

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

## **Contributors**

Hallsworth, Samuel.  
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A.D. 1875, 17th FEBRUARY. N° 573.

SPECIFICATION

OF

SAMUEL HALLSWORTH  
AND  
RICHARD BAILES.

CLARIFYING SEWAGE, &c.

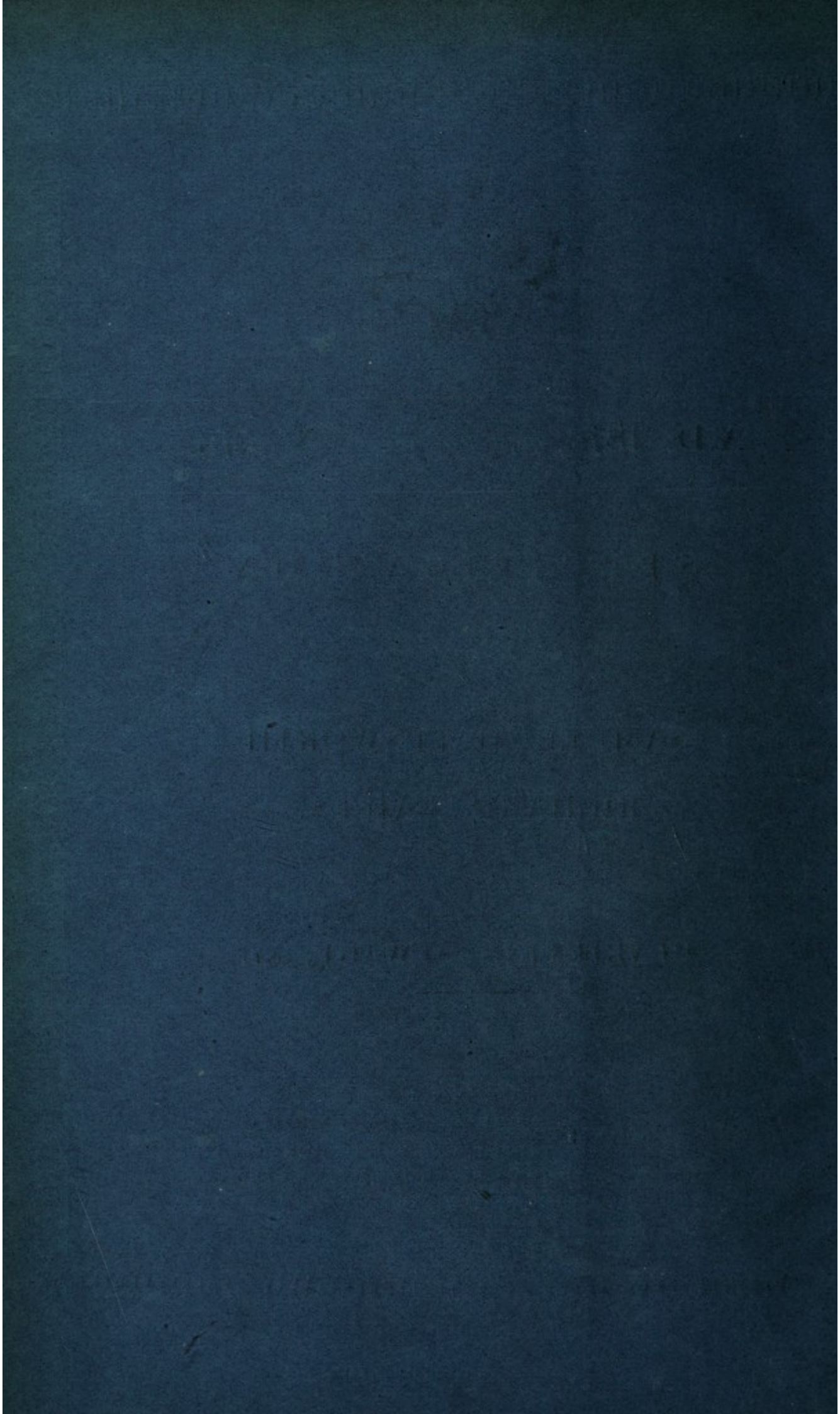
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A.D. 1875, 17th FEBRUARY. N° 573.

**Clarifying Sewage, &c.**

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

Sealed the 10th August 1875, and dated the 17th February 1875.

**PROVISIONAL SPECIFICATION** left by the said Samuel Hallsworth and Richard Bailes at the Office of the Commissioners of Patents, with their Petition, on the 17th February 1875.

