April 21, 1953 W. J. RALEIGH 2,635,595

CARBURETOR VALVE REGULATOR

Filed May 19, 1950 2 SHEETS—SHEET 1

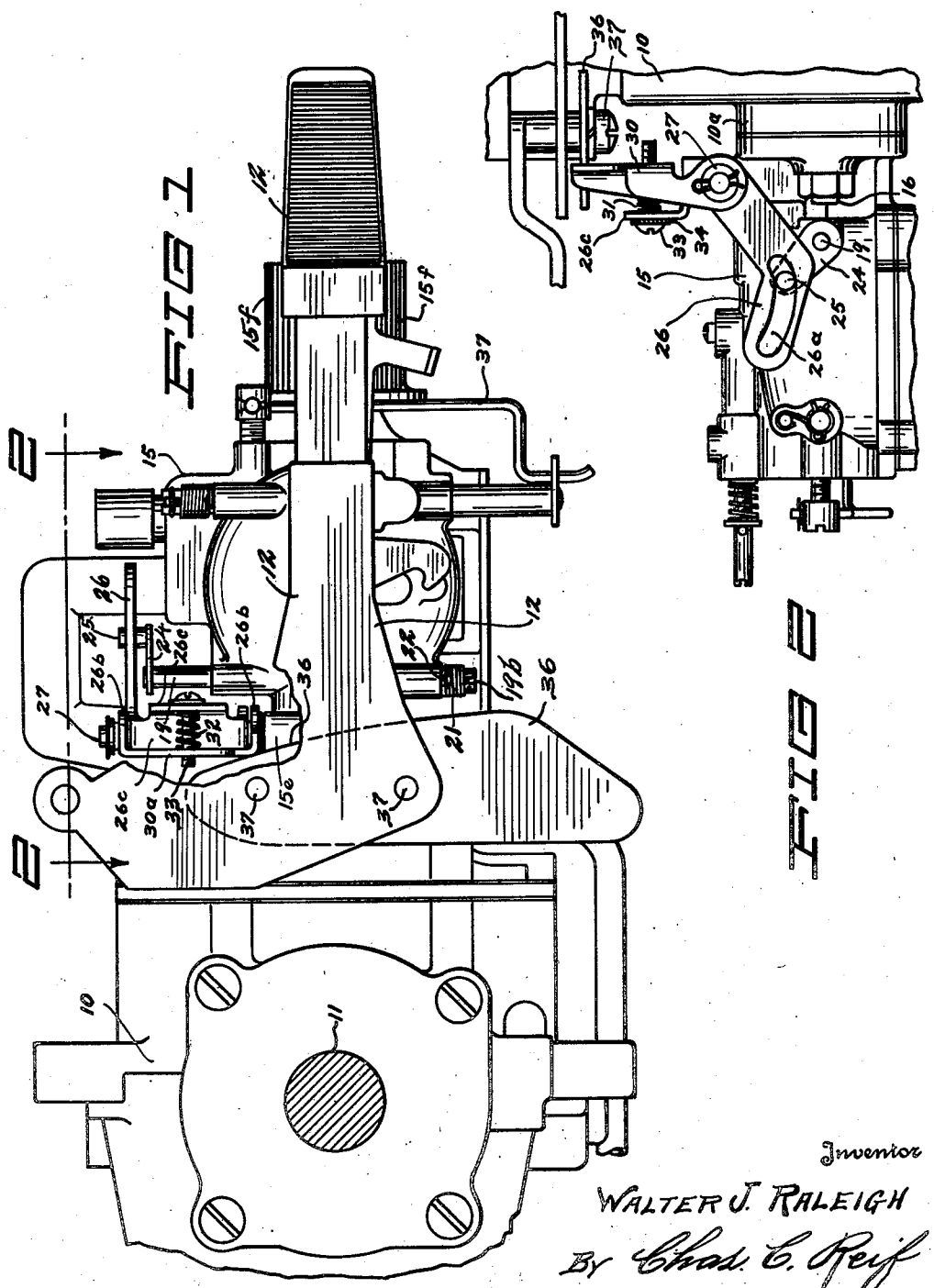


FIG. 1

FIG. 2

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FIG 3

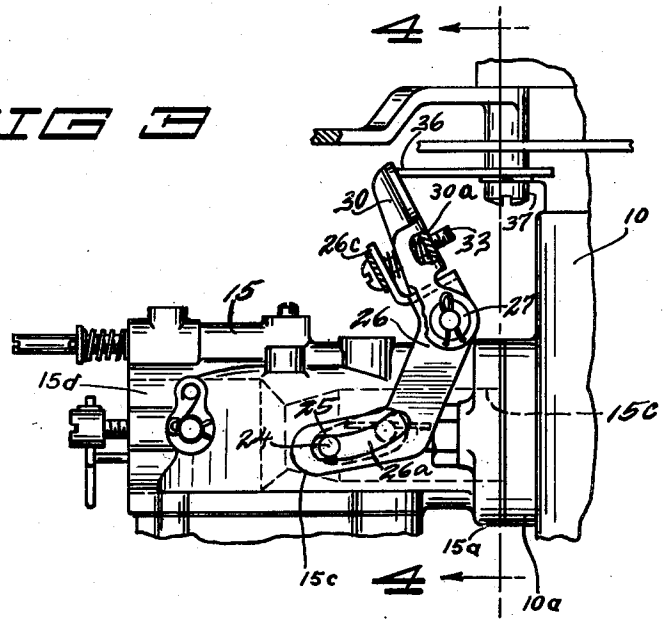


FIG 4

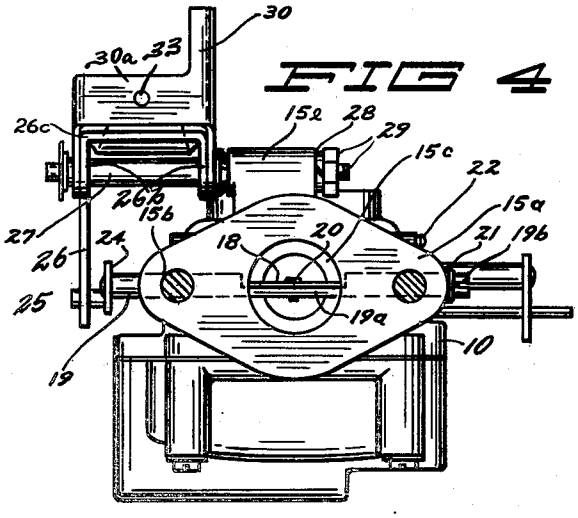
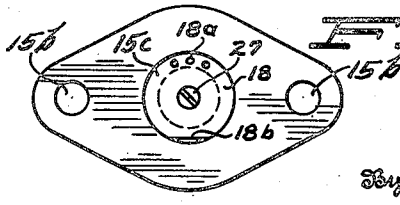


FIG 5



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CARBURETOR VALVE REGULATOR

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9 Claims. (Cl. 123—98)

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This invention relates to a carburetor which is used with an internal combustion engine and particularly to a carburetor used with an outboard motor. In such a carburetor there is a passage through which the combustible mixture passes, which passage has therein and is controlled by a plate-like valve or what is known as a "butterfly" valve. Magneto spark timing is varied by the motor operator by moving the stator part of the magneto in horizontal rotation about the vertical crankshaft axis. A cam is usually attached to this movable stator which causes a follower element to rotate on a horizontal axis in a vertical plane, the rotation of the follower being transmitted by levers, pitmans, gears, or cams to the carburetor throttle butterfly shaft. It is important to have a certain exact degree of throttle opening at each possible spark timing position in order that the correct rate of air flow exists through the carburetor passages and in combination with the spark timing results in the most satisfactory combustion conditions in the engine cylinder. The present device accomplishes this by eliminating deflections, backlash and other objections which were present in the mounting of the older device.

It is an object of this invention to provide a simple and efficient mechanism for operating the above mentioned valve from a part of the magneto, and one which will give the desired movement of said valve and one which can be adjusted with practically micrometer precision to give said desired movement of the valve.

