W. J. WELLS.

APPARATUS FOR EXTRACTING OILS.

APPLICATION FILED SEPT. 1, 1906.

954,660.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

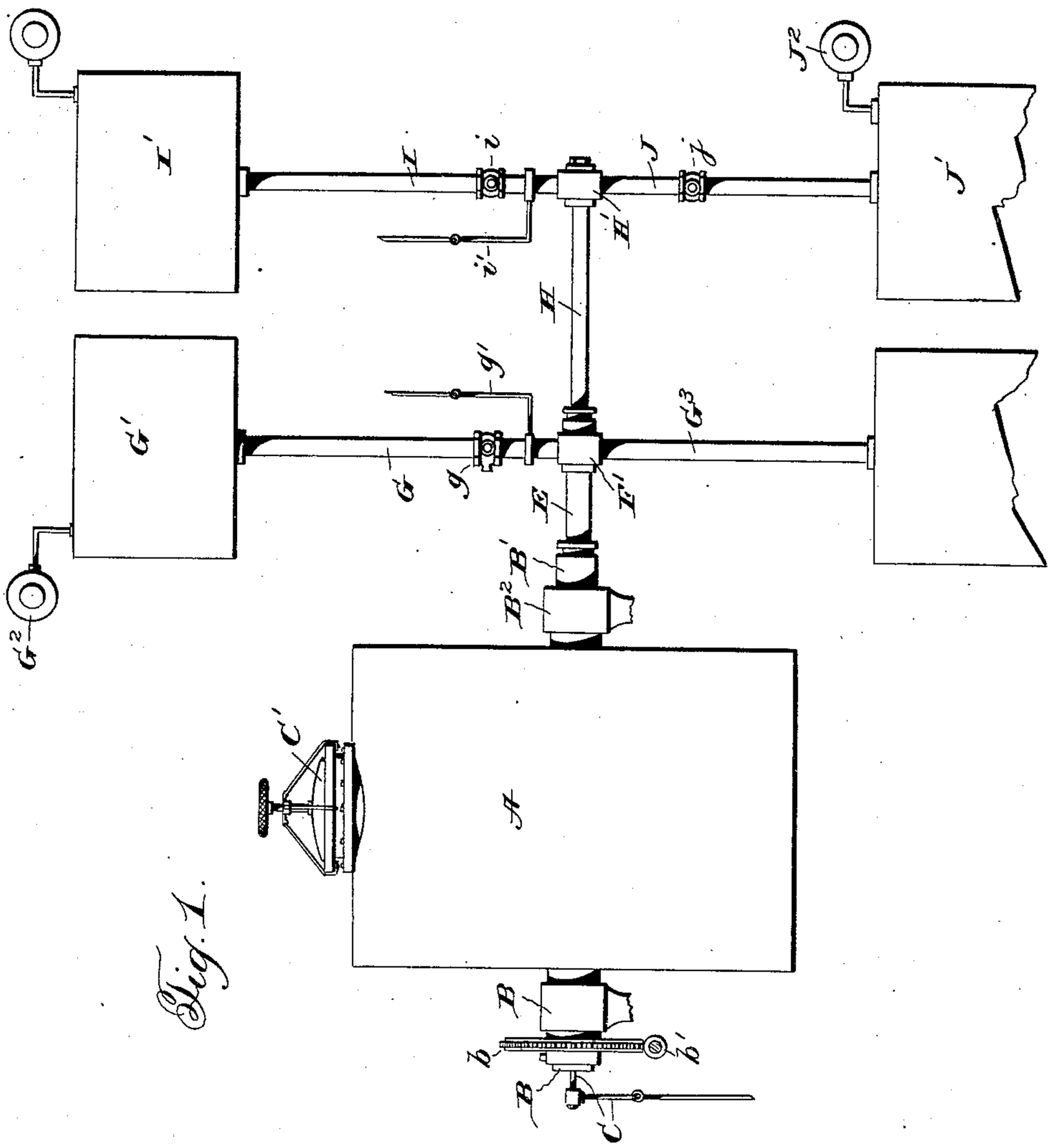

Fig. 1.

