United States Patent [19]

Slavin

[11] **3,880,214**

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[54] **ATTACHMENTS FOR PREVENTING FUEL PILFERAGE AND INCORRECT FUEL SUPPLY**

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[73] Assignee: **Albert C. Nolte, Jr.**, Jericho, N.Y. ; a part interest

[22] Filed: **Oct. 20, 1972**

[21] Appl. No.: **299,390**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 129,800, March 31, 1971, abandoned.

[52] **U.S. Cl.** **141/346**; 137/384.2; 251/149.6

[51] **Int. Cl.** **B65b 3/04**

[58] **Field of Search** ..... 137/384.2, 384.6, 384.8; 141/98, 207, 208, 291–296, 346–354; 220/86 AT, 55 K, 55 Z, 55 W, 55 Y; 222/74, 153, 517, 536, 537; 251/149.2, 149.6, 149.7; 285/93

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Primary Examiner—Houston S. Bell, Jr.
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Attorney, Agent, or Firm—Nolte and Nolte

[57] **ABSTRACT**

Interacting attachments for both a fuel filler pipe for a tank to be supplied with fuel, and a fuel pump nozzle. The attachment on the nozzle interacts with a mating attachment in the filler pipe of a vehicle to open a nozzle closure element, without, however, the mating attachment interfering with the standard fuel pump nozzles being used at gasoline filling stations. The attachments are also designed to prevent the accidental supplying of the wrong fuel to the tank, such as diesel fuel instead of ordinary gasoline.

8 Claims, 17 Drawing Figures

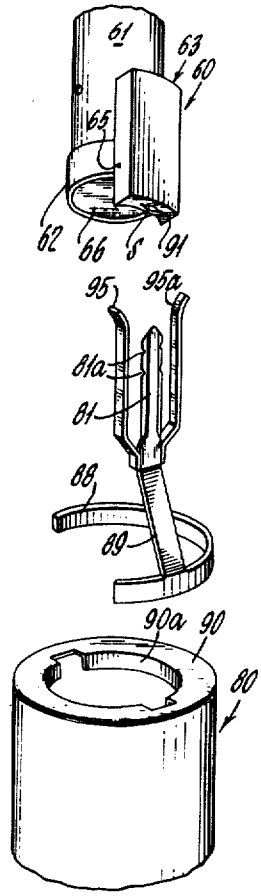


Fig. 1.

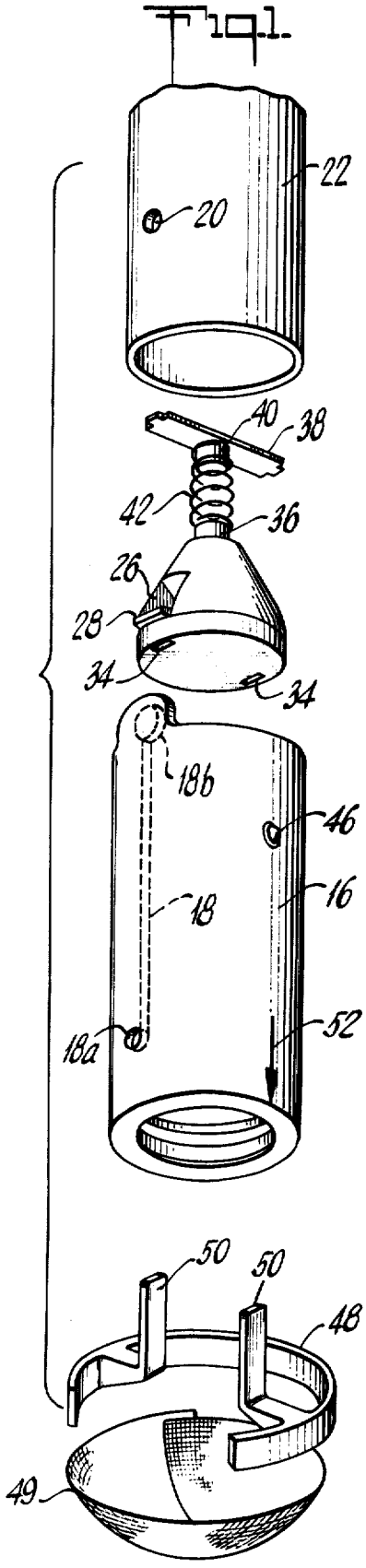


Fig. 8a.

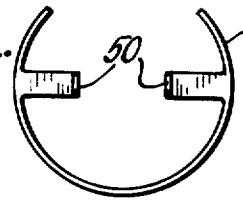


Fig. 8b.

