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CORROSION RESISTANT VALVE

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FIG. 1.

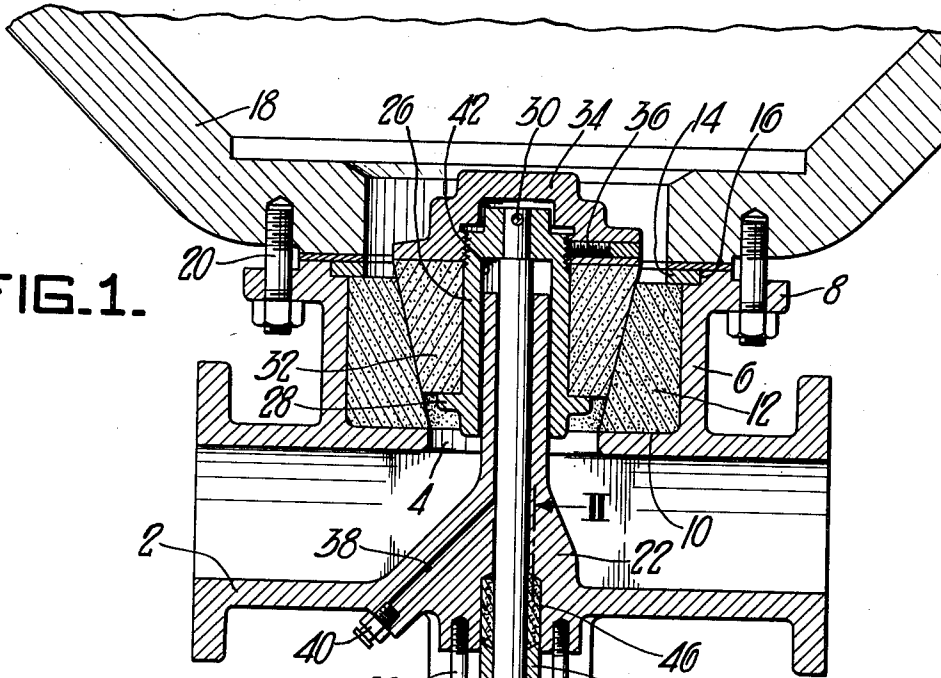
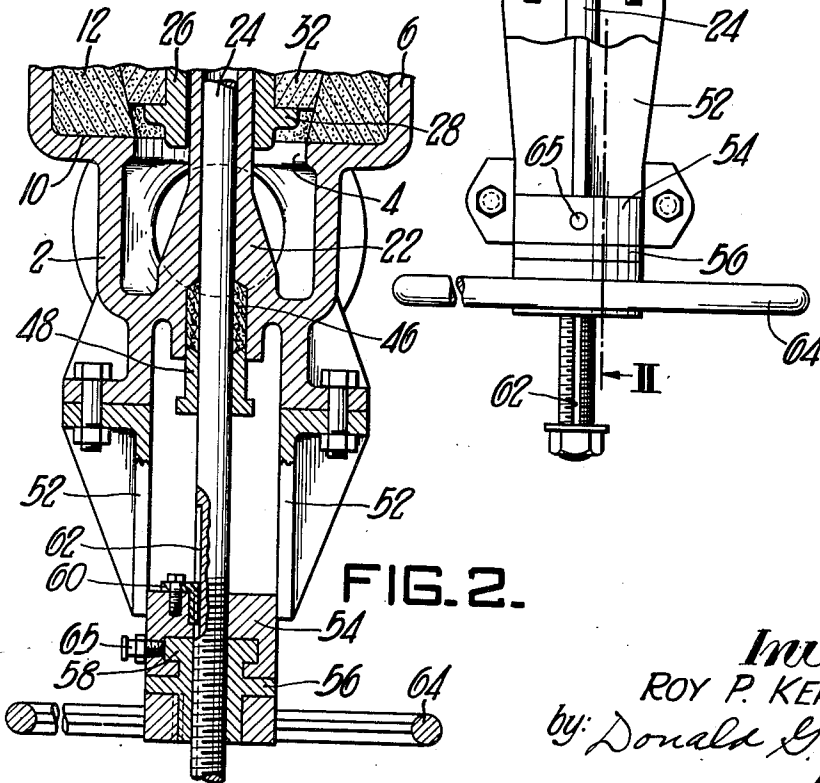


FIG. 2.



