No. 709,820.

Patented Sept. 23, 1902.

J. H. JACKSON.

POWER HAMMER.

(Application filed Feb. 9, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

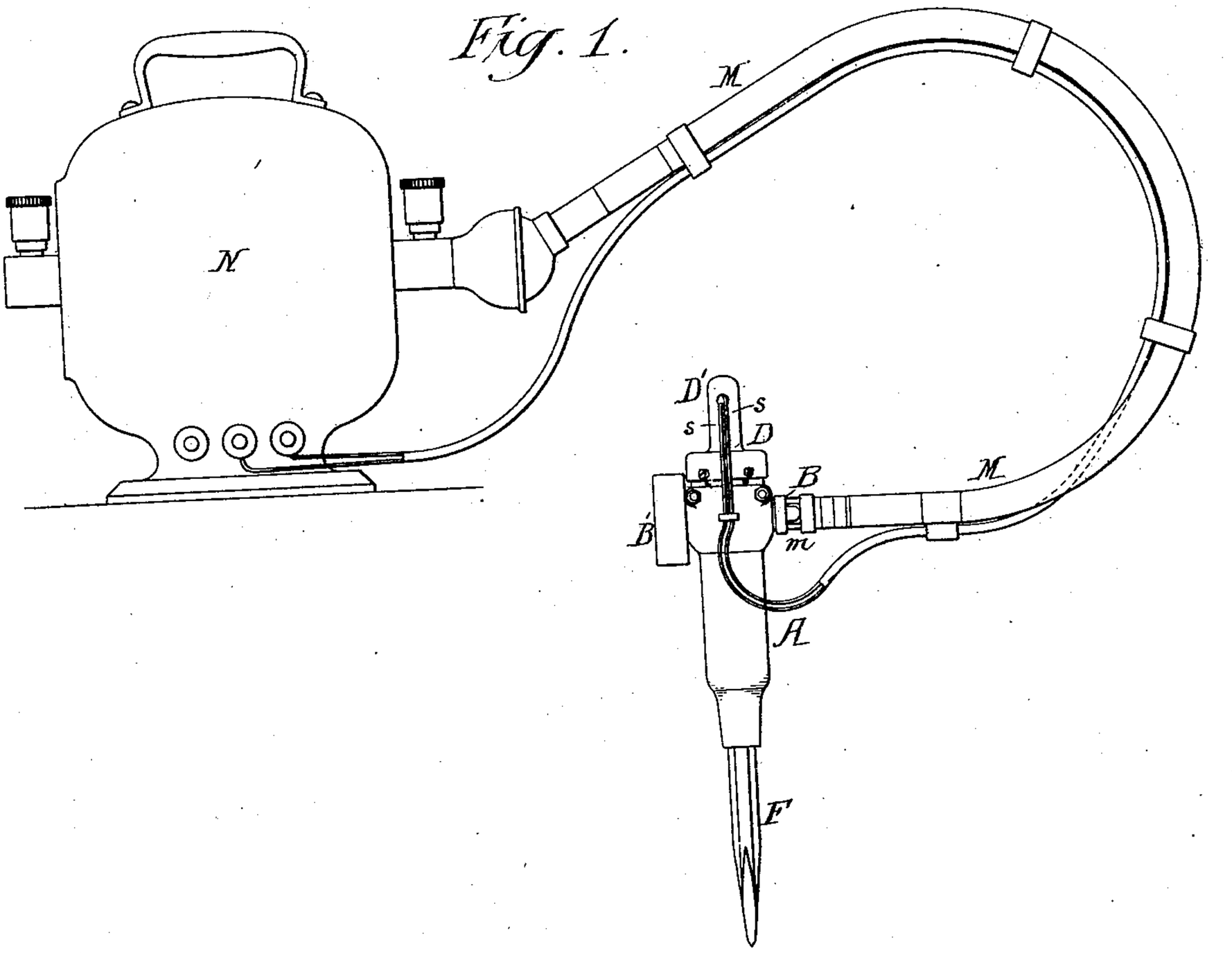
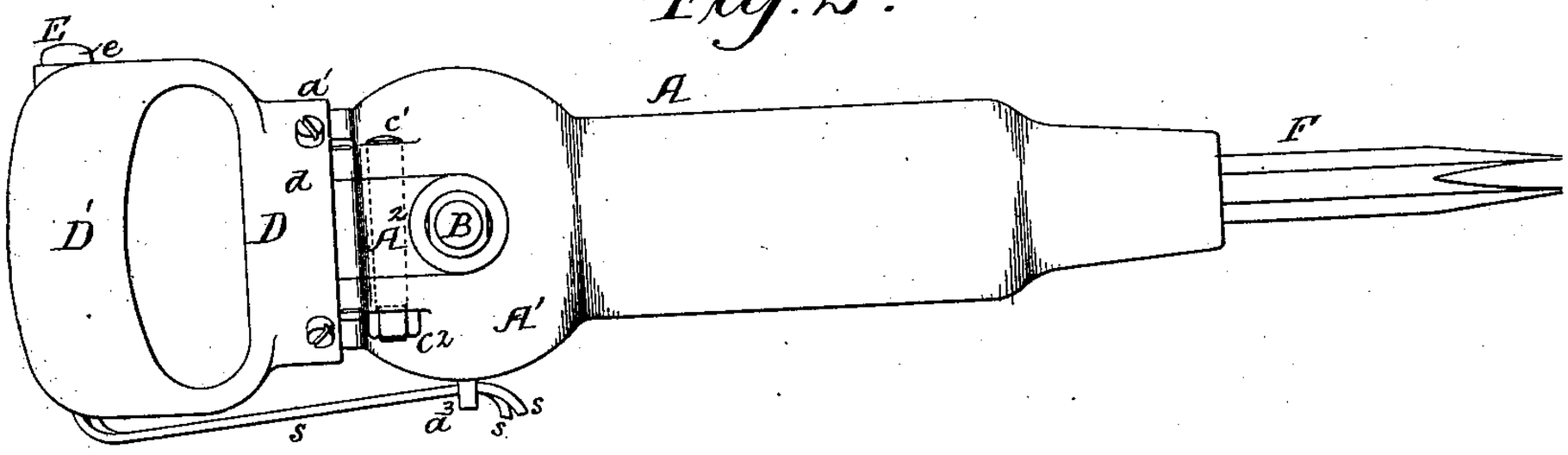


