June 1, 1948. J. H. KRIECK 2,442,696

APPARATUS FOR INCREASING THE EFFICIENCY OF INTERNAL-COMBUSTION ENGINES

Filed Nov. 1, 1945

Fig: 1

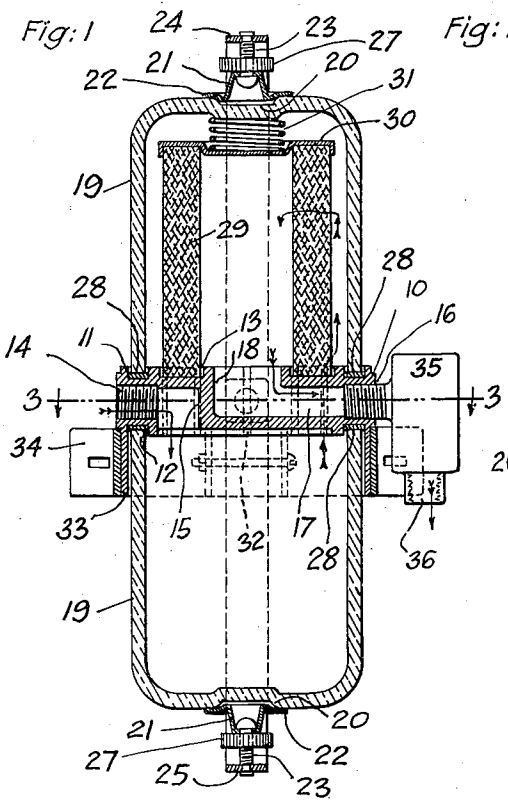


Fig: 2

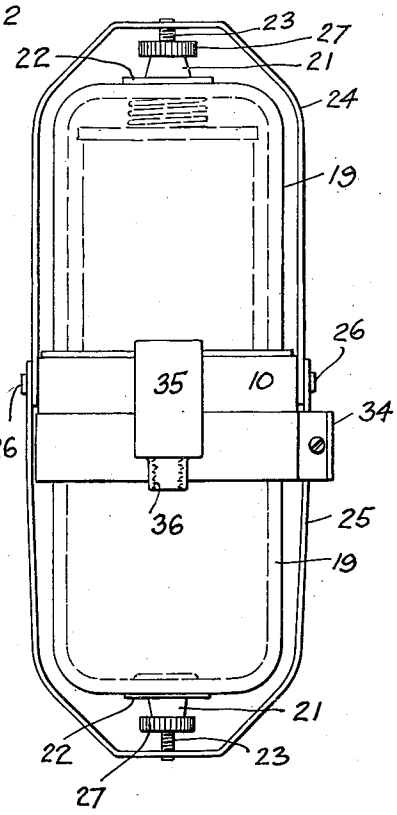
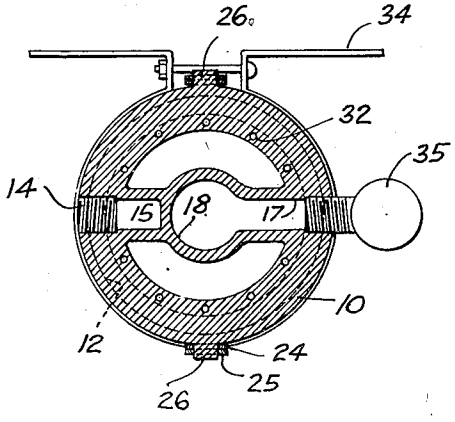


Fig: 3



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APPARATUS FOR INCREASING THE EFFICIENCY OF INTERNAL-COMBUSTION ENGINES

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2 Claims. (Cl. 183—67)

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This invention relates to apparatuses for increasing the efficiency of internal combustion engines, and it is one of the principal objects to provide an improved filtering device for the apparatus for which United States Patents #1,990,657 of February 12, 1935, and 2,226,405 of December 24, 1940, were issued to me.

In each of these patents a filtering device was disclosed through which vapors from the crankcase of the engine are drawn by the suction in the manifold passing through an automatic valve which causes variations in the suction to be minimized. The device has a reservoir into which impurities in the vapors are deposited.

It is the object of the invention to provide such a filtering device which is of a simple construction, can be economically manufactured, and is efficient in operation.

Another object is to provide a structure which is particularly adapted to cooperate with an automatic suction valve disclosed in my co-pending United States patent application, Serial #539,062.

Still other objects will become apparent after a perusal of the following specification and an inspection of the accompanying drawings in which a preferred embodiment of the invention is shown.

In the drawings:

Fig. 1 is a longitudinal sectional view of the device;

Fig. 2 is a side view of the same; and

Fig. 3 is a cross sectional view along the plane of line 3—3 in Fig. 1.

Like characters of reference denote similar parts throughout the several views and the following specification.

