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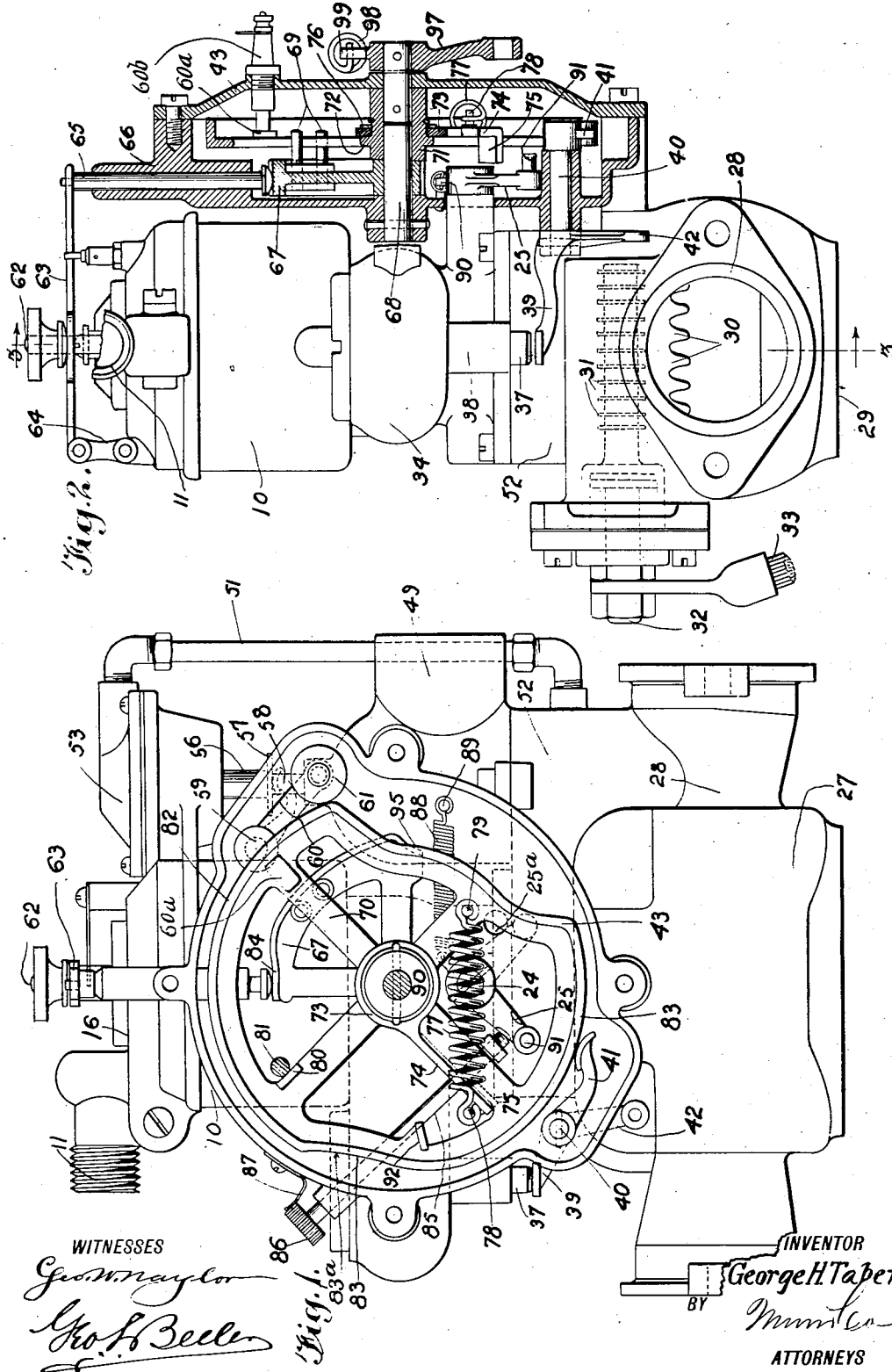
1,480,478