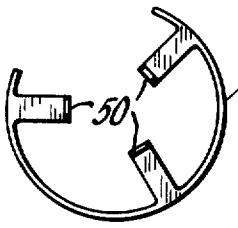


Fig. 8c.

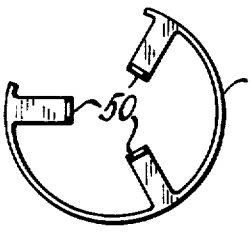


Fig. 9a.

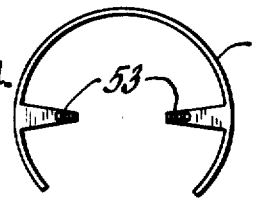
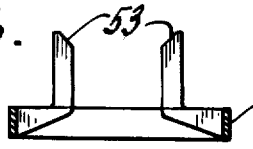


Fig. 9b.



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Fig. 2.

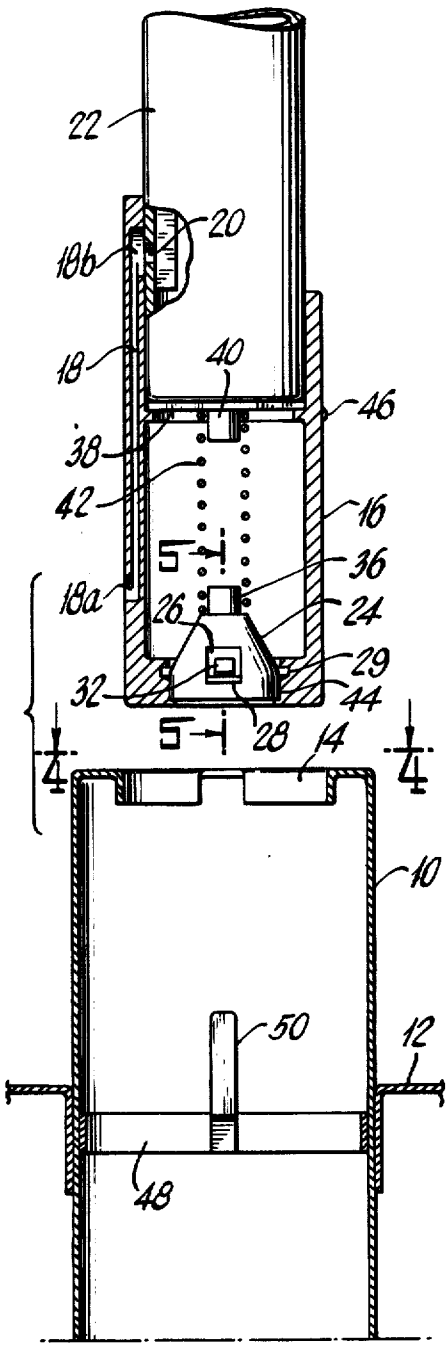


Fig. 4.

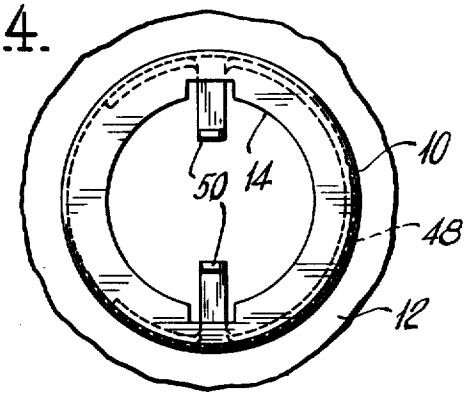
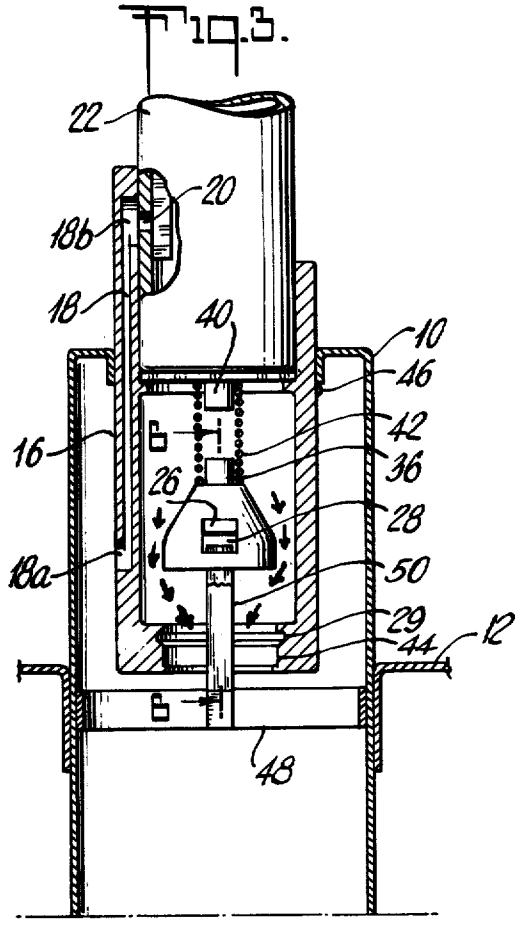


