No. 732,016. PATENTED JUNE 23, 1903.

E. UHLIN.

EXPLOSIVE ENGINE GOVERNOR.

APPLICATION FILED AUG. 19, 1901.

NO MODEL.

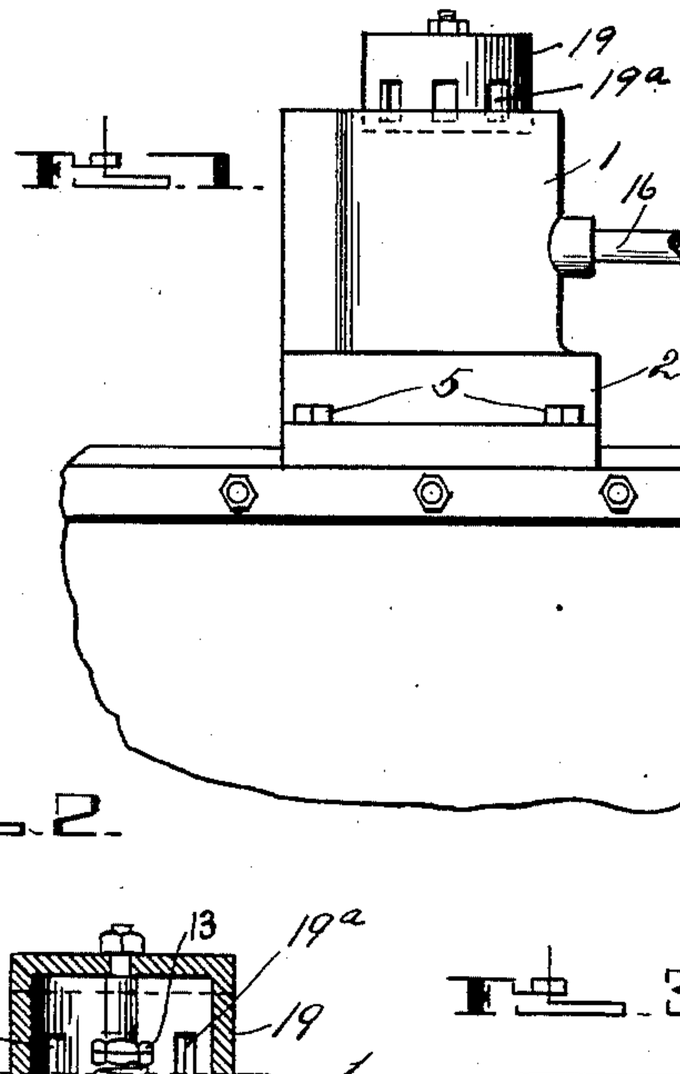

FIG. 1.

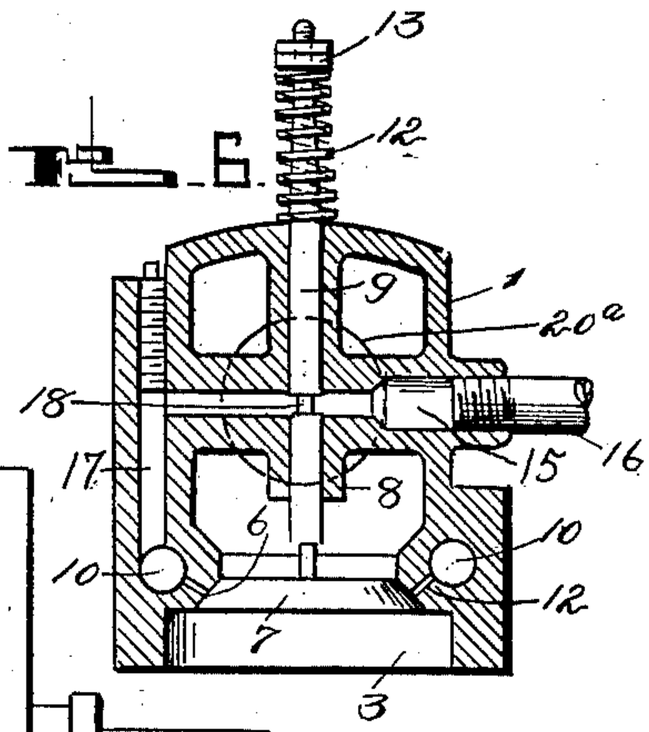

FIG. 2.

