

Specification of Henry Bird : treating sewage matters.

Contributors

Bird, Henry.

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A.D. 1864, 20th DECEMBER.

N° 3160.

S P E C I F I C A T I O N

OF

HENRY BIRD.

TREATING SEWAGE MATTERS.

LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

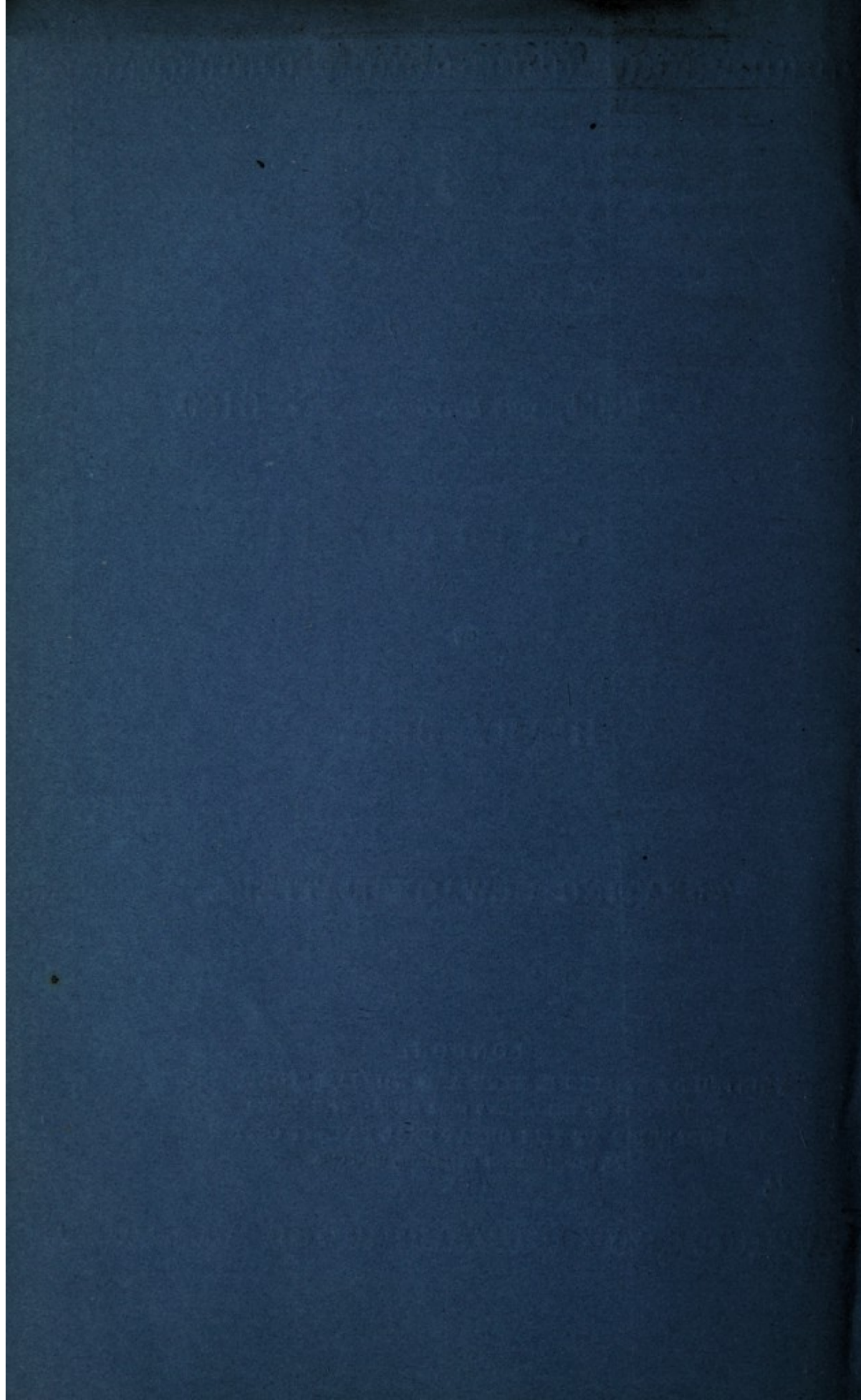
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A.D. 1864, 20th DECEMBER. N° 3160.

Treating Sewage Matters.

LETTERS PATENT to Henry Bird, of Number 1, Berkeley Street, Cheltenham, in the County of Gloucester, Physician and Surgeon of the Royal Colleges of London, for the Invention of "**IMPROVEMENTS IN TREATING SEWAGE MATTERS.**"

Sealed the 2nd May 1865, and dated the 20th December 1864.

PROVISIONAL SPECIFICATION left by the said Henry Bird at the Office of the Commissioners of Patents, with his Petition, on the 20th December 1864.

