

Feb. 21, 1967

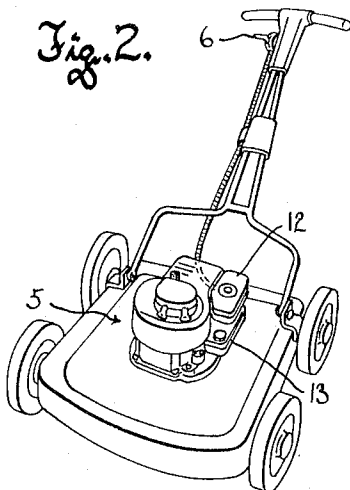
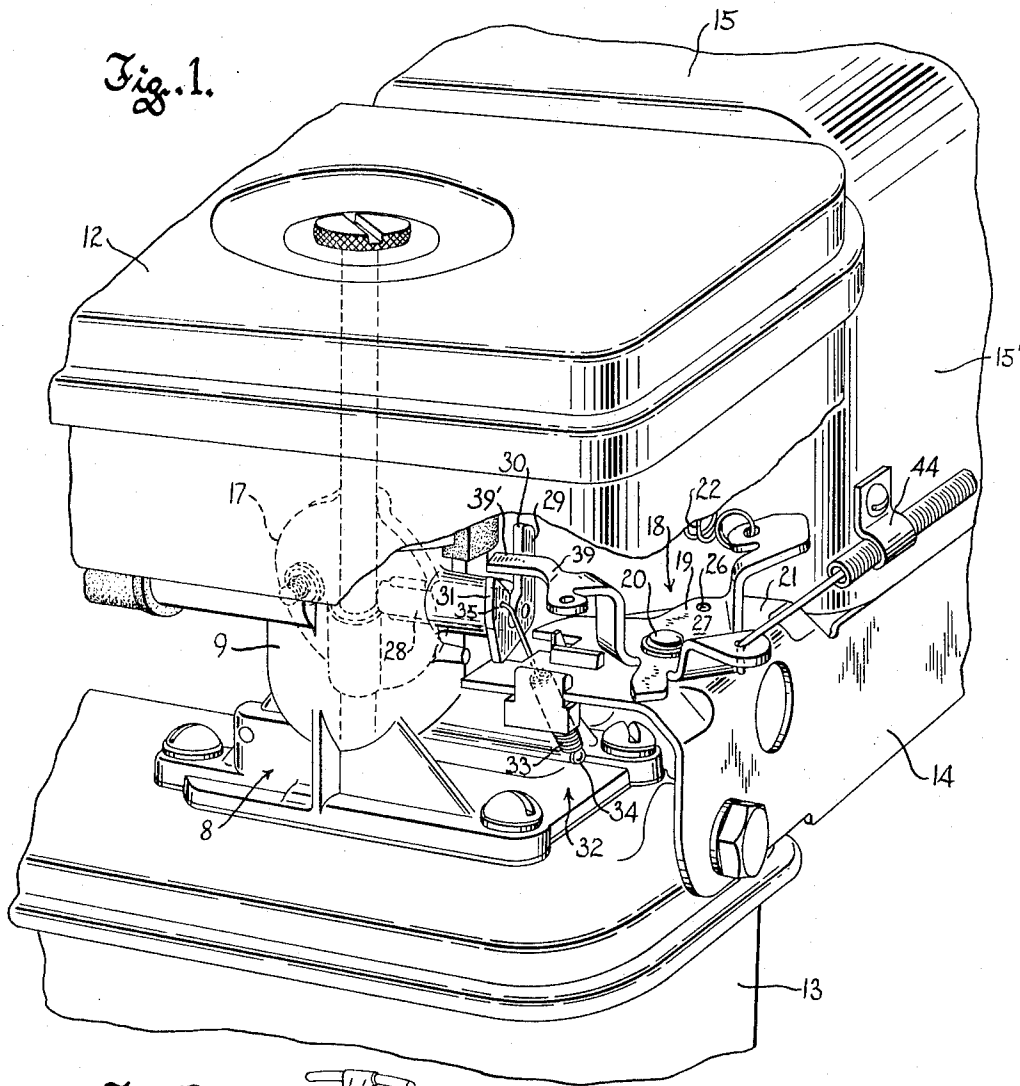
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3,305,223

CARBURETOR WITH IMPROVED CHOKE VALVE CONTROL

Filed Sept. 30, 1965

4 Sheets-Sheet 1



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CARBURETOR WITH IMPROVED CHOKE VALVE CONTROL

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4 Sheets-Sheet 2

Fig. 3.

