Oct. 3, 1939. F. L. DARLING 2,174,935

CARBURETOR

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Fig. 5.

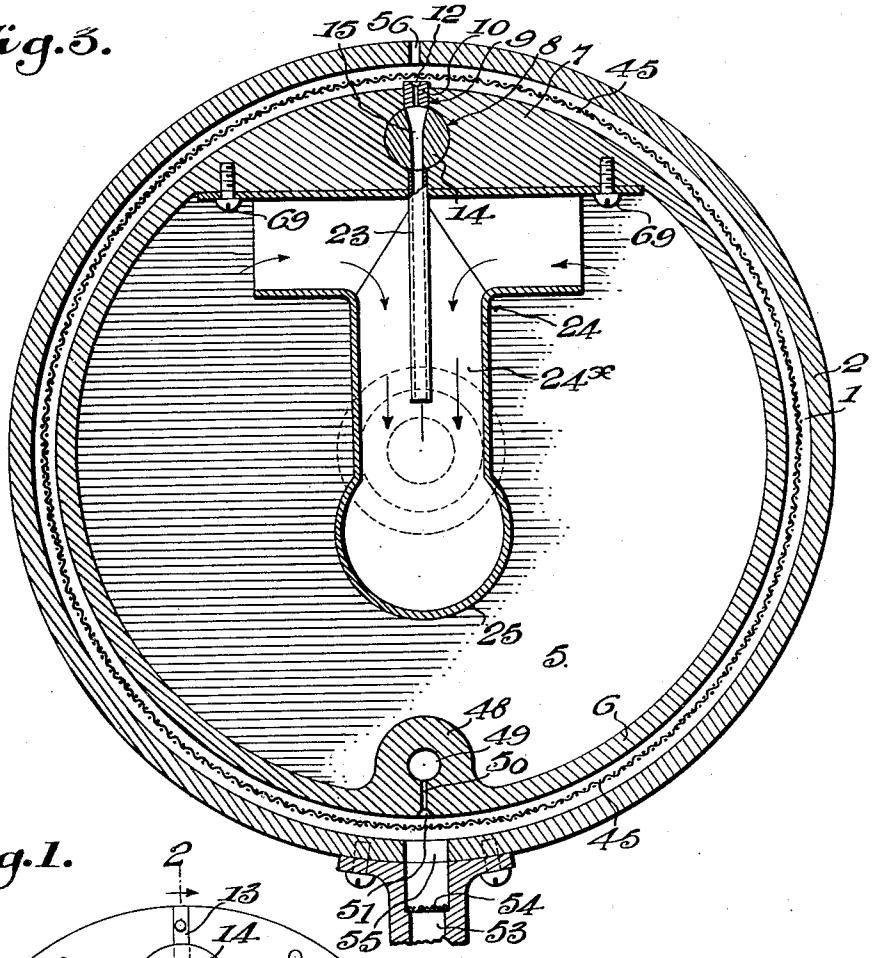
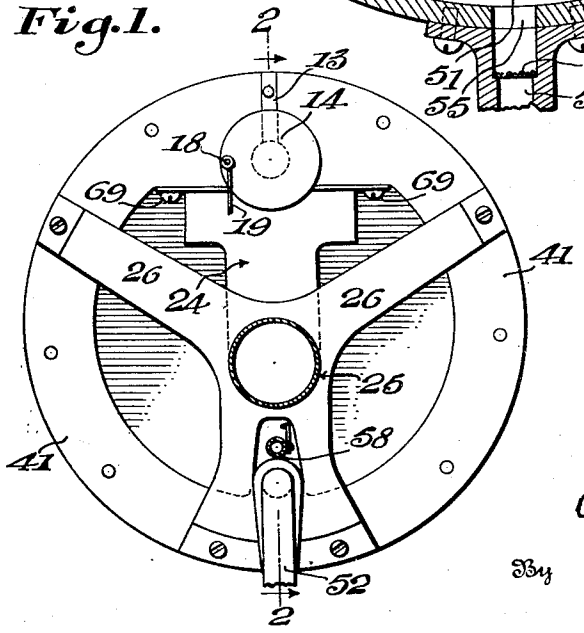


Fig. 1.



