

UNITED STATES PATENT OFFICE.

FREDERICK G. MORTON, OF BERMONDSEY, GREAT BRITAIN.

IMPROVEMENT IN TREATING TINNERS' CLIPPINGS.

Specification forming part of Letters Patent No. 136,532, dated March 4, 1873.

To all whom it may concern:

Be it known that I, FREDERICK GEORGE MORTON, of Bermondsey, in the county of Surrey, Kingdom of Great Britain and Ireland, engineer, have invented Improvements in the Treatment and Utilization of Tin-Plate Waste Scraps or Clippings, of which the following is a specification:

This invention relates to the treatment of tin-plate waste scraps or clippings in such manner as to separate the tin from the iron and to enable the products—tin and iron—to be utilized with greater advantage than hitherto.

In carrying out my invention I first open the tin-plate scraps or clippings and cut them into suitable lengths, and free them from dirt and other impurities by sorting on a lattice or in a revolving drum. The scraps or clippings, when sorted, are placed (say in quantities of about one hundred-weight) in a suitably-perforated box or receptacle of any convenient shape, made of wood to withstand the action of the acid, and provided with axles or trunnions, and with a door or cover for the purposes of filling and emptying. This box or receptacle having been charged with scraps or clippings is then lowered into a suitable vessel containing, say, about twenty hundred-weight of muriatic acid (otherwise called hydrochloric acid) of the ordinary full commercial strength—say about 32° Twaddel—and at a temperature of about 60° Fahrenheit, and in this acid the perforated box or receptacle, with its contents, is caused to rotate. In about half an hour by the action of the acid the tin is removed from the iron plate of the scraps and remains in solution in the acid, leaving the iron plates of the scraps in the perforated box or receptacle, which is raised, with its contents, out of the acid and allowed to drain, for the purpose of saving such acid as may be adhering to the plates. After draining I immerse the perforated box or receptacle, with its contents, in water, (either hot or cold,) in order to remove all acid from the surface of the plates, and then discharge the plates from the perforated box or receptacle into lime or some other suitable material for absorbing all the moisture from the plates. I prefer to use lime as the absorbent because it is beneficial in fluxing the iron and destroying the sulphur. In order effectually to remove lead or other impurities in cases in which they are

present, I place the iron plates in a reverberatory furnace, wherein I submit them to a temperature of about 700° to 800° Fahrenheit, or a dull-red heat, after the foregoing process.

The iron product obtained as above described may be made into bales, pressed, and utilized in the ordinary manner.

The muriate of tin composed of the muriatic acid containing in solution the tin which it has removed from the iron plates, as above described, is now allowed to stand so as to allow of the settlement of any iron and impurities that may have been removed by the acid from the plates and which may have remained in the solution. About twelve hours will generally suffice for this operation at the ordinary temperature of 60° Fahrenheit. A siphon is then introduced into the clear solution above the level for iron and other deposit, and the pure muriate of tin is thereby drawn off into suitable receivers. At this stage the muriate of tin will be of a strength of about 60° Twaddel, (this strength varying with the temperature according to the season of the year,) and will contain only about half the quantity of tin it is capable of saturating; and in order to carry on the process with advantage commercially for the manufacture of paper-foil it is desirable that the acid should be made to saturate as much tin as is possible without forming crystals. For this purpose, in order to enable it to saturate a further quantity of tin than it contains at this stage, I place the muriate of tin in a suitable vessel, made, by preference, of copper or earthenware, and add additional tin in a granulated form, and I heat the mixture by a furnace or by steam (not free steam) or otherwise to a temperature of about 120° Fahrenheit, taking especial care not to exceed this temperature. This temperature having been kept up for about five or six hours, (if in an ordinary atmospheric temperature of about 60° Fahrenheit,) I allow the compound to settle, its strength being about 120° Twaddel. It now resembles the muriate of tin ordinarily prepared from ingots of tin for the manufacture of paper-foil, and may be similarly utilized for that purpose, the process being as follows: The muriate of tin is diluted with water, and plates of zinc are introduced into the solution. The free acid remaining in the diluted muriate of tin dissolves the zinc

and precipitates the tin in the proportion of about thirty-two parts by weight of zinc dissolved by every fifty-four parts by weight of tin thrown up. The tin thus precipitated is collected and washed, and thereby the acid and the zinc are neutralized. The tin that has been precipitated and washed is then mixed with animal size, and is spread on paper by means of brushes, and the paper thus coated with tin and called paper-foil is then passed between heated friction-rolls, whereby the tin surface is calendered or finished so as to give it a polish or brilliant appearance, ready for the market.

The muriate of tin prepared as above described may be used for other purposes than paper-foil.

I am aware it has before been proposed to use muriatic or hydrochloric acid with and without other chemicals in the treatment of tin-plate scraps or clippings, and I do not claim this; but in all previously-proposed processes, so far as I am aware, the muriatic or hydrochloric acid has been either too much diluted to be effective, or has been mixed with other chemicals which would injure the iron plates. By using the acid at or about the full commercial strength of 32° Twaddell, as de-

scribed, I effectually remove the tin, when pure, from the iron without injury to the iron. Moreover, by treating the scraps in a furnace after subjecting them to the action of the muriatic or hydrochloric acid, I effectually cleanse the surface of the iron even when lead and other impurities are present, as is often the case; and I do this without injury to the iron itself.

I claim as my invention—

1. The process of treating tin-plate waste scraps or clippings by the employment, as herein explained, of muriatic or hydrochloric acid of the strength specified, for the separation of the tin from the iron and the utilization of the tin product, substantially as described.

2. The process of treating tin-plate waste scraps or clippings containing lead or other impurities by dissolving the tin in muriatic or hydrochloric acid and subsequently heating the plates in a suitable furnace so as to effectually remove the lead or other impurities from the iron, substantially as described.

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