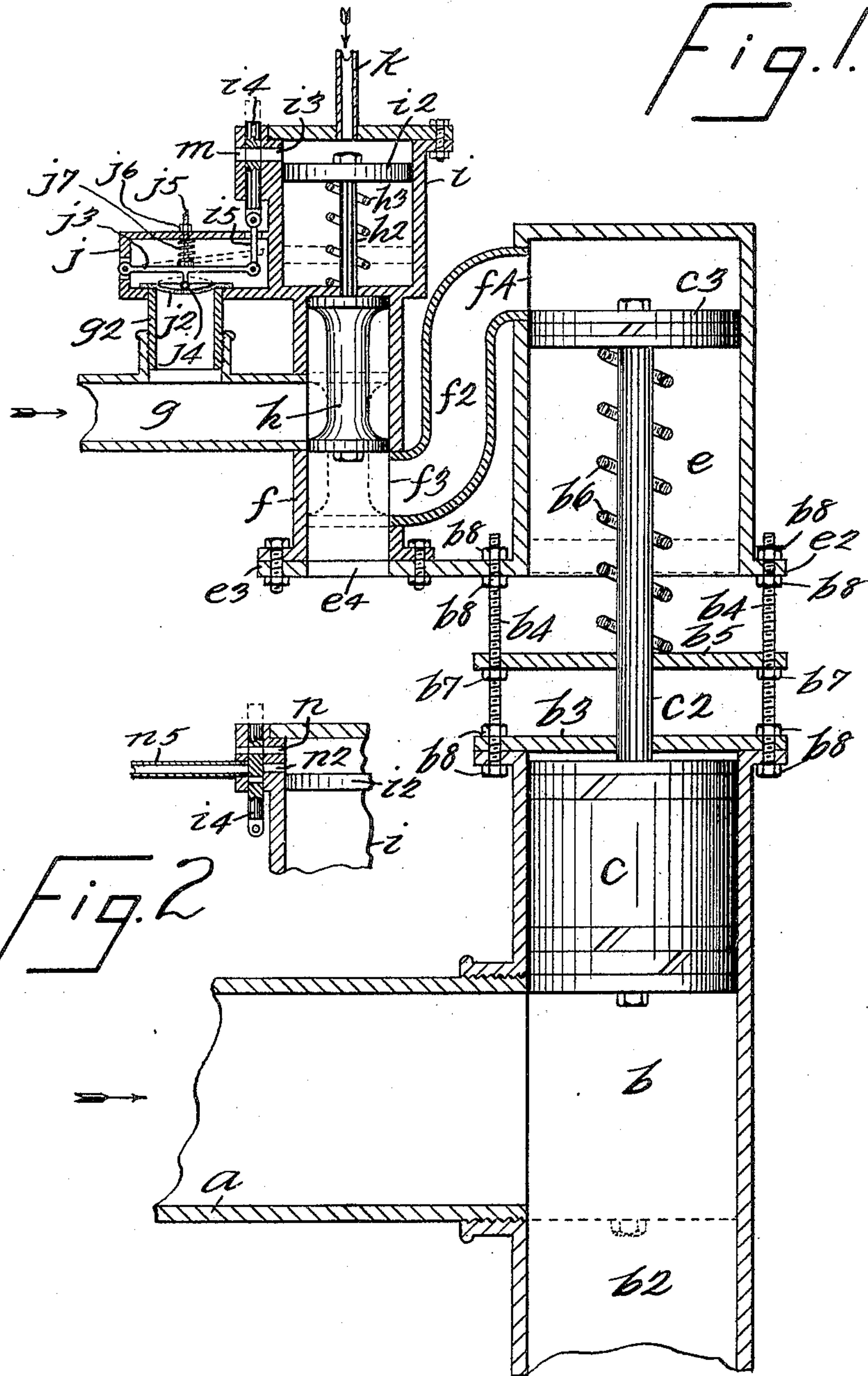


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H. W. GEARE.
PUMP GOVERNOR.
APPLICATION FILED OCT. 11, 1905.



