No. 834,274. PATENTED OCT. 30, 1906.

E. H. DEWSON.

ELECTRIC PUMP GOVERNOR.

APPLICATION FILED AUG. 22, 1905.

Fig. 1.

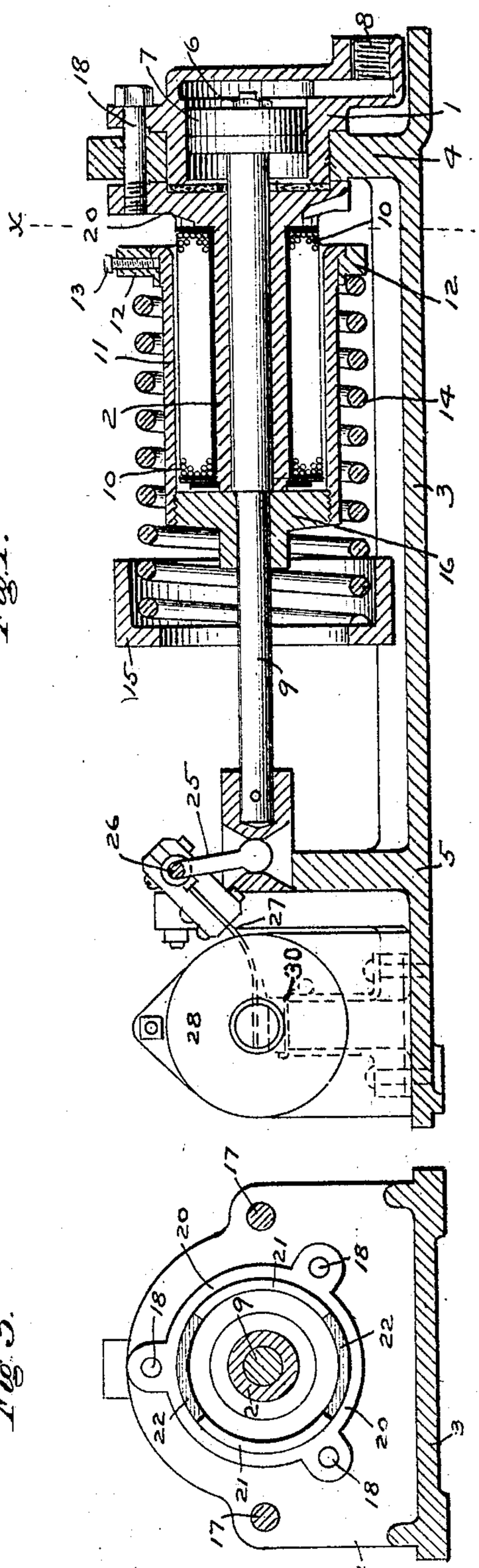


Fig. 2.

