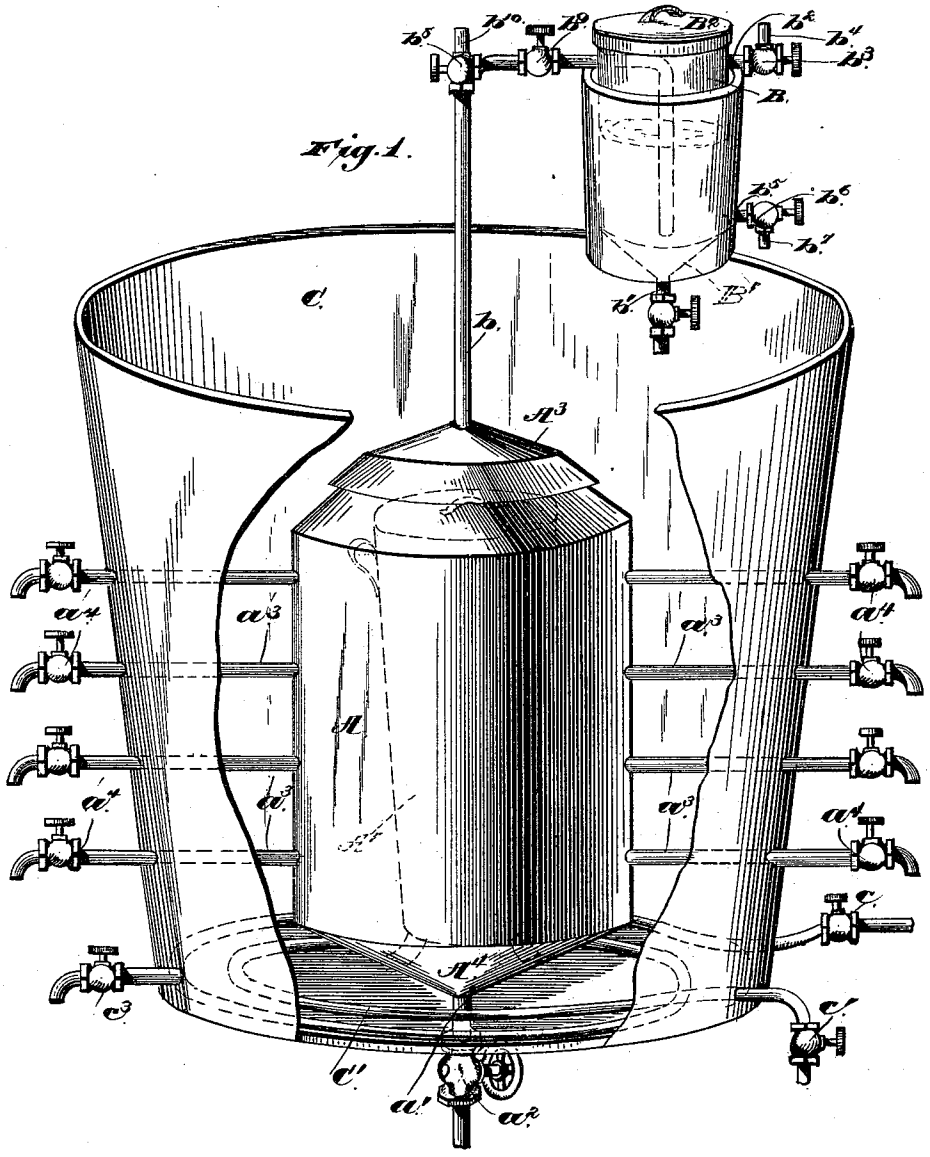
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A. M. TODD.

APPARATUS FOR TREATING ESSENTIAL OILS, &c.

No. 337,716. Patented Mar. 9, 1886.

Fig. 1.



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Edward L. Mills.

