July 15, 1924. 1,501,692

H. L. WARD

ELECTRODE

Filed July 1, 1922

Fig. 1

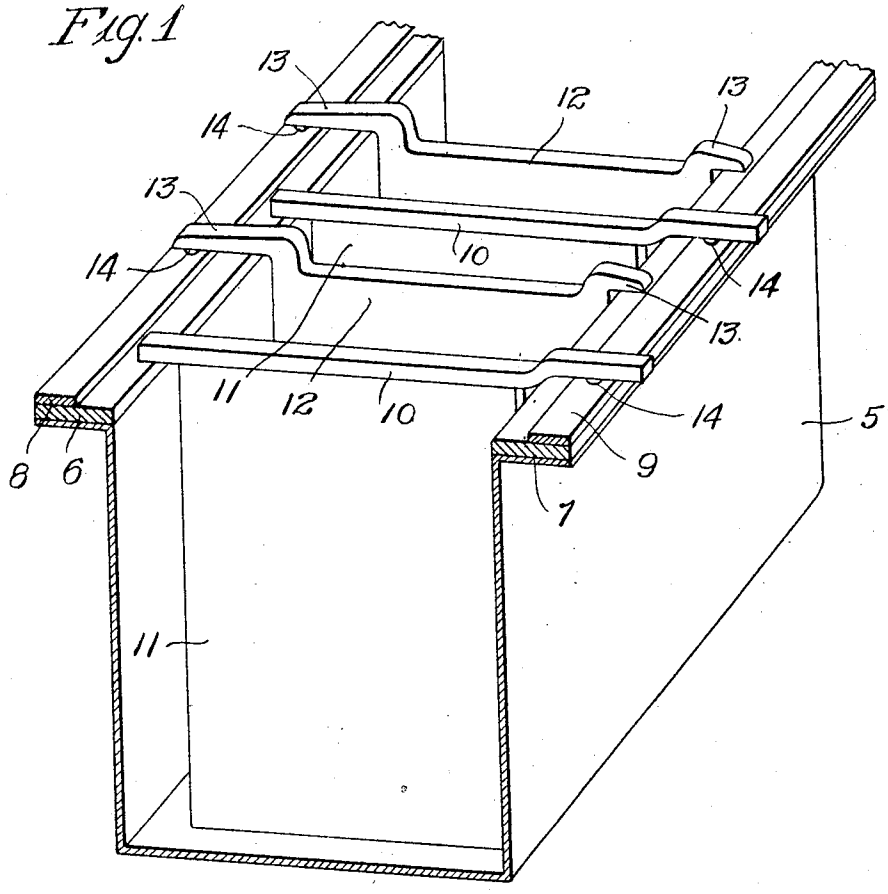
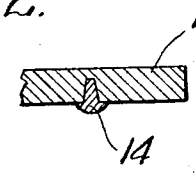


Fig. 2.



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by H. A. Pattison. Atty.

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UNITED STATES PATENT OFFICE.

HENRY L. WARD, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ELECTRODE.

Application filed July 1, 1922. Serial No. 572,181.

To all whom it may concern:

Be it known that I, HENRY L. WARD, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrodes, of which the following is a full, clear, concise, and exact description.

This invention relates to improvements in electrodes and more particularly to electrodes of the type used as cathodes and anodes in electrolytic apparatus.

The object of the invention is to provide an electrode with a mounting which reduces to a minimum the tendency toward a high resistance contact between the mounting and the bus bar or other element connected with the source of current.

Another object of the invention is to produce a mounting for electrodes of this type which is simple, cheap to manufacture and which employs a minimum amount of a metal of low electrical resistance since such metals are relatively expensive.

In the accomplishment of these objects the present invention consists in providing the mounting of an electrode with an insert or inserts of a metal which has a lower electrical resistance and is less corrosive than the metal constituting the mounting.

Electrodes made in accordance with this invention may be used to advantage in the electrolytic refining of iron but it is to be understood that the invention is not limited to such use but may be employed in connection with any electrolytic apparatus. When electrodes used in the electrolytic refining of iron are made in accordance with the present invention the mounting may be made of steel to which is secured a steel plate constituting the anode or cathode. The mounting is preferably provided with a flat under-surface carrying adjacent one end an insert or inserts of copper or other suitable material of low electrical resistance. These inserts are preferably in the form of rivets or dowels secured in the mounting and projecting a short distance below the flat surface thereof. In assembling the electrodes in the electrolytic apparatus the mountings are so positioned that one end rests upon wood or other suitable insulating material, and the copper inserts carried by the other end rest upon the bus bar or other element connected with the source of electric current.

Other objects and advantages of the present invention will be set forth in detail in the following description and particularly pointed out in the appended claims.

Referring now to the drawings which illustrate one embodiment of the invention,

Fig. 1 is a fragmentary, prospective view partly in section, showing an electrolytic refining apparatus used in refining iron, the electrodes utilized therein being made in accordance with the present invention.

