

July 9, 1935.

J. E. MALIVERT

2,007,336

FUEL FILTER

Filed Aug. 9, 1933

2 Sheets-Sheet 1

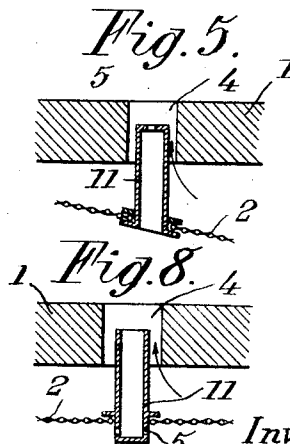
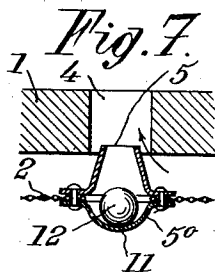
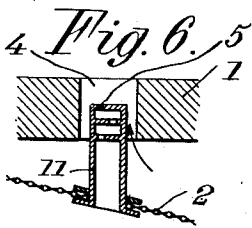
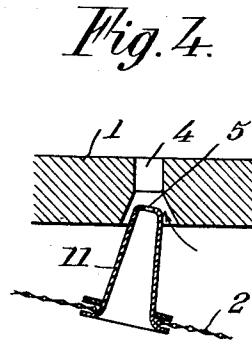
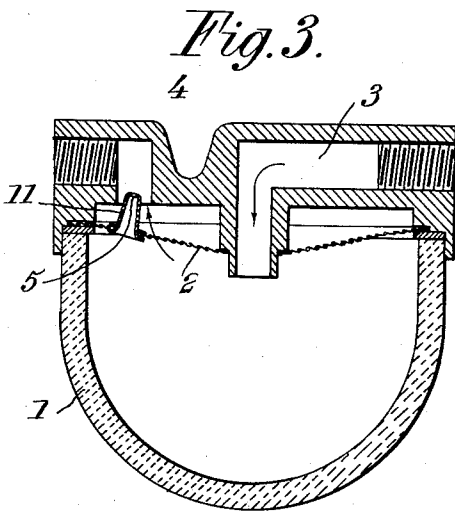
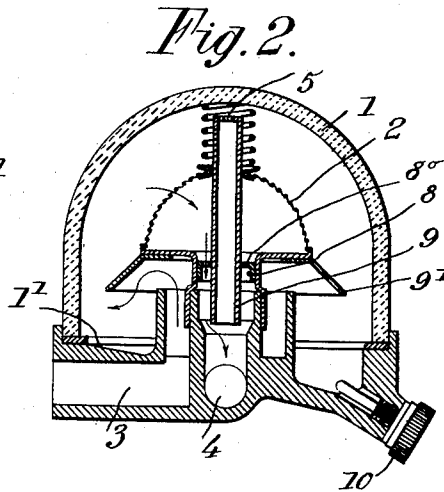
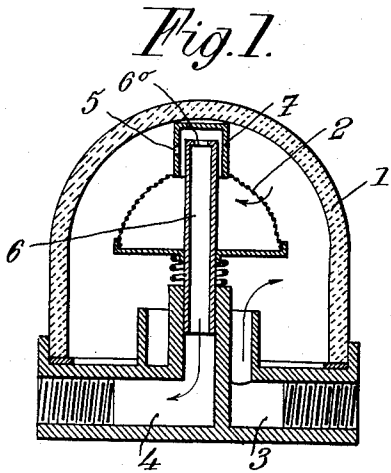


Fig. 8.

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2 Sheets-Sheet 2

Fig. 9.

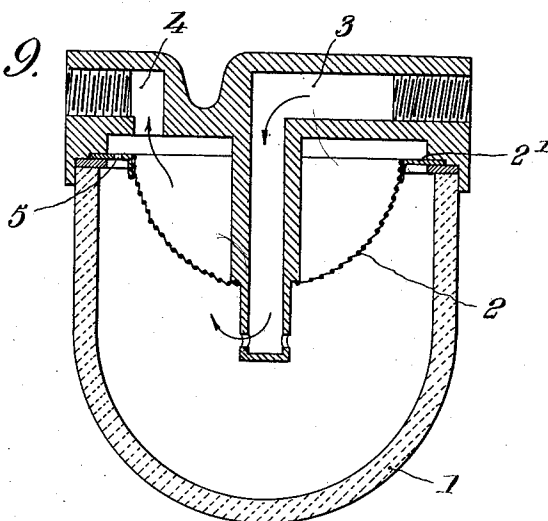


Fig. 10.

