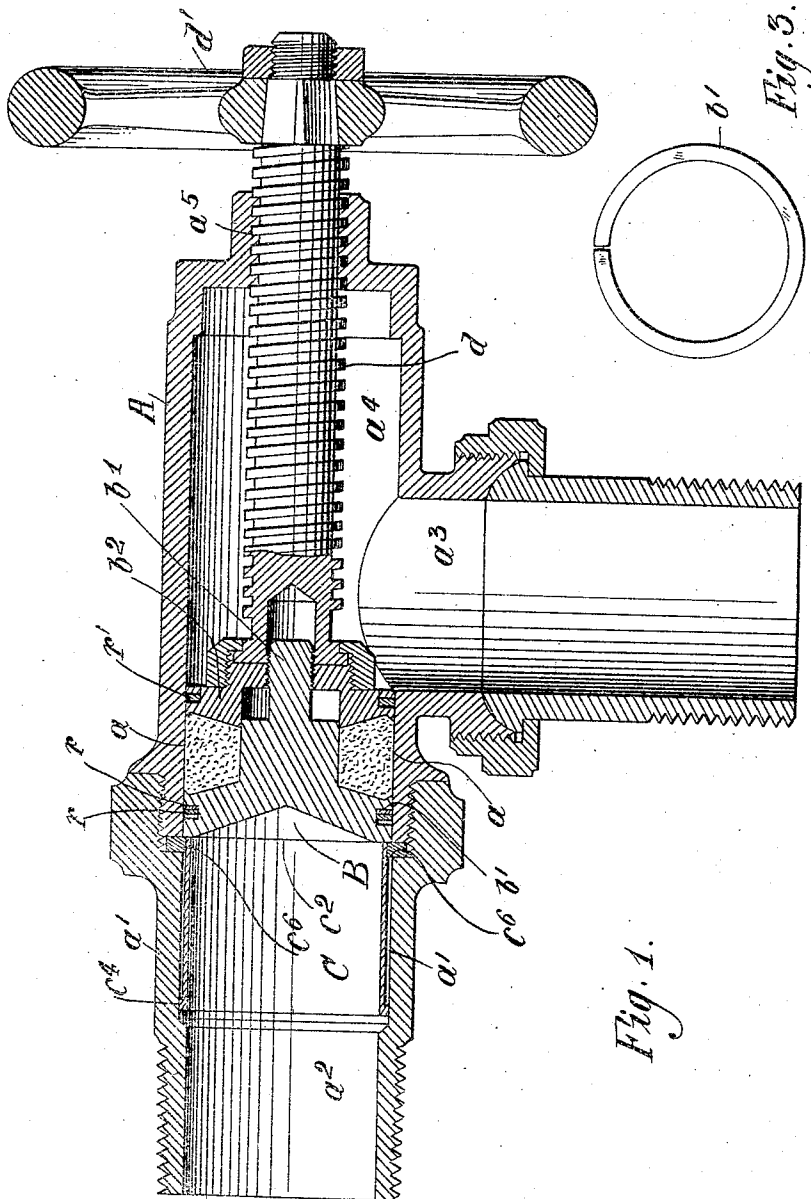


G. S. THOMPSON.
FLUID PRESSURE VALVE.
APPLICATION FILED SEPT. 29, 1914.

1,304,409.

Patented May 20, 1919.
2 SHEETS—SHEET 1.



