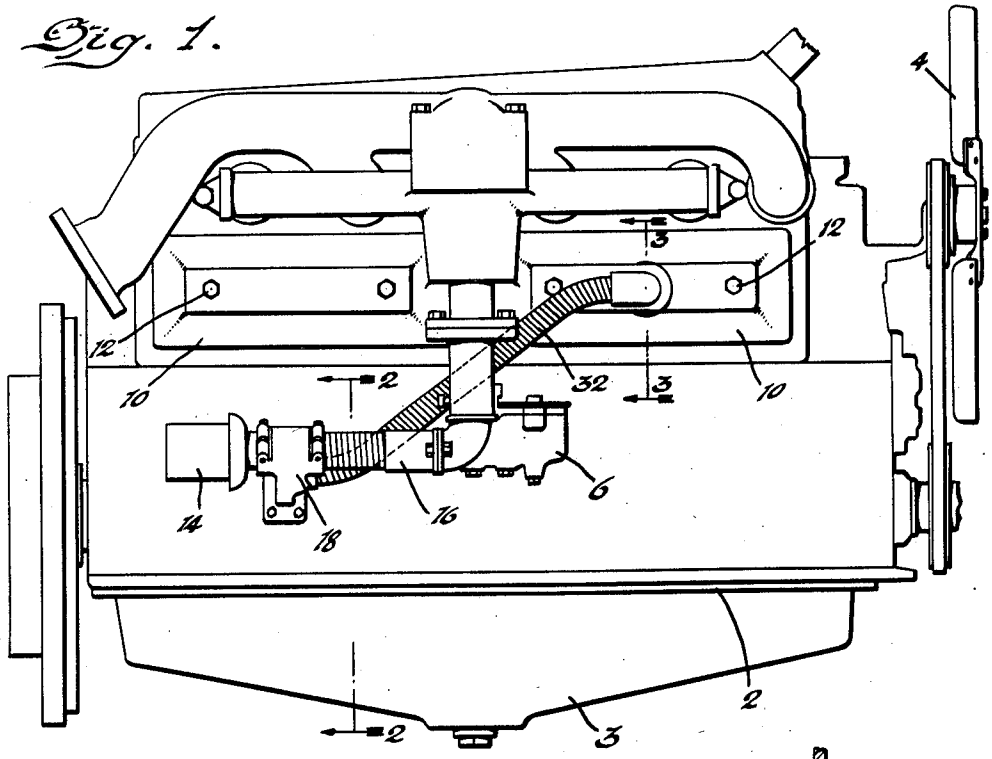
May 19, 1931. H. G. KAMRATH 1,806,543

CRANK CASE VENTILATION

Filed Jan. 7, 1927 2 Sheets-Sheet 1

Fig. 1.



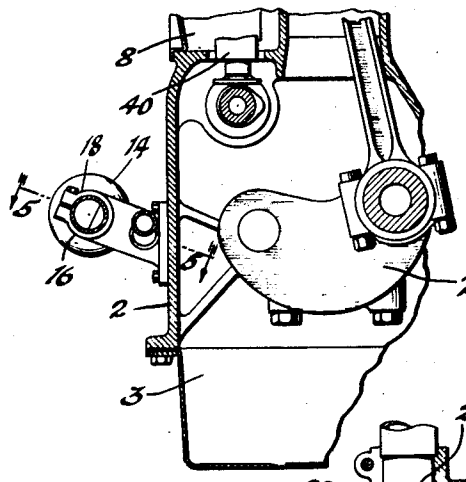


Fig. 2.

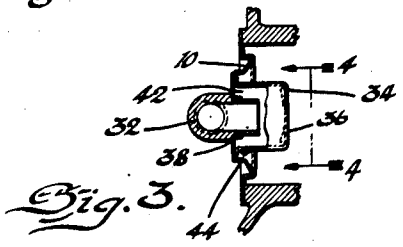


Fig. 3.

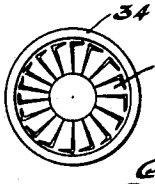


Fig. 4.

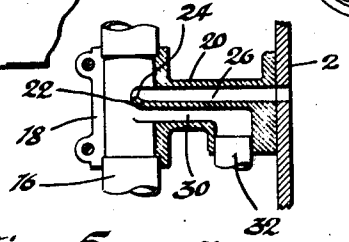


Fig. 5.

