Specification of Mark French Anderson : treating sewage for manure.

A.D. 1869, 8th DECEMBER. N° 3550.

SPECIFICATION

OF

MARK FRENCH ANDERSON.

TREATING SEWAGE FOR MANURE.

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A.D. 1869, 8*th* DECEMBER. N° 3550.

Treating Sewage for Manure.

LETTERS PATENT to Mark French Anderson, Licentiate Royal College of Physicians, Edinburgh, Member of the Royal College of Surgeons, England, of No. 15, Priory Row, Coventry, in the County of Warwick, for the Invention of "IMPROVEMENTS IN TREATING SEWAGE AND IN THE MANUFACTURE OF MANURE THEREFROM."

Sealed the 22nd February 1870, and dated the 8th December 1869.

PROVISIONAL SPECIFICATION left by the said Mark French Anderson at the Office of the Commissioners of Patents, with his Petition, on the 8th December 1869.

I, MARK FRENCH ANDERSON, Licentiate Royal College of Physicians, Edinburgh, Member of the Royal College of Surgeons, England, of No. 15, Priory Row, Coventry, in the County of Warwick, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN TREATING SEWAGE AND IN THE MANUFACTURE OF MANURE THEREFROM," to be as follows:—

I make use of sulphate or sesqui-sulphate of alumina made by treating clay with sulphuric acid and the subsequent addition of lime, or the lime

may be applied first and the sulphate or sesqui-sulphate of alumina used afterwards. The method I have found to answer best for manufacturing the sulphate as sesqui-sulphate of alumina on a large scale is to mix the clay and acid thoroughly in the proportions of two parts by weight of clay to one part by weight of common commercial sulphuric acid, and after the mass is well mixed to place it in a warm place until the acid has combined with the alumina of the clay, which will be shown by the mass becoming perfectly dry and of a greyish color. In order to produce the defecating effects of my process I add to the sewage collected in a tank or tanks the sulphate of alumina prepared as above in the proportion of one pound of the preparation to every one hundred gallons of sewage. The mass should then be well stirred so as to dissolve the sulphate or sesqui-sulphate of alumina from the clay mixture and disperse it evenly in the sewage. I then add lime in the proportion of one pound of slaked lime to every four pounds of the sulphate of alumina preparation. The lime should be well mixed with water before its addition to the sewage so as to help its combination with the sulphate or sesqui-sulphate of alumina. On the addition of the lime to the sewage containing the dissolved sulphate or sesqui-sulphate of alumina an immediate combination takes place between the lime and the sulphuric acid of the sulphate or sesqui-sulphate of alumina, and the alumina is set free in a state of minute subdivision as an insoluble precipitate. This precipitate in its descent adheres to and carries down with it the impurities contained in the sewage. After being allowed to settle for some few hours the supernatant liquid should be run off so as to leave the precipitate undisturbed at the bottom of the tank, and a fresh quantity of sewage run into the tank and treated as before. This should be repeated five or six times when the precipitate should be removed and dried and will be found to serve as a valuable manure. I also use chalk (carbonate of lime) and the carbonates of soda, potash, and ammonia alone or together in combination as above with sulphate or sesqui-sulphate of alumina as substitutes for lime in producing the defecating effect of alumina, but recommend the preferential use of lime as being either cheaper or more speedy in its action. If used instead of lime the carbonates should be used in larger quantities than the lime, or in the proportions of two parts of the sulphate or sesqui-sulphate of alumina to one of the carbonates of lime, potash, soda, or ammonia.

Anderson's Improvements in Treating Sewage for Manure.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Mark French Anderson in the Great Seal Patent Office on the 7th June 1870.

