

No. 652,608.

Patented June 26, 1900.

M. W. HANKS.
MULTIPLE GLOWER LAMP.

(Application filed Apr. 21, 1899. Renewed Mar. 27, 1900.)

(No Model.)

Fig. 1

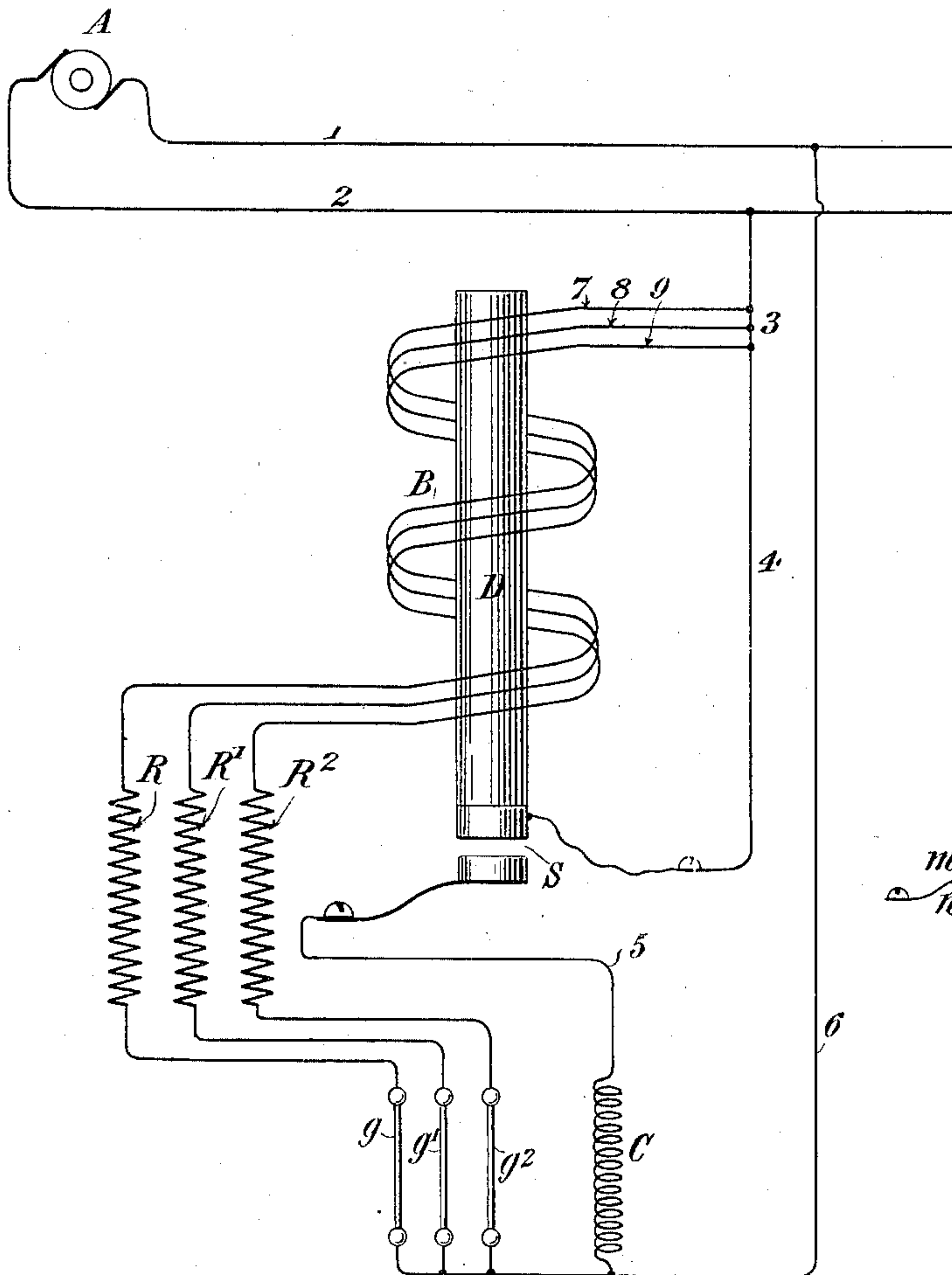