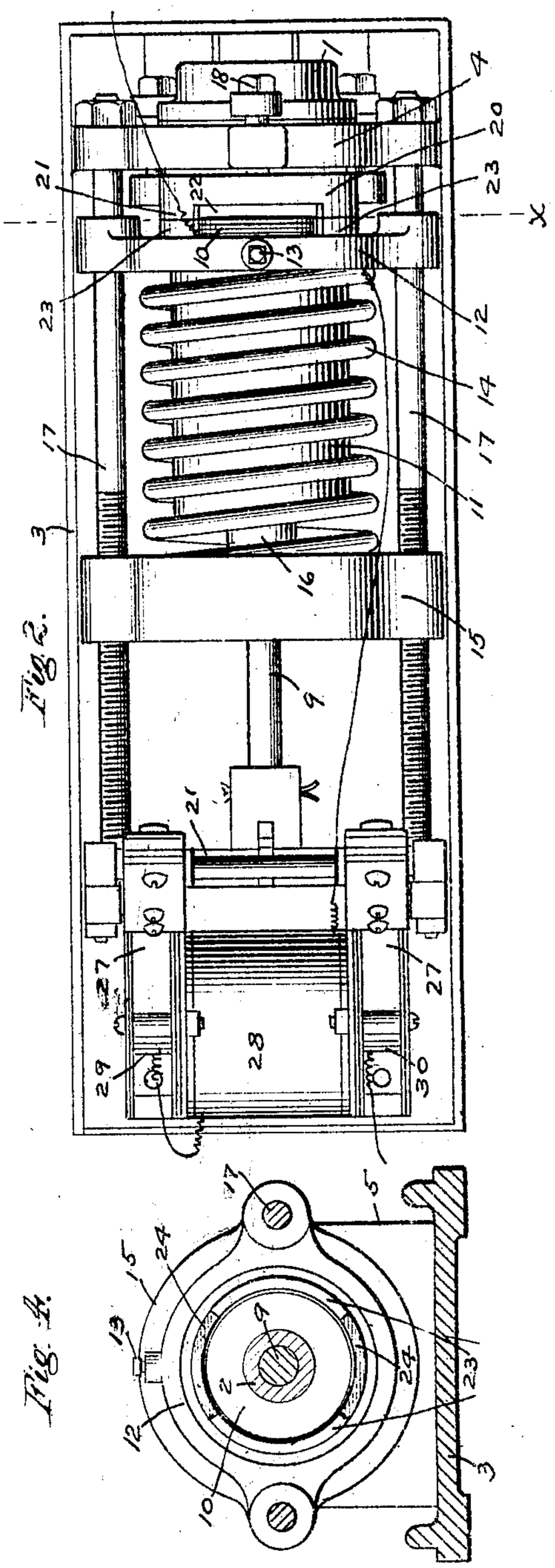


Fig. 3.




Fig. 4.




WITNESSES

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## ELECTRIC-PUMP GOVERNOR.

No. 834,274. Specification of Letters Patent. Patented Oct. 30, 1906.

Application filed August 22, 1905. Serial No. 275,274.

*To all whom it may concern:*

Be it known that I, EDWARD H. DEWSON, a citizen of the United States, residing in Edgewood Park, county of Allegheny, and State of Pennsylvania, have invented certain new and useful Improvements in Electric-Pump Governors, of which the following is a specification.

This invention relates to governors for electrically-operated pumps, and has for its object to provide improved means for adjusting the range of pressures within which the governor is adapted to open and close the circuit.

My invention is in the nature of an improvement upon the form of governor covered by prior Letters Patent to Francis Head, No. 671,883, of April 9, 1901. According to the construction set forth in said prior patent an electromagnet arranged in the electric-motor circuit is employed for assisting the spring in opposing the fluid-pressure from the pump acting upon the piston and tending to open the electric circuit, whereby when the pump-pressure increases to a point sufficient to overcome the combined force of the spring and electromagnet the armature moves away from the magnet, thereby diminishing its force, so that the piston then operates the switch with a positive snap-like action. With such a construction it is often desirable to adjust the strength of pull or the holding power of the electromagnet to meet different conditions of service, and my invention comprises means for this purpose. Various devices may be devised for securing this result; but I prefer to employ means for adjusting the relative position of the poles of the magnet whereby a greater or lesser area may be presented for the magnetic flux, and thereby vary the strength of pull of the magnet.

I will now describe more in detail a preferred form of structure embodying my invention, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section; Fig. 2, a plan view; Fig. 3, a transverse section taken on the line *x x* of Figs. 1 and 2 and looking toward the right, and Fig. 4 a similar transverse section in the same plane looking toward the left.

As shown, this construction comprises a bed-plate 3, having upright portions 4 and 5, the former supporting a cylinder 1, having a chamber 6, containing piston 7, which is subject to the pump-pressure by means of an inlet 8.

Supported on opposite sides of the upright pieces are two threaded rods or bolts 17, on which is mounted the adjustable cross-bar 15. The rear head 20, which is secured to the cylinder by bolts 18, is provided with a hollow core 2, extending around the piston-rod 9 and carrying the coil 10 of the electromagnet, the piston-rod being adapted to slide through the core 2 and provided with a cross-head 16, which is rotatably mounted on the piston-rod, but movable longitudinally therewith. A cylindrical casing 11 is secured to the cross-head 16 and covers the coil 10 of the electromagnet, the forward end of the casing being rotatably mounted in a cross-bar or ring 12, slidingly supported on the side rods 17 and having a set-screw 13 to prevent the casing from turning after being clamped in a certain position.

