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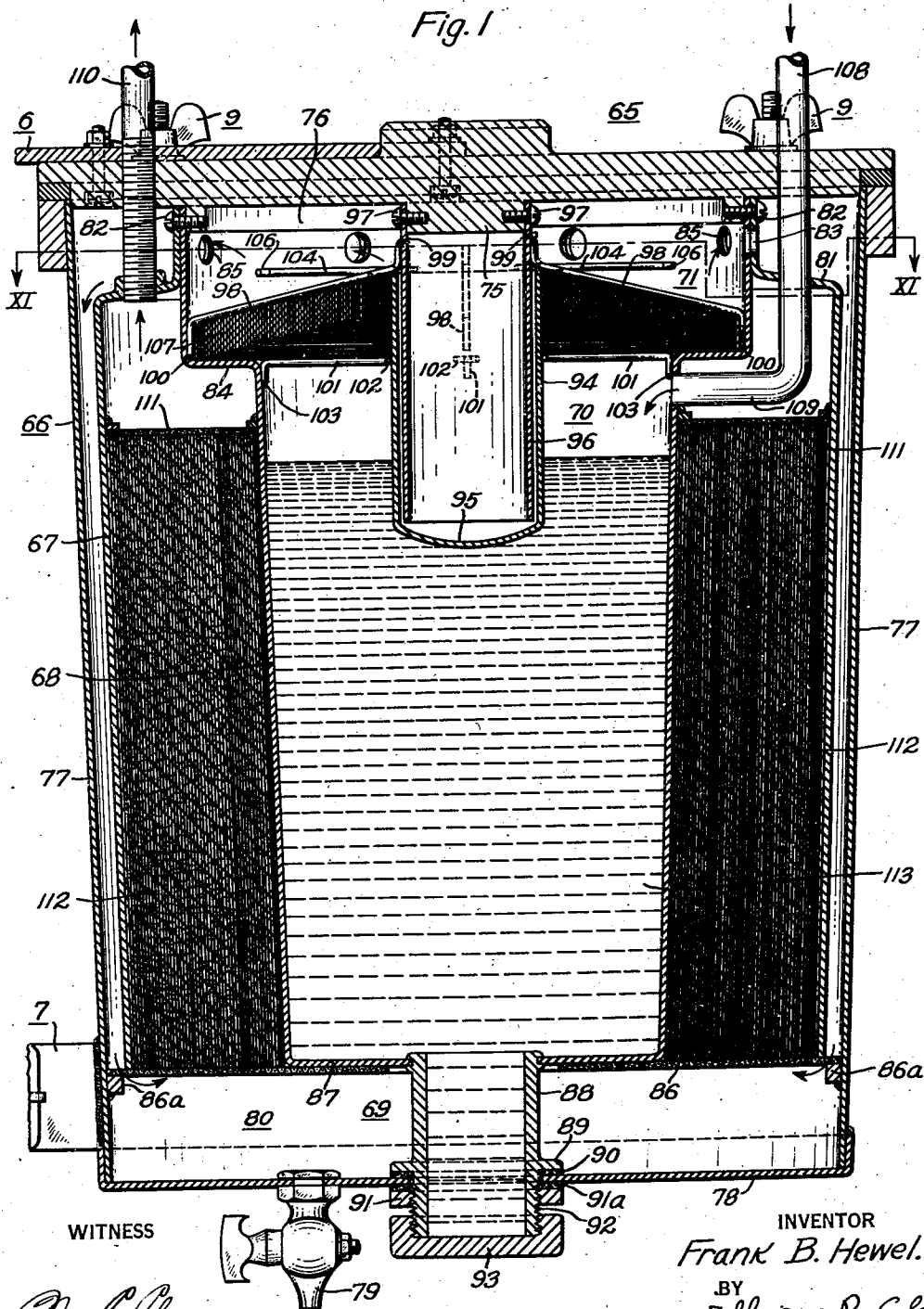
F. B. HEWEL

