Dec. 19, 1933. M. S. PARKHILL ET AL 1,940,226

CARBURETOR

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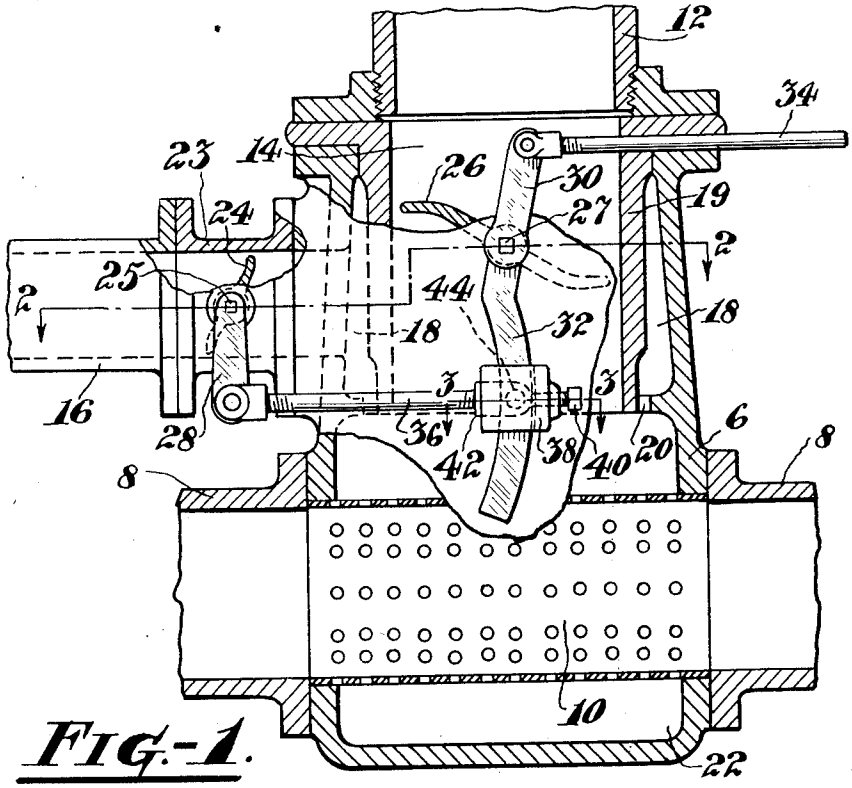


FIG.-1.

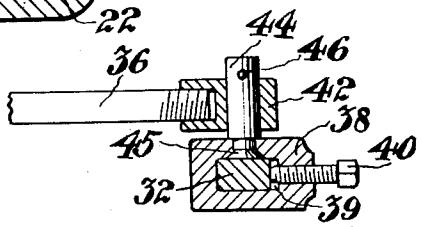


FIG.-3.

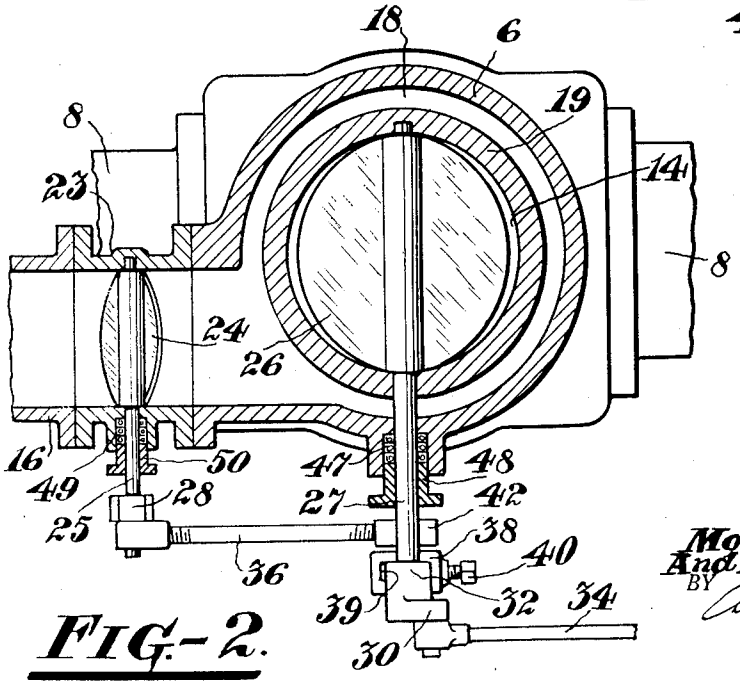


FIG.-2.

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CARBURETOR

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1 Claim. (Cl. 48—180)

This invention relates to carburetors, and more particularly to a mixture control device for carburetors adapted to mix air with a gaseous fuel. Internal combustion engines using gas as a fuel are required to operate under widely varying conditions. Such engines are commonly used in oil or gas fields where the fuel supply is taken directly from the well and is delivered without modification to the engine. The thermal capacity of such fuel may vary widely at different stages of the development of an individual well. The product from different wells even within a small area may differ widely in its B.t.u. content. Gas engines, therefore, require a carburetor or mixing valve adapted to be readily adjusted to properly carburet whatever type of gas may be supplied to it. All engines, to be efficiently operated, should consume all of the gas used for motive power, without, at the same time, operating on so lean a mixture that the power output of the engine is reduced.

