

No. 773,122.

PATENTED OCT. 25, 1904.

A. F. CHRISTMAS.
ELECTRIC HAMMER.

APPLICATION FILED DEC. 2, 1903.

NO MODEL.

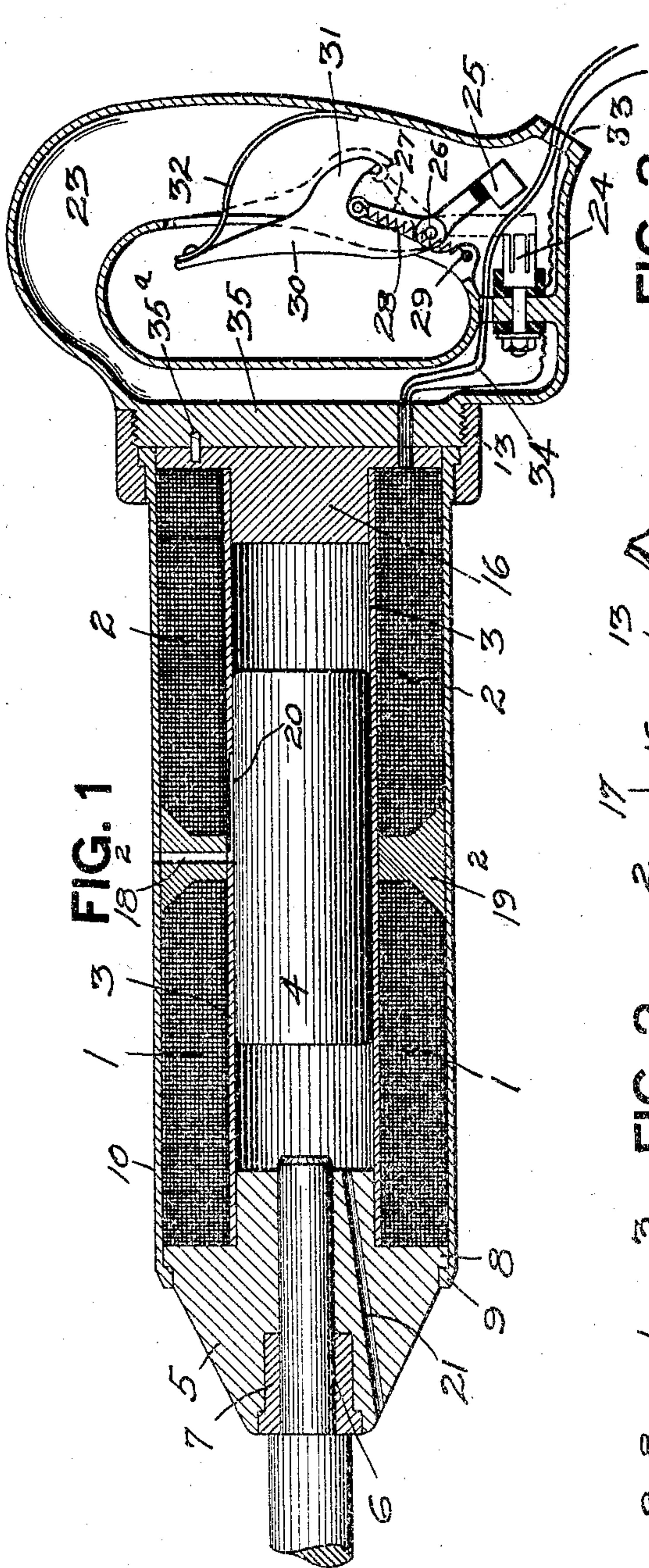


FIG. 1

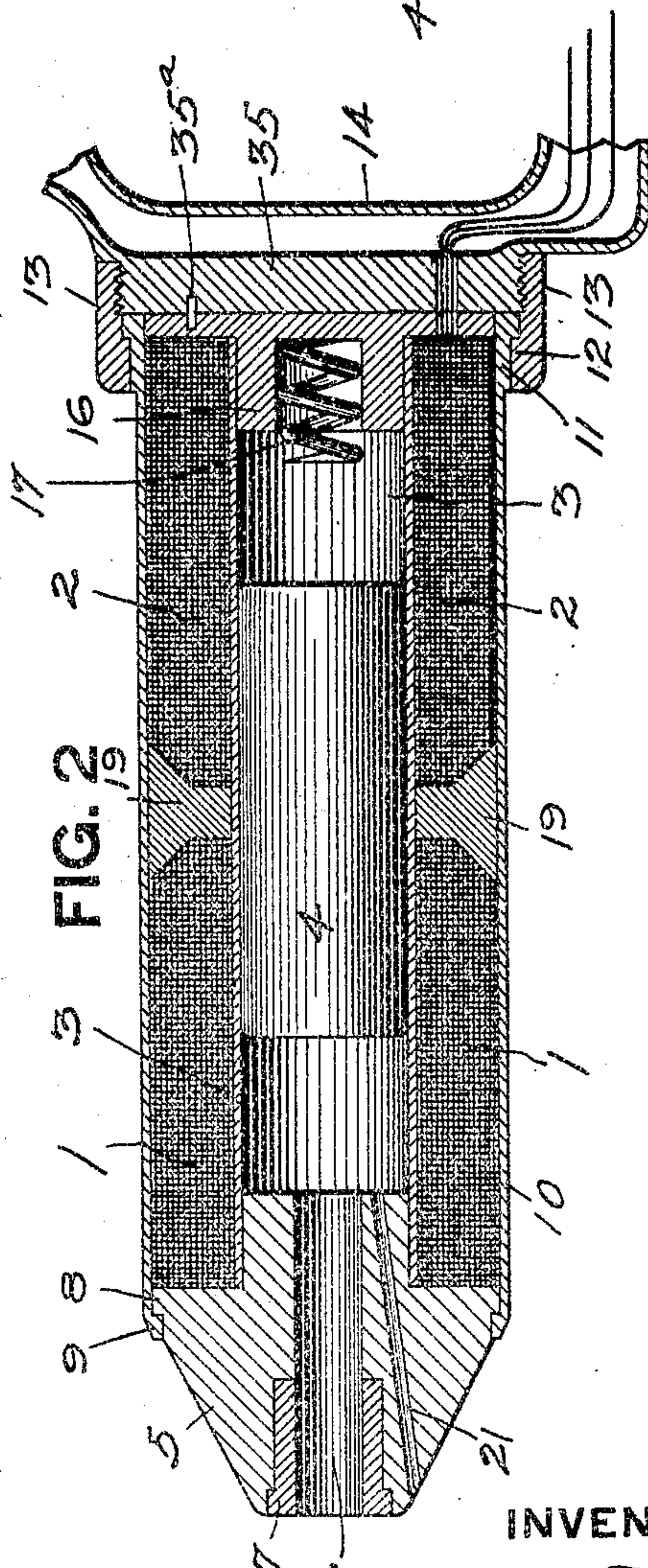


FIG. 2

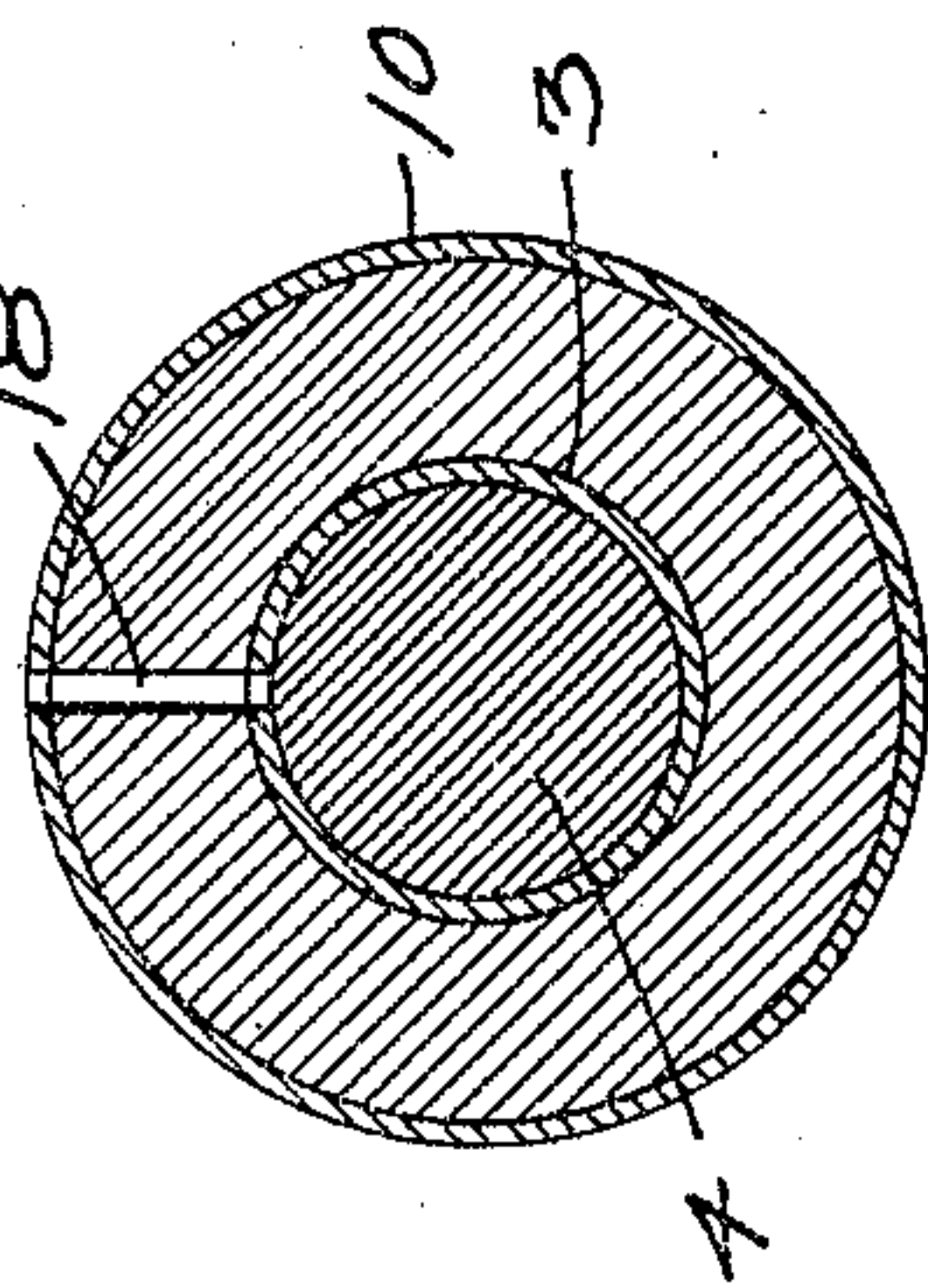


FIG. 3

WITNESSES.

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ADOLPH F. CHRISTMAS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO FRANK R. McFEATTERS, OF WILKINSBURG, PENNSYLVANIA.

ELECTRIC HAMMER.

SPECIFICATION forming part of Letters Patent No. 773,122, dated October 25, 1904.

Application filed December 2, 1903. Serial No. 183,520. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH F. CHRISTMAS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electric Hammers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electric reciprocating tools—such as hammers, chipping-tools, drills, calking-tools, and the like; and the object is to provide a tool of this character which will give a strong blow and yet is simple in its construction, and which can be started by the mere act of grasping the tool firmly to press it against the work and stopped by merely releasing the firm grasp on the tool.

In the accompanying drawings, Figure 1 is a longitudinal section through a hammer constructed according to my invention. Fig. 2 is a cross-section on the line 2 2, Fig. 1; and Fig. 3 is a longitudinal section showing a modification.

