essential principles of my invention. For instance, the bearing or fulcrum for the armature D may be a pin fastened in the iron core of the electro-magnet. The apparatus may also be constructed without the use of the armature E, its bearing I, and lever K; also, stud 5 and switch 8 may be dispensed with when continuous alarms only are desired.

What I claim, and wish to secure by Letters Patent, is—

1. In an electro-magnetic-bell apparatus, two electro-magnets placed in different horizontal planes, crossing each other diagonally but with coinciding centers, in combination with an armature pivoted between said magnets and adapted to be attracted by and swing between their respective poles, and a bell or gong operated by the movement of

said armature, substantially in the manner set forth.

2. In an electro-magnetic-bell apparatus, the diagonally-arranged magnets A and A′, each constructed with a space between the coils, exposing the cores, in combination with the swinging armature D, arranged between said magnets, its shaft *d*, passing centrally through said cores within the spaces, and a striker and bell operated by said armature, substantially as and for the purpose specified.

3. The combination, with the diagonally-placed magnets of the swinging armature D, having vertical shaft *d* and proper bearings therefor, of the rod *d′*, fixed to the central part of said armature and having counterbalance d^3 at one end and hammer or striker d^2 at the other, and a suitable bell or gong, substantially as set forth.

4. The combination, with the electro-magnets A A′ and armature D, working between their respective poles and having pin e^2 near its end, of the auxiliary armature E, a suitable support and connections therefor, and spring *e*, having hook or projection e^3, adapted to engage with said pin, substantially as and for the purpose described.

5. The combination, with the electro-magnets and their armature, the auxiliary armature E, carrying contact-screw 4, and support I, of the lever K, pillar 5, having contact 6, plates F F′, switch 8, and proper electrical connections, substantially as and for the purpose specified.

6. The combination, with the magnets and their swinging armature, of the hammer-rod *d′*, fixed to said armature, switch 8, having upwardly-projecting arm 10, plates F F′, contacts 4 and 6, armature E, and spring *e*, adapted to engage with the swinging armature, substantially in the manner and for the purpose specified.

7. The combination, with the electro-magnets, swinging armature, and hammer-rod, of the terminal plates F F′, pivoted strip *g*, adapted to form contact with said terminals alternately and having upright pins *g′* g^2, the spring H′, bearing upon said strip-stud H, and proper electrical connections, all arranged to operate substantially in the manner and for the purpose set forth.

8. In an electro-magnetic-bell apparatus, the combination of electro-magnets A A′, armature D, striker-rod *d′*, armature E, switch 8, terminal plates F F′, studs H and 5, spring H′, the movable metal strip *g*, provided with pins *g′* g^2, and the electrical connections, as described, with the binding-screws 1 2, as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 17th day of September, 1891.

PETER WAGNER.

Witnesses:
WILLIAM H. JOHNSON,
JOHN MACDOUGALL.