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CARBURETOR

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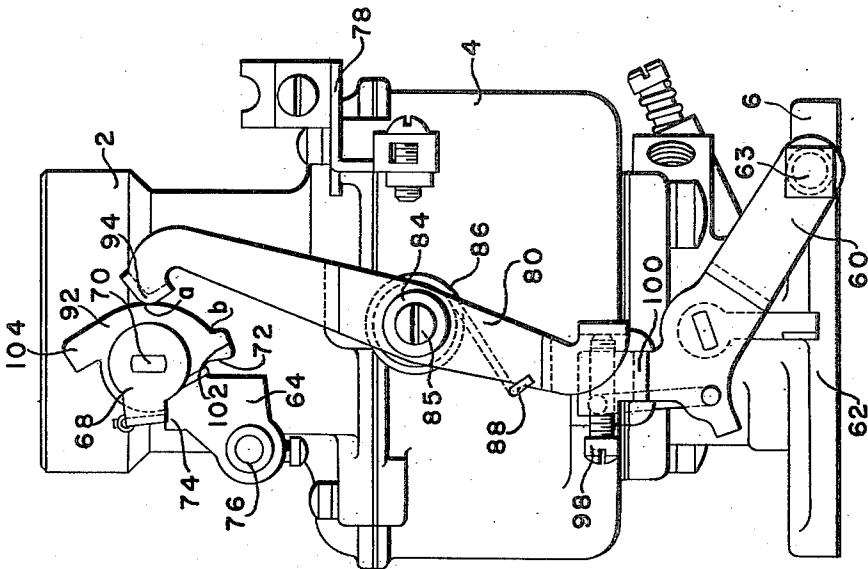


Fig. 2

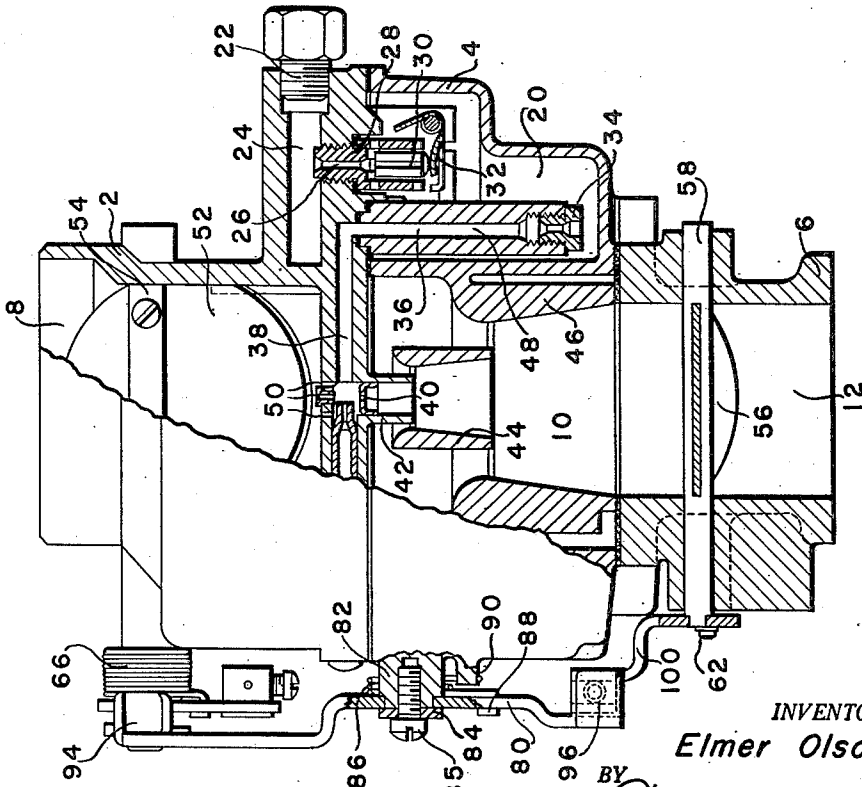


Fig. 1

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2,815,942

CARBURETOR

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Original application August 9, 1949, Serial No. 109,347, now Patent No. 2,694,560, dated November 16, 1954. Divided and this application August 3, 1954, Serial No. 447,619

2 Claims. (Cl. 261—52)

This invention relates to carburetors for internal combustion engines, particularly engines for automotive use, and is directed specifically to mechanism for operating the choke and throttle valves of such carburetors.

