No. 709,616. Patented Sept. 23, 1902.

R. THORNE.

APPARATUS FOR THE TREATMENT OF GARBAGE OR SIMILAR MATERIAL.

(Application filed June 30, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

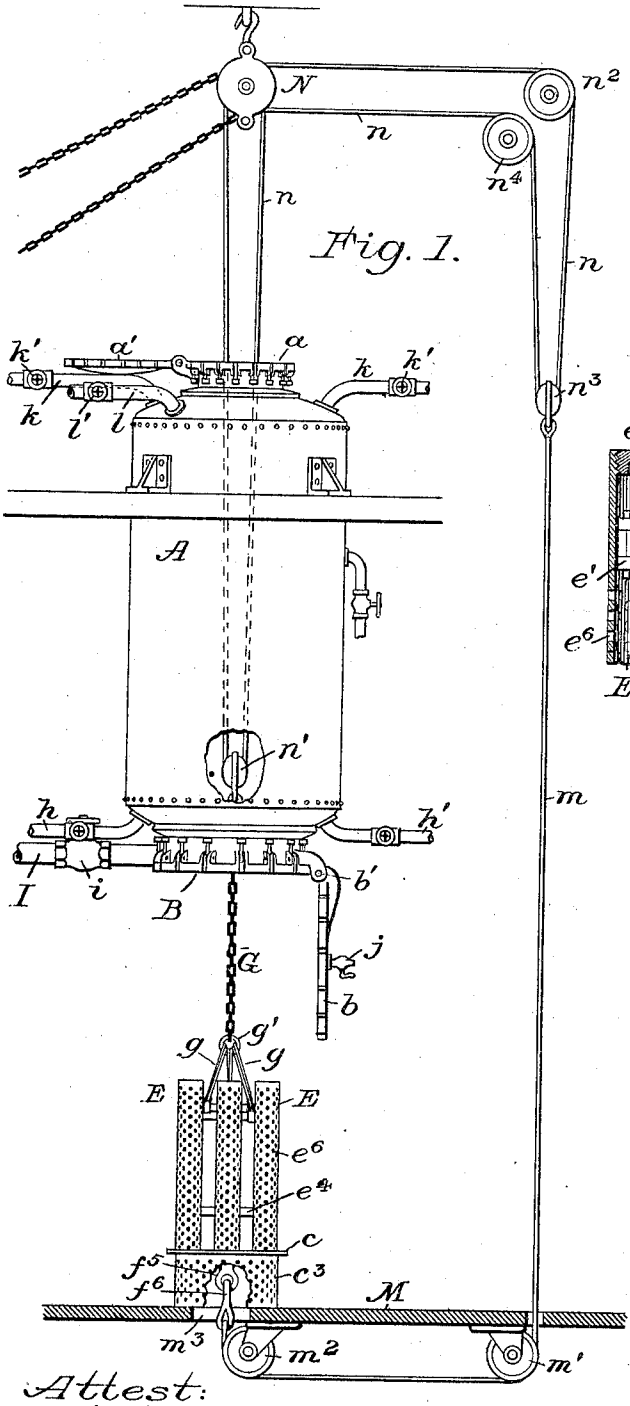

Fig. 5.

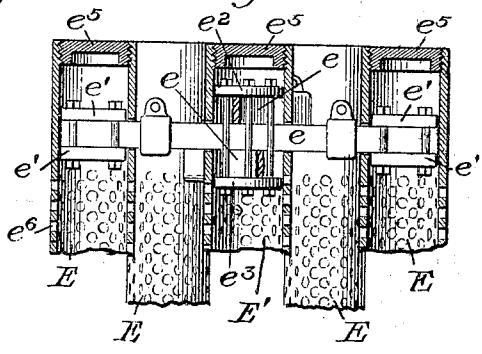

Fig. 6.

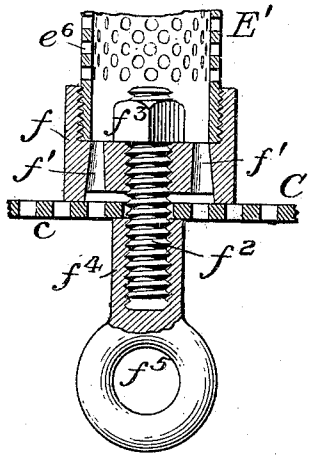

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Fig. 2.

