Sept. 23, 1952 J. POELMA ET AL 2,611,255

FLASHBULB

Filed Feb. 17, 1949

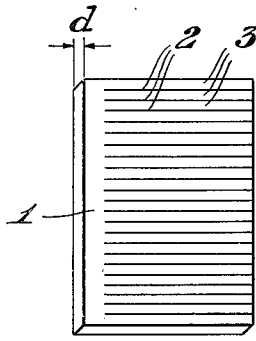


Fig. 1

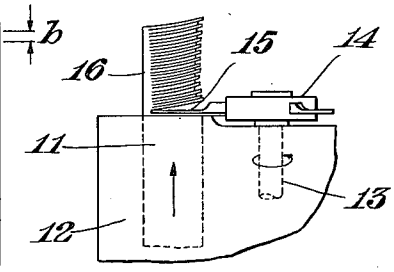


Fig. 2.

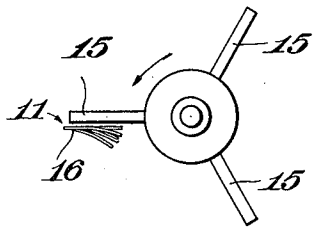


Fig. 3.

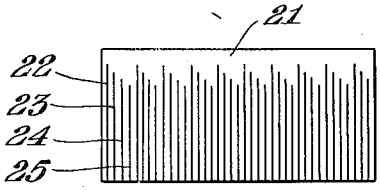


Fig. 4.

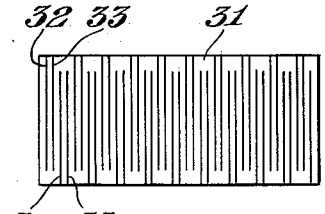


Fig. 5.

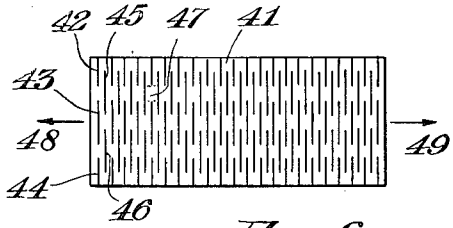


Fig. 6.

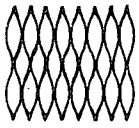


Fig. 7.

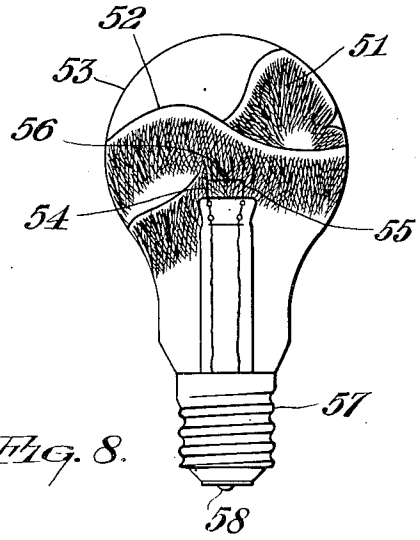


Fig. 8.

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Patented Sept. 23, 1952 2,611,255

UNITED STATES PATENT OFFICE

2,611,255

FLASHBULB

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Application February 17, 1949, Serial No. 77,036
In the Netherlands March 4, 1948

8 Claims. (Cl. 67—31)

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This invention relates to flashlamps the glass bulb of which is provided with a gaseous filling and actinically reactive metal.

In order to ensure rapid combustion of the actinically reactive metal, the same is distributed over the bulb space in the form of thin wires, chips, strips or foil. When use is made of chips or strips, the handling thereof causes difficulty since the amount of actinically reactive metal required in the flash-lamp is small and suitable dosing is important. Actinically reactive metal of drawn wire having a very small diameter is particularly suitable. Such metal wire may be pneumatically provided in the desired division in the bulb space. As a rule, however, drawn wire having a diameter of the order of magnitude smaller than 20 microns can be manufactured only with difficulty, since the manufacturing cost thereof is high. In certain cases such a manufacture is not practicable at all.

Actinically reactive metal foil, however, can as a rule be manufactured with great thinness. A rolling or platting operation permits of obtaining metal foil having a thickness of 10 microns or even considerably thinner, for example a thickness of from 0.5 to 1 micron, but this is also expensive and this the more so as a thinner foil must be obtained.

According to the invention, a flash-lamp comprises actinically reactive metal strips or wires, using a foil of considerably greater thickness as the starting material.

