

(No Model.)

W. H. BROWN.

MANUFACTURE OF TINNED STEEL PLATES.

No. 367,594.

Patented Aug. 2, 1887.

Fig. 1.

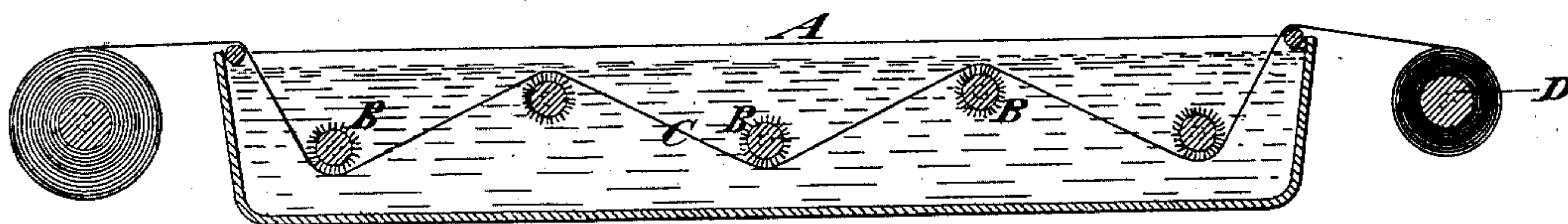
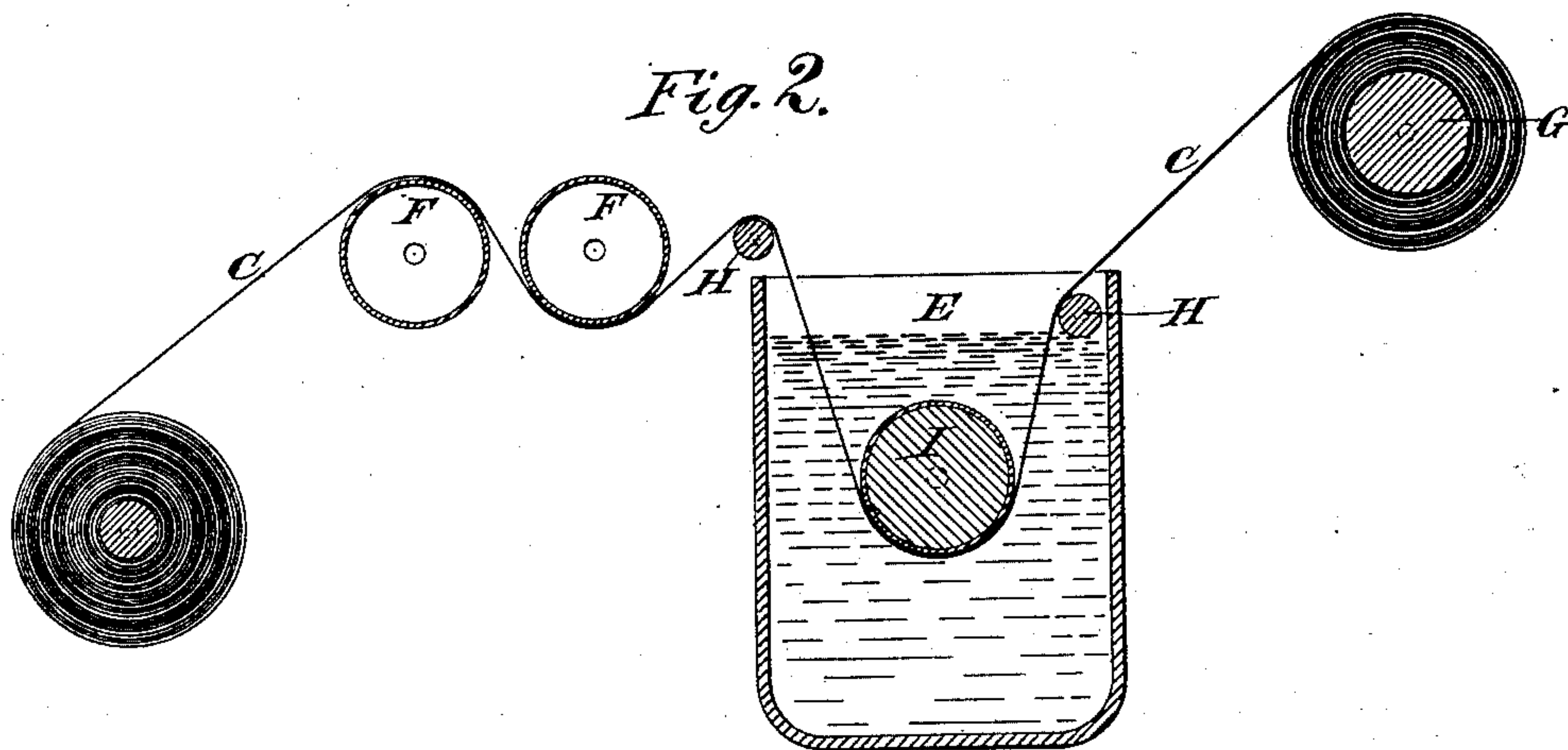


Fig. 2.



Witnesses.

Emil Herter.
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Inventor.
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UNITED STATES PATENT OFFICE.

