(No Model.) 4 Sheets—Sheet 1.

F. G. INGERSOLL.

ELECTRIC BELL.

No. 539,431. Patented May 21, 1895.

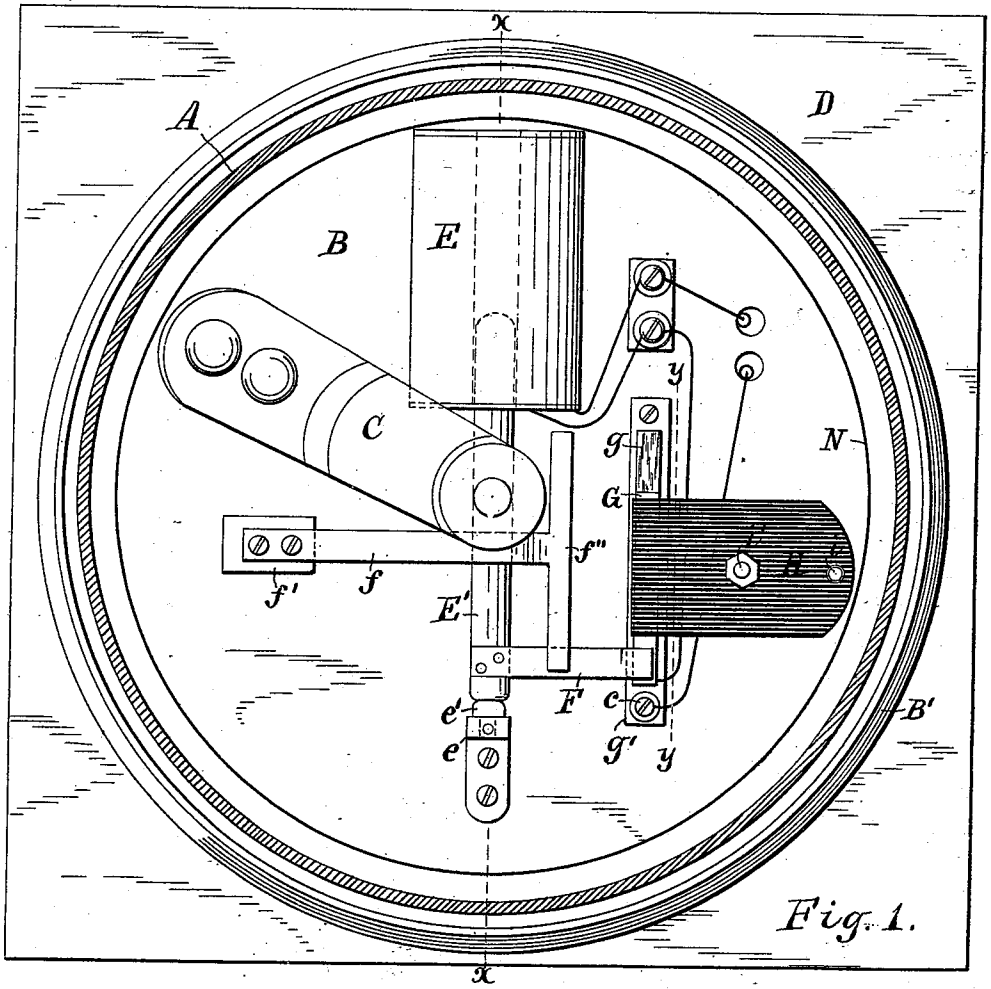


Fig. 1.

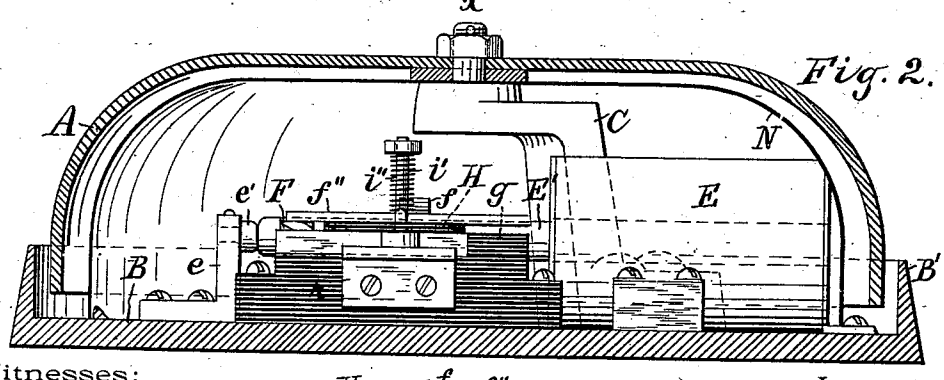


Fig. 2.

