Dec. 9, 1952 J. T. W. MOSELEY 2,621,029

TWO-FUEL CARBURETOR

Filed Jan. 31, 1948 2 SHEETS—SHEET 1

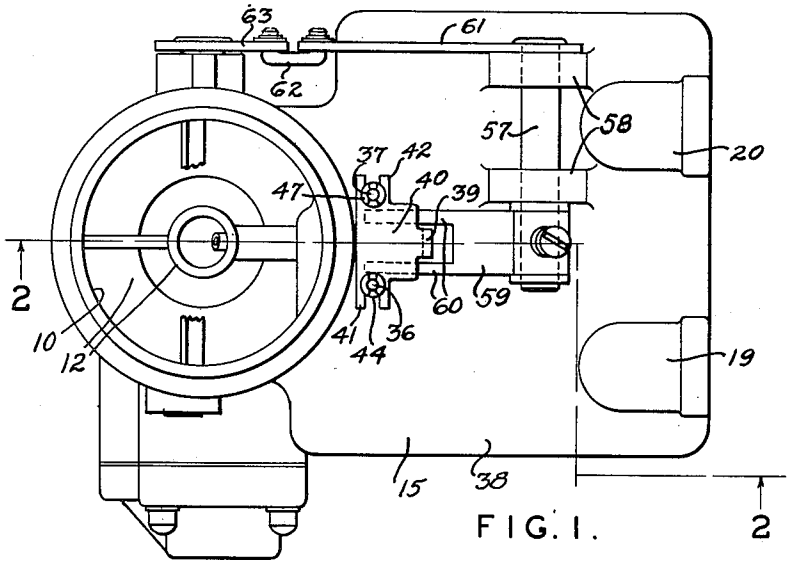

FIG. 1.

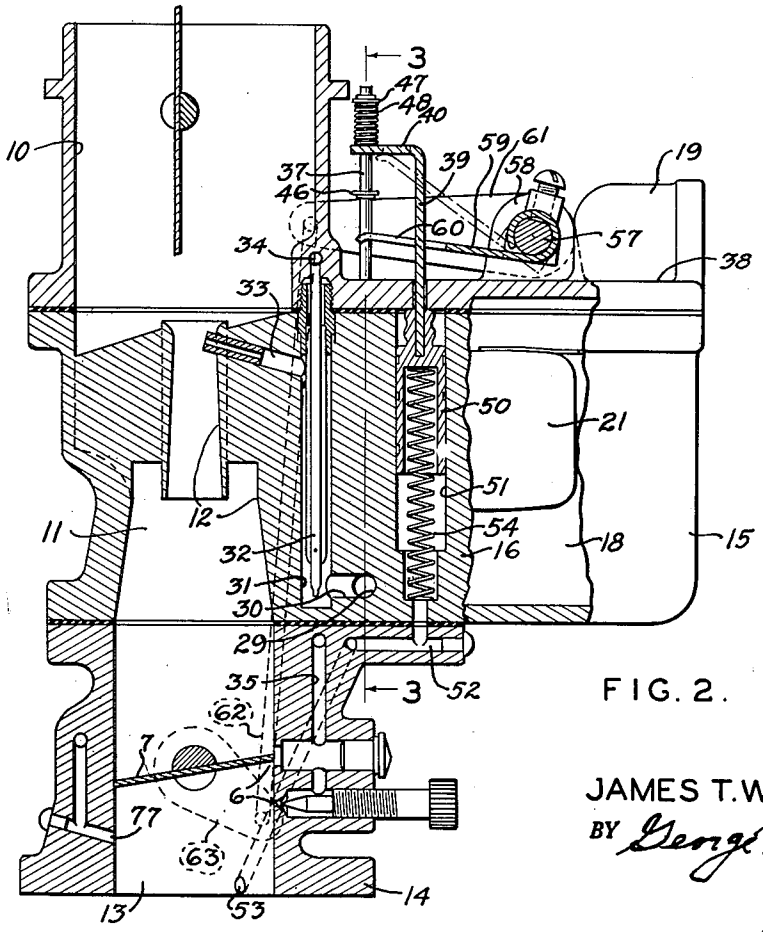

FIG. 2.

