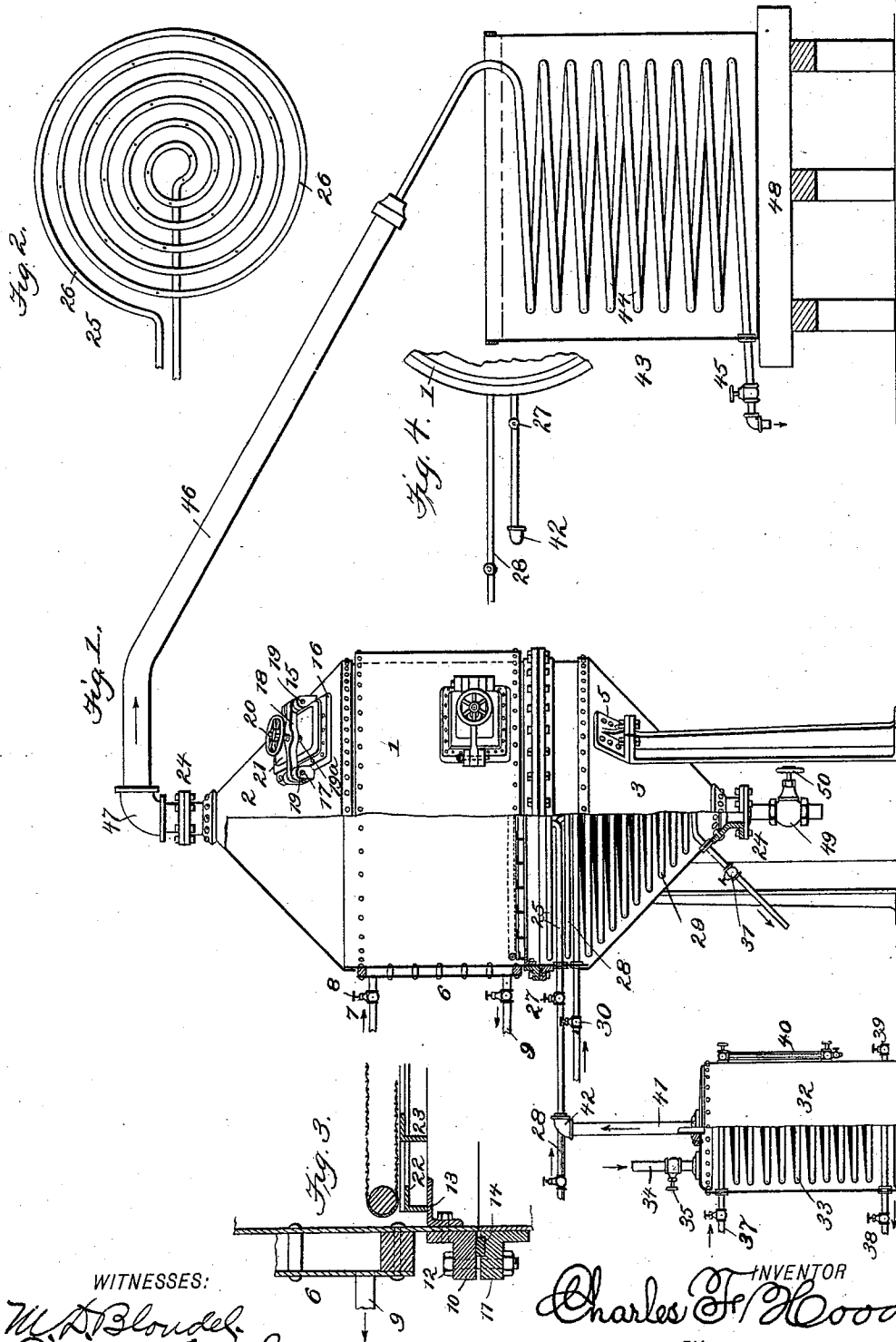


(No Model.)

C. F. HOOD.
EXTRACTING APPARATUS.

No. 530,893.

Patented Dec. 11, 1894.



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EXTRACTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 530,893, dated December 11, 1894.

