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FILTER AND MANUAL FUEL PUMP FOR CARBURETOR

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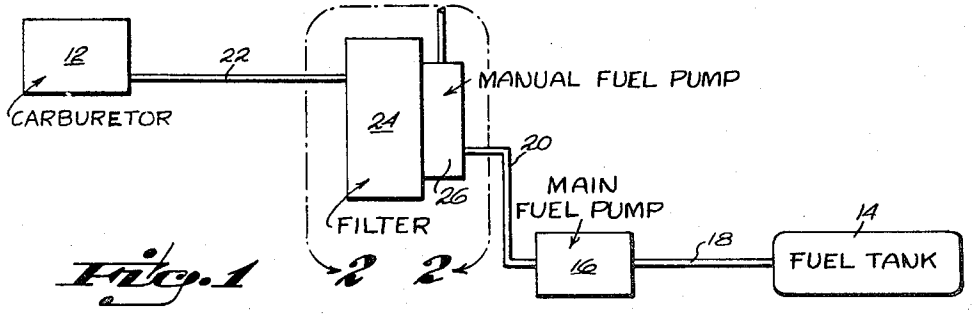


Fig. 1

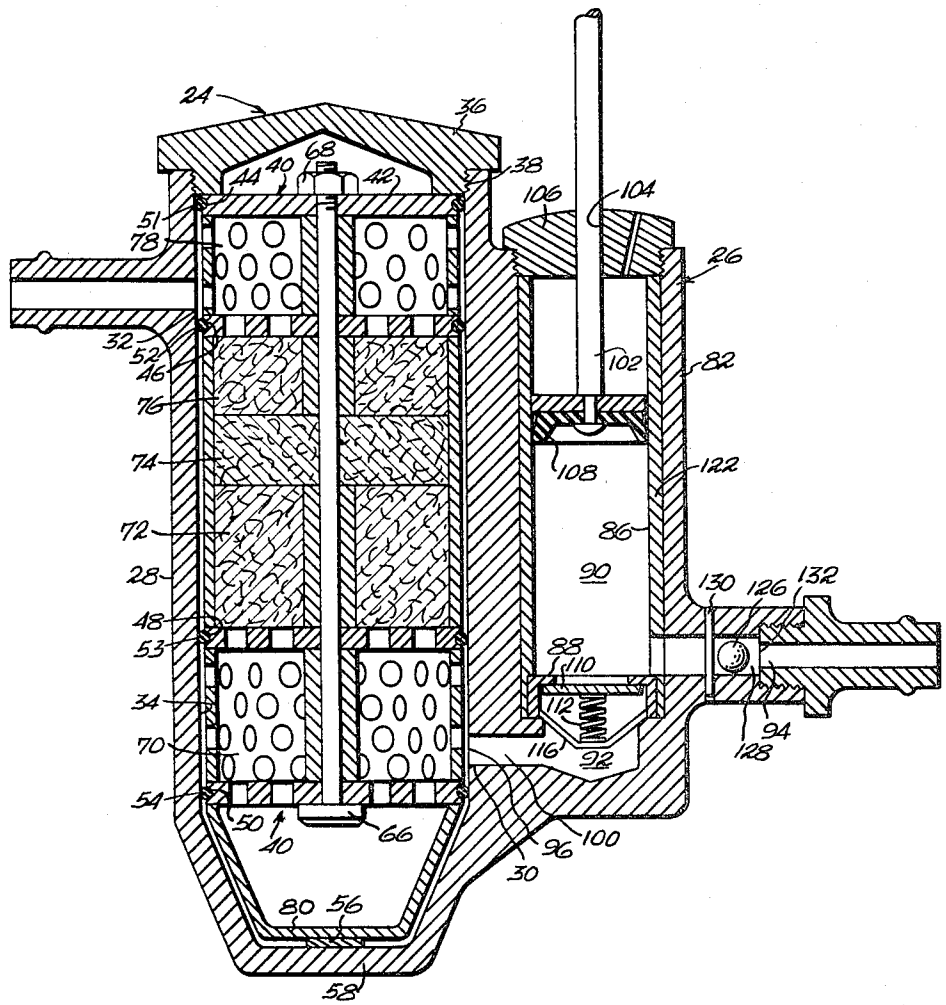


Fig. 2

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FILTER AND MANUAL FUEL PUMP FOR CARBURETOR

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ABSTRACT OF THE DISCLOSURE

A combined fuel filter-and-manual pump unit comprising a single housing having adjacent elongated filter and pump chambers connected by a passage extending through a common wall and communicating with a lower portion of said pump chamber and a lower intermediate portion of said filter chamber, a removable filter cartridge in said filter chamber including inlet and outlet portions whereby fuel must flow therethrough, said filter chamber including a floor portion below said passage, forming a sludge collection portion serving both said filter and pump chambers, said pump chamber including valve means opening toward said passage and an inlet directing fuel into said pump chamber above said valve means, a second valve means in said inlet opening toward said pump chamber permitting fuel to flow therein, and a manually operated piston in said pump chamber above said first mentioned valve means and subject to fuel pressure in said pump chamber under normal operating conditions whereby the piston is normally urged to the upper portion of said pump chamber and the pump chamber is filled with a substantial primer charge of fuel to be expressed manually toward the filter chamber by said manually operated piston.

