C. EDGERTON.

APPARATUS FOR EXTRACTING GREASE AND OILS.

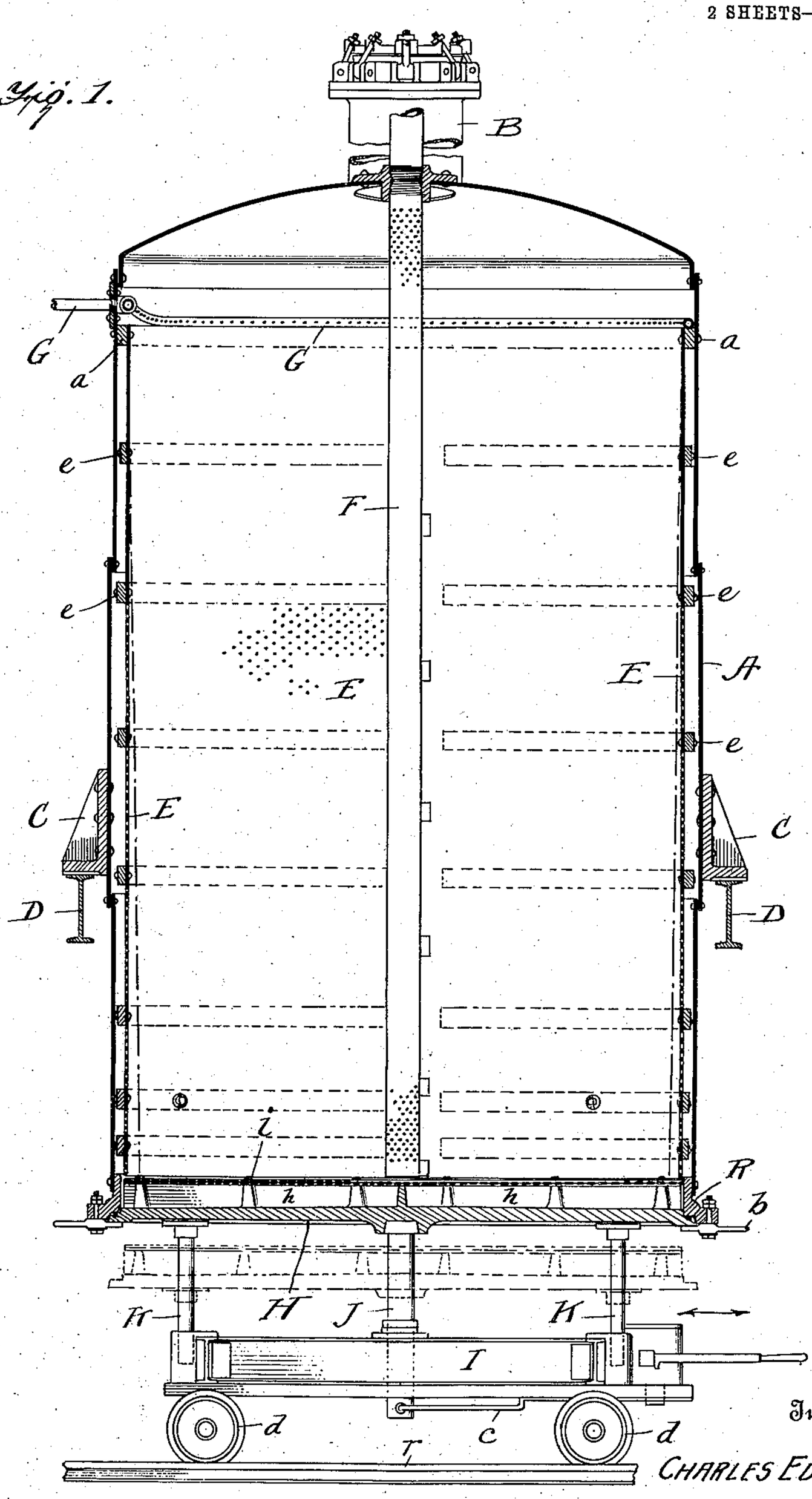
APPLICATION FILED JAN. 25, 1911.

991,491.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

L. H. Schmidt.

G. H. Baker.

Inventor

CHARLES EDGERTON,

By Edw. W. Byrn

Attorney

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2 SHEETS—SHEET 2.

Fig. 2.

