May 29, 1945. H. B. QUARFOOT 2,377,036

ANTI-TAMPERING ATTACHMENT FOR VALVES

Filed April 24, 1943 2 Sheets-Sheet 1

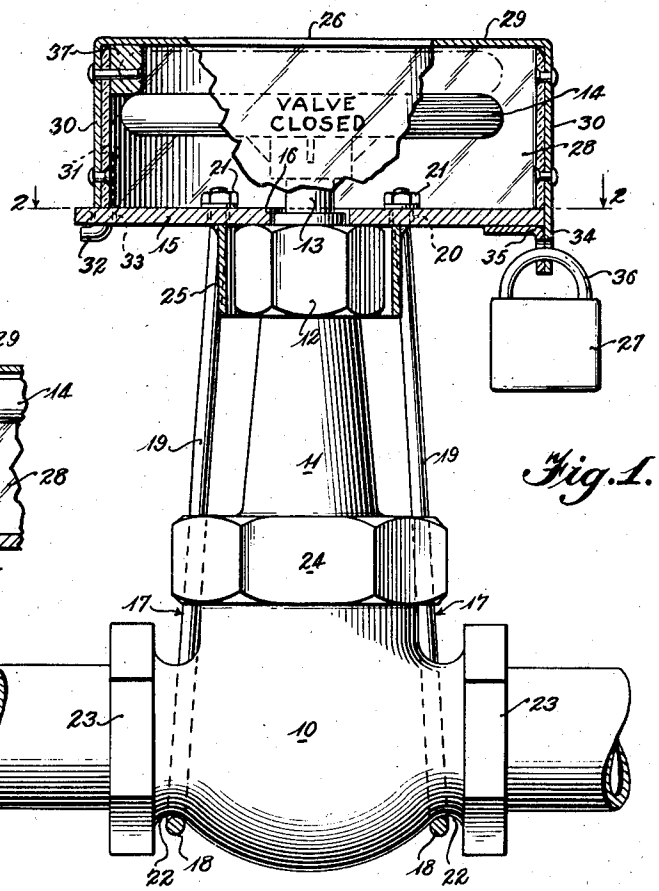


Fig. 1.

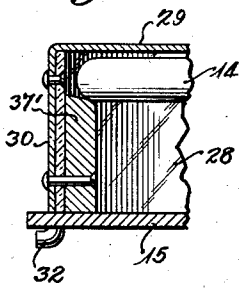


Fig. 6.

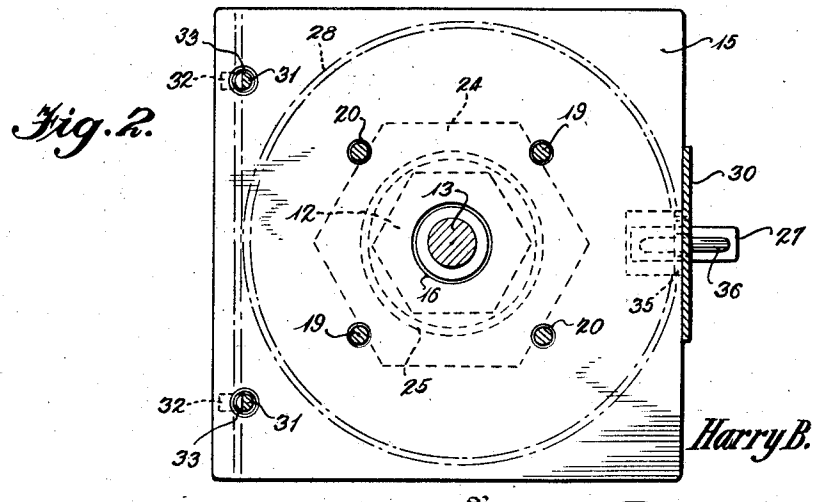


Fig. 2.

