April 7, 1959 A. H. WINKLER 2,880,978

AUTOMATIC CHOKE

Original Filed April 29, 1955 3 Sheets-Sheet 1

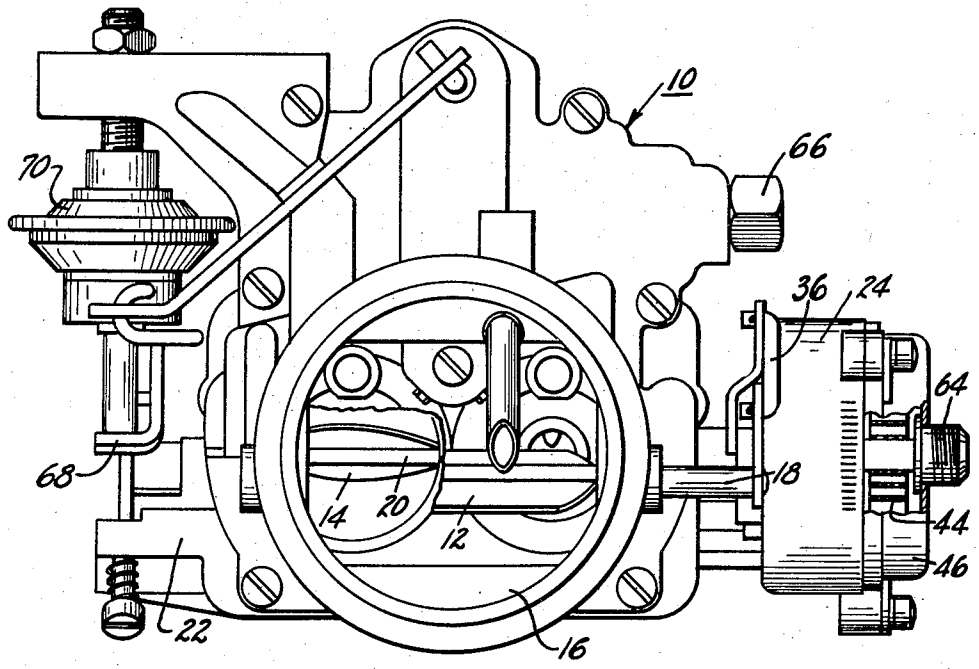


FIG. 1

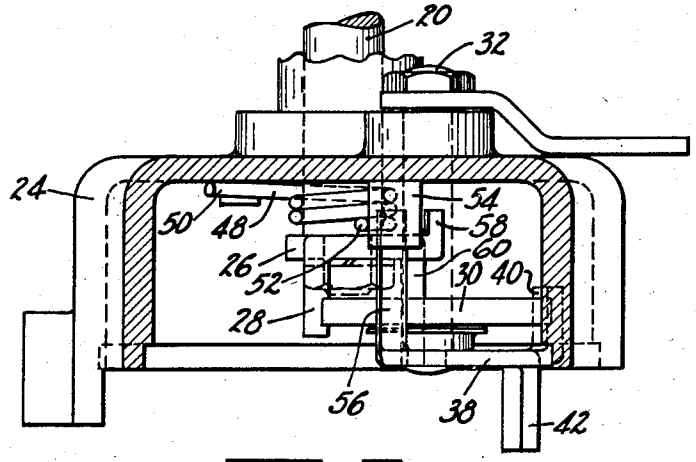


FIG. 2

INVENTOR.
ALBERT H. WINKLER
BY
James L. O'Brien
ATTORNEY

April 7, 1959 A. H. WINKLER 2,880,978

AUTOMATIC CHOKE

Original Filed April 29, 1955 3 Sheets-Sheet 2

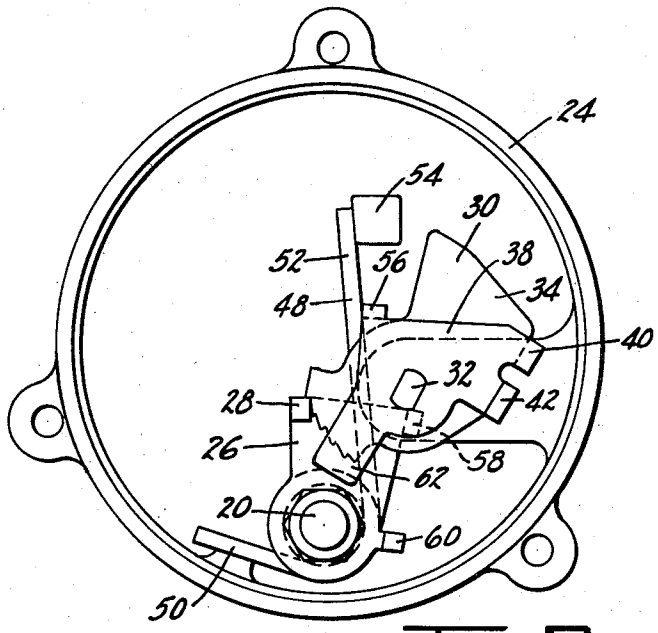


FIG. 3

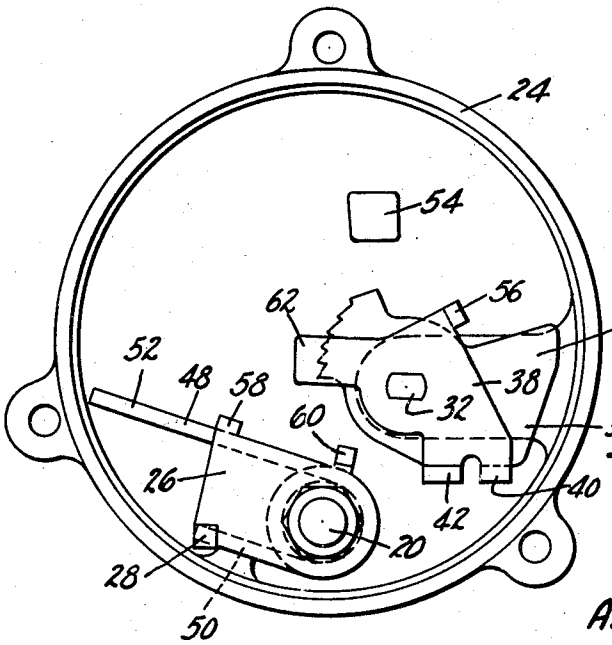


FIG. 4

INVENTOR.
ALBERT H. WINKLER
BY
James L. O'Brien
ATTORNEY

April 7, 1959 A. H. WINKLER 2,880,978

AUTOMATIC CHOKE

Original Filed April 29, 1955 3 Sheets-Sheet 3

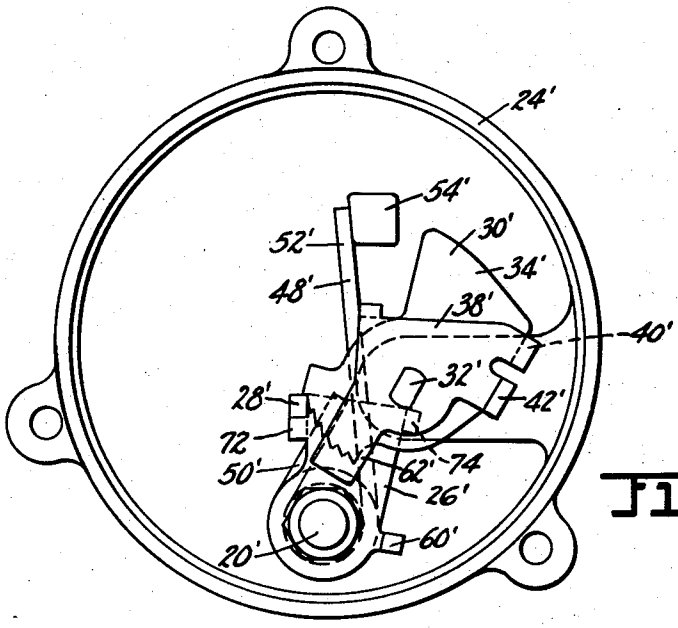


FIG. 5

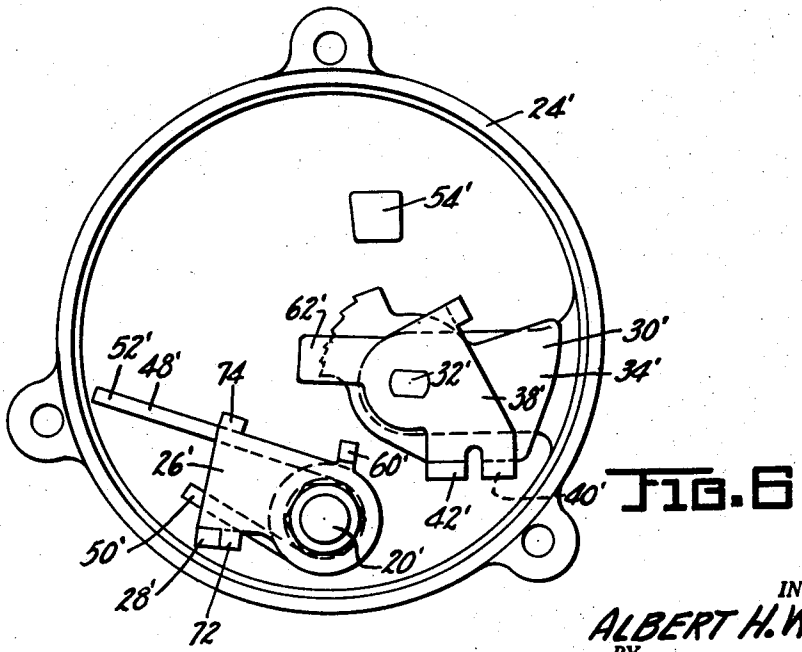


FIG. 6

INVENTOR.
ALBERT H. WINKLER
BY
James L. O'Brien
ATTORNEY

United States Patent Office 2,880,978 Patented Apr. 7, 1959

2,880,978

AUTOMATIC CHOKE

Albert H. Winkler, Elmira, N.Y., assignor to Bendix Aviation Corporation, South Bend, Ind., a corporation of Delaware

Original application April 29, 1955, Serial No. 504,937, now Patent No. 2,833,529, dated May 6, 1958. Divided and this application August 9, 1957, Serial No. 677,374

2 Claims. (Cl. 261—52)

This invention relates to carburetors for internal combustion engines and more particularly to means for automatically controlling the carburetor choke valve to vary the fuel-air mixture ratio in accordance to the requirement of the engine under various operating conditions. This application is a division of my copending application Serial No. 504,937 filed April 29, 1955 now Patent No. 2,833,529.

