W. K. RANKIN.

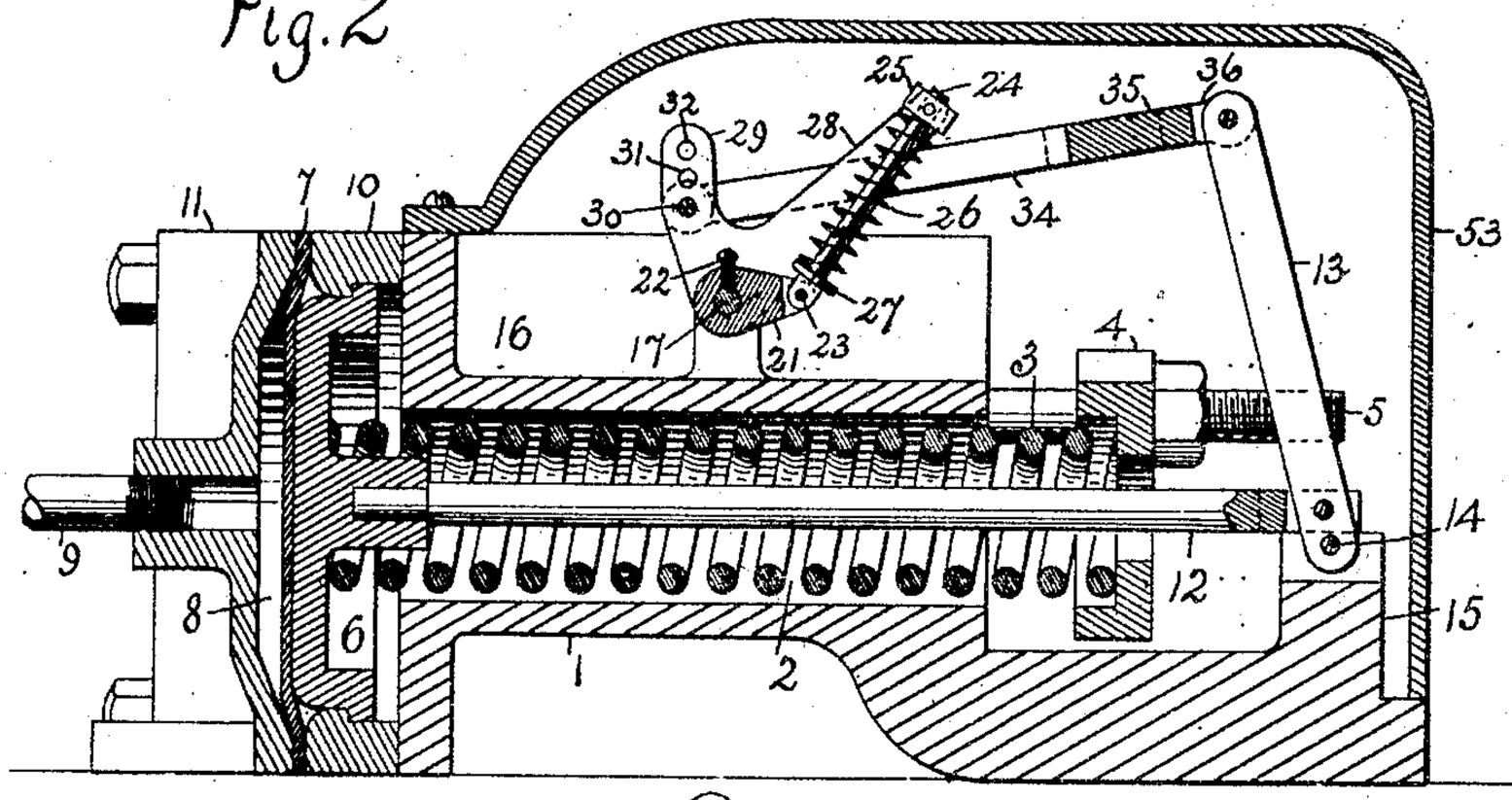
ELECTRIC AND PNEUMATIC GOVERNOR.

