C. EDGERTON.

APPARATUS FOR EXTRACTING GREASE AND OILS.

APPLICATION FILED JUNE 15, 1911.

1,017,518.

Patented Feb. 13, 1912.

3 SHEETS—SHEET 1.

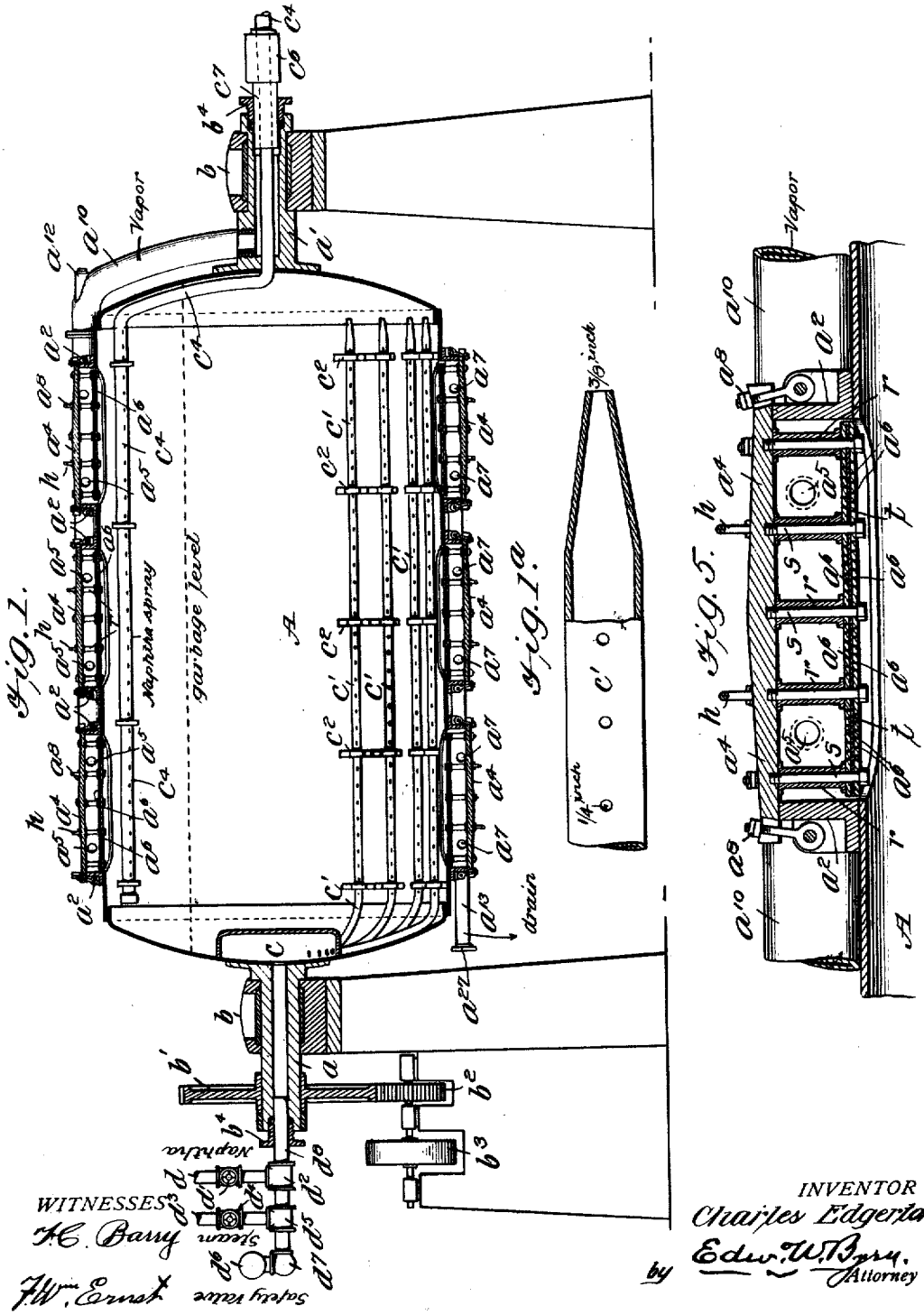

Fig. 1.

Fig. 1a.

Fig. 5.

WITNESSES

H. C. Barry

F. W. Ernst

INVENTOR

Charles Edgerton

by Edw. W. Barry, Attorney

C. EDGERTON.

APPARATUS FOR EXTRACTING GREASE AND OILS.

APPLICATION FILED JUNE 15, 1911.

1,017,518.

Patented Feb. 13, 1912.

