June 13, 1944. C. H. DE WALL 2,351,494

GAS MIXING DEVICE

Filed March 1, 1943 2 Sheets-Sheet 1

Fig. 1

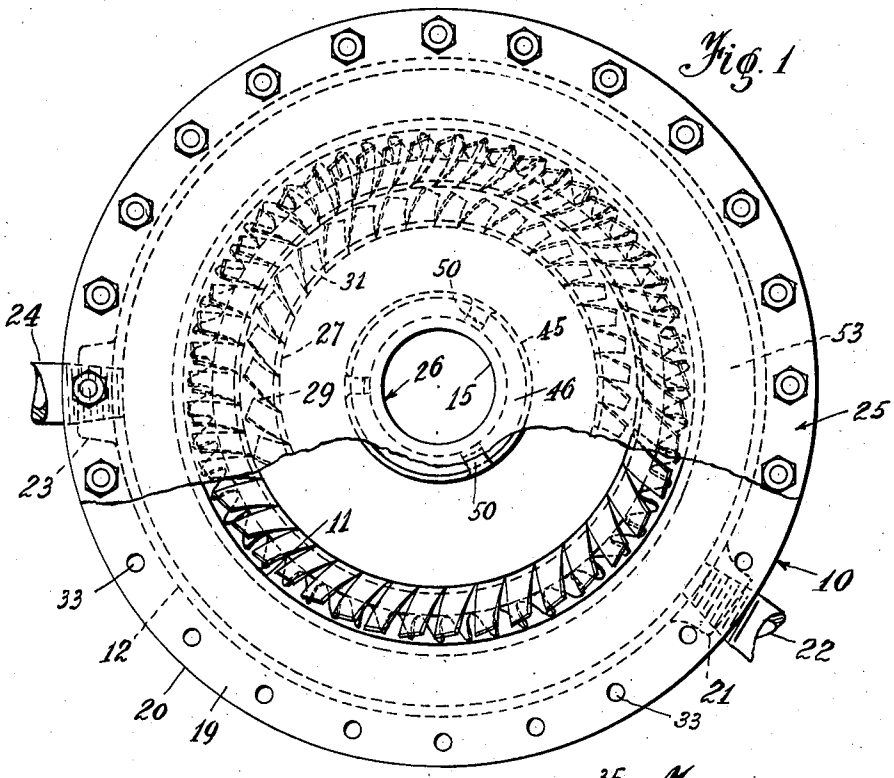
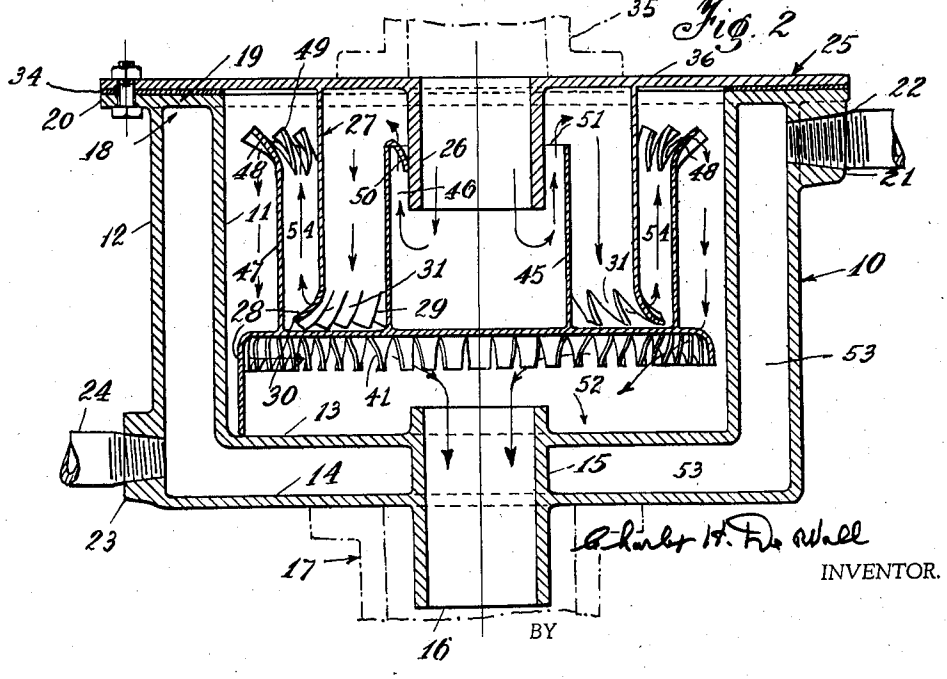


Fig. 2



Charles H. De Wall

INVENTOR.