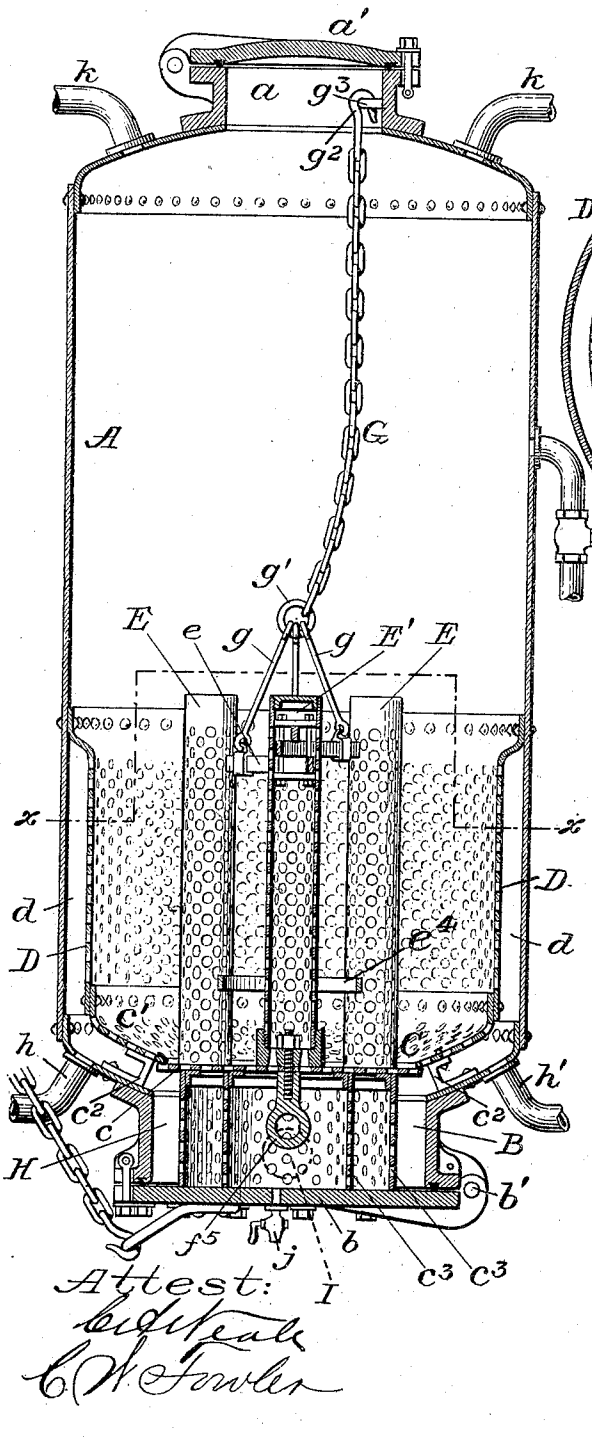


Fig. 3.

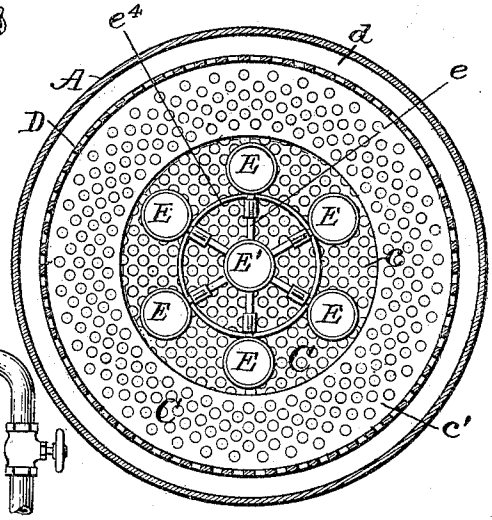
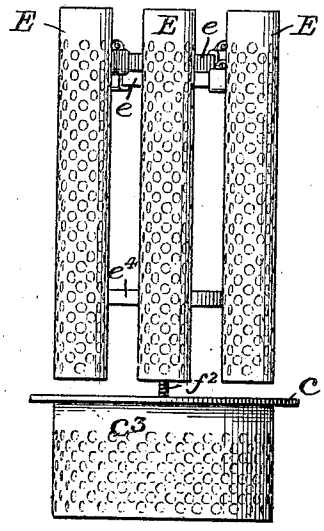


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROUGIER THORNE, OF GREENWICH, CONNECTICUT.

APPARATUS FOR THE TREATMENT OF GARBAGE OR SIMILAR MATERIAL.

SPECIFICATION forming part of Letters Patent No. 709,616, dated September 23, 1902.

