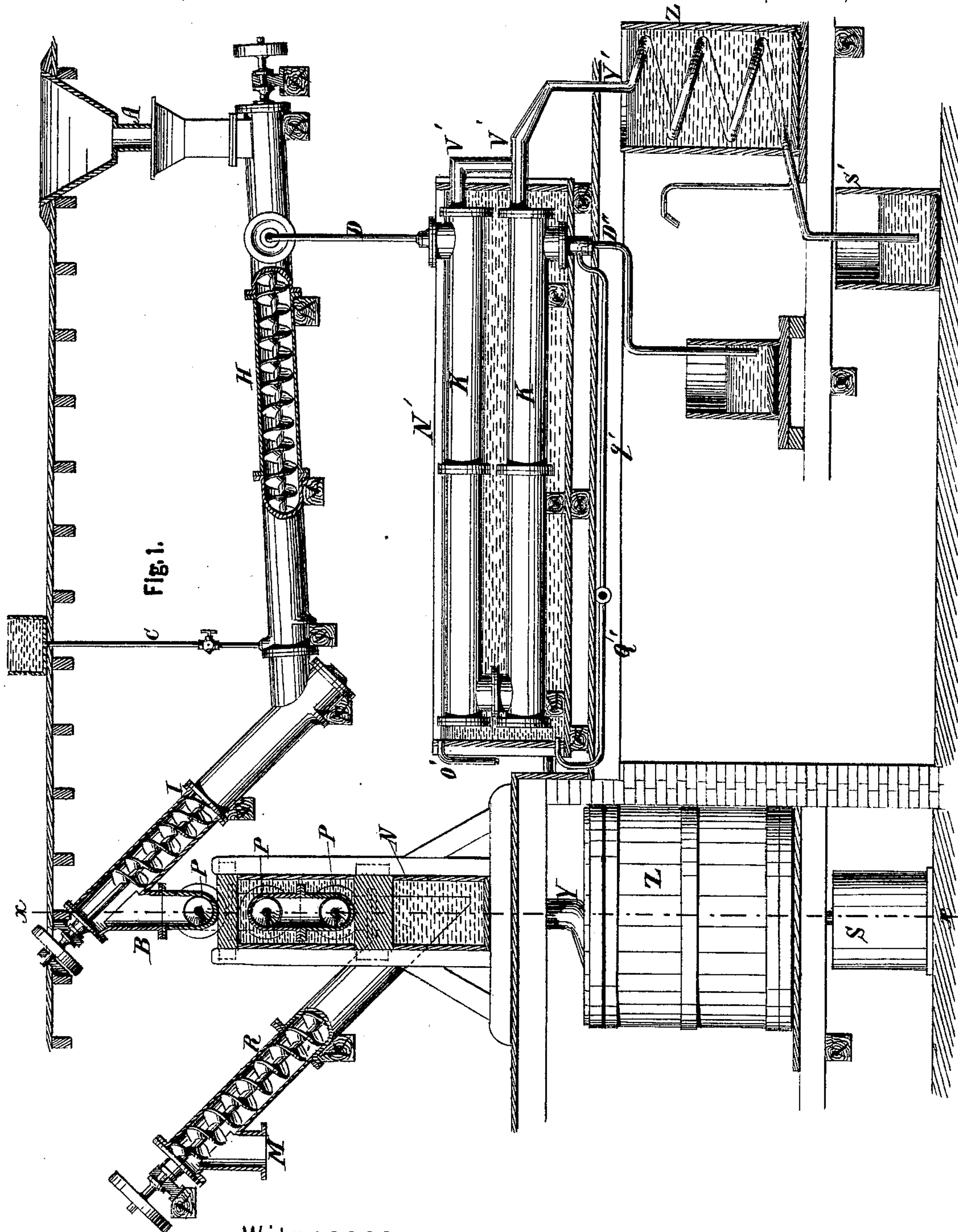


E. S. HUTCHINSON.
Improvement in Apparatus for Extracting Oil from
Vegetable Matters.

No. 126,300.

