H. R. JACKSON.

GOVERNING VALVE FOR INTERNAL COMBUSTION MOTORS.

APPLICATION FILED JULY 5, 1921.

1,437,423. Patented Dec. 5, 1922.

FIG. 1

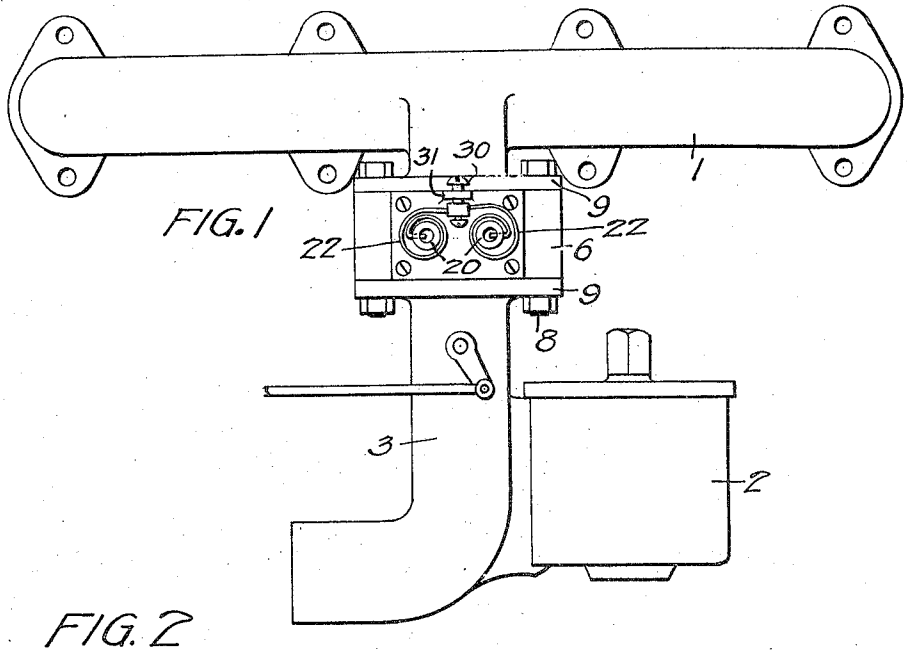


FIG. 2

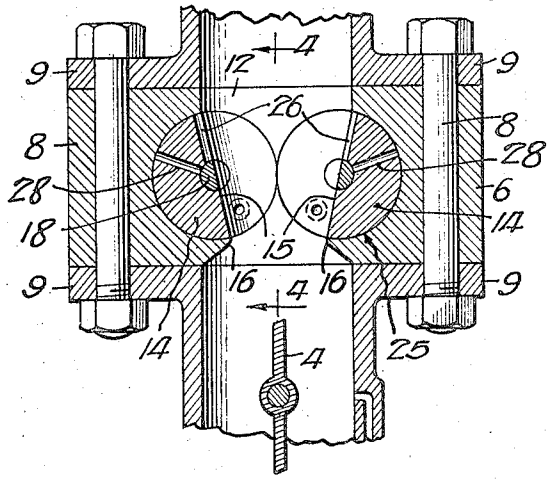


FIG. 3

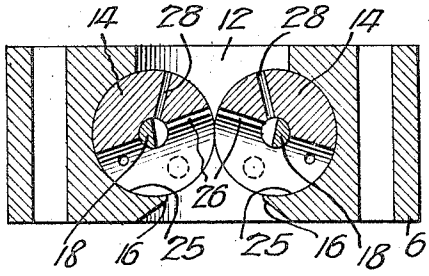


FIG. 4

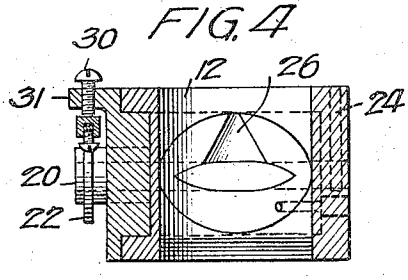


FIG. 5

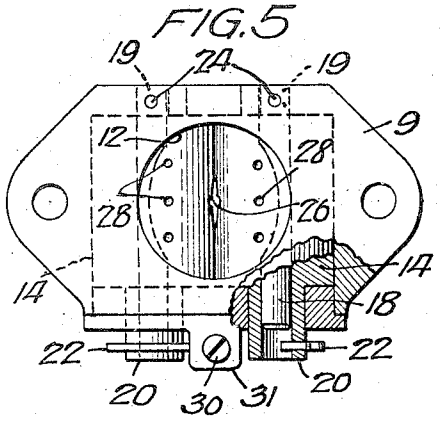
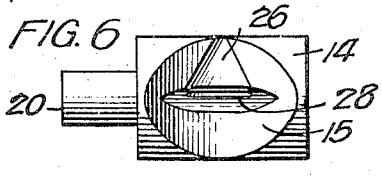


FIG. 6



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UNITED STATES PATENT OFFICE.

HARRY R. JACKSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO HENRY A. MAY, OF CHICAGO, ILLINOIS.

GOVERNING VALVE FOR INTERNAL-COMBUSTION MOTORS.

Application filed July 5, 1921. Serial No. 482,443.

To all whom it may concern:

Be it known that I, HARRY R. JACKSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Governing Valves for Internal-Combustion Motors, of which the following is a specification.

My invention relates to distributing valves for internal combustion engines, and the object of the invention is to provide means interposed between the throttle valve and the engine cylinder for deflecting the fuel vapor away from the sides of the intake duct and to homogenize the vapor entering the intake manifold. I obtain my object by the mechanism illustrated in the accompanying drawing in which

Figure 1 is an assembly view showing my device associated with a carburetor, throttle valve and intake manifold.

