Feb. 12, 1924. 1,483,658

A. R. GLIDDEN

FUEL ECONOMIZER FOR INTERNAL COMBUSTION ENGINES

Filed Feb. 6, 1923 2 Sheets-Sheet 1

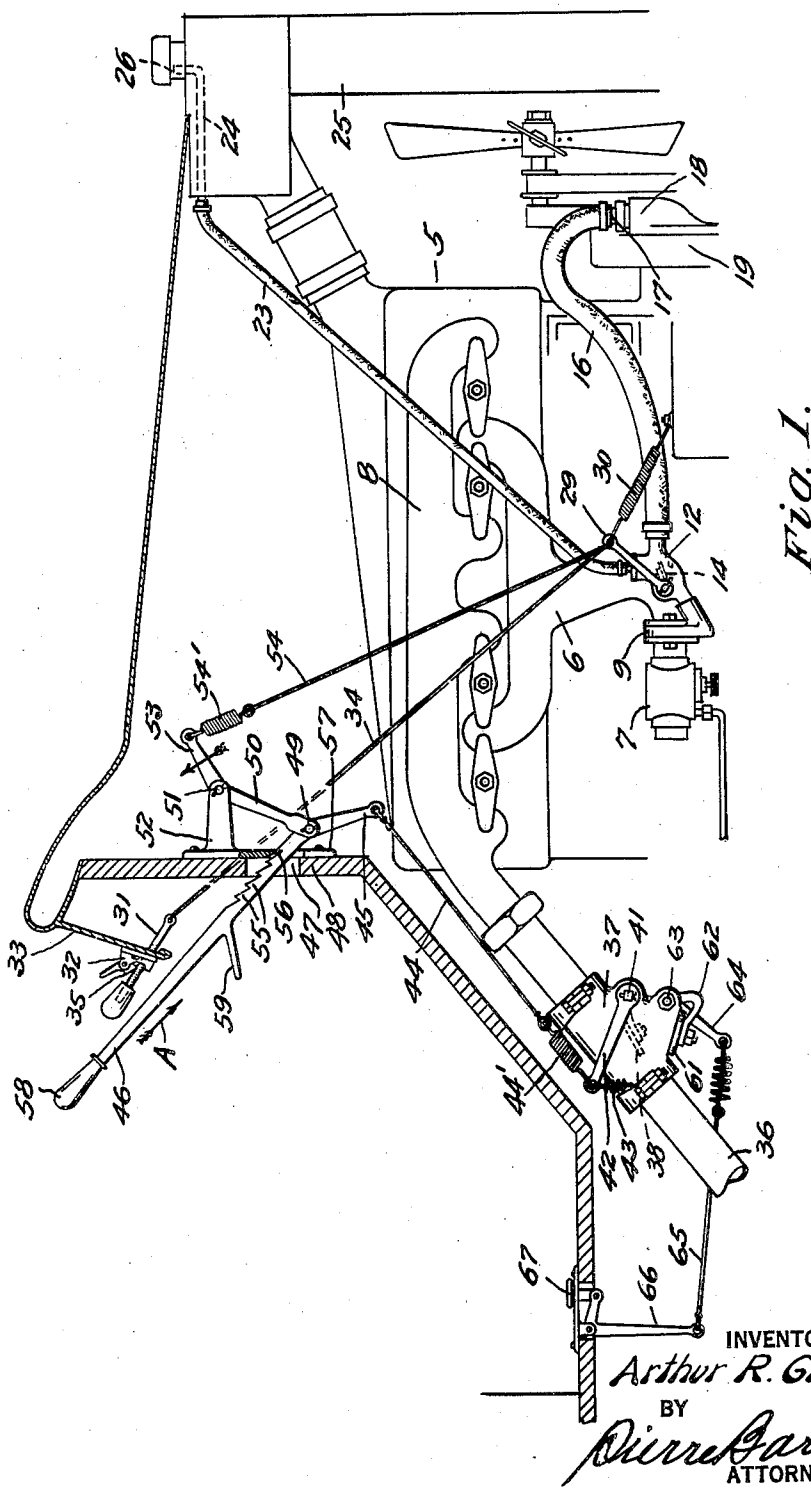


Fig. 1.

