F. M. ILER.

PNEUMATIC TOOL.

APPLICATION FILED APR. 24, 1908.

955,877. Patented Apr. 26, 1910.

Fig. 1.

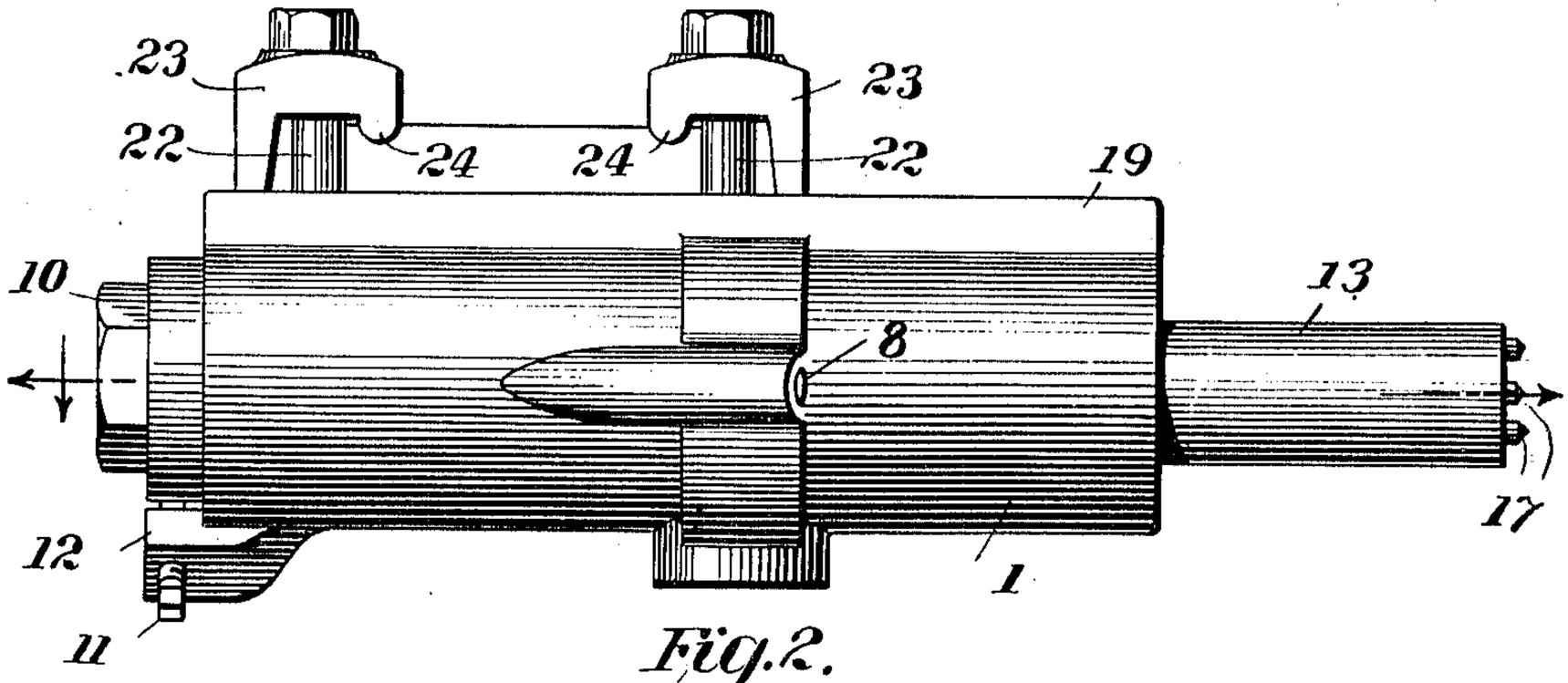


Fig. 2.