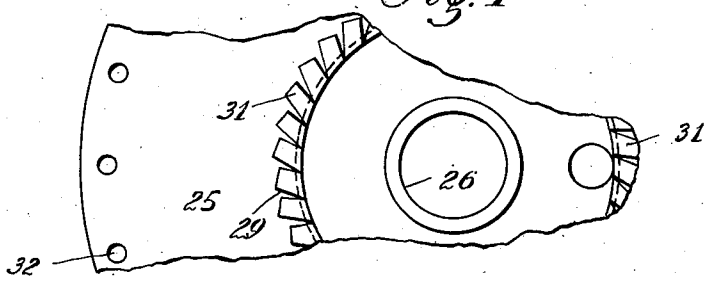
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GAS MIXING DEVICE

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Fig. 4



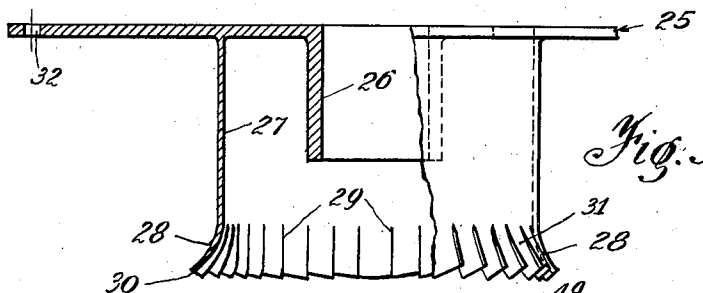


Fig. 3

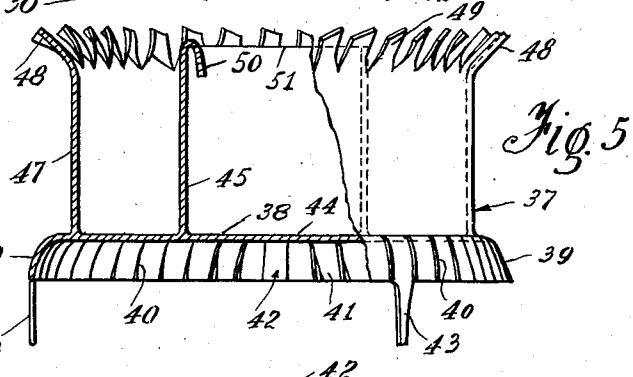


Fig. 5

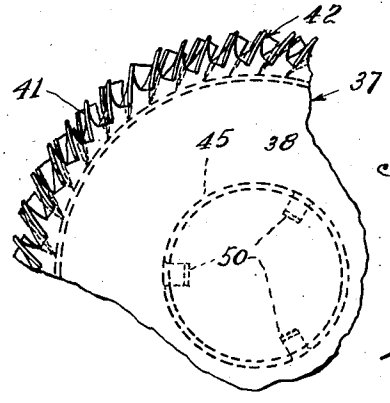


Fig. 6

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UNITED STATES PATENT OFFICE

2,351,494

GAS MIXING DEVICE

Charles H. De Wall, Orange, N. J.

Application March 1, 1943, Serial No. 477,680

4 Claims. (Cl. 48—180)

This invention relates to vaporizers or gas mixing devices for internal combustion engines or the like and has for its object to provide a device of this nature which will be adapted to be interposed between a carbureter and the intake manifold, or which will be capable of being situated in any suitable position, for the purpose of additionally vaporizing and mixing the fuel delivered to the engine while in transit from the carbureter to the cylinders.

It is well known that with present carbureters using standard fuels it is extremely difficult to produce a thoroughly vaporized fuel mixture for ideal engine performance. This incomplete mixing of the fuel results in a heavy or wet mixture being drawn through the intake manifold and into the engine cylinders thereby causing incomplete combustion and therefore carbon to form which, as is well known, will cause overheating of the engine which, of course, means loss of power.

