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2 Sheets-Sheet 1

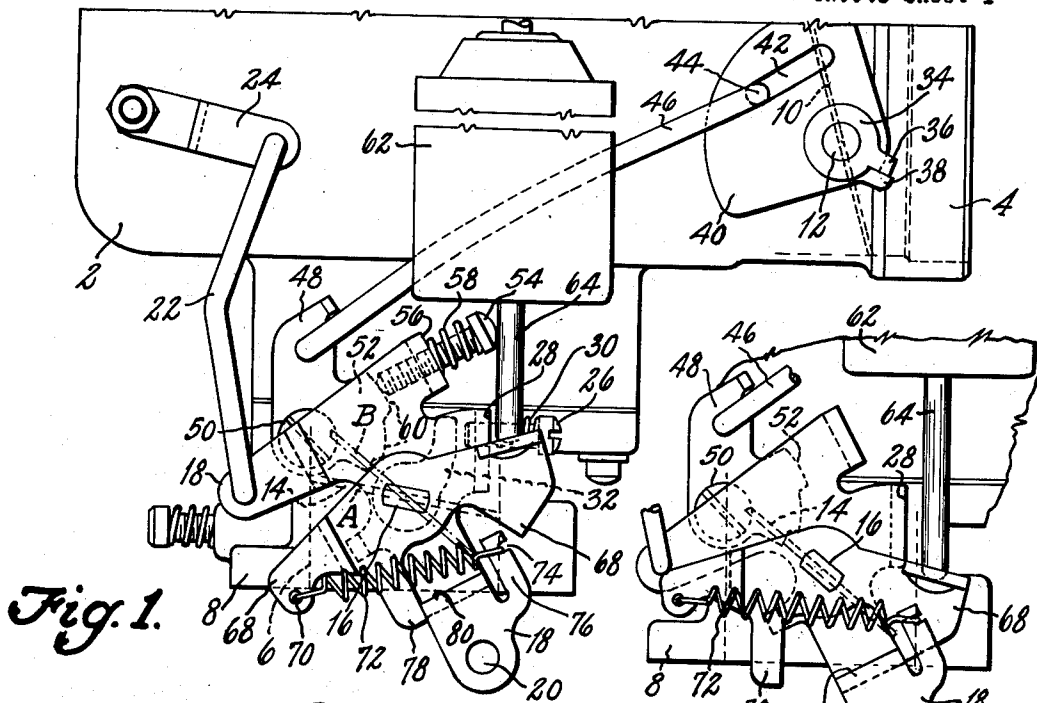


Fig. 1.

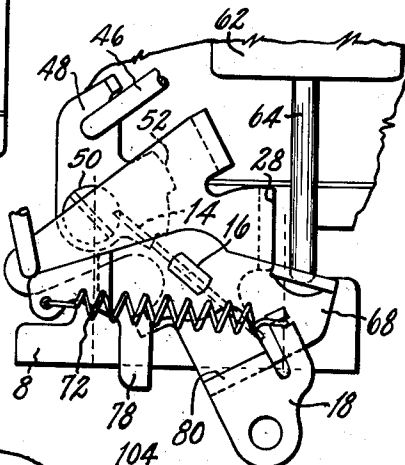


Fig. 2.

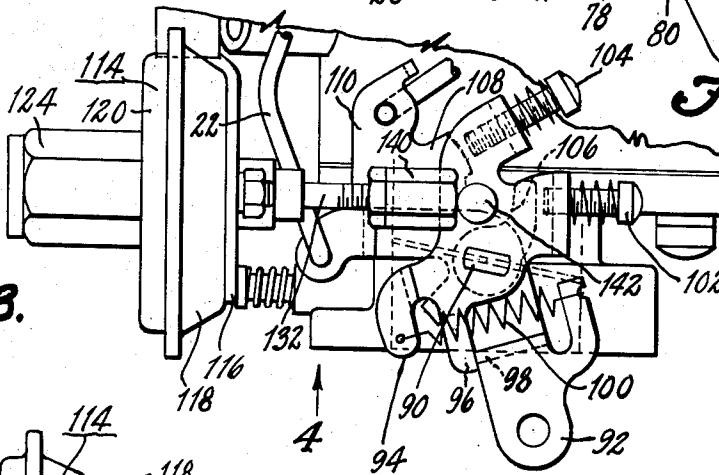


Fig. 3.