I, HENRY BIRD, of Number 1, Berkeley Street, Cheltenham, in the County of Gloucester, Physician and Surgeon of the Royal Colleges of London, do hereby declare the nature of the said Invention for "**IMPROVEMENTS IN TREATING SEWAGE MATTERS,**" to be as follows:—

This Invention has for its object improvements in treating sewage matters. For these purposes clay is combined with sulphuric acid and then mixed with fluid sewage matters by which the organic matters, in the sewage are deodorized and precipitated.

This process may be conducted in any suitable closets, cesspools, vessels, drains, sewers, or reservoirs into which the sewage matters are received. It may, however, be stated that it is found desirable that the sulphated clay should be applied as early as circumstances will allow to the sewage matters, in order to prevent their decomposition, and the sulphated clay may be used in the dry state or combined with water.

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The proportions in the combination of the sulphuric acid and clay may be varied, depending on the quantity of organic matters in the sewage, but I find that with ordinary sewage of towns, that from four to nine parts by weight of clay to one part or more by weight of sulphuric acid, specific gravity 1·840, and used with the sewage in the proportions of twenty grains to a pint, are 5 generally sufficient.

The precipitated organic matters and clay obtained are then further treated with sulphuric acid in about the following proportions:—One of the acid to nineteen of the precipitated matters, and dried, when the product alone or in combination with other manuring substances may be used as manure. 10

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Henry Bird in the Great Seal Patent Office on the 14th June 1865.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY BIRD, of No. 1, Berkeley Street, Cheltenham, in the County of Gloucester, 15 Physician and Surgeon of the Royal Colleges of London, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twentieth day of December, in the year of our Lord One thousand eight hundred and sixty-four, in the twenty-eighth year of Her reign, did, for Herself, Her heirs and successors, give and grant 20 unto me, the said Henry Bird, Her special licence that I, the said Henry Bird, my executors, administrators, and assigns, or such others as I, the said Henry Bird, 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, 25 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 TREATING SEWAGE MATTERS,**" upon the condition (amongst others) that I, the said Henry Bird, my executors or administrators, by an instru- 30 ment 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 Henry Bird, do hereby declare the 35 nature of the said Invention, and in what manner the same is to be

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performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

My Invention consists in combining a compound hereafter called sulphated clay with sewage waters or matters, by which the organic matters therein are
5 deodorized, the ammonia fixed, and when permitted, the organic matters are precipitated with the clay, leaving the water pure, or comparatively pure.

And the Invention further consists in combining sulphuric acid or sulphated clay with the precipitated matters in order to render them more suitable for manure.

10 The preparation of the sulphated clay may be somewhat varied in respect to the proportions of the sulphuric acid and clay employed, but it is preferred to prepare and apply sulphated clay as hereafter described.

The mechanical arrangements for mixing and regulating the supply of sulphated clay in proper proportions in respect to the quantities and qualities
15 of the sewage which are being acted on may also be varied, and will in some degree depend on the circumstances under which my Invention is to be applied.

Clays in general are capable of being used according to my Invention, but I prefer to employ those descriptions of clay which can be obtained at the
20 lowest cost in the place or district where my Invention is to be applied. The clay when dry is to be sifted through a coarse sieve, and the sifted clay is to be mixed and combined with sulphuric acid of 1·840 specific gravity, and to each nine tons of clay I usually apply one ton of sulphuric acid, and I mix these matters intimately together, and allow them to stand in a heap, and when
25 quite cool and dry the sulphated clay thus produced is fit for use. The sulphated clay if stirred into sewage waters and intimately mixed therewith, will deodorize the same and fix the ammonia, and if the mixture be allowed to stand or become comparatively quiescent, the organic matters together with the clay will precipitate and leave the water pure or comparatively pure. It is
30 however preferred to employ the sulphated clay dissolved in rain water before combining or mixing the sulphated clay with the sewage waters or matters. In thus dissolving the sulphated clay, I usually dissolve at the rate of 100 lbs. of the sulphated clay in 250 gallons of rain water. In this dissolved state the sulphated clay may be more readily mixed with sewage than when used in the
35 dry state, and such dissolved sulphated clay is stirred or mixed in proper proportions with the sewage waters or matters when in suitable vessels, or tanks, or drains, or reservoirs, or other receptacles. When applying my Invention on a more or less extensive scale, such as in treating the sewage waters or matters coming from a large establishment or from a town or part of a town,

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then I prefer to apply the dissolved sulphated clay and to mix it intimately with the sewage waters or matters, and then to allow the clay and organic matters to settle or precipitate by reason of the sewage waters or matters being retained in a quiescent or in a comparatively quiescent state for a time in any suitable vessels, or tanks, or cisterns, or reservoirs, but I prefer to allow 5 the sewage water or matters after the sulphated clay has been mixed therewith to flow slowly through any such vessels, or tanks, or cisterns, or reservoirs, so as to allow of the precipitation or deposit of the clay and organic matters taking place.

