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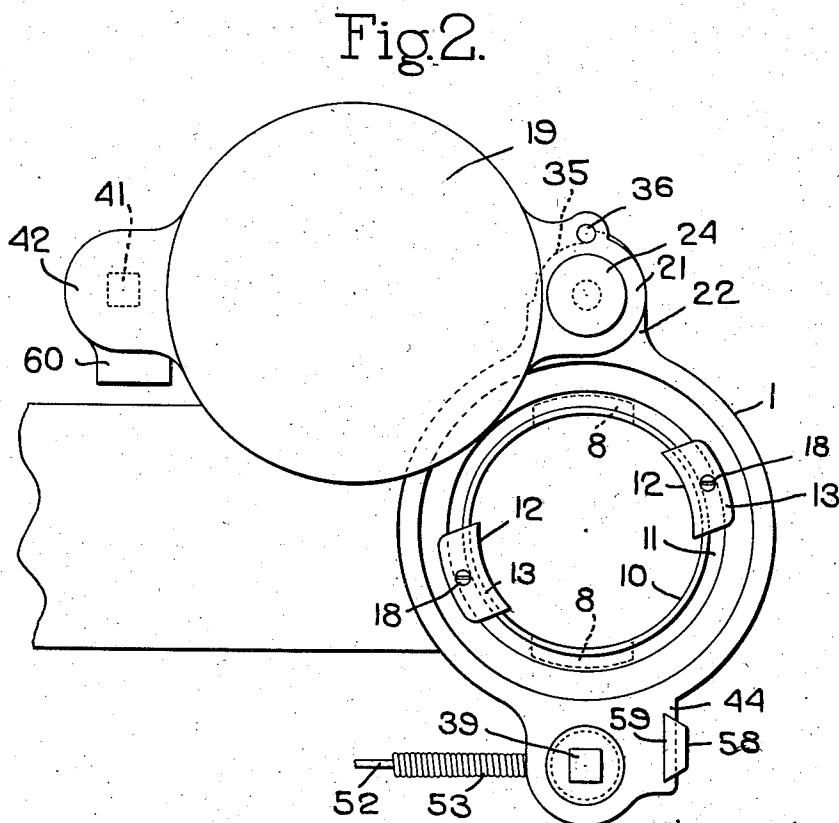
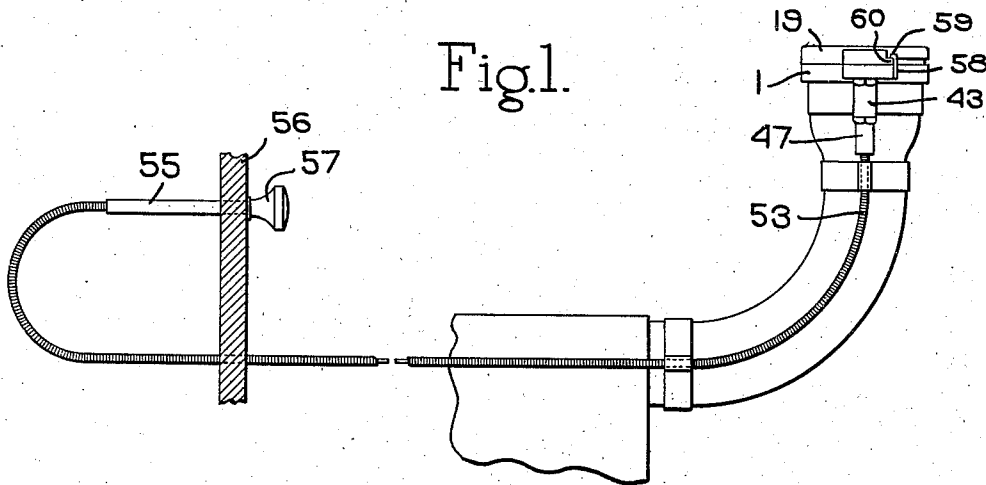
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SAFETY CLOSURE FOR FILLING TUBES OF TANKS

