

June 2, 1936.

M. E. CHANDLER

2,042,770

CARBURETOR

Filed May 7, 1932

2 Sheets-Sheet 1

Fig. 1

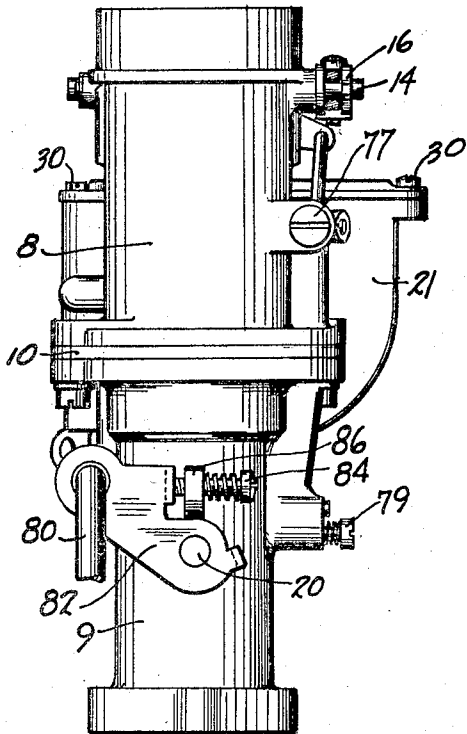


Fig. 3

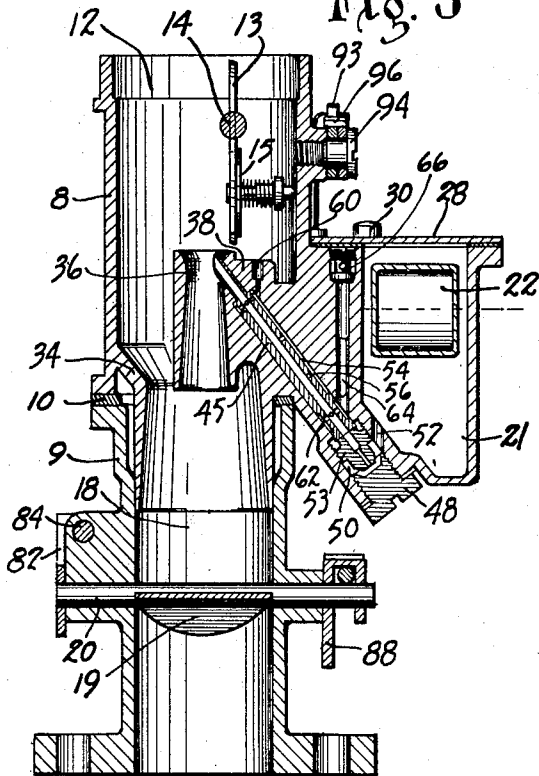


Fig. 2

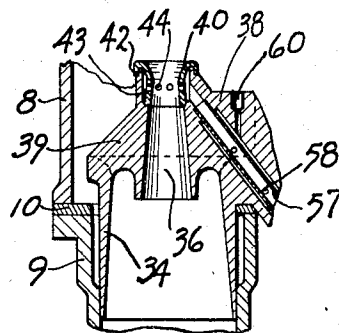
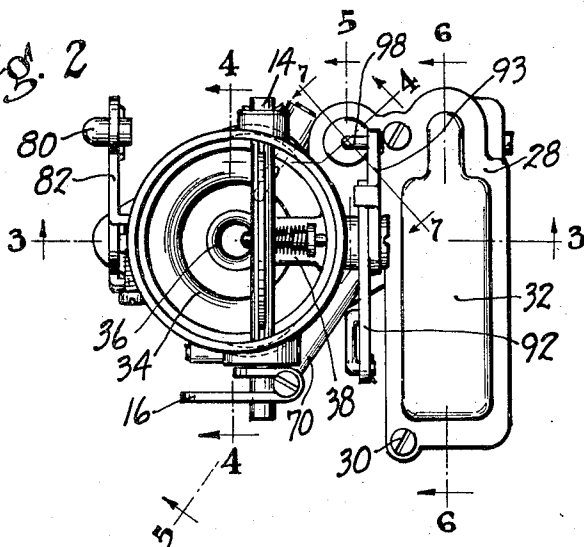


