

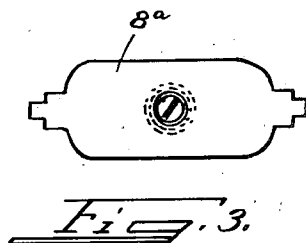
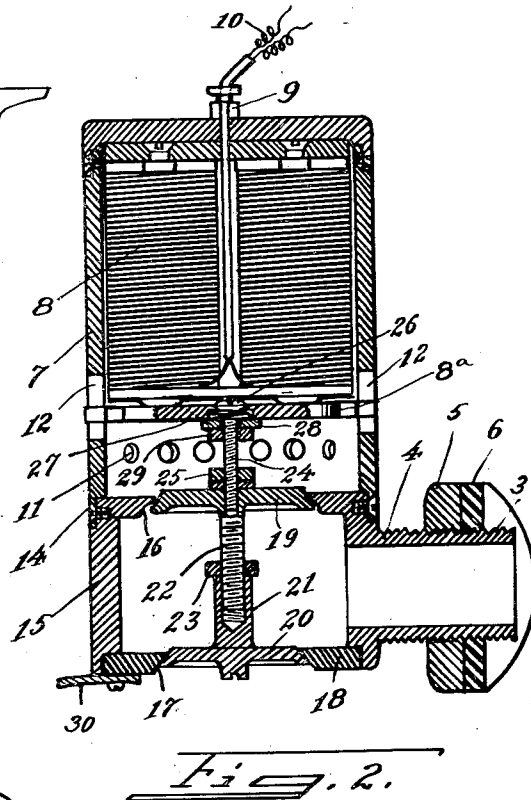
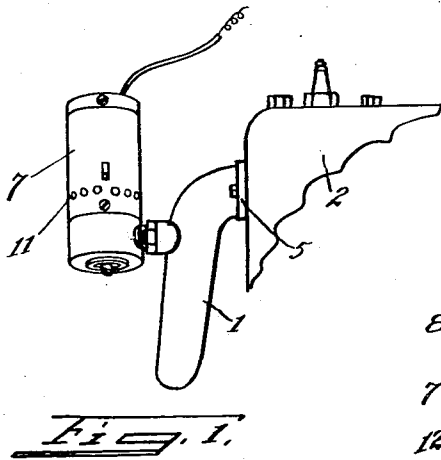
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CARBURETOR SUCTION RELEASE DEVICE

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CARBURETOR SUCTION-RELEASE DEVICE

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My invention relates to devices for use in connection with the carburetors of internal combustion engines, whereby the suction action through the manifold on the carburetor is relieved, while at the same time providing a flow of air through the manifold to scavenge the engine, and prevent creation of a vacuum in the combustion chamber during the expansion stroke, and prevent an accumulation of unburnt liquid fuel in the combustion chamber.

Expressed in other terms, it is my object to cut off pneumatically, the carburetor of an internal combustion engine, thereby effecting a number of highly valuable results.

In the driving of a motor vehicle, the usual method of stopping the operation of the engine is to unclutch the driving mechanism and then turn off the ignition switch. This does not prevent the engine from turning over a number of times, and during this free turning over without combustion a number of things happen.

If the throttle has been turned off, which is usually the case in slowing up before stopping, the cylinders which come to their suction stroke, cannot get gas from the carburetor, and hence tend to suck up oil from the crank case, which oil is not burnt at that time but lies in the combustion chamber above the piston. Such fuel as is sucked in is not burnt, and condenses and stays in the cylinder, mixing with the oil. The wider open the throttle when turning off the ignition, the more of this unburnt liquid will accumulate above the piston.

The accumulated liquid made up of oil thinned down by gasoline, runs down into the crank case, in part, thereby thinning the oil there and cutting down its lubricating quality. Such of it as stays in the combustion chamber, burns improperly, and carbonizes the valves and parts with which it comes in contact.

In coasting down a hill, with the ignition switch turned off, so that the engine can brake the movement of the vehicle, this situation attendant upon stopping is greatly exaggerated, and the deleterious results are also greatly increased. With the throttle wide

open, the accumulation of unburnt liquid is large, and with the throttle tight closed, the oil pumping action is quite harmful.