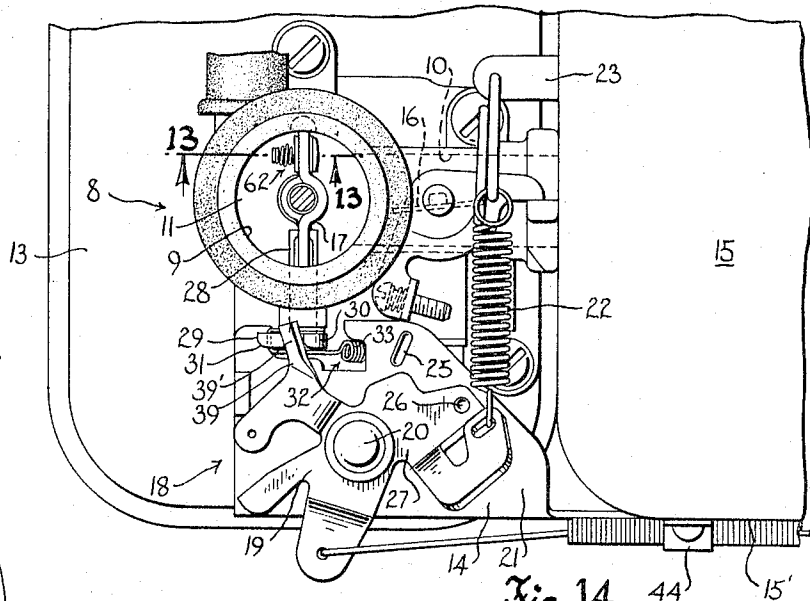


Fig. 13.

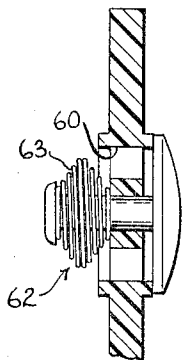


Fig. 14.

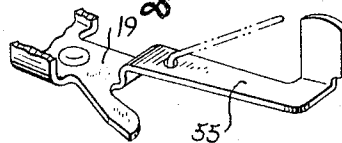
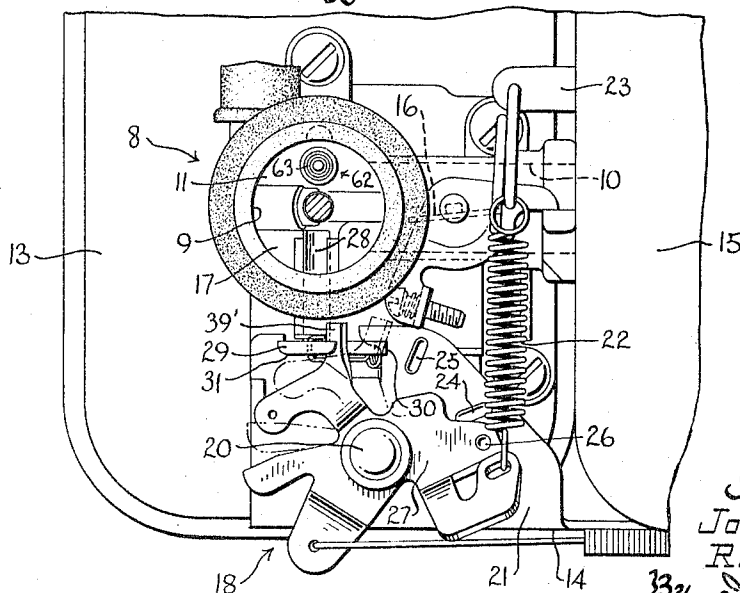


Fig. 4.



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4 Sheets-Sheet 3

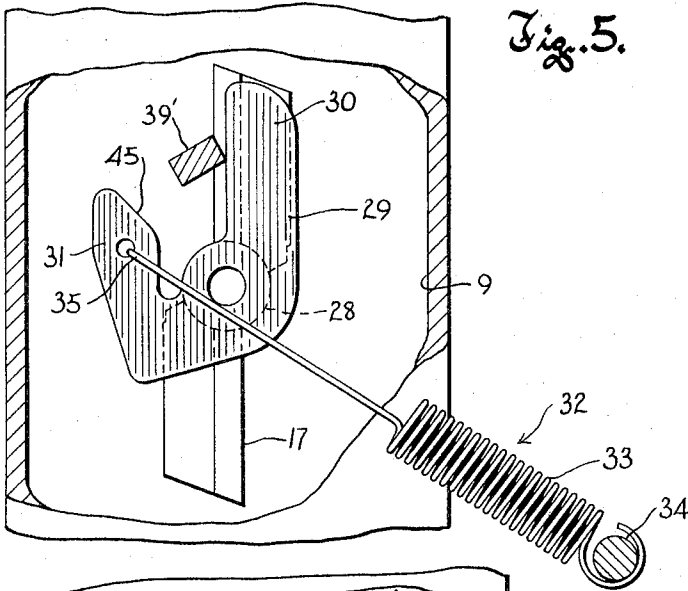


Fig. 5.

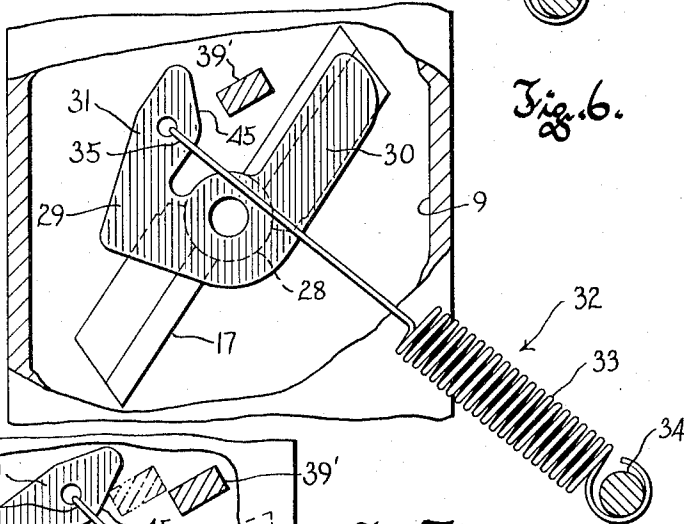


Fig. 6.

