W. A. SMITH.

ELECTRODE.

APPLICATION FILED MAY 29, 1911.

1,032,247. Patented July 9, 1912.

Fig. 1.

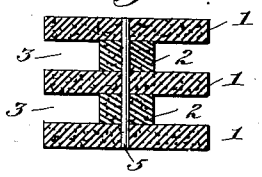


Fig. 4.

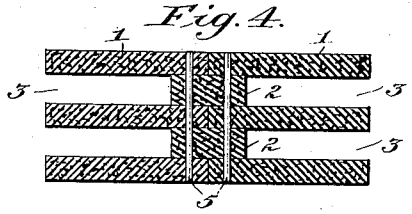


Fig. 2.

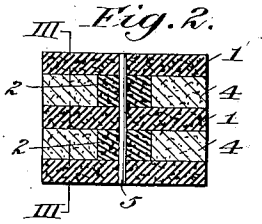


Fig. 5.

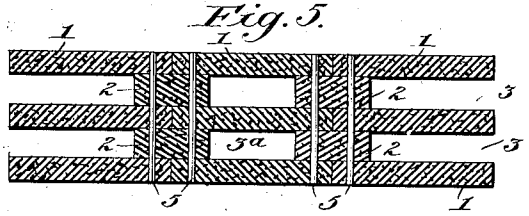


Fig. 3.

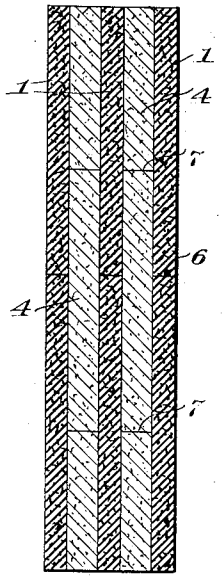


Fig. 6.

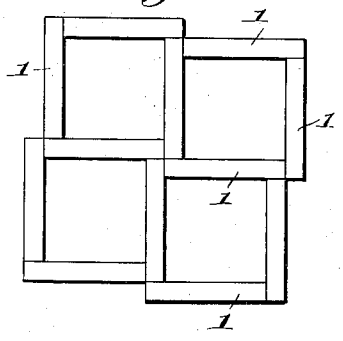
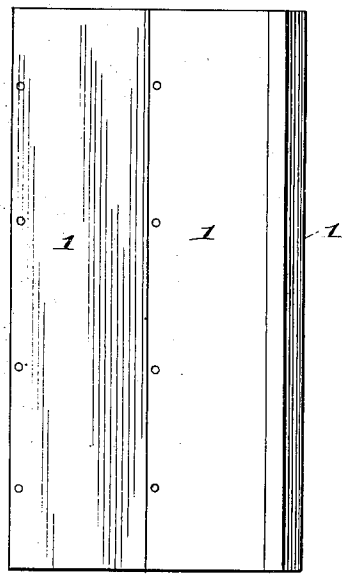


Fig. 7.



Witnesses:
H. J. Hulsizer.
C. H. Potter.

Inventor:
William Acheson Smith,
by Byrnes, Townsend & Brickenstein
Att'ys

UNITED STATES PATENT OFFICE.

WILLIAM ACHESON SMITH, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO INTERNATIONAL ACHESON GRAPHITE COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF NEW JERSEY.

ELECTRODE.

1,032,247. Specification of Letters Patent. Patented July 9, 1912.

Application filed May 29, 1911. Serial No. 630,033.

To all whom it may concern:

Be it known that I, WILLIAM ACHESON SMITH, 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 Electrodes, of which the following is a specification.

This invention relates to electrodes for electric furnaces, the object of the invention being the provision of improved electrodes consisting of or containing conductive members disposed to provide an increased effective area at the working end of the electrode, as compared with an equal weight of conductor arranged in a compact prismatic or cylindrical form.

Certain preferred embodiments of the invention are illustrated in the accompanying drawings, wherein—

Figures 1, 2, 4 and 5 are transverse sectional views of certain electrode constructions; Fig. 3 is a longitudinal section on line III—III of Fig. 2; Fig. 6 is a plan view of another form of electrode; and Fig. 7 is an elevation of the construction shown in Fig. 6.

It has been found desirable, for certain electrothermic purposes, to provide electrodes which may be of very large size, their transverse section often comprising several square feet. In such cases it has proven desirable, instead of constructing the electrode of a compact homogeneous mass or body of conductive material, as graphite or carbon, to distribute the conductive members in separated relation, often in conjunction with a filling or bedding mass of lower electrical conductivity.

