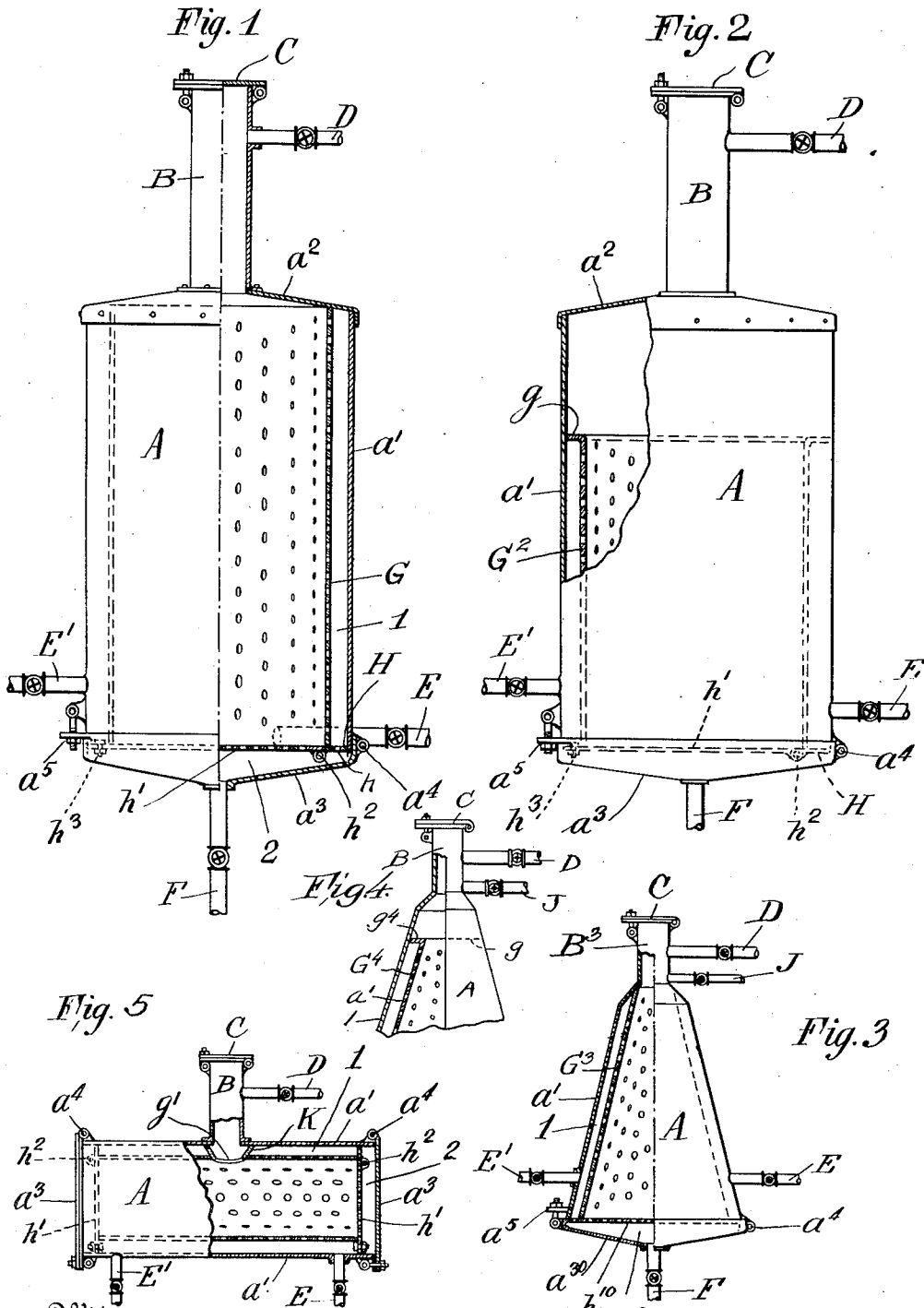


I. BLOUNT.
 APPARATUS FOR REMOVING LIQUIDS FROM SOLID MATERIAL.
 APPLICATION FILED MAR. 24, 1909.

1,056,495.

