A. PHINNEY.

CARBURETER.

APPLICATION FILED OCT. 4, 1909.

988,659.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

Fig. 2.

Fig. 3.

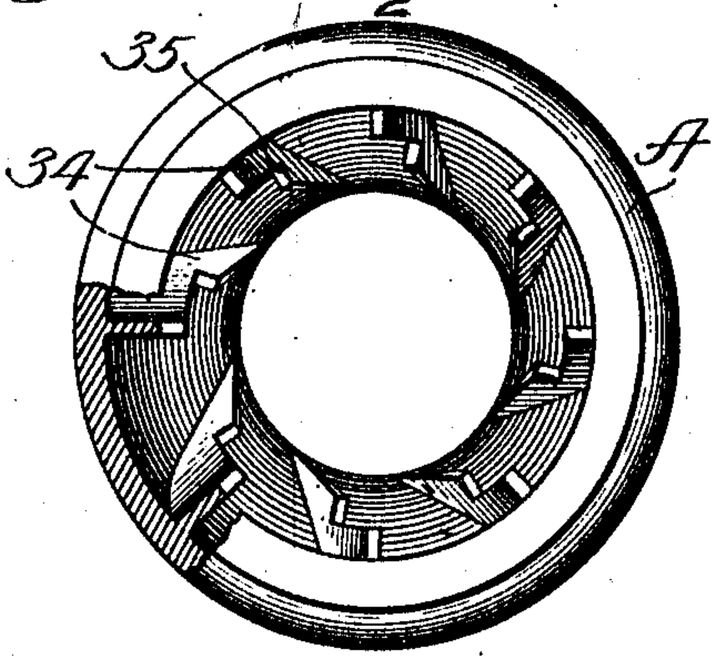
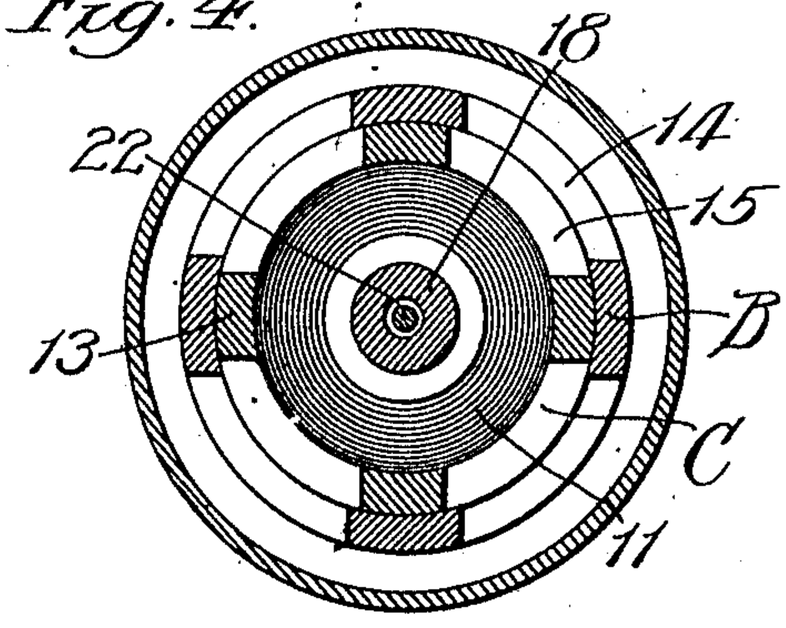


Fig. 4.



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2 SHEETS—SHEET 2.

