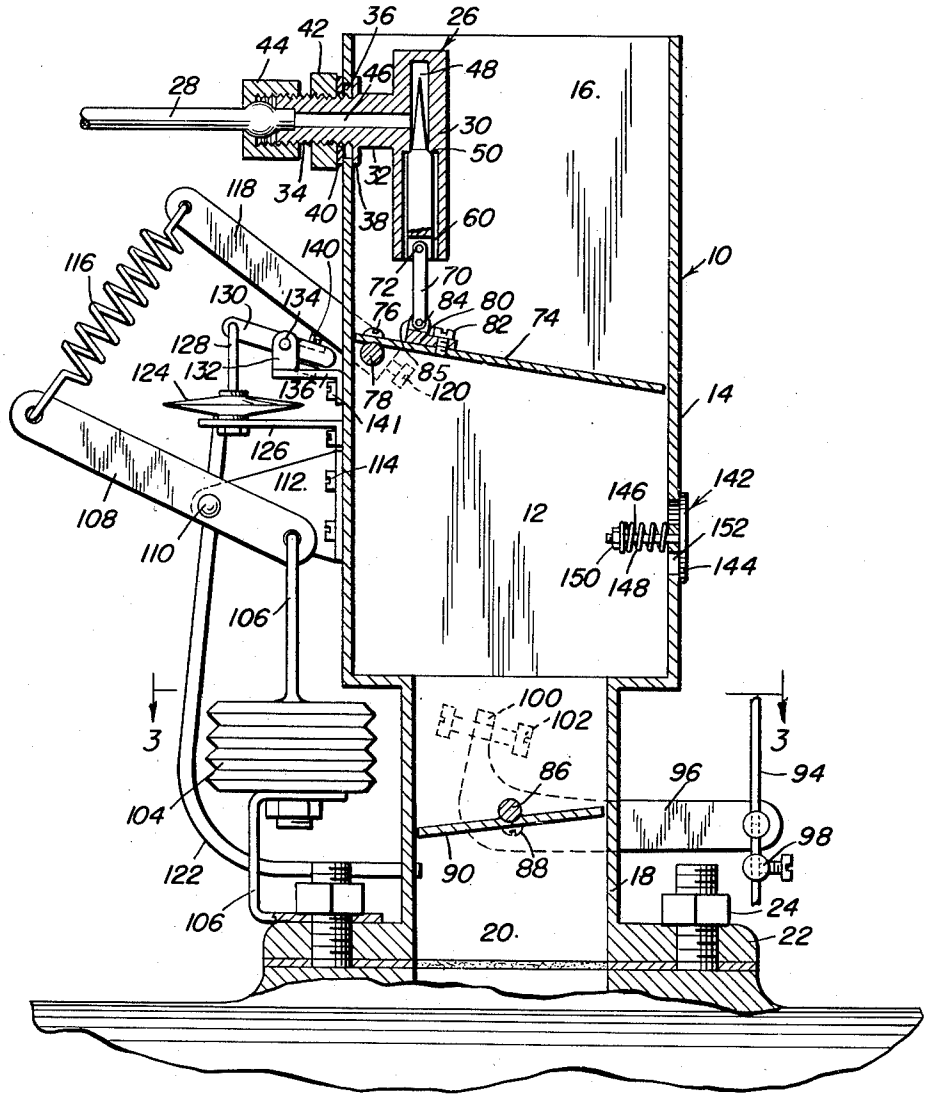
Jan. 22, 1952 L. T. ARNOLD 2,583,406

CARBURETOR

Filed April 6, 1948 2 SHEETS—SHEET 1

Fig. 1.



