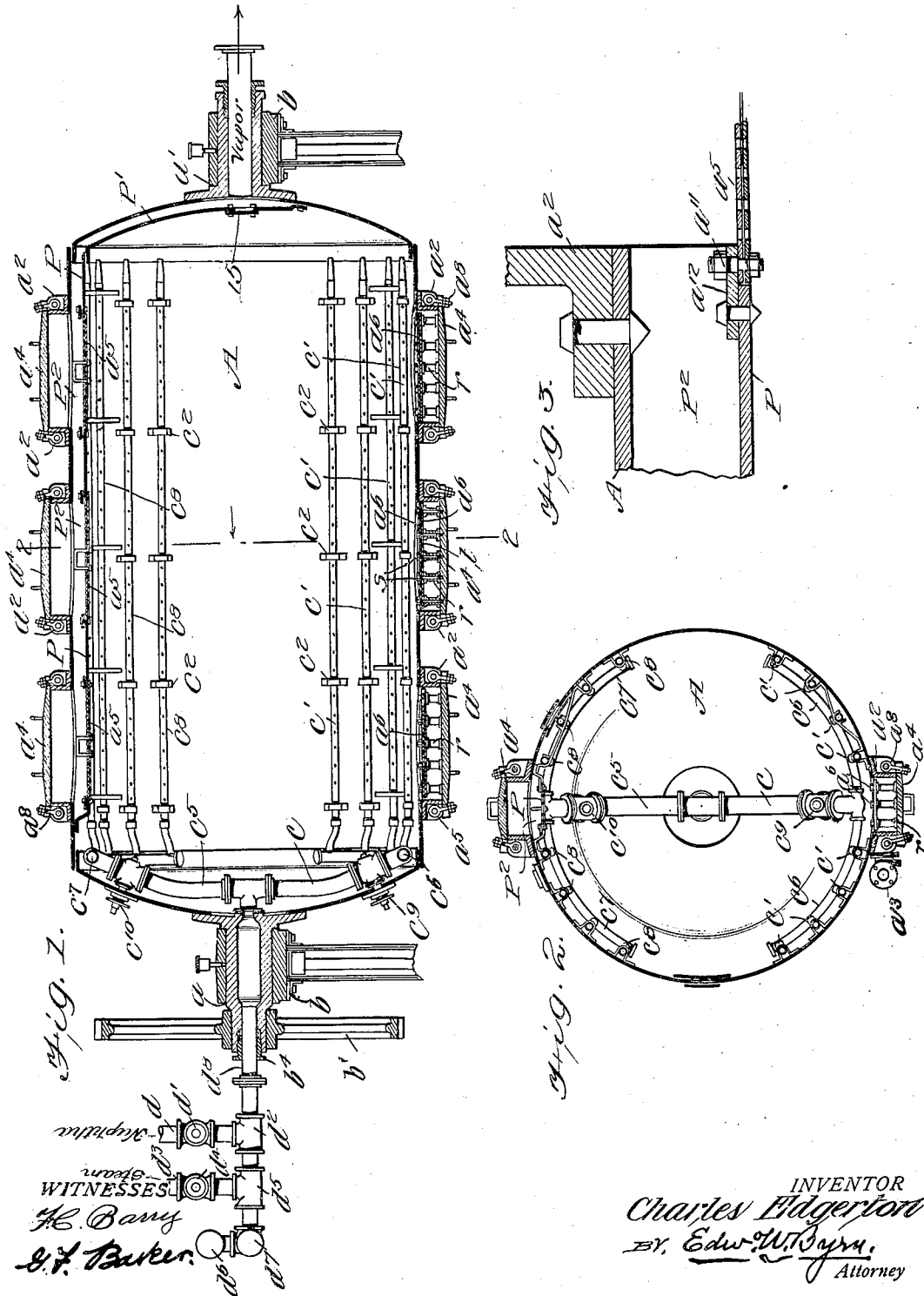


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 APPLICATION FILED FEB. 5, 1912.

