May 8, 1945. A. M. MALLUK 2,375,671

TANK LOCK

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Fig. 1.

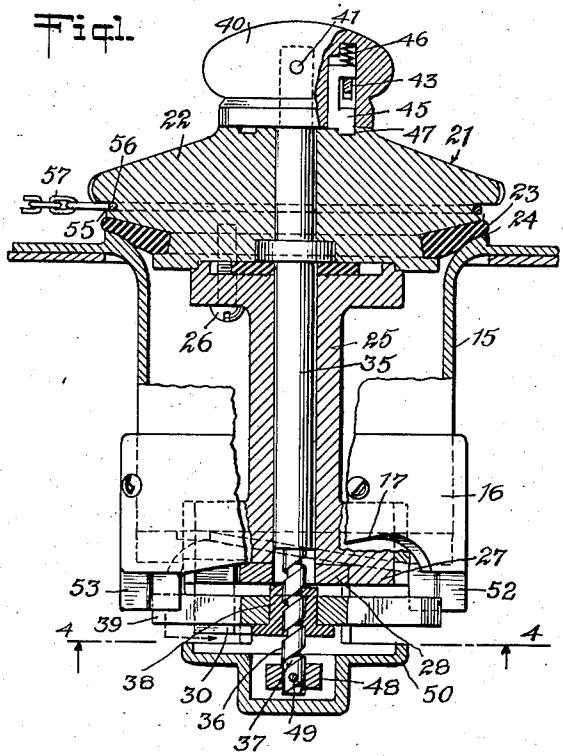


Fig. 2.

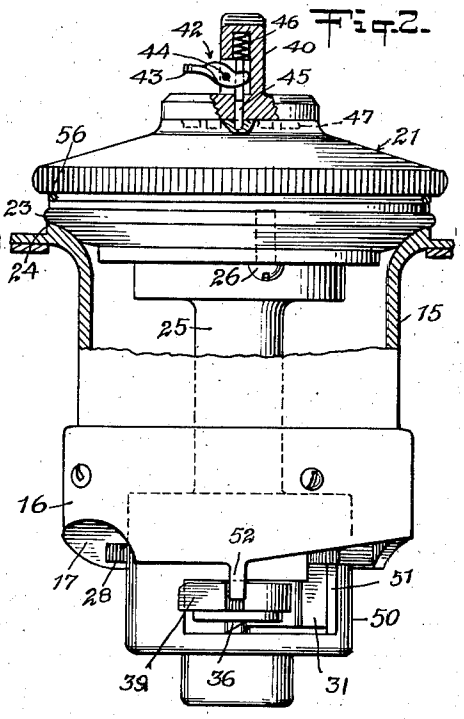


Fig. 3.

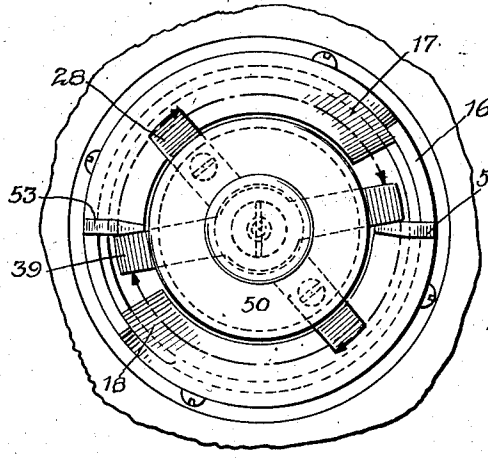
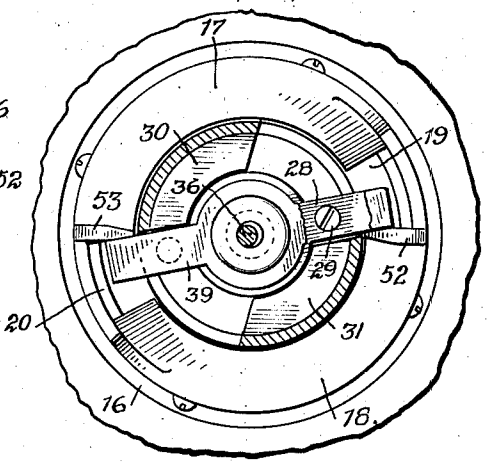


Fig. 4.



WITNESSES

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TANK LOCK

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Fig.5.

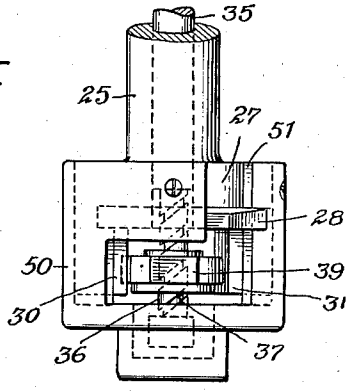


Fig.6.

