W. WAFER.

WASH-OUT PLUG OR VALVE.

APPLICATION FILED APR. 13, 1911.

1,008,093.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 1.

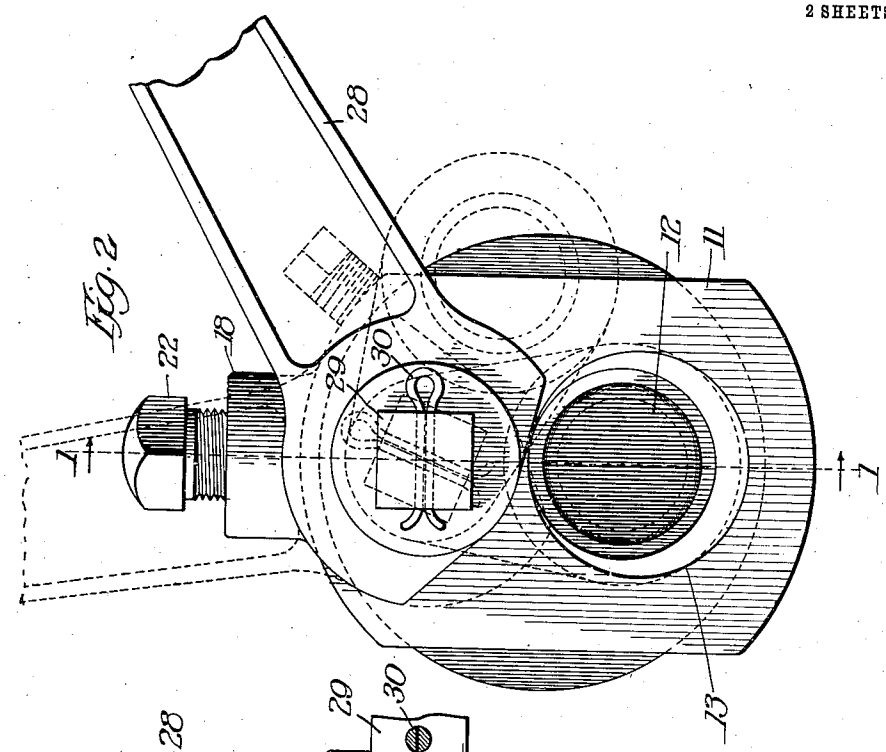

Fig. 2.

