June 16, 1959 C. R. LUNN 2,890,871

ANTI-ICING CARBURETOR

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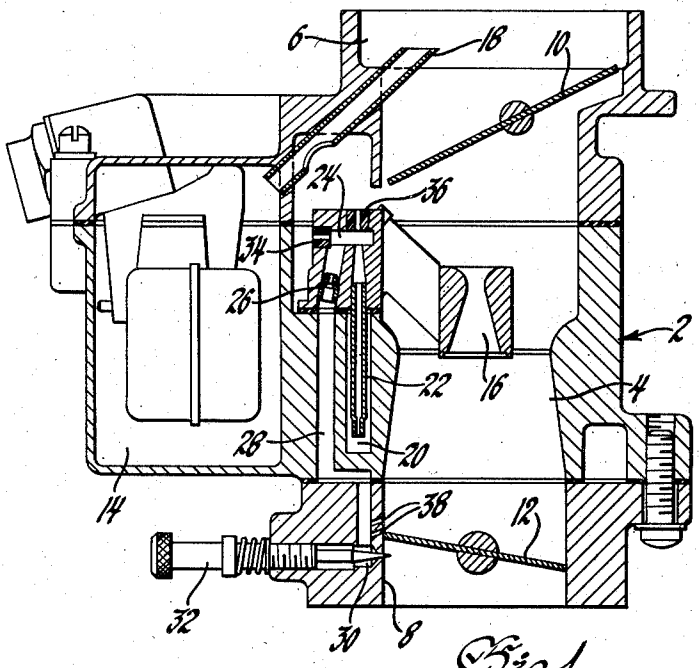


Fig. 1

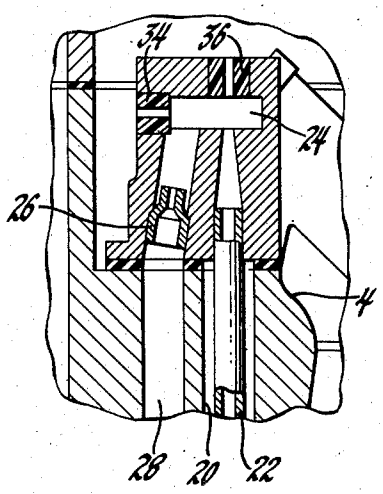


Fig. 2

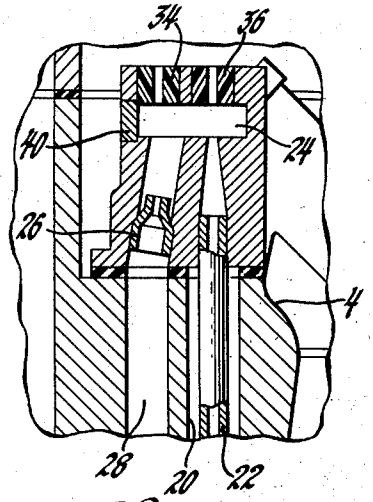


Fig. 3

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ANTI-ICING CARBURETOR

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1 Claim. (Cl. 261—41)

The present invention relates to carburetors and, in particular, to an anti-icing idling system therefor.

Frost formation in the atmospheric air bleeds of the idling system of a carburetor resulting in blockage of the air bleeds, over-enrichment of the idle fuel mixture and rough engine operation or even engine stalling has long been a serious problem. Such an over-enrichment will not ordinarily adversely affect cold engine operation. However, as the engine warms, less fuel enrichment is required, and blockage of the atmospheric air bleeds will continue the over-enrichment during idling resulting in the aforementioned rough engine operation or stalling due to flooding.

In an idling system as herein contemplated, manifold vacuum draws a fuel-air mixture through the idling system and supplies it to the engine intake manifold beneath the throttle valve which is closed. A part of the air for this idling mixture is supplied at a relatively high velocity through one or more orifices which are relatively small, often being in the order of 0.039" in diameter and even smaller. As the air leaves these small orifices, it expands thereby cooling the orifice walls and causing condensation formed thereon to ice or form frost which will block the orifices and give an over-rich fuel mixture.

It is therefore a principal feature and object of this invention to provide an idling system and particularly the atmospheric air bleeds therefor so that frost will not form on the latter to any appreciable extent to result in blockage or partial blockage of the flow of air therethrough.

