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ANTERIOR THROTTLE CARBURETOR

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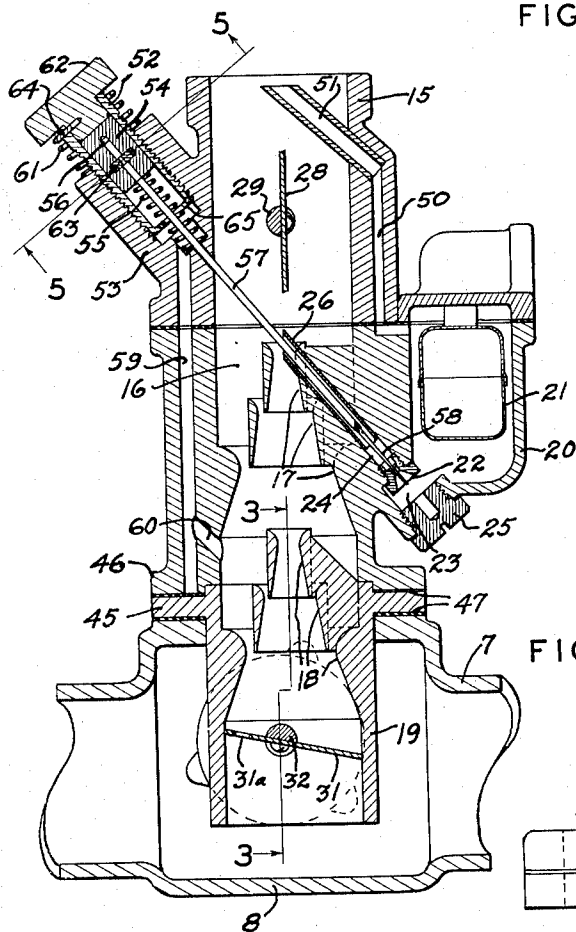


FIG. 1.

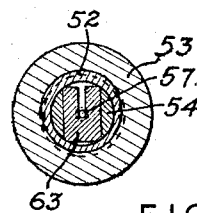
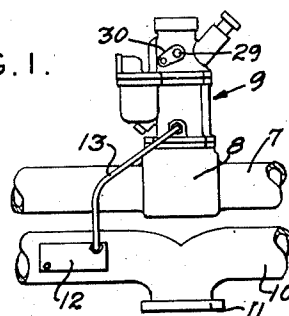


FIG. 5.

FIG. 2.

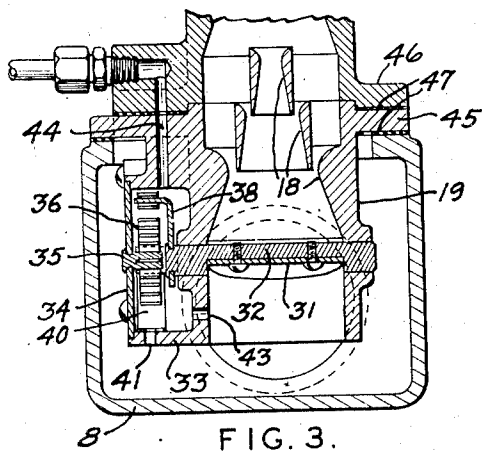


FIG. 3.

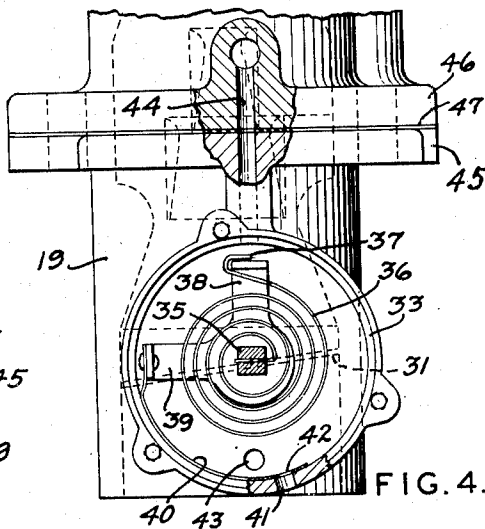


FIG. 4.

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ANTERIOR THROTTLE CARBURETOR

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4 Claims. (Cl. 123—119)

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This invention relates to carburetors for internal combustion engines and consists particularly in a novel carburetor of the anterior throttle type.

Anterior throttle carburetors have certain advantages over standard carburetors of the posterior throttle type in that adequate suction is applied to the nozzle at all times for aspirating fuel therefrom and in that the usual accelerating pump may be omitted. Accordingly, it is the main object of the present invention to provide a novel anterior throttle carburetor which is simpler and less expensive than previous carburetors of this type.

