

Specification of Samuel Hallsworth and Richard Bailes : treating and clarifying sewage, &c.;

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A.D. 1874, 9th OCTOBER. N° 3459.

SPECIFICATION

OF

SAMUEL HALLSWORTH
AND
RICHARD BAILES.

TREATING AND CLARIFYING SEWAGE, &c.

LONDON:

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A.D. 1874, 9th OCTOBER. N° 3459.

Treating and Clarifying Sewage, &c.

LETTERS PATENT to Samuel Hallsworth, of Armley, near Leeds, and Richard Bailes, of Woodhouse Carr, Leeds, both in the County of York, for the Invention of "IMPROVEMENTS IN THE MODE OF TREATING AND CLARIFYING SEWAGE OR OTHER IMPURE WATERS."

Sealed the 6th April 1875, and dated the 9th October 1874.

PROVISIONAL SPECIFICATION left by the said Samuel Hallsworth and Richard Bailes at the Office of the Commissioners of Patents, with their Petition, on the 9th October 1874.

We, SAMUEL HALLSWORTH, of Armley, near Leeds, and RICHARD
5 BAILES, of Woodhouse Carr, Leeds, both in the County of York, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE MODE OF TREATING AND CLARIFYING SEWAGE OR OTHER IMPURE WATERS," to be as follows:—

For the purpose of treating and clarifying sewage or other impure
10 waters we employ in our process the liquid or liquor which is obtained

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from beds of iron pyrites, this liquid or liquor being the same as that obtained for the manufacture or production of copperas.

The liquid or liquor is and may be obtained in the following manner from the beds of iron pyrites, or by other suitable processes:—A bed is made in a slanting direction of puddled clay or other equivalent to 5 prevent the escape of the liquid or liquor. The clay may be covered with stone flags or their equivalents, and a drain or drains is or are made to convey the liquid or liquor from the bed as it percolates through. A tank or other receptacle of suitable size is employed to receive the liquid or liquor as it runs from the bed. Iron pyrites are put 10 on the bed in suitable quantities, and if required may be crushed or broken small. The iron pyrites remain exposed to the atmosphere and weather, and in course of time a chemical change takes place. The rain falling upon them, or water thrown upon them when rain is not sufficient, produces a liquid or liquor, which liquid or liquor is what we use in our 15 process in clarifying sewage or other impure waters.

The mode of treating sewage or other impure waters with the liquid or liquor is as follows:—The sewage or other impure water under treatment may be run into a tank or other suitable receptacle. The necessary quantity of the herein-before mentioned liquid or liquor is 20 then gradually added, and the whole is then well mixed or agitated.

Other suitable or equivalent means may be employed for mixing the sewage or other impure waters under treatment with the liquid or liquor. The sewage or other impure water under treatment becomes “curdled” or “cracked”; when this occurs it is run off into another tank or tanks, 25 in which tank or tanks the impurities are precipitated. The clear water may be then run off.

The quantity of liquid or liquor employed in the aforesaid clarifying process varies in accordance with the state of the impurity of the sewage or other impure water under treatment, and the strength of the liquid or 30 liquor used in the process.

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SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Samuel Hallsworth and Richard Bailes in the Great Seal Patent Office on the 8th April 1875.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, **SAMUEL**
5 **HALLSWORTH**, of Armley, near Leeds, and **RICHARD BAILES**, of Woodhouse Carr, Leeds, both in the County of York, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Ninth day of October, in the year of our Lord One thousand eight hundred and seventy-four, in the thirty-
10 eighth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said Samuel Hallsworth and Richard Bailes, Her special licence that we, the said Samuel Hallsworth and Richard Bailes, our executors, administrators, and assigns, or such others as we, the said Samuel Hallsworth and Richard Bailes, our executors, admi-
15 nistrators, 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 THE**
20 **MODE OF TREATING AND CLARIFYING SEWAGE OR OTHER IMPURE WATERS,**" upon the condition (amongst others) that we, the said Samuel Hallsworth and Richard Bailes, our executors or administrators, by an instrument in writing under our, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention,
25 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 we, the said Samuel Hallsworth and Richard Bailes, do hereby declare the nature of our said Invention, and in
30 what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, that is to say:—

For the purpose of treating and clarifying sewage or other impure waters we employ in our process the liquid or liquor which is obtained from beds of iron pyrites, this liquid or liquor being the same as that
35 obtained for the manufacture or production of copperas.

