E. S. PECK.

PERCOLATOR.

APPLICATION FILED FEB. 21, 1908.

925,833. Patented June 22, 1909.

Fig. 1

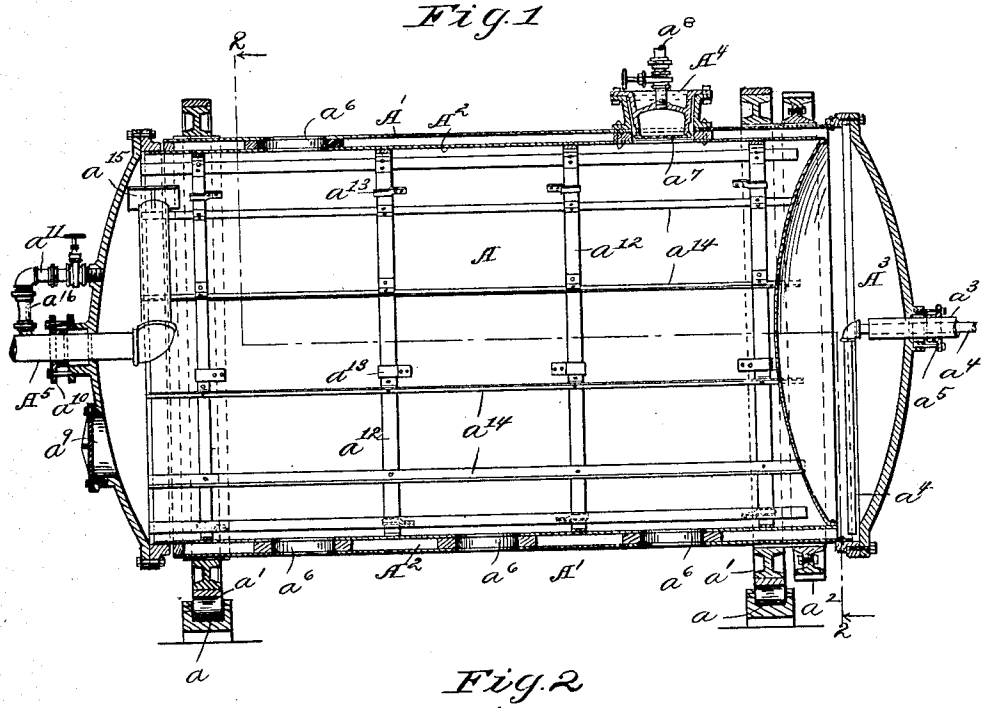
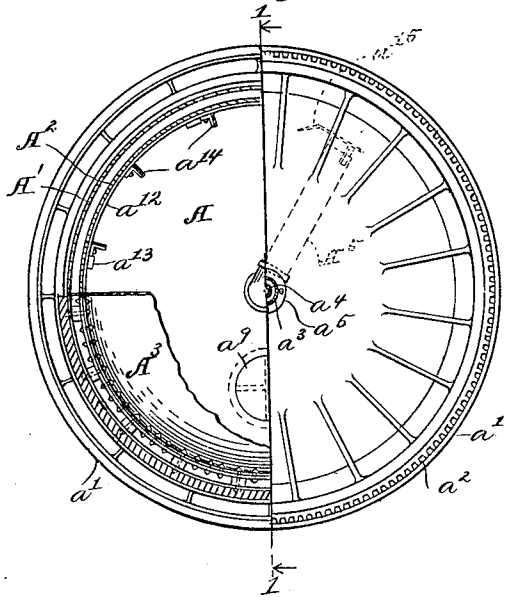


Fig. 2



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PERCOLATOR.

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Application filed February 21, 1908. Serial No. 416,986.

ll whom it may concern:

Be it known that I, ERNEST S. PECK, citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Percolators, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates, as stated, to percolators, by which term I propose to designate apparatus for the extraction of soluble fats and the like from tankage or other analogous materials forming one of the products of garbage reduction plants and rendering establishments. The solvent ordinarily used for taking up the grease is naphtha, a sufficient quantity being passed through the material to thoroughly extract the same. After such extraction has been completed it then becomes necessary to recover the portion of the naphtha or other solvent that has been absorbed by the material, the quantity of such naphtha or solvent being proportionately quite considerable, and the loss, unless it is thoroughly recovered, being a large item of expense in the carrying on of the operation referred to.

The object of the present invention is to provide a more efficient and labor saving apparatus for the purpose described and one that will be more economical both in the thoroughness with which the naphtha is recovered and in the amount of power and labor required to operate the apparatus.

