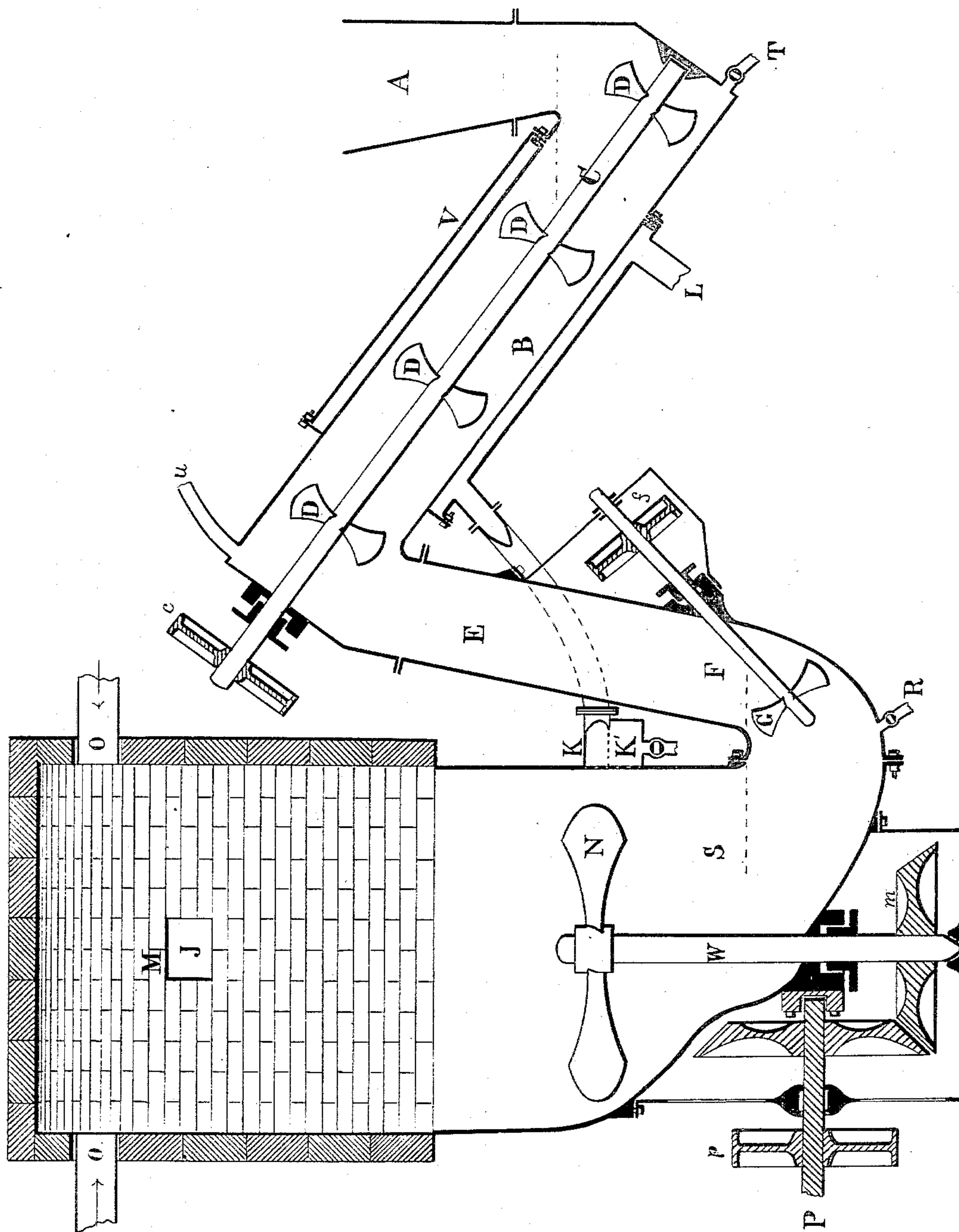


(No Model.)

J. A. MATHIEU.  
DISTILLATION OF WOOD.

No. 300,384.

Patented June 17, 1884.



*Witnesses.*  
Sumner Collins  
Edwin Sweetser

*Inventor.*  
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# UNITED STATES PATENT OFFICE.

JEAN A. MATHIEU, OF DETROIT, MICHIGAN.

## DISTILLATION OF WOOD.

SPECIFICATION forming part of Letters Patent No. 300,384, dated June 17, 1884.

Application filed January 12, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JEAN A. MATHIEU, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Process of and Apparatus for Feeding Retorts and Condensing Vapors of Distillation, of which the following is a specification.

The drawing is a vertical section.

My invention relates to a method of and apparatus for feeding a mass of loose material—such as sawdust, bagasse, and other similar material—into a kiln or retort, for the purpose of carbonizing the same, whereby the vapors resulting from carbonizing the upper portion of the mass of material in the retort are partially condensed by passing such vapors through the uncarbonized portion of said material, substantially as hereinafter shown and described.

