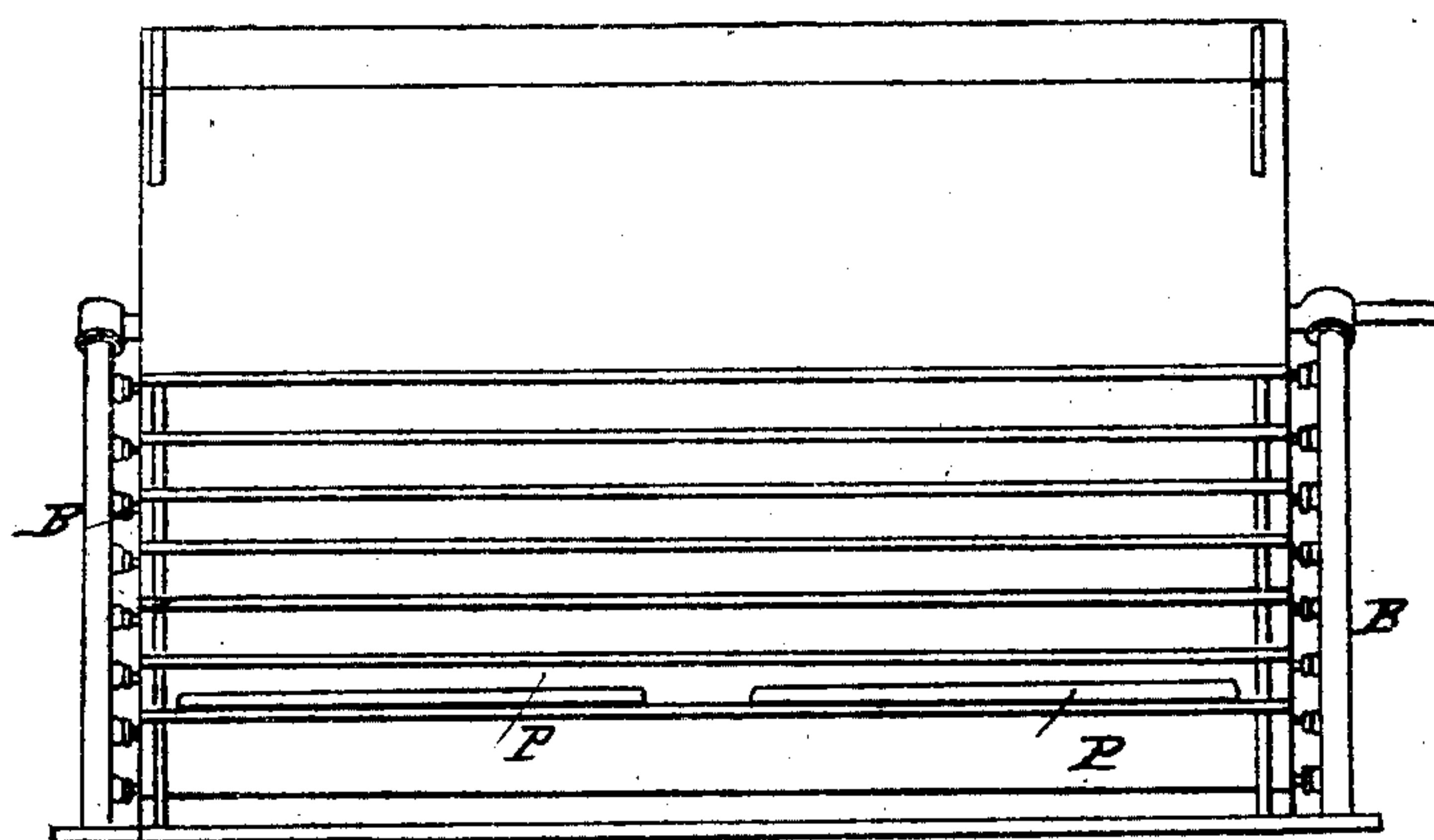
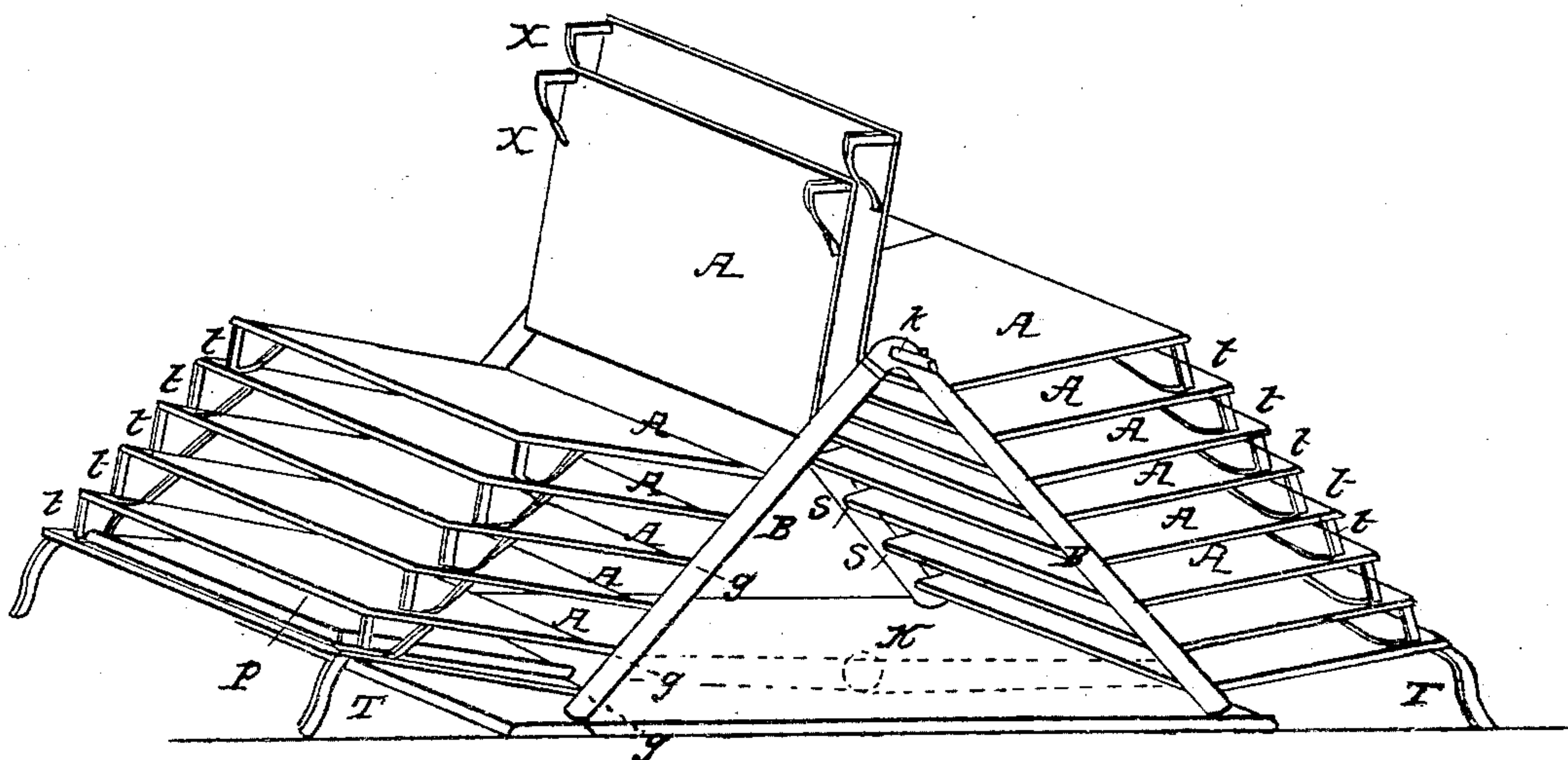


