

Jan. 25, 1938.

J. R. FLEGAL ET AL

2,106,344

ELECTRICAL DEVICE

Filed May 19, 1936

FIG. 1

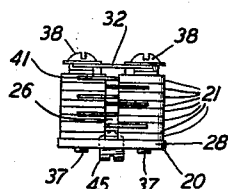


FIG. 2

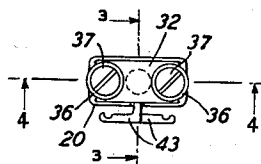


FIG. 3

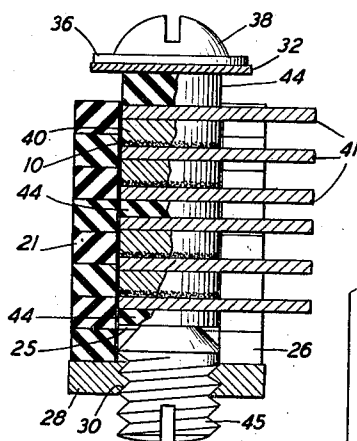


FIG. 4

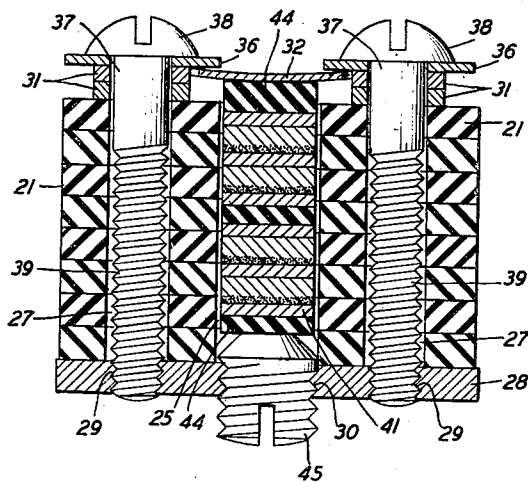
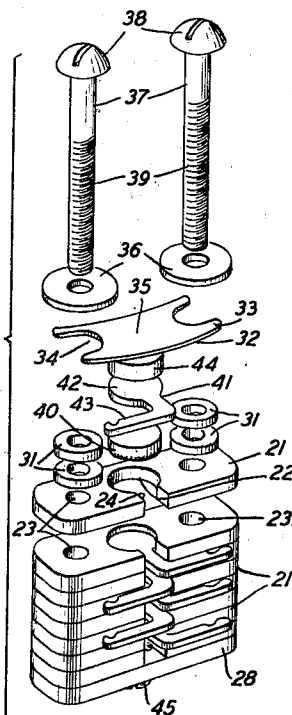


FIG. 5



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## UNITED STATES PATENT OFFICE

2,106,344

## ELECTRICAL DEVICE

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Application May 19, 1936, Serial No. 80,644

7 Claims. (Cl. 175—366)

This invention relates to electrical devices, and, more particularly, to an assembly embodying elements or discs having a non-linear voltage-current characteristic.

5 An object of the invention is to simplify the structure of resistance and rectifying devices, and to render their capacity readily variable.

A feature of the invention comprises the combination of dry rectifier discs or units and an enclosure therefor, the enclosure comprising a plurality of superposed plates or members defining a channel for the discs, the length of the channel and, consequently, the number of discs accommodated varying with the number of superposed plates.

Other and further features will be apparent from the description hereinafter.

A more complete understanding of the invention will be obtained from the detailed description which follows, taken in conjunction with the appended drawing, wherein:

Fig. 1 is a front elevational view, actual size, of an assembly or unit embodying the invention;

Fig. 2 is a top plan view of the device of Fig. 1;

25 Fig. 3 is an enlarged sectional view of the device of Figs. 1 and 2 taken along the line 3—3 of Fig. 2;

Fig. 4 is an enlarged sectional view taken along the line 4—4 of Fig. 2; and

30 Fig. 5 is an enlarged perspective view of the device of Fig. 1, partly exploded to show details of the assembly.

The device, assembly, unit or combination, designated generally as 20, comprises a plurality of superposed elongated, substantially rectangular plates 21, preferably of insulating material, each of which contains a central, circular opening or aperture 22 and an opening or aperture 23 on each side of the central opening, a slot 24 extending inwardly from one long edge of the plate to connect with the opening 23. The openings in the successive plates are in alignment to form a central passage or channel 25 with which an elongated slot 26 connects, and lateral channels or passages 27. At one or the lower end of the plates, 40 is a pressure member or plate 28, which may be of metal, containing spaced, threaded apertures 29, 30 that are in alignment with the channels 25, 27. At the other or upper end of the plates, spacer washers 31 are supported in alignment with the passages 27; a spring or resilient member 32 having recessed end portions 33, in the recesses 34 of which the washers 31 are positioned, the central portion 35 extending across the upper end of the central channel; and discs or washers 36 for 55 limiting the degree of upward movement of the

