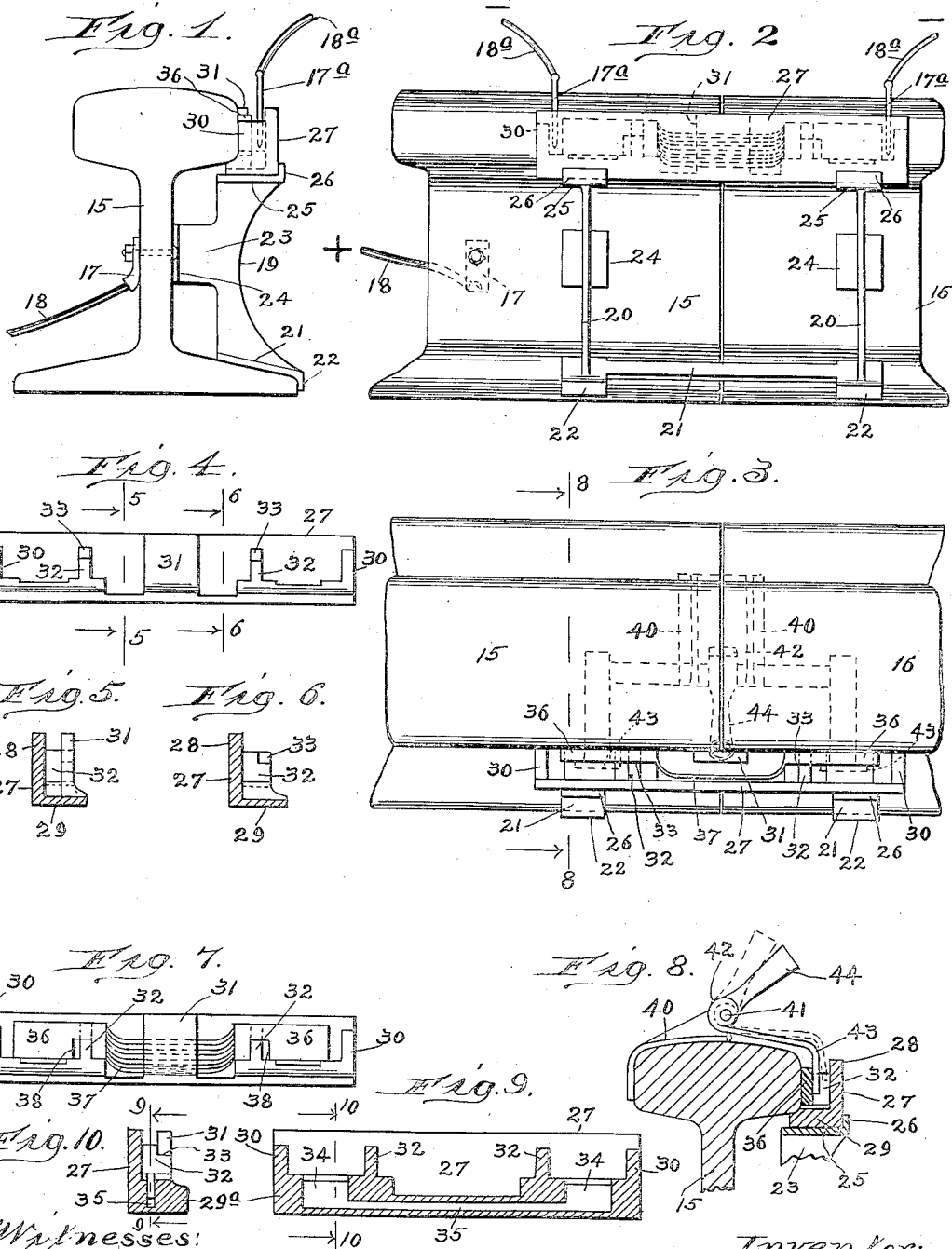


C. F. JACOBS.
PROCESS FOR BONDING RAILS.
APPLICATION FILED MAY 28, 1908.

933,458.

Patented Sept. 7, 1909.

2 SHEETS—SHEET 1.



Witnesses:

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Inventor:

Charles F. Jacobs.

