United States Patent [19]

Hubenthal

[11] **3,731,703**

[45] **May 8, 1973**

[54] **SHUT-OFF FUEL TAP FOR MOTOR VEHICLES OR THE LIKE**

[76] Inventor: **Aloys Hubenthal,** Hirschbergstrasse 19, Munich, Germany

[22] Filed: **May 10, 1971**

[21] Appl. No.: **141,671**

[30] **Foreign Application Priority Data**

May 13, 1970 Switzerland 7076

[52] **U.S. Cl.** **137/384.2**

[51] **Int. Cl.** **F16k 35/10**

[58] **Field of Search** 137/351–355, 383–385

[56] **References Cited**

UNITED STATES PATENTS

1,416,807	5/1922	Fisher	137/384.2
1,700,474	1/1929	Dunn	137/384.2
2,006,027	1/1935	Moore	137/384.2

Primary Examiner—Henry T. Klinksiek

Attorney—James E. Nilles

[57] **ABSTRACT**

A shut-off fuel tap which has a fuel plug interposed in the fuel line and which plug can be turned by a key insertable in a lock cylinder. The fuel tap includes sealing means between the shut-off plug and the lock cylinder which prevents escape of vapors or the like from the fuel line. The shut-off plug can be easily removed by means of an end plug in the fuel tap assembly and thereby facilitates cleaning and repair of the shut-off plug.

