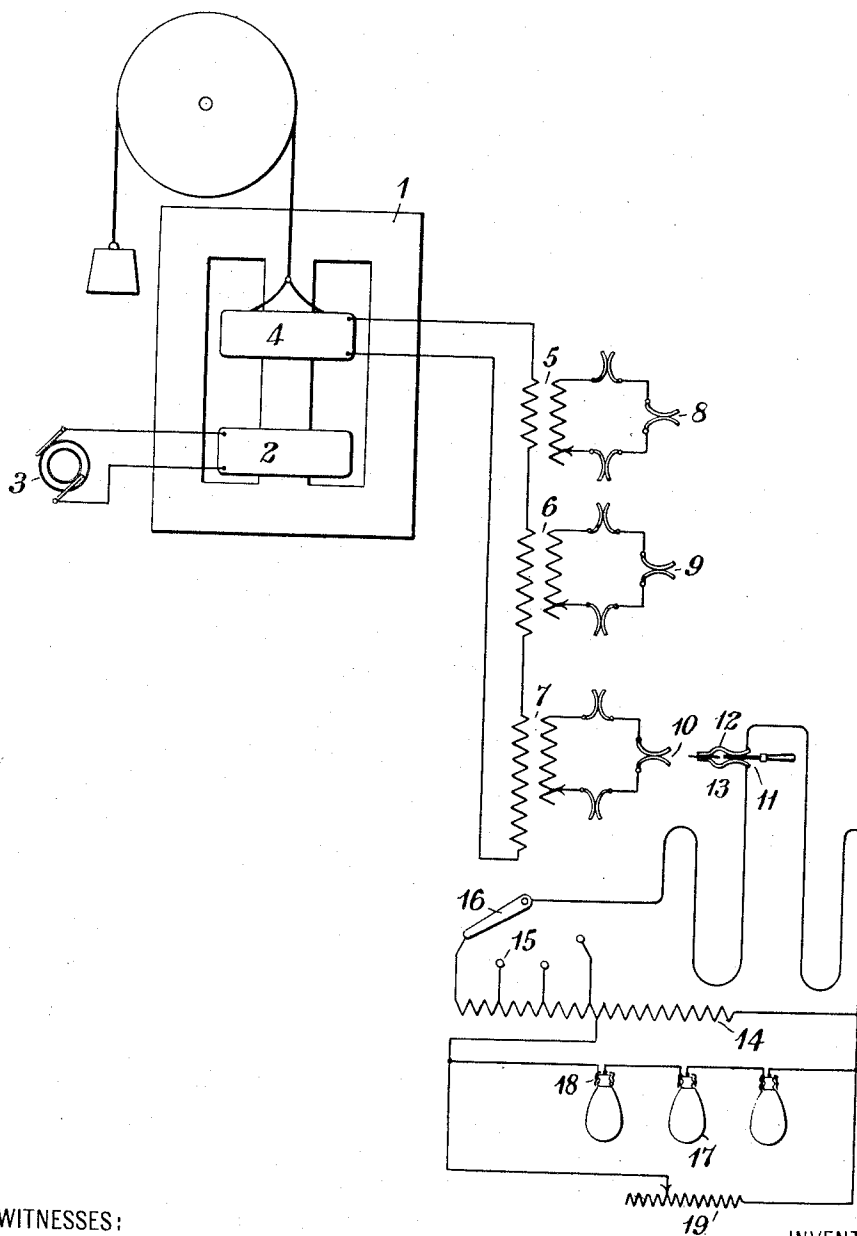


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W. G. HOUSKEEPER.
ELECTRIC CURRENT REGULATOR.
APPLICATION FILED FEB. 21, 1911.

1,049,484.

Patented Jan. 7, 1913.



WITNESSES:

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ELECTRIC-CURRENT REGULATOR.

1,049,484.

Specification of Letters Patent.

Patented Jan. 7, 1913.

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To all whom it may concern:

Be it known that I, WILLIAM G. HOUSKEEPER, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Electric-Current Regulators, of which the following is a specification.

My invention relates to electric current-regulating apparatus, and particularly to such apparatus as is adapted for use in adjusting the currents supplied to electric incandescent lamps during evacuation of the bulbs thereof.

In the evacuation of series incandescent electric lamps, it is often desirable to apply to the lamps several different current values at different stages of the evacuation, the lower current values being applied at the beginning of the evacuating process and the higher values as the process is continued and nears completion.

It is the purpose of the present invention to provide simple, effective and economical means whereby the desired and proper current values may be applied to lamps during evacuation, which means may be readily adapted for use with lamps having practically any current rating or capacity.

