

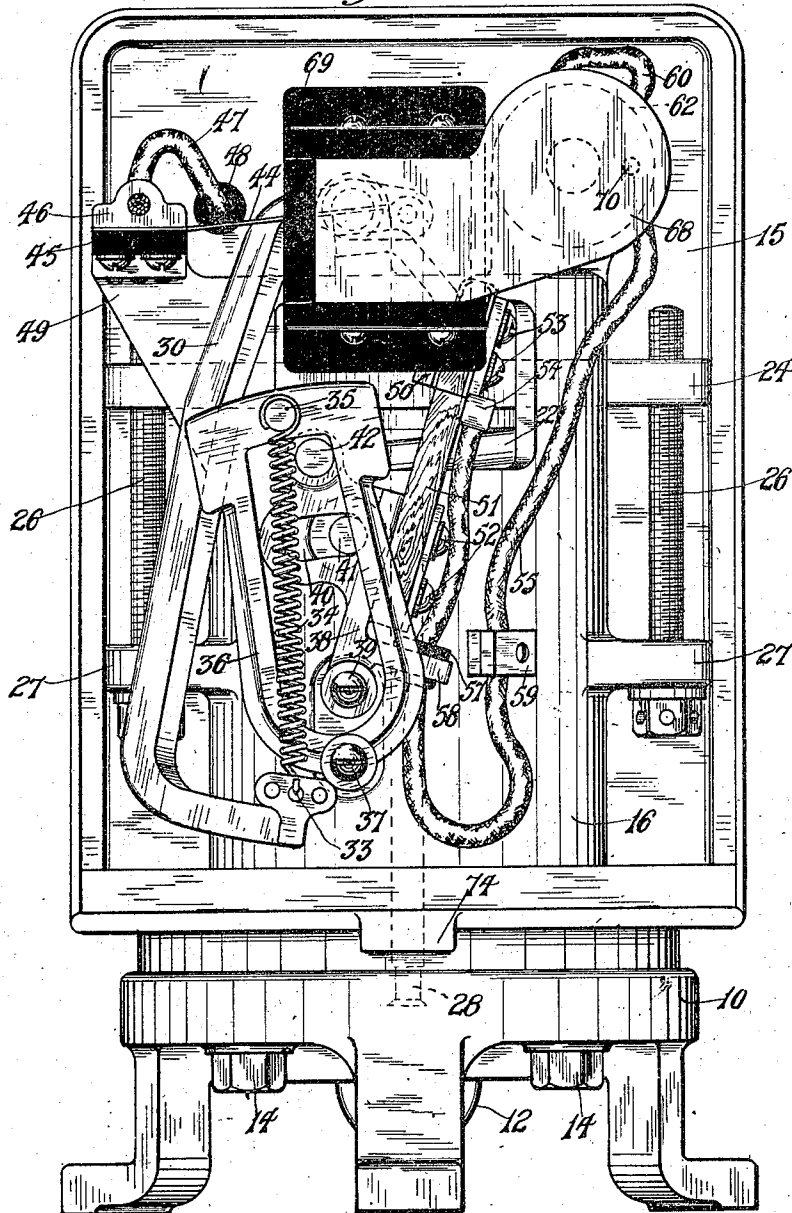
W. J. RICHARDS.
GOVERNOR.
APPLICATION FILED APR. 26, 1909.

969,193.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
A. G. Andrews.
Anna Schmittbauer

Inventor
Walter J. Richards.
By Benedict, Morse & Caldwell.
Attorneys.

W. J. RICHARDS.
GOVERNOR.

APPLICATION FILED APR. 26, 1909.

969,193.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 2.

Fig. 2.