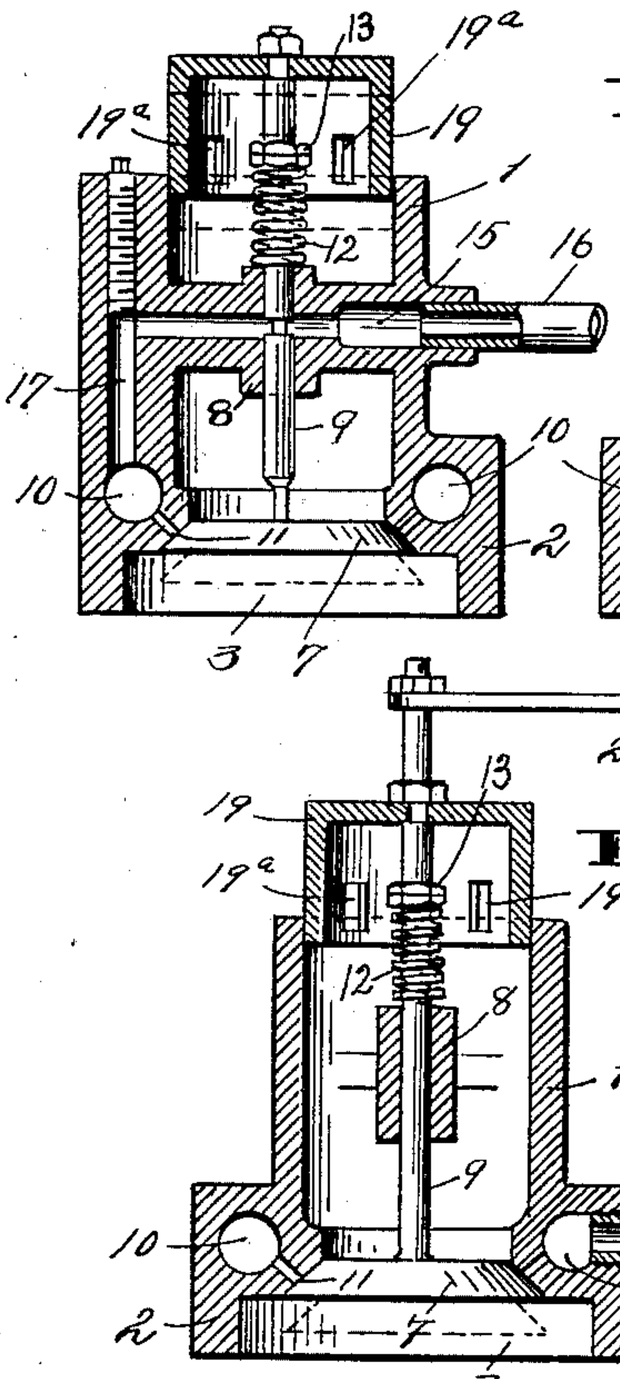

FIG. 3.

