

W. A. NEFF.  
PORTABLE APPARATUS FOR BONDING RAILS.  
APPLICATION FILED AUG. 24, 1908.

950,784.

Patented Mar. 1, 1910.  
2 SHEETS—SHEET 1.

Fig. 1

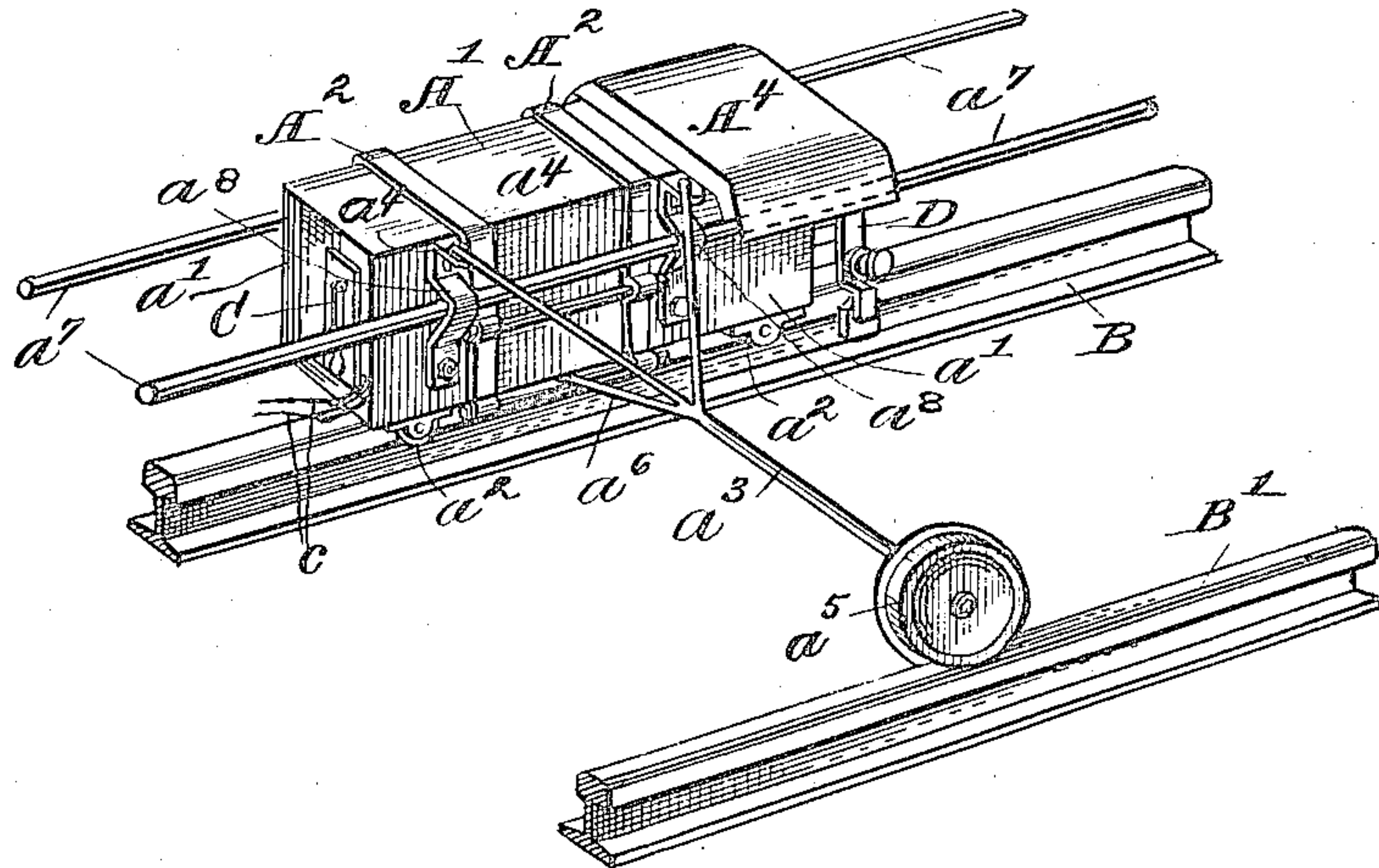
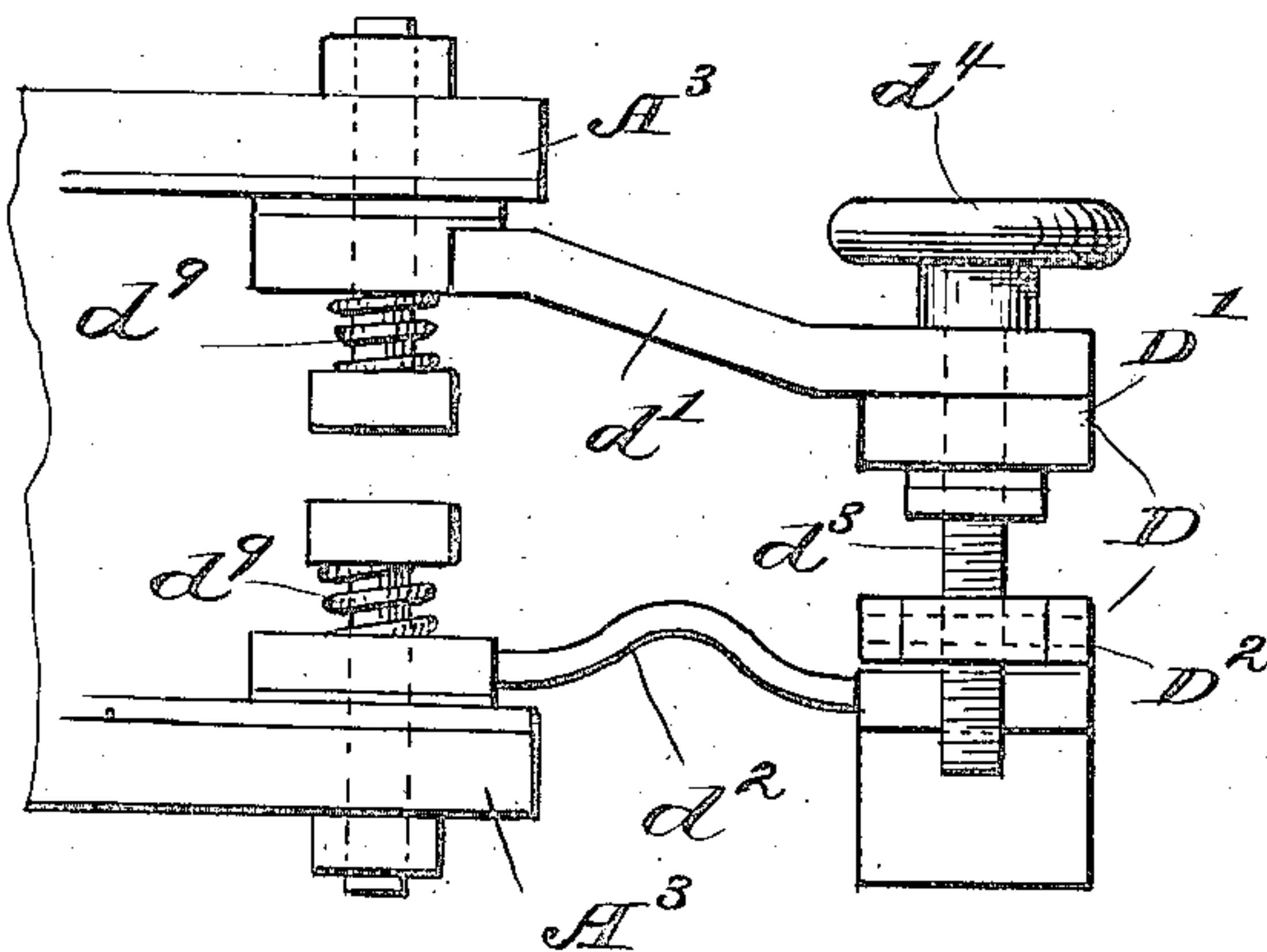


