Aug. 31, 1937. E. J. A. PORTES 2,091,566

CARBURETOR

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Fig. 1

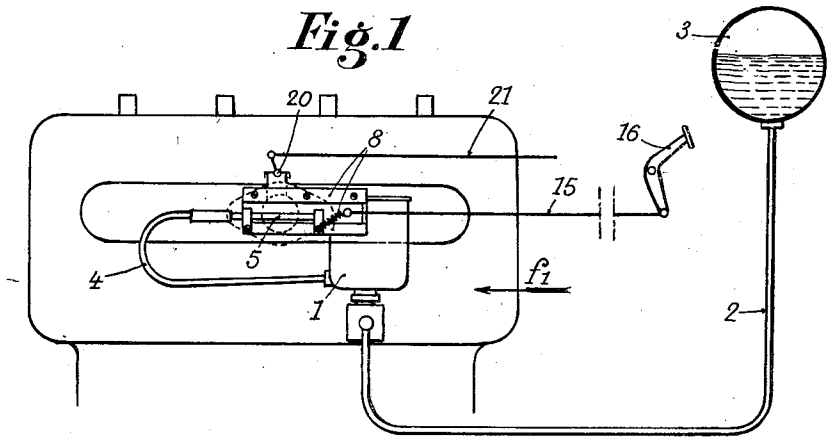


Fig. 2

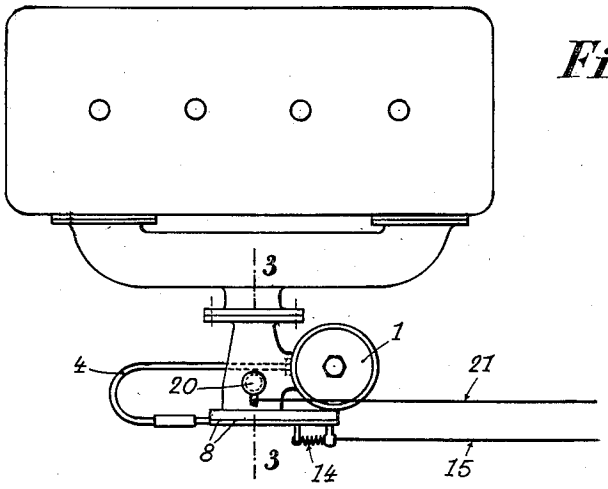
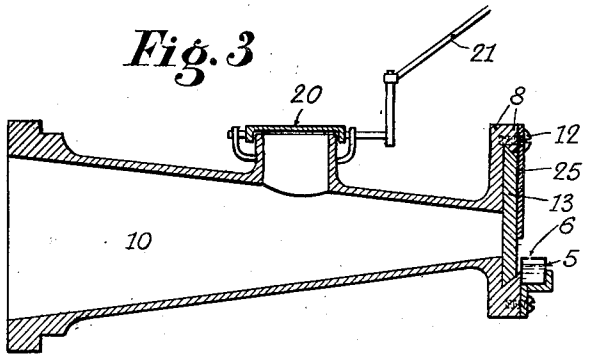