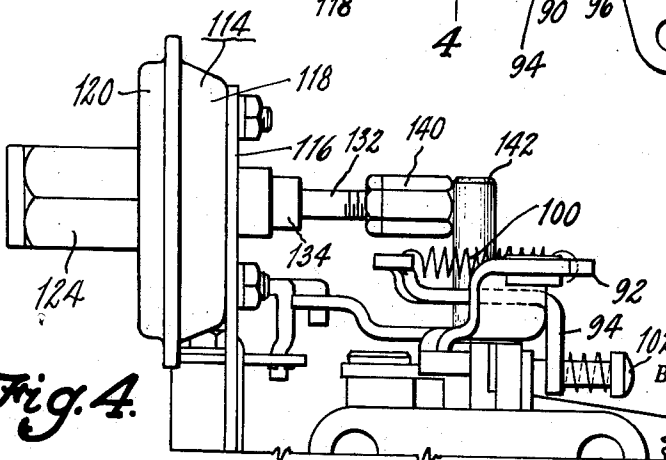


Fig. 4.

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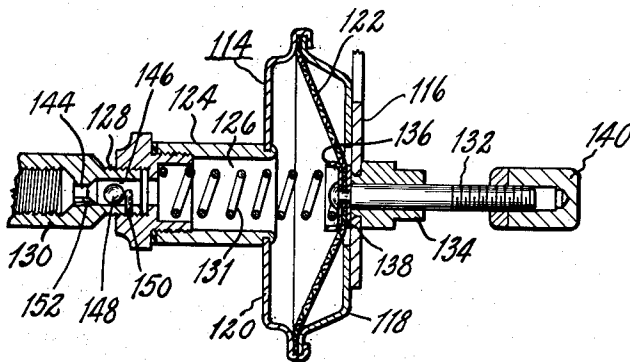
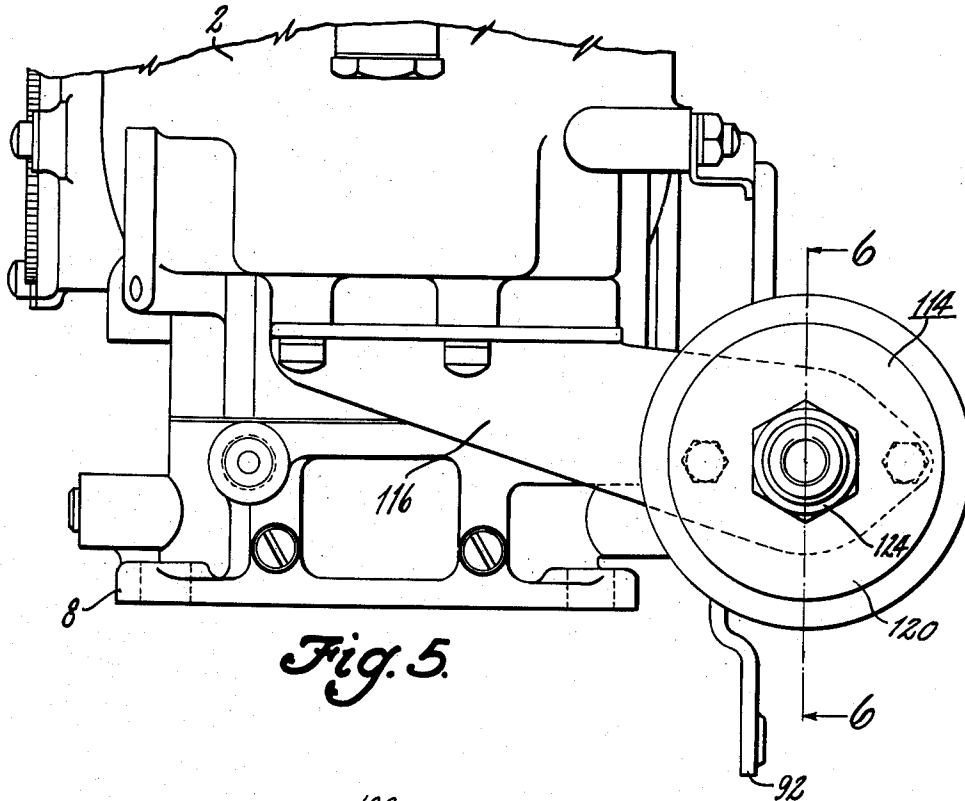
May 29, 1956

