Oct. 22, 1957 A. H. WINKLER 2,810,559

CARBURETOR

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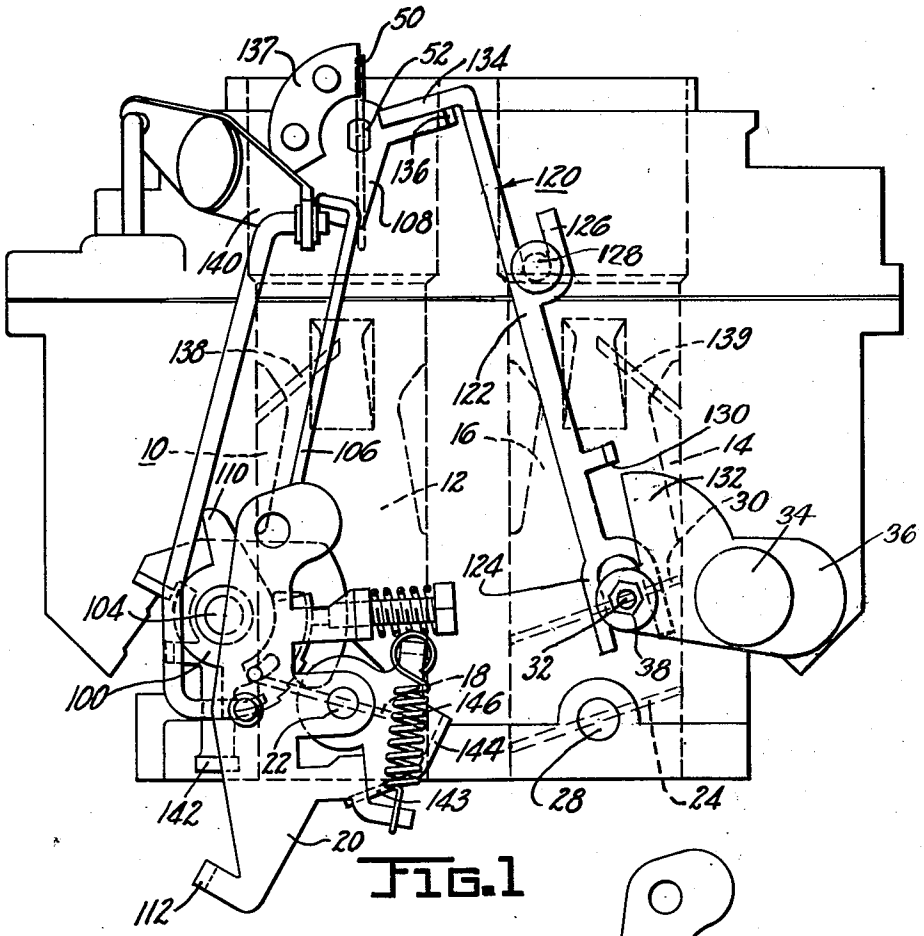


