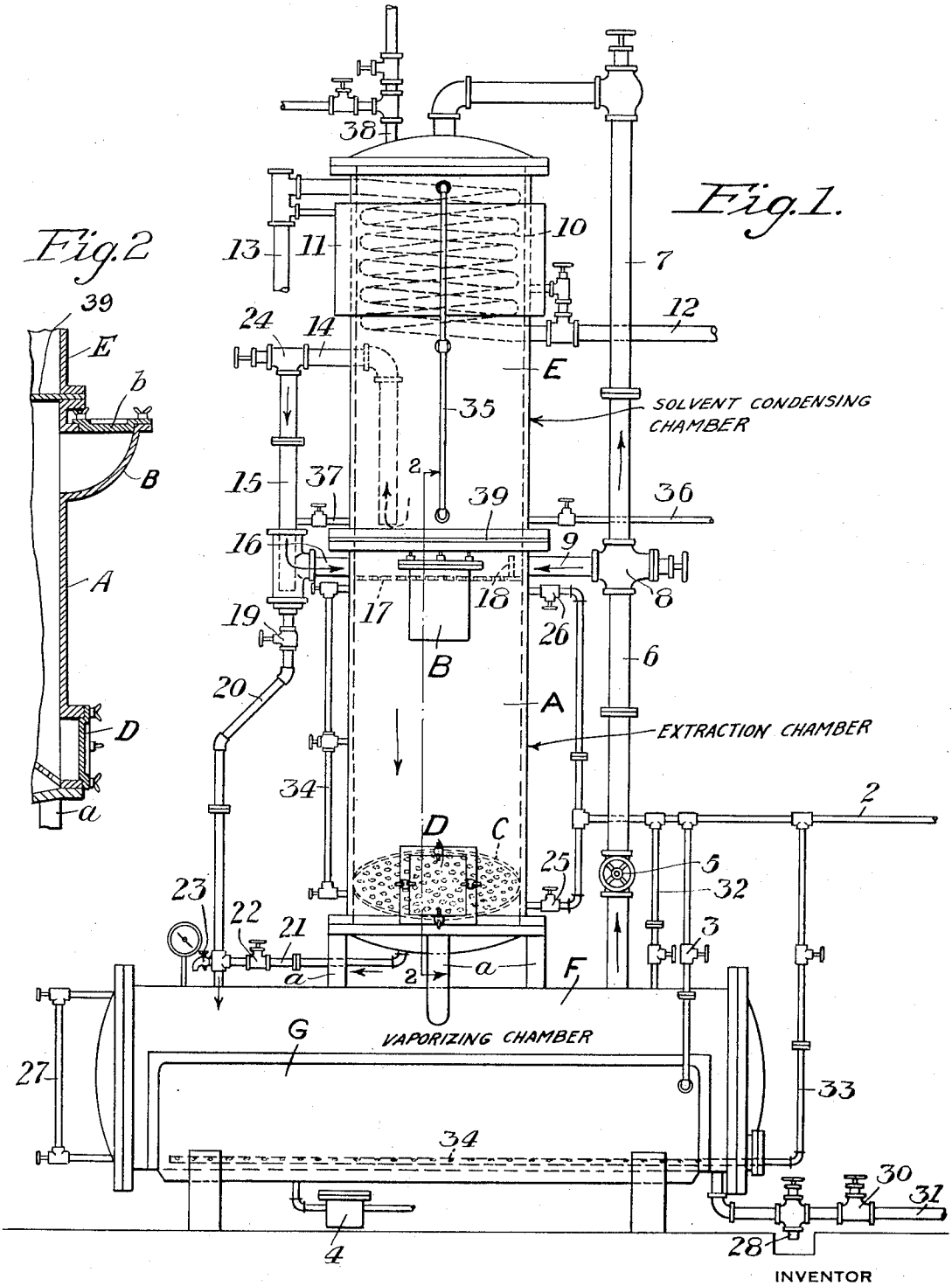
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GREASE EXTRACTOR

Filed June 9, 1926



INVENTOR

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UNITED STATES PATENT OFFICE.

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GREASE EXTRACTOR.

