

No. 684,094.

Patented Oct. 8, 1901.

H. N. POTTER.  
HEATER CUT-OUT FOR ELECTRIC LAMPS.

(Application filed Feb. 14, 1901.)

(No Model.)

Fig. 1.

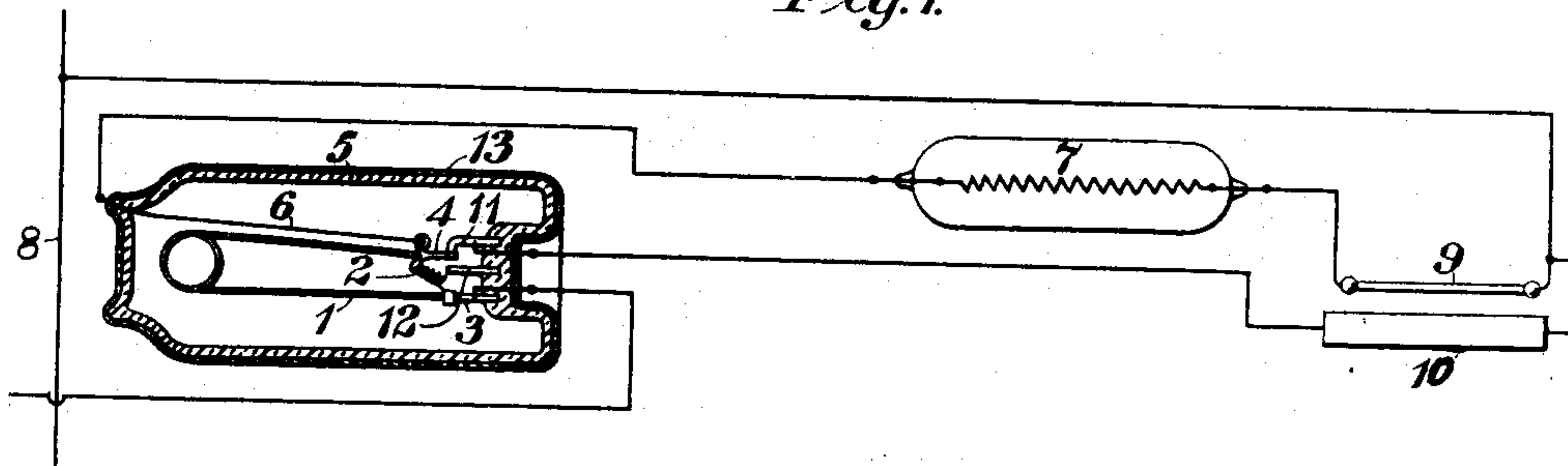
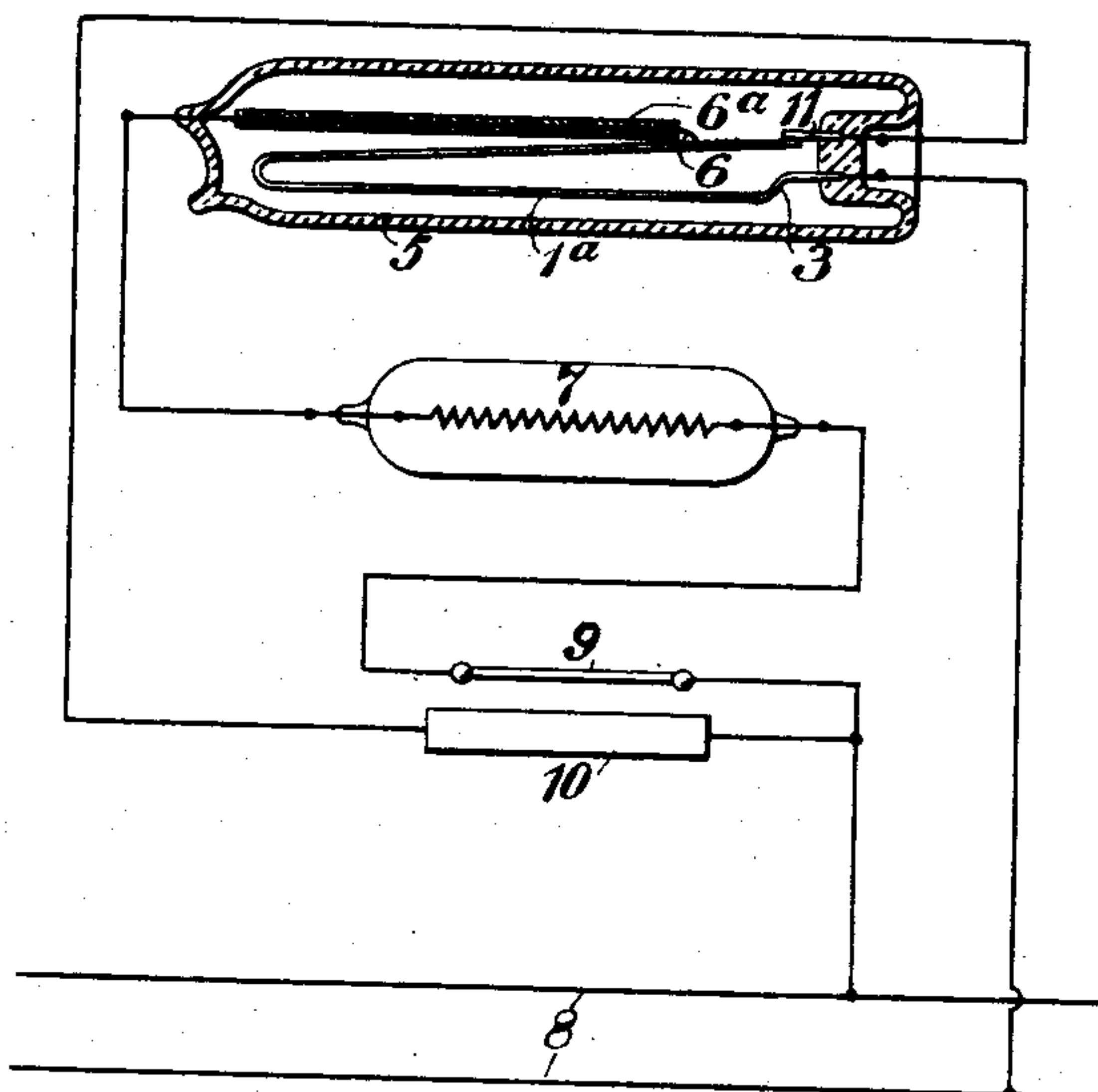


