B. S. AIKMAN.

ELECTRIC PUMP GOVERNOR.

APPLICATION FILED DEC. 24, 1914.

1,227,230.

Patented May 22, 1917.

2 SHEETS—SHEET 1.

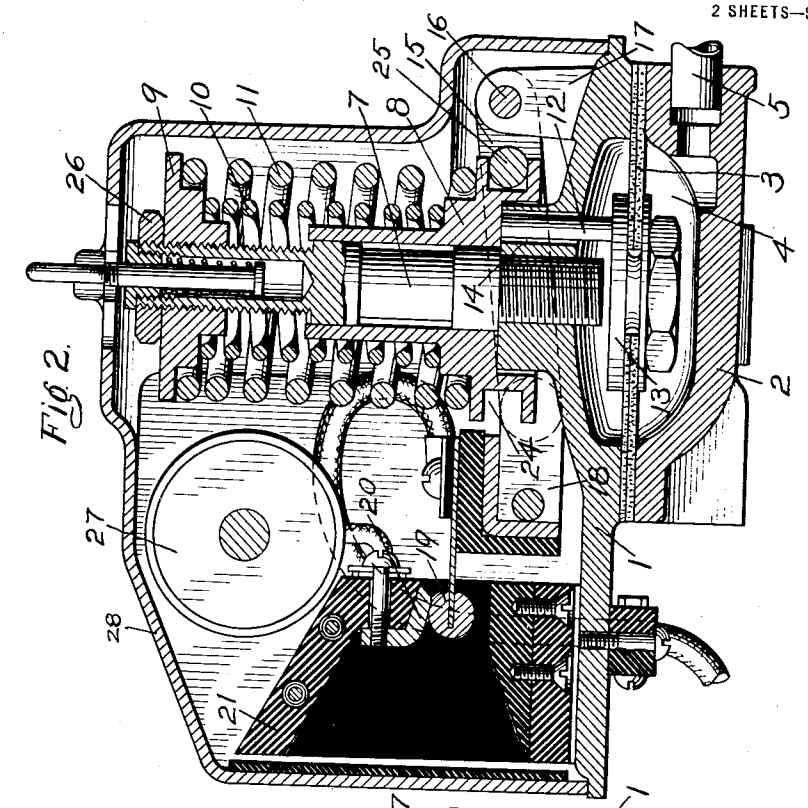


Fig 2.

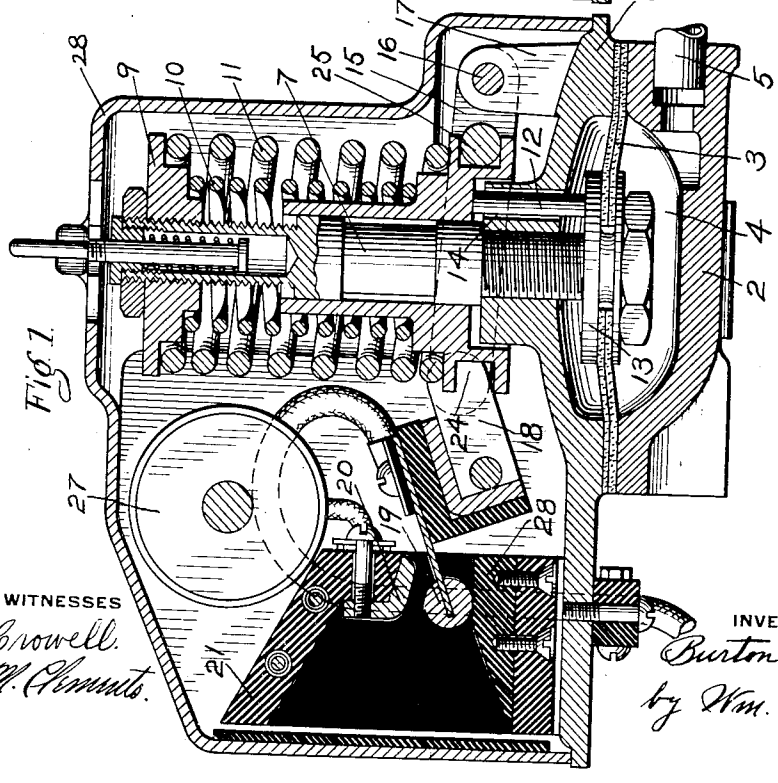


Fig 1.

WITNESSES

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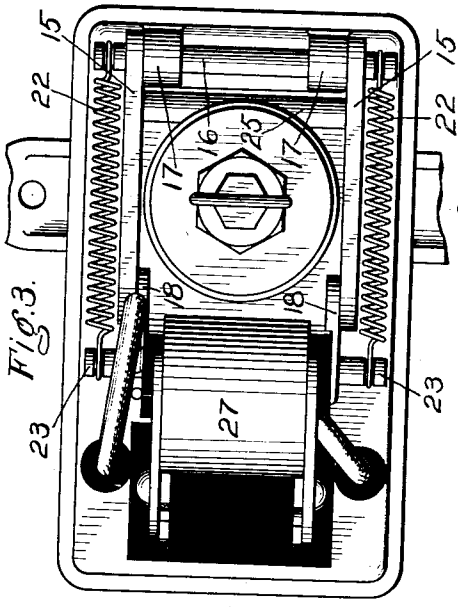


Fig. 3.