To the accomplishment of these and related objects, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing: Figure 1 represents a central longitudinal cross section of a percolator embodying my several improvements; and Fig. 2 represents the same, partially in end elevation and partially in transverse cross section, the section being taken on two different planes as indicated by broken line 2—2, Fig. 1.

From an inspection of the figures just referred to, my improved percolator will be seen to comprise essentially a cylindrical drum A, disposed in a substantially horizontal position and rotatably supported upon roller bearings a. To this end it is provided with annular bearing rings a' adapted to rest on such rollers, and with a gear a^2 at one end wherewith suitable driving means may be connected, as will be readily understood. The drum itself consists of two concentric cylindrical portions A' A^2 spaced from each other, thus forming a steam jacket surrounding practically the entire drum. Such jacket is connected with a steam head or chamber formed in one end of the cylinder. Centrally connected with the corresponding drum end are two pipes a^3 and a^4 one within the other, the outermost a^3 of which is adapted to supply steam to such head and thence to the jacket, the innermost a^4 of which depends in a radial direction to near the lower portion of the chamber, and is adapted to withdraw any water that may accumulate there from condensation of the steam within the jacket. A gland a^5 and suitable packing maintain the joint between pipe a^3 and the end of the drum tight while still permitting the latter to freely rotate.

The drum is provided in its lateral surface with two sets of similar openings, or man-holes, a^6 in diametrically opposite portions of its cylindrical wall. As shown, one set, consisting of two openings, is designed in the normal position of the drum to be on its upper side, while the other set, consisting of three openings, is designed to be on the lower side of the drum. Such man-holes are adapted to be closed by means of covers in the form of plugs A^4 fitted thereto as shown in Fig. 1, where only one such plug, however, is illustrated. Such plugs are hollow and have their inner ends closed by a screen, or perforated plate a^7, while with their outer ends are connected valve controlled pipes a^8 for supplying naphtha thereto or withdrawing the same therefrom, depending on whether the opening be on the upper or under side of the drum, as will be presently explained. An additional opening, or man-hole, a^9 is provided in the end opposite the steam supply end and below the center, whereby access may be had to the interior when desired. Centrally connected with the same end and bent so as to extend radially within the drum is a pipe A^5 for withdrawing the naphtha vapors from the drum during the process of

recovery of the naphtha. A gland a^{10} and suitable packing serve the same purpose in connection with this pipe that they do with steam supply pipe a^3. A second pipe a^{11} connected with the same drum end, at a point removed from its center and with said first pipe, is adapted to withdraw any excess of the solvent should the level of the latter rise to too great a height in the drum. A plate a^{15} serves as a shield for the inner end of pipe A^5 to prevent the entrance therein of the solid material being treated, and pipe a^{11} includes a sight glass a^{16} to indicate when the naphtha is overflowing.

Upon the inner cylindrical surface of the drum are secured in any suitable manner, as upon rings a^{12} held in place by clips a^{13}, a plurality of longitudinally disposed blades a^{14} that are adapted to impart movement to the contents of the drum when the latter is rotated.

Having thus described with what is thought sufficient detail the construction of my improved percolating apparatus, the manner of its use may be briefly set forth. The position of the drum shown in Fig. 1 is that which it will normally occupy while being filled with tankage and during the process of extraction. When the drum is thus disposed, the covers A^4 closing the two manholes a^6 on the upper side are removed and the drum filled preferably from one-half to two-thirds full of tankage. The plugs are then secured in place and the interior flooded with naphtha through the connections a^8 had with the same plugs. From the corresponding plugs on the under side of the drum the naphtha with grease in solution is withdrawn after percolating through the mass of tankage. Should more naphtha be supplied than is necessary, the excess escapes through the overflow pipe as described. In order to insure thorough contact between the solvent naphtha and all of the material it may become desirable during this process, in connection with certain classes of materials, to rotate the drum one or more times, thus thoroughly intermingling such contents and naphtha whereupon the process of draining the latter may be again continued. During rotation of course connections a^8 are temporarily broken. When the extraction of grease, or other valuable constituents, has thus been completed, the recovery of the naphtha still remaining in the tankage is effected by supplying steam to the steam jacket through pipe a^3, by means of which the naphtha is very quickly and economically vaporized, escaping through the pipe A^5 provided for this purpose to the condenser (not shown) where it is again liquidized. During this process, also, rotation of the drum is desirably utilized to hasten the process of vaporization and insure complete recovery of the naphtha by bringing all the particles of tankage to the necessary temperature, the blades on the interior wall of the drum rolling the material over and over and exposing it in sort of a loosely falling stream in the upper empty portion of the drum from which the vapors are withdrawn. After such recovery has been completed the tankage is then discharged by removing the plugs closing the openings on the under side of the drum, whereupon the contents of the drum of themselves drop out. Such discharge may be facilitated and hastened by further rotation of the drum, or by simply rocking it back and forth through a part turn.

