

Sept. 1, 1970

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3,526,590

OIL CLEANER

Filed Oct. 10, 1968

2 Sheets-Sheet 1

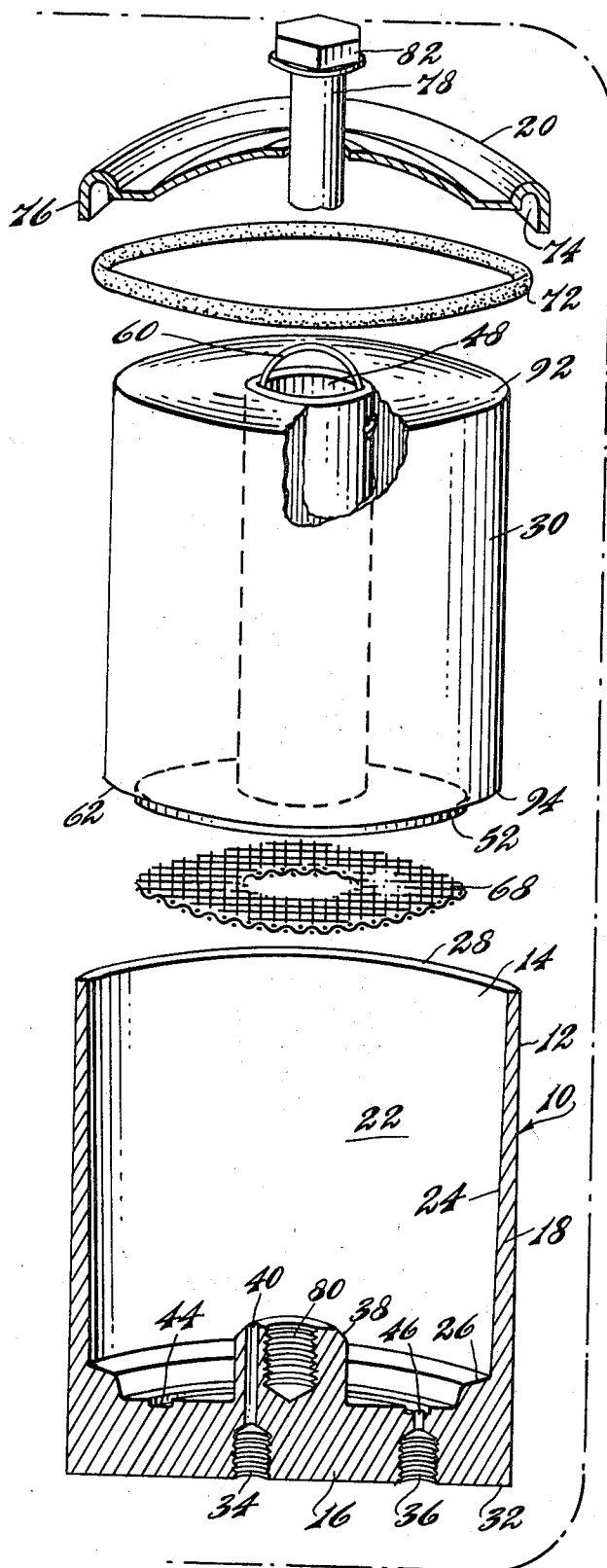


Fig. 1.

