

A. M. WILLIAMSON.
SECTIONAL ELECTRODE.
APPLICATION FILED MAR. 4, 1912.

1,040,830.

Patented Oct. 8, 1912.

Fig. 1.

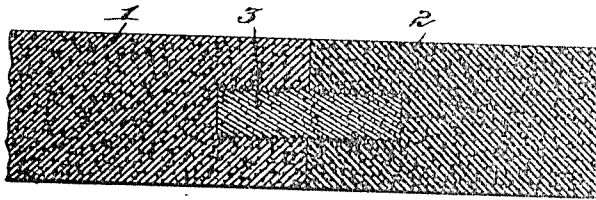


Fig. 2. III

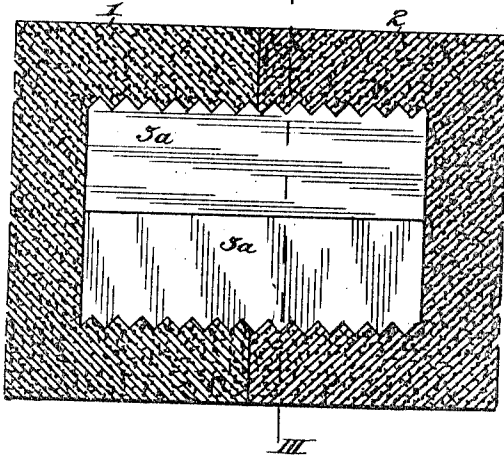
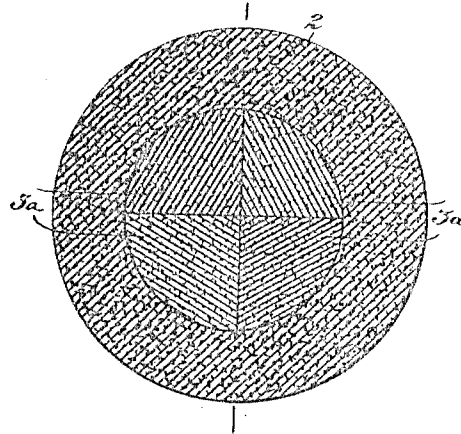


Fig. 3.



Witnesses:

E. Daniels
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UNITED STATES PATENT OFFICE.

ARTHUR M. WILLIAMSON, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO INTERNATIONAL ACHESON GRAPHITE COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF NEW JERSEY.

SECTIONAL ELECTRODE.

1,040,830.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR M. WILLIAMSON, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Sectional Electrodes, of which the following is a specification.

This invention relates to sectional electrodes, and particularly to electrodes of large cross-section, say twelve to sixteen inches or more in diameter, such as are used in electric furnace operations.

The primary object of the invention is to provide a strong, conductive and generally efficient joint between the electrode sections.

It is known that electrodes and similar articles, whether of baked or graphitized carbon, require for their production a carbon grain which is in general coarser as the cross-section of the electrode is greater, in order to minimize the breakage due to shrinking stresses; and that the tensile strength of the electrode, per unit of area, as well as its specific electrical conductivity, becomes in general less as the size of the grain increases, other conditions, as the character and proportion of bond and the degree of pressure, remaining the same. For example, a graphite electrode made from carbon grain of standard fineness, corresponding say to a screen of 14 mesh, would have a tensile strength varying from 300 to 400 pounds per square inch; on the other hand, an electrode or bar of smaller diameter can be successfully prepared from a much finer grain of carbon, corresponding say to a screen of 50 mesh, and such an electrode, prepared under conditions otherwise comparable, will have a tensile strength which may be upward of 600 pounds, attaining even 1,000 pounds per square inch. Similar relations obtain in case of electrodes or bars of baked carbon. According to the present invention electrodes of carbon or a graphitized carbon are joined by sections or members consisting also of carbon or graphite, but possessing a greater specific tensile strength than said electrode sections, whereby a sectional electrode is constructed which may consist exclusively of carbon or graphite, and which is materially stronger at the joints than an electrode of like size and con-

struction prepared solely from a single grade or quality of material. To this greater strength at the joints is usually added the advantage of an increased electrical conductivity.

An illustrative embodiment of the invention is shown in the accompanying drawings, wherein—

Figure 1 is a central longitudinal section through a joint of a sectional electrode; Fig. 2 is a similar view showing a slightly modified construction; and Fig. 3 is a transverse section on line III—III of Fig. 2.

In said drawing, 1, 2, represent electrode sections of baked or graphitized carbon as may be desired, said sections prepared from grains of a size, which is best adapted to their diameter, as is well understood in the art. 3 represents a joining member, which in the form illustrated is screw-threaded for engagement with the sections 1, 2, and which is prepared from finer grains than said sections, and possesses a superior tensile strength, with which is usually associated a higher specific electrical conductivity.

The joining member 3, as well as the electrode sections 1 and 2, may consist of baked or graphitized carbon as may be desired for any particular use. If desired, a fine-grain joining member of baked carbon may be associated with graphitized carbon sections prepared from coarser grain; or this construction may be reversed, a fine-grain graphitized joining member being used in connection with coarser-grain baked sections.

In case the joining member is itself of such diameter as to render it difficult of preparation from carbon of the fine grain desired, as may occur in the case of very large electrodes, this joining member may consist of any number of parts, individually of small diameter, and properly assembled. A construction of this character is illustrated in Figs. 2 and 3 wherein 1 and 2 represent the electrode sections, and 3^a, 3^b, a sectional joining member of relatively high tensile strength. A construction of this character is advantageous in connection with electrode sections having a diameter of fourteen to sixteen inches or more, and requiring a joining member having a diameter of eight to ten inches or more. For example, such joining member may be constructed, a

shown, of four pieces each 4x4 inches, or 5x5 inches in cross-section, these pieces being clamped or pinned together, machined to the desired size, and threaded if desired.

5 The term "carbon" is employed in the specification and claims to include baked carbon and also graphitized carbon or graphite. Obviously, the structural form of the parts may be widely varied without
10 departure from the spirit of the invention.

I claim:—

1. In a sectional electrode, a plurality of graphite sections with an interposed joining member also of graphite, said joining mem-
15 ber of finer grain than the said sections.

2. In a sectional electrode, a plurality of carbon sections with an interposed joining member also of carbon, said joining member of greater specific tensile strength than the
20 said sections.

3. In a sectional electrode, a plurality of carbon sections with an interposed joining member also of carbon, said joining member having a greater specific electrical conduc-
25 tivity and tensile strength than the material of the said sections.

4. In a sectional electrode, a plurality of carbon sections with an interposed joining member also of carbon, said joining member of finer grain and having a greater specific electrical conductivity and tensile strength
30 than the material of the said sections.

5. In a sectional electrode, a plurality of carbon sections with an interposed joining member also of carbon; said joining mem-
35 ber consisting of a plurality of pieces having a greater specific tensile strength than the said sections.

6. In a sectional electrode, a plurality of carbon sections with an interposed joining
40 member also of carbon, said joining member consisting of a plurality of pieces having a greater specific electrical conductivity and tensile strength than the material of the
45 said sections.

In testimony whereof I affix my signature
in presence of two witnesses.

ARTHUR M. WILLIAMSON.

Witnesses:

WM. ACHESON SMITH,
EBEN C. SPEIDEN.