March 26, 1929. G. P. MILLER 1,707,170

GAS SAVING ATTACHMENT

Filed Aug. 1, 1927

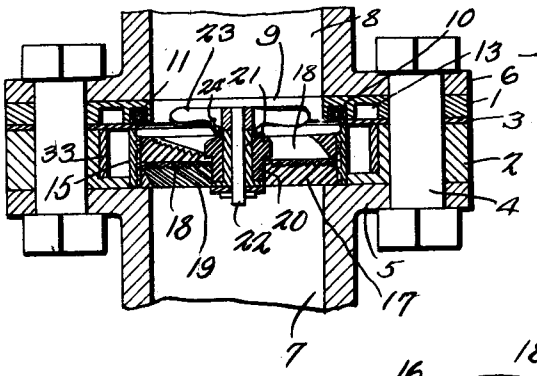


Fig. 1.

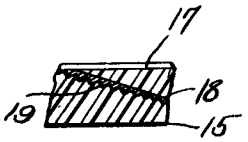
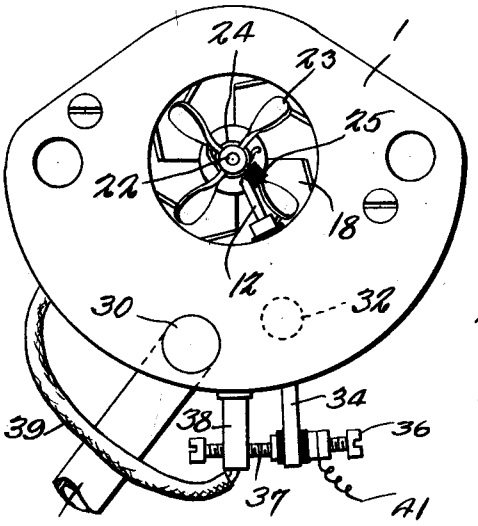
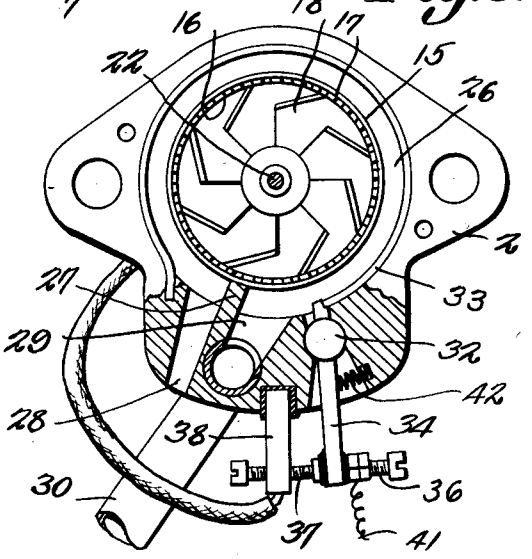


Fig. 6.

Fig. 2.

Fig. 3.





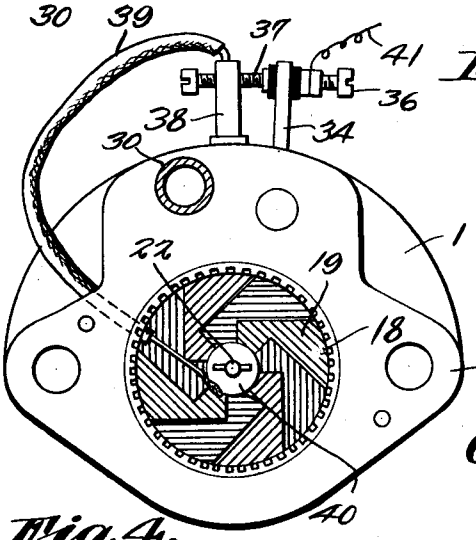
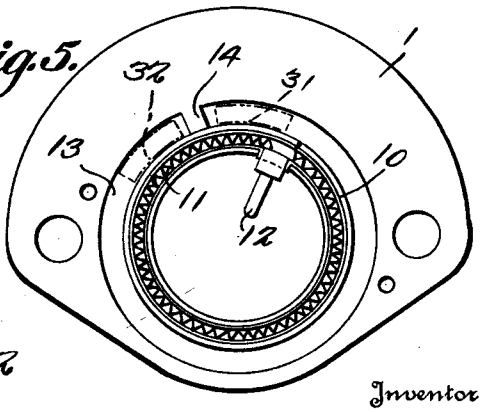


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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GAS-SAVING ATTACHMENT.

Application filed August 1, 1927. Serial No. 209,871.

This invention relates to a gas saving attachment designed primarily for use in connection with the intake manifold of an internal combustion engine.

One of the objects of the invention is to provide a member complete in itself adapted to be inserted between the carbureter and the intake manifold and having means whereby any unvaporized fuel leaving the carbureter will be deflected toward the wall of the attachment and momentarily retained until proper vaporization can be effected.

A further object is to utilize a supplemental heating unit for insuring the proper vaporizing of the fuel in the attachment before said attachment has been brought to a high temperature by the heat of the engine.

