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2,489,494

OUTBOARD MOTOR CHOKE AND PRIMING MEANS

Filed Feb. 1, 1946

3 Sheets-Sheet 1

Fig. 2.

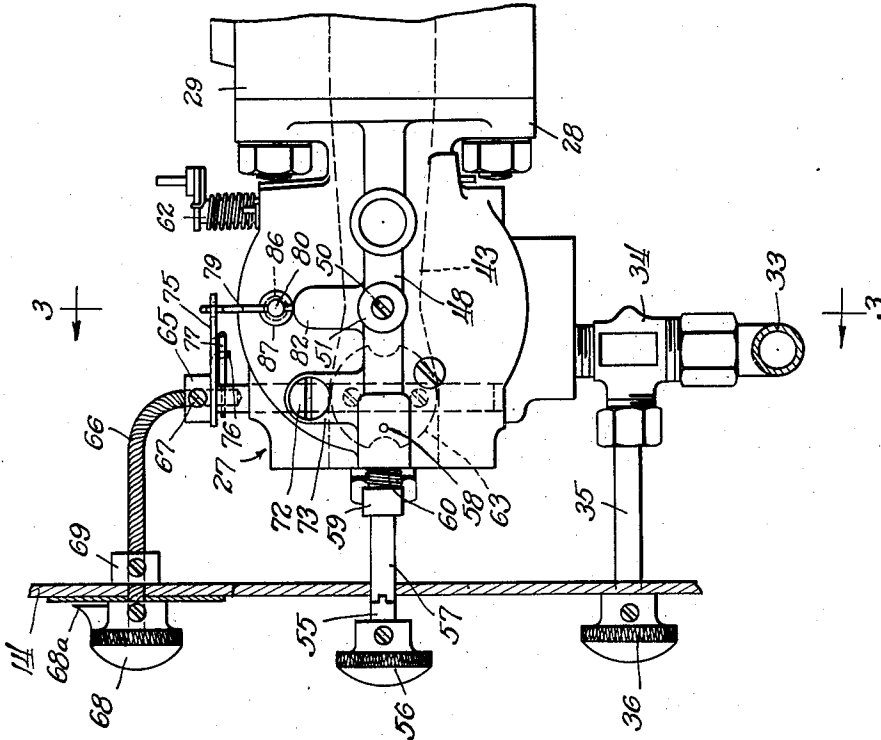
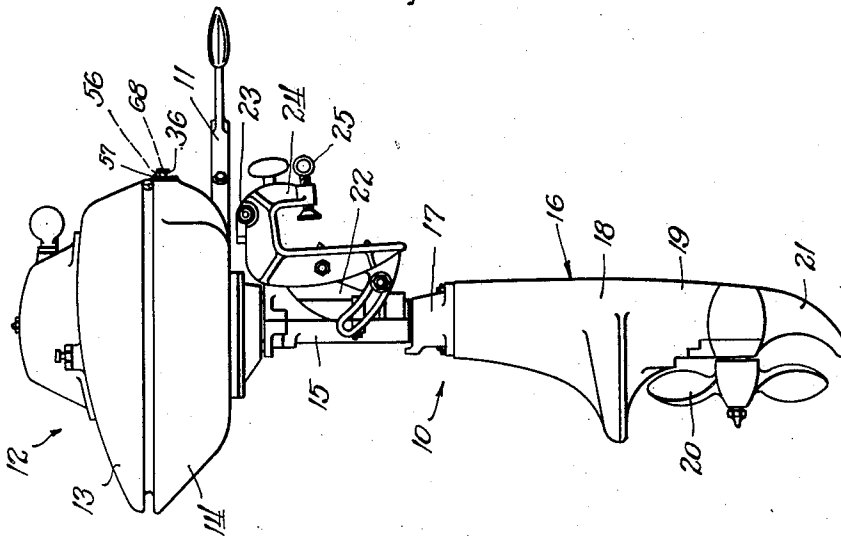


Fig. 1



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Fig. 3.