Application filed September 18, 1894. Serial No. 523,366. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. HOOD, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Extracting 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.

My invention relates to means for extracting volatile and oleaginous substances, or such as are readily converted into vapor by application of heat through operation of an apparatus consisting of certain novel and useful mechanism and combinations thereof, as hereinafter fully described and illustrated in the drawings.

My invention principally relates to treatment of cast off cotton and wool, also to extraction of fatty substances from leather refuse from factories and tanneries, but its operation and practice is not limited thereto, as its object and purpose is to obtain from any suitable substance or material, certain extracts by placing such material in a closed tank and vaporizing the same by subjecting it to the action of vapor steam and air, maintained at a suitable temperature, and condensation of said extracts by means of steam, the aerated vapor being discharged into the mass of material under treatment, by means of perforated coils in the tank chamber of the extractor.

Referring to the accompanying drawings, forming a part of this specification, wherein like figures of reference point out similar parts on each view, Figure 1. is a diagrammatic view of the entire apparatus, certain parts being broken away, to show interior construction. Fig. 2. is a top plan view of one of the perforated coils. Fig. 3. is a vertical section through the lower part of one side of the extractor showing structure of the jacket that surrounds the same, and arrangement of inner supports for substance under treatment. Fig. 4. is a detail view of a portion of the air and vapor pipes showing connections thereof with casing of the extractor.

In the drawings, 1, is the extractor, the main body of which is cylindrical, at or near the upper edge of which is riveted or bolted the conical top, 2. At or near the lower end of extractor, 1, is secured, by bolts or rivets, in a well known manner, the inverted cone shaped bottom, 3. The upper and lower oppositely inclined inclosures are shown as conical, but may be dome shaped, without departing from the scope and purview of my invention.

The cylindrical chamber of the extractor, 1, is mounted on supports of suitable conformation, illustrated in the drawings as vertical uprights, bolted to flanged brackets, 5, riveted to lower portion, 3, of the extractor. A steam jacket, 6, of usual construction, surrounds the main body. Near the top of the jacket, 6, is a pipe or tube, 7 provided with a stop cock, 8, for admission of live steam to the inside of the jacket. A similar pipe, 9, is arranged near the lower end of the jacket to be used as a drip, or for drawing off the exhaust. Below the jacket two annular flanged bands, 10, 11, surround the cylindrical body, which are secured together by bolts, 12, passed vertically through apertures in said flanges outside of the cylinder. The upper band, 10, has a sectional or continuous bracket, 13, connected to it, and to the body of the cylinder on the inside, for a purpose presently pointed out. The lower band, 11, has an annular recess, 14, in the top thereof, into which is inserted a lead gasket to form secure packing for the joint.

At the upper section 2, of the extractor is arranged a charging door, 15. This door comprises a rectangular frame, 16, having at two sides thereof upwardly projecting bifurcated lugs, 17, between which is pivoted an arm or latch bar, 18, by means of pins or toggles, 19, passed through said lugs. The bar, 18, is tapped vertically near its center, to receive screw bar, 19^a, on the outer end of which is a hand wheel, 20, for operating the same. A covering plate, 21, a little larger than the opening through the frame, 16, is provided and the inner end of the screw bar, 19^a, may be secured to the covering plate, 21, or may simply rest upon it, as it is evident that a perfect closure can be maintained by rotation of the hand-wheel, 20. The under side of the cov-

ering plate and the top of the frame are provided with suitable packing or gaskets to prevent leakage or escape of air or vapor.

I have shown the closing plate as rectangular, but it may be circular or of any suitable form. A similar door, the parts of which are the same as that just described, and are identified by same reference numerals, is arranged near the bottom of the cylindrical chamber of the extractor for removing the stock therefrom after it has been treated, or for withdrawal thereof, in whole or in part, at any stage of the process.

