

C. H. HAESELER.
 FLUID OPERATED PERCUSSION TOOL.
 APPLICATION FILED DEC. 11, 1911.

1,036,998.

Patented Aug. 27, 1912.

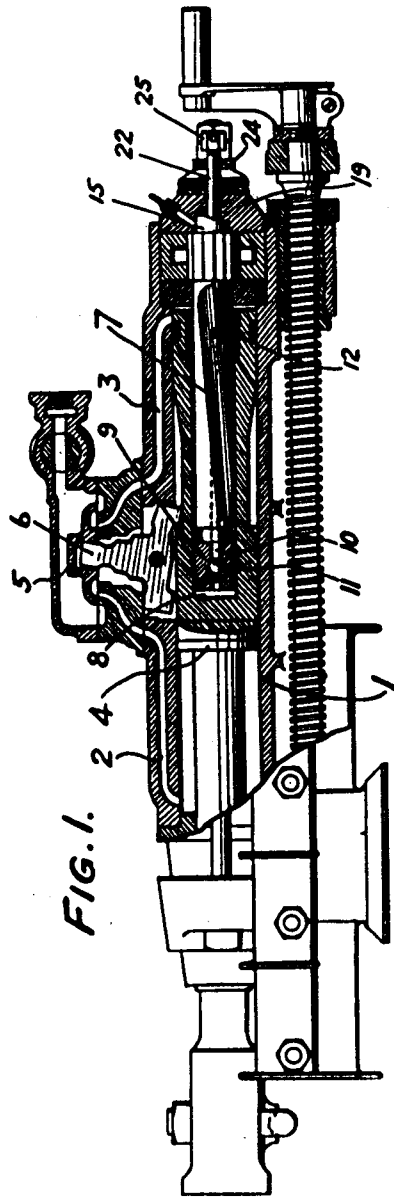


FIG. 1.

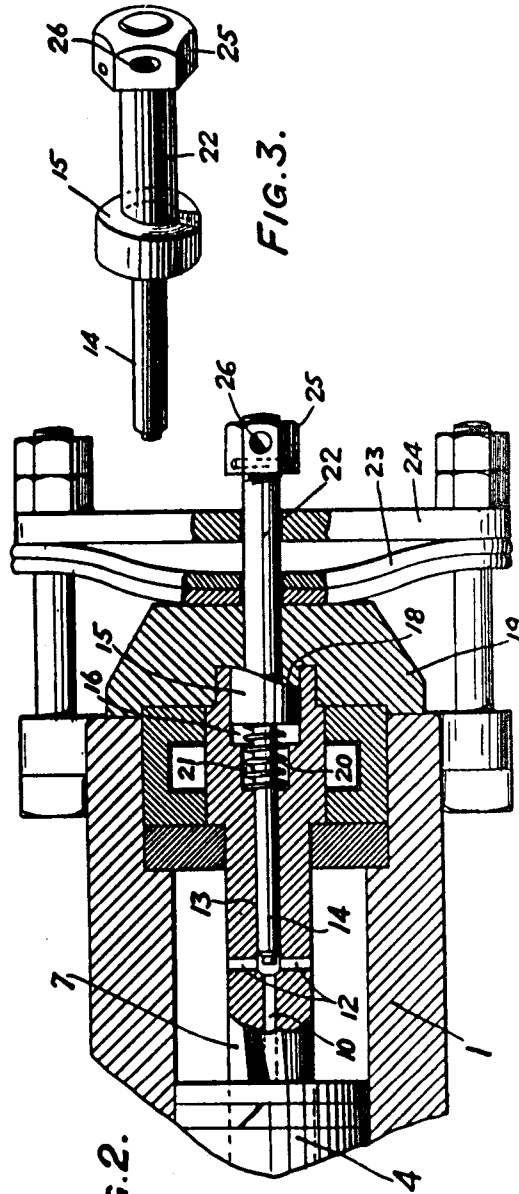


FIG. 2.

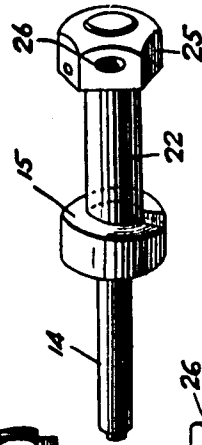


FIG. 3.

WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

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FLUID-OPERATED PERCUSSION-TOOL.

1,036,998.

Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed December 11, 1911. Serial No. 664,929.

To all whom it may concern:

Be it known that I, CHARLES H. HAESELER, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented certain Improvements in Fluid-Operated Percussion-Tools, of which the following is a specification.

This invention relates to and is an improvement on the fluid operated percussion tools, particularly rock drills, described in my Letters Patent of the United States numbered 994,743.

In the operation of rock drills, when working through soft and plastic strata, the retraction of the drill rod is resisted by the friction and adhesion of the material. This resistance renders it at times unnecessary and undesirable to impose the check on the reverse stroke of the operating piston which is effected by the entrapped elastic fluid, as provided in my said patent, and is a desideratum in cutting through solid material.

It is the primary object of this invention to improve the apparatus of my said patent by providing the same with convenient means for regulating the fluid entrapped to cushion the return movement of the operating piston, as also to wholly eliminate the cushion and the resistance otherwise opposed thereby to the return movement.

The characteristic features of my invention are fully disclosed in the following description and the accompanying drawings in illustration thereof.

