April 30, 1963 R. H. CATHA 3,087,474

OIL VAPOR CONDENSER

Filed Oct. 31, 1961

FIG. 1.

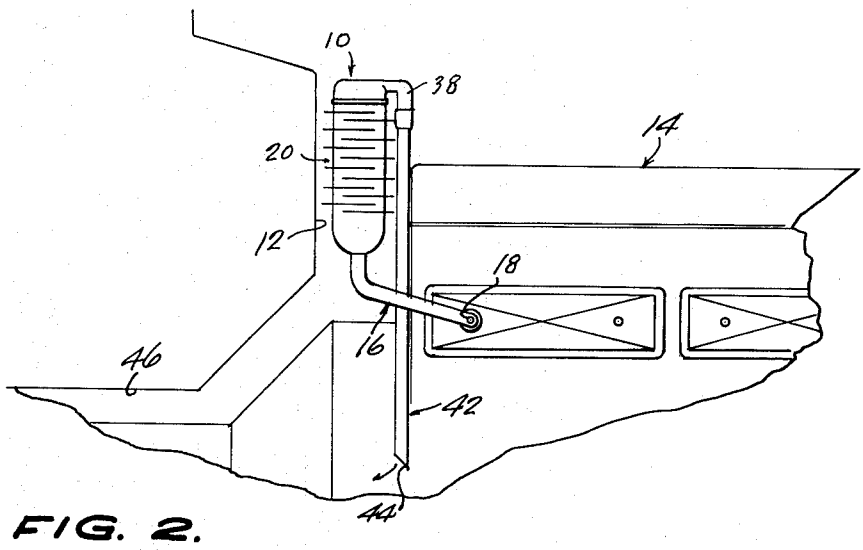


FIG. 2.

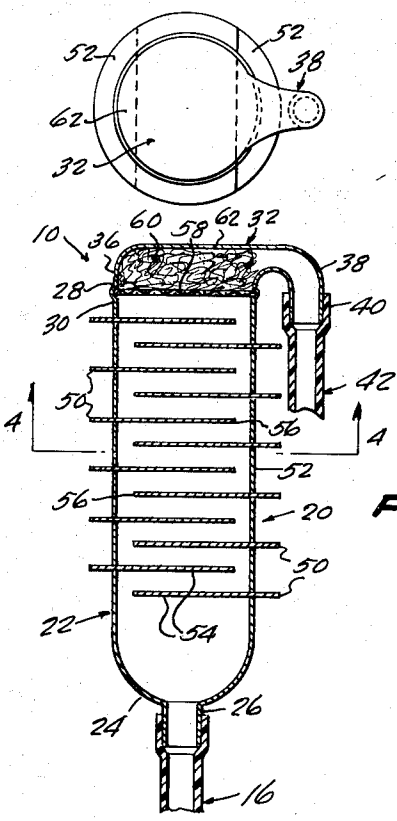


FIG. 3.

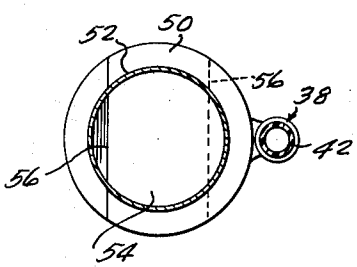


FIG. 4.

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United States Patent Office 3,087,474
Patented Apr. 30, 1963

3,087,474

OIL VAPOR CONDENSER

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Filed Oct. 31, 1961, Ser. No. 148,907
1 Claim. (Cl. 123—41.86)

This invention relates to a novel oil vapor condenser for internal combustion engines.

The primary object of the invention is the provision of an efficient, and easily installed device of the kind indicated, wherein the vapor usually discharged from an internal combustion engine crankcase through the engine's breather pipe, is condensed and the condensate returned to the crankcase, whereby the usual expected losses of oil, and oil additives, including detergents, are reduced or eliminated and the crankcase oil continues for an indefinite time its original maximum lubrication and cleaning of the engine and its components, with an accompanying increase in the life and efficiency of the engine.

Another object of the invention is the provision of a simple and inexpensive device of the character indicated above, which is adapted to be mounted in any suitable way, externally of and adjacent to the engine, in the place of the existing crankcase breather of an engine, and above the breather outlet, for gravitational return of condensate to the crankcase, the device having a vapor outlet, on a level above the crankcase oil vapor inlet, to which is connected an uncondensed vapor outlet conduit, which, in the case of an automobile engine, has an open lower end located below the floor or frame of the automobile, the pressure within the crankcase and the section produced at the open end of the conduit serving to assure positive flow of vapor from the crankcase through the device.

A further object of the invention is the provision of a device of the character indicated above, which has a closed vertical casing having external cooling fins, and vertically spaced staggered internal baffles which provide a tortuous path for crankcase vapors and serve as condensing plates.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is a schematic side elevation showing a device of the present invention mounted on an automobile firewall behind an internal combustion engine, to whose crankcase breather opening the inlet conduit of the device is connected;

FIGURE 2 is an enlarged top plan view of the device;

FIGURE 3 is a central vertical transverse section taken through the device; and

FIGURE 4 is a horizontal section taken on the line 4—4 of FIGURE 3.