P. CLARK.  
Paper Drier.

No. 17,489.

Patented June 9, 1857.





# UNITED STATES PATENT OFFICE.

PATRICK CLARK, OF RAHWAY, NEW JERSEY.

## MACHINE FOR DRYING PASTEBOARD OR PAPER.

Specification of Letters Patent No. 17,489, dated June 9, 1857.

*To all whom it may concern:*

Be it known that I, PATRICK CLARK, of Rahway, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Drying Pasteboard and Thick Paper and Substances of a Like Nature, which I call "Clark's Thick-Paper Drier," of which the following, together with the accompanying drawings, reference being had to the same in this specification by letters and figures marked thereon, and which form part of this specification, is a full and exact description.

In the drawings referred to Figure 1 is a perspective view of the driers as arranged ready for use, and Fig. 2 is a front sectional view of the same.

The same letters refer to the same parts in both views.

The drawings represent a double apparatus.

The nature of my invention consists in arranging hollow flat steam tight vessels in tiers or stacks with narrow intervals or spaces between them to receive and accommodate the paper or other material to be dried, and also in placing them in such relative position to each other and the steam pipes which supply them with steam that the stack of plates can be opened and closed like the leaves of a book are opened and closed, by means of which opening and closing the sheets of thick paper or other material may be readily spread on each sheet or heating leaf to dry while in a soft and plastic state and be conveniently removed when dry, and also in the application of heat to both sides of the material to be dried at the same time which in drying pasteboard prevents it from splitting and warping.

