March 31, 1936. M. E. CHANDLER 2,036,020

CARBURETOR

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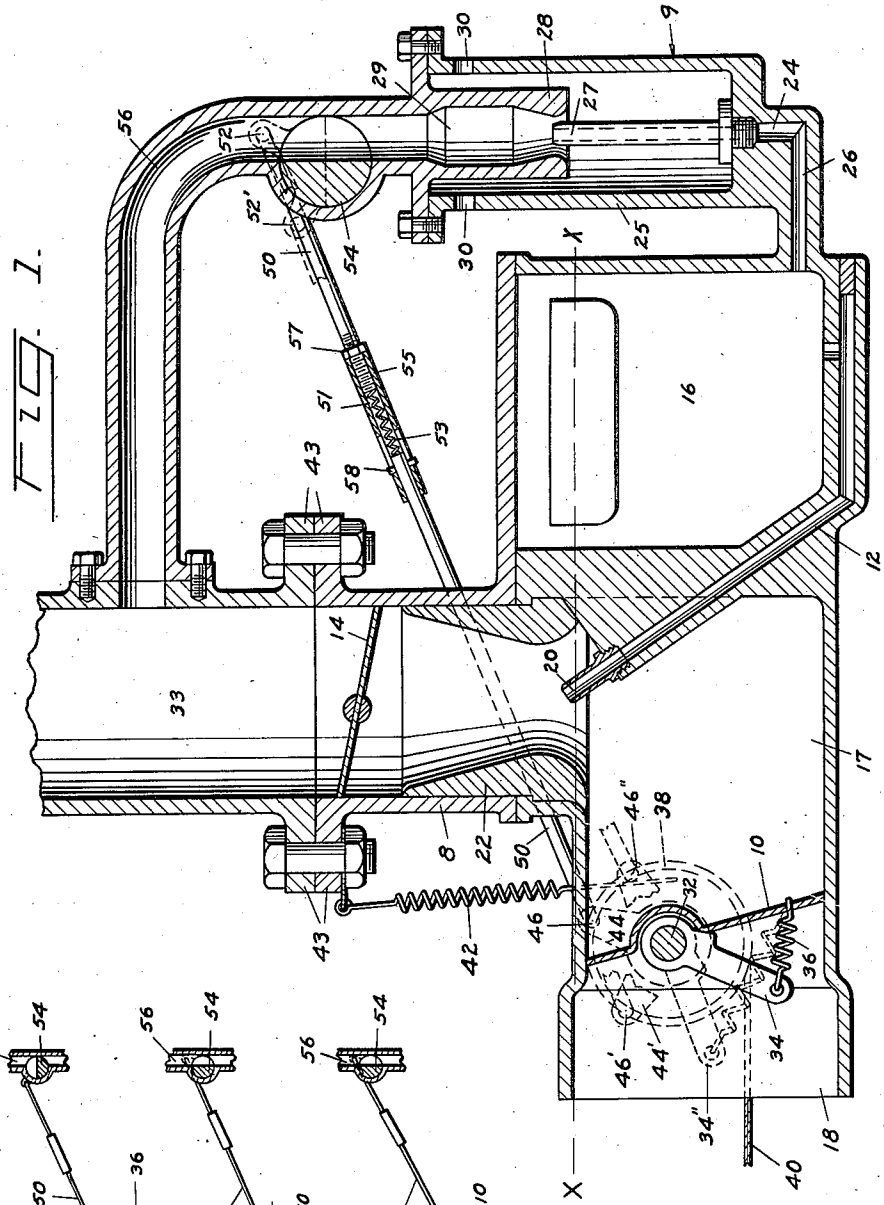


FIG. 1.

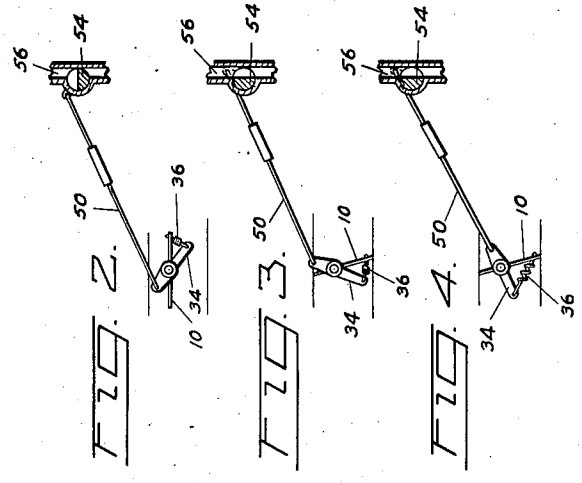


FIG. 2.

FIG. 3.

