May 9, 1933. S. LONG 1,908,432

CARBURETOR AIR FEED

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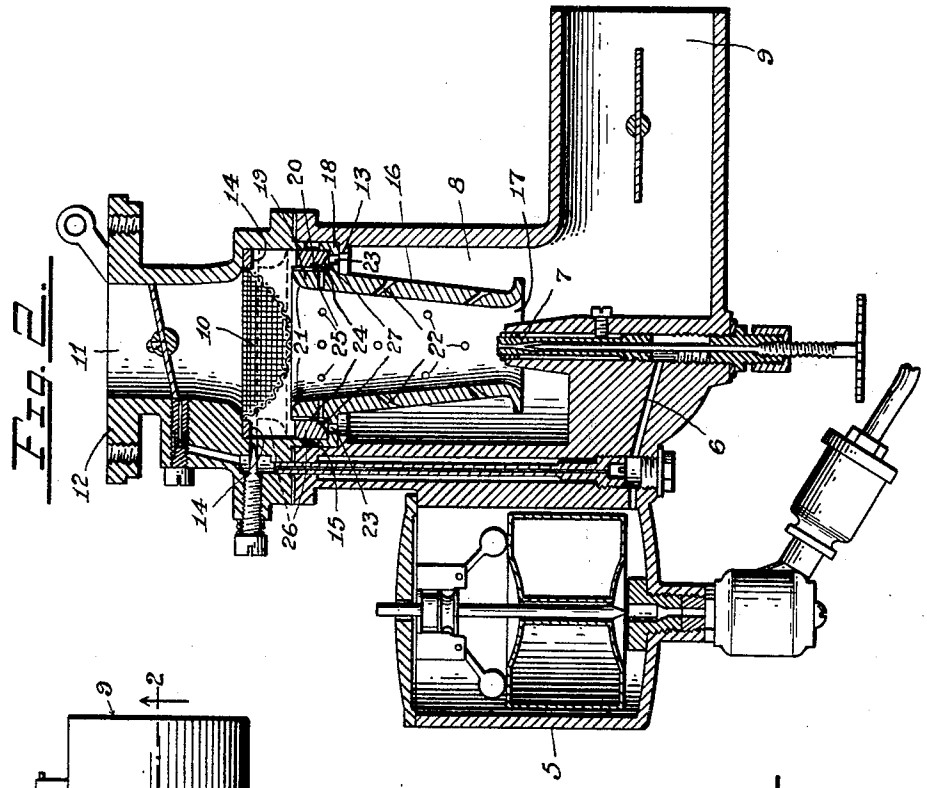

Fig. 2.

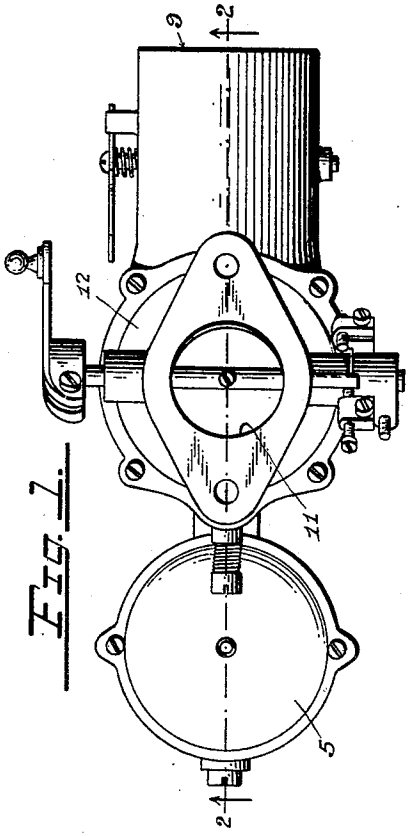

Fig. 1.

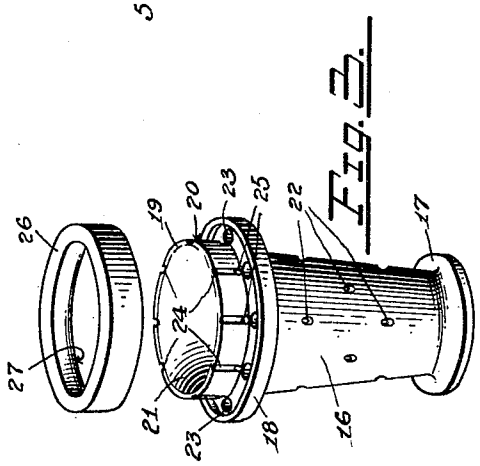

Fig. 3.