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2 Sheets-Sheet 1



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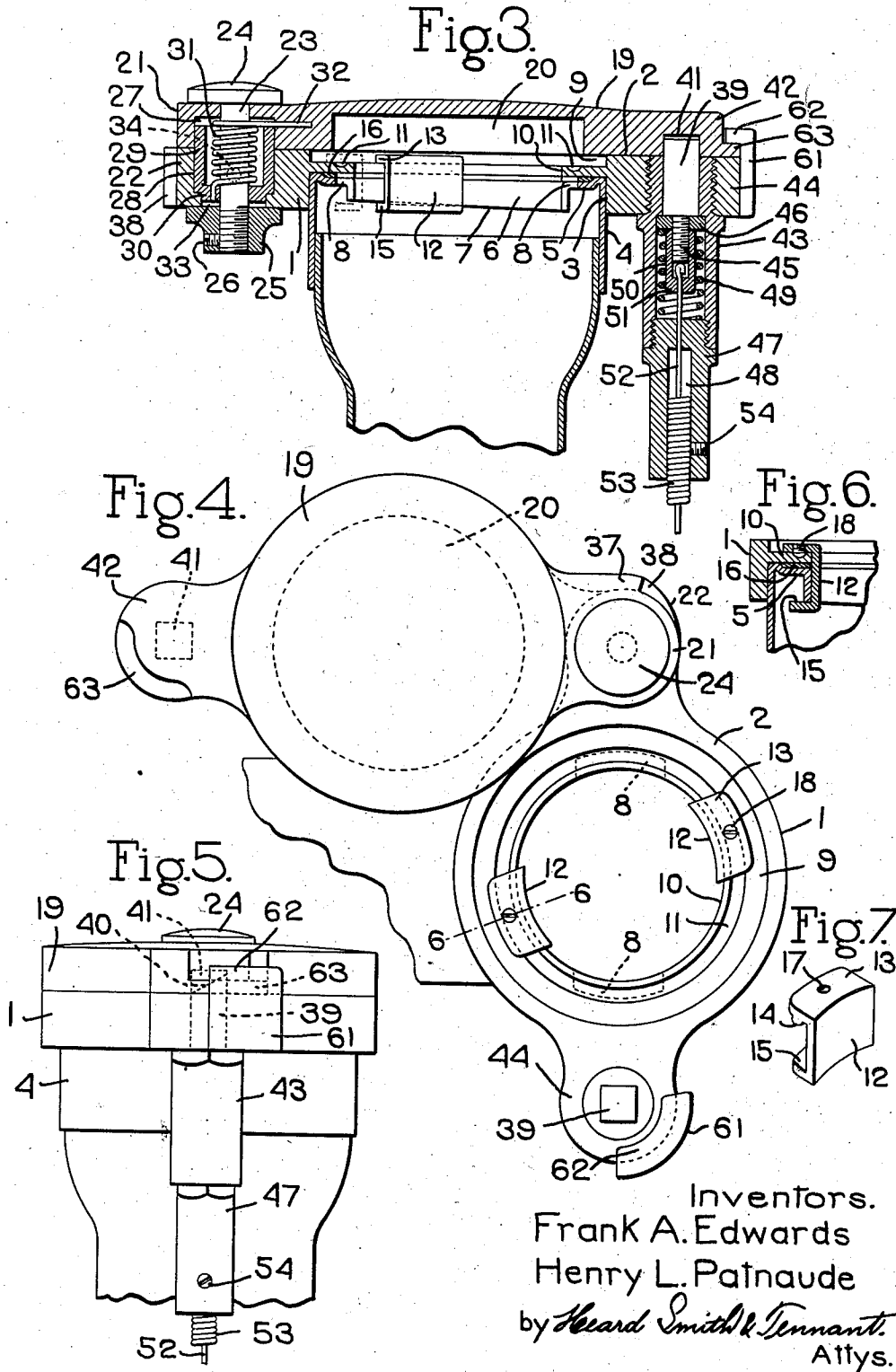
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UNITED STATES PATENT OFFICE

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SAFETY CLOSURE FOR FILLING TUBES OF TANKS

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2 Claims. (Cl. 220—35)

This invention relates to improvements in closures for the filling tube of a tank such as the tank for supplying fuel to an internal combustion engine, and more particularly to the fuel tanks of automobiles, and the object of the invention is to provide a safety closure having locking means which may be remotely controlled from such position as will prevent unauthorized access to the filling tank.

More particularly the invention relates to a closure for the filling tube of an automobile tank having locking mechanism which may be controlled by means mounted upon the dash or instrument board of the automobile and which is accessible only from within the car, so that when the doors of the car are closed and locked the filling tube cannot be opened and fuel surreptitiously removed therefrom.

Another object of the invention is to provide a safety closure of the character above described in which the cap for the filling tube is permanently connected to the tank and cannot be inadvertently lost.

Another object of the invention is to provide a closure of this character of such construction as will prevent entrance of water or dust into the tank.

