

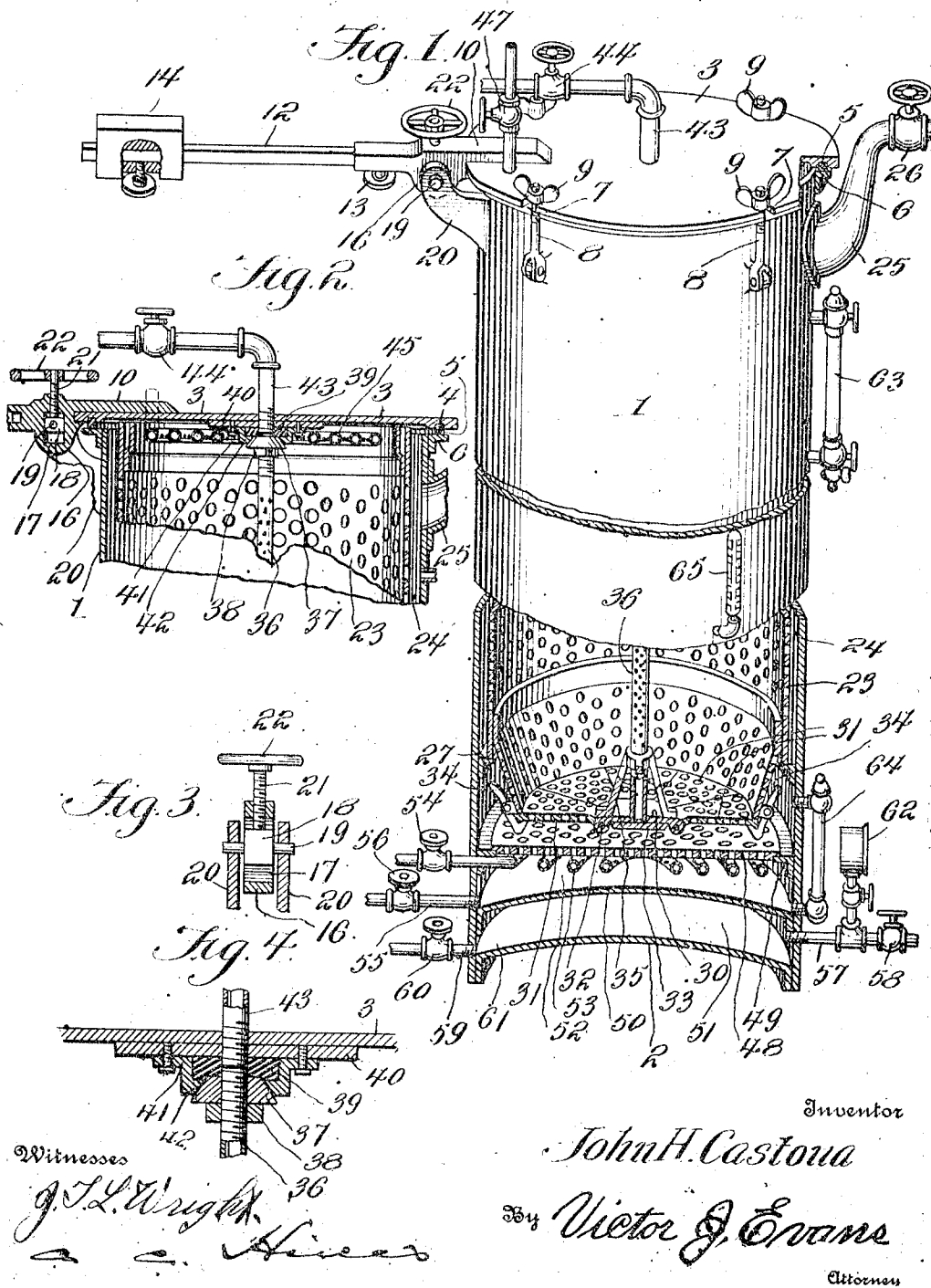
J. H. CASTONA.

EXTRACTOR.

APPLICATION FILED MAY 7, 1912.

1,112,980.

Patented Oct. 6, 1914.



UNITED STATES PATENT OFFICE.

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EXTRACTOR.

1,112,980.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN H. CASTONA, a citizen of the United States, residing at Moss Point, in the county of Jackson and State of Mississippi, have invented new and useful Improvements in Extractors, of which the following is a specification.

This invention relates to an extractor for use in extracting turpentine, resin, etc., from wood.

