Dec. 6, 1938. I. E. COFFEY 2,139,356

CARBURETOR STRUCTURE

Filed July 7, 1936 2 Sheets-Sheet 1

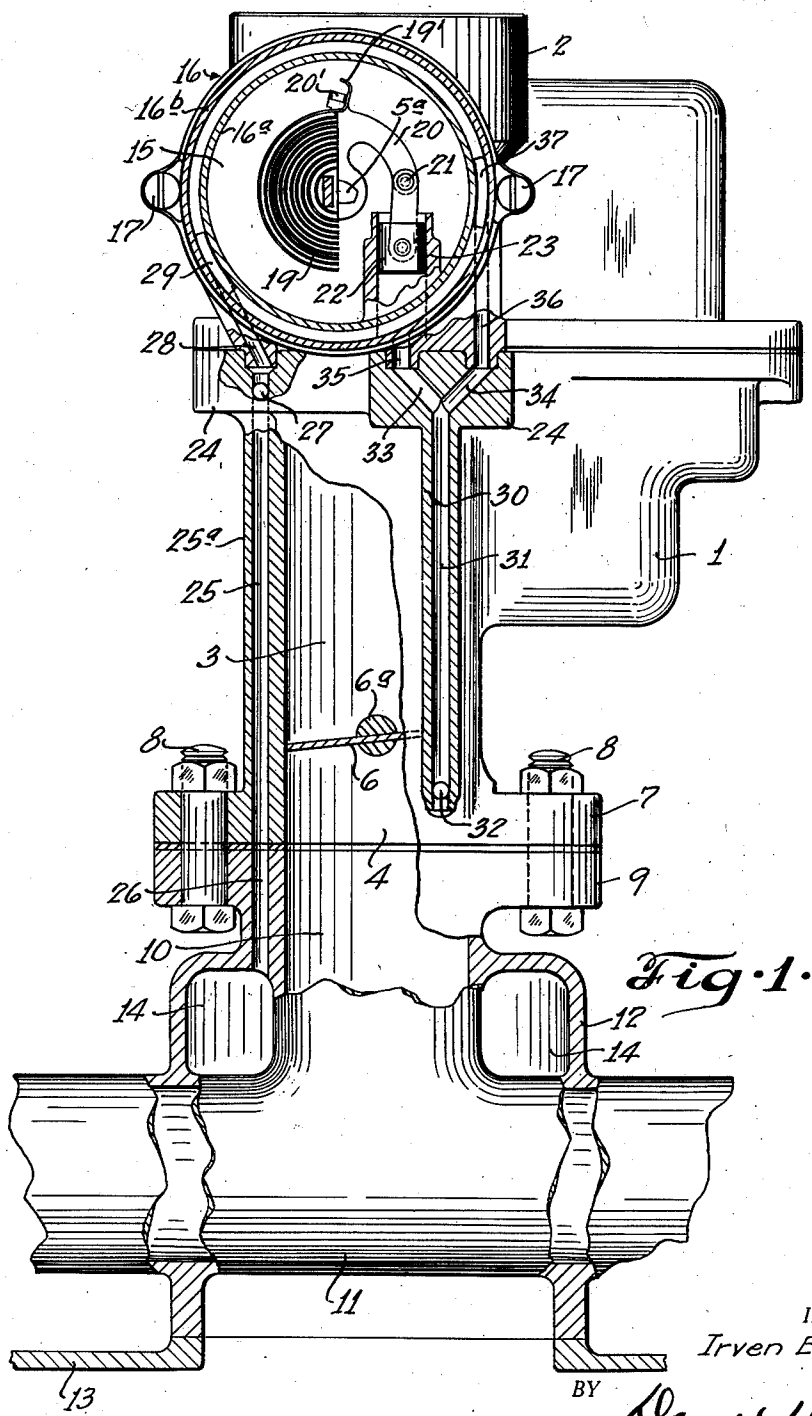

Fig. 1.

INVENTOR.
Irven E. Coffey.
BY
Daniel U. Rich
ATTORNEY.

