Specification of James Robey : charcoal for purifying sewage, &c.;

A.D. 1873, 20th JANUARY. N° 230.

SPECIFICATION

OF

JAMES ROBEY.

...RCOAL FOR PURIFYING SEWAGE, &c.

LONDON:
...ED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
...NTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
...ISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.
1873.

A.D. 1873, 20*th* JANUARY. N° 230.

Charcoal for Purifying Sewage, &c.

LETTERS PATENT to James Robey, of the City of Manchester, Sugar Refiner, for the Invention of "A NEW OR IMPROVED CHARCOAL TO BE USED FOR PURIFYING SEWAGE AND OTHER FOUL WATERS, AND FOR DISINFECTING AND DEODORISING PURPOSES."

Sealed the 13th June 1873, and dated the 20th January 1873.

PROVISIONAL SPECIFICATION left by the said James Robey at the Office of the Commissioners of Patents, with his Petition, on the 20th January 1873.

I, JAMES ROBEY, of the City of Manchester, Sugar Refiner, do hereby declare the nature of the said Invention of "A NEW OR IMPROVED CHARCOAL TO BE USED FOR PURIFYING SEWAGE AND OTHER FOUL WATERS, AND FOR DISINFECTING AND DEODORISING PURPOSES," to be as follows:—

In the purification of sewage by what is termed the precipitating process it is the practice to mix the sewage with certain precipitating agents, and then to pass the mixture into a tank or reservoir (or the mixture is made in the tank or reservoir itself) where the whole is

allowed to stand until the suspended impurities contained in the sewage together with the precipitant have settled to the bottom. The supernatent liquid is then drawn off, leaving the solid matter technically called sludge at the bottom of the tank or reservoir. I take this sludge or precipitate, as produced by the Native Guano Company, Limited, when working according to either of the two Patents granted to Messieurs Sillar and Wigner, bearing date the 15th June 1868, No. 1954, and to W. Wigner, bearing date the 12th May 1870, No. 1354, in both of which Patents clay is the principal precipitant, or I take the sewage precipitate or sludge produced by other precipitating processes in which clay is used, and after drying such sludge I char the same in closed vessels at a red heat; the mode usually adopted in animal charcoal manufactories may be used, and thus I produce a charcoal which can be used for purifying sewage or other foul liquids, or for improving the effluent waters from sewage precipitating processes, and which charcoal has a considerable power of absorbing free or albumenoid ammonia from substances filtered through it, and is also useful for disinfecting and deodorising purposes.

I also produce a similar charcoal and having similar properties by taking the refuse carbonaceous matter produced in prussiate of potash manufactories, and mixing it with common clay in the proportion by weight of about two of clay to one of refuse, both by preference in a wet state. This mixture I dry and then char it in closed vessels, as before described.

SPECIFICATION filed in pursuance of the conditions of the Letters Patent, and of an Order of the Lord Chancellor, by the said James Robey in the Great Seal Patent Office on the 25th July 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES ROBEY, of Manchester, in the County of Lancaster, Sugar Refiner, send greeting.

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 seventy-three, in the

thirty-sixth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Robey, Her special licence that I, the said James Robey, my executors, administrators, and assigns, or such others as I, the said James Robey, 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, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "A NEW OR IMPROVED CHARCOAL TO BE USED FOR PURIFYING SEWAGE AND OTHER FOUL WATERS, AND FOR DISINFECTING AND DEODORISING PURPOSES," upon the condition (amongst others) that I, the said James Robey, by an instrument in writing under my hand and seal, 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 James Robey, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

In the purification of sewage by what is termed the precipitating process it is the practice to mix the sewage with certain precipitating agents, and then to pass the mixture into a tank or reservoir (or the mixture is made in a tank or reservoir itself), where the whole is allowed to stand until the suspended impurities contained in the sewage together with the precipitant have settled to the bottom. The supernatant liquid is then drawn off, leaving the solid matter technically called sludge at the bottom of the tank or reservoir. I take this sludge or precipitate, as produced by the Native Guano Company, Limited, when working according to either of the two Patents granted to Messieurs Sillar and Wigner, bearing date the 15th June 1868, No. 1954, and to W. Wigner, bearing date the 12th May 1870, No. 1354, in both of which Patents clay is the principal precipitant, or I take the sewage precipitate or sludge produced by other precipitating processes in which clay is used, and after drying such sludge I char the same in closed vessels at a red heat ; the mode usually adopted in animal charcoal manufactories may be employed, and thus I produce a charcoal which

can be used for purifying sewage or other foul liquids, or for improving the effluent waters from sewage precipitating processes, and which charcoal has a considerable power of absorbing free or albuminoid ammonia from substances filtered through it, and is also useful for disinfecting and deodorising purposes. If I find the charcoal produced from sewage precipitant as herein-before described to be too friable, I prefer to intimately mix a sufficient quantity of clay with such precipitant previous to charring, and thus increase the compactness of the charcoal made therefrom to any desired extent and also add to its specific gravity.

