A. BECKER.

GAS MIXING VALVE FOR EXPLOSIVE ENGINES.

APPLICATION FILED JAN. 4, 1912.

1,046,141.

Patented Dec. 3, 1912.

2 SHEETS—SHEET 1.

Fig. 1

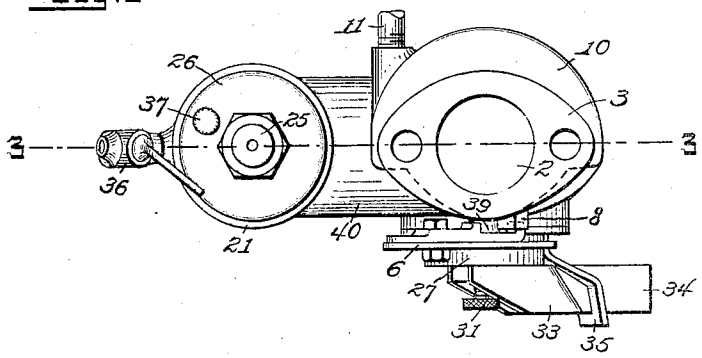
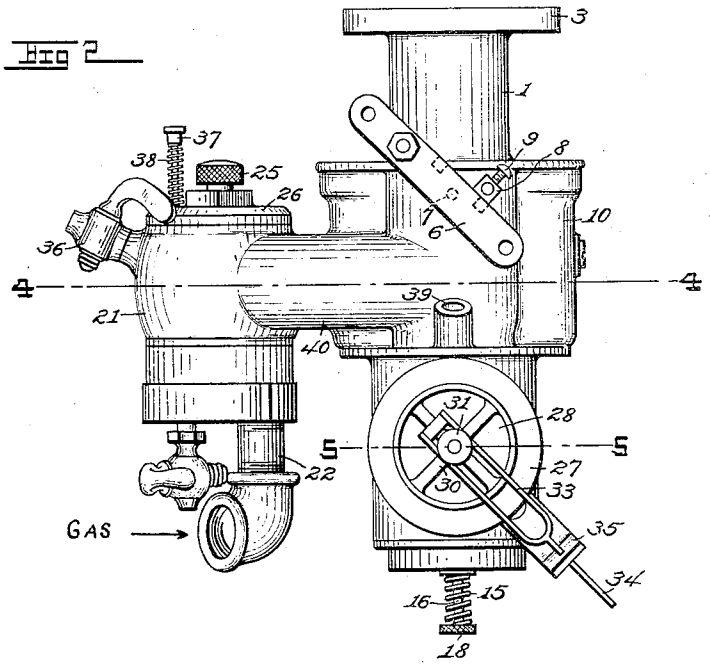


Fig 2



WITNESSES:

F. E. Arthur,

Bruce Morris.

INVENTOR

Adolph Becker.

BY

N. E. Dunlap

ATTORNEY.

