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No. 825,541.

PATENTED JULY 10, 1906.

C. F. JACOBS.  
PROCESS FOR UNITING METAL PIECES.  
APPLICATION FILED NOV. 6, 1905.

*Fig. 1.*

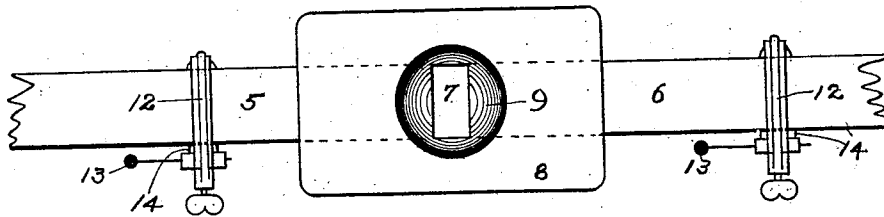
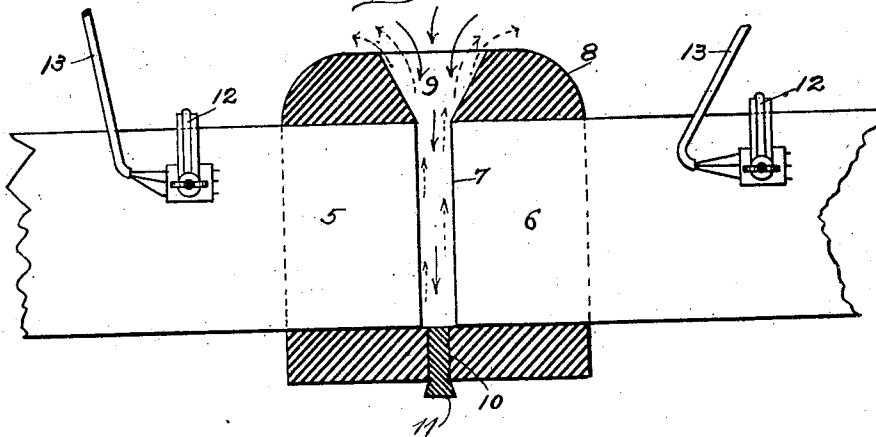


*Fig. 2.*



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## PROCESS FOR UNITING METAL PIECES.

No. 825,541.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed November 6, 1905. Serial No. 286,022.

*To all whom it may concern:*

Be it known that I, CHARLES F. JACOBS, a 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 Processes for Uniting Metal Pieces, of which the following is a specification.

This invention relates to improvements in a process for joining or uniting metal pieces, and while it is more especially intended for use in joining the rails of electric railways, so as to render them practically continuous and adaptable for transmission of electric currents, yet it is applicable for uniting rails or metallic pieces employed for other purposes; and it consists in certain novel features and steps practiced in carrying out the process.

The principal object of the invention is to provide a simple, inexpensive, and efficient method for joining metallic pieces by the use of which when used for joining railway-rails a continuous rail with perfect and permanent electric conductivity will be afforded at a great saving in time, labor, and expense.

In carrying out the process it will be understood that any suitable apparatus may be employed for holding the pieces of metal with their ends approximated, so as to receive the uniting material therebetween, and for connecting the electric conductors to the pieces of metal; and in the accompanying drawings I have shown one form of such devices; but I do not desire to be limited thereto, as they may be varied; but to facilitate the explanation of the process, so that it may be more easily and thoroughly understood, it is deemed necessary to illustrate one form thereof.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a plan view of two pieces of metal, showing their ends approximated and embraced by an apertured form or mold and illustrating an electric conductor clamped to each of said pieces; and Fig. 2 is a side view thereof, partly in section and partly in elevation.

Like numerals of reference refer to corresponding parts throughout both views of the drawings.