Another object of the invention is to provide a safety closure, for the filling tube of a fuel tank, of such construction that it can be readily applied to usual standard forms of filling tubes for the gasoline tank of automobiles, and which can be so secured to the filling tube from within as to prevent detachment when the cap is closed.

Another feature of the invention is to provide a filling tube closure of the character described which will reduce the time required by the attendant of the gasoline station to open the filling tube for the purpose of introduction of gasoline and to close the tube after the tank has been filled.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

A preferred embodiment of the invention is illustrated in the drawings, in which,

Fig. 1 is a detail side elevation of the filling tube and a closure embodying the invention illustrating the manner in which the remote control for the cap-locking device is illustrated as extending through the instrument board or dash of the automobile which is illustrated in vertical section;

Fig. 2 is a plan view of the filling tube with the

closure embodying the invention applied to the upper end of the tube;

Fig. 3 is a vertical diametrical sectional view through the filling tube closure illustrating the cap in locked position;

Fig. 4 is a plan view of the construction illustrated in Fig. 3 which differs slightly from that illustrated in plan in Fig. 2;

Fig. 5 is an end elevation on a smaller scale showing the cap for the closure in locked position;

Fig. 6 is a detail view in vertical section illustrating the manner in which the plate upon which the cap is pivotally mounted is secured to the usual type of filling tube from within and therefore inaccessible when the cap is closed;

Fig. 7 is a detail view in perspective illustrating one of the ring clamps for securing the plate upon the upper end of the filling tube as shown in Fig. 6.

The filling tubes of automobile tanks of usual standard construction are provided at their upper ends with an inwardly extending flange having a downwardly projecting lip usually provided with two diametrically oppositely inclined or cam-shaped edges, the flange and lips being cut away at intervals to permit the introduction of a locking plate which is secured to the cap and which when introduced and then turned part of a revolution will engage the inclined or cam-shaped face of the lip and thereby lock the cap in place upon the end of the tube.

The present invention comprises a closure for the filling tube which is adapted to be applied to filling tubes of this character and is in the form of a flat metal plate having a countersink to fit over the end of the filling tube with means to secure the plate to the filling tube in such manner that when the cap is closed it will be inaccessible, thereby preventing removal of the appliance from the tube. The cap for the filling tube has a flat under surface complementary to that of the plate, and is pivotally mounted to swing laterally with the flat faces in engagement a sufficient distance to permit the upper end of the filling tube to be exposed. Resilient means desirably are provided tending normally to force the cap to open position with automatically operable means for holding the cap in closed position and provided with remotely controlled means mounted in a convenient position within the automobile for releasing the locking means when it is desired to fill the tank.

The closure mechanism for the filling tube as illustrated in the drawings comprises an annular

plate 1 having a flat upper surface 2 and provided with a countersink 3 adapted to fit upon the end 4 of a filling tube of usual standard construction which is provided with an inwardly extending flange 5 and a downwardly extending lip 6 having a lower inclined or cam-shaped edge 7. In such usual constructions the flange and lip are provided with diametrically opposite cut-away sections 8 through which the locking member of usual caps may be introduced, and the cap turned through a portion of a revolution to cause the locking members to engage the inclined or cam-shaped edges of the lip 7.

In the present construction the upper flat face 2 of the plate 1 is provided with an annular countersink 9 and the flange 10 thus provided desirably has near its edge an annular groove 11.

The plate 1 is locked upon the inwardly extending lipped flange 5-6 by a plurality, preferably two, ring clamps 12 of the general U-shape having a horizontal upper portion 13 desirably provided on its under face with a rib 14 which engages the groove 11 of the flange 10 and a lower horizontal portion 15 which extends beneath and engages the inclined or cam-shaped edge 7 of the downwardly extending lip 6 of the filling tube. The upper surface of the horizontal member 15 of the ring clamp is inclined slightly upwardly to prevent lateral displacement of the clamp.

The ring clamps 12 are of such length as to be readily inserted through the cut-away portions 8 of the flange and lip and thereafter moved circumferentially until the lower flange 15 of the clip firmly engages the inclined or cam-shaped edge 7 of the lip and with the upper flange 13 firmly secures the plate to the inwardly extending flange of the filling tube.

Desirably a gasket 16 is interposed between the horizontal flange 5 of the filling tube and the inwardly extending flange 10 of the closure plate 1. Preferably also the upper flange 13 of the ring clamp 12 is provided with a hole 17 having a screw threaded wall to receive a set screw 18 adapted to engage the wall of the groove 11 and thereby positively prevent circumferential displacement of the clamping ring.

