(No Model.) 3 Sheets—Sheet 1.

G. S. ANDRES.

APPARATUS FOR MAKING EXTRACTS.

No. 436,624. Patented Sept. 16, 1890.

Fig. 1.

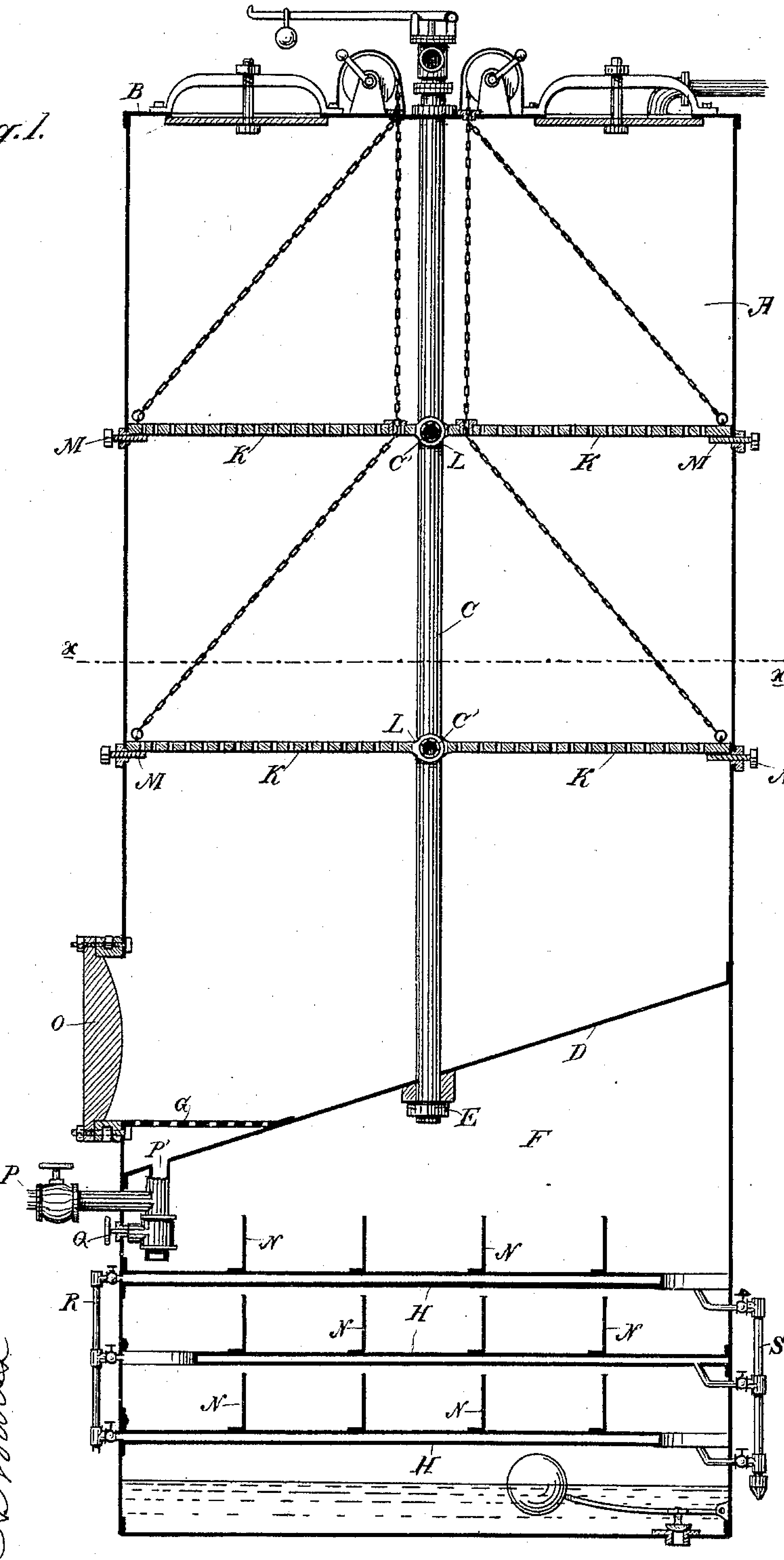

