

T. Sim Sheet 1, 2 Sheets.

App's. for Extracting Oil

N^o 93,645.

Patented Aug. 10, 1869

Fig. 3.

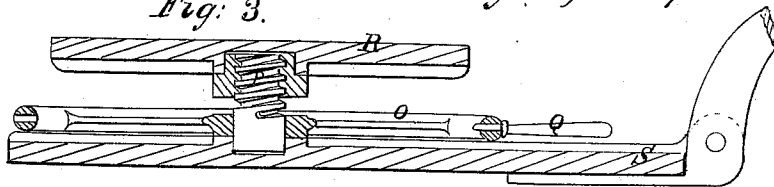


Fig. 1.

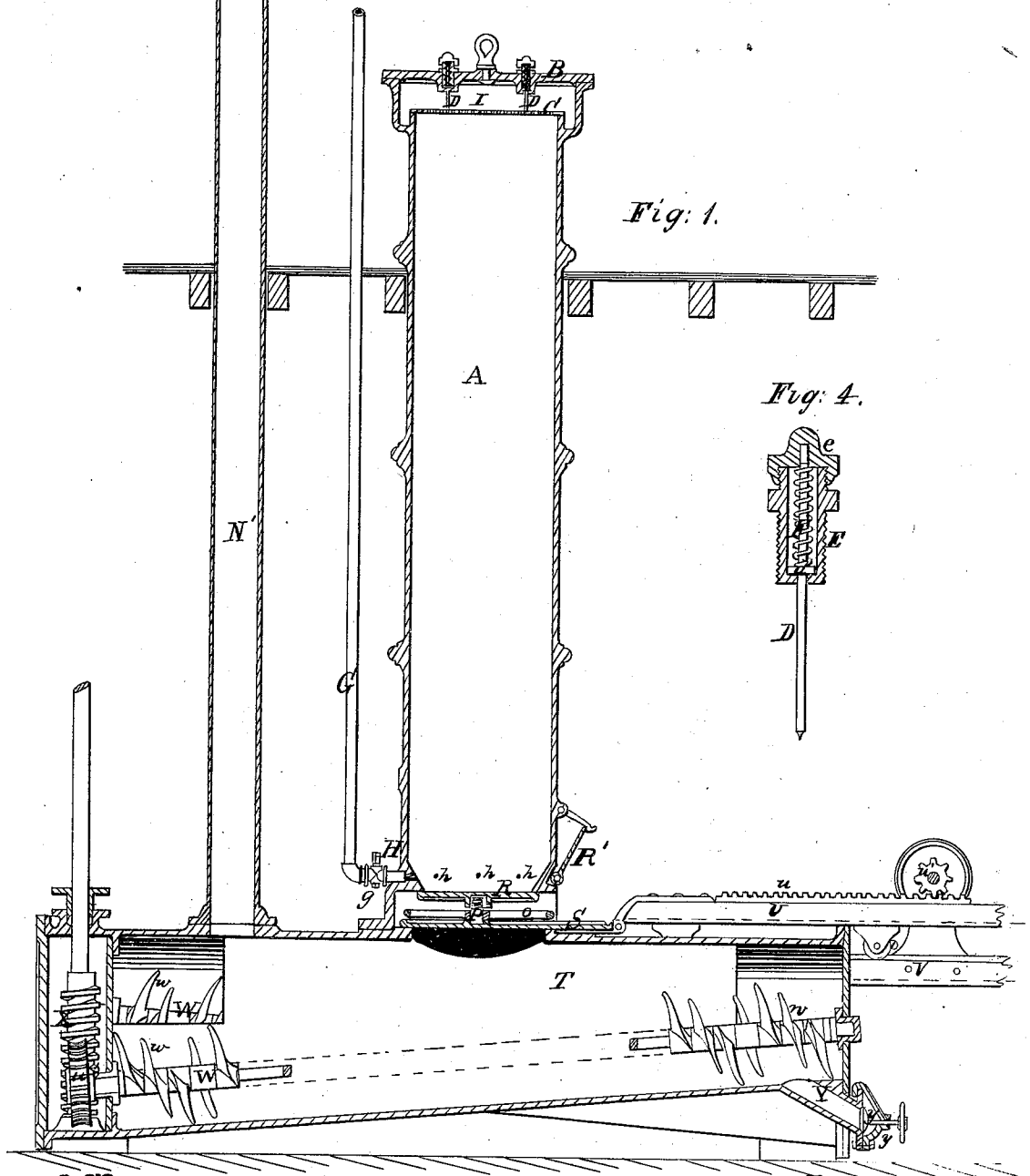


Fig. 4.



