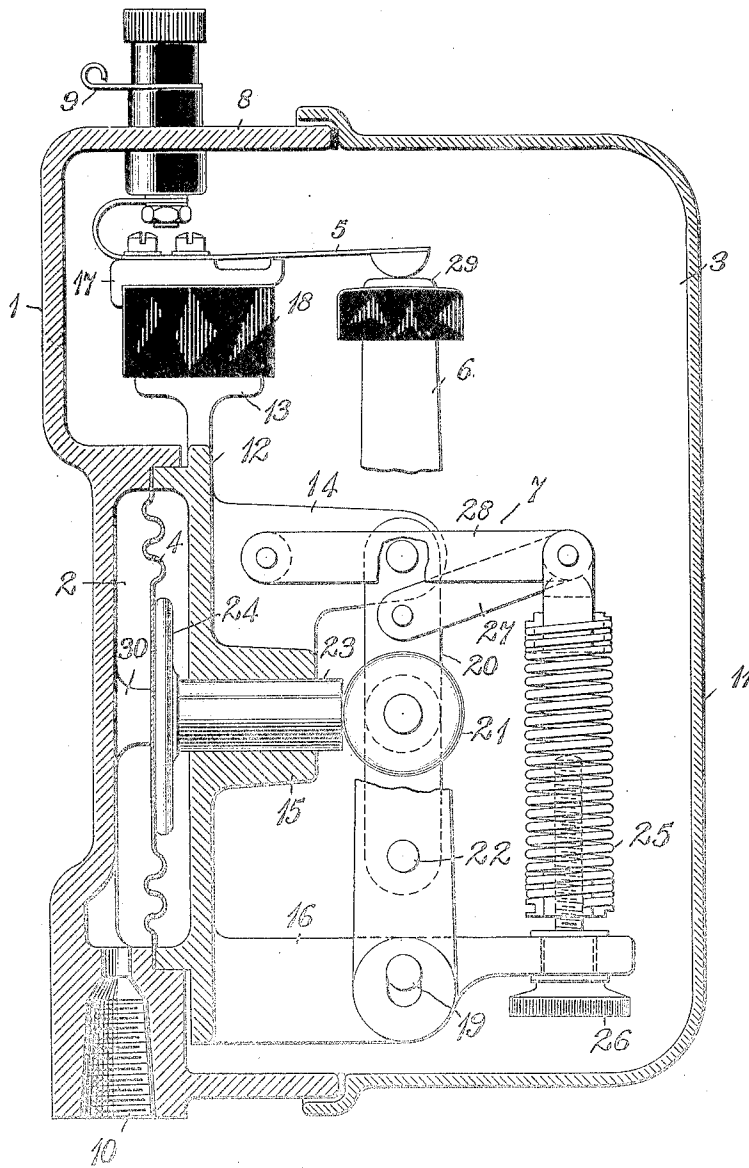


C. AALBORG.
 FLUID PRESSURE CONTROLLED SWITCHING DEVICE.
 APPLICATION FILED DEC. 6, 1907.

974,328.

Patented Nov. 1, 1910.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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FLUID-PRESSURE-CONTROLLED SWITCHING DEVICE.

974,328.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Application filed December 6, 1907. Serial No. 405,407.

To all whom it may concern:

Be it known that I, CHRISTIAN AALBORG, a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Fluid-Pressure-Controlled Switching Devices, of which the following is a specification.

My invention relates to electric switching devices, and it has special reference to such devices as are operated by fluid-pressure.

The object of my invention is to provide an improved device of the class above indicated that shall be adapted for automatically breaking and making an electric circuit, according as fluid-pressure, supplied to a receiving chamber in the device, exceeds or falls below a predetermined amount.

When electric current is utilized for generating steam for heating railway vehicles and for other purposes, it is specially desirable to provide automatic means for completing and interrupting the electric supply circuit according as the steam-pressure in the generator or boiler falls below or exceeds a predetermined amount.

The fluid-pressure in storage reservoirs of various kinds, such as the tanks employed in air brake systems, is often produced and maintained by electric motor-driven pumps, and it is frequently necessary to start and stop the motor in order to keep the pressure in the reservoir or tank substantially constant.

According to my present invention, I provide a fluid-pressure relay or switching device which is specially adapted for governing electric circuits in accordance with fluid-pressure variations, and it is simple and compact in construction.

The single figure of the accompanying drawing is a sectional elevation of a switching device constructed in accordance with my invention, certain of the levers being partially broken away to more fully disclose the complete operating mechanism.