Fig. 3.



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FIG. 5.

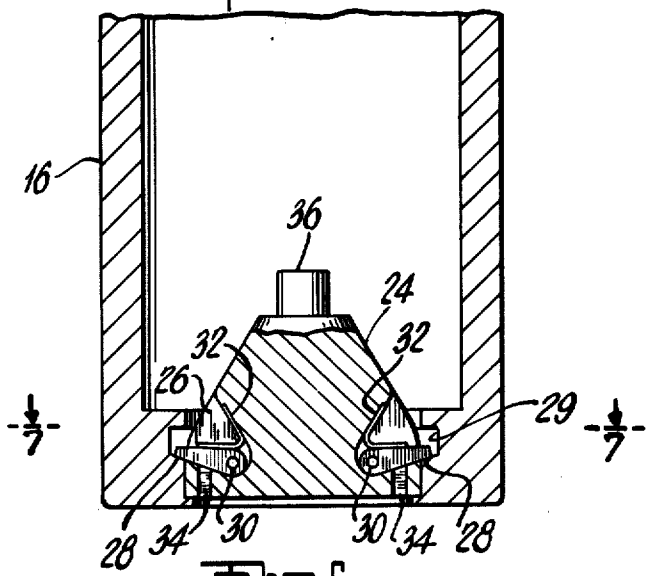


FIG. 6.

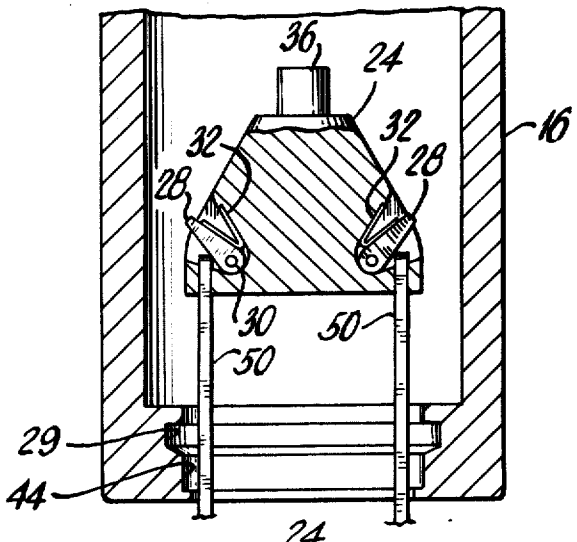
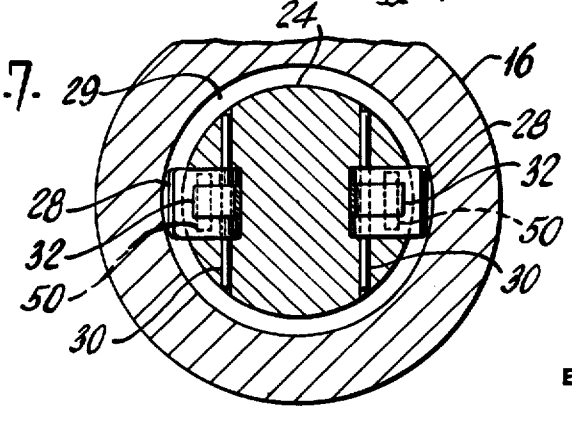


FIG. 7.



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Fig. 10.

