Dec. 22, 1936. E. O. WIRTH ET AL 2,065,167

CHOKE VALVE

Filed Sept. 23, 1932

Fig. 1

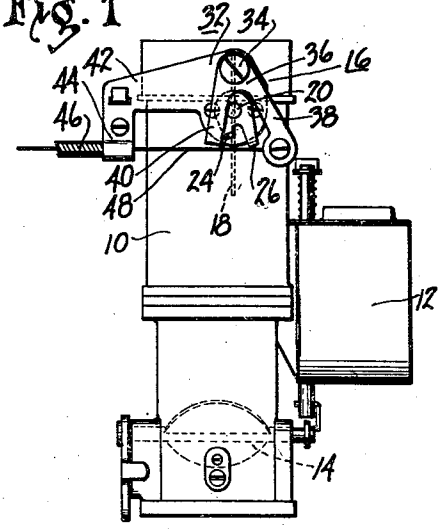
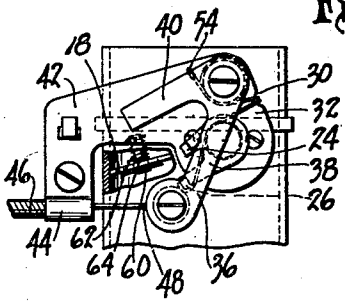


Fig. 2



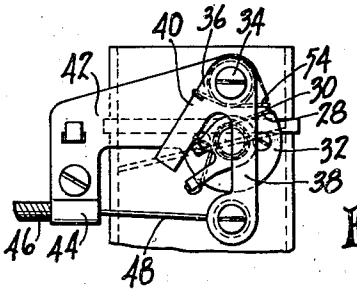
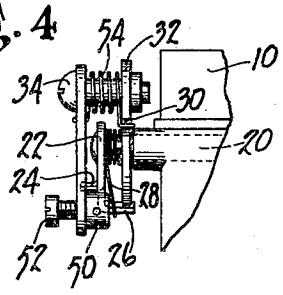


Fig. 3

Fig. 4



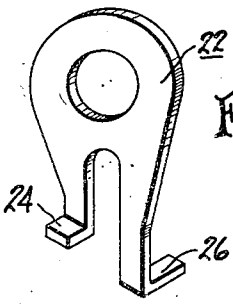
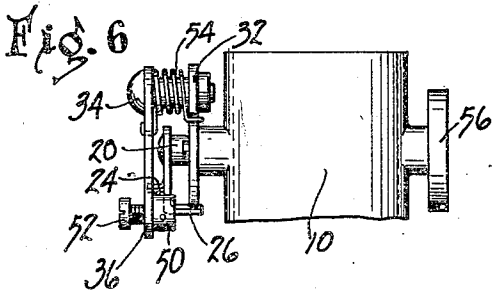


Fig. 5

Fig. 6



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CHOKE VALVE

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Application September 23, 1932, Serial No. 634,613

13 Claims. (Cl. 137—139)

This invention relates to valves and operating mechanism therefor and is illustrated as embodied in combination with a choke valve for an internal combustion engine carburetor.

In carburetor choke valves which are manually operable particularly of the butterfly type it is desirable that the valve to some extent operate automatically since manual operation cannot control the choke in accordance with such rapid changes in fuel requirements as occur during engine starting. This invention is therefore directed to a novel control mechanism which is flexible to permit semi-automatic valve operation, the control mechanism comprising a relatively long pivoted lever adapted to be manually actuated and a relatively short pivoted lever having a lost motion connection to the longer lever and fixed to the choke valve. Through this arrangement, the longer lever moves through a considerably smaller arc than the choke valve itself, which facilitates the use of a flexible cable control, as more fully described hereinafter.

It is accordingly an object of the invention to provide a novel air or choke valve operating mechanism whereby the choke may be manually operated but subject to automatic variation as conditions may require.

A further object of the invention is the provision of novel choke valve operating mechanism wherein a lost motion connection is provided with yielding means for taking up the lost motion whereby a choke valve of the unbalanced type may be self actuating to a limited extent.

A further object of the invention is the provision of means whereby an operating member for the choke valve may have a small angular movement suitable for actuation by a flexible cable control.

A still further object of the invention is the provision, in a butterfly type choke valve operating mechanism, of a lever mounted eccentric to the choke valve shaft axis adapted to actuate a crank on the end of the choke valve shaft to provide an operating member having small angular movement.

Still another object of the invention is the provision of choke valve operating mechanism readily adapted for cable operation and permitting a lost motion connection of rugged and simple design.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in connection with the accompanying drawing. It is expressly understood, however, that the drawing is employed for purposes of illustration only and is not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawing wherein similar reference characters refer to similar parts throughout the several views:

Figure 1 is a side elevation of a carburetor showing a preferred form of choke operating mechanism;

Figure 2 is a side elevation of the choke mechanism showing the choke in locked closed position;

Figure 3 is a side view of the choke mechanism showing the choke in resiliently closed position;

Figure 4 is an end view of a portion of the carburetor showing the operating mechanism;

Figure 5 is a perspective view of the preferred form of a crank member shown in Figures 1 to 4; and

Figure 6 is an end view of the choke operating mechanism provided with a thermostat.

