United States Patent

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[72] Inventor **Silas Owen Dye**
Highland, Ill.

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[73] Assignee **ACF Industries, Incorporated**
New York, N.Y.
a corporation of New Jersey

[54] **CARBURETOR THROTTLE VALVE**
6 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **261/41,** 261/65
[51] **Int. Cl.** **F02m 3/08**
[50] **Field of Search** 261/65, 41.4

[56] **References Cited**

UNITED STATES PATENTS

1,568,410	1/1926	Minter	261/65
2,097,409	10/1937	Wertz	261/65X
3,047,277	7/1962	Landrum	261/65

FOREIGN PATENTS

171,980	1/1923	Great Britain	261/41(.4)

Primary Examiner—Tim R. Miles
Attorney—Edward H. Casey

ABSTRACT: A carburetor having a conventional throttle valve for controlling the flow of air and fuel in the mixture conduit thereof is further provided with an auxiliary half-throttle arranged in such a manner that the half-throttle blocks off a portion of the mixture conduit during at least part of the opening movement of the conventional throttle thereby increasing air and fuel velocity in the mixing conduit at part throttle conditions.

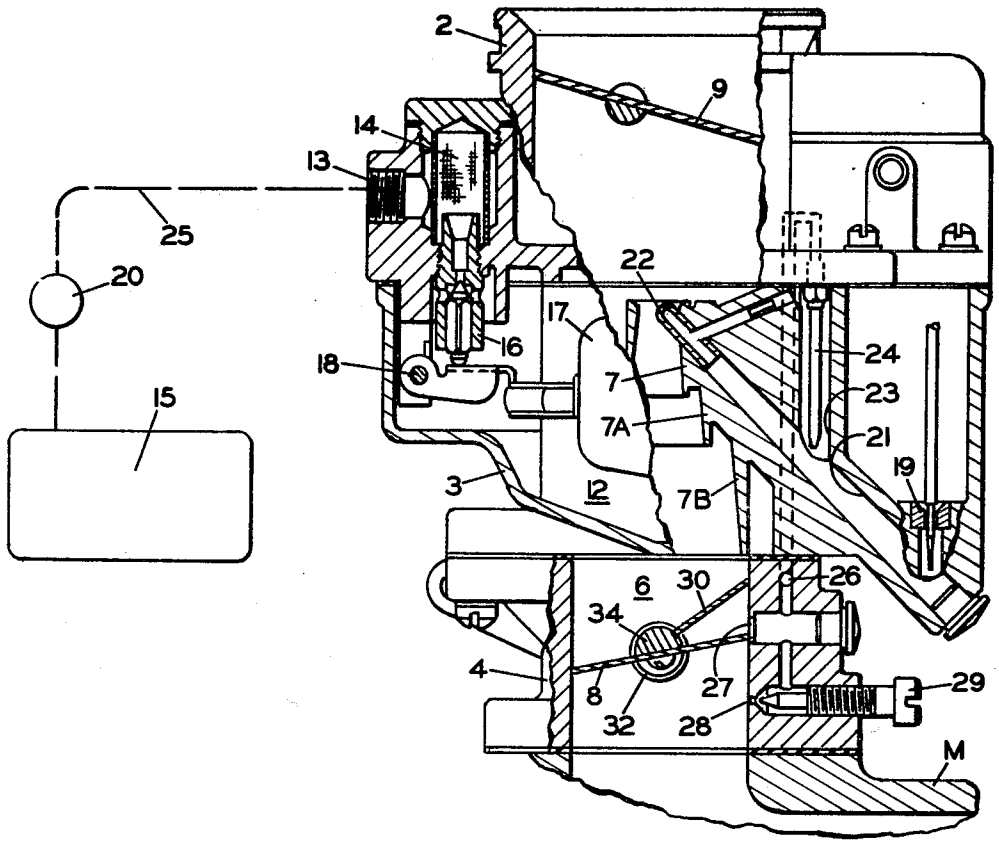
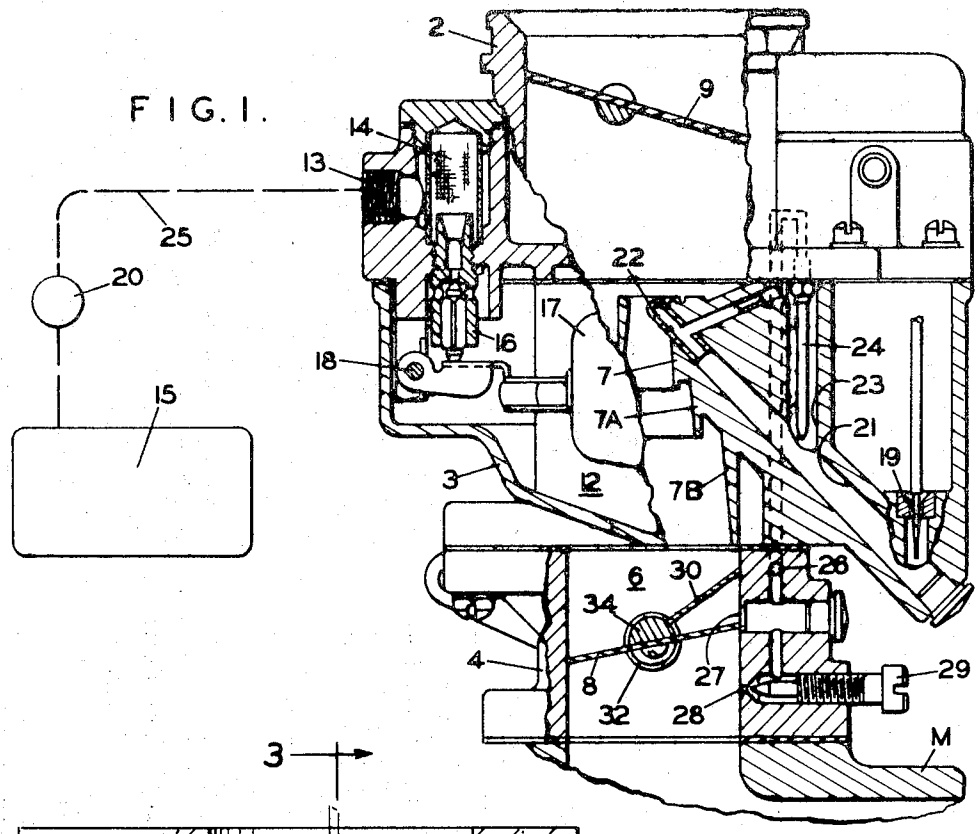


