July 18, 1939. A. H. BLATTNER 2,166,899

CARBURETOR STRUCTURE

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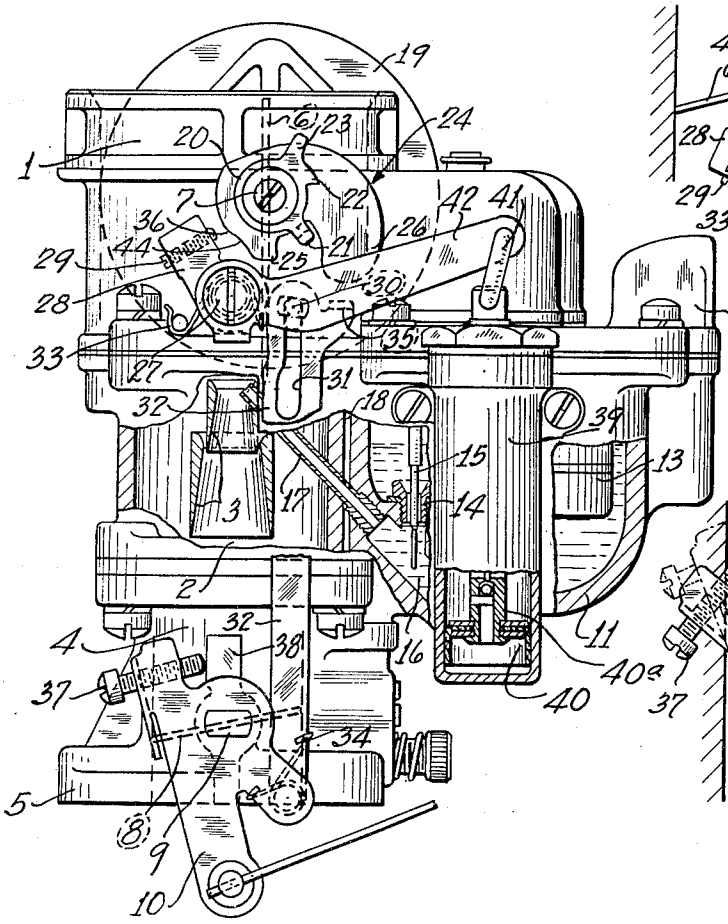

Fig. 1.

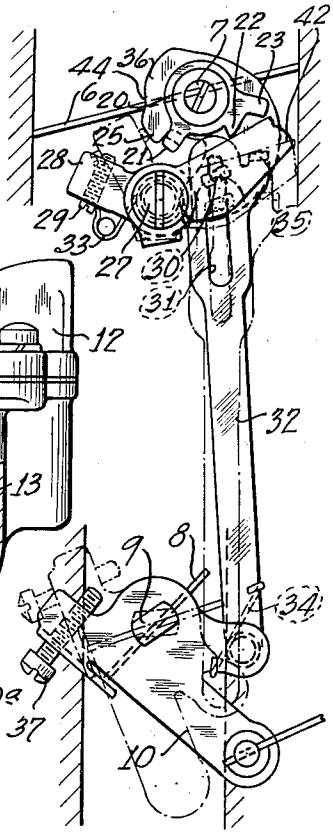

Fig. 2.

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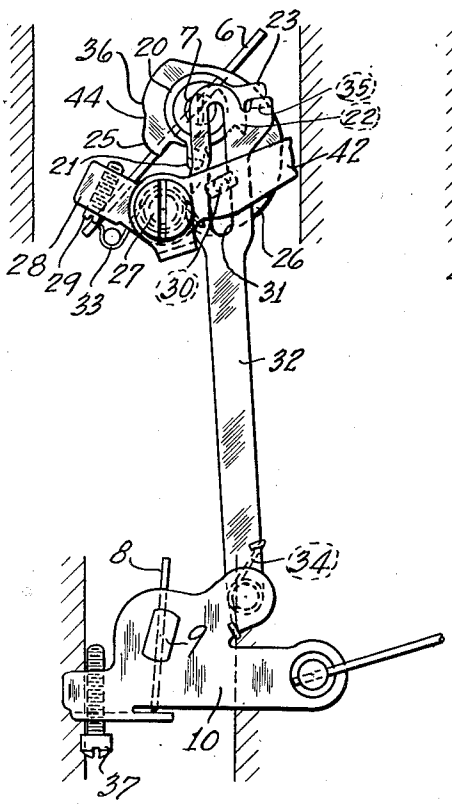

Fig. 3.

