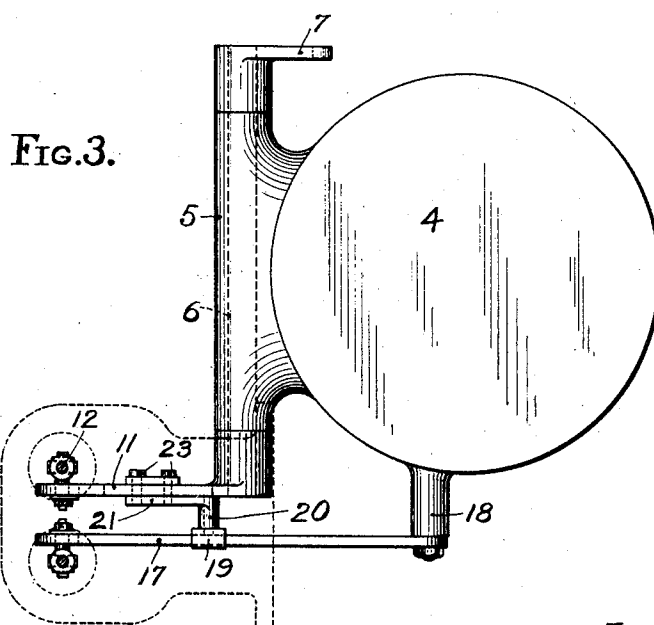
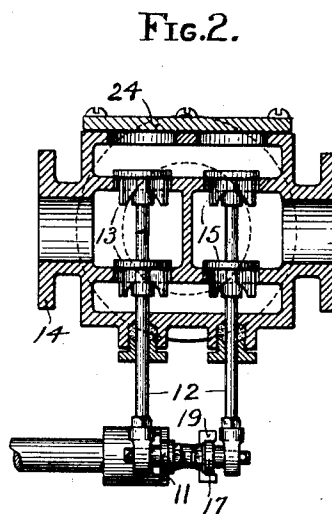
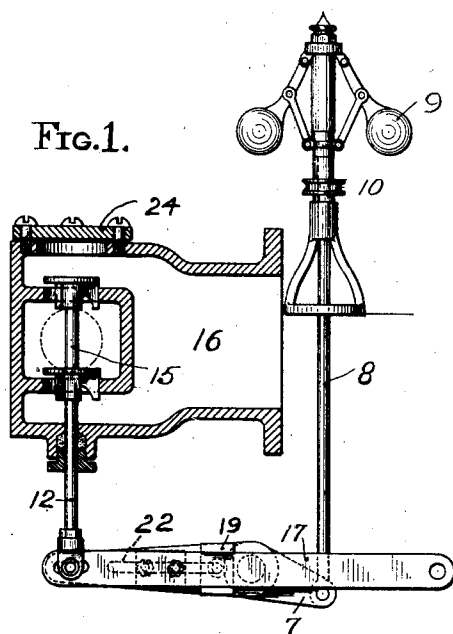


No. 846,307.

PATENTED MAR. 5, 1907.

F. G. HOBART.  
GAS ENGINE REGULATING VALVE.  
APPLICATION FILED APR. 2, 1904.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FRANKLIN G. HOBART, OF BELOIT, WISCONSIN, ASSIGNOR TO FAIRBANKS, MORSE & CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## GAS-ENGINE-REGULATING VALVE.

No. 846,307.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed April 2, 1904. Serial No. 201,231.

*To all whom it may concern:*

Be it known that I, FRANKLIN G. HOBART, a citizen of the United States, residing at Beloit, in the State of Wisconsin, have invented certain new and useful Improvements in Gas-Engine-Regulating Valves, of which the following is a specification.

This invention has reference to gas-engine regulating valves such as are employed for determining the mixture to be used in the cylinder and also controlling the quantity thereof by means of governor action, so as to regulate the speed of the engine in proportion to the load, that is to maintain the speed approximately constant regardless of variations in load.

In order to get the best results from gas engines it is necessary that the gas and the air should be mixed in certain proportion so as to secure the most perfect combustion, and this proportion should remain substantially the same regardless of the quantity of the mixture admitted or used in the cylinder, the quantity being varied necessarily so as to maintain approximately constant speed of the engine under varying conditions of load. Various devices have been heretofore proposed for accomplishing this object, and it is the object of the present invention to provide a device of this character which will secure maximum efficiency with a minimum expenditure of gas and by the employment of a simple and readily adjustable device.

The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawing wherein—

Figure 1 is a vertical sectional view showing a portion of my improved valve mechanism with the governor employed for actuating the same;

Figure 2 is a vertical section taken on the line (2) of Figure 1; and

Figure 3 is a plan view showing the device applied to a vertical cylinder engine.