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UNITED STATES PATENT OFFICE

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CARBURETOR AIR FEED

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My invention relates to carburetor air feeds and certain objects of the invention are to provide, in combination with the mixing chamber of a carburetor having a plurality of annular shoulders therein, an air feed device comprising a hollow truncated conical body having a cup flange formed around its upper and larger end portion and adapted to normally rest on one of said shoulders, and also to provide a plurality of upwardly slanting holes through the conical body and a plurality of holes extending vertically through the cup flange together with a plurality of vertical exterior grooves and holes extending radially and horizontally through the body whereby air is sucked through the holes and projected into the stream of gasoline and air entering from the needle valve and the lower end of the body respectively and whereby the fuel and air are thoroughly mixed. Further objects are to provide a ring adapted to normally rest on the cup flange and to be lifted by the suctional force of the engine to which the device is connected whereby passage of air through the holes that are associated with the ring is automatically regulated and controlled by the speed and suctional force of the engine. Still further objects are to provide the conical body with a flared smaller, lower end and to so dispose said end around the needle fuel valve whereby air is drawn upward and around the fuel and whereby the amount of air entering said lower end is varied by the vertical movement of the conical body which is also caused by the suctional force of the engine.

With the above and other objects in view which will appear as the description proceeds, the invention consists of the novel construction, adaptation, combination and arrangement of parts hereinafter described and claimed. These objects are accomplished by devices illustrated in the accompanying drawing; wherein: Figure 1 is a top plan view of a carburetor wherein my air feed device is installed; Fig. 2 is a view in central vertical section taken on a broken line 2—2 of Fig. 1 and showing the installation of the air feed; and Fig. 3 is a detail view in perspective of the air feed regulating device and its associated ring.

Referring to the drawing throughout which like reference numerals indicate like parts, the numeral 5 designates the float chamber of a carburetor from which gasoline is fed through a conduit 6 and through a needle valve 7 into a mixing chamber 8. Air is drawn into the mixing chamber through an entry port 9 and the mixture of gasoline and air passes outwardly from the mixing chamber through a screen 10 and discharge port 11 that are provided in a head member 12 which is secured to the top of the mixing chamber. The foregoing parts form no part of my invention except insofar as they may enter into combination therewith. Said parts may be of varied construction and design, it being understood that my improved air feed may be installed and used in connection with any form of carburetor to which it is adapted.

An annular shoulder 13 is formed in the upper interior portion of the mixing chamber 8 and serves as a seat for my device. Another annular shoulder 14 is formed in the discharge port 11 of the head member 12 where the screen 10 is mounted and serves as a stop to limit the upward movement of the ring member of my feed device. And a third shoulder 15 is provided between the aforesaid two shoulders by the bottom edge of the head member 12 which projects downwardly into the mixing chamber and terminates a short distance above the shoulder 13. Said last named shoulder limits the upward movement of the main body portion of my air feed device. It will thus be apparent that the three shoulders limit, define and control the functions of the air feed improvement which will now be described.

Essentially my invention comprises a hollow truncated conical body 16 with its lower or smaller end flared or curved outwardly, as at 17. The upper portion of said body is integrally provided with a cup flange 18 which normally seats on the annular shoulder 13 within the mixing chamber 8 and its outer annular edge fits snugly and slidably

into the mixing chamber above said annular shoulder. Above said cup flange the upstanding portion 19 of the main body 16 has a vertical outer wall 20 and a curved interior wall portion, as at 21, which merges into the interior slanting wall of the main body. When the cup flange 18 is seated on the annular shoulder 13 the lower flared end portion of the body 16 completely envelopes the upper portion of the needle valve 7 as clearly shown in Fig. 2 of the drawing.