1,024,838.

Patented Apr. 30, 1912.

2 SHEETS—SHEET 1.

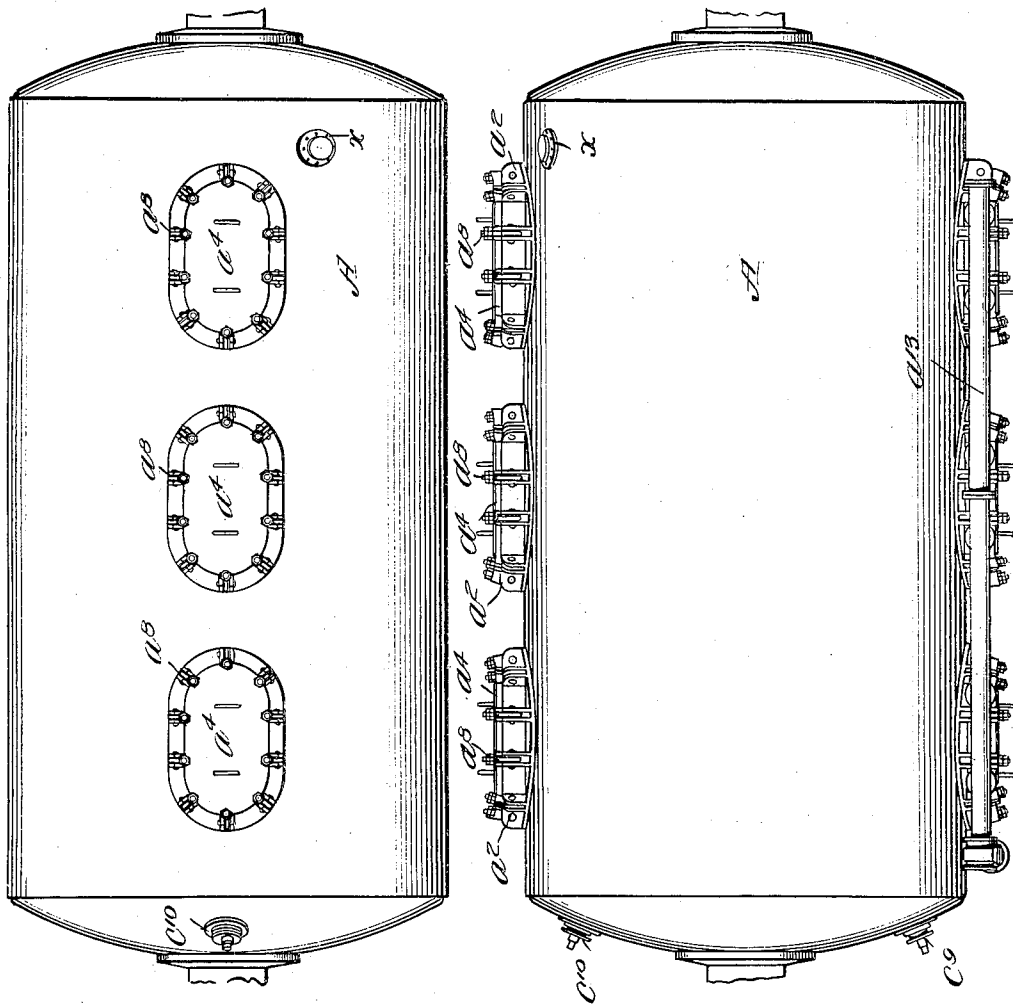


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APPARATUS FOR EXTRACTING GREASE AND OILS.

1,024,838.

Specification of Letters Patent.

Patented Apr. 30, 1912.

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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 is shown in my patent of Feb. 13, 1912 No. 1,017,518 which includes a horizontal cylinder mounted to revolve about its longitudinal axis and provided with large inlet and outlet doors or man holes 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, the construction being such as to avoid the necessity of the workman entering the cylinder and having also other advantages.