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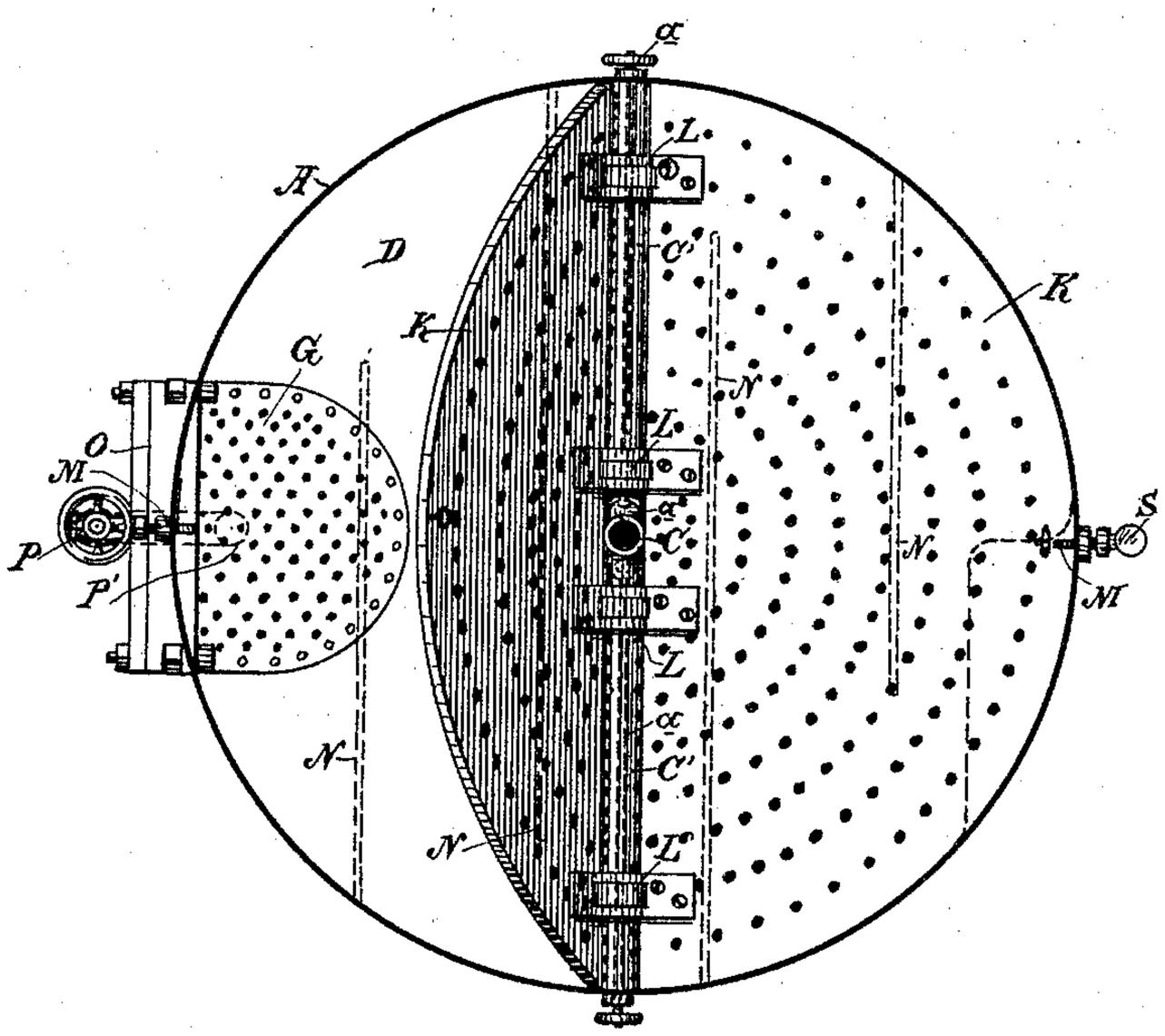
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3.