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CARBURETOR

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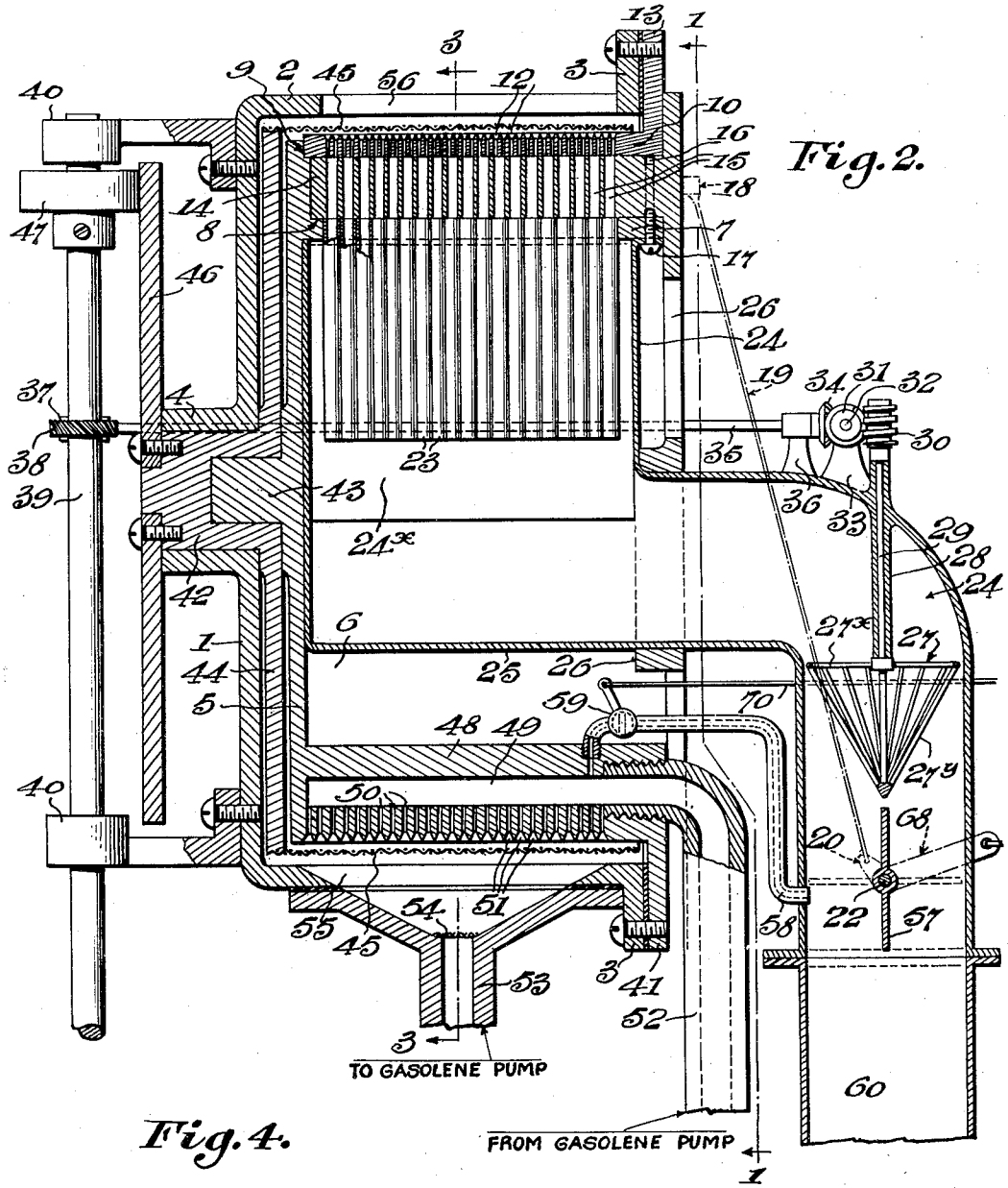
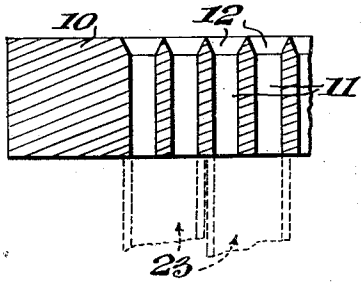


Fig. 2.

Fig. 4.



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CARBURETOR

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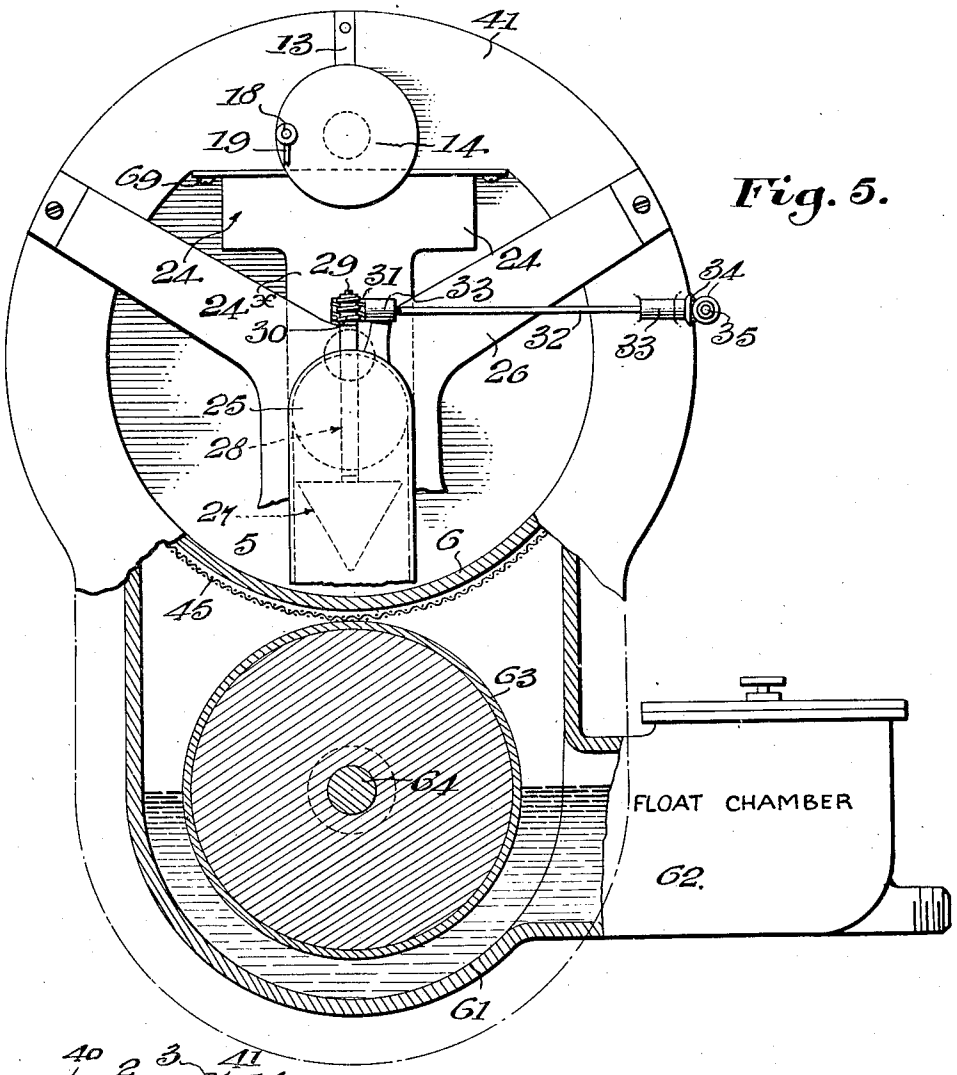


