T. J. DEAKIN.

The Art of Welding together Bars of Bessemer Steel.

No. 221,038. Patented Oct. 28, 1879.

Fig. 1

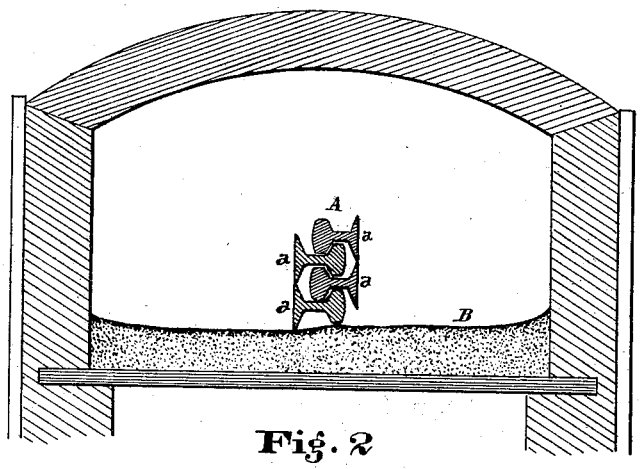


Fig. 2

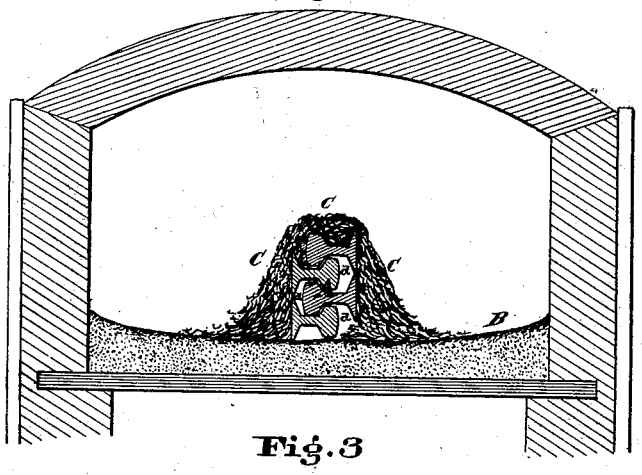
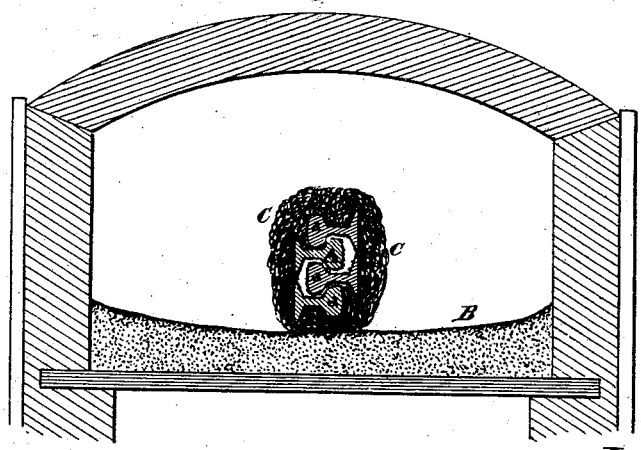


Fig. 3



Attests

Thos. T. Matthews.

Inventor

Thos. J. Deakin

by his atty

A. H. Addicks

UNITED STATES PATENT OFFICE.

THOMAS J. DEAKIN, OF COLUMBIA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS OF HIS RIGHT TO WILLIARD T. BLOCK, OF HANNIBAL, MO.

IMPROVEMENT IN THE ART OF WELDING TOGETHER BARS OF BESSEMER STEEL.

Specification forming part of Letters Patent No. **221,038**, dated October 28, 1879; application filed February 6, 1879.

