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SUCTION ACCESSORY SYSTEM AND CRANKCASE VENTILATOR

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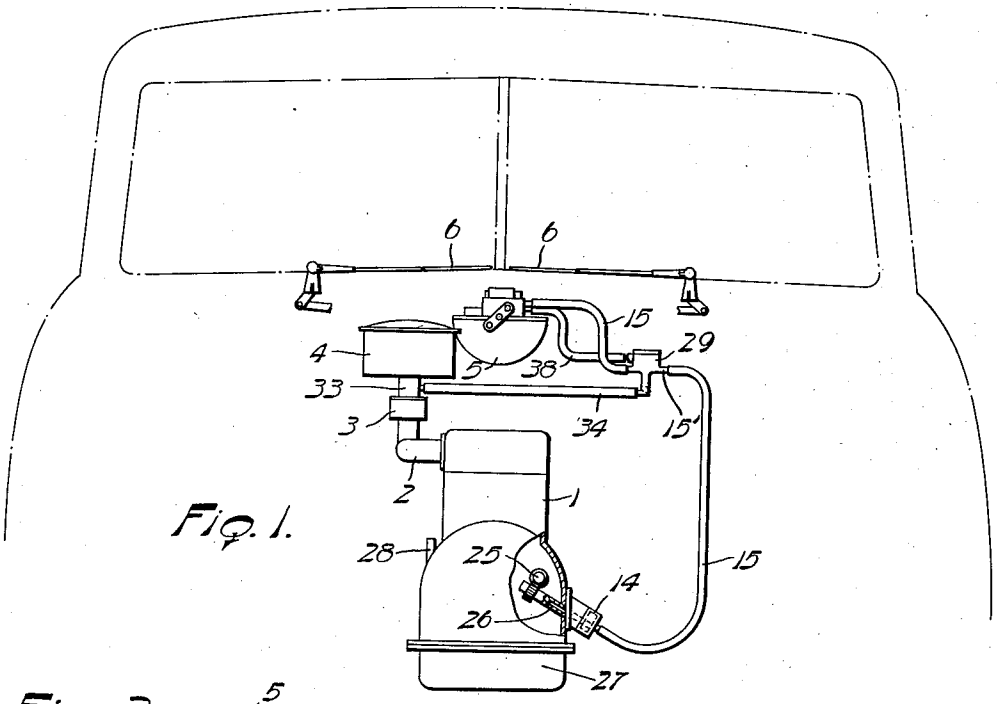


Fig. 1.

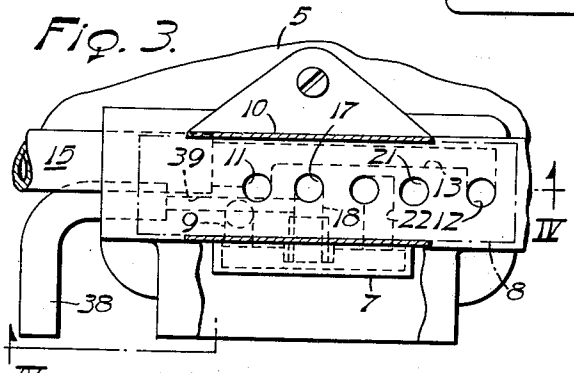


Fig. 3.

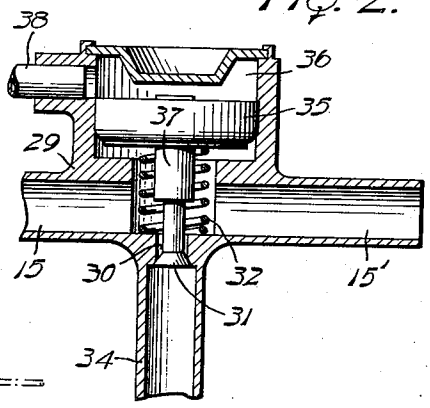


Fig. 2.

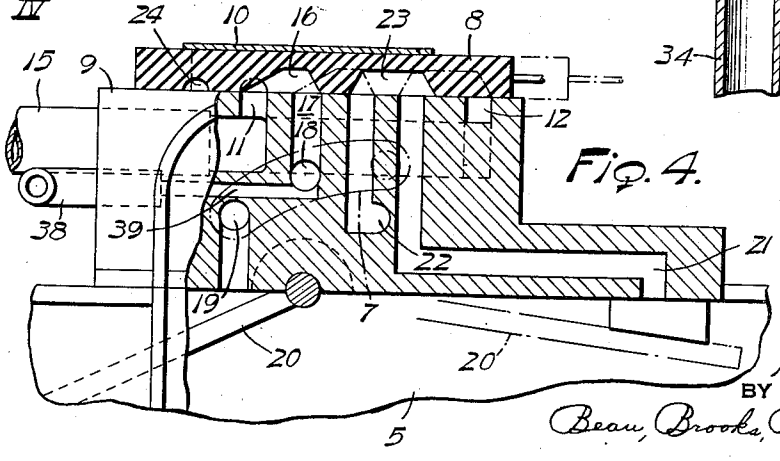


Fig. 4.