Fig. 5.

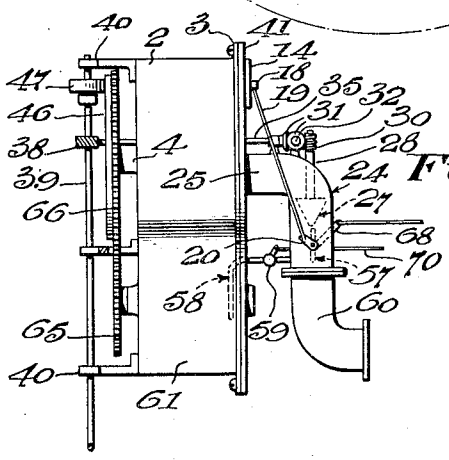


Fig. 6.

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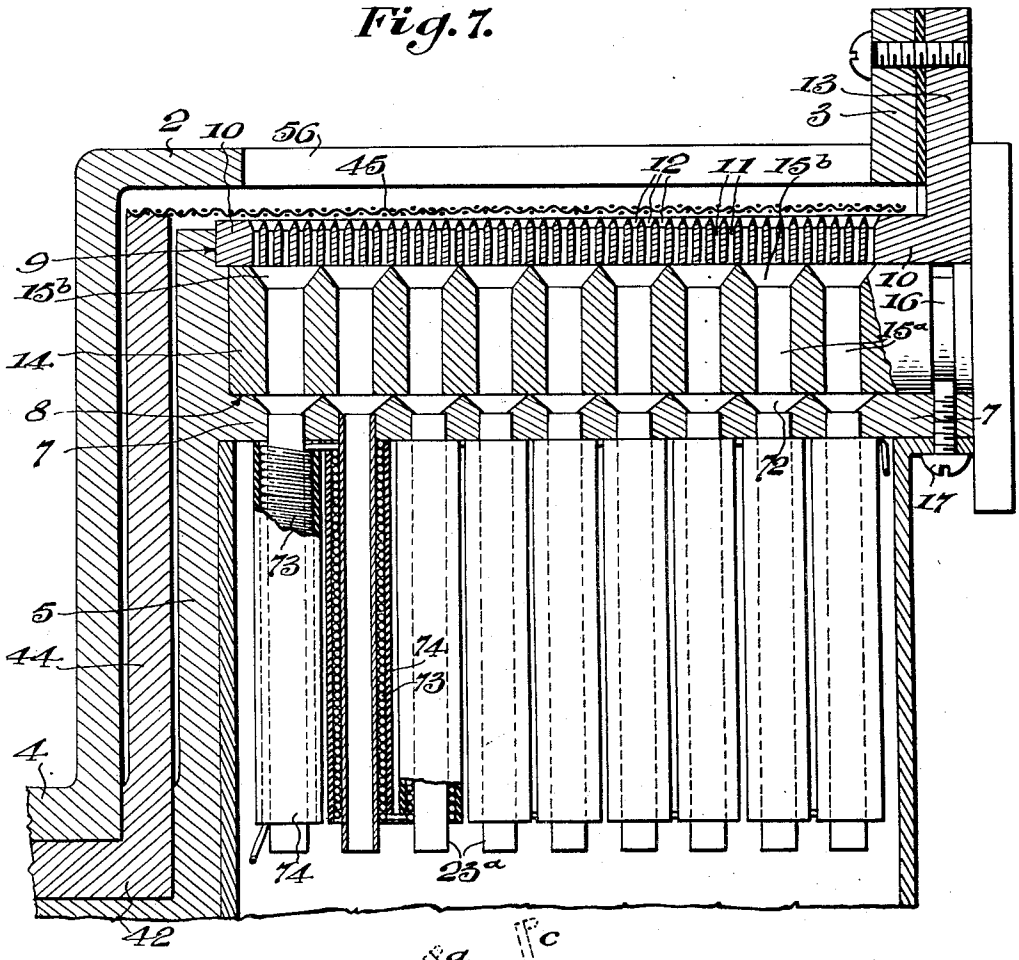
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Oct. 3, 1939. F. L. DARLING 2,174,935

CARBURETOR

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Fig. 7.



