May 30, 1961 J. T. W. MOSELEY 2,986,378

CARBURETOR FUEL NOZZLE

Filed Jan. 31, 1958 2 Sheets-Sheet 1

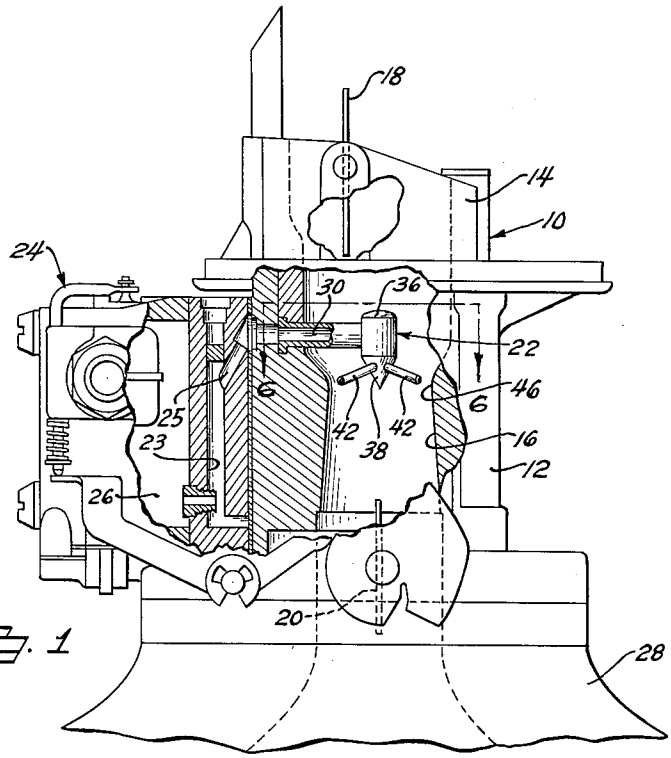


Fig. 1

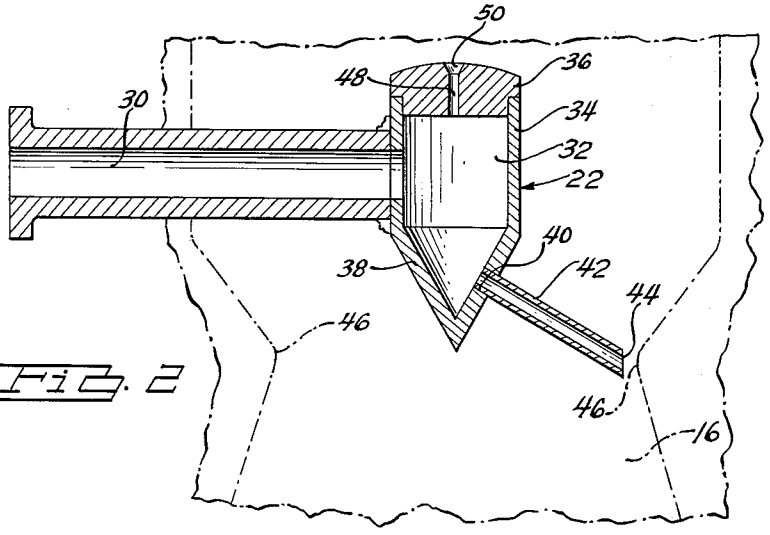


Fig. 2

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CARBURETOR FUEL NOZZLE

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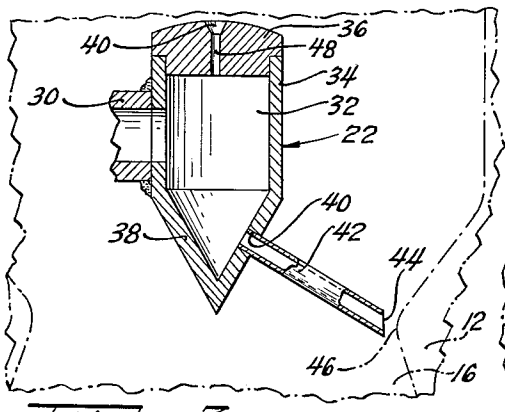


