Dec. 20, 1938. M. E. CHANDLER 2,140,734

CARBURETOR CHOKE VALVE

Filed Aug. 31, 1932

Fig. 1

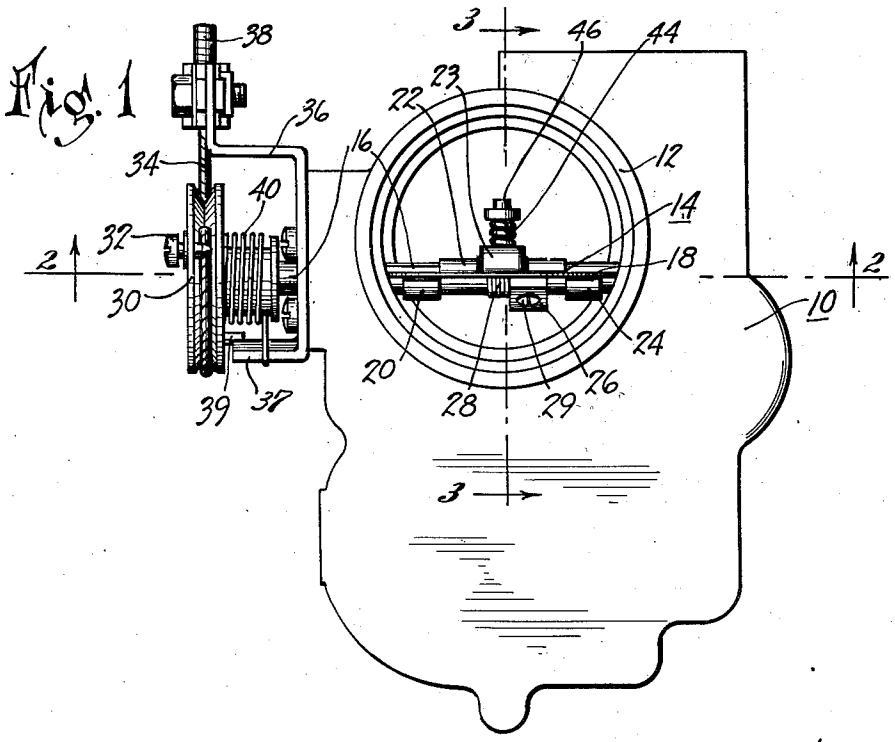


Fig. 2

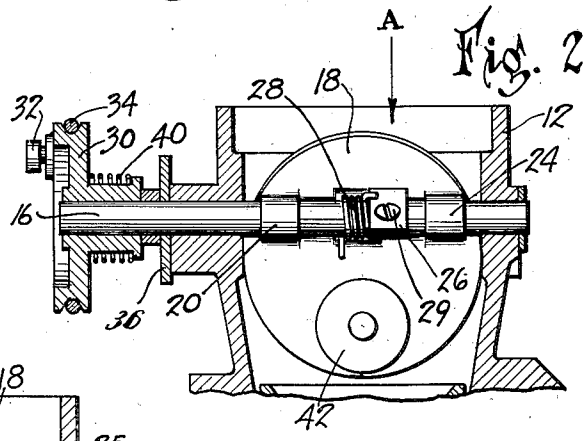
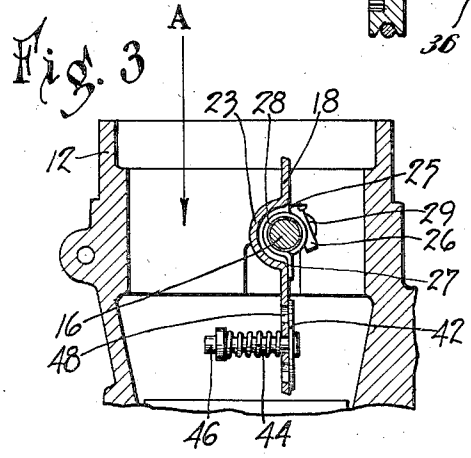


Fig. 3



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Patented Dec. 20, 1938

2,140,734

UNITED STATES PATENT OFFICE

2,140,734

CARBURETOR CHOKE VALVE

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Application August 31, 1932, Serial No. 631,282

11 Claims. (Cl. 277—42)

This invention relates to air valve structure and more particularly to pressure or flow sensitive valves of the butterfly type, and is illustrated as embodied in a carburetor choke valve.

Considerable difficulty is had with the usual type of air inlet or choke valve utilized in automotive engine carburetors since its operation has been for most part entirely manual. As a result, the uninstructed operator is often prone to over choke, and as a result flood the motor, thus delaying the starting of the motor, wasting fuel, and diluting the lubricant in the crank case. This invention is adapted to provide a choke valve which is semi-automatic, it being manually operable, but subject to automatic variation under motor starting and running conditions which may positively require a different choke valve position or effect than that which is effected manually.

