April 26, 1927. 1,626,073

S. C. BRADY

PRESSURE CONTROL DEVICE

Filed Sept. 9, 1926

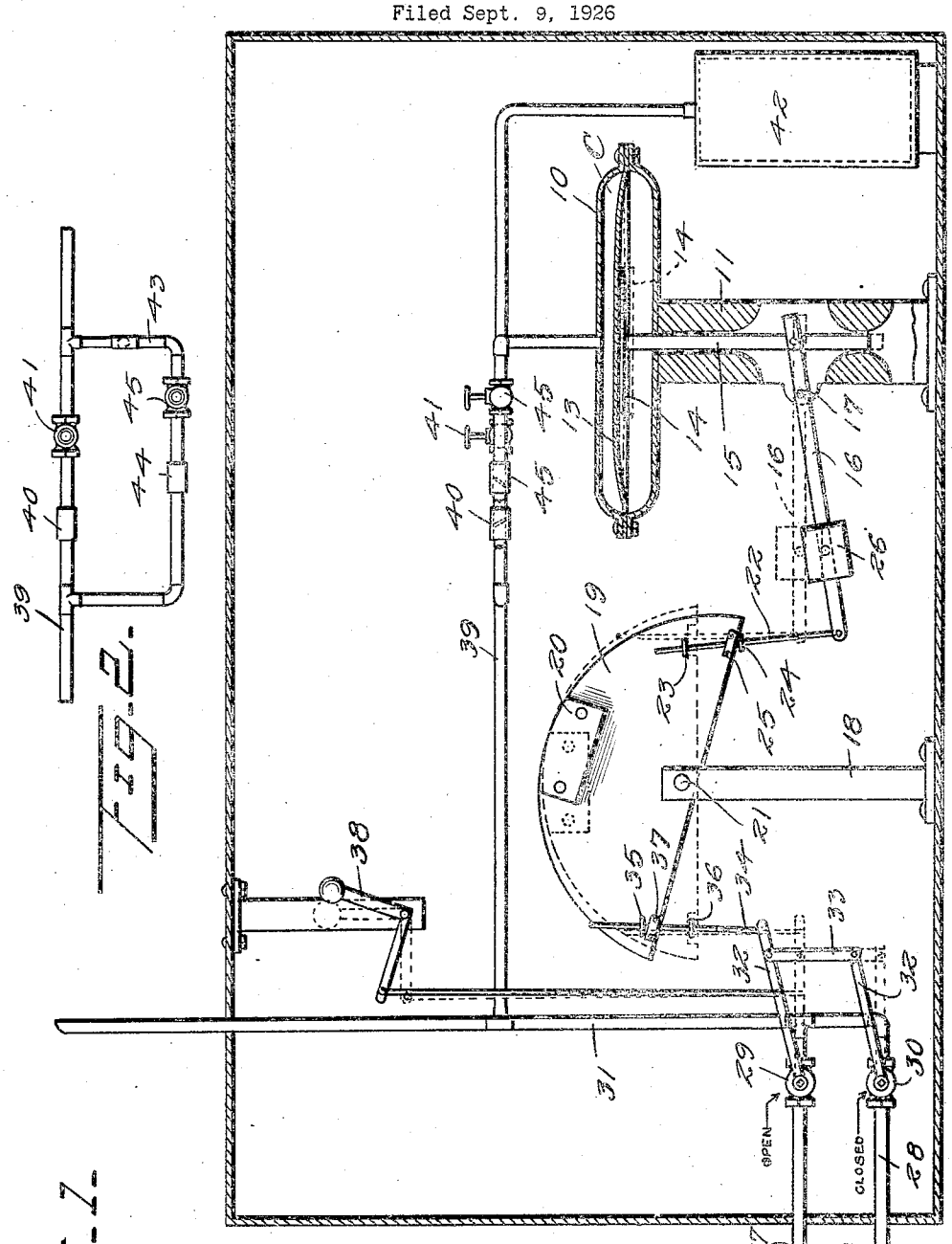

FIG. 2.