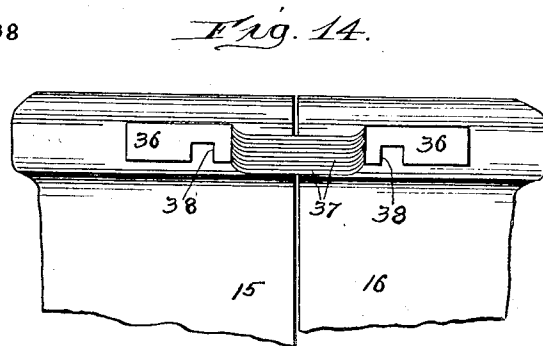
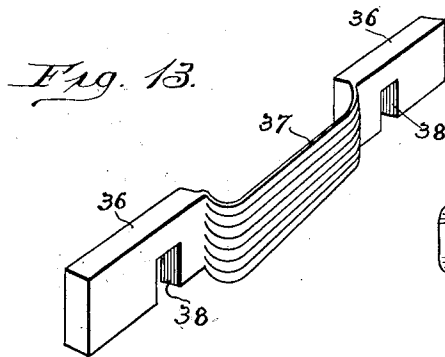
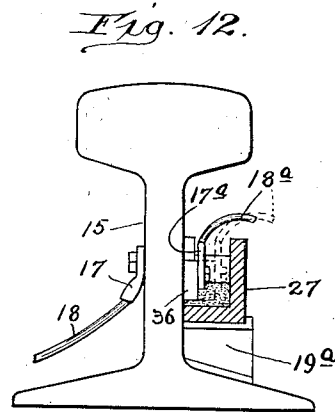
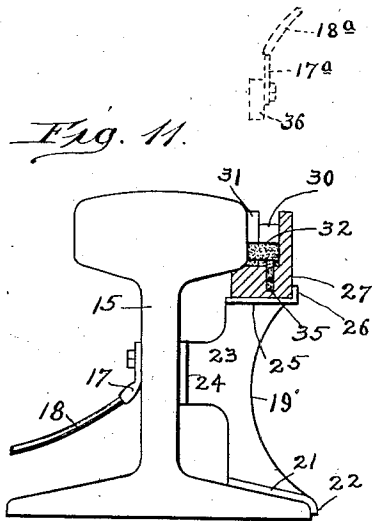
By

Chas. C. Pitman

C. F. JACOBS.
PROCESS FOR BONDING RAILS.
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES F. JACOBS, OF CHICAGO, ILLINOIS.

PROCESS FOR BONDING RAILS.

933,458.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed May 28, 1908. Serial No. 435,566.

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 Bonding Rails, of which the following is a specification.

This invention relates to the art of electrically uniting railway rails or other metallic pieces by means of bonds, for the transmission of electric currents, or for other purposes, and it has for its principal objects to furnish a simple, efficient, and inexpensive method or process for readily and securely uniting the bonds to the rails or pieces to be bonded, to the end that permanent and perfect electric conductivity through the rails or pieces, when desired, will be afforded, and in such a manner that when the bonds, as is usually the case, are of such material or dimensions as will fuse or melt at a different degree of heat from that at which the rails or pieces to be bonded will fuse or melt, the operation of securing the bonds and rails or pieces together may be done without detriment to the piece which melts or fuses at a lower degree of heat than the other.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

The invention consists in certain novel features, acts, procedure and steps practiced in carrying out the process, and I desire it understood that while I have shown in the drawings and will hereinafter describe certain devices for carrying out or practicing the different steps of the process for the purpose of facilitating the explanation thereof and so that it may be more readily and thoroughly understood, yet I do not wish to be limited to the use thereof, except when so specified in the claims, as they may be varied or other devices may be employed.

In the accompanying drawings, which serve to illustrate the manner of practicing the invention—Figure 1 is an end view of a railway rail, showing appliances in position thereon for carrying out the initial part of my process, but illustrating the bond in position within the receptacle or container to be joined to the rail; Fig. 2 is a view in side

elevation of a portion of two rails, showing the appliances in position thereon ready for performing certain steps of the invention; 55
Fig. 3 is a plan view of the parts shown in Fig. 2, with the electric conductors omitted; Fig. 4 is an inner face view of the flux receptacle or container; Figs. 5 and 6 are cross-sectional views thereof, taken on lines 5—5 60
and 6—6, respectively, of Fig. 4 looking in the direction indicated by the arrows; Fig. 7 is an inner face view of the flux receptacle, showing the bond located therein; Fig. 8 is a fragmental sectional view of a portion of 65
one of the rails and a part of the appliances used for securing the bond to the rails; Fig. 9 is a longitudinal sectional view taken on line 9—9 of Fig. 10 looking in the direction indicated by the arrows, showing a 70
modification in the construction of the flux receptacle or container; Fig. 10 is a cross-sectional view taken on line 10—10 of Fig. 9 looking in the direction indicated by the arrows; Fig. 11 is a view partly in elevation 75
and partly in section, showing the modified form of the flux container or receptacle mounted on the rail; Fig. 12 is a similar view of like parts, showing another modification in the construction of the flux container, 80
and means for connecting the bond to the web of the rail; Fig. 13 is a detached perspective view of a bond, especially adapted for use in the process; and Fig. 14 is a view in side elevation of a portion of two rails, 85
showing the bond secured thereto.