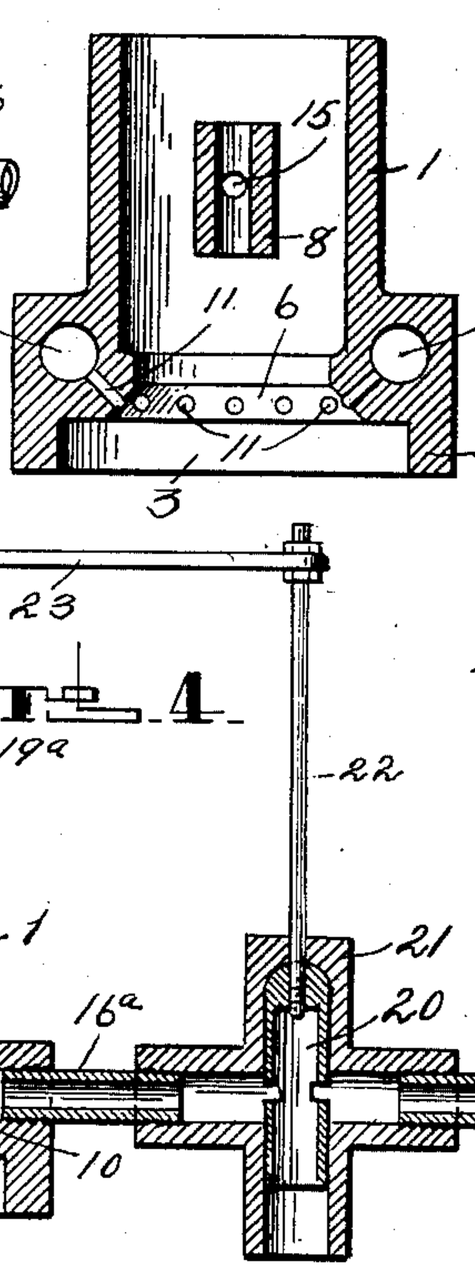

FIG. 4.

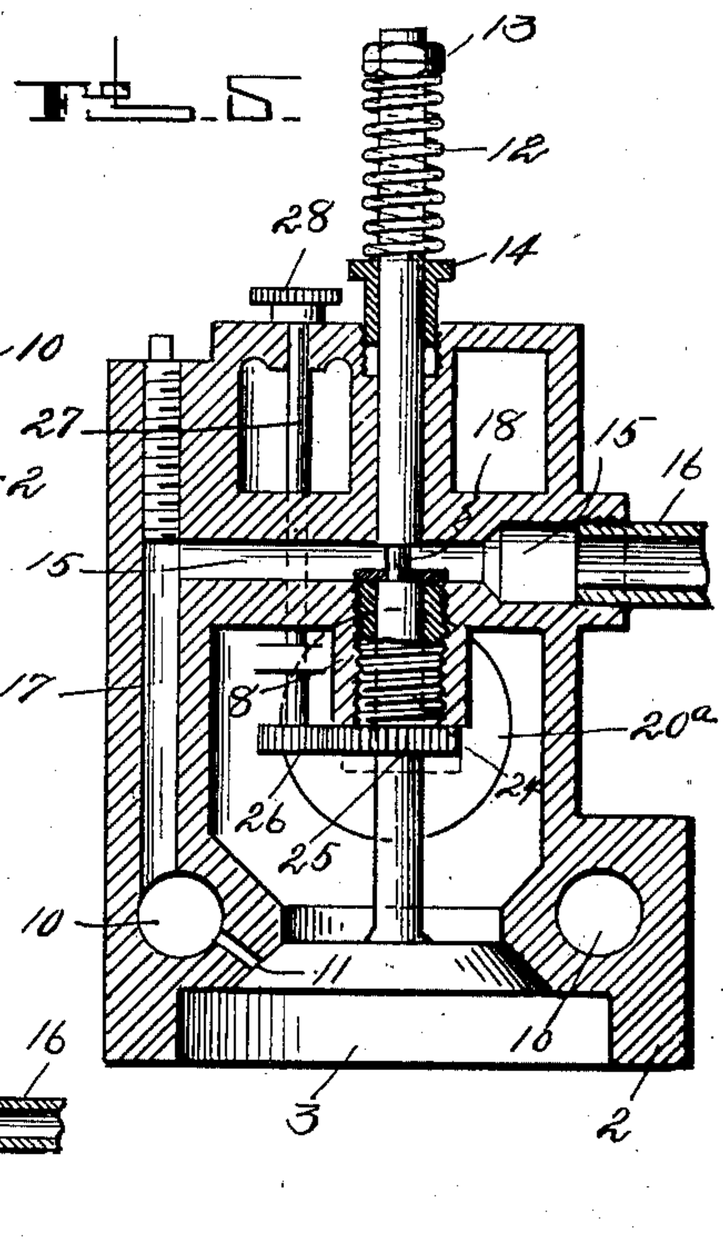

FIG. 5.

WITNESSES.

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No. 732,016. Patented June 23, 1903.

UNITED STATES PATENT OFFICE.

ERNEST UHLIN, OF McDONALD, PENNSYLVANIA, ASSIGNOR TO D. C. & U. GAS ENGINE COMPANY, OF McDONALD, PENNSYLVANIA.

EXPLOSIVE-ENGINE GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 732,016, dated June 23, 1903.

Application filed August 19, 1901. Serial No. 72,514. (No model.)