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CORROSION RESISTANT VALVE

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6 Claims. (Cl. 137-775)

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This invention relates to corrosion resistant valves and more particularly to a plug type valve having corrosion resistant plug and seat insert members.

During distillation of coke-oven gas and the like, the partially distilled light oils with which the gas is "scrubbed" are mixed in a so-called "washer" with sulphuric acid. After considerable agitation, the precipitated sludge is drained off through a drain valve and caustic soda added to the oils to neutralize any remaining acid. It is therefore seen that the drain valve at the bottom of the washer is subjected to severe corrosion, both from the elements in the light oils as well as the added acid and caustic soda. These valves have a very short life and accordingly must be replaced every few weeks. In addition to this disadvantage of having to frequently replace the valve and the consequent interruption to the use of the washer, a hazardous condition results since the valves start leaking after a very short period of use, permitting the highly volatile oils to escape from the less volatile oils.

It is accordingly an object of the present invention to overcome the foregoing disadvantages of such valves and provide a valve which is simple in design and durable in use.

It is a further object of the present invention to provide a plug type valve having chemically inert plug and seat inserts.

It is another object of the present invention to provide a plug type valve having plug and seat insert members and other wearing parts which are readily removable for quick replacement.

It is a still further object of the present invention to provide a design of plug type drain valve in which the valve stem is well shielded and inaccessible to the corrosive liquors and vapors.

It is still another object of the present invention to provide a plug type valve having means for lubricating the valve stem and plug spool to prevent the access of corrosive liquids and vapors thereto.

The foregoing and further objects will be apparent from the following specification when read in conjunction with the attached drawing, wherein:

Figure 1 is a vertical cross section; and

Figure 2 is a section on line II-II of Figure 1.

Referring more particularly to the drawing, the numeral 2 designates a valve body which, in a preferred embodiment as herein disclosed, is a T-shaped member having an opening 4 adapted to be closed by the valve of this invention. Disposed around and somewhat removed from the

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opening 4 is an upwardly extending annular sleeve or housing 6 having an outwardly extending flange 8 adjacent the upper end thereof. Spacing the annular housing 6 somewhat from the hole 4 provides a support or seat 10 for a valve insert plug 12. Thus the insert is supported on the bottom by seat 10 and around the periphery by the housing 6. The insert 12 may be held in place by a sealing ring 14 seated in an annular groove 16 at the top of the sleeve 6 and held therein by securing the valve body 2 to the underside of a suitable container or "mixer" 18 by means of stud bolts 20. Powdered graphite may be packed between the insert 12 and housing 6 under the ring 14 in order to seal the same against corrosive liquids.

Disposed interiorly of the valve body 2 is an upstanding hollow shield and guide member 22 which extends upwardly through the opening 4 and somewhat thereabove. A valve stem 24 is disposed in the shield or guide 22 and extends upwardly thereabove. A hollow cylindrical bushing 26 having an outwardly extending flange 28 around its lower end is suitably secured to the upper end of the stem 24 and locked thereon by means of a pin 30. An insert plug 32 is adapted to be disposed on the bushing 26 and rests on the lower flange 28 of the bushing. A cap 34 is adapted to be screw-threadedly mounted on the bushing 26 to hold the insert securely in place and provide a support for the full top thereof. Powdered graphite may be applied between the cap and the plug to make a seal therebetween. Means such as a set screw 36 may be provided for holding the cap in place with lead cast in the set screw opening to protect it from corrosion.