FIG. 1

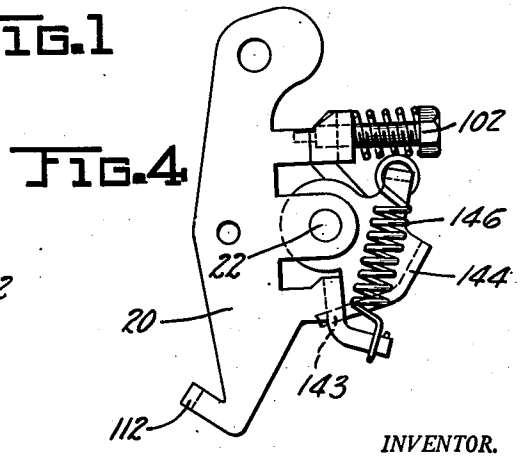


FIG. 4

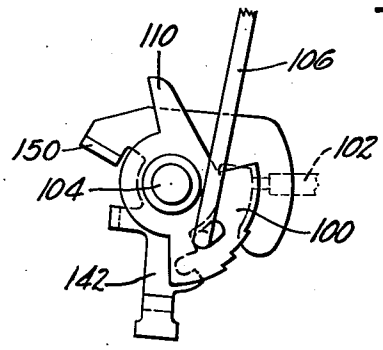


FIG. 5

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CARBURETOR

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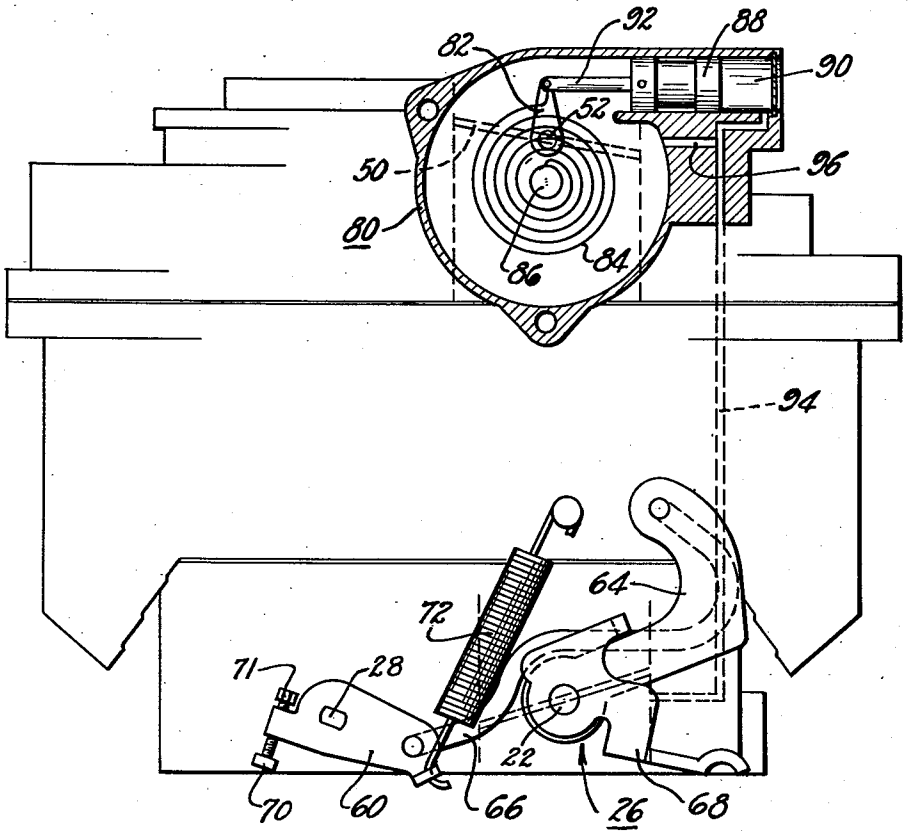


FIG. 2

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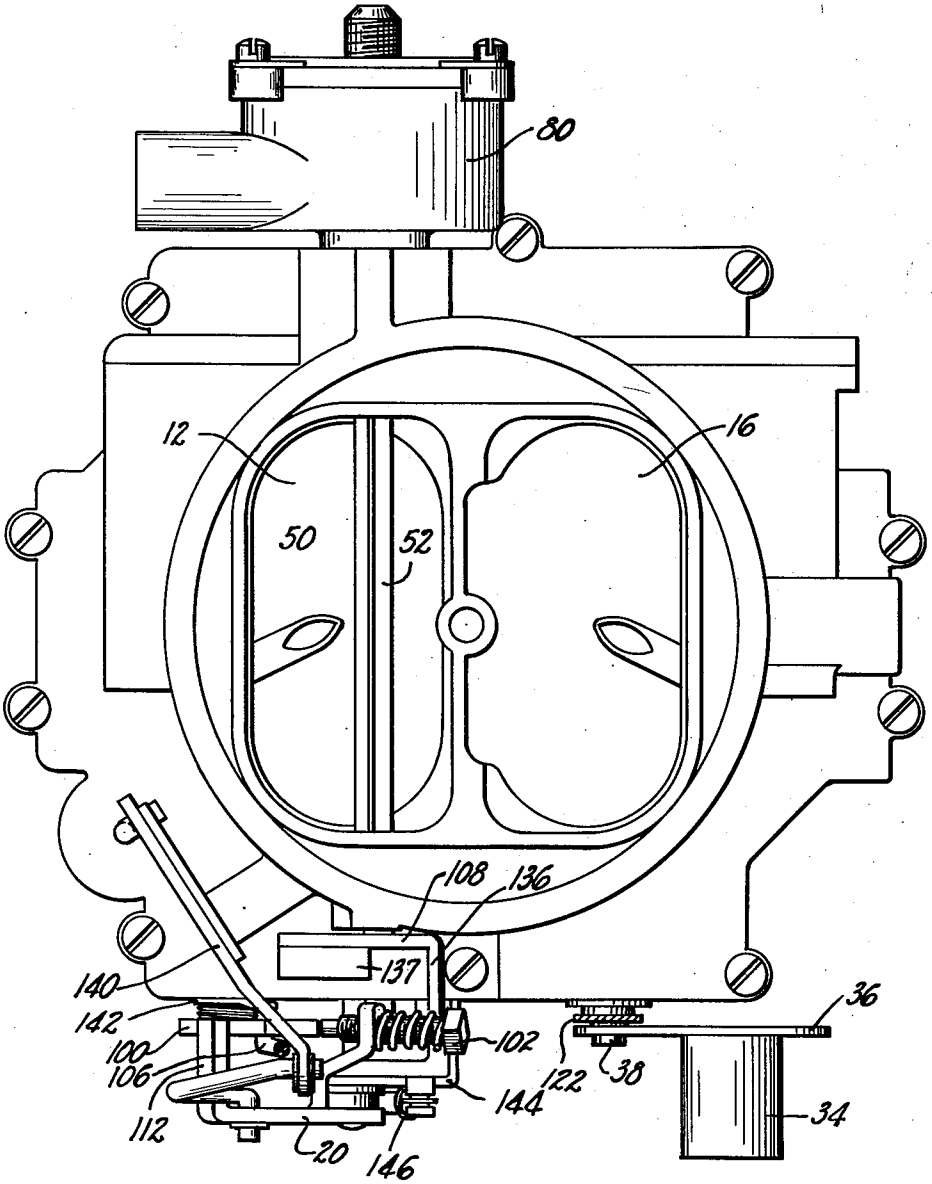


