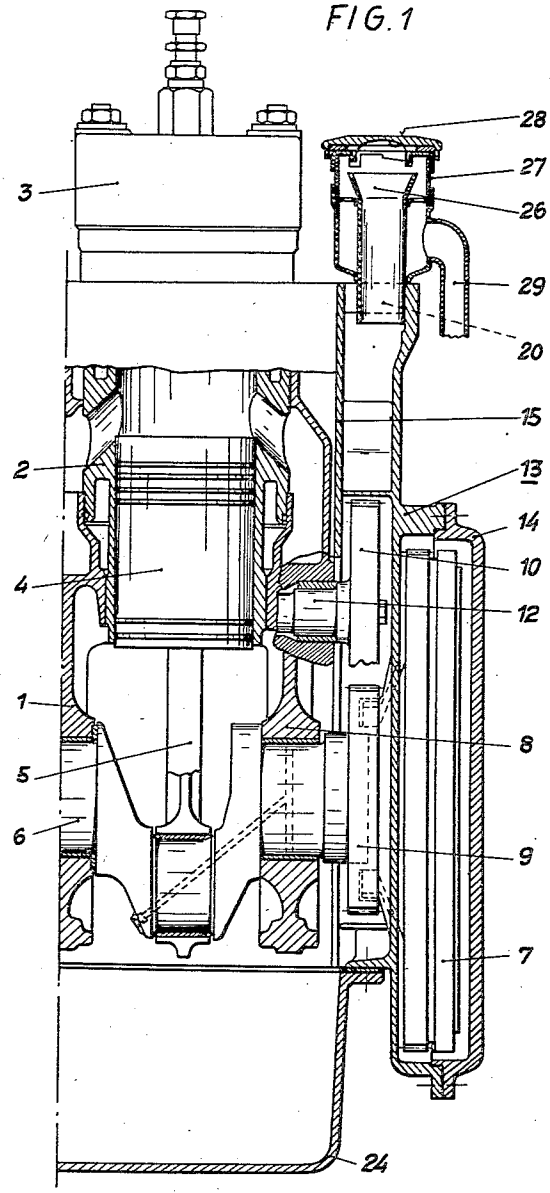
Jan. 28, 1958 A. SCHEITERLEIN 2,821,174

APPLIANCE FOR THE VENTILATION OF THE CRANKCASE OF INTERNAL COMBUSTION ENGINES

Filed May 27. 1955 2 Sheets-Sheet 1

FIG. 1



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Filed May 27. 1955 2 Sheets-Sheet 2

FIG. 3

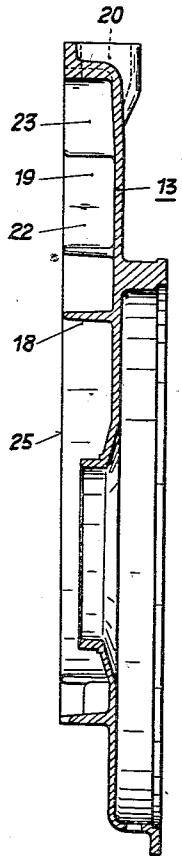
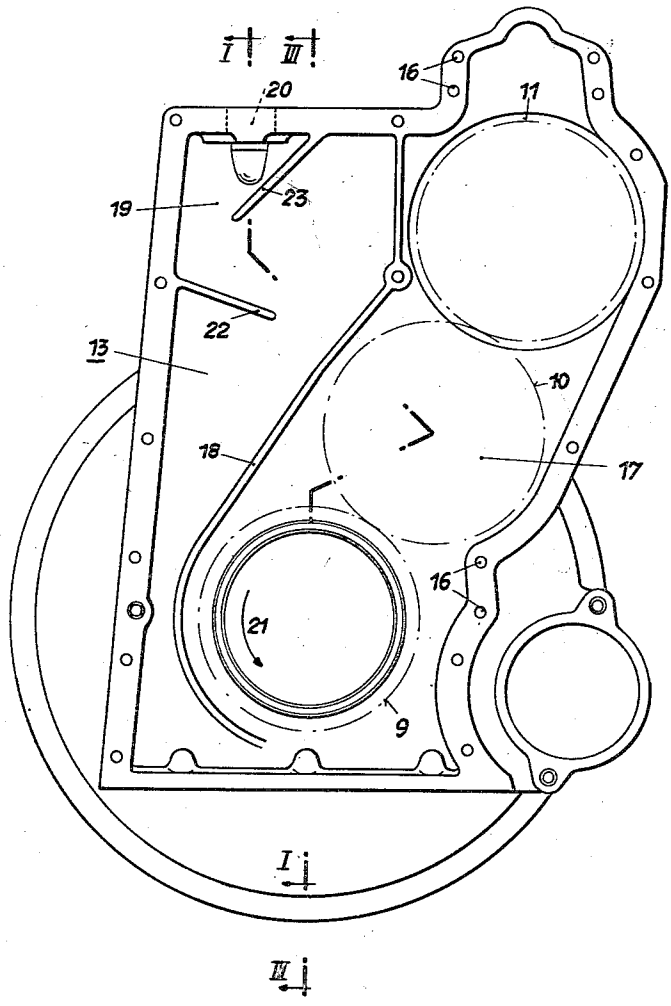


FIG. 2



INVENTOR.

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2,821,174

APPLIANCE FOR THE VENTILATION OF THE CRANKCASE OF INTERNAL COMBUSTION ENGINES

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5 Claims. (Cl. 121—194)

This invention relates to an internal combustion engine, the crankcase of which is ventilated via a separate expanding and condensing chamber.

