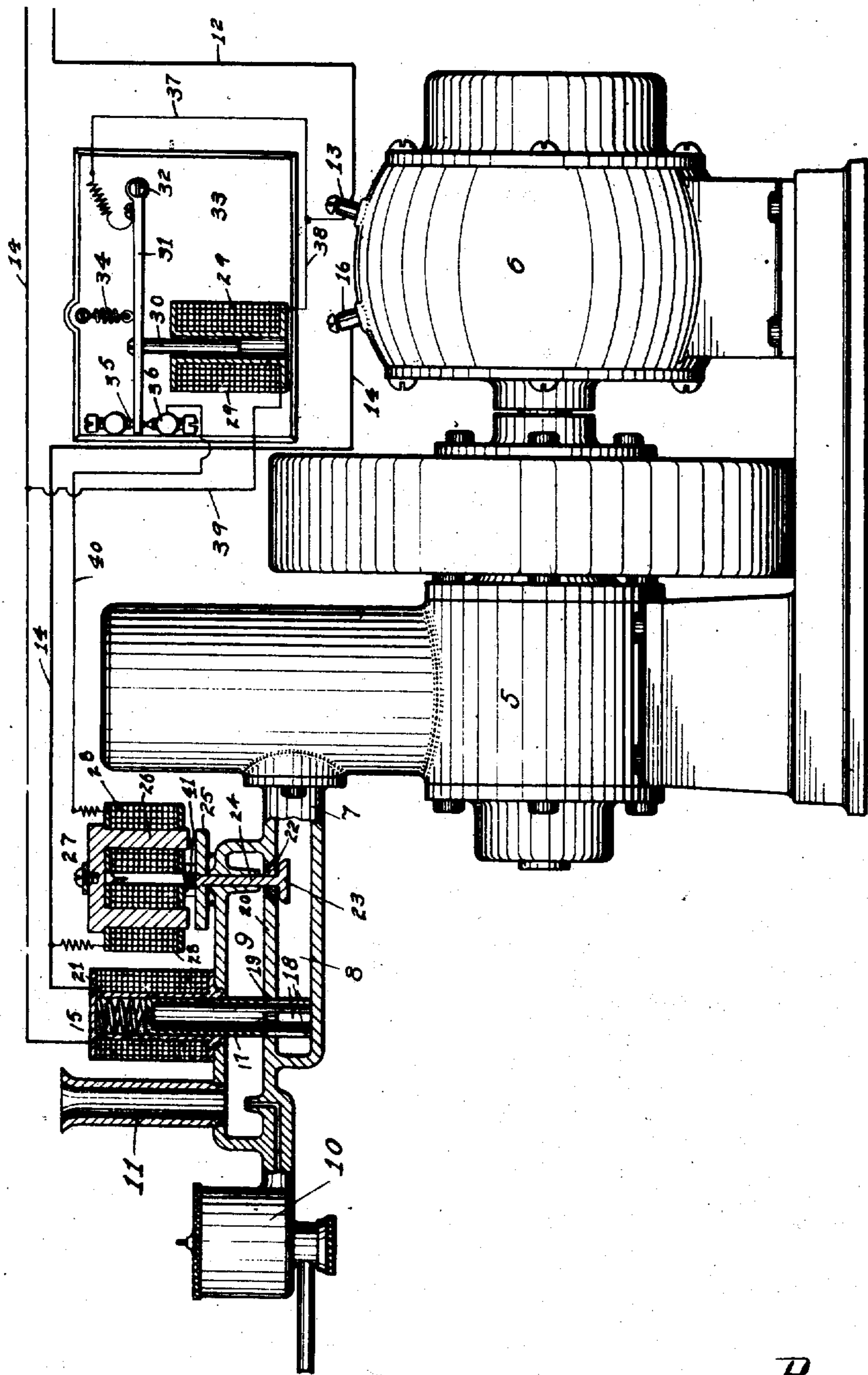


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GOVERNOR FOR GAS ENGINES.  
APPLICATION FILED FEB. 16, 1910.

989,030.

Patented Apr. 11, 1911.



Witnesses  
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# UNITED STATES PATENT OFFICE.

PERRY OKEY, OF COLUMBUS, OHIO, ASSIGNOR OF ONE-HALF TO SARAH LOUISE OKEY,  
OF COLUMBUS, OHIO.

GOVERNOR FOR GAS-ENGINES.

989,030.

Specification of Letters Patent. Patented Apr. 11, 1911.

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*To all whom it may concern:*

Be it known that I, PERRY OKEY, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Governors for Gas-Engines, of which the following is a specification.

This invention relates to governors for gas engines and more particularly to governors for use upon gas engines used for driving dynamos; the primary objects of the invention being, first to provide a governor which permits a definite amount of gaseous mixture to be delivered to the engine for each working stroke and that amount to be determined by the work being done by the engine at that particular instant, or in other words, to provide a throttling governor as distinguished from the hit and miss type, for it is well known in the art that the latter type is not well adapted for the governing of gas engines that are used in driving dynamos.

A further important object is to control the action of the governor by the variations of the current strength in the external circuit of the dynamo, said governor serving to maintain a constant voltage in said circuit, though the load may vary in wide limits.

Further objects and advantages of the invention will be set forth in the detailed description which now follows.

The figure shown in the accompanying drawing is a view partly in side elevation and partly in section of an engine and dynamo having the invention applied thereto.

