

No. 774,649.

PATENTED NOV. 8, 1904.

F. S. DAVIS.

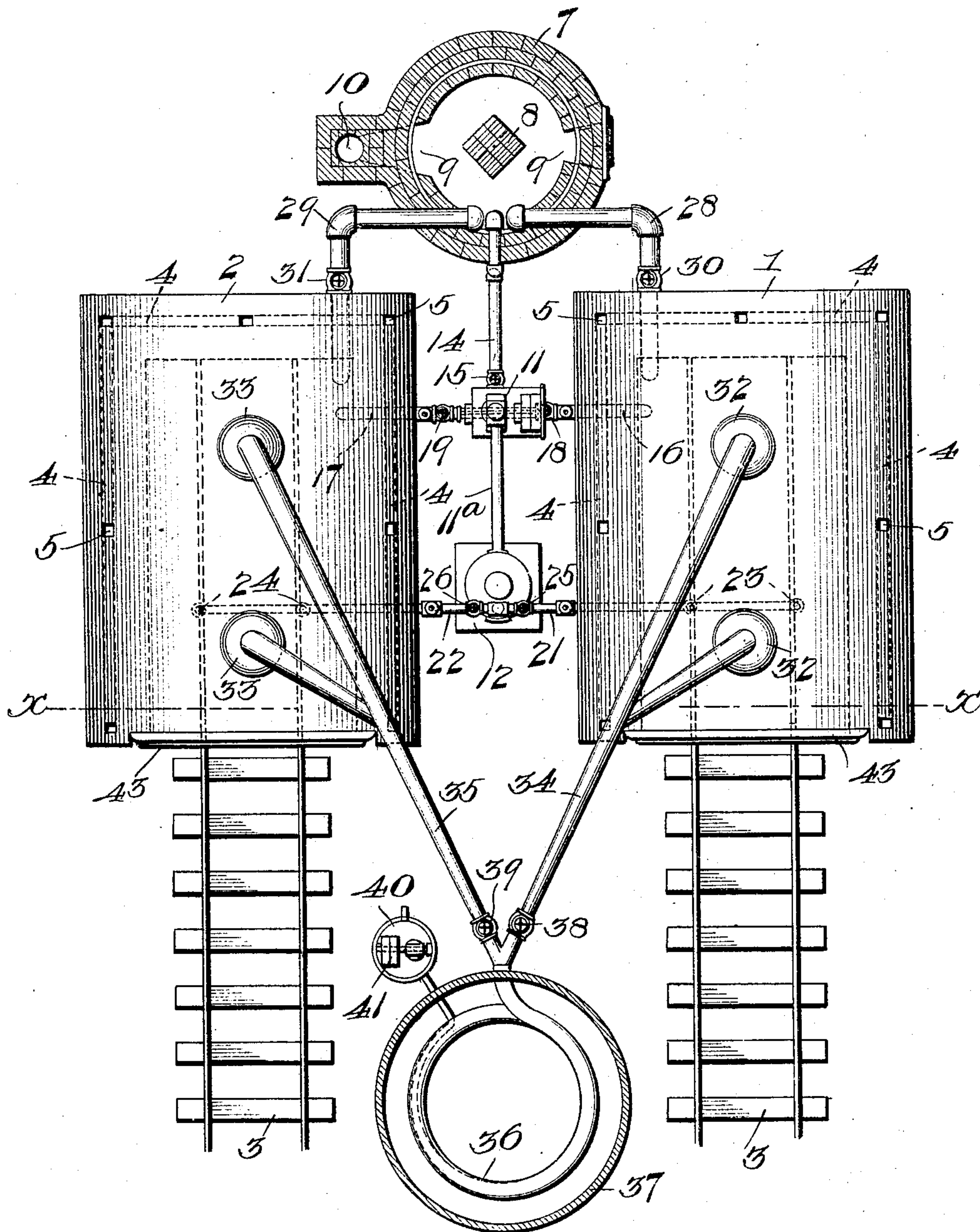
WOOD DISTILLING AND PRESERVING APPARATUS.

