

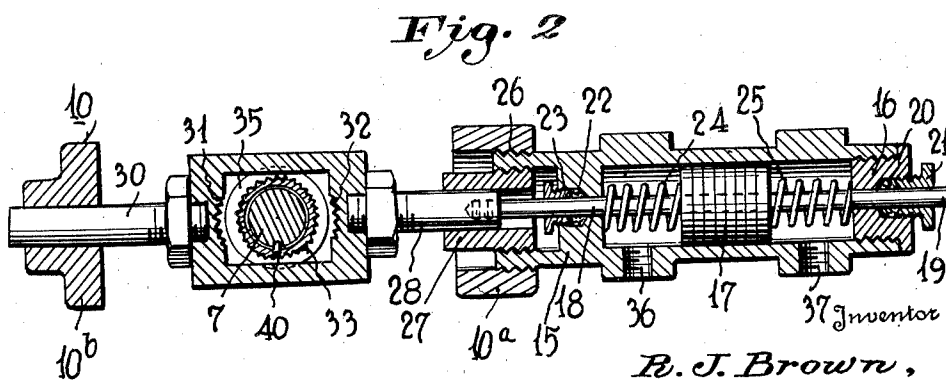
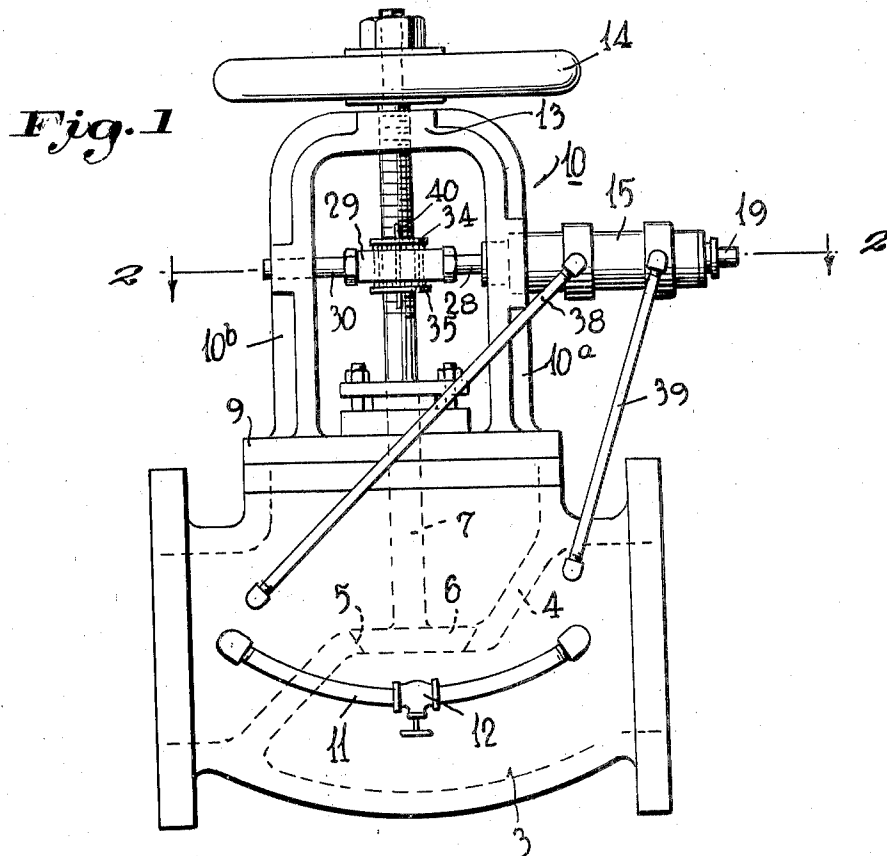
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VALVE CONTROLLING MEANS

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VALVE CONTROLLING MEANS

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This invention relates to improvements in valves, and more particularly to stop valves of the type provided with by-passes.

A few years ago a law was passed in the United States, requiring a by-pass on all stop valves over six inches in diameter, and at the present time a by-pass is required on all stop valves over four inches in diameter, when installed on ships which are inspected by the Bureau of Marine Inspection & Navigation. The by-pass is essential for safety purposes as it permits the pressure in the line to be equalized at both sides of the valve before the valve is opened.

The primary object of the present invention is to provide relatively small valves of the by-pass type with means to prevent opening of the valve until an auxiliary valve in the by-pass has been opened and the pressure equalized on both sides of the main valve. Such means will insure the use of the by-pass and make it necessary for the operator to open the auxiliary valve in the by-pass before he can open the main valve.

