

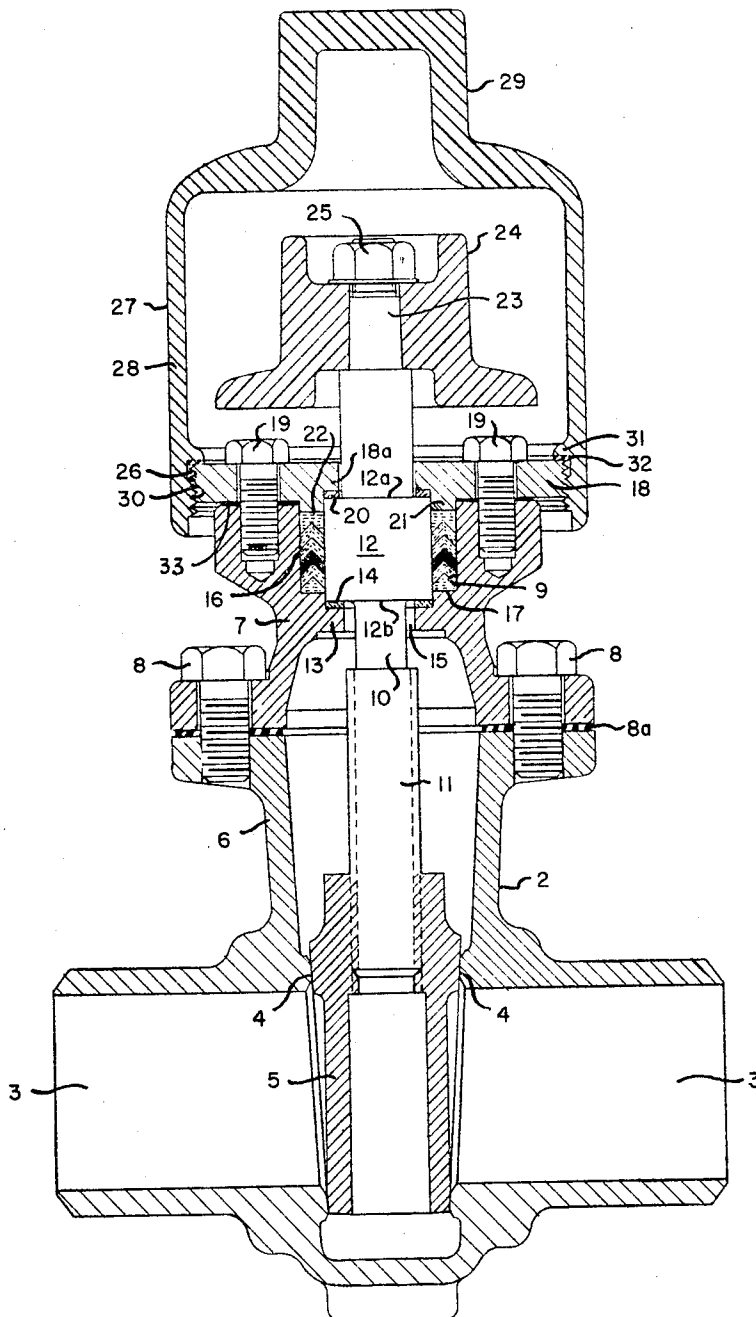
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HOODED GAS DISTRIBUTION VALVE FOR UNDERGROUND USE

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HOODED GAS DISTRIBUTION VALVE FOR UNDERGROUND USE

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2 Claims. (Cl. 137—382)

This invention relates to a gas distribution valve for underground use. It relates particularly to provision for protecting such a valve whereby to facilitate its operation and increase its life. This application is a continuation of my copending application Ser. No. 250,354, filed Jan. 9, 1963, now abandoned.

Vast numbers of valves are used in underground gas distribution systems. Such valves may be disposed in locations under streets and sidewalks or elsewhere where they are subjected to the action of deleterious substances. For example, the salt or other snow melting material used on streets and sidewalks in the winter causes the formation of incrustations on underground gas distribution valves. Such incrustations interfere with operation of the valves and also contribute to their rapid deterioration requiring replacement. When an underground gas distribution valve which has become thus incrustated is to be operated it is often necessary to use a crowbar to knock off the incrustation around the valve stem to enable turning of the valve stem. Use of the crowbar frequently damages the valve and still further contributes to its deterioration.

I have referred above to one example of conditions encountered in the installation and use of underground gas distribution valves. Other conditions exist causing foreign materials to be deposited on the valves and causing rusting and deterioration of the valves, particularly at the location where the valve stem projects out of the casing. Great numbers of underground gas distribution valves are in use which are subject to the disadvantages above referred to, yet prior to my present invention no satisfactory solution to the problem has been devised.

