Specification of George William Wigner : treating and purifying sewage.

A.D. 1870, 8th FEBRUARY. N° 364.

SPECIFICATION

OF

GEORGE WILLIAM WIGNER.

TREATING AND PURIFYING SEWAGE.

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Treating and Purifying Sewage.

LETTERS PATENT to George William Wigner, of No. 1, Saint Swithin's Lane, in the City of London, Analytical Chemist, for the Invention of "IMPROVEMENTS IN THE MODE OF AND APPARATUS FOR TREATING AND PURIFYING SEWAGE."

Sealed the 29th March 1870, and dated the 8th February 1870.

PROVISIONAL SPECIFICATION left by the said George William Wigner at the Office of the Commissioners of Patents, with his Petition, on the 8th February 1870.

I, GEORGE WILLIAM WIGNER, of No. 1, Saint Swithin's Lane, in the City of London, Analytical Chemist, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE MODE OF AND APPARATUS FOR TREATING AND PURIFYING SEWAGE," to be as follows :—

My Invention relates to those processes in which chemical or other matters are mixed with sewage in order to purify it by precipitation.

And my said Invention consists, firstly, in the use of a pit or tank which I term a "catch pit," and through which I cause the sewage to pass slowly on its way from the main sewer or other source to the mixing

pit herein-after referred to in order that the said sewage may be caused to deposit a portion of its sand and other insoluble matter which falls to the bottom of the "catch pit," which is made sloping and is furnished with a channel for the conveyance of the matters so deposited and a well for their reception. As such matters settle they are conveyed by the aforesaid channel to the well, whence they are removed in any convenient manner.

My Invention consists further of the improved apparatus herein-after described for mixing with the sewage the chemical or other matters used for its purification.

The said apparatus is constructed and arranged as follows:—A vertical revolving shaft having radial arms furnished with tangs or teeth works in the pit or tank (which I term the "mixing pit"), into which the sewage passes from the catch pit herein-before referred to or from the sewer itself when a catch pit is not used, and in which the said sewage and chemical matters are mixed together. The tangs or teeth carried by the aforesaid shaft work between stationary tangs or teeth fixed either in the bottom of the pit or to a bar or to bars extending across the said pit. The said shaft is caused to revolve by steam or other power so as to cause the tangs or teeth carried by the arms of the said shaft to pass between the fixed tangs or teeth aforesaid and to tear up and thoroughly macerate any coarse solid matter contained in the sewage, and to mix with the said sewage the chemical or other matters used for its purification.

My Invention consists further of the improved agitators or stirrers herein-after described by means of which the chemical or other matters are mixed or incorporated before being added to the sewage. The said agitators consist of central vertical shafts which are caused to revolve by steam or other power, and to which are affixed radial arms consisting of flat blades of iron twisted so as somewhat to resemble the blades of a screw propeller. One of these agitators is mounted in the centre of each of the chemical pits in which the chemicals are mixed as aforesaid, and which I prefer to construct or place at the side of the mixing pit, so that by means of endless chains of buckets working in the chemical pit the chemical or other matters can be raised therefrom and delivered to the "mixing pit."

My Invention consists further of the improved arrangement of precipitating apparatus herein-after described into which the sewage mixed

with chemical or other matters as aforesaid is caused to flow for the purpose of precipitating its impurities.

The said apparatus consists of a series of settling or precipitating tanks having sloping bottoms and channels for the more ready conveyance away of the mud which settles from the sewage. At the junction of four of these tanks I build or form a brick well (by preference of a circular form) into which the mud can be allowed to flow from the channels aforesaid through penstocks, and in this well I fix the pump or other apparatus by means of which the mud is removed. As the sewage flows from one tank to another it passes over brick walls by which the tanks are separated from one another, and at the end of the series of tanks the effluent water is received in a collecting culvert to be conducted to the filter.

My Invention consists further of the improvements herein-after described in the construction of the filter above referred to. As filters of this description are ordinarily constructed the top layer of filtering material consists of charcoal. Now according to my Invention I stretch over this layer a sheet of canvass or other similar permeable material for the purpose of protecting the charcoal from removal or disturbance, and over the said canvass or other material I put a layer of sand which when it is wished to clean the filter can be removed without disturbing the said charcoal.

