Aug. 27, 1929. F. W. MANNING 1,725,811

MAGAZINE FILTER DRIVING MECHANISM

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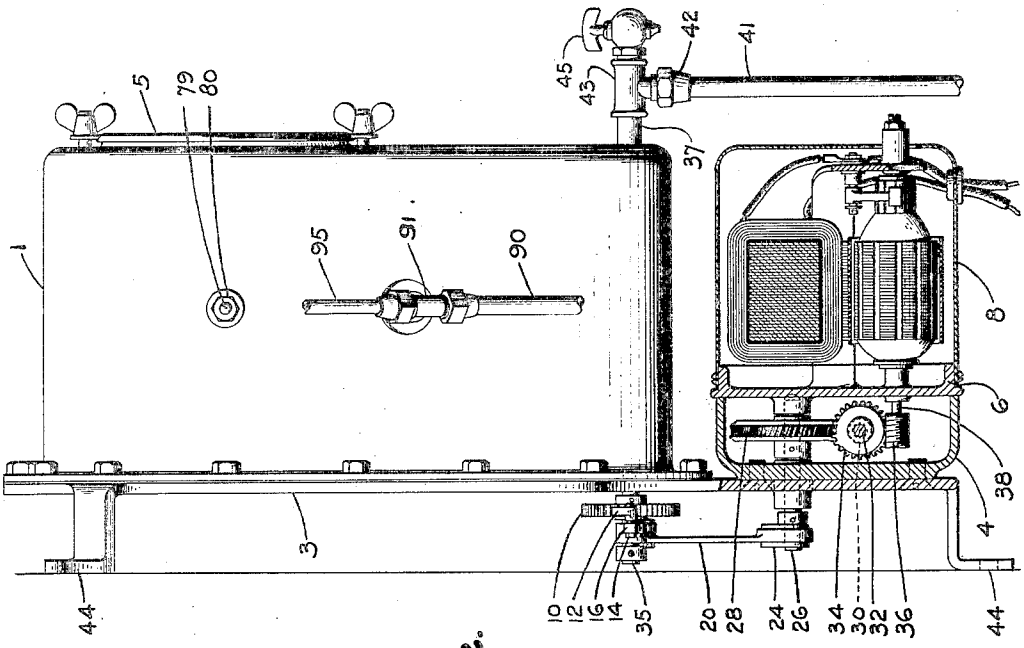


Fig. 2.

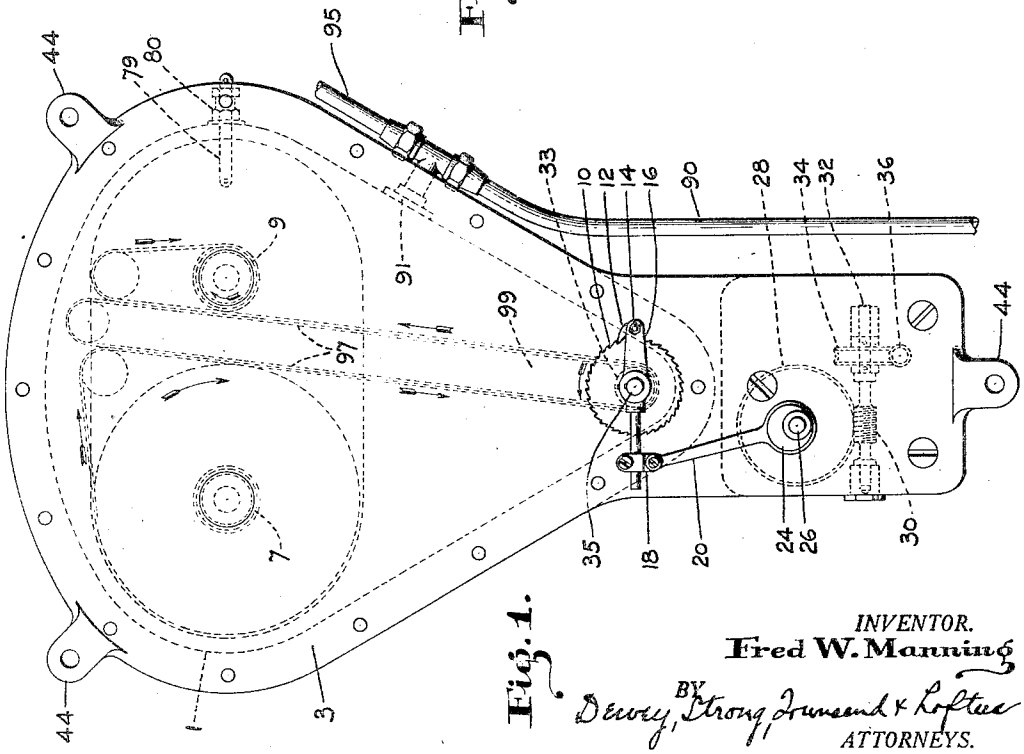


Fig. 1.

