UNITED STATES PATENT OFFICE.

ISAAC E. CRAIG, OF CAMDEN, OHIO.

MANUFACTURE OF SHEET-IRON.

SPECIFICATION forming part of Letters Patent No. 241,529, dated May 17, 1881.

Application filed March 9, 1881. (No model.)

To all whom it may concern:

Be it known that I, ISAAC E. CRAIG, a citizen of the United States, residing at Camden, in the county of Preble and State of Ohio, have invented a certain new and useful improvement in the manufacture of sheet-iron by deoxidizing or cleansing the surface of the sheets from the scale of oxide of iron formed thereon during the process of heating and rolling them, in a manner less expensive and more efficient than heretofore practiced, and as a part of the same process, and without further labor and expense, alloying the surface of the sheets with other metals found to be desirable in reducing their tendency to corrosion; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Heretofore it has been practiced to revive the metal of the superficial coating of oxide on the sheets by heating them for a sufficient length of time with layers of powdered charcoal or other carbonaceous matter between them, and afterward to rub the surfaces with powdered oxides of other metals and heat again until the oxides so applied were revived by the reducing-gases contained in the furnace or expelled from the body of the sheets and the restored metals drawn into the pores of the surface of the sheets and partly alloyed therewith.

The object of my invention is to lessen the length of time and quantity of fuel necessary to be used in reviving the metal from the coating of oxide of iron, and at the same time, and by the same heat, to alloy the metals of the other or applied oxides with the surface of the sheets.

To carry my invention into effect I intimately mix, by grinding or otherwise, the metallic oxide or oxides to be used with some carbonaceous matter—as powdered charcoal, or preferably lamp-black, in the proportion, by weight, of one of the oxide to two of lamp-black—and treat the resulting mixture with so much of some volatile fluid—as naphtha or spirits of turpentine—as will reduce it to the consistency of an easily-working paint, and then apply it with a brush to the surface of the sheets, sprinkling afterward on each surface, and before dry, a thin coating of powdered charcoal. The sheets are then done up in packages of convenient size, so as to exclude the air from circulating among them—as by wrapping with sheet-iron and wire—and heated in a furnace to a moderately bright-red heat from one-half hour to an hour and a half, depending much on the thickness of scale to be revived and the degree of heat used. The metal of the oxide of iron may be restored in a much less time by a temperature but little short of a welding-heat; but this high heat favors crystallization of the iron, impairing its flexibility and toughness, and is therefore to be avoided. I then withdraw the package from the furnace, and as its interior parts cool to a low red heat I separate the sheets, and by exposure to the air allow them to slightly reoxidize.

In the preparation of the materials for this treatment I make use of the oxide of tin, oxide of antimony, and oxide of lead, or either of them; but I find the following proportions, by weight, economical and best: oxide of tin, one part; oxide of antimony, one part; oxide of lead, four parts.

By the means described I am able to dispense with one heat heretofore used for the purpose of alloying the surface after the process of reviving has been completed. A less time is necessary to be consumed in the process of reviving the iron of the oxide, as the more fusible metals act as a channel or intermediary for the outflow of oxygen from the iron to the carbon. I am also able to use a much larger proportion of lead in the application to the surfaces than has heretofore been practicable without leaving lead in a globular state on the surface of the sheets, saving cost and improving the power of the surface to resist air and moisture. After this the sheets are carefully brushed, and may then be polished by the ordinary means of passing them in packages at suitable heat between rolls, or by hammering under power-hammers in bundles at a moderate red heat.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

As an improvement in the manufacture of sheet-iron, the process herein set forth of both deoxidizing and alloying the surface of the sheets at one and the same heat by applying to the surface of the sheets a composition of matter consisting of combustible carbon and one or more of the metallic oxides named, and then maintaining at a red heat in suitable furnace until the purpose is accomplished.

ISAAC E. CRAIG.

Witnesses:
JAMES L. THOMAS,
ASBERRY DECKER.