May 23, 1933. J. M. THRASHER 1,911,044

OSCILLATING VALVE

Filed June 19, 1930 2 Sheets-Sheet 1

FIG. 9.

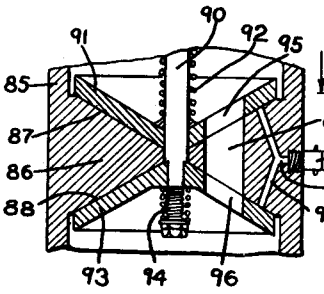

FIG. 1.

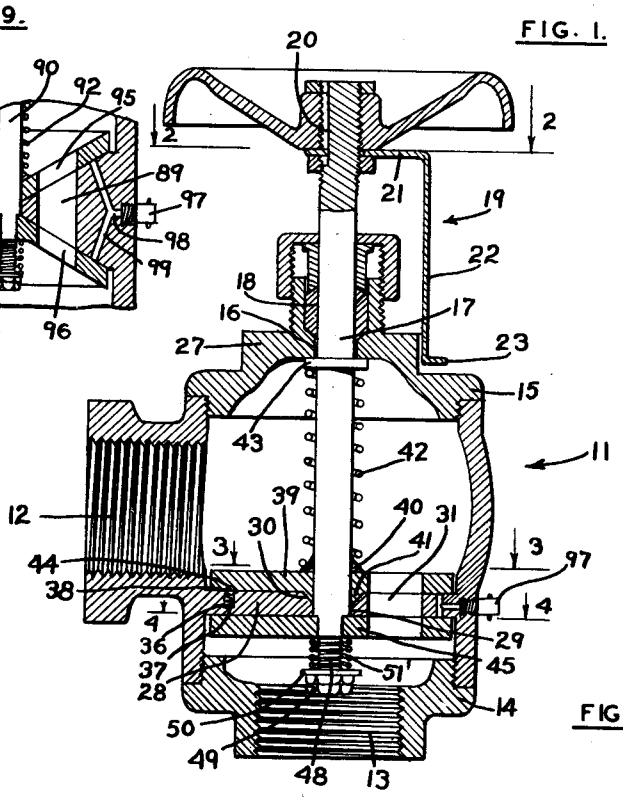

FIG. 2.

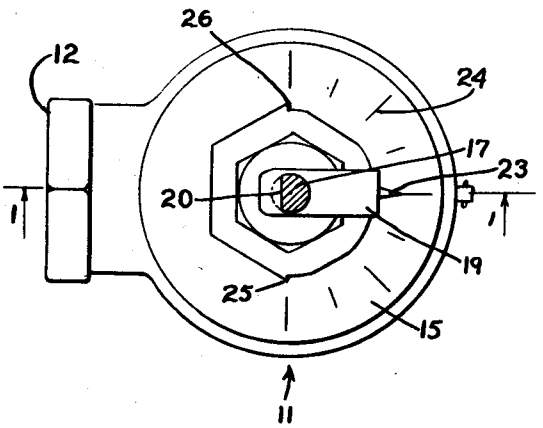

FIG. 3.

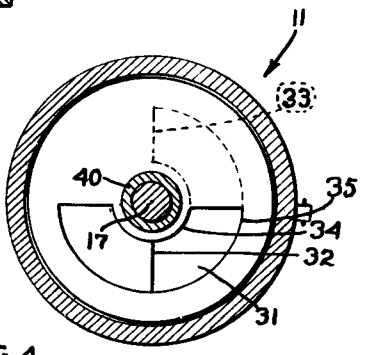

FIG. 4.

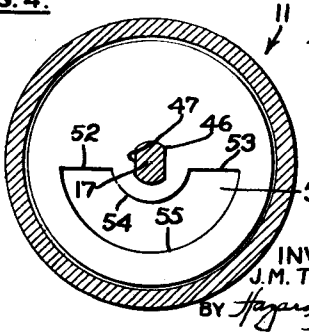

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FIG. 5.