To all whom it may concern:

Be it known that I, ERNEST UHLIN, a citizen of the United States, residing at McDonald, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Explosive-Engine Governors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is to provide new and improved means for governing the explosive charges admitted to the receiving-chamber or to the combustion end of the cylinder of an explosive-engine.

To this end my invention consists of a new and improved explosive-engine governor and in the construction and combination of parts, all as fully hereinafter described and claimed.

In the accompanying drawings, which illustrate applications of my invention, Figure 1 is a side elevational view of one form of my governor in position on an engine; Fig. 2, a central vertical sectional view of the form of Fig. 1; Fig. 3, a sectional view taken at right angles to Fig. 2; Fig. 4, a part sectional view and a part side elevational view of a modified form of governor embodying my invention; Fig. 5, a central vertical sectional view of another form of governor, and Fig. 6 a sectional view of still another form of governor embodying my invention.

Referring to the drawings, the casing 1 is preferably made in the manner shown and is provided with a hollow base 2, having an opening 3, adapted to register with a corresponding opening in the engine, which latter opening is in communication with a receiving-chamber of the engine. As illustrated, the governor is secured to the engine in the manner particularly shown in Fig. 1 by bolts 5. My governor, however, is adapted to be used in connection with various styles of explosive-engines and may be attached to the engine at any suitable point.

The interior of the casing is provided with a seat 6 for valve 7 and with a guide 8 for valve-stem 9. Directly above the valve-seat 6 is an annular chamber or passage 10 in open communication with a series of ports 11, located in that part of the interior of the casing forming the seat 6. A coiled spring 12 surrounds the valve-stem and in the forms shown by Figs. 2 and 4 is interposed between the guide 8 and adjustable nuts 13 and bears against the guide and nuts to force the valve 7 upon its seat 6. In the form of Fig. 5 the spring is compressed between the adjustable nuts 13 and a collar 14 and in the form of Fig. 6 between the nuts 13 and the top of the casing.

In the forms of Figs. 2, 5, and 6 the guide 8 is provided with a port 15, connecting a gas-supply pipe 16 with a passage 17. Port 15 crosses the opening in which the valve-stem moves, and the diameter of the port at the point of intersection with the opening is slightly less than the diameter of the opening. For the purpose of permitting a free passage of gas to the annular passage or chamber 10 from the gas-supply pipe 16 through port 15 and passage 17 when the valve is on its seat the diameter of the valve-stem is reduced, as shown at 18, or it may be provided with a port registering with the port 15. The air-supply may be admitted in the manner shown by Figs. 2 and 4 or in the manner shown by Figs. 5 and 6—that is to say, if it is desired to have the supply of air and gas admitted in proportional quantities the forms of Figs. 2 and 4 are especially adaptable for this purpose. In this instance air is admitted through openings 19ª in the cap 19, which latter is secured to the valve-stem and moves therewith. In the forms of Figs. 5 and 6 air is admitted through an opening 20ª. (Shown in dotted lines.)

In the modified form of Fig. 4 the passage of gas from the supply to the annular chamber 10 is controlled outside the casing 1 by a valve 20, located in a casing 21. This valve is connected to valve-stem 9 by rods 22 and 23 and is arranged to be moved vertically in its casing by the movement of the valve-stem 9. The travel of the gas in this instance is from the pipe 16 through casing 21, short pipe 16ª, into annular chamber or passage 10.

In Fig. 5 I have shown another modification comprising means for changing the speed of the engine while running without altering the compression of the spring 12, which is

sometimes difficult to do while the engine is in operation. These means comprise a sleeve 24, threaded into guide 8 and having a gear-wheel 25 secured to one end and its other end extended into port 15. A pinion 26, fitted on one end of shaft 27, meshes with the gear-wheel 25. The other end of shaft 27 is provided with a hand-wheel 28. The sleeve is moved vertically into and out of the port 15 by turning the hand-wheel 28, thereby allowing a greater or a less amount of gas to pass through the port and increasing or decreasing the speed and power of the engine accordingly. As shown in this form of governor, the air is admitted through the opening 20^a, as above mentioned; but with slight mechanical changes the top of the casing could be made open and, if desired, a movable cap 19 could be employed.

