

April 7, 1931.

P. W. LOEW

1,799,430

ATTACHMENT FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 17, 1928

2 Sheets-Sheet 1

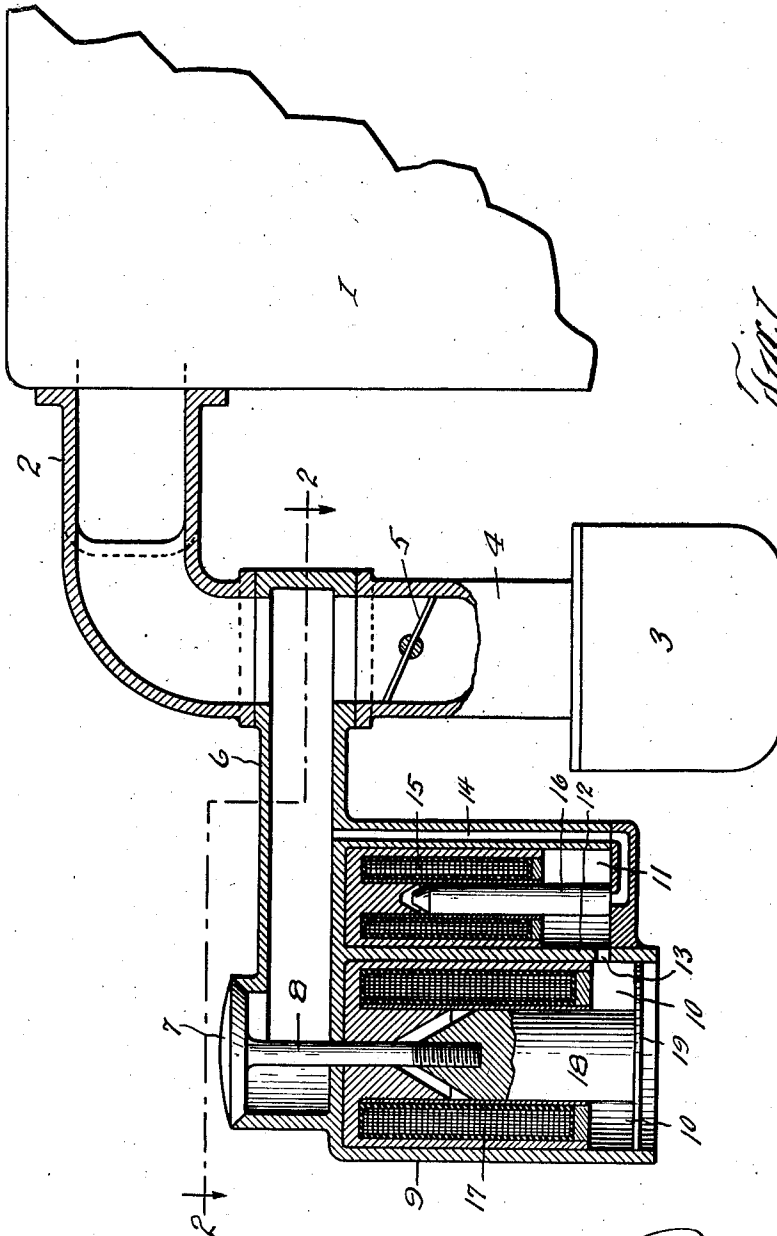


Fig. 1

Inventor

Paul W. Loew

By

Hull, Brock Wisk

Attorney

April 7, 1931.