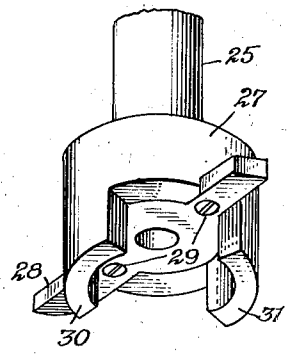


Fig.8.

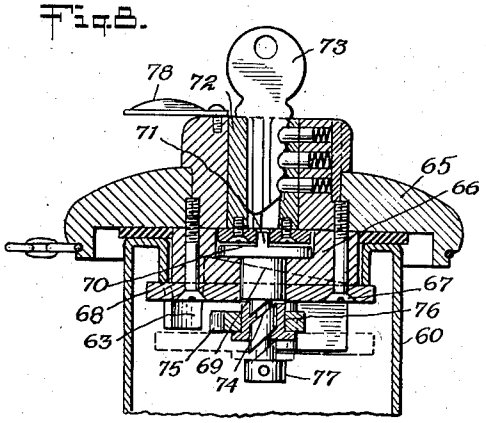


Fig.7.

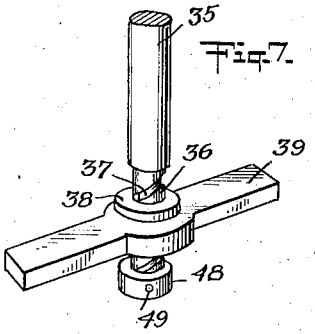


Fig.9.

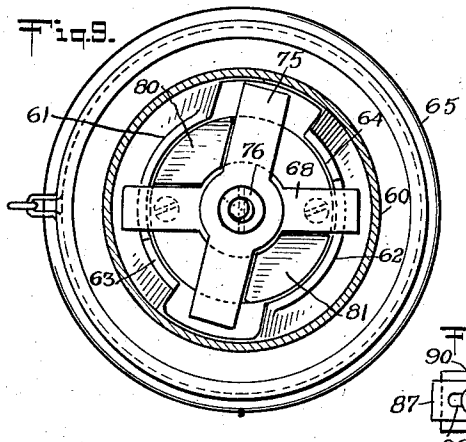


Fig.10.

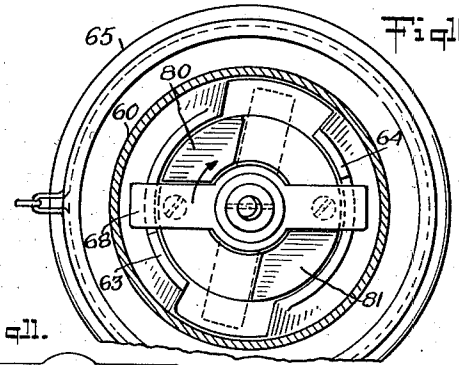
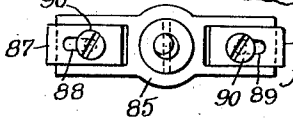


Fig.11.



WITNESSES

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TANK LOCK

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Fig12.

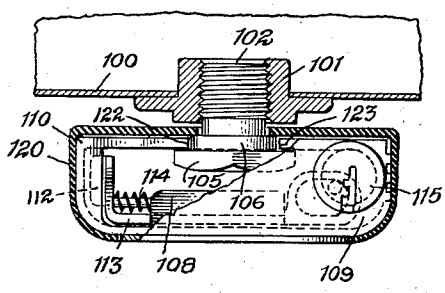


Fig15.

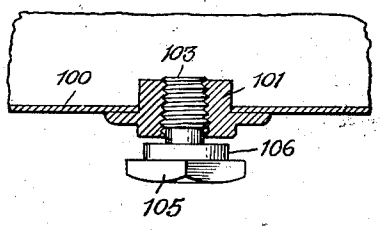


Fig13.

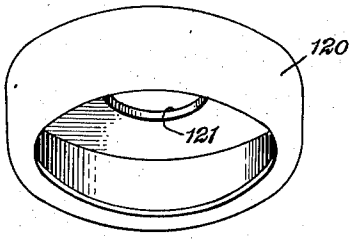


Fig16.

