April 17, 1934. LE ROY SAWYER 1,955,204

CARBURETOR CHOKE

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Fig. 1

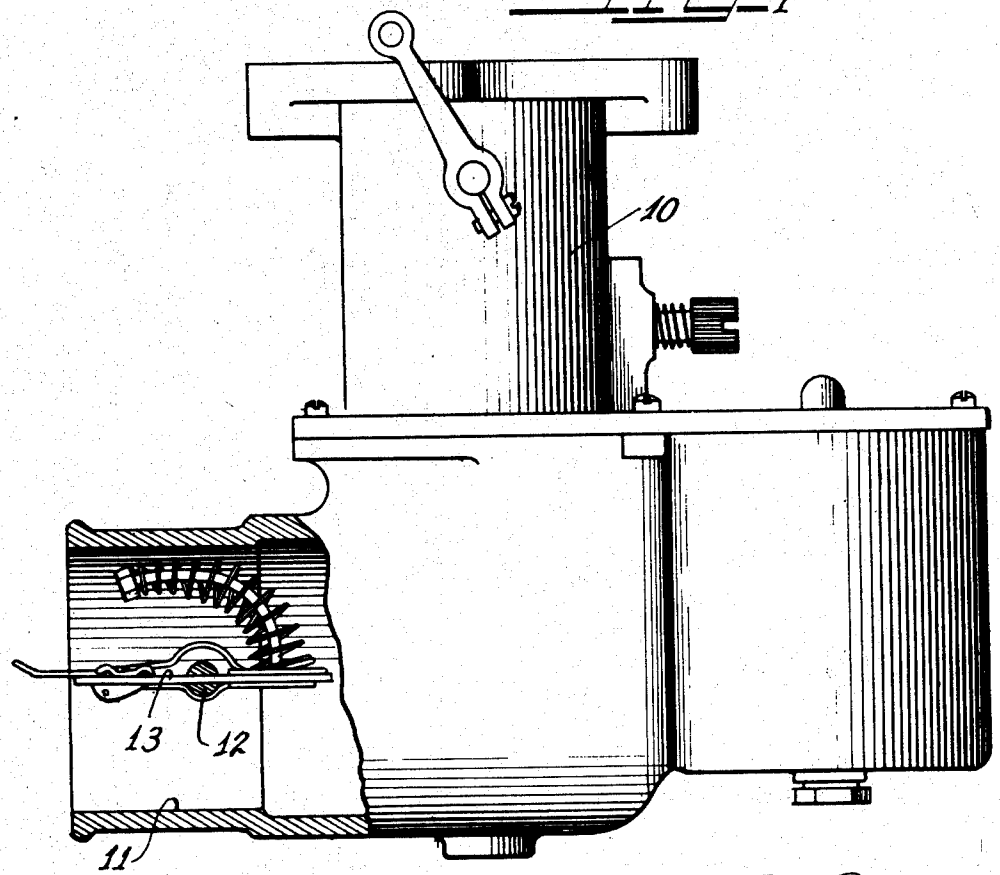


Fig. 2

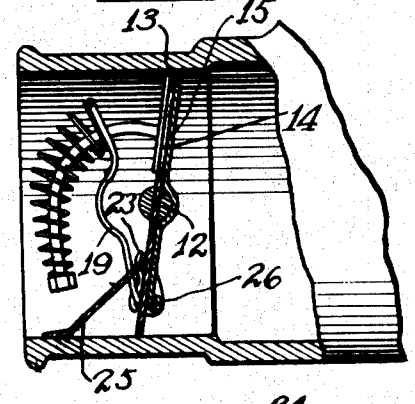
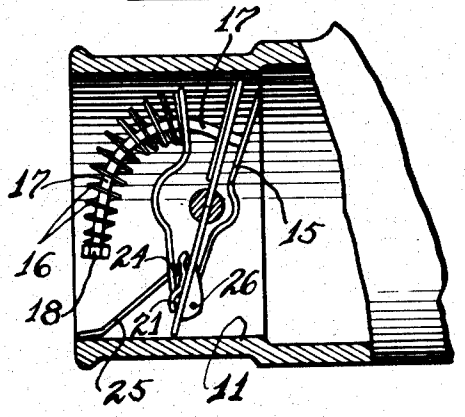