I provide for protecting the portion of an underground gas distribution valve at and adjacent the end of the valve stem which projects out of the valve casing. I provide a hood which when in operative position is mounted on the casing and protectively covers the end of the valve stem projecting out of the casing, the hood being removable from said position to permit access to the end of the valve stem projecting out of the casing for operation of the valve.

More specifically, I provide a gas distribution valve for underground use comprising a casing having a gas passage therethrough, a valve element movable between an operative position closing said passage and an inoperative position in which said passage is open, a stem turnably mounted in the casing with an end of the stem projecting out of the casing, connections between the stem and the valve element for moving the valve element between said positions upon turning of the stem, the stem being adapted to be turned by application of turning force to the end of the stem projecting out of the casing, and a hood as above referred to which when in operative position is mounted on the casing and protectively covers the end of the stem projecting out of the casing, the hood being removable from said position to permit access to the end of the stem projecting out of the casing for operation of the valve.

The hood when in operative position is preferably sealed to the casing whereby to confine gas leaking out past the stem. This is an especially important and valuable feature. The valve may be used in a domestic gas supply system where the gas pressure to homes is low. Fires

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are caused by gas leaking out past the stem of a valve. That danger is obviated by the sealing of the hood to the casing as the gas leaking out past the stem is confined, the hood and the seal between the hood and the casing being of ample strength to withstand the pressure of the leaking gas. The hood may have a portion which when the hood is in operative position is directly opposed to a portion of the casing and sealing means may be interposed between that portion of the hood and the opposed portion of the casing when the hood is in operative position to seal the hood to the casing.

The casing preferably has a separate removable and replaceable member through which the end of the stem projecting out of the casing extends, that member being provided with means for attachment of the hood thereto. The hood when in operative position is attached to that member through such means and thereby mounted on the casing to protectively cover the end of the stem projecting out of the casing. The attachment of the hood through such a separate removable and replaceable member has an important advantage in that if in removing incrustations from the joint between the hood and such member to enable removal of the hood such member is damaged it may easily be replaced.

The separate removable and replaceable member desirably has screw threads for threaded attachment of the hood thereto and the hood is adapted to be threadedly attached to that member and thereby mounted on the casing to protectively cover the end of the stem projecting out of the casing. Thus provision is made for easily and quickly removing and replacing the hood. The threaded connection between the hood and the casing has the further advantage that when the hood is in operative position the threads are interiorly disposed and not subject to rapid deterioration as would be the case with fastening or attaching means disposed exteriorly of the hood.

The end of the valve stem projecting out of the casing may have a non-circular wrench receiving portion adapting the stem to be turned by application of a wrench thereto. Preferably, as above indicated, the hood when in operative position is threadedly connected with the casing and protectively covers the end of the stem projecting out of the casing. The hood is desirably provided with a non-circular wrench receiving portion of the same size as the non-circular wrench receiving portion of the stem adapting the hood to be turned by application thereto of the same wrench as is used for turning the stem. This has the advantage that a workman may utilize a single tool first for removing the hood and thereafter for operating the valve.

My invention is applicable to underground gas distribution valves of various designs. One type of such valve which is well adapted for application of my invention is disclosed in copending United States patent application Ser. No. 241,324, filed Nov. 30, 1962, owned by my assignee, now Patent No. 3,204,970. In that type of valve the valve element is rectilinearly movable between an operative position closing the gas passage and an inoperative position in which the gas passage is open, and the valve stem is threaded into the valve element and mounted in the casing for turning movement to move the valve element between its operative and inoperative positions with an end of the stem projecting out of the casing, the stem being adapted to be turned by application of turning force to the end of the stem projecting out of the casing. The stem may have an enlargement and the casing may have an outwardly open chamber through which the stem passes and in which the enlargement is disposed, the chamber having an inward passage receiving the portion of the stem inwardly of the enlargement. Packing surrounds the enlargement and a thrust collar is provided which outwardly closes

the chamber and absorbs the outward thrust of the enlargement when the valve element is moved to one of the above mentioned positions. The thrust collar preferably has integral therewith a packing gland maintaining the packing in place. Means are provided for fastening the thrust collar to the casing, the engagement of the thrust collar with the casing limiting the inward movement of the packing gland and thus protecting the packing against overcompression. I provide the thrust collar with means for attachment of a hood thereto together with a hood which when in operative position is attached to the thrust collar through said means and thereby mounted on the casing to protectively cover the end of the stem projecting out of the casing, the hood being removable to permit access to the end of the stem projecting out of the casing for operation of the valve. I prefer to provide the thrust collar with screw threads whereby the hood is threadedly attached thereto.

