Specification of Joseph Caldwell Lee : collecting and treating excreta.

Contributors

Lee, Joseph Caldwell.

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A.D. 1869, 1st APRIL. N° 982.

SPECIFICATION

OF

JOSEPH CALDWELL LEE.

COLLECTING AND TREATING EXCRETA.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
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1869.

A.D. 1869, 1st April. N° 982.

Collecting and Treating Excreta.

LETTERS PATENT to Joseph Caldwell Lee, of Ashton-on-Mersey, in the County of Chester, Chemist, for the Invention of "CERTAIN METHODS OF COLLECTING EXCRETA AND OF TREATING THE SAME IN ORDER TO RENDER THEM COMPARATIVELY INNOCUOUS AND TO OBTAIN AN USEFUL PRODUCT OR USEFUL PRODUCTS THEREFROM."

Sealed the 25th September 1869, and dated the 1st April 1869.

PROVISIONAL SPECIFICATION left by the said Joseph Caldwell Lee at the Office of the Commissioners of Patents, with his Petition, on the 1st April 1869.

I, JOSEPH CALDWELL LEE, of Ashton-on-Mersey, in the County of Chester, Chemist, do hereby declare the nature of the said Invention for "CERTAIN METHODS OF COLLECTING EXCRETA AND OF TREATING THE SAME IN ORDER TO RENDER THEM COMPARATIVELY INNOCUOUS AND TO OBTAIN AN USEFUL PRODUCT OR USEFUL PRODUCTS THEREFROM," to be as follows:—

My Invention has for its object the collection of excreta, as, for example, human fœces and urine, in such a manner as shall prevent to a certain extent the discharge of noxious emanations into the atmosphere,

more particularly of large towns and cities, and the treatment thereof by improved methods in order to obtain useful products or an useful product therefrom, as, for example, a comparatively dry fertilizing agent.

In the carrying into effect of my Invention I employ boxes, cases, or receptacles preferably formed of metal, and fitted with lids, doors, or covers so fitted or arranged as that when the receptacles are closed by means of the said lids, doors, or covers the said receptacles shall be both air and water tight. For the purpose of making the joint between each receptacle and its lid or cover air-tight caoutchouc or any other suitable elastic material may be employed, or a channel may be formed in or on the receptacle, which is to be filled or nearly filled with water or with a deodorising fluid or material, or with any suitable substance or fluid into which a flanch formed on the lid or cover dips sufficiently to seal the receptacle, that is to say, to prevent wholly or partially the emission of noxious emanations from within the receptacle. I sometimes enclose the said receptacle in an outer case which is fitted with a lid or cover in manner as above described, the receptacle being in this case either provided with an air-tight cover or not as may be desired. It is preferred that the receptacle be fitted with an inclined or suitably shaped partition, grating, or screen in order to lessen the disturbance of the contents and the exposure thereof when the cover is removed or raised. The said receptacle or the outer case thereof is or may be fitted with a tube or pipe which is preferably fitted with a stop valve or cock, and is connected with a second pipe which may also be fitted with a stop valve, and which is in communication with the outside of the building, or with a cistern, chamber, or receptacle containing deodorising, disinfecting, or absorbing solutions or substances into which the gases or other emanations from the receptacle discharge themselves or are discharged by the action of an air pump, fan, or exhauster actuated by the hand at suitable intervals or by the action of opening or closing a door or the lid or cover of the receptacle. The connection between the pipe attached to the receptacle and the fixed pipe is effected by means of an union joint, or the junction of the two pipes is sealed with water or other fluid, as herein-before described when referring to the covers of the receptacles, or the said joint is otherwise so arranged as that the receptacle may be readily disconnected. To provide for exceptional circumstances, as, for example, in cases of illness, portable receptacles may be employed, in which case it is preferable that deodorising or disinfecting fluids or substances, as, for example, carbolic acid, be introduced into them before they are used.

