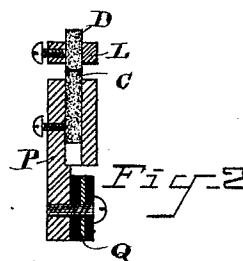
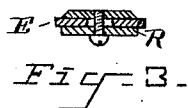
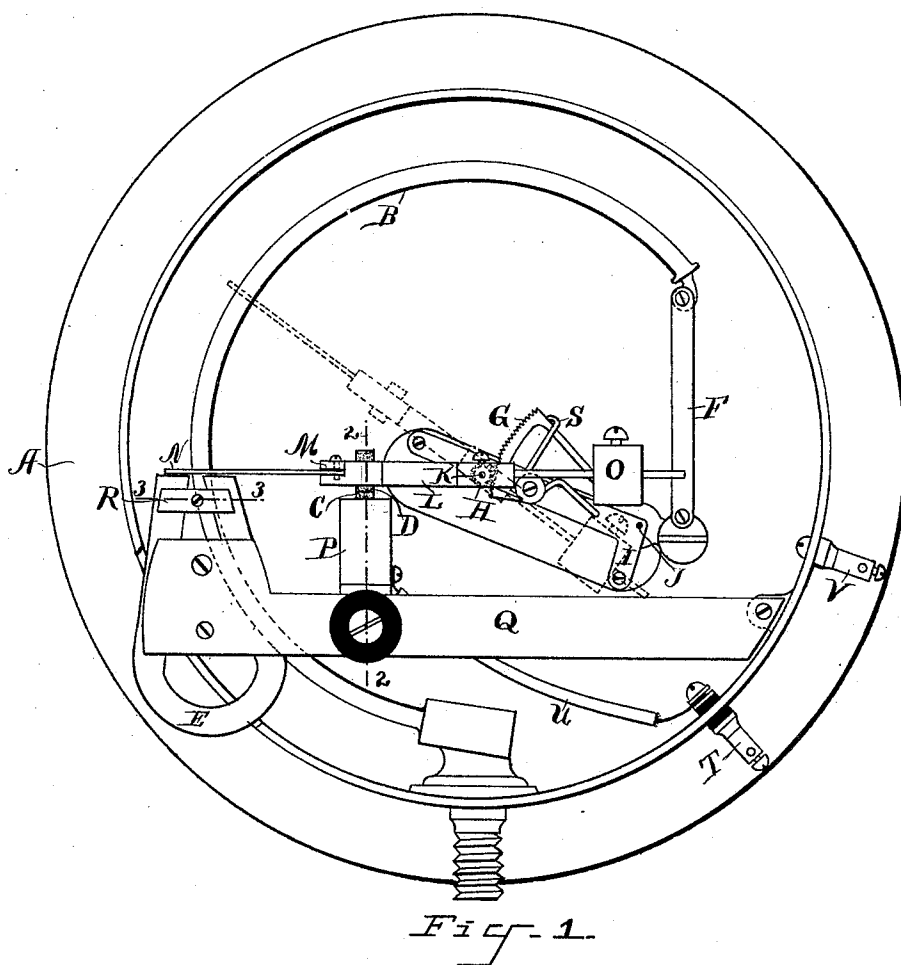


(No Model.)

B. B. WARD.  
CIRCUIT CONTROLLER FOR REGULATORS.

No. 527,092.

Patented Oct. 9, 1894.



ATTEST:  
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# UNITED STATES PATENT OFFICE.

BARTON B. WARD, OF NEW YORK, N. Y.

## CIRCUIT-CONTROLLER FOR REGULATORS.

SPECIFICATION forming part of Letters Patent No. 527,092, dated October 9, 1894.

Application filed October 13, 1893. Serial No. 488,056. (No model.)

*To all whom it may concern:*

Be it known that I, BARTON B. WARD, a citizen of the Dominion of Canada, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Circuit-Controller for Regulators, of which the following is a specification.

My invention relates to electric circuit controllers for regulators of various sorts as, for example, temperature regulators operating ventilators or dampers, or pressure regulators operating valves or pumps, or electric current regulators for making or breaking generator circuits generally.

The object of my invention is to provide an automatic circuit controlling contact so constructed and regulated that it may be operated by a device sensitive to fluctuations of fluid pressure, as a Bourdon tube, or by a device sensitive to changes of temperature as a bi-metallic bar. As an instance, it is desirable in dispensing malt liquors to maintain upon said liquors a pressure of air or gas which shall not drop below a certain fixed limit, say fifteen pounds, nor rise above another certain fixed limit, say twenty pounds. To accomplish this the compressor must be thrown into operation at the instant the pressure has dropped to the minimum and continue in operation until the maximum pressure has been reached. Then it should be thrown out of operation and remain inactive till the pressure has again dropped to the minimum. By constructing the regulator so as to provide this range of five pounds, the compressor is allowed quite an interval of rest between the periods of activity. In this way the life of the compressor is prolonged and a better effect is produced than when the attempt is made to keep the pressure constant at a fixed degree, in which case the compressor is constantly starting and stopping. This same interval of rest is desirable for the magnet, electric motor, or whatever other device may be used in actuating or controlling the operation of ventilators, dampers, valves or electric switches. My invention effectually controls these actuating devices by the moving contact gradually turning through an interval of lost motion till the desired degree is reached and the said actuating device thrown into operation. Then in the reverse

operation, said movable contact is retained in engagement with the fixed contact until the required degree of pressure is reached when it instantly breaks said engagement and throws said actuating device out of operation.

My invention, therefore, consists of a circuit controller in which a movable contact is actuated by a fluid pressure affected device or by a temperature affected device, or by any other automatically operating device, is retained in engagement with a co-operating contact until a certain pressure is reached and then instantaneously breaks said engagement.

