July 20, 1954 L. D. BOYCE 2,684,058

DEICING DEVICE

Filed Feb. 6, 1950

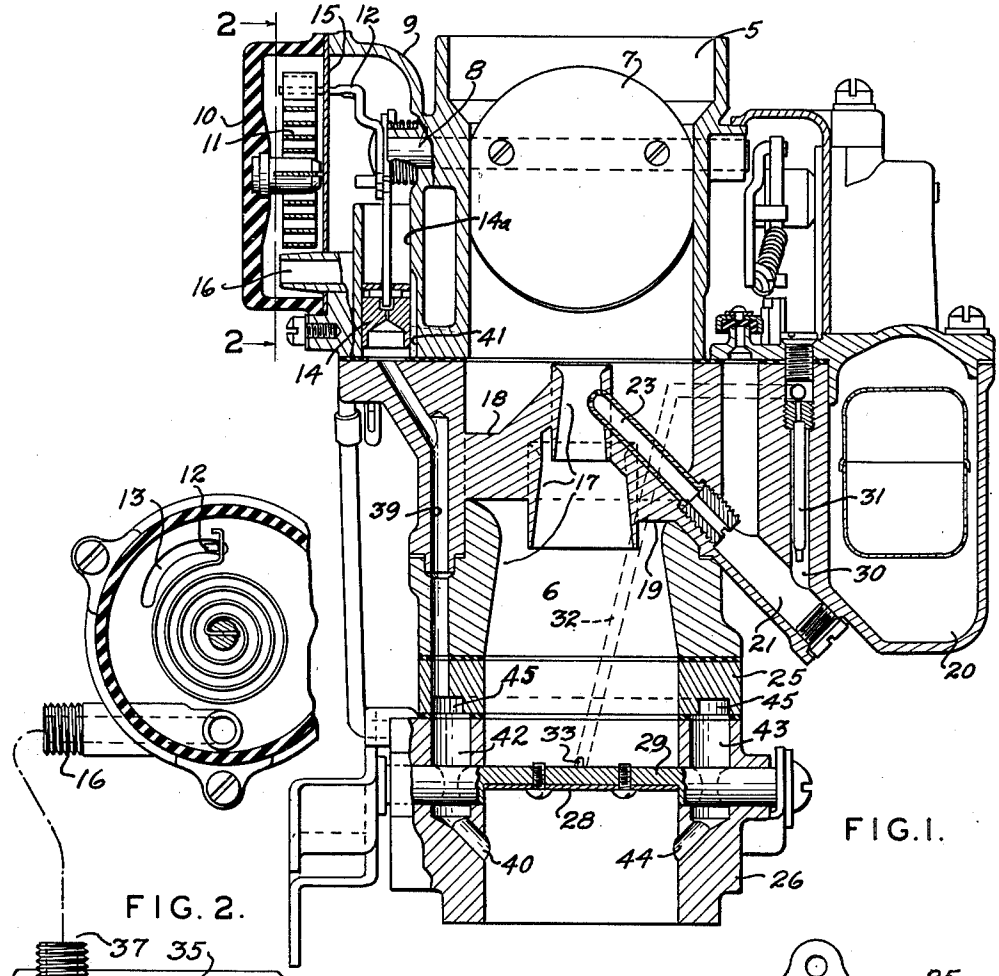
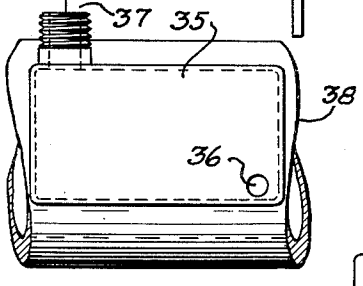


FIG. 1.

FIG. 2.



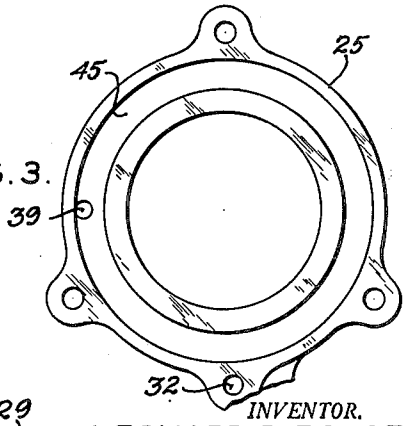


FIG. 3.

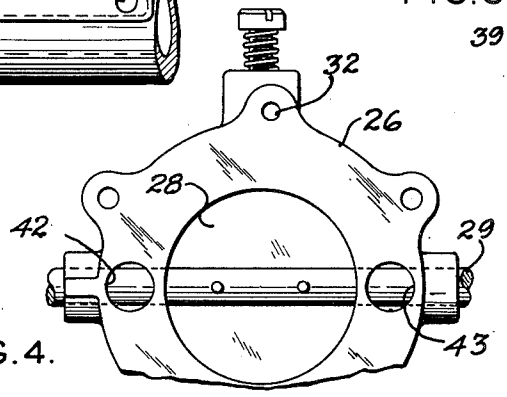


FIG. 4.

