

Specification of Alexander Melville Clark : treating sewage.

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A.D. 1875, 8th SEPTEMBER. N° 3162.

SPECIFICATION

OF

ALEXANDER MELVILLE CLARK.

TREATING SEWAGE.

LONDON:

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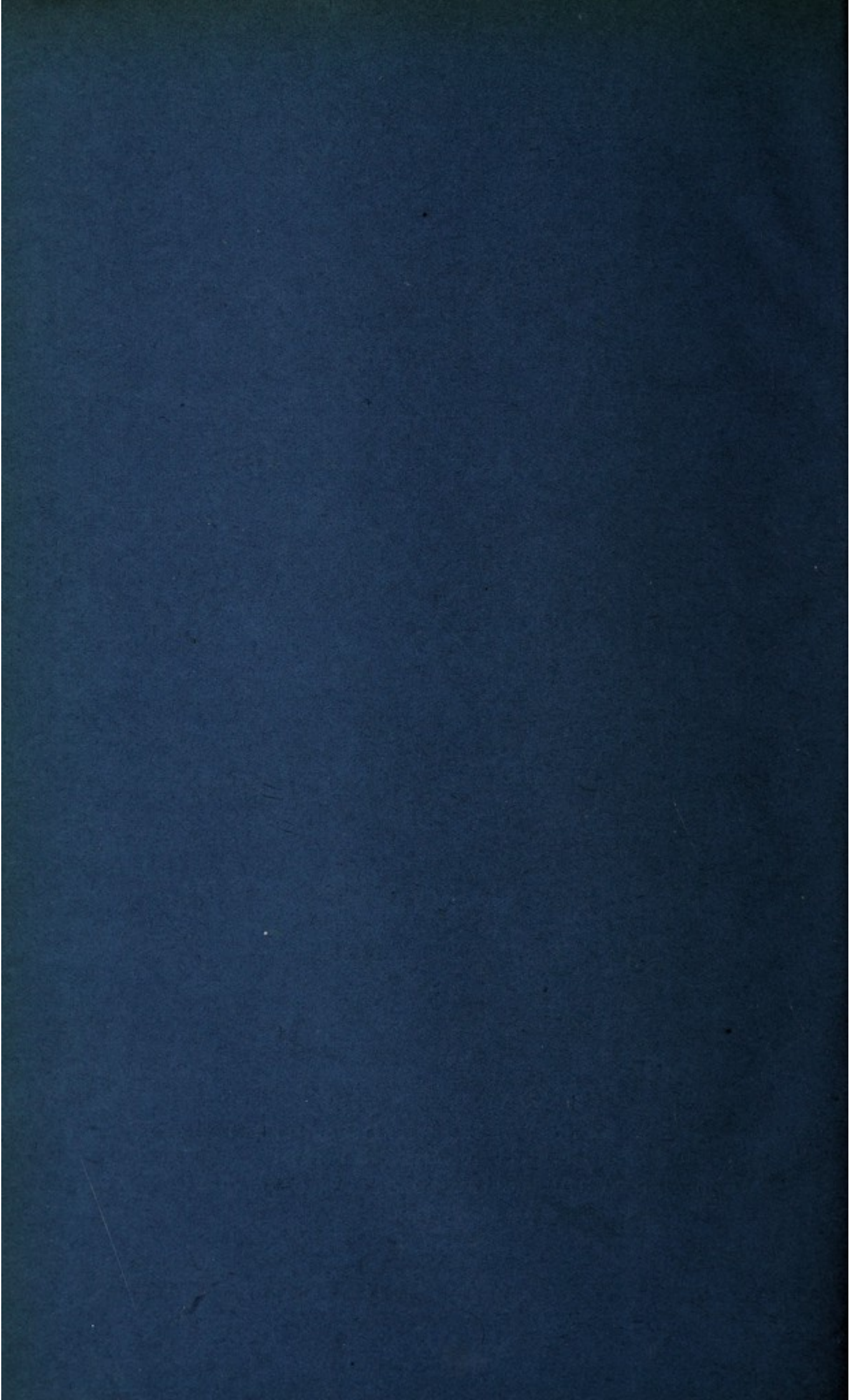
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A.D. 1875, 8th SEPTEMBER. N° 3162.

Treating Sewage.

