C. E. CHALKER.

GAS AND AIR MIXING DEVICE.

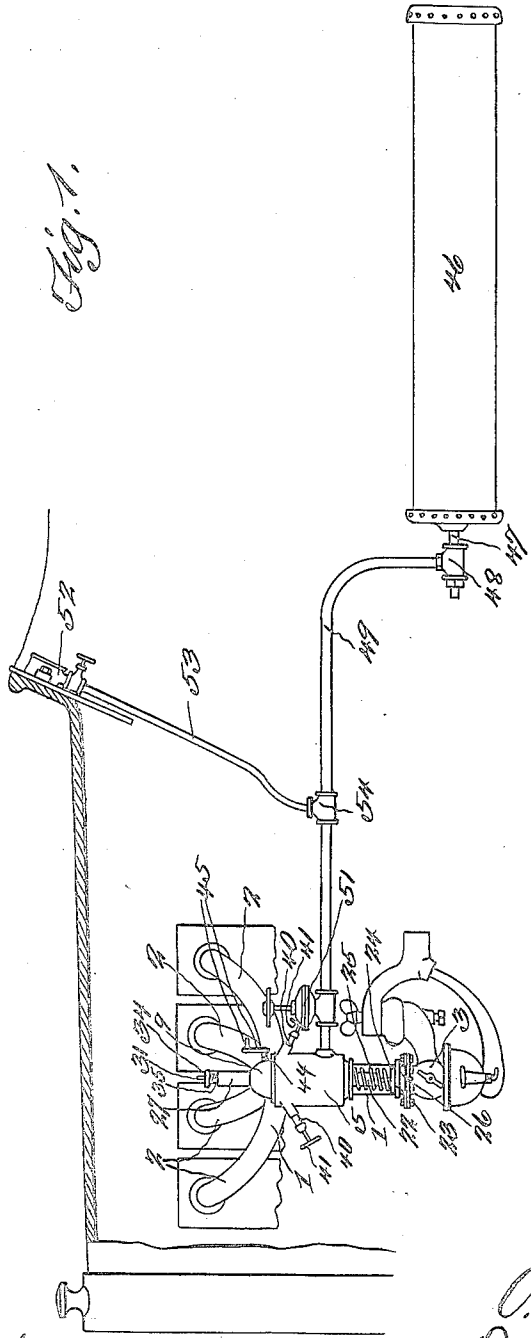
APPLICATION FILED JUNE 6, 1916.

1,239,882.

Patented Sept. 11, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

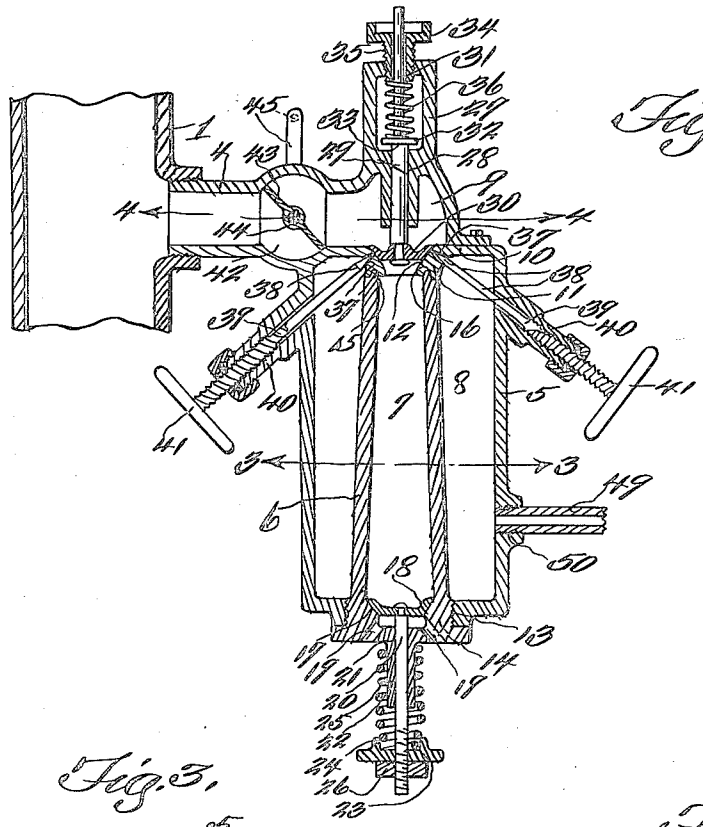


Fig. 3.