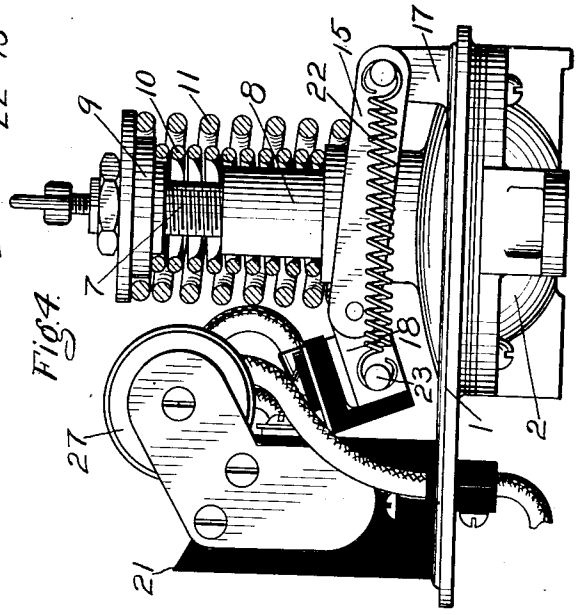


Fig. 4.

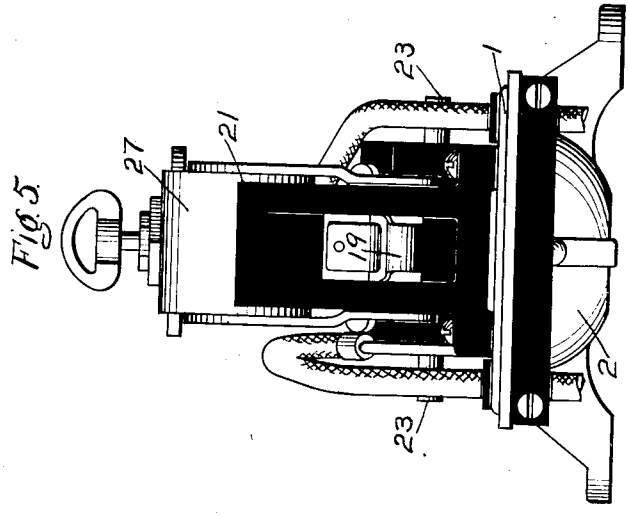


Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

BURTON S. AIKMAN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NATIONAL BRAKE & ELECTRIC COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ELECTRIC PUMP-GOVERNOR.

1,227,230. Specification of Letters Patent. Patented May 22, 1917.

Application filed December 24, 1914. Serial No. 878,962.

To all whom it may concern:

Be it known that I, BURTON S. AIKMAN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Electric Pump-Governors, of which the following is a specification.

This invention relates to electric pump governors, and more particularly to the type in which a strained spring is employed to throw a switch contact lever for effecting the opening and closing of the pump motor circuit, such as that shown in Patent No. 745,683 of S. B. Stewart, Jr., dated December 1, 1903.

One object of my invention is to provide a governor of the above type in which no movement of the parts takes place until the predetermined maximum and minimum pump pressures are reached at which the governor is adjusted to operate, so as to insure quick and certain movement of the contacts both in cutting-in and cutting-out.

Another object is to provide a governor construction of this type in which the switch contacts are held in engagement with the maximum pressure until the predetermined pump pressure is attained at which the governor is adjusted to operate.

Another object of my invention is to provide a pump governor of the strained spring type, in which the switch contacts have an automatic wiping or self cleaning action.

In the accompanying drawings, Figure 1 is a central vertical section of an electric pump governor embodying my invention, showing the parts in the cut-out position; Fig. 2 a similar view, showing the parts in the cut-in position; Fig. 3 a plan view of the governor, with the casing removed; Fig. 4 a side elevation thereof; and Fig. 5 an end elevation.

The governor may comprise a casting 1 having a chambered cap 2 secured thereto, a flexible diaphragm 3 being clamped between the casting and the cap. The chamber 4 at one side of the diaphragm 3 is connected by a pipe 5 to the pump or storage reservoir, so that one side of the diaphragm is always subject to the pressure of fluid compressed by the pump. A vertical stem 7 is screwed into the apertured central portion of the casing 1 and serves as a guide for a movable spring plate 8. The outer end of the stem 7 is screw threaded for a stationary but adjustable spring plate 9 and between the spring plates 8 and 9 are mounted coil springs 10 and 11.

One or more pins 12 are secured to the diaphragm plate 13 and extend through openings 14 in the casting 1 so as to engage the under face of the spring plate 8.