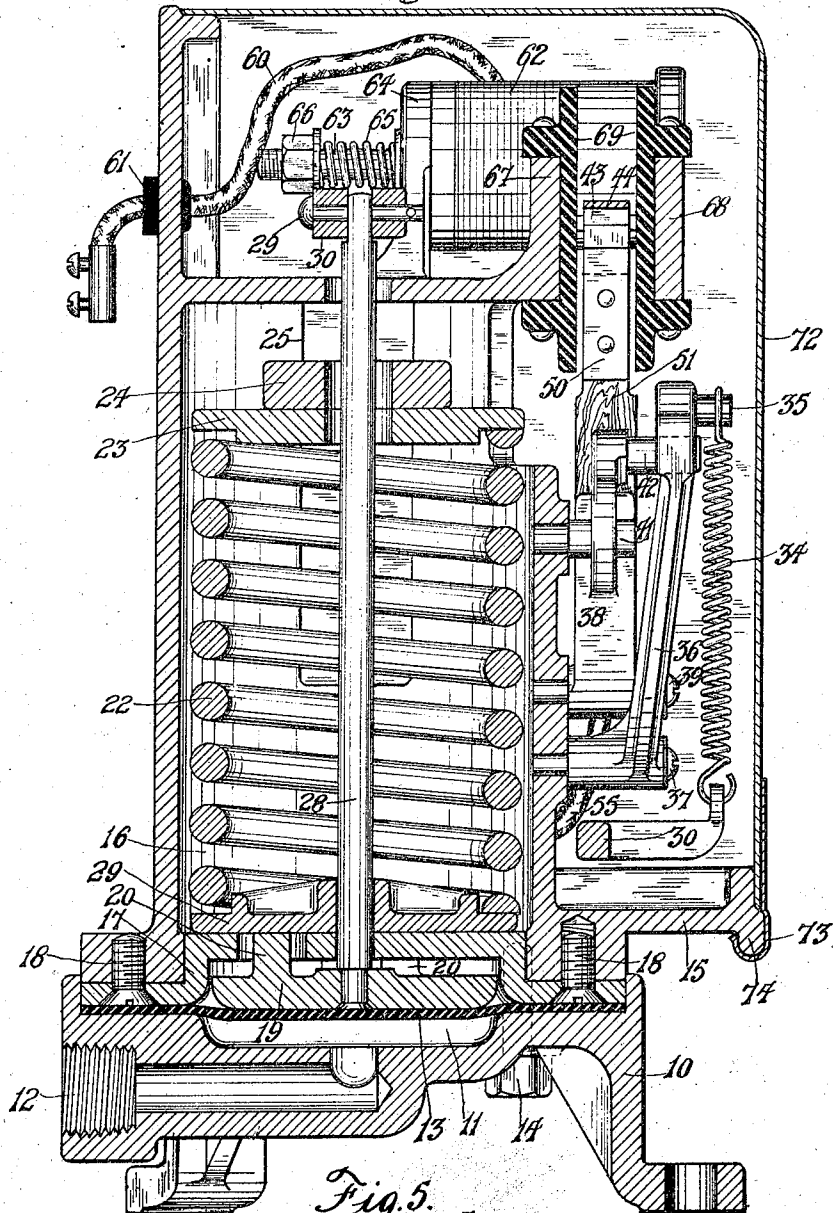
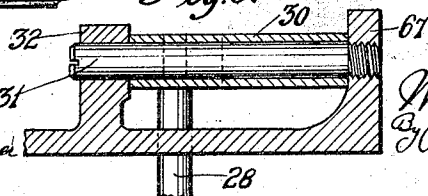


Fig. 5.

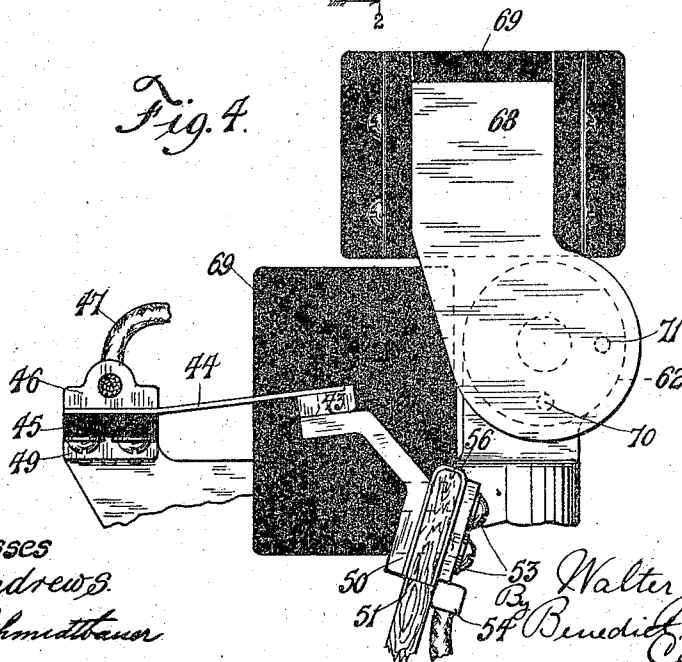
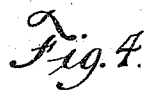


Witnesses
A. V. Andrews
Anna Schmidt

Inventor
Walter J. Richards
By B. B. Morsell &
Caldwell
Attorneys.

969,193.