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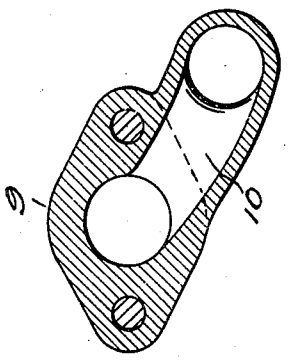


Fig. 3.

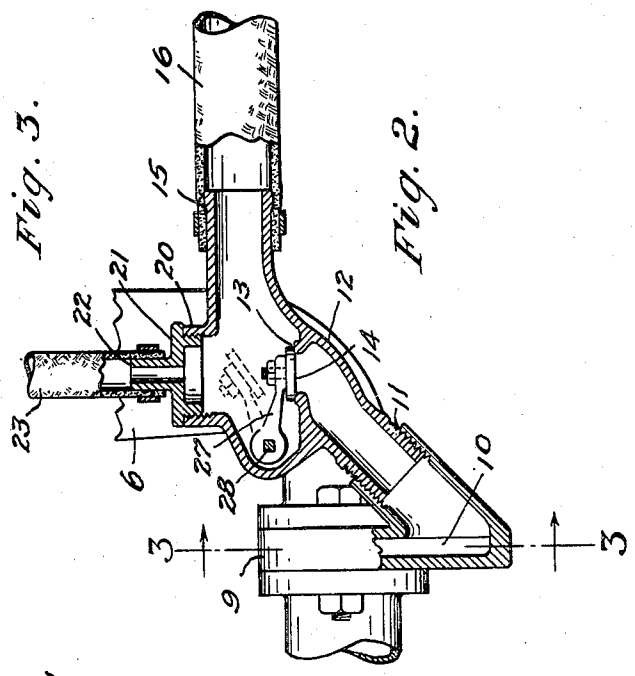


Fig. 2.

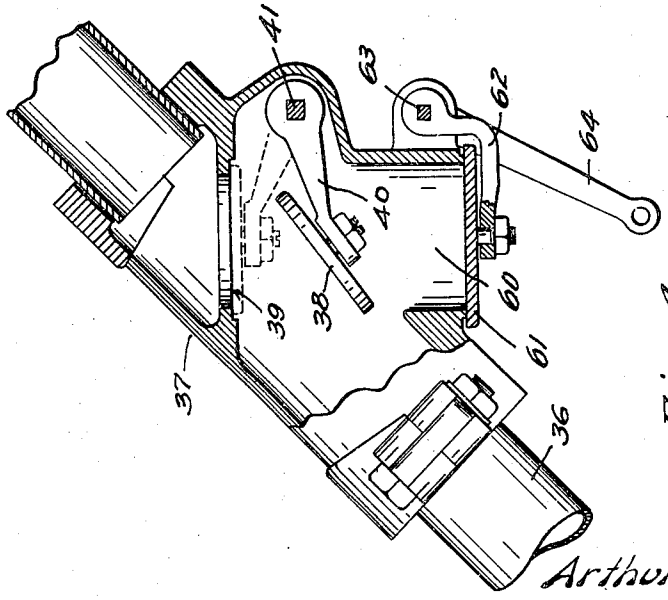


Fig. 4.

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Patented Feb. 12, 1924. 1,483,658

UNITED STATES PATENT OFFICE.

ARTHUR R. GLIDDEN, OF SEATTLE, WASHINGTON.

FUEL ECONOMIZER FOR INTERNAL-COMBUSTION ENGINES.

Application filed February 6, 1923. Serial No. 617,334.

