D. R. WILLS.

CARBURETER.

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1,038,050.

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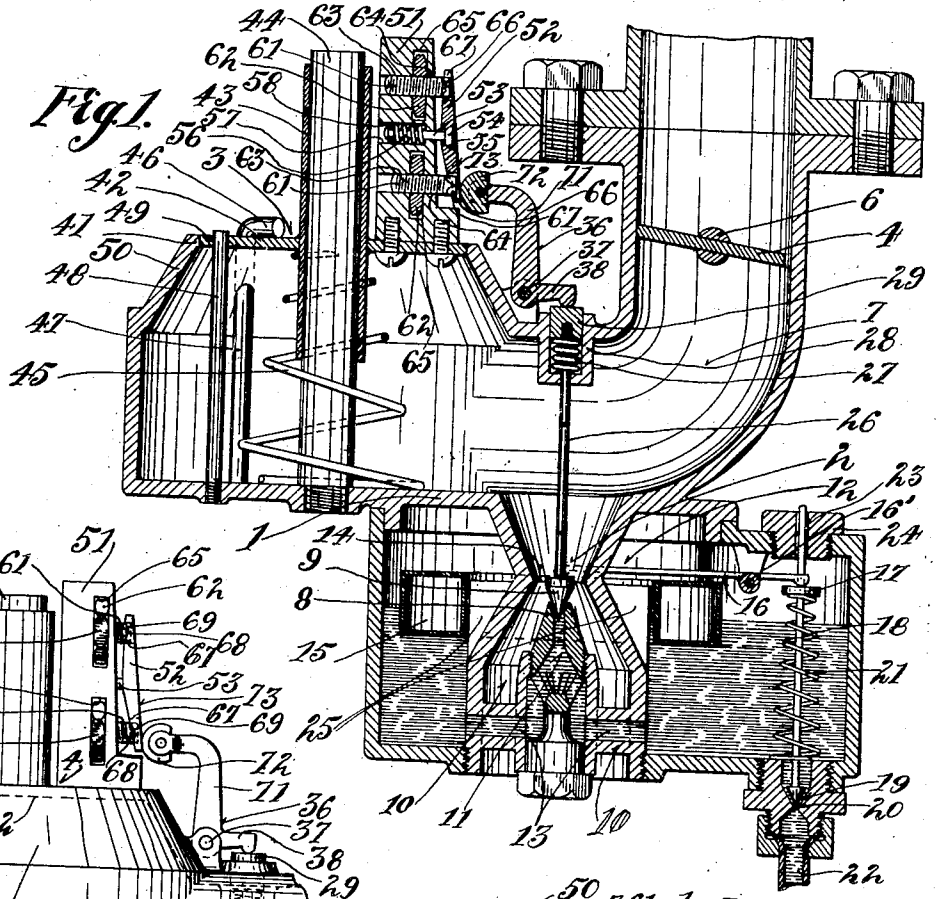

Fig. 1.

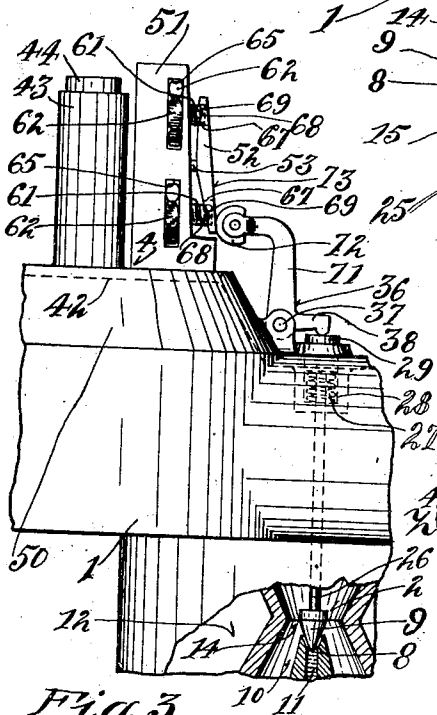

Fig. 3.