The mud precipitated from the sewage and collected in the well herein-before described may be treated in any suitable manner for the manufacture of manure.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said George William Wigner in the Great Seal Patent Office on the 8th August 1870.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, GEORGE WILLIAM WIGNER, of No. 1, Saint Swithin's Lane, in the City of London, Analytical Chemist, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Eighth day of February, in the year of our Lord One thousand eight hundred and seventy, in the thirty-

third year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said George William Wigner, Her special licence that I, the said George William Wigner, my executors, administrators, and assigns, or such others as I, the said George William Wigner, 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 "IMPROVEMENTS IN THE MODE OF AND APPARATUS FOR TREATING AND PURIFYING SEWAGE," upon the condition (amongst others) that I, the said George William Wigner, my executors or administrators, by an instrument 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 George William Wigner, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

My Invention relates to those processes in which chemical or other matters are mixed with sewage in order to purify it by precipitation.

And my said Invention consists, firstly, in the use of a pit or tank, which I term a "catch pit," and through which I cause the sewage to pass slowly on its way from the main sewer or other source to the mixing pit herein-after referred to, in order that the said sewage may be caused to deposit a portion of its sand and other insoluble matter which falls to the bottom of the catch pit, which is made sloping and is furnished with a channel for the conveyance of the matters so deposited and a well for their reception. As such matters settle they are conveyed by the aforesaid channel to the well, whence they are removed in any convenient manner. From the catch pit the sewage passes through a culvert to a pit (which I term a "mixing pit"), in which pit the said sewage is mixed with the chemical or other matters used for its purification.

I prefer to effect the mixture of such matters with the sewage by means of apparatus constructed and arranged as follows:—A vertical

revolving shaft having radial arms furnished with tangs or teeth works in the mixing pit, being caused to revolve therein by steam or other power, so as to cause the aforesaid tangs or teeth to pass between stationary tangs or teeth fixed either in the bottom of the pit or to a bar or to bars extending across the said pit, and thereby to tear up and thoroughly macerate any coarse solid matter contained in the said sewage, and to mix with the said sewage the chemical or other matters used for its purification.

When the sewage is much diluted (as is often the case at night), or when it rushes through the mixing pit with great force, the artificial agitation of the sewage as above described may be dispensed with.

In mixing or incorporating the chemical or other matters before adding them to the sewage as aforesaid, I prefer to use agitators or stirrers, consisting of central vertical shafts, which are caused to revolve by steam or other power, and to which are affixed radial arms consisting of flat blades of iron twisted so as somewhat to resemble the blades of a screw propeller. One of these agitators is mounted in the centre of each of the chemical pits in which the chemical or other matters are mixed as aforesaid, and which I prefer to construct or place at the side of the mixing pit, so that by means of endless chains of buckets working in the chemical pits the said chemical or other matters can be raised therefrom and delivered to the mixing pit.

My Invention consists further of the improved arrangement of precipitating apparatus herein-after described, into which the sewage mixed with the chemical or other matters is caused to flow for the purpose of precipitating its impurities.

The said apparatus consists of a series of settling or precipitating tanks, having sloping bottoms and channels for the more ready conveyance away of the sediment or mud which settles from the sewage. At the junction of four of these tanks I build or form a brick well (by preference of a circular form), into which the mud can be allowed to flow from the channels aforesaid through penstocks, and in this well I fix the pumps or other apparatus by means of which the sediment or mud is removed. As the sewage passes from one tank to another it passes over brick walls by which the tanks are separated from one another, and at the end of the series of tanks the effluent water is received in a collecting culvert to be conducted to the filter.

Wigner's Improvements in Treating and Purifying Sewage.

My Invention consists further of the improvement herein-after described in the construction of the filter above referred to. As filters of this description are ordinarily constructed the top layer of filtering substance consists of charcoal. Now according to my Invention I stretch over this layer a sheet of canvass or other similar permeable material for the purpose of protecting the charcoal from removal or disturbance, and over the said canvass or other material I put a layer of sand, which when it is wished to clean the filter can be removed without disturbing the said charcoal.

The sediment or mud precipitated from the sewage and collected in the well herein-before described may be treated in any suitable manner for the manufacture of manure.

Having now described the nature of my Invention, I will proceed to describe the manner in which the same is to be performed, reference being had to the accompanying Drawing, and to the figures and letters marked thereon.

Figure 1 is a horizontal section of the catch pit, mixing pit, precipitating tanks, and filter herein-before described; Figure 2 is a vertical section of the same taken on the line Y, Z, Figure 1; Figure 3 is a transverse section on a larger scale, the said section being taken on the line T, U, Figure 1; Figure 4 is a transverse section taken on the line V, X, Figure 1; Figure 5 is a vertical section of the mud well herein-after referred to; and Figure 6 represents on a larger scale side and end elevations of one of the stirrers d^2 herein-after referred to. The same figures and letters of reference indicate the same parts in each of the several Figures.