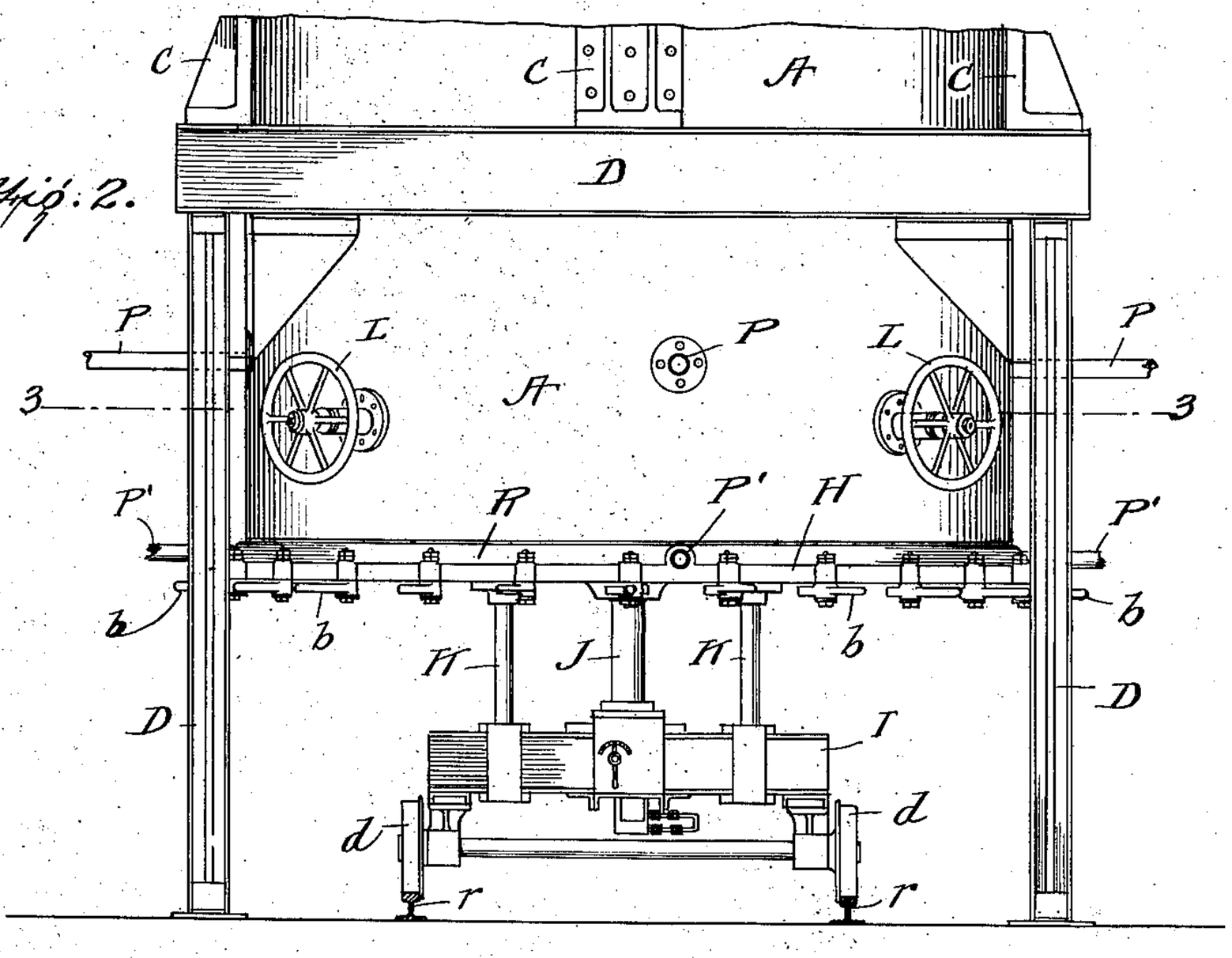


Fig. 3.

