

Aug. 6, 1935.

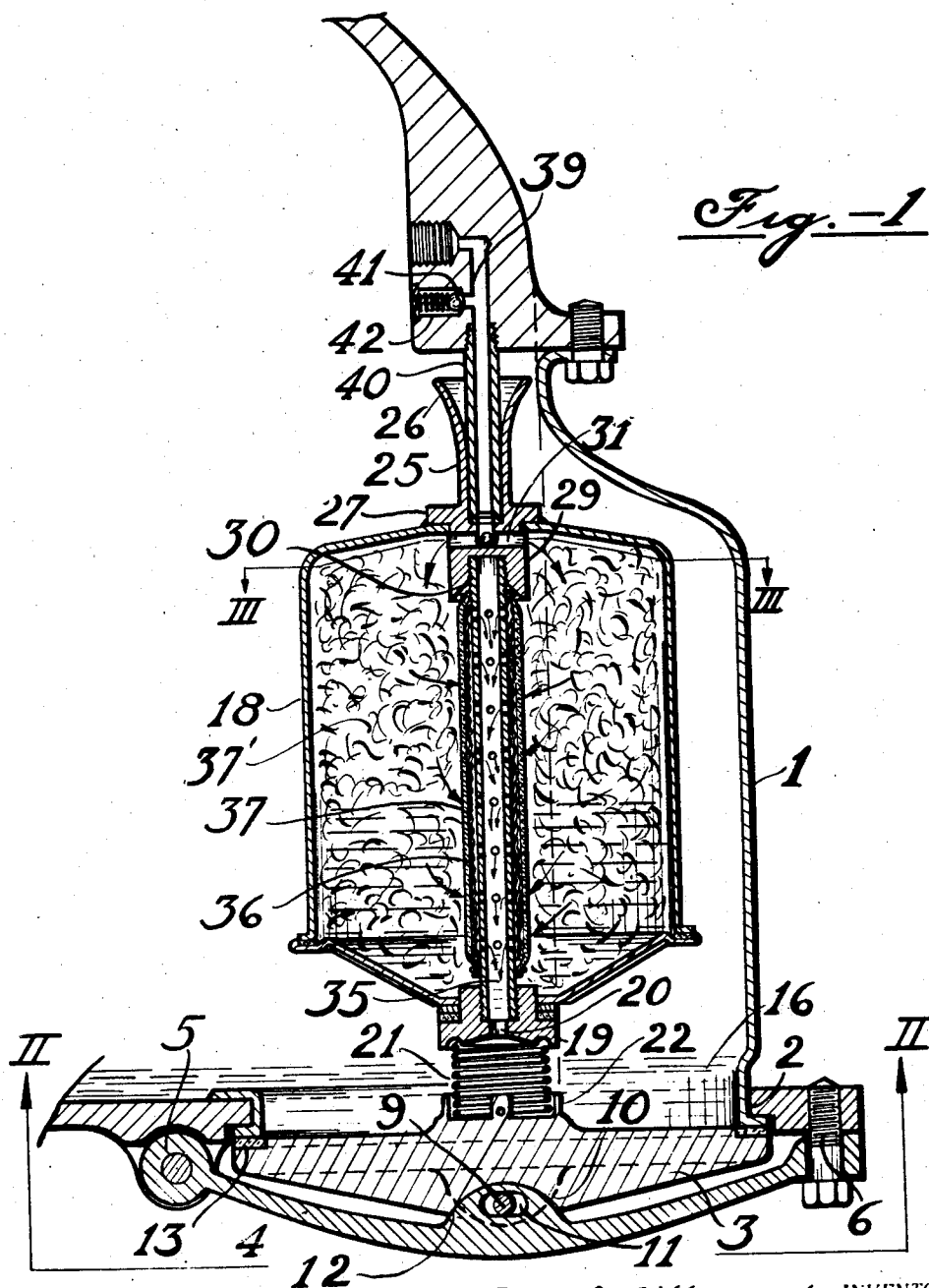
F. A. HOWARD ET AL

2,010,430

OIL FILTER

Filed March 17, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

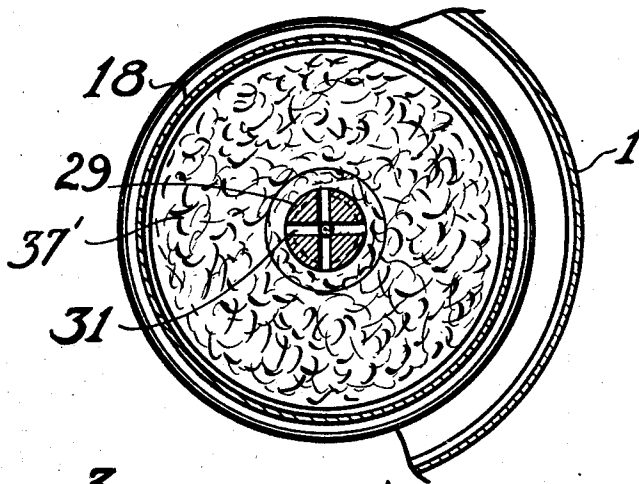


Fig. - 3

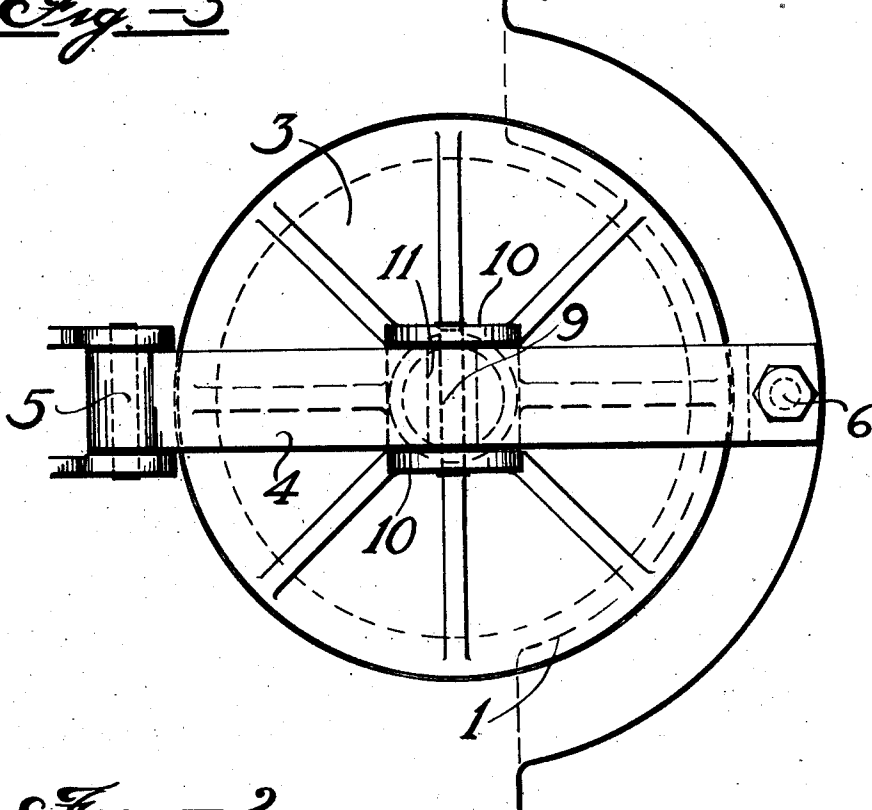


Fig. - 2

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UNITED STATES PATENT OFFICE

2,010,430

OIL FILTER

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Application March 17, 1932, Serial No. 599,578

7 Claims. (Cl. 210—131)

This invention relates to improvements in filtering devices and more particularly relates to an improved filtering device for use in the lubricating system of an internal combustion engine.

It is an object of this invention to provide a construction of filtering device within a receptacle such as the crank case of an internal combustion engine which will insure its periodical removal into position to be inspected.

Another object is to secure an improved arrangement of parts for securing most effective operation and efficiency of filtration of liquid.

Other objects will be apparent from the specification and from the accompanying drawings in which latter—

Fig. 1 is a vertical sectional view through a filter device and the crank case of an internal combustion engine;

Fig. 2 is a bottom plan view of the closure upon which the filter device is mounted and looking along the line II—II of Fig. 1, and

Fig. 3 is a transverse sectional view taken along the line III—III of Fig. 1.

