

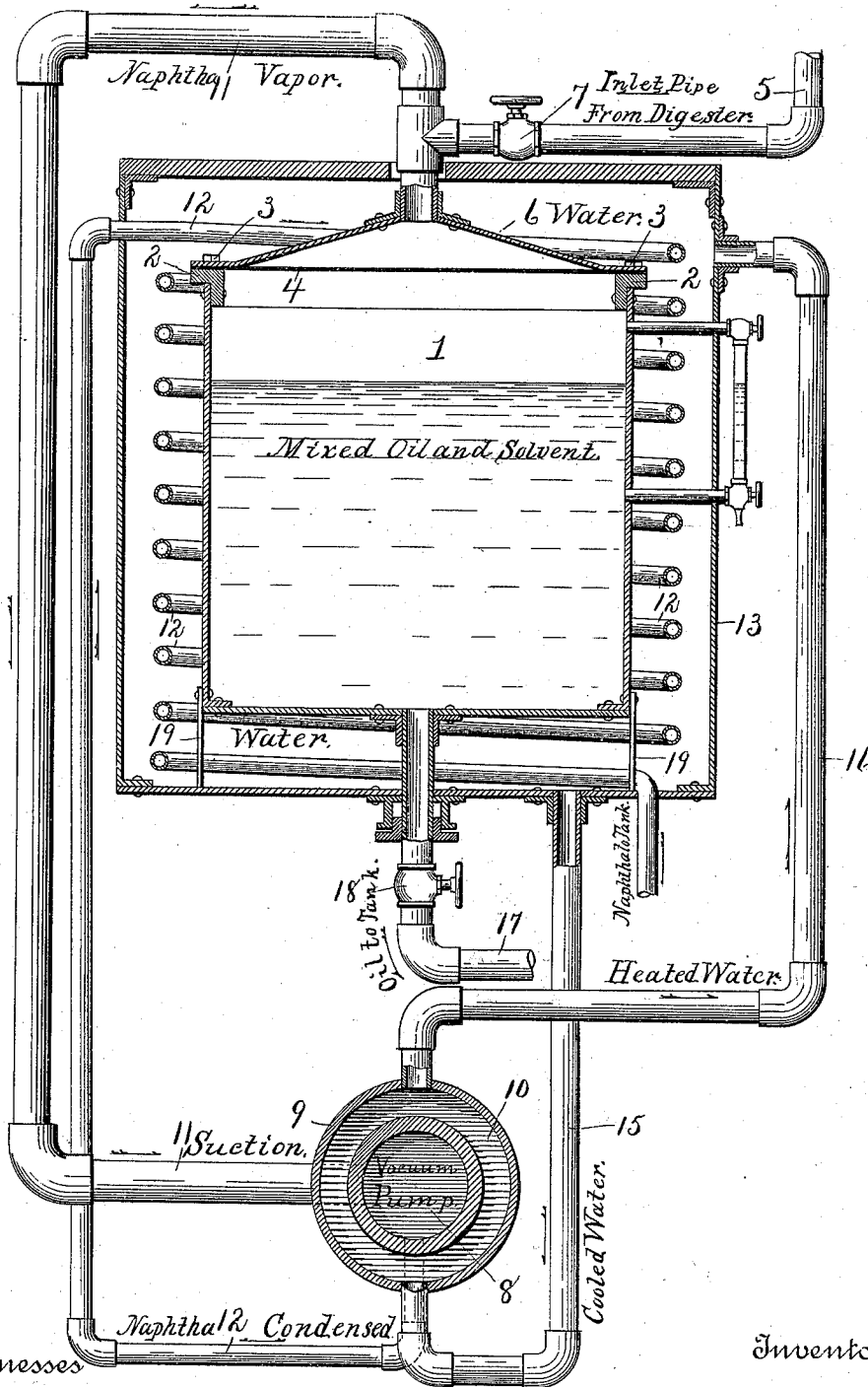
(No Model.)

J. F. LESTER.

APPARATUS FOR SEPARATING OLEAGINOUS MATTER FROM SOLVENTS.