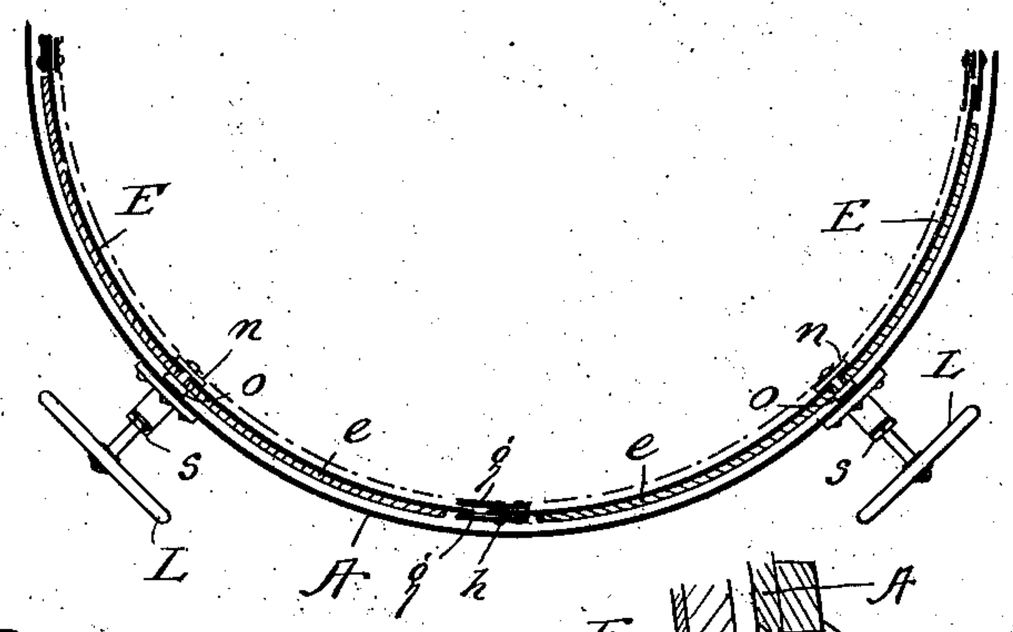


Fig. 5.

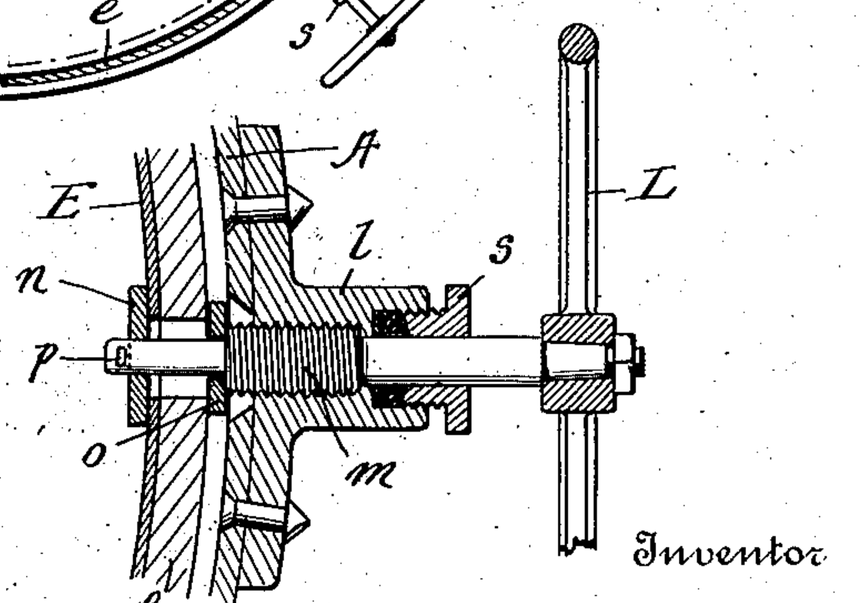


Fig. 6.

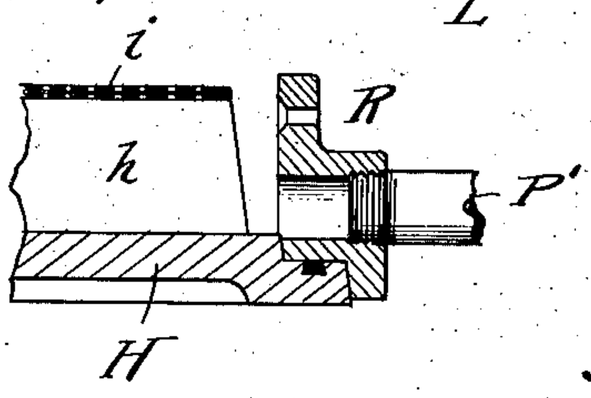
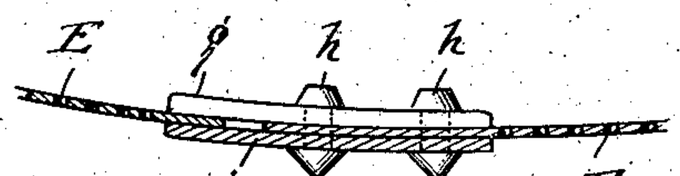


Fig. 4.



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Attorney

UNITED STATES PATENT OFFICE.