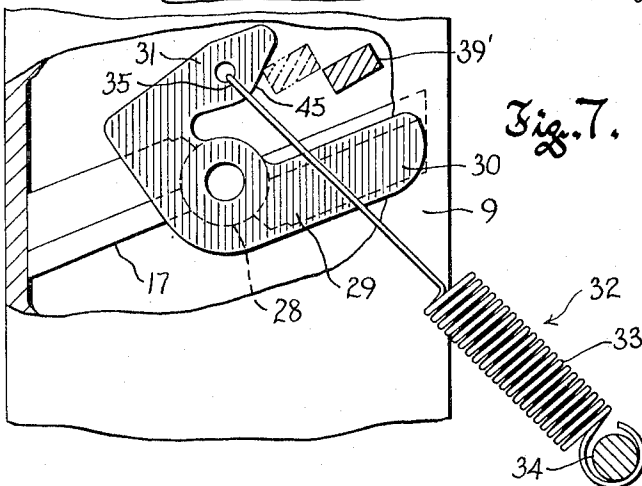


Fig. 7.

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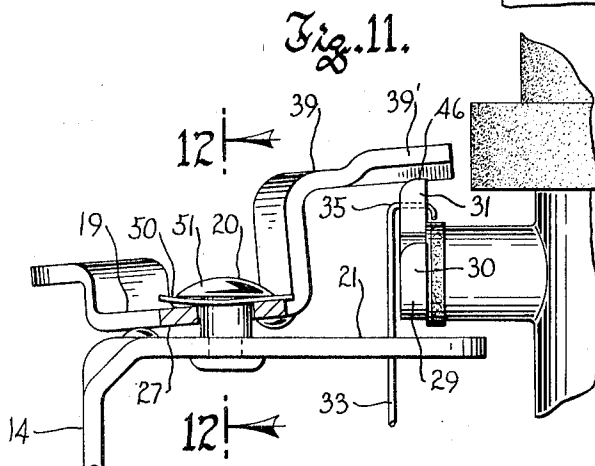
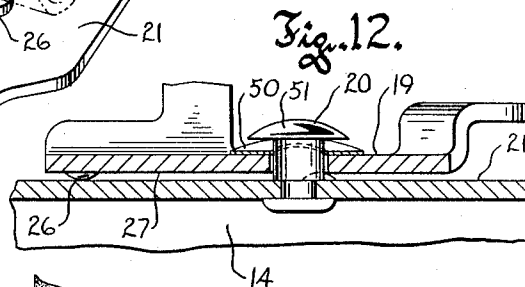
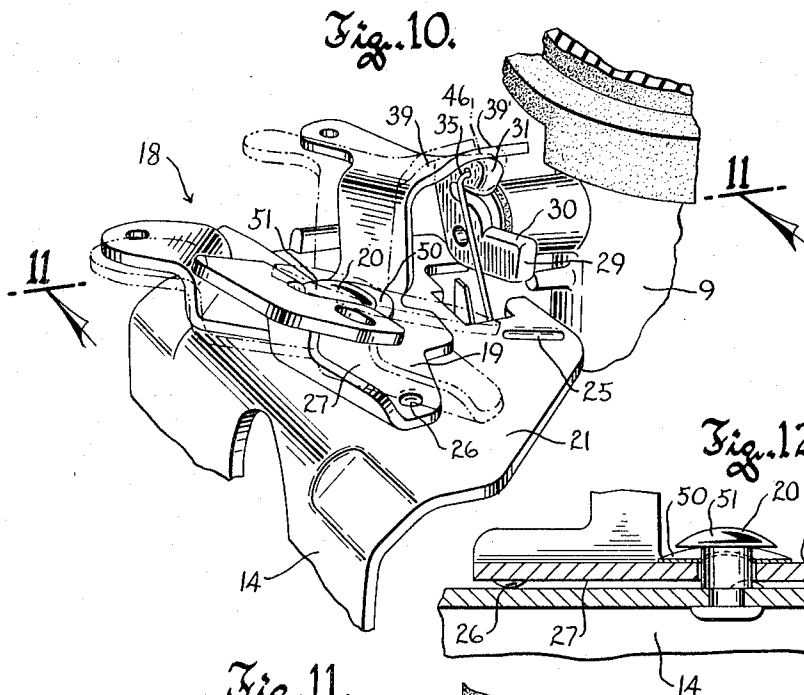
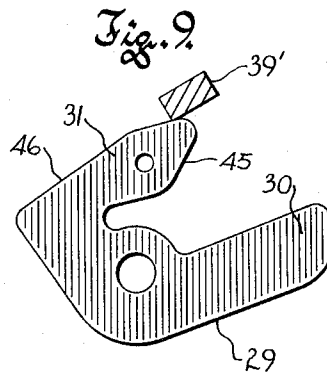
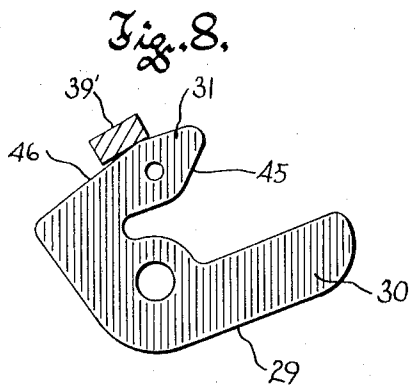
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CARBURETOR WITH IMPROVED CHOKE VALVE CONTROL

