Aug. 14, 1956 H. B. DONNELL 2,758,639

CARBURETOR FLUID LEVEL CONTROL DEVICE

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Fig. 1.

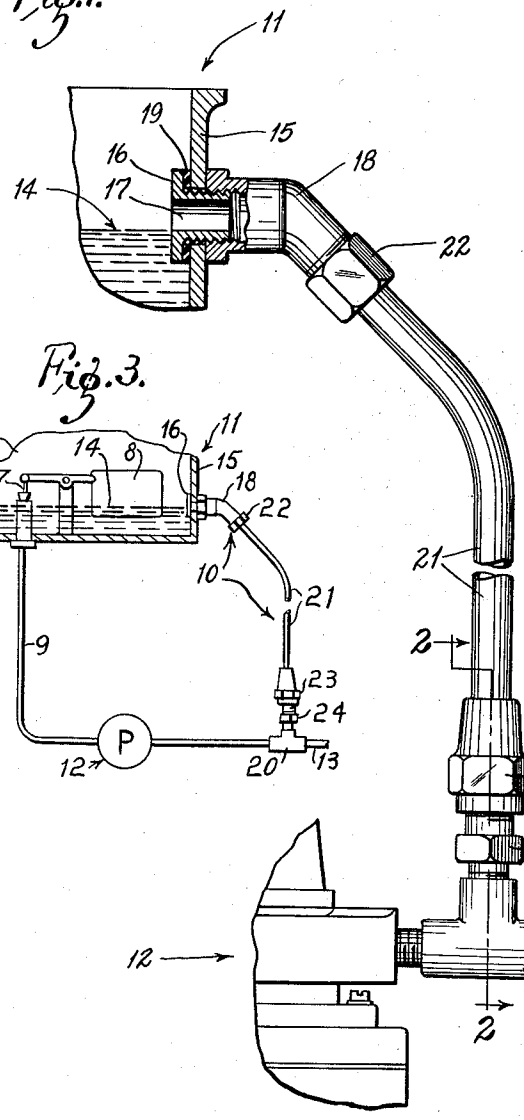


Fig. 2.

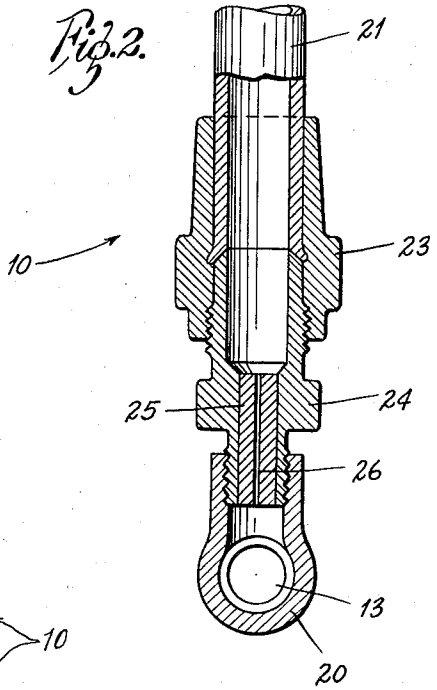


Fig. 3.

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CARBURETOR FLUID LEVEL CONTROL DEVICE

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3 Claims. (Cl. 158—36.3)

This invention relates to improvements in controls for carburetors and, in particular, is concerned with a fluid level control to prevent improper operation and flooding of the carburetor.

It has been a problem in the use of carburetors in the past to prevent flooding and use of excess fuel in the carburetor with attendant wastage thereof. This excess fuel, if uncontrolled, will flood through the venturi and intake manifold to the spark plugs and pistons of the engine to cause dilution of the engine oil, excessive cylinder and piston ring wear, valve stem wear, and a heavy deposit of carbon. Another direct disadvantage is due to a heavy drain on the battery due to hard starting of the engine when flooded. Excess fuel in the carburetor chamber may be caused from a high float setting, bad needle valve in seat, high fuel pump pressure, or by percolating or flooding of the gasoline within the carburetor chamber.

By means of this invention these difficulties and objections have been obviated by a device which drains any fuel that is above the recommended fuel high level line in the carburetor chamber. This recommended high level line is conventionally controlled by the carburetor float and is generally a little bit lower than the venturi opening in the intake manifold. Through this invention excess fuel which may fill up in the carburetor above the recommended level line and thereby cause flooding is caused to drain off gradually back into the system and into the fuel pump. Thus, there is no wastage of gasoline, and the fuel level line never increases beyond the recommended level line within the carburetor chamber.

In brief, the device which maintains the fluid level line at below the undesired level comprises a drain within the carburetor wall which communicates with a restriction in tubing connected therewith and opening at the bottom to the fluid line of the fuel pump. This restriction is rather small and is of such a size as to permit gradual flow of fluid therethrough to prevent flooding, but is small enough so that no adverse effect is had upon the action of the fuel pump.

Accordingly, it is an object of this invention to provide a device for a carburetor which controls the fluid level therein and prevents flooding and also prevents any wastage of fuel in this operation.