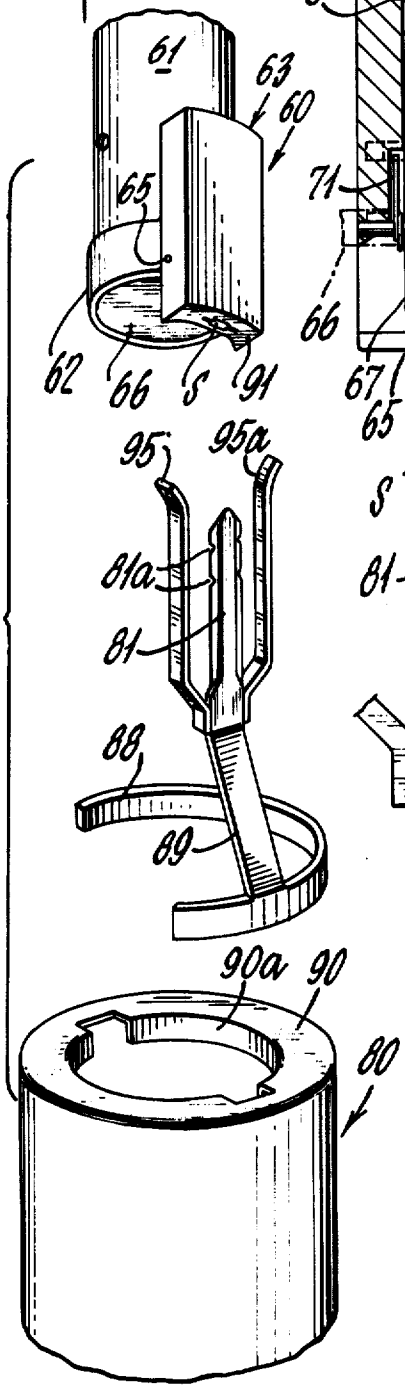


Fig. 12.

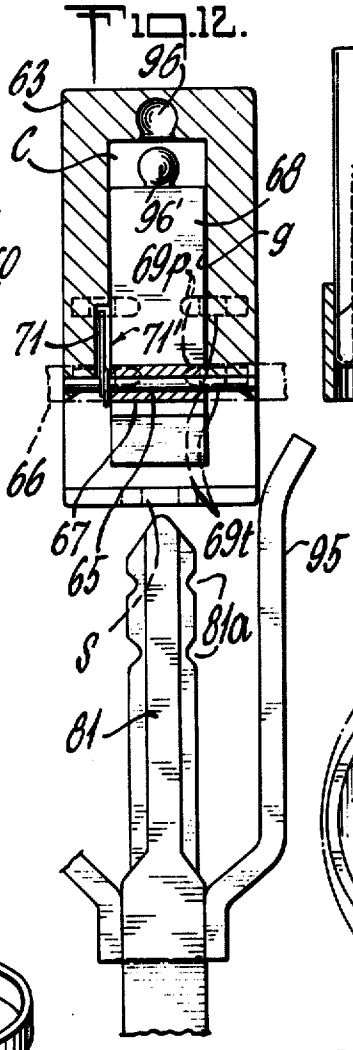


Fig. 11.

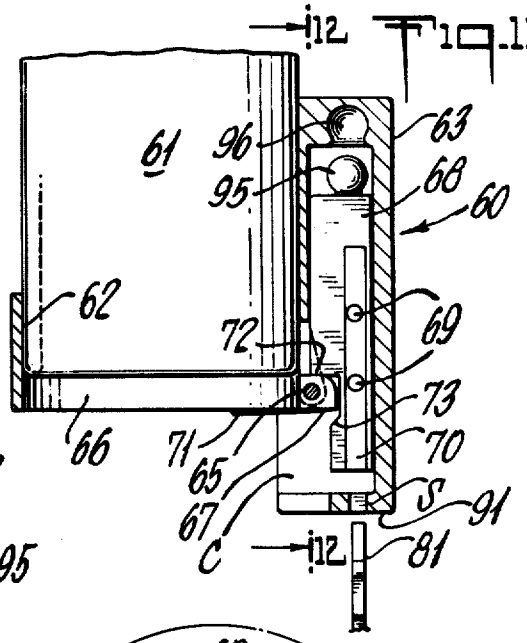


Fig. 13.