2,202,379

OIL FILTERING DEVICE

Filed July 3, 1936

3 Sheets-Sheet 1



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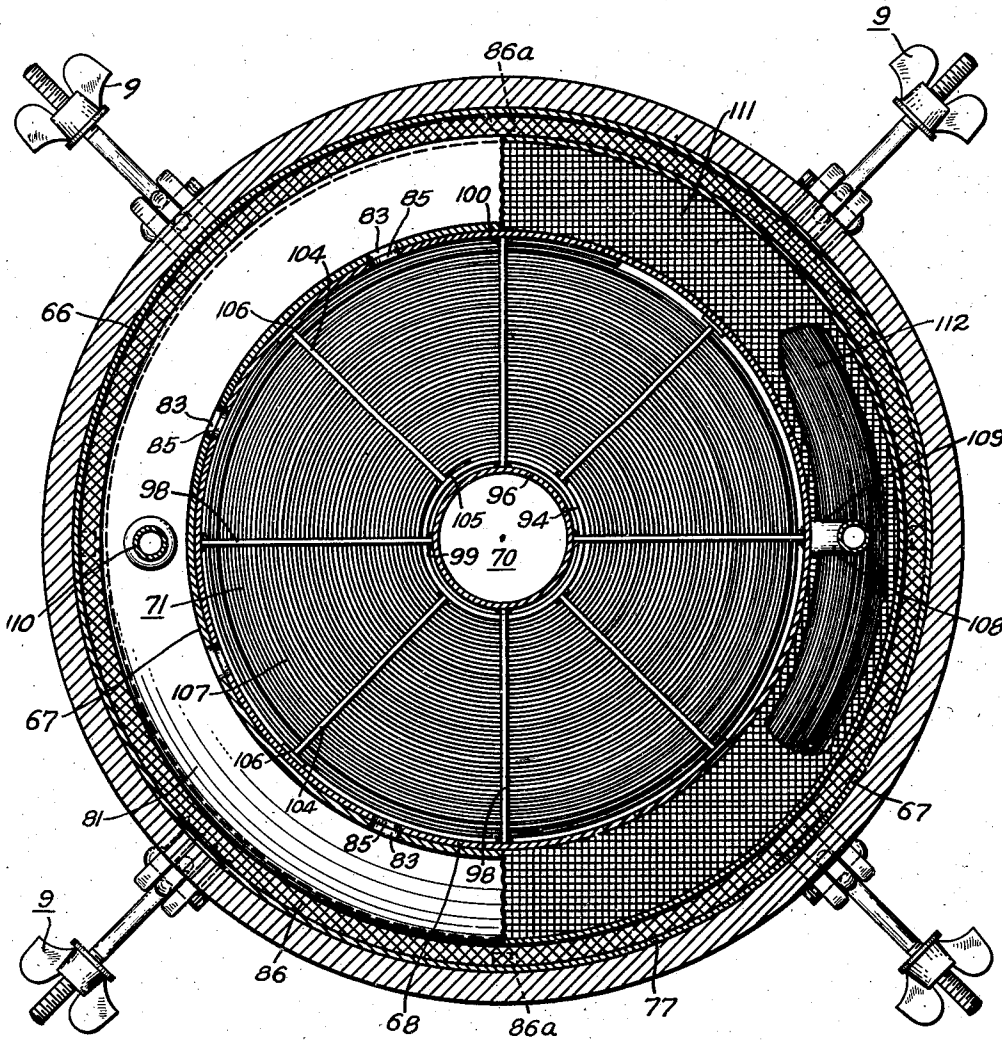
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Fig. 2