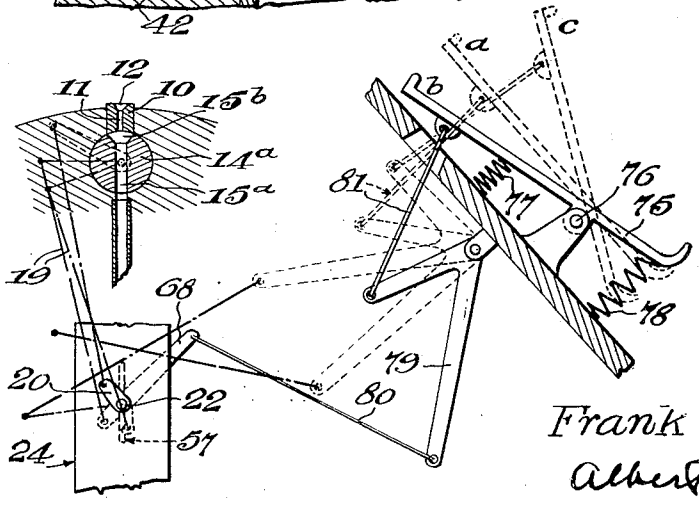


Fig. 8.

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2,174,935

UNITED STATES PATENT OFFICE

2,174,935

CARBURETOR

Frank L. Darling, Teaneck, N. J.

Application April 9, 1937, Serial No. 136,001

23 Claims. (Cl. 123—138)

My invention relates to motor vehicles and especially to carburetors used with the engines thereof.

The carburetors at present employed for producing the explosive mixture are notoriously inefficient, particularly under present day traffic conditions where frequent stops and startings are necessary. The present carburetors with the conventional spray nozzles are unable to accomplish the perfect mixture (proportion of air to gas to be consumed) at all speeds; usually they depend solely on the suction at the spray nozzles to meter the gas, but this is far from accurate.

My invention, therefore, has for its objects: to provide a carburetor which will give, practically, a perfect mixture in which just the right amount of air and gas are passed, as a thoroughly vaporized mixture, to the intake manifold at all speeds of the engine; to provide a carburetor in which the gasoline is delivered to the mixing chamber, downwardly, by injector action at a rate depending on the position of the throttle and speed of the engine, and to elevate the gasoline mechanically in metered quantities to the place where it is taken up by the injector so that the suction of the engine is not used to lift the gasoline against the action of gravity; to provide a device by which the elevator takes up only a film of fuel over a definite area at a time and delivers the same from a definite area to the injector mechanism, the latter area in effect increasing proportionately to the engine speed on open throttle; to provide a carburetor with means to reduce to a minimum or shut off instantly the injection of gasoline upon closing the throttle quickly with clutch in and the car coasting, so as to prevent the surge or flooding tendency now so prevalent in carburetors of the present day.

Generally, the invention provides a carburetor in which the gasoline is conveyed, to the place from which it is to be taken to the mixing chamber, by means of a relatively fine mesh screen cylinder rotating on a horizontal axis at speeds proportional to the speeds of the engine, the gasoline being taken by the screen from the immediate source of supply by capillary action, i. e., the meshes over a definite area receive films of gasoline and conduct the same as such to the top of the instrument from whence, through a large number of small metered holes and tubes, the gasoline films are drawn and delivered downwardly into the incoming air stream parallel to its direction of travel and in a manner so as to ensure as perfect a mixture as possible.

Another object is to provide a carburetor in which only a small volume of air is drawn with the gasoline through the metered holes and tubes, the main air supply being admitted without obstruction and passed along the outside of the tubes in the direction of their length so as to take up and thoroughly mix with the air and gasoline that passes through the tubes into the mixing chamber or passage.

A further object is to provide means to heat the gasoline while passing through the tubes.

Another object is to provide a carburetor and its operating mechanism with such devices as will enable the engine to be run as a compressor of air, for braking and self cooling purposes.

Other objects will in part be obvious and in part be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention still further resides in the novel details of construction, combination and arrangement of parts, all of which will be first fully described in the following detailed description, and then be particularly pointed out in the appended claims, reference being had to the accompanying drawings in which:

Figure 1 is a section on the line 1—1 of Figure 2.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is an enlarged detail sectional view of a portion of the metered-hole key.

Figure 5 is an elevation and part section of a modification of the invention.

Figure 6 is an elevation, on a reduced scale, of the modification shown in Figure 5, taken at right angles thereto.

Figure 7 is an enlarged detail vertical section showing a modification.

Figure 8 is a diagrammatic view showing the manner of operating the gasoline valve, and the throttle valve for normal running purposes and for braking purposes respectively.

In the drawings, in which like numbers and letters of reference indicate like parts in all the figures, it will be observed that the casing embodies two shells fitted one within the other. The outer shell comprises a back wall 1, a rim or annular wall 2, a flange 3 and a hub 4, while the inner shell includes a back wall 5, an annular wall or rim 6 and a flange 4¹. The flanges 3 and 4¹ are secured together in any suitable manner, as by screws, a suitable gasket being interposed to effect a fluid-tight joint.

The inner shell is formed with a valve casing 7 bored at 8 to receive the valve 14, the valve having a groove 16 for a retaining screw 17, as shown.

The rim or annulus 5 and the flange 41 are milled out to form a slot 9 to receive the key 10 having a set of metered holes or passages 11 whose entrant ends are countersunk to constitute funnel-like entrances 12. The key 10 has a flange section 13 to fit the milled slot in the flange 41 and the key may be held in place by one of the casing screws, as shown in Figure 2.

The valve 14 has a set of ports 15 of somewhat larger cross-section than the metered holes 11. For example, the cross-sectional diameters of the ports 15 are such as to take in two holes 11 each (see Figure 2). A set of metered tubes 23 register one with each port 15, while the valve 14 is open.