The present invention consists in a flash-lamp, the bulb of which is provided with a gaseous filling and actinically reactive metal in the form of strips or wires obtained by that metal foil having a thickness of 100 microns at the most, preferably a thickness of 50 microns, is provided with cuts at distances of 100 microns at the most and that the distance between the metal strip or wires is locally increased by deformation.

Cuts may be provided in foil material with the use of one or more rotary or rectilinearly moving knives. Such cuts may be very close to one another, for example, with a spacing of from 5 to 10 microns, by the use of a suitable mechanism for moving the foil. Since the resulting strips or wires are locally united, the possibility of handling the actinically reactive metal is improved. Such united metal parts may be transported in a simple manner and provided in the bulb of a flash lamp with the use of a catcher, for example a pair of tweezers, which is operated normally or by a suitably constructed mechanism.

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The local connection of the strips or wires obtained from foil material may be realized in different ways. In one form of flash-lamp according to the invention, the metal strip or wires are united by means of one or more dams of actinically reactive metal foil, which dams subsist on the sides or somewhere between the sides of the metal foil when the cuts have been provided. In a further form of construction the strips or wires are united pairwise at several points, which points are gradually dispersed over the surface. Extending the extremities of actinically reactive metal thus obtained ensures spatial distribution thereof such as is desired in the bulb of a flash-lamp.

In order that the invention may be clearly understood and readily carried into effect, it will now be described more fully by reference to the accompanying drawing wherein

Figure 1 is a perspective view of a length of an actinically reactive metal foil cut so as to provide metal strips in the manner of the invention;

Figure 2 is a side view of a mechanism for cutting the metal foil. A length of foil being cut is shown in association with the mechanism;

Figure 3 is a plan view of the cutting head with blades thereon of the mechanism shown in Figure 2;

Figure 4 is a surface view of a length of foil showing the pattern obtained by using knives of different lengths with the cutting mechanism illustrated in Figures 2 and 3;

Figure 5 is a surface view of another length of foil showing a different pattern obtained by using two knives cutting from opposite edges of the foil;

Figure 6 is a surface view of another length of foil illustrating still another pattern of cuts;

Figure 7 is a diagrammatic representation of a portion of the length of foil shown in Figure 6 and extended in the direction of the arrows; while

Figure 8 is an elevational view of a flash lamp incorporating foil in accordance with the present invention.

In Fig. 1, reference numeral 1 indicates actinically reactive metal obtained by providing metal foil with cuts 2 so as to obtain the metal strips or wires 3. The thickness d is 100 microns at the most. As a rule, however, according to circumstances, the thickness d will be smaller. The distance b between two cuts 2 is also 100 microns at the most, but this dimension also will generally be smaller. The length of the

metal foil plays no part in the case under consideration.

The cuts 2 may be obtained in different ways, for example with the use of the mechanism shown diagrammatically in side-view and plan view in Figs. 2 and 3. The metal foil here bears the reference numeral 11 and is moved upwards over the desired distance *b* between two cuts by a mechanism (not shown). The metal foil 11 is supported by members provided on the table 12. In the table a cutting head 14 is provided on a spindle 13, the cutting head 14 carrying three knives 15, which alternately contact with the metal foil 11, which in the meantime has been moved upwards over the required width, thus cutting the metal foil. By a suitable arrangement of the metal foil 11 with respect to the cutting head 14 it is ensured that in this cutting operation a dam 16 subsists, so that the metal strips or wires produced in cutting are united with one another. This can be clearly seen in Fig. 2. During cutting, the knives 15 cause the strips or wires to be slightly bent over so that the actinically reactive metal acquires an entangled structure so as to obtain the desired distribution of the actinically reactive metal in the bulb space of a flash-lamp according to the invention. This may be facilitated by giving not all the knives 15 the same length or by varying the mutual cutting angle so that the strips or wires produced by cutting are bent backwards to a greater or smaller extent. A comparable effect is obtained by torsion of the strips.

It will be evident that the pattern of the cuts may be made in different ways. Fig. 4 shows the pattern which is obtained if not all the knives of the cutting mechanism are of the same length. The figure shows that four cuts 22, 23, 24, 25 of decreasing length are provided in a metal foil 21.

In Fig. 5, a metal foil 31 has provided in it alternately two cuts 32, 33, which terminate at one edge of the foil, and two cuts 34, 35, which terminate at the other edge of the foil. This pattern is particularly suitable to be manufactured with rectilinearly movable knives, in which event the cuts 32, 33 are made by one knife and subsequently the cuts 34, 35 by another knife. The desired spatical distribution is obtained by deformation, for example by extension between the points 32 and 36.

