J. HARRIS.

CARBURETER.

APPLICATION FILED MAY 9, 1908.

985,999.

Patented Mar. 7, 1911.

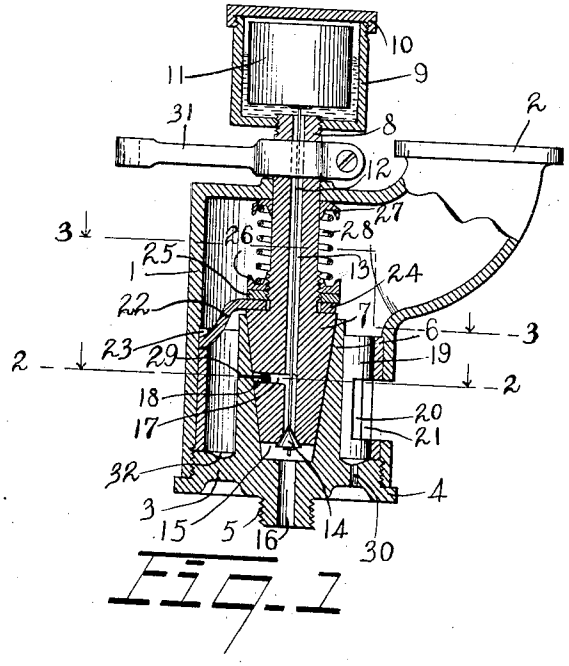

FIG. 1

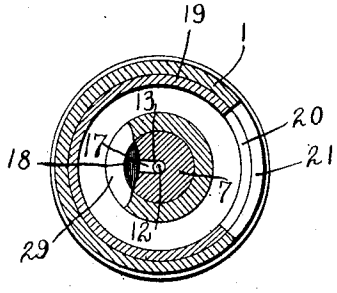

FIG. 2

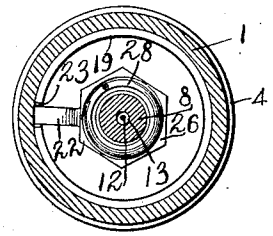

FIG. 3

Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN HARRIS, OF CLEVELAND, OHIO.

CARBURETER.

985,999. Specification of Letters Patent. Patented Mar. 7, 1911.

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To all whom it may concern:

Be it known that I, JOHN HARRIS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Carbureters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates generally to devices for producing a mixture of air with fluid fuel and more especially to devices, in the nature of carbureters, for producing mixtures of air with liquid fuel in vaporous condition.

It has for its general objects to simplify the construction of such devices; to provide a construction whereby the proportions of the air and the other fuel element will be maintained constant for all ranges of openings of the fuel and air ports; to provide a construction whereby the flooding of the apparatus will be prevented; also to provide a construction of mixing device which is adaptable for both gaseous and liquid fuels.

More limitedly, the invention consists in certain details of construction which are illustrated in the drawings hereto annexed, wherein—

Figure 1 represents a vertical sectional view taken through a carbureter constructed in accordance with my invention, a part of the engine connection being shown in elevation; Fig. 2 represents a sectional view corresponding to line 2—2 of Fig. 1; and Fig. 3 represents a similar view corresponding to line 3—3 of Fig. 1.

Describing the parts by reference characters, 1 denotes a casing forming a chamber wherein the fuel elements are mingled. This chamber is closed at its upper end, except for a central bore which receives a valve stem, and is provided with an upwardly extending connection 2 to which the engine suction pipe may be attached. At its lower end, casing 1 is provided with an internal thread for the reception of a bottom closure 3. This bottom closure is provided with an external thread by means of which it is fitted to the bottom of the casing 1 and with a flange 4 adapted to abut against the bottom of the casing. It is provided with a threaded connection 5 by means of which it may be coupled to a fuel supply pipe. Closure 3 has formed therewith an upwardly projecting inverted frusto-conical wall 6 forming a valve chamber adapted to receive a similarly shaped valve 7. This valve is of the plug type and is provided with a stem 8 which extends upwardly through the top of casing 1 and carries at its upper end a receptacle 9, which may be threaded onto the upper end of said valve stem. This receptacle is provided with a removable cover 10 and has therein a float 11 provided with a stem 12 which extends through the longitudinal bore 13 of said plug and carries at its lower end a conical valve 14 adapted to seat against a frusto-conical seat at the lower end of bore 13. A chamber 15 is provided between the lower end of the valve plug 7 and the bottom of the chamber formed within the wall or casing 6 to accommodate the movement of the valve 14, and connection 5 is provided with a bore 16 communicating with such chamber.

