

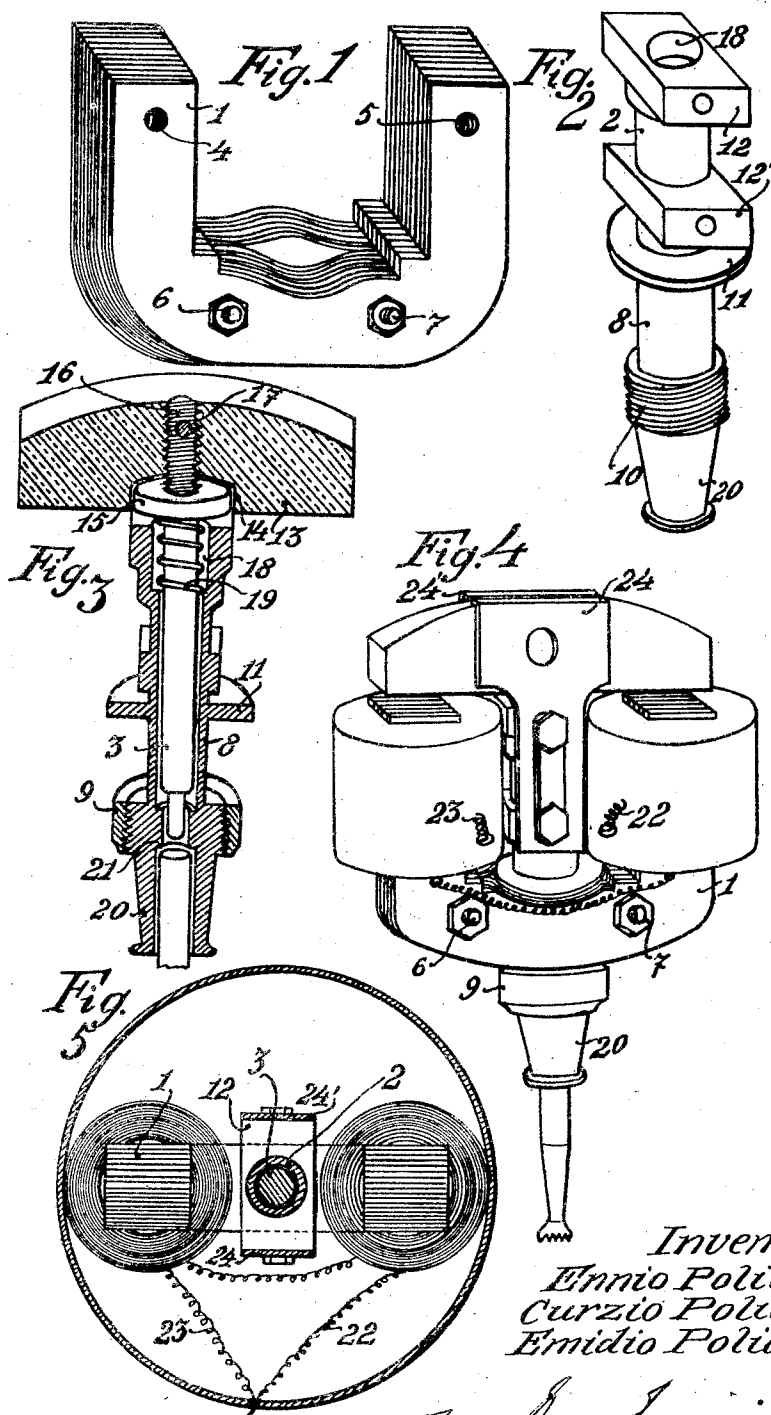
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E. POLIDORI ET AL

ELECTRIC HAMMER

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UNITED STATES PATENT OFFICE.

ENNIO POLIDORI, CURZIO POLIDORI, AND EMIDIO POLIDORI, OF ROME, ITALY.

ELECTRIC HAMMER.

Application filed January 16, 1922. Serial No. 529,665.

To all whom it may concern:

Be it known that we, ENNIO POLIDORI, CURZIO POLIDORI, and EMIDIO POLIDORI, all three subjects of the King of Italy, and residing at 18, Via Marmorata, Rome, in the Kingdom of Italy, have invented certain new and useful Improvements in Electric Hammers, of which the following is a specification, reference being had therein to the accompanying drawing.

The object of the invention is a metal and stone working device wherein the working tool is made to operate by means of an electrically and spring controlled ram arranged within a barrel-shaped tool-holder, the downward operative stroke of the ram being obtained through a magnet arranged to act on an armature on the ram when it is energized by an electric current transmitted to the induction coils from an independently arranged electric vibration device by which the circuit comprising the devices is alternately closed and opened at rapid intervals.

In the drawings—

Fig. 1 is a perspective view of the compound magnet,

Fig. 2 is a perspective view of the barrel-shaped tool-holder,

Fig. 3 is a vertical sectional elevation of the barrel-shaped tool-holder with the tool and the cooperating ram in position,

Fig. 4 is a perspective view of the device after removal of the casing,

Fig. 5 is a plan view of the device, with parts in section.

