J. J. LISCH.

GOVERNOR.

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1,039,151. Patented Sept. 24, 1912.

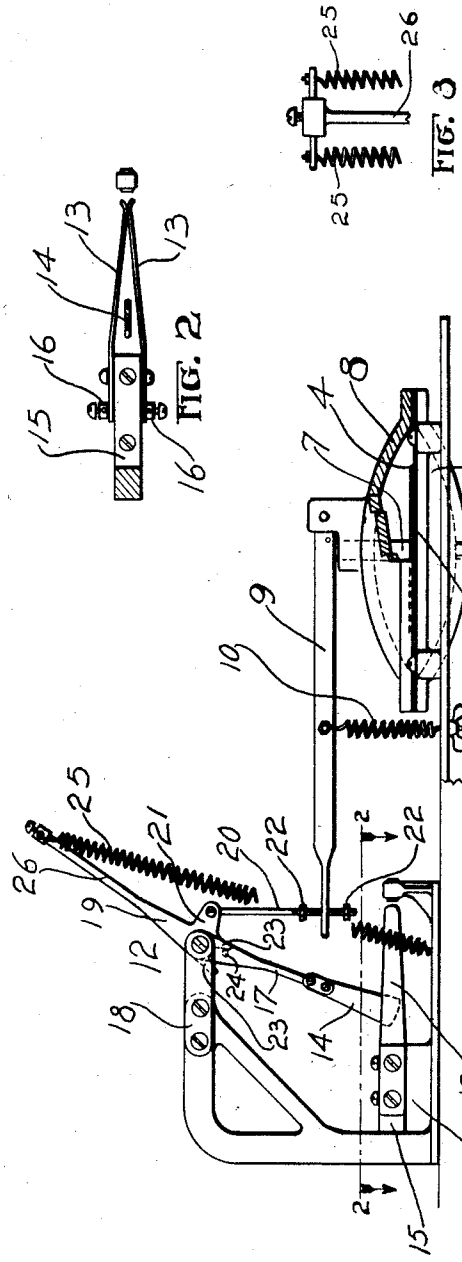

FIG. 1

FIG. 3

FIG. 2

Witnesses

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GOVERNOR.

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To all whom it may concern:

Be it known that I, JACOB J. LISCH, a citizen of the United States of America, and resident of Bellevue, Campbell county, State of Kentucky, have invented certain new and useful Improvements in Governors, of which the following is a specification.

This invention relates to automatic controlling means for fluid compressors, and has for an object to produce a pressure responsive governor, which is of simple construction, effective in operation and capable of a wide range of adjustment.

A further object is to produce a governor, which has no intermediate position, but which operates to either deliver full motive power to the fluid compressor, or to shut off the motive power.

These and other objects I attain by means of an apparatus embodying the features herein described and illustrated.

In the drawings accompanying this application and forming a part thereof, Figure 1 is a side elevation of an apparatus embodying my invention, a portion of the apparatus being broken away for convenience of illustration. Fig. 2 is a partial section, taken on the line 2—2 of Fig. 1, and in the direction of the arrows. Fig. 3 is a detail of the spring connection.

The apparatus shown, is adapted to control the operation of a motor driven fluid compressor, by cutting the motor in or out of an operating circuit.

It consists of a cut-out switch 3 for the electric motor and a pressure actuated means, such as a diaphragm 4, which is responsive to the pressure pumped by the compressor to be governed, and which is adapted, through the agency of levers, links and intermediate connections, to operate the switch. My invention may, however, be employed for controlling the operation of an engine or mechanically driven compressor, as will hereinafter be described.

The diaphragm 4 is inclosed within a chamber 5 and is exposed on one side to the pressure pumped by the compressor, and on the other side to atmospheric or any other constant pressure. The chamber 5, below the diaphragm, communicates with a source of pressure pumped by the compressor through a pipe 6, and is adapted to occupy different positions in response to variations of pressure in the chamber 5. The upper side of the diaphragm 4 is exposed to atmospheric pressure and supports a plunger 7, which projects upwardly through the walls 8 of the chamber and abuts against a lever 9, which is fulcrumed on a bracket, mounted on or formed integrally with the wall 8. The plunger 7 is reciprocated by the diaphragm 4 and operates the lever 9, so that it swings about its fulcrum point and occupies different positions in response to variations of pressure in the chamber 5. A controlling spring 10 is secured to the lever 9 and is provided with an adjusting nut 11, so arranged that the tension of the spring may be varied, so as to vary the operation of the lever.