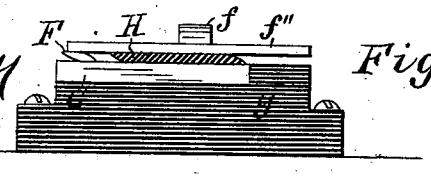


Fig. 3.

Witnesses:

Mark W. Dewey

R. S. Dewey.

Inventor.

Francis G. Ingersoll

By C. H. Duell

his Attorney.

(No Model.) 4 Sheets—Sheet 2.

F. G. INGERSOLL.

ELECTRIC BELL.

No. 539,431. Patented May 21, 1895.

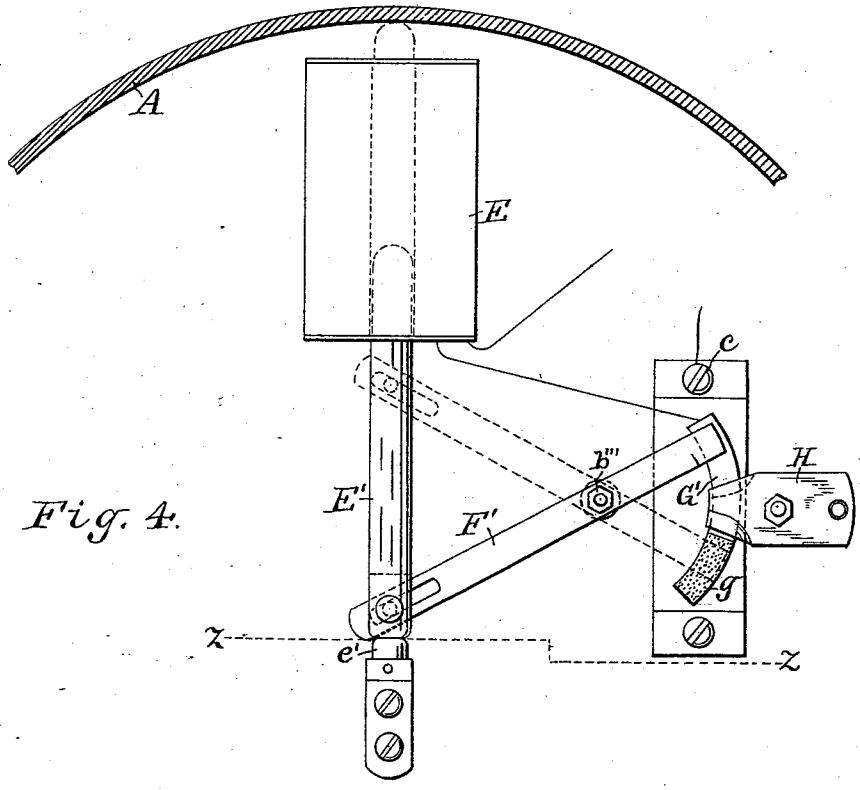


Fig. 4.

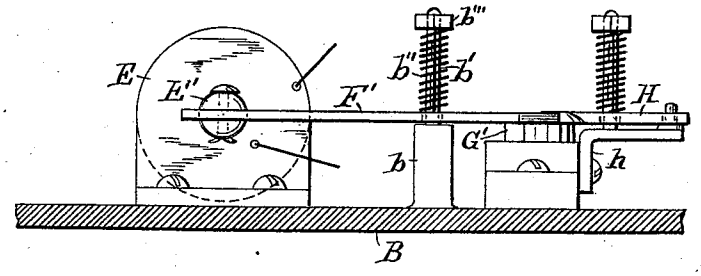


Fig. 5.

Witnesses:
Mark W. Dewey
R. S. Dewey.

Inventor.
Francis G. Ingersoll
By C. H. Duell
his Attorney.

(No Model.)

4 Sheets—Sheet 3.

F. G. INGERSOLL.

ELECTRIC BELL.

No. 539,431. Patented May 21, 1895.