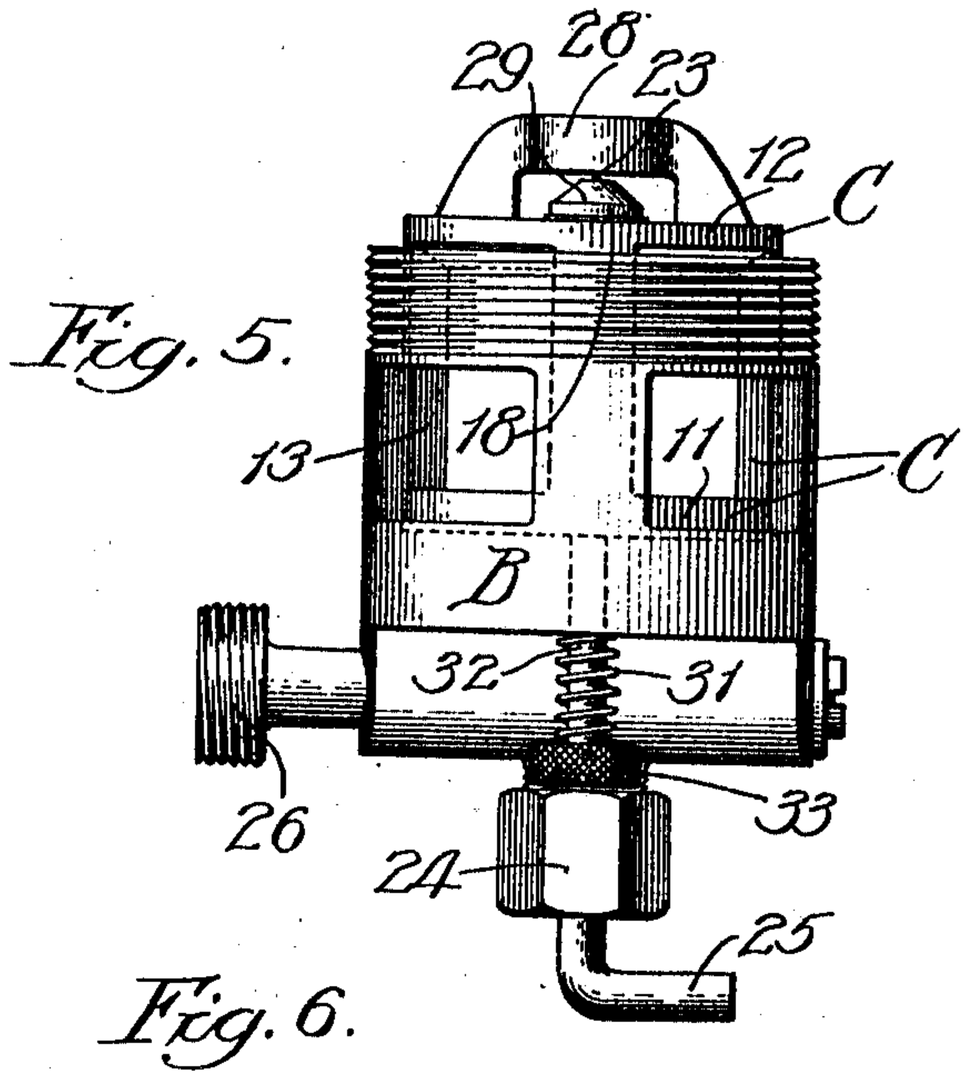


Fig. 5.

Fig. 6.