Referring in detail to the drawings wherein like numerals designate like parts throughout the several views, the numeral **10** generally designates a device of the present invention, shown mounted at the forward side of the firewall **12** of an automobile and behind the engine **14** thereof, the device having a gravity condensate return conduit **16** connected to the crankcase breather port **18**, from which the usual breather pipe (not shown) has been removed. It will be understood that the present invention contemplates use of the device **10** with other than automobile engines, and mountings thereof other than that illustrated and described herein. Adequate mounting of the device, relative to an internal combustion engine involves positioning the device on a level above the crankcase, for assured gravity return of vapor condensate to the crankcase, and, where necessary or desirable, the use of an additional vapor return conduit for returning condensate to a lower level than a breather pipe port, such additional conduit being connected either to the lower end of the device, or to the return conduit.

The device **10** comprises a vertically elongated closed air-cooled casing **20**, preferably cylindrical in form, and composed of a main or lower section **22**, having an inverted dome-shaped lower end **24**, provided with a centered pendant neck **26**, and an open upper end **28** expanded to provide an annular internal shoulder **30**; and a short inverted cup-shaped upper section **32**, the lower edge of whose side wall **36** is securably seated on the shoulder **30**.

The upper casing section side wall **36** is formed with an inverted L-shaped tubular outlet fitting **38**, having an open lower end **40**, on which is secured the upper end of a preferably flexible, pendant outlet conduit **42**, having an open lower end **44**, which is rearwardly bevelled, relative to the engine **14**, and is disposed at a level below the floor or frame **46** of the automobile, so that, on forward motion of the automobile, suction is produced at said lower end **44**, which supplements the existing crankcase pressure, for moving oil vapor from the crankcase and through the device **10**. The condensate return conduit **16** has its upper end secured on the pendant neck **26** of the casing **20** and leads downwardly to the crankcase breather port **18**.

The casing **20** is provided with vertically spaced external cooling fins **50**, on its side wall **52**, and with staggered, vertically spaced overlapped horizontal internal baffle plates **54**, which can be aligned with the fins **50**, as shown in FIGURE 3.

As shown in FIGURES 2, 3 and 4, the baffle plates **54** are of substantially three-quarter circular areas and have chordal free edges **56**, which face and are spaced from the casing side wall **52**, vertically adjacent baffle plates being reversed, so as to provide a tortuous path for crankcase vapor moving upwardly in the casing **20**, toward the outlet fitting **38**, from the neck **26** on the lower end of the casing. The relatively large areas of the baffle plates **54**, relative to the cross section of the casing **20**, provide condensing surfaces of maximum area, without undue arrestation of the passage of vapor and condensate, in either vertical direction in the casing **20**.

A mesh screen **58** covers the open upper end of the lower casing section **22** and seats on the internal shoulder **30**, beneath the lower end of the upper casing section **32**. A filter **60**, of such as metal fibers, fills the space between the screen **58** and the flat top wall **62** of the upper casing section, and serves to trap particles, of such as wanted oil additives, which may be present in vapor rising toward the outlet fitting **38** and which would otherwise be lost out of the fitting **38**.

In operation, oil vapor produced in the crankcase of the engine by operation of the engine, including water vapor and vapor of acid condensate present in the crankcase oil, and recoverable oil additives and detergents present in the vapor emanating from the crankcase oil, is forced upwardly into the casing **20**, through the neck **26**, and rises in the casing toward the outlet fitting **38**. In its upward movement through the casing **20**, the vapor is slowed down by the tortuous passage provided by the baffle plates **54**, and is forced to make maximum contact with the surfaces of the baffle plates **54**, which are cooler than the vapor, so that constituents of the vapor, including recoverable additives and detergents and recoverable oil vapor are condensed to liquid form, which falls to the lower end **24** of the casing **20** and is returned, via the return conduit **16** and the breather port **18**, to the engine crankcase. The vapor constituents which do not

condense on the baffle plates **54** pass out of the casing outlet fitting **38** into the atmosphere through the outlet conduit **42**. In cold weather, starting and gradual warm-up of the engine, substantially all of the crankcase vapor is condensed in the device **10** and returned to the crankcase, but where the engine attains operating temperature, the unwanted vapor constitutents are discharged to the atmosphere and the desired constituents are recovered and returned to the crankcase to reinforce and reconstitute the existing crankcase oil for the purposes hereinabove outlined.

Although there has been shown and described a preferred form of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claim appended hereto.

What is claimed is:

A crankcase oil vapor condenser comprising a vertically elongated closed casing having upper and lower ends, a vertical vapor inlet on the lower end of the casing, adapted to be connected to the breather port of the crankcase of an internal combustion engine, a screen extending across the interior of the casing, said screen being

located close to and being spaced downwardly from the upper end of the casing, filter means in the space between the screen and the upper end of the casing for trapping recoverable constituents of the oil vapor and passing the remainder of the vapor, a lateral outlet on the casing sidewall and communicating with the space between the screen and the upper end of the casing, and suction means connected to the outlet, and vertically spaced baffle plates secured to he sidewall of the casing between the screen and the lower end of the casing, said baffle plates having chordal edges spaced from the sidewall, adjacent baffle plates being in reversed relationship.

References Cited in the file of this patent

UNITED STATES PATENTS

1,461,726	Crafts	July 17, 1923
2,057,001	Bogdany et al.	Oct. 13, 1936
2,154,072	Kamrath	Apr. 11, 1939
2,311,036	Dressler	Feb. 16, 1943
2,354,722	Walton	Aug. 1, 1944
2,731,958	Robley	Jan. 24, 1956
2,821,174	Scheiterlein	Jan. 28, 1958
2,979,038	Zubro	Apr. 11, 1961
2,984,226	Court	May 16, 1961