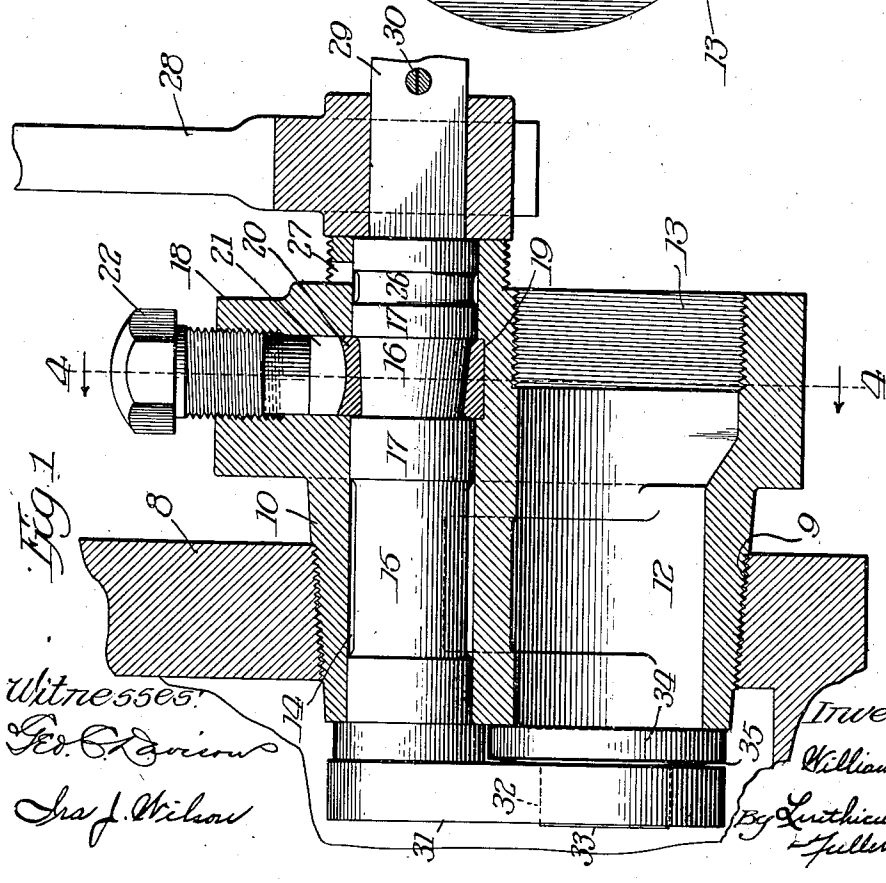

Fig. 1.

Witnesses:
Geo. C. Corion
Ira J. Wilson

Inventor:
William Wafer
By Lothrop Bell
Fuller Attys.

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2 SHEETS—SHEET 2.

Fig. 3

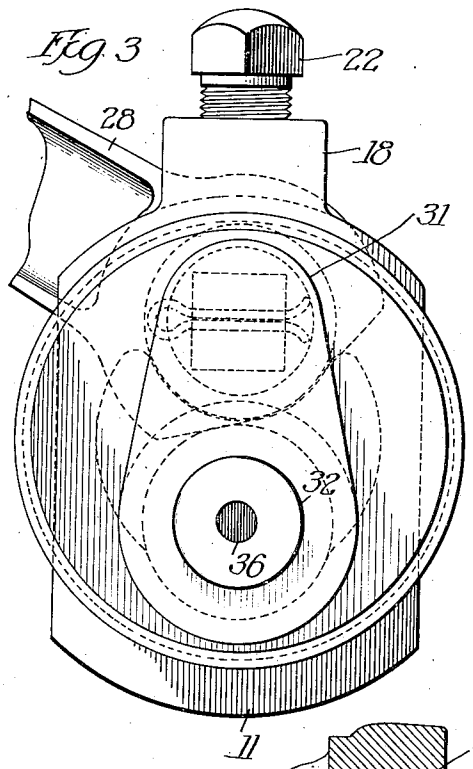


Fig. 4

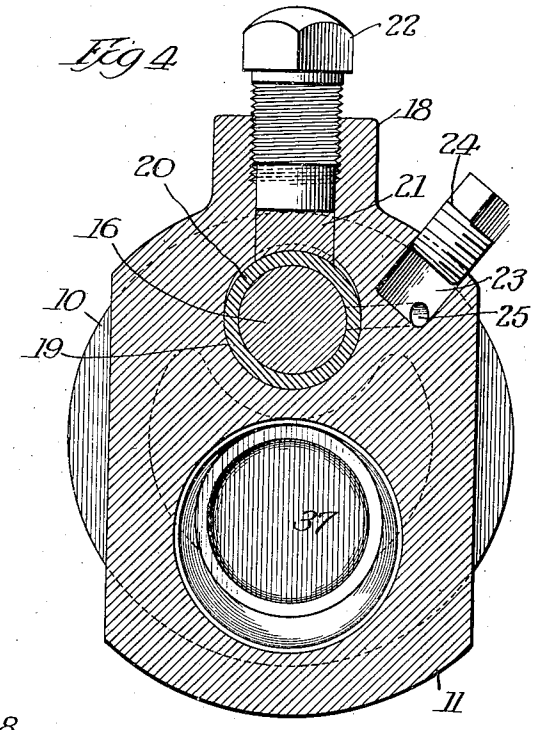
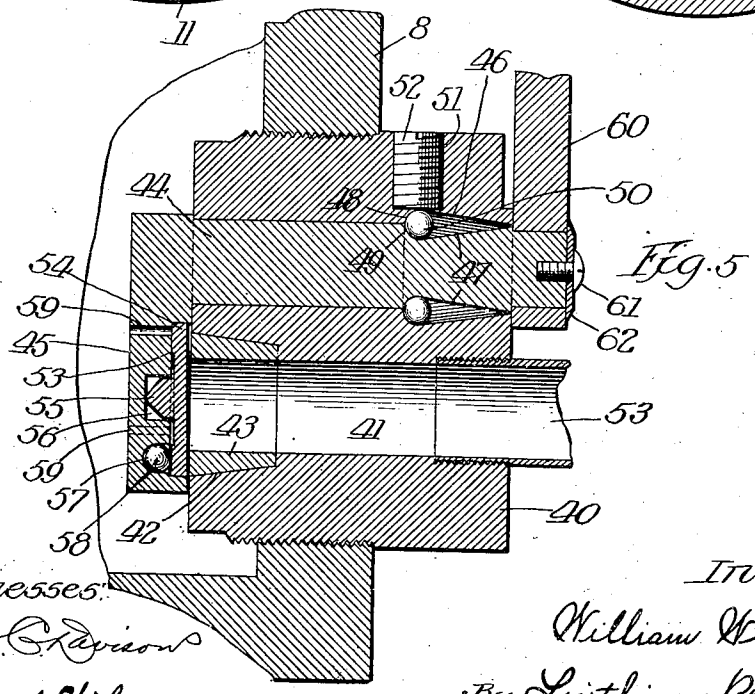