Referring to the drawing, the device here illustrated comprises a casing 1 in which a pressure-receiving chamber 2 and a chamber 3, containing the operating mechanism, are formed, a diaphragm 4 which constitutes one wall of the chamber 2, stationary contact fingers 5, a movable contact member 6 and a switch-operating mechanism 7.

The casing 1 comprises a cover member 11, and a body portion 8 having terminal members 9 by which suitable leads may be connected to the contact fingers 5, and a tapped hole 10 which communicates with the chamber 2 and is adapted to receive one extremity of a fluid-conducting pipe.

The diaphragm 4 is firmly supported in the chamber 2 by a flanged cap 12 which is provided with a plurality of projections 13, 14, 15, and 16 for supporting the operating mechanism 7. The contact fingers 5 are secured to a finger base 17 which, in turn, is supported by projection 13 of the cap 12 and is insulated therefrom by a spacing block 18. The contact-bearing arm 6 is pivotally supported upon the projection 16 by a pin shaft 19.

A lever 20, to which a roller 21 is secured at an intermediate point in its length, is connected at one extremity to the contact-bearing arm 6, near the shaft 19, by a pin 22 and, at its other extremity, it is pivotally connected to the projection 14.

The arrangement of parts is such that a relatively slight lateral movement of the lever 20, produced by a force applied to the roller 21, will effect a relatively large degree of movement of the contact-bearing arm 6 thereby widely separating the movable contact member from the contact fingers 5.

The roller 21 is engaged by one end of a plunger 23 the other end of which is provided with a head 24 which engages one side of the diaphragm 4, a stop 30 being provided to engage its other side when the fluid-pressure is reduced below a certain limit.

The contact members are normally held in engagement with each other when the fluid-pressure in the chamber 2 is less than a predetermined amount by a spring 25 the tension of which is adjustable by means of a screw 26, said spring being connected to the lever 20 by a link 27 and to the projection 14 by a link 28, the arrangement of parts being such that the plunger head 24 is held against the diaphragm 4 by the action of said spring.

In operation, the admission of fluid-pressure to the chamber 2 through the port 10 acts, through the diaphragm 4, to force the plunger 23 against the roller 21, thereby producing a rotative movement of the lever 20

about its point of connection with the projection 14. This movement serves to rotate the point 22 about the pin-shaft 19 and, consequently, the upper end of the lever 6 is moved through a considerable distance to carry the contact members 29 away from the contact fingers 5.

The points of connection between the links 27 and 28 and the lever 20 and projection 14 are such that a very small movement of the diaphragm materially reduces the leverage by which the spring acts against the plunger and, consequently, the action of the contact arm is positive and the pressure at which the action takes place is accurately determinate.

The predetermined pressure at which the switch shall open may be varied by adjusting the screw 26 to vary the pull of the spring 25.

Although I have shown and described a specific device, it is conceivable that various structural modifications may be effected within the scope of my invention, and I desire that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. In a fluid-actuated switching device, the combination with a fluid-receiving chamber, a diaphragm in said chamber, stationary contact fingers and a pivoted contact arm, of a plunger and a lever interposed between the contact arm and the diaphragm, a spring and two links that act in opposition to the fluid-pressure on the diaphragm, and means for adjusting the force exerted by the spring.

2. In a fluid-actuated switching device, the

combination with a fluid-receiving chamber, a diaphragm in said chamber, stationary contact members and a pivoted contact-bearing arm, of a lever interposed between a point near the pivot of the arm and a stationary part, a spring and two links one of which connects the spring to said lever and the other of which connects the spring to said stationary part.

3. In a fluid-actuated switching device, the combination with a fluid-receiving chamber, a diaphragm in said chamber, stationary contact members and a pivoted contact-bearing arm, of a lever which connects a point in the arm near its pivot to a stationary part, a roller mounted on said lever, a plunger interposed between the roller and the diaphragm, a spring and links for opposing the action of the pressure in the receiving chamber against the plunger, and means for adjusting the force exerted by the spring.

4. A fluid-actuated switching device comprising stationary and movable contact members, a fluid-receiving chamber, a diaphragm in said chamber, a plunger and a lever interposed between the diaphragm and the movable contact member, an adjustable spring and a link for forcing the plunger against the diaphragm in opposition to the fluid-pressure in the receiving chamber.

In testimony whereof, I have hereunto subscribed my name this 26th day of Nov., 1907.

CHRISTIAN AALBORG.

Witnesses:

H. C. SOULE,
BIRNEY HINES.