3 SHEETS—SHEET 2.

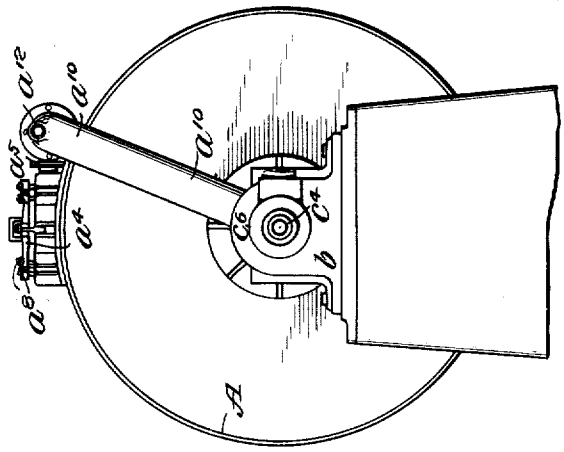

Fig. 3.

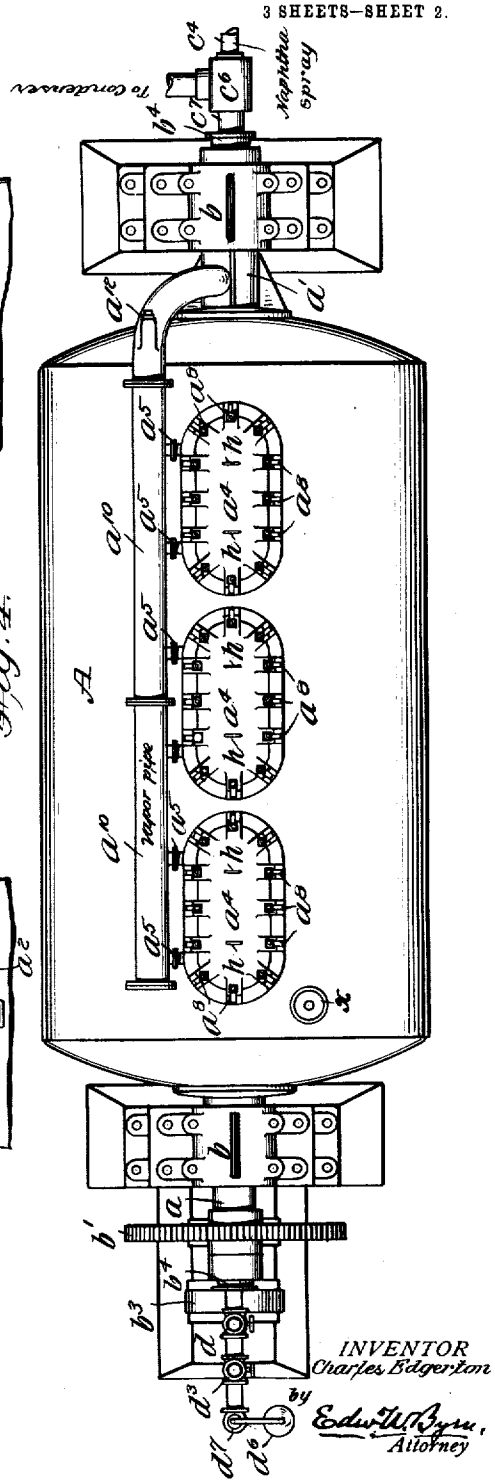

Fig. 4.

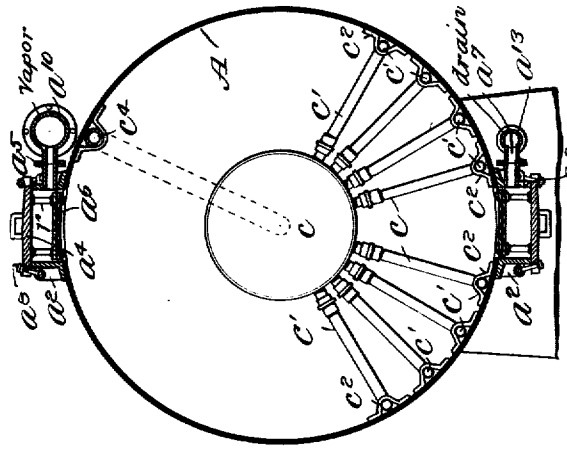

Fig. 2.

WITNESSES

H. C. Barry

F. W. Ernst

INVENTOR

Charles Edgerton

by Edwin H. Byrn, Attorney

C. EDGERTON.

APPARATUS FOR EXTRACTING GREASE AND OILS.

APPLICATION FILED JUNE 15, 1911.

1,017,518.

