No. 652,598. Patented June 26, 1900.

# E. I. DODDS.

## SNAP SWITCH FOR ELECTRIC LAMP CIRCUITS.

(Application filed Sept. 9, 1899. Renewed May 29, 1900.)

(No Model.)

*Fig. 1.*

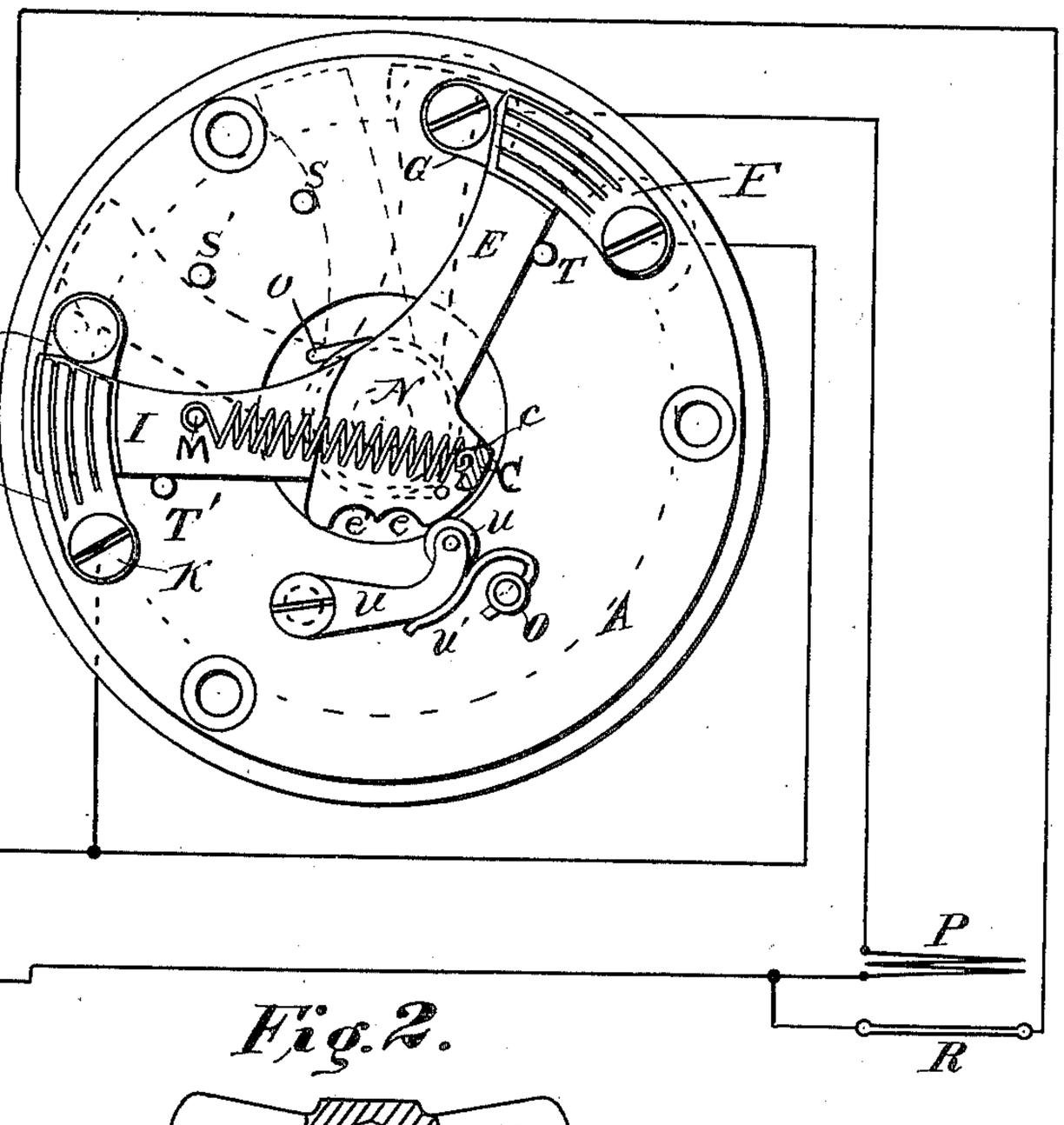
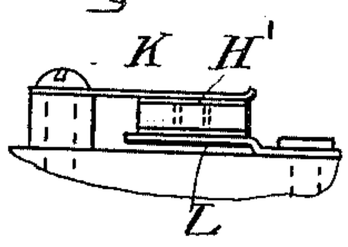