Fig. 3

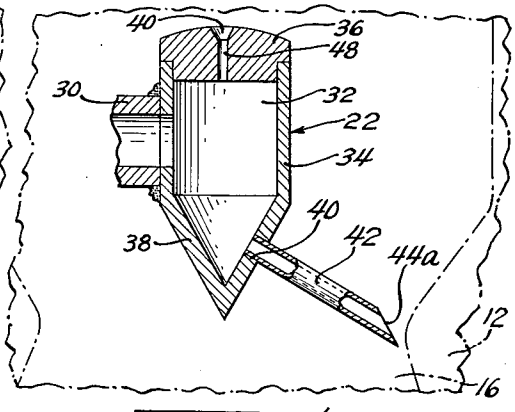


Fig. 4

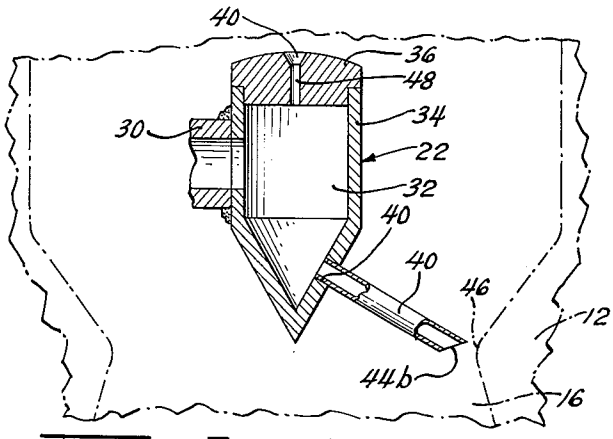


Fig. 5

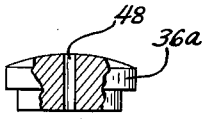


Fig. 7

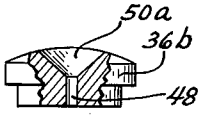


Fig. 8

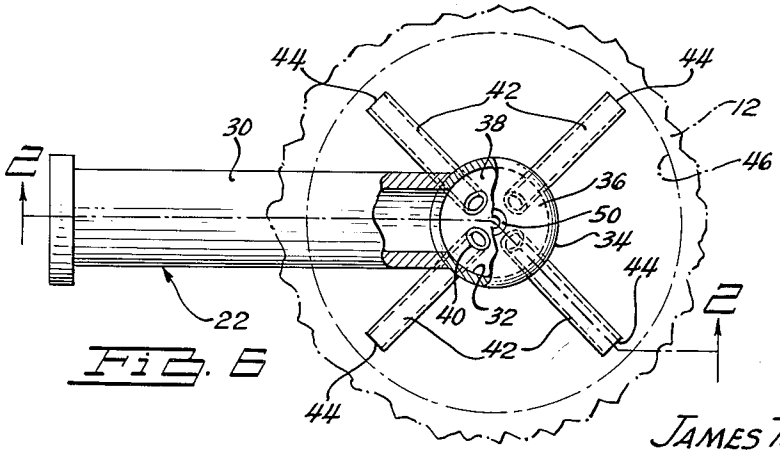


Fig. 6

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United States Patent Office

2,986,378

Patented May 30, 1961

2,986,378

CARBURETOR FUEL NOZZLE

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Filed Jan. 31, 1958, Ser. No. 712,493

2 Claims. (Cl. 261—19)

This invention relates generally to carburetors for internal combustion engines, and more specifically to nozzles for the delivery of fuel therein.

Carburetors of present design usually employ fuel nozzles which are generally slow in responding to both small changes in air flow and low air flows. This slow response is believed to be due to at least two factors which are: (1) position of nozzle with respect to the venturi throat; and (2) little or no fuel and air emulsification prior to discharge into the induction passage. In addition to being relatively insensitive, these nozlzes are also characterized by their lack of ability to deliver a thoroughly mixed combustible mixture to the engine.

Accordingly, it is an object of this invention to provide means which will eliminate the foregoing objections.

More specifically, it is an object of this invention to provide a nozzle of novel design which will emulsify the fuel and air prior to discharge into the induction passage and at the same time thoroughly mix the combustible elements so that proper distribution to the engine will be attained.

Other objects and advantages wil become apparent when reference is made to the accompanying illustrations in which:

Figure 1 is an elevational view with portions thereof broken away and in cross section, illustrating a carburetor embodying the invention.

Figure 2 is an enlarged sectional view taken on the plane of line 2—2 of Figure 6 and looking in the direction of the arrows.

Figures 3, 4 and 5 are fragmentary sectional views similar to Figure 2; Figures 4 and 5 illustrate modifications of the invention.

Figure 6 is a fragmentary enlarged top plan view, with portions thereof cut away and in cross-section, taken on the plane of line 6—6 of Figure 1 and looking in the direction of the arrows.

Figures 7 and 8 are partially sectioned views illustrating modified constructions of one of the elements shown by Figure 2.

Referring in greater detail to Figure 1, a carburetor **10** having a body **12** and air intake **14** is provided with an induction pasage **16** therethrough adapted to be controlled by a choke valve **18** and throttle valve **20**. The induction passage contains a fuel nozzle **22** which communicates by means of suitable conduitry **23** and **25** with a fuel bowl **24** formed to provide a cavity **26** containing fuel therein. The carburetor is securely mounted by any suitable means to the intake manifold **28** of an internal combustion engine.

Figure 2, an enlarged sectional view of the nozzle **22** sectioned substantially on line 2—2 of Figure 6, illustrates the invention in greater detail. The nozzle is generally comprised of conduit portion **30** suitably secured to and communicating with a chamber **32** formed by a generally cylindrical structure **34** having one end substantially closed by a cover **36** and the other end enclosed by a conical portion **38**. The conical portion has a plurality of apertures **40** therein which are adapted to receive and retain individual discharge conduits **42**. One end of the conduit **42** communicates with chamber **32** while the other end **44** is placed so as to be in relatively close proximity to the venturi throat **46**.