Dec. 6, 1938. I. E. COFFEY 2,139,356

CARBURETOR STRUCTURE

Filed July 7, 1936 2 Sheets-Sheet 2

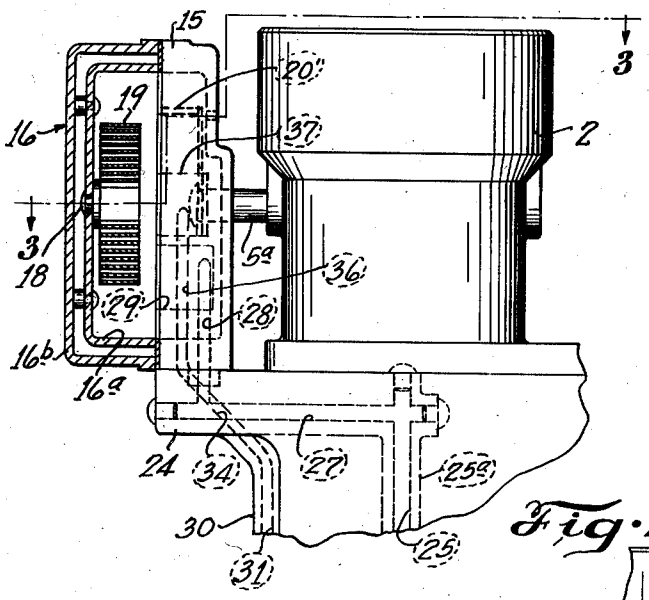

Fig. 2.

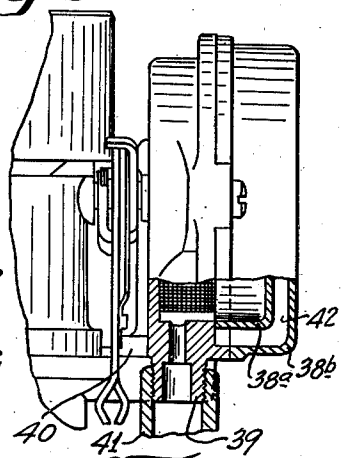

Fig. 4.

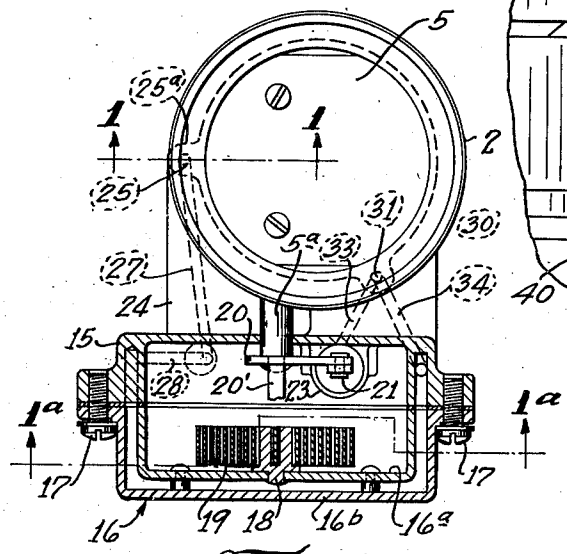

Fig. 3.

INVENTOR.

Irven E. Coffey.

BY Howard U. Rich

ATTORNEY.

Patented Dec. 6, 1938 2,139,356

UNITED STATES PATENT OFFICE

2,139,356

CARBURETOR STRUCTURE

Irven E. Coffey, St. Louis, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application July 7, 1936, Serial No. 89,311

12 Claims. (Cl. 123—119)

This invention relates to carburetors for internal combustion engines and consists particularly in novel construction and arrangement of thermo-responsive choke control devices.

In a well known form of automatic choke device for automative carburetors, a housing mounted on the carburetor barrel encloses a thermostat which is connected by suitable means to the choke valve. In order to insure sufficiently rapid heating of the thermostat after the engine has been started so that the proper mixture will be supplied at all times during the warm up, the housing communicates through a separate tube with a stove secured to the exhaust manifold and suction means is provided for drawing heated air through the housing. With this arrangement, substantial heat is lost during conduction from the stove and connection tube. Moreover, the heater and heater connection must be applied and adjusted separately from the carburetor.