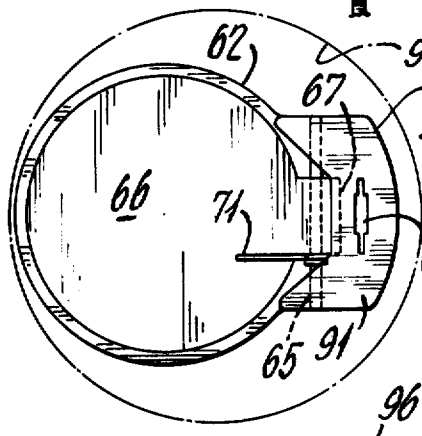
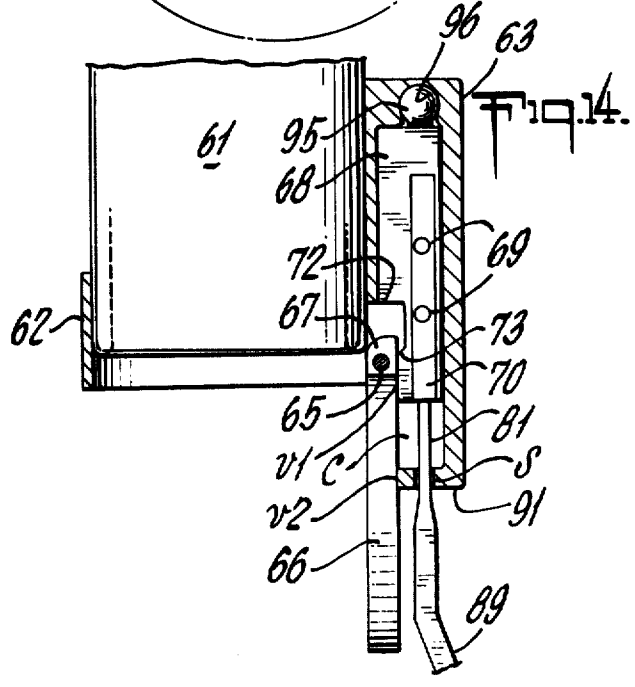


Fig. 14.



ATTACHMENTS FOR PREVENTING FUEL PILFERAGE AND INCORRECT FUEL SUPPLY

This is a continuation-in-part of copending application Ser. No. 129,800, filed Mar. 31, 1971 now abandoned.

The present invention relates to an arrangement whereby the attachments on the respective fuel filler pipe and fuel pump nozzle interfit to permit the opening of a nozzle closure element and allow the fuel to be discharged from the pump nozzle to the fuel filler pipe of the tank.

It is an object of the present invention to provide interfitting attachments on a fuel pump nozzle and a fuel filler pipe respectively which permits only a fuel tank having a filler pipe provided with the attachment to be connected to a pump nozzle incorporating a corresponding attachment, thereby opening the closure and permitting fuel to be supplied to the fuel tank.

Another object of the present invention is to provide corresponding projections and slots on the fuel filler pipe and fuel pump nozzle respectively which have a configuration that permits only the supplying of the correct fuel to the fuel tank.

A further object of the present invention is to provide easily observed alignable indicators on the fuel pump nozzle and fuel filler pipe for readily determining the "home" position of the nozzle and pipe with both accuracy and speed.

Another object of the present invention is to provide a structure in the fuel filler pipe neck which holds the nozzle closure element in an open position.

A further object of the present invention is, in one embodiment thereof, to provide a multiplicity of projecting pivoting catches which are normally biased against the inside wall of the nozzle attachment and engage in an annular groove therein, thus preventing the fuel valve, upon which the catches are mounted, from being normally forced open.

In conjunction with the pivoting catches, another object of the present invention is to provide a fuel filler pipe attachment in the form of a discontinuous ring with a plurality of spaced projections thereon for opening the nozzle valve. The ring can be easily inserted and fixed within the filler pipe.

Still another object of the present invention is to provide attachments for fuel filler pipes that have various numbers of projections and arrangements for different vehicle fleet operations.

In another embodiment of the invention, there is provided a novel linearly slidable key cylinder or block on the nozzle, and operable via a key projection in the filler pipe to open the nozzle closure.

The invention is illustrated by way of example in the accompanying drawings which form a part of this application and in which:

FIG. 1 is an exploded view of the closure attachments for a fuel filler pipe and a fuel pump nozzle in accordance with the teachings of the present invention;

FIG. 2 is a side elevation view of the assembled attachments shown in FIG. 1, but prior to the insertion of the fuel pump nozzle in the fuel filler pipe;

FIG. 3 is a side elevation view similar to FIG. 2, but with the fuel pump nozzle inserted within the fuel filler pipe and closure attachments opened to permit the flow of fuel;

FIG. 4 is a view taken along the lines 4—4 of FIG. 2;

FIG. 5 is a partial, enlarged sectional view showing the pivoting latches in a closed condition;

FIG. 6 is a partial, enlarged sectional view showing the pivoting latches in an open condition taken along the lines 6—6 of FIG. 3;

FIG. 7 is a sectional view taken along the lines 7—7 of FIG. 5;