It will be understood that the receptacles constructed substantially as above described are to be placed in such positions in or in connection with dwelling houses or other buildings as that the excreta may be received into the said receptacles, which latter are removed at suitable intervals, and their contents treated in manner as follows:—In the event of the contents of the receptacles being to some extent decomposed the resultant ammonia, or salt of ammonia, is or may be fixed by the addition of sulphuric acid or of other suitable acid substance or material. The said contents either after or without undergoing the above process are placed within a vessel of copper, iron, or other suitable metal or material, the said vessel being heated by suitable means, as for example, by steam introduced between the said vessel and an outer jacket, or through a coil or system of pipes arranged within the said vessel. It is preferred that the vessel be enclosed in manner similar as in the case of the ordinary vacuum pans in order that a partial vacuum may be produced in the interior of the vessel by means of an air pump or of air pumps or exhausters or by other suitable means acting by preference in conjunction with a condenser or with condensers. If it is not desirable to discharge the vapours and gases withdrawn from the said vessel directly into the atmosphere they may be rendered innocuous by being brought into contact with suitable disinfecting fluids or substances, or by being drawn or forced through sufficiently heated pipes, or by discharging them into or under fires or furnaces either separately or mixed with air or with inflammable gas or gases. The residue left in the said vessel after being sufficiently dessicated may be cooled by the application of cool air or fluid in the space previously occupied by steam, and may then be removed therefrom and employed as a manure or fertilizing agent, or may be made the source of products obtainable therefrom by suitable treatment. If found to be desirable the receptacles after being emptied and cleansed may be steamed or otherwise exposed to a high temperature in order to render inert any germs of infection or vitality.

Lee's Improved Method of Collecting and Treating Excreta.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Joseph Caldwell Lee in the Great Seal Patent Office on the 1st October 1869.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOSEPH CALDWELL LEE, of Ashton-on-Mersey, in the County of Chester, Chemist, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the First day of April, in the year of our Lord One thousand eight hundred and sixty-nine, in the thirty-second year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Joseph Caldwell Lee, Her special license that I, the said Joseph Caldwell Lee, my executors, administrators, and assigns, or such others as I, the said Joseph Caldwell Lee, 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 "CERTAIN METHODS OF COLLECTING EXCRETA AND OF TREATING THE SAME IN ORDER TO RENDER THEM COMPARATIVELY INNOCUOUS, AND TO OBTAIN AN USEFUL PRODUCT OR USEFUL PRODUCTS THEREFROM," upon the condition, amongst others, that I, the said Joseph Caldwell Lee, 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 Joseph Caldwell Lee, 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 and accompanying Drawings, that is to say:—

My Invention has for its object the collection of excreta, as for example, human fœces and urine, in such manner as shall prevent to a certain extent the discharge of noxious emanations into the atmosphere, more particularly of large towns and cities, and the treatment of the

said excreta by improved methods in order to obtain useful products or an useful product therefrom, as, for example, a comparatively dry fertilizing agent.

In the carrying into effect of my said Invention I employ boxes, cases, or receptacles preferably formed of metal and fitted with lids, doors, or covers so fitted or arranged as that when the rexeptacles are closed by means of the said lids, doors, or covers the said receptacles shall be air-tight or nearly air-tight. For the purpose of making the joint between each receptacle and its lid or cover air-tight caoutcnouc or any other suitable elastic material may be employed, or a channel may be formed in or on the receptacle, which is to be filled or nearly filled with water or with a deodorising fluid or material, or with any suitable substance or fluid into which a flanch formed on the lid or cover dips sufficiently to seal the receptacle, that is to say, to prevent wholly or partially the emmission of noxious emanations from within the receptacle. I sometimes enclose the said receptacle in an outer case which is fitted with a lid or cover in manner as above described, the receptacle being in this case either provided with an air-tight cover or not, as may be desired. It is preferred that the receptacle be fitted with an inclined or suitably shaped partition, grating, or screen in order to lessen the disturbance of the contents and the exposure thereof when the cover is removed or raised. The said receptacle or the outer case thereof is or may be fitted with a tube or pipe, which is preferably fitted with a stop valve or cock, and is connected with a second pipe, which may also be fitted with a stop valve and which is in communication with the outside of the building, or with a cistern, chamber, or receptacle containing deodorising, disinfecting, or absorbing solutions or substances into which the gases or other emanations from the receptacle discharge themselves or are discharged by the action of an air pump, fan, or exhauster actuated by the hand at suitable intervals or by the action of opening or closing a door, or the lid or cover of the receptacle. The connection between the pipe attached to the receptacle and the fixed pipe is effected by means of an union joint, or the junction of the two pipes may be sealed with water or other fluid, as herein-before described when referring to the covers of the receptacles, or the said joint is otherwise so arranged as that the receptacle may be readily disconnected. To provide for exceptional circumstances, as, for example, cases of illness, portable receptacles may be employed, in which cases it is preferable that deodorising or disinfecting fluids or substances, as,

for example, carbolic acid, be introduced into them before they are used.

