

J. C. STIER.
GOVERNOR FOR ENGINES.
APPLICATION FILED NOV. 5, 1910.

1,012,025.

Patented Dec. 19, 1911

2 SHEETS—SHEET 1

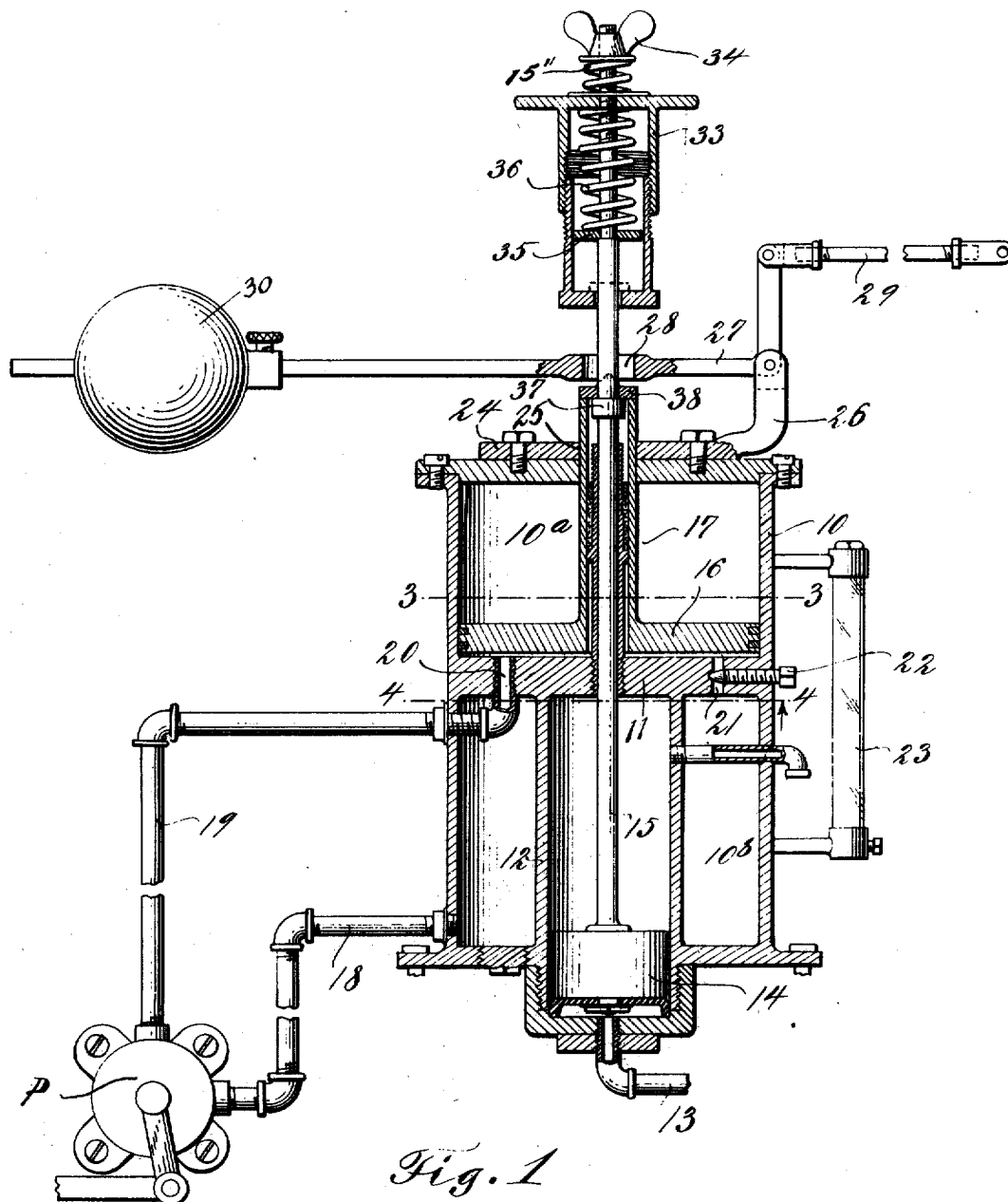


Fig. 1

WITNESSES:

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Charles Wilson

INVENTOR

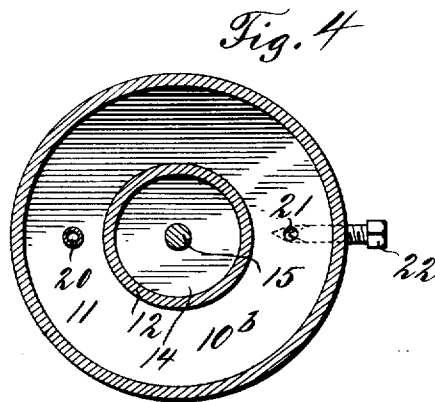
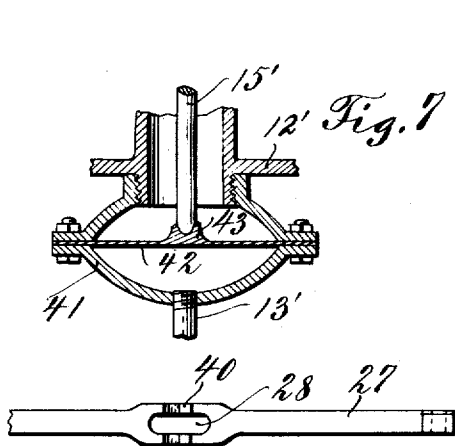
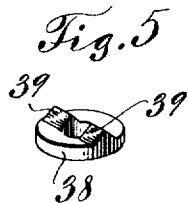
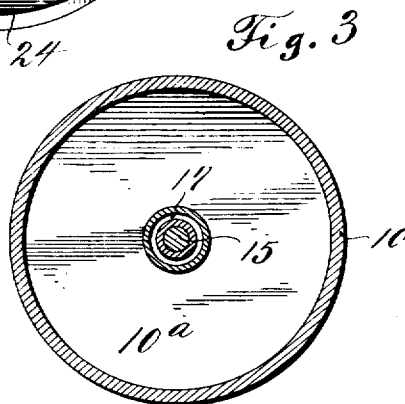
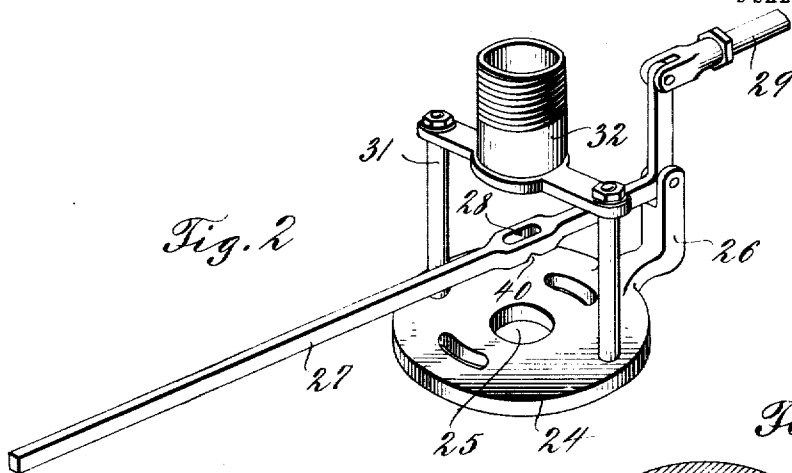
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2 SHEETS—SHEET 2



WITNESSES:

Fig. 6

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UNITED STATES PATENT OFFICE.

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GOVERNOR FOR ENGINES.

1,012,025.

Specification of Letters Patent.

Patented Dec. 19, 1911.

Application filed November 5, 1910. Serial No. 590,855.

To all whom it may concern:

Be it known that I, JOHN C. STIER, a citizen of the United States, residing at Mason City, in the county of Cerro Gordo and State of Iowa, have invented certain new and useful Improvements in Governors for Engines, of which the following is a specification.

This invention relates to combined speed and pressure governors for engines, and is designed to afford a simple, durable and accurately operable device of this nature, wherein the speed and pressure governors comprise fluid operated means, the latter being connected to a throttle rod or similar part, and also being peculiarly assembled to afford a compact mechanism.