10 is a body part of substantially round disk-like shape. 11 is an annular groove in its top and 12 is an annular groove in its bottom. 13 is another annular groove in its top concentric with and of smaller diameter than groove 11. 14 is an inlet at one side of body part 10 communicating with a passage 15 opening into the bottom of body part 10. 16 is an outlet at the other side of body part 10 which is connected by a passage 17 to a central recess 18 in the top of the body part 10.

19 are cup-shaped reservoirs, one at the top and one at the bottom of the body part 10, made preferably of glass or other transparent material, each adapted to fit with its open end into grooves 11 and 12, respectively, Each reservoir 19 has a central recess 20 at its closed end. The reservoirs are identical in every respect.

21 is a thimble at each closed outer end of

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reservoir 19 having a flange 22 adapted to fit in each of recesses 20. Each thimble has a screw 23 projecting outwardly fastened to U-shaped clamps 24 and 25, respectively, which have their open ends fulcrummed over pins 26 at opposite sides of body part 10. A regulating nut 27 is provided for on each screw 23 to draw the reservoirs 19 closely together and each against a gasket 28 in each of grooves 11 and 12 to form vaportight joints with the body part 10.

29 is a cylindrical wall of a filter element fitted at its bottom within groove 13 of body part 10. 30 is a flange closing the top of the filter element. 31 is a helical spring between the inside top of that reservoir 19 which is clamped to the top of body part 10 and flange 30, to keep the filter element within the top reservoir centrally with respect thereto and tightly within groove 13. 32 are small vertical passages connecting the top reservoir 19 between its inner wall and wall 29 of the filter element with the bottom reservoir 19. These passages are preferably evenly spaced.

Body part 10 is provided with a depending skirt 33 for engagement with a clamping bracket 34 which is attached to a suitable support.

35 is a suction control valve of, preferably, an automatic type of the kind disclosed in my co-pending United States patent application, Serial #539,062. This valve is screwed into outlet 16 of body part 10, is provided with a piston valve mechanism which responds to fluctuations in suction for the purpose of minimizing them, and has an outlet 36 for connection to the manifold of the engine.

The operation of the device is as follows:

The outlet 36 of the valve 3 is connected to the inlet manifold of the engine and inlet 14 by piping, preferably to the upper part of the crankcase. When the engine is operated, a suction is set up in the intake manifold which is communicated to the crankcase through passage 17 and recess 18, wall 29 of the filter element, passages 32, the lower reservoir 19, passage 15, inlet 14, and through suitable piping. Thus vapors with particles of dust, carbon, sludge and other impurities will be drawn into the lower reservoir 19 where the heavy particles will be deposited, and the vapors cleaned by the filter element in the top reservoir, so that only clean gases will be drawn into the manifold.

The construction of the device is extremely simple. The top and bottom reservoirs are identical. Only one size of reservoir need be stocked to take care of replacements. Clamping mecha-

nisms at the top and bottom are identical. The means of holding the filter element in place in the top reservoir consists of a simple helical spring only. By evenly spacing connecting passages 32 between top and bottom reservoirs, an even suction is obtained in the reservoirs.

Either of the reservoirs 19 may be removed and replaced for servicing or other purposes without disturbing the other, by merely loosening its adjusting nut 27 and swinging the U-shaped clamp 24 about the pivot 26 common to both clamps.

While an automatic suction control valve has been indicated in outline connected to the device, this valve can, of course, be omitted. The device may also be used for filtering other media than vapors, and its application is not restricted to internal combustion engines.

What I claim as new is:

1. In an apparatus of the kind described, a body member, a pivot extending from each side of said body member, a cup-shaped top reservoir and a cup-shaped bottom reservoir of identical shape having their open ends contact the top and bottom, respectively, of said body member, a U-shaped clamp over each of said reservoirs, each clamp straddling said body member and having its ends movably secured to said pivots, a cup-shaped filter element in the top reservoir in spaced relation thereto and having its open end contact the top of said body member, said body member having an inlet communicating with said bottom reservoir and having passages between the top and bottom reservoirs, exteriorly of said filter element, and said body member having an outlet in communication with the inside of said filter element, and means in each of said clamps to force said reservoirs tightly against said body member.

2. In an apparatus of the kind described, a body member, a pivot extending from each side of said body member, a cup-shaped top reservoir having its open end in contact with the top of said body member, a cup-shaped bottom reservoir having its open end in contact with the bottom of said body member, said reservoirs being of identical shape, a U-shaped clamp over each of said reservoirs, each clamp straddling said body member and having its ends movably secured to said pivots, a cup-shaped filter element in the top reservoir in spaced relation thereto and having its open end in contact with the top of said body member, a spring between the closed ends of said top reservoir and filter element forcing said element in contact with the body member, said body member having an inlet communicating with said bottom reservoir and having a plurality of evenly spaced passages between the top reservoir, exteriorly of said filter element, and said bottom reservoir, said body member having an outlet in communication with the inside of said filter element.

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The following references are of record in the file of this patent:

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