Inventor
Herbert G. Kamrath

By Blackmore, Spencer & Flint

Attorney

May 19, 1931. H. G. KAMRATH 1,806,543

CRANK CASE VENTILATION

Filed Jan. 7, 1927 2 Sheets-Sheet 2

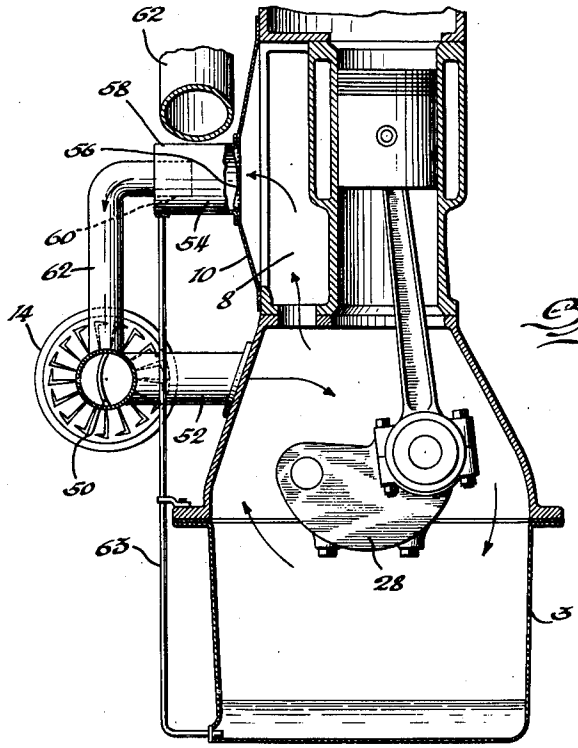


Fig. 6.

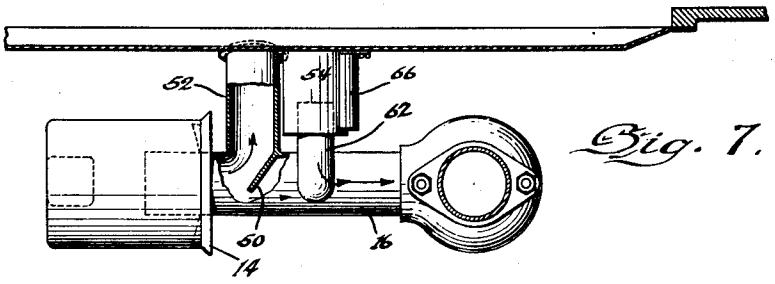


Fig. 7.

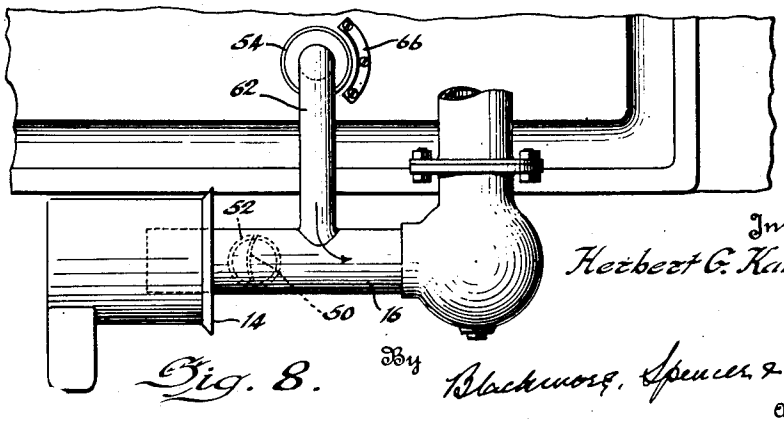


Fig. 8.

Inventor
Herbert G. Kamrath

By Blackwood, Spencer & Hisli
Attorney

Patented May 19, 1931 1,806,543

UNITED STATES PATENT OFFICE

HERBERT G. KAMRATH, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A COMPANY OF MICHIGAN

CRANKCASE VENTILATION

Application filed January 7, 1927. Serial No. 159,602.

This invention relates to crank case ventilating systems for internal combustion engines in which a considerable volume of air is passed through the crank case with the object of removing by evaporation water vapor and fuel which become mixed with the crank case oil during the operation of the engine. In such systems it is desirable that only clean air be drawn into the crank case and as it is now common practice to employ an air cleaner to clean the carburetor air supply, my system contemplates utilizing this same cleaner for cleaning the air supplied to the crank case. This, I have accomplished in a manner similar to that described and claimed in the application of C. E. Summers, Ser. No. 118,492, filed June 25th, 1926, but with the important difference that the air is introduced into the crank case at one point, for example adjacent the rotating crank shaft, and is removed therefrom at a remote point to insure thorough aeration of the crank case contents by the air stream. According to my preferred construction the air is removed by way of the valve chambers, the mechanism in the latter serving to separate particles of oil from the air stream and at the same time the mechanism itself is thoroughly lubricated.