Application filed June 30, 1902. Serial No. 113,762. (No model.)

To all whom it may concern:

Be it known that I, ROUGIER THORNE, a citizen of the United States, residing at Greenwich, in the county of Fairfield and State of Connecticut, have invented new and useful Improvements in Apparatus for the Treatment of Garbage or Similar Material, of which the following is a specification.

My invention relates to an improvement in apparatus for the treatment of garbage or similar material and the final separation of the liquid from the solid constituents of the mass of material under treatment. In apparatus of this general character the material to be treated is placed in a tank or receptacle and subjected to steam or other heat for reducing it to a proper condition for separating the liquid from the solid matter, the former being drained or expressed from the solid matter, the latter being left in the tank or receptacle to be thereafter discharged or removed by hand, according to the particular form of apparatus employed. For the operation of separating the liquid from the solid matter the mass of material is supported within the tank upon a perforated plate or false bottom, through which the liquids are expressed or allowed to drain to a space beneath, from which they are conveyed to suitable tanks or receptacles. To increase the drainage area, the material is sometimes also supported laterally by a perforated lateral support, which extends upwardly from the perforated false bottom, and to still further increase the drainage or drainage area conduits have been provided, which project to the interior of the receptacle for affording channels for the passage of liquid from the interior of the mass of material. These conduits have heretofore either been fixtures which obstructed the removal of the solid matter or such as were loosely placed in the receptacle by hand to be removed with the material or such as must be first raised up out of the material to permit the removal of the latter through a lateral discharge-opening. In apparatus where heavy steam-pressure is employed for expressing the liquids the solid matter is compressed into a compact mass, from which such conduits cannot be readily removed prior to the removal of the material without considerable force.

The main object of my invention is to secure the advantages to be derived from the use of interior drainage-conduits, coupled with means for facilitating the removal or discharge of the solid material remaining in the receptacle after the liquids have been drained or expressed therefrom.

Broadly stated, my invention consists in providing means whereby such conduits may be lowered through the lower end or bottom of the receptacle regardless of whether the material is discharged simultaneously with the lowering of the conduits or remains in the receptacle to be thereafter removed in any suitable manner.

After a detail description of an apparatus embodying my invention the features deemed novel will be specified in the claims hereunto annexed.

Referring to the drawings furnished and forming a part of this specification, Figure 1 is a side elevation of an apparatus embodying my invention, the charging and discharge openings at the top and bottom of the receptacle being shown open and the drainage-conduits lowered upon a platform provided for receiving the discharged material. Fig. 2 is a central vertical section of the tank or receptacle with the conduits therein and the charging and discharge openings closed. Fig. 3 is a horizontal section taken on line $x\ x$ of Fig. 2. Fig. 4 is a side elevation of the drainage-conduits removed from the receptacle and showing the removable perforated false bottom slightly separated therefrom. Fig. 5 is an enlarged vertical sectional view of the upper ends of the drainage-conduits, and Fig. 6 is an enlarged sectional view of the lower end of the central drainage-conduit, illustrating the means for connecting it to the perforated false bottom.

The tank or receptacle A is preferably constructed of boiler-iron in such manner as to make a steam-tight receptacle, the capacity and strength of which must depend upon particular requirements. The top of the receptacle is provided with a charging-opening a, which is normally closed by a suitable cover a', the latter being supplied with any well-known means for effecting a steam-tight joint between the cover and the edge of the opening. At the bottom of the tank or re-