G. H. TABER

CARBURETOR

Filed April 11, 1919

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

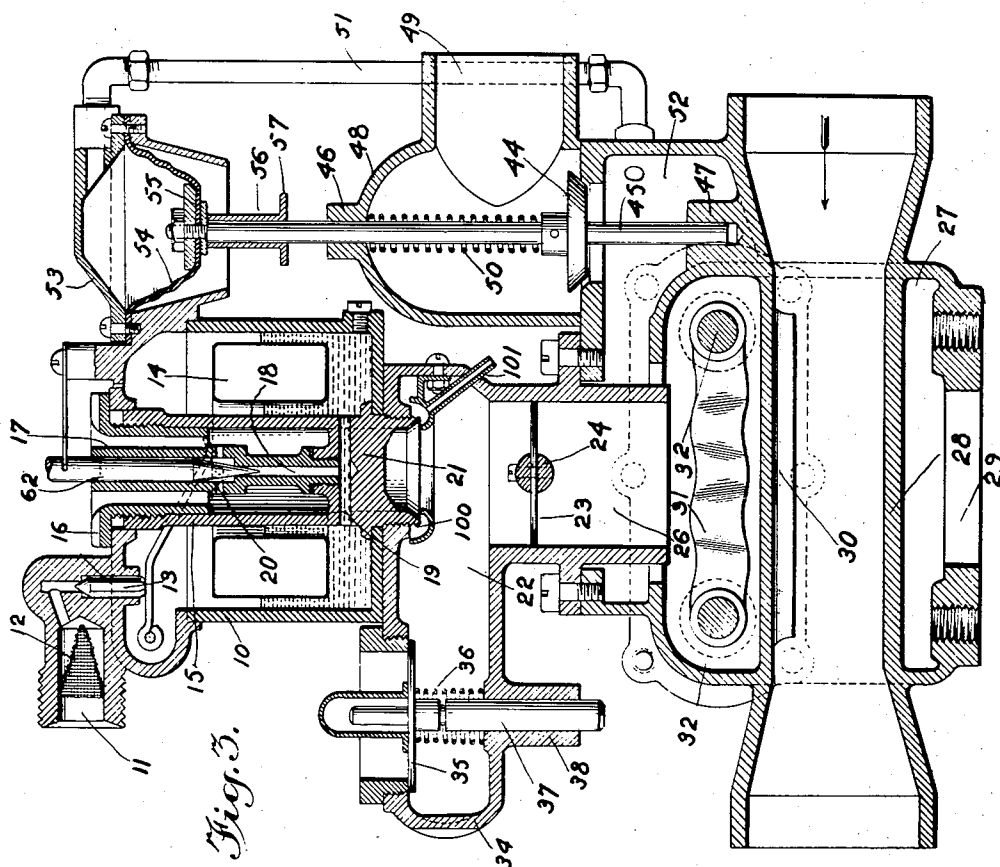
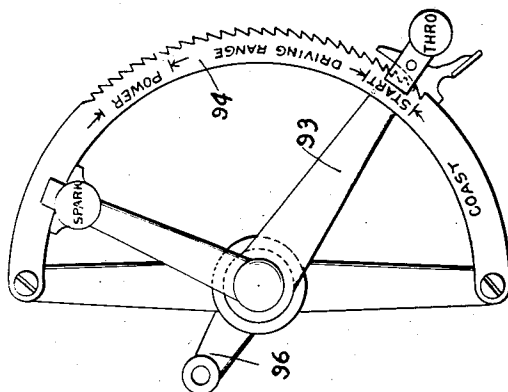


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CARBURETOR.

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To all whom it may concern:

Be it known that I, GEORGE H. TABER, a citizen of the United States, and a resident of Binghamton, in the county of Broome and State of New York, have invented a new and Improved Carburetor, of which the following is a full, clear, and exact description.

This invention relates to carburetors for internal combustion engines or the like and has particular reference to improved novel controlling means for such devices.

Among the objects of the invention is to provide means for automatically scavenging the engine cylinders at any desired time especially during the coasting or other idle periods of the engine, the momentum of the car driving the motor.

A further and one of the most important objects of the invention is to provide an improved mechanical means under the control of the operator at the steering wheel for automatically controlling the various feeds, pressure or mixtures of fresh air in accordance with the condition or speed of the machine, all of which will be made to appear fully as this description progresses.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a side elevation of my improved carburetor with the face plate removed and showing the relative position of the parts at period of coasting.

