E. A. KRÜGER.

METHOD OF REGENERATING ELECTRIC GLOW LAMPS.

APPLICATION FILED AUG. 30, 1911.

1,052,065. Patented Feb. 4, 1913

Fig. 1.

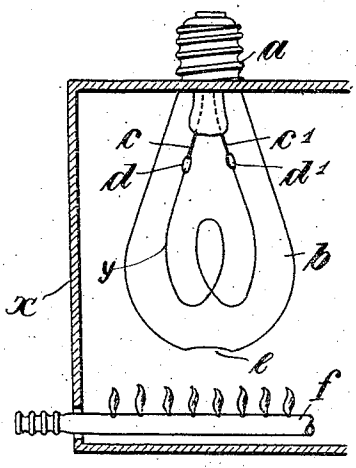


Fig. 2.

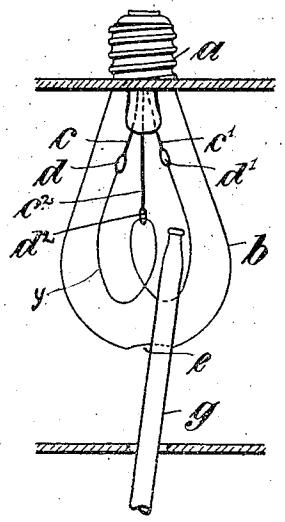
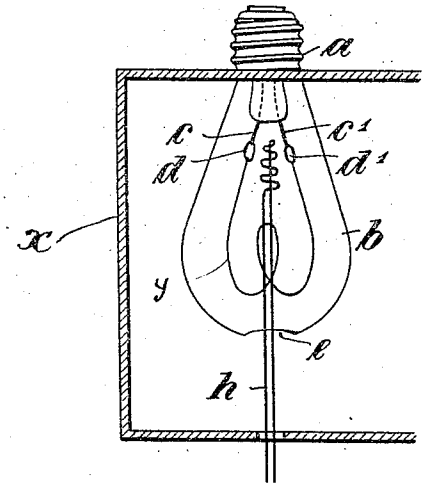


Fig. 3.



Witnesses:
A. Morriel
C. A. Walter

Inventor:
Ernst August Krüger
by Dr. Radde
Attorney

UNITED STATES PATENT OFFICE.

ERNST AUGUST KRÜGER, OF SEEHAUSEN, GERMANY, ASSIGNOR OF ONE-HALF TO SIGBERT BLOCH, OF CHARLOTTENBURG, NEAR BERLIN, GERMANY.

METHOD OF REGENERATING ELECTRIC GLOW-LAMPS.

1,052,065. Specification of Letters Patent. Patented Feb. 4, 1913.

Application filed August 30, 1911. Serial No. 646,810.

To all whom it may concern:

Be it known that I, ERNST AUGUST KRÜGER, subject of the German Emperor, residing at Seehausen, Altmark, Prussia, in Germany, have invented a certain new and useful Improved Method of Regenerating Electric Glow-Lamps, of which the following is a specification.

The present invention consists in an improved method of, and apparatus for, regenerating burnt out electric glow lamps by providing them with new filaments. The novelty resides in the manner in which the cemented joints connecting the filament to the electrodes are dried, the black deposit inside the glass bulb being also removed at the same time.

The method hitherto adopted consists in making the cemented joint conductive by drying it with the aid of an electric arc, which frequently results in damage to the filament joint, and in removing the black deposit inside the bulb by heating the latter with a blow lamp, which causes intense and rapid local heating and is also liable to cause breakage. These drawbacks are obviated by the present invention, according to which the cemented joints are only heated to an accurately regulatable temperature of approximately 270° to 320° C., whereby the black deposit in the bulbs is simultaneously removed. The heating is gradual and well distributed, as regards the bulb, so that there is no risk of breakage.

The invention is illustrated in the accompanying drawing, in which—

Figures 1, 2 and 3 are vertical sections of the apparatus, each showing a different appliance for effecting the heating of the bulb.

Referring in the first place to Fig. 1, the apparatus shown comprises a box x, into which is inserted the bulb b of the glow lamp, the cap a of the lamp remaining outside. The box may be constructed to simultaneously hold any desired number of lamps in this manner. The new filament y is introduced into the lamp bulb through the opening e, and is fastened to the leading-in-wires c, c^1 by means of cement joints d, d^1. The closed box or chamber is then heated up to the desired temperature by means of a burner f inserted into the box. The cap a, however, is not heated with the other parts of the lamp and may be subjected to a current of cold air to insure its being kept cool. Instead of inserting the burner, the box may be heated from outside. The cemented joints are dried very rapidly in this manner and the black deposit in the bulbs b is simultaneously removed, instead of requiring, as heretofore, the heating of each bulb separately with a blow lamp, manipulated by hand.

In the modification shown in Fig. 2, the lamp b, held together with a number of others, not shown, in the box, also has its cap a outside the box and has three leading-in-wires c, c^1, c^2, to which the new filament is fastened by cement joints d, d^1, d^2. The cemented joints are in this case dried and heated by introducing highly heated air into the bulb by means of the tube g inserted in the opening e. The current of air may be directed against the cemented joints so that the same are rapidly dried. As the whole lamp, with the exception of the cap, is inclosed in a chamber, the heat is concentrated as much as possible, and the deposit in the lamp bulb is likewise removed. The drying of the cement and the removal of the black deposit may be synchronous or successive, operations. In the latter case the temperature in the inclosed chamber, or of the air introduced thereinto, is at first only raised sufficiently to dry the cemented joint, whereupon the temperature is gradually increased until the black deposit entirely disappears. In the first case the temperature is somewhat higher to begin with, so that the cemented joint is dried and the deposit is removed from the bulb simultaneously.

The improved method may also be carried into effect during the production of the vacuum. The lamps are for this purpose placed in the inclosed case and heated after the connection with the vacuum pump has been made. In this case again the cemented joint is dried simultaneously with the removal of the deposit from the interior of the bulb, but, of course, the lamp bulbs can only be heated externally after having been placed in the inclosed chamber to be heated, the caps again being arranged outside.

The operation may also be carried out by drying the cemented joints, as shown in Fig. 3, by heating them by means of the heat developed by an electric current. For this purpose a spiral wire h, heated to the desired degree by the electric current, is introduced into each lamp bulb b at e and placed

in proximity to the cemented joints connecting the filament to the leading-in wires. The cap *a* is outside the chamber in this case also.

The three methods of l. ating, illustrated in the drawing, may also be combined in a suitable manner.

The method is applicable to carbon filaments and also to metal filament lamps.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. The method of regenerating an electric glow lamp by cementing a new filament to the electrodes and heating the cemented joints to a temperature of from 270° to 320° C. approximately, by which the cement is dried and the deposit inside the bulb of the lamp removed.

2. The method of regenerating an electric glow lamp by cementing a nc.v filament to the electrodes, heating the cemented joints to a temperature at which they become dry, and gradually continuing the increase of temperature in such manner as to remove the deposit from inside the bulb.

In witness whereof I have signed this specification in the presence of two witnesses.

ERNST AUGUST KRÜGER.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.