A. BECKER.

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Fig. 3

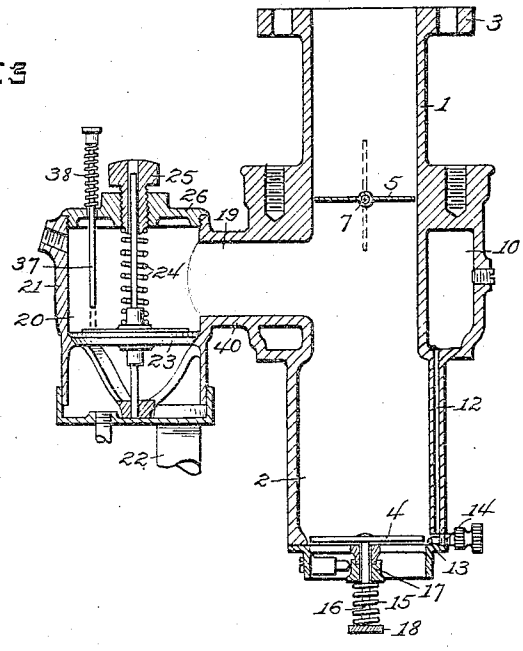


Fig. 4

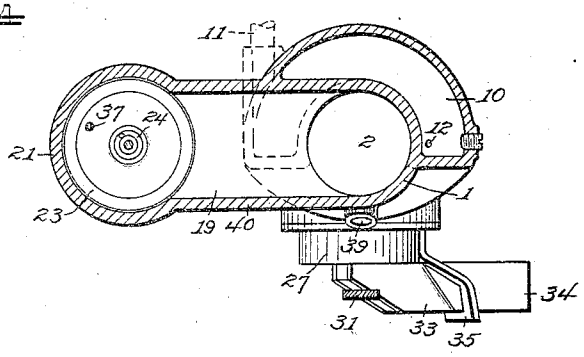
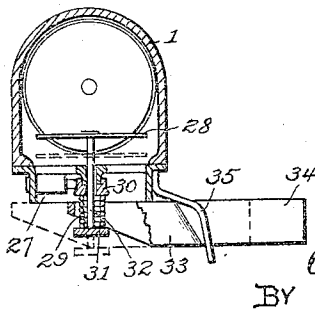


Fig. 5



WITNESSES:
H. E. Arthur,
Bruce Morris.

INVENTOR
Adolph Becker.
BY
N. E. Dunlap
ATTORNEY

UNITED STATES PATENT OFFICE.

ADOLPH BECKER, OF WHEELING, WEST VIRGINIA, ASSIGNOR TO ALBERT M. SCHENK, OF WHEELING, WEST VIRGINIA.

GAS-MIXING VALVE FOR EXPLOSIVE-ENGINES.

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To all whom it may concern:

Be it known that I, ADOLPH BECKER, a citizen of the United States of America, and resident of Wheeling, county of Ohio, and State of West Virginia, have invented certain new and useful Improvements in Gas-Mixing Valves for Explosive-Engines, of which the following is a specification.

This invention relates broadly to gas mixers, and specifically to a combined gas mixing valve and gasolene carbureter.

The primary object of the invention is to provide an integral structure for use in connection with internal combustion engines, which shall have the dual functions of mixing natural or artificial gas as an explosive fuel for such engines and of vaporizing a liquid fuel, as gasolene, to form an explosive mixture, being adapted to feed interchangeably both of said forms of fuel to the engine.

A further object is to provide a carbureting apparatus wherein both the employment of a spray and of a supply-regulating device, or float, is wholly dispensed with. And a still further object within the contemplation of the invention is to provide an apparatus which may be employed interchangeably and without adjustment for forming a proper explosive mixture from either an aeriform gas or a liquid gas.

Another object is to provide a device of the character mentioned for use on automobiles or other wheeled vehicles wherein an internal combustion engine is employed as a source of motive power, which is adapted to feed to the engine, in properly mixed explosive charges, gas supplied from a gas storage tank, or to feed properly carbureted charges from a gasolene or other liquid fuel supply.

With these and other objects in view, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be exemplified, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a top plan view of the invention; Fig. 2 is a side elevation of the same; Fig. 3 is a vertical section on the line 3—3, Fig. 1; Fig. 4 is a horizontal section on the line 4—4, Fig. 2; and Fig. 5 is a similar section on the line 5—5, Fig. 2.

Referring to said drawings, in which like designating characters distinguish like parts throughout the several views—1 indicates a casing in which is provided a mixing chamber 2 to which the gas or gasolene, according as one or the other is employed as fuel, is admitted and prepared for furnishing explosive charges to an engine cylinder or cylinders. Said casing is of substantially upright cylindrical form and has its upper end flanged, as shown at 3, for attachment to the usual intake pipe or manifold of an internal combustion engine. The lower end of said casing is open and has mounted therein a valve 4 whereby the admission of air to the mixing chamber 2 for mixing with the gasolene is controlled. Located in the upper end of the mixing chamber is a throttle valve 5 adapted to be manually operated from the car-operator's position in the usual manner, as by a series of suitably connected levers including a lever 6 mounted upon the projecting end of a rotary spindle 7 upon which said throttle valve is carried. For limiting the extent of closing movement of said throttle valve an outwardly projecting lug 8 carried by the casing has a set-screw 9 projected therethrough, constituting an adjustable stop for the lever 6.