A is the catch pit, a^1 is the sloping bottom thereof, and a^2 is a mud channel leading into the well a^3; C, C, are the mixing pits in which the chemical substances to be used in the purification of the sewage are or may be mixed previously to being added thereto. The said pits are furnished with agitators or stirrers consisting of shafts D, D, which revolve in bearings d^1, d^1, and carry radial arms d^2, d^2, formed of flat blades of iron twisted, as represented in Figure 6, so as somewhat to resemble the blades of a screw propeller. E, E, are endless chains carrying buckets e^1, e^1, by which the chemical substances are raised from the pits C, C, and delivered through troughs or channels e^2, e^2, to the mixing pit B, into which the sewage passes from the culvert a^4. The said substances are mixed with the sewage by means of a shaft F which revolves in

bearings f^1, f^1, and to which are affixed radial arms f^2, f^2, furnished with tangs or teeth f^3, f^3, which work between stationary tangs or teeth f^4, f^4, fixed either to a bar f^5 extending across the pit, as shown, or in the bottom of the pit itself. As the shaft F revolves the tangs or teeth f^3, f^3, pass between the tangs or teeth f^4, f^4, and tear up any coarse solid matter contained in the sewage, and mix with the said sewage the chemical or other substances used for its purification. The shafts D, D, and F may be driven by steam or other suitable motive power. G^1, G^1, G^2, G^2, G^3, G^3, are precipitating tanks, into which the mixture of sewage and chemical substances passes from the mixing pit B, the said mixture being introduced through a culvert b^1, b^2, and openings b^3, b^3, in the brickwork. The bottoms of the tanks slope towards the line V, X, and have mud channels $g^1, g^1, g^2, g^2, g^3, g^3$. H is a well constructed at the junction of the tanks G^1, G^1, G^2, G^2, (see Figures 1, 2, and 5). The sediment or mud deposited by the sewage in the tanks G^3, G^3, passes into the channels g^3, g^3, and thence through openings g^4, g^4, in the partition wall to the tanks G^2, G^2. The said openings may be furnished with penstocks. The sediment or mud in the tanks G^1, G^1, G^2, G^2, passes into channels g^1, g^1, g^2, g^2, and thence through penstocks h, h, h, h, into the well H, whence the said sediment or mud is removed by means of a pump or other suitable apparatus (not shown). As the sewage flows from one set of tanks to another it passes over the transverse partition walls, and the effluent water is received in the collecting culvert I, through or over which the said water is delivered to the filter K, whence the said water passes in a pure or nearly pure state to a river or other suitable outlet, or the said water may be discharged into the river or other outlet without filtration.

In constructing the filter K, I stretch over the top layer of charcoal k^1 or other chemical filtering substance a sheet of canvass k^2 or other similar permeable material, which protects the said charcoal or other similar chemical substance from removal or disturbance, and over the said sheet of canvass or other material I put a layer of sand k^3, which intercepts the coarser portions of the impurities in the effluent water aforesaid, so that when it is wished to clean the filter the said layer of sand and the impurities intercepted thereby can be removed without disturbing the charcoal or other chemical substance.

Having thus described the nature of my Invention, and the manner in which the same is to be performed, I wish it to be understood that I do

not confine myself to the precise details and proportions herein-before described, as the same may be varied without departing from the nature of my said Invention; but I claim as my Invention,—

Firstly. The construction and use of a catch pit with a mud channel and well, as and for the purpose herein-before described.

Secondly. The improved construction and arrangement of precipitating apparatus herein-before described and illustrated in Figures 1, 2, 4, and 5 of the accompanying Drawing, that is to say, tanks having sloping bottoms and mud channels for collecting the sediment or mud precipitated from the sewage or sewage water passing through the said tanks, and also a well or wells into which the said sediment or mud passes from the said channels, essentially as described.

Thirdly. The improvement herein-before described and illustrated in Figures 1, 2, and 6[A] of the accompanying Drawing in the construction of filters used for filtering sewage water, that is to say, stretching over that which in filters of the ordinary construction is the top layer of filtering substance a sheet of canvass or other similar permeable material as and for the purpose described.

In witness whereof, I, the said George William Wigner, have hereunto set my hand and seal, this Fourth day of August, in the year of our Lord One thousand eight hundred and seventy.

G. W. WIGNER. (L.S.)

Witness,
H. H. MURDOCH.

LONDON:
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Printers to the Queen's most Excellent Majesty. 1870.

FIG. 1.