During engine starting and warm up it is desirable to provide the engine with a rich fuel-air mixture. The degree of desired richness varies with ambient temperature, the colder the temperature the richer the mixture desired. The degree of richness also varies as a function of throttle position, a richer mixture being desired for full throttle operation than for part throttle operation.

It has been previously proposed in an automatic choke construction to use a yieldable member or spring between a throttle linkage and choke lever to compensate for variations in ambient temperature and throttle position during engine warm up. Such a construction is shown in copending U.S. application Serial No. 478,065, filed December 28, 1954, now Patent No. 2,786,657 issued March 26, 1957 in the name of Robert W. Sutton and assigned to the assignee of the present application. The construction shown in this copending application has operated satisfactorily in commercial use, yet in some instances a greater degree of accuracy or fineness of control is required in rendering the compensating yieldable means ineffective at a predetermined degree of throttle opening.

Accordingly, it is a principal object of the present invention to provide in an automatic choke a control device for removing the compensating spring from effective position at an accurately controlled predetermined position of the throttle.

It is a further object of the invention to provide an improved device for exercising a more accurate control of the compensating spring in an automatic choke which minimizes spring fatigue.

Other objects and advantages will be readily apparent in the following detailed description taken in connection with the appended drawings in which:

Figure 1 is a top view of a carburetor embodying my invention;

Figure 2 is an enlarged top view of a choke control device shown in Figure 1 with the cover broken away;

Figures 3 and 4 are views of the interior of one embodiment of the choke device illustrating a position of the elements during various conditions of engine operation;

Figures 5 and 6 are views of the interior of another embodiment of the choke control device illustrating the position of elements during various conditions of engine operation.

Referring now to the drawings, numeral 10 designates a carburetor having a choke valve 12 and a throttle valve 14 mounted in an induction passage 16 on shafts 18 and 20 respectively. The throttle shaft is journalled in a

throttle body 22 and extends at one end into a choke control housing 24 which is cast integrally with said body. A throttle lever 26 is secured to the throttle shaft 20 and is formed with a lug 28 which is adapted to engage the stepped portion of a fast idle cam 30 which is loosely pivoted on shaft 32 in the housing. Cam 30 is weighted as at 34 to assume the slow idle position. Shaft 32 is connected to choke shaft 18 by a linkage 36 and is adapted for rotation therewith. An intermediate lever 38 is secured to shaft 32 and is formed with a turned over portion 40 which is adapted to form a one way connection between said lever and fast idle cam. Lever 38 is also provided with a projecting finger 42 adapted for engagement with hooked end of thermostat 44 which is secured at its other end in a cover member 46. When cold, the thermostat urges lever 38 in a counterclockwise direction to move cam 30 to the fast idle position.

