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L. H. PETER

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APPARATUS FOR RECTIFYING ALTERNATING ELECTRIC CURRENTS

Filed Nov. 15, 1928

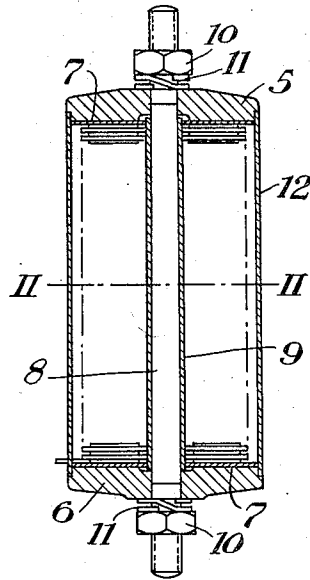


Fig. 1.

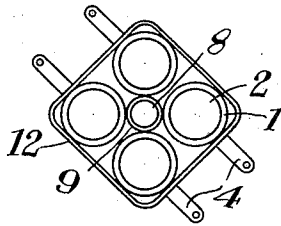


Fig. 2.

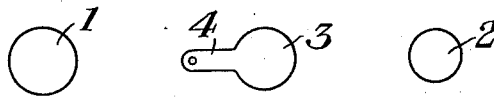


Fig. 3.

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LESLIE HURST PETER, OF LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

APPARATUS FOR RECTIFYING ALTERNATING ELECTRIC CURRENTS

Application filed November 15, 1928, Serial No. 319,526, and in Great Britain December 19, 1927.

My invention relates to apparatus for rectifying alternating electric currents of the kind comprising rectifying elements each consisting of a metal member having a layer of a compound of the metal formed directly thereon. In order to obtain full wave rectification with apparatus of this character four groups of rectifying units each consisting of a number of rectifying elements are connected to form a Gratz or Wheatstone bridge in the well known manner, and the present invention has for its object to provide an improved construction of rectifying apparatus which shall be simple and cheap to manufacture and assemble.

According to the principal feature of the invention each of the four rectifying units or groups or arms of the bridge consists of a column of superposed imperforate metal discs each coated on one face thereof with a layer of a compound of the metal of which the disc is composed. In particular copper discs coated on one face with a layer of cuprous oxide are found to be preferable and each unit or arm of the bridge consists of a number of discs superposed upon one another to form a column, the four columns thus constituted being arranged parallel to one another and held in position by means of suitable end plates connected together by a single bolt or rod.

The invention is illustrated by way of example in the accompanying drawings of which Fig. 1 is a sectional view of one form of rectifying apparatus embodying the invention, Fig. 2 being a sectional plan view thereof on the lines II—II of Fig. 1. Fig. 3 is a plan view of the several elements of which the unit shown in Figs. 1 and 2 are composed.

Referring now to the drawings, it will be seen that the apparatus comprises four columns of copper discs each coated on one side with a layer of cuprous oxide. Each of these discs is of the form shown at 1 in Fig. 3 and the discs are separated from one another by a lead washer of the form shown at 2. The end disc of each column is of the form shown at 3 in Fig. 3 and is provided with a lug 4 for effecting the necessary electrical connection of the unit and the columns thus built up are

held in position between upper and lower end plates 5, 6 of square form, an insulating washer 7 being interposed between each of the end plates 5, 6 and the adjacent ends of the columns of the discs. The end plates 5, 6 are each provided with a central aperture through which a supporting bolt 8 passes this bolt extending to the full length of the columns and projecting beyond the end plates 5, 6 as clearly shown in Fig. 1. The bolt 8 is surrounded by an insulating sleeve 9 and at each end of the bolt, nuts 10 and spring washers 11 are provided for enabling the end plates 5, 6 to be caused to grip the columns securely and to exert pressure upon the discs of which each column is composed. The structure thus formed is enclosed in an insulating casing 12 in the form of a tube of square section.

The imperforate discs 1 may each be constituted by the central portion removed from a larger disc and forming a washer for rectifying element of the kind comprising a number of perforated elements traversed by a supporting bolt or spindle and the invention being particularly, although not exclusively applicable to rectifying apparatus of relatively small capacity, the invention enables material to be conveniently and effectively utilized which would otherwise be regarded as waste.

The several rectifying elements 1 of each column are usually connected in series with one another as above described but obviously each unit or arm of the bridge may be constituted by a number of such columns connected in parallel with one another in which case each group or column constituting a unit or arm of the bridge will be suitably spaced from the remaining groups all the units being each held in position by a single pair of end plates and a single securing rod or bolt.

The construction of the individual rectifying units may be that described in my co-pending application No. 34,341 dated the 19th December 1927, and in the case of each arm or unit of the bridge comprising a number of groups or columns of elements the parallel connection of the various columns of the groups may be effected by heat dissipat-

ing elements as described in my co-pending application No. 34,842 dated the 19th December 1927.

The rectifying apparatus as a whole may be immersed in oil or other cooling liquid contained in a suitable tank or receptacle if desired.

The invention is evidently not limited to the particular constructional arrangements above described which may be varied in many respects in order to meet particular conditions without exceeding the scope of the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. Apparatus for rectifying alternating electric currents of the kind described comprising four rectifying units or groups in which each of these units consists of a column of superposed imperforate metal discs each coated on one face thereof with a layer of a compound of the metal of which the disc is composed, the four columns being arranged parallel to one another and held in position by means of suitable end plates connected together by a single bolt or rod, for the purpose specified.

2. A rectifying device comprising two spaced parallel end plates, a centrally disposed rod connecting said end plates, a plurality of rectifying columns located between said end plates and disposed in parallel relation to said rod and to each other, and means associated with said rod for clamping said plates in fixed positions against the ends of said columns.

3. A rectifying device comprising two spaced parallel end plates, a centrally disposed rod connecting said end plates, a plurality of rectifying columns located between said end plates and disposed in parallel relation to said rod and to each other, and means for rigidly attaching each of said end plates to said rod.

4. A rectifying device comprising a base, a supporting strut secured centrally to said base, securing means on the free end of said strut, and a plurality of rectifying columns disposed in spaced relation about said strut with the ends of each column abutting respectively against said base and said securing means.

5. A rectifying device comprising two parallel spaced end plates, four parallel rectifying columns disposed in rectangular formation between said plates, and means for clamping said plates against the ends of said columns.

6. A rectifying device comprising two parallel spaced end plates, four parallel rectifying columns disposed in rectangular formation between said plates, a strut connecting said plates at the center of the rec-

tangle formed by said column, and means for clamping said plates against the ends of said columns by rigidly attaching the plates to said strut.

7. A rectifying device comprising two spaced parallel end plates, a centrally located rod passing through said plates, a plurality of rectifying columns located between said plates and disposed around said rod, and means for attaching said plates to said rod.

In testimony whereof I affix my signature.

LESLIE HURST PETER.

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