Just below the lower edge of the door, last above described, and resting on the brackets, 13, on the inside of the cylinder, is a tray or frame consisting of radial angle arms, 22, which is the preferred form but no special form of tray is essential. Supported on this tray is an annular frame, 23. This frame is covered on the top or bottom, or on both top and bottom, with wire netting or other foraminous material, and upon this netting the stock or substance to be treated, in accordance with my invention, is deposited through the charging door, 15. Connections or couplings, 24, are provided at both the top and bottom, or conical ends of the tank, of the extractor and connect with suitable pipes, as hereinafter explained.

Within the lower portion of the extractor are arranged three coils of pipes, the upper one for vapor, the next for air, and the lower one for steam.

25, is the vapor coil, consisting of a single convolute pipe arranged horizontally within the extractor nearly coincident with the lower external band, 11. The pipe or tubing of which it is composed is pierced or perforated on top at intervals as seen at 26, Fig. 2, for the emission of vapor led therein from a vaporizing tank. The end of this coil passes through the wall of the extractor, suitably packed, and on the outer extension is a stop cock, 27.

The air coil, 28, is of the same construction as the vapor coil and is arranged horizontally underneath it. It also extends through the wall of the extractor and has a stop cock exterior thereto and from thence is prolonged to any proper source of supply.

The steam coil, 29, differs from the vapor and air coils in that it consists of a series of continuous spiral convolutions which diminish in size toward the bottom of the extractor and conform substantially to the shape thereof. It is imperforate and its upper end like the vapor and air coils is passed through the wall of the extractor and has a stop cock, 30, on its outer extension, and is connected with a suitable source of supply. The lower end of the tube forming the steam coil, 29, is extended diagonally through the bottom of the extractor and has a stop cock, 31, for drawing off the water of condensation therefrom.

Arranged at one side of the extractor is a vaporizing tank. It consists preferably of a

vertical cylinder, 32, constructed to be steam tight and containing a spiral coil, 33, for receiving and containing steam. At the top of the tank is an outwardly extending vertical pipe or tube, 34, provided with a stop cock, 35, through which pipe any suitable vaporizing fluid or material is fed into the tank. A lateral pipe, 36, provided with a stop cock, 37, supplies the coil, 33, with live steam. A drain pipe, and stop cock, 38, is arranged at one side of the tank, at its lower end for emptying the same and a second pipe and stop cock, 39, at the opposite side for drawing off water of condensation from coil 33. At one side of the tank is a water glass, 40, to indicate pressure. It comprises the ordinary gage glass and scale with stop cock and other connections commonly used on analogous devices. Projecting upwardly from the top of the tank is a pipe, 41, for conveying vapor from the tank to the vapor coil in the extractor and is connected to the pipe which feeds said coil by coupling, 42.

On the side of the extractor opposite the vaporizing tank, is a condensing receiving tank, 43. It is of usual construction and consists of a vessel open at the top, with adjustable cover if desired, adapted to contain water and having inside a tubular coil, 44. The lower end of this coil extends through the wall of the tank and is provided with a stop cock, 45, for drawing off the extract which has been vaporized and condensed. The end of the coil, 44, is carried beyond the top of the tank, 43, and connected to the vapor conduit which is a bent and inclined tube, 46, attached by coupling, 47, to pipe extending from top of the extractor. The condensing tank, 43, is mounted on any base, or supporting frame, 48.

A tube or pipe, 49, is connected to the bottom of the extractor and is provided with a stop cock, 50, for discharging waste or debris that may accumulate therein, and as will be readily understood can be utilized for cleansing purposes.

In the drawings the vaporizing tank is shown to the left of the extractor and the condensing cylinder to the right thereof, but it is manifest that the apparatus will operate if the relative location of the several members are reversed or arranged at suitable distances apart.

From the foregoing description, in connection with the drawings, the practical operation of my invention will be readily understood by all familiar with the class to which it is allied.