3 SHEETS--SHEET 3.



Witnesses
A. Y. Andrews.
Anna Schmittbauer

Inventor
Walter J. Richards
Benedict, Morrill &
Caldwell,
Attorneys

UNITED STATES PATENT OFFICE.

WALTER JOSEPH RICHARDS, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO NATIONAL BRAKE & ELECTRIC COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

GOVERNOR.

969,193.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed April 26, 1909. Serial No. 492,301.

To all whom it may concern:

Be it known that I, WALTER J. RICHARDS, residing in Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Governors, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention has for its object to provide a switch mechanism or governor actuated by condition changes, such as the variation in pressure in an air pressure system like the air brake system of a railway car, to control the operation of the motor compressor or the like, and adapted to accomplish a quick movement in one direction upon the occurrence of a maximum condition and to effect a quick movement in the opposite direction upon the occurrence of a minimum condition.

The main object of the invention is to provide such a governor which will be highly sensitive to condition variations and which will accomplish its movements with speed to avoid destructive arcing at the switch contacts.

A further object of the invention is to provide an improved construction of the respective parts of such governors whereby they become more durable and efficient in use.

I desire it to be understood that this invention is not limited to any specific form or arrangement of parts except in so far as such limitations are specified in the claims.

With the above and other objects in view the invention consists in the governor herein claimed, its parts and combinations of parts and all equivalents.

Referring to the accompanying drawings in which like characters of reference indicate the same parts in the different views; Figure 1 is a front elevation of a governor of this invention with the sheet metal casing removed; Fig. 2 is a central vertical sectional view thereof with the sheet metal casing in place and some parts sectioned out of the central plane for clearness of illustration; Fig. 3 is a plan view thereof with the sheet metal casing removed; Fig. 4 is a detail view showing one pole piece of the blow out magnet swung out of its normal position to render the switch contacts accessible; and,

Fig. 5 is a sectional detail view of the pivotal connection for the lever.

In these drawings 10 indicates a base which is so formed as to constitute a cup like chamber 11 with a pipe connection 12 leading thereto. A rubber diaphragm 13 covers the chamber 11 and is clamped in place between the upper surface of the base and the casing 15 which is clamped to the base by means of bolts 14. The casing 15 is preferably of cast metal and at one part forms an upstanding cylinder 16 into the end of which is let a dished cylinder head 17 fastened by means of screws 18 and bearing upon the edges of the rubber diaphragm 13. A plunger head 19 is contained within the chamber between the cylinder head 17 and the rubber diaphragm, being rounded on its under surface where it bears on the diaphragm, and is provided with upstanding lugs 20 on its upper surface which pass through corresponding openings in the cylinder head and bear upon a spring pressed plate 21 which is within the cylinder. A coil spring 22 bears at its lower end on the plate 21 and at its upper end it engages a similar plate 23 which is held by an adjusting yoke 24 the ends of which pass through slots 25 in the sides of the cylinder and have adjusting screws 26 threaded therein with their heads engaged in slotted lugs 27 on the sides of the cylinder. By turning the screws 26 the yoke 24 may be raised or lowered in the slots 25 to vary the compression of spring 22.

The compressed air beneath the diaphragm 13, which is received from the connection with a compressed air reservoir or the like, serves to move the plunger head 19 upwardly and thereby lift the plate 29 when the pressure is sufficient to overcome the pressure of the coil spring 22. Such upward movements of the plunger head are utilized for operating a switch through a system of leverage which will multiply the degree of movement to make it available for that purpose. A plunger stem 28 is secured to the plunger and loosely passes through the cylinder head 17 and the plate 21 as well as through the plate 23 and the yoke 24 and the top of the cylinder. At its upper end it is pivotally connected by a pin 29 to the short end of a lever 30 which is fulcrumed close by on a pin 31 between lugs 32 and 67 on the top

of the cylinder with its longer arm extending forwardly and downwardly to a position near the lower end of the casing where it is provided with one or more openings 33. A coil spring 34 connects with one of the openings 33 at its lower end and at its upper end it engages a lug 35 on the upper end of a hammer member 36 which is pivoted at 37 to the front of the cylinder 16. A switch member 38 is pivotally mounted at 39 to the front of the cylinder and is provided with an arc shaped slot 40 into which projects a stud 41 on the front of the cylinder to limit the pivotal movements of the switch member, while a stud 42 on the switch member projects into a slot or opening in the hammer member 36 to be engaged by said hammer member for causing the movements of the switch member.