Patented Mar. 18, 1913.



Witnesses
 John J. Kavanagh
 Agnes B. O'Connell

Inventor
 Irving Blount
 By his Attorney
 J. H. McGrath

UNITED STATES PATENT OFFICE.

IRVING BLOUNT, OF BROOKLYN, NEW YORK.

APPARATUS FOR REMOVING LIQUIDS FROM SOLID MATERIAL.

1,056,495.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed March 24, 1909. Serial No. 485,488.

To all whom it may concern:

Be it known that I, IRVING BLOUNT, a citizen of the United States, and a resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Apparatus for Removing Liquids from Solid Material, of which the following is a specification.

The present invention relates to an apparatus for simultaneously removing oil, grease, water or other liquids from garbage or other refuse matter and compressing the residue of such matter, its most important object being the production of an apparatus which will introduce important economies in the separation of liquids from the solid matter in garbage, etc., by making provision for the effective use of steam in the performance of its herein functions of extracting the liquids from the solid matter and compressing said solid matter and by also making provision whereby the compacted solid matter from which the liquid content has been extracted may be readily and economically removed from the separating apparatus.

In the accompanying drawing, I have shown several specifically different embodiments of the present invention, some of which embodiments are better adapted to carry out the particular purposes of the present invention than others, but all of which are capable of carrying such purposes into practice with more or less degree of satisfaction.

In said drawings: Figure 1 is a side elevation partly in section of one form of the apparatus. Fig. 2 is a side elevation, partly broken away, of a form of the apparatus like that of Fig. 1 in many respects, but having a change which increases its efficiency. Fig. 3 is an elevation, partly in section, of a conical form of the apparatus. Fig. 4 is a detail representation of the upper part of a modified form of conical apparatus, showing a form thereof preferred to that illustrated in Fig. 3. Fig. 5 is an elevation, partly broken away, showing a form and arrangement of the apparatus which is less desirable than any of the preceding forms but is within the spirit of the invention considered in its broadest aspects.

The present apparatus essentially includes a container having a chamber to which the garbage or other material to be treated is

supplied through an aperture having communication with said chamber, said chamber also having an inner perforated wall and an outer non-perforated wall, the inner wall extending throughout a part only of the length of the treating chamber, terminating short of the charging aperture and steam inlet sufficiently to provide between its end and said aperture and inlet a walled space within which the material is partly treated, said solid space having its wall formed without perforations, or at any rate, so formed that the steam which enters the treating chamber at a point in advance of the perforated inner wall will be compelled to pass through that portion of the matter which is surrounded by said imperforate wall and will be permitted to compress said matter, before it reaches any of the outlets provided by the perforations in the inner wall, thereby enabling the steam to extract the liquid content of said matter and compress the solid residue without loss of steam. The apparatus also essentially includes certain other features hereinafter more particularly set forth.

Referring to the construction illustrated by Fig. 1 of the drawing, the part lettered A represents a container consisting of a cylindrical wall a' terminating in a top a^2 tightly secured thereto, from which rises a drum B, the drum B, top a^2 and wall a' all being steam-tight. The drum B has a charging aperture which may be tightly closed by a closure C, preferably hinged to the drum, and said drum also has a valved steam inlet pipe D adjacent to said charging aperture. The bottom of the container is closed by a closure a^3 which in this particular exemplification of the invention is hinged at a^4 to the outer wall a' and is tightly held in its closed position by suitable means indicated at a^5 . Within the container there is an inner perforated wall G which is spaced from the steam tight wall a' to provide a liquid and steam space 1 communicating with which are valved outlet pipes E, E', through which the steam and extracted matter may be drawn. A perforated plate H is provided adjacent to the closure a^3 . In this particular exemplification of the invention the perforated plate H has a fixed section h forming the bottom of the annular space 1 between the walls of the container

and a hinged section h' which forms the bottom of the treating chamber, said hinged section having a diameter approximately equal to that of the treating chamber, being hingedly mounted at one side adjacent to the end of the perforated wall G and having at its opposite side a suitable securing device h^3 . This plate is spaced from the closure a^3 so as to provide a chamber 2 which has communication with the annular space 1 through the perforations in the fixed section h and also has communication with the treating chamber through the perforations in the hinged section h' . This chamber 2 is provided with a valved outlet pipe F through which the steam and liquid matter extracted from the matter undergoing treatment may be drawn.

