

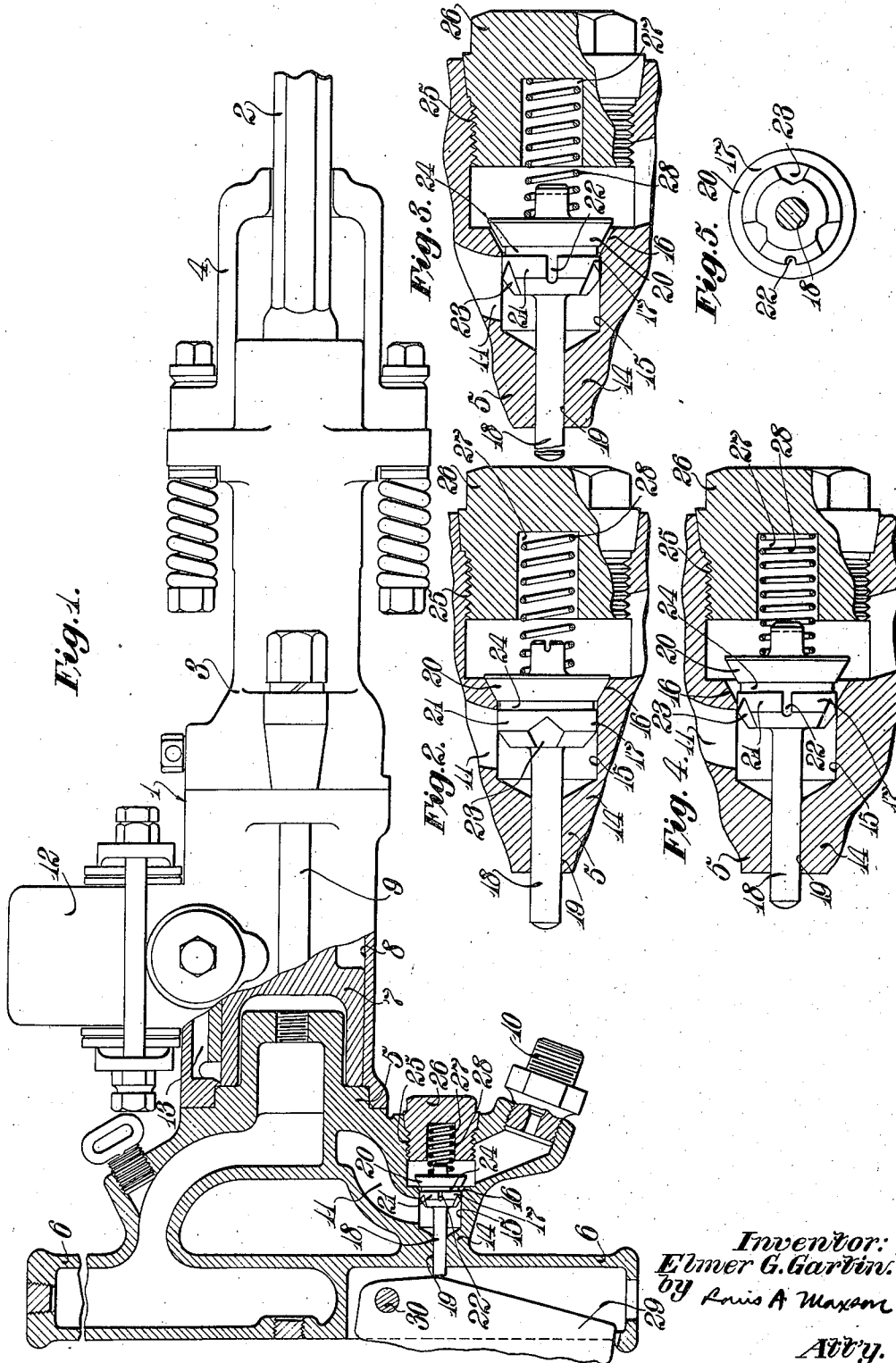
Oct. 1, 1929.

E. G. GARTIN

1,730,322

ROCK DRILL

Filed June 16, 1927



Inventor:
Elmer G. Gartin.
by Louis A. Maxson.
Atty.

UNITED STATES PATENT OFFICE

ELMER G. GARTIN, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN
MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS

ROCK DRILL

Application filed June 16, 1927. Serial No. 199,242.

My invention relates to rock drills.

It has for an object to provide improved means for controlling the supply of actuating fluid to the percussive motor of a rock drill.

Another object is to provide an improved throttle valve structure of the type adapted to be held on its seat by fluid pressure wherein means are provided for obtaining a very sensitive control of the valve opening.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

Fig. 1 shows a rock drilling tool in plan view having my improved throttle valve structure associated therewith, the valve structure and adjacent parts being shown in section to facilitate illustration.

Fig. 2 is a detail sectional view of the throttle valve structure showing the same in closed position.

Fig. 3 is a view similar to Fig. 2, showing the valve in its initial opening position.

Fig. 4 is also a view similar to Fig. 2 but showing the valve in intermediate opening position.

Fig. 5 is a detail view of the valve showing the valve stem in section.