It is a further object of the invention to provide a carburetor having a plate-like or butterfly valve for regulating the flow of combustible mixture to the motor, a long shaft secured to said valve for oscillating the same and mounted in widely spaced bearings to eliminate any play, an arm extending radially from said shaft and having a pin projecting therefrom spaced from said shaft thus forming a crank, together with an oscillatable lever having a slot in which said pin is disposed so that when said lever is swung said crank will be oscillated and said valve rotated in the desired manner.

It is another object of the invention to provide a carburetor having a passage with a plate-like valve movable therein and adapted to open and close said passage, a lever connected to said valve for oscillating the same, a second lever, said levers having juxtaposed portions between which a resilient member is disposed which transmits movement from said second lever to said first mentioned lever, together with means

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for changing the relative positions of said levers in exceedingly small amounts to secure a fine adjustment in the operation of said valve.

It is still another object of the invention to provide a carburetor having an oscillatable plate-like or butterfly valve for regulating the flow of combustible mixture, a control for said valve comprising an actuating member and an actuated shaft carrying said valve, the movement of said actuating member varying the angular position of said shaft, together with means for varying by very small amounts the movement of said shaft resulting from movement of said actuating member.

It is more specifically an object of the invention to provide a carburetor having a substantially cylindrical passage, a plate-like valve disposed in said passage for opening and closing the same, means for oscillating said valve including a crank having a crank pin, a lever having an elongated slot in which said pin is disposed, a second lever swinging about the same axis as said first mentioned lever, said levers having juxtaposed portions, a compression coiled spring between said portions, a screw extending through said portions for determining their relative positions, said second lever being arranged to be oscillated by a cam carried on the usual spark adjusting lever of the outboard motor.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a plan view of a portion of an outboard motor and carburetor attached thereto, the driveshaft of the motor being shown in horizontal section;

Fig. 2 is a partial view in side elevation of some of the parts shown in Fig. 1;

Fig. 3 is a view similar to Fig. 2 showing the parts in different position;

Fig. 4 is a view in front elevation of the carburetor; and

Fig. 5 is a partial view similar to Fig. 4 showing a valve in a different position.

Referring to the drawings, a portion of an outboard motor is shown comprising a portion 10 of a casing, the drive shaft 11, the spark adjusting lever 12 which is oscillatable about the axis of shaft 11, together with a carburetor 15. Carburetor 15 has a flange 15a provided with a pair of holes 15b adapted to receive attaching bolts 16 for securing it to a flange 10a project-

ing from the casing 10 forming part of the cylinder block of the outboard motor. Carburetor 15 has a passage 15c extending from flange 15a inwardly through which the combustible mixture passes to the cylinders of the motor. Disposed in passage 15c is a plate-like valve 18. Valve 18 is secured to a shaft 19 which is journaled in the casing 15d of the carburetor. Shaft 19 has a portion 19a which is substantially of semi-cylindrical form, one-half of the shaft being cut away. Valve 18 is secured to the flat side of portion 19a by a headed screw 20. Valve 18 is shown as having a plurality of small holes 18a at one side, shown as the top side, and having a lower straight portion 18b forming a chord of the periphery of said valve. Shaft 19 projects at one end of casing 15d and has a slot 19b in said end in which is secured one end of a coiled torsion spring 21, the other end of which is secured to a small headed screw 22 secured in casing 15d. Spring 21 acts to rotate shaft 19 and to turn valve 18 to the closed position shown in Fig. 5, said valve being stopped in said position by its upper end engaging the wall of passage 15c. Said valve has its vertical diameter of slightly greater diameter than the passage so that the upper end of the valve engages the wall of passage 15c with valve 18 substantially in vertical position or at right angles to the axis of passage 15c. The end of shaft 19 opposite spring 21 projects from casing 15d and has secured thereto an arm 24 which extends radially of shaft 19. While arm 24 could be secured in any suitable manner, in the embodiment of the invention illustrated it is shown as riveted to the end of shaft 19. Arm 24 extends radially of shaft 19 and has secured therein a pin 25 projecting therefrom with its axis parallel to the axis of shaft 19. Pin 25 is disposed in an elongated preferably curved slot 26a in one arm of an angular lever 26 which is pivoted on a shaft 27 projecting from a boss 15e on casing 15d. Shaft 27 is shown as having a reduced threaded end projecting at one end of boss 15e and equipped with a friction washer 28 and a nut 29. Lever 26 has a portion 26c extending parallel to shaft 27 and having spaced lugs 26b apertured to receive shaft 27. Lever 26 also has an upstanding plate-like portion 26c extending from portion 26a. Another lever 30 of plate-like form has a central portion 30a with portions extending at right angles to each side of portion 30a, which latter portions are rounded at their lower ends and apertured to receive shaft 27. Lever 30 is thus oscillatable on shaft 27 on which lever 26 is oscillatable. The central plate-like portion 30a of lever 30 is spaced some distance from and is in horizontal alinement with portion 26c so that portions 26c and 30a are juxtaposed. A compression coiled spring 32 is disposed between portions 26 and 30a and engages said portions respectively at its ends. A headed screw 33 extends through portions 26c and through spring 32 and is threaded into portion 30a. Screw 33 has a fine and accurate thread and is shown as having a washer 34 beneath the head thereof. Lever 30 extends upwardly and its upper end is in the plane of a cam 36 which is secured by screws 37 to the spark adjusting lever 12.

