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VALVE CONTROL MEANS

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Fig. 1.

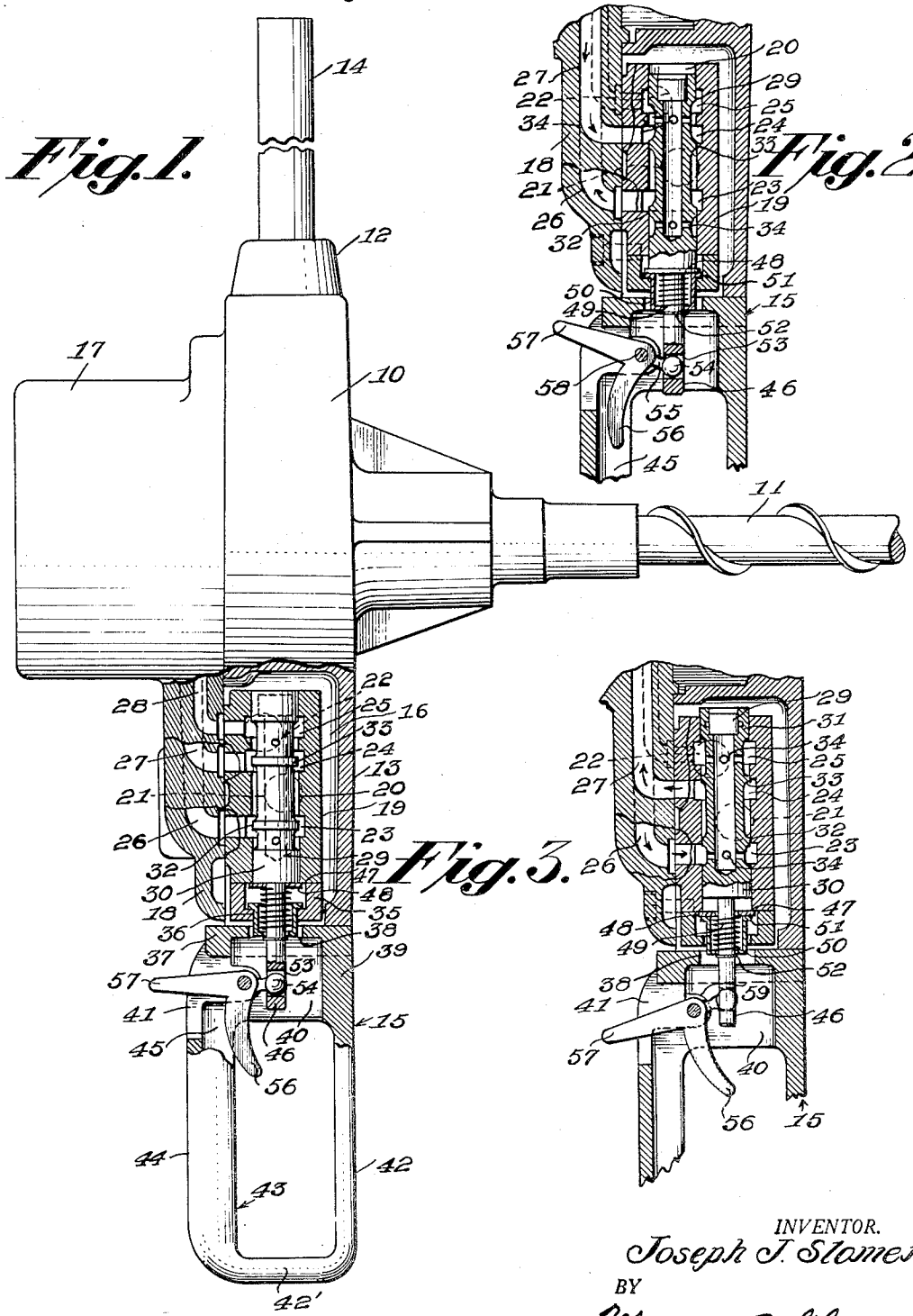


Fig. 2.

Fig. 3.

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VALVE CONTROL MEANS

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Original application January 17, 1950, Serial No. 139,092, now Patent No. 2,632,424, dated March 24, 1953. Divided and this application August 21, 1952, Serial No. 305,554

5 Claims. (Cl. 74—491)

This invention relates to valve control means, and is more particularly concerned with novel control means for a reciprocatory valve adapted to regulate the flow of fluid to and from an operating member, in the manner disclosed in my copending application Serial No. 139,092, filed January 17, 1950, now Patent No. 2,632,424, dated March 24, 1953, and of which the present application is a division.

