

**Specification of Robert Angus Smith and Alexander McDougall :  
deodorizing and disinfecting sewage matters, and separating manure  
therefrom.**

**Contributors**

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A.D. 1854 . . . . . N<sup>o</sup> 142.

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

OF

ROBERT ANGUS SMITH  
AND  
ALEXANDER M<sup>c</sup>DOUGALL.

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DEODORIZING AND DISINFECTING SEWAGE  
MATTERS, AND SEPARATING MANURE  
THEREFROM.

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LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,  
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1854.









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A.D. 1854 . . . . . N° 142.

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**Deodorizing and Disinfecting Sewage Matters, and  
Separating Manure therefrom.**

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**LETTERS PATENT** to Robert Angus Smith, of Manchester, in the County of Lancaster, Doctor of Philosophy, and Alexander M<sup>c</sup>Dougall, of the same place, Manufacturing Chemist, for the Invention of "**IMPROVEMENTS IN TREATING, DEODORIZING, AND DISINFECTING SEWAGE AND OTHER OFFENSIVE MATTER, WHICH SAID IMPROVEMENTS ARE ALSO APPLICABLE TO DEODORIZING AND DISINFECTING IN GENERAL.**"

Sealed the 4th April 1854, and dated the 20th January 1854.

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**PROVISIONAL SPECIFICATION** left by the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall at the Office of the Commissioners of Patents, with their Petition, on the 20th January 1854.

We, **ROBERT ANGUS SMITH**, of Manchester, in the County of Lancaster,  
5 Doctor of Philosophy, and **ALEXANDER M<sup>c</sup>DOUGALL**, of the same place,  
Manufacturing Chemist, do hereby declare the nature of the said Invention  
for "**IMPROVEMENTS IN TREATING, DEODORIZING, AND DISINFECTING SEWAGE AND  
OTHER OFFENSIVE MATTER, WHICH SAID IMPROVEMENTS ARE ALSO APPLICABLE TO  
DEODORIZING AND DISINFECTING IN GENERAL,**" to be as follows:—  
10 The substances, &c. to be acted on, are all materials which give out  
offensive or injurious exhalations or effluvia, either of sulphuretted hydrogen or  
phosphuretted hydrogen, or other organic or inorganic substances, in gases or  
effluvia from any source or in any position where they can be treated.



*Smith & M<sup>c</sup>Dougall's Impts. in Deodorizing & Disinfecting Sewage Matters, &c.*

The substances to be used or employed for the purpose of removing the offensive or injurious effluvia are sulphurous acid, either alone or in combination. We prefer the combination which sulphurous acid makes with lime and magnesia or magnesian limestone acted on by sulphurous acid. Next carbolic acid, either alone or in combination, forming carbolates used either 5 alone or in conjunction with the sulphurous acid or sulphites before mentioned, all or either, used either in an acid or alkaline state as may be convenient.

The mode of using these substances is as follows:—Examples. The refuse of towns will be treated with all or any of the above-mentioned substances or materials, either in heaps as solid matter or manure, or in the state of sewage 10 water, however carried off, treating it either in the sewers themselves or in receptacles made for the sewage water, either in public or private sewers or receptacles. The offensive smell of bone works, and all works and places where animal matter becomes offensive, and where injurious or offensive vapours arise, gas water, for example, may be treated thus; not confining ourselves to 15 any mode of applying the substance or substances, as it may be found desirable to act on various stages of the coal or gas during the making, or purifying, and on various stages of the products of distillation of coal.

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**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall in the 20 Great Seal Patent Office on the 19th July 1854.

**TO ALL TO WHOM THESE PRESENTS SHALL COME**, we, ROBERT ANGUS SMITH, of Manchester, in the County of Lancaster, Doctor of Philosophy, and ALEXANDER M<sup>c</sup>DOUGALL, of the same place, Manufacturing Chemist, send greeting. 25

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twentieth day of January, in the year of our Lord One thousand eight hundred and fifty-four, in the seventeenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, Her special license 30 that we, the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, our executors, administrators, and assigns, or such others as we, the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, 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 35 make, use, exercise, and vend, within the United Kingdom of Great Britain



*Smith & M<sup>c</sup>Dougall's Impts. in Deodorizing & Disinfecting Sewage Matters, &c.*

and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN TREATING, DEODORIZING, AND DISINFECTING SEWAGE AND OTHER OFFENSIVE MATTER, WHICH SAID IMPROVEMENTS ARE ALSO APPLICABLE TO DEODORIZING AND DISINFECTING IN GENERAL," upon the condition (amongst others) that we,  
5 the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, by an instrument in writing under our 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  
10 Letters Patent.

