Jan. 12, 1943. J. T. RADKE 2,307,954

MAGNETIC OIL CLEANER

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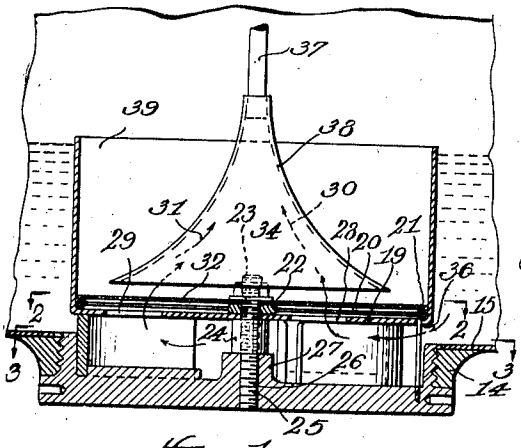
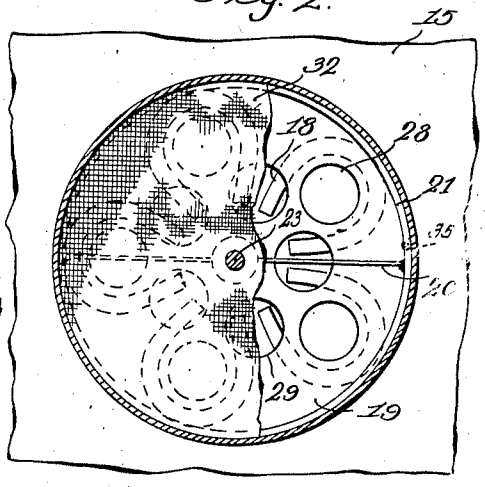


Fig. 1.

Fig. 2.



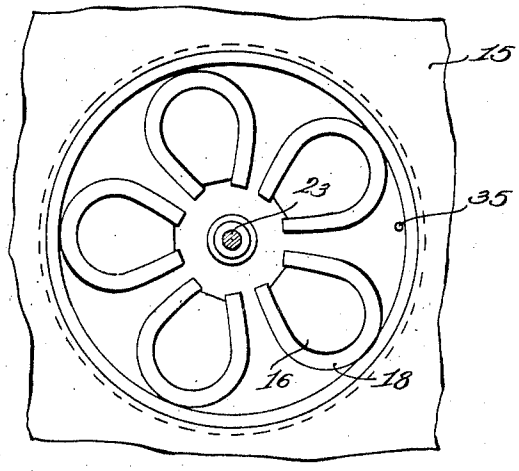


Fig. 3.

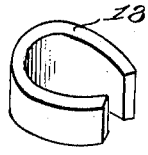


Fig. 4.

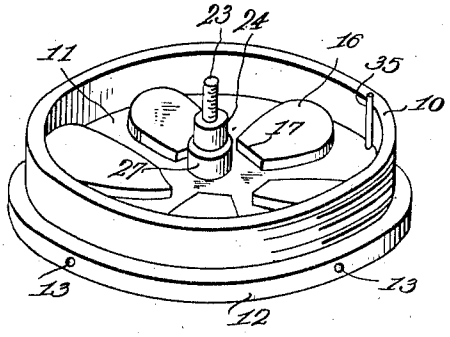


Fig. 5.

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MAGNETIC OIL CLEANER

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4 Claims. (Cl. 210—170)

This invention relates to a magnetic oil cleaner and has for an object to provide a device of this character adapted to effectively collect all fine steel or wire particles which ordinarily go through the oil system of a machine and function as emery dust to grind the wearing parts, thereby causing looseness in gears and excessive wear on bearings with resultant shortening of the life and usefulness of these parts.

A further object is to provide a device of this character which may be easily disassembled for cleaning without dismantling parts of the engine or other machine.

A further object is to provide apparatus of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view, the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming a part of this specification:

Figure 1 is a cross sectional view of a portion of an internal combustion engine crank case showing an oil cleaner, constructed in accordance with the invention, applied thereon.

Figure 2 is a plan view of the parts shown in Figure 1 with a portion of the screen broken away to show the baffle plate and permanent magnets below the baffle plate and screen.

Figure 3 is a plan view of the cleaner applied with the screen and baffle plate removed to show the permanent magnets and the aligning pin for the baffle plate and screen.

Figure 4 is a detail perspective view of one of the permanent magnets.

Figure 5 is a perspective view of the shell showing the spacers and the permanent magnets and the threaded stud for receiving a nut which holds the parts removably assembled.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, the magnetic oil cleaner is shown to comprise a shell plug including an exteriorly threaded cylindrical wall **10**, closed at the bottom by an imperforate bottom wall **11** which is provided with a peripheral flange **12** having wrench receiving openings **13** at spaced intervals, as best shown in Figure 4.

The wall of the plug is adapted to be secured to the boss **14** of the drain opening, see Figure 1, of a crank case **15**, which forms the oil reservoir in an internal combustion engine to which the magnetic oil cleaner is applied, by way of example, although it may be applied to other machinery equally as well.