I preferably make the hood of substantially uniform exterior cross-sectional shape for a substantial distance upwardly from the bottom of the hood so that when foreign matter is cleared away from the upper part of such portion of the hood of substantially uniform exterior cross-sectional shape the hood may be grasped by such upper part and removed through foreign matter still surrounding the portion of the hood of substantially uniform exterior cross-sectional shape. This would not be possible with a hood of outwardly flaring or bell shape as in order to remove such a hood the foreign matter all the way down to the rim of the hood would have to be removed. Often gas distribution valves are employed in situations where they are virtually completely covered with incrustations or other foreign matter which becomes hardened and difficult to remove and has to be chipped away. In chipping away the foreign matter there is great danger when the valve is not protected by a hood of damaging either the stem where it enters the valve casing or the portion of the stem to which a wrench is applied to turn the stem. By utilization of a hood of the specific shape just referred to complete protection to the valve stem is obtained while at the same time the hood may be removed without removing all incrustations or other foreign matter surrounding the lower part of the hood. This is quite important from the practical standpoint as considerable time is saved which without the hood would be required for the chipping away of incrustations.

Other details, objects and advantages of the invention will become apparent as the following description of a present preferred embodiment thereof proceeds.

In the accompanying drawing I have illustrated a present preferred embodiment of the invention in which the figure is a cross-sectional view axially through a gas distribution valve for underground use and also through the center line of the gas passage through the valve and illustrating my novel provision of a hood for protectively covering the end of the valve stem which projects out of the valve casing.

Before referring to the drawing, it will be understood that valves of the type above referred to form parts of an underground gas distribution system, such valves being employed, for example, in feeder lines extending to individual properties from a gas main. The valves may be disposed under streets or sidewalks or in other locations where they are subjected to the deleterious effects above referred to. The valves may be made of various materials, the material being selected to be compatible with the use. For example, the valve shown in the drawing and hereinafter described may be made of steel and may be of the type designed to be joined to pipes on either side thereof by welded connections.

The valve casing comprises a main housing 2 through which a gas passage 3 extends and having opposed inclined integral seats 4. The valve element is shown at 5 and is mounted for vertical movement between an operative position closing the gas passage 3 through tight en-

gagement with the seats 4 as shown in the drawing and an inoperative position in which the gas passage 3 is open, the valve element 5 being raised into the neck portion 6 of the housing 2 when in inoperative position.

A bonnet 7 is applied to the housing 2, being fastened thereto by bolts 8, suitable sealing means 8a being provided between the housing and bonnet as is customary in the art. The housing 2 and bonnet 7 together with the thrust collar hereinafter described form the valve casing. The bonnet has a cylindrical chamber 9 which is open outwardly and upwardly thereof.

The valve element 5 is raised and lowered by means of a stem 10 which has a threaded portion 11 which is threaded into the valve element 5 so that when the stem 10 is turned in place the valve element moves axially of the stem. The stem 10 has an integral cylindrical enlargement 12 with flat top and bottom faces 12a and 12b respectively disposed at right angles to the axis of the stem 10, the enlargement 12 being disposed in the cylindrical chamber 9 of the bonnet 7. The downward thrust of the enlargement 12 when the valve element 5 is being moved upwardly is taken by the portion 13 of the bonnet having a flat upper face through a flat thrust washer 14. The bonnet has an inward passage 15 receiving the portion of the stem inwardly of the enlargement 12.

Packing 16 which may be of any suitable type but is preferably preformed to predetermined dimensions is disposed about the enlargement 12 of the stem 10 within the chamber 9 and at its bottom seats on a ledge 17 near the bottom of the chamber. A thrust collar 18 is applied to the bonnet 7 and fastened in place by bolts 19. The thrust collar 18 has a flat annular downwardly facing abutment portion 18a which through a flat thrust washer 20 absorbs the upward thrust of the enlargement 12 when the valve element 5 is being moved downwardly from inoperative to operative position in the housing 2 and seated against the opposed valve seats 4 to close the gas passage 3. The thrust collar 18 is sealed to the bonnet 7 by gasket 33.

Integral with the thrust collar 18 is an annular packing gland 21 which enters the chamber 9 and surrounds the outer end of the enlargement 12, fitting between the outer end of the enlargement and the outer end of the chamber, and engages the outer face 22 of the packing 16. Since downward movement of the combination thrust collar and packing gland is positively limited by the bonnet 7 the distance to which the packing gland 21 may enter the annular space between the outer periphery of the upper portion of the enlargement 12 and the inner periphery of the upper portion of the chamber 9 is positively limited so that it is impossible to impose on the packing 16 any pressure in excess of the design pressure.

