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MAGNETIC COLLECTOR AND NEUTRALIZING ELEMENT FOR ENGINES AND THE LIKE

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FIG. 1.

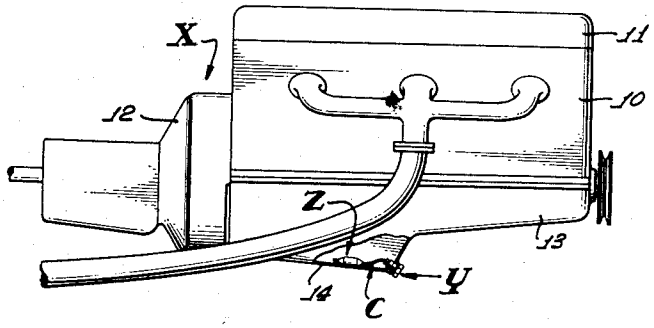


FIG. 2.

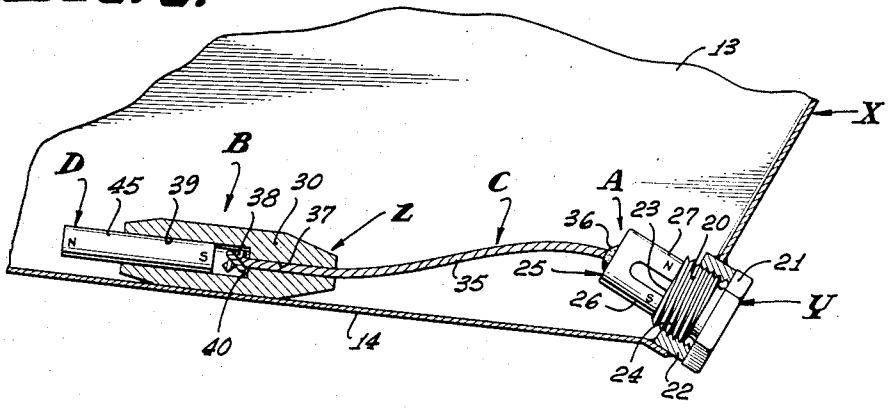
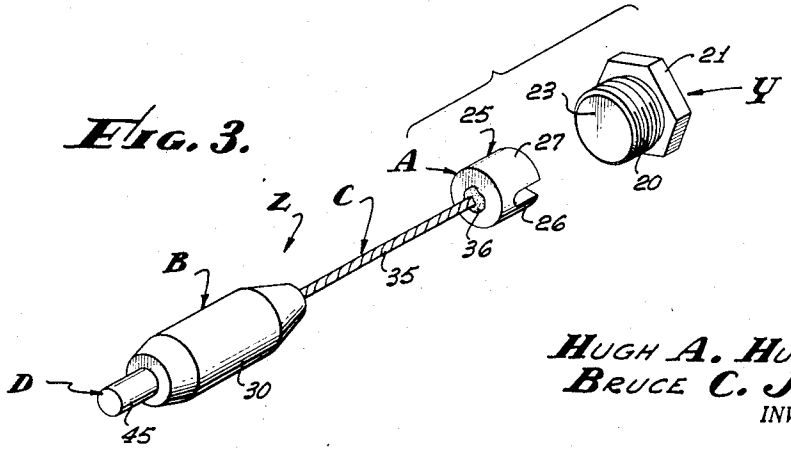


FIG. 3.



HUGH A. HUTCHINS
BRUCE C. JONES
INVENTORS.

BY Wm. H. Maxwell Jr.

AGENT.

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MAGNETIC COLLECTOR AND NEUTRALIZING ELEMENT FOR ENGINES AND THE LIKE

Hugh A. Hutchins, Temple City, and Bruce C. Jones, Monrovia, Calif., assignors to Ernest J. Newhouse, Los Angeles, Calif.

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This invention has to do with a magnetic collector and neutralizing element for engines and the like, and is particularly concerned with a drain plug attachment for use on crank cases of internal combustion engines.

In the operating of internal combustion engines considerable wear and corrosion of parts takes place due to metal particles and acids that are carried through the engine by the oil or lubricant employed. The metal particles are in the nature of filings and have cutting action, while the acids, for example, sulphuric acid, present in and liberated from the oil are highly corrosive. These factors result in shortened engine life.

It is a general object of this invention to provide an element that may be easily attached to an engine which element collects metal particles and neutralizes the acids contained in the lubricants employed in the engine.

