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THROTTLE VALVE FOR PNEUMATIC DRILLS.

APPLICATION FILED JUNE 1, 1908.

935,268. Patented Sept. 28, 1909.

Fig. 1.

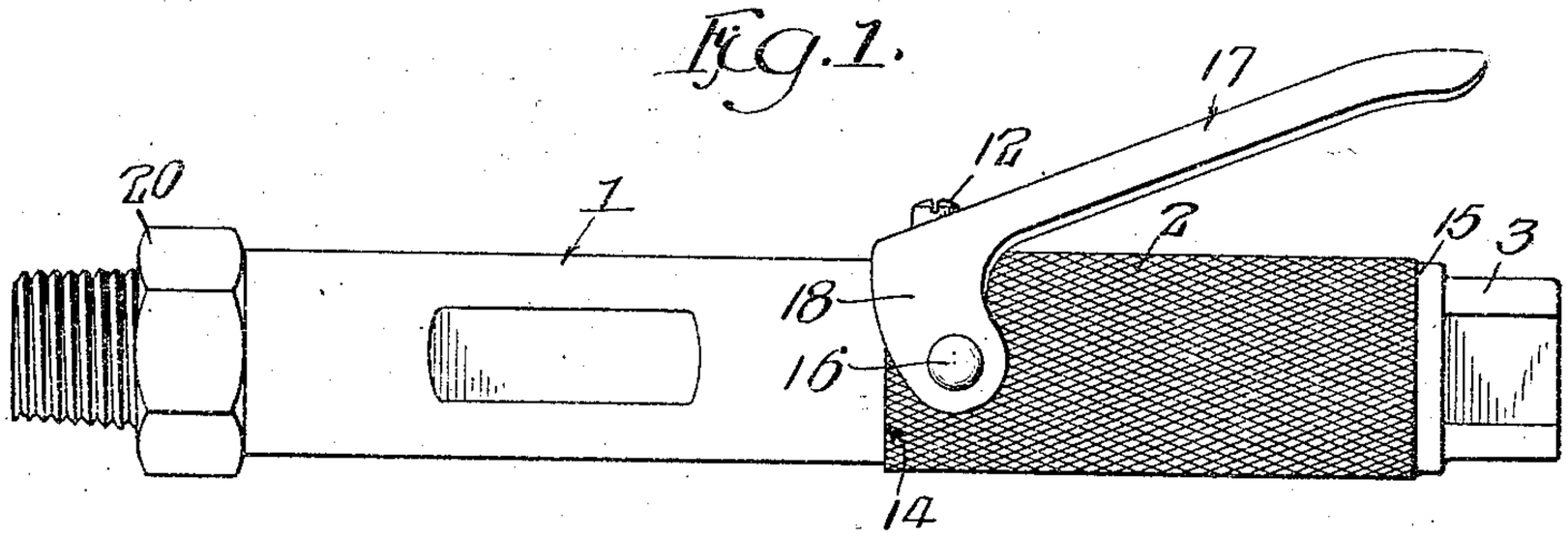


Fig. 2.

