Nov. 12, 1940. H. G. VANCE 2,221,729

VALVE

Original Filed May 29, 1937

Fig. 1.

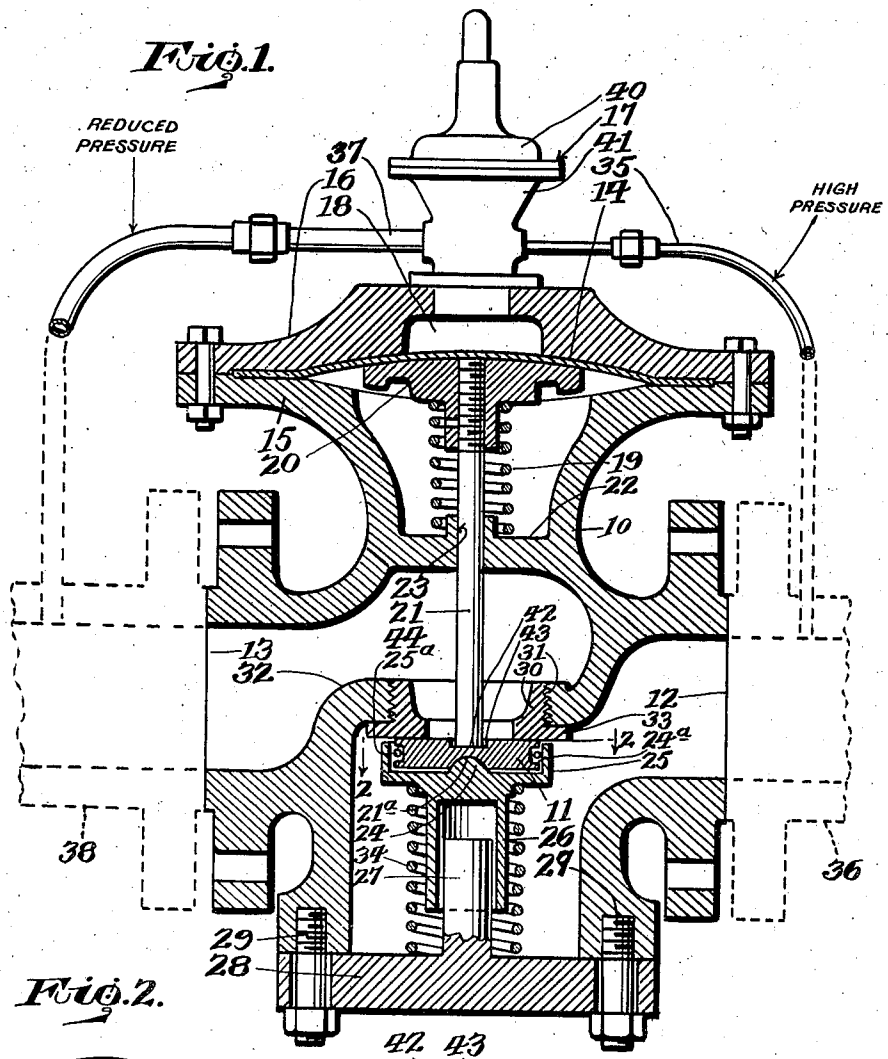
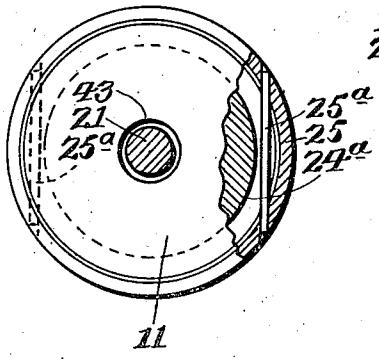


Fig. 2.



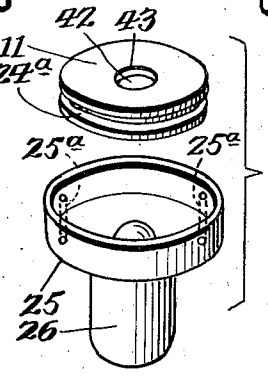


Fig. 3.

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2,221,729

VALVE

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Original application May 29, 1937, Serial No. 145,612, now Patent No. 2,171,613, dated September 5, 1939. Divided and this application July 19, 1939, Serial No. 285,399

1 Claim. (Cl. 251—137)

This invention relates to valves described and claimed in an application filed by me on May 29, 1937, Ser. No. 145,612, now Patent No. 2,171,613 granted Sept. 5, 1939, of which the present application is a division.

An object of the invention is the provision of a main valve for controlling the flow of fluid through a valve casing or housing and which is automatically controlled by a pilot valve, the main valve being so mounted that it is adapted to rotate in a holder with a slight vertical movement so that the valve may be freely moved without the usual noisy chattering operation.

A further object of the invention is the provision of a main valve for controlling the flow of fluids through a housing in which the main valve is maintained on its seat by a holder and spring with means for retaining the valve in the holder while permitting rotation of the valve.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claim.

