

(No Model.)

H. W. METZING.
PNEUMATIC TOOL.

No. 534,901.

Patented Feb. 26, 1895.

Fig 1

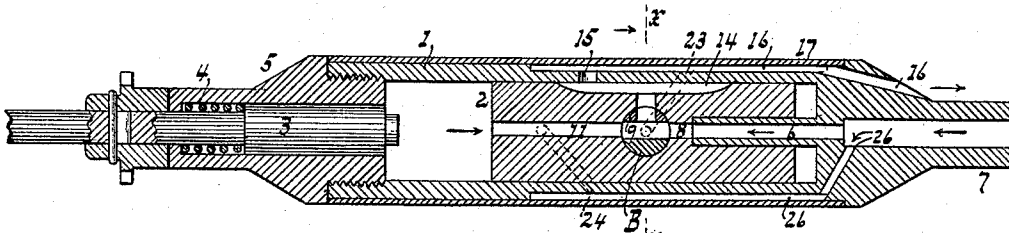


Fig. 2.

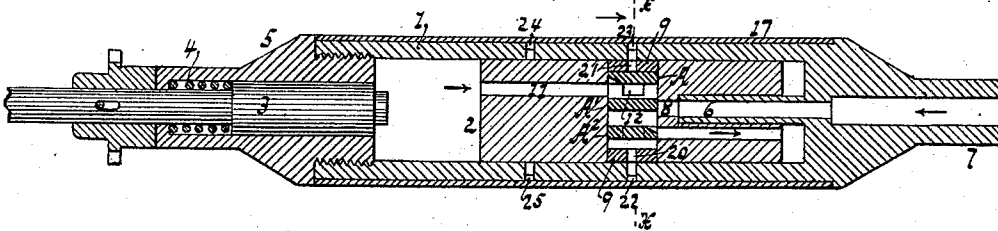


Fig. 3.

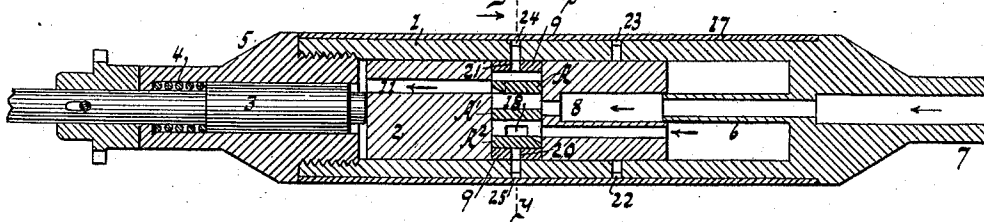


Fig. 5.

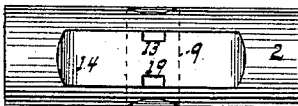


Fig. 4.

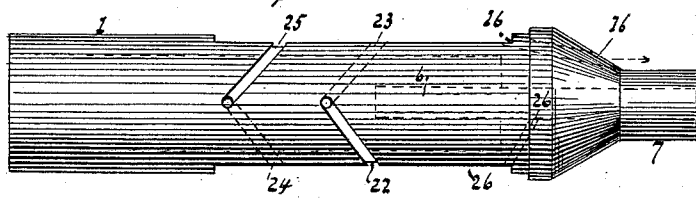


Fig. 7.

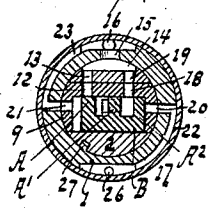
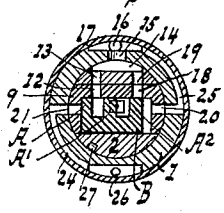


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY W. METZING, OF NEW YORK, N. Y.

PNEUMATIC TOOL.

SPECIFICATION forming part of Letters Patent No. 534,901, dated February 26, 1895.

Application filed June 7, 1894. Serial No. 513,820. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. METZING, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Pneumatic Tools, of which the following is a specification.

The object of this invention is to provide a pneumatic tool serviceable for such work as drilling, chipping, cutting or the like, which will be reliable in its operation and not liable to derangement and which will be simple of construction; and the invention consists in the novel details of construction set forth in the following specification and claim and illustrated in the annexed drawings, in which—

Figure 1 is a longitudinal section of the tool with the piston at one end of its throw. Fig. 2 is also a longitudinal section of the tool, the section being taken at right angles to that of Fig. 1. Fig. 3 is a view similar to Fig. 2 with the piston at the other end of its throw from that shown in Fig. 1. Fig. 4 is a detail view of the cylinder. Fig. 5 is a detail view of the beater or piston. Fig. 6 is a section along xx Fig. 2. Fig. 7 is a section along yy Fig. 3.