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Fig. 5.

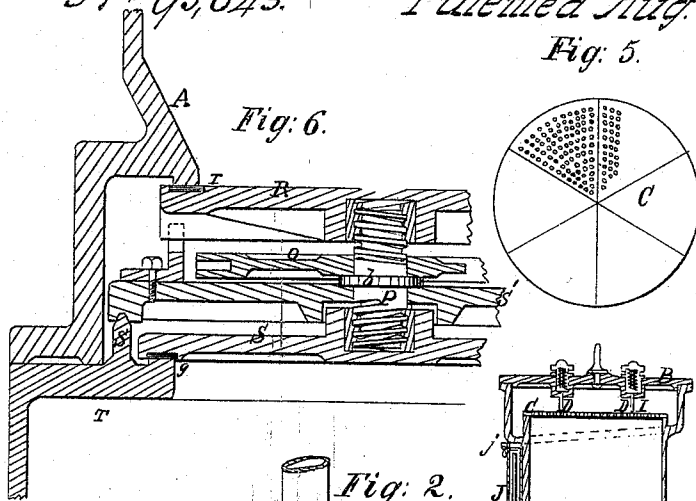
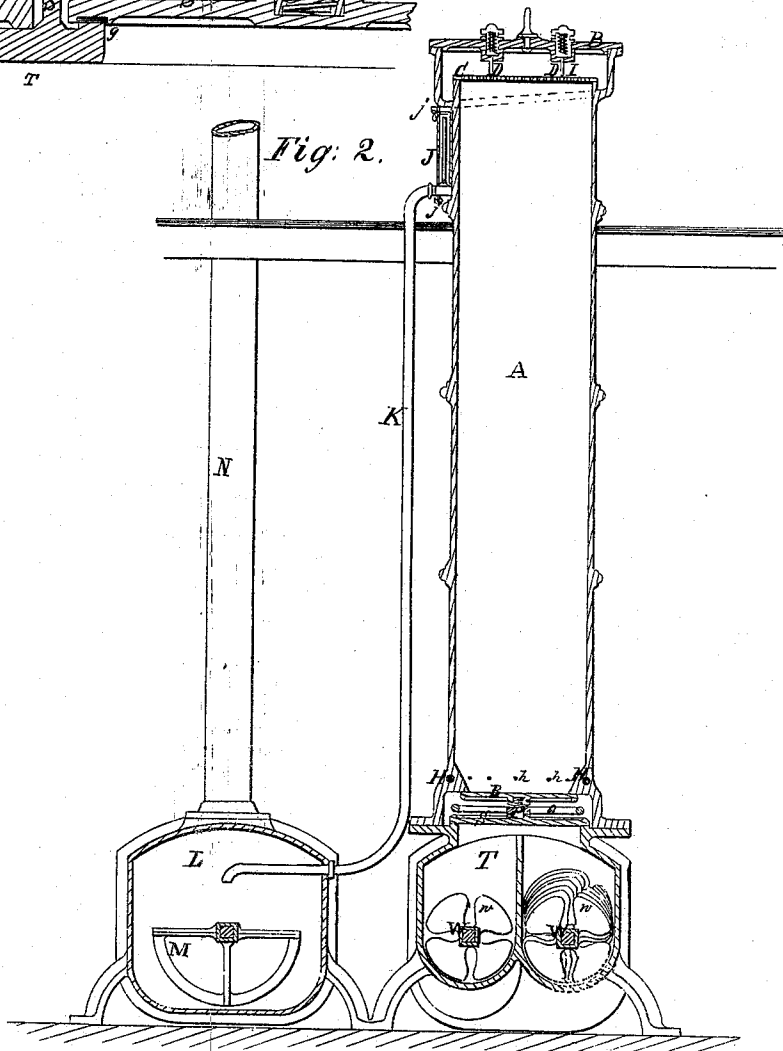


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS SIM, OF BALTIMORE, MARYLAND.