Patented Feb. 13, 1912.

3 SHEETS—SHEET 3.

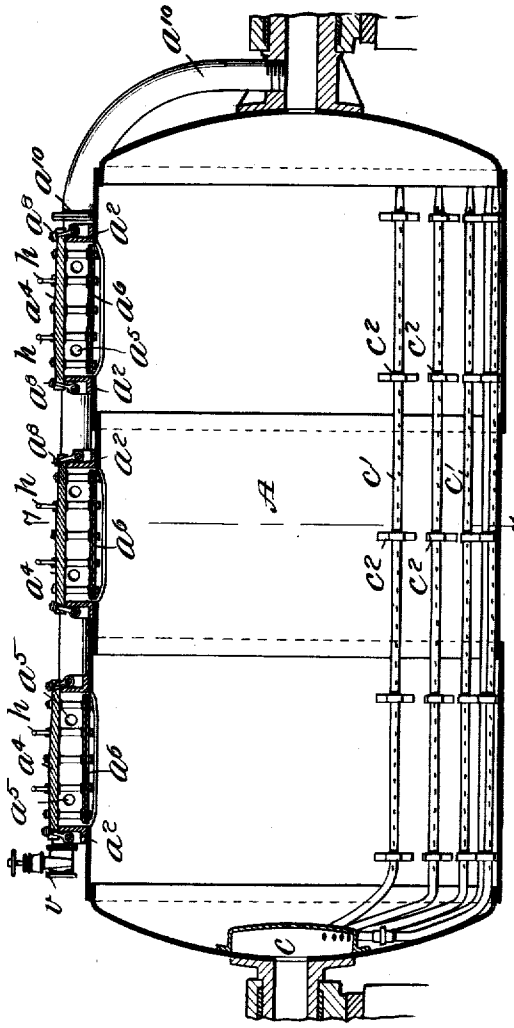

Fig. 6.

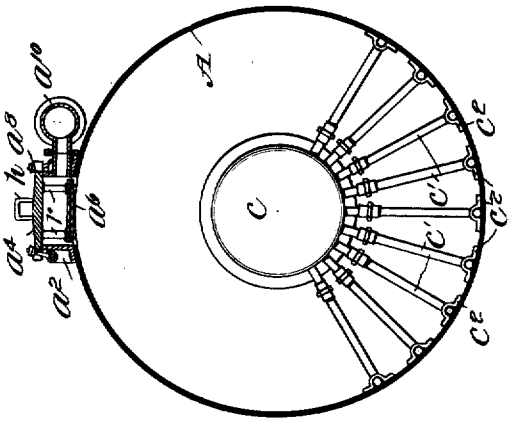

Fig. 7.

WITNESSES

F. C. Barry

F. Wm. Ernst

INVENTOR

Charles Edgerton

by Edw. W. Byrn.

Attorney

UNITED STATES PATENT OFFICE.

CHARLES EDGERTON, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR EXTRACTING GREASE AND OILS.

1,017,518. Specification of Letters Patent. Patented Feb. 13, 1912.

Application filed June 15, 1911. Serial No. 633,216.

To all whom it may concern:

Be it known that I, CHARLES EDGERTON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Extracting Grease and Oils, of which the following is a specification.

My invention relates to that class of apparatus known as percolators, and especially to percolators which are used for extracting grease and oils from garbage or other organic matter. In such extraction of oils it has been for many years a common practice to introduce into the garbage some solvent of the oils, such as naphtha, and, after agitation and saturation of the mass therewith, to draw off the dissolved oil with the solvent and then to reclaim the solvent remaining in the mass by means of steam, or heat in some form, by which the volatile naphtha in the remaining mass is distilled and driven off into a condenser where it is liquefied for use again. One type of machine for carrying out such process includes a horizontal cylinder mounted to revolve about its longitudinal axis and provided with large inlet and outlet doors or manholes for charging and discharging the mass, and with supply pipes for the solvent and for steam, and with draining or draw-off pipes for the solvent and oil and also with vapor pipes through which the solvent remaining in the mass is driven off and distilled. Such general instrumentalities are now old and for the most part common property as shown in many expired patents.

My invention relates to this class of apparatus and consists in certain novel construction and arrangement of parts, whereby the successive operations are performed with greater facility and rapidity in charging and discharging, with less risk of springing leaks in the connecting pipes for naphtha and steam and without the necessity of sending a workman into the cylinder for cleaning out obstructed drainage, or for repairs, which entrance of the workman is very objectionable and dangerous on account of the overpowering fumes of naphtha.

