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OIL PURIFIER

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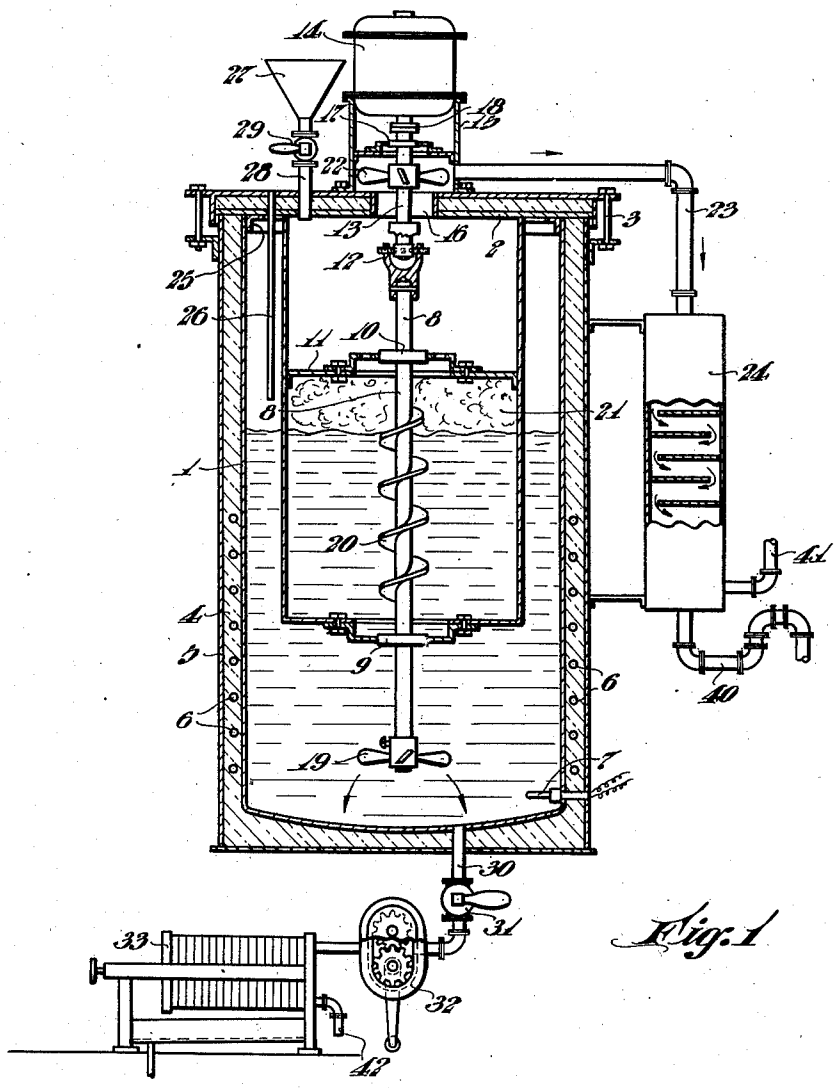


Fig. 1

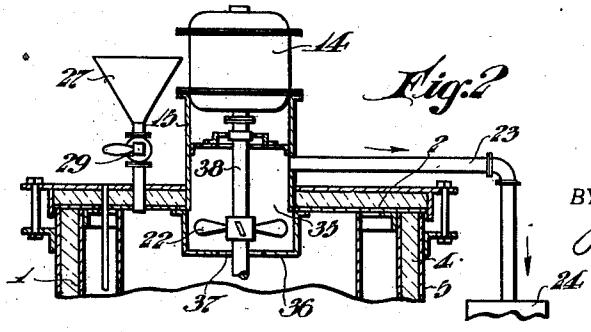


Fig. 2

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OIL PURIFIER

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3 Claims. (Cl. 196—16)

My invention relates to oil purifiers and particularly to apparatus for purifying or renovating crank-case oil of motor vehicles.

An object of my invention is to provide an oil purifier that is of such simple and inexpensive construction that it is capable of extended use by owners of relatively small numbers of vehicles or owners of garages.

A further object of my invention is to provide an oil purifier of few and simple moving parts whereby its operation is attended with relatively little wear and the replacement or repair of such parts is reduced to a minimum.

A still further object of my invention is to provide an oil purifier that has improved efficiency and operation and which produces an improved product.

Heretofore devices of the same general character as that of my invention have been so complicated and expensive in construction that their field has been limited to owners or operators of relatively large flects of trucks or automobiles. The initial investment of such devices has been so high that the savings effected by its use must be relatively large.

The oil purifier of my invention is of such simplicity and the number of parts has been so reduced that it may be constructed at a cost that will render it available to the operator of a relatively small number of trucks or automobiles and which is sufficiently simple in operation to permit it to be operated by relatively unskilled labor.

In the accompanying drawing,

Figure 1 is a vertical sectional view of an oil purifier constructed in accordance with my invention; and

Fig. 2 is a similar view of a portion of a modification.

An upright cylindrical metal tank 1 is provided with a removable top or cover 2 that is secured thereon by bolts 3. The body of the tank 1 and the cover 2 each have a jacket 4 of asbestos or other suitable heat-insulating material and an outer steel covering 5 for protecting the jacket 4.

Substantially the lower half of the tank 1 is surrounded by an electric heating element 6 that is electrically insulated from the tank 1 and the covering 5. The heating element 6 is connected to any suitable source of current (not shown). A thermostat 7 automatically controls the maximum temperature of the contents of the tank to prevent overheating.

