

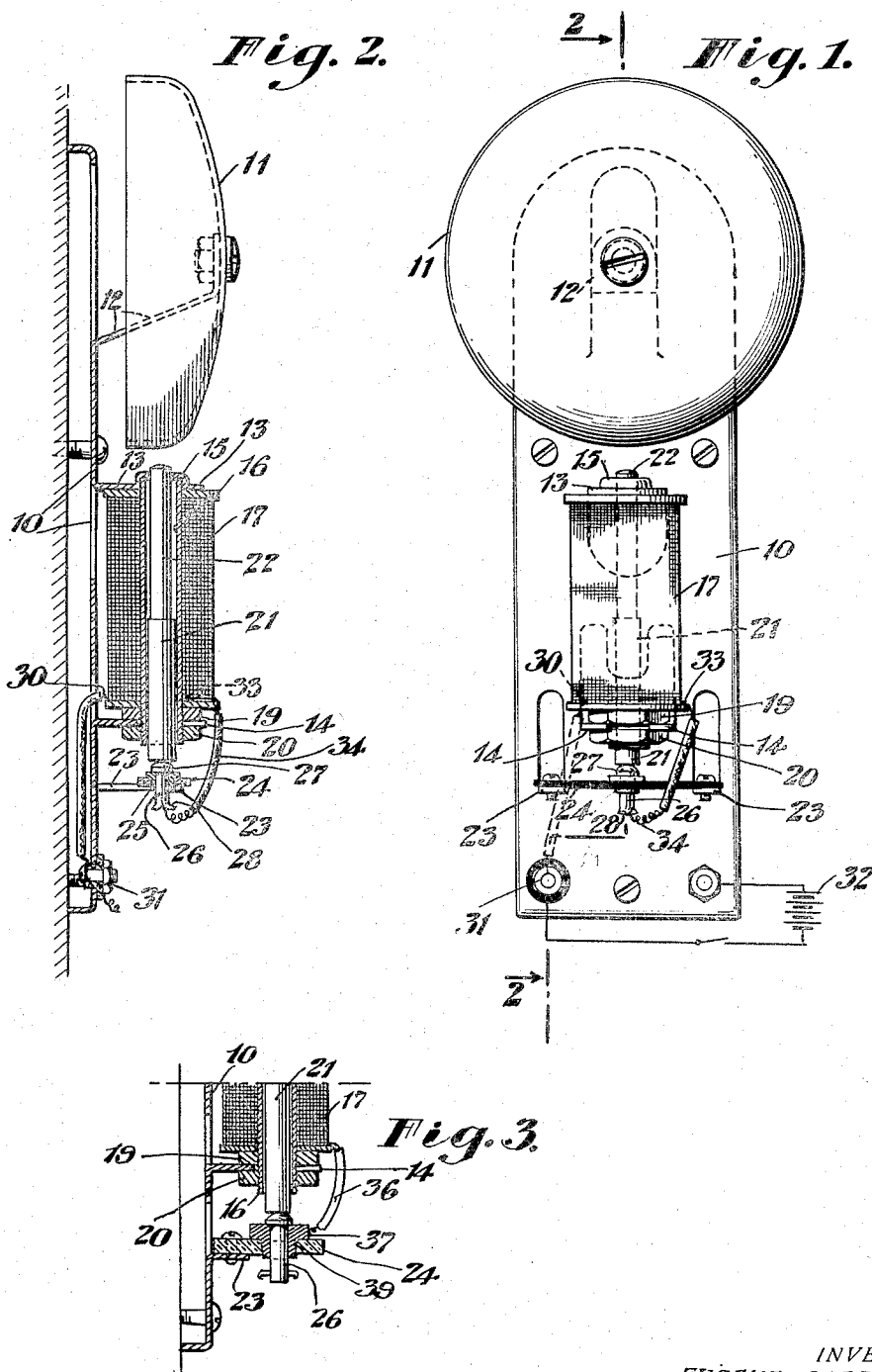
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ELECTRIC BELL

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## ELECTRIC BELL

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7 Claims. (Cl. 177-7)

My invention relates to an electric bell; more particularly it relates to an electric bell of the plunger type, operable by a solenoid energized from electric power of either alternating or direct  
5 current.

Electric bells, heretofore used, for example in homes, present many disadvantages, one of which is the use of transformers with their accompanying wiring system which is both expensive to install and is a source of possible trouble. Furthermore, these bells are of intricate construction and relatively expensive to manufacture. Also they very easily get out of order when spring contacts or the hammer arms are slightly bent accidentally or when they become fatigued.

It is an object of the present invention to avoid the above mentioned disadvantages and to provide an electrically operated bell, simple in design and cheap to manufacture, which will operate either on alternating or direct current, and which may be constructed for use at any current strength. Furthermore, by varying the wiring resistance construction, this electric bell may be made to produce a loud far-reaching sound for  
25 alarm purposes or may be made to produce a relatively weak sound, enough for house signaling purposes.