It will be understood that the receptacles constructed substantially as above described are to be placed in such positions in or in connection with dwelling houses or other buildings as that the excreta may be received into the said receptacles, which latter are to be removed at suitable intervals and their contents treated in manner as follows:—In the event of the contents of the receptacles being to some extent decomposed the resultant ammonia or salt of ammonia is or may be fixed by the addition of sulphuric acid or of other suitable acid substance or material. The said contents either after or without undergoing the above process are placed within a vessel of copper, iron, or other suitable metal or material, the said vessel being heated by suitable means, as, for example, by steam introduced between the said vessel and an outer jacket, or through a coil or system of pipes arranged within the said vessel. It is preferred that the vessel be enclosed in manner similar as in the case of the ordinary vacuum pans in order that a partial vacuum may be produced in the interior of the vessel by means of an air pump or of air pumps, or exhausters, or by other suitable means acting by preference in conjunction with a condenser or with condensers. If it is not desirable to discharge the vapours and gases withdrawn from the said vessel directly into the atmosphere they may be rendered innocuous by being brought into contact with suitable disinfecting fluids or substances, or by being drawn or forced through sufficiently heated pipes, or by discharging them into or under fires or furnaces, either seperately or mixed with air or with inflammable gas or gases. The residue left in the said vessel after being sufficiently dessicated may be cooled by the application of cool air or fluid in the space previously occupied by steam and may then be discharged from the said vessel and employed as a manure or fertilizing agent, or may be made the source of products obtainable therefrom by suitable treatment. If found to be desirable the receptacles after being emptied and cleansed may be steamed or otherwise exposed to a high temperature in order to render inert any germs of infection or vitality.

In order that the said Invention may be better understood I have attached to this Specification a Sheet of Drawings having letters of reference marked thereupon. Similar letters indicating corresponding parts in the various Figures.

Referring in this place to the said Drawings, Fig. 1 represents a cross section through one of the aforesaid receptacles, and Figs. 2 to 7 represent various modifications which may be made in the construction of the said receptacles, and in the arrangements connected therewith, all the said Figures, with the exception of Fig. 7, being drawn about one-eighth of the full size.

In Fig. 1 *a* is the body of the receptacle; *b* is the lid thereof; *c* is a pipe, to carry away the gases or foul air; and *d* is the wood casing which may be of any suitable form and construction. The said receptacle is fitted with a circular mounting *e*, in which is formed an annular recess to contain water or other fluid or substance as aforesaid, and the lid is furnished with a projecting flanch made to enter the said recess in order to seal the receptacle, as afore-mentioned. The sloping partition *f* is in this example made of a circular form in order that it may be readily withdrawn when the receptacle is to be cleansed, the said partition being formed of earthenware or of metal preferably enamelled and resting upon a projecting ledge formed around the interior of the mounting, as shewn. An opening is formed at f^1 communicating with the interior of the receptacle. The said receptacle is shewn as fitted with a stop-cock or valve *g* to which is attached the piece *h* which forms a portion of a water joint, the other portion h^1 being fitted to slide on the lower end of the pipe *c*, so that the receptacle may be readily connected with or disconnected from the pipe *c*, the said pipe being in communication with a chimney or other flue, or being continued to the outside of the building. When the receptacle has to be removed the stop-cock is closed, and the sliding piece h^1 is moved upwards.

In Fig. 2 a modification of the said sliding piece is shewn. In this example the lower end of the said sliding piece enters an annular channel formed on the upper part of the receptacle, a loose cap being placed in the said channel when the receptacle has to be moved.

In Fig. 3 another form of receptacle is illustrated. In this example the body of the receptacle is formed with a channel *i* to contain water, and the upper portion a^1 is formed with a projecting rim which enters the said channel in order to seal the receptacle in a similar manner as in the case of the lid in Fig. 1. The upper portion of the receptacle may by these means be readily removed. A ring of caoutchouc *j* is employed to make a joint between the lid *b* and the upper portion of the receptacle. The joint between the receptacle and the pipe *c* is made

with a screw coupling k. When the said coupling is detached from the receptacle a suitably formed cap may be screwed on in its place. In order that the receptacle may be readily removed it is fitted with handles l and with wheels l^1, any of the other forms of receptacles being similarly fitted if desired.

The receptacle shewn at Fig. 4 is adapted to be ordinarily used without any other cover than the usual hinged lid d^1. In this example the space enclosed by the wood casing is in communication with an air passage or flue c^1, the said passage or flue being continued upwards or being connected with a chimney flue or pipe which is continued upwards sufficiently to create a draft or current of air outwards from the aforesaid casing and into the said passage or flue, a valve so balanced as to close the said passage when a down draft occurs being employed if found to be necessary. When the receptacle is to be removed a lid may be placed over the opening, and may be secured by the hinged bolts shewn at m, m, or otherwise as may be desired.