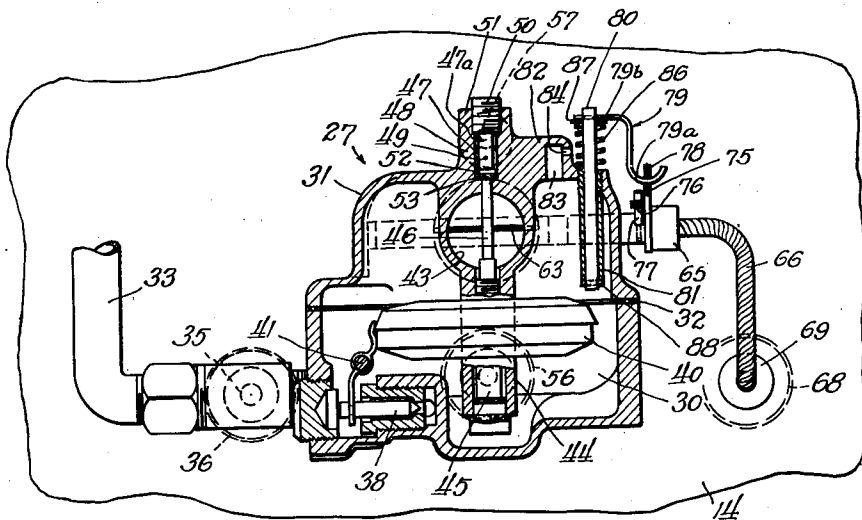


Fig. 5.

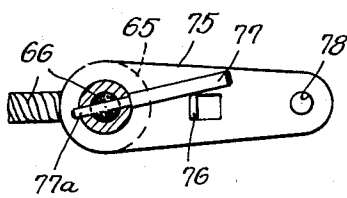


Fig. 4.

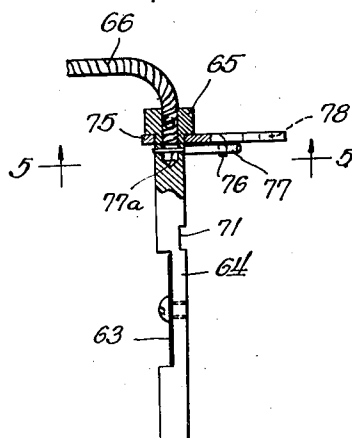
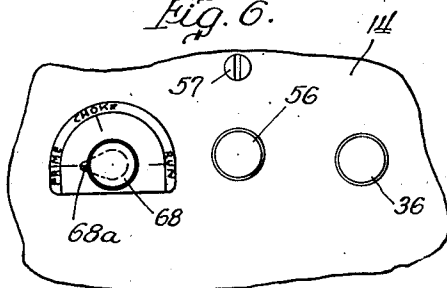


Fig. 6.