APPLICATION FILED MAY 22, 1907. RENEWED AUG. 6, 1908.

915,112. Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 2



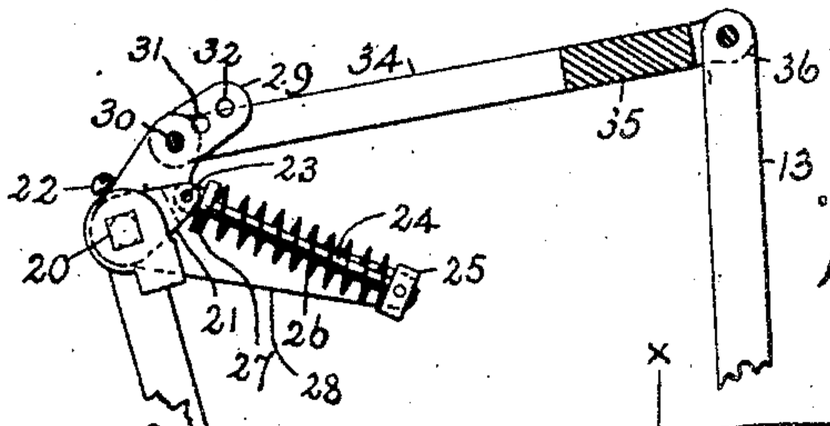
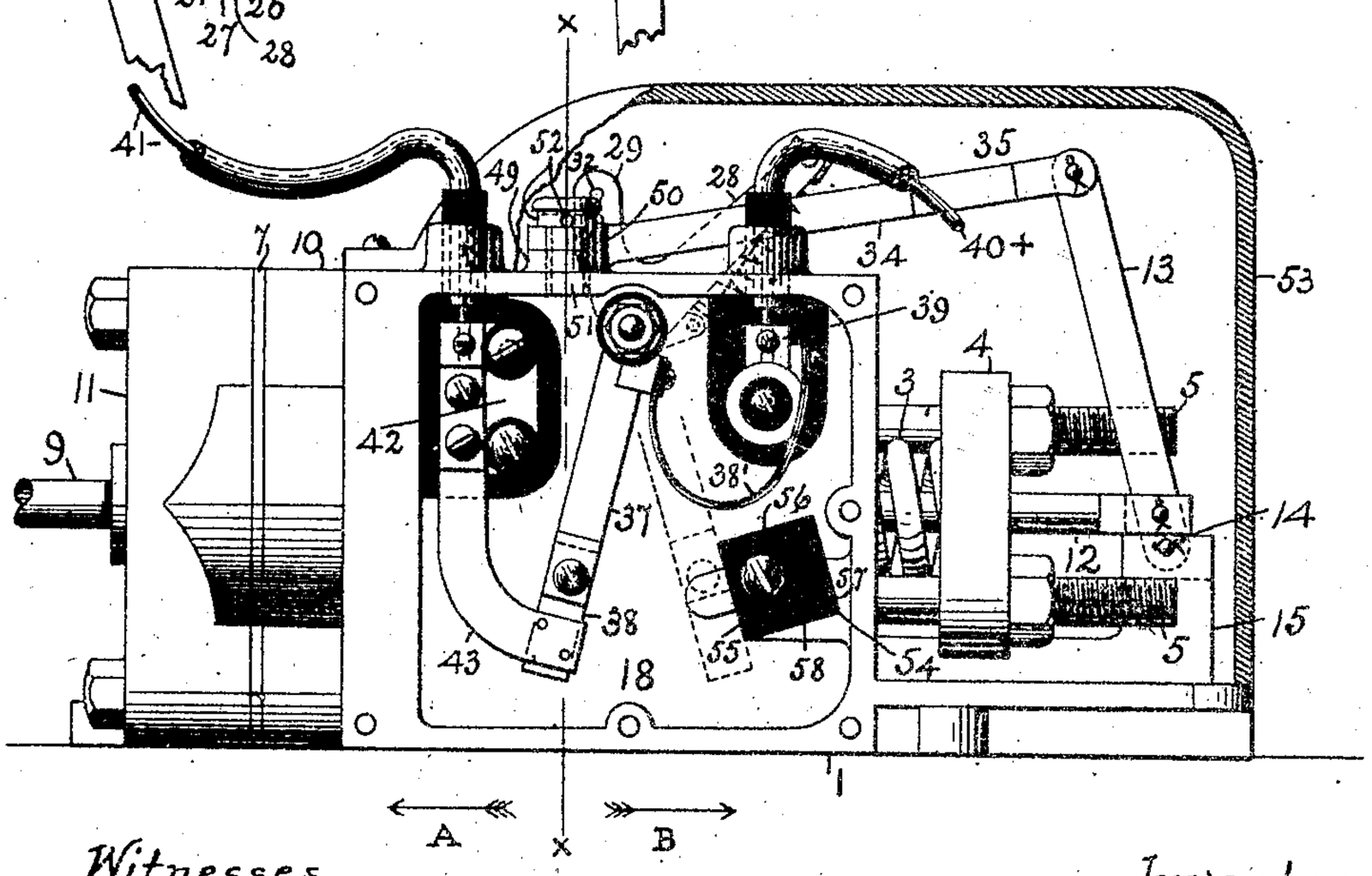