Filed Sept. 30, 1965

4 Sheets-Sheet 4



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3,305,223

CARBURETOR WITH IMPROVED CHOKE VALVE CONTROL

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Filed Sept. 30, 1965, Ser. No. 491,519

11 Claims. (Cl. 261—52)

This invention relates to carburetors of the type used on small, portable internal combustion engines and refers more particularly to a control for such carburetors.

Carburetors of the type with which this invention is concerned have a throttle valve, the maximum open position of which is manually adjustable, and a choke valve by which the admission of air to the carburetor may be fully or substantially interrupted during starting of the engine; and, as shown in the Lechtenberg et al. Patent No. 3,194,224, a common manually operable control member which controls both the throttle valve and the choke valve.

Although the manually operable control member by which the position of the throttle valve may be set and the choke valve closed, may be operated directly, in many instances it is customary to provide means for actuating the control member from a remote point. This is especially so in situations where the engine drives a power lawn mower, in which event a control lever mounted on the handle of the mower is connected to the control member of the carburetor by means of a Bowden wire.

In the carburetor illustrated in the Lechtenberg et al. patent, the control member is mounted to swing about a fixed axis in juxtaposition to the choke valve between an idling position in which the throttle valve is very nearly closed, and a full throttle or high speed position in which the throttle valve is fully open. This is the normal range of adjustment of the control member. However, the control member is also movable beyond its full throttle position, and this additional range of motion is employed to effect closure and reopening of the choke valve. To this end, a finger on the control member collides with a lever fixed to the shaft of the choke valve and imparts valve opening motion thereto against the bias of a spring which, in the aforesaid Lechtenberg et al. patent, at all times tends to hold the choke valve open.

Although that arrangement entailed moving the control member to its extreme limit of motion beyond its full throttle position in order to close the choke valve, this was not objectionable where the control member was directly actuated. However, where the adjustment of the control member was effected from a remote point, as by a lever located on the handle bars of the mower and connected with the control member by a Bowden wire, it did present problems. Unless the Bowden wire was very accurately adjusted and its sheath was anchored exactly in its right position, it was often impossible to move the control member far enough beyond its full throttle position to fully close the choke valve. The result was difficult engine starting.

With a view toward overcoming this objection, the present invention has as its purpose and object to provide a carburetor having an improved control or, more accurately, an improved control for carburetors and especially the choke valves thereof, wherein complete closure of the choke valve is assured despite the fact that the control member by which such closure is effected may not have had the full range of motion imparted thereto.

More specifically, it is the purpose and object of this invention to provide a Bowden wire type remote control for carburetors by which complete closure of the choke valve will be assured, despite variations in the extent of motion imparted to the actuator of the control by the

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Bowden wire due to slack or inaccurate adjustment of the Bowden wire.

With a view toward achieving the aforesaid primary objectives of this invention, it is another object of this invention to provide a carburetor wherein the choke valve is yieldingly held either in its open or its closed position by an overcenter spring means which not only serves to hold the choke valve in one or the other of its positions, but also snaps the same to each of its positions when the overcenter spring means crosses dead center, so that both closure and opening of the choke valve can be accomplished with a shorter actuating motion than was heretofore necessary.

Another object of this invention is to provide means whereby the choke valve may be quickly reopened in the event it is accidentally closed, by simply operating the control.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention, constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a perspective view of a carburetor embodying this invention, said view illustrating a portion of the engine supplied by the carburetor and part of its fuel tank;

FIGURE 2 is a perspective view on a reduced scale of a power lawn mower driven by an engine equipped with the carburetor and control thereof of this invention, and illustrating the conventional way remote control of the carburetor is effected in such installations;

FIGURE 3 is a top plan view of the carburetor with its air cleaner removed, illustrating the control thereof in its full throttle position and the choke valve open;

FIGURE 4 is a view similar to FIGURE 3 but illustrating the control in its starting position, with the choke valve closed;

FIGURES 5, 6 and 7 are detail views illustrating the manner in which the choke valve is yieldingly held in either its open or closed position by an overcenter spring which also serves to snap the choke valve to the position toward which it is being moved by actuation of the control, FIGURE 5 illustrating the condition at the instant valve closing motion is being initiated, FIGURE 6 illustrating the condition directly after the choke valve has been moved toward its closed position far enough to enable the overcenter spring means to carry it the rest of the distance toward closed position, and FIGURE 7 illustrating the condition just prior to reopening of the choke valve;