WITNESS

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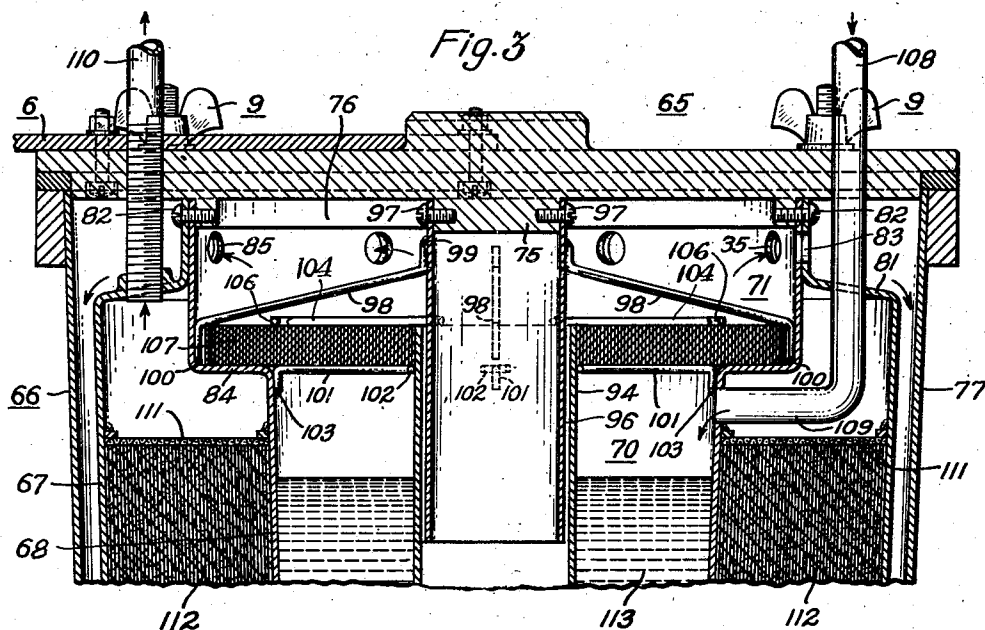
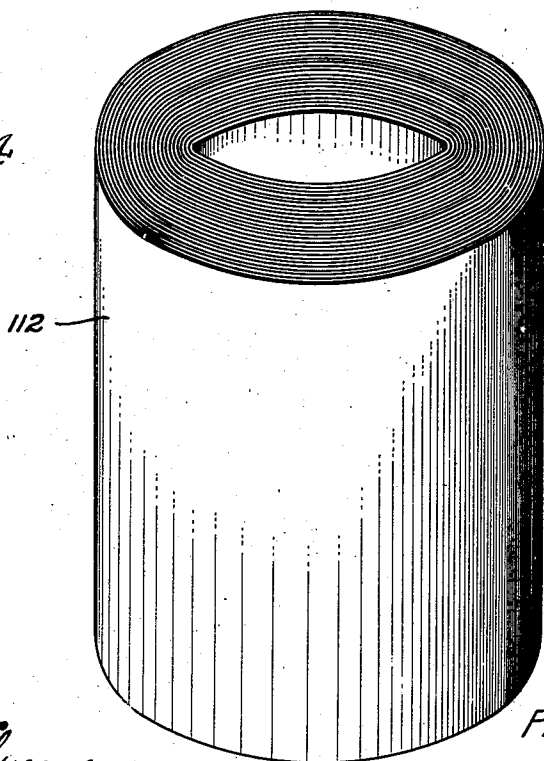


Fig. 4



WITNESS

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OIL FILTERING DEVICE

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Application July 3, 1936, Serial No. 88,735

5 Claims. (Cl. 210-167)

My invention relates to oil filtering devices and particularly to such devices for use in automotive vehicles.

At the present time, it is almost universal practice to change the motor oil in automobiles and trucks periodically, usually at the end of some fixed mileage such as one thousand or fifteen hundred miles, this change being made because of grit, sludge or acid in the oil which tends to impair its lubricating value. The expense and time required to make these frequent changes of motor oil are too familiar to require any extended discussion here.

One object of my invention, therefore, is to provide an oil filtering device whereby the motor oil may be used for an indefinite period, the only attention required being periodical replacements of the filtering material, which replacements require less expense and time than would replacements of the motor oil itself.

A further object of my invention is to provide, in a structure of the type described above, a sump at the bottom of the outer casing to effect separation of moisture from the oil to be filtered.

Another object of my invention is to provide the outer casing with a slight degree of taper, whereby the roll of woven material that substantially fills the outer chamber may be readily removed along with the inner casing.

Another object of my invention is to provide a device of the character described in which the top cover and the oil pipe connections are permanently secured to a dashboard or the like, whereas the remainder of the device is detachably secured to the dashboard, thereby permitting ready removal in the event of it becoming necessary to make replacements of the filtering materials.

Another object of my invention is to provide an oil-filtering device with a metal edge filter in one chamber and a cloth roll or ledge filter in another, the oil to be filtered being directed through the chambers in a predetermined order.

