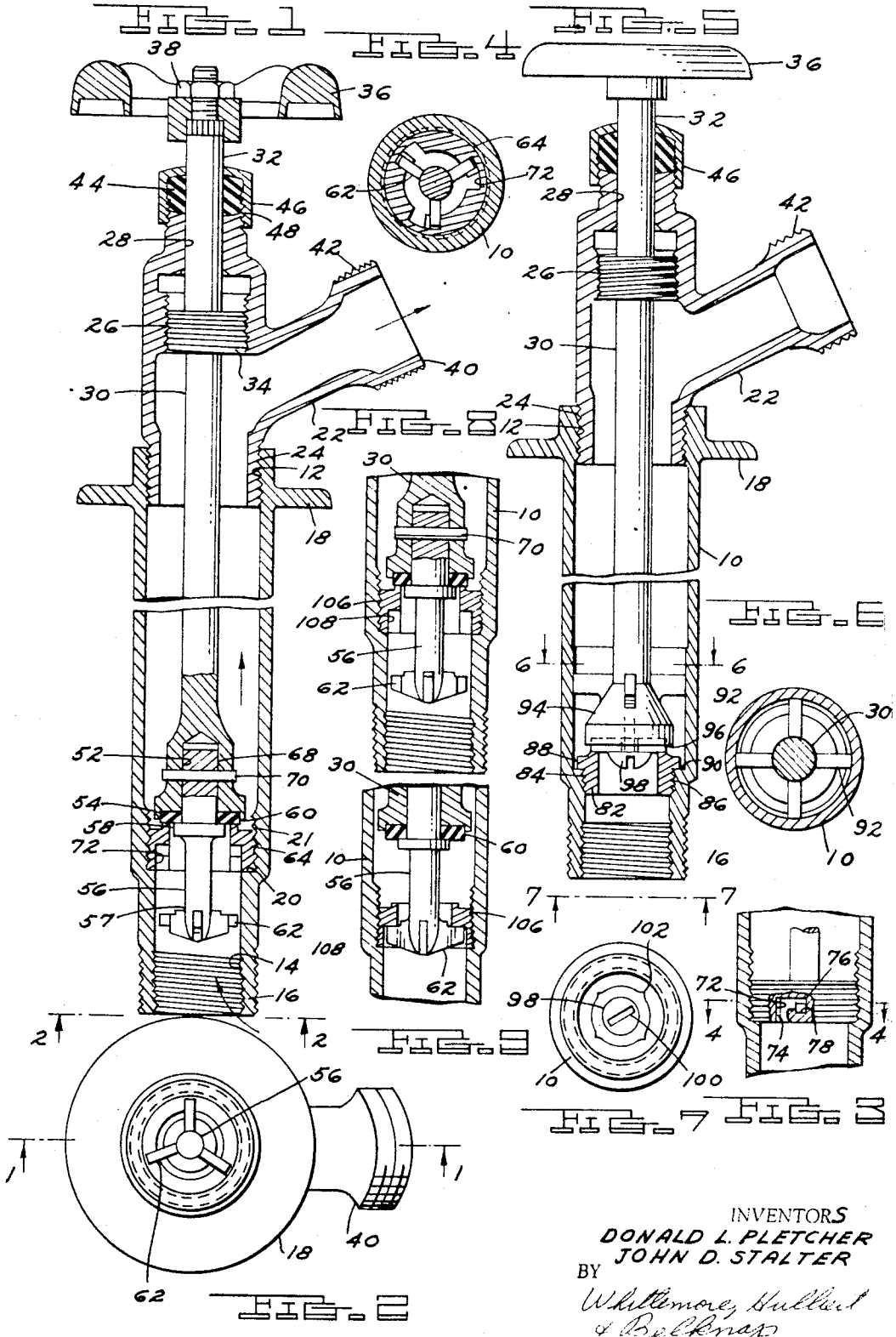
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FROSTPROOF SILLCOCK

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FROSTPROOF SILLCOCK

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This invention relates to a frostproof sillcock and is a continuation-in-part application of our copending application U.S. 22,951, now Patent No. 3,074,424 which issued on January 22, 1963.

More particularly, this invention relates to a water faucet normally placed at about sill height on the outside of a building. This invention is characterized by its structural arrangements contributing to improved maintenance, reliability and long life.