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SUCTION ACCESSORY SYSTEM AND CRANKCASE VENTILATOR

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7 Claims. (Cl. 60—19)

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This invention relates to motor vehicles and primarily to an accessory system in which the accessory is operated by suction as derived from a suction or low pressure generating pump. As is well known, a motor vehicle accessory, such as the windshield cleaner, is operated only at infrequent intervals, and when a suction-producing pump is employed as the source of low pressure it consequently has long intervals of idleness. It is also well known that the bath of oil in the engine crank case of the internal combustion power plant gives off oil and fuel vapors by reason of the high temperature existing therein during engine operation. Special provisions have been made to ventilate the crank case in one way or another to cool the engine and secure greater efficiency therefrom.

The primary object of the present invention is to provide an improved air circulating system for the engine crank case by bringing the engine-driven pump of an accessory system into function as the air circulating medium whereby the engine performance will be improved and maintained at a high efficiency.

A further object of the invention is to provide a system in which the suction generating pump of the accessory system will be put to advantage in ventilating the engine crank case during periods when the accessory itself is inoperative.

The foregoing and other objects will manifest themselves as the following description progresses, reference therein being made to the accompanying drawing, wherein

Fig. 1 is a diagrammatic view showing the vehicle power plant embodying the present invention;

Fig. 2 is a detailed sectional view through the automatic vent; and

Figs. 3 and 4 are detailed views of the accessory, such as a windshield cleaner, Fig. 4 being a section taken on the line IV—IV of Fig. 3.

Referring more particularly to the drawing, the numeral 1 designates the motor vehicle internal combustion engine having an intake manifold 2, a carburetor 3 and an air cleaner 4. The numeral 5 designates a suction operated motor of an accessory, such as might be employed for oscillating the windshield wiping blade 6, the accessory having a valve 7 of the usual automatic valve mechanism (not shown), and a control valve 8 which is movable on its valve seat 9 from the accessory running position, shown in full lines in Fig. 4, to a parking position indicated by broken lines. The valve is guided in its adjustment by a strap-like housing 10. The valve seat

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is provided with a running port 11 and a parking port 12 both in constant communication with a suction supply passage 13, which latter is connected to a suction generating pump 14 by a hose 15.

With the control valve 8 in the running position, the passage 11 is connected by a valve recess 16 to a port 17 which in turn communicates with the supply port 18 and through the valve 7 either to one side or the other of the motor chamber. With the valve 7 in the position shown by broken lines in Fig. 4, the port 18 will be brought into communication with a chamber port 19 leading into the accessory motor chamber at the left side of the piston or vane 20 while the opposite side of the chamber will open to the atmosphere through port 21, the valve recess 23 and the uncovered port 22. The valve 7 is actuated by and during movement of the vane 20 to alternately connect the supply port 18 first to port 19 and then to port 22, with the unconnected port being open to the atmosphere to provide the pressure differential required for effecting the oscillation of the vane. This automatic valve mechanism may be of any approved form. When the control valve is shifted to its broken line position of Fig. 4, it will close the running port and connect the supply port 18 to the chamber port 22 and at the same time connect the port 21 to the parking port 12. The control valve may be relieved as at 24 to avoid the constant low pressure in the port 11 marring the smooth undersurface of the valve when the latter is in its parked position. When the accessory is so arrested the vacuum producing pump 14 will merely idle, being driven constantly by the engine cam shaft 25. The pump discharges through a port 26 into the crank case 27 when the accessory is running and therefore the volatile matter in the crank case will be carried off with the discharging air as it passes out through the usual breather pipe 28.

Heretofore when the accessory was shut off the air discharge from the pump would be practically nil and consequently there would be no circulation of air through the crank case. In accordance with the present invention means are provided to maintain a constant air circulation through the crank case so as to ventilate the same continuously during engine operation and thereby insure greater efficiency in engine performance. To this end means are provided to open the suction line 15 to the atmosphere when the accessory is arrested. While this might be accomplished manually, the embodiment depicted

herein is automatic. This automatic vent comprises a casing 29 having a port 30 normally closed by a valve 31 under the urge of the spring 32 during accessory operation. The port 30 opens through the side wall of the suction passage 15' so that when the valve is opened against the urge of the spring, atmospheric air will enter the passage and be delivered by the pump into the crank case. To insure a clean supply of air, the port 30 may be connected to the air intake pipe 33 immediately beneath the air strainer by a hose connection 34. An auxiliary motor has a piston 35 operating in a chamber 36 and connected to the stem 37 of the valve 31. That portion of the chamber above the piston 35 is connected by a tube 38 to a duct 39 leading off from the port 17 with the result that the upper side of the chamber 36 will be opened to the atmosphere when the control valve 8 is in its parked position. The low pressure influence in the passage 15' will cause the piston 35 to depress against the action of the spring 32 and open the venting valve 31 for supplying the pump with fresh air by which maintenance of crank case ventilation may be insured. When the accessory is turned on by shifting the control valve 8 to its full line position, the passage 38 will practically evacuate the air content from the chamber 36 above the piston to enable the spring 32 to close the vent 30.