In the drawings, Figure 1 is a sectional side elevation of a rock drill embodying my invention; Fig. 2 is an enlarged sectional view transverse to that of Fig. 1 illustrating the valve mechanism embodied in my improvements; and Fig. 3 is a perspective view of the valve shown in Fig. 2.

The drill, as illustrated in the drawings, comprises the cylinder 1 having the passages 2 and 3 which communicate with its opposite ends, the percussive piston 4 reciprocated in the cylinder 1 by motive fluid acting through the passages 2 and 3, the valve 5 which is reciprocated to control the passages 2 and 3 by the rocker 6 oscillated by the piston 4, and the rifled rotator bar 7 which engages the rifled wall of the chamber 8, has the piston 9 thereon which acts in the chamber, and contains the passage 10 controlled by the valve 11 and the ports or passages 12, controlled by the piston 4

for communicating motive fluid from the rear end of the cylinder 1 to the chamber 8 in front of the piston 9 and trapping it in such chamber, as described in my said patent.

In my present invention, in its preferred form, the bar 7 is provided with the axial passage 13 which intersects the ports 12 and provides a bearing for a rod valve 14 revolvable and longitudinally movable in said bearing to control said ports, said valve being adapted for closing the passage 10. A cam 15, fixed on the valve, is revoluble in the cylindrical recess 16 in the rear end of the bar 7 and engages the cam 18 formed in the head 19 of the cylinder 1. A spring 20, disposed on the rod 14, is seated in the recess 21 of the bar 7 and bears against the cam 15 to hold it in engagement with the cam 18. A stem 22, fixed to the cam 15, extends through and is revoluble in the cylinder head 19 and its yoke bars 23 and 24, the stem having a head 25 and a hole 26 for the application of a wrench or key.

In the normal operation of the drill, in cutting through solid material, the valve 14 is held in the position shown in Fig. 2, motive fluid admitted to the rear end of the cylinder 1 to effect the forward stroke of the piston 4 flows through the passages 12 and 10 to the chamber 8 and on the backward stroke of the piston the fluid in this chamber is trapped by the automatic closure of the check valve 11, the entrapped fluid providing an elastic cushion imposing the desired check on such backward movement. But when the character of the material through which the drill is acting imposes resistance to the withdrawal or retraction of the cutting mechanism, so as to render the air cushion unnecessary for the purpose of checking such retraction and undesirable because of the force opposed thereby to such retraction, the stem 22 is turned, so that the cam 15 shall be moved inwardly by the cam 18, and the valve 14 is moved inwardly so as to cut off communication between the cylinder 1 and the passage 10, whereby the air cushion and its resistance to the retractive stroke are eliminated.

Having described my invention, I claim:

1. In a fluid operated percussive tool, the combination with a cylinder and a percussive piston therein, of means for applying elastic motive fluid against a given area of the piston to move it in one direction, means

for entrapping motive fluid and for compressing it against a relatively smaller area during the movement of said piston in said direction, and means for rendering said last named means inoperative and eliminating the resistance due to the entrapping of motive fluid.

2. In a fluid operated percussive tool, the combination with a cylinder and a percussive piston therein, of means for applying elastic motive fluid against a given area of the piston to move it in one direction, means for entrapping motive fluid and for compressing it against a relatively smaller area during the movement of said piston in said direction, and mechanism for controlling the entrapping of said motive fluid and regulating the resistance to said movement due to the compression thereof.

3. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, an auxiliary cylinder, an auxiliary piston acting in said auxiliary cylinder, means whereby motive fluid is communicated from said cylinder first named to and entrapped in said auxiliary cylinder, and means for cutting off communication from said first named cylinder to said auxiliary cylinder.

4. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, an auxiliary cylinder in said piston, an auxiliary piston in said auxiliary cylinder, a passage whereby said cylinders communicate, a check valve for preventing the return of motive fluid flowing from said cylinder first named through said passage to said auxiliary cylinder, and a valve for preventing the flow of motive fluid from said first cylinder through said passage to said auxiliary cylinder.

5. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, a rod engaged to said cylinder, an auxiliary piston on said rod, an auxiliary cylinder in said percussion pis-

ton in which said auxiliary piston acts, a passage for admitting fluid from said cylinder first named to said auxiliary cylinder, and a valve for preventing the normal admission of motive fluid to said auxiliary cylinder.

6. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, a chamber in said piston, a rod provided with a piston in said chamber, a passage through said rod whereby motive fluid is communicated from said cylinder to said chamber, and a valve comprising a rod movable in said rod first named whereby said passage can be regulated.

7. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, a chamber in said piston, a rod provided with a piston in said chamber, a passage through said rod and the piston thereon whereby fluid is communicated from said cylinder to said chamber, a check valve for entrapping fluid in said chamber, and a valve comprising a rod movable in said rod first named whereby said passage can be closed.

8. In a fluid operated percussive tool, the combination of a cylinder, a percussion piston movable therein, a chamber in said piston, a rod having a piston in said chamber, said rod being connected to said cylinder and having a passage whereby said cylinder communicates with said chamber, and a valve mechanism for controlling said passage, said valve mechanism comprising a revoluble and longitudinally movable rod in combination with means whereby said rod is moved longitudinally by turning it.

In witness whereof I have hereunto set my name this 9th day of December, 1911, in the presence of the subscribing witnesses.

CHARLES H. HAESELER.

Witnesses:

JOS. G. DENNY, Jr.,

CHARLES N. BUTLER.