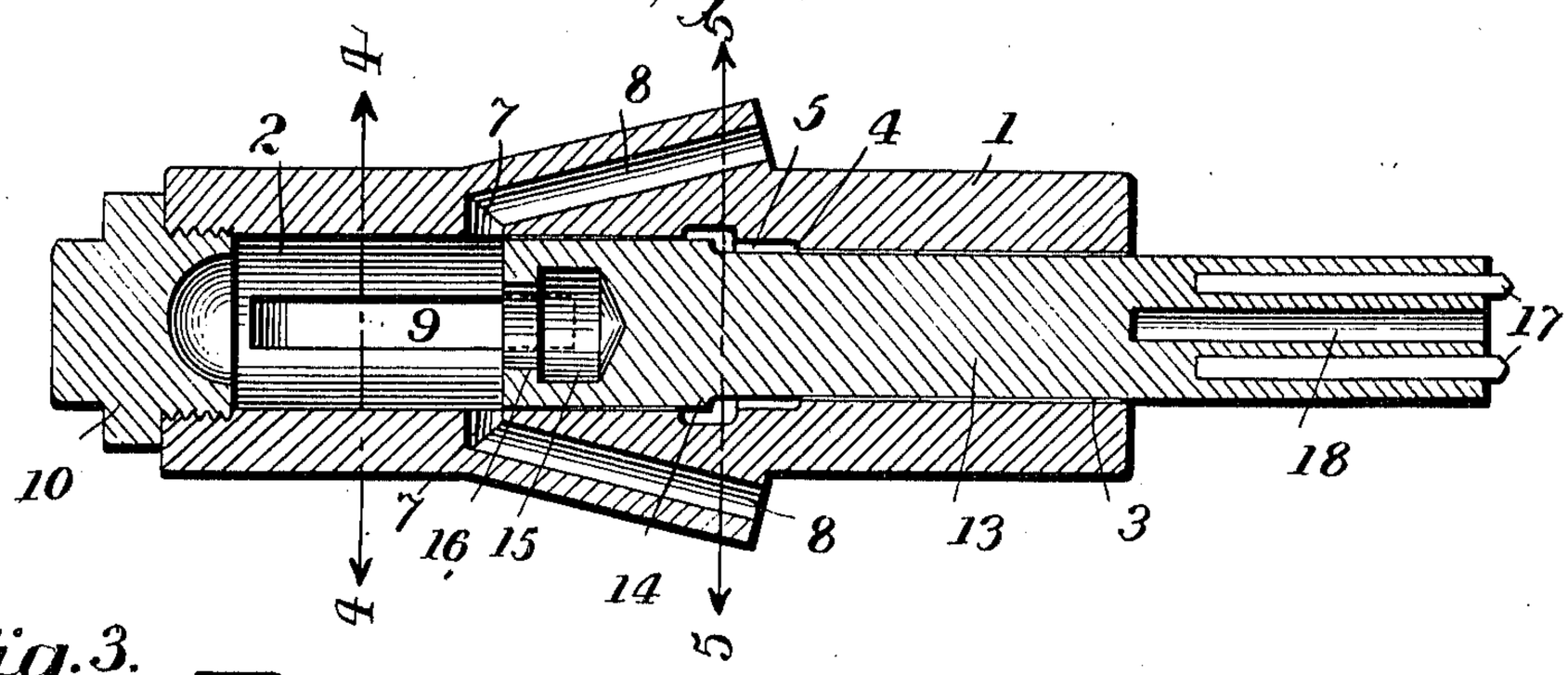


Fig. 3.