WITNESSES

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HENRY W. GEARE, OF BROOKLYN, NEW YORK.

PUMP-GOVERNOR.

No. 822,519.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY W. GEARE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Pump-Governors, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to automatic pump-governors for steam-pumps; and the object thereof is to provide a governor of this class which will under certain conditions entirely cut off the supply of steam to the pump until the pressure in the water-pipe which leads from the pump is reduced to a predetermined point, at which time the supply of steam to the pump will be renewed, whereby the "dragging" action of the pump, common in devices of this class, is avoided and whereby there is also a saving in steam. In steam-pump governors of this class as usually constructed there is only a partial cut-off of supply of steam to the pump when the pressure in the water-pipe which leads from the pump reaches a predetermined point, and this causes a dragging action of the pump-piston, which results from a lack of pressure of the steam supplied to the cylinder of the pump, whereby there is only a partial stroke of the piston and an increase in the space in the piston-cylinder, which must necessarily be filled with steam before the piston is moved, the operation of the piston being only sufficient to counterbalance the pressure of the water in the water-pipe, the piston itself being balanced by the pressure of steam in one direction and the pressure of the water in the other direction. With my improvement, however, the supply of steam is entirely cut off when the pressure of water in the water-pipe which leads from the pump reaches a predetermined point, and the action of the pump is stopped until the pressure of water is decreased to a predetermined point, at which time the steam is again supplied to the pump and the latter operated to its full capacity.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a sectional side elevation of an apparatus involving my invention, and Fig. 2

a similar view of a modification of a detail thereof.

In the drawings forming part of this specification I have shown at *a* a steam-pipe, which in practice is connected with a steam-supply boiler, and the pipe *a* in practice is connected with a cylinder or pipe *b*, the end *b*² of which is connected with a pump, which is not shown. Mounted in the cylinder *b* is a piston *c*, provided with a rod *c*², which passes through the head *b*³ of the cylinder *b*, and above or in line with the cylinder *b* is a supplemental cylinder *e*, in which is placed a piston *c*³, with which the rod *c*² of the piston *c* is connected. Connected at opposite points with the head *b*³ of the cylinder *b* are threaded rods *b*⁴, on which is mounted a cross-head *b*⁵, and the end of the cylinder *e* adjacent to the cylinder *b* is open, and mounted on the rods *c*² between the cross-head *b*⁵ and the piston *c*³ are springs *b*⁶, and by means of nuts *b*⁷ on the rods *b*⁴ the tension of the springs *b*⁶ may be adjusted, as will be readily understood.

The cylinder or pipe *e* is provided at its open end with a laterally-directed member or members *e*², through which the rods *b*⁴ are passed, and said rods are also provided at their opposite ends with nuts *b*⁸, which hold the cylinders *e* and *b* in proper relative position.

The cylinder *e* is also provided at its lower end with a laterally-directed plate *e*³, to which is secured an auxiliary cylinder *f*, which is smaller than the cylinders *b* and *e*, said last-named cylinders being preferably of the same diameter, and the plate *e*³ is provided with an opening *e*⁴, which registers with the opening in one end of the cylinder *f*, and connected with the cylinder *f* adjacent to the open end thereof is a water-pipe *f*², which communicates with said cylinder *f* by means of the port or passage *f*³ and with the end of the cylinder *e* opposite the cylinder *b* by means of a port or passage *f*⁴.

Connected with the cylinder *f*, substantially midway thereof, is a water-pipe *g*, which in practice is connected with the water-pipe which leads from the pump, the latter being not shown, and mounted in the cylinder *f* is a spool-shaped piston *h*, having a rod *h*², which passes through the closed end of the cylinder *f* and into a pressure-regulating cylinder *i*, in which is placed a piston *i*², with which the rod *h*² is connected, and mounted on the rod *h* and bearing on the piston *i*² and

on the end of the cylinder i adjacent to the cylinder f is a spring h^3 , which normally holds the pistons h and i^2 and in the positions shown in full lines in Fig. 1.