LETTERS PATENT to Alexander Melville Clark, of 53, Chancery Lane, in the County of Middlesex, Patent Agent, for the Invention of "IMPROVEMENTS IN TREATING SEWAGE AND OTHER IMPURE OR POLLUTED WATERS."—A communication from abroad by Paul Albert Bonnard, of Paris, France.

Sealed the 29th February 1876, and dated the 8th September 1875.

PROVISIONAL SPECIFICATION left by the said Alexander Melville Clark at the Office of the Commissioners of Patents, with his Petition, on the 8th September 1875.

I, ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the 5 County of Middlesex, Patent Agent, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN TREATING SEWAGE AND OTHER IMPURE OR POLLUTED WATERS," to be as follows :—

This Invention relates to a process of purifying, clarifying, and rendering inodorous foul water from various sources, but especially
10 sewage water and the impure waters from manufactories; it may also be

Clark's Improvements in Treating Sewage.

applied to river water contaminated with organic matters. The process is based on the employment of certain chemical reagents hereafter specified, and which may be employed together or separately.

The method of treatment and the kind of reagent employed vary according to the nature and condition of the impurities which it is 5 desired to eliminate or to destroy, and also according to the precise object in view, that is to say, according to whether it is merely intended to purify the waters without seeking to obtain therefrom products utilizable as manures, or whether on the other hand it is desired to obtain marketable manures. 10

The reagents employed are,—

1st. Aluminate of soda; this salt precipitates the azotised organic matters, forming with these substances and also with the coloring matters species of lakes; it is especially useful for the treatment of the waters from manufactories, and it may be used together with chloride of 15 calcium.

2ndly. Aluminate of soda, and afterwards phosphoric acid, or an alkaline phosphate, or a soluble phosphate of lime or of magnesia. In this case insoluble phosphates of alumina, of lime, or of magnesia are formed, which unite with the organic matters in suspension, a part of 20 those which are in solution, and the coloring matters, whilst there remains in solution an ammoniacal salt and an alkaline phosphate, or a phosphate of ammonia. If to these liquids a soluble salt of magnesia be added a precipitate of double phosphate of ammonia and magnesia is obtained. 25

3rd. Phosphate of soda and a soluble salt of magnesia, giving preference more particularly to the tribasic phosphate of soda mixed chemically or mechanically with phosphate or oxide of iron. In the latter case it is often of advantage to employ as the soluble salt of magnesia a certain quantity of the acid phosphate of this base. As all 30 the reagents are soluble they are mixed with the waters to be purified, either by distributing them in the tanks or reservoirs in which the waters are contained, or by supplying them to the flowing water in quantity proportionate to the volume and the degree of impurity of the latter, after which the precipitates are allowed to subside in tanks, and 35 the liquid subsequently drained off, but the separation is much more quickly effected by employing Parrot's filtering tanks.

Clark's Improvements in Treating Sewage.

4th. When the waters to be treated contain but little ammonia, but are chiefly contaminated by the presence of urea or of organic matters, it is in certain cases advantageous to destroy these impurities by the action of nitrous or hyponitric acids, or of nitrous vapors resulting from
5 certain industrial reactions, and in which the nitric acid is in part deoxidised, or of soluble nitrites. In some cases this reaction may be employed very efficaciously to complete the purification already effected by the first reagents specified. When I employ at same time a soluble phosphate and a salt of magnesia to produce a precipitate of double
10 phosphate of ammonia and of magnesia, which takes up all the ammonia that is in solution in these liquids, it may happen that a part of the double phosphate thus formed remains in solution in the clarified waters (since one part of ammonio-magnesian phosphate dissolves in fifteen thousand parts of water), and to avoid the loss which might result from
15 this solubility, slight though it may be, the liquids may be filtered on dolomite (double carbonate of magnesia and lime), which retains all the phosphate dissolved.

