J. G. GAUNTT.

HYDRANT.

APPLICATION FILED APR. 28, 1913.

1,091,210.

Patented Mar. 24, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

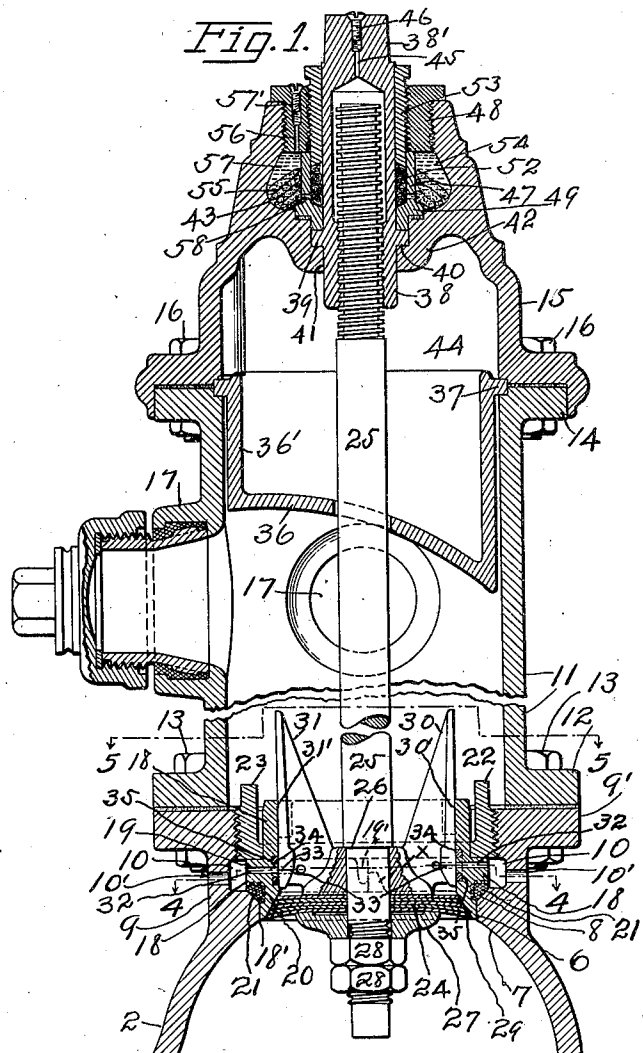
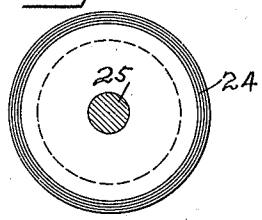


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 2

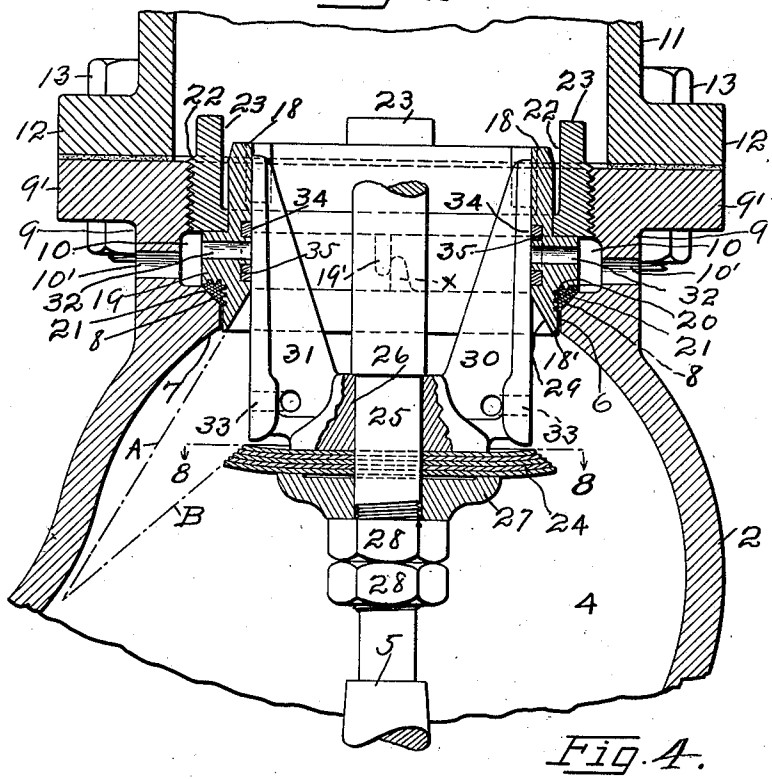


Fig. 4.

