UNITED STATES PATENT OFFICE.

GEORGE ATKINS, OF CLEVELAND, OHIO.

PROCESS OF MAKING PLANISHED SHEET-STEEL.

SPECIFICATION forming part of Letters Patent No. 440,298, dated November 11, 1890.

Application filed August 4, 1890. Serial No. 360,969. (No specimens.)

To all whom it may concern:

Be in known that I, GEORGE ATKINS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new Process of Manufacturing Soft Sheet-Steel having a Glazed or Planished Face.

By means of the improvement hereinafter set forth the sheets of steel or iron have the quality and appearance of Russia sheet-iron without being subjected to the elaborate operation and means employed, the use of the several agents—such as acid baths, lime-water, bituminous or soft coal, and other specialties, which contain more or less sulphur or phosphorus, which tend to degrade the integrity of the sheet metal and to oxidate or erode the face thereof—causing it to have the appearance of the common sheet.

In my improved process a furnace properly constructed having a charcoal bottom a wood fire is used for the purpose of heating the soft-steel bars for rolling into sheets and for reheating, rolling, and annealing the sheets, in place of coal, to avoid the degrading influence of the aforesaid agents upon the metal developed by heat in the furnace. By the use of a wood fire and a charcoal bottom in place of ordinary soft coal it prevents the steel sheets from being decarbonated, and especially so in annealing them after being rolled. When the ordinary soft or bituminous coal is used, the sheets become eroded, resultant from the sulphurous gases eliminated from the coal by heat, which has such an affinity for the metal as to present a face of a common sheet.

The sheets are first rolled out from hot bars, preferably of soft steel which can be of varied widths and thickness—say from No. 20 to No. 30, wire-gage, in thickness or any suitable variations therefrom. The said bars are heated in a suitable furnace by means of a wood fire and charcoal bottom, as before stated. These sheets, after being rolled out, are again reheated in packs to a dull red heat by fuel of the same character. Then two or more of the pack are withdrawn from the furnace and rolled a second time. Next four or more of the second-rolled sheets are laid one upon the other in order, again reheated to a dull red heat, then withdrawn from the furnace, and rolled a third time. This reheating and rerolling of the sheets is continued until they are reduced to the desired thickness. In reheating and rerolling the faces of the sheets should continue in the same order of contaction until the final heating and rolling. After the sheets have been heated and rolled to the required condition they are then packed in such a way as to admit of a space between them. In this space is introduced a wire-gauze to prevent close contact of the sheets.

In this arrangement the sheets are annealed by reheating. In this way they are more equally and uniformly annealed than in compact packs, as with my improvement the heat is disseminated through the sheets in the same degree, while in the close packs it is unequal, rendering the sheets not uniform in finish or quality, as the heating and cooling affect the exterior sheets of a close pack differently from the interior in annealing. The sheets in this way are heated and cooled in different stages or degrees, which causes the erosion of the plates when bituminous coal is used, and other ordinary fuel causes the closed pack to warp and buckle up from the non-uniform expansion and contraction thereof.

These objections and inherent difficulties attendant upon the ordinary process of manufacturing planished or glazed sheet steel or iron are avoided by my improvements, the distinguishing features of which consist in heating the metal or flat bars for rolling into sheets by a wood fire in a properly-constructed furnace with a charcoal bottom, and in the different stages of the process of rerolling and reheating in packs and parts thereof, as described; also, in laying up the sheets in order with a space between them interposed by a wire-gauze frame or its equivalent to separate the sheets of the pack for final annealing, whereby the furnace-heat, as described, is disseminated through and between the pack evenly and equally, whereby the sheets have a uniform glazed face and an even and superior quality of metal.

In annealing the sheets it is preferable to inclose them in an air-tight box or case to reduce the oxidizing influence of heat and to disseminate a uniform and even degree through the entire pack or series. For this purpose the sheets are laid in the case with a space between them by interposed wire frames or

other suitable means to cause a separation of the plates, so that the heat may be freely disseminated, whereby the sheets have the desired uniform Russian color and are prevented from that buckling and crimping up as is usually attendant more or less in the ordinary method.

What I claim, and desire to secure by Letters Patent, is—

1. The herein-described process of manufacturing soft-steel sheets having a glazed or planished face, by rolling the sheets from bars heated in a furnace with a charcoal bottom and a wood fire, next reheating the sheets in packs or series of sheets by the same means and rerolling the same in series or duplicates, and continuing the process of reheating and rerolling said sheets together until reduced to the required dimensions, next annealing the said sheets by inclosing the same in packs with an air-tight box or case, with a wire frame or its equivalent interposed to form a space between the sheets, and then subjecting the case and contents to the required heat in a furnace of the character described, in the manner and for the purpose set forth.

2. The herein-described process of manufacturing soft sheet-steel having a glazed or planished face, by heating the bars in a furnace with a charcoal bottom and a wood fire and rolling the sheets therefrom, next reheating the sheets in packs or series of sheets by the same means and rerolling the same in series or duplicates, and continuing the process of reheating and rerolling said sheets until reduced to the required dimensions, substantially as and for the purpose set forth.

3. The annealing of sheets of soft steel by inclosing the same in packs in an air-tight case with a wire frame or its equivalent interposed to form a space between the sheets, and then subjecting the case and contents to the required heat in a furnace of the character described, in the manner and substantially for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE ATKINS.

Witnesses:
QUINCY EWING,
W. H. BURRIDGE.