The single figure of the accompanying drawing illustrates diagrammatically apparatus embodying my invention, which apparatus comprises a constant-current regulating device 1 of any suitable construction or character, the primary winding 2 of which is adapted to be connected to a source of alternating current, such as that shown at 3, and the secondary winding 4 of which supplies current to the primary windings of a plurality of series transformers 5, 6 and 7, respectively, having different ratios of transformation. The secondary windings of the series transformers are respectively connected to pairs of normally engaging spring fingers 8, 9 and 10 that are adapted to be separated and engaged by a plug 11 carrying terminals 12 and 13 that are connected to a sub-divided auto-transformer 14 constituting part of a suitable current-regulating device. The series transformers 5, 6 and 7 may, if desired, be of the single winding or auto-transformer type, and they are preferably so constructed that the active lengths of their secondaries may be adjusted somewhat. A plurality

of pairs of the clips 8, 9 and 10 are preferably provided respectively in the secondary circuits of each of the series transformers 5, 6 and 7, in order that a plurality of auto-transformers, or other suitable current regulating devices, may be connected thereto. The terminals 12 and 13 are separated at or near their free ends only by a thin piece of insulating material, such as a piece of paper, which is punctured when the voltage between the terminals becomes excessive, as will occur if an open circuit occurs in a lamp being evacuated.

The points of sub-division of the auto-transformer winding are respectively connected to stationary contact terminals 15 with which an adjustable switch arm 16 is adapted to engage, the points of sub-division of the auto-transformer winding corresponding, respectively, to the different current ratings or capacities of standard series incandescent lamps, though other points of sub-division may also be provided in order to take care of lamps having other than standard ratings or capacities. Other suitable current-regulating means may also be employed, if desired, instead of the sub-divided auto-transformer winding 14. The lamps 17, that are to be evacuated, are inserted in sockets 18, which sockets are included in the secondary circuit of the auto-transformer 14 for which the lamps constitute a load. A rheostat 19, or any other suitable resistance or current-regulating device, is connected in shunt to the lamps 17 for the purpose of permitting of gradual application of current to the lamps.

In evacuating the lamps, they are first inserted in the sockets 18, and, while they are substantially completely shunted by the rheostat 19, the plug 11 is inserted between the upper pair of spring fingers 8, the switch arm 16 being placed upon that one of the stationary contact terminals 15 which corresponds to the nominal rating or current capacity of the lamps being subjected to the evacuation process. The resistance of the rheostat 19 is then gradually introduced into the shunt circuit around the lamps and the shunt circuit is finally opened, so that the lamps then constitute the only load for the auto-transformer 14. The current-regulating device 1 then maintains the current supplied to the lamps substantially constant, this current value being

preferably something less than the normal current rating or capacity of the lamp being evacuated, such, for instance, as approximately 60% of the said normal value. After this amount of current has been applied to the lamps for a suitable period, the plug 11 is removed from between the spring fingers 8 and inserted between the fingers 9, whereupon a larger amount of current is applied to the lamps, this current being preferably about the normal current rating or capacity of the lamps. After a sufficient period of the application of the latter current value to the lamps, the plug 11 is removed from between the spring fingers 9 and inserted between the fingers 10, under which condition the current traversing the lamps is something greater than normal current rating or capacity thereof, this value being preferably approximately 130% of the normal current capacity.

While the apparatus is particularly adapted for use in applying the proper current values to lamps during the evacuation process, it is not limited in its use to such a specific application, but the lamps may be replaced by a load of any other desired character. The percentages of the normal current values that are applied to the lamps or other load may also be varied from the specific values above given, and any desired and suitable number of series transformers may be provided without departing from the spirit of the invention.

I claim as my invention:

1. Current-regulating apparatus comprising a plurality of sources of currents of different values, means for maintaining the said currents substantially uniform in value, a load, and means for connecting the same to any one of said sources.

2. Current-regulating apparatus comprising a plurality of sources of substantially constant alternating currents of different values, a current regulating device, means for connecting the same to any one of said sources, and a load supplied from said regulating device.

3. Current-regulating apparatus comprising a constant-current regulator, a plurality

of series transformers supplied therefrom having different ratios of transformation, another transformer adapted to be connected to the secondary winding of any one of said series transformers, and a load supplied from the latter transformer.

4. Current-regulating apparatus comprising a constant-current regulator, a plurality of series transformers supplied therefrom having different ratios of transformation, another transformer adapted to be connected to the secondary winding of any one of said series transformers, a load supplied from the latter transformer, and a resistance adapted to be connected in shunt to the load.

5. Current-regulating apparatus comprising a constant-current regulator, a plurality of series transformers supplied therefrom having different ratios of transformation, a variable-ratio transformer adapted to be connected to the secondary winding of any one of said series transformers, and a load supplied from the variable-ratio transformer.

6. Current-regulating apparatus comprising a constant-current regulator, a plurality of series transformers supplied therefrom having different ratios of transformation, a variable-ratio transformer adapted to be connected to the secondary winding of any one of said series transformers, a load supplied from the variable-ratio transformer, and a resistance adapted to be connected in shunt to the load.

7. Current-regulating apparatus comprising a plurality of transformers differing in their ratios of transformation and having series-connected primary windings, an adjustable-ratio transformer adapted to be connected to the secondary winding of any one of said series transformers, and a load supplied from an adjustable-ratio transformer.

In testimony whereof, I have hereunto subscribed my name this 14th day of Feb., 1911.

WILLIAM G. HOUSKEEPER.

Witnesses:

OTTO S. SCHAIRER,
B. B. HINES.