No. 550,628.

Patented Dec. 3, 1895.



Witnesses

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APPARATUS FOR SEPARATING OLEAGINOUS MATTER FROM SOLVENTS.

SPECIFICATION forming part of Letters Patent No. 550,628, dated December 3, 1895.

Application filed April 6, 1895. Serial No. 544,797. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. LESTER, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Improvement in Apparatus for Separating Oleaginous Substances from a Solvent; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing.

My apparatus for separating oleaginous matter from a solvent is represented mostly in vertical section.

This invention relates to that class of apparatus by means of which oils and fats are separated from the hydrocarbon or other solvent used in extracting the oil—such, for example, as vegetable oil from cotton-seed or as fatty oil from oleaginous animal matter; and its object is to provide apparatus for separating the hydrocarbon from the oil or fatty matter without the aid of fire and in a manner to render the naphtha or other hydrocarbon almost pure for future use.

To this end my invention consists in the construction and combination of parts forming apparatus for separating oleaginous substances from a solvent, hereinafter more fully described and claimed, reference being had to the accompanying drawing, in which—

1 represents a tank, which may be of any usual form; but I prefer to make it cylindrical with a flat bottom and a convex conical top or cover 6. This cover is to be made removable for the purpose of thoroughly cleaning the interior whenever that may be necessary, and the edges of the cover should be provided with an air-tight seat upon the tank, which may be secured by means of a flange 2, bolts 3, and an interposed packing 4.

5 represents a passage marked on the drawing, "inlet-pipe," through which the mixed oil or grease and solvent are to be admitted from a digester which is properly located overhead, but is not herein shown, as its peculiarities form no part of my invention.

7 is a stop-cock to the inlet-pipe.

8 is the cylinder of a vacuum-pump, which

may be either a rotary or reciprocating piston-pump of any style suitable for this purpose.

I have not thought it necessary to show any piston or means for working the pump, as they form no part of this invention.

9 is a jacket surrounding the pump at a distance therefrom sufficient to leave a considerable annular space 10 between the two.

11 is a pipe communicating between the interior of the vacuum-pump and the upper portion of the tank 1.

12 is the delivery-pipe from the pump. This pipe passes up outside and is coiled around the tank 1 and finally leads away to a naphtha-storage tank.

13 represents a water-tank surrounding the separating-tank 1 and enough larger than the latter tank to leave considerable space above, below, and around it, so that the tank 1 may be entirely submerged in water contained in tank 13. The top of the tank 13 is made in separable parts, which may be removed to render the inner tank accessible.

15 is a pipe always open, communicating between the bottom of the tank 13 and the lower part of the water-space 10 around the pump 8.

16 is a pipe always open and communicating between the upper portion of the water-space 10 and the upper portion of the tank 13.

17 is a discharge-pipe leading from the bottom of tank 1 to an oil-storage tank, (not shown,) and 18 is a stop-cock for closing and opening the said pipe.

The tank 1 may be supported within the tank 13 in any usual manner, such as by legs 19.

The operation is as follows: Let us suppose naphtha to be the hydrocarbon used in digesting or separating the oil or fat which is to be treated. First open the stop-cock 7 until sufficient mixed oil or grease and naphtha have run through pipe 5 into the tank 1 to fill the same nearly to the top and close the stop-cock 7 and start the vacuum-pump 8. This causes suction through the pipe 11, whereby air is withdrawn from the top of the tank 1, and the pressure being removed from the oil