Inventor
Harry B. Quarfoot
By L. Donald Myers
Attorney

May 29, 1945. H. B. QUARFOOT 2,377,036

ANTI-TAMPERING ATTACHMENT FOR VALVES

Filed April 24, 1943 2 Sheets-Sheet 2

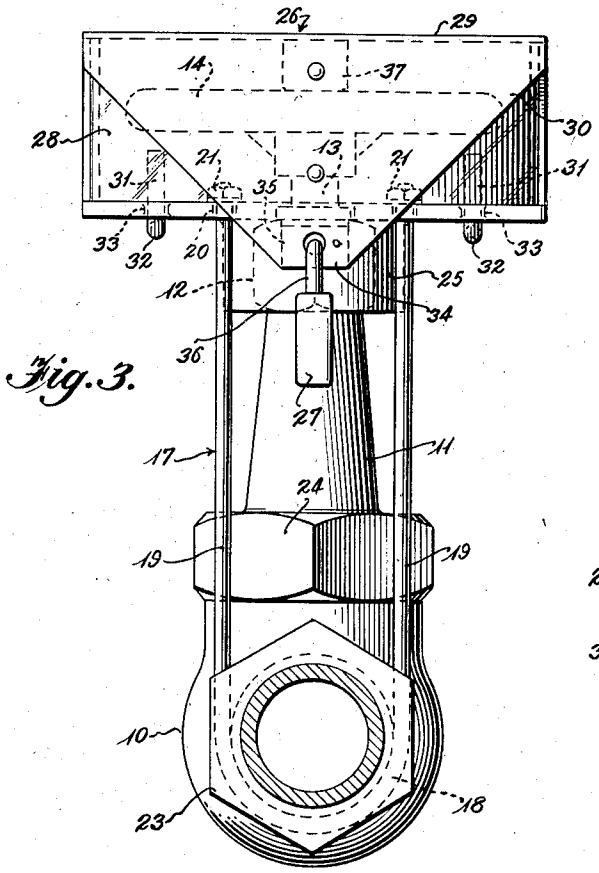


Fig. 3.

Fig. 5.

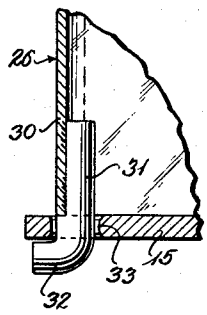
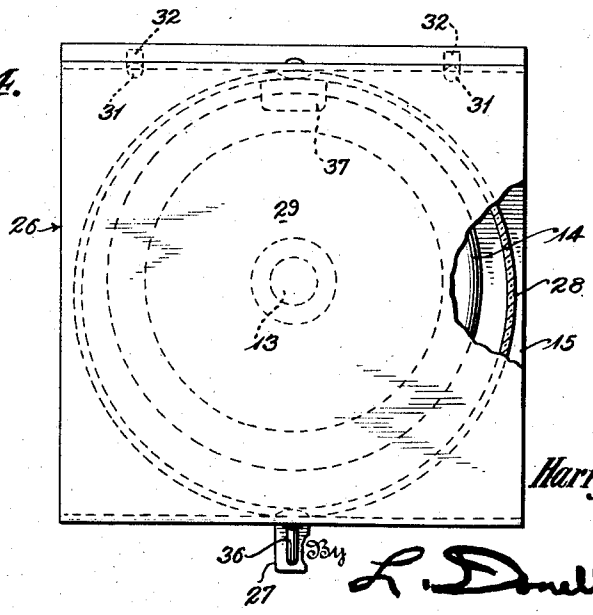


Fig. 4.



Inventor

Harry B. Quarfoot

By L. Duell Rogers Attorney

Patented May 29, 1945 2,377,036

UNITED STATES PATENT OFFICE

2,377,036

ANTITAMPERING ATTACHMENT FOR VALVES

Harry B. Quarfoot, Chicago, Ill., assignor, by mesne assignments, to Reconstruction Finance Corporation, Chicago, Ill., a corporation of the United States

Application April 24, 1943, Serial No. 484,418

16 Claims. (Cl. 70—178)

This invention relates to anti-tampering attachments for valves, and has for its general object to provide an anti-tampering attachment which is of simple, inexpensive construction, which may readily be applied to and removed from a valve, and which is thoroughly reliable and efficient in the performance of its purpose of rendering it practically impossible for any unauthorized person to effect, without detection, opening or closing actuation, or loosening of any exposed movable part, of a valve to which it is applied.

With the foregoing general object and various other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in an anti-tampering attachment for valves embodying the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the accompanying drawings, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a side elevation of a valve showing the attachment operatively applied thereto, the attachment being shown in section;

Figure 2 is a cross section on the line 2—2 of Fig. 1;

Figure 3 is an end elevation of the valve and of the anti-tampering attachment operatively applied thereto;

Figure 4 is a top plan plan view, partly broken away, of the anti-tampering attachment;

Figure 5 is an enlarged sectional view showing in detail the hinge means for the cover of the handle enclosing housing of the attachment; and

Figure 6 is a fragmentary sectional view illustrating an alternative form of an element of the attachment.

