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L. B. HAIGH

2,485,593

RECTIFIER AND METHOD OF MAKING THE SAME

Original Filed Aug. 14, 1943

Fig. 1.

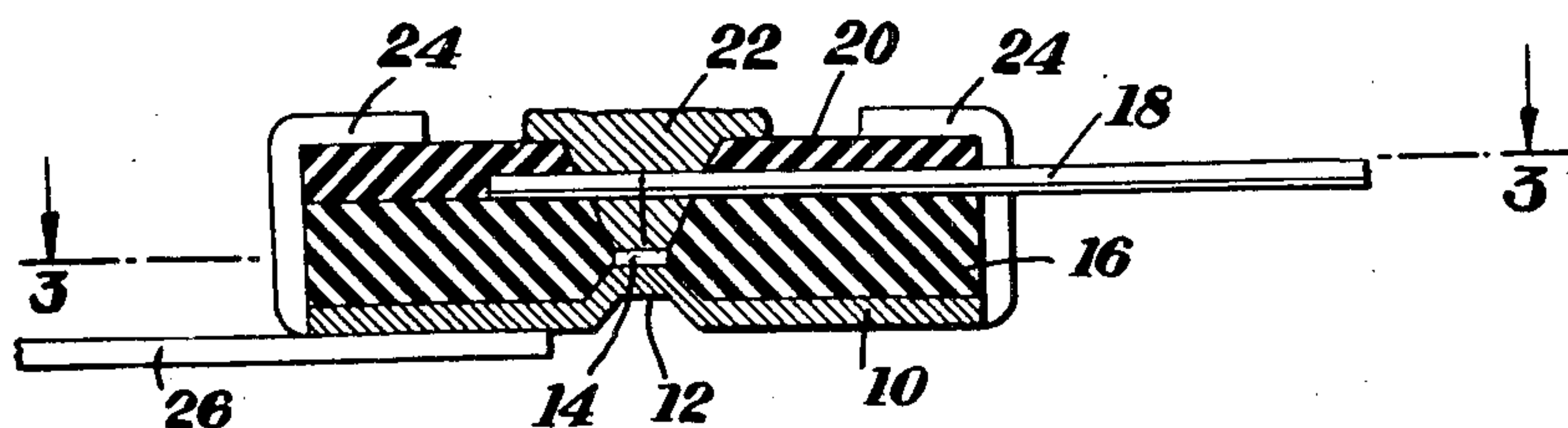


Fig. 2.