To all whom it may concern:

Be it known that I, THOMAS J. DEAKIN, of the town of Columbia and county of Lancaster, in the State of Pennsylvania, have invented a new and useful Improvement in the Art of Manufacturing Merchantable Bar, Sheet, or Plate Metal, and other standard merchantable products from railroad-bar ends or cuttings, old railway-bars, and other forms of Bessemer steel, by a process hereinafter fully and exactly described, reference being had to the accompanying drawings, which form a part thereof, and in which—

Figure I is a view of the pile in its first heating, showing the end view of rail-bars in a convenient arrangement, and Fig. II a view of the pile at the commencement of its second and last heating, showing the same arrangement of rail-bars with the introduction of iron turnings, Fig. III showing the pile at the completion of its second heating after the busseling when ready to be removed from the furnace to be welded under hammer or through the rolls.

The object of my invention is to produce a tough, tenacious, and easily-wrought metal suitable for marketable purposes, as merchant bar, wire, sheet, or plate, axles, and the like.

My invention is a cheap and practical process of utilizing the rail ends, old rail-bars, and many waste forms of old and new Bessemer steel by double heating and welding two or more pieces into a homogeneous mass to be wrought into merchantable forms.

For the better information of the public, I will describe my invention in detail, that those skilled in the art to which it appertains may comprehend it.

Having selected some form of Bessemer steel, such as rail-bars, which I shall use for purposes of illustration in this specification, I proceed to reduce them to uniform lengths with reference to the purpose to which the finished product is to be applied, and arrange them (if rails *a*) in a convenient and practical form, A, on the bed of the heating-furnace B, forming a pile without any bands or ties whatever, and consisting of as many pieces as may be desired. (See Fig. I, in which A is the pile, consisting of the pieces *a a a a*, and B the bed of the heating-furnace.)

Having completed this first stage of my process, which may resemble that in ordinary use in the art, if ties or bands are not used therein, I commence the second stage, which is the first heating, and which continues until the pile has reached, or nearly reached, the weld-heat for this metal, which is the more readily obtained and perfectly distributed where rail-bar or similar forms are used in the pile, because of the free access of the heat to the inner surfaces of the pile, there being no filling to obstruct free play of the heat or to draw from its intensity.

Having reached this stage of the process, care should be taken to prevent any such increase of heat as would be sufficient to burn the steel. The pile is ready for the third and last stage, prior to the removal to the hammer or rolls, which is the second heating, as follows: I open the doors of the heating-furnace, thus tempering the heat, and throw into it and over the pile and bed of the furnace a sufficient quantity of iron turnings (those from wrought-iron producing the best results) and proceed with the second heating and busseling by rolling the pile (the fagots being now in a sort of temporary weld sufficiently strong in bond to keep together in form) over the turnings on the bed of the furnace, which, with those already thrown over it, weld to the pile and exert a dual influence: First, they protect it from the increased heat at this stage; and, second, I have found they assist in the final welding under the hammer or the rolls.

Fig. II shows the pile A, and *a a a* the bed of furnace B and the turnings *c* at the commencement of the second heating. Fig. III shows the busseled pile ready for removal to hammer or rolls.

The pile, after having reached the end of the third stage, second heating, is ready to be passed under a hammer or through a train of rolls after the manner that obtains in the ordinary course practiced in the art.

Any ordinary furnace may be used to carry out this process where the degree of heat can readily be regulated and controlled, and I use

in handling the pile the instruments common to the trade.

I disclaim any novelty in the mere form of the pile used for purposes of illustration in the drawings and text of this specification; nor do I limit myself to the use of the form aforesaid.

What I do claim as my invention, for which I desire the protection of Letters Patent of the United States, is—

In the welding of steel, the process substantially described in the specification, to wit: the forming of an open pile of steel bars, and heating the same, in any suitable furnace, to a temperature somewhat short of a proper welding heat; then arresting the heat at this point by the admission of air into the furnace and covering the pile and bed of the furnace with iron turnings; then increasing the heat to the full welding temperature, and rolling the pile upon or in the bed of iron turnings until the softened surface of the pile is completely coated with the said turnings, and then removing the coated pile from the furnace and welding it by hammering or rolling.

In witness whereof I have hereunto set my hand.

THOS. J. DEAKIN.

Witnesses:
RICHARD GOULD,
his
MICHEAL × LIBFRIED.
mark.