Feb. 12, 1929. 1,701,816

A. M. MALLUK ET AL.

LOCKABLE CLOSURE FOR TANKS

Filed Jan. 7, 1928

Fig. 1,

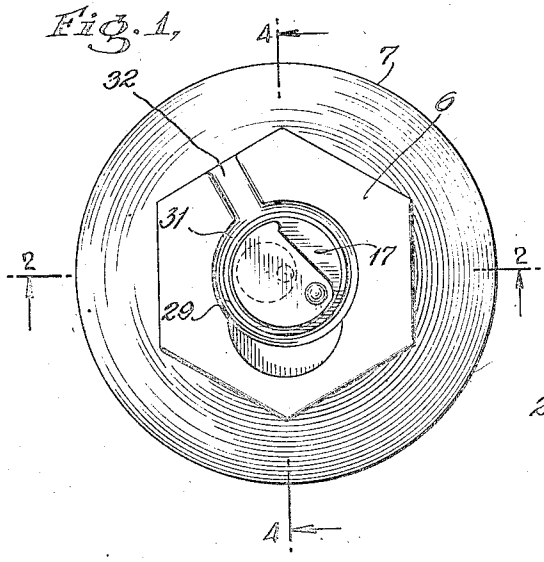


Fig. 3,

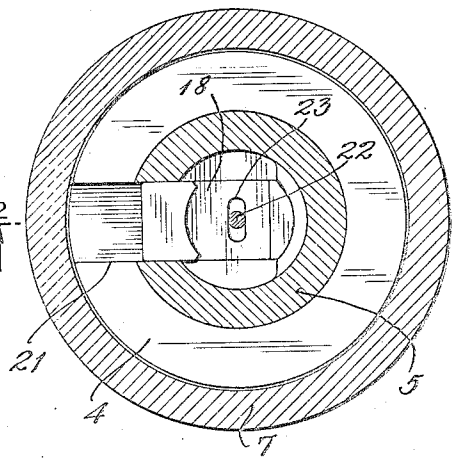


Fig. 2,

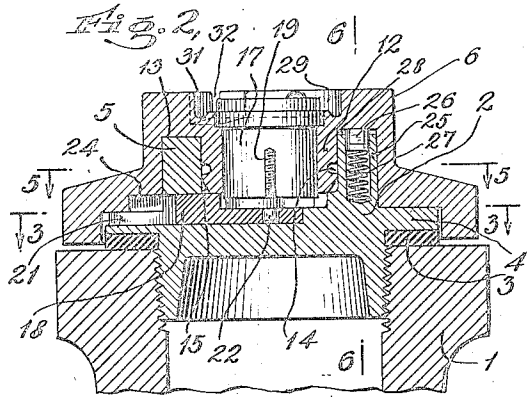


Fig. 4,

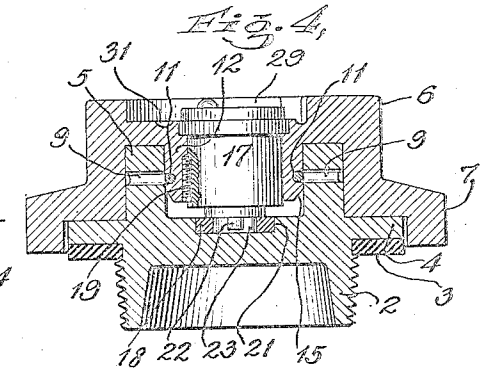


Fig. 5,

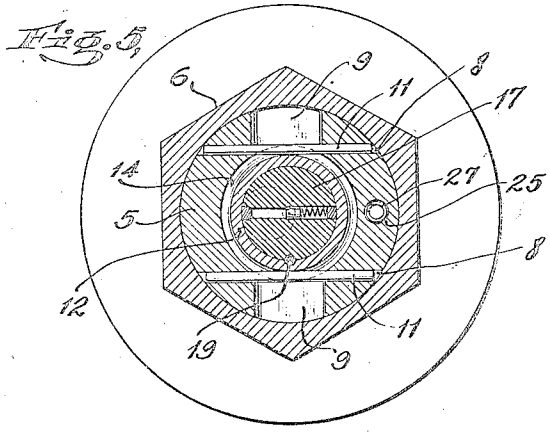
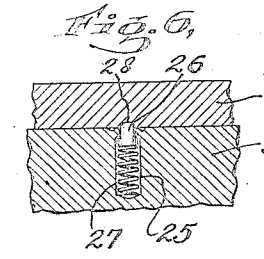


Fig. 6,



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UNITED STATES PATENT OFFICE.

