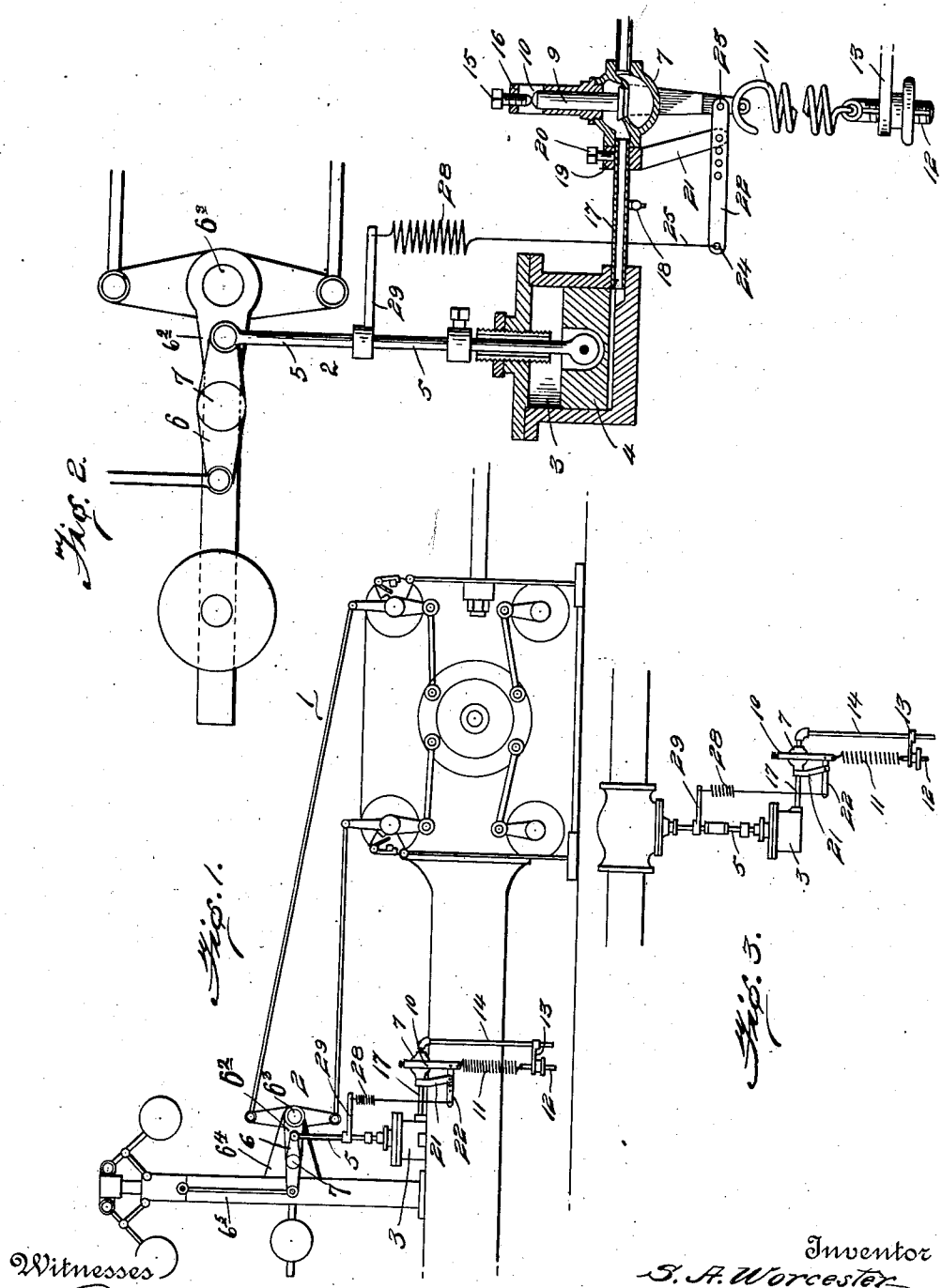
S. A. WORCESTER.

PRESSURE GOVERNOR.

APPLICATION FILED AUG. 27, 1908.

930,257.

Patented Aug. 3, 1909.



Witnesses

C. M. Offutt

C. H. Griesbauer.

Inventor

S. A. Worcester

By A. B. Williamson & Co

Attorneys

# UNITED STATES PATENT OFFICE.

SAMUEL A. WORCESTER, OF VICTOR, COLORADO.

## PRESSURE-GOVERNOR.

No. 930,257. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed August 27, 1908. Serial No. 450,513.

*To all whom it may concern:*

Be it known that I, SAMUEL A. WORCESTER, a citizen of the United States, residing at Victor, in the county of Teller and State of Colorado, have invented certain new and useful Improvements in Pressure-Governors for Air or Gas Compressors, Pumps, or the Like; and I do 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.

This invention relates to new and useful improvements in pressure governors for air or gas compressors, pumps or other like devices. Governors of this type now used for regulating the operation of air compressors or pumps, are usually of the piston or plunger type and are loaded with heavy weights or springs which are necessary for opposing the force of air pressure from the main. These governors are objectionable, however, in that a variation of several pounds in pressure is usually necessary for operating them and further, because they are irregular or intermittent in their action allowing a large variation in the speed of the machine. These objections I overcome, however, by providing a pressure governor which is extremely sensitive and will operate with a variation of but a few ounces in the main and thus proportionately increase or decrease the speed of the air compressor or other like device to which it is applied.