Referring particularly to the drawings, reference numeral 1 designates the crank case of an internal combustion engine. The crank case is provided with a drainage or outlet opening 2 in its bottom wall. A closure 3 is adapted to seat against the wall of the outlet opening and is held in position by means of a cross bar 4 which is pivotally connected to the crank case at 5 and is detachably connected to the crank case at 6. The connection of the closure to the cross bar is effected by means of a pin 9 which extends between ears 10 protruding from the closure. The pin extends through an elongated slot 11 in a protruding lug 12 upon the cross bar. Suitable sealing means 13 prevent leakage of liquid around the closure.

The crank case is adapted to contain a body of lubricant 16 therein which is to be subjected to filtration through a filter device. The filter device or assembly comprises a shell 18 provided with a base 19 having a delivery orifice for filtered lubricant at 20 which communicates with the main chamber of the crank case. The shell is supported resiliently upon the closure 3 by means of a helical spring 21, one end of which is secured to a suitable cup-formed at 22 upon the inner face of the closure. The opposite end of the spring nests within an annular groove formed upon the under surface of the base 19, as is clearly shown in Fig. 1.

An inlet for oil to be filtered to the shell is provided opposite the discharge orifice 20. The

inlet comprises a body having a tubular portion 25, the inlet end of which is flared radially outwardly at 26. The positioning flange 27 protrudes radially from the body. A base portion 29 protrudes from the body into the shell. The base portion is provided with a passageway 30 which communicates at one end with the interior of the tubular portion and at its other end communicates with a plurality of transversely extending passageways 31 which open through the base portion into the shell 18.