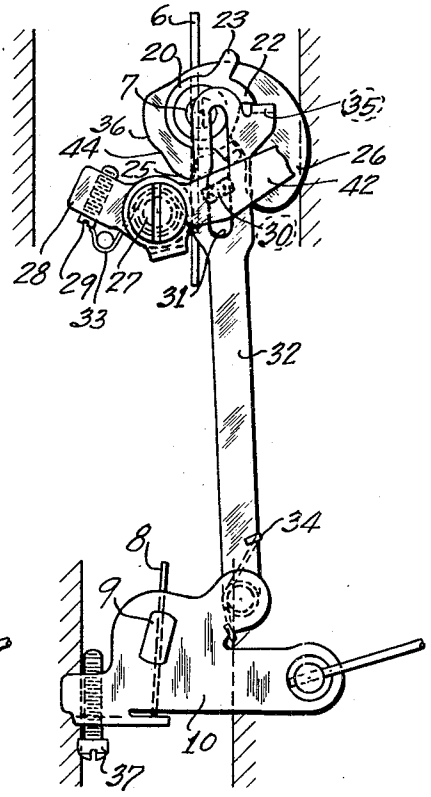

Fig. 4.

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Fig. 5.

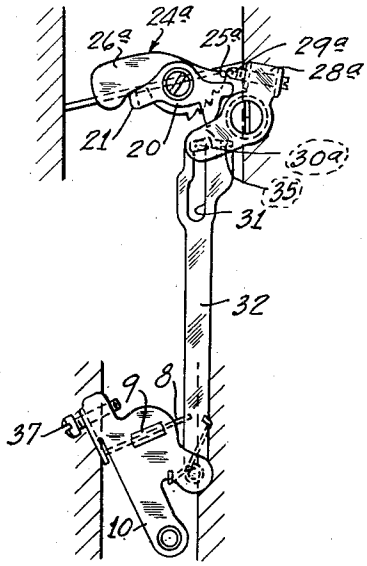


Fig. 6.

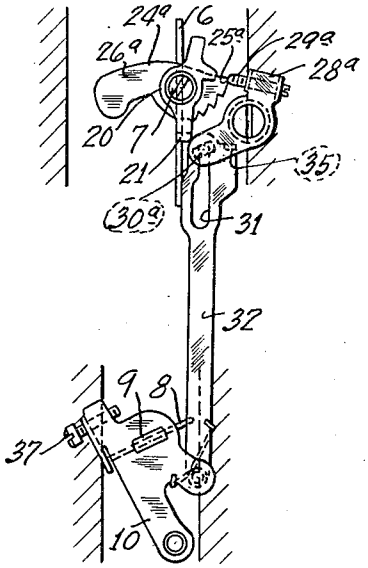


Fig. 7.

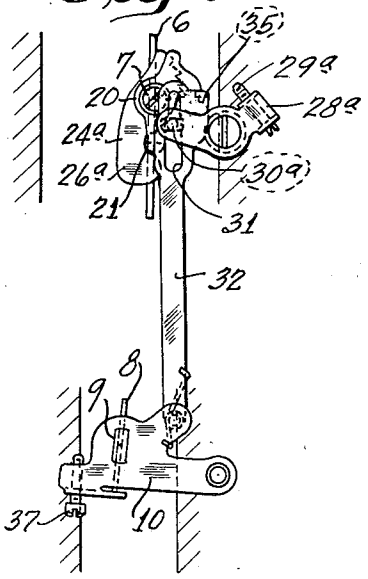
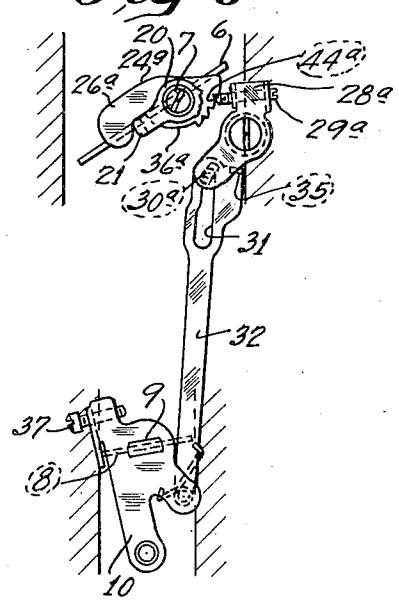