An upward movement of the stem 28 produced by the pressure beneath the diaphragm causes it to lift the short end of lever 30 and thereby swing the long end of said lever to the right from the position shown in Fig. 1, and as soon as the lower end of the spring 34 is carried beyond the line between the pivotal connection 37 of the hammer member and the spring connecting stud 35, said spring 34 serves to forcibly throw the hammer member 36 to the right from its position shown in Fig. 1, to strike the stud 42 of the switch member a hammer blow and quickly move said switch member to the right from the position shown in Fig. 1, and these movements of the switch member and the hammer member are limited by the engagement of the stud 41 with the end of the slot 40 of the hammer member. Likewise, a downward movement of the stem 21, due to a reduction in pressure beneath the diaphragm so that the spring 22 becomes superior, causes the lever 30 to swing back toward the position shown in Fig. 1, and as soon as the lower end of spring 34 is again carried beyond the line of its connection 35 with the hammer and the pivotal connection 37 of the hammer, said hammer is forcibly thrown by the spring to the left and by striking the stud 42 with a hammer blow causes the switch member to also move to the left until the parts are brought to rest in the position shown in Fig. 1, by the engagement of the stud 41 with the end of slot 40.

The movements of the switch member 38 are caused to open and close switch contacts for controlling an electrical circuit which may be the circuit of a motor compressor for supplying the compressed air. A stationary contact 43 is supported on the end of a leaf spring 44 which is clamped on the end of an insulating block 45 by means of a cleat 46 which receives the end of a wire cable 47 entering the casing through an insulating bushing 48 at the rear thereof; the insulat-

ing block 45 being supported on a bracket extension 49 from the top of the cylinder. An angularly bent movable contact 50 is carried on the end of an insulating arm 51, preferably of wood, which is connected by bolts 52 with the switch member 38, the said movable contact being held on the arm 51 by means of bolts 53 which also hold a cable terminal 54 of a wire cable 55. Desirably a metal strap 56 passes around the end of the arm to form a connection between the cable terminal and the movable contact. The cable 55 passes through an insulating bushing 57 in a ring 58 on the switch member 38 near its pivotal connection and also passes through a cleat 59 on the wall of the cylinder.

In order to disrupt the arc which may be drawn upon opening the switch, a blow out magnet is provided, with one end of its winding connected with the wire cable 55 and the other end of its winding connected with a wire cable 60 leading out of the casing through an insulating bushing 61 in the back thereof. The blow out magnet comprises a magnet spool 62 which has a bolt 63 projecting from its core and securing it to an upstanding lug 64 forming a part of the integral frame at the top of the cylinder, there being a spring 65 surrounding said bolt and gearing at one end against the lug 64 and at the other end against an adjusting nut 66 on the bolt to hold the magnet spool against the face of the lug 64 with pressure. Another upstanding integral lug 67 on the frame forms one pole piece of the blow out magnet, the other pole piece being formed by a plate 68 which forms an arm rigidly mounted on the magnet spool 62. The pole pieces 67 and 68 of the blow out magnet are provided with arc deflecting guards 69 of insulating material which are spaced apart to permit of the movements of the switch contacts between them, the pole pieces being located on opposite sides of the switch contacts to disrupt the arc between them when the switch is opening. When it is desired to have access to the switch contacts for any purpose, the arm 68 may be swung upwardly, for the normal position of the magnet spool is determined by a pin 70 projecting from the end thereof and fitting in a corresponding recess 71 in the lug 64 and to swing the arm it is only necessary to draw the magnet spool against the action of spring 65 so as to remove the pin 70 from the recess 71 and then turn the magnet spool on the bolt 63 as a pivot to lift the arm to an upright position as shown in Fig. 4.

The four open sides of the frame may be inclosed by a sheet metal hood or cover 72 which fits around the edges of the back and bottom of the casing formed by the frame 15 and may be held in place by a spring

catch 73 engaging a lug 74 at the bottom of the frame.

The operation of the invention has been fully described incidental to the description of its various parts and from what has been stated it will be seen that the governor mechanism is extremely sensitive to the fluctuation of fluid pressure, having the slight movement of the plunger head greatly multiplied by the relative distances from the pivotal center of the stem connection and the spring connection with the lever 30. During either its closed or open position the switch member 38 is held by the action of spring 34 against moving, but as soon as the lower end of said spring is swung to the other side of the line connecting the lug 35 and the pivotal connection 37 the effect of the spring is to quickly swing the hammer member and cause it to strike a hammer blow on the stud of the switch member and throw the switch member by the combined effect of such blow and the continued pull of the spring 34 to its other position, thus opening or closing the switch automatically with a quick and positive action and holding it in its new position with spring pressure until conditions change to cause it to be thrown to its other position.

