Oct. 25, 1938. L. D. BOYCE 2,134,354

CARBURETOR STRUCTURE

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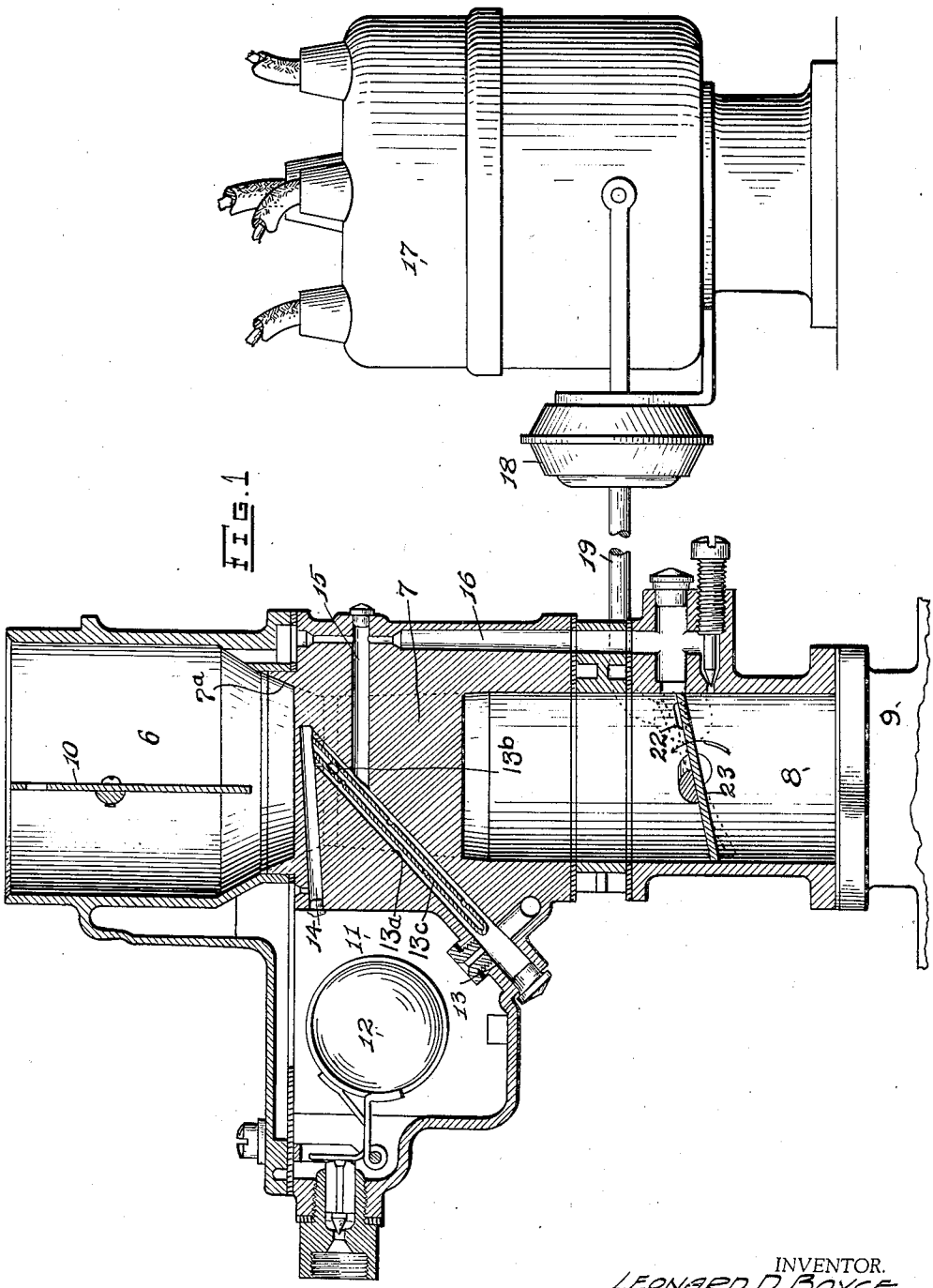


FIG. 1

INVENTOR.
LEONARD D. BOYCE
Donald U. Rich

BY

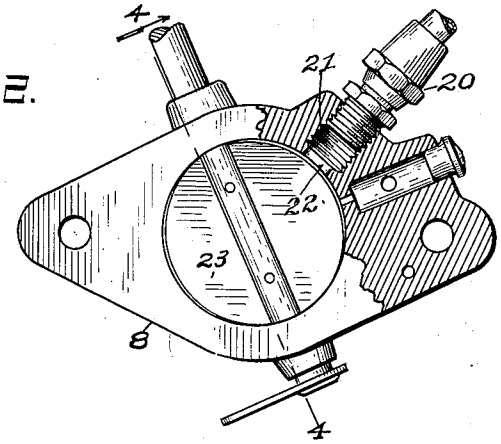
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FIG. 2.



