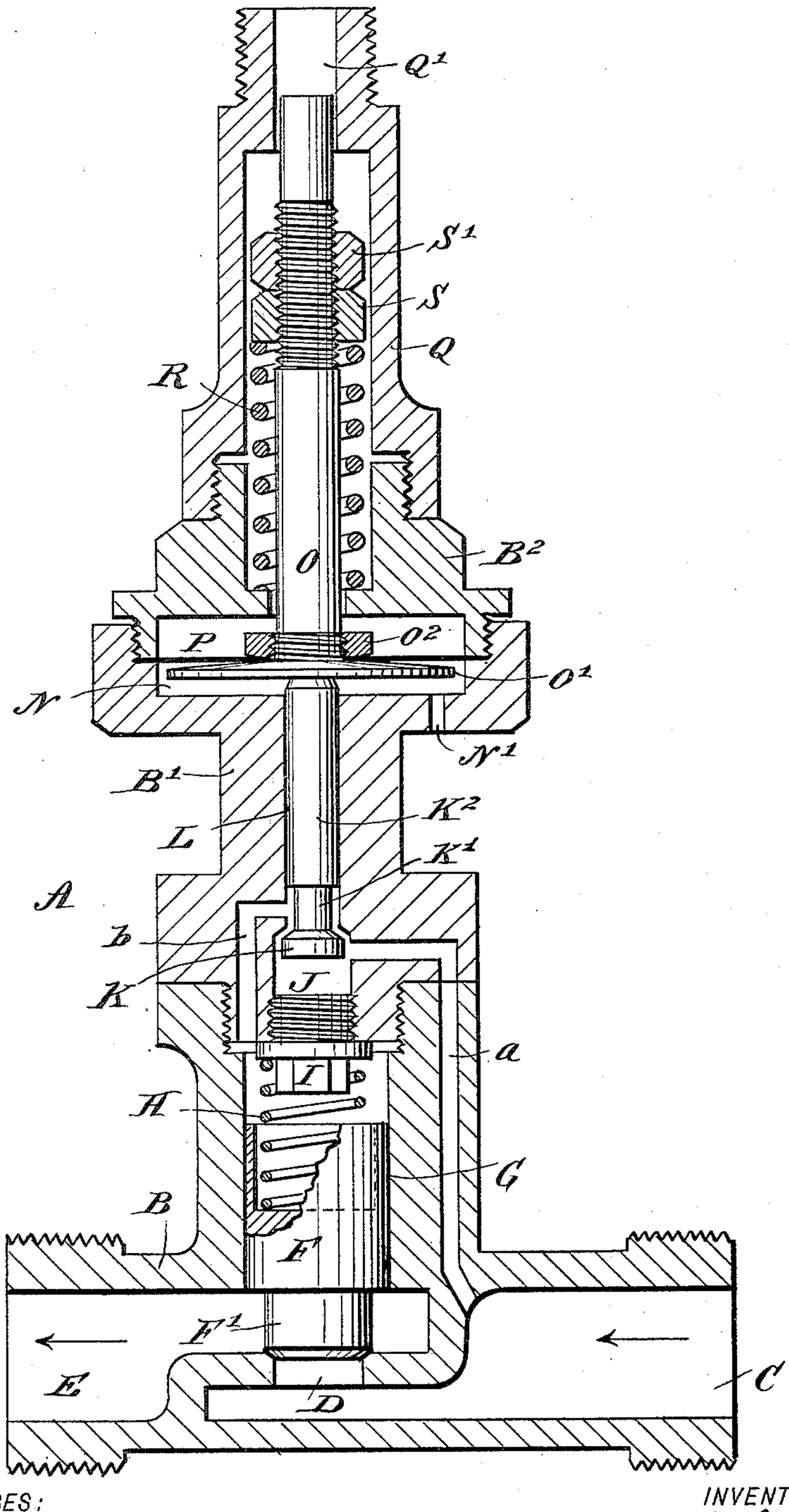
(No Model.

C. R. ORD.

AIR PUMP GOVERNOR.

No. 442,492. Patented Dec. 9, 1890.



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AIR-PUMP GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 442,492, dated December 9, 1890.

Application filed April 4, 1890. Serial No. 346,605. (No model.)

To all whom it may concern:

Be it known that I, CRAVEN R. ORD, of Montreal, in the Province of Montreal and Dominion of Canada, have invented a new and Improved Air-Pump Governor, of which the following is a full, clear, and exact description.

The invention relates to governors for air-brakes; and its object is to provide a new and improved governor which is simple and durable in construction and very effective and positive in operation.

The invention consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawing, forming a part of this specification, in which the figure represents a sectional side elevation of the improvement.

The improved air-pump governor A is provided with a suitably-constructed casing B, having a steam-inlet C, connected by the port D in the partition D′ with the steam-outlet E, leading to the pump. The steam-inlet C is connected in the usual manner with the boiler. The port D is adapted to be closed by the reduced end F′ of a cylindrical main valve F, fitted to slide freely in the cylinder G, formed on the casing B.

The upper part of the cylindrical main valve F is made hollow and is adapted to receive one end of a coiled spring H, pressing with its other end against a plug I, screwing in one end of a cylinder J, somewhat less in diameter than the cylinder G, but arranged into line with the latter. The cylinder J is formed in a casing B′, screwing into the main casing B, as is plainly shown in the drawing. The upper end of the cylinder J is formed with a valve-seat adapted to be closed by an auxiliary valve K, held on a reduced end K′ of a valve-stem K^2, fitted to slide in the cylinder L, formed in the upper part of the casing B′ and somewhat less in diameter than the cylinder J, previously mentioned.