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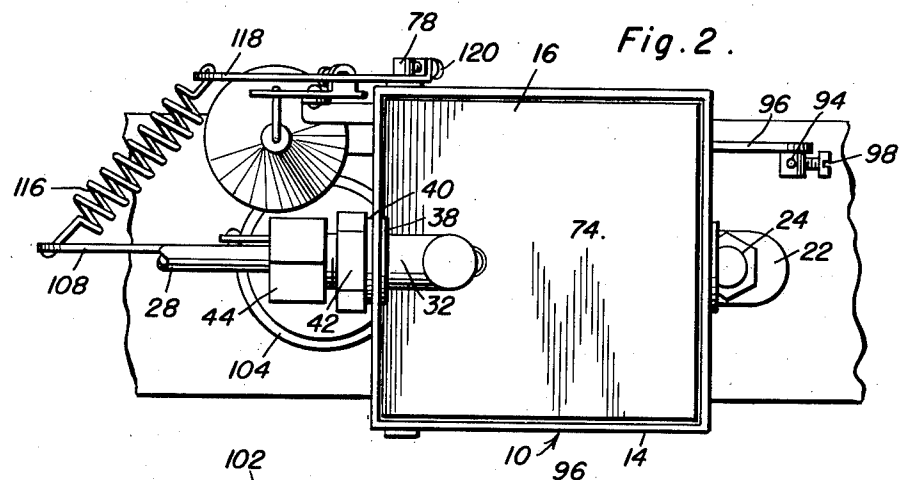


Fig. 2.

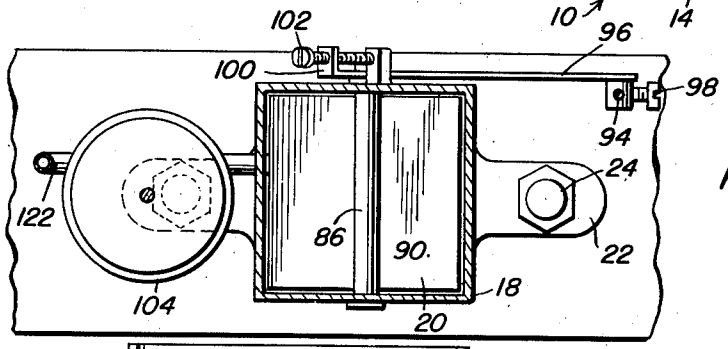


Fig. 3.

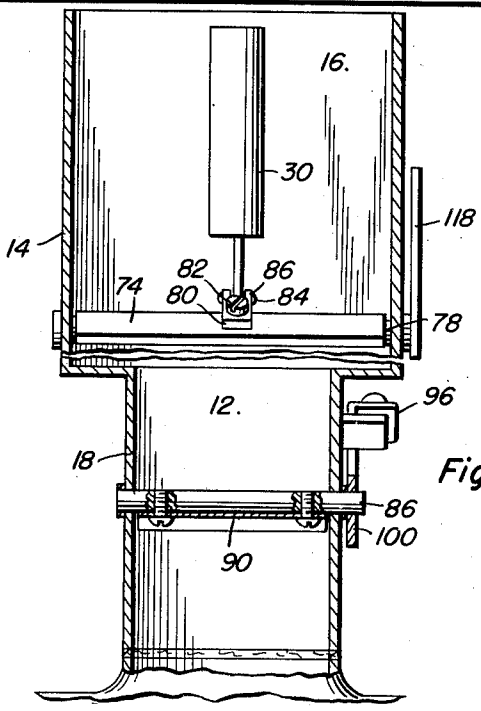
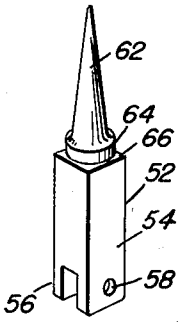


Fig. 4.

Fig. 5.



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2,583,406

CARBURETOR

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Application April 6, 1948, Serial No. 19,260

1 Claim. (Cl. 261—39)

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This invention relates to a carbureter for use in internal combustion engines and has for its primary object to maintain a predetermined and correctly proportioned air and fuel mixture for delivery to the engine, to insure greater smoothness in operation, to prevent back-firing due to an improper mixture and poor fuel composition, and to obtain maximum efficiency and proper sparking with an economical saving in fuel.

An improper feature of this invention resides in the provision of a square casing, having suitably journaled therein a square vacuum valve which, responsive to the operation of the engine, maintains a proper fuel mixture and delivers same under predetermined conditions to the engine.

Another important feature of this invention resides in the provision of a control fuel inlet and air-admittance chamber, the control element being responsive to the operation of the engine, and in non-operation thereof to a thermostatic control.

Another object of this invention resides in the provision of a carburetor, which is economical to manufacture, efficient and reliable in operation, responsive to automatic control, and durably constructed.

