To all whom it may concern:

Be it known that I, Philip W. Davis, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Methods of Refining Tin; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a method of refining tin.

In smelting tin ore or concentrates where iron and silica are present there is produced a certain amount of slag which contains a considerable quantity of tin. The practice has been to remelt this slag in the smelting furnace in order to extract as much of the residuum of tin as economically possible, and with each smelting process a certain amount of tin is recovered, also a certain amount of tin alloyed with iron, which must itself be remelted, but which then gives rise to an additional amount of slag, and the repeated smelting of the slag and alloy is expensive and inefficient in separating tin from the iron. Tin iron alloy is also produced in the process of tinning iron and steel by dipping, the bath gradually taking up iron from the things being dipped, and forming alloy therewith, so that after a certain amount of use the tin is no longer fit for the dipping bath. This tin bath alloy must be refined or in some way treated in order to be made commercially valuable again.

The object of the present invention is to produce a method of refining tin, and the invention consists in the method hereinafter described and particularly defined in the claims.

Tin containing iron is introduced into a furnace and melted. Then oxygen or air or a mixture of the two is introduced into the molten bath, preferably near the bottom of the bath, so that the bath is agitated by the passage of oxygen or air through it. The oxygen or air oxidizes the iron. After the process has been carried on the proper length of time, all but a small quantity of the iron will be oxidized, and thereby removed from the bath, while the refined tin will remain. The process should be carried on at a temperature sufficient to keep the bath molten. The converter or furnace must be lined with a basic lining.

This process is available for the refining of any tin which contains so much iron as to be unmarketable or unfit for commercial use.

The gist of the invention resides in treating a molten bath of tin-iron alloy with oxygen or air or mixtures of the two by passing the latter through the molten bath, whereby the iron is oxidized and removed, and the tin is refined.

Having thus described the invention, what is claimed is:

1. The method of refining tin-iron mixtures or alloys which consists in melting the tin-iron mixture or alloy and passing oxygen through such molten mass.

2. The method of refining tin-iron mixtures or alloys which consists in melting the tin-iron mixture or alloy and passing air through such molten mass.

3. The method of refining tin-iron mixtures or alloys which consists in melting the tin-iron mixture or alloy and passing an oxidizing gaseous mixture or gaseous compound of oxygen through such molten mass.

4. The method of refining tin-iron mixtures or alloys which consists in melting the tin-iron mixture or alloy and passing an oxidizing gaseous mixture or gaseous compound of oxygen through such molten mass.

Philip W. Davis.