United States Patent

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[54] **SAFETY INSTALLATION IN A FUEL FEEDLINE**
14 Claims, 2 Drawing Figs.

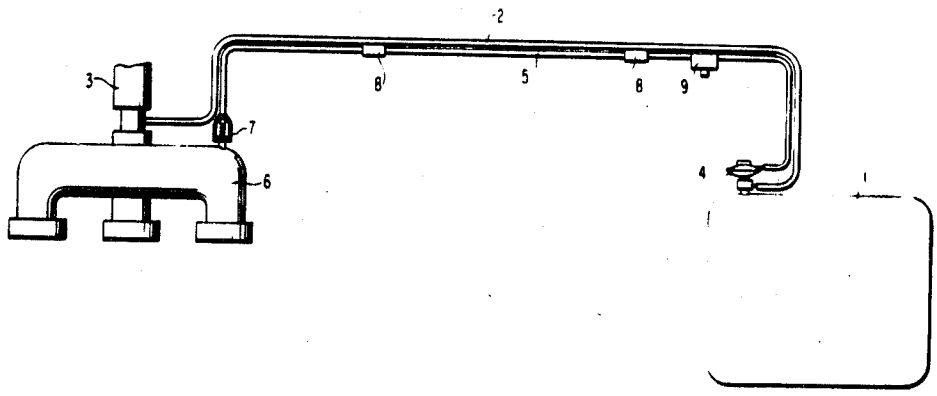
[52] **U.S. Cl.** ..... **123/136,** 123/142, 123/198 DB
[51] **Int. Cl.** **F02b 77/08,** F02m 37/00
[50] **Field of Search** 123/136, 139, 198, 142

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ABSTRACT: A safety installation for a fuel feedline supplying fuel from a fuel tank to an internal combustion engine driving a motor vehicle, which includes a valve that automatically closes in case of an accident and is kept open against the force of a closing spring by a pneumatic pressure medium available in the motor vehicle; the pressure medium flows to the valve through a line which is made from a material readily melting in case of a fire, and preferably several coupling members are arranged in the line which open the line in case of a slight pull.



