May 25, 1965 A. L. MENNESSON 3,185,453

CARBURETORS

Filed July 2, 1962 2 Sheets-Sheet 1

Fig. 1.

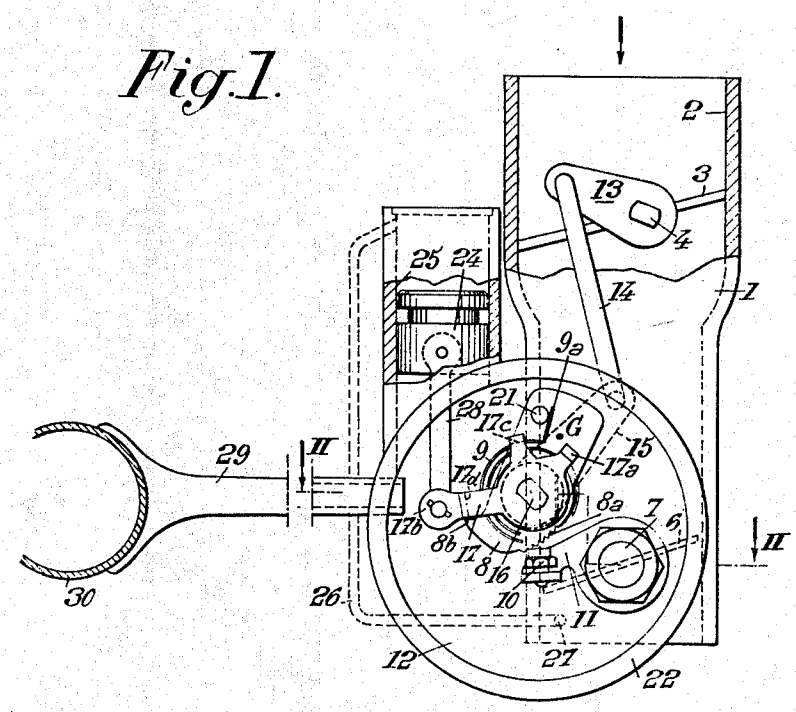
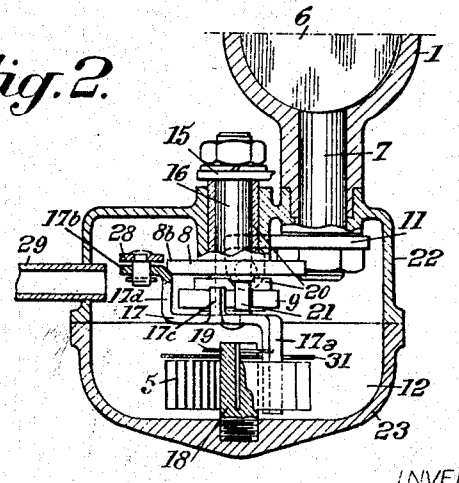


Fig. 2.



INVENTOR
ANDRE LOUIS MENNESSON

BY
Bailey, Stephens & Huettig
ATTORNEYS

May 25, 1965 A. L. MENNESSON 3,185,453

CARBURETORS

Filed July 2, 1962 2 Sheets-Sheet 2

Fig. 3.

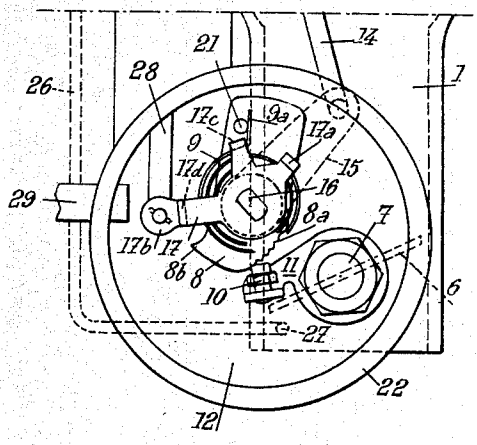
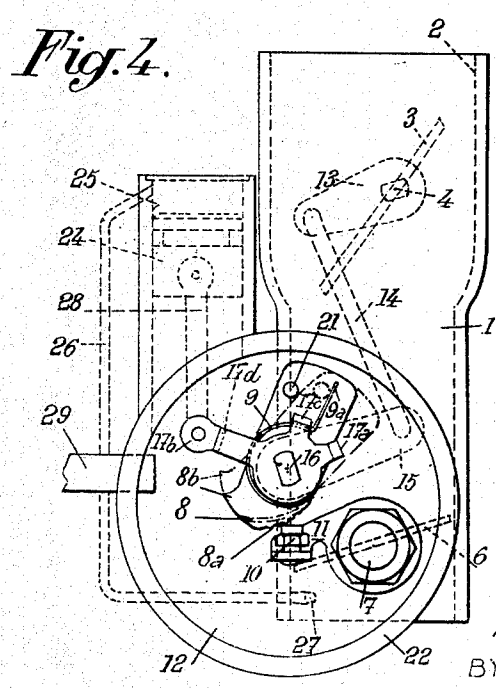


Fig. 4.