*Fig. 2.*

*Fig. 3.*



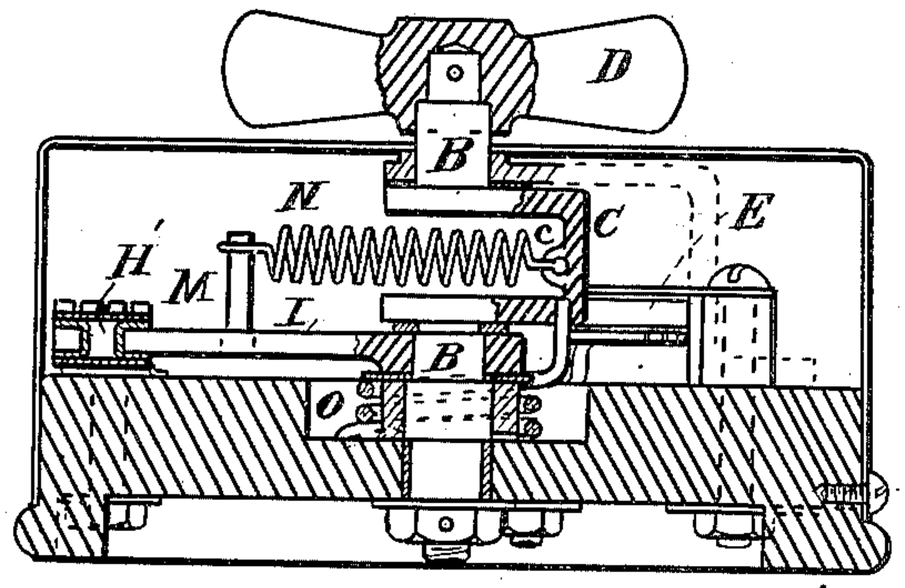




*Fig. 4.*

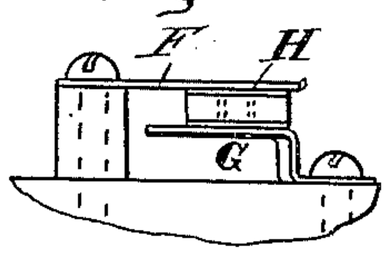



*Fig. 5.*

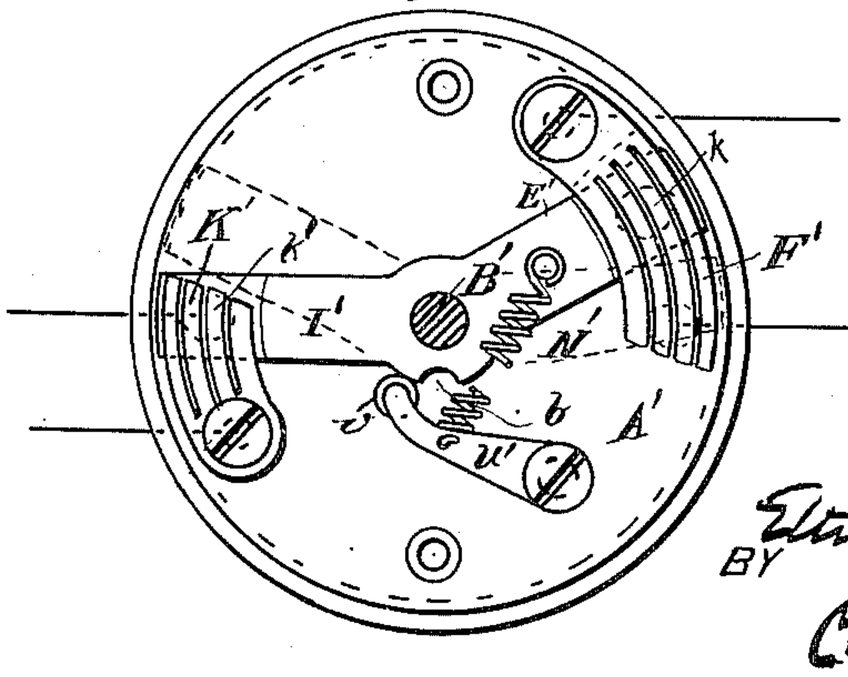
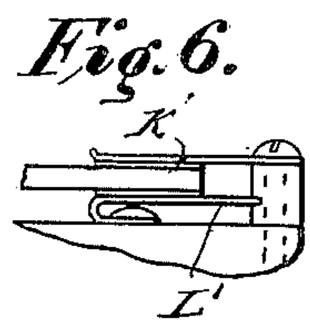



*Fig. 6.*

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## SNAP-SWITCH FOR ELECTRIC-LAMP CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 652,598, dated June 26, 1900.

Application filed September 9, 1899. Renewed May 29, 1900. Serial No. 18,461. (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 Snap-Switches for Electric-Lamp Circuits, of which the following is a specification.

My invention relates to improvements in switches such as are adapted to close two circuits simultaneously and to permit the successive rupture of the said circuits, such rupture being accomplished by a quick sudden movement. The characteristics described adapt my switches for use in connection with the circuits of Nernst lamps, wherein it is convenient and advantageous to close the circuit of the glower at the same time that the circuit of a heater for the said glower is brought into operation, and wherein also it is convenient and advantageous to break the heater-circuit before the circuit of the glower is ruptured. When the glower has thus been left in operation as long as is desired, means have to be provided for breaking the glower-circuit also, and the present invention provides an apparatus which is adapted to fulfil all the desired functions and is at the same time simple in its construction and efficient in its operation.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is plan of my switch with the cover removed. Fig. 2 is a central vertical section of my switch. Figs. 3 and 4 illustrate details of the switch shown in Figs. 1 and 2. Fig. 5 is a plan of a modified form of switch, and Fig. 6 is a detail of the switch illustrated in Fig. 5.