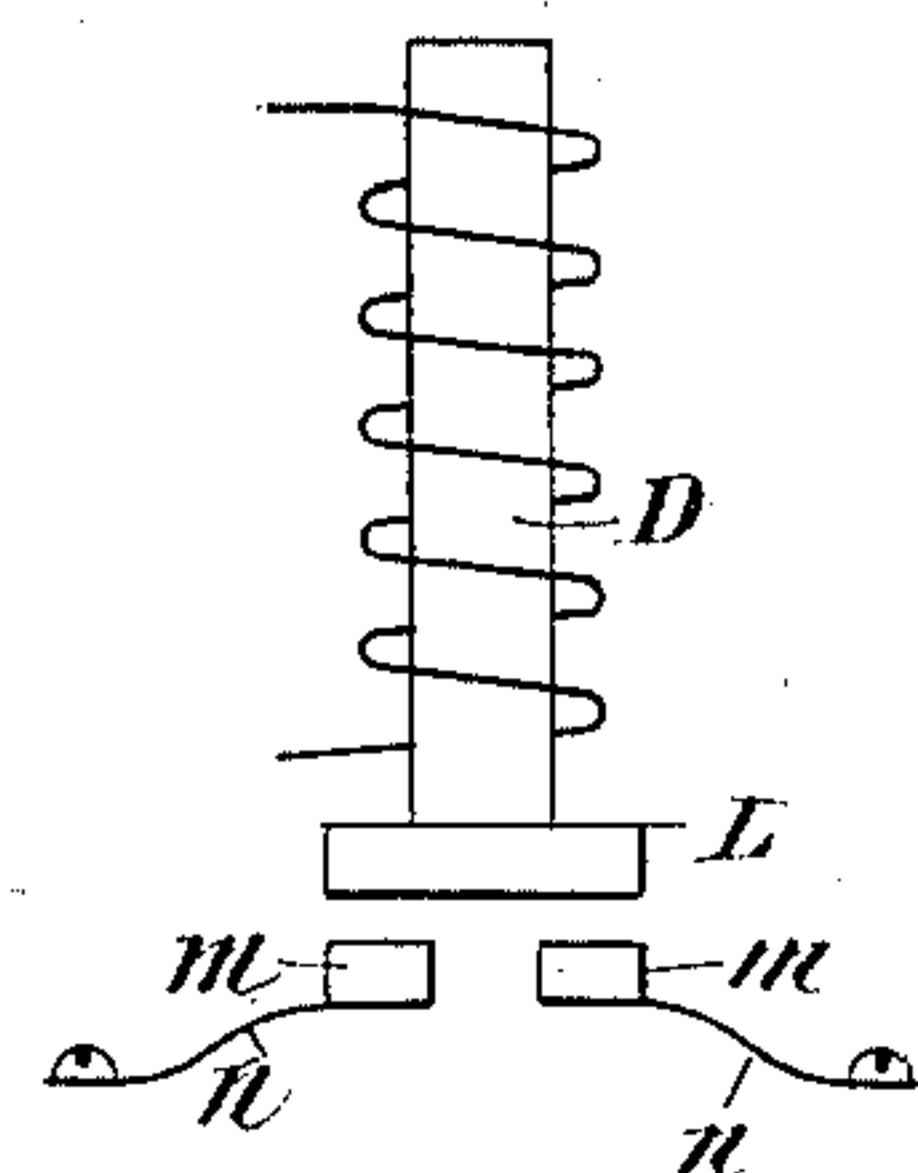


Fig. 2



Witnesses:
Raphael Vetter
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by Charles A. Tamm - Atty.

