

No. 774,135.

PATENTED NOV. 1, 1904.

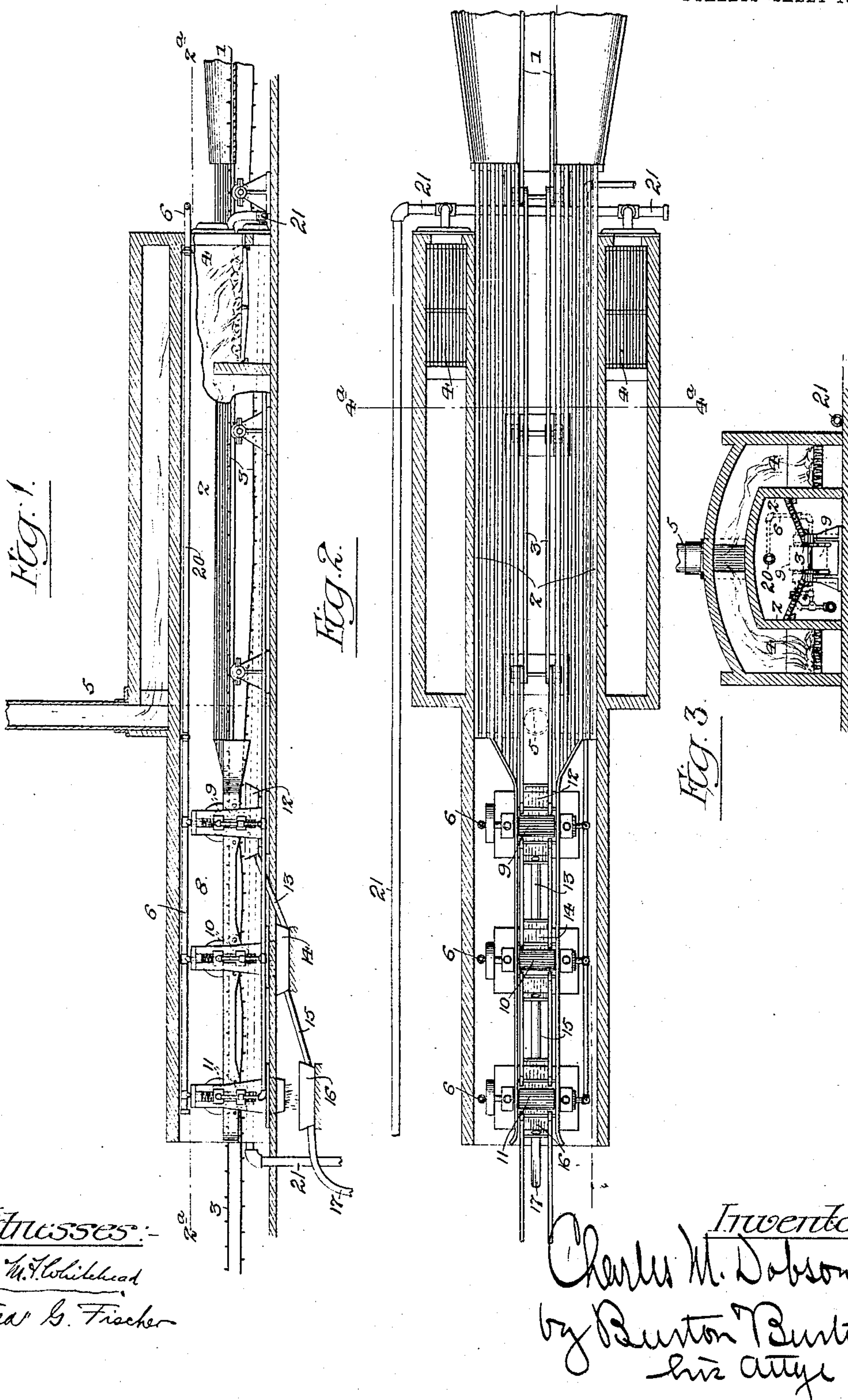
C. M. DOBSON.

PROCESS OF DERIVING PRODUCTS FROM WOOD.

