Oct. 24, 1944. D. G. ROOS 2,361,061

CRANKCASE VENTILATION SYSTEM

Filed Dec. 24, 1942 2 Sheets-Sheet 1

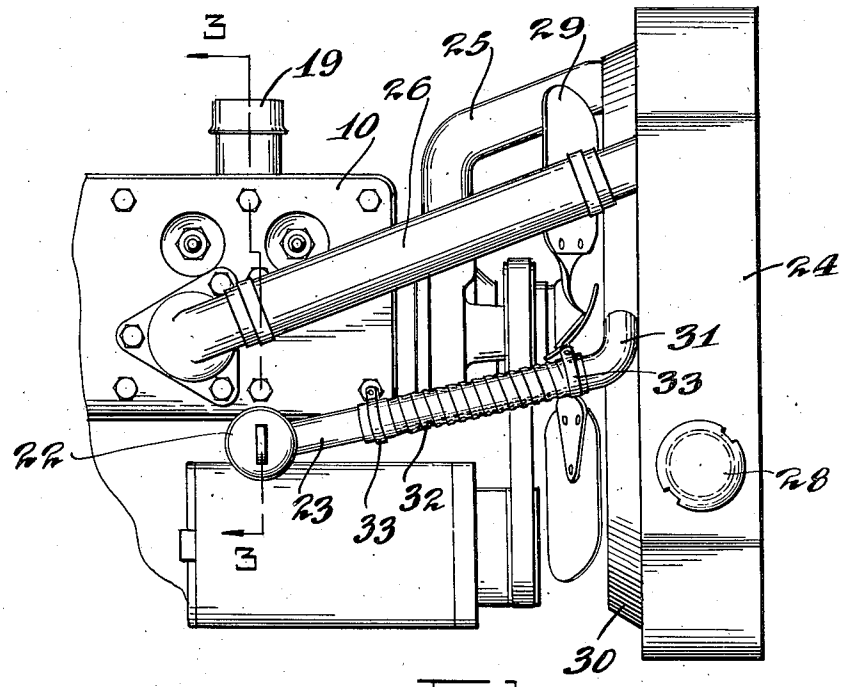


FIG 1

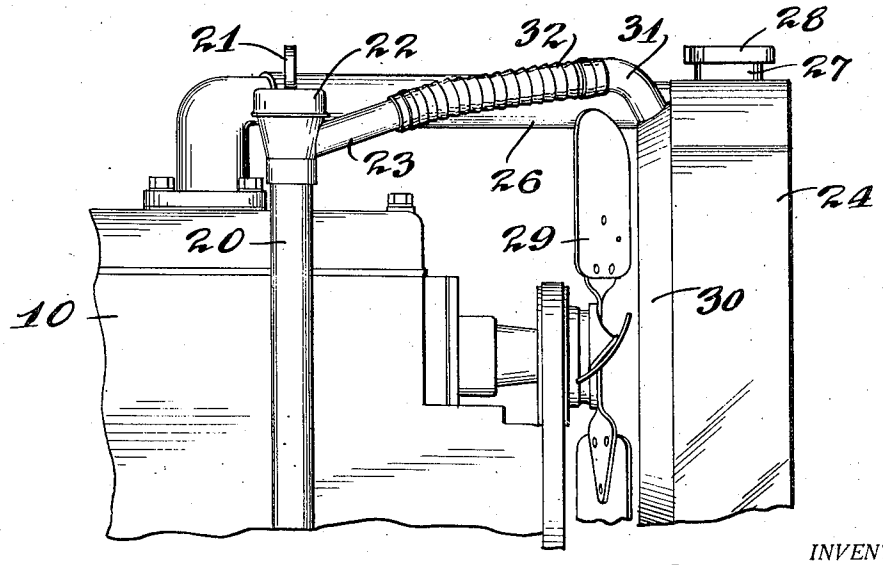


FIG 2

INVENTOR.
Delmar G. Roos
BY
Owen & Owen
ATTORNEYS.