I would here remark that other precipitating agents, such as lime, burned 10 chalk, and others, have before been applied and mixed with sewage waters, and the sewage waters have been allowed to flow slowly through tanks or reservoirs, so as to admit of the precipitation or settlement of the precipitating agents together with organic matters taking place, and I would state that any such arrangements of apparatus may be employed when using sulphated clay 15 as the agent to deodorize the organic matters in sewage waters or waters to fix the ammonia and to precipitate such matters.

In treating ordinary sewage waters or matters of towns, I employ at the rate of about one ounce of sulphated clay to each five cubic feet of sewage waters. If the sewage waters or matters have more organic matters in them 20 than ordinary town sewage, a greater proportion of sulphated clay should be used, and if the ammonia is not sufficiently fixed, then it is desirable to employ a greater proportion of acid in preparing the sulphated clay.

It is preferred when treating large quantities of sewage to employ long settling reservoirs having at intervals transverse partitions so as to divide each 25 reservoir into several compartments, and that in each partition there should be a passage or opening of dimensions suitable for the flow of the requisite quantity of sewage waters at the speed required, in order on the one hand that ample time may be allowed for precipitation, and on the other hand that the requisite quantity of sewage may pass from end to end of a reservoir 30 within the time allowed; and in order that the matters which rise to the surface and float may not pass away through the openings or passages in the partitions, such openings should be below the level at which the sewage constantly stands in a reservoir, and such works should be arranged in such manner that the precipitated matters may be continuously removed from the 35 reservoirs, which arrangement is preferable to having two or more sets of settling vessels, or tanks, or reservoirs, from which the precipitated matters are required to be dug out or removed after running off the waters therefrom, but such arrangements may be used if preferred. The precipitated matters

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when separated for the most part from the waters with which they were previously combined are allowed to drain, and it is desirable that they should become as dry as possible by being spread out in suitable and well-ventilated sheds or otherwise, after which a quantity of sulphuric acid, by preference
5 of about the strength above mentioned, is mixed therewith in the proportions of about 224 lbs. of sulphuric acid to each ton of the dry or nearly dry precipitated matters. Or the sulphuric acid may be first combined with clay as above described, and the sulphated clay combined with the precipitated matters, which are then to be piled into a heap and allowed to stand till they are cooled
10 and dry, when they will be fit to be used as manure, either alone or mixed with other manuring substances.

In consequence of the composition of sewage varying so greatly in different places and at different times at the same place, no precise rule can be given as to the quantity which should be used in each case, but a little experience
15 will enable a manager of such works to judge of the effect produced by the sulphated clay, and he will readily ascertain when he is applying such clay with advantage by observing whether the precipitation is sufficiently ample by examining the state in which the sewage water is coming away from the reservoirs at the outlet. The scum or floating matters are to be removed by
20 skimming from time to time as required.

In witness whereof, I, the said Henry Bird, have hereunto set my hand and seal, this Thirteenth day of June, in the year of our Lord One thousand eight hundred and sixty-five.

HENRY BIRD. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1865.

when required for the most part from the water which they were
previously contained are added to drink and it is desirable that they should
be made as dry as possible by being spread out in suitable and well-ventilated
places or otherwise after which a quantity of sulphuric acid may be put
in about the strength above mentioned. It mixed thoroughly in the proportion
of about 200 lbs of sulphuric acid to each ton of the dry or nearly dry per-
centage mixture. On the sulphuric acid may be first dissolved which may be
about dissolved and the solution is mixed with the percentage mixture
which are then to be put into a heap and allowed to stand till they are cooled
10 and dry when they will be fit to be used as manure either alone or mixed
with other manuring substances.

In consequence of the composition of sewage varying so greatly in different
places and at different times at the same place, the precise rule can be given
as to the quantity which should be used in each case. It is a little experiment
15 will enable a manager of such works to judge of the effect produced by the
percentage of dry, and he will readily ascertain when he is applying such dry with
advantage by observing whether the proportion is sufficiently ample by
examining the state in which the sewage water is coming away from the
fermenters at the outlet. The scum or floating matters are to be removed by
20 skimming from time to time as required.

In witness whereof, I the said Henry Bird, have hereunto set my
hand and seal, this Twentieth day of June, in the year of our Lord
One thousand eight hundred and forty-four.

HENRY BIRD, (Ss.)

LONDON:
Printed by GEORGE HOWARD, at the WILKINSON PRESS, 10, ST. MARK'S LANE, 1844.
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