

FUEL TANK CAP

BACKGROUND OF THE INVENTION

The invention relates to a fuel tank cap at the filler neck of a motor vehicle fuel tank, with a locking gas cap, which can be swiveled about a pivoting axis and a locking part, which is disposed internally at the locking gas cap and lies against the edge of the filler neck, sealing it, in the closed position, in which it can be locked and in which the locking gas cap is spring-loaded in the opening direction, it being possible to unlock the locking gas cap and swivel it into the open position by pressing down on it briefly especially by means of a robot-guided fuel pump nozzle.

For conventional fuel tank cap systems, a filler neck, starting out from a fuel tank, is manually closed off tightly by means of a screw-in locking gas cap. The locking gas cap, in turn, is covered by a fuel tank flap, which is embedded in the side wall of the vehicle. However, such fuel tank cap systems are obviously not suitable for the automatic refueling of motor vehicles which is planned for the future.

A series of differently configured fuel tank cap systems has already been proposed in order to make automatic refueling possible. For example, the Offenlegungsschrift DE 42 43 883 A1, which is incorporated herein by reference, already discloses a locking construction of the type described above. The unlocking takes place due to the fact that an unlocking pipe, which can be connected with the refueling pipe, comes up against a lever arm of the locking gas cap, opening the latter. This means, that in every case, aside from a fuel pump nozzle, a separate unlocking pipe must be provided, since the lid remains open only as long as the unlocking pipe is pressed onto the lever at the locking gas cap. In turn, such design requires that special refueling equipment is required and that it is not possible to use different automated fueling systems in conjunction with such a motor vehicle closing device.

However, since it is absolutely essential to construct the fuel tank cap in such a manner that different automatic refueling systems can also be used in conjunction with such a fuel tank cap, insofar as it cannot be expected that the oil industry will introduce a uniform refueling system, it is therefore an object of the present invention to configure a closing device at the filler neck of a motor vehicle fuel tank of the type referred to above, in such a manner that it can be unlocked from the outside merely by briefly pushing against it and, in the same way, closed and locked once again so as to form a seal simply by pressing it shut.

SUMMARY OF THE INVENTION

To accomplish this objective, provisions are made pursuant to the invention so that the opening of the tank connection pipe, which is to be closed off, is disposed offset towards the inside at the inner end of an essentially cylindrical expansion of the tank connection pipe and that, internally, at the locking gas cap, a casing is fastened, in which a piston, which is provided with a seal that is seated on the opening that is to be closed off, is mounted axially displaceable and which, when acted upon axially by pressure, forces a blocking element radially towards the outside into a locking edge groove of the cylindrical expansion of the tank connection pipe. The piston is mounted in the casing in the form of a pushbutton switch, which locks when depressed and releases once again when depressed once more, so that the casing with the locking gas cap moves to the outside relative to the piston and the blocking element is retracted from the locking groove.

Due to the inventive configuration, the inventive fuel tank cap, starting out from an open position, can be closed simply by pressing shut the locking fuel cap, which is hinged to the car body, together with the internally mounted locking part. By once again pressing the fuel tank cap, so closed, slightly further, the locking is released automatically and, preferably by providing a spring element, the lid is caused to spring open completely for the purpose of introducing the tank connection pipe. Such a locking and unlocking system can evidently be used for automatic refueling, the tank connection pipe or a scanning element, rigidly disposed at the nozzle, initially coming up against the locking gas cap and, by these means, opening it. After the refueling, the locking gas cap is pressed on simply once again in an appropriate manner and, at the same time, locked tightly.

In the simplest case, the blocking element can be a stop sphere. However, in a further development of the invention, it has proven to be particularly advantageous if the blocking element is a rubber elastic ring, which is mounted on the piston and is supported between the head of the piston, carrying the seal for the tank connection pipe, and the casing and which, when acted upon axially by pressure, after the piston is placed on the opening of the tank connection pipe, which is to be closed off, is expanded radially and pressed into the edge locking groove. The rubber elastic ring, by means of which the locking is achieved, and/or a spirally coiled spring between the fuel tank cap and the piston ensure a bracing in the opening direction, so that, after the blocking element is unlocked, the locking gas cap is forced towards the outside relative to the piston which, to begin with, is still seated on the opening that is to be closed off, and this opening motion then causes the whole of the closing system to spring open.

The piston can be mounted in the casing in the form of a clamping displacement mechanism of a ball point pen.

In accordance with a further embodiment of the invention, instead of such a clamping displacement mechanism of a ball point pen, provisions are made so that a heart-shaped curve is disposed and, in particular, molded into the piston, and is engaged by one end of a latching hook, the other end of which is mounted at the casing. While closing by pressing on the tension spring, especially of the rubber elastic ring that serves for the locking, the latching hook passes through one of the curved branches of the heart-shaped curve into the upper arc end from where, when there is a slight spring-back, it reaches a central locking position. Conversely, by briefly pressing on the fuel tank cap of the locked closing device, the hook is moved upward back into the edge region and slides along the corresponding curve line into its lower middle position, so that the casing and the piston can be shifted axially against one another by a distance, which corresponds to the distance between the two center positions of the heart-shaped curve. This is sufficient for relieving the tension on the rubber elastic ring, so that it retracts from the locking edge groove and opening of the fuel tank cap thus can take place.

The above, and other objects, distinguishing features, details and advantages of the present invention will become apparent from the following description read in conjunction with the accompanying drawings, in which like reference numerals designate the same elements.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a section through a fuel tank cap according to an embodiment of the invention shown in a partially open position;