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Fig. 4.

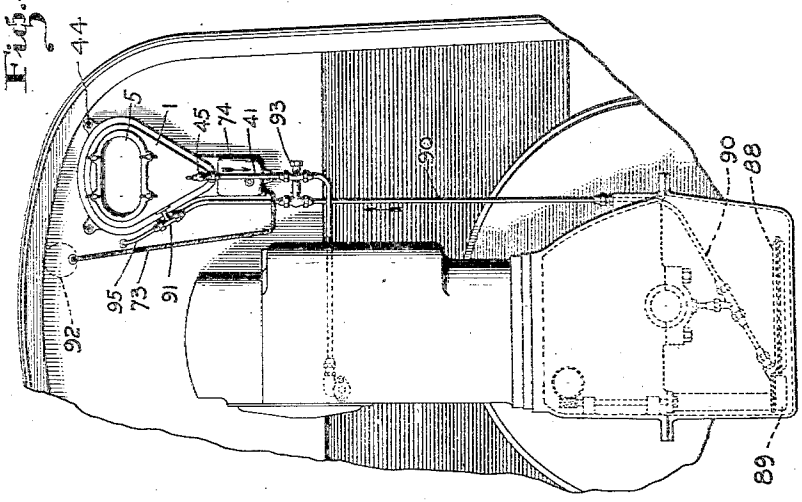


Fig. 5.

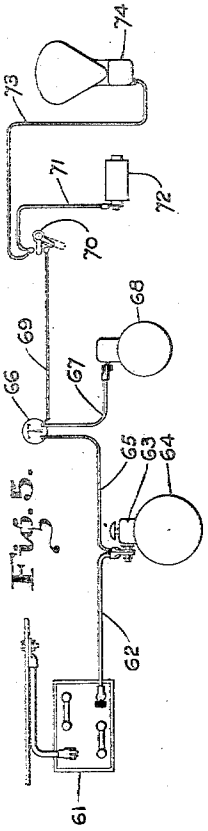
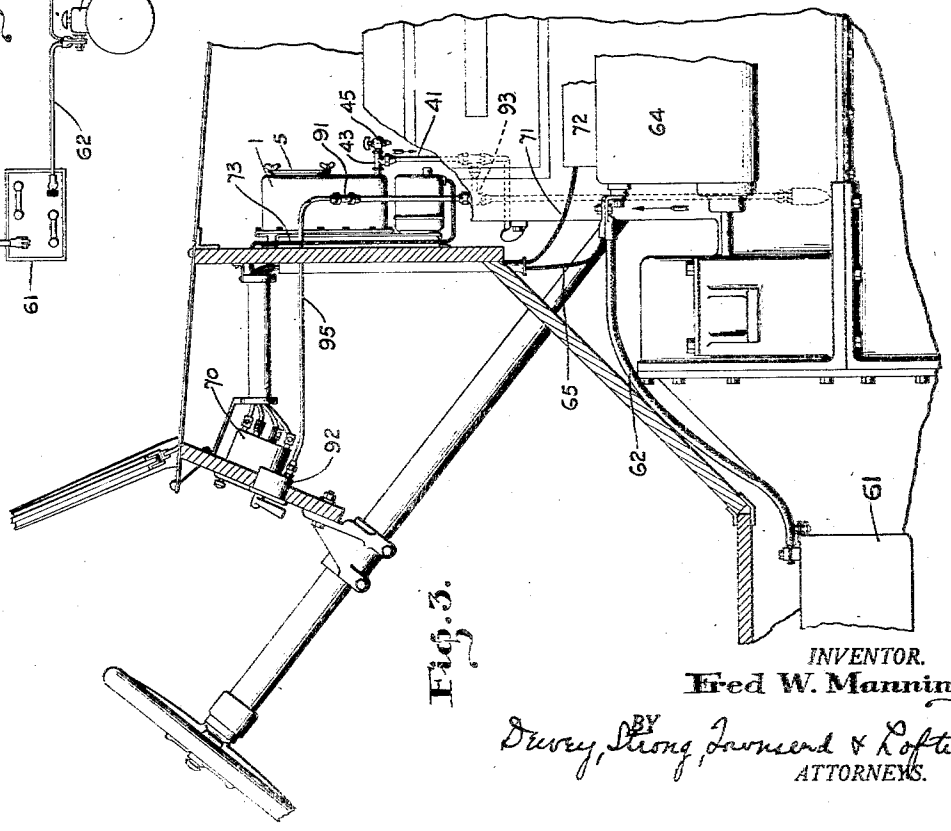


