July 26, 1960 F. R. DENNISON ET AL 2,946,577

CHOKE LOCK-OUT

Filed June 28, 1957 2 Sheets-Sheet 1

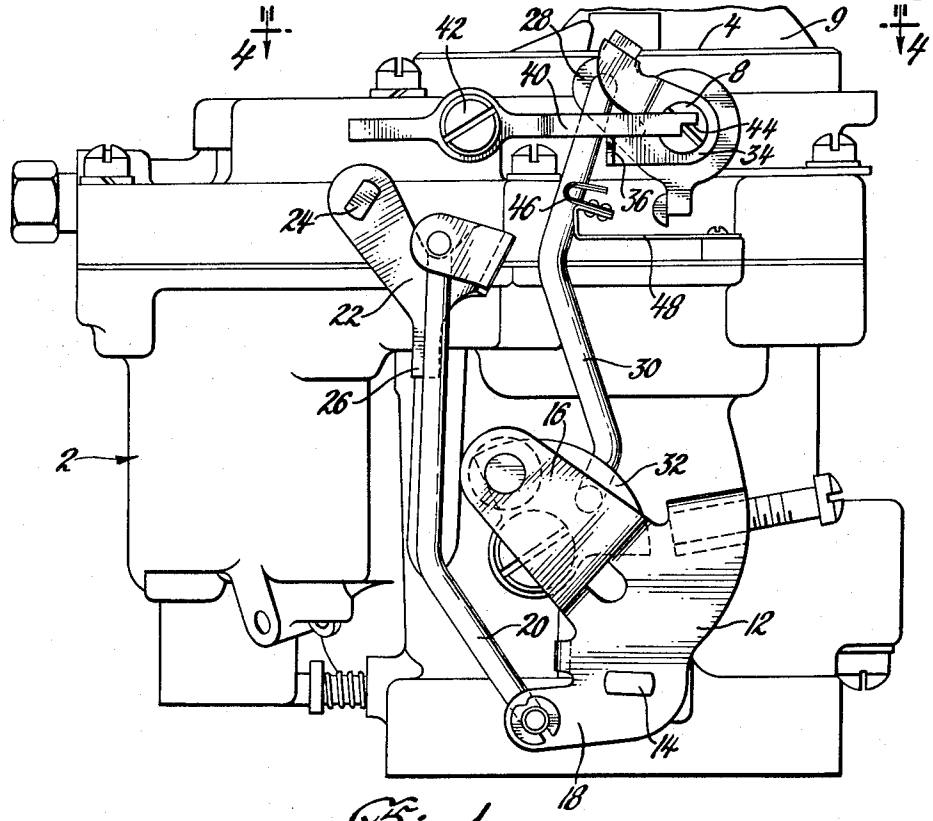


Fig. 1

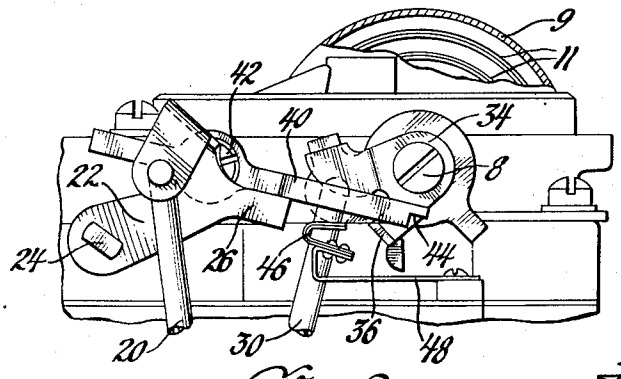


Fig. 2

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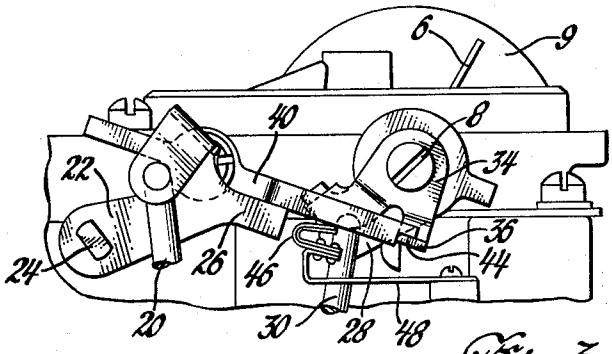