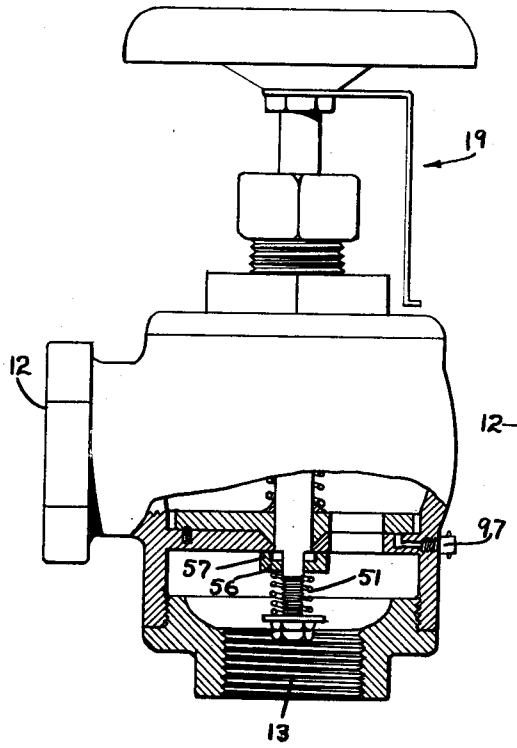


FIG. 6.

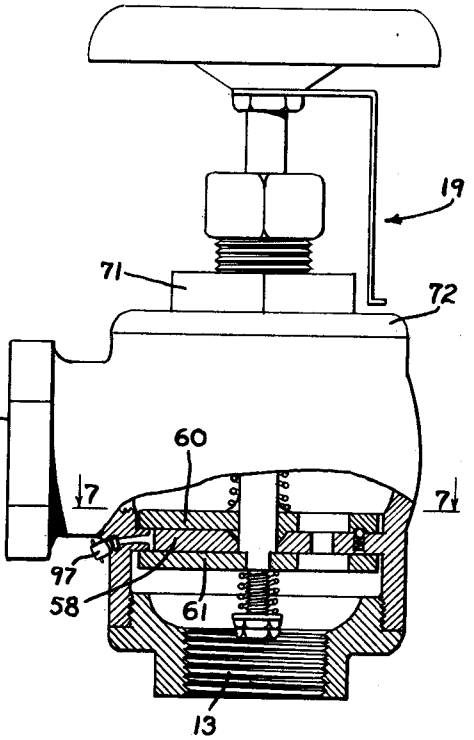


FIG. 7.

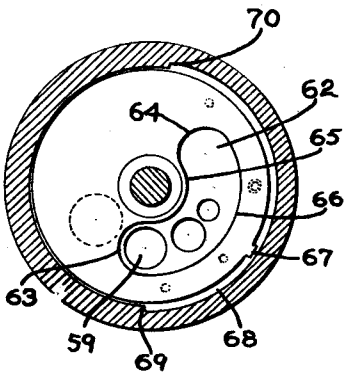
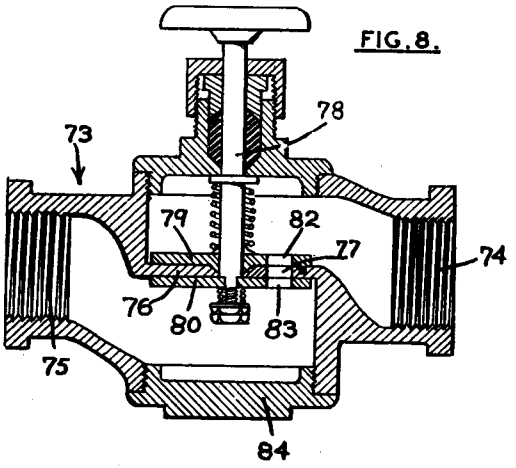


FIG. 8.



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Patented May 23, 1933 1,911,044

UNITED STATES PATENT OFFICE

JOHN M. THRASHER, OF MONTEBELLO, CALIFORNIA

OSCILLATING VALVE

Application filed June 19, 1930. Serial No. 462,275.

The type of oscillating valve to which my invention pertains has one or more flat disks which bear against a partition, the partition having one or more ports and the disks having openings or passages to align with the ports and thus allow passage of the liquids or gases through the valve. My valve is arranged so that a full opening may be obtained with less than a complete rotation of the valve stem.

A feature of my invention is a construction by which a leakage adjacent the valve stem is prevented and in which the disks bear against the fixed partition with sufficient force to prevent passage of liquids or gases between the disks and the partition and thus limit the chances of leakage adjacent the stem.

Another feature of my invention embodies the construction of the partition having a single arcuate port of the full size to give a full opening of the valve, or with a series of ports which are preferably formed circular and of different diameters so that a graduated opening of the valve may be made by uncovering one or more of these graduated ports and aligning these with the openings or passages in the rotatable disks.