The valve 14 is operated by any suitable means so as to close the ports 15 in proportion to the throttle valve 57 closing, and to open such ports 15 in proportion to the throttle valve opening again. This may be accomplished in a variety of ways; for example, the valve 14 may be provided with a crank pin 18 connected by a rod 19 with a lever 20 on the shaft 22 of the throttle valve 57.

The valves 57 and 14 may be operated by a foot pedal 75, pivoted at 76, and held in an idling position by balanced springs 77 and 78. The pedal 75 is connected by a rod 81 to the short arm of a lever 79 whose long arm 79 is connected by a rod 89 to the arm 68 of the throttle valve. When the pedal 75 is in the position *b* in Figure 8 valve 14 and throttle valve 57 are both fully open; when the pedal 75 is in position *a* the valves are nearly closed for the idling of the engine; when the pedal is at position *c* the valve 14 is entirely closed and valve 57 is open to permit fresh air only to be drawn into the engine while using it as a brake.

The main air intake 24 is of large cross-section, and includes a vertically disposed mixing chamber 24^x into which the tubes 23 extend vertically also. The chamber 24^x delivers the mixture of gasoline spray and air into a duct in which the gasoline and air are further mixed by means of a beater 27 made in the form of a conical wire cage having horizontal wires 27^x and inclined wires 27^y. The duct 25, mixing chamber 24^x and air intake 24 are supported by means of a spider 26 secured to the casing, and by means of screws 69 passing through a flange of the duct 24 into the valve casing, or in any other suitable manner.

The beater 27 is driven by a shaft 29 mounted in a suitable bearing 28 and driven in any suitable way from the shaft 39 that is in turn driven by the cam shaft (not shown) of the engine, say by means of worm gearing 30—31, shaft 32 (supported in suitable bearings 33), bevel gears 34, shaft 35 (journaled in suitable bearings 36) and worm gearing 37—38. The shaft 39 is mounted in suitable bearings 40.

Between the inner and outer shells of the casing is mounted to rotate on a horizontal axis a cylinder composed of relatively fine mesh screen wire 45 and secured at its back end to the periphery of a disc 44 which has a hub 42 journaled in the bearing 4. The hub 42 is provided with a bearing recess for the stub 43 on the casing wall 5. Thus the disc 44 rotates on a horizontal axis between the backs 1 and 5 of the casing while the screen 45 turns between, but not touching, the annular flanges 2 and 6. The key 10 extends close under the screen but so that the screen will just clear it (without actually touching the key).

The rotating screen 45 and its disc 44 and stub 42 constitute a gasoline elevator of measured quantities of gasoline, as will later more fully appear. Any suitable means may be provided for driving the elevator so long as its number of R. P. M. bear a fixed ratio to the engine R. P. M. For example: to the stub 42 may be attached a friction disc 46 to be driven by a friction drive wheel 47 adjustably held on the shaft 39 for the purpose of initially adjusting the speed of the elevator to that of the engine. When once adjusted for the most efficient mixture, further adjustment becomes unnecessary and the wheel 47 may be fixed.

In the preferred embodiment of the invention (Figures 1 to 4) the inner shell of the casing has an enlargement 48 with a bore 49 and a series of fine gasoline ducts 50 with flared outlets 51. The fuel pipe 52 from the fuel pump (not shown) of the engine connects with the enlargement 48 to deliver fuel to the bore 49, while excess gasoline returns to the pump by way of a pipe 53 from a drain opening 55, a suitable back-fire stop screen 54 being placed adjacent the entrance to pipe 53. In order to prevent forming a partial vacuum in the casing above the place of gasoline delivery to the metering holes 11, the annulus 2 has a slot 56 over the row of holes 11 (see Figure 2).

In order to furnish a rich mixture for starting a cold engine, a priming tube 58, controlled by a priming valve 59, may be used to lead gasoline from bore 49 to duct 25 below the throttle valve.

The duct 25 connects in the usual way to the inlet of the intake manifold 60.

Operation

The drum or cylindrical screen is geared to turn relatively slowly, say, 35 revolutions of the drum to 500 revolutions of the engine. The gasoline pump delivers fuel through pipe 52 and ducts 49—50—51 to the screen 45 across its width, preferably at its lowest place, a continuous spray of gasoline passing from ducts 50—51 to pipe 53 and returning to the pump. As the drum rotates through this spray its meshes will pick up films of gasoline which are carried up over the metered holes 11. If the valve 14 is open, as it is in all positions when the throttle 57 is open in whole or in part, the suction of the engine will draw the gasoline films, as they come over the holes 11, down through the holes and valve, and through the tubes 23 where the gasoline (and such air as passes with it from slot 56) enters the main air stream as a vapor spray, becoming the gaseous mixture in mixing chamber 24^x and duct 25, the mixture being further perfected as the fluids are drawn through the beater 27. As the engine picks up speed, through the further opening of the throttle, the screen 45 will rotate proportionately faster, in virtue of which more screen-mesh-gasoline films are brought successively over the holes 11 and consequently proportionately more gasoline is delivered through the tubes 23 to meet and be mixed as a fine vapor with the proportionately increased volume of air being drawn through the entrances of the main air intake 24. As the throttle is gradually closed to reduce engine speed, the velocity and amount of air intake proportionately decreases, as does also the speed of rotation of the screen 45, also valve 14 proportionately closes, and consequently the amount of gasoline passed through holes 11, ports 15, and tubes 23 is proportionately decreased. Thus for engine speeds on open throttle

the proportion of gasoline to air is maintained, as nearly as can be, constant.