The sillcock of the present invention consists of a tubular member having at its outer end a threaded portion in which is threadedly received a removable spout or body. The tubular member is normally mounted in a wall of the building. The body extends beyond the plane of the building and is readily removable from the tubular member by unthreading the connection therebetween. An externally threaded valve seat which is subject to wear, due to long and continued operation, is positioned in the tubular member in threaded engagement therewith against an internal shoulder. The body adjustably carries a valve stem which carries a valve in such a manner so that upon movement of the valve stem the valve is moved toward and away from the valve seat to respectively close and open the sillcock. After the valve and/or valve seat has been subjected to wear, it is necessary to replace the wearing part(s).

In order to insert or replace the valve seat when worn, means are provided so that the valve stem may carry and insert the valve seat against the internal shoulder, wherein the valve still functions in the normal manner so as to move toward and away from the valve seat. The same means are utilized in removing the valve seat without the necessity of a separate tool. In effect, a sub-assembly, including the body, valve stem, valve, and valve seat is provided for insertion as a unit into the tubular member without the necessity of utilizing an independent tool for inserting or removing the valve seat. This is accomplished by loosely locating the valve seat in between a plurality of anti-rattle fingers, carried by a rod connected to the valve stem and the valve element.

It is an object of the present invention to provide an improved sillcock comprising a tubular member and a valve sub-assembly adapted to be inserted as a unit into the member, said sub-assembly providing means for carrying a valve seat and threadedly locating the seat in the tubular member upon assembly of the tubular member and sub-assembly.

Another object of the present invention is to provide an improved sillcock of the aforementioned type wherein the valve stem is provided on the inner end thereof with a rod which carries a plurality of fingers, and an externally threaded annular valve seat member loosely carried on the rod between the valve and the fingers, said seat member including a plurality of slots in the surface of the seat member which faces the shoulder provided in the tubular member, said fingers being out of engagement with the seat member in the normal valve movement of the rod, with the fingers being constructed and arranged to interlock with the walls of the slots in the seat member so as to rotate the seat member into threaded engagement with a corresponding threaded portion provided in the tubular member and into shoulder engaging position upon rotation of the valve stem in one direction, and the fingers being constructed and arranged to interlock with the walls of the slots in the seat member upon rotation of the stem in the other direction to rotatably unthread the seat member from the threaded portion and move the seat member away from the shoulder engaging position upon disassembly of the body from the tubular member.

Still another object of the present invention is to provide a sillcock of the aforementioned type wherein the rod is secured to the valve stem by a removable pin.

It is thus another object of this invention to provide a simplified low cost structure of the aforementioned type having certain advantages contributing to efficiency, reliability and long life as well as ease of maintenance.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawing, illustrating preferred embodiments of the invention, wherein:

FIGURE 1 is an elevational view, in section, of the preferred embodiment of the present invention, taken on line 1—1 of FIGURE 2.

FIGURE 2 is an end view taken on line 2—2 of FIGURE 1.

FIGURE 3 is a fragmentary elevational view, partly in section, illustrating the plurality of fingers in engagement with the bayonet slots provided in the valve seat member.

FIGURE 4 is a sectional view taken on line 4—4 of FIGURE 3.

FIGURE 5 is an elevational view, in section, showing another embodiment of the present invention.

FIGURE 6 is a sectional view taken on line 6—6 of FIGURE 5.

FIGURE 7 is an end view looking in the direction of line 7—7 of FIGURE 5.

FIGURE 8 is a fragmentary elevational view, partly in section, of still another embodiment of the present invention and illustrating the component parts in assembled position.

FIGURE 9 is a view similar to FIGURE 8, with the plurality of jfingers in engagement with slots provided in the valve seat member immediately prior to removing the valve seat member from the tubular member.

FIGURE 1 shows a tubular member **10** having an internally threaded end **12** at the flange end of the member and having an internally and externally threaded end at the other end represented by numerals **14** and **16** respectively. The flange end consists of a flange **18** which is generally annular. The tubular member **10** is generally mounted in the foundation of a building or similar structure.

The threaded end **12** normally projects outwardly from the foundation of the building. The other end of the tubular member **10** may have an internally or externally threaded member connected thereto so as to engage either of the threaded portions **14** or **16**. The tubular member **10** has an internal shoulder **20**. The tubular member **10** is internally threaded immediately above the shoulder **20** as is indicated by the numeral **21**. The member **10** is is usually inserted in the foundation before the sub-assembly, comprising the remaining parts of the valve structure, is inserted thereon.