In the drawings there has been illustrated by way of example a so-called "Globe" valve to which the anti-tampering attachment is applied, said valve comprising, as usual, a casing 10, a bonnet 11 threaded thereon, a packing nut 12 threaded on the outer end of said bonnet, a valve stem 13 extending through said bonnet and said packing nut and projecting beyond the latter, and a handle 14 on said valve stem.

The anti-tampering device includes a strong, rectangular base plate 15 of sheet metal or other suitable material of a length and width somewhat greater than the diameter of the valve handle 14. This base plate is provided, centrally thereof, with an aperture 16 of a size to accommodate the valve stem 13, and in applying the anti-tampering device to the valve, the valve handle 14 is removed and said base plate is engaged over the valve stem 13 with said stem extending through the aperture 16. The valve handle 14 then is re-applied to the valve stem.

The base plate 15 is intended to be fastened rigidly in a position between the valve handle 14 and the packing nut 12, preferably but not necessarily against the outer end of said packing nut. To this end there are employed a pair of U-shaped plate fastening rods or yokes 17, 17 the bight portions 18 of which are engaged with the valve casing 10 in embracing relationship thereto at opposite ends thereof, respectively. The arms 19 of said yokes 17 are extended at their free ends through apertures 20 in the base plate 15. Beyond the outer face of said base plate they have nuts 21 threaded thereon. The nuts 21 then are tightened to draw the base plate firmly and securely against the outer end of the packing nut 12.

The bight portions 18 of the rods or yokes 17 are disposed in the usual depressions 22 in the main body of the valve casing 10 adjacent to usual nut formations 23 at the ends of said valve casing. Therefore, when the nuts 21 are tightened to draw the base plate 15 firmly against the packing nut 12, it is impossible to disengage the rods or yokes 17 from the valve casing 10 or to shift them relative to said casing. In this connection it will be observed that the apertures 20 in the base plate 15, through which the free ends of the yoke arms 19 extend, are so located in said base plate that said arms 19 are required to lie against flat faces of the usual nut formation 24 at the inner end of the valve bonnet 11. Accordingly, when the base plate 15 is fastened by the rods or yokes 17, the arms 19 of said rods or yokes cooperate with the nut formation 24 of the bonnet 11 to prevent rotation of said bonnet.

Fixed to and extending inwardly from the base plate 15, centrally thereof, is a sleeve 25 which extends over and closely encloses the packing nut 12 when said base plate is fastened in its operative position. Accordingly, any possibility of engaging with the packing nut 12 a wrench or other implement by which it might be turned, is effectively prevented by the sleeve 25 as long as the base plate 15 remains fastened in its operative position.

A cover 26 is provided for cooperation with the base plate 15 to afford a housing to enclose the valve handle 14 and the nuts 21, and a padlock 27 is provided for locking said cover to said base plate. Accordingly, as long as said cover

is locked to said base plate, access to the valve handle 14 is denied so that the valve cannot be opened or closed, and access to the nuts 21 likewise is denied so that the rod or yoke arms 19 must remain in their positions preventing rotation of the bonnet 11, and the sleeve 25 must remain in its position denying access to the packing nut 12 of a wrench or other implement for turning the same. In other words, short of actually breaking some part of the anti-tampering device, it manifestly is impossible to open or close the valve or to loosen or otherwise manipulate any exposed, movable part thereof, such as the bonnet 11 or the packing nut 12, as long as the cover 26 remains locked in its closed position relative to the base plate 15. Moreover, should any part of the anti-tampering device be broken or damaged to an extent to permit opening or closing of the valve or loosening or other manipulation of any exposed, movable part thereof such, for example, as the bonnet 11 or the nut 12, the extent of the breakage or damage necessarily would be so great as to be readily detectable by mere casual inspection.

