Aug. 24, 1965 A. N. SZWARGULSKI ETAL 3,202,287

FUEL FILTER WITH SEDIMENT CHAMBER

Original Filed Sept. 16, 1957

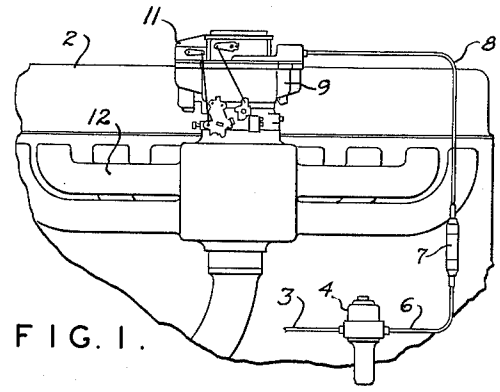

FIG. 1.

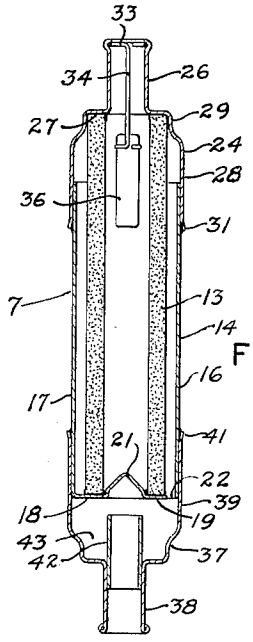

FIG. 2.

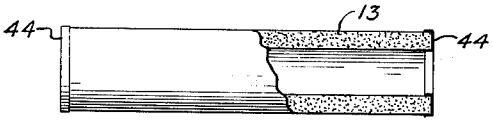

FIG. 3.

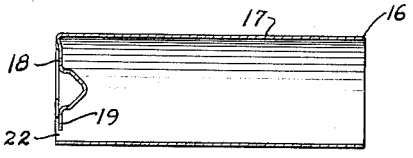

FIG. 4.

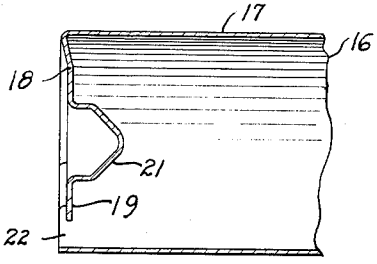

FIG. 6.

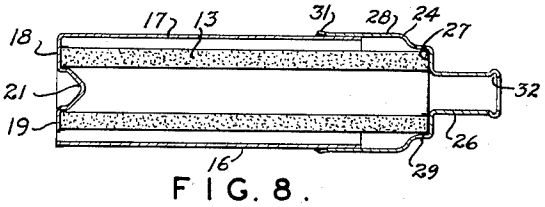

FIG. 8.

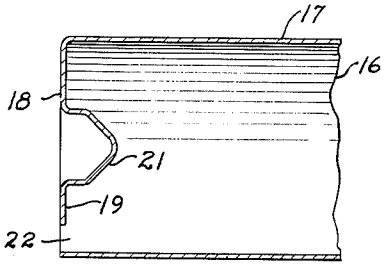

FIG. 7.

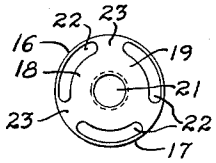

FIG. 5.

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United States Patent Office 3,202,287 Patented Aug. 24, 1965

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FUEL FILTER WITH SEDIMENT CHAMBER

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Continuation of application Ser. No. 684,301, Sept. 16, 1957. This application Oct. 2, 1961, Ser. No. 142,406
2 Claims. (Cl. 210—306)

This application is a continuation of the co-pending application filed by applicants, Serial No. 684,301, on September 16, 1947, now abandoned.

This invention relates to fuel filters for internal combustion engines and, more particularly, to a filter adapted to be interposed in and to conform generally to the contour of a fuel line extending between a fuel pump and a carburetor for the purpose of removing foreign particles from the fuel.

During the past few years, the trend in automobile design has been to reduce the height of cars, increase the size of engines, and to add auxiliary engine equipment under the hood, thereby creating a rather crowded underhood condition. Due to the limited available under-hood space, it is desirable to reduce the size of certain devices on and around the engine in order to conserve such space. It is, therefore, an object of the present invention to provide a fuel filter which occupies a minimum amount of space.