With the above and other objects in view, this invention consists in the construction, combination, and arrangement of parts as hereinafter more fully described, claimed, and illustrated in the accompanying drawings, wherein—

Figure 1 is a central, vertical section of the governor constructed in accordance with the present invention; Fig. 2 is a perspective view of the yoke supporting the control and the throttle rod operator; Fig. 3 is a transverse section taken along line 3—3 of Fig. 1; Fig. 4 is a similar section taken along line 4—4 of Fig. 1; Fig. 5 is a perspective view of the fulcrum of the lever operating the throttle rod; Fig. 6 is a fragmentary bottom plan view of the throttle rod operating the lever; Fig. 7 is a vertical section of the modification.

The governor forming the subject matter of the present invention comprises a cylinder divided into two compartments, the lower of said compartments having an inner cylinder located therein. A piston reciprocates in each compartment, said pistons operating at a common point upon a bell-crank which in turn shifts a throttle rod. The piston in the upper compartment is operated by oil contained in the lower compartment surrounding the cylinder contained in said lower compartment and comprises a governor for the speed of the engine. The piston contained in the inner cylinder of the lower compartment is operated by the pressure of the fluid, such as water, air, etc., in a pressure reservoir in which the fluid may be forced by the pump operated

by the engine. Said piston and connected operating devices comprise a governor of the pressure.

Referring more particularly to the drawings, 10 indicates a cylinder divided by the partition 11 into the upper compartment 10^a and the lower compartment 10^b. The lower compartment 10^b contains an inner cylinder 12 which is connected at its lower terminal by the pipe 13 to the outlet pump operated by the engine. The piston 14 operates in the cylinder 12 and its piston rod 15 extends upwardly through the partition 11.

A piston 16 reciprocates in the compartment 10^a, the rod 17 of said piston comprising a sleeve which projects through the upper cylinder head of the cylinder 10 and operates about the piston rod 15 of the piston 14. The piston 16 is reciprocated by oil forced from the compartment 10^b into the compartment 10^a. This is done by an outlet pipe 18 located adjacent to the lower terminal of the compartment 10^b and extends to an oil pump of any suitable construction, operated in any suitable manner from the engine. An inlet pipe 19 extends from the oil pump into the compartment 10^b and opens into the port 20 which is located in the partition 11 and permits the oil to pass into the compartment 10^a, exerting a pressure on the under surface of the piston 16. An outlet opening or port 21 is oppositely disposed to the inlet port 20 and permits the oil to return to the compartment 10^b after the movement of the piston has decreased the speed of the engine to the required amount. A screw 22 operates in the partition 11 and has its inner terminal tapered in such a manner that the flow of the oil returning to the compartment 10^b is regulated. A gage 23 is located between the compartment 10^a and the compartment 10^b in order that the amount of oil contained therein may be ascertained.

A plate 24 is carried by the upper cylinder head of the cylinder 10 and has a central opening 25 through which the sleeve 17 upon the rod 15 operates. A bracket 26 is formed on one side of the plate 24 and has pivotally mounted therein the bell crank 27, said bell crank having an opening 28 therein directly over the opening 25 for the passage of the piston rod 15. One arm of the bell crank 28 is connected with a throttle

rod 29 while the opposite terminal thereof has the ball counterbalance, 30 reciprocatingly and adjustably mounted thereon.

A yoke 31 is mounted on the plate 24 to span the bell crank 27 and the openings 25 and 28. This yoke carries a tube 32 through which the rod 15 projects. A cover 33 is threaded on the tube 32 and forms a bearing for the thumb nut 34 which is threaded on the upper terminal of the rod 15 projecting through the cover 33. A plate 35 is mounted on a shoulder formed adjacent to the upper terminal of the rod 15 and forms a bearing for one end of a spring 36 interposed between the cover 33 and said plate.

A shoulder 37 is formed on the rod 15 adjacent to the upper terminal of the sleeve or rod 17, said shoulder adapted to operate against the disk 38 which loosely bears on the upper terminal of the rod or sleeve 17. This disk is provided with the tapered or triangular projections 39 which are received in the similarly formed openings or depressions 40 disposed on each side of the openings 28.

