Oct. 30, 1923. 1,472,665

F. D. MOWEN

FUEL VAPORIZING AND MIXING MECHANISM

Filed June 15, 1922 2 Sheets-Sheet 1

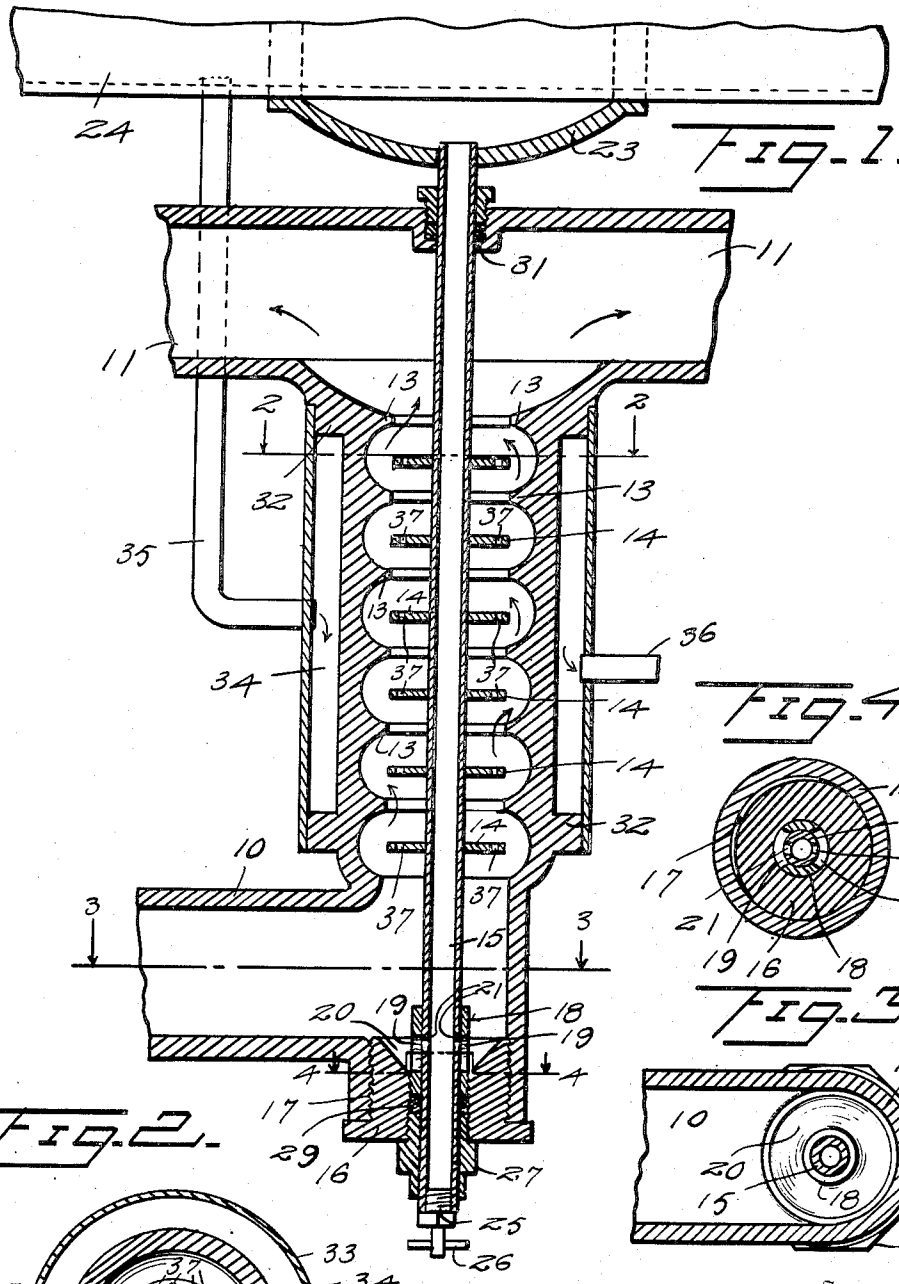



Fig. 1.