WITNESSES:
Fred. Rogers
Dorothy Matt

INVENTOR.
George S. Thompson
BY
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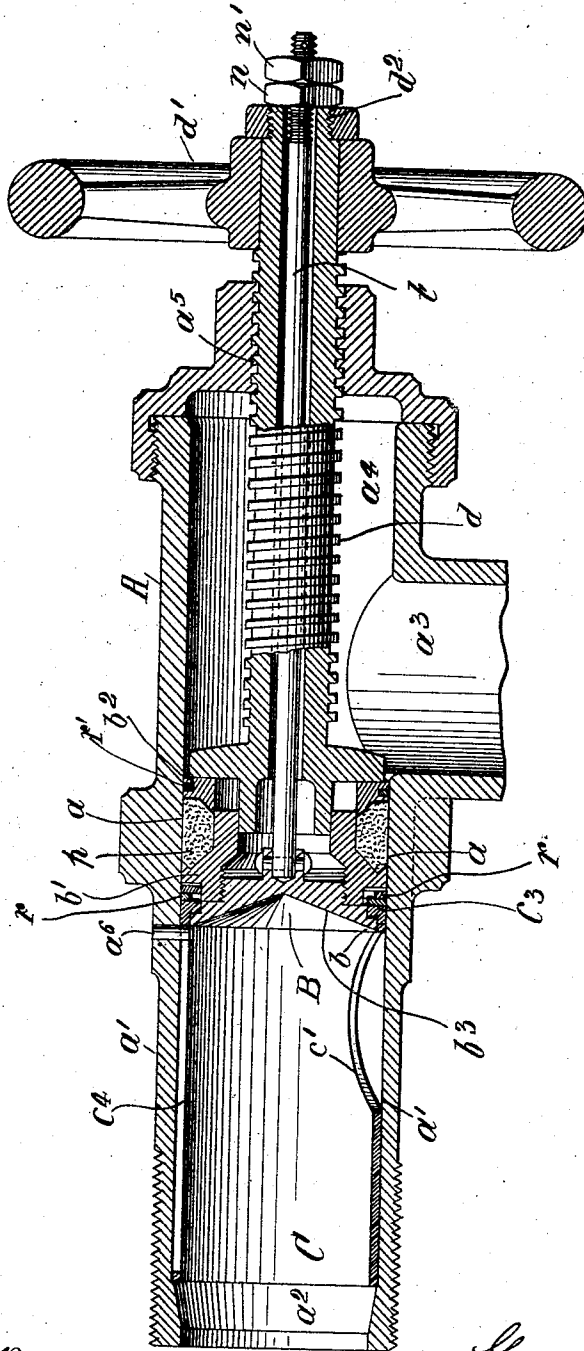


Fig. 2.

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GEORGE S. THOMPSON, OF HOCKESSIN, DELAWARE.

FLUID-PRESSURE VALVE.

1,304,409.

Specification of Letters Patent.

Patented May 20, 1919.

Application filed September 29, 1914. Serial No. 864,037.

To all whom it may concern:

Be it known that I, GEORGE S. THOMPSON, a citizen of the United States, and a resident of Hockessin, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Fluid-Pressure Valves, of which the following is a specification.

My improvements relate to valves for controlling liquid and fluid mediums under pressure generally, and are particularly adapted for use in connection with discharge or "blow-off" valves in which the valve seats are exposed to the cutting action of steam or other gaseous fluids under pressure, or to the attritive or corrosive action of liquids under pressure containing sedimentary or other foreign matter the pressure of which is calculated to wear down or disintegrate the seat if contacting therewith.

The objects of my present invention are mainly to insure the tight and effective packing of the valve against its incasing seat and the exclusion of solid or extraneous matter held in suspension in the fluid from contact with the principal or fluid packing, and also to cover and thereby protect the seat, when the valve is open in whole or in part, against erosive action, as hereinafter more fully set forth.

My invention also includes certain special features in the construction and arrangement of parts whereby these results are attained, and whereby the primary or fluid-excluding-packing (called hereinafter for convenience the "fluid packing") is tightened by compression.

In the accompanying drawings,
Figure 1, represents a central sectional elevation of valve for fluids constructed in accordance with my invention;

Fig. 2, a similar view showing a modification thereof;

Fig. 3, a side view of one of the split packing rings.

In Figs. 1, and 2, A, represents the main portion of the casing in which is formed the cylindrical seat a , for the valve B. a' is an extension of this valve seat a , on which extension a' , is supported normally a movable valve seat protector or cylindrical seat lining C, adapted to follow the valve B, as the latter is retracted to open communi-

cation between the ports a^2 , a^3 , and to recede before said valve B, as it is reseated to close communication between said ports a^2 , a^3 .

