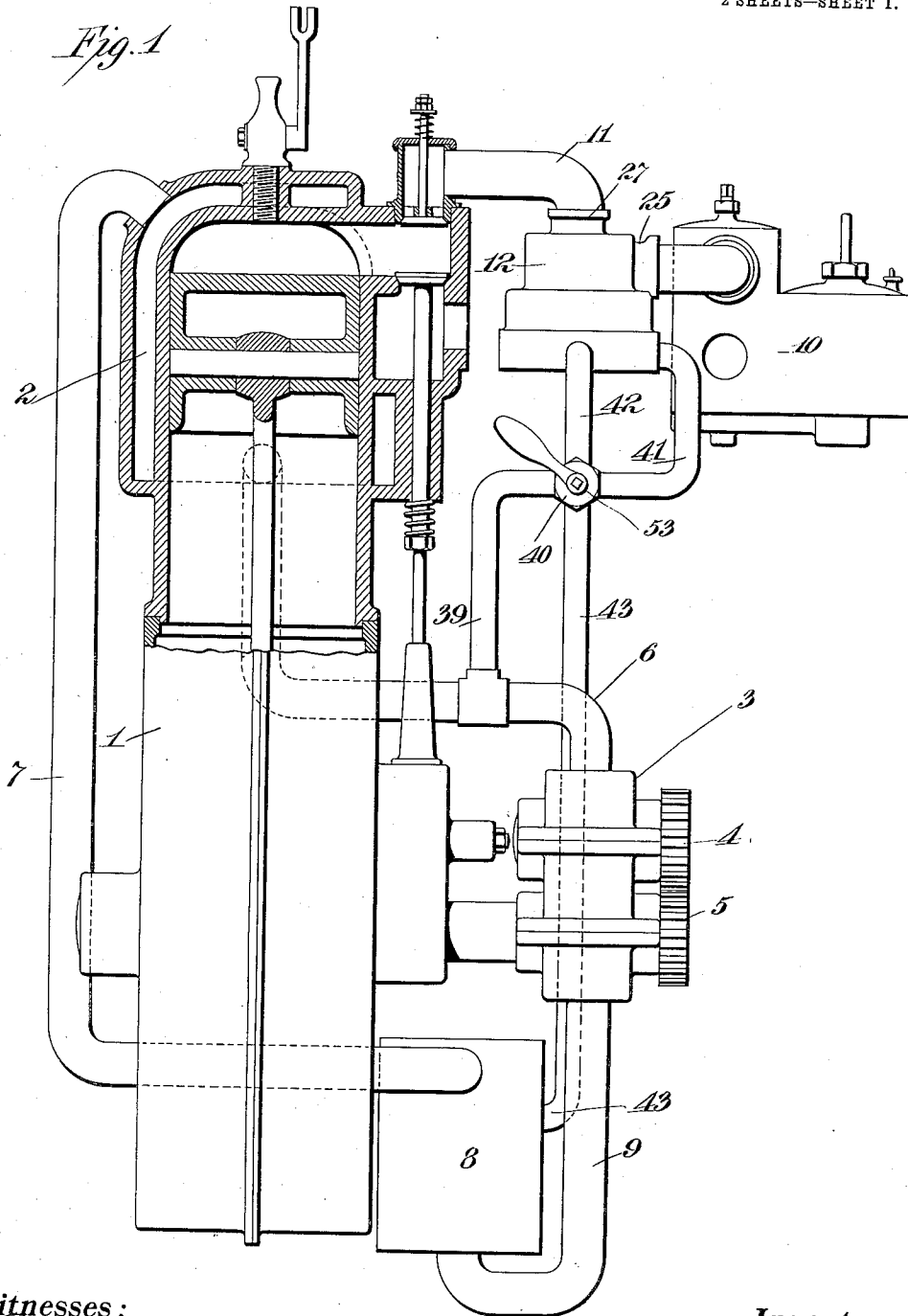


W. M. POWER.
GOVERNOR FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED APR. 15, 1905.

939,923.

Patented Nov. 9, 1909.