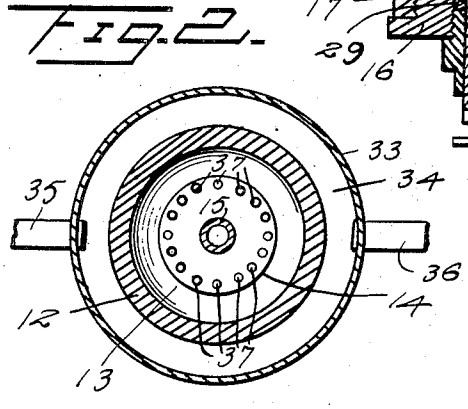



Fig. 2.




Fig. 4.




Fig. 3.

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Filed June 15, 1922 2 Sheets-Sheet 2

Fig. 5.

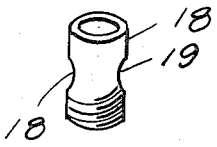



Fig. 6.

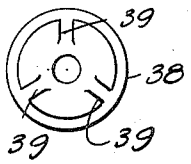
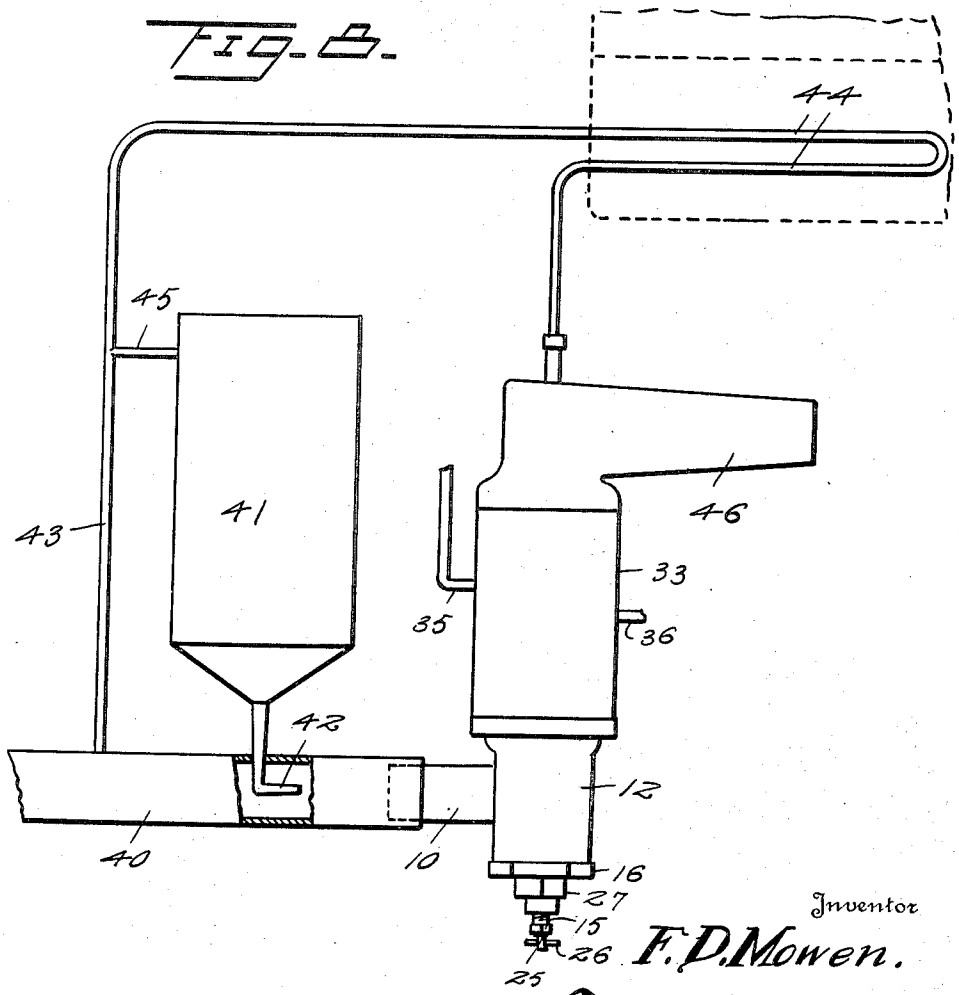



Fig. 7.




Fig. 8.




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# UNITED STATES PATENT OFFICE.

FREDERICK D. MOWEN, OF PLAINFIELD, NEW JERSEY.

## FUEL VAPORIZING AND MIXING MECHANISM.

Application filed June 15, 1922. Serial No. 568,423.

*To all whom it may concern:*

Be it known that I, FREDERICK D. MOWEN, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in a Fuel Vaporizing and Mixing Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a fuel mixing and vaporizing means for internal combustion engines, burners as of furnaces and boilers, and generally where fuel is to be mixed with air or vaporized.