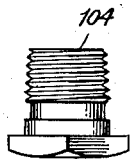
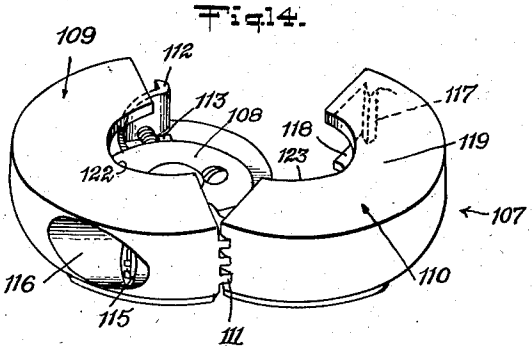


Fig14.



WITNESSES

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Patented May 8, 1945

2,375,671

UNITED STATES PATENT OFFICE

2,375,671

TANK LOCK

Assad M. Malluk, New York, N. Y.

Application April 13, 1943, Serial No. 482,861

9 Claims. (Cl. 70—168)

This invention relates to locks for necks of fuel tanks and while not limited to such is particularly directed to locks for fuel tanks of planes, cars, and similar vehicles.

An object of this invention is to provide a lock system which may not only prevent tampering with the contents of the tank but which will prevent the caps from becoming loose due to vibration, shock or the sharp turning of the vehicle.

With airplanes, which for the most part are kept under guard, the key lock is not always necessary. However, due to the vibration of flight, the sudden turns and stresses, a positive lock which will prevent the cap from becoming unscrewed is highly desirable. It is, therefore, one of the objects of this invention to provide a key lock which operates on the same principle and also to provide a complete tank security system whereby not only the filling neck but the drainage plug will be adequately protected.

Since no tank lock can be 100 percent effective unless the tank drain is also protected, I provide in combination with a neck lock means for preventing the draining of the tank by the removal of the drainage plug, and the resultant combination completely protects the car or other vehicle so that it is impossible to remove the gasoline therefrom without having the keys.

In the accompanying drawings,

Figure 1 is a side elevation in cross section showing my improved lock.

Figure 2 is a side elevation partly in section taken at right angles to Figure 1.

Figure 3 is an end view of my lock with the locking arms in locked position.

Figure 4 is a view taken on the line 4—4 of Figure 1 with locking arms in the unlocked position.

Figure 5 is a detailed view of the housing covering the locking arms.

Figure 6 is a detail view of the spindle with the housing removed.

Figure 7 is a detailed view of one of the locking arms on the operating shaft.

Figure 8 is a side elevation in cross section of a modification of my device for use with a key.

Figure 9 is a bottom view showing locking arms in locked position.

Figure 10 is a view similar to Figure 9 with the locking arms in register.

Figure 11 is a detailed view of a modified locking arm.

Figure 12 is a sectional side elevation of my improved plug lock.

Figure 13 is a perspective view of a protecting cover therefor.

Figure 14 is a perspective view of the lock.

Figure 15 is a sectional view showing the plug used to cover a small sized drain.

Figure 16 is a view of the plug used to cover the larger sized drain.

Referring more particularly to the drawings, Figures 1 and 2 each show a neck 15 of the type used on planes. The neck 15 is provided with a collar 16 having a pair of cammed faces 17 and 18 and openings 19 and 20 adjacent to the end of each cammed face. Lugs 52 and 53 are provided at the end of each cam face.

My improved cap 21 is provided with an exterior cap member 22, the lower part of which may be provided with a washer 23 which will insure tight contact with the mouth 24 of the neck 15. Depending from the cap member 22 is a shank 25 fastened to the underside of the cap member by means of the screws 26. The shank 25 is widened at its lower end to provide an enlarged member 27 which bears the fixed locking arm 28 screwed to the bottom thereof by means of the screws 29. It may also be provided with the abutments 30 and 31 to limit the movement of the movable locking arm hereinafter described. Mounted within the shank 25 is a shaft 35 having its lower end 36 cut with a high pitched spiral groove 37. Freely mounted thereon is a bushing 38 which is provided with internal lugs to engage said groove. Bushing 38 bears a movable locking arm 39. The shaft 35 extends not only through the shank 25 but through the cap portion 22 into the handle 40 which is rotatable upon the cap member 22. A pin 41 fixes the shaft in place in the handle.

Rotation of the operating handle 40 is governed by a spring release 42 comprising the lever 43 pivoted at 44 and engaging the pin 45 which in turn is normally depressed by the spring 46. The pin 45 registers with a plurality of depressions 47 to lock the operating handle in place. It may be seen that by depressing the lever 43, the operating handle 40 may then be turned to transmit rotation to the shaft 35.

In order to prevent the movable locking arm 39 from falling off at the end of the shaft, a bushing 48 is provided and held by the pin 49 through the shaft. The pitch of the spiral groove 37 is such that it and the weight of the arm 39 will tend to cause the movable arm 39 to rotate with the shaft when it is turned.