Fig. 6



Witnesses.
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Fig. 1

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Fig. 3

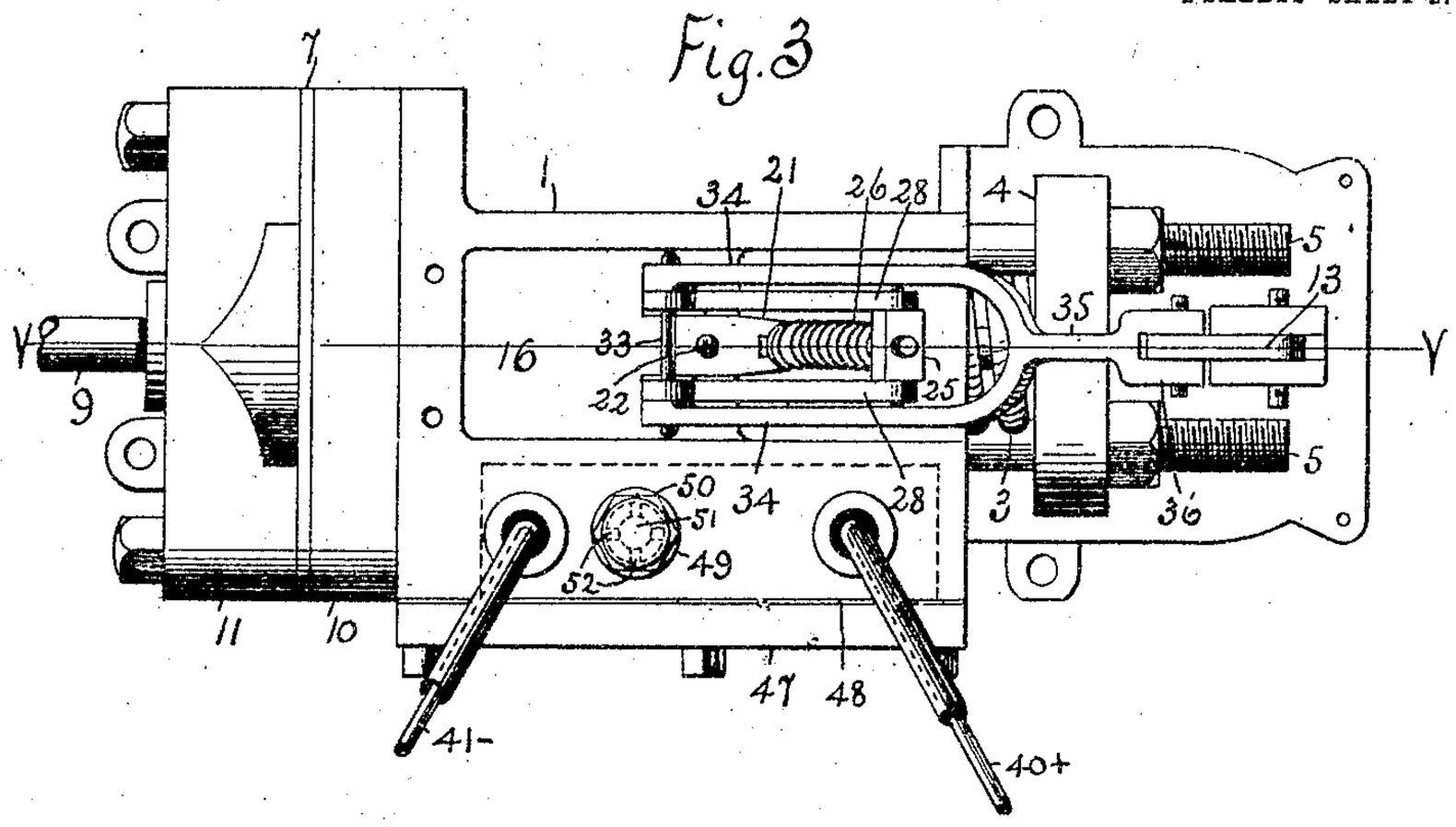


Fig. 4

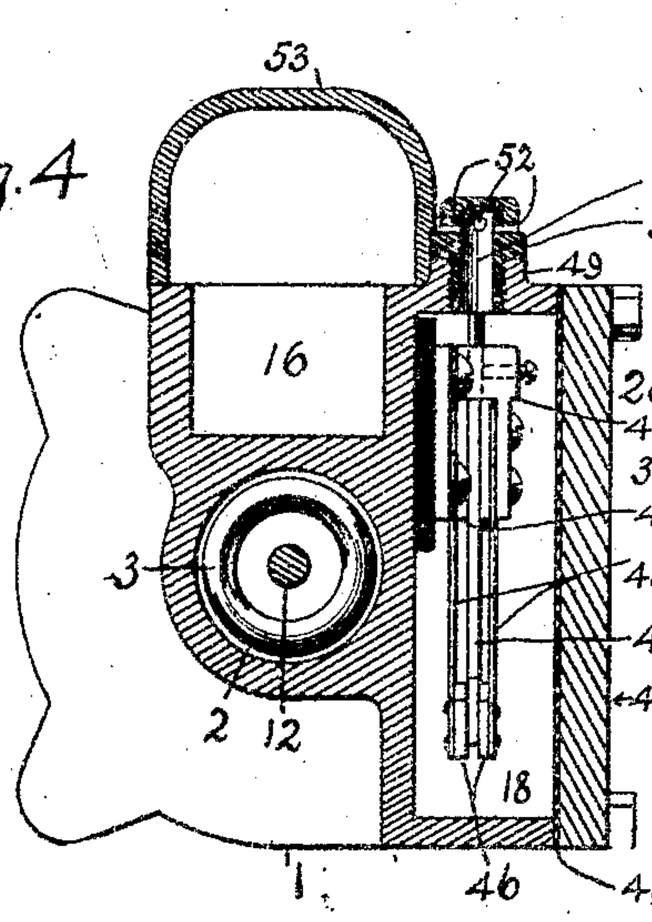
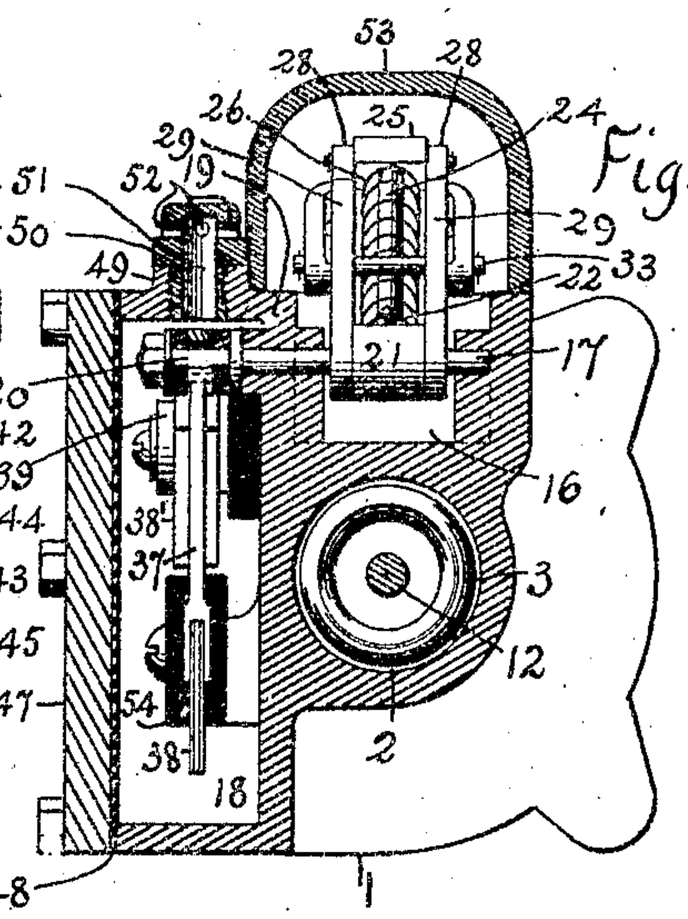