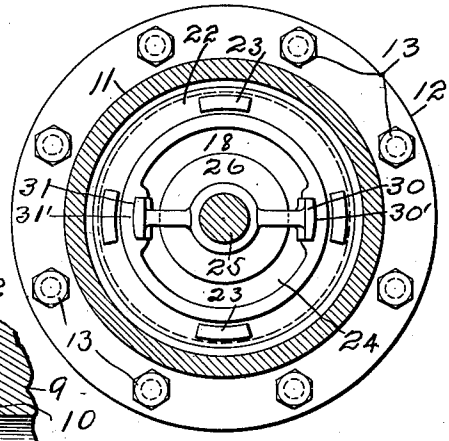


Fig. 3.

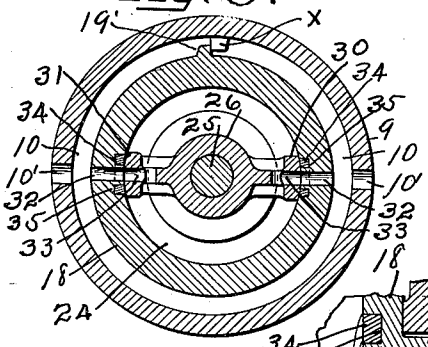
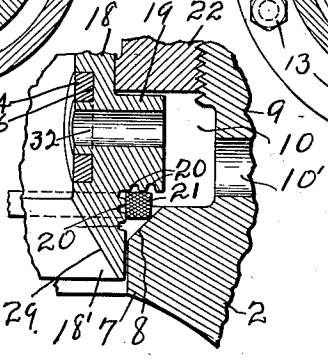


Fig. 5.



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HYDRANT.

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Application filed April 28, 1913. Serial No. 764,289.

To all whom it may concern:

Be it known that I, JAMES G. GAUNTT, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Hydrants, of which the following is a specification.

This invention relates to improvements in hydrants or plugs, of the class commonly used in connection with city water-systems for extinguishing fires.

The object of the invention is to provide a hydrant of the class, wherein a novel, simple and highly effective valve mechanism is employed for controlling the water, the valve consisting of a non-corrodible metal and so constructed and arranged that it is self-cleaning.

A further object is to provide novel and simple means for applying and securing the valve seat-ring, and also for packing the seat-ring.

The various features and parts of the invention will be understood from the detailed description which follows, and by reference to the accompanying drawings, which form a part of the specification, and in which—

Figure 1 is a central vertical section through the hydrant, with parts broken away; showing generally the construction and arrangement of the complete hydrant; also showing the valve closed. Fig. 2 is an enlarged central vertical section of the valve and related parts; showing the valve open. Fig. 3 is a horizontal section, taken on line 4—4 of Fig. 1; showing the construction and arrangement of the drain. Fig. 4 is a horizontal section taken on line 5—5 of Fig. 1; showing the means for applying and removing the hold-down ring. Fig. 5 is an enlarged detailed section; showing the first step in the application of the soft metallic packing which seals the joint between the seat-ring and the shoe. Fig. 6 is a top plan view of the valve, taken on line 8—8 of Fig. 2.

In the drawings, 2 represents the shoe of the hydrant, having the usual inlet 3, which is arranged to connect with a water main. The shoe 2 is an irregular hollow body having a relatively large water chamber 4, the inner walls of which are arranged in long easy curves, which eliminate the friction, and thereby prevent the loss of head. The inner surface of the chamber 4 is entirely free from obstructions excepting a relatively small upwardly projecting boss 5, which serves as a stop for limiting the opening movement of the valve. The water is discharged from the chamber 4 through a circular port or opening 6, which is defined by an inwardly projecting flange 7, having an annular bevel 8, which serves as the seat for a packing which will later be described. Above the outlet 6, the shoe has a relatively large neck 9, which is surrounded by a flange 9′ for providing a relatively broad ledge or seat for receiving and supporting the lower end of the barrel or stand-pipe 11, which is provided with a similar flange 12. The flanges 9′ and 12 have coinciding perforations to receive bolts 13 which clamp and hold the shoe and barrel together. Above the bevel 8, the neck 9 is provided with an annular drain-groove 10 by means of which the waste water from the barrel is collected and then discharged through oppositely facing ports 10′. The upper end of the barrel 11 is provided with an external flange 14 which receives and supports the flanged lower end of the cap or bonnet 15, and these parts are secured together by bolts 16.

