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3,719,595

FUEL FLOW RESTRICTING AND FILTER ASSEMBLY

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Fig. 1

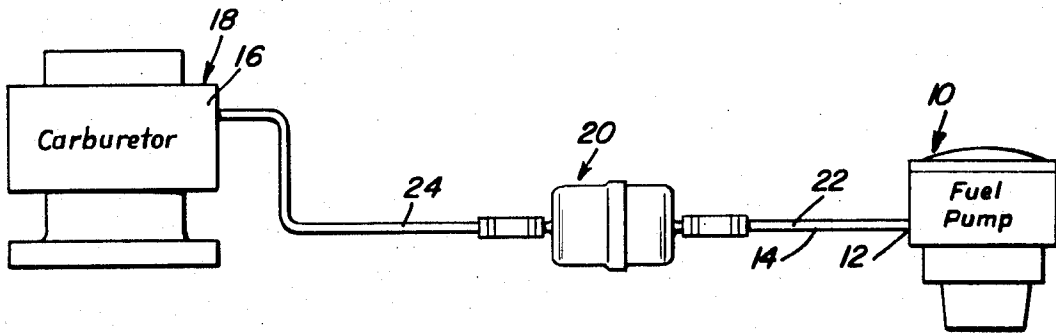


Fig. 2

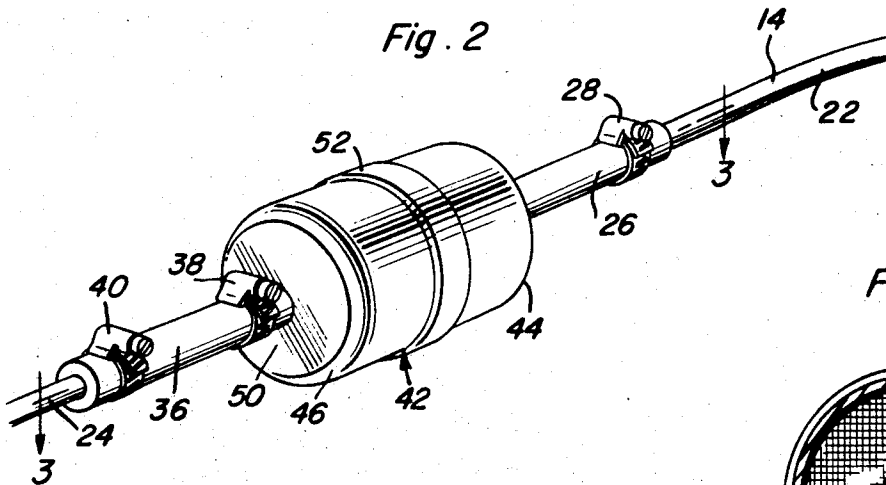


Fig. 4

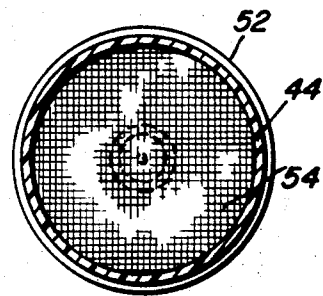


Fig. 3

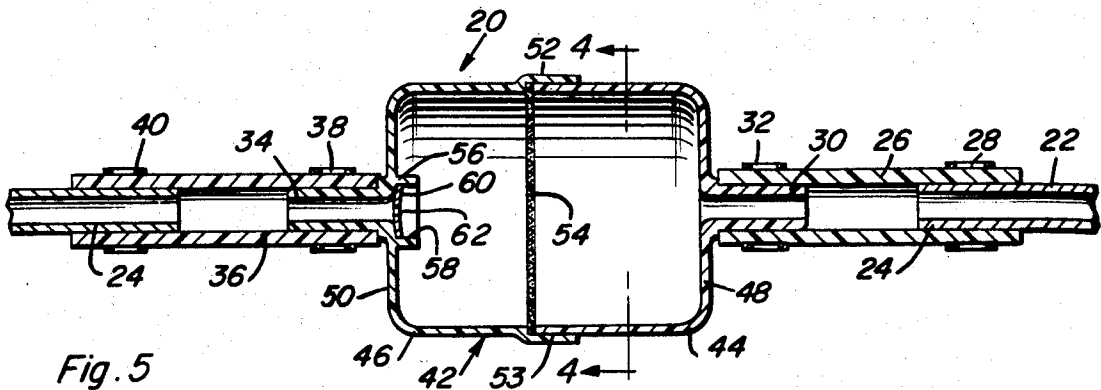
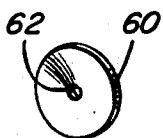


Fig. 5



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FUEL FLOW RESTRICTING AND FILTER ASSEMBLY

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Continuation-in-part of application Ser. No. 37,147,
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2 Claims

ABSTRACT OF THE DISCLOSURE

A tubular body for interposing in a fuel flow line to a fuel metering induction assembly of the type adapted to meter measured quantities of fuel for mixing with a combustion supporting gas. The body has a passage formed therethrough and a midportion of the passage defines a flow restrictive zone for reducing fluid pressure pulses. Also, the passage includes a zone of increased cross-sectional area intermediate the inlet end of the passage and the fuel flow restrictive zone for further reducing fluid pressure pulses. The zone of increased cross-sectional area is provided with a transverse filter body through which fuel flowing through the tubular body must pass and thus the filter body is afforded maximum filter area with each unit of cross-sectional area of the filter body subject to a minimum flow of fuel therethrough.

