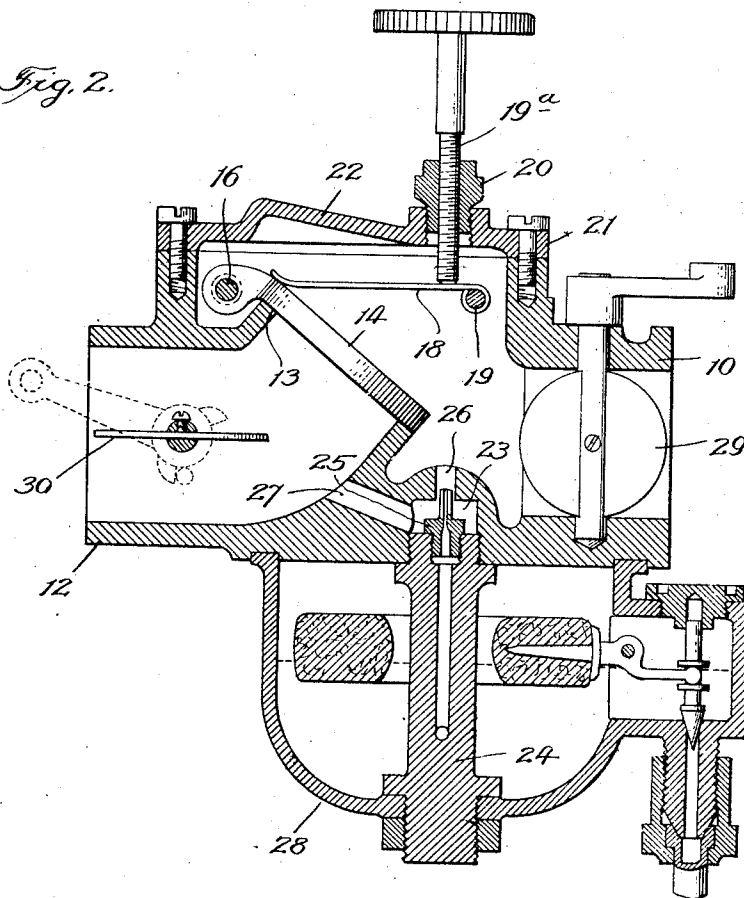


APPLICATION FILED APR. 26, 1917.

Patented June 14, 1921.



Inventor:  
Harry C. Waite,  
By Sympson, Lee, Chittin and Wilcox.  
Attys.

# UNITED STATES PATENT OFFICE.

HARRY C. WAITE, OF ELGIN, ILLINOIS, ASSIGNOR TO THERMO CARBURETOR CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## CARBURETER.

1,381,680.

Specification of Letters Patent. Patented June 14, 1921.

Application filed April 26, 1917. Serial No. 164,718.

*To all whom it may concern:*

Be it known that I, HARRY C. WAITE, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Carbureters, of which the following is a specification.

My invention relates to certain new and useful improvements in carbureters for internal combustion engines and will be fully understood from the following specification taken in connection with the accompanying drawings, in which—

Figure 1 is a top plan view of a carbureter embodying my invention; and Fig. 2 is a longitudinal central section there-through on the line 2, 2 of Fig. 1.

Referring more particularly to the drawings, the numeral 10 designates the outlet member of the carbureter, the said outlet being of cylindrical form and disposed horizontally and provided with a flange 11, by which it may be attached to the inlet end of the manifold of an internal combustion engine. The inlet member of the said carbureter is designated by 12 and is in the form of an elbow or nipple, one arm of which is horizontal and preferably in alinement with the outlet member 10.

The outlet end of the elbow 12 forms an annular valve-seat 13, with which coöperates a pivoted flap-valve 14, the pivot pin of which is arranged horizontally in the body-casting, as shown at 16, and preferably secured in place therein by means of cotter-pins 17 passing through perforations in the projecting ends of the pintle. The valve 14 may be forcibly held against its seat by a leaf-spring 18 disposed horizontally and supported at one end upon a pintle 19 arranged transversely of the body-casting and secured as is the pintle 16. The free end of the spring 18 rests upon the flap-valve 14, preferably at a point near the pivot thereof. For adjusting the tension of the spring 18 there is provided a thumb-screw 19<sup>a</sup>, frictionally held in a bushing 20, which in turn is screwed into a cover-plate 21, which closes the open top of the body-casting. This cover-plate 21 may be provided with a raised portion 22, the inner cavity of which forms a recess giving ample clearance for the free action of the valve 14 and spring 18. By arranging the thumb-screw 19<sup>a</sup> near the fixed end of the spring 18, as is illustrated in the

drawings, and by employing a relatively quick-pitch thread for the screw a fraction of a revolution thereof may be made to give the desired range of adjustment of the tension of the spring 18. This feature is of peculiar importance in that it simplifies the control of the carbureter, particularly where the usual dash or steering-wheel control linkages are employed.