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LOCKABLE CLOSURE FOR TANKS.

Application filed January 7, 1928. Serial No. 245,149.

This invention relates to lockable closures for tanks, particularly gasoline or oil tanks. It is the object of the present invention to improve upon closures of the type disclosed in copending application, Serial No. 196,442, filed by one of the present joint applicants.

The closure of that other application comprises three parts: a plug designed to be seated on a filling neck by a turning movement, a normally rotatable cap mounted upon and completely covering the plug, and a lock by means of which the cap may, when desired, be held against rotation relative to the plug. Thus, when the cap is free to rotate, the plug, if seated, cannot be removed and the tank is therefore locked, but when the cap is held fast to the plug, the plug can be removed by turning the cap. The cap is held against axial movement relative to the plug by means of a retaining pin extending through the cap and lying partly within an annular groove in a boss on the plug about which the cap is normally free to rotate. Free rotation is prevented by means of a bolt normally lying within a groove in the plug but slidable to enter a corresponding groove in the cap when the two are in registry. The lock cylinder, by means of which the bolt is actuated, is carried by the cap and projects slightly above its upper face.

The retaining pin which extends through the cap and lies partly within the annular groove in the boss about which the cap rotates, terminates externally of the cap, and although removal of this pin by unauthorized persons would be a very difficult operation, it would, nevertheless, be possible to remove it. Once removed the cap could be taken from the plug and access thus had to the tank by simply unscrewing the plug. In accordance with the present invention we have positioned the retaining pin so that it cannot be reached. In doing this we have reversed the position of the pin and groove, placing the latter on the cap and the former in the plug. The pin is thus completely covered by the cap when the parts are assembled and cannot be removed.

When sliding the bolt of the earlier closure to lie within both grooves, the one in the plug and the other in the cap, it is, of course, necessary that these grooves be in registry. It is therefore necessary to turn the cap slowly with one hand while attempting to turn the key with the other, so that the bolt will be slid outward when the two slots register. In accordance with the present invention we have simplified this operation by providing the cap with a spring-pressed detent which fits into a depression in the cap when the two slots are in registry. Hence it is necessary only to spin the cap until the detent automatically indicates that the slots are in proper position, whereupon the key is turned and the bolt shot. The force exerted by the spring of this detent is very slight so that the detent in no sense acts to lock the cap on the plug, but merely indicates that the parts are in such position that the bolt may be moved to lock the cap to the plug.

The lock cylinder of the earlier closure extends slightly above the outer upper face of the cap. We consider it better construction to have the upper end of the cylinder terminate below the outer upper face of the cap, the cap thus acting not only to protect the cylinder, but facilitating ease of handling during shipment, etc. We have accordingly provided the outer upper face of the cap with a countersink in which the upper end of the lock cylinder terminates. This countersink, however, would be likely to catch and retain liquids such as water or gasoline which would tend to corrode the lock mechanism were not measures taken to prevent this. We have therefore provided this countersink with a drain whereby any liquid falling into it is immediately lead away.

In the accompanying drawing which illustrates a preferred embodiment of our invention, Figure 1 is a plan view of the closure showing the cap only; Figure 2 is a vertical section taken along line 2—2 of Figure 1 and showing the closure in position upon the neck of the tank; Figure 3 is a horizontal section taken along line 3—3 of Figure 2; Figure 4 is a vertical section similar to Figure 2, but taken along line 4—4 of Figure 1; Figure 5 is a horizontal section taken along line 5—5 of Figure 2, and Figure 6 is a detail of the detent which indicates when the grooves in the cap and plug are in registry.

The closure, as illustrated in Figure 2, is seated within an internally threaded filling neck 1 of a tank. The closure proper consists of an externally threaded plug 2 which is screwed into the neck and makes a gas and liquid-tight seal by means of a gasket 3 interposed between the outer end of the neck and an annular flange 4 on the plug. Ex-

tending upwardly from the plug is an annular boss 5 upon which, and the flange 4, a cap 6, in the form of a hexagonal nut, is rotatably mounted. As illustrated most clearly in Figure 2, the cap is provided with a depending annular flange 7 which extends within a short distance of the filling neck 1 and completely covers the plug when the latter is mounted on the neck in tank closing position. In this position it is therefore impossible to reach the plug and as long as the cap is free to rotate the plug cannot be unscrewed.

