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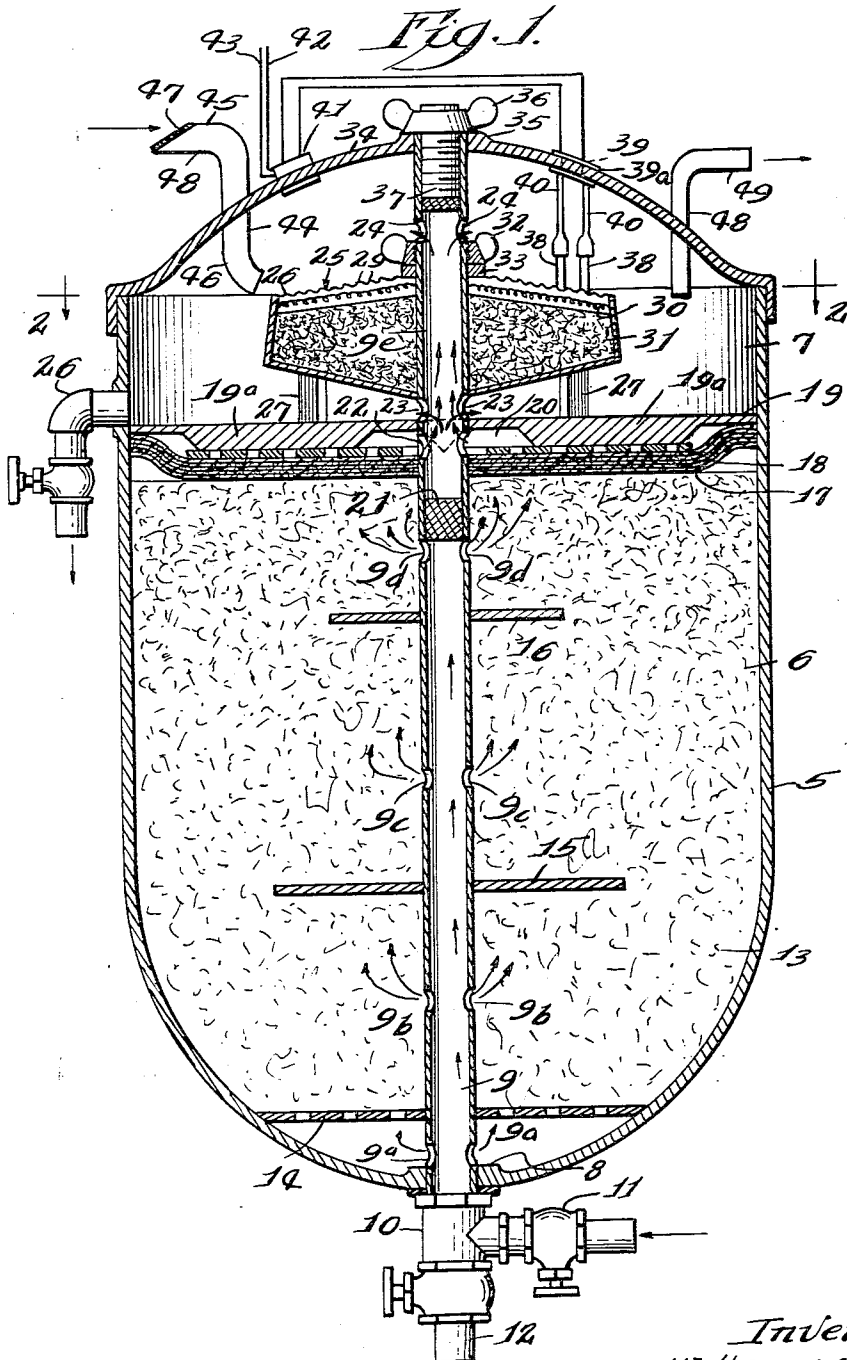
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OIL RECLAIMER