Within the shell is a central vertical tube 35 supported at one end by the base 19 of the shell in communication with the delivery orifice 20. The tube is supported at its upper end by the base portion 29. A plurality of perforations are provided throughout the length of the tube as can be clearly seen in Fig. 1. Surrounding the perforated tube 35 are a fine wire screen 36 and a wrapping of canton flannel or similar fabric 37. It is preferred to have this combination of means, but under some circumstances a single mesh device of suitable fineness can be used and some of the advantages of the invention retained. Surrounding the outer wrapping 37 and substantially filling the shell 18 is a mass of fibrous or filamentous material 37' such as silk, wool, asbestos or the like. The function of the fibrous material is to form a filter body which strains out the impurities of the oil.

The oil to be filtered is introduced into the filter device from a suitable source through a passageway 39 and pipe 40 which protrudes from a wall of the crank case into the tubular inlet of the shell forming a sliding fit therewith which is liquid tight. A spring pressed ball valve 41 is mounted in a wall of the crank case communicating with the passageway 39. In the event that excess pressure develops in the filter, the ball valve will open and permit the by-passing oil to return to the crank case through a passage 42.

In the operation of the device, a part of the circulating oil is delivered in known manner through passageway 39 into the shell of the filtering device where the oil passes through the fibrous material, the outer wrapping of cloth 37, the wire screen 36, and through the perforations into the tube 35 from which it is delivered through orifice 20 back into the crank case.

By the construction described the filter device is readily removable from the lubrication system. It is withdrawn with the closure each time that the crank case is drained of oil. Consequently it is subjected to inspection at frequent intervals

to determine if it is operating at its proper efficiency. The removal of the filter device is facilitated by the sliding fit between the pipe 40 and tubular inlet portion 25. The filter device is protected from possible injury during use by the walls of the crank case. It is readily reinserted into operative position by closing the closure of the crank case.

While the invention has been described as applied to the crank case of an internal combustion engine, it will be understood that it is contemplated to apply it to other containers in a fluid circulation system.

Various changes may be made within the terms of the appended claims in which it is desired to claim all novelty inherent in the invention as broadly as the prior art permits.

We claim:

1. In combination with the outwardly removable bottom closure for the bottom discharge opening of a receptacle, a filter assembly within the receptacle of lesser diameter than the opening and including an imperforate shell having an outlet, filter material in the shell, means resiliently supporting the shell from the closure, an inlet tube protruding from the shell opposite the resilient support, and a delivery tube protruding into the receptacle telescopically engaging the inlet tube whereby the filter assembly is withdrawn from the receptacle through the opening when the closure is removed from the opening.

2. In combination with the outwardly removable closure for the bottom discharge opening of a receptacle, a delivery tube protruding inwardly from a wall of the receptacle toward the closure, a filter assembly of a lesser diameter than the opening within the receptacle including an imperforate shell having an outlet, filter material in the shell, means resiliently supporting the shell from the closure, and an inlet tube protruding from the shell into telescopic engagement with the delivery tube whereby the filter assembly is withdrawn from the receptacle through the opening when the closure is removed from the opening.

3. In combination with the outlet closure of a crank case, a lubricating oil filter including a shell supported within the crank case by the closure, an upstanding tube in the shell,

fibrous material surrounding the tube, and means for passing oil from the crank case through the fibrous material to the tube, the tube opening through the shell into the crank case for returning oil to the crank case after it has traversed the fibrous material.

4. Apparatus according to claim 3 in which the path of return for the oil to the crank case includes a screen member surrounding the tube.

5. In combination with the outlet closure of a crank case, a removable filter assembly including a shell having an inlet for oil, a perforated upstanding discharge tube in the shell, means for filtering oil flowing from the inlet to the tube, the tube opening exteriorly of the shell, and means for resiliently supporting the filter assembly upon the outlet closure.

6. In combination with the outwardly removable bottom closure for the bottom discharge opening of a receptacle, a filter assembly within the receptacle of lesser diameter than the opening and including an imperforate shell having a bottom outlet, filter material in the shell, means resiliently supporting the shell upon the closure, an inlet tube protruding from the shell opposite the resilient support, and a delivery tube protruding from the receptacle telescopically engaging the inlet tube whereby the filter assembly is withdrawn from the receptacle through the opening when the closure is removed from the opening.

7. In combination with the removably mounted bottom closure for the discharge opening of a receptacle, a filter assembly within the receptacle of lesser diameter than the opening and including an imperforate shell having a bottom outlet, filter material in the shell, means resiliently supporting the shell upon the closure, an inlet tube having an outwardly flared mouth protruding from the shell opposite the resilient support, and a delivery tube protruding from the receptacle telescopically engaging the inlet tube whereby the filter assembly is withdrawn from the receptacle through the opening when the closure is removed from the opening.

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