The end of the casing 11 is provided with an annular projecting flange 23 with cut-out portions 24, while the cylinder-head 20 has corresponding raised flange 21 with cut-out portions 22. As will be readily seen from the drawings, these flanges 21 and 23 form the opposite poles of the electromagnet, and when the notches or cut-out portions 22 and 24 of the opposite poles are adjusted to register with each other, as indicated in Fig. 2, the flanges 21 and 23 make contact over their maximum area or surface. By partially rotating the casing 11 in the ring 12 and clamping the set-screw 13 the sections of the flange 23 may be adjusted to register partially with the opposite flange-sections and notched sections, so as to give any desired amount of area of the opposite poles in contact, and thereby vary the cross-sectional area of the path of the magnet flux and the corresponding holding power of the magnet. A spring 14 is located between the adjustable cross-bar 15 and the ring 12, which moves longitudinally with the piston and piston-rod.

Any desired form of controlling device operated by the piston or movable abutment may be employed for governing the motor, such as a switch for opening and closing the electric circuit, that shown comprising a rock-shaft 26, arm 25, and two flexible blades 27,

adapted to make contact with the terminals 29 and 30. A blow-out magnet-coil 28 may be mounted between these terminals. The spring 14 being adjusted to the desired tension and the relative position of the poles of the electromagnet being set for a certain holding power, the switch is closed and the pump continues to operate until the pressure admitted at inlet 8 and acting on the piston 7 is sufficient to overcome the power of both spring and magnet. As soon as the piston begins to move out the poles 21 and 23 of the magnet separate, and consequently as the pull of the magnet diminishes very rapidly as the poles separate the piston moves with a positive and quick movement to the end of its stroke, compressing the spring 14 and turning the rock-shaft 26 to open the switch and stop the pump. The instant that the blades 27 leave the terminal points the circuit through the coil 10 is broken, so that the magnet has no further power until the circuit is again closed. As the pressure on the piston then diminishes to a degree less than the power of the spring, the piston-rod with its cross-head 16 and casing 11, carrying the pole of the magnet, move back slowly to a point at which the blades 27 touch the terminals. This closes the circuit through the coil 10 and energizes the electromagnet, so that the poles are instantly attracted and operate to complete the closing movement of the piston-rod and switch. It will thus be seen that the degree of pressure at which the switch closes is determined by the spring, while the opening pressure is determined by the combined force of the spring and the holding power of the electromagnet. This range of the governor, or the difference between the degrees of opening and closing pressures, may be adjusted to any amount desired by setting the poles of the magnet to the corresponding relative position, and thereby vary the pull or holding power of the magnet. By means of this construction the range of the governor may be readily adjusted to meet different conditions, thereby giving very reliable and efficient service.

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

1. An electric-pressure governor comprising a movable abutment subject to the fluid-pressure, a controlling device operated thereby, an electromagnet for opposing the fluid-pressure, and means for adjusting the holding power of the magnet.

2. An electric-pressure governor comprising a movable abutment subject to the fluid-pressure, a controlling device operated thereby, an electromagnet for opposing the fluid-pressure, and means for adjusting the relative positions of the opposite poles of the magnet to vary its effect.

3. An electric-pressure governor comprising a piston subject to the pump-pressure, a controlling device operated by the piston, an adjustable spring opposing said pressure, an electromagnet exerting its pull to assist the spring, and means for adjusting the holding power of said magnet.

4. An electric-pressure governor comprising a piston subject to the pump-pressure, a controlling device operated by the piston, an adjustable spring opposing said pressure, an electromagnet exerting its pull to assist the spring, and means for adjusting the relative positions of the opposite poles of the magnet to vary the range of the governor.

5. An electric-pressure governor comprising a piston subject to the pump-pressure and a controlling device operated thereby, an electromagnet for opposing the fluid-pressure, and means for adjusting the area of the engaging surface of the opposite poles of the magnet.

6. An electric-pressure governor comprising a piston subject to the pump-pressure, an electric switch operated thereby to open and close the motor-circuit, an adjustable spring for opposing the fluid-pressure, an electromagnet arranged concentrically with the piston-rod for assisting said spring, and means for adjusting the effective area of the poles of the magnet.

7. An electric-pressure governor comprising a piston subject to the pump-pressure, an electric switch operated thereby to open and close the motor-circuit, an adjustable spring for opposing the fluid-pressure, an electromagnet arranged concentrically with the piston-rod for assisting said spring, and a casing forming part of said magnet surrounding the coil and rotatably mounted on the piston-rod.

In testimony whereof I have hereunto set my hand.

EDWARD H. DEWSON.

Witnesses:

E. A. WRIGHT,

J. B. MACDONALD.