Generally, after the tubular member **10** is fixed in position, the outer body **22**, which forms part of the sub-assembly, is threadedly engaged with the threaded end **12** of the body **10** through the externally threaded portion **24**. The body **22** generally has a somewhat smaller diameter than the tubular member **10**. The body **22** has an internally threaded portion **26** and an opening **28** in the top portion thereof. A valve stem **30** is threadedly inserted into the body **22** with the outer portion **32** thereof extending outwardly from the opening **28** with the threaded part **34** of the shaft **30** engaging the threaded portion **26** of the body **22**. A handle **36** is connected to the outer end **32** of the stem **30** by appropriate fastening

means, such as the nut and bolt arrangement 38 as shown.

The body 22 includes a portion which is axially in line with the tubular member 10 and, in addition thereto, has a spout portion 40 with an externally threaded end 42. Appropriate packing 44 is retained by a packing nut 46, which is secured to the threaded end 48 of the body 22. Obviously, the packing 44 helps to prevent leakage across the valve stem 30 at the point where the stem 30 emerges from the threaded end 48.

The other end of the valve stem 30 is somewhat enlarged and has a drilled hole 52 therein. A rim 54 is provided at the outer end of the valve stem 30 for positioning the valve disc 60, as will be subsequently described in more detail.

The valve rod 56 has a shoulder 58 thereon which carries the valve 60. The lower end 57 of rod 56, on the other side of the shoulder 58, has a plurality of fingers 62 secured thereto. Prior to the valve 60 being placed on the rod 56 and the rod 56 being connected to the stem 30, an externally threaded annular valve seat 64 is loosely placed around the rod 56. The fingers 62 prevent the valve seat 64 from slipping off from the lower end 57 of the rod 56.

The valve assembly consists of rod 56, the fingers 62 located on the end 57 of the rod 56, the valve seat 64 inserted over the shoulder 58 and the valve 60 placed on the shoulder 58. The other end of the rod 56, as identified by the numeral 68, is inserted into the opening or cavity 52 provided in the valve stem 30. A pin 70, or other means, is used to secure the rod 56 to the lower end of the stem 30. It should be observed that the valve seat 64 is loosely located between the valve 60 and fingers 62 prior to assembly. In order to facilitate the insertion or removal of the valve seat in or from the tubular member 10, the valve seat 64 is provided with a plurality of bayonet type slots 72 in the lower surface thereof facing the annular shoulder 20. One bayonet type slot 72 is provided for each of the fingers 62 and in the specific embodiment three sets of slots and fingers are illustrated. Each bayonet slot includes a vertically extending portion 74, the upper end of which is provided with a transversely extending portion 76 as best illustrated in FIGURE 3.

After the valve assembly has been connected to the valve stem 30, the stem 30 is threadedly connected to the body 22. Prior to threading the body 22 to the tubular member 10, the fingers 62 are interlocked in the bayonet slots 72 provided in the valve seat 64. This is accomplished by bringing the fingers 62 into contact with the walls of the slots 72 by first moving the fingers 62 in the vertical portions 74 and then providing relative rotation between the seat 64 and the stem 30 so as to move the fingers 62 through the slot portions 76 and finally into interlocking engagement in the notches 78 as best illustrated in FIGURE 3. After this has been accomplished, the stem 30 and the valve assembly are inserted axially into the tubular member 10 to a position where the threaded valve seat 64 engages the threaded portion 21. Prior to threading the body 22 to the tubular member 10, the body 22 and the parts carried thereby are first rotated so as to thread the valve seat 64 to the tubular member 10. Since the fingers 62 are interlocked with the valve seat 64, rotation of the valve stem 30 and the parts connected thereto will, in turn, rotate the valve seat 64 and thread the seat 64 into the threaded portion 21 to a shoulder engaging position determined by the internal shoulder 20 provided in the tubular member 10.

After the valve seat 64 has been inserted in the manner just described, the stem 30 is rotated with respect to the valve seat 64 and tubular member 10 to release or move the fingers 62 out of bayonet slots 72. Finally, the threaded portion 24 of the body 22 is threaded into the threaded end 12 of the tubular member 10 to compelte the assembling operation.

Is should be understood that whether or not the valve seat 64 is threaded to the tubular member 10 prior to threading the body 22 to the tubular member 10 depends on the lengths of the various threaded portions, the position of the stem 30 with respect to the body 22, lengths of the parts, etc. It is, therefore, within the contemplation of the present invention that the component parts may be assembled in a manner different from that specifically described.

It should be observed that the fingers 62 are smaller in length than the internal diameter of the lower part of the member 10 and, hence, do not interfere with the assembling of the valve seat 64.