This application comprises a continuation-in-part application of my co-pending U.S. application Ser. No. 37,147, filed May 14, 1970, for In-Line Fuel Flow Restricting and Filter Assembly, now U.S. Pat. No. 3,655,059, dated Apr. 11, 1972.

The flow restricting and filter assembly of the instant invention has been specifically designed to reduce pressure pulses of liquid fuel intermediate a supply pump and a carburetor or other air and fuel mixing device. Also, the assembly has further been designed to limit and thereby reduce maximum fuel pressures received at the inlet of an automotive carburetor from the fuel pump of the associated vehicle when the vehicle is operating at high speeds, but not under full throttle conditions.

Conventional mechanical fuel pumps provided on present day automobiles and other motor vehicles are engineered so as to be capable of delivering a maximum volume of fuel required by an automotive engine while operating at high speeds and under full throttle conditions. Further, most fuel pumps are capable of delivering fuel amounts in excess of the maximum fuel which might be required at an associated carburetor with the result that when the vehicle is operating at highway speeds and under normal partial throttle conditions required to attain such highway speeds on level ground an excess volume of fuel is pumped to the carburetor under excess pressures. This excess volume of fuel at higher pressures than that required by the carburetor results in pumped fuel forcing its way past the float valve or valves of the carburetor which attempt to throttle the flow of fuel into the float bowl as the level of fuel in the float bowl reaches the desired level. This condition of fuel being forced past the float valves results in the level of fuel within the float chamber or chambers being excessive and this in turn results in a richer air to fuel mixture than is required and a resultant reduction in gas mileage and increase of exhaust emission of smog producing materials.

It is accordingly the main object of this invention to provide an apparatus which will be capable of restricting the flow of fuel to the carburetor at a point upstream from the carburetor so as to reduce or eliminate excess

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fuel levels within the associated carburetor float chamber or chambers.

Another object of this invention, in accordance with the immediately preceding object, is to provide means for restricting the flow of fuel to an associated carburetor in a manner such that pressure pulses of fuel discharged from the associated fuel pump to the carburetor will be reduced en route to the carburetor.

Still another object of this invention is to provide an apparatus in accordance with the preceding objects and which will also function to filter the flow of fuel there-through.

A final object of this invention to be specifically enumerated herein is to provide a fuel flow restricting and filter assembly in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to install so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a schematic view of the instant invention interposed in a fuel line extending between a fuel pump and an associated carburetor;

FIG. 2 is a perspective view of that portion of the fuel line in which the flow restricting and filter assembly of the instant invention is interposed;

FIG. 3 is a fragmentary enlarged horizontal sectional view taken substantially upon the plane indicated by the section line 3-3 of FIG. 2;

FIG. 4 is a transverse vertical sectional view taken substantially upon the plane indicated by the section line 4-4 of FIG. 3; and

FIG. 5 is an enlarged perspective view of the fuel flow metering disk of the instant invention.

Referring now more specifically to the drawings the numeral 10 generally designates a mechanical fuel pump including an outlet 12 with which the inlet end of a discharge line 14 is communicated. The outlet end of the discharge line opens into the interior of the float chamber 16 of a carburetor referred to in general by the reference numeral 18 and the fuel flow restricting and filter assembly of the instant invention is referred to in general by the reference numeral 18.

The assembly 18 is interposed in the line 14 which includes a first section 22 upstream from the assembly 20 and a second section 24 downstream from the assembly 20.

With attention now invited more specifically to FIG. 3 of the drawings, it may be seen that the outlet end of the section 22 has a first end 24 of a flexible connecting line 26 telescoped thereover and clamped thereon by means of a clamp 28. The opposite end of the connecting line 26 is telescoped over and clamped to a tubular nipple 30 by means of a clamp. The nipple 30 comprises the inlet fitting for the inlet end of the assembly 20 and the outlet end of the assembly 20 includes an outlet nipple 34 over which a first end of a second connecting line 36 is telescoped and clamped by means of a clamp 38. The other end of the connecting line 36 is telescoped over the adjacent end of the section 24 and clamped thereto by means of a clamp 40.

The assembly 20 defines a housing referred to in general by the reference numeral 42 and the housing 42 includes a first inlet half 44 which carries the nipple 30 and a second outlet half 46 which carries the nipple 34. The

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housing halves or sections 44 and 46 are generally cylindrical and the half 44 includes an end wall 48 from which the nipple 30 is supported and the half 46 includes an end wall 50 from which the nipple 34 is supported. The end walls 48 and 50 are disposed on the remote ends of housing halves 44 and 46 and the nipples 30 and 34 open through the end walls 48 and 50 and into the remote ends of the halves 44 and 46.