Fig. 2



Witnesses:  
J. C. Turner  
Jno. F. Oberlin.

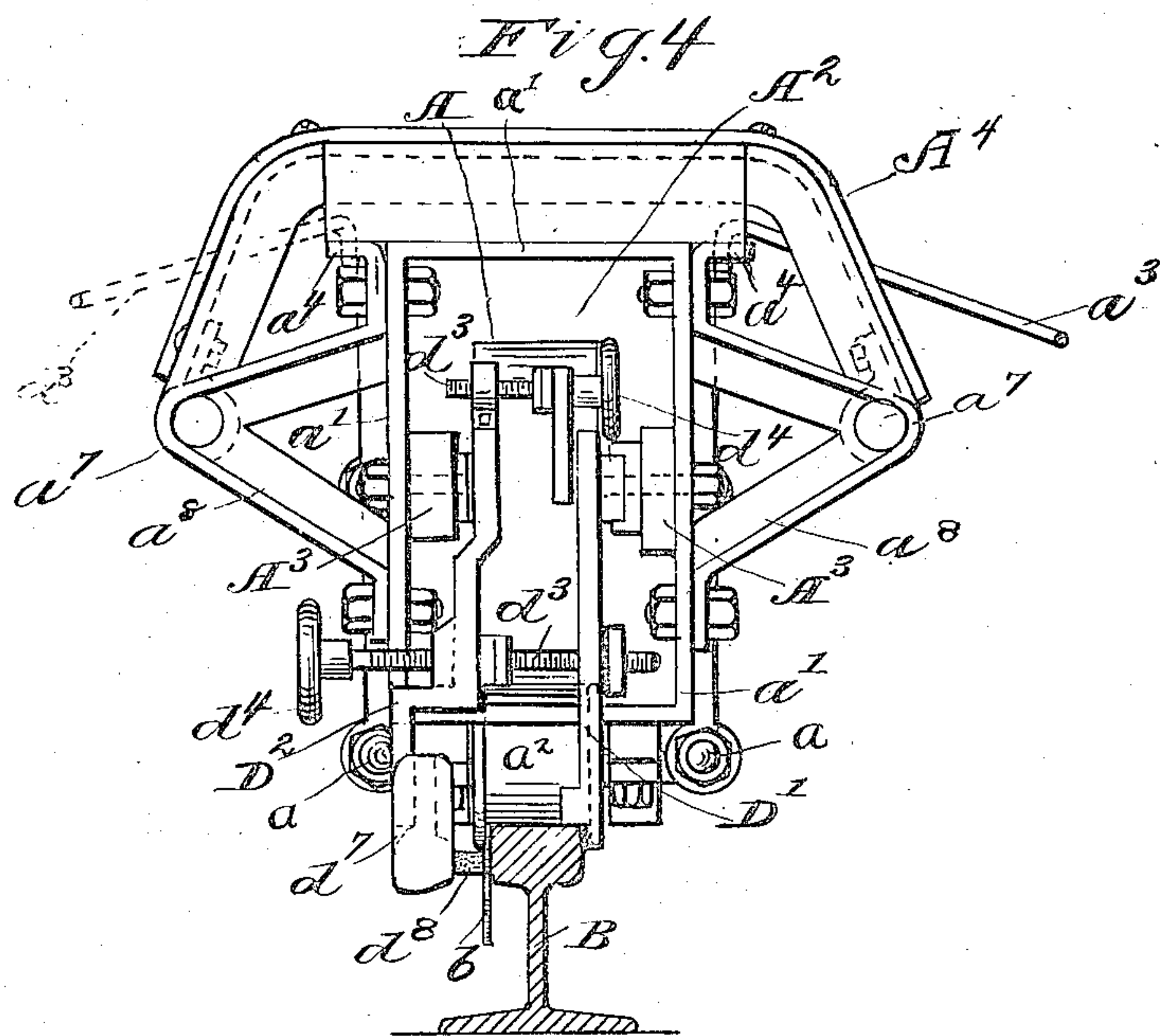
