Feb. 8, 1938.

F. NEILSON

2,107,832

FUEL SAVER FOR ENGINES

Filed June 17, 1935

FIG. 1.

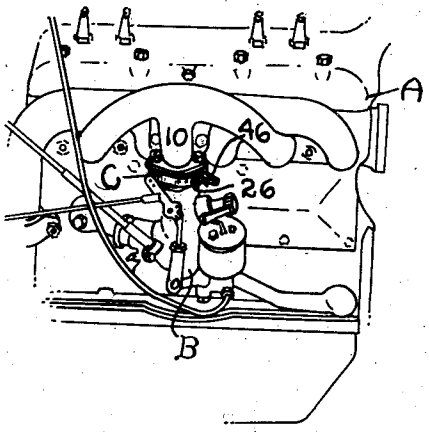


FIG. 2.

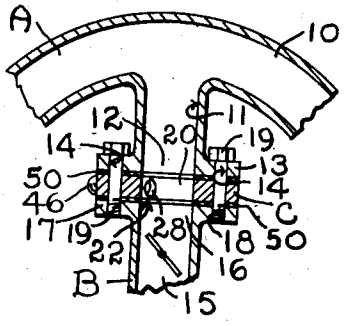


FIG. 3.

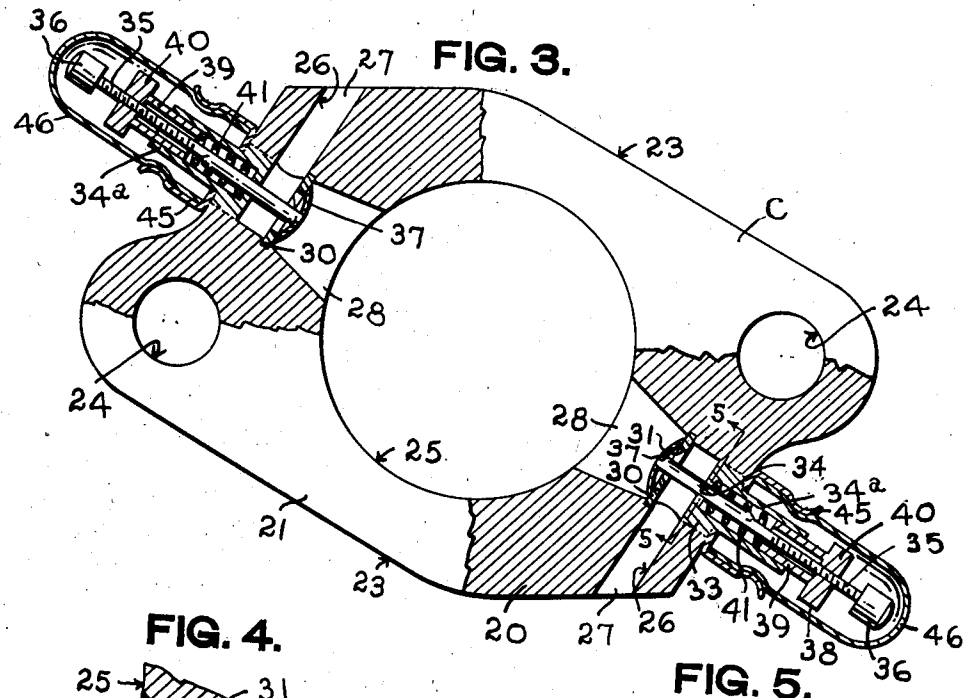


FIG. 4.

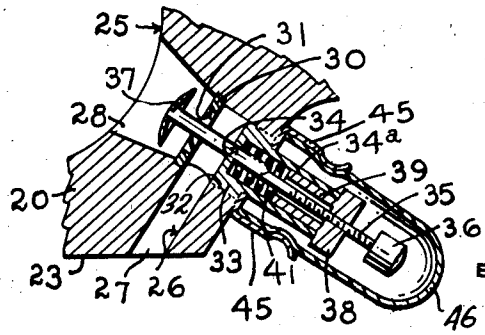
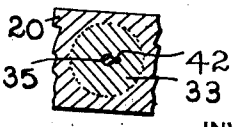


FIG. 5.



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FUEL SAVER FOR ENGINES

Frank Neilson, New York, N. Y.

Application June 17, 1935, Serial No. 27,086

1 Claim. (Cl. 251—145)

This invention relates to fuel mixers and more particularly to a device to be associated with the intake manifold of an internal combustion engine for the purpose of mixing a volume of air with the charge coming from the engine's carburetor.

