Nov. 11, 1952 J. P. STUDNICKY ET AL 2,617,656

CARBURETOR CONSTRUCTION

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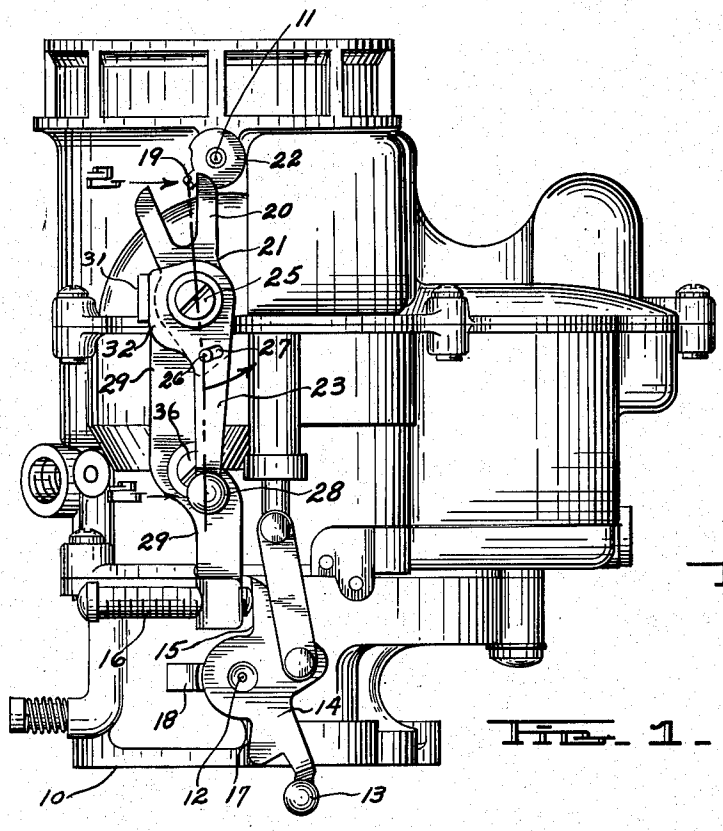

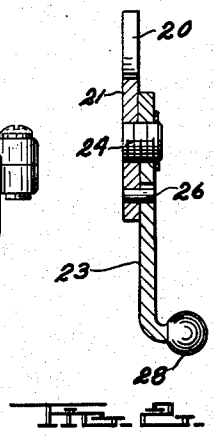

FIG. 1.

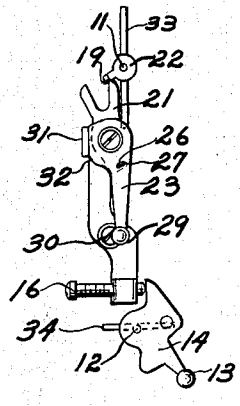

FIG. 2.

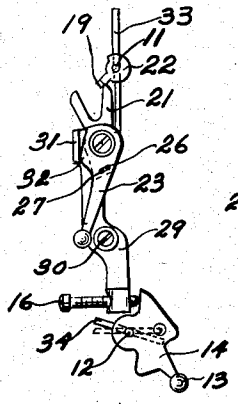

FIG. 4.

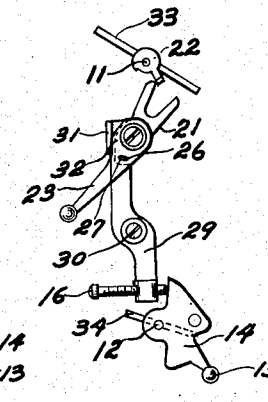

FIG. 3.

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CARBURETOR CONSTRUCTION

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4 Claims. (Cl. 277—42)

1

This invention is concerned with internal combustion engine carburetors and more particularly with a control system for such carburetors. There has been a pronounced tendency in recent years towards the simplification of vehicular controls and the elimination of as many controls as possible. In line with this tendency, the throttle lever has been deleted from the dash board. With this change, the only carburetor controls available to the driver are the choke lever and the foot throttle. This control situation is inadequate in many situations. As typical of such may be cited occasions where it is desired to rapidly idle the motor to assist in starting the automobile up a grade, or to rapidly warm up the engine.

It has been common practise in the automotive industry to interconnect the choke valve and the throttle valve so that the throttle valve is partially opened by the initial movement of the choke valve towards the closed position. This is to insure easy starting. With this structure and in the absence of a hand throttle, there is a tendency on the part of drivers to secure rapid idling by partially closing the choke in order to secure a partial opening of the throttle valve. This practise results in the operation of the engine with a very rich mixture with the inevitable waste of fuel and washing of lubricant from the cylinder walls. To enable an operator to selectively use the choke lever either to obtain fast idling or as a conventional choke this invention has been developed.

This invention is probably best understood by a study of the drawings in which:

Figure 1 is a side elevation of a downdraft carburetor employing applicants' invention,

Figure 2 is a cross section along the line 2—2 in Figure 1,

Figure 3 is a schematic representation of the throttle-choke linkage in the normal or driving position,

Figure 4 is a schematic representation of this linkage in the fast idling position, and

Figure 5 is a schematic representation of this linkage in the choked position.

In the carburetor shown in Figure 1, the air is inducted at the uppermost part and sweeps down through the device and enters an intake manifold (not shown) which is bolted against face 10. The passage of air through the carburetor is subject to the control of two butterfly type valves, a choke valve which pivots on pin 11 and a throttle valve which pivots on pin 12. The throttle valve is of course controlled by

2

the accelerator pedal. Motion is imparted to the throttle valve through ball 13 mounted on plate 14 which is securely riveted to pin 12. Face 15 of plate 14 abuts against adjustable set screw 16 to accurately regulate the setting of the throttle valve in the closed or idling position. Similarly, the movement of the throttle valve in the fully open position is limited when face 17 on plate 14 abuts stop 18.

