

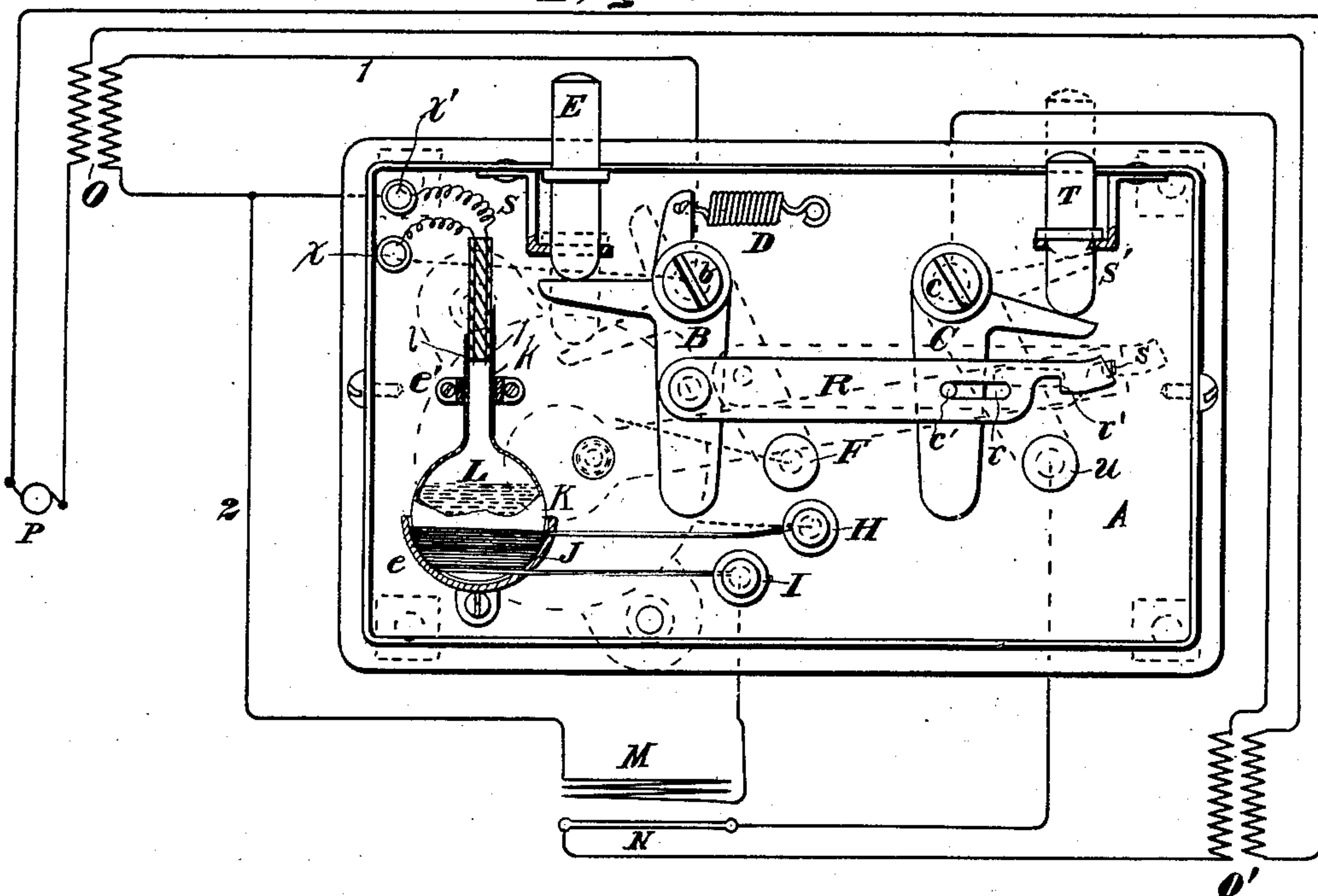
E. I. DODDS.

SWITCH FOR ELECTRIC CIRCUITS.