In carrying out my invention, assuming it to be applied as shown in Figure 3 to an engine having a vertical cylinder 4, I provide a bracket 5 thereon within which is mounted a rocker shaft 6 carrying a lever 7 to which by means of a rod 8 there is secured a governor device which, as shown, is an ordinary ball governor 9 provided with a pulley-wheel

10 for imparting rotation thereto. The rocker shaft 6 has at the end opposite the lever 7 a lever or arm 11 which is arranged to actuate an air valve spindle 12 which carries the air valve 13. The air valve 13 is mounted in a chamber formed in a casing 14 along-side of a gas valve 15 which is mounted in a similar chamber, the said chambers of the two respective valves being provided with independent inlet and outlet ports, the outlet ports leading into a common mixing chamber 16 shown in Figure 1 from whence the mixture is free to pass to the engine cylinder through the usual controlling valve mechanism ordinarily employed in such constructions and which, as it constitutes no part of this present invention, I have not shown herein in detail.

It will be observed that the air valve actuating arm 11 is directly attached to the governor rocker shaft 6 and is subject to direct movement by the same. As a means for actuating the gas-valve 15 I provide another lever or arm 17 which has one end pivoted to a fixed stud indicated at 18, and which receives its reciprocating movement through the instrumentality of a sliding block 19 mounted on a pin 20 that in turn is carried by a block 21 which is secured in a slot 22 in the arm 11 by means of fastening devices 23. By the arrangement described, the position of the pin 20, the sliding block 19 relative to the lever 17, can be changed by loosening the fastening devices 23 and moving the block 21 in the slot 22 so as to vary the relative position of the center of the pin 20 and the center of the rocker shaft. By this arrangement, as will be readily seen, if the center of the pin 20 is placed coincident with the center of the rocker-shaft 6 there will be practically no movement at all of the arm 17 and the gas valve actuated thereby, whereas the movement of the gas valve in proportion to the movement of the air valve will increase in amount according as the pin 20 is moved further from the center of the rocker-shaft to the left, as indicated in Figure 3. If the pin 20 be moved out until it is approximately as far from the center of the rocker shaft 6 as is the pin that carries the spindle 12 of the air valve, then the air valve and the gas valve will have substantially the same amount of movement due to governor action and about the same quantity of air and gas will be ad-

mitted to the mixing chamber 16 giving equal proportions of the two in the mixture. If the pin be moved to about the position shown in Figure 3 there will be very much larger movement of the air valve than is imparted to the gas valve and thus much more air will be admitted than there is gas, and this will be approximately the adjustment for some kinds of gas; the mixture varying largely with the quality of the combustible used.

It should be observed that in constructing this apparatus for engines which are to employ some combustible, wherein a proportion of about one to one is to be used to get the best results, then the two valves, the air and the gas valves, should be approximately the same size, as they are in fact indicated in this drawing. Such would be about the best condition for use in conjunction with what is known as producer gas. On the other hand if combustible is to be used which is of higher heat value and of which a less quantity is required in proportion to the air, as for example in the case of natural gas where very much more air can be used in proportion to the gas employed, then the gas valve should be made of smaller size in proportion to the air valve in order to get the best results.

It will be observed, on examination of the drawing, that the peculiar form of valve which I employ is perfectly balanced, and with said form of valve there is no need for having it rest at any time squarely upon its seat so that any trouble encountered with the ordinary form of device of this kind seating and sticking to its seat, as where gummy substances are found in the combustibles used, is overcome. Another advantage of this arrangement, to which attention is directed, is the employment of two independent cham-

bers, an air and a gas chamber, formed, together with a mixing chamber, in the common casing, the whole being provided with removable cap 24 so as to make the several parts easy of access.

Having thus described my invention and illustrated its use, what I claim as new, and desire to secure by Letters Patent, is the following:

1. The combination with a casing having a gas inlet and an air inlet and a mixing chamber, of a balanced valve controlling each of said inlets, levers attached to the stems of said valves, means for operating one of said levers directly from a governor, and the sliding adjustable connection 20 between said lever and the other lever 17 controlling the other valve, substantially as described.

2. A gas engine regulating valve comprising a casing having air and gas inlets with valves controlling said two inlets respectively, a crank shaft and a governor controlling the angular position of said shaft, a crank on the shaft actuating one of the said inlet valves, a lever for the other inlet valve substantially parallel to the crank arm and having its pivot on one side of the crank shaft and its operative connection to the inlet valve on the other side of such crank shaft and a sliding connection between the lever and the crank whereby the amount of oscillation of said lever may be adjusted between any desired limits.

In testimony whereof I have hereunder signed my name in the presence of the two subscribed witnesses.

FRANKLIN G. HOBART.

Witnesses:

P. C. BROOKS,  
GEO. B. INGERSOLL.