FIG. 1.

Inventor

S. C. Brady

By Watson E. Coleman

Attorney

Patented Apr. 26, 1927. 1,626,073

UNITED STATES PATENT OFFICE.

SANFORD C. BRADY, OF BARTLESVILLE, OKLAHOMA.

PRESSURE-CONTROL DEVICE.

Application filed September 9, 1926. Serial No. 134,566.

This invention relates to pressure control devices and more particularly to a device for controlling pressure to provide intermittent blasts thereof.

An important object of the invention is to provide a device of this character which will be wholly automatic in its operation and which provides for intermittently introducing and exhausting the pressure.

A further object of the invention is to provide a device of this character which may be very readily and cheaply produced, which will be durable and efficient in service and a general improvement in the art.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a vertical sectional view through control apparatus constructed in accordance with my invention, the control apparatus being shown in one extreme position in solid lines and in an intermediate position in dotted lines;

Figure 2 is a detail plan view of a portion of the connections showing the arrangement thereof.

Referring now more particularly to the drawings, the numeral 10 generally designates a casing and 11 a tubular support therefor. Extending transversely of the casing and subdividing the same into upper and lower chambers is a flexible diaphragm 13. Within the lower chamber is arranged a head 14 which abuts the diaphragm and is held in engagement therewith. This head has a stem 15 projecting into the hollow support 11 and to which is pivotally connected one end of a lever 16 which is pivoted intermediate its ends to the stem, as at 17. Arranged in spaced relation to the support 12 is a second support 18 upon which is pivoted a member 19 including a counterweight 20 swingable to opposite sides of the pivot 21 of the member 19, so that it tends to hold the member with either end thereof depressed. One end of this member is link-connected at 22 with the free end of the lever 16, the connection including spaced stops 23 and 24 upon the link and a guide 25 carried by the member 19 and engaging the link intermediate the stops.

When the diaphragm 13 is depressed, its engagement with the head 14 will cause the outer end of the lever 16 to be elevated, with the result that the stop 24 will come into engagement with the guide 25, elevating the engaged end of the lever 19 until the weight 20 passes a vertical plane including the axis of the pivot 21. At this time, the weight will continue the movement of the lever 19 in this direction. When, however, pressure is removed from the diaphragm, an adjustable weight 26 upon the lever 16 will cause the outer end of the lever to move downwardly, so that the stop 23 comes into engagement with the guide 25 and the lever and weight are moved in the opposite direction.

The mechanism just described is arranged within a casing and projecting into this casing are inlet and exhaust pipes 27 and 28, the inlet pipe 27 being connected with a suitable source of fluid under pressure. Arranged in the inlet and exhaust pipes are oppositely closing valves 29 and 30 and beyond these valves, the inlet and exhaust pipes join a common conduit 31. With the operating member of each valve 29 and 30 is connected a lever 32, the outer ends of these levers being connected for simultaneous movement in the same direction as by a bar 33. The bar 33 is connected with the opposite end of the lever 19 by a link 34 having stops 35 and 36 coacting with a guide 37 carried by the lever 19. When the stop 35 is contacted by the guide 37, the valve 29 is opened and the valve 30 closed, thus admitting pressure to the conduit 31. When the stop 36 is engaged by the guide, the valve 30 is opened and the valve 29 closed, so that the pressure within the conduit 31 may exhaust through the pipe 28. The valves 29 and 30 are preferably biased by a counterweight 38, so that they will remain in their adjusted positions.

The conduit 31 which leads from the casing to a point where the pressure is to be employed is connected with the chamber C at the opposite side of the diaphragm 13 from the head 14 by a conduit 39 having arranged therein a check valve 40 and an ordinary globe valve 41, this check valve opening toward the chamber C. Beyond the check valve 40 in the conduit 31, the conduit 39 is in communication with an expansion chamber 42 and that portion of the conduit 39 including the check valve and globe valve are by-passed by a branch con-

duit 43 which likewise contains a check valve 44 and globe valve 45. The check valve 44 opens toward the conduit 31.