Fig. 2.



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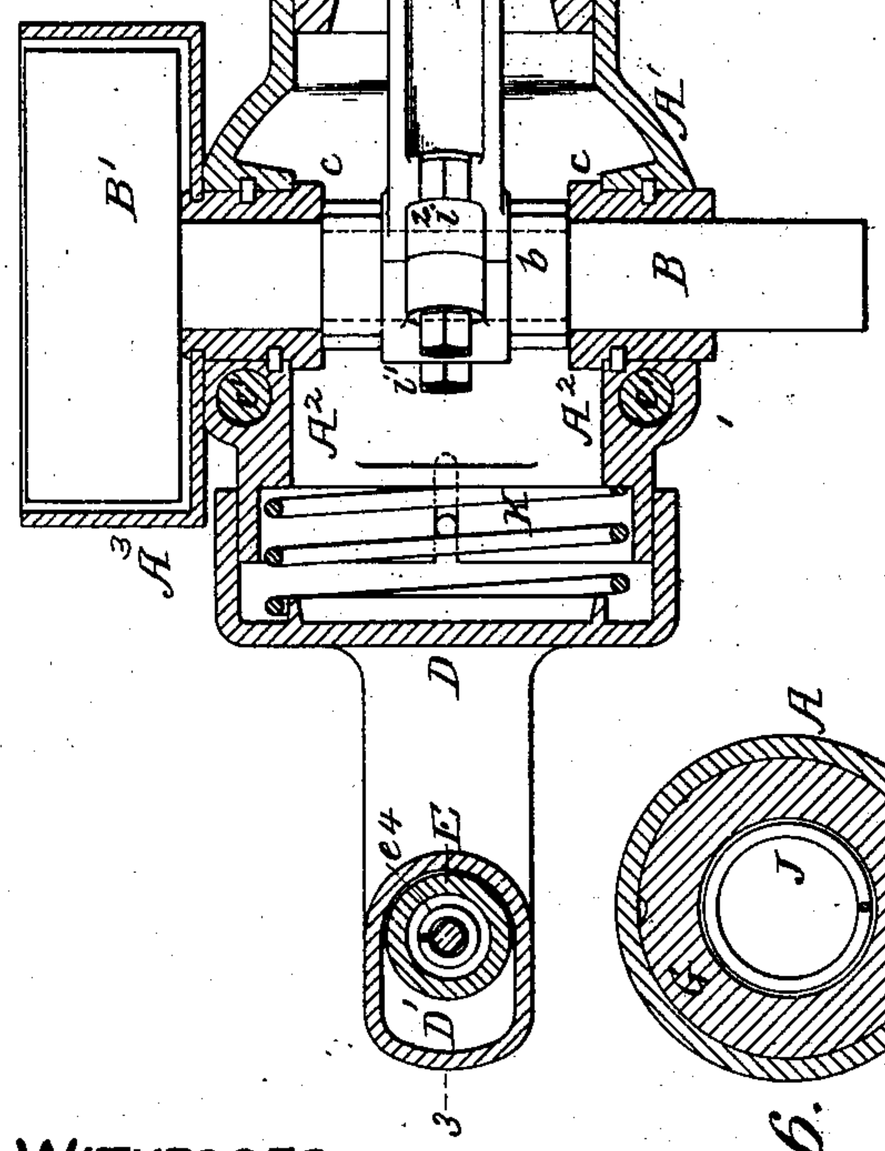