In the drawing:

Figure 1 is a vertical sectional view of a valve housing showing my valve incorporated therein,

Figure 2 is a horizontal section taken along the line 2—2 of Fig. 1 with parts broken away, and

Figure 3 is a view in perspective of the valve and holder in separated relation.

Referring more particularly to the drawing, 10 generally designates a housing for a main valve 11. This housing has an inlet passage 12 for high pressure fluid and an outlet passage 13.

A diaphragm 14 is secured at its periphery between the upper end 15 of the housing and a cover plate 16 in any approved manner. A pilot valve housing generally designated by the numeral 17 is secured to the cover plate 16 and has its lower end in open communication with a chamber 18 formed between the cover plate 16 and the diaphragm 14, so that high pressure fluid which enters the chamber 18 from the pilot housing 17 will act on the diaphragm 14 and force it downwardly against the tension of a spring 19, which has its upper end in engagement with a nut 20 threaded onto a stem 21. The opposite end of the spring rests upon a shoulder 22 of the housing 10. The stem 21, it will be noted, is slidably mounted in a passage 23 formed in the shoulder 22.

The valve 11 at the lower end of the stem 21 is in the shape of a hard metal disc having on the underside at the exact center a semi-circular recess 21*a*. At the periphery of the disc is cut an annular groove 24*a* sufficiently large to engage a retaining means 25*a* in a cup-shaped holder 25 for loosely maintaining the disc in position in the holder.

The specially constructed cup-shaped member 25 supports the main valve 11 and is provided with a depending sleeve 26 which receives a post 27 carried by a base plate 28 connected to the housing by means of bolts 29. The cup-shaped member has a greater diameter than the valve 11 and at the exact center of the bottom of the cup-shaped member is provided a semi-spherical projection 24 which is received by the recess 21*a* and upon which the valve disc 11 may rotate.

The retaining means 25*a* in the form of pins or wires are attached to the side wall of the cup 25 or the ends of the wires are embedded in the side walls. The intermediate portions of the pins are slightly bowed inwardly and loosely fit within the groove 24*a* in the periphery of the valve disc 11. It will be seen that this specially constructed valve disc holder allows free movement of the valve disc in any direction with substantially little friction.

A ring seat 30 is threaded at 31 into an opening formed in a shoulder or partition 32. The lower end of the seat is provided with an annular flange 33 against which the valve 11 is pressed by the action of a spring 34 and fluid pressure. The flange 33 acts as a seat for the valve 11. The upper end of the spring is in engagement with the underface of the cup-shaped member 25, while the lower end of the spring rests upon the base 28 and surrounds the sleeve 26.

A pipe 35 is in open communication with an inlet pipe 36 which communicates with the inlet port 12. An outlet pipe 37 is adapted to carry off the fluid under reduced pressure from the housing of the pilot valve, as will be presently explained. This pipe, however, is connected with a discharge pipe 38 that is in communication with the outlet port 13 of the housing 10.

The pilot valve construction as described and claimed in my co-pending application above-entitled is located within the housing 17 which is formed of the sections 40 and 41. When pressure in the lower section 41 of the housing 17 reaches a predetermined degree it will act on

the diaphargm 14 and force said diaphragm downwardly against the tension of the spring 19. As the diaphragm is moved downwardly the lower end of the stem 21 acts on the upper face of the lower end 42 of the stem 21 seated within a socket 43 formed in the upper face of the valve 11 so that when the stem 21 is depressed it will act on the valve 11 and force the same downwardly together with the cup-shaped holder 25 against the tension of the spring 34. The holder 25 and the valve 11 will be guided in their vertical downward movement by the sleeve 26 which is slidably mounted on the post 27 formed on the upper face of the closure plate 28 and the valve will be opened so that fluid under pressure will be admitted through the inlet passage 12 to the chamber 44 whence the fluid will be discharged through the outlet opening 13. It will be noted that the valve 11 has a recessed portion 21*a* at the center which is received by the rounded projection 24 on the bottom of the holder 25 so that the valve 11 is rotatably mounted on this projection. The annular groove 24*a* loosely receives the pins 25*a* so that the valve will be held in position within the cup-shaped member but will be permitted to a slight movement vertically within the cup while the valve is permitted to revolve in said holder. By this construction the valve is substantially frictionless and will be seated promptly when the pressure has been released against the diaphragm 14 and the spring 34 will then move the cup-shaped holder upwardly and the valve on its seat on the lower end of the ring 30.

I claim:

A valve construction comprising a housing, a disc acting as a valve, a valve seat in the housing, a holder and guide for the disc, the holder at the upper end being provided with a cup-shaped member to receive and house the disc, means on the cup-shaped member and disc for centering the disc in the said member, said disc having an annular groove in the side wall midway between the top and bottom faces of the disc and cooperating means on the cup-shaped member projecting into the groove at diametrically opposite points to provide for universal movement of said disc and for confining the disc in the cup-shaped member, a spring for urging the holder and disc toward the valve seat, said disc having a centrally disposed socket and an operating rod for the valve having the free end received within the socket so that as the rod is moved towards the disc it will exert pressure on the disc in alinement with the cooperating means against the tension of the spring to force the disc away from the seat.

HARVEY G. VANCE.