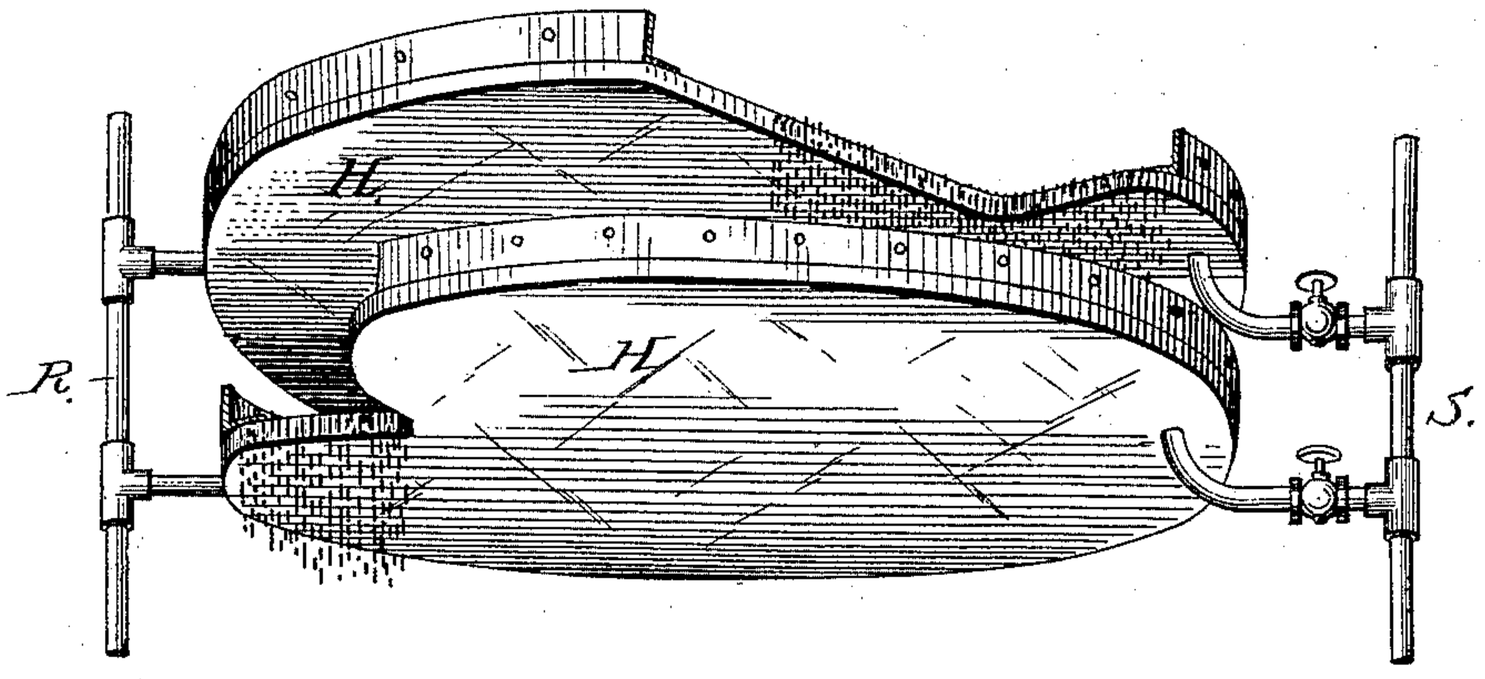
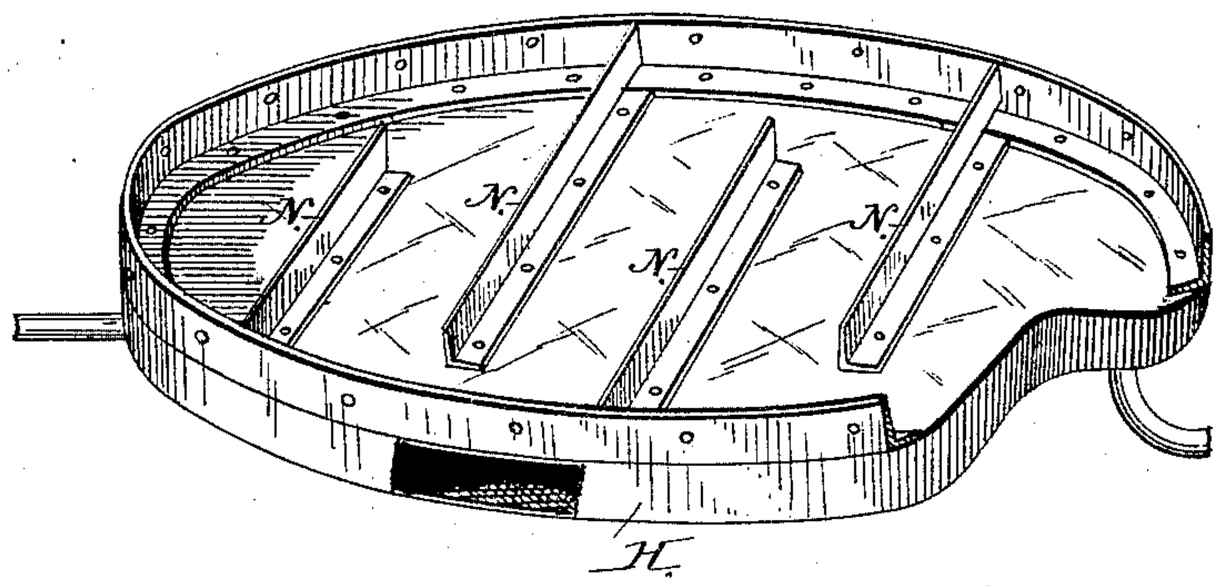