APPLICATION FILED DEC. 23, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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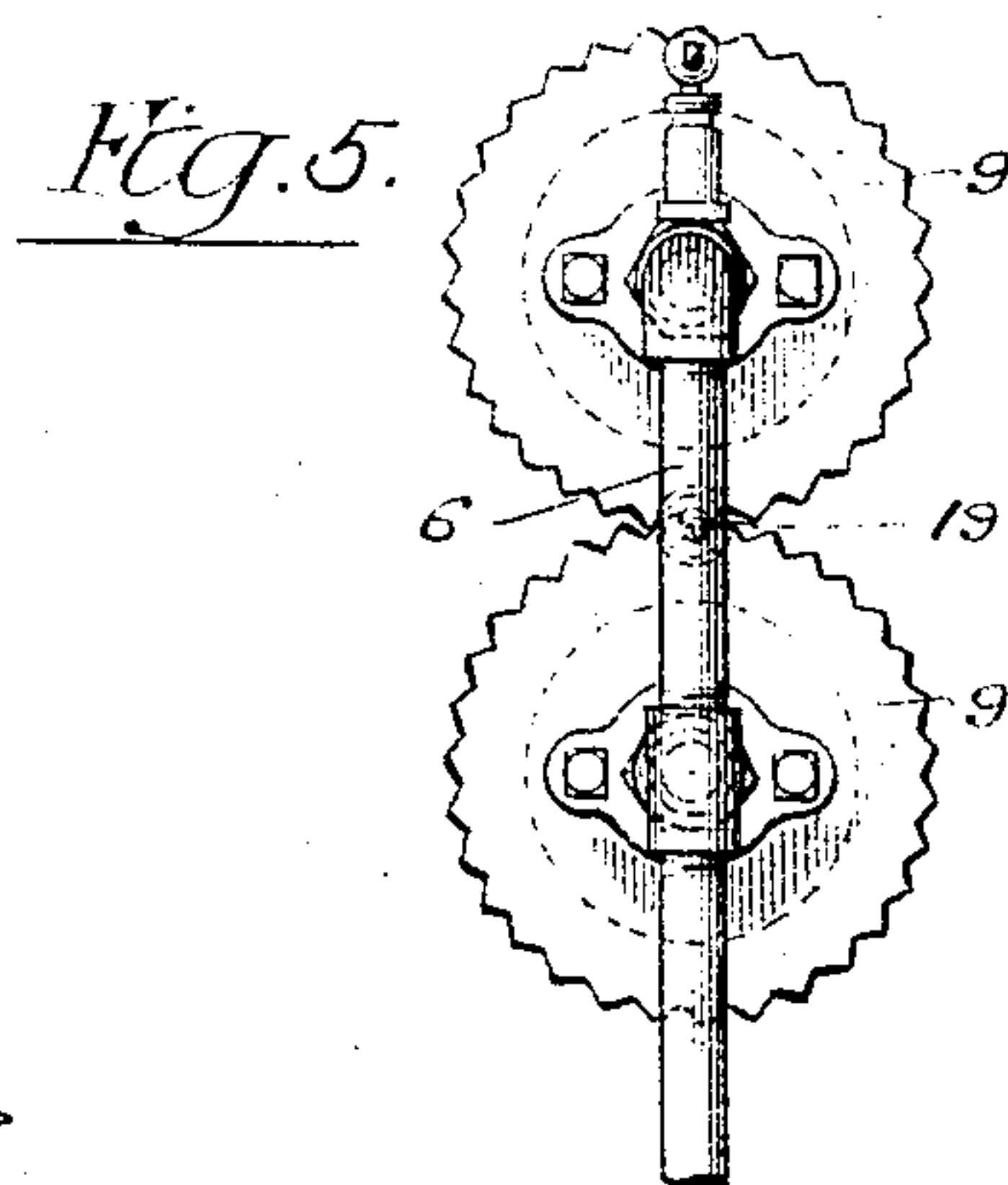
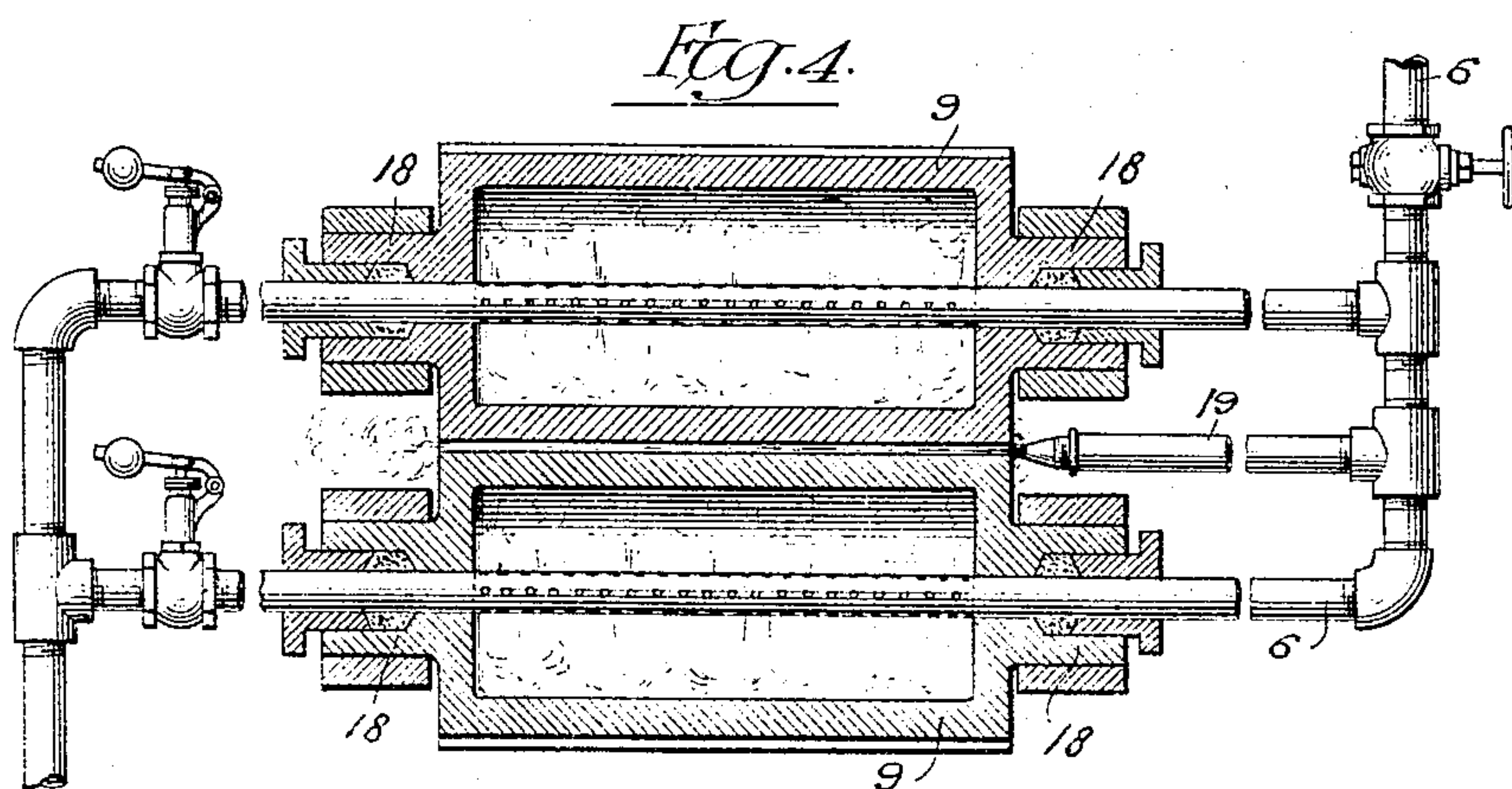
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2 SHEETS—SHEET 2.



