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M. J. BARKER

2,480,108

ADJUSTABLE BY-PASS CHECK VALVE

Filed Jan. 29, 1946

FIG. 1.

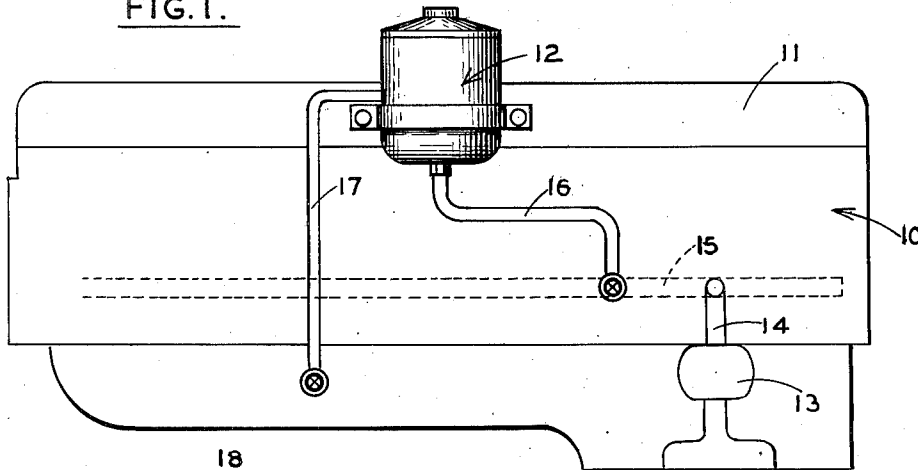


FIG. 4.

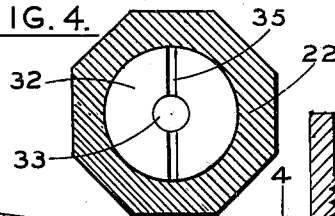


FIG. 2.

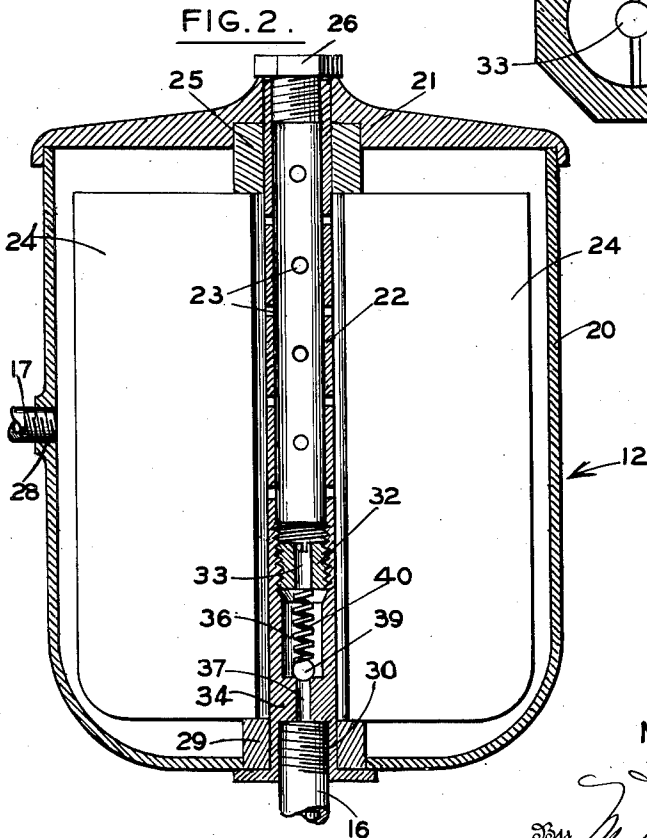
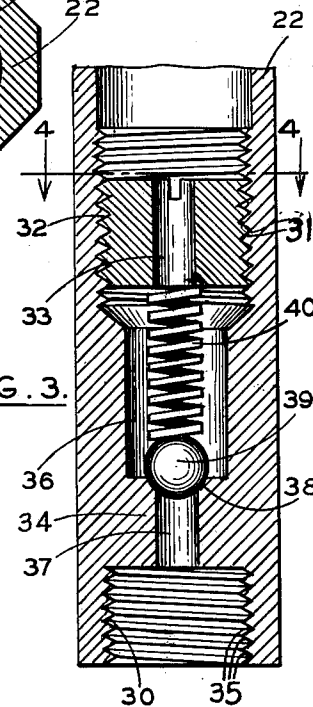


FIG. 3.



Inventor

MARTIN J. BARKER

By *McNarrow, Brown & Davidson*
Attorneys

UNITED STATES PATENT OFFICE

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ADJUSTABLE BY-PASS CHECK VALVE

Martin J. Barker, San Francisco, Calif.

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1 Claim. (Cl. 210-164)

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This invention relates to an adjustable check valve and by-pass for oil filters, and more particularly to such oil filters as applied to internal combustion engines.