To all whom it may concern:

Be it known that I, ARTHUR R. GLIDDEN, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Fuel Economizers for Internal-Combustion Engines, of which the following is a specification.

This invention relates to engines of motor vehicles. Its general objects are, first, the provision of improved means for economizing in the fuel consumption of the engine; and, second, to provide improved means whereby the exhaust gases from the engine may be retarded to produce compression in the engine cylinders for braking purposes.

Another object of the invention is to provide valve devices for effecting the objects above mentioned and in the provision of means for controlling such valve devices so that one of them may selectively be opened independently or simultaneously with the the closing of the other valve device.

Further objects and advantages of the invention will appear in the following specification.

The invention consists in the novel construction, arrangement and combination of parts hereinafter described and claimed.

In the accompanying drawings,—

Figure 1 is a view, partly in side elevation and partly in longitudinal section, of a portion of the front end of an automobile and showing engine controlling devices embodying my invention applied thereto. Fig. 2 is a longitudinal sectional elevation of an inlet valve and the pipe connections associated therewith. Fig. 3 is a transverse section taken through 3—3 of Fig. 2. Fig. 4 is a longitudinal sectional elevation of the exhaust throttle and cut-out valves.

In said drawings, the reference numeral 5 designates, generally, an automobile engine provided with a fuel inlet manifold 6 extending from a carbureter 7, and an exhaust manifold 8. Interposed between the intake manifold 6 and the carbureter 7 is a coupling 9 which, as shown in Figs. 2 and 3, is provided with a branch passage 10 extending to a socket 11.

Engaged in said socket is the outlet of a valve casing 12 having intermediate its length a seat 13 for a valve 14.

At the opposite side of the seat 13 from said outlet, the casing 12 is provided with two branches 15 and 20.

The branch 15 is connected by a flexible tube 16 with a nipple 17 which is removably inserted in the breather cap provided for the opening in the boss 18 through which lubricating oil is poured into the crank case member 19 of the engine.

Within the casing branch 20 is a bushing 21 having a nipple extension 22 which is connected by a flexible tube 23 with an end of a pipe 24 which extends into the radiator 25 of the engine water-cooling system.

The inlet end 26 of pipe 24 is directed upwardly into the steam space above the water level in said radiator.

The valve 14, as shown in Fig. 2, is preferably of the disk type connected to an arm 27 of a valve spindle 28 which, exteriorly of the casing, is provided with an operating arm 29. A spring 30 connected to the arm 29 serves to yieldingly retain the valve 14 in its closed relation with respect to its seat 13.

31 represents a pull-rod extending through an attachment 32 secured to the instrument board 33 of the automobile. The pull-rod 31 is connected by a flexible wire or cable 34 with the arm 29 for effecting the opening movements of valve 14 in opposition to spring 30.

The said valve may be retained in various adjusted positions by having the pull-rod 31 clamped to the attachment 32 through the medium of a finger operated cam-piece 35.

Included in the discharge pipe 36 leading from the exhaust manifold 8 is a casing 37 having therein a seat 39 for a check or non-return valve 38.

The valve 38 is connected to an arm 40 of a spindle 41 having, exteriorly of the casing, an arm 42 to which is attached a spring 43, see Fig. 1, which serves to yieldingly retain the valve 38 in its open position with respect to its seat.

For closing the valve 38 the arm 42 is connected by a wire or flexible cable 44 with an end 45 of a push-rod 46 which extends through an aperture 47 provided in the dash partition 48 of the automobile body.

The push-rod 46 is connected adjacent to its end 45 by a pivotal pin 49 to an arm 50 of a lever which is fulcrumed at 51 to a bracket 52. The other arm 53 of said lever is connected by a flexible wire or cable 54 with the operating arm 29 for the inlet valve 14.

The connections 44 and 54 are advanta-

geously provided with extensible spring elements 44^1 and 54^1. The push-rod 46, as shown, is provided with a series of ratchet teeth 55 which are engageable with a detent 56 provided by a guide plate 57 which is secured to said dash partition for releasably securing the push-rod 46 in selected positions.