The cylinder J is connected by a port *a* with the steam-inlet C, and the lower part of the cylinder L is connected by a port *b* with the upper end of the cylinder G. The upper end of the valve-stem K^2 extends into a chamber N, formed in the extreme upper end of the casing B′, and in the said chamber is held a disk O′, against the under side of which abuts the upper end of the valve-stem K^2. The disk O′ is secured on the lower end of a stem O, and on the top of the said disk is arranged a diaphragm P, held in place on the said disk O′ by a nut O^2, screwing on the stem O.

The diaphragm P is held in place in the chamber N by a cap B^2, screwing into the upper end of the casing B′. The stem O projects into this cap B^2, and also into a cap Q, screwing on the cap B^2, and provided at its upper end with an opening Q′, connected with the air-pipe of the air-brake on which the device is to be applied. The upper end of the stem O is quite slack in the opening Q′, so that the air passes down into the cap B^2, where it presses on the top side of diaphragm P.

On the stem O is a coiled spring R, which rests with its lower end on the cap B^2 and with its upper end against the under side of a nut S, screwing on the stem O and locked in place by a jam-nut S′. The lower part of the chamber N is connected by an opening N′ with the outside, the said opening serving as a drip for any water of condensation which may accumulate in the chamber N.

The operation is as follows: The device, as illustrated in the drawings, shows the diaphragm P when it is depressed by air-pressure applied on its top side, which comes down through the opening Q′. The auxiliary valve K is thereby pushed off its seat in the upper end of the cylinder J, so that live-steam from the inlet C can pass through the port *a* into the cylinder J, and from the latter past the auxiliary valve K into the lower end of the cylinder L, from which the steam passes into the port *b* and into the upper end of the cylinder G to press the main valve F downward, so that its reduced end F′ closes the port D, thus shutting off communication between the inlet C and the outlet E. It is understood that the total pressure on top of valve F is greater than the total pressure on the bottom, owing to the spring H and the weight of the valve, which keeps the pressure greater on the inlet side than on the outlet, and the initial pressure on the shoulder, or that portion of the valve which does not cover the port D, being less than the initial pressure which acts on the top of the valve, the total pressure on the bottom will be less than the total press-

ure on the top, so that the valve starts and moves downward toward its seat as soon as the auxiliary valve K is pushed off its seat by the diaphragm. Now as this main valve approaches its seat the opening through the port D is reduced, so that the volume of steam will be slightly checked and the pressure on the outlet side thereby lowered, and at the same time the pressure acting on the shoulder, or that portion of the valve which does not cover the port, will be also lessened, and consequently the downward movement of the valve is accelerated until the valve reaches its seat. When the valve has finally reached its seat and the port thereby closed, the pressure is only on the extreme lower end, or that portion of the valve which covers the port, and its area being less than the whole top area of the valve, the valve will be firmly held to its seat until the pressure on the top is reduced. The moment the air-pressure is reduced or taken off the spring R draws the stem O and the diaphragm P upward, so that live steam entering the cylinder J through the port *a* seats the auxiliary valve K, thus shutting off the communication of the cylinder J with the port *b*, leading to the cylinder G. The steam-pressure in the inlet C now acts on the reduced end F′ of the main valve, so that the latter slides upward and the port D is opened to establish the communication between the inlet C and the outlet E. It will be seen that when the auxiliary valve K is closed by a reduction of the air pressure on the diaphragm P then the steam confined in the upper end of the cylinder G reduces the pressure gradually by escaping between the sides of the main valve F into the outlet E, so that this reduced pressure, together with the pressure of spring H, will at last be overcome by the steam-pressure in inlet C, which will force the main valve F upward and open the port D.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In an air-pump governor, the combination, with a passage-way provided with a partition having a port therein and a cylinder opening into the outlet, of a valve fitted to slide freely in the said cylinder and adapted to close the said port, the portion of the valve which closes the port being of less cross-sectional area than the part fitting in the cylinder, a spring acting on said valve to retain a greater pressure on the inlet than on the outlet side, and an auxiliary valve operated by air-pressure and controlling the admission of steam to the first-named valve, substantially as described.

2. In an air-pump governor, the combination, with a passage-way provided with a partition having a port therein and a cylinder opening into the outlet and communicating through ports with the inlet, of a valve fitted to slide freely in the cylinder and having its lower end, which closes the port, of less cross-sectional area than the part fitting in the cylinder, a spring acting upon the upper end of the valve, and an auxiliary valve for closing the ports leading to the said cylinder, said auxiliary valve being operated by air-pressure, substantially as herein shown and described.

3. In an air-pump governor, the combination, with a passage-way divided by a partition having a port therein, a cylinder above the port and opening into the outlet side of the passage-way, and a second cylinder of less diameter than the first-named cylinder and communicating therewith and with the inlet of the passage-way, of a spring-pressed valve in the first-named cylinder and adapted to close the port of the passage-way, an auxiliary valve in the second-named cylinder and adapted to establish and close communication between the inlet of the passage-way and the cylinder containing the spring-pressed valve through the cylinder of the auxiliary valve, and a diaphragm adapted to be acted upon by air-pressure to operate the auxiliary valve, substantially as herein shown and described.

4. In an air-pump regulator, the combination, with the spring-pressed stem O, provided with the diaphragm P, adapted to be acted upon by air-pressure, of a passage-way divided by a partition having a port therein, the cylinder G above the port and opening into the outlet of the passage-way, the spring-pressed valve F F′ in the cylinder, the cylinder J above the cylinder G and connected by port *a* with the inlet of the passage-way and provided with a valve-seat, the cylinder L, connected by port *b* with the cylinder G, and the auxiliary valve K, provided with the stem K^2, having the reduced portion K′ and adapted to be engaged by the lower end of the stem O, substantially as herein shown and described.

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Witnesses:
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