The device comprises a horse-shoe laminated magnet 1 whose yoke is traversed by a barrel 2 which encloses a ram 3. The suitably insulated leaves of the magnet 1 are held together at their free ends by means of tie-rods 4, 5 driven in flush with the outer surfaces, and at their bottom part by two bolts 6, 7 which are held in place by nuts. The bolts 6, 7 extend along a part 8 of the barrel 2 which engages the central passage provided in the yoke of the magnet so as to prevent lateral movements of the barrel, while vertical movements thereof are prevented by a nut 9 screwed onto a threaded portion 10 on the barrel below the part 8. The barrel has above its part 8 as annular projection 11 which is provided on its lower surface with a layer of insulating material to prevent an electric connection being set up between the leaves of the magnet after the barrel has been secured in place.

The barrel 2 carries respectively at an intermediate point above the projection 11 and on its top two disc-shaped projections 12' and 12 whose length is equal to the width of the armature of the magnet 1. The disc 12 projects slightly above the pole-faces of the magnet, in order to prevent the armature coming into contact with the pole-faces and crushing them when the device is running light.

The armature 13 of the magnet 1 consists of a block of soft iron and has provided in its lower surface a central circular hollow 14 to receive a disc-like projection 15 on the ram 3, the upper end of the ram being screw-threaded as at 16 to engage a threaded hole provided in the armature 13 wherein it is secured by means of a pin 17. The ram 3 is arranged within the barrel 2 which is provided towards its upper end with a tubular expansion 18 to hold a spiral spring 19 which surrounds the ram and acts to hold the armature 13 at the required distance above the pole-faces of the magnet when it is in its position of rest. The lower end 20 of the barrel is preferably in the shape of a truncated cone and receives the tool, for example a chisel, which is held at a suitable distance from the bottom end of the ram by the aid of a contraction 21 provided in the barrel, when the parts are in their position of rest.

The windings employed for the magnetic induction are arranged as coils 22, 23 and they are coated with lacquer and glued together and covered with fiber tapes so as to obtain a compact mass adapted to resist any shock. The ends of the wires are soldered to a brass plate secured to the fiber cover. The cross-sectional area of the wires and the number of the windings vary of course in accordance with the current employed and the power required.

Two brass straps 24, 24' are secured to the projections 12, 12' on the barrel and serve to hold the armature in the required position within the range of the magnetic field.

It has been found in practice that the component parts of the device should be arranged so that the up- and downward strokes of the armature do not exceed three millimeters and that it is held up at a distance of one millimeter above the pole-faces of the magnet to assure a rapid demagnetization, the armature striking at this point against the disc 12 on the barrel which pro-

jects for a distance of one millimeter above the pole-faces. It is thus evident that the magnetic field has to cover a distance of four millimeters and the distance intervening between the lower end of the ram and the upper end of the tool must be equal to three millimeters when the parts are in their position of rest.

The device constructed as above described has its component parts arranged as shown in Figure 4, while its outside appearance is illustrated in Figure 5 where it is enclosed within a casing.

What we claim is:

1. A metal and stone working device comprising a tool, a barrel-shaped tool-holder, an electrically and spring controlled ram arranged inside the tool-holder within the range of the tool, a laminated horse-shoe magnet having its yoke traversed by the tool-holder, means to hold the tool-holder in place within the magnet, an armature secured to the ram within the range of the pole-faces of the magnet, a disc-shaped projection on the barrel so as to project slightly above the pole-faces of the magnet, guides for the armature, and exciting coils.

2. A metal and stone working device comprising a tool, a barrel-shaped tool-holder, a ram slidably arranged within the tool-holder, a solid block of soft iron carried by the ram, a spiral spring arranged within the barrel around the ram so as to engage the block, a laminated horse-shoe magnet provided with an opening in its yoke for the insertion of the tool-holder so that the block is within the range of the pole-faces of the magnet, guides for the block secured

to the tool-holder, a disc-shaped projection on the barrel projecting slightly above the pole-faces of the magnet, and exciting coils.

3. A metal and stone working device comprising a tool, a barrel-shaped tool-holder, an electrically and spring controlled ram arranged to slide within the tool-holder, a laminated horse-shoe magnet traversed by the tool-holder, exciting coils surrounding the magnet, an armature carried by the ram within the range of the pole-faces of the magnet, means to stop the armature at the required distance from the pole-faces during the downward stroke, guides for the armature secured to the tool-holder, and a casing enclosing tool-holder, electromagnet and armature.

In witness whereof, said ENNIO POLIDORI has signed this specification at Rome, Italy, this 14th day of November, 1921.

ENNIO POLIDORI.

In presence of—

ANGELO CAVATTONI,
ZORELLO FONTANI.

In witness whereof, said CURZIO POLIDORI has signed this specification at Rome, Italy, this 14th day of November, 1921.

CURZIO POLIDORI.

In the presence of—

ANGELO CAVATTONI,
ZORELLO FONTANI.

In witness whereof, said EMIDIO POLIDORI has signed this specification at Rome, Italy, this 14th day of November, 1921.

EMIDIO POLIDORI.

In the presence of—

ANGELO CAVATTONI,
ZORELLO FONTANI.