The cylinder 1 is provided with a reciprocating piston or beater 2 which when arriving at the end of a throw in one direction will strike a stem 3 so as to move the latter against the force of its restoring spring 4. This stem 3 may be a tool or may be arranged to hold a tool as well known so that the impact of the piston on stem 3 can be communicated to the tool. The tool holder or stem 3 is located in a plug or tail piece 5 screwed or secured to cylinder 1. The cylinder has an inlet passage or tube 6 for the entrance of air or pressure conducted to the head 7 of the cylinder by any suitable conduit or hose.

The piston 2 has a longitudinal central channel or passage 8 into which said tube 6 enters and which tube thus serves as a sort of guide for the piston. This channel 8 communicates with a valve chamber bored transversely through the piston at or near its center and within which chamber is immovably placed or fixed a valve seat 9. The valve in this chamber comprises three wings or partitions $A A' A^2$ secured to a base B and this valve $A A' A^2$ B can play or move back and forth in the seat between the position shown in

Figs. 2 and 6 and the position shown in Figs. 3 and 7. The piston 2 has the lateral channels or passages 10 and 11 made to extend longitudinally.

In the position of parts shown in Figs. 2 and 6 the pressure entering through channel 8 passes between the valve partitions $A' A^2$ and thence through channel 10 into the head portion of cylinder 1 so as to drive the piston toward the foot of the cylinder (Fig. 3) or toward the stem 3. The air or pressure beneath the piston during this movement exhausts through channel 11, passing thence between valve partitions $A A'$ into the exhaust port 12 (Fig. 6) of the valve seat registering with exhaust port 13 in the piston, and which exhaust port 13 leads into the exhaust space 14 (Fig. 5) hollowed or formed in the piston and which exhaust space is of such size that no matter what the position of the piston this space 14 constantly communicates with the exhaust opening 15 in the cylinder. This opening 15 leads to the exhaust channel or passage 16 readily formed by removing part of cylinder 1 and surrounding this cylinder with a close fitting sleeve 17. When arriving at the lower end of its throw (Fig. 3) this piston strikes the stem 3 and the valve is then shifted as seen in said Figs. 3 and 7. The pressure from tube 6 entering channel 8 now passes between valve partitions $A A'$ through channel 11 into the foot portion of cylinder 1 so as to drive the piston back to the position shown in Figs. 1 and 2. During this movement the air or pressure above the piston exhausts through channel 10 passing out between the valve partitions $A' A^2$ through exhaust port 18 in the valve seat registering with exhaust port 19 in the piston, which port 19 communicates with the space 14 described in connection with exhaust port 13.

The valve is shifted as follows: In the valve seat at each end is a hole or entrance orifice marked respectively 20 and 21. When the parts are in the position shown in Figs. 1 and 2, the orifice 20 registers with a pressure channel 22 and the orifice 21 registers with an exhaust channel 23 so that the valve is shifted toward orifice 21. When arriving at the position shown in Fig. 3 the orifice 21 registers with the pressure channel 24 and the orifice 20 registers with the exhaust channel 25, so

that the valve is shifted to the position shown in Fig. 3.

5 The channels 22 and 24 communicate with the pressure channel 26 forming a branch of inlet 6, and the channels 22 to 26 both inclusive are readily formed by cuts or grooves in cylinder 1 and afterward covered by shell 17. The pressure channel 22 has its outlet mouth opposite to the inlet mouth of exhaust channel 23 and the pressure channel 24 has its outlet mouth located opposite to the inlet mouth of exhaust channel 25 so that the valve will be exposed to alternating and oppositely acting pressures and exhausts for shifting the valve back and forth.

15 The piston as is readily understood in this class of tools, should be feathered or arranged to travel in the cylinder without turning, as by means of a pin or lug 27 (Figs. 6 and 7) on the cylinder engaging a groove in the piston. The valve seat 9 can be slipped into the transverse bore of the piston and held against rotation by any suitable means, and when the piston is inserted into the cylinder the valve seat is held in the piston.

25 As seen in Figs. 6 and 7 the valve when shifted back and forth will strike against the

ends of the valve seat 9 so that said valve seat protects the cylinder against the impact of the valve.

What I claim as new, and desire to secure by Letters Patent, is—

A cylinder having supply and exhaust passages, combined with a piston, or beater, having three passages, one of which is made to communicate with the supply passage, and a non-rotating valve made to reciprocate transversely in the piston and adapted to alternately bring the other passages of the piston into communication with the supply and exhaust passages, said valve being composed of a base B having one side or face smooth or unbroken, and the opposite face provided with three wings A A' A² forming channels or passages in the valve for registering alternately with the supply and exhaust passages, substantially as described and shown.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY W. METZING.

Witnesses:

WM. C. HAUFF,

E. F. KASTENHUBER.