17 represents a series of nozzles or plugs employed for drawing the water from the barrel, and this may follow any suitable or usual construction.

The valve which controls the flow of water from the shoe into the barrel, and also its operating and related parts will now be described:

18 represents generally the valve seat, which consists of an annular ring, the lower end 18′ of which preferably fits snugly into the opening 6 of the shoe 2.

19 represents an external annular flange of greater diameter than the end 18′, which limits the insertion of the ring in the opening 6.

The seat-ring 18 is intended to be non-rotatable, and for this purpose the said ring is provided with a peripheral lug 19′ which engages a lug x located in the drain-groove 10, as best seen in Fig. 4. The underside of the flange 19, and also the adjacent surface of the portion 18′ of said ring are provided with annular grooves 20, which I prefer to be like the standard acme threads and which are adapted to receive portions of a packing, as 21, which may be any substance

suitable for the purpose, when the packing is subjected to sufficient pressure to force it into the said grooves. The packing 21 in the first place preferably consists of an annular gasket or part which is square in cross-section (see Fig. 6), which is first forced over the end 18′ of said ring in position to engage the bevel 8 of the port 6. Then the seat-ring is inserted in the opening 6 and forced downwardly until the soft material of the packing ring 21 is transformed from the cross-sectional area shown in Fig. 6 to the irregular area shown in Figs. 1 and 3. The forcing of the packing 21 in the grooves 20 of the seat-ring effects the interlocking of the packing with the seat-ring, which thereafter permits the seat-ring and packing to be removed or replaced, at will, without danger of leaving any portion of the packing in or around the discharge mouth 6 of the shoe. This feature is of great advantage, when it is understood that the shoe 2 of the hydrant is located from two to eight feet in the ground, and is therefore inaccessible except by digging up and removing the earth all around the hydrant. The compressing of the packing 21, as described, effects the perfect sealing of the joint between the seat-ring and the flange 7 of the shoe. The seat-ring is held in place by an annular hold-down ring 22, which has external threads for engaging corresponding internal threads in the neck 11 of the shoe opposite the flange 9′. The bottom of the hold-down ring 22 engages the top side of flange 19 of the seat-ring, and therefore exerts an even downward pressure upon the seat-ring. The hold-down ring may be rotated in opposite directions by a wrench or other suitable instrument, by means of a series of upwardly projecting lugs 23 which are disposed around the top end of said ring.