It is accordingly an object of the invention to provide a choke or air valve which is semi-automatic in operation and which is adapted for automatic self compensation during maladjustment due to manual control.

A further object of the invention is to provide a semi-automatic choke of simplified construction which is rugged, practical and readily adapted for low cost production.

A still further object of the invention is the provision of an air pressure or flow sensitive choke valve adapted to be resiliently either closed, or locked closed, manually, but yet provided with relief means operable automatically under engine conditions requiring relief.

Another object is the provision of novel flexible cable control means for actuating the choke valve.

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 top view of a down draft type of carburetor showing the choke valve and operating mechanism in open position;

Figure 2 is a section through Figure 1 taken on the line 2—2 of Figure 1;

Figure 3 is a section through Figures 1 and 2 taken on the line 3—3 of Figure 1;

Referring more particularly to Figure 1, there is shown therein a plain tube type of carburetor 10 having an air inlet 12 with a choke valve mounted therein generally denoted by 14. As may be observed, a shaft 16 extends through the inlet 12 at one side of the center and carries thereon a butterfly valve disc 18 which in this instance is of the unbalanced type. The valve disc 18 is rotatable relative to the shaft 16 and is preferably provided with oppositely struck loop portions 20, 22 and 24 embracing the shaft 16.

In order to limit the rotation of the valve disc upon the shaft, a stop member such as 26 is secured to the shaft by any suitable means such as a screw 29 at a point opposite a looped portion such as 22 on the valve disc 18, which stop is adapted to engage the valve disc at diametrically opposite points 25 and 27 and provide suitable lost motion. To urge the valve disc against one side of the stop, a suitable coil spring 28 may be provided preferably engaging the stop member and the disc, and lying in a clearance space formed by the further struck out central portion 23 of the loop 22 which also restricts axial movement of the spring for the purpose of retaining the same in proper position.

To actuate the valve, the shaft 16 is shown as extended without the carburetor wall and is fitted with a cable drum 30 to which is secured by means of the set screw 32 a flexible cable 34. A bracket 36 secured to the carburetor in any suitable fashion provides a stop 37 adapted to engage the lug 39 on the drum 30 and a support for a conduit 38 tangentially arranged with respect to the drum through which the flexible cable 34 is adapted to slide. Since the cable 34 is designed to exert tension only, a return spring 40 is suitably positioned so as to engage the drum at one end, and the bracket or other stationary part at the other end, and is so tensioned initially as to tend to open valve 14 at all times.

During such times as the valve may be locked in shut position it is preferable to have some form of relief valve. For this purpose a poppet valve 42 is provided in the valve disc 18 and is retained in seated position by the spring 44 retaining the stem 46 under tension and thus closing the apertures 48 located under the valve head.

In operation, it will readily be apparent that the air flow is downward or as indicated by the arrow A in Figures 2 and 3, and that the valve may be readily opened or closed by the turning of the valve shaft 16, since the spring 28 urges the valve into engagement with the stop member 26 (see Figure 3) at 25 and thus normally causes the valve to

follow the movement of the shaft. Upon turning the valve to closed position, it will be seen that the valve is held in this position by the spring 28 and that the pressure differential developed when the motor is running, may open the valve against the resistance of the spring 28 because of the valve's unbalanced construction. By further turning of the shaft, the resistance of the spring may be increased and by turning the shaft until the stop 26 strikes the other side of the valve at 27, the valve may be held or locked shut. Under these conditions the only relief available is by means of the valve 42 which may open to provide some air should the pressure differential be sufficient.

Thus there is provided a manual control which is adapted to be automatically modified under conditions which would ordinarily strangle or flood the motor and make starting difficult.

Though only one embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto but may be embodied in various mechanical forms and combinations as desired. 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 persons skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a carburetor having a vertically disposed air inlet passage, a pressure actuated choke mechanism comprising a shaft extending through the inlet and offset from the axis thereof, a disc valve rotatably mounted on the shaft, a pressure responsive valve positioned in the disc valve to relieve excess pressure on opposite sides of the disc valve when the choke valve is in the fully closed position, stop means carried by the shaft to limit the rotation of the valve relative to the shaft in both directions, yielding means including a coiled spring coaxially wound about the shaft and engaging the stop means and the disc valve and urging the valve to rotate in a direction to close the air inlet passage, manual means including a cable drum fixed to the shaft to rotate the shaft, and yielding means engaging the cable drum to rotate the shaft to open the air inlet passage.