In Fig. 1, this traveling seat lining C, is shown as independent of or unattached to the valve B, whereas in Fig. 2, it is connected with said valve B, the result being substantially the same in either case in that the traveling seat lining C, covers the valve seat a , as the valve B, is retracted to open communication between the ports,—the only difference being that in the modification shown in Fig. 2, the valve B, has to be fully retracted before the whole seat a , is covered, owing to the necessity for a lateral port opening c' , in the movable lining C, when the latter is coupled to the valve B, while in the case of the unattached lining C, shown in Fig. 1, no lateral port opening is necessary, a perfect cylinder being employed for the purpose of the temporary seat lining which is held normally against the valve B, by the fluid pressure exerted through the port a^2 , of the casing.

In other words in this latter case the lining sleeve C, does not follow the valve B, across the port a^3 , but stops when the actual seat a , is covered, and the discharge is through the end c^2 , of said lining C, or rather between said open end c^2 , and the retracted end face of the valve B,—the maximum capacity for discharge being attained when the said valve is fully retracted into the recess a^4 , formed for its reception in the casing A, said retraction being effected by means of the manipulating screw d , actuated by a handle d' , or by other well known mechanical expedient, it being understood of course that the screw d , engages with a female screw a^5 , formed in a part of the casing, considered as a whole.

In Fig. 2, the lining sleeve C, is coupled to the valve B, by the interlocking of the annular shoulder c^3 , on said sleeve with the annular shoulder b , on the valve B, or by any other means that will admit of the turning of the valve B, independent of the lining sleeve C, which latter is held against rotation by the engagement of the inner end of the pin or stud a^6 , with the sides of the longitudinal slot c^4 , formed for its reception in the lining sleeve C. As a result the port opening c' , in said lining sleeve C, is maintained in alinement with the discharge

port a^3 , and will always be brought into coincidence therewith when the piston valve B, is fully retracted into the space a^4 .

The piston valve B, is formed with two interlocking members b' , b^2 , the opposed faces of which fit and are slidable one within the other; and between these opposed surfaces is arranged the main or fluid packing p , of suitable compressible material. The surfaces between which the fluid packing p , is confined are preferably convergent toward the central axis as shown, so that when the members b' , b^2 , are forced toward each other the said fluid packing p , will be compressed and squeezed outward to contact firmly and intimately with and against the valve seat a .

This adjustment of one piston member b' , upon the other b^2 , may be effected by resort to various mechanical expedients, and I do not restrict myself in this particular, one method being shown in Fig. 2, of the drawings, in which the screw d , is made hollow to accommodate the tightening rod t , which is coupled at its inner end to the front member b^2 , of the piston P, and threaded at its outer extremity for engagement with the jaw nuts n , n' , which bear against the outer end d^2 , of the screw shank. The front member b^2 , being attached to the piston member b' , it is obvious that by means of said nuts the fluid packing p , may be made to exert sufficient pressure against the valve seat a , to insure the exclusion and prevent the passage of a liquid or fluid of any kind, even when the latter is subjected to a very high degree of pressure.

In order to protect the liquid seal, thus effected by the fluid packing p , as hereinbefore set forth, against deterioration or impairment by contact with solid gritty matter of any kind that might be carried by the fluid under pressure acting as a vehicle therefor, I position split packing rings r , r' , in the piston in front of said fluid-packing p , and also preferably behind the same as at r' , Figs. 1, and 2. These split elastic resilient steel packing rings, which are of well known form and construction, fit in suitable grooves or recesses formed for their reception in the periphery of the piston valve, and by exerting a constant tension or pressure outward against the valve seat effectually exclude extraneous matter from between the seat and the liquid seal p , thereby obviating the cutting of the valve seat and insuring the long life and efficiency of said fluid seal p .