Correct conditions require a thoroughly homogenized air and fuel mixture for ideal combustion and it is believed that by the use of the present invention a thoroughly vaporized mixture will be achieved which will improve the quality and performance of the fuel mixture also provide greater facilities for more complete vaporization of the fuel used in the operation of internal combustion engines.

It is the object of the invention to provide a device so arranged to give the air and gas mixture drawn through the device by suction from the engine a whirling action to more thoroughly mix the same and also break up the fuel mixture stream and produce sufficient turbulence by drawing the mixture over, under and in circular direction between a series of baffles and deflectors between a heated area or surface.

Another object of the present invention is to provide a device with means whereby the fuel mixture is spread over an enlarged area, over and under a series of circular baffles, each provided with a plurality of deflectors to produce a circular fuel mixture stream after which the latter is drawn through the exit portion of the device of reduced area and then through the intake manifold to the engine cylinders.

Yet another object of the invention is to provide a device in which the speed of the fuel mixture varies while passing through the several, radially disposed, baffles and deflectors of the device.

Still another object of the invention is the provision of a fuel mixing device which may be used as an attachment for internal combustion engines which may be installed in engines now in use without alterations thereto.

A further object of the invention is the provision of a fuel mixing device which is simple in construction and inexpensive to manufacture.

With these and other objects in view, the invention resides in the certain novel construction, combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawings, in which:

Figure 1 represents a top plan view of the assembled device showing part of the cover removed.

Figure 2 is a vertical central section through the improved gas mixing device.

Figure 3 shows a vertical sectional view through the cover of the device including the centrally disposed inlet port and the dependent baffle ring and deflectors, partly in outline.

Figure 4 is a fragmentary bottom view of Figure 3.

Figure 5 is a sectional view, partly in outline of the cylindrical vessel as used in this invention.

Figure 6 is a fragmentary bottom view of Figure 5.

Referring to the drawings by reference characters, the numeral 10 designates a hollow cylindrical body having an inner wall 11 and an outer wall 12, an inner bottom 13 and an outer bottom 14, both bottoms merging into a centrally disposed vertical outlet tube 15, the exterior portion 16 of which extends into the flanged end 17 of an intake manifold (not shown). The upper space 18 of said body 10 between the inner wall 11 and the outer wall 12 is filled up or covered by a circular plate 19 which extends outwardly to form a flange 20. On the outer wall 12 of said hollow body 10 and adjacent the top thereof is a boss 21 which is provided with suitable pipe threads adapted for reception of a pipe 22. The outer wall 12 has another boss 23, near the bottom thereof which is also provided with pipe threads for the reception of a pipe 24.

The cylindrical body 10 is provided with a cover 25 having a central, depending tubular extension 26 which serves as an inlet port. This cover 25 is also provided with a downwardly extending cylindrical baffle 27 spaced in concentric relation in respect to the tubular extension 26, the bottom portion 28 of which is preferably flared outwardly and provided with a plurality of slits 29 extending radially around the circum-

ference of the lower edge 30 of said baffle 27, thus leaving lugs 31. Each lug 31 is twisted at an angle, as shown in Figures 1 and 2.

The said cover 25 is provided with bolt holes 32 which correspond with the holes 33 of the cylindrical body 10. A gasket 34 is interposed between the cover 25 and said body 10 in order to produce a tight joint therebetween.

The numeral 35 designates the flange portion of a carbureter (not shown) which is secured to the outer portion 36 of the cover 25 in any suitable manner.

Referring now to Figures 5 and 6, I have illustrated the structure of the removable cylindrical vessel 37 which is placed within the body or casing 10 in a manner as shown in Figures 1 and 2, or otherwise. Said vessel 37 comprises a circular base 38 having a downwardly flaring rim 39 which is provided with a series of slits 40, thus leaving lugs 41 which may be twisted at any desired angle so as to form a circular deflector 42. Three or more of said lugs 41 may be utilized as supporting legs 43 for said vessel 37 by extending the lugs downwardly, as shown.

