

E. B. EDWARDS.  
Method of Manufacturing and Piling Iron.

No. 209,470.

Patented Oct. 29, 1878.

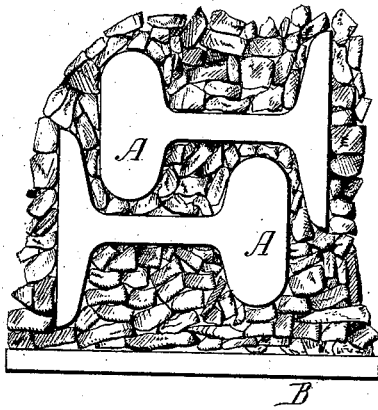


FIG. 1.

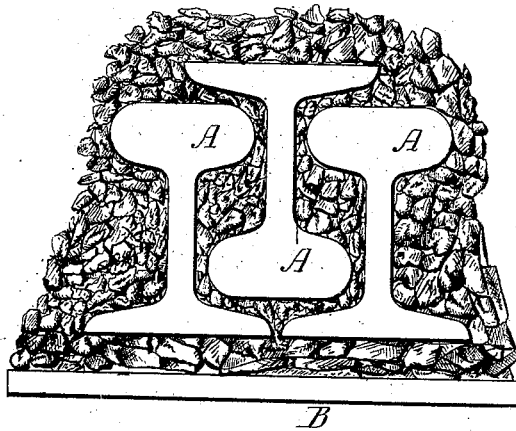


FIG. 3.

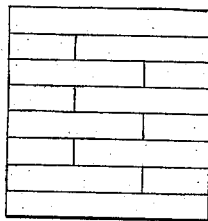


FIG. 2.

Witnesses,  
Harry Smith  
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Inventor,  
Edward B. Edwards  
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# UNITED STATES PATENT OFFICE.

EDWARD B. EDWARDS, OF COLUMBIA, PENNSYLVANIA.

## IMPROVEMENT IN THE METHODS OF MANUFACTURING AND PILING IRON.

Specification forming part of Letters Patent No. **209,470**, dated October 29, 1878; application filed April 23, 1878.

*To all whom it may concern:*

Be it known that I, EDWARD B. EDWARDS, of Columbia, Lancaster county, Pennsylvania, have invented a new and useful Improvement in the Manufacture of Iron, of which the following is a specification:

The object of my invention is to utilize the waste ends of Bessemer-steel rails, or old Bessemer rails, or other steel scraps, by forming them into a pile with scraps or other pieces of wrought-iron, and in some cases with additional scraps of steel, subjecting the pile to heat in the bed of a furnace, and finally reducing the same by hammering to a bloom, which may be converted by rolling into bars, plates, or other forms of wrought-iron having a tough fibrous texture.

Figure 1 of the accompanying drawing represents a pile consisting of the ends of two steel rails, A A, a foundation-plate, B, and a mass of scraps of wrought-iron, in which the rail ends are embedded. The foundation-plate B is of wood, and a mass of scraps should first be placed on the board, then the lower piece of rail partly embedded in the mass, then the upper piece of rail arranged as shown, taking care that the interstices are packed as closely as possible with scraps, which should also be built up the sides and ends and placed over the top of the pieces of rails, so that the latter may be surrounded in all directions by the scraps. The pile thus built up may be confined by suitable wires.

When the pile has been thus completed it is placed on the bed of the heating-furnace, where the effect of the heat will be to reduce the metal of the rail ends to a semi-molten condition, while the wrought-iron scrap is reduced to a welding heat, so that the steel is amalgamated with the wrought-iron to a greater or less extent.

The foundation plate or board in this operation, burning under the pile, serves an important purpose in taking out the phosphorus and other impurities, such as in the ordinary mode of refining iron are removed by means of charcoal. The effect or result of this portion of the process is to thicken the more fluid steel with the scrap-iron, so that an intermingling of the two takes place under the protection of the exterior coating of scrap-iron, which

prevents the steel from being injured by burning, resulting in a malleable iron of fine character.

When the pile is at a proper heat it may be removed directly to a hammer or rolls and worked into rough bars, which are subsequently cut into suitable lengths for the formation of another pile. This secondary pile may be built up in different styles in accordance with the uses to which the metal has to be applied. In making bars or rods, for instance, I prefer to build up the secondary pile as shown in Fig. 2, which will be readily understood without explanation.

The bar resulting from the rolling of this secondary pile will consist of wrought-iron of such peculiarly tough and fibrous character as to render it available for all objects in the manufacture of which wrought-iron of a superior quality is desirable.

It should be understood that any desired number of pieces of steel rails may be formed into a pile, care being taken to cover them with wrought-iron scraps. The pile, however, should in no case be so arranged as to entirely exclude the steel from the action of the products of combustion in the furnace.

The rails may be differently arranged in the original pile—in the manner shown in Fig. 3, for instance—and other bars or pieces of steel may be employed in place of or in addition to the pieces of the rails.

Instead of converting the original pile into bars, plates, or other forms in the manner described above, it may be simply hammered into a crude bloom for sale to iron-manufacturers, who can convert it into rough bars to be cut and piled for such uses as may be required; or the secondary pile may be hammered into a bloom for manufacturers who desire to convert it directly and without repiling into bars, plates, or other shapes.

The original pile may be composed of pieces of rails or other pieces of steel combined with billets of wrought-iron made by folding and compressing thin iron—such, for instance, as has been used as cotton-ties—these billets being fitted snugly to the rails, and the whole being confined by a suitable system of wires.

Instead of the wooden board, I may sometimes use a metallic base-plate, forming part of

the pile, in order to produce a malleable iron in a more economical manner; but the quality of the iron will be inferior to that produced over the wooden base, as above set forth.

I am aware that it is not new to slit or flatten the ends of Bessemer-steel rails and roll these flattened bars piled with alternate layers of puddled-iron bars to form an amalgam, and that it is old to form an air-tight pile of Bessemer-rail ends and muck bar-iron, heating and rolling the same, as shown in the Patent No. 186,836, dated January 30, 1877. Hence I do not claim such inventions, which are adapted to form iron surfaces next to interior steel.

My invention is designed to surround the steel with a porous mass of scrap, extending around each piece of steel in the pile and filling all the interstices, thereby affording an iron body of extensive surface to take up the steel as soon as it is rendered fluid by the heat.

I claim as my invention—

1. As an improvement in the mode of utilizing old Bessemer-steel rails, fag-ends, or steel-scrap, preparing said rails, ends, or scrap by piling the same in an open pile, with pieces of wrought-iron, upon a wooden base-board forming part of the pile, subjecting the pile to heat in the bed of a furnace, reducing the same to a bloom, and converting the latter by rolling

or hammering into bars, plates, or other forms of malleable iron, as specified.

2. In the manufacture of iron from steel-rail ends or scrap, the pile herein described, consisting of a wooden base and the layers of steel-rail ends or steel pieces packed between with layers and pieces of wrought-iron or scrap of the same, the whole being covered on the sides, ends, top, and bottom with pieces or scrap of wrought-iron, and supported on said wooden base, as specified.

3. The mode herein described of converting old steel-rail ends or steel-scrap into malleable iron, consisting in enveloping with and packing between said rail ends or steel-scrap wrought-iron scrap, to prevent burning and running of the steel, then heating the same, and thereby effecting an intimate mixture of the wrought scrap and steel in the interior of the mass, as well as in the superficial portion, and finally hammering or rolling the mass, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD B. EDWARDS.

Witnesses:

HARRY A. CRAWFORD,  
HARRY SMITH.