An object of the present invention is to provide improved means for insuring rapid heating of the thermo-responsive choke control means in an automatic choke carburetor. Another object is to utilize exhaust gases for heating the thermostat. Another object is to form heating and suction passages for the thermostat housing integral with the barrel of the carburetor thus eliminating separate outside connections. Still another object is to provide a novel double-walled thermostat housing in which the space between the walls may be utilized as a chamber for passing exhaust gases in the immediate vicinity of the thermostat, or as a dead air space for insulating the inner portion of the housing which encloses the thermostat. These objects and other more detailed objects hereafter appearing are attained substantially by the structures illustrated in the accompanying drawings in which:

Figure 1 is a side view of an automotive carburetor and part of an associated manifold, the upper portion of the figure being sectioned substantially on line 1*a*—1*a* of Figure 3 and the lower portion being broken away and sectioned substantially on line 1—1 of Figure 3.

Figure 2 is a view of a part of the carburetor taken at 90 degrees to Figure 1, the cover portion of the thermostat housing being sectioned on the center line thereof.

Figure 3 is a top view and section taken substantially on line 3—3 of Figure 2.

Figure 4 is a view of a carburetor somewhat as in Figure 1, but showing a modification.

The carburetor in Figures 1 to 3 comprises a constant level fuel bowl 1 and a barrel or body portion forming a downdraft intake conduit including air horn portion 2, mixing chamber 3 which may include one or more venturis, and outlet portion 4. A choke valve 5 is pivotally mounted in the air horn on shaft 5*a* and a throttle valve 6 is pivoted in the lower portion of the barrel on shaft 6*a*. A suitable crank (not shown) is secured to shaft 6*a* for manual operation of the throttle valve. A flange 7 on the lower portion of the carburetor is secured by bolts 8 to a flange 9 on the riser portion 10 of intake manifold 11.

Formed integral with the intake manifold is a heater or "hot spot" structure 12 communicating with the exhaust manifold, a part of which is shown at 13, in a manner to conduct exhaust gases through spaces 14 around the intake manifold for heating the fuel mixture immediately before it enters the carburetor.

Mounted on the outside of the air horn is a thermostat housing including a base portion 15 and cover portion 16 secured thereto by screws 17. A stud 18 projects from the center portion of the inner wall 16*a* of the housing and mounts a spiral, bi-metal thermostat 19. Rigid with choke shaft 5*a* within the housing is a crank 20 having an outward projection 20' about which extends a hook 19' on the outer end of the thermostat for controlling the choke valve, responsive to temperature conditions, in a well known manner. Crank 20 is also connected at 21 to a piston 22 mounted for oscillation in cylinder 23 formed in the housing base portion 15. The thermostat housing is carried in part by choke shaft 4 and in part by a lateral extension 24 on the body of the carburetor.

Extending along the left hand side of the carburetor body, Figure 1, is a passage 25 formed in a rib 25*a* integral with the body and connected at its lower extremity with passage 26 in the manifold riser portion 10, which in turn opens into the exhaust gas space 14. At its upper end, passage 25 has a portion 27 extending at right angles thereto through the body extension 24 and then upwardly and communicating with inclined passage 28 in the housing base portion. Passage 28 has an opening 29 into the space between the walls 16*a* and 16*b* of the housing cover portion.

Also extending along the carburetor body portion, but substantially on the right hand side thereof, Figure 1, is a rib 30 drilled to form a passage 31 communicating at its lower end through hole 32 with the intake conduit posterior to the throttle valve. At its upper end, passage 31 has

diverging branches 33 and 34 formed within the body extension 24. Passage 33 communicated through an apertured boss 35 with the interior of cylinder 23, and passage 34 communicates with passage 36 which has an opening 37 between the walls of the thermostat housing.

As is well known in the art, a substantial difference in pressure will exist, during operation of the engine, between the intake and exhaust manifolds. This causes exhaust gases to be drawn from space 14 in the "hot spot" through passages 26, 25, 27 and 28 into the space between the walls 16a and 16b of the thermostat housing cover portion. These gases circulate around the housing, being sealed from the thermostat by inner wall 16a, and are drawn through opening 37 and passages 36, 34 and 31 into the interior of the carburetor and the intake manifold.

Obviously greater quantities of hot gas will be drawn through the annular gas chamber in the housing when the throttle is partially closed or closed and the engine idling due to the higher suction in the intake conduit at such times. This is an advantage since rapid warming of the thermostat is desirable when the engine is warming up after a cold start. Sufficient gases will be drawn through the heated chamber at all times during operation of the engine to hold the choke open. If desired, suitable means may be provided for cutting down the quantity of gases drawn through the housing after the choke has fully opened so as to prevent excessive heating of the thermostat.