INVENTOR
André Louis Mennesson
BY
Bailey, Stephens & Huettig
ATTORNEYS

United States Patent Office 3,185,453 Patented May 25, 1965

3,185,453

CARBURETORS

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 July 2, 1962, Ser. No. 206,582
Claims priority, application France, July 17, 1961, 868,125
3 Claims. (Cl. 261—39)

The present invention relates to internal combustion engine carburetors comprising an unbalanced choke valve located in the air intake of the carburetor, upstream of the system for introduction of the primary mixture of air and fuel, said choke valve being actuated by the air stream sucked into the carburetor, against the action of a first thermostatic device which tends to close this choke valve when the engine temperature is below a given limit, such carburetors further comprising a cam for controlling the idling running position of the throttle valve and capable of holding said throttle valve slightly open when the choke valve is at least partly closed.

The object of the present invention is to provide a carburetor of this kind capable of quickly reducing the minimum degree of opening of the throttle valve immediately after the engine has been started.

For this purpose, a carburetor according to my invention is characterized in that the above mentioned throttle valve is controlled by said thermostatic device for values of the engine temperature within a range above a given limit value and by a second thermostatic device, also responsive to variations of the engine temperature, for values of said temperature within a second range of temperatures lower than the first one, the whole being arranged in such manner that the second thermostatic device is placed out of connection with the cam as soon as the engine is started with an engine temperature below said limit value.

A preferred embodiment of this invention will be hereinafter described with reference to the appended drawings, given merely by way of example, and in which:

FIG. 1 is a diagrammatic vertical section of a carburetor according to the invention, the elements of this carburetor being shown in the position they occupy when the engine is at rest and its temperature is equal to the limit between the two above mentioned temperature ranges;

FIG. 2 is a horizontal section on the line II—II of FIG. 1;

FIG. 3 is a view similar to FIG. 1, the elements being shown in the position they occupy when the engine is at rest and its temperature is within the lower temperature range;

FIG. 4 is a view similar to FIGS. 1 and 3 showing the elements in the position they occupy when the engine has just been started.

The carburetor comprises an induction pipe **1** provided with an air intake **2**. A system for the introduction of the primary mixture of air and fuel into induction pipe **1** has not been shown on the drawing for the sake of simplicity, this system being for instance of any known type.

A choke valve **3** is mounted in the air intake **2** upstream of said system, this valve **3** being pivoted eccentrically about an axis **4** (in the drawing the direction of flow of the gases is indicated by the arrow visible in FIG. 1). Choke valve **3** is urged in the opening direction by the air stream sucked into the carburetor, but its opening is limited by the action of a first thermostatic device **5** (visible in FIG. 2) which closes said choke valve **3** when the engine temperature is equal to or lower than (i.e., at most equal to) a given temperature limit.

The usual throttle valve **6** of the carburetor is mounted

on a rotating spindle **7** located downstream of said system for introducing the primary mixture. This throttle valve **6** is actuated through the usual control means (not shown) such that when said control means are released, the throttle valve is resiliently returned to its minimum opening position. This minimum opening position is determined by a cam **8**, which is the fast idle cam. For this purpose, as shown, this cam acts, through steps **8***a* carried by it, upon an abutment **10** (preferably adjustable, as shown) carried by a lever **11** fixed on the spindle **7** of throttle valve **6**.

Choke valve **3** is connected to thermostatic device **5** through transmission means comprising a lever **13** fixed on the spindle **4** of valve **3**, a connecting rod **14**, a lever **15** and a spindle **16** on which are fixed this lever **15** and another lever **17**. Thermostatic device **5** consists of a spiral wound bimetallic strip. An arm **17***a* of lever **17** is engaged in the hook-shaped end of strip **5**, the inner end of said strip being secured in a fixed axis **18**. This strip **15** is kept in position by a disc **19**.

According to the present invention cam **8** is controlled by said first thermostratic device **5** within a first range of temperature (for instance above +20° C.) and by a second thermostatic device **9**, also responsive to variations of the engine temperature, within a second range of temperature lower than the first one (in the present case below +20° C.) and the whole is arranged in such manner that the second thermostatic device is placed out of connection with cam **8** as soon as the engine has started with an engine temperature within the second temperature range.