My invention also consists in means for securing a more convenient and thorough extraction of the oils and the avoidance of all clogging of the vapor pipe in distilling off the residue of the solvent.

My percolator is shown in the accompanying drawings in which:

Figure 1 is a vertical longitudinal section. Fig. 1^a is a detail of an end of one of the steam pipes. Fig. 2 is a vertical transverse section. Fig. 3 is a partial end elevation. Fig. 4 is a top plan view of the cylinder. Fig. 5 is an enlarged detail of the filtering manhole covers. Fig. 6 is a longitudinal section of a simplified modification and, Fig. 7 a cross section thereof.

Similar letters of reference indicate the same parts in all the figures.

In the drawing, A represents a large horizontal cylindrical casing to whose heads are coaxially bolted the hollow trunnions a a^1 which are sustained in bearings b b on suitable standards or pillow blocks. To one of the hollow trunnions a is rigidly keyed a large gear wheel b^1 with which meshes a pinion b^2 on the same shaft with a pulley b^3, by which a slow motion may be imparted to the cylinder to rotate it on its longitudinal axis. Outside of the driving gears and communicating coaxially with the hollow trunnion a there is a stationary pipe d^8 which passes through a stuffing box b^4 in the end of the hollow trunnion and which forms a swiveling connection between the revolving trunnion and the stationary pipe d^8. Connecting with the pipe d^8 by couplings d^2 d^5 are right angular pipes d d^3 having respectively valves d^1 d^4. The pipe d is for the introduction of naphtha and the pipe d^3 for the introduction of steam. Outside of these pipe connections there is an elbow coupling d^7 and a pop safety valve d^6. The coaxial pipe d^8, it will be seen, is capable of introducing either naphtha or steam at will into the hollow trunnion a and this hollow trunnion communicates with a concentric housing or distributing cap c within the cylinder and securely fastened to its head. From this distributing cap there radiate two groups of pipes c' c', Figs. 1 and 2, which extend down along the head to the horizontal wall of the cylinder and thence extended in two spaced-apart groups, see Fig. 2, the full length of the cylinder. These pipes are provided along their length on their inner sides with rows of perforations of one quarter-inch diameter. At the extreme ends of the pipes they are tapered to a reduced diameter, Fig. 1^a, but are left open with a three-eighths-inch hole

in the end of each, which is purposely made larger than the size of the perforations along the sides of the pipes. It is through these pipes that either naphtha or steam may be introduced into the mass of garbage and the object of making the holes in the pipes of the relative size indicated is to permit soft particles of garbage, which find their way into the interior of the pipes through the perforations, to be blown out through the three-eighths-inch hole at the end by a blast of steam, since anything which will pass through the quarter-inch perforations may be readily and quickly blown out through the larger hole in the end of the pipe. The tapering of the pipe chokes the issuance of steam to compel the steam to issue through the small perforations. These pipes are spaced in two groups to give room for the large drainage openings between them and said pipes are held in place in parallel position by clips or yokes c^2 riveted to the interior walls of the cylinder.

In constructing and arranging the inlet and outlet doors or man-holes at the top through which the garbage is charged and discharged, and also the drainage outlets at the bottom, I make them of very large size and elongated or oblong shape, as seen in Fig. 4, and so close together in alinement that they form almost a continuous opening. The man-hole covers for the upper charging and discharging openings at the top and the man-hole covers of the lower drainage openings are of identical pattern. In a sixteen-foot cylinder the actual size of each opening is about 18 by 42 inches. This gives not only great clearance and facility in charging and discharging, but they are made of such large size, so as to permit the incorporation therein of filters or strainers of large size, which filters are integral with the man-hole covers and are removable together with the covers by the mere opening of the man-hole; that is, when the cover is removed the filter goes with it. This is an important feature of my invention, in that the cleaning out of obstructed strainers, which must frequently be done, is effected from the outside without any necessity for workmen to go inside the cylinder where the fumes of naphtha soon overpower them. The filtering man-hole cover is seen in detail in Fig. 5, and it consists of an outer plate a^4 having spacing sleeves r on its inner side against which rests a filtering diaphragm composed of two flat perforated plates a^5 a^6 having between them a layer of burlap t or other fabric. Bolts s pass through the spacing sleeves and connect the cover a^4 and the filter together so that the plates a^4 a^6 are integrally removable from the man-hole with the cover. The cover and filter, or strainer, fit within marginal cast iron frames a^2 which are fixed to the cylinder and project outside of the same and said covers are secured in place by swinging draw bolts a^8 which pass laterally into and out of slots around the margin of the cover, as seen in Fig. 4.

