Aug. 30, 1966 W. B. BALDWIN 3,269,711

CARBURETOR

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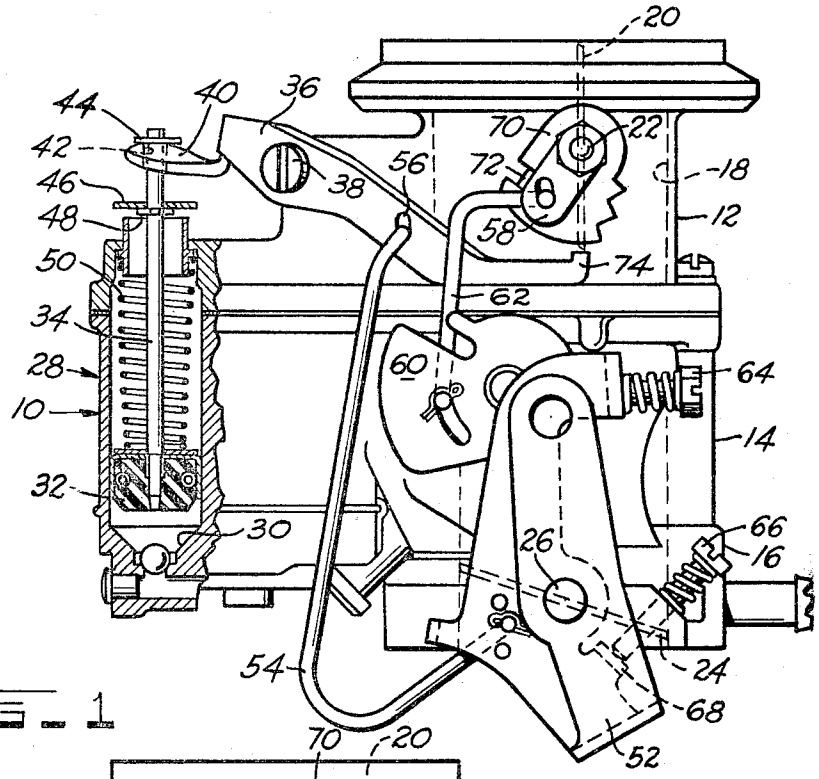