By reason of this construction the plate 1 is so locked to the upper end of the filling tube from within that when the cap is in closed position it is inaccessible. This locking mechanism furthermore is such that the plate cannot be rotated in a direction to enable the ring clamps to be removed through the cut-away portions 8 of the filling tube flange and lip, and removal of the closure for the purpose of theft of fuel from the tank is therefore effectively prevented.

The opening in the plate which registers with the upper end of the filling tube is closed by a circular metal cap 19 complementary to the plate 1. The cap may if desired be provided with a chambered central portion 20 to decrease its weight. The cap 19 is provided with a rearward extension or boss 21 complementary to a similar extension 22 of the plate and is pivotally connected to the plate by a bolt 23 having a large head 24 and provided at its lower end with a nut 25 which may be locked in adjusted position by a set screw 26.

The extension of the cap 21 and the extension 22 of the plate are respectively provided with cylindrical countersinks 27 and 28 and a cylindrical sleeve 29, which is mounted in said countersinks, has a lower head 30 which rotatably fits upon the cylindrical stem of the bolt 23. A

spiral spring 31, which encircles the bolt 23, is anchored at its lower end in the head 30 and has at its upper end an extension 32 which is mounted in a suitable diametrical bore in the cap 19. The lower end of the head desirably is provided with a diametrical recess 33 adapted to be engaged by a spanner wrench in order that the sleeve may be turned in a suitable direction to place the spring 31 under tension tending to swing the cap to a predetermined preferably open position. When the sleeve 29 is thus rotated to tension the spring it is secured in adjusted position by a set screw 34 which is mounted in the extension 21 of the plate.

Suitable means are provided for arresting the opening swinging movement of the cap. As illustrated in Fig. 2 the extension 22 of the plate is provided with a cut-away portion 35 provided at its ends with shoulders adapted to be engaged by a pin 36 which is fixedly mounted in said cap and travels in the path concentric with the wall of said cut-away portion. As illustrated in Fig. 4 the extension 21 of the cap is provided with a downward projection 37 which is adapted to engage a shoulder 38 on the extension 22 of the plate 1.

The means for locking the cap in closed position comprises a bolt 39 having a beveled upper end 40 (see Fig. 5) positioned to engage a suitable recess 41 extending upwardly from the under face of the extension 42 of the cap. The bolt 39 desirably is of rectangular form and reciprocally mounted in a complementary guideway in the upper end of a sleeve 43 having a screw threaded upper end which engages complementary screw threads in a vertical aperture through an extension 44 of the plate. The bolt 39 is provided with a screw threaded stem 45 having mounted upon it a nut 46 which is reciprocally mounted in a cylindrical bore in the lower section of the sleeve. The lower end of the sleeve 43 is tapped and has secured to it the upper end of a nipple 47 having a small central aperture therethrough and an enlarged countersunk portion 48. A spring 49, which is seated upon the upper end of the nipple and at its upper end engages the nut 46, normally tends to force the bolt upwardly into locking position.

Suitable means are provided for connecting the bolt to a device which will permit remote control of the locking bolt. In the preferred embodiment illustrated the screw threaded portion 45 of the bolt is provided with a hollow nut 50 having a head 51 provided with a small central aperture and a wire 52 leading to the remote control device extends through the bore in the upper end of the sleeve and through the bore in the nut and is bent over within the hollow nut 50 in such manner that when the wire is pulled lengthwise the nut 50 and the bolt 39 will be withdrawn from locking position. The bolt-actuating wire 50 desirably is enclosed in a coiled wire flexible sheath 53 one end of which extends into the countersink 48 of the nipple 47 and is fixedly secured thereto by a set screw 54. The sheath-enclosed wire which is usually known as a Bourdon wire, extends longitudinally of the machine and is bent backwardly and the sheath is secured at its remote end to a sleeve 55 which is mounted in the instrument board or dash 56 of the automobile. The wire 52, which extends through the sheath and is reciprocable therein, has its remote end secured to a knob 57 normally held against the rear face of the instru-

ment board or dash by the action of the spring 49.

The knob 57 therefore constitutes a remote control device which when drawn away from the instrument board pulls the locking bolt 39 downwardly thereby releasing it from engagement with the socket in the cap and permitting the cap to be swung from the closed position illustrated in Figs. 1 and 3 to open position illustrated in Figs. 2 and 4.

Obviously when all of the doors of the car are locked this bolt is inaccessible so that when the cap is in locked position it cannot be swung laterally to expose the open end of the filling tube. Theft of fuel is thereby effectively prevented.