Fig. 8

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Fig. 4

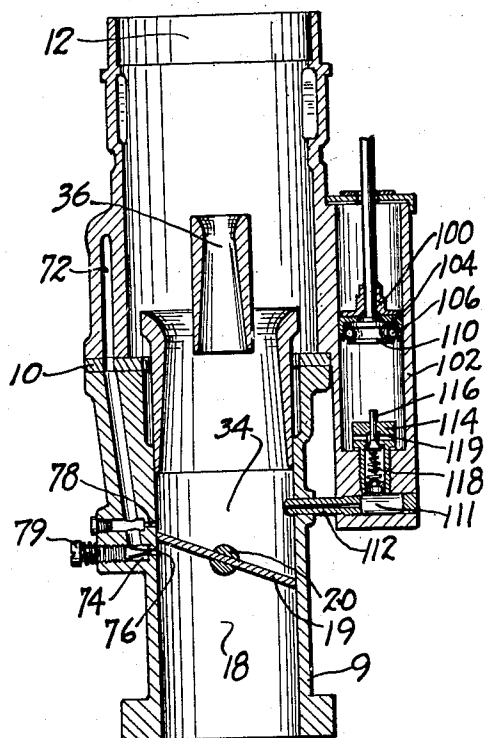


Fig. 5

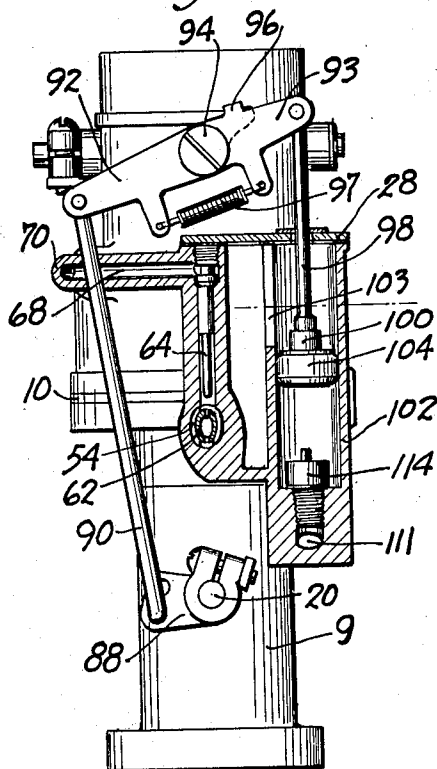


Fig. 6

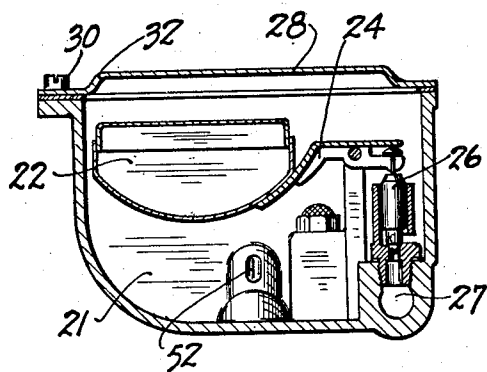
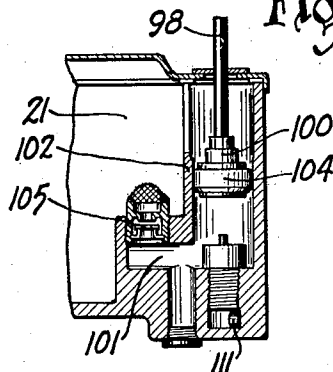


Fig. 7



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2,042,770

CARBURETOR

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Application May 7, 1932, Serial No. 609,931

5 Claims. (Cl. 261—75)

This invention relates to charge forming devices and more particularly to carburetors for internal combustion engines.

An object of the invention is to provide a carburetor of simplified construction which may be manufactured at materially less cost than those heretofore produced.

A further object of the invention is to provide a carburetor wherein a number of parts usually formed separately may be cast integral with each other.

A further object is to provide an improved economizer and acceleration pump.

Further objects and advantages of the invention will be apparent from the following description taken in connection with the appended drawings in which:

Figure 1 is a view in elevation of a carburetor embodying the invention;

Figure 2 is a plan view of the same;

Figure 3 is a longitudinal section taken on the line 3—3 of Figure 2;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a sectional view taken on the line 5—5 of Figure 2;

Figure 6 is a sectional view of the float mechanism taken on the line 6—6 of Figure 2;

Figure 7 is a sectional view of the acceleration pump taken on the line 7—7 of Figure 2; and

Figure 8 is a sectional view of a modified form of nozzle and Venturi construction.

