

# UNITED STATES PATENT OFFICE.

MOSHER A. SUTHERLAND, OF NEW YORK, N. Y.

## IMPROVEMENT IN UTILIZING WASTE TIN-SCRAP.

Specification forming part of Letters Patent No. **205,770**, dated July 9, 1878; application filed July 5, 1877.

*To all whom it may concern:*

Be it known that I, MOSHER A. SUTHERLAND, of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Utilizing Waste Tin-Plate Scraps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same.

The nature of my invention consists in heating the tin scraps in a reverberatory furnace prepared in the usual way for puddling iron until they are heated to a welding-heat, and then working them with the puddling-iron into balls preparatory to forming them into blooms.

The waste tin-plate scraps operated on are diminished in bulk by any suitable press, as those for compressing hay and cotton. By this means about forty cubic feet of the scraps are reduced to two cubic feet, or about one-twentieth of their original bulk. The weight of the bundle is about one hundred pounds. Five of these bales are placed in a reverberatory furnace suitable for puddling iron, and heated to a white or welding heat in the manner practiced for puddling cast-iron and forming it into blooms of wrought-iron. The only difference in the structure of the furnace required is a receptacle or chamber of the character described in Letters Patent granted to me in 1877, numbered 186,178, placed between the neck of the furnace and the chimney or stack, for the purpose of condensing and collecting the tin or tin alloys which pass over with the hot air and gases; or this may be dispensed with when the hot air and gases traverse the flues of boilers, or underneath them, for the purpose of generating steam. In such cases the tin is collected in the flues or in the chambers below the boilers, from which, at suitable intervals of time, it may be removed and reduced in crucibles, as in such cases practiced, to metallic ingots.

When the bundles of scraps have attained a welding or white heat, the mass is worked with the puddling-iron similarly to the operation of working iron after it has come to nature in refining cast to wrought iron. By such working the scraps are welded together, and, when submitted to the squeezers or the rolls

commonly employed in iron-mills, the mass becomes a homogeneous bloom, bar, or sheet of wrought-iron of a superior quality, partaking of the quality of softness of the metal of which the scraps formed a part. The quality of the iron obtained in this manner is suitable for being drawn into wire, rolled into thin sheets, or for the manufacture of a fine quality of cast or crucible steel.

When it is desirable, cast-iron in any proportion may be mixed with the scraps in the furnace. When this is done the "pigs" or other forms of carbonized iron are placed in the furnace and melted, and, after being puddled until at the stage technically termed "coming to nature," the tin scraps are added, and the whole worked together and subsequently treated by the squeezers and rollers as described above for working the scraps alone and without any addition to them.

The tin scraps may be added before the pigs come to nature; but I find the best results follow when not added until about that time. If the tin scraps be added to the pigs when the operator commences to work the latter with the puddling-iron, the tin scraps, by the time the pigs are brought to nature, will have been subjected to the puddling operation longer than is desirable. In other words, the metal in the scraps will be puddled much more than the metal of the pigs, since the former is brought to nature before it is tinned. But if I first puddle the pigs until they come to nature, and then add the tin-scrap, the two metals will receive about the same puddling, and the result will be more in accordance with what is desired. The quality of iron resulting in such cases depends upon that of the cast-iron and the proportion of its mixture.

Instead of bundling the scraps, as described, they may be cut into fine pieces and thrown loosely into the furnace.

I am aware that tin scraps have been hammered by steam-hammers into iron-molds, so as to form heavy ingots suitable for being placed in crucibles, and that such, aided by the addition of carbon and the other suitable fluxes, have been melted, cast into ingots, and forged into steel bars; also, that such ingots of scraps have been dipped into melted cast-iron for the purpose of filling the interstices

of the ingots, and that such ingots have been melted in cupola-furnaces for converting them into pig or cast iron. These I do not claim.

I am also aware that for the purpose of making steel tin scraps and cast-iron have been puddled together in a puddling-furnace, the tin scraps being added as soon as the cast-iron begins to melt; but the latter is not my invention, and therefore I lay no claim to it.

What I claim, and desire to secure by Letters Patent of the United States, is—

The within process of utilizing tin scraps, which consists in heating them to a welding-

heat in a reverberatory furnace prepared in the usual way for puddling iron, and working them with the puddling-iron into balls preparatory to forming them into blooms, substantially as set forth.

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

MOSHER A. SUTHERLAND.

Witnesses:

JOSEPH MEEKS,  
H. B. DENISON.