APPLICATION FILED JULY 16, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
J. L. Mochamer
Warren G. Ogden

Inventor
Fred. S. Davis
by Milken & Fisher,
Attorneys.

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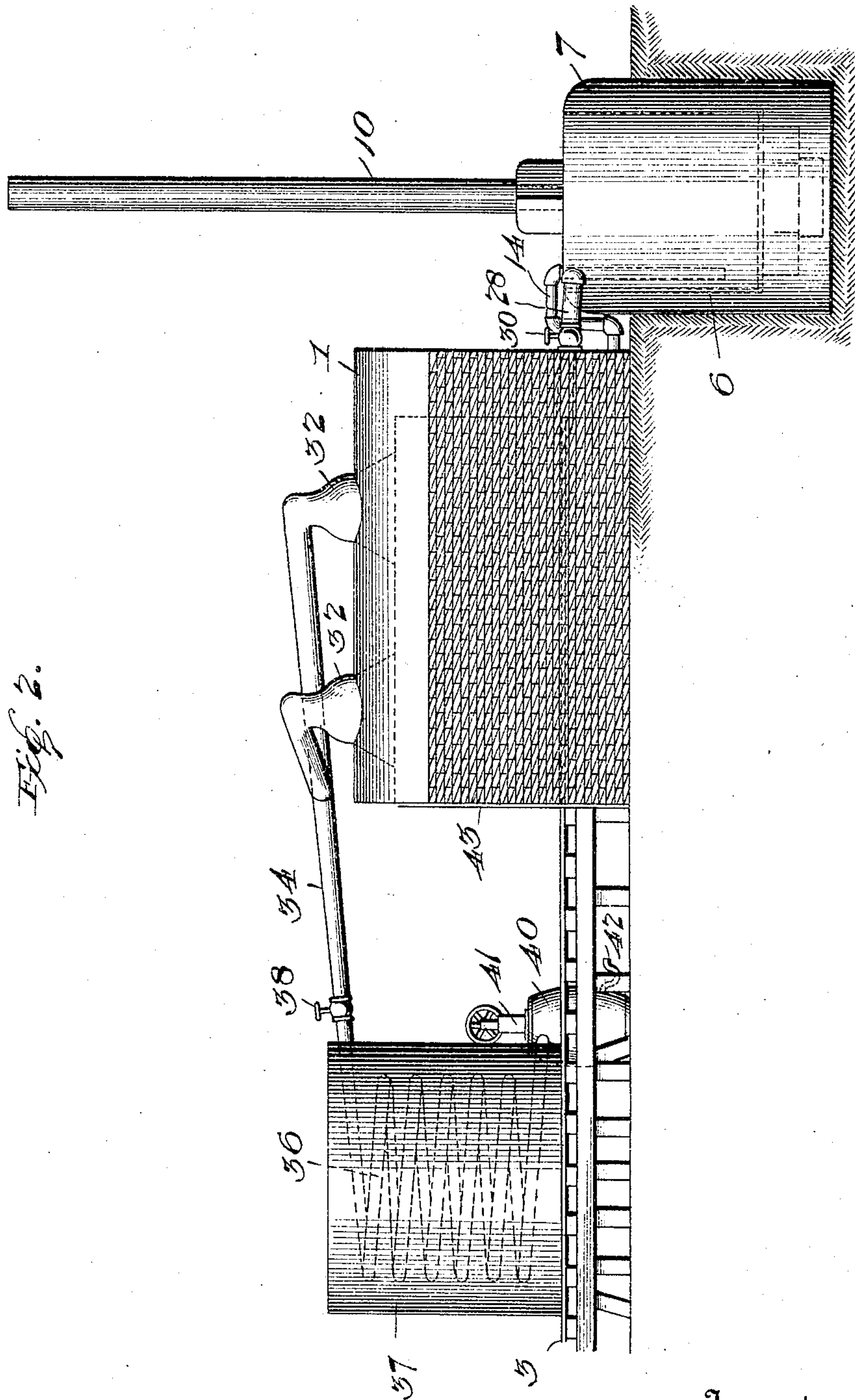
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3 SHEETS—SHEET 2.