The cover 26 may be of any suitable construction and may be permanently hinged to the plate 15 or bodily separable therefrom. Moreover, it may or may not be entirely or in part transparent to afford a view of the valve handle 14 therethrough. In this connection and as illustrated by way of example in the drawings, said cover may appropriately comprise, primarily, a short-length, open-ended, hollow section 28 of a suitable transparent plastic or other material, and a sheet metal strap 29 extending over and closing the outer end of said section and having inturned end portions 30 lying against and riveted or otherwise suitably fastened to opposite side portions thereof. In addition, said cover may include a pin or pins 31 suitably fastened to one of the end portions 30 of the strap 29 and having out-turned inner or free ends 32 projecting beyond the inner or free edge of said strap portion 30 to be entered in a hole or holes 33 in the base plate 15. At the free or inner edge of the other end portion 30 of the strap 29 there is provided an apertured projection 34 to register, when the cover is closed, with an apertured lug 35 suitably fixed to the base plate 15.

When a cover, constructed as described, is applied to the base plate 15, the hollow section 28 is disposed in surrounding, enclosing relationship to the valve handle 14 and with its inner end in engagement with the outer face of said base plate; the pins 31 are disposed in the holes 33 with their free ends underlying the base plate and thereby preventing outward movement of the related side portion of the cover relative to said base plate, and the apertured projection 34 is registered with the apertured lug 35 so that the hasp 36 of the lock 27 may be engaged through the apertures thereof. Manifestly, therefore, when the hasp 36 of the lock 27 is engaged through the apertures of the projection 34 and the lug 35, the cover 26 is securely locked to the base plate 15 and cooperates therewith to provide a housing enclosing the valve handle 14 and the nuts 21 and preventing any unauthorized access thereto. Moreover, due to the transparency of the hollow section 28, the valve handle 14 constantly is exposed for observation as to whether it is in valve-open or valve-closed position, which observation may be facilitated by suitably providing said section with a word or words or other suitable means to indicate the valve-open or valve-closed position of said handle.

In some instances it may be desired that the valve shall be normally closed and in other instances it may be desired that the valve shall be normally open. In this connection the invention may include means to prevent operative application of the cover 26 to the base plate 15 unless the valve handle 14 is in its valve-open or valve-closed position, as the case may be, thereby to render the attachment fool-proof insofar as concerns the possibility of the valve being open when it should be closed or closed when it should be open.

If it should be intended that the valve have a normally closed position, as shown in Figs. 1 to 4, inclusive, the means referred to may comprise a lug 37 fastened to the hollow section 28 interiorly thereof to overlie and engage an outer face portion of the valve handle 14 when the valve is closed and the cover 26 is operatively applied to the base plate 15. Accordingly, unless the valve handle is in its inner, valve-closed position, engagement of the lug 37 with the valve handle will prevent the housing 26 from being operatively applied to the base plate 15 and closing of the valve will be necessary before said cover may be operatively positioned and locked with respect to said base plate. Alternately, if it should be intended that the valve have a normally open position, a lug 37′ may be fastened to the hollow section 28 interiorly thereof, as indicated in Fig. 6, to underlie and engage an inner face portion of the valve handle 14 when the valve is open and the cover 26 is operatively applied to the base plate 15. Thus, the valve handle must be in its outer or valve-open position in order to permit operative application of the housing 26 to the base plate 15. The lug 37 or 37′, as the case may be, serves additionally to prevent any opening or closing creeping movement of the valve due to vibration, or the like.

The invention as illustrated and specifically described is intended for use with a valve of the type specifically illustrated and described. Manifestly, however, certain features of the invention may be used to the exclusion of others thereof. For example, if a valve should not include an element such as the bonnet 11, the yoke arms 19 might be disposed in various manners other than as shown as they would not be relied upon to perform the function of preventing rotation of the nut formation 24 of the valve. Likewise, the sleeve 25 might be eliminated if the valve should not include an element such as the packing nut 12. In fact, it is manifest that the attachment might have various structural forms other than that shown without departing from the spirit and purview of the invention. For example, instead of providing the cover 26 with the lug 37, the same purpose might be accomplished by making the cover of sufficiently shallow depth so that the strap 29 might serve as a stop means requiring the valve handle 14 to be in its valve-closed position in order to permit operative application of the cover 26 to the base plate 15. From a practical and economical manufacturing standpoint, however, it is preferred to employ covers 26 of practically duplicate construction for use with both normally closed and normally open valves, simply providing the cover with a lug such as 37 or 37′, depending upon whether the valve is to be normally open or normally closed.