According to the present invention there is provided an improved electrode construction wherein the conductive members are assembled in such manner as to provide an efficient distribution of the current at the working end of the electrode, the arrangement being such that the cross-sectional area of the electrode may be increased as desired in either dimension.

It is characteristic of the preferred embodiments of the invention that the several conductive members are in electrical contact with each other, usually throughout their length, and are disposed to provide a plurality of parallel interspaces or channels, which may be left void or filled with material of lower conductivity according to the intended use of the electrode.

It is further characteristic of the invention, in its preferred embodiments, that certain of the conductive members are laterally exposed at the exterior of the electrode in such manner that effective electrical contact may be made with them at any desired point.

Referring to the drawings, the construction of Fig. 1 comprises conductive members 1, 2, alternately wider and narrower, whereby there are provided a plurality of interspaces or channels 3. The conductive members 1, 2, are usually of graphite, but may be of non-graphitic carbon. The relative arrangement of these members is such as to provide a large effective working area at the end of the electrode. The several members may be secured together by any appropriate means, as by the use of graphite pins 5.

The interspaces or channels may be filled with a material of lower conductivity than the members 1, 2, as indicated at 4 in Figs. 2 and 3. This filling is preferably also of lower heat conductivity than graphite, and may comprise a mixture of coke and tar, other carbonaceous material and binder, or a composition comprising a slag or slag-forming mixture appropriate to the use for which the electrode is intended, such mixture usually having cementitious properties.

Fig. 4 illustrates an essentially similar electrode, in which each of the wider members consists of two laterally abutting conductive plates 1, the joints being covered and secured by members 2 narrower than the combined width of the members 1, thereby providing parallel channels 3. In this as in all other cases, the channels may be filled as described in connection with Figs. 2, 3.

Fig. 5 shows a further extension of the electrode, consisting in this case of a multiple series of three abutting plates 1, with intermediate members 2. This construction provides in addition to the exterior channels 3, interior channels 3^a, making a cellular electrode, whereof the channels or interspaces may be filled or not.

A further modification is illustrated in Figs. 6 and 7, in which the plates 1 are assembled to provide a cellular electrode con-

sisting of a plurality of hollow prismatic forms having their adjacent sides in common.

One of the principal advantages of the forms shown is that the cross-sectional area of the electrode is capable of indefinite extension in either dimension by assembling the desired number of standard parts. Furthermore, the length of the electrode may be increased as desired, its composite character permitting the addition of members with abutting ends, as indicated at 6, 7 in Fig. 3.

I claim:—

1. An electrode having conductive members assembled in contact with each other to provide a plurality of substantially parallel interspaces.

2. An electrode having graphite members assembled in contact with each other to provide a plurality of substantially parallel interspaces.

3. An electrode having conductive members assembled in contact with each other to provide a plurality of substantially parallel interspaces, said interspaces filled with a material of lower electrical conductivity.

4. An electrode having graphite members assembled in contact with each other to provide a plurality of substantially parallel interspaces, said interspaces filled with non-graphitic carbon.

5. A prismatic electrode composed of conductive members assembled in contact with each other, and an intermediate filling of material of lower electrical conductivity.

6. A prismatic electrode composed of graphite members assembled in contact with each other, and an intermediate filling of material of lower electrical conductivity.

7. A prismatic electrode composed of graphite members assembled in contact with each other, and an intermediate filling of non-graphitic carbon.

8. An electrode comprising exterior members of conductive carbon assembled in conductive relation to each other, and an intermediate filling of lower electrical conductivity.

9. An electrode comprising exterior members of graphite assembled in conductive relation to each other, and an intermediate filling of lower electrical conductivity.

10. An electrode comprising exterior members of graphite assembled in conductive relation to each other, and an intermediate filling of non-graphitic carbon.

11. An electrode comprising exterior and interior members of conductive carbon, and an intermediate filling of lower electrical conductivity.

12. An electrode comprising exterior and interior members of graphite, and an intermediate filling of lower electrical conductivity.

13. An electrode comprising exterior and interior members of graphite, and an intermediate filling of non-graphitic carbon.

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

WILLIAM ACHESON SMITH.

Witnesses:

ORRIN E. DUNLAP,

C. A. TRYON.