

June 12, 1962

R. H. DUMM

3,038,499

THREE-WAY BALANCED VALVE

Filed Nov. 14, 1960

2 Sheets-Sheet 1

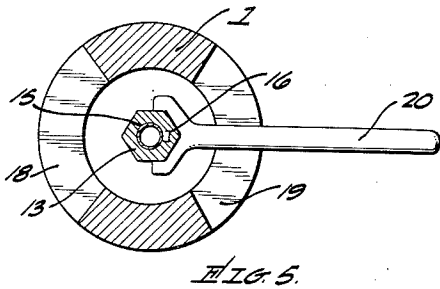
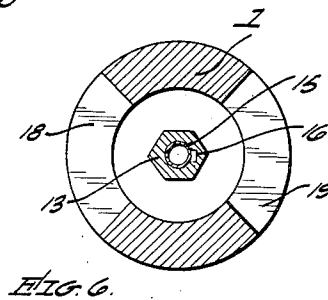
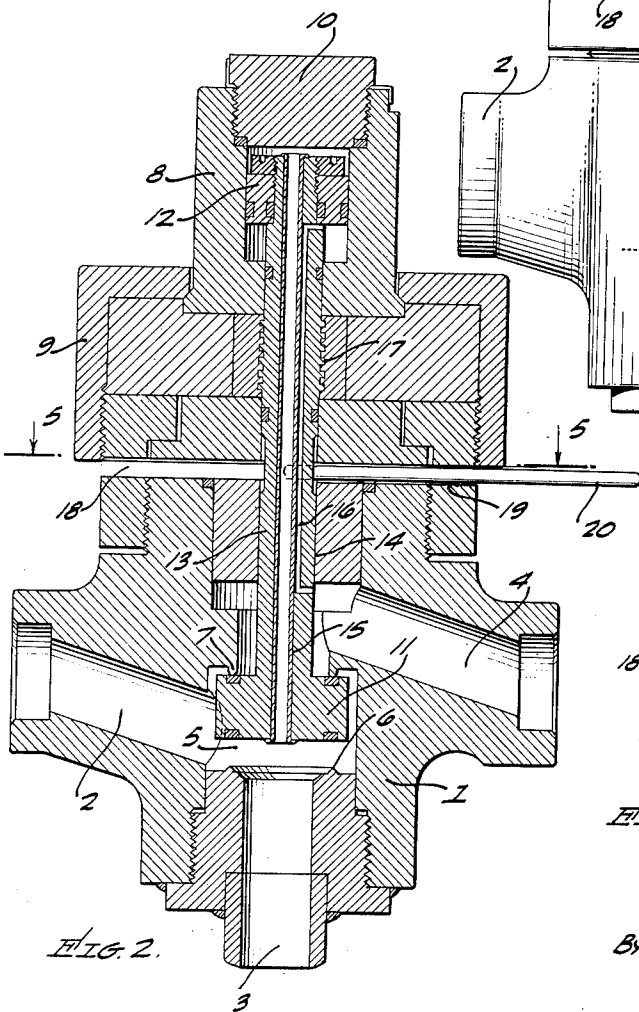
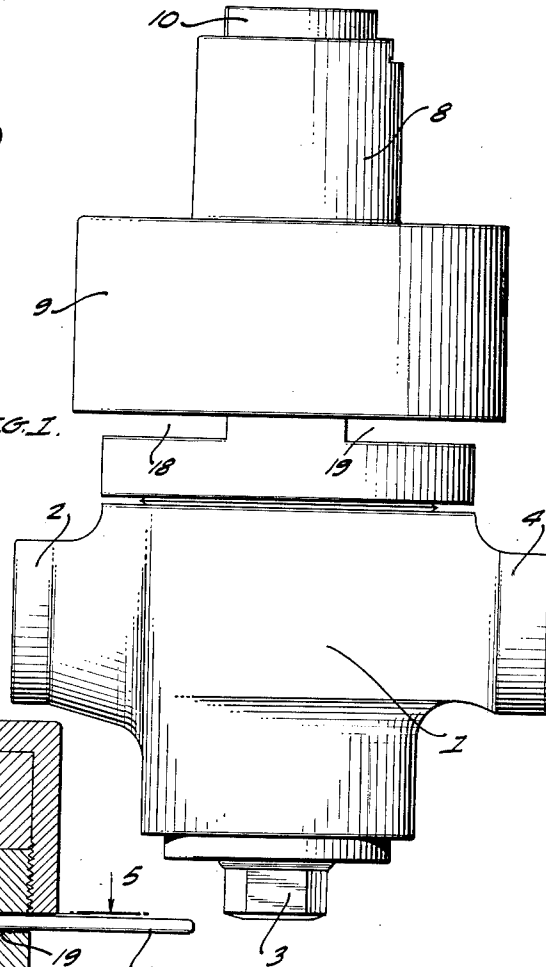


