

F. SKAUPY ET AL

ELECTRIC GAS LAMP WITH GLOW DISCHARGE

Filed June 6, 1921

4 Sheets-Sheet 1

Fig. 1

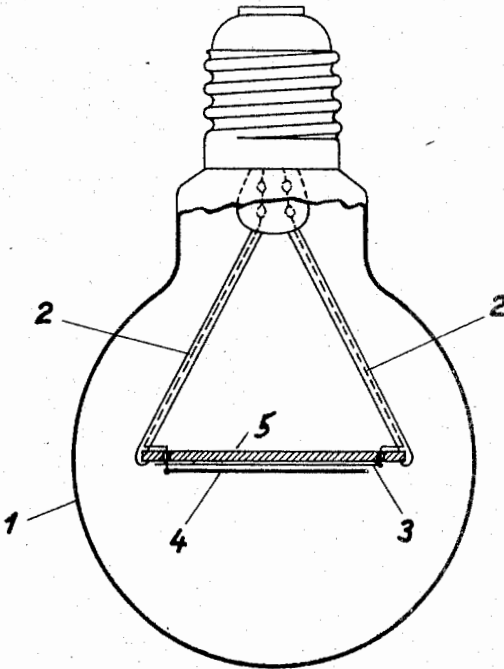
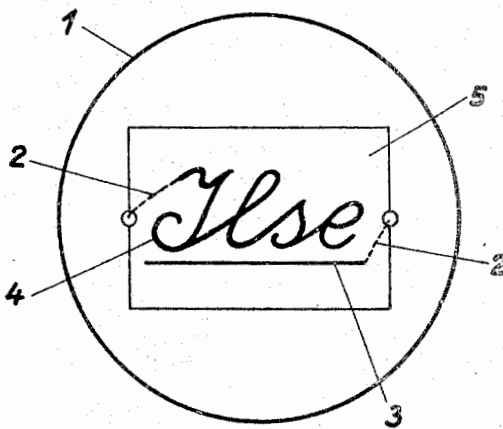


Fig. 2



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att.

Fig.3

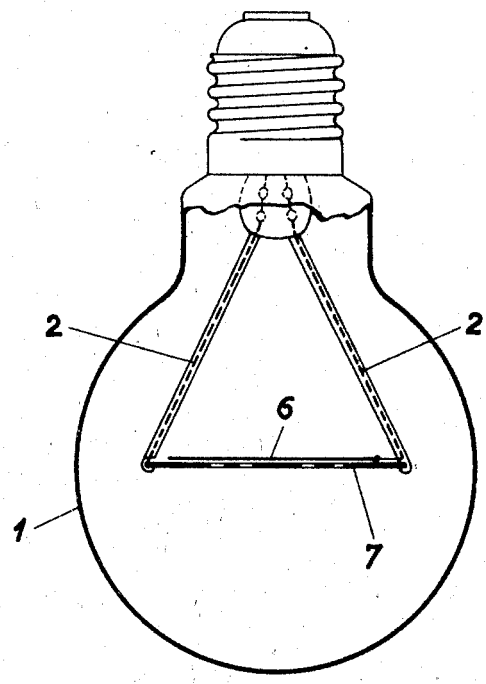
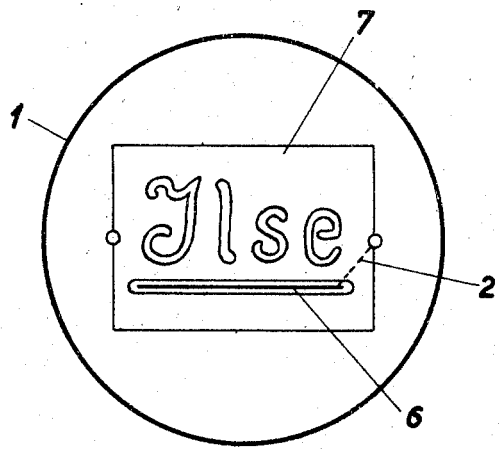


Fig.4



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Fig. 5.