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

Our Invention consists in the preparation of clarifying mixtures "which are prepared from certain materials and liquids herein named, and in the use of the said clarifying mixtures" in connection with "gas

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*Hallsworth & Bailes' Improvements in Clarifying Sewage, &c.*

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lime" (which has been used in the purification of coal gas), or "slacked lime."

We first dry, then grind or crush in a mortar mill or by other suitable means the following materials separate or combined:—Copperas, dry copperas, copperas bottoms, copperas sediment, the sediment that subsides 5 from the manufacture of nitrate of iron, the spent residue of iron pyrites after being calcined for the production of sulphuric acid, also spent pyrites which may have piled upon heaps for a time and exposed to the weather, and such iron ores or slags containing iron that are capable of being ground or crushed to a fine powder. 10

We next take a given weight of the above-mentioned spent residue of iron pyrites, or of one or other of the iron ores or slags in fine powder, and well mix with an equal weight of any of the following materials:—Copperas, dry copperas, copperas bottoms, copperas sediment, or sediment 15 from the manufacture of nitrate of iron, and carefully calcine the mixture in a furnace or other suitable equivalent. It may then be taken out, and allowed to cool. We call this No. 1 clarifying mixture.

In our next process we take a quantity of spent residue of iron pyrites, iron ore, or slag containing iron in fine powder, and saturate it with the liquor that runs from the beds of iron pyrites at copperas works, 20 or with diluted sulphuric acid about twenty degrees (Twaddle's hydrometer), or with muriatic acid, or with diluted nitric acid about twenty-four degrees (Twaddle). This we call No. 2 clarifying mixture.

We now proceed to state the manner in which we treat and clarify sewage water or other impure or waste waters. The impure or waste 25 water or sewage may be run into a tank or other suitable receptacle. Say to five thousand gallons of sewage, impure or waste water, we add the following ingredients and of about the following quantities:—Seventy-eight pounds of "slacked lime," or one hundred and fifty-six pounds of "gas lime," and twenty-three pounds of clarifying mixture, 30 No. 1, or forty-six pounds of the clarifying mixture, No. 2. Having run the sewage, impure, or waste water into the tank the "slacked lime" or "gas lime" is mixed with a portion of the sewage, impure, or waste water to a thin paste or milky state in a tank or other equivalent, then added to the sewage, impure, or waste water under treatment, and well 35 mixed by means of an agitator or other suitable equivalent. The sewage, impure, or waste water then becomes curdled or cracked, and the

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clarifying mixture being previously mixed with a portion of the sewage, impure, or waste water to a thin paste is then added, well agitated again, and afterwards allowed to settle; the impurities and discolourations are precipitated, and the clear water may then be run off. In this operation  
5 the ingredients used are not wholly exhausted, so that in a second operation less of them will be required. About half the quantities have been found to effect the purpose.

**SPECIFICATION** in pursuance of the conditions of the Letters Patent,  
filed by the said Samuel Hallsworth and Richard Bailes in the  
10 Great Seal Patent Office on the 17th August 1875.

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

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her  
15 Letters Patent, bearing date the Seventeenth day of February, in the year of our Lord One thousand eight hundred and seventy-five, in the thirty-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  
20 Bailes, our executors, administrators, and assigns, or such others as we, the said Samuel Hallsworth and Richard Bailes, our 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,  
25 within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN THE METHOD OR MEANS EMPLOYED IN 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  
30 an instrument in writing under our, or one of our, 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  
35 of the said Letters Patent.

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NOW KNOW YE, that we, the said Samuel Hallsworth and Richard Bailes, do hereby declare the nature of our 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:—

Our Invention consists in the preparation of clarifying mixtures 5 which are prepared from certain materials and liquids herein named, and in the use of the said clarifying mixtures in connection with "gas lime" (which has been used in the purification of coal gas), or "slacked lime."

We first dry, then grind or crush in a mortar mill or by other suitable 10 means the following materials, separate or combined:—Copperas, dry copperas, copperas bottoms, copperas sediment, the sediment that subsides from the manufacture of nitrate of iron, the spent residue of iron pyrites after being calcined for the production of sulphuric acid, also spent pyrites which may have been piled upon heaps for a 15 time and exposed to the weather, and such iron ores as are in a peroxydized state containing iron capable of being ground or crushed to a fine powder.