Fig. 5



Witnesses:

Geo. E. Davison

Ira J. Wilson

Inventor

William Wafer

By Smithcuse Belt & Fuller

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM WAFER, OF CHICAGO, ILLINOIS.

WASH-OUT PLUG OR VALVE.

1,008,093. Specification of Letters Patent. Patented Nov. 7, 1911.

Application filed April 13, 1911. Serial No. 620,879.

To all whom it may concern:

Be it known that I, WILLIAM WAFER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wash-Out Plugs or Valves, of which the following is a specification.

This invention relates to improvements in wash-out valves, capable of employment in connection with boilers in general, but particularly adapted for use on locomotive or other boilers designed for outdoor use.

Heretofore valves of this character have included a casing containing the movable valve member, and experience has shown that sludge and the like will accumulate within the casing and around the valve and thereby prevent movement thereof. Moreover as the valve casing is located exteriorly of the setting of the stationary steam boiler and also exteriorly of the locomotive boiler, the water which accumulates in the casing will freeze and thereby prevent operation of the valve.

It is the purpose of the present invention to obviate the difficulties enumerated and in carrying out this object it is proposed to arrange the movable valve member within the water space of a steam boiler, whereby there will be no opportunity for sludge and the like to accumulate in the valve and prevent movement thereof. Moreover by being inclosed within the water space of the boiler there is no possibility of the valve becoming frozen.

The movable valve member, of the present invention, and the means for actuating the same are carried by a plug which latter is adapted to fit in an opening in the outer wall of a water space of a steam boiler, the valve element being carried exteriorly of the plug and working across the inner end, from which it will be understood that the movable valve element is within the water space of the boiler.

Still another object is to provide a valve which can be readily taken apart to permit the valve disk and the seat to be ground whenever this operation becomes necessary, and to so construct and arrange the parts that the valve disk will be held tightly against its seat by the pressure within the boiler to which the valve is attached thereby obviating leakage.

Still another object is to provide novel packing means for the valve stem whereby the same will be held against longitudinal movement in its bearings and whereby leakage around the valve stem will be prevented.

Other objects and advantages of my invention will be apparent from the following description when taken in connection with the accompanying drawings illustrating preferred embodiments thereof.

Referring to the drawings—Figure 1 is a longitudinal sectional view of a valve embodying one form of my invention shown as attached to a boiler, this view being taken on line 1—1 of Fig. 2. Fig. 2 is an elevation looking at the outer end of the valve shown in Fig. 1. Fig. 3 is an elevation looking at the inner end of the valve shown in Fig. 1. Fig. 4 is a sectional elevation taken on the line 4—4 in Fig. 1; and Fig. 5 is a sectional view of another form of my invention.

On the drawings reference numeral 8 designates the outer sheet of a boiler forming the outer wall of a water leg disposed adjacent the fire-box. The sheet 8 is provided with a tapped opening 9 near its bottom to receive the valve plug 10 provided with suitable circumferential threads to engage in the threaded opening 9 whereby the plug is attached to the boiler. The plug is substantially cylindrical in shape and is provided on its outer end with a head 11 to which a wrench may be applied for turning the plug when it is desired to connect or disconnect the same with the boiler.