Fig. 2 is an elevation looking toward the right in Fig. 1 and with the cam wheel and adjacent parts in vertical section, the face plate being in place.

Fig. 3 is a vertical section on the line 3—3 of Fig. 2; and

Fig. 4 is a plan view of the controlling devices carried on or adjacent to the steering wheel of the vehicle not shown.

Referring now more specifically to the drawings I show a carburetor comprising a float chamber 10 into which a liquid fuel is admitted through a pipe connected to the coupling nipple 11 having a screen 12 and

guarded by means of a valve 13 whose action is controlled by a float 14 within the chamber 10 and surrounding the fresh working air inlet member 15. A thimble 16 is fitted into the upper end of the member 15 and in the center or axis of this thimble is a needle valve tube 17 having a longitudinal vertical bore 18 communicating with a transverse port 19 communicating with the lower portion of the chamber 10. Any suitable number of lateral ports 20 may lead from the bore 18 into the air space in the member 15 whence the air and gasoline will be carried down on both sides of the bridge 21 through which the transverse port extends and into the mixing chamber 22 guarded by a throttle valve 23 mounted upon a horizontal shaft 24 to the outer end of which is secured a lever 25. The delivery skirt 26 from the chamber 22 communicates with a large heating chamber 27 surrounding a pipe 28 through which exhaust gases from the engine are adapted to pass freely and from which heating chamber the fuel mixture passes through a port 29 to the intake manifold of the engine, not shown. The interior of the tube 28 is provided with any suitable number of longitudinal ribs 30 for the purpose of increasing the surface contact for the absorption and transfer of heat from the exhaust gases to the heating chamber.

Within the upper portion of the heating chamber 27 are provided a plurality of metallic ribbons 31 connected to the binding posts 32 in a shunt circuit 33 with the starting motor of the engine which ordinarily is employed for initiating the operation of the engine. These ribbons 31 constitute heating elements over and between which the mixture is delivered on the way to the intake manifold prior to the warming up of the heating tube 28 and ribs 30. The action of these heating elements 31 is automatic, being coincident with the operation of the self starting motor or its equivalent, and consequently such action is stopped when the starter is cut off and the operation is proceeded with through the regular course.

One side portion 34 of the mixing chamber casing is fitted with an inwardly opening auxiliary air valve 35, against the inner face of which a spring 36 has constant bearing around a stem 37 projecting downward through a hub 38 below said chamber. Fresh air is admitted through this valve

into the mixing chamber automatically whenever the manually controlled fuel feed devices are moved to provide for the maximum efficiency of the engine, as will more fully appear presently. A lever 39 is pivoted at 40 in the lower portion of the carburetor casing and connected to the pivot or rock shaft 40 for independent actuation thereof are two arms 41 and 42, the former of which is arranged for automatic actuation by a cam wheel 43 which will be described more fully below, and the latter of which arms is adapted for manual or mechanical actuation. The auxiliary air valve 35 is held seated either by the spring 36 or the arm 39 or both, but will open automatically due to the suction of the engine when high speed or power is required, the arm 39 at such time being movable downward ahead of the stem 37.

At any desired place, preferably on the opposite side of the throttle from the auxiliary air valve 35 is another air valve 44 connected to a stem 45 extending entirely through the valve and seated or movable in upper and lower guides 46 and 47 formed as parts of a dome 48 and the casing of the heat chamber 28. The dome 48 has a mouth 49 open to the atmosphere and inward through which air is adapted to be admitted for purging or purifying the engine cylinders, especially when the machine is coasting. The valve 44 is normally held closed by means of a spring 50 acting between the guide boss 46 and the upper face of the valve. 51 is an equalizing tube communicating at its lower end with the air chamber 52 surrounding the skirt 26 of the throttle, and at its upper end with a casing 53 in which is secured a flexible diaphragm 54 to the center of which the upper end of the valve stem 45 is fixed by means including a washer 55 having a diameter as large as the effective under surface of the valve 44. Beneath the diaphragm and surrounding the valve stem is a thimble 56 having an outwardly projecting flange 57 adapted to be engaged by an arm 58 fixed to a rock shaft 59 and to another portion of which is fixed an arm 60 carrying at its free end an anti-friction roller 61, or its equivalent, co-operating with the periphery of the cam wheel 43. The arrangement of the valve operating means is such that the valve 44 will always remain closed unless mechanically opened by means of the arm 58, or its equivalent. The equalizing tube 51 communicating with the valve on opposite sides thereof will prevent any pressure or suction from influencing the position or action of this valve.

