(No Model.)

C. B. KING.

STEAM OR PNEUMATIC ENGINE.

No. 550,324. Patented Nov. 26, 1895.

Fig. 1.

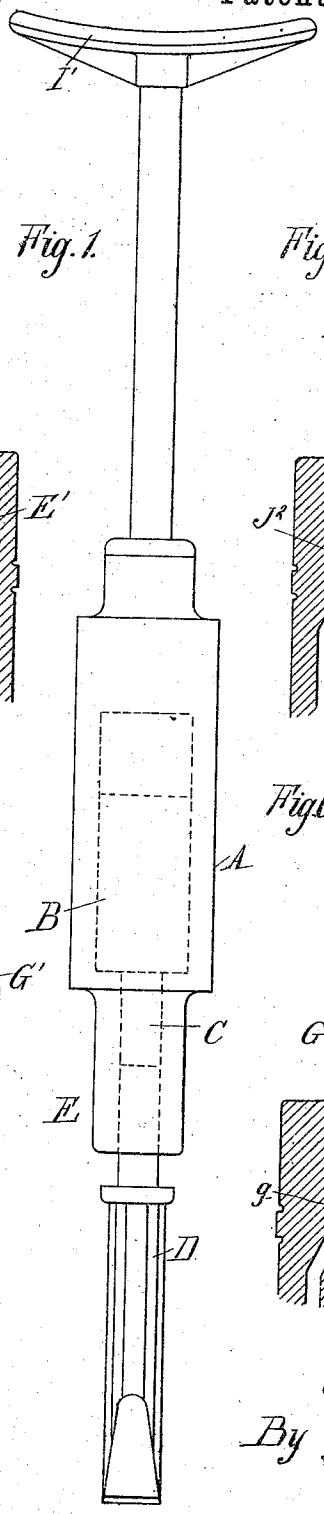


Fig. 2.

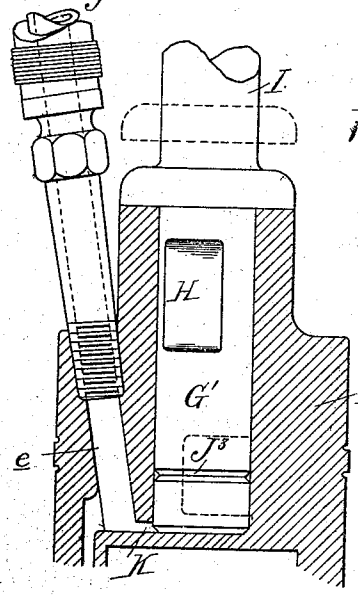


Fig. 5.

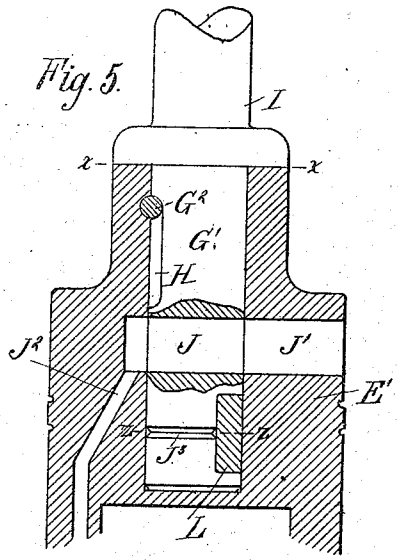


Fig. 3.

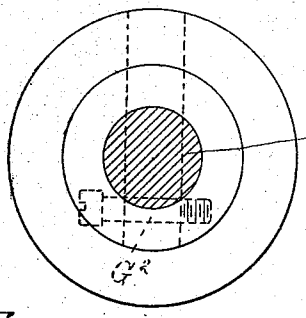


Fig. 4.

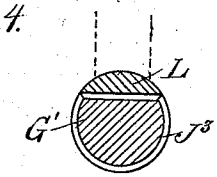
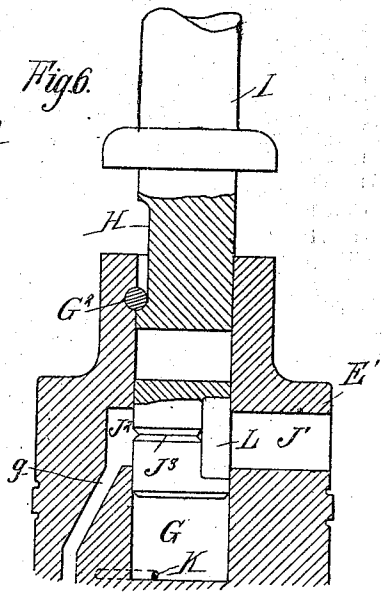


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES B. KING, OF DETROIT, MICHIGAN.

STEAM OR PNEUMATIC ENGINE.

SPECIFICATION forming part of Letters Patent No. 550,324, dated November 26, 1895.

Original application filed May 22, 1894, Serial No. 512,037. Divided and this application filed February 20, 1895. Serial No. 539,099. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. KING, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Impact-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the construction of a steam or pneumatic engine, usually known commercially as a "pneumatic tool."