One important object is to provide a tortuous passage means consisting of a first set of baffles, a second set of baffles, one being movable relatively to the other to control the extent of opening between the baffles to insure admixture of the fuel and air therein and to act as a throttle to control the velocity with which the mixture passes therethrough.

Another object is to provide a construction having a well or means to catch fuel globules which fail to vaporize in association with a source of heated air having its inlet at the well.

A further object is to provide a novel adjustable inlet tube for heated air and on which a set of the said baffles may be provided, together with a novel mounting and valve means for the tube.

A still further object is to provide such a means to function supplemental to the carbureter and to utilize heat from the exhaust products of combustion for air admitted to the fuel and to warm the means through the fuel passes.

Additional objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating one practical embodiment.

In said drawings:—

Figure 1 is a view illustrating my improvement principally in vertical section;

Figure 2 is a cross sectional view on the line 2—2 of Figure 1;

Figure 3 is a cross sectional view on the line 3—3 of Figure 1;

Figure 4 is a cross sectional view on the line 4—4 of Figure 1;

Figure 5 is a detail perspective view of the valve sleeve employed;

Figure 6 is a plan view of one form of baffle discs used;

Figure 7 is a plan view of another form of baffle discs used, and

Figure 8 is a fragmentary view partly in elevation and partly in section showing the invention used in connection with the burner of a furnace or fire box.

Like reference characters designate like or similar parts in the different views.

Referring specifically to the drawings, and first to Figures 1 to 7, an intake manifold having its inlet tubular section at 10, its outlet section at 11 and an intermediate tubular section or conduit at 12. The manifold is of the general type used in internal combustion engines and the portion 10 adapted to receive carbureted fuel from the carbureter and the portions 11 adapted to supply it into the cylinders or combustion chambers.

The conduits 12 may be of any configuration and have a row or series of baffle plates at 13 in the form of flanges integral therewith. A plurality of baffle or throttle disks or plates 14 are provided which may be carried by a stem in the form of a tube 15. Tube 15 is disposed longitudinally of the conduit 12 and is adjustable so that the distance between the baffle plates 14 and the baffle flanges 13 above the same may be varied or throttled independently of or in conjunction with throttling of the carbureter so as to vary the velocity of the carbureted mixture passing through the manifold.

Below the conduit 12 and in line therewith, the manifold is closed by a plug 16 in the form of a detachable gland nut screw threaded in place as at 17.

Screw threaded into the bore of the plug 16 is a valve sleeve or tube 18. This sleeve may have a plurality of outlet ports 19 in its side which communicate with the depression or well 20 in the upper surface of the plug 16.

Tube 15 is adjustably disposed within the sleeve 18 and it has a plurality of outlet ports 21 to communicate with the ports 19. Tube 15 is adapted to convey heated air which is received within a hood or the like 23 applied about or adjacent to the exhaust pipe of the engine with which the manifold is associated and as suggested at 24. A plug of any suitable construction is provided for the

lower end of the tube as at 25 and a manipulating pin or handle 26 is provided therefor.

Also screw threaded in the bore of the plug 16 is a stuffing box gland 27. Compressible packing means at 29 may be interposed in the bore of nut 16 intermediate the end of the sleeve 18 and gland 27. A suitable packing box structure is preferably provided as at 31, about the tube 15, where it slidably passes through the upper wall of the manifold.

Suitable flanges 32 offset a drum 33 about the conduit 12 in order to provide a heating chamber 34 in communication with the exhaust pipe 24 as through a conduit 35. The exhaust products discharge from the chamber 34 as through a conduit 36.

The variation in the position of the tube 15 may be effected by a lever in contact with the pin 26 which lever may be operated in conjunction with the throttle of a carbureter or independently thereof by a rod extending through the dash and within convenient reach of the operator of the vehicle to which the invention is applied.

In operation, the carbureted mixture flows through the portion 10 and then through the conduit 12, taking a tortuous course in view of the baffles 18 and 14. The friction of the fuel and warm air supplied through the ports 21 and 19 will cause intimate admixture thereof and contact with the baffles 13 and 14. This admixture is aided by heat from the exhaust products of combustion discharging through the chamber 34. The baffles will cause the heavier globules or particles of the fuel to fall into the well 20 thus in the direct line of entering heated air, so as to cause vaporization of such globules or particles.