FIG. 1

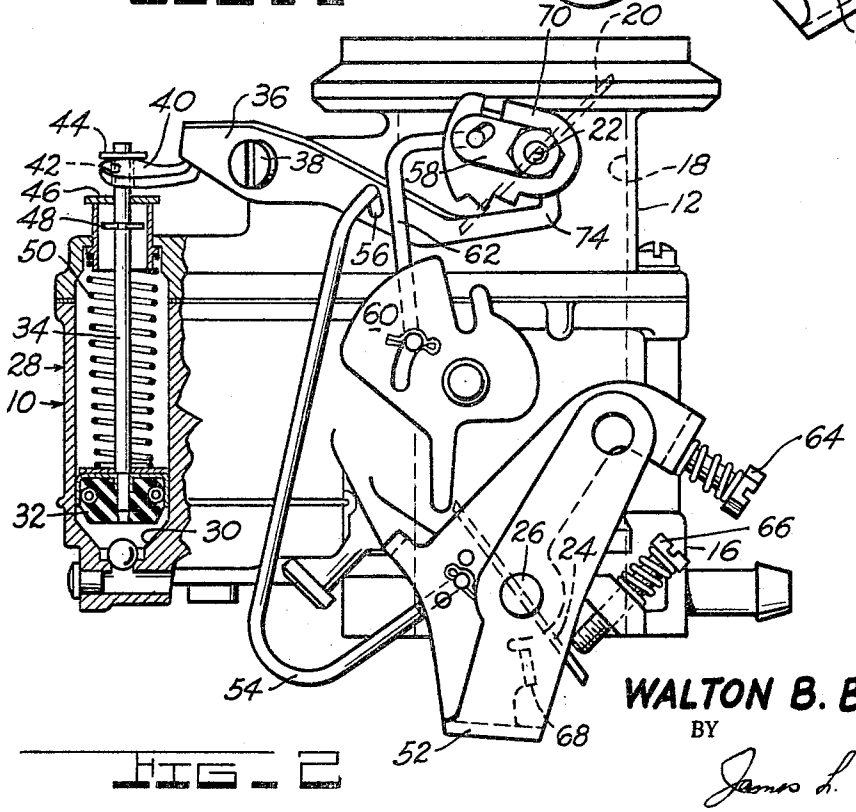


FIG. 2

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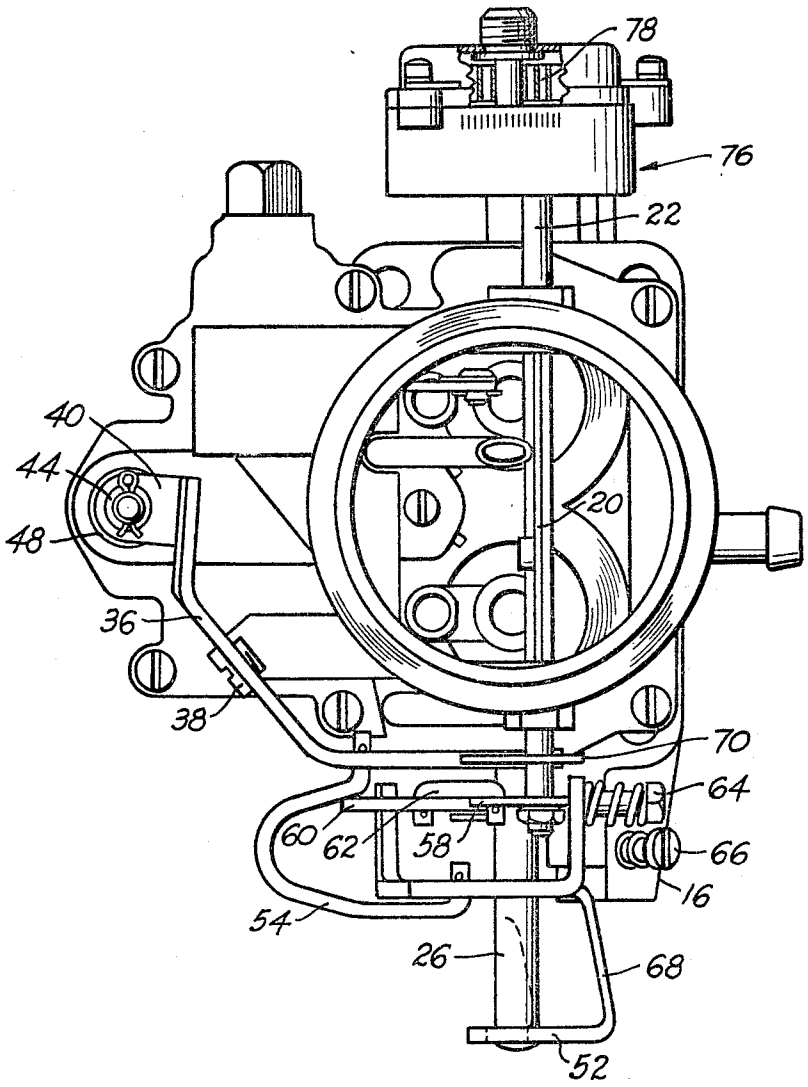


FIG. 3

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CARBURETOR

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2 Claims. (Cl. 261—34)

The present invention relates generally to carburetors for internal combustion engines, more particularly to an improvement in accelerating pumps for such carburetors.

