

Nov. 5, 1963

A. L. MENNESSON

3,109,874

CARBURETORS COMPRISING AN AUXILIARY DEVICE TO INCREASE
THE FUEL FEED FOR COLD STARTING CONDITIONS
Filed March 24, 1961

Filed March 24, 1961

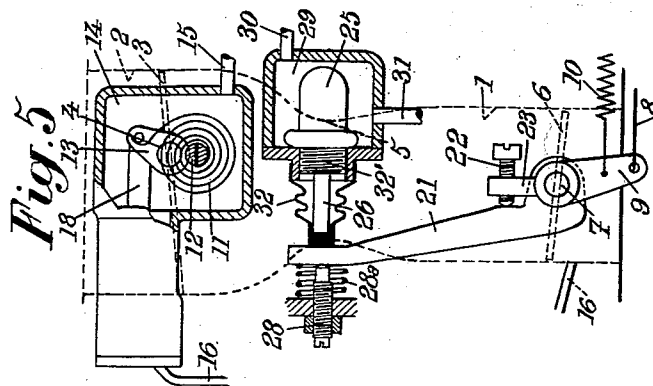
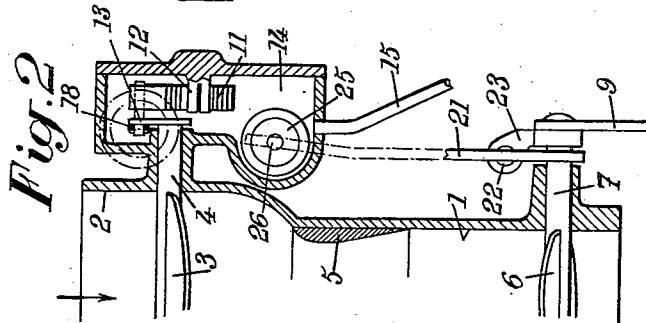
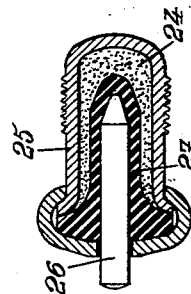
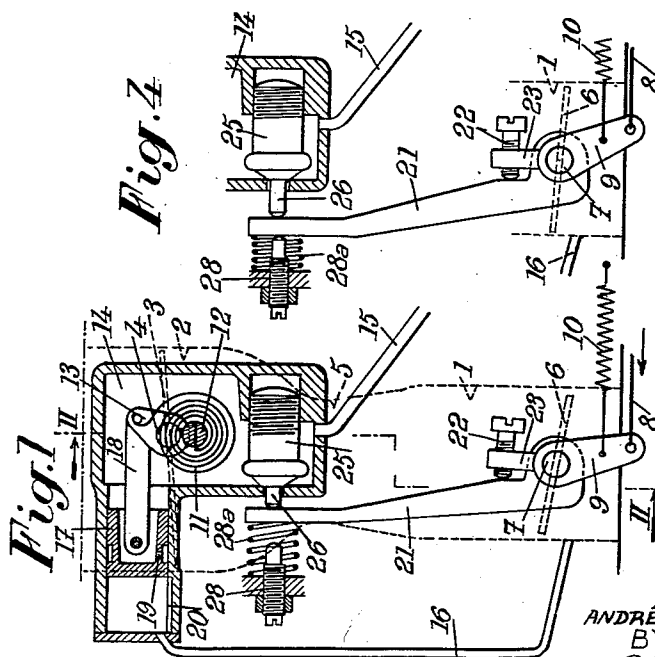


Fig. 3

INVENTOR

ANDRÉ LOUIS MENNESSON

B

Bailey, Stephens & Huetting
ATTORNEYS

1

3,109,874

CARBURETORS COMPRISING AN AUXILIARY DEVICE TO INCREASE THE FUEL FEED FOR COLD STARTING CONDITIONS

André Louis Mennesson, Neuilly-sur-Seine, France, assignor to Societe Industrielle de Brevets et d'Etudes S.I.B.E., Neuilly-sur-Seine, France, a society of France
Filed Mar. 24, 1961, Ser. No. 98,201

Claims priority, application France Feb. 20, 1961

2 Claims. (Cl. 261—39)

The present invention relates to internal combustion engine carburetors comprising an auxiliary device to increase the fuel feed for cold starting conditions and abutment means for controlling the idling throttle opening, said abutment means being capable of increasing this opening for running with cold engine, said auxiliary device and abutment means being operated automatically and distinctly in accordance with the temperature of the engine.

It is known that this increased opening of the throttle valve when the engine is cold requires an effort sufficiently great to overcome the action of the resilient control return means which are generally provided to urge the throttle valve toward the minimum opening position. As a rule, this effort is supplied by the driver who, just before starting the cold engine, must open said throttle valve for the time just necessary to enable the abutment means to come into the desired position across the path of the throttle valve, after which said valve is brought by said resilient return means into contact with said abutment means.

Attempts have been made to eliminate the necessity of this operation. One of the solutions suggested for this purpose was to control the abutment means through an electro-magnet sufficiently powerful to overcome the resistance of the resilient return means. But such a system is both heavy and expensive.

