

UNITED STATES PATENT OFFICE.

GEORGE LLOYD WIGG, MATTHEW STEELE, AND WALTER JOHN WIGG, OF
RUNCORN, COUNTY OF CHESTER, ENGLAND.

OBTAINING FERRIC OXIDE FROM THE WASTE LIQUORS OF COPPER-WORKS.

SPECIFICATION forming part of Letters Patent No. 370,511, dated September 27, 1887.

Application filed May 15, 1886. Serial No. 202,312. (No specimens.) Patented in England October 17, 1884, No. 13,722; in France July 22, 1885, No. 170,251, and in Belgium July 23, 1885, No. 69,684.

To all whom it may concern:

Be it known that we, GEORGE LLOYD WIGG, MATTHEW STEELE, and WALTER JOHN WIGG, subjects of the Queen of Great Britain, residing at Runcorn, in the county of Chester, England, have invented a certain new and useful Improvement in Treating Certain Residual Liquors to obtain Oxide of Iron and Sulphate of Lime or Plaster-of-Paris, (for which we have obtained Letters Patent of Great Britain, No. 13,722, October 17, 1884; France, No. 170,251, July 22, 1885, and Belgium, No. 69,684, July 23, 1885, and nowhere else;) and we hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of the invention is to treat the residual liquor obtained in the precipitation of copper by the wet process and the residual chloride-of-calcium liquor obtained in the manufacture of chlorine by the Weldon process in such a manner as to obtain sulphate of lime—as plaster-of-paris or pearl-hardening—practically pure and in fit condition for use by paper-makers, and also oxide of iron ready for use as a pigment; and in order that our said invention may be fully understood we shall now proceed to describe the system, mode, or manner in or under which the same may be carried into practical effect.

The composition of the waste copper-liquors it is proposed to treat may be generally stated as containing about sixteen (16) per cent. of sulphate of soda, ten (10) per cent. of chloride of iron, three (3) per cent. of chloride of sodium, traces of other salts, and seventy-three (73) per cent. of water, though said proportions will necessarily vary, and must not be taken as matters of limitation.

In the first place, after determining from the strengths of the liquors their fixed proportions, the residual copper-liquors (which may be neutralized or not, as circumstances demand) and the residual chloride-of-calcium liquors are brought together in large vessels and thoroughly agitated by manual or mechanical power until the whole mass becomes homo-

geneous. During the time and immediately succeeding the time occupied in this operation the free sulphates contained in the residual copper-liquors combine with the calcium contained in the residual chloride-of-calcium liquors, forming a white bulky precipitate, which we now allow to settle. When the separation is complete, we arrange the clear liquor and the white precipitate thus obtained in different receptacles, proceeding with the two distinct branches of our invention at one and the same time, in the following manner:

To obtain pearl-hardening, plaster-of-paris, or sulphate of lime, the white precipitate is first treated with dilute hydrochloric acid for the purpose of clearing it of any iron. It is then passed through filter-presses, or other mechanical appliances, for the purpose of washing out all impurities and pressing to such a consistency as the requirements of the trade demand. Treating this same precipitate with gentle heat, we obtain a parian-plaster, or plaster-of-paris, of the first quality.

To obtain oxide of iron, we treat the clear liquor already referred to, or from residual copper-liquors direct, with an equivalent of milk of lime for the purpose of precipitating the iron as an oxide. The dark-green precipitate which readily forms is then further oxidized by injection of air, chlorine, or other oxidizing agent, washed through filter-presses or other mechanical appliances, and furnace-d to obtain the various shades of color.

We claim—

1. The method herein described of obtaining oxide of iron from the residual liquors obtained in the precipitation of copper by the wet process and the residual chloride-of-calcium liquor obtained in the manufacture of chlorine by the Weldon process, which consists in first mixing and agitating the said liquors; secondly, separating the precipitate and supernatant liquor; third, treating the liquor with an equivalent of lime, and, finally, oxidizing and furnace-d the precipitate last obtained, substantially as and for the purposes specified.

2. The method herein described of obtain-

ing sulphate of lime, or plaster-of-paris, from
the residual liquors obtained in the precipita-
tion of copper by the wet process and the re-
sidual chloride-of-calcium liquor obtained in
5 the manufacture of chlorine by the Weldon
process, (as a by-product in treating said
liquors to obtain oxide of iron,) which con-
sists in first mixing and agitating the said
liquors; secondly, separating the precipitate
10 and supernatant liquor; third, treating said
precipitate with dilute hydrochloric acid, and,
finally, washing, pressing, and gently heating

the precipitate to remove impurities and pre-
pare it for the market, substantially as and for
the purposes specified.

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Witnesses:

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