INVENTOR.
JAMES T. W. MOSELEY
BY George R. Trueson

ATTORNEY

Dec. 9, 1952 J. T. W. MOSELEY 2,621,029

TWO-FUEL CARBURETOR

Filed Jan. 31, 1948 2 SHEETS—SHEET 2

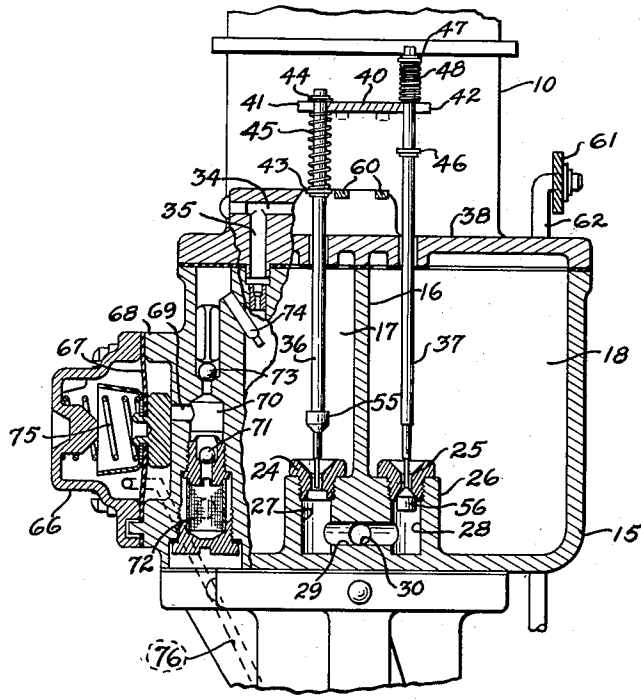

FIG. 3.

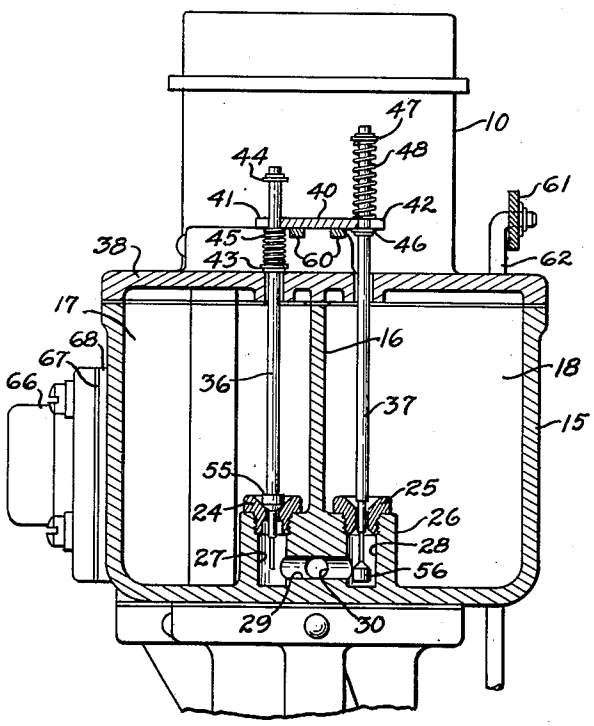

FIG. 4.

INVENTOR.
JAMES T. W. MOSELEY
BY George R. Ericson
ATTORNEY

Patented Dec. 9, 1952

2,621,029

UNITED STATES PATENT OFFICE

2,621,029

TWO-FUEL CARBURETOR

James T. W. Moseley, Clayton, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application January 31, 1948, Serial No. 5,538

2 Claims. (Cl. 261—18)

1

This invention relates to carburetors for internal combustion engines, particularly of the automotive type. It consists of a novel construction of the fuel storage and supply means for equipping the carburetor to handle a plurality of fuels.

Automotive engines are tending toward higher compressions in order to obtain greater efficiency. However, such higher compressions will cause detonation, especially when the engine is operating under a load, unless high test fuel is used. However, even high compression engines can operate with so-called low test fuels when the engine is operating under light load or in the part throttle or economy range when relatively low pressures exist in the cylinders and intake manifold.

Accordingly, it is the object of the present invention to provide a carburetor which is adapted to supply a low test fuel under part throttle or economy conditions and a high test or anti-detonating fuel when greater power is demanded.

Another object is to provide a single metering arrangement which is adapted to control the supply of both fuels according to whichever is required at the moment.

These objects and other more detailed objects hereafter appearing are attained by the device illustrated in the accompanying drawings in which

Fig. 1 is a top view of a carburetor embodying the invention.