The upper cover **36** is formed to provide a passage **48**, with a somewhat conical depression **50** at one end, communicating between the air within the intake passage **16** and the chamber **32** within the nozzle **22**.

Figures 3, 4 and 5 illustrate modifications of the invention in each of which the free end **44** of conduit **42** has been altered in order to obtain different flow characteristics of the nozzle assembly. Figure 3, for instance, has end **44** formed so as to have its edge generally parallel to the normal flow of air within the intake passage **16**. End **44*a*** of Figure 4 is formed so as to present an aperture somewhat open towards the flow of air; this is in direct contrast to end **44*b*** of Figure 5, which forms an aperture that is open in the same general direction as the flow of air past it.

Figure 6 illustrates the general position of the nozzle assembly within the venturi throat **46** as viewed from a position anterior to the nozzle assembly and with the cover **36** removed. For purposes of illustration, four conduits **42** are shown in communication with the chamber **32** of the nozzle. The number of conduits **42** may be varied, depending upon the requirements of the particular engine.

Figures 7 and 8 illustrate two modifications of cover **36**. The cover **36*a*** of Figure 7 has only a conduit portion **48** with no conical depression **50**, as seen in Figures 2 through 5; the cover **36*b*** of Figure 8 has a conduit portion **48** with a relatively large conical depression **50*a*** therein. The effects of these modifications will be discussed later in the specification.

General operation of invention

When the engine is operating, fuel is drawn into conduit **30** and subsequently into chamber **32** where it is emulsified with the air, by means of conduit **48**, which is rushing past it through the induction passage **16**. The resulting fuel-air mixture is then drawn through conduits **42** and discharged into the induction passage.

In general, the resulting emulsification becomes lighter in weight than "raw" fuel and because of this, more sensitive to air flows through the induction passage.

During actual tests which were conducted on this nozzle, it was found that responsiveness of fuel flow increased as the ends **44** of conduits **42** approached the venturi throat. Therefore, it becomes apparent that a means of obtaining optimum fuel-air ratio curve characteristics is the relative position of conduits **42** with respect to the venturi throat **46**.

Another means of controlling the "curve characteristics" is by changing the angle of ends **44** of the conduits **42**, and Figures 4 and 5 illustrate some of these modifications. By having the end shaped as **44*a*** of Figure 4, it is possible to create a ram effect within the conduit **42**, thereby leaning out the fuel-air ratio at higher engine speeds and air flows. If the end were formed as **44*b*** of Figure 5, the fuel-air ratio would be increased because of the added aspirating effect caused by the air flow past the open end **44*b***. It can readily be seen that any of these modifications or any combination of them can be employed in order to control the "flow curve" characteristics of the carburetor.

Figures 7 and 8 illustrate modifications of the cover **36**. Figure 7 shows a passage **48** of relatively uniform size, extending through the cover **36*a***. Figure 8 discloses a cover **36*b*** having a passage **48** communicating with a relatively large conical depression **50*a*** on the normally exterior portion of the cover. If cover **36*a*** were

employed, a relatively small amount of air would be admitted therethrough, thereby reducing the degree of emulsification of the fuel and air within the chamber **32**. However, if the cover **36***b* were used, the air would strike the surface of depression **50***a* and consequently add a greater amount of air to the resulting emulsification.

It is apparent that the nozzle provided by the invention is highly flexible in that it can be adapted to any carburetor on any engine by virtue of the disclosed modifications. Tests have shown that engines which have been equipped with carburetors employing this invention are generally more responsive to operator demands and have delivered a substantial increase in torque with all other variables being equal. This is due, of course, to the sensitivity of the nozzle and its ability to deliver a thoroughly mixed combustible mixture to the engine at a point where best distribution can be accomplished.

Still other modifications may be made without exceeding the scope of the invention, as defined by the attached claims.

What I claim as my invention is:

1. In a fuel nozzle for a carburetor for an internal combustion engine, an induction passage formed through said carburetor, a venturi formed within said induction passage, means forming a substantially closed emulsifying chamber within said induction passage upstream of said venturi, a main fuel supply conduit adapted to supply fuel to said chamber terminating in said chamber, single air inlet means at the upstream end of said chamber supplying all of the air required to said chamber for controlling the degree of emulsification, and means at the downstream end of said chamber for conducting the resulting emulsion to a plurality of points in close proximity to said venturi.

2. In a carburetor for an internal combustion engine having an induction passage with a venturi formed therein and a fuel reservoir for supplying fuel in metered quantities to said induction passage, a main fuel supply conduit having its one end in communication with said fuel reservoir and its other end terminating in a substantially closed fuel emulsifying chamber, said chamber being located within said induction passage anterior to said venturi and presented generally within the path of travel of the air passing through said induction passage, single air inlet means forming a ram pipe communicating with the end of said chamber on which said air normally impinges, said ram pipe having a volume less than the volume of said chamber and serving to supply all of the required air for emulsification of said fuel within said chamber, and a plurality of radially spaced downwardly depending discharge conduits communicating between said chamber and points in close proximity to the throat of said venturi.

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