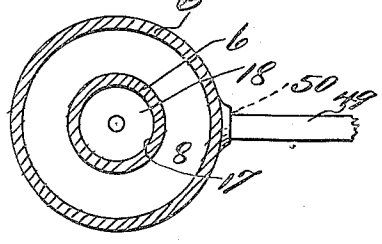
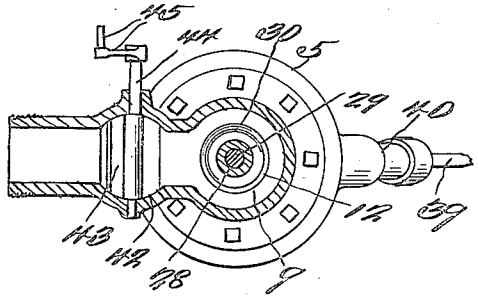


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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GAS AND AIR MIXING DEVICE.

1,239,882. Specification of Letters Patent. Patented Sept. 11, 1917.

Application filed June 6, 1916. Serial No. 102,009.

To all whom it may concern:

Be it known that I, CHARLES E. CHALKER, a citizen of the United States, residing at Tampa, in the county of Hillsboro, State of Florida, have invented a new and useful Gas and Air Mixing Device; 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 internal combustion engines, and more especially to improved means for feeding gas fuel instead of liquid fuel to the engine.

One of the objects of the invention is to provide a gas and air mixing feeding device, adapted to be connected or tapped into the side of the usual manifold of an internal combustion engine, and being in turn connected to a tank of gas under pressure, there being suitable pressure reducing means in the connections between the tank and feeding and mixing means, to reduce the pressure of the gas, just before it enters said means, where it mixes with a requisite amount of air producing a suitable combustible fuel to be drawn into the engine.

Another object of the invention is the provision of means for governing the respective proportionate amount of air and gas, at the time of mixing the same.

Another object of the invention is to provide a butterfly valve for timing the admission of fuel into the engine with respect to the movement of its piston.

Another object of the invention is to provide a gas feed means, which is applicable to the inlet manifold of an automobile engine, without removing the usual carbureter, there being a gas storage tank in addition to the gasolene tank, whereby the chauffeur or operator may employ his gas feed means and gas supply tank, or the usual carbureter, and the gasolene supply, should one or the other give out. Furthermore, it is to be understood that in the manufacture of the device, it may be applied to the inlet manifold of the engine, after the construction of the engine and the automobile is complete, or may be applied at the time of construction. It is to be further understood that the gas feed means may be applied to an automobile engine, that is, tapped to the inlet manifold, or connected direct to the manifold, eliminating the use of the carbureter, preferably at the time of construction of the machine, thereby saving the expensive gasolene fuel.

In practical fields, the details of construction may necessitate alterations falling within the scope of what is claimed.

The invention comprises further combination of features of parts as hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a view in side elevation and partly in section, showing the improved gas and air mixing and feeding means as applied to an internal combustion engine.

Fig. 2 is an enlarged detail sectional view of the gas and air mixing and feeding device constructed in accordance with the invention.

Fig. 3 is a sectional view on line 3—3 of Fig. 2.

Fig. 4 is a sectional view on line 4—4 of Fig. 2.

Referring more especially to the drawings 1 designates the usual manifold, which is provided with the usual branches 2, which connect to the several cylinders of the engine, and 3 designates the usual carbureter. The side of the main portion of the manifold is provided with a threaded opening into which the extension 4 of the upper part of the casing of the gas and air mixing and feeding device is threaded. This gas and air mixing and feeding device comprises the casing 5 having an interior tapering tubular portion 6 forming an air chamber 7 and the gas chamber 8. Constructed in the upper part of the casing 5 is a mixing chamber 9, and where the tapering tubular part 6 merges into the wall 10 near the upper part of the casing 5, a conical wall 11 having a valve seat 12 is formed. The lower end of the casing 5 has a threaded opening 13, which receives the threaded plug 14, to which the tapering tubular portion 6 is integrally secured. When the plug 14 is threaded in the opening 13, the reduced portion 15 at the upper end of the tapering tubular part 6 engages a recess 16 of the conical wall 11. The plug 14 is provided with a valve seat 17, with which the valve 18 coöperates, for controlling the air supply through the ports 19 into the chamber 7. The valve 18 is carried by the stem 20, which is mounted in suitable guides 21 of the ex-