Fig. 3

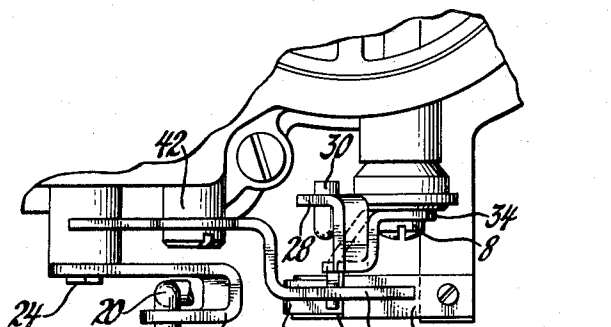


Fig. 4

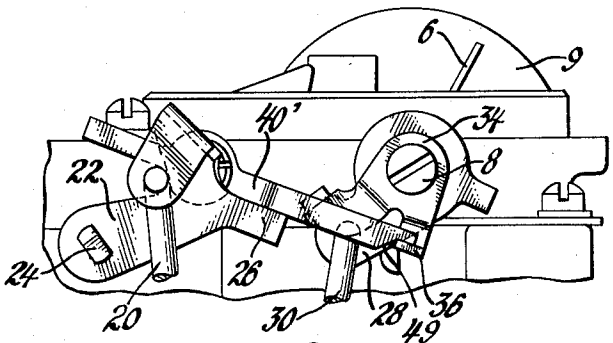


Fig. 5

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CHOKE LOCK-OUT

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The present invention relates to carburetors and, in particular, to means for latching a choke valve in an open position after the engine has once obtained the proper operating temperature together with an automatic means for unlatching the choke valve upon a decrease in engine temperature.

It is, of course, well known that a choke valve is utilized in the air inlet or induction passage of a carburetor to control the fuel-air mixture while initially starting and running a cold vehicle engine. Such choke structures include means responsive to engine temperature change to automatically control the position of the choke valve between open and closed positions. These constructions typically comprise a choke blade or valve rotatably disposed in the carburetor induction passage on a shaft operatively connected to a bimetallic temperature responsive element. Such automatic choke valve devices have been found to be troublesome in situations in which a warm engine has been stopped for a short period of time, for example 15 or 20 minutes, and the choke thermostat moves the choke valve to a closed position. However, during such a short interval of time, the engine itself is still reasonably warm. Thus, when the vehicle operator attempts to start the engine, an over-rich fuel mixture is supplied to the intake manifold often resulting in engine flooding and inability of the engine to start.

According to the present invention, it is contemplated to provide a carburetor including an automatic choke with a latching means which, upon stopping the vehicle, will maintain the choke valve in the full open position at least for the interval of time during which the engine remains warm relative to the automatic choke thermostat.

Moreover, it is contemplated within the scope of this invention to provide the carburetor, including the aforedescribed automatic choke mechanism and latching mechanism therefor, with temperature responsive means which will operate to automatically release the latch to close the automatic choke valve after an interval of time. Moreover, manual over-control means may also be provided for releasing the latch.

As the description of the invention proceeds, reference will be made to the following drawing in which:

Figure 1 is a side elevation of a carburetor equipped with one form of the choke lock-out or latch device of this invention;

Figure 2 is a fragmentary enlarged view of the choke lock-out mechanism as it moves toward a position to lock the choke valve in the full open position;

Figure 3 is a fragmentary enlarged view of the mechanism in the latched position;

Figure 4 is a fragmentary plan view taken on line 4—4 of Figure 1;

Figure 5 is a fragmentary side elevation of another form of the choke lock-out device of this invention.