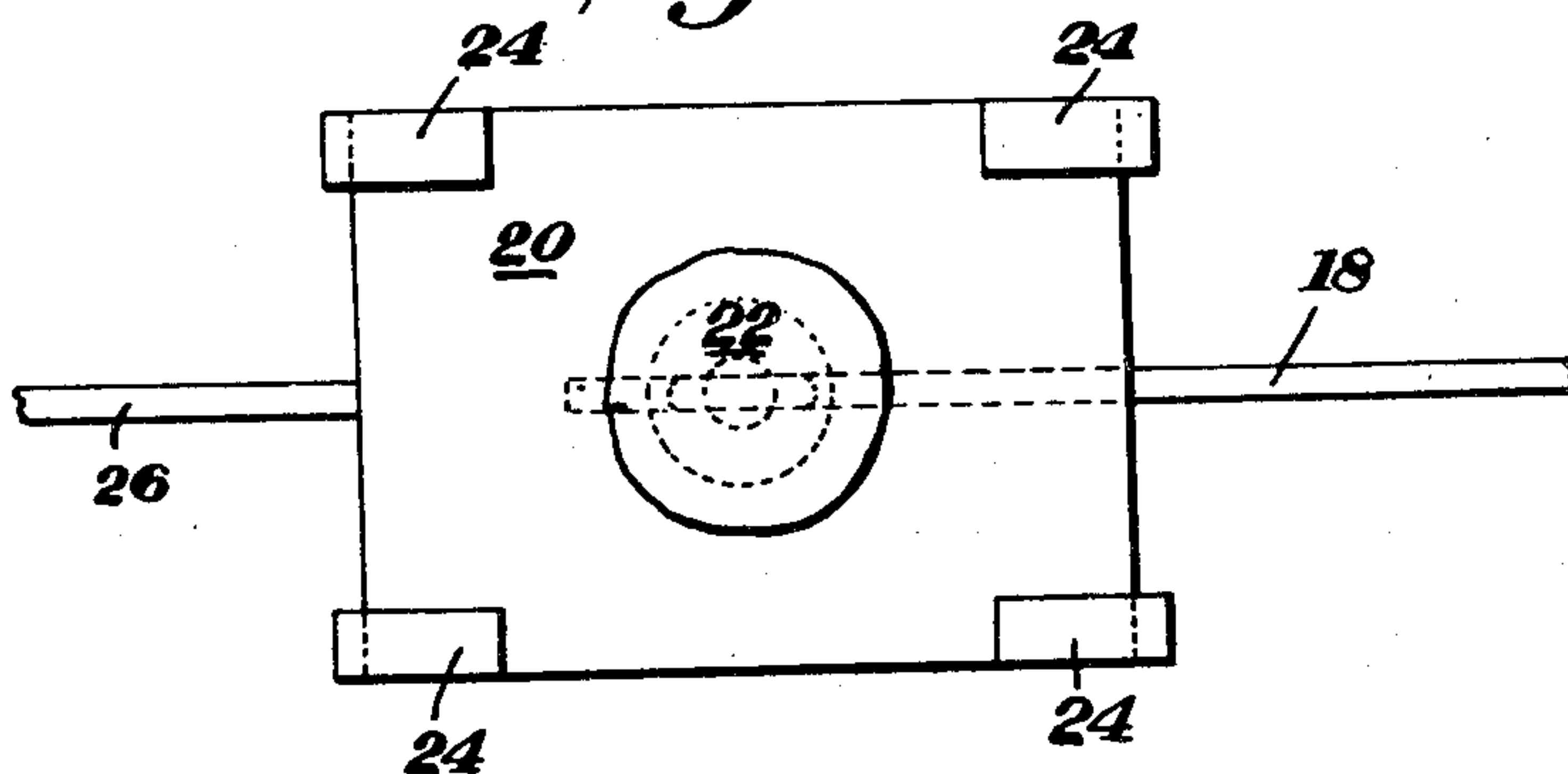
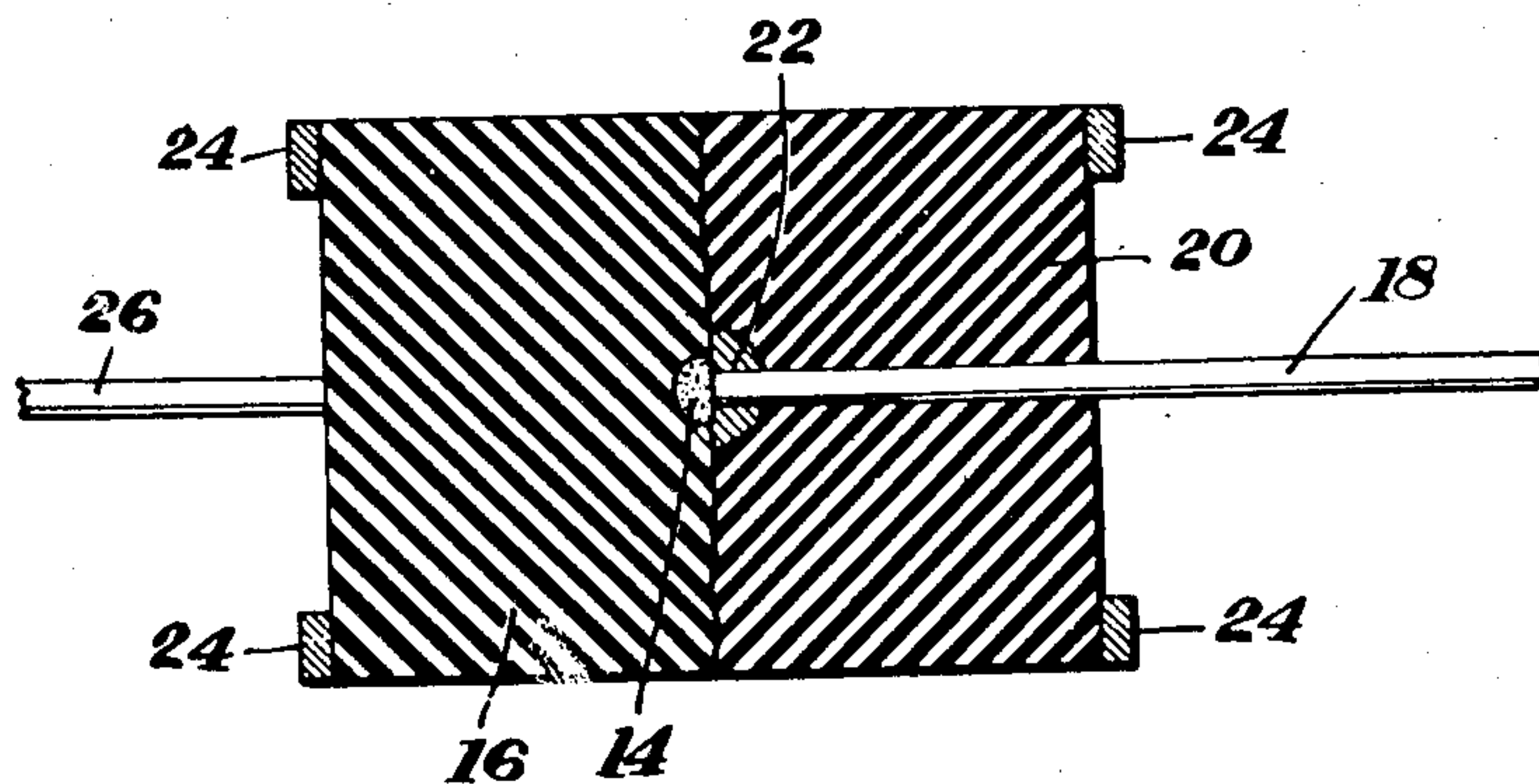