The valve which controls the passage of water from the shoe into the barrel, comprises a series of metal disks 24, preferably made of a non-corroding metal of considerable elasticity or flexibility, all of which are perforated centrally to receive the valve stem 25. The disks or laminæ of the valve 24 are preferably disposed between top and bottom clamping plates 26 and 27 respectively, and these plates and also the disks are held in place by nuts 28, which engage the threaded lower end of the valve rod 25. The disks comprising the valve 24 are of greater diameter than the clamping plates 26 and 27, as best seen in Figs. 1 and 3, and the free over-hanging edges of the plates 24 are preferably flexible enough to bend downwardly when the said edges engage the beveled seat 29, as when the valve stem is moved upwardly for closing the valve (see Fig. 1), as well as, to restore themselves to their normal shape, as shown in Fig. 3. The disks 24 are of greater diameter than the bore of the seat-ring, and each disk, in order, from the topmost to the lowermost is of a different or greater diameter, as shown. All of the disks 24 are preferably concavo-convex, and when the valve is open the disks have substantially the same concavity and fit closely together, the dished sides facing upwardly, as shown in Fig. 3. When however the valve is brought into engagement with the sloping seat 29, at the initial closing movement the bottom disk engages the seat first, while the other disks are disengaged. This feature may be better understood by comparing the lines A and B in Fig. 3. Then as the valve stem is moved upwardly, each succeeding disk, in order, from the lowermost to the topmost, will come into engagement with the bevel seat 29, at different intervals of time, until the valve is fully closed, as shown in Fig. 1, wherein all of the disks 24 are in contact with the seat 29 and the free edge of each is shown to be curved downwardly, due to the force exerted by the rod 25, and the disks are also shown to be separated from each other due to the difference in the diameters. By employing the flexible or elastic disks 24, the free peripheral edge of each disk engages the seat-ring with substantially uniform pressure, thus taking care of any eccentricity which might occur in the disks. I have shown five disks comprising the valve 24, but a greater or less number of said disks may be employed if desired. Owing to the peculiar construction and arrangement of the laminæ of the valve 24, when the said valve is closed as shown in Fig. 1, each disk constitutes a valve in itself, and if one or more of the disks should fail to become properly seated, the remaining disks will effect a closing and sealing of the port 6. The action of the laminated valve during the closing or seating operation is to effect a scraping or brushing of the beveled seat 29, and by this means all corrosion and accumulation of vegetable or organic matter is thereby removed from the seat. In the same manner all roots or similar obstructions which happen to lodge on the seat of the valve will be cut or sheared off by the sharp corners of the disks. Heretofore, where non-metallic valves have been used, and frequently where plain metal valves have been used, solid matter of various kinds have become lodged or caught between the valve and the seat, which allowed a continual oozing of the water through the valve, when it was supposed to be entirely closed. This leaking of the valves not only causes flooding in the vicinity of the hydrants, but in cold weather the hydrants freeze up and either burst or prevent the drawing of the water. By the use of my improved laminated metal valve, construct-

ed, arranged and operated, as herein shown and described, practically all of the aforesaid troubles and defects are eliminated, and when properly made and installed, the valve requires less re-adjustment and repair and will outlast the old non-metal valves, as well as, all other hydrant valves known to me.

The top plate 26 of the valve is provided with integral upwardly projecting guides 30 and 31, which are disposed diametrically opposite each other. These guides are employed for steadying and guiding the valve when opened to any extent. The outer face edge of each guide is convex to conform to the curvature of the inner face of the seat-ring 18, and in this way a substantially true and even bearing is afforded the guides during the opening, as well as, the closing movement of the valve. The guides 30 and 31 preferably travel in grooves 30′ and 31′ formed in the seat-ring which prevent shifting or displacement. The seat-ring 18 is provided with a plurality of drains which consist of holes or passages 32 which are drilled horizontally through the opposite sides of the seat-ring substantially in line with the vertical centers of the guides 30 and 31. The holes 32 coincide with similar holes 33 formed in the guides 30 and 31, when the valve is in the fully closed position, as shown in Fig. 1. By this arrangement of the drain openings 32 and 33, together with the peculiar manner in which the laminæ of the valve engage the seat 29, when the valve is lowered sufficiently to free all of the disks from the said seat, the guides 30 and 31 will have moved downwardly sufficiently to shift the holes 33 out of register with the holes 32, and thereby effects the closing of the drain. This is necessary in order to prevent the water coming from the chamber 4 from escaping through the drains, since the drains are only employed for drawing off the water from the barrel after each closing of the valve. In order to guard against the water leaking through the joints between the guides 30 and 31, and the inner surface of the seat-ring, and finding its way into the drains 32, I provide packings 34 which are disposed in similar annular grooves 35 formed in the inner surface of the seat-ring concentric to the holes 32. These packings may consist of any suitable material, and are preferably in constant engagement with the outer face of the guides 30 and 31 whether the valve is open or closed. The packings 34 are preferably so positioned that the stream of water flowing through the barrel never comes in contact with, and therefore cannot wear or injure the packings. Owing to the position and arrangement of the grooves 35, it is impossible for any portion of the packings 34 to escape from said grooves and enter and clog up the drains 32. After each closing of the valve 24, whatever water may be held in the barrel 11, between the plugs 17 and the valve, will immediately pass through the ports 33 and 32 into the annular groove 10, and thence pass out of the neck of the shoe by way of the ports 10′.