The outer extremity 23 of the end of the stem projecting out of the casing is of non-circular cross section and has applied thereto an exteriorly non-circular wrench receiving portion or hub 24 held in place by a nut 25. Thus the non-circular wrench receiving portion or hub 24 is operatively integral with the stem 10. A wrench receiving portion 24 of the stem 10 adapting the turn the stem 10 to move the valve element 5.

The thrust collar 18 is threaded at its outer periphery as shown at 26. A hood 27 is provided which is of generally bell shape as shown with a skirt portion 28 and a non-circular wrench receiving top portion 29, the lower extremity of the skirt portion 28 of the hood 27 being interiorly threaded as shown at 30 so that the hood may be screwed onto the thrust collar 18 as shown in the drawing. The non-circular wrench receiving portion 29 of the hood 27 is of the same size as the non-circular wrench receiving portion 24 of the stem 10 adapting the hood 27 to be turned by application thereto of the same wrench as is used for turning the stem 10.

As above indicated an important advantage is derived from the attachment of the hood to a separate removable and replaceable member such as the thrust collar 18. In

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case of damage to the threads 26 the thrust collar may be replaced with a new one without having to replace any other portion of the valve. The threads are interiorly disposed when the hood 27 is in place as shown in the drawings so that they are protected against damage while the hood is in place. The hood completely protects the end of the stem projecting out of the casing and inhibits formation of incrustations thereon and at the place where the stem enters the casing, which incrustations if allowed to form prevent or hinder operation of the valve and have to be chipped away. Such chipping away has the twofold disadvantage of increasing labor cost with the attendant possibility or even likelihood of damage to the valve stem which might result in having to disassemble the entire valve for servicing and/or replacement of parts.

The hood has an inwardly projecting annular flange 31 which as shown in the drawing is flat on the bottom and is directly opposed to the upper surface of the thrust collar 18 adjacent the periphery of the thrust collar. A gasket 32 is interposed between the upper surface of the thrust collar and flange 31 of the hood and seals the hood to the casing as above described. The seal is made as tight as desired by screwing the hood down onto the thrust collar by applying a long handled wrench to the portion 29 of the hood. By reason of the gaskets 32 and 33 there is no way for foreign matter to infiltrate the valve.

The hood is shown as being of substantially uniform exterior cross-sectional shape for a substantial distance upwardly from the bottom of the hood for the reason above described. With the hood thus shaped when incrustations or other foreign matter is cleared away from the upper part of the portion of the hood of substantially uniform exterior cross-sectional shape the hood may be grasped by such upper part and removed through foreign matter still surrounding that portion of the hood.

While I have shown and described a present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. A valve for underground use comprising a casing having a passage therethrough, a valve element movable between an operative position closing said passage and an inoperative position in which said passage is open, a stem turnably mounted in the casing with an end of the stem projecting out of the casing, connections between the stem and the valve element for moving the valve element between said positions upon turning of the stem, means for turning the stem through application of turning force to the end of the stem projecting out of the casing, the casing having fastened thereto in fixed position relatively thereto a separate member through which the end of the stem projecting out of the casing extends, means removably fastening said member to the casing, said member being sealed to the casing, said means being protected

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against ingress of moisture from the outside between said member and the casing by the means sealing said member to the casing, said member being provided with means for attachment of a hood thereto, and a hood having means whereby when the hood is in operative position it is attached to said member through said means, the hood also having means whereby when it is in operative position it is sealed to said member whereby the hood is mounted on the casing and protectively covers the end of the stem projecting out of the casing, the hood being removable from said position to permit access to the end of the stem projecting out of the casing for operation of the valve.

2. A valve for underground use comprising a casing having a passage therethrough, a valve element movable between an operative position closing said passage and an inoperative position in which said passage is open, a stem turnably mounted in the casing with an end of the stem projecting out of the casing, connections between the stem and the valve element for moving the valve element between said positions upon turning of the stem, means for turning the stem through application of turning force to the end of the stem projecting out of the casing, the casing having fastened thereto in fixed position relatively thereto a separate member through which the end of the stem projecting out of the casing extends, a gasket interposed between said member and the casing sealing said member to the casing, bolts removably fastening said member to the casing, the bolts passing through the gasket and being protected by the gasket against ingress of moisture from the outside between said member and the casing, said member being provided with means for attachment of a hood thereto, and a hood having means whereby when the hood is in operative position it is attached to said member through said means, the hood also having means whereby when it is in operative position it is sealed to said member whereby the hood is mounted on the casing and protectively covers the end of the stem projecting out of the casing, the hood being removable from said position to permit access to the end of the stem projecting out of the casing for operation of the valve.

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