Partially encircling the casing 1 is a reservoir 10 to which gasolene is supplied through a pipe 11 from a suitable reservoir or source of supply. Gasolene from the reservoir 10 passes by gravity through a passage 12 in the casing wall and is admitted to the mixing chamber near the lower end of the latter through a port 13 controlled by an adjustable needle valve 14.

The valve 4 at the lower end of the mixing chamber is normally maintained closed by a compression spring 15 mounted on a stem 16 to which the valve is attached, said spring being interposed between a fixed part or member, as 17, and a head 18 carried by the outer end of said stem.

Carried by the casing 1 is a laterally directed arm 40 through which leads a passage 19 opening into the mixing chamber at a point below the position of the throttle valve 5, said passage having communication at its opposite end with a gas chamber 20 formed within a casing 21 integral with said arm 40, said gas chamber being adapted for receiving natural or artificial gas through a pipe 22 leading from a source of supply, admision of said gas being controlled by a

suitably mounted valve 23. Said valve is normally maintained closed against the pressure of the gas admitted through said pipe by a compression spring 24 which has one end seated against the face of the valve and whose tension is regulated by an adjusting screw 25 projected through a removable cap 26 fitted in the end of the casing 21 in a position facing said valve.

Leading into the mixing chamber 2 at a point below the gas passage 19 is a large air inlet passage 27 controlled by a valve 28 which is normally held open, as by a retractile coil spring 29 interposed between a fixed portion or member 30 and a head 31 carried on the outer end of the stem 32 on which said valve 28 is carried. Suitable means are employed whereby said valve 28 may be seated for closing off the air supply through said passage 27, as when the gas supply to the gas chamber 20 is shut off and gasolene is being used, the air supply for the gasolene being admitted through the lower valve-closed end of the mixing chamber 2. The means herein depicted for closing the air passage 27 is but one of various means which might be employed, the same comprising a yoke 33 disposed in straddling relation to the valve stem 32 and having an inclined face or edge in sliding engagement with the inner face of the head 31 of said stem. Said yoke has a stem 34 slidably mounted in a guide member 35 and is adapted to be shifted forward and retracted by any appropriate means for actuating the valve 28 to move respectively to closed and open positions.

In practice, either gas or gasolene may be directed through the device, the former being thoroughly mixed with air for producing a proper explosive mixture, and the latter being vaporized and properly mixed for producing such mixture without the employment of either a spray or a float feed, as hereinbefore indicated.

When gas is employed for fuel, the gasolene supply to the auxiliary reservoir 10 is cut off and the valve 28 controlling the admission of air through the air passage 27 is opened to freely admit a current of air therethrough, which current is induced by the suction of the engine. The suction produced by the engine pistons and acting on the mixing chamber 2 through the intake manifold is regulated by manipulation of the throttle valve 5, and this suction acts to elevate the valve 23 for admitting gas to the gas chamber, the extent of opening of said valve, and, consequently, the relative size of the admitted charge, being dependent upon the extent of opening of the throttle valve, as is also the amount of air drawn through the passage 27 for mixing with the gas.

When gasolene is the fuel employed, the gas supply through the pipe 22 is shut off and the valve 28 controlling the admission of air through the passage 27 is caused to seat for closing said passage. The suction of the engine acting directly upon the gasolene, as the latter gravitates to the port 13, draws a supply of gasolene into the mixing chamber, the volume of which is regulated by the degree of suction which the throttle valve permits to be induced within said chamber; and said suction acting upon the valve 4, elevates said valve with each engine pulsation a distance commensurate with the amount of suction acting within said chamber. Thus, a relatively large supply of air is admitted with the gasolene to the mixing chamber whereby proper carburetion may be effected in the passage of the mixture through the mixing chamber.