UNITED STATES PATENT OFFICE.

MARSHALL W. HANKS, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
GEORGE WESTINGHOUSE, OF SAME PLACE.

MULTIPLE-GLOWER LAMP.

SPECIFICATION forming part of Letters Patent No. 652,608, dated June 26, 1900.

Application filed April 21, 1899. Renewed March 27, 1900. Serial No. 10,407. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL W. HANKS, a citizen of the United States of America, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Multiple-Glower Lamps, of which the following is a specification.

In the class of electric lamps to which the present invention is particularly applicable illuminants or glowers are employed which when cold are non-conductors of electricity at ordinary potentials, but which become conductors when heated to a dull-red heat, while beyond that degree of heat their conductivity increases rapidly with an increase of temperature. When lamps of this class are operated in practice, it becomes necessary to employ artificial means for raising the illuminants or glowers to a temperature at which they will absorb current enough to become further heated by the passage of the current itself. Since it usually involves an unnecessary consumption of energy to operate the heaters after they have served their purpose of bringing the glowers to a conductive state and such continuous heating being further calculated to shorten the life of the heaters, it is customary to break the heating-circuit after the glowers are once lighted either by operating a hand-switch or by the use of some automatic device. It has also been found in practice that in some instances or with certain mixtures of the rare earths constituting the incandescing body a glower which has been brought to a conductive temperature will fall in resistance so rapidly under the influence of a constant difference of potential as to permit current enough to flow to endanger or even destroy the glower itself. To provide automatic means for breaking the heating-circuit when it has brought the glowers to a high enough temperature for starting, it has been proposed to include in the glower-circuit a coil or solenoid having a moving core or armature which is attached to a movable terminal of the heating-circuit. By these means it is accomplished that when a sufficient quantity of current begins to flow through the glower-circuit the coil or solenoid acts magnetically upon its core or arma-

ture and removes the movable terminal from contact with the corresponding terminal, and thereby breaks the heating-circuit. To overcome the above-mentioned danger of the glowers being destroyed by too great a flow of current, it has been proposed to insert in series with each glower a steadying resistance, which may be an ordinary coil or wire or which may be of such a nature as to have a high positive temperature coefficient, and so offer an increasing opposition to the flow of the current as the latter increases.

It is the object of the present invention to apply the above-mentioned devices in a simple and efficient manner to the purposes of an electric lamp of this class in which two or more glowers are combined to form a single lighting structure or lamp. To this end I have devised the plan for utilizing for the purpose of breaking the heating-circuit for the glowers a coil or solenoid having as many strands as there are glowers, and I have introduced a further feature of economy, which consists in making each strand serve as a part or the whole of the steadying resistance for the glower with which it is connected.

My invention will be clearly understood by reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic view omitting the details of the lamp construction, and Fig. 2 is a detail of the circuit-controller contacts.

In the drawings circuit-wires 1 and 2 are represented as running from any suitable source A of electric current. At 3 the circuit is divided, one part passing by way of wire 4 through the circuit-breaker or switch S to one terminal 5 of a spiral or convolute wire C, constituting a heating device, the other terminal of said heating device being joined by a wire 6 to the return-circuit of the generator. The lamp or glower circuit passes beyond the point 3 by way of wires 7, 8, and 9 to a magnet or solenoid B, the core or armature D of which, as the case may be, is attached to a movable portion of the switch or circuit-breaker S.

