

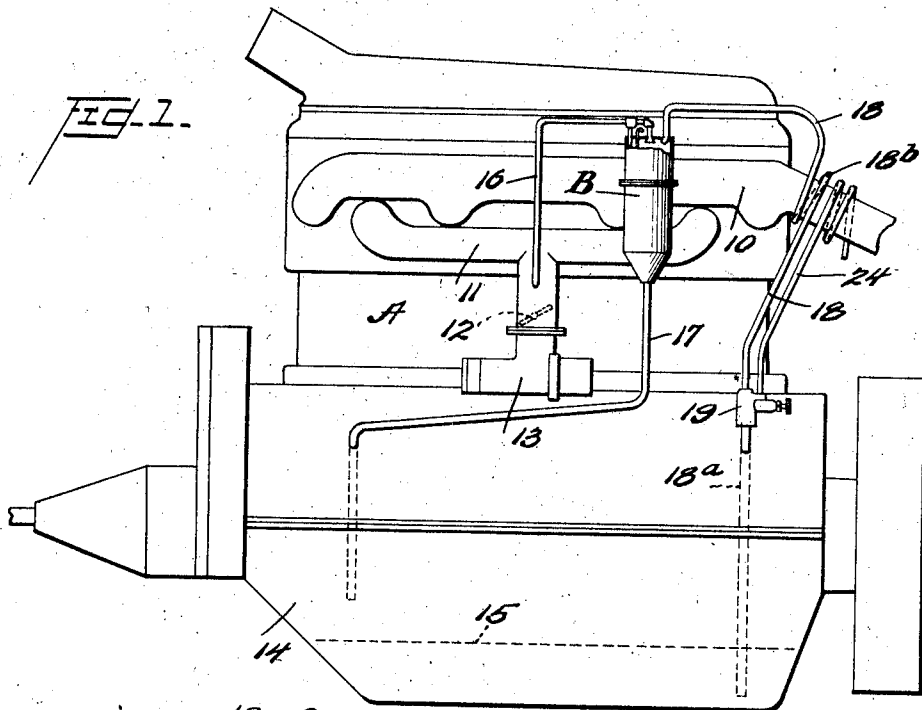
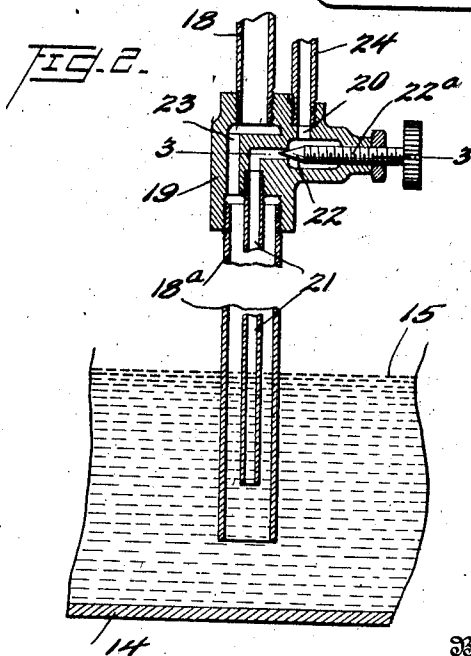
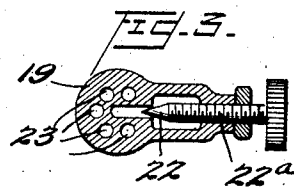
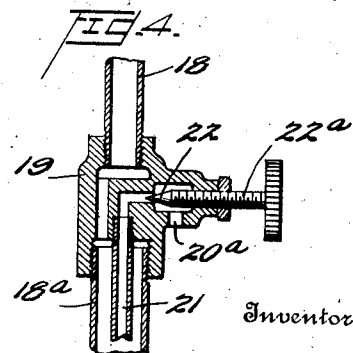
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OIL PURIFYING APPARATUS FOR HYDROCARBON ENGINES

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UNITED STATES PATENT OFFICE.

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OIL-PURIFYING APPARATUS FOR HYDROCARBON ENGINES.

Application filed January 23, 1926. Serial No. 83,255.

The present invention relates to improvements in oil purifying apparatus for internal combustion engines, and more particularly to means for aerating the oil in its passage from the crank case or main reservoir to the refining device in which the air and volatile impurities are separated out, the oil being returned to the oiling system. The air is preferably commingled with the oil at the lower end or inlet of the conduit through which the oil is conveyed to the refiner. The air, preferably heated, lightens the rising column of oil, causing it to flow more readily. Furthermore by causing the air to travel with the oil it is made to absorb the volatile impurities, such as gasoline and water, and greatly aid the refiner in separating these impurities from the oil.

The invention is illustrated in the accompanying drawing, in which:—

Figure 1 is a side elevation of a hydrocarbon engine with apparatus embodying the present invention applied;

Figure 2 is a sectional view of the aerating device;

Figure 3 is a section on the line 3—3 of Figure 2, and

Figure 4 is a sectional view similar to Figure 2, showing a modification.

Referring to the drawing A indicates the engine, 10 the exhaust manifold, 11 the intake manifold, 12 the throttle valve, 13 the carburetor, and 14 the crank case, the normal oil level being indicated by the dotted line 15.