It is the primary purpose of this invention to provide novel and improved means for operating the choke and throttle valves of a carburetor which includes resilient means for manually moving an unbalanced choke valve to its closed position for cold weather starting, means for moving the throttle toward open position as the choke is moved to fully closed position in order to increase the idling speed for low temperature operation, and means for positively moving the choke valve toward closed position from its fully open position in the event that the choke valve gets stuck in the latter position.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Figure 1 is a view, partly in elevation and partly in vertical section, of a carburetor embodying the present invention; and

Figure 2 is a side elevation as seen from the left in Fig. 1.

The present invention is shown as embodied in a carburetor such as illustrated in copending application of Elmer Olson, S. N. 109,347, filed August 9, 1949, now Pat. No. 2,694,560, dated November 16, 1954, of which this application is a division. Since the invention to which this particular application is directed only to the mechanism for operating the choke and throttle valves, the entire structure of the carburetor is not shown and what is shown, other than the mechanism claimed herein, is only briefly described.

The carburetor, which is of down-draft type, comprises three separate castings 2, 4 and 6 positioned one above the other. The casting 2, which comprises the air inlet, is supported on top of the casting 4, in which the fuel chamber and the mixing chamber are positioned, and the casting 4 is supported on the casting 6, in which the throttle valve which controls the quantity of fuel mixture supplied to the engine is rotatably mounted. Suitable gaskets are positioned between the several castings. The air inlet passage is indicated at 8, and communicates with the mixing chamber 10 in casting 4 and the mixture formed therein is delivered to the outlet passage 12 in casting 6.

Fuel is delivered to a constant level fuel chamber 20 in the casting 4, through a conduit 22 connecting with a passage 24 in casting 2. A passage 26 in a nipple 28 connects passage 24 with chamber 20 and flow through the passage 26 is controlled by a valve 30, which rests on arm 32 operated by the usual float (not shown) in the conventional manner to maintain a constant fuel level in chamber 20.

Fuel flows from the chamber 20 to main and idling

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fuel inlets through a metering plug 34 to a vertical passage 36 which connects at its upper end with a horizontal passage 38, formed in a tubular part of the casting 2 which extends across the mixture passage. Fuel flows from this passage through a restricted opening 40 into the main fuel supply nozzle 42 which terminates in a small venturi tube 44, discharging into a large venturi tube 46 formed by the wall of the mixing chamber.

The passage 38 extends all the way across the mixture passage and at its left end connects with the upper end of a vertical passage 48 in casting 4, which leads to the idling fuel inlet (not shown). A plurality of openings 50 admit air to the passage 38 to form an emulsion of fuel and air therein.

The arrangement of fuel passages above described is the same as that shown in the above-mentioned parent application and since the specific arrangement of such passages forms no part of the present invention, no more detailed description of this structure is necessary herein.

Coming now to the mechanism which constitutes the present invention, admission of air through the air inlet 8 is controlled by an unbalanced choke valve 52 secured off-center to a shaft 54 journaled for rotation in the casting 2. Being rotatably mounted off-center, the valve is, of course, responsive to variations in suction within the carburetor and an increase in such suction tends to open the valve. The throttle which controls the quantity of fuel mixture supplied to the engine is designated at 56 and is secured to a shaft 58 journaled in the outlet casting 6.

The throttle is operated manually by an arm 60 secured to the flattened end 62 of the shaft 58 and the usual operating connection extending to the conventional accelerator pedal, and which is not shown, is adapted to be connected to the swivel block 63 carried by the arm 60. When the unbalanced choke valve 52 moves toward open position, the shaft 54 moves clockwise, as seen in Fig. 2, and, of course, a reverse movement of the shaft is effected to move the choke valve toward closed position. As already indicated, the choke valve in the device disclosed is manually operated, but instead of employing the conventional positive operating connection, the valve is moved to closed position through the medium of a spring which may yield in response to the high suction created when the engine starts to run under its own power, to permit the valve to open to some extent when this occurs.

The mechanism for operating the choke valve includes an arm 64 which is loose on the shaft 54 and this arm is connected by a torsion spring 66 which surrounds the shaft 54 with a second arm 68 fixed to the flattened end 70 of shaft 54. One end of this spring is hooked over the lower edge of arm 64 in a notch 72 and the other end of such spring is hooked over a rearwardly extending part of the arm 68 so that if arm 64 is moved counter-clockwise, as seen in Fig. 2, the spring will pull downwardly on the arm 68 and will move the arm 68, the shaft 54 and valve 52 counter-clockwise, to move said valve toward its closed position. Normally, the spring holds the arms 64 and 68 in the position shown in Fig. 2, with the rearwardly extending portion of arm 68 in contact with a shoulder 74 on the arm 64.