5 The pipe g is provided at a predetermined distance from the cylinder f with a branch tube g^2 , which communicates with a box j , the communication between said branch tube and the box j being closed by a diaphragm j^2 ,
10 and pivoted in the end of the box j opposite the cylinder i is an arm j^3 , having a finger j^4 , adapted to bear on the diaphragm j^2 , and the arm j^3 is provided opposite the finger j^4 with a rod j^5 , which passes through the side of the
15 box j opposite the pipe g^2 and is provided with a nut j^6 , and mounted on the rod j^5 within the box j and bearing on the arm j^3 is a spring j^7 , which normally holds said arm in the position shown in full lines in Fig. 1.
20 The end of the cylinder i opposite the cylinder f is provided at one side with a port or passage i^3 , controlled by a valve i^4 , which is preferably a slide-valve and which is connected with the inner end of the arm j^3 by a
25 link or rod i^5 . The cylinder i is also provided at the end thereof opposite the cylinder f with a steam or air supply pipe k , and in practice this pipe may be connected either with a steam-supply device or an air-supply
30 device, according to the work which the pump is desired to do or the use to which said pump is devoted.

It is a well-known fact that governors of this class are frequently applied to elevators
35 and similar devices which are provided with tanks containing air under pressure, and when this is the case the pipe k will be connected with said air-tank; but in other uses of my improved governor the pipe k may be
40 connected with the steam-supply of the pump.

In practice steam from any suitable source or generator is supplied to the pipe a , which communicates with the cylinder b , which, as
45 hereinbefore stated, is connected with the pump, which is not shown, and in the operation of the pump if at any time the pressure in the water pipe or pipes which lead from the pump becomes too great the pressure in the pipe g
50 will force the piston h downwardly and the water will pass through the pipe f^2 into the cylinder i and the pistons c and c^3 will be forced downwardly into the position indicated in dotted lines and the passage of steam
55 to the pump will be entirely cut off. This operation results from pressure on the diaphragm j^2 in the branch pipe g^2 , which pressure raises the valve i^4 and allows the steam or air entering through the pipe k to depress the pistons h and i^2 , in which operation the
60 latter piston is depressed, so that the water will pass through the pipe f^2 . As soon as the pressure in the water-pipe which leads from the pump is decreased to a predetermined point or to the desired point, the springs b^6
65 and h^3 return the various pistons to their nor-

mal position, the spring j^7 operating to move the arm j^3 so as to operate the valve i^4 to open the port or passage i^3 , which communicates with the cylinder i . It will be understood that at this time there is an exhaust through
70 the port or passage i^3 , and a suitable discharge-pipe may be connected with this port or passage at m , if desired.

In Fig. 2 I have shown a modification whereby the cylinder i is provided with two
75 ports or passages n and n^2 instead of the single port or passage i^3 . In this form of construction a steam-pipe n^5 communicates with the port or passage n^2 , and the pipe k is omitted. The pipe n^5 is connected with the
80 steam-supply of the pump, and when the valve i^4 is raised, as hereinbefore described, steam enters the cylinder i through the pipe n^5 , and the pistons i^2 and h are depressed, as hereinbefore described, the port or passage n
85 being closed, and when the operation of the pistons i^2 and h is reversed or said pistons are returned to their normal positions, as hereinbefore described, the valve i^4 is moved downwardly and the port or passage n^2 closed,
90 while the port or passage n is opened.

By means of this construction it will be seen that when the pressure in the water-pipe which leads from the pump is abnormally increased or increased beyond the desired point
95 the supply of steam to the pump is totally cut off, and there is no loss of steam and no dragging operation of the pump, the latter being restored to its normal action as soon as the pressure in the water-pipe falls to the desired
100 point.

When the pistons h and i^2 are thrown into the position shown in dotted lines in Fig. 1, in the operation hereinbefore described, the
105 water from the pipe d passes, as hereinbefore described, through the cylinder f and pipe f^2 to the cylinder e , and the pistons c and c^3 are forced into the position also shown in dotted lines in said figure, and when this operation is
110 reversed and the said pistons are returned to their normal position, or that shown in full lines, the water in the cylinder e is forced out through the pipe f^2 and the open end of the cylinder f at e^4 , and, if desired, an escape-pipe may be connected with the cylinder f to carry
115 away said water.

