

UNITED STATES PATENT OFFICE.

KARL JOSEF BAYER, OF WOBURN, MASSACHUSETTS.

PROCESS OF PRODUCING POTASSIUM CHLORATE.

SPECIFICATION forming part of Letters Patent No. 543,326, dated July 23, 1895.

Application filed April 3, 1895. Serial No. 544,255. (No specimens.)

To all whom it may concern:

Be it known that I, KARL JOSEF BAYER, a subject of the Emperor of Austria-Hungary, residing in Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Processes for Producing Potassium Chlorate, of which the following is a specification.

It is well known that in the manufacture of potassium chlorate in the usual manner only about one-fifth of the chlorin gas generated is utilized, while about four-fifths of said gas goes to waste in the form of calcium chlorid.

The object of this invention is not so much to increase the yield of potassium chlorate, but mainly to utilize the greater part of the wasted four-fifths of the generated chlorin and regain it in a useful and valuable combination. For this purpose the process of making potassium chlorate is not carried out with lime, as heretofore, but with zinc oxid, which can be obtained cheaply as zinc-white from zinc-furnaces, or directly by burning metallic zinc, or in any other suitable manner. This zinc oxid, however, has to be as free as possible from ferric, manganese, arsenic, and antimony compounds, so as to avoid loss.

In carrying out my improved process the best result is obtained by first mixing the zinc oxid with water and then adding directly the equivalent quantity of potassium chlorid up to the saturation-point of the mixture—that is to say, for every three equivalents of zinc oxid (ZnO) one equivalent of potassium chlorid (KCl) is used. The chlorin gas is then conducted into this mixture until the zinc oxid is dissolved. Before the chlorin is introduced into the solution it has to be heated to a temperature of from 95° to 98° centigrade, as only in this manner the precipitation of a basic zinc chlorid (oxychlorid) is avoided; while on the other hand, by the heating of the solution, it is possible to incorporate a larger quantity of zinc oxid into the basic solution. Care must be taken that neither a too small nor too large a quantity of water with which the zinc oxid is mixed is used, as in one case too small a quantity of zinc oxid would be dissolved, while in the other case a badly soluble oxychlorid would be formed, which has to be prevented.

By introducing potassium chlorid directly into the solution in the manner described, before treating it with chlorin, zinc chlorate and potassium chlorate are formed without the intermediate formation of a hypochlorite salt, as described in my pending application for a process of producing potassium chlorate, Serial No. 524,285, filed September 27, 1894. The clear solutions which are obtained are first tested by adding water, so as to see whether a precipitate is formed—that is to say, whether they are of basic nature and contain zinc oxid. In case the solution is not basic, a small quantity of zinc oxid is added and the solution then evaporated to 4° Baumé. After cooling the solution and crystallizing the potassium chlorate from the same, the latter can be readily purified by redissolving and recrystallizing, while the liquors are again evaporated to 60° Baumé and cooled down to 0° centigrade, so as to part with another portion of the potassium chlorate in the same. The remaining solution of zinc chlorid is next evaporated either directly to the solidification-point—namely from 70° to 75° Baumé—or mixed with a quantity of hydrochloric acid, (six equivalents HCl to one equivalent $KClO_3$) when the small quantity of potassium chlorate still contained in the solution should be objectionable. The solution is then subjected to slow heat, boiled, and finally evaporated to the solidification-point for being packed and shipped. The chlorin which is obtained by the last operation can be used to advantage in any approved manner.

The zinc chlorid produced by my improved process is of superior whiteness and purity, and can be applied for use in the industrial arts.

The advantage of my improved process, as compared to the process described in the pending application before referred to, is that by the direct introduction of potassium chlorid into the mixture of zinc oxid and water and the subsequent treatment with chlorin gas, besides zinc chlorid, potassium chlorate is obtained without the intermediate formation of hypochlorite of zinc.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The process herein described of producing potassium chlorate, which consists in mixing zinc oxid and water with potassium chlorid, and subjecting the solution to the
5 action of chlorin so as to produce directly potassium chlorate and zinc chlorid, substantially as set forth.

2. The process herein described of producing potassium chlorate, which consists in
10 mixing zinc oxid and water with potassium chlorid, heating the solution to near the boiling temperature and then subjecting the heated solution to the action of chlorin so as to produce potassium chlorate and zinc
15 chlorid, substantially as set forth.

3. The process herein described of pro-

ducing potassium chlorate, which consists in mixing zinc oxid and water with potassium chlorid, heating the solution to near the boiling temperature, subjecting the heated solu- 20 tion to the action of chlorin, separating the potassium chlorate from the liquor by crystallization and concentrating the zinc-chlorid in the remaining liquor, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

KARL JOSEF BAYER.

Witnesses:

HERMANN C. LAGRÈZE,
J. FREIS.