I also produce a similar charcoal and having similar properties from the carbonaceous refuse produced in prussiate of potash manufactories. This carbonaceous refuse is a well-known powerful disinfectant deodoriser and decolorer of foul liquids, as well as a good absorbent of ammonia and soluble salts. So far back as the year 1854 its application for deodorising sewage was described by Mr. Thomas Wicksteed in the Specification of Patent No. 193, but its use as a filtering medium has hitherto been discouraged owing to its extremely fine state of division. The difficulty of filtering through this material has been attempted to be overcome by the admixture with it of various substances, such as gravel, coarse sand, cinders, or other material to render it more open, and thus facilitate the passage through it of the filtrate.

Although filtration through the said prussiate of potash refuse has thus been accomplished, yet the admixture of so much inert matter is very objectionable, especially when it is desirable to restore its power after exhaustion, which could otherwise be most rapidly and economically accomplished by heating to redness in closed vessels, as is practised so extensively in the revivification of the animal charcoal used by sugar refiners.

It is obvious that the presence of the necessarily large amount of gravel, coarse sand, cinders, or other material alluded to, would add much to the expense of such a process of revivification, inasmuch as a large quantity of inert matter would thus require to be dried and made red hot or otherwise manipulated. The gravel, sand, or other material, it is true, might be sifted out, but as after use for filtering purposes the mixture would be a wet mass, this itself would be an expensive operation on the large scale, and even if economically and satisfactorily

accomplished the resulting charcoal is in so very fine a state of division as to present serious practical obstacles to the process of revivification by heating to redness in closed vessels. My object is therefore, first, to avoid all these difficulties in using such refuse as a filtering medium whilst retaining its full powers as a deodoriser, and secondly, to produce a material useful for precipitating the suspended and soluble impurities contained in sewage and other foul liquids. For these purposes, I intimately mix clay with the prussiate of potash refuse, and afterwards char the mixture at a red heat in closed vessels. Clay being a powerful absorbent of ammonia, and soluble salts is itself very useful as a filter for foul liquids, especially when calcined at a low temperature, and when so treated after mixture with the carbonaceous refuse herein-before described; it is very porous and presents in addition the still more powerful absorbent of impurities, the carbonaceous refuse of the prussiate of potash manufacture, in finely divided particles in a porous body to the fluids filtering through it, in this respect resembling closely in its physical condition the animal charcoal of the sugar refiner, but containing more carbon.

The quality and fine state of division of the varying carbonaceous refuses will require varying proportions of clay to secure the maximum amount of the former in the prepared charcoal, but a useful proportion I find to be about one to two parts by weight of dry clay to one part by weight of the dry carbonaceous refuse, but I use as little clay as may be necessary. Too little clay, however, would render the resulting charcoal too friable, as much therefore must be used as will yield after charring a compact charcoal, but rarely more than the above proportion of clay will be required. The clay I prefer for this purpose is pipe clay free from sand or foreign matters, but where economy is a main object I use any common ferruginous or other clay, selecting that which contains the least sand or other inert matter. I prefer to mix both the clay and the carbonaceous refuse in a moist condition by a pug or mortar mill or by any suitable machinery (that will accomplish a thoroughly homogeneous admixture), such as brick-making machinery, to such a consistency that it can be delivered from such machines in the form of small bricks, capable of being readily dried and charred; I then reduce the charred mixture to a granular state of about the size of large blasting powder or very coarse sand, a size very suitable for large filtering operations, and which facilitates the action of all kinds of

revivifying processes, but when using this my improved charcoal as a precipitant of suspended and soluble impurities in sewage and other foul liquids, I reduce the charred mixture to a state of fine powder, its increased specific gravity causing it to settle down in thick sewage much quicker than the prussiate of potash alone will do when so used.

Having thus particularly described and ascertained the nature of this my said Invention, together with the best methods with which I am acquainted for carrying the same into practical effect, I wish it to be understood that I do not confine myself to any particular method of intimately mixing the afore-mentioned material, nor to any particular kind of clay, but what I do claim is, the manufacture of an improved charcoal, as and for the purposes herein-before described.

In witness whereof, I, the said James Robey, have hereunto set my hand and seal, this Eighteenth day of July, in the year of our Lord One thousand eight hundred and seventy-three.

JA^{S}. ROBEY. (L.S.)

Witness,
JOHN G. WILSON,
Patent Office,
71, Market Street,
Manchester.

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