Another object of the invention resides in the provision of an elongated cylindrical filter adapted to be mounted in an upright branch of a fuel line and conforming generally to the shape thereof, whereby the fuel line and filter may be arranged to suit the space conditions under the hood.

A further object of the invention resides in the provision of a tubular ceramic filter element enclosed within telescopically engaged housing sections providing coaxial inlet and outlet nozzles for attachment by means of rubber nipples to a fuel line.

Another object of the invention is to provide an elongated cylindrical filter structure provided at the fuel inlet end thereof with a sediment chamber to receive foreign particles removed from the fuel.

Another object is to provide a filter which is relatively inexpensive to manufacture and may be replaced at small expense after a predetermined service period.

The invention embodies other novel features, details of construction, and arrangement of parts which are hereinafter set forth in the specification and claims, and illustrated in the accompanying drawings, wherein:

FIGURE 1 is a schematic view of a fuel system including a filter, in accordance with the invention and as applied to an internal combustion engine.

FIGURE 2 is a longitudinal sectional view of the filter of FIGURE 1, in accordance with the invention.

FIGURE 3 is a view partly in section of the filter element used in the filter of FIGURE 2.

FIGURE 4 is a sectional view of the filter body section of the filter of FIGURE 1.

FIGURE 5 is an end view of the filter body section of FIGURE 4.

FIGURE 6 is an enlarged partial sectional view of the filter body section of FIGURE 4.

FIGURE 7 is another enlarged partial sectional view of the filter body section in accordance with the invention.

FIGURE 8 is a sectional view of a filter subassembly used in the filter shown in FIGURE 2.

Referring now to the drawings for a better understanding of the invention, a fuel system for an internal combustion engine **2** is shown as comprising a conduit **3** leading from a source of fuel to the inlet side of a pump

4. A conduit **6** leads from the outlet side of the pump to the inlet of a fuel filter **7**. Another conduit **8** leads from the filter outlet to an inlet of a constant level float bowl **9** of a conventional downdraft carburetor **11** mounted on the engine intake manifold **12**. The filter inlet and outlet are provided with nozzles connected to their respective conduits by means of suitable rubber nipples and clamps (not shown).

A fuel filter **7** embodying features of the invention is shown as comprising a tubular ceramic filter element **13** mounted within a housing, indicated generally at **14**. The housing is preferably formed of several telescopically engaged sheet metal sections to thereby reduce the cost of manufacture, but it will be apparent that the housing may, if desired, be formed of other materials.

The housing **14** is shown as comprising an elongated body section **16** having a tubular side wall **17** and an end wall **18** providing an anuular seat **19** for engagement with one end of the filter element **13**. A conical boss **21** formed on the end wall **18** projects inwardly from the inner periphery of the seat **19** for the purpose of centering the filter element on the seat during assembly of the filter. A plurality of circumferentially spaced, elongated, arcuate slots **22** (FIGURE 5) are formed in the end wall **18** between the annular seat **19** and the side wall **17** to form a plurality of resilient bridge portions **23** adapted to yieldably resist axial movement of the seat relative to the side wall.

An outlet nozzle section **24** is formed with a nozzle **26** merging with the inner periphery of an annular seat **27** for abutting engagement with the other end of the filter element **13**. A cup-shaped tubular skirt **28**, formed with a reduced guide portion **29** merging with the outer periphery of the seat **27** to provide an apertured cup portion, is provided on the outlet nozzle section **24** for snug telescopic engagement over the open end of the body section **16**. The skirt **28** is also formed with an outwardly flaring rim portion **31** to facilitate assembly and also for leakproof, soldered engagement with the side wall **17** of the body section **16**.

The outer end of the nozzle **26** is formed with an annular recess **32** (FIGURE 8) to receive a loop **33** formed at the end of a resilient wire support **34** secured to a permanent magnet **36**. By forming the support of resilient wire, the loop **33** is adapted to be readily mounted in or removed from the recess **32**, and, as is clearly shown in the drawing, the magnet **36** and support **34** are smaller than the inside diameter of outlet nozzle **26**, facilitating easy removal and emplacement of the magnet through the outlet end of the assembled filter for removing accumulations of magnetic particles.