In the present instance I have shown three glowers g g' g'' combined in a single lighting structure or lamp placed in proximity to the heating-coil C, and in conducting the circuit

from the wire 3 to the lamp I divide it up into three strands 7, 8, and 9, each strand constituting one of the three coils in the magnet or solenoid B. Beyond the said magnet or solenoid each strand is connected with a separate glower, either with or without the interposition of an additional steadying resistance, as $R R' R^2$. It follows from this construction and arrangement of parts that the heating-circuit will be automatically broken in the manner already described when it shall have accomplished its purpose of bringing the glowers to a sufficiently-high temperature for the reception of a current which is itself calculated to still further heat the glowers or maintain them at a temperature already attained. This will happen whether all the glowers shall have reached the requisite temperature or some one or more of them only. It also follows from the described construction and arrangement that each glower is provided with a steadying resistance by the use of as little special apparatus as possible. In some instances it may be desirable to supply additional resistances $R R' R^2$; but it will often be sufficient to properly proportion the resistance of the different strands of the magnet or solenoid in order to prevent too great an absorption of the current by the glowers. It will be understood that the switch S and the heater C are merely represented typically in Fig. 1 of the drawings and that the switch may be of any desired form and may be designed to break the circuit at two or more points instead of at one, as illustrated in the said figure. It will be further understood that the switch S is represented as open or in the position which it would occupy after the glowers were lighted, the original position being one in which the switch is closed. In Fig. 2 I show a switch provided with carbon contacts and adapted to break the circuit at two points. L is a carbon disk attached to the core D, and m and m are co-operating carbon buttons fastened to flat springs $n n$ for securing good contact. When the core D is down, the disk L bridges the contact-buttons $m m$. The use of carbon tends to lessen the sparking when the circuit is broken and to prevent the sticking of the contacts.

For the purposes of this invention broadly it is not necessary that the glowers should be combined in a single lamp or lighting device. They might form elements of separate lamps and still be joined, if desired, to the circuit-breaking coil.

I claim as my invention—

1. In a multiple-glower lamp, a plurality of glowers, and a single circuit-breaking coil having as many strands as there are glowers, each strand being connected with a separate glower and a single circuit-controller operated by the conjoint action of currents flowing through such said strands.

2. In a multiple-glower lamp, a plurality of

glowers, a circuit-breaking coil in circuit therewith having strands equal in number to the glowers, said strands being in multiple with each other and thus adapted to become energized simultaneously for operating the circuit-breaker.

3. A multiple-glower lamp having a plurality of glowers, and also having a heating-circuit and a lighting-circuit, a coil in the said lighting-circuit, the said coil having a separate strand connected with each glower and constituting a part of the steadying resistance for the said glower, and a circuit-controller in the said heating-circuit operated by the said coil.

4. A multiple-glower electric lamp having a heating-circuit and a lighting-circuit, a coil in the lighting-circuit controlling the said heating-circuit, the said coil having a separate strand connected with each glower and constituting a part of the steadying resistance of the said glower in combination with an additional steadying resistance in the circuit of each glower.

5. In an electric-lighting system, two or more glowers and an electric heating device therefor, in combination with a coil having a separate strand connected with each glower, and a circuit-controller in circuit with the said heating device, the said circuit-controller being operated by the said coil.

6. In an electric lamp having multiple glowers, the combination with the glowers and a heater therefor, of a heater-controlling device comprising a single solenoid or magnet wound with multiple coils, each coil being connected with a corresponding glower, a single armature or core controlled by the said magnetic device, and a circuit-breaker connected to the said armature or core.

7. In a multiple-glower lamp, a number of glowers adapted to operate simultaneously, a circuit-breaking coil in circuit therewith having as many strands as there are glowers, each strand being in series with a separate glower, the said strands constituting a magnetic device in combination with an armature for the said magnetic device, said armature controlling a suitable circuit-breaker.

8. In a multiple-glower lamp, a number of glowers adapted to operate simultaneously, a heater for the said glowers included in a suitable heating-circuit, a circuit-breaker in the said heating-circuit and connected with a suitable core or armature, and a circuit-breaking coil in circuit with the said glowers, the said coil having strands equal in number to the glowers and each strand arranged in series with a separate glower.

Signed by me at Pittsburg, Pennsylvania, this 18th day of April, 1899.

MARSHALL W. HANKS.

Witnesses:

WESLEY G. CARR,

H. C. TENER.