Formed integral with the bottom wall **11** of the plug is a plurality of horseshoe shaped spacers **16** disposed radially, and preferably formed solid. The spacers have their straight edges **17** disposed in confronting arrangement and spaced from the center of the upper face of the bottom wall **11** of the plug.

A plurality of permanent horseshoe magnets **18** are mounted on the spacers with the curved edges of the spacers engaging the inner curved edges of the horseshoe magnets, see Figure 3. Thus, the poles at the ends of the legs of the horseshoe magnets are disposed in an annular series concentric with the axis of the plug.

A disk baffle plate **19** is superposed above the permanent magnets, and for mounting the baffle plate a diametrically disposed bar **20** is secured at the ends to a ring shaped flange **21**, which is formed integral with the bottom of the baffle plate at the edge thereof, see Figures 1 and 2. The bar is provided centrally with a hub **22** which receives the upper reduced threaded end **23** of a stud **24** having a threaded stem **25** which is engaged in an opening **26** formed in a boss **27** disposed centrally on the top face of the bottom wall **11** of the plug **10**.

The baffle plate **19** is provided with a plurality of openings **28** which are disposed within the enclosure of the horseshoe magnets. The baffle plate is also provided with a plurality of openings **29**, which are disposed at the poles of each two adjacent horseshoe magnets, see Figure 2. Oil contaminated with impurities, such as particles of steel and iron passes from the crank case **15** between the magnets and is sucked upwardly through the openings **28** to be screened and also passes between the magnets into the space at the center of the plug where it is sucked up through the openings **29**, as shown respectively by arrowheads **30** and **31** in Figure 1.

A circular screen **32** is superposed above the baffle plate and is provided with a funnel opening **33**, see Figure 2, to receive the threaded end **23** of the stud **24**. A nut **34** is threadedly engaged with the stem above the screen and removably assembles the screen and the baffle plate on the stud. Removal of the nut permits the screen and baffle plate to be removed and cleaned and

also affords access to the permanent magnets to permit removal of the steel and iron particles which cling to the magnets after being extracted from the oil circulation by the magnets.

For aligning the openings **28** and **29** of the baffle plate in their respective positions with relation to the magnets, as above explained, an aligning pin **35**, see Figure 5, is disposed vertically on the bottom wall **11** of the plug and the upper end of the pin is engaged in an opening **36** formed in the baffle plate, see Figure 1.

The conventional oil suction pipe **37** for the lubricating system is provided with a funnel shaped inlet **38** which is disposed in a cylindrical tank **39**, which is open at the bottom and is formed integral at the bottom edge of its cylindrical wall with the edge of the baffle plate **19**. The funnel shaped inlet **38** of the oil suction pipe is disposed adjacent to and spaced slightly above the screen so that oil purified of extraneous matter will be sucked from the tank **39** after entering the tank through the openings **28** and **29** of the baffle. The tank thus separates purified oil from the contaminated oil in the crank case.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. A magnetic oil cleaner comprising, a drain plug, an outlet pipe, a plurality of horseshoe magnets spaced in an annular series on and extending above the top of the plug with the poles disposed adjacent the center of the plug, a baffle plate superposed upon the magnets and holding the magnets on the plug, the baffle plate being provided with openings through which oil contaminated with metal particles is drawn upwardly around the magnets to be freed of metal particles by the magnets, a cylindrical wall on the top of the baffle plate and of the same diameter as the baffle plate through which oil purified of metallic particles passes to the outlet pipe, said outlet pipe being disposed within the inclosure of said cylindrical wall and having its intake end disposed above and adjacent the openings in the baffle plate, and means for holding the baffle plate, the cylindrical wall and the magnets assembled with the plug.

2. A magnetic oil cleaner comprising, a drain plug, a plurality of horseshoe magnets disposed on the top face of the plug in an annular series concentric with the axis of the plug, a baffle plate superposed upon the magnets having a cylindrical wall and outlet pipe for purifying oil disposed within the enclosure of the cylindrical wall, said baffle plate holding the magnets upon the plug there being openings in the baffle plate through which oil may pass around the magnets into the outlet pipe, a screen superposed upon the baffle plate, and means detachably securing together the screen, baffle plate and the plug.

3. A structure as of claim 2 and in which said means comprises a lug extending vertically from the axis of the plug, a threaded stem extending vertically from the lug and loosely engaged through openings in the baffle plate and in the screen, and a nut threaded on to the stem above the screen.

4. A magnetic oil cleaner comprising a drain plug, an outlet pipe above the plug, a plurality of horseshoe-shaped spacers arranged in an annular series on the top face of the plug concentric with the axis of the plug, a plurality of horseshoe magnets removably assembled with the spacers and having their inner peripheries engaging the outer peripheries of the spacers to dispose the poles of all of the magnets adjacent the center of the plug, a baffle plate superposed on the magnets having openings through which oil to be freed of metallic particles may flow around the magnets at both the inner and outer sides thereof to the outlet pipe, and a cylindrical wall on the baffle plate disposed around the outlet pipe and adapted to receive oil freed of metallic particles.

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