More specifically, it is a feature and object of this invention to form the aforementioned atmospheric air bleed orifices of a material having a low rate of heat transfer thereby precluding the formation of frost blocking air flow.

These and other features and objects of this invention will appear more fully hereinafter as the description of the invention proceeds, and in which reference is made to the following drawing in which:

Figure 1 is an elevational cross section of the anti-icing carburetor of this invention;

Figure 2 is an enlarged view of one form of the idling system as shown in Figure 1; and

Figure 3 is an enlarged view of another form of this invention.

Referring now to the drawing, there is shown a conventional type of carburetor comprising a housing 2 having a charge-forming or induction passageway 4 communicating at its upper end 6 with atmosphere and its lower end 8 with an engine intake manifold. An unbalanced choke valve 10 is rotatably disposed in the upper portion of the induction passage 4 to control

the amount of air supplied therethrough. A throttle valve 12 is disposed posteriorly of the choke valve 10 to control the flow of the combustible charge to the intake manifold. Enclosed within the carburetor housing 2 is a fuel chamber 14 which communicates, in the usual manner, with a booster or fuel venturi 16 disposed between the choke valve and the throttle valve. A tube 18 vents the fuel chamber to atmosphere.

The idling system is of usual construction and comprises a fuel well 20 which is supplied with fuel from the fuel chamber 14. An idle fuel nozzle 22 extends into the well 20 and communicates with a passageway 24 connected through the idle fuel orifice 26 with a passageway 28 connected by idle fuel mixture port 30 to the carburetor passage 4 beneath the throttle valve. Idle adjusting screw 32 controls the quantity of the idle fuel mixture passing through the idle port 30.

Atmospheric air bleeds comprising the plugs 34 and 36 having small orifices passing therethrough together with the usual air bleeds 38 establish communication between the passageway 24 and atmosphere to supply air to the idle fuel mixture. Any material having a sufficiently low rate of heat transfer for the purpose aforedescribed may be used for forming these atmospheric air bleeds 34 and 36. For this purpose, it has been found desirable to utilize polymeric compounds having a high molecular weight. A material which is particularly adaptable for this purpose is the polyamide resin made by the polymerization of a hexamethylenediamine salt of adipic acid, commonly known as "nylon." However, polytetrafluoroethylene ("Teflon") or other suitable epoxy resins, phenolic resins, polyester resins and similar plastic compounds which are solid and thoroughly stable and resistant to deterioration under engine operating temperatures may be used.

For the sake of illustrating the operation of the anti-icing idling system of the carburetor, let it be assumed that a cold engine is started on a cold day and, particularly, under relatively high humidity conditions. After the engine is started and initially begins to warm, the idle fuel mixture, including air drawn through the atmospheric air bleeds 34 and 36, will be supplied to the induction manifold of the engine through the idle fuel port 30. As the atmospheric air leaves the small orifices of the air bleeds, it will expand resulting in absorption of heat from the air bleeds of a conventional idling system, formation of frost or ice from the condensation in the bleeds, and blockage of the latter. In the present invention, this refrigeration effect is avoided since the atmospheric air bleed orifices are formed of a suitable plastic material having a low rate of heat transfer as aforedescribed.

Consequently, in a vehicle equipped with the anti-icing system of this invention, the formation of frost or icing is avoided thereby precluding the supply of an over-enriched idle fuel mixture to the engine intake manifold.

In Figure 3, the atmospheric air bleed means are disposed radially of the longitudinal axis of the passage 24, a suitable plug 40 being a convenient means for closing the end of this passage.

I claim:

In combination with a combustible charge-forming device having a charge-forming passageway establishing communication between atmosphere and the intake manifold of an internal combustion engine, and a throttle valve disposed within said passageway; an anti-icing idling

system, said system comprising a source of fuel, a conduit connecting said source to said passageway posteriorly of said throttle valve, an orifice establishing communication between said conduit and atmosphere, said orifice being relatively small to transfer air at a relatively high velocity to said conduit in which it expands, said orifice being formed of a solid synthetic polymeric compound having a high molecular weight.

References Cited in the file of this patent

UNITED STATES PATENTS

2,407,534	Carlson	Sept. 10, 1946
2,626,790	Betcher	Jan. 27, 1953
2,775,984	Dahl	Jan. 1, 1957

FOREIGN PATENTS

504,871	Great Britain	May 2, 1939