

UNITED STATES PATENT OFFICE.

GEORGE O. SEWARD AND FRANZ VON KÜGELGEN, OF HOLCOMBS ROCK, VIRGINIA.

PRODUCTION OF MAGNESIUM.

No. 868,226.

Specification of Letters Patent.

Patented Oct. 15, 1907.

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To all whom it may concern:

Be it known that we, GEORGE O. SEWARD, a citizen of the United States, and FRANZ VON KÜGELGEN, a subject of the German Emperor, both residing at Holcombs Rock, Bedford county, Virginia, have jointly invented certain new and useful Improvements in the Production of Magnesium, of which the following is a specification.

Magnesium is at present produced by the electrolysis of a fused mixture of magnesium chlorid ($MgCl_2$) and an alkali chlorid, as KCl. The aim in this process is to have the specific gravity of the electrolyte so low that the separated magnesium will sink to the bottom readily. There is, however, no suitable flux which can be used and which will so lower the specific gravity of the electrolyte that the result desired may be obtained to any satisfactory extent,—this on account of the lightness of the metal magnesium.

We adopt the opposite course, which is to add such fluxes that the specific gravity of the electrolyte is so much greater than that of magnesium that the separated metal will float readily on the electrolyte and is collected at the top instead of at the bottom of same.

We have discovered that the fluorids of metals more electro-positive than magnesium, are peculiarly adapted to increase the specific gravity of a magnesium chlorid electrolyte.

We prefer to use the fluorids of the earth alkali metals, as we get the desired heavy electrolyte by addition of a small percentage of these fluorids. The process may be carried out as follows:—To a molten mixture of $MgCl_2$ and an alkali chlorid, about 6 per cent. fluorspar is added. This dissolves in the electrolyte and makes the same so heavy that the magnesium, separated by the electrolysis of the molten mixture, rises readily to the top. Barium-fluorid may be substituted for fluorspar if desired.

We are aware that fluorspar has been used as a flux, but never for the purpose of making the electrolyte heavier than the separated metal, and never in such quantities that this result would be obtained.

It is preferable to use such an electrolytic vessel that the magnesium is separated at the top of the electrolyte.

Though we have described with great particularity of detail certain specific processes embodying the invention, yet it is not to be understood that the invention is limited to the specific processes described. Various modifications thereof may be made by those skilled in the art without departure from the invention.

What we claim is:—

1. In producing magnesium electrolytically, the process which consists in the addition to the electrolyte of so much of a fluorid of a metal more electro-positive than magnesium that the electrolyte becomes heavier than the separated magnesium.

2. In the electrolytic production of magnesium, the process which consists in the addition to the electrolyte of so much of an alkali-earth-fluorid that the electrolyte becomes heavier than the separated magnesium.

3. The process of producing magnesium, which consists in forming a molten mixture of magnesium chlorid and alkali chlorid, and so much of a fluorid of a metal more electro-positive than magnesium that the electrolyte becomes heavier than magnesium, and separating the magnesium by electrolysis.

4. The process of producing magnesium, which consists in forming a molten mixture of magnesium chlorid, an alkali chlorid, and about 6 per cent. of fluorspar, whereby the electrolyte becomes heavier than magnesium, and separating the magnesium by electrolysis.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

GEORGE O. SEWARD.

FRANZ VON KÜGELGEN.

Witnesses:

J. H. WEBB,

C. OFFERHAUS.