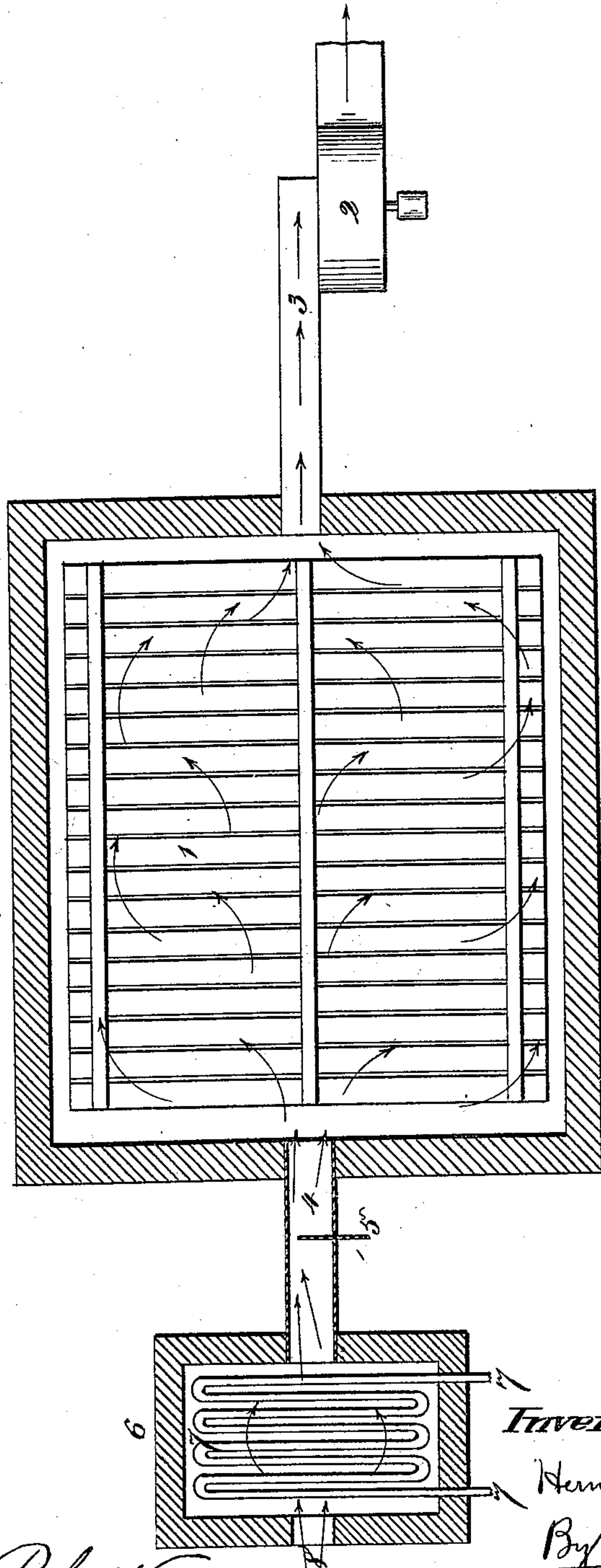


(No Model.)

H. C. ZAPPERT.  
PROCESS OF DRYING.

No. 560,561.

Patented May 19, 1896.



*Attest:*  
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# UNITED STATES PATENT OFFICE.

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## PROCESS OF DRYING.

SPECIFICATION forming part of Letters Patent No. 560,561, dated May 19, 1896.

Application filed October 31, 1891. Serial No. 410,506. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN C. ZAPPERT, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful  
5 Improvement in Processes of Drying, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification.

10 My process consists in subjecting the article to be dried to a constantly-changing supply of air so much below the normal atmospheric pressure as to considerably assist the vaporization of the moisture and favor its escape from the interior of the article, the process being carried out by introducing the article into a chamber having a restricted air-inlet with or without heating apparatus, and a  
15 forced-draft outlet of greater capacity than said inlet.  
20

The drawing is a horizontal longitudinal section of an apparatus that may be properly used in carrying out my process.

1 is an air-tight chamber, in which lumber  
25 or other articles may be loosely piled, so that air will have easy access to said lumber or articles.

2 is an exhaust-fan or other suction device communicating with the interior of the chamber 1 by a pipe or passage 3.  
30

4 is an inlet-pipe to the chamber supplied with a valve 5, by which its size, and consequently the supply of air to chamber 1, may be limited.

35 6 is a chamber containing a steam-coil 7. The induction pipe or passage 3 of the drying-chamber 1 constitutes the eduction pipe or passage of the heating-chamber 6.

40 8 is the induction-opening through which air enters the heating-chamber. The course of the air is indicated by arrows in its passage through the induction-opening 8, heating-chamber 6, passage 3, drying-chamber 1, passage 3, and exhaust-fan 2.

45 The heating device may be dispensed with or may be used, as may be preferred.

The process of drying is as follows: The article to be dried is placed in the chamber 1 and the exhaust-fan put in operation, which  
50 exhausts air from the drying-chamber. Air enters the chamber 1 through the passage 4 to take the place of the air exhausted from

the chamber, and thus an air-current is established that carries off the moisture from the article under treatment. In order to assist the vaporization of the moisture and its escape from the pores of the article, the atmospheric pressure is partly removed. This is accomplished by partly closing the valve 5, so that the demands of the suction-fan are not supplied and a partial vacuum is established in the chamber 1. The degree of attenuation of the air may be increased by lessening the port of valve 5 or by increasing the action of the fan. In the drying of lumber and some other articles it is objectionable to dry the surface with great rapidity while the interior remains moist, because the surface shrinks faster than the interior and becomes checked. The reduction of pressure in the drying-chamber favors the escape of moisture from the interior of the articles and causes the vaporization of the moisture at a lower temperature, so that greater results are obtained at a lower temperature and the articles are not so liable to injury from the extreme heating and drying of the surface, while the interior remains comparatively moist and cold.

In carrying out the process air of normal temperature may first be used and at normal pressure or slightly below the normal pressure and both temperature and vacuum may be increased as the drying progresses and the danger of checking diminishes.

I am aware that for the purpose of drying articles have been subjected to the influence of a partial vacuum in a closed chamber, but there has not been any means for removal of the moist air after the vacuum has been produced. I am also aware that articles have been subjected to a current of air produced by suction or pressure; but in no case that I am aware of has the pressure been reduced sufficiently to materially increase the vaporization of moisture when an air-current was present and the air is constantly changing, so that the moisture is continually carried off. All these conditions assist in effecting not only a complete drying process, but a gradual drying from the interior out, with a complete avoidance of checking.

I therefore claim as my invention and desire to secure by Letters Patent—

1. The process of drying lumber, which con-

sists in subjecting the same to the action of  
a continuous draft of air induced by exhaus-  
tion of the local atmosphere around the lum-  
ber, and simultaneously supplying air in such  
5 continuous minimum quantities as that the  
local atmosphere will be rarefied below the  
normal air-pressure, whereby the moisture  
in the lumber is drawn to the surface, evap-  
orated, and carried off continuously until the  
10 lumber is dried, as set forth.

2. The process of drying lumber, which con-  
sists in subjecting the same in a chamber to

the action of a continuous air-current caused  
by exhaustion, and inducing by said exhaus-  
tion a continuous current of fresh air to flow 15  
into the chamber in such minimum quanti-  
ties as that the atmosphere in the chamber  
will be rarefied below normal air-pressure, as  
and for the purpose set forth.

HERMANN C. ZAPPERT.

Witnesses:

SAML. KNIGHT,  
E. S. KNIGHT.