

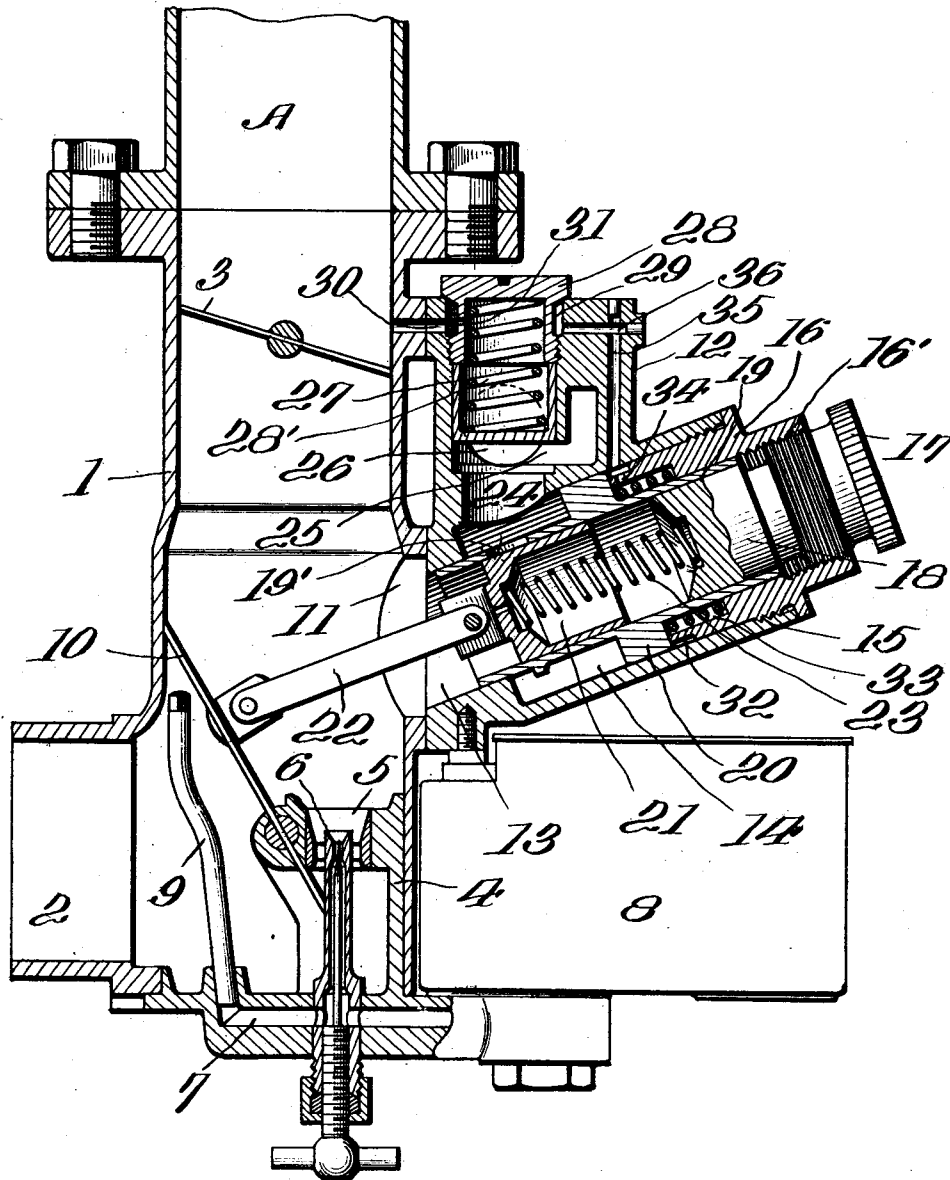
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CARBURETOR

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## UNITED STATES PATENT OFFICE

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## CARBURETOR

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This invention relates to certain new and useful improvements in carburetors, the object being to provide a carburetor that will meter the most economical mixture of air and fuel at all loads and speeds under normal driving conditions and one that will produce the most powerful explosive mixture at full load as in accelerating, hill climbing and speeding by controlling the fuel flow by the air velocity and vacuum in intake manifolds which are both the function of the load irrespective of the speed.

