May 19, 1931. F. R. SIMMS ET AL 1,806,001

MEANS FOR CLEANSING OR FILTERING LUBRICATING OILS

Filed Dec. 28, 1927

Fig. 1.

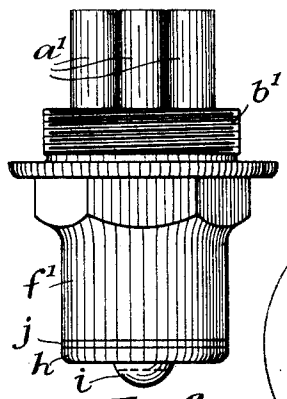


Fig. 2.

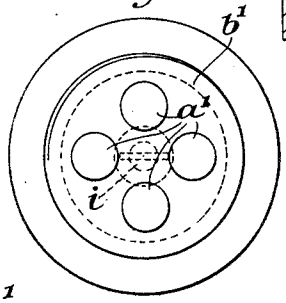


Fig. 3.

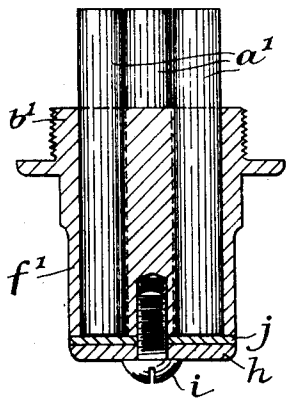


Fig. 4.

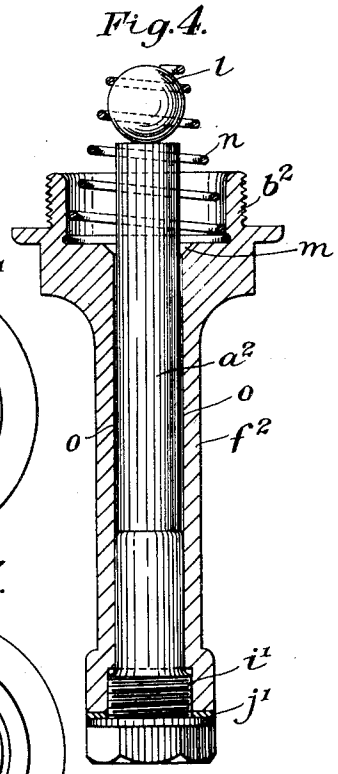
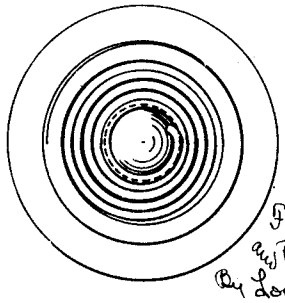


Fig. 5.



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UNITED STATES PATENT OFFICE

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MEANS FOR CLEANSING OR FILTERING LUBRICATING OILS

Application filed December 28, 1927, Serial No. 243,152, and in Great Britain August 25, 1927.

Our invention relates to improved means for cleansing or filtering lubricating oils, such as are used in machinery and engines, that is to say, for separating therefrom, by the known method of magnetic attraction, any parts or suspended particles of iron or steel which are worn or broken away from moving parts of the machinery being lubricated, and particularly such particles as are of so minute a nature that they cannot be removed by an ordinary filter.

According to the invention, our improved device comprises a single bar magnet, or series of bar magnets, which may be of any shape in cross-section, or one or more horseshoe magnets, the said magnet or magnets being fitted with a plug or adaptor designed to be applied to such portions of the machinery as contain the lubricant, or through which it passes, such, for example, as a gear-box, or engine crank-chamber, the outer end of said adaptor being provided with an aperture through which the magnetic device may be removed without disconnecting the adaptor from the oil receptacle and with a removable closure for said aperture.

The device may be inserted in position either in place of the drain-plug or filler, or other plug, or it may be introduced by means of the adaptor into any other position, irrespective of the aforesaid plugs.

In cases where the device is inserted in place of a drain-plug or filler plug, or the like, it is sometimes necessary to provide means whereby the opening through which the filter device is inserted shall be closed when the said filter device is removed, and to this end, we attach to the said opening an automatic valve. For example, a tubular fitting is screwed into the aforesaid hole or opening, the end of the said fitting being made with a valve-seat adjacent to the oil container. In conjunction with this valve-seat, we provide a ball-valve, which is normally retained on the seat by spring action. The magnet is introduced into the open end of the tubular fitting, the diameter of which, adjacent to the oil container, is larger than that of the magnet, so that there is an annular space existing between the magnet and the interior surface of the fitting. Furthermore, the magnet is of a length such that, when pushed into the fitting by a screw or otherwise, its inner end projects into the oil container, and so lifts the ball-valve from its seat, thereby placing the interior of the oil container in communication with the annular space between the magnet and the tubular fitting, so that the oil contained in the said annular space or adjacent thereto and any particles therein are subjected to the attraction of the magnet. When the magnet with its deposited particles is removed from the tubular fitting, the valve automatically closes under the action of the spring, so that no discharge of oil can take place.