Fig. 5



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UNITED STATES PATENT OFFICE.

WILLIAM K. RANKIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN E. REYBURN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC AND PNEUMATIC GOVERNOR.

No. 915,112. Specification of Letters Patent. Patented March 16, 1909.

Application filed May 22, 1907. Serial No. 375,047. Renewed August 6, 1908. Serial No. 447,323.

To all whom it may concern:

Be it known that I, WILLIAM K. RANKIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Electric and Pneumatic Governors, of which the following is a specification.

This governor is for the control of an electric air compressor, by the action of the pressure within an air reservoir, which, when the pressure has been reduced to an allowed minimum, automatically forms a circuit to the compressor's motor to increase the pressure to an allowed maximum, which then breaks the circuit, and stops the motor until the pressure has again decreased to an allowed minimum. The governor is thus controlled by the pressure in the reservoir between a fixed maximum and minimum amount. Means are provided whereby different degrees of extreme pressures may be had by a change of attachments requiring only a slight manipulation, and there is also a means to correct any inequalities in the resilient means employed for the operation of the switch, all of which are more fully set forth in the specification.

The mechanism is illustrated in the accompanying drawings wherein the same characters of reference indicate the same parts throughout the views.

Figure 1 is a side elevation, with the cover to the oil chamber removed, and the top cover mostly in section. Fig. 2 is a central vertical section on line V V Fig. 3. Fig. 3 is a top view with the top cover removed. Fig. 4 is a section on line X X Fig. 1 looking in the direction of arrow A. Fig. 5 is also a section on line X X Fig. 1 looking in the direction of arrow B. Fig. 6 is a fragmentary view showing the position of parts connected to the switch blade when the circuit is broken.

In an integral case 1 there is a spring pocket 2 for the diaphragm spring 3, with its outer end in a seat 4 having screws 5 by which to adjust the spring's tension against the follower 6 at the opposite end of the spring, which is in contact with diaphragm 7 in chamber 8, having a pipe 9 in communication with the air reservoir (not shown). A seat 10 limits the movement of follower 6, and a head 11 holds seat 10 and diaphragm 7 to case 1. By the tension put on spring 3 the desired maximum pressure against the diaphragm and in the air tank is obtained.