17 denotes a transverse bore extending from the bore 13 to a flared outlet port 18 at the periphery of said plug. The transverse bore 17 is of the same capacity as bore 13. The outlet port 18 is flared horizontally and is of the same depth as the diameter of bore 17, for a purpose to be hereinafter described.

Within the casing 1 there is rotatably mounted a cylindrical valve 19 having a circumferential elongated port 20 in the vertical wall thereof. This port is adapted to register with a corresponding port 21 in the casing 1 located beneath the connection 2. For the purpose of rotating the valve 19, I mount upon the valve stem 8 a finger 22, said finger projecting downwardly and outwardly and fitting within a slot 23 formed in the wall of valve 19 preferably diametrically opposite the port 20. This finger is provided with a central ring 24 adapted to fit over the valve stem 8 and is clamped in place on said stem by means of a nut 25 threaded onto said stem and clamping the ring portion of the finger between itself and the upper surface of plug 7. 26 denotes a cup-shaped washer which is also threaded on the valve stem above the nut 25, and 27 denotes an inverted cup-shaped washer the upper surface whereof is tapered or conical to form a bearing against the top of the casing which will allow the valve plug to turn easily without binding. Between these two washers there is interposed a spiral spring 28. This spring holds the washer 27 in close contact with the up-

per surface of the casing 1 and largely prevents any leakage of the mixture at this point. The pressure of the spring against the washer 26 holds the valve plug to its seat within the wall 6. It will be noted that a full taper is given to the valve plug and its surrounding casing. This prevents the binding of the plug within the casing and the leakage of fuel through the valve. The wall or casing 6 is provided with an elongated slot 29 which is located diametrically opposite the port 21 in casing 1. The slot 29 is narrow, varying from 60 to 80 thousandths of an inch, according to the capacity of the engine with which the carbureter may be employed. It is flared outwardly at opposite ends and its length at the inner surface of casing 6 is equal to the length of the outer flared end of port 18. Its full capacity will be no greater than that of bores 13 and 17 to maintain said slot under the constant pressure of the head produced by the receptacle 9, and its angular extent will be equal to that of ports 20 and 21. The width of slot 29 is so proportioned to the width of ports 20, 21 as to secure the proper proportions of air and fluid fuel to produce the desired mixture thereof. By the construction described, this proportion will be maintained for all positions of the air and fuel valves.

The bottom plate or closure 3 is provided with an aperture 30 which communicates with a groove 32 in the upper surface of the closure and provides a discharge outlet for any liquid fuel that may tend to collect in the mixing chamber, thereby preventing the flooding of such chamber. Above casing 1, valve stem 8 is provided with an operating handle 31 detachably connected thereto by means of which the valve stem may be rotated and the supply of air and fuel varied as desired.

To the threaded supply pipe 5 is coupled the fuel supply pipe (not shown) through which fuel is fed to the carbureter. The float 11 acts to maintain a constant pressure of this fuel at the port 18 by drawing the valve 14 to its seat whenever the predetermined height of the liquid in the float chamber is exceeded. In normal operation, the valve 14 is never entirely seated but is held by the float 11 at just the distance from the seat which will maintain a constant feed to the carbureter and a constant level in the float chamber.

By the construction illustrated and described, I have provided means whereby a definite proportion between the fluid fuel and air may be maintained irrespective of the extent of opening of the fuel and air valves. This definite proportion results not only from the provision of air and fuel ports which are opened and closed simultaneously in the same proportions but from the fact that the pressure of the fluid fuel on the discharge slot 29 is constant. This constancy is secured by the provision of the flaring port 18 and by the constant head maintained by the float chamber 9. This constant proportion between the air and fuel ports dispenses with the necessity for manipulating an additional fuel valve to "enrich" the mixture when climbing a hill. It also dispenses with the use of a "setting point" for the valves in starting the engine, as a proper mixture will always be obtained, no matter what may be the extent of opening of the valves.

It will be noted that the air port 21 in the casing is located beneath the engine connection 2. This connection is ordinarily bolted directly to the down-turned inlet valve of the engine cylinder thus bringing the port 21 into close proximity with the cylinder wall and causing the air to be warmed by the engine prior to its admission to the mixing chamber. Also, in the case of "back-fire", it provides a free discharge which is remote from the fuel port 29, thereby preventing such discharge from impoverishing the mixture by carrying off the liquid fuel that may be in and around said port.