The object of the present invention is to provide a carburetor which solves the above stated problem by the use of simple, light and resistant means.

The invention consists essentially in having the abutment means directly positioned by means of a thermostatic device comprising a material, contained in a closed housing, which undergoes an important variation of volume when passing in a reversible fashion from one physical state to another one and in particular from the solid state to the liquid state between the temperatures to which said material is subjected according as the engine is cold or warm, respectively, such a device being capable of developing an effort greater than the force exerted by the resilient return means acting upon the throttle valve.

Preferred embodiments of the present invention will be hereinafter described with reference to the appended drawings given merely by way of example and in which:

FIG. 1 is a diagrammatical elevational view, with parts in section, of a carburetor made according to the present invention.

FIG. 2 is a sectional view of the line II—II of FIG. 1.

FIG. 3 is an axial sectional view on an enlarged scale of the thermostatic device of FIG. 1.

FIG. 4 is a partial view of some of the elements of FIG. 1 in the position corresponding to warm engine running.

FIG. 5 shows a modification of the carburetor of FIG. 1, the part being shown in the position corresponding to warm engine running.

The carburetor shown by the drawings comprises an induction pipe 1 having at the top thereof an air inlet 2 in which is provided a choke valve 3 mounted on a spindle 4, this spindle being preferably offset with respect

2

to the center of the induction pipe to unbalance the choke valve so that the air flow through the induction pipe will tend to open said valve. Downstream of said choke valve 3 are located successively in pipe 1 a venturi 5 and a cylindrical portion in which is mounted a throttle valve 6 carried by a spindle 7. Throttle valve 6 may be opened by the driver through the throttle control 8 which acts in the direction of the arrow of FIG. 1 upon a lever 9 fixed on spindle 7, the throttle valve being constantly urged toward its closed position by resilient return means consisting of a spring 10, the limit closing position being determined by abutment means which will be hereinafter described.

In order to control choke valve 3 there is provided a bimetal spring 11 which, when cold, tends to close said choke valve. For this purpose, the inner end of this spiral spring 11 is secured to a fixed pin 12, whereas the outer end acts through a lever 13 on the spindle 4 of spring 11. This bimetal spring 11 is subject to the temperature of a fluid which grows warmer and warmer as the engine is warming up. This fluid may consist of the exhaust gases, a stream of air warmed up by these gases, the cooling water of the engine, or the oil used for lubricating said engine. For this purpose, bimetal spring 11 is housed in a chamber 14 through which said fluid is flowing, entering through a conduit 15 and leaving through a conduit 16.

Generally, as illustrated by the drawing, outflow channel 16 opens into pipe 1 downstream of throttle valve 6; thus, choke valve 3 is subjected, in the opening direction, not only to the action of the air stream that is sucked in, but also to that of a piston 17 connected to lever 13 through a link 18, this piston being interposed between conduits 16 and 15, so as to be acted upon by the suction existing in pipe 1 downstream of throttle valve 6. This piston is provided with an orifice 19 which, as soon as the piston has been moved toward the left under the effect of the suction, is in communication with a slot 20 and thus permits the fluid from chamber 14 to pass into conduit 16.

It is known that, when the engine is cold, choke valve 3 is closed by spring 11, which increases the fuel feed flow rate through the supply orifice located at the level of venturi 5, and that as the engine is warming up, spring 11 gradually opens choke valve 3 urged in the opening direction by the air stream flowing through pipe 1 and also by the action of piston 17.

The closing position of throttle valve 6 is determined by a lever 21 pivoting about the same axis as said throttle valve and the edge of which bears against a screw 22 mounted in a lug 23 rigid with the spindle 7 of said throttle valve, the lever and screw 22 thus constituting an abutment means for controlling the idling position of the throttle valve.

The position of lever 21 corresponding to the closing of throttle valve 6 is determined by a piston 26 against which said lever is urged by a spring 28a.

According to the invention, the position of piston 26 is determined by a thermostatic device, as shown by FIG. 3, comprising a material 24 contained in a closed housing 25 and capable of undergoing an important variation of volume when passing in reversible fashion from one physical state to another one and in particular from the solid or pasty state to the liquid state between the temperatures to which it is subjected according as the engine is cold or not. The nature of this material 24 is chosen in accordance with the limits within which its temperature is to vary and advantageously consists of stearic acid or some derivative thereof (stearates).

The changes of volume of material 24 are transmitted to the outside of casing 25 by piston 26. Furthermore,

3

a sleeve 27 of natural or synthetic rubber is provided in casing 25 between piston 26 and material 24 to prevent leakage of said material in the liquid state. Piston 26 constitutes a part against which lever 21 is applied by spring 28a. This spring 28a is chosen of a strength such that it can overcome the resistance of return spring 10. An adjustable stop 28 carried by the frame of the carburetor is advantageously mounted in spring 28a, so as to limit the displacement of lever 21 toward the left under the action of piston 26.