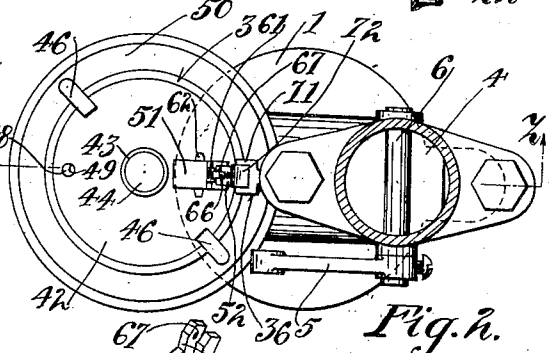

Fig. 2.

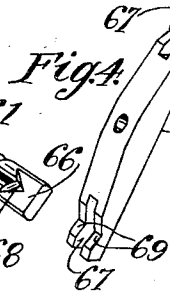

Fig. 4.

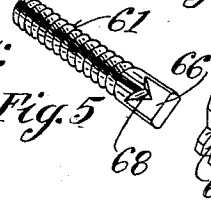

Fig. 5.

Witnesses:

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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,038,050. Specification of Letters Patent. Patented Sept. 10, 1912.

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To all whom it may concern:

Be it known that I, DONALD R. WILLS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to carbureters, and has for its object the provision of novel means whereby the supply of fuel is regulated, and further, the provision of novel means whereby the suction-controlled valve regulates the movable member of the fuel-valve, and the invention will be readily understood from the following description and claims, and from the drawing, in which latter:

Figure 1 is a central vertical section of my improved device taken on the line *z*—*z* of Fig. 2. Fig. 2 is a plan view of the same. Fig. 3 is a front elevation of the mechanism for controlling the fuel-valve, with the carbureter partly broken away and partly in section on the line *z*—*z* of Fig. 2. Fig. 4 is a perspective view of the guide for the fuel-valve controlling means; and, Fig. 5 is a perspective view of one of the adjusting screws for the guide.

1 represents the casing, 2 is a fuel-valve, 3 is an air-intake valve, 4 is a throttle-valve which has suitable connection with an ordinary throttle-lever, for instance of an automobile or other device in connection with which the carbureter may be used, the throttle-lever having suitable connection with an arm 5 secured to the rock-shaft 6 on which the throttle-valve is mounted, the throttle-valve being located in an outlet or suction passage 7 communicating in suitable manner with the cylinder or cylinders of an internal combustion motor.

The fuel-valve 2 in the form shown comprises a valve-seat 8 with which a valve-plug 9 coacts for opening or closing the valve, the fuel-valve having communication with a primary air-intake passage 10. The fuel-passage 11 for the fuel-valve connects in suitable manner with a fuel-reservoir 12 as by ducts 13 crossing the primary air-intake passage. The primary air-intake passage is shown contracted, as at 14, adjacent to the fuel-valve, the fuel, such as gasolene, being drawn from the fuel-valve by the forced passage of the air past the fuel-valve.

15 is a float which contacts a lever 16 shown pivoted at 16′, and arranged to contact a collar 17 of a valve-stem 18 of a valve 19, the valve-seat 20 whereof is arranged to have the valve-plug of the valve-stem 18 received therein, but normally urged therefrom by a spring 21 which normally tends to open the valve 19 for supplying the fuel at suitable height in the reservoir, the fuel-supply being received through a pipe 22 from a suitable source. The float is guided by wings 25. The valve-stem 18 is received in a hole 23 of a closing-plug 24, the hole 23 being sufficiently large to permit the passage of air between its wall and the valve-stem into the space of the reservoir above the fuel.