FIG. 1.



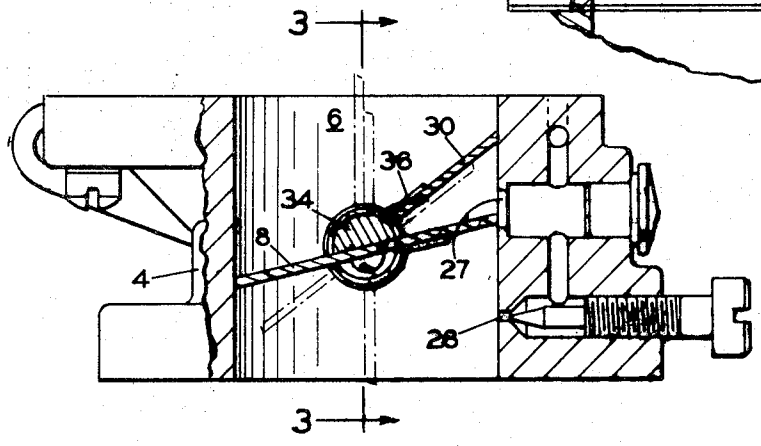


FIG. 2.

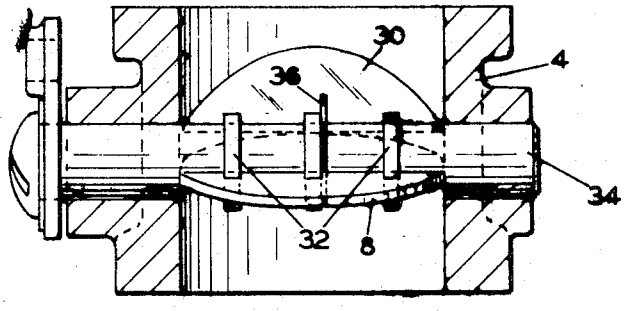


FIG. 3.