ceptacle there is a discharge port or opening B, which is also provided with a suitable cover *b*, supplied with means for effecting a steam-tight closure. The cover *b* is shown hinged at one side, as at *b'*, to swing clear of the opening B when opened; but it is to be understood that a sliding cover may be employed, if desired. Within the tank is a perforated false bottom C, and extending upwardly therefrom is a perforated interior wall D, which affords lateral support for the solid matters placed in the receptacle and an extended drainage-surface for the liquids, said wall being located a sufficient distance from the outer wall of the tank to afford a space *d* for drainage purposes, as will be understood. The drainage-conduits E and E' project upwardly into the receptacle from the perforated false bottom C, and while I have shown seven of these conduits in the form of perforated tubes it must be understood that the number of conduits employed or their particular form is immaterial to the main feature of my invention. Six of these tubes or conduits E are shown arranged in a circle around a central conduit E', and all of them are connected and secured together by means of three bars or rods *e e e*, which pass through slots in the central tube E' and connect opposite tubes E. The outer end of these bars pass through slots in the outer tubes E and are therein secured by means of blocks *e'*, which are clamped to the bars to prevent them from being pulled away from the bars, as best shown in Fig. 5. Within the central tube E the three bars *e e e* are clamped together between plates e^2 and e^3, all of the tubes or conduits being thus firmly united together. The outer tubes E are connected together near their lower ends by a ring or hoop e^4, to which each of said tubes is riveted, as clearly shown in Figs. 2, 3, and 4. All of the tubes are closed at their upper ends by plugs e^5, and all of said tubes are perforated, as at e^6. The lower ends of the outer tubes E rest upon the central portion *c* of the perforated bottom C, the latter being shown as constructed in two sections *c* and *c'*, the central section *c* being removable, as will be presently explained. The central tube or conduit E' is provided at its base or lower end with a base-block *f*, which affords means whereby all of the conduits are attached to the removable section *c* of the perforated bottom. As shown in Fig. 6, block *f* is in the form of a cap, which is screwed on the end of tube E' and provided with a series of perforations *f'* to permit the liquid which enters said tube to pass through the perforated false bottom to the space H below. Tapped through the central portion of said block is a screw f^2, provided with a nut f^3 at its upper end and having its lower end extending down through the perforated bottom C. A nut f^4 on the lower end of said screw is employed for securing the conduits to the perforated bottom, and said nut is provided with an eye f^5, to be hereinafter referred to.

Secured to the rods *e* at each side of the central conduit E' are links *g*, all of which are connected to a ring *g'*, to which is attached a chain G, said chain being provided at its upper end with a hook g^2, which normally hangs in a hook or staple g^3, adjacent to the charging-opening of the tank, as shown in Fig. 2.

The perforated false bottom C is shown as being inclined downwardly from its junction with the perforated wall D to facilitate the discharge of material upon removal of the central portion *c*. It will, however, be understood that when material is to be discharged through the bottom of the receptacle, as provided for in the apparatus illustrated, the entire false bottom may be made removable, if desired, without departure from my invention. Should it be desirable to remove the material through a side opening in the tank, the perforated bottom may be made a fixture in the tank, in which case the drainage-conduits will project up through openings in the perforated bottom, so that said conduits may be readily lowered through said openings. The central movable portion *c* of the perforated bottom is preferably circular in outline and slightly larger in diameter than the central opening through the fixed portion *c'*, so that the inner edge of the latter will slightly overlap the outer edge of the removable section, as clearly shown in Fig. 2. The fixed section *c'* is supported at intervals by posts or supports c^2, and attached to the under side of the removable section *c* are supports c^3 c^3, which are shown as being cylindrical in form and provided with numerous perforations for the passage of liquid therethrough to an outlet-pipe I. (Shown in Fig. 1 and in dotted lines in Fig. 2.) The supports c^3 rest on the inner surface of the door or cover *b*, the removable section of the perforated bottom and the drainage-conduits being normally supported by said cover. The chamber H below the perforated false bottom is provided with an outlet-pipe I, before referred to, which is supplied with a suitable cock *i*, and entering said space are two pipes *h* and *h'* for supplying steam or hot water for reducing the garbage or other material prior to the final operation of separating the liquid from the solid matter, and in cover *b* is a tap-cock *j* for draining the chamber H of any liquid that may have remained therein prior to discharging the solid matter, as will be hereinafter explained.

The upper portion of the tank is supplied with steam-pipes *k k*, having suitable cocks *k' k'*, and there is also a pipe *l*, provided with a suitable cock *l'*, for carrying away the steam and gases during treatment of the material. The tank is supported or suspended above a platform M, and suspended above the tank is a differential pulley-block N, which is supplied with an endless cable *n*, said cable pass-

ing through a pulley-block n', (which normally hangs over the charging-opening a,) thence around the differential pulley-block, over a pulley n^2, and through a pulley-block n^3, back over a pulley n^4, to the differential pulley N, to the pulley-block n' in a well-known manner. To the pulley-block n^3 is attached a cable m, which passes under pulleys m' and m^2 beneath the platform M and up through an opening m^3 in the latter, and attached to the end of said cable is a hook f^6.

It is to be understood that my invention in no manner relates to any particular process or mode of treating garbage or other material prior to the final separation of the liquids from the solid matter.

