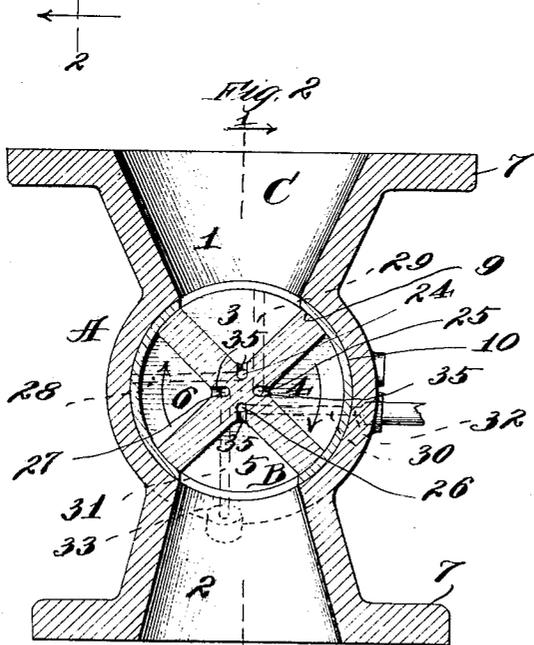
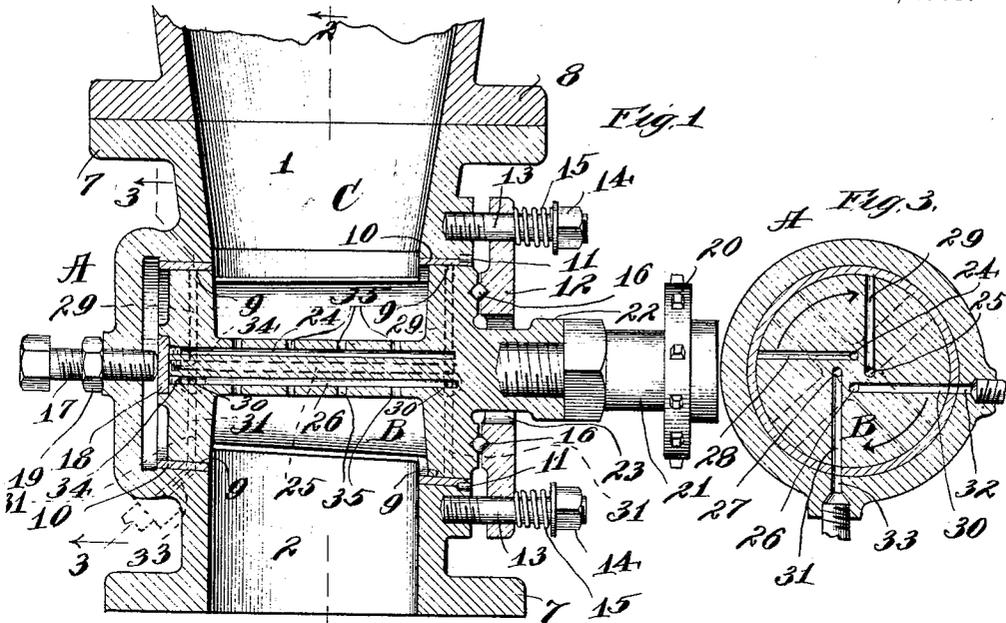


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 ROTARY DISCHARGE VALVE.  
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Patented Nov. 23, 1909.



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# UNITED STATES PATENT OFFICE.

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## ROTARY DISCHARGE-VALVE.

941,024.

Specification of Letters Patent. Patented Nov. 23, 1909.

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*To all whom it may concern:*

Be it known that I, OTTO MANTIUS, a subject of the Emperor of Germany, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Discharge-Valves, of which the following is a specification.

This invention relates to rotary discharge valves of the type comprising a suitable casing provided with a passageway which is controlled by a valve plug rotatably mounted in a suitable seat or bearing formed in said valve casing which extends transversely to the passageway through said valve casing, said valve plug being provided with pockets in its perimeter, adapted to be brought alternately into communication with the sections of the passageway through the valve casing on opposite sides of said valve plug, by rotation thereof.

Rotary discharge valves of the general type to which my invention relates admit of a wide range of application. Of its various uses the following may be specified, for purposes of illustration: discharging salt from vacuum pans; in pneumatic conveyers, as see particularly U. S. Letters Patent No. 588,518, dated August 17, 1897; and in measuring apparatus of various kinds.

Among the objects of the invention are to provide for "taking up" wear in the valve plug bearing, in order to adjust the fit of said plug to its bearing; and to prevent the valve plug from binding in its seat or bearing.

Further objects of the invention are to provide means for exhausting air from the pockets in said valve plug before they come into communication with the admission section of the passageway through the valve casing, in order that the material to be discharged may enter said pockets freely; and to provide means for discharging jets or fluid under pressure, as compressed air or steam, into said pockets, preferably at or adjacent to the bottoms thereof, when said pockets are in communication with the discharge section of said passageway to said valve casing, in order to break the adhesion between the contents of said pockets and the sides thereof, thereby dislodging the entire contents of said pockets and permitting the same to fall by gravity, thus in-

surging maximum efficiency in the operation of the valve.