It is a further object of this invention to provide a carburetor and internal combustion engine with a device for preventing flooding and overflow of the fluid above a recommended level in which the fluid is removed above a recommended level through a drain and recycled to the fuel pump.

A still further object of this invention is to provide a carburetor for an internal combustion engine with a drain which prevents fluid from flowing into the carburetor chamber beyond a recommended level and in which the drain communicates with a restriction between the carburetor chamber and the fuel pump to prevent any waste of the fuel, and to recycle the fuel back to the fuel pump.

Yet another object of this invention is to provide an internal combustion engine with a device which prevents the fuel within a carburetor from rising above a certain recommended level such that the fuel flooding above this level is removed through a drain communicating with a restriction element connected to the inlet side of a fuel pump in order that the drain in the case of flooding is gradual and the functioning of the fuel pump is not affected.

Yet another object of this invention is to provide an antiflood drain for the carburetor in an internal combustion engine to remove any flooding fuel from the carburetor chamber through a restrictor element to a fuel pump, and in which all of the parts are made of standard fittings, tubing and connections for adaption to any carburetor or fuel pump to provide a rugged and simple apparatus that is inexpensive in cost and easy to maintain, inspect and repair.

Further objects of this invention will appear in the detailed description which follows, and will be further apparent to those skilled in the art in connection therewith.

A typical embodiment of the invention is illustrated in the accompanying drawings for the purpose of description. In these drawings:

Fig. 1 is a view in elevation and partly in cross section showing the control device connected between a fragmentary portion of the carburetor and the inlet side of a fuel pump;

Fig. 2 is a vertical cross-sectional view taken on the line 2—2 of Fig. 1; and

Fig. 3 is a schematic view of the connections between the fuel pump and the carburetor and showing a portion of a carburetor float valve chamber in cross-section.

Referring now to Figures 1 and 3, the control device is shown generally indicated at **10** connected between the flat valve chamber fragmentary portion of the carburetor **11** and the fragmentary portion of a fuel pump **12**. As more generally shown in Fig. 3, the carburetor **11** has a float valve chamber **6** provided with a float valve **7** and float **8** which controls the passage of fuel from fuel pump **12** through conduit **9** into the carburetor. The inlet to the fuel pump from a conventional fuel tank (not shown) is shown at **13** through conventional ⅛ or ¼ inch tubing, and the recommended level line of the fuel within the carburetor is shown at **14**.

The control device **10** is connected to the wall **15** of the carburetor chamber by means of a threaded nipple **16** which fits through a hole in the wall **15** so that the opening **17** within the nipple is in register at its bottom with the recommended fluid level line **14**. The nipple **16** is secured to the flanged elbow **18** of the control device and is sealed and further secured against the possibility of any leakage by a gasket **19** which, of course, should be chosen from a material that is resistant to the action of the fuel. The lower end of the control device is connected to a three-way opening T-fitting **20** which is inserted between the fuel pump **12** and the inlet fuel line **13**.

The control device, which is shown in more particular detail in Fig. 2, includes a long piece of conventional ⅛ or ¼ inch tubing or piping **21** made of copper or the like which may be connected to the elbow **18** by coupling **22**. The lower end of the tubing **21** is connected to a union **23** which is provided with a threaded opening at its lower end to receive a male connector element **24**.

The male connector element **24** is threaded at both ends and has a hexagonal flange at its middle so that it can be readily received by a wrench or the like for the assembly or disassembly operation. The lower end of the connector element fits within the central portion of T-fitting **20** so that communication is established between

the carburetor, through the control device, and into the inlet line 13.

Positioned within the interior of the male connector element 24 is a restrictor element 25 which is provided with a restrictor opening 26 of small diameter to restrict the flow of fluid therethrough. This opening in the case of conventional carburetors and fuel pumps used in passenger cars may vary in size in the range of from about 0.015 to 0.025 inch. It is, of course, to be understood that where larger engines are used with larger carburetors and higher capacity fuel pumps that this restriction may be enlarged accordingly so that the diameter will be greater to accommodate the different conditions. Conversely, should the size of the engine, carburetor and the fuel pump be reduced, the reverse will be true. It should be pointed out that the smaller the cross-sectional area of the restrictor opening, the more effective is the operation of the fuel pump, while the larger the area, the faster is the drain into the fuel pump. Thus, the size of the opening depends upon the carburetor and fuel pump utilized, as will be readily understood by those versed in this art.

In use

When the fluid level control device 10 is in use in the normal internal combustion engine of a passenger car or the like, it will not change the functioning of the carburetor nor will it affect the operation of the fuel pump adversely or change it in any manner at all where the fuel level is below line 14, i. e., below the bottom of the opening 17. In this situation fuel will, by the actuation of the fuel pump 12, be caused to flow from the fuel tank to inlet line 13 and thence to the carburetor. The restriction opening 26 in the restrictor element 25 is of such a small diameter that any loss of vacuum in the section will be negligible and will not adversely affect the fuel pump operation.