The mixing device herein described and illustrated may be used alike for gaseous and liquid fuels. Furthermore, when operating with liquid fuel, it is practically independent of atmospheric conditions and will always secure a proper proportion between the air and the fuel ingredient.

It will be understood that the size of slot 29, bores 17 and 13 and the air port 21 may be varied to accommodate different fuels, both gaseous and liquid, as well as different capacities of engines.

I claim:

1. In a carbureter, the combination of a casing having a mixture outlet and an elongated inlet port for air, a rotary valve for said casing having an elongated port corresponding to the port in said casing, a fluid fuel valve casing having an elongated slot having an angular extent substantially equal to that of the air inlet port, a rotary valve co-acting therewith and having a port adapted to discharge through said slot, and connections for operating said valve simultaneously.

2. In a carbureter, the combination of a casing having an elongated air inlet port in the wall thereof and also having a mixture outlet, a rotary valve mounted within said casing and having an elongated port corresponding to the former port, a fluid fuel valve comprising a casing within the former casing and having an elongated slot in its wall of substantially the same angular extent as that of the air inlet port, a rotary valve within the latter casing and having

a port adapted to register with the elongated slot in said casing, means for rotating said latter valve, and a connection between said valves for rotating the same in unison.

3. In a carbureter, the combination of a chamber having an elongated air inlet port in the wall thereof and also a mixture outlet, a valve rotatably mounted within said chamber and having an elongated port adapted to register with the former port, a fluid fuel valve located within said chamber and having an elongated discharge slot of substantially the same angular extent as the air inlet port, and an operating finger carried by the fluid fuel valve and engaging the air valve.

4. In a carbureter, the combination of a casing having an elongated air inlet port in the wall thereof and also a mixture outlet, a rotary valve mounted within said casing and having a port adapted to register with the former port and having a slot in the upper edge thereof, a fluid fuel valve within said casing and concentric with said first mentioned valve and comprising a rotary plug, and a finger carried by said plug and projecting into the slot in the upper edge of the air valve.

5. In a carbureter, the combination of a casing having an air inlet port in the wall thereof and a mixture outlet, a valve associated with said casing and having a port adapted to register with the former port, an end closure for said casing having a frusto-conical valve seat projecting into said casing and a fluid fuel connection communicating with said seat, said seat being provided with a discharge orifice in the wall thereof, a rotary plug mounted in said seat and having a longitudinal port adapted to communicate with the interior of said seat and a lateral port adapted to register with the lateral port in said seat, and means for rotating said valves in unison.

6. In a carbureter, the combination of a casing having an air inlet port in the wall thereof and a mixture outlet, a rotary valve mounted within said casing and having a port adapted to register with the former port, an end closure for said casing having a fuel supply connection and provided with a central frusto-conical valve seat having an elongated slot in the wall thereof, a rotary plug mounted within said seat and having a longitudinal port adapted to communicate with the fuel supply connection and having a lateral port extending from the longitudinal port and adapted to register with said slot, and connections for rotating said plug and the first mentioned valve in unison.

7. In a carbureter, the combination of a casing having an elongated air inlet port therein, and a mixture outlet therefrom, a valve mounted within said casing and having an elongated port adapted to register with the former port, an end closure for said casing having an inwardly projecting frusto-conical valve seat provided in its wall with an elongated slot, a frusto-conical valve mounted within said seat and having a longitudinal bore and a lateral port extending therefrom provided with an elongated discharge orifice adapted to register with said slot, means for supplying fluid fuel to the latter valve and means for rotating the valves in unison.

8. In a carbureter, the combination of a casing having an elongated air inlet port in the wall thereof and also having a mixture outlet, an adjustable rotary valve cooperating with said casing and having an elongated port adapted to register with the former port, and a fluid fuel valve adapted to discharge into said casing, said valve comprising a valve casing having an elongated slot in the wall thereof and a rotary valve mounted in said casing and having a port provided with a flared orifice adapted to register with said slot, and means for rotating the two valves in unison.

9. In a carbureter, the combination of a casing having a mixture outlet, means for regulating the supply of air to said casing, a valve for supplying liquid fuel to said casing, said valve comprising a plug having a stem projecting through and above said casing, a float feed chamber carried by said stem, said stem and said valve having a passageway therethrough, a valve carried by said stem and adapted to seat at the lower end of the valve plug, said plug being provided with a lateral discharge port, and a valve casing cooperating with said plug and having a discharge outlet with which said lateral port may register.