An object of this invention is to provide an attachment of the character referred to that is adapted to be applied to an engine crank case without modifying any of the parts thereof.

It is also an object of this invention to provide an acid neutralizing element as above referred to, which sacrifices itself to the acids contained in the lubricant employed in the engine.

It is still another object of this invention to provide a magnetic collector and neutralizing element which may be universally applied to engine constructions, and which is easily removed, cleaned and replaced without the modifying of any of the parts of the element, or of the engine to which the element is applied.

The various objects and features of our invention will be fully understood from the following detailed description of a typical preferred form and application of our invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side view of a typical engine to which the element of the present invention is shown applied. Fig. 2 is an enlarged detailed sectional view of a portion of the structure shown in Fig. 1, and Fig. 3 is a perspective view of the element of the present invention shown separated from the engine.

The magnetic collector and neutralizing element of the present invention is adapted to be applied to or attached to a wide variety of machines in various manners as circumstances require. The element we provide is particularly adapted to automotive engines, and, therefore, we have shown a typical situation wherein the element Z of the present invention is applied to an engine X.

The engine X is characterized by a cylinder block **10**, a cylinder head **11**, a clutch housing **12**, and a crank case **13**. The cylinder block **10** is a typical engine block having cylinder bores that carry reciprocating pistons. The cylinder head **11** is a typical head that closes the upper end of the block **10** and accommodates the usual ignition parts and valve gear. The clutch housing **12** is a typical housing enclosing the fly wheel, and the crank case **13** is a typical case or pan that houses the crank and connecting rods and associated parts.

The crank case **13** is a vessel-like structure adapted to catch and contain the supply of lubricant employed to operate the engine and is, therefore, provided with a sump **14** forming a reservoir to handle the oil. It is apparent that as particles settle in the sump they fall to the bottom of the sump which is the lowermost part of the engine. In accordance with the usual construction the engine is supplied with a suitable drain plug Y.

The drain plug Y is of ordinary form and construction and involves a threaded closure **20** with a head **21**. The closure **20** is threadedly carried in an opening **24** in a boss **22** at the lower end or bottom of the sump **14** so that the head **21** is at the exterior of the crank case and so that it is engageable by a tool such as a wrench or the like. The plug Y is adapted to be rotated for installation or removal of the plug from the boss **22**. The end of the closure **20** opposite the head **21** has a face **23** in a plane normal to the axis of the plug Y.

The magnetic collector and neutralizing element Z that we have provided involves, generally, an attaching means A, an acid neutralizing means B, a coupling C, and a metal collecting means D. The attaching means A is provided to secure the element Z to the engine structure while the acid neutralizing means B and magnetic collector means D are suspended in the oil contained in the sump **14** and are secured to the attaching means A by means of the coupling C.

The attaching means A is provided to secure the element Z of the present invention to one of the engine parts at the interior of the engine to be submerged in the oil contained therein. In the preferred case we attach the element Z to the plug Y hereinabove described and, as shown, the attaching means A is a magnetic means involving a simple permanent magnet **25**. The permanent magnet **25** may be of any suitable form or shape and is preferably a simple "horse-shoe" magnet having a pair of legs **26** and **27** of opposite polarity. In practice, the permanent magnet **25** is of a single integral body of magnetic material capable of receiving and retaining a substantial charge of magnetism, and is cylindrical in cross section and of somewhat smaller diameter than the opening **24**. The legs **26** and **27** terminate in a common plane and are engageable with the end face **23** of the closure **20**. It will be readily understood that the permanent magnet **25** may be secured to any suitable engine part as circumstances require.

The acid neutralizing means B is provided to eliminate the effect of acids in the lubricating oil so that the engine parts are not affected thereby. In accordance with the invention the means B that we provide sacrifices itself in order to neutralize the acids carried by the lubricant and may involve a body of any suitable acid neutralizing material. In practice, we employ a body **30** of magnesium or zinc, or the like, since such material is acted upon to a much greater degree than the other materials used in the construction of engines. The body **30** of magnesium may be of any suitable form or shape, however, in practice, it is preferably cylindrical in form and somewhat smaller in diameter than the opening **24** so that it is readily passed through the opening and into the interior of the crank case **13**.

It will be apparent that the body **30** of magnesium which is submerged in the oil will be attacked more readily than the other materials of the engine construction, thereby eliminating the acids by chemical action and with the result that the engine parts are protected against the corrosive action of the acids.