A second housing 50 may be provided to cover and protect the end of the shaft and the locking

arms and to aid in centering the cap. The housing 50 is provided with L-shaped openings 51 to allow the movement of the movable locking arms.

In use the movable arm and the stationary arm are held in register by the spring release 42 when the cap is out of the neck. The cap is inserted into the neck with the arms passing through the openings 19 and 20. The cap is then turned and tightened into position with the fixed locking arm 28 engaging the cam faces 17 and 18 of the collar 16 thus tightening the washer 23 against the mouth 24 and providing a tight fit. The spring release is then pressed down with the finger and the handle 40 turned in a clockwise direction. This causes the locking arm 39 to rotate with the shaft until it contacts the abutments 30 and 31 when it can rotate no further. As the shaft continues to rotate the locking arm then must rise on the shaft until it is brought into position against the housing 50 and behind the depending lugs 52 and 53 as shown in Figure 3. This locks the entire cap into position so that it may not be rotated to loosen the permanent locking arms' grip on the cam faces 17 and 18 and no amount of vibration can loosen the cap. The handle is held against turning by the spring release 42.

When it is desired to remove the cap, spring release lever 43 is pressed and the handle 40 turned in a counter-clockwise direction. This will drive the arm 39 downwardly on the shaft until the lugs 52 and 53 are cleared, when the arm will again rotate until it again engages the abutments 30 and 31 at which point they will be in register with the permanent locking arm 28. The entire cap can then be rotated until the locking arms register with the openings 19 and 20 when the cap may be removed.

In order to prevent possible loss of the cap, a groove 55 with a ring 56 attached to a chain 57 seated in the groove 55 may be provided. It will be understood that the ring 56 will rotate in the groove so that the chain 57 will not restrict the operation of the cap. The other end of the chain 57 may be fastened to any convenient fixture.

In the form shown in Figures 8, 9, and 10 the identical principle is involved except that the shaft is rotated by a key. This form is adapted to the ordinary automobile tank neck 60 which is provided with internal cam faces 61 and 62 terminating in lugs 63 and 64. The cap 65 instead of having a long shank as shown in the form heretofore described, engages a housing 66 which is fastened by means of the screws 67 to the bottom of the cap. The same screws fasten the permanent locking arm 68 to the bottom of the housing 66.

The shaft 69 extends through the housing and has a table 70 at the top thereof, which table is provided with a key 71 adapted to engage the bottom of the lock mechanism 72, controlled by the key 73. The bottom of the shaft 69 is provided with a spiral groove 74 and the movable locking arm 75 mounted on the bushing 76 engaging said groove. The bushing 77 holds the arm on the shaft. When the cap is inserted in the neck the arms are placed in register and the fixed locking arm 68 engages the cams 61 and 62. After the cap is in place, key 73 is turned causing the movable locking arm to turn in a clockwise direction until it has cleared the lugs 63 and 64 and engages the abutments 80 and 81 and then to ride upwardly behind the lugs 63 and 64 to lock the cap against rotation. The key may then be removed and the key hole covered by the cap 78.

When the cap is to be removed, the key 73 is inserted and turned until the movable arm 75 drops clear of the lugs 63 and 64 and then rotates into alignment with the locking arm 68 when the cap may be removed.

In the modified locking arm 85 extensions 86 and 87 are provided. These extensions are keyed into the arm 85 and are provided with slots 88 and 89 through which the screws 90 extend. It will be appreciated that the extensions 86 and 87 may be slid inwardly or outwardly and then fixed into position by tightening the screws 90.

It will be appreciated that many modifications of my cap may be made without departing from the spirit of my invention and that my invention resides primarily in the provision of a fixed locking arm adapted to hold the cap firmly within the neck against the cam faces and the further provision of a movable arm adapted to register with the fixed arm when the cap is unlocked and to rotate and move upwardly behind the lugs when the cap is in a locked position.

Every tank such as the tank 100 is provided with a plug drain consisting of a housing 101 adapted to receive the plug 102, these plugs may vary in diameter such as the plugs 103 and 104. I provide plugs adapted to fit any of the standard sizes with varying sized shanks but with a standard head 105 and with a standard annular portion 106.

My lock 107 consists of a base plate 108, a side member 109 and an additional side member 110 hinged to the member 109 at 111, a spring latch hook 112 is pressed outwardly by a spring 113 connected by means of a rod 114 to the lock 115 which is seated in the grooved portion 116 of the member 109. A catch member 117 is adapted to engage the spring latch 112 to hold the lock in a closed position. The member 110 has a lower wall 118 and an upper wall 119 both of which extend inwardly, the lower wall 118 contacting the base 108 while the upper wall forms with the member 109 an annular opening adapted to engage the annular face 106 of the plug.

