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Contributors

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A.D. 1871, *4th* NOVEMBER.

N° 2975.

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

OF

JOB COLE AND WILLIAM ABBOTT.

TREATING AND UTILIZING SEWAGE, &c.

LONDON:

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A.D. 1871, 4th NOVEMBER. N^o 2975.

Treating and Utilizing Sewage, &c.

LETTERS PATENT to Job Cole, Promenade Garden, Sutton Coldfield, in the County of Warwickshire, and William Abbott, Brass Founder, Birchfield, in the County of Staffordshire, for the Invention of "IMPROVEMENTS IN TREATING AND UTILIZING SEWAGE AND OTHER REFUSE MATTER, AND IN APPARATUS TO BE USED FOR THIS PURPOSE."

Sealed the 5th January 1872, and dated the 4th November 1871.

PROVISIONAL SPECIFICATION left by the said Job Cole and William Abbott at the Office of the Commissioners of Patents, with their Pet on the 4th November 1871.

We, JOB COLE, Promenade Garden, Sutton Coldfield, in the County of
5 Warwickshire, and WILLIAM ABBOTT, Brass Founder, Birchfield, in the
County of Staffordshire, do hereby declare the nature of the said Invention
for "IMPROVEMENTS IN TREATING AND UTILIZING SEWAGE AND OTHER REFUSE
MATTER, AND IN APPARATUS TO BE USED FOR THIS PURPOSE," to be as follows:—

Heretofore in order to purify sewage and to separate from it the solid
10 matters it contains the sewage has been passed into a series of settling

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tanks, and in some cases chemical substances have been added to it either before it enters or whilst it is contained in the settling tanks in order to precipitate the organic impurities contained in the sewage. The solid and organic matters settle down at the bottom of the depositing tanks, whilst the purified liquid portion of the sewage is allowed to flow away into a river or stream on to the land for the purposes of irrigation. The deposit accumulated in the tanks has from time to time to be removed and dried to be manufactured into a saleable manure, and great difficulty is now experienced in drying such deposit, and in addition the accumulated deposit whilst it is drying frequently gives off offensive smells and creates a nuisance wherever such sewage works are erected.

The object of our Invention is to remedy these inconveniences and to facilitate the drying of the deposit collected in the settling tanks. For this purpose we form the bottom of the settling tank of plates of metal, or tiles or other thin plates, and below such bottom we form hollow passages which are caused to traverse to and fro in a zig-zag manner from one side of the tank to the other. When an accumulation of deposit has been obtained in one of the settling tanks and the liquid portion of the sewage has been allowed to drain off from it hot water or steam or other heated fluid is caused to traverse through the zig-zag passages below the bottom of such tank, and thereby the whole of the bottom of the tank is heated and the deposit is dried in a few hours. The dried deposit is then removed from the tank and the tank can be again used for receiving sewage. The several settling tanks may be covered over with a suitable roof, and the gases or vapour given off whilst the deposit in any of them is being dried may be led through a fire and carried away to a chimney or may be otherwise disposed of. If chemical matters be used to purify the sewage and the liquid which passes off from the setting tanks is in a sufficiently purified state it may be allowed to pass at once into a river. If the liquid which passes from the settling tanks be not completely purified it may be led on to the land for irrigating purposes; it may also be purified by causing it to flow from the settling tanks into a channel covered over at the top with gratings or plates over which is a depth of earth, which absorbs any smell which may be given off, and the liquid then flows into or over shallow beds in which are aquatic plants; this completes the deodorization and purification of the liquid sewage and renders it fit to be passed into a

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river if desired. A stream of air is also drawn through the covered channel to carry off the injurious gases, and such stream of air where it leaves the channel may be conducted through charcoal to purify it from such gases, or it may be passed through a fire or otherwise disposed of.

- 5 The liquid sewage as it is passing through the channel may if desired be heated to facilitate the driving off of the carbonic acid gas therefrom. In some cases the solid and liquid excreta from closets in place of being carried off by a stream of water as sewage may be collected in tanks and be from time to time dried therein by the application of heat to the bottom
- 10 of the tank. Any smells arising from such closets are conducted off to a chimney of sufficient height to cause the requisite draught, and may be deodorized on their passage as before described. Sifted ashes or other dry material may from time to time be thrown into the closet.