Patented April 30, 1872.



Witnesses.
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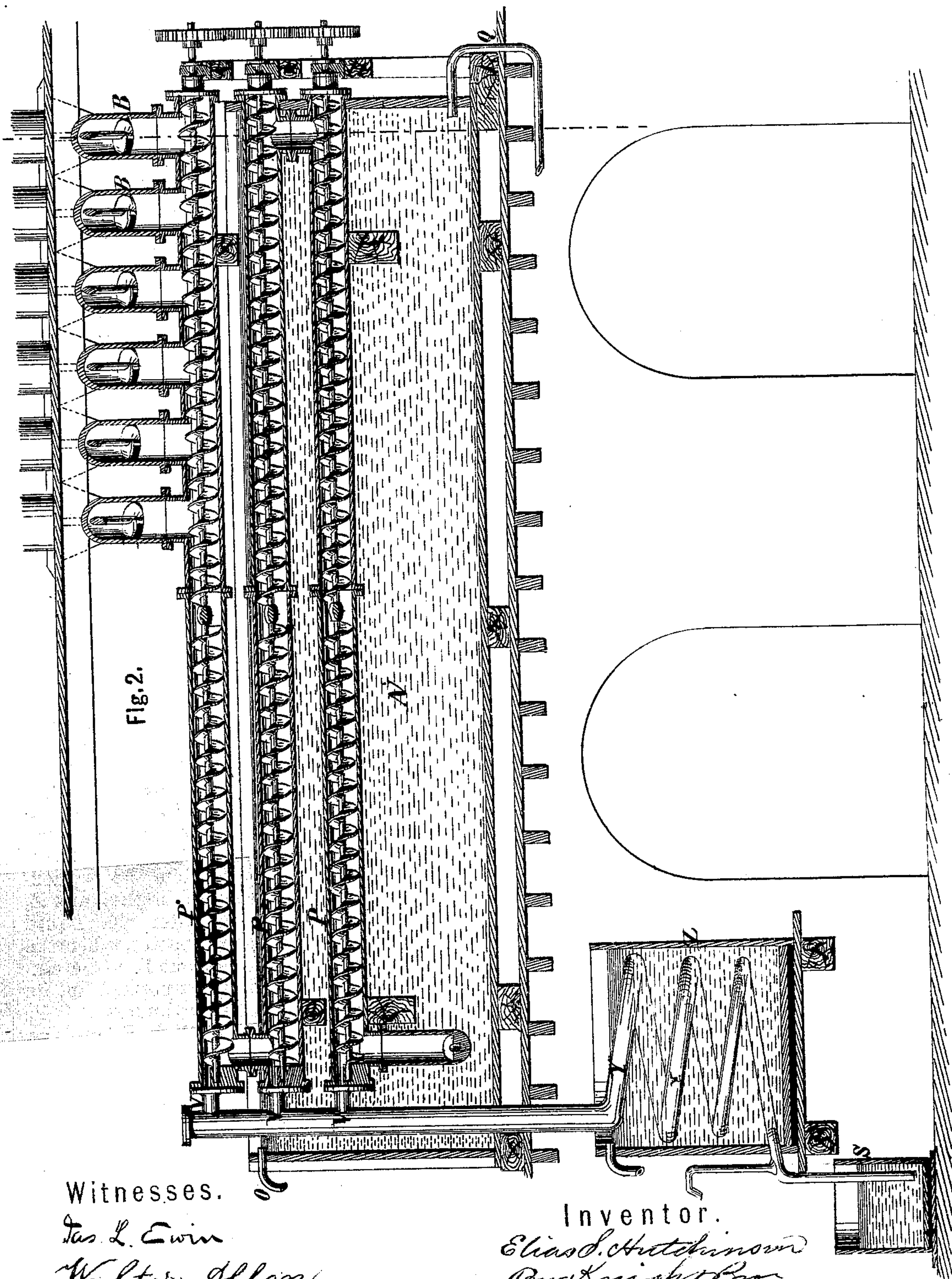
Inventor.
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UNITED STATES PATENT OFFICE.