FIG. 4.

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CARBURETOR

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Application October 27, 1933, Serial No. 695,441

15 Claims. (Cl. 261—23)

This invention relates to carburetors and more particularly has reference to starting and warming up devices therefor.

Considerable difficulty is frequently encountered with the conventional manually controlled choke valve, due to the impossibility of determining how rich the mixture should be for best operation during the intermediate stages between starting when the motor is cold and normal operation when the motor is sufficiently warmed up to operate at the normal carburetor setting.

It is an object of this invention to produce a carbureting device consisting of a main or high speed carburetor for normal operation, and an auxiliary carburetor adapted to furnish a rich mixture for starting purposes. The two carubretors are controlled by valves which are so interconnected that the action of one is dependent upon that of the other, and the control of the mixture is semi-automatic, giving proper grades of mixture to secure best operation during the intermediate stages from cold engine to warmed up operation.

A further object of this invention is to provide a carbureting device which will automatically mix fuel and air in proper proportions to secure maximum efficiency of the engine under varying temperature conditions.

A still further object of the invention is to so correlate the action of the two aforesaid carburetors that the action of one will, within limits, be dependent upon that of the other, thus securing the most advantageous setting of the carbureting device at all times.

With these and other objects in view, this invention consists in the combination and arrangement of elements hereinafter described and illustrated in the accompanying drawing. It is expressly understood, however, that the drawing is employed for the purpose of illustration only, and is not designed as a definition of the limits of the invention, reference being had for that purpose to the appended claims.

Figure 1 is a vertical longitudinal section of a carbureting device embodying this invention;

Figure 2 is a diagrammatic view showing the relative positions of the auxiliary valve and the choke valve for normal operation;

Figure 3 is a view similar to Figure 2 showing the position of the valves when in choking position; and

Figure 4 is a view similar to Figure 2 showing the position of the valves in priming position.

Referring to Figure 1, there is shown therein an updraft carburetor 8, which has been chosen for the purpose of illustrating this invention, although obviously it may be equally well applied to downdraft and other forms of carbureting devices. The drawing shows a carburetor consisting of a main carbureting passage 17 having mounted eccentrically therein a choke valve 10, which regulates the flow of air through the air horn 18. In passage 17 there is also a fuel discharge nozzle 20 supplied with liquid fuel by means of a fuel duct 12 from a float chamber 16, which may be of any of the conventional forms. Also, in passage 17 there is a throttle 14 which controls the amount of combustible mixture admitted to the main riser 33 of the intake manifold (not shown).

The auxiliary carburetor 9 comprises a shell 25 and a venturi 28 positioned therein and communicating with a mixing chamber 29, and is supplied with fuel by a fuel nozzle 27, terminating within the venturi above the fuel level in the float chamber, indicated by the line X—X. Nozzle 27 is supplied with fuel through a fuel duct 26 leading from the float chamber 16. Air is supplied to the auxiliary carburetor through ports 30 formed in the shell 25.

A shaft 32 is journaled in the walls of the main carbureting passage eccentrically of the axis thereof, and is fitted with a cable drum 38 to which is secured by means of a set screw or other securing device, not shown, a flexible cable 40. An arm 34 fixed to shaft 32 is connected by means of a tension spring 36 to the unbalanced choke valve 10, which is pivotally mounted on shaft 32. A second tension spring 42 is attached to said cable drum 38 and to a fixed portion of the carburetor, such as the flange 43, in such manner as to tend to turn the drum 38 in the counterclockwise direction.

The construction of the choke valve and its control means is generally similar to that disclosed in my copending application Serial No. 631,282, filed August 31, 1932.

Although springs 36 and 42 are shown herein as being simple tension springs, it will be understood that in actual construction it may be preferable to use torsion springs in helical form and mounted coaxially with the various members which they are to rotate, as disclosed in my copending application above referred to.

An ear 44 fixed to cable drum 38 has a pivotal connection with one end 46 of a rod 50. The other end of rod 50 is connected by means of a pivotal connection 52 with a cylindrical throttle valve 54, which controls the mixture passage

56 of the auxiliary carburetor 9. Passage 56 discharges into the riser 33 posterior to the main throttle valve 14, as shown.

Rod 50 is formed in two sections, which are connected by means of a lost motion telescoping connection 51 consisting of a threaded sleeve 55, adjustable by means of a lock nut 57, and formed with slots which receive a pin 58 fixed to the adjacent end of the lower section of the rod. A compression spring 53 tends to separate the upper and lower sections of rod 50 from each other.