Witnesses:-

Louis M. Whitelwood

Fred B. Fischer

Inventor:-

Charles M. Dobson
by Burton + Burton
Pat Attys.

UNITED STATES PATENT OFFICE.

CHARLES M. DOBSON, OF NEW YORK, N. Y., ASSIGNOR TO THE WOOD DISTILLATES & FIBRE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ARIZONA TERRITORY.

PROCESS OF DERIVING PRODUCTS FROM WOOD.

SPECIFICATION forming part of Letters Patent No. 774,135, dated November 1, 1904.

Application filed December 23, 1903. Serial No. 186,395. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES M. DOBSON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Processes of Deriving Products from Wood, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to produce from resinous or "fatty" woods the various products of the nature of oils, distillates, and other commercially useful elements which are contained in their sap or the hardened deposits or residuum of the sap which may be liquefied and extracted in such manner that the fibrous portion of the wood remaining after the extraction of the elements susceptible of being liquefied shall not be charred or otherwise deteriorated, so as to become mingled in dust or carbon deposit with the liquid elements nor deprived of its value as fiber for any of the purposes for which wood is used in the arts, such as paper-making and the like.

It consists in the process hereinafter described, and set out in the claims.

I have illustrated a mechanism for carrying out this process, which is shown in the drawings, in which—

Figure 1 is a longitudinal section of a muffle-furnace and crushing and pressing mill employed in the leading steps of my process. Fig. 2 is a horizontal section at the line *a a* on Fig. 1. Fig. 3 is a transverse section at the line *a a* on Fig. 2. Fig. 4 is a vertical section of one of the macerating-mills axially with respect to the rolls with the gears omitted. Fig. 5 is a detail side elevation, the same showing the gears.

In the drawings there is shown a chain conveyer 1 for carrying slabs of the wood to be treated and delivering the same to a second conveyer 3, which travels through the chamber 2 of a muffle-furnace which comprises two fire-chambers 4 4, from which the flame and smoke passages extend, so as to encompass the chamber 2 upon both sides and top, reaching discharge through the flue 5. This cham-

ber may be also provided with means for introducing steam thereinto, as indicated by a steam-pipe 6, opening into the chamber. Suitable doors (not shown) may be employed to close the chamber except so far as it is necessarily opened for the passage of the conveyer and material carried thereby. The chamber 2 may be continuous with the mill-chamber 8, which is shown thus as a continuous structure and in which there are located three sets of crushing or pressing rolls 9, 10, and 11, into which the wood is carried on the conveyer 3 for crushing in the first set of rolls 9, mashing to a greater degree in the second set 10, and pressing to a maximum degree for expressing therefrom the liquid in the final set of rolls 11. The chamber 2 is maintained at a temperature adequate to liquefy the more or less solidified deposits of the sap, comprising gums, oils, &c., so that the crushing to which the wood is subjected in the first set of rolls 9 and the mere dripping which will occur therefrom at this stage in the process will cause a considerable quantity of liquid to be accumulated in the drip-pan 12 underneath said set of rolls. This drip-pan communicates by a duct 13 with a drip-pan 14 under a second set of rolls 10, where the crushed wood is macerated and a still larger proportion of liquid is accumulated and conducted by a pipe 15 to the drip-pan 16 under the rolls 11, where the material, now reduced to a mass of fiber, is squeezed or wrung to press therefrom the greatest possible proportion of the liquid elements of the wood. From the last set of rolls 11 the fibrous mass remaining of the wood is delivered by the conveyer 3 to any convenient point of accumulation, (not illustrated,) and the liquid is conducted from the pan 16 by a pipe 17 for subsequent treatment for separating the elements of different character or value in any manner which may be deemed desirable.

Preferably, in order to maintain the temperature of the wood at the best point for the results desired throughout the entire step of the process, which is performed while it is passing through the crushing and lacerating

rolls, provision is made for heating these rolls and also additionally or specially heating the wood after it is partly crushed and lacerated as it enters between the second and third pairs
 5 of rolls. This insures every particle and fiber of the wood being raised to the proper temperature without any part of it being raised to a temperature so high as to deteriorate the fiber, as might be the result of either making
 10 the temperature of the muffle-furnace so high or extending the time during which the wood is passing through that chamber as would be necessary in order to cause the center of the larger pieces to become as thoroughly heated
 15 as necessary for liquefying the substances to be extracted. The interior parts which may thus fail to reach the necessary temperature in the first chamber will be thoroughly heated both by contact with the hot rolls and by the
 20 discharge upon them as they enter the rolls of hot steam. The construction which is preferred for this purpose consists in mounting both rolls upon hollow trunnions 18, connected at both ends with a system of pipes
 25 for circulating hot water or steam and in which there may be located a pump (not shown) for promoting such circulation at any desired rate of movement. In addition to thus heating the rolls by the steam or hot water passing
 30 through the trunnions a branch pipe 19 may be laid from the system discharging upon the material being treated at the entering side of the rolls, thus both heating and moistening the fiber or crushed wood.