The operation of the apparatus is as follows: The plate or valve C is opened and garbage or other matter is charged through the drum B into the cylinder F until the garbage reaches the position in the drum just below the inlet pipe D, when the valve is closed and steam is then admitted through the pipe D. The steam will pass through the garbage, forcing and carrying out with it through the perforations in the cylinder G and the bottom a^3 , oil, water or other liquid which is collected in the spaces 1 and 2, and conducted away through the outlet pipes E, E' and F. The pressure of the steam at the same time will compress the garbage and force it out of the drum B and compress it in the cylinder G below the top of said cylinder. If the process be now continued without the addition of further material to that portion of the treating chamber situated between the inner perforated wall and the steam inlet the steam instead of passing through the garbage will escape through the perforations at the top of the cylinder and pass out through space 1 and escape through the outlet pipes E, E', at a great loss in steam. To prevent this loss, as soon as the garbage is forced to the bottom of the drum B, the steam is shut off, the plate C is opened and more garbage is charged into the drum B up to the point D, when the plate C is again closed and the steam again turned on. This operation is repeated until all the oil, water, &c., is forced out of the garbage and the same is pressed tightly inside the cylinder G. When this operation is completed the steam is shut off, the bottom a^3 and the hinged plate H are opened and the substantially dry material is removed.

In an apparatus constructed as shown in Fig. 1, repeated recharging of the drum therefore is necessary. This not only takes up time but a large amount of steam is lost each time the valve C is opened. To overcome this objection, I may construct the apparatus as shown in Fig. 2. In this case

instead of the inner perforated wall, marked G^2 in this figure extending to the top a^2 , it is much shorter than the outer wall a^1 . The upper edge of this inner perforated wall G^2 is outturned to form a flange g' which tightly rests against the inner surface of the side a^1 of the container. In this construction the treating chamber includes a space above the upper end of the perforated wall G^2 and between the same and the outlet end of that section of the treating chamber which is within the drum B, and as the garbage in the treating chamber must be forced below the flange g' before the steam can freely escape, it is not necessary to so frequently add the garbage to the treating chamber during the operation of the apparatus.

A conical form of the apparatus is preferable to a cylindrical form thereof. I have shown such a form in Figs. 3 and 4. In this form of the construction the inside perforated member, marked G^3 in Fig. 3, may extend substantially to the drum B^2 , as shown in Fig. 3, or said inner perforated member marked G^4 in Fig. 4 may be outturned to form a flange, marked g^4 , as shown in Fig. 4. In this construction I have also shown the bottom a^{30} of the conical section and the bottom perforated plate h^{10} connected together. In other words, the bottom a^{30} is a double bottom having an inner perforated plate h^{10} with the space 20 between. In the conical form of apparatus the solid residue, that is, the material left after the liquid content of the matter has been extracted may be more readily removed than in cylindrical construction. This removal of the solid matter is accomplished by opening the hinged bottom a^{30} said bottom moving to an open position on its hinge a^4 and when in said open position fully exposing the interior of the receptacle. This receptacle being now in downwardly open position and with its larger end at the bottom induces a movement of the solid matter therefrom in a minimum length of time.

In some instances the garbage after being treated to remove the oil and other matter, may be easily removed from the receptacle by forcing compressed air in the top thereof through the pipe J. While I have shown this pipe as connected to the drum, it is apparent that it may be connected directly to the steam pipe D so that air can be forced into the drum over the top of the garbage after the steam is cut off.

In some cases it may be advantageous to have the container placed horizontally instead of vertically. I have shown an apparatus so arranged in Fig. 5. In this construction the drum B is connected to the side of the container and it communicates with the inside of the perforated cylinder through an opening g' thereon. K is a circular inclined plate which prevents the gar-

bage, during the charging, from entering the space 1 and also prevents the steam from escaping in said space before passing through the garbage. In this construction each end of the receptacle A is provided with a hinged cover a^3 and each end of the receptacle is also provided with a perforated hinged cover h' with a space 1 between each of said covers.