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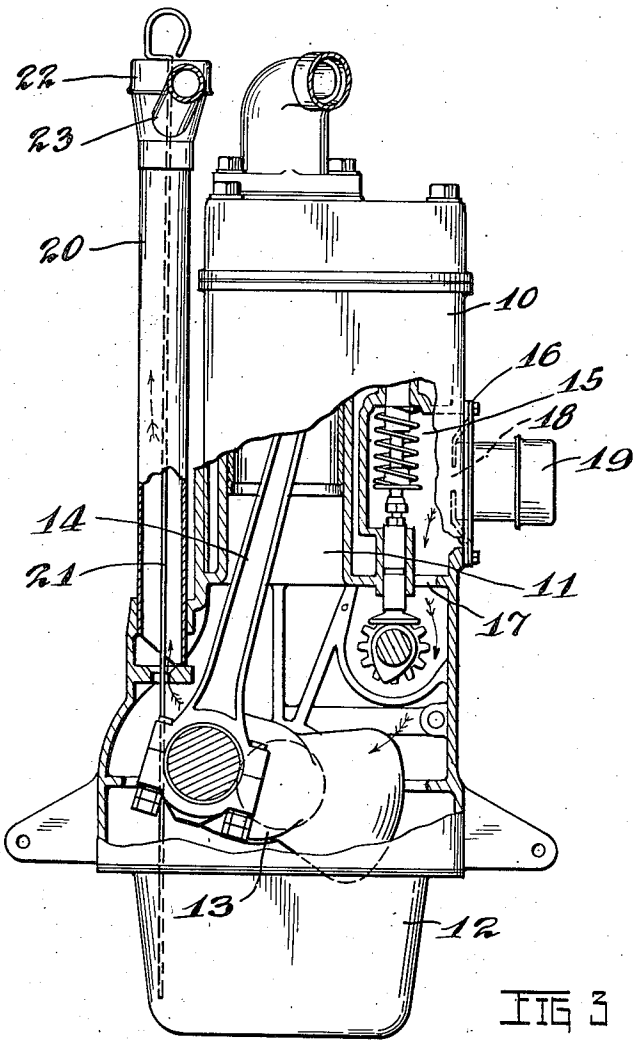


FIG 3

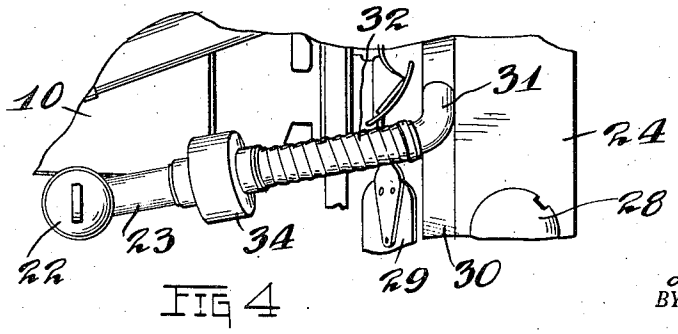


FIG 4

INVENTOR.
Delmar G. Roos
BY
Owen & Owen
ATTORNEYS.

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CRANKCASE VENTILATION SYSTEM

Delmar G. Roos, Toledo, Ohio, assignor to Willys-Overland Motors, Inc., Toledo, Ohio, a corporation of Delaware

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3 Claims. (Cl. 123—171)

This invention relates to means for removing vapors and gases from the crankcase of an internal combustion engine. It is now customary in the manufacture of such engines to provide crankcase breathers to permit the escape of vapors and other products of combustion which pass the piston rings and enter the crankcase. However, such breathers do not always adequately ventilate the crankcase principally because no positive means is provided for inducing or promoting circulation of air.

Tests have indicated that by continuously removing the vapors from the crankcase, oil contamination by dilution as well as by sludge formation due to oxidation is materially reduced. The dilution of the oil by water vapor which collects on the cold walls of the crankcase and other parts of the engine when standing idle is undesirable, as even a small percentage of such dilution materially lowers the lubricating qualities of the oil and undue wear of the cylinder walls and the moving parts of the engine are likely to follow.

One of the principal objects of the invention is to provide means for circulating air through the crankcase whereby the crankcase vapors are continuously removed through a conduit communicating with the vapor space during the operation of the engine. Preferably, the engine fan is utilized to induce an air flow sufficient to draw the crankcase vapors through the conduit.

A further object of the invention is to provide means for circulating air through the crankcase of an internal combustion engine which may be adapted to existing engine types without requiring material alterations in the structure of the engine.

A further object of the invention is to provide ventilating means of the above character which will carry away objectionable vapors and gases through the oil filler tube and discharge same at a point remote from such tube.

Still another object of the invention is to provide a suitable air filter which may be attached to the engine so that dust particles and other contaminants may be removed before the air enters the crankcase.

Further objects and advantages are within the scope of this invention such as relates to the arrangement, operation and functioning of the related elements of the structure, to various details of construction and to combination of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which—

Figure 1 is a fragmentary top plan view of a conventional internal combustion engine and its cooling radiator embodying my invention; Fig. 2 is a side elevational view of the structure shown in Fig. 1; Fig. 3 is a view, partly in section, taken substantially on the line 3—3 of Fig. 1, and Fig. 4 is a top plan view of a portion of the engine and radiator which illustrates a modified form of the invention.