A still further object is to provide a device of this character so designed as to receive a portion of the exhaust gases which are thus utilized for maintaining the temperature of the attachment at a high degree.

A further object is to provide means for automatically cutting out the supplemental heater after the attachment has been heated to a predetermined temperature.

Another object is to provide an electric heater for initially heating the attachment and the fuel therein, said heating unit being controlled by a suction actuated switch.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings,

Figure 1 is a section through the fuel saving attachment, the same being shown fastened in position for use.

Figure 2 is a top plan view of the attachment.

Figure 3 is a top plan view of the lower section of the attachment.

Figure 4 is a bottom plan view of the attachment.

Figure 5 is a bottom plan view of the upper section of the attachment.

Figure 6 is a section through a portion of one of the members of the attachment showing the relative pitch of the baffle blades and the peripheral grooves.

Referring to the figures by characters of reference 1 designates the top plate of the fuel saving attachment, 2 designates the bottom plate thereof, and 3 designates an interposed gasket of fiber or any other suitable material. These parts are adapted to be held together securely by bolts 4 which not only extend through them but also through flanges 5 and 6 formed with the carbureter outlet 7 and the intake manifold 8 respectively.

The attachment has a central opening extending entirely through it alining with the passage in the parts 7 and 8. Formed within the bottom surface of the top plate 1 concentric with the opening 9 in said plate in a groove 10 in which is located a heating element in the form of a coiled wire 11 bent to circular form and made of nichrome wire or any other suitable resisting material. This resistance coil is of course insulated from the wall of the groove or channel in which it is located, one end thereof being connected to the plate 1 while the other end is connected to a pin 12 extending inwardly from the plate 1 toward the center of the opening but insulated from said plate. Formed within the bottom surface of the plate 1 concentric with the groove or channel 10 is another groove 13, there being a suitable partition 14 extending across this groove to prevent gases from circulating continuously within the groove.

The bottom plate 2 has a ring 15 fitted snugly within the opening 16 in said plate, this ring being provided in its inner or concave face with grooves 17 while extending inwardly from the grooved face of the ring are inclined blades 18 each of which has obliquely disposed grooves 19 therein. These blades are all arranged in lapped relation so that it becomes impossible for any portion of the fuel to blow directly through the opening 16. Instead all parts of the fuel must come against one or more of the blades and flow over the roughened or grooved surface thereof. During this action any unvaporized portions of the fuel mixed with the gas will drain along the inclined grooves toward the grooved wall of the opening 16 so as thus to be retarded materially in their progress through the attachment.

The blades 18 cooperate to support a hub 20 in which is arranged a sleeve 21 of insulat-

ing material. In this sleeve a pin 22 is mounted to rotate freely and to one end of the pin is secured a small fan wheel 23. Two of the blades of this fan wheel normally straddle the pin 12 located in the upper plate 1 and a spring 24 which is coiled about the insulating sleeve 21 and connected to the fan wheel serves to hold one of the blades of this wheel normally pressed against the pin. That portion of the blade contacting with the pin, however, has a covering 25 of insulating material. The blades are so pitched that when the fan wheel is subjected to the action of suction due to the movement of the engine piston, the wheel will be rotated to move this insulated portion 25 away from the pin 12 and bring an uninsulated blade of the wheel 23 against the pin 12. Normally, however, the spring 24 holds the insulated portion 25 in contact with the pin 12 as shown in Figure 2. Formed within the upper face of the bottom plate 2 is a groove 26 provided with a partition 27 adapted, when the two plates are assembled, to match the other partition 14. An exhaust port 28 is provided at one side of the partition 27 while an intake port 29 is provided at the other side thereof. This intake port is adapted to be connected by a tube 30 to the exhaust manifold of the engine so that a portion of the exhaust gases will be free to enter the port 29, flow longitudinally of the groove or channel 26 and exhaust through the outlet port 28. It might be stated that the gasket 3 which is interposed between the plates 1 and 2 is provided with openings 31 and 32 whereby the groove 26 can communicate with the groove 13 at opposite sides of the registering partition. Thus when exhaust gases enter the port 29, portions thereof can flow through the opening 31 in the gasket into one end of the groove 13 and flow around said groove to the opening 32 at the other end whereupon the gases can exhaust down into the groove 26 and out through the port 28. Thus the grooves in both plates will receive portions of the exhaust gases and both plates will therefore be heated by these gases. In Figure 5 the positions of the openings 31 and 32 in the gasket have been indicated by dotted lines.

Arranged within the groove or channel 26 is an arcuate strip of metal indicated at 33, one end thereof being anchored in the wall of the channel near one side of the exhaust port 28 while the other end is located adjacent the intake port 29 and bears against one end of a short lever 34 fulcrumed at 32 in the plate 2. This strip 33 constitutes a thermostat.

Secured to the outer end of the lever 34 is a contact screw 36 adapted normally to bear against a contact screw 37 carried by a plug 38 which is seated in but insulated from the plate 2. One end of a wire 39 is connected to the plug 38 and the other end of this wire is electrically connected to a disk 40 of conducting material carried by the pin 22. This wire is insulated from the plate 2.