end portions of the member 32. The assembly is secured together by fastening members or screws 37, the heads 38 bearing against the washers 36, and the threaded ends 39 engaging with the apertures 29. Superposed dry rectifier discs or units 40, for example, of the type comprising a copper blank having a layer 10 of cuprous oxide thereon, and terminal discs or members 41 of tin-coated lead, having a contact portion 42 and an L-shaped lug portion 43 extending outwardly through the slot 26, are disposed in the central channel. The rectifier disc is substantially the same thickness as the insulating plate. Circular discs 44 of insulating material insulate the end terminal members from the spring member and the pressure plate and divide the superposed rectifier discs and terminal members into two sections. By adjusting the position of the set screw 45 engaging with the aperture 30, the pressure between the rectifier discs and terminal members may be adjusted to the desired degree, the spring member acting as a resilient stop at the upper end of the assembly.

The device described may be utilized, for example, as a rectifier; or, as a variable resistance device, i. e., one in which the asymmetric, non-linear voltage-current characteristic of the discs 40 is taken advantage of to obtain a variation in resistance with variation in current or voltage in a given circuit. The capacity of the device may be readily changed by adding or removing insulating plates and rectifier discs and associated terminals, fastening screws of appropriate length being substituted.

While a single embodiment of the invention has been disclosed, it is to be understood that it is not restricted thereto, but is to be considered as limited in scope by the appended claims only.

What is claimed is:

1. In combination, a plurality of superposed insulating plates, each plate having a central aperture and a slot extending inwardly from an edge to the aperture, the apertures and slots being in alignment to define a passage and an elongated slot connecting therewith, rectifying elements mounted in the central passage, conductive terminal members interposed between said elements and having extensions projecting through said elongated slot, and means for securing said plates together and for applying pressure to and for adjusting the pressure between said elements and members, said means including a pressure member at one end of the passage and a resilient member at the other end of said passage.

2. In combination, a plurality of superposed

rectangular-shaped insulating plates, each plate having a central aperture and an aperture on each side thereof and a slot extending inwardly from one long edge of the plate to the central  
5 aperture, the apertures in the plates being in alignment to define three passages and the slots in alignment to form a single elongated slot, rectifying elements mounted in the central passage, conductive terminal members interposed  
10 between said elements and having extensions projecting through said elongated slot, a spring metal member at one end of said superposed plates, a pressure plate at the other end of the superposed plates, means extending through the  
15 passages and engaging with the pressure plate and the spring metal member, and means engaging with said pressure plate and the superposed elements and discs for adjusting the pressure between the elements and discs, the spring member  
20 constituting a resilient stop at the other end of the central passage.

3. In combination, a plurality of insulating plates each containing a central aperture and an aperture on each side of the central aperture,  
25 each plate containing a slot connecting with the central aperture, said plates being superposed with the apertures of each in alignment with those of the others, such that three continuous passages are provided, the central passage having  
30 a continuous elongated slot connecting therewith, a metallic plate member having threaded apertures aligned with said passages, a pair of fastening members having a threaded end and an enlarged end extending through the  
35 outer passages with the threaded ends interengaging with the outer threaded apertures in the metallic plate member, a spring metal member positioned over the central opening and having end portions engaging with the undersurfaces of  
40 the enlarged portions of the fastening members, a plurality of rectifying elements mounted within the central passage, conductive terminal members interposed between said elements and having extensions projecting through said elongated  
45 slot, and means cooperating with the threaded central aperture of the metallic plate

member for adjusting the pressure between the rectifying elements and terminal members, the spring member constituting a resilient stop at the other end of the central passage.

4. In combination, a plurality of superposed  
5 insulating plates, each plate having a central aperture and a slot extending inwardly from an edge to said aperture, the apertures and slots being in alignment to define a passage and an elongated slot connecting therewith, dry rectifier  
10 discs mounted in said passage, conductive terminal members associated with said elements and having extensions projecting through said elongated slot, and means for securing said  
15 plates together and for adjusting the pressure between said discs and members, said means including a pressure member at one end and a resilient member at the other end of said passage.

5. In combination, a plurality of superposed  
20 insulating plates, each plate having a central aperture, the apertures being in alignment to define a passage, superposed discs in said passage having a non-linear voltage-current characteristic, and means for securing said plates together and applying pressure to said discs, said  
25 means including a pressure member at one end and a resilient member at the other end of said passage.

6. In combination, a plurality of superposed  
30 insulating plates, each plate having a central aperture, the apertures being in alignment to define a passage, superposed resistance discs in said passage, and means for securing said plates together and said discs in said passage.

7. In combination, a plurality of discs having  
35 a non-linear current-voltage characteristic and an enclosure for said units containing a channel in which said discs are positioned, said enclosure comprising a plurality of superposed insulating plates having aligned apertures to define said  
40 channel, the length of said channel and the number of discs accommodated therein varying with the number of superposed plates.

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