It also consists in details of construction and arrangement of parts hereinafter described and pointed out in the claims.

In describing my invention reference is made to the accompanying drawings which form a part of the specification, and in which—

Figure 1, is a face view of my circuit controller, the cover being removed showing the parts in the position of rest, the operative position being indicated in dotted lines. Fig. 2, is a section on line 2, 2, of Fig. 1, showing the relation of the contacts; and Fig. 3, is a horizontal section indicated in Fig. 1, by line 3, 3, showing the regulator for the magnet.

In the drawings, A, indicates the casing which may be that of an ordinary pressure gage.

B, indicates the expanding and contracting member represented as a Bourdon tube.

C, indicates the fixed contact; D, the movable contact and E, the magnet controlling the movable contact.

To the end of the tube B, is connected a link F, which at its lower end is connected to a counter-balance of the sector gear G, which gear together with its pinion H, is mounted in a suitable frame I, the pivotal shafts for said sector and pinion being shown respectively at J and K. To the outer end of the shaft K, is secured arm L, for carrying the movable contact D. At one end of said arm L, is formed a clamp M, for securing to said arm the armature N. At the other end of arm L, is attached an adjustable counter weight O. The fixed contact C, is mounted in a post P, secured to and properly insulated from a cross-bar Q. Clamped between one end of said cross-bar and the casing is a small

permanent magnet E, which is so located that when the two contacts are in engagement armature N, shall rest across the poles thereof in close proximity thereto.

5 The contacts C and D, may be of any suitable form and material and supported in any convenient manner, but I have shown them as consisting of carbon rods adjustably seated within the arm L, and post P, respectively, 10 as shown in Fig. 2.

Upon the magnet E, is placed a keeper as R, and by moving this keeper to or from the poles of the magnet I regulate the attraction of the magnet for its armature. To insure 15 the keeper from being displaced by sudden jar, or any other means, I pass a screw through it into a nut bearing on the opposite face of the magnet as clearly shown in Fig. 3.

Upon the frame I, I mount an adjustable 20 stop S, which shall check the movement of sector G, when the armature N, has approached magnet E, sufficiently near to draw the contacts into engagement by virtue of the usual amount of slack motion in the gear and parts 25 associated therewith.

The object of clamping the armature to arm L, is that armatures of different size and mass may be substituted in adjusting the circuit controller to different pressures. By this 30 means and by means of the adjustable keeper my circuit controller can be perfectly regulated to operate through any desired range in variations of pressure. This range may be further extended by the use of magnets of 35 different strength.

It is obvious that in place of the permanent magnet, I may use any form of electro-magnet or solenoid or I may combine with the permanent magnet a de-energizing coil of any 40 of the usual forms as the circumstances of the case may suggest or require.

The arm L, may be set upon the shaft K, at various angles and by so changing the distance through which it will have to travel in 45 descending to the magnet it may to a certain extent determine the degree of pressure which may be reached before the contacts come together.

The circuit within the regulator is formed 50 as follows: The binding post T, is insulated from the casing and from it the wire U, leads to the post P, which post, as shown and described, is insulated from all parts of the regulator. When the contacts are in engage- 55 ment the circuit will pass from the contact C, to contact D, and through the parts of the regulator to the casing and to the other binding post V.

The operation of my regulator is as follows: 60 When the maximum amount of pressure is on the contact arm will stand substantially as indicated in Fig. 1, in dotted lines. Then as the pressure decreases, the arm will gradually descend until the contacts come 65 together when the armature will rest over the poles of the magnet. The circuit being now closed the regulator is thrown into operation,

the pumps started and the pressure begins to increase until the maximum degree is reached when it will have sufficient force to raise the 70 armature from the magnet and separate the contacts, thereby breaking the circuit and stopping the pumps. As soon as the maximum degree is reached and the armature starts from the magnet, the tube B, will assume its full expanded position and so cause 75 an instantaneous separation of the contacts.

It is obvious that this circuit closer may be operated by the use of other means than the Bourdon tube as by a metallic bar and that 80 when thus equipped it may be used in circuits controlling ventilators or like devices. It may also be used in other ways which will readily suggest themselves to mechanics and electricians and the parts thereof may be 85 modified in construction and arrangement without departing from the spirit of my invention.

What I claim as my invention is—

1. In a circuit controller for regulators, the 90 combination with a pair of contacts movable with relation to each other, of a contracting and expanding member for causing said motion, and a magnet for retaining said contacts in engagement until said member exerts a 95 predetermined degree of power.

2. In a circuit controller for regulators, the combination with a fixed contact, of a movable contact, an expanding and contracting 100 member connected to said movable contact, and a magnet for retaining said contacts in engagement during a predetermined interval.

3. In a circuit controller for regulators, the combination with an expanding and contracting 105 member, of a fixed contact, a movable contact connected to said member, a magnet for retaining said contacts in engagement until said member exerts a predetermined degree of 110 power, and means for regulating the strength of said magnet.

4. In a circuit controller for regulators, the combination with an expanding and contracting 115 member of a fixed contact, a movable contact carrying arm connected to said member and provided with a clamp at one end, an armature removably secured in said clamp for the purpose set forth, and a magnet located in the path of said armature.

5. In a circuit controller for regulators, the combination with an expanding and contracting 120 member of a fixed contact and a magnet, of a movable contact carrying arm connected to said member, an armature removably clamped in one end thereof, and an adjustable counterpoise attached to the other end 125 of said arm, as and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 11th day of October, A. D. 1893.

BARTON B. WARD.

Witnesses:

WM. H. CAPEL,  
T. F. CONREY.