

(No Model.)

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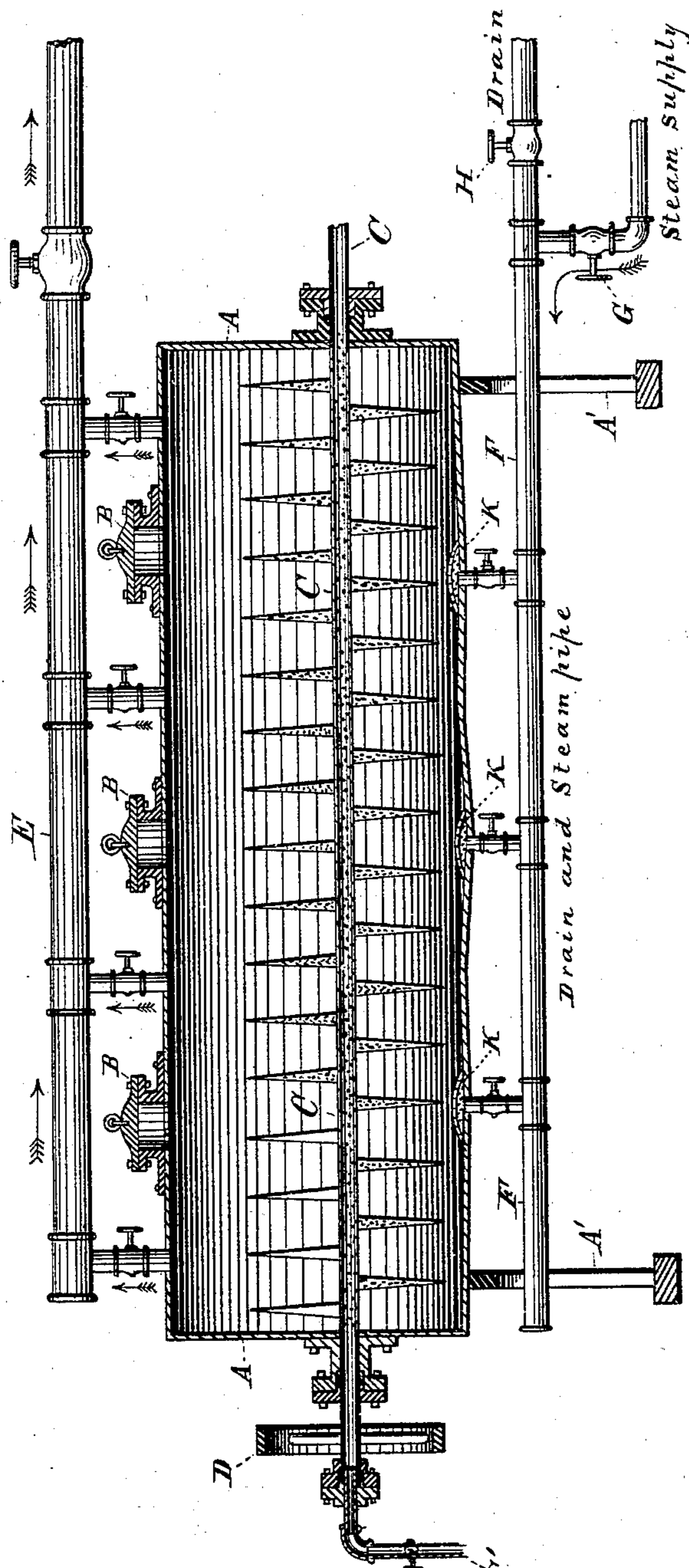
J. W. EVANS.

PROCESS OF AND MECHANISM FOR EXTRACTING OILS.

No. 285,598.

Patented Sept. 25, 1883.

Fig. 1.



WITNESSES

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Fig. 2.