In aeroplane practice, the action of coasting, i. e. of turning off of the ignition, while vol-planing, results in a similar effect to a motor vehicle coasting down hill with the clutch holding and the ignition off. The propeller of the aeroplane is revolved by the wind action, which cranks the engine around, and sucks in gasoline (liquid fuel) or sucks up oil, or both, in either instance dragging the engine, making it likely not to start up at once, and in addition flooding the driver with oil and gasoline.

My invention is directed to avoiding the above difficulties, and in addition thereto, providing the driver of an internal combustion engine, with means for cleaning out or scavenging his engine cylinders while coasting. I combine the relief device with the ignition switch of the engine, and operate it electro-magnetically thereby obtaining an automatic operation of the device whenever the ignition is turned off.

In its mechanical essentials my invention consists in an electro-magnet to open up a large port in the manifold of an internal combustion engine, thereby cutting out the carburetor altogether, by relieving the suction which operates it. I could provide for this action by other than electrical means, and generically my invention is intended to cover any means having cooperation with the ignition switch, or any means generically, which opens up a large enough hole in the manifold of an internal combustion engine to entirely or practically entirely cut off the carburetor from action.

I am aware of the fact that it has been the practice in a certain automobile accessory device to help the combustion in such engines, by providing a small air intake in the manifold, thereby improving the mixture under predetermined conditions. My invention differs from such devices in one way, in the size of the air intake, since I provide so large a one as to prevent the operation of the carburetor venturis, and the lift from the mixing chamber or chambers.

My object above outlined and other advantages to be noted, I accomplish by that certain construction and arrangement of parts to be hereinafter more specifically pointed out and claimed.

In the drawings;

Figure 1 is a perspective view showing my device on the manifold of an engine.

Figure 2 is a central vertical section through my device in an illustrative embodiment.

Figure 3 is a plan view of the armature device.

I have shown or indicated in the drawings a manifold 1, for an engine 2. This manifold is tapped to receive the threaded end 3 of a pipe 4, which I have shown as a three quarter inch pipe. On the pipe is a thrust nut 5, and a lead washer 6, cut out to a curve to engage over the face of the manifold, and form a tight seal under the nut 5.

I provide a case 7 for electro-magnets 8, which case may be of any type desired. It is here shown as a cylindrical body, having a closed top on which is binding post 9 for wires 10 from the output side of the ignition coil of a motor vehicle, aeroplane or the like. In this case, which is preferably formed with apertures 11, to give plenty of access of air thereto, are slots 12, 12, which guide the armature piece 8^a.

The case 7 is here shown as held by screws 14, to a valve chamber housing 15, with which is integrally formed the pipe 4. This housing is particularly arranged with a large port surrounded by a valve seat 16, and a slightly smaller port surrounded by a valve seat 17, the latter seat having the greater taper.

The valve device which opens and closes the ports, is intended to permit a free flow of air through the pipe 4 into the manifold, this flow being sufficient to more than by-pass the carburetor of the engine in question.

The bottom plate 18 of this housing 15, is soldered in after the valve assembly is set in place, in order to get the valves into the chamber. The valve 19 finds its seat in the inside of the housing at the seat 16 and the valve 20 finds its seat on the outside of the housing at the seat 17.

The two valves are mounted adjustably, by the formation of a boss 21 on the lower and smaller valve, and a threaded post 22 on the larger valve, with a lock nut 23 on the stem, so that the post can be screwed into the assembly, locked, and the two valves be ground to their seats.

The means for attachment of the two valves to the armature of the electro-magnet in my illustrated embodiment comprises a screw 24, threaded into a socket in the top valve, with lock nuts 25 to bind the threaded engagement.

These nuts can be reached by a special tool that hooks around the armature 8^a, which it will be noted does not fill the magnet case.

This screw is engaged in the armature by its head 26, and the underside of the armature is hollowed out to provide a seat for a spring 27, which is set around the screw and bears on the head of the screw and on a plate 28 soldered over the under side of the armature to close the spring chamber. A stop nut 29 is mounted over the screw.

In operation the magnet is energized when the ignition switch is turned on, and pulls up the two valves to their seats. The action of the armature is such that it pulls the valves against their seats before it is fully engaged by the magnets, leaving say a thirty second of an inch of movement. The spring is then compressed by the further movement, since the head of the screw can slide through the armature against the spring resistance.

This action is accomplished because the last fraction of an inch of pull on its armature by an electro-magnet is very strong, and thus the valves are held against their seats so that when the ignition switch of the vehicle or plane is turned off, the spring will immediately extend again, and thrust down the valve assembly, breaking instantly the effects of residual magnetism in the magnet cores.

