

# UNITED STATES PATENT OFFICE.

ARTHUR J. MASKREY, OF CANTON, OHIO, ASSIGNOR OF ONE-HALF TO JOHN E. CARNAHAN, OF CANTON, OHIO.

## METHOD OF ROLLING IRON OR STEEL SHEETS.

1,029,936.

Specification of Letters Patent.

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No Drawing.

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*To all whom it may concern:*

Be it known that I, ARTHUR J. MASKREY, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a certain new and useful Improved Method of Rolling Iron or Steel Sheets, of which the following is a specification.

The invention relates to the process of rolling iron or steel sheets from bars or plates, and the object of the improvement is to prevent the sticking or welding together of the sheets by the action of the rolls when the sheets have been reduced to the thinner gages. The process of rolling such sheets involves the heating of the bars or plates in a furnace to a bright red color, then passing the same, first singly and then in pairs, between rolls to form thick sheets, then doubling the thick sheets upon themselves to form a pack and again heating and passing the same between rolls to form thinner sheets; and then doubling the thinner sheets upon themselves, and again heating and passing the same between rolls to form the thinnest sheets.

It is customary to separate the sheets of the pack after each rolling for the double purpose of breaking or rupturing any sticking or welding together which may have occurred, and of admitting air between the sheets to effect an oxidation of the surfaces; which separation and exposure to the air is usually sufficient to prevent a sticking or welding of the sheets of the pack together during the next succeeding rolling, at least until the sheets have been reduced to the thinner gages. It has been found, however, with respect to certain kinds or grades of iron or steel, and more particularly with the richer or purer irons or high carbon steels, or steels which contain an alloy of other metals, that the sticking or welding together of the sheets cannot be avoided or prevented by the usual process or method of rolling set forth above, when the sheets have been reduced to about twenty-six gage or thinner. And in general, with all kinds or grades of iron or steel, there is more or less inseparable adhesion of the sheets, proportioned to the gage to which they have been reduced, with a resulting loss or wastage in the manufacture thereof.

The separability of the sheets of the pack is probably due to the oxidation of their

surfaces resulting from the exposure to air when separated while hot after each rolling, and while being heated in the furnace; and it is very likely that the rolling of the thinner sheets to the thinnest gages so extends the sheets and thereby so attenuates the oxidation thereon as to render the same inefficient to prevent a sticking or welding together of the sheets.

A very convenient, and therefore a preferred manner of overcoming the difficulty thus set forth in general terms, is to dip or immerse the pack of sheets, which have been rolled to a thinner gage and folded and separated, in a saturated solution of ferrous sulfate or protosulfate of iron; and, when the dipping is done immediately after the sheets have come from the rolls and are yet at a dark red heat, they should be gradually inserted in the solution so that the same will cool the sheets rather than that the sheets shall unduly heat the solution.

The solution forms a thin film on the sheets, and, when the water thereof evaporates, there is left a coating of greenish white crystals of protosulfate of iron on the sheets, which substance is composed of the ferrous sulfate and such water as is combined to form the crystals; after which the sheets are again heated to a bright red for rolling to the thinnest gages, in which process the sulfuric acid is driven off from the film or coating substance, thus leaving a film or coating of red oxid of iron on both surfaces of each sheet, which serves to prevent the sheets from welding or sticking together by the final rolling; after which the sheets may be trimmed and separated in the usual manner.

It is not intended to limit the scope of the present invention to the use of a solution of ferrous sulfate for coating the thinner sheets with a substance which will leave iron oxid thereon, for it is evident that the same or an equivalent result can be obtained by the use of a solution, as for instance, of protochlorid or perchlorid of iron, from the crystal coating of which the heat will expel the hydrochloric acid and leave an iron oxid residuum.

Furthermore, it is not essential for the purpose of the present invention that a coating substance shall be supplied or applied on the sheets which will form an iron oxid, for it is evident that a suitable coating of

any substance may be applied to the sheets which will form a metallic oxid thereon when heated, as, for instance, sulfate or chlorid of zinc, or sulfate or chlorid of manganese. It is preferable, however, that the resulting oxid shall be readily dissolvable in sulfuric acid or hydrochloric acid in the pickling process which usually succeeds the rolling of the sheets. And finally, it is not essential for the general purpose of the present invention that the oxid-forming coating substance shall be applied to the sheets in the form of a solution, for it is evident that the same may be spread or sifted on the sheets in a powdered form, as, for instance, in the form of crystallized and powdered ferrous sulfate.

I claim:

1. In hot rolling a pack of metal sheets, the process which consists in coating the sheets with a metallic oxid forming substance.

2. In hot rolling a pack of metal sheets, the process which consists in coating the sheets with a ferric oxid forming substance.

3. In hot rolling a pack of metal sheets, the process which consists in coating the sheets with a metallic salt to form a metallic oxid thereon.

4. In hot rolling a pack of metal sheets, the process which consists in coating the sheets with a ferrous salt to form an iron oxid thereon.

5. In hot rolling a pack of metal sheets, the process which consists in dipping the sheets in a metallic salt solution and, subsequently heating the sheets to form a coating of metallic oxid thereon.

6. In hot rolling a pack of metal sheets, the process which consists in dipping the sheets in a ferrous salt solution and subsequently heating the sheets to form a coating of iron oxid thereon.

7. In hot rolling a pack of metal sheets, the process which consists in dipping the sheets in a solution of ferrous sulfate, and subsequently heating the sheets to form a coating of iron oxid thereon.

8. In hot rolling a pack of metal sheets, the process which consists in dipping the sheets in a saturated solution of ferrous sulfate, and subsequently heating the sheets to form a coating of iron oxid thereon.

ARTHUR J. MASKREY.

Witnesses:

RUTH A. MILLER,  
RAY F. KOHL.