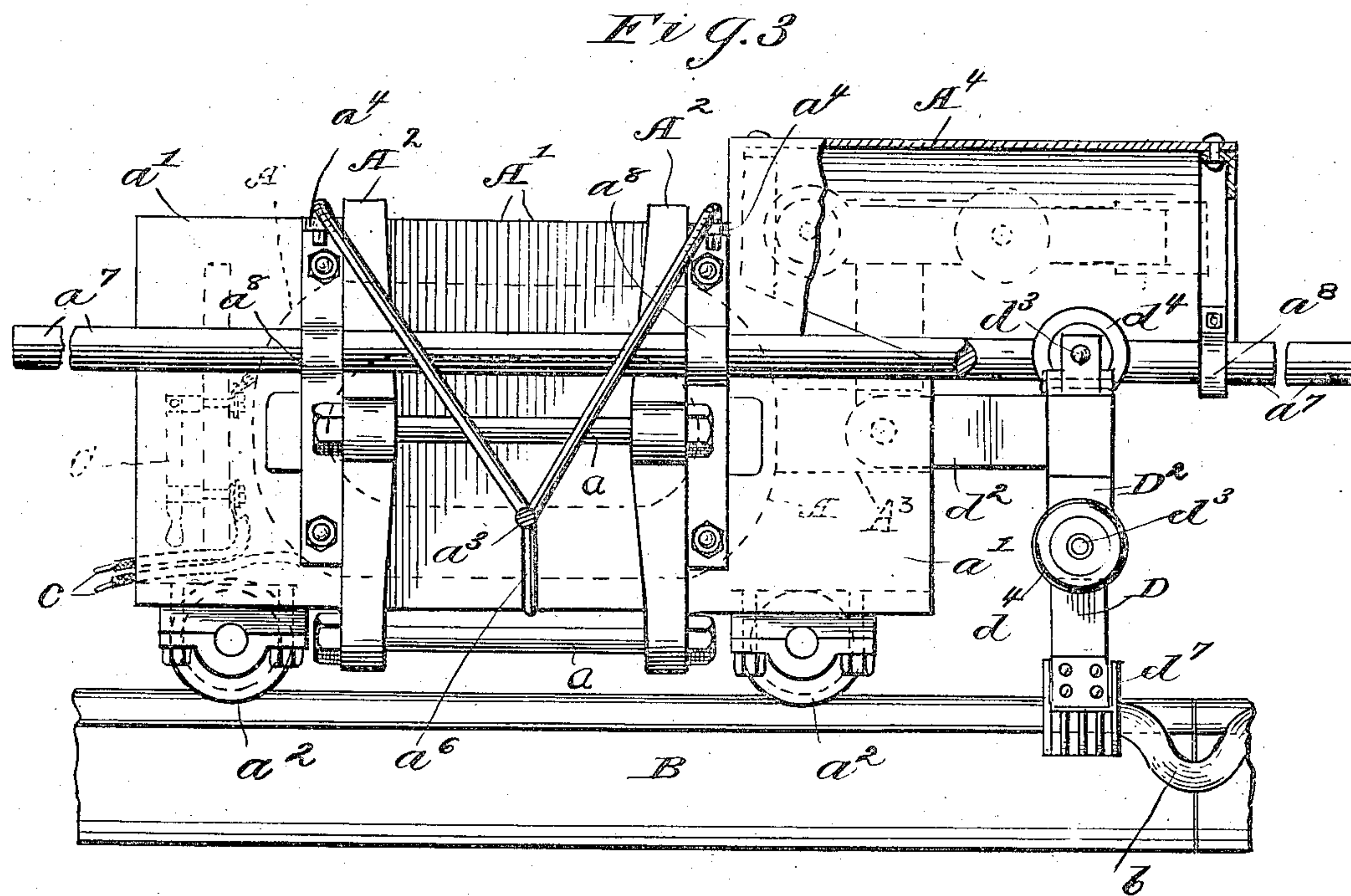
Inventor:  
William A. Neff;  
by J. P. Fay  
Attorney.