The operation of the governor, assuming that it has been secured in its proper position on the engine, is as follows: The intake or receiving stroke of the piston will create a vacuum or a partial vacuum in the receiving-chamber of the engine, and consequently reduce the pressure on the lower side of valve 7. After the pressure on the lower side of the valve becomes less than the pressure on the upper side of the valve the valve is moved away from its seat, which movement permits air and gas to pass to the receiving-chamber. It will be noted that the pressure above the valve must overcome the resistance of spring 12 in moving the valve from its seat, and it follows that the greater the resistance offered by spring 12 the less the valve and its stem will be moved. The compression of spring 12 is regulated by the adjustable nuts 13. When the pressure on both sides of the valve is equal, the valve will be closed by the action of the spring. Valve-stem 9 moves with its valve, and the opening of the valve reduces the opening for the passage of gas through port 15 on account of the reduced portion 18 of the stem being moved out of register with the port. If the engine is running under a constant load, the spring 12 should be adjusted so that the valve in opening will not close the passage around the reduced portion 18 of the stem beyond the amount necessary to supply the proper quantity of gas required to maintain the desired speed. Should all or a portion of the load be thrown off the engine, the speed of the piston will be increased, and the result is that the valve will be forced farther from its seat and the reduced portion of the stem moved out of alinement with port 15, thereby reducing or entirely cutting off the gas-supply. If an increased load is put upon the engine, the operation of the governor is the reverse of that just described.

If it is desired to lessen the speed of the engine, the nuts 13 should be adjusted to reduce the compression of the spring 12, which will permit of a greater movement of the valve away from its seat and a consequent greater contraction of the gas-passage around the reduced portion of the valve-stem. To increase the speed of the engine, the spring is put under a greater compression, and the movement of the valve away from its seat will be less, thereby permitting a greater volume of gas and air to be admitted to the receiving-chamber of the engine. In the form of Fig. 5 the compression of the spring 12 is regulated by moving the screw-threaded collar 14.

It will be evident that in the forms of Figs. 2 and 4 the supply of air which is admitted to the interior of the casing through openings 19^a in the cap 19 will depend upon the position of the cap and that the position of the cap is controlled by the valve 7. Consequently the supply of air to the receiving-chamber of the engine is controlled in the same manner as the supply of gas.

It will be noted that I entirely dispense with the use of balls, cams, connecting-rods, and other mechanism for controlling the charges of explosive mixture, the operation of my governor depending upon the vacuum created by the stroke of the piston.

What I claim is—

1. In combination with a gas-engine, a supply-controlling mechanism comprising a casing, air and gas supply passages, a suction-operated valve, and means connected to and actuated thereby arranged to diminish the gas-supply as the valve opens wider with increased engine speed and conversely, substantially as set forth.

2. In combination with a gas-engine, a supply-controlling mechanism, comprising a casing, air and gas supply passages, a suction-operated valve, and means directly connected to and actuated by the suction-valve arranged to reduce the quantity of explosive mixture admitted to the cylinder as the valve opens wider with increased engine speed and conversely, substantially as set forth.

3. In combination with a gas-engine, a supply-controlling mechanism comprising, a casing, a gas-supply passage therein, a suction-operated valve having a valve-stem provided with a port adapted to register with the gas-supply passage and arranged to diminish the quantity of gas passing through said passage as the valve opens wider with increased engine speed and conversely, substantially as set forth.

4. In combination with a gas-engine, a supply-controlling mechanism comprising a casing having a gas-supply passage therein, a suction-operated valve having a valve-stem provided with a port arranged to cross said gas-passage and means for controlling the quantity of air admitted to the casing said parts arranged so as to reduce the quantity of explosive mixture admitted to the cylinder as the valve opens wider with increased engine speed and conversely, substantially as set forth.

5. In combination with a gas-engine, a supply-controlling mechanism, comprising a cas-

ing, a gas-supply passage, a suction-valve controlling the admission of an explosive mixture to the cylinder actuated by the suction created by the travel of the piston, and means directly connected to and actuated by the valve for reducing the quantity of gas admitted to the cylinder when the lift of the valve is increased as the "load" is suddenly thrown off the engine, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST UHLIN.

Witnesses:
F. H. RIDDILE,
J. B. DETRY.