Witnesses:

Jas. E. Hutchinson.

Thos. R. Cottrell.

Inventor:

William J. Wells,

By Wilkinson & Mason Attorneys:

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3 SHEETS—SHEET 2.

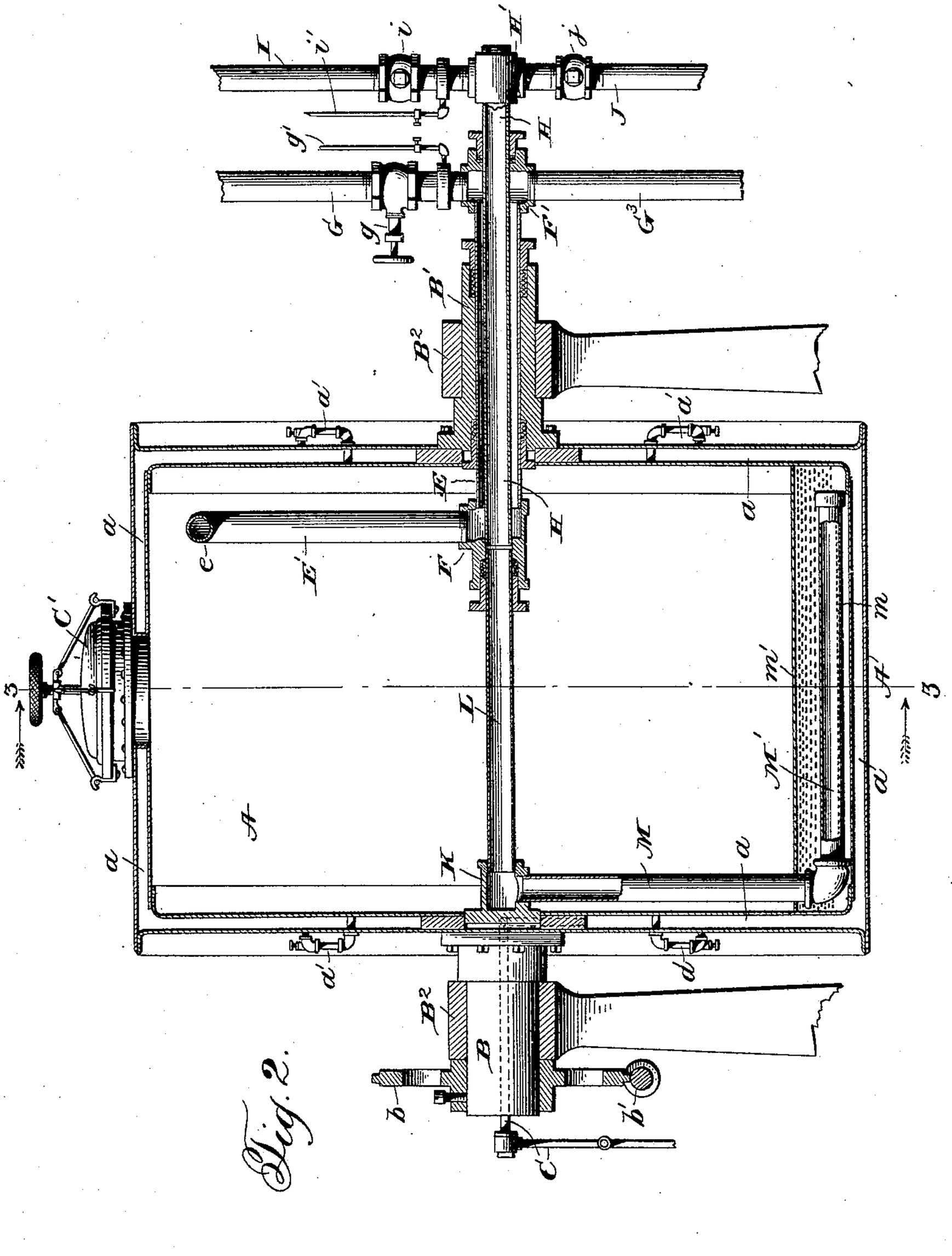

Fig. 2.