2 SHEETS—SHEET 1.



Witnesses:

John H. Hotchkiss
Albert L. Smith

Inventor

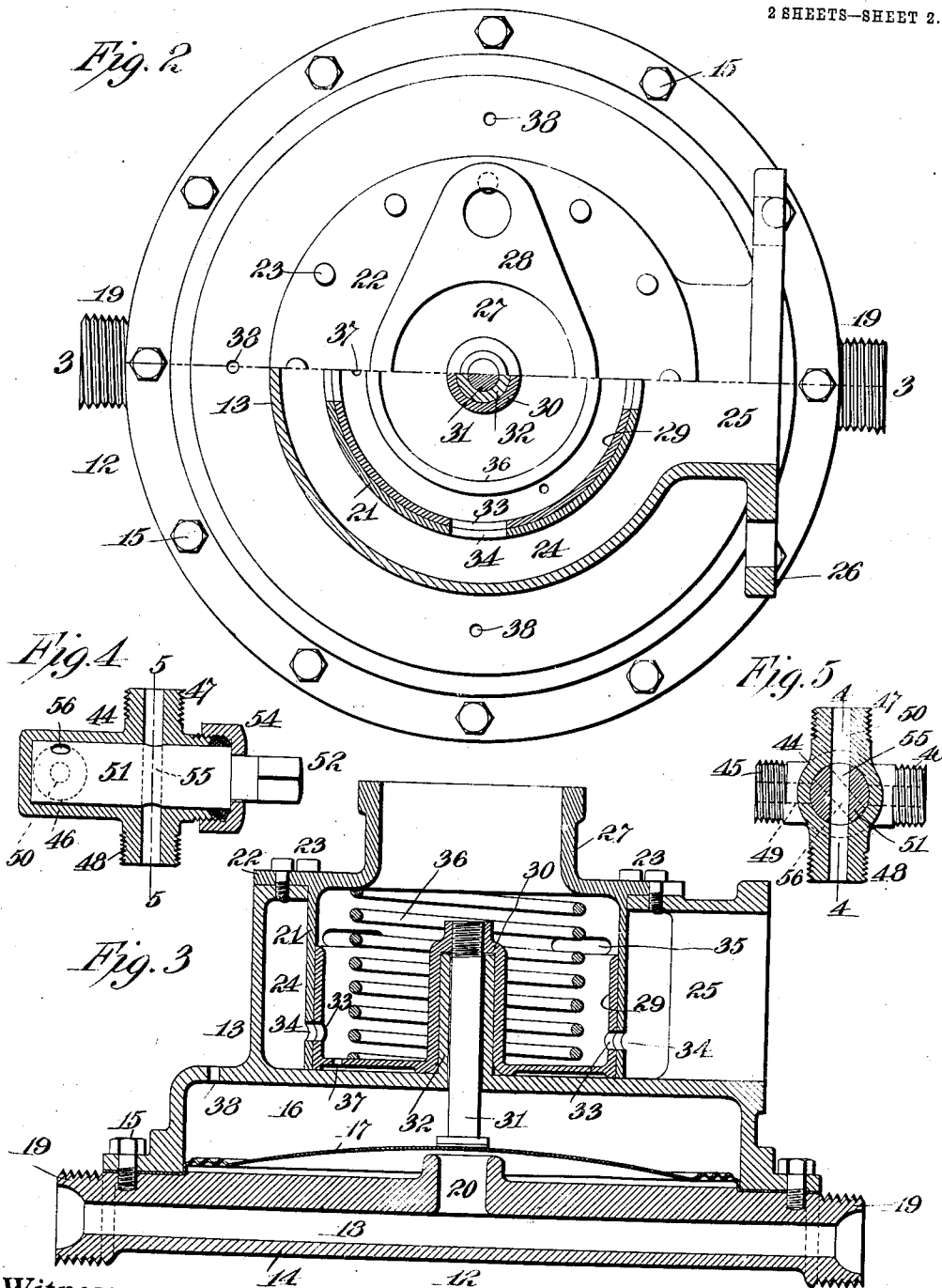
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UNITED STATES PATENT OFFICE.

WILLIAM M. POWER, OF PORTCHESTER, NEW YORK.

GOVERNOR FOR INTERNAL-COMBUSTION ENGINES.

939,923.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed April 15, 1905. Serial No. 255,748.

To all whom it may concern:

Be it known that I, WILLIAM M. POWER, a citizen of the United States, residing in Portchester, county of Westchester, State of New York, have invented a certain new and useful Improvement in Governors for Internal-Combustion Engines, of which the following is a specification.