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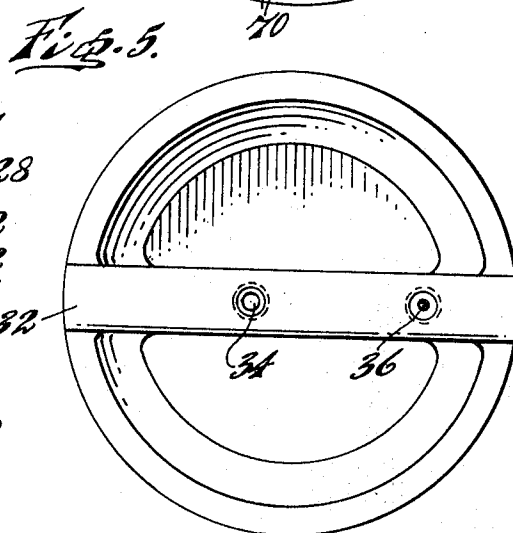
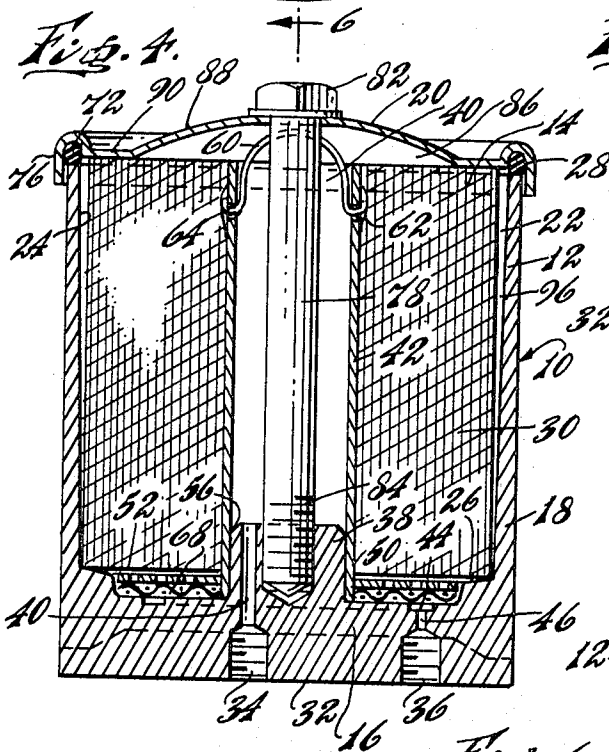
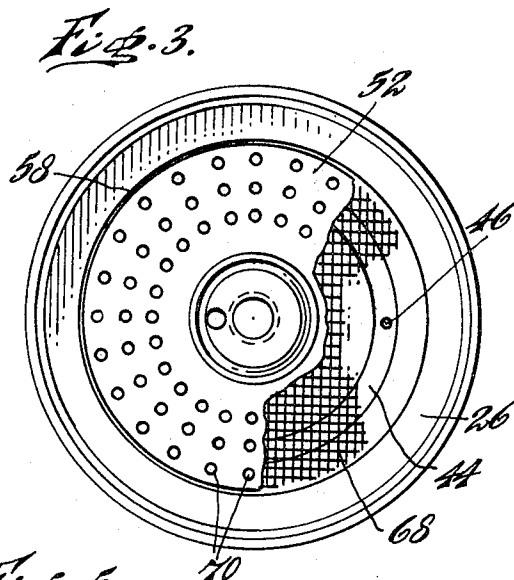
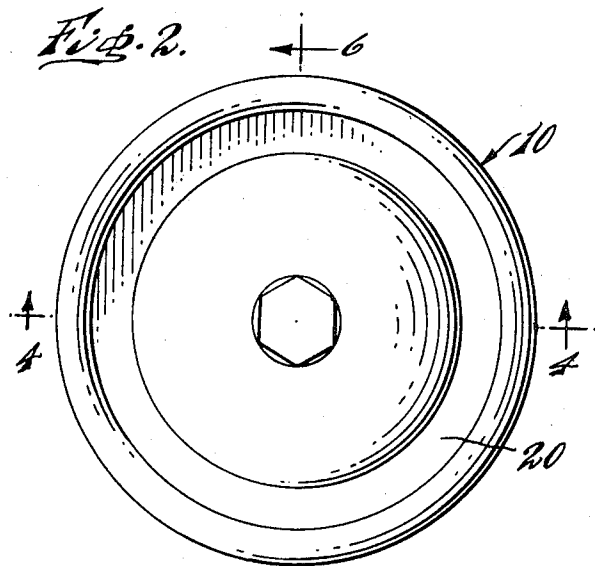
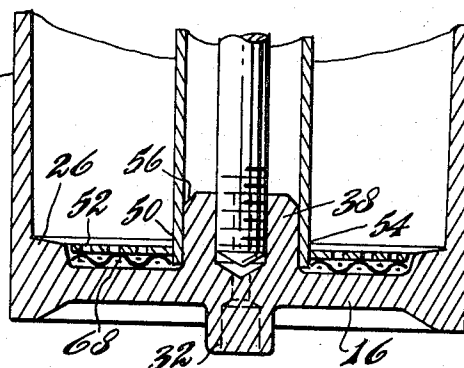


Fig. 6.



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OIL CLEANER

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1 Claim

ABSTRACT OF THE DISCLOSURE

A bypass type oil cleaner including a body designed to permit easy replacement of a low cost filter element, including a top cover, internal oil sealing means and readily accessible means designed to permit the replacement of the filter element with the least possible soil.

