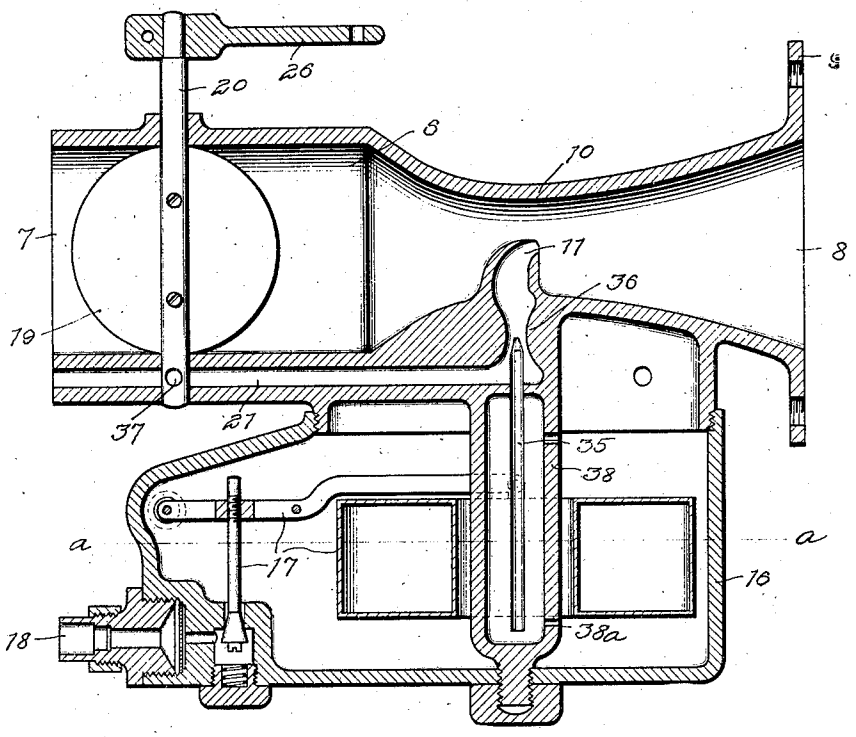
Oct. 16, 1923. **1,470,616**

D. COLE

CARBURETOR

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Inventor
Don Cole
By Brown, Hanson & Bottke
Attorneys

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UNITED STATES PATENT OFFICE.

DON COLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO STROMBERG MOTOR DEVICES COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CARBURETOR.

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To all whom it may concern:

Be it known that I, DON COLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Carburetors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to carburetors for internal combustion engines and its purpose is the provision of such a device which will proportion the air and fuel in a more simple, accurate and effective way than has heretofore been possible and which will more thoroughly and more nearly completely atomize the liquid fuel than has heretofore been possible, throughout the entire range of speeds and loads which such engines are made to assume in modern automobile and allied practices.

Further objects of my invention are to embody the features which procure the results above outlined in a simple and inexpensive structure, to make these features simply and reliably operative, and to make them readily usable by the average operator.

I employ a carbureting passageway having a portion thereof preferably in the form of a Venturi tube, and a throttle valve controlling said passageway, there being a comparatively small air and fuel passageway leading to the carbureting passageway. Into this comparatively small passageway, to which air is admitted liquid fuel is fed, and that passageway may, therefore, be viewed either as a small carbureting passageway through which air passes and to which gasoline is fed, or as an air bled fuel nozzle. In this comparatively small passageway preliminary mixing takes place, and the liquid fuel is so fed into this passageway as to cause it to be subject to aspiration. The admission of air to this passageway is valve controlled, directly or indirectly by the main throttle. I have herein shown an anterior throttle device, and in such a device, the preliminary mixture may form the proper mixture for idling and low running. On the higher speeds this preliminary flow then joins the flow controlled by the main throttle.

My invention will be more readily understood by reference to the accompanying drawings, which is a vertical longitudinal section of a carburetor constructed according to my invention.

It will be seen that I provide a carbureting passageway 6 which is provided with an air inlet 7 at one end and a mixture outlet 8 at the other end, the outlet being surrounded by a flange 9 for attachment to the engine manifold. In the Venturi tube 10, which I form or dispose in the carbureting passageway, a fuel nozzle 11 is arranged in the most effective place for aspiration, this nozzle 11 being fed with fuel by means of a tube 35 from a well 38, having a restricted air opening 39. This well is fed through an opening 38ª from a chamber 16 in which means 17 are provided for maintaining a substantially constant level of liquid fuel, the liquid fuel being fed to the chamber by means of the inlet 18.

A throttle valve 19 is pivoted upon a shaft 20 extending across the carbureting passageway 6, this throttle valve being on the air inlet side of the nozzle 11. This is the usual manual control of the engine, and the only control, so far as regular running is concerned, except that the valve is disposed anterior instead of posterior to the nozzle. A passageway 21 extends from the end of the casting and admits air into the nozzle 11.

The shaft 20 of the valve 19 is provided with an opening 37 in the plane of the passageway 21, this opening 37 being of such size and so disposed that when the valve 19 is in wide open position there will be a slight bleed therethrough into the passageway 21. As the shaft 20 turns to close the valve 19, such turning movement results in the swinging of the opening 37 into axial coincidence with the passageway 21. It is obvious, of course, that the throttle shaft 20 is moved in the usual way by means of an operating lever 26. The fuel tube 35 leads from adjacent the bottom of the well 38 and discharges into the nozzle 11, particularly at a portion thereof made in the form of a Venturi tube 36 so as to emphasize the aspirating effect of the air entering by way of the bleed passageway 21.

It will now be seen that when the throttle valve 19 is closed, or practically closed, a comparatively slight amount of air enters the passageway 21. The engine suction applied to the nozzle 11, when the engine is turned over, draws in air through the pas-

sageway 21 and with it, simultaneously, liquid fuel from the nozzle tube 35. Thus, with the throttle, in closed or practically closed position, the mixture is determined by the air entering thru the passageway 21 and the gasoline entering by way of the nozzle tube 35, by which this air sweeps the proper mixture for idling and low running being thus secured. Due to this arrangement, not only is the proper metering of the air and gasoline secured, but the gasoline is thoroughly broken up and complete and effective atomization takes place. As the throttle valve 19 is opened, the nozzle 11 becomes subject to the depression due to the velocity of the air entering by way of the air inlet 7 and as the air coming in that way is gradually increased, the bleed into the nozzle 11 is gradually reduced until finally the only bleed into the nozzle is the minimum bleed. In this way, an effective mixture for idling and low running is secured, and the same nozzle may be used for idling and low running and for the higher suction. At the same time, due to the arrangement employed, effective atomization of the fuel takes place.

By having the nozzle tube 35 draw its supply of fuel from the well 38, an accelerating or fuel enriching action is obtained for providing extra fuel on starting and acceleration. The nozzle tube 35 is made of proper capacity to give a certain part of the contents of the well to the mixture nozzle 11 upon acceleration of the engine speed.

I claim:—

In a carburetor, a comparatively large carbureting passageway having an air inlet and a mixture outlet, a source of liquid fuel, a comparatively small passageway having means for the admission of air at one end and terminating at the other end in a fuel and air nozzle feeding to said carbureting passageway, a well fed from said liquid fuel source and having a connection to the atmosphere independent of said comparatively small passageway, a liquid fuel nozzle leading from said well and to said comparatively small passageway, and valve mechanism simultaneously but oppositely controlling said carbureting passageway and the air inlet end of said comparatively small passageway.

In witness whereof, I hereunto subscribe my name this 8th day of March, A. D. 1916.

DON COLE.