Another object is to provide a thermostatic valve in the carburetor mixture conduit posterior to the throttle to aid in vaporization of fuel during cold starting and warm-up.

Another object is to provide a novel fast idle arrangement for carburetors.

These objects and other more detailed objects hereafter appearing are attained by the structure illustrated in the accompanying drawing in which:

Fig. 1 is a side view showing a carburetor and portions of the exhaust and intake manifolds of an internal combustion engine.

Fig. 2 is a vertical, transverse section through my novel carburetor applied to an engine intake manifold.

Fig. 3 is a detail, vertical section taken on line 3—3 of Fig. 2.

Fig. 4 is a view of the lower portion of the carburetor structure removed from the intake manifold and showing a part broken away and sectioned for clearer illustration.

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

Figure 1 shows a portion of an internal combustion engine intake manifold 7 with a central portion 8 upon which is mounted the carburetor 9. Below the intake manifold is shown a portion of the exhaust manifold 10 with a flange 11 for attachment to the usual tail pipe (not shown). A warm air stove 12 is attached to the exhaust manifold and connected to the carburetor by a tube 13.

The carburetor itself is of the downdraft type, including an upper air horn portion 15, a central mixing chamber portion 16, including a series of Venturi tubes 17, a second series of Venturi tubes 18, and an outlet portion 19. A bowl 20, adjacent mixing conduit 16, encloses the usual float 21 and needle valve mechanism (not shown) for maintaining fuel in the bowl at a substantially constant level. A main metering orifice 22 is located in a pocket 23 in the lower, inner portion of the bowl and at the base of main fuel passage 24. A threaded plug 25 closes pocket 23 at the bottom. Main fuel nozzle 26 extends upwardly at an angle within the main fuel passage and discharges within smallest Venturi tube 17.

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An anterior throttle valve 23 is mounted in the inlet portion of the mixture conduit upon a shaft 29 which mounts a crank 30 on the outside of the carburetor barrel for attachment to the usual accelerator linkage (not shown). An unbalanced vaporizing valve 31, with a fixed orifice 31a, is mounted in outlet portion 19 upon a shaft 32. Carried on the outside of outlet portion 19 is a cylindrical housing 33 having a detachable cover 34 with a central pintle 35. A spiral, bi-metal thermostat 36 has its center portion secured to pintle 35 and has a hook 37 at its outer extremity. A bell crank having arms 38 and 39 is rigid with the end of shaft 32 within housing 33. Arm 38 has a bent-out extremity receiving thermostat hook 37. This arrangement is such that at low temperatures, the thermostat tends to unwind and yieldingly urge valve 31 toward closed position. As the temperature increases, the thermostat coil winds upon itself so as to reduce the tension on the vaporizing valve and, eventually, hold this valve open.

The other arm 39 of the bell crank is secured to a metal strip 40 which extends along the inner wall of housing 33.

A port 41 in the wall of thermostat housing 33 provides communication between the same and the interior of the intake manifold 7 which receives and surrounds both the housing and outlet portion 19 of the carburetor mixture conduit. Curved strip 40 extends over port 41 and has an opening 42 near its extremity. A fixed port 43 also connects the interior of the thermostat housing with the intake manifold. Ports 41 and 43 apply intake suction to the inside of the housing for drawing warm air thereinto through tube 13 and passage 44 from stove 12. In cold starting, this warm air insures proper heating of the thermostat. Port 41 being open at such time, due to registry therewith of opening 42 therewith, also provides a substantial flow of auxiliary air into the manifold which increases the idling speed of the engine. As the temperature increases, bell crank arm 39 and valve strip 40 are rotated counterclockwise and port 41 is gradually reduced and ultimately closed.

Outlet portion 19, including Venturi tubes 18, is separately formed and has a flange 45 at its upper portion which is interposed between a flange 46 at the lower end of the carburetor proper and the upper surface of enlarged portion 8 of the intake manifold. This separate formation of outlet portion 19 permits the interposition of heat resisting gaskets, as at 47, and permits adjustment of the angularity of the carburetor and outlet portion, with respect to their vertical axis, as desired and within the limitations of the attaching bolts and bolt holes (not shown).

The constant level chamber 20 is connected to the air inlet horn 15 by means of a bowl balance vent 50 and tube 51.