Another object of the invention is to provide a carburetor with a movable air valve for actuating a plunger to let in air as the air valve opens or as the air velocity increases.

A still further object of the invention is to provide a carburetor which is very simple and cheap in construction and one which is very economical in use, as the richness of the explosive mixture is automatically controlled by the working condition of the internal combustion engine to which the carburetor is attached, by first calibrating the carburetor for maximum power at wide open throttle and then leaning up the mixture by bleeding air into the mixture between the air valve and throttle so as to obtain the maximum economy.

It has been found by experimenting that for any given speed the air-gasoline ratio for maximum economy should vary from about 12 to 1 by weight at no load to about 17 to 1 at full load while for maximum power a constant mixture of about 12 to 1 should be maintained independent of the speed or load. In other words, the ideal carburetor would deliver a rich mixture at closed throttle and a gradually leaner mixture as the throttle is opened and at about three-fourths load would automatically shift to the rich mixture.

In the drawing I have shown a vertical section through a carburetor constructed in accordance with my invention in which 1 indicates a shell having a lateral air inlet 2 at its lower end and a throttle valve 3 adjacent its upper end. The upper end of the shell is provided with a flange and is

adapted to be connected to the intake manifold A of an internal combustion engine in the ordinary manner.

The tubular shell is provided with an open lower end to receive an insert 4 provided with a Venturi tube 5 into which extends a low speed nozzle 6 supplied with fuel from a passage 7 in communication with a fuel bowl 8 as clearly shown. Extending upwardly from the fuel passage 7 is a high speed nozzle 9 which terminates adjacent the wall of the shell above the air inlet 2 and over which is arranged an air valve 10 pivotally mounted on the insert 4 and adapted to be normally held in the position shown. The construction thus far described is substantially the same as the ordinary Marvel type of carburetor now in use and to which my improved construction is adapted to be attached for obtaining the desired result.

The shell 1 is provided with an opening 11 on the opposite side of the air inlet and over which is secured a casting 12 provided with an obliquely arranged bore 13 enlarged as shown at 14 and provided with a threaded end portion 15 in which is arranged an air screw shell 16 having an internally threaded portion 16' to receive an air screw 17 provided with a reduced portion 18 working in the outer end portion of a sleeve 19 which is slidably mounted in the bore 13 and is provided with an annular enlargement 20 fitting snugly in the enlargement 14.

The sleeve 19 is provided with an opening 19' over which is slidably mounted a dash pot plunger 21 connected to the air valve 10 by a rod 22 so as to be moved by the opening and closing movement of the air valve for opening and closing the opening 19' in the sleeve 19 to allow additional air into the mixing chamber of the carburetor below the throttle and between the throttle and the air valve. The plunger is held in the position shown by a spring 23 disposed in the plunger and engaged by the air screw 17 so as to hold the air valve normally in closed position.

The casting has a vertical passage 24 extending upwardly from the enlarged portion 14 of the bore 13, which passage is also

enlarged as shown at 25 and is provided with an air inlet passage 26 in communication with the atmosphere and over which is slidably mounted a cup shaped piston valve 27 working in the enlarged portion 25 of the passage 24 and adapted to close the passage 24 and air inlet opening 26. The upper end of the passage 25 is threaded and into it is screwed the threaded enlarged end of a hollow plug 28 in which is disposed a calibrated spring 28' extending into the piston valve 27 as clearly shown.

The head of the plug and the lower enlarged threaded end forms an annular chamber 29 from which extends a horizontally disposed bore 30 passing through the casting and shell of the carburetor into the throat above the throttle valve. A bore 31 is formed in the wall of the plug 28 so as to bring the interior of the piston valve in communication with the intake above the throttle valve to allow the same to be acted upon by the manifold suction and is fully closed at a depression of approximately 6" of mercury and fully opened at approximately 7" of mercury. At wide open throttle the valve 27 is shut and the carburetor is working under a rich explosive mixture and full power, but the moment the throttle is closed, it instantly opens and stays open as long as the vacuum is above approximately 7" of mercury.