To effect these objects, my improved discharge valve comprises the various features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated—Figure 1 is a sectional view of my improved discharge valve on the line 1—1 of Fig. 2, the positions of the compression fluid connections being indicated in dotted lines. Fig. 2 is a sectional view thereof on the line 2—2 of Fig. 1; and Fig. 3 is a sectional view on the line 3—3 of Fig. 1, the pockets and passageways in the valve plug being indicated in dotted lines.

Referring now to the drawings, A and B designate, respectively, the casing and rotatable plug of my improved valve, said valve casing A being provided with a longitudinal passageway C and the valve plug B being mounted in a suitable seat or bearing in said valve casing extending transversely to said passageway in position to close the same. As shown, said valve plug B divides said passageway C into an upper admission section 1 and a lower discharge section 2.

Formed in the perimeter of the valve plug B are open sided pockets 3, 4, 5 and 6, which are adapted to be brought alternately into communication with the admission and discharge sections 1 and 2 of the passageway C by rotation of the valve plug B.

At its ends the valve casing A is provided with flanges 7, adapted for connecting the same to a pipe or conduit or to the discharge opening of any desired receptacle, indicated at 8, Fig. 1.

As regards the foregoing features, my improved valve is old and well known in the art and will be readily understood from an inspection of the drawings without a further detailed description thereof.

To provide for taking up wear in the bearing 9 of the valve plug B, said valve plug B and its seat or bearing are correspondingly tapered. The fit of said plug to its seat or bearing can therefore be adjusted by adjusting said valve axially. To increase the life of the valve plug bearing, and to provide for renewing the same, the valve seat or bearing is preferably formed directly in the bushing 10, preferably made

of phosphor-bronze or the like, said bushing being secured against rotation by means of pins 11. The bushing 10 is provided with holes or openings which register with the admission and discharge sections 1 and 2 of the passageway C. As said bushing forms, in effect, a unitary structure with the valve casing, the holes or openings therein will be considered as forming parts of the admission and discharge sections 1 and 2 of the passageway through said casing.

The valve plug B is maintained yieldingly in engagement with its seat or bearing by means of a plate 12, supported on the valve casing A and which bears against the large end of said valve plug. As shown, the plate 12 is mounted on the valve casing by means of stud bolts 13 which extend through suitable holes or openings in said plate 12. Threaded to said stud bolts outside of said plate 12 are nuts 14 between which and the outer side of said plate are inserted coiled springs 15. With this construction it is obvious that the valve plug B will be held yieldingly in engagement with its seat or bearing with a pressure which may be adjusted by setting up or loosening the nuts 14. In order to reduce the friction between the valve plug B and plate 12, an antifric-tion ball bearing 16 is preferably provided between the opposed surfaces thereof.

To prevent the valve plug B from binding in its bearing, due to the pressure of the plate 12, a thrust bearing is preferably provided at the opposite end of said valve, consisting, as shown, of a bolt 17 threaded through a rigid portion of the valve casing, preferably in axial alinement with the valve plug B, the inner end of which is adapted to bear against the end of said valve plug B. In order to reduce wear and friction, the screw 17 preferably bears directly against a hardened steel disk 18 fitted to turn freely in a suitable recess formed in the end of said valve plug. The screw 17 is adapted to be secured in any desired adjustment by means of a lock nut 19. Said thrust screw 17 also provides convenient means for adjusting the valve plug B in its bearing to provide for taking up wear and for maintaining a desirably close fit.

Rotation is adapted to be imparted to the valve plug B from any suitable source of power, not shown, by means of a chain belt or the like, not shown, applied to a sprocket wheel 20 secured to rotate with said valve plug. As shown, said sprocket wheel 20 is keyed or otherwise secured to rotate with a stud 21 threaded into the end of a hub 22 formed on the large end of the valve plug B, both said stud and hub being in axial alinement with said valve plug and a hole or opening 23 being formed in the plate 12 through which the hub 22 projects.

To provide for exhausting the air from

the pockets 3, 4, 5 and 6 in the valve plug B, before they come into communication with the admission section 1 of the passageway C, and for discharging jets of fluid under pressure into said pockets when in communication with the discharge section 2 of said passageway, passageways equal in number to the pockets in the valve plug, are formed in said valve plug, said passageways comprising, respectively, sections 24, 25, 26 and 27, which extend lengthwise of said valve plug preferably directly beneath the bottoms of said pockets and lateral sections 28, 29, 30 and 31, formed in the solid end portions of said valve plug adapted to be brought into register with ports 32 and 33 formed in the valve casing A and adapted for connection, respectively, with a suitable source of supply of fluid, under pressure, as steam or compressed air, and with a vacuum pump or the like, not shown, the relation being such that said passageways will come into register with the port 33 between the times said pockets pass out of communication from the discharge section 2 of the passageway C and before they come into communication with the admission section 1 of said passageway, in which position the open sides thereof are closed by the side of the valve casing forming the seat or bearing for the valve plug B, that is, when said pockets are substantially in the position of the pocket 6, Fig. 2, and the relation being such, also, that said passageways will come into register with the port 32 when said pockets are in communication with the discharge section 2 of the passageway C, that is, when substantially in the position of the pocket 5, Fig. 2.