These and ancillary objects and other meritorious features are attained by this invention, a preferred embodiment of which is set forth in the following description and illustrated in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view of an improved carburetor, constructed in accordance with the principles of this invention, showing some of the actuating structure in elevation;

Figure 2 is a top plan view of this invention;

Figure 3 is a transverse sectional view taken substantially on the plane of lines 3—3 of Figure 1;

Figure 4 is a vertical sectional view, showing some of the components in elevation; and

Figure 5 is a view in perspective of the needle valve, employed to control the admission of fuel to the casing.

Referring now more particularly to the drawings wherein similar characters of reference designate corresponding parts throughout, the numeral 10 designates a square carburetor casing, having a vertical passageway 12 therein, with an upper end portion 14 defining an air inlet chamber 16 and a coaxially reduced lower portion 18, forming an outlet or engine chamber 20. A flange 22 is disposed at the end of the outlet casing 18 and is adapted to seat on any conventional type of intake manifold, being secured thereon by bolt and nut assemblies 24.

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Suitably secured in the upper portion 14 adjacent the air inlet end is a fuel inlet assembly 26 which is connected by a suitable connection 28 to the fuel pump, not shown. The assembly 26 comprises a valve housing 30 which is positioned vertically in the passageway 12 and spaced from the side walls of the casing by a lateral extension 32, having an extending exteriorly threaded portion 34, which protrudes beyond the walls through a casing slot or opening 36. Means are provided for vertically adjusting the assembly and includes a flange 38 formed on the lateral extension 32 and abutting against the interior of the casing wall, with a complimentary plate 40 received on the threaded terminus and positioned against the exterior surface of the wall. A locking nut 42 is suitably secured on the threaded extremity and bears against the exterior plate 40, securing the lateral extension in selected vertical placement. A cap 44 is threaded on the terminus of the extension 34 and secures the fuel connecting tube 28 in inserted position within an inlet bore 46 disposed in the lateral extension. The inlet bore 46 transversely communicates with a vertical passageway or bore 48 disposed in the valve block 30, the bore 48 being enlarged outwardly by the opposed shoulders 50 and terminating in a square guide bore 60.

Reciprocably guided and fitted within the vertical bore 48 and adapted to control the flow of fluid therethrough, responsive to automatic means, is a needle valve 52 having a stem 54, preferably square in cross section, and having a bifurcated extremity 56, with transversely aligned apertures 58 disposed in the bifurcations.

Extending from the stem 54 opposite the bifurcations 56 is a needle portion 62, with the secured portion 64 preferably circular and coaxially reduced from the sides of the square stem 54, defining a valve seat 66. The bifurcations 56 have a link 70 received therein and pivotally supported by a pin 72. The opposite extremity of the link is suitably received on a square valve gate 74 which is formed to correspond to the interior configuration of the upper casing 14 and controls the vertical passageway 16, the valve gate 74 being secured by screws 76 to a shaft 78 which is transversely journaled in the casing. An attaching plate 80 is secured by suitable means, such as bolts 82, to the upper face of the square gate 74. Raised from one end of the plate 80 are cooperating apertured ears 85, within

which the apertured extremity of the connecting link 70 is pivoted by a transverse pin 84.

Transversely journaled in the reduced square lower portion 18 is a throttle shaft 86, to the under side of which is secured by securing means 88 the square butterfly valve or gate 90, which is manually actuated by a cable or rod 94 secured to the extending end of a crank lever 96 by stop assembly 98 secured on the extending end thereof. The lateral terminus 100 of the lever 96 is suitably apertured and received on a travel limit pin 102, with the angular portion pivoted to the extending portion of the throttle shaft 86 outside the casing.

Means are provided to control the automatic vacuum actuating gate 74, which is responsive to the vacuum created in the intake manifold when the engine is in operation, whenever the engine is cold, and includes a conventional thermostat 104 having one end secured to a U-shaped attaching bracket, the opposite arm of the bracket being held in position by the bolt assembly 24 on the flange 22 of the lower casing 18. A rod 106 extends vertically from the thermostat and is inserted in an aperture in the end of a bar 108, which is suitably pivoted offcenter, as at 110, to a triangular bracket plate 112, which is bolted to the side of the casing by bolt assemblies 114. The opposite end of the pivot bar 108 is suitably apertured and connected by resilient means 116, such as a coil or tension spring, to a similar bar 118, which has its opposite terminus received on the extending end of the shaft 78, with an adjusting set screw 120 provided.

