(No Model.)

2 Sheets—Sheet 1.

W. T. FORBES.

APPARATUS FOR TREATING FIBROUS PLANTS, &c.

No. 510,168. Patented Dec. 5, 1893.

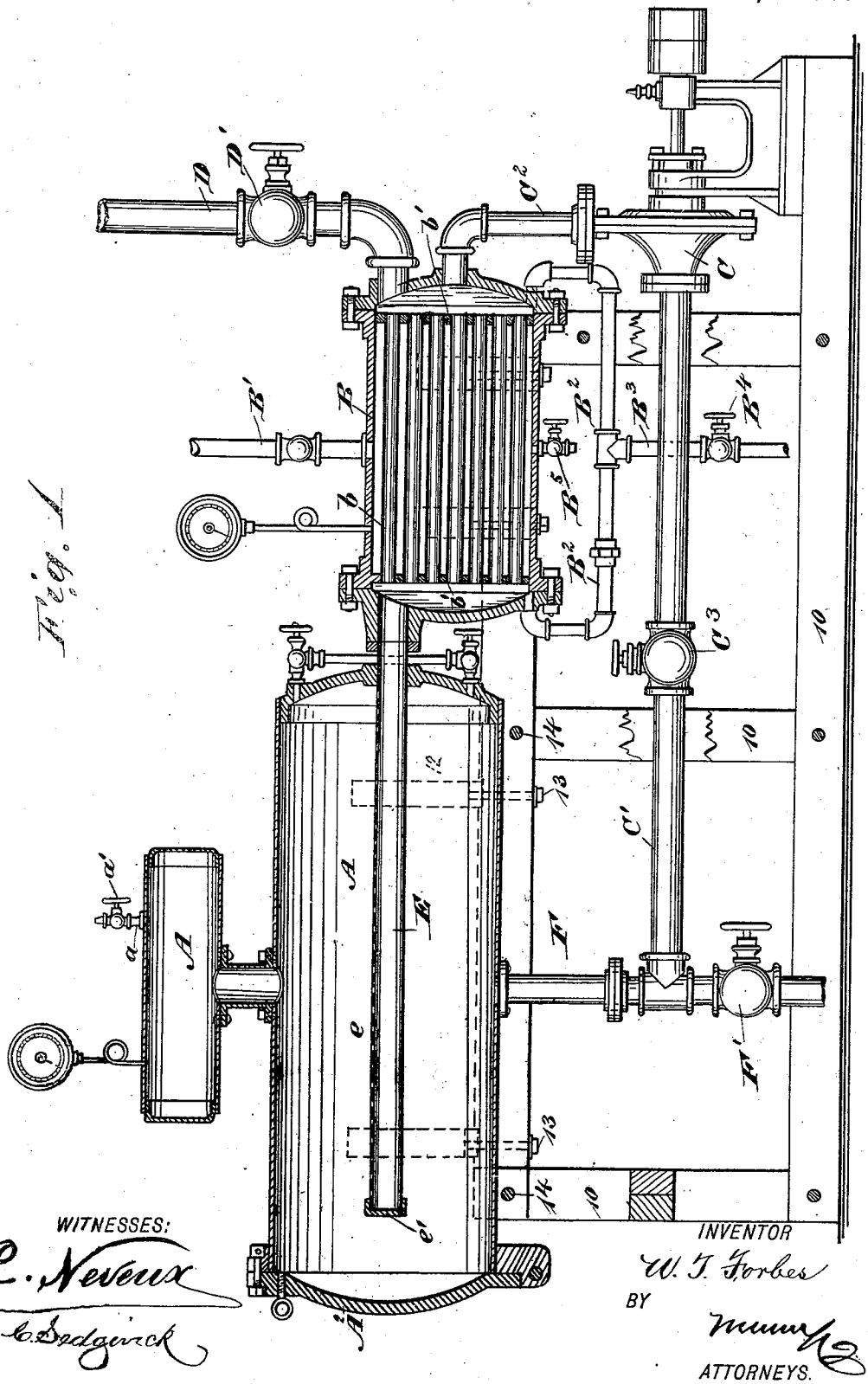

Fig. 1.

WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

W. T. FORBES.

APPARATUS FOR TREATING FIBROUS PLANTS, &c.