In the lower face of the body-casting, and centrally thereof, is a threaded bore 23, which receives a threaded and shouldered spindle 24 designed to serve as the supporting means for the float-bowl and as a conduit forming communication between the latter and the nozzle. The nozzle is preferably in the form of a separate element 25 threaded into the counterbored upper end of the spindle 24 and having a reduced extremity bored to provide an aperture of a size to deliver the required amount of liquid fuel. This reduced extremity enters a vertical passage 26 formed in an appropriate boss upon the floor of the body-casting, the bore 26 and the nozzle extremity projecting thereinto forming an efficient atomizer for breaking up the issuing stream of liquid fuel and securing the finest practical state of subdivision thereof. The air required for the atomizing effect, which air constitutes the "primary air" of the carbureter, is supplied from the elbow 12 through an inclined bore 27 forming communication between the outer angle of the elbow and the counterbore 23, thereby providing a shunt passage which bypasses the valve 14.

The lower threaded and shouldered end of the spindle 24 has secured thereto a float-bowl 28, which may be of the usual form, carrying a float-valve and float which operate in the well understood manner to maintain a constant liquid level. The outlet member 10 of the carbureter is provided with the usual butterfly throttle-valve 29, and the horizontal portion of the inlet elbow 12 may have a similar butterfly 30 normally standing in open position and intended to be closed to provide an increased vacuum or strangling effect for those running conditions in which an excessively rich mixture is desirable.

As to the mechanical construction of the carbureting device above described, the following features are to be particularly noted. The body-casting of the carbureter is of an

exceedingly simple form, well adapted for casting in iron. In place of resorting to the use of intricate cored passages, as is common in carbureter construction, I have  
 5 so arranged the necessary structural elements as to permit the use of simple cores, all small passages being so located as to be capable of being machined with ease. By resorting to the open-top casting closed by  
 10 a separate cover-plate, the valve-seat 13 may be readily machined and the moving parts assembled without difficulty.

The body-casting of my carbureter affords a mixing chamber provided with primary  
 15 and secondary air inlets, the primary air inlet being through the bore 27 and through the passages 23 and 26 which constitute the atomizer, while the secondary air-inlet is formed by the inclined inner end of the  
 20 elbow closed by the valve 14. The parts are so related that upon the initial opening of the valve 14 the secondary air will be directed transversely of the primary mixture issuing from the atomizer. A thorough inter-  
 25 mixture of the constituents of the discharge is thereby effected and in addition the maximum aspirating effect will always be exerted upon the fuel nozzle by reason of the angular relation of the issuing streams of primary and secondary air. The whole of the  
 30 air used for carburation enters the carbureter through the single inlet 12, which is of advantage in that the single strangle-valve 30 may be employed to create a high vacuum, and further by reason of the fact  
 35 that a single means for supplying heated air may be attached to the inlet 12 to furnish such air to the mixing chamber both through the primary and secondary air inlets.  
 40 The valve 14 may be made of such weight as to properly control by its weight alone the admission of secondary air as required for the leanest mixture which may be needed under any running condition. The leaf-  
 45 spring 18 as tensioned by the adjustment screw 19<sup>a</sup> will impose any desired degree of additional resistance to correspondingly decrease the amount of diluting air and richen the mixture. By so proportioning the  
 50 weight of the valve, complete release of the spring 18, as by an improper adjustment thereof, will not render the carbureter wholly inoperative, such release of the spring being in fact the desirable adjust-  
 55 ment for maximum economy. As hereto-

fore pointed out, the arrangement of the spring and its adjusting means is such that something less than a complete revolution of the adjusting screw affords the required range of adjustment of the spring tension. 60

While I have described in considerable detail a specific embodiment of my invention, it is to be understood that this is illustrative only and for the purpose of making  
 65 clear the nature and objects of the invention and the manner in which the invention may be employed. I do not regard the invention as limited to the particular construction and arrangement of the parts shown or  
 70 described except in so far as such limitation is included within the terms of the accompanying claims, in which it is my intention to claim all novelty inherent in the invention as broadly as is permissible in view of the  
 75 prior art.

What I claim as new and desire to secure by Letters Patent is:

1. In a carbureter, a mixing chamber, a fuel nozzle, an inlet air passage of elbow-form, a valve between said passage and  
 80 chamber, an air shunt passage through the wall of the inlet air passage, the inner end of which terminates in an enlarged chamber surrounding the fuel nozzle, a comparatively restricted passage leading from said  
 85 enlarged chamber to the mixing chamber, said shunt passage and its connections constituting a primary air passage and discharging posterior to the valve between the air inlet and mixing chamber and in the  
 90 path of the air issuing from beneath the valve, whereby an aspirating effect is produced, as set forth.

2. In a carbureter, a mixing chamber, a fuel nozzle, an upwardly extending air inlet  
 95 passage terminating at its inner end in said chamber, a valve between said passage and chamber, the air inlet passage being provided with an open bore in the lower wall thereof said bore connecting at its inner  
 100 end with an enlarged chamber surrounding the fuel nozzle and terminating in a comparatively restricted passage leading into the mixing chamber, the discharge end of said last-referred to passage being posterior  
 105 to the valve between the air inlet and mixing chamber and in the path of the air issuing from beneath the valve, whereby an aspirating effect is produced, as set forth.

HARRY C. WAITE.