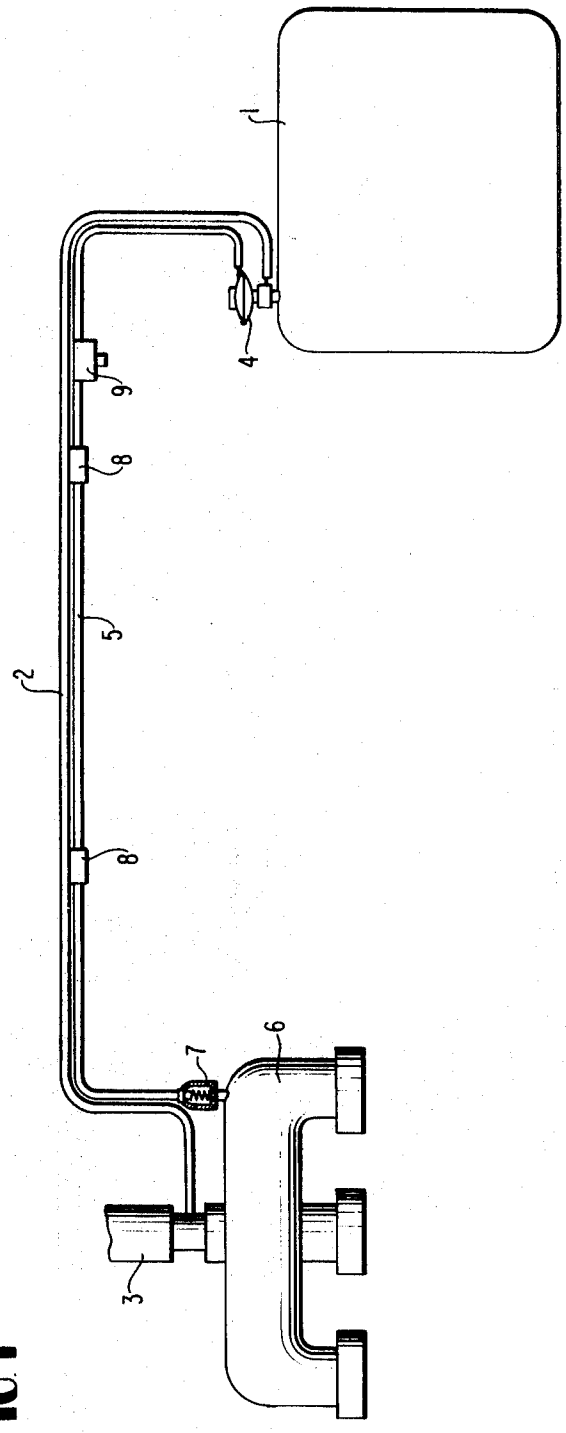


FIG. 1

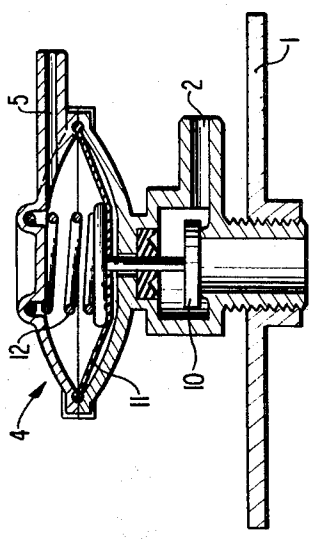


FIG. 2

SAFETY INSTALLATION IN A FUEL FEEDLINE

The present invention relates to a safety installation in a fuel feedline from a fuel tank to a driving internal combustion engine in a motor vehicle, which essentially consists of a valve that automatically closes in case of an accident.

In order to automatically close the fuel feedline from the fuel tank to the driving internal combustion engine, for example, in case of an accident, safety installations are known in the prior art which respond to a large deceleration of the vehicle. Furthermore, couplings are known which are inserted in the fuel feedline and which, in case of a forcible tearing apart of the fuel line, close the same as intended break places. Disadvantageous with these prior art installations is the fact that relatively large forces or decelerations in predetermined directions are necessary in order to assure a response.

In contradistinction thereto, it is the aim of the present invention to so construct the safety installation that it reacts already in the presence of small forces and that therebeyond it responds also in case of fires. The underlying problems are solved according to the present invention in that the valve is held open during the operation of the driving internal combustion engine by a pneumatic pressure medium present in the motor vehicle against the force of a spring, and the pressure medium is conducted to the valve in a line which consists of a material readily melting in case of fire and in which preferably several coupling members are arranged which open the line in case of slight pull or tension.

If one manufactures the line for the pressure medium, for example, from a synthetic resinous material, whose melting temperature is considerably lower than the flame temperature in case of a vehicle fire, a destruction of the line will occur rapidly in case of a fire. The pressure medium can escape from the line. The valve in the fuel feedline closes. Recommended for the use as coupling elements are the arrangement of rubber hoses which are slipped over the plastic fuel line and which can be pulled off from the fuel line already with a slight force, for example, with 5 Kp.

In an advantageous construction of the present invention, the line for the pressure medium may be located as close as possible to the fuel feed line. If, in fact, the fuel feedline breaks for any reason and the outflowing fuel is ignited, the line disposed adjacent thereto for the pressure medium melts and the fuel feed line is then closed off. Additionally, a valve may be arranged in the line for the pressure medium which responds to strong deceleration and which places into communication the interior of the line with the atmosphere.

With a motor vehicle having an Otto-engine as driving internal combustion engine, the valve closing the fuel feedline may be connected to the suction pipe of the driving engine by the interposition of a check valve. With a motor vehicle having a compressed air installation, the valve may be kept open by compressed air.

Accordingly, it is an object of the present invention to provide a safety installation for a fuel feedline which avoids by simple means the aforementioned shortcomings and drawbacks encountered in the prior art.

Another object of the present invention resides in a safety installation for a fuel feedline which operates reliably under all conditions without requiring forces or decelerations occurring in predetermined directions and of predetermined size.

A further object of the present invention resides in a safety installation of the type described above which responds to relatively small forces and assures a reliable closure of the fuel feed line in case of fires.

Another object of the present invention resides in a safety installation for a fuel feedline which is simple in construction, can be readily installed into the existing space of the vehicle and assures reliable operation of the safety installation.

These and further objects, features, and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

FIG. 1 is a schematic view of a safety installation in accordance with the present invention; and

FIG. 2 is a cross-sectional view, on an enlarged scale, through the valve of the safety installation in accordance with the present invention.