The object I have in view is the production of a governor, for controlling the speed of internal combustion engines which are subject to varying load, and for varying the speed at will. I attain these objects by the mechanism illustrated in the accompanying drawings, in which,

Figure 1 is a view partly in section of an internal combustion engine, showing one embodiment of my invention applied thereto. Fig. 2 is a view partly in plan and partly in section of the governor proper. Fig. 3 is a sectional view taken on the lines 3—3 of Fig. 2. Fig. 4 is a longitudinal section of the governor valve the view being taken on the lines 4—4 of Fig. 5, and Fig. 5 is a vertical section thereof taken on the lines 5—5 of Fig. 4.

In all the views like parts are designated by the same reference characters.

In carrying out my invention I provide a means for keeping the speed of the motor constant or varying it at will by controlling the inlet of the mixture. This is controlled by a throttle valve, the position of which is varied and determined by the flow of the circulating water. The flow of water will be determined by the speed of the engine, and will vary with such speed, being due to a pump operated by the motor. The speed of the motor may be controlled within limits by varying the pressure of water acting upon the throttle valve.

In the drawings 1 represents a motor of the internal combustion type. As shown this motor has a single cylinder, but it is to be understood that the character of the motor may be varied as necessary or desirable. The motor is provided with a water jacket indicated at 2. A pump 3 is driven in time with the engine, conventional mechanism being shown consisting of gear wheels 4, 5, on the pump shaft and engine shaft respectively for attaining this object. The pump may be a rotary or reciprocating pump whichever is preferred in practice as the character of the pump does not affect the invention. The circulating system com-

prises a pipe 6 leading from the pump to the water jacket and a pipe 7 leading from the water jacket to a tank 8. A pipe 9 leading from the tank to the pump completes the circulating system. In connection with the engine thus described is employed a carbureter 10 connecting through an inlet pipe 11 to the engine. The parts described are those commonly employed in commercial use.

In connection with the mechanism already described I employ a governor indicated in Fig. 1 by the numeral 12. The details of the governor are illustrated in the other views. The governor comprises a casing 13 secured to a base 14, by bolts 15. At the base of the casing 13 is a chamber 16. Within this chamber is a diaphragm 17. The diaphragm may be conveniently retained in place by being clamped between the casing 13 and the base 14 by means of bolts 15. The base 14 contains a passage 18 extending throughout its length, the portions of the base adjacent to the ends of the passages being extended to form nipples or couplings 19, to which pipes may be secured. A branch passage 20 extends between the chamber 16 and the passage 18 below the diaphragm 17. Within the upper portion of the casing 13 is inserted a second casing 21. This casing may have a flange 22 through which securing bolts 23 may pass, for attaching it to the casing 13. The casing 21 is smaller than the casing 13 so that an annular passage 24 is provided between the two. This passage 24 communicates with the outside through an extension passage 25 formed in the casing 13. This portion of the casing may be provided with a flange 26 for attachment to a pipe forming the exit of the carbureter 10. The upper portion of the casing 21 is contracted forming an exit pipe 27, and the ends of this pipe may be provided with ears 28 for attachment to the pipe 11 connected to the engine.

Within the casing 21 is mounted a throttle valve 29. This valve is cup shaped as shown, and is provided with a central hollow boss 30 for attachment to the lifting stem 31. This stem passes through an opening formed in the casing 13 and in order to form an elongated bearing for the stem a hollow support 32 is formed upon the casing 13. The throttle valve is provided with ports 33 which when the valve is seated will register with ports 34 formed in the inner casing 21. Additional ports 35 may be

formed in this casing above the upper edge of the valve, such ports being adapted to be closed by the raising of the valve. A spring 36 within the chamber 21 is used for seating the valve. Small ports 37 formed in the bottom of the valve permit an equalization of pressure below the valve so that a vacuum will not be formed when the valve is lifted. Other ports 38 formed in the casing 13 connect the upper part of the diaphragm chamber 16 with the external air, so that pressure will be equalized.

The governor is located between the carbureter 10 and the entrance pipe 11 of the engine as already described, the carbureter being connected to the inlet pipe 25 and the pipe 11 to the outlet pipe 27. The valve 29 is shown in Fig. 3 in the open position. The ports 34 and 35 are of sufficient area to permit the mixture to pass through the apparatus in the desired amount; the valve being opened or closed will vary the amount of mixture flowing from the carbureter to the engine as will be obvious.