Witnesses:
Jas. E. Hutchinson.
Thos. R. Strath

Inventor:
William J. Wells,
By Macrae & Macrae Attorneys.

W. J. WELLS.

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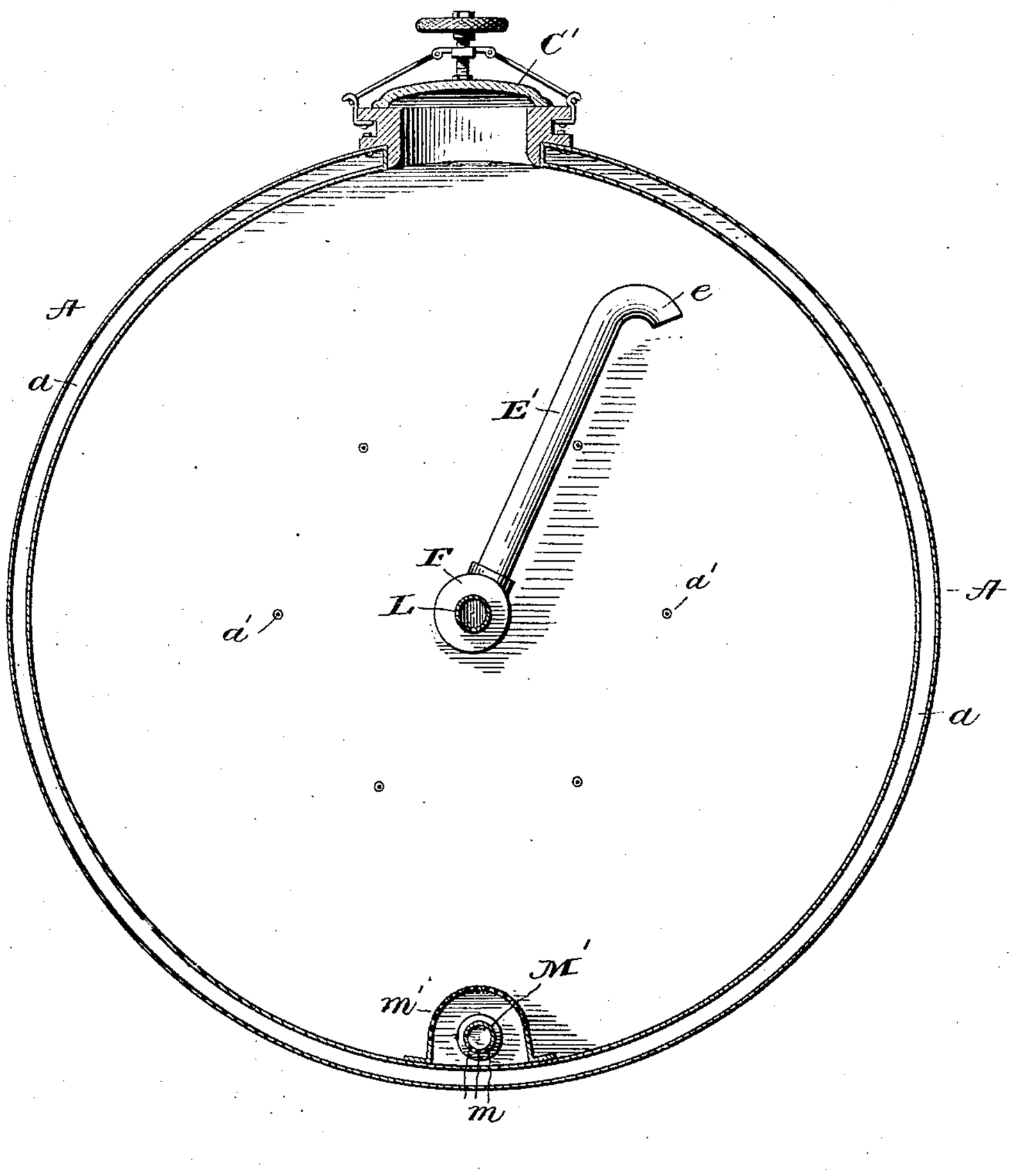
3 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