The object of the invention is to provide an extractor which is simple of construction and efficient and economical in operation, which may be easily and conveniently handled, operated and cleaned with a minimum expenditure of time and labor, and which is adapted to permit of the use of suitable solvents for the extraction of the resin and volatile constituents of the wood and enable products of a high degree of purity to be obtained.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a perspective view, partly in elevation and partly in section, of an extractor embodying my invention. Fig. 2 is a vertical section through the top of the extractor. Fig. 3 is a detail section on the line 3—3 of Fig. 2 through the hinge joint of the top head or cover. Fig. 4 is a detail section showing the sealing or joint closing connection between the steam supply and steam injection pipes.

Referring to the drawings, 1 designates the body of the extractor, which comprises a cylinder having a dished or concaved bottom head 2 adapted to be closed at its top by a removable head or cover 3. This head or cover 3 is provided on its underside adjacent to its periphery with an annular groove 4 receiving a packing ring or gasket 5, which is adapted to bear against an annular abutment or seat ring 6 secured to the top of the body. Formed in the edge of the cover at spaced intervals are slots 7 adapted to receive shackle bolts 8 hinged or pivoted to the body so as to be swung into and out of said slots and provided with winged clamping nuts 9, whereby said bolts

are adapted to be fastened in cover-holding position. When the cover is clamped in position the gasket 5 is held crowded against the ring 6, thus tightly closing the extractor against the escape of heat and the volatile elements from the wood and solvent.

The cover 3 is provided at one side with a lever arm 10 firmly fastened thereto in any suitable manner and which is formed in its outer end with a socket 11 adjustably receiving an extension arm or rod 12 fixed within the socket by means of a set screw 13. Slidably mounted on this extension arm is a counterbalancing weight 14 adapted to be secured in adjusted position by a set screw 15. The arm 10 is formed with a depending portion 16 provided with an oblong rectangular slot 17 through which extends a block 18 carrying a pivot pin or trunnions 19 journaled in bearings in spaced brackets 20 projecting from the extractor body, whereby the cover 3 is pivotally mounted on the body for opening and closing movements. The counterweight 14 approximately balances the weight of the cover, so that the latter may be opened and closed with a minimum amount of effort on the part of the operator. By adjusting the arm 12 in or out and varying the position of the weight 14, it is evident that the counterweight leverage may be varied as desired. Supported by the arm 10 is an adjusting screw 21 which engages the block 18 and is provided with a hand wheel 22, whereby the arm and cover may be adjusted on the pivotal support to regulate the seating of the gasket 5 against the abutment 6, as well as to permit the cover to be pried up without injury to the gasket, in the event that the latter should stick to the abutment 6.

Arranged within the extractor body is a removable perforated cage or basket 23, which is of somewhat less diameter than the body to provide an intermediate space 24 for the discharge of the volatile constituents of the wood and vapor from the solvent and passage of the same to a condenser through a goose-neck outlet or discharge pipe provided with a controlling valve 26. Said cage or basket is also of less length than the body and rests at its lower end against supporting lugs or members 27 arranged some

distance above the bottom of the body. The cage is provided at its upper end with apertured cars 28 for connection with hooks or the like of a suspending device, whereby it may be inserted within and removed from the extractor body through the medium of a crane or other suitable hoisting appliance.

The cage or basket has a frusto-conical lower portion 29 and a removable bottom comprising a central section 30 and an annular series of segmental sections 31, hinged or pivoted to said body, as at 32. The body 30 is strengthened by a reinforcing plate 33, to prevent it from buckling under the weight of the charge of material resting thereon, and the portion 29 and pivoted sections 31 are perforated to permit of the gravitative discharge of the resin extracted from the charge. Pivoted latches 34 are carried by the portion 29 to engage under the pivoted sections 31 and hold the same clamped against the lower edge of said portion 29, whereby the bottom of the cage is held in position. By retracting the latches the bottom as a whole may be released to permit the parts of the cage to be disassociated for cleaning or repairs, or one or more of the pivoted sections may be dropped for the discharge of the contents of the cage.

Rising from the body 30 is a bracket 35 and supported at its lower end by said body and bracket is a perforated steam supply pipe 36 which extends centrally within and to the top of the cage and is provided at its upper end with a frusto-conical packing head 37 threaded or otherwise adjustably mounted thereon and adapted to be held in adjusted position by a nut 38. This packing head is adapted to engage a gasket 39 mounted upon the bottom of the cover 3, said gasket being secured to a reinforcing plate 40 fixed to the cover by means of a ring-shaped retaining member 41 having a flange 42 projecting beneath and confining the gasket. The surface of this flange is beveled to form a conical opening to receive the conical packing head and to enable the head to seat steam-tight against the gasket. The pipe 30 projects through the head and through the construction described communicates with the delivery end of a steam supply pipe 43 fixed to the cover 3 and extending through the plate 40 and gasket, said pipe being provided with a controlling valve 44 for controlling the flow of steam to the pipe 36 from a suitable source of supply. This construction provides a means whereby the pipes 36 and 43 are brought into registering position when the cover 3 is applied, while enabling the cover to be opened without interference from the pipe 36.