Witnesses
J. L. Mochan
Wm. G. Ogden

Inventor
Frid. S. Davis,
by *Milliken & Fisher*,
Attorneys

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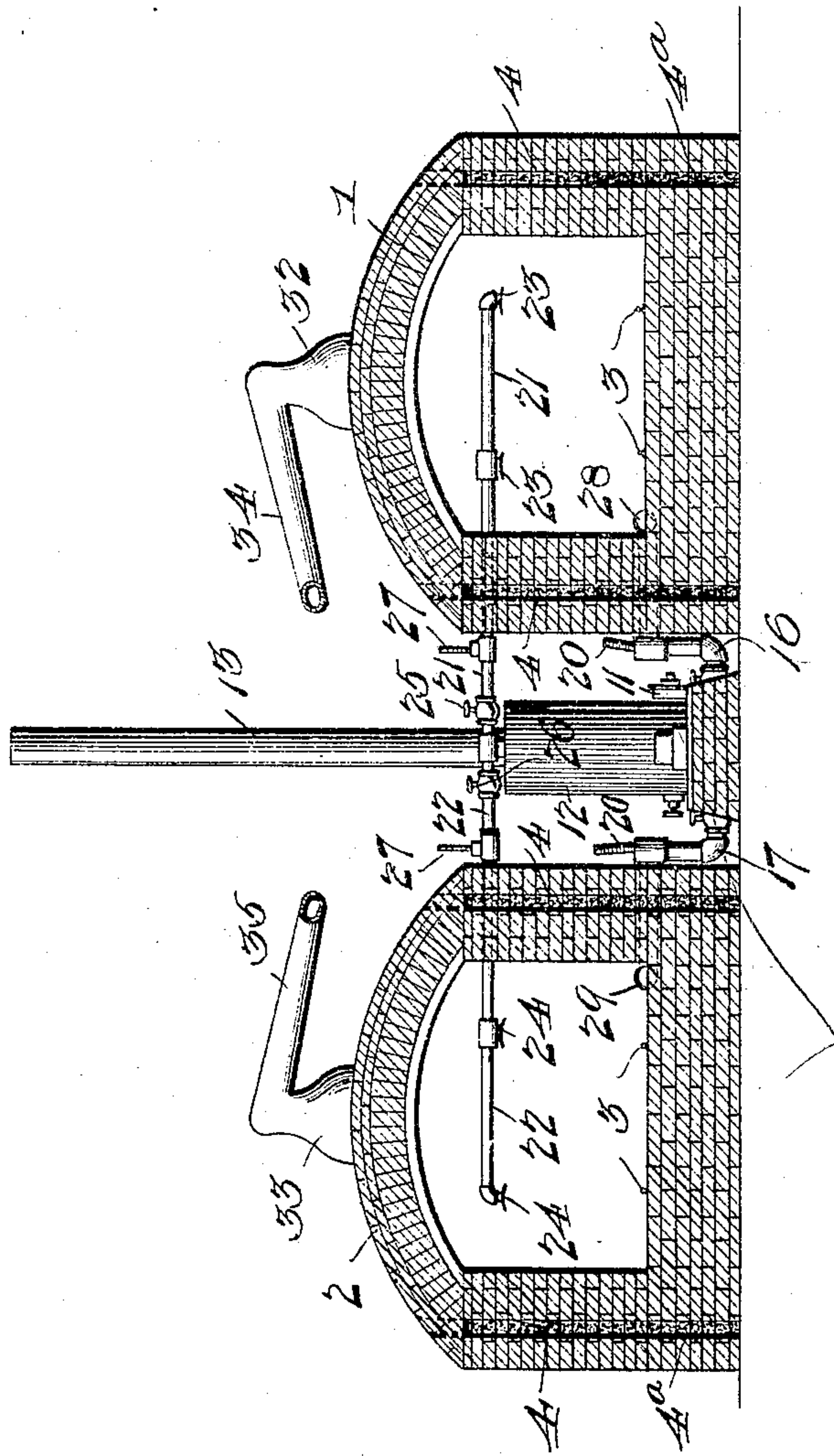
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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 3.