CHARLES EDGERTON, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR EXTRACTING GREASE AND OILS.

991,491. Specification of Letters Patent. Patented May 9, 1911.

Application filed January 25, 1911. Serial No. 604,649.

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 used for extracting grease and oils from semi-solid materials and more especially for extracting grease and oils from tankage, garbage and other products containing a percentage of grease, by the agency of some solvent such as naphtha. The known construction of such apparatus embodies an outer cylindrical shell or container, an inner perforated lining, openings for introducing the charge, pipes for introducing the solvent and drawing off the grease and oils and means for discharging the more or less solid residuum after the oil and grease have been extracted.

My invention consists in the novel construction and arrangement of the parts of the apparatus for facilitating and expediting these operations and for securing a very thorough extraction of the grease and oil and the convenient discharge and disposition of the solid residuum, as hereinafter fully described with reference to the drawing in which:

Figure 1. is a vertical sectional elevation of the apparatus. Fig. 2. is a side elevation of the lower portion of the apparatus, the view being taken at right angles to that shown in Fig. 1. Fig. 3. is a horizontal section of one half of the cylinder on line 3—3 of Fig. 2., the other half being the same. Fig. 4. is a sectional detail of the slip joint of the sections of the inner perforated lining. Fig. 5. is a sectional detail of the adjusting mechanism for projecting the lower end of the perforated lining inwardly and drawing it out again, prior to discharging the contents of the cylinder and, Fig. 6 is a sectional detail of the connection for the drainage pipe.

In the drawing, Fig. 1. A represents an outer cylindrical shell of plate metal, to which near the middle are riveted brackets C that rest upon and are supported by a rectangular metal frame D, Fig. 2. which holds the cylinder in elevated position with its lower end a considerable distance above the floor or ground sufficient to permit a car I, with wheels *d* running on rails *r* to run to a position either immediately below the cylinder, or to a position out of vertical range of the cylinder.

At the upper end of the cylinder A is provided a charging inlet B having a suitable door capable of being sealed air tight, through which the material to be treated is inserted. In vertical position in the center of the cylinder is fixed a large perforated pipe F which extends through the top of the cylinder and opens into the bottom of the same.

E is a perforated inner lining of sheet metal forming a strainer. This is riveted or bolted at its upper end to the main cylinder A through an interposed rib *a* that rigidly holds the top of the perforated lining some distance away from the outer shell with an annular space between the two. This inner perforated lining is made in four quadrantal sections, see Fig. 3. These sections are each reinforced by horizontal quadrantal ribs *e* which are attached to the lining but have no connection with the outer shell. Opposite the ribs *e* and also at the upper end the lining is not perforated, as seen in Figs. 1 and 3. The quadrantal sections of the inner perforated lining are connected along their vertical meeting edges by slip joint connections that permit the inner lining at its lower edge to be projected inwardly to a reduced circumference, as seen in dotted lines in Figs. 1 and 3, for the purpose hereafter described. This slip joint connection is shown in detail in Fig. 4, in which *g g* are two parallel plates riveted to one vertical edge of one quadrantal section by rivets *h h* and embrace between them the other vertical edge of the adjacent quadrantal section, so as to allow the lining sections to slip in their own planes to or from each other to accommodate the variation in their circumferential dimension in their adjustment inwardly and outwardly.

For projecting the perforated lining inwardly and drawing it out again, adjusting screws with hand wheels L are employed near the bottom of the cylinder as seen in Figs. 2 and 3. This adjusting device, of which there is one for each lining section, is shown in detail in Fig. 5, in which L is a hand wheel having a screw shank *m* that passes through a stuffing box *s* and whose thread engages a thread on the interior of a gland casting *l* riveted to the outside of the shell. The inner end of the screw shank has two washers *n* and *o* which fit on op-

posite sides of the rib *e* and the attached inner lining, the inner washer *n* being held on by a pin *p*. This end of the screw shank, with its washers, embracing the inner lining and its rib, forms a swivel joint and as the hand wheel L is turned, the screw threaded shank *m* projects the inner lining and its rib *e* inwardly or pulls it out according to the direction of the rotation.