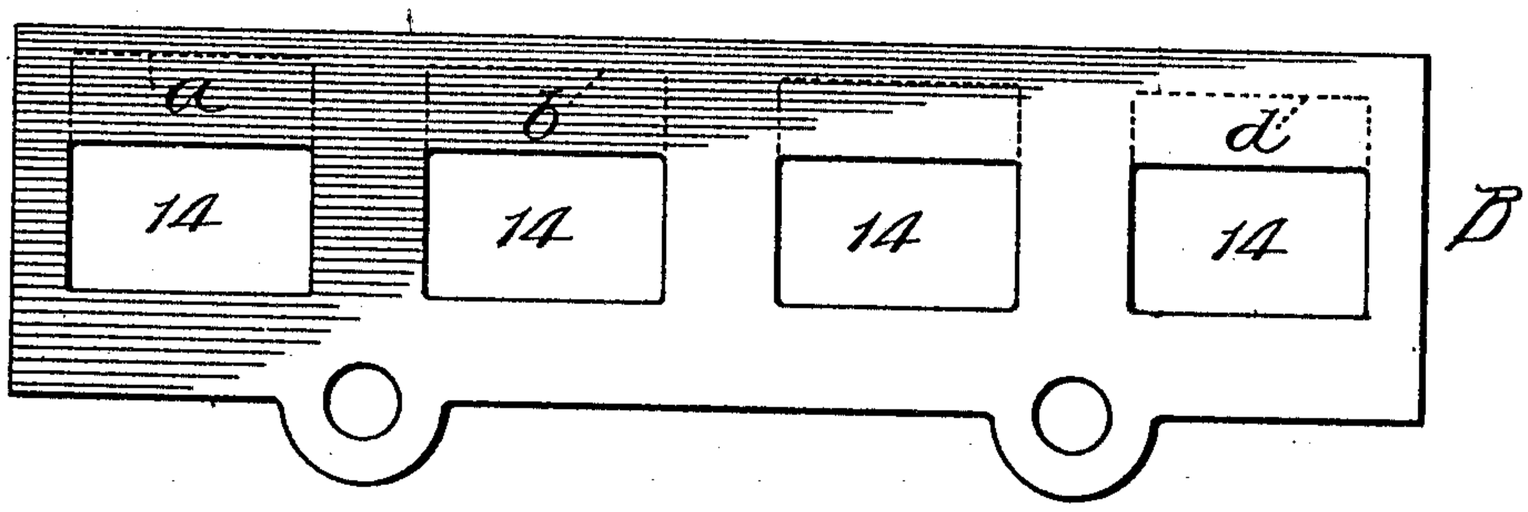
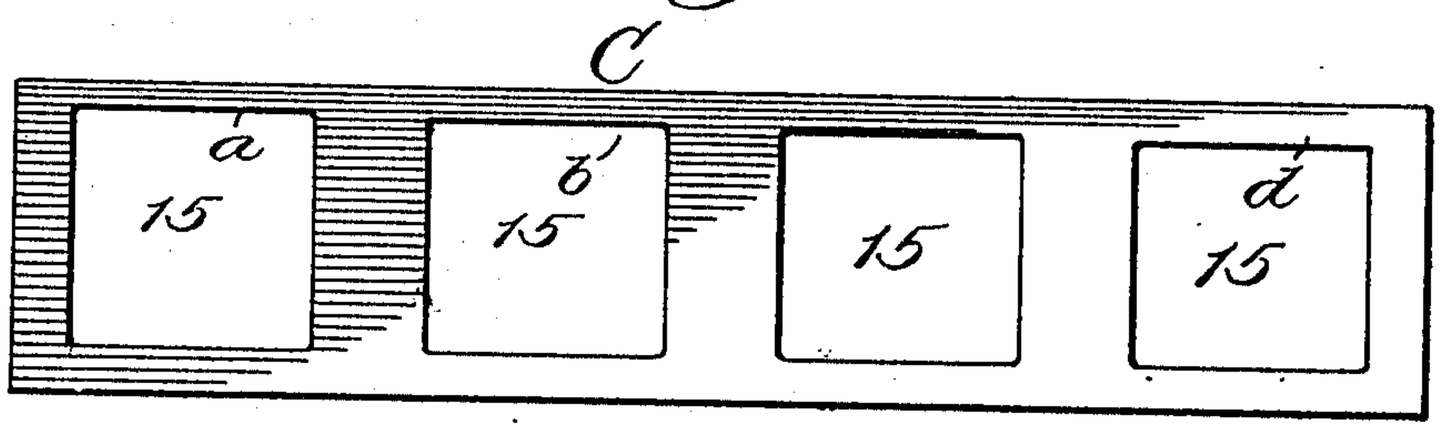


Fig. 7.



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CARBURETER.

988,659. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed October 4, 1909. Serial No. 520,974.

To all whom it may concern:

Be it known that I, ALBERT PHINNEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to a carbureting apparatus for use in connection with explosive engines, and is more especially intended for automobiles and other vehicles.

The principal object is to provide a device of this character that will automatically control and regulate the admission and mixing of the explosive charge.

In carrying out the objects of this invention, means are employed which will simultaneously control the admission of the air and hydrocarbon vapor elements in proper proportions to secure the greatest efficiency.

A practical embodiment of the invention is illustrated in the accompanying drawings in which—

Figure 1 is a vertical longitudinal section. Fig. 2 is a similar view on line 2, Fig. 1. Fig. 3 is a horizontal section on line 3, Fig. 1. Fig. 4 is a horizontal section on line 4, Fig. 1. Fig. 5 is an elevation. Figs. 6 and 7 are diagrammatic views illustrating the relative position of the air admission ports.

