April 23, 1968 M. FRISCH 3,379,185

DEVICES FOR ADVANCING THE STARTING OF COLD INTERNAL COMBUSTION ENGINES

Filed May 10, 1966 2 Sheets-Sheet 1

Fig. 1.

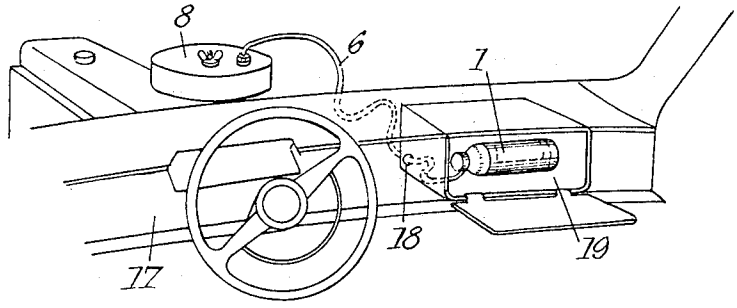


Fig. 2.

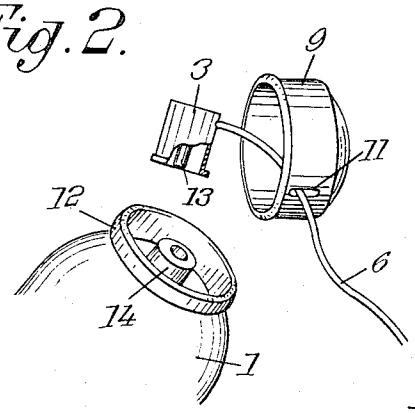


Fig. 4.

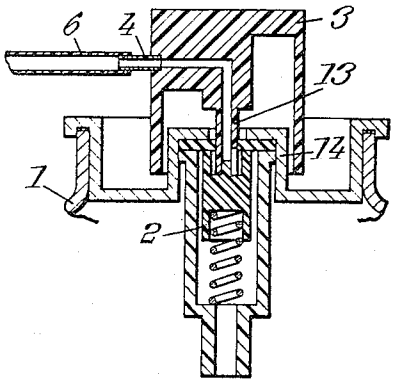
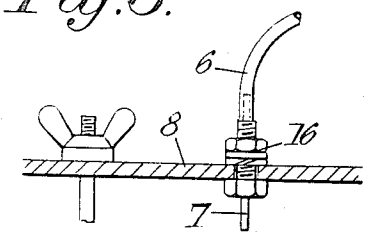


Fig. 3.

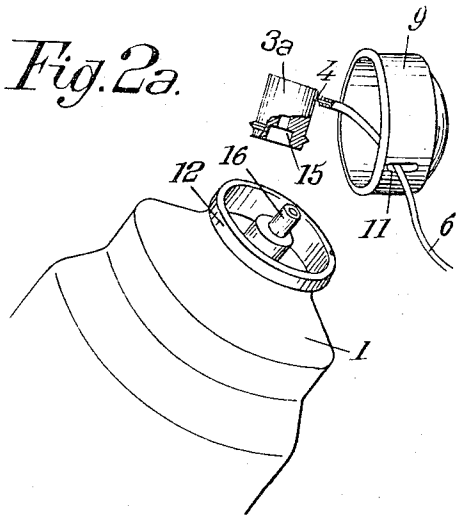


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DEVICES FOR ADVANCING THE STARTING OF COLD INTERNAL COMBUSTION ENGINES

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Fig. 2a.



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DEVICES FOR ADVANCING THE STARTING OF COLD INTERNAL COMBUSTION ENGINES

Maurice Frisch, 24 Parc de l'Ile Verte, 78 Chatou, France

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4 Claims. (Cl. 123—180)

The present invention relates to devices for advancing the starting of cold internal combustion engines, more particularly to the devices which enable the injection of a starting fluid, preferably under an atomized form within the air intake of these engines.