One vitally important use for valve anti-tampering devices of the instant type is to prevent

sabotage of fire extinguishing systems. Many such systems have a shut-off valve which is employed to stop the flow of the extinguishing medium to the entire system only when repairs are being made to piping, discharge devices, or the like. Such shut-off valves should normally be open. If one is maliciously closed and its condition is not detected up to a time when its associated system is called upon to extinguish a fire, the system would be rendered inoperative by the failure of the supply of extinguishing medium.

Other systems, such as carbon dioxide, foam, water-fog, and the like, depend on a limited supply of an extinguishing medium maintained under its own vapor pressure, or of a compressed gas to effect discharge of the extinguishing medium. If a normally open or normally closed valve in one of these systems, that is constantly subjected to the vapor or gas pressure of or for the extinguisher, is tampered with by the loosening of a packing nut, a bonnet, or the like, a slow leak can be created which will bleed off the extinguishing medium, or the expelling gas, at a rate which may escape detection. The system then will fail when it is called upon to extinguish a fire.

Obviously the present anti-tampering attachment may be structurally varied in many respects within the spirit and scope of the invention as defined in the appended claims.

Having thus described the invention, I claim:

1. An anti-tampering attachment for a valve of the type comprising a casing, a bonnet threaded on said casing and having external flat faces, a packing nut threaded on the outer end of said bonnet, a valve stem extending through said bonnet and said packing nut, and a handle on said stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned between the packing nut and the handle, a pair of U-shaped rods to embrace the casing and to extend through apertures in said plate, nuts to be threaded on said rods outwardly of said plate to fasten the latter in its aforesaid position, said rods being engageable with the flat faces of the bonnet to hold the bonnet against rotation, a sleeve fixed to said plate to surround the packing nut and thereby prevent access thereto of an implement for turning the same, a housing for cooperation with said plate to enclose the valve handle and the nuts on said rods, and means for locking said housing to said plate.

2. An anti-tampering attachment for a valve of the type comprising a casing, a stem extending therefrom, a handle on said stem, and a packing nut surrounding said stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned between the packing nut and the handle, a sleeve fixed to said plate to surround the packing nut and thereby prevent access thereto of an implement for turning the same, rods embracing the valve casing and extending through apertures in said plate, nuts threaded on said rods outwardly of said plate to fasten the latter in its aforesaid position, a housing cooperating with said plate to enclose the valve handle and the nuts on said rods, and means for locking said housing to said plate.

3. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, rods to embrace the valve casing and to extend through apertures in said plate, nuts to be threaded on said rods outwardly of said plate to fasten the latter in its aforesaid position, a housing for cooperation with said plate to enclose the valve handle and said nuts, and means to lock said housing to said plate.

4. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, means for fastening said plate rigidly in said position, a housing for cooperation with said plate to enclose the valve handle and to prevent access to said plate fastening means for the purpose of unfastening the same, means to lock said housing to said plate, and means carried by said housing for cooperation with the valve handle to prevent valve-opening movement thereof when the housing is locked to said plate.

5. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, means for fastening said plate rigidly in said position, a housing for cooperation with said plate to enclose the valve handle and to prevent access to said plate fastening means for the purpose of unfastening the same, means to lock said housing to said plate, and means carried by said housing for cooperation with the valve handle to prevent valve-closing movement thereof, when the housing is locked to said plate.

6. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, means for fastening said plate rigidly in said position, a housing for cooperation with said plate to enclose the valve handle and to prevent access to said plate fastening means for the purpose of unfastening the same, means to lock said housing to said plate, and a lug carried by said housing for cooperation with the valve handle to prevent valve-opening movement thereof when the housing is locked to said plate.

7. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, means for fastening said plate rigidly in said position, a housing for cooperation with said plate to enclose the valve handle and to prevent access to said plate fastening means for the purpose of unfastening the same, means to lock said housing to said plate, and a lug carried by said housing for cooperation with the valve handle to prevent valve-closing movement thereof when the housing is locked to said plate.

8. An anti-tampering attachment for a valve of the type comprising a casing, a bonnet threaded on said casing, a packing nut threaded on said bonnet, a valve stem extending through said bonnet and said packing nut, and a handle on said stem; said attachment comprising an apertured plate to be engaged over the valve stem and positioned between the packing nut and the handle, rod means to embrace the casing and to extend through apertures in said plate and to cooperate with said bonnet to prevent rotation thereof, securing means to be threaded on said rod means outwardly of said plate to fasten the latter in its aforesaid position and also to maintain said rod

means positioned to prevent rotation of said bonnet, means carried by said plate to enclose the packing nut and to prevent access thereto of an implement for removing the same, a housing for cooperation with said plate to enclose the valve handle and the securing means on said rod means, and means for locking said housing to said plate.