The plates 1 and 2 are of course grounded to the engine. The contact screw 36 is insulated from lever 34 and a wire 41 is connected thereto. Under normal conditions, after the switch has been turned on to close the circuit, the current will flow through wire 41 to contact 36 thence through 37 and wire 39 to shaft 22 and thence to the fan wheel 23. However this wheel is normally positioned with the insulation 25 against the pin 12 so that the circuit cannot be completed through said pin 12 and the plate 1. When the engine is started a suction will be set up sufficient to give a partial rotation to the fan wheel 23 with the result that the insulation 25 will be moved away from the pin 12 while the next uninsulated blade of the wheel will come against the pin 12. The wheel will be maintained in this shifted position against the action of the spring 24 by the continued suction set up by the engine and as long as the wheel is in contact with the pin 12 a circuit will be closed through the resistance coil 11. Thus the coil will act as a heater to heat the plate 1 and adjacent parts and the fuel drawn through the attachment will have the unvaporized portions thrown radially against the wall of the opening through the attachment where it will be further vaporized by the heated plate. After the engine has begun to exhaust and portions of the exhaust gases have entered and heated the plates 1 and 2 as already explained, it becomes unnecessary to further use the electric heating element. Consequently as the attachment becomes heated to a predetermined degree the thermostat 33 will expand and shift lever 34 so as to break the connection between the contacts 36 and 37. Thus the current to the heating coil will be cut off and thereafter heating of the attachment will be dependent on the discharge of exhaust gases thereinto.

Importance is attached to the use of the stationary lapping deflecting blades 18 with the obliquely disposed groove 19 because these blades are heated by conduction from the ring 15 and when unvaporized fuel comes thereagainst it will be quickly vaporized or at least portions thereof will be trapped in the grooves, deflected toward the wall of the opening, and become retarded in the grooves in said wall as shown at 17. Thus with these grooves 19 and 17 together with the heated plates, complete vaporization of the fuel is insured. Although the notches or grooves 17 in the ring 15 can be disposed at any angle desired, it is preferred to have them spirally arranged so that fuel rushing therethrough will be given a whirling action until brought against the inclined blades 18 whereupon the gases will be

whirled in an opposite direction. In other words it is preferred to have the grooves 17 spirally disposed but pitched oppositely to the blades 18. This has been shown particularly in Figure 6.

To facilitate the movement of lever 34 in one direction a spring 42 can be positioned thereagainst as shown in Figure 3.

What is claimed is:

1. In a device of the class described, a plate having an opening therethrough provided with grooves in the wall thereof, stationary lapping inclined blades within said opening and extending toward the center thereof from the grooved wall, said blades having grooves in those faces nearest the intake side of the device disposed at such angles as to deflect unvaporized fuel toward the wall, the grooves in the wall of the plate being spirally disposed and pitched oppositely to the grooved blades, and means within the blades and concentric with the opening for heating fuel passing through the opening and in contact with the blade and wall, said means including a resistance coil, a stationary contact electrically connected thereto, and a fan wheel having an insulated portion normally engaging the contact, said wheel being actuated by suction to engage and close a circuit through the contact.

2. A device of the class described including detachably connected plates having an opening therethrough for the passage of fuel, means within the opening for deflecting unvaporized fuel against the wall of the opening, a resisting coil housed within one of the plates and concentric with the opening, a thermostat housed within the attachment, a stationary contact electrically connected to the coil and projecting into the opening, a second stationary contact, a fan wheel within the opening electrically connected to the second contact, said fan wheel having an insulated portion normally engaging the stationary contact in the opening, yielding means for holding said insulated portion in engagement with said stationary contact in the opening, a movable contact cooperating with one of the stationary contacts for normally closing an electrical connection to the wheel, said movable contact being connected to the thermostat, the fan wheel being actuated by suction through the opening in the attachment to shift the insulated portion thereof away from the adjacent stationary contact and bring an uninsulated portion into engagement with said contact, thereby to complete a circuit to the coil, said thermostat when heated by the coil constituting means for actuating the contact connected thereto, thereby to break a circuit to the coil.

3. In a device of the class described the combination with a structure for the passage of gaseous fuel, electrical heating means therein, and means for deflecting the fuel toward the heating means, of a fan wheel for actuation by the gaseous fuel, and means actuated by the fan wheel for closing an electric circuit to the heating means.

4. In a device of the class described the combination with a structure for the passage of gaseous fuel, electrical heating means therein, and means for deflecting the fuel toward the heating means, of a fan wheel for actuation by the gaseous fuel, means actuated by the fan wheel for closing an electric circuit to the heating means, and means for automatically returning the fan to initial position and breaking the circuit when the flow of fuel is stopped.

5. In a device of the class described the combination with a structure for the passage of gaseous fuel, electrical heating means therein, and means for deflecting the fuel toward the heating means, of means operated by the flow of gaseous fuel through the passage for closing an electric circuit to the heating means.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

GEORGE P. MILLER.