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H. B. NORRIS

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CARBURETOR

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Fig. 2.

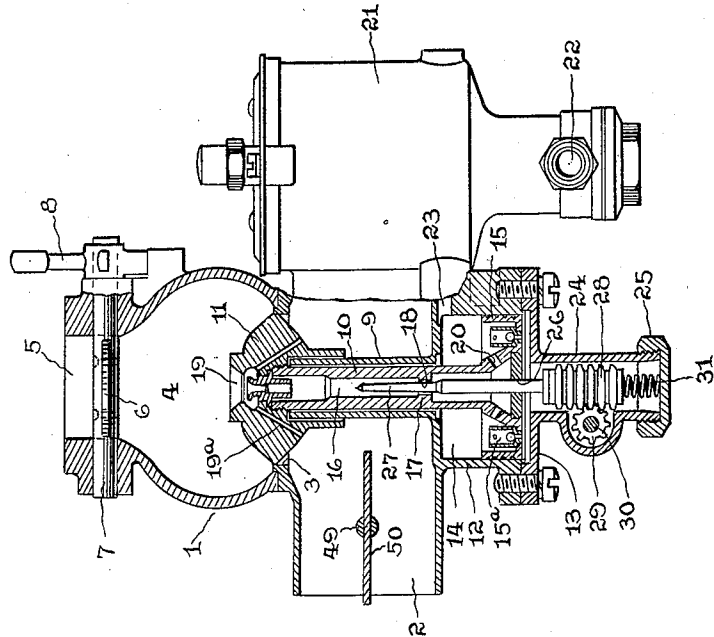
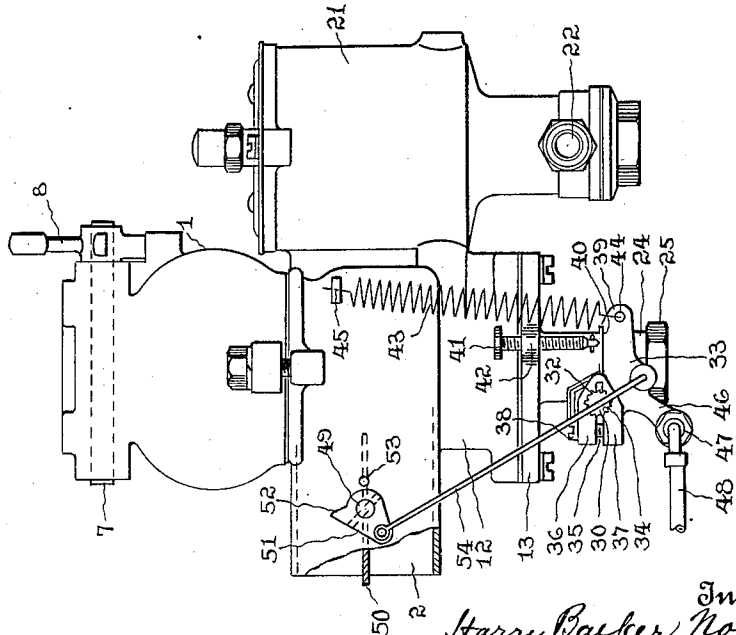


Fig. 1.



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CARBURETOR

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My invention relates to carburetors, and more particularly to means to control the admission of air and fuel to the mixing chamber of the carburetor.

5 In the operation of internal combustion engines, it is well known that for quick starting of the engine, the engine requires a richer mixture, i. e., a greater proportion of liquid fuel to air, than is required for normal conditions of engine running. The richness of the starting mixture is dependent upon the temperature of the atmosphere, colder weather requiring a richer mixture. Heretofore the proportion of fuel to air has been increased 15 in carburetors of the so-called constant vacuum type by increasing the size of the normal opening of the fuel inlet. However, it has been found in carburetors of this type that due to the opening of the automatic air valve 20 to its full extent on engine starting, the increased richness of the mixture obtained by increasing the opening of the fuel inlet has not been sufficient for quick starting in extreme cold weather. It is therefore an object 25 of my invention to provide a simple and efficient means by which the mixture of air and fuel supplied to the mixing chamber of a carburetor may be regulated at the will of the operator, and, further to provide means 30 whereby the air and liquid fuel may be inversely regulated, so that for engine starting in cold weather, liquid fuel substantially unmixed with air may be supplied to the engine cylinders and quick firing of the engine will 35 result.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter and the novelty of which will be particularly pointed out and 40 distinctly claimed.

In the accompanying drawing, to be taken as a part of this specification, I have fully and clearly illustrated a preferred embodiment of my invention, in which drawing—

45 Figure 1 is a view in side elevation of a carburetor embodying my device, and

Fig. 2 is a side view, partially in vertical central section, of the carburetor.