ELIAS SMITH HUTCHINSON, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN APPARATUS FOR EXTRACTING OIL FROM VEGETABLE AND OTHER MATTERS.

Specification forming part of Letters Patent No. 126,300, dated April 30, 1872.

Specification of an apparatus for the extraction of oil, fat, or resin from vegetable or other solid matter by chemical agency; and the recovery of the chemical employed, invented by ELIAS SMITH HUTCHINSON, of Baltimore, State of Maryland.

Object.

The object of my invention is to furnish apparatus by the use of which oil, fat, or resin may be extracted and removed from large quantities of solid matter in a more economical and expeditious manner than has heretofore been done.

Operation.

The plan of operation is to conduct a quantity of solid matter containing oil, fat, or resin through a receptacle in which is placed bisulphide of carbon or other liquid chemical solvent or absorbent of oil, fat, or resin. The solid matter and the combined liquids are then conveyed to suitable separators for the removal and recovery of the chemical without interrupting the continuity of the treatment.

In the accompanying drawing, Figure 1 is a longitudinal section of an apparatus illustrating my invention. Fig. 2 is a vertical section of the same on the line *x x*, Fig. 1.

This apparatus is constructed with two screw-conveyers for conveying ground decorticated or pulverized solid matter, (as decorticated oleaginous seeds and the meal of oil-bearing cereals,) the conveyers being inclosed in cylindrical tubes. The longer cylinder containing the longer screw is placed at a slight angle with the horizontal plane, and the shorter one at an angle of about forty-five degrees. Each screw-conveyer is driven by suitable machinery. The solid matter to be treated is admitted at the spout A, and is conveyed along by the screw H, until it meets the screw I, and is by that conveyed to the discharge-spout B, which is placed at a short distance above the end of the screw, so as to cause the solid matter to fill the cylinder and form a close packing as the screw revolves. The two cylinders being full of the solid matter, the liquid solvent is admitted through the inlet-pipe C, and, flowing along, comes in contact with and interpenetrates the solid, uniting with the oil, fat, or resin it contains, and flows

away at the outlet-pipe D combined with the oil, fat, or resin. The solid matter in the cylinder H becomes, however, saturated with the liquid, in which condition it is received by the screw I, by the action of which the solid is raised and separated from the solvent, and discharged at the spout B nearly free of liquid, which is rapidly drained out from the solid as the latter is elevated by the action of the screw. From the spout B the solid matter may be discharged into any suitable apparatus for the purpose of evaporating and afterward recovering by condensation any portion of the chemical yet remaining in union with it, and discharging the dried solid from the apparatus without escape of the solvent in a state of vapor or otherwise. Several plans for doing this are shown in my Letters Patent No. 112,349.

I prefer to use, in this connection, a form of drier, which I have now represented, consisting of cylindrical tubes and screw-conveyers P P P and R, inclosed in a tank, N, which may be filled with water up to the outlet O, which water is heated with the steam-pipe Q. The solid matter, being discharged from the draining-cylinder I at the spout B, as explained, is conveyed through the heated cylinders P P P into the cylinder R, which, standing at an angle, as shown, elevates the meal, and discharges at the spout M. The cylinders P P P are provided with outlets V V V, connecting with the condenser Y in the tank Z, which is supplied with cold water. The liquid solvent saturating the solid matter, when the latter is discharged at the spout B, as hereinbefore explained, becomes vaporized in its passage through the heated cylinders P P P, escapes through the outlets V V V into the condenser Y, where it is condensed, and is collected in the receiver S for reuse. There may be several treating and draining cylinders connected with a single drying apparatus.