The valve 60 is shown in a closed position in FIGURE 1. The water generally flows in the direction of the solid arrows; namely, into the threaded end 14, across the valve seat 64, and out through the spout 40. Obviously, the spout 40 may be opened to atmosphere as illustrated or may be connected to a suitable conduit such as a garden hose.

In operation, all that is required is that the handle 36 be rotated in a direction so as to move the valve stem 30, which carries the valve 60, upwardly. This, in turn, opens the valve 60 and permits the water to flow across the valve seat 64. It should be observed that the fingers 62 are smaller in area as compared to the valve opening and, therefore, do not create a restriction of substantial size. When it is desirable to close the valve, all that is required is that the handle 36 is rotated so as to move the valve stem 30 downwardly into the tubular member 10, thereby moving the valve 60 into contact with the valve seat 64.

One of the problems in the industry has been the replacement of the valve seat 64 and the valve 60 after considerable wear has taken place. This wear may be caused by continued operation over a long period of time or may be caused by the mineral effects of the water on valve seat 64 and valve 60. In addition, frost and generally cold weather will have an adverse effect on the valve 60. In any event, for whatever reason, it is sometimes required to replace the valve seat 64 and valve 60. Previously it was required to remove the entire sill-cock assembly from the supporting structure. This required a considerable amount of time and labor and complicated the maintenance problem. It was particularly difficult to perform in inclement weather.

Our invention has overcome this basic problem by employing means for removing the sub-assembly including the valve seat 64, valve 60, and the valve stem 30 from the tubular member 10 as a unit. This is accomplished in part by means of the fingers 62 and the bayonet slots 72. After the water supply has been terminated so that there is no flow across the valve, the body 22 is rotated so as to remove its threaded end 24 from the threaded end 12 of the tubular member 10. Immediately after the threads 12 and 24 have been disengaged, an axial force is applied to the body 22 in such a manner that the fingers 62 are brought into interlocking engagement with the walls of the slots 72 to the position illustrated in FIGURE 3 where the fingers are received in the notches 78. The body 22 and stem 30 are then rotated in the opposite direction so as to unthread the valve seat 64 from the threaded portion 21. As a result thereof, the valve seat 64 is moved away from the shoulder 20. After the valve seat 64 has been unthreaded, the entire valve sub-assembly is removed from the tubular member 10 as a unit.

In order to replace the valve and valve seat, it is necessary that the pin 70 be removed and the rod 56 removed from the recess 52 of the stem 30. The valve 60 and the valve seat 64 are then easily replaced on the rod 56. After the replacement parts have been positioned on the rod, the rod portion 68 is brought into engagement with the opening 52 and the pin 70 connected or inserted. The sub-assembly is inserted in the tubular member 10

in the manner previously described. From such a description, it is obvious that the valve seat and valve may be replaced in a short period of time and with a minimum amount of effort.

Another embodiment of the invention, as shown in FIGURES 5–7, is described utilizing many of the numeral designations as applied to FIGURE 1 where similar parts are utilized. In essence, the invention differs from the first embodiment in the valve structure. In this embodiment the valve seat **82** has a threaded portion **84** which is threadedly engaged with the internal threads **86** of the lower part of the tubular member **10**. The valve seat **82** includes a flange portion **88** which engages the shoulder **90** of the tubular member **10**. The valve seat **82** is inserted in and removed from the tubular member **10** by a tool, not shown.

The valve stem **30** carries on the lower end thereof, four thin locating members **92** which are appropriately secured to the shaft **30**. In addition, the conical valve disc carrying member **94** carries therewith the valve disc **96** which is secured thereto by means of a screw **98**. Screw **98** has a slot **100** therein which permits the screw to be readily removed so that the disc may be replaced. The bottom of the valve seat **82** has a plurality of tool-carrying notches **102** which are substantially square and are formed on the inner periphery of the valve seat **84**. The tool has projections to match the notches **102**. After the body **22**, which carries the stem **30** and disc **96** is removed from the tubular member **10**, the tool is inserted in the notches **102** from the threaded end **16** and rotated in a direction so as to unthread or to disengage the threaded portion **84** from the threads **86**.

FIGURES 8 and 9 illustrate still another embodiment of the present invention. The same numeral designations as applied to FIGURE 1 will be utilized where similar parts are provided. This embodiment is similar to FIGURES 1–4 in essentially all respects, with the exception of the valve seat **64**. The valve seat in FIGURES 8 and 9 is designated by the numeral **106** and instead of being provided with bayonet slots **72** of the type illustrated in FIGURES 1–4, is provided with substantially vertically arranged slots **108** which are adapted to receive the corresponding fingers **62** in a substantially force-fit friction type relationship. In other words, the fingers **62** are constructed and arranged to bear tightly against the walls of the slots **108**. The valve seat **106** is assembled in and disassembled from the tubular member **10** in substantially the same manner as described for the embodiment illustrated in FIGURES 1–4.