9 Claims, 2 Drawing Figures

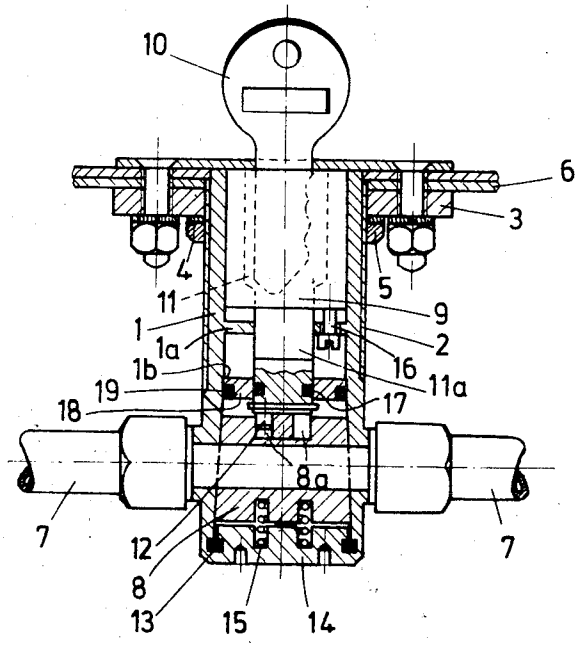
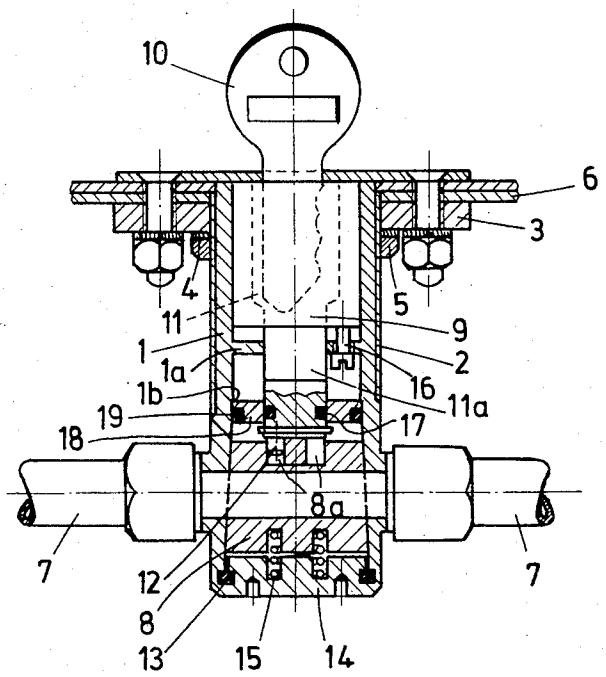
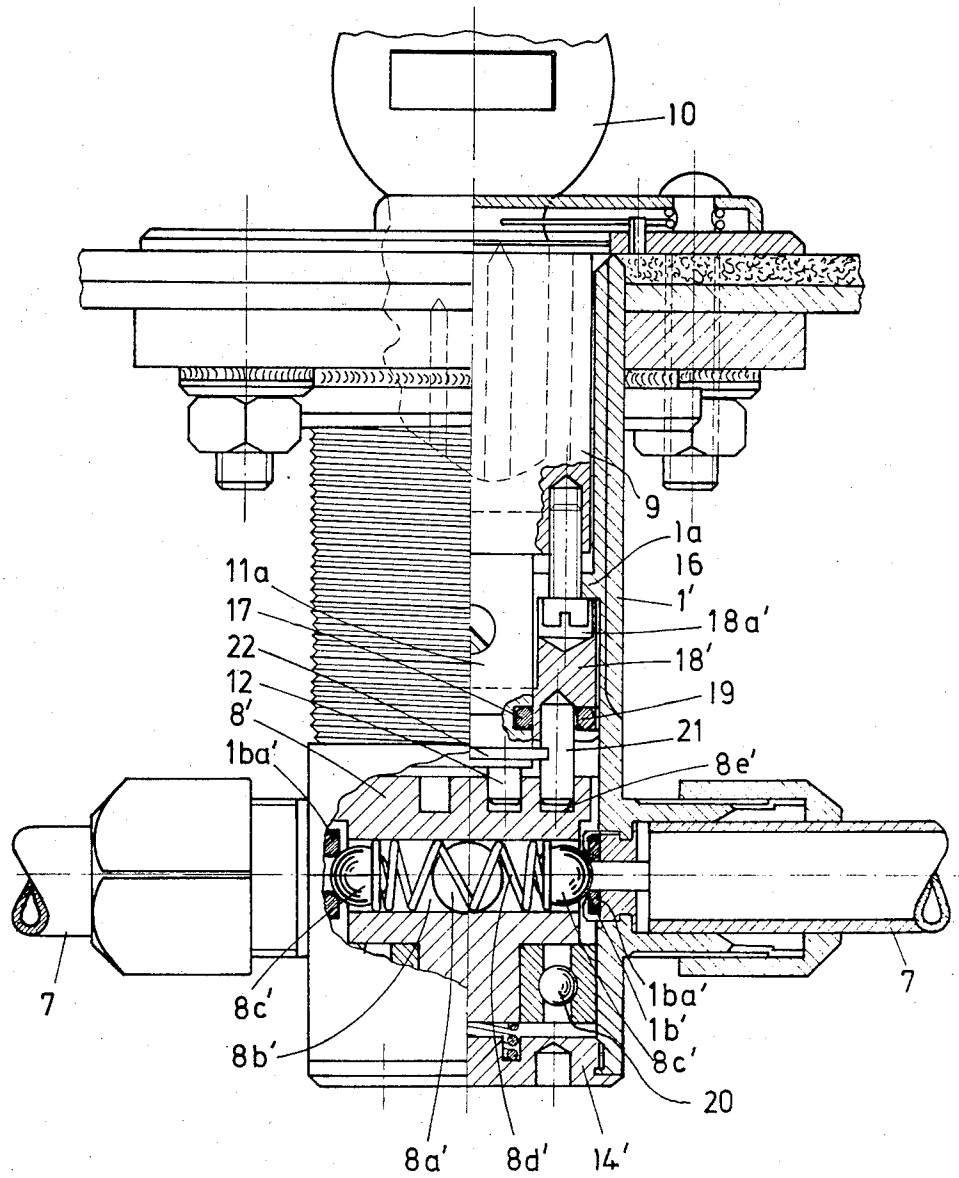