INVENTOR
SILAS OWEN DYE
by Edward H. Casey
ATTORNEY

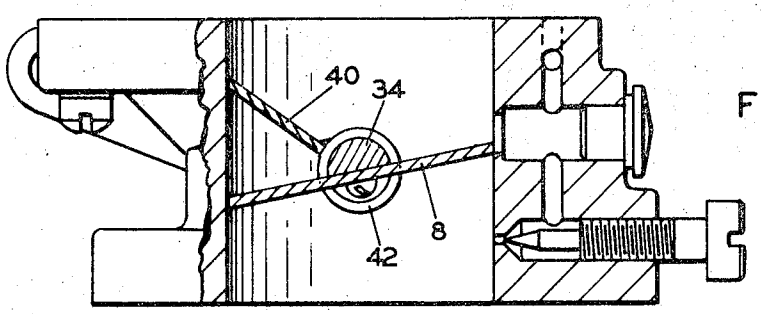


FIG. 4.

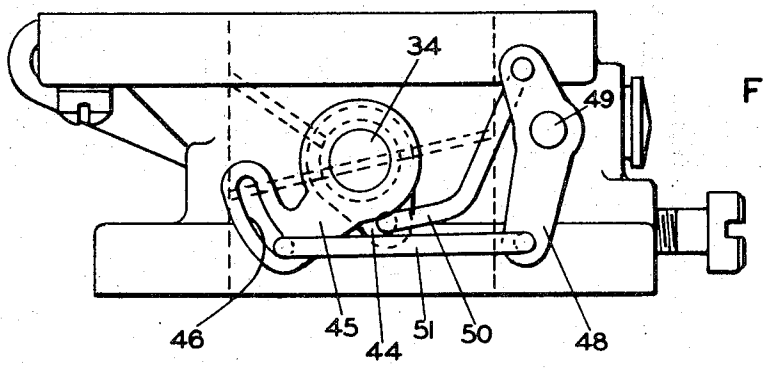


FIG. 5.

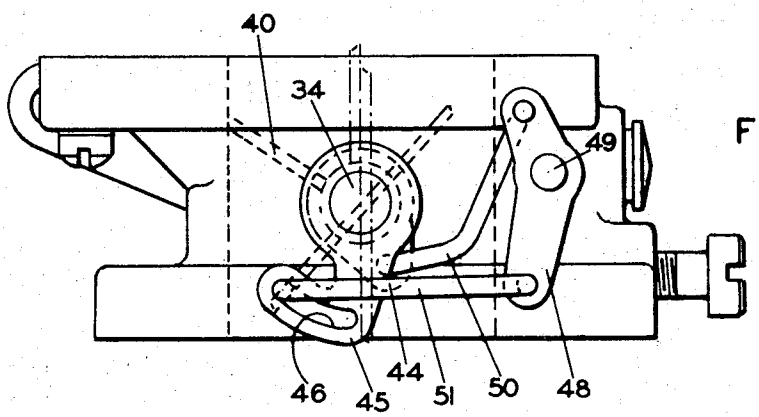


FIG. 6.

INVENTOR
SILAS OWEN DYE
by Edward H. Casey
ATTORNEY

CARBURETOR THROTTLE VALVE

BACKGROUND OF THE INVENTION

For many years downdraft carburetors have been provided with a butterfly type throttle valve. Normally this is simply a circular disc which has its central portion attached to a shaft in such a manner that as the shaft rotates the disc rotates in the mixing conduit of the carburetor. Because of this construction and the other features of the carburetor which operate with the throttle valve, something less than ideal performances has resulted. A part of the difficulty has arisen from the fact that two separate fuel systems are utilized in most carburetors. One of these, the idle fuel system, is normally located at one side of the mixing conduit. When the throttle valve is opened only a small amount the air is divided into two approximately equal portions with one-half the air going through a crescent shaped opening at one side of the throttle valve and the other half going through a similar opening at the other side. Under these conditions all or most of the fuel is delivered to the mixing conduit on one side of the carburetor only. Thus one half the air mixes with all of the fuel and the other half of the air, which contains no fuel, must necessarily mix with the first mentioned mixture of air and fuel at some point below the carburetor.