Fig. 3



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Fig. 4

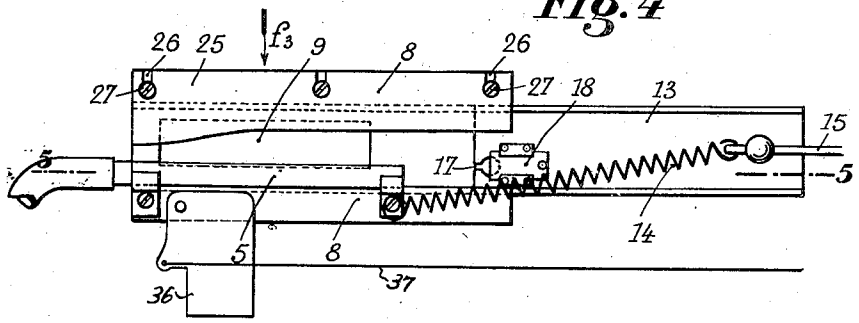


Fig. 5

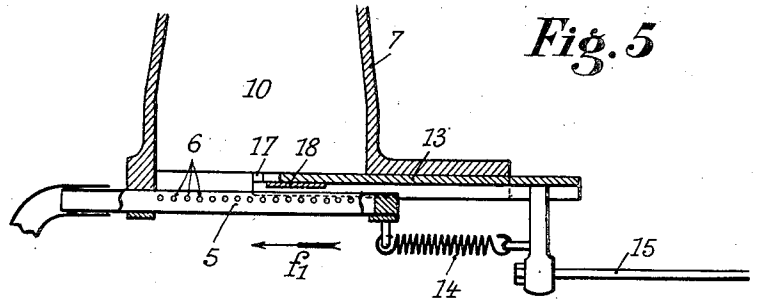


Fig. 7

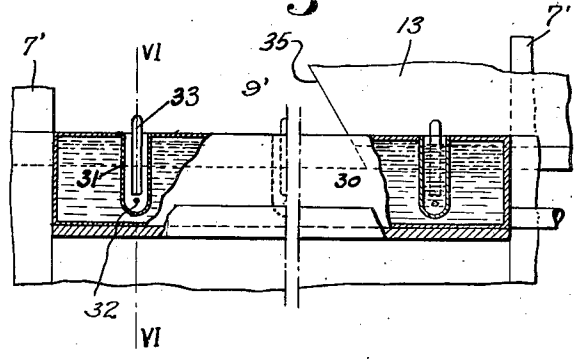
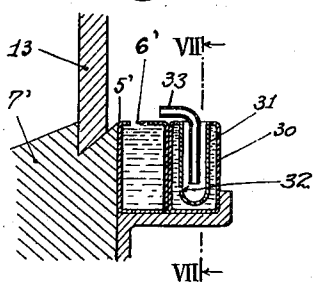


Fig. 6



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CARBURETOR

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Application May 5, 1933, Serial No. 669,464
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16 Claims. (Cl. 261—41)

My invention relates to a carburetor for internal combustion engines.

The primary object of my invention is to provide for a constant air-fuel ratio of the carbureted mixture whatever be the engine speed and the load, thereby affording a saving of fuel and a more satisfactory running of the engine.

Another object is to provide for a perfect atomization of the fuel and a thorough and uniform blending of air and atomized fuel.

A further object is to provide a simultaneous control of the air and fuel flow sections.

A still further object is to discharge the required fuel quantity into the body of air sucked by the engine in the form of a great number of separate minute streams and to render the number of such streams variable in dependence on the air flow section.

With these and other objects in view as will appear from the following description, my invention resides in the provision of means and combination of parts as will be set forth hereinafter and more fully pointed out in the claims.

An embodiment of a carburetor in conformity to the invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is an elevational view of a carburetor mounted on the engine of a vehicle, and

Fig. 2 is a corresponding plan view;

Fig. 3 is a lengthwise section on a larger scale, on the line 3—3 of Fig. 2;

Fig. 4 is a front view showing the intake aperture for the liquid fuel, this aperture being fully open;

Fig. 5 is a lengthwise section on the line 5—5 of Fig. 4, with the valve closed;

Fig. 6 shows a further improvement in conformity to my invention and Fig. 7 is a corresponding section along line VII—VII thereof.

The carburetor illustrated in Figs. 1 to 5 comprises as usual a float-feed chamber 1 which is supplied with liquid fuel through a pipe 2 connected with a fuel tank 3.

The float-feed chamber 1 supplies, through a pipe 4, a horizontal tube 5 or similar hollow elongated member, the wall of which is pierced with a plurality of calibrated holes 6 spaced apart along said tube. The holes 6 have a very reduced cross-section; they are for instance circular with a diameter of about 1 to 3 or 4 tenths of a millimetre. They are preferably pierced in a thinned portion of the wall of the member 5, in order that their length also does not exceed about 1 to 3 or 4 tenths of a millimetre. For a 30 H. P. engine for instance of effective power there are about 28 holes of 2 tenths of a millimetre. The tube 5 is mounted on one side of the frame 8 at the lower part of a large aperture 9 provided in the said frame, which latter is secured to the suction conduit 7, so that the engine will withdraw air through the aperture 9 of the frame 8 over and transversely of the tube 5 and its fuel outlets 6. It will be noted that in such a combination the spraying means consist in fact in a plurality of minute level sprayers each formed by a hole 6.