36 represents a baffle plate which is disposed in the top portion of the barrel 11 just above the plugs 17. The said plate is arranged at an angle, as shown, for the purpose of deflecting the water toward the plugs, the bottom of said plate being slightly curved for diminishing friction. The baffle plate shown in the present case comprises the bottom of a hollow cylindrical cup or part 36′ which is suspended in the top of the barrel by means of the annular flange 37, which is seated between the top of the barrel 11 and the bonnet 15.

The valve operating rod or stem 25 passes upwardly through the center of the barrel and through a perforation in the center of the baffle plate 36, which tends to support and guide the rod, and its upper end is threaded, and is disposed concentrically in the bonnet or hood 15. The valve-stem 25 is operated by means of a stem-nut 38, which is internally threaded for engaging the threads of the stem. The stem-nut is operatively supported in the bonnet by means of an annular flange 39 which rides upon a similar ledge 40, which surrounds an opening 41 in a transverse wall 42, which divides the bonnet into two compartments 43 and 44. The upper end 38′ of the stem-nut extends above the top of the bonnet and is formed in the usual manner to receive a wrench, by means of which the stem-nut may be rotated for raising and lowering the valve stem. The upper end 38′ of the stem-nut is preferably solid except for a small hole 45 through which oil may be supplied for lubricating the threads of said nut and the valve stem. The hole 45 is normally closed by a screw 46. The chamber 43 of the bonnet contains a stuffing-box 47 by means of which I provide continuous lubrication to the valve operating parts.

Above the flange 49 the box 47 is counterbored to receive a hydraulic packing which preferably consists of a number of rings 52, which are compressed and held in place by a gland-nut 53 which is threaded into the bushing 48 and surrounds and affords a bearing for the upper end of the stem-nut 38. The remaining portion of the chamber or compartment 43 of the bonnet comprises an annular cavity 54 which is preferably partially filled with an absorbent material 55, which lies on the bottom of said cavity, and the space above the absorbent material is intended to be filled with a suitable lubricating oil 57, which is supplied to the reservoir 54 by means of a port 56 in the bushing 48, which is normally closed by screw 57′. The bushing 48 is externally threaded for

screwing into the internally threaded opening in the top of the bonnet, and the top end of the said bushing is arranged to receive a wrench in the usual manner. Likewise the upper end of the gland-nut 53 is arranged to receive a wrench.

To operate the hydrant, the stem-nut 38 is turned by a suitable wrench which rotates the said nut the same as the rotatable member of a swivel. The exterior of the nut being threaded for engaging the threads of the valve-stem 25, when the stem-nut is turned in opposite directions, the valve-stem moves upwardly and downwardly for opening and closing the valve 24. The guides 30 and 31 move with the valve and tend to steady and guide the valve, so that the valve is always held in true relation to its seat whether it is opened or closed. The top plate 26 of the valve, as well as, the guides are so constructed and arranged that when the valve is opened they offer the least possible obstruction or restriction to the free passage or flow of the water, from the shoe 2 into the stand-pipe 11.

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

1. In a hydrant, the combination with a shoe having a discharge port in its top, of a seat-ring disposed in said port, means for holding said seat-ring in place, a valve in said shoe concentric to said port, said valve comprising a plurality of elastic disks of different diameters adapted to engage the seat-ring at different intervals of time during the closing of the valve, the peripheral edges of said disks adapted to be forced and held apart when the valve is closed, whereby each disk effects an independent closure for said port, a rod for operating said valve, and means for raising and lowering said rod.

2. In a hydrant, the combination with a shoe, having a port in its upper side for discharging water into a barrel mounted above and concentric to said port, of a valve seat-ring bushing in the said port, means for holding said seat-ring in place, a valve in said shoe concentric to said seat-ring, said valve comprising flexible disk laminæ of different diameters adapted to engage the seat in said ring successively and to flex or bend downwardly for providing a space between said disks when the valve is closed, said disks adapted to be disengaged from said seat in the reverse order during the opening of the valve, as for the purpose set forth.

3. In a hydrant, a shoe having a water inlet opening in one end and a water discharge opening in its top, a seat-ring bushing in the said discharge opening, a drain for carrying off the waste water from the hydrant, a valve in said shoe disposed concentric to said seat-ring, said valve comprising a series of flexible disks of different diameters adapted to engage the seat-ring at different intervals of time during the closing of the valve, said disks adapted when being disengaged from the seat-ring to prolong the opening movement of the valve for preventing the water from the shoe from entering the said drain, and means for opening and closing said valve.