This invention relates to an improved filter and manual fuel pump including a check valve for inclusion in the fuel line of automobiles between the carburetor and fuel pump.

The instant invention provides an improved gasoline filter and manual pump for inclusion intermediate the main fuel pump and the carburetor in a fuel delivery system, which is to be positioned above the level of the fuel pump. The filter and pump includes a valve intermediate the filter portion of the device and the manual fuel pump portion of the device to restrict gasoline flow therethrough with the valve member being normally closed and adapted to be opened (a) to permit gasoline to flow to the filter and carburetor when the main fuel pump is operating, or (b) when the fuel pump is not operating, to open in response to activation of the manual fuel pump, which includes a piston means to open the valve while simultaneously closing and restricting the inlet passage so that fuel in the fuel body may not pass down stream but only to the filter.

It is a general object of this invention to provide a device for automobiles which will permit of improved starting for an automobile which is out of gas in the carburetor and a portion of the fuel line for the reason that it will restrict the back flow of gasoline in the fuel line and is adapted to pump fuel to the carburetor to result in quicker starting.

It is a general object of this invention to provide a device of the type described which is simple in construction, economical to manufacture, and is otherwise well adapted for the purposes set forth.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings illustrating a preferred embodiment thereof:

In the drawings:

FIG. 1 is a schematic view of a filter and check valve arrangement of the instant invention in relation to a carburetor, fuel pump and main reservoir tank for an automobile; and

FIG. 2 is an enlarged cross-sectional view taken medially of the check valve and filter indicated in FIG. 1 with the arrowed line 2—2 therearound.

Referring to the drawings wherein like reference characters designate like or corresponding parts throughout the different views, and referring particularly to FIG. 1, which is a schematic view of the fuel pump system of a motor vehicle having the instant invention installed, the numeral **12** represents a carburetor and the numeral **14** represents a fuel reservoir or tank. Intermediate the carburetor and the tank a fuel pump **16** is provided for causing a pressure differential to draw the fuel from the tank through the conductor lines **18**, **20** and **22**. The instant invention comprises the combination of the filter **24** and the manual fuel pump and the check valve **26** adjacent the filter which are, as indicated in the schematic drawing, positioned, when installed, above the plane of the fuel pump for a reason which will become apparent hereinafter.

Referring now to FIG. 2, it will be seen that the fuel filter comprises a housing **28** having an inlet port at the lower end **30** and an outlet port at the upper end **32** which lead into a main chamber **34** which is adapted to be closed by a cap **36** which, as indicated, is threaded for threaded engagement as at **38** with the interior upper lip of the housing. Within the housing the filter unit, generally designated by the numeral **40**, is provided; the filter unit comprises a cartridge frame **42** sized for insertion into the central chamber of the housing and provided with a plurality of peripheral grooves **44**, **46**, **48** and **50** which seat neoprene O-rings **51**, **52**, **53** and **54**, which, when the cartridge is assembled in the housing, tightly engage and nestle against the side walls of the housing. A cushion block such as **56** may be provided in the floor **58** of the housing so that the cartridge will rest thereon. The cartridge may be provided with various types of filtering mediums in stacked annular members which are connected together by a relatively long headed screw **66** and a nut **68** which threadably screws on the end of the screw **66** to draw various elements, such as **70**, **72**, **74**, **76** and **78** together into close abutting relation. The upper and lower elements **70** and **78** respectively are provided with perforated outer walls to permit of fluid flow between the inlet and outlet ports and the respective elements while each of the elements are provided with abutting surfaces which permits of fluid flow through the various filtering mediums of the cartridge. It is preferred that the first filtering medium be of a material spaced above the floor **80** of the cartridge, to facilitate sludge collection, which will pre-filter and remove moisture from the fuel. The various other levels of the filter may include conventional filtering materials and a charcoal filter for the purpose of degreasing the gasoline and rendering it more pure. It will be readily apparent that the cartridge may be removed as a unit simply by removing the cap **36** from the housing and pulling the cartridge as a unit from the interior of the housing. In this manner one may change the cartridge, or, indeed, substitute a different filtering medium for one in the cartridge assembly by simply removing the nut **68** from the end of the headed screw **66** and replacing one of the elements of the cartridge.