Another feature of my invention is having what I may term an upper disk welded or similarly secured to the valve stem, the stem being slidable in the valve packing, and the stem of the disk being forced into contact with the fixed partition by a spring; and when I use two disks, one on each side of the partition, the lower disk on the lower end of the stem is pressed downwardly into contact with the partition by a spring.

My invention in several forms is illustrated in connection with the accompanying drawings, in which:—

Fig. 1 illustrates a vertical section taken on the line 1—1 of Fig. 2 in the direction of the arrows.

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1 in the direction of the arrows.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1 in the direction of the arrows.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1 in the direction of the arrows.

Fig. 5 is a side elevation partly broken open of a modified form of valve having the single rotatable disk.

Fig. 6 is a side elevation partly broken open of another modification of my invention having a pair of rotatable disks, and the diaphragm having a series of graduated ports.

Fig. 7 is a section on the line 7—7 of Fig. 6 in the direction of the arrows.

Fig. 8 is a longitudinal section through the valve designed for connecting in a line of pipe.

Fig. 9 is a detail section through an alternative type of valve having a cone-shaped seat and cone-shaped valve disks.

Referring first to the construction of Figs. 1 through 4: The valve is provided with a valve casing or housing 11 having an intake opening 12 and an outlet 13. The outlet is shown constructed in a ring 14 which may be screwed into the casing. A cap 15 is also screwed into the casing and is provided with a bore 16 therethrough, through which extends a valve stem 17, there being usual packing 18, a packing gland to form a gas or liquid-tight seal for the stem.

The valve has the usual type of handle and has a pointer 19 secured to the stem, the stem preferably having a flat section 20 to engage a partly circular and partly flat opening in a horizontal section 21 of the pointer. This pointer has a vertically depending port 22 with a lateral finger 23 which indicates with graduations 24 marked on the cap 15 the degree of opening of the valve. There are a pair of vertical buttons 25 and 26 on a projecting shoulder 27 of the cap so that the finger 23 on meeting these abutments registers the closed and fully opened position of the valve.

The valve housing has a partition 28 constructed integral therewith and forming a valve seat, this partition having a central bore 29 with a beveled edge 30. This partition has an arcuate port 31 which is indicated as having terminal edges 32 and 33, and inner and outer arcuate edges 34 and 35, these being formed concentric, and, in the illustration, the port forms substantially half of

a circle. The partition is provided with a socket 36 having a spring 37 therein with a ball 38 resting on the spring.

The stem is indicated as having an upper disk 39 secured thereto by a weld or braze 40. The disk has a cone-shaped central section 41 bearing on the beveled surface 30 of the partition. A compression spring 42 is coiled on the valve stem and bears on the upper disk 39 and on a washer 43 which abuts against the inner part of the cap 15, thus pressing the upper disk in firm relation to the partition. The disk is provided with a series of recesses 44 to engage the ball 38 and thus indicate the different positions of the valve so that a person may note by the feel of the valve in opening or closing the condition of the valve. This is convenient for operating the valve in the dark when the position of the pointer cannot be seen.

In this type of valve there is a lower disk 45 which has a central opening 46 flattened on each side to engage flattened surfaces 47 of the lower part of the stem. The bottom end of the stem is screw threaded as indicated at 48, and has a nut 49 thereon with a washer 50, there being a compression spring 51′ bearing between the washer and the lower disk, thus forcing this lower disk into tight engagement with the bottom surface of the partition 28.

The upper and lower disks are each provided with a similar opening or passage 51. This is formed arcuate and has terminal ends 52 and 53 formed by radial lines, and inner and outer concentric, curved edges 54 and 55. The various edges of the openings in the disks register with the edges of the port 31 in the fixed partition. In the illustration the valve is shown half open and it will be seen that it is only necessary to turn the valve stem half a revolution to shift from the fully closed to the fully open position, and that any graduated degree of opening may be obtained. This construction allows a full valve opening to be obtained very quickly by the half rotation of the stem.

In the construction of Fig. 5, the valve housing and other details are substantially the same as in Figs. 1 through 4, having the same type of partition with a port therein, a similar upper valve disk with a similar opening, but this construction omits the lower disk, and in order to obtain an additional pressure of the disk on the valve partition or seat a washer 56 is used having a rim 57 bearing on the under side of the partition and forced into engagement therewith by a spring similar to the spring 51.

