UNITED STATES PATENT OFFICE.

JOHAN GUSTAF WIBORGH AND WILHELM PALMAER, OF STOCKHOLM, SWEDEN.

PROCESS OF MANUFACTURING MANURE FROM APATITE OR SIMILAR MINERAL PHOSPHATE.

SPECIFICATION forming part of Letters Patent No. 707,886, dated August 26, 1902.

Application filed October 22, 1900. Serial No. 33,998. (No specimens.)

To all whom it may concern:

Be it known that we, JOHAN GUSTAF WIBORGH and WILHELM PALMAER, subjects of the King of Sweden and Norway, residing at Stockholm, Sweden, have invented certain new and useful Improvements in Manufacturing Manure from Apatite or Similar Mineral Phosphate, and the Product Obtained, of which the following is a specification.

The invention consists in transforming apatite or other hard soluble mineral phosphate into an easily-soluble phosphate; and the process is carried out in the following manner: The process is an electrolytic one, and we employ as the electrolyte a solution of a salt of such a composition that during the electrolysis there is disengaged at the anode an acid which forms with lime a soluble salt, while at the cathode there is formed a basic hydrate or a solution of a mixture of such salts. For this purpose we prefer to employ alkaline or ammoniac salts which contain, for instance, nitric acid, chloric acid, or perchloric acid. If the mineral phosphate is placed in a suitable manner near to the anode in an electrolyte containing a salt such as described—for instance, an alkaline salt—the phosphate is dissolved by the acid solution formed at this place; but as soon as this solution enters into that part of the electrolyte where the cathode is arranged, which part is alkaline, the phosphate of calcium dissolved is again precipitated, but in the form of a voluminous flocky mass which sinks to the bottom of the vessel, from where it may be brought up and gathered at intervals. The phosphate thus precipitated is the new phosphate in question. Dried at the temperature of the outer air or up to 100° centigrade it is a white amorphous loose powder, which holds about forty-five per cent. phosphoric acid and is easily soluble in a solution of citric acid of two per cent., but insoluble in water. After heating to redness it is not so easily soluble. The electrolyte remains very nearly unaltered. In order to prevent the phosphate precipitated to enter again into the acid liquid of the anode, where it would be dissolved, it is advantageous to separate the two electrodes in the electrolyte by a porous diaphragm, which allows the solution, but not the precipitated phosphate, to pass through. If the mineral phosphate contains impurities of quartz, feldspar, and similar minerals, a phosphate as pure and containing the same proportion of phosphoric acid is, however, obtained, as the said impurities remain undissolved at the anode; but if the mineral phosphate contains iron ore the phosphate is slighly contaminated with sesquioxid of iron.

We claim—

The process herein described of manufacturing manure from apatite or similar mineral phosphate, said process consisting in passing an electric current through an electrolytic bath having an anode and cathode and containing an electrolyte consisting of a solution of a salt disengaging at the anode an acid which forms a soluble salt with lime, while at the cathode a basic hydrate is formed, dissolving the mineral phosphate by the acid disengaged and precipitating the same in the alkaline liquid of the cathode as phosphate of calcium, but in another more soluble form, all substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHAN GUSTAF WIBORGH.
WILHELM PALMAER.

Witnesses:
FREDRIK L. ENQUIST,
A. HELJESTRAND.