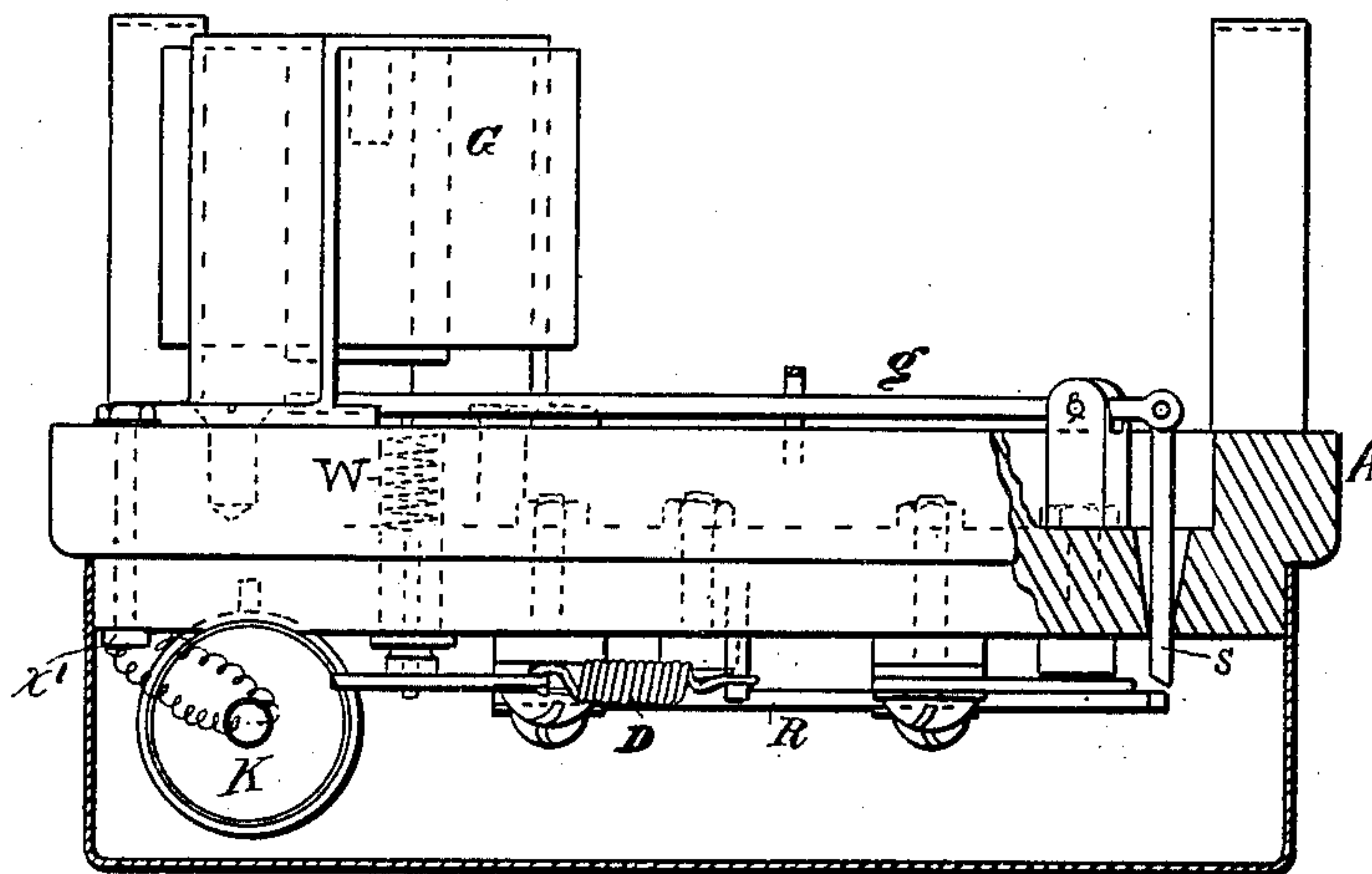
(Application filed Sept. 9, 1899.)