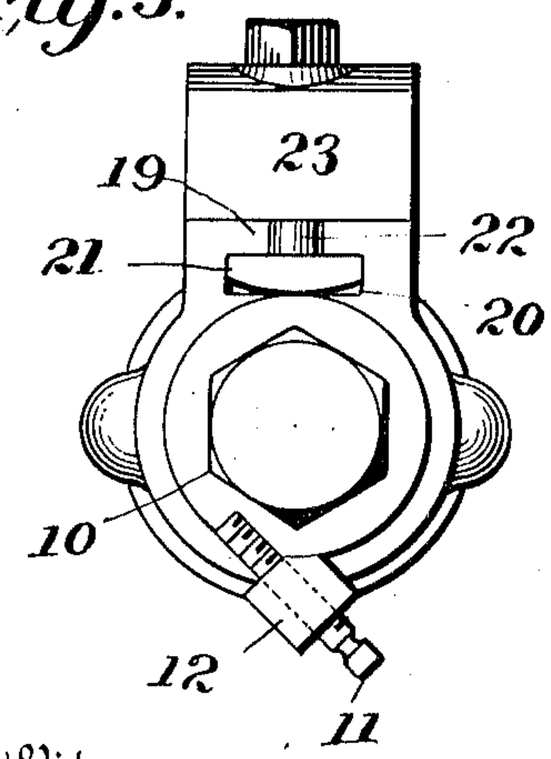


Fig. 4.

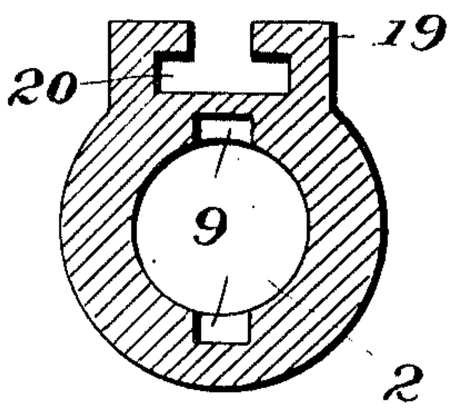
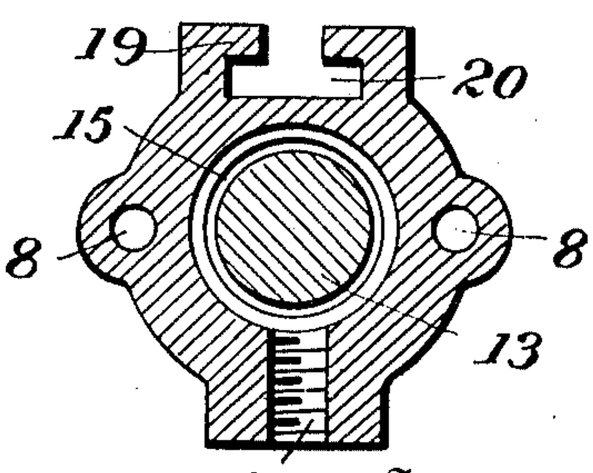


Fig. 5.



Witnesses

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PNEUMATIC TOOL.

955,877. Specification of Letters Patent. Patented Apr. 26, 1910.

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To all whom it may concern:

Be it known that I, FRANKLIN M. ILER, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Pneumatic Tools, of which the following is a specification.

This invention relates to improvements in pneumatic tools, and particularly to tools used in drilling rock.

Its objects are to simplify the construction of pneumatic tools in general and to produce a tool easy to make, simple and effective in operation, and not liable to get out of order.

Its other object is to make a tool which is easy to assemble and easy to take apart for the purpose of repair or substitution of parts.

To these ends the invention consists in the features hereafter described and claimed.

In the acompanying drawings,—Figure 1 is a side elevation of a tool embodying my invention; Fig. 2 is a longitudinal section thereof; Fig. 3 is an end view of the tool shown in Fig. 1; Fig. 4 is a cross section on the line 4—4 of Fig. 2; and Fig. 5 is a cross section on the line 5—5 of Fig. 2.

As shown in the drawing the tool embodies an outer casing 1 which is preferably made integral, having a longitudinal cylindrical bore therethrough, the end 2 of this bore being of greater diameter than the end 3, thus making a shoulder 4 between them. Adjacent the shoulder 4 there is preferably provided an annular groove 5 and leading into this groove is the inlet port 6 for the fluid under pressure, which is to operate the drill. Upon opposite sides of the portion 2 of the bore outlet ports 7 are placed, and these outlets or exhausts lead through the enlargement 8, and are thus directed toward the point of the drill. Considerably back of the annular groove 5 longitudinal grooves 9 are made in the walls of the casing. The rear end of the longitudinal bore is inclosed by a removable screw cap 10 which may be locked against accidental removal by the screw 11 passing through the lug 12.