My hammer is provided with two coils 1 and 2, having within them the lining tube or bobbin 3, in which reciprocates the core or armature 4. The coil and armature are inclosed in a suitable casing, and as tools of this character are subjected to violent shocks difficulty has heretofore been experienced in so constructing the casing as to withstand these shocks. My casing comprises the front end or nose-piece 5, preferably formed of soft steel, having an opening 6 therethrough for the passage of the shank of the tool. A hardened-steel bushing 7 is placed in this end piece to take the wear of the tool-shank. This nose-piece is provided with an external shoulder 8, which is engaged by an internal shoulder 9 on the coil-inclosing tube 10. Preferably both the shoulders 8 and 9 are slightly undercut, as shown, so as to prevent their slipping past each other after being worn. The inclosing tube 10 at its opposite end is provided with an external annular shoulder 11, which is engaged by an internal shoulder 12 on one end of a coupling-sleeve 13, which at its opposite end is internally threaded and engages threads on the inner end of a handle-piece 14. The coupling-sleeve binds all the parts together.

The inner end of the sleeve or bobbin 3 is tightly closed by means of a head 16, which is held in place by the handle-piece bearing against the same. Preferably there will be interposed between this head and the core 4 some means for cushioning said core and starting it on its return movement. This means may be a helical spring 17, as is shown in Fig. 3, which will cushion the core 4 as it approaches the head 16 and starts on its return movement. Preferably, however, this result will be gotten by making the core 4 to closely fit the bore of the sleeve 3, and as a consequence the inner end of said sleeve will act as a pneumatic cylinder—that