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

The two pieces of metal to be bonded, 90
which in the present instance are shown as railway rails, but may be metallic pieces used for other purposes, are designated by the reference numerals 15 and 16 and are placed in alinement with their ends closely 95
approximated or abutting. Secured to one of said rails or metal pieces and usually to the web thereof is an electrode 17 which is connected by a suitable conductor 18 to a source of electric supply (not shown). 100

Mounted on the upper surface of the bases of the rails and on each side of their joint is a supporting-chair, which is indicated as a whole by the reference numeral 19, and

comprises two uprights 20 which are joined together at their lower ends by means of a bar 21, or horizontal portion, which is provided at its ends with feet or enlarged portions 22 of such form as to rest on the bases of the rails. Each of the uprights 20 is provided between its ends with an inwardly extending arm 23 having on its free end a plate 24 to rest against the webs of the rails or sides of the metal pieces to be joined. The upper end of each of the uprights 20 is provided with a horizontally disposed seat 25, each of which has at its outer end an upwardly extending flange 26, and these seats and the flanges thereon are employed for the purpose of supporting and holding a flux container or receptacle 27 in position against the sides and lower portions of the heads of the rails and across their joint, as will be clearly understood by reference to Figs. 1, 3, 8 and 11 of the drawings. The container or receptacle 27 is shown as being angular in cross-section, but obviously it may be of other shape, so as to provide an upwardly extending portion 28 and a floor or portion 29 extended toward the rails. That portion of the container 27 adjacent to the rails is open, but each end of the container or receptacle is closed by means of an inwardly extending flange 30, the free edges of which are shaped to conform to the surface of the rails against which they are adapted to rest, so as to make close joints and to prevent leakage of the flux. At about the longitudinal middle of the floor 29 of the flux receptacle is an upwardly extending portion or plate 31 which, as shown in Figs. 3 and 5, is spaced from the upwardly extending portion 28 of the receptacle and rests against the rails or metal pieces so as to close the joint therebetween when the receptacle is in its operative position. Between each of the ends 30 of the receptacle and the upright 21 is located a weir 32 which extends from the floor or lower portion 29 upwardly, so that, when the receptacle is placed against the rails or metal pieces, compartments will be formed between the weirs 32 and ends 30 of the receptacle to receive flux used in the process. Each of the weirs 32 is provided in its upper and free portion with a recess 33 to receive portions of the bond, as will be presently explained.

In Figs. 9, 10 and 11 of the drawings, I have shown a modification in the construction of the flux receptacle, which is quite similar to the construction above-described, except that, the floor or lower portion 29^a of this modified form is much thicker than the floor 29 of the other construction, and is provided between the weirs 32 and ends 30 with openings 34 which communicate with each other through a channel 35 which extends longitudinally in the lower portion of

the receptacle, and is for the purpose of permitting the molten flux to pass from one of the compartments between the weirs and end pieces and from one of the openings 34 therein to the other, so as to require one electrode only to keep heated the flux in both of the fusing chambers or the receptacle, whereas in the other construction two electrodes will be required for this purpose. When this modified form of the receptacle is employed, a chair 19, of the construction above-described, may be employed for supporting the receptacle against the rails, as is obvious and as is shown in Fig. 11 of the drawings.

Instead of securing the bonds to the sides of the rail heads it may be desirable to secure them to the webs, as shown in Fig. 12 of the drawings, in which construction it is evident that either of the receptacles above-described may be employed, but in the present instance I have shown one of the construction illustrated in Figs. 4 to 6, and have shown it supported by a chair 19^a, which may be of any suitable construction, so as to be adapted to extend across the joint of the rails and to be interposed between the bases thereof and the lower portion of the receptacle.

The bonds which I prefer to use in connection with my process are of a novel and peculiar construction, but, of course, I do not desire to be limited to the use of any special kind of bonds as they may be varied in shape and construction. In the present instance, however, I have shown the bonds, which consist of two terminals 36, united together at the outer portions of their adjacent ends by a series of ribbons 37, which are preferably outwardly curved, as is clearly shown in Fig. 13 of the drawings. Each of the terminals is provided in its lower portion with a vertically extending recess 38 to stride the weirs 32 of the receptacle or container, so that the recesses 33 in the upper portions of the weirs will receive or engage the recesses 38 of the bonds, as will be clearly understood by reference to Figs. 2 and 7 of the drawings.