Fig. 3



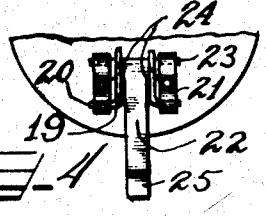


Fig. 4

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Fig-5

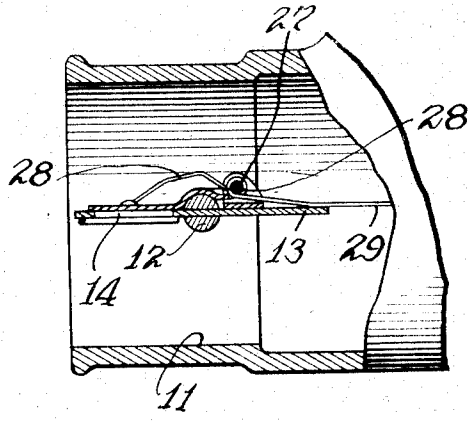


Fig-6

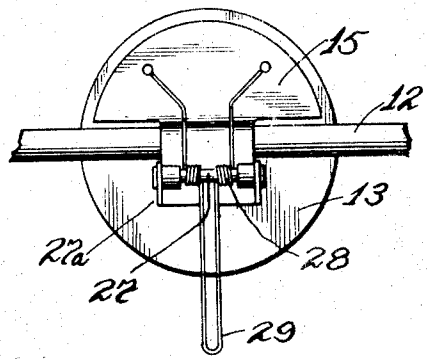


Fig-7

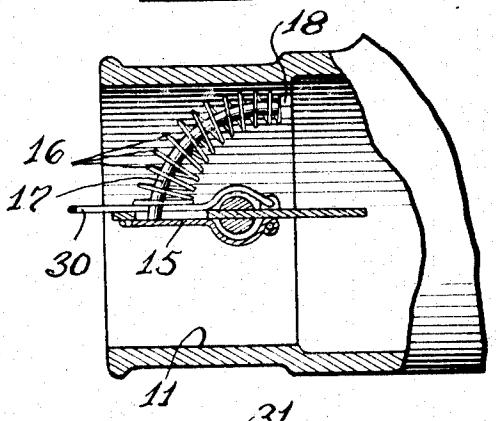


Fig-8

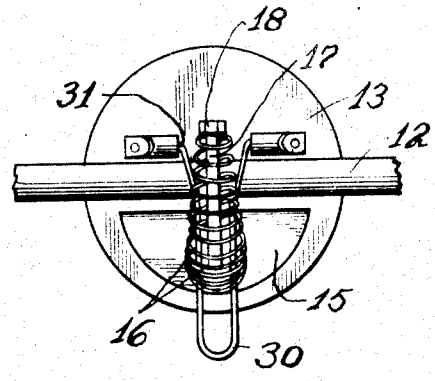
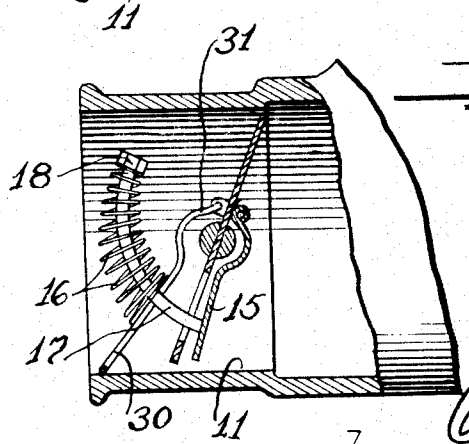


Fig-9



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Patented Apr. 17, 1934 1,955,204

UNITED STATES PATENT OFFICE

1,955,204

CARBURETOR CHOKE

Le Roy Sawyer, Chicago, Ill.

Application October 29, 1930, Serial No. 491,992

8 Claims. (Cl. 277—23)

This invention relates to improvements in a valve structure for controlling the flow of fluid through a conduit; and more particularly to an improved type of choke valve for use in connection with the air inlet passage of a carburetor for internal combustion engines, to facilitate starting and warming up of such an engine.

It has heretofore been proposed to provide choke valves per se in connection with the air inlet passages of carburetors, as the use of such a valve practically cuts off the inflow of air thus increasing the suction imposed on the carburetor fuel nozzles and increasing the delivery of fuel, which is advantageous in starting a cold engine, as some of the excess fuel eventually finds its way to the engine cylinders. The chief drawback in the use of the choke is that the operator is apt to leave its control "pulled out" for too long in which case the continued supply of excess fuel contaminates the lubricating supply of the engine, eventually working past the pistons into the crankcase. I have found that I can avoid this undesirable result by providing a choke valve with a port therein normally covered but opened by an increase in suction in the carburetor body. I explain the results obtained by the following reasoning:

