No. 692,799. Patented Feb. 4, 1902.

# W. H. SOLEY.

## PNEUMATIC TOOL.

(Application filed June 15, 1900.)

(No Model.)

FIG. 3.

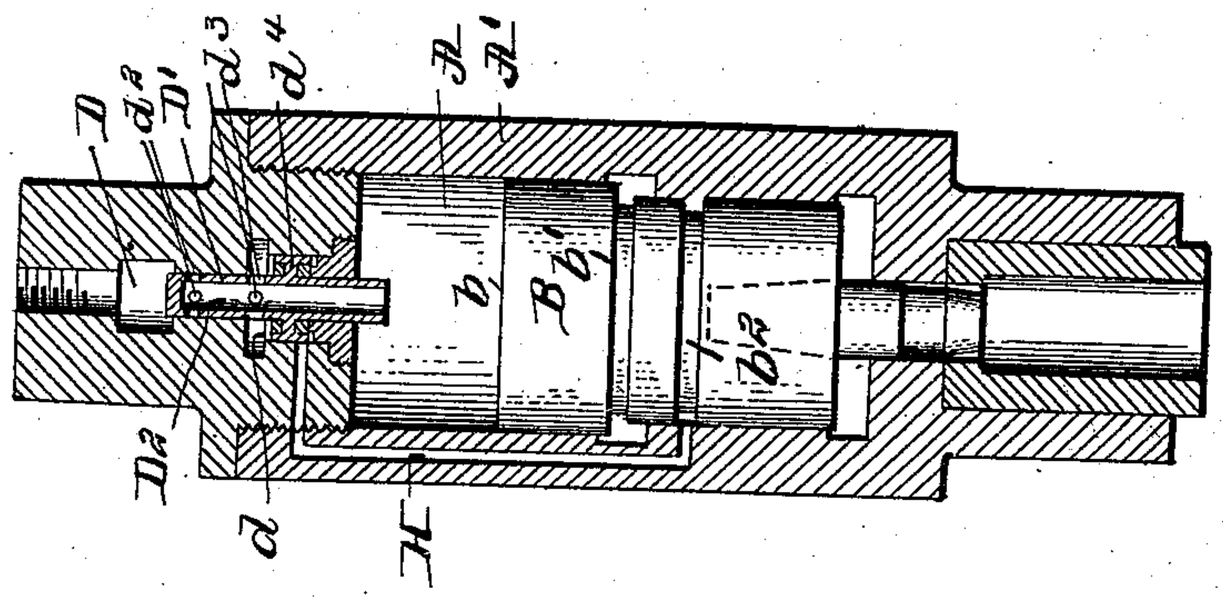



FIG. 2.