therein the naphtha begins to evaporate and its vapor is drawn over with the air into the pump. This operation extracts heat from the mixture and renders the heat latent in the naphtha-vapor, and when the vapor enters the pump the pressure required to expel it partially condenses it, rendering the latent heat sensible heat, which is imparted to the water in the surrounding jacket 10. The naphtha from the pump is discharged into the delivery-pipe 12 in a partly-liquid and partly-gaseous form, and being pumped up into the coil of the pipe 12, which is submerged in the water that surrounds the tank 1, the naphtha is fully condensed and is discharged into the naphtha-storage tank. In the passage of naphtha from liquid to vapor in tank 1 heat from the mass of liquid in that tank is rendered latent in the vapor and the mass of liquid in turn absorbs heat from the water in the surrounding tank 13, thus lowering the temperature of the water, and the cool water naturally gravitating passes through the pipe 15 to the jacket 10 around the vacuum-pump, where it serves, as described, to withdraw a portion of the heat which has been rendered sensible by the condensation of naphtha in the pump, and by this means the water is again heated and caused to rise in the pipe 16, whence it discharges into the upper portion of the tank 13. Thus it may be seen that the water will continue circulating and the separation of the naphtha will continue to take place as long as the pump continues operation or until there is no more naphtha to be evaporated from the oil. Then the separation being completed, the oil may be withdrawn from tank 1 by opening the stop-cock 18 and permitting the pipe 17 to discharge the oil into the oil-storage tank. Thus it may be seen that the heat generated by the evaporation of naphtha consequent to the working of the vacuum-pump is utilized in so warming up the mass of oil as to keep it in a fluid condition, rendering the evaporation of the naphtha more rapid and complete, and that the pump action, by means of the circulation described, first heats and then cools the water, so that the same water may be used over and over again, and no fire whatever is required to produce the necessary heat for conducting this process.

It is evident that different locations of the two tanks and the vacuum-pump may be arranged and the pipes be located accordingly or that the pipes may be otherwise located on the principle herein described to carry out my invention.

Other hydrocarbons besides naphtha may be used as solvents in the previous process of digesting and separating oils and fats from the substance which produced them; but so long as that solvent is of the light volatile character of naphtha this apparatus is adapted to the separating described.

Some advantage would be obtained from

this apparatus if the separating-tank were submerged, whether surrounded by the naphtha-discharge coil or not. Whether the tank be wholly or partially submerged is only a question of degree, better results following complete than partial submersion, one advantage being the water sealing of the cover-joints.

Having thus fully described my invention, what I believe to be new, and desire to secure by Letters Patent, is the following:

1. In apparatus for separating oleaginous substances from a solvent, a water tank, a tank submerged therein for containing the mixed oleaginous substance and solvent, a pipe communicating between the lowest part of the outer tank and a heating device, and another pipe communicating between the heating device and the upper part of the said outer tank, substantially as described.

2. In apparatus for separating oleaginous substances from a solvent, a water tank, a mixed oil and solvent tank located therein; a pump; a pipe communicating between the suction side of the pump and the upper portion of the oil and solvent tank, and a discharge pipe for the pump, a portion of which discharge pipe is located in a coil between the said tanks, substantially as described.

3. In apparatus for separating oleaginous substances from a solvent, a water tank; a tank submerged within the water tank; a pump; a pipe communicating between the suction side of the pump and the upper portion of the submerged tank; a discharge pipe for the pump coiled between the outer and inner tanks; a jacket around the pump; a pipe communicating between the lower portion of the outer tank and the jacket space around the pump and another pipe communicating between the said jacketed space and the upper portion of the outer tank, substantially as described.

4. In apparatus for separating oleaginous substances from a solvent, a tank for the mixed oleaginous substance and solvent; means for submerging the tank; means for drawing air, gases and fluids from the top of the tank and means for heating cooling and circulating the water or other liquid in which the tank is submerged, substantially as described.

5. In apparatus for separating oleaginous substances from a solvent, a tank for the mixed oleaginous substance and solvent; means for submerging the tank; a jacketed vacuum pump and pipe connections substantially as described whereby suction from the tank is obtained and whereby the water of submersion is circulated and repeatedly heated and cooled.

6. In apparatus for separating oleaginous substances from a solvent, a tank for the mixed oleaginous substance and solvent, solvent vaporizing apparatus connected with the top of the tank, a circulating medium for heat

and means substantially as described for circulating the said medium whereby the heat rendered latent in vaporizing the solvent is drawn from the said medium, and the said
5 latent heat is again made sensible and returned to the circulating medium to maintain the latter in a fluid condition.

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

JAS. F. LESTER.

Witnesses:

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