For this purpose, in the embodiment of the invention illustrated by the drawings, cam **8** is rotatable in both directions about its axis but is constantly urged in the direction tending to reduce the minimum opening of throttle valve **6** (in the clockwise direction in FIGS. 1–3 and 4) and the rotation of cam **8** in this direction is limited by two abutments **17***d* and **9***a*, controlled respectively by said thermostatic devices **5** and **9**, said devices being adjusted in such manner that both of these abutments are in contact with cam **8** when the engine temperature is equal to the limit between the two temperature ranges (+20° C.), abutment **9***a* being subjected to the action of pneumatic means capable of placing it out of connection with cam **8** (by pushing it in the clockwise direction) when the engine, started at a temperature within the lower temperature range, produces a sufficient suction downstream of throttle valve **6**.

In order to have cam **8** urged to rotate in the clockwise direction, this cam is mounted on a fixed sleeve **20** coaxial with spindle **16** in such manner that said cam can rotate in both directions, but the center of gravity of cam **8** is located above the horizontal plane passing through spindle **16** and always on the right hand side of the vertical plane passing through this spindle, so that the weight of this cam tends constantly to rotate it in the clockwise direction.

The abutment controlled by thermostatic device **5** to limit this rotation consists of a bent portion **17***d* of lever **17** cooperating with a projection **8***b* of cam **8**, thermostatic device **5** being arranged to rotate lever **17** in the clockwise direction when the temperature rises.

The second thermostatic device **9** consists of a spiral wound bimetallic strip mounted about sleeve **20**, the inner end of this strip **9** being fixed to this sleeve **20** and the outer end of said strip being bent in a radial direction so as to form the abutment **9***a* against which bears a pin **21** rigid with cam **8**. Thermostatic device **9** is adjusted in such manner that its end **9***a* moves in the clockwise direction when the temperature rises.

The above mentioned pneumatic means consist of a

piston 24 slidable in a cylinder 25 so as to define therewith a variable volume chamber from which starts a conduit 26. This conduit 26 opens, at 27, into pipe 1 downstream of throttle valve 6. Piston 24 is connected through a rod 28 to one end 17*b* of lever 17, near which is located the above mentioned bent portion 17*d*. In order to move the end 9*a* of thermostatic device 9 out of connection with cam 8, lever 17 carries an arm 17*c* intended to push said end 9*a* in the clockwise direction when piston 24 is sucked upwardly.

Both of the thermostatic devices 5 and 9 are placed in a common casing 12 heated through any suitable means when the engine is started.

Preferably, as shown, said casing 12 is located close to throttle valve 6 so that spindle 7 can penetrate directly into said casing and lever 11 can be fixed on the end of this spindle.

In order to permit initial adjustment of bimetallic strip 5, the walls of casing 12 comprise a fixed portion 22 through which passes spindle 16, and a cover 23 carrying spindle 18, this cover being adjustable angularly with respect to fixed portion 22.

In order to heat the inside of casing 12, hot air is circulated therethrough. This air comes from a tube 29 passing close to the exhaust pipe 30 of the engine, this hot air being circulated owing to the fact that the inside of casing 12 is in communication with a portion of induction pipe 1 located downstream of throttle valve 6. For instance, piston 24 is provided with a hole placing the inside of casing 12 in communication with conduit 26.

The means for heating casing 12 might consist of an electrical resistor, located in said casing, arranged to be fed with current when the engine is started. Said means might also consist of a circulation of hot liquid in the wall of cover 23.

Fixed portion 22 and cover 23 are preferably made of a heat insulating material such as a plastic material, strip 5 being provided with a screen 31 to limit its heating.

This carburetor works as follows:

If the engine temperature is the limit between the two above mentioned temperature ranges, for instance +20° C., the elements occupy, before the engine is started, the positions of FIG. 1, after a partial opening of throttle valve 6 intended to release its steps 8*a* from contact with screw 10. Choke valve 3 is closed. Throttle valve 6 is in a position more opened than the position for idling when the engine is warm and this position of throttle valve 6 is determined by the contact of the projection 8*b* of cam 8 with the bent portion 17*d* of lever 17 and at the same time by the contact of pin 21 carried by cam 8 with the bent end 9*a* of thermostatic device 9.

Thermostatic devices 5 and 9 are made in such manner that if the engine temperature passes from the above mentioned limit value (+20° C.) to a higher value, abutment 17*d*, controlled by thermostatic device 5, moves in the clockwise direction a distance smaller than the displacement of the abutment 9*a* of thermostatic device 9. Therefore, in this case, the position of cam 8 is determined by thermostatic device 5, by contact of abutment 17*d* with the projection 8*b* of the cam.