The sleeves r which separate the outer plate a^4 of the cover from the filtering diaphragm or strainer are long enough to allow considerable space for the collection of the oil and solvent between the two when drawing off, or for the free escape of vapor when distilling the residue of the naphtha. The filtering or straining diaphragm being also in the plane of the cylindrical shell, the gathering space for the oil and solvent in the man-hole covers is below the solid mass of garbage in the cylinder when draining off, so that all of the liquid may be drained off. In order that this important feature of my invention may be fully understood, I would state that these filtering man-hole covers are not draining means to be compared with those heretofore used. In the first place they are of extraordinary size. As before stated, in a sixteen foot drum each opening, of which there are three, is 18 by 42 inches. This great size is necessary, not for the purpose of admitting a man through the same, as in my invention no man is subjected to the dangers of entering the drum but the great size is for the purpose of adequate filtration and straining both of the oil with its solvent and the vapors, but this great size of a filtering medium, removable from the outside with the cover, requires special construction in order both to make it removable with the cover and also to stand the strain of the great weight of the contents; that is to say, in my invention the extensive filtering and straining diaphragm must first be rigidly attached to the cover; secondly it must be smaller than the hole so as to be removable with the cover and thirdly, owing to the great area of the filtering and straining medium and its relative thinness and weakness under the weight of the superincumbent mass of garbage, said filtering and straining medium must be supported at numerous points along its surface to stand the weight of the garbage. These essential qualities are all efficiently provided for in the construction shown and illustrated in detail in Fig. 5. It will thus be seen that the large size of these man-hole covers and the means for supporting their inner filtering faces at a plurality of points along their surfaces are correlated factors. There are two sets of these man-holes with filtering covers placed diametrically on opposite sides of the cylinder; the upper set is used for charging and discharging garbage and also for distilling off the residual naphtha, and the lower set is at the normal bottom of the cylinder between the two groups of

steam and naphtha pipes. The latter set is exclusively for draining off the naphtha and dissolved oil. The connecting outlet pipes, whether for drainage or for distillation of vapor, are the same *i. e.* they consist for each man-hole of two or more short inch and a half pipes tapped through the side of the man-hole frame a^2 outside of the cylinder so as to communicate with the space between the filtering or straining diaphragm and the outer cover plate a^4 and communicate with the two longitudinal pipes a^{10} a^{13} outside the cylinder. The drain pipe a^{13}, which is shown at the bottom, runs along past all the discharge man-holes and has its communicating pipes a^7 tapped through the frame of the lower man-holes and has at its end a flanged connection a^{27} for temporary communication with any other pipe or hose through which the extracted oil and naphtha may be run to a suitable container.

The outlets for naphtha vapor, when the latter is being distilled, are shown at a^5 at the top where they communicate with a large vapor pipe a^{10} which runs outside the cylinder parallel to the man-holes and at a^{12} has a clean-cut plug and then bends down to and communicates with an annular chamber in the hollow trunnion a^1. This hollow trunnion has in its outer end a swiveling connection with a stationary pipe c^7 by means of a stuffing box b^4. A T-coupling c^6, see Figs. 1 and 4, connects with a pipe at right angles leading to a condenser. Centrally through this T-coupling and through the hollow trunnion and into the cylinder there extends a pipe c^4 which is bent up to and extends along the upper wall of the cylinder parallel to the same in proximity to the charging man-holes and is sustained by clips or yokes which attach it to the shell. The pipe c^4 is provided with perforations along its length and is designed to provide means for introducing on top of the garbage a spray of naphtha to finish the complete washing out of the grease and oil at the end of the draining operation.

The operation of my percolator is as follows: When in the position shown in Fig. 1, the upper man-hole covers are removed and the cylinder is filled about two thirds full of garbage. The man-hole covers are then applied and tightly closed by the draw bolts. Naphtha is now introduced into the garbage through pipe d, distributing cap c and the two groups of pipes c^1 c^1 under the garbage. While the naphtha is being introduced, and afterward, the cylinder is slowly revolved to thoroughly intermix and saturate the garbage. The cylinder is then allowed to come to a rest in the position shown in Fig. 1, and drainage pipe a^{13} being connected by a hose or other pipe to a receiving vessel, the naphtha with the dissolved grease and oil then drains away at the bottom through pipe a^{13}. A final spray of naphtha from pipe c^4 on top of the garbage completes the washing out of oil and grease which all drains away down through the filtering diaphragms of the lower man-holes into the spaces in the man-hole covers and thence passes out through drain pipe a^{13}. To facilitate this action steam pressure may be turned into the cylinder. After the oil and naphtha have by subsidence drained away, steam is turned on from pipe d^3 and entering the cylinder through cap c and perforated pipes c^1 vaporizes the naphtha remaining in the more or less solid mass of garbage and drives it up through the filtering diaphragms of the upper man-hole covers and into the large vapor pipe a^{10} and thence through the annular space in the hollow trunnion a^1 and coupling c^6 to the condenser for liquefaction and use again.