The end of the housing half 46 adjacent the half 44 includes a diametrically enlarged portion 52 into which the adjacent end of the housing half 44 is snugly telescoped. A fluid tight seal is formed as at 43 by any suitable means and a circular filter panel 54 is seated within the diametrically enlarged portion 52 prior to the telescoping of the open end of the half 44 into the open end of the half 46.

It may be seen from FIG. 4 of the drawings that the housing half 46 is also provided with a cylindrical projection 56 defining a counter bore 58. A fuel flow metering disk 60 is seated and frictionally retained within the counter bore 58 and includes a central aperture 62 through which the fuel passing through the assembly 20 is metered.

In operation, that portion of the connecting line bridging the axial spacing between the section 22 and the inlet nipple 30 defines a fuel flow passage of greater cross-sectional area than the section 22. Then, the internal diameter of the inlet neck 30 defines a fuel flow restrictive zone and the interior of the housing 42 defines a flow zone of greatly increased cross-sectional area in which the filter screen 54 is disposed. The aperture 62 formed in the metering disk 60 defines a further reduced cross section fuel flow area and the interior of the outlet nipple 34 defines a zone of increased cross-sectional area through which the fuel passing through the assembly flows. Of course, the portion of the connecting line 36 extending between the nipple 34 and the section 24 defines a flow zone of increased cross-sectional area and the internal diameter of the section 24 defines a zone of decreased cross-sectional areas through which fuel passing from the fuel pump to the carburetor 18 must flow.

Accordingly, fuel passing through the line 14 from the fuel pump 10 to the carburetor 18 initially passes through a first zone of increased cross-sectional area defined by the midportion of the connection line 26, a first zone of reduced cross-sectional area defined by the inlet nipple 30, a second zone of increased cross-sectional area defined by the housing 42, a second zone of decreased cross-sectional area defined by the aperture 62, a pair of successive zones of increased cross-sectional area defined by the nipple 34 and the midportion of the line 36 and then finally into the section 24 of the line 14.

As the fuel flowing from the fuel pump 10 to the carburetor 18 passes through these alternating zones of increased and decreased cross-sectional area, surges in the fuel pressure are modulated until the fuel flowing into the inlet end of the section 24 from the connecting line 36 is substantially constant. Further, the area of greatest cross-sectional area is defined by the housing 42 in which the filter screen 54 is disposed. Therefore, maximum filter area for the fuel is provided thereby enabling the fuel to be filtered to be moving at a relatively slow speed as it passes through the filter screen 54.

The size or diameter of the aperture 62 may be readily varied by the selection of a specific disk 60 and it is to be understood that the disk 60 may be readily removed and replaced by a similar disk having a center aperture of a different diameter. Therefore, the assembly 20 may be utilized in conjunction with different automobiles and other motor vehicles as well as any fuel supply system in which there may be periods of the supply of fuel being greater than the demand.

The assembly 42, exclusive of the filter disk 54 and

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the metering disk 60, may be constructed of any suitable plastic and the housing halves 44 and 46 may be thermal welded together after selection of the proper disk or secured together in any other manner capable of fusing the overlapped ends of the housing halves 44 and 46 together fuel tight manner. Of course, the clamps 28, 32, 38 and 40 are readily removable so that the assembly 20 may be replaced when desired. In addition, the assembly 20 may be readily interposed in any fuel line merely by cutting a short section from the line and mounting the assembly between the adjacent ends of the remaining sections of the line in the manner illustrated in FIGS. 1 through 3 of the drawings.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A tubular body defining a flow passage extending therethrough including small diameter inlet and outlet ends and an intermediate portion of considerably greater cross-sectional area than both of said inlet and outlet ends, said body including filter means in said intermediate portion extending transversely of a straight path extending between said small diameter inlet and outlet ends and through which liquid passing from said inlet end to said outlet end must flow, said flow passage including means defining a flow restrictive zone intermediate said inlet and outlet ends of appreciably smaller cross-sectional area than either of said inlet and outlet ends, said tubular body comprising an elongated housing provided with apertured end walls, said end walls including oppositely outwardly projecting tubular nipples forming outward continuations of said apertures, one of said nipples including an inward extension thereof projecting into the interior of said intermediate portion of said flow passage and including an enlarged counter bore at its inlet end, a flow restricting disk removably frictionally seated in said counter bore and having a central small diameter aperture formed therethrough defining said flow restrictive zone.

2. The combination of claim 1 wherein said tubular body comprises an elongated housing provided with apertured end walls, said end walls including oppositely outwardly projecting tubular nipples forming outward continuations of said apertures, said housing including opposite end sections with adjacent ends telescopically engaged with each other and sealed relative to each other forming a fluid tight seal therebetween, one of said adjacent ends including a diametrically enlarged terminal end into which the other adjacent end is telescopically received and defining a peripherally extending shoulder, said filter means comprising a screen panel seated against said shoulder and disposed between the latter and said other adjacent end.

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