C. JACKSON.

POWER HAMMER.

APPLICATION FILED MAY 31, 1904.

952,255.

Patented Mar. 15, 1910.

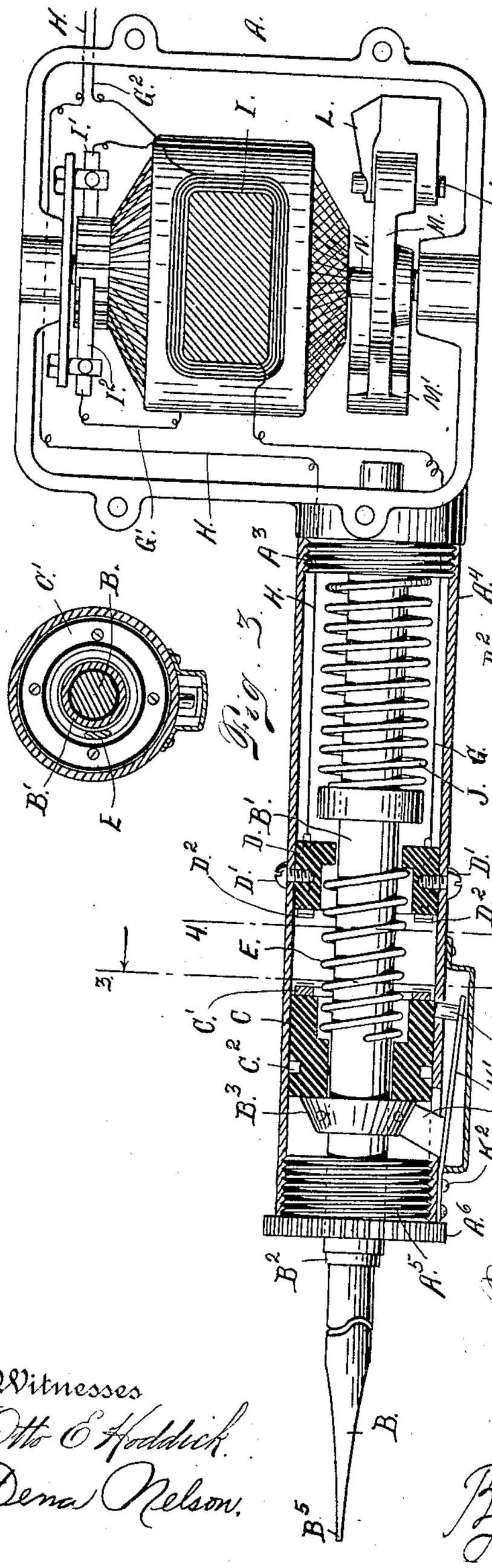

Fig. 1.

Fig. 2.