A lubricating channel 38 having an exterior fitting 40, opens into the guide 22 to supply lubricant to the stem 24 and the space 42 at the upper end of the guide, which in turn will supply lubricant to the space between the guide and the bushing 26. The lubricant may suitably be an acid resistant grease of the wax type or may be conventional cup grease with graphite added. This lubricant will prevent the access of corrosive fluid and vapors thereof to the stem member and thereby prevent its being attacked by the corrosive liquid passed through the valve. A packing 46 is provided at the lower side of the valve body around the stem 24 and is suitably compressed by gland 48 and stud bolts 50. The purpose of the packing is to seal off the lower portion of the stem so that lubricant can be forced upwardly along the stem into the space 42 and then downwardly between the bushing 26 and shield

22. Thus the lubricant in the space between the bushing 26 and shield 22 will resist the tendency for the fluid or vapors to pass therebetween. Consequently the valve stem 24 is well shielded throughout its length.

Brace members 52 extend downwardly below the valve body to support the downwardly extending stem. A split collar 54 is carried by the braces 52 and a brass bushing 56 having a shoulder 58 is rotatably mounted in and held against vertical movement by the split collar 54. The bushing 56 is screw-threadedly mounted on the lower end of the stem 24 and acts as a sleeve nut therefor. The stem 24 is prevented from rotating by means of key 60, mounted on the collar 54, and extending into a longitudinal groove or keyway 62 in the stem. A suitable handwheel 64 is keyed or otherwise secured to the lower end of the bushing 56. The size or diameter of the handwheel is such that only a slight pressure can be applied to the plug and thereby prevent breaking the plug and seat members if made of brittle substances. A lubricating fitting 65 is provided to permit lubricating the collar and bushing.

The insert members may be any suitable chemically inert material which is resistant to attack by both acid and caustic soda. The preferred material used is carbon though other materials such as glass or porcelain and suitable plastics may be used. All of these materials tend to be brittle and easily broken but the combination of the full support provided by my invention, together with a small handwheel, which prevents excess strain being applied thereto, permits the use of such desirable material. The valve body 2 and the central guide may be formed of high nickel cast iron and the like. While not completely resistant to corrosion it is quite resistant and due to such resistance and the thickness of these members will last for considerable time.

From the foregoing, it is seen that the insert valve seat 12 is fully supported by the seat 10 and housing 6. Likewise, the plug is fully supported by the core of the bushing 26 and the cap 34 when the members are seated. In addition, the insert members are readily removable and replaceable. If, during use, some solid particles lodge on the seating faces, such particles can easily be dislodged by removing the key 60 and rotating the stem 24.

This application is a continuation of my prior application, Serial No. 5,951, filed February 3, 1948, now abandoned.

While I have shown and described one specific embodiment of my invention, it will be understood that this embodiment is merely for the purpose of illustration and description and that various other forms may be devised within the scope of my invention, as defined in the appended claims.

I claim:

1. In a plug type valve, a valve body having a drain opening, an annular housing on said body around said opening, said housing being spaced from said opening to provide a seat between said opening and housing, a removable brittle corrosion resistant insert having a tapered central opening disposed on said seat, the bottom of said insert having substantially the same area as the top of said seat, said seat providing a support for the entire bottom of said insert and said housing a support for its periphery, a valve stem extending through said opening, a hollow cylindrical bushing secured to the upper end of said stem, a

brittle corrosion resistant insert plug having a tapered exterior carried by said bushing, an uninterrupted cap member secured to said bushing contacting the entire top of said insert plug, said cap providing a support for the entire top of said plug when it is forced against the first mentioned insert to close the drain opening and means to reciprocate said stem to open and close said drain opening.