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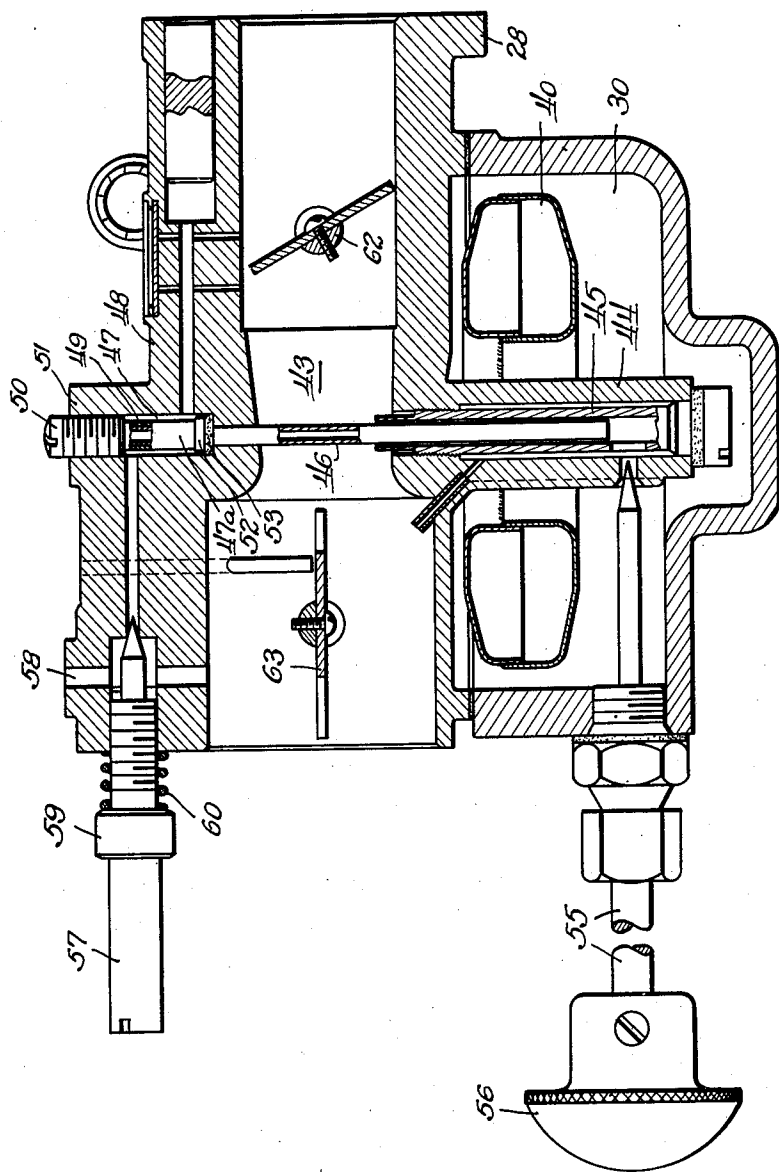
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OUTBOARD MOTOR CHOKE AND PRIMING MEANS

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3 Sheets-Sheet 3

Fig. 7.



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UNITED STATES PATENT OFFICE

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OUTBOARD MOTOR CHOKE AND PRIMING MEANS

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Application February 1, 1946, Serial No. 644,933

6 Claims. (Cl. 261—64)

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This invention relates to carburetors, and has to do with choke and priming means particularly suitable for use with outboard motor units.

Outboard motor units ordinarily comprise an internal combustion engine having an associated carburetor for supplying to the engine or motor a proper fuel-air mixture. Carburetors commonly have a float bowl or chamber to which the liquid fuel is supplied under pressure, admission of fuel to the float chamber being regulated by a float therein for maintaining the fuel at a desired level, under normal operating conditions. To facilitate starting of the motor, particularly when it is cold, means is provided for choking the engine and priming the carburetor. To that end, the carburetor is provided with the usual fuel-air passage, communicating with the float chamber, such passage being controlled by a choke valve, as well as the usual throttle valve, means being provided whereby the float may be depressed for admitting additional fuel to the float chamber and thereby raising the fuel level therein above normal, for flooding or priming the carburetor to assure adequate supply of fuel to the fuel-air passage sufficient to start the motor when cold.

In some outboard motor units the carburetor is placed in an exposed location and priming is accomplished by depressing with the finger a plunger located above the float in the carburetor, choking being accomplished by turning a knob or handle which operates the choke valve. It is becoming increasingly the practice to enclose the motor and its appurtenances, in outboard motor units, in a shroud which provides for streamlining so as to reduce wind resistance and also protects the motor and its appurtenances, including the carburetor, while also improving the appearance of the unit. In such units, the carburetor, being enclosed by the shroud, is not readily accessible and cam and lever arrangements are employed for effecting the choking and priming operations. Such arrangements are ordinarily rather inflexible as to the location, outside of the shroud, of the knob or handle for operating the choke valve, which often necessitates the location of such knob or handle in an inconvenient position.