The choke valve is spring biased into the closed position and normally is held open against this spring bias by the contact of arm 19 with tine 20 of bifurcated lever 21. This arm 19 is mounted on disc 22 which in turn is riveted to pin 11 upon which is mounted the choke valve. Lever 21 and choke control arm 23 are both pivoted on stub shaft 24 as shown in Figure 2 and are secured against axial motion by screw 25.

As can be best seen in Figure 2, a pin 26 is mounted rigidly in lever 21. This pin is received in slot 27 in arm 23 (Figure 1). Lever 21 and arm 23 are free to rotate independently of each other within the limits permitted by the coaction of pin 26 and slot 27. Motion is imparted to arm 23 by a manually operated linkage terminating in ball 28.

Lever 29 (Figures 1, 3, 4 and 5) is pivotally mounted on screw 30 and is threaded at its lower end to receive adjusting set screw 16 which serves to regulate normal idling speed of the motor. Lever 29 is spring biased to rotate clockwise about screw 30. The upper end of lever 29 is bent at right angles to provide a cam follower 31. Cam follower 31 coacts with cam face 32 which is part of lever 23. When arm 23 is manually rotated clockwise to permit the choke butterfly valve to close, cam follower 31 rides up cam face 32 and causes lever 29 to rotate counterclockwise. This counterclockwise rotation of lever 29 moves adjusting screw 16 to the right and opens the throttle valve to a position beyond the ordinary idling position.

Three positions of the various linkages are shown in Figures 3, 4 and 5. Figure 3 is the ordinary idling position in which choke butterfly 33 is in the fully open position and throttle butterfly 34 is in the idling position. In this position, choke butterfly 33 is held in the fully open position against its spring bias by the contact of arm 19 against tine 20.

In the position shown in Figure 4, arm 23 has been rotated clockwise until pin 26 abuts the right rather than the left end of slot 27. This causes cam follower 31 to ride up cam face 32

and so rotate lever **29** counterclockwise against its spring bias. This moves adjusting screw **16** to the right and moves throttle butterfly **34** to a position more open than the usual idling position. For purposes of comparison, the normal idling position of throttle butterfly **34** has been indicated in dotted lines. While in this position, movement of lever **29** by the spring bias of the choke butterfly **33** is prevented by a ball and socket detent or other frictional restraining mechanism (not shown).

Figure 5 differs from Figure 4 in that the arm **23** has been manually moved to the full choke position. When this happens, pin **26** engages the slot **27** and rotates lever **21** clockwise and permits the spring bias of choke butterfly **33** to become effective to move it to the position shown. The position of the throttle valve remains unchanged.

This invention is an improvement upon the structure taught in United States Letters Patent 1,583,959, issued May 11, 1926, to H. D. Church. Church teaches the concept of a choke structure, the initial movement of which partially opens the throttle valve. This structure has been found inadequate for modern carburetors if used merely to secure fast idling, or for warm-up purposes since even the slightest movement of the choke necessary to open the throttle causes too rich a mixture to be produced. Applicants' structure avoids in this manner the difficulty of attempting to adjust a carburetor so that it will give a single mixture suitable for both a warm and a cold engine.

From the above description it will be seen that an apparatus whereby a limited amount of throttle control can be incorporated into a vehicular choke without interfering with the normal operation of the choke has been provided.

We claim as our invention:

1. In an internal combustion engine carburetor, a choke valve, a choke valve operating lever movably mounted upon said carburetor, a movable throttle stop carrying member mounted on said carburetor, said choke valve operating lever being mechanically connected to both said choke valve and said throttle stop carrying member so that the initial movement of said operating lever moves said throttle valve to a predetermined open position without moving said choke valve and further movement of said operating lever moves said choke valve towards its closed position.

2. In an internal combustion engine carburetor, a choke valve, a choke valve operating lever movably mounted on said carburetor and mechanically interconnected with a throttle stop carrying lever so that the initial movement of the choke operating lever from the open towards the closed position will partially open the throttle valve, and

said choke valve operating lever and choke valve being mechanically interconnected so that substantial movement of the choke valve operating lever from the open towards the closed position occurs without causing movement of the choke valve from the full open position to effect an increased idling speed by use of the choke lever without moving the choke valve from its fully opened position.

3. In an internal combustion engine carburetor, a choke valve, a choke valve operating lever movably mounted on said carburetor and mechanically interconnected with a throttle stop carrying lever so that the initial movement of the choke operating lever from the open towards the closed position will partially open the throttle valve, and said choke valve operating lever and choke valve being mechanically interconnected through a lost motion device so that substantial movement of the choke valve operating lever from the open towards the closed position occurs without causing movement of the choke valve from the full open position to effect an increased idling speed by use of the choke lever without moving the choke valve from its fully opened position.

4. In an internal combustion engine carburetor, a choke valve, a choke valve operating lever movably mounted on said carburetor and mechanically interconnected with a throttle stop carrying lever so that the initial movement of the choke operating lever from the open towards the closed position will partially open the throttle valve, and said choke valve operating lever and choke valve being mechanically interconnected through a pin and slot so that substantial movement of the choke valve operating lever from the open towards the closed position occurs without causing movement of the choke valve from the full open position to effect an increased idling speed by use of the choke lever without moving the choke valve from its fully opened position.

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