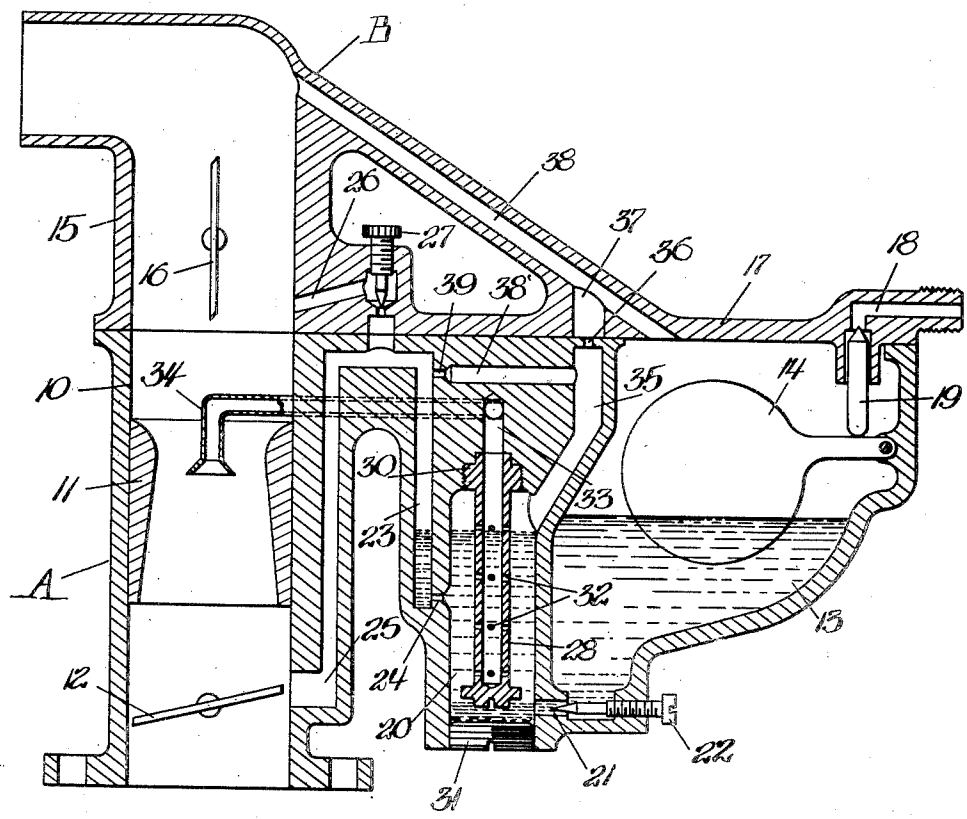
Nov. 1, 1938. E. JEDRZYKOWSKI 2,134,877

CARBURETOR

Filed Nov. 23, 1936




Inventor
Edmund Jedrzykowski
By V. F. Lassagne
Atty.

Patented Nov. 1, 1938

2,134,877

# UNITED STATES PATENT OFFICE

2,134,877

## CARBURETOR

Edmund Jedrzykowski, Chicago, Ill., assignor to International Harvester Company, a corporation of New Jersey

Application November 23, 1936, Serial No. 112,256

7 Claims. (Cl. 261—41)

This invention relates to a carburetor. More specifically it relates to a particular construction designed to prevent an objectionable condition known as percolating.

Carburetors of the type used on vehicle engines generally include a fuel reservoir and they are located in a hood compartment in close proximity to the engine. During operation of the engine, the entire carburetor is cooled by a substantial current of air which the fan of the cooling system forces rearwardly over the engine. The carburetor is also cooled by the air which passes through the mixing chamber. It is obvious, therefore, that, during operation of the vehicle, the float chamber of the carburetor and the carburetor in general is cooled sufficiently to prevent a temperature rise sufficient to boil or vaporize to any appreciable extent, the liquid fuel.

When operation of the engine is discontinued these cooling factors are not present and, as a result, the heat given off by the metal of the engine rapidly raises the temperature of the carburetor. A great deal of difficulty has been encountered due to temperature increases sufficient to boil the liquid fuel in the reservoir and in the communicating fuel passage. This action causes the fuel in the fuel passages to percolate, with the bubbles carrying liquid fuel through the nozzle. This effect has recently received more recognition, due to the use of down-draft carburetors. In such carburetors, the fuel which is percolated through the nozzle, immediately after the vehicle is stopped and operation of the engine discontinued, flows through the carburetor mixing chamber downwardly through the manifold into the engine cylinder. The overload or flooded condition often prevents it from being started, and is particularly undesirable because of oil dilution.

The principal object of the present invention is to provide a construction designed to reduce the percolating action to a minimum and to remove the vapor produced thereby without discharge of fuel through the nozzle into the mixing chamber.

Another object is to incorporate the antipercolating feature with the air bleed system of an otherwise conventional carburetor.

Another object is to provide an air bleed construction which increases suction in the accelerating well during idling and part throttle operation of the engine, hastening the refilling of the accelerating well and increasing its capacity. This air bleed construction causes the well to respond to both the manifold vacuum and suction of the nozzle, improving the acceleration and pick-up of the engine.