Application filed June 9, 1926. Serial No. 114,641.

My invention relates to a method and apparatus for circulating an absorbing medium through materials containing grease or other matter which is capable if absorption.

The invention will be hereinafter described as employed in connection with the extraction of grease from bones, hide trimmings, various waste materials, etc. by the use of solvents, such as carbon tetra chloride, gasoline, naptha, benzine, benzol or other solvents.

One object of my invention is to provide a means for extracting grease and the like from substances, in a more rapid and thorough manner than possible with the devices heretofore employed.

Another object of my invention is to provide an apparatus which is of simple form and semi-automatic in operation.

One form which my invention may take is shown in the accompanying drawing wherein Figure 1 is a side elevational view of the apparatus, and Fig. 2 is a cross sectional view of a portion of the apparatus, taken on the line II—II of Fig. 1.

As shown in the drawing, I provide a chamber A into which the material, such as bones, hide trimmings, etc.. may be introduced through a cover *b* of a hopper B, which is provided with a grid or perforated partition plate C near the bottom, the plate C being inclined downwardly and forwardly so that the solid material remaining after the solvent has been passed through the chamber A can be conveniently removed through a door D.

A solvent-condensing chamber E is provided above the chamber A, and a receiving chamber F is disposed below the chamber A and supports legs *a* of the chamber A. A steam jacket G partially surrounds the chamber F, for the purpose of heating the contents thereof. Steam is introduced to the jacket G from a steam line 2, past a valve 3, to heat the chamber F. A steam trap 4 of any usual type, is provided for the steam jacket G.

Assuming that a body of liquid solvent is contained in the receiving chamber F and steam is supplied to the jacket G, the solvent will be vaporized and flow past the valve 5, through pipes 6 and 7, to the condensing chamber E. A valve 8 controls communication between the pipe 6 and a pipe 9 that leads into the upper end of the chamber A, so that some of the hot vapor rising from the pipe 6 may be diverted into the chamber A to heat the same and facilitate the extraction of grease. As the vapor enters the chamber E it is condensed by cooling coils 10 and a water jacket 11. The coils 10 are disposed within the chamber E and the jacket 11 surrounds the same. The coils and the jacket are supplied with cold water from a pipe 12. The cooling water passes through the coils and the jacket and is conducted to a waste pipe 13.

When the level of the condensed solvent in the chamber E has risen to the height of a pipe 14, such solvent will be caused to flow by siphonic action through pipes 15 and 16 into the chamber A. The point of entry into the chamber A is above a perforated plate 17 that serves to distribute or spray the liquid upon the refuse or other material contained in the tank A. A baffle 18 prevents the liquid solvent from flowing into the pipe 9. While the liquid is flowing through the pipe 15 to the chamber A, the valve 19 which controls flow through a pipe 20 that communicates with the lower end of pipe 15 and with the tank F is closed.

The liquid solvent in the chamber A passes through the refuse and the grid C to the bottom of the tank, from whence it flows through a pipe 21, past a valve 22, and into the receptacle F. The flow past the valve 22 is retarded so that the solvent will not pass through the refuse too quickly to properly absorb grease. The solvent and the grease which enter the tank F are heated by the steam jacket G and the solvent is again vaporized and passed to the condensing chamber E in another cycle of movement as above described. The grease has a lower boiling point than the solvent and is not vaporized thus remaining in the tank F. The solvent is repeatedly passed through the tank A until samples drawn out of valve 23 indicate that no further grease is being

extracted from the refuse, whereupon valves 22, 24, 19 and 3 are closed and valve 19 is opened, no heat being supplied to the jacket G during this stage of operation.