Fig. 2.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## HEATER CUT-OUT FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 684,094, dated October 8, 1901.

Application filed February 14, 1901. Serial No. 47,356. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY NOEL POTTER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Heater Cut-Outs for Electric Lamps, of which the following is a specification.

My invention relates to automatic cut-outs for the heaters of electric lamps of the type in which the light-giving elements or glowers are non-conductors when cold and are raised to conducting temperature by means of electric heaters.

The principal object of my invention is to provide a circuit-closing spring which shall be simple in construction and both reliable and sensitive in operation and which shall maintain its elasticity indefinitely under the relatively high temperatures to which it is subjected in use.

In the construction of cut-outs for heaters of lamps of the type above indicated it has been the usual practice to employ metal springs for the purpose of automatically bringing the contact-terminals of the cut-outs into engagement to close the heater-circuits when the glower-circuits are inactive. Springs made of various metals and alloys have been made and tested, but, so far as I am aware, none have been satisfactory in use, for the reason that after being subjected to the relatively high temperatures of lamps of this character for several hours they tend to take a permanent set, and their usefulness as springs is therefore either destroyed or seriously impaired. In order to obviate the difficulties heretofore experienced, I propose to employ carbon filaments as springs for moving the cut-out contact-terminals into engagement. In certain cases I propose also to employ a thermostatic device to act in opposition to the carbon spring for the purpose of interrupting the heater-circuit when the glower becomes conductive, and when a thermostatic device is employed for this purpose I propose to prevent or materially reduce the dissipation of heat by locating the device in a vacuum-chamber. As an additional means for preventing dissipation of heat, the thermostatic device or the receptacle for the cut-

out elements, or both, may be provided with a covering, such as asbestos, that is a poor conductor of heat.

In the accompanying drawings, illustrating my invention, Figure 1 is a sectional view of one form of cut-out device combined with diagrammatic representations of the other parts of the lamp and the circuits. Fig. 2 is a view similar to Fig. 1, but showing a modification.