Fig. 6

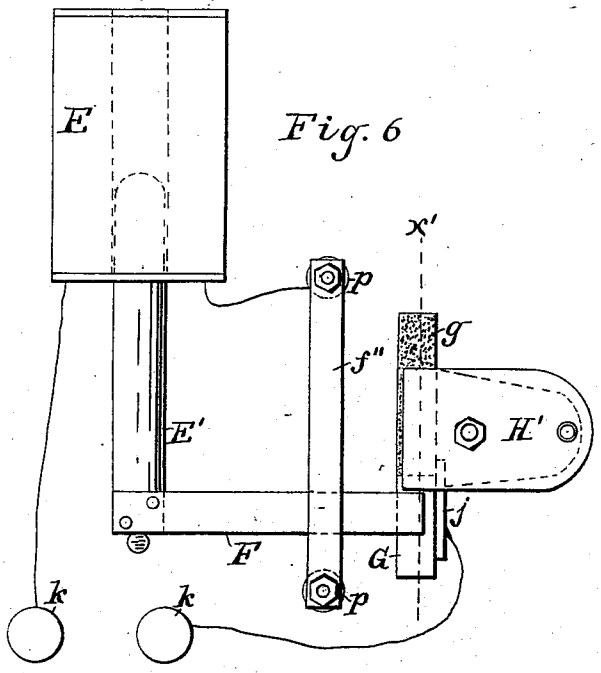


Fig. 7.

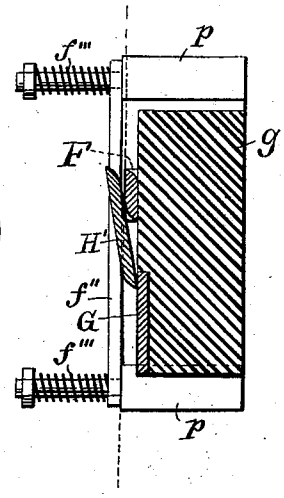
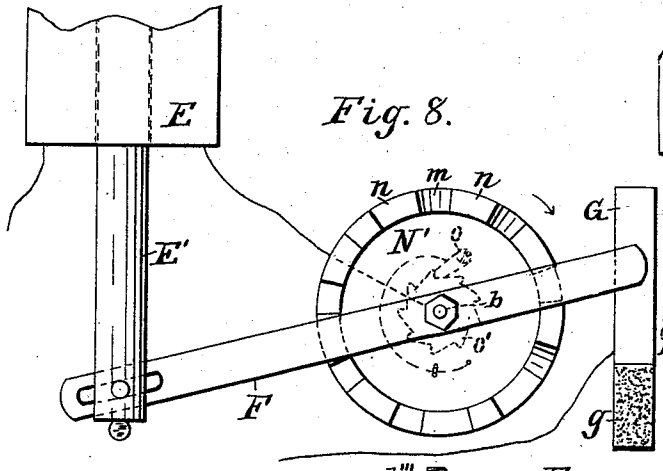


Fig. 8.



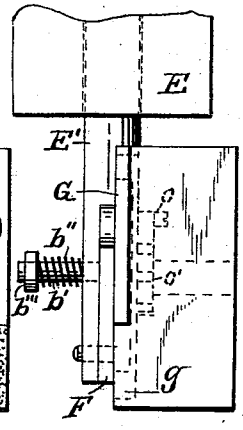


Fig. 9.

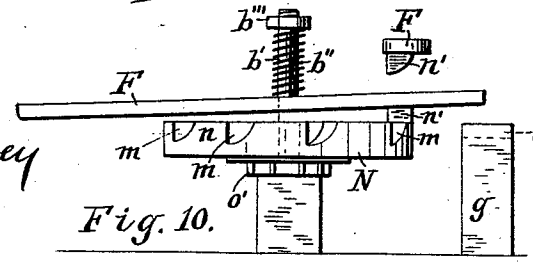


Fig. 10.

Witnesses:

Mark W. Dewey

A. S. Dewey.

Inventor.

Francis G. Ingersoll

By C. H. Duell

his Attorney.

(No Model.) 4 Sheets—Sheet 4.

F. G. INGERSOLL.

ELECTRIC BELL.

No. 539,431. Patented May 21, 1895.