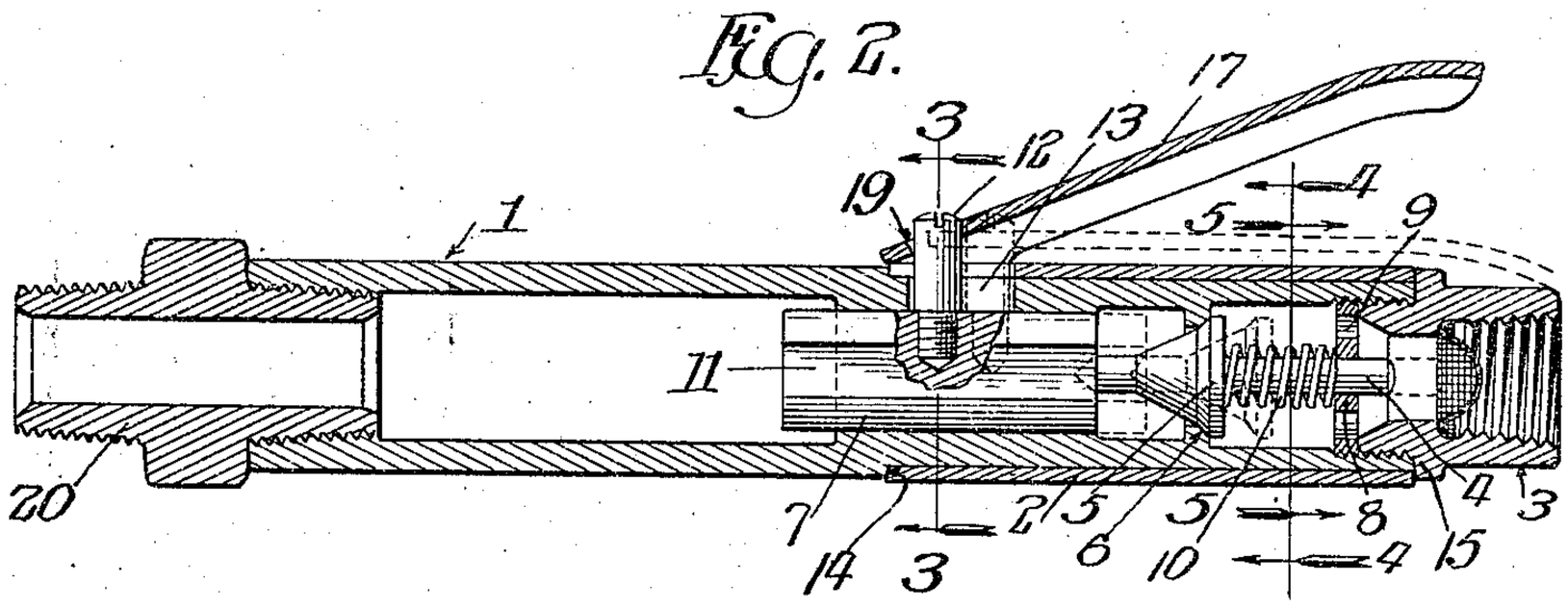


Fig. 3.

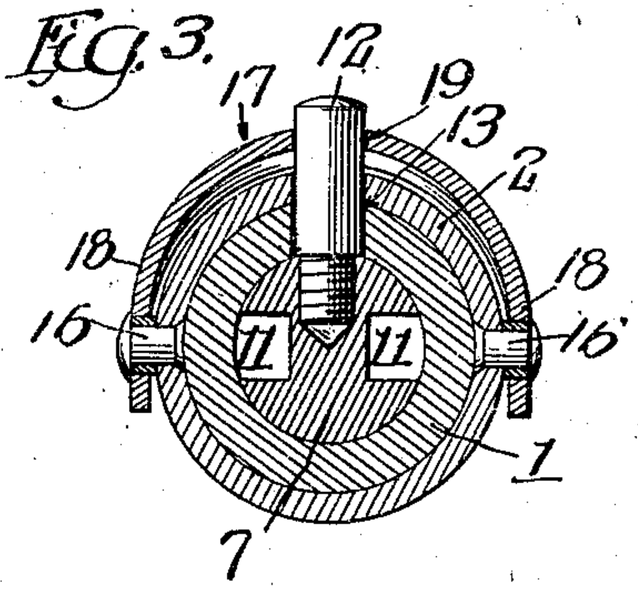


Fig. 4.

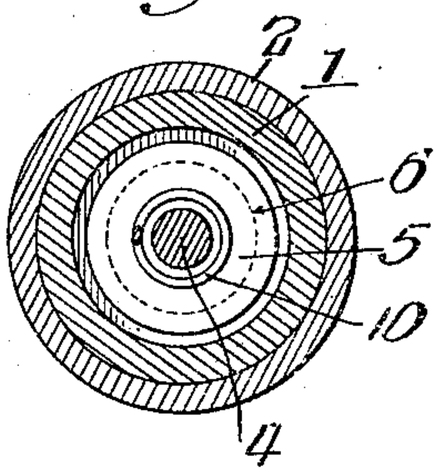


Fig. 5.

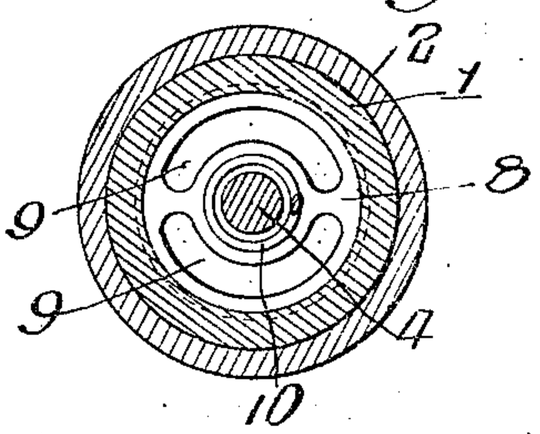


Fig. 6.

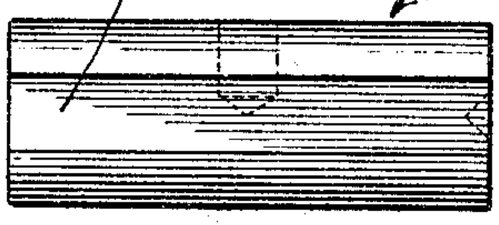
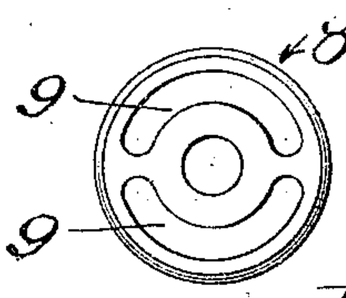


Fig. 7.