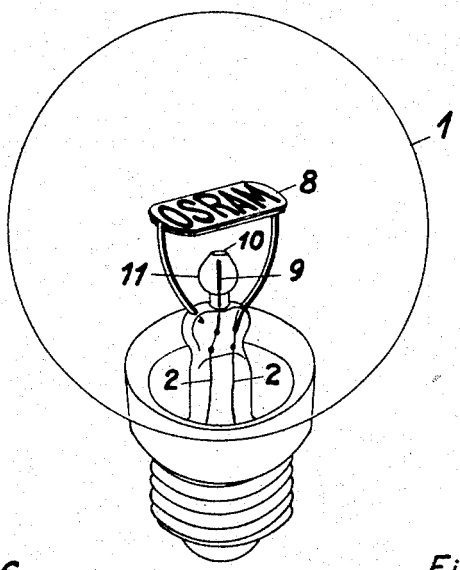


Fig. 6.

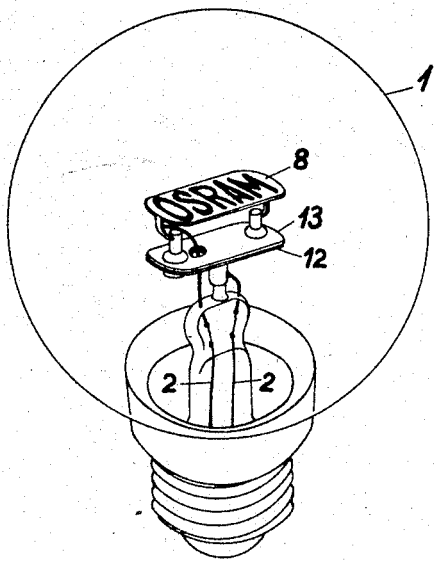
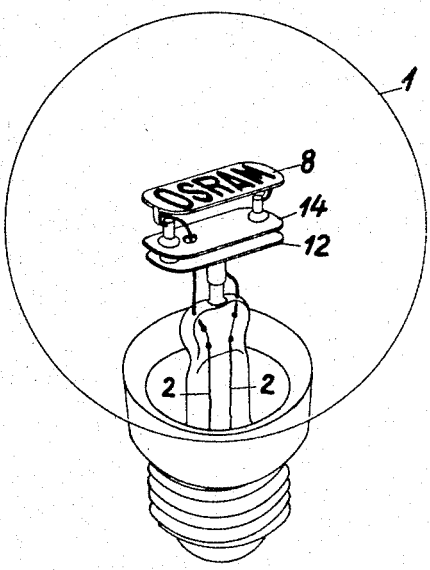


Fig. 7.



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Fig. 8

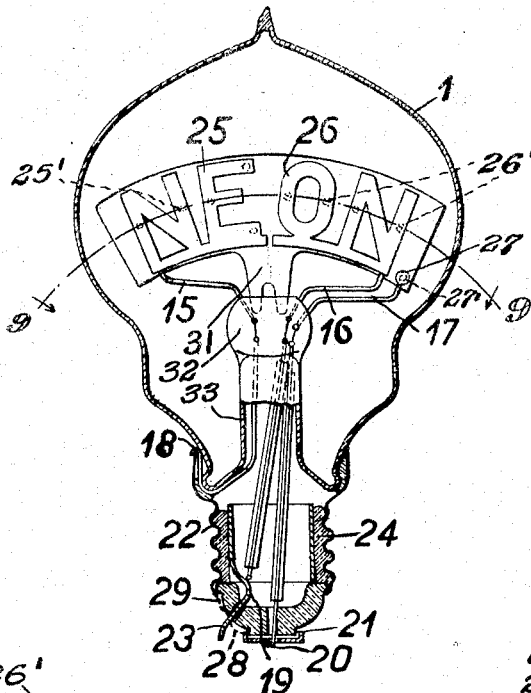


Fig. 9.

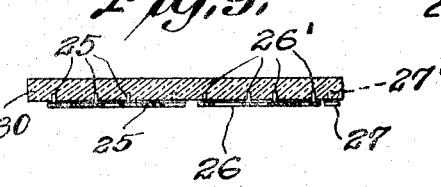


Fig. 10.

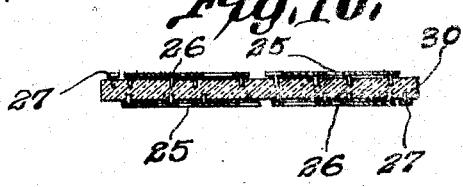
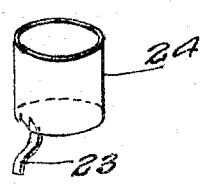


Fig. 11.



