Nov. 22, 1927. 1,649,866

A. P. STEINER

CONTROL VALVE

Filed June 21, 1926

Fig. 2.

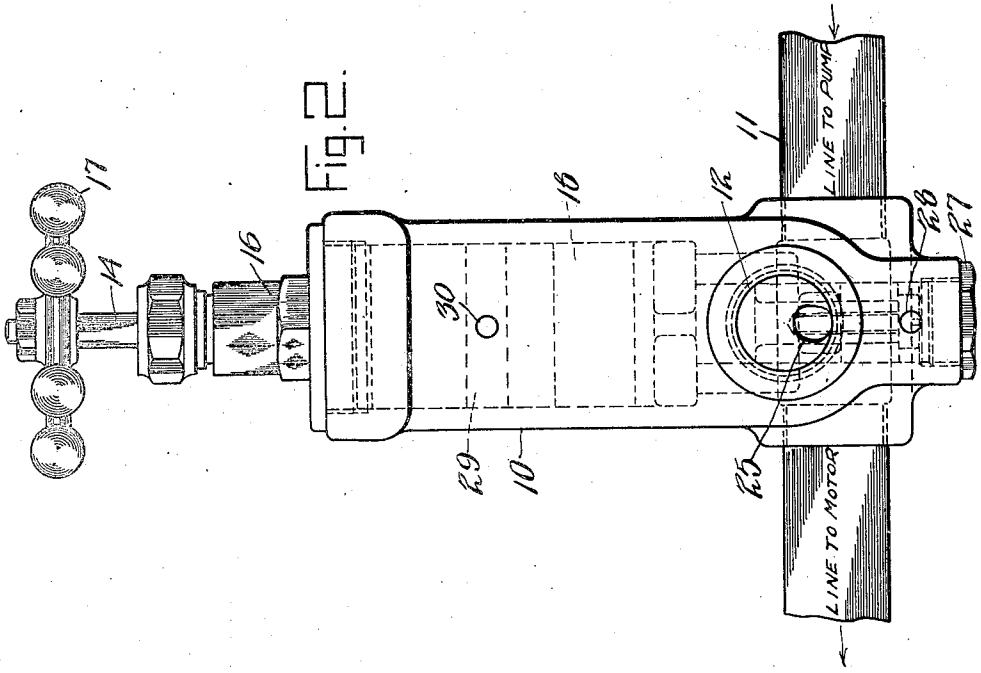
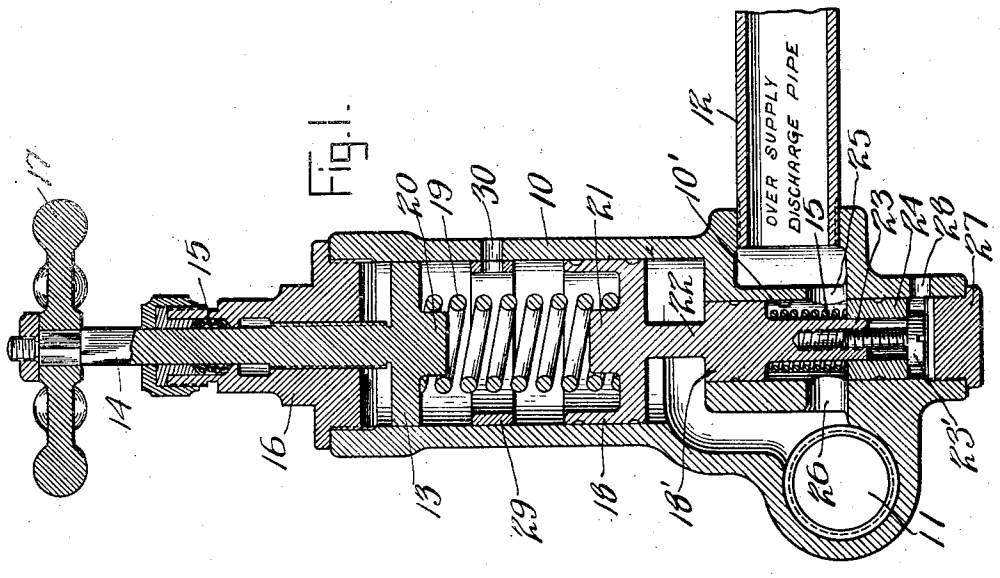


Fig. 1.



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UNITED STATES PATENT OFFICE.

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CONTROL VALVE.

Application filed June 21, 1926. Serial No. 117,542.

My said invention relates to a pressure responsive valve for controlling the supply of a pressure fluid, or a fluid under pressure utilized for operating machinery such as for example the reciprocating carriage of a grinding machine and it is an object of the invention to provide a control valve of this character which will supply an amount of fluid proportionate to the load which is driven and which will by-pass surplus fluid back to a supply tank until such time as the same is needed, all as will be hereinafter more fully described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a central longitudinal section of a control valve constructed in accordance with my invention, and

Figure 2, an elevation taken at right angles to Figure 1.