P. W. LOEW

1,799,430

ATTACHMENT FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 17, 1928

2 Sheets-Sheet 2

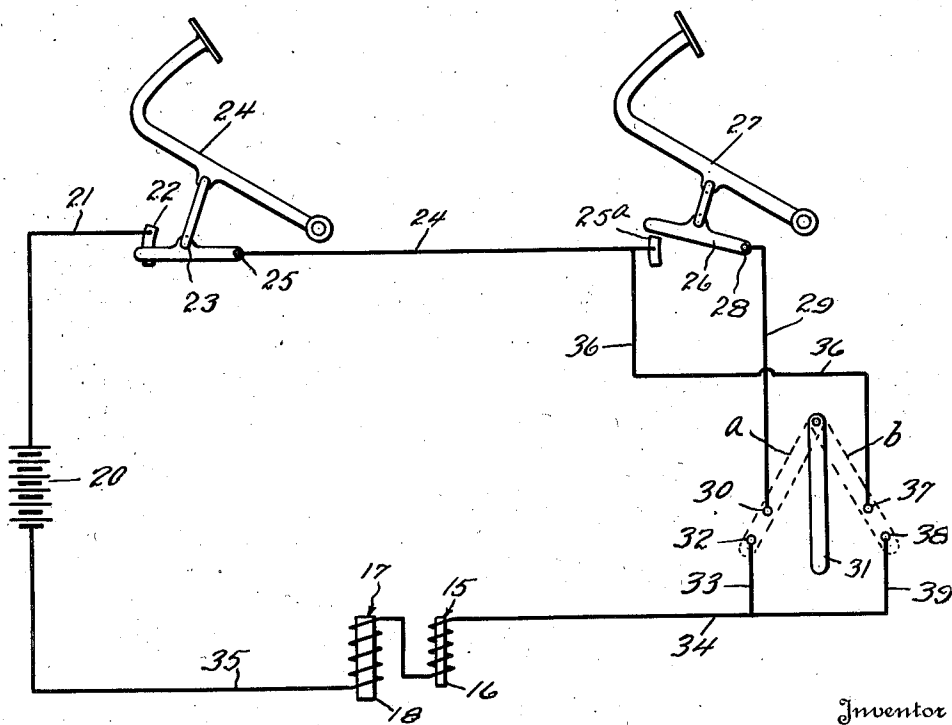
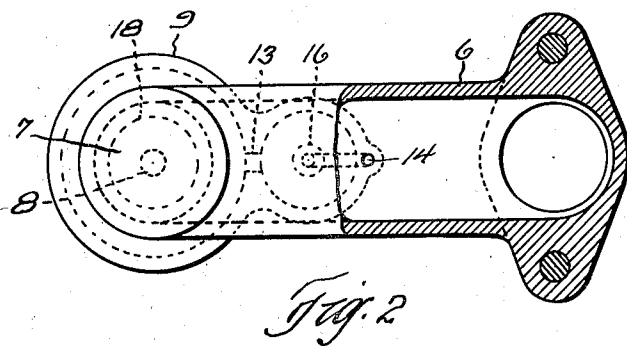


Fig. 3

Inventor

Paul W. Loew
By *Null, Brock & West*
Attorney

UNITED STATES PATENT OFFICE

PAUL W. LOEW, OF LAKEWOOD, OHIO

ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES

Application filed October 17, 1928. Serial No. 313,076.

This invention relates generally to internal combustion engines and more particularly to an attachment for internal combustion engines whereby fresh air may be delivered to the engine cylinders under certain predetermined conditions thus effecting a cooling of the pistons and valves and a saving of fuel.

The main object of the invention is to provide an attachment of the character described which is adapted for use with automotive vehicles driven by an internal combustion engine and which is provided with means for admitting fresh air to the engine cylinders to effect a cooling of the engine and also to brake the engine as a result of the compression of air within the cylinders while the vehicle is descending an incline or when the speed of the vehicle is retarded.

Another object of the invention is to provide a device of the character described which is simple in construction, dependable and efficient in operation and which comprises comparatively few parts which are readily assembled or disassembled for the purpose of replacement or repair.

Another object of the invention is to provide an attachment of the character described adapted to be connected with an internal combustion engine of an automotive vehicle in such a manner that when the brake is applied to check or retard the speed of the vehicle the device will be automatically actuated to admit fresh air to the engine cylinders as and for the purpose described.

Further and more limited objects of the invention will appear as the description proceeds and by reference to the accompanying drawings in which Fig. 1 is a fragmentary view partly in front elevation and partly in vertical section disclosing my device attached to an internal combustion engine; Fig. 2 is a horizontal sectional view on the line 2-2 of Fig. 1, and Fig. 3 is a diagrammatic view illustrating the electrical circuit for controlling the operation of the device.

Referring now to the drawings the reference character 1 designates a portion of an internal combustion engine having an inlet manifold 2, and a carburetor 3 adapted to be connected therewith by means of a connec-

tion 4. Arranged within the connection 4 is the usual butterfly throttle valve 5 which is adapted to be actuated to control the speed of the engine. Connected in the inlet manifold between the connection 4 and the inlet manifold is a pipe or conduit 6 having an air inlet opening which is normally closed by a valve 7 having a valve stem 8. Carried by the pipe or conduit 6 and preferably cast integral therewith is a casing or container 9 which is divided into compartments 10 and 11 by means of a partition 12. The partition 12 has a port or passageway 13 therein which serves to provide communication between the compartments 10 and 11. Leading from the compartment 11 is a bore or passageway 14 which serves to provide communication between the pipe or conduit 6 and the compartment 11. Arranged within the compartment 11 is a solenoid 15 having a movable core 16 the lower end of which constitutes a valve member and normally closes the port or passageway 14.