Fig. 4.

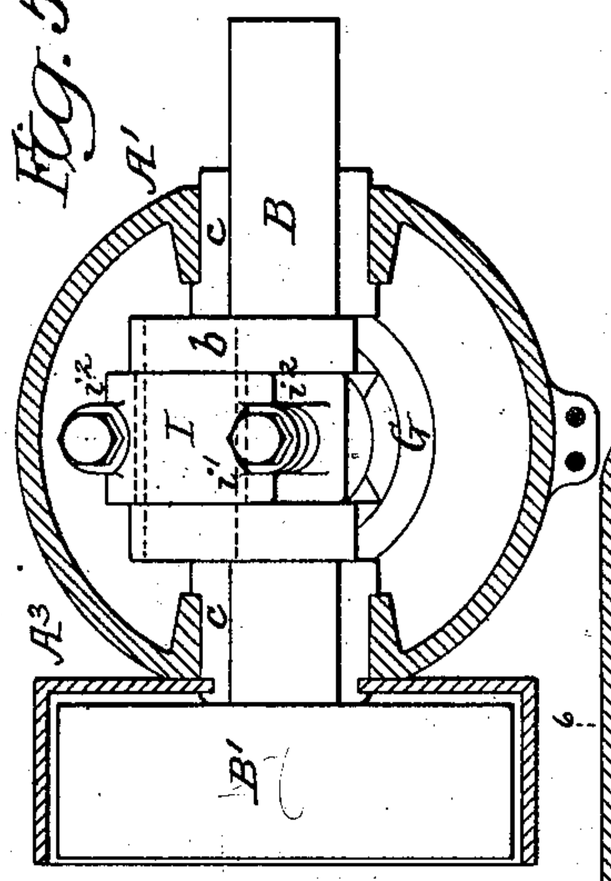

Fig. 5.