Fig.1



INVENTOR:
A. HUBENTHAL
BY:
James E. Nilles
ATT'Y

Fig. 2



INVENTOR:
A. HUBENTHAL
BY:
James E. Nilles
ATT'Y

SHUT-OFF FUEL TAP FOR MOTOR VEHICLES OR THE LIKE

BACKGROUND OF THE INVENTION

The invention pertains to a shut-off fuel tap for motor vehicles or the like, and having a housing containing a lock cylinder fitted coaxially in relation to a shut-off plug, one end of the lock cylinder containing a hole for the insertion of a key and also a locking component turned by the key and coupled to the shut-off plug. These taps prevent fuel from being withdrawn from tanks by unauthorized persons and more particularly prevent or at least render more difficult the unauthorized use or the theft of a motor vehicle.

Prior art lock cylinders for taps of this type are mounted lengthwise and arranged to turn within the tap housing, and these cylinders also constitute the locking component coupled to the shut-off plug. When this is in the "Off" position, a pin that can be moved radially out of the peripheral face of the lock cylinder engages in a corresponding recess in the tap housing. The disadvantage of this prior art fuel tap is that the housing wall surrounding the lock cylinder can be broken open outwardly with a suitable tool, such as a chisel, without much expenditure of energy or time, so that the shut-off becomes ineffective. Since the fuel tap, when fitted to a motor vehicle, must be accessible from the vehicle interior, there is a risk, even when the lock cylinder forms a very close fit as it turns in the tap housing, that fuel vapor arising within the latter may escape into the interior of the vehicle. Therefore, this type of prior art fuel tap also constitutes a danger to the occupants.

Another prior art safety device for preventing the misuse or unauthorized use of a motor vehicle consists of a flap valve inserted in the fuel feed pipe to the engine, which can be locked in the "off" position by a lock cylinder of ordinary commercial type, and which is fitted with its longitudinal center line parallel to the valve spindle. At the end remote from that end containing the hole for the key, a portion of the rotary locking component, smaller in diameter than the said end, extends beyond the lock cylinder, which is held against turning in relation to the tap housing, and engages with teeth on the valve spindle. The means by which relative rotary motion is prevented between lock cylinder and tap housing is, however, very easy to undo, so that this prior art safety device can likewise be put out of action without much expenditure of time or effort.

Still another form of prior art fuel tap utilizes a tap housing having a cap that turn in relation to the shut-off plug and contains a zig-zag opening shaped like the cross-section of a particular type key, for receiving the key. The shut-off plug is widened in cross-section towards the rotary cap on the housing and contains, in the end that faces the key, a slot into which the operative part of the key can be inserted without freedom to rotate in relation thereto. Should such a fuel tap be fitted to a motor vehicle, the rotary cap on the housing must be accessible from inside the vehicle. However, this makes it possible for the rotary cap to be forced off the housing without great expenditure of time or effort, leaving the plug exposed. This can then be extracted from within the vehicle and replaced after being turned to a position such that the fuel flow is unimpeded. It follows from this that the protection afforded by this prior art type of tap, again, is very easy to nullify, in addition

to which there is likewise the risk, when the tap is fitted in a vehicle, of fuel vapor escaping from the tap housing into the vehicle interior.

SUMMARY OF THE INVENTION

This invention provides a fuel tap which makes interference with the shut-off very difficult, or at least possible only by considerable expenditure of time and effort, and enables the tap to be fitted in a motor vehicle without risk to its occupants. More specifically, a portion of the rotary locking component, situated at but smaller in diameter than that end of the lock cylinder which is remote from the keyhole, extends beyond the lock cylinder in the conventional manner, the cylinder being secured against turning in relation to the tap housing, and that the projecting portion of the locking component, between the shut-off plug and that end of the lock cylinder which faces the cylinder, is sealed to, but can rotate in relation to, the tap housing.