10. In a carbureter, the combination of a casing having a mixture outlet, means for admitting air to said casing, a closure for the bottom of said casing provided with an inlet for liquid fuel and having a valve casing projecting into the former casing, the latter casing being provided with a discharge port in the wall thereof, a rotary valve mounted in the latter casing and having an operating stem projecting through the top of the former casing, there being a longitudinal bore through said valve and stem, a float-feed chamber carried by the upwardly projecting portion of said valve stem, a float in said chamber, a valve-stem carried by said float and projecting through the bor of the first mentioned valve and stem, a valve on the stem, carried by the float, said first-mentioned valve being provided with a lateral port adapted to communicate with the port in its seat.

11. In a carbureter, the combination of a casing having a mixture outlet, means for admitting air to said casing, a liquid fuel

valve casing in the former casing, the latter casing being provided with a discharge port, a rotary valve mounted in the latter casing and having an operating stem projecting upwardly therefrom, a float feed chamber carried by the upwardly-projecting portion of said valve stem, a float in said chamber, a valve-stem carried by the float and projecting into a bore in the former valve stem, a valve on the second valve stem, said first-mentioned valve being provided with a lateral port adapted to communicate with the bore in its stem and with the port in its seat.

12. In a carbureter, the combination of a casing having an air inlet port in the side wall thereof, and also having a mixture outlet, a valve having a port coöperating with the first mentioned port, a fluid fuel supply connection comprising a valve casing projecting into the former casing, a rotary valve within the latter casing and having a stem projecting through the former casing, an operating finger carried by the valve stem and engaging the former valve, means for locking said finger in place, a tapered washer mounted on said valve stem and bearing against said casing, and a spring engaging said washer and operating to seat said fuel supply valve.

13. In a carbureter, the combination of a casing having an air inlet port in the side wall thereof, and also having a mixture outlet, a valve having a port coöperating with the first mentioned port, a fluid fuel supply connection comprising a valve casing projecting into the former casing, a rotary valve within the latter casing and having a stem projecting through the former casing, an operating finger carried by the valve stem and engaging the former valve, means for locking said finger in place, cup shaped washers mounted on said valve stem, and a spring interposed between said washers.

14. In a carbureter, the combination of a casing having an elongated air inlet port in the wall thereof, and also having a mixture outlet, a rotary valve mounted within said casing and having an elongated port adapted to register with the former port, a fluid fuel connection carried by said casing, a valve seat projecting into said casing and communicating with said connection and having a port in the wall thereof, a rotary plug within said valve casing and having a lateral port adapted to communicate with the port in the wall of said valve casing, a finger carried by said valve and operatively connected with the first-mentioned valve, means for clamping said finger in position, a pair of washers mounted on said stem, one of said washers being provided with a tapered surface adapted to engage the surface on the first-mentioned casing, and a spring interposed between said washers.

15. In a carbureter, the combination of a casing having an air inlet port and a mixture outlet, a valve controlling said port, a closure for the bottom of said casing having an annular trough in the surface thereof within the casing and a drain port extending through said closure and communicating with said trough, a valve casing above said closure having an opening for the admission of the fluid fuel, a valve within said valve casing controlling the opening in the casing, and connections for operating said valves in unison.

16. A carbureter comprising in combination a casing having an air inlet port and a mixture outlet, a rotatable air valve fitting within said casing and having a port adapted to be brought into register with the casing port, a fuel valve arranged centrally within said casing, said fuel valve comprising a fixed member and a rotatable member, one of said members having an elongated slot of substantially the same angular extent as the air inlet port and the other of said members having a port adapted to cooperate therewith, and means for operating said valves simultaneously.

17. In a carbureter, the combination of a casing having a mixture outlet and an elongated air inlet port, a rotary valve for said casing having an elongated port corresponding to the port in said casing, a fluid fuel valve comprising a fixed member having an elongated slot and a rotatable member having an elongated slot adapted to be brought into register with the slot in the fixed member, the angular extent of the opening through the registering slots in said fuel valve member being substantially the same as the angular extent of the registering portions of said ports, and connections for operating said valves simultaneously.

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

JOHN HARRIS.

Witnesses:
J. S. HARGER,
CHAS. C. LINDSAY.