A vacuum idle control mechanism is provided and comprises a connection 122 which communicates between the lower casing 18 and a bellows 124, which is suitably secured to the upper portion 14 by means of the extending bracket arm 126. A pin 128 is received in the bifurcated extremity of an adjusting bar 130, the bar 130 being centrally pivoted between a pair of upstanding apertured ears 132 by a pin 134, the apertured ears 132 being integrally carried by an angle bracket 136 which is suitably secured to the outer wall of the upper portion 14 by means of the bolt assembly 141. Suitably secured to the pivoted bar 130 is an adjusting screw 140, which is adapted to serve as a stop medium for the bar 118, attached to the shaft 78 of the valve gate 74.

In operation, assuming the engine to be cold, the bellows type thermostat 104 is contracted, and the lever 108 is moved around the horizontal axis 110, allowing the lever 118 to move upwardly, with the tension removed from the resilient means 116. The upward movement of the lever 118 causes the valve gate 74 to move downwardly on the shaft 140 and through the linkage 70, coincidentally and correspondingly moves the needle valve. Unseating of the needle valve 50 allows the fuel to enter through the fuel inlet bores 48 and 60 and to mix with the air entering from the air admission chamber 16, whereupon manual actuation, through the rod 94, causes the throttle valve 90 to pass the fuel mixture through the lower casing 18 on into the cylinders.

When the engine is running at idling speed, a vacuum is created in the intake manifold and when the throttle valve 90 is actuated, the vacuum causes the valve gate 74 to move downwardly, admitting the fuel and the air, as noted above, the mixture passing through the passageway 12.

The vacuum idle control mechanism is adapted to enable the adjusting screw 140 to serve as a stop medium for the vacuum gate 74 and allows the vacuum gate to remain open a sufficient period of time to allow a slight amount of fuel to reach the engine, the slight admission of fuel enabling the engine to maintain the idling speed. When the motor stops, correspondingly, there is no vacuum in the manifold and the bellows 124 expands to cause the screw 140 to move away from the lever 118 as the rod 128 moves the lever upwardly, causing the valve gate 74 to be moved upwardly by the spring 116, shutting off the fuel inlet 46 and the air admission chamber 16.

To compensate for a backfire, caused by faulty timing, wet ignition system or the like causations, a pressure release valve 142 is provided. The valve 142 is disposed in the casing 10 below the valve gate 74 and comprises a head 144 disposed on the exterior of the casing. A stem 146 extends into the casing, a compression spring 148 being received thereon. A stop plate 150 supports the spring on the stem in association with the casing for normally biasing the head 144 in covering placement over the apertures 152.

Thus, it is to be seen that there is provided an improved carburetor which, responsive to the operation of the engine, maintains correct mixture of fuel and air in the casing and conveys the proper fuel composition to the engine.

However, since many other purposes and objects of this invention will become apparent to those skilled in the art, upon a perusual of the foregoing description in view of the accompanying drawings, it is to be understood that certain changes, not amounting to invention, may be effected thereon, within the spirit of the invention and within the scope of the appended claim.

Having described the invention, what is claimed as new is:

A carburetor comprising a housing having an axially reduced open end adapted to be attached to the intake manifold of an internal combustion engine, said housing having an air inlet opening at its other end, a fuel nozzle positioned axially of and within the housing adjacent the air inlet opening, a needle valve in said nozzle, a valve plate positioned transversely in the housing below the fuel nozzle and connected to the needle valve, said valve plate being journaled at one end for vertical swinging movement in the housing responsive to suction in the intake manifold, an actuating arm for said valve plate, a thermostat for actuating the arm, a bellows operatively connected to the reduced end of the housing and responsive to vacuum in the intake manifold, a bar mounted for pivotal movement and connected to said bellows, stop means actuated by the bellows and adjustably secured to said bar for limiting the movement of the actuating arm.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,294,182	Severson	Feb. 11, 1919
1,394,452	Taft	Oct. 18, 1921
1,991,804	Johnson	Feb. 19, 1935
2,088,464	Chandler et al.	July 27, 1937
2,336,810	Smith	Dec. 14, 1943
2,457,570	Leibing	Dec. 28, 1948