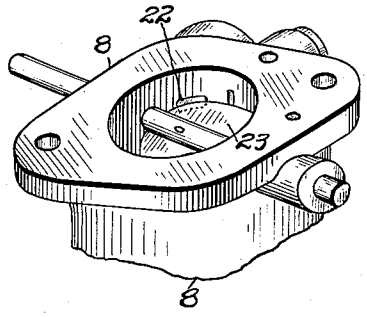


FIG. 3.

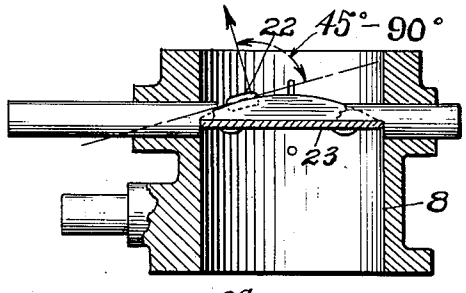
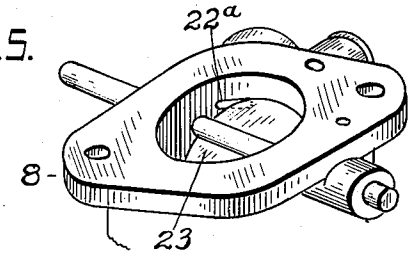


FIG. 4.

FIG. 5.



INVENTOR.
LEONARD D. BOYCE

BY

ATTORNEY.

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UNITED STATES PATENT OFFICE

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CARBURETOR STRUCTURE

Leonard D. Boyce, Maplewood, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application May 29, 1937, Serial No. 145,617

7 Claims. (Cl. 123—117)

This invention relates to improvements in carburetors and has for its specific object a vacuum port provided with an elongated orifice so positioned as to be partly closed by the peripherial contour of the throttle valve, and so arranged that immediate action takes place on the spark advance diaphragm by the slightest tilting of the throttle.

Another object is to locate, form and position the vacuum orifice to be partly closed by the throttle valve when said throttle is manipulated the suction caused by the downward flow of air through the carburetor and passing between its inner wall and periphery of the throttle creating a vacuum in the vacuum port thereby operating the diaphragm which in turn manipulates the distributor advancing or retarding the spark depending upon the opening or closing of the throttle.

The improved feature herein involved is exceedingly sensative and operates the diaphragm by the slightest movement of the throttle, the orifice being elongated and arranged approximately in alignment with the peripherial contour of the throttle permits the suction to function more promptly, accurately and instantaneously than where the orifice is of a round nature or formation as is the case in carburetors now in use.

Another object is the general arrangement, construction and combination of parts as will be fully hereinafter described and set forth in the claims accompanying this application.

Figure 1 is a vertical central sectional view of a carburetor showing its relative connection with the distributor and the position of the improvement herein involved.

Figure 2 is a top plan view of the throttle valve housing with a part broken away and in section showing the vacuum orifice herein concerned.

Figure 3 is a detail perspective view of the same with a part broken away.

Figure 4 is a vertical sectional view of the same taken on the line 4—4 of Figure 2, viewing the same in the direction indicated by the arrow.

Figure 5 is a perspective view of the same showing a modified position of the vacuum orifice in relation to the throttle valve.

The carburetor, in general, comprises a downdraft mixture conduit composed of an air inlet member 6, jet bar member 7 and an outlet member 8 which is firmly bolted or otherwise secured to the intake manifold 9 of the engine or motor.

In the member 6 is located the usual choke valve 10 and to one side of the carburetor casing is positioned the usual constant level chamber or bowl 11 having incased therein the fuel flow controlling float 12.

Fuel is supplied to the mixture conduit through a metered orifice member 13, inclined passage 13a, and lateral discharge orifices 13b. Passage 13a is air bled by means of coaxial tube 13c and passage 14 communicating with the top of the bowl. Idling fuel is supplied through passages 15 and 16 and the usual port adjacent the throttle valve 23.

17 indicates a distributor and 18 a diaphragm mechanism by which the distributor is manipulated for advancing and retarding the spark.