Carburetor 15 has other portions not connected with the present invention including a cylindrical member 15f which is moved longitudinally to engage a lever 37 to operate a choke valve. Member 15f can be rotated to adjust the supply of fuel. It is believed description of other parts of the carburetor is unnecessary.

In operation when the spark adjusting lever 12 is moved to the position it occupies when the motor is stopped, cam 36 moves so that spring 21 can swing valve 18 to the closed position shown in Fig. 5. This swings shaft 19 and crank arm 24 which in turn swings lever 26. Lever 26 in turn through spring 32 swings lever 30 to the position shown in Fig. 2. As the spark adjusting lever 12 is moved toward the starting position and is further moved in a counter-clockwise direction, as shown in Fig. 1, to increase the speed of the motor, cam 36 engages the upper portion of lever 30 and oscillates the same. In its extreme position lever 30 occupies the position shown in Fig. 3. Movement of lever 30 moves lever 26 through the spring 32. Movement of lever 26 as described, swings the crank arm 24 and moves valve 18 to its open position, as shown in Fig. 3. The motion of the arm of lever 26 containing slot 26a and the action of said curved slot on pin 25 gives the desired movement to valve 18. When the valve is first opening a certain movement of levers 26 and 30 gives a relatively small movement to valve 18. When the valve is nearly open wide a certain movement of levers 26 and 30 gives a greater movement to valve 18. The desired control of the fluid passing through passage 15c is thus obtained. Lever 26 is as shown operated in one direction through spring 32. Spring 32 is preloaded or flexed and does not flex in the movement of levers 26 and 30. Turning of screw 33 changes the relative positions of portions 26c and 30b. This gives a very easy and simple and at the same time a very fine and accurate adjustment. In previous structures two levers included in the operating mechanism for the valve were made as rigidly joined arms. To adjust the valve a connecting link which joined one of these arms was in effect shortened and lengthened by a set screw arrangement. The set screw would make a hole in the shaft so that when it was attempted to set it at another place adjacent said hole it would tend to slip into the previously made hole. Such an adjustment was not satisfactorily positive or permanent. With the present structure the shaft 19 is quite long and mounted in spaced bearings which are comparatively widely spaced. Shaft 27 is also mounted in spaced bearings. This gives a rigid structure and minimizes the effects of bearing play. A great improvement is obtained in the initial setting or pick-up position of the motor by the screw and spring adjustment means. As stated, the screw gives a substantial micrometer control in making said initial setting. Formerly this setting was made by the use of a set screw as above described. The shape of the slot 26a can be varied as required by the particular motor to give the desired movement to the valve shaft.