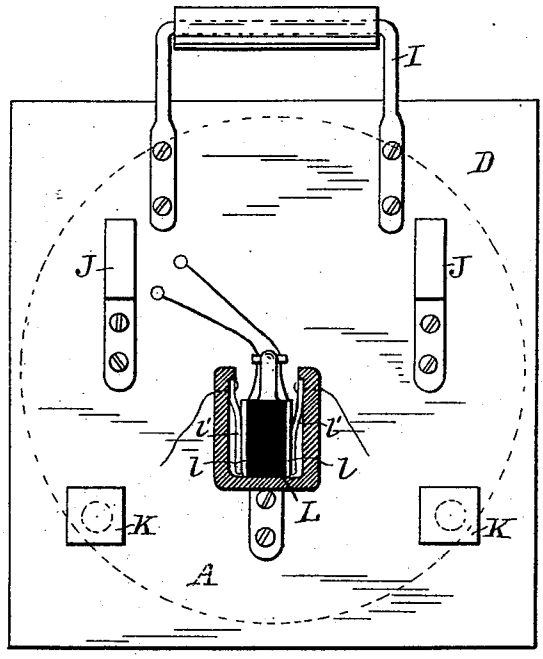


Fig. 11.

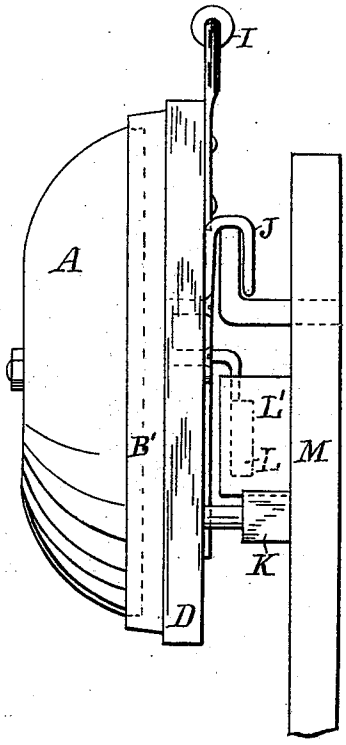


Fig. 12

Witnesses:
Mark W. Dewey
C. S. Dewey

Inventor.
Francis G. Ingersoll
By C. H. Duell
his Attorney.

UNITED STATES PATENT OFFICE.

FRANCIS G. INGERSOLL, OF NEW YORK, N. Y., ASSIGNOR TO THE DEWEY ELECTRIC SIGNAL COMPANY, OF SAME PLACE.

ELECTRIC BELL.

SPECIFICATION forming part of Letters Patent No. 539,431, dated May 21, 1895.

Application filed October 26, 1894. Serial No. 527,052. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS G. INGERSOLL, of New York, in the county of New York, in the State of New York, have invented new and useful Improvements in Electric Bells, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to electric bells or gongs for signaling and other purposes, but more particularly for use on electric street cars, and the object of my invention is to provide a simple and durable electric bell that will give heavy strokes slowly and repeatedly, while the circuit is kept closed at the transmitting key or button.

To this end my invention consists in the combination with the bell hammer and the base, of a magnet to operate the hammer, a stationary electric contact, a movable contact to be reciprocated and to operate simultaneously with the said hammer, and suitable means whereby the movable contact is removed or separated from the said stationary contact when moving in one direction; and my invention consists in certain other combinations of parts hereinafter described and particularly set forth in the claims.

In the drawings hereto annexed, Figure 1 is a side elevation of the apparatus mounted on its base, the gong being shown in section. Fig. 2 is a vertical transverse section of the gong and base, taken on line *x x* of Fig. 1, the inner parts being shown in elevation and appearing as when viewed from right to left in Fig. 1. Fig. 3 is a view taken on line *y y* of Fig. 1. Fig. 4 is another form of construction for accomplishing my invention. Fig. 5 is a view on line *z z* of Fig. 4. Fig. 6 is a side elevation of a modified form of apparatus similar to Fig. 1. Fig. 7 is a view on line *x' x'* of Fig. 6. Fig. 8 is still another form of apparatus for accomplishing my invention. Figs. 9 and 10 are other views of Fig. 8. Fig. 11 is the rear side view of my invention when it is made portable; and Fig. 12 is a side elevation of my portable bell hanging in place, as on the dash of a street car.

Referring specifically to the drawings, A indicates the bell or gong.

B is a metal base provided with a post or support, C, upon which the bell is secured and D is a board which may be secured to the back of the base if desired. The said board, D, is not essential but is preferred, especially when the apparatus is made portable, in order that the bail, hooks, &c., may be easily secured to the apparatus.

E is a hollow coil of wire usually termed a solenoid, fixed stationary, and in a vertical position upon the upper part of the metal base.

E' is the armature or movable core for the solenoid and is shown in its normal and vertical position with its upper end within the coil and its lower end resting upon a bracket, *e*, extending from the base. The bracket is provided with a rubber cushion, *e'*, where the core rests upon it.