In order to protect the lock, I provide an elastic cover 120 adapted to fit the entire lock 107. In applying my lock a plug of the proper size is inserted into the housing 101. The cover 120 is then placed with its opening 121 over the bolt and the lock 107 snapped about the head of the plug. The elastic cover 120 is then drawn over the lock 107 and the entire plug and lock are protected from tampering. The annular edges 122 and 123 form an opening slightly larger than the annular face 106 so that any rotation of the lock will not cause a loosening of the plug and it will be impossible to drain gasoline from the tank unless the person so doing has a key for the tank.

It may be seen that I have provided a means for complete security for fluid tanks whereby not only the neck of the tank but the drainage plug is protected.

I claim:

1. The combination with a neck having internal cam faces and lugs adjacent to said faces, of a cap, said cap having a fixed arm adapted to engage said cam faces, a movable arm adapted to engage said lugs and means for rotating said movable arm and causing it to ride upwardly behind said lugs to engage them.

2. The combination with a neck having internal cam faces and lugs adjacent said cam faces, of a cap therefor, said cap having a fixed locking arm adapted to engage said cam faces, a movable arm adapted to register with said fixed arm when said cap is in unlocked position and means for ro-

tating and elevating said movable arm to lock said movable arm behind said lugs, said means being operable externally of the cap.

3. A tank closure including a neck having an internal flange, openings in said flange, lugs on said flange, a closure cap, means on said closure cap to engage said flange and rotatable and upwardly movable means on said cap to engage said lugs to prevent movement of the cap.

4. The combination with a neck having internal flanges and lugs adjacent to said flanges of a cap therefor, said cap having a fixed locking arm adapted to engage said flanges, a shaft extending through said cap, a spiral groove in the end of said shaft, a second locking arm having internal lugs engaging said groove mounted on said shaft and means operable from the top of said cap to rotate said shaft and to cause said arm to rotate and ride upwardly on said shaft.

5. The combination of a neck having internal cammed surfaces and lugs adjacent to said cammed surfaces with a cap closure therefor, said cap having a fixed locking arm adapted to engage said cammed surface, a shaft extending through said cap, a means for rotating said shaft, a spiral groove on the lower end of said shaft, a movable arm mounted on the lower end of said shaft having lugs engaging said groove and abutments to limit the rotation of said movable arm.

6. A locking device for use in cooperation with a pair of depending lugs comprising a shaft, a spiral groove on the lower end of said shaft, a movable arm mounted on the lower end of said shaft having lugs engaging said groove, an abutment limiting the rotation of said arm, said abutment being so placed with relation to said lugs as to prevent the rotation of said arm beyond said lugs when said shaft is rotated and to cause said arm to move upwardly on said shaft behind said lugs.

7. A tank closure including a neck having a pair of lateral cammed surfaces, lugs adjacent said cammed surfaces, a closure cap therefor, said closure cap having projections adapted to engage said cammed surfaces to hold said cap in place, a shaft extending through said closure cap, a spiral groove on said shaft, a movable arm having lugs engaging said groove mounted on said shaft, stop means limiting the rotation of said arm whereby said arm will rotate with said shaft until it engages said stop means when it will rise upwardly on said shaft behind said lugs and a handle member on the exterior of said cap for rotating said shaft.

8. A tank closure including a neck having a pair of lateral cammed surfaces, lugs adjacent said cammed surfaces, a closure cap therefor said closure cap having projections adapted to engage said cammed surfaces to hold said cap in place, a shaft extending through said closure cap, a spiral groove on said shaft, a movable arm having lugs engaging said groove mounted on said shaft, stop means limiting the rotation of said arm whereby said arm will rotate with said shaft until it engages said stop means when it will rise upwardly on said shaft behind said lugs and key controlled means for rotating said shaft.

9. A tank closure including a neck having a pair of lateral cammed surfaces, lugs adjacent said cammed surfaces, a closure cap therefor, said closure cap having projections adapted to engage said cammed surfaces to hold said cap in place, a shaft extending through said closure cap, a spiral groove on said shaft, a movable arm having lugs engaging said groove mounted on said shaft, stop means limiting the rotation of said arm whereby said arm will rotate with said shaft until it engages said stop means when it will rise upwardly on said shaft behind said lugs and a handle member on the extension of said cap for rotating said shaft, said handle member having a releasable catch to prevent its accidental rotation.

ASSAD M. MALLUK.