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UNITED STATES PATENT OFFICE.

AXEL LEVEDAHL, OF AURORA, ILLINOIS, ASSIGNOR TO AURORA AUTOMATIC MACHINERY COMPANY, OF AURORA, ILLINOIS, A CORPORATION OF ILLINOIS.

THROTTLE-VALVE FOR PNEUMATIC DRILLS.

935,268. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed June 1, 1908. Serial No. 435,865.

To all whom it may concern:

Be it known that I, AXEL LEVEDAHL, a citizen of the United States, and a resident of Aurora, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Throttle-Valves for Pneumatic Drills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in throttle valves of the kind used in portable pneumatic tools, such as pneumatic drills, having an air driven motor and provided with two handles one of which contains the throttle-valve mechanism for controlling admission of air to the motor, and the invention refers more specifically to an improved construction and arrangement of the parts associated with the throttle valve by means of which the valve is operated by the hand of the operator which grasps the handle of the tool and is adapted to be automatically closed when the operator's grasp is released.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a side elevation of a tool handle containing a throttle-valve embodying my invention. Fig. 2 is a view in central longitudinal section taken through the tool handle, and the throttle valve mechanism. Fig. 3 is a section, on a slightly larger scale, taken upon line 3—3 of Fig. 2. Fig. 4 is a section on a larger scale taken upon line 4—4 of Fig. 2. Fig. 5 is a sectional view on a larger scale taken upon line 5—5 of Fig. 2. Fig. 6 is a view in side elevation of the endwise sliding cylinder in the tubular handle. Fig. 7 is a side view of the guide disk for the valve-stem.

As shown in said drawings, 1 indicates the tubular handle of the tool in which is contained the throttle valve mechanism and which is grasped by the operator during the time the drill is in operation. The handle 1 is provided with a bore or passage extending through the same from end to end. Over the portion of the handle 1 which is grasped by the operator there is fitted an exteriorly knurled cylindric sleeve forming a hand grip. The throttle valve illustrated in the drawings is located in the bore of the handle 1 and adjacent to that portion of the said handle which is surrounded by the sleeve 2. The bore or passage of the handle 1, in which the throttle valve is located, opens at its ends through both ends of the handle, and one end of the bore constitutes a supply passage or inlet for the air or other fluid under pressure. In said inlet end of the bore or passage is inserted a sleeve or nipple 3 having interior screw threads for attachment thereto of the pipe or hose through which air is supplied to the tool. Said nipple 3 has external screw-threads engaging the corresponding screw-threads in the end of said bore or passage which is enlarged to receive it. Within said passage and near the inlet end is a longitudinally arranged valve stem 4 which is provided with a valve disk 5, adapted to bear on a valve seat formed by an inwardly extending offset or shoulder 6 in the said passage. The said valve seat faces toward the inlet end of the tubular handle so that the pressure of the air entering the bore of the handle tends to press the said valve disk against its seat, or to hold the valve closed. The opposite or inner end of the valve stem bears endwise against a cylindric block 7, which is adapted to slide endwise in the bore of the tube 1. A cylindric seat is formed in the tube 1 in which the cylindric block 7 fits and slides, and said block is provided at its opposite sides with longitudinal grooves or channels 11, 11 to permit the passage of air through the tube past said block. The inner end of said valve stem is provided with a conical point which engages a conical recess in the adjacent end of said block.

The nipple 3 is provided at its inner end with a rigidly attached guide disk 8 having a guide aperture formed centrally therein, through which passes the adjacent or outer end of the valve stem 4. The said guide disk 8 is provided with curved slots or apertures 9, 9 formed concentric with the guide aperture therein and through which air passes to the valve. Between the guide disk 8 and the valve disk 5 is a coiled actuating spring 10 by which the valve disk is held normally against the valve seat.

Provision is made for operating the throttle valve for admission of air to the motor as follows: Secured to one side of the said sliding block 7 at right angles thereto is an outwardly extending stud 12. Said stud 12

extends outwardly through a longitudinal slot 13 provided in the side wall of the tube 1 and through a corresponding slot in the sleeve 2 thereon. Said sleeve is held from endwise movement on the tube 1 by means of an annular shoulder 14 on the tube 1, against which the inner end of the sleeve abuts, and by contact of the opposite or outer end of said sleeve with an outwardly extending annular flange 15 on the nipple 3. Pivotally supported upon the said sleeve 2, by means of pivot studs 16, 16, is a hand lever 17 which is provided with lateral arms 18, 18 extending from the pivoted end of the lever at opposite sides of the sleeve 2, and through which the pivot studs 16, 16 are inserted. The opposite or swinging end of said lever 17 extends from its pivoted end outwardly or toward the inlet end of the tube 1. At its pivoted end the said lever 17 is provided with an aperture 19 through which the outer end of the stud 12 extends. The said aperture 19 is arranged substantially in transverse alinement with the pivot studs 16, 16; the arrangement of the parts being such that when the free end of the lever is pressed toward the tube the aperture therein which engages the stud 12 will be moved or shifted endwise of the tube and toward its outer or inlet end, and a like movement will be transmitted to the sliding block 7 through the medium of the said stud 12: The said sliding block, by its endwise pressure on the valve stem, will shift the same endwise against the action of the spring 10 to effect the opening of the valve.