Referring to the drawing by characters of 50 reference, 1 designates generally a hollow

casing of a carburetor which I have shown as a carburetor of the so-called constant vacuum type and known on the market as a Stewart carburetor. The casing 1 has an air inlet 2 opening through a port 3 into a mixing chamber 4 from which leads a mixture outlet 5 55 having a flow control or throttle valve 6, preferably of the butterfly type mounted rigidly on a throttle shaft 7 journaled in the walls of the casing 1. One end of the shaft 7 projects through the casing and is provided with an operating arm or lever 8. Within the casing 1 and projecting upward transversely of the air inlet 2 and from the bottom wall thereof is a hollow sleeve 9 serving as guide 65 means for a valve stem 10 which is reciprocable in the sleeve 9. Secured on the upper end of the stem 10 is a valve 11 which cooperates with the port 3 to control the flow of air from the air inlet 2 to the mixing chamber 4. 70 On its under side the casing 1 has a depending cylindrical flange 12 concentric with the sleeve 9 and which is closed and sealed by a plate member 13 to form a dash-pot chamber 14. The lower end of stem 10 extends into 75 the chamber 14, and secured rigidly thereon or formed integral therewith is a dash-pot piston 15. Through the stem 10 and valve 11 is a longitudinal bore 16 terminating at its lower end in piston 15, and having intermediate its ends an internal annular flange 17 80 providing a valve port 18. The valve 11 has a recess 19 in its top face into which the bore 16 opens. Extending upwardly through valve 11 are air passages 19^a which open from 85 inlet 2 into the recess 19 adjacent the upper end of bore 16. Through the piston 15 or the stem 10 adjacent the piston are ports or passages 20 which open from bore 16 into chamber 14 above the piston 15. The piston is 90 provided with check valves 15^a, preferably of the ball type, which open upwardly so that opening of air valve 11 by engine suction will be retarded or slow, while upon cessation of suction the valve 11 will close quickly due 95 to opening of check valve 15^a. At the side of the casing 1 is a fuel reservoir 21 of any well known construction having a float controlled fuel inlet 22 connected with a source of fuel supply (not shown), and having an 100

outlet 23 into the dash-pot chamber 14 above piston 15. Depending from plate member 13 concentric with sleeve 9 is a hollow boss 24 which is closed and sealed at its lower end by a cap member 25. Projecting upwardly through a guide aperture 26 in the piston 15 concentric with bore 16 and opening therein, is a needle valve 27 which co-operates with port 18 to control the flow of fuel through bore 16 to the mixing chamber 4. At its lower end within boss 24, the valve 27 has a toothed rack 28 which cooperates with a gear pinion 29 housed within the hollow boss 24 and fixed rigidly on a shaft 30 journaled in the depending boss 24. Within the boss 24 and between the under side of the rack 28 and the cap member 25, is a coil spring 31 under compression, which serves to eliminate back lash between rack 28 and pinion 29. One end of shaft 30 projects from the boss 24 and is serrated or toothed longitudinally, as at 32, to receive an operating member 33 having a transverse aperture 34 correspondingly serrated for gripping engagement with the serrated end of shaft 30. The member 33 has a slot 35 which opens into aperture 34 and provides clamping fingers 36, 37. A screw 38 is passed through an aperture in finger 36 and threaded into finger 37 to pull the member 33 at the sides of aperture 34 tightly into clamping engagement with shaft 30. The member 33 has an arm 39 which during normal operation of the carburetor is substantially horizontal and which has a lateral flange 40 which cooperates with an adjustable abutment or stop pin 41 threaded through a boss 42 on casing 1 into the path of movement of flange 40. The flange 40 is normally urged into engagement with pin 41 by a spring means 43 connected to the arm 39, as at 44, and to the casing 1, as at 45. The member 33 has a second arm 46 which extends downward and away from arm 39 at an angle of substantially 45° to the vertical. Secured to the free end of arm 46, in any suitable manner, as by a ball and socket joint 47, is a rod 48 comprising an operating means by which an operator can rotate or oscillate shaft 30 to control the valve 27. Extending across the air inlet 2, substantially parallel to shaft 30, is a shaft 49 which is journaled in the walls of the casing 1 and on which is fixed within the casing a valve 50, preferably of the butterfly type comprising a control means for the air inlet 2. One end of shaft 49 extends through casing 1, and fixed thereon external of the casing, is a lever member 51. Projecting from member 51 is a lug or tooth 52 which engages, when the valve reaches closed position, a pin or stop member 53 fixed to and projecting from the casing 1. A rod or link 54 is connected at one end by a swivel joint or the like to the member 33 on the far side of shaft 30 from valve 50, and at its other end is connected by a

swivel joint or the like to the member 51, such that when the valve 50 is open and the valve 27 is in normal position, as in Fig. 2, the rod 54 extends substantially through the projected center line of shaft 30, so that clockwise rotation of shaft 30 will cause clockwise rotation of shaft 49.