Devices are known for injecting a starting fluid in an aperture of the air intake parts of an engine, for instance, in the engine air filter or in the conduit connecting the filter and the carburettor, or further, in the air intake collector, such devices comprising a can containing the starting fluid under pressure and having in its upper part a valve the opening of which is controlled through a push-button comprising an atomization orifice or nozzle for emitting this fluid in the form of an aerosol jet.

In the case, for instance, where the engine of a car must be started under cold atmospheric conditions, the user must open the hood in order to carry out the atomization of the above aerosol in the air intake parts of the engine, in most instances in its air filter, prior to entering his car and actuating the starter. A great portion of the fluid injected in the air intake of the engine, however, is lost during the short period of time separating the atomization operation and the starting operation itself.

In order to overcome such drawbacks, it has been proposed to separate the injection nozzle from the valve, to mount the valve within the portion of the air intake part of the engine where the aerosol injection is to be effected and to connect it to the valve of the can which, itself, is secured to the body of the vehicle, for instance to the dash-board, within the hand-reach of the driver when the latter sits behind the steering-wheel of the vehicle, the valve being then actuated through a handle which is equally articulated on a part of the car body.

However, in such remote controlled devices, the can, its valve as well as the actuating member of the valve are not protected against inopportune actuations which then produce a useless waste of starting fluid and, above all, endanger the engine by subjecting it to high over-pressures. Further the use of such devices is limited to large vehicles, such as trucks, which have space available, for instance on the dash-board, for the fixation of the above elements of said devices.

The object of the invention is, principally, to improve the remote controlled injection devices of a starting fluid in the air intake of an engine, in connection with their absolute security against inopportune operation of the injection.

Another object of the invention is to provide a remote controlled device, the construction and use of which are very simple, while extremely efficient, and which is likely to be used even on small cars.

The invention consists, essentially, in connecting through a flexible pipe the outlet means of a can containing a starting fluid under pressure and comprising a valve and a push-button overlying said valve for controlling the operation thereof, through a downward pressure so as to release the fluid under pressure from said can, with an injection nozzle rigidly mounted in the area of the air intake parts of the engine where the atomization should take place, said can being further associated with a protective cap adapted to be movably fit on said can (closure position), so as to cover said push-button in order to protect it against any inopportune actuation,

this cap further comprising an aperture in its wall for the loose passage therethrough of said flexible connection pipe so that, when said cap is removed from the above closure position, it remains retained on said flexible pipe in a "non-losable" manner, thus always within hand-reach, while it enables actuation of said push-button.

The other objects of the invention will appear as the description proceeds in connection with the appended drawings of a preferred though non limitative embodiment of this invention and in which:

FIG. 1 is a diagrammatic perspective view of the whole device according to the above preferred embodiment.

FIG. 2, 2*a*, and 3 respectively, are perspective views of details of said embodiment.

FIG. 4 is a section of an illustrated embodiment of the valve used in the device according to the invention.

The device represented in the drawing shows the remote control of the injection of starting fluid in the air intake of the cold engine of a car which should be started. It comprises a can containing starting fluid under pressure and which carries in its upper portion, a valve **2** (an embodiment of which will be described hereafter with more details in connection with FIG. 4), a push-button **3** normally overlying this valve and provided with a tubular stub **4** (FIG. 4) serving as an outlet for the starting fluid released from the can upon opening of the valve through a downward pressure on said push-button **3**. The tubular stub **4** engages one extremity of a flexible pipe **6**, advantageously of a plastic material, the other extremity of which is connected to an injection nozzle **7** (FIG. 3) secured in the wall **8**, for instance of the air filter of the engine. The length and diameter of the flexible pipe are determined such that the totality of the starting fluid released by the valve, when push-button **3** is actuated, be injected into said air filter so that only fresh starting fluid be delivered upon another subsequent actuation of said push-button.