The stock, or material to be treated, is introduced into the extractor through the charging door at its upper end and will fall upon the netting or foraminous tray, and after the requisite quantity has been introduced, the charging door is hermetically closed. Preferably solvents such as benzine or ether are employed for producing vapor, but I do not desire to limit my process and apparatus thereto as there are many other materials,

both solid and fluid, that can be used for generating vapor either separately or in combination, in carrying out the object and purpose of my invention. A fluid or suitable

5 vapor generating material is fed into the vaporizing tank through the vertical supply tube, 34, extending upwardly therefrom, and from thence passes downwardly within the coil, 33, the quantity to be introduced being
10 from time to time regulated by operation of stop cock, 35. Steam is then introduced through the feed pipe, 36, and allowed to flow for any desired period by operation of its stop cock, 37. As vapor is thus generated in the
15 tank, 32, it passes upwardly through the eduction pipe, 41, to the vapor coil, 25, from whence it is discharged or atomized by means of apertures in top of said coil, and through the intervention of heated air, produced by
20 steam admitted in the steam coil, 29, and atmosphere passing outwardly through orifices of the air coil, 28. The aerated vapor circulates through the stock mass deposited on the foraminous tray and the extract
25 charged with material withdrawn, from said stock, is carried to the top of the extractor and from thence passes down through the outlet tube, 46, into the coil, 44, in receiving tank, 43, and the product is drawn off by means of
30 stop cock, 45. The residuum remaining in the extractor is removed through the door at bottom of the main chamber.

I do not limit operation of my invention to a given pressure or continuous flow of steam, or air, into the extractor, nor to any special
35 quantity or character of vapor generated in the tank, 32, as each will depend upon the nature, quality and quantity of material to be treated, and it will be readily understood
40 that the generated vapor can be changed and always governed by the nature of material from which it is to be eliminated, and the supply flow of air, steam and vapor can each be regulated and controlled by partially or
45 completely opening the conduits to the main chamber of the extractor.

The quality of residuum drawn off through the stop cock, 44, depends naturally on the character of the stock treated in the main
50 cylinder, and may be subsequently treated by analysis or any suitable process, to separate ingredients thereof or utilize it in the condition drawn off for any desired purpose.

Having thus fully described my invention and the manner of its operation, what I claim, and desire to secure by Letters Patent of the
55 United States of America, is—

1. In an apparatus of the character described, a cylindrical extractor provided with
60 an interior foraminous supporting tray for material under treatment, vapor, air and steam coils, arranged, one above the other,

under the tray, in combination with an exterior vapor generator, connected to inlets of the extractor, and a condenser connected to 65 outlets therefrom, substantially as described.

2. In an apparatus of the character described, an extractor surrounded with a steam jacket; provided interiorly with a foraminous supporting tray, a vapor coil, beneath the 70 tray, comprised of a single perforated convolute tube, connected to an outer generator; an air tube, of like construction, under the vapor coil connected to an outer supply source, and an imperforate steam coil, connected to 75 an outer generator; each of said coils provided with stop cocks whereby the flow of air, vapor, and steam, may be independently regulated, in combination with a vapor generator, connected to inlet tubes, and a con- 80 denser connected to outlet tubes, of the extractor, as and for the purpose intended, substantially as described.

3. In an apparatus of the character described, an extractor, the body of which is 85 cylindrical, with a conical top to which is connected an outlet tube extending therefrom to a condenser, the extractor having an inverted conical bottom provided with a drain cock, an interior foraminous tray, within the 90 main chamber of the extractor, below which are perforated convolute air and vapor coils having underneath an imperforate spiral steam coil each of said coils connected with external sources of supply, substantially as 95 described.

4. In an apparatus of the character described, an extractor having an upper charging door and lower emptying door, for supply of material to be treated, and withdrawal 100 of residuum thereof, said extractor having inlet air, vapor and steam tubes connected separately to the main chamber of the extractor, each tube provided with a stop-cock to independently regulate flow respectively 105 therethrough, from external sources of supply, into the extractor which is provided near its lower end with a foraminous tray for support of material to be treated, under which are arranged perforated convolute tubes, for 110 discharge of air and vapor, having a lower spiral imperforate steam coil, all in combination with an outer condenser having a tube extending therefrom and coupled to upper end of the extractor, as and for the purpose 115 intended, substantially as described.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

CHARLES F. HOOD.

Witnesses:

SAMUEL H. JACOBSON,
WM. P. YOUNG.