The invention herein described is divided out of my application, Serial No. 512,037, filed May 22, 1894; and it consists in the construction of the controlling-valve for the motive agent, particularly in the construction of that valve and its combination with a handle for the engine, so that in forcing the engine to its work the valve is opened, and when the engine is withdrawn from its work the engine is stopped. This valve is shown applied to the exhaust of the engine, to which it can be applied as well as to the supply. The valve may be applied to any form of engine of this type—such, for instance, as the construction shown in my previous patent, No. 513,941, of January 30, 1894—or to a so-called "valveless engine," as shown in my previously-mentioned application.

As the engine itself or the hammer and its ports and passages is no part of my present invention, I do not deem it necessary to illustrate the same.

In the drawings, Figure 1 is a side elevation of an impact-engine embodying my invention and showing in dotted lines the piston or hammer. Fig. 2 is a longitudinal section through the top of the tool, illustrating the construction of the controlling-valve. Fig. 3 is a cross-section on line *x x*, Fig. 5. Fig. 4 is a section on line *z z*, Fig. 5. Figs. 5 and 6 are sections similar to Fig. 2, but upon different planes, showing the parts in different positions.

A is the cylinder, within which is the piston or hammer B, preferably having the nose or hammer-block C, adapted to strike upon the end of the bit or chisel D, which slidingly engages in an aperture of the nose-piece E on the cylinder.

e is an air-inlet passage for supplying air to reciprocate the piston B.

g is an exhaust-passage from the cylinder, these ports being so combined and arranged (with or without a valve) and with suitable ports or passages as to reciprocate the piston when the air is supplied to the cylinder through the supply-ports *e* when the exhaust-valve is open.

The end cap or head of the tool E, I have shown provided with a central bore or chamber G, in which slidingly engages the stem G, the end motion of which is limited by a screw G^2, secured in the end cap and passing through a groove or cut-away portion H of the stem, as shown in Figs. 2 and 6. This stem is preferably formed integral with the shaft I, on the end of which is an arm or knee-plate I'. This shaft forms a handle by means of which the tool may be held up to its work. Through this stem is formed the port J, adapted to be registered with the exit-port J' in the body or head and the exhaust-passage J^2 from the cylinder in its inner position. The end of this stem forms a piston under which air is admitted from the supply-passage through the port K, Fig. 2, and thus acts when the pressure is on to normally hold the stem in its outermost position, as shown in Fig. 6, to close the exhaust and thus stop the piston.

To prevent leakage around the stem through the exhaust, I preferably form a check-valve for this port by fitting in a notch in the stem a complementary block L, fitting across the port J'. A groove J^3 around the stem at this point admits the air under pressure from the exhaust-passage J^2 to the flat rear face of the block, and thus seats the valve by pressure when the stem is moved to its outer position. (Shown in Fig. 6.) The exhaust-passage J^2 is connected with the cylinder by the port *g*.

The parts being thus constructed and arranged, the operation is as follows: The stem G' will be held out in the position shown in Fig. 6 by the air-pressure entering through the port K when the tool is not in use. In this position of the parts the exhaust-passage will be closed by the valve L, as described. To start the device, the bit D is held against

the work and pressure applied to the handle or shaft I, which will force in the stem G′ against the air-pressure until the exhaust-port is opened, as shown in Fig. 5, when the engine will be started and the piston will continue to reciprocate, striking upon the bit or chisel in the well-known manner.

What I claim as my invention is—

1. The combination with the cylinder, the piston and the supply and exhaust ports, of a shaft for holding the tool to its work, a stem on the end of the shaft having a port therethrough, adapted to register with the exhaust port, working in a cylinder or bore in the end of the cylinder or head, and a port connecting the inner end of this bore or cylinder with the air supply.

2. The combination with the cylinder, the piston and the supply and exhaust ports, of a shaft for holding the tool to its work, a stem on the end of the shaft having a port therethrough, adapted to register with the exhaust port, working in a cylinder or bore in the end of the cylinder or head, a port connecting the inner end of this bore or cylinder with the air supply, a flattened portion on the stem having shoulders at the ends and a screw passing through such flattened portion and acting as a stop to limit the motion of the stem.

3. The combination with the cylinder having an exhaust port, a stem working in a bore across the exhaust-port and having a port adapted to register with the port in the shell or body, and having an imperforate portion adapted to be moved across said port, of a valve block L formed of a complementary section of the stem and the groove J^2 around the stem behind the valve-block.

4. The combination with the cylinder, the exhaust port, a stem working in a bore across the exhaust port and having an exhaust opening adapted to register with the port in the shell or body, and an imperforate portion adapted to close the exhaust port, substantially as described,

5. The combination of the body, the exhaust port, the stem G′, the block L and the groove J^2 around the stem behind the block, substantially as described.

6. In a pneumatic tool, the combination with the cylinder piston and the supply and exhaust ports therefor, of a tool support at one end, a tool therein, a movable shaft for holding the tool to its work and a valve controlling the piston actuated by the holding means, substantially as described.

7. In a pneumatic tool, a valve controlling the motive agent, a cylinder in which said valve works, a port for supplying the motive agent to said cylinder to hold said valve normally closed, and means for opening said valve which means is adapted to be controlled by the pressure applied to hold the tool to its work, substantially as described.

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

CHARLES B. KING.

Witnesses:
JAMES WHITTEMORE,
L. J. WHITTEMORE.