

UNITED STATES PATENT OFFICE.

J. MASLIN COOPER, OF NEW YORK, N. Y.

IMPROVEMENT IN WELDING IRON AND STEEL.

Specification forming part of Letters Patent No. 132,900, dated November 12, 1872.

To all whom it may concern:

Be it known that I, J. MASLIN COOPER, of the city, county, and State of New York, have invented a new and useful Improvement in the Art of Welding Iron and Steel, of which the following is a specification:

My invention relates not only to the manufacture of the steel-headed rails of Bessemer steel or other cast-steel, but also relates to the union of iron and steel together for other purposes, whether for edge-tools or otherwise.

For the manufacture of steel-headed rails I use an intermediate layer of metal—made of Codorus ore, wholly or in part—placed between the iron and the Bessemer steel to be united. This Codorus ore, which is found on Codorus creek, York county, Pennsylvania, contains certain chemical properties which, when used with other irons or used alone, forms a metal which welds readily to iron, to Bessemer steel, or to itself, the metals to be welded being heated in a furnace at a proper heat and then subjected to hammering or rolling. In making a steel-headed rail I use three or four layers of the irons ordinarily employed; then a layer of Codorus metal, and then a layer of Bessemer steel. The whole is put into the welding-furnace, the pile generally turned so that the steel will be on the bottom of the furnace to keep it from burning. When it has arrived at a heat when the iron will weld together it is reversed for a moment or two, so that the steel part of the pile is uppermost. After remaining thus barely long enough to prevent the steel from burning, it is drawn out, put upon the iron carriage, and wheeled to the rolls, where it is, by frequent passages, rolled into a perfect rail having a Bessemer steel head, perfectly welded to the iron by means of the intermediate layer of Codorus metal. The Codorus metal will, when observed, be found to be mingled with the particles of Bessemer steel, so much so that one metal can hardly be distinguished from

the other at the point of fracture, the metals thus welded having the appearance of being homogeneous. The iron is readily known by its dark and fibrous appearance, or, if crystallized iron, from its coarse particles as compared with the other portions of the head of the rail. So completely are the metals united that they cannot be separated by hammering across the grain either while cold or when in a heated state. If necessary to prevent burning or to attain the proper welding heat, the steel to be attached to the iron pile may be heated in a separate furnace.

In uniting iron and steel together for other purposes the process may be modified to suit the article being made. If the body of the article is composed of metal containing Codorus ore, wholly or in part, it will take at once and readily weld to the steel. If other irons are used in the body of the article to be made an intermediate layer of Codorus metal may be used, either separately or previously united to the steel before heating for forging together and making the article desired. This latter description relates more particularly to edge-tools, the body of which is made of iron and the edge of steel.

In working certain classes of metals it may be expedient to use a flux in connection with the metal above mentioned; but, ordinarily, I prefer to dispense with a flux, the metal itself welding so readily as to render a flux unnecessary.

I claim as my invention—

The improvement in the art of welding iron and steel, hereinbefore set forth, by means of an interposed layer of the metal specified, having an affinity for both metals.

In testimony whereof I have hereunto subscribed my name.

J. MASLIN COOPER.

Witnesses:

JONATHAN H. CRANE,
E. M. WOOD.