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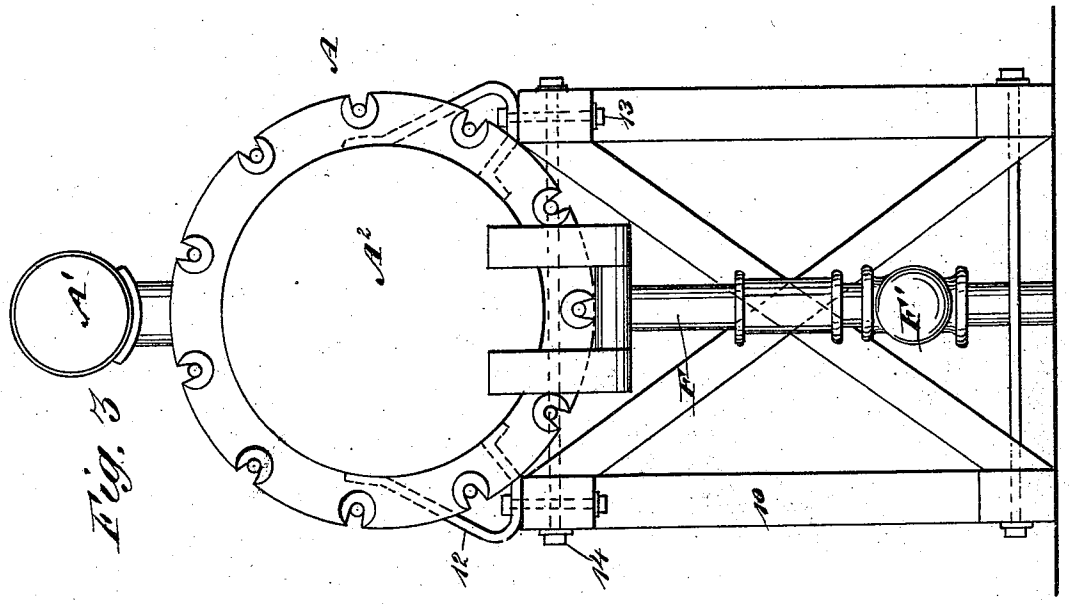

Fig. 1.

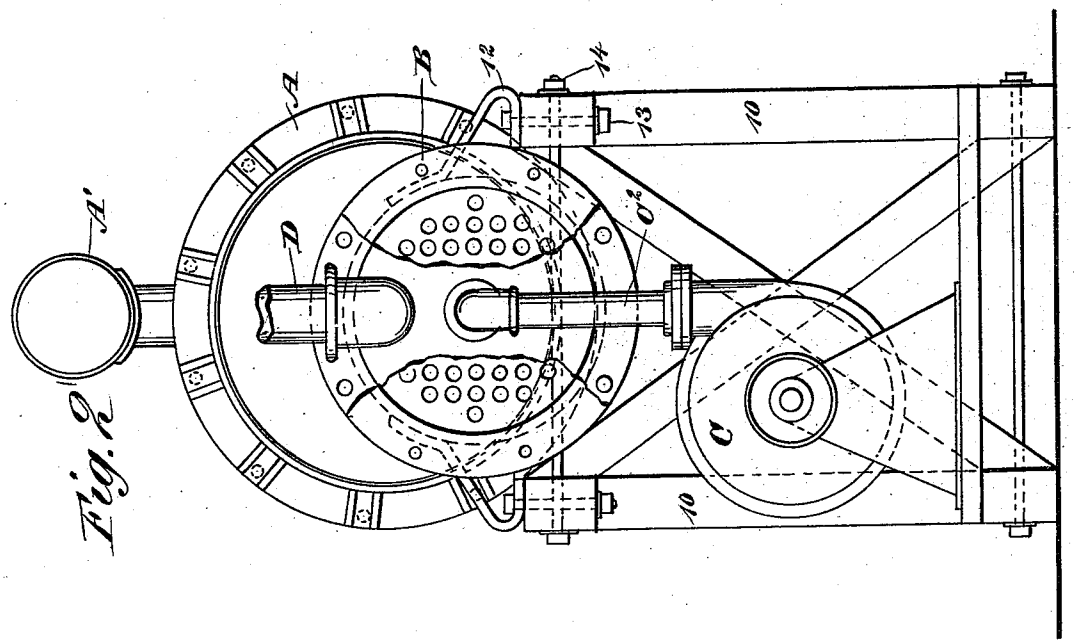

Fig. 2.

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UNITED STATES PATENT OFFICE.

WALTER T. FORBES, OF ATLANTA, GEORGIA.

APPARATUS FOR TREATING FIBROUS PLANTS, &c.

SPECIFICATION forming part of Letters Patent No. 510,168, dated December 5, 1893.

Application filed June 14, 1892. Serial No. 436,648. (No model.)

To all whom it may concern:

Be it known that I, WALTER T. FORBES, of Atlanta, in the county of Fulton and State of Georgia, have invented a new and Improved Apparatus for Treating Fibrous Plants and for other Purposes, of which the following is a full, clear, and exact description.

The invention relates to apparatus for carrying out the continuous process of subjecting fibrous plants or oil producing materials to the action of proper liquids for obtaining the fibers, extracting the oils, or the like.