From the foregoing it will be understood that when the pressure in the outlet pipe of the pump increases beyond a desired point the water rises in the cylinder 12, causing the piston 14 and the piston rod 15 to move upwardly. By this movement the shoulder 37 engages the disk 38 and causes a pressure to be exerted on the weighted arm of the bell crank 27 thereby operating the throttle rod. The spring 36 forms a resistance to the movement of the piston and controls the time of operation thereof. Should the speed of the engine increase beyond a desired point, the pump P will likewise operate beyond the desired speed and will pump oil at a faster rate into the compartment 10^a thereby forcing the piston 16 upwardly. This movement of the piston 16 causes the sleeve or rod 17 to raise the disk 38 and shift the weighted arm of the bell crank 27 against the weight 30 thereby shifting the throttle rod 29.

Referring to the modification illustrated in Fig. 7, the piston 14 is eliminated. The inner cylinder 12' is provided in which the rod 15 operates. An elliptical casing 41 is located at the lower terminal of the cylinder 12', said casing containing a diaphragm 42 which is provided with a socket 43 to receive the lower end of the rod 15'. The water inlet 13' is located on the under side of the casing 41 and permits the water to enter said casing and exert a pressure on the diaphragm, thereby shifting the rod 15 and causing the throttle rod to operate as in the preferred form.

The piston rod 15 is extended so as to project at its upper end above the top of the cover 33, and an auxiliary spring 15'' is interposed between the nut 34 and said

cover 33. By the use of the spring 15'' the governor is rendered more sensitive, a springy motion being imparted to the rod 15 and piston 14, by the use of said spring 15'', and during the movement of the piston 14 in the cylinder 12.

Having thus fully described my invention, what is claimed as new is:—

1. In an engine governor, the combination of a speed governor comprising a piston, a pressure governor comprising a piston, piston rods extending from the respective pistons of the governors, and one of said rods passing through the other, fluid pressure means for actuating the respective pistons independently or simultaneously, a throttle rod, and means operable by the respective piston rods for actuating the throttle rod.

2. In a speed and pressure governor, the combination of a cylinder divided into separate compartments having a connecting passage, a piston operating in one of said compartments, an oil pump connected with both of the compartments for operation of the piston aforesaid, an auxiliary cylinder arranged in the compartment adjacent to that having the piston therein, a second piston arranged in the auxiliary cylinder, fluid pressure means connected to the auxiliary cylinder for operating the piston therein, a throttle rod, a counterbalance connected to said rod, and piston rods extending from the respective pistons aforesaid for operating said counterbalance.

3. In a speed and pressure governor, the combination of a cylinder divided into separate compartments having a connecting passage, a piston operating in one of said compartments, an oil pump connected with both of the compartments for operation of the piston aforesaid, an auxiliary cylinder arranged in the compartment adjacent to that having the piston therein, a second piston arranged in the auxiliary cylinder, fluid pressure means connected to the auxiliary cylinder for operating the piston therein, a throttle rod, a counterbalance connected to said rod, a piston rod extending from the piston in one of said compartments and of hollow form, a second piston rod projecting from the piston in the auxiliary cylinder, and means on the respective piston rods for actuating the counterbalance of the throttle rod.

4. In a device of the class described, the combination with a cylinder, of a plurality of compartments formed therein, independent pistons operating in said compartments, a throttle rod located adjacent to said cylinder, a counterbalance connected to said throttle rod, a single connection between the rods of said pistons and said counterbalance, a pump adapted to pump oil from one of said compartments against one of

said pistons, and means whereby the remaining piston may be operated.

5 In a device of the class described, the combination with a cylinder, of a plurality of compartments formed therein, independent pistons operating in said compartments, a throttle rod located adjacent to said cylinder, a counterbalance connected to said throttle rod, a single connection between
10 the rods of said pistons and said counter-

balance, a pump adapted to pump oil into one of said compartments against one of said pistons, and pressure means for operating the remaining piston.

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

JOHN C. STIER.

Witnesses:

LULU B. TYSON,
J. W. ADAMS.