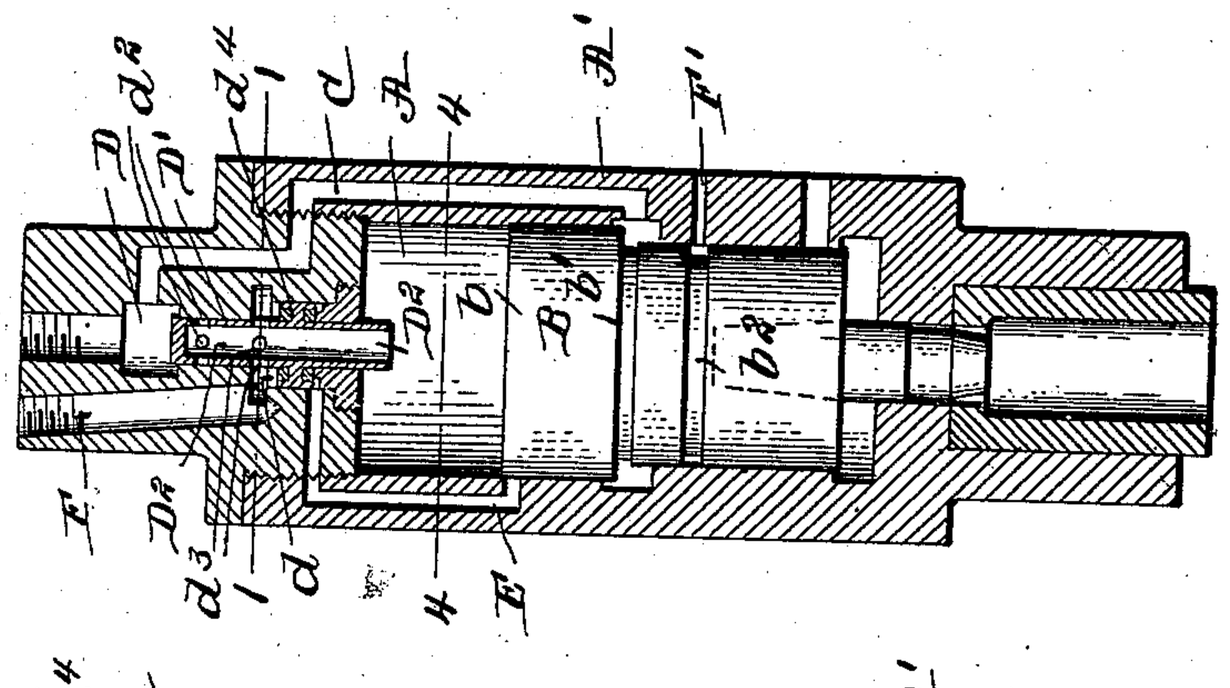



FIG. 1.

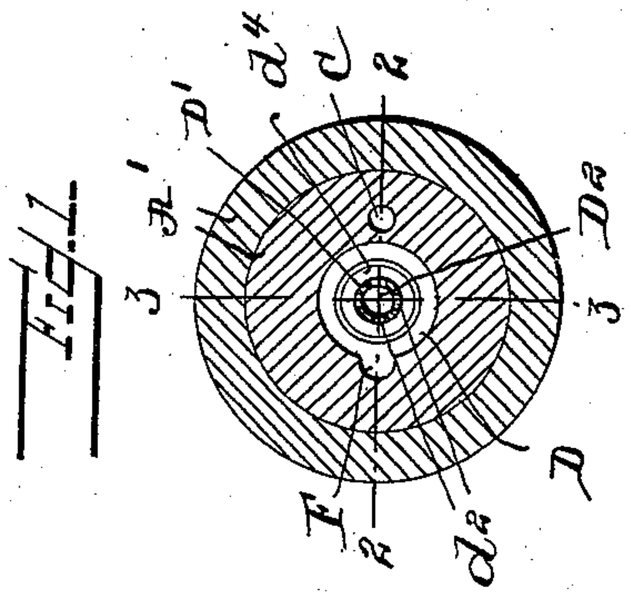
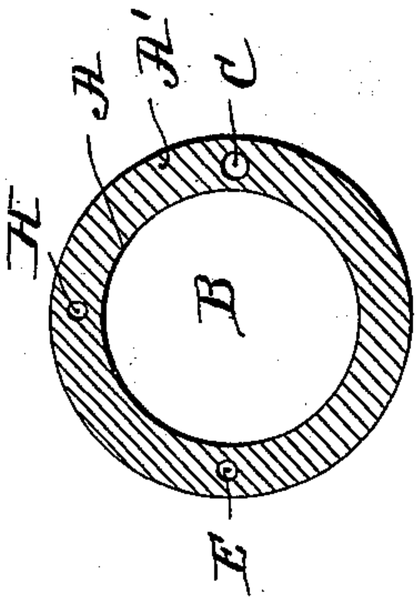



FIG. 4.

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## PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 692,799, dated February 4, 1902.

Application filed June 15, 1900. Serial No. 20,417. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. SOLEY, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Pneumatic Tools, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvements in that class of tools used for cutting, chipping, and the like, generally known as "pneumatic" tools, and has for its object to provide means and mechanism to make the tool more simple in construction and effective in operation.

To that end it consists in certain improvements in construction to obtain this result, all of which will more clearly appear in the drawings and specification.

In the drawings, Figure 1 is a section through the tool on the line 1 1 of Fig. 2. Figs. 2 and 3 are sections on the lines 2 2 and 3 3 of Fig. 1. Fig. 4 is a section on the line 4 4 of Fig. 2.

A is the chamber formed in the casing A', having at different points greater and lesser areas. In this chamber is placed the piston B, having the head portion $b$ with shoulder $b'$, so that the piston-head is of differential area on opposite sides. From a source of pressure-supply through the passage C air is constantly supplied to the chamber A beneath the piston-head to the surface of lesser area.

D is a valve-chamber formed in the upper portion of the casing. This valve-chamber has an enlarged portion. In this valve-chamber is placed a valve D', having the valve-piston $d^4$ resting in the enlarged part $d$ of the valve-chamber. The upper end of the valve-chamber D is in constant communication with the source of pressure-supply. The valve D' is also bored out to form the annular chamber $D^2$, open to the top of piston-chamber A, and through the surface of this valve D', connecting with the chamber $D^2$, are the ports $d^2$ $d^3$. The passage E connects the piston-chamber A and the valve-chamber D. There is also a passage F from this valve-chamber through the casing to the exterior thereof. In the piston B is the annular groove $b^2$, and extending from the piston-chamber A through the casing A' are the ports F and G. There is also a passage H connecting the piston-chamber opposite the port F with the valve-chamber D, beneath the valve-piston $d^4$.

