

No. 805,095.

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A. RIDD.

METHOD OF MAKING OXID COATED SHEET METAL.

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Fig. 1.

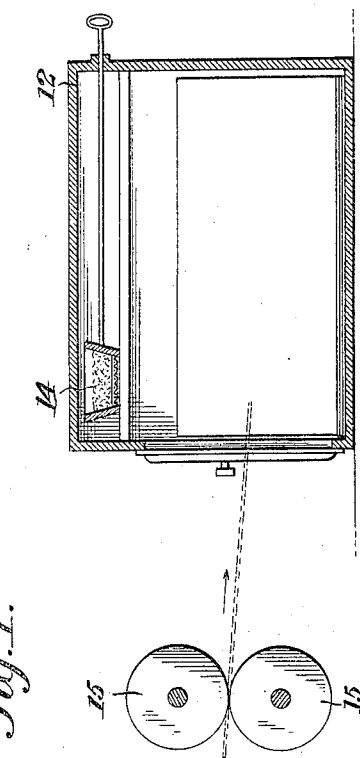


Fig. 3.

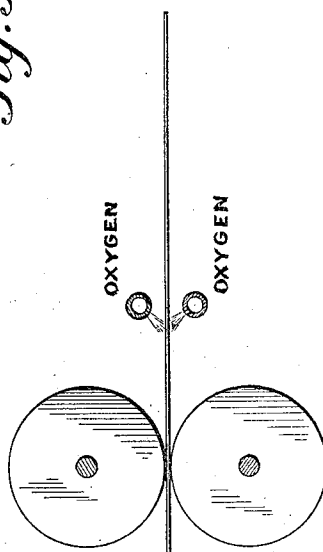
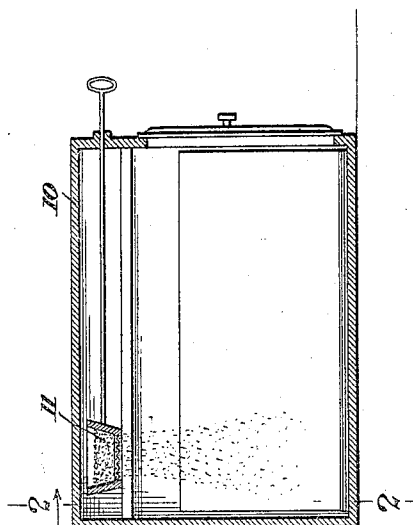
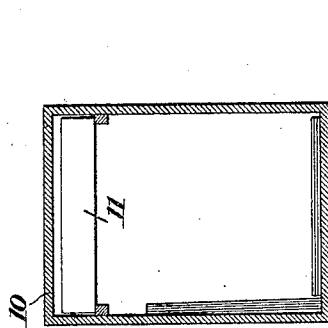


Fig. 2.



Witnesses

*E. J. Howard*  
*Jno. S. Carter*

Ambrose Ridd

Inventor

by

*C. A. Snow & Co.*

Attorneys

# UNITED STATES PATENT OFFICE.

AMBROSE RIDD, OF NEWPORT, KENTUCKY.

## METHOD OF MAKING OXID-COATED SHEET METAL.

No. 805,095.

Specification of Letters Patent.

Patented Nov. 21, 1905.

Application filed August 1, 1905. Serial No. 272,209.

*To all whom it may concern:*

Be it known that I, AMBROSE RIDD, a citizen of the United States, residing at Newport, in the county of Campbell and State of Kentucky, have invented a new and useful Method of Making Oxid-Coated Sheet Metal, of which the following is a specification.

This invention relates to a method of manufacturing that class of sheet metal known as "Russian sheet-iron."

The principal object of the invention is to manufacture metal sheets in which the surface of the sheet is provided with a coating of oxid of iron that is compressed and condensed during the process of manufacture and produces a hard smooth skin or enamel which will protect the metal of the sheet from further oxidation when exposed to the action of air or moisture.

With this object in view the invention consists in the novel method of manufacturing sheet metal hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a view partly in the nature of a diagram, illustrating a means for applying a powdered oxid of iron to an iron or steel sheet which may already be provided with a naturally-formed coating of oxid. Fig. 2 is a transverse sectional view of one of the ovens. Fig. 3 is a detail view illustrating a modification of the invention.

In the manufacture of that class of sheet metal known as "Russian sheet-iron" many attempts have been made to produce the highly-finished surface which is the principal characteristic of the metal, one of many methods employed consisting in rolling the iron and annealing the same, so that the sheet becomes coated with an oxid of iron, and afterward finishing the sheet by a number of processes which result in the condensation or compression of the oxid to form the smooth surface. The naturally-formed coating of oxid is in many cases insufficient for the protection of the metal, inasmuch as the coating is more or less irregular, and while portions of the sheet may be wholly free from oxid other parts will be oxidized to a considerable depth.