SPECIFICATION in pursuance of the conditions of the Letters Patent,
15 filed by the said Job Cole and William Abbott in the Great Seal Patent Office on the 4th May 1872.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, JOB COLE, Promenade Garden, Sutton Coldfield, in the County of Warwickshire, and WILLIAM ABBOTT, Brass Founder, Birchfield, in the County of
20 Staffordshire, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Fourth day of November, in the year of our Lord One thousand eight hundred and seventy-one, in the thirty-fifth year of Her reign, did, for Herself, Her heirs and successors,
25 give and grant unto us, the said Job Cole and William Abbott, Her special license that we, the said Job Cole and William Abbott, our executors, administrators, and assigns, or such others as we, the said Job Cole and William Abbott, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and
30 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 TREATING AND UTILIZING SEWAGE AND OTHER REFUSE MATTER, AND IN APPARATUS TO BE USED FOR THIS PURPOSE," upon the
35 condition (amongst others) that we, the said Job Cole and William

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Abbott, our executors or administrators, by an instrument in writing under our or their hands and seals, or under the hand and seal of one of us or them, 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 5 calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said William Abbott, on behalf of myself and the said Job Cole, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, 10 to be particularly described and ascertained in and by the following statement thereof, that is to say :—

Heretofore in order to purify sewage and to separate from it the solid matters it contains the sewage has been passed into a series of settling tanks, and in some cases chemical substances have been added to it 15 either before it enters or whilst it is contained in the settling tanks in order to precipitate the organic impurities contained in the sewage. The solid and organic matters settle down at the bottom of the depositing tanks, whilst the purified liquid portion of the sewage is allowed to flow away into a river or stream on to the land for the purpose of irrigation. 20 The deposit accumulated in the tanks has from time to time to be removed and dried to be manufactured into a saleable manure, and great difficulty is now experienced in drying such deposit, and in addition the accumulated deposit whilst it is drying frequently gives off offensive smells and creates a nuisance wherever such sewage works are erected. 25

The object of our Invention is to remedy these inconveniences and to facilitate the drying of the deposit collected in the settling tanks. For this purpose we provide at the bottom of each settling tank a number of pipes or passages through which steam or other heated fluid may be caused to pass in order that when an accumulation of deposit 30 has been obtained in a settling tank and the liquid portion of the sewage has been drained off therefrom, that the whole of the deposit may be heated and quickly dried by causing steam or other heated fluid to pass through the pipes or passages. When the deposit has been sufficiently dried it may be removed from the tank and the tank can then be 35 again used for receiving sewage. The several settling tanks may be carried over with a suitable roof, and the gases or vapour given off

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whilst the deposit in any of them is being dried may be led through a fire and carried away to a chimney, or may be otherwise disposed of. If chemical matters be used to purify the sewage and the liquid which passes off from the settling tanks is in a sufficiently purified state it may
5 be allowed to pass at once into a river. If the liquid which passes from the settling tanks be not completely purified it may be led on to the land for irrigating purposes; it may also be purified by causing it to flow from the settling tanks into a channel covered over at the top with gratings or plates over which is a depth of earth which absorbs
10 any smell which may be given off, and the liquid then flows into or over shallow beds in which are aquatic plants; this completes the deodorization of the liquid sewage and renders it fit to be passed into a river if desired.

Having thus described the nature of our Invention we will proceed to
15 describe more fully the manner in which we carry the same into effect.

DESCRIPTION OF THE DRAWINGS.