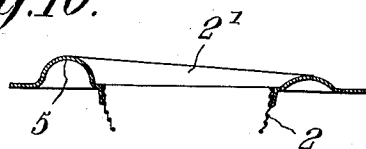


Fig. 11.

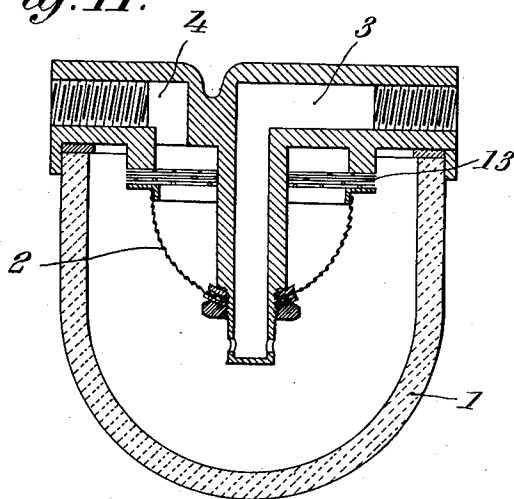
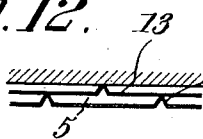


Fig. 12.



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UNITED STATES PATENT OFFICE

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FUEL FILTER

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6 Claims. (Cl. 210-165)

The present invention relates to fuel filters, and more particularly, to those of the type generally employed on automobile and aeronautical motors.

The gasoline filters ordinarily mounted on automobiles are placed adjacent the motor. In practice, it has been found that the heat from the motor frequently converts the gasoline inside the filter into a gas and accumulation of the latter diminishes the flow of fuel through the wire cloth or similar filtering element forming part of the filter assembly. In extreme cases the flow of gasoline through the filter may be completely interrupted.

One of the objects of the invention is to provide an improved form of filter assembly wherein any gases accumulating therein are vented into the discharge conduit supplying fuel to the motor carburetor.

Other objects will appear in the course of the detailed description now to be given with reference to the accompanying drawings, in which:

Fig. 1 represents an axial section through one illustrative embodiment of the invention;

Figs. 2 and 3 are similar sections taken through two other possible forms of the invention;

Figs. 4 to 8 inclusive show, in section, five different variants of the gas venting element illustrated in Fig. 3;

Fig. 9 represents, in axial section, still another form of the invention;

Fig. 10 shows, in section, a special form of flange adapted to be used in assemblies of the type represented in Fig. 9;

Fig. 11 is an axial section taken through a variant of the assembly shown in Fig. 9;

Fig. 12 is an enlarged detail of the venting plates in Fig. 11.

Referring to Fig. 1 of the drawings, there is shown an assembly composed of a detachable glass globe 1 of conventional design limiting a filtering chamber, a spherically shaped filter 2 formed of wire gauze in the usual way, a fuel supply conduit 3, a fuel discharge conduit 4, a cylindrical cap 7 inserted into the top of filter 2 and having a vent hole 5 formed therein, a tube 6 supported in conduit 4 and having an inlet orifice 6⁰ formed in the upper end thereof, tube 6 extending into element 7, a plate *a* supporting filter 2, and a spring tending to force element 7 into contact with globe 1.

Venting orifice 5 should be positioned at a point where there is no danger of unfiltered liquid passing inside element 7. If desired, this orifice may be made of capillary dimensions so as to permit passage of gases while opposing a resistance to

the flow of liquid. Orifice 5 may even be made of very considerable section and a wire filter may be inserted therein.

The manner in which the above described assembly operates is practically self evident. Vapours or gases accumulating in the top of globe 1 will evacuate through orifices 5 and 6⁰ and will flow to the carburetor together with the filtered fuel traversing filter 2. The auxiliary venting structures are designed so that ordinary filters may be easily transformed into structures of the type shown in Fig. 1.

In the form of assembly represented in Fig. 2, gasoline or similar fuel enters via conduit 3 and is deflected downward by a frusto-conical flange 9¹ so that gross impurities fall into an annular groove 1¹ and may be evacuated by unscrewing a plug 10. The fuel will then rise into the upper part of globe 1 and pass through filter gauze 2. If vapours or gases accumulate in the top of globe 1 they will evacuate through capillary orifice 5 formed in one end of a tube 9 communicating with discharge conduit 4. The fuel filtered through gauze 2 will finally pass through orifices 8⁰ formed in a plate 8 to join whatever gases may flow out through tube 9. The assembly is completed by a spring *b*¹ interposed between the top of gauze 2 and globe 1. Flange 9¹ functions also to prevent vortices or violent currents from forming inside the filter assembly.