My invention is directed to carburetor choke and priming means which is highly flexible with respect to positioning of the knob or handle for operating the choke valve, so that such knob or handle may be located so as to be readily accessible, conveniently adjacent the fuel supply control valve and the high speed regulating valve of the carburetor. I also provide means whereby priming may be accomplished in the movement of the choke valve from its normal open or run position to substantially closed position for starting the motor. Preferably, priming is effected by

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movement of the choke valve from its fully closed or choke position to a slightly open position so that, when desired, the engine may be choked without priming. That is desirable since in many cases priming may not be required to start the motor, as in warm weather or when the motor is not sufficiently cold to render priming necessary for starting. On the other hand, if it is found that the motor will not start readily when the choke valve is in its choke position, movement of this valve a slight distance beyond choke position, in the same direction in which it was moved from its run position to choke position, effects priming to assure starting of the motor. Preferably, the priming means comprises means whereby the choke valve is automatically returned from its priming position to its choke position upon release of the manual means for operating such valve. That avoids likelihood of excessive priming and flooding of the carburetor, with possible failure of the engine to start, such as might occur if the operator left the choke valve in priming position for too long a time, or if priming occurred when the choke valve is in its choke position, in which it remains until it is moved therefrom manually by its associated operating member. The choke and priming means of my invention is of simple and inexpensive construction, while being durable and facilitating choking and priming, or choking alone, as desired. Further objects and advantages of my invention will appear from the detail description.

In the drawings:

Figure 1 is a side view of an outboard motor unit embodying the choke and priming means of my invention;

Figure 2 is a plan view, of a carburetor embodying the choke and priming means of my invention, the motor shroud being shown fragmentarily and in section and the manifold cover being shown fragmentarily;

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2, certain parts being shown in elevation;

Figure 4 is a detail elevational view, on an enlarged scale, partly broken away and in section, of the choke valve and its shaft and the flexible member for operating the latter, this view showing also the arm for operating the priming plunger and the member for connecting this arm to the shaft for turning therewith;

Figure 5 is a sectional view, on an enlarged scale, taken substantially on line 5—5 of Figure 4;

Figure 6 is a fragmentary front view, on a reduced scale, of the engine shroud and the associated carburetor valve operating members; and

Figure 7 is a central vertical sectional view,

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taken from front to back and on an enlarged scale, of the carburetor shown in Figure 2, certain parts being shown in elevation.

In Figure 1 I have shown an outboard motor unit 10 having an associated handle 11 suitably attached thereto. Unit 10 is provided at the upper end thereof with a power head 12, including an internal combustion motor and its appurtenances, enclosed within a suitable streamlined housing 13 including a shroud 14, this housing 13 carrying a fuel supply tank, the power head being mounted on the upper end of a motor support tube mounted for turning movement about a substantially vertical axis through a tubular housing 15, for steering purposes. An underwater unit 16 is bolted or otherwise suitably secured to the fitting 17 fixed on the lower end of the motor support tube at the lower end of housing 15. The underwater unit 16 comprises an intermediate housing 18 and a lower gear case 19 containing gearing establishing driving connection between the drive shaft of the motor, which shaft extends downward through the motor support tube and the housing 18 into the gear case 19, and the propeller shaft on which the propeller 20 is mounted, gear case 19 being provided with a downwardly extending skeg 21. Housing 15 is provided, at its upper end, with an outwardly extending arm 22 fixed thereto, preferably integral with one section thereof, this housing being conveniently formed in two sections bolted together, which arm is pivotally connected at 23 to a clamping bracket 24, for tilting movement about a substantially horizontal axis. The bracket 24 is of generally C-shape and is provided with clamping screws, one of which is shown at 25, which cooperate with the after arms of bracket 24 for clamping the latter to the sill or transom at the stern of a boat, as is known. It will be understood that the outboard motor unit 10 shown in Figure 1 is illustrative only, and that the choke and priming means of my instant invention may be used either with that unit or with any other suitable unit.

In Figure 2 I have shown the choke and priming means of my invention as applied to a carburetor 27 which, with the motor (not shown) is enclosed within the shroud 14. The carburetor 27 is provided with a bolting flange 28 bolted to a manifold cover plate 29 which is suitably secured to the motor, by bolting or in other suitable manner. The carburetor 27 is of known construction, except as to those features having to do particularly with my invention, and a brief description thereof will suffice. It comprises a float chamber or bowl 30 suitably secured to an upper section 31, with an intervening gasket 32. The liquid fuel is supplied to float chamber 30 through a tube 33 under pressure due to gravity, from a fuel tank (not shown) in the upper portion of housing 13. A fuel supply control valve 34 is interposed in tube 33, stem 35 of this valve extending through the forward end of shroud 14 and having a suitable knob 36 secured thereon. As will be understood, supply of fuel to the carburetor may be cut off and restored by turning valve 34 into proper position. Admission of fuel to the float chamber 30 is regulated by a needle valve 38 under control of a float 40 pivoted at 41 in chamber 30, as is known. The float 40 and the needle valve 38 serve normally to maintain the fuel at a predetermined desired level within float chamber 30, as is well understood.