Fig. 2 is an enlarged, fragmentary, vertical sectional, detailed view showing the inserts in the mounting.

Referring now to the drawings in detail, 5 represents a tank containing a suitable electrolyte. Supported on the two opposite upper edges of the tank 5 are strips 6 and 7 of wood which in turn support copper strips 8 and 9 respectively. The copper strips 8 and 9 are suitably connected with the opposite poles of a source of current (not shown), the said strips constituting bus bars as is readily understood.

The improved cathode electrode comprises a bar 10, which may be constituted of steel and when the electrode is to be used in the electrolytic refining of iron, the plate 11 which is suitably attached to bar 10 may be made of steel also. Instead of making the bar 10 and plate 11 as separate elements they may be cast together as an anode electrode to form a plate 12 with integral lugs 13. Various other forms of mountings and plates may be employed, however, without departing from the spirit and scope of the present invention. It is preferable that the bar or lugs constituting the mounting be provided with a flat under-surface to provide a better support for the electrodes when they are mounted in the electrolytic apparatus.

In order to provide a contact of low electrical resistance, the bar 10 and lugs 13 are provided with a copper insert 14 to engage the adjacent bus bar. The insert 14 may be attached to the mounting in any suitable manner as by means of riveting, doweling, etc. It is preferable that the insert be given a shape which will provide point contact be-

tween it and the bus bar in order to reduce the electrical resistance of the contact to a minimum.

Although the mountings are shown provided with only one insert a plurality of such inserts may be utilized, as desired, without departing from the spirit and scope of the present invention. By providing the mountings with a small insert or inserts of a metal of low electrical resistance, a low resistance contact is afforded at small cost since only a small amount of metal is used in the inserts, which metal is relatively expensive. With this construction of electrode very expensive inserts may be utilized such as gold, platinum, etc., which have exceedingly low electrical resistance without making the cost of the electrode prohibitive.

Tests have shown that when ferrous metal mountings for electrodes are placed in contact with copper bus bars, the contact resistance is very high, especially when the mountings and bus bars are subjected to alternate wetting and drying experienced in the operation of electrolytic apparatus, causing rapid oxidization of the mounting. When, however, copper contact members having pointed ends are provided in the ferrous metal mountings, the contact resistance between the contact member and the bus bar is very low, due to the inherent low electrical resistance of the copper insert, its point contact with the bus bar, and its less corrosive and oxidizing properties in the presence of alternate wetting and drying incident to electrolytic apparatus.

What is claimed is:

1. An electrode for use in electrolytic apparatus, comprising a body portion and a mounting, and a contact member carried by said mounting, said contact member having an electrical resistance lower than that of said mounting.

2. An electrode for use in electrolytic apparatus, comprising a body portion and a mounting secured thereto, and a contact member carried by said mounting, said contact member having an electrical resistance lower than that of said mounting.

3. An electrode for use in electrolytic apparatus comprising a body portion, a mounting attached thereto, and a contact member carried by said mounting said contact member being of lower electrical resistance than the mounting.

4. An electrode for use in electrolytic apparatus comprising a body portion, a mounting secured thereto and projecting at opposite sides thereof, a contact member carried by one of the projecting portions of said mounting, said contact member having an electrical resistance lower than that of the mounting.

5. An electrode for use in electrolytic apparatus comprising a body portion, a metallic mounting secured thereto, and a metallic contact member carried by said mounting, said contact member formed of a metal of lower electrical resistivity than that of the mounting.

6. An electrode comprising a body portion and a mounting, said mounting provided with means for making a point contact between the mounting and a bus bar.

7. An electrode for use in electrolytic apparatus, comprising a body portion and a mounting, and a contact member carried by said mounting and of such shape as to afford a point contact with the bus bar.

8. An electrode for use in electrolytic apparatus, comprising a metallic body portion and a metallic mounting, and a metallic contact member carried by said mounting, said contact member being less corrosive than the mounting.

9. An electrode for use in electrolytic apparatus, comprising a body portion and a ferrous metal mounting, and a copper contact member carried by said mounting.

10. An electrode for use in electrolytic apparatus, comprising a body portion and a mounting, and a dowel secured in said mounting to constitute a contact member, said dowel being formed of a metal having an electrical resistance lower than that of the mounting.

11. An electrode for use in electrolytic apparatus, comprising a body portion and a ferrous metal mounting, and a copper dowel secured to said mounting to constitute a contact member, the exposed end of said dowel being pointed.

12. An electrode comprising a body portion and a mounting means for cooperating with a supporting means, and means associated with one of said cooperating means for making a point contact therebetween.

13. An electrode comprising a body portion and a mounting for cooperating with a bus bar, and means interposed between said mounting and bus bar for making a point contact therebetween.

14. An electrode comprising a body portion and a mounting for cooperating with a bus bar, and means associated with said mounting and bus bar having an electrical resistance lower than that of said mounting for making a point contact between the mounting and bus bar.

In witness whereof, I hereunto subscribe my name this 22nd day of June A. D., 1922.

HENRY L. WARD.