35 The moistening of the wood in the prior step of the process is frequently of advantage, and for that purpose a steam-pipe 20 is shown discharging within the chamber 2, so as to maintain the hot air therein at any desired stage
 40 of moisture, and, if desirable in any instance on account of the peculiar dry condition of the wood, it may be directly moistened by steam or water sprayed upon it as it passes into and through the chamber on the carrier.
 45 This steam-pipe may be a part of the circuit which supplies the rolls for heating them, as described, and the drawings may be so understood.

While I have in the drawings illustrated a
 50 set of pipes 21 communicating with the frame-chambers 4 4 of the muffle-furnace and adapted to conduct combustible gases thereto, if desired, from any approved source, they are only intended to be shown incidentally and
 55 not as involving an essential feature of the present invention.

I claim—

1. The process of reducing wood to its elements, which consists in exposing it to a temperature adequate to liquefy the sap, gums
 60 and fats, for a time less than adequate for charring the fiber; while it is thus heated, crushing it by heated mechanical means for maintaining its heat and further and more directly heating the fragments separated by
 65

crushing, and by the same means expressing the liquid elements from it.

2. The process of reducing wood to its elements, which consists in dissolving the gums and fats and soluble deposits of the sap by exposure to moisture and a temperature adequate for liquefying said elements and less than adequate for charring the fibers; while it is thus heated, crushing it and expressing the liquid elements from it by heated mechanical means for maintaining the temperature and extending the same to the fragments separated by crushing, and separately delivering the crushed fiber and liquid elements.

3. The process of reducing wood to its elements, which consists in dissolving the gums and fats and soluble deposits of the sap by moisture and a temperature adequate for liquefying said elements and less than adequate for charring the fibers; while thus heated, mechanically crushing it; applying to it further heating means while thus crushed; pressing it for expressing therefrom the liquid elements, and finally, separately delivering the expressed liquid and resultant fiber.

4. The process of reducing wood to its elements, which consists in dissolving the gums and fats and soluble deposits of the sap by moisture and a temperature adequate for liquefying said elements and less than adequate for charring the fibers; while thus heated crushing it by heated mechanical means for maintaining its temperature and extending the same to the fragments separated by crushing; further heating the crushed mass and pressing it for expressing the liquid therefrom, and separately delivering the expressed liquid and resultant fiber.

5. The process of reducing wood to its elements, which consists in exposing it to a temperature adequate to liquefy the sap, gums and fats, for a time less than adequate for charring the fibrous portion; while thus heated crushing it and further heating it by the means employed for crushing; next macerating the crushed mass and simultaneously heating it by the macerating means; subsequently pressing the heated and macerated mass for expressing the liquid elements therefrom, and separately delivering the expressed liquid and resultant fiber.

6. The process of reducing wood to its elements, which consists in dissolving the gums and fats and soluble deposits of the sap by moisture and a temperature adequate for liquefying said elements and less than adequate for charring the fibers; while thus heated, crushing it and further heating it by the crushing means; then macerating the crushed and heated mass and further heating it by the macerating means; subsequently pressing the heated and macerated mass for expressing the liquids therefrom and heating it by the pressing means, and separately delivering the expressed liquid and resultant fiber.

7. The process of reducing wood to its elements, which consists in exposing it in a heated chamber to a temperature adequate to liquefy the sap, gums and fats for a time less than
5 adequate for charring the fibrous portion; while it is thus heated crushing the wood by heated rolls for further heating it and expressing from it the liquid elements, and separately delivering the expressed liquids and resultant
10 fibrous portion.

8. The process of reducing wood to its elements, which consists in exposing it in a heated chamber to a temperature adequate to liquefy the sap, gums and fats for a time less than
15 adequate for charring the fibrous portion;

while in this heated condition expressing the liquid elements by first crushing it in specially and continuously heated rolls, then specially heating it while in the crushed state, and afterward compressing it in specially and continu- 20
ously heated rolls; and separately delivering the expressed liquid and resultant fiber.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 10th day of December, 25
1903.

CHARLES M. DOBSON.

In presence of—

A. F. CLEARY,

CHAS. S. BURTON.