Attached to follower 6 there is a rod 12 which passes outward, through, and beyond seat 4, with its outer end bifurcated to receive a lever 13 pivoted at 14 to a lug 15 of case 1. Above spring pocket 2 there is a recess 16, across which there is a shaft 17 which, extends within the oil receptacle 18, it has a collar 19 and a square inner end 20. In recess 16 an arm 21 is adjustably secured to shaft 17 by a screw 22, the outer end of the arm is bifurcated, and a pivot 23 secures thereto a rod 24, outwardly extending and freely guided through a spring seat 25; a spring 26 is placed around rod 24, between seat 25 and a collar 27 of rod 24. The spring seat 25 is pivotally supported between arms 28 which are rotatably journaled on shaft 17. Arms 28 have extensions 29 wherein are holes 30, 31, 32 to receive a pin 33 for the attachment of bifurcations 34 of reach rod 35 with jaws 36 adapted for attachment to diaphragm lever 13.

Within oil receptacle 18, and secured to the square part 20 of shaft 17 there is an insulated switch blade 37 having a removably secured contact 38 and a yielding copper ribbon conductor 38′ to a terminal 39 of the incoming conductor 40. Opposite the blade there is a terminal for the outgoing conductor 41, comprising a base plate 42 with attached fingers 43 of thin yielding copper plates, separated by pieces 44 from an interposed live-stop 45 against which contact 38 abuts, and renewable contacts 46 for fingers 43.

The oil receptacle 18 has a removable cover 47 and a compressible gasket 48. A boss 49 above receptacle 18 receives a ventilator 50 with a passage 51 from the receptacle with outlets 52 to the atmosphere. A removable cover 53 incloses the working parts exterior to the oil receptacle.

The operation is as follows; as illustrated in Figs. 1, 2, 3, the working parts are in the positions assumed when the pressure in the air reservoir has been reduced to its allowed minimum pressure, and the diaphragm has operated connected mechanism to form a circuit to the motor-compressor. As the pressure in the air reservoir accumulates diaphragm 7 forces follower 6 and its rod 12 t(

move lever 13 and cause it, through its connections to pull down the rotatable arms 28 which move in a path eccentric to pivot 23, causing the compression of spring 26 until the spring passes the dead center of arm 21 when the spring expands and pushes up arm 21 and through shaft 17 carries blade 37 back against dead stop 54, breaking the circuit and stopping the motor-compressor, with the spring, its arm and movable parts as seen in Fig. 6. As the pressure in the reservoir decreases the movements just described will be reversed and the circuit will again be formed, with the parts as seen in Fig. 1. Pin 33 is attached through holes 30 in extensions 29, which allow for a movement of the parts for a variation of ten pounds pressure between maximum and minimum against diaphragm 7 and in the reservoir, while holes 31, 32 will permit a variation of 13 and 15 pounds respectively. To compensate for the inequalities of springs 26, or variations in set or resiliency, the stop 54 is adjustably attached with its side 55 nearest the center of attachment, and sides 56, 57, 58 each in succession more remote, so that by turning the stop the movement of blade 37 may be limited to suit the power of the spring, which is preferable to replacing the spring.

I claim.

In an electric and pneumatic governor, a fluid pressure diaphragm, a switch blade and electrical connections thereto; a terminal adapted for engagement by the blade, and a conductor therefrom; a shaft whereto the blade is attached, an arm affixed to the shaft and coöperating with the blade, a spring pivotally attached to the arm, extending outwardly therefrom, and its outer end seated upon a pivotally supported guide; rotatable arms supporting the guide, extensions from the arms with interchangeable means for attaching the means operative by the diaphragm and whereby upon the accumulation of an excess of pressure, or the decrease of pressure, within fixed limits, the outer end of the spring is moved eccentric to its pivotal connection to the arm aforesaid, whereby to force the movement of the arm and blade as the alinement of the shaft and spring pivot are passed.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM K. RANKIN.

Witnesses:
LEWIS H. REDNER,
RANSOM C. WRIGHT.