TO ALL TO WHOM THESE PRSEENT SHALL COME, I, MARK FRENCH ANDERSON, Licentiate Royal College of Physicians, Edinburgh, Member of the Royal College of Surgeons, England, of No. 15, Priory Row, Coventry, in the County of Warwick, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Eighth day of December, in the year of our Lord One thousand eight hundred and sixty-nine, in the thirty-third year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Mark French Anderson, Her special licence that I, the said Mark French Anderson, my executors, administrators, and assigns, or such others as I, the said Mark French Anderson, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN TREATING SEWAGE AND IN THE MANUFACTURE OF MANURE THEREFROM," upon the condition (amongst others) that I, the said Mark French Anderson, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Mark French Anderson, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say :—

I make use of sulphate or sesqui-sulphate of alumina in conjunction with lime or carbonate of lime (chalk) for deodorizing and purifying sewage or other waters containing organic or other impurities.

As commercial sulphate of alumina is too expensive to be used for purifying sewage I will describe the method by which I make it in a

much cheaper way than it can be at present purchased. I mix common clay (any kind of clay or earth containing clay may be used) with sulphuric acid in the proportions of two parts of clay to one of acid by weight. After the clay and acid have been thoroughly and evenly mixed I place the compound in a warm place until the sulphuric acid has combined with the alumina of the clay to form sulphate of alumina. The combination between the sulphuric acid and alumina will take place under ordinary temperatures, but without heat requires a longer time for completion than when the combination is assisted by heat. The completion of the action is shown by the change of colour in the mass from reddish brown to grey. Clay consists of silicate of alumina and small quantities of other substances, in the case of common brick clay chiefly oxide of iron. The compound prepared as directed consists therefore of sulphate of alumina and silica or sand with a small proportion of other ingredients, which latter may be looked upon as harmless impurities. This is the compound I make use of in conjunction with lime or chalk for purifying sewage or other waters containing organic or other impurities.

The water or sewage to be treated should be collected in a tank or receptacle suited for the purpose, and the sulphate of alumina compound added in the proportion of one pound of compound to every one hundred gallons of liquid to be purified; the mass should then be well stirred so as to dissolve the sulphate of alumina contained in the compound and common slacked lime added in the proportion of one pound of slacked lime to every five pounds of the sulphate of alumina compound.

In some cases a smaller or larger proportionate and relative quantity of the sulphate of alumina compound and lime may be used, but for ordinary sewage these quantities will be found to answer. After the addition of the lime (which may be mixed with water before its addition to the liquid to be treated to assist the action) the whole mass of sewage or water under treatment should be well stirred or agitated so as to disperse the lime evenly throughout the liquid. A chemical combination quickly takes place between the lime and sulphuric acid in the sulphate of alumina compound, sulphate of lime is formed, and alumina is set free as a flocculent precipitate. This precipitate in the act of falling adheres to and carries down with it the impurities contained in the sewage or other water under treatment. If carbonate of lime be used a larger proportionate quantity should be used than when lime is used.

For every one pound of lime used as above directed two pounds of chalk or carbonate of lime should be used. The other alkalis and alkaline earths or their carbonates which may also be used instead of lime are too expensive to admit of practical application, so that their use need be no more than alluded to.

After agitation of the sewage or water under treatment which has now had added to it both the sulphate of alumina compound and the lime or chalk, the whole liquid should be allowed to settle until the precipitate has fallen to the bottom of the tank or other receptacle, when the clear supernatant liquid may be run off by means of an opening in the tank or other receptacle a short distance above the precipitate which will be lying at the bottom. The precipitate should then be removed and dried so as to fit it for sale as manure. The drying may be effected by heat or by means of the centrifugal machine or by other suitable means. Instead of proceeding as above described the lime or chalk may be added first and the sulphate of alumina afterwards.

In describing my process I have entered into an account of the manufacture of the sulphate of alumina compound in order to point out the cheapest way of making it, but to this way of manufacturing sulphate or sesqui-sulphate of alumina I lay no claim; but I claim the application of sulphate or sesqui-sulphate of alumina, whether prepared in the way before described or in any other suitable way, in conjunction with lime or chalk, to sewage as herein described.

In witness whereof, I, the said Mark French Anderson, have hereunto set my hand and seal, this Thirtieth day of May, in the year of our Lord One thousand eight hundred and seventy.

M. F. ANDERSON. (L.S.)

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