E. A. KEHOE
CARBURETOR

2,747,848

Filed June 26, 1952

2 Sheets-Sheet 2



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2,747,848

CARBURETOR

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Application June 26, 1952, Serial No. 295,731

16 Claims. (Cl. 261—52)

This invention relates to carburetors for internal combustion engines and primarily to such carburetors as are equipped with automatic choke devices, through the medium of which the mixture proportions are varied by mechanism operating in response to variations in temperature and engine suction, in order to provide automatically a mixture of proper proportions for starting and operation of the engine during the so-called warm-up period, before the engine reaches normal operating temperatures.

In carburetors of this type this automatic regulation of mixture proportions is generally accomplished by the provision of an unbalanced air inlet or choke valve positioned in the air intake of the carburetor which is held in closed position at temperatures lower than normal room temperature by a thermostat, the closing force of which increases as the temperature decreases. When the engine starts to operate under its own power, the force of suction acting directly on the unbalanced valve tends to open such valve and also the force of suction maintained posterior to the throttle is effective on a piston connected to the choke valve to exert a force tending to open the valve, which is controlled by throttle position and engine speed.

Generally in association with most known automatic choke devices, there is provided what is termed a fast idle mechanism. This mechanism is effective to bring about operation of the engine at faster than normal idle speed when the engine is idling and the temperature is low, such operation being necessary to prevent stalling under those conditions. This mechanism usually consists of a stepped cam which is moved by the choke, when the latter is moved to closed position, to such a position that the high point of the cam is opposite a fast idle stop screw carried by an arm movable with the throttle valve. Engagement of the stop screw with this fast idle cam prevents closing movement of the throttle to its normal hot idle position, thus holding the throttle a little more open for idling when cold than when idling at normal temperature.

When normal engine temperature is reached and the choke valve is moved to open position, the fast idle cam is moved to a position where the low point of the cam is opposite the fast idle stop screw so that if the accelerator pedal is released by the operator, the throttle can move to its normal hot idle or closed position where a hot idle stop screw engages a fixed stop.

If the engine is stopped after running at normal temperature the throttle moves to its closed or hot idle position and the fast idle cam is held against any movement toward cold idle position by engagement of its stepped surface with the fast idle stop screw which is movable with the throttle. Because of this engagement, unless the throttle is opened to some extent before starting, the choke would be held open and it would be substantially impossible to start the engine at low temperatures. Accordingly, it is more or less general practice for the operator of an automotive vehicle to open the throttle whenever

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the engine is to be started, sufficiently to release the fast idle cam from the stop screw, so that the choke can be moved by the thermostat to its closed position, before the starter control switch is closed to cause operation of the starting motor.

It is also desirable, when the engine is started to have the throttle in whatever open position has been found to give the best results, in other words, in the position in which the engine has been found to start most easily.

Accordingly, it is the principal object of the present invention to provide means which becomes operative whenever the engine stops and before it can be restarted to position the throttle in a sufficiently open position to permit the choke valve to move to its closed position and to permit the proper quantity of combustible mixture to be supplied to bring about the easiest possible starting of the engine.

It is also an object of the invention to provide means to prevent the movement of the throttle to normal closed or idle position if there is a failure of engine suction upon release of the accelerator pedal, to prevent accidental stalling of the engine under such conditions.

In one form of the invention, a solenoid is connected with the starter control circuit in such a way that it is energized whenever said control circuit is closed to cause operation of the starting motor and actuation of such solenoid moves the throttle toward open position until it occupies the best position for starting and releases the fast idle cam to permit movement of the choke valve to its closed position.

In another form of the invention, a spring operated rod is normally moved by engine suction to a position where it is wholly inoperative, but whenever the engine stops or slows down to a very low speed, is moved by the spring to a position to hold the throttle open to the desired extent. If upon release of the accelerator pedal to permit closing of the throttle, the engine tends to stall, the spring operated member will engage the throttle, preventing full closure thereof and will prevent stalling of the engine. In the solenoid operated device, this result is not obtained.