The frame 8 is provided with a guide 12 for a slide-valve-plate 13 provided in the rear of the tube 5 and adapted to control the air flow section through the aperture 9. Said plate 13 urged into its closing position by a spring 14 can be actuated by the driver through the medium of any suitable means such as the rod 15 and the pedal 16.

In the said valve-plate, and preferably near its end, is an orifice 17 which may be brought into register with one or more of the fuel outlets 6 of the tube 5. The orifice 17 of the valve-plate is under the control of a sliding plate 18, whereby the flow section through said orifice can be adjusted at will. Said orifice 17 is used for the engine running at slow speed and at no load.

The conduit 7 may be further provided with a valve 20, which may be opened by the driver through the medium of any gear such as the cable 21.

The carburetor above described operates in the following manner:

When the valve-plate 13, which is urged back by the opposing spring 14, is at the end of its stroke according to the arrow f^1, i. e. in the starting position, only one or a few of the end fuel outlets 6 of the tube 5 are in face of the orifice 17 in the valve-plate 13 and but a small volume of air is sucked by the running engine through said orifice which has been suitably adjusted for the purpose by means of the slide 18, so that the engine will run slowly.

For speeding up the engine, the driver pushes the pedal 16, thus causing the valve-plate 13 to slide in the contrary direction to f^1. During this sliding movement, the said plate uncovers an increasing number of fuel outlets 6 of the tube 5, while at the same time the air flow section through the aperture 9 is increased.

A great advantage offered by this apparatus appears to consists in the fact of reducing to a great extent, for a given position of the valve plate, the differences in the values of the vacuum acting upon the fuel outlets for the extreme

speeds of the engine obtained by varying the load, and this greatly reduces the variations of the ratio between air and liquid fuel. This ratio will evidently remain constant, owing to the construction of the carburetor, when the valve-plate 13 is operated while maintaining a constant speed.

When the vehicle runs down a slope, and the driver desires to use the engine as a brake, he has only to release the pedal 16, so that the valve-plate is resiliently urged back into the position for slow speed (Fig. 2) and to act upon the cable 21 in order to open the valve 20.

Due to the opening of this valve, the engine can withdraw pure air through the valve 20 and the conduit 7, and without liquid fuel, and this still further increases the braking effect of the engine, also affording economy by eliminating all useless consumption of fuel.

On the other hand, the frame 8, having the admission opening 9, carries a separately mounted plate 25 which is adjustable on the front face of said frame and above the sprayer tube 5.

The plate 25 is provided with guides 26 in which are engaged the rods of the screws 27 by which the plate 25 is secured to the frame 8. The plate 25 serves to regulate the width of the opening 9 and thus to assure the qualitative regulating of the fuel mixture, this regulating being obtained by displacing the plate 25 with reference to the frame 8 according to f^3, or inversely, thus changing the flow section of the air for a given position of the movable valve-plate 13.

The edge of the plate 25 can be evidently given a suitable outline in order to determine the flow of air at a given point in a more exact manner. In particular, it is preferable that the height of the air flow slot should be less in the region corresponding to the commencement of the opening of the valve 13.

On the other hand, the part 35 (Fig. 7) of the valve-plate which limits the slot is more or less inclined from the direction of displacement of the said plate, this form having a favourable effect upon the transfer from slow speed to a higher speed, when the part of the slot which is uncovered in the first place by the plate has a gradually increasing height.

Although the engine can be readily started when cold, this can be still further facilitated by mounting in front of the sprayer tube an auxiliary closing plate 36 which is under manual control 37 and is adapted to act as a shield in front of the slow-speed holes, thus obliging the air to circulate along the tube in order to proceed above these slow-speed holes and the adjacent holes, instead of flowing across the tube. In normal operating, this plate 36 is out of use.

Figs. 6 and 7 illustrate an arrangement for still further enhancing the rapidity of the engine speed increase. For this purpose a second tube 30 or similar elongated container is placed side by side with the spraying tube 5' and communicates freely with the float chamber. One or more tubes 31 project within said container 30 and communication is afforded between a tube 31 and the container 30 by means of a small hole 32 having a diameter of one or more tenths of a millimetre. Said tubes 31 are airtightly secured in the wall of the tube 30 and they communicate freely with the surrounding air. Within each tube 31 dips further a smaller tube 33. In this manner a small fuel storage is provided within each tube 31 and the thus storaged fuel is instantaneously sucked by the engine when the slide-plate 13 is abruptly opened. Once the tube 31 has been emptied, the hole 32 acts like a headed sprayer nozzle until the slide-plate 13 again shields off the emptied tube or tubes 31 and allows the latter to be filled again. It will be noted that since the hole 32 can discharge some additional fuel during normal running the tube 5' may have no fuel outlets in the regions in the rear of said tubes 31 or the air flow section may be locally increased in register with the said region.