The construction of the present invention permits use of an inexpensive lock cylinder for shutting off the fuel tap, the shut-off action of which it is difficult to nullify.

The invention also permits the seal, which located between the tap housing and that portion of the locking component which is smaller in diameter than and projects beyond the lock cylinder, to be given a seating made to close tolerances, since the frictional resistance exerted by the said seating in opposition to rotation of the locking component can be overcome by the key without much effort, owing to the small diameter of the locking component. Nevertheless, when the fuel tap is installed in a motor vehicle, the seal between the tap housing and the rotary locking component in the lock cylinder will prevent fuel vapor from escaping into the vehicle interior, thereby excluding all risk to the occupants.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a mid - plane suction of one form of fuel tap embodying the principle of the invention; and

FIG. 2 is a side elevation, partly in section, of a fuel tap of modified design.

DESCRIPTION OF A PREFERRED EMBODIMENT

Generally, in one recommended form of the proposed fuel tap, the shut-off plug has an axially withdrawable plug-in connection to the rotary locking component in the lock cylinder, is separated from the latter by at least one partition in the housing, through a central hole in which the locking component passes, can be changed for a replacement plug through a closable opening in that end of the tap housing which is remote from the lock cylinder, and bears, possibly through the agency of an interposed compression spring, against a plug or stopper in the tap housing which plug can be removed only with a special tool. The plug in the housing, against which the shut-off plug bears, can be fitted without difficulty in a position outside any vehicle in which the tap is installed, where it is accessible only with the aid of the special tool. The partition in the tap housing, between the lock cylinder and the shut-off plug, will prevent the latter from being removed and replaced in the "On" position, even if a

person with expert knowledge of safety locks should succeed in withdrawing the lock cylinder from the tap housing.

To make it difficult to remove the lock cylinder from the tap housing, from the keyhole end, the partition contains at least one hole through which a screw can be introduced from the plug side and screwed into a thread in the adjacent end of the lock cylinder.

A fuel tap such as shown in FIG. 1 has a cylindrical housing 1, carrying an external screwthread 2, onto which a fixing flange 3 is screwed and secured against turning by a nut 5, and an interposed toothed lock washer 4. The fixing flange 3 is bolted to a mounting plate 6 which may be a floor plate in the passenger compartment of a motor vehicle, for example, and through which the tap housing 1 passes. At the end remote from the fixing flange 3, the tap housing 1 has two pipe connections, by which it can be inserted in a fuel pipe 7. The fuel flow through the casing 1 can be cut off by the shut-off plug 8. Coaxial with this plug, that end of the casing that carries the fixing flange contains a lock cylinder 9, the outer end face of which has a hole for the insertion of a Yale-type key 10. This key can be used to turn a locking component 11, with the lock cylinder 9, the component 11 having a portion 11a, smaller in diameter than the lock cylinder, which extends through and can turn in relation to that end of the latter which lies towards the plug 8. The small diameter portion 11*a* is connected to the plug 8 so as to be prevented from turning in relation to it by an axially withdrawable plug-in connection such as, for example, a stub 12 engaging in a recess 8a in the plug.

The small diameter portion 11of the rotary lock component 11 is very carefully sealed against the interior wall of the tap housing 1 by means which will be described later, so as to prevent fuel vapor from escaping from the plug space in the tap housing 1, between the interior wall of the housing and the lock cylinder 9 or through the latter itself.

As can be seen from the drawing, the end of the tap housing 1 remote from the lock cylinder 9 is open and is fitted with a screw plug 14, which is sealed by a packing ring at 13 and can be undone only by the use of a special tool. The shut-off plug 8 is held clear of this screw plug 14 by an interposed compression spring 15.

When the screw plug 14 is removed, the plug 8 of the tap can be extracted through the end of the housing 1, the plug-in connection 8*a*, 12 being thereby released by axial withdrawal, the plug-in connection 8*a*, 12 being re-established as the plug 8 or a replacement plug is inserted again into the housing 1.