Secured rigidly to the core, E', near its lower end, and extending horizontally to one side is an arm, F, as shown in Fig. 1. This arm, F, moves with the core and forms the movable electric contact and the circuit maker and breaker. Between the end of the arm, F, and the base and secured stationary to the latter, is a contact plate or strip, G, for the end of the arm to engage and ride upon. At the upper end of the strip, G, is a stationary block of insulating material, *g*, which causes the circuit of the coil to be broken when the core and arm have been raised sufficiently for the latter to pass upon it.

In order to hold the end of the arm, F, upon the strip, G, and block, *g*, and to provide a better electric connection between the arm, F, and the base, B, I mount a horizontal spring, *f*, upon a post, *f'*, on the base, and provide the free end of the spring with a vertical bar *f''* which will bear upon the side of the arm continually during its movements to force it gently toward the strip. The strip, G, and insulating block, *g*, are mounted upon a large block of insulating material, *g'*, fixed upon the base B.

In order that the circuit may remain broken during the greater portion of the downward or return movement of the arm, I mount a yielding insulating plate H upon a bracket, *h*, projecting from the side of the block, *g'*, so that one of its sides will lie upon a portion

of the surface of the strip G. The said plate, H, is loosely mounted upon two pins, *i*, and *i'*, extending from the bracket, *h*, and the plate is made yielding and is forced gently toward the strip, G, by a coil spring *i''*, placed between the plate and a nut on the end of the pin *i'*.

Both the insulating plate, H, and the end of the arm, F, are beveled on their sides as shown clearly in Fig. 3, so that when the arm is drawn upward by the core entering the coil the arm will pass beneath the insulating plate, remaining in contact with the electric contact, G, until it passes onto the insulating block, *g*, then the circuit of the coil being broken and the current interrupted, the core with the arm, F, drops by gravity to the stop, *e'*, the arm passing over the insulating plate, H, and then, just before it reaches its lowest position again makes contact with the strip G, closing the circuit through the coil to repeat the operation.

It will be obvious that should it be desired to place the bell in a position in which the core could not move out of the coil by gravity, a spring may be employed for this purpose. Instead of the spring, *f*, used for forcing the arm toward the contact strip, G, I may employ a metallic plate and mount it as the plate H.

Referring now to Figs. 4 and 5 of the drawings, F' is a contact arm pivoted intermediate of its length to a post, *b*, extending from the base B, and connected to the lower end of the core by means of a pin and a slot in the end of the arm, the opposite end of the arm being beveled and adapted to move on a curved contact strip, G'. In this case all other parts are the same or similar to those already described in reference to Figs. 1, 2 and 3, but the arm, F', being pivoted intermediate of its length, it becomes necessary to place the insulating block, *g*, below instead of above the strip, G', and to reverse the beveled sides on the arm and the insulating plate, H, so that when the core descends the contact end of the arm in moving upward will pass over the insulating plate, H, instead of between it and the strip G'. The contact arm, F', is made yielding by extending the pivot, B', and placing a coil spring, *b''*, on the pivot between a nut *b'''* on its end and the said arm.

The circuit extends through the base, B, to the coil, from the coil to the contact strip, G, or G', then through the arm F or F' to the base, and from the latter to the opposite end of the circuit, *via* the screw *c*.

Figs. 6 and 7 show an apparatus similar to that shown in Figs. 1, 2 and 3, the only difference being, that the movable plate, H', is in this case made of metal instead of insulating material, the bar, *f''*, is held on posts, *p*, *p*, at its ends by spiral springs, *f'''*, and the electric connections differ somewhat as is clearly shown. In this construction the circuit is broken when the arm, F, passes behind the metallic plate, H', during the downward movement of the arm, as the bar *f''* is held from contact with the arm then by the shoulders on the posts. The said circuit is broken between the bar, *f''*, and the front side of the arm, F. The bracket, *h*, is electrically connected with the stationary electric contact, G, by a strip *j*. *k*, *k* are the binding screws or terminals of the bell circuit.

Referring now to Figs. 8, 9 and 10 of the drawings showing another modification, F is the movable contact arm pivoted intermediate of its length and connected to the core, E', as shown in Figs. 4 and 5. Between the said arm, F, and the base is a ratchet wheel, N', mounted to turn on the post on which the said arm is pivoted. The recesses or notches, *m*, of said wheel are in the side of the projecting rim, *n*, of the wheel and engage with a tooth, *n'*, on the rear side of the arm F. The wheel is revolved notch by notch in the direction of the arrow and prevented from revolving in the opposite direction by an ordinary pawl, *o*, and ratchet *o'*, on the rear side of the wheel. The circuit is broken through the coil when the core descends for the reason that the tooth, *n'*, then rides on the rim of the wheel, between the notches, and the arm, F, is separated from the contact G.