Figure 2 is a sectional view of the device taken longitudinally through the axis of the intake duct.

Figure 3 is similar to Figure 2 but shows the valve elements in closed position.

Figure 4 is a sectional view on the line 4—4, Figure 2.

Figure 5 is a face view of the device showing the upstream side and looking down stream, and

Figure 6 is a face view of one of the valve elements.

Like numerals denote like parts throughout the several views.

While the parts with which my device are associated may assume a wide variety of forms, I have illustrated them conventionally in Figure 1 in which 1 represents the intake manifold of an internal combustion engine, 2 represents the carburetor, 3 the intake duct, and 4 a common type of throttle valve. My device is designed to be placed in the intake duct 3 between the throttle valve and the engine cylinder and has a casing 6 which is held in place by any suitable means, for example, bolts 8 which pass through it and through flanges 9 formed in the proximate ends of the duct 3.

The casing has a central passage 12 in line with the duct and within this, on opposite sides, are mounted two rotatable valves 14. These are, in the main, cylindrical, but are cut away in such manner as to form curved acting faces 15 which conform to the walls of the duct when the valves are in open position as shown in Figure 2. It is desirable that passage 12 be somewhat constricted at the point 16 near its upstream end, thus producing a venturi effect. The valves 14 may be rotatably mounted in various ways. In the present case they are bored longitudinally at their axes to receive pins 18. One end, 19, of these pins, bears in one side of the casing as shown in dotted lines in Figure 5. At the opposite end the valves have sleeves 20 which project out through the casing and are attached to a spring 22 which will be hereinafter again referred to. In the present case the pins 18 are secured by dowels 24 as shown in Figure 5, thus being nonrotary, although the specific construction may be varied. The valves are seated in cylindrical chambers 25 and according to the design shown, at a point midway between their ends about one-half of the valve is cut away. A tapered recess 26 is formed in the face of each valve at the middle, the purpose being to cause the gases to converge toward the center of the duct when the valves are partially closed. Another purpose is to form a bleed passage so that the valves will never be entirely closed in the sense of being air tight. It is desirable for the same purpose to form bleed passages 28 in the valves, as best shown in Figures 2 and 3.

Spring 22, previously mentioned, is designed to constantly urge the valves to rotate from open position shown in Figure 2 to closed position shown in Figure 3. The form of spring may be varied, but in the present case has two spirals, the ends of which are fastened to the extensions 20 of the valves, the middle portion being acted upon by a set screw 30 mounted in a lug 31 as best shown in Figures 1, 4 and 5. The construction is such that by screwing down the screw 30 the tension on the springs will be increased.

In operation, when the engine is not running the valves will assume the closed position shown in Figure 3. It will be noted that even in this closed position a small amount of fuel vapor may pass, partly through the recesses 26 and partly through the bleed passages 28. If the throttle valve 4 is opened wide and the engine is started, the suction will cause the valves to rotate toward open position shown in Figure 2.

The degree of rotation will, of course, depend upon the energy of flow, and this will in turn depend upon the speed of the engine and upon the position of the throttle valve 4. The commonest type of throttle valve, when closed or partially closed, tends to deflect the vapor toward the sides of the intake duct, the result being that the gases are chilled and tend to deposit on the side walls in the form of small liquid globules. This, for well known reasons, decreases the efficiency, but is overcome by my device which, in the first place, tends to deflect the gases toward the middle by reason of the converging mouth 16 of the casing 6; but the effect is chiefly produced by the position of the valves 6 which throw the gases toward the central portion of the duct and keep them away from the walls thereof. The more nearly the throttle valve is closed, the weaker will be the flow, and hence the more nearly closed will be the valves 14. As the suction increases, due to the opening of the throttle, the less need there will be for my valves, not only because the throttle itself has a lesser tendency to deflect the gases laterally, but because at higher speeds the engine cylinder becomes hotter by convection, and the heat of the intake manifold and duct is correspondingly increased. The elevated temperature of the intake duct and manifold tends to prevent a deposition of the fuel in liquid form, and hence the device is automatic. The greater the need of the deflecting valves, the greater will be their deflecting effect, and vice versa.

It will be noted that the valves in my device face upstream, that is to say, in rotating from open to closed position the acting faces rotate toward the oncoming stream and yield when the energy of the stream increases. They consequently have little throttling effect, the throttling effect being controlled by the throttle 4 which is operated manually and is independent of the distributing valves. It will also be noted that these valves are hung in the middle in the sense that the axes are midway between the edges of the acting faces. This makes them less sensitive than if the axes were at the upstream edges, and hence they require a spring of less strength to hold them to their work.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a device for governing the flow of gas in the intake of an internal combustion engine, a valve casing having a central passage adapted to form part of the intake duct, cylindrical valves rotatably mounted on opposite sides of said passage and being cut away to conform when open to the walls of the passage, means for yieldingly urging the valves to rotate in a direction to turn the acting faces upstream and thereby deflect the gases towards the center of the duct, the valves having tapered recesses in their acting faces converging down stream for enhancing converging effect on the gases.

2. In a device for governing the flow of gas in the intake of an internal combustion engine, a valve casing having a central passage adapted to form part of the intake duct, cylindrical valves rotatably mounted on opposite sides of said passage and being cut away to conform when open to the walls of the passage, means for yieldingly urging the valves to rotate in a direction to turn the acting faces upstream and thereby deflect the gases towards the center of the duct, the valves having bleed passages extending radially through them and communicating with the upstream and the downstream side of the valves when the valves are closed.

In witness whereof, I have hereunto subscribed my name.

HARRY R. JACKSON.