UNITED STATES PATENT OFFICE.

ELIAS T. DAY, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO FRANZ O. MATTHIESSEN, TRUSTEE, OF IRVINGTON, NEW YORK.

IMPROVEMENT IN PROCESSES OF UNITING BESSEMER METAL AND INCREASING THE TENSILE STRENGTH THEREOF.

Specification forming part of Letters Patent No. **192,320**, dated June 19, 1877; application filed May 16, 1877.

To all whom it may concern:

Be it known that I, ELIAS T. DAY, of Jersey City, Hudson county, New Jersey, have invented a certain Improvement in the Manufacture of Steel, of which the following is a specification:

The object of my improvement is to impart increased tensile strength to Bessemer steel; and my invention consists in treating steel with boracic acid in connection with the ordinary process of piling.

My invention is especially useful for the purpose of utilizing and improving the quality of Bessemer steel scrap or old rails, which, after being formed into slabs or fagots, may be reworked at a comparatively low heat when the fagots are covered with a thin coating of boracic acid preparatory to piling them in the usual way. When so prepared, the pile upon being heated and worked yields a homogeneous product of increased tensile strength.

In my process I form slabs of convenient shape and size, and then cover their surfaces evenly with a thin coating of boracic acid, and build them into an ordinary pile composed of as many pieces as may be necessary to produce a finished bar of a given size. I then place the pile in a furnace, and having heated it to a welding heat, which, in the case of a small pile will be a bright red, I remove it from the furnace and first subject it to moderate pressure by rolling, hammering, or in any other convenient way, which effects the union of the slabs with each other. I then reduce the pile by hammering or rolling into bars or rods, as may be desired, reheating the pile from time to time, as may be necessary.

The slabs may be varied in thickness, and consequently the quantity of boracic acid used may be varied according to the purpose for which the product is designed. For example, if the steel is designed for tires, the slabs need not be thinner than, say, three-quarters of an inch.

In the treatment of Bessemer steel scrap, which varies considerably in quality, the slabs may be made much thinner, and a larger proportion of boracic acid used, the effect of which will be to render the product more uniform in its character.

A composition of calcined borax and powdered iron has been heretofore used as a welding flux; but my process, which dispenses with iron, effects a close union of the slabs or fagots with each other, without leaving the division line, which is a marked characteristic of the joint when iron is present.

I claim as my invention—

In the manufacture of merchant bars or rods from steel scrap, the method of improving the tensile strength of the product herein described, which consists in coating steel slabs or fagots with boracic acid, and then forming the slabs into piles, and heating and rolling or hammering the piles into bars or rods, substantially as set forth.

ELIAS T. DAY.

Witnesses:

M. L. ADAMS,

EDWD. PAYSON.