The top portion 44 of said base 38 is provided with an upstanding, centrally disposed tubular baffle 45 of a diameter, large enough to provide a space 46 between the central tubular extension 26 of the cover 25 when in assembled position.

In concentric relation with said tubular baffle 45 is the cylindrical outer shell 47, preferably made integral with said base 38, the upper flared edge 48 of which is also provided with a plurality of lugs 49 of similar design as the ones described for the cylindrical baffle 27 of the cover 25.

In order to properly center and retain the cylindrical vessel 37 within the body or casing 10 I provide three or more inwardly turned finger extensions 50 at the top edge 51 of said tubular baffle 45.

The outlet tube 15 of said casing 10 extends upwardly of the inner bottom 13, so as to provide a trap 52 for retarding heavy fuel for further evaporation.

The fuel mixture within the device may be heated in an effective manner by leading a portion of the exhaust gases taken from the exhaust manifold of the engine through the heating chamber 53 of the device.

In the operation of the device, the mixture produced by a carbureter, or otherwise is drawn through the tubular inlet port 26, then up the space 46 between said tube 26 and the tubular baffle 45 and down between the baffles 45 and 27, after which the fluid mixture passes through the deflector lugs 31, thereby causing a whirling action of the mixture, whereupon it flows between the space 54 between the baffles 27 and 47 and is then whirled through the reflector lugs 49 of the outer shell or baffle 47 after which the fluid mixture is drawn downwardly and whirled through the deflector lugs 41 and finally discharged into the intake manifold through the outlet tube 15.

It will be apparent, that by circulating the fuel mixture through the various baffles and deflectors of the device, the same will be completely vaporized and may be used with maximum efficiency for combustion purposes.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, hence I do not wish to be limited to the particular embodiment herein shown and described.

I claim:

1. A fuel mixing device of the character described comprising a casing and a cover therefore to form a mixing chamber for the fuel; a fuel intake tube in said cover and a fuel outlet tube in said casing; a series of upstanding and depending cylindrical baffles within said mixing chamber interposed in alternate relation and some of said cylindrical baffles provided at their free edge with a plurality of outwardly flared and angularly twisted lugs to form a deflector for the fluid.

2. A fuel mixing device of the character described comprising a casing and a cover therefore to form a mixing chamber; said cover provided with a central downwardly extending fuel inlet tube and a depending cylindrical baffle concentric therewith provided at its lower free edge with a plurality of outwardly flared and angularly twisted lugs to form a deflector and turbulator for the fluid; a removable vessel within said mixing chamber provided with concentric upstanding cylindrical baffles arranged in alternate, interposed relation with said depending cylindrical baffles of said cover; the innermost baffle provided with means to frictionally retain said removable vessel in concentric relation with the baffles of said cover.

3. A fuel mixing device of the character described comprising a casing and a cover therefore to form a mixing chamber; said cover provided with a central downwardly extending fuel inlet tube and a depending cylindrical baffle concentric therewith provided at its lower free edge with a plurality of outwardly flared and angularly twisted lugs to form a deflector and turbulator for the fluid; a removable cylindrical vessel within said mixing chamber having a base with a downwardly flared rim provided with a series of twisted lugs, some of which being elongated to form a rest for said vessel; concentric upstanding cylindrical baffles arranged in alternate interposed relation with said depending baffles of said cover; the innermost baffle thereof provided with means to retain said removable vessel in concentric relation with the baffles of said cover and the outer baffle provided at its upper free edge with a series of twisted lugs.

4. A fuel mixing device of the character described comprising a casing and a cover therefore to form a mixing chamber; said cover provided with a central downwardly extending fuel inlet tube and a depending cylindrical baffle concentric therewith provided at its lower free edge with a plurality of outwardly flared and angularly twisted lugs to form a deflector and turbulator for the fluid; a removable cylindrical vessel within said mixing chamber having a base with a downwardly flared rim provided with a series of twisted lugs, some of which being elongated to form a rest for said vessel; concentric upstanding cylindrical baffles arranged in alternate interposed relation with said depending baffles of said cover; the innermost upstanding baffle of said removable vessel provided with a series of inwardly turned flexible finger extensions to frictionally engage the exterior surface of said fuel inlet tube of said cover.

CHARLES H. DE WALL.