A further object of my invention is to provide a movable metal edge filter and a cloth filter in an oil-filtering device, together with a cage for restricting movements of the metal filter.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings in which:

Fig. 1 is a view in longitudinal section of an oil-filtering device constructed in accordance with my present invention;

Fig. 2 is a sectional view taken along the line II-II of Fig. 1;

Fig. 3 is a fragmentary view of a portion of the apparatus of Fig. 1 occupying a different position; and

Fig. 4 is a perspective view of an element of the apparatus shown in Fig. 1.

Referring to the drawings, the oil filtering device herein shown comprises a top or cover structure 65, an outer casing or receptacle 66, an intermediate casing 67 and an inner casing or receptacle 68, all three casings being preferably concentric, a filling tube structure 69 at the bottom of the apparatus, and a sliding vertically extending cylinder structure 70 located in the upper portion of the oil filter and cooperating with a movable metal filter 71 of the edge type, as subsequently more fully described.

The upwardly extending walls of the casings 67 and 68 are respectively preferably slightly tapered outwardly and inwardly toward the bottom, while the walls of outer casing 66 may be substantially vertical, for purposes to be set forth.

The top cover member 65 is preferably provided with swingable wing nut fastening devices 9, and suitable dashboard-fastening devices 6 and 7 are also preferably employed with the structure shown.

The under side of the cover 65 is provided with a preferably integral central boss 75 and with an annular boss or downwardly-extending flange 76 located approximately two-thirds of the distance between the center and the periphery of the plate, although this particular radius is not important. The purposes of the bosses 75 and 76 will be subsequently set forth.

The outer casing or receptacle 66 comprises a slightly tapered upwardly-extending wall 77 to which is secured a bottom cap 78 by welding or otherwise. This receptacle 66 is, therefore, closed at the bottom and open at the top, being clamped to the cover 65 by wing nuts 9 in any suitable manner.

A petcock 79 may be suitably affixed to the bottom cap 78 for the purpose of permitting drainage from the sump 80, constituting the lower portion of receptacle 66 below the lower edges of the intermediate and inner casings 67 and 68, respectively.

A coarse screen 86, supported by lugs 86a on inside walls of casing 66, serves to hold a roll or edge filter of cloth 112 in place between intermediate and inner casings 67 and 68, whenever jarring of vehicle might tend to loosen the roll.

The intermediate casing 67 is open at the bottom and is provided near its upper end with an inwardly-extending shoulder 81 and terminates

in a substantially vertically-extending flange which is secured by means of four screws 82, for example, to the outer periphery of the annular boss 76 on the under side of plate 65. A short distance below the plane of the screws 82 a plurality of small holes 83 are provided in the intermediate casing 67 for a purpose to be set forth.

The inner casing or receptacle 68 is provided with a bottom portion 87 which tightly encloses the upper end of filling tube 69, while near the upper end of the casing 68 an outwardly-extending shoulder 84 is provided and the casing terminates in a substantially vertically-extending flange which is likewise secured to the annular boss 76 (within the top flange of intermediate casing 67) by means of the above-described screws 82. A plurality of small holes 85 are provided in the vertical flange of inner casing 68, these holes registering with the holes 83 in the intermediate casing 67.

The filling tube 69 may be of any suitable type and dimensions, being employed for filling or cleaning purposes, and comprises a main tubular member 88 which is suitably peened over or otherwise secured within an opening in the bottom plate 87 of inner casing 68 to provide a fluid-tight connection. An intermediate flange 89 is provided with a gasket 90 just within the bottom cap 78 of outer casing 66, and a nut 91, with gasket 91a, is secured just below the cap 78, being turnable on the lower threaded portion 92 of the tube 88 to properly tightly assemble the illustrated parts. A suitable removable cap 93 is threaded on the lower end of the tube 88 when cap 93, nut 91 and gasket 91a are removed, as well as top wing nuts 46 and rods 44 thrown open, outer casing 66 may be slid over filling tube 69 and removed.

The movable or sliding cylinder structure 70 is shown as comprising an outer movable cylindrical member or guide means 94 having a rounded bottom 95 and which is open at the top, while a second cylinder or stationary guide 96 of smaller diameter and slightly spaced from the outer member 94 is secured by means of a plurality of screws 97, for example, around the central boss 75 on the under side of cover plate 65.