Fig. 8.



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Patented July 18, 1939 2,166,899

UNITED STATES PATENT OFFICE

2,166,899

CARBURETOR STRUCTURE

August H. Blattner, Pine Lawn, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application July 6, 1936, Serial No. 89,088

3 Claims. (Cl. 261—52)

This invention relates to carburetors for internal combustion engines and consists particularly in novel interconnection control means extending between the choke and throttle valves.

A co-pending application, Serial Number 666,118, filed April 14, 1933, in the name of George M. Bicknell and Otto Henning, a co-pending Patent No. 2,160,410 issued May 30, 1939, in the name of August H. Blattner, and a co-pending Patent No. 2,160,411, issued May 30, 1939 in the name of Blattner and Fred A. Kommer, illustrate novel mean for interconnecting the choke and throttle valve of automotive carburetors in particular. The devices disclosed and claimed in the listed applications provide for limiting the closing movement of the throttle valve to the "fast idle" position when the choke valve is substantially closed and for manually opening the choke valve against the force of the thermostat or other choke control when the throttle is substantially opened. The last two mentioned applications also disclose means for locking the choke valve when both the choke and throttle valve are substantially fully opened.

The present invention involves choke and throttle interconnection means embodying fast idle, unloading, and choke valve locking features, but embodies certain structural and functional differences and advantages over the inter-connection mechanisms disclosed in the co-pending applications mentioned.

One object of the present invention is to provide carburetor choke and throttle valve interconnection means which is more compact and rugged than similar mechanisms heretofore suggested.

Another object is to provide novel interconnection means of the above type embodying fast idle, unloading, and choke locking features in a simple, compact mechanism which may be readily and attractively applied to the outside of an automobile carburetor.

Another object is to provide novel choke and throttle valve interconnection means in which the choke valve may be fully opened and closed even though the fast idle mechanism is in its cooperative functional relationship.

In the accompanying drawings:

Figure 1 is a side view of a carburetor embodying the invention, portions being broken away and sectioned for clearer illustration of the underlying structure.

Figures 2, 3 and 4 are diagrammatic views showshowing the valves and interconnection mechanism in different positions.

Figures 5, 6, 7 and 8 are views similar to Figures 1, 2, 3 and 4 but showing a modification, the valves and linkage being shown in various positions.

The carburetor illustrated in Figure 1 is of a well known type having a downdraft mixture passage including air inlet horn 1, mixing chamber 2, venturis 3, and an outlet portion 4, flanged as at 5 for attachment to the intake manifold (not shown) of an associated engine. An unbalanced choke valve 6 is pivotally mounted in the air horn on a shaft 7 and a throttle valve 8 is pivotally mounted in the outlet portion on the shaft 9. A crank or arm 10, rigid with shaft 9, provides for manual operation of the throttle valve, the usual spring (not shown) being provided for closing the throttle.

Adjacent the mixture passage is a bowl 11 within which fuel, fed thereto from a remote source through a boss 12, is maintained at a substantially constant level by float 13. Fuel is drawn by suction through a metering orifice 14 having metering pin 15 associated therewith, a chamber 16, and main nozzle 17 opening through the throat of the small or primary venturi 3. Idling fuel is supplied through a passage, part of which is shown at 18, to a discharge port (not shown) adjacent the edge of the throttle in a well known manner.