The above objects and others, which will be apparent from the detailed description to follow, are attained by a construction as illustrated in the drawing in which:

Figure 1 is a vertical section substantially through the center of the mixing chamber, being somewhat diagrammatic in order to show all of the fuel and air passages in a single drawing.

In the form shown, the antipercolating construction is embodied in a carburetor of the down-draft type. Said carburetor is made in two sections, the lower section A having a tubular portion **10**, in which a venturi **11** is located. At the outlet end of the mixing chamber on the engine side of the venturi, a throttle valve **12** is positioned, to control mixture flow to the engine. Integrally formed as a part of the lower section of the carburetor, a float chamber **13** forms a source of fuel supply. A float **14** pivoted in said chamber is utilized to regulate the liquid fuel level therein. The upper section B of the carburetor has a tubular portion **15** in alignment with the mixing chamber. A choke valve **16** is mounted in said portion. An integral extension **17** from the tubular portion forms a cover for the float chamber **13**. A fuel inlet passage **18** is cored in said cover, communicating with the float chamber. A needle valve **19** engaged by the float **14** controls the inlet of fuel through the passage **18**.

The lower section of the carburetor is formed with a vertical cylindrical accelerating well **20**. A metering jet or orifice **21** forms a communication between the bottom of the float chamber and the bottom of the well **20**. Said jet is adjustable, being regulated by a threaded needle valve **22** extending outside the float chamber bowl for adjustment.

It will be understood that, when the carburetor has not been in operation, the liquid level in the accelerating well **20** will be the same as in the float chamber **13**. An idle fuel passage **23** communicates through a metered orifice **24** with the well **20** intermediate its ends. Said passage extends upwardly to the top of the lower section of the carburetor and then downwardly, terminating in an outlet **25** adjacent the throttle valve **12** when it is in closed position. A conventional air bleed for the idle passage is provided by a valve control passage **26** communicating with the main air inlet and with the idle passage. A threaded needle valve **27** forms the idle adjust-

ment to regulate the amount of air drawn in through the passage 26.

A metering well 28 is mounted in the well 20 spaced from the bottom and side wall thereof, being secured in position at the top and only where it is threaded into a bore 30 formed in the lower section of the carburetor body. Said well is inserted and removed from position by removal of a plug 31 at the bottom of the well 20.

The metering well 28 is of the progressively uncovered air bleed type, there being a series of perforations 32 in the well beginning close to the top and extending to substantially the bottom of the well.

The hollow interior of the well 20 communicates with a mixture passage 33 formed in the carburetor. Said passage extends upwardly and laterally to the mixing chamber. A fuel nozzle 34 formed as a hollow tube is fitted into the outlet end of the passage 33 providing thereby a fuel discharge means terminating in the restricted portion of the venturi 11. It is understood that in an air bled jet of this type, the openings 32 are progressively uncovered as the fuel level is lowered in the well 20. The relatively large amount of fuel in said well serves to provide the excess fuel necessary for acceleration when the throttle is first opened.

A passage 35, formed in the lower section of the carburetor, communicates with the top of the accelerating well 20 and through a metered orifice 36 with a passage 37 formed in the upper section of the carburetor. The passage 37 communicates directly with a balance tube 38 connecting the top of the float chamber with the main air inlet.

A passage 38' connects with the passage 35 between the metering orifice 36 and the well 20 and by means of a metered orifice 39 with the idle passage 23.

In the operation of a carburetor, as above described, when the engine employing the carburetor is stopped, the effect of the heat applied to the carburetor is reduced to a minimum between suspension of the metering well 28 out of contact with the lower portion of the carburetor body. Heat, which reaches said well, must be transmitted downwardly from the top with the result that sufficient heat is ordinarily not transmitted to the metering well to produce any appreciable amount of percolation within the well.

Heat, of course, is transmitted to the carburetor with the result that boiling with percolation is effected in the main accelerating well 20. Due to the provision of the passage 35 communicating with the extreme top of the well 20, the bubbles and liquid fuel carried thereby rise upwardly through said passage. The gas escapes or is condensed, and the liquid returns to the accelerating well or to the float chamber. As the bottom of the well 28 is closed any bubbles which rise from the bottom of the well 20 cannot pass upwardly into the well 28. Bubbles passing upwardly along the outer wall of the well 20 will not pass through the small metering orifices 32 into the interior of the well. The proper location of the passages and the orifices and their relative sizes are important features in a construction of this type. The principle is as illustrated, however, insofar as the novel feature of construction is concerned.

The air bleed 39 is in series with the main air bleed provided by the orifice 36. High vacuum in the idle passage 23 when idling increases the suction in the accelerating well 20, causing the fuel level there to rise. The idle quantity of fuel available by this rise in level benefits the pick-up and acceleration particularly when there has been a great drop of engine speed. When the suction in the idle discharge chamber 25 drops, due to sudden opening of the throttle valve 12 or change of engine speed, the suction in the accelerating well 20 decreases, releasing an idle quantity of fuel therein to flow to the engine in addition to that normally metered through the main fuel jet or adjustment. The important feature of this construction is that the well action responds to either suction at the nozzle, or to the manifold vacuum. When approaching full load from part throttle, the pressure in the manifold increases with the result that the idle bleed 39 back-bleeds into the well 20 in addition to the main air bleed 36. Suction is thereby reduced in the accelerating well 20, releasing an additional quantity of fuel to flow besides that normally metered through the main fuel adjustment.