A suitable number, such as four, of wires or rods 98 extend outwardly and downwardly from near the upper end of the inner cylinder or stationary guide 96, to which they are secured by welding or otherwise, as indicated at 99, to the vertical flange of the inner casing 68 to which they are secured by welding or otherwise, as indicated at 100.

Substantially in the same plane as the shoulder 84 of the inner casing 68 are a suitable number, preferably four, of wires or rods 101, the inner ends of which bear or slide against the surfaces of outer movable member 94 by means of suitable T-shaped ends 102, for example, while the other ends of the wires or rods 101 are welded or otherwise secured to the inner casing 68 close to the shoulder 84, as indicated at 103.

Another set, preferably comprising four, of rods or wires 104 have their inner ends suitably secured as by welding, as indicated at 105, to the upper edge of movable member 94, while the outer ends of these rods 104 are provided with suitable bearing surfaces, such as T-shaped ends 106, for sliding along the upper vertical flange of the inner casing 68.

A metal filter 107 of the well known edge or spiral spring type having contiguous closely nested coils is disposed to operate in the space be-

tween or cage formed by the sloping rods 98 and the horizontal rods 101. The inner convolutions or coils of the edge filter 107 are suitably secured by welding or otherwise to the upper end of movable member 94, so that the edge filter is movable up and down with the slidable member 94, in accordance with oil pressure, as hereinafter more fully described. The outer coil of the filter, in accordance with a known practice, is fixed with respect to the wall of chamber 68 between the outer portions of said rods, as shown in Figs. 1 and 3. This up and down relative movement of the adjacent coils of the edge filter renders it self-cleaning, in accordance with well known principles.

An inlet tube 108 for the oil extends through cover plate 65 near one edge thereof, through the shoulder 81 of intermediate casing 67 and then has a horizontally-extending portion 109 piercing the inner casing 68 just below horizontal rods 101. Consequently, this inlet pipe communicates with the inner casing or receptacle 68.

The outlet tube 110 for the oil after it has been filtered extends through the top plate 65 at a point opposite the inlet tube 108, although this is not essential, and pierces the shoulder 81 of the intermediate casing 68, thus communicating with the top of the chamber or space between the inner receptacle 68 and the intermediate casing 67.

An annular screen 111 preferably extends between the walls of the intermediate casing 67 and the inner casing 68 just below the plane of the inlet pipe section 109, being retained in place by suitable shoulders or otherwise on the casing walls, and preferably the entire annular space between the screen 111 and the lowermost surfaces of the intermediate casing 67 and inner casing 68 is filled with a roll or edge filter 112 of filter material, such as silk or wool, preferably, however, cotton flannel. See Fig. 4, showing a made-up roll, ready to insert in place. When inserted, it holds screen 111 in place against the illustrated shoulders. By using certain available liquid type acid-neutralizers on edge filter or roll 112, my invention may also be used to neutralize acid in the oil being filtered.

The inner receptacle 68 is adapted to contain a body of oil to be filtered, which will occupy different levels during the operation of the filter, as pumped into and out of the filter.

By reason of the divergently tapering walls of casings 67 and 68, the cotton flannel roll 112 may be prepared independently of the filtering device and then inserted in place. By removing the outer casing 66, as previously described, along with screen 86, the used roll may be readily removed and replaced by a fresh roll.

The operation of the filtering device shown in Figs. 1 and 2 may be described as follows: The dirty oil from the crankcase or motor flows into inlet pipe 108, as indicated by arrows, and thence through pipe 109 into the inner receptacle forming the body 113. The pressure of this oil against the bottom portion 95 of the movable member 94 and against the edge filter 107 at times serves to force the edge filter 107 into its illustrated uppermost position, but, when the oil level or pressure drops, by reason of the engine stopping, for example, the weight of the movable member 94 and metal edge filter 107 causes them to drop to a position where the edge filter engages horizontal rods 101, as shown in Fig. 3. The edge filter 107 thus operates in a cage comprising the upper members 98 and lower members 101, and the

up and down expanding and contracting movement of the edge filter serves to automatically clean it, in accordance with familiar principles, thereby causing sludge and heavy matter to fall to bottom of inner casing 68.