In the construction illustrated in Figs. 6 and 7 the valve housing is substantially the same as illustrated in connection with Figs. 1 through 4, but in this case a partition 58 forming the valve seat has a series of ports 59 graduated in diameter, these being illustrated as circular, and having one port of a small diameter and graduated from this to the largest port of a large diameter. This valve has upper and lower disks 60 and 61 mounted on the valve stem in the same manner as Figs. 1 through 4, but in this case passages or openings 62 through these disks have arcuate ends 63 and 64, and inner and outer concentric, curved edges 65 and 66. The upper disk 60 is indicated as provided with a lug 67 extending radially beyond its periphery and operating in a segmental groove 68 in the valve housing, which groove is provided with end abutments 69 and 70, and forms a limit for the motion of the valve in opening and closing.

In this case a shoulder 71 on a valve cap 72 does not have any abutments thereon but the pointer 19 is of the same type as illustrated in Figs. 1 and 2, and indicates on graduations on the cap the different positions of the valve. This arrangement also uses the ball operating in the recesses to indicate the position of the valve opening.

In the construction illustrated in Fig. 8, a valve housing 73 has an intake end 74 and a discharge end 75, and utilizes a central partition 76 forming a valve seat with one or more ports 77. A valve stem 78 has upper and lower disks 79 and 80 thereon, which may be mounted in the same manner as the disks of Fig. 1. These are provided with openings or passages 82 and 83 to align with the port or ports 77. A plug 84 is indicated as screwed into the bottom of the valve casing, and this may be removable to give access to the lower disk and to the nut and spring on the lower end of the valve stem. This type of construction is indicated as having the ball operating in the recesses to indicate the position of the valve opening, and uses the same type of lug operating on the turn of the buttons as Fig. 7.

An important feature of my valve is that the pressure on the intake side presses the upper disk tight on the partition seat and thus makes a close seal so that there is no danger of the valve leaking when it is shut off.

My valve is particularly adapted for boiler feed work in which, sometimes, there is a back pressure from the boiler should the check valve between the feed valve and the boiler not function properly. In this case, with the upper and lower disks on each side of the seat, the back pressure presses upon the lower disk and thus forms a seal against a back leak from the boiler. This is very convenient, especially when it is necessary to repack the valve stem.

For boiler feed work I find it more advantageous to use a valve having the differently sized ports through the valve seat, as a better regulation of the flow of feed water

may be obtained than with the single large port.

An important feature of my invention also is that there are no threads on the valve stem so that the stem is not subject to any motion except a rotary motion and, as above mentioned, this is only a part of a circle.

On account of the high pressure exerted against the valve seat it is desirable to make this of a hard material or have a hard wearing surface. This high pressure also, sometimes, makes it difficult to open or close the valve and it is sometimes necessary to attach a lever to the valve stem instead of a wheel-like handle.

In the construction of Fig. 9 I indicate part of a valve housing 85 having a partition 86 therein. This is illustrated as having a conical upper surface 87 and also a conical lower surface 88, there being either a single or a plurality of graduated ports 89 through the partition. A valve stem 90 has an upper valve disk 91 which is conically shaped and bears on the surface 87 of the seat. A compression spring 92 on the stem bears on the upper disk. A lower disk 93 is shiftable on the stem and is also conical on the stem, bearing on the lower surface 88 of the seat. A compression spring 94 thrusts this upwardly. These valve disks are provided respectively with openings 95 and 96.

One advantage of my type of valve is that the valve disks and the seats can be readily lubricated and, for instance, in Figs. 1 and 9, I illustrate a nipple 97 suitable for alemite or like greasing which connects to a grease duct 98, this having diverging ducts 99 connecting to the face of the valve seat and the upper and lower disks.

In the claims it is convenient to refer to the intake side of the valve partition or seat as the pressure side and the discharge side as the non-pressure side. The valve is normally designed to operate with the respective intake and discharges as described in the specification, and the disks on the discharge or non pressure side are pressed upwardly with sufficient force by the spring on such side to form a closure even against the pressure of fluid passing through the valve. However, my valve is quite adapted to a reversal of pressures in which the discharge side of the valve may have the greatest pressure thereon. This causes the lower disk to bear tighter on the separating partition than when it is merely held in place by the spring.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A valve having a valve housing with a partition structure therein having a port therethrough and forming a valve seat, a stem having a bearing in the partition and extending therethrough, one side of the seat being on the intake and the other on the discharge side of the valve, a closure element mounted on the stem on each side of the partition, and a spring on the discharge side of the partition and mounted on the stem forcing the closure element on the discharge side in close contact with the said partition.