IMPROVED PROCESS AND APPARATUS FOR EXTRACTING OIL FROM VEGETABLE AND OTHER MATTERS.

Specification forming part of Letters Patent No. 93,645, dated August 10, 1869.

To all whom it may concern:

Be it known that I, THOMAS SIM, of the city of Baltimore, in the State of Maryland, doctor of medicine, have invented a new and useful Process and Apparatus for Removing Oil from Vegetable and other Matters; and that the following is a sufficiently full and exact description thereof to enable one skilled in the art to which my invention appertains to carry it into effect, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is to provide for the separation of oil from meal or other material, in all quantities, by the agency of bisulphide of carbon or other suitable chemical, with little expenditure of time or labor.

To this end I employ an apparatus consisting of a high vat to contain the meal or other material through which the bisulphide of carbon is caused to ascend, carrying the oil with it, a receiver located beneath or below the said vat and communicating with the latter in such a manner that the matter divested of its oil may be readily and instantaneously discharged to leave the vat ready for a new charge, and appliances to assist the vaporization and complete removal of any bisulphide of carbon remaining in the meal after the latter has been divested of oil.

In the drawings, Figure 1 represents a vertical section of so much of my improved apparatus as is necessary to illustrate my present invention. Fig. 2 represents a vertical section in a plane at right angles to that shown in Fig. 1. Fig. 3 represents a vertical section, on a larger scale, of a device employed for closing the openings in the vat and receiver, through which the meal is discharged from one into the other. Fig. 4 represents a vertical section, on a larger scale, of a device employed for holding down the perforated diaphragm, which confines the meal within the vat, as hereinafter described. Fig. 5 is a plan illustrating the construction of the perforated diaphragm. Fig. 6 is a partial vertical section, illustrating a modified and improved mode of constructing and operating the combined sliding doors of the vat and receiver.

Similar letters of reference indicate corresponding parts in the several views.

To fill the vat A, its top B and the false top or perforated diaphragm C are both removed.

Meal or other material may then be introduced, after which the diaphragm C is replaced and the cover B set on.

Spring-pins D, set into the cover B and resting on the diaphragm C with a yielding pressure, serve to retain it in place. The manner of securing these pins is more clearly shown in Fig. 4.

E represents a shell, which screws into the cover B; F, a spring bearing down upon a collar, *d*, on the pin D and up against the cap *e* of the shell E. The pins thus bear uniformly on the various parts of the diaphragm, while the cover B is firmly seated on top of the vat.

The vat being thus filled and prepared, liquid bisulphide of carbon or other equivalent chemical is conducted from an elevated reservoir (not shown) through a pipe, G, and by opening a cock, *g*, is caused to flow into an annular chamber, H, which surrounds the lower extremity of the vat, and communicates with the interior thereof through a number of apertures, *h h h*, so that the bisulphide will be introduced uniformly around the lower extremity of the vat, and rising within the same will completely permeate the body of the meal or other matter, so as to remove all the oil, which, mingling with the bisulphide, rises through the perforated diaphragm C, overflows into a receiving-chamber, I, within the upper part of the vat, and from the lowest part of this chamber or trough it passes through a transparent gage-pipe, J, into a conducting-pipe, K, by which the mingled oil and bisulphide are discharged into a tank, L, which is provided with an agitator, M, of any suitable construction. That here shown is intended to receive an oscillating motion by any suitable mechanical means. This agitation of the combined liquid causes the rapid vaporization of the bisulphide at ordinary temperatures, and as fast as the vapor is formed within the tank L it is pumped out through a pipe, N, and forced through a condenser, from whence the chemical is conducted in liquid form into the elevated reservoir, to be used again in the way already described.

The pump, condenser, and reservoir may be constructed and arranged substantially as described in Letters Patent granted to myself and Elias S. Hutchinson on the 23d day of March, 1869, or in any other suitable manner, and do not require specific description here.

As soon as the liquid running through the transparent gage-pipe J is found to be bisulphide of carbon free from oil, indicating that the oil has all been removed from the matter within the vat, the cock *g* is temporarily closed to stop the flow of bisulphide.

