G. M. NELL.

THROTTLE VALVE.

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1,413,288. Patented Apr. 18, 1922.

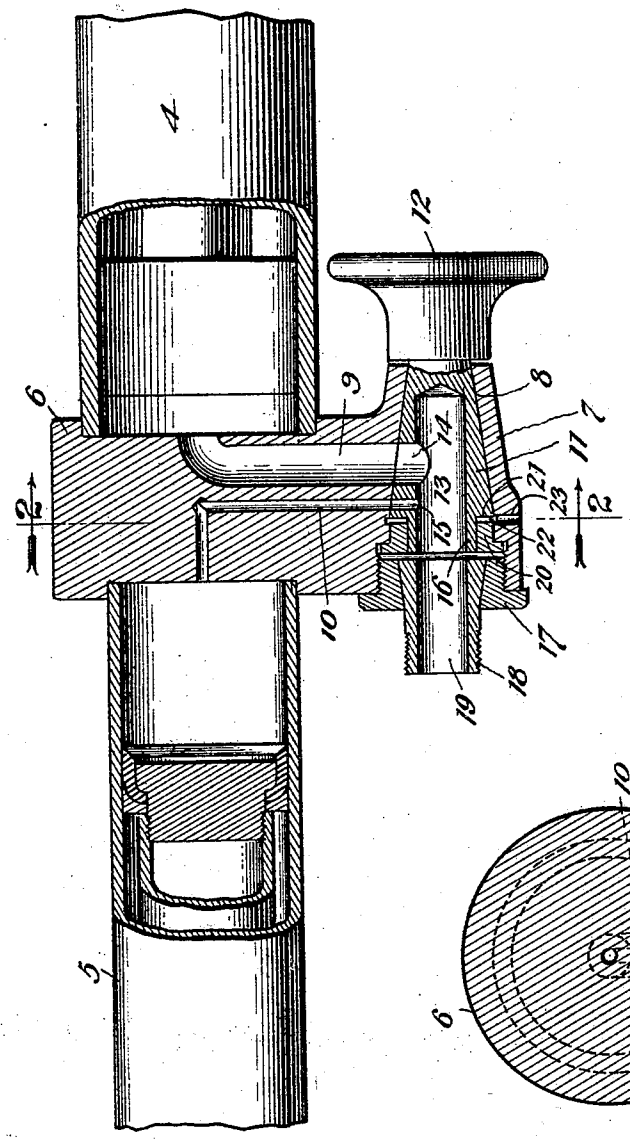


Fig. 1.

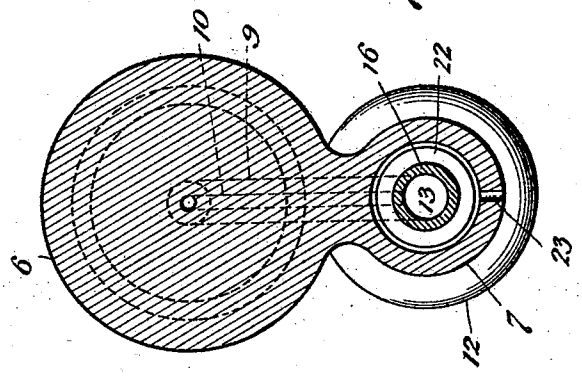


Fig. 2.

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UNITED STATES PATENT OFFICE.

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THROTTLE VALVE.

1,413,288. Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed December 7, 1920. Serial No. 428,947.

To all whom it may concern:

Be it known that I, GUSTAVE M. NELL, 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 Throttle Valves, of which the following is a specification.

The present invention relates more particularly to throttle or controlling valves for rock drills, but may be utilized for other purposes. As is well known, it is the common practice to employ rotary valves having tapered bearing portions. The pressure of the fluid against these valves is in a direction to force the taper portion into engagement with its seat. While this is essential, the pressure is often so great as to cause the valve to stick or be operable only under difficulty.

The primary object of the invention is to provide means whereby the pressure is in great measure relieved, though sufficient is maintained to secure the necessary seating action. As a consequence the desired bearing fit is secured, and yet is not so tight as to make the operation of the valve difficult.

An embodiment of the invention that is at present considered the preferable one, is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal sectional view through a portion of a rock drill, showing the improved valve structure:

Figure 2 is a cross sectional view on the line 2—2 of Figure 1.

In the structure disclosed, a drill actuating motor is shown generally at 4, and the usual fluid pressure operated feeding means is designated 5. Interposed between the members 4 and 5 is a head block 6 having at one side a valve casing 7 provided with a tapered valve seat 8. A supply passageway 9 leads from the seat to the motor 4, and a passageway 10 also extends from the seat to the fluid pressure operated feeding means 5.

The valve is designated generally by the reference numeral 11, and is tapered to conform to the taper of the seat 8. Mounted on its smaller end is an exposed operating handle 12 that is located at one end of the valve casing 7. An intake port 13 opens through the larger end and is in communication with lateral ports 14 and 15 that are movable into and out of communication with the passageways 9 and 10 accordingly as the valve 11 is turned by its handle 12. The larger end of the valve is also provided with a reduced extension 16 that is generally cylindrical in form.

A plug 17, threaded into the opposite end of the valve casing 7 to the handle 12, secures in place a nipple 18 to which a motive fluid supply line, as for example a hose, may be connected. The bore 19 of the nipple is in line with the intake port 13 of the valve. The plug 17 terminates short of the extension 16, and snugly fitting on said extension and into the adjacent portion of the valve casing, is a flanged packing member 20. This packing member terminates short of the shoulder 21 formed by the larger end of the valve, thus producing a chamber 22 that is open to atmosphere through a vent 23 in the valve casing.

With this structure, it will be evident that the pressure of the motive fluid introduced through the nipple 18 operates only against the end surface of the extension 16 and the bottom or closed end of the intake port 13, the packing member 20 substantially cutting off the passage of the fluid around the extension 16. Inasmuch as there may be and in practice usually is a slight amount of leakage past the packing member, the vent 23 permits the escape of the fluid and prevents any building up of pressure against the shoulder 21. It will thus be evident that while there will be pressure against the valve sufficient to hold it properly seated the amount of this pressure is relatively slight and the valve therefore is easily operable.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In apparatus of the character set forth, the combination with a valve casing, of a rotary tapered valve therein having an exposed operating handle on its smaller end and a reduced extension in its larger end,

a plug in the end of the valve casing that contains the said larger end, and a packing member in the valve casing surrounding the extension and separate from the plug.

2. In apparatus of the character set forth, the combination with a valve casing, of a rotary tapered valve therein having an exposed operating handle on its smaller end and a reduced extension in its larger end, a plug in the end of the valve casing that contains the said larger end, and a collar separate from the plug and located within the casing, said collar snugly receiving the extension and being spaced from the larger end, forming a leak-receiving chamber, said chamber having a vent to atmosphere.

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

GUSTAVE M. NELL.

Witnesses:
A. R. STEUERLE,
H. C. GUSTAFSON.