Referring to the drawing and particularly Figure 1, there is shown a down draft carburetor 10 having a float chamber 12, throttle valve 14 and choke mechanism generally denoted as 16. The choke valve comprises a butterfly disk 18, which is supported and carried by a shaft 20 which, in the modification shown, is secured to the disk along a line spaced from the center of the disk, so that air flow or differential of pressures may tend to open the valve. On the end of the shaft 20, outside the air inlet channel, as is best shown in Figure 4, there is provided a crank member 22, shown particularly in detail in Figure 5, having oppositely turned up ears 24 and 26. To urge the valve toward closed position, a coil spring 28 wrapped around the shaft 20 is hooked at one end on the ear 26 and at its other end in a notch 30 provided in a bracket member 32 secured to the carburetor in any suitable manner.

In order to open the valve or positively close it, there is pivoted at 34 on the bracket 32 a forked lever 36 having spaced tines 38 and 40, which are adapted to engage the ear 24 on the crank member 22. An extension arm 42 on the bracket 32 is provided at its extremity with a clamp 44 adapted to hold a cable conduit, such as 46, in line with the end of the lever 36. To operate the lever 36, a manual control cable 48 slidably mounted in the conduit 46, is secured to the end of the lever 36 in a swivel collar 50 provided with a clamping screw 52. In order that the stresses

in the actuating cable may be limited to tension, a heavy coil spring 54 is provided on the pivot 34, one end of which is hooked in the notch 30 and the other end of which engages the lever 36 tending to turn the same in a counterclockwise direction and tension the cable 48.

As shown in Figure 6, there is provided on the right hand end of the shaft 20 in place of the coil spring 28 at the other end, a thermostatic element 56, which may be of a bimetallic type formed into a flat spiral which thermostat is adapted to urge the choke valve towards closed position during cold operating conditions. The thermostat may be located adjacent the engine so as to be affected by the temperature thereof and reduce its tension on the choke valve as the engine warms up to normal operating temperature.

In order to prevent overchoking, as might result from an operator retaining the choke in locked closed position at such times as the engine might be turning at a rate sufficient to produce excessive suction and flood the engine cylinders with gasoline, there is provided a relief valve 60 of the poppet type, which is held closed by the spring 62 mounted concentrically upon the valve stem 64 which spring is tensioned so as to permit opening of the valve under excessive suction conditions.

As shown in Figure 1, the choke valve is in its wide open position and is held in this position by pressure of the forked lever tine 40, upon the ear 24 forming a crank pin on the crank 22. In choking, tension is applied to the cable 48 sliding the same to the left, rotating the lever 36 and tine 40 in a clockwise direction and under such circumstances the crank 22 will tend to rotate similarly as a result of the coil spring 28 urging rotation in a clockwise direction. Should the lever 36 be rotated to the position shown in Figure 3, the coil spring 28 may urge the choke valve to the closed position shown. It will, of course, be apparent that suction pressure upon the unbalanced valve disk will tend to open the same against the resistance of spring 28 when in this position thus tending to automatically position the choke valve, since the crank 22 on the choke valve may rotate clockwise without being interfered with by the lever 36 due to the lost motion provided. Should it be desired to lock the valve closed, rocking the lever 36 to the position shown in Figure 2 will accomplish this result. It will also be apparent that if the lever 36 is positioned at any point intermediate the position shown in Figures 2 and 3, it may limit the maximum open position which the choke valve may take, since the ear 24 of the crank 22 will engage the tine 38 of the forked lever and thereby limit the movement. There is thus provided a lever connected with a control cable adapted to move through a relatively small angular movement thereby tending to retain the control wire relatively straight and at the same time providing an operating mechanism to rotate the carburetor choke valve through a much wider angle than could conveniently and efficiently be effected by direct connection, since the angularity of the crank and cable in the actuating movement of the choke would be so great as to produce uneven movement and bend the cable possibly beyond its elastic limit gradually fatiguing the same.

There is further provided by the mechanism a suitable lost motion connection which permits the choke valve to be held positively open, resiliently closed by yielding means and/or under the influence of a thermostat, or locked closed which arrangement is of advantage, since it permits the choke to operate automatically within certain limits irrespective of the operator's control thereof. When a thermostatic element, such as shown in Figure 6, is used in place of the coil spring 28, it may be so adjusted as to exert little or no effort toward closing the valve when at normal engine operating temperatures but on the other hand exert a closing force sufficient to suitably enrich the mixture when cold. It will of course be understood that the degree of lost motion may be varied and where the same may be undesirable, the lost motion may be completely eliminated.

Although two embodiments of the invention have been illustrated and described, it is to be understood that the invention is not limited thereto, but may be embodied in various other mechanical forms and combinations. As various changes in construction and arrangement of parts may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

We claim:

1. In a carburetor, a bracket, a lever pivoted thereon, an arm on said bracket for supporting a flexible cable housing in line for actuating said lever, a choke shaft passing through said bracket eccentric from the lever pivoted thereon, and means including a lost motion connection for transmitting movement of said lever in either direction to said shaft.