FIG. 1.



INVENTOR.
BY ROGER H. DUMM,
R. H. Dumm
ATTORNEY

June 12, 1962

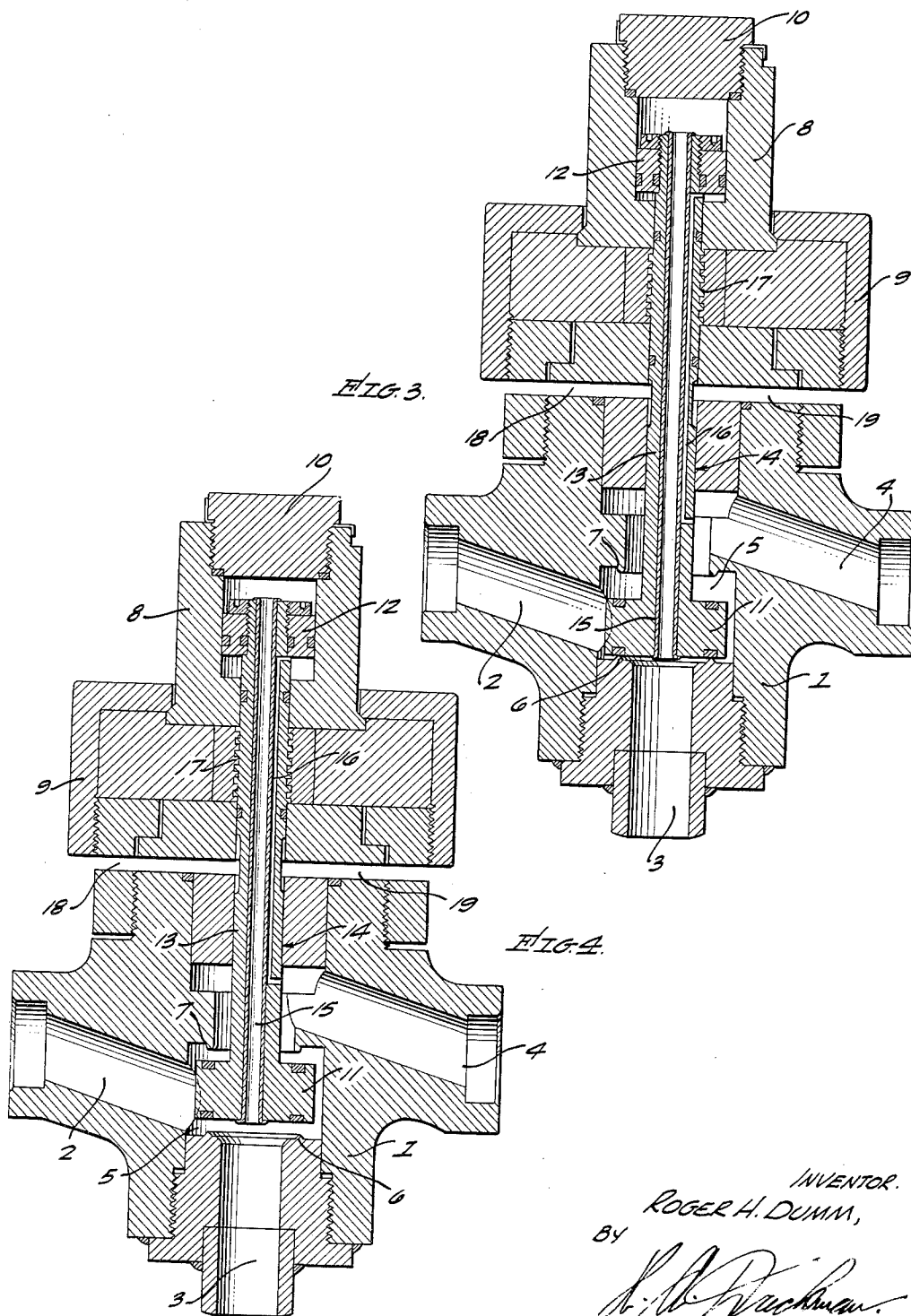
R. H. DUMM

3,038,499

THREE-WAY BALANCED VALVE

Filed Nov. 14, 1960

2 Sheets-Sheet 2



INVENTOR.
ROGER H. DUMM,
BY
R. H. Dumm
ATTORNEY

1

3,038,499

THREE-WAY BALANCED VALVE

Roger H. Dunn, Long Beach, Calif., assignor to Pacific Valves, Inc., Long Beach, Calif., a corporation of California

Filed Nov. 14, 1960, Ser. No. 69,179

3 Claims. (Cl. 137-625.5)

This invention relates to a three-way or three position valve, in which the control piston or head is balanced in all of its three operative positions.

Another object of my invention is to provide a novel three position balanced valve in which a balancing piston is mounted on the control head and spaced therefrom, and ports are provided which conduct fluid under pressure to the balancing piston to equalize pressure on the control head.

Still another object is to provide a novel three-way balanced valve in which the valve stem is so ported and drilled that pressure fluid is conducted from the ports of the valve to the balancing piston for the purpose of equalizing the fluid pressures on the control head.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

In the drawings:

FIGURE 1 is a side elevation of my three-way balanced valve.

FIGURE 2 is a vertical sectional view of my valve showing the parts in one position.

FIGURE 3 is a view similar to FIGURE 2 showing the parts in still another position.

FIGURE 4 is a view similar to FIGURES 2 and 3 and showing the parts in still a different position.

FIGURE 5 is a sectional view taken on line 5-5 of FIGURE 2.

FIGURE 6 is a view similar to FIGURE 5 but with the actuating handle removed.