WILLIAM HENRY BROWN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO
ROBERT O. BABBITT, OF SAME PLACE.

MANUFACTURE OF TINNED-STEEL PLATES.

SPECIFICATION forming part of Letters Patent No. 367,594, dated August 2, 1887.

Application filed December 11, 1886. Serial No. 221,334. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY BROWN, of Jersey City, in the county of Hudson and State of New Jersey, have invented a new and
5 useful Improvement in the Manufacture of Tin Plates, of which the following is a specification, reference being had to the accompanying drawings.

This invention embraces not only a new process of manufacturing tinned-steel plates, but the product of said process, such product consisting in a long sheet of tin-plated steel, in which the tin and the steel are condensed and consolidated together and hardened with a
15 highly-polished surface by pressure, such plate being distinguishable from all other tin-plate by its hardness and polish.

The process consists in producing a sheet of steel of any continuous length and of desirable width by first rolling the metal hot and afterward rolling it cold until a proper thickness and a perfectly smooth surface is obtained, then scouring the surface of the sheet, afterward passing the sheet through a bath of molten
25 tin to receive its coating of tin, and finally subjecting the tinned sheet to a rolling operation under a heavy pressure between highly-polished rolls, by which the tin and the steel are condensed and consolidated together and the surfaces are hardened and polished.

In carrying out my invention the rolling machinery employed is or may be such as is commonly used in rolling metals, and, therefore, being so well known, is not illustrated by the accompanying drawings, in which I have
35 thought it only necessary to represent merely diagrams of the machinery and apparatus for scouring the sheets of steel and for turning them.

Figure 1 represents a longitudinal vertical section of the principal parts of the scouring-machine, and Fig. 2 a longitudinal vertical section of the tinning-bath and its appurtenances.

I will now proceed to describe in detail my
45 process of manufacture.

I take a billet of homogeneous steel of suitable size, and by successive passages of it in a hot state through a rolling-mill reduce it to a long continuous sheet or plate, which may be,
50 say, fifty feet, (more or less,) in length, fourteen

inches, (or more or less,) in width, and of any thin gage. I then thoroughly clean this plate or sheet of all its scale, in the way commonly practiced for cleaning metal of scale, and subject it to repeated rolling operations in a cold
55 state between highly-polished rolls until its thickness is reduced nearly to the thickness for finishing, annealing the said sheet or plate between these successive cold-rolling operations, after which I cleanse the sheet or plate in the
60 most thorough manner by acids and scouring either in the usual way by hand or by a series of rotary scouring and polishing wheels or rollers submerged in water in a tank, while the metal is drawn over, under, or between them
65 and taken up on a reel, as illustrated in Fig. 1, in which A designates the tank, B designates the polishing wheels or rollers, C designates the sheet of metal, and D the reel. After having been thus thoroughly scoured or
70 polished the cold-rolled sheet of steel is prepared for tinning by applying a coating of acid, then thoroughly dried, and afterward passed through a bath of molten tin.

The method which I prefer of passing the
75 metal through the bath is illustrated in Fig. 2, wherein E designates the bath, which may be heated in any suitable manner to keep the tin in a melted state. F F designate steam-heated rollers, over which the metal C passes on its way to the bath for the purpose of drying it. H H designate rolls over which the metal is conducted to and from the bath, in which it runs under a roll, I, which is submerged in the molten metal in the bath. G designates a
85 reel, on which the metal coming out from the bath is taken up after having been cooled sufficiently to solidify the tin.

The roll I may be coated with some protecting substance or compound—such as a compound of asbestos—with plaster-of-paris or other binding material. The tin bath should be as narrow as the metal tinning will allow, and a stratum of tallow should be kept floating on the surface of the melted tin to protect it from
95 oxidation. The passing of the metal under the roll I in the tin bath produces a flexure of the metal, and the well-known affinity of tin for steel gives a perfect coating. After the so-tinned sheet has become cool it is then sub- 100

jected to a rolling under a heavy pressure between highly-polished rollers as often as may be desirable until the tin has been so compressed and condensed that a very highly polished surface is obtained.

5 The tin will be found to be so hardened upon and incorporated with the steel as to produce a tin-plate which is superior in most respects to any tin-plate heretofore produced, and
10 which, owing to the homogeneous molecular structure of steel, differs very essentially from any tinned-iron plate, because the fibrous structure of the iron would render it impossible to subject it after tinning to such a heavy rolling as I employ without its working its fibers
15 into or through the tin in such manner as to leave the tin very thin in some places or break through it entirely. This kind of tin-plate is especially well adapted for electroplating.

20 For some purposes the steel would only be tinned on one side, the other side being pre-

vented from receiving the tin in the bath by having applied to it a protecting coating.

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

1. The process of manufacturing hardened
25 tinned-steel plate, consisting in making the steel into sheets of any length, width, and thickness by first rolling it in a hot state, then cleaning it, and afterward rolling it in a cold
30 state, subsequently passing the so-rolled sheets through a bath of molten tin, and finally rolling them to condense and harden the tin and incorporate it with the steel, substantially as
35 herein described.

2. The cold-rolled tinned-steel plate herein described.

WM. HENRY BROWN.

Witnesses:

FREDK. HAYNES,
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