The whole operation of removing the oil and separating the solvent from the solid matter may thus be continuous; or it may be intermittent; or the mechanical contrivances used for treating and conveying may be so arranged as to be assisted by the gravity of the solid. The treating or extracting of the oil may also be accomplished by first introducing the liquid instead of the solid into the cylinder H. The mixture of oil, fat, or resin and chemical sol-

vent discharged at D, as shown, is conducted into a suitable separator or still with condensers attached, by which the solvent is evaporated, and the oil, fat, or resin, and also the solvent, are recovered each in a pure state, methods of doing which are shown in my Letters Patent No. 112,350. I prefer to use, in this connection, the form of a separator of oil from chemical solvent shown in Fig. 1, which consists of the cylindrical tubes K K, placed in the tank N', filled with water up to the overflow O', which is heated by the steam-pipe Q'. The chemical solvent combined with oil, fat, or resin which has been discharged at D, as hereinbefore explained, flows into and through the heated cylinders K K. The solvent becomes vaporized, and escapes at outlets V' V' into the condenser Y' in the tank Z', (which is supplied with cold water,) where it is condensed and collected in the receiver S' for reuse. The oil, fat, or resin thus freed from the chemical, flows out at D''. A jet of free steam may be introduced through the branch steam-pipe q', near the outlet D'', for the purpose of expelling from the oil, fat, or resin any remaining traces of the solvent.

A modification of the apparatus above described having belts or chains, or other suitable carrying appliances, instead of screw-conveyers, may be used for removing oil, fat, or resin from wool, cotton waste, or other solid matter not in a state of pulverization.

I do not limit my invention to any particular form of mechanical construction, but have herein presented plans which I prefer, having experimented with various forms and arrangements of apparatus.

Claims.

What I claim as my invention is—

1. In the process of extracting oil, fat, or resin from vegetable or other solid matter by treatment with bi-sulphide of carbon or other suitable liquid chemical solvent or absorbent of oil, fat, or resin, an apparatus adapted, substantially as set forth, to allow the solid matter, after being deprived of its oil, fat, or resin, to be removed from the treating-vessel without discharging the main body of the liquid contents of the vessel.

2. An apparatus for extracting oil, fat, or resin from vegetable or other solid matter,

adapted to subject the solid matter while in motion to the action of a liquid chemical solvent flowing in the opposite direction, or in the same, or a transverse direction, essentially as hereinbefore set forth.

3. An apparatus constructed with an inlet-spout and a discharge-orifice for the solid matter, an inlet for the liquid solvent, and an outlet for the combined solvent and oil, fat, or resin, in combination with mechanical contrivances for moving the solid matter during treatment and draining, substantially as described.

4. An apparatus whereby the process of removing oil, fat, or resin from solid matter may be continuous or non-intermittent in its operation, essentially as hereinbefore described.

5. An apparatus for removing oil, fat, or resin from vegetable or other solid matter by flowing bisulphide of carbon laterally through it, substantially as described.

6. An apparatus, substantially as described, for the accelerated draining of liquid chemical solvent or mixture of such solvent with oil, fat, or resin from vegetable or other solid matter, after such solid matter has been treated, by means of an elevating-screw or otherwise, without breaking the connection of such screw or other contrivance for draining with the apparatus used for treating and that used for drying the solid, and without interrupting the continuity of those processes.

7. An apparatus for treating and draining, substantially as hereinbefore described, operated continuously in combination with a drier or separator of the chemical from the solid matter, operated continuously, as hereinbefore mentioned, and with an apparatus for separating the chemical from the oil, fat, or resin, also operated continuously and with condensers for the continuous recovery of the chemical solvent employed, so as to make the entire process of extracting oil, fat, or resin from solid matter by chemical agency, and recovering the solid matter, the oil, fat, or resin, and the chemical agent each separate, a continuous or non-intermittent process.

ELIAS SMITH HUTCHINSON.

Witnesses:

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M. D. MERCER.