tension 22 of said plug. A disk 23 having an annular rib 24 upon one face is threaded upon the lower portion of the stem 20, and between which disk and the plug 14 (where it merges into the extension 22) is a coil spring 25, the lower end of which engages inside the rib 24. By virtue of this spring the valve 18 is held normally seated, and by adjusting the disk 23 the tension of the spring 25 may be increased or decreased as required. A lock nut 26 is threaded upon the lower end of the stem 20, to lock the disk in adjusted positions on the stem. The upper part of the casing where the mixing chamber 9 is constructed has a hollow extension 27 and a guide 28, in which the valve stem 29 having the valve 30 (which coöperates with the seat 12) is guided. The upper part of the stem 29 terminates in a reduced portion 31. A disk or collar 32 is supported upon the shoulder 33, at the point where the reduced portion 31 connects to the larger portion of said stem 29. A thumb nut 34 is provided having its reduced extension 35 threaded into the upper end of the extension 27. It is to be noted that the reduced part 31 of the stem 29 extends through said thumb nut 34. Interposed between the extension 35 of said thumb nut 34 and the disk or collar 32 is a coil spring 36, acting to normally hold the valve 30 in engagement with the seat 12. By adjusting the thumb nut 34 the tension of the spring 36 may be increased or decreased, so as to regulate the opening action of said valve 30. The conical wall 11 is provided with the needle valve seats 37, with which the needle valves 38 coöperate, the stems 39 of which are threaded into the extensions 40, and are provided with hand wheels 41, whereby the needle valves may be adjusted toward and from their seats. The extension 4 is provided with a spherical or globular hollow portion 42, in which a butterfly valve 43 is pivotally mounted. The shaft 44 of the valve 43 is positioned transversely, and is provided with a crank arm 45, which may be operated manually for opening said valve 43, in order to permit a charge from the chamber 9 to be drawn into the engine. To be used in connection with the gas and air mixing device is a tank 46, designed to contain gas under pressure, and extending from one end of the tank 46 is a tubular extension 47 having a suitable check valve 48, to prevent the back flow of gas into the tank 46. Connected to the casing of the check valve 48 is a tube 49, the other end of which is threaded into an opening 50, of the casing 5 of the gas and air mixing device. The tube 49 is provided with a suitable or conventional form of pressure reducing valve 51, for reducing the pressure of gas, prior to its entering the gas and air mixing and feeding device. A suitable gage 52 for indicating the pressure of the gas in the tank, is connected to the tube 49 by the tube 53 and union 54. When the butterfly valve 43 is opened the valve 30 is unseated, due to the suction of the engine, in which case a supply of air is drawn into the chamber 9, together with a supply of gas from the chamber 8, and in which chamber 9 said gas and air mix, and is drawn into the intake manifold 1. The tube 49 carries the gas into the chamber 8. When the valve 30 opens, the valve 18 simultaneously opens, thereby keeping the chamber 7 supplied with air through the ports 19.

The invention having been set forth what is claimed as new and useful is:—

A gas and air mixer for internal combustion engines having an intake manifold, said device comprising a casing provided with a central air chamber, a mixing chamber having an opening of communication with the air chamber, a valve seat about said opening, said mixing chamber having means of communication with the manifold, and a gas chamber in surrounding relation to the air chamber adapted for connection to a gas tank having gas under pressure therein, said valve seat having diametrically disposed eduction apertures connecting the gas and mixing chambers, a self closing valve coöperating with said seat, opening in response to the suction strokes of the engine, whereby, upon opening of said valve, opposite jets of gas and an intermediate supply of air substantially impinging with one another are drawn into the mixing chamber to mix therein, manual means for controlling said eduction apertures and self closing means at one end of the air chamber opening in response to the suction strokes of the engine for controlling air into said air chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. CHALKER.

Witnesses:
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ROBERT A. BOSWELL.