There are two important results which my present improvements are designed to accomplish, while still retaining all of the main advantages of the former apparatus. One of these results is the introduction of the naphtha and steam at one end of the revolving cylinder only, through a hollow trunnion connecting with pipes wholly inclosed within the cylinder, and the other is the taking off of the vaporized naphtha at the other end of the cylinder by a conduit also wholly inclosed within the cylinder, the advantages being the simplification of the operation and the simplification of the construction, avoiding all external joints in the open air and

making the apparatus more nearly self contained.

My improvements will be first described in connection with the drawings, and then pointed out in the claims.

Figure 1 is a vertical longitudinal section. Fig. 2 is a transverse section on line 2—2 of Fig. 1. Fig. 3 is an enlarged sectional detail of the marginal structure at one side of a man hole and of the vapor offtake conduit. Fig. 4 is a top plan view of the cylinder and Fig. 5 is a side view of the same.

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

In the drawing, A represents a large horizontal cylinder casing or drum to whose heads are coaxially bolted the hollow trunnions a a^1 which are sustained in bearings b b on suitable supports. To one of the hollow trunnions a is rigidly keyed a large gear wheel b^1 by which a slow motion may be imparted to the cylinder to rotate it on its longitudinal axis. Outside of the driving gear and communicating coaxially with the hollow trunnion a there is a stationary pipe d^s 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^s . Connecting with the pipe d^s by couplings d^2 d^3 are right angular pipes d d^s having respectively valves d^1 d^4 . The pipe d is for the introduction of naphtha and the pipe d^s for the introduction of steam. Outside of these pipe connections there is an elbow coupling d^7 and a pop safety valve d^8 . The coaxial pipe d^s , 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 two oppositely radiating pipes c c^s within the cylinder near its head. Pipe c communicates with a curved transverse pipe c^s from which two groups of pipes c^1 c^1 , Figs. 1 and 2, extend along the horizontal wall of the cylinder 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 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
 5 object of making the holes in the pipes of the relative size indicated is, as in my former patent, to permit soft particles of garbage, which find their way into the interior of the pipes through the perforations,
 10 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 will be readily and quickly blown out through the larger
 15 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
 20 are held in place in parallel position by clips or yokes c^2 riveted to the interior walls of the cylinder.

The other pipe c^5 connects with a curved
 25 transverse pipe c^7 which in turn communicates with parallel longitudinal perforated pipes c^8 c^9 , arranged in two groups on opposite sides of the upper man holes and having the same construction as the pipes c^4 at
 30 the bottom. These upper pipes c^8 are for the final spraying of naphtha on top of the garbage and take the place of the pipe c^4 in my former patent referred to. Both the pipes c and c^5 have cut off valves c^9 and c^{10} ,
 35 by which the flow of steam or naphtha may be controlled alternately and these valves, as well as the pipes, are wholly within the cylinder, but their operating stems extend through to the exterior of the shell.