Suction in passage 31 is also communicated to cylinder 23 and piston 22 which function to open the choke valve against the force of the thermostat particularly when the engine fires after cranking.

Figure 4 illustrates a thermostatic housing having double walls 38a and 38b and enclosing a thermostat (not shown) as in the previous form. A threaded boss 39 on the housing base portion 40 is connected to a conduit 41 which at its lower end communicates with a suitable stove (not shown), associated with the exhaust manifold. The inside of the housing also preferably communicates with the intake manifold for drawing hot air therethrough for heating the thermostat. A dead air space 42 between the walls of the housing cover portion provides substantial insulation against the loss of heat.

The construction of the carburetor in both forms, and the automatic thermo- and suction-responsive choke control are well known in the art and accordingly are not described in detail. These parts and also the heating and housing means may be modified as will occur to those skilled in the art. For instance exhaust gases may be passed into the inner chamber in Figures 1 to 3, but this is not desirable due to the corrosive effect of the exhaust gases, and also hot air from a stove may be circulated through the outer chamber. The exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In an internal combustion engine, an exhaust passage, an intake conduit, a choke valve in said conduit, a thermo-responsive control element for said valve, a chamber adjacent said element, and separated therefrom, and connections between said chamber and said passage and said chamber and said conduit for utilizing pressure differences in said passage and said conduit to draw heated exhaust gases into the vicinity of said element.

2. Structure as specified in claim 1 further including a housing for said thermo-responsive element, said chamber and said housing being substantially sealed from each other.

3. Structure as specified in claim 1, in which said chamber extends substantially around said thermo-responsive element.

4. Structure as specified in claim 1, further including a throttle valve in said conduit, said chamber communicating with said conduit posterior to said throttle valve.

5. In combination, an internal combustion engine carburetor having a choke valve, a thermo-responsive control element for said valve, and a double walled housing for said element, there being substantially open chamber structure between the walls of said housing forming dead fluid space for insulating the inner portion of said housing.

6. In an internal combustion engine, manifold structure including heater means, a carburetor carried by said structure and including a barrel part, a thermo-responsive choke control device adjacent said carburetor, and a conduit connecting said heating means and said device and substantially wholly formed integrally with said manifold structure and said carburetor barrel part.

7. In an internal combustion engine, and intake conduit, an exhaust passage extending at least partially around said conduit for heating the same, a choke valve in said conduit, a thermostat for controlling said valve, a housing for said thermostat having a cover with spaced walls and a base portion, said thermostat being sealed from the space between said walls, a duct leading from said exhaust passage through said housing base portion into the space between said cover walls for heating said thermostat, and a duct leading from said intake conduit into the space between said cover walls for drawing exhaust gases therethrough.

8. In an internal combustion engine, an intake conduit, an exhaust passage extending at least partially around said conduit for heating the same, a choke valve in said conduit, a thermostat for controlling said valve, a housing for said thermostat having a cover with spaced walls and a base portion, said thermostat being sealed from the space between said walls, and a duct leading from said exhaust passage through said housing base portion into the space between said cover walls for heating said thermostat, said heating duct leading from the portion of said exhaust passage directly associated with said intake conduit.

9. In combination, an internal combustion engine carburetor having a choke valve, thermo- and suction-responsive control means for said choke valve, a housing for said control means, a heating chamber adjacent said housing and substantially sealed therefrom, a connection between said chamber and said exhaust passage, and communication between said intake conduit and said suction-responsive means and said conduit and said heating chamber.

10. The combination of elements specified in claim 9 in which said communications constitute a branched passage with co-extensive parts extending from said intake conduit and branched portions connecting, respectively, with said suction-responsive means and said chamber.

11. In combination, an internal combustion en-

ine intake manifold structure, a carburetor including a mixture conduit connected to said structure and a choke valve therein, an exhaust manifold having a part forming a portion of said intake manifold structure for heating the same, a thermo-responsive control element for said choke valve and substantially spaced from said intake manifold structure, and a heating passage for said element formed in the wall of said conduit and extending a substantial distance therealong for conducting hot gases from said manifold structure into the vicinity of said control element.

12. Structure as specified in claim 11 further including a suction passage also formed in the wall of said conduit.

IRVEN E. COFFEY.