It will be appreciated that this necessity of mixing air with a mixture of air and fuel below the throttle valve is undesirable and in most instances is highly inefficient. The range of car speeds through which the undesirable condition exists, corresponds roughly to the average operating condition for normal city driving. At higher speeds such as highway driving, the main nozzle system comes into play and a more uniform mixing of air and fuel is achieved because the fuel mixes with air before it passes the throttle plate.

Accordingly it is an object of the invention to provide a throttle construction that will promote more efficient mixing of air and fuel.

Another object of the invention is to provide a throttle construction that will promote high air velocity under part throttle conditions.

It is a further object of the invention to provide a throttle construction such that all of the air and fuel will pass to one side of the mixing conduit during low load conditions.

BRIEF DESCRIPTION OF THE INVENTION

According to the invention there is provided a carburetor of conventional construction having a butterfly throttle valve fixed to a throttle shaft. There is further provided an auxiliary throttle which is pivoted on the throttle shaft and so arranged as to block off one-half the mixing conduit when the auxiliary valve is in its closed position. The principal butterfly throttle valve coacts with the auxiliary throttle valve so that at some predetermined point the principal valve will cause the auxiliary valve to begin an opening movement. In one embodiment of the invention, the auxiliary valve is simply lifted off its sealing surface upon continued opening of the principal valve. In another embodiment levers and links are utilized to accomplish the opening of the auxiliary valve.

For a better understanding of the invention including the novel features, details of construction and arrangement of parts, reference is made to the following specification and claims and to the accompanying drawing wherein:

DESCRIPTION OF THE DRAWING

FIG. 1 is a vertical section partly in side elevation illustrating a carburetor having one embodiment of the throttle valve of the invention.

FIG. 2 is an enlarged cross-sectional view.

FIG. 3 is a view taken along the lines 3–3 of FIG. 2.

FIGS. 4, 5 and 6 illustrate an alternate embodiment of the throttle valve structure of FIG. 1.

Referring now to the drawing for a better understanding of the invention, a downdraft carburetor is shown as comprising an air horn section 2, a main body section 3, and an outlet section 4, said sections being secured together and forming a mixture conduit 6 having a stack of venturis 7, 7*a* and 7*b* in the main body section. The carburetor is mounted on the intake manifold M of a conventional internal combustion engine adapted for use in driving a vehicle.

A conventional choke valve control mechanism, operable responsive to intake manifold suction and temperature, is provided to control the operation of a choke valve 9 provided in the air inlet end of the mixture conduit 6. A throttle valve 8 is disposed in the outlet end of the mixture conduit and is connected by means of a suitable linkage to an accelerator pedal for control by the operator.

The main body section 3 is provided with a fuel bowl 12 having a fuel inlet 13 provided with a screen filter 14 and a fuel inlet valve 16. A float 17 is pivotally mounted at 18 within the fuel bowl to actuate the valve to maintain a substantially constant fuel level within the bowl. Fuel is supplied to the bowl from a fuel tank 15 by means of a conventional engine operated fuel pump 20 interposed in a fuel conduit 25 leading to the fuel inlet 13.

A fuel metering orifice 19 leads from the fuel bowl to an upwardly inclined main fuel passage 21 having a main fuel nozzle 22 discharging into the primary venturi 7. An idling fuel system is shown as comprising a fuel well 23 leading upwardly from the main passage 21, the well having a metering tube 24 therein communicating with an idle passage 26 provided with idle ports 27 and 28. An idle adjustment screw 29 is provided for the idle port 28.

The carburetor as just described is conventional. In FIGS. 1, 2 and 3 there is shown one embodiment of the present invention. More particularly there is provided an auxiliary or half-throttle 30. Half-throttle 30 is provided with one or more tangs 32 which extend through slots in throttle blade 8 and are curved about the shaft 34. The resultant curved tangs 32 provide a modified sleeve bearing so that throttle blade 8 can make a partial movement without affecting the position of half-throttle 30. A coil spring 36 is arranged about the shaft in such a manner that the spring biases the half-throttle 30 toward the closed position.

In operation when the throttle shaft 34 is moved by the driver of the automobile, throttle blade 8 will open in response to such movement. If the movement is small then all of the air will pass over the low side of throttle blade 8 and the fuel, of course, will immerge from the ports 28 and 27 in the customary manner. Due to the increased velocity of air flow, a better mixing of fuel and air results in the zone beneath the carburetor.