Between the plug 8 and the lock cylinder 9, the housing 1 incorporates a partition 1a containing a central hole through which the rotary small diameter portion 11a of the locking component 11 passes. The partition 1a also contains at least one hole through which a screw 16 can be screwed, from the side that faces towards the plug 8, into the end of the lock cylinder 9 adjacent to the partition. The cylinder is thus secured against turning in relation to the tap housing 1 and can be withdrawn from it only after the removal of the screw 16.

To insure the sealing, already referred to, of the small diameter portion 11a of the locking component 11 against the interior wall of the tap housing 1, a ring-shaped disc 18 through which the rotary small diameter portion 1a passes, is fitted within the housing 1 and acts in conjunction with packing rings 17 and 19 which provide seals between the disc and the portion 11*a* and housing 1 respectively. The disc 18 can be pushed into the housing 1 from the end that accommodates the plug 8 until it comes up against a stop 1b which may take the form of a shoulder, for instance, produced by a reduction in the inside diameter of the housing 1 between the plug 8 and the partition 1a. The disc 18 is thus secured in the housing 1 against movement towards the lock cylinder 9 and constitutes a second partition in the housing 1 between the screw 16 and the plug 8. Instead of the compression spring 15 shown in the drawing, between the plug 8 and the screw plug 14, a set screw passing through the latter might be provided, with provision for adjustment and locking, with which to press the plug 8 into the bore of the housing 1 which tapers to match the plug 8. The fuel tap might also be provided with three pipe connections, one for intake and the other two for distribution to two carburetors. Additionally, the screw 16 and the screw plug 14 of the tap housing 1 might be joined to the latter by so-called "cold welding" or with contact adhesives and thus given particularly effective protection against unauthorized removal.

The effective seal provided between the lock cylinder and the plug component of the fuel tap makes it possible, as in FIG. 2, to use a plug 8′ which is not only substantially cylindrical, but may even, if desired, form a loose fit in an appropriate tap housing 1′ bearing against this through the agency of a roller-action bearing 20. This makes the plug 8′ very east to turn with the key 10. It is true, of course, that the loose fit of the plug 8′ in the housing1′ would permit some slight flow of fuel through the fuel pipe 7 when the fuel tap was in the "off" position. Though the amount of fuel removed by unauthorized persons as a result of this slight flow would necessarily be very small, even this can be entirely prevented at little additional cost. To that end, the plug 8′ of the tap contains two intersecting bores 8*a*′ and 8*b*′, the former being brought into alignment with the fuel pipe 7 when the tap is open and the latter when it is closed. The plug bore 8*b*′ contains two sliding valve bodies such as the ball valves 8*c*′, for example, with a compression spring 8*d*′, or some other equivalent device between them, which seeks to force them towards the interior wall of the housing 1′. When the plug 8′ is in the "off" position, the balls 8*c*′ or the like are thrust against valve seatings 1*b*′, screwed into the openings in the housing 1′ at the points of entry of the fuel pipe 7, so as to form seals. Each seating 1*b*′ is fitted with a sealing ring, 1*ba*′ to mate with the balls 8*c*′ or the like.

In the example illustrated in FIG. 2, the packing rings 17 and 19 are fitted to a ring-shaped disc 18′ which is prevented from moving towards the lock cylinder 9 by being held against the partition 1a in the housing 1′ and from turning in relation to the lock cylinder by means of the screw 16 by virtue of the screwhead being accommodated, for example, in a recess 18*a*′ in the disc. A pin 21 with its longitudinal center line parallel to that of the locking component 11*a* is screwed into the disc 18′ and engages in an arc-shaped groove, 8*e*′ in the top end face of the plug 8′ of the tap. In the example

shown, this groove extends through 90° of arc and jointly with the pin **21** sets a limit to the rotation of the plug **8'** of the tap.