For convenience in assembling and affording access for examination and repairs, the casing is divided into two parts, the upper part A and the lower part B, assuming the apparatus is placed in a vertical position. The two parts are separably threaded together, as at 8. The lower part is inclosed by a protecting sleeve 9 leaving an annular air space 10 therebetween as best shown in Figs. 1, 2 and 4. A cylindrical combination valve C, located on the inside of the lower part of the casing, is adapted to have a free floating or vibratory movement and consists of a bottom disk 11, a top disk 12 and a number of spaced apart bars or ribs 12^a connecting the same, as shown in Figs. 1, 2, 4 and 5. Normally this valve is supported in a free suspended position as will be explained later. This part of the casing, a diagram of which is shown in Fig. 6, is provided with a number of air inlet openings 14. These openings and the corresponding air-ports, 15, in the inclosed valve, register with each other in coincident relation. By reference to the developments Figs. 6 and 7, the top line *a* of the first of the series of air-ports 15, is seen in a higher plane than the rest of the series. The top line *b* of the next port being a little lower and so on to the top line *d* of the last air-port which is the lowest of all in graduated order.

It will be understood that the series of air-ports 15 are the spaces between the bars or ribs 12^a of the valve; the term port being used in this instance as distinguishing from the openings 14 in the inclosing casing and also from the fact that the upper ends of these ports are uncovered in admitting air into the mixing chamber 16, as will be described farther along.

A development of the valve C is shown in Fig. 7, and relative positions with the casing B of the upper ends of air-ports 15 are indicated by dotted lines in Fig. 6, which corresponds to the normally closed position of the valve C. That is, when the valve is in its lowermost or closed position, the upper ends of the ports 15 are below the surrounding top edge 17 of the inclosing casing part B, which may be said to form a valve-seat therefor in closing the air inlet ports.

The object of having the upper ends of the air ports 15 in different graduated planes is to have the same open up in progressive order above the upper end of casing B for the gradual admission of the air element in accordance with the speed of the engine or motor, and also proportionately with reference to the incoming quantity of gasolene or other gaseous fluid.

The valve C is raised by the suction action of the engine piston and starting moderately will be raised gradually to first uncover the upper end *a* of the first port for the admission of a fair proportion of air. As the speed of the engine increases, the ports will open up in regular order and the volume of the air supply gradually increased. Any number of air ports may be used and each may be positioned in the same plane or in different planes as may afford the best results in practical working.

A tubular post 18 has its base fixed in the bottom part of the casing B and its upper end extending into the mixing chamber 16 above the valve C. An annular space 19 (Fig. 1) is provided between this post and the top end disk. This post has a collar 20 threaded thereon and located under the end

disk 12. The valve C being in its lowest position, the collar 20 is adjusted to leave a space 21 between it and the underside of the end disk 12. The spaces 19 and 21 are precautionary as against back explosions and when one occurs the pressure is relieved through these passages and injurious effects avoided. When the engine is in motion some air will always pass up through the spaces 19 and 21 into the mixing chamber, but this is provided as a part of the supply only. When the valve is raised, the space between the end disk 12 and the collar 20 is increased. This collar is set by the maker of the carbureter to determine the initial flow of air through passage 19. The inflow of air at this point is, of course, limited by the size of passage 19, while the flow through ports 15 has a wider range of variation.

A valve rod 22 extends up through the tubular post 18 and has a needle valve 23 formed on the upper end thereof. The lower end of rod 22 passes through and is threaded in a part of a stuffing box 24 and is manipulated by means of the handle end 25 in adjusting the position of the needle valve. The gaseous element enters the apparatus through a tubular connection 26 and passes up through the space 27 between the valve rod 22 and the surrounding wall of the tubular post 18 into the mixing chamber 16.

A bridge 28 is mounted on the end disk 12 of valve C and arches over the upper end of the tubular post and the needle valve. The upper end of the post presents a conical surface 29 and the bridge is provided in the underside with a corresponding seating cavity 30, forming a downwardly deflecting stopper which, when the valve C is in its closed position, engages the upper end of the tubular post and closes the passage past the needle valve and when the valve is raised directs the hydrocarbon downwardly and laterally into the currents of air. Thus the valve C is supported from the upper end of the tubular post in a suspended position when the engine is at rest. By this arrangement combination valve C with its central gas port and its central and circumferential air ports automatically controls and proportions the admission of both the air and gaseous elements into chamber 16 in accordance with the working demand of the engine. The valve C will ordinarily gravitate into its closing position, but is assisted by companion springs 31 coiled on companion rods 32 inserted in the lower ends of two of the valve ribs and located at opposite sides. The nuts 33 provide means for adjusting the tension of said springs. When the gaseous element flows into the mixing chamber it impinges against the underside of the bridge and is forced out laterally in different directions. The air as it enters into the mixing chamber 16 through the center port 19 and the circumferential ports 15, entirely surrounds the incoming gas element so that a thorough mixture of the elements constituting the explosive charge is effected. The inner circumferential surface of that portion of the casing inclosing the mixing chamber is provided with a number of inclined vanes 34 and acts to impart a spiral whirling motion to the elements forming the explosive charge and assist in the operation of mixing. The shoulders 35 formed on the vanes 34 limit the up or open movement of the valve C. In practical working the valve has a very sensitive vibratory action and instantly responds to the slightest variation of speed in the engine and admits more or less of the gaseous and air elements as required.