It is necessary and customary to ventilate the crankcase of four-stroke engines and two-stroke engines without a crankcase scavenging system by maintaining a permanent connection between its interior and the atmosphere in order to avoid power and oil losses due to overpressure which might be produced by piston leakage. Ventilation is of particular importance for two-stroke engines with piston-controlled exhaust ports, if uncontrollable losses of lubricating oil between the pistons and cylinder walls and through the exhaust ports are to be avoided.

For the purpose of eliminating oil losses through the breather it is known to provide an expanding and condensing chamber along the passage leading to the exhaust port inside the crankcase, permitting the oil contained in the crankcase air in the vapor state to condense and flow back into the oil sump. The exhaust port is usually located at a high level of the crankcase and can be used simultaneously as an oil filler inlet.

In these known designs the arrangement of a separate condensing chamber invariably involves higher cost and the necessity of enlarging the crankcase and consequently, the entire engine. This is particularly true of engines with a lubricating system where oil is intentionally sprayed in the crankcase so as to feed it to certain points requiring lubrication, as a result of which the crankcase air contains a large amount of oil.

In order to eliminate these shortcomings the present invention provides for an expanding and condensing chamber formed by the rear gear cover. As a result of this arrangement, the path of the crankcase air to the exhaust port will be lengthened and the oil condensation improved. At the same time, the design of the crankcase is simplified and its construction cost reduced and the overall dimensions of the engine will be smaller.

The expanding and condensing chamber is preferably arranged in the rear gear cover beside the chamber which houses the gears, both chambers being separated from each other at least partly by a partition. This affords a very simple and space-saving shape of the cover and the jointly machined surface of attachment simultaneously provides the closure of the smoothing chamber.

The invention is illustrated by way of example in the accompanying drawings wherein:

Figure 1 shows a vertical section through a two-stroke engine, the cover part being shown in section along the line I—I of Figure 2. Figure 2 shows a rear view of the gear cover and Figure 3 a section of this cover along the line III—III of Figure 2.

In Figure 1 only the flywheel end adjacent cylinder of the two-stroke engine with cylinders arranged in a row is shown. The crankcase is designated by **1**, the cylinder liner by **2**, the cylinder head by **3**, the piston by **4** and the connecting rod by **5**. The end of the crankshaft **6** carries the flywheel **7**. Between the flywheel **7**

and the last main bearing **8** of the crankshaft, a gear wheel **9** is located on the crankshaft, driving the auxiliary machines not shown, such as the fuel injection pump via the idler **10** and another gear wheel **11**. The idler **10** can be designed as a counterbalancing wheel and is mounted on a counterbalancing shaft **12** passing through the crankcase. The three aforementioned gear wheels **9**, **10** and **11** are in alignment and located outside the crankcase **1** and covered by a gear cover **13**.

The gear cover **13** is also part of the flywheel housing which is closed by a cover **14**. It is secured by screws to the crankcase **1** with the interposition of a plate **15**. The bores **16** for the fixing screws are shown in Figure 2. The interior **17** of the gear cover serves to house the gear wheels **9**, **10** and **11**. Separated from the chamber **17** by a partition **18**, an expanding and condensing chamber **19** is provided in the cover, with its lower portion communicating with the lower bottom half of the crankcase and a vent **20** in its upper portion. The partition **18** is partly bent over the lower gear wheel **9** to prevent oil from being sprayed from the gear wheel **9** rotating in the direction of the arrow **21** directly into the smoothing chamber. The expanding and condensing chamber **19** is upwardly enlarged so that the air flow from the crankcase to the vent **20** will be slowed down still further. In addition, baffle plates **22**, **23** of a type known per se are arranged inside this chamber to divert the air and lengthen the flow path. These measures permit the separation of even the smallest drops of oil. The separated oil flows back to the oil sump **24**.

The partition **18** and the baffle plates **22** and **23** reach as far as the connecting surface **25** of the gear cover **13** and are machined jointly with the latter. They register with the flat plate **15** located between the crankcase **1** and the gear cover **13**. This provides a lateral separation of the expanding and condensing chamber **19** from the chamber **17** of the gear wheels.

The vent **20** also serves as a filler inlet. For that purpose, a funnel tube **26** is inserted in the vent and surrounded by the housing **27** which can be closed by means of a cover **28**. If the cover **28** is closed, the ventilation is effected through the funnel tube **26** and a tube **29** leading downward, of which the upper part only is shown in the drawing.

I claim:

1. In an internal combustion engine of the reciprocating piston type having a rotary crankshaft driven by the reciprocating piston, said engine including a housing having a crankcase in which said crankshaft is rotatably disposed, said crankcase being open at one end, and the corresponding end of the crankshaft projecting through said one end, a gear fixed on said projecting end of the crankshaft, a gear cover closing said open end of the crankcase and housing said gear, means cooperating with said gear cover to define an oil condensing passage extending generally upwardly to one side of said gear from the lower portion of said cover to a vent formed in the upper portion of said cover, said passage being upwardly enlarged to lower the velocity of the air following its entry into said passage to permit an improved separation therefrom of oil particles and oil vapor for drainage into said crankcase.

2. The combination of claim 1 in which the said means cooperating with the cover comprises a flat plate interposed between the upper portion of said cover and the open end of the crankcase and terminating short of the lower extremity of said passage to establish communication thereof with the crankcase.

3. The combination of claim 2 in which said cover is formed with a recess presented toward the crankcase for housing said gear, and provided with an integral

partition extending upwardly through said recess on one side of the gear and in flush engagement with said flat plate to define said passage.

4. The combination of claim 3 including baffle plates integral with the cover plate and projecting into said passage from generally opposite sides thereof to direct the air through said passage in a tortuous path, thereby to prolong the retention of air in said passage and secure improved removal of oil particles and vapor from the air within said passage.

5. The combination of claim 4 wherein said baffle plates extend into flush engagement with the said flat plate.

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