FIGURES 8 and 9 illustrate the manner in which operational relationship between the control member and the choke valve is re-established in the event the choke valve is accidentally closed while the engine is running, to enable reopening of the choke valve by actuation of the control member;

FIGURE 10 is a perspective view of the control member and associated structure, also illustrating the manner in which operational relationship between the control member and the choke valve is re-established after accidental closing of the choke valve, by simply actuating the control member;

FIGURE 11 is a detail sectional view through FIGURE 10 on the plane of the line 11—11;

FIGURE 12 is a detail sectional view through FIGURE 11 on the plane of the line 12—12;

FIGURE 13 is a detail sectional view through FIGURE 3 on the plane of the line 13—13; and

FIGURE 14 is a fragmentary perspective view of a portion of the control member to illustrate a slight modification thereof.

Referring now more particularly to the accompanying drawings, the numeral 5 designates an engine of the small, portable single cylinder type with which this invention is particularly concerned. Engines of this type have many uses, not least of which is the driving of power lawn mowers, as shown for instance in FIGURE 2. When so used, the engine speed is controlled by a lever 6 which is mounted on the handle of the mower, and is connected with the carburetor of the engine through a flexible motion transmitting element or Bowden wire 7. It is also customary to use this remote control to "choke" the engine during starting, and it is here where prior remote controls have led to the difficulties which this invention overcomes. The manner in which this is accomplished will be presently described, but first the general nature of the carburetor and its control must be understood.

The carburetor, indicated generally by the numeral 8, may be like that of the aforesaid Lechtenberg et al. Patent No. 3,194,224. Hence, it has a tubular body portion 9 provided with a mixture passage 10 which leads to the intake port of the engine and has an upwardly facing air inlet 11 to receive air through an appropriate air cleaner 12. The carburetor is secured to the top wall of a fuel tank 13, which in turn is solidly supported from the engine by means including a bracket 14 fixed to the engine in any suitable way, and substantially coplanar with an end wall 15' of the customary air directing shroud 15 of the engine.

The carburetor has a throttle valve 16 mounted in its mixture passage, to swing between open and closed positions, and a choke valve 17 which controls the admission of air to the carburetor. A common control, indicated generally by the numeral 18, is provided for both of these valves, and this common control includes a movable control member 19 which is pivoted, as at 20, to a horizontal flange 21 forming part of the bracket 14. A tension spring 22 connects the movable control member 19 with the throttle valve and the actuating arm 23 of a governor (not shown). It is possible, therefore, to set the maximum speed at which the engine is to run by adjusting the position of the control member; movement thereof in one direction increasing the tension on the spring and causing the throttle valve to open, while opposite adjustment of the control member decreases the spring tension and causes the engine to run slower.

The manner in which the governor maintains the selected engine speed forms no part of this invention, and hence has not been illustrated.

During operation of the engine, the normal range of motion or adjustment of the control member 19 is between "full throttle" and "idling" positions. These positions are identified by detents in the form of indentations 24 and 25 in the flange 21 and a downwardly projecting pimple 26 in the base portion 27 of the control member. As the control member is rotated about its pivotal mounting 20, the pimple 26 travels in an arc which intersects the indentations, to snap into one or the other when the control member reaches its "full throttle" or "idling" position, the "full throttle" position which is shown in FIGURE 3, being identified by engagement of the pimple into the indentation 24.

As in the carburetor of the Lechtenberg et al. patent, the control member may be moved beyond its "full throttle" and "idling" positions. Movement of the control member beyond its "idling" position defined by the indentation 25 carries it to a "stop" position in which it grounds the ignition circuit, but since this latter feature

is in nowise involved in the present invention, it has not been illustrated.

On the other hand, the movement of the control member beyond its "full throttle" position is significant to the present invention, since it is this additional motion of the control member which is employed to effect closure and reopening of the choke valve in a manner now about to be described.

The choke valve 17 is of the customary butterfly type, and preferably is constructed and mounted as in the aforesaid Lechtenberg et al. patent. Accordingly, the choke valve is fixed to a shaft 28 which is journaled in an appropriately located bearing formed in the carburetor body, and is part of a plastic molding. On its outer end, the shaft 28 has a lever 29 formed integrally therewith, to provide means by which the choke valve may be swung from one position to the other. The outer end portion of the lever 29 is bifurcated, the resulting bifurcations 30 and 31 being respectively long and short.

The choke valve is yieldingly held in either its open or closed position by yieldable overcenter means, indicated generally by the numeral 32, and comprising a tension spring 33, an anchor 34 for one end of the spring fixed with respect to the carburetor body, and a connection 35 between the other end of the spring and the bifurcated lever 29. The anchor 34 is so located with respect to the axis about which the choke valve swings, that in the open position of the valve (see FIGURE 5), the connection 35 between the spring and the bifurcated lever 29 is at one side of the choke valve axis, while in the closed position of the choke valve (see FIGURE 7), the connection 35 between the spring and the bifurcated lever is at the other side of the valve axis. Obviously, therefore, the overcenter means crosses dead center at an intermediate position of the choke valve, and acts to yieldingly hold the valve in the position towards which it is moving when dead center is crossed.