The carburetor shown in the drawings is of the down draft type (although the invention may be applied to other types) and comprises an upper body section 8 and a lower body section 9, the upper section being preferably formed of an aluminum alloy or other suitable metal by die casting, while the lower body section is preferably formed of cast iron and consists essentially of a plain tube having relatively thin walls and separated from the upper section by a gasket 10 of material of low heat conductivity. The upper body section comprises the usual air horn 12 having mounted therein a choke valve 13 carried by a shaft 14 and having a spring pressed poppet valve 15 mounted therein. An actuating arm 16 is secured to shaft 14 and is adapted to receive a control wire or other member operable from the driver's seat or operable by automatic mechanism such as is disclosed in the application of Hunt and Olson, Serial No. 575,025, filed November 14, 1931.

The lower section 9 of the carburetor forms a mixing chamber 18 and has the usual throttle 19

therein mounted on a shaft 20 controlling the flow of the mixture through the mixing chamber. The lower section 9 is preferably formed of cast iron or other material of low heat conductivity to retard the flow of heat from the intake manifold to the float chamber and main nozzle. A float chamber 21 is cast integral with the upper section 8 and houses a float 22, which is carried by a pivoted lever 24 which controls the inlet valve 26 admitting fuel through the fuel supply duct 27 to the float chamber. The float chamber is provided with a cover 28, which is removably held in place by screws 30. The cover 28 may be formed of stamped sheet metal and is deformed as indicated at 32 to provide clearance for the float. The normal fuel level in the carburetor is indicated by broken lines in Figures 3 and 5.

An outer venturi 34 and an inner venturi 36 are provided in the usual relation and are cast integral with the upper section 8, this operation being made possible by a fin or boss 38 which joins both venturis to the body section 8. The venturi 36 is provided with a nozzle formed by a tubular member 45 seated in an inclined bore in the body section 8 and discharging into the air stream axially of the venturi 36. The inclined bore extends downwardly to a point adjacent the bottom of the float chamber, its lower end being closed by a threaded plug 48. The bore is enlarged at its lower end to receive the plug and to provide a well 50 communicating by way of a port 52 with the float chamber. The tube 45 is held in place by a metering plug 53 threaded in the well 50 and having a metering passage communicating with the bore of tube 45. Tube 45 is cut away as indicated at 54 to provide an air-bleed passage which communicates with the bore of the tube through ports 56. An air bleed duct 60 leads from the upper surface of fin 38 to the passage 54 to provide air bleeding of the main jet through ports 56 after the motor has been in operation long enough to lower the fuel level in the passage below the level of the ports.

The tube 45 is cut away circumferentially as indicated at 62 to provide communication with a vertical idling bore having a tube 64 therein formed at its upper end with a plug 66. The plug communicates with a horizontal bore 68 formed in a boss 70 of body section 8, and bore 68 communicates with a downwardly extending idling passage 72 which extends through sections 8 and 9 to a horizontal passage 74 discharging through idling nozzle 76 into the mixing cham-

ber 18 posterior to the throttle 19 when the throttle is in closed or nearly closed position. The idling passage 72 is aided by means of an idle air bleed plug 77, of suitable known construction, designed to be supplied with air from the air horn and to introduce such air into the fuel flowing through passage 72. A port 78 opens from the mixing chamber into passage 72 anterior to the throttle, and with nozzle 76 forms a bypass for the throttle when the latter is in its closed position. The discharge from nozzle 76 is controlled by an adjusting screw 79.

The throttle is actuated by a throttle control rod 80 pivoted to a lever 82 which is secured to the throttle shaft 20, the closed position of the throttle being adjustably determined by a stop screw 84 threaded in a boss 86 formed on body section 9. At its opposite end the shaft 20 is provided with a lever 88 connected by a rod 90 to a lost-motion lever formed by two overlapping members 92 and 93, both pivoted on a pin 94, their pivotal movement relative to each other being limited by a stop 96 formed on member 93. A tension spring 97 extends between projecting lugs on members 92 and 93 and tends to keep them in a position of alignment relative to each other as shown in Figure 5.

Member 93 is connected by means of a rod 98 to the plunger 100 of an acceleration pump, the cylinder 102 of which is cast integral with the upper body section 8 and communicates with the float chamber through a port 103. The plunger 100 is formed with a flexible washer 104 which engages the walls of cylinder 102 in liquid tight relation, being urged thereagainst by a light coiled spring 106 seated in an annular groove formed in the plunger. On the upward stroke of the plunger 100, fuel is supplied to the cylinder 102 through a passage 101 which leads to the float chamber 21 and is controlled by a check valve 105 (Figure 7).