A pet cock 36 is preferably provided in the casing 21 through which gas contained in the gas chamber 20 may be exhausted when such exhaust is desirable. Also provided at a suitable point, as in the cap 26, is a pin 37, normally held by a spring 38 in an elevated position, which is adapted to be depressed into bearing contact with the face of the valve 23 whereby the latter may be held seated, as when gas is the fuel used and it is desired to have the gas contained in the chamber 20 exhausted prior to taking in a fresh charge.

A small tubular opening 39 is preferably provided in the side of the casing 1 allowing free communication between the mixing chamber and the atmosphere, said passage serving as a relief passage through which exhaust of any back-firing charge in the device is permitted.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A device of the character described comprising a mixing chamber and a gas chamber, a gas passage between said chambers, means supplying gasolene to the mixing chamber, means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber at a point adjacent to the gas passage, and a controllable valve in said passage whereby the latter is opened and closed.

2. A device of the character described comprising a mixing chamber and a gas chamber, a gas passage between said chambers, means supplying gasolene to the mixing chamber, suction-opened means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber,

and a controllable valve in said air passage whereby the latter is opened and closed.

3. A device adapted for interchangeably mixing aeriform and liquid gases, comprising a tubular mixing chamber having a throttle valve within its discharge end, a suction-opened spring-seated air-admission valve in the opposite end of said chamber, means supplying gasolene to said chamber adjacent to the last-mentioned valve, a gas chamber, a suction-opened spring-seated gas-admission valve in said gas chamber, an open gas passage between said gas chamber and said mixing chamber, a side-opening air-passage leading into said mixing chamber below said gas passage, means normally holding said air-passage open, and means for closing said air-passage.

4. A device adapted for interchangeably mixing aeriform and liquid gases, comprising a tubular mixing chamber having a throttle valve within its discharge end, a suction-opened spring-seated air-admission valve in the opposite end of said chamber, means supplying gasolene to said chamber adjacent to the last-mentioned valve, a gas chamber, a suction-opened spring-seated gas-admission valve in said gas chamber, an open gas passage between said gas chamber and said mixing chamber, a side-opening air-passage leading into said mixing chamber below said gas passage, a valve normally holding said air-passage open, and means for seating said valve.

5. A device adapted for interchangeably mixing aeriform and liquid gases, comprising a tubular mixing chamber having a throttle valve within its discharge end, a suction-opened spring-seated air-admission valve in the opposite end of said chamber, means supplying gasolene to said chamber adjacent to the last-mentioned valve, a gas chamber, a suction-opened spring-seated gas-admission valve in said gas chamber, an open gas passage between said gas chamber and said mixing chamber, a side-opening air-passage leading into said mixing chamber below said gas passage, a valve normally holding said air-passage open, and a slidable member for seating said valve.

6. A device of the character described comprising a mixing chamber and a gas chamber, an open gas passage between said chambers, means supplying gasolene to the mixing chamber, suction-opened means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber, means normally maintaining said air passage open, and means for closing said passage.

7. A device of the character described comprising a mixing chamber and a gas chamber, an open gas passage between said chambers, means supplying gasolene to the mixing chamber, suction-opened means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber, a valve controlling said passage, means normally maintaining said valve unseated, and means for seating said valve.

8. A device of the character described comprising a mixing chamber and a gas chamber, an open gas passage between said chambers, means supplying gasolene to the mixing chamber, suction-opened means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber, a valve controlling said passage, means normally maintaining said valve unseated, and a yoke associated with said valve whereby the latter is seated.

9. A device of the character described comprising a mixing chamber and a gas chamber, an open gas passage between said chambers, means supplying gasolene to the mixing chamber, suction-opened means for admitting air to said mixing chamber at a point adjacent to the gasolene admission point, suction-opened means controlling the admission of gas to said gas chamber, an air passage leading into said mixing chamber, a valve controlling said passage, a spring normally maintaining said valve open, and means for seating said valve against the tension of said spring.

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

ADOLPH BECKER.

Witnesses:
H. E. DUNLAP.
L. D. MORRIS.