

960,681.

Patented June 7, 1910.

2 SHEETS—SHEET 1.

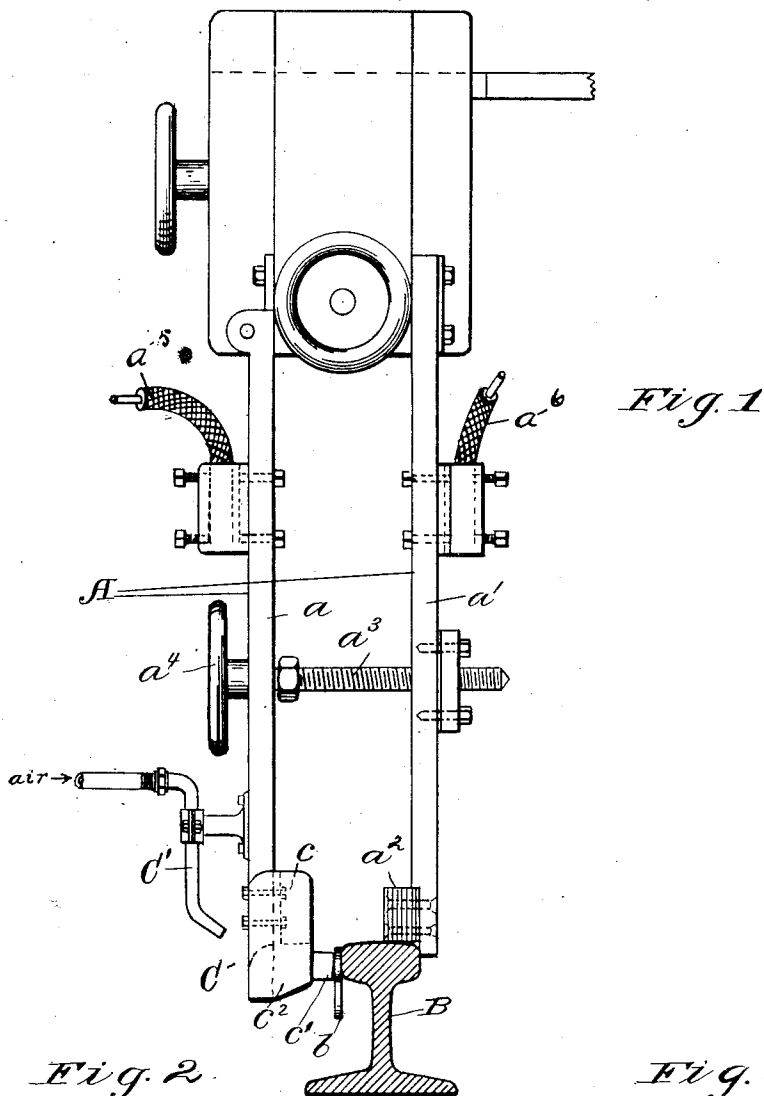
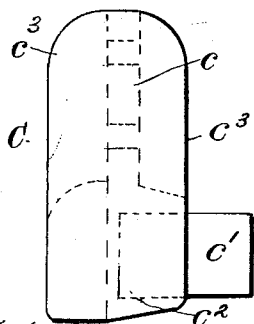


Fig. 1

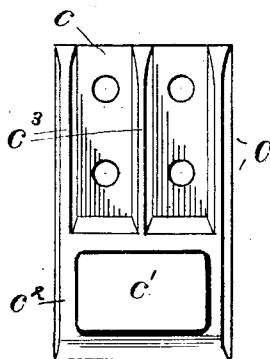
Fig. 2



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Fig. 3



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2 SHEETS—SHEET 2.