From the above description it will be seen that I have provided a simple and efficient construction for operating the valve 18. Not only is the movement of the valve made as desired but adjustment of the operating mechanism is very simple. The structure constitutes a great advance over the prior art. The novel structure has been amply demonstrated in actual practice, found to be very successful and efficient and is being commercially made.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's inven-

tion, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. A carburetor structure having in combination, a casing, a passage in said casing, a valve for opening and closing said passage, a member journaled in said casing to which said valve is connected, a lever for oscillating said member and valve, a second lever, said levers having juxtaposed spaced portions, a resilient means between said portions acting to move them apart, means connecting said levers constructed and arranged to change their relative positions by very small increments, and means for oscillating said second lever whereby a very fine control of said valve is obtained.

2. A carburetor structure having in combination, a casing, a passage in said casing, a valve for opening and closing said passage, a member journaled in said casing to which said valve is connected, a lever connected to said member and oscillatable about an axis for oscillating said lever and valve, a second lever oscillatable about said axis, said levers having juxtaposed portions, a compression coiled spring between said portions, a screw for varying the distance between said portions, and means for oscillating said second lever.

3. A carburetor structure having in combination, a casing, a passage in said casing, a plate-like valve for opening and closing said passage, a member journaled in said casing to which said valve is connected, an arm secured to said member and extending radially therefrom, a pin carried by said arm and spaced from said member, a lever having angularly diverging arms, one of said arms having a slot extending longitudinally thereof in which said pin is disposed, said lever being pivoted adjacent the end of its other arm, a second lever having a portion adjacent said first mentioned lever at the side of the pivot of the latter remote from said slot, means for varying the relative positions of said levers, and means for oscillating said second lever.

4. An outboard motor structure having in combination, a carburetor having a passage therein, a valve for opening and closing said passage, means connected to said valve for oscillating the same including a crank pin, a lever having an elongated slot therein in which said pin is disposed, a second lever, a member between said levers through which motion is transmitted to said first mentioned lever by said second lever, a spark adjusting lever, and a cam carried by said spark adjusting lever for operating said second lever.

5. The structure set forth in claim 4, and

means for varying the relative positions of said first mentioned and second levers by very small amounts whereby a fine regulation of said valve is had.

6. A carburetor structure having in combination, a casing, a passage in said casing, a plate-like valve for opening and closing said passage, a member journaled in said casing to which said valve is connected, a lever for oscillating said member and valve, a second lever, said levers having spaced juxtaposed portions, means engaging said portions including a resilient means between and engaging said portions for varying the distance between said first mentioned and second levers, a spark adjusting lever, and means on said spark adjusting lever for engaging said second lever for oscillating the same.

7. The structure set forth in claim 6, said first mentioned means comprising a fine thread screw whereby a very accurate positioning of said valve is obtained.

8. In an outboard motor having a spark adjusting lever, a carburetor having a passage therein for a combustible mixture, a valve movable for regulating said passage, means operated by said spark adjusting lever for moving said valve comprising connected oscillating members having spaced juxtaposed portions, and a screw having fine threads for a substantial micrometer adjustment of said portions to vary the relative positions of said members.

9. In an outboard motor having a spark adjusting lever, a carburetor having a passage therein for a combustible mixture, a valve movable for regulating said passage, a shaft to which said valve is secured, spaced bearings in which said shaft is journaled, a lever for oscillating said shaft to change the position of said valve, a second lever for transmitting motion to said first mentioned lever, said lever having spaced juxtaposed portions and a resilient means between and engaging such portions for varying the relative positions of said levers by very small amounts, and means for actuating said second lever from said spark adjusting lever.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
913,121	Frayer	Feb. 23, 1909
956,882	Bright	May 3, 1910
1,001,352	Chadwick	Aug. 22, 1911
1,014,328	Podlesak	Jan. 9, 1912
1,895,328	Howe	Jan. 24, 1933
2,069,315	Irgens	Feb. 2, 1937
2,087,669	Johnson et al.	July 20, 1937
2,430,806	De Marco	Nov. 11, 1947
2,455,775	Johnston et al.	Dec. 7, 1948