Filed March 14, 1955

2 Sheets-Sheet 1



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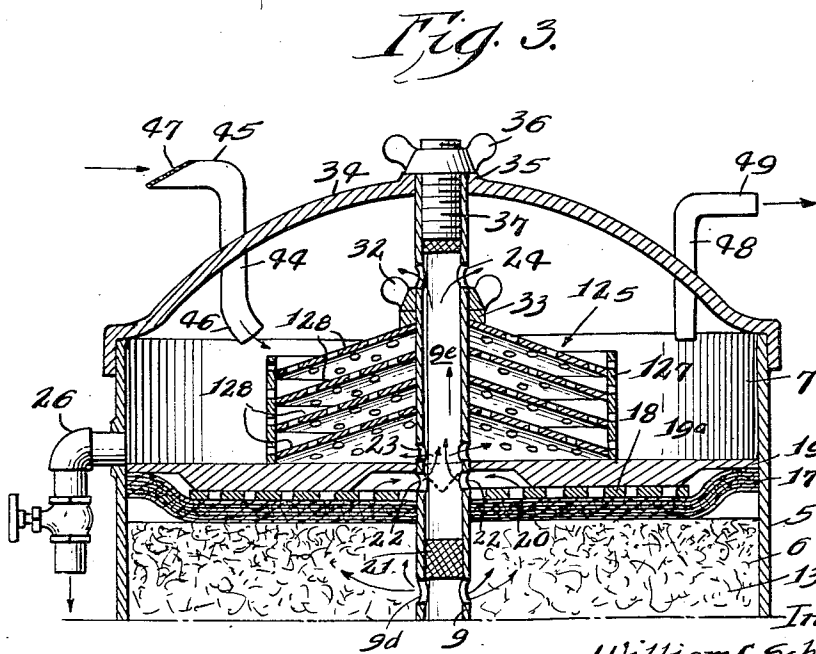
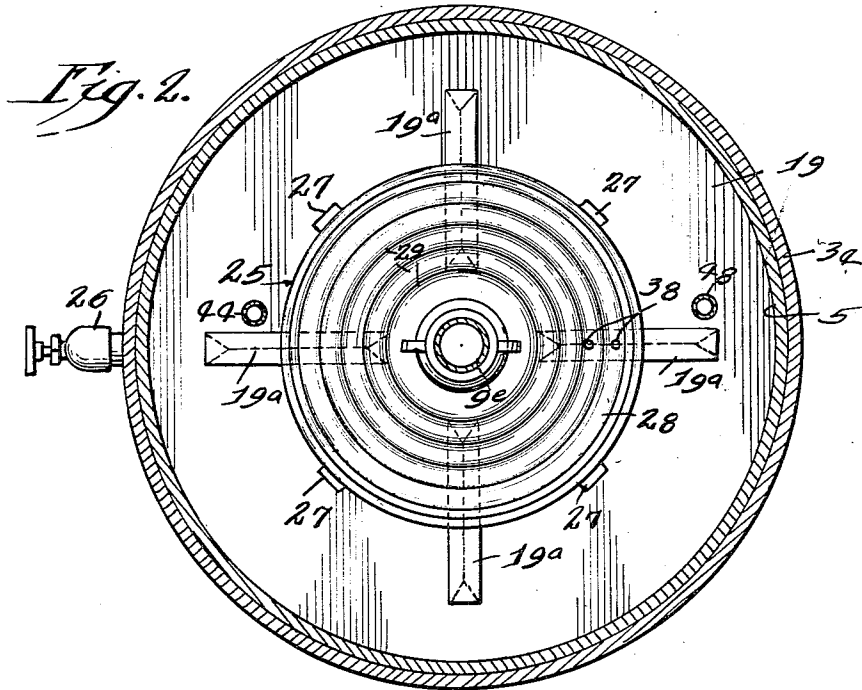
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**OIL RECLAIMER**

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12 Claims. (Cl. 196—15)

This invention relates to an oil reclaiming device; and in particular it relates to an oil reclaiming device which is adapted for installation in modern motor vehicles.

It has been well known for many years that the conventional oil filters used in internal combustion engines are of only limited value because they provide no means of removing light diluents or water from the oil. This requires some sort of a vaporizing unit in addition to the filter.

The principal object of the present invention is to provide an oil reclaiming device which is adapted for installation in modern passenger vehicles in which the exhaust manifold is so positioned that it can not be reached as a source of heat for operating the vaporizing mechanism of the reclaimer.

A further object of the invention is to provide a reclaimer in which part of the oil flow from a filter compartment is passed over a vaporizing surface of a vaporizing unit, while the rest of the oil from the filter by-passes the vaporizing unit and returns directly to the crank case without being heated. This prevents excessive heating of the entire body of oil.

A further object of the invention is to provide an oil reclaimer which may be used in hot climates without any heating means for the vaporizing unit. This is accomplished in one embodiment of the invention by extending an air vent to a position close to the vaporizing member to conduct hot air from the air stream outside the reclaiming device over the vaporizing surface of the vaporizer.