The valve-plug 9 is shown on a valve-stem 26, the valve-plug being preferably urged away from its valve-seat for tending to maintain the valve 2 in open relation. This in the form shown is done by a spring 27 received between the bottom of a socket 28 in the casing and a head 29 on the valve-stem, the head being slidable in and guided by the wall of the socket as a bearing therefor. The raising of the valve-stem 26 is limited by an obstructing part 36 which controls the position of the movable part of the valve 2. It is shown in the form of a lever pivoted at 37, the lever being shown as a bell-crank lever, one arm 38 whereof has bearing on the end of the valve-stem 26, the position of the controlling part being determined by the automatic air-intake valve.

The automatic air-intake valve in the form shown comprises a seat 41 which is arranged to be substantially closed by a valve-disk 42 which has a sleeve-bearing 43 about a post 44 secured to the casing. The valve-disk is normally urged toward closing position by a spring 45 received between said valve-disk and the casing for normally urging the valve-disk toward seating position, the movement of the valve-disk into seating position being shown limited by stops 46 shown in the form of the bent ends of rods 47 secured to the casing, the bent ends being received above said valve-disk. The valve-disk is prevented from turning by a post 48 secured to the casing and received through an aperture 49 in said disk. The valve-seat 41 is at the outer end of a shell 50 having an inner tapering wall, and as the valve-disk is drawn inwardly by suction through the throttle or suction-valve

4, the space between the outer edge of said valve-disk and said tapering inner wall gradually increases for admitting greater quantities of air. Making this inner wall, across which said valve-disk has movement, tapering, has the function of permitting the opening of said automatically acting air-intake valve to be graduated by the extent of movement thereof, the extent of this movement also controlling the extent of movement of the movable part of the fuel-valve as hereinafter more fully described.

Suitable means are provided for controlling the degree of movement of the movable part of the fuel-valve from the automatically acting air-intake valve, which in the present instance I have shown in the form of a guideway for guiding the movement of the end-thrust or controlling member for the valve-stem 26. Thus the valve-disk has thereon a pedestal 51 which moves with the valve-disk and supports a guide 52 shown as a pivoted guide, pivoted on a stem 53 having a head 54 received in a socket 55 in the guide for preventing release of the guide from the pedestal. There is a spring 56 received in a socket 57 of the pedestal and about the stem between a collar 58 on the stem and the bottom of the socket for urging the guide toward the pedestal. In the form shown, the guide is positioned by means of screws 61 with which nuts 62 have threaded engagement. The screws are slidable longitudinally in bearings 63 64 of the pedestal, the nuts being received in slots 65, the walls of which position the nuts longitudinally. Upon manipulation of the nuts, longitudinal movement of the screws is caused. The outer ends of the screws are provided with positioning heads 66 received in slots 67 in the guide for preventing turning of the screws. The screws are provided with bearing faces 68 at the respective sides of the heads, shown as knife-edge bearings, these knife-edge bearings being received in recesses 69 of the guide.

The contact-member as stated is shown as a bell-crank lever, and the arm 71 thereof is provided with a shoe 72 which makes contact with the guide, along the guiding face 73 of the guide. This shoe is preferably made of fiber for guarding against excessive wear of the parts.

The guide is so arranged that its guiding face may be placed parallel with or at an angle with relation to the line of movement of the automatic air-intake valve, and the lower or the upper end of the guiding face may be adjusted relatively close to or relatively far from the axis of longitudinal movement of said valve, so that the control of the fuel-valve by the movement of the axially movable automatic air-intake valve may be either neutral or a gradually opening or a gradually closing control for the fuel-valve. In its normal and general relation the control by the guide of the fuel-valve would be a gradually opening control so that as greater suction is caused by the speed of the motor a gradually increasing raising of the valve-plug may result from the movement of the automatic air-intake valve.