FIG. 3

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CARBURETOR

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Application November 1, 1951, Serial No. 254,215

3 Claims. (Cl. 261—23)

The present invention relates to carburetors, and more particularly to a throttle and choke valve control means for multiple stage carburetors.

One of the principal objects of the present invention is to provide a control mechanism for multiple stage carburetors, wherein the operation of an air valve or throttle in the secondary induction passage is coordinated with the operation of the throttle and choke valve in the primary induction passage.

Another object of the invention is to provide in a multiple stage carburetor a control means for coordinating the operation of an air valve or throttle of the secondary induction passage with the operation of a choke valve in the primary induction passage.

Another object is to provide a mechanism in a multiple stage carburetor for preventing the opening of an air valve in the secondary induction passage when the choke valve of the primary induction passage is in closed or partially closed position.

A further object of the invention is to provide, in a multiple stage carburetor having an automatically controlled choke valve in the primary induction system and an air valve in the secondary induction system held closed while the engine is cold by a linkage between said valves, a manually operated mechanism for opening said choke valve without releasing said air valve.

Still another object is to provide in a multiple stage carburetor an operating lever arrangement for coordinating the operation of the primary and secondary throttle valves and a choke valve.

Additional objects and advantages of my invention will become apparent from the following description and accompanying drawings, wherein:

Figure 1 is a side elevation of a multiple stage carburetor embodying my throttle and choke valve control mechanism;

Figure 2 is an elevation of the other side of the carburetor shown in Figure 1, showing further details of the control mechanism;

Figure 3 is a top plan of the carburetor; and

Figures 4 and 5 are detailed views of portions of the control mechanism.

Referring more specifically to the drawings, there is shown a four barrel multiple stage carburetor in which numeral 10 designates the primary induction system consisting of two side-by-side induction passages 12 and numeral 14 designates the secondary induction system consisting also of two side-by-side induction passages 16. A throttle 18 controlled by the operator through an accelerating pedal and a throttle lever 20 is disposed in each primary induction passage on a shaft 22, and a throttle 24 controlled manually through linkage 26, as shown in Fig. 2, with the primary throttle is disposed in each secondary induction passage on a shaft 28. An air valve 30 is also disposed in each secondary induction passage on a shaft 32 and is unbalanced in the direction to be openable by air flow in opposition to a weight 34 supported by a pivoted lever 36 secured to shaft 32 by a nut 38. A

choke valve 50 mounted on shaft 52 is disposed in the air inlet passage of the primary induction system, the air inlet passage for each system being a single conduit adapted to supply both induction passages of each system. No choke valve is provided in the secondary induction system since said system remains inoperative until the engine approaches normal operating temperatures.