Fig. 4

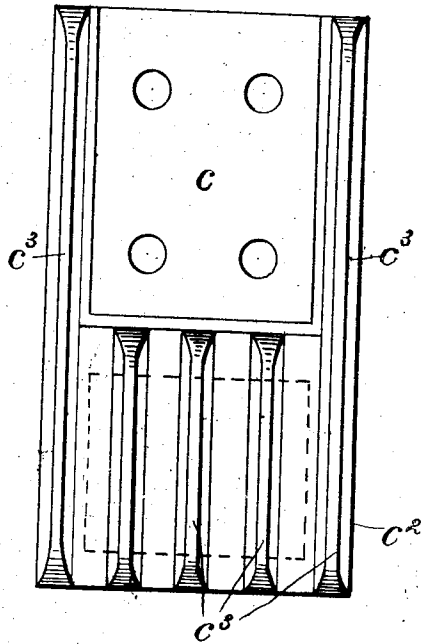


Fig. 5

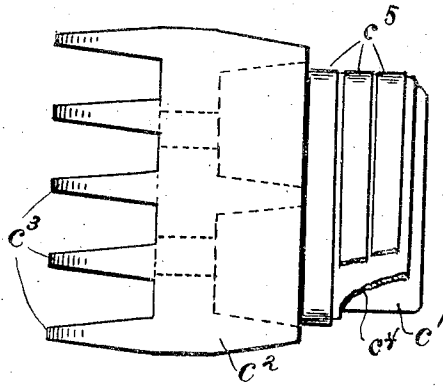


Fig. 6

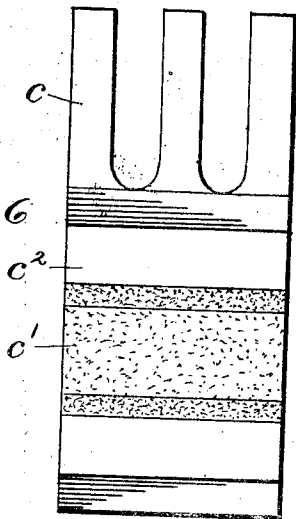
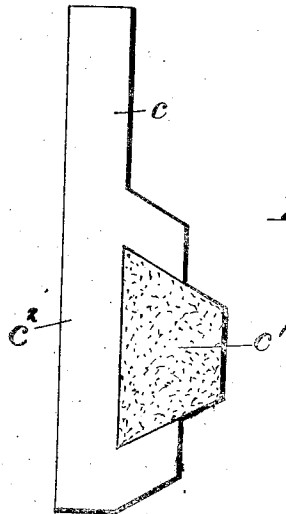


Fig. 7



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UNITED STATES PATENT OFFICE.

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ELECTRODE FOR WELDING, &c.

960,681.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed November 20, 1907. Serial No. 402,974.

To all whom it may concern:

Be it known that I, WILLIAM A. NEFF, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Electrodes for Welding, &c., of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates in general to the art of welding, soldering or brazing by electricity, and has more particular regard to the provision of a suitable electrode for use in operations of this kind where the heat, upon which dependence is placed for raising the bodies to be joined to the necessary temperature, is generated in the electrode rather than by the resistance interposed by the bodies themselves, or by the joint between the bodies, to the passage of current. The most suitable material for use in connection with electrodes of this kind in order to develop the proper degree of heat for the purpose named is carbon, as is well known. In the use of this material, however, considerable difficulty has been encountered in securing an effective and satisfactory mounting for the same owing to heating of such mounting by the block if the latter be made short, while, on the other hand the block of carbon cannot be made of undue length for the reason that the heating effect of the current passing therethrough will have become exhausted and dissipated before the contact face of the block is reached. The heating of the mounting or holder is due not so much to the proximity of the heated contact face of the block to such holder, as to the imperfect electrical contact existing between the block and holder in the prevailing forms of construction. In other words, it is owing to the resistance introduced at the joint between the holder and the block that much of this objectionable heating effect is to be attributed. It is with a view then to obviating these several difficulties that the apparatus constituting the present invention has been devised, such invention consisting of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such dis-

closed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is an elevational view of electrical welding or brazing apparatus, adapted particularly for the bonding of rails, in which is incorporated my improved construction of electrodes; Fig. 2 is a side elevation of the terminal portion of the heating electrode consisting of a carbon block mounted in a suitable holder as hereinafter to be described; Fig. 3 is a front elevation of the same; Fig. 4 is a rear elevation of such holder on a larger scale; Fig. 5 is a bottom plan view of the holder and block combined, a certain modification, shown as partly broken away, being introduced in the construction of the block; and Figs. 6 and 7 are respectively a front and a side elevation of another simpler form of electrode construction in which is embodied, however, the same inventive idea.

As indicated, the apparatus chosen for illustrative purposes and illustrated most completely in Fig. 1, is apparatus designed for bonding rails, an operation that is now being most satisfactorily accomplished by electrically brazing or welding the bond terminals to the respective rail ends. The apparatus shown in Fig. 1 comprises essentially a rail clamping device A suitably supported from a truck or the like (not shown), so as to bring the lower end of the device in proximity to the rail ends that are to be joined. Such clamping device is composed of two members or arms a a' , respectively adapted, when the device is thus positioned, to rest with their lower ends against the inner and outer sides of the rail B. One of said members, the inner one a' as shown, is provided at its lower end with a laterally projecting foot a^2 adapted to rest on top of the rail, and have an electrical contact therewith. The other arm a terminates in the electrode C proper, that is designed simultaneously to rest against the side of such rail when the inner member thus rests on the rail top. In order to draw the two members together to clamp the interposed bond b against the rail a bolt a^3 is provided, rotatably mounted in the outer arm a and having a screw threaded engagement with the inner one a' , such bolt being provided on its outer end with a hand-wheel a^4 of usual pattern. Current is supplied to the clamping

device thus described through suitable conductors a^5 a^6 attached to the respective arms or members a a' .