In most cases the apparatus is placed below each of the platforms of the car or upon the top, but in some cases it is made portable so that it may be hung at either end of the car on the outside of the dash.

Referring now to Figs. 11 and 12 showing the portable form of the apparatus, I is a bail secured to the back and upper part of the board D. J, J are hooks to hold the apparatus to the top edge of the dash. K, K are rubber cushions mounted on the ends of spindles projecting from the board, D, to bear against the dash without marring or defacing it. Near the center of the board, D, is a block of insulating material L. Said block is separated somewhat from the board and is supported by a bracket secured to the board. The block, L, carries a thin contact plate, *l*, on each side, which plates form the terminals of the bell. Mounted on the dash, M, of the car is a pocket of insulating material, L', which has an opening in its upper side to receive the block, L, with its plates, *l*, *l*. On each side of the interior of the pocket, L, is a spring plate, *l'*, *l'*, to make contact with the plates, *l*, *l*, when inserted within the pocket. The spring plates, *l'*, *l'*, are connected with the terminals of the main circuit which may contain a suitable circuit maker and breaker in any convenient location.

The base, B, is provided with a flange, B', outside the edge of the bell, A, and a spun cap, N, is fitted closely over the inner parts of the apparatus between the bell and the base to keep the movable parts free from water and dirt.

A hole in the upper side of the cap, N, allows the core, E', to pass through it to strike the bell A.

Having described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. The combination of an electro magnet, an armature, a contact carried by the armature, a stationary conducting strip, and a yielding plate partially covering said strip, and provided with beveled or inclined sides, as and for the purpose described.

2. The combination of an electro magnet, an armature, a contact carried by the armature, a stationary conducting strip, and a yielding plate of insulating material partially covering said strip, and provided with beveled or inclined sides, as and for the purpose described.

3. The combination of an electro magnet, an armature, a contact carried by the armature, a stationary conducting strip, an insulating block, a yielding plate of insulating material partially covering said strip and provided with inclined sides, and a stop to limit the movement of the armature, substantially as described.

4. The combination of a solenoid, a longitudinally movable core, a stop to limit its movement, an electric contact carried by the core, a stationary contact, a block of insulating material, a yielding plate of insulating material partially covering the stationary contact and provided with beveled sides, and beveled sides on the movable contact, as set forth.

5. The combination of a sounding device, a solenoid, a longitudinally movable core, a stop to limit its movement, an electric contact, carried by the core having beveled sides, and an electric contact with which the same can co-operate, and a plate of insulating material adapted to pass between or separate the two contacts during each return movement of the core, as and for the purpose described.

6. The combination with the bell and the base therefor, of a solenoid mounted on the base, a core for the solenoid adapted to be reciprocated and forming the hammer for the bell, an arm secured rigidly to one end of the core, a stop for the core, a contact strip insulated from the base to engage the end of the arm, a yielding plate of insulating material partially covering the working surface of the said strip and provided with beveled sides, and suitable means to yieldingly force the said arm toward the strip, as described.

7. The combination with the bell and the base therefor, of a solenoid mounted on the base, a core for the solenoid adapted to be reciprocated and forming the hammer for the bell, an arm secured rigidly to one end of the core, a stop for the core, a contact strip insulated from the base to engage the end of the arm, the insulating block, *g*, the yielding plate, H, pins, *i*, and *i'*, spring *i''*, spring, *f*, and the electric connections, as set forth.

8. The combination with an electric bell and its base, of a bail secured to the base, hooks, cushioned bearings, and electric contacts separated from each other and connected to the terminals of the bell circuit, as set forth.

9. In a portable electric bell, supports secured to the back thereof, a bracket also secured to the back, a block of insulating material carried on the end of the bracket, electric contacts, one on each side of the block and connected to the terminals of the bell circuit, and a socket of insulating material provided with electric contacts to engage those on the block, as and for the purpose described.

In testimony whereof I have hereunto signed my name.

FRANCIS G. INGERSOLL. [L. S.]

Witnesses:
RAYMOND IVES BLAKESLEE,
C. L. MALCOLM.