An object of the invention is to provide such a device which will save a large volume of fuel, such as gasoline, when employed in connection with an internal combustion engine or the like.

Another object is to provide a fuel saver, as heretofore described, which will efficiently preheat the air before it mixes with the charge from the carburetor.

Still another object, and an important one, is to so lead the air stream that the operating portions of the device will not become clogged by foreign matter nor will they be apt to become rusted or corroded.

Another object is to provide a valved fuel saver and mixer which will not allow the escape of fuel charges into the atmosphere, yet will permit an addition of atmospheric air to the charge.

Another object is to provide a device of this kind which will operate to discharge two air streams into the fuel charge as it comes from the carburetor, the discharge being such that the additional air will become well mixed with the fuel charge.

Other objects and advantages of the invention will be apparent during the course of the following detailed description, taken in connection with the accompanying drawing, forming a part of this specification and in which drawing:—

Figure 1 is a perspective view of the novel device attached to an internal combustion engine between the carburetor and the intake manifold thereof.

Figure 2 is a vertical section through the novel device and associated portions of the carburetor and intake manifold of an internal combustion engine.

Figure 3 is a view, largely in horizontal section, of the novel device with valves, forming a portion of the construction, closed.

Figure 4 is a fragment of the novel device showing one of the valves, by way of example, open; and

Figure 5 is a sectional view substantially on the line 5—5 of Figure 3.

In the drawing wherein for the purpose of illustration is shown a preferred embodiment of the invention and wherein similar reference characters designate corresponding parts throughout the several views, the letter A designates generally an apparatus making use of a fuel charge, such as an internal combustion engine, B a main charge forming device, such as a carburetor, and C the novel fuel mixer.

For the purpose of illustration, A is shown as an internal combustion engine having an intake manifold 10 provided with a charge intake passageway 11, the mouth 12 of the passageway being surrounded by a flange 13 having perforations 14, all the foregoing being conventional construction.

Usually the charge forming device B, shown as a conventional carburetor, has a passageway 15 for the charge after it is formed, the passageway ending in an outlet mouth 16 surrounded by a flange 17 provided with perforations 18, co-axial with the perforations 14 so that, ordinarily, the flanges 13 and 17 may be coupled together, as by screws 19.

The novel fuel saver C is adapted to be interposed between these two flanges 13 and 17, and includes a body portion 20, preferably relatively thin and having opposite flat faces 21 and 22 and an outer face 23 preferably conforming to the contour of the outer faces of the flanges 13 and 17, thus providing a gasket-like structure. It is preferred that this body portion be of heat conducting metal and the body portion may be integral although it is apparent it may be formed of two half sections joined together longitudinally.

The body portion 20 is provided with a suitable number of perforations 24, co-axial with the perforations 14 and 18 when the body portion is interposed between the flanges 13 and 17 as stated. Furthermore, the body portion 20 has a central bore or chamber 25, of substantially the same circumference as the circumferences of the passageways 11 and 15.

Extending from the outer face 23 of the body portion 20 to the chamber 25 are, preferably, two substantially L-shaped passageways or conduits 26 and the mouths 27 of the passageways 26 at the face 23 may be termed the intakes of the passageways 26, while the mouths 28 of the passageways 26 at the chamber 25 may be termed the outlets of the passageways 26. It will be noted that there is provided a relatively long passageway formed by this L-shape, much longer than a passageway which might extend in a straight line radially from the chamber 25. By this construction, air or other gas flows through the L-shaped passageways and will be heated much more than air which will flow through the shorter or conventional passageways provided for

devices of this kind. However, this desirable heating is not the only reason for the specific shape of the passageways **26**.

Preferably, the mouths **28** are tapered, as shown in Figure 3 and, inwardly of each of these mouths **28**, is a valve seat **30** which may comprise a metallic disc having a central bore **31**. However, the seat **30** may be a split ring adapted to be sprung into place through the chamber **25** and the tapering mouths **28**, the body portion being suitably grooved for the purpose of accommodating the edge portions of the seat **30**. This seat **30** may be said to face towards the chamber **25**.

Extending from the face **23** of the body portion **20** are perforations **32** co-axial with the mouths **28** and ending at the passageways **26**. In other words, the axes of the perforations **32** are normal to the axes of a part of the passageways **26**.

