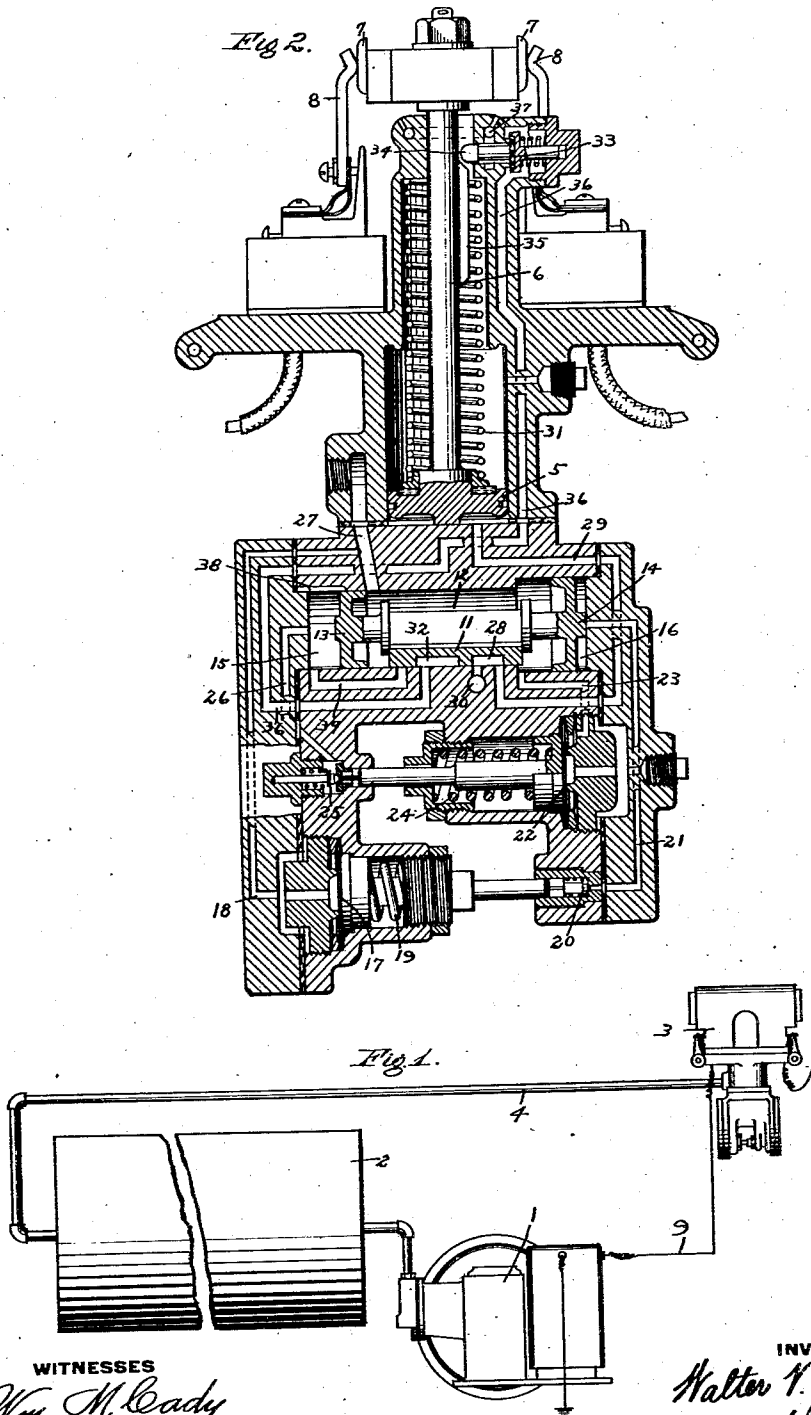


1,004,943.

Patented Oct. 3, 1911.



WITNESSES

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UNITED STATES PATENT OFFICE.

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ELECTRIC-PUMP GOVERNOR.

1,004,943.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed October 30, 1908. Serial No. 460,312.

To all whom it may concern:

Be it known that I, WALTER V. TURNER, a citizen of the United States, residing at Edgewood, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Electric-Pump Governors, of which the following is a specification.

This invention relates to pressure governors for pumps, and more particularly to those designed for operating an electric switch device to control the current to an electric motor driven pump. In a governor of this type, a blow out device is usually employed for the purpose of directing a jet of air to the switch contacts at the moment of separation, so as to blow out or prevent the formation of arcs between the fixed and the movable contacts of the switch.