A further object of the invention is to provide an oil reclaimer in which the vaporizing chamber is of very small height, so that the overall height of a unit including a filter and a vaporizing chamber thereabove is little greater than the height of a filter alone.

A further object of the invention is to provide a single basic structure with which either an electrically heated vaporizing unit or an air stream heated vaporizing unit may be employed depending upon the local conditions.

The invention is illustrated in a preferred and an alternative embodiment in the accompanying drawings in which:

Fig. 1 is a central vertical sectional view of the preferred embodiment of the invention;

Fig. 2 is a section taken as indicated along the line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary section of the vaporizing chamber of an oil reclaimer provided with the alternative form of vaporizing device heretofore referred to.

Referring to the drawings in greater detail, and referring first to Fig. 1, a reclaimer unit has a deep drawn sheet metal body 5 which has a filter compartment 6 in its lower portion and a vaporizing chamber 7 in its upper end portion. At the bottom of the filter compartment 6 is a boss 8 to receive a central oil inlet pipe 9 which extends axially through the entire body 5 from bottom to top, and is connected at its lower end to a fitting 10 for an oil inlet 11. An oil drain pipe 12 is provided,

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with a suitable valve. The filter compartment 6 is shown in the drawings as filled with loose filter material 13; but it is obvious that a filter cartridge could be substituted for the loose filter material if desired. The oil inlet pipe 9 has a pair of openings 9a to admit oil to the filter chamber 6 immediately above the nipple 8, and oil passing through the openings 9a may flow through the holes in a foraminous plate 14 and upwardly through the filter material 13. Above the plate 14 are additional holes 9b through which oil may pass into the filter material, and still farther up are holes 9c and 9d. If desired the pipe 9 may be provided with radial baffles 15 and 16 to force the oil to flow outwardly through the outer portion of the loose filter material 13. Obviously the arrangement of baffles could not be used in conjunction with a filter cartridge unless the baffles were an integral part of the cartridge instead of being fastened to the oil inlet pipe 9.

On top of the filter material 13 is a felt pad 17 held down by a perforate filter plate 18 and a solid diverter plate 19 which has radial ribs 19a bearing on the filter plate to leave a space 20 between the plates. Thus the plates 18 and 19, spaced by the ribs 19a, in effect form a hollow floor for the vaporizing chamber 7. The filter plate 18 is of smaller diameter than the felt pad, so that the margin of the pad is elevated as seen in Fig. 1. Just below the level of the felt pad 17 the oil inlet pipe 9 is provided with a plug 21 which prevents any oil from passing directly through the oil inlet pipe into the vaporizing chamber 7. Thus all the oil must pass through the filter material and through the felt pad 17; and from the space 20 between the plates the oil may pass through oil return holes 22 into a vaporizer feed portion 9e of the oil inlet pipe 9. Immediately above the diverter plate 19 are small oil by-pass holes 23 through which some oil may pass to the top of the diverter plate, while near the upper end of the vaporizer feed portion 9e are oil feed holes 24 for permitting oil to flow onto a vaporizing unit, indicated generally at 25. Thus, part of the oil may pass through by-pass holes 23 and flow to an oil return line 26 without passing over the vaporizing unit 25, while the balance of the oil flows through the oil feed holes 24 onto the vaporizing unit.

Referring now to Figs. 1 and 2, the vaporizing unit 25 has a plurality of legs 27 which stand on the diverter plate 19, and a frusto-conical sheet metal top 28 which, as seen in Fig. 2, has concentric corrugations 29. The top 28 acts as a vaporizing surface over which oil from the feed holes 24 may flow in a thin film. Beneath the vaporizing top plate 28 is an electric heating coil 30 below which is a packing consisting of any suitable heat resistant material 31 such as asbestos. The vaporizing unit 25 is firmly held down on the diverter plate 19, and the diverter plate and filter plate 18 are pressed against the felt pad 17 by means of a wing nut 32 which screws onto a thread on the vaporizer feed portion 9e of the oil inlet pipe and bears on a washer 33 to clamp the vaporizing unit in place.

Surmounting the heating chamber 7 is a top closure 34 which has a boss 35 surrounding a central opening to accommodate a wing nut 36 which screws onto a projecting stud 37 which plugs the top of oil inlet pipe 9 just above oil feed holes 24. The heating coil 30 has a pair of rigid electric contacts 38 which extend upwardly in line with an opening 39 in the closure 34, and a pair of armored cables 40 secured to the contacts 38 extend upwardly through the opening 39 and are surrounded by an insulating plug 39a through which the cables 40 may slide when the closure 34 is removed from the unit.