SPECIFICATION in pursuance of the conditions of the Letters Patent,
filed by the said Alexander Melville Clark in the Great Seal Patent
20 Office on the 4th March 1876.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, ALEXANDER MELVILLE CLARK, of 53, Chancery Lane, in the County of Middlesex, Patent Agent, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her
25 Letters Patent, bearing date the Eighth day of September, in the year of our Lord One thousand eight hundred and seventy-five, in the thirty-ninth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Alexander Melville Clark, Her special license that I, the said Alexander Melville Clark, my
30 executors, administrators, and assigns, or such others as I, the said Alexander Melville Clark, 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

Clark's Improvements in Treating Sewage.

the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN TREATING SEWAGE AND OTHER IMPURE OR POLLUTED WATERS," a communication to me from abroad by Paul Albert Bonnard, of Paris, France, upon the condition (amongst others) that I, the said Alexander Melville Clark, 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 Alexander Melville Clark, 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, that is to say:—

This Invention relates to a process of purifying, clarifying, and rendering inodorous foul water from various sources, but especially sewage water, and the impure waters from manufactories. It may also be applied for purifying river water contaminated with organic matters. The process is based upon the employment of certain chemical reagents hereafter specified, and which may be employed together or separately.

The method of treatment and the reagent employed vary according to the nature and condition of the impurities which it is desired to eliminate or destroy, and also according to the precise object to be attained, that is to say, according to whether it is merely intended to purify the waters without seeking to obtain utilizable products therefrom, such as manures, or whether on the other hand it is desired to obtain marketable manures.

The reagents employed are,—

1st. Aluminate of soda. This salt precipitates the azotized organic matters forming with these substances, and also with the coloring matters species of lakes. It is especially useful for the treatment of waters from manufactories, and it is well adapted for use with chloride of calcium.

Clark's Improvements in Treating Sewage.

- 2nd. Aluminate of soda, and afterwards phosphoric acid or an alkaline phosphate, or a soluble phosphate of lime or of magnesia. In this case insoluble phosphates of alumina, lime, or magnesia are formed, which unite with the organic matters in suspension with a part of those which
5 are in solution, and with the coloring matters, whilst there remains in solution an ammoniacal salt and an alkaline phosphate, or it may be a phosphate of ammonia. If to these liquids a soluble salt of magnesia be then added a precipitate of double phosphate of ammonia and magnesia is obtained.
- 10 3rd. Phosphate of soda and a soluble salt of magnesia, giving preference more particularly to the tribasic phosphate of soda, mixed chemically or mechanically with phosphate or oxide of iron. In the latter case it is often of advantage to employ as the soluble salt of magnesia a certain quantity of the acid phosphate of this base. As all
15 these reagents are soluble they are mixed with the water to be purified, either by distributing them in the tanks or reservoirs in which the waters are contained, or by supplying them to the flowing water in quantity proportionate to the volume and the degree of impurity of the latter, after which the precipitates are allowed to subside in tanks and
20 the liquid subsequently drained off, but the separation is much more quickly effected by employing Parrot's filtering tanks.
- 4th. When the waters to be treated contain but little ammonia, but are chiefly contaminated by the presence of urea or of organic matters, it is in certain cases advantageous to destroy those impurities by the
25 action of nitrous or hyponitric acids, or of nitrous vapours resulting from certain industrial reactions in which the nitric acid is in part deoxidised, or of soluble nitrites. In some cases this reaction may be employed very efficaciously to complete the purification already effected by the first reagents specified. When I employ at same time a soluble
30 phosphate and a salt of magnesia to produce a precipitate of double phosphate of ammonia and magnesia, which takes up all the ammonia that was in solution in the liquids, it may happen that a part of the double phosphate thus formed remains in solution in the clarified waters (since one part of ammonio-magnesian phosphate dissolves in fifteen
35 thousand parts of water), and to avoid the loss which might result from this solubility, slight though it may be, the liquid may be filtered on dolomite (double carbonate of magnesia and lime) which retains all the phosphate dissolved.

Clark's Improvements in Treating Sewage.

Having described the nature of the Invention, and the manner of performing the same, I declare that what I claim as the Invention to be protected by the herein-before in part recited Letters Patent is,—

1st. The employment of aluminate of soda either alone or in conjunction with soluble, alkaline, or earthy phosphates, as and for the purpose specified. 5

2nd. The employment of the same phosphates mixed either mechanically or chemically with oxide or phosphate of iron in conjunction with a soluble salt of magnesia, as and for the purpose specified. 10

3rd. The employment of the oxygenated compounds of nitrogen richer in oxygen than the protoxide and less so than nitric acid for the purpose of destroying the organic matters not precipitated by the reagents, as herein-before specified.

In witness whereof, I, the said Alexander Melville Clark, have hereunto set my hand and seal, this Fourth day of March, in the year of our Lord One thousand eight hundred and seventy-six. 15

A. M. CLARK. (L.S.)

LONDON:

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