In operation, when the motor is running at slow speed, with the throttle-valve practically closed or only slightly open, air is drawn through the primary air-inlet passage 10, which causes fuel, such as gasolene, to be drawn through the fuel-valve, the fuel mixing with the air for forming the mixed charge received into the cylinder of the engine for forming the propulsion charge for the piston. Upon further opening of the throttle-valve a greater quantity of air will be drawn through the primary air-inlet valve past the fuel-valve, and if the quantity of air so drawn exceeds the capacity of the primary air-inlet passage to supply or if the suction created by the more rapidly moving piston or pistons of the engine upon the automatic valve is sufficient to counteract the closing action of the spring thereof, the automatic air-intake valve will be opened to an extent dependent on the suction created, and the farther that the throttle-valve is opened the greater will be the automatic movement of the automatic air-intake valve. The air received through the automatic air-intake valve is mixed with the charged air received from the primary air-inlet passage and passes to the cylinder or cylinders of the engine, for supplying the greater quantities of air required under high-speed conditions.

In the relation of the parts shown in the drawing, the fuel valve-stem is permitted to move a distance dependent on the extent of movement of the automatic air-intake valve for, as the automatic air-intake valve is caused to move, the guide thereon moves with the valve, and as the guiding face of the guide is at an angle with reference to the linear line of movement of the automatic air-inlet valve, the heel of the fuel-valve controlling part is permitted to recede with consequent movement of the fuel-valve stem.

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

1. In a carbureter, the combination with a casing having a primary air-intake passage, of a fuel-valve having a movable part and opening into said passage, an axially movable automatic air-intake valve, said automatic air-intake valve movable automatically in the direction of suction from the engine for opening said automatic air-intake valve, a pedestal mounted on and moving with said axially movable automatic

air-intake valve, a guide on said pedestal, said guide provided with a guiding-face, means for adjusting the said guide on said pedestal for changing the angularity of said guiding-face with relation to the line of movement of said axially movable air-intake valve, a controlling part for said movable part of said fuel-valve provided with a part coacting with said guiding face, and resilient means for normally automatically closing said automatic air-intake valve, substantially as described.

2. In a carbureter, the combination of a fuel-valve having an axially movable part, an axially movable air-intake valve, said axially movable part and said axially movable air-intake valve movable in parallel lines in closely adjacent parallel planes, a spring acting on said movable part for normally opening said fuel-valve, a pedestal mounted on and moving with said axially movable air-intake valve, a guide thereon extending in the general direction of said parallel planes, means for adjusting the angularity of said guide with relation to said parallel planes, and a bell-crank connecting-member between said guide and movable part having a pair of contact-parts thereon, one of said contact-parts coacting with said guide and the other of said contact-parts acting on said movable part of said fuel-valve, substantially as described.

3. In a carbureter, the combination with a casing having a primary air-intake passage of a fuel-valve, said casing comprising an air-intake shell, an axially movable automatic air-intake valve for said shell automatically moving in the direction of suction from the engine for opening said automatic air-intake valve, a pedestal mounted on and movable with said axially movable automatic air-intake valve, a guide on said pedestal, said guide having a guide-face extending in the general direction of said axial movement, means for adjusting the angularity of said guide-face with relation to said axial movement, said pedestal and guide located within the longitudinal projection of said air-intake shell, and resilient means for normally automatically closing said automatic air-intake valve, and a controlling member for said fuel-valve guided by said guide-face, substantially as described.

4. In a carbureter, the combination of a casing provided with a throttle-passage and a fuel-reservoir, an axially movable automatic air-intake valve, an axially movable fuel-valve located between said throttle-passage and said air-intake valve, said fuel-valve and said air-intake valve being in closely adjacent positions, fuel-valve controlling means actuated by said axially movable automatic air-intake valve comprising an adjustable guide and a contact-part therefor within the longitudinal projections of said axially movable automatic air-intake valve and fuel-reservoir, and resilient means for normally automatically closing said automatic air-intake valve, substantially as described.

In testimony whereof, I have signed my name hereto in the presence of two subscribing witnesses.

DONALD R. WILLS.

Witnesses:
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C. TATGENHORST, Jr.