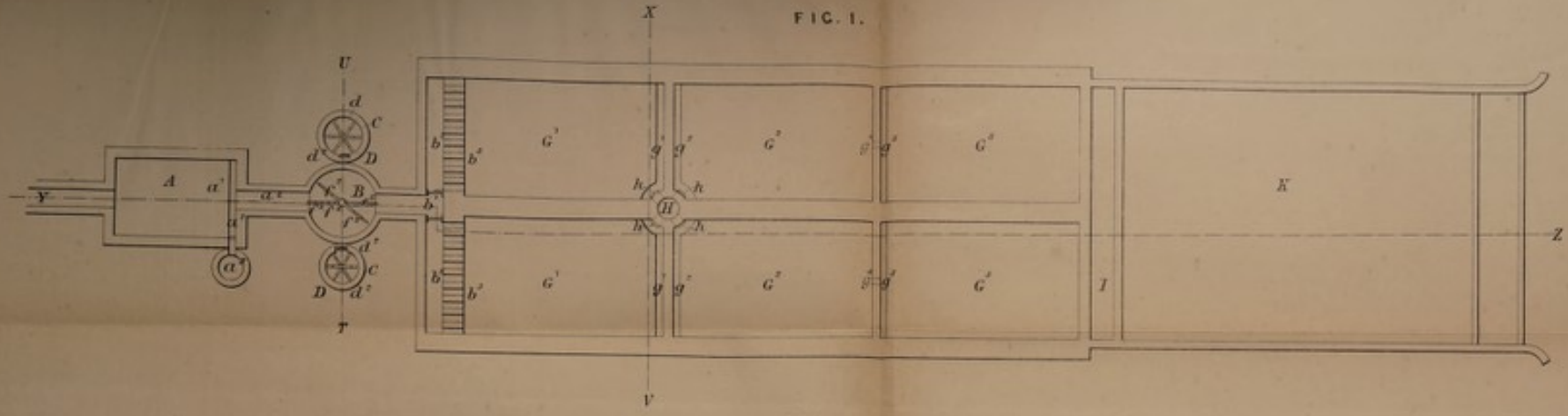

FIG. 2.

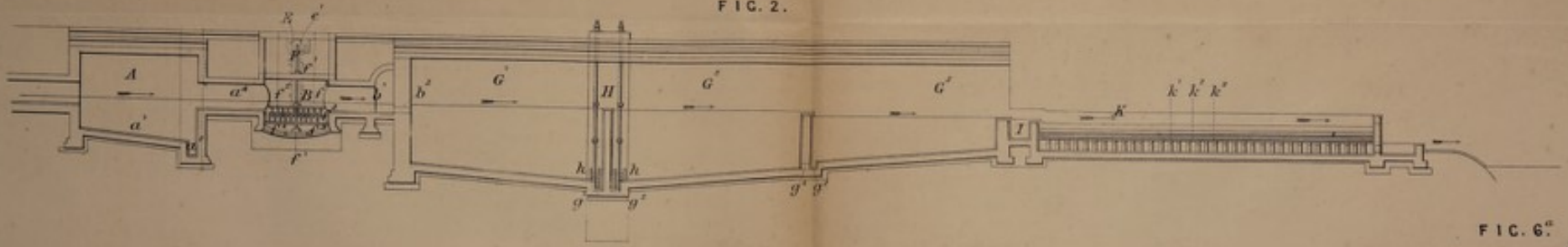

FIG. 3.

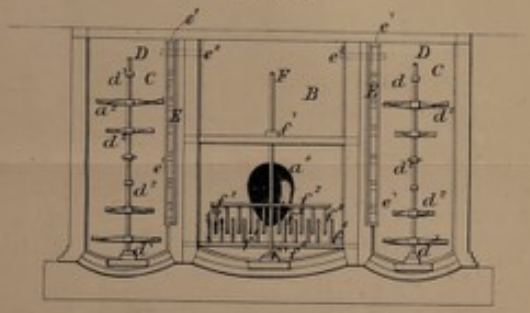

FIG. 4.

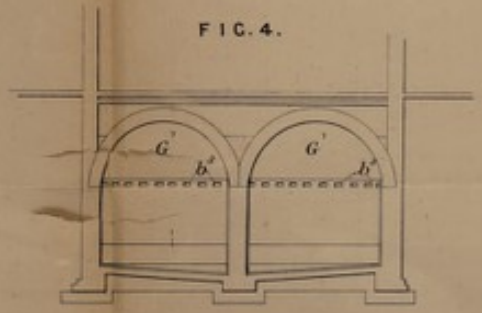

FIG. 5.

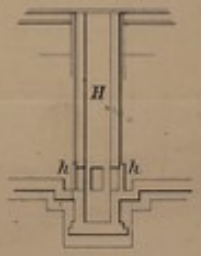

FIG. 6.

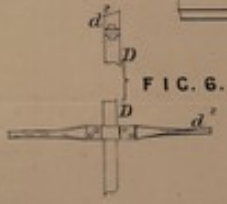

FIG. 6ª.

The filed drawing is not colored.

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