A primary object of this invention is the provision of an improved adjustable check valve adapted to check the flow of oil through the filter at low speed, thereby holding the oil pressure up while the motor is idling, assuring safe lubrication and simultaneously releasing excess pressure through the filter at high speed, thus reducing the danger of excess oil supply and consumption, on engines of the internal combustion type utilizing oil filters.

A further object of the invention is the provision of such a device which will be sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, assemble and install.

Other objects reside in the combinations of elements, arrangements of parts and features of construction, all as will be more fully pointed out hereinafter and shown in the accompanying drawings wherein there is disclosed a preferred embodiment of this inventive concept.

In the drawings:

Figure 1 is a side elevational partially diagrammatic view of an internal combustion engine having an oil filter applied thereto, certain concealed portions thereof being indicated in dotted lines.

Figure 2 is a vertical sectional view, enlarged, of an oil filter adapted to be applied to an internal combustion engine, showing the check valve of the instant invention in association therewith.

Figure 3 is an enlarged longitudinal sectional view of the check valve showing the adjustable feature thereof.

Figure 4 is a sectional view taken substantially along the line 4-4 of Figure 3.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Having reference now to the drawings, and more particularly to Figure 1, there is generally indicated at 10 the motor block of a conventional internal combustion engine, provided with a head 11, and having secured thereto an oil filter generally indicated at 12. An oil pump 13 of conventional design is provided connected by a line 14 to the pressure line 15 of the motor. From pressure line 15 an oil inlet 16 leads to the filter 12, and an oil outlet line 17 extends from the filter to the oil pan 18.

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Having particular reference now to Figure 2, it will be seen that the oil filter 12 includes a casing 20 provided with a cover 21 and having an internally positioned inlet tube 22 provided with perforations 23 to permit the passage of oil outwardly therefrom. Suitable packing is provided, as at 25, surrounding the tube 22 and inset in a suitable groove or recess in the lid or cover 21, and the device is held in assembled relation by a lid screw 26. A filter cartridge 24 of conventional design is positioned around the inlet tube 22 and the outlet tube 17 is suitably threaded into a threaded aperture 28 positioned in the side of the casing 20.

Suitable packing 29 is also provided adjacent the inlet of the device and surrounds the inlet tube 16, which threadedly engages suitable threads in a lower counterbore 30 in the base of the inlet tube 22.

Having particular reference now to Figure 3, it will be seen that the inlet tube 22 is provided near its lower, flanged end with an internal plug 34 having a central bore of reduced diameter therethrough and at each side of the plug with counterbores comprising an upper counterbore 36 and a lower counterbore 30, both of which are internally screw-threaded, as indicated at 31 and 35 respectively. At its upper end the plug bore 37 is beveled to provide a valve seat 38, and a valve ball 39 in upper counterbore 36 is engageable with this seat. A screw plug 32 having a central bore 33 is threaded into the upper counterbore 36 above the plug 34, and a compression spring 40 is interposed between this screw plug and the valve ball to resiliently seat the ball on the valve seat 38. The reduced plug bore 37 opens into the lower counterbore 30 which lower counterbore receives the adjacent end portion of the oil inlet tube 16.

From the foregoing the operation of the device should now be readily understandable. When the motor is idling, it will be seen that the force exerted by the spring 40 serves to bias the ball valve 39 against the seat 38 against the relatively low pressure of the oil being circulated by the motor at low speed, thus by-passing the oil from the filter directly into the pressure line 15 for recirculation through the system. Conversely, however, as the pressure increases, the pressure in the system is sufficient to unseat the valve 39 from its associated seat, whereupon oil is permitted to circulate through the inlet tube 22 through the filter cartridge 27 and to the outlet line 17.

While in the foregoing the device has been de-

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scribed as positioned in the inlet line it will be readily apparent that if desired the device may be positioned at any desired location in the filter system, according to the type of filter or system utilized.

From the foregoing it will now be seen that there is herein provided an improved check valve for internal combustion engines which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

In a lubricating oil filter having a hollow, cup-shaped casing for receiving a filter cartridge, said casing having an open upper end and a bottom wall provided with a central aperture, a cartridge-engaging collar secured to said bottom wall within said aperture and extending inwardly of said casing, a removable lid fitted upon the open end of said casing and having a central aperture, and a cartridge-engaging collar disposed at the inner side of said lid surrounding said lid aperture, a tube extending through said bottom wall aperture, said cap aperture, and said collars, an annular flange on one end of said tube underly-

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ing said bottom wall, screw threads on said tube adjacent its opposite end, a nut threaded on said tube and bearing upon said lid, said tube having perforations in its wall between said collars and having near its flanged, lower end a plug provided with a bore of reduced diameter and internally screw-threaded counterbores disposed one at each side of said plug, a valve ball overlying the upper end of said plug bore, an apertured screw plug threaded into the counterbore above said plug, and a compression spring between said screw plug and said valve ball to resiliently seat said valve ball in the upper end of said plug bore, said counterbore below said plug receiving the end portion of an oil inlet tube.

MARTIN J. BARKER.

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