In my device the piston operating within the cylindrical bore is the tool itself which I have lettered 13, and which is made of two diameters fitting closely the two sections 2 and 3 of the cylinder. The enlarged rear end is comparatively short, extending from the shoulder 14, and the forward end is long and perfectly straight to the operative point of the tool. In the rear face of the enlarged portion I have made a recess 15 having an internal shoulder 16 so as to offer convenient means for engaging the tool by an instrument inserted through the rear end of the cylinder when the closure 10 is removed. By this means the tool may be drawn entirely out of the cylinder for repairs or for the purpose of substituting another tool.

It will be noted that the entire tool, including its point is made in one piece and is integral with the piston which works within the cylinder, and that there are no moving parts in the device save the tool itself.

In order to secure a tool which shall be integral with the piston and which shall have an effective drilling point I make the main body of the tool of soft metal and embed in its outer end longitudinal hard metal pieces 17 which are preferably made in the shape of small rods of self-hardening steel. These rods may be secured in place by shrinking the soft metal tool upon them. It will be understood that the soft metal of the tool point will wear away, leaving the hard metal points of the pieces 17 projecting slightly from the surface, and the pieces 17 are made of such small diameter that they will furnish proper cutting points for drilling stone. The rods 17 are placed in various positions in the end of the tool, and I preferably cut away the surplus soft metal at the center of the drill point.

The casing 1 is adapted to be secured to a support by an adjustable clamp. The casing is provided on one side with the longitudinal rib 19 having therein the T-shaped slot 20 which receives the heads 21 of the bolts 22, which bolts pass through the loose clamping members 23, having on their under surface the engaging points 24.

In operation, air or other fluid under pressure is admitted to the inlet port 6 and expanded against the shoulders 14 forcing the tool to the left in Fig. 2, but since the area of the shoulder 14 is comparatively limited the pressure tending to force the tool to the left is small. When the shoulder 14 reaches the end of the slot 9 the air pressure from the inlet point is permitted to pass around the piston head of the tool and to enter the chamber in the enlarged part 2 of the cylinder, and to thus bear with full force upon the entire end of the tool tending to force

it quickly to the right. This force on the end of the tool so far overbalances the pressure on the shoulder 14 that the tool will be quickly thrown to the right thus striking a blow. When the shoulder 14 reaches the end of the slot 9 pressure will be cut off from the end of the tool and when that end reaches the exhaust ports 7 the pressure on the rear end of the tool will be entirely relieved, thus permitting the tool to be forced to the left by the pressure on the shoulder 14. It will thus be seen that without the use of valves the tool 13 will automatically reciprocate as long as the pressure is supplied through the port 6.

It should be particularly noted that all of the operating ports of my device are in the single casting constituting the casing, and that none of these ports are in the piston or tool. It should also be noted that the tool and piston are one and the same and can be easily and quickly removed without disarranging the parts of the apparatus. It will thus appear that the movable parts of the apparatus have been reduced to a minimum, and the construction so far simplified that there is nothing about the apparatus to get out of order, aside from wear upon the tool.

It will be understood that my invention is not limited to the particular structure and form shown, and that modifications may be made without departing from the principle of my invention.

While I have referred to the piston head as solid, this does not mean that it is necessarily made of metal or in one piece, but means that it has no passages or ports therethrough.

Having thus described the invention, what is claimed is—

1. In a device of the class described, a straight stone cutting tool of two diameters formed from a single piece of soft metal the larger diameter being in the shape of a piston and the said tool having small longitudinal pieces of hard metal embedded in its smaller end within its outer margin.

2. A rock cutting drill for pneumatic tools, comprising a soft metal piston having small longitudinal hard metal pieces embedded in its outer end.

3. A rock cutting drill for pneumatic tools, comprising a soft metal piston with small longitudinal rods of self hardening steel embedded at intervals in its outer end.

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

FRANKLIN M. ILER.

Witnesses:

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WILLIAM L. BASSETT.