My present improvements are directed more especially to pressure governors of the class in which a main valve mechanism is provided for supplying and releasing fluid under pressure to and from an actuating piston connected to the controlling switch, and having a regulating means operating according to the degree of pump pressure for venting fluid from one side or the other of said valve mechanism to cause the movement thereof. In order to minimize the possibility of arcing as the switch contact points separate, it is highly desirable that the switch actuating piston should move quickly and positively so as to cause a rapid snap-like action of the switch.

It is the principal object of my invention to provide improved means for causing the quick movement of the switch actuating piston and the movable contact bars of the switch and for this purpose I contemplate utilizing the arc blow out means for producing a rapid venting of air from the main valve mechanism, whereby said mechanism is positively and fully shifted so as to admit an ample supply of air to the actuating piston and cause its quick movement to the cut out position and at the same time an abundant flow of air is provided through the blow out means to the switch contacts.

In the accompanying drawing; Figure 1 is a diagrammatic view of an electric air compressor apparatus, with my improvements applied thereto; and Fig. 2 a central sectional view of an electric pump governor

embodying my invention in a preferred form.

Fig. 1 illustrates a typical air compressor apparatus comprising an electric motor driven air pump 1, storage reservoir 2 and pump governor 3, having a pipe 4 communicating with the storage reservoir 2.

The pressure governor 3 to which my improvements are shown applied in Fig. 2 of the drawing, comprises a piston 5 having piston rod 6 to which are attached movable contact bars 7 adapted to engage the fixed contact bars 8 connected to circuit wire 9 for supplying current to the electric motor of the air compressor 1, a main valve mechanism consisting of a slide valve 11 contained in valve chamber 12 and controlled by a movable abutment having piston heads 13 and 14, operating respectively in piston chambers 15 and 16, a low tension regulating device comprising a diaphragm 17 subject on one side to pump pressure through passage 18 and on the opposite side to the pressure of an adjustable spring 19 and a valve 20 controlled thereby and adapted to govern the release of fluid from piston chamber 16 through passage 21 to the atmosphere, and a high tension regulating device having a diaphragm 22 subject on one side to pump pressure through passage 23 leading to valve chamber 12 and on the opposite side to the pressure of an adjustable spring 24 and a valve 25 controlled by said diaphragm for governing the release of fluid from piston chamber 15 through port 26 to the atmosphere. A port 27 from pipe 4 supplies air at pump pressure to the valve chamber 12 and the piston heads 13 and 14 being loosely fitted, fluid equalizes on opposite sides of the heads into piston chambers 15 and 16.

When the pump pressure is less than the adjusted tension of spring 19, the diaphragm 17 opens the valve 20 and fluid in piston chamber 16 is released to the atmosphere, causing the main valve mechanism to assume the position shown in Fig. 2, in which a cavity 28 connects port 29 leading to the pressure chamber of piston 5, with an exhaust port 30, so that said piston is pressed to its inner position by the spring 31, closing the switch and the pump circuit. Upon the rise of pump pressure to exceed that at which spring 24 is adjusted, the valve 25

is opened, valve 20 having been previously closed by the pump pressure rising to the low tension pressure on the diaphragm 17. Air is thus released from chamber 15, while the fluid pressure having equalized around piston head 14, the main valve mechanism is shifted to its opposite position, in which port 29 is cut off from exhaust port 30 and is opened to valve chamber 12, so that fluid under pressure is admitted to the actuating piston 5, thereby shifting same to its outer position, breaking the electric pump circuit, and thus cutting the pump out of action.

According to my improvements, a blow out valve 33 is provided, the stem 34 of which is adapted to engage a projecting rib portion 35 on the piston rod 6, upon movement of the piston 5 in the direction to separate the switch contacts. The blow out valve 33 controls communication from a supply passage 36, leading to the seat of the slide valve 11, to the blow ports 37 which are directed toward the contacts of the switch.

In operation, upon the pump pressure rising on diaphragm 22 to a degree in excess of the tension at which spring 24 is adjusted the valve 25 is opened and air is released from piston chamber 15. The main valve mechanism thereupon moves over in the direction to uncover the port 29, leading to the actuating piston 5. A little before this port 29 starts to open a cavity 32 in the main valve 11 connects passage 36 with a passage 39 opening into the piston chamber 15 so that the supply passage 36 to the blow out valve 33 is in communication with chamber 15, and if for any reason the movement of the main valve mechanism should be sluggish, and the actuating piston 5 should consequently move slowly, it will be seen that as soon as the rib 35 on piston rod 6 has moved far enough to engage the valve stem 34, the valve 33 is opened and air is vented from chamber 15, so that the main valve mechanism is caused to quickly complete its transverse movement and fully uncover the port 29 leading to the actuating piston 5.