Referring more particularly to the drawing, the numeral 1 indicates the body of a three-way valve, which includes an intake port 2 and outlet ports 3 and 4. A chamber 5 is provided within the body 1 into which all of the ports 2-3 and 4 extend. A valve seat 6 surrounds the port 3 and a seat 7 surrounds the area within the chamber 5 and into which the port 4 extends. A cylinder 8 is secured to the upper end of the body 1 by means of the ring 9 which screws onto the body, or is attached by other suitable attaching means. A plug 10 closes the upper end of the cylinder 8, for a purpose to be subsequently described.

A control head 11 is mounted for reciprocating movement within the chamber 5 and moves between the seats 6 and 7. The head 11 can rest on either of the seats 6 or 7, or can be positioned midway between these seats, depending upon the direction of flow through the valve. A piston 12 is mounted within the cylinder 8 and moves synchronously with the head 11. A piston rod 13 is fixedly attached to both the head 11 and the piston 12, and moves through the vertical bore 14 from the chamber 5 to the cylinder 8. The piston rod 13 is hollow, and a tube 15 is welded in the hollow rod 13 and extends from top to bottom thereof. The tube 15 thus permits fluid to pass from the bottom of the head 11 to the top of the piston 12 within the cylinder 8. Thus the upward pressure on the bottom of the head 11 is counterbalanced by a downward pressure on the top of the piston 12. A duct 16 is formed in the piston rod 13 and extends from the port 4 at one end to the bottom of the piston 12 at the other. The duct 16 opens into the cylinder 8 below the piston 12, as shown. The inner portion of the duct 16 is closed by the tube 15, thus forming a closed duct or channel opening at its lower end into the port 4 and

2

at the upper end into the cylinder 8 below the piston 12 as shown. Thus any pressure occurring in the port 4 will be conducted to the area on the bottom of the piston 12, thus exerting an upward thrust on the head 11 to counterbalance a downward force on the top of said head.