FIGS. 8*a*, 8*b* and 8*c* are top plan views, respectively, of different arrangements of the upstanding projections on the discontinuous ring;

FIG. 9*a* is a top plan view of upstanding projections on a discontinuous ring which is keyed for a particular type type of fuel;

FIG. 9*b* is a side elevation view of the structure shown in FIG. 9*a*;

FIG. 10 is an exploded view of the closure attachment for a fuel filler pipe and a fuel pump nozzle in accordance with another embodiment of the invention and utilizing a key projection and lock construction;

FIG. 11 is a partial sectional view of the nozzle and closure attachment shown in FIG. 10;

FIG. 12 is a sectional view taken along the line of 12—12 of FIG. 11;

FIG. 13 is a bottom plan view of the nozzle closure attachment of FIGS. 10–12 showing the inner periphery of a fuel filler pipe in broken lines; and

FIG. 14 is a partial sectional view of a nozzle closure attachment in the open position with the key projection positioned to unlock the lock.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1–3, a fuel filler pipe **10** is shown which extends from a vehicle chassis **12**. The pipe **10** has an open end **14** through which a tube extension attachment **16** on a fuel pump nozzle **22** is inserted. The tube extension **16** is attached in any well known manner to the fuel pump nozzle **22**. It should be noted that other means of attachment of the tube extension **16** to the nozzle **22**, such as by screw threads, may be employed within the scope of the present invention.

Referring to FIG. 1, a conically-shaped closure valve **24** is shown provided with a plurality of notches **26** spaced around the periphery thereof and having latches **28** therein. As seen in FIGS. 5–7, the latches **28** are pivoted at **30** and are provided with springs **32** that normally bias the latches **28** in an outward direction. The valve **24** is further provided with openings **34**, the purpose of which will be set forth in detail hereinafter. Projecting from the valve **24** is a circular post **36**. A crossbar **38** is shown which is inserted and fixed within the tube extension **16** and has a depending circular post **40** of essentially the same configuration as circular post **36**. Surrounding the circular posts **36** and **40** is a compression spring **42**. Thus, the compression spring **42** biases the valve **24** into a closed position in the opening **44** of the tube extension **16**, as seen in FIG. 2. The latches **28** additionally maintain the valve **24** in this closed position, as will be explained hereinafter. It will be noted that there is also a spring-pressed ball type latching projection **46** on the outer surface of the tube extension **16**.

The attachment fixed within the fuel filler pipe **10** is a discontinuous ring **48** having upstanding projections **50**. The compressible ring **48** is easily inserted in the fuel filler pipe **10** adjacent to the open end **14** thereof and secured therein in any well-known manner, such as

by a fast-bonding, high strength adhesive. Secured to the ring **48**, across the opening thereof is a concave mesh disc **49** which functions to prevent siphoning of the fuel. The mesh openings are of a diameter to permit the substantially unimpeded flow of fuel through the filler pipe **10**.

As seen in FIG. 3, the tube extension **16** is inserted within the filler pipe **10** with the latching projection **46** engaged behind the edge of the open end **14** of the filler pipe **10**. Thus, when the openings **34** through the bottom of the valve **24** are aligned with the upstanding projections **50** on the ring **48** fixed in the filler pipe **10**, the projections **50** pass through the openings **34** and respectively engage latches **28**, and as seen in FIG. **6**, pivots the same against the pressure of the springs **32**, which are weaker than compression spring **42**, whereby the latches are pivoted upwardly on pivots **30** and clear the annular groove **29** in the extension nozzle **16**. Morover, the valve **24** is elevated from its valve seat in the extension nozzle **16** against the pressure of compression spring **42**. When this occurs, the fuel in nozzle **22** and the tube extension **16** passes in the direction of the arrows illustrated in FIG. 3 and into the filler pipe **10**.

As seen in FIGS. **1**, **2** and **3**, the tube extension **16** is provided with a passage **18** which opens to the exterior of the tube extension **16** at **18***a*, at one end thereof, and communicates at the end **18***b* with the opening **20** in the pump nozzle **22**. Thus, as seen in FIG. **3**, an unobstructed air passage is formed leading from the fuel filler pipe **10** to the pump nozzle **22** to thereby ensure the automatic closing of the valve (not shown) in the fuel nozzle and the shut-off of the fuel supply to the pipe **10** when the fuel tank is filled and the fuel rises in the pipe **10** to cover the opening **18***a* of the passage **18**. The fuel shut-off arrangement is known in the art and the present construction merely extends the length of the passage **18** from the pump nozzle **22** to the tube extension **16**.