The upper or cover section 31 of the carbure-

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tor 27 is provided with an air-fuel passage 43, of Venturi shape, and with a tubular element or sleeve 44 depending therefrom into float chamber 30, centrally thereof, float 40 being of annular shape, as is known. A main discharge nozzle or high speed jet 45, closed at its lower end, is threaded at its upper portion into sleeve 44. An idler tube 46 extends downward through the upper end of jet 45, this tube being open at its lower end. Tube 46 extends across passage 43 and thence upward into a lengthwise passage 47 of a rib 48 extending lengthwise of carburetor section 31. A portion of tube 46 within passage 47 is enlarged at 47a and is provided with a restricted opening 49 communicating with passage 47. At its upper end tube 46 is provided with a screw head 50 which threads into a boss 51 integral with rib 48. Tube 46 is further provided, at the lower end of the enlarged portion 47a thereof, with a collar 52 which seats on a sealing gasket 53 surrounding this tube at the bottom of passage 47. Fuel is admitted from float chamber 30 to nozzle or jet 45 adjacent the lower end thereof, through aligned ports (Figure 7) controlled by a high speed regulating needle valve 55 the stem of which extends forwardly through shroud 14 and has secured on its outer end a knob 56 for convenience in adjustment of this valve. The stem of valve 55 underlies an air bleed needle valve 57 for regulating the admission of air to passage 47 of rib 48, the latter being provided with an air bleed opening 58, as is known. Valve 57 is provided with an integral collar 59 between which and the forward end of rib 48 a compression spring 60, disposed about the stem of valve 57, is confined, for holding this valve in adjustment. Adjacent the rearward end of passage 43, the carburetor is provided with a throttle valve having a shaft 62 projecting to one side of the carburetor, as shown in Figure 2. The carburetor is further provided with suitably disposed openings establishing communication between passage 47 of rib 48 and passage 43, at the throttle valve area thereof, as is known. The carburetor so far described is of known construction and operation and requires no further description except as to those features which have to do with my invention.

A choke valve 63 is disposed in the forward or entrance end of passage 43. Valve 63 is secured on a shaft 64 rockably mounted in the forward portion of upper section 31 of the carburetor and projecting outward thereof to one side of the carburetor body. Shaft 64 is provided at its outer end with a collar 65 fixed thereto, conveniently formed integral therewith. The end portion of shaft 64, including the collar 65, is axially bored for reception of one end portion of a flexible member 66 secured therein in a suitable manner, conveniently by means of a set screw 67. Member 66 conveniently is formed of a length of a braided wire rope or cable of known type and is flexible throughout its length. This member extends from shaft 64, substantially at right angles thereto, forward through the forward wall of shroud 14 and has secured on its forward end, in any suitable manner, an operating knob 68, at the outer face of shroud 14, there being a stop collar 69 secured on member 66 at the inner face of the forward wall of shroud 14. It will be seen that the member 66 provides means for turning the choke valve shaft 64 in either direction desired and, due to its ready flexibility, provides simple and efficient means whereby the knob 68 for operating the choke valve may be disposed

adjacent the knobs 36 and 56, providing a convenient assembly such that ready access to the throttle valve knob, as well as to the knobs 36 and 56, is assured.

