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VALVE

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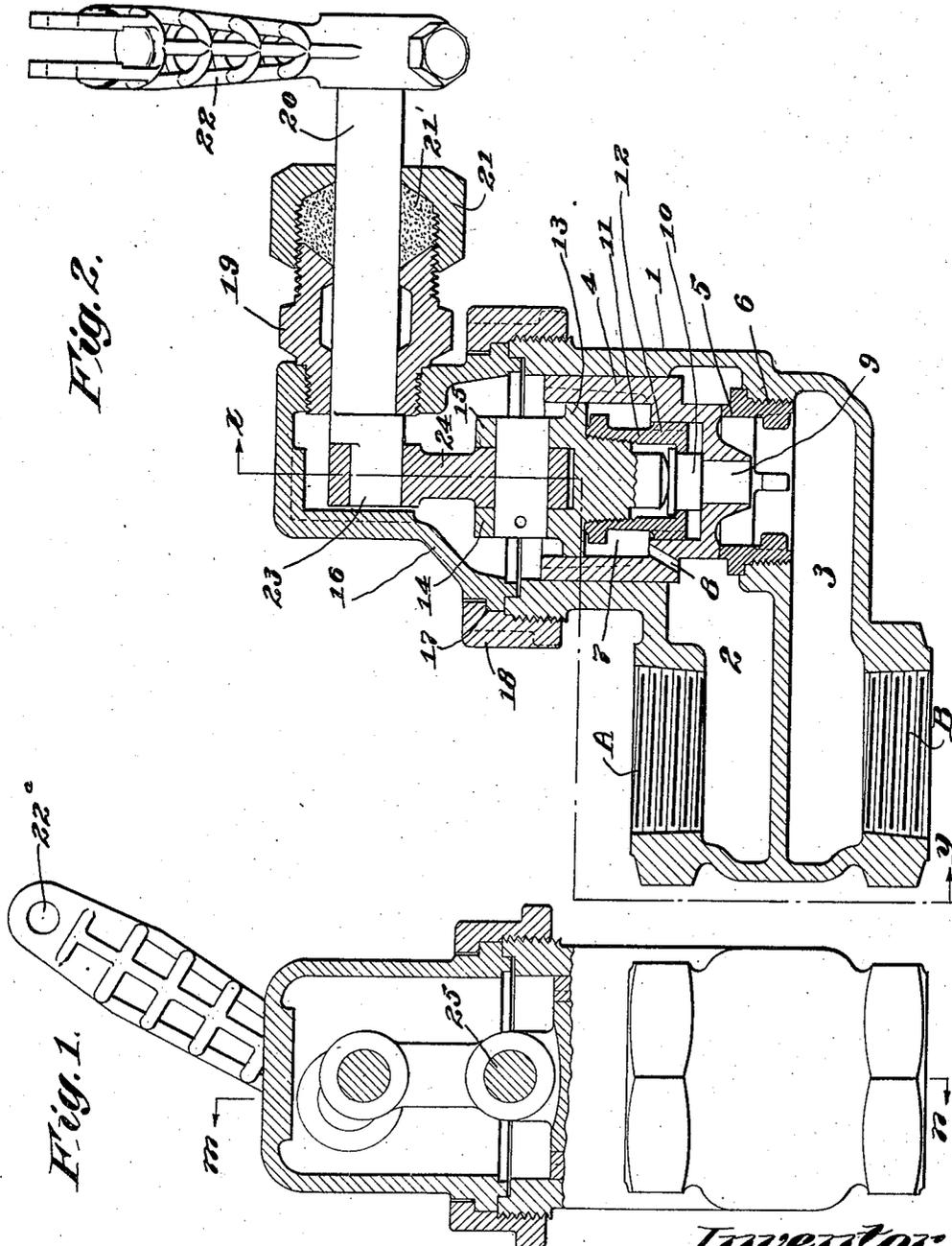


Fig. 2.

Fig. 1.

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UNITED STATES PATENT OFFICE.

BELVIN T. WILLISTON, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO MANNING, MAXWELL & MOORE, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

VALVE.

