Draftsman

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PERCUSSIVE TOOL.

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966,329.

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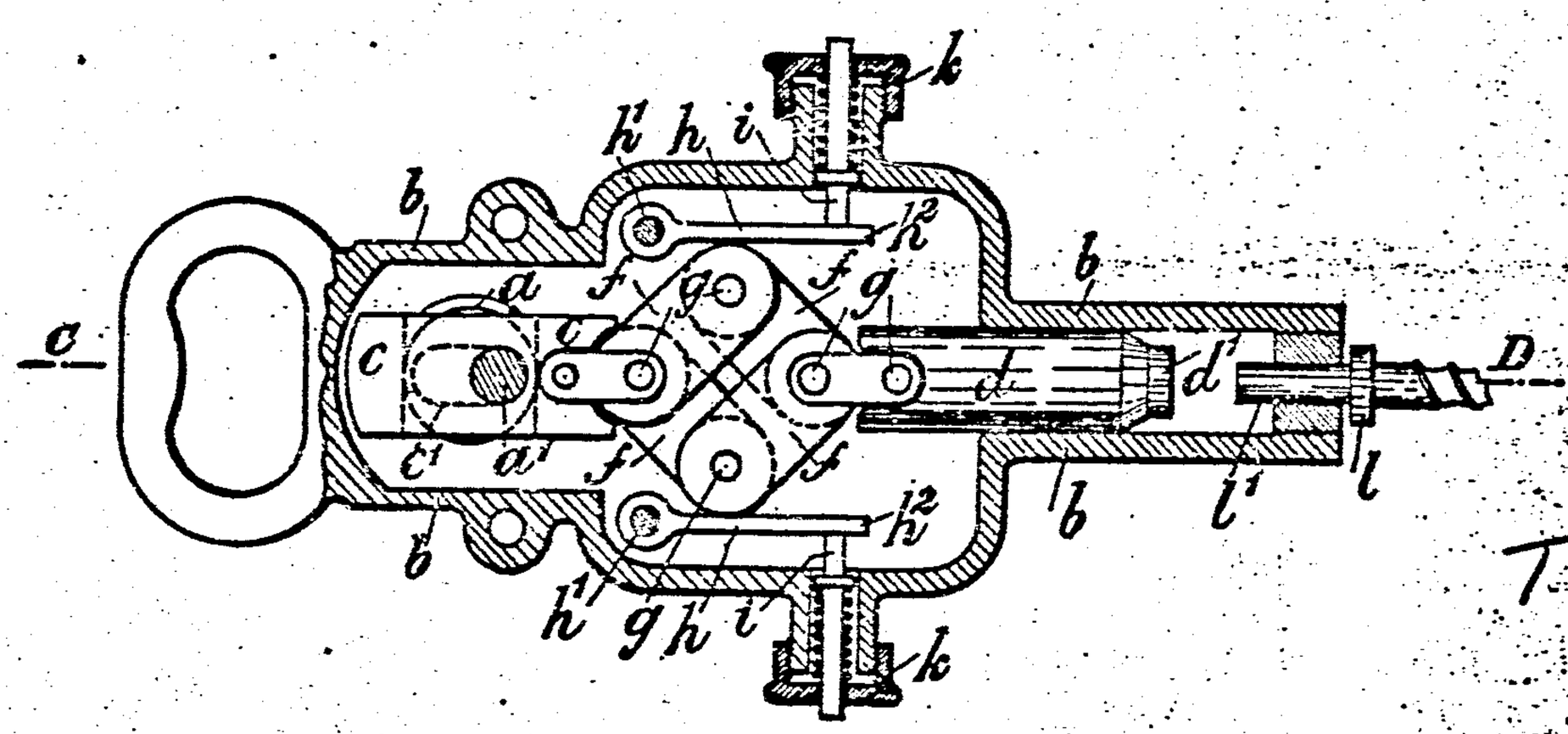
Fig. 1.



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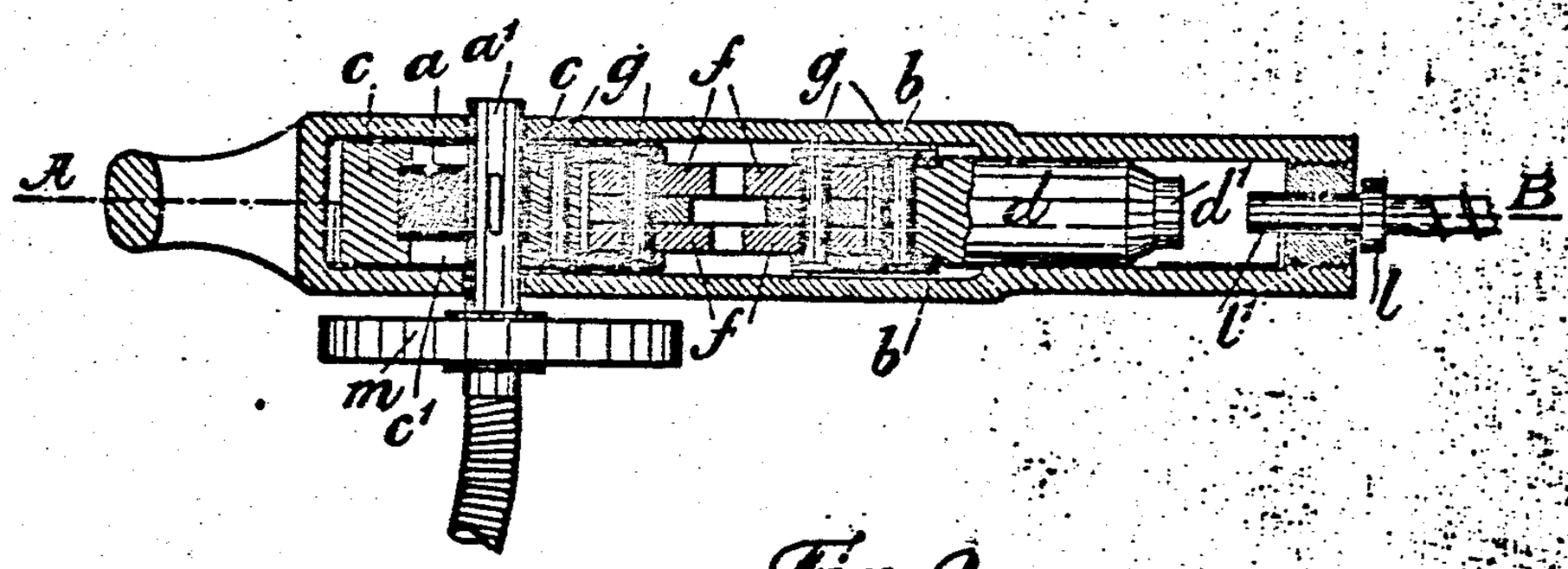