Other objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Figure 1 is a side elevation of a part of a carburetor showing the outlet thereof and the throttle operating mechanism.

Figure 2 is a fragmentary elevation of a part of the mechanism of Fig. 1 showing the parts in operative position.

Figure 3 is a fragmentary elevation of a modified form of throttle operating mechanism.

Figure 4 is a bottom plan view of Fig. 3 seen in the direction of the arrow 4.

Figure 5 is an end elevation of a carburetor with the modified form of the invention incorporated therein.

Figure 6 is a fragmentary side elevation of a carburetor with the modified form of the invention showing the latter in section on the line 6—6 of Fig. 5.

As shown in Fig. 1 a part of the carburetor housing is indicated at 2 and it will be understood that the structural details of the carburetor are entirely immaterial so far as this invention is concerned. The carburetor is provided with an air inlet 4 and a mixture outlet passage 6 through which combustible mixture is supplied to the engine, fuel being supplied in the carburetor in the usual way and being mixed with air therein. A flange 8 is provided for securing the carburetor in the conventional manner.

A choke valve 10, shown in dotted lines, is provided

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in the air intake 4 to control the admission of air. This valve is secured to a shaft 12, which is off-center with respect to the valve, so that the valve is unbalanced and the direct effect of suction on the valve itself tends to open the valve, if the pressure differential across the valve is increased. This valve is held closed at low temperatures to facilitate starting of the engine by the automatic choke mechanism, which is not shown herein because its construction is in no way material so far as the present invention is concerned. This automatic choke mechanism may be of any conventional construction, as for example, of the construction shown in the patent of Elmer Olson, No. 2,615,694, of October 28, 1952.

In mechanisms of this kind, a thermostat is provided to hold the valve in closed position at low temperatures and a member subject to manifold suction is also connected to the valve and tends to pull the valve open against the force of the thermostat when the engine starts to run under its own power. Therefore, when the engine starts to run, the choke valve assumes a position where the forces of the thermostat and suction are balanced. This mechanism is standard conventional construction and used in most carburetors now on the market.

The quantity of mixture supplied to the engine is controlled by a throttle valve 14, shown in dotted lines, which is secured to a shaft 16, suitably journaled in the housing. The throttle is manually operated through the medium of arm 18 loosely mounted on the throttle shaft and having an orifice 20 in which some form of operating connection extending to the usual accelerator pedal is adapted to be connected. The throttle is normally held in closed position by the usual throttle return spring (not shown) and is manually moved to whatever open position is desired to control the engine speed.

Connected to the throttle operating arm 18 by the link 22 is a lever arm 24 which operates a fuel pump. Neither this operating connection nor the pump constitutes any part of this invention.

The normal closed, or hot idle, position of the throttle is adjustably determined by the position of an adjustable stop screw 26 which is threaded in a laterally projecting lug 28 integral with the arm 18. A spring 30 holds the screw in any adjusted position and the end of such screw is adapted to engage a fixed stop lug 32 formed on the carburetor housing.

As already stated herein, when the temperature is low it is desirable to increase the idling speed of the engine to prevent possible stalling and under such conditions the throttle is prevented from moving to its fully closed position by mechanism which will now be described, and this means for controlling the idling speed is positioned by the choke valve. To this end the choke valve 10 has secured thereto a collar 34 having a lug 36 integral therewith. Such lug engages a cooperating lug 38 integral with a weighted member 40 rotatably mounted on the shaft 12 and provided with a slot 42 which receives the bent over end 44 of an operating link 46. A similar bent over end of the link 46 is connected in an opening in an arm 48, pivotally mounted on a pin 50 screwed into the carburetor housing. This arm is of the shape shown in Fig. 1 and at the right side of such arm a fast idle cam 52 is formed. This cam is engaged by an adjustable stop screw 54, threaded in a laterally projecting lug 56 integral with arm 18, said screw being held in any position of adjustment by the spring 58. The cam 52 is so formed that when the choke valve is closed, the highest point of the cam is engaged by screw 54 and the throttle is held at a considerably wider open position than the normal closed or hot idle position, the latter being indicated at A in Fig. 1 and the fast idle position at B. As the choke moves toward open position upon increase of engine temperature, the arm 48 is rotated counterclockwise so that the lowest point on the cam 52 is ultimately brought into engagement with screw 54 and with the cam in such position the throttle will move to its normal idle position, if it is not manually held open.