We shall now describe our improved means for holding the cap against axial displacement relative to the plug while at the same time permitting free relative rotation. Two horizontal holes 8 are drilled through the walls of the annular boss 5, the drill just passing through the inner space defined by the boss so that the outer side of the drill is substantially tangent to the inner face of the boss. This operation produces a pair of arcuate grooves in the inner face of the boss which are deepened, preferably by cutting through the walls of the boss to form slots 9. A pair of spring-wire steel pins 11, not longer than the chords defined by the holes 8, are inserted into these holes, and extend partly within the inner space defined by the boss with their outer elements lying substantially tangent with the inner face of the boss, all as clearly shown in Figure 5. The cap 6 is provided with a depending centrally disposed stud 12 which constitutes the inner wall of an annular recess 13 of the same dimensions as those of the annular boss 5 and designed to receive the latter when the cap is seated upon the plug. This stud 12 is provided with an annular groove 14, and just beyond that, with a beveled edge 15.

To assemble the parts, the pins 11 are positioned as shown in Figure 5 with their ends terminating at, or within, the outer face of the boss 5. The cap is then placed upon the plug, the annular recess 13 receiving the boss 5. As the cap descends, the stud 12 encounters the pins 8. Were these pins rigid, or were there no slots 9, it would obviously be impossible to proceed further. However, upon exerting a pressure upon the cap the beveled edge 15 bends the pins 8 outward until their middle portions are forced into the slots 9, thus permitting the stud to pass. The next instant, however, the groove 12 reaches the plane of the pins which thereupon spring back into their original position and are seated within the groove. The cap is thus mounted upon the plug for free rotary movement, but is effectively locked against axial displacement relative to the plug.

In order to make seating and unseating of the plug on the neck possible, a lock is provided for holding the cap and plug against relative rotation so that a wrench applied to the cap can turn the plug. This lock comprises a lock cylinder 17, and a slidable bolt 18, the lock cylinder being keyed in position within the stud 12 by means of a screw 19. The bolt 18 lies within a groove 21 in the upper face of the plug and is slid back and forth in this groove by means of an eccentrically movable pin 22 depending from the lock cylinder and lying within a transverse slot 23 in the bolt. Movement of the bolt is thus effected by inserting the key within the lock cylinder and turning it.

The cap 2 is also provided with a groove 24 of a width corresponding to that of the groove 21, and, when in registry with the latter, capable of receiving the outer end of the bolt. Thus, when the cap and plug are in the positions illustrated in Figure 3 the bolt can be slid to the left to be within both grooves and thus effectively lock the plug and cap against relative rotation. When the parts are in this position a wrench applied to the hexagonal nut faces of the cap can screw or unscrew the plug. When the plug has been seated on the filling neck, the key is turned in the lock to withdraw the bolt and retract it to a position within the cylindrical boss 5 in which position it clears the groove 24 of the cap and leaves the latter free to rotate upon the plug. When in this position, the pin 22 is concentric of the boss 5 so that rotation of the cap is not interfered with.

The annular boss 5 is provided with a drilled hole 25 in which is seated a detent 26 and a compression spring 27 constantly urging the detent outward. The bottom of the annular recess 13 in the cap is provided with a depression 28 designed to receive the outer end of the detent when in proper position. The detent and the slot are so arranged that when the former is seated in the latter the two grooves 21 and 24 are in registry and the bolt 18 can be moved to lock the cap to the plug.

The outer upper face of the cap 6 is provided with a countersink 29 in which the upper end of the lock cylinder terminates. This countersink is provided with a gutter 31 which surrounds the outer end of the lock cylinder and leads any liquid falling into the countersink to an outwardly and downwardly extending drain 32 which effectively removes any such liquid and prevents corrosion of the lock mechanism.

When the closure of the present invention is seated upon the neck of the tank and the bolt 18 retracted to lie within the plug alone, the cap is free to rotate upon the plug, and as it, in cooperation with the neck itself completely covers the plug, it is impossible for any unauthorized person to gain access to the tank through the plug. The closure is of strong and rugged construction so that the cap cannot well be forcibly removed and as the retaining pins 11 are carried by the plug and not by the cap they cannot be reached and

tampered with. The detent with its cooperating depression enables the operator by a simple spinning movement of the cap to locate the position of registry of the bolt slots so that a single turning movement of the key will slide the bolt to hold cap and plug against relative rotation and thus enable the latter to be unscrewed. The lock cylinder is so positioned that it is completely protected against blows, while any liquid falling into the countersink in which it terminates, is immmediately drained off and cannot injure the lock mechanism.