Referring to the drawings by letter, A is a base, of porcelain or other good insulating material. Pivoted within the said base is a shaft B, which is provided with a bent portion or crank C and with a handle D, of insulating material. To the shaft B is rigidly secured a bent arm E, constituting a contact-arm, which coöperates with springs F and G, secured to the base A. When the said contact-arm E is so located that its end is between the springs F and G, it brings into contact with the said springs a pin H, of metal, which is held in the end of the arm E, but so as to be insulated therefrom. A second contact-arm I is loosely mounted upon the shaft B and has a similar pin H′, held within its outer end and insulated therefrom, the said pin being adapted to make contact with springs K and L, secured to the base A, when the end of the arm I is located between the said springs. On the arm I is mounted a standard M, preferably of insulating material, and by means of a spring N the said standard is connected to a lug *c* on the crank C. Below the arm I a spiral spring O is connected at one end to the base A and at the other to the crank C. The connection is such that when the handle D is turned so as to move the shaft B toward the right the said spring is put under tension. The springs F and G are connected to the terminals of a circuit which includes an electric heater P, adapted to become hot under the influence of the current proceeding from any suitable generator, such as the secondary of a converter, (shown at Q.) In proximity to this heater I show a glower R, which is located in a branch circuit to the heater, the terminals of which branch or derived circuit are connected to the springs K and L. Manifestly the arm E, being fixed to the shaft B, will move with the shaft, while the arm I, being loosely mounted on the said shaft, will have a movement independent of the shaft and depending on the pull of the spring N. In the first position of the switch the arms E and I are in the position shown in dotted lines, the former resting against a pin or stop S, secured in the base A, and the latter resting against a pin or stop S′, also secured in the base A. The opposite extreme positions of the arms E and I are those in which the former rests against a pin or stop T, secured in the base A, and the latter rests against a pin or stop T′, similarly secured.