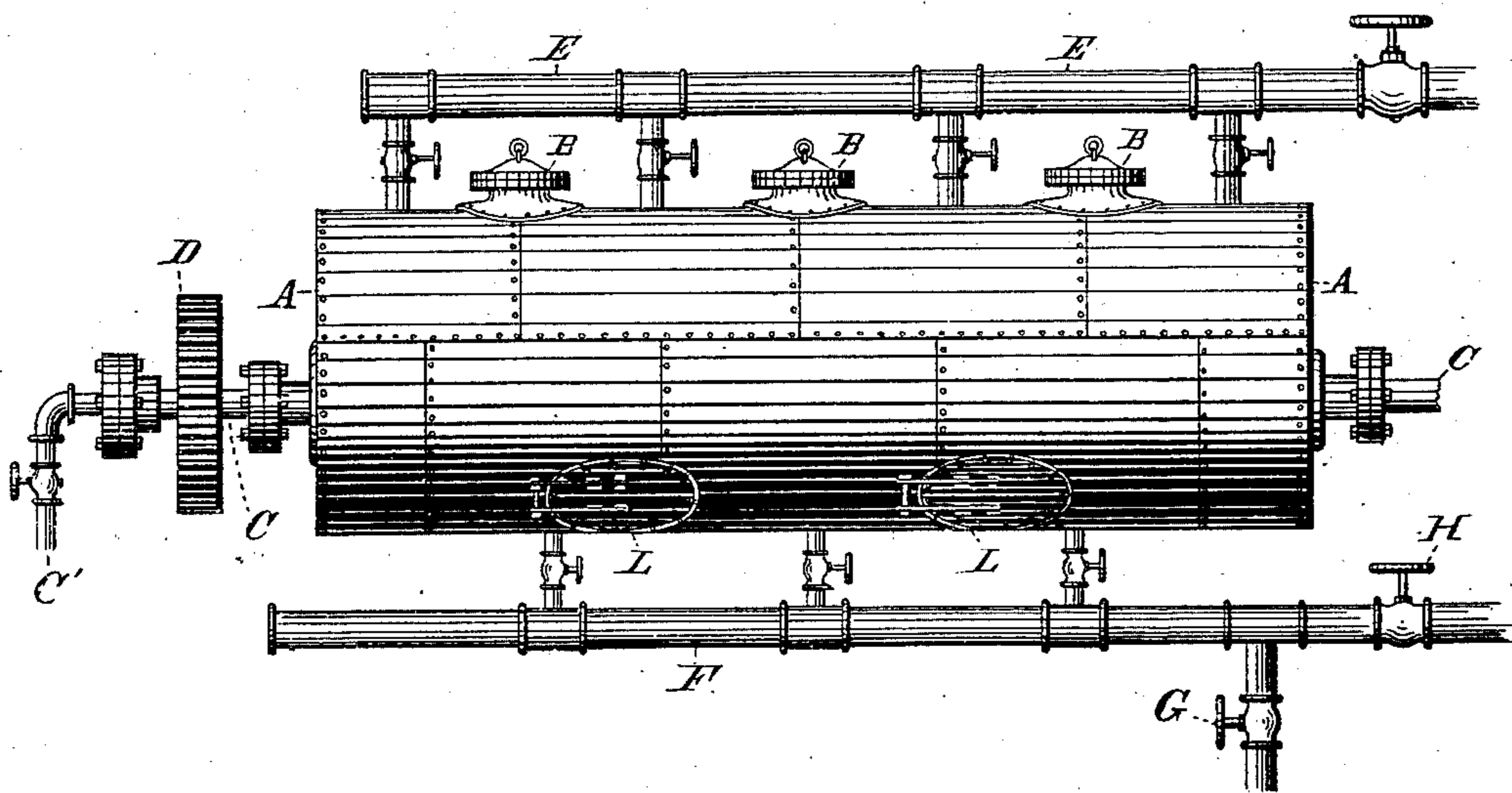
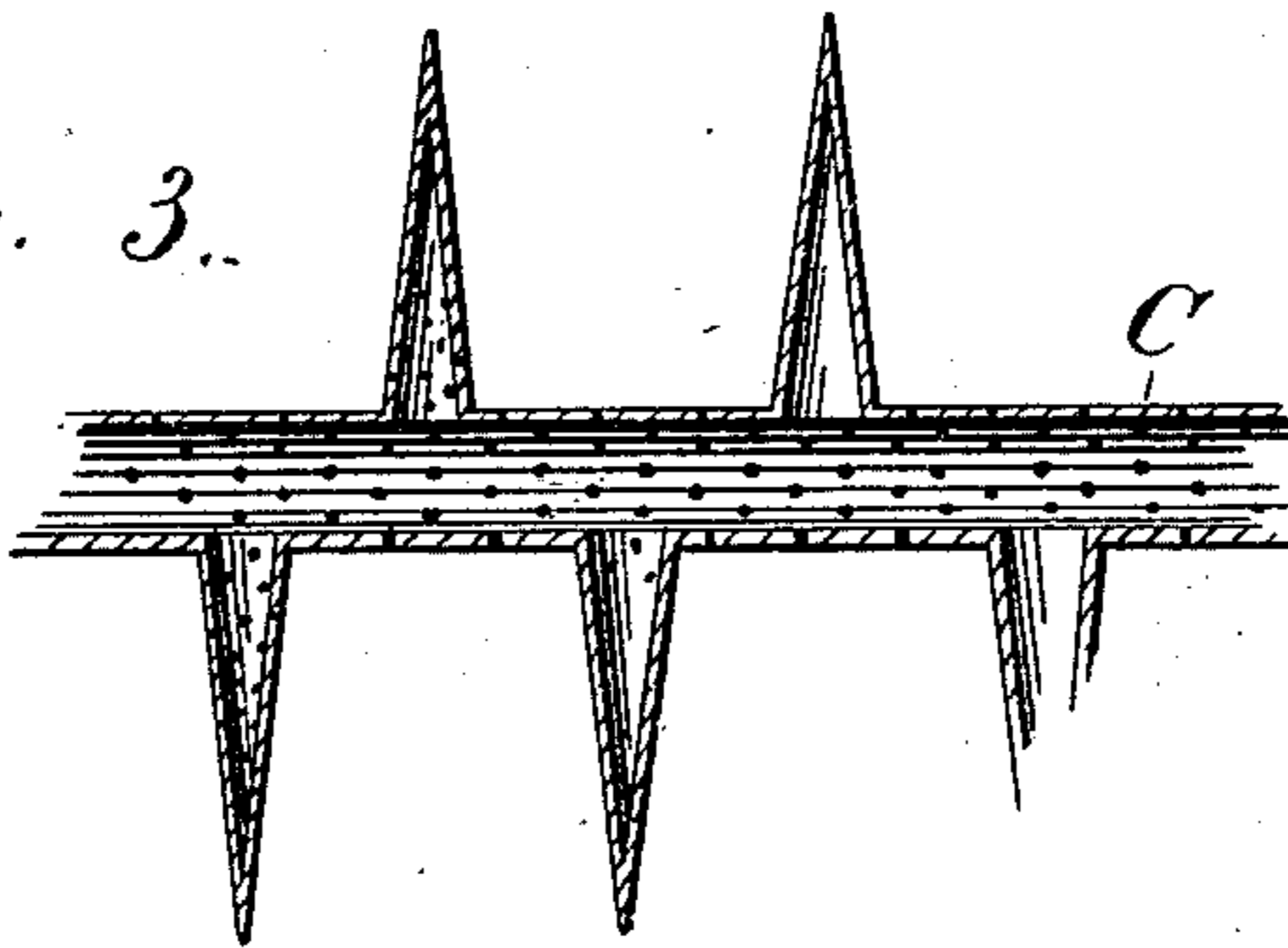