Inventor:
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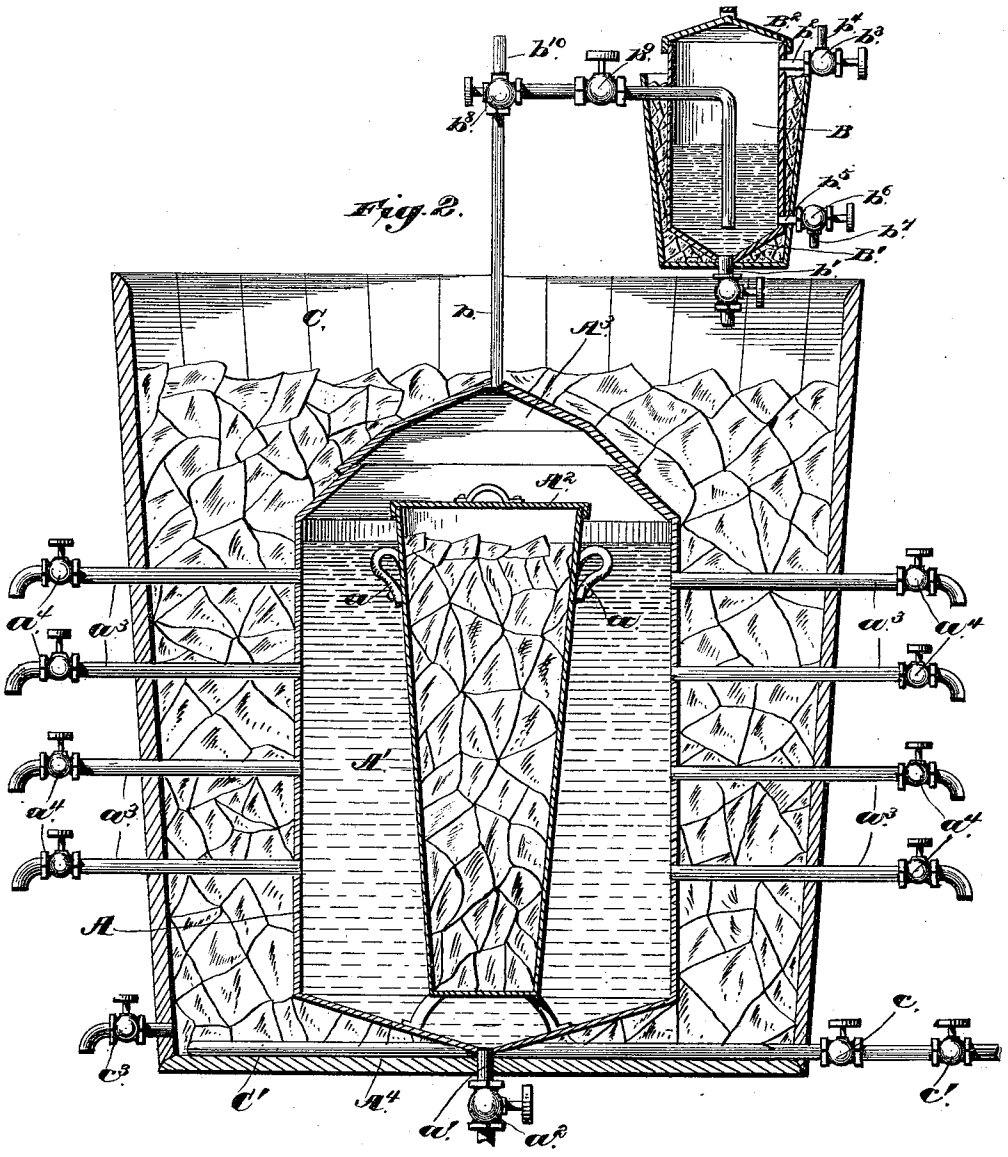
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No. 337,716. Patented Mar. 9, 1886.

Fig. 2.



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APPARATUS FOR TREATING ESSENTIAL OILS, &c.

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Fig. 3.