Steam is then blown into chamber A through pipe 2 and valve 25, to heat the mass of material within the chamber A and drive off the remaining solvent, in vapor form, through pipes 9 and 17 into chamber E and there condensed. The water in the bottom of the chamber E is meanwhile drawn off through the pipe 36. Any condensed water present will settle to the bottom of the chamber F and be indicated by the gauge 27, and may be drawn off through the drain pipe 28. The solvent and steam which enters the chamber F during this operation will pass from the chamber F up through the valve 5 and pipes 6 and 7, to chamber E and be condensed by the coils 10 and the cooling jacket 11. The water thus condensed is indicated by a gauge 35 and may be drawn off through pipe 36. The valves 19, 25 and 26 may then be closed and valve 3 opened so that the solvent remaining in the tank F may be vaporized and caused to flow to the chamber E. The grease can be withdrawn past a valve 30 to a pipe 31 which leads to a storage receptacle (not shown). Flow of the grease from the chamber F is facilitated by steam pressure admitted through a pipe 32.

When solvent is present in the chamber F, distillation thereof may be hastened by supplying steam through a pipe 33 that has a perforated extension 34 disposed within the chamber F. The water and solvent are separated in the chamber E by drawing off the water, which is of the heavier specific gravity, through the pipe 36.

When the grease has been removed from the chamber F and the refuse withdrawn from the chamber A, another supply of untreated material is introduced therein, and the valves 24, 22, 8 and 5 opened to permit resumption of circulation of the solvent, the body of solvent in the chamber E being automatically siphoned through pipes 14, 15 and 16 into the chamber A as above described.

The chamber A is provided with a gauge 34 so that the volume of solvent and the time which is required for it to pass through the chamber A can be readily determined. The gauge 35 will indicate whether there is sufficient volume of condensate in E and also indicates the presence of any water in the chamber E, which water may be drawn off through drain pipes 36 or 37, the solvent present being allowed to remain in the chamber. An inlet 38 is provided at the top of the chamber E, to admit solvent to the system, either as an initial charge or to replace solvent which escapes through the system through leakage or otherwise.

A heat-insulating, solid plate, member 39 is provided to separate the chambers E and A, so that the heated vapors which enter the chamber A through pipe 9 will not be cooled by contact with the underside of condensing chamber E.

The solvent in chamber F is maintained at substantially a constant level, by reason of the fact that the flow from chamber A, past the valve 22, is at a rate substantially equal to the rate of evaporation, so that the heat of the jacket G is most effectively utilized. The valve 22 being suitably manipulated, when necessary, by reason of changes of liquid level in the chamber A, although slight fluctuations in rate of flow, by reason of differences in pressure head, will not seriously interfere with the proper functioning of the apparatus.

From the foregoing, it will be seen that I provide a system whereby clean absorbent liquid is automatically and rapidly passed through material from which grease or the like is to be extracted until interrupted by the operator and wherein new charges of solvent are automatically provided in the chamber A, and that a substantially continuous slow flow of the solvent through the mass is effected by reason of the relatively quick siphonic action and the retarded flow past the valve 22 and the receiving chamber. The supply of vaporized solvent to the chamber E is substantially constant and is being condensed in the chamber E while the previously siphoned charge is being slowly passed through the chamber A into the chamber F. There is therefore little time lost between the completion of one cycle of operations and the beginning of another series of operations upon a mass of material being treated.

I claim as my invention:

1. Apparatus for the extraction of solvent soluble substances from a mass of solids, comprising a chamber for the solid material, a solvent condensing chamber above the material chamber, a siphon connection between said chambers, whereby solvent is drained to the material chamber when it has reached a predetermined level in the solvent chamber, a distilling chamber below the material chamber, a restricted outlet leading from the material chamber to said distilling chamber whereby flow of solvent from said material chamber is retarded, means for heating said distilling chamber, and means for conducting vapors produced by said heating to the solvent chamber.

2. Apparatus for the extraction of solvent soluble substances from a mass of solids, comprising a chamber for the solid material, a solvent condensing chamber above the material chamber, a siphon connection between said chambers, whereby solvent is drained to the material chamber when it

has reached a predetermined level in the solvent chamber, a distilling chamber below the material chamber, a restricted outlet leading from the material chamber to said distilling chamber whereby flow of solvent from said material chamber is retarded, means for heating said distilling chamber, means for conducting vapors produced by said heating to the solvent chamber, and means in said solvent chamber for condensing said vapors.

In testimony whereof I, the said FREDERICK E. LYNN, have hereunto set my hand.

FREDERICK E. LYNN.