A A &c., Fig. 1, represent the flat hollow leaves (four on each side) arranged in their proper relative positions and connected with the main steam and exhaust pipes B B. The hollow leaves may be made of any convenient size to suit the work intended to be done, they are made by riveting or otherwise fastening two sheets of iron or other metal together steam tight at their edges and leaving a space between them everywhere else except at their edge of from one quarter to three quarters of an inch, according to their size, the larger the surface of the sheet or leaf the greater the distance between the sheet should be. I find by

experience that for leaves 3 feet by 8 that half an inch is sufficient for a leaf of that dimensions. In two corners of each leaf is inserted steam tight hollow tubes, they are shown at s s s s, Fig. 2. Those tubes communicate with the interior of the hollow leaves one serving for an inlet for the steam and the other for an outlet for the steam and water. The leaves being thus prepared and having stops o o placed on the opposite corners of each to hold them the requisite distance apart are connected with the main pipes by inserting the tubes s s s s in the main pipes in openings or holes prepared to receive them and fitted with stuffing boxes to prevent the escape of steam. The main pipes B B are placed on an incline subtending an angle of about 45 degrees to the perpendicular, by inclining the pipes B B in the manner above described, the outer edge of each of the stack of plates connected with them by means of their hollow journals may describe a quarter of a circle without coming in contact with the one next to it and consequently they may be successively lifted one by one beginning with the top one from the line of the horizontal to that of the perpendicular and thereby enable the operator to lift them one by one and remove the dried material, and when it is removed from the lower leaf or radiator he may spread on other material to be dried successively as he again turns each leaf down again. The position of the leaves when up are shown at X X, Fig. 1, and when down their position is shown at l l l l, &c., in the same figure. The top leaf when up rests against the stay bar R, Fig. 1, and all the rest when raised lean against it. When they are all down the bottom leaf rests on a suitable support shown at T T, Fig. 1, and all the rest are supported by it, suitable supports being interposed between each leaf to keep them the proper distance apart. Those supports are shown at t t t, &c., Fig. 1.

The supports T T are made sufficiently big to give the leaves a slight inclination and descent toward the side where the hollow journals are inserted, so that the water may rapidly drain off and be discharged at the outlet tubes s s s, Fig. 1, as it is generated by the condensation of the steam.

The operation is as follows: Steam is admitted through the pipe K, Figs. 1 and 2, which by means of the main pipes B B fills the hollow leaves and heats them to a



temperature due to the pressure. The leaves are then successively raised one after another until all except the bottom one has attained the position shown at X X, Fig. 1.

5 As much of the material to be dried *e. g.*, (paste board in its pulpy state) as the lower leaf is capable of accommodating is now spread upon it, when this is done the next leaf is turned down and covered with  
10 the material to be dried in like manner and so on until all are filled or spread. When dry the top leaf is lifted and the dry material is removed from the upper surface of the one next below it and so on until it is  
15 all removed, when the heated hollow plates are again in position to be again successively turned down and spread with more material to be dried as before described.

At P P, Figs. 1 and 2, is shown the material to be dried (in this instance a pasteboard) placed in the proper position between two of the heated hollow leaves.

The advantages of this, my invention, for drying pasteboard, thick paper, and other  
25 substances, are as follows:

First, by arranging the hollow leaves in tiers or stacks with spaces between them to accommodate the material to be dried a very large drying surface may occupy but  
30 little space, as the stacks may be 20 leaves high without being unhandy to operate, as the spaces between the plates for ventilation need not be more than  $1\frac{1}{2}$  inches for drying thick paper. Thus 20 plates 3 feet by 8  
35 equals 480 square feet of surface, but they only occupy 24 square feet of floor surface.

Secondly, by arranging them in tiers or stacks heat is applied about equally to both sides of the material to be dried at the same  
40 time. By the application of heat in this manner pasteboard is dried in one-fourth of the time it would take if applied to one side only.

Thirdly, by arranging the heated hollow

leaves in tiers or stacks and at the same 45 time in such a manner that they may be successively opened and closed by means of their being free to turn on their hollow journals, pulpy and soft material may be spread between them with facility and yet 50 the surfaces may approach very close to each other, thereby preventing loss of heat by radiation, and it also prevents the warping of pasteboard and thick paper.

Having described my invention and 55 stated its advantages, I wish to state that I do not wish to confine the application of my invention to the drying of any one particular substance, but to drying generally wherever applicable, nor to the use of 60 heated hollow plates, heated by steam because I contemplate under certain circumstances substituting light frames for the heated hollow plates, but arranged in the same manner as the plates and drying with 65 natural or artificial currents of air.

I am aware that heated hollow tables have been used for drying purposes, the material spread on the top of them to be dried, but I am not aware that one heated 70 hollow table was ever placed above another for such or any other purpose or arranged in the manner I have described. And I am also aware that heated hollow plates have been used for heating purposes, but I am 75 not aware that they have been used in the manner here described.

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

The arrangement of the series of hollow 80 heating plates for drying purposes substantially as therein described and for the purpose set forth.

PATRICK CLARK.

Witnesses:

G. W. SAVAGE,  
S. COOKE.