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The liquid or liquor is and may be obtained in the following manner from the beds of iron pyrites or by other suitable processes:—A bed is made in a slanting direction of puddled clay or other equivalent material to prevent the escape of the liquid or liquor. The clay may be covered with stone flags or their equivalents, and a drain or drains is or are 5 made to convey the liquid or liquor from the bed as it percolates through. A tank or other receptacle of suitable size is employed to receive the liquid or liquor as it runs from the bed. Iron pyrites are put on the bed in suitable quantities, and if required may be crushed or broken small. The iron pyrites remain exposed to the atmosphere and 10 weather, and in course of time a chemical change takes place. The rain falling upon them, or water thrown upon them when rain is not sufficient, produces a liquid or liquor, which liquid or liquor is what we use in our process in clarifying sewage or other impure waters.

The mode of treating sewage or other impure waters with the liquid 15 or liquor is as follows:—The sewage or other impure water under treatment may be run into a tank or other suitable receptacle. The necessary quantity of the herein-before mentioned liquid or liquor is then gradually added, and the whole is then well mixed or agitated.

Other suitable or equivalent means may be employed for mixing the 20 sewage or other impure waters under treatment with the liquid or liquor. The sewage or other impure water under treatment becomes “curdled” or “cracked”; when this occurs it is run off into another tank or tanks, in which tank or tanks the impurities are precipitated. The clear water may be then run off. 25

The quantity of liquid or liquor employed in the aforesaid clarifying process should be varied in accordance with the state of the impurity of the sewage or other impure water under treatment, and the strength of the liquid or liquor used in the process.

We will now proceed to describe more fully the treating and clarifying 30 of sewage or other impure waters.

In treating sewage or other impure waters in which tanning or a stringent matter is present it is found advantageous to use slacked lime or gas lime in combination with the liquid or liquor which is obtained from beds of iron pyrites in about the following proportions:—To 35 5,000 gallons of the above-named impure waters $4\frac{1}{2}$ gallons of the herein-before mentioned liquid or liquor is added and well mixed

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therewith. Ninety pounds of slacked lime, or about double the quantity of gas lime is mixed with water until it gets to a milky state, and then added to the impure water under treatment, after which the whole is well mixed together and agitated.

- 5 In treating sewage or other impure water which is free from dye liquids we proceed as follows:—To about 5,000 gallons of this impure water we add one and a half gallons of the liquid or liquor obtained from beds of iron pyrites, and 50 pounds of slacked lime, or double the quantity of gas lime, the lime being previously mixed with water to a
10 milky state. The whole is then well agitated. These ingredients will also be found to effect the clarification of water when it is mixed to some extent with dye liquid. The sewage or other impure water to be treated is run into a tank or other suitable receptacle, in which the various ingredients are thrown.
- 15 The sewage or other impure water under the herein-before mentioned treatments becomes “curdled” or “cracked” after the ingredients have been added and agitated therewith. When this occurs the water under treatment is run off into another tank or tanks, in which the impurities are precipitated. The precipitation being then completed the clear water
20 may be then run off.

Any convenient means may be employed for mixing the sewage or impure water with the ingredients.

- Previous to gas lime being used it is found advisable to allow it to be exposed to the weather for several weeks, at the end of which time it
25 may be dried and ground into a fine powder in a mortar mill, or by equivalent means.

- The ingredients are not wholly exhausted in the first operation, so that in treating a second quantity of impure water, about half the quantities of the herein-before mentioned ingredients will be found to
30 effect the clarification.

- We do not bind ourselves to the exact quantities of the ingredients used, but wish it to be distinctly understood that the quantity of the ingredients may be varied or modified in accordance with the impurity of the sewage or other impure water under treatment, and the strength
35 or quality of the ingredients employed in the process.

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Having described the nature of our said Invention, and in what manner the same is to be performed, we declare that we claim, the employment of liquid or liquor obtained from beds of iron pyrites, either separately or in combination with lime or other suitable ingredients, for the purpose of treating and clarifying sewage or other impure waters, 5 substantially as herein set forth.

In witness whereof, we, the said Samuel Hallsworth and Richard Bailes, have hereunto set our hands and seals, this Sixth day of April, in the year of our Lord One thousand eight hundred and seventy-five.

10

SAMUEL HALLSWORTH. (L.S.)

RICHARD BAILES. (L.S.)

LONDON:

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