The bottom end of the cylinder, see Fig. 1, is closed by a vertically adjustable base plate H equal to the cross section of the cylinder. This plate has around its circumferential edge a packing ring or gasket fitting tightly against the lower rabbeted edge of a cast metal ring R riveted to the lower edge of the cylinder and the lower edge of which ring has an off setting flange in which is arranged a series of vertical bolts forming the fulcrums of a series of cam-headed lock levers *b* which are arranged to be swung under the edge of the base plate H to draw it up tightly to the cylinder, or be turned out of the way to allow the base plate H to be lowered in discharging the contents of the cylinder. The base plate H has an inner perforated false bottom *i* mounted upon the tops of ribs *h* so as to leave a space between the plate H and the false bottom which is in open communication through the false bottom *i* with the lower end of the perforated central tube F and the annular space around the lining. The base plate H is mounted upon, and vertically adjusted bodily by, a hydraulic jack J supplied by a pipe *c* and carried on the car I, or other form of lifting device, and is controlled in its vertical adjustment by guide stems K K passing through guide holes in the car, which guide stems may also be lifting jacks. When the car is arranged centrally beneath the cylinder A and the lifting devices are in their highest position, the bottom plate H closes the bottom of the cylinder and is tightly locked in such position by the cam-headed levers *b*. When however, the levers *b* are released and the lifting devices are lowered, the bottom plate H descends to the position of the dotted lines in Fig. 1. and the car with the bottom plate may then be run from beneath the cylinder A to allow the discharge of its more or less solid contents.

P, Fig. 2, is a set of pipes tapped into the outer shell near the bottom and through which naphtha and steam are alternately allowed to enter as hereafter described the annular space between the inner lining and the outer shell and G, Fig. 1, is a circular perforated pipe at the top resting upon the upper rib *a* and also adapted to introduce naphtha on top of the contents of the cylinder. P^1 is another set of pipes at the bottom tapped through the cast iron base ring R, see Fig. 6, in a plane between the false bottom *i* and base plate H and adapted to draw off the oil and grease which may collect there and through which also naphtha may be introduced.

The operation of my apparatus is as follows: The bottom of the cylinder being placed in position and made tight, the cylinder is then filled with material through the charging inlet B. Naphtha is then pumped in through the pipes P and P^1 at the bottom, which naphtha fills the annular space between the inner lining and the outer shell and also the space beneath the false bottom and passes also up through the central perforated pipe F. Naphtha is also pumped in through the circular perforated pipe G at the top, falling in a spray upon the material. In this way naphtha is allowed to penetrate the material in all directions to thoroughly dissolve and extract the grease and oil. The liquid consisting of a solution of grease and oil in naphtha is then drawn off by the pipes P^1 from beneath the false bottom and the process is continued by pumping naphtha through the perforated spray pipe G at the top and washing it down through the material, taking it out as before through the pipes P^1 until there is no more grease or oil coming away with the naphtha.

After the naphtha and grease are drained out as far as possible, steam is introduced into the apparatus through the same pipes which formerly carried the naphtha and a wall of steam encircles the material between the inner and outer shell and between the false bottom and bottom plate and passing through the perforations in the inner shell permeates every part of the material. The large central perforated pipe F now comes into service. This pipe at its upper end extends to a condenser. The steam rapidly evaporates any naphtha remaining in the material and it passes out through the perforated pipe F to the condenser to be used again. The perforated pipe as well as the false bottom and the inner shell act as strainers and prevent any solid material from going out with the steam and naphtha. When the naphtha is all drawn off by this process, which is called "steaming out", the fastening devices *b* at the bottom are loosened and the bottom H lowered by the hydraulic jack and the car is then run out on the rails from beneath the apparatus, and the contents of the cylinder dumped. The purpose and object of the inward adjustment of the inner perforated lining will now be made clear. The semi-solid matters during the percolation process will so penetrate the perforations of the inner lining that the charge will often hang and fail to drop from gravity, even if the perforated plates be covered with a burlap strainer. To relieve this difficulty, and overcome this tendency to stick and not discharge properly, and also temporarily support the contents of the container when

the bottom discharge door is opened, the inner perforated lining is made in four segments with slip joints so as to readily move inward and being secured at the top and loose at the bottom, said lining sections are pressed inward to contract the cross sectional area, thus compressing the material and holding it suspended while the bottom discharge door is being removed. After the bottom door is lowered vertically and carried away horizontally on the car or truck said lining sections are then immediately drawn out again which breaks the bond between the material and inner perforated shell or strainer and allows the material to drop down and be removed in a simple and expeditious manner.

The important results of my invention are to be found in the means for discharging the tank by the integral vertical movement of the removable bottom and its bodily transfer horizontally to a different place on a car, by which the full charge is allowed to quickly drop; the means for the expansion and contraction of the inner perforated lining to hold the semi-solid materials temporarily suspended and also to break the bond and facilitate the discharge of the material from gravity and the construction for securing a thorough permeation of all parts of the material in the cylinder with the naphtha, and the draining out of the same, as well as the means for the complete "steaming out" for driving the balance of the solvent out of the material.