It is to be understood that the tube 15 has vertical movement and normally is in a raised position where the openings 19 and 21 do not register, but when the tube is lowered to space the baffles 13 and 14, the ports register and warm air is fed into the mixture coming from the carbureter.

The baffles 14 may be of any suitable construction, for instance as shown in some of the figures, may have one or more openings or perforations therethrough as at 37 through which the fuel may also pass to thus establish cross currents thereof. The same function may be performed by the modified form of baffle plate 14 shown in Figure 6 where it is designated 38 and is scored and deflected to provide ports at 39. Still another modified form is to be shown in Figure 7 where the baffle is designated 40, being equivalent of baffles 14 and 38 but solid or imperforate.

The invention is not limited to use in an internal combustion engine as it may be used in many other relations for instance as shown in Figure 8. In said figure, air or steam under pressure passes through a conduit 40 into conduit 10. A supply tank 41 for liquid fuel discharges into conduit 40 at a nozzle 42 whereby it is atomized as it mixes with the steam or air; a pipe 43 leads from conduit 40 to the tube 15, having a portion 44 disposed in or adjacent a fire box or burner of a boiler or the like so that compressed air discharging from pipe 15 will be preheated. A branch 45 leads from pipe 43 to the tank 41 to assist in discharging fuel therefrom by the compressed air or steam in conduit 40, The fuel mixed with air or vaporized as in the embodiment of Figures 1 to 7 and discharges into the burner through a tube 46. Space 34 receives the exhaust products of combustion from such burner or is in communication with heated air therefrom in any suitable manner.

As merely practical embodiments have been illustrated and described, it is to be understood that changes in the details may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:—

1. A fuel supply mechanism having a conduit to receive carbureted fuel, said conduit having interior baffle flanges, said conduit having exterior shoulders, a drum in engagement with said shoulders to provide a chamber to receive exhaust products of combustion, a plug at the base of said conduit provided with a well and a bore, a sleeve screw threaded in said plug and having a port in communication with said well, an air inlet tube in said conduit adjustably mounted in said sleeve and having a port to cooperate with said port, a nut screw threaded on said sleeve in said bore, packing intermediate said nut and said sleeve, said tube being slidably mounted in the bore of the conduit, and baffle members extending from said sleeve to cooperate with said baffle flanges.

2. A fuel supply mechanism having a conduit to receive fluid fuel, said conduit having baffle members therein in spaced relation, an air pipe in said conduit, said pipe having an opening within said conduit, a second set of baffle members mounted on said pipe and cooperating with the first mentioned baffle members to cause the fuel to follow a tortuous course through said conduit and through a plurality of passages, and said pipe being adjustable to move the baffle members carried thereby to throttle said passages.

3. A fuel supply mechanism having a conduit to receive fluid fuel, said conduit having baffle members therein in spaced relation, an air pipe in said tube and arranged centrally thereof, said pipe having an opening within said conduit, a second set of baffle

members mounted on said pipe and cooperating with the first mentioned baffles to cause the fuel to follow a tortuous course through said conduit and through a plurality of passages, said pipe being adjustable to move the baffle members carried thereby to throttle said passages, and said baffle members carried by said pipe being perforated.

4. A fuel supply mechanism having a conduit to receive fluid fuel, said conduit having baffle members therein in spaced relation, an air pipe in said conduit, said air pipe having an opening within said conduit, means normally closing said opening, a second set of baffle members mounted on said pipe and cooperating with the first mentioned baffles to cause the fuel to follow a tortuous course through said conduit and through a plurality of passages, said pipe being adjustable to move the baffle members carried thereby to throttle said passage and to expose the opening in said pipe and permit the entrance of air into said conduit.

5. A fuel supply mechanism having a conduit to receive fluid fuel, said conduit having baffle members therein in spaced relation, an air pipe in said conduit, said air pipe having an opening within said conduit, means normally closing said opening, a second set of baffle members mounted on said pipe and cooperating with the first mentioned baffles to cause the fuel to follow a tortuous course through said conduit and through a plurality of passages, said pipe being adjustable to move the baffle members carried thereby to throttle said passage and to expose the opening in said pipe and permit the entrance of air into said conduit, and the baffle members carried by the pipe being perforated.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK D. MOWEN.

Witnesses:

CHARLES W. MOWEN,

GEORGE E. MOWEN.