Should the operator remove his foot from the accelerator suddenly, the springs 77—78 will immediately restore the parts to the idling position, thus instantly reducing the gasoline suction through ports 15 and tubes 23 and preventing the formation of an over-rich mixture while the car is driving the engine, thereby saving gasoline.

If it be desired to use the engine as a brake pedal 75 is rocked to position c Figure 8, as before explained, to close off entirely the gasoline flow through tubes 23 and open throttle 57 to permit clear air to flow into and cool the engine cylinder.

When starting a cold engine it often becomes necessary to prime it. This is done by pulling the primer wire 70 and holding valve 59 open an instant, or until the engine takes hold, whereupon the primer is pushed in again to close valve 59.

The embodiment of Figures 5 and 6

This embodiment differs from that of Figures 1 to 4 inclusive only in the means to supply the gasoline to the screen drum 45. It provides a carburetor for those engines which do not use fuel pumps. In this form the casing is continued to provide a well 61 into which gasoline is delivered to a constant level from a float chamber 62 of any desired design wherein the fuel level is maintained through the action of a float-controlled valve. A roller 63 of suitable material is rotatable in the well 61 and makes an approximately line-contact constantly with the lower portion of the screen 45. This roller 63 has its lower portion immersed in the gasoline and takes up a film of liquid on its periphery, as it is rotated, and delivers the same to the meshes of the screen.

The roller 63 has its shaft 64 journaled in suitable bearings in the front and back walls of the well 61 and the roller 63 is rotated at the same peripheral speed as that of the screen 45 in any suitable way as, for example, by gears 65 and 66 (see Fig. 6).

The screen 45 will take up only enough gasoline to fill the meshes with films of gasoline to be elevated and delivered to the metered holes 11 as in the preceding form.

It is believed, from experiments made, that heated gasoline vapors combined with cool air leads to the formation of a more efficient mixture, due perhaps to the greater density (and hence greater the volume of oxygen) of cool air over heated air, to combine with the heated vapor. This may be accomplished in my carburetor (as shown in Figure 7) by providing the tubes 23^a with electric heating coils 73 in series with one another, a suitable heat insulating cover 74 being provided so as not to heat the passing air.

In the modification shown in Figure 7, the valve ports 15^a are spaced farther apart than in Figure 1 and correspondingly fewer tubes are used so that the heater 73 and insulation 74 may be used.

The entrances of the ports 15^a are flared as at 15^b so as to take in a proportionately increased number of metered holes 11 (see Figure 7).

From the foregoing it will be seen that by drawing some air through the screen with the gasoline of the mesh-films, and delivering the mixture via the metered holes 11 and tubes 23 into the main air stream, the fuel is evenly distributed into the incoming air stream thus materially increasing the efficiency of the carburetor and accomplishing economy in gasoline consumption, and increased engine efficiency.

By forcing the gasoline by pumping it through the screen (Fig. 2) only the gasoline held in the meshes by a capillary attraction is carried away by the screen, thereby ensuring a uniform carrying of gasoline from place of screen-film loading to place of screen-film unloading, a thing that cannot be accomplished by those carburetors heretobefore devised which employ screens rotating partly immersed in the gasoline fluid. Where the principle of screen immersion is employed the screen acts as a water wheel and an uncontrollable and variable amount of gasoline is carried along with the screen. My invention overcomes such objectionable action, since with my method only the gasoline caught in the meshes is carried away, thus metering the gasoline.

It is also a distinct advantage only to draw a small amount of the air for combustion through the screen 45 and metered holes 11 and to have the main bulk of air coming through the unobstructed entrances of the suction duct, as this makes it possible to distribute the gasoline vapor evenly in the main air stream and ensures a more uniform mixture; if the whole volume of air to the engine passed through the screen, the gasoline would be wiped off the screen along the advancing edge of the openings and would not mix uniformly with the total volume of intake air. The carburetors using the conventional spray nozzles have the same difficulty—none of them accomplish the perfect mixture of gasoline and air at all speeds; they depend on the suction at the spray nozzles in the carburetor to meter and lift the gasoline, but this is far from accurate. By rotating the screen in my design at speeds in direct ratio to the engine speed, a definite proportion of gas-to-air mixture is maintained at all engine speeds with open (more or less) throttle.

The same ratio of air to gasoline should be maintained at all speeds. Only the aggregate quantity should be increased or decreased to attain the different speeds, if the engine is to run most efficiently.

In the drawings I have shown two main embodiments of my invention for purposes of illustration, and not for limitation, as other modifications may be made in the details of construction and arrangement of parts without departing from the spirit of the invention or the scope of the appended claims.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation and advantages of the invention will be clear to those skilled in the art.

What I claim is:

1. In a carburetor for an internal combustion engine, a case, a screen drum rotatably mounted on a horizontal axis in said case, means to rotate said drum at speeds proportional to the engine speed, means at one place to deliver gasoline to said drum over a predetermined area thereof, means at another place for withdrawing the gasoline from a predetermined area of said drum, said last named means including a plurality of tubes, and an air suction tube into which said plurality of tubes project, said air suction tube having its air inlet to the rear of the outlet of the plurality of tubes and its discharge end connectable with the intake manifold of the engine.

2. In a carburetor for an internal combustion

engine, a case, a screen drum having its axis horizontal, means to rotate said drum at speeds in direct proportion to the engine speeds, means causing said drum to acquire films of gasoline in its rotation and conveying the same to an elevated place, means at said elevated place for drawing off metered quantities of said films, said last named means including a set of metered holes, and a set of tubes into which said holes deliver the gasoline, a main air intake duct surrounding said tubes through which the suction of the engine draws the air and gasoline as an explosive mixture.

