Jan. 29, 1924.

1,482,211

S. BAILIE

HOLLOW THROTTLE VALVE

Filed Nov. 12, 1921

2 Sheets-Sheet 1

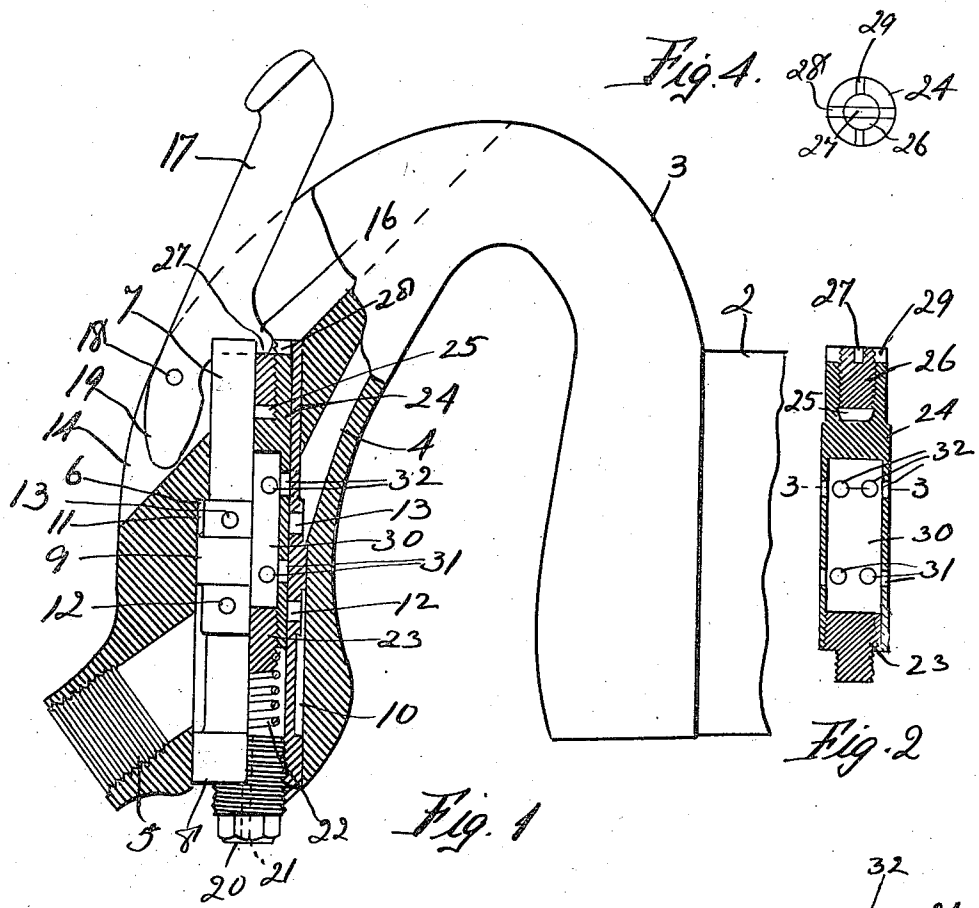



Fig. 1




Fig. 2




Fig. 4.

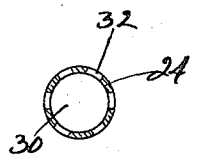



Fig. 3.

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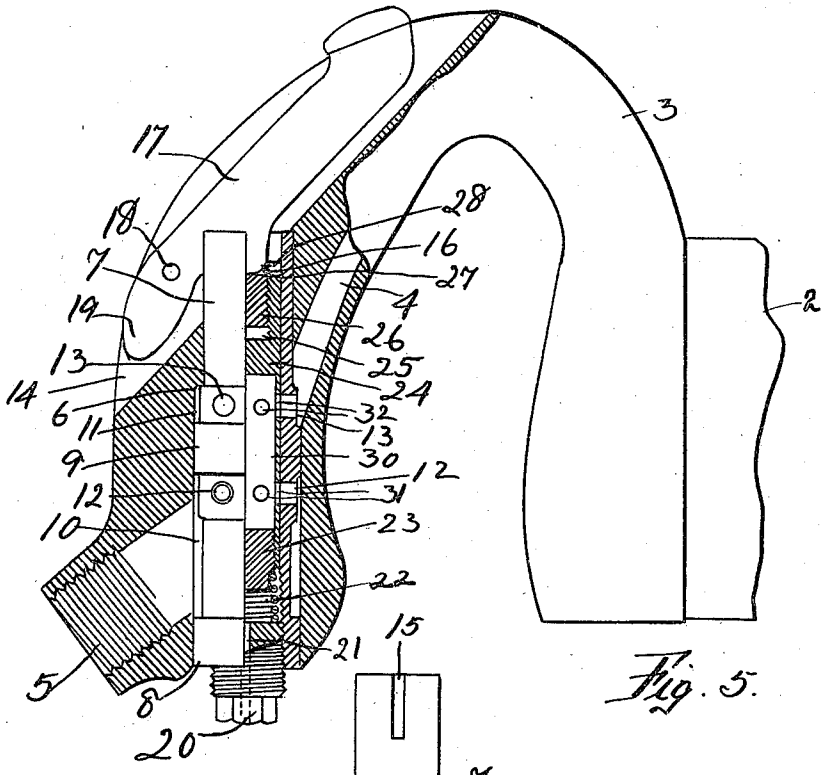



Fig. 5.