A further object of the invention is to provide a relatively simple, compact means mounted directly on the stop valve for controlling the opening thereof so that such means can be installed on a valve fitted with a by-pass in any position and any location.

With the foregoing objects outlined, and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in connection with the accompanying drawing, and more particularly pointed out in the appended claims.

In the drawing:

Fig. 1 is a side elevation of a stop valve of the by-pass type provided with my improvement.

Fig. 2 is an enlarged sectional view taken on the line 2—2 of Fig. 1.

Referring to the drawing, 3 designates the body or casing of a conventional stop valve having an internal partition 4 provided with a port 5 adapted to be closed by a plug 6 actuated by a stem 7. The latter extends from the casing through packing 8 on the bonnet 9 provided with a yoke 10.

A by-pass 11 arranged at the exterior of the body 3 extends from one side of the partition to the other, and is provided with an auxiliary valve 12.

The stem of the main valve is threaded and the threads engage complementary threads in the top 13 of the bonnet, and the upper end of the stem is provided with a hand wheel 14 whereby when the wheel is turned, the stem 7 will turn in the head 13 so as to raise or lower the plug 6,

depending on the direction of turning of the wheel.

As thus far described, the construction of the by-pass stop valve is conventional with the exception of the yoke 10 and it has been modified to accord with my invention.

Referring specifically to Fig. 2, 15 designates a cylinder provided at one end with a removable plug 16. A piston 17 provided with rings, is connected to a piston rod 18 which extends from one side thereof. A tail rod 19 extends from the opposite side of the piston and is guided by the plug 16. The tail rod extends through packing 20 and a gland 21 supported by the plug.

The piston rod 18 also extends through packing 22 and a gland 23 supported by the cylinder. Spring means, such as springs 24 and 25 surrounding respectively the rods 18 and 19, are positioned between the piston and the ends of the cylinder and function to normally hold the piston midway between the ends of the cylinder.

The cylinder is supported by the yoke 10, and for this purpose one end of the cylinder is provided with external threads 26 having threaded engagement with one side 10a of the yoke. This end of the cylinder also has internal screw threads having threaded engagement with a guide bearing 27 functioning as a guide for a rod 28 secured to and movable with the piston rod 18. The guide rod 28 is in turn fixedly secured to one end of a locking block or member 29; the opposite end of the latter being fixedly secured to a tail rod 30 slidably supported by the opposite arm 10b of the main yoke 10.

The block 29 has oppositely disposed sets of teeth 31 and 32 designed to interlock with the teeth or grooves of a toothed wheel 33. The wheel 33 is loosely keyed on the valve stem 7 and the stem is free to move up or down relatively to the wheel but the wheel is rotatable with the stem. Consequently, if either set of teeth 31, 32 is in engagement with the toothed wheel 33, the stem 7 cannot rotate.

In order to limit the vertical movement of the toothed wheel, the latter is provided (see Fig. 1) with upper and lower abutments or flanges 34 and 35 which extend laterally far enough to overlap the sides of the locking block 29, which co-operates with the flanges to limit such movement.

The cylinder 15 is provided near the opposite ends thereof with pipe tap openings 36 and 37 connected respectively to passageways or tubes 38 and 39 which in turn are connected respec-

tively to the valve body 3 at opposite sides of the partition 4.

In operation, it may be seen that when the main valve is closed, if the pressure at either side of the partition 4 is in excess of the pressure at the opposite side thereof, these differential pressures will be transmitted to the cylinder 15 by means of the pipes 38 and 39, with the result that the piston 17 will cause the locking block 29 to interlock with the toothed wheel 33. Consequently, the stem 7 cannot be turned until the by-pass valve 12 is opened. When the latter is opened, pressure in the main valve will be equalized at opposite sides of the partition 4, and as the pipes 38 and 39 will transmit the equalized pressures to the cylinder 15, the springs 24 and 25 will act to move the piston 17 to a neutral or midway position whereby the locking block will release the wheel 33 so as to allow the stem 7 to be turned in order to release the plug 6 from its seat.

With regard to the advantages of my improved construction, it will be noted that I use a straight cylinder 15 with a piston fitted with rings, tail rod and piston rod, and connected to each side of the valve body 3 by tubes 38 and 39. The piston, tail rod, piston rod and locking block are connected solidly together in a straight line and constitute only one moving part. The springs 24, 25 normally maintain the piston in a central position when the pressure is equal on both sides of the main valve. This provides a balanced piston and can be subjected to very high pressures.