The means for regulating or controlling the feed of the liquid fuel between the float chamber and the mixing chamber consists of a needle valve 62 projecting into the bore

18. The delicacy of the adjustment of the needle valve may be determined in any well known manner, but is shown herein as including a lever 63 pivoted at the back portion of the carburetor through a link 64 and having its front end engaged by a plunger 65 guided for vertical reciprocations in the guide 66 and having a head at its lower end co-operating with a cam quadrant 67 pivoted upon the cam wheel stud 68 and secured in any suitable mechanical manner to the fixed portion of the casing or wall of the mixing chamber 34.

The cam quadrant 67 is slipped upon the stud 68 and is provided with two spaced pins 69 lying on opposite sides of one of the spokes 70 of the cam wheel whereby the rotation of the cam wheel causes a similar angular movement of the cam quadrant around the axis of the stud. The cam wheel includes a hub 71 journaled upon the stud and upon said hub and against a flange 72 thereof is supported the annular hub portion 73 of a yielding throttle carrier including an arm 74 having a laterally or inwardly projecting finger 75 bearing normally against one of the spokes of the cam wheel. A spring collar 76 surrounds the wheel hub and serves to hold the throttle carrier against said flange 72.

A spring 77 is secured at one end to a stud 78 constituting a part of the throttle carrier arm 74 and at its other end to a stud 79 carried by the wheel. The tendency of this spring 77 is to cause by its contraction the arm and finger 74 and 75 to follow the adjacent wheel spoke, at which time one high portion 82 of the cam wheel acts outward or upward upon the roller 61 causing the opening of the purging air valve 44 as above described. Also another high portion 83 on the opposite side of the cam wheel acts through the arm 41, rock shaft 40 and arm 39 to hold the auxiliary air valve 35 closed. Again, the cam quadrant 67 at this time has a low portion of its periphery 84 against which the plunger 65 is seated to allow the automatic closing of the needle valve and thereby the shutting off of the liquid fuel. Also the throttle controlling arm 25 lies against the end of an adjustable bolt 85 the inner end of which constitutes a limiting stop, the exact position of which is determinable by means of a knurled finger piece 86 at the outside of the carburetor which is held from accidental rotation by means of a spring 87, and whereby the extent of closing of the throttle 23 may be delicately adjusted or determined. At this time a spring 88 anchored at one end at 89 to the fixed part of the device and at its other end to an arm 90 of the throttle mechanism, serves to hold the throttle closed or as nearly closed as the adjustable stud 85 will permit. The throttle control-

ling arm 25 has a laterally projecting finger 91 arranged in the path of but normally spaced from the finger 75 of the throttle carrier. Another lug or finger 92 projects from the cam wheel and in the idle position of the engine or during the coasting action is spaced circumferentially from the finger 75 or as shown in Fig. 1 the finger 75 is substantially midway between the fingers 91 and 92.

Any suitable means may be provided to actuate the cam wheel and to this end I indicate diagrammatically in Fig. 4 a hand lever 93 co-operating as usual with a controller or index arc 94. As indicated this index arc is provided with various legends indicative of the several conditions or functions of the engine. When the lever 93 is swung to the left the position of the parts is as indicated in Fig. 1 and the coasting air valve 44 will be open giving free admission of pure warm air into the chamber 52, sweeping around the skirt 26 of the throttle and thence through the chamber 27 to and through the engine cylinders sweeping out all impurities and cleaning the same. At the next stage of the lever 93 the roller 61 will then be dropped to the shallow portion 95 of the cam wheel periphery closing the valve 44, but the finger 92 will not yet have engaged the finger 75 for the opening of the throttle. It will be understood, of course, that between the lever 93 any suitable mechanical connections will be employed between a short arm 96 and an arm 97 connected to the cam wheel. The main spring 98 connected to an arm 99 tends to swing the cam wheel and parts associated therewith in a clockwise direction bringing a lip 80 against a fixed stop 81. When the cam wheel is turned in a contra-clockwise direction for starting and subsequent operation of the engine the finger 91 will be engaged at the proper time to cause the opening of the throttle gradually against the force of the spring 88 and the high portion of the periphery of the cam quadrant 67 will open the needle valve 62. At the time the adjustment is effected for maximum power of the engine the cam wheel will have moved far enough to the left to bring the low portion 83' of the cam 83 opposite the arm 41 permitting the auxiliary air valve 35 to open automatically with the suction.