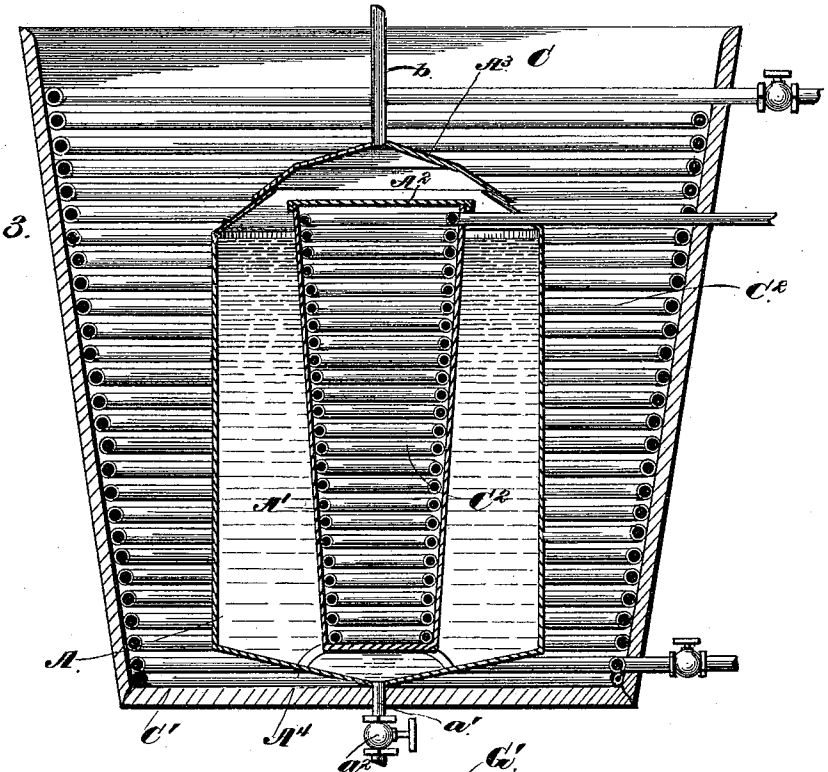
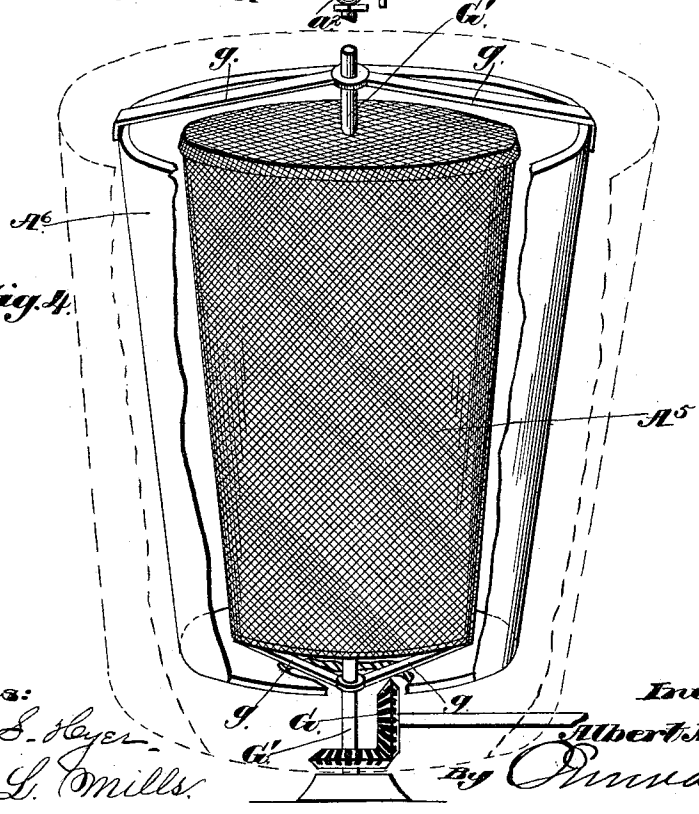


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

ALBERT M. TODD, OF NOTTAWA, MICHIGAN.

APPARATUS FOR TREATING ESSENTIAL OILS, &c.

SPECIFICATION forming part of Letters Patent No. 337,716, dated March 9, 1886.

Application filed November 9, 1885. Serial No. 182,306. (No model.)

To all whom it may concern:

Be it known that I, ALBERT M. TODD, a citizen of the United States, residing at Nottawa, in the county of St. Joseph, State of Michigan, have invented certain new and useful Improvements in Apparatus for Treating Essential Oils and other Substances, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an apparatus for treating essential oils; and it consists in the construction and arrangement of the parts, which will be more fully hereinafter described, and pointed out in the claims.

The essential feature of my invention consists in providing a metallic vessel to contain the substance to be operated upon, which is surrounded in whole or in part, or has connection with a refrigerating material in such a manner that refrigeration of the contents of the said vessel to any required degree is rendered possible.

The object of my invention is to so construct an apparatus for revolving or separating essential oils into liquid and crystallized or concrete form, so that they may be more easily handled for commercial usage, and made practically beneficial, said apparatus being simple and efficient in its construction, and readily understood and operated. I attain these objects by the mechanism illustrated in the accompanying drawings, forming a part of this specification, wherein like letters of reference indicate similar parts in the several views, and in which—

Figure 1 is a perspective view of my apparatus partially broken away. Fig. 2 is a horizontal vertical sectional view of the said apparatus, illustrating the manner of using the refrigerating substance. Fig. 3 is a detail view in sectional elevation showing a modified form of the internal refrigerating-tank and outer inclosing-vat, and Fig. 4 is a detail view in perspective of a centrifugal drying device.