Jas. E. Hutchinson

Thos. C. Strath.

Inventor:

William J. Wells,

By Thomas Milans Attorneys:

UNITED STATES PATENT OFFICE.

WILLIAM J. WELLS, OF DECATUR, ILLINOIS.

APPARATUS FOR EXTRACTING OILS.

954,660. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed September 1, 1906. Serial No. 332,956.

To all whom it may concern:

Be it known that I, WILLIAM J. WELLS, a citizen of the United States, residing at Decatur, in the county of Macon and State of Illinois, have invented certain new and useful Improvements in Apparatus for Extracting Oil, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an improved apparatus for treating cereals, leather and other products for the purpose of extracting the oil therefrom, and drying the residue.

The object of the present invention is the provision of improved apparatus for treating material for the purpose of extracting oil therefrom, in which a common pipe is employed for admitting the solvent to the drum or holder containing the material and withdrawing the solvent from said drum or holder after the material has been subjected to the proper treatment, whereby the process of treating the material, withdrawing the oil and drying the resulting product may be carried on without opening the drum or holder and thereby permitting any noxious fumes or gases to escape.

A further object of the invention is the provision in an apparatus of this character of means for siphoning the solvent from the drum or holder and of means for creating a pressure within the drum or holder to facilitate said siphonic action.

Other objects of the invention will be apparent from the detailed description hereinafter, when read in connection with the accompanying drawings forming a part hereof wherein a preferable embodiment of my invention is shown, and wherein like letters of reference refer to similar parts in the several views.

In the drawings: Figure 1 is a diagrammatic view of my improved apparatus. Fig. 2 is a longitudinal section of the drum or holder, and Fig. 3 is a section on the line 3—3 of Fig. 2.

Referring now more particularly to the drawings, A designates a drum or holder, which is preferably cylindrical in form and which is provided with the hollow spaced side walls *a*. The drum A is supported by trunnions B and B′, which project axially from the heads thereof and are journaled in suitable bearings B^2. Any suitable means may be employed for imparting a rotary movement to the drum, but in the form illustrated in the drawing, I have shown a worm gear *b* secured to the trunnion B, with which meshes a worm *b′*, driven from any suitable source of power. Steam may be supplied to the interior of the hollow walls *a* of the drum in any suitable manner, but I prefer to use a steam pipe C, which has a loose connection with a pipe extending axially through the trunnion B and communicating with the interior of the hollow walls. The drum A is provided with a cap C′ of any suitable construction, through which the material to be treated is introduced into the drum. The trunnion B′ is hollow and extending axially therethrough is a pipe E which is rigidly supported, suitable packings being interposed between said pipe and the ends of the trunnion to prevent the escape of any gases therebetween from the interior of the drum. One end of the pipe E projects within the interior of the drum A and is threaded or otherwise suitably secured in one end of a pipe union F. Extending upwardly from the pipe union F and in communication with the pipe E is a vent pipe E′, the upper open end of which extends into proximity to the upper portion of the drum and terminates in a downwardly bent portion *e*, so as to prevent any of the material contained in the drum from falling therein during the rotation of said drum. The opposite end of the pipe E extends without the drum A and is threaded or rigidly secured in any other suitable manner into a fourway pipe union F′. Extending upwardly from the pipe union F′ and communicating with the pipe E is a pipe G, which leads to a suitable condenser G′ for condensing the gases and fumes withdrawn from the interior of the drum A. Communicating with the condenser G′ is a pump G^2 of any suitable construction so that a partial vacuum may be formed therein to facilitate the withdrawal thereinto of the noxious fumes or gases from the interior of the drum A. Interposed in the pipe G is a valve *g* of any suitable construction for cutting off communication between the condenser and the interior of the drum A. Extending downwardly from the pipe union F′ and in communication with the pipe E is a pipe G^3 leading to a settling basin, which may be of any suitable construction, which is adapted to receive any solid matter which may be drawn through the vent pipe with the gases.