An angularly disposed cylinder 52 is threaded in a boss 53 formed on the upper portion of the carburetor mixture conduit opposite main nozzle 25 and receives a piston 54 constantly urged upwardly by means of a coiled spring 55. The piston has a central orifice 56 receiving a metering pin 57 which extends downwardly through main nozzle 25 and has a reduced tapered portion 58 extending through main metering orifice element 22. Cylinder 52, beneath piston 54, is connected by means of a passage 59 to the carburetor mixture conduit, as at 60. The metering rod is secured in position by a horse shoe key 63 received in registering slots in piston 54 and the rod. A plug 62 is snugly received in the upper end of the cylinder and a coiled spring 61 is compressed between the enlarged, hexagonal head thereof and the opposed end of the boss 53 to resist unauthorized turning of the cylinder assembly. The end 64 of the spring is inserted in registering openings in the cylinder and head, as shown in Fig. 2, to maintain the assembly. The plug may be removed simply by snapping spring end 64 out of its receiving holes to permit access to the piston and metering rod assembly for removal thereof.

An inward flange 65 at the lower end of cylinder 52 provides a stop for the piston and determines the idling position of the metering rod. Turning of head 62 and the cylinder adjusts this position.

The operation is as follows:

During cold starting, vaporizing valve 31 will be held yielding in the closed position, as in Fig. 2. Suction will be transmitted to the main nozzle through fixed orifice 31a in the vaporizing valve for drawing starting fuel. Preferably, the throttle valve will be in nearly closed position at this time. The cranking suction applied to cylinder 52 will be insufficient to counteract spring 55 so that piston 54 and the metering pin will be in their uppermost positions resulting in maximum effective opening through the metering orifice for the supply of starting fuel. When the engine starts to run, unbalanced valve 31 will be urged open by the increased mixture flow therpast and the metering pin will be drawn downwardly, restricting the effective opening in the metering orifice. During the warm-up, valve 31 will fluctuate with the suction, providing a restriction at this point for preventing excessive suction drop in the intake manifold and insuring adequate vaporization of the fuel. When the suction drops, as during acceleration, the valve will move counterclockwise (Fig. 2) towards its closed position and the metering pin will lift to provide a richer fuel mixture. The second series of Venturi tubes 18 also assist in proper vaporization of the fuel.

As exhaust manifold 10 becomes heated, warm air is drawn past the thermostat which gradually winds upon itself to relax the closing tension applied to the choke valve and, ultimately, hold the choke valve open. At the same time, this action of the thermostat moves fast idle adjusting strip 40 from its fast idle position, shown in Fig. 4, with port 41 fully opened, to a normal idle position with port 41 closed and port 43 relied upon to supply merely enough warm air to housing 33 to insure the holding of the choke valve open. This port may be very small or even may be omitted, particularly, due to the location of the housing wholly within intake manifold 7 which of course, reflects the engine temperature. This feature is of especial value when the engine is stopped after being fully heated. Under this

condition, the thermostat will remain at the engine temperature, even though the flow of warm air from the stove is stopped so that the amount of restriction due to vaporizing valve 31 will accurately correspond to the requirements for the particular temperature of the engine.

The rotatable outlet portion 19 of the carburetor mixture conduit permits adjustment of the angularity of vaporizing valve 31 to obtain the best distribution. Also, the outlet arrangement permits mounting of the thermostatic control in position to accurately reflect engine temperature, yet adequate insulation of the outlet parts from the carburetor proper is provided. The penetration of the metering pin through the nozzle will function to impede passage of gas bubbles upwardly therethrough.

During normal idling, when throttle 28 is nearly closed and piston 54 seated on flange 65, metering valve 57 will be in its most restricting position, so that only sufficient fuel is supplied for idling purposes.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. An internal combustion engine intake system including an intake manifold with an opening in the central portion of the wall thereof, a carburetor mixing conduit detachably secured to said manifold about said opening and having an outlet part projecting into said manifold, a flow restricting valve in said outlet part, and a thermostatic control for said valve carried by said part and inside said manifold, said control being removable from said manifold with said conduit for inspection and adjustment.

2. An internal combustion engine intake system as described in claim 1 further including a main fuel nozzle discharging into said mixing conduit and a manually operated throttle in said conduit anterior to said nozzle.

3. An internal combustion engine intake system including an intake manifold and a carburetor mixing conduit with an outlet part projecting into said manifold, a flow restricting valve within said outlet part, a housing on the outside of said outlet part and inside said manifold, a thermostatic control for said valve in said housing, and a warm air stove connected to said housing, there being a port in the wall of said housing for communicating intake manifold suction to the interior of said housing for drawing warm air past said thermostat.

4. An internal combustion engine intake system as described in claim 3 further including a valve element associated with said port and actuable by said thermostat to open said port at low temperatures and thereby increase the admission of air to and the idling speed of the engine at low temperatures.

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