W. A. NEFF.  
 PORTABLE APPARATUS FOR BONDING RAILS.  
 APPLICATION FILED AUG. 24, 1908.

950,784.

Patented Mar. 1, 1910.

2 SHEETS—SHEET 2.



Witnesses:  
*J. C. Turner*  
*Jno. T. Oberlin*

Inventor:  
*William A. Neff,*  
 by *J. C. Fay*  
 Attorney.



# UNITED STATES PATENT OFFICE.

WILLIAM A. NEFF, OF CLEVELAND, OHIO, ASSIGNOR TO THE ELECTRIC RAILWAY  
IMPROVEMENT COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

PORTABLE APPARATUS FOR BONDING RAILS.

950,784.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed August 24, 1908. Serial No. 450,083.

*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 Portable Apparatus for Bonding Rails, 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 subject matter of the present invention is concerned in its specific aspects with the bonding of rails, or similar discontinuous conductors, where by bonding is meant the securing across the gaps intervening between the meeting ends of the rails of a suitable conductor adapted to render such rails a good return circuit for the electric current used in the operation of cars thereon.

The present invention relates to an application of the art of electric welding to thus securing the bonds to the rail ends, wherein, by the use of an electric current, sufficient heat is developed at the proper points to solder, braze or weld the bonding member to the rail.

The object of the invention is the provision of apparatus for use in operations of the character just referred to, that will be portable, that is, capable of being manually moved about should occasion arise. This becomes frequently a matter of considerable convenience, for example where the operation is being carried on upon a line that is in use and where the interruption to traffic incident to using a car movable along the track as has been done heretofore, would preclude employment of the particular method in hand in spite of numerous other advantages.

To the accomplishment, then, of the above and related objects said invention consists 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 disclosed 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 a perspective view of an approved form of my present apparatus shown as being mount-

ed in operative position upon a track; Fig. 2 is a plan view of one end of said apparatus with a portion of the cover at one end broken away; Fig. 3 is a side elevation, a portion of the cover again being removed to disclose the interior construction, and Fig. 4 is an end elevation, viewing the apparatus from the right as illustrated in Fig. 3.

Apparatus of the general class in hand, that is apparatus for electrically welding, brazing or soldering bonds to rails, as in fact any apparatus where the electric current is used for heating purposes, desirably employs a current of low voltage and correspondingly high amperage. Since the current regularly available in connection with the operation of bonding is that employed for power purposes, a transformer, or its equivalent, is hence uniformly a part of the bonding apparatus. The present invention, then, is concerned chiefly with the mounting for a transformer and the provision in connection therewith of suitable electrodes, all in such compact and simple form as to render the apparatus easily portable, as is necessary in the connection above noted, as also to adapt the same to convenient use for the operation in question. The transformer A itself, shown as being of the shell type, is of familiar construction comprising primary and secondary coils surrounded by an iron core A' built up of stampings which latter are clamped together between plates A<sup>2</sup> A<sup>2</sup> of special construction, as will be presently noted, by means of bolts *a* extending longitudinally of the transformer. The features added to the construction of the plates are two open box-like extensions *a'* that, see Fig. 3, inclose the respective ends of the transformer coils and project far enough therebeyond to include the several parts now to be described. Before proceeding to these details, however, it will be observed that wheels *a*<sup>2</sup>, preferably doubly flanged, are secured on the under sides of the respective box-like extensions *a'* and adapt the transformer and casing to be movably supported upon a single rail as B. To preserve the apparatus upright when thus resting upon a rail, a laterally extending arm *a*<sup>3</sup> is supplied, adapted to be detachably secured to either side of the frame in eyes *a*<sup>4</sup> as desired; such arm bears at its outer end a wheel *a*<sup>5</sup> adapted to engage the opposite rail B' of the track. The inner end of the arm



is preferably forked so as to have two points of pivotal attachment as described and in addition has a third projecting branch  $a^6$  that loosely rests against the lower portion 5 of the transformer frame to steady the whole. For removing the apparatus or manually transporting the same when not resting on the rail, carrying handles are provided, preferably in the form of two 10 rods  $a^7$  adapted to engage brackets  $a^8$  on the respective sides of the frame and sufficiently long to allow their ends being grasped by workmen at either end of the apparatus.