In the construction of temporary seat lining sleeve C, shown in Fig. 1, the sleeve is formed with an annular external shoulder c^4 . As the piston valve is retracted to open the port a^3 , the fluid pressure through port a^2 , causes the sleeve to follow the piston B, until this shoulder contacts with the annular stop shoulder c^6 , which protrudes slightly

inward beyond the surface of the valve seat a , of the casing, and this stop c^6 , is so positioned as to hold and retain the protective lining sleeve C, as soon as the latter has covered the said seat a ,—which is just before the valve piston begins to open communication between the inlet port a^2 , and the discharge port a^3 . As a result the attrition and wear to which the valve seat would otherwise be subjected by reason of the presence of solid foreign matter in the escaping fluid under pressure, is transferred from said seat to the protecting sleeve lining or shield C, leaving the valve seat unimpaired and true, and hence maintaining and insuring a fluid-tight valve seal in perpetuity, because the protective lining sleeve can readily be removed and replaced by a new one whenever necessary or desirable with very little trouble or expense. Hence the life and efficiency of the valve may be prolonged indefinitely, whereas ordinarily the valve as a whole has to be discarded as soon as the valve seat becomes impaired.

It will be noted that the inner bore of the casing is cylindrical, and that the longitudinal extensions a' , and a^4 , of the valve seat a , are in alinement therewith and form continuations thereof. Also that the discharge port is at right angles to the said seat a , and extensions a' , a^4 .

What I claim as my invention and desire to secure by Letters Patent is,

1. A valve of the character designated, comprising a casing formed with a cylindrical valve seat and a longitudinal extension thereof, with a readily removable protective lining sleeve for said seat normally positioned in said extension, a piston valve, said lining being adapted to follow said valve as the latter is retracted and to recede before said valve as the latter is re-seated and to cover the valve seat when the valve is retracted to open communication between the ports.

2. A valve of the character designated, comprising a cylindrical valve seat, a cylindrical valve piston for contacting therewith formed of interlocking members one slidable within the other and with a peripheral fluid-packing of suitable compressible material, and with a split ring packing in front of said fluid packing adapted to protect the latter from contact with solid matter suspended in a fluid vehicle, means for advancing and retracting said valve piston, a protective lining sleeve normally held against the valve by fluid pressure and means for limiting the movement of said lining just prior to the opening of communication between the inlet port and the discharge port for the purpose described.

3. A valve of the character designated, comprising a cylindrical valve seat, a cylindrical valve piston for contacting therewith,

formed of interlocking members one slidable within the other and with a central peripheral fluid-packing of suitable compressible material, means for compressing the latter, 5 split ring packings on either side of said central fluid packing, means for advancing and retracting said valve piston, a protective lining sleeve normally held against the valve by fluid pressure and means for limiting the movement of said lining just prior 10 to the opening of communication between the inlet port and the discharge port for the purpose described.

4. A valve of the character designated, 15 comprising a cylindrical valve seat, a valve piston formed with two interlocking members slidable one within the other and having opposed inclined surfaces which converge centrally to form a seat for a compressible packing, a protective lining sleeve normally held against the valve by fluid pressure, means for limiting the movement of 20 said lining just prior to the opening of communication between the inlet port and the discharge port, a fluid compressible packing, and means for forcing said interlocking members toward each other to compress the fluid-packing, for the purpose described.

5. A valve of the character designated, 30 comprising a cylindrical valve seat having

a longitudinal extension, a cylindrical seat lining movable in said extension and supported thereby, a valve reciprocable over said seat, said lining being automatically movable with said valve as the latter is advanced and retracted, said lining being normally held against the valve by fluid pressure, and means for limiting the movement of said lining at a predetermined point just prior to the opening of communication between the inlet port and the discharge port. 35 40

6. A valve of the character designated, comprising a cylindrical valve seat having a longitudinal extension, a cylindrical seat lining movable in said extension and supported thereby, a valve reciprocable over said seat, said lining being automatically movable with said valve as the latter is advanced and retracted, said lining being normally held against the valve by fluid pressure, means for limiting the movement of said lining at a predetermined point just prior to the opening of communication between the inlet port and the discharge port, and a liquid seal for said valve. 45 50

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."