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# UNITED STATES PATENT OFFICE.

FRANZ SKAUPY AND ADOLF FEHSE, OF BERLIN, AND GEORG GAIDIES, OF BERLIN-PANKOW, GERMANY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, OF SCHENECTADY, NEW YORK, A CORPORATION OF NEW YORK.

## ELECTRIC GAS LAMP WITH GLOW DISCHARGE.

Application filed June 6, 1921. Serial No. 475,351.

*To all whom it may concern:*

Be it known that we, FRANZ SKAUPY, residing at Berlin O. 17, Rotherstrasse 1, ADOLF FEHSE, residing at Berlin O. 27, Blumenstrasse 99, GEORG GAIDIES, residing at Berlin-Pankow, Lindenpromenade 55, Germany, have invented certain new and useful Improvements in Electric Gas Lamps With Glow Discharges (for which we have filed an application in Germany, May 1, 1918, and May 3, 1918), of which the following is the specification.

This invention relates in general to electric gas lamps with glow discharge and more particularly to lamps of this kind that are adapted for advertising and similar purposes. As is well known, such lamps consist of a glass vessel filled with rare gases and containing two electrodes, the luminous effect resulting from the negative luminous zone of gas surrounding the cathode. In lamps of this kind luminous signs may be obtained in a very simple and effective manner by making the cathode of a metallic conductor shaped in the form of letters or other characters. To enhance the effect obtained the cathode may be arranged on a dark substratum, as of colored glass. But with such lamps it is also possible to obtain letters on luminous surfaces by making the cathode of a strip of metal with perforations in the form of letters or other characters.

In the forms of lamps heretofore described in which the light effect is produced by a luminous glow discharge on the cathode the second electrode always consisted of a very small anode. Hence these lamps are adapted more particularly for continuous current, and the electrode that produces the luminous signs or characters must be so connected as to act as a cathode. To enable the lamp according to the invention to be used to equal advantage in connection with a continuous and an alternating current supply it must be equipped with a specially arranged second electrode, because this latter acts as a cathode during one half of each wave of the alternating current. To prevent these second electrodes from being dissipated during this interval of time their

surface must either be made large enough, or, if they are made small, they must consist of a special not easily atomized material and, in the latter case, as the process of dissipation cannot be entirely prevented in the case of such small surfaces, they must be placed in an insulating envelop which retains the dissipated particles and prevents them from being scattered on the lamp bulb.

As the light emitted by the second electrode—that intermittently acts as a cathode if the lamp is connected to an alternating current supply circuit—must not interfere with the effect of the sign producing electrode, the surface of the second electrode must either be made to radiate in a different direction from the first, or its rays must be obscured by an opaque screen.

Furthermore it is possible to obtain lamps for alternating current in this manner, that the letters are separated in two groups, one of which acts as a cathode and the other as an anode.

In this modification the letters or other signs can be also illuminated by continuous current arranging an auxiliary anode with a third leading in wire.

A number of constructional forms of the invention are shown in the drawings—

Fig. 1 being an elevation of a lamp with the bulb portion in section and

Fig. 2 a bottom sectional view of Fig. 1 showing the cathode in the form of writing on a dark substratum.

Figs. 3 and 4 are a sectional elevation and a bottom view respectively of a modification in which the cathode consists of a metal strip or sheet with characters in the form of perforations.

Figs. 5, 6 and 7 illustrate three types of lamps which are equally adapted for continuous and alternating current circuits.

Fig. 5 being a lamp with a small enveloped second electrode, and

Figs. 6 and 7 lamps with a second electrode that radiates in a different direction from the first.

Fig. 8 illustrates a lamp with letters separated in two groups and with three conducting wires for alternating and continuous current.

Fig. 9 is a section on line 9—9 Fig. 8 and Fig. 10 is a similar section showing two sets of electrodes one on each side of the plate, and

Fig. 11 is a perspective view of the sleeve 24.

The lamp shown in Figs. 1 and 2 comprises a glass bulb 1 filled with rare gas, and conducting wires 2 which lead to the anode 3 formed in the shape of a straight line and to the cathode 4 in the form of written characters. 5 is a dark rear surface or substratum at the back of the cathode 4.