In the one end of the apparatus, the left 15 as shown in Fig. 3, suitably housed in the box-like extension  $a'$  of the corresponding member of the transformer frame is the switch C whereby the supply of current to the primary coil of the transformer is controlled. Suitable leads  $c$  will be provided of 20 such length as to give the apparatus the necessary radius of action, having due regard to the frequency of points where the current may be tapped. Into the box-like 25 extension  $a'$  at the other end of the transformer frame, project the secondary terminals  $A^3$ , to which is attached the welding device D proper. Such device comprises two clamping arms  $D^1$ ,  $D^2$ , Fig. 4, respectively pivotally secured by lateral branch 30 portions  $d^1$ ,  $d^2$ , to the secondary terminals, Figs. 2 and 3, and forming in effect continuations of said terminals, springs  $d^3$  maintaining a good electrical contact. Of 35 such branch portions  $d^1$ ,  $d^2$  the one  $d^2$  is preferably of flexible construction and by means of threaded rods  $d^3$ ,  $d^3$ , bearing handles  $d^4$ ,  $d^4$ , at their outer ends, the upper and lower ends of the clamping members 40 may be independently drawn more or less closely together. Insulation is introduced at suitable points to prevent escape of the current across such rods  $d^3$ ,  $d^3$ , as will be readily understood. Of the two clamp arms 45 the one  $D^1$  is designed to rest against the inside face and upon the top of the rail to be bonded, the particular construction of such arm forming, it should be stated, no part of the present application; to the outer 50 arm, on the contrary, there is secured a heating electrode comprising a cast iron holder  $d^5$  in which is secured a carbon block  $d^6$ . In operation such carbon block is designed to be brought against the terminal 55 portion of the bond  $b$  which is to be attached to the rail, the inner clamp arm simultaneously being drawn against the opposite face of the rail. Normally, when the apparatus is not in use, such clamp arms are retained 60 in the upper position indicated in dotted outline in Fig. 3, being conjointly oscillatory, as has been explained, about the pivotal axis formed by their points of attachment to the secondary terminals. In such position they are protected both against the

weather and against accidental injury by a hood  $A^4$  built over the box-like end of the corresponding clamping plate  $A^2$ . Accordingly, in order to be brought into operative position the arms in question require merely to be lowered when they will 70 at once assume the proper relation to the rail, the off-set of the inner arm resting as aforesaid upon the top of the rail so that by adjustment of the outer arm the desired 75 clamping effect is had. The current, of course, is controlled as will be obvious, through switch C.

From the foregoing description my improved bonding apparatus will be seen to 80 afford a structure adapted to be conveniently handled by two workmen so as to be easily placed on and removed from the rails and that when in position thereon will lend itself to the rapid and economical 85 attachment of the bonds to the rails.

By supporting the primary coil in a substantially vertical plane, as shown, a very compact structure is presented, and at the same time the various appurtenant parts, 90 and particularly the extensions of the secondary terminals that constitute the clamp arms, are disposed in convenient operative relation to each other and the rail.

Other modes of applying the principle of 95 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 of the following claims or the equivalent of such stated 100 means be employed.

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

1. Rail-bonding apparatus comprising a transformer, and means borne by said transformer adapted to support the same directly 105 over the rail to be bonded, the secondary terminals of said transformer including means adapted to engage with such rail.

2. Rail-bonding apparatus comprising a 110 transformer, and means borne by said transformer adapted to support the same with the primary coil disposed in a substantially vertical plane directly over the rail to be bonded, the secondary terminals of said 115 transformer including means adapted to engage with such rail.

3. Rail-bonding apparatus comprising a transformer, and wheels borne by said transformer adapted to movably support the same 120 directly upon the rail to be bonded, the secondary terminals of said transformer including means adapted to engage with such rail.

4. Rail-bonding apparatus comprising a 125 transformer, a casing therefor, and wheels on said casing adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, the secondary terminals of said transformer in- 130



cluding means adapted to engage with such rail.

5. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, and wheels on said members adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, the secondary terminals of said transformer projecting without one of said members and including means adapted to engage opposite sides of such rail.

6. Rail-bonding apparatus comprising a transformer, and means borne by said transformer adapted to support the same directly over the rail to be bonded, and clamp arms movably secured to the respective secondary terminals of said transformer and forming continuations thereof, said arms being adapted in one position to engage with such rail.

7. Rail-bonding apparatus comprising a transformer, wheels borne by said transformer adapted to movably support the same directly upon the rail to be bonded, and clamp arms pivotally secured to the respective secondary terminals of said transformer and forming continuations thereof, said arms being adapted in one position to engage with such rail.

8. Rail-bonding apparatus comprising a transformer, a casing therefor, wheels on said casing adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, and clamp arms pivotally secured to the respective secondary terminals of said transformer and forming continuations thereof, said arms being adapted in one position to be substantially contained within said casing and in another position to engage opposite sides of such rail.

9. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, one of said members having a box-like extension, wheels on said members adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, and arms pivotally secured to the respective secondary terminals of said transformer and forming continuations thereof, said arms being adapted in one position to be substantially contained within such box-like extension and in another position to engage opposite sides of said rail.

10. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, said members having box-like extensions, wheels on said members adapted to movably support the same, together with said transformer, di-

rectly upon the rail to be bonded, electrical connections and a switch for said transformer contained in one such box-like extension, the secondary terminals of said transformer projecting into the other extension, and arms pivotally secured to said terminals respectively and forming continuations thereof, said arms being adapted in their upper position to lie within the corresponding box-like extension and in another position to engage opposite sides of such rail.

11. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, wheels on said members adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, the secondary terminals of said transformer projecting substantially horizontally without one of said members, and clamp arms, forming continuations of said terminals, laterally pivoted thereto so as to be oscillatory in a vertical plane, said arms being adapted in their lower position to engage with such rail.

12. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, wheels on said members adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, the secondary terminals of said transformer projecting substantially horizontally without one of said members, and clamp arms, forming continuations of said terminals, having lateral branches pivotally secured to said terminals whereby said arms are rendered oscillatory in a vertical plane, said arms being adapted in their lower position to engage opposite sides of such rail.

13. Rail-bonding apparatus comprising a transformer of the shell type, members for clamping together the stampings forming the core of said transformer, wheels on said members adapted to movably support the same, together with said transformer, directly upon the rail to be bonded, the secondary terminals of said transformer projecting substantially horizontally without one of said members, clamp arms, forming continuations of said terminals, having lateral branches pivotally secured to said terminals whereby said arms are rendered oscillatory in a vertical plane, said arms being adapted in their lower position to engage opposite sides of such rail, and the lateral branch of one of said arms being flexible, and means for independently drawing together the upper and lower ends of said arms.

14. In apparatus of the class described, the combination with a suitable support, of a pair of clamping members each including a



- lateral branch pivotally secured to said support so as to render said members oscillatory in a substantially vertical plane, said members being adapted in their lower position to engage opposite sides of a rail and the lateral branch of one member being flexible, and means for independently drawing together the upper and lower ends of said members.
15. Rail-bonding apparatus comprising a transformer, and means borne by said transformer adapted to support the same directly over the rail to be bonded, the secondary terminals of said transformer including members adapted to engage with such rail, and handle means for transporting said transformer.
16. Rail-bonding apparatus comprising a transformer adapted to be movably supported directly upon the rail to be bonded, the secondary terminals of said transformer including members adapted to engage with such rail, brackets laterally affixed to said transformer, and rods adapted to removably engage said brackets for transporting said transformer.
17. Rail-bonding apparatus comprising a transformer, means borne by said transformer adapted to movably support the same directly upon the rail to be bonded, the secondary terminals of said transformer including members adapted to engage with such rail, and means adapted to engage a rail adjacent to said first rail, for supporting said transformer in an upright position.
18. Rail-bonding apparatus comprising a transformer, wheels borne by said transformer adapted to movably support the same directly upon the rail to be bonded,

the secondary terminals of said transformer including members adapted to engage with such rail, an arm projecting laterally from said transformer, and a wheel mounted on the outer end of said arm adapted to engage a rail adjacent to said first rail, and thereby support said transformer in an upright position.

19. Rail-bonding apparatus comprising a transformer, means borne by said transformer adapted to movably support the same directly upon the rail to be bonded, the secondary terminals of said transformer including members adapted to engage with such rail, and a member removably attached to said transformer and adapted to engage a rail adjacent to said first rail, for supporting said transformer in an upright position.

20. Rail-bonding apparatus comprising a transformer adapted to be movably supported directly upon the rail to be bonded, the secondary terminals of said transformer including members adapted to engage with such rail, an arm projecting laterally from said transformer, said arm dividing into three branches at its inner end, two of which are detachably pivoted to said transformer, the other loosely resting against the same, and a wheel mounted on the outer end of said arm adapted to engage a rail adjacent to said first rail, and thereby support said transformer in an upright position.

Signed by me, this 21st day of August, 1908.

WILLIAM A. NEFF.

Attested by—

E. R. RODD,  
JNO F. OBERLIN.