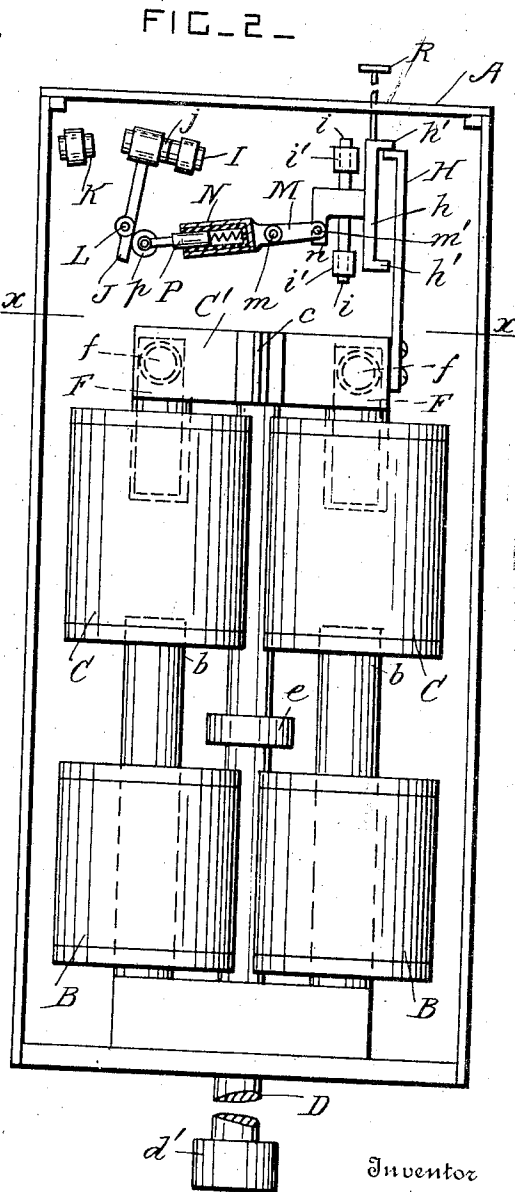
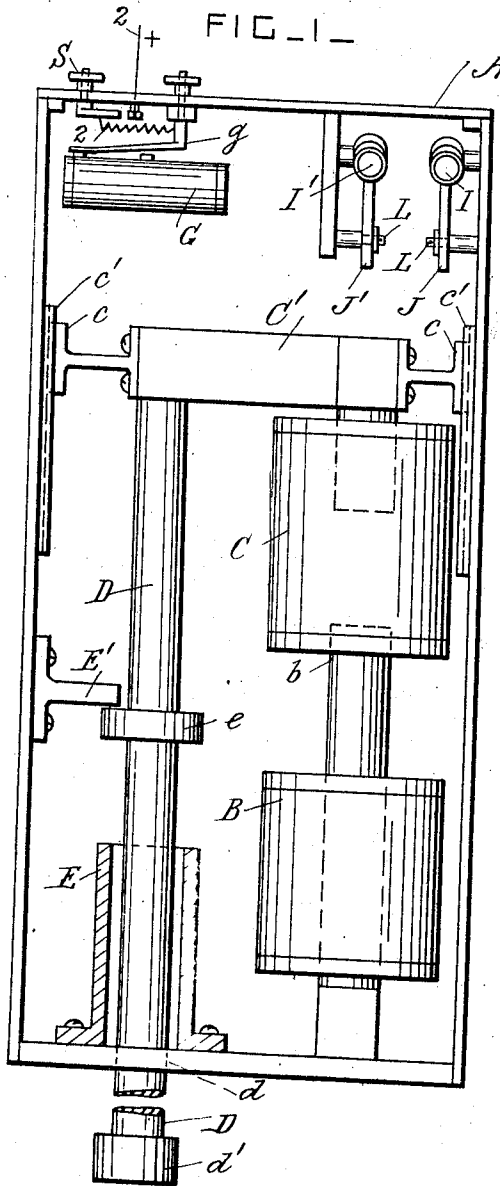


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ELECTRIC HAMMER.
APPLICATION FILED NOV. 22, 1910.