The coupling means C is provided to join the attaching means A with the acid neutralizing means B in a manner that is universal so that the element Z is adapted to be applied to a wide variety of situations. Since it is desirable to locate the active parts of the element Z in

the lowermost part or portion of the crank case 13, the coupling means C is a flexible means involving a flexible connector 35 that extends between the means A and means B. In practice, the connector 35 may be a length of cord, such a metal cord or wire, or may be of a length of chain or the like.

As shown, the flexible connector 35 is fastened to the attaching means A by means of solder at 36 and is passed through a bore 37 extending through the body 30 of the neutralizing means B. The bore 37 extends through the body 30 from one end thereof, there being a counterbore 39 entering the other end of the body forming a shoulder 40 intermediate the ends thereof. The flexible connector 35 is tied at 38 forming a knot that engages with and is stopped by the shoulder 40. It will be apparent how the attaching means A and acid neutralizing means B are inserted through the opening 24 and how the means B will lie upon the bottom of the crank case out of the path of the working parts of the engine, such as the crank and connecting rods, etc.

The metal collecting means D is provided to attract and collect metallic particles carried by the oil, that is, to collect iron particles that have become dislodged from the engine parts and which ordinarily float in suspension throughout the engine. The collecting means D is a magnetic means and involves a simple elongate bar 45 of magnetic material charged with a magnetic flux and secured to the attaching means A. In practice, the bar 45 is carried by the acid neutralizing means B, preferably in the counterbore 39 entering one end of the body 30. The bar 45 is charged with magnetism and is a simple cylindrical part pressed into the bore 39.

From the foregoing it will be apparent that we have provided an extremely simple and inexpensive device for neutralizing the acids in an engine and which is effective in collecting metallic particles. The element of the present invention as clearly illustrated in Fig. 2 of the drawings, is easily inserted into the interior of the engine through the opening 24 and is easily retracted from the engine through said opening for periodic cleaning, if necessary. The magnesium neutralizing body shown in the preferred form of the invention lies on the bottom of the sump 14 and is extremely effective in attracting and acting upon the acids carried by the lubricant and will last a substantial length of time before it is necessary that it be replaced. Both of the magnets involved are effective in collecting metal particles.

Having described only a typical preferred form and application of our invention, we do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to ourselves any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described our invention, we claim:

1. An improved magnetic collector for use in the crank case of an internal combustion engine to remove metallic particles from the lubricating oil, said crank case having a drain opening and a drain plug removably secured in said drain opening, comprising, a solid cylindrical holder having an opening extending longitudinally inwardly from one end thereof, a magnet secured within said opening and having a substantial portion thereof exposed for direct contact with the lubricating oil in the crankcase, flexible means having one end attached to said holder and the other end adapted for attachment to said drain plug, said holder when lying upon the bottom of said crankcase maintaining said magnet spaced from the bottom of said crankcase, said holder consisting essentially of an acid neutralizing material.

2. A combined drain-plug and improved magnetic collector for use in the crank case of an internal combustion engine to remove metallic particles from the lubricating oil, said crankcase having a drain opening wherein said drain plug may be removably secured in said drain opening, comprising, an elongated, solid metallic cylindrical holder having an opening extending longitudinally inwardly from one end thereof, a magnet secured within said opening and having a substantial portion thereof exposed for direct contact with the lubricating oil in the crankcase, flexible means having one end attached to said holder and the other end attached to said drain plug, said flexible means being of a length sufficient to enable said holder to rest upon the bottom of a crankcase when said plug is secured to the drain opening thereof, said holder maintaining said magnet spaced from the bottom of said crankcase, said holder consisting essentially of a metallic acid neutralizing metal selected from the group consisting of zinc and magnesium.

3. A combined drain-plug and improved magnetic collector for use in the crankcase of an internal combustion engine to remove metallic particles from the lubricating oil, said crankcase having a drain opening wherein said drain plug may be removably secured in said drain opening, comprising, an elongated, solid metallic cylindrical holder having an opening extending longitudinally inwardly from one end thereof, a magnet secured within said opening and having a substantial portion thereof extending outwardly beyond said opening, flexible means having one end attached to said holder and the other end attached to said drain plug, said flexible means being of a length sufficient to enable said holder to rest upon the bottom of a crankcase when said plug is secured to the drain opening thereof, said holder maintaining said magnet spaced from the bottom of said crank case, said holder consisting essentially of a metallic acid neutralizing metal selected from the group consisting of zinc and magnesium.

4. Combined drain-plug and improved magnet collector as defined in claim 2 wherein said other end of said flexible means has a magnet thereon for removably attaching said other end to said drain plug.

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