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING EXTRACTS.

SPECIFICATION forming part of Letters Patent No. 436,624, dated September 16, 1890.

Application filed April 18, 1890. Serial No. 348,542. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. ANDRES, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Apparatus for Making Extracts; and I hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to improvements in apparatus for extracting from substances containing the same their fatty oils, and in general all such constituents as are soluble in volatile solvents—such as some of the hydrocarbons, bisulphide of carbon, alcohol, ether, &c.; and it consists in the construction of the apparatus and in the combination of its several parts, substantially as hereinafter fully described, and as set forth in the claims hereto annexed.

The object of the invention is to provide an apparatus of simple construction by means of which extracts may be obtained, either in a continuous or intermittent manner, and which may also be employed for more perfectly removing the solvent from the extract, either with or without pressure.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a vertical sectional elevation. Fig. 2 is a horizontal cross-section through the line *x x* of Fig. 1. Fig. 3 is a perspective view showing the upper and lower plates H and connections. Fig. 4 is a perspective view showing one of the plates H with its partitions N, which form the serpentine passages.

A is a vertical tank or cylinder having an opening in the top through which it may be charged, and provided with a suitable plate or cover B. Within this tank, and some distance above the bottom, is fixed a false bottom or floor D, which is bolted or otherwise secured within the tank, so as to stand at an inclination, as shown. At the lower edge of this false bottom is an opening or space P′, through which the solution and extract are allowed to flow down into the space below this inclined bottom D, as will be hereinafter described. G is a grating or perforated plate fixed above this opening or space, so as to prevent the solid material with which the upper portion of the tank is filled from passing down into the opening, while the perforations are sufficient to allow the solution or extract to flow through. On the same plane with this grating G is an opening through the outer wall of the tank, of sufficient size to discharge the tank from time to time, when required, and this opening is closed by a door or plate O, having suitable bolts and nuts, and means for making a tight joint.

Through the center of the false bottom D a hollow pipe C extends upward through the top of the tank, and it has an inclined washer and a lock-nut E beneath the bottom D, which serves to support the central portion of the bottom D. This pipe serves as a passage for the hot vapors to pass from the chamber F beneath the bottom D, up so as to be either discharged into a condenser at the top, which is not shown here, or by means of the perforated pipes C′, which extend horizontally out from it at intervals between the bottom D and the top of the tank. These vapors may be discharged into the mass of material which is contained within the tank. In order to support this material and prevent its being too much compacted by reason of it great depth and weight, I have shown perforated shelves K, which divide the upper portion of the tank into two or more compartments. These plates or shelves are hinged to the vapor-pipes C′, as shown at L, and when free to move they may be turned either upward or downward about their hinges. These plates are turned upward, when the tank is to be filled by means of rods or chains connecting with them and leading up through the top of the tank A. That portion which passes through the top of the tank may be made in the form of a smooth rod, which will pass through a stuffing-box, so that there will be no leakage at that point. When the tank is to be filled, these plates are turned upward so that the material first introduced through the openings at B will fall down upon the inclined bottom D, and when this space has been filled up to a point just beneath the first of the perforated plates or shelves K, that plate will be let down into a horizontal position, where it is held by means of a stop or stops M, which project through the side of the tank,