In addition to the valve seat **30** each valve structure includes a valve guide and sleeve, comprising an enlarged portion **33** snugly accommodated in the perforations **32** and having a valve stem bore **34** and a sleeve portion **34a**. Furthermore, the valve structure includes a valve stem **35** slidably extending through the bores **31** and **34** and sleeve portion **34a**, the opposite or outer end of the valve stem portion protruding from the face **23** of the body portion **20**, and this protruding end may be screw threaded and terminate in a head **36**.

The inner end of each valve stem **35** terminates in a valve **37**, preferably somewhat cup-shaped and adapted to seat on the valve seat **30**, with the convex face of the valve **37** facing the chamber **25**. A follower **38** is adjustably threaded upon the valve stem **35** and includes a cylindrical portion **39** which extends about a portion of the stem **35** and is screw threaded, and an enlarged head **40**. The cylindrical portion **39** of the follower **38** is slidably accommodated within the sleeve portion **34a** and this sleeve portion also accommodates an expansion coil spring **41** with one end of the latter bearing against the face of the base of the sleeve portion **34a** and the other end bearing against the cylindrical portion **39**. This arrangement normally forces the valve **37** to remain seated. So that the valve stem **35** will not rotate, it may be provided with a laterally extending portion slidable through an opening **42** shown in Figure 5, which opening may extend from the base of the sleeve portion through the enlarged portion **33** to the passageways **26**.

Welded or otherwise secured to (or forming a part of) either the body portion **20** or the valve housing are spring clips **45** of any approved construction, for removably retaining suitable valve caps **46** for protecting the valve structures, as is apparent in Figure 3.

Gaskets **50** may be provided, if desired, to be disposed between each face **21** and **22** and the adjacent faces of the flanges **13** and **17**, as is shown in Figure 2.

In the use of the novel fuel saver C, after the charge forming device B, such as the conventional carburetor shown, is uncoupled from the end of the intake manifold **10**, the novel fuel saver is inserted with the gaskets **50**, and all, including the carburetor, are tightly coupled together.

The charge, after being formed in the carburetor B, enters the chamber **25** and as the charge flows through the chamber **25**, the vacuum created unseats the valves **37** and allows air to be drawn through the passageways **26**. This air is well heated because of its relatively long passage through the substantially L-shaped passageways, since the body portion **20** is heated by the heat radiated from the adjacent structure of the engine. The heated air stream, striking both the stream of the charge as well as the stream of heated air flowing from the opposite mouth **28**, will be well baffled about so that a good mixture is effected in the chamber **25** without the need of baffles or the like. In fact baffles would be detrimental when this mouth-facing-mouth arrangement is employed.

One factor that has seriously interferred with the successful operation of devices of this kind, where the air is drawn in past and along the valve stem or stems for substantially their entire length, has been that grease, oil, moisture and the like have also been drawn in and have lodged upon the valve structure (particularly the valve stem and spring) ordinarily associated therewith. By the construction disclosed, there is provided, at one and the same time, a relatively long passageway for the air and also protection for the valve structure, since the air does not flow along or about the spring **41** and major portion of the valve stem **35**.

The caps **46** may remain in place except when it is desired to adjust the tension of the springs **41**, which may be done by adjusting the positions of the followers **38** along the valve stems **35** as is apparent.

Various changes may be made to the form of invention herein shown and described, without departing from the spirit of the invention or the scope of the claim.

What is claimed is:

In a fuel saver, adapted to add a volume of gas to a charge pre-formed by a charge-forming device and adapted to be interposed between the outlet of said charge-forming device and the inlet of an intake manifold of an internal combustion engine, a gasket-like body portion having a centrally-disposed chamber therethrough, with openings at both ends thereof, one opening adapted for communication with said charge forming device and the other opening adapted for communication with said intake manifold, said body portion also having a substantially L-shaped gas intake passageway, wholly within said body portion, opening to the outer atmosphere directly at the exterior of said body portion and extending to said chamber, the longitudinal axis of that portion of said gas passageway nearest said chamber being radially disposed with reference to the axis of said chamber, a valve structure carried by said body portion, including a seat within said portion of said passageway, disposed at the juncture of the two portions of said L-shaped passageway and spaced from and facing said chamber, a valve normally on said seat and a valve stem secured to said valve, extending into said passageway and disposed with its axis substantially radial with reference to the axis of said chamber, and valve means urging seating of said valve, including a spring located wholly outside said gas intake passageway.

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