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MAGAZINE-FILTER-DRIVING MECHANISM.

Application filed October 22, 1925. Serial No. 64,247.

This invention relates to the treatment of liquids for effecting their purification or other desired improvements in their characteristics, but more particularly it relates to the purifying of used motor oils by clarification, decolorization, or other treatment.

Motor oils of moving vehicles very quickly become contaminated with road dust, metal and carbon particles, and other impurities which are often held loosely together by oxidized oil. These impurities not only cause wear to the moving parts of the engine but tend to clog the oil holes, and the abrasive action of these impurities is often accentuated by dilution of the lubricating oil caused by the addition of fuel oil and water by-products of operating with relatively cold engines. The constant wear on the engine parts due to the contamination of crank case oil of motor vehicles has been relieved to some extent by the use of various types of pressure filters. However, these have not been found to be very satisfactory, as their filtering fabrics gradually become clogged with impurities, resulting in decreased filtering rates and increased filtering pressures. The ultimate result is usually the replacement of the filter at considerable expense.

In a previous application filed October 1, 1925, Serial Number 59,787, I have described how the above mentioned objections may be obviated by means of a magazine type of filter in which the filtering fabric in the form of a belt is fed as required from a supply spool over an endless drainage member supported by rollers onto a storage spool. In the present application I describe how such a filter may be operated at any desired speed by means of a small motor and reduction transmission attached to the filter.

In accordance with the present invention the motor with reduction gear for driving the filter may be mounted on any suitable part of the filter such as an extended portion of the back cover plate, the wiring connections of the motor being made to the ignition switch connections so that the moving of the ignition switch to "on" and "off" positions starts and stops the filter motor.

Further, in accordance with the present invention the oil to be filtered may be pumped to the filter from any suitable source of supply such as the crank case or other reservoir for receiving the lubricant escaping from the lubricated parts of the engine or other machinery. The filtered oil may be led to the rocker arm bearings and from there distributed, or to any other suitable part of the engine for distribution. A relief or by-pass valve may be inserted between the filter's supply and discharge lines if desirable, but this will seldom be necessary as the rate of filtration is constant due to fresh fabric being continuously or intermittently supplied for filtering purposes as the contaminated filtering fabric is removed and wound on a storage spool. When the oil is cold as when starting up the engine such a valve may be of service but probably not at any other time.

Further, in accordance with the present invention, the filtering fabric or belt may be a closely woven metallic cloth, or it may be composed of cotton, paper, asbestos or other fibrous material strengthened by a metallic cloth or a screen incorporated in it, and this fibrous material may be made up in laminated sheets and impregnated with a treating agent as bone char, kieselguhr, etc.

The features of the invention hereinbefore referred to in general terms will be better understood by reference to the following description, taken in conjunction with the accompanying drawings which illustrate a preferred form of apparatus for carrying out my invention. It will be understood, however, that the construction herein illustrated and described is merely illustrative of how the features of the invention may be employed, and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a rear elevation of the filter.

Figure 2 is a side elevation of the filter and sectional elevation of the motor and reduction gearing.

Figure 3 is a sectional elevation of a motor vehicle showing the relative position of the filter apparatus with piping and wiring connections.

Figure 4 is a front elevation of the dash of a motor vehicle showing relative position of filter apparatus with piping and wiring connections.

Figure 5 is a diagrammatic arrangement of the wiring connections.