Any drip of liquid fuel that may tend to enter the mixing chamber 22 from the lower or inner end of the tubular member 15 will be received by a circular gutter 100 having a delivery spout 101 leading outward through the wall of the mixing chamber as clearly shown in Figure 3, so that any tendency of the engine to become foul because of improperly mixed fuel will be obviated.

From the foregoing it will be appreciated that my improved carburetor is of a triple

function character, that is to say, it has three important and distinct phases of operation: first, coasting, secondly, the normal or regular automatic phase controllable by means of the arm 25 with the throttle at any stage from closed to full open, and thirdly the phase for excess speed or power made effective by a further throw or stroke of the operating lever beyond the full open position of the throttle. When the lever 25 moves from its full line position of Fig. 1 to the dotted line position it strikes against a stop pin 25^a which limits the position of the throttle, but a further operation in a contra-clockwise direction of the cam wheel may be permitted by virtue of the elongation of the spring 77. The depression or relief at 83^a of the cam surface 83 provides for the automatic opening of the auxiliary air valve 35 at a time when the engine is running at high speed and the maximum air supply is required. For the most part, however, the auxiliary air valve 35 is held partly closed by the cam surface 83 acting upon the lever 41, and hence the valve 35 is prevented from fluttering during the second or automatic stage of the device. It will be noted that the cam 67 has a gradual rise or lift all the way to its right hand end so that the movement of the cam to the left to the maximum extent will cause the maximum opening of the needle valve and at such time the auxiliary air valve 35 will be permitted to open supplying the required amount of air for mixing with the added increments of fuel.

Making further reference to the supply of air through the port 49 and past the purging air valve 44 I wish to explain that the air is piped from a heater or stove, not shown, but understood to embrace the exhaust manifold from the engine, and hence such air will be heated before it is caused to sweep around the skirt 26 of the throttle.

By virtue of the three phase conditions above referred to I am able to obtain ideal results by progressively moving the arm 97 in relation to the motor speed and from this fact it is possible for the operator to make a large portion of every run on a weak and economical mixture. The feasibility of always determining at a glance at the steering wheel or the controlling devices carried by the steering wheel is of vast importance for the reason that the driver will always know the setting or action of the carburetor. With the controlling lever at the wheel on the coasting phase position as marked in Fig. 4 the carburetor automatically goes into coasting phase by letting the accelerator pedal fully retarded or all the way back.

Attention is called to the provision of means for automatically grounding the ignition circuit in the coasting stage of the car-

buretor. To this end I provide a lip 60^a on one of the arms of the cam wheel which is adapted to co-operate with a pin 60^b fixed in the cover plate insulated therefrom. The
 5 outer end of this pin has a terminal binding post for the magneto grounding wire. Said lip 60^a is either to ground or open the ignition circuit, depending upon the system of ignition used or the type of car to which
 10 the carburetor may be attached. By reason of this grounding the ignition circuit during the coasting phase by the automatic action of the carburetor mechanism the motor is prevented from speeding up momentarily
 15 when entering the coasting phase.

The arm 41 does not hold the valve 35 tightly closed, but is so designed as to hold it so that it may open automatically to a certain degree, such degree as may be sufficient to admit the amount of air to enter
 20 to yield the proper mixture. The valve 35, however, is intended to be held tight to its seat when starting the motor when it is cold.

In my carburetor construction the float
 25 chamber is made preferably of brass or bronze, while the part having the throttle, the heating chamber and the coasting air dome are of cast or gray iron. I use this gray iron because it does not conduct the
 30 heat to the float chamber inasmuch as the float chamber should be kept as cool as possible.