Another object of this invention is to provide an electric bell of the plunger type in which there is a rapid successive make and break of the electric circuit brought about by the rapid energization and de-energization of a solenoid by the rapid upward and downward movement of the plunger itself, in relation with a contacting circuit  
35 breaking member.

Still another object of this invention is to provide an electric bell of the plunger type in which the interval of time required to make and break the circuit may be simply and effectively regulated by varying the plunger stroke.

It is a further object of this invention to provide an electric bell of the plunger type in which the length of travel of the plunger stroke may be simply and effectively regulated to any length,  
45 within the power of the particular solenoid used.

The invention essentially includes a solenoid having a core and impacting means in circuit. There is also provided a circuit breaking member engageable by the core at its position of rest,  
50 which is magnetized by the core and made to travel upward with it any regulated distance when the latter is magnetized and pulled upward by the energized solenoid. When the limit of travel of the circuit breaking member is reached  
55 the core pulls away from the circuit breaking

member thereby breaking the circuit. The circuit breaking member returns to its position of rest preferably by the force of gravity. The core, however, under the influence of its momentum caused by the energization of the solenoid continues to travel upward a certain distance, causes an impact, then falls back to its position of rest, preferably thru the force of gravity, and contacts again with the circuit breaking member to thus repeat the process very rapidly, and continuously until the current is shut off.

With these and other objects in view my invention includes certain novel features of construction and arrangement of parts as hereinafter described in detail and defined in the appended  
70 claims.

In the accompanying drawing which shows a preferred embodiment of my invention, similar characters of reference designate like parts throughout.

In the drawing,

Fig. 1 is a front elevation of the embodiment, Fig. 2 is a vertical section taken on line 2-2 of Fig. 1; and

Fig. 3 is a detailed enlarged section of a modification of the circuit breaking member.

Referring more particularly to the drawing; a base plate 10 made preferably of non-magnetizable metal is provided with a bell 11 mounted on an extending member 12. Said member 12 is preferably punched from the plate and is integral therewith. Projecting from the face of base plate are prong members 13 and 14 which occur in pairs and are in spaced apart relation. It is to be noted that these prong members are preferably stamped or punched from the plate.

Upper prong members 13 are provided with a centrally opened cap or socket 15 for accommodating and making contact with the upper end of central tube 16 of a removable solenoid 17. Said end is retained between prong members 13. The opposite end of central tube 16 is threaded and retained between prong members 14. The threaded end has threaded nuts 19 and 20 mounted respectively above and below the prong members. Said nuts are drawn tightly against the prong members to retain solenoid 17 in fixed position on the base plate. It is apparent that by this arrangement the solenoid is easily removable and replaceable, and furthermore, does not make actual contact with the base plate.

Adapted to move in central tube 16 of the solenoid is an iron core 21 on which is fixed a striker 22 made preferably of non-ferrous or non-magnetizable metal for sounding bell 10 on the up-  
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ward stroke of core 21. Said striker makes sliding contact with the socket 15 at all times to complete the circuit hereinafter described.

The lower portion of the plate is provided with another set of prong members 23, preferably stamped therefrom. Said prongs support a cross insulation member 24 mounted and fixed thereon by any suitable means. Said insulation member has an opening 25 therein thru which slides a soft iron circuit breaker or stop piece 26 whose head 27 makes contact with the end of core 21. The lower end of stop piece 26 has an annular flange 28 to limit its upward travel when the solenoid, being energized, attracts core 21 which in turn attracts the stop piece. The underside of insulation member 24 is provided with an insulation block 29 with an opening in alignment with opening 25 to absorb the shocks caused by the rapid reciprocating movement of the stop piece.

Solenoid 17 being in electrical circuit has one terminal 30 in connection with an insulated binding post 31 which is in electrical connection with a source 32 of electric power. The other solenoid terminal 33 has a flexible connecting end 34 fixed to stop piece 26. Said flexible connecting end permits easy movement of the stop piece and is resistant to wear and tear while at the same time conducting electric current.

The detailed modification of the insulation member shown in Fig. 3 has a permanently fixed wire 36 extending from solenoid 17 to a soft iron plate 37. This plate has a central opening whose wall makes contact with the soft iron stop piece 26. The plate also has a seat 39 imbedded in the insulation 24 and permits permanent contact with the stop piece 26, to insure at all times a proper conduction of electric current from wire 36.