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Patented June 27, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 3—

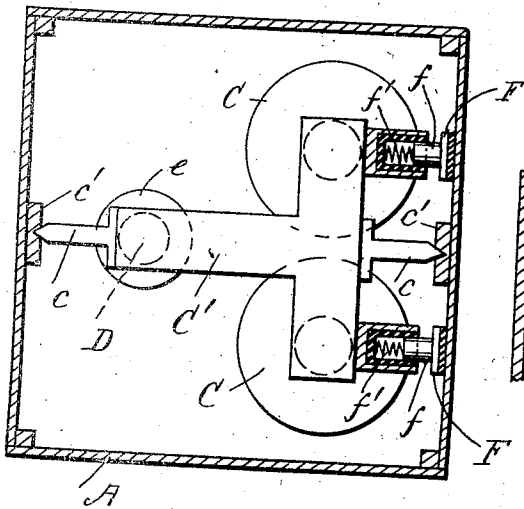


FIG. 4—

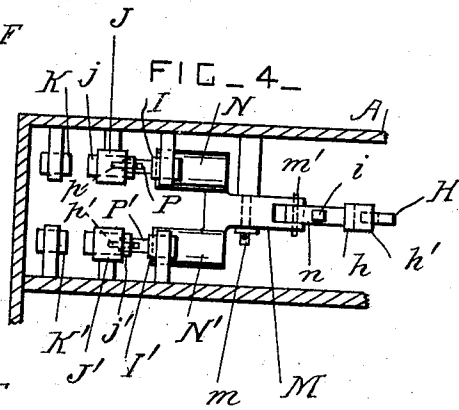
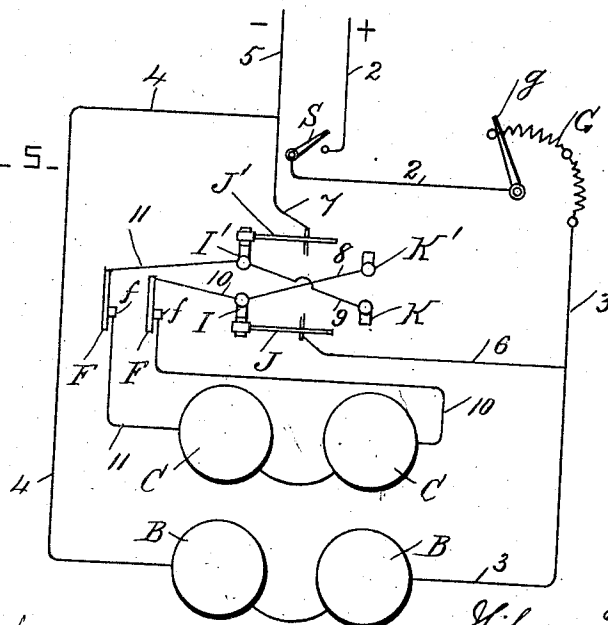


FIG. 5—



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ELECTRIC HAMMER.

996,439.

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To all whom it may concern:

Be it known that I, HILARY F. WHALTON, a citizen of the United States, residing at Key West, in the county of Monroe and State of Florida, have invented certain new and useful Improvements in Electric Hammers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electric hammers provided with electromagnets and reversible contact mechanism; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a side view of the hammer with the front of the casing removed. Fig. 2 is a front view of the electromagnets showing the reversing devices. Fig. 3 is a plan view taken in section on the line *x-x* in Fig. 2. Fig. 4 is a diagrammatic plan view of the contact mechanism. Fig. 5 is a diagram of the electrical connections.

A is an inclosing case of any convenient size and material.

B are two stationary electromagnets secured to the bottom of the case.

C are two slidable electromagnets secured together and arranged over the electromagnets B. The electromagnets C are secured to the arms of a T-shaped cross head C', and D is a hammer shaft secured to the stem of the crosshead and arranged to one side of and between the centers of the pairs of electromagnets. The electromagnets C have guide-bars *c* secured to them which are slidable vertically in guides *c'* secured to the case. The guide-bars and guides are of any approved form, but it is preferable to make the guides with V-shaped grooves for the guide-bars to slide in, so as to make them work with very little friction. The hammer shaft D slides in a hole *d* at the bottom of the case, and the hammer-head *d'* is secured to its projecting end portion.

A collar *e* is secured on the hammer shaft and works between two stops E and E' secured to the case, the stop E being preferably a cylinder surrounding the hammer shaft and secured to the bottom of the case. These stops limit the motion of the slidable electromagnets; and the cores *b* of the stationary electromagnets are preferably con-

structed to work inside the coils of the slidable electromagnets so as to reduce the magnetic leakage.

F are insulated contact-pieces secured to the case, and *f* are insulated contact-pieces carried by the electromagnets C. These contact-pieces are kept in circuit in any approved manner, and in the form of the devices shown, the contact-pieces *f* slide upon the contact-pieces F and are pressed on them by springs *f'*.

G is an adjustable resistance of any approved make inclosed within the casing and arranged in circuit with the electromagnets. A lever or finger-piece *g* is provided for varying the resistance.