In many carburetor systems for internal combustion engines, it is unnecessary to supply an accelerating charge to a warmed up engine after the throttle has been opened a predetermined amount, e.g. 30 to 40 degrees. In such carburetor systems, it is conventional practice to provide a throttle actuated accelerating pump wherein closing movement of the throttle moves the pump in an intake stroke direction compressing the pump discharge spring as it does so. At fully closed, normal idle position the throttle determines the maximum intake stroke position of the pump. It is conventional to have a fixed maximum discharge stroke position which may be simply obtained by permitting the pump to bottom in the accelerating pump well at the predetermined throttle open position. For accelerations at throttle openings less than the predetermined amount, the discharge stroke and consequently the quantity of fuel discharged is determined by the change in throttle position. However, for accelerations starting with the throttle opened less than the predetermined amount and terminating with the throttle opened greater than the predetermined amount, the discharge stroke is determined by the difference in position between the initial throttle position and the fixed maximum discharge position of the pump. With such a conventional system having a fixed maximum discharge position, it can be readily seen that the maximum potential acceleration charge is less when the throttle initially is in the fast idle position than in the normal idle position. As is well known, a cold engine requires more fuel than a fully warmed up engine. Unfortunately, in the prior systems fast idle operation which is associated with a cold or only partially warmed up engine provides a decreased maximum potential acceleration charge at a time when the engine actually requires an increased acceleration charge.

The present invention overcomes this disadvantage of the prior art system by providing a variable abutment to control the maximum limit of the discharge stroke of the accelerating pump. The abutment is preferably actuated by the choke shaft which also actuates the fast idle cam whereby the control of the discharge stroke may be readily correlated to the minimum available throttle position as determined by the fast idle cam and may also be readily actuated as a function of engine temperature by the temperature responsive means in the automatic choke control or by a separate temperature responsive means.

Accordingly, it is an object of the present invention to provide for an accelerating pump apparatus for varying the maximum discharge stroke position of pump.

It is another object of the invention to provide for a carburetor accelerating pump, a stroke control which is correlated with engine operating conditions such as temperature.

It is a further object of the invention to provide an improved carburetor accelerating pump having an adjustable stroke which is simple in construction, reliable in operation and relatively inexpensive to manufacture.

These and other objects and advantages of the invention will be readily understood from the following detailed description taken in connection with the appended drawings in which:

FIGURE 1 is a side view partly in section of a carburetor embodying the present invention and showing the position of the parts in a normal idle position.

FIGURE 2 is a view similar to FIGURE 1 showing the position of the parts in the fast idle position with the throttle opened a predetermined amount; and

FIGURE 3 is a top view of the carburetor shown in FIGURE 1.

Referring now to the drawings, and more particularly to FIGURE 1, numeral **10** designates a carburetor having an air horn **12**, a main body **14** and throttle body **16** which together define an induction passage **18** in which are mounted a choke valve **20** on a choke shaft **22** and a throttle valve **24** on throttle shaft **26**. An accelerating pump system **28** is provided which includes an accelerating pump well **30**, a piston or plunger **32** reciprocably disposed in the well for actuation by an accelerating pump rod **34**. An accelerating lever **36** is pivotally mounted on the air horn **12** as at **38** and is formed at one end **40** with a bore **42** which is adapted to receive pump rod **34**. A retainer **44** is secured adjacent one end of rod **34** to limit in one direction the movement of lever **36** with respect to rod **34**. The upper end of accelerating well **30** is provided with a vent cap **46** which is engaged by a retainer **48** when the throttle **24** is in the closed position to raise the vent cap **46** to the position shown in FIGURE 1. A discharge spring **50** is disposed in the accelerating well **30** to urge piston **32** in the downward discharge direction.

A throttle lever **52** secured to throttle shaft **26** is connected to one end of a rod **54** which at its other end is disposed in a slot **56** formed in lever **36** whereby a one way connection is formed between rod **54** and lever **36**.

A choke lever **58** secured to choke shaft **22** is connected to a fast idle cam **60** by means of a choke rod **62**. When the choke **20** is in the closed or partially closed position such as is shown in FIGURE 2, the fast idle cam is rotated to a position where it may be engaged by a fast idle screw **64** mounted on throttle lever **52** to limit the closed position of the throttle. When the choke valve is in the wide open position such as is shown in FIGURE 1, the fast idle cam **60** is rotated so as to be out of engagement with fast idle screw **64** whereby the normal idle position of the throttle is determined by the engagement of normal idle screw **66** with a turned over flange **68** formed on throttle lever **52**.