Fig. 3.



INVENTOR

BY *Robert H. Haidinger*
Attorney

UNITED STATES PATENT OFFICE

2,485,593

RECTIFIER AND METHOD OF MAKING
THE SAME

Leslie B. Haigh, West Orange, N. J., assignor to
Federal Telephone and Radio Corporation,
Newark, N. J., a corporation of Delaware

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498,654. Divided and this application January
3, 1947, Serial No. 720,035

6 Claims. (Cl. 175—366)

1

This invention relates to improvements in rectifiers and methods of making the same, and more particularly to rectifiers of the dry contact type, such as selenium rectifiers.

This application is a division of application, Serial No. 498,654, filed August 14, 1943, now Patent No. 2,419,602, issued April 29, 1947.

An object of this invention is directed to the provision of improved, small, low-capacity rectifiers.

Another object of this invention is to provide a small rectifier of simple design and high efficiency.

A further object of this invention is directed toward an improved and simplified method of making rectifiers.

Generally speaking, this invention may be defined as comprising the constructions and combinations recited in the annexed claims and illustrated in the drawings accompanying and forming a part of this application, wherein:

Fig. 1 is a longitudinal cross-sectional view of a preferred form of rectifier construction in accordance with the present invention;

Fig. 2 is a top plan view of the rectifier illustrated in Fig. 1; and

Fig. 3 is a horizontal cross-sectional view taken along the line 3—3 of Fig. 1.

In the form of invention shown in Figs. 1, 2 and 3, it will be seen that the rectifier is built-up on a metal base plate 10 having a raised portion 12, preferably substantially centrally located with respect to the plate as a whole, upon which is formed in any suitable manner known to the art, a thin selenium layer 14. A layer of insulation 16, which may be a thermoplastic artificial insulation such as polystyrene or may be formed of insulating paper is placed on the base 10 and is provided with a through opening uncovering the selenium spot 14. A lead wire 18 is placed on the insulating layer 16, passing over the opening therethrough and a second layer of insulation 20 is applied over the lead wire 18 and joining with the first insulating layer 16. The second insulating layer is also provided with a through opening substantially aligned with the opening in the insulating layer 16. Counter-electrode alloy 22 is then melted and poured through the aligned openings forming contact with the selenium layer 14 and, at the same time fusing with a portion of the lead wire 18 and thus holding the latter in position. In accordance with the construction of the described modification, the base plate 10 is preferably formed with four ears 24 at its corners and these are bent upwardly and over

2

the top insulating layer 20 pressing the parts against the base plate 10 to form a unitary structure. A second lead wire 26 may be soldered or otherwise attached to the base plate 10.