A linkage connects the throttles in the primary induction system with the throttles in the secondary induction system and consists of a lever 60 secured to shaft 28 of the secondary throttles, a lever 64 rotatably mounted on shaft 22 of the primary throttles, a rod 66 connecting said levers, and a lever 68 adapted to rotate with the shaft of the primary throttles. A stop screw 71 on lever 60, in cooperation with lug 70 on the carburetor throttle body, limits the closing movement of the secondary throttles. Lever 68 is so arranged in relation to lever 64 that the primary throttles must open a few degrees before lever 68 engages lever 64 and opens the secondary throttles. A spring 72 returns the secondary throttles to their closed position as the primary throttles are closed.

The choke valve, which is unbalanced in the direction to open with air flow, is operated by an automatic choke control unit 80 consisting of a lever 82 secured to choke shaft 52, coiled thermostat 84 of bimetallic material anchored at its inner end on a fixed pin 86 and connected at its outer end to the free end of lever 82, and a piston 88 mounted in a cylinder 90 and connected by a rod 92 to the free end of lever 82, said cylinder being connected by a conduit 94 with the primary induction passage on the engine side of the throttle. To regulate the thermostat in accordance with engine temperature, the choke housing is connected by a conduit with a stove or the like (not shown) on the engine exhaust manifold and by conduits 96 and 94 with the intake manifold. Heated air is thus drawn by manifold vacuum from the stove through the housing around the thermostat, thence through conduits 96 and 94 to the intake manifold on the engine side of the throttle. When the engine is cold, the thermostat urges choke valve 50 to closed position during cranking and to points intermediate between closed and open position as the engine warms up after starting. In order to give the engine sufficient air to maintain combustion immediately after starting, piston 88, under the influence of manifold vacuum, urges the choke valve a few degrees toward open position as soon as the engine fires. At greater degrees toward open position, the choke valve is controlled by the thermostat and the effect of air flow on the unbalanced valve.

The position of the primary throttle during idling is controlled by a fast idle cam 100 and a cooperating screw 102 on the throttle lever 20. The cam which is provided with a series of steps adapted to be engaged by said screw when the throttle approaches closed position is mounted on a pin 104 and is connected to the choke valve by a rod 106 and lever 108 secured to choke shaft 52. With this linkage, when the choke is moved toward closed position by the choke control unit, the fast idle cam 100 is rotated counterclockwise, placing the higher steps of the cam surface in the path of stop screw 102 and consequently preventing the throttle from completely closing or from closing to the extent that it does when the choke valve is open. When the choke valve is opened, the cam is rotated to the position where one of the lower steps is in the path of the stop screw. On the cam opposite the cam surface is an arm 110 adapted to be engaged by a lug or arm 112 on the throttle lever 20 when the throttle approaches wide open position with the choke valve in at least a partially closed position. When arm 112 engages arm 110 as the throttle is opened wide, cam 100 is rotated in a clockwise direction moving rod 106 and lever 108 in the direction to open the choke valve.

This feature is provided in order to deflood the engine, should it become flooded during cranking, by opening both the choke valve and throttle to permit air to sweep the fuel from the engine cylinders.

While the engine is operating at subnormal temperatures with the choke valve in the primary induction passage in closed or partially closed position, the air valve **30** in the secondary induction passage is prevented from opening by a linkage, generally indicated by numeral **120**, between the choke valve and the air valve. A sliding lever **122**, having a bifurcated lower end **124** for sliding in a slot around shaft **32** and an arm **126** for sliding over a pin **128** on the side of the carburetor, is provided with a lug **130** adapted to be disposed in the path of an extension **132** on lever **36** when said lever is in its lowermost position and thereby to prevent opening of the air valve **30**. The upper end of lever **122** is provided with an arm **134** which is contacted by a lug **136** on lever **108** as the choke valve is moved toward open position. Further movement of the choke valve after the initial contact of lug **136** with arm **134** lifts lever **122** and when the choke valve has moved to its fully open position, lug **130** is completely removed from the path of lever extension **132**. When the choke valve is moved toward closed position, lever **122** is permitted to move downwardly under its own weight until lug **130** moves into the path of lever extension **132** and prevents opening of the air valve. A counter weight **137** is provided on lever **108** opposite lug **136** to balance the weight of lever **120**.