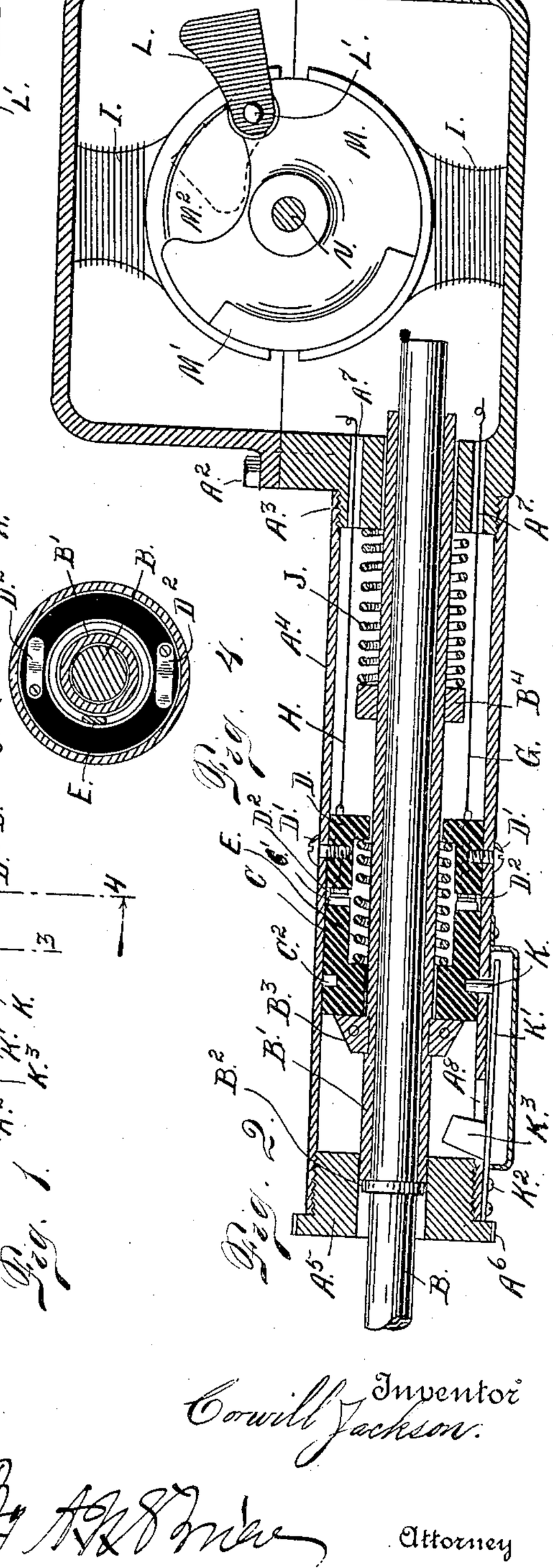

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses

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POWER-HAMMER.

952,255. Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed May 31, 1904. Serial No. 210,568.

To all whom it may concern:

Be it known that I, CORWILL JACKSON, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Power-Hammers; 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 the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in power hammers.

My improvement consists of a tool loosely mounted and arranged to be acted on by a hammer mounted on the armature of an electric motor and rotating therewith. This hammer is pivotally connected with a disk mounted on the armature shaft and is adapted to swing outwardly in response to the centrifugal force incident to the rotation of the disk. The disk is cut away adjacent the hammer on one side, to allow the hammer to fold into the said recess while it is passing the extremity of the tool upon which it acts. The motor is mounted in a casing of suitable size to allow the hammer to swing outwardly under the influence of centrifugal force, as soon as it has passed the extremity of the tool. Provision is made for closing the circuit through the motor and starting the latter automatically, as the cutting extremity of the tool is applied to the surface to be acted on and given suitable pressure whereby two contacts are brought together, through which the circuit is closed. This device is adapted for use in all the varied relations where an article of its class is ordinarily employed.

Having briefly outlined my improved construction as well as the function it is intended to perform, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a top view of my improved hammer with the upper part of the casing inclosing the motor, removed and the shell connected with the motor casing shown in section. Fig. 2 is a sectional elevation, the section being taken at right angles to that shown in Fig. 1. Figs. 3 and 4 are sections taken on the lines 3—3 and 4—4 respectively of Fig. 1.

The same reference characters indicate the same parts in all the views.

Let A designate the body of the motor casing and A′ a detachable housing connected with the casing by means of stud bolts A^2. The body of the casing A is provided with a threaded projection A^3, upon which is screwed a cylindrical casing A^4 whose outer extremity is provided with a plug A^5 which is screwed into the forward end of the cylindrical casing or that remote from the motor casing. This plug is provided with a milled zone A^6 exposed for convenience in turning the latter for the purpose of insertion and removal. The plug A^5 at the forward extremity of the cylinder and the projection A^3 which enters the rear extremity thereof, are both provided with central openings through which the tool B passes. This tool is surrounded by a bushing B′ and is loose therein. The forward extremity of the bushing bears against a shoulder B^2 formed on the shank of the tool. In the rear of this shoulder a collar B^3 is secured to the bushing, and in the rear of the collar an insulating block C is loosely mounted on the bushing, while in the rear of the block C is a second insulating block D, the latter being secured to the cylinder A^4 by screws D′. The two blocks C and D are interiorly recessed or chambered to receive a coil spring E whose extremities bear against the respective insulating blocks.

To the rear face of the block C is attached a contact ring C′, while to the adjacent face of the block D are attached two contacts D^2 to which lead electrical conductors G and H. These conductors both pass through openings A^7 formed in the projection A^8 of the motor housing. The conductor H passes through the housing to one pole of the electrical source (not shown); while the conductor G passes to one of the field coils I of the motor, thence through one of the brushes I′ to the armature, thence to the brush I^2 and thence by way of a conductor G′ to the other field coil I, and thence through a conductor G^2 to the other pole of the electrical source. The bushing B′ is surrounded by a collar B^4 which is made fast thereto. This collar is located in the rear of the insulating

block D, and between the collar B^4 and the projection A^3 of the motor housing, is interposed a coil spring J which is under sufficient tension to hold the bushing normally in engagement with the shoulder B^2 of the tool. The contacts D^2 are normally separated from the contact ring C′, through the instrumentality of the coil spring E which is under sufficient tension to force the block C, the bushing B′ and the tool B forwardly to effect the separation of the said contacts and break the circuit, except when the cutting extremity of the tool is pressed with sufficient force against some object, to cause the insulating block C to move rearwardly far enough to bring the contact ring C′ into engagement with the contacts D^2; and when the tool is in operation, the pressure of the cutting extremity of the tool against its work is sufficient for the said purpose. The parts are then in the position shown in Fig. 2. When the circuit is closed the insulating block C is locked in the circuit closing position by a pin K, fastened on a spring K′, made fast to the cylinder, as shown at K^2. The collar B^3 of the bushing B′ is beveled. The projection K^3, attached to the spring K′, passes through a slot A^8 formed in the cylindrical casing. As soon as the pressure ceases to act on the cutting extremity of the tool, the spring J will force the bushing B′ forwardly and bring the collar B^3 into engagement with the projection K^3, whereby the spring K′ is forced outwardly sufficiently to release the pin K from the circumferential recess C^2 formed in the insulating block C. The recoil of the spring E, then acts to force the insulating block C to the position shown in Fig. 1, breaking the circuit and quickly separating the contact ring C′ from the contacts D^2.