In the illustrative form of my invention I have shown the same associated with a rock drilling tool which may be of any well known type employing a drilling motor generally designated by the numeral 1 for actuating a drill steel 2. The drill steel is held in position in a chuck housing 3 which has connected thereto a suitable drill steel retainer 4 in a well known manner. The rear end of the drilling motor is closed by a head block 5 having operating handles 6 formed integral therewith. A portion of the hammer piston 7 and its cylinder 8 are also illustrated. The chuck housing member, cylinder member and head block are held together by the usual side rods 9. The means for supplying pressure fluid to the cylinder 8 comprises the usual hose connection 10, suitable passages 11 in the head block communicating with other passages in the cylinder member (not shown), a usual fluid distribution valve

12, and distribution passages, one of which is indicated at 13.

My improved throttle valve structure comprises a valve casing 14 having a cylindrical bore 15 and a conical seat 16. The throttle valve 17 is reciprocably mounted in the valve casing and has suitable means for guiding the same comprising a stem 18 extending through a bore 19 in the valve casing and head block. This valve is provided with a conical portion 20 for cooperation with the conical seat 16 and a cylindrical portion 21 fitting in the cylindrical bore 15. This portion 21 has formed therein a narrow slot 22 of uniform cross section and V-shaped notches 23 increasing in cross sectional area toward the outlet side of the valve. A circumferential recess 24 is also formed on the valve at the base of the conical portion and communicates with the narrow slot 22. The valve casing has a threaded opening 25 for receiving a removable plug 26 to make the valve easily accessible. This plug 26 has a recess 27 in which is received a spring 28 one end of which bears against the conical portion of the valve and tends to hold the same against its seat. The means for operating the throttle valve comprises a manually operated lever 29 pivotally mounted at 30 in one of the operating handles 6. As will be apparent from the drawings, this lever is adapted to engage the valve stem 19 to reciprocate the valve.

As a result of my invention it will be clear that improved means have been devised for sensitively regulating the flow of pressure fluid to a percussive motor, thereby avoiding the sudden application of highly compressed fluid to the hammer piston together with the undesirable effects of such operation. With my improved valve, the initial movement of the lever 29 will allow a restrictive quantity of fluid to flow through the narrow slot 22, which is of such limited cross section that the motor will be actuated very slowly. This position of the valve is shown in Fig. 3. The initial opening action also relieves to a certain extent the unbalanced fluid pressure on the base of the valve, thereby avoiding sudden opening. On further movement of the lever 29 the valve will move to some position

as shown in Fig. 4, gradually increasing the valve opening to apply the desired power to the percussive motor of the drilling tool. When fully opened, the valve will be moved

5 to a position in which the cylindrical portion at the inner end of the seating portion will be in a position in which flow may take place completely around it.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms

15 without departing from its spirit or the scope of the appended claims.

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

1. A throttle valve structure comprising a valve casing having a conical seat and a cylindrical bore, a valve slidably mounted in said casing having a conical portion adapted to be held against said seat by fluid pressure, said valve also having a cylindrical portion

25 slidable in said bore, said cylindrical portion having a notch of restricted cross section for permitting a limited flow of fluid through the valve during initial opening movement, and other notches of varying cross section for gradually increasing the valve opening during further movement thereof, and manual means for operating said valve.

2. A throttle valve for controlling the supply of fluid to a percussive motor comprising a valve casing, having a conical seat and a cylindrical bore, a valve slidably mounted in said casing having a conical portion adapted to be held against said seat by fluid pressure, a spring in said casing also tending to hold

40 said valve against its seat, said valve also having a cylindrical portion slidable in said bore, said cylindrical portion having a notch of uniform restricted cross section therein for permitting a flow of fluid through the valve during initial opening movement, and V-shaped notches for gradually increasing the valve opening during further movement thereof, a valve stem projecting from the outlet side of said valve through a bore in said casing, and a manually operated operating lever engaging said valve stem for operating the valve.

3. In a pressure fluid actuated percussive motor, conduit means for conducting pressure fluid to said motor, and control means for controlling the flow of fluid to said motor comprising a throttle valve structure interposed in said conduit means, said valve structure including a valve casing forming a cylindrical bore and a conical valve seat at one end of said bore, a valve having cylindrical and conical portions respectively cooperating with said bore and seat, said cylindrical portion having notches therein of varying cross

70 ranged adjacent said conical portion so as to provide for a restricted opening during initial valve opening movement which may be controlled accurately by the operator.

4. In a pressure fluid actuated percussive motor, conduit means for conducting pressure fluid to said motor, and control means for controlling the flow of fluid to said motor comprising a throttle valve structure interposed in said conduit means, said valve structure including a valve casing forming a cylindrical bore and a conical valve seat at one end of said bore, a valve having cylindrical and conical portions respectively cooperating with said bore and seat, said cylindrical portion having V-shaped notches therein of gradually increasing cross sectional area with the most restricted portions disposed closest to said conical portion, whereby a restricted opening of the valve may be under the control of the operator during starting of said motor.

In testimony whereof I affix my signature.

ELMER G. GARTIN.

90

95

100

105

110

115

120

125

130