In FIGS. 4, 5 and 6 there is showed a preferred embodiment of the invention having the half-throttle mounted on the side of the carburetor opposite the idle fuel system. In this embodiment a half-throttle 40 is mounted on a short sleeve 42 which extends at one end through the wall of the carburetor. Fastened to sleeve 42 on the exterior of the carburetor is a lever 44. Fastened to throttle shaft 34 is a lever 45 having an elongated slot 46. A rocker arm 48 is mounted on a stub-shaft 49 which is mounted on the body of the carburetor. A link 50 connects one end of rocker arm 48 with lever arm 44. A second link 51 connects the other end of arm 48 with the elongated slot 46 in lever arm 45.

The operation of the device illustrated in FIGS. 4, 5 and 6 is as follows. Beginning with the curb idle position of the throttle 8 in FIG. 4, opening movement of the throttle is in the counterclockwise direction and when the throttle has moved to the position shown In FIG. 6 the end of slot 46 picks up link 51 which in turn drives rocker arm 48 in a counterclockwise direction. The movement of arm 48 causes link 50 to move arm 44 which in turn by way of sleeve 42 causes the half-throttle to move in a clockwise direction. The fully open position of the throttles 8 and 40 are shown by the vertical dash lines in FIG. 6. It is apparent that when the throttle 8 is in a partially open position and the throttle 40 is closed, that all air must pass on one side of the carburetor, namely that portion containing the idle fuel system. Accordingly all of the air and the fuel from the idle fuel system mix at high velocity in that por-

tion of the carburetor. The links of slot **46** can be adjusted to give any desired delay in the initial opening of the half-throttle **40**.

Various other arrangements of linkages and levers would be possible since all that is necessary is that there be the ability to have a sequential opening of the throttle **8** and the throttle **40** and that the two throttles be permitted to reach a full open position. Various modifications to the structure shown will occur to those skilled in the art and it is contemplated that such modifications which come within the scope of the appended claims are regarded as part of this invention.

I claim:

1. In a carburetor for an internal combustion engine having a fuel bowl, fuel level control means, a mixing conduit, main and idle fuel systems for discharging fuel into the said mixing conduit and a throttle valve mounted on a rotatable shaft for regulating the quantity of air/fuel mixture delivered to an intake manifold of an internal combustion engine, the improvement comprising means for blocking off substantially one-half the said mixing conduit whereby all of the air must pass one edge of the said throttle during at least a portion of the initial opening of said throttle, thereby increasing the velocity of the said air, and in which the said means for blocking comprises a half-throttle journaled about the said shaft and disposed in the mixing conduit adjacent the said idle fuel system.

2. The carburetor of claim **1** including a biasing spring for urging the said half-throttle toward closed position when said throttle is in closed position.

3. In a carburetor for an internal combustion engine having a fuel bowl, fuel level control means, a mixing conduit, main and idle fuel systems for discharging fuel into the said mixing conduit and a throttle valve mounted on a rotatable shaft for regulating the quantity of air/fuel mixture delivered to an intake manifold of an internal combustion engine, the improvement comprising means for blocking off substantially one-half the said mixing conduit whereby all of the air must pass one edge of the said throttle during at least a portion of the initial opening of said throttle, thereby increasing the velocity of the said air, and in which the said means for blocking includes a half throttle journaled about the said shaft and disposed in the mixing conduit on the side opposite the said idle fuel system.

4. The carburetor of claim **1** in which the said half throttle is mounted on a sleeve which surrounds the said shaft over a portion of its length, said sleeve extending through the wall of said mixing conduit, and an actuating lever mounted on said sleeve for controlling the movement of said half throttle.

5. The carburetor of claim **4** further including sequential actuating means whereby said half-throttle is caused to begin an opening movement at a predetermined angle of opening of the said throttle.

6. The carburetor of claim **5** in which the said sequential actuating means includes a slot in the said actuating lever, a rocker arm pivotally mounted on said carburetor, a lever arm on said shaft, a connector link connecting said lever arm and one end of said rocker arm and a second link connecting the other end of said rocker arm with said slot.