Leading from the diaphragm mechanism is a suction tube 19 having a coupling 20 with threaded connection 21 and elongated port 22 adjacent the throttle valve. Port 22 is disposed with its longer axis substantially paralleling the throttle disc, as shown in Fig. 3, or, in other words, making a right angle with the direction of movement of the portion of the valve edge which sweeps past the port.

Port 22 is disposed so as to be approximately one half covered by the edge of the throttle valve when closed and completely cut-off thereby from the suction posterior to the throttle. In this position of the parts, the diaphragm and the distributor are arranged to fully advance the spark for idling. Immediately upon opening of the throttle valve, a substantial portion of port 22 is exposed to engine suction and the valve, during its opening movement, quickly clears the entire port. Consequent application of suction to the diaphragm retards the spark in accordance with the speed and load applied to the engine.

It has been discovered by practical experimentation that an elongated orifice, as shown, is far superior and more effective than a round orifice, because where a round orifice is used, the edge of the throttle valve, in passing over the orifice, leaves part of the orifice exposed on both sides of the throttle so that the suction applied to the lower part of the orifice is modified by air entering the upper part of the orifice. The suction diaphragm is substantially more sensitive where the elongated port is used, as shown, due to the fact that slight opening movement of the valve exposes greater proportions of the port to engine suction and the port is sooner cut-off from conditions anterior to the throttle than where a round port is used.

In Fig. 5, the orifice 22a is arranged with its longer dimensions disposed at an angle to the surface of the throttle valve disc when closed, that

is making an angle of less than 90° with the portion of the valve edge adjacent the same. The proportions of the parts exposed to engine suction are different in this case, than in the previous form, but the diaphragm response will still be substantially more sensitive to engine suction conditions than where a round port is used as heretofore.

The chief advantages of the invention are obtained with the use of a suction port or port structure of any non-circular or irregular shape related to the throttle valve in such a manner that the total area of the port exposed directly to engine suction during opening of the throttle increases at a greater rate than the linear path of the portion of the throttle edge which moves along and past the port. Thus, an elongated port, the longer dimension of which makes an angle of from 45° to 90°, plus or minus, including a right angle, to the direction of opening movement of such portion of the edge of the throttle valve when adjacent the port, may be utilized, the size and disposition of the port and its relation with the valve itself being determined in accordance with other engine conditions. For instance, the entire port may be located anterior to the throttle valve when closed.

The invention, as shown, is used in connection with a carburetor and suction spark control device, but the broad features thereof for the control of other suction devices where rapidity of action and sensitiveness are important. The exclusive use of all such modifications as come within the scope of the appended claims is contemplated.

I claim:

1. An improvement in carburetors comprising in part a throttle valve housing, a throttle valve axially positioned therein, of a vacuum port conveniently located its inlet end terminating into an elongated orifice and communicating with the interior of the throttle valve housing and so positioned as to be partly covered by the peripheral edge of the throttle valve and to functionally cause communication with a diaphragm for advancing the spark when the valve is elevated.

2. An improvement of the character described comprising the formation of a vacuum port its inlet end constructed in elongated formation, of a throttle valve, said valve so positioned as to close the lower part of the inlet when in normal closed position, and to produce immediate action upon a diaphragm for advancing the spark when the valve is raised.

3. In a carburetor, an induction conduit, a throttle valve therein comprising a member having an edge adapted to move along a part of the wall of said conduit when said valve is manipulated, and an elongated port for a suction controlled device in said wall part, the longer dimension of said port making an angle of from 45° to 90° with the direction of movement of said edge when said valve is nearly closed.

4. The combination of elements specified in claim 3 in which said port is partly covered by said throttle valve when closed.

5. In a carburetor, an induction conduit, a butterfly throttle valve therein having an edge disposed to move along a part of the wall of said conduit, and a port in said wall part for a suction spark control device, at least a portion of said port being anterior to said throttle valve when closed and said portion being of elongated shape with its longer dimension making an angle of from 45° to 90° with the direction of movement of said valve edge when adjacent said port.

6. In a carburetor, an induction conduit, a throttle valve in said conduit and having an edge adapted to move along a part of the conduit wall during manipulation of said valve, and a port in said wall part for a suction spark control device, said port being of elongated shape with its longer dimension making a right angle with the direction of movement of said valve edge when the throttle valve is nearly closed.

7. In a carburetor, an induction conduit, a throttle valve therein comprising a member having an edge adapted to move along a part of the wall of said conduit when said valve is manipulated, and elongated ported structure in said wall for a suction controlled device, the longer dimension of said ported structure making an angle of from 45° to 90°, plus or minus, with the direction of movement of said edge when adjacent said port.

LEONARD D. BOYCE.