The operation of the device is as follows. When it is desired to start the engine while it is cold, the operator pulls the choke button on the dash panel full out, thus exerting tension on flexible cable 40, which is wound on cable drum 38. Thus shaft 32 will rotate in a clockwise direction, carrying with it arm 34. Because of the tension of spring 36 choke valve 10 will rotate until it comes to the position shown in Figure 1, at which point its movement will be arrested by the walls of the main carbureting passage 17. From this point on, further rotation of the drum 38 will merely increase the tension of spring 36, so that greater suction in the carburetor is required to partially open the choke valve, until finally a point is reached where the choke will not open even partially under the influence of carburetor suction.

During this rotation of cable drum 38 the parts will first move from the position indicated in Figure 2 to the position indicated in Figure 3, causing the pin 46 to move from the position shown at 46' to the position shown at 46 while the choke valve 10 moves to the fully closed position. The further rotation of cable drum 38 will move the parts to the position indicated at Figure 4, causing the pin 46 to move from the position 46 to the position 46''. This will also move rod 50, which will move pin 52 from position 52' to position 52, thus opening valve 54 as shown in Figures 1 and 3. As pin 46 moves from position 46 to position 46'' spring 53 will be compressed and spring 36 will be extended, thus holding the choke valve 10 securely closed and subjecting the auxiliary carburetor 9 to suction due to the pumping action of the engine. A rich fuel mixture, suitable for starting a cold engine, is thus formed in the auxiliary carburetor and drawn through the passage 56 to the engine.

When the engine has started, the operator will push the choke button part way in, thus rotating the cable drum 38 in the counterclockwise direction until the pin 46 moves from the position 46'' to 46, at which point the tension in the springs 36 and 53 will become zero. At this point the choke valve 10 will be free to open against the force of spring 36, and the pumping action of the engine will be exerted on both carbureting systems. When the engine is warmed after running for a few minutes, the operator will push the choke button all the way in and pin 46 will move from position 46 to 46', exerting tension on rod 50 and closing valve 54 as shown in Figure 2. In this position the entire fuel supply of the engine is furnished by the main carbureting passage controlled by throttle valve 14.

Although the invention has been described with particular reference to the illustrated embodiment, it is expressly understood that it may be embodied in other forms, and is not limited except by the language of the following claims.

What is claimed is:

1. In a carbureting device having a body portion forming a main carbureting passage, a pressure responsive choke valve controlling the inflow of air to said passage, means to vary the force urging the choke valve towards the closed position, an auxiliary carbureting passage, and yielding means for controlling said auxiliary passage in accordance with the position of the choke valve.

2. In a carbureting device having a body portion forming a main carbureting passage, an unbalanced choke valve, means for actuating said choke valve, means to vary the force urging the choke valve towards the closed position, an auxiliary carbureting passage for supplying a rich mixture for starting and warming up, means for controlling said auxiliary passage, and a yielding lost motion connection between said controlling means and said actuating means whereby continued movement of the actuating means in the closing direction actuates the controlling means, to open the auxiliary passage and to increase the force urging the choke valve towards the closed position.

3. In a carbureting device for an internal-combustion engine, a main carbureting passage, a throttle and a pressure responsive choke valve in said passage, an auxiliary carburetor designed and constructed to provide a rich mixture for starting when the engine is cold and discharging into the main carbureting passage posterior to said throttle, a throttle for the auxiliary carburetor, and yielding means controlling the auxiliary throttle in accordance with the position of the choke valve.

4. In a carburetor having a body portion forming a main carbureting passage, a shaft in said passage, an unbalanced choke valve pivotally mounted thereon, a stop member fixed to said shaft, yielding means urging the choke valve into abutment with said stop member, an auxiliary carbureting passage, a throttle in said auxiliary carbureting passage, a cable drum fixed to said shaft, connecting means between the cable drum and said throttle including a lost motion connection so designed and constructed that the throttle will be opened when the cable drum is moved to one extreme position, and will be closed when the cable drum is moved to its opposite extreme position.

5. In a carbureting device having a body portion and a shell forming a main and an auxiliary carbureting passage respectively, a pressure responsive choke valve controlling the inflow of air to said main carbureting passage, manual means for actuating said choke valve, an auxiliary throttle valve in said auxiliary carbureting passage, and means including a yielding connection between said choke valve and said auxiliary throttle for reversing the position of said auxiliary throttle valve upon continued movement of said manual means.

6. In a carbureting device for an internal combustion engine, a main carbureting passage, an unbalanced choke valve and a throttle valve journaled in the walls of said carbureting passage, manual means for actuating said choke valve, yielding means between said actuating means and said choke valve, an auxiliary carbureting passage discharging into the main carbureting passage posterior to said throttle, an auxiliary throttle valve journaled in the walls of said auxiliary carbureting passage, means for actuating said auxiliary throttle valve including an extensible connection to said choke valve actuating means so that when said unbalanced choke valve is closed, said auxiliary throttle valve

is open and the fuel for the operation of the engine will be supplied from said auxiliary carburetor.