In Figs. 3 and 4, 1 is the glass bulb filled with rare gas, and 2 are the conducting wires, one of which leads to the anode 6 whilst the other leads to the cathode 7. The cathode 7 consists of a plate with perforations representing, say, the word "Ilse." The anode 6 consists of a wire.

In Fig. 5, 1 is the glass bulb, 2 are the conducting wires, 8 is the electrode bearing writing or characters of any kind and to which one of the conducting wires is connected. The other wire 2 leads to the small electrode 9 which is placed in a small envelope or vessel 11 having an opening 10. The vessel 11 is designed to retain the metal particles separated from the small electrode during the process of atomization and to thus prevent the blackening of the glass bulb.

In Fig. 6 the reference numerals 1, 2 and 8 have the same significance as in Fig. 5. The lower electrode, however, consists in this case of a piece of sheet metal 12 covered at the top by a sheet of mica 13. Hence the upper surface of this electrode remains dark and the light is only emitted from its side that is averted from the sign producing electrode.

In Fig. 7 all parts are like those of Fig. 6 except that the plate of mica 13 of Fig. 6 is replaced by an opaque plate 14 arranged above the sheet metal electrode 12 and adapted to act as a light screen.

In the forms illustrated in Figs. 5 to 7 only the light emitted by the letter electrode will be seen by the observer, because the second electrode is either too small to produce an appreciable luminous effect or it is prevented from emitting light towards the observer by the layer of mica or the light screen. At the same time the injurious effects of the atomization of the second electrode are eliminated either by the dislodged particles being intercepted, or by making the disintegrated surfaces so large that the atomizing effect per unit of surface is inappreciable.

In the modification shown in Fig. 8 the glass container 1 is also filled with rare gas. This container is provided with conducting wires which are connected, at the points 18, 19 and 20, to the terminal contacts 21, 22 and terminal 23 respectively, which terminal

23 is connected to ring 24. There are shown in Fig. 8 two groups of letters 25 and 26 and an auxiliary anode for direct current use.

It will thus be seen that the cathode and anode are spaced apart on dark glass, mica or other light screen or support 30 so that either both groups of letters 25 and 26 alone are illumined or the whole sign including the period electrode 27 depending upon whether the tongue 23 is in the position 29 or the position 28. The electrodes 25, 26 and 27 are disconnected or spaced from one another and are held to the glass support 30 by small pins 25', 26' and 27' either on one side or on both sides as desired.

The glass plate 30 is supported by a shank 31 which is inserted in the upper end of the column 33 by squeezing the walls together while hot as shown at 32.

The arrangement acts as follows:

If alternating current only is available, the tongue 23 must be bent to the bottom contact and soldered therewith as shown in dotted lines at 28; then the group 25 of the letters is connected to one of the contacts, the group 26 with the anode 27 to the other. By this connection—for alternating current—the group 25 of the letters acts as a cathode and the groups 26, 27 as an anode, and vice versa, so that all signs are illumined.

If continuous current is only available, the tongue 23 must be bent and soldered to the socket contact 22 as shown in dotted lines at 29 so that all signs form the cathode, while the point 27 acts as an anode.

Signs of the above character have the advantage over the usual continuous filament signs in that they run cool and in that the amount of current consumed is only a small fractional part of the current consumed in the filament type.

We claim:

1. In an electric gas lamp having a glow discharge, a glass chamber, a pair of spaced electrodes therein each of said electrodes comprising a conductor in the form of an advertisement one electrode serving as an anode and the other as a cathode.

2. In an electric gas lamp having a glow discharge, a glass bulb and a base therefor, three spaced electrodes therein, terminals on the said base, a conducting wire from each electrode connected to a corresponding one of said terminals and means exterior of the bulb for permitting one of said terminals being connected to either of the other two terminals.

3. An electric gas lamp with glow discharge for alternating current, comprising a transparent bulb filled with rare gas, two groups of signs in the bulb which act alternately as dim anode and luminous cathode.

4. In an electric glow lamp, a glass enclosure, an anode electrode therein, an anode

terminal outside the glass and a connection  
between the terminal and the electrode, a  
cathode terminal outside the glass, a cathode  
electrode in the glass with a connection be-  
5 tween the two and a third electrode in the  
glass together with connecting means where-  
by the third terminal may be connected with

either the anode or the cathode terminal at  
will.

In testimony whereof we affix our signa- 10  
tures.

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