In constructing and arranging the doors
 40 or man holes 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.
 45 The man hole covers for the upper openings and the man hole covers of the lower openings are of identical pattern. They are made of large size, so as to permit the incorporation therein of filters or strainers
 50 of large size which filters at the bottom man holes, 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
 55 goes with it. This permits the cleaning out of obstructed strainers without any necessity for workmen to go inside the cylinder where the fumes of naphtha soon overpower them. The filtering man hole covers at the
 60 bottom consists as in my former patent 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^9 a^{10} having between them a
 65 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^{10} are integrally removable from the man hole with the cover.
 70 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. The sleeves r which separate the outer plate a^4 of the cover from the
 75 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. 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
 80 covers is below the solid mass of garbage in the cylinder when draining off, so that all of the liquid may be drained off. The lower man holes are employed for charging the garbage into the cylinder, and discharging it from the same, and also for
 85 straining and drawing off the oil from the garbage dissolved in naphtha. For the latter purpose a longitudinal drain pipe a^{13} runs along the sides of the lower man hole frames and has short connecting pipes entering the space between the man hole covers
 90 and their attached filters, as shown in my previous patent. The upper man holes are however, equipped in an entirely different manner. They have the same covers and
 95 means for fastening them, but have no attached filters or strainers. Instead thereof there is a partition P arranged longitudinally in the cylinder and spaced away about four inches from its top side and forming a longitudinal conduit P^2 closed at one end and at
 100 the other end P^1 extending down to the axis of the cylinder and communicating with a hollow trunnion at this end and thence to a condenser not shown. This partition has
 105 openings in it immediately beneath the upper man holes and approximately of the same size therewith. These openings are provided with strainers a^5 formed of two perforated plates with an interposed layer
 110 of fabric, as seen in Fig. 3, and these strainers are detachably secured to the margins of the holes in the partition P by a rabbet strip a^{12} and bolts a^{11} . They also have hand holds by which they can be lifted out. The
 115 space within the conduit P^2 communicates with the interior of the cylinder only through the strainers a^5 , and the conduit is made large enough in cross section to accommodate the expansion and vaporization
 120 of naphtha and serves as an off-take for the same. The strainers a^5 merely strain the vaporized naphtha and prevent the outlet to the condenser from being clogged with
 125 stuff blown up by the steam. If, however, 130

any deposits should collect in the conduit, the man hole cover may be removed and the strainers taken out and cleaned. Also a removable cover plate 15 is placed in the conduit connection P^1 directly in line with the hollow trunnion, for cleaning out deposits at this point.

The operation of my percolator is as follows: For charging the garbage into the cylinder, the position shown in Fig. 1 is reversed, and the man hole covers (bearing removable filters) are taken off and the cylinder filled about two thirds full of garbage. The covers are then secured and the cylinder turned back to the position shown in Fig. 1. Naphtha is now introduced into the garbage through the perforated pipes by opening valve in pipe d . While naphtha is being introduced, the cylinder may be turned to intermix it with the garbage. The cylinder is then allowed to come to rest in the position shown in Fig. 1, and the naphtha supply is cut off. The drainage pipe a^{13} is then connected, by a temporary pipe connection, with some receiving vessel and the naphtha with the dissolved grease and oil drains away at the bottom through pipe a^{13} . When no more liquid comes away, the valve c^9 controlling the lower pipes c^1 is closed and the valve c^{10} controlling the upper pipes c^8 is opened and a spray of naphtha is showered down upon the top of the garbage to wash away the final traces of oil in the garbage, which also drains away through pipe a^{13} . To facilitate this draining out of oil, steam pressure may be admitted to the garbage. After all the oil and naphtha have drained away, the drainage outlet is closed and also valve c^{10} and then steam is admitted from pipe d^3 by way of valve c^9 through the lower pipes c^1 into the mass of garbage and this vaporizes the naphtha and drives it up through the strainers a^5 and into the conduit P^2 and thence down P^1 to the hollow trunnion and off to the connected condenser, where it is liquefied and saved for further use. The lower man holes are then opened and the more or less solid contents are allowed to drop out.

It will be seen, from the foregoing, that all the advantages of my former construction are preserved, with the added advantages of simplicity of construction and operation and the location of practically all the pipes and joints inside the cylinder, making the apparatus more self contained and freer from derangement, leakage and danger.

It will be understood that the upper man holes are only used at long intervals for repairs or cleaning the strainers at the top. It will also be noted that it is impossible ever to close the passage from the percolator to the condenser, which is an important point in insuring the safety of the apparatus against explosion.

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 further against danger I provide not only the safety valve d^6 , but another safety valve x on the drum itself.

I claim.