In the operation of the device, the electric current passes from source 32 thru binding post 31 into the solenoid to energize the same. Simultaneously, core 21 is magnetized and rises in the solenoid, at the same time carrying circuit breaker or stop piece 26. The current then is completely passed from the solenoid up thru core 21 thru striker 22 and back to source 32. The bell is sounded, whereupon the stop piece 26 has reached its limit of travel and the circuit has already been broken. It will be noted that there is a very rapid make and break in the electrical circuit. When core 21 rises due to energization of solenoid 12, it magnetizes stop piece 26 and carries the latter upward a limited distance. The circuit being closed, the stop piece rises very rapidly being carried by the core and is stopped from further travel by means of annular flange 28. The core member rises very forcibly because of the energization of the solenoid and after the circuit breaking member has been disengaged from the core, the latter continues to rise and strike the bell.

It will be noted from the foregoing description taken in connection with the accompanying drawing that there is a rapid double action of the solenoid. The core makes and breaks the electrical circuit by alternately connecting and breaking with stop piece or circuit breaker 24, and carries a non-magnetizable member which is in sliding contact with the upper prongs of the base plate, thereby always conducting electricity when core and stop piece are in connection. The stop piece in connection with the insulation member and the core form important features to permit rapid striking of the bell.

A device made in accordance with the present invention may be used on any voltage or type of current. It is useful not only for houses but in

any place where signaling or alarm systems are installed. Also the limit of stroke may be varied by regulating the length of movement of the circuit breaker. The longer the stroke the less rapid the sounding of the bell, and the shorter the stroke the more rapid the striking of the bell.

While I have described a simply constructed and economically made embodiment of my invention, it is understood that various changes and modifications as to form, structure, use of material, and arrangement of parts may be made without departing from the spirit and scope of my invention as defined in the accompanying claims.

1. An electric bell, comprising a metal base plate, a sounding member, a plurality of sets of prongs projecting from the plate, a solenoid mounted on said prongs, a source of electric current in connection with said solenoid, a core in said solenoid adapted to rise therein when the solenoid is energized and fall of its own weight when the solenoid is de-energized, a non-magnetizable striker connected to said core for impacting the sounding member when the solenoid is energized, said striker making sliding contact with one set of prongs for conducting current therethru to the plate, an insulation member projecting from the base plate having an opening therein, and magnetizable circuit breaking means slidable thru said member in electrical connection with the solenoid and having stopping means at one end, said breaking means being carried by the core when magnetized and disengaged by the stopping means from the core to break the circuit when carried thru a limited distance through the insulation member by said core.

2. In an electric bell, a metal base plate, a solenoid in electrical connection with the plate, a core in the solenoid, electrical conducting means in connection with the core, for impacting the bell, a plurality of prongs extending from the base plate, one of said prongs being in contact with said means, an insulation member on the base plate, a circuit breaker slidable thru said insulation member in contact with the core, stopping means on the circuit breaker for breaking the electrical connection with the solenoid when said stopping means come into contact with the insulation member, and electrical means in connection with the solenoid for energizing said solenoid.

3. In an electric bell, a solenoid, an electric circuit in connection with the solenoid, a metal base plate, means on the base plate for retaining the solenoid thereon, magnetizable core means in the solenoid movable upon energization of the solenoid, an insulation member projecting from said plate and having an opening therein, striker carried by the magnetizable means and making contact with said retaining means, circuit breaking means attracted by the core upon energization of the solenoid and slidable through the insulation member, and stopping means on the breaker for breaking the electric circuit upon upward movement of the core and upon contact with said insulation member.

4. An electric bell, comprising a base plate having a plurality of sets of prongs projecting from one face of the plate and spaced from each other, a sounding member on the plate, a solenoid mounted between a pair of sets of the prongs, an electric circuit in connection with the plate and solenoid, slidable current conducting means in the solenoid, a non-magnetizable striking member on said conducting means in connection with one of the prongs also conducting current, an insulation plate on one set of said prongs, magnetizable

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means in said circuit passable thru said plate and carried by said slidable means when the solenoid is energized, and projections on said magnetizable means limiting the movement of said means to break the circuit when the core travels upwardly in the solenoid and permit rapid alternate breaking and making of the circuit.

5. In an electric bell of the plunger type, the improvement, comprising a solenoid, a core slidable in the solenoid, a member in alignment with said core and magnetizable thereby when the core is energized, and current breaking means in contact with the member for stopping the further movement of said member upon energization of said solenoid, and breaking the contact with the core after said member is carried a limited distance by said core.

6. In an electric bell, the improvement comprising a solenoid, a solenoid core, a magnetizable

member in contact with the core when said core is energized, and means for stopping the movement of said member and breaking the contact with the core when the latter is energized, and moved thru part of the length of the solenoid.

7. In an electric bell having a base plate, the combination with a solenoid mounted on the plate, of a core slidable in the solenoid, an insulation plate member extending from the plate of said bell and having an opening therein, a magnetic element in contact with the core and slidable through said insulation member and carried thereby when said core is energized, means on said element coming into contact with said insulation member for stopping the movement of said element to break said contact, and electrical circuit means in connection with the core and said first means for energizing said solenoid.

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