The tube extension **16** is provided with a scribe mark **52** on the outer periphery thereof which is adapted to be aligned with another scribe mark **54** on the fuel filler pipe **10** so that the upstanding projections **50** are properly aligned to pass through the openings **34** in the valve **24**.

FIGS. **8***a*, **8***b* and **8***c* show different arrangements of the upstanding projections **50** on the ring **48**. In this connection the two projections **50** in FIG. **8***a* are diametrically opposite and in FIG. **8***b* the three projections **50** are at approximately 90° to each other while in FIG. **8***c* the three projections **52** are at approximately 120° to each other.

FIGS. **9***a* and **9***b* show upstanding projections **53** which are perpendicular to the plane of the projection. Thus, for example, the ring **48** with the projections **50** can be used for ordinary gasoline while the ring **48** with the projections **53** may be utilized for diesel fuel and since the configurations are different there is no possibility that diesel fuel may be supplied to the fuel tank instead of gasoline, or vice versa.

In another preferred embodiment of the invention, shown in FIGS. **10–14**, a key operated and locking closure device **60** is secured via integral collar **62** by any conventional means, not shown, to the end of nozzle **61**. Of course, a locking and closure portion of the device **60**, to be described, could be manufactured as part of the nozzle or secured thereto by means other than an integral collar.

The lock housing **63** pivotally supports a closure cap **66** at a peripheral extension **67** thereof via pivot pin **65** carried by the housing. Within the cavity C of the housing **63** there is disposed a lock slide **68** held in position by the tumblers of pin and tumbler arrangements shown generally at **69***p* and **69***t*, extending between the lock slide and lock housing **63** in aligned cyclindrical guideways *g*. The pin and tumblers **69** are biased inwardly towards keyway **70**, are held in place by conventional lock structures, not shown, and are slidable toward and away from the keyway axis. As is usual, when the pins are depressed they act to dispose the tumblers within the housing to form a rigid column, consisting of the key, pins and slide, moveable within the housing.

As most clearly disclosed in FIG. **12**, spring **71** coiled about pivot pin **65** bears against an inner surface of lock housing **63** within the spring retainer area **71'** (best seen in FIGS. **11** and **12**) and the bottom of closure cap **66**, thus biasing the cap toward the closed position, as seen in FIG. **11**, in which position the upper surface of the peripheral extension **67** of closure cap **66** underlies and is retained in the closed position via surface **72** of lock slide **68**.

Below extension **67** is camming surface **73** of the lock slide, the functioning of which shall be described.

Within the filler pipe **80** is disposed the key **81** supported on the discontinuous and compressible ring **88** via projection **89** extending upwardly and inwardly of the filler pipe to position the key **81** past the aproned entry flange **90** for vertical alignment with the keyway **70** and false bottom **91** and key entry slot S of the lock housing **60**.

The ring **88** is inserted and secured to the filler pipe, again, in any well known manner such as by fast-bonding or the like. In this particular embodiment, extension **89** at its upper end provides a forked guideway **95–95***a* for receiving the sides of a lock housing **63** to thereby center key **81** relative to the keyway **70**, and in this respect, the outer surfaces of revolution of the collar **62** and lock housing **60** are so positioned relative to the inner surface of revolution of the aproned portion **90a** of filler pipe **80** as to assist in aligning the key **81** and the keyway **70**.

Thus, when the nozzle **61** incorporating the key operating locking device **60** of this embodiment of the invention is inserted into the filler pipe, the sides of the housing **63** meet the outwardly diverging ends of forked guide **95–95***a* to guide the key **81** through the slot S of false bottom **91** of the housing into the keyway **70** of lock slide **68** whereby the cuts **81***a* of key **81** positions the pins and tumblers to thereby release the slide for vertical movement upwardly via the upward force of key **81** upon the pins and slide, the tumblers now being disposed within the housing. Resultingly, camming surface **73** contacts the lower edge of extension **67** to open the closure **66** against the bias of spring **71**. A slide holding knob **96'** at the top of lock slide **68** is pressed into the slide holding knob catch **96** to hold the closure **66** in the opened position in the filler pipe against the bias of spring **70** with the lower surface of closure **66** pressed against vertically aligned surfaces *v*1 and *v*2 of slide **68** and housing bottom **91**. The slide knob and catch arrangement prevents the sliding of slide **68** and thus the nozzle from inadvertently being

dislodged from the filler pipe during unattended filling as the key is now captured in the retained slide.