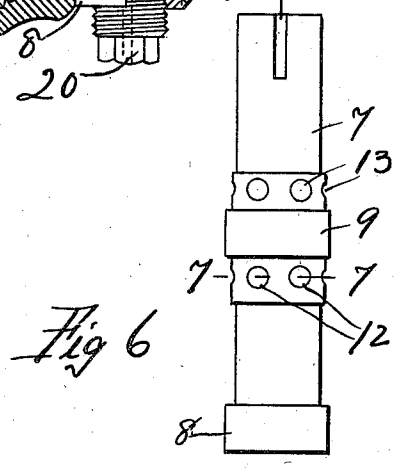



Fig 6

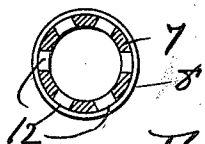



Fig. 7.

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# UNITED STATES PATENT OFFICE.

SAMUEL BAILIE, OF CAMDEN, NEW JERSEY.

## HOLLOW THROTTLE VALVE.

Application filed November 12, 1921. Serial No. 514,636.

*To all whom it may concern:*

Be it known that I, SAMUEL BAILIE, a subject of the King of England (having declared his intention of becoming a citizen of the United States), residing at Camden, in the county of Camden and State of New Jersey, have invented new and useful Improvements in a Hollow Throttle Valve, of which the following is a specification.

My invention relates to new and useful improvements in a hollow throttle valve for pneumatic hammers, machines or tools and the like, and has for its object to provide an exceedingly simple and effective device of this character provided with a plurality of ports, certain of which are used as inlet openings and others as outlet openings, the different sets of openings being spaced apart and adapted to be moved into or out of alignment with similar coacting openings or ports in the valve casing, this arrangement providing means for closing the valve at two points which will practically prevent the leakage of fluid to the actuating parts generally known as the engine.

Another object of the invention is to provide means for adjusting the amount of port valve lap and port opening.

A further object of the invention is to provide a hollow throttle valve having a chamber through which a pressure fluid, such as for instance compressed air, must pass before entering the operating parts of the device.

With these ends in view, this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains, may understand how to make and use the same, I will describe its construction in detail referring by numerals to the accompanying drawings forming a part of this application, in which:—

Fig. 1, is a fragmentary side elevation of a pneumatic tool showing my improved hollow throttle valve mounted therein, portions of the handle of the tool, valve casing and valve being broken away and sectioned to clearly illustrate the construction, said valve being shown in its closed position.

Fig. 2, is a longitudinal sectional view of the hollow throttle valve.

Fig. 3, is a section at the line 3—3 of Fig. 2.

Fig. 4, is an end view of the throttle valve.

Fig. 5, is a view similar to Fig. 1 showing the throttle valve in its open position.

Fig. 6, is a side elevation of the valve casing.

Fig. 7, is a section at the line 7—7 of Fig. 6.

In carrying out my invention as here embodied, 2 represents a pneumatic tool with relation to which my hollow throttle valve will be described in order to set forth its construction and operation and said tool is provided with a handle 3 provided with a suitable inlet duct or passageway 4 through which the pressure is supplied to the engine and this passageway terminates at its outer end in a threaded opening 5 for the attachment of a hose or suitable nipple.

Across the passageway 4 is a bore 6 for the reception of the valve casing 7, the said valve casing having a rib 8 at its outer end to close the outer end of the bore 6 and another rib 9 intermediate its ends to divide the bore into an intake compartment 10 and an outlet compartment 11, the said casing tigthly fitting within the bore to prevent leakage from said bore or from one compartment to the other. To one side of the rib 9 are formed a plurality of inlet openings 12 so as to communicate with the intake port 10 while to the other side of said rib are formed a plurality of outlet openings 13 so as to communicate with the outlet compartment 11 or a portion of the passageway 4. The inner end of the valve casing 7 projects into the trigger slot 14 formed in the handle of the tool and said projecting inner end of the valve casing is slotted as at 15 which is in alignment with the trigger slot and with which registers the heel 16 of the trigger 17 mounted on the pivot pin 18 disposed across the slot 14, the toe 19 of said trigger engaging the inner wall of the slot 14 to limit the movement of the trigger in one direction.

In the outer end of the valve casing is threaded a plug 20 having a vent opening 21 therethrough and this plug is jammed home to prevent accidental displacement thereof, one end of a spring 22 rests against said plug as the stationary member

while the other end of said spring engages the cap 23 having threaded engagement with the inner end of the throttle valve 24. In the outer end of the valve is a bore 25 in which is adjustably mounted the adjusting or set screw 26 having a transverse slot 27 in its outer end for registration with either of the slots 28 or 29 formed in the outer end of the valve, the said last named slots being at right angles to each other, as plainly shown in Fig. 4, either of which is adapted to register with the heel 16 of the operating trigger 17 and when so arranged neither the valve nor the adjusting screw can be revolved.