Referring now to the drawing, and in particular to Figure 1, there is shown a carburetor comprising a housing 2 having an air inlet or induction passage 4 through

which air may be drawn for mixture with fuel also supplied to the passage by the usual ports and venturi means, not shown. A choke blade or valve 6 (Figure 3) is disposed on a shaft 8 rotatably mounted on the housing 2. An automatic choke mechanism 9 including a thermostatic element 11 is operatively connected to the shaft 8 so as to position the choke blade 6 between an open and closed position in the passage 4 in response to temperature change. Such an automatic choke mechanism may take the form shown in the patent to Jorgensen et al.—2,705,484.

The usual throttle control linkage is provided at one side of the carburetor housing and includes a throttle control lever 12 mounted on a rotatable shaft 14 and having an arm 16 suitably connected in the usual manner to an accelerator pedal, while the arm 18 of the lever 12 is connected by a rod 20 with an accelerator pump lever 22 disposed on a rotatable shaft 24. For a purpose to appear more fully hereinafter, an integral arm 26 is formed on the accelerator pump lever 22. The usual fast idle linkage is also provided on the carburetor and includes a lever 28 disposed on rotatable shaft 8, and a rod 30 which connects the lever 28 to a fast idle cam 32. The fast idle linkage is conventional and functions in the usual manner to control the idle position of the throttle.

One form of the lock-out or latching means of this invention is shown in Figures 1 through 4, inclusive, and includes a latch lever 34 disposed on the choke valve shaft 8 at one side of the carburetor housing. This latch lever 34 includes an arm 36 bent outwardly from the housing substantially parallel to the shaft 8 for engagement with the rearwardly extending portion of a latch arm 40 pivotally mounted at 42 to the housing. It will be noted that the rearwardly extending portion of the latch arm 40 is bowed outwardly for engagement with the arm 36 of the latch lever 34. Moreover, a notched portion 44 in the end of the latch arm is adapted to lockingly engage the arm 36 of the latch lever.

It will be obvious from the drawing that with the choke initially in the closed position as depicted in Figure 1, the latch arm 40 will rest on the arm 36 of latch lever 34 and will be urged thereagainst by gravity. Thereafter, when the engine is started and warms up, the automatic choke mechanism will function to progressively rotate the choke valve shaft 8 counterclockwise, and the latch lever 34 through the Figure 2 position to that shown in Figure 3. As the automatic choke operates on the choke valve shaft in this manner, the latch arm 40 swings clockwise under the force of gravity to be in continuous engagement with the arm 36 of latch lever 34 until such time as the automatic choke reaches the full open position. At this time, the notched end 44 of the latch arm will lock with the lever arm 36.

Thereafter, if the engine is stopped for a short interval of time during which the automatic choke is cooled while the engine actually has not completely cooled, the latch prohibits the choke from closing wholly or partially as it would normally.

Since the vehicle may be left standing for a period of time during which the engine also cools, some means must be provided to release the latching means to permit the choke valve to return to a closed position for proper cold engine starting. To accomplish this, a substantially U-shaped temperature responsive member 46 is mounted on a bracket 48 on the exterior wall of the carburetor housing 2. When the latch arm 40 reaches the Figure 3 position due to the engine reaching operating temperature, the element 46 will also be heated and will be engaging the latch arm. The element 46 is designed to have a slower rate of response to temperature change than the thermostatic element of the automatic choke

mechanism so that as the latter functions to ordinarily return the choke to a closed position, the action of the thermostatic element 46 will be retarded relative thereto. However, upon the critical time interval being passed, the thermostatic element 46 will function to rise against the arm 40 to move it against gravity to unlatch the lever 34 and permit the choke to return to a closed position in response to torque applied by the automatic choke thermostat.

Referring now to Figure 5, there is shown another form of the instant invention in which the notched portion of the latch arm 40' has a surface 49 which slopes away from the leading edge of the latch lever arm 36. The slope of the surface 49 is so designed relative to the leading edge of the arm 36 as to permit the latter, acting through the torque imposed on the choke valve shaft 8 by cooling of the automatic choke thermostatic element, to cam against the arm 40' until it is undogged therefrom thereby permitting the automatic choke thermostat to return the choke to a closed position.