NOW KNOW YE, that we, the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, 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):—

15 Our objects are the removal of all offensive smells from sewage and other offensive matter, and the separation or preservation of such parts of the same as are useful as manure. Offensive smells arise from the evolution of sulphuretted hydrogen or phosphuretted hydrogen, or other inorganic or organic substances, gases, or effluvia. We remove such offensive smells by the use of sulphurous  
20 acid, which when brought into contact with the offensive gases causes their immediate decomposition and consequent destruction of the smell. As it is more convenient to use the sulphurous acid in combination, we prefer as a base an alkaline earth, and of such bases we prefer magnesia and lime. It has been found that magnesia has the property of rapidly separating the two  
25 substances which constitute manure in urine, sewage, and other organic refuse matters, but it was not used for that purpose because of its inefficiency as a deodorizer. These substances are phosphoric acid and ammonia, with which the magnesia combines to form the ammonio-phosphate of magnesia, a scarcely soluble compound, of great value as a manure, and well known to chemists.  
30 The facts relating to the action of magnesia on substances containing phosphoric acid and ammonia have been for some years familiar to chemists, and therefore we do not claim its use as our Invention in the combinations specified. It sometimes happens that after the sulphite or sulphurous acid has done its part in deodorizing, a slight residual smell is perceived, which we remove by  
35 the use of carbolic acid, either in a free state or in combination. When such substances are to be disinfected, we use a mixture of sulphite of magnesia and lime, or a mixture of both and carbolate of magnesia and lime, the latter in very small proportion, which accomplishes the double purpose of removing all smell and precipitating in a condition most suitable for manure the phos-



*Smith & M<sup>c</sup>Dougall's Impts. in Deodorizing & Disinfecting Sewage Matters, &c.*

phoric acid and ammonia contained in the substances operated upon. We propose the use of our preparation in all stables, cowhouses, piggeries, privies, urinals, ash pits, and other places where organic matter becomes offensive; by its use the offensive smells will be removed, and the manure preserved and greatly increased in value. We also propose the use of our preparation in 5 gas works and other places where it will act in removing sulphuretted hydrogen, ammonia, and other offensive gases. In the application of our Invention to the sewage of a town, if the object be merely the removal of the offensive smell, it will be sufficient to introduce the preparation into the sewers through the grids or other openings to the surface, but if it be also desired to 10 preserve the manure, it will be necessary to provide reservoirs or receptacles (to be used alternately), in which the sewage may be allowed to stand while the matters which have been precipitated by the action of the disinfectant shall have time to subside, when the clear water standing above the deposit may be allowed to run off. It is desirable to have two or more reservoirs, 15 that one or more may be receiving the sewage or other matter, while the precipitated manure is being removed from the other. In some cases it may be found convenient to have the reservoirs of such area as to secure a very gentle current, and so permit the deposition to take place without the necessity of stopping the inlet to allow of subsidence. 20

Having thus particularly described and set forth our improvements in treating, deodorizing, and disinfecting sewage and other offensive matter, which said improvements are also applicable to deodorizing and disinfecting in general, we desire it to be distinctly understood that we claim the novel and peculiar treatment above named, and the operation, employment, or use 25 of the agents or substances so applied in the above-named process or processes, for the purpose of removing offensive or injurious effluvia.

In witness whereof, we, the said Robert Angus Smith and Alexander M<sup>c</sup>Dougall, have hereunto set our hands and seals, this Seventeenth day of July, in the year of our Lord One thousand eight hundred and 30 fifty-four.

ROBT ANGUS SMITH. (L.S.)

A. M<sup>c</sup>DOUGALL. (L.S.)

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1854.