It may also be found well, to admit some steam to the drum and jacket of the tank during the process of percolation, since, by keeping the material warm in this manner, the naphtha or other solvent will more quickly absorb the grease and so hasten the work.

It need scarcely be stated that while my improved percolator has been thus described as being particularly adapted for use in treating the tankage from garbage disposal works or the like, all this by way of illustration merely, and without any implication of limitation to this particular field. Obviously such apparatus is adaptable to equally successful employment wherever the method of treating materials by percolation is utilized.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A percolator comprising a rotatable, substantially horizontal drum provided with openings in its cylindrical wall for the supply and discharge of the material to be treated; connections to such wall for introducing the solvent; an externally fixed pipe centrally connected to one end of said drum and bent upwardly inside the same for withdrawing vapors therefrom; and a second pipe connected with said drum end at a point removed from its center, said second pipe being adapted to withdraw any excess of the solvent.

2. A percolator comprising a rotatable, substantially horizontal drum provided with a steam jacket and with openings in its cylindrical wall for the supply and discharge of the material to be treated; connections to such wall for introducing the solvent; connections to one end of said drum for supplying steam to said jacket; an externally fixed pipe connected to the other end of said drum and bent upwardly inside the same for withdrawing vapors therefrom; and a second pipe connected with said drum end at a point

removed from its center, said second pipe being adapted to withdraw any excess of the solvent.

3. A percolator comprising a rotatable, substantially horizontal drum provided with a steam jacket, and with openings in its cylindrical wall for the supply and discharge of the material to be treated; removable closures for such openings, connections to said closures adapted to introduce the solvent to said material when said closures are on top and to drain such solvent therefrom when said closures are on the bottom; two pipes, one within the other, centrally connected with one end of said drum for supplying steam to said jacket and for withdrawing the water of condensation therefrom; a pipe similarly connected to the other end of said drum and bent in a radial direction inside the same for withdrawing vapors therefrom; and a second pipe connected with the same drum end at a point removed from its center, said second pipe being adapted to withdraw any excess of the solvent.

4. A percolator comprising a rotatable, substantially horizontal drum provided with a steam jacket, and with openings in its cylindrical wall for the supply and discharge of the material to be treated; removable closures for such openings, connections to said closures adapted to introduce the solvent to said material when said closures are on top and to drain such solvent therefrom when said closures are on the bottom; two pipes, one within the other, centrally connected with one end of said drum for supplying steam to said jacket and for withdrawing the water of condensation therefrom; a pipe similarly connected to the other end of said drum and bent in a radial direction inside the same for withdrawing vapors therefrom; a shield for the end of said pipe adapted to prevent the entrance therein of the material being treated; and a second pipe connected with the same drum end at a point removed from its center, said second pipe being adapted to withdraw any excess of the solvent.

5. A percolator comprising a rotatable, substantially horizontal drum provided with a steam jacket, and with openings in diametrically opposite portions of its cylindrical wall for the supply and discharge of the material to be treated; closures for such openings consisting of hollow plugs; screens closing the inner ends of said plugs; connections to the outer ends thereof adapted to introduce the solvent to said material when said plugs are on top and to drain such solvent therefrom when said plugs are on the bottom; connections to one end of said drum for supplying steam to said jacket and for withdrawing the water of condensation therefrom; and connections to the other end of said drum for withdrawing vapors therefrom.

6. A percolator comprising a rotatable, substantially horizontal drum provided with a steam jacket, and with openings in diametrically opposite portions of its cylindrical wall for the supply and discharge of the material to be treated; closures for such openings consisting of hollow plugs; screens closing the inner ends of said plugs; connections to the outer ends thereof adapted to introduce the solvent to said material when said plugs are on top and to drain such solvent therefrom when said plugs are on the bottom; two pipes, one within the other, centrally connected with one end of said drum for supplying steam to said jacket and for withdrawing the water of condensation therefrom; a pipe similarly connected to the other end of said drum and bent in a radial direction inside the same for withdrawing vapors therefrom; and a second pipe connected with the same drum end at a point removed from its center and with said first pipe, said second pipe being adapted to withdraw any excess of the solvent.

Signed by me this 15th day of February, 1908.

ERNEST S. PECK.

Attested by—
E. R. RODD,
JNO. F. OBERLIN.