In carrying out the present invention provision is made for increasing the quantity of oxid on the surface of the sheet by the employment of agents which will rapidly oxidize the metal of the sheet or by the addition

of a previously-formed ferric oxid in powdered form.

In carrying out the invention the sheets of metal as they come from a tight or loose mill are placed in an annealing-oven 10, the sheets standing on one edge, and at the top of the oven is placed a sifting device 11, containing a quantity of ferric or other oxid of iron. The sheets are turned down flatwise one by one, and after each sheet is moved to the horizontal position the sifting device is operated and the powdered oxid falls thereon. The assembled sheets with the layers of oxid between them are then rolled for the production of sheets in the usual manner, the oxid clinging to both the upper surface of the sheet on which it is deposited and the lower surface of the sheet next above. The sheets are then placed in a second annealing-oven 12 and exposed to comparatively high temperature, and then a sifting device 11', placed at the top of the oven, is operated and a quantity of oxid is dropped onto each sheet before the latter is passed separately through the rolls 15. From the rolls the sheets are delivered into the annealing-oven 10 and are turned over and thence are fed again from this annealing-oven back to the second annealing-oven, the then upper faces of the sheets being also provided with a coating of oxid prior to their removal from the first oven. The rolls are preferably heated to a temperature greater than that of the sheets, and as the latter pass through the rolls the oxid will be heated and will be pressed into the metal, the surface of the oxid being condensed and resulting in the formation of a thin smooth glazed skin or enamel which after another annealing operation will bend freely as the sheet is bent without danger of cracking or checking.

In place of applying the oxid in powdered form the oxidation may be hastened by applying to the sheet a blast or blasts of pure oxygen in advance of the arrival of the sheets at the rolls, so that a relatively heavy coating of oxid will be formed, and this coating will extend completely over the sheet in the same manner as the mechanically-applied oxid previously described. In both cases the layer of oxid is sufficient to fully protect the metal of the sheet from exposure, and as the oxid has already absorbed or taken up all of the oxygen possible it will not deteriorate from exposure nor can the depth of the layer of the oxid be increased.

During the operation of condensing the oxid and forcing the same flat against the body of the sheet care is taken to prevent any accidental loosening of the oxid by the rolls, and for this purpose the rolls are made of uniform diameter and are connected by intermeshing gears of the same diameter, so that the strain exerted on one side of the sheet will be precisely the same as that exerted on the opposite side of the sheet and there will be no dragging, such as might occur where only one roll is positively driven or where both rolls are positively driven at different surface speeds. This permits the forcing of the oxid against the surface of the sheet and the condensation of such oxid, the latter being made to form a part of the sheet through the application of heat and pressure, and the coating thus formed will be absolutely rust-proof.

Having thus described the invention, what is claimed is—

1. The herein-described method of manufacturing rust-proof sheet-iron, said method consisting of depositing a heavy uniform layer of oxid of iron throughout the whole of the surface of a sheet of metal while the latter is in a heated condition, and then passing the same through heated rolls.

2. The herein-described method of manufacturing rust-proof sheet-iron, said method consisting in applying to the surface of the sheet while hot, a dry powdered oxid and then subjecting the coated sheet to heat and pressure.

3. The herein-described method of manufacturing rust-proof sheet-iron, said method consisting in applying to the sheets while the latter is heated, a uniform layer of dry powdered oxid, and then passing the coated sheet while still in a heated condition through heated rolls.

4. The herein-described method of manu-

facturing rust-proof sheet-iron, said method consisting in depositing a heavy layer of oxid on the sheet to be treated, and then passing the oxid-coated sheet through a pair of heated compression-rolls positively driven and having uniform surface speed.

5. The herein-described method of manufacturing rust-proof sheet metal, said method consisting in applying oxid in finely-divided form to the surface of the sheet while the latter is in an annealing or heating oven, and then rolling the sheet to compress and condense the oxid and afterward annealing said sheet.

6. The herein-described method of manufacturing rust-proof sheet-iron, said method consisting in introducing an iron oxid in finely-divided form between the sheets of a pack, rolling the pack, applying oxid to the single sheets of the pack and then rolling the single sheets in order to compress and condense the oxid.

7. The herein-described method of manufacturing rust-proof sheet metal, said method consisting in placing an oxid in finely-divided form between the sheets of a pack while the latter is in an annealing-oven, rolling the pack, passing the same to an annealing-oven, supplying additional oxid to the single sheets of the pack, rolling the sheets separately, passing the same to the first annealing-oven, applying oxid to the opposite side of the sheet, again rolling said sheet, and finally annealing the sheet.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

AMBROSE RIDD.

Witnesses:

J. H. JOCHUM, Jr.,  
JAS. M. WALKER.