As noted hereinbefore, the choke valve is moved from one position thereof towards the other by rotation of the control member 19 about its pivotal mounting 20, between its "full throttle" position and its extreme position of clockwise rotation beyond "full throttle." To enable the control member to perform this function, it has an actuating finger 39 formed integrally therewith, to travel in a defined arcuate path which intersects the bifurcated lever 29. Normally, this path of motion of the finger 39 lies in a horizontal plane parallel to the flange 21 and above the axis of the choke valve.

When the choke valve is open, as shown in FIGURES 1, 3 and 5, the long bifurcation 30 occupies a substantially vertical position directly in the path of the finger 39 as the latter travels in a clockwise direction, as viewed from the top, during motion of the control member from its "full throttle" position toward its extreme limit of clockwise rotation. The special relationship of the parts is such that contact is made between the finger 39 and the long bifurcation 30 as the control member leaves its "full throttle" position. Thus, upon continued motion of the control member in a clockwise direction beyond its "full throttle" position, the bifurcated lever will be rocked in the direction to close the choke valve. As it does, the overcenter means 32 crosses dead center, so that the tension of its spring 33 snaps the choke valve to its closed position long before the control member reaches its extreme limit of choke valve closing clockwise rotation.

This is one of the most significant features of the instant invention. Because of it, full closure of the choke valve is assured, regardless of whether or not the control member has been moved to its extreme limit of choke valve closing motion, which was not the case with prior carburetor controls. The advantage gained by this feature of the invention is especially significant in situations requiring remote control of the carburetor as in the power lawn mower shown in FIGURE 2. Now, for the first time, lack of absolutely accurate adjustment of the Bow-

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den wire driving connection between the control lever 6 on the mower handle and the movable control member 19, does not prevent full closure of the choke valve. As a result, it is not too important just where the sheath of the Bowden wire is anchored, it being sufficient that the lower end thereof be secured in any suitable manner to a fixed portion of the engine, as by means of a clamp 44 secured to the end wall 15' of the shroud 15, and that the upper end of the sheath be secured to the mower handle in any suitable way.

As best seen in FIGURES 5, 6 and 7, the bifurcations 30 and 31 are spaced apart a distance substantially greater than the width of the actuating finger 39. Accordingly, the bifurcations and the finger 39 may be considered a lost motion driving connection between the control member and the choke valve.

As also shown in FIGURES 5, 6 and 7, when the choke valve is snapped to its closed position by the overcenter spring means, the inner edge of the short bifurcation 31 moves into the path of the finger 39 so that, during retrograde or counterclockwise rotation of the control member, the finger collides with the short bifurcation and imparts choke valve opening torque to the bifurcated lever. To facilitate this action, the inner edge 45 of the short bifurcation presents a downwardly facing inclined cam surface to the approaching finger 39 when the choke valve is in its closed position.

As the bifurcated lever is lifted by the advancing finger 39 and the choke valve begins to open, the overcenter spring means is carried toward dead center and the instant it crosses dead center it acts to snap the choke valve to its open position, and with this action, the short bifurcation 31 swings out of or below the path of the finger 39, so that continued motion of the control member toward its "idling" position is possible.

Inasmuch as the finger 39 moves away from the bifurcated lever 29 when the choke valve is opened and the control member is brought to a position somewhere along its range of motion between "full throttle" and "idling," and since the choke valve is held open only by the overcenter spring means, the choke valve can be accidentally closed—as, for instance, by a twig on a bush coming in contact therewith as the mower is operated in its vicinity. Such accidental closure of the choke valve while the engine is running will, of course, interfere with proper engine operation and will call for prompt reopening of the valve.

Since many users of engines of this type, for instance, the ordinary home owner, seldom recognize what has happened when an accidentally closed choke valve suddenly causes the engine to lose speed and give every indication of stopping, an operator, by instinct, will work the control lever back and forth. In recognition of this fact, the present invention provides means whereby such back and forth actuation of the control member will reopen the accidentally closed choke valve.

As shown in FIGURES 8-11, when the choke valve is accidentally closed the bifurcated lever 29 assumes a position at which the outer edge 46 of its short bifurcation lies across the path of the finger 39. Thus, as the finger moves along its path with return of the control member towards its "full throttle" position, it collides with the edge 46. But to enable the actuating finger 39 to be brought into proper operational relationship with the bifurcated lever and permit reopening of the choke valve by the instinctive back and forth actuation of the control member, it must be possible for the finger 39 to ride over the short bifurcation 31. To enable this to occur, yieldability is incorporated in the engagement which occurs between the finger and the outer edge of the short bifurcation as the control member is moved towards its "full throttle" position. This yieldability is obtained in either of two ways, or preferably by a combination thereof.