Fig. 2 is a vertical transverse section taken substantially on line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken substantially on line 3—3 of Fig. 2.

Fig. 4 is a section similar to Fig. 3, but showing the valves reversed.

The carburetor shown includes a downdraft induction or mixture conduit including the air horn portion 10, mixing chamber 11 including Venturi tubes 12, and outlet portion 13 having a flange 14 for attachment to the usual engine intake manifold. The entire mixture conduit and manifold are termed the induction system of the engine. Located at one side of the mixture conduit is a fuel bowl structure 15 having a central vertical partition 16 forming a pair of fuel chambers 17 and 18. The chambers have fuel inlet bosses 19 and 20 and the fuel level therein is controlled by well-known constant level mechanisms including a float, as at 21, in each chamber, and a needle valve in the fuel inlet thereto.

Located near the bottoms of the chambers are metering orifice elements 24 and 25 mounted on an enlargement 26 projecting from the floor of the bowl structure and drilled out to form vertical passages 27 and 28 directly receiving the orifice elements and connecting cross passage 29.

2

A passage 30 extends at right angles from cross passage 29 to a vertical well 31 which receives an idling tube 32. A main nozzle passage 33 extends from the upper portion of well 31 into smaller venturi 12. The idling tube at its upper end connects with a cross passage 34 and a vertical passage, shown in part at 35, which terminates in idling ports 6 adjacent and posterior to the edge of throttle valve 7 when closed.

Orifice elements 24 and 25 are controlled, respectively, by metering pins 36 and 37 having graduated lower portions projecting through the orifice elements and extending upwardly through bowl cover 38. An L-shaped link or rod 39 has a top plate element 40 with lateral forked portions 41 and 42 which, respectively, embrace pins 36 and 37. Pin 36 has spaced collars 43 and 44 on its upper portion between the lower of which and forked portion 41 there is compressed a coiled spring 45. Pin 37 has spaced collars 46 and 47 between the upper of which and forked portion 42 is compressed a coiled spring 48.

L-shaped rod 39 at its lower extremity is secured to a piston 50 which works in a cylinder 51 formed in a suitable enlargement in bowl web 16. The cylinder is connected at its lower extremity by means of a passage 52 to a port 53 opening into the carburetor induction conduit posterior to the throttle valve so as to expose the cylinder and piston to engine intake manifold suction. A coiled spring 54 normally urges piston 50 upwardly and in opposition to the force of suction on the piston.

Metering pin 36 has a conical cut-off portion 55 above orifice element 24 and adapted to seat thereon to close the orifice element when pin 36 is urged downwardly. Pin 37 has a conical cut-off portion 56 located below orifice element 25 and adapted to seat thereon when pin 37 is urged upwardly. The pins are arranged with respect to the orifice elements so that one or the other of the valve enlargements is seated at all times except shortly before and after the transfer point.

A countershaft 57 is pivotally carried by posts 58 on top of bowl cover 38 and has an arm 59 rigidly secured thereto. This arm has bifurcations 60 extending on opposite sides of L-shaped rod 39 and beneath upper element 40 thereof. A second arm 61 rigid wtih shaft 57 is connected by a link 62 to a crank 63 rigid with the throttle shaft. The arrangement is such that the linkage and lever 59 form a one-way operative connection between the throttle and the metering pins.

Mounted on the left side of the bowl structure (Figs. 3 and 4) is a cap element 66 which secures a diaphragm 67 in position upon a boss 68. The space within boss 68 at the right of the diaphragm is connected by a short passage 69 to a vertical chamber 70 which opens at its lower extremity past an inlet check 71 and a screen 72

into fuel chamber 17. The upper portion of chamber 70 communicates past an outlet check 73 with a nozzle 74 discharging into the mixture conduit. A coiled spring 75 is compressed between cap structure 66 and the diaphragm and constantly urges the same towards the right or in the discharge direction. A suction passage 76 connects the space in cap element 66 and to the left of the diaphragm with a port 77 opening into the mixture conduit posterior to the throttle.

In operation, chambers 17 and 18 will be connected, respectively, with sources of relatively high test or anti-detonating fuel and low test fuel. The rest positions of the metering pins and their operating mechanism is illustrated in Figs. 2 and 3. Piston 50 and, consequently, both metering pins, are urged upwardly by spring 54 so that valve enlargement 56 is seated against orifice element 25 so as to cut off chamber 18 from the mixture conduit. At the same time, enlargement 55 on pin 36 is clear of orifice element 24.