The casing is provided with a longitudinal eccentrically located bore 12 extending entirely through the casing from end to end and affording an uninterrupted passageway through which the water and sludge may be discharged from the boiler. The outer end of the bore is preferably enlarged as shown in Fig. 1, so that any liquid contained in the discharge passageway when the valve is closed will immediately be discharged at the outer end of the passageway thereby eliminating the possibility of breakage of the valve or casing by freezing of liquid in the discharge passageway. This enlarged portion may be threaded as indicated at 13, for connecting with a discharge pipe, if preferred, and also to enable the plug to be readily mounted in a lathe for grinding down the inner end thereof which forms the valve seat. A valve stem bore 14 is formed in the plug parallel with the discharge pas-

sageway to receive a rotatable valve stem 15 extending through the plug. The stem is provided with a tapered portion 16 near its outer end and with shoulders 17 on either side of said tapered portion, and the plug is provided with a hollow stud 18 which communicates with an annular groove 19 surrounding said tapered portion of the valve stem. Metallic packing 20 is introduced into the hollow stud 18 and forced into the groove 19 around the tapered portion of the stem by a plunger 21 which is forced downwardly against the packing by a screw 22 threaded into the open end of the stud. By this construction the metallic packing is caused to fit tightly around the stem between the shoulders 17 to prevent longitudinal movement of the stem and also to insure against leakage around the stem. An oil cup 23 is formed on one side of the casing near the forward end which is normally closed by a screw-stopper 24 and this oil cup communicates through a passage 25 with the valve stem bore inside the inner shoulder 17 so that sufficient lubricant can be applied to the stem to prevent its rusting or sticking. A groove 26 is formed on the stem outside the outer shoulder 17 and an oil opening 27 communicates therewith through which the outer end of the stem is lubricated. An operating lever 28 is fitted over the squared outer end 29 of the stem and is retained in position thereon by a cotter-pin 30.

An arm or valve member 31 preferably constructed integrally with the stem 15 projects radially from the inner end of said stem across the inner face of the plug and said arm is provided near its outer end with a recess or opening 32 in which is seated a stud 33 of a circular valve disk 34. This valve disk is loosely mounted thereon so as to be capable of rotary movement in the arm and also of slight tilting movement so that it will fit tightly against the inner face of the plug and effectually close the inner end of the discharge passageway. The rear face of the valve disk is slightly tapered as indicated at 35, so that the steam or water under pressure in the boiler may enter between the rear face of the disk and the valve member to assist in holding the disk against its seat. It will be evident that the pressure on the interior of the boiler will also be exerted upon the inner end of the stud 33; substantially the entire area of the rear face of the valve disk being thus subjected to pressure. A threaded socket 36 is preferably formed in the rear face of the stud 33 to enable the disk to be readily mounted in a lathe whenever it becomes necessary to grind its wearing face. To insure close fit of the valve disk and to reduce the frictional resistance to its opening and closing movements, the bearing face of the disk is preferably concaved or recessed as indicated at 37, Fig. 4; this depressed portion normally lying in alinement with the discharge passageway when the valve is in closed position.

When the valve is in closed position as indicated in full lines in Figs. 1 to 4, inclusive, the valve disk fits tightly over the inner end of the discharge passageway and prevents the escape of the boiler contents, but by moving the operating lever 28 to the position indicated in dotted lines in Fig. 2, the valve member or arm 31 is swung away from the discharge passageway transversely of the casing carrying with it the valve disk to open the passageway. It is well known that a quantity of sludge, mud and deposits always accumulate in the water legs of the boiler and this accumulation of solid matter has seriously interfered with the opening and closing of the sludge valves which have been used prior to my invention. This interference with the operation of the valves was particularly liable to occur where valves having disks which moved in a right line toward and from their seats were employed for the reason that solid matter would accumulate on the seat or on the face of the disk and prevent the disk from firmly seating. In my present invention the presence of solid material around or in the plug does not affect the seating of the disk for the reason that the disk moves transversely across its seat and is also capable of rotation in the arm 31 so that a shearing action takes place between the bearing edge of the disk and the edge of its seat which shears and displaces any solid matter which may be lodged therebetween. It will be evident that the valve may be opened in either direction.