2. In a carburetor, a vertically disposed air passage, a rotatable control shaft extending across said passage and spaced from the center thereof, a valve disc rotatable with respect to said shaft and adapted to be urged toward open position by air flow through the passage, resilient means including a spring wound coaxially about said shaft and connected between the shaft and disc and urging the disc toward closed position with a force varying with the relative positions of the shaft and valve disc, stop means carried by the shaft for limiting the rotation of the disc relative to the shaft in either direction, and manually operable means to rotate the shaft.

3. In a carburetor, a vertically disposed air inlet passage, a shaft in said passage, an unbalanced air inlet valve rotatably mounted on said shaft, a stop member fixed to said shaft and adapted to engage said valve in either of two extreme positions, resilient means carried by the shaft engaging the stop member and said valve and urging said valve toward one of said positions while permitting the valve to be rotated by suction to the other of said positions, manually operable means to rotate the shaft, and a relief valve adapted to function whenever an excess of differential fluid pressure on opposite sides of said air inlet valve is produced.

4. In a carburetor, an air inlet passage, a choke shaft extending across the air inlet passage, an unbalanced choke valve rotatably mounted on the shaft, stop means carried by the shaft to limit the movement of the valve with reference to the shaft in both directions, and yielding means helically wound about the shaft and engaging the valve to urge the valve towards one extreme position.

5. In a carburetor, an air inlet passage, a choke shaft extending across the air inlet passage, an unbalanced choke valve rotatably mounted on the shaft, stop means carried by the shaft to limit the movement of the valve with reference to the shaft in both directions, yielding means coiled about the shaft and engaging the valve and stop means to urge the valve in the direction to restrict the air inlet passage.

6. In a carburetion system, a choke valve and means for operating the same, comprising yielding connections between said valve and said means for progressively applying tension to said valve to provide a plurality of different stages of operation whereby in one stage said valve will be movable towards an open position under a predetermined minimum pressure differential, and in another stage said valve will only be responsive to a predetermined increased pressure differential to move towards an open position and means for admitting a limited amount of air past said valve when the operating means is in its extreme closed position.

7. In a carburetion system, an unbalanced choke valve tending to open in response to engine suction, an operating lever therefor having a limited movement with respect thereto, a spring normally causing the valve to follow the lever in its valve closing movement, said spring being adapted to yield to engine suction to permit an increased valve opening relative to the lever position, and means for admitting a limited amount of air past said valve in response to a higher degree of suction when said lever reaches its extreme position.

8. In a carburetion system, an unbalanced choke valve tending to open in response to engine suction, an operating lever therefor having a limited movement with respect thereto, a spring normally causing the valve to follow the lever in its valve closing movement, said spring being adapted to yield to engine suction to permit an increased valve opening relative to the lever position, said lever being adapted to progressively limit the opening movement of the valve in response to suction as the lever is moved past the valve closed position, and means responsive to a higher degree of suction adapted to admit a limited amount of air past said valve when the lever is in its extreme position.

9. In a carburetion system, a suction responsive choke valve adapted to admit air therepast in proportion to the suction acting thereon, an operating lever having a lost motion connection to the valve, yieldable means adapted to normally cause the valve to follow the closing movement of the lever until the valve reaches its closed position, said lever being adapted to progressively restrict the yielding movement of the yieldable means as the lever is moved past the valve closed position, and means responsive to a higher degree of suction adapted to admit a

limited amount of air past said valve when the lever is in its extreme position.

10. In a carburetion system, an unbalanced choke valve tending to open in response to engine suction, an operating member therefor, a yielding connection between said operating member and said valve for applying tension to said valve in a degree varying with the relative positions of the operating member and valve to cause the same to normally follow the operating member in its closing movement, said connection yielding under a predetermined engine suction to permit an increased opening of the valve relative to the operating member position, a positive connection between said operating member and said valve operative when said operating member reaches its extreme closed position, and means operative when the operating member is in its extreme closed position to admit a limited amount of air past said valve.

11. In a carburetion system, an unbalanced choke valve tending to open in response to engine suction, an operating member therefor, spring means normally tending to move said operating member to its full open position, a yielding connection between said operating member and said valve for applying tension to said valve in a degree varying with the relative positions of the operating member and valve to cause the same to normally follow the operating member in its closing movement, said connection yielding under a predetermined engine suction to permit an increased opening of the valve relative to the operating member position, a positive connection between said operating member and said valve operative when said operating member reaches its extreme closed position, and means operative when the operating member is in its extreme closed position to admit a limited amount of air past said valve.

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