March 4, 1930. J. H. HUNT 1,749,345

CRANK CASE VENTILATION

Filed June 30, 1926

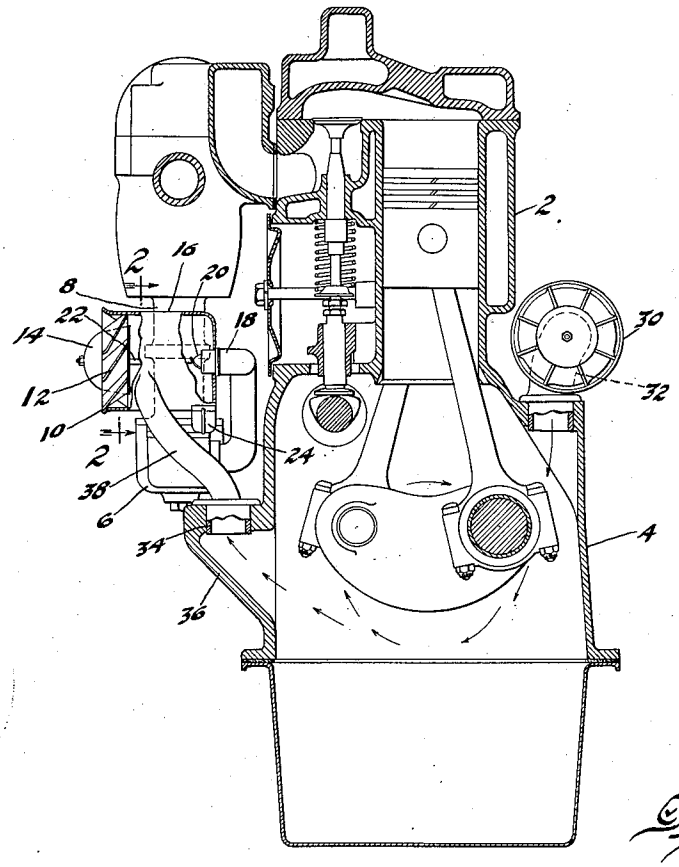

Fig. 1

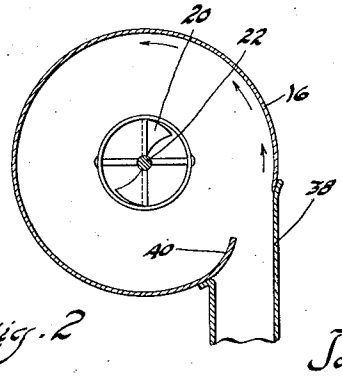

Fig. 2

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UNITED STATES PATENT OFFICE

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CRANK-CASE VENTILATION

Application filed June 30, 1926. Serial No. 119,668.

This invention relates to means for ventilating the crank-cases of internal combustion engines with the object of preventing oil dilution by increasing the rate of evaporation of the diluents. In some designs the air which is passed through the crankcase is led to the carburetor and thence into the engine. With such constructions it has been found that particles of oil carried by the air stream are lodged in the carburetor, and, in time cause clogging of the delicate moving parts of the carburetor, interfering with its operation. It has consequently been proposed that an oil separator be provided to remove particles of oil from the stream passing to the carburetor. As many present day power plants are provided with an air cleaner as standard equipment, and this cleaner will serve efficiently for the removal of particles of oil as well as particles of dust, I have conceived the idea of employing this cleaner for the removal of oil particles from the crankcase vapors as well as for the cleansing of the main air supply. With this arrangement a separate cleaner or separator for the crankcase air is rendered unnecessary.

Details of the invention will appear from the following description and the appended drawing, in which Figure 1 is a partial sectional view of an automobile engine with my ventilating arrangement applied thereto.

Figure 2 is a section on line 2—2 of Figure 1.

I have indicated at 2 an internal combustion engine of conventional type, provided with a crankcase 4. The reference character 6 indicates a conventional carburetor supplying combustible mixture through conduit 8 to the usual manifold and thence to the cylinders. 10 indicates an air cleaner of the same general type as described in the application of Caleb E. Summers, Serial No. 754,007, filed Dec. 5, 1924. The cleaner comprises spirally arranged blades 12, positioned between baffle member 14, and the interior of the casing 16 of the cleaner, and an air discharge tube 18 connected to the carburetor intake. At 20 I have indicated an air straightener such as described in the Summers' application above referred to, this straightener preferably being mounted on a rod 22 which serves to tie the parts of the cleaner together. At 24 I have indicated a dust receptacle communicating with the interior of the cleaner through an aperture in the casing wall. The cleaner itself forms no part of my invention and operates in the customary manner; that is, air entering through the open end of the casing 16 is directed in a spiral path by blades 20 and follows the interior of the casing until it reaches the closed end thereof, where the outer dust-laden portions of the air stream are projected into the dust receptacle 24, the main air stream striking the closed end of the casing and reversing its movement and, after a second reversal, passing outwardly through conduit 18 to the carburetor.

