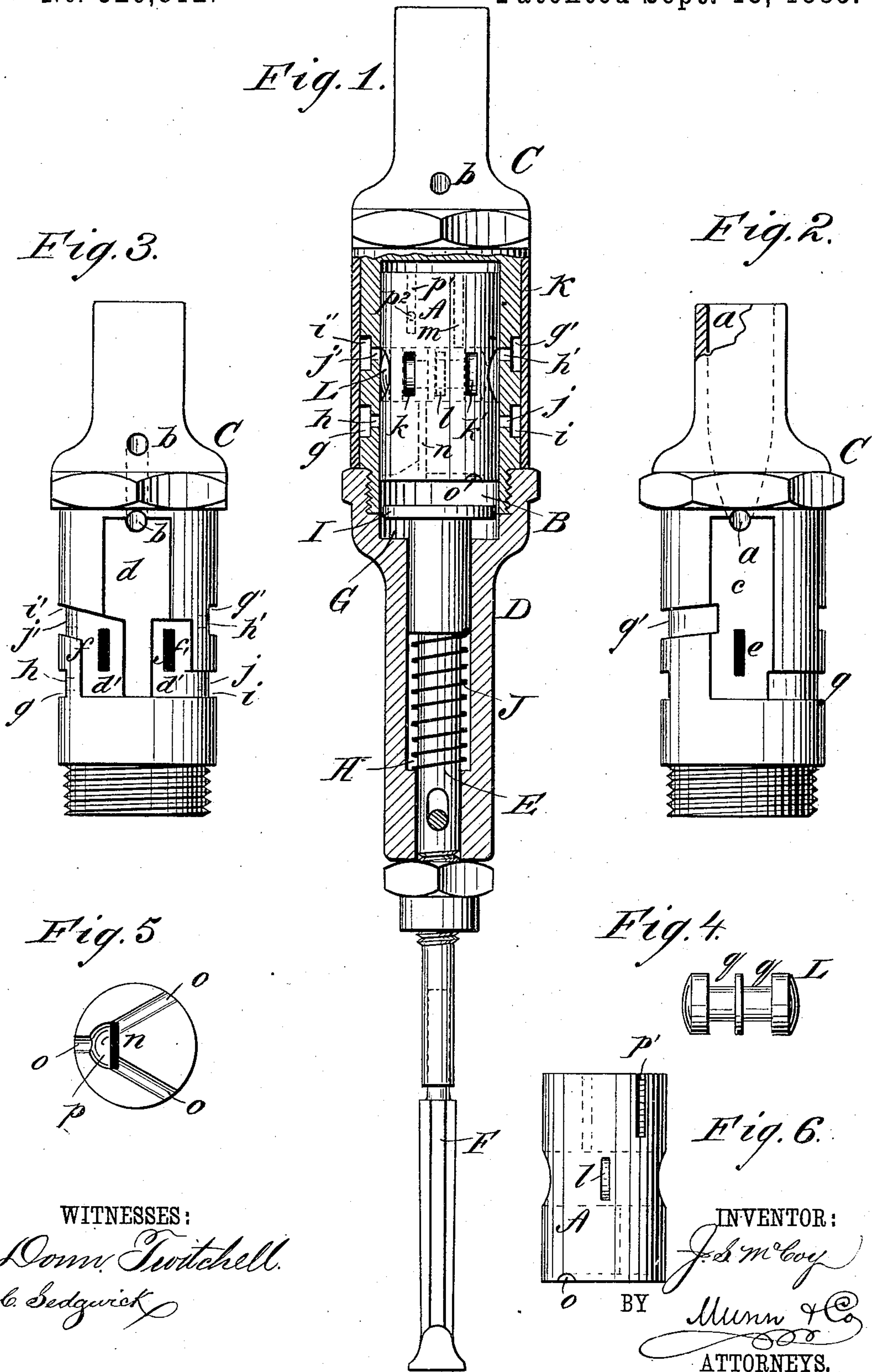


(No Model.)

J. S. McCOY.
PNEUMATIC TOOL.

No. 326,312.

Patented Sept. 15, 1885.



UNITED STATES PATENT OFFICE.

JAMES S. MCCOY, OF BROOKLYN, NEW YORK.

PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 326,312, dated September 15, 1885.

Application filed October 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. MCCOY, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Pneumatic Tool, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in the pneumatic device shown and described in my application for Letters Patent filed August 30, 1884, Serial No. 141,966; and it consists, principally, in forming the lower end of the striker with air-passages or recesses to facilitate the exhaust of the air from below the striker, so that the striker in its downward movement will not be unevenly resisted by the air in the piston-chamber.

The invention also consists of means for preventing the striker from turning in its chamber; also of the construction, arrangement, and combination of parts, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation of my improved pneumatic tool. Figs. 2 and 3 are reverse side views of the piston-chamber, the outer shell being removed. Fig. 4 shows the piston-valve. Fig. 5 is a plan view of the lower end of the piston or striker, and Fig. 6 is a side elevation of the striker.

A represents the piston or striker of the pneumatic tool. This striker fits closely in the chamber B, formed by the casing of the machine, which is composed of the upper and lower parts, C D, screwed together, as shown in Fig. 1. The lower part, D, of the casing carries the spindle E, that holds the tool F at its outer end, and this part D of the casing is countersunk at G, and again at H, the former being for the purpose of receiving the enlarged head I of the spindle E, the latter for forming a shoulder to support the coiled spring J, that acts to return the spindle E after each stroke of the striker A upon it in the operation of the device.