The refiner B may be of the type illustrated in Figures 1 to 4 inclusive of my Patent No. 1,359,453, dated November 16, 1920, or of any other form in which a partial vacuum is used to draw the oil to the refiner and to assist in vaporizing the volatile impurities. The operation of the refiner is fully described in the before-mentioned patent. In the drawing, 16 indicates the conduit connecting the refiner with the intake manifold above the throttle to produce a partial vacuum and to convey the impurities removed from the oil to the engine, 17 indicates the conduit which returns the purified oil to the oiling system, and 18 indicates the conduit through which the oil is conveyed from the crank case or reservoir to the refiner.

As shown in the drawing a valve casing 19 is connected to the pipe 18 and a pipe 18^a connected to the lower end of the valve

casing extends into the oil, represented at 15 in the lower part of the crank case or reservoir 14. The valve casing has a port 20 through which air enters and passes down through an inner tube 21 to be discharged near the lower end of the pipe 21 which is slightly above the bottom of the pipe 18^a. The admission of air is controlled by a suitable valve 22 and the lower end of the tube 21 is preferably below the normal level of the oil in the reservoir, although not necessarily so.

The suction in pipe 18 draws oil from the crank case and also draws more or less air from the lower end of the pipe or tube 21, which air in bubbles rises with the oil and flows into the refining device B through pipe 18. Openings 23 in the body of the valve permit the air and oil to pass from the pipe 18^a to the pipe 18. One effect of the air is to lighten the column of oil and cause it to flow more freely into the refining chamber. A second advantage of this arrangement is that the air by reason of its intimate mixture with the oil absorbs some of the gasoline, water or other volatile diluents of the oil and thus aids in refining the oil. This effect is enhanced by heating the oil in its passage to the refining chamber, as may be done by the coil 18^b encircling the exhaust manifold 10 or in any other suitable manner.

The amount of air required to aerate the oil is small and the valve 22 is therefore in the nature of a needle valve regulated by a screw 22^a. In Figures 1 and 2 I have shown means for heating the air consisting of a pipe 24 coiled about the exhaust manifold and leading to the inlet 20. While it is preferable to heat the air to cause it to absorb a greater quantity of the volatile impurities in the oil it is not essential that it be heated and hence I have shown in Figure 4 an inlet 20^a for air at ordinary temperature. This inlet is preferably in the lower side of the casing to prevent it from being clogged with dirt.

The operation of the apparatus will be obvious from the foregoing description. The partial vacuum in the intake manifold when the engine is running creates a partial vacuum in the refiner B which causes the oil to be sucked up from the crank case or any suitable reservoir through pipes 18, 18^a and discharged into the refiner. The suction in pipe 18 will draw air from pipe 24 and cause it to mingle with the oil. This will

lighten the column of oil in pipe 18, causing the oil to flow more freely, and the intimate mixture of the air and oil will cause the air to absorb volatile impurities from the oil, especially if the air be preheated. The air will be separated from the oil in the refiner and will be drawn into the intake through pipe 16 and the oil will return to the engine through pipe 17. The quantity of air admitted should be limited by the valve 22 to an amount which will not appreciably reduce the partial vacuum which is necessary for the operation of the refining device. This may be accomplished by limiting the admission openings 20, 20^a but it is preferred to use the needle valve 22 for this purpose.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:—

20 1. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, means for creating sub-atmospheric pressure in said chamber, a reservoir for oil beneath the engine, a tube for conveying oil from said reservoir to said refining chamber, and means for admitting air to the lower part of the tube to lighten the oil and absorb diluents therein.

30 2. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, means for creating sub-atmospheric pressure in said chamber, a reservoir for oil beneath the engine, a tube for conveying oil from said reservoir to said refining chamber, and means to admit air to said tube above its lower end and below the normal level of the oil in said reservoir, for the purpose set forth.

40 3. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, means for creating sub-atmospheric pressure in said chamber, a reservoir for oil beneath the engine, a tube for conveying oil from said reservoir to said refining chamber, and valve controlled means for admitting a regulated supply of air to said tube to mingle with the oil therein, for the purpose set forth.

50 4. The combination with a hydrocarbon engine of an oil refining chamber, a passage connecting said chamber with the intake of the engine to create sub-atmospheric pressure in the chamber, a passage to convey oil

from the crank case of the engine to the chamber, means to admit air to said latter passage, means for heating the air so admitted, and means to convey refined oil from the refining chamber to the crank case.

5. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, and means for creating sub-atmospheric pressure in said chamber, of a reservoir for oil beneath the engine, a passage for conveying oil from the reservoir to the refining chamber, means for introducing air into the lower part of said passage to mingle with the oil in said passage to lighten the column of oil and absorb the diluents therein, means for removing the air from the oil, and means for returning the oil from the refining chamber to the engine.

6. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, and means for creating sub-atmospheric pressure in said chamber, of a reservoir for oil beneath the engine, a passage for conveying oil from the reservoir to the refining chamber, means for introducing air into the lower part of said passage to mingle with the oil in said passage to lighten the column of oil and absorb the diluents therein, means for removing the air from the oil, and means for returning the oil from the refining chamber to the engine, said means for introducing air comprising a valve for regulating the supply of air.

7. In an oil refining apparatus for hydrocarbon engines, the combination with a refining chamber, and means for creating sub-atmospheric pressure in said chamber, of a reservoir for oil beneath the engine, a passage for conveying oil from the reservoir to the refining chamber, means for introducing air into the lower part of said passage to mingle with the oil in said passage to lighten the column of oil and absorb the diluents therein, means for removing the air from the oil, and means for returning the oil from the refining chamber to the engine, said means for introducing air comprising an air pipe arranged to discharge air within and near the lower end of said oil passage.

In testimony whereof I hereunto affix my signature.

JAMES A. WATSON.