In the drawings, I have shown duplicate sets of lateral passages 28, 29, 30 and 31, located and communicating with the longitudinal passages 24, 25, 26 and 27 at opposite ends of the valve plug B and have also shown duplicate ports 32 one adapted for connection with a source of steam supply and the other with a source of supply of compressed air, whereby either steam or compressed air may be used for dislodging the contents of the pockets 3, 4, 5 and 6 of the valve plug B, as may be desired.

The lateral passages 28, 29, 30 and 31 open through the sides of the valve plug B and, except when in communication with the ports 32 and 33, are closed by the walls of the valve casing A forming the seat or bearing for the valve plug B.

As shown, the longitudinal passageways 24, 25, 26 and 27 are drilled from the small end of the valve plug, their outer ends being afterward closed by means of plugs 34. Said longitudinal passageways 24, 25, 26 and 27 communicate with the pockets 3, 4, 5 and 6 preferably closely adjacent to their bottoms, by means of holes or openings 35.

With the arrangement and relation of passages shown, the valve plug B is designed to rotate in the direction indicated by the arrows in Figs. 2 and 3.

5 I claim:

1. In a valve, the combination of a valve casing provided with a passageway extending through the same and with a valve seat, said passageway comprising separate sections on opposite sides of said valve seat, a rotary valve member mounted in said valve seat provided with an opening or openings adapted to be brought into register with different sections of the passageway through said valve casing by rotation of said rotary valve member, said valve being provided with a passageway or passageways, comprising a section or sections formed in the valve casing, adapted to be connected with a source of supply of fluid under pressure and adapted to be brought into communication with the opening or openings in said rotary valve member by rotation thereof.

2. In a valve, the combination of a valve casing provided with a passageway extending through the same and with a valve seat, said passageway comprising separate sections on opposite sides of said valve seat, a rotary valve member mounted in said valve seat provided with an opening or openings adapted to be brought into register with different sections of the passageway through said valve casing by rotation of said rotary valve member, said valve being provided with a passageway or passageways, comprising a section or sections formed in the valve casing, adapted to be connected with vacuum producing means and adapted to be brought into communication with the opening or openings in said rotary valve member by rotation thereof.

3. In a valve, the combination of a valve casing provided with a passageway extending through the same and with a valve seat, said passageway comprising separate sections on opposite sides of said valve seat, a rotary valve member mounted in said valve seat provided with an opening or openings adapted to be brought into register with different sections of the passageway through said valve casing by rotation of said rotary valve member, said valve being provided with passageways, comprising sections formed in the valve casing, adapted to be connected, respectively, with a source of supply of fluid under pressure and with vacuum producing means and adapted to be brought into communication with the opening or openings in said rotary valve member by rotation thereof.

4. In a rotary discharge valve of the type

described, the combination of a valve casing provided with a passageway and with a valve seat, a valve plug provided with pockets in its perimeter rotatably mounted in said valve seat, and means for securing said valve plug in said valve seat, said valve plug being provided with passageways which communicate with the pockets therein adapted to be brought into communication with a port or ports adapted for connection with a source of supply of fluid under pressure by rotation of said valve plug.

5. In a rotary discharge valve of the type described, the combination of a valve casing provided with a passageway and with a valve seat, a valve plug provided with pockets in its perimeter rotatably mounted in said valve seat, and means for securing said valve plug in said valve seat, said valve plug being provided with passageways which communicate with the pockets therein adapted to be brought into communication with a port adapted for connection with vacuum producing means.

6. In a rotary discharge valve of the type described, the combination of a valve casing provided with a passageway and with a valve seat, a valve plug provided with pockets in its perimeter rotatably mounted in said valve seat, and means for securing said valve plug in said valve seat, said valve plug being provided with passageways which communicate with the pockets therein adapted to be brought into communication with ports adapted for connection, respectively, with a source of supply of fluid under pressure and with vacuum producing means.

7. In a rotary discharge valve of the type described, the combination of a valve casing provided with a passageway and with a valve seat, a valve plug provided with pockets in its perimeter rotatably mounted in said valve seat, and means for securing said valve plug in said valve seat, said valve plug being provided with passageways which communicate with the pockets therein, adapted to be brought into communication with a port or ports formed in the valve casing, the outer ends of said passageways opening through the side of said valve plug and being normally closed by the walls of the valve casing forming the valve seat.

In testimony, that I claim the foregoing as my invention, I affix my signature in presence of two subscribing witnesses, this 29th day of February, A. D. 1908.

OTTO MANTIUS.

Witnesses:

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