Exteriorly of the closure 34 the cables 40 are wired into a sealed thermostat unit 41 which is mounted in an opening in the closure 34 so that its inner face is inside the

chamber 7; and wires 42 and 43 connect the thermostat into the generator circuit and to ground in the usual way. The cables 40 and wires 42 and 43 have enough slack to permit removal of closure 34 without detaching the wires.

In order to assure the rapid removal of evaporated diluents and water from the vaporizing chamber 7 an air inlet pipe 44 extends through the closure 34 and has its outer end portion 45 turned horizontally toward the front of the vehicle so as to take air from the air stream passing around the oil reclaimer. The inner end 46 of the inlet pipe 44 is directed at the vaporizing unit 25 so as to assure rapid removal of evaporated materials from the vicinity of the vaporizing surface 28. Preferably a small fine mesh dust filter screen 47 covers the front of the air inlet pipe 44. Cooperating with the air inlet 44 is an air outlet 48 which has its outer portion 49 directed rearwardly so that the air stream passing thereover helps sustain a rapid air flow through the vaporizing chamber 7 to remove vaporized impurities.

The operation of the device is believed to be obvious from the foregoing description. After oil passes through the filter material 13 and the felt pad 17 it reenters the vaporizer feed portion 9e of the oil inlet pipe 9 through the openings 22, and passes upwardly through said portion 9e where some of it escapes from the pipe through the by-pass holes 23 and some passes through the feed holes 24 and spreads in a thin film over the vaporizing surface 28 of the vaporizing unit 25 so as to have the low boiling diluents and water removed from it. The thermostat 41 is set to maintain the temperature within the evaporating chamber 7 no higher than about 250°, so that the oil does not become excessively hot. Oil which flows over the vaporizing unit 25 and also the oil which flows through the by-pass 23 is discharged on top of the diverter plate 19 and out to the oil return line 26.

Referring now to Fig. 3, the second form of the invention is exactly like the first embodiment except for the fact that it has an unheated vaporizing unit 125.

The vaporizing unit 125 in the present form of the device consists of a foraminous, annular supporting wall 127 within which is mounted a plurality of parallel, foraminous, frusto-conical plates 128. The units 25 and 125 are exactly the same height and diameter so that they may be interchanged in the same vaporizing chamber depending on the local conditions which are encountered in the use of the oil reclaiming device.

The second form of the invention is particularly adapted for use in the hot southwest parts of the United States during the summertime when the hot, dry air entering the air inlet pipe 44 is quite adequate to vaporize any undesirable diluents or water from the oil passing over the vaporizing surfaces 128. Because of the lower temperatures employed, the vaporizing area of the alternative unit 125 needs to be substantially greater than that of the electrically heated unit 25, and this is accomplished by employing the plurality of foraminous plates 128 which permit the oil to flow from one plate to another.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom, as some modifications will be obvious to those skilled in the art.

I claim:

1. In an oil reclaimer: a vaporizing chamber having a floor and a removable closure; a vaporizing unit in said chamber having an inclined vaporizing surface over which oil may flow in a thin film; oil inlet means in the floor of the chamber through which oil may enter said chamber; means associated with said oil inlet means for permitting a portion of the oil admitted to the chamber to flow over said vaporizing surface; an oil outlet; a bypass for conducting all but said portion of the oil to the outlet without flowing over the vaporizing surface; means for vaporizing impurities from the oil flowing over the vaporizing

surface; and vent means through which vaporized impurities may escape from the chamber.

2. The device of claim 1 in which the means for vaporizing impurities comprises an electric heating member beneath the vaporizing surface.

3. The device of claim 1 in which the means for vaporizing impurities comprises an air inlet constructed and arranged to conduct air from an air stream outside of the chamber onto the vaporizing surface.

4. In an oil reclaimer: a vaporizing chamber having a floor with a central aperture and a removable closure; a vaporizing member in said chamber having a frusto-conical vaporizing surface over which oil may flow in a thin film and a central aperture aligned with that in the floor of the chamber; an oil inlet pipe extending through said apertures, said pipe having an oil receiving opening beneath the floor and a pair of oil feed holes, one of said feed holes being positioned to feed oil over the frusto-conical vaporizing surface and the other being a bypass hole; an oil outlet adapted to receive oil fed from both feed holes; means for vaporizing impurities from the oil flowing over the vaporizing surface; and vent means through which vaporized impurities may escape from the chamber.