An inlet nozzle section **37** comprises a nozzle **38** provided with a skirt **39** for snug telescopic engagement over the end of the body section **16**, the skirt having an outwardly flaring rim portion **41** to facilitate assembly and soldered leakproof engagement with the side wall **17** of the body section. A standpipe **42** is press-fitted into the nozzle **38** to define with the skirt an annular sediment chamber **43**.

To insure a leakproof joint between the filter element **13** and the annular seats **19** and **27**, the ends of the element are, preferably, coated at **44** to a thickness of, for example, 0.010 inch with a suitable gasoline resistant sealing compound which may serve as a gasket, adhesive or cement, between the abutting surfaces. The sealing compound may be applied to ends of the filter element in a liquid condition to seal the openings therein.

In assembly of the filter structure, the filter element **13** is first coated at its ends (see FIGURE 3) with a suitable sealing compound **44** and then inserted into the body section **16** to engage the seat **19**. The skirt of the outlet nozzle section **24** is then sleeved over the open end of the

body section to engage the seat **27** against the filter element with sufficient force to move the end wall **18** outwardly from its position shown in FIGURE 6 to its position shown in FIGURES 7 and 8 to thus flex the resilient bridge portions **23**; after which, the skirt rim **31** is soldered to the side wall **17**, as shown in FIGURE 8.

The skirt **39** of the inlet nozzle section **37** is then sleeved onto the other end of the body section **16** and secured thereto by soldering the skirt rim portion **41** to the side wall **17**, as illustrated in FIGURE 2.

In the use of the filter for removing foreign particles from liquid fuel, the fuel is forced under pump pressure through the inlet nozzle **38**, sediment chamber **43**, slots **22**, and filter element **13**. As the fuel passes through the filter element, some of the foreign particles are separated therefrom and are collected in the sediment chamber **43**. As the filtered fuel passes outwardly through the outlet nozzle **26**, any iron particles therein are attracted to and collected on the permanent magnet **36**.

It will be noted that the filter thus shown and described is particularly adapted for use in automobile fuel lines for the purpose of saving space, as the fuel line serves as the sole support for the filter. As the filter is relatively inexpensive to manufacture, it may be discarded and replaced by a new filter after a predetermined period of use. The permanent magnet and its wire support may, of course, be removed from the filter for cleaning and inserted back into the filter, or it may be removed from the discarded filter for use in the new filter. It will also be noted that the stressed bridge portions **23** act, after assembly of the filter, to bias the seats **19** and **27** against the opposite ends of the filter element **13** with sufficient force to maintain leakproof joints therebetween.

Certain structures have been described herein which will fulfill all the objects of the present invention, but it is contemplated that other modifications will be obvious to those skilled in the art which come within the scope of the invention as defined by the appended claims.

We claim:

1. A fuel filter comprising an elongated tubular body member having a transverse wall closing one end thereof, said transverse wall including a centrally positioned inwardly projecting conical boss, a plurality of apertures spaced by bridge portions around the outer periphery of said transverse wall and an annular seat positioned between said spaced apertures and the base of said conical boss, a cup-shaped element having a nozzle at the end thereof and an annular shoulder extending laterally about said nozzle, the end of said cup-shaped element being telescoped with and sealed to the other end of said tubular body member, a tubular filter fitted within and spaced from said tubular body member, said tubular filter having one end thereof seated against said annular seat portion of said transverse wall and the other end thereof seated against the annular shoulder of said cup-shaped element, a tubular inlet structure including a cylindrical portion and an end wall portion, said cylindrical portion telescopically fitting said one end of said tubular body and being in sealed relationship therewith, said end wall portion including an outwardly extending centrally positioned nozzle structure, and a standpipe sealed in said nozzle structure and having one end thereof extending into said tubular inlet structure to a point beneath and spaced from said conical boss to provide a sediment chamber thereabout.

2. The structure of claim **1** characterized in that the bridge portions spacing the apertures around the outer portion of said transverse wall are resilient to yieldingly resist axial movement of the seat relative to the tubular body member.

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