Fig. 2.

Witnesses,
J. L. Freeman.
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UNITED STATES PATENT OFFICE.

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PERCUSSIVE TOOL.

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To all whom it may concern:

Be it known that I, HEINRICH CHRISTIAN HANSEL, a subject of the German Emperor, and resident of Giessen, Germany, have invented a certain new and useful Improvement in Percussive Tools, of which the following is a specification.

This invention relates to a percussive drill having a resilient action, the hammer or piston of which is operated by lazy tongs which slide over one or more levers and press these back against the pressure of springs under the action of the blow. The forward movement of these lazy tongs is effected by an eccentric mounted within a frame, the operative surface of which eccentric is inclosed at both sides by the straight operative surfaces of the frame.

The advantage of this invention resides in this, that the lazy tongs first transmit the blow as a rigid integer to the hammer and then yield toward the end of the stroke; the strain on the springs is considerably reduced by the lever transmission, and in consequence there is much less danger of them breaking.

The arrangement of the eccentric within a frame inclosing its operative surface on two sides has the advantage that the frame is retracted positively by the eccentric, the springs being thereby relieved; the formation of the operative surfaces of the frame as plane faces reduces the friction between them and the eccentric.

In the acompanying drawing which illustrates the invention, Figure 1 is a longitudinal section on the line A—B of Fig. 2, and Fig. 2 is a transverse section on the line C—D of Fig. 1.

In the neck of the drill casing *b* is guided the hammer or piston *d*, having a reduced end *d'* to engage the bit D. A shaft a^1 mounted in the casing *b*, and receiving its motion form a motor of any suitable kind, for example an electric motor and a flexible connecting shaft, carries an eccentric *a* arranged within a frame *c*. This frame is guided on the shaft a^1 by means of slots c^1 and surrounds the operative face of the eccentric, allowing slight play between the two plane surfaces. Between the frame *c* and the hammer *d* is provided—and connected with each by a link—an arrangement of lazy tongs which consist of members *f* pivotally connected with one another by bolts *g* to form a toggle and held between levers *h* pivotally mounted in the machine casing at h^1. Against the ends of these levers, by means of spiral springs, are pressed bolts *i* mounted in sockets in the casing *b*. A collar on the bolt *i* and a cap on the socket serve as abutments to the spring; the springs tend to move the levers *h* into the position shown in Fig. 1. The tension of the springs can be regulated by the cap *k* as desired.

The operation of the drill is as follows:—If the shaft a^1, which is preferably provided with a fly-wheel *m* rotated in the direction of the arrow, the eccentric *a* moves the frame *c* and so forces the lazy-tongs or toggle *f* and the hammer *d* against the bit *l*. In consequence of the power of the springs the lazy tongs at first remain in the position shown in Fig. 1 and transmit the blow to the bit as a rigid integer. When the resistance of the bit on further forward movement against the rock or the like, and the leverage with which the lazy-tongs engage the lever *h* reaches a certain amount, the lazy-tongs are pressed together against the action of the springs, and the remaining part of the blow is transmitted through resilient connections. When the eccentric has gone beyond the forward stroke position, the frame *c* is positively retracted, this reversal being simplified by the slight play of the eccentric therein. Simultaneously, the hammer *d* and lazy-tongs *f* also move backward, the latter under the action of the spiral springs, into their initial positions, and the members of the lazy tongs arrangement again assume their normal position as shown in Fig. 1.

The tension of the springs is adjusted according to the hardness of the rock or the like to be drilled; the length of the lever arm is so arranged that the springs at each stroke are only pressed back a very small amount—a few millimeters or a fraction of a millimeter—and in consequence are not likely to be fractured.

As is evident, the form of the lazy-tongs and the levers as also their relative positions, may be varied.

I claim:

1. In apparatus of the character described, a casing, a reciprocatory hammer, a toggle connected to said hammer, means to move said toggle, swinging levers to engage said toggle, and means to yieldingly hold said levers in engagement with said toggle.

2. In apparatus of the character described, a casing, a reciprocatory hammer, a toggle connected to the hammer, means to move said toggle, pivoted levers to engage said toggle, and spring actuated bolts to engage said levers.

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

HEINRICH CHRISTIAN HANSEL.

Witnesses:
WALTER E. HESS,
JEAN GRUND.