By way of example, it can be mentioned that a flexible plastic pipe having a 5 feet length and an 0.06 inch diameter is of convenient use. The flexible connection pipe passes advantageously in a hole **18** provided in the dash-board **17**, for instance within the glove box, of the car.

The device according to the invention, further comprises a cap **9** provided with an aperture **11** permitting the loose passage of the flexible pipe **6**, this cap **9** being adapted to engage a flanged portion **12** of the cam in order to protect the push-button **3** when the engine is stopped or during its normal operation.

It will be readily appreciated that this very simple device provides a complete security against inopportune emission of starting fluid in the cylinder of the engine thanks to, on the one hand, the lack of any rigid fixation to the car body, of the can, the valve and the actuating member of this valve which are thus protected from the vibrations of the engine and, on the other hand, to the "non-losable" cap **11** which, when closing the valve controlled outlet of the can, efficiently protects the push-button **3** of any external contact, in particular, from accidental striking by a neighbouring object.

The device according to the invention is not only very secure, but is of a particularly simple use. It can be reached by the driver when the latter sits behind the steering-wheel and can be actuated simultaneously with the actuation of the starter of the engine whereby the fluid released by the can is immediately and completely used for advancing the starting of the engine as soon as it enters in the air filter.

Further, this device can be placed anywhere in the car, for instance in the glove box of the car.

The push-button may be contrived in any appropriate form suitable to be associated with the current types of valves used in connection with such cans. The two prin-

cipal types of valves are represented in FIG. 2 wherein the push-button **3** comprises a member **17** adapted to be slidably fit within the aperture **14** of the valve, and in FIG. 2*a* (in which the same elements are designated by the same reference numerals) wherein the push-button **3***a* comprises a cavity **15** adapted to engage with a protruding outlet tubular stub **16** integral with the valve.

As shown, more particularly in FIG. 4, the push-button **3** (corresponding to the one shown in FIG. 2) comprises a central channel **13** connecting the valve controlled outlet of the can and the tubular stub **4**, so as to directly forward the fluid released from the can into said flexible pipe **6**, push-button **3** being advantageously mounted in frictional engagement with an internal flanged portion of the valve **2**.

In connection with the injection nozzle **7** which fits into the opposite extremity of the flexible pipe **6**, it is, for instance provided in the wall **8** of the air filter through a fastening device comprising a threaded portion secured within said wall by nuts **16**.

While the invention has been described in connection with a particular preferred embodiment, it will be understood that the invention is not limited to that embodiment, but is intended to encompass all alternatives, modifications and equivalents as may be properly included within the spirit and scope of the invention as defined by the appended claims.

What I claim is:

1. A device for advancing the starting of the cold internal combustion engine of a vehicle which comprises in combination a nozzle rigidly mounted in the air intake of said engine, a can containing a starting fluid under pressure, outlet means for said fluid carried by said can, a valve controlling the release of said fluid under pressure from said can through said outlet means and a member for actuating said valve both carried by said can, a flexible pipe connecting said outlet means to said nozzle, a cap adapted to protect said actuating member and said outlet means movably fit in its closure position on said can and apertured to permit the loose passage therethrough of said flexible connection pipe, whereby said cap, in its closure position, protects said valve against any inopportune actuation, and, when removed from said closure position, is retained in a "non-losable" manner on said flexible connection pipe.

2. A device according to claim **1** wherein said valve actuating means are constituted by a push-button overlying said valve, said outlet means being provided in said push-button and comprising a tubular stub projecting outside from said push-button and engaging one extremity of said flexible pipe.

3. A device according to claim **2** wherein said push-button is mounted in frictional engagement with an external portion of said valve.

4. A device according to claim **1** wherein said nozzle is rigidly secured within the wall of the air filter of said engine.

References Cited

UNITED STATES PATENTS

2,986,135	5/1961	Clark et al.	123—180
3,187,735	6/1965	Fiedler et al.	123—187.5

LAURENCE M. GOODRIDGE, *Primary Examiner.*