The rear extremity of the tool B enters the chamber of the motor housing A, and is in position to be acted on by the hammer L which is pivoted at L′ to a disk M made fast to the armature shaft N and reinforced at M′ opposite the hammer L, whereby the disk is balanced. The disk is cut out as shown at M^2, to allow the hammer to fold thereinto as shown by dotted lines in Fig. 2, after the hammer strikes the rear extremity of the tool. As the hammer occupies the same plane as the body of the disk, this recess is necessary in order to allow the hammer to pass the rear extremity of the tool. As soon as this occurs, however, the centrifugal force will throw the hammer outwardly whereby it will assume its limit of outward movement or that indicated in Fig. 2.

From the foregoing description the use and operation of my improved hammer will be readily understood. Assuming that the parts are in the position shown in Fig. 1, as the user begins the operation of the tool, he will press its forward or cutting extremity B^5 against the rock or other surface to be acted on, with sufficient force to throw the tool and bushing rearwardly and bring the contact ring C′ into engagement with the contacts D^2, whereby the circuit is closed through the field coils of the motor. At the same time the pin K will slip into the recess C^2 of the insulating block C and lock the parts in the circuit-closing position. The rotation of the motor armature, together with the disk M and the hammer L, then commences; and every time the hammer L makes a revolution, it strikes the rear extremity of the tool, and as often as it strikes this tool, it folds into the recess M^2 while passing the tool after which it returns to its outward position whereby it is made to act most effectively upon the tool.

The spring J tends to maintain the tool in its extreme outer position in which position its blow-receiving end is clear of the hammer. Therefore, by moving the drill so as to bring the tool against the work and then moving the drill into various positions relative to the work, the tool is forced inward against the tension of the spring so as to bring its blow-receiving end into different operative relations to the hammer. This is of importance in that the force of the blows on the drill may be varied so as to cause it to operate most advantageously irrespective of the character of the material operated upon.

Having thus described my invention, what I claim is:

1. The combination with an electric motor, a hammer operated by the motor, a casing, a tool movably mounted in the casing, a bushing also mounted in the casing and through which the tool passes, the latter being loose in the bushing, the tool having a shoulder which the forward extremity of the bushing engages, the bushing being provided with a collar, a coil spring interposed between the casing and the said collar, another collar mounted on the bushing forward of the first named collar, an insulating block movably mounted in the casing and adapted to engage the forward collar of the bushing, another insulating block fast in the casing in the rear of the first named block, the adjacent faces of the two insulating blocks being provided with contacts located in the circuit of the field coils of the motor, a coil spring interposed between the two insulating blocks and having a tendency to force the movable block forwardly to break the circuit, means for locking the movable insulating block in the casing comprising a spring-actuated pin having a forwardly located, interiorly projecting part, lying in the path of the forward collar of the bushing when the latter is driven to its forward limit of movement whereby the interiorly

projecting part is acted on to disengage the spring-actuated pin from the insulating block thus releasing the latter.

2. In a tool of the class described, the combination with an electric motor and a casing, of a bushing movable longitudinally in said casing, a spring whose tendency is to force the bushing to its forward limit of movement, circuit-closing contacts located in the casing, means for locking the movable contact in the circuit-closing position, the said locking means having a part projecting into the casing, the bushing having a collar adapted to engage the said projection of the locking device and release the movable contact when the bushing is driven forwardly, a spring acting to move the unlocked contact sufficiently to break the circuit, and a tool passing through the bushing and provided with a shoulder acted on by the bushing.

3. The combination with an electric motor comprising a casing forming a part of the magnetic circuit of said motor and an armature inclosed by and journaled in said casing, said casing being formed with a tool-receiving passage or opening, a centrifugal hammer located in said casing and rotated by said armature, of a shell secured to said casing, a tool supported in said shell with one end projecting through said opening or passage into the casing in a position to be struck by said hammer, a pair of relatively movable contacts in said shell, the engagement of said contacts being controlled by the position of the tool, and a lead extending from one of said contacts to the motor, said lead being located within said casing and said shell.

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

CORWILL JACKSON.

Witnesses:
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