Specification of John Leigh : treating sewage.

A.D. 1873, 11*th* JUNE. N° 2071.

SPECIFICATION

OF

JOHN LEIGH.

TREATING SEWAGE, &c.

LONDON:
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1873.

A.D. 1873, 11*th* *June.* N° 2071.

Treating Sewage, &c.

LETTERS PATENT to John Leigh, of Manchester, in the County of Lancaster, for the Invention of "AN IMPROVED MODE OF TREATING SEWAGE AND OTHER CONTAMINATED WATERS."

Sealed the 9th December 1873, and dated the 11th June 1873.

PROVISIONAL SPECIFICATION left by the said John Leigh at the Office of the Commissioners of Patents, with his Petition, on the 11th June 1873.

I, JOHN LEIGH, of Manchester, in the County of Lancaster, do hereby declare the nature of the said Invention for "AN IMPROVED MODE OF TREATING SEWAGE AND OTHER CONTAMINATED WATERS," to be as follows:—

I propose to purify sewage and other contaminated waters by adding thereto in suitable vessels with agitation a solution of an earthy salt, and afterwards a solution of silicate of soda or of potass, whereby a precipitation or subsidence of the suspended matters in the sewage or other waters is produced.

Of the earthy salts I prefer to use a solution of alum or of sulphate of alumina, of sulphate or of muriate of magnesia, or of muriate of lime.

Should the sewage or other water after being thus treated contain any gelatinous or albuminous matters in solution, or afford evidence of other organic matter in solution, I propose to add a small quantity of a solution of tannin or of some solution containing tannin thereto.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said John Leigh in the Great Seal Patent Office on the 11th December 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOHN LEIGH, of Manchester, in the County of Lancaster, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Eleventh day of June, in the year of our Lord One thousand eight hundred and seventy-three, in the thirty-sixth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said John Leigh, Her special license that I, the said John Leigh, my executors, administrators, and assigns, or such others as I, the said John Leigh, 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 "AN IMPROVED MODE OF TREATING SEWAGE AND OTHER CONTAMINATED WATERS," upon the condition (amongst others) that I, the said John Leigh, 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 John Leigh, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, that is to say :—

My Invention consists in purifying sewage and waters contaminated

thereby, or by other matters held in mechanical suspension by adding thereto and agitating therewith in suitable tanks, vessels, or receptacles, a solution of an earthy salt, followed by a solution of silicate of soda or of potash, whereby a precipitation or subsidence of the suspended matters in the sewage or other waters is produced.

Of the earthy salts I prefer to use a solution of alum or of sulphate of alumina, of sulphate or of muriate of magnesia, or of muriate of lime.

Should the sewage or other contaminated water after being thus treated contain any gelatinous or albuminous matters in solution, or afford evidence of other organic matter in solution, I add thereto a small quantity of a solution of tannin, or of some solution containing tannin.

As the sewage and other contaminated waters will vary from time to time in consistence and degree of dilution, so also will the quantity of earthy salts and of alkaline silicates that may be required to produce complete precipitation of the suspended matters.

The sewage or other contaminated waters to be treated may be received in suitable tanks, receptacles, or reservoirs, and thereto added a solution of alum, whether potash alum, soda alum, or ammonia alum, in such proportion that a quantity, equivalent to two grains, and increasing from that to ten grains for each gallon of sewage shall be added, or a quantity of solution of muriate of lime, equivalent to one grain, and increasing from that to seven grains for each gallon of sewage, or of a solution of sulphate of magnesia, which shall hold dissolved from one grain to eight grains of the crystallised sulphate for each gallon of sewage. For the alums may be substituted the sulphate of alumina, prepared commercially on a large scale for use in dyeing, by treating pure clay with strong sulphuric acid. When this is used a somewhat smaller quantity will be required.

After any of these earthy salts have been added to the sewage or other waters proposed to be treated, and well mixed therewith, a solution of silicate of soda or of silicate of potash is to be added, by which an insoluble earthy silicate will be formed, and this in its fall through the liquid will carry with it to the bottom of the tank or vessel such matters as may have been held in suspension in the liquid.

The proportion of silicate of soda or of silicate of potash to be added to the sewage or other contaminated waters to which the earthy salts have been already added will vary slightly in amount accordingly as a less or greater amount of these salts may have been primarily contained in the liquids to be treated. A quantity of solution of silicate of potash, containing one hundred and seventy-one pounds of dry tetra-silicate of potash, or of a solution of silicate of soda, containing one hundred and eight pounds of dry mono-silicate of soda, may be added to a quantity of sewage or other contaminated water, with which about four hundred and seventy pounds of alum or fifty-five pounds of muriate of lime, or one hundred and twenty-three pounds of sulphate of magnesia have been mixed. Alkaline silicates are prepared on a large scale for commercial purposes, and each manufacturer has certain proportions of silica and of alkali, which he prefers in the manufacture of his silicates.

It is also possible that the proportion of silica to alkali may vary occasionally with each manufacturer. As any of the soluble alkaline silicates, commercially prepared, however, will suffice to precipitate the bases of the earthy salts added to the sewage or other liquids to be treated, I wish it to be understood that I do not confine myself to the use of alkaline silicates containing only certain exact proportions of silica and alkali, but I claim to use any soluble alkaline silicates, nor do I confine myself to the quantities of earthy salts herein-before mentioned to be added to the sewage or other foul waters, inasmuch as the sewage may sometimes in consequence of the large quantity of water added to it by rain and from other sources be so much diluted that smaller quantities than those mentioned of the earthy salts may be sufficient.

Should the sewage or other contaminated waters, treated as herein-before mentioned, appear to be slightly milky or turbid after the subsidence of the precipitate formed, I add a small additional quantity of the solution of alum or other earthy salt, and reagitate the mixture, after which, on subsidence of the insoluble matter or precipitate the water is usually clear.

Sewage often contains in solution a quantity of gelatinous or albuminous matter, the putrefaction of which renders the smell of the sewage very offensive. To prevent the continuance of this putrefaction after the sewage has been cleared of its suspended matters, I add a small quantity of a solution containing tannin.

The subsequent deodorization of the sewage may be effected when necessary in various ways, as by passing the clarified liquid through a bed of fine coal ashes, or of earth, or breaking it into cascades, so as to oxidise it. The general effect of this treatment is to free the sewage from certain gases dissolved in it, and to the presence of which the offensive smell is due.

It is not the object by the process herein-before described to produce a manure, but to clarify sewage and other contaminated waters in such a way as to produce the smallest possible amount of deposit in the liquids treated.

In witness whereof, I, the said John Leigh, have hereunto set my hand and seal, this Tenth day of December, in the year of our Lord One thousand eight hundred and seventy-three.

JOHN LEIGH. (L.S.)

Signed, sealed, and delivered
by the within-named John
Leigh, in the presence of
G. SEPTIMUS HUGHES,
Patent Agent,
Manchester.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1873.