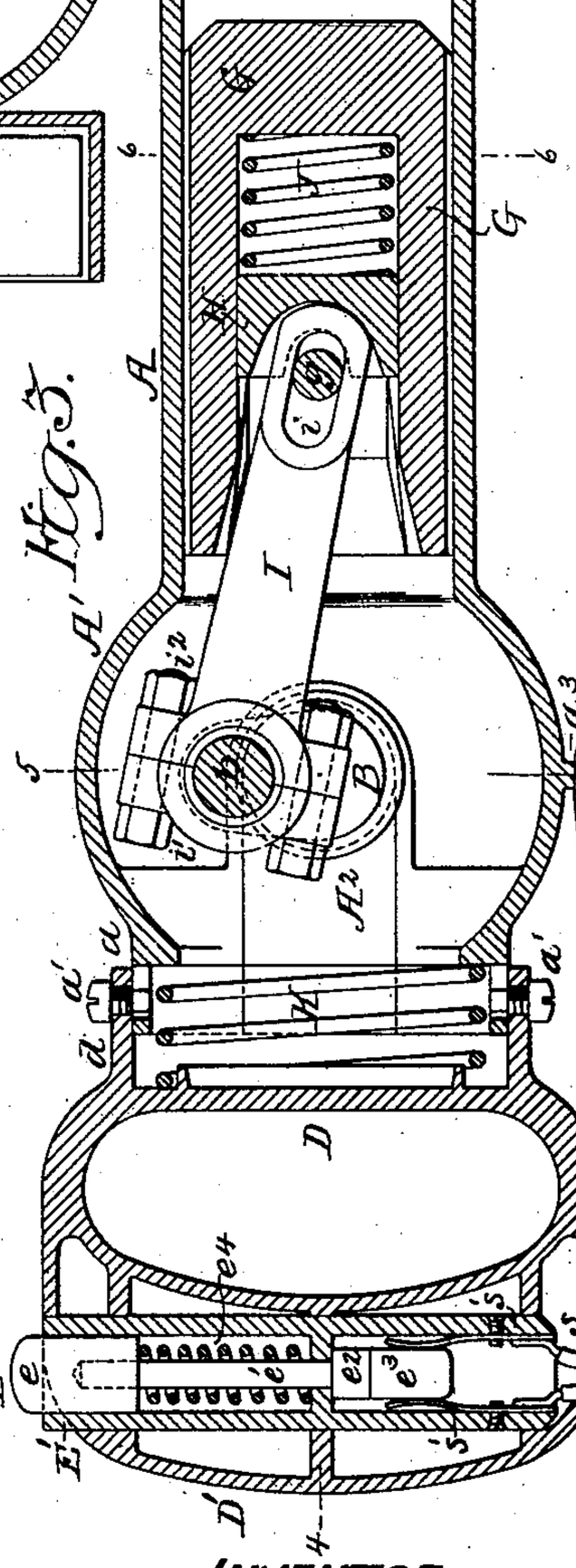

Fig. 3.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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POWER-HAMMER.

SPECIFICATION forming part of Letters Patent No. 709,820, dated September 23, 1902.

Application filed February 9, 1901. Serial No. 46,688. (No model.)

To all whom it may concern:

Be it known that I, JAMES HOMER JACKSON, a citizen of the United States, and a resident of Denver, Colorado, have invented certain Improvements in Power-Hammers, of which the following is a specification.

My invention relates to certain improvements in portable power-hammers for use in riveting, chipping, calking, carving, and for many other purposes for which a hammer of this type is adapted.

The main object of my invention is to provide a hammer that can be operated through a flexible shaft from an electric motor or other source of power and in which the blow of the hammer depends entirely upon momentum.

My invention is especially applicable for use in connection with an electric motor, a further object being to provide the hammer with means for making and breaking the circuit of the motor by the hand holding the tool, so that the motor and the tool are under absolute control of the operator.

A still further object of the invention is to so construct a hammer having a power-driven shaft that it can be held by the operator without the operator receiving the jars and tremor of the tool.

In the accompanying drawings, Figure 1 is a view showing the hammer coupled to an electric motor by means of a flexible shaft. Fig. 2 is a side view of my improved hammer. Fig. 3 is a longitudinal sectional view on the line 3 3, Fig. 4. Fig. 4 is a longitudinal sectional view on the line 4 4, Fig. 3. Fig. 5 is a transverse sectional view on the line 5 5, Fig. 3. Fig. 6 is a transverse sectional view on the line 6 6, Fig. 3.

A is the casing of the tool.

B is a shaft having a crank *b*. The shaft is mounted in bushings *c c* in the enlarged portion A′ of the casing. At the rear of the shaft are blocks A^2, which fit against the bushing, and these blocks are held in place by tapered pins *c′*, which are screw-threaded at one end, and adapted to the screw-threaded portion of the pins are nuts c^2.

D is a cap having a flange *d*, which fits over a flange *a* at the end of the casing A′ and is held in place by set-screws *a′*. The set-screws pass into slots in the flange *a*, and between a flange on the casing A and the cap D is a spring K, which takes up the jar and tremor of the casing when the tool is in operation. Connected to the cap is a handhold D′, within which is the push-button controlling the device for making and breaking the circuit of the driving-motor. Details of this device will be described hereinafter. In the opposite end of the casing A is mounted the tool F. The shank *f* of this tool extends into the casing and has a head *f′*, which is in position to be struck by the end of the hammer G, arranged to slide in the body of the casing A, as clearly shown.

Within the cavity a^2 in the end of the casing A is a collar f^2, confined within the cavity by pins f^3, and in the cavity back of the collar is a spring F′. The collar rests back of a shoulder on the tool, so that the tool can be forced into the casing by the operator to any desired distance, according to the blow to be struck, the spring F′ forcing the tool out as soon as the casing is relieved from pressure.