The air screw shell 16 is internally and externally reduced at its inner end and forms in connection with the enlarged portion of the bore 13 concentric vacuum chambers 32 and 33 in communication with one another by a passage 34. The inner chamber 33 is provided with a calibrated spring working against the enlarged portion of the sleeve 19 and the outer chamber 32 registers with a vertical passage 35 formed in the casting, which passage registers with a horizontally disposed passage 36. This passage 36 is in communication with the annular chamber 29 and through the bore 30 is in communication with the bore of the carburetor above the throttle valve to allow the sleeve 19 to be acted upon by the pressure in the manifold. As the pressure increases the sleeve moves toward the dash pot plunger and opens the air port 19', the spring being calibrated to begin to open at the point of maximum suction and to be fully opened at the wide open throttle. The sleeve 16 and dash pot plunger being movable relative to one another act to control the admission of additional air below the throttle, the sleeve being actuated by the pressure in the manifold and the plunger by the increased air velocity in the carburetor.

While I have shown certain details of construction in producing a carburetor having the advantages hereinbefore clearly set forth, I do not wish to limit myself to these

details of construction as I am aware that the specific construction to obtain the desired result can be changed without departing from the spirit of my invention.

What I claim is:—

1. A carburetor having a suction operated air valve with an auxiliary nozzle arranged thereunder, a throttle valve and an auxiliary air inlet, a plunger for controlling the admission of air through said auxiliary inlet, said plunger having a connection with said suction operated air valve, an auxiliary air valve for said auxiliary air inlet controlled by the vacuum above the throttle valve and a member in which said plunger works controlled by the vacuum above the throttle valve for regulating the amount of air passing through said auxiliary air inlet. 70
2. A carburetor having a suction operated air valve, a throttle valve and an auxiliary air inlet, two members movably mounted with respect to each other for controlling the admission of auxiliary air through said auxiliary air inlet, one of said members being actuated by the air valve, said air valve being operated by the suction below the throttle valve and the other by the vacuum above the throttle valve. 75
3. A carburetor having an air valve, a throttle valve and an auxiliary air inlet below said throttle valve, two members movably mounted with respect to each other for controlling the admission of auxiliary air through said inlet, one of said members being operated by the air valve and the other member by the vacuum above the throttle valve. 80
4. A carburetor having means for admitting auxiliary air below the throttle valve comprising an auxiliary air inlet from the atmosphere, and passages leading therefrom to a point below the throttle valve, a suction operated air valve mounted in said carburetor, a valve mounted over said auxiliary air inlet and actuated by suction above the throttle and two members movably mounted with respect to each other for controlling the passage of air through said passages, one of said members being actuated by the suction operated air valve and the other by the pressure above the throttle. 85
5. A carburetor having a shell having an air inlet at its lower end provided with high and low speed nozzles, a suction operated valve mounted over said high speed nozzle, a throttle valve, an auxiliary air inlet in communication with the atmosphere, means actuated by the vacuum above the throttle valve for controlling the admission of air through said auxiliary air inlet and means actuated by the suction operated valve for controlling also the admission of air through said auxiliary air inlet into the mixing chamber of said carburetor. 90
6. A carburetor having a suction operated 100

air valve, a throttle valve and an auxiliary air inlet below said throttle valve, a dash pot plunger operated by said suction operated air valve for controlling the admission of air through said auxiliary air inlet and means actuated by the vacuum above the throttle valve for modifying the amount of air admitted through said auxiliary air inlet.

7. A carburetor having high and low speed nozzles and a throttle valve, an attachment for said carburetor comprising a casing having means for admitting auxiliary air below said throttle valve, said casing having concentrically arranged members mounted therein, a suction operated air valve for said carburetor, one of said members being connected to said suction operated air valve, and means for actuating the other member by the vacuum above the throttle valve.