The needed yieldability can be obtained by forming the bifurcated lever of material having a high degree of

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inherent resilience—as, for instance, nylon—and by joining the short bifurcation to the rest of the lever through a reduced neck portion. It can also be accomplished by incorporating yieldability in the mounting of the control member which permits it to tilt, as shown in FIGURES 10 and 11, as the finger rides up onto the outer edge of the short bifurcation. In any event, as the control member is moved back toward its "full throttle" position, the finger rides up onto the short bifurcation and drops off the end thereof into the space between the bifurcations so that, movement of the control member in the opposite direction reopens the choke valve. To facilitate the finger riding across the short bifurcation, its outer end portion 39' is twisted to present a smooth surface to the outer edge 40 of the short bifurcation.

Yieldability in the mounting of the control member is afforded by interposing a spring washer 50 of the Belleville type between the top face of the control member and the head 51 of the rivet which provides the pivotal mounting 20 for the control member. Ordinarily, the spring washer holds the control member in flat parallel relationship with the top face of the mounting bracket flange 21, but when the finger 39 rides up onto the outer edge 46 of the short bifurcation, the spring yields and allows the finger to ride up over the short bifurcation and into the space between the bifurcations.

For engines that are destined to be used with implements and equipment requiring remote control of the carburetor, such as the lawn mower shown in FIGURE 2, it is preferable to incorporate the spring in the pivotal mounting of the control member, even though the bifurcated lever is molded of inherently resilient material; but where the control member is to be directly manually actuated, as in the case of riding type mowers where the engine usually is directly beneath the operator, it is preferable to rely solely upon the inherent resilience of the material of which the bifurcated lever is formed and to omit the spring from the mounting of the control member. This provides greater frictional resistance to unwanted creeping of the control member from an adjusted position. Also, for such direct manual adjustment, the control member may be equipped with a handle 55, as shown in FIGURE 14 and this handle may be provided with means for attaching a Bowden wire thereto, as indicated in dotted lines.

Since some delay in actuation of the control member to reopen the choke valve after the engine has started is inevitable, and since the admission of some air is necessary to keep the engine running, the choke valve has an air admission port 60 which is normally closed by a suction responsive valve 62. This valve is simply a poppet held in its closed position by a light spring 63, with the head of the valve at that side of the choke valve which faces inwardly when the valve is closed so that it will be drawn off its seat by engine suction.

From the foregoing description, taken in connection with the accompanying drawings, it should be apparent to those skilled in this art that this invention eliminates one of the chief causes of difficult engine starting by assuring full closure of the choke valve when the carburetor control is actuated to its "choke" or engine starting position.

What is claimed as my invention is:

1. A control for the choke valve of a carburetor by which the valve may be manually opened and closed from a point remote from the carburetor, said control comprising:

- (A) a control member mounted for back and forth movement between defined limits along a path fixed with respect to and adjacent to the choke valve;
- (B) a flexible driving member connected to the control member and by which said member may be moved from a point remote therefrom;
- (C) cooperating transiently engageable abutment means fixed with respect to the control member and the choke valve, providing a lost motion driving

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connection through which movement of the control member can impart movement to the choke valve from one position thereof towards its other position while leaving the choke valve free to continue its motion to such other position without hindrance from the control member; and

(D) overcenter drive means including a spring, said overcenter drive means being connected with the choke valve to yieldingly hold the same in either its open or closed position and to snap the same to the position toward which it may be moving in consequence of motion being imparted thereto by the control member when said overcenter drive means crosses dead center, so that closure of the choke valve takes place before the control member reaches the limit of its motion in the direction it must be moved to effect closure of the choke valve, whereby normal variations in the amount of motion imparted to the control member by the flexible driving member due to slack in the latter and other causes, do not interfere with full closure of the choke valve.

2. A control for the choke valve of a carburetor by which the valve may be manually opened and closed either from a point remote from the carburetor or directly at the carburetor, said control comprising:

(A) a control member mounted for back and forth movement between defined limits along a path fixed with respect to and adjacent to the choke valve,

said control member being operable either by direct manual actuation thereof or by a flexible driving member connected thereto and operable at a remote point;

(B) cooperating transiently engageable abutment means fixed with respect to the control member and the choke valve, providing a lost motion driving connection through which movement of the control member can impart movement to the choke valve while leaving the choke valve free to continue its motion to such other position without hindrance from the control member; and

(C) overcenter drive means including a spring, said overcenter drive means being connected with the choke valve to yieldingly hold the same in either its open or closed position and to snap the same to the position toward which it may be moving in consequence of motion being imparted thereto by the control member when said overcenter drive means crosses dead center, so that closure of the choke valve takes place before the control member reaches the limit of its motion in the direction it must be moved to effect closure of the choke valve, whereby normal variations in the amount of motion imparted to the control member do not interfere with full closure of the choke valve.

3. The control of claim 2, wherein the cooperating abutment means which provides the lost motion driving connection between the control member and the choke valve comprises

a finger constrained to move along a defined path, a lever oscillatable about a fixed axis, and bifurcations on the free end portion of the lever,

one of said bifurcations extending across the path of the finger when the choke valve is in its closed position to have valve actuating engagement with the finger during movement of the control member in the direction to effect movement of the choke valve towards its closed position, and

the other of said bifurcations being moved into the path of the finger concomitantly with closure of the choke valve, so that said other bifurcation will have valve actuating engagement

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with the finger during return motion of the control member to effect movement of the choke valve towards its open position.