The carburetor having been connected at the outlet 5 to the intake manifold of an internal combustion engine and to a source of fuel at inlet 22, the operation of my device is as follows: The throttle valve 6 is opened part way, and for starting in very cold weather, such as temperatures below zero, the rod 48 is pulled to the left of Fig. 2 to its maximum extent. This rotates shaft 30 clockwise, depressing the metering pin 27 and opening port 18 to its maximum. Due to the fact that rod 54 is in substantially dead center position, movement of member 33 by rod 48 will push upwardly on rod 54, which, acting on lever member 51, will rotate shaft 49 clockwise and the valve 50 to closed position, when the lug 52 will strike pin 53, preventing further movement of valve 50 and rod 48. If the engine is now "turned over", an extremely rich fuel mixture will be drawn into the engine cylinders, as it is evident that ingress of air to the mixing chamber has been materially cut down by valve 50. The priming charge thus supplied to the engine cylinders will cause quick "firing" of the engine, and as soon as the engine starts to run, the rod 48 is pushed by the operator toward the right of Fig. 1 until the valve 50 is about three-quarters open and with the metering pin 27 corresponding, moved toward its normal position. This will supply mixture to the engine for "warming up", which mixture is slightly richer than that required for normal running of the engine. When the engine has been "warmed up", the rod 48 is returned all the way toward the right and to the position of Fig. 1, when flange 40 will abut pin 41 which is normal running position.

From the foregoing description it is apparent that I have provided means to supply a priming mixture which is very rich in liquid fuel to an internal combustion engine for extreme cold weather starting. However, it will be understood that for engine starting at temperatures above freezing the valve 50 need not be closed, but merely moved so as to restrict the inlet 2 to provide a mixture richer than normal.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, control means for said fuel inlet, control means for said air inlet, spring means normally urging said second-named control means to a position to permit flow of air to said chamber, a

shaft journaled in said casing, means fixed on said shaft positively connecting said shaft with said first-named control means, means positively connecting said shaft to said second-named control means, and means to rotate said shaft to operate said first-named and said second-named control means.

2. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, a valve to control said fuel inlet, a shaft journaled in said casing, a valve normally in open position and fixed on said shaft to control said air inlet, spring means normally acting to maintain said air inlet valve in open position, a second shaft journaled in said casing, means fixed on said second-named shaft positively connecting said second-named shaft and said first-named valve, means connecting said second-named shaft and said first-named shaft whereby rotation of said second-named shaft will rotate said first-named shaft, and means to rotate said second-named shaft to operate said valves.

3. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, a valve to control said fuel inlet, a shaft journaled in said casing, means fixed on said shaft within said casing operatively connecting said shaft and said valve, a member fixed on said shaft external of said casing, a normally open valve to control said air inlet, spring means normally urging said air inlet valve toward open position, means connecting said member and said second-named valve for operation of said second-named valve by said member, and means to rotate said shaft to control said valves.

4. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, a valve to control said fuel inlet and normally urged toward closed position, a shaft journaled in said casing and having operative engagement with said valve for movement of said valve toward and from said fuel inlet, a member fixed on said shaft external of said casing, a shaft journaled in said casing at said air inlet, a valve fixed on said second-named shaft to control said air inlet and normally urged toward open position, a member fixed on said second-named shaft external of said casing, means positively interconnecting said members whereby rotation of said first-named shaft operates said valves toward open and closed positions respectively.

5. A carburetor comprising a hollow casing having a mixing chamber, air and fuel inlets to said chamber, a normally open valve having an operating shaft and controlling said air inlet, a valve having an operating

shaft and controlling said fuel inlet, a lever member fixed on said air valve shaft, a lever member fixed on said fuel valve shaft, a tension spring having its opposite ends fixed to said casing and to said second-named lever member respectively and normally acting to urge said air inlet valve toward open position, and a rigid rod extending between and fixed to said members whereby said valves are interdependently and positively connected.

6. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, a reciprocable valve controlling said fuel inlet and having means normally urging said valve toward closed position, a rack rigid with said valve, a shaft having a pinion meshing with said rack whereby rotation of said shaft actuates said valve, a lever fixed on said shaft, a valve normally open and controlling said air inlet, a lever for operating said second-named valve, and a link connecting said levers such that rotation of said first-named shaft to open said first-named valve will cause closing movement of said second-named valve.

7. A carburetor comprising a hollow casing having a mixing chamber and a mixture outlet, said casing having an air inlet and a fuel inlet to said mixing chamber, a reciprocable valve controlling said fuel inlet and having means normally urging said valve toward closed position, a rack rigid with said valve, a shaft having a pinion meshing with said rack whereby rotation of said shaft actuates said valve, a lever fixed on said shaft, a valve normally open and controlling said air inlet, a lever for operating said second-named valve, a link connecting said levers such that rotation of said first-named shaft to open said first-named valve will cause closing movement of said second-named valve, and means engaging said first-named lever to actuate said valves.

In testimony whereof I have hereunto signed my name.

HARRY BARKER NORRIS.