Referring to the drawings in detail, I have illustrated a conventional internal combustion engine comprising a crankcase 10, one or more cylinders 11 and an oil pan 12. The crankcase encloses and supports the crankshaft 13 and connecting rods 14. A portion of the upper wall of the crankcase is provided with a valve push rod chamber 15 which is closed by means of the usual removable cover plate 16. The chamber has a passageway 17 communicating with the lower part of the crankcase and the oil pan 12. An opening 18 is provided in the cover plate which may be open to the atmosphere or may be connected directly with an air cleaner or filter 19. The filter may be of any convenient construction, and per se forms no part of the present invention. In supplying air to the air cleaner, an arrangement is made whereby the air may be taken from the atmosphere and contaminants coming in with the air are separated from the air and collected in a trap within the cleaner.

As the oil in the crankcase is consumed due to wear and loss by leakage, the oil supply is replenished through the usual upright filler tube 20, which is positioned on the opposite side of the engine from the air cleaner. The tube is adapted to receive an oil level measuring rod 21 having a cap or cover 22 secured to the rod and adapted to fit snugly over the upper end of the tube 20. Below the cap 22 the oil filler tube is provided with an air outlet pipe 23 leading toward a water cooling radiator 24. The radiator has a lower and upper end connected with the water jacket of the engine by means of tubes 25 and 26 so that the water will circulate through the radiator in the usual manner. The upper end of the radiator is provided with a filling neck 27 through which water is introduced into the radiator when necessary, and closed by means of cap 28. A cooling fan 29 is provided to promote a flow of air through air passages or cells in the radiator for cooling the water.

In accordance with the present invention a shroud 30 is soldered or otherwise secured to the

radiator and has an opening toward the fan 29. At the top of the shroud, positioned between the fan and the radiator, an air outlet pipe 31 is provided which is secured to the shroud and which is in communication with the space therein. A flexible conduit 32 is secured to the air outlet pipes by means of clamps 33. By using a flexible conduit 32, breakage of the same is avoided when the radiator and the engine move relative to each other during the operation of the engine.

By the arrangement above described, the vapor space within the crankcase is directly connected with the space between the fan and the radiator, so as to promote or induce the circulation of air through the crankcase during operation of the engine cooling fan.

During the operation of the engine the action of the cooling fan creates a partial vacuum within the shroud, so that air is drawn thorugh the air filter, into the valve compartment which is in communication with the lower part of the crankcase and the oil pan where it becomes mixed with the crankcase vapors. The vapors are continuously withdrawn from the crankcase through the oil filler tube 20 and the conduit 32. The vapors are thus removed and cannot act to contaminate or dilute the lubricating oil. It will be noted that to provide thorough ventilation the oil filler tube is positioned on the opposite side of the engine from the air cleaner, so that the air enters the crankcase on one side of the engine and is discharged on the other. It will also be noted that the filler tube 20 not only serves as a conduit through which lubricating oil is introduced into the crankcase, but also serves as an outlet for the gases and vapors in the crankcase.

Figure 4 illustrates a modified form of the invention which is similar to the above described form with the exception that a suitable oil filter or separator 34 is provided which communicates with the flexible conduit 32 and the oil filler tube 20. As the air enters the crankcase through cleaner 19 it becomes mixed with the oil particles and the crankcase vapors. By the suction action created by the engine fan the vapors are withdrawn from the crankcase through the filter 34 whereby entrained liquid particles are separated from the air. In some instances wherein the liquid is of sufficient purity it may be permitted to drain back into the crankcase, otherwise it will be discarded.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent, is:

1. That improvement in means for ventilating an internal combustion engine including a crankcase having inlet and outlet ventilating openings, a fan driven by the engine and a radiator in advance of the fan, which comprises a shroud intermediate the radiator and fan, an opening in the wall of said shroud and a tubular connection leading from said opening and adapted to be connected to said outlet.

2. That improvement in means for ventilating an internal combustion engine including a crankcase having inlet and outlet ventilating openings, a fan driven by the engine and a radiator in advance of the fan which comprises a shroud at the rear side of the radiator and in advance of the fan, an opening in the wall of said shroud and a tubular connection leading from said opening and adapted to be connected to said outlet.

3. That improvement in means for ventilating an internal combustion engine including a crankcase having inlet and outlet ventilating openings, a fan driven by the engine and a radiator in advance of the fan which comprises a shroud intermediate the radiator and the fan and having a diameter substantially the same as that of the fan, an opening in the wall of said shroud and a tubular connection leading from said opening and adapted to be connected to said outlet.

DELMAR G. ROOS.