In my construction of percolator it will be seen that the steam and naphtha pipes are all coaxial and concentric with the axis of revolution and therefore fixed in position against accidental leakage. Where a cylinder is rotated by a toothed peripheral tire rolling on eccentric supporting pinions, if a nail, wrench, or other tool accidentally drops between the gears it lifts and jams the whole cylinder, straining the connections with the fixed external pipes and starting leaks in the steam and naphtha pipes, which with such insidious fluids under pressure is not only troublesome but dangerous. With the concentric arrangement of pipes this cannot occur. Also by raising the man-holes to the large size I am enabled to fashion their covers into effective filters or strainers which may be removed and cleaned without the necessity of entering the cylinder and which leaves the interior of the cylinder unobstructed and also places the solvent and oil gathering spaces outside of the inner periphery of the cylinder where it may better separate by subsidence and be more completely drained. Furthermore the steam pipes are quickly and completely cleared of obstruction by blowing out all material from the inside.

In carrying out my invention I do not confine myself to the exact construction and arrangement shown and described, but may vary it within the limits of my claims; thus for instance in Figs. 6 and 7, I show a simplified modification, in which the lower drainage man-holes and drain pipe are dispensed with and the upper set of man-holes with their covers are used for both charging and discharging the garbage and in connection with a single longitudinal pipe are used for draining away the oil and solvent, and also for the volatilization and driving off of the naphtha vapors. In such case the single set of man-holes are uppermost

when charging and also in driving off the vaporized naphtha, and are in the inverted or lowermost position when draining the oil and solvent and in discharging the garbage. In such modification the single longitudinal pipe connecting with the space between the man-hole covers and their filtering and straining diaphragms serves the double purpose, according to the position of the cylinder, to drain off the oil and solvent at one stage of the operation and to take off the evaporated vapors of the solvent at another stage. When draining off the oil and solvent in this modification the man-holes are at the bottom and a valve v is opened and the pipe a^{10} connected with a suitable outside pipe or hose through such valve. In this form of my device the final spraying with naphtha is introduced through the pipes c^1, which are uppermost when draining off. This final naphtha spray, effected by pipe c^4 in Figs. 1 and 2 and pipes c^1 in Figs. 6 and 7 serves the purpose of washing out the material with clear naphtha, which is kept up, until no grease comes away with the naphtha from the drain pipe below, which is readily ascertained by the color of the liquid.

In pointing out the advantage of arranging the vapor off-take pipe so as to connect directly with the man-holes in both forms of my invention, I would state that heretofore it has been customary to enter the vapor off-take pipe concentrically through one of the axial journals or trunnions and then bend or extend it up radially, so that its upper end opens into the drum above the garbage. This stationary upwardly bent end forms an unsupported stationary stand-pipe which is liable to be laterally deflected or twisted off by the rolling of the heavy mass of garbage against it. This is entirely avoided by tapping the vapor off-take pipe into the man-holes above the filters and as such connections are outside of and independent of the man-hole cover, the latter may be removed without disturbing said connections. Furthermore it will be seen that in my invention the large vapor pipe a^{10} is connected, through two short pipes in the side of each man-hole opening, to the percolator between the outside cover a^4 and the inner straining plates. Now in the operation of this device when steam under pressure is turned into the cap c and distributed under the material through pipes c^1, the material being light is frequently shaken up and light portions are blown into the space above the material and around the straining device. If it were not for this straining device fine particles of the light material would pass outward through their openings into the main vapor pipe which would be very objectionably. Particles of garbage would also be likely to get into the end of the vapor pipe when revolving. The straining devices a^6 a^6 between the interior of the drum and the outlets to the vapor pipe correct this difficulty in both cases, and the vaporized naphtha fumes are strained and filtered before they pass into the vapor pipe and the condenser.

In describing the cylinder or drum as horizontal, or rotating about a horizontal axis, I would have it understood, that I mean substantially or approximately horizontal, as it is obvious that a slight inclination might be given the drum without materially affecting its action. In using the term man-hole also, it is adopted as a term of convenience only, as in my invention no man need enter the drum. To guard against danger I provide not only the safety valve d^6, but another safety valve x on the drum itself.

I claim.