Witnesses
J. L. Kochman
Harris G. Ogden

Inventor
Ford. S. Davis,
By Wilkinson & Fisher,
Attorneys.

UNITED STATES PATENT OFFICE.

FRED SMITH DAVIS, OF SHIRLEY, SOUTH CAROLINA, ASSIGNOR OF ONE-HALF TO JAMES CLARENCE RICHARDSON, OF ROBERTSVILLE, SOUTH CAROLINA.

WOOD DISTILLING AND PRESERVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 774,649, dated November 8, 1904.

Application filed July 16, 1904. Serial No. 216,816. (No model.)

To all whom it may concern:

Be it known that I, FRED SMITH DAVIS, a citizen of the United States, residing at Shirley, in the county of Hampton and State of South Carolina, have invented certain new and useful Improvements in Wood Distilling and Preserving Apparatus; 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 appertains to make and use the same.

This invention relates to an apparatus for use in the distillation of wood by a process which does not destroy the material acted upon, but fully preserves it from injury and leaves it, after the turpentine and other light oils have been recovered, in condition for use in other connections.

Further objects of the invention are to provide an apparatus of this character having a novel and advantageous heating apparatus and construction and arrangement of retorts conducive to economy of fuel and heat and to time and labor required.

To the accomplishment of these objects and such others as may hereinafter appear the invention consists of the novel construction and combinations of parts hereinafter described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, showing the preferred embodiment thereof, in which the same reference-numerals designate like parts throughout the several views, and in which—

Figure 1 shows a plan view of the apparatus and sections of track leading to and into the retorts. Fig. 2 shows an elevational view of one side of the apparatus, and Fig. 3 shows a cross-sectional elevational view on line X X of Fig. 1.

Briefly, the apparatus includes an arrangement of retorts, which are first charged with wood and then filled with a heated preserving fluid, which effects the distillation and which are preferably located in pairs and provided with connections, so that one may be cleaned and recharged during the operation of the other, thus effecting a great saving in time

and obviating the need of repumping to and from the main source of supply of the distilling and preserving fluid for each charge. In connection with the retorts there are used a furnace and tank for reducing to a liquid form the material to be used in the process, a pump of any approved design, but preferably rotary, and a heater, the whole being joined by pipe-lines suitably valved, so that the distilling and preserving fluid may be circulated through the pump, heater, and either retort and tank, or the tank may be cut out and a circulation maintained through the pump, heater, and either retort in the order named. Each retort is provided with one or more condensing-hoods, as may be found necessary or advantageous, two being the preferable number used, as shown in the drawings, for gathering the wood-gases given off, and suitable conduits lead therefrom to a condenser of approved type, which has a vacuum-pump arranged at its outlet, so as to pump air there- through, and thereby aid in clearing the same as fast as the gases condense.

It has been found by experiment that excellent results have been obtained by using melted rosin as the distilling and preserving fluid, and in the following description such fluid will be referred to as "rosin;" but it should be understood that the process is not limited in its use to this especial preservative, as tar, pitch, creosote, or any other of the well-known preservatives for wood may be used with advantage, and the apparatus is equally well adapted to the use of any of them.

Referring to the drawings, 1 and 2 represent retorts, which are preferably of a size to conveniently contain a truck loaded with pine-wood, although they may be of any convenient or desirable size, and into these retorts lead the tracks 3, on which the trucks are run. The walls of the retorts are preferably constructed of brick and cement and are made double—that is, there is an outer and an inner wall, with an air-space between, as shown at 4. This air-space is closed for the greater part of its length by the roof of the retort, the only openings being small apertures 5 made in the

roof, through which may be poured dry sand or any other suitable filler 4^a, which is used for the purpose of running into and sealing any crack that may be formed in the walls of the retort by coming into contact with the rosin which is forced into the retort by the means hereinafter described.

