

Specification of William White : precipitating sewage and other foul waters, &c.;

Contributors

White, William.

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A.D. 1873, 20th NOVEMBER. N° 3781.

SPECIFICATION

OF

WILLIAM WHITE.

PRECIPITATING SEWAGE AND OTHER
FOUL WATERS, &c.

LONDON:

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A.D. 1873, 20th NOVEMBER. N° 3781.

Precipitating Sewage and other Foul Waters, &c.

LETTERS PATENT to William White, of 30, Thurlow Road, Hampstead, in the County of Middlesex, for the Invention of "**IMPROVEMENTS IN THE PRECIPITATION OF SEWAGE AND OTHER FOUL WATERS, AND IN THE PREPARATION OF PRECIPITATING MATERIALS.**"

Sealed the 22nd May 1874, in pursuance of an Order of the Lord Chancellor, and dated the 20th November 1873.

PROVISIONAL SPECIFICATION left by the said William White at the Office of the Commissioners of Patents, with his Petition, on the 20th November 1873.

I, **WILLIAM WHITE**, of 30, Thurlow Road, Hampstead, in the County of Middlesex, do hereby declare the nature of the said Invention for "**IMPROVEMENTS IN THE PRECIPITATION OF SEWAGE AND OTHER FOUL WATERS, AND IN THE PREPARATION OF PRECIPITATING MATERIALS,**" to be as follows:—

In the Provisional Specification of a Patent, No. 2532, dated 24th July 1873 it is stated that in the treatment of sewage and cesspool water I introduce milk of lime to neutralise any excess of acid, and to

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precipitate calcic phosphate, which in some cases I mix with the sewage or cesspool water.

Instead of milk of lime simply I find the purifying and clarifying power of such method of precipitation is greatly increased by using lime charcoal, which I prepare by calcining an intimate mixture of peat or sawdust with chalk or lime, or magnesian limestone, or other cheap and convenient substances, resulting on calcination in a combination of carbon and calcic oxide or calcic and magnesian oxide; or I mix intimately small coal or coal dust with lime, and introduce the mixture into the retorts at gas works. The result is lime coke such as I require for precipitation.

I also prepare a similar precipitating material, which I designate phosphatic charcoal, from an intimate mixture of pulverised or pulpy mineral phosphates, calcic and aluminous (which phosphates usually contain a considerable proportion of calcic carbonate) with peat or other carbonaceous matter, and use the same in like manner as the lime charcoal.

I also use such phosphatic charcoal for precipitation by simply mixing it in a powdered state with the sewage and allowing it to settle; but sewage is often so diluted with water and mingled with manufacturing refuse having little value as manure, that it would be wasteful to use phosphates after the manner described. Under such circumstances I employ lime charcoal alone for precipitation, or what I call lime clay charcoal obtained by calcining lime and clay together or separately with carbonaceous matter, which simple and inexpensive precipitants may be used either with or without or before or after calcium, chloride, and ferrous sulphate, as set forth in my former Specification, No. 2532.

Sewage and foul waters are of many qualities, and according to their variety require special precipitants, and taking carbon as the primary and essential element I vary its associates of lime, phosphates of lime and alumina, magnesia and clay, to meet the particular condition; and where the precipitate is unsuitable for manure it may be drained, dried, and calcined for use again as a precipitant. With carbon so varied in its associates, the precipitation of almost every impurity in sewage or foul waters from dye works, print works, paper mills, and other factories may be accomplished.

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SPECIFICATION filed in pursuance of the conditions of the Letters Patent, and of an Order of the Lord Chancellor, by the said William White in the Great Seal Patent Office on the 23rd May 1874,

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM
5 **WHITE**, of 30, Thurlow Road, Hampstead, in the County of Middlesex, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twentieth day of November, in the year of our Lord One thousand eight hundred and seventy-three, in the thirty-
10 seventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William White, Her special license that I, the said William White, my executors, administrators, and assigns, or such others as I, the said William White, my executors, administrators, and assigns, should at any time agree with, and no others, from
15 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 THE PRECIPITATION OF SEWAGE AND OTHER FOUL WATERS, AND IN THE PREPARATION OF**
20 **PRECIPITATING MATERIALS,**" upon the condition (amongst others) that I, the said William White, 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
25 cause the same to be filed in the Great Seal Patent Office on or before the 26th day of May 1874.

NOW KNOW YE, that I, the said William White, 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
30 the following statement thereof, that is to say:—

In the Specification of a Patent, No. 2532, dated 24th July 1873, it is stated that in the treatment of sewage and cesspool water I introduce milk of lime to neutralise any excess of acid and to precipitate calcic phosphate, which in some cases I mix with the sewage or cesspool
35 water.