Mounted on one side of air horn 1 is a housing 19 enclosing thermostatic and/or suction means for controlling the choke valve. The automatic choke control means in itself does not constitute the present invention and is not disclosed in detail herein.

Rigid with the other end of the choke shaft is a disk-like element 20 having an axial projection 21 and radial abutments 22 and 23 spaced circumferentially thereon. Loosely mounted on choke shaft 7 inwardly of element 20 (Figs. 1-4) is a cam-like member, generally indicated at 24, having a high point 25 and a weighted tail portion 26 normally depending on opposite sides of projection 21.

Pivoted on a screw 27 adjacent choke shaft 7 is a bell crank or lever 28 carrying an adjustable screw 29 for engaging cam-like member 24, as described hereafter, and a pin 30 slidably received in slot 31 in the upper portion of link 32 which is pivoted at its lower end to throttle arm 10. A wire spring 33 constantly urges lever 28 in a counterclockwise direction tending to withdraw screw 29 from contact with the cam-like member and a spring 34 urges link 32 to the left for a purpose to be referred to hereafter. An inwardly

projecting lip 35 on link 32 adjacent slot 31 is positioned to engage abutments 22 and 23 according to the position of the disk or plate-like element 20.

The operation of the mechanism is as follows:

Figure 2 shows in solid lines the valves and interconnecting parts in the cold starting position with choke valve 6 held closed by the thermostat and throttle valve 8 partially opened. When the engine fires, suction in the mixture passage will cause the unbalanced choke valve 6 to open slightly as permitted by the space between high point 25 and tail 26 on cam-like member 24 without moving this member from the fast idle position as shown. When the throttle valve is released with the weighted member in this position, its closing movement will be limited to the fast idle position, indicated in broken lines in Figure 2, by engagement of control screw 29 movable with the throttle, with high point 25 on the cam-like member.

Figure 3 shows the unloading position of the valve and interconnection mechanism in which the choke valve is manually opened a substantial distance to unload or clean out the intake system in case of over-enrichment of the fuel mixture during the starting or warm-up periods. As shown, throttle arm 10 is rotated counterclockwise, which opens the throttle and lifts link 32, causing lip 35 thereon to engage the upper radial abutment 23 on disk-like element 20 to rotate this element counterclockwise and open choke valve 6.

Figure 4 shows the choke and throttle valves fully open with the choke valve locked. Locking of the choke valve is effected by engagement of the lower abutment 22 on the disk-like element 20 with the finger 35 at the upper end of link 32. Slot 31 is slightly enlarged in its lower portion to permit lip 35 to clear abutment 22, spring 34 functioning to move lip 35 beneath abutment 22 when the choke valve is fully opened. Locking of the choke valve as described is desirable due to the fact that suction in the intake system relied upon to draw hot air adjacent the thermostat choke control, is relatively low when the engine is subjected to a heavy pull with the throttle wide open and in cold weather, the heated air supplied at such time may be insufficient to prevent contraction of the thermostat with corresponding closing movement of the choke valve.

Figure 1 shows the parts in the normal idling position with weighted cam-like member 24 supported by projection 21, rigid with the choke valve, in a position to place a relatively low point 35 on the cam-like member adjacent abutment screw 29, permitting throttle valve 8 to fully close, as shown. The normal idling position of the throttle is controlled by engagement of adjustable screw 37 in the throttle control arm 10 with a rib 38. Between high and low points 25 and 35 on the cam-like member is a portion 44 disposed to be engaged by screw 29 when the choke is partly open to limit closing of the throttle to intermediate fast-idle positions.

Mounted on fuel bowl 11 is a dash pot 39 enclosing a piston 40 and piston rod 40*a* the top of the dash pot mechanism being approximately at the level of the lever 28. Rod 40*a* is connected by a link 41 with an extension portion 42 on pivoted lever 28. During the last part of the closing movement of the throttle valve, pin 30 is engaged by the upper edge of slot 31 and further closing movement of the throttle valve beyond this point is resisted by the dash pot mechanism. If desired, a separate arm or lever may be provided for transmitting force between link 32 and the dash pot, or arm 42 may be disposed to be engaged by lip 35 on the link for transmitting this force. The arrangement shown has the advantage of greater compactness and simplifies the throttle connection to the dash pot where these parts are substantially spaced apart vertically.