M represents a retort such as is shown in a patent granted to me the 8th of October, 1878, No. 208,835, and in an application for Letters Patent filed by me the 23d of December, 1878, the view of said retort being substantially the same as that shown in Figure 1 of said application.

O O represent pipes, through which hot gases from other retorts are forced into retort M, passing down through said retort M, and being led out from said retort through the pipe K.

A represents a hopper opening into the lower end of an inclined shaft or trunk, B.

C represents a shaft set in suitable bearings in trunk B, and having thereon screw-knives D. A pulley, *c*, is attached to the outer end of shaft C, and is driven by a belt from any convenient source of power.

E represents a chute connecting the upper end of trunk B with the lower end, S, of retort M, having in its lower end a shaft, F, having thereon screw-blades G, adapted to force any solid matters in chute E into the lower end of the retort.

*f* represents a pulley by which shaft F may be driven.

W represents a vertical shaft partly within the lower part, S, of retort M, and supported in a stepset below the retort. It passes through

a stuffing-box in the lower part of the retort, and carries at its upper end the screw-blades N. Shaft W may be driven directly, as are shafts C F, or by pulley *p*, counter-shaft P, and bevel-gear *m*, as shown in the drawings. 55

K represents a pipe opening into the lower part, S, of retort M, having its inner end covered with a grating to allow the entrance of gas, but prevent the entrance of solid bodies. Pipe K leads into the upper part of a jacket, V, surrounding trunk B for a portion of its length, and from the lower part of said jacket V a pipe, L, leads to a condenser. 60

K' represents a tight box attached to pipe K, and communicating therewith, as shown in the drawings, and serves to collect any liquid that may enter pipe K. A faucet is attached to box K' to draw off the contents thereof. 65

U represents a pipe leading from the top of trunk B to a condenser. 70

R and T represent faucets by which the liquid contents of chute E and trunk B may be drawn off.

J represents one of two apertures through which the contents of retort M are removed. 75

The operation of my invention is as follows: The lower ends of hopper A and chute E are first filled with liquid up to the dotted lines, to form water-seals. Shafts C, F, and W are set in motion, and the sawdust, bagasse, or other article to be carbonized is then thrown into hopper A. Screw-blades D on shaft C convey the sawdust up trunk B, and deliver it into chute E, whence it is forced by screw G into the lower part of retort M. Screw N now forces the sawdust up into retort M, and this manner of conveying the sawdust necessarily subjects it to considerable pressure, and tends to compact it in blocks. Hot gas is forced through pipes O into retort M, as shown in my previous patents, passes down through the sawdust in retort M, thereby carbonizing the same, and passes out of the retort through pipe K, the water-seal at the bottom of chute E preventing its entrance into said chute. The gas which passes through pipe K is led into jacket V, and heats trunk B and its contents. From thence it passes through pipe L to a condenser. When the material operated upon contains elements which distill at a com- 100



paratively low temperature, these elements are vaporized in trunk B, and pass off through pipe U to a condenser. By removing the cover used to close aperture J the charcoal can be  
5 from time to time removed from retort M. When the hot gas coming through pipes O meets the material to be carbonized in retort M, it carbonizes the upper portion of said material, and this in turn gives off gas which contains  
10 pyroligneous acid and wood-tar. As this gas passes downward through the material in retort M, it gives off a portion of its heat to said material, and the result is a partial condensation of the pyroligneous acid and wood-tar  
15 contained in said gas, which falls to the bottom of the retort and fills the same until the acid can be drawn off through box K', and the wood-tar can be drawn off through faucet R. As the upper portion of the material in retort M is  
20 removed through apertures J as fast as the same is carbonized, and fresh material is constantly supplied by screw N, the operation of carbonization and partial condensation of the resulting vapors is continuous.

25 What I claim as my invention, and desire to secure by Letters Patent, is—

1. The herein-described method of partially condensing the vapors resulting from carbonizing the upper portion of a mass of material

contained in a retort, consisting in passing 30 such vapors through the uncarbonized portion of the material in said retort.

2. The combination of the screw N with the retort M, chute E, trunk B, and auxiliary screws D G, substantially as shown and described. 35

3. The combination of the jacket V and trunk B with the exit-pipe of the retort, whereby a preliminary distillation of the material is effected by the hot vapors issuing from 40 the retort.

4. The combination of the jacketed trunk B, hopper A, chute E, and screw D, substantially as shown and described.

5. The combination of a retort having a pipe 45 at or near its top for entry of hot vapor with mechanism for introducing the substance to be distilled at the bottom of the retort, and forcing the same upward as fast as the distilled solid material is removed from the retort, 50 whereby distillation is effected from above upon a mass of material raised up within the retort to the source of heat.

JEAN A. MATHIEU.

Witnesses:

SUMNER COLLINS,  
EDWIN SWEETSER.