Choke valve shaft 64 is provided, adjacent and at the opposite side thereof from choke valve 63, with a flat 71. This flat is disposed for contact by a spring pressed ball or plunger (not shown), the spring of which is confined between the plunger and a screw plug 72 threaded into a boss 73 projecting from one side of rib 48. The spring pressed plunger cooperates with the flat 71 for normally holding choke valve 63 in its full open or run position shown in dotted lines in Figure 2, as is known. The particular means for holding the choke valve in its run position is not of the essence of my invention and any other suitable means may be provided for that purpose. As noted, the choke valve 63, when the engine or motor is in operation, normally occupies its full open or run position. In order to start the motor, the choke valve 63 is turned through approximately 90°, from its full open or run position to its full closed or choke position, by means of knob 68 and the flexible operating member 66. That provides for choking the engine, for starting, as is well understood. I also provide means whereby the carburetor may be flooded for priming the engine to facilitate starting thereof, under conditions where choking alone may not be sufficient, as when the engine is quite cold, as in cold weather or unusually low temperature, as will be explained.

An arm 75 is loosely mounted at its forward end on shaft 64, at the inner face of collar 65 thereof, this arm 75 having a tab 76 struck inward therefrom. A pin 77 is secured to shaft 64, conveniently by having a reduced portion 77a driven through shaft 64 diametrically thereof. The pin 77 is disposed to contact the upper edge of tab 76, when shaft 64 has been turned a predetermined distance in clockwise direction, as viewed in Figure 5, for turning the choke valve 63 from its normally open or run position to its substantially closed or choke position, as will be explained more fully presently. Arm 75 is provided at its rearward end with an opening 78 which receives an upwardly curved hook element 79a at the lower end of wire link 79. At its upper end link 79 is provided with a straight horizontally extending element 79b which is inserted diametrically through the upper end portion of a plunger 80 slidable through a guide tube 81 screwed at its upper end into the top wall of upper section 31 of the carburetor, adjacent a boss 82 extending from one side of rib 48, this boss being provided with a bore 83 extending from its under face and an air inlet port 84 opening into bore 83, as shown. Plunger 80 is urged upward by a compression spring 86, disposed thereabout and confined between the top wall of carburetor section 31 and a washer 87 disposed about plunger 80, at the under face of element 79a of link 79. A cross pin 88, secured to plunger 80 a short distance above the lower end thereof, limits the upward movement of plunger 80 by spring 86, this plunger normally occupying its position shown in Figure 3, in which the lower rounded end of the plunger overlies the float 40.

In order to start the motor, assuming that the choke valve is in its run position, shaft 64 is turned in clockwise direction, by means of the flexible operating member 66, as viewed in Figure 5, thus turning valve 63 in closing direction. Preferably, the pin 77 is so disposed that it con-

tacts tab 76 of arm 75 when the choke valve 63 has been turned into its fully closed or choke position, or substantially so. The motor is thus choked and, if conditions are suitable, may be started.

As above noted, however, under unfavorable conditions priming may be required to assure starting of the motor. In such conditions, shaft 64 is turned a further distance in clockwise direction, carrying with it the arm 75. This movement of arm 75 with shaft 64 forces the plunger 80 downward in opposition to spring 86, as will be clear from Figure 3. The plunger 80, in its downward movement, contacts float 40 and, when the choke valve 63 has been moved a slight distance beyond its choke position into prime position, in which it is cracked open a slight distance, the plunger 80 depresses float 40 into position opening the needle valve 38. That permits free flow of fuel into the float chamber 30, flooding the carburetor and thus priming the motor, in a known manner. By relating the pin 77 and tab 76 of arm 75 in the manner stated, the choke valve 63 may be moved into choke position without priming and, in the continued movement of this valve in closing direction, that is, in the direction in which it is turned for closing, the plunger 80 may be depressed for priming. That is desirable in that it renders it possible either to choke without priming, or to choke and also prime, by turning the choke valve shaft in one direction, which is desirable as providing a simple but highly efficient control. Since the compression spring 86 is placed under compression when the plunger 80 is depressed, it is necessary to hold the knob 68 in prime position in opposition to spring 86. In practice, when priming, the knob 68 is held in prime position for approximately five seconds and is then released. Upon release of knob 68 the spring 86 returns choke valve 63 to its choke position. That is advantageous in that it guards against excessive priming and possible failure of the engine to start, such as might occur if means were not provided to assure return of the choke valve from its prime position to choke position. Conveniently, though not necessarily, a choke and primer control knob 68 is provided with an index mark 68a and the forward wall of shroud 14 is provided with a dial concentric with knob 68 marked to indicate the angular positions thereof corresponding to the "prime," "choke" and "run" positions of the choke valve, as shown in Figure 6.

