

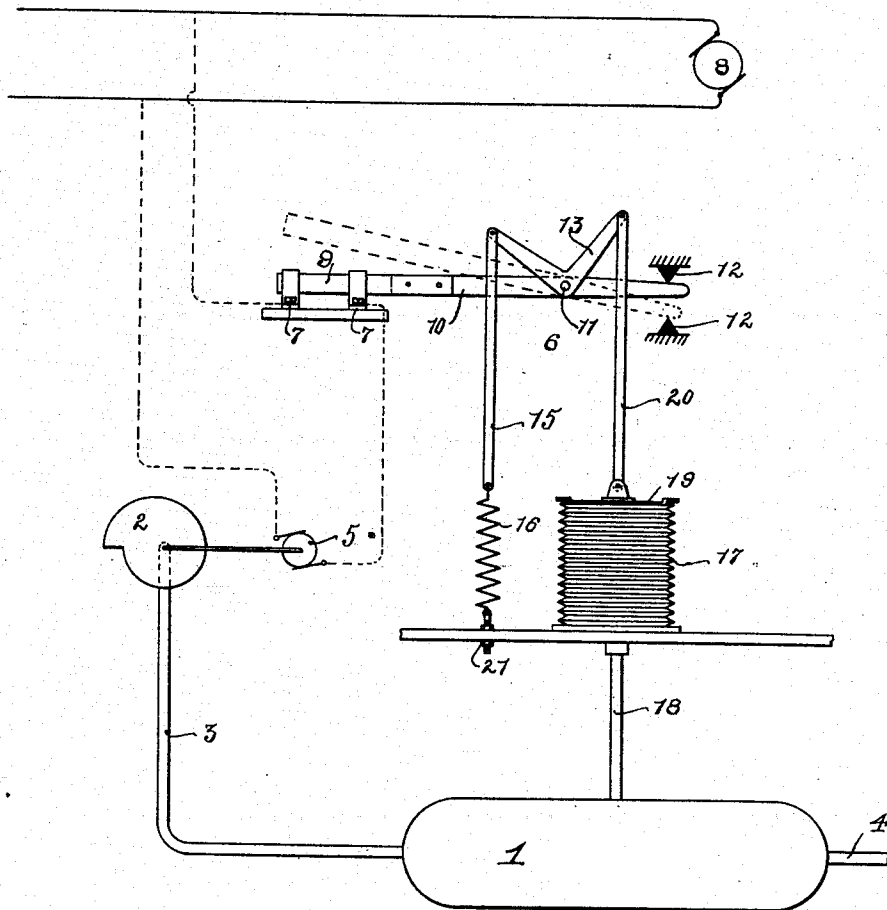
No. 674,840.

Patented May 21, 1901.

C. HOFFMANN.
CIRCUIT CONTROLLER.

(Application filed Mar. 10, 1900.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

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CIRCUIT-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 674,840, dated May 21, 1901.

Application filed March 10, 1900. Serial No. 8,213. (No model.)

To all whom it may concern:

Be it known that I, CARL HOFFMANN, a subject of the Emperor of Germany, residing at Charlottenburg, Germany, have invented a certain new and useful Improvement in Circuit-Controllers, (Case No. 337,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to circuit-controllers, and has for its object the provision of improved means whereby the continuity of a circuit is dependent upon the amount of pressure in a closed receptacle.

More particularly, my invention relates to means whereby the amount of pressure in a receiver is adapted to control the continuity of circuit through a motor, whereby a pump may be operated to retain the pressure in said receiver at a normal value. In the operation of air-pumps for supplying air to a reservoir—as, for instance, in the reservoirs of air-brakes—it is advisable to control the amount of air which is forced into the receiver—i. e., to control the pressure stored therein—by operating the said air-pump at various times, the duration of this operation of the air-pump being as nearly as possible dependent upon the pressure in the receiver, so that the same may be kept at a normal value. For this reason it is advisable that the pump be controlled automatically by the pressure in the receiver. It is likewise of importance to control the pressure in vessels which are adapted to have the air exhausted therefrom by automatically connecting the same with an air-pump, the vacuum in the receiver automatically controlling means for producing this effect. The provision of automatic means for retaining the pressure or vacuum in receivers at the normal value is also of importance, inasmuch as no time need be wasted in performing the same operation by hand, in which case it requires close attention to a pressure-gage in order that the normal pressure be not deviated from greatly.

Generally speaking, my invention comprises a suitable governor, which is in communication with a receiver in which the supply of air is adapted to be maintained at a

normal value, the said governor being preferably constructed after the manner of a bellows, which is operatively associated with one arm of a bell-crank lever, the other arm of the bell-crank lever being operatively associated with an adjustable spring or other suitable controlling means. The bell-crank lever in the preferred embodiment of the invention is preferably operatively associated with a pivotally-mounted switch-arm through a suitable tripping device, whereby the switch-arm is adapted to rapidly engage and disengage terminals for controlling the continuity of the circuit through a motor which is preferably coupled to an air-pump, the said air-pump being adapted to supply or exhaust air from the receiver.

I will describe my invention more particularly with reference to the accompanying drawing, illustrating the preferred embodiment thereof, in which the figure is a diagrammatic view of the apparatus of my invention.

Like characters of reference indicate similar parts.