Figures 1 and 2 show the filter casing 1 mounted upon back cover plate 3 which ex-

tends downwardly to take the reduction gear box 4 to which is fastened motor box base plate 6 and motor cover 8. Ratchet wheel 10 is fastened to the lower cylindrical roller 33 by means of extension 35 described in my previous patent application above mentioned, and is rotated by means of pawl 12 attached by pin 14 to lever 16 connected by adjustable coupling 18 to eccentric rod 20 reciprocated by eccentric 24, rotated by shaft 26, worm gear 28, worm 30, shaft 32, worm gear 34 and worm 36 fastened to the motor shaft 38. The rate at which fresh filtering fabric is brought into service is regulated by the adjustment of coupling 18 on lever 16. Indicator pin 79 which is slowly pushed out of the filter casing 1 through a small stuffing box 80 as the contaminated filtering fabric is wound on storage spool 9, indicates when the filter requires a fresh supply spool.

Figures 3 and 4 show how the filter with reduction gear and motor may be fastened by means of supporting lugs 44 to the dash under the hood of a motor car. Figure 5 shows how the filter motor may be wired up from the ignition switch of a standard make of motor car. Storage battery 61 is connected by main feed wire 62 to starting switch 63 of motor 64. Starting switch 63 is connected by wiring 65 to ammeter 66. The ammeter's opposite terminal is connected by wiring 67 to generator 68 and also by wiring 69 to ignition key 70. Ignition key is connected by wiring 71 to ignition coil 72 also by wiring 73 to filter motor 74.

The operation of the apparatus thus constructed has been in part indicated in connection with the foregoing description. Oil from the sump in the crank case reservoir enters the screen inlet 88 of the pump 89 a portion of it going to the crankshaft bearings or other suitable parts of the engine and a portion of it passing up pipe 90 enters the filter at 91 and after passing through the filtering belt extending from spools 7 and 9 over the endless carrying member 97 leaves the filter through filtrate outlet 37 and passing through pipe 41 is carried to the rocker arm bearings or other suitable part of the engine for distribution. Pipe 95 is a continuation of pipe 90 past inlet 91 to connect with the oil gauge 92. A relief or by-pass valve 93 may connect the filter feed pipe 90 to the filtrate discharge pipe 41 so that when the engine is first started, a portion of the oil may be by-passed until it warms up and obtains its regular rate of flow through the filtering belt.

Measuring rod 79, which moves outwardly as the storage spool builds up, will indicate clearly when the supply spool has become exhausted and the filter should be replenished with a fresh supply of filtering fabric. The supply spool upon becoming exhausted still retains one end of the belt which is fastened to it by means of hooks or other suitable device not shown and upon exhaustion of the belt the oil in the filter chamber will begin to pass through openings or small holes in the end of the belt into the filtrate chamber 99 and from there out. These holes will be provided at the inner ends of the belts on all supply spools for the purpose of causing the pressure in the filter to drop to zero by allowing the oil to pass through the filter freely without being filtered the moment the supply spool is exhausted and thus relieve the strain on the apparatus which would arise if the oil were allowed to continue to filter through the belt with the carrying member 97 moving and the end of the filtering belt attached to the exhausted supply spool.

Having thus described my invention, what I claim is:

1. The combination with an engine of an oil filter therefor, said filter comprising a filtering element movable for presenting new filtering surfaces, and means for moving said element controlled by the ignition mechanism of the engine.

2. The combination with an internal combustion engine of a filter for the engine lubricant, said filter comprising a web of filtering fabric, means for propelling said web past a point of delivery thereupon of the lubricant for presenting new filtering surfaces, said means comprising an electric motor and energizing circuit therefor connected for control by the ignition switch of the engine.

3. In combination with an engine, a magazine oil filter having a continuous filter member, oil conducting connections between the engine and the filter, an electric motor, means including a reducing driving connection from the motor to the filter member for very slowly moving the filter member upon rotation of the motor, and including mechanism for varying the movement of the filter member relative to the motor movement, the motor being energized in the ignition circuit of the engine and controlled by the engine ignition switch.

4. In combination with the lubricating system of an internal combustion engine of an oil filter therefor, and means for substituting the fresh filter material for contaminated filter material, said means being controlled by the ignition mechanism of the engine.

5. The combination with a lubricating system of an internal combustion engine, of an oil filter therefor, and means for renewing the filter element, said means being controlled by the ignition mechanism of the engine.

6. The combination with the lubricating system of an internal combustion engine, of an oil filter therefor, said filter comprising a filtering element movable for presenting new filtering surfaces, and means for moving said element controlled by the ignition mechanism of the engine.

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