In the drawing, the numeral 5 designates a gas engine and 6 a dynamo driven thereby. The fuel intake pipe 7 comprises chambers 8 and 9, the discharge from the mixing valve 10 entering the chamber 9 immediately below an air inlet tube 11. One of the line wires 12 leads directly to one of the binding posts 13 of the dynamo, the other line wire 14 having the windings of a solenoid magnet 15 in series therewith, said wire 14 being continued and connected at 16 to the dynamo 6. The core 17 of the magnet 15 constitutes a valve having the ports 18 formed therein, this valve passing through a port 19 formed in the division wall 20 between the chambers 8 and 9. This core is normally forced downward by a spring 21.

A second port 22 is formed through the division wall 20 and is adapted to be closed by a valve 23 which is connected by a stem 24 to an armature 25. This armature is arranged to be attracted by the core 26 of a magnet 27 when the windings 28 of said magnet are energized. A relay magnet 29 has a core 30 that is connected to an armature bar 31 pivoted at 32 to a base plate 33. A spring 34 normally tends to draw this armature bar upwardly. Contact members 35 and 36 are arranged adjacent the other end of the armature bar. The armature bar is connected by a conductor 37 with the post 13 and a conductor 38 connects the windings of the magnet 29 to the post 13. A conductor 39 connects the other side of said windings to conductor 14. A conductor 40 connects the windings 28 of the magnet 27 to the contact member 36, the other set of said windings being connected to the conductor 14. A spring 41 normally holds the valve 23 in its open position.

The operation of the device is as follows: With the valve 23 in its open position, the engine is started and the current in the external circuit builds up and as it builds up, the windings of the magnet 15 are energized and the valve 17 is drawn upwardly to permit the passage of fuel through the ports 18 and 19. These ports are so proportioned that with the valve 23 closed, the amount of fuel received by the engine will not be quite sufficient to maintain the desired current strength in the external circuit, but with both of the valves 17 and 23 open, the engine receives more than sufficient fuel and runs at such a rate of speed that the voltage in the external circuit becomes excessive, the voltage of the windings of the solenoid relay magnet 29 becomes sufficient to draw the core 30 downwardly until the outer end of the armature bar 31 strikes the contact 36. This completes a circuit, to energize the windings 28 of the magnet 27, the energizing of this magnet attracting the armature bar 25 to close the valve 23 against the tension of the spring 41. The closing of this valve is but momentary since as soon as it is closed, the amount of fuel delivered to the engine, is at once decreased to what can be drawn through the ports 18 and 19 and as before stated, this is not sufficient to maintain the desired voltage in the external circuit. As soon as the voltage drops, the

spring 34 acts to open the relay controlled circuit and deenergizes the magnet 27 whereupon the valve 23 is again opened by the spring 41 for the above described operation to be repeated. It will thus be seen that when current is flowing through the external circuit and consequently through magnet 15, the governor acts on the throttling principle because of valve 17 remaining substantially open to a degree dependent upon the load in the external circuit and the actual close regulation being obtained by the small valve 23 which further closes or opens the intake port should the voltage be above or below normal. The movements of this valve are extremely rapid and close together, and it admits of very close regulation.

From the foregoing description, it will be seen that simple and efficient means are herein provided for accomplishing the objects of the invention, but while the elements shown and described are well adapted to serve the purposes for which they are intended, it is to be understood that the invention is not limited to the precise construction set forth, but includes within its purview such changes as may be made within the scope of the appended claims.

What I claim, is—

1. The combination with an explosive engine, of a dynamo driven thereby, a passageway for the explosive charge leading to the engine, a pair of controlling valves in the passageway, one of said valves being variably opened and closed by variations in the current strength and the other of said valves being opened when the voltage falls below a predetermined degree and closed when said voltage exceeds a predetermined degree.

2. The combination with an internal combustion engine, of a dynamo driven thereby, an electrically actuated valve for controlling the fuel supply to the engine, said electrically actuated valve being connected in series with the dynamo, a second electrically actuated valve also controlling the fuel supply to the engine, means for opening said second valve when the amount of fuel admitted to the engine is insufficient to main-

tain a predetermined voltage, and a relay for closing the circuit of said second valve, said relay being actuated to close said circuit and consequently the valve when the predetermined voltage is exceeded.

3. The combination with an explosive engine and a dynamo driven thereby, of a plurality of controlling valves located in the fuel inlet of said engine and controlling the passage of the fluid therethrough, one of said valves being actuated by a solenoid, the actuation of said valve varying with variations in the current strength, and the other of said valves being magnetically operated whereby said valve is positively closed when the voltage of the external circuit rises above a predetermined degree, and the magnet is energized, and positively opened when the voltage of the external circuit falls below the predetermined degree and the magnet is deenergized.

4. The combination with an explosive engine and a dynamo, a relay magnet, means for closing an electric circuit when said magnet is energized, a fuel conduit divided into two chambers, a valve for controlling the passage of fuel from one of said chambers to the other, a spring normally tending to hold said valve open, a magnet for closing said valve against the tension of said spring, said magnet being located in the circuit that is controlled by the relay magnet, a second electrically controlled valve also controlling the passage of fuel from the first to the second named chambers, the electromagnet of said last named valve being connected in series with the line wires from the dynamo, the construction and arrangement being such that both valves are opened to admit a charge when the voltage in the exterior circuit falls below a predetermined degree and one of said valves is closed when said voltage exceeds a predetermined degree.

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

PERRY OKEY.

Witnesses:

C. P. BEACH,  
M. S. HOPKINS.