4. In a hydrant, the combination with a shoe, a barrel mounted upon said shoe, and a hood mounted upon said barrel, of a valve-rod disposed concentrically in the said hood and said barrel and extending part-way into said shoe, a stem-nut for operating said valve-rod, said stem-nut journaled in a transverse wall in said hood and engaging the upper end of said rod, a valve-seat in the top of said shoe, and a valve in said shoe, said valve mounted on the lower end of said rod and adapted for controlling the passage of water from the shoe into said barrel, said valve comprising flexible disk laminæ adapted when engaging said seat to flex and clean said seat.

5. A hydrant, comprising a shoe having a water discharge opening in its top, a removable seat-ring disposed in said opening, a laminated disk valve in said shoe below the seat-ring, the disks of the said valve increasing in diameter from the uppermost to the lowermost disk, each of said disks from the lowermost to the uppermost adapted to engage the said seat-ring at different points and at different intervals of time, guides mounted above the valve for steadying and guiding the valve, said guides being perforated, drain openings in said seat-ring arranged to coincide with the perforations in the guides adapted for drawing off the waste water from the hydrant after each closing of the valve, and a packing surrounding each drain opening and engaging the said guides for preventing the water from entering said drains while the valve is open.

6. In a hydrant, the combination with a shoe having a port in its upper side for discharging water into a barrel mounted above and arranged concentric to the said port, of a valve seat-ring bushing in the said port, a packing surrounding said seat-ring, means for interlocking said packing with said seat-ring for rendering said packing movable with said ring, a valve in said shoe concentric to said seat-ring, said valve comprising a series of flexible concavo-convex disks arranged to flex and scrape the valve seat during the closing and opening movements of the valve, guides for said valve, said guides adapted to travel in said seat-ring, a drain for drawing off waste water from the barrel, said drain comprising coinciding ducts formed in the seat-ring and in said guides, means for preventing the stream of water

coming from the shoe from entering the said drain, and means for operating said valve.

7. In a hydrant, a shoe having an inlet opening in one end, and a discharge opening in its top, the said discharge opening surrounded by an upwardly facing bevel portion, a seat-ring bushing in the said discharge opening, said seat-ring having an external flange of greater diameter than said discharge opening, said flange facing said bevel portion, a packing for sealing the joint between said flange and said bevel portion, said packing capable of being compressed and interlocked with said seat-ring so that the said parts may be withdrawn from the hydrant as one part, a drain for carrying off the waste water from the hydrant, a valve in said shoe disposed concentric to said seat-ring, said valve comprising a series of flexible disks of different diameters adapted to engage the seat-ring at different intervals of time during the closing of the valve, said disks adapted to be disengaged from the seat-ring in the reverse order, and capable of preventing the water from said shoe from entering the said drain during the initial opening movement of the valve, and means for opening and closing said valve.

8. In a hydrant, the combination with a bonnet, the barrel and the shoe, connected as one part, of a valve seat disposed in the top of the shoe, said seat comprising an annular ring having a flange provided with acme-thread grooves to retain a packing which coöperates with said ring for sealing the joint between the seat-ring and the shoe, a hold-down ring threaded into the top portion of the shoe and bearing upon the flange of the seat-ring, adapted to force the seat-ring downwardly for effecting the interlocking of the packing with said ring, a valve disposed in the shoe, said valve comprising disk laminæ of flexible metal adapted to permit or prevent the passage of water from the shoe into the barrel, and a rod for operating said valve, said rod extending downwardly through the barrel and the bonnet.

9. In a hydrant, a shoe having a water discharge opening in its top, an annular seat-ring bushing in said opening, a hold-down ring for securing said seat-ring in place, a valve in said shoe, said valve comprising a series of disks of different diameter adapted to engage the said ring at different intervals of time and to flex or bend for spreading the peripheral edges of said disks apart, whereby each disk effects an independent closure and sealing of said opening, and a rod for raising and lowering said valve.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES G. GAUNTT.

Witnesses:
WM. C. ANDERSON,
HARRY DE WALLACE.