Figure 1 shews a plan view partly in section of apparatus constructed as herein-before described for treating and utilizing sewage; Figure 2 shews a longitudinal section of one of the settling tanks; Figure 3 shews
20 a transverse section of the same. A is the main sewer or channel by which the sewage is conducted to the apparatus; B, B, are branch passages therefrom to the settling tanks C; the sewage as it enters these tanks is first received on to a grating D upon which all the larger solid matter is collected, whilst a large proportion of smaller solid matter falls
25 through the grating and is collected in the chamber E below it. The bottom of the settling tank we prefer to form in the manner shewn in section at Figure 4. In this Figure, F represents a layer of coarse gravel resting on perforated tiles G similar to the perforated tiles used when drying malt; H, H, are pipes through which steam or other heated fluid
30 may be caused to pass. These pipes are laid parallel with one another across the tank and are connected at their ends to longitudinal pipes, by which steam from a suitable steam boiler or by which other heated fluid may be supplied to and led off from them whenever the deposit which may have collected is required to be dried. By forming the bottom of
35 the settling tank like a filter bed as above described a large portion of the fluid sewage may be drawn off through the bottom of the tank and led away through the channels I which are below the perforated tiles. As

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before stated the settling tanks are covered in with a roof; this is marked K in Figure 3, and as a large amount of vapour will be condensed upon the roof when the deposit in any of the tanks is being dried we form the rafters in the manner shewn in transverse section at Figure 5, so that the sheets L of glass or other material may rest upon ledges M, below 5 which are channels N to conduct away the condensed water and prevent it again falling down to the settling tank. In place also of causing the sheets of glass or other material to overlap one another as usual at their ends we support their ends on iron bearers formed in a similar manner to the joists as shewn at Figure 6; the condensed water trickling 10 down the sheets of glass runs into the channels O of the iron bearers and from there into channels N of the rafters, by which it is led away to gutters at the bottom of the roof. The water drained off from the sewage in the settling tanks passes into the channel P, from which it flows into the channels Q, shewn in section at Figure 7. Numerous 15 perforations are formed in the arches or covers of these channels so that any gases passing from the sewage may rise up through the perforations. Above the arches or covers is a layer of mould which absorbs the gases as they arise, and in the earth thus fertilized crops of various kinds may be grown. After flowing through the channels Q, which may be of any 20 desired length, the purified liquid is received into a channel R and is led by channels S, S, on to any of the beds T, T, in which are to be grown plants or trees which grow freely in marsh land; these will quickly absorb any remaining impurities in the liquid sewage, and the liquid now purified may either be led away over the land for the 25 purposes of irrigation or be allowed to pass off into a river or other water.

Having thus described the nature of our Invention, and the manner of performing the same, we would have it understood that we claim as our improvements in treating and utilizing sewage and other refuse 30 matter and in apparatus to be used for this purpose,—

1. The treating and utilizing sewage by apparatus arranged substantially as herein described.

2. The application of pipes or passages at the bottom of a sewage settling tank so that the deposit collected in such tank may be dried 35 by causing steam or other heated fluid to pass through the pipes or passages.

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3. The combined arrangement of apparatus substantially as herein described for treating and utilizing sewage.

4. The treating and utilizing sewage by causing it after the solid matters have been separated therefrom to flow through channels covered
5 at the top with gratings or perforated coverings over which earth is placed to absorb any gas which may rise up through the perforations.

In witness whereof, I, the said William Abbott, have hereunto set my hand and seal, this Twenty-sixth day of April, in the year of our Lord One thousand eight hundred and seventy-two.

10

WILLIAM ABBOTT. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1872.

Col. J. Abbott's experiments in the treatment of the lungs, &c.

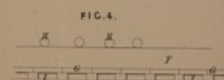
1. The combined arrangement of apparatus, and the manner of applying the treating and utilizing agency, is as follows:
2. The treating and utilizing agency, by causing it after the matter has been separated therefrom to flow through channels formed at the top with openings or perforated coverings over which is placed to absorb any gas which may rise up through the perforations.
3. In witness whereof, I, the said William Abbott, have hereunto set my hand and seal, this Twenty-sixth day of April, in the year of our Lord One thousand eight hundred and seventy-two.

WILLIAM ABBOTT. (A.S.)

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LONDON:

Printed by James Edwards, 15, Abchurch Lane, and William Horswood, 15, Abchurch Lane, in the Strand, near the Temple Church, 1872.



Section of Circular Sewer R