9. An anti-tampering attachment for a valve of the type comprising a casing, a bonnet threaded on said casing, a packing nut threaded on said bonnet, a valve stem extending through said bonnet and said packing nut, and a handle on said stem; said attachment comprising a housing to enclose the valve handle, said housing including a cover to be opened to afford access to the interior of said housing, means to lock said cover closed, means to fasten said housing to the valve casing and to prevent rotation of said bonnet, means to prevent rotation of said packing nut as long as said housing is fastened by said fastening means, and means whereby said fastening means is accessible for housing fastening and unfastening purposes only when said cover is unlocked and opened.

10. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, and a handle on said valve stem; said attachment comprising a housing to enclose the valve handle, said housing including a cover to be opened to afford access to the interior of said housing, means to lock said cover closed, means within the housing to prevent closing of its cover when the valve handle is not in a predetermined position, means to fasten said housing to the valve casing, and means whereby said fastening means is accessible for housing fastening and unfastening purposes only when said cover is unlocked and opened.

11. An anti-tampering attachment for a valve of the type comprising a casing, a valve stem, a packing nut surrounding said stem, and a handle on said stem; said attachment comprising a housing to enclose the valve handle, said housing including a cover to be opened to afford access to the interior of the housing, means to lock said cover closed, means to fasten said housing to the valve casing, means whereby said fastening means is accessible for housing fastening and unfastening purposes only when said cover is unlocked and opened, and means carried by said housing preventing access to said packing nut of an implement for turning the same as long as said housing is fastened by said fastening means.

12. An anti-tampering attachment for a valve, comprising a housing, adapted to enclose a valve handle, including a bottom plate having a valve stem receiving aperture, and a cover consisting of an angular strap hinged at one end to an edge portion of the plate and a hollow open ended transparent member associated with the strap so as to have one of its ends bridged by the strap and its other end bridged by said bottom plate when the cover is closed, and means for locking the cover in its closed position.

13. An anti-tampering attachment for a valve, comprising a housing, adapted to enclose a valve handle, including a bottom plate having a valve stem receiving aperture, and a cover consisting of an angular strap hinged at one end to an edge portion of the plate and a hollow open ended transparent member associated with the strap so as to have one of its ends bridged by the strap and its other end bridged by said bottom plate when the cover is closed, means for locking the cover in its closed position, and a valve stem packing nut encircling sleeve secured to and depending from the lower face of the bottom plate.

14. An anti-tampering attachment for a valve, comprising a housing, adapted to enclose a valve handle, including a bottom plate having a valve stem receiving aperture, and a cover consisting of an angular strap hinged at one end to an edge portion of the plate and a hollow open ended transparent member associated with the strap so as to have one of its ends bridged by the strap and its other end bridged by said bottom plate when the cover is closed, means for locking the cover in its closed position, and means for detachably connecting the attachment to a valve.

15. An anti-tampering attachment for a valve, comprising a housing, adapted to enclose a valve handle, including a bottom plate having a valve stem receiving aperture, and a cover consisting of an angular strap hinged at one end to an edge portion of the plate and a hollow open ended transparent member associated with the strap so as to have one of its ends bridged by the strap and its other end bridged by said bottom plate when the cover is closed, means for locking the cover in its closed position, a pair of bent rods for detachably connecting the attachment to a valve, and means located within the housing for fastening the rods to said bottom plate.

16. An anti-tampering attachment for a valve comprising a casing, a valve stem, and a handle on said valve stem, said attachment comprising an apertured plate to be engaged over the valve stem and positioned inwardly of the valve handle, means for fastening said plate rigidly in said position, an angular strap hinged at one end to an edge of the plate, means for locking the free end of the strap to the plate, and means positioned inside of the strap and fastened thereto to cooperate with the valve handle to prevent movement of the strap into position to have its free end locked to the plate when the valve handle is not properly positioned with respect to said plate and to prevent movement of the valve handle out of said proper position when the free end of the strap is locked to said plate.

HARRY B. QUARFOOT.