The pipe 36 is provided for distributing steam uniformly through the mass of chips or comminuted wood contained within the

cage, whereby the volatile constituents of the wood are driven off and the rosin extracted, such constituents passing with the steam into the space 24 and thence to the condenser through the pipe 25. In order to enable a solvent to be employed in connection with the steam for the purpose of extraction, a coiled spray pipe 45 is arranged beneath the cover 3 to distribute the solvent uniformly to the charge of wood, and this coil connects with a conducting pipe 46 suitably mounted upon the cover and extending therethrough and provided with a valve 47 for controlling the flow of the solvent to the coil from a suitable source of supply.

The rosin extracted from the wood and passing through the perforated bottom of the cage flows through a fine screen or grating 48 supported by a flange or lugs 49 secured to the body 1 immediately above a partition plate or false bottom 50 arranged between said screen and the bottom 2. This supplemental or false bottom 50 is dished like the bottom 2 and arranged in spaced relation thereto to provide a heating chamber 51 and a collection space or chamber 52. Extending through the side of the body 1 into the chamber 52 between the elements 48 and 50 is a perforated steam supply pipe 53 provided on the exterior with a controlling valve 54, through which pipe steam may be supplied to the chamber 52 to keep the extracted rosin heated for a free discharge and prevent it from hardening on the bottom 50. The dished form of the bottom 50 provides a sloping surface leading to an annular gutter or channel 54 into which the rosin flows, and from which it may be withdrawn through one or more drain pipes 55 having a controlling valve 56. A steam supply pipe 57 provided with a controlling valve 58 communicates with one side of the heating chamber 51 for the supply of steam thereto, and a discharge pipe 59 provided with a controlling valve 50 is provided at the diametrically opposite side of said chamber for the exhaust of steam and discharge of the water of condensation. The dished form of the bottom 2 also provides a sloping surface leading to a depressed gutter or channel 61 whereby the drainage off of the water of condensation is facilitated. Arranged in the pipe 57 between the valve 58 and the body 1 is a gage 62, whereby the pressure of the steam contained within the chamber 51 may be determined at any time. Gages 63 and 64 are provided near the top and at the bottom of the body 1 to respectively indicate the normal maximum level of the liquid solvent in the extractor and its minimum level when it has been evaporated and exhausted by the action of the steam. The body 1 may also be provided with a thermometer or tempera-

ture gage 65, whereby its internal temperature may be readily ascertained at any time in the extraction operation.

In operation, the cage containing a charge of suitably divided or comminuted wood is placed within the extractor 1 and the cover closed to hermetically seal the extractor. The valve 44 in the steam supply pipe is then opened for the flow of steam through the perforated pipe 36 and its distribution throughout the mass of the material, whereby the volatile constituents and resin are freed, the volatile constituents passing with the steam through the pipe 25 to the condenser, while the rosin gravitates downward into the chamber 52. The valve 54 in the pipe 53 may be opened when necessary or desirable to augment the heat at the bottom of the extractor to keep the rosin in a liquefied condition and facilitate its discharge through the pipe 55, as well as to prevent it from becoming deposited in a hardened condition on the upper head 50. If desired, steam may also be admitted into the chamber 51 to augment the temperature to a still higher degree and maintain an even temperature throughout the extractor, by which all of the volatile constituents, resin, etc., contained in the wood will be driven off and obtained in a rapid and economical manner. If it is desired to employ a solvent in the process of extraction, the valve 47 is opened to permit a suitable solvent to spray into the top of the cage through the coil 45, so that the solvent will percolate through the mass of the material and will be vaporized with the volatile constituents of the wood and discharge with the same through the pipe 25. In the use of such an agent, the introduction of steam into the chambers 51 and 52 prevents the solvent from remaining in liquid condition at the bottom of the extractor and effects its convergence into vapor, so that the turpentine and other volatile constituents will be discharged for recovery in highly pure condition. After the charge contained within the cage has been subjected to the process of treatment, the valves are closed to cut off the flow of steam or solvent to the extractor, the cover 3 swung open and the cage with its contents removed, so that upon retracting the latches 34 the refuse may be discharged and the cage placed in condition for subsequent use.

The material advantage of the construction of extractor disclosed resides in the fact that the material is subjected to an even degree of heat throughout and the resin prevented from clinging in the bottom of the extractor, whereby pure volatile products are obtained and the parts of the extractor maintained in such condition that they may be readily and conveniently cleansed whenever necessary.