2. In a valve, a valve body having a drain opening on the upper side thereof, a seat above said valve body around said opening, a hollow shield and shield member integral with said body and extending upwardly through said opening, a valve stem extending through said guide member, a hollow cylindrical bushing secured to the upper end of said stem and telescoped over said shield member for a greater distance than the distance said stem can be moved to open said valve, means on said bushing adapted to close on said seat from above and external means to reciprocate said stem to open and close said drain opening, a passageway having an opening on the exterior of said housing and extending into the interior of said guide member and a packing around said stem at the lower end of said guide member whereby a sealing medium can be forced upwardly between said stem and guide member and from thence to between the telescoped portion of said guide member and said bushing, said telescoped guide, bushing means and sealing medium providing an extensible shield for said stem whereby said stem is shielded from corrosive fluids passed downwardly through said opening.

3. In a plug type valve, a valve body having a drain opening, an annular housing on said body around said opening, said housing being spaced from said opening to provide a seat between said opening and housing, a removable corrosion resistant insert having a tapered central opening disposed on said seat, said seat providing a support for the bottom of said insert and said housing a support for its periphery, a hollow shield member extending through said opening, a valve stem extending through said shield member, a hollow cylindrical bushing secured to the upper end of said stem and telescoped over a substantial portion of said shield member, a corrosion resistant insert plug having a tapered exterior disposed on said bushing, a cap member secured to said bushing covering the top of said insert plug, said cap providing a support for the top of said plug when it is forced against the first mentioned insert to close the drain opening and means to reciprocate said stem to open and close said drain opening.

4. In a plug type valve, a valve body having a drain opening, an annular housing on said body around said opening, said housing being spaced from said opening to provide a seat between said opening and housing, a brittle removable corrosion resistant insert having a tapered central opening disposed on said seat, said seat providing a support for the bottom of said insert and said housing a support for its periphery, a hollow shield member extending through said opening, a valve stem extending through said shield member, a hollow cylindrical bushing secured to the upper end of said stem and telescoped over a substantial portion of said shield member, a brittle corrosion resistant insert plug having a tapered exterior disposed on said bushing, a cap member secured to said bushing covering the top of said insert plug, said cap providing a support for the top of said plug when it is forced against

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the first mentioned insert to close the drain opening and means to reciprocate said stem to open and close said drain opening, said means being designed to prevent excessive pressures being applied to said inserts when closing said drain opening.

5. In a plug type valve, a valve body having a drain opening, an annular housing on said body around said opening, said housing being spaced from said opening to provide a seat between said opening and housing, a removable corrosion resistant insert having a tapered central opening disposed on said seat, said seat providing a support for the bottom of said insert and said housing a support for its periphery, a hollow shield member extending through said opening, a valve stem extending through said shield member, a hollow cylindrical bushing secured to the upper end of said stem and telescoped over a substantial portion of said shield member, a corrosion resistant insert plug having a tapered exterior disposed on said bushing, a cap member secured to said bushing covering the top of said insert plug, said cap providing a support for the top of said plug when it is forced against the first mentioned insert to close the drain opening, means to reciprocate said stem to open and close said drain opening and means to insert a sealing medium between said bushing and said shield member to prevent corrosive fluids passed through said drain opening from contacting said stem.

6. In a plug type valve, a valve body having a drain opening, an annular housing on said body around said opening, said housing being spaced from said opening to provide a seat between said opening and housing, a brittle removable corrosion resistant insert having a tapered central opening disposed on said seat, said seat providing a support for the bottom of said insert and said housing a support for its periphery, a hollow shield member extending through said

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opening, a valve stem extending through said shield member, a hollow cylindrical bushing secured to the upper end of said stem and telescoped over a substantial portion of said shield member, a brittle corrosion resistant insert plug having a tapered exterior disposed on said bushing, a cap member secured to said bushing covering the top of said insert plug, said cap providing a support for the top of said plug when it is forced against the first mentioned insert to close the drain opening and means to reciprocate said stem to open and close said drain opening, a passageway having an opening on the exterior of said housing and extending into the interior of said shield member and a packing around said stem at the lower end of said shield member whereby a sealing medium can be forced upwardly between said stem and shield member and from thence to between the telescoped portion of said shield member and said bushing to prevent corrosive fluids passed through said drain opening from contacting said stem.

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