The oil from the inner receptacle 68 intermittently rises through the edge filter 107 and flows out through the openings 85 and 83 near the top edges of the inner and intermediate casings 68 and 67, respectively, as indicated by the arrows. The oil then traverses downwardly the annular space between the outer and intermediate casings, and as indicated by the arrows, then flows upwardly through the roll or edge filter 112 of canton flannel and then out through the outlet pipe 110 back to the engine.

In this way the oil is first filtered or cleansed by permitting sludge and other heavy material to sink to the bottom of the inner receptacle 68, then works its way through the metal edge filter 107 and finally through the canton flannel edge filter 112, so that the oil when flowing out of the pipe 110 is fully cleansed and purified and substantially restored to its initial lubrication characteristics.

It will be seen that I have thus provided an oil filtering device which effectively removes all sludge, grit, acid and water from used oil and restores to it its original lubricating characteristics. As a result, the oil may be used for an indefinite period of time and, when it is necessary to replace the filtering material, this may be readily accomplished by the means provided, only a short period of time being required to replace the relatively inexpensive filtering material employed.

I do not wish to be restricted to the specific structural details or arrangement of parts herein set forth, as various further modifications thereof may be effected without departing from the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims.

I claim as my invention:

1. An oil filtering device comprising an upper chamber and two adjacent concentric lower chambers, a cloth roll filter disposed in the outer lower chamber, inlet means for conveying oil under varying pressure into one of said lower chambers and to force the oil through all three chambers in series, outlet means for thereafter conveying said oil from the other of said lower chambers, a metal edge filter in the upper chamber and comprising contiguous coils closely nested and spirally arranged, means for fixing the outer coil of the filter with respect to the wall of one chamber, a vertically extending cylindrical member connected to the inner coil of the edge filter and having a closed lower end, the coils of said edge filter being movable by pressure of oil exerted on the edge filter and on said lower end for causing relative movement between the adjacent coils of said metal edge filter.

2. An oil filtering device comprising an upper chamber and a lower chamber, a movable metal edge filter in the upper chamber and comprising closely nested contiguous coils spirally arranged, means for fixing the outer coil of the filter with respect to the wall of one chamber, means for forcing the oil to be filtered through said chambers and said filter in a predetermined order, a hollow cylindrical member secured adjacent its upper end to the inner coil of said filter, said member extending downwardly below the filter and terminating in a closed lower end, a cover for the upper chamber, a guide secured to the cover and extending downwardly to a position within the member, said filter and member being movable in response to the pressure of oil acting thereon for causing relative movement between the adjacent coils of the filter.

3. An oil filtering device comprising a casing, a metal edge filter for the oil within the casing and having a plurality of closely nested, spirally arranged, contiguous coils, one of said coils being fixed with respect to the inner wall of the casing, a hollow cylindrical member secured adjacent its upper end to the inner coil of said filter, said member extending downwardly below the filter and terminating in a closed lower end, a cover for the casing, a guide secured to the cover and extending downwardly to a position within the member, a chamber for oil within the casing, said filter being positioned in the chamber, means for forcing oil through said chamber and filter in the direction of movement of the member, the pressure of oil on said filter and on the member being effective to move said coils edgewise to effect cleaning of adjacent coils one by the other.

4. In an oil filtering device as set forth in claim 3, means for limiting the movement of the metal edge filter in each direction after a predetermined distance of travel.

5. An oil filtering device comprising a casing forming a chamber to contain oil, a metal edge filter within said casing, means for forcing oil into said chamber and through said filter, said filter comprising contiguous coils spirally arranged, means for fixing one coil of the filter with respect to the casing, a hollow cylindrical member secured adjacent its upper end to the inner coil of said filter, said member extending downwardly below the filter and terminating in a closed lower end, a cover for the casing, a guide secured to the cover and extending downwardly to a position within the member, said filter and member being vertically movable in response to changes in oil pressure acting thereon in the chamber for causing relative movement between adjacent pairs of coils that are positioned between said last-named coil and the fixed coil, and a cage for limiting movement of said filter attached to said guide.

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