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN W. EVANS, OF CLEVELAND, OHIO.

PROCESS OF AND MECHANISM FOR EXTRACTING OILS.

SPECIFICATION forming part of Letters Patent No. 285,598, dated September 25, 1883.

Application filed October 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. EVANS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in a Process of and Mechanism for Extracting Oil; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to a process and mechanism for extracting oil from seeds, beans, or any other oleaginous vegetable substance; and it consists in the steps and mechanism hereinafter specified and claimed.

This invention is well adapted for the extraction of oil from linseed, cotton-seed, castor-beans, the refuse of glucose-factories, and other oleaginous vegetable substances.

The essential steps constituting my invention may be briefly described as follows: The substance from which the oil is to be extracted is placed in a suitable receptacle, and is more or less saturated with naphtha or benzine, whereby the oil is separated in the form of a compound of the oil and naphtha. When the naphtha has done its work in separating the oil, steam or hot air is thoroughly introduced throughout the mass, which meanwhile is agitated to facilitate the admission and application of the heating and vaporizing agent. The action of the heat of the steam or hot air is to evaporate the free naphtha remaining in the mass after its oil has been extracted, and this evaporated naphtha is carried off through suitable pipes to be condensed and re-employed, as above specified. The oil and naphtha compound sinks, and is drawn off to be afterward treated and refined.

A fair understanding of my process will be obtained from the following description of apparatus employed in practicing it.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in longitudinal section, of an apparatus embodying my invention. Fig. 2 is a view thereof in side elevation, and Fig. 3 is a sectional view of a section of the agitator.

A is a container or receptacle of any desired shape and material, a metal cylinder being preferred. This container may rest on any support, A'.

B B are man-holes of appropriate number and size, through which the substance from which oil is to be extracted is introduced into the container A. These man-holes are provided with tight covers.

C is a revolving hollow shaft or body having arms or projections. The shaft and arms may both be perforated, or either the shaft or arms alone may be perforated, for the escape of hot air or steam, which is forced through the shaft from an extraneous source, C'. As the shaft C revolves, the contents of the receptacle A are agitated, so that the hot air or steam (steam preferred) is thoroughly admitted and applied to the whole of said contents.

D represents a pulley or gear-wheel to which driving-power may be applied for revolving the shaft C.