In the drawings reference character 10 indicates a valve casing, 11 a supply line from the pump to the motor extending through said casing and 12 a by-pass or over-supply discharge pipe for returning excess pressure fluid to a supply tank (not shown). Or in other words I have provided one inlet and two exhaust passages in the valve casing. The valve casing or valve body 11 is provided in its upper end with a piston 13 having a rod 14 which extends through a stuffing box 15 of a closure 16, said rod and closure for the upper end of the casing having complementary threads. The upper end of the rod 14 is provided with a handle or operating element 17. A second piston 18 is mounted below the piston 13 and a spring 19 holds the pistons 13 and 18 in spaced relation. In order to hold the spring 19 between the centers of the respective pistons, bosses 20 and 21 are provided which extend for a short distance into the ends of the spring. The lower end of the valve casing is provided with a reduced axial opening 10′ through which extends and in which is disposed a second piston or valve member 18′ on the lower end of the stem 22 of the piston 18. Said smaller piston is preferably formed integrally with the valve stem 22 and at its outer end is provided with a reduced extension 23 having a screw threaded opening in its extremity for reception of an adjustable screw member 23′ provided with an enlarged head adapted to bear against the outer end of a slidable sleeve 24 which is slidable on the extension 23 of said valve. A spring 25 is confined between the end of the valve and the sleeve 24 mounted on the extension 23. The interior of the valve body is formed with ports 26 communicating with the line 11 to the pump and to the motor and with the by-pass, or over-supply discharge pipe 12. The lower end of the valve body is provided with a closure 27 which is threaded into the end of the same and an air outlet 28 is provided to prevent entrapping of air in the casing and hindering operation of the parts.

A ring 29 is mounted between the pistons 13 and 18 in the valve body which forms a stop to limit the downward movement of the piston 13 and the upward movement of the piston 18, and an opening or vent 30 is provided through said ring and valve body to prevent air being entrapped in the same between said pistons 13 and 18.

In operation pressure fluid is supplied from a pump (not shown) through pipe line 11 and the valve body 10 to the motor (not shown). When the motor is not operating the pressure fluid runs through the pressure line to the motor and by-passes through the motor to the tank for the fluid. Fluid also passes from the pressure line 11 through the ports 26 and through the discharge pipe 12. When the motor is started fluid pressure in the line 11 and valve casing 10 begins to build up due to the load on the motor, said pressure acting against the underface of the piston 18 and through the ports 26 against the underface of the piston or valve 18′, moves the pistons 18 and 18′ and sleeves 24 upwardly against the action of the spring 19 closing the discharge pipe 12. The movement of the piston 18 is limited by its contact with the ring or stop 29. The position of the slidable sleeve 24 on its support may be varied by means of the adjusting screw 23′, movement in one direction being against the action of the spring 25 and partly closing the ports 26. The ports may also be partly closed by operating the hand lever 17 and releasing the pressure on the spring 19. By compressing the spring 19 a

greater fluid pressure is required to lift the pistons 18 and 18' to close the passage through the by-pass or discharge pipe 12 and by cooperative use of the adjustments upon the upper and lower springs 19 and 25 respectively the device may be made to operate with smaller or greater pressure as desired.

A relief valve may be placed in the pressure line 11 or elsewhere in the system to afford the necessary escape of fluid when the discharge pipe has been closed and the pressure is built up beyond a point where the piston 18 engages the stop 29.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of the invention and therefore I do not limit myself to what is shown in the drawings and described in the specification but only as indicated in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between the passages through the valve casing, substantially as set forth.

2. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between the passages through the valve casing, and spring means for holding the slidable sleeve in one extreme position of movement, substantially as set forth.

3. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between the passages through the valve casing, spring means for holding the slidable sleeve in one extreme position of movement, and means for compressing said spring means, substantially as set forth.

4. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between the passages through the valve casing, spring means for holding the slidable sleeve in one extreme position of movement, means for tensioning said spring means, and means for yieldably holding said piston in one position of longitudinal movement, substantially as set forth.

5. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between the passages through the valve casing, spring means for holding the slidable sleeve in one extreme position of movement, means for tensioning said spring means, means for yieldably holding said piston in one position of longitudinal movement, and means for varying the tension on said piston, substantially as set forth.

6. The combination of a valve casing, a passage through one side of the casing, a passage through another side of the casing, ports forming communication between said passages, a valve stem extending between said ports, a sleeve slidably mounted on said valve stem, a piston supporting said valve stem adapted to be moved longitudinally for positioning the slidable sleeve over the ports to shut off communication between passages through the valve casing, spring means for holding the slidable sleeve in one extreme position of movement, means for tensioning said spring means, means for yieldably holding said piston in one piston of longitudinal movement, means for varying the tension on said piston, and a stop adapted for limiting the movement of the piston in one direction and for limiting the adjustment of the compressing means, substantially as set forth.

In witness whereof, I have hereunto set my hand at Waynesboro, Pennsylvania, this 15th day of June, A. D. nineteen hundred and twenty-six.

AMOS P. STEINER.