It will be noted that in the arrangement illustrated the level sprayers 6' discharge fuel into the body of air flowing directly from the atmosphere through the slot 9' and the intake 7' which form main air passage means while each tube 33 forms with the associated well 31 a kind of branch air passage leading from the atmosphere to said main air passage means since once the well is emptied air will flow thereinto from top to bottom before flowing out through the tube 33 to the slot 9'.

The spraying tube may also be connected at both ends with the float chamber, which will be located in such position that the whole arrangement will offer a plane of symmetry in a direction perpendicular to the tube.

I claim:

1. A carburetor comprising in combination a member adapted to be mounted on the engine intake and pierced with an air passage the cross-section of the inlet end of which is in the shape of a horizontally elongated slot, an elongated small container arranged along one horizontal edge of said slot and provided with a great number of quite minute holes spaced apart along the slot, means for feeding fuel to said container, said holes being further so located that fuel streams will issue therefrom into the body of air flowing through the slot, a slide-valve member shiftable lengthwise of the slot and adapted both to vary the air flow section through the slot and to simultaneously vary the number of fuel issuing holes swept by an air stream flowing in a direction transverse to the container length, and means for actuating at will said slide valve member.

2. A carburetor as in claim 1 comprising further a plurality of separate small fuel wells provided in front of said slot and spaced apart along the same and means for feeding fuel to said wells through a minute hole in their walls.

3. A carburetor as in claim 1 comprising further a plurality of separate small fuel wells provided in front of said container and spaced apart along the same, means for feeding fuel to said wells through a minute hole in their walls, and local increases in the height of the slot in the rear of said fuel wells.

4. In a carburetor, in combination, a casing having an air passage therethrough and provided with a horizontally elongated slot forming part of said air passage and also with a flange around said slot, an elongated small container arranged along a long side of said slot and provided with a great number of quite minute holes spaced apart along the slot and so arranged that fuel streams will issue therefrom into the body of air flowing through the slot, means for feeding fuel to said container, and a slide-valve plate located between said container and the flange shaped to closely engage said flange and shiftable lengthwise of the slot, whereby it is adapted both to vary simultaneously the effective length of the slot and the number of holes in operation.

5. In a carburetor, in combination, a casing

having an air passage therethrough and provided with a horizontally elongated slot forming part of said air passage and also with a flange around said slot, a plurality of sprayers spaced apart along and close to a long side of said slot and transversely disposed to the air flow direction through the slot, means for feeding fuel to said sprayers, and a slide-valve plate located past said sprayers but close thereto and in front of said flange, further shaped to closely engage said flange and adapted both to vary simultaneously the effective length of the slot and the number of sprayers in operation, and means for actuating at will said plate.

6. In a carburetor for an internal combustion engine, a carburetor casing having an air passage therethrough adapted for connection to the engine intake, spraying means including a plurality of exit ports into said air passage and whereby the fuel is divided into a plurality of minute streams capable of simultaneously issuing therefrom into the body of air flowing through said passage, means for feeding fuel to said spraying means, a plurality of spaced apart small fuel wells in communication with the air intake, means for feeding fuel to said wells and including a minutely bored member flowed through by said fuel, and control means including valve means, actuatable at will, and adapted to simultaneously vary the effective air flow section through said passage and shield off or unshield a variable number of exit ports and of said fuel wells.

7. In the combination as in claim 6 said fuel feeding means to the wells including for each fuel well a separate minutely bored member.

8. In the combination as in claim 6 said fuel wells including each a small container the wall of which is pierced with a minute hole and the fuel feeding means includes a small receptacle supplied with fuel and in which projects said small container so that the wall portion thereof pierced with said hole is externally bathed by the fuel contained in said receptacle.