The operation of the device is as follows: Pressure entering through the conduit 27 and valve 29 passes through the conduit 31 to the point where it is to be employed and through the conduit 39 and check valve 40 to the chamber C. When pressure within the expansion chamber 42 and chamber C is built up to a point where the diaphragm will move against the resistance afforded by the counterweight 26, the outer end of the lever 16 moves upwardly, bringing the stop 24 into engagement with the guide 25 and thereby causing the stop 37 to come into engagement with the stop 36, with the result that the valve 29 is closed and the valve 30 opened. With the opening of the exhaust, pressure is relieved in the conduit 31 and stored pressure within the chamber C and expansion chamber 42 will be relieved through the check valve 41 and pipe 39. As soon as pressure reduces to a sufficient point, the counterweight 26 will move the outer end of the lever 16 downwardly, bringing the stop 23 into engagement with the guide 25 and rocking the lever 19 in the opposite direction. This brings the stop 35 into engagement with the guide 37 with the result that the valve 29 is opened and the valve 30 is closed.

It will be obvious that the construction hereinbefore set forth is entirely automatic in its operation and may be very readily and cheaply produced. Certain changes being possible in the construction without departing from the spirit of the invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In combination with a conduit, intake and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached. pressure actuated means for shifting said lever from one toward the other of said positions, weight operated means for shifting the lever from said other toward the first named position, and a connection between the pressure actuated means and said conduit.

2. In combination with a conduit, intake and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached, pressure actuated means for shifting said lever from one toward the other of said positions, weight operated means for shifting the lever from said other toward the first named position, and a connection between the pressure actuated means and said conduit including parallel conduits each having a check valve, the check valves of said parallel conduits opening in opposite directions.

3. In combination with a conduit, intake and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached, pressure actuated means for shifting said lever from one toward the other of said positions, weight operated means for shifting the lever from said other toward the first named position, a connection between the pressure actuated means and said conduit including parallel conduits each having a check valve, the check valves of said parallel conduits opening in opposite directions and an expansion chamber for communication with the pressure actuated means.

4. In combination with a conduit, intake and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached, a casing, a diaphragm subdividing the casing into two chambers one of which is in communication with said conduit, a piston in the other chamber, a stem for said piston, a pivoted lever connected with said stem at one end and at its opposite end with the further lever and a weight on the last named lever urging the lever in a direction maintaining the piston in engagement with said diaphragm.

5. In combination with a conduit, intake

and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached, a casing, a diaphragm subdividing the casing into two chambers one of which is in communication with said conduit, a piston in the other chamber, a stem for said piston, a pivoted lever connected with said stem at one end and at its opposite end with the further lever, a weight on the last named lever urging the lever in a direction maintaining the piston in engagement with said diaphragm, the connection between the first named chamber of the casing and said conduit including parallel connections each including a check valve, said check valves opening in opposite directions.

6. In combination with a conduit, intake and exhaust valves connected therewith, a connection between the valves whereby they are simultaneously and oppositely actuated including a lever, a further lever being connected with the first named lever, a weight associated with the last named lever and adapted to maintain the same in either of two positions and upon a predetermined movement of the lever from either of said positions toward the other of said positions, continuing such movement until the other of such positions is reached, a casing, a diaphragm subdividing the casing into two chambers one of which is in communication with said conduit, a piston in the other chamber, a stem for said piston, a pivoted lever connected with said stem at one end and at its opposite end with the further lever, a weight on the last named lever urging the lever in a direction maintaining the piston in engagement with said diaphragm, the connection between the first named chamber of the casing and said conduit including parallel connections each including a check valve, said check valves opening in opposite directions and an expansion chamber in communication with the first named chamber of the casing.

In testimony whereof I hereunto affix my signature.

SANFORD C. BRADY.