Application filed July 24, 1920. Serial No. 398,639.

To all whom it may concern:

Be it known that I, BELVIN T. WILLISTON, citizen of the United States of America, and resident of Somerville, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to fluid controlling valves, and while herein described as applied to a valve of the pressure controlled type such as employed for admitting steam to the blower of a locomotive, is of general application and not limited to such use.

Valves for controlling the flow of fluid are frequently situated in restricted spaces where the position of the actuating handle or lever becomes of importance.

An object of the present invention is to provide a valve device of such construction as to permit the position of the handle, relatively to the valve casing, to be determined at will, whereby it may be located in the most advantageous situation for use. To this end the valve operating handle may be mounted upon a shaft having bearings in a member which may be adjusted through any desired angle relatively to the axis of the casing.

A further object of the invention is to provide simple and durable means for transmitting motion from the operating handle or lever to the valve, and which shall serve to move the valve rapidly from one limit of its movement to the other while requiring but a slight movement of the handle lever for this purpose. One mode of attaining the object just set forth may consist in the provision of a crank or eccentric upon the handle shaft arranged to actuate the valve through a suitable connecting rod or equivalent device. By properly proportioning the various parts the full throw of the valve may be obtained very rapidly and by moving the handle through but a small arc.

As illustrative of one of the many ways in which the above objects may be obtained, reference may be had to the annexed drawings in which—

Fig. 1 is an elevation of the valve device on that side at which the intake and discharge openings are located, the upper portion thereof being broken away on the line $x-y$ of Fig. 2; and

Fig. 2 is a transverse cross-section of the

device shown in Fig. 1, on the line $m-n$ thereof.

1 indicates the valve casing having an intake connection A and discharge connection B, the intake opening into a chamber 2, and the discharge opening from a chamber 3. 4 is a main valve slidable within the casing 1, and when in closed position, seating against the upper edge of a ring 5, the interior opening of which forms the main passage between the chambers 2 and 3 and which has screw-threaded engagement with the casing at 6. The main valve is formed with a chamber 7 which communicates with the chamber 2 by means of a passage 8, whereby the pressure in chambers 7 and 2 is equalized. 9 is an opening leading from the chamber 7 into the chamber 3, and for normally closing this opening an auxiliary valve member 10 is provided, this valve member being supported in a valve structure comprising a sleeve 11, said sleeve being slidably guided within the main valve 4 by means of spaced fins such as 12.

The valve structure further comprises a ring 13 secured to the sleeve 11, said ring having a pair of spaced-apart and substantially parallel, upstanding ears 14, 15. The upper open end of the casing 1 is normally closed by means of a cap 16 having a radial flange 17 which rests upon the upper edge of the casing 1. For clamping the flange 17 to the casing, a ring 18 is provided, having screw-threaded engagement with the casing. At 19 is indicated a sleeve extending laterally from the casing near its upper end, and providing bearings for a handle-lever shaft 20. If desired, a stuffing box 21 having the usual packing material 21' may be provided whereby to prevent the escape of fluid longitudinally of the shaft. 22 is a lever secured to the outer extremity of the shaft in any suitable manner, this lever being herein shown as in the form of a handle for manual manipulation, although, if desired, a mechanically actuated lever may be employed, the lever 22 being herein illustrated as provided with an opening 22^a by means of which a suitable operating connection might be secured thereto.

Fixed to the inner end of the shaft 20 and within the cap 16 is a crank pin 23 having engagement with the end of a pitman 24, the opposite end of which is pivotally secured, as by means of a pin 25 between the

ears 14, 15 of the auxiliary valve structure.

In Fig. 2 the valve is shown in closed position, the main valve being seated upon the ring 5, and the auxiliary valve member 5 being seated upon the upper surface of the main valve. By a partial rotation of the handle 20, the crank member 23, acting through the pitman 24, will move the auxiliary valve member 10 away from its seat, permitting fluid to pass from the chamber 7 into the chamber 3. As soon as this takes place, the pressure on the upper surface of the main valve becomes less than that on the under surface thereof, whereby the main valve is opened to its full extent by the fluid pressure, and the fluid is then free to pass downwardly through the ring 5 into the discharge chamber 3.