H designates a pipe, which is smaller in diameter than the pipe E and which is concentrically disposed therein, one end of said pipe being threaded into an aperture to form in a wall within the pipe union F, beyond its connection with the vent pipe E′ and the opposite end of said pipe extending through the pipe union F and being threaded or otherwise rigidly connected to one end of a three-way pipe union H′. A suitable packing is provided between the pipe H and the pipe union F′ to prevent the escape of any gases therebetween. Extending upwardly from the pipe union H′ is a pipe I which extends to a tank I′ of any suitable construction for holding naphtha or other solvent, which is located in a higher plane than the drum A. Interposed in the pipe I is a valve *i* for cutting off communication between the naphtha tank and the interior of the drum. Extending downwardly from the pipe union H′ is a pipe J, which leads to a tank J′ of any suitable construction for receiving the oil and solvent from the interior of the drum. Communicating with the upper portion of the tank J′ is a pump J², so that a partial vacuum may be formed therein to facilitate the withdrawal of the oil and solvent from the interior of the drum A. Interposed in the pipe J is a valve *j* of any suitable construction, for cutting off communication between the tank J′ and the drum A. Rigidly secured to the interior of the drum A diametrically opposite the trunnion B is a two-way pipe union K.

L designates a pipe, one end of which is threaded or otherwise rigidly secured to the pipe union K and the opposite end of which is journaled loosely in the aperture in the wall of the pipe union F into which the end of the pipe H is threaded, the end of said pipe extending into proximity to the end of the pipe H so as to form substantially a continuation thereof. A suitable packing is provided between the pipe L and the pipe union F to prevent the escape of the liquid therebetween.

M designates a pipe, the upper end of which is rigidly secured to the pipe union K and in communication with the pipe L and the lower end of which extends into proximity to the inner wall of the drum A and terminates in a collecting chamber M′ which extends transversely of the inner walls of the drum and thereacross.

In the embodiment of my invention illustrated in the drawing accompanying this specification, I have shown the collecting chamber M′ as consisting of a pipe, the outer end of which is closed by a suitable cap and the under side of which is provided with several rows of perforations *m* therein to permit the passage of the oil thereinto. To prevent the perforations *m* in the pipe or collecting chamber M′ from becoming clogged by the material in the drum during the rotation thereof, said pipe or collecting chamber is inclosed by an arched shield of perforated metal *m′*, which extends completely across the inner wall of the drum A and has its edges secured thereto in any suitable manner. It will be obvious that the shield *m′* will prevent the material within the drum from coming into direct contact with the perforations *m′* in the pipe or collecting chamber M′.

The hollow side walls *a* of the drum A are provided with a plurality of valves *a′* of any suitable construction for the purpose of admitting steam therefrom into the interior of the drum when desired.

Interposed in the pipes G and I between the valves *g* and *i* and their connections with the pipes E and H are arranged the pipes *g′* and *i′* which are adapted to deliver live steam to the interior of said pipe for the purpose of cleaning the vent pipe and the collecting chamber. Should the vent pipe become clogged, the valve *g* in the pipe G is closed and steam is introduced through the pipe *g′* which will cause any solid matters or impurities contained in the vent pipe to be blown out into the interior of the drum. During this operation the valve *i* in the pipe I is open so that the steam which is blown out of the vent pipe may escape from the interior of the drum through the collecting chamber M′, pipes M, L, H and I. When it is desired to clean the collecting chamber and the pipes for effecting the withdrawal of the oil, this operation is reversed, the valves *i* in the pipe I being closed and the valve in the pipe *i′* being open to permit live steam to pass to the interior of the drum through the pipe M and collecting chamber M′, the valve *g* in the pipe G during this operation being open to permit the steam to escape from the interior of the drum by way of the vent pipe.