According to my preferred design, the air which is passed through the crank case is led to the carburetor for consumption by the engine, although it is obvious that if preferred the suction set up by the motion of the vehicle, or that produced by the fan blast may be utilized to draw the vapors from the crank case and discharge them into the atmosphere. Where the crank case vapors are led to the carburetor I preferably pass them through a separator to remove particles of oil and the like which might cause clogging of the small passages in the carburetor through which fuel is projected into the air stream. This is accomplished by the employment of a simple type of air cleaner preferably mounted on and combined with the valve cover providing a cheap and simple construction.

Other objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a side elevation of a conventional automobile engine showing my invention applied thereto;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a view taken from line 4—4 of Fig. 3;

Fig. 5 is a section on line 5—5 of Fig. 2;

Fig. 6 is a vertical section showing a slight modification;

Fig. 7 is a partial top plan view of Fig. 6, but with parts removed and parts in section to better show the construction;

Fig. 8 is a side elevation of Fig. 6.

The form shown in Figs. 1 to 5 will first be described. Reference character 2 indicates an internal combustion engine of the L-head type provided with the usual crank case 3, cooling fan 4, carburetor 6 and valve chambers 8 provided with the customary covers 10 secured in place by studs or bolts 12. 14 represents a conventional air cleaner, in this case the type known throughout the trade as the A. C. cleaner. This cleaner operates to remove dust from the air stream by centrifugal action. Obviously, other kinds of cleaners may be employed instead, if found desirable. Air cleaned by passage through the cleaner is led to the carburetor through conduit 16. In this conduit there is interposed a fitting 18 which is in the form of a T having an angled portion 20 extending toward the crank case 2 and provided with passages 26 and 30 separated by partition 22 having a forwardly turned edge 24 extending toward the incoming air. The passage 26 leads directly to the crank case in proximity to the rotating crank shaft 28. The passage 30 leads to conduit 32, the other end of which communicates with the crank case at a point remote from the connection of passage 26 thereto. In this embodiment of my invention conduit 32 leads to one of the valve chamber covers 10 to which it is secured in any suitable manner. Upon the inside of the valve cover 10 over the mouth of the conduit 32, I have mounted a cup shaped fitting 34 provided with integrally formed blades 36 adapted to impart a whirling motion to vapors passing therethrough.

The inner end of conduit 32 projects within the member 34 as shown at 38 providing an annular trap 42 having a tangential orifice 44 for the discharge of particles of oil.

The operation is as follows:

A portion of the air passing from the cleaner 14 through conduit 16 to carburetor 6 is deflected by lip 24 into passage 26 and thence into the crank case adjacent the crank shaft. The whirling action of the crank shaft further assists in causing air to be drawn into the crank case. The crank case oil is thus thoroughly aerated and evaporation of diluents is effected. The air passing from the cleaner to the carburetor likewise exerts an aspirating action on passage 30 causing crank case vapors to be drawn upwardly past valve tappets 40 into valve chamber 8 and thence outwardly through conduit 32 and passage 30 into the carburetor. In passing from the valve chamber 8 into the conduit 32 the vapors are given a whirling motion by blades 36 resulting in throwing oil particles outwardly and preventing their entrance into conduit 32. The oil particles thus trapped in the annular chamber 42 surrounding the inner end 38 of conduit 32 may be returned to the crank case through tangential opening 44 as shown or may flow by gravity and discharge outwardly through the openings between the blades. The vapors are thus relieved of their oil content prior to passage into the carburetor and clogging or "gumming up" of the latter is avoided.

In the modification shown in Figures 6 to 8, the same reference characters indicate corresponding parts. In this case a portion of the air passing from air cleaner 14 to the carburetor is intercepted by baffle 50 and diverted into tube 52 leading to the crank case 3. Crank case vapors are discharged from the crank case into valve chamber 8 and from thence into oil separator 54 which is of slightly different construction from that shown in Figure 1. Thus the blades 56 are integral parts of the valve chamber cover 10 being pressed outwardly from the metal of the cover. Casing 58 in the form of a cup is secured to the outer side of the cover 10 and within the closed end of the casing projects the inner end 60 of the conduit 62 communicating with conduit 16 at a point beyond baffle 50. A pipe 63 returns recovered oil to the crank case.

In this form of the invention the oil separator 54 is located in close proximity to exhaust conduit 62 so that the heat from the latter maintains the diluents in vapor form and facilitates their discharge. As this portion of the engine is subject to the cooling action of the fan blast, I preferably provide baffle 66 to shield the oil separator from the effects of the blast. The operation of the device is the same as in the preceding form.

I claim—

An internal combustion engine having a valve compartment, a cover for said compartment and an air cleaner through which air is conducted from said compartment, said cleaner having air directing parts formed integrally with said cover, said air directing parts comprising a series of annularly arranged air directing blades pressed out of the material of the cover.

In testimony whereof I affix my signature.

H. G. KAMRATH.