

Sept. 13, 1938.

M. LAZARUS

2,129,947

CONTACTING TERMINAL STRUCTURE FOR ELECTRICAL DEVICES

Filed Aug. 6, 1936

Fig. 1.

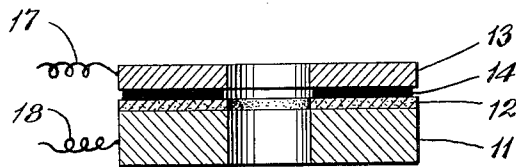


Fig. 2.

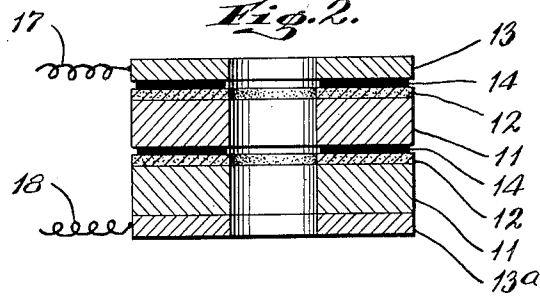
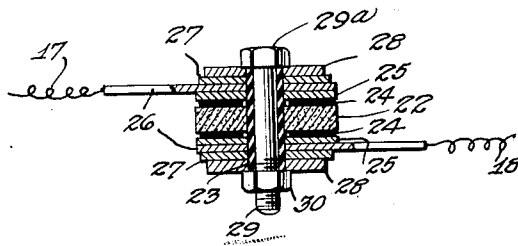


Fig. 3.



INVENTOR
MEYER LAZARUS

BY
Israel Benjamins.
ATTORNEY

UNITED STATES PATENT OFFICE

2,129,947

CONTACTING TERMINAL STRUCTURE FOR
ELECTRICAL DEVICESMeyer Lazarus, Brooklyn, N. Y., assignor to
Coprox Inc., Brooklyn, N. Y.

Application August 6, 1936, Serial No. 94,525

2 Claims. (Cl. 201-63)

My invention relates to improvements in contacting terminal structures for electrical devices, such as copper oxide rectifying elements, resistance elements and the like; and it consists in the novel features which are hereinafter described.

One of the objects of my invention is to provide perfected inexpensive contacting terminal structures for electric rectifiers, resistance elements and the like, whereby high pressure may be avoided in assembling the discs of said rectifiers and resistance elements into a stack.

Another object is to reduce the aging of the terminals to wit: to prevent an increase of resistance at the junction of the terminals and the said discs due to oxidation.

A further object is to enable the said terminal structures to withstand relatively high temperatures.

Still another object is to have said devices adapted for mass production.

Another object of my invention is to reduce the electrical resistance at the junction of the terminals of the said devices and thereby reduce the contact drop.

Other objects and advantages will hereinafter appear.

I attain these objects by the electrical devices and the contacting terminal structures thereof which are illustrated in the accompanying drawing or by any mechanical equivalents or obvious modifications of the same.

In the drawing, Fig. 1 is a vertical section of an electrical device containing a single element and embodying one form of my contacting terminal structure which is shown as connected thereto.

Fig. 2 shows a stack of elements of the electrical device which is shown in Fig. 1. Each of these elements includes a contacting terminal structure.

Fig. 3 is a view partly in section and partly in elevation of another electrical device embodying my contacting terminal structure which is shown as connected to each of the opposite sides of the said device.

The thickness of the sundry plates and layers is exaggerated in all the figures of the drawing.

Similar numerals refer to similar parts throughout the several views:

In the modification of my improved electrical device, which is shown in Fig. 1, 11 designates a metal carrier of an electrical element, which may be either a resistance element or a rectifying ele-

ment, and 12 a layer of oxide of the metal of the carrier 11, which is integral therewith.

The carrier 11 may be made of copper and the layer 12 of cuprous oxide.

Instead of an oxide any other poor conductor, such as an iodide, a telluride, a sulphide or a selenide, may be employed in some cases, if desired.