is to say, when the core 4 is drawn toward the head 16 by the energization of the coil 2 the air between said core and the head 16 will become compressed, thus acting as a cushion and also serving by its expansive force to start the core 4 on its return movement. The coils 1 and 2 of the hammer will be alternately energized, and each one for only a small interval of time, the coil 2 serving to draw the core back toward the head 16 and the coil 1 serving to draw said core in the opposite direction to give the blow, being aided in this by the expansive power of the air which has been compressed between the core 4 and the head 16, thus getting a powerful blow. In order that the dash-pot may not act by suction to retard the core 4 when it approaches the limit of its outward movement, an air inlet or inlets are provided leading into the sleeve 3 in such position that they will be uncovered by the inner end of the core 4 passing beyond the same when the latter approaches the limit of its outward movement. These air-inlets may be provided in any suitable way; but, as shown in the drawings, a duct or ducts 18 are formed in the soft-steel partition 19, which divides the two coils, this duct communicating with a groove 20, formed in the inner face of the sleeve 3 and terminating at such a point that its inner end will be uncovered by the inner end of the core 4 when the latter approaches the limit of its outward movement. The outer end of the sleeve 3 is in free communication with the atmosphere, as by means of a duct 21, extending through the

nose-piece 5, thus preventing a cushion being formed in front of the core.