Figs. 5 and 6 illustrate a receptacle of a circular form, the upper portion of which is secured to the lower portion by means of bolts and nuts, a ring of caoutchouc or other suitable material being employed to make a tight joint.

Any of the other receptacles shewn in the Drawings may be made of a circular form if desired.

At Fig. 7 a method is shewn of creating an artificial draft or of causing a current of air to flow out of the receptacle. In this example the discharge pipe c^2 terminates in the tank n, which is partly filled with water or other fluid, and the upper end of the said pipe is fitted with a valve. A lever o is attached to the under side of the hinged lid d, and to the said lever is attached a cord or chain which passes over the pulley o^1, and from which is suspended the drum o^2. When the lid d^1 is raised the said drum is drawn upwards by means of the action of the said lid on the cord or chain, and a current of air flows out of the receptacle to occupy the interior of the said drum. When the said lid is closed the falling of the drum causes the discharge of the air through the pipe o^3.

Fig. 8 represents a longitudinal section, and Fig. 9 a cross section of an apparatus specially designed to be employed in the concentration or dessication of the excreta. In the said Figures p is a circular boiler or evaporator, which is formed with an inner shell p^1, the space between

the said inner shell and the outer shell being in communication with the pipe q and with the pipes and valves r, r, in order that either steam or water may be admitted to the said space as may be required. To the outside of the said boiler are attached two turned cast-iron rings w, w, which rest on the wheels x, x, so that on the said wheels being caused to rotate by any suitable means the said boiler will revolve on its axis. The curved pipe s is fixed to the chamber t, and the boiler is fitted with a stuffing box and gland y, in order that a partial vacuum may be maintained in the said boiler. A pipe z conveys the vapour and gases from the chamber t to a condensing apparatus and air pump or exhauster, the said apparatus being of any ordinary and suitable construction, as, for example, it may consist of a series of metal pipes outwardly exposed to the atmosphere or to the contact of water. The water arising from the condensation of steam is discharged through the valve x^1, which is opened at intervals by the adjustable incline y^1. The excreta collected by the means herein-before described or otherwise collected, are to be allowed to flow through a shute or are to be otherwise introduced into the aforesaid boiler through the door or man-hole u, for which purpose the boiler is rotated until the said man-hole is in or near its highest position. When the boiler is sufficiently charged the door is closed and screwed tight, the steam is admitted to the space between the outer and the inner shells of the boiler, and the said boiler is caused to rotate and at the same time a partial vacuum is maintained within the boiler and condenser. By causing the said boiler to rotate an increased area of evaporating surface is obtained, and at the same time the deposition of the excreta on the interior surface of the boiler is to a great extent prevented. A fixed scraper u^1 is employed to prevent the accumulation of deposit on the said interior surface. Any solid matter passing through the pipe s will to a certain extent be deposited in the chamber t, and may with the vapour condensed in the said chamber be withdrawn through the pipe v or otherwise as found to be most convenient. When the contents of the boiler are sufficiently concentrated and after they have been cooled by the admission of water into the aforesaid steam space if such cooling is found to be desirable, the said contents may be withdrawn through the man-hole u, and may be received into wagons, as shewn by the dotted lines in Fig. 8.

In lieu of the apparatus illustrated by Figs. 8 and 9 any other suitable

form of evaporator may be employed, in which the aforesaid concentration is effected by the application of heat.

Having now fully described the nature of my said Invention, and means for carrying the same into practical effect, I would have it to be distinctly understood that I claim,—

First. The collection of excreta in portable receptacles adapted to be closed or sealed and to be removed with their contents from the dwelling houses or other places in which they may be employed, substantially as herein described and as illustrated in the attached Drawings.

Secondly. Effecting the concentration or dessication of excreta in suitable covered or enclosed vessels, boilers, or evaporators by the application of heat, either with or without the maintainence of a partial vacuum within the said vessels, boilers, or evaporators.

And thirdly. The form of evaporator as and for the purpose as herein-before described and illustrated by Figs. 8 and 9 of the accompanying Drawings.

In witness whereof, I, the said Joseph Caldwell Lee, have hereunto set my hand and seal, this Thirtieth day of September, in the year of our Lord One thousand eight hundred and sixty-nine.

JOSEPH CALDWELL LEE. (L.S.)

Signed and sealed by the said Joseph Caldwell Lee, in the presence of

EDWARD K. DUTTON,
Agent to the Patentee,
3, Smithy Door,
Manchester.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1869.

A.D. 1869. April 1. N° 362.
LEE'S Specification.