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As stated, the position of the fast idle cam controls the position of the lever 18 and also the closed position of the throttle. The mechanism through the medium of which the loosely mounted lever 18 determines the position of the throttle will be described later.

It will be noted that the cam 52 comprises a series of steps 60 at different distances from its axis of rotation. If the engine stops when it is hot, with the choke valve wide open, upon closing of the throttle the screw 54 will engage the lowermost step 60 and obviously the choke valve cannot return to its closed position until the throttle is opened enough to disengage the screw 54 from the cam 52. Since it is necessary, at any relatively low temperature, for the choke valve to be in closed position in order to start the engine and since it is desirable to have the throttle open to a greater extent than the normal idle position for starting, means are provided to open the throttle far enough to be at the proper starting position and to disengage screw 54 from the cam 52.

For this purpose a solenoid 62 is provided which is secured in any desirable way to the carburetor housing in such a position that the armature 64 of such solenoid is immediately above a laterally projecting lip integral with a lever 68 secured to the throttle shaft 16 and having an opening 70 in which one end of spring 72 is received, the other end of such spring engaging a notch 74 in an arm 76 integral with and projecting from the throttle operating arm 18.

Normally when the solenoid is not energized the solenoid and throttle occupy the position shown in Fig. 1 but the choke valve is in closed position and the cam 52 is in fast idle position. At any time the engine is stopped after operation at normal temperature, the throttle and solenoid would be as in Fig. 1, but the choke would be open and cam 52 in the normal or hot idle position. If the solenoid is energized lever 68 is moved to the Fig. 2 position, opening the throttle to the desired extent and through spring 72 moving arm 18 clockwise to release the fast idle cam from screw 54 so that the choke can close and move the cam to its fast idle position.

When the cam 52 is in the fast idle position the throttle cannot move toward closed position after the solenoid is deenergized because a projecting toe 78 integral with lever 68 is engaged by an offset portion 80 of lever 18. Lever 18 being held in position by the fast idle cam, movement of the throttle toward closed position is stopped by said lever 18.

When the throttle is operated manually the lever is moved in a clockwise direction by the manual operating connection and moves lever 68 and the throttle in a clockwise direction through engagement of the offset 80 with the toe 78, to open the throttle. On closing of the throttle the movement of lever 18 pulls the throttle toward closed position through the medium of spring 72.

The structure of the solenoid is wholly immaterial so far as the present invention is concerned and also the details of its control circuit. Any suitable circuit can be provided, by means of which the energization of the solenoid is effected when the starter control circuit is closed and is continued as long as said circuit is closed. When the solenoid is deenergized the throttle will take whatever position is determined by the position of the fast idle cam. If the temperature is below some predetermined degree the throttle will be in the position of Fig. 2 and if the temperature is above such predetermined degree, but less than normal operating temperature, the throttle will be somewhere between the Fig. 2 and Fig. 1 positions, depending upon the position of the cam 52.

Coming now to the second form of the invention, which is shown in Figs. 3 to 6 inclusive, the arrangement of parts is slightly different and the function also is slightly different, the throttle being moved to partially open position as soon as the engine stops instead of at the time the starter circuit is closed, and closing movements of the throttle which might cause engine stalling being prevented.

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In this form of the invention the throttle shaft is designated 90 and the manually operable throttle actuating lever comparable to lever 18 at 92. This lever is also loose on the throttle shaft as is the lever 18 and also operates a fuel pump through connections such as shown in Fig. 1. Secured to the throttle shaft is a lever 94 and this lever has a projecting toe 96 integral therewith which is engaged by a laterally offset portion 98 of the lever 92 as the latter is moved clockwise to effect opening of the throttle. The lever 94 is connected to lever 92 by a spring 100 similar to the spring 72 and when lever 92 is returned to normal position upon release of the accelerator pedal the spring pulls the lever 94 in a counterclockwise direction to move the throttle toward closed position. Stop screws 102 and 104 which correspond to screws 26 and 54, respectively, are carried by lever 94 which is secured to the throttle shaft instead of by a lever loose on the shaft as in the device shown in Fig. 1. However, these screws cooperate with a fixed stop 106 for normal idling and a movable fast idle cam 108, similar to cam 52 on an arm 110 which is connected to the choke valve by a rod similar to rod 46 to be moved thereby in the same way as arm 48 and cam 52, so as to control the idle position of the throttle in the same way as previously described.