I claim:

1. In a carburetor, the combination of a
 35 fuel feed manifold connection, down feed connections for gaseous or liquid fuels thereto, means to control the delivery of fuel and air through the carburetor and supplementary warm air delivery means through the
 40 carburetor and through the manifold connections aforesaid for supplying fresh heated air to the engine when the air and fuel supplies are shut off.

2. In a three adjustment carburetor, the
 45 combination of devices providing for idle coasting with fresh air intake through the carburetor and the fuel supply cut-off, a throttle movable from closing position to full open position at 90 degrees from its
 50 closed position, means for delivering automatically controlled volumes of fuel mixtures with the throttle in any position up to full open position, and means to increase the fuel supply along with additional fresh
 55 air for mixing therewith after the throttle has been fully opened, the last mentioned means being operatable in connection with the throttle opening means and in the same direction as for opening the throttle.

3. In a carburetor, the combination of
 60 fuel feeding and controlling means, an auxiliary air valve, means to automatically hold the air valve from fluttering in connection with the operation of the fuel feeding devices, said air valve controlling means in-

cluding a cam having a depression brought into play at the time the maximum fuel supply for highest speed and power are desired.

4. In a carburetor, the combination of
 70 fuel feed controlling devices and an auxiliary air valve adapted to open automatically under the suction of the engine, means to prevent the fluttering of the air valve when the motor is under heavy labor, and
 75 interconnecting means to permit the opening of the air valve when the machine is operating at high speed.

4. In a carburetor, the combination of
 80 float chamber made of metal having a high degree of heat conductivity, and supporting means for the float chamber comprising a coasting air dome, a heating chamber upon which the dome is supported and a throttle chamber leading to the heating chamber,
 85 said air dome, heating chamber and throttle chamber being formed of gray iron for low conductivity of heat.

6. In a carburetor, the combination of a
 90 mixing chamber, a downdraft working air tube projecting into said mixing chamber, means to control the delivery of liquid fuel into the mixing chamber through said tube, and an annular gutter disposed beneath the inner end of the air tube and communicating
 95 with a trough adapted to discharge the collected liquid exteriorly of the mixing chamber.

7. In combination with an internal combustion engine, a carburetor including a
 100 construction having a fuel regulating valve by which the flow of liquid fuel into the mixing chamber of the carburetor may be controlled, a throttle valve between the inlet manifold of engine and mixing chamber, an
 105 auxiliary air valve adapted to establish communication with the intake manifold of the engine at a point forward to the throttle valve, an operating lever, and mechanical means connected to said lever whereby the
 110 same may be operated for closing the regulating valve and throttle valve simultaneously with the opening of the auxiliary air valve for the purpose described.

8. In combination with an internal combustion engine, a carburetor construction
 115 including a fuel regulating valve by which the flow of liquid fuel to the mixing chamber of the carburetor may be controlled, an auxiliary valve adapted to establish communication between the atmosphere and
 120 mixing chamber upon a predetermined suction from the cylinders of the engine, a throttle valve located between the manifold of the engine cylinders and the mixing chamber, a second auxiliary valve adapted to establish communication between the atmosphere and the intake manifold at a point
 125 forward to the throttle valve, an operating lever, and mechanical means connected to
 130

said lever whereby the fuel regulating valve and throttle will be closed and the first mentioned auxiliary air valve locked in closed position simultaneously with the opening of the second auxiliary valve for the purpose described.

9. In combination with an internal combustion engine, a carburetor including a construction having a fuel regulating valve by which the flow of liquid fuel into the mixing chamber of the carburetor may be controlled, a throttle valve between the inlet manifold of engine and mixing chamber, an auxiliary air valve adapted to establish

communication with the intake manifold of the engine at a point forward to the throttle valve, an operating lever, mechanical means connected to said lever whereby the same may be operated for closing the regulating valve and throttle valve simultaneously with the opening of the auxiliary air valve, and means also actuated by said lever whereby the ignition system of said internal combustion engine will be rendered inoperative upon completion of the last named operation.

GEORGE H. TABER.