The automatic reversing devices are shown in Fig. 2. H is a tappet secured to the slidable electromagnets C, and *h* is a slidable tappet-bar provided with projections *h'* at its ends for the tappet to engage with. The tappet-bar *h* is provided with guide-bars *i* which are slidable vertically in guides *i'* secured to the case A. I and I' are two insulated contact-pieces secured side by side in the case; and K and K' are two similar insulated contact-pieces secured side by side in the case and arranged opposite the contact-pieces I and I'. J and J' are two insulated contact-levers pivoted to the case by pins L and provided with contact-pieces *j* and *j'*. The contact-pieces are all preferably formed of carbon. The contact-piece *j* works between the contact-pieces I and K, and the contact-piece *j'* works between the contact-pieces I' and K'. M is a switch-lever pivoted to the case by a pin *m*. One end of this lever is pivotally connected by a pin *m'* to an arm *n* on the tappet-bar *h*, and the other end of the lever M is forked and is provided with cylinders N and N'. P and P' are insulated pistons slidable in the cylinders N and N'; and *p* and *p'* are wheels journaled in the projecting end portions of the pistons P and P' and bearing against the contact-levers J and J' respectively so as to rock the contact-levers when the lever M is oscillated on its pivot by the tappet mechanism. R is a finger-piece connected to the tappet-bar *h* and projecting from the case, so as to afford a means for starting the reversing mechanism by hand. S is a switch for starting and stopping the hammer.

The current passes from the line wire 2 through the switch to the resistance G, and thence by wire 3 to the stationary electro-

magnets B, and by wire 4 to the other line wire 5. The current also passes from the resistance G to the contact lever J by a wire 6; and the other contact-lever J' is connected with the line wire 5 by a wire 7.

The contact-piece I is connected with the contact-piece K' by a wire 8; and the contact I' is connected with the contact-piece K by a wire 9, the wires 8 and 9 being crossed but insulated from each other. The contact-piece I is connected with the slidable electromagnets C by a wire 10; and the contact-piece I' is connected with the electromagnets C by a wire 11. The contact-pieces F and f are included in the wires 10 and 11, when used, but if the wires 10 and 11 are sufficiently long and flexible the parts F and f can be omitted.

The tappet H makes and breaks and reverses the circuit automatically as long as current is supplied, and the hammer shaft is reciprocated by the slidable electromagnets. The reversal of the motion of the slidable electromagnets is accomplished by the levers J and J' which are placed alternately in contact with the contact-pieces I I' and with the contact-pieces K K', by the motion of the tappet H secured to the slidable electromagnets C.

This construction permits the hammer to be used with equal facility in all directions, and enables it to strike an upward blow with the same force as a downward blow.

The pairs of stationary electromagnets and pairs of slidable electromagnets are connected in parallel and the stationary magnets are permanently magnetized while the hammer is in operation. The hammer-head delivers a dead blow which is not checked by the action of any return spring, and as the current is reversed immediately after the blow has been struck there is no tendency for the magnets to stick to each other.

What I claim is:

1. In an electric hammer, the combination, with a case, and a stationary electromagnet secured in the case; of a slidable electromagnet supported in the case and provided with a hammer shaft, a switch lever pivoted in the said case and provided

with two insulated end portions, tappet mechanism for oscillating the said lever connected to the said slidable electromagnet, two contact-levers pivoted in the case and provided with insulated contact-pieces and operatively connected with the insulated end portions of the said switch-lever, two pairs of stationary contact-pieces secured in the case and operating in connection with the contact-pieces of the two said contact-levers respectively, and electric connections between the line wires including the electromagnets in parallel and including the contact-levers in circuit with the slidable electromagnet, the direction of the current through the slidable electromagnet being reversed automatically by the said tappet mechanism and switch-lever.

2. In an electric hammer, the combination, with a case, and a stationary electromagnet secured in the case; of a slidable electromagnet supported in the case and provided with a hammer shaft, a switch-lever pivoted in the case and provided at one end with two spring-pressed pistons arranged side by side and carrying wheels at their free ends, tappet mechanism connecting the other end of the said switch-lever with the slidable electromagnet, two contact-levers pivoted in the case in operative engagement with the said wheels and provided with insulated contact-pieces, two pairs of stationary contact-pieces secured in the case and operating in connection with the contact-pieces of the two said contact-levers respectively, and electric connections between the line wires including the electromagnets in parallel and including the contact-levers in circuit with the slidable electromagnet, the direction of the current through the slidable electromagnet being reversed automatically by the said tappet mechanism and switch-lever.

In testimony whereof I have affixed my signature in the presence of two witnesses.

HILARY F. WHALTON.

Witnesses:

ED. VAN DELDEN,
S. M. LESTER.