

UNITED STATES PATENT OFFICE.

JOHN F. GIBBONS AND GUSTAV A. LIEBIG, OF BALTIMORE, MARYLAND.

TREATING PHOSPHATES FOR FERTILIZERS.

SPECIFICATION forming part of Letters Patent No. 252,029, dated January 10, 1882.

Application filed June 16, 1881. (No specimens.)

To all whom it may concern:

Be it known that we, JOHN F. GIBBONS and GUSTAV A. LIEBIG, of the city of Baltimore and State of Maryland, have invented a new and Improved Method of Treating Phosphates Containing Iron or Alumina and Converting them into the Superphosphates of Commerce, of which the following is a full, clear, and exact description.

It is well known that crude phosphatic guanos which contain iron or alumina, either or both, in any considerable quantities cannot be converted into commercial superphosphates by the admixture of acids. These phosphates have been subjected to various treatments—for example, by burning, roasting, or melting the ferruginous or aluminous phosphates with some one or more of the alkaline salts, by which a soluble phosphoric acid to a greater or less extent was produced; again, by burning, roasting, or melting them with some one or more of the ash elements—to wit, soda or potash—singly or in combination, with or without carbonaceous matter; and, again, by burning them with carbonaceous matter alone, as shown and described in Letters Patent of the United States granted to Gustav A. Liebig and John F. Gibbons on the 24th day of May, 1881, and numbered 241,868; but we are not aware that any attempt has ever been made to convert phosphates containing iron or alumina after being calcined by any of the above methods into the superphosphates of commerce by mixing them with acids.

The object of our present invention is to take these ferruginous or aluminous phosphates which have been calcined by any of the above methods, and by treating them with acids, preferably sulphuric acid, convert them into a manageable commercial superphosphate and make of them a merchantable and salable article, rich and dry, and comparing favorably with other superphosphates of commerce.

Our method is as follows: We take the aluminous or ferruginous phosphates, and mix with them salts of soda, potash, or magnesia. We are unable to state the exact proportions which give the best results, as they may be varied somewhat by the character of the phosphate used, but the following proportions have been found to produce good results: To one hundred parts of the phosphate add ten parts

of the salts of soda, potash, or magnesia, and when, in addition to the above salts, carbonaceous matter is used, we have found twenty-five parts of the carbonaceous compound to be a proper quantity. They are then burned or calcined together with or without the carbonaceous matter, and afterward mixed with the acid, the proportions of the acid to the calcined product being about sixty parts to the hundred. This article, when so treated, contains an increased percentage of available phosphoric acid, and is entirely free from the difficulties which exist when the same ferruginous or aluminous phosphate is treated with acid before it has undergone the calcining process. It is then pulverized as is usual with superphosphates. It may also be made into the ammoniated superphosphate of commerce by mixing with it any of the forms of nitrogen or compounds yielding ammonia, together with ash elements—such as salts of potash, soda, or magnesia—employed in the manufacture of the so-called “complete fertilizer;” but such admixture, so far as the nitrogen is concerned, must take place after calcining. The ash elements, however, being indestructible by fire, may be added before or after calcining.

Having thus described the nature of our invention, what we claim, and desire to secure by Letters Patent, is—

1. The above-described process of treating ferruginous or aluminous phosphates by first mixing the crude phosphate with salts of soda, potash, or magnesia, then burning or calcining the same together, and then adding an acid to the calcined product, substantially as described.

2. The process of treating a ferruginous or aluminous phosphate by first mixing the crude phosphate with salts of soda, potash, or magnesia and carbonaceous matter, then burning or calcining the same together, and then mixing the product with an acid, substantially as described, and for the purposes set forth.

3. A phosphatic fertilizing compound consisting of superphosphates combined with acid salts of alkalies and lime, as set forth.

JOHN F. GIBBONS.
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Attest:

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H. LAMBERT.