At 30 I have indicated an air cleaner of the same type as that described from which clean air is led by conduit 32 into the crankcase 4, preferably so as to be entrained by the whirling body of air and gas produced by the rotation of the crankshaft. The air currents thus set in motion are discharged through aperture 34 in boss 36 formed at one side of the crankcase, and are led through conduit 38 to the interior of the cleaner adjacent the blades 12. I preferably provide a baffle 40 extending in the direction of flow of the whirling air stream and partially covering the opening in the casing 16 which communicates with the conduit 38. This baffle is preferably an integral part of casing 16 as shown.

In operation, the main air supply for the carburetor enters the cleaner 10 and passes to the carburetor through conduit 18 in the usual manner. Air supplied to the crankcase through cleaner 30, and conduit 32, is mixed with oil particles and crankcase vapors by the action of the revolving crankshaft, thus affecting evaporation of diluents, and the resultant mixture is discharged through opening 34 and conduit 38 into the cleaner 16. The passage of the mixture of gases from the crankcase to the cleaner is effected by the centrifugal action of the crankshaft and also by the aspirating action produced by the main air supply in its passage through

the cleaner. The crankcase vapors unite with the main air stream in the cleaner, and particles of oil and foreign matter carried by the vapors are thrown outwardly and are discharged into receptacle 24, the cleaned air and vapors passing to the carburetor through conduit 18.

Besides rendering it unnecessary to have an independent oil separator for the crankcase vapors, this arrangement possesses the advantage that the oily crankcase vapors form a coating for the interior of the cleaner which collects particles of dust thrown outwardly by the whirling air stream, and thus enhances the efficiency of the cleaner.

I claim:

1. The combination of an engine having a crankcase, means for admitting air to the crankcase, a carburetor, an air cleaner connected to the carburetor arranged to clean the air supplied thereto, said cleaner comprising a casing having an open end, spirally arranged air directing blades in the open end of the casing, a dust discharge orifice at the other end of the casing, and a conduit communicating at one end with the crankcase and at the other end with the interior of the cleaner adjacent said blades so that the stream of air passing through the cleaner will exert an aspirating action on the conduit to entrain crankcase vapors and effect their cleaning prior to admission to the carburetor.

2. In the combination as defined in claim 1, said means for admitting air to the crankcase being supplied with an air cleaner.

3. The combination of an engine having a carburetor provided with an air cleaner, a crankshaft, a crankcase, means for introducing air into the crankcase so as to be entrained by the whirling air stream produced by the rotation of the crankshaft, a port for the discharge of vapors from the crankcase, said port being tangentially arranged so that the vapors are discharged by the action of centrifugal force, and a conduit leading from said port to the air cleaner, the discharge end of said conduit being subject to the aspirating action of the air passing through the cleaner.

4. In the combination as defined in claim 3, said air cleaner being of the centrifugal type, and said last named conduit having its discharge end arranged tangentially with respect to the cleaner.

5. The combination of an internal combustion engine having a crankcase and an air intake, an air cleaner connected to the intake, said cleaner having a main air inlet open to the atmosphere, means for admitting air to the crankcase, and means having connection with the crankcase at a point spaced from said first named means and connected to said air cleaner for causing a stream of air to flow through the crankcase entraining with it oily crankcase vapors and projecting them into the cleaner.

6. The combination of an engine having a crankcase and an air intake, means for admitting air to the crankcase, an air cleaner connected to the intake and having a main air inlet open to the atmosphere, said cleaner comprising means for effecting a sharp change in direction of the air passing therethrough to effect separation of foreign particles therefrom, and a connection from the crankcase to the cleaner to draw the oily crankcase vapors therethrough into the cleaner, said vapors being replaced by fresh air admitted to the crankcase through said first-named means.

7. The combination of an engine having a crankcase and an air intake, an air cleaner connected to the intake and having a main air inlet open to the atmosphere, said cleaner comprising means for whirling the air to effect separation of foreign particles therefrom, means for admitting air to the crankcase, and means connected to the crankcase at a point spaced from said last-named means and also connected to the air cleaner for drawing oily vapors from the crankcase into the cleaner, said vapors being replaced by fresh air admitted through said first-named means.

In testimony whereof I affix my signature.

JOHN H. HUNT.