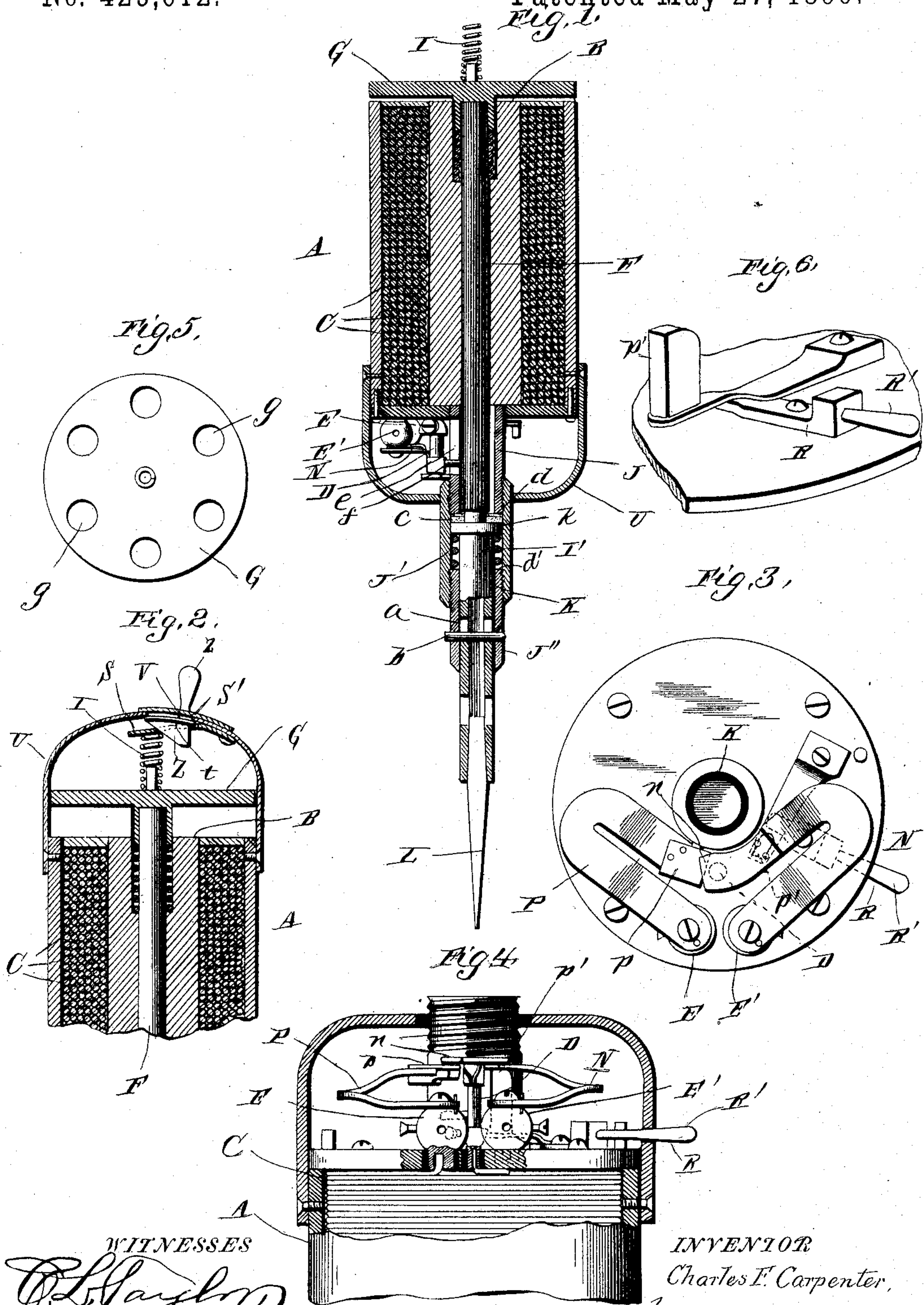


(No Model.)

C. F. CARPENTER.
MAGNETIC TOOL.

No. 429,012.

Patented May 27, 1890.



WITNESSES
W. L. Haydon
Philip Masi

INVENTOR
Charles F. Carpenter,
by *E. W. Anderson*,
his Attorney

UNITED STATES PATENT OFFICE.

CHARLES F. CARPENTER, OF LOUISVILLE, KENTUCKY.

MAGNETIC TOOL.

SPECIFICATION forming part of Letters Patent No. 429,012, dated May 27, 1890.

Application filed August 17, 1889. Serial No. 321,052. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. CARPENTER, a citizen of the United States, and a resident of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Electro-Magnetic Tools; and I do 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a central vertical section of my instrument. Fig. 2 is a sectional view of the upper portion of the instrument. Fig. 3 is a top view. Fig. 4 is a sectional view of the lower portion of the instrument in reversed position. Figs. 5 and 6 are details.

This invention relates to instruments for effecting rapid intermittent blows or strokes when influenced by an electric current; and it is designed chiefly for cutting stone and other hard substances.

In the accompanying drawings, the letter A designates a cylinder or case, which may be made of soft iron, and to which is connected an inner hollow or bored cylinder or case B of soft iron, which is surrounded with the coil C, of insulated wire of low resistance—for instance, No. 12 Birmingham wire-gage—forming an electro-magnet, the ends of the coil-wire being connected to the contact-post D and the binding-post E, which receives one of the wires from the battery or generator.

E' is the binding-post for the return-wire. In the hollow core-cylinder is located the central rod-hammer F, which is of bronze or some metal of no magnetic power, to the rear end of which is secured the armature G, which is provided with perforations g or passages to permit the ready escape of air from one side of said armature to the other during its rapid movements.

