Sept. 1, 1931. F. H. HEITGER 1,821,014

CARBURETOR

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FIG. 1.

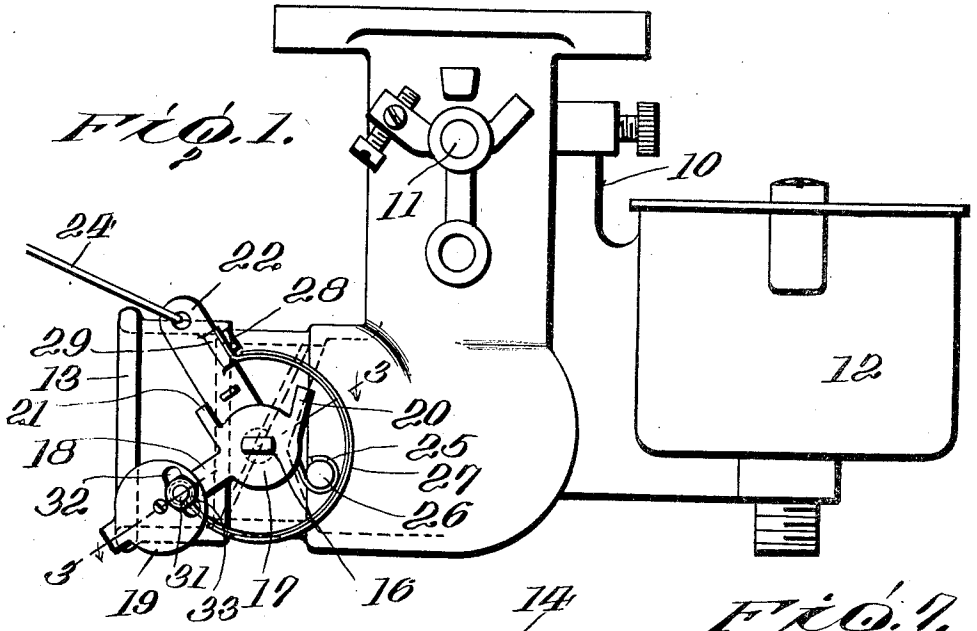


FIG. 2.

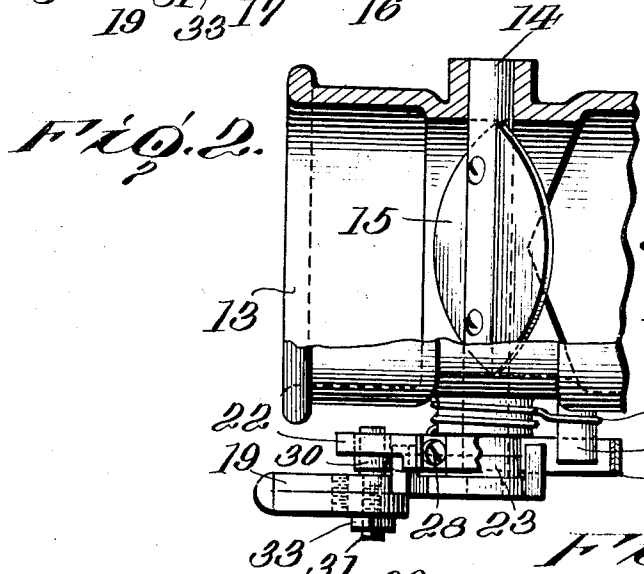


FIG. 3.

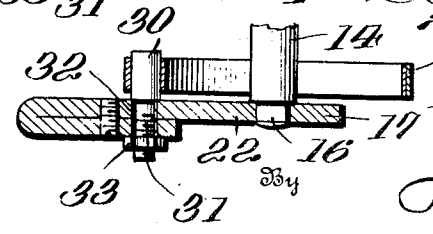
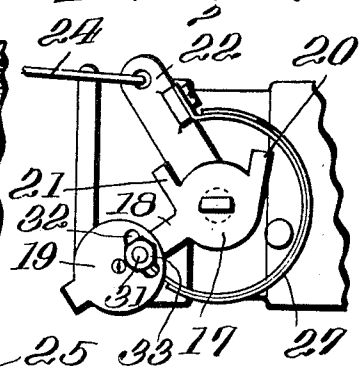


FIG. 4.



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Fig. 4.

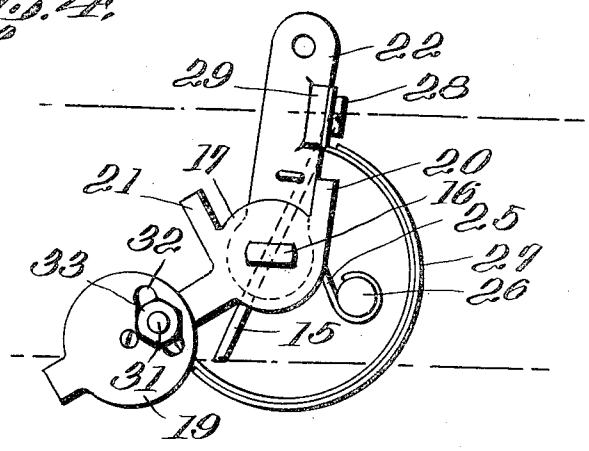


Fig. 5.