It is to be understood that applicant has shown and described only a preferred embodiment of his improvements in carburetors and that he claims as his invention all modifications falling within the scope of the appended claims.

What is claimed is:

1. In a carburetor and in combination with the carburetor body and the fuel discharge nozzle thereof, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between the bottom of said well and the bottom of the float chamber, a metering well located in said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, a fuel discharge conduit connecting the interior of said well with the discharge nozzle, said metering well formed with a plurality of progressively uncovered air bleeds, a balance tube communicating with the top of the float chamber, a conduit connecting the top of the accelerating well with said balance tube, and said conduit being provided with a metering restriction forming a main air bleed, an idling fuel supply conduit communicating with the accelerating well below the float chamber fuel level and with the mixture passageway, and a well reloading conduit communicating with said idling fuel conduit and with the conduit connected to the accelerating well.

2. In a carburetor and in combination with the carburetor body and the fuel discharge nozzle thereof, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between the bottom of said well and the bottom of the float chamber, a metering well located in said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, a fuel discharge conduit connecting the interior of said well with the discharge nozzle, said metering well formed with a plurality of progressively uncovered air bleeds, an idling supply conduit communicating with both the mixture passage and the accelerating well below the float chamber fuel level and having an intermediate portion extending thereabove, and an accelerating well reloading conduit connecting the top of the accelerating well with the idling supply conduit, said reloading conduit being provided with a metering restriction.

3. A down-draft carburetor comprising in combination a mixture passageway formed with a Venturi throat, a throttle valve below said venturi, a starting shutter above said venturi, a fuel

nozzle located in the restricted portion of the venturi, a float chamber means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between the bottom of said well and the bottom of the float chamber, a metering well located in said accelerating well, a fuel discharge conduit connecting the interior of said well with the discharge nozzle, an idle fuel conduit communicating with the accelerating well at an intermediate point therein, said conduit extending upwardly above the normal fuel level and then downwardly terminating adjacent the edge of the throttle valve when it is in closed position, said conduit being formed with a metering jet adjacent the accelerating well, a balance tube connected to the top of the float chamber, a conduit connecting the top of the accelerating well with said balance tube, said conduit being provided with a metering restriction forming a main air bleed, and a conduit communicating with said conduit between the accelerating well and said air bleed and with the idle conduit, said last named conduit being provided with a metering restriction forming an air bleed.

4. A down-draft carburetor comprising, in combination with the carburetor body, a mixture passageway formed with a Venturi throat, a throttle valve below said venturi, a fuel nozzle located in the restricted portion of the venturi, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between said well and the float chamber, a metering well located in said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, said metering well being closed at its bottom and being formed with a plurality of metering orifices spaced vertically along the side wall, and a fuel discharge conduit connecting the interior of said well with the discharge nozzle.

5. A down-draft carburetor comprising, in combination with the carburetor body, a mixture passageway formed with a Venturi throat, a throttle valve below said venturi, a fuel nozzle located in the restricted portion of the venturi, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between said well and the float chamber, a metering well located in said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, said metering well being closed at its bottom and being formed with a plurality of metering orifices spaced vertically along the side wall, an air bleed conduit communicating with the top of the accelerating well outside the metering well for carrying away bubbles resulting from percolation, and a fuel discharge conduit connecting the interior of said well with the discharge nozzle.

6. A down-draft carburetor comprising, in combination with the carburetor body, a mixture passageway formed with a Venturi throat, a throttle valve below said venturi, a fuel nozzle located in the restricted portion of the venturi, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between the bottom of said well and the bottom of the float chamber, a metering well extending downwardly into said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, said metering well being closed at its bottom end against the entrance of fuel or bubbles and being formed with a plurality of progressively uncovered metering orifices spaced vertically along the side wall, and a fuel discharge conduit connecting the interior of said well with the discharge nozzle.

7. A down-draft carburetor comprising, in combination with the carburetor body, a mixture passageway formed with a Venturi throat, a throttle valve below said venturi, a fuel nozzle located in the restricted portion of the venturi, a float chamber, means for maintaining fuel at a predetermined level in said float chamber, an accelerating well, a metered communication between the bottom of said well and the bottom of the float chamber, a metering well located in said accelerating well spaced from the bottom and side wall thereof and contacting the carburetor body only at its upper end, said metering well being closed at its bottom end against the entrance of fuel or bubbles, said metering well being formed with a plurality of progressively uncovered metering orifices spaced vertically along the side wall, a fuel discharge conduit connecting the interior of said well with the discharge nozzle, and a conduit with a metering restriction connecting the top of the accelerating well with the float chamber.

EDMUND JEDRZYKOWSKI.