It is an object of this invention to provide a mixing valve for gas engines which will permit ready adjustment to properly mix air with gas of any degree of richness through a simple mechanism whereby the operation of the air and gas valves may be coordinated according to the quality of the gas supplied to the engine.

Other objects are either apparent or will be referred to hereinafter.

In the accompanying drawing,

Figure 1 is a view of the carburetor in which a part has been broken away sufficiently to show the internal construction of the valve mechanism and the mixing chamber,

Figure 2 is a cross section of Figure 1 taken on the line 2—2 looking in the direction of the arrows, and

Figure 3 is an enlarged view in section taken through the line 3—3 of Figure 1 looking in the direction of the arrows.

Referring to the drawing, a casing 6 forms a mixing chamber 22 from which pipes 8 lead to the intake of an engine (not shown). In the mixing chamber and connecting the pipes 8 is a perforated pipe or strainer 10 which, by breaking up the air and gas passing therethrough into numerous jets, serves to provide a more intimate mixture. An inlet pipe 12 admits air at the top of the carburetor to a conduit 14 in a valve cage 19 seated within the casing 6. A pipe 16 enters the casing 6 and provides an inlet for fuel gas which is conducted into an annular chamber 18 defined by the interior of the casing wall 6 and the exterior of the valve cage 19. Gas from the chamber 18 is admitted to the mixing chamber 22 through an annular inlet 20. Interposed in the gas inlet pipe 16 is a valve cage 23 having a valve 24 and interposed in the valve cage 19 is a valve 26.

The valves 24 and 26 as illustrated are of the familiar butterfly type and are operated by shafts 25 and 27 respectively which pass through the diameters of the valves and are journaled at one end in a recess in the valve cage. An end of each shaft extends through holes in the valve cage which may be suitably packed with packing rings 47 and 49 held in place by packing glands 48 and 50. The ends of valve shafts 25 and 27 may be squared to accommodate operating arms 28 and 30. Attached to one end of the operating arm 30 is a control rod 34 which may be connected at its opposite end to a governing device (not shown). Attached to the operating arm 28 is the control rod 36 which is connected to an arcuate extension 32 of the operating arm 30 of the valve 26 in the manner to be presently described.

The extension 32 of the operating arm 30 is formed in an arc the radius of which is determined by the length of the connecting rod 36 which is in effect a radius rod. When the valve 24 and the valve 26 are each in their fully closed positions the radius rod 36 may be swung in an arc about its pivoted connection on the operating arm 28. The extension 32 of the arm 30 is coincident with this arc. At the end of the rod 36 is threaded a nut 42 having a transverse bore therein. Mounted in this bore and extending therethrough on either side is a lug 44. At one end of the lug 44 is a locking pin 46. At the opposite end of the lug 44 is a screw or rivet 45 which serves to fasten to the lug 44 a yoke or collar 38 having a hole 39 adapted to receive and slide upon the extension 32 of the arm 30. Threaded into the collar 38 and adapted to bear against the extension 32 is a set screw 40.

It will be readily seen that the rod 36 which is adjustably connected by means of the clamping device just described to the arcuate arm 32 may be swung through its arc into any desired position on the extension 32 without changing the relative position of either the valve 24 or the valve 26 when both valves are in the closed position. This necessarily follows because the arc of the extension 32 is determined by the path of the rod 36 when swung from the center determined by the position of the operating arm 28 when the valve 24 is closed.

It will be understood, however, that although the position of the connection between rod 36

and arm 32 makes no change in the relationship of the valves 24 and 26 when they are in the closed position, it nevertheless makes a very great change in their relationship when the valves are opened. The arm 32 swings through a definite arc with the shaft 27 as a center when the valve 26 is operated. Naturally, the chord of this arc increases as the distance from the center increases and, consequently, the motion transmitted to the valve 24 through the control rod 36 is greater when the connection between the rod 36 and the extension 32 is made at the outer end thereof than when it is made at the inner end thereof.

It will be seen, therefore, that when a rich gas is supplied to the engine the connection of the rod 36 to the arm 32 will be made at a point rather close to the axis of the valve 26 so that a wide opening of the valve 26 permitting a large quantity of air to enter the mixing chamber 22 insures a relatively small opening of the valve 24 so that a relatively small amount of the rich gas is admitted through the pipe 16 and the chamber 18 to the mixing chamber 22.

Conversely, when a lean and impoverished gas is supplied to the engine the connection of the rod 36 to the extension 32 will be made at a point remote from the axis of the valve 26 so that a small opening of the valve 26 will entail a large opening of the valve 24 thereby permitting only a small amount of air to mingle with a relatively large amount of gas, providing a satisfactory fuel mixture to be supplied to the engine. For gas of intermediate richness the connection may be made at suitable intermediate points on the arm 32. The nature of the related operation of the two valves insures a constant ratio of gas to air, for any given adjustment, throughout the entire range of the valve.

Having thus described the construction and operation of our invention, we claim:

A gas carburetor comprising a mixing chamber, an air inlet thereto having a control valve therein, a gas inlet thereto having a control valve therein, operating arms on said valves, an arcuate member connected to the air control valve, and a radius rod connected to the arm of the gas control valve, a collar slidably connectible to any point on said arcuate member when both valves are closed whereby motion of one valve may be communicated to the other in a ratio determined by the point of connection, and a set screw for clamping the collar to the arcuate member.

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