The present invention is also an improvement on the structure disclosed in my Patent No. 2,466,972, dated April 12, 1949.

A primary object of the present invention is to provide novel operating and control means for a reciprocatory fluid flow control valve in a structure as above referred to, which is readily accessible to an operator and which is capable of controlling the valve with accuracy and in the absence of error on the part of the operator.

A further object of the invention is to provide a transversely open, rectangular handle for a portable fluid operated device including an elongated, axially reciprocatory, fluid control valve and wherein a two arm trigger is pivotally supported by the handle at one side of the opening therethrough and has an operative connection with the valve.

Another object is to provide such a structure in which the trigger arms are respectively finger engageable at opposite sides of one side member of the open handle, which side member also provides with other side members a guarded hand engageable member.

A still further object of the invention is to provide a directly operable means for a fluid controlling, reciprocatory valve wherein the valve is automatically yieldably urged by resilient means to neutral position, and wherein the valve is positively limited in its movements to operative positions on each side of its neutral position by means enclosing the resilient means.

Other objects and advantages of the invention will become apparent in the course of the following detailed description, taken in connection with the accompanying drawing, wherein—

Fig. 1 is a view partially in top plan and partially in horizontal section disclosing the invention as associated with a portable tool having opposed hand grippable handles, the valve being shown in neutral or motor non-operable position.

Fig. 2 is a fragmental horizontal section corresponding to the lower portion of Fig. 1 but showing the valve in an operative position for forward rotation of the motor.

Fig. 3 is a view corresponding to Fig. 2 but showing the valve in a position for reverse rotation of the motor.

Referring now in detail to the drawing wherein so much of the structure of said parent application is described as to show the use of the novel valve control means, 10 designates a main casing of a portable tool in which is operatively positioned the base end of a drill 11, as disclosed in said parent application.

The casing 10 includes axially aligned lateral projections 12 and 13 to the former of which is secured the inner end of a cylindrical handle 14 and to the latter of which is suitably secured a generally rectangular handle 15 which forms part of the novel structure of this application.

The projection 13 is provided with a substantially large recess 16 which opens through the rear face and one end thereof. An auxiliary casing 17 is suitably secured to the rear face of the main casing 10 in which is housed a reversible fluid motor as disclosed in said parent application, and the auxiliary casing includes an elongated extension 18 overlying the rear face of the projection 13 and closing the corresponding opening to the recess 16.

A valve block 19 is removably supported in the recess 16 and is provided with a central bore 20 which is in communication with inlet and outlet ports 21 and 22 respectively, and providing at 20 a valve chamber. The bore 20 is circumferentially expanded at axially spaced zones in the provision of channels 23, 24 and 25 which respectively communicate with ducts 26, 27 and 28 in the extension 18, which ducts 26 and 27 supply fluid to opposite sides of a motor while duct 28 is for permitting fluid bleeding as set forth in said parent application.

An elongated tubular valve 29 has opposite cylindrical ends 30 and 31 in bearing engagement with opposite ends of the bore 20, and the valve intermediate said ends is of less diameter than bore 20 except for a pair of axially spaced lands 32 and 33 which are of the same diameter as the bore 20, and the wall of valve 29 is provided with small radial ports 34 between each end thereof and the adjacent lands 32 and 33.

A recessed retainer block 35 is suitably removably secured to the outer end of the valve block 19 and which extends through the open end of recess 16 into adjacency to the outer ends of projection 13 and extension 18, and which is provided with an opening 36 concentric with bore 20.

The above referred to generally rectangular open handle 15 includes a base portion 37 including an inner wall provided with an opening 38 aligned with the aforesaid opening 36. The said handle base portion 37 further includes a perimetrical wall 39 defining with wall 37 a recess 40 open at its outer end and which communicates with a slot 41 opening through the wall 39.

The handle 15 further includes a cylindrical, side member 42, an end member 42', and an opposed parallel side member 43 which is in the form of a wall arcuate in cross section and presenting an outer convex hand engageable surface 44 and an inner trigger arm receiving channel 45.