The wheel O, to which the screw P is attached, is partially rotated by the hand of the operator applied to the lever Q, so as to draw down the bottom R of the vat, and at the same time raise or relieve from pressure the sliding cover S, so that the vat-bottom R and the cover S of the receiver T may be drawn out together from between the vat and receiver by means of the pinion *w'*, gearing with a rack, *u*, on a bar or frame, U, connected to a slide, S, which runs on ways *s'*, and supports said vat-bottom and receiver-cover through the medium of the right-and-left screw P, as shown in Fig. 6. The matter within the vat will then descend into the reservoir T, and, the gate R S being replaced, the vat will be ready for a fresh charge.

R' represents a flap or door, to close the vertical space between the vat and receiver when the bottom R and cover S are drawn out.

In the modification shown in Figs. 1 and 3 the sliding frame U is supported by wheels *v*, running on a track, V, which is so declined that as the frame is run out the support of the inner end thereof, acting as a fulcrum, will, as the outer end is pressed down, cause the vat-bottom R to be pressed upward against the lower edge of the vat sufficiently to scrape the said bottom and prevent the escape of meal.

Within the reservoir T are one or more agitators, W, which operate to stir the meal, so that all the parts may be exposed successively, in order to facilitate the vaporization of the bisulphide liquid remaining in the meal.

The vapor, as fast as formed, is pumped out through the pipe N', which may communicate with the same pump as the pipe N of the oil-tank L, or with a separate pump.

If one pump be used for both pipes, they may, of course, be furnished with suitable valves, so that either may be closed at will, and the whole force of the pump exerted through the other one.

In the present illustration I have represented two agitators, W W, furnished with spiral wings *w*, and inclined in opposite directions, the receiver being formed in two troughs fitting or corresponding with the agitators W W and similarly inclined.

The agitators may be continuously rotated by an endless screw, X, gearing with a worm-wheel, *w'*, on each agitator-shaft. By this arrangement the agitators may be made to move the meal continuously around the receiver—that is to say, carrying it toward the upper end of each trough—and as it reaches the upper end it will be forwarded through an aperture in the partition between them, and falling into the lower end of the other trough will be caught and again drawn up by the agitator therein. When by this operation the bisul-

phide has all been evaporated from the meal, gates *y* (one shown) may be opened, and the continued rotation of the agitator will cause the meal to be discharged through the spouts Y.

Instead of the above-described horizontal arrangement of the receiver T, a vertical cylinder of large diameter may be employed, with one, two, or more vats, A, arranged above and within its periphery.

By the above-described apparatus the separation of oil from meal or other matter may be carried on without the slightest injury to the material, with great economy and rapidity, and almost continuously, by reason of the two operations of extracting the oil and drying the meal being carried on at the same time in separate chambers.

By the time one charge has been dried in the chamber or receiver T and removed therefrom a second charge, from which the oil has been extracted, may be ready to introduce into the drying-chamber. A valve, *β*, at the upper end of the gage J, or some other convenient point in the pipe J K, may serve to close said pipe, to prevent the escape of the vapor of the bisulphide from the oil-separator L there-through while the vat is being emptied and filled.

The gage J may be provided with the customary petcock.

I do not desire to limit myself to the precise details or arrangement of parts herein laid down, because the same may be varied without departing from the essential features of my invention.

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

1. The process and apparatus for separating oil from vegetable and other matter, substantially as herein set forth.
2. The filter or perforated diaphragm C, employed at the upper part of the vat A, to retain the solid matter and allow the overflow of oil and bisulphide, as described.
3. The inclined annular trough I and the spring-pins or holders D, each in combination with the filter C, for the purposes stated.
4. The gate consisting of the vat-bottom R and receiver-cover S, arranged to operate in combination, substantially as and for the purposes set forth.
5. The receiver or drying-chamber T, provided with agitators W, arranged to operate in any manner substantially as set forth.
6. The combination of the slides S', ways *s'*, cover S, vat-bottom R, and connecting-screw P, substantially as described.

To the above specification of my process and apparatus for extracting oil from vegetable and other matters I have signed my hand this 21st day of June, A. D. 1869.

THOS. SIM.

Witnesses:

JOHN GRINNELL,
W. B. DEMING.