While I have stated that the inner wall is a perforated cylinder or cone, it is to be understood that these members may be made out of a wire netting or any other suitable material, and while I have shown an air pipe J only in the constructions illustrated by Figs. 3 and 4, it is understood that such a pipe may be connected to the construction shown in any of the other figures for the same purposes. While I have shown only in Fig. 3 the bottoms a^{30} and h^{10} connected together yet such a cover may be used in the construction shown in any of the other figures.

It will be noted that in each of the foregoing exemplifications of the present invention the portion of the treating chamber having the perforated wall is entirely free from ledges and other projections, and that said portion of the treating chamber is similarly free from any elements which would form obstructions to the compressing of the solid residue or interfere with its free removal from the treating chamber when the outlet closure is adjusted to its open position.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container having a treating chamber with an outer imperforate wall and an inner perforated member spaced from the outer wall, said outer wall being provided with a charging aperture which communicates with the treating chamber and has means for closing it, the outer wall being also provided with means for the inlet of steam to the treating chamber, the inner perforated member of the container terminating sufficiently away from the charging aperture and the point at which the steam is admitted to provide a section of the treating chamber between said perforated wall and steam inlet, the wall of said section being adapted to prevent the flow of steam laterally therethrough, thereby permitting the steam to compress the material, said container also having at one end a movable closure of area approximately equal to that of the adjacent end of the treating chamber, whereby the interior of the treating chamber is approximately entirely exposed when the closure is opened to permit the discharge of the treat-

ed material, the interior of the treating chamber being free from obstructions to such discharge, and valved means for the outlet of the extracted fluid from the container.

2. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container having a treating chamber with an outer imperforate wall and an inner perforated member spaced from the outer wall, said outer wall being provided with a charging aperture which communicates with the treating chamber and has means for closing it, the outer wall being also provided with means for the inlet of steam to the treating chamber, the inner perforated member of the container terminating sufficiently away from the charging aperture and the point at which the steam is admitted to provide a section of the treating chamber between said perforated wall and steam inlet, the wall of said section being adapted to prevent the flow of steam laterally therethrough, thereby permitting the steam to compress the material, said container also having at one end a movable closure of area approximately equal to that of the adjacent end of the treating chamber, whereby the interior of the treating chamber is approximately entirely exposed when the closure is opened to permit the discharge of the treated material, the interior of the treating chamber being free from obstructions to such discharge, said closure having an imperforate member and a perforated member, each movable relatively to the container, said members being spaced to provide a chamber between them and said chamber having communication with the treating chamber and space between said outer wall and inner perforated member of the container, and valved means for the outlet of fluid from the container.

3. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container having a treating chamber with an outer imperforate wall and an inner perforated member spaced from the outer wall, said outer wall being provided with a charging aperture which is arranged at or near the upper end of the container and communicates with the treating chamber and has means for closing it, the outer wall being also provided near the upper end of the container with means whereby fluids for extracting the liquid content from the material and expelling the residue of the material from the treating chamber respectively may be introduced into the treating chamber at different times, the inner perforated member of the container terminating sufficiently away from the

charging aperture and the place at which the extracting fluid is admitted to provide a section of the treating chamber between said perforated wall and place having a fluid tight lateral wall, a closure for the bottom of said container, said closure consisting of a solid member and a perforated member spaced from the solid member, the space between said members having communication with the interior of the treating chamber and with the space between the outer wall and inner perforated member of said treating chamber, and valved outlet means having communication with said spaces.

4. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container having a treating chamber with an outer imperforate wall and an inner perforated member spaced from the outer wall, said outer wall being provided at or near its upper end with a charging aperture which communicates with the treating chamber and has means for closing it, the outer wall being also provided with means for the inlet of steam to the treating chamber, the inner perforated member of the container being conoidal and terminating sufficiently away from the charging aperture and the point at which the steam is admitted to provide a section of the treating chamber between said perforated wall and steam inlet whose wall is adapted to prevent the flow of steam therethrough, thereby permitting compression of the material under treatment, said container having its bottom provided with a movable closure of area substantially equal to that bounded by the perforated wall of the treating chamber at the widest part of the latter, the interior of the treating chamber being free from obstructions to the discharge of the material when said closure is open.

5. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container, a drum connected to the upper end of the container, said drum having a charging aperture provided with a closure, means for admitting a treating fluid to the interior of the drum, the wall of said drum being adapted to prevent the free egress of the treating fluid laterally therethrough, a hollow member arranged in said container and communicating interiorly with said drum, said member having lateral perforations in its wall and having its opening tapered upward from the bottom and its upper end arranged below and spaced from the fluid inlet in the drum, means for closing the lower end of said hollow member, said means being movable to open the lower end of said member and said hollow member being interiorly free from obstructions to the discharge of the treated

matter when said closure has been opened, and means for the outlet of the fluid from the space around the hollow member.

6. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a container, a drum connected to the upper end of the container, said drum having a charging aperture provided with a closure, means for admitting a treating fluid to the interior of the drum, the wall of said drum being adapted to prevent the free egress of the treating fluid laterally therethrough, a hollow member arranged in said container and communicating interiorly with said drum, said member having lateral perforations in its wall and having its opening tapered upward from the bottom and its upper end arranged below and spaced from the fluid inlet in the drum, a closure for the lower end of said hollow member, said closure being movable to open the lower end of the hollow member and the hollow member being interiorly free from obstructions to the discharge of the treated matter when said closure has been opened, the closure comprising an outer solid wall and an inner perforated wall arranged to provide between them a chamber which has communication with the interior of said hollow member and also with the space between the hollow member and the outer wall of the container through its perforated wall, and means for the outlet of the fluid from said chamber and space.

7. An apparatus for simultaneously extracting the liquid content of materials of the kind described and compressing the solid residue, comprising a conoidal container, a drum connected to the upper end of the container, said drum having a charging aperture provided with a closure, means for admitting a treating fluid to the interior of the drum, a conoidal member arranged in said container and having a perforated wall spaced from the wall of the latter, the upper smaller end of said conoidal member terminating below the lower end of the drum, to provide a space in the container between said member and drum, said space being open to the drum and to the interior of the conoidal member, and said drum, space and conoidal member conjointly forming a treating chamber whose lateral walls are adapted to prevent the egress of the treating fluid therethrough above the inner perforated conoidal member, a closure for the lower end of said treating chamber and means for the withdrawal of the fluid from the space between the perforated conoidal member and the outer wall of the container.

8. An apparatus for simultaneously extracting the liquid content of materials of

the kind described and comprising the solid residue, comprising a conoidal container, a drum connected to the upper end of the container, said drum having a charging aperture provided with a closure, means for admitting a treating fluid to the interior of the drum, a conoidal member arranged in said container and having a perforated wall spaced from the wall of the latter, the upper smaller end of said conoidal member terminating below the lower end of the drum, to provide a space in the container between said member and drum, said space being open to the drum and to the interior of the conoidal member, and said drum, space and conoidal member conjointly forming a treating chamber whose lateral walls are adapted to prevent the egress of the treating fluid therethrough above the inner perforated conoidal member, a closure for the lower end of said treating chamber, said closure comprising an outer solid wall and an inner perforated wall arranged

to provide between them a chamber which has communication with the interior of the inner perforated member and also with the space between said member and the outer wall of the container through its perforated wall, the closure being movable to open the lower end of the treating chamber and the inner perforated member being interiorly free from obstructions to the discharge of the treating matter when said closure has been opened, and means for the withdrawal of the fluid from the space between the inner conoidal member and outer conoidal member and from said chamber. 25 30 35

In witness whereof I have hereunto set my hand at the city of New York, county of New York and State of New York, this fifteenth day of March, 1909. 40

IRVING BLOUNT.

In presence of—

HOLGER OLIVARIUS,
FRANK EUFERNIA.