Having described my improved apparatus, I will now set forth the manner of using the same in treating cereals, grain or other products for the extraction of oil. The cereal, grain, or other product to be treated is introduced into the drum A through the cover C′ and the cover is then securely fastened on. The valve *g* in the pipe G is then opened and the pump G² is actuated to withdraw the air from the interior of the drum through the vent pipe E′ and cause a partial vacuum to be maintained therein. The valve *i* in the pipe I is then opened to permit solvent to flow from the tank I′ through the pipes I, H, L, M and collecting chamber M′ to the interior of the drum A, the valve in the vent line being left open to permit the gases thrown off by the solvent to escape to the condenser and to relieve the pressure in the drum. When the solvent has risen in the drum to a point adjacent the upper end of

the vent pipe E′, the valve *i* is closed. The drum A is then rotated to thoroughly commingle the solvent with the material to be treated. Steam is then admitted to the hollow walls of the drum or container in sufficient quantities to thoroughly warm the material to be treated, the drum being continuously rotated. When the material has been treated a sufficient length of time to thoroughly break the oil cells therein and to release the oil into the solvent, the rotation of the machine is stopped with the perforated collecting chamber or pipe M′ below the level of the liquid contained therein. The valve *j* in the pipe J is then opened and the drum is slowly rotated until the pipe or collecting chamber M′ reaches its lowermost position, when the rotation of the drum is stopped. With the drum in this position and the valve *j* in the pipe J open, the oil above the pipe union L will flow by gravity through the perforations *m* into the collecting chamber M′ and from thence through the pipes M, L, H and J, into the receiving chamber J′. After the level of the oil in the drum falls below the pipe union L, the remainder of the oil contained in the drum A will be drawn into the receiving chamber J′, on which a vacuum is maintained by means of the pump J^2, by a siphonic action. If desired, the withdrawal of the oil in the drum by the siphonic action may be expedited by closing the valve *g* in the vent line allowing what gases still remain in the drum to create a pressure above the oil therein, or pressure above the oil may be obtained by opening one or more of the valves *a′* and permitting steam to pass directly from the hollow walls *a* into the interior of the drum. After all of the oil has been withdrawn from the interior of the drum, the valve *j* in the pipe J leading to the tank J′ is closed and the valve *g* in the vent line is open. The drum is then rotated and a full head of steam introduced into the hollow walls thereof, which will heat the material to the proper temperature. During the rotation of the drum a number of the valves *a′* are open to permit live steam to pass from the interior of the hollow walls A into the material in the drum. This operation is continued until the volatile solvent, that is contained in the material being treated is removed therefrom through the vent pipe to the condenser G′. When the material is tested through a suitable test valve and is found to be free of any traces of the solvent, the steam valves *a′* are closed to prevent the further admission of steam to the interior of the drum. Should the material then be found too moist, the machine is rotated until the surplus moisture is driven out when the lid D of the drum A is removed and the drum is inverted to permit the discharge of the material.

I do not desire to limit myself to the precise form and construction shown in the drawings, as it is obvious that many minor changes may be made thereto without departing from the spirit of the invention.

I claim:

1. In an oil extracting apparatus, the combination with a rotary container, of a collecting chamber arranged to rotate therewith, fixed liquid inlet and outlet pipes in communication with said collecting chamber and means for creating a partial vacuum in said container.