It is with the details of the construction of the electrode C constituting the lower end of the outer clamping member a that the present application is primarily concerned. Such electrode comprises in its simplest form, Figs. 6 and 7, merely a metal holder c , preferably of cast-iron, adapted to be adjustably secured to the lower end of outer member by means of bolts or the like, and a block c' of carbon or equivalent high resistance material borne thereby. The distinguishing feature of the construction of such electrode is the manner in which the carbon block c' is mounted in such holder c . This instead of being effected by bolts or like clamping means I accomplish by solidly embedding the said block in the holder in the process of casting the latter. To this end the block is partly embedded in the mold so that when the metal is poured into the mold it will completely surround the base portion of the block left extending into open space of the mold. In this way I not only secure an exact conformance of the contacting surfaces of the holder and carbon block, but, owing to the contraction of the metal upon cooling, great pressure is brought to bear upon such block, which not only holds the latter very securely, but, as is well understood produces a most effective and satisfactory electrical contact between the two materials in question.

Obviously it will only be upon a heating of the metal to a temperature substantially equal to that at which shrinkage began that the grip of the holder upon the block will relax. Ordinarily the holder is secure against being subjected to a temperature as high as this. With a view, however, to facilitating the rapid radiation of such heat as may be conducted to the holder from the block, and thus maintaining a relatively low temperature, I have made the several modifications in the construction of the block illustrated in Figs. 1 to 5. Such modified construction involves first of all increasing the bulk of metal constituting the terminal portion c^2 of the holder, that immediately adjacent to the block c' in which, in other words, such block is embedded. The rear of the holder and also the face of the same above the block is furthermore provided with a number of flanges c^3 largely increasing the radiating surface of the block; and in conjunction with the flanges on the rear of the holder I provide, if found desirable, an air blast C' , Fig. 1, by means of which the difficulty heretofore encountered in the use of apparatus of this kind is very largely obviated.

Even in a carbon block of the proper proportions, that is one in which the passage of

the current therethrough will properly heat the contact face, the whole block becomes more or less incandescent and as a result of this I have found that the sides will actually burn away or oxidize more rapidly than the face which is partially protected from the air by contact with the article being welded or brazed. Accordingly the sides of the block are eaten away, leaving the projecting portion of the block of a pointed form, thus rendering the same useless long before the contact face has been burned back to the base. In order to overcome this difficulty I have found it desirable to inclose the block laterally with a coating c^4 of suitable refractory, or relatively incombustible, material, preferably an asbestos composition, although fire-clay or the like can be utilized in certain situations where the electrode is not subjected to severe knocks or jars. This coating is conveniently secured in place by a plurality of metallic bands c^5 passing around the block. As the face of the block becomes worn away these bands and the corresponding annulus of protecting material can be successively torn away, thus exposing to the air only a relatively small portion of the block at any one time and maintaining the contact face of substantially its original superficial area. The usefulness or life of the block is thus greatly prolonged.

While my improved construction of electrode has been described in connection with a particular type of electrical welding or brazing apparatus, namely, one adapted for use in bonding rails, it will be understood that practically all of the features hereinbefore described are susceptible of advantageous incorporation in many forms of welding machines, such as are used in factories for the carrying on of divers manufacturing operations involving the welding or brazing of parts together. The utility, however, of a construction such as here secured whereby the life of the resistance blocks of carbon is prolonged is very effectively illustrated in the use described. As is well known the operation of bonding, especially in the case of a railway in operation, requires to be carried on in intervals between passing cars, and the delay incident to a broken electrode, such as is so frequently occasioned by the holder heating and bending entails considerable more loss than might be the case in a machine. In other words a construction giving assurance that the bonding apparatus once set up can actually be used to effect the desired operation at the point in question is of vast importance for the reason that another opportunity to set up the apparatus may not come for some time.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as

regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

5 I therefore particularly point out and distinctly claim as my invention:—

1. In an electrode for electric welding and analogous operations, the combination of a suitable holder, a block of high resistance material secured thereto and projecting therefrom, a coating of relatively incombustible material laterally surrounding the block, and a plurality of independently removable bands for holding such coating in place.

15 2. In an electrode for electric welding and analogous operations, the combination of a suitable holder, a block of carbon secured thereto and projecting therefrom, a coating of asbestos composition laterally surrounding said block, and a plurality of independently removable bands for holding such coating in place.

20 3. In an electrode for electric welding and analogous operations, the combination of a

metallic holder formed with a relatively enlarged terminal portion, a block of high resistance material secured thereto and projecting therefrom, a coating of relatively incombustible material laterally surrounding the block, and a plurality of independently removable bands for holding such coating in place. 25 30

4. In an electrode for electric welding and analogous operations, the combination of a metallic holder formed with a relatively enlarged terminal portion, a block of carbon secured thereto and projecting therefrom, a coat of asbestos composition laterally surrounding the block, and a plurality of independently removable bands for holding such coating in place. 35 40

Signed by me, this 15th day of November, 1907.

WILLIAM A. NEFF.

Attested by—

E. R. RODD,

JNO. F. OBERLIN.