Fig. 3 shows the invention applied to an inverted form of filter. Here, fuel enters, as before, through conduit 3 to fill globe 1, then traverses filter gauze 2 and flows out through conduit 4. If gas or vapours accumulate, it will be in the region above wire gauze 2. To prevent this from taking place, a hollow venting tube or nipple 11 of conical form is inserted in the filter gauze and is provided with a capillary orifice 5 similar to those described. Nipple 11 should be positioned so as to extend slightly into conduit 4. The filtered fuel entering the discharge conduit and flowing past the outside of the nipple will then act in the manner of an ejector to aspirate any vapours. If orifice 5 is not of capillary dimensions but has a considerable section, it should be provided with a wire gauze (not shown).

In the variant shown in Fig. 4, the lateral walls of conduit 4 are given a conical instead of cylindrical form to modify the velocity of the liquid current flowing outside of nipple 11.

The variant shown in Fig. 5 differs from the one represented in Fig. 4 only in that nipple 11 as well as the lateral walls of conduit 4 are cylindrical.

In the variant represented in Fig. 6, nipple 11 is of cylindrical form and is provided with a plurality of capillary orifices 5 positioned in staggered relation to one another.

5 In Fig. 7, element 11 is made concave and supports a ball valve 12 tending to float upward into a conical seat 5; passage for vapours taking place through a plurality of orifices 5⁰.

10 Fig. 8 shows another variant wherein capillary orifices 5 are positioned at the lower, instead of at the upper, end of element 11.

15 In Fig. 9 another form of inverted filtering assembly is shown wherein venting of vapours and gases is effected via capillary orifices 5 formed in a flange 2¹ supporting filter gauze 2, said flange being clamped in position under globe 1.

If desired, annular flange 2¹ may be given a buckled form as shown in Fig. 10, orifices 5 being formed at the top of the annular groove.

20 Figs. 11 and 12 show a variant of the filter illustrated in Fig. 9 wherein a plurality of superposed plates 13 provided with extending points 13¹ are inserted in the upper part of the assembly on the discharge side of wire gauze 2. Gases accumulating inside globe 1 and outside of gauze 2 are free to make their way into conduit 4 by passing into the spaces between adjacent plates 13. The height of extensions 13¹ may be chosen so that gases are free to pass between adjacent plates while liquid is prevented from so doing by capillary action.

What I claim is:—

35 1. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing, which comprises, in combination, a filtering partition adapted to be removably fixed in said casing between said respective conduits and operative to prevent the flow of impurities from one into the other, and gas venting means carried by said partition provided with at least one hole forming a communication between the opposite faces of said partition and arranged to be positioned in the upper part of said casing when said partition 40 is secured in position therein.

45 2. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing, which comprises, in combination, a filtering partition adapted to be removably fixed in said casing between said respective conduits and operative to prevent the flow of impurities from one into the other, said partition including a central filtering part and a solid annular flange rigid with said 50

central part, said annular flange being provided with a venting orifice for establishing a communication between the opposite faces of said partition.

5 3. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing, which comprises, in combination, a filtering partition adapted to be removably fixed in said casing between said respective conduits and operative to prevent the flow of impurities from one into the other, a hollow venting member carried by said filtering partition, and provided with at least one hole in its upper part, said member being so arranged as to be positioned in the upper part of 10 said casing when said partition is secured in position therein.

15 4. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing at the upper part thereof, which comprises, in combination, a filtering partition adapted to be removably fixed in said casing between said respective conduits and operative to prevent the flow of impurities from one into the other, and a hollow venting member carried by said filtering partition extending upwardly into said fuel discharge conduit, said venting member having at least one orifice formed therein.

20 5. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing at the upper part thereof, which comprises, in combination, a filtering partition adapted to be removably fixed in said casing between said respective conduits and operative to prevent the flow of impurities from one to the other, and a hollow venting member carried by said partition and having its upper end extending into said discharge conduit, said member having at least one orifice 25 formed therein at the upper end thereof.

30 6. A filter element for use in a fuel filter including a casing and fuel supply and discharge conduits both opening into said casing, which comprises, in combination, a filtering partition adapted to be removably fixed between said respective conduits and operative to prevent the flow of impurities from one conduit into the other, and a plurality of spaced plates carried by said filtering partition and interposed between it and 35 said casing so as to form a plurality of venting passages establishing communication between the opposite faces of said partition.

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