To enable the invention to be fully understood we will describe it by reference to the accompanying drawings, in which:—

Figures 1 and 2 are, respectively, an elevation and a plan view of the form of the improved device involving the use of a plurality of bar magnets and

Figure 3 is a sectional elevation thereof.

Figures 4 and 5 are, respectively, a sectional elevation and a plan view of a form of the improved device involving the use of a single withdrawable bar magnet and a ball-valve for sealing the opening in the fitting in which the magnet is located when the said magnet is withdrawn therefrom.

Referring to Figs. 1 to 3, a' indicates the bar magnet or magnets for attracting the ferrous particles in the lubricating oil to be cleansed, four of such magnets being shown, and b, is the plug or adaptor provided with a threaded portion to enable it to be screwed into an opening in the bottom of a chamber or container containing the said lubricating oil, the said plug being formed with a socket extension, f', in which the magnets are shown supported in spaced relation with their upper ends projecting above the upper end of the adaptor, so as to extend into the oil and accumulate the ferrous particles attracted to the exposed upper ends of the magnets. The bottom portion of the extension, f', is provided with an aperture, or apertures, through which the magnets can be removed from the plug and cleansed and replaced therein, by

removing a closure or plate, h, secured by a screw, i, a packing, j, being provided between the said plate and the bottom of the extension, f'.

Figures 4 and 5 show a construction allowing the withdrawal of a bar-magnet a^2 without removing the containing plug or adaptor b^2 from the oil chamber, and which plug is provided at its upper end with a cavity or cup surrounding the upper end of the magnet, and the socket portion f^2 is open at the bottom and a plug i^1 with an extension is screwed therein as shown for supporting the magnet and made oil tight with a packing washer j^1. l is the ball-valve for closing the upper end of the socket f^2 by engagement with the seating m when the plug i^1 and the magnet a^2 are withdrawn, the said ball being normally maintained in contact with the upper end of the magnet by the volute spring n. In this arrangement, the inner diameter of the upper portion of the socket f^2, is slightly larger than that of the magnet, providing the annular space o into which ferrous particles will pass into contact with the magnet, thus permitting the magnet to be withdrawn while the collected ferrous particles will adhere.

Claims:

1. A device for separating para-magnetic particles from lubricating oil, comprising an adaptor provided with means for securing it to an oil receptacle in communication with the ordinary drain aperture therein, and a magnetic device removably supported in said adaptor and having its inner end projecting beyond the end of the adaptor into the oil within said receptacle, the outer end of said adaptor being provided with an aperture through which the magnetic device may be removed without disconnecting the adaptor from the oil receptacle, and a removable closure for said aperture.

2. A device for separating para-magnetic particles from the lubricating oil of a machine, comprising at least one magnet operably connected to the crank chamber of the machine, so as to extend into the same and attract any para-magnetic particles contained in the oil circulating through the said chamber, means whereby the magnet is arranged within a passage through a plug or adaptor and a valve to close the said passage when the magnet is removed.

3. A device for separating para-magnetic particles from lubricating oil, comprising an adaptor provided with means for securing it to an oil receptacle in communication with the ordinary drain aperture therein, and a magnetic device removably supported in said adaptor and having its inner end projecting beyond the end of the adaptor into the oil within said receptacle, the outer end of said adaptor being provided with an aperture through which the magnetic device may be removed without disconnecting the adaptor from the oil receptacle, said adaptor being provided with a valve seat surrounding the magnetic device, a valve for engaging said seat disposed in alignment with said magnetic device and adapted to be moved to open position by the insertion of the magnetic device within the adaptor, and yielding means for seating said valve when the magnetic device is removed.

4. A device for separating para-magnetic particles from lubricating oil, comprising an adaptor provided with means for securing it to an oil receptacle in communication with an aperture therein, said adaptor being open at its outer end, a removable closure for the outer end of said adaptor, a plurality of bar magnets held in said adaptor in laterally separated position and having their outer ends supported by said closure, the inner ends of said magnets projecting into the circulating oil in said receptacle.

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