I is a spring or elastic buffer connected to the armature or its hammer, and I' is the retracting-spring of the hammer.

Attached to the cylinder is a tubular guide J J' J'', within which is carried the anvil-

piece or bit-carrier K, having upon it a collar k. This anvil-piece is preferably of a cylindrical form, as also is the hammer-rod, and these parts are in axial relation to the cylinder-core of the electro-magnet. The anvil-piece is provided with a guide or slot, as at a, which is engaged by a pin b, which keeps the anvil-piece from turning in the guide-tube, while allowing it a certain amount of reciprocating motion. Back of the collar and seated thereon is a leather washer c, which may be of any thickness required, to limit the back movement of the anvil-piece in accordance with the work in hand. The washer c in its back movements engages the interior shoulder d of the tubular guide, which is usually made in several pieces, as shown, for convenience in construction. The anvil-piece is provided at its end with a chuck or socket for the bit L. In the tubular guide is made a slot or opening e, extending lengthwise, through which projects the arm f, which is attached to the hammer-rod, said arm having with said hammer-rod motion of reciprocation when the instrument is in operation. Between the collar k and the lower interior shoulder d' of the tubular guide is the retracting-spring I' of the anvil-piece or tool-carrier.

Connected to the binding-post E' is a spring-contact N, which is armed with platinum at n. This platinum plate, resting on the post D, completes the circuit through the coil C. Connected to the binding-post E is the spring-contact P, also armed with platinum, as at p, its platinum plate being, however, normally out of contact with the platinum plate n, but capable of motion toward the same when pushed by the arm f of the hammer F, and when said arm f in its forward movement has effected contact between the plates n and p, short-circuiting the coil C, its motion continues for an instant sufficiently to lift the contact-plate n from the post D, so that the current cannot pass through the coil, but passes by the spring-contacts N and P from one binding-post to the other, and the attractive power of the electro-magnet is destroyed without the injurious concomitant of the spark.

The retracting-spring of the hammer I' acts instantly upon the change of circuit, pushing

back the armature which has been relieved from magnetic attraction and allowing the anvil-piece or tool-carrier, actuated by its retracting-spring I'' , to return to its normal position. The return of the hammer drawing back the arm f , the contact P falls, closing the short circuit and opening the circuit through the coil of the electro-magnet, which again attracts the armature and causes the hammer-rod to strike the rear or inner end of the anvil-piece or bit-carrier, causing the same to move forward sharply in its guide in an effective manner for working its bit or chisel in cutting stone.

To cut off the current from the coil and short circuits, I have provided a movable key R , which operates when moved in one direction to push the contact N from the post D without moving the contact P . By means of this device the action of the instrument can be caused to cease instantly, a slight pressure of the finger being sufficient.

To control and regulate the stroke of the hammer through the movement of the armature, I provide a governor V , which may consist of a cushion-spring S and a slide S' , having a finger-stud z and a flange t , provided with an inclined edge Z , adapted to engage the spring S .

When the hammer and armature are retracted by the spring I' , the buffer-spring I engages the cushion-spring S , which limits the movement according to its adjustment, which is effected with the greatest facility by moving the slide S' .

The cut-off key R is armed with an operating end R' , of ebonite or other non-conducting material, and engages a plate carrying a non-conducting bearing p' . The binding-posts and the post D are insulated by suitable bushings of non-conducting material.

I prefer to arrange the cut-off key R at one end of the incasement or cylinder handle and the governor V at the other end thereof, so that in operating the instrument the governor may be manipulated by one hand, while the other is free to direct the bit and to use the cut-off key when necessary.

The mechanism at the end of the electro-magnet is protected by coverings indicated at U , these being preferably of spherical or rounded character in order that the instrument may be moved in the hand with facility.

The character of the regular stroke of the instrument is determined by the thickness of the washer or adjustable stop c , which limits

the back movement of the anvil-piece, and the instrument should be set for the work in advance; but the variation of stroke required in the course of the work is effected without stopping the action of the instrument by means of the governor V , which limits the back movement of the hammer-rod.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In an electro-magnetic cutting-instrument, the combination, with the electro-magnet having a hollow core, the armature, axial hammer-rod, and axial anvil-piece or bit-carrier, of the retracting-springs, the governor, and the short-circuiting device operated by the electro-magnet through the hammer-rod, consisting of the hammer-arm f , the plates n and p , post D , and spring-contacts N and P , substantially as specified.

2. In an electro-magnetic cutting-instrument, the combination, with the coil of insulated wire and its hollow core and contact-post, of the non-magnetic central hammer-rod in said core, the axial anvil-piece, the retracting-springs, and governing and regulating devices of the wire binding-post, and its spring-contact normally in circuit with the contact-post of said insulated wire coil, the binding-post of the return-wire, the short-circuiting spring-contact in connection with the latter binding-post, and the pushing-arm f of the hammer-rod, substantially as set forth.

3. An electro-magnetic cutting-instrument having an electro-magnet, a central-acting non-magnetic hammer-rod within the core of said electro-magnet, the axial anvil-piece or bit-carrier, the retracting-springs, short-circuiting devices, and cut-off, substantially as specified.

4. An electro-magnetic cutting-instrument having an electro-magnet, a central-acting non-magnetic hammer-rod within the core of said electro-magnet, the axial bit-carrier, the retracting-springs, the short-circuiting devices, the governor or regulating device, the handle-cylinder or incasement, and the rounded covers at the ends of said handle-cylinder or incasement, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHAS. F. CARPENTER.

Witnesses:

PHILIP C. MASI,
M. P. CALLAN.