The reference-numerals 5 and 6 designate two pieces of metal, which may be railway-

rails or metallic pieces used for other purposes and which have their ends approximated, so as to leave a space 7 therebetween. Placed around the adjacent portions of the pieces 5 and 6 is a form or mold 8, which may be of any suitable material and is provided in its upper end with an opening 9, which is preferably funnel-shaped or tapered, as shown, to communicate with the space 7 between the metallic pieces, so as to convey the molten material used in the process thereto. The lower portion of the form 8 may also be provided with an opening 10 for the discharge or withdrawal of the flux or electrolyte, and said opening may be closed by means of a plug 11 of any suitable non-fusible material. Detachably secured to each of the pieces of metal by means of a screw-clamp 12, or otherwise, is an electric conductor 13, each of which lead from a source of electric supply and have their ends electrically connected to an electrode 14, carried by each of the screw-clamps 12, as will be readily understood by reference to the drawings. While I have shown the conductors 13 as being held in electric connection with the pieces 5 and 6 by means of the clamps 12, yet it is apparent that they may be connected thereto by other suitable means. When the adjacent portions of the rails or pieces 5 and 6 have been surrounded or embraced by the form or mold 8, a quantity of good electrolytic flux in a molten form is poured into the space 7 through the opening 9 in the form and the electric current turned on through the conductors 13, when by reason of the conductivity of the electrolyte or flux the ends of the rails or pieces 5 and 6 will become heated to a suitable degree, when by removing the plug 11 from the opening 10 the flux will be discharged through said opening and the space 7 filled with molten metal after the plug 11 has been replaced in said opening. Instead of using the plugged opening 10 for the discharge of the flux the molten metal may be poured through the opening 9 of the form 8 into the space 7, which by reason of its greater specific gravity will force the flux upwardly and out through the opening 9, as indicated by the dotted arrows shown in Fig. 2 of the drawings, and this mode of removing the flux will usually be practiced.

By practical tests and experiments I have found that a flux consisting of about twenty-five per cent. (25%) of each of the following-

named ingredients—to wit, borax, fluor-spar, zinc chlorid, and sodium chlorid—is especially well adapted for use in my process, yet I do not desire to be limited to the use of said composition, nor do I desire to be limited to the exact proportions of each ingredient above named, for in some instances I may omit one or more of the ingredients or may vary the proportions thereof or I may employ a flux or an electrolyte composed of other ingredients without departing from the spirit of my invention. In practicing the process the electric current is turned off immediately before the molten metal is placed between the ends of the metallic pieces.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described process of uniting metal pieces, which consists in securing a form around the adjacent portions of the metallic pieces, placing an electrolytic flux in molten form in the space between the ends of said pieces, heating the ends of the metallic pieces through the agency of the flux and by means of an electric current, and displacing the flux by means of molten metal, substantially as described.

2. The herein-described process of uniting metal pieces, which consists in securing the ends of the pieces by placing an apertured form around the same, placing molten flux in the space between the ends of said pieces, heating the ends of the metallic pieces through the agency of the flux and by means of an electric current, removing the flux through one of the apertures of the form and filling the space between the ends of the metal pieces with molten metal, substantially as described.

3. The herein-described process of uniting

metal pieces, which consists in securing the approximated ends of the pieces by means of an apertured form, placing molten flux consisting of borax, fluor-spar, zinc chlorid, and sodium chlorid, in about the quantities specified, in the space between the ends of said pieces, heating the ends of the metal pieces through the agency of the flux and by means of an electric current, and displacing the flux by means of molten metal, substantially as described.

4. The herein-described process of uniting metal pieces, which consists in securing the approximated ends of the pieces by means of an apertured form which surrounds the same, placing molten flux consisting of borax, fluor-spar, zinc chlorid, and sodium chlorid, in about the quantities specified, in the space between the ends of said pieces, heating the ends of the metal pieces through the agency of the flux and by means of an electric current, removing the flux through one of the apertures of the form and filling the space between the ends of the metal pieces with molten metal, substantially as described.

5. The herein-described process of uniting metal pieces, which consists in securing a form on the adjacent portions of the metallic pieces, placing molten flux in the space between the ends of said pieces, heating the ends of the metallic pieces through the agency of the flux and by means of an electric current, turning off said current and then displacing the flux by means of molten metal, substantially as described.

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Witnesses:

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