In connection with the governor already described means is provided for admitting water to the passage 18, the pressure of the water being varied according to the speed of the motor. In Fig. 1 a pipe 39 is connected to the pipe 6 the pipe 39 being of considerably smaller capacity than the pipe 6 so that only a small portion of water flowing from the pump will be diverted or shunted to one side, and passed through this pipe. The pipe 39 connects with the four way cock or valve 40 and from there passes by a pipe 41 into the passage 18 of the regulator. The exit from this passage is through a pipe 42 through the valve 40 and through a pipe 43 into the tank 8. The object of the valve 40 is to regulate the size of the opening to permit the water shunted through the pipe to vary in volume. Details of this valve are shown in Figs. 4 and 5. It comprises a body 44 having nipples 45, 46, 47, 48 for attachment to the pipes 39, 41, 42, 43, respectively, the nipples 45 and 46 being arranged opposite to each other. Within the body 44 is located a valve stem 51 having a squared extremity 52, for attachment of an operating lever 53 (see Fig. 1.) The stem is provided with ports 55, 56, in line with the passages 49, 50, respectively. These ports are arranged at an angle of 45° to each other as shown in Fig. 5. By this construction the flow of water through the regulator can be varied. By turning the valve so that the passage through the pipes 39 and 41 will be entirely open, the passage through the pipes 42 and 43 will be closed. When in this position, the maximum amount of pressure will exist within the passage 18 and the diaphragm 17 will be elevated, entirely closing the throttle valve, so long as the pressure is sufficient to compress the spring 36. By

varying the position of the valve 40, the inlet through the pipes 39 and 41 will be gradually closed and the outlet to the pipes 42 and 43 will be gradually opened, thus relieving the pressure through the passage 18. The turning of the valve 40 may be continued until the pipes 39 and 41 are entirely closed and the pipes 42 and 43 entirely opened at which time there will be no pressure within the chamber 18. By employing this four way valve very delicate adjustment can be secured, and the motor can be controlled within very close limits.

In operation, the pressure of the water within the diaphragm chamber will vary according to the speed of the pump, and motor, and with the extent of opening of the four way cock. The cock being set for a definite amount of opening, the amount of water passing through it will depend upon the speed of the pump and the pressure of the spring in the throttle valve, these two forces being correlative. As the speed of the pump increases the pressure rises, and the valve is closed reducing the amount of mixture admitted to the engine. As the speed of the engine is reduced by such action the pressure is reduced and the valve is opened, thus admitting more mixture.

Having now described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a governor for internal combustion engines, the combination with the circulating pump and connections with the water jacket of the motor, of a branch connected to such connections and a governor coöperating with the branch, said governor containing a chamber through which the water circulates, the said governor including a throttle valve for controlling the entrance of the mixture to the engine, means for causing the said governor to respond to changes in pressure within the circulating system, and means for varying the position of the throttle valve independently of the speed of the engines.

2. In a governor for explosive engines, the combination with a casing, a diaphragm chamber therein, a base having a water passage, nipples communicating with the ends of the water passage, a diaphragm clamped between the casing and the base and within the diaphragm chamber, a valve-casing within the casing, the said valve-casing having a flange secured to the casing, a throttle valve within the valve-casing, ports formed within the valve and valve-casing, a stem on the valve extending into the diaphragm chamber, and engaging with the diaphragm, a hollow boss formed on the valve and engaging with the stem, and a guide secured to the casing and surrounding the stem.

3. In a governor for explosive engines, the combination with the engine of a pump and the circulating system of the water jacket, a

governor arranged between the carbureter
and the inlet valve of the engine, the said
governor including a throttle valve for the
mixture, a spring for opening the valve and
5 a diaphragm for closing it, and tubular con-
nections between the circulating system and
the governor, the said connections including
a four-way cock, by means of which the out-
let from the diaphragm may be cut off as

the inlet thereto is opened, and by means of 10
which the pressure within the regulator may
be controlled.

This specification signed and witnessed
this tenth day of April, 1905.

WILLIAM M. POWER.

Witnesses:

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JNO. ROBT. TAYLOR.