A torsion spring 48 is looped about throttle shaft 20 and is formed with arms 50 and 52 adapted for engagement with a wall of the housing 24 and a stop member 54 respectively. Thermostat 44 urges a finger 56 on intermediate lever 38 into engagement with spring arm 52 which yieldingly opposes the closing of the choke valve. If the thermostat is cooled below a predetermined temperature the force of the thermostat will exceed that of the spring arm 52 and the choke valve will be moved toward closed position. A lug 58 on throttle lever 26 is adapted to form a one way lost motion connection with spring arm 52 to positively move said arm away from the finger 56 when the throttle valve has been opened a predetermined amount. A lug 60 on the throttle lever is adapted to engage the finger 62 on the intermediate lever 38 so as to provide a conventional means for unloading the carburetor.

Cover member 46 is adapted to be connected with a source of heated air (not shown) through a conduit 64. The interior of housing 24 is adapted to be connected to the induction passage posterior the throttle valve by a suitable conduit (not shown). The remainder of the carburetor structure is conventional and includes a fuel inlet passage 66, a throttle arm 68 adapted for connection to the usual accelerator pedal (not shown), and a dashpot 70 for retarding the closing movement of said throttle arm.

In the operation of the embodiment described thus far, the various elements of the automatic choke control device assume the position shown in Figure 3 where the throttle is in the fast idle position and lug 58 on the throttle lever 26 has been rotated out of engagement with the spring leaving stop member 54 to restrain further movement of the spring. In this position lug 28 prevents the further closing of the choke. As the throttle is opened lug 28 is disengaged from the fast idle cam 30 leaving spring arm 52 together with the force of air flow through the induction passage to balance the force of thermostat 44. At a predetermined degree of throttle opening, lug 58 picks up spring arm 52 moving it out of engagement with stop member 54. Continued movement of the throttle toward opened position renders spring arm 52 progressively less effective until at a predetermined value of throttle opening spring arm 52 is moved completely out of the path of finger 56 whereby the spring arm 52 is rendered completely ineffective to oppose the closing movement of the choke.

In Figure 4 the elements are illustrated in the wide open throttle and choke position where the spring is ineffective and the choke valve is controlled only by the thermostat 44 and air flow on the unbalanced surface of the choke valve.

It is to be noted that the operation of the device would

remain unchanged if the stop member **54** were removed and the spring **48** calibrated to assume the position shown in Figure 3 when unrestrained by lug **58**.

In the embodiment shown in Figures 5 and 6 the structure is intended to be identical to the previous embodiment with the exception of the throttle lever and the location of the spring. Similar parts appearing in the two embodiments are designated in this embodiment by similar numerals followed by a prime mark. Throttle lever **26'** is formed with a pair of lugs or arms **72** and **74** adapted to engage and restrain arms **50'** and **52'** respectively, of torsion spring **48'** which is looped about a throttle shaft **20'**.

The operation of the device shown in Figures 5 and 6 is substantially identical to the previous embodiment with the exception that lug **72** carries arm **50'** of the spring for movement with the throttle lever so as to keep the flexing of the spring at a minimum. This construction reduces fatigue and lengthens the life of the spring.

In each of the embodiments there is shown a positively actuated means for accurately controlling the effectiveness of the automatic choke compensating spring **48** or **48'**. The relative location of the various parts may be varied in different applications to vary the precise point in the opening of the throttle that the compensating spring is rendered ineffective.

The details of the arrangement shown and described are by way of example only and may be varied to meet specific conditions within the teaching of the invention.

I claim:

1. A choke control device for a carburetor having a throttle valve, a choke valve and a shaft for said throttle valve comprising a lever operatively connected to said choke valve, a pair of spaced lugs operatively connected to said throttle shaft and a torsion spring encircling said shaft and stressed between said lugs and formed to engage said choke lever to oppose the closing of said choke valve when said throttle valve is in substantially closed position.

2. A choke control device for a carburetor having a throttle valve and a choke valve comprising a lever operatively connected to said choke valve, a pair of spaced arms operatively connected to said throttle and a torsion spring stressed between said arms and formed to engage said choke lever to oppose the closing of said choke valve when said throttle valve is in substantially closed position.

References Cited in the file of this patent

UNITED STATES PATENTS

2,124,778	Hunt	July 26, 1938
2,786,657	Sutton	March. 26, 1957