A contacting plate 13 which may be a metal plate is shown as connected to the layer 12 on the side of the latter which is remote from said carrier 11 and a coating 14 of a substance known in the arts as "graphalloy", preferably babbitt "graphalloy", is shown as placed between the layer 12 and the terminal plate 13 and in contact with said plate 13. Lead "graphalloy", tin graphalloy or lead and tin graphalloy may be used.

Graphalloy is an imperfect alloy or conjunction of graphite and a soft metal produced by filling the interstices of porous graphite with the metal in a state of fusion.

The coating 14 may first be formed on said layer 12 by rubbing the layer 12 or a part thereof with a piece of the graphalloy, which may have a suitable shape.

I prefer to cover with the coating 14 only a portion of the surface of the layer 12 opposite the plate, 13, to prevent any portion of the layer 14 from being brought into contact with the carrier 11 through cracks at the inner and outer peripheries of said layer 12, to avoid short circuiting the element 11-14.

The operation of coating the layer 12 with the said graphalloy may be done either manually or by any suitable machine or contrivance.

Both the layer 12 and the plate 13 may be coated with said graphalloy, if desired, but I prefer to form the coating on the layer 12.

The said disc at the surface of contact thereof with the coating 14 will maintain a substantially constant and low contact resistance with the coating 14 without an increase of resistance at the junction or contact surface thereof.

The said disc is also adapted to withstand very high temperatures.

Instead of graphalloy any other imperfect alloy or conjunction of carbon with a soft metal may be used, but I prefer an imperfect alloy or conjunction of graphite and Babbitt metal.

The coating 14 serves to fill the inequalities and interstices on the layer 12 and forms thereon a thin, firmly adhering, nonoxidizable film, which I found to produce a low contact drop between said layer 12 and said plate 13.

The metal "graphalloy" has a higher electrical conductivity than graphite.

Wires 17 and 18 are connected to the plate 13 and the carrier 11.

5 Fig. 2 shows a stack of multiple discs 11 of the same type as shown in Fig. 1. Only one plate 13 is shown as employed at one end of the stack, and a terminal plate 13a is shown as connected to the other end of the stack. The adjacent
10 discs 11 of the stack serve as contacting plates of the device.

Wires 17 and 18 are connected to the plates 13 and 13a.

In the modification of my electrical device, 15 which is shown in Fig. 3 and is a resistance unit, a disc 22 of oxide, preferably cuprous oxide, is shown as having on the opposite sides thereof coatings 24 of "graphalloy"; a sheet 25 of metal foil is shown as in contact with each of the said
20 coatings 24. A terminal plate 26 is shown as in contact with each of said sheets 25. Wires 17 and 18 are shown as connected to said terminals 26. Discs of insulation 27 are shown as in contact with said terminals 26.

25 Pressure plates 28 are shown as applied to the discs 27 at the ends of the unit. The discs 27 serve to insulate the terminals 26 from said plates 28.

30 A bolt 29 having thereon a head 29a and a nut 30 in engagement with said bolt 29 are shown as holding and pressing together all the above described parts of the complete unit. The bolt

29 is encompassed by a sleeve 23 of insulating material.

Variations are possible and parts of my invention may be used without other parts.

The term "an oxide and the like," as used in the claims hereinafter, is meant to include also
5 a selenide and a sulphide.

I claim as my invention, and desire to secure by Letters Patent:

1. A terminal structure for an electrical device including a contacting plate, a metal plate carrier and a layer of an oxide of said carrier on said carrier, a film of an alloy of graphite and a soft metal on said layer, firmly adhering thereto, interposed between said layer and said contacting plate, the metal of the alloy of said film
10 extending into contact with both said layer and said contacting plate and filling the inequalities and interstices in the bodies of both said layer and said contacting plate on the adjacent sides
15 of the same, thereby enhancing the conductivity through the body of said terminal structure.

2. The method of making a terminal structure for an electrical device comprising a contacting plate, a metal carrier and a layer of an oxide of the carrier on said carrier integral with the latter, consisting in rubbing an alloy of graphite and a soft metal on said layer, said alloy thereby being made firmly to adhere to the said layer and to extend into and fill the inequalities and interstices in the body of said layer on the side
20 thereof which is adjacent to the contacting plate.

MEYER LAZARUS.