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DEICING DEVICE

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11 Claims. (Cl. 123—122)

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This invention relates to carburetors for internal combustion engines and consists particularly in means for applying heat to those portions of the mixture conduit adjacent the idle port and throttle valve.

As the air fuel mixture in a carburetor passes through the venturis, its pressure and consequently its temperature decrease, and any moisture present condenses and tends to freeze on the throttle valve and on the mixture conduit walls adjacent the idle port and throttle; this results in considerable interference with satisfactory operation of the carburetor. The icing condition is further aggravated by the presence of heat insulating device between the carburetor and the manifold.

Consequently, an object of the invention is to provide means for applying heat to those portions of the mixture conduit adjacent the throttle and idle port.

A second object is to utilize insofar as possible present passageways in the conventional carburetor structures for the transmission of heat to this area.

Another object is to utilize heated air provided to the automatic choke control for heating the mixture conduit adjacent the throttle.

A still further object is to utilize manifold suction to draw the heated air from the automatic choke control housing to the vicinity of the throttle and idle port.

Additional objects and advantages of the invention will appear from a reading of the disclosure in connection with the drawings in which:

Fig. 1 is a vertical section through a carburetor incorporating my invention;

Fig. 2 is a view showing the automatic choke control housing and the hot air connection between it and a manifold stove;

Fig. 3 is a plan view of the carburetor insulating spacer;

Fig. 4 is a plan view of lower portion of the mixture conduit wall structure showing the throttle valve and shaft.

Fig. 1 shows a carburetor formed with an air horn 5, and mixture conduit 6. Admission of air to the mixture conduit is regulated by unbalanced disk choke valve 7, mounted on rotatable shaft 8, which is journalled in the walls of air horn 5. A choke control mechanism is mounted on the air horn and comprises housing 9, cover 10, bimetallic thermostat 11 for urging the choke valve toward closed position at low temperatures, and crank 12, one end of which abuts against the outer end of thermostat 11, the

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other end being secured to choke shaft 8, suction actuated piston 14 slidably mounted in cylinder 14a for assisting the choke valve toward open position under certain conditions, and hot air inlet 16. A thin partition member 15, formed with an arcuate opening 13, to permit movement of crank 12 therethrough, is interposed between cover 10 and housing 9.

Posterior to choke valve 7, in mixture conduit 6, is formed a series of concentric venturis 17 the outermost comprising part of the mixture conduit wall structure and the inner ones being supported centrally in the mixture conduit by webs 18 and 19.

A float controlled constant level fuel bowl 20 is formed adjacent the outer wall of mixture conduit 6, and communicates with mixture conduit 6 through a metering orifice (not shown), passageway 21, and main nozzle 23.

The lower portions of mixture conduit 6 are formed by an insulating spacer 25 and body flange casting 26 and are secured to each other and to the upper portion by means of screws or other suitable means (not shown). A throttle valve 28 is mounted on throttle shaft 29, which is rotatably journalled in body flange casting 26.

Fuel for idling is provided via passageway 30, idle orifice tube 31, passageway 32, and idle port 33, which discharges into mixture conduit 6 adjacent throttle valve 28.

A stove 35, having air inlet 36 and air outlet 37 is mounted on exhaust manifold 38 to provide heated air for the operation of thermostat 11. Stove outlet 37 is connected to choke control hot air inlet 16 by suitable tubular passageways. Heated air is drawn into the thermostat chamber through inlet 16, past thermostat 11, and out through arcuate slot 13 by manifold suction. Manifold suction is communicated to the lower surface of piston 14, by passageway 39 formed in the carburetor wall structure and communicating with mixture conduit 6 at suction port 40, posterior to throttle 28. A groove 41 is formed in the wall of cylinder 14a adjacent piston 14 to allow the vacuum in passageway 39 to draw heated air from manifold stove 35 past thermostat 11 and into mixture conduit 6.

In order to fully utilize the heated air drawn through passageway 39 for preventing icing adjacent throttle valve 29, that portion 42 of passageway 39 adjacent throttle valve shaft 29 is arranged to intersect or be intersected by throttle shaft 29 and is enlarged to slightly greater diameter than shaft 29, a similar enlarged chamber 43 is formed in casting 26 adjacent the other end

of shaft 29, an outlet passageway 44 is formed between the lower end of chamber 43 and mixture conduit 6, and an annular passage 45 is formed in insulating spacer 25 to provide communication between passageway 39 and chamber 43.

During operation of the engine warm air is drawn from manifold stove 35 through inlet 16, past thermostat 11, through slot 13, past piston 14 through groove 41 and passageways 39 and 45 into chambers 42 and 43, and thence via outlets 40 and 44 into mixture conduit 6, meanwhile heating the mixture conduit wall structure adjacent the throttle, the throttle valve shaft, and the valve itself, thus preventing icing in the mixture conduit adjacent the throttle and idle port and on the throttle valve.