1. An extraction apparatus comprising a rotatable horizontal casing having an opening in its side, a marginal frame for said opening projecting outside of the plane of the casing, a cover for said opening consisting of an outer plate and an attached filtering and straining inner diaphragm parallel to the outer plate, of smaller size than the marginal frame, a plurality of fixed spacing devices between said outer plate and the filtering and straining diaphragm distributed along the surface of the same, and an off-take pipe arranged longitudinally to the casing outside thereof and having a branch connection extending through the edge of the marginal frame and communicating with the space between the outer plate and diaphragm and fastening devices for the cover of the opening.

2. An extraction apparatus comprising a rotatable horizontal casing having an opening in its side, a marginal frame for said opening projecting outside of the plane of the casing, a cover for said opening consisting of an outer plate and an attached filtering and straining inner diaphragm parallel to the outer plate, of smaller size than the marginal frame, a plurality of fixed spacing devices between said outer plate and the filtering and straining diaphragm distributed along the surface of the same, and an off-take pipe arranged longitudinally to the casing outside thereof and having a branch connection extending through the edge of the marginal frame and communicating with the space between the outer plate and diaphragm, and fastening devices for the cover of the opening, said opening with its cover and filtering diaphragm being repeated in an alined series and each made of oblong shape whose greatest length is parallel to the longitudinal axis of the cylinder.

3. An extraction apparatus comprising a

rotatable horizontal casing having an opening in its side, a marginal frame for said opening projecting outside of the plane of the casing, a cover for said opening consisting of an outer plate and an attached filtering and straining inner diaphragm parallel to the outer plate, of smaller size than the marginal frame, a plurality of fixed spacing devices between said outer plate and the filtering and straining diaphragm distributed along the surface of the same, and an off-take pipe arranged longitudinally to the casing outside thereof and having a branch connection extending through the edge of the marginal frame and communicating with the space between the outer plate and diaphragm and fastening devices for the cover of the opening, said opening with its cover and filtering diaphragm being repeated in alined series and each made of oblong shape whose greatest length is parallel to the longitudinal axis of the cylinder, the branch connection between the off-take pipe and each oblong opening being made at a plurality of points along the side of each opening.

4. An extraction apparatus comprising a rotatable horizontal casing having an opening in its side, a marginal frame for said opening projecting outside of the plane of the casing, a cover for said opening consisting of an outer plate and a filtering and straining inner diaphragm parallel to the outer plate, fixed spacing devices between said outer plate and the filtering and straining diaphragm, and an off-take pipe arranged longitudinally to the casing outside thereof and having a branch connection extending through the edge of the marginal frame and communicating with the space between the outer plate and diaphragm, and fastening devices for the cover of the opening, said off-take pipe being extended outside of the end of the casing down to and communicating with a hollow trunnion.

5. An extraction apparatus comprising a rotatable horizontal casing having an opening in its side, a marginal frame for said opening projecting outside of the plane of the casing, a cover for said opening consisting of an outer plate and a filtering and straining inner diaphragm parallel to the outer plate, fixed spacing devices between said outer plate and the filtering and straining diaphragm, and an off-take pipe arranged longitudinally to the casing outside thereof and having a branch connection extending through the edge of the marginal frame and communicating with the space between the outer plate and diaphragm, and fastening devices for the cover of the opening, said off-take pipe being extended outside of the end of the casing down to and communicating with a hollow trunnion and a solvent spray pipe extended concentrically through said trunnion and bent up to lie parallel to and within the upper wall of the casing.

6. An extraction apparatus comprising a rotatable horizontal casing having man-holes along its sides with liquid and vapor outlets and having inside the casing a group of parallel perforated pipes fixed to the casing opposite to the man-holes and bent up at one end, a distributing cap fixed concentrically to one head of the casing into which cap said pipes are tapped, a hollow trunnion communicating with said cap and two fluid pipes with controlling valves for introducing steam and a liquid solvent alternately into the casing through the trunnion.

7. An extraction apparatus comprising a rotatable horizontal casing having man-holes along its sides with liquid and vapor outlets and having inside the casing a group of parallel perforated pipes fixed to the casing opposite to the man-holes and bent up at one end, a distributing cap fixed concentrically to one head of the casing into which cap said pipes are tapped, a hollow trunnion communicating with said cap and two fluid pipes with controlling valves for introducing steam and a liquid solvent alternately into the casing through the trunnion, said perforated pipes being arranged in two spaced-apart groups with drainage outlets from the casing located between the two groups.

8. An extraction apparatus, comprising a horizontal rotatable casing having charging openings in one side and a set of steam pipes arranged within the casing opposite the charging openings, said steam pipes being provided with perforations along their sides and each pipe having an opening in its end larger than the perforations to permit the blowing out of solid matter passing through the perforations.