The drawing and the foregoing specification constitute a description of the frostproof sillcock in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What we claim as our invention is:

1. A sillcock comprising an elongated tubular member, an internal shoulder in said tubular member near one end thereof, a portion of said member above said shoulder being threaded, and a removable sub-assembly for said tubular member comprising a body threaded to the other end of said tubular member, said body having a passage therein connected to the interior of said tubular member, an elongated valve stem movably carried by said body and having one end thereof extending into said tubular member, means for rotating said valve stem and effecting lengthwise movement thereof with respect to said tubular member, said one end of said valve stem being provided with a cavity which opens toward said shoulder, an abutment on said one end of the stem surrounding said cavity, a rod having an end portion in said cavity, means for securing said rod to said stem, a flange on said rod axially spaced from said abutment, a resilient valve element interposed on said stem and held against said abutment by the flange on said rod, a plurality of fingers on the other end portion of said rod, an externally threaded annular valve seat member removably mounted with a threaded fit with the threaded portion of said tubular member in abutting engagement with said shoulder, said rod extending freely through the passage in said seat member, and a selectively engageable and disengageable driving connection provided between said threaded annular valve seat and said fingers consisting of a plurality of slots provided in the surface of said threaded valve seat member facing said shoulder, one slot for each of said fingers, said fingers being disengaged from said seat member in the normal valving movement of said stem and said rod, said fingers having abutment surfaces which are constructed and arranged upon selected movement of said valve stem to engage and interlock with the walls of the slots in said threaded valve seat member to form said driving connection which is effective upon rotation of said valve stem in one direction to rotate said seat member into threaded engagement with the threaded portion of said tubular member and into shoulder engaging position, and said driving connection being effective upon rotation of said stem in the other direction to rotatably unthread said seat member from said threaded portion and move said seat member away from said shoulder engaging position upon disassembly of said body from said tubular member.

2. A sillcock defined in claim **1** wherein the first-mentioned end portion of said rod is in surface-to-surface contact with the wall of said cavity.

3. A sillcock defined in claim **2** wherein the means for securing said rod to said stem includes a removable pin.

4. A sillcock defined in claim **2** wherein the means for securing said rod to said stem is in the form of a pin which has an axis substantially perpendicular to the axis of said stem.

5. A sillcock comprising an elongated tubular member, an internal shoulder in said tubular member near one end thereof, a portion of said member above said shoulder being threaded, and a removable sub-assembly for said tubular member comprising a body threaded to the other end of said tubular member, said body having a passage therein connected to the interior of said tubular member, an elongated valve stem movably carried by said body and having one end thereof extending into said tubular member, means for rotating said valve stem and effecting lengthwise movement thereof with respect to said tubular member, said one end of said valve stem being provided with a cavity which opens toward said shoulder, a rod having an end portion in said cavity, means for securing said rod to said stem, a resilient valve element on said one end of said stem surrounding said cavity, a plurality of fingers on the other end portion of said rod, an externally threaded annular valve seat member removably mounted with a threaded fit with the threaded portion of said tubular member in abutting engagement with said shoulder, said rod extending freely through the passage in said seat member, and a selectively engageable and disengageable driving connection provided between said threaded annular valve seat and said fingers consisting of a plurality of slots provided in the surface of said threaded valve seat member facing said shoulder, one slot for each of said fingers, said fingers being disengaged from said seat member in the normal valving movement of said stem and said rod, said fingers having abutment surfaces which are effective upon selected movement of said valve stem to interlockingly engage the walls of the slots in said threaded valve seat member to form said driving connection which is effective upon rotation of said valve stem in one direction to rotate said seat member into threaded engagement with the threaded portion of said tubular member and into shoulder engaging position, and said driving connections being effective upon rotation of said stem in the other direction to rotatably unthread said seat member from said threaded portion and move said seat member away from said shoulder engaging position upon disassembly of said body from said tubular member.

6. A sillcock defined in claim **5** wherein the first-men-

tioned end portion of said rod is in surface-to-surface contact with the wall of said cavity.

7. A sillcock defined in claim 6 wherein the means for securing said rod to said stem includes a removable pin.

8. A sillcock defined in claim 6 wherein the means for securing said rod to said stem is in the form of a pin which has an axis substantially perpendicular to the axis of said stem.

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