2. In an oil extracting apparatus, the combination with a rotary container, of a collecting chamber comprising a longitudinally extending pipe positioned within said container and arranged to rotate therewith, fixed liquid inlet and outlet pipes arranged without the container and in communication with the collecting chamber, and valves in said pipe.

3. In an oil extracting apparatus, the combination with a rotary container, of a collecting chamber comprising a pipe extending longitudinally of the interior of the container and adapted to rotate therewith, fixed liquid inlet and outlet pipes without the container and in communication with the collecting chamber, valves in said pipes, and a vent pipe leading from the interior of the container.

4. In an oil extracting apparatus, the combination with a rotary container, of a fixed pipe extending through one side thereof and terminating in independent valved liquid inlet and outlet pipes, a collecting chamber comprising a pipe arranged within said drum and adapted to rotate therewith, and a connection between the collecting chamber and the pipe extending without the side of the container.

5. In an oil extracting apparatus, the combination with a rotary container having a hollow trunnion, of a fixed pipe arranged within the trunnion and extending within the container, independent valved liquid inlet and outlet pipes communicating with said fixed pipe, a collecting chamber comprising a pipe positioned within the container and arranged to rotate therewith, and a pipe leading from said collecting chamber and having a loose connection with the end of the fixed pipe projecting within the container.

6. In an oil extracting apparatus, the combination with a rotary container, of a collecting chamber comprising a longitudinally extending pipe positioned therein and arranged to rotate therewith, said collecting chamber comprising a perforated pipe positioned adjacent the wall of the container and extending longitudinally thereof, and a common liquid inlet and outlet pipe in communication with said collecting chamber

and extending to the exterior of the container.

7. The combination with a rotary container, of a collecting chamber positioned therein and adapted to rotate therewith, said collecting chamber comprising a perforated pipe positioned adjacent the wall of the container, a liquid inlet pipe communicating with said collecting chamber, a valved liquid receiving chamber positioned outside of the container and therebelow, and a valved pipe connecting said collecting chamber and liquid receiving chamber.

8. The combination with a rotary container, of a collecting chamber extending longitudinally of the container adjacent the periphery thereof and adapted to rotate therewith, a liquid inlet pipe communicating with said collecting chamber, a liquid receiving chamber positioned outside of the container and therebelow, a valved pipe connecting said collecting chamber and liquid receiving chamber, and a vent pipe leading from the interior of said container.

9. The combination with a rotary container, of a casing fixedly secured within said container diametrically opposite one of the trunnions thereof, a pipe extending longitudinally of the inner wall of the container, a connection between the pipe and said casing, and a common liquid inlet and outlet pipe in communication with said casing and projecting without the container.

10. The combination with a rotary container having trunnions journaled in suitable supports, a fixed pipe extending through one of said trunnions into the interior of said container, a casing secured to the interior of the container diametrically opposite the other trunnion thereof, a collecting chamber extending longitudinally of said container and adapted to rotate therewith, a connection between the collecting chamber and the casing, and a pipe leading from said casing and having a loose connection with the end of the fixed pipe extending through the trunnion.

11. The combination with a rotary container, of a fixed upwardly extending vent pipe leading therefrom, a second fixed pipe leading from the container, a collecting pipe arranged within the container and adapted to rotate therewith, a connection between the collecting pipe and the second fixed pipe, a valved pipe leading from the vent pipe, and oppositely disposed liquid inlet and outlet pipes communicating with said second fixed pipe.

12. The combination with a rotary container having trunnions journaled in suitable supports, of two concentrically disposed fixed pipes extending through one of said trunnions and into the interior of the container, an upwardly extending vent pipe arranged within the container and communicating with one of said fixed pipes, a collecting chamber arranged within the container and adapted to rotate therewith, a pipe extending from the collecting chamber and having a swivel connection with the other of said fixed pipes, and a liquid inlet pipe communicating with such pipe exteriorly of the container.