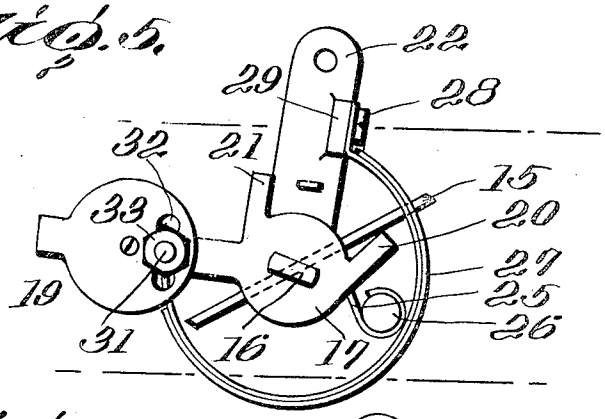
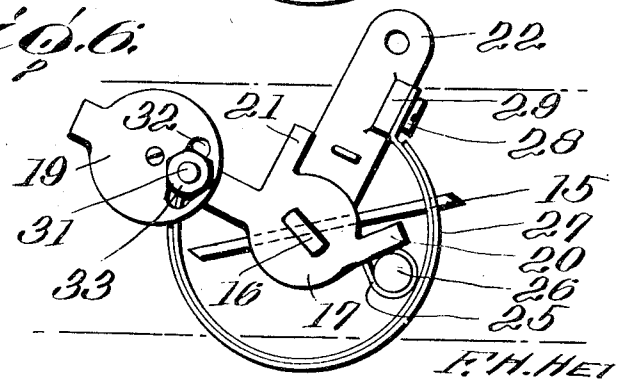


Fig. 6.



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UNITED STATES PATENT OFFICE

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CARBURETOR

Application filed July 21, 1927. Serial No. 207,487.

This invention relates to carburetors and more particularly to improvements in the choke valve usually provided in the carburetor air intake and the invention has for one of its objects to provide means for automatically regulating the choke valve so as to obtain a high degree of economy in the fuel consumed in the interval from which the explosive engine is started until it is brought up to its normal operating temperature.

A further object is the provision of choke means associated with the air intake of a carburetor which will ensure a supply of uniformly rich mixture for warming up the engine at all positions of the throttle and which to a certain extent is subject to manual control for varying the degree of richness of the mixture according to the thermal condition of the engine.

A further object is the provision of means combined with a device acting in response to the velocity of the air passing through the intake and controlled according to the thermal condition of the engine for opening the valve as the engine warms up so as to decrease the richness of the fuel mixture and thus supply fuel and air in proper proportion in accordance with the thermal condition of the engine.

In the accompanying drawings wherein an improved embodiment of the invention is illustrated:

Fig. 1 is a side elevation of a conventional type of carburetor showing the invention applied thereto,

Fig. 2 is an enlarged fragmentary plan of the air inlet of the carburetor partly in section,

Fig. 3 is a section on line 3—3 of Fig. 1,

Figs. 4 to 6 are diagrammatic views showing the various positions of the valve and control means therefor, and

Fig. 7 is a detail in elevation showing the connection of the control arm with a rod.

Referring to the drawings in detail a conventional type of carburetor is indicated at 10 and includes the usual throttle valve 11, the fuel reservoir 12 and air intake 13 in which is journalled a shaft 14 supporting the choke valve 15.

According to the present invention the shaft 9 is located in a plane below the axis of the air intake 13 in order that the incoming air exerts a differential pressure on the upper and lower portions of the valve which normally tends to move the latter to open position. One extremity of the shaft 14 is extended externally of the carburetor body as indicated at 16 and is rigidly connected with the hub part 17 of an arm 18 carrying a weight 19 at its outer extremity disposed in such angular relation to the valve 15 as to normally tend to move the latter to closed position.

The hub part 17 is provided with stops 20 and 21 having angular extremities disposed in the path of and engageable by an arm 22 loosely mounted on a boss 23 on the body of the carburetor 10 coaxial with the shaft 14. The arm 22 is adapted for manual control through the medium of a link or rod 24 as suggested in Fig. 7 and is mounted and rotatable independently of the arm 18, between the limit of the stops 20 and 21.