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Instead of milk of lime simply I find the purifying and clarifying power of such method of precipitation is greatly increased by using lime charcoal, which I prepare by calcining an intimate mixture of peat or sawdust with chalk or lime, or magnesian limestone, or other cheap and convenient substances, resulting on calcination in a combination of 5 carbon with calic oxide or calcic and magnesian oxide. I mix the peat or sawdust by preference with chalk or limestone in such proportions as to yield a product containing about 90 per cent. of lime and 10 per cent. of charcoal. I calcine the mixture in iron or clay retorts at a temperature sufficient to expel the carbonic acid from the chalk. If lime be 10 substituted in making the mixture a lower temperature will suffice in the calcining process. I thus obtain charcoal in a very porous and divided state disseminated amongst lime.

When this lime charcoal is used as a precipitating agent the lime acts both chemically as a precipitant and also mechanically to cause the 15 charcoal to sink through the sewage, so bringing it into intimate contact with it, without which the powerful defecating and deodorising properties of the charcoal could not be excited.

A very advantageous way of treating sewage and other similar foul waters is to add to them first bone or mineral phosphate of lime rendered 20 soluble by means of hydrochloric or other acid, and afterwards to use lime charcoal to precipitate the phosphate of lime, together with remaining impurities in the sewage.

In some cases in place of lime charcoal I prepare and use in a similar manner a lime coke. I mix intimately small coal or coal dust with 25 chalk or lime, and introduce the mixture into the retorts at gas works. The result is a form of lime charcoal, which I call "lime coke" such as I require for precipitation. This lime coke may conveniently contain about 80 per cent. of carbon. Coke being of a denser nature than charcoal it is desirable to employ a larger proportion. 30

I also prepare a similar precipitating material, which I designate phosphatic charcoal or phosphatic lime charcoal, from an intimate mixture of pulverised or precipitated mineral phosphates, calcic, or aluminous (which phosphates usually contain a considerable proportion of calcic carbonate) with peat or other carbonaceous matter, and use the 35 same in like manner as the lime charcoal.

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I also use such phosphatic lime charcoal for precipitation by simply mixing it in a powdered state with the sewage and allowing it to settle.

I prepare phosphatic lime charcoal in a similar manner to that in
5 which lime charcoal is prepared, using in place of chalk or limestone cheap phosphatic minerals containing a large proportion of calcic carbonate. The phosphatic ingredients in the mineral become part of the phosphatic lime charcoal, and ultimately serve to enrich the precipitate from the sewage and render it more valuable for manurial
10 purposes.

Sewage is often so diluted with water and mingled with manufacturing refuse having little value as manure that it would be wasteful to use phosphates after the manner described. Under such circumstances I employ lime charcoal alone for precipitation, or what I call lime clay
15 charcoal obtained by calcining lime and clay together or separately with carbonaceous matter, which simple and inexpensive precipitants may be used either with or without or before or after calcium, chloride, and ferrous sulphate, as set forth in my former Specification, No. 2532.

I prepare clay charcoal in the same way as lime charcoal, substituting
20 clay for chalk or limestone. The clay acts as a precipitant and also mechanically to weight the charcoal so that it may sink through the liquid in which it is required to act.

In treating dilute sewage clay charcoal is very advantageously used after the sewage has been treated with calcium, chloride, and ferrous
25 sulphate.

Sewage and foul waters are of many qualities, and according to their variety require special precipitants, and taking carbon as the primary and essential element I vary its associates of lime, phosphates of lime and alumina, magnesia and clay, to meet the particular condition; and
30 where the precipitate is unsuitable for manure it may be drained, dried, and calcined for use again as a precipitant. With carbon so varied in its associates the precipitation of almost every impurity in sewage or foul waters from dye works, print works, paper mills, and other factories may be accomplished.

35 The amount of precipitant employed will vary with the quality of the sewage, and is best ascertained by a preliminary trial. I prefer that

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the precipitate should amount to one half per cent. or more of the weight of liquid treated.

Having thus described the nature of my said Invention and the manner of performing the same I would have it understood that I claim,—

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1. The treatment of sewage and other foul waters with lime charcoal, phosphatic lime charcoal, or clay charcoal, such materials being added to the sewage and allowed to sink through it so as to carry down with them as a precipitate some of the impurities which the said sewage or foul waters contain, substantially as described.

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2. The treatment of sewage and other foul waters with phosphate of lime rendered soluble by an acid, and then with lime charcoal or phosphatic lime charcoal, substantially as described.

3. The manufacture of lime charcoal and phosphatic lime charcoal, substantially as described.

15

In witness whereof, I, the said William White, have hereunto set my hand and seal, this Eighteenth day of May, in the year of our Lord One thousand eight hundred and seventy-four.

WILLIAM WHITE. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1874.



