(No Model.)

P. RICHARDS.

COLD ROLLING SHEET METAL.

No. 399,562. Patented Mar. 12, 1889.

Fig. 1.

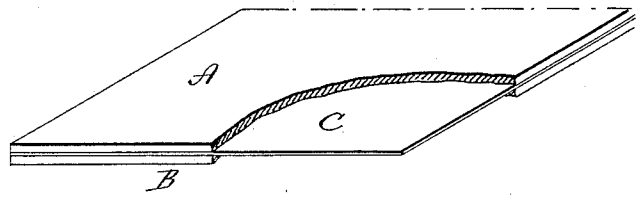
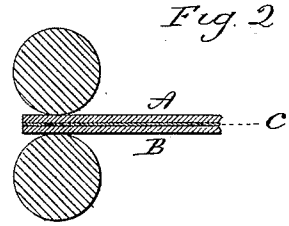


Fig. 2.



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UNITED STATES PATENT OFFICE.

PHILIP RICHARDS, OF SEYMOUR, CONNECTICUT.

COLD-ROLLING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 399,562, dated March 12, 1889.

Application filed January 25, 1889. Serial No. 297,580. (No model.)

To all whom it may concern:

Be it known that I, PHILIP RICHARDS, of Seymour, in the county of New Haven and State of Connecticut, have invented a new Improvement in Cold-Rolling Sheet Metal; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a perspective view of the two plates, a portion broken away, showing the sheet to be rolled as laid between them; Fig. 2, the plates and sheets as passing between a pair of reducing-rolls.

This invention relates to an improvement in cold-rolling sheet metal, such as it is desired to give a finely-planished surface—such as copper—and which must be given to the sheet cold.

In rolling sheet-copper the now more generally accepted method of rolling, where a planished surface is required, is to roll two sheets at one operation, one lying upon the other, the surface between the two sheets becoming planished under the operation of rolling. This is particularly adapted to sheets of copper which are tinned upon one side only. If sheets be tinned upon both sides the tin surface comes in contact with the rolls, and the effect of the tin is to deaden the rolls, so that a planished surface cannot be produced upon the side which comes in actual contact with the rolls. In this method of rolling, while the planished surface upon one side is attained, the sheets will not come from the rolls perfectly flat and smooth, but, on the contrary, will wrinkle more or less. The thinner the sheet the more wrinkling there will be as it comes from the rolls. Again, in rolling sheet-copper for the finer numbers, the strain upon the copper is very great, and the sheets frequently break, and also require frequent annealing because of the direct action of the rolls upon the copper.

The object of my invention is to produce the sheet-copper with highly-planished surfaces, whether one or both sides be tinned, or whether neither side be tinned, avoid annealing, and deliver the copper perfectly flat from the rolling operation; and it consists in placing the sheet to be tinned between two highly-planished copper plates, and then passing the plates with the sheet between them through the rolls, under great pressure, which pressure reduces the sheet between the plates to the desired extent and causes the sheet to partake of the highly-planished character of the surfaces of the copper plates.

I first prepare two plates of copper—A B representing these two plates—of a size at least as large as the sheet of copper which is to be operated upon. The surfaces of these copper plates are highly planished, and between these planished surfaces the sheet C to be operated upon is placed. Then the plates with the sheet between them are passed between the rollers, as indicated in Fig. 2, and as if they together constituted but a single plate of copper. The pressure of the rolls having been first properly adjusted, the pressure of the rolls reduces to some extent the plates A B, but to at least a proportionate extent reduces the sheet between the two plates. The action of this operation is to give to the surfaces of the copper sheet a planished surface corresponding to the planished surfaces of the plates A B, and as the plates A B are sufficiently stiff to retain their plane shape the sheet of copper between them comes from the roll perfectly flat and without wrinkle. If it be necessary for the reduction of the sheet, the sheet and plates may be passed several times between the rolls.

As the action of the rolls does not come directly upon the sheet between the plates A B, the usual hardening effect of the rolls upon the copper is avoided, and the several operations may be performed without annealing the sheet.

The plates A B may be employed until they have been so far reduced in thickness as to lose the requisite stiffness and have a tendency to wrinkle, when they in their turn may be reduced to sheets and new plates employed.

If the copper be tinned, the result of the planishing operation is the same, whether it be upon one or both sides, and in copper without tinning the natural color of the copper is better preserved than when the rolling or

planishing is produced with the rolls acting directly upon the copper.

Under this operation of rolling the sheet may be run extremely thin without tendency to tear or break the sheet, which frequently attends the rolling operation when made directly by rolls.

I claim—

The herein-described improvement in cold-rolling sheet metal, which consists in placing the sheet to be operated upon between two planished copper plates, and then passing the said two plates with the sheet between them between the rolls under pressure, substantially as described.

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Witnesses:
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