If the engine temperature is within the lower temperature range, being for instance equal to 0° C. or even −20° C., thermostatic devices 5 and 9 might both tend to displace their respective abutments 17*d* and 9*a* in the anti-clockwise direction. But this movement is impossible for abutment 17*d*, because the lever 17 which carries it, is connected through transmission means 13, 14, 15 with choke valve 3 which is then wholly closed and consequently prevented from turning in the direction corresponding to a rotation of lever 17 in the anti-clockwise direction. On the contrary the abutment 9*a* of thermostatic device 9 is free to move in the anti-clockwise direction to come into the position of FIG. 3, thus pushing cam 8 in this direction by acting upon the projecting pin 21 thereof. As a consequence the degree of opening of this valve 6 is increased.

Therefore in all cases, when the engine is started, throttle valve 6 is set in an idling running position which depends upon the engine temperature which itself is determined by the atmospheric temperature.

As soon as the engine is started, piston 24 is lifted and choke valve 3 begins to open. Piston 24 causes lever 17 to pivot in the clockwise direction and abutment 17*c* pushes the end 9*a* of thermostatic device 9 away from pin 21 (FIG. 4). If the driver does not move the throttle pedal, throttle valve 6 remains locked in the position it occupied precedingly (determined by cam 8 in the position thereof corresponding to the solid lines position of abutment 10). But if the driver depresses said pedal he releases cam 8, which then pivots in the clockwise direction under the effect of its weight to come into the position shown in dotted lines. In this position, pin 21 carried by cam 8 is in contact with the end 9*a* of thermostatic device 9 precedingly pushed by abutment 17*c* (or alternately the projection 8*b* of cam 8 has come into contact with the bent portion 17*d* of lever 17). Throttle valve 6 then occupies an idling running position which is more closed than precedingly so that the speed of the engine is lower.

As thermostatic device 5 is heated more and more, piston 24 moves up toward its end position, while choke valve 3 moves toward its fully opened position.

The end 9*a* of thermostatic device 9 follows this movement, either due to its own heating or because it is pushed by arm 17*c*, which permits a gradual rotation of cam 8 in the clockwise direction if it is released by intermittently displacing the pedal.

As soon as piston 24 has reached the end of its movement, the position of cam 8 corresponds to the normal idling running position of the engine.

Of course the above described embodiment of the invention is given merely by way of example.

What I claim is:

1. In a carburetor for an internal combustion engine, the combination of an induction pipe with an air intake, an unbalanced choke valve in said pipe mounted to be urged in the opening direction by the inflow of air through said pipe, a first thermostatic device responsive to engine temperature variations, transmission means mounted between said first thermostatic device and said choke valve for closing said valve for engine temperatures up to a given limit and allowing it to open more and more as the engine temperature is higher and higher above said limit, a throttle valve in said pipe downstream of said choke valve, a cam mounted rotatable in both directions with respect to said pipe, said cam being operatively connected with said throttle valve for determining the idling running position thereof, means for urging said cam constantly to rotate in the direction corresponding to decreasing openings of said throttle valve, a second thermostatic device responsive to engine temperature variations, said transmission means between said first thermostatic device and said choke valve including an abutment adapted to cooperate with said cam for rotating it in a direction opposed to said last mentioned direction when the engine temperature is less and less above said limit temperature, means operatively connected with said second thermostatic device and forming an abutment for said cam to rotate it in the direction corresponding to increasing openings of said throttle valve when the engine temperature is more and more below said limit temperature, pneumatic means operative by the suction created in said pipe downstream of said throttle valve when the engine is started for imparting to said transmission means a displacement opening said choke valve, and an abutment carried by said transmission means and adapted to cooperate with said second thermostatic device when it is in a position corresponding to an engine temperature below said limit temperature for placing said

second thermostatic device out of connection with said cam in response to said displacement imparted to said transmission means.

2. A combination according to claim 1 wherein said cam is constantly urged in the direction corresponding to decreasing openings of said throttle valve by the action of gravity upon said cam.

3. A combination according to claim 1 further comprising a casing containing both of said thermostatic devices and means for circulating through said casing a fluid at a temperature varying with the engine temperature.

References Cited by the Examiner

UNITED STATES PATENTS

2,262,408	11/41	Read	261—39
2,394,665	2/46	Christian	261—39
2,939,445	6/60	Sterner	261—39
2,943,848	7/60	Gordon et al.	261—39

HARRY B. THORNTON, *Primary Examiner.*

HERBERT L. MARTIN, *Examiner.*