The crank C is formed externally on the lines of the arc of a circle, with a dog U, carrying a roller *u*, pressing against its periphery, the source of pressure being a spring *u′*, attached to a post *o*, secured to the base A. The crank is provided with notches *e e′*, into which the roller *u* is adapted to be pressed when the crank is turned into the proper position to allow of it. In the first position of

the arm E, as already described, the roller *u* rests within the notch *e'*, and in the other extreme position of the parts the roller rests upon the periphery of the crank, as appears in Fig. 1. There is, however, an intermediate position for the arm E (represented in dotted lines) between the two extreme positions, and in this intermediate position the roller *u* rests within the notch *e*.

In operating the switch the handle is first turned to the right until the arm E is brought into the position illustrated in Fig. 1. This action puts both the spring O and the spring N under tension and carries the latter spring outside the center of the shaft B, thereby throwing the arm I into the power of the said spring and causing it to be drawn into the position shown in Fig. 1. In this position both the heater and the glower circuits are closed. The heater is thereby brought into operation and begins its work of raising the temperature of the glower R. When this work has been accomplished to such a degree that the said glower becomes a good conductor, the operator releases the pressure of the arm and allows the arm E to be carried into its intermediate position, thereby breaking the heater-circuit. The arm I, however, continues to maintain contact between the springs K and L, and the glower remains active so long as this condition remains. To turn out the light, the switch-handle is turned to the left far enough to bring the arm E against the stop S. At this moment the spring N, having passed beyond the center of the shaft B, throws the arm I with a quick movement out of contact with the arms K and L, and thus ruptures the glower-circuit.

In Fig. 5 I show a simpler form of spring or snap switch, the same consisting, essentially, of a base A', arms E' and I', and a shaft B', to which the said arms are rigidly secured, in combination with springs K' and L', coöperating with the arm I', and springs F' and G', coöperating with the arm E'. The said arms E' and I' are, like the arms E and I in Figs. 1 and 2, of metal, preferably brass, and they have secured within their ends, but insulated therefrom, the contact-pins *k* and *k'*, respectively. The arms are formed at their point of union with the shaft B' into a hub having a notch or depression *b*. A dog U', carrying a roller *v*, is held against the said hub by a spring N'. The said spring is attached to the dog U' and the arm E', as shown. In the original position of the switch the arms E' and I' are outside the ends of the contact-springs F' and G' and K' and L'. The first operation of the switch consists in turning the shaft B' to the left until the arms E' and I' occupy the position shown in the drawings. The switch is held in this position until the glower is seen to be in a condition to carry the electric current, whereupon the hand releases the switch, which then takes the position shown in dotted lines, wherein the arm I' is carried out of range with the springs K' L', although the arm E' is still in range with the springs F' G'. The heater-circuit is thus broken and the glower-circuit is left in operation. The latter circuit is broken by turning the switch still farther to the right until the arm E' is carried out of range of the springs F' G'.

The invention claimed is—

1. The combination with a glower and an electric heater therefor and separate circuits for the glower and heater, of a hand-operated switch having independent contact-arms adapted to close both circuits by a movement of the hand, and a spring adapted to operate the arm which controls the heater-circuit by a quick sudden movement.

2. The combination with two circuits one including a glower and the other an electric heater therefor, of a pair of terminals for each circuit and two switch-arms controlling the said circuits, means for operating the said switch-arms by hand for closing the said circuits simultaneously, and a spring connected with the arm that controls the heater-circuit, whereby a quick sudden movement of the said arm can be effected.

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:

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GEORGE H. STOCKBRIDGE.