2. In a carburetor, a bracket, a lever pivoted thereon, an arm on said bracket for supporting a flexible cable housing in line for actuating said lever, a shaft passing through said bracket eccentric from the lever pivoted thereon, a pressure responsive choke valve on said shaft, and means operable by said lever for transmitting movement in either direction to said shaft.

3. In a carburetor, a support, a lever pivoted thereon, yielding means for urging said lever in one direction, a shaft eccentric to the lever pivot, an unbalanced butterfly valve mounted on said shaft, yielding means urging said shaft to rotate in one direction, and means including a lost motion connection for transmitting motion of said lever in either direction to said shaft.

4. In a carburetor, an air inlet, a shaft, a normally open unbalanced choke valve fixed to the shaft and controlling the air inlet, yielding means urging the valve toward closed position, an actuating member pivoted eccentrically of the shaft, a Bowden wire control for said actuating member, and means including a lost motion connection between said actuating member and said shaft for causing a given angular movement of the actuating member to impart a greater angular movement to the shaft.

5. In a carburetor for internal combustion engines, an unbalanced choke valve, a shaft therefor, a crank fixed to said shaft, yielding means for urging said valve to closed position, a lever pivoted eccentric to said shaft and having spaced opposing surfaces adapted to engage said crank, said surfaces being spaced so as to afford lost motion between said lever and crank to permit limited opening and closing movement of the choke valve to automatically supply a quantity of air dependent upon the requirements of the engine without movement of the lever.

6. In a carburetor, an air inlet, a lever pivotally mounted thereon, a bracket having an arm

for supporting a flexible cable housing in line for actuating the lever without subjecting the cable to undesirable bending, a choke shaft passing through the air inlet at a distance from said lever, and means including opposed yielding means and a lost motion connection for transmitting movement to the lever in either direction of the shaft.

7. In a carburetor having an air inlet passage, a choke shaft extending through the air inlet passage and offset with respect to the axis thereof, a choke valve fixed to the choke shaft, a control member fixed to the choke shaft, yielding means engaging said member and urging said valve toward closed position, a crank eccentrically pivoted with respect to the choke shaft and having spaced arms positioned to alternatively engage said member, yielding means urging said crank to a position to rotate said member to open the choke valve, and manually operable means to rotate said crank.

8. In a carburetor having a vertically disposed air inlet passage, a choke shaft extending through the air inlet passage and offset with respect to the axis thereof, a choke valve fixed to the choke shaft, a control member fixed to the choke shaft, yielding means urging said valve toward closed position, a crank eccentrically pivoted with respect to the choke shaft and having spaced arms engaging said member, yielding means urging said crank to a position to engage said member by one arm to open the choke valve, and means to rotate said crank to move the last named arm out of contact with said member whereby the choke valve will be first resiliently closed and then positively locked closed as the other arm of said crank engages said member.

9. In a carburetor having an air inlet passage, a choke valve controlling the air inlet passage, means to actuate the choke valve, yielding means urging the choke valve towards the closed position, a lever eccentrically mounted with respect to the choke valve and engaging said actuating means, yielding means urging the lever to rotate in a direction to open the choke valve, said last named yielding means being of greater strength than the first named yielding means tending to normally position the choke valve in the open position, and means to move the lever out of engagement with the actuating means to permit the choke valve to close and thereafter to move the lever into engagement with the actuating means to lock the choke valve in the closed position.

10. A control mechanism for a carburetor, comprising a passage, a valve therein mounted on a shaft, a bifurcated lever having its pivot offset relative to the shaft, yielding means for urging said lever to rotate in one direction, yielding means urging the shaft to rotate in the opposite direction, and a lost motion connection including the arms of the bifurcated lever for transmitting motion of said lever in either direction to said shaft.

11. In a carburetor, an air inlet, a lever pivotally mounted thereon, a spring urging the lever in one direction, a bracket having an arm for supporting a flexible cable housing in line for actuating the lever without subjecting the cable to undesirable bending, a choke shaft passing through the air inlet parallel to the pivot of said lever, an unbalanced choke valve fixed to said shaft, an arm on said shaft constructed and arranged to contact said lever, a spring urging said arm into contact with the lever, said lever being movable by the flexible cable beyond the position corresponding to closed position of the choke valve.

12. In a carburetor, a support, a lever pivoted thereon, yielding means for urging said lever in one direction, a shaft eccentric to the lever pivot, yielding means urging said shaft to rotate in the opposite direction, and means including a lost motion connection for transmitting motion of said lever in either direction to said shaft.

13. In a carburetor having an induction passage, a lever having a fixed pivot, yielding means urging the lever to move towards one extreme position, a choke valve to control the inlet to the induction passage, a choke shaft therefor eccentrically mounted with respect to said lever, yielding means urging the choke valve to move in the direction opposite to the direction of movement of the lever, and means including a lost motion connection for transmitting movement of the lever to the shaft.

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