As shown in FIGURE 2, the head 11 rests against the seat 7 and fluid passes from the port 2 to the port 3. Upward pressure on the bottom of the head 11 is counterbalanced by a downward pressure on the top of the piston 12, to which fluid is conducted through the tube 15. The plug 10 forms a closed chamber above the piston 12 and within the cylinder 8 to which the pressure fluid flows. In FIGURE 3 the head 11 is shown resting on the seat 6 and the fluid flow is from the port 2 to the port 4. Pressure in this instance is exerted on the top of the head 11, and this downward pressure on the head is counterbalanced by pressure flowing through the duct 16 from the port 4 and thence to the bottom of the piston 12; the pressure fluid being confined within the cylinder 8 and below the piston 12. In FIGURE 4 the head 11 is midway between the seats 6 and 7 and fluid can thus flow from the port 2 to both ports 3 and 4. In this case pressures on the bottom and top of the head 11 are both counterbalanced by downward pressure on the top of the piston 12 and upward pressure on the bottom of the piston 12, which fluid is conducted to the cylinder 8 through the tube 15 and the duct 16.

To move the control head 11 vertically within the chamber 5, I may use a number of methods, one of which consists of interengaging threads 17 on the rod 13 and the body 1, so that rotation of the piston rod 13 will cause this rod and the head 11, as well as the piston 12, to move between the seats 6 and 7 to the positions described above. To rotate the piston rod 13 I provide a pair of arcuate openings 18 and 19 in the body 1, and which extend from the outside of the body to the central bore 14. These arcuate openings permit a spanner wrench 20 to be inserted from the outside of the valve and engage a squared portion of the piston rod 13, thus permitting the rod to be rotated and the threads 17 will then cause the rod to move vertically, adjusting the head 11 to the required position. In all positions of the head 11 the head and the piston rod 13 can be easily adjusted with a minimum amount of force required on the wrench 20.

Having described my invention, I claim:

1. A three-way balanced valve comprising a body, said body having an intake port and outlet ports, and a chamber into which each of said ports extend, a cylinder on said body, a piston in said cylinder, a control head in said chamber, a piston rod connecting the control head and the piston, a seat adjacent one of the outlet ports and another seat adjacent another of the outlet ports, said control head being movable to various positions between said seats, means to move said piston rod to adjust the control head and the piston to various positions, said piston rod having a port therein extending from the bottom of the control head to one side of the piston in said cylinder, said piston rod having a duct therein extending from said chamber to said cylinder.

2. A three-way balanced valve comprising a body, said body having an intake port and outlet ports, and a chamber into which each of said ports extend, a cylinder on said body, a piston in said cylinder, a control head in said chamber, a piston rod connecting the control head and the piston, a seat adjacent one of the outlet ports and another seat adjacent another of the outlet ports, said control head being movable to various positions between said seats, means to move said piston rod to adjust the control head and the piston to various positions, said piston rod having a port therein extending from the bottom of the control head to the top of the piston in said cylinder, said piston rod having a duct therein extending from said chamber

above the control head to said cylinder below the piston.

3. A three-way balanced valve comprising a body, said body having an intake port and a pair of outlet ports therein, and a chamber into which each of said ports extend, a cylinder fixedly mounted on the body, a piston 5 slidably mounted in said cylinder, a control head adjustably mounted in said chamber, a piston rod extending through the body and connecting the control head and the piston, a seat adjacent one of the outlet ports and another seat adjacent another of the outlet ports, said seats 10 being in vertical alignment and spaced from each other, said control head being movable to various positions between said seats, means to move said piston rod to adjust

the control head and the piston to various positions, said piston rod having a port therein extending from the bottom of the control head to the top of the piston in said cylinder, said piston rod having a duct therein extending from said chamber above the control head to said cylinder below the piston.

References Cited in the file of this patent

UNITED STATES PATENTS

2,555,262	Weinberg	May 29, 1951
2,980,139	Lynn	Apr. 18, 1961