The presence of more than one of the openings 33 in the lower end of the lever 30 is to permit of the adjustment of the connection of the spring 34 with said lever to the right or the left to compensate for inaccuracies in the positioning of the connecting points of the lever and the hammer member.

The construction of the plunger head 19 and the cylinder head 17 is such that when the pressure beneath the diaphragm is less than normal the said diaphragm is relieved of the pressure of spring 22, the plate 21 being limited in its downward movement by the cylinder head.

What I claim as my invention is:

1. A governor for air pumps and the like, comprising a casing, a dished plate secured to the casing, a plunger head working within the recess of the dished plate and provided with lugs projecting through openings in the dished plate, a pressure flexed diaphragm bearing on the plunger head, a spring pressed plate within the casing bearing on the ends of the lugs of the plunger head, and a movable circuit controller having connection with the plunger head to be operated thereby.

2. A governor for air pumps and the like, comprising a cylindrical casing, a dished plate fitting in the end thereof, a plunger head working in the recess of the dished plate and provided with lugs extending through openings in the dished plate, a pressure flexed diaphragm bearing on the plunger head, a spring contained within the cas-

ing, a spring plate bearing on the ends of the lugs of the plunger head and engaging the end of the spring, a yoke member passing through openings in the sides of the casing and bearing on the end of the spring, adjusting screws engaging the casing and the ends of the yoke member for adjusting the compression of the spring, and a circuit controller having connection with the plunger head to be operated by the movements thereof.

3. A governor for air pumps and the like, comprising a casing, a pressure flexed diaphragm, a plunger head bearing on the diaphragm, a coil spring within the casing for applying pressure to the plunger head, a yoke member projecting through openings in the casing and bearing on the spring, adjusting screws engaging the casing and the ends of the yoke member to vary the compression of the spring, a stem connected to the plunger and passing through the yoke member, and a movable circuit controller actuated by the movements of the stem.

4. A governor for air pumps and the like, comprising a plunger sensitive to variations in air pressure, a suitably fulcrumed lever having connection with the plunger stem, a spring carried by the longer end of the lever, a pivoted hammer member to which the spring is connected, a pivoted switch member in the path of the hammer member to be struck thereby and forcibly moved to or from its closed position, and a stationary switch member cooperating with the pivoted switch member to constitute a circuit controller therewith.

5. A governor for air pumps, and the like, comprising a plunger sensitive to variations in air pressure, a casing through which the stem of the plunger passes, a lever fulcrumed on the casing and having connection with the plunger stem, a spring carried by the longer end of the lever, a pivoted hammer member to which the spring is connected at such a point that the axis of the spring will cross the axis of the hammer member during the movements of the lever and thereby cause the hammer member to swing, a pivoted switch member in the path of the hammer member to be struck thereby and forcibly moved from its closed position, and a stationary switch member cooperating with the pivoted switch member to constitute a circuit controller therewith.

6. A governor for air pumps and the like, comprising a cylindrical casing, a spring pressed plunger therein sensitive to variations in air pressure, a lever pivotally mounted on top of the cylindrical casing and having its short end connected with the plunger and its longer end extending toward the other end of the cylindrical casing on the outside thereof, a coil spring connected to the longer end of the lever, a ham-

mer member pivotally mounted on the casing and having the coil spring connected to it at a point which will cause the movements of the lever to carry the axis of the spring from one side to the other of the axis of the hammer member whereby the hammer member is caused to swing from side to side, a switch member also pivotally mounted on the casing and provided with a projection to engage the hammer member at points spaced apart to allow for play of the projection between said engaging points, and a stationary switch member cooperating with the pivoted switch member to constitute a circuit controller therewith.

7. A governor for air pumps and the like, comprising a casing, a pressure sensitive switch mounted on the casing and consisting of a stationary contact and a movable contact, a projection on the casing, a blow out magnet having a bolt pivotally mounted in

the projection, a head on the bolt, a spring on the bolt between the head and the projection, a pin and recess connection between the blow out magnet and the projection, a plate carried by the blow out magnet and forming one pole piece thereof, a projection on the casing forming the other pole piece of the blow out magnet, and insulating deflector plates secured to the pole pieces of the blow out magnet and having the switch contacts between them, the blow out magnet being capable of being moved against the pressure of its spring to disengage its pin and socket connection and then turned to render the switch contacts accessible.

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

WALTER JOSEPH RICHARDS.

Witnesses:

W. K. BOYLE,
A. V. LOOSE.