E is a pipe or conduit connected with the receptacle A by one or more pipes, through which naphtha-vapor escapes as it is driven by the heating aforesaid from the receptacle A. The pipe E may lead to any suitable apparatus for condensing the naphtha-vapor. The pipe E may also be employed for introducing naphtha into the receptacle A, as will hereinafter be more fully set forth. Both the pipe E and its branches entering the receptacle A should be provided with suitable valves or stop-cocks, as indicated in the drawings.

F is a pipe which may be employed either to drain the liquid contents of the receptacle A or to introduce steam into said receptacle. When used for draining purposes, the valve or stop-cock G of the steam-supply pipe should be closed and the stop-cock H of the drain-pipe opened. When the pipe F is to be employed for the introduction of steam into the container A, the valve H is to be closed and the valve G opened. The pipe F has one or more branches entering the bottom of the receptacle A, each of which is provided with a suitable valve or stop-cock, as shown. I prefer constructing the bottom of the receptacle A in such a manner as to readily drain its liquid contents into the branches of the pipe F, as shown; and over the mouth of said branches I place a suitable screen, K, for preventing the entrance of other than liquid matter into the pipe F. If desired, a coarse cloth may be placed over the screens K.

The operation of the apparatus described

is as follows: The substance from which the oil is to be extracted is introduced through the man-holes B into the receptacle A. Naphtha or benzine is then introduced, either through the man-holes B or through the pipe E and its branches, until the contents of the receptacle A are sufficiently saturated. Enough naphtha is employed to cut and dissolve all the oil from the contents of the receptacle A, and the oil thus extracted is in the form of a compound with the naphtha employed in its separation. The free oil and naphtha sink to the bottom of the receptacle A and are drawn off through the pipe F, the strainers or screens K preventing the escape of solid substance. After the contents of the receptacle A have been sufficiently drained the shaft is revolved and steam forced through to its arms or projections. By this operation the naphtha remaining is completely evaporated and carried off through the pipe E to a suitable condensing apparatus, and after this operation is completed the solid contents of the receptacle A are withdrawn through the doors L, which are placed at or near the bottom of the receptacle A, as indicated in Fig. 2 of the drawings.

In Fig. 1 of the drawings it will be observed that I have placed the shaft C below the center of the receptacle A. While I do not limit my invention to this particular construction, I have found it useful, as the contents of the receptacle A, after the oil is extracted, occupy less space than at first, and by lowering the shaft C, as shown, I place it more nearly in the center of the mass. The shaft, however, may be placed in the longitudinal axis of the receptacle A, if desired, or in any other desired position.

Fig. 3 of the drawings is a detached view, showing a portion of the shaft C, with its projections, as indicated in Fig. 3. These projections may or may not be perforated. The shaft C should revolve during the entire operation of extracting the oil and driving the remaining naphtha from the contents of the receptacle A, for by its revolution packing of the contents of the receptacle A is prevented and the naphtha more thoroughly saturates and extracts the oil from said contents.

What I claim is—

1. A process of extracting oil from vegetable substances, consisting, essentially, in simultaneously subjecting the substances to the action of a liquid solvent and thorough agitation without heating either the substances treated or the solvent, substantially as set forth.

2. A process of extracting oil from vegetable substances by the use of a solvent, and of recovering the solvent remaining in the substances after the combined solvent and oil has been drawn off, said process consisting in placing the substances to be treated in a container, then subjecting them to the action of a liquid solvent and thorough agitation without heating either the substances treated or the solvent, then drawing off the resulting liquor, and finally subjecting the substances to the direct action of steam or hot air and thorough agitation without removing them from the container in which they were originally placed, substantially as set forth.

3. In an apparatus for extracting oil from vegetable substances by the use of a solvent, the combination, with a container, of an agitator consisting, essentially, of a hollow shaft provided with hollow radial arms, said shaft and arms, either or both, being perforated, and means for supplying steam or hot air to the shaft, substantially as set forth.

4. In an apparatus for extracting oil from vegetable substances by the use of a solvent, and for recovering the solvent remaining in the substances treated after the combined oil and solvent has been drawn off, the combination, with a cylindrical receptacle adapted to fulfill the twofold function of a percolator and evaporator, of a hollow shaft provided with hollow radial arms, said shaft and arms, either or both, being perforated, and means for supplying steam or hot air to the hollow shaft, substantially as set forth.

5. In an apparatus for extracting oil from vegetable substances by the use of a solvent, and for removing the solvent remaining in the substances treated after the combined oil and solvent has been drawn off, the combination, with a receptacle for the substances to be treated, of pipes arranged to be used at one time for introducing liquid solvent into the receptacle, and at another time forming an outlet for vapor, and other pipes arranged to be used at one time for drawing the combined oil and solvent from the receptacle, and at another time for introducing steam thereinto, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. EVANS.

Witnesses:

LEVERETT L. LEGGETT,
A. E. LYNCH.