9. An extraction apparatus comprising a horizontal rotatable casing mounted on hollow trunnions and provided with two series of alined man-holes arranged opposite to each other, each being provided with filtering man-hole covers, one series being provided with a longitudinal external off-take pipe for vapor connected to one hollow trunnion and the other series being provided with a longitudinal off-take draining pipe, and perforated steam pipes arranged within the casing and communicating with the other hollow trunnion.

10. An extraction apparatus comprising a horizontal rotatable casing mounted on hollow trunnions and provided with two series of alined man-holes arranged opposite to each other, each being provided with filtering man-hole covers, one series being provided with a longitudinal external off-take pipe for vapor connected to one hollow

trunnion and the other series being provided with a longitudinal off-take draining pipe, and perforated steam pipes arranged within the casing and communicating with the other hollow trunnion, said steam pipes being arranged in two groups on opposite sides of the draining man-holes.

11. An extraction apparatus comprising a horizontal rotatable casing mounted on hollow trunnions and provided with two series of alined man-holes arranged opposite to each other, each being provided with filtering man-hole covers, one series being provided with a longitudinal external off-take pipe for vapor connected to one hollow trunnion and the other series being provided with a longitudinal off-take draining pipe, perforated steam pipes arranged within the casing and communicating with the other hollow trunnion and a solvent spray pipe arranged concentrically with the vapor off-take pipe at the point where it passes through the hollow trunnion and bent up inside the casing parallel to its wall adjacent to the charging man-holes.

12. In an extraction apparatus, the combination with the outer casing having a man-hole opening; of a cover for the opening consisting of an outer plate, a parallel inner filtering and straining diaphragm, a plurality of spacing devices extending along the surface of the same and separating the two, said outer plate and diaphragm being rigidly connected together and integrally removable and a vapor off-take pipe connected to the man-hole outside of the cover.

13. An extraction apparatus comprising a horizontal rotatable casing having on one side a set of alined man-holes, each made of an elongated form and each provided with a removable cover having a filtering and straining diaphragm parallel to the outer plane of the cover and off-set therefrom, a plurality of supporting devices for said diaphragm distributed along its surface, a single off-take pipe arranged parallel to the axis of the casing and having branch connections entering the edges of the man-holes at a point between the covers and filtering diaphragm and means for introducing steam and a solvent.

14. An extraction apparatus comprising a horizontal rotatable casing, having on one side a set of alined man-holes each made of an elongated form and each provided with a removable cover having a filtering and straining diaphragm parallel to the outer plane of the cover and off set therefrom, a plurality of supporting devices for said diaphragm distributed along its surface, a single off-take pipe arranged parallel to the axis of the casing and having for each man-hole a plurality of branch connections entering the longitudinal edges of the man-holes at a point between the covers and the filtering diaphragm and means for introducing steam and a solvent.

15. In an extraction apparatus, a rotatable casing having a man-hole elongated along the longitudinal axis of the casing and a cover for the same adapted to form both a closure and a strainer and consisting of an outer plate, an inner perforated diaphragm off-set from said plate in parallel position and fixed to the same for integral removal therewith from the outside, a plurality of supporting devices distributed along its surface and an outlet pipe for the elongated man-hole having a plurality of connections along the side of the man-hole outside of the cover.

16. An extraction apparatus comprising a rotatable casing having an opening in its side for charging it with material, a cover for said opening having a spaced away strainer on its inner side, a plurality of supports for the same extending along its surface, an inlet pipe for vaporizable solvent, and a vapor off take pipe leading to a condenser for distilling off the vaporized solvent, said off-take pipe being made of a large size to accommodate the expansion of a liquid into a vapor and having a branch connection with said opening independent of its cover and between the outer plate and inner strainer, to strain the evaporated solvent and prevent the fouling of the vapor pipe and condenser.

17. The combination with a rotatable drum for treating garbage and the like; of a perforated pipe for introducing fluids below the garbage having its end tapered and left open with a hole larger than the perforations and means for introducing fluid into the perforated pipe.

18. In an extraction apparatus, the combination with the outer casing having a man-hole opening; of a cover for the opening consisting of an outer plate, an attached parallel inner filtering and straining diaphragm with spacing devices separating the two, an off-take pipe having branches connected to the edge of the man-hole at a point between its cover and its filtering diaphragm, said off-take pipe being a large vapor pipe of a size adapted to accommodate the expansion of the solvent into a gas.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES EDGERTON.

Witnesses:
IRVIN BASS,
E. C. POGUE.