3. In a carburetor for an internal combustion engine, a case, a screen drum having its axis horizontal, means to rotate said drum at speeds in direct proportion to the engine speeds, means causing said drum to acquire films of gasoline in its rotation and conveying the same to an elevated place, means at said elevated place for drawing off metered quantities of said films, said last named means including a set of metered holes, a set of tubes into which said holes deliver the gasoline, a main air intake duct surrounding said tubes through which the suction of the engine draws the air and gasoline as an explosive mixture, a valve having ports interposed between said metered holes and said tubes, a throttle valve for controlling the flow of mixture to the engine, and means to close said valve in proportion to the closure of said throttle-valve for purposes described.

4. In a carburetor for an internal combustion engine having an intake manifold, a case composed of two cup-like bodies nested one within the other and spaced apart, a cup-like rotor mounted in the space within the case to turn on a horizontal axis and including an annular screen, means to deliver gasoline to said screen at a relatively low place thereof, an air duct with a mixing chamber located within the inner cup-like body, said inner cup-like body having at its highest place a set of metered holes through its walls, the highest part of said annular screen passing over said holes, the outer cup-like body having an air port above said holes, a set of tubes beneath said holes to receive gasoline and air passed through said holes and to deliver the same into said duct to the mixing chamber thereof, means in virtue of which said air duct may be connected with the intake manifold of the engine, a throttle valve for controlling passage through said duct, and means to rotate said rotor in proportion to engine speeds.

5. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, and means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve.

6. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, and means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve, said means to acquire films of gasoline comprising means to pass gasoline through the meshes of the screen at a predetermined place while it is rotating.

7. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, and means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve, said means to acquire films of gasoline including a gasoline well and an applicator roller partly immersed in said well and in rolling contact with said screen.

8. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve and including a set of tubes, a control valve located between said metered holes and said tubes for controlling the passage of fluid to the tubes, and means to operate said control valve.

9. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline

in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve and including a set of tubes, a control valve located between said metered holes and said tubes for controlling the passage of fluid to the tubes, means to operate said control valve, and cooperative connections between said throttle valve and said control valve.

10. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve, said means to acquire films of gasoline comprising means to pass gasoline through the meshes of the screen at a predetermined place while it is rotating, and a priming duct with a priming valve therein to convey gasoline from said means-to-pass into said duct.

11. In a carburetor for an internal combustion engine having an intake manifold, a screen annulus mounted for rotation about a horizontal axis, means for effecting such rotation at speeds proportional directly to engine speeds, means to cause said annulus to acquire films of gasoline in its meshes at a place below its axis and carry the same to a place above its axis, a body having a transverse row of metered holes under the screen at said last named place, means above the screen and above said holes to admit a limited supply of air to the screen, means for drawing the films of gasoline with said limited supply of air through and from the screen meshes as they arrive over said metered holes and for drawing in a sufficient main supply of air to produce the desired working gaseous mixture, said last named means including a duct connectable to the intake manifold of the engine and being provided with a throttle valve, said means to acquire films of gasoline including a gasoline well and an applicator roller partly immersed in said well and in rolling contact with said screen, and a priming duct with a priming valve therein to convey gasoline from said means-to-pass into said duct at the engine side of said throttle valve.

12. In a carburetor for an internal combustion engine having an intake manifold, a case comprising an outer shell having a back wall and an annular wall with a flange, an inner shell also having a back wall and an annular wall with a flange, the inner shell being nested in said outer shell with the back and annular walls of the shells spaced apart, means securing the flanges together; a rotor including a disc and a screen annulus located between the inner and outer shells with the screen annulus out of contact with the walls of said case; means to turn said rotor at speeds proportional to the speeds of the engine; a main air duct having an air intake, a vertically disposed mixing chamber and a portion connectable to the intake manifold of the engine; means supporting said main air duct within said inner shell; said inner shell having at the top of its annular wall a transverse set of metered holes over which the screen annulus passes, the outer shell having a transverse air inlet port in its annular wall over said holes; means to supply films of gasoline to the meshes of said screen annulus before they pass over said metered holes; and means to receive the gasoline from said metered holes and deliver the same at a plurality of points to and in the direction of flow of the main air stream through the mixing chamber.

13. In a carburetor for an internal combustion engine having an intake manifold, a case comprising an outer shell having a back wall and an annular wall with a flange, an inner shell also having a back wall and an annular wall with a flange, the inner shell being nested in said outer shell with the back and annular walls of the shells spaced apart, means securing the flanges together; a rotor including a disc and a screen annulus located between the inner and outer shells with the screen annulus out of contact with the walls of said case; means to turn said rotor at speeds proportional to the speeds of the engine; a main air duct having an air intake, a vertically disposed mixing chamber and a portion connectable to the intake manifold of the engine; means supporting said main air duct within said inner shell; said inner shell having at the top of its annular wall a transverse set of metered holes over which the screen annulus passes, the outer shell having a transverse air inlet port in its annular wall over said holes, said inner shell having a valve-receiving bore adjacent said metered holes and a control valve in said bore; tubes carried by said inner shell with their entrant ends located adjacent said valve and with their delivery ends located in said duct, said control valve having ports to effect communication between said metered holes and said tubes.