In this form of the invention, it will be readily apparent that the latching means comprising the lever 34 and arm 40' will act to maintain the choke valve in a full open position until such time as the automatic choke thermostatic element has completely cooled to apply sufficient torque to provide the undogging function. In other words, without such a latching mechanism, as the automatic choke thermostatic element cools it will progressively return the choke blade to the closed position. However, with the time delay feature of the latching mechanism of this embodiment of the invention, the choke blade will be maintained in the full open position as the automatic choke thermostatic element cools until such time as the latter is completely cooled. It will be apparent that the slope of surface 49 may be varied in selecting the desired time delay interval.

In both forms of the invention, manually controlled means is provided to release the latching means at the will of the operator. For this purpose, the arm 26 formed integral with the accelerator pump lever 22 is aligned with the aforedescribed bowed portion of the latch arm 40 or 40'. Thus, with the latch member substantially in the position shown in either Figure 3 or Figure 5 corresponding to the choke being latched in the full open position, the vehicle operator by actuating the throttle control linkage to a full throttle position will cause the integral arm 26 to strike the bowed portion of the lever arm 40 to raise it against gravity to undog the latch.

Two preferred forms of the invention have been shown by way of illustration, but it is to be understood that other forms or uses of this invention will be apparent to those skilled in the art. Thus, while this invention has been disclosed primarily as a latch to maintain a choke valve in a wide open position, it is obvious that the latch structure can be designed to hold the choke valve in any desired position to provide, for instance, desired fuel-mixture.

We claim:

1. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, and temperature responsive means operatively connected to one of said members for releasing said latch in response to a change in ambient temperature.

2. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, and temperature responsive latch releasing means operatively connected to one of said members to release said latching means, said releasing means being effective at a predetermined low ambient temperature.

3. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, said latching means being operative to maintain said valve in the open position irrespective of the action of said temperature responsive means tending to move said valve to a position intermediate said open and closed positions; and means operatively connected to said latching means to release the latter, said latch releasing means being responsive to a predetermined low ambient temperature.

4. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage, latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, and temperature responsive means operatively connected to one of said members for releasing said latch in response to a low ambient temperature, and manually actuable means operative upon said latching means independently of said latch releasing means to unlatch said members.

5. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a rotatable choke valve shaft, a choke valve mounted on said shaft within said passage, temperature responsive means operatively connected to said shaft to automatically rotate said valve between passage closing and opening positions in response to increase in temperature; latch means for locking said valve in an open position within said passage, said means comprising a latch lever mounted on said shaft, a pivotally mounted latch arm, said latch arm being urged against said latch lever as the latter rotates to a passage opening position, locking means formed on said arm and lever to lock the latter in a passage opening position, and unlatching means comprising temperature responsive means operative upon said arm at a low temperature to lift the latter to unlatch said locking means.

6. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a rotatable choke valve shaft, a choke valve mounted on said shaft within said passage, temperature responsive means operatively connected to said shaft to automatically rotate said valve between passage closing and opening positions in re-

sponse to increase in temperature; latch means for locking said valve in an open position within said passage, said means comprising a latch lever mounted on said shaft, a pivotally mounted latch arm, said latch arm being gravitationally urged against said latch lever as the latter rotates to a passage opening position, locking means formed on said arm and lever to lock the latter in a passage opening position, said locking means being operative to maintain said valve in a passage opening position irrespective of a decrease in temperature acting on said temperature responsive means; a first unlatching means comprising temperature responsive means operative upon said arm at a predetermined temperature to lift the latter against gravity to unlatch said locking means, and a second unlatching means operative independently of said first means and comprising a throttle control linkage, said linkage including means engageable with said latch arm to rotate the latter against gravity to unlatch said locking means upon moving said linkage to full throttle opening position.

7. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism including a choke valve rotatably mounted within said passage for automatic rotation between open and closed positions; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, temperature responsive means operable upon said latching means to unlatch the latter at a low ambient temperature, and independently operable manually actuable means acting on said latching means to unlatch the latter.

8. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage, said mechanism including a choke valve automatically rotatably mounted within said passage for automatic rotation between open and closed positions latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between an open and closed position, a second latch member engageable with said first latch member to lock said valve in an open position, temperature responsive means operable upon said latching means to unlatch the latter at a low ambient temperature, and independently operable manually actuable means acting on said latching means to unlatch the latter, said manually operable means including throttle control linkage means engageable with said latching means upon actuation thereof to full throttle position.

9. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between open and closed positions, a second latch member engageable with said first latch member to lock said valve in an open position, said latching means being operative to maintain said valve in the open position irrespective of closing action of said temperature responsive means; and additional temperature responsive means operatively connected to one of said members for releasing said latch at a predetermined ambient temperature.

10. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between open and closed positions, a second latch member engageable with said first latch member to lock said valve in an open position, said latch means being operative to maintain said valve in the open position irrespective of the action of said choke temperature responsive means; second temperature responsive means operative on said latching means, said second means being responsive to a predetermined low temperature to unlock said latching means to permit return of said valve to a closed position under control of said choke temperature responsive means.

11. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a first latch member operatively connected to said valve for rotation with the latter between open and closed positions, a second latch member engageable with said first latch member to lock said valve in an open position, said latch means being operative to maintain said valve in the open position irrespective of the action of said choke temperature responsive means; a second temperature responsive means, said second temperature responsive means being responsive to a low engine temperature to unlock said latching means to permit return of said valve to a closed position under control of said first temperature responsive means; a throttle linkage, and means forming a part of said linkage and operatively selectively engageable with said latching means to unlock the latter independently of said second temperature responsive means upon actuation of said linkage to full throttle position.

12. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a latch lever operatively connected to said valve for rotation with the latter, a rotatably mounted latch arm, said latch arm being urged against said latch lever as the latter rotates to a valve opening position, and a cam locking means between said arm and lever to lock the latter in a valve opening position as said temperature responsive means initially responds to decrease in temperature, said latching lever acting on said cam means in response to a further decrease in temperature to unlock said latch means.

13. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a latch lever operatively connected to said valve for rotation with the latter, a rotatably mounted latch arm, said latch arm being urged against said latch lever as the latter rotates to a valve opening position, and a cam locking means on said arm engaging said lever to lock the latter in a valve opening position as said temperature responsive means responds to a decrease in temperature, the torque applied to said lever at a predetermined low

temperature being effective on said cam means to unlock said latch means.

14. A carburetor comprising an air passage, an automatic choke mechanism controlling the flow of air through said passage; said mechanism comprising a choke valve rotatably mounted within said passage, temperature responsive means operatively connected to said valve to automatically rotatably position the latter within said passage; latch means for locking said valve in an open position within said passage, said latch means comprising a latch lever operatively connected to said valve for rotation with the latter, a rotatably mounted latch arm, said latch arm being gravitationally urged against said latch lever as the latter rotates to a valve opening position, an open locking notch in the end of said arm for engagement with said lever to lock the latter in a valve opening position as said temperature responsive means responds to a decrease in temperature, said notch including a cam surface against which said lever acts as temperature decreases, said latching lever acting on said

cam surface in response to a predetermined low temperature and torque applied by said temperature responsive means to lift said arm and unlock said latch means.

15. A carburetor comprising an air passage, a choke valve rotatably mounted within said passage, a temperature responsive automatic choke mechanism operatively connected to said valve to rotatably position the latter automatically within said passage, latch means for locking said valve in an open position within said passage, temperature responsive means operatively connected to said latch means to release the latter in response to a change in ambient temperature, and manually actuable means operative upon said latch means to release the latter independently of said temperature responsive latch releasing means.

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