Complementary means are provided upon the plate and cap to prevent the cap from being pried up or broken off to permit access to the fuel. In the construction illustrated in Figs. 1 and 2 the extension 44 of the plate has welded to it a boss 58 having an extension 59 adapted to overlie a boss or extension 60 which is integral with the extension 42 of the cap. An equivalent construction which is shown in Figs. 4 and 5 comprises a boss 61 integral with the extension 47 of the plate which has an inwardly extending flange 62 adapted to overlie a countersunk portion 63 of the extension 42 of the cap. The bosses 58 and 61 also act to limit the closing movement of the cap and to position the recess 41 in the cap in accurate alinement with the upper end of the bolt 39. The beveled upper end 40 of the bolt 39 enables the cap to be swung into locking position as the flat under face of the cap will, when it engages the beveled upper end of the bolt, force the bolt downwardly compressing the spring 49 until the recess 41 is in alinement with the bolt, whereupon the bolt will be thrust upwardly by the spring into the locking position illustrated in Fig. 3.

In the operation of the device the bolt 39 normally is maintained in upwardly extending position in engagement with the socket in the cap, as illustrated in Figs. 1 and 3. When the operator of the automobile desires to refill the tank he stops at a filling station, thereupon pulls upon the knob 57 which is conveniently located upon the dash sufficiently to withdraw the bolt 39 from locking position. The spring 31 thereupon swings the cap laterally to open position, as illustrated in Figs. 2 and 4. The attendant at the gasoline station may thereupon introduce the desired amount of gasoline into the tank and after having removed the filling hose swing the cap to closed position. Inasmuch as the bolt is restored by the spring 49 to locking position immediately when the operator of the car releases the knob 57 the cap is automatically locked in closed position. By reason of this construction the attendant is relieved of the necessity of removing the cap as is customary and placing it in a convenient location and afterwards restoring the cap to its locked position, thereby saving a considerable amount of time which otherwise would be required. Furthermore, there is no danger that the attendant of the gasoline station will fail to replace the cap or properly to lock the cap in place as the only act which he is required to accomplish is to swing the cap to closed position.

By reason of the pivotal connection between the cap and the plate which comprises a sleeve of large diameter which extends both into the

plate and cap, the flat contacting surfaces of the sleeve and cap are maintained in tight engagement which will exclude the admission of water and dust into the filling tube, thereby preventing contamination of the fuel by the presence of water or dust.

In certain types of automobiles the filling tube extends through one of the rear fenders and in such cases a suitable hole is bored in the fender to receive the sleeve which encloses the locking bolt. In such constructions, therefore, additional means are provided for preventing rotative movement of the sleeve relatively to the upper end of the filling tube, thus further insuring inaccessibility to the filling tube by predatory individuals.

While the present invention has been more specifically described with reference to its applicability to the filling tubes of gasoline tanks of automobiles, it will be understood that the invention may be applied to the filling tube of any tank in which a remote control of the locking mechanism for the filling tube cap is desirable.

It will be understood that the particular embodiments of the invention disclosed herein are of an illustrative character and are not restrictive of the meaning and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A safety appliance for closing a fuel tank filling tube having an internal flange provided with downwardly extending lips presenting spaced inclined lower edges comprising an annular plate having a downwardly extending flange to fit the end of the filling tube and presenting an upper flat face provided with an inner annular countersunk portion having a concentric groove, a plurality of spaced narrow ring-clamp members having means to engage respectively the groove of the countersink and one of the inclined edges of said lip, each of said ring clamps having a set screw engaging said plate to prevent displacement of said ring clamps, a cap having a flat face complementary to and engaging the flat face of said plate, means pivotally connecting said cap to said plate to permit the cap to swing laterally with said flat faces in contact, resilient means connecting said plate and said cap normally tending to swing said cap to open position, and remotely controlled means for locking said cap to said plate when in closed position.

2. A safety appliance for closing a fuel tank filling tube comprising an annular plate having means fitting the end of said filling tube and internally secured thereto and presenting a flat upper surface, a cap having a flat surface complementary to that of said plate closely engaging the same, means pivotally connecting the cap to the plate comprising a sleeve seated in complementary extensions of said plate and cap, a spring having one end secured to said cap and the other end to said sleeve and adapted to be so placed under tension by rotation of said sleeve as to swing the cap to a predetermined position, means for securing the sleeve in adjusted position, a bolt extending axially through said sleeve and said cap and remotely controlled means for locking said cap in closed position.

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