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METHOD OF FORMING SPRAYED LAYERS

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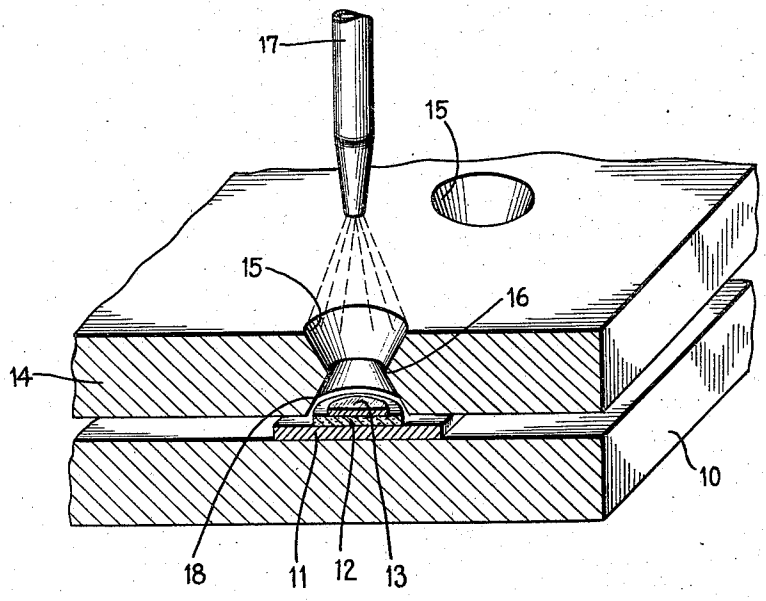

INVENTOR.
WALTER F. BONNER

BY E. O. Kinney

ATTORNEY.

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METHOD OF FORMING SPRAYED LAYERS

Walter F. Bonner, Glen Ridge, N. J., assignor to Federal Telephone and Radio Corporation, a corporation of Delaware

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1 Claim. (Cl. 101—129)

This invention relates to means for assuring deposit of matter on a predetermined area and more particularly to means for depositing a counter-electrode over a small area for production of small rectifiers.

It sometimes occurs that it is desirable to deposit a thin layer of matter over a small area of a base plate, the area of deposit to be substantially constant. Such a problem is encountered in the application of counter-electrodes to small rectifiers, such as instrument rectifiers.

It has been proposed to assure that the desired area be covered by use of a template serving as a stencil with openings of the desired size and shape. However, this is not found satisfactory in the making of small rectifiers such as instrument rectifiers since the metal forming the counter-electrode tends to adhere to the template so that when it is removed the metal deposit may be disturbed or lifted entirely off the rectifier layer. This leads to lack of uiformity in the rectifiers produced and to generally unsatisfactory results.

It is an object of my invention to avoid the difficulties which arise from matter deposited through a template sticking thereto.

It is a further object of my invention to provide apparatus for the production of rectifiers of small size so that the individual rectifiers will be substantially uniform.

According to a feature of my invention I provide a template with an opening or openings through which matter to be deposited on a plate supported therebelow may be applied over the desired area. The openings are made with a flare toward the lower side of the template so that matter deposited through the holes will not contact the template and will therefore not be disturbed upon removal of the template from the base plate.

Preferably my invention applies to production of selenium rectifiers and deposit of the counter-electrode is made by spraying molten metal from above the upper surface of the template through the openings.

A better understanding of my invention and the objects and features thereof may be had from the particular description thereof made with reference to the accompanying drawing the single figure of which illustrates an enlarged scale apparatus for practicing my invention. The figure of the drawing shows by way of example in exaggerated scale an arrangement for practicing my invention. In this figure a supporting plate or table 10 is shown on which is placed a strip or plate 11 forming the base plate of rectifier units. On this plate 11 is a further layer 12 which may be a thin layer of selenium or in the case of other rectifiers, a suitable semi-conducting oxide. In order to complete a rectifier unit counter-electrodes 13 must be applied to the selenium layer. In the case of instrument rectifiers which are very small in size, this thin counter-electrode layer may be easily stripped from the selenium if it is permitted to stick to any portion of the template through which it is deposited. To avoid this difficulty I provide a template 14 of special form, which is arranged over the coated strip 11 so that holes or openings 15 in the template are directly above selenium layer 12. Each hole is reduced in diameter so that at point 16 the diameter of the hole is substantially of a size to correspond to the desired area of counter-electrode layer 13. The metal forming the counter-electrode 13 may be applied by means of a metal spray gun indicated at 17 by the nozzle. When this molten metal is sprayed over the upper surface of template 14 so as to feed through the hole 15, it will then deposit a thin layer 13 over a small area of the selenium coated surface. In accordance with my invention the difficulty caused by metal of the thin layer sticking to the template is avoided by flaring out the hole 15 below point 16, as indicated at 18, so that the sprayed metal deposited on the selenium layer 12 is at no point in contact with the template. As a consequence when template 14 is removed, the deposited metal is not disturbed.

A plurality of holes 15 may be provided in template 14 so that the counter-electrode for many rectifiers may be applied to a strip or plate of metal coated with selenium. After deposit of the counter-electrode the strip may be cut up to form the individual rectifier units. By using apparatus as outlined in accordance with my invention, a uniformity of the rectifier product is achieved. This is of extreme importance in small rectifiers, for example, in instrument rectifier units.

While I have described my invention as particularly applied to the production of small rectifier units, it should be distinctly understood that this method may be applied in any case where it is necessary to deposit matter over a predetermined area. Whenever the problem of preventing the deposited matter sticking to the template or stencil sheet arises, my invention will be found useful. It is, therefore, clear that the principles of my invention may be applied gener-

ally to the deposit of thin layers of fixed area and need not be limited to the specific purpose outlined above.

What is claimed is:

In a method of spraying a thin layer of material on a predetermined area of a flat surface by means of a template having holes therethrough, said holes being divided into two continuous zones, said zones having a relatively small common cross-section and each zone increasing in cross-section to its outer end at the surface and the said two zones forming a sharp angle at their meeting point in an axial section through the said hole, comprising the steps of applying said template to said flat surface around the area of the latter to be sprayed, spraying said material through the holes of said template on an area smaller than the end of said hole adjacent to said flat surface, and removing said template from said flat surface, thereby preventing that a part of said layer is removed with said template.

WALTER F. BONNER.