A throttle valve 36 is mounted on a stem 37 and located in the passage 38 in the casing part A which connects with the tube or pipe conducting the explosive charge into the engine cylinder. A crank arm is mounted on the outer extended end of stem 37 and provides for the operative connection with the mechanism under control of the operator.

Having thus described my invention, what I claim is:—

1. The combination with a mixing chamber, of a casing fixed thereto and having air inlets in the side walls thereof, a sliding hollow valve within said casing and having an open end adapted to project into said chamber and provided with lateral air ports registering radially with the air inlets of said casing and adapted to open into the mixing chamber, and an inlet tube for the hydrocarbon passing entirely through said sliding valve and having its discharge opening located centrally of the air inlets whereby its discharge may always be over the upper end of said valve into said chamber.

2. The combination with a mixing chamber, of a casing in axial alinement therewith and having in the side walls thereof air inlets, a sliding hollow valve in said casing having a central opening in one end communicating with said chamber and having lateral ports in radial registry with the air inlets in the side of said casing and adapted to open into said chamber, an inlet tube for hydrocarbon arranged to discharge centrally of said air inlets, and a stopper for said tube connected to and movable with said valve.

3. The combination with a mixing chamber, of a casing in axial alinement therewith and having in its side walls air inlets, a sliding hollow valve in said casing having a central opening in one end and communicating with said chamber, and having lateral ports of varying lengths in radial registry with the air inlets in the side of said casing and adapted to open successively into said

chamber, an inlet tube for hydrocarbon arranged to discharge centrally of said air inlets, and a downwardly deflecting stopper for said tube carried on the upper end of said valve.

4. The combination with a mixing chamber provided with obliquely arranged vanes on its lateral walls, of a casing joined thereto adjacent to said vanes, a chambered reciprocating valve in said casing and limited in its movement in one direction by said vanes, said valves having central and lateral ports adapted to open into said chamber, a centrally located inlet tube for hydrocarbon, and a downwardly and laterally deflecting stopper for said tube whereby the hydrocarbon is directed laterally through the incoming currents of air and the mixture directed among said vanes for more thorough admixture.

5. The combination with a mixing chamber, of a valve casing connected thereto, a chambered sliding valve in said casing and having a central port and lateral ports adapted to admit air into said valve, a tube for hydrocarbon passing through said central port and of less diameter than said port, and an adjustable collar on said tube whereby to restrict the opening into said central port.

6. A carbureter consisting of a mixing chamber having a throttling valve in its outlet, a valve casing connected to said chamber and having lateral air inlets, a chambered valve located for longitudinal movement in said casing and having one end opening into said chamber and having lateral air-ports in registry through the air inlets of said casing, a hydrocarbon inlet in the base of said casing, a hollow post communicating with said inlet and extending axially through said casing and opening into the mixing chamber, a needle-valve located in said post for controlling the outlet into said chamber, a bridge across the upper end of the sliding valve and having a downwardly deflecting stopper fitted to the upper end of said post and adapted to close the outlet thereof.

7. In a carbureter, the combination with a mixing chamber, of a cylindrical valve casing connected thereto in axial alinement and having lateral air inlets, a hollow cylindrical valve mounted in said casing to slide longitudinally thereof, and having lateral ports in registry with the air inlets of the casing and adapted to open into the mixing chamber, studs extending from the valve through the outer end of the casing and provided with adjusting nuts, springs about said studs between the casing and the nuts, and means for admitting hydrocarbon into the mixing chamber centrally of said valve.

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

ALBERT PHINNEY.

Witnesses:
H. T. STANWOOD,
D. J. DAVIS.