The hammer G is hollow, as shown, and extending into the hammer is a connecting-rod I. A pin *g* passes through the hammer and through a slot *i* in the connecting-rod I, coupled to the crank *b*, as clearly shown in Fig. 4. The rod in the present instance is made with a cap *i′*, held in place by screw-bolts i^2, so that the rod can be readily detached from the crank-shaft, and by removing the blocks A^2 the crank-shaft can be detached from the casing after the cap D has been removed.

Between the end of the rod I and the bottom of the cavity in the hammer G is a plunger or block H and a spring J. The block is shaped to fit the end of the rod, as shown, so that the blow is transmitted from the rod I to the hammer G through the block H and spring J. The hammer is thus a floating hammer, not being rigidly connected to the power-shaft and in which the blow of the hammer depends entirely upon momentum. By this construction the shaft is relieved of all jar due to the hammer striking the end of the tool, and thus the even running of the shaft without undue racking is accomplished.

I preferably mount a fly-wheel B′ on the shaft B, so that the shaft will have a steady motion, and I couple the shaft to a section of

flexible shafting M by a coupling *m*. This flexible shaft is connected either directly or indirectly to the armature-shaft of an electric motor N, Fig. 1, or it may be connected to any suitable shaft to which power is applied; but I prefer to use a small portable electric motor, as I find that this is more convenient than any other form of motive power, and the tool can be used in places inaccessible by tools of the pneumatic type.

As remarked above, in the handle I provide a device for making and breaking the circuit of an electric motor. This device consists of a tubular shell E′, set in the handle D′, and in this shell is a push-button *e*, connected to a rod *e*′, carrying a contact-piece e^2 and a cut-out e^3. A spring e^4 is mounted between an internal flange in the tube E′ and the button *e*, so that the cut-out e^3 is normally in contact with the terminals *s*′ *s*′ of the wires *s s*, leading to the dynamo. When the button *e* is pushed in, however, the contact-piece e^2 is in contact with the terminals *s*′ *s*′ and the motor is in circuit. I preferably extend the wires *s s* through openings in a lug a^3 on the section A′ of the casing directly under the shaft B and run the wires on the casing of the flexible shaft to the motor.

I inclose the fly-wheel B in a protecting-shell A^3, attached to the casing in any suitable manner.

Any suitable flexible connection may be used between the plunger or block H and the hammer G, and while I have shown in the present instance a coiled metallic spring J it will be understood that air may be used, and in this event the block should snugly fit the cavity in the hammer.

The operation of my improved hammer is as follows: The shaft B of the hammer is coupled to an electric motor N through a flexible shaft M and the motor is placed in a convenient position to the work. The wires can be readily run to the motor from any line-wire from a generator. The handle of the tool is grasped by one hand, with the thumb resting on the button to make and break the circuit, and the other hand grasps the casing of the hammer near the tool, and sufficient pressure is exerted on the tool to compress the spring F′, projecting the head *f*′ of the tool into position to be struck by the end of the hammer G. The button *e* is then pushed into its tube, making contact and causing the power to be transmitted to the shaft B, and as the shaft rotates the connecting-rod I reciprocates, forcing the block H into the cavity of the hammer G and compressing the spring at the same time, causing the hammer to move forward, striking the necessary blow on the end of the tool. The rebound is taken up by the spring J, and the block is again in position to be forced forward by the rod. The shaft B being driven at a high speed, the blows upon the end of the tool are given in rapid succession. The jar of the blow is taken up by the several springs, so that the operator feels very little, if any, of the tremor or jar of the blow.

I claim as my invention—

1. The combination in a power-hammer, of a casing, a crank-shaft mounted in bearings therein, a tool carried by the opposite end of the casing, a hammer within the casing, a connecting-rod on the crank of the shaft and loosely connected to the hammer whereby the blow of the hammer depends entirely upon momentum, substantially as described.

2. The combination in a power-hammer, of a casing, a tool carried by said casing, means in the casing for striking said tool, a shaft for operating said means, an electric motor, a flexible shaft connecting the motor with the operating-shaft, means on the tool for making and breaking an electric circuit, and wires extending from the said means on the tool to the electric motor, substantially as described.

3. The combination in a power-hammer, of a casing, a hammer within the casing, a crank-shaft, means for connecting the crank-shaft to the hammer, a handle for the tool, a device carried by the handle for making and breaking an electric circuit, an electric motor, a flexible shaft connecting the electric motor with the crank-shaft of the tool, and wires extending from the circuit making and breaking device on the handle of the tool to the electric motor, substantially as described.