In the form of my invention shown in Fig. 5, the plug 40 which is threaded into the boiler sheet 8, is provided with a discharge passageway 41 which has an inwardly tapered enlargement 42 to receive a correspondingly shaped bushing 43 which is preferably made of a different kind of material from the plug 40 and when seated in the enlargement 42 presents its outer end flush with the inner end of the plug, thus forming a valve seat. The inner end of the valve stem 44 is provided with a valve member 45 which is preferably formed integral with the stem. The bore in which the valve stem is mounted is inwardly enlarged from its outer end, as indicated at 46, and the stem within this tapered portion of the bore is tapered at 47. The inner ends of the tapered portions of the bore and stem terminate in shoulders 48 and 49, respectively. This construction of the bore and stem furnishes a space for the reception of packing balls 50 or shot which may be placed in said space through a screw-threaded opening 51 formed in the upper portion of the plug and normally closed by a screw plug 52. A pipe

section 53 may be threaded into the outer end of the discharge passageway and lead to any desired point of discharge.

The surface of the valve member 45 lying adjacent to the inner end of the plug 40 is provided with an annular seat or cavity 53 for the reception and operation of a valve disk 54 which is provided on one of its surfaces with a pointed stud 55 loosely fitted in a recess 56 formed in the inner surface of the valve member and centrally located with respect to the cavity or seat 53. The inner surface of the valve member is also provided with a cavity 57 for the reception and operation of a ball 58 against which the valve disk 54 will rest. A plurality of openings or passages 59 communicates with the cavity 53 to permit the pressure of the contents of the boiler to be exerted upon the rear face of the disk to maintain it against its seat. The ball 58 serves as a ball bearing to permit the disk to rotate during the opening and closing movements of the valve. The ball also serves to tilt the disk slightly, as shown in the figure, when pressure within the boiler is reduced, but as soon as the pressure is increased the disk will be forced tightly against the face of the bushing 43 and a cushion will be formed between the inner surface of the disk and the inner wall of the cavity 53. This relieves the frictional engagement between the disk and the valve member so that the disk will freely rotate on the ball 58 when the valve is opened and closed. The valve is operated in the present instance by a lever 60 secured by a screw 61 or washer 62 or otherwise, upon the outer end of the valve stem.

It will be evident from the foregoing that an unobstructed passageway is provided in the plug through which the boiler contents may be discharged and also that the valve disk and valve member are located inside of the boiler where there is no possibility of their freezing. The device is simple in construction, cheap to manufacture and efficient in its operation, and it is believed that its construction and many of its advantages will be apparent from the foregoing without further description, and it will be obvious that many mechanical changes in the size, shape, proportion and arrangement of the various parts may be resorted to without departing from the spirit or sacrificing any of the material advantages of the invention.

I claim:

1. A blow-out valve including a plug adapted to be fitted in a boiler shell and having an open-ended unobstructed blow-off passage extending therethrough from front to rear, and a valve carried by the plug and working at the exterior of the latter to open and close the passage, substantially as described.

2. A blow-out valve including a plug adapted to be fitted in a boiler shell having an open-ended unobstructed blow-off passage extending therethrough from front to rear, a valve for one end of the passage carried by the plug and working at the exterior of the latter, and valve actuating means accessible at the other end of the plug, substantially as described.

3. A blow-out valve including a plug adapted to be fitted in a boiler shell having an open-ended unobstructed blow-off passage extending therethrough from front to rear, and a valve carried by the plug exteriorly thereof and working transversely across the inlet end of the passage and exposed to the pressure of fluid seeking to enter the passage, substantially as described.

4. A blow-out valve including a plug adapted to be fitted in a boiler shell having an open-ended unobstructed blow-off passage extending therethrough from front to rear, a rotatable valve-stem mounted on the plug and projecting at the front and rear thereof, a crank arm carried by one projecting end of the stem exteriorly of the plug, a valve carried by the arm and working transversely across the inlet end of the passage exteriorly of the plug, and a crank handle carried by the other projecting end of the stem, substantially as described.