Should the fluid level within the carburetor chamber be caused to be raised above line 14 under normal conditions without the use of the control device 10, flooding will occur and improper operation will result. By the use of the control device 10, the fluid level line is prevented from rising above level line 14 or the lower portion of the opening 17, since all excess fluid is drained out the nipple, through elbow 18 and conduit 21, to the interior of the male connector element 24. Thus, the excess fluid, which would under normal conditions flood the carburetor, will gradually pass through the restrictor element 25 and into the fuel line 13 to the fuel pump so that wastage is prevented. Should for any reason the flooding be fairly rapid, the tubing 21 in the interior of the male connector element 24 above the restrictor element 25 acts as a reservoir until proper operation is effected through the carburetor.

The operation of control device 10 is effective under any situation where there is too much fuel in the carburetor and the level of fuel is above the recommended level line 14. Thus, for high float setting, bad needle valve in seat, high fuel pump pressure, all tending to raise the level 14 under any set of conditions, the control device 10 will operate to correct these features and prevent the rise in level of the fluid within the chamber of the carburetor. Also, in conditions of percolation where the gasoline boils within the carburetor, excess fuel is drained off through the control device 10 and pressure is reduced so that this and other disadvantageous features are obviated. Further, vapor lock which is due to overheating of the fuel line on the inlet side of the fuel pump will be minimized due to the direct communication to the carburetor through the restrictor element.

The control device is particularly effective because there are no working parts to get out of operation, and there is no possibility of starving the carburetor since fuel is never blocked in any manner at all from getting into the carburetor by the control device 10 and fuel is never removed from the carburetor until the level line is above the recommended position.

The control device of this invention is exceedingly simple to install and requires only that the carburetor chamber wall 15 be tapped at the desired point such that the nipple 16 can be correctly inserted therein. Further, by means of the tubing 21 which is adaptable to be bent in any desired configuration, communication can be had with the fuel pump in any desired location. All that is required to install the control device in addition to the positioning within the carburetor 11, is the insertion of the T-fitting 20 between the fuel pump 12 and the inlet line 13. After this has been effected the installation of the control device 10 is exceedingly simple requiring only that the male connector 24 be connected at its bottom to the T-fitting after which the device is ready for operation.

Should for any reason it be desired that the size of the restrictor opening 26 within the restrictor 25 be varied this can be easily accomplished by inserting a new restrictor elementt which is held within the male connector by a press fit or other conventional removable securing means, if desired. This gives a wide range of adaptability to the control device so that it can operate for varying sets of conditions, for different size engines, or different sizes of carburetor and fuel pumps.

The control device is extremely rugged by virtue of its simplicity, but should any maintenance or repair work be required, this can be easily accomplished by the disassembly of the various threaded fittings and can be effected with the use of a wrench as the only tool required. Thus, cleaning, repair and maintenance can be made on the road by the operator of the car, should this for any reason be necessitated. Also, since the control device uses standard parts and equipment, the initial cost is extremely low and virtually no maintenance is needed.

Various changes and modifications of this invention will appear from the description of this invention and will be further obvious to those skilled in the art. Such modifications and changes are within the teaching of this invention and are included within the scope of this invention as defined by the claims appended hereto.

What is claimed is:

1. In combination with a fuel pump delivering fuel to a carburetor having a float chamber provided with a float valve therein for metering fuel from said pump to said carburetor, means in communication with the carburetor and said fuel pump for preventing the fuel supply within said carburetor from exceeding a fixed high level line independently of the metering action of said float valve, said means including a drain conduit connected at one end to the float chamber above and contiguous with said level, said drain conduit being connected at its other end to the inlet side of the fuel pump and closely adjacent thereto, and a restricting means having a reduced free cross-sectional area in said drain conduit and having a pressure drop therethrough substantially greater than that developed between the inlet side of the fuel pump and the fuel source.

2. In combination with a fuel pump delivering fuel to a carburetor having a float chamber provided with a float valve therein for metering fuel from said pump to said carburetor, means in communication with the carburetor and said fuel pump for preventing the fuel supply within said carburetor from exceeding a fixed high level line independently of the metering action of said float valve by draining excess fuel above said level into said fuel pump, said means including a drain conduit connected at one end to the float chamber above and contiguous with said level and connected at its other end to the inlet side of said fuel pump, through a restricting means in communication with and adjacent to the inlet side of said fuel pump, said restricting means being located near the bottom of said conduit adjacent the fuel pump to provide a substantial overflow fuel reservoir in the drain conduit above the restricting means and having a free cross-sectional area substantially less than

that of the fuel pump inlet line to prevent any adverse effect on the operation of said fuel pump.

3. In combination with a fuel pump delivering fuel to a carburetor having a float chamber provided with a float valve therein for metering fuel from said pump to said carburetor, conduit means connected to the inlet side of the fuel pump for delivering fuel thereto, drain means in communication with the carburetor and said fuel pump for preventing the fuel supply within said carburetor from exceeding a fixed high level line independently of the metering action of said float valve, said drain means being connected at one end to the float chamber above and contiguous with said level and being connected at another end to the conduit means closely

adjacent to the inlet side of the fuel pump, and a restrictor means in the drain means having a free cross-sectional area substantially less than that of the drain means.

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