With this and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation illustrating the application of my improved pressure governor to the well known Corliss releasing valve gear; Fig. 2 is a sectional view of the governor and associated parts; and Fig. 3 is a diagrammatical view illustrating the application of the invention to a steam throttle valve.

In the accompanying drawings, numeral 1, indicates the well known Corliss releasing valve gear and 2 my improved pressure governor. This governor as shown comprises a cylinder 3 which is suitably mounted upon the frame work of the valve gear, a piston 4 being arranged in said cylinder 3 and provided with the usual upright stem 5 which extends through the upper end of the cylinder and is connected with one end of the float lever 6 which is pivoted intermediate its ends, as at 7, to lever $6^2$ which in turn is pivoted at its inner end, as at $6^3$ to the inner end of a horizontal arm or bracket $6^4$ projecting from one side of the usual support $6^5$. By these connections it will be seen that when piston stem 5 is raised by pressure exerted upon piston 4, the free end of lever $6^2$ will be caused to swing upward and operate the cut-off mechanism. A valve casing 7 is arranged near the piston. A valve 8 is formed at the lower end of a stem 9 mounted to slide vertically within said casing and is adapted to close the passage therethrough. A yoke 10 straddles the valve casing, its lower end being connected by an adjusting spring 11, and a screw 12, with a lateral arm 13 projecting from a fluid supply pipe 14 leading from the main pressure supply to the valve casing. A screw 15 screws through the cross piece 16 of the yoke 10 against the upper end of the stem 9 the purpose of which will be presently disclosed. A fluid conducting pipe 17 provided with an exhaust pipe 18 effects communication between the valve casing and cylinder 3. A collar 19 is held upon the pipe 17 by an adjusting screw 20, said collar having a depending arm or bracket 21, to the lower end of which is adjustably pivoted a horizontally disposed operating member 22, one end of which as 23, is attached to the lower end of the yoke 10 and the opposite end of which, as 24, is attached to one end of the coil spring 28, the upper end of the latter being attached to the outer end of the horizontal arm 29 projecting from the stem 4.

In Fig. 3 of the drawings, the pressure regulator is shown applied to a steam throttle valve of ordinary construction.

In the operation of the invention, air pressure from the main or pressure tank is led to the casing 7 by the pipe 14. When the compressor is started, it runs at the speed given it by the throttle or speed governor until the air pressure rises to the limit to which the adjusting spring 11 is set. As soon as the pressure, however, exceeds this limit, the valve 8 is raised slightly and the pressure fluid is admitted beneath the piston 4 as will be evident and causes the piston to rise in the cylinder 3, the result of which is that the

cut-off mechanism of the engine is operated to reduce the speed of the engine. As the piston 4 and stem 5 rise, the spring 28 is caused to expand to a greater extent and pulls harder upon the free end of the operating lever 22, and as this lever is pivoted to the arm or bracket 21 of the collar 19 and is connected at its pivoted end with the lower end of the yoke, the pull tending to oppose upward movement of the yoke is increased, and for this reason the governor is not allowed to make its full stroke until a greater rise in pressure occurs to cause the piston 4 to rise still farther in the cylinder 3. Under ordinary running conditions, therefore, the piston 4 will be sustained in mid-position with the air pressure from the main between high and low limits.

In practice, assuming the range of pressure allowable on the main to be two pounds per square inch or from ninety-nine to one hundred and one pounds, there is then available for operating the pressure governor, a pressure variation of nearly one-hundred pounds, while the main pressure varies by two pounds. This feature of large pressure variation makes the pressure governor so sensitive as to respond to a variation of but a few ounces in pressure at the main and operate heavy cut-off valve gear with ease.

It is obvious that a stationary plunger with a movable cylinder or any other like device may be substituted for regulating the cut-off mechanism. Also, electric compressors may be regulated by connecting this governor to suitable switches.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended claims.

Having thus described and ascertained the nature of my invention, what I claim as new and desire to secure by Letters-Patent, is:

1. In a pressure governor, a cylinder, a piston movable therein, connections between the piston and a speed reducing gear, a valve casing, a vertically movable valve to close the casing against the passage of a pressure fluid therethrough, a fluid supply pipe leading to the casing, a second pipe between said casing and cylinder, a yoke to stradlde the valve casing, a screw screwing through the yoke against the valve stem and an adjustable spring tending to oppose vertical movement of said valve when acted upon by a pressure fluid.

2. In a pressure governor, a casing, a piston movable therein, connections between said piston and a speed reducing valve gear, a valve casing, a valve movable therein, a fluid supply pipe leading to the casing, a yoke to straddle the valve casing and to engage the valve stem, a resilient element tending to oppose movement of the valve when acted upon by a pressure fluid, adjustable means for said resilient element, an operating lever or link pivoted beneath the valve casing and attached at its pivoted end to the yoke and a resilient element between the free end of said link and said piston.

3. In a pressure governor, a cylinder, a piston movable therein, connections between said piston and a speed reducing gear, a valve casing, a valve movable therein, a fluid supply pipe leading to the casing, a yoke to straddle the valve casing and to engage the valve stem, a resilient element tending to oppose movement of the valve when acted upon by a pressure fluid, an operating link pivoted beneath the valve casing and connected with the yoke, and a resilient element between the free end of the link and said piston.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SAMUEL A. WORCESTER.

Witnesses:
FRANK J. SCHRIVER,
JOSEPH E. HARDY.