We claim:

1. A lockable closure for tanks comprising the combination of a plug designed to be seated by a turning movement, a cap rotatably mounted on the plug and covering it when the plug is seated, a pin on the plug lying within an annular groove in the cap whereby axial displacement of cap and plug is prevented while they are left free for relative rotation, and a lock for holding the cap and plug against relative rotation.

2. A lockable closure for tanks comprising the combination of a plug designed to be seated by a turning movement, a boss on the plug, a cap rotatably mounted on the plug and covering it when seated, a pin on the boss, an annular groove in the cap which receives the pin whereby axial displacement of cap and plug is prevented while they are left free for relative rotation, and a lock for holding the cap and plug against relative rotation.

3. A lockable closure for tanks comprising the combination of a plug designed to be seated by a turning movement, an annular boss on the plug, a spring member extending from the boss and into the inner space defined by the boss, a cap rotatably mounted on the boss, a depending stud on the cap extending within the inner space defined by the boss, an annular groove in the side wall of the stud into which the spring member projects to hold the cap and plug against relative axial movement, and a lock for holding the cap and plug against relative rotation, the cap effectively covering the plug when the latter is seated.

4. A lockable closure for tanks comprising the combination of a plug designed to be seated by a turning movement, an annular boss on the plug, a spring member extending through the boss and into the inner space defined by the boss, a cap provided with an annular recess for receiving the boss rotatably mounted on the boss, a depending stud on the cap forming the inner wall of the recess and extending within the inner space defined by the boss, an annular grove in the side wall of the stud into which the spring member projects to hold the cap and plug against relative axial movement, and a lock for holding the cap and plug against relative rotation, the cap effectively covering the plug when the latter is seated.

5. A lockable closure for tanks comprising the combination of a plug designed to be seated by turning movement, an annular boss on the plug, a spring wire pin extending through the walls of the boss and passing across the inner space defined by the boss, the outer side of the wire pin being substantially tangent to the inner face of the boss, a slot in the boss behind the pin, a cap provided with an annular recess for receiving the boss rotatably mounted on the boss, a depending stud on the cap extending within the inner space defined by the boss, an annular groove in the side wall of the stud, a beveled edge on the stud just beyond the annular groove whereby as the cap is seated upon the plug the stud forces the pin into the slot until received by the groove, the cap and plug being thus held against relative axial movement though free for relative rotation, and a lock for holding the cap and plug against relative rotation when desired, the cap effectively covering the plug when the latter is seated.

6. A lockable closure for tanks comprising the combination of a threaded plug, a cap rotatably mounted on the plug, a groove in in the plug, a corresponding groove in the cap, a bolt completely enclosed by the cap adapted to enter both grooves when in registry and hold the cap and plug against relative rotation, and means for indicating when both grooves are in registry.

7. A lockable closure for tanks comprising the combination of a threaded plug; a cap rotatably mounted on the plug, a groove in the plug, a corresponding groove in the cap, a bolt completely enclosed by the cap adapted to enter both grooves when in registry and hold the cap and plug against relative rotation, and a spring actuated detent on the plug designed to fit into a depression in the cap when both grooves are in registry.

8. A lockable closure for tanks comprising the combination of a threaded plug, a cap rotatably mounted on the plug and completely covering it when the plug is seated on the tank, a lock external of the plug for holding the cap and plug against relative rotation and a countersink in the outer upper face of the cap, the outer end of the lock extending into the countersink but terminating below the outer upper face of the cap.

9. A lockable closure for tanks comprising the combination of a threaded plug having a groove in its upper face, a cap rotatably mounted on the plug and having a groove in its lower face, a bolt normally lying within the groove in the plug but not in the groove in the cap, a lock cylinder for moving the bolt to lie within both grooves and thus hold the plug and cap against relative rotation, and a countersink in the outer upper face of the cylinder, the outer end of the lock extending

into the countersink but terminating below the outer upper face of the cap.

10. A lockable closure for tanks comprising the combination of a threaded plug, a cap rotatably mounted on the plug and completely covering it when the plug is seated on the tank, a lock external of the plug for holding the cap and plug against relative rotation, a countersink in the outer upper face of the cap, the outer end of the lock extending into the countersink but terminating below the outer upper face of the cap, and means for draining off liquid from the countersink.

In testimony whereof we affix our signatures.

ASSAD M. MALLUK.
SIDNEY R. BELL.