On opposite sides of the spring plate 8 levers or links 15 are fulcrumed on bearing pin 16 mounted in lugs 17 and pivotally connected to said links is a short contact arm 18 carrying a rounded contact 19 adapted to engage a fixed contact 20, the contacts being contained in a suitable molded chute 21 of insulating material.

Adjacent to each link 15 is a coil spring 22 having one end attached to a projecting end of the bearing pin 16 and the other end to a pin 23 carried by the contact arm 18.

An annular groove 24 is provided in the spring plate 8 and a pin 25 connecting the links 15 operates in said groove, so that movement of the spring plate 8 may be communicated to the links 15.

The tension of the springs 10 and 11 may be adjusted by screwing down the spring plate 9 and said plate is held in its adjusted position by means of a jam nut 26. A magnet blow-out coil 27 of the usual construction may be provided for suppressing arcs formed when the switch contacts are separated.

The governor parts may be inclosed within a suitable removable casing 28.

In operation, if the pump pressure acting in chamber 4 against the under side of the diaphragm 3 is less than the tension of the springs 10 and 11, the spring plate 8 will be moved to its seat on the upper face of the casting 1 and thereby the pin 25 is shifted so as to effect a downward movement of the links 15.

During this movement, the contact 19 rests on the stop 28 which acts as a fulcrum, so that the arm 18 is rocked on its pivot connection with the links 15. As soon as the center of this pivot connection is moved below the axes of the springs 22, the force of said springs is immediately exerted to throw the contact arm 18 upwardly and cause the contact 19 to engage the fixed contact 20.

The contact arm 18 is short as compared with the links 15, so that an inward wiping movement of the contact 19 on the contact

20 is effected, which thus insures clean contact surfaces at the point of final engagement.

The pump motor circuit being thereby closed, the pump is operated to compress fluid in the usual way.

The switch contacts are firmly pressed together during the time that the contacts are in engagement by the tension of the springs 22.

When the pump pressure has been raised to the maximum degree at which the governor is designed to cut-out, the diaphragm 3 is moved so as to cause the pins 12 to lift the spring plate 8 against the tension of the springs 10 and 11. The links 15 are then elevated by the movement of the pin 25 and the fixed contact 20 acting as a fulcrum for the contact 19, the contact arm 18 is rocked on its pivot connection with the levers 15 until the pivot center is shifted across the axes of the springs 22 and then the tension of the strained springs 22 is instantly exerted to throw the arm 18 and the contact 19 out of engagement with the fixed contact 20 with a quick snap-like movement which prevents the formation of arcs.

The upward movement of the diaphragm 3 is limited by the engagement of the diaphragm plate 13 with the lower end of the stem 7 and the parts remain in the cut-out position, as shown in Fig. 1 of the drawing, until the pump pressure falls to the predetermined maximum pressure at which the governor is adjusted to cause the pump to be cut in, when the operation of the governor to cut in the pump is effected as hereinbefore described.

It will be noted that the maximum effective resistance of the strained springs 22 is exerted when the contact 19 is in the cut-out and cut-in positions, from which it follows that the diaphragm 3 is not moved until the predetermined maximum and minimum pump pressures are reached at which the governor is adjusted to operate.

The above action insures the quick and certain movement of the switch contact and prevents possible centering of the links and the contact arm. By means of the present construction, the contacts are pressed into engagement with the maximum spring pressure of the springs 22 until the contacts separate.

The maximum pump pressure at which it is desired to have the governor cut out may be regulated by varying the tension of the springs 10 and 11 through the adjustment of the spring plate 9 and the maximum pump pressure at which the pump will cut in depends upon the tension of the strained spring 22. If a wide range between tht cutting-out and cutting-in pressures is desired, the strained springs are made of heavy gage wire and the range may be made closer by employing springs of lighter gage wire.

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

1. An electric pump governor comprising an arm, a switch contact carried at the extreme end of said arm, stops for engaging and limiting the movement of said contact, a member supported at one end by a fixed pivot and having a pivoted connection with said arm, springs connecting the remote ends of the arm and member, and a movable diaphragm operated according to the opposing pressures of the pump and a spring for shifting the pivotal connection of the arm across the axes of the springs with the contact fulcrumed on one of the stops, to thereby cause the springs to throw the arm and the switch contact into engagement with the other stop.

2. An electric pump governor comprising a movable switch contact, an arm carrying said contact, fixed stops for engaging and limiting the movement of said contact, one of which constitutes the fixed contact, links pivotally supported at one end and having a pivotal connection with said arm, strained springs connecting the remote ends of the links and said arm, and a movable abutment subject to the pressure of fluid compressed by the pump and operatively connected to said links for effecting the movement of the pivotal connection of the arm across the spring axes with one of the stops acting as a fulcrum.

In testimony whereof I have hereunto set my hand.

BURTON S. AIKMAN.

Witnesses:
THOS. T. BOURS,
WM. K. BOYLE.