It is to be understood that while a preferred form of my invention is shown and described in the application, the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a carburetor having a mixture conduit and choke and throttle valves therein, a throttle shaft journalled in the walls of said mixture conduit, a thermostatic choke control device, a source of heated air communicating with said choke control device, a passageway communicating between said choke control device and said mixture conduit posterior to said throttle, said passageway being formed with an enlarged portion adjacent the end of said throttle shaft.

2. In a carburetor having a mixture conduit provided with a choke valve and a throttle valve, a thermostatic choke control device, a shaft for said throttle valve rotatably journalled in the walls of said mixture conduit, a source of heated air communicating with said choke control device, a passageway connecting said choke control device and said mixture conduit posterior to said throttle, and an annular passage surrounding said mixture conduit anterior to said throttle and communicating with said passageway.

3. In a carburetor having a mixture conduit provided with a choke valve and a throttle valve, a thermostatic choke control device, a shaft for said throttle valve rotatably journalled in the walls of said mixture conduit, a source of heated air communicating with said choke control device, a passageway connecting said choke control device and said mixture conduit posterior to said throttle, and an annular passage surrounding said mixture conduit anterior to said throttle and communicating with said passageway, said passageway being formed with an enlarged portion intersecting said throttle shaft.

4. In a carburetor having a mixture conduit provided with a choke valve and a throttle valve, a thermostatic choke control device, a shaft for said throttle valve rotatably journalled in the walls of said mixture conduit, a source of heated air communicating with said choke control device, a passageway connecting said choke control device and said mixture conduit posterior to said throttle, an annular passage surrounding said mixture conduit anterior to said throttle and communicating with said passageway, said passageway being formed with an enlarged portion intersecting said throttle shaft, and a similar enlarged portion intersecting the opposite end of said throttle shaft and communicating at its upper end with said annular passage and at its lower end with the mixture conduit.

5. In combination with an internal combustion engine having intake and exhaust manifolds, a carburetor having a mixture conduit, choke and throttle valves therein, a thermostatic device for controlling said choke valve, a stove, passage means for transmitting heated air from said stove to said thermostatic device, and means for conducting said heated air for circulation in said mixture conduit wall adjacent said throttle..

6. In combination with an internal combustion engine having intake and exhaust manifolds, a carburetor having a mixture conduit, choke and throttle valves therein, shafts for said valves rotatably journalled in the mixture conduit wall, a thermostatic device for controlling said choke valve, a stove on said exhaust manifold, passage means for transmitting heated air from said stove to said thermostatic device, suction means for conducting said heated air from said thermostatic device for circulation in said mixture conduit wall adjacent said throttle shaft, said suction means comprising a passageway connecting said thermostatic device with said mixture conduit posterior to said throttle, and an annular passage surrounding said mixture conduit anterior to said throttle and communicating with said first named passageway.

7. In combination with an internal combustion engine having intake and exhaust manifolds, a carburetor having a mixture conduit, choke and throttle valves therein, shafts for said valves rotatably journalled in the mixture conduit wall, a thermostatic device for controlling said choke valve, a stove on said exhaust manifold, passage means for transmitting heated air from said stove to said thermostatic device, suction means for conducting said heated air from said thermostatic device for circulation in said mixture conduit wall adjacent said throttle shaft, said suction means comprising a passageway connecting said thermostatic device with said mixture conduit posterior to said throttle, an annular passage surrounding said mixture conduit anterior to said throttle and communicating with said first named passageway, and enlarged chambers intersecting the ends of said throttle shaft and communicating at their upper ends with said passageway and annular passage, respectively, and at their lower ends with said mixture conduits.

8. In combination with an internal combustion engine, a fuel mixture conduit having a throttle valve therein, an idle passage discharging into said conduit, a source of heated air, laterally extending passage means in heat exchange relation with a substantial portion of the periphery of said mixture conduit and with said idle passage, and means for conducting heated air from said stove to said passage means.

9. In combination with an internal combustion engine, wall structure forming a fuel mixture conduit, a throttle shaft journalled at both ends in said wall structure, a throttle valve mounted on said shaft, passage means in said wall structure having a portion adjacent both ends of said throttle shaft, a source of heated air, and means for conducting heated air from said source to said passage means for preventing the formation of ice in said mixture conduit.

10. In a carburetor having a mixture conduit and choke and throttle valves therein, a throttle shaft journalled in the walls of said mixture conduit, a thermostatic choke control device having a suction motor, a source of heated air communicating with said choke control device, a passageway under control of said suction motor and communicating between said choke control device and

said mixture conduit posterior to said throttle, said passageway being formed with an enlarged portion adjacent the end of said throttle shaft.

11. In a carburetor having a mixture conduit and choke and throttle valves therein, a throttle shaft having journal bearings in the wall of said mixture conduit, a thermostatic choke control device, a source of heated fluid communicating with said choke control device, and a passageway connecting said choke control device and said mixture conduit posterior to said throttle valve also

for conducting heated fluid, said passageway being intersected by at least one of said journal bearings for heating said throttle shaft and throttle valve to reduce icing tendency.

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