This invention relates in general to the art of oil filters and oil cleaners, and more particularly is directed to improvements in oil cleaners of the bypass type especially suitable for use with internal combustion engines.

Prior art oil cleaners and oil filters have generally included devices including a cartridge container and a filter element in cartridge form which is insertable into and removable from the container. Most prior art oil filters were located in inaccessible locations and generally presented a relatively dirty job when it became necessary to replace the filter element. In addition, prior art oil cleaners usually included provisions for the installation and replacement of a filter element that was relatively expensive in manufacture and in installation. Previously known oil cleaners also presented problems in efficiency wherein after a given period of use, the ability of the filter element to entrain impurities in the oil was greatly reduced thereby permitting considerable contamination of the oil until such time as the filter element was replaced.

The present invention seeks to improve over previously known devices by providing an oil cleaner assembly located adjacent to an automobile or other type of engine in a position to permit ready access to the unit. The oil cleaner assembly has been designed with a top opening to thereby permit easy installation or replacement of the filter element directly through the top of the unit. In the interest of economy in operation, the filter unit chosen may be any commercially available roll of tissue, such as toilet tissue or if desired, perhaps a roll of absorbent paper towel. Specially designed cartridge filter units may also be employed when desired. The oil filter unit may be designed and sized to accommodate any common roll of toilet tissue, or optionally, may be designed of a size to receive in operative relation, any specially fabricated element of filter material.

By employing the present oil cleaner, it has been found that the present widely accepted practice of changing the crank case oil in automobile and in other motor vehicle engines may now be completely abandoned with utmost safety and efficiency. It has been proven that motor oil does not wear out and that the same oil may be used over and over again for the life of the engine. Due to this quality of motor oil, the instant invention functions to keep the oil clean to thus prevent engine wear and eliminate the necessity of changing the oil.

It is therefore, an object of this invention to provide an improved oil cleaner assembly of the type set forth.

It is another object of the present invention to provide an oil cleaner assembly that may be readily connected to the internal combustion engine of a passenger automobile or other automotive vehicle.

It is another object of this invention to provide an oil cleaner assembly that may be readily installed for op-

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eration with an engine without the use of special tools, special skills, or special knowledge.

It is another object of the present invention to provide an oil cleaner assembly incorporating the use of an inexpensive and replaceable filter element.

It is another object of the present invention to provide an oil cleaner assembly which includes novel filter replacement means.

It is another object of the present invention to provide a novel oil cleaner assembly incorporating a bottom oil inlet and oil outlet connections whereby an unencumbered, removable top is provided.

It is another object of the present invention to provide an oil cleaner assembly incorporating integral oil sealing means and substantially leak-free internal oil paths.

It is a further object of the present invention to provide an oil cleaner assembly of extremely simple construction utilizing parts that may be easily and inexpensively manufactured.

It is a further object of the present invention to provide a novel oil cleaner assembly featuring unique interior construction to provide improved oil flow characteristics.

It is another object of the present invention to provide an oil cleaner assembly that is rugged in construction, inexpensive in manufacture and trouble free in operation.

Other objects and a fuller understanding of the invention will be had by referring to the following description and claim of a preferred embodiment thereof, taken in conjunction with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is an exploded, perspective view, partially broken away and partially in cross section to show the interior construction.

FIG. 2 is a top-plan view of the invention.

FIG. 3 is a top plan view of the invention with the cover removed, and with the support plate partially broken away to disclose the bottom construction.

FIG. 4 is a cross-sectional view taken along line 4—4 of FIG. 2, looking in the direction of the arrows.

FIG. 5 is a bottom-plan of the invention.

FIG. 6 is a partial, cross-sectional view taken along line 6—6 of FIG. 2, looking in the direction of the arrows.

Although specific terms are used in the following description for the sake of clarity, these terms are intended to refer only to the particular structure of my invention selected for illustration in the drawing; and are not intended to define or limit the scope of the invention.

Referring now to the drawings, the oil cleaner 10, comprises a hollow, cylindrical main body 12, having an open top 14, and a closed bottom 16, which is integrally connected to the cylindrical side walls 18, in oiltight, leak-proof relation. A top 20, which may be formed of pressed sheet metal seals the open top 14, and is designed to be readily removable so as to easily expose the interior 22, of the main body 12, for filter element insertion and removal purposes.