8. A carburetor comprising a shell having an air inlet at its lower end and a throttle valve at its upper end, high and low speed nozzles disposed in said shell, an air valve mounted in said shell over the high speed nozzle, a casting secured to said shell having an air inlet, a suction controlled valve arranged over said air inlet and two movable members mounted in said casting for controlling the admission of air to said shell below the throttle, one of said members being actuated by the pressure in the manifold and the other member being actuated by said first mentioned air valve.

9. A carburetor having high and low speed nozzles, a throttle valve, a suction operated air valve disposed over the high speed nozzle below said throttle valve, an auxiliary air inlet between said suction operated air valve and said throttle valve and means for controlling the admission of air through said auxiliary air inlet actuated by said suction operated air valve and the vacuum above the throttle valve.

10. A carburetor comprising a shell having a suction controlled air inlet valve and a throttle valve, said shell having an extension on one side provided with a bore having an auxiliary air inlet, a valve controlling the passage of air through said auxiliary air inlet operated by the suction above said throttle valve, a sleeve movably mounted in said bore provided with an opening in communication with said auxiliary air inlet, said sleeve being operated by the suction above the throttle valve, a plunger working in said sleeve and controlling said opening and a connection between said plunger and said suction operated air valve.

11. A carburetor comprising a shell having a suction operated air inlet valve and a throttle valve, said shell having an extension on one side provided with a bore having an auxiliary air inlet, a valve controlling the passage of air through said auxiliary air inlet operated by the suction above said

throttle valve, adjustable means for controlling the movement of said valve, a sleeve movably mounted in said bore provided with an opening in communication with said auxiliary air inlet, said sleeve being operated by the suction above the throttle valve, a plunger working in said sleeve and controlling said opening and a connection between said plunger and said suction operated air valve.

12. A carburetor comprising a shell having a suction operated air inlet valve and a throttle valve, said shell having an extension on one side provided with a bore having an auxiliary air inlet, a valve controlling the passage of air through said auxiliary air inlet operated by the suction above said throttle valve, a sleeve movably mounted in said bore provided with an opening in communication with said auxiliary air inlet, said sleeve being operated by the suction above the throttle valve, adjustable means for controlling the movement of said sleeve, a plunger working in said sleeve and controlling said opening and a connection between said plunger and said suction operated air valve.

13. A carburetor having a suction operated air valve and a throttle valve, a plunger connected to said suction operated air valve, means for resisting the movement of said plunger for normally holding said suction operated air valve in closed position, a movable sleeve in which said plunger is mounted, said sleeve being provided with an auxiliary air inlet, said plunger controlling the admission of air through said auxiliary air inlet and being actuated by the said suction operated air valve and by the pressure above the throttle valve.

14. A carburetor having a mixing chamber provided with a throttle valve for controlling the outlet thereof, a suction operated air valve arranged below said throttle valve for controlling the admission of air to said mixing chamber, said mixing chamber being provided with an auxiliary air inlet, and means for controlling the passage of air through said auxiliary air inlet actuated by the suction operated air valve and the pressure above the throttle valve.

15. A carburetor having a mixing chamber provided with means for supplying fuel and air thereto, a suction operated air valve for controlling the admission of air thereto, said mixing chamber being provided with an auxiliary air inlet, and means actuated by said suction operated air valve and the vacuum above the throttle valve for controlling the passage of air through said auxiliary air inlet.

16. A carburetor having a suction operated air valve normally held in closed position, a throttle valve, a movable sleeve actuated by the pressure above the throttle valve provided with an auxiliary air inlet, a

plunger mounted in said sleeve for controlling the passage of air through said auxiliary air inlet having a connection with said suction operated air valve and means for controlling the volume of air passing through said auxiliary air inlet actuated by the pressure above the throttle valve.

In testimony whereof I hereunto affix my signature.

EUGENE C. RICHARD.

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