Referring now to the drawing wherein like reference numerals are used throughout the two views to designate like parts, and more particularly to FIG. 1, reference numeral 1 designates in this figure the fuel tank of a conventional motor vehicle, from which the fuel is supplied by way of the fuel feedline 2 to the carburetor 3 of the driving internal combustion engine (not shown) of the motor vehicle. In order to be able to interrupt rapidly the feed of fuel through the feedline 2 in case of a fire or of an accident, the valve generally designated by reference numeral 4 is arranged in the feedline 2 in proximity to the fuel tank 1, which during operation of the driving internal combustion engine is kept open by the vacuum. The valve 4 is connected for this purpose by the line 5 with the suction pipe 6 of the driving engine. The check valve 7 is arranged in the line 5 at the connection with the suction pipe 6. As to the rest, the line 5 which is disposed close to the fuel feedline 2, consists essentially of a synthetic plastic material of any conventional type which melts already at relatively low temperatures. At several places, the line 5 s interrupted and these places are bridged by rubber hoses 8 placed over the line which can be pulled off already with smaller pulling or tensional forces. Additionally, the valve 9 is arranged in the line 5 which is of conventional construction and which brings the line 5 into communication with the atmosphere in case of strong decelerations.

As can be seen more clearly from FIG. 2, the valve body 10 within the valve 4, which is secured at the diaphragm 11, is pressed against its seat in the closing position by the compression spring 12. During the operation of the driving internal combustion engine, the vacuum prevailing in the suction pipe 6 can continue through the line 5 up to the valve 4 where it pulls the diaphragm 11 and therewith the valve body 10 upwardly against the force of the spring 12. The valve 4 is thus opened.

During strong decelerations, for example, in case of an impact of the vehicle against an obstacle, the valve 9 responds in a conventional manner. The line 5 and therewith the valve 4 is vented. The valve 4 then closes the fuel feedline 2. In case of other accidents, the rubber hoses 8 are pulled off, whereby the line 5 is also vented and the valve 4 closes. In case of a fire, the line 5 melts. Its interior comes into communication with the atmosphere and the valve 4 closes.

While we have shown and described only one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art, and we therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

We claim:

1. A safety installation in a fuel feedline leading from a fuel tank to a driving internal combustion engine of a motor vehicle, which includes valve means automatically closing in case of an accident, characterized in that the valve means is held open during the operation of the engine by a pneumatic pressure medium present in the motor vehicle against the force of a spring, and in that the pressure medium is conducted to the valve means by way of a line means which is made, at least in part, from a material readily melting in case of a fire.

2. A safety installation according to claim 1, characterized in that said line means essentially consists of said readily melting material.

3. A safety installation according to claim 1, characterized in that at least one coupling means is provided in the line which readily opens the line in case of a slight pull.

4. A safety installation according to claim 3, characterized in that several coupling means are provided in the line which are spaced at different places.

5. A safety installation according to claim 4, characterized in that said line means essentially consists of said readily melting material.

6. A safety installation according to claim 3, characterized in that the line for the pressure medium is located as close as possible to the fuel feedline.

7. A safety installation according to claim 6, characterized in that a valve means responding to strong decelerations is arranged in the line for the pressure medium which provides a communication between the interior of the line with the atmosphere in case of response thereof.

8. A safety installation according to claim 7, in which an Otto-engine is provided as driving engine, characterized in that the valve means is connected with the suction pipe of the internal combustion engine under interposition of a check valve.

9. A safety installation according to claim 7, in which the motor vehicle is provided with a compressed air installation, characterized in that the valve means is kept open by the compressed air of the compressed air installation.

10. A safety installation according to claim 1, characterized in that the line for the pressure medium is located as close as possible to the fuel feedline.

11. A safety installation according to claim 1, characterized in that a valve means responding to strong decelerations is arranged in the line for the pressure medium which provides a communication between the interior of the line with the atmosphere in case of response thereof.

12. A safety installation according to claim 1, in which an Otto-engine is provided as driving engine, characterized in that the valve means is connected with the suction pipe of the internal combustion engine under interposition of a check valve.

13. A safety installation according to claim 1, in which the motor vehicle is provided with a compressed air installation, characterized in that the valve means is kept open by the compressed air of the compressed air installation.

14. A safety installation according to claim 11, characterized in that at least one coupling means is provided in the line which readily opens the line in case of a slight pull.

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