An accelerating cam **70** is rotatably mounted on choke shaft **22** and formed with a turned over lug **72** which is adapted for one way engagement with choke lever **58**. One end **74** of accelerating lever **36** is adapted for engagement with the accelerating cam **70** to determine the counterclockwise limit position of accelerator lever **36** which in turn determines the maximum discharge stroke position of the accelerating pump piston **32**.

As shown in FIGURE 3, an automatic choke control means **76** having a thermostat **78** is connected to choke shaft **22** to urge the choke valve towards closed position when the thermostat is cold. A vacuum piston (not shown) may be provided in the automatic choke control to urge the choke valve towards open position in response to manifold vacuum. As noted the choke valve **20** is of the unbalanced type and tends to be openable in response to any pressure differential which exists across it.

In operation, when the throttle valve is in the normal idle position such as is shown in FIGURE 1, the linkage means including rod **54** and lever **36** raises the accelerating pump piston **32** to its maximum intake position. The end **74** of lever **36** is in its extreme clockwise position out of engagement with accelerating cam **70**. When the throttle valve is moved toward open position, end **40** of lever **36** tends to move out of engagement with retainer **44** thereby permitting spring **50** to move the pump piston

32 in a discharge direction. When the throttle valve has opened a predetermined amount, the accelerating lever 36 will have rotated in a counterclockwise direction sufficiently to bring end 74 into engagement with accelerating cam 70 which in this position determines the normal maximum discharge position of pump piston 32. As the throttle valve 24 is moved toward open position beyond the predetermined position, the end of rod 54 rides up in the slot 56 in lever 36 such that the accelerating linkage does not limit further travel of the throttle valve and further travel of the throttle has no influence on the accelerating pump.

During operation with the choke in the closed or partially closed position such as is shown in FIGURE 2, wherein the fast idle cam 60 is positioned to limit the closing movement of the throttle valve, the clockwise rotation of accelerating lever 36 is thereby limited which in turn prevents the pump piston 32 from being raised to its maximum intake stroke position. During this condition of operation, however, the choke lever 58 through engagement with abutment 72 has rotated accelerating cam 70 to the position shown whereby lever 36 may rotate counter clockwise beyond the limit position shown in FIGURE 1 and the maximum discharge stroke position is increased. The maximum potential discharge stroke of the accelerating pump 28 may be made equal to or greater than the normal discharge stroke under choke opened conditions as illustrated in FIGURE 1 by controlling the shape of acceleration cam 70.

By means of the present invention the disadvantage of the prior art system wherein the accelerating charge is decreased during cold and warm up operation has been obviated. Flexibility has been provided so that the acceleration charge may be tailored for a particular engine during the cold and warm up operation without effecting the operation of the accelerating pump during normal engine temperature operating conditions.

While only one preferred embodiment of my invention has been described, it will be readily apparent to those skilled in the art that many changes or arrangements of parts may be made with departing from the spirit of my invention.

I claim:

1. In a carburetor having an induction passage with a choke valve and throttle valve respectively mounted on a choke shaft and throttle shaft therein:

an accelerating pump,

lever means connected to said throttle shaft and having a one way connection with said pump for moving said pump in an intake stroke direction as said throttle is moved in a closing direction,

spring means urging said pump in a discharge stroke direction,

an accelerating pump cam rotatably mounted on said choke shaft and adapted to engage said lever means at times to determine the limit of the discharge stroke of said pump.

2. In a carburetor having an induction passage with a choke valve and a throttle respectively mounted on a choke shaft and a throttle shaft therein:

an accelerating pump having a pump rod,

an actuating lever pivoted intermediate its ends and having at one end a one way connection with said pump rod,

lever means operatively connected to said throttle shaft and to said actuating lever for pivoting said actuating lever in a pump intake stroke direction when said throttle is moved in the closing direction,

spring means urging said pump in a discharge stroke direction,

and an accelerating pump cam rotatably mounted on said choke shaft and having a one way connection therewith, said cam being disposed to engage the other end of said actuating lever to thereby limit at times the travel of said pump in the discharge stroke direction.

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