5. A blow-out valve including a plug adapted to be fitted in a boiler shell having an open-ended unobstructed blow-off passage extending therethrough from front to rear, a rotatable valve-stem mounted on the plug exteriorly of the passage and projecting at the front and rear of the plug, a crank arm carried by one projecting end of the stem exteriorly of the plug, a valve rotatably mounted upon the arm and working transversely across the inlet end of the passage exteriorly of the plug, and valve operating means associated with the other end of the valve-stem, substantially as described.

6. In a wash-out valve, the combination of a plug adapted to be fitted in a boiler shell, said plug having an open-ended unobstructed blow-off passageway therethrough and a valve stem bore disposed above said passageway, a valve stem rotatably mounted in said bore, an arm extending radially from said stem exteriorly of the plug across the inner end thereof, a valve disk carried by said arm in position to lie against the inner face thereof and over the inner end of said discharge passageway exteriorly of the plug, and means for rotating said stem to move the disk away from said discharge passageway in either direction.

7. In a wash-out valve, the combination of a plug adapted to be fitted in a boiler shell and having a continuous longitudinally extending open-ended unobstructed blow-off passageway and a valve stem bore disposed parallel to said passageway, a

valve stem rotatably mounted in said bore, an arm projecting radially from said stem across the inner end of said plug exteriorly thereof, a valve disk carried by said arm exteriorly of the plug to normally close the inner end of said passageway, and means connected to the valve stem outside said plug for rotating said stem in either direction to move the valve disk away from said discharge passageway.

8. In a wash-out valve, the combination of a plug substantially cylindrical in form threaded to be engaged in an opening in a boiler and provided with a longitudinally disposed unobstructed open-ended blow-off passageway and a longitudinally disposed valve stem bore, a valve stem rotatably mounted in said bore and projecting beyond the ends thereof, an arm projecting from the inner end of said stem transversely of the plug exteriorly thereof, a valve disk carried by said arm in position to normally close the inner end of said discharge passageway and disposed exteriorly of the plug, and an operating member secured to the outer end of said valve stem whereby the stem is rotated to move the valve disk away from said discharge passageway.

9. A wash-out valve consisting of a plug adapted to be fitted in a boiler shell and having an open-ended unobstructed blow-off passageway extending therethrough, a valve stem rotatably mounted on the plug, means for rotating said stem, a valve member on the inner end of said stem exteriorly of the plug and having an annular cavity in its surface adjacent the plug, said valve member being adapted to contact with the surface of the inner end of the plug, and a valve disk pivotally mounted in said cavity with its face adjacent the plug flush with the corresponding face of the valve member.

10. A wash-out valve comprising a plug adapted to be fitted in a boiler shell and having an open-ended unobstructed blow-off passage extending therethrough, a valve stem rotatably mounted on the plug, means on one end of said stem to turn the same, a valve member eccentrically mounted on the other end of said stem and having an annular cavity in its surface adjacent the plug, said valve member also having a recess in its inner surface centrally located with respect to said cavity and also having a cavity near the recess, a ball located in said last named cavity, and a disk located in the first named cavity and having a projection disposed in said recess.

11. A wash-out valve comprising a plug adapted to be fitted in a boiler shell and having an open-ended unobstructed blow-off passage extending therethrough and a longitudinally extending bore provided near its outer end with a packing receiving groove, a valve stem located in said bore and having a tapered portion located within said groove, packing disposed in said grooved portion of the bore and around said tapered portion of the stem, means on one end of the stem to turn the same, a valve member projecting from the other end of the stem exteriorly of the plug and having a recess near its outer end, and a disk rotatably mounted in said recess.

12. A wash-out valve comprising a plug adapted to be fitted in a boiler shell and having an open-ended unobstructed blow-off passage extending therethrough and provided at one of its ends with an inwardly tapered enlargement, a valve stem rotatably mounted on the plug, means on one end of said stem to turn the same, a valve member mounted on the other end of said stem exteriorly of the plug and having an annular recess near its outer end, a valve disk rotatably mounted in said recess, and a bushing positioned in the enlarged end of said discharge opening to form a seat for said valve disk.

WILLIAM WAFER.

Witnesses:
HENRY M. HUXLEY,
IRA J. WILSON.