A vertical shaft 8, which extends centrally of the tank 1, has a lower outboard bearing 9 and an upper outboard bearing 10. The bearings 9 and 10 are supported by a framework 11 that is secured to and removable with the cover 2.

The shaft 8 is connected through a universal joint 12 and a short shaft 13 to an electric motor 14 mounted on the upper end of a gas-tight cylindrical casing 15. The shaft 13 extends through an aperture 16 in the cover 2 and a stuffing box 17 in the casing 15 and is connected to the motor shaft by means of a coupling 18.

The shaft 8 is provided at its lower end with an agitating device in the form of a propeller 19 for the purpose of producing a turbulent agitation of the oil and preventing the deposition of sediment in the bottom of the tank.

The shaft 8 is also provided with a spiral fin 20 which serves to actuate a stream of oil upward around the shaft and fin and which is thrown outward at the end of the spiral fin in the form of spray, as indicated at 21, to facilitate the escape of vapors from the oil.

A fan 22 is mounted on the shaft 13 within the casing 15 and above the aperture 16. The fan 22 draws vapors upwardly through the aperture 16 and forces them to flow through an outlet pipe 23 into a condenser 24. The cover 2 is provided with an inner circular flange 25 for preventing the escape of vapors between the cover 2 and the tank.

The cover 2 is provided with an air inlet pipe 26 and an inlet for oil to be treated comprising a funnel 27 and a pipe 28 having a valve 29. The bottom of the tank is provided with an outlet pipe 30 having a valve 31 and that is connected to a gear pump 32 and a filter press 33.

The apparatus of Fig. 2 differs from that of Fig. 1 in that the cover 2 is provided with a larger central aperture 35 which is of substantially the same diameter as that of the casing 15. A cylindrical casing 36 is suspended from the cover and is provided with a central opening 37, through which extends a shaft 38 that replaces the shaft 13 of Fig. 1. The fan 22 is mounted on the shaft 38 within the casing 36. In other respects, the apparatus of Fig. 2 is substantially similar to that of Fig. 1.

In the operation of the purifier, oil to be treated is poured in at the top by means of the funnel 27 until the tank is filled to a desired level, as indicated in the drawing. The tank is ordinarily adapted to receive from five to ten gallons of oil.

A suitable quantity of clay or fuller's earth is added for the purpose of absorbing tarry constituents of the oil and the valve 29 is closed.

The clay or fuller's earth may, however, be added later, if desired.

The tank is then heated to raise the temperature of the oil to between 350° F. and 450° F., depending upon the character of the oil being treated and the degree to which the lighter or more volatile constituents are to be removed. The thermostat 7 may be adjustable or designed for the maximum temperature desired.

The motor 14 is in operation during the heating of the oil. The propeller 19 actuates oil downwardly against the bottom to prevent the deposition of sediment and to keep the fuller's earth or clay in suspension. The spiral fin 20 produces oil spray to increase the surface exposure of the oil and the liberation of vapors of the volatile elements.

The fan 22 withdraws air and vapors upwardly through the aperture 16 into the casing 15 and forces them out through the pipe 23. Air flows in through the air inlet pipe 26 adjacent the surface of the oil and the circulation of air thus caused by the fan 22 assists in the liberation of vapors of gasoline and other volatile ingredients.

The condenser 24, which may be of any suitable or usual type, collects the liquid resulting from the condensible vapors and which flows out through a pipe 40. The non-condensible vapors and gases escape through a pipe 41.

When the oil has been sufficiently treated, the valve 31 is opened and the gear pump 32 is operated to withdraw the oil from the tank 1 and force it through the filter press 33. All sediment and solid material are removed from the oil and the latter thus entirely purified and renovated is collected at the pipe 42.

The purified oil is now in condition for the same uses for which it was suitable in its original state. In fact, the treated oil may have an even higher viscosity than that of the original oil.

The purifier may be refilled after the treated oil is withdrawn and the operation repeated as often as desired.

My improved purifier operates simply and efficiently to remove undesirable ingredients of used crank-case oil or oil employed for similar purposes and to restore it to at least its original state of purity and viscosity. The apparatus is extremely simple and may be operated with entire safety by relatively unskilled labor.

It is possible that similar results may be obtained by modifications of the apparatus of my invention. For example, the vertical shaft and spiral fin may be replaced by other forms of agitating devices, such, for example, as propeller blades or a hollow shaft with internal grooves without departing from the scope of my invention. Accordingly, I do not limit my invention to the precise embodiment shown and described other than as expressed in the claims.

I claim as my invention:

1. An oil purifier comprising a tank for oil adapted to be filled to an intermediate level, means for heating said oil, a vertical shaft in said tank, an agitator for said oil mounted on said shaft, means for supplying air adjacent to the surface of said oil, an impeller for vapor on said shaft above the level of the oil and means for driving said shaft.

2. An oil purifier comprising an upright container for oil to a desired level, a vertical shaft having means thereon for forcing oil upward to form a spray above the level thereof, means for supplying air adjacent to the surface of said oil, an impeller on said shaft above said oil, and a motor on said tank for driving said shaft.

3. An oil purifier comprising a tank adapted to be partially filled with oil, an inlet for oil, an inlet for supplying air for circulation adjacent to the surface of the oil, a vertical shaft in said tank having means for agitating said oil, a fan on said shaft for causing a circulation of air through said tank above the oil and for withdrawing air and vapors from said tank, and means for actuating said shaft and said fan.

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