[1 SHEET]

FIG. 2.

FIG. 1.

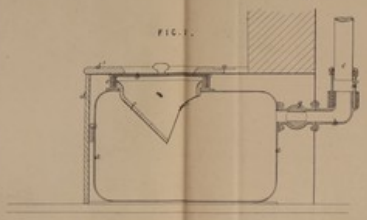


FIG. 8.

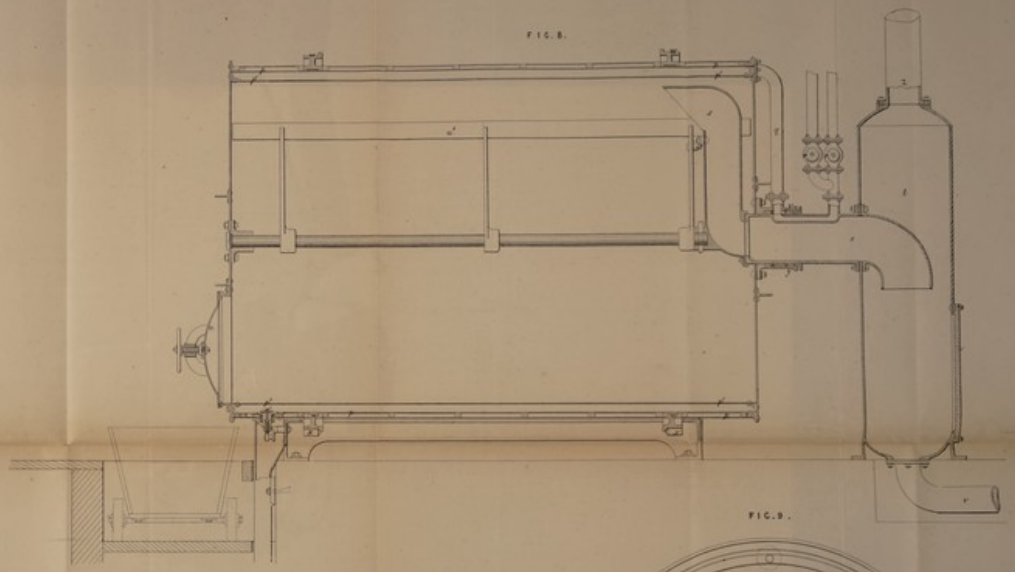


FIG. 3.

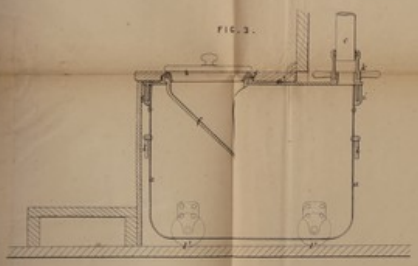


FIG. 5.

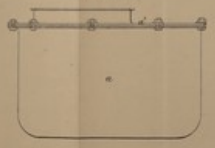


FIG. 9.

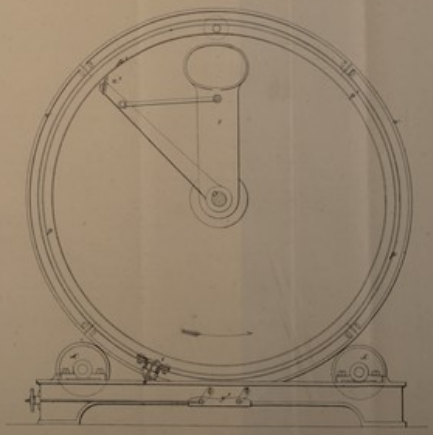


FIG. 4.

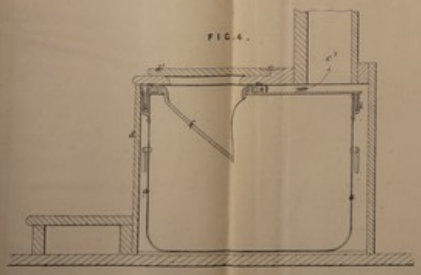


FIG. 6.

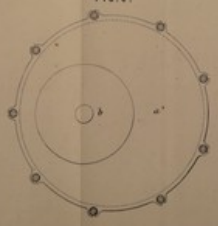
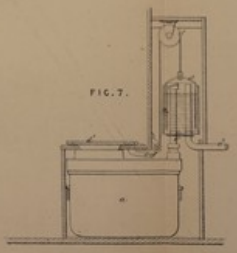


FIG. 7.



The blue drawing is partly colored.

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Drawn on Stone by Melby & Sons.