Upon withdrawal of the nozzle **60** from the filler pipe **80**, the key is withdrawn from the keyway and slot S in the false bottom **91**. During withdrawal of the key, contact between the key and pins effects relative sliding movement between the slide and housing pulling the knob **95** from catch **96**, bringing surface **73** below pivot pin **65** to permit extension **67** to pivot under pressure from spring **71**. Surface **72**, while descending, contacts extension **67** during closing of closure **66** and assists spring **71** in that function until closure **66** is again retained in the closed position as previously described. Key **81** is then permitted to be withdrawn fully as pins and tumblers **69** are again aligned in the slide and housing guideways and are movable via the peaks of the key, away from the axis of the keyway against the bias of the inner lock structures.

It is noted that in the embodiment in FIGS. **10–14** the lock slide is rectangular in shape as opposed to the usual cylindrical lock tumbler construction to assure alignment of the tumblers **69**. It should also be noted that the slide and housing could be curved along the vertical axes thereof to accommodate nozzle curvature, for instance.

It should also be noted that in the embodiment of FIGS. **10–14**, the closure element **66** is totally outside of the nozzle, offering no resistance to gas flow when opened and could be constructed so that the nozzle is under gas feeding pressure at all times, if desirable.

The constructions herein are strong deterrents to fuel pilferage which is a serious problem with vehicle fleet owners as well as preventing the wrong fuel being accidentally supplied to the fuel tank, the latter also being a serious problem. The above-described attachments are fitted in the standard fuel filler pipe and fuel nozzle respectively, easily and inexpensively. In addition, the attachment in the vehicle filler pipe will not prevent that vehicle from receiving fuel from an ordinary fuel pump which does not have a corresponding tube extension attachment in its standard fuel nozzle.

What is claimed is:

1. Apparatus for preventing fuel pilferage and/or incorrect supply, comprising the combination of coacting attachments on a fuel filler pipe member and fuel pump nozzle member, said attachments including an element in one of said members having at least one outwardly, axially extending projection, a tube on the other of said members, means for opening and closing the end of said tube, latch and catch means between said opening and closing means and said tube, means retaining said opening and closing means in the closed position, axially extending means for receiving said at least one projection, means movable by said at least one projection when inserted in said receiving means for unlatching said latch and catch means, for releasing said opening and closing means from said retaining means and for moving the same to an open position said receiving means comprising a lock having a lock slide longitudinally slidable between lock and open positions and wherein said at least one projection comprises key means for operating said slide.

2. The combination of claim **1** wherein said element includes a partial annular ring constituting means for mounting the element on the inside of a fuel filler pipe member and said tube includes a collar constituting means for mounting the tube at the free end of a fuel pump nozzle member.

3. The combination of claim **1** wherein said lock slide is longitudinally slidable by means laterally movable within a key way in the slide, said opening and closing means is a closure for the end of said tube, said retaining means includes means for mounting said closure for pivotal movement to and from a position covering the open end of said tube and an open position away from the open end, said mounting means comprising surface means on said slide for retaining and moving said closure from and to the covering and open positions upon sliding movement of said slide and cooperating guide means are provided on said attachments for guiding said key way and key to mating relationship.

4. The combination of claim **3**, wherein said closure includes a lateral mounting projection pivoted to said tube and extending into engagement with said surface means.

5. The combination of claim **3**, wherein spring means are provided for biasing said closure to the closed position.

6. The combination of claim **3**, wherein said lock has an outer housing attached to the side of said tube and said guiding means comprises a pair of projections extending from said element on either side of said key means in such spaced relation as to receive and guide said housing and said receiving means into fitting relationship with said key means.

7. The combination of claim **3**, wherein said lock has an outer housing providing a false bottom with a slot to receive said projection, means are provided for stopping the slide of said lock slide at both ends of said housing, and catch means are provided for holding said slide in the open position.

8. In combination, closure means for the open end of the fuel pump nozzle and means for mounting and operating the same, said mounting and operating means including a lock having a lock slide longitudinally slidable from and to lock and open positions by means laterally movable within a key way in the slide, pivot means supporting said closure means for pivotal movement to and from a position covering the open end of the nozzle and an open position away from the open end, said mounting and operating means comprising surface means on said slide for retaining and moving said closure means from and to the covering and open positions upon sliding movement of said slide, key means on a fuel filler pipe for engagement in said key way to operate said laterally movable means and free said slide for longitudinal sliding movement between said lock and open positions, and means for guiding said key way and key into engagement.

* * * * *