Upon starting a cold engine, by closing the choke and cranking the engine, the slow cranking speed is not effective in creating sufficient suction in the carburetor beneath the throttle valve to uncover the normally closed port in the choke valve so that under these conditions the choke valve of my invention acts as effectively as a solid valve for the initial starting operation. When the engine starts to fire and thus picks up speed, the increased suction created by the increased speed is sufficient to then uncover the port in the choke valve, admitting sufficient air to assure proper operation of the engine at idling speeds. Without my improved choke valve structure the continued supply of practically raw fuel to the intake system would result in a cumulative "loading" of the engine which might eventually result in stoppage thereof due to flooding of the cyinders with excess fuel, and at least result in undesirable carbon formation and oil contamination. It is accordingly an object of my invention to provide an improved choke valve of the type described.

It is another object of this invention to provide an improved choke valve of the type described having a port therein normally covered by a resiliently seated closure together with means for increasing the seating pressure on the closure when the choke valve is fully closed. By this arrangement the closure is lightly seated when the choke valve is only partially closed so that the closure can open in response to a relatively slight increase in carburetor suction thus preventing over-enrichening of the carburetted mixture under conditions such as part load operation when the choke is only partly pulled out in an effort to compensate for a cold engine. When it is necessary to operate with full choke, the closure pressure is then increased to a predetermined extent to supply the desired rich starting mixture.

It is a further object of this invention to provide an improved and simplified choke control which compensates for unskilled or thoughtless operation of the choke by the average driver; and one that can be cheaply constructed and installed without requiring changes in the carburetor or external controls therefor.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is an elevation of a carburetor partly broken away to show a choke valve embodying the preferred form of this invention.

Figure 2 is a fragmentary view similar to Figure 1 showing the choke valve in its closed position.

Figure 3 is a view similar to Figure 2 showing the partly opened relief port in the choke valve.

Figure 4 is a plan view of the choke valve closure pressure varying mechanism.

Figure 5 is a fragmentary view of a modified form of choke valve structure embodying the features of this invention.

Figure 6 is a plan view of the form of choke valve shown in Figure 5.

Figure 7 is a fragmentary view of another modification of this invention.

Figure 8 is a plan view of the valve of Figure 7.

Figure 9 shows the valve of Figure 7 in its closed position with the port therein partially uncovered.

As shown on the drawings:

A conventionalized showing of a carburetor 10 has been chosen to illustrate the application of the embodiments of this invention thereto. The carburetor includes an air inlet passage 11, usually but not necessarily circular in section.

This passage has a cross shaft 12 approximately but not necessarily on a diameter of the passage, which shaft will be referred to hereinafter as the choke shaft. As is well known the choke shaft is usually connected by levers and linkage to a pull button convenient to the operator.

The choke shaft carries a butter-fly valve disc 13 within the passage 11, which disc, hereinafter called the choke valve, is turned to substantially obstruct the passage 11 for starting purposes. Since it is preferable to seat the valve at an oblique rather than a right angular position the valve is made slightly elliptical in outline for a circular passage.

The improvement of my invention relates to the provision of a port 14 in the choke valve 13 which port is covered by a hinged or pivoted flap or closure 15 which opens in such a way as to admit an additional supply of air to the carburetor when the choke valve is turned to partially or fully obstruct the air inlet passage 11. The structure so far described is common to each modification, the variations relating to the means for resiliently and variably seating the closure 15.

In the modifications of Figures 1 and 4 and 7 to 9 the closure 15 is normally held seated by a coiled spring 16 mounted on a pilot 17 curved to provide the necessary clearance in the passage 11. The spring seats against a head 18 carried by the outer end of the pilot, the inner end of the pilot being rigidly mounted on the closure 15. The working end of the spring is provided with an adjustable seat for varying the spring pressure on the closure. This seat and its associated mechanism forms the difference between the two modifications.

In the form of Figures 1 to 4 the working end of the spring rests on a wire loop 19 the free ends 20 of which are pivoted beneath one end of each of a pair of brackets 21 attached to the choke valve disc 13. A lever 22 has pins 23 similarly pivoted under the other ends of said brackets 21, this lever having shoulders 24 engaging under the wire loop 19 close to the pivoted ends thereof; the arrangement being such that when the lever 22 lies parallel to the choke valve the wire loop 19 is also in contact therewith. When the free end 25 of the lever 22 is moved away from the choke valve, the shoulders on the lever lifts the wire loop away from the valve 13 thus increasing the spring pressure on the closure 15 by compressing the spring 16. The free end of the lever 22 extends beyond the edge of the choke valve 13 sufficiently to strike the wall of the intake passage 11 sufficiently in advance of the valve itself so that a complete closure of the valve results in a substantial movement of the wire loop and a consequent compression of the spring 16 as shown in Figure 2.