7. In a carbureting device having a body portion forming a main carbureting passage, a shaft in said passage, an unbalanced choke valve pivotally mounted thereon, an auxiliary carbureting passage connected in parallel with said main carbureting passage, a throttle in said auxiliary carbureting passage, actuating means fixed to said shaft, yielding means between said choke valve and said actuating means and connecting means between said actuating member and said throttle including a yielding lost motion connection so designed and constructed that said throttle will be opened when said actuating member is in one extreme position, and will be closed when said actuating member is moved to the other extreme position.

8. In a carbureting device for an internal combustion engine, a body portion forming a main carbureting passage, an air valve responsive to fluid pressures controlling the inflow of air, and a throttle valve journaled in the walls of said carbureting passage, an auxiliary carbureting passage formed by an auxiliary shell, a throttle valve journaled in the walls of said auxiliary carbureting passage, and a yielding connection between said air valve and said throttle valve so that when said main carbureting passage is closed said auxiliary throttle valve is open, and vice versa.

9. In a carbureting device for an internal combustion engine, a body portion forming a main carbureting passage, a pressure-responsive choke valve controlling the inflow of air, a throttle valve journaled in the walls of said main carbureting passage, a shell forming an auxiliary carbureting passage, an auxiliary throttle valve journaled in the walls of said auxiliary carbureting passage, and means including a yielding connection between choke valve and the auxiliary throttle for closing the auxiliary throttle when the choke valve is open, and vice versa.

10. In a carbureting device having a main carbureting passage, a shaft journalled in the walls of said passage, a stop member fixed to the shaft, an unbalanced choke valve pivotally mounted on the shaft, yielding means urging the choke valve into abutment with the stop member, manual means to actuate the shaft, a throttle valve controlling said passage, an auxiliary carbureting passage discharging into the main carbureting passage posterior to said throttle valve, an auxiliary throttle valve mounted in said passage, and yielding means interconnecting the manual means and the auxiliary throttle valve.

11. In a carbureting device having a main carbureting passage, a shaft journalled in the walls of said passage, a stop member fixed to the shaft, an unbalanced choke valve pivotally mounted on the shaft, yielding means urging the choke valve into abutment with the stop member, manual means to actuate the shaft, a throttle valve controlling said passage, an auxiliary carbureting passage discharging into the main carbureting passage posterior to said throttle valve, an auxiliary throttle valve mounted in said passage, and yielding means interconnecting the manual means and the auxiliary throttle valve operable to progressively open the auxiliary throttle valve as the choke valve approaches the closed position and to progressively close the auxiliary throttle as the choke valve approaches the open position.

12. A carburetor having a main carbureting passage, an auxiliary carbureting passage, a pressure responsive choke valve controlling the main carbureting passage, a throttle valve controlling the auxiliary carbureting passage, manual means to actuate the choke valve, and connecting means between the manual means and the throttle valve to control the throttle valve in accordance with the position of the choke valve.

13. A carburetor having a main carbureting passage, an auxiliary carbureting passage, a pressure responsive choke valve controlling the main carbureting passage, a throttle valve controlling the auxiliary carbureting passage, manual means to actuate the choke valve, yielding means to vary the force urging the choke valve towards closed position, and connecting means including a yielding telescoping lost motion connection between the manual means and the throttle valve to yieldingly control the throttle valve in accordance with the position of the choke valve.

14. A carburetor having main and auxiliary carbureting passages, a pressure responsive choke valve controlling the entrance to the main carbureting passage, a valve controlling the outlet of the auxiliary carbureting passage, and yielding means operably interconnecting said valves.

15. A carburetor having main and auxiliary carbureting passages, a choke valve controlling the entrance to the main carbureting passage, a valve controlling the outlet of the auxiliary carbureting passage, and yielding means interconnecting said valves and operable to open the valve in the auxiliary carbureting passage when the choke valve approaches the closed position, and to close the valve in the auxiliary passage when the choke valve is moved toward the open position.

MILTON E. CHANDLER.

CERTIFICATE OF CORRECTION.

Patent No. 2,036,020. March 31, 1936

MILTON E. CHANDLER.

It is hereby certified that error appears in the printed specification c the above numbered patent requiring correction as follows: Page 3, first column, line 26-27, claim 8, for the words "an auxiliary shell, a" read a shell, an auxiliary; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of October, A. D. 1936.

Henry Van Arsdale
Acting Commissioner of Paten

(Seal)