By the arrangement of parts herein shown, it will be evident that it is necessary to impart but a slight movement to the handle 22, in order to move the valve member 10 from one limit of its stroke to the other, thus reducing the necessary arc of movement of the handle 22 to a minimum.

By supporting the shaft 20 in bearings in the cap 16, it will readily be understood that upon loosening the ring 18 the cap 16, together with the shaft 20, may be turned angularly so that the axis of the shaft 20 may be caused to point in any desired direction. By mounting the handle shaft as hereinbefore described, the device is rendered capable of installation in restricted spaces without the necessity of first considering the question of interference of the valve handle with surrounding objects, as said handle may be easily adjusted after installation of the valve to accommodate itself to its surroundings, while the small arc of movement necessary to fully open or close the valve is of great importance in the same connection.

It is further desired to point out that the actuating parts of the valve are entirely enclosed within the casing, and that the angular adjustment of the valve handle has no effect whatsoever upon the open or closed position of the valve.

Having thus described a preferred embodiment of the invention and the mode of operation thereof, what I claim and desire to secure by Letters Patent of the United States is:

1. A valve device comprising a casing having an inlet opening, an outlet opening, and a valve chamber provided with a valve seat defining a passage between the inlet and outlet openings, a main valve slidable in said chamber and cooperable with said seat, said valve being of generally cylindrical form and having an axial bore, an auxiliary annular valve seat intermediate the ends of said bore, an auxiliary valve structure slidable within the body of the main valve and having a part engageable with the auxiliary

valve seat, means normally admitting fluid pressure from the inlet to pass within the main valve, a closed chamber adjacent said valve, and a crank device, located in said closed chamber and connected with the auxiliary valve structure for moving it away from its seat to admit fluid pressure from the inlet to pass from the interior of the main valve to the under side thereof.

2. A valve device having in combination a valve casing providing a valve chamber having an outlet opening, a pressure actuated main valve arranged in the chamber, said valve being hollow and provided at one end with an orifice defined by an annular valve seat and having an opening in its wall normally admitting fluid pressure to its interior, an auxiliary valve structure slidable within the main valve and constructed and arranged normally to close the orifice therethrough to prevent escape of fluid from the interior of the main valve, a pair of spaced ears carried by said auxiliary valve structure, a pitman arranged within the casing having one end pivotally secured between said ears, a crank member pivotally secured to the other end of said pitman, and a shaft for turning said crank member whereby to actuate the auxiliary valve for opening the passage through the main valve, said pitman being disposed on the opposite side of the main valve from the outlet opening of the valve chamber.

3. In combination in a valve device, a casing having a valve chamber, means providing inlet and outlet openings disposed to one side of said chamber, a valve reciprocable in said chamber, a cap for the valve chamber arranged in substantially axial alignment therewith, said cap being angularly adjustable relatively to said casing, bearings carried by said cap, a shaft rotatably supported in said bearings and arranged at substantially right angles to the axis of the valve chamber, a crank device fixed to said shaft, and connections between said crank device and the valve.

4. In a valve of the class described, in combination, a valve casing having a valve chamber, a valve in said chamber, means providing an inlet and outlet disposed to one side of said chamber, a hollow cap for said casing supporting bearings for an actuating shaft, a shaft in said bearings arranged at substantially right angles to the axis of the chamber, operating connections between said shaft and the valve, said connections being disposed within said cap, and means for holding said cap in selected position of angular adjustment relatively to the casing.

5. A valve comprising a substantially cylindrical casing having a lateral offset providing an inlet and outlet, a pressure actuated main valve within said casing for controlling the passage between said inlet

and outlet, an auxiliary valve for determining the actuation of the main valve, a cap for closing the end of said valve casing, bearings supported by said cap, a shaft arranged in said bearings and extending substantially at right angles to the axis of the casing, a crank upon the shaft disposed

within the cap and a pitman also arranged within said cap and connecting said crank and the auxiliary valve.

Signed by me at Boston, Massachusetts.
this 22nd day of July, 1920.

BELVIN T. WILLISTON.