(No Model.)

*Fig. 1.*



*Fig. 2.*



WITNESSES:  
W. H. Chapel,  
J. H. Jones

INVENTOR  
E. I. Dodds  
BY  
Charles A. Ruy.  
ATTORNEY



# UNITED STATES PATENT OFFICE.

ETHAN I. DODDS, OF AVALON, PENNSYLVANIA, ASSIGNOR TO GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA.

## SWITCH FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 652,596, dated June 26, 1900.

Application filed September 9, 1899. Serial No. 729,887. (No model.)

*To all whom it may concern:*

Be it known that I, ETHAN I. DODDS, a citizen of the United States, and a resident of Avalon, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Time-Switches for Electric Circuits, of which the following is a specification.

My invention relates to automatic time-switches which are applicable, primarily, to circuits for operating electric lamps of the Nernst type. It is usually possible to determine pretty closely how long it is necessary to operate the electric heater of such a lamp in order to raise the temperature of the incandescing lamp-body sufficiently to render it conductive. Accordingly an automatic switch adapted to close the lamp-circuit and then by its own operation to break the heater-circuit at the end of a predetermined time would serve the purposes of lamps of this class, and the present invention is designed to apply such a switch, the details of which are illustrated in the accompanying drawings and fully described in the present specification.

In the drawings, Figure 1 is a side elevation of one of my improved switches, and Fig. 2 is a plan view showing the cover and one end of the switch-base in section.

On the base A are supported two angular levers B and C, pivoted, respectively, at *b c*. The lever B is acted upon by a spring D, tending to draw the upper end of said lever to the right. Acting on one arm of the lever B is push-button E, by means of which the said lever can be moved in opposition to the spring D. The arm B when thus pushed in opposition to the spring by the push-button E may be brought into contact with a conducting-terminal F, secured to the base A, whereby the main body of the arm B may serve to bridge across from the terminal F to the conducting-pivot *b*. The terminal F is connected by a suitable wire to the coil of a magnet G, behind the base A, the opposite extremity of the said coil being connected to a binding-post H on the said base. Between the said binding-post H and a similar binding-post I on the base A is a portion of an electric circuit including a fine heater-wire J.

The said heater-wire is wound around a bulb K, containing mercury, as shown at L. The bulb runs off into a narrow neck or tube *k*, into which project two insulated conducting-wires *l*. The said conducting-wires may be insulated by running them through a stopper made of cloth or rubber. The bulb K and the neck *k* are supported upon the base A by means of suitable brackets *ee'*. From the binding-post I the circuit passes to a heater M in proximity to a glower N. The said heater is supplied by any suitable source of electric current, such as a converter O, fed from a suitable generator P. The glower N may be fed from the same converter or from a second converter O', as shown in Fig. 1, or it may be fed from any other suitable generator. The circuit of the heater is completed on one side of the converter O by a wire 1, running to the pivot *b*, and on the other side by a wire 2, running directly to the heater M.

The angular lever C is connected to the lever B by a link R, having a slot *r*, in which a pin *c'* on the arm C rests. The link R is formed at its right-hand end so as to have a catch *r'* in line with a detent *s*, which projects forward through the base A and is connected with the armature-lever *g* of the magnet G. The arm C or one portion of it is adapted to be acted upon by the push-button T in the same manner as the arm B is acted upon by the push-button E. The arm C, however, has no spring which opposes the action of the button T. The push-buttons described pass through openings in the walls of the base A and are guided in their to-and-fro motion by suitable guides or brackets S and S', respectively. An insulated terminal *u* on the base A is adapted to be touched by the arm C, so as to complete a circuit across from the said terminal to its conducting-pivot *c*. The glower-circuit accordingly terminates at the terminal *u* and the pivot *c*.

The apparatus appears in Fig. 1 in its normal position before operation.