As best seen in FIG. 4, the outer portion of the side-walls 18, is cylindrically formed and integrally joins the bottom 16. The main body 12, is preferably fabricated of aluminum and is preferably forged in well-known manner to provide a rigid body of suitable strength for the oil pressure retaining service for which it is designed. The interior 24, of the sidewall 18, tapers gently outwardly from the filter element receiving ledge 26, at the bottom to the top 28, of the sidewall. The internal diameter of the unit at the ledge 26, is constructed substantially equal to the diameter of the filter element 30, to thereby receive the element bottom 66, in tight engagement for oil sealing purposes. The diameter at the top 28, of the unit is

slightly larger than the diameter of the filter element 30, thereby permitting ready insertion of the filter element 30, into the interior 22, of the oil cleaner 10. The tapered interior sidewall 24, thus serves to facilitate easy insertion and removal of the filter element without binding or obstruction.

As best seen in FIGS. 5 and 6, a reinforced, diametrically arranged bar 32, integrally strengthens the bottom 16, of the unit to provide sturdy construction to accommodate the oil inlet 34, and oil outlet 36, tappings and also to provide the firm support base for the upwardly facing, concentric, solid, cylindrical spindle 38. The spindle 38, is drilled to provide the oil inlet conduit 40, and further serves to receive the bottom of the support tube 44, in pressed engagement to provide a substantially oiltight joint therewith. As best seen in FIG. 4, the oil inlet conduit 40, communicates between the tapped opening 34, and the interior of the space enclosed by the support tube 42, to thereby direct the incoming oil from the bottom to the top of the unit within the interior of the support tube 42, in the direction of the arrows.

As best seen in FIGS. 1, 3, and 4, a circular groove 44, recesses into the bottom 16, of the unit and is machined concentric with the spindle 38. An oil outlet conduit 46, communicates between the circular groove 44, and the oil outlet tapping 36, to provide a continuous drain to remove oil from the unit once it has been cleaned after passing through the filter element 30.

Referring again to FIGS. 1, 3, and 4, the support tube 42, is illustrated as being fabricated from a hollow, cylindrical tube, preferably of aluminum. The tube 42, terminates upwardly in an open, unobstructed end 48, to thereby permit unimpeded passage of the untreated lubricating oil (not shown) which is introduced into the oil cleaner 10 through the bottom oil inlet 34. The bottom end 50, of the tube 42, presses into a circular opening formed in the cartridge support plate 52, to form a substantially oiltight, circular joint 54, therebetween. It is thus seen that a substantially oil tight circular junction 56, is provided by pressing the bottom 50, of the support tube 42, over the spindle 38, and a second, substantially oiltight, circular joint 54 is provided at the junction of the bottom 50, of the support tube 42, and the support plate 52. In this manner, oil may be directed upwardly through the support tube 42, with substantially no leakage at the junction 56. Additionally, oil feeds out of the unit 10, through the circular groove 44 once it passes through the filter element 30. The substantially oiltight joint 54 prevents leakage and undesirable recycling of the oil. It is noteworthy that both oil tight joints 54, 56 function adequately under pressure without a need for washers, seals or other soft parts, so as to thus prevent wear and deterioration.

The support plate 52 is preferably stamped from sheet aluminum of adequate strength to hold the filter element 30 without deformation and is constructed to an outer diameter 58 of circular configuration sized to easily fit within the filter element receiving ledge 26. A handle 60 which may be of wire construction, affixes to the top of the support tube 42 through a pair of diametrically opposed holes 62, 64, which are drilled therein to receive the ends of the handle in relatively loose engagement. The handle 60 provides a convenient finger grip to thus permit easy withdrawal of the support tube 42 and the attached support plate 52 from the interior 22 of the oil cleaner 10. In this manner, the filter element 30, which fits over the support tube and has its bottom 66 resting upon the top of the support plate 52, may be conveniently removed from the unit without soiling the fingers of the user. It is thus observed that only the handle 60 need be grasped in order to remove or insert the filter element 30 into the oil cleaner 10 through the open top 14 thereof.