We next take a given weight of the above-mentioned spent residue of iron pyrites, or of one or other of the iron ores in a peroxydized state in 20 fine powder, and well mix with an equal weight of any of the following materials:—Copperas, dry copperas, copperas bottoms, copperas sediment, or sediment from the manufacture of nitrate of iron, and carefully calcine the mixture in a furnace or other suitable equivalent. It may then be taken out, and allowed to cool. We call this No. 1 clarifying 25 mixture.

In our next process we take a quantity of spent residue of iron pyrites, iron ore containing iron in fine powder, and saturate it with the liquor that runs from the beds of iron pyrites at copperas works, or with diluted sulphuric acid about twenty degrees (Twaddle's hydrometer), or 30 with muriatic acid. This we call No. 2 clarifying mixture.

We now proceed to state the manner in which we treat and clarify 35 sewage water or other impure or waste waters. The impure or waste water or sewage may be run into a tank or other suitable receptacle. Say to five thousand gallons of sewage, impure, or waste water we add 35 the following ingredients, and of about the following quantities, viz.:— Seventy-eight pounds of "slacked lime," or one hundred and fifty-six 38

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pounds of "gas lime," and twenty-three pounds of clarifying mixture, No. 1, or forty-six pounds of the clarifying mixture, No. 2. Having run the sewage, impure, or waste water into the tank the "slacked lime" or gas lime is mixed with a portion of the sewage, impure, or waste water to a thin paste or milky state in a tank or other equivalent, then added to the sewage, impure, or waste water under treatment, and well mixed by means of an agitator or other suitable equivalent. The sewage, impure, or waste water then becomes curdled or cracked, and the clarifying mixture being previously mixed with a portion of the sewage, impure, or waste water to a thin paste is then added, well agitated again, and afterwards allowed to settle, the impurities and discolourations are precipitated, and the clear water may then be run off. In this operation the ingredients used are not wholly exhausted, so that in a second operation less of them will be required. About half the quantities have been found to effect the purpose.

Having now described the nature of our said Invention we would here remark that the ingredients forming the various clarifying mixture may be varied in their quantities to suit the varied impurities of sewage or other impure waters without in any way departing from the nature of our Invention; but what we do claim and desire to be secured to us by Letters Patent is, the combination of the various herein-before named ingredients and their application for clarifying sewage and other impure waters, substantially as set forth.

In witness whereof, I, the said Samuel Hallsworth, for myself and on behalf of the said Richard Bailes, have hereunto set my hand and seal, this Fourteenth day of August, in the year of our Lord One thousand eight hundred and seventy-five.

SAMUEL HALLSWORTH. (L.S.)

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LONDON:

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Printers to the Queen's most Excellent Majesty. 1875.

Hall's Patent for Improvements in the Treatment of Sewage, &c.  
pounds of "lime" and twenty-five pounds of chloride of lime  
No. 1, or forty-five pounds of the clarifying mixture, No. 2. Having  
the sewage impure or waste water enter the tank the bottom of  
or gas time is mixed with a portion of the sewage impure or wa-  
ter in a thin paste or milky state in a tank or other apparatus, and  
added to the sewage impure or waste water under treatment, and is  
mixed by means of a agitator or other suitable apparatus. The sewage  
impure or waste water then becomes settled or separated, and the  
clarifying mixture being previously mixed with a portion of the sewage  
impure or waste water in a thin paste is then added with agitated water  
and afterwards allowed to settle the impurities and the water is  
precipitated, and the clear water may then be used off. In this process  
the ingredients used are not wholly exhausted, as that in a second  
operation less of them will be required. About half the quantities have  
been found to effect the purpose.

Having now described the nature of my said invention, we would  
here remark that the ingredients forming the various mixtures herein  
may be varied in their quantities to suit the varied impurities of sewage  
or other impure waters without in any way departing from the nature of  
our invention; but what we do claim and desire to be secured to us is  
the nature of the combination of the various ingredients herein  
ingredients and their application for clarifying sewage and other impure  
waters, substantially as set forth.

In witness whereof, I, the said Samuel Hall, do hereby certify and  
as aforesaid of the said Richard Smith have hereunto set my hand  
and seal, this fourteenth day of August, in the year of our Lord  
One thousand eight hundred and seventy-five.

SAMUEL HALL, WITNESS.

LONDON:  
Printed by George Edward Fryer and William Stevenson,  
Printers to the Queen's most Excellent Majesty, 1875.