The said push-rod may be operated manually by a handle 58 or by means of the operator's foot through the medium of a pedal element 59 of the push-rod. When thrust forwardly in the direction of arrow A, the push rod 46 effects the closing of the exhaust valve 38 and also influences the lever 50—53 to effect the opening of the inlet valve 14.

The casing 37 is provided with a branch outlet 60 into the atmosphere to afford what is known conventionally as a cut-out. To close such cut-out there is provided a valve 61 which is carried by an arm 62 of a spindle 63 having another arm 64 which is connected by a flexible cable 65 with a bell-crank lever 66 which is operated by a pedal attachment 67 for closing the valve 61 when the exhaust gases are to be discharged through the muffler, not shown.

In operation, the suction strokes of the engine pistons produce a partial vacuum in the intake manifold 6 which effects the supply of fuel charges from the carbureter 7 when the valve 14 is in its closed or nearly closed position as should be the case when starting the engine. By fully opening the valve 14 the vacuum above referred to acts through the coupling 9 to effect the drawing into the manifold 6 of charges of steam and oil-vapors through the tubes 23 and 16, respectively, to the exclusion of fuel gases from the carbureter. By adjusting the position of the valve 14 to admit concurrently carburetted fuel, steam and oil-vapors into the intake manifold, a considerable saving in the expense of operating the engine is effected.

When coasting or traveling upon down grades, the valve 14 should be brought into its most open position to supply a preponderance of steam and oil-vapors which serve to clean and lubricate the interior of the cylinders.

The valve 14 may be operated independently of the exhaust valve 36 by means of the pull-rod 31. Under such conditions the exhaust valve 38 is held in its wide open position by means of the spring 43. When the valve 38 is to be employed, however, for throttling the engine exhaust, the valve 14 should be moved into its open position, such control of the two valves being accomplished through the medium of the push-rod 46 and the lever 50—53.

The closing of the exhaust valve prevents the escape of compressed air or gases from the engine cylinders and causes such confined fuel to exercise a retarding or brake effect through the medium of the power transmission mechanism which is associated with the engine.

From the foregoing it is apparent that the fuel controlling valve is operable in unison with, or independently of, the exhaust valve, thereby affording a complete control of the fuel supply and exhaust gases as may be required.

What I claim, is,—

1. An automobile engine, a coupling member located between the carbureter and the intake manifold of the engine, said member having a side inlet opening, a tubular connection between said opening and the crank case of the engine, a tubular connection between said opening and the steam space of the water cooling radiator, a normally closed inlet valve between said opening and both of said connections, a normally open valve provided for the exhaust manifold of the engine, means whereby said inlet and exhaust valves are respectively moved in unison into their open and closed positions, and means whereby the inlet valve may be moved independently of the exhaust valve into its open position.

2. In an automobile engine having communicative connections between its intake manifold and the interior of the engine crank case and with the steam space of the water cooling radiator, the combination with a normally closed valve for said connections, and a normally open valve for the exhaust manifold of the engine, of means to regulate said inlet and exhaust valves in unison, said means comprising a manually operated rod, a flexible connection between said push-rod and the exhaust valve, a lever having one of its arms connected to said rod, and a flexible connection between the other end of said lever and the inlet valve.

3. In an automobile engine having a fuel intake manifold, a crank case and a water cooling radiator, a casing provided with a valve-seat intermediate the length thereof, said casing being connected at one side of the valve-seat with said manifold, pipe connections between said casing at the other side of its valve-seat with said crank case and also with the radiator above the water level therein, a valve for said valve-seat, and means for regulating the position of the valve with respect to the valve-seat to control the passage of oil-gas and water-vapor from the respective pipe connections to said manifold.

Signed at Seattle, Washington, this 25th day of January 1923.

ARTHUR R. GLIDDEN.

Witnesses:

PIERRE BARNES,

M. G. SUPPLE.