A circular screen 68 interposes between the unit bottom 16 and the bottom of the support plate 52 to space the support plate 52 from the bottom 16 to thereby provide

a circular, lateral area beneath the support plate for movement of filtered oil. As shown in FIG. 3, the support plate 52 is drilled to provide a plurality of oil openings 70 for passage of the treated oil into the circular groove 44 and for eventual exit through the oil outlet conduit 46. A circular gasket 72 fabricated of rubber, neoprene or similar oil sealing material of diameter to equal the diameter of the top 28 of the sidewall 18 rests thereon and receives the peripheral, downwardly facing groove 74 in sealing relation of the top 20. A peripheral, depending lip 76 serves to retain the gasket 72 in position to insure a tight seal between the top 20 and the main body 12 when the unit is closed for operation. A bolt 78 threadably engages into the tapped opening 80 which is concentrically provided in the spindle 38. As best seen in FIG. 4, the bolt 78 may be tightened in well-known manner by turning the head 82 until the bolt threads 84 tightly engage the threads of the tapped opening 80, thereby pulling the cover 20 into tight engagement with the top 28 of the sidewall 18. It should be noted that the sturdy construction comprising the unitary fabrication of the spindle 38, the bottom 16 and the reinforcing bar 32 provide a secure area of attachment for the bolt 78 so that considerable torque may be applied to the bolt head 82 without fear of damaging the unit.

The top 20, as best seen in FIG. 4 is pressed to a domed configuration to provide a space 86 above the top of the filter element 30 for oil flow directional purposes. The domed area 88 of the top 20 terminates radially in a circular depression 90 which presses upon the outer periphery of the top 92 of the filter element 30 to thereby act as a seal so that oil from the interior of the support tube 42 may be directed through the space 86 and thence downwardly from the top 92 to the bottom 62 of the filter element 30. It should be noted that the filter element receiving ledge 26 engages the outer periphery of the bottom 66 of the filter element 30. Because of the difference in physical properties between the hardness of the metallic ledge 26 and the fibrous filter bottom 66, the circular edge 94 at the bottom 66 of the element 30 compacts upon application of pressure from the top 20 and thereby forms a seal against the ledge 26 which prevents leakage and thereby directs the filtered oil into the area beneath the support plate 52 for eventual exit through the oil outlet conduit 46.

As seen in FIG. 4 when the top 20 is positioned to seal against the main body 12, the circular depression 90 impresses upon and seals against the outer periphery of the top 92 of the filter element 30 thereby preventing untreated oil from flowing into the space 96 between the filter element 30 and the interior wall 24. It should be noted that oil flows upwardly through the interior of the support tube 42 and then radially through the space 86 provided between the top of the filter element and the unit top 20 until stopped by the seal of the circular depression 90 against the top 92 of the filter element. The oil then flows downwardly through the filter element 30 for complete cleaning. The treated oil downwardly exits the filter element 30 and passes through the oil passages 70 provided in the support plate 52 and thence into the circular groove 44 which conveys the treated oil to the oil outlet conduit 46.

What is claimed is:

1. In an oil cleaner, the combination of
 - (A) a generally cylindrical hollow main body,
 - (1) said body having a closed bottom and an open top,
 - (2) said body having an interior sealing ledge peripherally rising above the said bottom;
 - (B) an axially aligned, interior threaded spindle,
 - (1) said spindle concentrically rising from the said bottom,
 - (2) said spindle having a relatively small diameter in comparison to the diameter of the said main body;

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(C) a hollow, cylindrical support tube removably contained within the said body,

(1) said tube being removably pressed upon the threaded spindle,

(a) said tube forming a substantially oiltight seal against the said spindle; 5

(D) a circular plate carried by the said support tube and spaced from the bottom thereof,

(1) said plate forming a substantially oiltight joint with the said support tube, 10

(2) said plate being of diameter to fit within the said bottom sealing ledge,

(3) said plate being spaced from the said bottom of the support tube a distance substantially equal to the height of the bottom sealing ledge; 15

(E) an oil filter element surrounding the support tube and contained within the said main body,

(1) the said element having a portion of its bottom in contact with and resting upon the said circular plate, 20

(2) said element having its bottom outer periphery in sealing engagement with the said sealing ledge radially outside of the said circular plate;

(F) a gasketed top cover closing upon and sealing the said open top of the main body, 25

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(1) the cover being secured in place by a rod threadedly engaged within the said spindle, and

(2) a portion of the said cover contacting the top of the oil filter element and peripherally sealing the said top against the passage of oil;

(G) oil inlet means provided in the bottom of the main body and communicating with the interior of the said support tube;

(H) oil outlet means provided in the bottom of the said main body, said oil outlet means including a bottom positioned, concentric drain groove underlying the said circular plate and a bottom opening communicating with the said drain groove, whereby treated oil may exit the oil cleaner beneath the said circular plate.

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