The handle-piece 14 is provided with the usual member 23 to be grasped by the hand of the operator. This handle portion is made hollow, and in it are mounted the terminals 24 and also a switch-blade 25, which is pivoted at 26 and provided with a projection or arm 27. To the latter is connected one end of a helical spring 28, the opposite end of which is connected to the handle at 29, being so arranged that the axis of said spring will pass the pivot-center 26 in the movement of the switch-blade in both directions, thus causing the same to move with a snap and interrupt any arcs that may be formed. Also pivoted in the handle is a switch-closing lever 30, which is provided with a forked portion 31, engaging the projection 27 of the switch-blade, said lever being so positioned with reference to the portion 23 of the handle that when the handle is firmly grasped, as it must be in pressing the tool against the work, it will move the switch-blade to close the same. A flat leaf-spring 32 presses against the lever 30, so as to move the same to open the switch-blade as soon as the grasp on the tool-handle is released. In this manner I provide for the starting and stopping of the tool without the operator having to give any especial attention thereto, it being accomplished by the mere act of properly using the tool.

In connecting the tool the wires lead through an opening 33 into the chamber in the hollow handle and are connected to the terminals and have portions 34 thereof extending to the coils through holes in the inner web member 35 of the handle and the head 16. In order that the handle web member 35 will not shear off the circuit-wires, it is necessary to prevent the rotation of the handle with reference to the head 16. This is conveniently accomplished by having a key 35^a projecting into alining openings in the head 16 and the handle member.

The wiring of this hammer will be such that independent wires lead to the coils 1 and 2, and in connection therewith suitable means will be provided for directing the current alternately to said coils, and preferably the arrangement will be such as to energize each of the coils for only a short interval of time, thus preventing the heating of the tool, as would result by continuing the current, but at the same time getting a sufficiently strong magnetic pull on the core. This circuit-interrupting device preferably will operate in synchronism with the period of oscillation of the core 4, as more specifically described and claimed in my application, Serial No. 183,518, filed December 2, 1903.

What I claim is—

1. In an electric reciprocating tool, the combination of a sleeve or bobbin closed at one end, a coil thereon, a reciprocating core in

said sleeve and closely fitting the same, and an air-duct leading into said sleeve and so arranged that it will remain closed until the core approaches the limit of its outward movement.

2. In an electric reciprocating tool, the combination of a sleeve or bobbin closed at one end, two coils thereon, a partition separating the same, a reciprocating core in said sleeve and closely fitting the same, and an air-duct through the said partition and entering said sleeve at such a point that it will be uncovered when the core approaches the limit of its outward movement.

3. In an electric reciprocating tool, the combination of a casing, a coil and a core therein, a handle for said tool, a circuit-closer, and operating means for the circuit-closer on said handle and in such position that the act of grasping the handle closes the circuit.

4. In an electric reciprocating tool, the combination with the casing, of a coil and core therein, a handle for said tool, a circuit-closer, operating means for said circuit-closer mounted on said handle and so arranged that the act of grasping the handle closes the circuit, and a spring for normally holding the circuit-closer open.

5. In an electric reciprocating tool, the combination with the casing, of a coil and core therein, a handle for said tool, a circuit-closer pivoted in said handle, a helical spring having one end connected to said circuit-closer and its opposite end connected to the handle and arranged so as to pass the pivot-center of the circuit-closer in both movements of the latter, and operating means for said circuit-closer mounted in the handle and so arranged that the act of grasping the handle will close the circuit.

6. In an electric reciprocating tool, the combination with the casing, of a coil and core therein, a handle for said tool, a circuit-closer pivotally mounted in said handle, an operating-lever also pivotally mounted in the handle and arranged to engage the circuit-closer and being in such position that the act of grasping the handle will close the circuit, and a spring bearing against said operating-lever and normally holding the circuit-closer open.

7. In a reciprocating electric tool, the combination with the casing, of a coil and core therein, a handle for said tool, a circuit-closer pivotally mounted in said handle, an operating-lever therefor also pivotally mounted in the handle and arranged so that the act of grasping the handle will operate the same, and a fork on said lever engaging a projection on the circuit-closer.

In testimony whereof I, the said ADOLPH F. CHRISTMAS, have hereunto set my hand.

ADOLPH F. CHRISTMAS.

Witnesses:

F. W. WINTER,
ROBERT C. TOTTEN.