The valve 29 is provided with a stem 46 which projects outwardly through the openings 36, 38 and into the recess 40. The retainer block 35 has an inner wall of greater diameter than the bore 20 providing a shoulder 47 which is engageable by a washer 48 in free surrounding relation to the stem 46 and which is engaged by one end of a coil spring 49 which surrounds the stem 46 and whose opposite end seats in the bottom of a thimble 50 through which the stem extends. The thimble is provided with an outwardly directed flange 51 engageable with the lower wall of the retainer block, and a spring ring 52 is removably seated in a circumferential groove in stem 46 for restraining movement of the thimble toward the free end of the stem beyond a predetermined point.

The lower end of the stem 46 is provided with a diametrical opening 53 adjacent its outer free end in which is received a ball 54 rigid with one end of an arm 55 whose opposite end is rigid with diverging trigger arms 56 and 57, which adjacent their juncture are pivotally

mounted at 58 on opposed ears 59 at opposed sides of slot 41.

In Fig. 1 the valve 29 is in neutral or intermediate position wherein no finger pressure is applied to either trigger arm 56, 57 and the spring 49 is of such tension as to maintain the valve in its neutral position.

In the neutral position of the valve, fluid from the inlet port 21 is bypassed around the land 33 which is in registering position with channel 24 and thence to the outlet port 22. In this position, the land 32 is in registering position with the channel 23. Thus, while the fluid is being bypassed from the inlet to the outlet the ducts 26 and 27 are open to both sides of the motor or other operative device to balance the supply of fluid thereto. The fluid also has egress to the center bore of the valve through the ports 34 to balance the pressures in the system.

In Fig. 2, the trigger arms 56 and 57 are shown as having been rotated clockwise from their neutral position in Fig. 1 with a resulting axial movement of the valve 29, and wherein it will be seen that the inlet and outlet ports 21 and 22 have been placed in communication with the respective ducts 26 and 27 for flow of the fluid in the direction indicated by the arrows and in which position a motor will be rotated in one direction.

In Fig. 3, the trigger arms are shown as having been rotated in a counterclockwise direction from their neutral position in Fig. 1 which results in flow of fluid through ducts 26 and 27 in a direction opposite to that of Fig. 2 with a resulting rotation of the motor in an opposite direction. It is to be particularly noted that the valve 29 is positively and accurately limited in its movements to the neutral position of Fig. 1 and the opposite operative positions of Figs. 2 and 3.

As seen in Fig. 1 the spring 49 automatically urges the valve outwardly in the absence of restraining pressure on the trigger arms 56 and 57 and in which neutral position the flange 51 of thimble 50 engages the lower wall of the retainer block 35 which in effect is a part of the valve block 19, but is initially separate therefrom to facilitate assembly.

In the position of Fig. 2 the valve 29 is limited in its outward movement through engagement of the washer 48 with said thimble flange.

In the position of Fig. 3 the valve 29 is limited in its inward movement upon engagement of the washer 48 with the shoulder 47.

While I have herein disclosed one form in which my invention may be embodied, it will be understood that the construction thereof may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

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

1. Control means for actuating a valve, or the like, comprising a casing, a handle of open form secured to said casing, said casing having an opening and said handle comprising a base portion having an opening aligned with said casing opening and a side portion provided with a slot, a stem projecting through said openings into said handle, a two-arm trigger pivotally supported by the handle with one arm of said trigger extending through said slot and being accessible to the thumb of an operator having a hand engaged with said side portion, the other arm of said trigger being disposed within the open handle adjacent said side portion, and an operative connection between said trigger and said stem.

2. The structure according to claim 1 together with a recess in the casing adjacent the inner end of said stem and having inner and outer walls, a coil spring surrounding said stem, opposed members in said recess in surrounding relation to said stem respectively engageable with the inner and outer walls of said recess for limiting axial movement of the stem in opposite directions, and said spring being of a tension to automatically retain the stem in neutral position with said members both engaged with the respective inner and outer wall of the recess.

3. The structure according to claim 2 wherein one of said members comprises a thimble receiving the outer end of said spring and having a flange at its open end for engagement with said outer wall and said other member, in the outer and inner limits of movement of the stem respectively, and means on said stem for limiting outward movement of the thimble relative thereto.

4. The structure according to claim 3 wherein said other member comprises a washer normally engaged with a shoulder on the inner wall and against which the inner end of said spring bears and said washer being of a greater diameter than said bore.

5. The structure according to claim 1, wherein said side portion is provided with a recess in its inner wall for receiving said other arm in one extreme operative position of the trigger.

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