The main portion of the throttle valve is hollow thereby providing a fluid chamber 30 having a plurality of inlet openings or ports 31 leading thereto adjacent one end thereof and also having a plurality of outlet ports 32 leading therefrom adjacent the other end of said chamber and spaced from the inlet ports or openings. The inlet and outlet ports or openings in the valve are of the same number as those in the valve casing and are so set that when the valve is moved forward into its open position all of the ports in the valve will align with their respective ports in the valve casing.

The inlet and outlet ports are preferably each six in number equally spaced circumferentially about the valve and as the slots in the outer end of the valve are at right angles to each other one of said slots is in direct alignment with two opposite ports of each set, while the other slot is within a line drawn between two of the ports, as plainly shown in Fig. 2. This arrangement permits my throttle valve to be used with pneumatic tools of different constructions in certain of which one of the ports of both the inlet and outlet openings are in alignment with the trigger whereas in other constructions the ports are out of alignment with said trigger.

From the foregoing description it will be noted that when the valve is in its closed position, as shown in Fig. 1, a multiple closure is provided, as the pressure fluid entering the threaded opening 5 cannot under ordinary conditions pass through the inlet ports 12, or if for any reason this pressure fluid should seep into the valve chamber 30 it is not likely that it could pass through the outlet openings of the valve and then reach the outlet openings of the valve casing so as to enter the passageway 4, but as soon as the trigger 17 is actuated so as to be brought into a position approximating that shown in Fig. 5, the inlet and outlet ports of the valve will be moved into alignment or registration with the similar ports in the valve casing thus permitting a free passage of the pressure fluid in the compartment 10 through the inlet openings 12 and 31 into the valve chamber 30 and then through the outlet openings 32 and 13 into the compartment 11 and the passageway 4 permitting said pressure fluid to then pass on to the engine.

If it is desired to change the lap of the valve or if a change becomes necessary due to wear of the heel 16 of the trigger 17 or the adjusting screw 26 the latter may be moved inward or outward thus accomplishing the desired change as will be obvious. When the proper adjustment has been obtained and the slot 27 in the adjusting screw is in alignment with one of the slots 28 or 29 in the valve and that slot in the valve is in alignment with the slot 15 in the valve casing the heel 16 of the trigger will register with all of said slots and the tension of the spring 22 will hold the parts in engagement thereby preventing any of said parts from getting out of alignment.

As the valve is a snug fit in the valve casing and has a long bearing surface the chances of wearing ridges in the valve casing are eliminated or reduced to a minimum.

So far as I am aware this is the first multiple ported hollow throttle valve having spaced inlet and outlet openings for controlling the flow or pressure fluid of a pneumatic tool, machine or the like.

Of course I do not wish to be limited to the exact details of construction as herein shown as these may be varied within the limits of the appended claims without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and useful is:—

1. A hollow throttle valve having six inlet ports and six outlet ports separated from the inlet ports, the ports of each set being equally spaced about the valve and further provided with two transverse slots at one end and at right angles to each other, one of said slots being in alignment with two opposite ports of each set and the other in alignment with the space between two ports of each set.

2. A hollow throttle valve having six inlet ports and six outlet ports separated from the inlet ports, the ports of each set being equally spaced about the valve and further provided with two transverse slots at one end, one of said slots aligning with the centers of certain of said ports and the other aligning with a line drawn midway between certain of the other of said ports.

3. A hollow throttle valve having six inlet ports and six outlet ports separated from the inlet ports, the ports of each set being equally spaced about the valve and further provided with two transverse slots at one end, said slots being arranged at right angles to each other.

4. A hollow throttle valve provided with

inlet and outlet ports and a slotted adjustable screw at one end thereof.

5. A hollow throttle valve having separated inlet and outlet ports all of said inlet ports and all of said outlet ports being equally spaced about the valve and further provided with two transverse slots at one end, said slots being at right angles to each other and an adjustable screw mounted in the slotted end of said valve and also having a transverse slot to align with either of the slots in the valve for the purpose set forth.

6. In combination a valve casing having separated inlet and outlet ports, a hollow throttle valve also having separated inlet and outlet ports, and adjustable means carried by the valve to regulate the lap of the ports.

7. In a device of the character stated, a valve casing adapted to be disposed in a bore across a pressure fluid passageway and having means to divide the bore in which said casing is adapted to be disposed into two compartments, said casing having inlet ports to one side of said means and also having outlet ports to the other side of said means, a throttle valve having a fluid chamber and provided with separated inlet and outlet ports so positioned as to register with the inlet and outlet ports of the casing when said valve is in an open position, all of said ports being in covered relation when the valve is in a closed position, resilient means to normally hold said valve in its closed position, a trigger having a heel for moving said valve toward its open position, and adjustable means carried by the valve to take up the wear between itself and the heel of the trigger and to regulate the lap of the ports, said means, one end of the valve and the valve casing being slotted to register with a portion of the trigger to align the valve ports with the casing ports and prevent rotation of said valve.

In testimony whereof, I have hereunto affixed my signature.

SAMUEL BAILIE.