Preferably assembled on the filter, a manual fuel pump and check valve structure generally designated by the numeral **26** is provided, the body **82** of which includes a central cylindrical chamber **86**, the interior walls of which are provided with a valve seat **88** dividing the interior chamber into an upper portion **90** and a lower portion **92**. An inlet port **94** is provided for the upper

portion and an outlet port **96** is provided for the lower portion, there being an integral of otherwise suitably arranged connector pipe **100** to connect the body **82** to the filter housing, which in this embodiment is a simple passageway in the body connection to the filter housing. A piston **102** is provided in the upper portion **90** and is slidable with respect to the axial bore **104** in the vented cap **106** to move a neoprene gasket head **108** on the inner end of the piston vertically to act as a pump or push force on liquid in the upper portion. On the valve seat **88** a valve plate **110** is provided which is normally urged by spring means **112** to seat on the lower surfaces of the seat, the spring **112** being held in place by a retaining frame member **116** in the lower portion. A replacable liner **122** for the body may be provided which is of suitable material. It will also be noted that in the inlet of the manual fuel pump or check valve body, another valve is provided which comprises a ball **126** which is captivated in the chamber **128** between a pin **130** and the end **132** of the fitting which may be discharged so that pressure in the body **82** will force the ball to seat and block entrance of gasoline into the body **82** while a force is being applied to the piston.

It is thus seen that so long as the carburetor is provided with fuel from the fuel tank by reason of the action of the fuel pump the engine will continue to operate. When the fuel tank supply has been exhausted the fuel pump will cease to provide sufficient pressure to keep the valve **110** open and, consequently, a fuel supply captivated in the body **82** will be trapped. During the operation of the motor vehicle, the piston **102** will have been gradually raised upwardly by the pressure of the fuel in the main upper chamber **90** pressing against the piston head or gasket **108**. Thereafter, to start the automobile once the fuel tank has been recharged, there is a problem in drawing sufficient fuel through the line to start the engine automatically. The fuel line may be primed by pushing downwardly manually on the piston **102** with sufficient force so that two things will happen simultaneously: the fuel in the reservoir **82** will be forced into the filter housing and the ball will be brought against the end **130** of inlet port **94** of the pipe to constrain the fuel trapped in the upper chamber **90** to one direction of movement only in response to the pressure or force of the piston head **108**. It is thus seen that the carburetor will immediately be supplied with the gasoline in the line **22**, the filter **24** and the reservoir **90** of the manual fuel pump and check valve to immediately start the engine and, consequently, the fuel pump. This will result in an immediate replacement of the normal supply of fuel in the line **18** and will gradually refurnish a supply of extra fuel in the upper chamber **90** by causing the piston to gradually retreat upwardly to the recharged position so that the next time the vehicle runs out of gas it may be readily started again in a similar manner. The reservoir of the upper chamber **90** is at least equal to the cup of the carburetor for the vehicle on which it is mounted so that there will be sufficient fuel supply to it.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent apparatus and articles.

What is claimed is:

1. In a fuel delivery system for an internal combustion engine including a fuel supply, main fuel pump and carburetor connected in series, the improvement comprising:

a combined fuel filter-and-manual fuel pump unit comprising a unitary housing including adjacent, parallel, elongated filter and pump chambers having a common wall and respectively connected at intermediate and lower portions to a passage extending through said common wall,

said housing including an upper outlet communicating with said filter chamber for connection in series to the carburetor,

said housing including an inlet having a portion for connection in series with said main fuel pump, said inlet communicating with an intermediate portion of said pump chamber,

a filter cartridge removably retained in said filter chamber and including an intermediate inlet communicating with said passage and an upper outlet communicating with said chamber outlet, said filter cartridge including a lower sludge collecting portion below said passage,

said pump chamber including first one-way valve means biased to open only toward said filter chamber and disposed below said inlet to said pump chamber, a second one-way valve means in said inlet and opening only toward said pump chamber, and

a manually-operable piston reciprocably supported in said pump chamber above said valve means whereby normal fuel pressure in said system fills said pump chamber with an emergency charge of priming fuel and positions said piston at an upper portion of said pump chamber to permit said priming charge of fuel to be readily directed through said filter chamber to a carburetor.

2. The structure as claimed in claim **1** in which said filter and pump chambers, respectively, include removable closure caps affording ready accessibility to said piston and filter cartridge.

3. The structure as claimed in claim **2** in which said pump chamber includes an inner sleeve retained therein by the closure cap of said pump chamber, said first one-way valve including an apertured valve seat engaged by a lower portion of said sleeve and retained in position by said sleeve, a valve plate disposed beneath said valve seat, a frame depending beneath said valve seat, and a spring engaged between said frame and said plate and normally urging said plate into engagement on said apertured valve seat.

4. The structure as claimed in claim **2** in which said filter cartridge comprises a stack of axially disposed filter elements, and means extending axially of said stack of filter elements and removably retaining the same in a stack and permitting interchangeability of said filter elements.

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