Conveniently located with relation to the retorts, and preferably with its top below the level of the floor of the retorts, is a tank 6, used as a melting-tank for the rosin to be pumped into the retorts. The low level is for the purpose of making a gravity flow from the retorts back into the tank in case of a shut-down or for repairing. The tank 6 is suitably mounted within a furnace 7, which is preferably constructed, as shown in the drawings, with a centrally-located supporting-pillar 8, flues 9, and a stack 10. This tank 6 should be of such a size that it will hold enough rosinous fluid to entirely submerge a loaded truck when within one of the retorts.

Conveniently located, preferably between the retorts, so as to save piping, is a pump 11, which may be of any convenient design, although a rotary pump has been found very serviceable and efficient, and located near it is a heater 12, which may be of any suitable construction, but which is preferably formed with a furnace in the lower part leading to a stack 13, as shown by Fig. 3.

Connections between the elements described above are made preferably in the following manner. Piping 14 connects the tank 6 and pump 11, which piping is provided with a valve 15 at a convenient point. From the pump pipe-lines 16 and 17 lead to the floor of each of the retorts 1 and 2, respectively, and each of these pipe-lines is provided with a conveniently-located cut-off valve 18 and 19. Suitable pockets are also formed therein for the reception of thermometers 20, used for ascertaining the temperature of the fluid passing therethrough. The pump and the heater are connected by a pipe 11^a, and from the top of the heater 12 run pipes 21 and 22 through the walls of retorts 1 and 2, respectively, and a distance into their interior, their length within the retorts being provided with suitable discharge openings or nozzles 23 and 24. These pipes are also provided with valves 25 and 26, located near the outlet from the heater, for cutting out either retort, as may be desired, and with sockets for the reception of thermometers 27 for determining the temperature of the preserving fluid as it enters the retorts. The retorts 1 and 2 are also each provided with a pipe 28 and 29, respectively, having valves 30 and 31 conveniently located therein, which lead on an incline from the floor of the retorts back to the melting-tank 6 and through which the liquid rosin may flow by gravity. The heat of the liquid rosin causes gases to form in the retorts, and these gases rise into

condensing-cones 32 and 33, located on the tops of retorts 1 and 2, respectively, which cones are connected by suitable piping 34 and 35 to one end of a condenser-coil 36, located in a tank of water or other cooling medium 37. The pipes 34 and 35 are provided, respectively, with valves 38 and 39 for cutting off either from connection with the condenser, as may be described. The condenser-coil empties its products into any suitable receptacle, as a barrel 40, on which is mounted a vacuum-pump 41 of any approved type, which is arranged to suck air through the worm and pipe connected therewith leading to the condensing-hoods, thereby aiding in clearing the worm of the heavier oils which run down very slowly of their own accord. The collector 40 is provided with an outlet 42, which is in turn provided with a trap, as is customary. The pump 41 should not be of great enough power to lift the condensed oils or draw the gases through the worm before they are condensed.

In operation a charge of wood is run into one of the retorts—say retort 1—and the doors 43 closed thereon and suitably sealed. Rosin which has previously been melted to a liquid state in tank 6 is then pumped from said tank through pipes 14 and 11^a, heater 12, and pipe 21 into the retort, completely submerging the wood. Valve 15 is then closed and valve 18 opened, when pump 11 again resumes operations and a continuous flow of rosin is kept up through the retort, the pump, and the heater. The circulation is maintained for the purpose of heating the rosin, the proper temperature being maintained by manipulation of the fire in the furnace of the heater, the same being indicated by the thermometer 27. The hot rosin drives off the gases from the wood, which are collected in cones 32 and condensed by the worm 36, valve 38 being open, said fluid at the same time preserving the wood and leaving it in condition for further use in any desired capacity. During the operation as above described valves 19 and 26 are closed, and to use the other retort when all the gases from the charge in retort 1 have been drawn off it is merely necessary to close valve 25 and open valve 26, which allows the rosin to be pumped from retort 1 into retort 2. When all has been pumped over, valve 18 is closed and valve 19 opened, when a circulation may be maintained through retort 2, as described, for retort 1, and the gases condensed by passing through pipe 35 and open valve 39. By this method of manipulating the distilling and preserving fluid the same does not lose the gases held in solution therein from its use in connection with retort 1, and these are therefore saved. The rosin is never run back into tank 6 unless for reason of a shut-down, and so the operation is practically continuous.