By mounting the cover 3 in the described manner, it may be easily and conveniently handled and the operation carried out without requiring the service of more than a single attendant, with resultant economy.

Having thus described the invention, what I claim as new is:—

1. An extractor of the character described comprising a vertically disposed outer vessel having an extraction chamber, a vapor outlet at its top, a bottom heating chamber, and a bottom rosin collection space between the extraction chamber and heating chamber and in communication with the former and out of communication with the latter, means for heating said heating chamber, a receptacle for the material being treated disposed longitudinally within the extraction chamber, said receptacle having a perforate bottom and sides and spaced from the outer vessel for the escape of vapors into the intervening space, a pipe or tube extending vertically and axially through the receptacle, said pipe being perforate throughout its length for the injection of an extracting agent throughout the mass of material contained therein, and means for supplying the extracting agent to said perforate pipe or tube.

2. An extractor of the character described comprising an extracting vessel, a cover for closing the upper end thereof, said cover having an opening therein, a steam supply pipe fitting within said opening, a retaining ring arranged upon the under side of the cover and provided with a conical socket, a sealing gasket secured to the cover by said retaining ring and exposed within said socket, a removable perforated cage arranged within the vessel and in spaced relation thereto, a perforated steam injection pipe secured at its lower end to the bottom of the cage and extending upwardly to the top of the cage, the upper end of said injection pipe being adapted to enter said socket in the retaining ring and register with the steam supply pipe when the cover is closed, and a conical enlargement upon said steam injection pipe adapted for sealing contact with said gasket and to enter said conical socket.

3. An extractor of the character described comprising an extracting vessel open at its top and provided at its bottom with a pair of superposed heads forming a steam chamber and a collection space above the same, a perforated cage supported within the vessel and in spaced relation thereto and terminating above said collection space, steam supply and exhaust pipes communicating with said steam chamber, a steam injection coil arranged within the collection space and between the same and the lower end of the perforated cage, means for closing the upper ends of the vessel and perforated cage, a

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perforated steam injection pipe supported at its lower end by the cage and extending upwardly thereinto, and a steam supply pipe carried by the cover and adapted to register
5 with the perforated steam injection pipe when the cover is closed.

4. An extractor of the character described comprising an extracting vessel open at its upper end and provided at its lower end
10 with a pair of spaced superposed concavo-convex heads, forming a bottom steam chamber closed against communication with the vessel and a collection space above said chamber and in communication with the vessel,
15 steam supply and exhaust pipes communicating with the steam chamber, a valved outlet for the rosin communicating with the collection space, an outlet for the vapors at the upper portion of the vessel, a
20 perforated cage support within and in spaced relation to the vessel and terminating above said collection space, a cover for closing the top of the vessel, a perforated steam injection pipe supported at its lower end by
25 the cage, and a steam supply pipe extending through the cover and adapted for connection with the perforated injection pipe when the cover is closed.

5. An extractor of the character described
30 comprising a vessel open at its top and provided at its bottom with a pair of spaced superposed heads forming a lower steam chamber out of communication with the vessel and an upper collection chamber
35 in communication with the vessel, steam supply and exhaust pipes communicating with the steam chamber, an outlet for the rosin communicating with the collection space, a perforated cage supported within and in
40 spaced relation to the vessel and terminating above the collection space, a perforated

steam coil disposed within the collection space, a cover for closing the top of the vessel, a perforated steam injection pipe supported at its lower end by the cage and extending upwardly thereinto, and a steam supply pipe supported by the cover and adapted for connection with the perforated steam injection pipe when the cover is closed.

6. An extractor of the character described comprising an extracting vessel open at its upper end and provided at its lower end with a pair of spaced superposed heads, forming a bottom steam chamber closed against communication with the vessel and a collection space above said chamber and in communication with the vessel, the steam supply and exhaust pipes communicating with the steam chamber, a valved outlet for the rosin communicating with the collection space, an outlet for the vapors at the upper portion of the vessel, a cover for closing the top of the vessel, a perforated cage removably supported within and in spaced relation to the vessel
65 and terminating above said collection space, a perforated steam injection pipe arranged within the cage, a steam supply pipe carried by the cover and adapted for communication with said injection pipe when the cover
70 is closed, a perforated steam coil disposed within the collection space, a perforated plate or diaphragm disposed between said coil and the lower end of the cage, and a perforated coil carried by the cover and projecting into the top of the cage.
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In testimony whereof I affix my signature
in presence of two witnesses.

JOHN H. CASTONA.

Witnesses:

WILLIAM E. THOMAS,
FRANK LINDNER.