The drainage-conduits being in proper position in the tank and the cover b being properly closed, as shown in Fig. 2, the tank is charged with the garbage or other material through the charging-opening a, which is thereafter tightly closed. The material is then subjected to any of the well-known processes for reducing it prior to the separation of the liquid from the solid matter. At the conclusion of such treatment steam may be admitted into the upper portion of the receptacle through the pipes k k for supplying pressure for expressing the liquids in a well-known manner, the liquids being forced through the perforated bottom, the lateral perforated support, and the conduits E and E' to the chamber H, from whence it is conveyed away by the pipe I. After the liquids have been expressed or allowed to drain from the solid matter as may be desired the tap-cock j is opened for draining the chamber H of any liquid that may remain therein. The charging-opening is then uncovered, and chain G is secured to pulley-block n', the latter being then drawn up by the differential block N sufficiently to hold the drainage-conduits in place while the cover b at the discharge-opening is being removed. Before removing said cover it is desirable to drain the chamber H of any liquid remaining therein, and for this purpose tap-cock j is opened, after which said cover is removed. The hook f^6 on end of cable m is then secured in the eye f^5 of the nut f^4 beneath the perforated bottom C. The differential pulley-block N is then operated for pulling on cable m, the drainage-tubes, together with the removable section c of the perforated bottom and its supports c^2 and c^3, being thereby lowered through the discharge-opening B to the platform M. Except in cases where excessive steam-pressure has been employed for expressing the liquid from the solid matter the latter will leave the receptacle with the drainage-conduits; but should any material remain in the receptacle it may be readily removed by hand through the discharge-opening. The material falls upon the platform M and is thereafter removed in any suitable manner.

In the separation of the liquid from the solid matter it is desirable that the latter be filtered to some extent to as far as possible prevent fine particles of solid material from entering any of the pipes which are connected with the chamber H. For this purpose it is usual to cover the perforated false bottom with a sheet of burlap or some other filtering medium, and to provide for this I have arranged for the separation of the drainage-conduits from the perforated bottom to permit of the insertion and removal of a piece or sheet of burlap or other material that may serve as a filtering medium. To effect this, nut f^4 is loosened sufficiently to permit the drainage-conduits to be raised from the perforated bottom, the old filtering-cloth being then removed and a new cloth inserted, after which said nut is tightened for securing the parts together. The filtering-cloth should extend to or project over the edge of the removable section c in order that it may be clamped between the edges of the two sections of the perforated bottom. After the material has been discharged from the tank and a new filtering-cloth supplied, as above described, the differential pulley-block is operated for raising the conduits into proper position in the tank for another operation. Cable m is then disconnected from the under side of the perforated false bottom and cover b is securely fastened. The chain G is then disconnected from the pulley-block n' and hung in the staple g^3, the tank being then ready for a fresh charge of material.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle provided with a perforated false bottom, one or more drainage-conduits projecting upwardly from said bottom and affording a channel or channels for the drainage of liquids, and means whereby said conduits may be lowered below the working plane of said perforated bottom.

2. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle provided with a perforated false bottom, a discharge-port in the bottom of said receptacle, one or more drainage-conduits, projecting upwardly from said false bottom and affording one or more channels for the drainage of liquids, and means for lowering said conduit or conduits through said opening.

3. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle provided with a discharge-port at its lower end, one or more drainage-conduits affording a channel or channels for the drainage of liquids, a perforated support for said conduits, and means whereby said conduits and support may be lowered through said discharge-port and replaced for service.

4. In an apparatus for the treatment of gar-

bage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle provided with a discharge-port at its lower end, a removable perforated false bottom, one or more drainage-conduits attached to and supported thereby and means for lowering said false bottom and conduits through said discharge-port.

5. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle provided with a discharge-port in the bottom thereof, a perforated support in said receptacle, one or more drainage-conduits removably attached to and supported by said support, and means for lowering said support and conduits through said discharge-port, for the purpose set forth.

6. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle having a removable bottom, a perforated false bottom or support normally supported by said removable bottom, and one or more drainage-conduits supported by said perforated support and affording one or more channels for the drainage of liquids.

7. In an apparatus for the treatment of garbage or similar material, the combination substantially as hereinbefore described, of a tank or receptacle having a discharge-port in the bottom thereof, a perforated support in said receptacle, drainage-conduits consisting of a series of perforated tubes connected together and removably attached to said perforated support, and means for lowering said support and conduits through said discharge-port and replacing them for service.

In testimony whereof I, ROUGIER THORNE, have signed my name to this specification, in the presence of two subscribing witnesses, this 18th day of June, 1902.

ROUGIER THORNE.

Witnesses:

TOWNSEND CADDY,

RAWDON W. KELLOGG.