2. A valve as claimed in claim 1, the stem having a compression spring coiled thereon and bearing against the closure element on the intake side of the valve and against a structure connected from the valve housing.

3. A valve having a valve housing with a partition separating the pressure intake and non-pressure discharge sides of the valve and having a port therethrough and having parallel upper and lower flat surfaces, a rotatable stem extending through the partition and having a flat disk on the pressure side secured to the stem, a second flat disk on the non-pressure side of the partition slidably mounted on the said stem, the said disks bearing on opposite sides of the partition and each having an opening adapted to register with the port in the partition, and means on the stem thrusting the second disk into close contact with the partition.

4. A valve as claimed in claim 3, the stem having a compression spring coiled thereon, said spring bearing on the disk secured to the stem and on part of the valve housing.

5. A valve having a valve housing with a partition structure therein separating the intake and discharge sides of the valve and having a port therethrough forming a valve seat, a rotatable stem having a bearing in the partition and extending centrally therethrough, one side of the seat being on the intake and the other on the discharge side of the valve, a closure element mounted on the stem on each side of the partition each having an opening, the element on the intake side being secured to the stem and on the discharge side being slidable on the stem, and means interconnecting the said elements with the stem and the valve housing to force said elements into close contact with the seat of the partition.

6. A valve having a valve housing with a partition structure therein separating the pressure intake and non-pressure discharge sides of the valve and having a port therethrough and forming a valve seat on its opposite sides, at least one side being conical, a rotatable stem extending centrally through the partition and having a bearing therein and having a disk-like closure element mounted on the stem on the pressure and non-pressure sides of the partition, said elements conforming in shape to the seat of the partition, the said closure elements having aligned openings to align with the port of the partition.

7. A valve having a valve housing with a partition structure separating the pressure

intake and non-pressure discharge sides of the valve and having a port therethrough and forming a valve seat on its opposite sides, said seats being conical, a rotatable stem extending through the partition and having a bearing therein, a closure disk mounted on the stem on the pressure and non pressure sides of the partition and conforming in shape to the seat on such side, said disks being rotatable with the stem, and each disk having aligned openings to register with the port.

8. A valve having a valve housing with a partition structure therein separating the pressure intake and non pressure discharge sides of the valve and having a port therethrough and forming a valve seat on its opposite sides, the seats being conically shaped with the apexes contiguous, a rotatable stem centrally mounted in the partition having a bearing therein, a disk secured to the stem for rotation on the pressure and non pressure sides of the partition, each disk being coned to conform to the seat on such side, each disk having an opening in alignment and adapted for alignment with the said port.

9. A valve having a valve housing with a partition structure therein separating the pressure intake and non pressure discharge sides of the valve and having a port therethrough, said partition having valve seats on its opposite sides, said seats being cone shaped with the apexes contiguous and at the center, a rotatably mounted stem extending through the partition and having a cone shaped valve disk on the pressure and non pressure sides of the partition bearing on the seat, each disk having an opening, said openings being in alignment and adapted to align with the said port, and a spring means forcing each disk into close engagement with the seat on which it bears.

10. A valve as claimed in claim 9, the stem on the discharge side having an extension with one of the springs coiled thereon and bearing against the disk on such side and against the end of the stem.

11. A valve as claimed in claim 9, the stem on the intake side having one of the coiled springs thereon bearing against the disk on such side and against the valve housing, and on the discharge side the stem having an extension with the other spring coiled thereon and bearing against the end of the stem and the disk on the discharge side.

12. A valve having a valve housing with a partition therein separating the pressure intake and non-pressure discharge sides of the valve and having a port therethrough, said partition having conically shaped seats on its intake and discharge sides with the apexes contiguous, a stem extending through the valve housing from one side and having a bearing in the partition and being provided with an extension beyond the partition, a conically shaped disk mounted on the stem on each side of the partition, each bearing on the valve seat, and each disk having an opening in alignment to align with the port of the partition, means to rotate the stem, a coiled spring on the extension of the stem and bearing against one of the disks and the stem end, and a coiled spring on the stem bearing against the other disk and against the housing whereby said disks are forced into close fitting engagement with their respective seats on the pressure intake and non pressure sides of the valve.

In testimony whereof I have signed my name to this specification.

JOHN M. THRASHER.