As above indicated, and as will be understood by those skilled in this art, changes in construction and arrangement of parts of my invention may be resorted to without departing from the field and scope thereof, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been disclosed.

I claim:

1. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber, a choke valve carried by said carburetor controlling said passage and turnable about an axis extending transversely of said passage, a flexible operating member connected to said valve and extending substantially perpendicular to said axis for opening and closing said valve, and means whereby

said float is actuated responsive to closing of said choke valve thereby raising the fuel level in said float chamber above normal.

2. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber, a choke valve carried by said carburetor controlling said passage and turnable about an axis extending transversely of said passage, an operating member flexible throughout its length attached at one end to said valve and extending substantially perpendicular to said axis for opening and closing said valve, and means connected to said valve whereby said float is actuated responsive to closing of said choke valve thereby raising the fuel level in said float chamber above normal.

3. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber, a choke valve carried by said carburetor controlling said passage having a shaft projecting outward beyond said carburetor at one side thereof, an operating member flexible throughout its length secured at one end to said shaft extending substantially perpendicular thereto for turning said shaft in one direction for closing said valve and in the opposite direction for opening said valve, a plunger slidable through the top of said carburetor overlying said float having limited upward movement and normally yielding held raised, an arm loose on said shaft, means providing lost motion connection between said shaft and said arm effective for turning the latter with said shaft in the turning thereof in said one direction when said valve has been moved to substantially fully closed position, and connections between said arm and said plunger whereby the latter is depressed in the turning movement of said arm with said shaft in said one direction thereby depressing said float and raising the fuel level in said chamber above normal.

4. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber, a choke valve carried by said carburetor controlling said passage having a shaft projecting outward beyond said carburetor at one side thereof, means for turning said shaft in one direction for closing said valve and in the opposite direction for opening said valve, a plunger slidable through the top of said carburetor overlying said float having limited upward movement and normally yielding held raised, an arm loose on said shaft, a member fixed to said shaft disposed to contact said arm when said valve reaches substantially fully closed position, and connections between said arm and said plunger whereby the latter is depressed in the turning movement of said arm with said shaft in said one direction beyond its position in which said valve is fully closed thereby depressing said float and raising the fuel level in said chamber above normal.

5. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber, a choke valve carried by said carburetor controlling said passage having a shaft projecting outward beyond said carburetor at one side thereof, means for turning said shaft in one direction for closing said valve and in the opposite direction for opening said valve, a plunger slidable through the top of said carburetor overlying said float having limited upward movement and normally yielding held raised, an arm loose on said shaft, a collar on said shaft at one side of said arm, a member fixed to said shaft at the other side of said arm in cooperation with said collar restraining said arm against relative movement lengthwise of said shaft, said arm having an element disposed to be contacted by said member when said valve reaches substantially fully closed position, and connections between said arm and said plunger whereby the latter is depressed in the turning movement of said arm with said shaft in said one direction thereby depressing said float and raising the fuel level in said chamber above normal.

6. In outboard motor choke and priming means, a carburetor having a float chamber with a float therein and float controlled means for regulating admission of fuel to said chamber and thereby maintaining a normal fuel level therein, said carburetor also having an air-fuel passage in communication with said float chamber and fuel supply and high speed regulating valves provided with forwardly projecting operating stems, a choke valve carried by said carburetor controlling said passage having a shaft projecting outward beyond said carburetor at one side thereof, said choke valve having a "run" position in which it is substantially fully open and being movable therefrom in one direction to a "choke" position in which it is substantially fully closed and thence to a "prime" position in which it is cracked slightly open, a flexible operating member attached at one end to said shaft extending forward therefrom substantially at right angles thereto adjacent said fuel supply and high speed regulating valve stems, and means for actuating said float and thereby raising the fuel level in said float chamber above normal responsive to movement of said valve from its "choke" position to its "prime" position, said means comprising means for automatically returning said valve from "prime" position to "choke" position.

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