The chief difficulty with naphtha extraction has been the danger connected with it and the slowness of the operation. My invention is characterized by great thoroughness and rapidity of operation and safe manipulation.

I claim.

1. An apparatus of the kind described, comprising an upright container having a detachable bottom equal to the cross section of the container, a perforated strainer lining off-set from the side walls of the container and adjusting devices for forcing the perforated lining inwardly and drawing it out again to break the bond between the strainer and the material within the same, the perforated strainer lining being connected to the container at its upper end and being free to move inwardly below said connection.

2. An apparatus of the kind described, comprising an upright container having a detachable bottom equal to the cross section of the container, a perforated strainer lining off-set from the side walls of the container and adjusting devices for forcing the perforated lining inwardly and drawing it out again to break the bond between the strainer and the material within the same, the perforated strainer being made in separate vertical sections.

3. An apparatus of the kind described, comprising an upright container having a detachable bottom equal to the cross section of the container, a perforated strainer lining off-set from the side walls of the container and adjusting devices for forcing the perforated lining inwardly and drawing it out again to break the bond between the strainer and the material within the same, the perforated strainer being made in separate vertical sections in the form of cylindrical segments connected along their vertical edges by slip joints.

4. An apparatus of the kind described comprising an upright container, a removable bottom equal to the cross section of the container, a perforated lining made in vertical sections having ribs on their outer sides to reinforce the same and space the lining away from the container and adjusting devices for forcing the lining sections inwardly.

5. An apparatus of the kind described, comprising an upright container, a removable bottom equal to the cross section of the container, a perforated lining made in vertical sections having ribs on their outer sides to reinforce the same and space the lining away from the container and adjusting devices for forcing the lining sections inwardly, said adjusting devices being made to operate upon the ribs of the lining.

6. An apparatus of the kind described, comprising an upright container, a removable bottom equal to the cross section of the container, a perforated lining made in vertical sections having ribs on their outer sides to reinforce the same and space the lining away from the container and adjusting devices for forcing the lining sections inwardly said adjusting devices being made to operate upon the ribs of the lining and consisting of screw stems having turning handles on the outside and a swiveling connection with the lining sections.

7. An apparatus of the kind described, comprising a vertical container, a perforated lining off-set from the vertical walls, a detachable bottom equal to the cross section of the container having a perforated false bottom, a central vertical perforated pipe extending through the body of the container and out through the top of the container to carry off the vaporized solvent and inlet and outlet pipes communicating with the space around the lining and the space below the false bottom.

8. An apparatus of the kind described, comprising a vertical container, having an inner perforated lining, means for forcing the lining inwardly and drawing it out, a detachable bottom equal to the cross section of the container, a wheeled car with track below the bottom and lifting devices on the car connected to and carrying the detach-

able bottom and adjusting it bodily in both a vertical and horizontal plane.

9. An apparatus of the kind described, comprising a vertical container, having an inner perforated lining, means for forcing the lining inwardly and drawing it out, a detachable bottom equal to the cross section of the container, a wheeled car with tracks below the bottom and lifting devices on the car connected to and carrying the detachable bottom and adjusting it bodily in both a vertical and horizontal plane, and locking devices for connecting the edges of the bottom to the lower edge of the container.

10. An apparatus of the kind described, comprising a vertical container, having an inner perforated lining, means for forcing the lining inwardly and drawing it out, a detachable bottom equal to the cross section of the container, a wheeled car with track below the bottom and lifting devices on the car connected to and carrying the detachable bottom and adjusting it bodily in both a vertical and horizontal plane, said lifting devices consisting of a hydraulic jack with vertical guides.

11. An apparatus of the kind described, consisting of an upright container having the full cross section of its lower end open, a detachable bottom therefor, a perforated lining for the container made contractible at its lower end a car carrying lifting devices for said detachable bottom and arranged to move said bottom both vertically and horizontally.

12. An apparatus of the kind described, consisting of an upright container having the full cross section of its lower end open, a detachable bottom therefor, a perforated lining for the container made contractible at its lower end a car carrying lifting devices for said detachable bottom and arranged to move said bottom both vertically and horizontally, and a series of separate locking devices for tightening the joint between the lower edges of the container and the detachable bottom.

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

CHARLES EDGERTON.

Witnesses:
JOHN B. HENKELS,
CHRISTIAN PFEIFFER.