and may be operated from the outside. The space above the lowermost of the shelves K is then filled, and the next perforated shelf K is let down in a like manner, and so on until the tank is filled to the top. By thus subdividing the material a less amount is supported in any one body and the mass is not compressed together as much as if it was all supported without any intervening shelves or bottoms. This allows the solvent material to flow more freely through the mass and thus act upon it in a quicker and more thorough manner.

When a tank is to be discharged, by opening the door or gate O and withdrawing the stops M the shelves K will swing downward about their hinges, thus leaving all the contents of the tank free to be discharged, and by reason of the inclined bottom D the discharge will take place by gravitation automatically without the necessity of much manual labor to rake out or remove the contents.

The pipes or branches C′, which extend out horizontally and to which the shelves K are hinged, are perforated so as to allow the vaporized solvent which passes up through the pipe C to be discharged into the mass of material within the tank, and thus dissolve out the portions which are desirable.

In the lower part F of the tank and beneath the inclined bottom D are a series of horizontal plates H, arranged one above the other and having vertical partitions N made across them in such a way as to form serpentine passages, through which the solvent and also the extract which comes down through the perforated plate G passes, and through which the vapor passes upward. The solvent is admitted through a pipe P, which opens into the lower part of the chamber just beneath the lower edge of the inclined floor D, and it has a branch P′, extending upwardly through this floor, and a valve Q to cut off the discharge upon the upper plate H, when desired, for a purpose to be hereinafter described. The solvent being admitted through the pipe P, flows backward and forward over the upper plate H between the vertical plates N, following the sinuous passage thus formed until it reaches the opposite side of the plate H, where a space is formed which allows it to fall down upon the plate below, where it again passes back and forward and is discharged at the opposite side of this plate, and so on, until it reaches the bottom of the tank, while the vapor arising from the solvent passes upward through the same channels. These plates H are made double, having a space between them, and are properly braced or stayed to resist the internal pressure of steam which is admitted between the double plates H from a pipe R, connected with the boiler and having suitable cocks by which the admission of steam to each of the plates is regulated, so as to supply the amount of heat necessary for the purpose. The opposite edges of the plates are connected by pipes with the discharge-pipe S, which delivers the steam and condensed water through a proper steam-trap, by which a suitable heat and pressure may be maintained within the plates H.

The operation will then be as follows: The tank having been filled with the fatty or other materials from which it is desired to make an extract, the solvent is admitted through the pipe P, the valve Q being open, and flows upon the heated plates H, where it is vaporized, and passing up through the passages in these plates and through the pipe C is distributed through the branches C′, and escaping through the perforations it will permeate the mass of the material and gradually find its way down upon the inclined plate D, whence, flowing through the perforated plate G and the pipe or passage P′, it finds its way to the heated plates H with whatever extract it may have dissolved out of the material above. The heat of the plates H will again vaporize the volatile solvent and cause it to pass up through the pipe C, a portion of which passes again into the perforated arms C′, and the remainder passing upward through the upper end of the pipe into a condenser, which may be of any suitable or well-known form, and from which the condensed liquid is returned to a tank from which the pipe P receives its supply, the volatile solvent liquid being thus used over and over as long as may be desired. The extract which is made from the material by the use of this solvent, being less volatile, flows over the hot plates H, following the sinuous passages before described until it reaches the bottom of the tank, and the heat of the plates is such that the volatile solvent will be vaporized and driven out before the heavier material reaches the bottom. From this point it is drawn off through a suitable globe or other valve.

