Sept. 22, 1942. C. A. ROWLEY ET AL 2,296,575

MANUFACTURE OF ALTERNATING CURRENT RECTIFIERS

Filed March 17, 1942

Fig. 1.

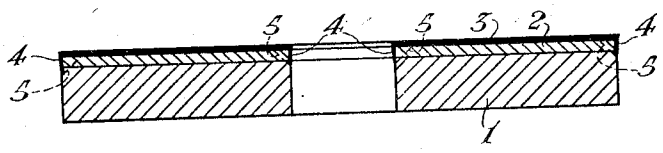
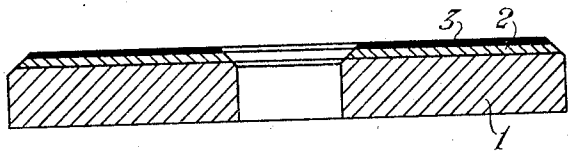


Fig. 2.



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MANUFACTURE OF ALTERNATING CURRENT RECTIFIERS

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In Great Britain October 24, 1940

5 Claims. (Cl. 175—366)

This invention relates to the manufacture of alternating current rectifiers more particularly of the type comprising a sheet metal base or support provided with a layer of rectifying material such as selenium to which a conducting metallic layer is applied.

The invention is more particularly applicable to rectifiers produced by the process of the general character described in the specification of United States Patent No. 2,235,051 in which sheet metal is coated with selenium material the surface of which is then covered with a conducting layer of metal applied by spraying or otherwise, the composite sheet thus formed being subsequently subdivided into rectifying elements of the desired size and shape by a punching or stamping operation. In order to prevent the possibility of a short-circuit between the metallic coating and the metal base it has hitherto been proposed to protect those portions of the selenium layer at which the separation of the composite sheet into individual rectifying elements is effected by means of a suitable mask during the application of the metallic coating but this step in the process of manufacture has the disadvantage that the mask must evidently be accurately adjusted and considerable care and time is thus involved which increases the cost of manufacture.

According to the principal feature of the invention the composite sheet comprising the sheet metal base with its applied coatings of rectifying and conducting material is subdivided into individual elements by punching or stamping without the use of a mask or its equivalent and the metallic coating is then removed adjacent to the edge or edges of each element by a cutting or grinding operation. Preferably the cutting or grinding tool is so adjusted that a chamfering action is effected, the finished edge or edges of the element being thus slightly bevelled.

In carrying the invention into practice the punching or stamping of the composite sheet is so effected that the burr or raised rim necessarily produced at the cut edge is on that side of the sheet to which the rectifying and conducting coatings are applied so that the removal of this burr or rim by the action of the cutting or grinding tool removes the metallic coating over a narrow zone adjacent to the edge of the element. This removal of the burr or rim produced by the punching or stamping operation so as to render plane the coated face of the element will thus achieve the object of the invention but as above stated it is preferable to chamfer or bevel slightly the cut edge so as to ensure the effective removal of the metallic coating adjacent to this edge and thus prevent any possibility of the coating being brought into electrical connection with the metal of the base or support by any subsequent treatment or handling during assembly of the elements.

It will be understood that in the case of rectifying elements provided with one or more apertures for enabling the finished elements to be assembled on one or more supporting rods or bolts in the well known manner the edges of these apertures must be similarly treated so as to remove the metallic coating adjacent to the edges of the apertures. In the case of circular rectifying elements each provided with a central aperture, the burr or rim at the outer edge of the element and at the edge of the aperture may be simultaneously removed by the action of a suitable combined cutting or grinding tool which may take the form of an outer cutter element rotating in the opposite direction to an inner rotary cutter element so that the torques exerted by the two cutter elements on the rectifying element are balanced.

In the accompanying drawing Figure 1 is a view in vertical section on an enlarged scale of a rectifier disc or washer as it appears after being punched or stamped out of a larger sheet of coated stock in the usual manner, Figure 2 being a similar view of a similar disc or washer after completion by a grinding operation in accordance with the invention.

It will be seen from Figure 1 that the rectifier disc comprises a sheet metal base 1 coated with a layer 2 of selenium material on which a metallic conducting coating 3 is superposed. Owing to the effect of the punching operation by which the disc is produced the coating 3 is, at the cut edges, burred over as indicated at 4 so as to be brought into electrical contact with the metal base 1.

In accordance with the invention the outer edges of the disc and of the central aperture therein are cut or ground away as indicated in dotted lines at 5 so that in the completed disc these edges are chamfered or bevelled as shown in Figure 2.

It will be understood that with the alternative method of punching or stamping above described, the subsequent cutting or grinding operation also results in the completed disc having substantially the form shown in Figure 2.

The invention evidently eliminates the necessity for very accurate tool clearances to be maintained as regards the punching or stamping tools

employed while effectively preventing the risk of short circuit between the metal base and the conducting coating of the individual rectifying elements produced.

The invention is not limited to the particular process above described and illustrated by way of example which may evidently be varied to suit particular conditions without exceeding the scope of the invention.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A process for the manufacture of alternating current rectifiers of the kind described which consists in applying a layer of rectifying material to a sheet metal base of sufficient size to provide a plurality of rectifying elements, applying a conducting layer to the entire surface of the rectifying layer, subdividing the base with its applied coatings into rectifying elements by a punching or stamping operation, and then removing the metallic conducting layer adjacent to the edge or edges of each element by a cutting or grinding operation.

2. A process as claimed in claim 1 in which the cutting or stamping of the coated base is so effected that the burr or raised rim produced at the cut edge is on that side of the base to which the coatings are applied, for the purpose specified.

3. A process for the manufacture of alternating current rectifiers of the kind described which consists in applying a layer of rectifying material to a sheet metal base of sufficient size to provide a plurality of rectifying elements, applying a conducting layer to the entire surface of the rectifying layer, subdividing the base with its applied coatings into rectifying elements by a punching or stamping operation, and then removing the metallic conducting layer adjacent to the edge or edges of each element by a cutting or grinding tool so adjusted that a chamfering action is effected for the purpose specified.

4. A process for the manufacture of alternating current rectifiers of the kind described which consists in applying a layer of rectifying material to a sheet metal base of sufficient size to provide a plurality of rectifying elements, applying a conducting layer to the entire surface of the rectifying layer, subdividing the base with its applied coatings into circular rectifying elements having a central aperture by a punching or stamping operation, and then removing the metallic conducting layer at the outer edge of the element and at the edge of the aperture by the action of two cutting or grinding tools rotating in opposite directions so that the torques exerted on the rectifying element by the two tools are balanced.

5. A process for the manufacture of alternating current rectifiers of the kind described which consists in applying a layer of rectifying material to a sheet metal base of sufficient size to provide a plurality of rectifying elements, applying a conducting layer to the entire surface of the rectifying layer, subdividing the base with its applied coatings into circular rectifying elements having a central aperture by a punching or stamping operation in such manner that the burrs or raised rims produced at the cut edges are on that side of the base to which the coatings are applied, and then simultaneously removing the burr at the outer edge of the element and the burr at the edge of the aperture by a cutting or grinding operation.

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