In the drawings, A represents a metallic tin coated or lined tank in which oil to be operated upon is placed. A tank, A′, of smaller dimensions, is supported inside of the said containing-tank A, resting on the bottom thereof by means of suitable feet. This smaller tank, A′, has a removable cover, A^2, and handles *a a* on the sides thereof, for removing said tank from the containing-tank A. The tank A′ is adapted to hold or be fed with a suitable refrigerating substance, for purposes which will be hereinafter described. The tank A is also provided with a removable cover, A^3, which is conical in shape and, as illustrated, has connected to its apex a pipe, *b;* but it is obvious that this pipe may be connected to any other portions of the said cover. The pipe *b* extends vertically upward, and has an elbow formed therein, from whence the said pipe extends in a horizontal direction and enters a trap or tank, B, which is supported thereby. After entering the tank B the pipe *b* again has an elbow formed therein, from whence the pipe extends vertically downward to near the bottom of the said tank. This tank B is formed at its lower part with a conical bottom, B′, to the apex of which a pipe, *b′*, is connected, which allows the said tank to be drained. The upper portion or top of the tank B is provided with a removable cover, B^2, which may be taken off to partially fill the tank with any suitable fluid. The upper side of the tank opposite the pipe *b* is provided with a pipe, b^2, which has a valve, b^3, having an escape-pipe, b^4, situated therein. The lower side of the tank has also a pipe, b^5, connected therewith, having a valve, b^6, with an escape-pipe, b^7. This latter valve is constructed so as to drain the fluid out of the tank, while the former valve allows the air to escape therefrom. The pipe *b* is also provided with valves b^8 and b^9, the valve b^8 being situated at the outside elbow, and has an escape-pipe, b^{10}, connected therewith, while the valve b^9 is situated in the horizontal portion of the pipe *b* beyond the elbow.

The bottom A^4 of the tank A is formed in the shape of a cone, and has a pipe, *a′*, connected to the apex thereof, which has a valve, a^2, the said pipe and valve being adapted to drain the said tank. Connected to the sides of the tank A is a series of pipes, a^3 a^3 a^3, having cocks a^4 a^4 a^4, which pipes are adapted to drain the said tank from different levels thereof.

Surrounding the tank A is a vat, C, having a drain-cock, c^3, the pipes from the said tank passing to and through the outside of said vat. This vat may be supplied with any

suitable refrigerating substance for keeping the containing-tank A at a regulated temperature, acting in conjunction with the tank A′ to produce the desired refrigeration on the substance operated upon.

In the bottom of the inclosing-vat C is placed a coil of pipe, C′, which is connected with a steam or hot-water supply, by which steam or hot water may be turned on at will when it is desired to obtain heat during the operation of the apparatus. To prevent the backing of the water in the coil just described and its consequent freezing, owing to the action of the refrigerating substance in the vat C, the entrance end of the said coil is raised somewhat above the level of the coil, and the exit or draining end is lowered. By this means the condensed steam or cooled water which may stand therein is allowed to be forced out and drained off, and thereby prevent the freezing of the same and bursting of the pipes of the coil. The entrance end of the coil of pipe is provided with a cock, *c*, and the exit end thereof with a cock, *c′*, said valves being being adapted to regulate the entrance and exit of the heating substance at will.

In Fig. 3 a modified form of inner tank and outer inclosing-vat is illustrated. In this form I construct the said vessels with a coil or coils of pipe, as C^2, encircling the inside walls, into which a suitable freezing mixture or gas may be conducted to cool or refrigerate the oil or substance which may be placed in the tank A. These coils have suitable ingress and egress pipes provided with suitable cocks to control the flow of said freezing mixture or gas.