The recess **18***a'* in the disc **18'** is a blind hole so that screw **16** is covered towards the plug **8'** by the disc **18'**. A circlip **22** is fitted to that end beyond of the lock cylinder **9** which projects beyond the disc **18'** towards the plug **8'**. Before the lock cylinder **9** can be withdrawn from the key end of the tap housing **1'**, the following time-consuming steps must be carried out in proper sequence:

1. Removal of the screw plug **14'**, secured by cold welding or contact adhesive to the tap housing **1'**;
2. Withdrawal of the plug **8'** from the housing **1'**;
3. Removal the circlip **11** from the end **11***a* of the lock cylinder **9**;
4. Extraction of the disc **18'** from the housing **1'**; and
5. Release of the screw **16**, secured by cold welding or contact adhesive to the housing **1'**. In this connection, the partition **1***a* should preferably contain a further hole for a second screw **16** on the other side, this screw being engaged in a corresponding threaded hole in the lock cylinder **9**.

By way of departure from the example illustrated in FIG. **2**, the plug **8'** of the tap might be fitted with only one valve body **8***c'*, thrust towards the interior wall of the housing **1'** by the compression spring **8***d'* or the like, the housing **1'** being equipped with only one valve seating **1***b'*, preferably in the opening of the fuel pipe **7** on the intake side. The plug **8'**, moreover, instead of having a roller-action bearing **20**, might be arranged to turn in a low-friction plain bearing in the tap housing **1'** and/or might contain only the bore **8***b'* accommodating the valve body **8***c'*, in conjunction with at least one passage in its cylindrical face through which fuel could pass when in the "On" position.

I claim:

1. A shut off fuel tap for motor vehicles or the like comprising, a tap housing, a lock cylinder rotatably mounted in said housing adjacent one end thereof, a shut off plug rotatably mounted in said housing adjacent the other end thereof and generally coaxially arranged with said lock cylinder, said cylinder having means for the insertion of a key means, said cylinder also having a locking component engageable with said shut off plug for turning movement thereof, said locking component including a portion of reduced diameter which is smaller in diameter than the inner end of said lock cylinder, said portion extending beyond said lock cylinder, releasable connecting means between said tap housing and said cylinder for securing said cylinder against rotation in said tap housing, and sealing means located between that portion of said locking component and said tap housing.

2. A fuel tap as defined in claim **1** having disengagable and interengagable means between said locking component portion and said shut off plug, and a partition in said housing and through which said locking component portion passes, and a removable screw plug in said housing and at that end adjacent to said shut off plug whereby the latter can be removed from said housing, and means on said screw plug for removal thereof by a special tool.

3. A fuel tap as claimed in claim **2** in which said partition contains at least one hole, and a screw extendable through said hole from the plug side is screwed into the adjacent end of the lock cylinder so as to secure the latter against rotation in said tap housing.

4. A fuel tap as claimed in claim **3** in which the tap housing incorporates a second partition between the shut-off plug and the screw, said rotary locking component extends through said second partition, and a packing ring interposed between the second partition and the locking component.

5. A fuel tap as claimed in claim **4** in which the second partition in the tap housing consists of a ring-shaped disc which is mechanically prevented from moving towards the lock cylinder and is sealed to the interior wall of the tap housing by a second packing ring.

6. A fuel tap as claimed in claim **5** in which the ring-shaped disc is secured against sliding in relation to the partition and against turning in relation to the screw by the screw head being accommodated in a recess in the disc.

7. A fuel tap as claimed in claim **2** in which the housing screw plug is sealed to the tap housing and secured to it.

8. A fuel tap as claimed in claim **1** in which the shut-off plug forms a loose fit in the tap housing and contains intersection bores, one of which is equipped with at least one valve body, a spring urges said valve body against the interior wall of the tap housing when the valve is in the "On" position and against a valve seating when in the "Off" position.

9. A fuel tap as claimed in claim **8** in which the valve seating in the tap housing is fitted with a seal designed to mate with the valve body in the shut-off plug.

* * * * *