The arm 22 is normally urged in a direction to engage the stop 20 and turn the valve 15 to open position by the tension of a spring 25 coiled about the boss 23 and engaged at one end with the arm 22 and at the other end with a stop lug 26 integral with the carburetor body and engageable by the stop 20 for limiting the opening movement of the valve.

An arcuate spring 27 is connected at one end as at 28 with a lug 29 on the arm 22 and at its other end it is pivotally mounted on a pin 30 having a threaded shank 31 movable in a slot 32 in the weight 19, the pin 30 being secured in adjusted position in the slot by a nut 33. The tension of the spring 27 normally tends, when the arm 22 is held in an adjusted position, to so displace the arm 18 as to close the valve 15 thereby assisting the weight 19 intending to maintain the valve in closed position in opposition to the tendency of the incoming air to open the valve.

If desired by increasing the tension of the spring 27 to an extent to equal the added tendency of the weight 19 to close the valve said weight may be dispensed with.

The spring 27 is bi-metallic or otherwise

rendered thermo-sensitive and in addition to the function above stated of normally tending to close the valve 15 it is influenced when subjected to low temperatures to effect an automatic regulation of the valve 15 independently of the velocity of air passing through the inlet to supply a proper rich mixture in exceedingly cold weather and as the engine becomes heated gradually opens the valve to reduce the richness of the mixture.

In operation:

Aside from the thermo-control of the valve 15 which influences the thermo-sensitive spring 27 under abnormal weather conditions and which will be hereinafter more fully described, the invention when applied to use is initially set for starting a comparatively cold engine by moving the arm 22 to the extreme left as shown in Fig. 1 engaging the stop 21 and fully closing the valve 15. Having started the engine the arm 22 is partially moved to the right through a small angle to permit the valve 15 to open against the tension of a spring 27 and the influence of the weight 19 and under the influence of the pressure of the air acting on the upper part of the valve. If the engine is operated at comparatively low speed the velocity of the incoming air is proportionately low as also the differential pressure exerted on the valve 15 and thus the spring 27 and weight 19 maintain the valve 15 in a predetermined position admitting only the amount of air necessary for a proper mixture of fuel and air dependent upon the position of the arm 22. However, as the speed of the engine increases the velocity of air passing through the inlet is proportionately increased and due to the increase pressure differential the influence of the spring and weight are overcome and the valve is opened to a greater extent to maintain a mixture of uniform richness regardless of the velocity of the engine.

The thermostatic feature of the spring 27 acts during periods when the engine and carburetor are exposed to exceedingly low temperature and under such circumstances the engine is started as above stated by initially closing the valve 15 manually through the arm 22 but the thermostatic spring 27 responding to the low temperature expands and turns the arm 18 and valve 15 so as to close the latter thereby reducing the area of the cross sectional passage through the air inlet to such an extent as to supply a rich mixture appropriate to the weather conditions. As the engine becomes warmer the thermostatic spring 27 is influenced by the radiated heat and contracting moves the valve 15 to the farthest open position permitted in accordance with the adjustment of the arm 22. As will be understood when the engine has been heated to its normal operating temperature the arm 22 is so adjusted as to permit full opening of the valve 15.

It will of course be understood that various changes in the construction and arrangement of the parts may be made in practical embodiments of the invention, and that the shaft 14 can be either above or below the center of the air intake.

What I claim is:

1. In a carburetor, an air intake, a valve located in said inlet opened in response to the pressure of incoming air, a manually operable member movable independently of the valve, and spring means connecting said member with said valve and normally tending to close the latter.

2. In a carburetor, an air intake, a valve located in said inlet opened in response to the pressure of incoming air, a manually operable member movable independently of the valve, and adjustable spring means connecting said member with said valve and normally tending to close the latter.

3. In a carburetor, an air intake, a valve located in said inlet opened in response to the pressure of incoming air, a manually operable member movable independently of the valve, and spring means connecting said member with said valve and normally tending to close the latter, said spring means being thermo-sensitive and acting to regulate the valve in response to varying temperature conditions.

4. In a carburetor having an air inlet, a suction valve in said inlet for use to abnormally restrict the same during the initial start of the motor and the warming up period, manually operated means and thermo means forming a connection between the manual control and said valve whereby the valve may be closed or opened or set in an intermediate position.

5. In a carburetor having an air inlet, a suction valve in said inlet for use to abnormally restrict the same during the initial start of the motor and the warming up period manually operated means and thermo means forming a yielding connection between said valve and the manually operated means whereby the valve may be closed or opened or set in an intermediate position.

6. In a carburetor having an air inlet, a suction valve in said inlet for use to abnormally restrict the same during the initial start of the motor and the warming up period, manually operated means, thermo means forming the yielding connection between said valve and manually operated means, whereby the said valve may yield to suction when the manually operated means is so set to allow it to so perform.

In testimony whereof I hereunto affix my signature.

FRANK H. HEITGER.