In Fig. 4 another modification is illustrated. This device is adapted, after the refrigeration has been completed and partial isolation, to dry the crystals and free them from any unsolidified oil which may still remain in contact therewith by placing the said crystals in the wire-gauze receptacle A^5, which is revolved by suitable gearing, as G, and the action of centrifugal force brought to bear upon the crystals, allowing the oil to fly outwardly from the crystals, through the reticulations of the wire-gauze receptacle, and be caught and retained in a vessel, A^6, which surrounds the said gauze receptacle, said vessel A^6 acting also to retain any of the smaller crystals which may come through the reticulations of the gauze receptacle with the oil. These two vessels just described are encircled by another vessel, as seen in dotted lines, which may be the vat C, containing a suitable refrigerating substance or provided with a coil of pipe, as shown in Fig. 3, for the admission of a cooling fluid or gas for keeping the crystals at a low degree of temperature while being centrifugally operated upon. The gauze receptacle is constructed with a gearing, as G, as heretofore described, and has suitable brace-rods *g g*, which support the shafts G′, which are attached only to the top and bottom thereof, and does not pass through the receptacle itself and interfere with the crystals while being operated upon. The gauze receptacle A^5 is provided with a removable cover, which allows of free access to the inside of the said receptacle. By the use of the centrifugal device the process of isolation is greatly shortened.

The construction of the apparatus heretofore described having been fully carried out, the operation of the same or the formation of crystals from *Mentha piperita* will be as follows:

After having purified the essential oil by means of fractional distillation, it is allowed to cool down by being placed in any cool receptacle until it reaches the temperature of about 40° Fahrenheit. It is then poured into the tank A and around the refrigerating-tank A′, which has been previously filled with a suitable refrigerating substance. The cover A^3 is placed on the said tank A, and the outer vessel, C, filled with or has conducted into its pipes or coil a suitable freezing mixture or gas. These freezing-mixtures are in the proportion to the volume of oil acted upon as in the ratio of six to one—that is, if I use salt and ice, I take about fifteen hundred pounds of ice and three hundred pounds of salt to semi-solidify or crystallize three hundred pounds of oil. The apparatus is thus left, being continually replenished with the freezing mixture until a temperature of from 5° Fahrenheit above to 8° Fahrenheit below zero is reached, when the oil will have changed into a semi-solid or jelly-like mass and crystals be formed.

I have discovered that the oil, when congealed to a jelly as above described, contains crystals, although not really apparent, but which may be brought out and made to appear by draining off so much of the mass as still remains in a fluid condition. In order to effect such drainage, the cocks a^4 a^4 a^4 in pipes a^3 a^3 a^3 in the sides of tank A and valve a^2 in pipe *a′* in the bottom thereof are opened, being closed while the process of congealing is being effected. When the crystals are formed or the mass solidified sufficiently to offer considerable resistance, the valve b^3 in the elbow of pipe *b* is opened, admitting air, and the oil allowed slowly to drain off. This draining continues for a period of about three days, or until all the oil is drained therefrom, and at a uniform temperature of from zero to 4° Fahrenheit. I also found that the displacing power of gravitation is admirably adapted to perform the isolating process, since the fluid portion is thereby removed through the medium of the faucets illustrated, and yet in so gentle a manner as not to seriously disturb or disintegrate the delicately-formed crystals which, being yet moist and imperfect, cannot offer a sufficient resistance to strong force or pressure, and by the ingress of air from above a vacuum is prevented from being formed and a consequent destruction of the crystals. Previous

to the isolation of the crystals by drainage the valve b^8 in pipe b is closed, as heretofore described, to prevent the outside warm air from entering upon the surface of the cooled oil. When the isolating process begins, however, the said valve b^8 is opened and the air gradually allowed to flow in through the short pipe b^{10}, connected therewith, and fill the space between the surface of the crystals and the under surface of the cover, so as to prevent a vacuum being formed at this point as the oil is drained out from the under surface of the crystals.

The third step of my process is to harden or perfect the crystals, which may be done in either one of two ways—viz: After such fluid portion has escaped, or as much thereof as is likely to escape readily at or near the temperature at which the separation was commenced, it is then allowed from seven to fourteen days to gradually and slowly raise in temperature with renewed or continuous drainage until about 90° Fahrenheit is reached, a point at which the mass will not reliquefy. The crystals are now allowed to stand at this test temperature until little or none of the liquid will settle or deposit, when they should be found dry and hard at ordinary temperatures, and the process may be pronounced completed. When the temperature is being raised, as heretofore described, by suitable heating substance entering the coil of pipe C' in the bottom of the vat C, there will be more or less vapor carrying oil pass up through the pipe b. The vapor passes through the said pipe b, through the valve b^9, and down into the tank B, and into the water contained therein, which is at a comparatively low temperature. The vapor will consequently be condensed and the water will take up the condensed oil, which will rise and float on the top of the said water, and be collected when the water is drawn off; or, after such liquid portion is drained off, or all of it which seems likely to do so at about the temperature at which the separation was commenced, as before stated, the crystals are then fused by an application of warm water of a temperature of about 60° Fahrenheit while the mass is still cold. It is then subjected to a second congealing, crystallization, and isolation, as at first, and usually drying and perfecting them after this recrystallization, substantially as by the first-mentioned process. By this recrystallization greater solidity and compactness of the product is secured without compression.