It will be seen from the description just given that the described construction provides a very simple and yet extremely efficient low capacity rectifier. The selenium spot and the counter-electrode area in contact therewith are kept small, thus providing for high current density and improved efficiency of the rectifier. In the drawings, the thickness of the parts such as the metal plate 10, selenium layer 14 and the insulating layers 16 and 20 have been exaggerated for the purposes of clear illustration, and while the invention is not intended to be limited to any particular size, it may be mentioned that rectifiers of the type described have been manufactured with a length of about $\frac{3}{8}$ of an inch, a width of about $\frac{1}{4}$ of an inch and a thickness of less than $\frac{1}{8}$ of an inch. Additionally, while the integral legs formed on the base plate are shown to extend longitudinally thereof, it will be obvious to those skilled in this art that these built-up and turned-over legs could project laterally from the base plate as well. After assembly of the exposed portions of the rectifier, including the base plate, the turned-over legs, the counter-electrode alloy and parts of the lead wires can be further insulated as by painting, if desired.

Various changes and modifications coming within the scope of the present invention will occur to those skilled in this art. The base plate 10 will preferably consist of a metal containing iron but other metals suitable for use with selenium for the purposes of rectification may be used, or the base plate 10 may be formed of any metal coated with an iron-containing alloy. The manner in which the selenium is applied to the base plate is of no particular importance with respect to the present invention and various methods known to the art may be utilized, while after assembly, the rectifier may be electroformed in the usual manner to create the desired barrier layer. As previously pointed out, the insulating layers can be any suitable insulation, either artificial resinous insulating materials or plain or impregnated paper.

What is claimed is:

1. A rectifier comprising, in combination, a metallic base plate, a selenium layer on said base plate, an insulating layer supported on said base plate and having an opening therethrough exposing a relatively small area of selenium, a lead wire supported on said insulation, a portion of

3

said wire passing over said opening, a second layer of insulation above said lead wire and having an opening therethrough substantially coaxial with the opening in the first insulating layer, a counter-electrode alloy extending through said two openings, about said lead wire and to said selenium layer, and integral extensions on said base plate bent upwardly and over the second insulating layer to hold all the parts together as an integral unit.

2. A rectifier comprising, in combination, a metallic base plate, a layer of selenium on said base plate, an insulating layer supported by said base plate and having a small opening therethrough exposing a small area of selenium, a lead wire on said insulating layer passing across said opening, counter-electrode alloy in said opening, fused to said lead wire and contacting the selenium layer, a second insulating layer over said lead wire and the first insulating layer, and integral extensions on said base plate bent upwardly and over the second insulating layer to hold all the parts together as an integral unit.

3. The combination according to claim 2, in which said second insulating layer has an opening therethrough substantially aligned with the opening in the first insulating layer, and in which said alloy extends through both openings to the selenium layer.

4. The combination according to claim 2, in which said selenium layer comprises a small spot of selenium on the base plate, corresponding in size to the size of the opening in the first insulating layer.

5. A rectifier comprising, in combination, a metallic base plate having a raised substantially central portion, a layer of selenium on said raised portion, a first insulating layer on said base plate,

4

having an opening exposing said selenium layer, a lead wire on said insulating layer having a portion extending over said opening, a second layer of insulation on said first insulation, covering said lead wire and having an opening aligned with the opening in the first insulating layer, counter-electrode alloy in said openings, fused to the lead wire and contacting the selenium layer, and integral extensions on said base plate bent upwardly and over said second insulating layer to hold said parts together.

6. A rectifier comprising, in combination a metallic base plate, a layer of insulating material covering the major portion of the top surface area of said base plate, said layer having an opening extending therethrough, a spot of selenium covering only that portion of said base plate top surface that is bounded by said opening, a lead wire supported on said insulation and passing over said opening, a second layer of insulation above said lead wire and having an opening above said first-named opening, and a counter-electrode element extending through said openings into contact with said lead wire and selenium spot.

LESLIE B. HAIGH.

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The following references are of record in the file of this patent:

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