A plurality of spaced apart holes or perforations 22 are provided through the main body 16 and said holes slant upwardly and inwardly and are slightly larger on the outside of the body. A plurality of spaced apart holes 23 extend vertically through the cup flange 18 and grooves 24 extend upwardly along the outer vertical wall 20 of the upstanding body portion 19. At the bottoms of each of said grooves a hole 25 extends horizontally and radially through said upstanding body portion. A ring 26 fits slidably and snugly around the upstanding body portion 19 and is normally seated into the cup flange 18. Said ring is rounded on its inner, under edge, as at 27, so that it does not completely obstruct the holes 23 and 25.

My device operates by means of the suction created by the intake stroke of the engine to which it is attached, it being understood that the head member 12 of the carburetor is ordinarily connected to the intake of an engine manifold. When the engine is first started the members of my air feed device remain in the normal or seated position, as shown in Fig. 2, whereby a comparatively small amount of air is drawn through the device and consequently a rich mixture of gasoline is delivered to the engine from the needle valve 7. The air enters through the port 9, passes upwardly through the lower flared end 17 of the body 16, and also into said body through the upwardly slanting holes 22 in its side wall. Some air also passes through the holes 23 in the cup flange 18, a part of which passes upwardly through the grooves 24, and some of which is directed by the rounded under edge 27 of the ring 26 through the horizontal holes 25 into the upper portion of the body 16.

Upon increase of the engine's suctional force the ring 26 is lifted from its seat on the cup flange 18 and more air is thus mixed with the fuel. When the force of suction becomes sufficiently strong said ring is lifted entirely free of the top portion 19 of the body 16, as shown in dotted lines in Fig. 2, and may be stopped by the annular shoulder 14. In this position of the ring air passes directly upward and freely through the holes 23 in the cup flange 18 thus supplying a lean fuel mixture to the engine. Upon excessive suctional force of the engine the entire body 16 of the device may be lifted until its cup flange 18 engages the intermediate annular shoulder 15 and remain there while the engine is running at high speed. In this lifted position of the body its top portion 19 is again brought into engageable relation with the lifted ring 26 whereby most of the air will pass through the main body 16 entering same through its slanting holes 22 and through its flared bottom end 17. An increase of air passes through said flared bottom end due to the fact that same is lifted whereby the passage area around the tip of the needle valve 7 is increased. When the engine is slowed down and its suctional force is decreased the reverse movements of the body 16 and the ring 26 take place respectively until they are again normally seated upon slow speed of the engine. It will now be apparent that my air feed is entirely automatic and dependent upon the speed or suctional force of the engine in its movements and in its supply of air.

The upwardly slanting holes 22 through the body 16 of my device form a very important part of my invention. Said holes serve to thoroughly vaporize or mix the gasoline from the valve 7 with the air from the lower flared end 17 in its upward passage through the main body of the device, and the air projected through the radial, horizontal holes 25 serves to complete the mixing process. The extension of the body down whereby its smaller flared end 17 envelops the tip of the valve 7 is another important feature of my invention. From actual tests it is found that my air feed device effects a considerable saving in fuel by increasing the mileage per gallon, causes the engine to run smoothly without vibration, and keeps the engine cool at all times.

Having thus described my invention, it being understood that minor changes in its construction may be resorted to without departing from the scope and spirit of the invention, what I claim and desire to secure by Letters Patent of the United States is:—

The combination with a carburetor mixing chamber having three spaced apart shoulders in its upper portion and a central upstanding fuel valve in its lower portion, of an air feed comprising a hollow conical truncated body having its smaller, lower end flared outwardly, a cup flange for the upper portion of said body adapted to normally seat on the lowermost of said three shoulders, and adapted for slidable movement between the lowermost and intermediate shoulders, the lower flared end portion of said hollow body positioned to envelop the tip of the fuel valve, said hollow body having a plurality of spaced apart holes extending upwardly and inwardly therethrough below the cup flange, said cup

flange having a plurality of holes extending vertically therethrough, a plurality of grooves extending upwardly from the holes through the cup flange along the outside of the body, a plurality of holes extending horizontally from the lower ends of the grooves through the body, a ring adapted to normally seat on the cup flange and adapted to slidably move to the uppermost of the three shoulders, and said ring having a rounded under, inner edge whereby the holes through the cup flange and through the upper portion of the body are partly restricted when the ring is normally seated on the cup flange.

In testimony whereof I affix my signature.

SETH LONG.