F. A. HEATH.

CHARGE MIXING DEVICE FOR GAS ENGINES.

APPLICATION FILED SEPT. 20, 1909.

1,051,369. Patented Jan. 21, 1913.

Fig. 1.

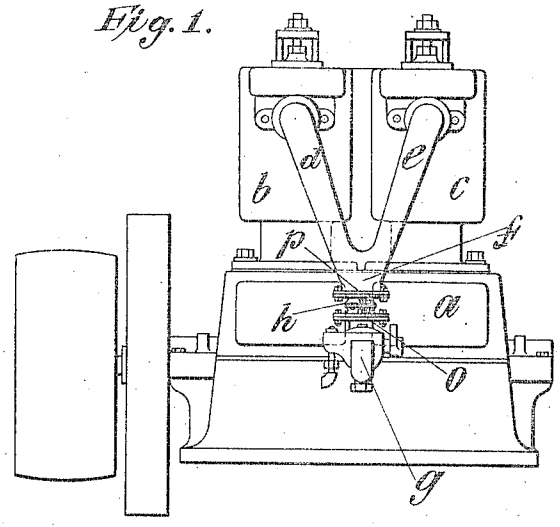


Fig. 2.

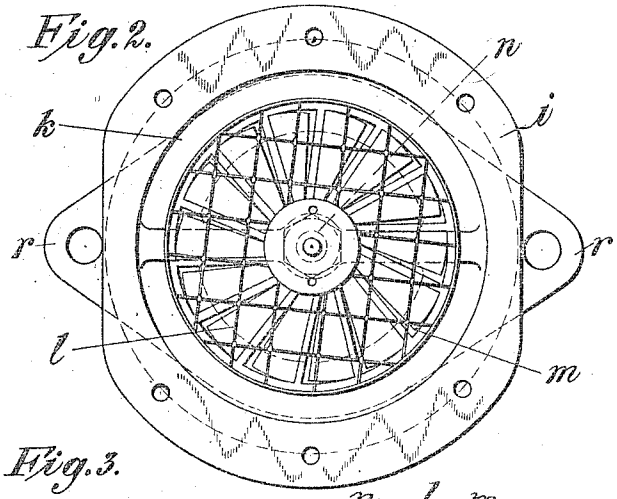
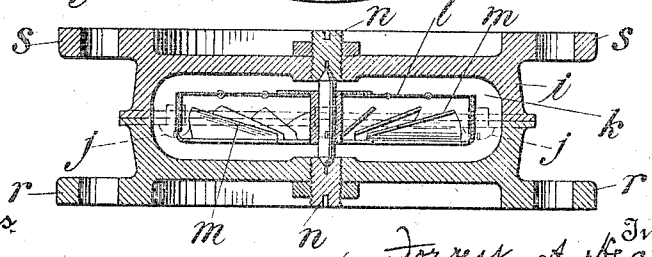


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

FORREST A. HEATH, OF JERSEY CITY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HOMO COMPANY OF AMERICA, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF DELAWARE.

CHARGE-MIXING DEVICE FOR GAS-ENGINES.

1,051,369. Specification of Letters Patent. Patented Jan. 21, 1913.

Application filed September 20, 1909. Serial No. 518,509.

To all whom it may concern:

Be it known that I, FORREST A. HEATH, a citizen of the United States, and a resident of Jersey City, in the State of New Jersey, have invented certain new and useful Improvements in Charge-Mixing Devices for Gas-Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The general object of the present invention is to organize into a convenient and practical relation, a gas engine, a carbureter and a mixing device for the gas and air which are brought together in the carbureter to form the fuel mixture for the engine. It is well understood that such fuel mixture should have its elements thoroughly commingled, that is, should be perfectly homogeneous throughout, in order that the best results from its combustion within the engine may be obtained. For this reason, it has been proposed to embody, in a carbureter, a mixing device which would tend to effect a uniform mixture of the fuel elements before they left the carbureter; or, in other words, to unite or combine, in a unitary or complete structure, means for introducing a hydrocarbon and for vaporizing the same, and for introducing air to be carburized thereby, with a means for stirring up the more or less unevenly mixed combination of gases produced by the introduction at random of the air and hydrocarbon.

In carrying out the general object of the invention above stated, a mixing device has been devised of the most compact form and so as to constitute a unitary or complete structure. The said device and its coördination with the engine and the carbureter will now be particularly shown and described in connection with the accompanying drawings in which,

Figure 1 is a view in side elevation of an engine structure with the invention embodied therein. Fig. 2 is a top plan view of the mixing device removed from the engine and on a much larger scale, and, Fig. 3 is a vertical central section through the same.