A groove 38 is provided in piston chamber 15 which is adapted in the movement of the main valve mechanism to cutting out position to open communication around the piston head 13 from valve chamber 12 to passage 39. By this means an ample air supply is insured for the blow out device for the purpose of blowing out arcs formed as the switch contacts separate.

In order to facilitate the assembling of the parts, one piston head of the main valve mechanism is made of a smaller diameter than the other, and preferably the larger piston head is located at the cut in end, so that in case a sudden reduction of pressure occurs in the valve chamber space between the piston heads, the tendency will be for the parts to move toward the cut out position

by reason of the fluid pressure acting on the greater area of the outer face of the larger piston head.

Although my improvements are shown in the drawings as applied to a particular construction of pressure governor, it will be evident that the same may be employed in connection with various other forms of governors.

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

1. A pressure governor comprising a controlling device and a piston for actuating the same, a main valve mechanism for controlling the supply of fluid under pressure to said actuating piston, and valve means operated by the movement of said actuating piston for varying the pressure on one side of said valve mechanism to facilitate its movement.

2. A pressure governor comprising a controlling device and a piston for actuating the same, a main valve for supplying fluid to said piston, a movable abutment controlled according to the pump pressure for actuating said valve, and a valve operated by the movement of said actuating piston for opening a vent port to one side of said movable abutment to assist the movement thereof.

3. An electric pump governor comprising an electric switch, an actuating piston therefor, a main valve mechanism governed according to variations in pump pressure for controlling the fluid pressure on said actuating piston, and a blow out valve means for said switch, operated by the movement of said actuating piston to vent air from one side of said valve mechanism and thereby facilitate its movement.

4. An electric pump governor comprising an electric switch, an actuating piston therefor, a main valve mechanism governed according to variations in pump pressure for controlling the fluid pressure on said actuating piston, and a blow out valve means having its air supply passage communicating with one side of said main valve mechanism and adapted to be opened by the movement of the actuating piston, to thereby vent air from said main valve mechanism to facilitate the movement thereof.

5. An electric pump governor comprising an electric switch, an actuating piston therefor, a main valve mechanism governed according to variations in pump pressure for controlling the fluid pressure on said actuating piston, and a blow out valve for said switch having an air supply passage, and means controlled by said main valve mechanism for releasing air from one side thereof to said supply passage, thereby causing the quick movement of said main valve mechanism.

6. An electric pump governor comprising an electric switch, an actuating piston therefor, a valve mechanism governed according to the pump pressure for controlling the fluid pressure on said actuating piston, and means for venting air to said switch from one side of said valve mechanism and thereby assist the movement of said valve mechanism.

7. An electric pump governor comprising an electric switch for the pump motor circuit, an actuating piston therefor, a blow out valve means operated by the movement of said actuating piston for directing a jet of air to the switch, a main valve mechanism governed according to the pump pressure for controlling the operation of said actuating piston, and means controlled by the movement of said main valve mechanism for opening communication from the chamber at one side of said valve mechanism to said blow out valve means and for opening a fluid pressure supply port to said chamber.

8. An electric pump governor comprising an electric switch for the pump motor circuit, an actuating piston therefor, a blow out valve means operated by the movement of said actuating piston for directing a jet of air to the switch, a valve mechanism comprising a main valve means for controlling the admission and release of fluid

under pressure to said actuating piston, a movable abutment comprising two heads normally subject to opposing fluid pressures and operated according to the pump pressure for controlling said main valve means, and means controlled by the movement of said valve mechanism for opening communication from the chamber at one side of one piston head to said blow out valve means and for opening a port for supplying air from a source of fluid pressure to said chamber.

9. An electric pump governor comprising an electric switch, an actuating piston therefor, a valve mechanism for controlling the fluid pressure for operating said piston, means governed by pump pressure for venting fluid from one side of said valve mechanism to operate the same, and a blow out valve device for the switch adapted to vent air from said valve mechanism to assist the movement of said valve mechanism and also utilize the air to blow out arcs formed at the switch.

In testimony whereof I have hereunto set my hand.

WALTER V. TURNER.

Witnesses:

WM. M. CADY,
A. M. CLEMENTS.