Arranged within the compartment 10 is a solenoid 17 having a movable core 18 which is threadedly connected with the valve stem 8. The lower end of the core 18 terminates in a piston 19 which has a working fit within the compartment 10. The solenoids 15 and 17 are preferably connected in series, the solenoid 17 being considerably larger than the solenoid 15. The piston 19 is also of greater cross sectional area than the valve 7, the purpose of which will hereinafter appear.

The electrical circuit for actuating the solenoids is shown in detail in Fig. 3 and consist essentially of a battery 20, or other source of electrical energy, from which leads a wire 21 which is connected with a terminal 22 of a switch 23. The switch 23 is operatively connected with the clutch pedal 24 of the vehicle so as to be opened when the clutch is disengaged. Leading from the terminal 25 of the switch 23 is a wire 24 which connects with a terminal 25^a of a switch 26 which is operatively connected with the brake pedal 27 of the vehicle so that when the brake is applied the switch is closed. Leading from the terminal 28 of the switch 26 is a wire 29 which connects with one terminal 30 of a double

pole double throw switch 31. Leading from one terminal 32 of the switch 31 is a wire 33 which connects with a wire 34 which leads to one terminal of the solenoid 15 which is preferably connected in series with the solenoid 17. Leading from the opposite terminal of the solenoid 17 is a wire 35 which connects with the opposite side of the battery 20 thus completing the electrical circuit. Leading from the wire 24 is a wire 36 which connects with one terminal 37 of the switch 31. Leading from the terminal 38 of the switch 31 is a wire 39 which connects with the wire 34. The switch 31 is preferably located on the dash of the vehicle so as to be readily accessible to the driver.

Under ordinary operating conditions of the engine, the valves 16 and 7 are in closed position, as shown most clearly in Fig. 1. When the engine is running, there is always some degree of vacuum in the inlet manifold, and it will be seen that the suction through the passageway 14 tends to hold the valve 16 to its seat. Assuming that the switch 31 is in the position *a*, shown in dotted lines in Fig. 3, and the vehicle is in motion, and it is desired to bring the vehicle to a stop, the brake 27 will be applied, thereby closing the switch 26. When this circuit is closed, the solenoids 15 and 17 will be energized, and the core 16 of solenoid 15 will be lifted, thus opening the passageway 14 whereupon the compartment 10 will be placed in communication with the inlet manifold. The solenoid 17 is so designed and of such strength that it does not exert sufficient pull to lift the piston 18 so long as atmospheric pressure exists within the chamber 10 and suction in chamber 6. When the valve 16 is opened, the compartment 10 will be placed in communication with the inlet manifold and the suction therein will decrease the pressure within this compartment, whereupon the piston 18 will be lifted because of greater suction on piston 19 than valve 7 due to difference in their areas, and also by the action of the solenoid, thus opening the valve 7 and admitting fresh air through conduits 6 and to the inlet manifold 2. During this operation, the throttle valve 5 will usually be in the position shown in Fig. 1 and the engine will be idling. As soon as the clutch 24 is disengaged the switch 23 will be opened thereby breaking the circuit to the solenoid and allowing the valve 7 to close by gravity. Of course a spring may be used for closing this valve, if desired.

When it is desired to descend a steep grade, as down a mountain, the switch 31 is moved to the position *b* as shown in dotted lines in Fig. 3. The engine will be idling and when the brake 27 is applied to check the speed of the vehicle, the switch 26 will be closed and the circuit to the solenoids will be made, thereby opening the valve 7 and admitting fresh air to the cylinders. Admitting fresh

air to the cylinder tends to materially cool the cylinders and engine valves and also increases the braking action due to the compression of the air within the cylinders. As soon as the clutch pedal 24 is slightly depressed, the circuit to the solenoids is broken. With the switch 31 in the position *b* shown in Fig. 3, it will be seen that the circuit to the solenoids will be made regardless of the position of the brake 27 and that the valve 7 will be opened as soon as the suction through the conduit 6 is sufficient to decrease the pressure within the compartment 10 sufficiently to permit the piston 18 to be lifted by the solenoid 17 thus rendering the device automatic.

While I have described the device as an attachment, it is of course understood that the device could be made an integral part of the carburetor or intake manifold; but it must be located at some point between the throttle valve of the carburetor and the engine cylinders.