In order that the parts gripped by the hand of the operator may be as small in diameter as possible, the lever 17 is transversely curved and has its inner side concave to correspond with the curvature of the sleeve 2. By this construction in the lever, when said lever is pressed against the sleeve 2, it will afford a substantially cylindric surface to be held or gripped by the operator during the handling of the tool. The tube or handle 1 at its exit end, or that which is attached to the tool, is shown as provided with a screw-threaded nipple 20, by which it is connected with the casing of the tool.

In the operation of the throttle valve described, the hand of the operator is applied around the sleeve 2 and the lever 17 in such manner that, by the grasp of the hand, the lever is swung inwardly and the cylinder 7 thereby moved longitudinally toward the inlet end of said handle. A corresponding movement will be imparted to the valve stem 4 and the valve disk 5 will be moved against the action of the spring 10 and the pressure of the incoming motive fluid or air away from its seat. The motive fluid or air will then pass through the apertures 9, 9 of the guide disk 8, through the opening in the valve seat, and through the channels 11, 11 of the cylinder 7 to the motor. When the operator's grip upon the handle is released the valve disk 5 will be shifted to its closed position by the action of the spring 10 aided by the air-pressure.

An advantage gained by the construction described is that the throttle valve will close automatically when the pressure of the hand on the handle of the tool is released, thereby insuring the stoppage of the motor in case the handle of the tool should slip from the grasp of the operator.

It is to be understood that the presence of the sleeve 2 is not necessary to the operation of the throttle valve described, although the same is of advantage because affording a pivotal support for the hand lever 17 adapted to be easily placed upon and removed from the tube 1. In case the said sleeve 2 is omitted, the hand lever 17 will be pivotally connected with the tube 1 in some other convenient manner. The employment of said sleeve 2, as a separate removable member, is of advantage, moreover, because in case a self-closing valve be not desired, the sleeve 2 with the hand-lever may be removed from the tube, and for the same may be substituted, a like sleeve provided with an oblique slot to receive and engage the stud 12, and adapted to be turned or rotated on the tube 1 to give endwise movement to the stud 7 and through the same to the valve in a manner heretofore known.

I claim as my invention:—

1. The combination with a pneumatic motor handle provided with a bore or passage, of a throttle valve embracing an endwise movable valve stem, an endwise sliding block fitting within the bore of the handle and adapted to give endwise movement to the valve stem, said sliding block being provided with a longitudinally arranged air passage and with a rigidly attached outwardly extending stud, and said handle being provided with a longitudinal slot through which said stud extends, a hand lever extending lengthwise of said handle at one side of the same and pivotally connected at one end with said handle by a transverse pivot, the pivoted end of said handle being engaged with the outwardly extending stud on the sliding block, and a spring applied to hold the valve in its closed position and the free end of the hand lever at a distance from the handle.

2. The combination with a pneumatic motor handle provided with a bore or passage, of a throttle valve embracing an endwise movable valve stem, an endwise sliding block fitting within the bore of the handle and adapted to act endwise on said valve stem, said block being provided with a longitudinally arranged air passage and with a stud rigidly attached thereto and said handle being provided with a longitudinal slot through which said stud extends, and a hand

lever pivotally supported upon the said handle and adapted at its pivoted end for engagement with the outwardly extending stud of the sliding block, the said hand lever being provided with lateral arms which extend at opposite sides of the handle and which are pivotally connected with the same.

3. The combination with a pneumatic motor handle provided with a bore or passage, of a throttle valve embracing an endwise movable valve stem, an endwise sliding block fitting closely in the bore of the handle and adapted to act endwise on the valve stem, said block being provided with a longitudinally arranged air passage and with a stud rigidly attached thereto, a sleeve surrounding the handle, said handle and sleeve being provided with longitudinal slots through which the said studs outwardly extend, a hand lever which extends lengthwise of the handle, which is pivoted at one end to said sleeve and engages at its pivotal end with said stud, and a spring acting on the valve stem to hold the valve normally closed and to maintain the free end of the hand lever at a distance from the handle.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 27th day of May A. D. 1908.

AXEL LEVEDAHL.

Witnesses:
E. C. Eiter,
O. Hammerlund.