The lower end of cylinder 102 is connected by a port 111 to an acceleration nozzle 112 which is arranged to discharge anterior to the throttle 19. An economizer valve controls the flow of fuel to nozzle 112 and consists of a plug 114 having a bore which is controlled by a valve member 116 which has an upwardly projecting stem designed to be engaged by the plunger 100. A compression spring 118 urges valve member 116 upwardly with sufficient force to prevent flow of fuel to nozzle 112 except when the plunger 100 is forced downwardly, whereupon the fluid pressure is exerted on member 116 through a transverse port 119 and is sufficient to force it from its seat and permit an accelerating charge of fuel to be discharged into the mixing chamber through nozzle 112. It will be seen that, with a slow opening of the throttle, members 92 and 93 will be caused by spring 97 to pivot in unison about pivot 94, causing a slow discharge of fuel through nozzle 112, plunger 100 being moved downwardly in proportion to the movement of the throttle. If the throttle is opened rapidly, however, the member 93 will move more slowly than member 92 and will thus produce a sustained acceleration discharge, the pressure of the fuel below the plunger being sufficient to force valve member 116 from its seat to permit an acceleration charge to flow through jet 112. If the throttle is maintained at a substantially full open position, valve member 116 is displaced by contact with plunger 100 and a steady flow of fuel by gravity through jet 112 begins and continues until the throttle is moved away from its

full open position. The construction just described thus acts both as an acceleration pump and as an economizer. It will be noted that when it functions as an economizer the discharge is to a great extent independent of the suction existing within the mixture passage, since the static head at nozzle 112 is sufficient to produce a good flow even when the suction is low, as when the engine is laboring at low speed.

In the modified form shown in Figure 8, a second fin 39 is provided to extend in alignment with fin 38 from the inner venturi 36 to the periphery of the outer venturi 34. The inner venturi 36 is provided at its upper end with a cap 40 which constitutes the main nozzle of the carburetor and which is held in position by means of a peripheral flange 42 which grips the upper end of the venturi. The cap 40 extends downwardly in the venturi and overlies a recess 43 formed therein, cooperating with the recess to form a distributing passageway for fuel discharging into the venturi through a plurality of ports 44. The recess 43 is fed by a tube 57 which is spaced from the walls of an inclined bore 46 to provide an accelerating well and air-bleed passage therearound, and the tube 57 communicates with said well and passage through a plurality of ports 58. In other respects, the construction is the same as that shown in the other figures.

While the invention has been described with particular reference to certain specific embodiments thereof, it will be evident that it is capable of being embodied in other forms and that considerable modification may be made therein without in the spirit of the invention as defined in the following claims.

I claim:

1. In a carburetor, a body section having an induction passage formed therein, and a second body section comprising a portion forming a continuation of said induction passage, a venturi formed integral with said portion and telescoping within said induction passage, a second venturi positioned to discharge into the first named venturi, and a fin connecting the two venturis and formed integral therewith and provided with a fuel conduit discharging within the second venturi.

2. In a carburetor, a body section having an induction passage formed therein, and a second body section comprising a portion forming a continuation of said induction passage, a venturi formed integral with said portion and telescoping within said induction passage, a second venturi positioned to discharge into the first named venturi, a fuel reservoir, a member connecting the two venturis and the fuel reservoir and formed integral therewith and provided with a fuel conduit leading from the fuel reservoir to the second venturi.

3. In a carburetor, a secondary venturi, a downwardly directed primary venturi discharging into the secondary venturi, an integral fin connecting the venturis, and an upwardly inclined nozzle in said fin having a rectilinear bore and terminating in a substantially vertical plane within said primary venturi inwardly of the inner walls thereof.

4. In a carburetor, an air tube, a main venturi and an inner venturi in said air tube, a supporting member connecting the air tube and the venturis, said air tube, venturis, and supporting member being formed integral with each other and being shaped to permit them to be formed

by die-casting, said supporting member being provided with a bore terminating at the inner venturi and adapted to receive a fuel nozzle.

5 In a carburetor, a cast iron body section having an induction passage formed therein, and a die-cast body section comprising a portion forming a continuation of said induction passage, a venturi formed integral with said por-

tion and projecting within said induction passage, a second venturi positioned to discharge into the first-named venturi, a fin connecting the two venturis and formed integral therewith, and a removable, inclined fuel nozzle projecting 5 through and discharging within the second venturi.

MILTON E. CHANDLER.

DISCLAIMER

2,042,770.—*Milton E. Chandler*, South Bend, Ind. CARBURETOR. Patent dated June 2, 1936. Disclaimer filed September 23, 1937, by the assignee, *Bendix Aviation Corporation*.

Hereby enters disclaimer to claim 5 of said patent.
[*Official Gazette November 2, 1937.*]