In the construction of FIGS. 1, 2 and 4, thermostatic device is subjected to the action of the same heating fluid as bimetal spring 11 and it is therefore housed in the chamber 14 containing said spring.

In the construction of FIG. 5, the thermostatic device is subjected to the action of a heating fluid different from that acting upon spring 11. For this purpose it is housed in a separate chamber 29 provided with an inlet conduit 30 and an outlet conduit 31 for said fluid which is preferably gaseous.

In order to avoid any leak of heating fluid either between piston 26 and the whole of the chamber 14, or 29, through which this piston is extending (FIGS. 1 and 4) or between this wall and the threaded portion 32 through which said thermostatic device is screwed in position (FIG. 5) the external portion of piston 26 is preferably surrounded by a fluidtight sleeve 32 carried by said wall, as shown by FIG. 5.

The carburetor according to the present invention functions in the following manner.

When the engine, and consequently thermostatic devices 11 and 25—26 are cold, the elements of the carburetor are in the position of FIG. 1, at least when the engine is at rest. Choke valve 3 is closed and throttle valve 6 is slightly open under the action of spring 28a, piston 26 being wholly retracted and material 24 being for instance in its solid state.

As soon as the engine is started, piston 17 moves toward the left and opens conduit 16 through orifice 19 and slot 20, which enables the hot gaseous fluid to flow through chamber 14. Bimetal spring 11 is gradually heated, thus permitting choke valve 3 to open gradually. Material 24 is also heated and soon reaches the temperature at which it changes of state, for instance becoming liquid, then applying on lever 21, through piston 26, an effort (averaging several kilograms) sufficient to overcome the resistance of spring 28a until, after a displacement of some 5–10 mm., this lever is applied against stop 28. Spring 10 then pulls lever 9 to bring throttle valve 6 into normal position (FIG. 4 or 5) corresponding to idling with a warm engine.

Stop 28 and casing 25 are adjusted in such manner that the limit positions of lever 21 correspond respectively to the normal idling position of throttle valve 6 (FIGS. 4 and 5) and to the increased opening position (FIG. 1) necessary to allow starting the engine at the lowest temperature. It should be noted that thermostatic device 25, 26 permits an infinity of intermediate positions of throttle valve 6 and thus determines the degree of opening thereof corresponding exactly to the temperature at which the engine is running.

According to the modification of FIG. 5 where bimetallic spring 11 and device 25—26 are heated by different heating fluids, it is possible to have for choke valve 3 and throttle valve 6 different laws of opening and closing as a function of the temperature. Furthermore, thermostatic device 11 may be subjected to very high temperatures (for instance by flowing thereon air that has been caused to pass through the exhaust pipe of the engine) which could not be withstood by thermostatic device 25, 26 which is then subjected to lower temperatures, for instance those of the cooling water or lubricating oil of

4

the engine. It should be well understood that the auxiliary device to increase the fuel feed for cold starting conditions may be of any type other than the eccentric choke valve above described but, nevertheless, requiring a supplementary opening of throttle valve 6. Of course, the carburetor, instead of being of the fuel suction type, may be of the type where fuel is injected under pressure into induction pipe 1, either upstream or downstream of the throttle valve.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of my invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

What I claim is:

1. An internal combustion engine carburetor which comprises, in combination, an induction pipe, a choke valve in said pipe, first means responsive to the engine temperature for closing said choke valve when the engine is cold and stopped and opening it when the engine is started and warming up, a throttle valve in said pipe downstream of said choke valve, abutment means movable with respect to said pipe operatively connected with said throttle valve for controlling the idling running position thereof, return spring means for urging said throttle valve toward the position determined by said abutment means, second means responsive to variations of the engine temperature but entirely independent of said first engine-temperature responsive means operatively connected with said abutment means for moving the abutment means in one direction for automatically controlling the position thereof to adjust the degree of opening of said throttle valve in said idling running position thereof; said second engine-temperature responsive means comprising a casing mounted in fixed position with respect to said pipe, and a mass of material enclosed in said casing capable of undergoing a great variation of volume when passing from one physical state to another, in a reversible manner, in response to variation of its temperature from one given value to another one, respectively, and including means for subjecting said casing to one temperature when the engine is cold and to another temperature when the engine is warm; and means operable on the abutment means in the other direction for moving said abutment means with respect to said casing in response to reverse variations of the volume of said mass of material, said last abutment moving means being capable, upon such reverse variations of volume of said mass of material, of moving said abutment means against the action of said spring means.

2. A carburetor according to claim 1 wherein said last abutment moving means include second spring means for constantly applying said abutment means against said second means, said second spring means being stronger than said first mentioned spring means urging the throttle valve toward the position determined by said abutment means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,393,290	Chandler	Jan. 22, 1946
2,714,759	Von Wangenheim	Aug. 9, 1955
2,803,442	Hausburg	Aug. 20, 1957
2,926,895	Seyfarth	Mar. 1, 1960
2,943,848	Gordon et al.	July 5, 1960

FOREIGN PATENTS

1,087,346	France	Aug. 25, 1954
-----------	--------	---------------