9. In a carburetor, in combination, a casing having an air passage therethrough, spraying means including a plurality of minute exit ports into said air passage and capable of simultaneously discharging through said ports fuel divided thereby into a plurality of minute streams, means for feeding fuel to said spraying means, a plurality of small fuel wells adapted to be subjected to a suction depending on the air pressure in said passage, means for feeding fuel to said wells and including for each fuel well a separate minute bore flowed through by said fuel, control means including valve means, actuatable at will, and adapted to simultaneously vary the effective air flow section through said passage and to shield off or unshield a variable number of exit ports and of fuel wells, and associated with each fuel well a corresponding discharge tube of an inner cross-section greater than that of said minute bore and having one end dipped within said associated well and the opposite end located in a region adapted to be subjected to the suction of an engine supplied by the carburetor to a depression greater than that to which the well itself will be subjected at the same time.

10. In a carburetor, in combination, a casing having an air passage therethrough and provided with a horizontally elongated slot forming part of said air passage, spraying means including a plurality of minute spraying orifices spaced apart along and close to a long side of said slot, means for feeding fuel to said spraying means, a slide-valve member for controlling the effective air flow section through the slot, which valve-member is located in the rear of said orifices but close thereto and slidable lengthwise of the slot, thereby varying the effective length of the slot, a plurality of small fuel wells provided in front of said spraying means and spaced apart along the slot further adapted to be subjected to a suction depending on the air pressure in said passage, and means for feeding fuel to said wells, such feeding means including for each well a minute bore arranged to be flowed through by the fuel on its way to the corresponding well.

11. In a carburetor as in claim 10, further fuel wells each associated with an angled discharge tube having one branch dipped within the well and the other extended towards the slot.

12. In a carburetor as in claim 10, spraying means the spraying orifices of which are located out of register, longitudinally of the air passages, with at least some of the fuel wells.

13. In a carburetor, in combination, a casing having an air passage therethrough and provided with a horizontally elongated slot forming part of said air passage, spraying means including a plurality of exit ports into said air passage, spaced along the edge of a long side of said slot and adapted to divide fuel into a plurality of minute streams capable of simultaneously issuing therefrom into the body of air flowing through said passage, means for feeding fuel to said spraying means, and a slidable valve-member actuatable at will and adapted to simultaneously vary the effective air flow section through said passage and shield or unshield a variable number of exit ports, the side of the slot opposite the exit ports being inclined to the length of the slot, at least in the slot portion first uncovered by opening the valve-member, in order that the width of this slot portion increases in the opening direction of such valve-member.

14. In a carburetor, in combination, a casing having an air passage therethrough and provided with a horizontally elongated slot forming part of said air passage, spraying means including a plurality of exit ports into said air passage, spaced along the edge of a long side of said slot and adapted to divide fuel into a plurality of minute streams capable of simultaneously issuing therefrom into the body of air flowing through said passage, means for feeding fuel to said spraying means, a slidable valve-member actuatable at will and adapted to simultaneously vary the effective air flow section through said passage and shield or unshield a variable number of exit ports, a movable valve plate actuatable at will, located adjacent the exit ports first unshielded by the opening displacement of the slidable valve member and capable when closed of defining with the casing an air passageway extended along and over a plurality of said exit ports, thereby constraining air to flow along and over said ports in a parallel direction to the slot instead of flowing transversely of the slot over said ports.

15. In a spray carbureting device having air passage means, in combination, spraying means adapted to cooperate with said air passage means and including a plurality of minute level sprayers and a plurality of headed sprayers, both said level sprayers and headed sprayers being capable of simultaneous operation, and control means, actuatable at will and including valve means, adapted to simultaneously shield or unshield a variable number of both said level sprayers and headed sprayers, and to vary at the same time

the effective flow-section through said air passage means.

16. In a spray carbureting device having air passage means, in combination, main air passage means, branch air passage means leading therefrom to the atmosphere, a plurality of minute level sprayers arranged to cooperate with said main air passage means, a plurality of headed sprayers arranged to cooperate with said branch air passage means, both said level sprayers and headed sprayers being capable of simultaneous operation, and control means, actuatable at will and including valve means, adapted to simultaneously shield or unshield a variable number of both said level sprayers and headed sprayers, and to vary at the same time the effective flow-section through said main air passage means.

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