In order to operate the switch, one pushes in on the push-button E until the arm B comes into good electrical connection with the terminal F. By this operation the arm C is brought into good connection with the terminal *u*, and the push-button T is pushed out-



ward into the position shown in dotted lines. At the same time the link R is moved into a position where the detent *s* may engage with the catch *r'*, and since the heater-circuit is  
 5 closed by the same action the magnet G, included in the said circuit, becomes energized and causes the said detent to engage with the catch. The operator may now release the  
 10 push-button E and leave the circuit to take care of itself. Both the heater and the glower-circuit accordingly remain closed until the release of the detent, which takes place under the influence of a spring W, acting on the armature-lever *g*, as soon as the magnet  
 15 G is short-circuited, which takes place when the mercury in the bulb K rises into contact with the wires *l*. The spring W is made strong enough to withdraw the detent *s*, which having taken place the force of the spring D  
 20 draws the arm B away from the contact with the terminal F, and so breaks the original heater-circuit. The link R is carried along with the arm B; but, owing to the length of the slot *r*, it does not pull the arm C with it,  
 25 but leaves it in contact with the terminal *u*. To put out the lamp, the push-button T is operated to break contact between the arm C and the terminal *u* and restore the said arm C to the position which it occupies in Fig. 1.  
 30 The short circuit, which is closed by the contact of the mercury with the wires *l*, can be easily traced upon the drawings, Fig. 1. It passes from the pivot *b* by way of the wire (shown in dotted lines) to a binding-post X  
 35 on the base A. This binding-post is arranged side by side with a binding-post X' on the same base. The said binding-posts being connected, respectively, with the wires *l*, the short-circuit proceeds from the former binding-post by way of the wire *l*, the mercury  
 40 L, one of the wires *l*, and binding-post X', back to the source of current.

That part of my invention which is concerned with the expansible conductor L and  
 45 the heating-coil K and the circuit controlled thereby is applicable to any electric circuit which for any reason could be operated to advantage by a time-switch. Moreover, the device as a whole might be applied to a pair of  
 50 circuits, one of which was to operate for a predetermined period and the other at the will of the operator.

The invention claimed is—

55 1. The combination with two electric circuits and means for closing both circuits simultaneously, of an automatic time-switch controlling one of the said circuits.

2. The combination with two electric circuits, one including a glower of the type described and the other including an electric  
 60 heater therefor, of means for closing both circuits simultaneously, and an automatic time-switch for opening the heater-circuit at the expiration of a predetermined period.

3. The combination of an electric circuit including a glower of the type described, an  
 65 electric circuit including an electric heater for the said glower, a switch adapted to close the two circuits simultaneously, hand-operated devices controlling the said switch, an  
 70 automatic switch in the heater-circuit adapted to close a short circuit around the heater, the said switch being adapted to operate the said short circuit at the expiration of a predetermined period.  
 75

4. In an electric switch, two pairs of contact points or terminals and two arms adapted to bridge the said pairs of terminals, means for operating both arms simultaneously for  
 80 bridging the said terminals, and independent means for operating one of the said arms independently of the other in the breaking of the respective circuit which includes the terminals.

5. In an electric switch, two pairs of contact-terminals in separate electric circuits,  
 85 two contact-arms adapted to bridge the respective pairs, a link connecting the two arms, the said link being pivotally connected to one of the said arms and joined to the other arm  
 90 by a slot-and-pin connection, a push-button acting upon one arm for moving both arms simultaneously, a catch adapted to hold the arms from being retracted, a tooth on the said link coöperating with the said catch, and a  
 95 spring connected with one of the arms and tending to retract the said arm and the link connected therewith to their original position.

6. The combination with two circuits and  
 100 means for closing the same simultaneously, of a detent for holding one of the circuits closed, electrically-operated means for holding the said detent in place, an automatic  
 105 switch for cutting out the said electrically-operated devices and releasing the said detent.

Signed at New York, in the county of New York and State of New York, this 11th day of August, A. D. 1899.

ETHAN I. DODDS.

Witnesses:

WM. H. CAPEL,  
 GEORGE H. STOCKBRIDGE.