Referring particularly to Fig. 1, 1 is a carbon filament of such size that it will not be excessively heated when traversed by the glower-current. It may, however, be plated with metal or short-circuited by a flexible conductor 2, if desired. The ends of the carbon spring 1 are provided with metal tips 3 and 4, the former of which is securely seated in the end of the inclosing receptacle 5 and the latter of which is connected to one end of a conducting rod or wire 6, that expands freely under the action of heat. The other end of the wire or rod is connected through a suitable leading-in wire and external conductor to one terminal of the ballast 7. The tip 3 is connected by means of a leading-in wire and external conductor to one of the supply-mains 8. One of the terminals of the glower 9 is connected to one terminal of the ballast 7 and the other terminal is connected to the other supply-main 8. The heater 10 has one terminal connected to one of the glower-terminals and its other terminal connected by means of a conductor and a suitable leading-in wire to the stationary terminal 11 of the cut-out.

12 is a limiting buffer or stop against which the tip 4 impinges when the cut-out opens.

The chamber or receptacle 5 has the air exhausted therefrom and is either employed in that condition or is filled with an atmosphere of hydrogen or other suitable inert gas. The vacuum will be generally preferable on account of its poor heat conductivity. As has been already indicated, the receptacle 5 may be provided with a coating 13 of asbestos or other poor conductor of heat.

It will be understood from the foregoing description that when the wire or rod 6 is cold it will be of such length that the spring 1 will force the contact-tip 4 into engagement with



the terminal piece 11, and thereby complete the heater-circuit, the heater-current passing either through the spring or through the short-circuiting conductor 2. When the glow-er becomes conductive, the current will obviously pass through the wire or rod 6 and heat it up, so that it will expand and force the tip 4 away from the terminal 11 against the action of the spring.

10 In Fig. 2 the several parts are substantially the same as those shown in Fig. 1, except that the thermostatic piece 6 is provided with a sheath 6<sup>a</sup>, of asbestos or other non-conductor of heat, in order that hydrogen may be employed to better advantage within the chamber 5, and the carbon spring 1<sup>a</sup> is shown as of slightly-different form from the spring 1 of Fig. 1. The parts not specifically referred to are given the same reference-numerals as the corresponding parts shown in Fig. 1, and the description hereinbefore given of such parts may be read in connection with this figure. The wire or rod 6 may be of a material that has a temperature coefficient, and may there-  
25 fore be used to supplement the ballast 7 as a current-restraining device, if desired.

My invention is susceptible of various modifications as regards form, dimensions, and relations of parts, and I therefore disclaim any  
30 limitations that are not imposed by the prior art and specified in the claims.

I claim as my invention—

1. In a heater cut-out for electric lamps, a circuit-closing spring consisting of a carbon  
35 filament.

2. In a heater cut-out for electric lamps, the combination with the contact-terminals, of a carbon spring for bringing said terminals into engagement.

3. A heater cut-out for electric lamps comprising contact-terminals, means for separating them when the glow-er-circuit is active and a carbon spring for bringing them into engagement when the glow-er-circuit is inactive. 40

4. A heater cut-out for electric lamps comprising contact-terminals, a carbon spring for bringing said terminals into engagement and a thermostatic device acting in opposition to the spring to separate the terminals. 45

5. A heater cut-out for electric lamps comprising contact-terminals, a carbon spring for moving them into engagement, a thermostatic device for separating said terminals and a chamber for said device from which the air is exhausted. 50

6. A heater cut-out for electric lamps comprising a chamber from which the air is exhausted, a carbon spring for closing the circuit, a thermostatic device acting in opposition to the spring to open the circuit and means for preventing or reducing the dissipation of heat from the thermostatic device. 55

7. A heater cut-out for electric lamps comprising separable contact-terminals, a spring tending to hold said terminals in engagement, a thermostatic device for separating the terminals, a vacuum-chamber in which said parts are located and means for preventing dissipation of heat from the thermostatic device. 60

In testimony whereof I have hereunto subscribed my name this 11th day of February, 1901. 70

HENRY NOEL POTTER.

Witnesses:

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G. E. CHAPIN.