1. An apparatus of the kind described, comprising a horizontal rotary drum with hollow trunnions at each end and man holes on the side, external steam and solvent pipes communicating with one of the hollow trunnions, a transverse pipe arranged within the drum near its head and communicating with the hollow trunnion, perforated pipes arranged longitudinally in the drum and communicating with the outer end of the transverse pipe, a valve in the transverse pipe having operating connections extending to the exterior of the drum, a longitudinally arranged vapor offtake conduit having strainers in it between the interior of the drum and the conduit and a transverse vapor conduit extending from the longitudinal conduit to the hollow trunnion opposite the steam and solvent inlet.

2. An apparatus of the kind described, comprising a horizontal rotary drum having at one end a hollow trunnion and man holes in the side, a pipe connecting with said hollow trunnion and arranged within the drum near its head, a valve arranged in said pipe and having operating connections extending to the exterior through the drum, and perforated pipes arranged longitudinally within the drum near its side wall and communicating with said valved pipe.

3. An apparatus of the kind described, comprising a horizontal rotary drum having at one end a hollow trunnion, and man holes in the side, a pipe connecting with the hollow trunnion and arranged within the drum near its head, a valve arranged in said pipe and having operating connections extending to the exterior through the head of said drum, a curved transverse pipe communicating with the outer end of said valved pipe, and parallel longitudinally arranged perforated pipes arranged within the drum near its side and communicating with the curved transverse pipe.

4. An apparatus of the kind described, comprising a horizontal rotary drum having at one end a hollow trunnion and man holes in the side, separate steam and naphtha pipes, with valves communicating exteriorly with the hollow trunnion, two oppositely extending transverse pipes communicating

with the hollow trunnion and arranged within the drum and near its head, valves arranged in each of said pipes and having operating connections extending to the exterior through the drum, and two sets of perforated pipes arranged longitudinally within the drum near its side walls and communicating respectively with the two valved pipes.

5. An apparatus of the kind described, comprising a horizontal rotary drum having at one end a hollow trunnion and man holes in the side, separate steam and naphtha pipes, with valves communicating exteriorly with the hollow trunnion, two oppositely extending transverse pipes communicating with the hollow trunnion and arranged within the drum and near its head, valves arranged in each of said pipes and having operating connections extending to the exterior through the drum, and two sets of perforated pipes arranged longitudinally within the drum near its side walls and communicating respectively with the two valved pipes, the drum being provided with two sets of man holes on opposite sides, and the perforated pipes on each side of the drum being arranged in two spaced apart groups on opposite sides of each set of man holes.

6. An apparatus of the kind described, comprising a horizontal rotary drum with hollow trunnion at one end and a set of man holes in the side, a vapor off take conduit arranged within the drum and extending past the man holes and having vapor strainers interposed in the same between the interior of the drum and the conduit, and a transverse conduit arranged at the head of the

drum communicating at one end with the longitudinal conduit and at the other end with the hollow trunnion.

7. An apparatus of the kind described, comprising a horizontal rotary drum with hollow trunnion at one end and a set of man holes in the side, a vapor offtake conduit arranged within the drum and extending past the man holes and having vapor strainers interposed in the same between the interior of the drum and the conduit, and a transverse conduit arranged at the head of the drum communicating at one end with the longitudinal conduit and at the other end with the hollow trunnion and a detachable cover plate in said transverse conduit arranged in the axial line of the hollow trunnion.

8. An apparatus of the kind described, comprising a horizontal rotary drum with hollow trunnion at one end and a set of man holes in the side, a partition arranged longitudinally in the drum and extending past the man holes and having detachable strainers in the same immediately opposite the man holes, and forming a vapor off take conduit, and a transverse conduit arranged at the head of the drum and communicating at one end with the longitudinal conduit and at the other end with the hollow trunnion.

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

CHARLES EDGERTON.

Witnesses:

CHRISTIAN PFEIFFER,
MINOR M. RESSET.