If during the engine cranking operation the engine becomes flooded, the operator can deflood the engine by opening the throttle sufficiently for lug **112** to engage arm **110** on the fast idle cam. Further movement of the throttle after initial engagement rotates cam **100** in the clockwise direction, causing rod **106** and lever **108** to move the choke valve in the opening direction. As lever **108** moves in the valve opening direction, lever **122** is lifted by lug **136** on lever **108**. The lug **112**, however, is so adjusted that rotation of the throttle to its wide open position will not impart sufficient rotation to cam **110** and lever **108** to cause the lever **130** to be moved from the path of the lever extension **132**. Thus, if the operator accelerates while the engine is cold by fully opening the throttle, he will not cause lever **122** to release air valve **30** and thereby produce a leaning out of the required rich mixture for cold engine operation.

The multiple stage carburetor shown in the drawing would include the elements or units normally present in conventional carburetors, such as main metering system of the primary and secondary induction systems, respectively (shown partially in broken lines at numerals **138** and **139**), an idling system and an economizing system for each induction system, and an accelerating pump the actuating linkage of which is shown at numeral **140**. A starting switch such as that covered by my Patent No. 2,492,340, issued December 27, 1949, may be mounted on the carburetor and operated by the primary or secondary throttle actuating levers. So that the operator will know when the throttles have been beyond the position for most effective starting, a lever **142** having a lug **150** adapted for engagement with cam arm **110**, is rotatably mounted on a pin **104** so that when the choke is closed or partially closed cam arm **110** engages lug **150** causing lever **142** to extend into the path of a lug **143** on a lever **144** mounted on the end of the primary throttle shaft adjacent throttle lever **20**. The throttle lever and lever **144** are normally held engaged by a spring **146** so that they move in unison until lug **143** engages lever **142**, at which time lever **144** is prevented from further movement and the throttle lever is moved further toward open position only with considerably greater force in opposition to spring **146**. When the choke valve is open and cam **100** is moved to its slow idle position, lever **142** swings clockwise from the path of lever **144** so that levers **20** and **144** move in unison to all throttle positions.

Modifications in the various linkages and controls may be made without departing from the scope of the invention.

I claim:

1. In a carburetor, a primary induction passage having a throttle therein, a secondary induction passage having a throttle therein, an air valve in said secondary induction passage mounted on a shaft, a choke valve in said primary induction passage, a lever for actuating said primary throttle, a linkage having lost motion means connecting said primary and secondary throttles, a means for controlling said choke valve in response to engine temperature, a one-way lost motion linkage between said primary throttle lever and said choke valve for opening said choke valve, a lever on the shaft of said air valve, a rod operatively connected to said choke valve and having a lug thereon forming an abutment for said air valve lever to prevent opening of said air valve when said choke valve is in at least a partially closed position.

2. In a carburetor, a primary induction passage having a throttle therein, a secondary induction passage having a throttle therein, an air valve in said secondary induction passage mounted on a shaft, a choke valve in said primary induction passage, a lever for actuating said primary throttle, a linkage having lost motion means connecting said primary and secondary throttles, a means for controlling said choke valve in response to engine temperature, a fast idle cam adjacent said throttle lever, a linkage connecting said cam and said choke valve, an arm on said cam adapted to be moved by said throttle lever to open said choke valve, a lever on the shaft of said air valve, and a means operatively connected to said choke valve and forming an abutment for said air valve lever to prevent opening of said air valve when said choke valve is in at least a partially closed position.

3. In a carburetor, a primary induction passage, a throttle in said primary passage, a shaft for said primary throttle, a secondary induction passage, a throttle in said secondary passage, a shaft for said secondary throttle, an air valve openable by air flow in said secondary induction passage mounted on a shaft, a choke valve in said primary induction passage, a lever for actuating said primary throttle mounted on said primary throttle shaft, a linkage having lost motion means connecting said primary and secondary throttles, an automatic means for controlling said choke valve in response to engine temperature and manifold vacuum, a fast idle cam adjacent said throttle lever, a linkage connecting said cam and said choke valve, an arm on said cam adapted to be moved by said throttle lever for opening said choke valve when said throttle valve approaches wide open position, a lever rotatably mounted on said primary throttle shaft adjacent said throttle lever, a spring connecting said two last mentioned levers, an abutment means for said rotatable lever pivoted adjacent said cam and movable into position to be engaged by said rotatable lever only when said choke valve is in at least a partially closed position, a lever on the shaft of said air valve, a weight on the free end of said air valve lever, and a rod operatively connected to said choke valve and having a lug thereon forming an abutment for said air valve lever to prevent opening of said air valve when said choke valve is in at least a partially closed position.

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