14. In a carburetor for an internal combustion engine having an intake manifold, a case comprising an outer shell having a back wall and an annular wall with a flange, an inner shell also having a back wall and an annular wall with a flange, the inner shell being nested in said outer shell with the back and annular walls of the shells spaced apart, means securing the flanges together; a rotor including a disc and a screen annulus located between the inner and outer shells with the screen annulus out of contact with the walls of said case; means to turn said rotor at speeds proportional to the speeds of the engine; a main air duct having an air intake, a vertically disposed mixing chamber and a portion connectable to the intake manifold of the engine; means supporting said main air duct within said inner shell; said inner shell having at the top of its annular wall a transverse set of metered holes over which the screen annulus passes, the outer shell having a transverse air inlet port in its annular wall over said holes, said inner shell having

a valve-receiving bore adjacent said metered holes and a control valve in said bore; tubes carried by said inner shell with their entrant ends located adjacent said valve and with their delivery ends located in said duct and arranged to deliver in the direction of the fluid stream moving through said duct, said control valve having ports to effect communication between said metered holes and said tubes.

15. In a carburetor for an internal combustion engine having an intake manifold, a case comprising an outer shell having a back wall and an annular wall with a flange, an inner shell also having a back wall and an annular wall with a flange, the inner shell being nested in said outer shell with the back and annular walls of the shells spaced apart, means securing the flanges together; a rotor including a disc and a screen annulus located between the inner and outer shells with the screen annulus out of contact with the walls of said case; means to turn said rotor at speeds proportional to the speeds of the engine; a main air duct having an air intake, a vertically disposed mixing chamber and a portion connectable to the intake manifold of the engine; means supporting said main air duct within said inner shell; said inner shell having at the top of its annular wall a transverse set of metered holes over which the screen annulus passes, the outer shell having a transverse air inlet port in its annular wall over said holes; means to supply films of gasoline to the meshes of said screen annulus before they pass over said metered holes; and means to receive the gasoline from said metered holes and deliver the same at a plurality of points to and in the direction of flow of the main air stream through the mixing chamber, said inner shell having a slot and a key having said metered holes and located in said slot.

16. In a carburetor for an internal combustion engine, a body having a row of metered holes vertically through the same; a row of tubes extending below said body and into the tops of which said holes deliver; means to pass a screen, containing in its meshes films of fuel, over said holes; and means causing a confined stream of air to flow around and along said tubes and suck the fuel through the holes and tubes and form therewith a combustible mixture.

17. In a carburetor for an internal combustion engine, a body having a row of metered holes through the same from top to bottom, the tops of the holes being flared; a row of tubes extending below said body and into the tops of which said holes deliver; means to pass a screen, containing in its meshes films of liquid fuel over said holes, and means causing a confined stream of air to flow around and along said tubes and suck the fuel through said holes and said tubes and form a combustible mixture, said means to pass said screen including mechanism to vary the rate of passage according to the rate of flow of said air stream.

18. In a carburetor for an internal combustion engine, a body having a row of metered holes vertically through the same; a row of tubes extending below said body and through the tops of which said holes deliver; means to pass a screen, containing in its meshes films of fuel, over said holes; means causing a confined stream of air to flow around and along said tubes and suck the fuel through the holes and tubes and form therewith a combustible mixture; and means to heat the fuel while passing through the tubes.

19. In a carburetor for an internal combustion engine, a body having a row of metered holes vertically through the same; a row of tubes extending below said body and through the tops of which said holes deliver; means to pass a screen, containing in its meshes films of fuel, over said holes; means causing a confined stream of air to flow around and along said tubes and suck the fuel through the holes and tubes and form therewith a combustible mixture; means to control the flow of fuel through the tubes in proportion to the variation in the flow of the air; means to vary the flow of the air; and means to effect the operation of said means-to-control and said means-to-vary for entirely closing off the fuel flow and open the air flow when using the engine as a brake.

20. In a carburetor for an internal combustion engine having an intake, an air duct controlled by a throttle valve and connectable to the intake of the engine, means for delivering metered quantities of gasoline into said duct for mixing with the air in the duct and forming therewith a working mixture, said means including a valve for controlling the delivery of gasoline; and means for operating said valves in cooperation for producing a uniform working mixture at all speeds of the engine on open throttle while the engine is operating under its own power, and to shut off entirely the delivery of gasoline and open the throttle to permit the air to flow when the engine is being used as a brake.

21. In a carburetor for an internal combustion engine, a body having a row of metered holes vertically through the same; a row of tubes extending below said body and through the tops of which said holes deliver; means to pass a screen, containing in its meshes films of fuel, over said holes; and means causing a confined stream of air to flow around and along said tubes and suck the fuel through the holes and tubes and form therewith a combustible mixture, said tubes being located with respect to the air stream so as to distribute evenly the fuel from the tubes into the air stream.

22. In a carburetor for an internal combustion engine, a body having a row of metered holes vertically through the same; a row of tubes extending below said body and into the tops of which said holes deliver; means to pass a screen, containing in its meshes films of fuel, over said holes; and means causing a confined stream of air to flow around and along said tubes and suck the fuel through the holes and tubes and form therewith a combustible mixture, and a power driven agitator located in said confined stream at a place to cause further atomization of the liquid fuel and cause its intimate mixture with the air, and means to drive said agitator in unison with the operation of said screen passing means.

23. In combination with a carburetor having a metering valve and a throttle valve, means to operate said valves in cooperation to produce uniform working mixtures at various engine speeds and including means to close entirely said metering valve and open said throttle valve to pass air to the engine for using the engine as a brake.

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