13. The combination with a rotary container, of a collecting chamber comprising a pipe arranged therein and adapted to rotate therewith, a fixed pipe communicating with said collecting chamber and extending without the container, independent liquid inlet and outlet pipes communicating with said pipes, an upwardly extending fixed vent pipe arranged within the container, a fixed pipe communicating with said vent pipe and extending without the container, and means for admitting steam to both of said fixed pipes without the container.

14. The combination with a rotary container, of a common inlet and outlet pipe in communication with said container, a vent pipe leading from said container, and means for creating a suction in said vent pipe.

15. The combination with a rotary container, of a collecting chamber positioned therein and arranged to rotate therewith, a common inlet and outlet pipe in communication with said collecting chamber and extending to the exterior of the container, a valved pipe extending upwardly from said common pipe to a solvent tank positioned above the collecting chamber within the container, a valved pipe leading from said common pipe to an oil receiving chamber positioned below the collecting chamber within the container, and a vent for said container.

16. The combination with a rotary container, of a common inlet and outlet pipe in communication with said container, a vent pipe leading from the container, means for creating a suction in said vent pipe, and means for creating a pressure within the container.

17. The combination with a rotary container, of a collecting chamber positioned therein and arranged to rotate therewith, a common inlet and outlet pipe in communication with said collecting chamber and extending to the exterior of the container, a valve pipe extending upwardly from said common pipe to a solvent tank positioned above the collecting chamber within the container, a valved pipe leading from said common pipe to an oil and solvent receiving chamber positioned below the collecting chamber within the container, a valved vent pipe leading from the interior of said container, and means for creating a suction in said vent pipe.

18. The combination with a rotary container, of a collecting chamber positioned therein and arranged to rotate therewith, a

common inlet and outlet pipe in communication with said collecting chamber and extending to the exterior of the container, a valved pipe extending upwardly from said common pipe to a solvent tank positioned above the collecting chamber within the container, a valved pipe leading from said common pipe to an oil and solvent receiving chamber, a valved vent pipe leading from the exterior of said container, means for creating a suction in said vent pipe, and means for creating a pressure within the container.

19. In combination with a container, of a valved vent pipe leading therefrom, a liquid receiving chamber, exterior to the container and positioned therebelow, a valved liquid outlet pipe leading from the interior of said container to said chamber, means for creating a partial vacuum in said chamber, and means for creating a pressure in said container.

20. The combination with a rotary container having hollow walls, of a valved vent pipe leading from said container, means for siphoning the liquid container in said container to the exterior thereof, means for admitting steam to the hollow walls of the container, and valves affording a communication between the space between the hollow walls of the container and the interior thereof.

21. The combination with a rotary container having trunnions journaled in suitable supports, of two concentrically arranged fixed pipes extending through one of said trunnions and into the interior of the container, an upwardly extending vent pipe arranged within the container and communicating with one of said fixed pipes, a collecting pipe arranged within the container and adapted to rotate therewith, a pipe connection between said collecting pipe and the other of said fixed pipes, and valved liquid inlet and outlet pipes communicating with such other pipe.

22. The combination with a rotary container having trunnions journaled in suitable supports, of two concentrically arranged fixed pipes extending through one of said trunnions and into the interior of the container, an upwardly extending vent pipe arranged within the container and communicating with one of said fixed pipes, a collecting pipe arranged within the container to rotate therewith and communicating with the other of said fixed pipes, valved liquid inlet and outlet pipes communicating with such other pipe, and means for introducing steam into either of said concentrically arranged pipes.

23. In an oil extracting apparatus, the combination with a rotary container, of a collecting chamber comprising a pipe extending longitudinally of the interior of the container and adapted to rotate therewith, fixed liquid inlet and outlet pipes without the container and in communication with the collecting chamber, valves in said pipes, a vent pipe leading from the interior of the container, and means for creating a suction in said vent pipe.

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

WILLIAM J. WELLS.

Witnesses:

DAVID DIETER,

ALFRED PAYNE.