UNITED STATES PATENT OFFICE.

WATERS DEWEES WOOD, OF PITTSBURG, ASSIGNOR TO THE W. DEWEES WOOD COMPANY, OF McKEESPORT, PENNSYLVANIA.

PROCESS OF MANUFACTURING SHEET-IRON.

SPECIFICATION forming part of Letters Patent No. 490,236, dated January 17, 1893.

Application filed June 10, 1891. Serial No. 395,765. (No specimens.)

To all whom it may concern:

Be it known that I, WATERS DEWEES WOOD, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Processes of Manufacturing Sheet-Iron, of which improvement the following is a specification.

The invention described herein relates to certain improvements in the manufacture of common, as distinguished from planished, sheet iron or steel.

The invention has for its object the preservation or retention, or, perhaps better the protection of the oxide surfaces on the sheets during the reduction from broken down sheets to the finished product, whereby I am enabled to increase largely the output or product of the mill, and a consequent lessening of the cost, as well as a more uniformly good product. The methods heretofore employed in finishing the sheets in such manufacture, after the usual breaking down of the sheet bars to sheets of the desired gage, are known as the tight and open rolled methods. In the former method a large number of comparatively thick sheets, as they come from the breaking down rolls, that is unscaled, are arranged in a pile or pack and then heated to a cherry red or to a working heat at which the sheets will not weld together during the rolling operation. Although the sheets do not weld together during the rolling, they sometimes adhere closely together and have to be torn apart. This adherence and consequent tearing apart, when they occur, leave the sheets rough and uneven by reason of the removal or stripping off of portions or bits of the oxide surfaces of the sheets and the latter are sometimes torn during the opening up of the sheets.

In order to avoid the objectionable features of the tight method resort is had to the open rolled method. In this method the sheets are arranged in packs as above described and heated to a higher degree than is desirable in the other method, but as soon as the pack is withdrawn from the furnace, the sheets are separated and fine charcoal, coal dust or other suitable material is thrown in between the sheets and the pack is then rolled. The presence of the charcoal, &c., between the sheets prevents their adherence during rolling, but on account of the rapid cooling during the separation of the sheets and throwing cold dust between them, it is inexpedient to include more than three sheets in a pack. Hence, it will be seen that the tight method is objectionable on account of the adherence of the sheets together and the open method is objectionable on account of the small number of sheets that can be placed in a pack, and the consequent limitation of the capacity of the mill.

In the practice of my invention, the sheet bars are broken down in the usual manner. The surfaces of these sheets as they come from the breaking down rolls, with their oxidized surfaces intact are covered with a coating formed of a material, such as a mixture of charcoal dust and water, capable of adhering to the surfaces of the sheets during subsequent heating and rolling and of preventing the adherence of the sheets during subsequent treatment. This coating may consist of a thin paste formed of a liquid as water or oil and some solid material, as coal, coke, or charcoal dust or other material, which will not have any injurious effect on the sheets during subsequent treatment and which, when the paste has dried, will adhere and form such a coating as will prevent any adherence or welding of the sheets together. This coating may be applied in a variety of ways, as, for example, by a brush, or by dipping the sheets in a bath prior to their being arranged in packs. As only a very thin coating is required to prevent the adherence of the sheets together, it is preferred that the material with which the sheets are to be coated should be made as thin as is compatible with formation of a practically continuous coating, when the material employed has dried or hardened. After the sheets have been thus coated they are arranged in packs containing from three to eight or more sheets and the packs are then heated and rolled in the usual manner. It is not necessary to allow the coating to dry or harden prior to pack-

ing and charging them into the furnace. Although the coating may be more or less burned during the heating of the sheets, the ash or unconsumed material will adhere to the surfaces of the sheets until loosened during rolling, and thereby prevent when the sheets are separated after rolling, the stripping off of the oxide surfaces, as sometimes happens, producing rough and uneven surfaces, under the old method as above described. After the sheets have been rolled and separated, the surfaces thereof are cleaned by washing or in any other suitable manner.

A distinguishing characteristic of my invention is the coating of the unscaled sheets prior to forming them in a pack and charging the pack into the furnace, whereby I attain important advantages, first the preservation of the oxide surfaces of the sheets in an unbroken condition, second, the prevention of an adherence of the sheets together, and, third, a large increase in the capacity of a mill.

I am aware that it is old to coat the surfaces of scaled or clean sheets with a carbonaceous material for the purpose of forming a carburet on the surfaces of the sheets. It is also old to coat the surfaces of unscaled sheets with carbonaceous material for the purpose of reviving the oxide surfaces to a metallic condition. In both of these cases the coated sheets are subjected for a long time to a very high heat in order to effect the desired conversions. In the present method the sheets are coated for the purpose of preventing the adherence of the sheets together, and they are subjected to only sufficient heat to bring them to a working condition and for a short time only, the purpose being to produce sheets having a smooth and even surface and to increase the output of the mill.

I claim herein as my invention:

1. In the art of manufacturing sheet iron or steel, the method herein described of preserving or protecting the original oxide surfaces of the sheets and preventing the sheets from sticking or welding together during the heating and reduction of the broken down sheets, consisting in coating the original oxide surfaces of the broken down sheet with a suitable liquid or plastic adhesive material adapted to prevent welding or sticking, but without material change in the oxide surface, arranging the sheets in packs, raising the packs to a rolling heat and then rolling them promptly on attaining the rolling heat, whereby without material deoxidation or carburization to avoid destruction of or material injury to the oxide surfaces of the sheets, substantially as set forth.

2. In the art of manufacturing sheet iron or steel, the method herein described of preserving or protecting the original oxide surfaces of the sheets and preventing the sheets from sticking or welding together during the heating and reduction of the broken-down sheets, consisting in coating the original oxide surfaces of the broken-down sheets with a mixture of finely divided carbonaceous material and a liquid, arranging the coated sheets in packs, heating the packs to a rolling heat, and then rolling them before any material deoxidation or carburization can be effected whereby to avoid the destruction of or material injury to the oxide surfaces of the sheets, and without substantial change in such oxide surfaces, substantially as set forth.

3. In the art of manufacturing sheet iron or steel the method herein described of preserving or protecting the original oxide surfaces of the sheets and preventing the sheets from sticking or welding together during the heating and reduction of the broken-down sheets, consisting in coating the original oxide surfaces of the broken-down sheets by dipping them in a bath consisting of carbonaceous matter and a liquid, arranging the coated sheets in a pack, heating the packs to a rolling heat and then rolling them before any material deoxidation or carburization can be effected whereby to avoid the destruction of or material injury to the oxide surfaces of the sheets, and without substantial change in such oxide surfaces, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WATERS DEWEES WOOD.

Witnesses:

R. H. WHITTLESEY,

DARWIN S. WOLCOTT.