Figures 5, 6, 7 and 8 illustrate modified interconnection mechanism. In this form the weighted tail portion 26*a* of cam-like member 24*a* is disposed to normally urge the member towards a rest position, as shown in Figure 7 with low point 36*a* adjacent abutment screw 29*a* and the choke valve fully open. In this position of the choke and interconnection closing movement of the throttle will be limited by engagement of screw 37 with rib 38 as in the first form. Lever 28*a* is pivoted to the carburetor body on the right hand side of the choke shaft instead of substantially to the left thereof, as lever 28 in Figures 1 to 4, and has a pin 30*a* slidably received within slot 31 in link 32.

Figure 5 shows the choke valve held closed by a cold thermostat and supporting weighted cam 26*a* substantially horizontally by means of the plate-like element 20 rigid with the choke shaft and lateral projection 21 engaging tail piece 26*a*. Throttle control screw 29*a* in pivoted lever or crank 28*a* is disposed to engage high point 25*a* on the cam member 24*a* to limit closing movement of the throttle valve to the fast-idle position. With the throttle and interconnection in the fast-idle position as shown, the choke valve may open fully, independently of the interconnection, under the influence of suction in the carburetor or the thermostat, as shown in Figure 6.

Figure 8 shows fast-idle screw 29*a* engaging stepped or toothed portion 44*a* on the cam-like member 24*a* so as to limit the closing movement of the throttle valve to an intermediate fast-idle position between the full fast-idle shown in Figures 5 and 6 and the fully closed or normal idling position (Fig. 1).

The modified form of interconnection embodies unloading and choke locking features which function the same as in the first form. The chief distinction in the modification consists in the full "breathing" of the choke valve when the cam-like member and interconnection are held in their fast-idle position, as shown in Figure 6. In Figue 7 the choke and throttle valves are both fully open, the choke being locked.

The modified interconnection structure may also be arranged to cooperate with dash pot means as in the previous form for retarding closing movement of the throttle. Dash pot lever as at 42 in Fig. 1, may be engaged by inwardly projecting lip 35 on link 32 during the last part of the throttle closing movement.

In each of the forms, the interconnection mechanism functions effectively to attain the desired relative movement of the choke and throttle valves and is rugged, simple and economical. The parts present an attractive appearance when applied to a carburetor and fit snugly against the carburetor body so as to provide a minimum of danger of injury due to interference with adjacent engine parts or by a mechanic during inspection or repair, or during handling or shipment.

This and other modifications may be made in the structure illustrated without departing from

the spirit of the invention and the exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a carburetor, choke and throttle valves, a choke valve shaft having structure with circumferential, radially spaced abutments, and an element movable with said throttle valve and disdisposed to engage one of said abutments when said throttle is substantially opened to force and hold said choke valve at least partially open and to cooperate with the other abutment when both of said valves are substantially fully open to prevent closing of said choke valve.

2. In a carburetor, choke and throttle valves, a choke valve shaft, a disc element on said shaft and having circumferentially spaced radial abutments, an element movable with said throttle valve, and interconnection structure extending from said throttle element adjacent said disc element, said structure having a part for engaging one of said abutments to force and hold said choke valve open when said throttle valve is opened and to cooperate with the other abutment only when both of said valves are substantially fully open to prevent closing of said choke valve.

3. In a carburetor, choke and throttle valves, an operating arm on said throttle valve, a cam-like member pivoted adjacent said choke valve, means for moving said member responsive to movements of said choke valve, a lever pivoted adjacent said cam-like member and spaced vertically from said arm, said lever having a connection with said throttle arm and an abutment for cooperating with said cam-like member to prevent full closing of said throttle valve, and dash pot mechanism with its top part located substantially at the level of said lever and connected thereto for retarding at least a part of the closing movement of said throttle valve.

AUGUST H. BLATTNER.