In the figure I have shown a receiver 1 as being in communication with an air-pump 2, adapted to exhaust the air therefrom through a pipe 3, a pipe 4 connecting the receiver with the place at which it is desired to keep the rarefaction of air at a normal value.

The air-pump 2 is preferably operated by means of a motor 5, with which it is mechanically connected. The operation of the motor 5, and consequently of the air-pump, is controlled by means of my improved controlling device 6. The motor 5 is adapted through the terminals 7 7 to be connected in circuit with leads supplied with current from the generator 8, the continuity of the circuit through the said terminals being controlled by a switch-arm 9. The switch-arm 9 is mechanically united to and electrically insulated from a second arm 10, pivotally mounted upon a shaft 11, the range of movement of the said arm being controlled by means of stops 12 12. In the position shown the circuit is closed at the terminals, while in the alternative position of the switch-arm the circuit at the said terminals is opened, this alternative position of the switch-arm being in-

licated by dotted lines. The switch-arm 10 is operatively associated with a bell-crank lever 13. One arm of the bell-crank lever 13 is connected by means of a link 15 to an adjustable spring 16, while the remaining arm is connected to a governor 17, which is hollow and constructed, preferably, with sides of corrugated iron, the interior whereof is in communication with the receiver 1 by means of the pipe 18, a change in the pressure of the receiver effecting a vertical displacement of the cover 19 of the said governor 17, thereby vertically displacing the link 20, which connects the said cover with the bell-crank lever 13. I preferably provide nuts 21 for adjusting the tension of the spring 16.

The operation of the device will now be evident. In the position shown the circuit through the motor 5 is closed through the terminals 77 by means of the switch-arm 9, thereby operating the air-pump 2 to exhaust air from the receiver 1. The rarefaction of air in the governor 17 corresponds with the rarefaction of air in the receiver 1, inasmuch as they are in communication with each other. If the rarefaction in the receiver, and consequently in the governor, has reached a predetermined amount, a sufficient downward movement of the link 20, uniting the said governor with the bell-crank lever 13, will cause the switch-arm 10, through the aid of the tripping device, to suddenly open the circuit and occupy the position indicated by dotted outlines, the amount of rarefaction at which the said switch-arm is thrown being controlled by means of the adjustable spring 16 and the nuts 21. If now the amount of air in the receiver has increased and has reached a certain amount, the governor 17 will allow the link 20 to recede sufficiently under the influence of the spring 16 to operate the tripping device in a reversed direction, thereby quickly again closing the circuit through the motor 5, and air will then be again exhausted from the receiver 1.

It is evident that in case the receiver is adapted to be used as a storing-chamber instead of a rarefaction-chamber the relative positions of the governor 17 and the spring 16 will be reversed with respect to the bell-crank lever 13.

I have herein particularly described my invention with reference to air-receivers; but I do not wish to limit myself to such application of my invention.

It is obvious that changes may readily be made in the device of my invention herein shown and particularly described without departing from the spirit thereof, and I do not, therefore, wish to be limited to the precise construction and arrangement shown; but

I claim as new, and desire to secure by Letters Patent, the following:

1. The combination with a reservoir and means for varying the pneumatic pressure therein, an electric motor for operating said

pressure-varying device, a circuit connected with said motor, a switch device controlling said circuit, a governor consisting of a hollow structure made collapsible and expansible communicating with the reservoir, and connections between said governor and the switch device, whereby the variation of pneumatic pressure in the governor varies the size thereof and thereby operates the switching device, substantially as described.

2. The combination with a reservoir, a pressure-varying device for varying the pressure therein, an electric motor for operating such device, a circuit extending to said motor, a switch controlling said circuit, a bell-crank lever for operating said switch, a spring holding said lever in a desired normal position, a governor consisting of a collapsible and expansible hollow device communicating with the reservoir, and a link connecting the said governor with the bell-crank, whereby variation in size due to the change in the pneumatic pressure in the governor causes the said link to operate the bell-crank and thereby by the switch, substantially as described.

3. The combination with a reservoir, a device for varying pressure therein, an electric motor for operating said device, and with a circuit connected with said motor, of contacts arranged in said circuit, a switch-arm arranged to connect said contacts when the arm is swung down, a bell-crank for operating said switch-arm, a governor consisting of a hollow metal structure made collapsible and expansible by variation of interior pneumatic pressure, a pipe connecting said governor with the reservoir, a link connecting the governor with one arm of the bell-crank, and a spring connected with the other arm of the bell-crank for holding the same in normal position, substantially as described.

4. The combination with the reservoir and means for varying the pneumatic pressure therein, of a governor consisting of a hollow structure made collapsible and expansible, the said governor being in communication with the reservoir, and means whereby the variation in size of the governor by pneumatic pressure controls the device for varying such pneumatic pressure, substantially as set forth.

5. The combination with a reservoir, and means for varying the pneumatic pressure therein, of a governor consisting of a collapsible and expansible bellows-like metallic structure, the said governor being in communication with the reservoir, and means for controlling the pressure-varying device by the expansion or contraction of the said governor, substantially as set forth.

In witness whereof I hereunto subscribe my name this 14th day of February, A. D. 1900.

CARL HOFFMANN.

Witnesses:

WOLDEMAR HAUPT,
WILLIAM MAYNER.