It will also be seen that, as shown in the drawings, the cylinder i and piston i^2 are larger than the cylinder f and piston h , this construction being preferred in order to facilitate the operation hereinbefore described.
120 From the foregoing description it will be seen that my improved governor apparatus for steam-pumps comprises two pairs of cylinders each of which is provided with a piston, the
125 pistons in each pair being connected and also provided with springs whereby they are held in their normal position or in the position which they occupy when the pump is in operation, one cylinder of one of said pairs being
130

provided with a steam-supply pipe which in practice is connected with the steam-supply of the pump, and one cylinder of the other pair being provided with a water-supply pipe which in practice is connected with the water-pipe which leads from the pump, the last-named cylinder being also in communication with the cylinder of the first-named pair, with which the steam-supply pipe is not connected.

It will also be seen that in the normal position of the separate pairs of cylinders the piston in the cylinder which is provided with a water-supply pipe is in such position as to cut off the flow of water therethrough and into the cylinder of the other pair which is connected therewith. The remaining features of the invention comprise details of construction by which the separate pairs of pistons are operated in their corresponding cylinders by an overincrease in the pressure of the water in the pipe which leads from the pump and in the opposite direction by a decrease in said pressure.

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

1. A governor for steam-pumps, comprising two pairs of cylinders, the cylinders of each pair being provided with pistons which are connected, springs for holding the separate pairs of pistons in a predetermined position, and means whereby an increase of pressure in the water-pipe leading from the pump will operate said pistons and cut off the flow of steam to the pump, substantially as shown and described.

2. A governor for steam-pumps, comprising two pairs of cylinders, the cylinders of each pair being provided with pistons which are connected, springs for holding the separate pairs of pistons in a predetermined position, and means whereby an increase of pressure in the water-pipe leading from the pump will operate said pistons and cut off the flow of steam to the pump, comprising a pipe by which a cylinder of each pair is placed in communication, a water-pipe communicating with one of said cylinders, and means whereby an increase of pressure in the last-named pipe will operate the piston in said cylinder and the corresponding piston with which it is connected, substantially as shown and described.

3. An apparatus of the class described, comprising two pairs of cylinders, the piston-

cylinders of each pair being arranged in line, pistons mounted in the cylinders of each pair, the pistons in each pair being connected and provided with springs by which said pistons are held in their normal position, one cylinder of each pair being in communication, a water-pipe connected with one of the last-named cylinders, and means whereby an increase of pressure in the last-named pipe will operate the piston in said cylinder and the piston connected therewith, substantially as shown and described.

4. In an apparatus of the class described, a pair of cylinders arranged in line, pistons mounted in each cylinder and in operative connection, a spring for holding said pistons in their normal position, a water-pipe communicating with one of said cylinders, a fluid-pressure pipe communicating with the other cylinder, said last-named cylinder being also provided with an exhaust or passage, and means whereby an increase or decrease of pressure in the water-pipe will close and open, said exhaust port or passage, substantially as shown and described.

5. In an apparatus of the class described, a pair of cylinders arranged in line, pistons mounted in each cylinder and in operative connection, a spring for holding said pistons in their normal position, a water-pipe communicating with one of said cylinders, a fluid-pressure pipe communicating with the other cylinder, said last-named cylinder being also provided with an exhaust port or passage, and means whereby an increase or decrease of pressure in the water-pipe will close and open said exhaust port or passage, said apparatus also comprising another pair of cylinders one of which is in communication with the cylinder of the first pair with which the water-pipe is connected, and the other of which is provided with a steam-supply pipe, and pistons mounted in the cylinders of the last-named pair and provided with a spring by which they are held in their normal position, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 10th day of October, 1905.

HENRY W. GEARE.

Witnesses:

F. A. STEWART,
C. J. KLEIN.