The simplest method of control would naturally be a manually operated switch, with perhaps a small light or other indicator indicating whether or not the solenoids were energized. However, it is intended that the device should be automatic, and controlled primarily from the brake and clutch so that the driver will have the benefits of the device without having to remember whether or not the manually operated switch is closed, so that when bringing the vehicle to a stop, or when coasting or braking, the device will automatically function when the brake is applied. Just before a complete stop is made, the driver usually disengages the clutch to prevent stalling of the engine with the result that the switch 23 is opened, thus breaking the circuit to the solenoids and allowing the valve 7 to close.

My device has a beneficial effect on the engine of the vehicle because it tends to cool the piston with a volume of cool fresh air and also tends to cool the valves. The admission of fresh air into the engine cylinders unmixed with any gas or vapors also has a decarbonizing effect should there be any excess carbon present. Many drivers make a practice of descending steep grades in second gear and of cutting off the ignition to the engine, and with my attachment, it will be seen that fresh air will be drawn in through the intake manifold unmixed with any gas vapors thereby effecting a considerable saving of fuel. It will therefore be seen that my device is of particular utility in mountainous regions as well as in warm or tropical climates.

It is of course understood that the air inlet valve may be operated by means of a single solenoid, if desired, but it has been found by experiment that a single solenoid of sufficient strength to open this valve would require a considerable current, whereas, according to my preferred construction, the two

solenoids arranged as described require only a very small amount of current.

Various other changes may be made in the details of construction and arrangement of parts without departing from the spirit of my invention, and it is therefore understood that my invention is limited only in accordance with the scope of the appended claims.

Having thus described my invention, what I claim is:—

1. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a mechanism connected into the inlet manifold between the carburetor throttle valve and engine for admitting fresh air to the engine cylinders under certain predetermined conditions, said mechanism including a casing having an air inlet opening and a conduit leading into said inlet manifold, said casing having a pair of compartments, a piston arranged within one of said compartments, an air inlet valve connected with said piston, a bore connecting said compartment with said conduit, a valve for controlling the flow through said bore, electromagnetic means for actuating each of said valves and means for energizing said electromagnetic means.

2. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine for admitting fresh air to the engine cylinders under certain predetermined conditions, said mechanism including a casing having an air inlet opening and a conduit leading into said inlet manifold, a valve normally closing said air inlet opening, a piston connected with said valve and constituting the core of an electromagnet and means for energizing said electromagnet, suction means for exhausting the air above said piston and means for rendering said suction means effective.

3. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine for admitting fresh air to the engine cylinders under certain predetermined conditions, said mechanism including a casing having an air inlet opening and a conduit leading into said inlet manifold, a valve normally closing said air inlet opening, and the combination of electromagnetic means and suction means for opening said valve under certain predetermined conditions, and electromagnetic means for rendering such suction means effective.

4. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine for admitting fresh air to the engine cylinders under

certain predetermined conditions, said mechanism including a casing having an air inlet opening, a valve normally closing said opening, electromagnetic means for opening said valve under certain predetermined conditions, and suction means for rendering said electromagnetic means effective.

5. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine and including a valve adapted to be opened to admit fresh air into the engine cylinders, electromagnetic means for opening said valve including a manually operable switch for closing the circuit to energize said electromagnetic means, and suction means for rendering said electromagnetic means effective.

6. In an automotive vehicle having an internal combustion engine for driving the same and a brake for checking the movement thereof, of a mechanism connected in the inlet manifold between the carburetor and engine, said mechanism including a valve adapted to be opened to admit fresh air to the engine cylinders and electromagnetic means connected in electrical circuit with said brake for opening said valve to admit fresh air to the engine cylinders when the brake is applied.

7. In an automotive vehicle having an internal combustion engine for driving the same, the combination of a brake for checking the movement of the vehicle and a clutch for disconnecting the driving connection between the motor and vehicle, of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine, said mechanism including a valve adapted to be opened to admit fresh air to the engine cylinders and electromagnetic means for opening said valve, said electromagnetic means being connected in electric circuit with said brake and clutch.

8. In an automotive vehicle having an internal combustion engine for driving the same and a clutch for disconnecting the drive between the engine and the vehicle, the combination of a mechanism connected in the inlet manifold between the carburetor throttle valve and engine, said mechanism including a valve adapted to be opened to admit fresh air to the engine cylinders and including electromagnetic means for opening said valve, said electromagnetic means being connected in electrical circuit with said clutch.

In testimony whereof, I hereunto affix my signature.

PAUL W. LOEW.