In the position of the parts shown in Figs. 2 and 3 the valve D' is in such position that the inlet-port $d^2$ is closed while the exhaust-port $d^3$ is in connection with the passage F. The air above in piston-chamber A above the piston exhausts through the chamber $D^2$, port $d^3$, and passage F. The constant supply of air-pressure below the piston-head elevates the piston until the annular groove beneath the shoulder of piston B registers with the passage E, at which time air will be admitted from the source of constant pressure beneath the piston-head to the valve-chamber, beneath valve-piston $d^4$. This portion of the valve being of greater area than the end subject to constant air-pressure, the valve D' will rise, covering the exhaust-port $d^3$ and opening the inlet-port $d^2$ to the source of pressure. Air will then enter through this port to the chamber $D^2$ and thence to the piston-chamber, above the piston-head. The upper side of piston-head being of greater area, the piston will now descend, the air below the piston exhausting through passages G after the piston B has moved down sufficiently to close passage E and bring annular groove $b^2$ in connection with passage H. Under these conditions live air no longer enters the valve-chamber beneath the valve, and the air from the valve-chamber at that point exhausts out through the passage H, annular groove $b^2$, and port F'. The air-pressure above the valve forces the valve down until the inlet-port $d^2$ is closed and the exhaust-post $d^3$ opened. At this time the parts are again in the initially-described position and the piston ready to rise. The valve D' has the annular grooves $d^5$ and $d^6$. In these annular grooves fiber is forced. This fiber cushions the blow of the valve in each direction of movement.

The lower portion of the piston B is coun-

terbored, as at I, and in this is placed the striker K.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In a pneumatic tool, in combination with a casing, a piston-chamber formed in said casing, a piston of differential area in said chamber, a source of pressure-supply, a constant communication between said source of pressure-supply and the lesser piston area, a valve-chamber, a valve in said chamber having a closed end, constantly acted on by the pressure-supply, and a chambered portion communicating with the piston-chamber, a piston for said valve, a passage leading from said valve-chamber to the piston-chamber and adapted in the reciprocation of the piston to be covered by the piston and open into the chamber below the piston-ports in said valve, connecting with the chambered portion of the valve, one port adapted in the movement of the valve in one direction to register with an exhaust-passage and the other port in the reciprocation of the valve in the other direction adapted to register with the air-supply.

2. In a pneumatic tool in combination with a casing, a piston-chamber formed in said casing, a piston of differential area in said chamber, a source of pressure-supply, a constant communication between said source of pressure-supply and the lesser piston area, a valve-chamber, a valve in said chamber having a closed end, constantly acted on by the pressure-supply, and a chambered portion communicating with the piston-chamber, a piston for said valve, a passage leading from said valve-chamber to the piston-chamber and adapted in the reciprocation of the piston to be covered by the piston and open into the chamber below the piston-ports in said valve connecting with the chambered portion of the valve, one port adapted in the movement of the valve in one direction to register with an exhaust-passage and the port in the reciprocation of the valve in the other direction adapted to register with the air-supply, an annular groove $b^2$ in the piston, a port F extending through the casing to the piston-chamber and a passage H extending from the valve-chamber to the piston-chamber opposite port F.

3. In a pneumatic tool of the character described, a source of pressure-supply, a piston and piston-chamber, a valve-chamber, a valve having a closed end in communication at that end with the pressure-supply at all times and an open end in communication with the piston-chamber at all times, ports and passages connecting the open end of the valve with the exhaust and pressure-supply.

4. In a pneumatic tool of the character described, a source of pressure-supply, a piston and a piston-chamber, a valve-chamber, a valve having a closed end in communication at that end with the pressure-supply at all times and an open end in communication with the piston-chamber at all times, ports and passages connecting the open end of the valve with the exhaust and pressure-supply, and a piston for said valve, ports and passages controlled by the main piston adapted to connect the valve-piston portion of the valve-chamber with the pressure-supply and exhaust.

In testimony of which invention I have hereunto set my hand, at Philadelphia, on this 12th day of June, 1900.

WILLIAM H. SOLEY.

Witnesses:
M. F. ELLIS,
J. M. SHINDLER, Jr.