The lever 9 actuates a controlling device 12 for the cut-out switch 3. The switch 3 consists of spring terminals 13, which are normally held in contact with each other, and an insulating finger 14, which is actuated by the device 12 to separate the terminals and thereby cut off the flow of current to the electric motor. The spring terminals are mounted on opposite sides of an insulating block 15, and each is electrically connected to a terminal post 16 for a wire of the motor circuit. The finger 14 is mounted on an arm 17, which is fulcrumed on a bracket 18.

The operating device 12 for the arm 17 is so constructed that the arm is moved either to fully open or to fully close the switch 3. The device consists of a bell-crank lever 19, fulcrumed concentrically with the arm 17 on the bracket 18, and which is actuated by the lever 9. A link 20 is pivotally connected to an arm 21 of the bell-crank and projects through a slot formed in the outer or free end of the lever 9. Adjustably mounted nuts 22 are mounted on the link 20, on each side of the lever 9, and form with the link a lost motion connection by means of which the motion of the lever 9 is transmitted to the bell-crank 19. Prongs or lugs 23 are formed on the bell crank and are adapted to engage a pin 24 on the arm 17. The prongs are separated so that they form, with the pin, a lost motion connection between the bell-crank and the arm 17. One end of springs 25 is secured to the outer end of the arm 26 of the bell-crank, and the other end is so located and secured that the spring will move the bell-crank to one or the other extreme

position after the bell-crank has been moved past its intermediate position. In the apparatus illustrated, the springs 25 are secured vertically below the fulcrum point of the bell-crank, so that the spring and the arm 26 of the bell-crank will be parallel, when the arm is in its intermediate or vertical position.

The operation of the apparatus is as follows: Variations in the pressure pumped by the apparatus to be governed, cause corresponding variations of pressure in the chamber 5, below the diaphragm 4. This causes the diaphragm, the plunger 7, and the lever 9, to occupy different positions. The motion of the lever 9 is transmitted through the lost motion connection, formed by the nuts 22, to the bell-crank 26. When the pressure in the chamber 5 is below the predetermined pressure, and the switch 3, and consequently the bell-crank 19, are in the closed position, an increase in pressure will raise the lever 9 until it contacts with one of the nuts 22, and, as the pressure continues to increase, the lever will continue to rise and will move the bell-crank 19 from its extreme open position past its intermediate position, in opposition to the tension of the springs 25. This motion of the bell-crank will not be transmitted to the arm 17, because of the lost motion connection formed by the prongs 23. As soon as the bell-crank has been moved past its intermediate position, the tension of the spring operates to move the bell-crank to its extreme closed position. This motion of the bell-crank is transmitted to the arm 17, and the finger 14 is forced through the spring terminals 13 to open the switch and cut off the current to the electric motor. The upward motion of the lever 9, in response to the pressure below the diaphragm 4, takes place in opposition to the tension of the spring 10. As the pressure in the chamber 5 below the diaphragm decreases, the spring 10 operates to return the lever 9, and when it is decreased a sufficient amount the lever engages one of the nuts 22 and then moves the bell-crank, in opposition to the tension of the spring 25, from the extreme open position past the intermediate position. As soon as the bell-crank is moved past the intermediate position, the spring 25 operates to move the bell-crank to its extreme closed position and to thereby withdraw the finger 14 from between the terminal springs 13, so that current is again delivered to the motor. The arm 17 may be employed to control the delivery of motive fluid to an engine utilized in driving the compressor, or it may be employed to shift belts, or to otherwise control the delivery of power to the compressor. I find it preferable to employ a plate 27 on the diaphragm 4 and between it and the plunger. This renders the apparatus more sensitive and decreases the wear on the diaphragm.

What I claim is:

In an apparatus of the character described, a control switch comprising blade-shaped spring terminals normally contacting with each other, an insulating member capable of moving between and separating said terminals, a pivotally mounted arm for actuating said member, a lost-motion connection between the arm and the member, a spring secured to the arm for moving it from an intermediate to an extreme position, a rod for moving said arm from either extreme position past the intermediate position in opposition to the spring, an adjustable lost-motion connection between the rod and the arm, and pressure actuated means for actuating the arm.

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