The arm 64 carries a swivel block 76 and a Bowden cable (not shown), but extending to the instrument panel may be supported by a bracket 78 secured to the carburetor housing, and connected to said swivel block for operating the arm 64.

A lever 80 is pivotally mounted on a stud 82 which projects from the casting 4 and is retained thereon by a washer 84 and screw 85, this lever being normally held in the position shown by the torsion return spring which surrounds the stud and has one end 88 engaging the le-

ver and the other end engaging a fixed lug 90 extending from the housing, as shown in Fig. 1. The arm 64 has a cam 92 formed thereon and this cam serves to variably position the lever 80 as the arm is moved to control the position of the choke valve, such cam being engaged by the laterally extending upper end 94 of said lever, which is held in engagement with the cam by the spring 86.

The position of the lever 80 determines the idle position of the throttle valve and for this purpose, the lever 80, at its lower end, has a laterally extending part 96 which is adapted to be engaged by a stop screw 98, adjustable in an upwardly extending part 100 of the throttle operating arm 60. Obviously, the position of the part 96 will determine the position of the throttle. If the part 96 is moved to the left, the throttle will be opened and if moved to the right, the throttle will be moved to a more nearly closed position by its return spring.

The cam 92 has a gradually increasing radius from the point *a* to the point *b* and beyond *b* terminates in a hump 102 of appreciable magnitude. If the arm 64 is moved counter-clockwise to effect closing of the choke valve, the lever 80 will be rotated slightly clockwise so as to gradually increase the opening of the throttle as the choke is moved toward closed position and when moved to effect full closing of the choke valve, as would be desirable for starting in quite low temperatures, the hump 102 becomes effective and the opening of the throttle is considerably increased, so as to cause the engine to run much faster at idle than it does at normal operating temperatures.

The provision of the unbalanced choke and yielding operating means has the very practical advantage of eliminating the necessity of the driver moving the choke valve toward open position immediately, when the engine becomes self-operative, in order to prevent overchoking. The unbalanced valve will open to some extent against the action of the spring, due to the fact that the suction effective on such valve is suddenly and very considerably increased when the engine begins to operate under its own power.

Sometimes, a choke valve will tend to stick in its wide open position and a resilient operating connection such as disclosed, might have a spring which would not exert sufficient force to release the valve. In order to eliminate any difficulty arising from the possible sticking of the choke valve, a lug 104 is provided on the cam 92 and if the arm 64 is moved counter-clockwise to a sufficient extent, such lug will engage the rearwardly extending portion of arm 68, positively releasing the choke valve and moving it toward closed position.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In a carburetor having a mixture passage, a throttle controlling the flow of combustible mixture through said

passage, a fuel supply chamber, means for supplying fuel to the mixture passage, an air inlet admitting air to said mixture passage, an unbalanced choke valve controlling the admission of air to said mixture passage and responsive to variations in suction therein whereby an increase in suction in said passage tends to move said valve toward open position, a rotatable shaft on which said choke valve is mounted, an operating arm secured to said shaft, a manually operable arm for moving the choke valve toward closed position rotatable on said shaft, resilient means connecting said two arms, said operating arm and resilient means being so related that the choke valve may be rotated toward open position by suction with said manually operable arm in the fully closed choke position, a member movable to different positions to determine the idling position of the throttle valve, a cam having a contour of gradually increasing radius integral with said manually operable arm and engageable with said member to move said member to effect gradual opening of the throttle as said arm is moved to effect closing of the choke valve, and a hump on the cam at one end of said contour adapted to engage said member when the manually operable arm is moved to fully close said choke valve to effect an abrupt increase in the idle opening of the throttle when the choke is fully closed.

2. In a carburetor having a mixture passage, a throttle controlling the flow of combustible mixture through said passage, a fuel supply chamber, means for supplying fuel to the mixture passage, an air inlet admitting air to said mixture passage, an unbalanced choke valve controlling the admission of air to said mixture passage and responsive to variations in suction therein whereby an increase in suction in said passage tends to move said valve toward open position, a rotatable shaft on which said choke valve is mounted, an operating arm secured to said shaft, a manually operable arm for moving the choke valve toward closed position rotatable on said shaft, resilient means connecting said two arms, a throttle, a lever fixed for rotation with said throttle, a lever pivotally mounted intermediate its ends on said carburetor, a cam integral with said manually operable arm and engageable with one end of said pivoted lever, an adjustable stop element mounted on said throttle lever and adapted to abuttingly engage the other end of said pivoted lever to determine the idle position of the throttle in accordance with the position of said cam, and additional resilient means coaxially disposed intermediate said carburetor and the pivoted lever to continuously urge the said one end of the pivoted lever into engagement with said cam.

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