Accordingly, during starting, high test fuel will be supplied from chamber 17. However, when the engine starts to run and is operating at idle or part throttle with high load, suction draws piston 50 and the metering pins downwardly, seating enlargement 55 on its orifice element and withdrawing enlargement 56 from element 25. Thus, fuel under this condition, when detonation does not occur, is supplied from low test chamber 18. Normally, idling fuel will be supplied from low test chamber 18 because of normal high suction existing in the engine manifold during idling. Preferably, piston 50 will remain in its uppermost position until a suction of approximately 8 inches of mercury is exceeded in the intake manifold.

The one-way throttle connection by means of link 62 and levers 59 and 61 is adjusted so that during opening movement of the throttle, forked lever 59 moves clockwise. Under part throttle conditions, L-shaped link or rod 39 will be held downwardly against bifurcated arm 59 and, thus, the metering pins will move with the throttle. However, because of the reversed, yielding connections between the pins and suction actuated element 40, only one pin at a time will move with the throttle or the suction element. Thus, while enlargement 56 is seated (Fig. 3) metering pin 36 is free to operate to bring different portions of its tapered lower extremity into operative relationship with metering orifice 24, until element 40 drops far enough to engage collar 46 on pin 37. Thereafter, upon increase in suction, only pin 37 will move, pin 36 being held stationary by seating of its enlargement 55 on orifice element 24. Thus, for slow throttle movement, the fuel from whichever chamber is connected to the mixture conduit at the moment will be metered in proportion to the degree of throttle opening. Both metering pins have relatively small metering portions adjacent their lower extremities to provide for maximum effective size of the corresponding metering orifice when this portion is located therein.

In order to prevent both cut-off enlargements 55 and 56 being seated at the same time, the lost motion provided on pin 37 in the position of Fig. 3 and on pin 36 in the position of Fig. 4 is such that this lost motion will be exhausted just before the cut-off enlargement of the other pin seats. Thus, there will be a short period when fuel will be supplied through both metering orifices. However, in practice, this condition will scarcely ever exist so that, in effect, the fuels in the separate fuel chambers will be supplied alternatively. The use of the fuel in the high test chamber as the pick up charge injected by the accelerating pump is desirable since the accelerating conditions are accompanied normally by a drop of suction in the engine manifold and a tendency to detonate.

The arrangement, accordingly, insures a supply of anti-detonating fuel at times when detonation is likely to occur. At other times, the less expensive low test fuel is supplied.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a carburetor, a mixture conduit having a throttle, separate fluid chambers for independent supply of high- and low-test fuels, supply passages between said conduit and said chambers, and means for controlling the flow of fuel through said passages comprising combined metering and fuel cut-off members for the individual chambers in said passages, an actuator responsive to changes in manifold pressure for positioning said members, and a mechanical connection between said actuator and said throttle, including separate, successively acting means for each member connected to the individual members for sequential operation of the members during opening movement of the throttle, said connection positioned in the path of movement of said actuator so as to limit movement of said actuator when the throttle is partly open.

2. In a carburetor, a mixture conduit having a throttle, separate fluid chambers for independent supply of high- and low-test fuels, supply passages between said conduit and said chambers and means for controlling the flow of fuel through said passages comprising metering orifices for each said passage, control valves for said orifices disposed in parallel relation and extending therethrough, an orifice closing portion on each valve, one on the upstream side of one orifice and the other on the downstream side of the other orifice, a differential pressure operated valve actuator, yielding connections between said actuator and said valves positioned in opposed relation relative to said actuator, and having a one-way operating connection with each of said valves, respectively, to permit continued relative movement between one of said valves and said actuator when either valve is seated, and a mechanical connection between said throttle and actuator including a means to position the actuator and acting to restrict its range of movement.

JAMES T. W. MOSELEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,676,828	Howard et al.	July 10, 1923
1,983,957	White	Dec. 11, 1934
2,142,979	Hans	Jan. 3, 1939
2,208,702	Read	July 23, 1940
2,261,794	Carlson et al.	Nov. 4, 1941
2,311,827	Hansen	Feb. 23, 1943
2,337,982	Ericson	Dec. 28, 1943