5. The device of claim 4 in which the vaporizing surface comprises a plurality of vertically spaced plates provided with openings through which oil may pass downwardly from one plate to another, and the means for vaporizing impurities comprises an air inlet constructed and arranged to conduct air from an air stream outside the chamber onto said plates.

6. The device of claim 4 in which the means for vaporizing impurities comprises an electric heating member beneath the vaporizing surface, and thermostat means are provided to limit the maximum temperature within the chamber.

7. In an oil reclaimer: a vaporizing chamber having a hollow floor into which oil may pass from an oil filter, and a central aperture in said floor; a removable closure for said vaporizing chamber provided with vent means; a vaporizing member having a frusto-conical vaporizing surface over which oil may flow in a thin film and a central aperture aligned with that in the floor of the chamber; an oil inlet pipe extending through said apertures, said pipe having an oil receiving opening within the hollow floor and a pair of oil feed holes, one of said holes being beneath the vaporizing member to serve as a by-pass and the other of said feed holes being positioned to feed oil over the vaporizing surface; an oil outlet adapted to receive oil fed from both feed holes; means for vaporizing impurities from the oil flowing over the vaporizing surface and vent means through which vaporized impurities may escape from the chamber.

8. In an oil reclaimer: a vaporizing chamber having a floor with a central aperture and a removable closure; a vaporizing member in said chamber having a frusto-conical vaporizing surface over which oil may flow in a thin film and a central aperture aligned with that in the floor of the chamber; an oil inlet pipe extending through said apertures, said pipe having an oil receiving opening beneath the floor and a pair of oil feed holes, one of said feed holes being positioned to feed oil over the frusto-conical vaporizing surface and the other being a by-pass hole beneath the vaporizing member; an oil outlet adapted to receive oil fed from both feed holes; means for vaporizing impurities from the oil flowing over the vaporizing surface; and vent means through which vaporized impurities may escape from the chamber.

9. In an oil reclaimer: a cup-like body having an oil inlet at the bottom; a filter compartment in the lower portion of the body; a vaporizing chamber in the body which has a floor above said filter compartment; a removable closure for the body; a vaporizing unit in said chamber having an inclined vaporizing surface over

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which oil may flow in a thin film; oil outlet means in the side wall of the cup-like body which is positioned to receive oil which has passed over said vaporizing surface and oil which has by-passed said surface; oil inlet means in the floor of the chamber adapted to cause a part of the oil from the filter compartment to flow over the vaporizing surface and to by-pass a part of the oil from the filter compartment directly to the oil outlet means; means in the vaporizing chamber for vaporizing impurities from the oil flowing over the vaporizing surface; and vent means through which vaporized impurities may escape from the chamber.

10. In an oil reclaimer: a cup-like body having an axial oil inlet at the bottom; a transverse partition dividing said cup-like body into a lower filter compartment and an upper vaporizing chamber, said partition being imperforate except for an axial opening; a removable closure for the cup-like body; an oil conducting pipe extending from the oil inlet upwardly through the axial opening in the partition to the upper portion of the vaporizing chamber, said pipe having a plug a short distance below the partition, outlet holes below the plug, a filtered oil return hole above the plug and below the partition, a by-pass hole above the partition and a vaporizing oil feed hole in the upper portion of the vaporizing chamber; filter means in the filter compartment; spacer means between the filter means and the partition to form a space through which oil may flow

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into the oil return hole of the pipe; a vaporizing unit mounted on said partition, said unit having an inclined vaporizing surface over which oil from the vaporizing feed hole may pass in a thin film; means for vaporizing impurities from the oil flowing over the vaporizing surface; an oil outlet through which all oil which enters the vaporizing chamber may leave the cup-like body; and vent means through which vaporized impurities may escape from the chamber.

11. The device of claim 10 in which the means for vaporizing impurities comprises an electric heating member beneath the vaporizing surface.

12. The device of claim 10 in which the means for vaporizing impurities comprises an air inlet constructed and arranged to conduct air from an air stream outside of the chamber onto the vaporizing surface.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

20	1,703,648	Van Brunt et al. -----	Feb. 26, 1929
	2,336,021	La Brecque -----	Dec. 7, 1943
	2,348,247	Dushane -----	May 9, 1944
	2,377,988	Braun -----	June 12, 1945
	2,392,548	Pogue -----	Jan. 8, 1946
25	2,425,377	La Brecque -----	Aug. 12, 1947
	2,645,607	Allen -----	July 14, 1953