4. The control of claim 3, wherein said bifurcations are of different lengths and the long bifurcation is the one which has engagement with the finger during movement of the control member to effect closure of the choke valve,

wherein the short bifurcation occupies a position out of the path of the finger when the choke valve is in its open position,

wherein the valve actuating engagement between the finger and the short bifurcation and the consequent movement of the short bifurcation out of the path of the finger occurs before the control member reaches the limit of its motion in the direction it moves to effect opening of the choke valve, so that accidental closure of the choke valve and re-entry of the short bifurcation into the path of the finger is possible without hindrance from the control member when the latter has moved beyond the point at which valve actuating engagement occurs between the finger and the short bifurcation,

and further characterized by

means providing yieldability in the engagement between the finger and the short bifurcation during movement of the control member in the valve closing direction while the valve is closed, so that the short bifurcation and the finger may be restored to valve opening relationship and the accidentally closed valve may be reopened by means of the control member.

5. The control of claim 3, wherein:

(A) said finger is on the control member and moves therewith;

(B) the lever is fixed with respect to the choke valve;

(C) the bifurcations on the lever are of different lengths,

(1) the inner edge of the long bifurcation is engaged by the finger during movement of the control member to effect closure of the choke valve,

(2) the inner edge of the short bifurcation is engaged by the finger during movement of the control member to effect opening of the choke valve, and

(3) the short bifurcation moves out of the path of the finger as the overcenter means snaps the choke valve to its open position;

(D) valve actuating engagement between the finger and the short bifurcation and consequent movement of the short bifurcation out of the path of the finger occurs before the control member reaches the limit of its motion in the direction it moves to effect opening of the choke valve, so that accidental closure of the choke valve and re-entry of the short bifurcation into the path of the finger is possible without hindrance from the control member when the latter has moved beyond the point at which it effects opening of the choke valve, such accidental closure of the choke valve and re-entry of the short bifurcation into the path of the finger disrupting proper operational relationship between the finger and the bifurcated lever and placing the outer edge of the short bifurcation in position to have the finger collide therewith as the control member is moved in its valve closing direction,

and said control being further characterized by

(E) means for restoring proper operational relationship between the finger and the bifurcated lever by movement of the control member, said means comprising

(1) yieldable means maintaining the finger and the outer edge of the short bifurcation on a collision path when the choke valve has been accidentally closed; and

(2) coacting means on the outer edge of the short

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bifurcation and the finger enabling the finger to ride over the short bifurcation and into the space between the bifurcations.

6. The control of claim 5, wherein said yieldable means is provided by inherent resilience in the short bifurcation and its junction with the rest of the lever. 5

7. The control of claim 5, wherein said yieldable means is provided by a spring incorporated in the mounting of the actuating lever.

8. The control of claim 5, wherein said lever is formed of material having a substantial degree of inherent resilience so that the short bifurcation may be deflected out of its normal position, and wherein the mounting of the control member incorporates a spring which permits deflection of the finger on the control member as it rides up onto the outer edge of the short bifurcation, said inherent resilience and the spring coacting to provide said yieldable means. 10 15

9. In a carburetor having a throttle control member mounted for movement from an idling to a full throttle position and also beyond the full throttle position, and having a choke valve constrained to swing about a fixed axis between open and closed positions in consequence of movement of said control member between said full throttle position and an extreme position therebeyond: 20 25

(A) a finger on the control member movable along a defined path with said member;

(B) a lever fixed with respect to the choke valve to swing about said fixed axis,

said lever having bifurcations on its free end portion, one of which extends across the path of said finger when the choke valve is in its open position to be engaged by the finger during movement of the control member toward said extreme position to effect closure of the choke valve, and the other of said bifurcations being moved into the path of said finger concomitantly with closure of the choke valve, so that the finger will engage the same and effect reopening of the choke valve during return motion of the control member toward its full throttle position; and 30 35

(C) overcenter spring means operatively connected with the choke valve to yieldingly hold the same in 40

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either its open or closed position and to snap the same to each of said positions when the overcenter spring means crosses a dead center position which is reached before the control member is advanced to said extreme position thereof or returned to its full throttle position, so that closure of the choke valve is not dependent upon the control member reaching its said extreme position.

10. In a carburetor, the structure set forth in claim 9, wherein the bifurcation which is engaged by the finger during opening of the choke valve swings out of the path of the finger as the valve snaps to its open position, but occupies a position with the outer edge thereof in the path of the finger in the event of accidental closure of the choke valve after the valve has been opened,

and further characterized by means for enabling reopening of the accidentally closed choke valve by actuation of the control member, said means comprising

means yieldingly maintaining the finger and said outer edge of the bifurcation on a collision course as the control member is moved to carry the finger towards the bifurcated lever while the valve is open, and coacting cam means on the outer edge of said bifurcation and the finger to cause the finger to ride over the bifurcation and into the space between the bifurcations.

11. In a carburetor, the structure of claim 9, further characterized by an air admission port through the choke valve, and a suction responsive valve normally closing said port, said valve opening in response to engine produced suction to permit a limited amount of air to pass into the carburetor until the choke valve is opened.

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