While the invention has been described with particular reference to the details of the ar-

5 rangement and construction of parts, it should be understood that it is not to be limited thereto, as obviously some features of the invention may be used without others, and the same may be embodied in widely-varying forms.

10 Therefore, without limiting the invention to the arrangement and construction shown and described nor enumerating equivalents, I claim, and desire to secure by Letters Patent, the following:

1. In an apparatus of the class described, a suitable retort for the reception of the material to be treated, a suitable furnace and tank for melting down the material used as a distilling and preserving fluid, means for transferring said fluid from said furnace to said retort, means for heating said fluid during said passage and means for returning said fluid from said retort to said tank, substantially as described.

2. In an apparatus of the class described, a suitable retort for the reception of the material to be treated, a suitable furnace and tank for melting down the material used as a distilling and preserving fluid, a pipe-line connecting said tank and retort, a heater on said line and a pump for delivering said fluid from said tank to said retort and for maintaining a continuous circulation thereof through said heater and retort, substantially as described.

3. In an apparatus of the class described, a suitable retort for the reception of the material to be treated, a suitable furnace and tank for melting down the material used as a distilling and preserving fluid, a pipe-line connecting said tank and retort, a pump for delivering said fluid through said pipe-line to said retort, a valve between said pump and said tank, a heater on said pipe-line, and connections for maintaining a continuous circulation through said heater and said retort, substantially as described.

4. In an apparatus of the class described, a battery of retorts, each retort thereof capable of containing a suitable distilling and preserving fluid, a heater for said fluid, connections between said heater and retorts, and means for maintaining a continuous circulation through said heater and any one of said retorts, substantially as described.

5. In an apparatus of the class described, a battery of retorts, a supply-tank for the distilling and preserving fluid, a heater for said fluid, connections between said tank and heater and said heater and each retort of the battery, means for pumping said fluid from said tank

into any one of said retorts, and means for maintaining a continuous circulation of said liquid through said charged retort and said heater, substantially as described. 60

6. In an apparatus of the class described, a battery of retorts, a supply-tank for the distilling and preserving fluid, a heater for said fluid, connections between said tank and heater and said heater and each retort of the battery, means for pumping said fluid from said tank into any one of said retorts, means for maintaining a continuous circulation of said liquid through said charged retort and said heater, and means for discharging each retort back into said supply-tank, substantially as described. 65 70

7. In an apparatus of the class described, a battery of retorts, each retort thereof capable of containing a suitable distilling and preserving fluid, a heater for said fluid, connections between said heater and retorts, means for maintaining a continuous circulation through said heater and any one of said retorts, and means for determining the temperature of said fluid as it enters and leaves the retort, substantially as described. 75 80

8. In an apparatus of the class described, a battery of retorts, each retort thereof capable of containing a suitable distilling and preserving fluid, a heater for said fluid, connections between said heater and retorts, means for maintaining a continuous circulation through said heater and any one of said retorts, means on each of said retorts for collecting the gases given off joined together, and a suitable condenser at said juncture, substantially as described. 85 90

9. In an apparatus of the class described, a battery of retorts, each retort thereof capable of containing a suitable distilling and preserving fluid, a heater for said fluid, connections between said heater and retorts, means for maintaining a continuous circulation through said heater and any one of said retorts, means on each of said retorts for collecting the gases given off joined together, a suitable condenser at said juncture, and means for cutting out any one of said collecting means from its connection with said condenser, substantially as described. 95 100 105

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

FRED SMITH DAVIS.

Witnesses:

JAS. C. RICHARDSON,
J. C. RICHARDSON, Jr.