Referring now to Figs. 1 to 8, inclusive, when the container or receptacle 27 is placed against the sides of the rail heads it is apparent that the lower and inner portions of said receptacle will fit snugly against the surfaces of the rail heads and in such a manner that the portion 31 of the receptacle will close the crevice between the rails or metal pieces. A quantity of flux, such as borax, fluorspar, cryolite, sodium chlorid, or other suitable kinds of fluxes *ad libitum*, which ingredients may be employed singly or in combination, in a molten condition, is then placed in the compartments between the end pieces 30 and weirs 32 of the receptacle, before

which an electrode 17^a having a conductor 18^a leading to a source of electric supply has been placed in each of the said compartments, when by passing the electric current through the conductor 18, electrode 17, conductors 18^a and electrodes 17^a it is evident that the surfaces of the rail heads will be heated by means of the electric current or currents and through the instrumentality of the flux until it nearly reaches the desired degree, when by placing the terminals 36 of the bond in the receptacle 27 so that the recesses 38 of the bond will stride the weirs 32, that portion of the terminals located in the compartments containing the flux will become heated to the desired degree, when by applying pressure to the outer surface of the bond and forcing it against the rail heads the said heads and bond will be firmly united. Any suitable device may be employed for forcing the bond into close contact with the rail heads or metal pieces, but in Figs. 3 and 8 of the drawings I have shown a clamping device which consists of two spaced apart and hooked jaws 40 which are adapted to engage one side of the rail heads, and have journaled in their upper portions a shaft 41 on which is mounted an eccentric sleeve 42 which carries near each of its ends a hooked jaw 43 to engage the terminals of the bond. The sleeve 42 is provided at about its middle with a lever 44 used for turning the sleeve and operating the jaws 40 in the proper direction.

From the above it will be understood that the molten flux will be held in the compartments between the weirs 32 and end pieces 30 of the receptacle so that it cannot enter the crevice or joint between the metal pieces. Should any of the flux find its way into the space between the two weirs, it is apparent that the upright portion 31 will prevent it entering the crevice or joint of the rails. It is evident that by using the modified form of receptacle shown in Figs. 9 and 10 of the drawings one electrode 17^a only need be employed, as the compartments which hold the flux are in communication with one another by way of the channel 35 through which the molten flux may pass from one of said compartments to the other.

In Fig 11 of the drawings I have shown another modification in the construction of the receptacle, and also a modified means of heating the bond to the desired degree for uniting it to the rail heads after the latter have been brought to about the proper degree of heat. In the modification now under consideration, the weirs 32 of the receptacle are formed without the recesses 33 therein, that is to say, so that their upper surfaces will lie in substantially a horizontal plane, on which the terminals of the bond may be moved, which bond in the present in-

stance has connected thereto an electrode 17^a provided with a conductor 18^a leading to a source of electric supply. When the rail heads shall have been heated to nearly the desired degree, it is apparent that the bond having the electrode connected thereto may be placed in the receptacle and flux therein at a distance from the rail heads, when by reason of the electric current or currents and through the instrumentality of the flux, the bond will be heated to the desired degree, and at the same time the rail heads will be further heated, when the bond may be forced into contact therewith by any suitable means and firmly united thereto.

In Fig. 12 is shown another modification, which consists in supporting a receptacle 27 against the webs of the rails or sides of the metal pieces to be joined, when the same steps may be employed as that described in reference to Fig. 11, or if desired, an independent electrode or electrodes as shown and described in relation to Figs. 1 to 8, inclusive, and the steps of the process related in reference to the last-named figures may be employed in securing the bond to the webs of the rails or sides of the metal pieces.

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

1. The process of bonding rails or metal pieces consisting in holding a quantity of flux in contact with the rails or metal pieces, then heating the said pieces by means of the flux and an electric current, introducing the bond into the flux and heating the same as well as further heating the rails or metal pieces by means of the flux and the electric current, and then forcing the bond and metal pieces into intimate contact.

2. The process of bonding rails or metal pieces consisting in supporting a receptacle in juxtaposition to the surfaces of the metal pieces or rails, introducing molten flux into the receptacle and heating the surfaces of the metal pieces or rails by means of the flux and an electric current, introducing a bond into the molten flux and heating the same as well as further heating the metal pieces by means of the flux and the electric current, and forcing the bond and metal pieces or rails into intimate contact.

3. The process of bonding rails or metal pieces consisting in holding molten flux against portions of the surfaces of the rails or metal pieces, heating said portions of the rails or pieces by means of the flux and an electric current, introducing a bond into the flux at a distance from the rails or metal pieces, passing an electric current through the bond flux and metal pieces or rails, and forcing the bond and rails or metal pieces into contact.

4. The process of bonding rails or metal

pieces consisting in supporting a receptacle
in juxtaposition to the surfaces of the metal
pieces or rails, placing molten flux in the re-
ceptacle, introducing a bond into the molten
5 flux and heating the same as well as the rails
or metal pieces by means of the flux and an
electric current, and forcing the bond and

the metal pieces or rails into intimate con-
tact.

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