The upper part, C, of the casing of the machine is surrounded by the shell or packet K, and is formed with the air-inlet passage *a*, Fig. 2, and exhaust-passage *b*, Figs. 1 and 3. It is faced off at *c*, as shown in Fig. 2, and on the opposite side again at *d d'*. (Shown in Fig. 3.)

In the flat surface *c* is formed the port *e*, and the air-inlet passage *a* opens into the flat surface *c*. The exhaust-port *b* opens out from the flat surface *d*, and in the flat surfaces *d' d'* are formed through the casing the air-ports *f f'*. From the flat surface *c* the casing C is grooved, as shown at *g*, and again on the opposite side at *g*. The groove *g'* leads to the port *h*, (see full lines Fig. 1 and dotted lines Fig. 3,) while the groove *g'* leads to the port *h'*. From the flat surfaces *d' d'* the casing C is grooved, as shown at *i* and *i'*. The groove *i* leads to the port *j*, while the groove *i'* leads to the port *j'*. (Both ports are shown in full lines in Fig. 1 and in dotted lines in Fig. 3.)

The striker A is provided with the transversely-arranged valve L, and it has the passages *k k'*, which reach through to the chamber that contains the valve L, and these openings coincide with or stand in the same plane with the ports *f f'*. The striker A also has the passage *l* formed in it. (Shown in dotted lines in Fig. 1 and in full lines in Fig. 6.) This passage also reaches through to the valve-chamber, and it coincides with or stands in the same plane with the port *e* made in the casing C. The striker A also has the vertical passages *m n* formed in it, which reach, respectively, from the chamber containing the valve L to the top and bottom of the striker, as shown in dotted lines in Fig. 1, and in full lines in Fig. 5. The lower end of the striker A is grooved, as shown at *o*, and is recessed, as shown at *p*, about the passage *n*, and the grooves *o* all communicate with the recess *p* to facilitate the exhaust of the air from between the lower end of the striker A and the head I when the striker descends to deliver its blow; and I form a groove, *p'*, in the striker A, preferably near one end, which receives a stud or pin, *p''*, in the casing C, which stud and groove, while they do not interfere with the free longitudinal movement of the striker, prevent it from turning axially out of position in the casing.

The valve L is circumferentially grooved, as shown at *q q*, so that the valve in its reciprocating movement, caused by pressure of air entering the ports *j j'*, alternately opens and closes all the air-passages through the striker A.

The operation is as follows: The striker

A being in the upper position, air admitted to the induction-passage *a* enters the passage-formed by the flat surface *c* and passes through the passage *e* and port *h'*, moving valve L to close passage *k'* and to connect passages *e*, *l*, and *m*, thus admitting air above the striker A, and at the same time the passages *k*, *f*, and *n* are connected to allow exhaust from below the striker A through the space formed by the flat surface *d* and the passage *b*. Then the air through the passage *g* and port *h* moves valve L to close passage K, and to connect passages *e l n* to admit air below the striker, and to connect passages *m, k',* and *f'* to open the exhaust from above the striker, and so on alternately, causing the striker A to have a rapid reciprocating or vibratory movement, causing it to deliver rapid blows upon the head I of the spindle E, causing the tool F to perform its work. The down-stroke of the piston A will be against a pressure of air confined in the chamber B, and owing to the recesses or grooves *o*, and enlarged exhaust, the exhaust of air from the chamber will be practically uniform from all parts of the chamber below the striker, so that the remaining air below the striker will be equally distributed in the chamber, thus forming a uniform air-cushion on which the striker acts, causing a direct and uniform downward action of the spindle E, caused partly by the impact of air and partly by the direct stroke of the striker upon the plate I. This direct action on the spindle E prevents all lateral movement of the spindle E, and thus prevents friction, and the uniform air-cushion prevents also all lateral tendencies of the striker A, and also prevents battering of the striker and plate I, as the blow of the striker is not a dead blow of metal on

metal, but of metal on metal and air, and the air-cushion also assists the spring J in its reaction after each stroke to elevate the striker in the piston-chamber for another blow.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pneumatic drilling-tool, the casing provided with an inlet and an exhaust port, in combination with the striker having a vertical passage extending upward from the slots in the bottom of said striker and the transverse valve, substantially as and for the purpose set forth.

2. In a pneumatic drilling-tool, the casing provided with an inlet and an exhaust port and carrying a spindle, in combination with the valve striker placed in the casing and having recesses or slots formed in its lower end and a vertical passage connecting with said passages or slots, substantially as and for the purpose set forth.

3. In a pneumatic drilling-tool, the casing having an inlet and an exhaust port and carrying a spindle having a plate secured to its inner end in combination with the valved striker having recesses or slots in its lower end and a vertical passage connecting with said recesses or slots, substantially as and for the purpose set forth.

4. In a pneumatic drilling-tool, the valved striker A, formed with the slot P', in combination with the pin *p*², fitted in the casing C, for causing the striker to move in a straight line, substantially as described.

JAMES S. McCOY.

Witnesses:

H. A. WEST,
C. SEDGWICK.