Fig. 6 shows that the metal foil 41 has provided in it three cuts 42, 43, 44 and beside them two cuts 45, 46, which overlap the cuts 42, 43, 44 in the transverse direction. With this pattern it is possible, after the said cuts in an actinically reactive metal foil have been provided, to extend the foil in the longitudinal direction according to arrows 48 and 49. This results in the structure shown in Fig. 7, in which for the sake of simplicity the strips or wires of actinically reactive metal are shown as lines.

The dam may alternatively be provided centrally between the edges of the metal foil owing to cuts being made with a V-shaped knife. The distance between the strips or wires may be locally increased by torsion of the dam.

In Figs. 1 to 7 the initial material used was a rectangular metal foil. It is alternatively possible, however, to use metal foil of circular or oval shape in which the cuts extend, if desired, in the radial direction.

Fig. 8 shows a flash-lamp according to the invention. The actinically reactive metal filling indicated by the reference numerals 51 and 52 is obtained by providing metal foil with cuts as shown in Fig. 1 by means of the cutting mechanism shown in Figs. 2 and 3. The entangled structure of the strips or wires is clearly shown. The mounting operation of this filling causes no particular difficulties. The united metal parts may be provided in the bulb 53 by means of a pair of tweezers and, if desired, be attached to one of the internal parts of the lamp, for example to either of the pole wires 54, 55. The extremities of the pole wires 54, 55, are connected by means of a filament on which the igniting mass 56 is provided. The pole wires 54 and 55 are connected to the cap of the flash-lamp 57 and the central contact 58 respectively.

What we claim is:

1. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reative metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, to so separate a plurality of strips formed of said metal foil, said metal foil body being deformed whereby the distances between adjacent ones of said strips are increased.

2. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, said cuts extending from one side edge of said metal foil body to a region extending adjacent the opposite side edge thereof to so separate a plurality of strips formed of said metal foil which have common attachment to said region, said metal foil body being deformed whereby the distances between adjacent ones of said strips are increased.

3. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, said cuts being discontinuous in and dispersed over the surface of said metal foil body to so separate a plurality of strips formed of said metal foil each of which said strips is connected to an adjacent one at one or more points along the lengths thereof, said metal foil body being deformed whereby the distances between adjacent ones of said strips are increased.

4. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, part of the number of said cuts extending from one side edge of said metal foil body to a region adjacent the opposite side edge thereof, while the remainder of said cuts extend from said opposite side edge to a region adjacent said one side edge to so separate a plurality of strips formed of said metal foil and which are attached at the extremities thereof to said regions, said metal foil body being deformed whereby the distances between adjacent ones of said strips are increased.

5. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal

in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, said cuts extending from one side edge of said metal foil body to a region extending adjacent the opposite side edge thereof to so separate a plurality of strips formed of said metal foil which have common attachment to said region, said region of said metal foil body being torsionally deformed whereby the distances between adjacent ones of said strips are increased.

6. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, part of the number of said cuts extending from one side edge of said metal foil body to a region adjacent the opposite side edge thereof, while the remainder of said cuts extend from said opposite side edge to a region adjacent said one side edge to so separate a plurality of strips formed of said metal foil and which are attached at the extremities thereof to said regions, said metal foil body being deformed by extension whereby the distances between adjacent ones of said strips are increased.

7. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts therein spaced at distances between adjacent cuts of not more than approximately 100/u, said cuts being discontinuous in

and dispersed over the surface of said metal foil body to so separate a plurality of strips formed of said metal foil each of which said strips is connected to an adjacent one at one or more points along the lengths thereof, said metal foil body being deformed by extension whereby the distances between adjacent ones of said strips are increased.

8. A flash-lamp comprising a bulb, a filling gas in said bulb, and an actinically reactive metal in said bulb, said actinically reactive metal comprising a body of metal foil having a thickness of not more than approximately 100/u and a plurality of cuts of a predetermined number of different lengths therein spaced at distances between adjacent cuts of not more than approximately 100/u, said cuts extending from one side edge of said metal foil body to a region extending adjacent the opposite side edge thereof to so separate a plurality of strips formed of said metal foil which have common attachment to said region, said metal foil body being deformed whereby the distances between adjacent ones of said strips are increased.

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