The object of the invention is to increase the efficiency of apparatus of this character and to promote economy in its construction and operation.

The invention consists in the novel combination and arrangement of parts, as hereinafter particularly described and defined in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and numerals of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of an apparatus constructed in accordance with my invention, parts being in vertical section. Fig. 2 is a rear end elevation parts being broken away; and Fig. 3 is a front elevation.

In constructing an apparatus in accordance with my invention, a suitable single connected frame 10 serves to support the digester A, the heater B, and the pump C, together with the necessary connections, inlets, and outlets, the digester and heater being supported from the frame by brackets 12, bolted to the frame by bolts 13, and suitable transverse bolts 14 being employed for strengthening the frame. It will be seen that by thus supporting the complete apparatus in a single frame, the apparatus is self-contained and in compact form.

A supply pipe D having a valve D′ enters one end of the heater B near the top. The heater may be of any approved construction, that shown being of the water tube form, in which the tubes *b* are supported in sheets *b′*, so that the liquid in the boiler D passes through the tubes to the opposite ends. Steam is supplied to the heater through the pipe B′ and circulates around the tubes *b*, exhausting through the pipe B^5. At the end opposite the inlet pipe D, near the top, which is the hottest part of the heater, a pipe E is connected and enters the digester A about the center, ranging in the latter nearly the full length of the same, the said pipe being formed, at its top surface only, with a longitudinal series of perforations *e*, the extreme end being capped as at *e′*. Connected with the bottom of the digester A is a drain pipe F to which is connected the suction pipe C′ of the pump C, the outlet nozzle of the said pump connecting by a pipe C^2 with one end of the heater B, as is best shown in Fig. 1, thus bringing the digester, pump and heater into circuit.

In the drain pipe F, beyond its connection with the suction pipe C′ is a valve F′ and in the said suction pipe is a valve C^3, whereby, by closing the valve F′ and opening the valve C^3 the suction pipe is brought into connection with the digester. Pipes B^2 connect at the bottom with the ends of the heater B, and connect with a drain pipe B^3 having a suitable valve B^4, said pipe serving to drain the heater.

A steam drum A′ is supported on the top of the digester A, communicates with the latter, and is provided with an outlet pipe *a*, having an air cock *a′*, the purpose of said drum being to store the steam arising from the liquid in the digester and thereby serve to maintain a proper moisture at the top of the digester and prevent the materials therein from becoming damaged by constantly being in contact with dry steam.

In the operation of the apparatus the fibers, fibrous plants or other material is placed in baskets as shown and explained in Patent No. 439,032, granted to me on October 21, 1890, entrance being had to the digester through the door A^2. When thus charged with the material, the valve F′ being closed and the valves C^3 and D′ open, the liquid is supplied through the pipe D to substantially fill the apparatus whereupon the valve D′ is closed and the pump started, to maintain continuous circulation of the liquid which is forced from the pump through the heater B into the perforated pipe E in the digester, escaping at the top only from the latter, so that the said liquid is forced in an upward and outward direction on its way to the drain pipe F thereby effectively diffusing it through the material contained in the baskets in the digester.

When the material has been sufficiently treated by the circulating liquid, the pump is stopped and the apparatus drained by opening the valves F′, B^4, through which the solution and dissolved gum are discharged.

By the arrangement of parts specified, the apparatus may be immediately arranged to act as a washing apparatus by closing the valves C^3, B^4, as now water may be supplied through the pipe D and its valve D′, the previous liquids having been drained out through the pipe F and the pipe B^3, and the said water will flow through the heater and through the material in the digester, and out through the pipe F′, after which the material may be removed from the digester, a fresh charge supplied, and the apparatus again readily adjusted for circulating the solution employed.

The apparatus is also especially adapted for extracting oils from cotton seed, linseed, &c. In this case a solvent, naphtha for instance, is supplied through the pipe D, and circulated in the same manner as described in reference to the treatment of fibrous plants, and the oil, &c., is removed through the outlet pipe F. After the oil has been extracted steam is turned on through the pipe D′, which serves to drive off all the naphtha remaining in the residuum, the vapors passing through the pipe *a* in the drum A′, through suitable connections to a condensing apparatus, not shown.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In apparatus for treating fibrous plants and the like, a horizontally disposed digester having a drain pipe at the bottom, and having an inlet pipe ranging longitudinally therein and perforated along its upper side only, in combination with a circulating pump having its suction pipe connected with the drain pipe of the digester and its discharge pipe in communication with the longitudinally ranging inlet pipe thereof, substantially as described.

WALTER T. FORBES.

Witnesses:
E. F. BOJANUS,
J. V. PARKER.