The gas engine, denoted by *a*, is shown in a conventional way and, so far as the present invention is concerned, may be of any construction or type whatever. In the present case, for purposes of illustration and explanation, a hydrocarbon engine having two cylinders *b* and *c* is shown in Fig. 1 of the drawings, the intake conduits for the fuel mixture being denoted by *d* and *e* respectively. These conduits lead from a V-shaped manifold *f* to which, ordinarily, the carbureter, as *g*, would be secured. In the present case, instead of securing the carbureter directly to the manifold or intake of the engine, a mixing device *h* for the gas and air issuing from the carbureter in a more or less mixed condition is provided or interposed between the carbureter and the manifold, as indicated clearly in Fig. 1. This mixing device, as will be seen from the drawings, consists of a unitary or complete element, having a two-part casing *i*, the two parts of which are secured together by screws *j* to form a chamber *k*, and a mixing element for the gas and air within the chamber. From Figs. 2 and 3, the mixing device as a whole will be seen to be relatively flat and the chamber thereof to be relatively shallow.

As shown, the mixing element consists of a screen *l* formed of relatively coarse wire mesh and secured to a fan *m* pivoted in bearings *n* so as to rotate in the plane of the casing. The screen is parallel to the plane of rotation of the fan and, being secured as it is to the fan, is rotated whenever the fan is rotated; and the blades upon the latter are so arranged that when gas and air are drawn through the inlet opening of the mixing device below the fan, the fan will be set in rotation, thus causing the screen to cut across the stream of gas and air in a plane substantially normal to the direction in which the gas and air are moving. After the gas and air pass through the screen they will be delivered through the outlet opening in the top of the mixing device into the manifold of the engine. In this way the gas and air will be thoroughly commingled and the mixture, instead of being "streaky" so to speak, will be delivered into the engine cylinder as a perfectly homogeneous gas. The wire mesh, cutting across the stream of gas and air as it does, acts as a stirrer or agitator, and, on account of its relative coarseness, does not impede the movement of the gas and air to any appreciable extent.

The mixing device as a whole constituting a unitary structure and being separable

from the engine and carbureter, may be inserted and removed at will. For this purpose, the parts are constructed and arranged so that the carbureter may be fitted directly to the engine and so that the mixing device may be fitted between the engine and the carbureter. In the present case this is accomplished by providing the carbureter and engine with flanges or flanged faces *o* and *p* respectively and by providing the mixing device with corresponding flanges or flanged faces *r* and *s* respectively, although it will be obvious that other constructions might be adopted for the same purpose, it only being necessary that the mixing device shall have inlet and outlet fittings similar respectively with the fuel inlet fitting to the engine and the fuel outlet fitting from the carbureter. As shown in Fig. 1 where the mixing device is interposed between the carbureter and engine, the flanges *p* and *s* are secured together by means of nuts and bolts and the flanges *r* and *o* are secured together in the same way. By removing the nuts and bolts from both pairs of flanges, the mixing device may be removed and the carbureter attached directly to the manifold *f*, as will be obvious

It will be apparent from an inspection of the drawings that the fan M is a plate with an upstanding edge or flange and that the bottom of the plate has fan blades which are cut therefrom. This fan consists of a one-piece sheet metal circular plate having its marginal edges bent up laterally at substantially right angles thereto for forming a cylindrical rim or upstanding guard flange and the main body portion of the plate has portions thereof cut away to form a series of blades and intervening openings. The openings last referred to are of less radial length than the radius of the fan, thus leaving a central web or portion uniting the inner ends of the blades. The outer ends of the blades are separated from the rims by slits extending, in the same direction as the rim, from the openings at one edge to a point in proximity of the opposite edge of the blades leaving relatively narrow webs uniting the outer edges of the blades to the rim. The portions of the outer edges of the blades which are separated from the rim by the slits are deflected laterally upwardly to points in close proximity to the upper edge of the rim.

The advantages of the foregoing construction and relation of parts have already been referred to and will be obvious without further exposition at this point. It will be clear, too, that on account of the flat and compact form of the mixing device, it may be very readily embodied in existing gas engine constructions. Moreover, it should be noted that the mixing device may be embodied in many different forms as a separable and unitary structure and hence the invention is not limited to the present embodiment shown and described herein.

I claim as my invention:

In a gas engine construction the combination with the cylinders thereof of a V-shaped manifold having each branch connected to a cylinder and having its ends provided with flanges, a mixing device comprising a two-part sectional casing, and a carbureting device, one part of the sectional casing having a flange bolted to a flanged end of the manifold, the other part of the sectional casing having bolted thereto a flanged portion of the carbureter, the parts of the sectional casing being detachably connected together and having therebetween a rotatable fan and screen member supported on a shaft having end bearings carried by each part of the casing.

This specification signed and witnessed this 16th day of September, A. D., 1909.

FORREST A. HEATH.

Signed in the presence of
G. McGRANN,
LUCIUS E. VARNE.