In my device, the pressure when exerted on either end of the piston causes it to either push or pull, in a straight line, the locking block against the toothed or grooved wheel 33, which is free to move up or down on the stem, but which has to turn with the latter as it is loosely keyed thereon, by any suitable means, such as a key 40. Due to the large number of grooves or teeth in the wheel 33, the sets of teeth 31, 32 will engage at any position. This is important as the position of the stem 7 may change due to wear or as the result of grinding in the main valve.

My improvements require no special supports as they are attached directly to the yoke on the valve proper and they can therefore be installed on a valve (fitted with a by-pass) in any position or any location.

The device which I have designed, is small and compact and is suitable for any size valve in any position.

My device in effect is an integral part of the valve as the connections from each side of the valve to the cylinder are very short and the cylinder and locking mechanism are mounted directly on the yoke of the valve.

From the foregoing, it is believed that the construction, operation and advantages of my device may be clearly understood and I am aware that changes may be made in the details disclosed without departing from the spirit of the invention as expressed in the claims.

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

1. In a stop valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the

valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition.

2. In a stop valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, and springs cooperating with the pistons for normally holding the latter in a central position in the cylinder when pressures are equalized at opposite sides of the partition.

3. In a stop valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, said cylinder being arranged at right angles to said stem.

4. In a stop valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, said piston being provided with a tail rod slidably guided by one end of the cylinder.

5. In a stop valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder

with the body of the valve respectively at opposite sides of said partition, said toothed wheel being provided with abutments which cooperate with a locking member to limit movement of the toothed wheel axially of the stem.

6. In a stop valve of the type having a body provided with a ported partition, a block for closing the port in the partition, a yoke, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the yoke, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition.

7. In a stop valve of the type having a body provided with a ported partition, a block for closing the port in the partition, a yoke, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the yoke, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, said locking member being movable in a plane at right angles to the axis of the stem.

8. In a stop valve of the type having a body provided with a ported partition, a block for closing the port in the partition, a yoke, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the yoke, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, said cylinder and the axis of the piston being arranged at right angles to said stem.

9. In a stop valve of the type having a body provided with a ported partition, a block for closing the port in the partition, a yoke, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the yoke, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end

portions of the cylinder with the body of the valve respectively at opposite sides of said partition, said toothed wheel being provided with abutments which cooperate with the locking member to limit movement of the toothed wheel axially of the stem.

10. In a stop valve of the type having a body provided with a ported partition, a block for closing the port in the partition, a yoke, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the yoke, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, and spring means cooperating with the piston for normally holding the same in a central position in the cylinder when pressures are equalized at opposite sides of said partition.

11. In a valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a yoke provided with spaced arms, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder secured to one of the arms of the yoke and arranged at right angles to the stem, a piston in the cylinder, a rod actuated by the piston, a locking member secured at one end to the guide rod and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, a tail rod secured to the opposite end of the locking member and guided by the other arm of the yoke, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition.

12. In a valve of the type having a body provided with a ported partition, a plug for closing the port in the partition, a yoke provided with spaced arms, a threaded stem connected to the plug and having a threaded connection with the yoke, and a valved by-pass connected to the body and extending from one side of the partition to the other, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder secured to one of the arms of the yoke and arranged at right angles to the stem, a piston in the cylinder, a rod actuated by the piston, a locking member secured at one end to the guide rod and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, a tail rod secured to the opposite end of the locking member and guided by the other arm of the yoke, passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said partition, and spring means for normally holding the piston in a central portion in the cylinder when the pressure is equalized at opposite sides of said partition.

13. In a stop valve of the type having a body

provided with a port, a plug for closing the port, a threaded stem connected to the plug, and a valved by-pass connected to the body and extending from one side of the port to the opposite side thereof, the improvement which comprises a toothed wheel turnable with the stem, the stem being axially movable relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and provided with oppositely disposed sets of teeth adapted to interlock with the toothed wheel, and passageways connecting opposite end portions of the cylinder with the body of the valve respectively at opposite sides of said port.

14. In a stop valve of the type having a body provided with a valve seat, a valve member co-

operating with said seat, a threaded stem connected to the valve member, and a valved by-pass connected to the body and extending from one side of the seat to the other for use in equalizing pressure at opposite sides of the valve member, the improvement which comprises a toothed wheel turnable with the stem, the stem being free to move axially relatively to the wheel, a cylinder mounted on the valve, a piston in the cylinder, a locking member actuated by the piston and adapted to interlock with the toothed wheel, and passageways placing opposite end portions of the cylinder in communication with the valve body at opposite sides of said seat.

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