To position the throttle in the proper place for starting, to release the fast idle cam from the screw 104 and to retard the closing of the throttle upon release of the accelerator pedal, a device movable in response to manifold suction is employed. This device comprises a diaphragm housing 114 which is secured to the carburetor housing in any suitable way, as by means of a bracket 116, shown in Fig. 5, which is attached by screws to the carburetor body and to which the diaphragm chamber is secured by screws.

The chamber 114 is formed of two parts 118 and 120 which are joined together in any suitable way to form a fluid-tight joint and a flexible diaphragm 122 of any suitable material is clamped between the two parts 118 and 120. Extending from the member 120 is a coupling member 124 having a passage 126 therethrough. This passage may be threaded to receive the reduced neck 128 of a nipple 130 as shown in Fig. 6, and the nipple may be connected in any suitable way to a conduit leading to the intake passage at some point posterior to the throttle. A spring 131 is received in the passage 126 and normally forces the diaphragm to the right to the position shown in Fig. 6.

A rod 132 is slidably received in a bushing 134 mounted in the supporting plate 116 and a reduced extension of this rod extends through the diaphragm and reinforcing plates 136 and 138 and is riveted to hold the assembly together. An elongated nut 140 with a closed end is screwed so that by movement of the nut the effective length of the rod can be modified. This nut is adapted to engage a pin 142 extending from the lever arm 94 and when the spring is expanded the lever 94 is moved to the right to open the throttle to an extent determined by the adjustment of the nut 140.

The function of the mechanism described is obvious. Whenever the engine is inoperative and no suction is effective on the diaphragm 122 the latter and rod 132 are moved to the right to move the throttle to the desired open position for starting. When moved to this position the screw 104 no longer engages the fast idle cam 108 so that there is no interference with the movement of the choke valve to closed position or to any other position, as determined by the temperature.

If, when the engine is operating, the throttle is released by the operator and the engine continues to run normally, the suction effective on the diaphragm will overcome the pressure of the spring 131 and will hold the rod 132 in a position far enough to the left to prevent any effect of the rod on the position of the throttle, it being understood that during normal operation of the

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engine the mechanism is without effect in controlling the throttle movements. If, however, upon release of the accelerator pedal and a rapid closing movement of the throttle the engine speed decreases so rapidly that there is a tendency for the engine to stall, the engine speed becomes so low that the suction will not overcome the pressure of spring 131, rod 132 will move to the right preventing closing of the throttle sufficiently for stalling to take place. This form of the device is particularly useful in vehicles equipped with certain automatic transmissions in which there is no driving connection between the vehicle and the engine when the vehicle slows down.

There may be a ball check valve provided in the suction passage between the intake passage and the diaphragm chamber which is so arranged that movement of the diaphragm toward the right is free, but movement toward the left is retarded. The purpose of this device is obvious from the following. Whenever the rod 132 is moved to the right, as previously described when the engine tends to stall, the throttle is opened enough to keep the engine going and the engine speed picks up. It is desired that the throttle return toward normal idle position to prevent operation of the engine at higher speed than necessary, but it is not desired to permit this movement too rapidly or there would be a further tendency to stall. As the engine speeds up the suction becomes effective to move the diaphragm toward the left and the check valve is provided to prevent too rapid movement in response to this increase in suction.

As shown in Fig. 6 a small passage 144 is provided in the neck 128 of the nipple 130 and this communicates with an enlarged chamber 146 in which a ball valve 148 is retained between the end of passage 144 and a pin 150, but any suitable ball retaining means may be used. In addition to the passage 144 there is a restricted passage 152 through which suction is communicated to the diaphragm. Upon a reduction of suction the ball does not block the passage 144 so the effect is immediate and movement of the diaphragm and rod 132 to the right is not retarded, but upon increase of suction in conduit 130 the ball is moved to block passage 144 so that the suction effective on the diaphragm is communicated thereto only through the small passage 152 and movement of the diaphragm and rod 132 is obviously retarded. In this way closing of the throttle after engagement of pin 142 by rod 132 is delayed.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member operable by said choke valve when moved to closed position for holding said throttle valve open to a greater degree than its normal idle position, in order to secure faster than normal idling, said member being movable by the choke valve during its opening movement to a position where movement of the throttle to normal idle position is permitted and being effective when in such position to prevent return of the choke valve to its closed position, means for holding said member in such position when the throttle is in normal idle position, and means operated automatically when the engine is inoperative for opening the throttle at least as far as the fast idle position to release said member and permit its return to normal position.

2. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member operable by said choke valve when moved to

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closed position for holding said throttle valve open to a greater degree than its normal idle position, in order to secure faster than normal idling, said member being movable by the choke valve during its opening movement to a position where movement of the throttle to normal idle position is permitted and being effective when in such position to prevent return of the choke valve to its closed position, means for holding said member in such position when the throttle is in the normal idle position, and a solenoid adapted to be energized when the engine starting means is rendered operative, said solenoid being operative when energized to open the throttle at least as far as its fast idle position to release said member and permit its return to normal position.

3. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member operable by said choke valve when moved to closed position for holding said throttle valve open to a greater degree than its normal idle position, in order to secure faster than normal idling, said member being movable by the choke valve during its opening movement to a position where movement of the throttle to normal idle position is permitted and being effective when in such position to prevent return of the choke valve to its closed position, means for holding said member in such position when the throttle is in normal idle position, and suction controlled means operable automatically when the engine ceases to operate under its own power to open the throttle at least as far as its fast idle position to release said member and permit its return to normal position.

4. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member operable by said choke valve when moved to closed position for holding said throttle valve open to a greater degree than normal idling, said member being movable by the choke valve during its opening movement to a position where movement of the throttle to normal idle position is permitted and being effective when in such position to prevent return of the choke valve to its closed position, means for holding said member in such position when the throttle is in normal idle position, and suction controlled means movable upon a reduction in the suction effective thereon, to a position where said means is effective to prevent closing movement of the throttle to its normal idle position whereby release of said member and return thereof to its normal position is effected.

5. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to a position to hold the throttle open beyond normal idle position when the choke valve is closed, a stop member operatively connected to said throttle and engaging said first member, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed and means operable automatically when the engine is inoperative to hold the throttle open sufficiently to disengage the stop member from said first member, to permit movement of said first member to its initial position and closing of the choke valve.

6. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for con-

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trolling the operation of said throttle valve including a member movable by the choke valve to a position to hold the throttle open beyond normal idle position when the choke valve is closed, a stop member operatively connected to said throttle and engaging said first member, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, a solenoid adapted to be energized when the engine starting means is rendered operative, an arm operatively connected to the throttle and actuated by said solenoid when energized to move the throttle toward open position sufficiently to disengage said stop member from the member movable by the choke valve to permit movement of said first member to its initial position and closing of the choke valve.

7. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to a position to hold the throttle open beyond normal idle position when the choke valve is closed, a shaft supporting the throttle rotatably mounted in the mixture outlet passage, an operating arm rotatable on the throttle shaft but operatively connected thereto, a stop member carried by said operating arm and engageable with said first-named member, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, a solenoid adapted to be energized when the engine starting means is rendered operative, an arm secured to the throttle shaft and movable by the solenoid when energized to move the throttle to a position where the aforesaid stop member is not in position to engage the member movable by the choke valve to permit movement of said first member to its initial position and closing of the choke valve.

8. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to determine the idling position of the throttle, said member being so positioned when the choke valve is opened that the throttle can be closed to its normal idle position and movable to a position to hold the throttle open to a greater extent when the choke is closed, a stop member operatively connected to the throttle valve movable therewith and engageable with said first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm secured to the throttle, and automatic actuating means for said arm effective when the engine is inoperative to move said arm and open the throttle sufficiently to move said stop member and disengage it from said first-named member to permit movement of said first member to its initial position and closing of the choke valve.

9. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to determine the idling position of the throttle, said member being so positioned when the choke valve is opened that the throttle can be closed to its normal idle position and movable to a position to hold the throttle open to a greater extent when the choke is closed, a stop member operatively connected to the throttle valve and engageable with said first-

named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm secured to the throttle, and automatic means operative concurrently with the starting of the engine to move said arm and open the throttle sufficiently to disengage said stop member from the first-named member to permit movement of said first member to its initial position and closing of the choke valve.

10. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to determine the idling position of the throttle, said member being so positioned when the choke valve is opened that the throttle can be closed to its normal idle position and movable to a position to hold the throttle open to a greater extent when the choke is closed, a stop member operatively connected to the throttle valve and engageable with said first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm secured to the throttle, and a solenoid adapted to be energized concurrently with the starting of the engine and effective when energized to engage said arm and move the throttle toward open position far enough to disengage said stop member from the first-named member to permit movement of said first member to its initial position and closing of the choke valve.

11. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable to different positions to variably control the idling position of the throttle, a stop member operatively connected to the throttle and engageable with said first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm for the throttle, and automatic means operable concurrently with the starting of the engine and effective to operate said arm and move the throttle toward open position sufficiently to disengage the stop member from the first-named member to permit movement of said first member to its initial position and closing of the choke valve thus locating the throttle in the best position for starting.

12. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable to different positions to variably control the idling position of the throttle, a stop member operatively connected to the throttle and engageable with said first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm for the throttle, means operable when the engine is inoperative to engage said arm and hold the throttle open to an extent sufficient to move said stop member to a position where it is disengaged from and permits movement of said first member to its initial position and closing of the choke valve thus locating the throttle in the best position

for starting, and means operable by engine suction when the engine is operating under its own power for rendering said last-named means ineffective.

13. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member movable by the choke valve to determine the idling position of the throttle, said member being so positioned when the choke valve is opened that the throttle can be closed to its normal idle position and movable to a position to hold the throttle open to a greater extent when the choke is closed, a stop member operatively connected to the throttle valve and engageable with said first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, an operating arm secured to the throttle, means operable when the engine is inoperative to engage said arm and hold the throttle sufficiently open and to move said stop member to a position where it cannot engage with and thus permits movement of said first member to its initial position and closing of the choke valve, and means operated by engine suction when the engine is operating under its own power to render said last-named means ineffective.

14. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a throttle shaft rotatably mounted in the mixture outlet passage, an operating arm rotatable on the throttle shaft but operatively connected thereto, a member movable to different positions to variably control the idling position of the throttle, an arm secured to the throttle shaft, a stop member carried by said last-named arm and engageable with the first-named member to limit the closing movement of the throttle, said stop member being effective to hold said first-named member in the position to which it has been moved by the choke valve and prevent closing of the latter when the throttle is closed, automatic means operable when the engine is inoperative to engage said last-named arm and move the throttle sufficiently toward open position to move the stop member to a position where engagement of said member with said first-named member is prevented permitting movement of said first member to its initial position and closing of choke valve and means operated by engine suction when the engine is self-operative to render said automatic means inoperative.

15. In a carburetor having an air inlet, a mixture outlet passage, a choke valve controlling the admission of air and a throttle valve for regulating the quantity of combustible mixture supplied to the engine; means for controlling the operation of said throttle valve including a member connected to the choke valve for movement therewith and movable to different positions as the choke valve is moved to variably control the idling position of the throttle, a stop member operatively connected with the throttle and engageable with said first-named member to limit the closing movement of the throttle valve, said stop member being effective when in engagement with said first-named member to prevent movement of such member in a direction to permit closing of the choke valve when the throttle is closed, automatic means operable when the engine is inoperative to disengage said stop member from the first-named member in order to permit closing of the choke valve to facilitate starting of the engine, and means operated by engine suction when the engine starts to operate under its own power to render said automatic means inoperative.

16. In a carburetor having a mixture outlet passage,

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a throttle valve for regulating the passage of combustible mixture through said outlet, an air inlet and a choke valve adapted to be automatically moved to different positions to control the admission of air through said inlet, means for controlling the throttle valve comprising a member connected to the choke valve for movement therewith and movable to different positions as the choke valve is moved to variably control the idling position of the throttle, a stop member operatively connected with the throttle valve, said stop member being effective when in engagement with said first-named member to prevent movement of such member in a direction to permit closing of the choke valve in open position if the engine is stopped when relatively hot, and automatic means oper-

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able concurrently with the starting of the engine to disengage said stop member from the first-named member and permit movement of the choke valve to closed position before the engine is started.

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