In this form of the invention, the closure 15 is pivoted on a hinge pin 26 on the opposite side of the choke valve to the brackets 21.

In the form of the invention shown in Figures 5 and 6 the closure 15 is pivoted on a hinge pin 27 supported in a bracket 27*a* attached to the choke valve, the closure 15 being urged to its seat by a torsion spring 28 wrapped around the hinge pin and having a fulcrum extension 29 extending beyond the edge of the choke valve to make contact with the intake passage wall in advance of the choke valve proper. Further movement of the valve to its fully closed position then results in winding up the spring to an increased tension.

In the third form of the invention, the working end of the spring 16 rests on a wire loop 30 the ends 31 of which are pivoted to the choke valve. In this form the loop extends beyond the edge of the valve to make direct contact with the intake passage wall, necessitating the inversion of the port and closure relative to the form of Figures 1 to 4, the wire loop in the third form taking the place of the lever 22 of the first form.

In the operation of the choke valves of this invention the partial closure of the valve up to the point where the various extensions 25, 29 and 30 make initial contact with the intake passage wall results in a partially closed choke valve having a port closure yieldingly held closed by relatively light spring pressure so that the port will be uncovered in response to a relatively slight increase in carburetor suction to feed an increased supply of air. Upon further closing movement of the choke valve the closure 15 is held to its seat by an increasing spring pressure due to the mechanism which compresses the closure springs 16 and 28 so that an increased carburetor suction is required to effect the opening of the closure 15 to supply additional air. The spring rate and buildup is predetermined to suit the engine requirements in such a way as to hold the port closed for starting but to permit it to be uncovered after the engine fires and gains idling speed.

It will thus be seen that I have invented an improved and simplified choke having automatic responsiveness to engine requirements to prevent abuse of the choke control by ignorant or careless operators.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. A choke valve for controlling the air intake of a carburetor, said valve having a port therein, movable closure means for said port, resilient means for normally seating said closure means, and means operable by the closing of the choke valve for increasing the seating pressure of said resilient means.

2. A choke valve for the air inlet of a carburetor comprising a manually controllable choke valve for obstructing said air inlet, yieldable means carried by said choke valve to reduce the restriction caused thereby at extreme suctions in the carburetor and means operable by the closing of the choke valve for increasing the seating pressure on said yieldable means.

3. A choke valve for the air inlet of a carburetor comprising a manually controllable choke valve in said air inlet, said valve having a port therethrough, a pivoted flap normally closing said port and opening toward the inside of the carburetor, spring means urging said flap against the valve port, and means operated by the closing of the choke valve to increase the pressure of said spring means on said flap.

4. A choke valve for the air inlet of a carburetor comprising a manually controllable choke valve in said air inlet, said valve having a port therethrough, a pivoted flap normally closing said port and opening toward the inside of the carburetor, spring means urging said flap against the valve port, and means for temporarily increasing the seating pressure of said spring means.

5. A choke valve for controlling the air intake of a carburetor, said valve having a port therein, yieldingly mounted closure means for said port,

and means carried by said valve adapted to progressively impose a yielding load on said closure means as the choke valve approaches its fully closed position.

6. In a carburetor, means for forming a mixing conduit, a choke valve controlling the admission of air to said mixing conduit, a warm up valve for varying the admission of air to said mixing conduit when said choke valve is in partially closed position, and means for resisting the opening of said warm up valve when said choke valve is in closed position, said means including a lateral projection extending beyond the edge of the choke valve to engage the conduit wall as the choke valve is closed.

7. In a carburetor, means forming a mixing conduit, a choke valve mounted near the inlet of said mixing conduit to control the admission of air thereto, a warm up valve operable by suction to admit quantities of air when said choke valve is in partially closed position, said warm up valve being constructed and arranged to open only when said choke is in partly open position, said warm up valve including a lateral projection extending beyond the edge of the choke valve to engage the conduit wall as the choke valve is closed.

8. In a carburetor, means forming a mixing conduit, a choke valve for controlling the admission of air thereto, a warm up valve carried by said choke valve, a spring for normally holding said warm up valve in one position with respect to said choke valve, said warm up valve being operable by suction when said choke valve is in partly closed position, and means carried by said choke valve to prevent opening thereof when said choke valve is in fully closed position, said means including a lateral projection extending beyond the edge of the choke valve to engage the conduit wall as the choke valve is closed.

LE ROY SAWYER.