4. The combination in a power-hammer, of a casing, a handle flexibly connected thereto, a hammer within the casing, a crank-shaft extending through the casing, a rod connecting the crank-shaft to the hammer, a flexible shaft coupled to the crank-shaft, an electric motor coupled to the flexible shaft, a circuit-breaker carried by the handle, and wires extending from the circuit-breaker to the electric motor, substantially as described.

5. The combination in a power-hammer, of a casing, a tool carried by said casing, a floating hammer within the casing and arranged to strike the tool, a crank-shaft mounted in bearings in the casing, a rod connecting the crank-shaft to the hammer, a plunger mounted within the hammer and bearing against the end of the rod, and a spring mounted between the plunger and the hammer, substantially as described.

6. The combination of a casing, a crank-shaft mounted in said casing, a floating hammer in the casing, a plunger within the hammer, a flexible connection between the plunger and the hammer, a rod connected to the crank of the shaft and slotted at the opposite end, and a pin on the hammer passing through the slot in the rod, substantially as described.

7. The combination of a casing, a crank-shaft mounted therein, a floating hammer within the casing, a plunger, a spring between the plunger and the hammer, a rod connecting the plunger and the crank of the shaft, a tool extending through the end of the casing, and a spring tending to force the tool

out, the end of said tool being in position to be struck by the hammer, substantially as described.

8. The combination of a casing, a crank-shaft, a floating hammer, a plunger, a rod connecting the plunger with the crank of the shaft, a spring mounted between the plunger and the hammer, a tool projecting into the casing into position to be struck by the hammer, and a handled cap at the rear of the casing, substantially as described.

9. The combination of a casing, a crank-shaft, a floating hammer, a plunger, a rod connecting the plunger with the crank of the shaft, a spring mounted between the plunger and the hammer, a tool projecting into the casing in position to be struck by the hammer, a handled cap at the rear of the casing, and a spring mounted between the rear of the casing and the cap, substantially as described.

10. The combination of a slotted casing, bushings in the slot, blocks back of the bushings, means for securing the blocks to the casing, a crank-shaft mounted in the bushings, a floating hammer, means for connecting the hammer to the crank-shaft, and a tool carried by the opposite end of the casing, substantially as described.

11. The combination of a casing, a tool in one end of the casing, a floating hammer, a crank-shaft, a plunger within the floating hammer and connected to the crank of the shaft, an electric motor coupled to the said crank-shaft, a handle attached to the casing, a device in the handle for making or breaking the motor-circuit, and wires extending from the handle to the motor, substantially as described.

12. The combination of a casing, a crank-shaft mounted in the casing, a floating hammer, a plunger within the hammer, a spring mounted between the end of the plunger and the hammer, a tool projecting into the casing in position to be struck by the hammer, a rod connecting the crank-shaft with the plunger, a handled cap at the rear of the casing, a spring between the cap and the rear of the casing, a tube mounted in the handle, and a push-button device for making and breaking the electric circuit to start and stop the driving mechanism of the hammer, substantially as specified.

13. The combination of a casing, a tool carried by one end of the casing, a handle secured to the opposite end of the casing, a fly-wheel mounted on one end of the crank-shaft, the opposite end of the crank-shaft being arranged to be coupled to a flexible shaft, a hammer within the casing arranged to strike the tool, and a connecting-rod mounted on the crank of the shaft and loosely connected to the hammer, substantially as described.

14. The combination in a power-hammer, of a casing, a tool mounted in one end of the casing, a handle yieldingly connected to the opposite end of the casing, an electric circuit-breaker within the handle, a crank-shaft mounted in bearings in the casing, a fly-wheel on said crank-shaft, a hammer mounted within the casing and arranged to strike the tool, a rod mounted on the crank of the shaft and connected loosely to the hammer, and a spring between the end of the rod and the hammer, substantially as described.

15. In a power-hammer, the combination, of the flexible shaft connecting the motor with the tool having wires extending from the handle of the tool to the motor; with the tool, consisting of the casing, the hammer operating within the casing, the shaft, means for connecting the shaft to the hammer, the handle for the tool, the controlling device provided in the handle for connecting and breaking the electric circuit, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES HOMER JACKSON.

Witnesses:

CARL JACKSON,

FRANCES MONTGOMERY.