From the foregoing it will be observed that there will be a constant air circulation through the engine crank case. The vent is automatic so as to close during accessory operation and therefore its presence will not affect the efficient operation of the accessory. The invention is simple and practical and provides an efficient means for circulating a cooling air stream through the engine crank case, and while the foregoing description has been given in detail, it is without thought of limitation since the inventive principles involved herein are capable of assuming other physical embodiments without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A vehicle power plant of the internal combustion type having an engine with a crank case opening to the atmosphere, an accessory system having a suction operated motor, an engine driven pump discharging into the crank case and operatively connected by a passage to the accessory for generating an operative low pressure, said motor having a chamber and a piston therein, a control valve having a running port and a parking port selectively connectible to the motor for respectively operating the motor and holding the piston in an arrested position in which latter position airflow through the passage is substantially nil while the pump continues to operate, and, an atmospheric vent in the passage, a valve closing the vent, an auxiliary fluid motor having a chamber in open communication with the passage, a piston in the second chamber having operative connection with the second valve and a second passage connecting the control valve to the second chamber at the opposite side of its piston for creating an operating pressure differential for the second piston to actuate the second valve when the first motor is arrested.

2. In combination, a motor vehicle engine having a crank case, a suction generating pump constantly driven by the engine and discharging into the crank case to effect an airflow therethrough for carrying off volatile matter, a suction actuated accessory connected by a passage to the pump for fluid operation thereby, said accessory having a motor chamber with a piston therein and automatic valve mechanism operating to reverse the fluid pressure applications to the piston for moving the latter back and forth, a control valve interposed in the passage and operable to connect the latter either to the automatic valve mechanism for so actuating the piston or to one side only of the chamber for arresting the piston, and, an atmospheric venting valve arranged in the passage, and an auxiliary fluid motor connected to the venting valve for opening the same when the first piston is arrested, and means cooperating with the control valve for actuating the auxiliary motor.

3. The combination with a motor vehicle engine having a crank case, a suction generating pump constantly driven by the engine and discharging its air content into the crank case to effect an airflow therethrough for carrying off volatile matter, a suction actuated accessory connected by a passage to the pump for fluid operation thereby, and a control valve for the accessory movable from an accessory running position to an accessory parked position in which latter position the pump is connected to the accessory to hold the latter inoperative by the generated suction, of an automatic vent having a valve and a fluid motor for opening and closing the same, and energized through the control valve when the latter is in its accessory parked position.

4. In combination, a motor vehicle engine having a crank case, a suction generating pump driven from the engine and discharging into the crank case, a suction actuated accessory connected to the pump for operation thereby, a control valve for the accessory movable from an accessory running position to an accessory parked position in which latter position the pump is connected to the accessory to hold the latter inoperative by the generated suction, a valve normally closing a vent in the suction line between the pump and the accessory, and an auxiliary fluid motor responsive to the pump suction and connected to the vent-closing valve to open the vent when the control valve is in its parked position.

5. A motor vehicle engine having a crank case, an air strainer connected to the engine carburetor, a suction generating pump driven by the engine and discharging into the crank case to effect an airflow therethrough for carrying off volatile matter, a suction actuated accessory connected to the pump for operation thereby, a control valve for the accessory movable from an accessory running position to an accessory parked position in which latter the pump is connected to the accessory to hold the latter inoperative by the generated suction, a spring-seated valve normally closing a vent in the suction line between the pump and the accessory, an auxiliary motor for unseating the vent-closing valve, said motor having a chamber and a piston therein operatively connected to the vent-closing valve for so unseating it, and a fluid passage from the chamber to the control valve for being opened thereby when in a parked position to energize the auxiliary motor for so unseating the vent-closing valve.

6. The combination with a motor vehicle engine having a crank case, a suction generating pump constantly driven by the engine and discharging its air content into the crank case to

effect an airflow therethrough for carrying off volatile matter, a suction actuated accessory connected by a passage to the pump for fluid operation thereby, a control valve for the accessory movable from an accessory running position to an accessory parked position in which latter position the pump is connected to the accessory to hold the latter inoperative by the generated suction, of an automatic vent responsive to the pressure differential between the pump suction on one side and the atmospheric pressure on the opposite side to vent the passage to the atmosphere when the accessory is arrested, means operable by the control valve for establishing communication between said opposite side of the automatic vent and the pump to balance the pressures when the accessory is so operating, and spring means closing the vent when the pressures are so balanced.

7. In combination, a motor vehicle engine having a crank case, a suction generating pump driven from the engine and discharging into the crank case, a suction actuated accessory connected to the pump for operation thereby, a control valve for the accessory movable from an accessory running position to an accessory parked position in which latter the pump is connected to the accessory to hold the latter inoperative by the generated suction, a valve normally closing a vent in the suction line between the pump and the accessory, an auxiliary fluid motor responsive to the pump suction to open the vent when the control valve is in its parked position, and means operable with the control valve for establishing communication between the pump and the auxiliary motor when the accessory is operating and for breaking such communication when the accessory is arrested.

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