In the treatment of some material—such as linseed-meal—it is preferable to use the solvent cold and in a liquid form, in which case the valve Q is closed and the solvent being admitted through the pipe P and the branch P′ flows up through the perforated plate G and fills the chamber. In order to prevent this liquid solvent from flowing through the perforated pipes C′ and the vertical pipe C, and thus obtaining access to the chamber below the inclined floor D, I have shown valves operated by rods and handles *a* from the exterior of the tank A, so that by means of these handles the valves may be closed at the inner ends of the pipes C′, thus preventing any communication between these pipes and the central pipe C. Whenever the extract is sufficiently completed in this manner the solution is allowed to flow down in small quantities at a time upon the heated plates H by opening the valve Q, and the solvent will then be vaporized to pass up through the pipe C and through the condenser and receiving-tank, as before described, the extract being discharged at the bottom.

Having thus described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for making extracts, the tank having a series of heating-plates in the lower portion, an inclined floor or diaphragm fixed within the tank above these plates and adapted to support the material from which the extract is to be made, a perforated plate at the lower edge of this inclined floor, and a passage through which the extract may pass upon the heated plates below, in combination with a central pipe extending upward through the floor and the top of the tank, and having openings or perforated arms through which the vaporized solvent may be discharged at different points into the mass of material, substantially as herein described.

2. In an apparatus for making extracts, a tank having the inclined floor or diaphragm forming the bottom of the chamber within which the material to be treated is contained, and a chamber below said diaphragm containing the heating-plates over which the solvent and extract are caused to flow, a pipe extending upward through the inclined floor communicating with the condenser exterior to the tank, and having the openings or perforated arms through which the vaporized solvent is discharged into the material within the tank, and valves or cocks by which communication between said arms and the center pipe may be cut off, substantially as herein described.

3. In an apparatus for making extracts, a tank having the heating-chamber in the lower part, the inclined floor or diaphragm forming the bottom of the chamber which contains the material to be treated, a series of perforated diaphragms or shelves hinged within the tank at intervals between the inclined floor and the top, and a means comprising rods or chains leading up through the tank, whereby said shelves may be turned up on edge to allow the tank to be filled, and stops whereby the shelves are supported in a horizontal position when the tank is full, or allowed to turn downward for the purpose of discharging the tank, substantially as herein described.

4. In an apparatus for making extracts, a tank having the inclined floor or diaphragm and the hinged movable shelves upon which the material to be treated is supported, a central pipe extending upward through the bottom of the inclined floor and the top of the tank and having the openings or perforated arms connected with the pipe and discharging into the material beneath each of the shelves, a chamber beneath the inclined floor having the double horizontal plates extending transversely, and passages through which steam is admitted between said plates and discharged therefrom, vertical partitions upon the surfaces of said plates, forming serpentine passages, and a pipe through which the solvent material is admitted upon the upper plate to flow through said passages, whereby said solvent is vaporized and caused to pass through the central pipe into the material to be treated, substantially as herein described.

5. In an apparatus for making extracts, the inclined floor or bottom and the perforated shelves or diaphragms upon which the material to be treated is supported, a perforated plate at the lower side of the inclined floor, and a pipe or passage beneath it through which the extract and condensed solvent may flow into the chamber below the inclined floor, horizontal double plates situated one above the other in the chamber beneath said floor, having serpentine passages through which the solvent and extract flow from one side of each plate to the opposite side and openings through which they are discharged upon the plate below, pipes and cocks through which steam may be admitted into the double heating-plates, whereby the volatile solvent is vaporized and caused to pass upward through the discharge-pipe, while the heavier extract flows to the bottom of the tank, substantially as herein described.

6. In an apparatus for making extracts, the inclined floor or diaphragm, and the hinged perforated shelves or diaphragms situated at intervals above said floor for the purpose of supporting the material to be treated, a central pipe passing upward through said floor, having perforated arms or branches and valves or cocks, whereby the communication between said arms or branches and the central pipe is closed, in combination with an inlet pipe or passage P′, through which the volatile solvent is admitted into the chamber above the inclined floor, a chamber beneath said floor containing the heating-plates or diaphragms, and a valve Q, whereby communication between the pipe P′ and said chamber is opened or closed at will, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE S. ANDRES.

Witnesses:
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H. C. LEE.