For the purpose of drying the crystals, if desired, the apparatus shown in Fig. 4 may be used, in the manner heretofore described.

The apparatus I have illustrated and described is adapted for commercial manufacture; but it is obvious that various forms and sizes of vessels can be used at will with as equal efficiency as the ones described. The residuum or drained-off oil can be operated upon in like manner as when it was first put into the apparatus, and with the same results.

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

1. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle, a tank situated inside of said receptacle, and a vat surrounding the same on the outside, said inner and outer vessels being adapted to be supplied or fed with a suitable refrigerating substance, substantially as described.

2. In an apparatus for crystallizing essential oils, the combination of an oil containing receptacle having suitable drain-pipes, a tank removably situated inside of said receptacle, a vat surrounding the same, said inner and outer vessels being filled with a refrigerating substance, and means for heating the device, substantially as described.

3. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle having a removable cover, drain-pipes having valves connected to the receptacle, a tank having a cover, and side handles removably situated within the receptacle, an outer vat surrounding the oil-containing vessel, and means for feeding the said inner and outer vessels with a refrigerating substance, substantially as described.

4. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle having a conical bottom, a drain-pipe connected to the apex of said bottom, a removable conical cover having an air-pipe with suitable valves connected with the said cover, a trap containing water supported by the air-pipe, a tank removably situated within the oil-containing receptacle, and a vat surrounding the outside thereof, said inside and outside vessels being adapted to be fed with a refrigerating substance, substantially as described.

5. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle having suitable drain-pipes in its sides and bottom, an air-pipe supporting a trap connected to the removable cover of said oil-receptacle, an inside tank containing suitable means of refrigeration, a surrounding vat, also provided with refrigerating appliances, and a coil of pipe in the bottom of said vat adapted to be supplied with a suitable heating substance, substantially as described.

6. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle having suitable drain-pipes in its sides and bottom, an air-pipe connected to the top thereof having an elbow extending into and supporting a metallic vessel having a removable cover and containing water, suitable inlet and outlet pipes to said vessel, and an inclosing vat adapted to be supplied with a refrigerating substance, substantially as described.

7. In an apparatus for crystallizing essential oils, the combination of an oil-containing receptacle having suitable drain-pipes in its

sides and in its conical bottom, a removable cover therefor having an air-pipe entering and supporting a trap connected thereto, with suitable valves and an escape-pipe, an internal tank resting on the conical bottom of said containing-receptacle having suitable handles and a removable top, a vat surrounding these vessels, said inner tank and outer vat being adapted to be fed with a refrigerating substance by suitable means, and a heating-coil lying in the bottom of the surrounding vat, being fed with a suitable heating material, substantially as described.

8. In an apparatus for crystallizing essential oils, the combination of an oil-containing tank having suitable drain-pipes, an internal tank removably situated inside of the containing-tank, a vat surrounding these vessels, said internal and external vessels being provided with a coil of pipe supported on their inner walls and supplied with a suitable mixture or gas, and a coil in the bottom of the surrounding vat supplied with a heating substance, when desired, substantially as described.

9. In an apparatus for crystallizing essential oils, the combination, with a surrounding vat containing suitable refrigerating substance, of a centrifugal drying device consisting of a wire-gauze vessel in the form of an inverted frustum of a cone, a vessel surrounding this wire-gauze vessel for catching the oil, and suitable gearing and shafts to which power is applied for turning the said wire-gauze vessel at a desirable rate of speed, substantially as described.

10. In an apparatus for crystallizing essential oils, the combination of a containing-vessel, A, having suitable drain-pipes, a^3 a^3 a^3, and internal tank, A′, situated within said containing-vessel A, and outer vat, C, surrounding vessels A A′, and adapted to be fed with refrigerating material, and a heating-coil, C′, in the bottom of said vat C, substantially as described.

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

ALBERT M. TODD.

Witnesses:

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EDWARD L. MILLS.