The extra play taken up by the spring also takes care of the difficulty attendant upon getting the valves to seat properly when the magnet armature is in home position. Refinements in adjustment are avoided by giving a play of a fraction of an inch, to the armature.

The relative sizes of the two valves results in the valve assembly having enough of a balance that tends to suck them open, that when they are released from the magnets, they will at once be sucked to wide open position.

This balance is not great enough, however, to prevent enough of an equalization of pressures on all sides of the valves, that they will stay closed under the influence of a small magnetism.

The opening to the atmosphere through the two valve seats is proportioned so that with the engine running, and the carburetor throttle wide open, the air rushing into the manifold through the valves will cut out the influx of air through the carburetor so much so that no fuel will be lifted through the carburetor mixing chambers to the manifold. If the device fails to work for any reason it can be latched shut by a plate 30 screwed to the base of the housing.

It will be noted that another way of accomplishing my object would be to use the electro-magnets to close the float valve of a carburetor, but this would require thought on the part of the driver of the engine, to open his throttle wide enough for influx of air through the manifold. With the gasoline shut off and the throttle closed the result to the engine would be that upon the expansion stroke, a vacuum would be set up in the

combustion chamber that would suck up oil from the crank case.

It might be found best in some cases, such as for example in aeroplanes, to provide a shut-off for the liquid fuel pipe, operating in connection with my device above described.

It might also be found best to cause the ignition switch bar to mechanically open and close the valves in the device described. No mechanism is shown for this purpose, since it will be readily understood that some universally jointed rods, such as are used to control the carburetors in internal combustion engines, could be connected to the valves, in the manner that the armature in the above showing is connected.

Another advantage of my structure over a device which merely shuts off the fuel from the carburetor, is that the residual fuel in the carburetor at the instant of shutting off the ignition would be drawn into the engine, this being one of the main things I wish to avoid. The scavenging effect of a rush of clean air as accomplished by my invention is best obtained by a structure such as I have shown, which is fool proof to a high degree and requires no added action on the part of a driver.

In aeroplanes my device removes one of the most apparent elements of danger resulting from failure of engines to operate, and as long as the connecting wires or wire (in case of a grounded case), are not broken, the magnets will work, because only a very slight current is required, and there are no moving parts to be broken as in the case of mechanical means of operation.

An electro-magnet, having only a slight pull to impart, is the safest means of operating a mechanism from a relatively remote point, such as the driver's seat in an automobile.

I do not desire to be limited to the form of device shown, because of my failure to point out other shapes of structure, and other modes of operation. By the term "manifold" in the claims that follow I wish to include the entire suction system between the engine cylinders and the liquid fuel intake.

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

1. Means of scavenging an internal combustion engine comprising in an internal combustion engine, the combination with the manifold thereof, of a valve chamber having an opening into the manifold, and a pair of interconnected valves arranged for simultaneously closing and opening two other ports in the chamber that open to the air and means for closing said valves, one of said valves being slightly larger than the other, so that under a slight vacuum in the manifold

the tendency to move to open position will be greater than to move to closed position.

2. In an internal combustion engine, the combination with the manifold thereof, of a valve chamber and a valve therefor, said chamber opening into the manifold, and the valve controlling an air port, and electro-magnetic means for closing said valve comprising an electro-magnet and an armature, with the armature having a spring connection with the valve so arranged that the valve is closed before the magnet armature is in home position by a fraction of an inch.

3. In an internal combustion engine, the combination with the manifold thereof, of a valve chamber, and a valve therefor, said chamber opening into the manifold, and the valve controlling the air port, and electro-magnetic means for closing said valve comprising an electro-magnet and an armature, with the armature having a spring connection with the valve so arranged that the valve is closed before the magnet armature is in home position by a fraction of an inch, said armature connection comprising a screw, a spring pocket in the armature having a spring with which the head of the screw engages, and means on the valve for engaging the screw.

4. In combination with the intake manifold of an internal combustion engine, a pair of air relief valves of uneven size coupled together, the larger of the valves so arranged as to open with suction in the manifold carrying the smaller valve also to open position, and means for closing said valves.

5. In combination with the intake manifold of an internal combustion engine, a pair of air relief valves of uneven size coupled together, the larger of the valves so arranged as to open with suction in the manifold carrying the smaller valve also to open position, means for closing said valves, and resilient means tending to open said valves with the inhibition of said closing means.

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