E. & J. R. CUSHMAN.

Paper Drier.

No. 11,411. Patented Aug. 1, 1854.

Fig. 2.

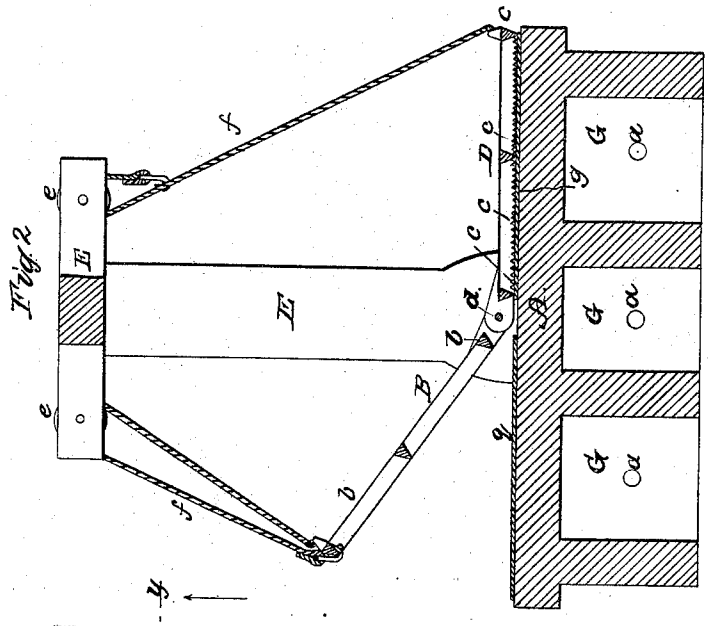


Fig. 1.

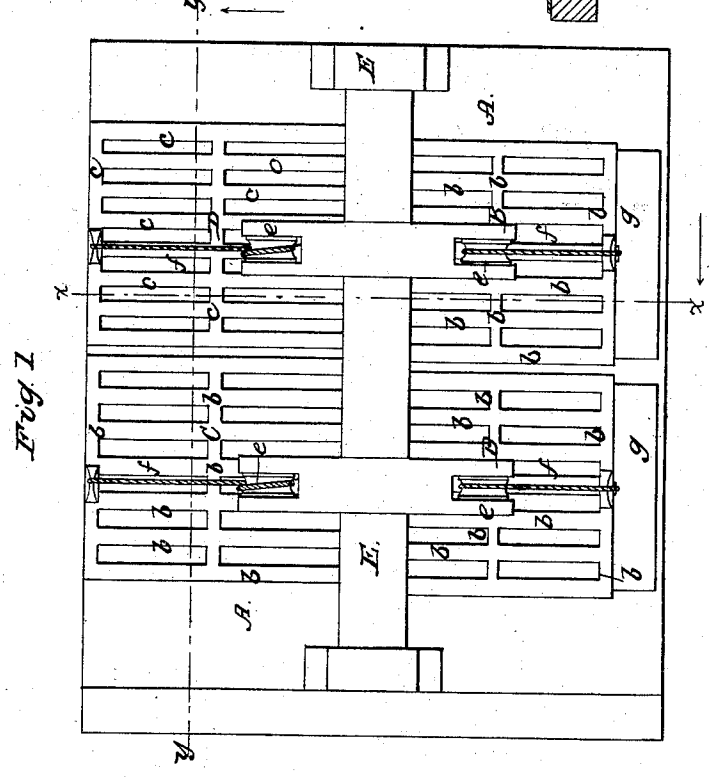
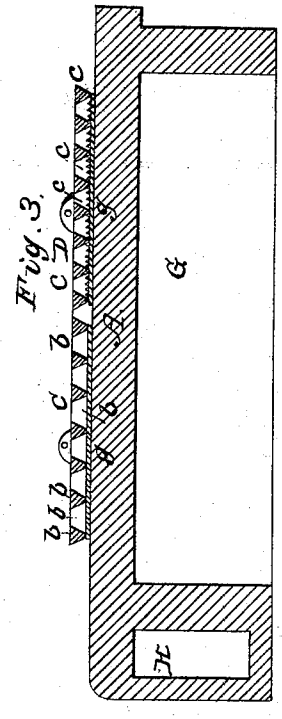


Fig. 3.



UNITED STATES PATENT OFFICE.

E. CUSHMAN AND J. R. CUSHMAN, OF AMHERST, MASSACHUSETTS.

DRYING THICK PAPER.

Specification of Letters Patent No. 11,411, dated August 1, 1854.

To all whom it may concern:

Be it known that we, EPHRAIM CUSHMAN and JOHN R. CUSHMAN, of Amherst, in the county of Hampshire and State of Massachusetts, have invented a new and Improved Machine for Drying Thick Paper (Such as is Used by Bookbinders and for Making Boxes and Similar Purposes) in the Process of Making; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, Figure 1 being a plan of the machine; Fig. 2 a vertical section thereof in the line *x* of Fig. 1, and Fig. 3 a vertical section of the same in the line *y* of Fig. 1.

Like letters designate corresponding parts in all the figures.

In the ordinary process of manufacturing the above mentioned kinds of paper, on account of the thickness of the sheets and their liability to warp, it has been found impracticable to dry the paper properly, except by placing the sheets on the ground in suitable weather during the summer season, and afterward subjecting them to pressure to restore them to shape, as otherwise they would warp so much as to make it impossible to shape them. Consequently the manufacturer is obliged to preserve constantly in a damp state, all the paper made at other seasons of the year till the next summer arrives, by storing it away, before drying, in heaps where it will be kept in a moist state. The large amount of stock thereby required to be kept on hand for months, requiring additional outlay of capital, and the room required for its storage, together with the greater labor, trouble and uncertainty of manufacturing make this process inconvenient, tedious and expensive.

The nature of our invention consists in drying thick paper uniformly and without warping, by means of a machine composed of a properly heated plane platform, or table, on which the sheets in a pulpy state are separately spread, and of a number of lattice weights, whose under sides are sharpened or pointed so as to present no appreciable surface of contact, which, as soon as the paper has become sufficiently hard by partially drying, are let down upon the sheets and keep them in proper shape till the process is completed, substantially in the manner hereinafter set forth.

A level platform A, of any convenient size is constructed; and provided with inclosed spaces G, G, underneath, to be supplied with steam or hot air from a flue H, (communicating with a boiler or furnace,) through apertures *a*, *a*, (Fig. 2,) for the purpose of obtaining a degree of temperature suitable to dry the paper with the required rapidity. Upon this platform the sheets of paper *g*, *g*, in a pulpy state, are spread one by one, as represented. A series of metallic weights B. C, D, are provided, and hinged to the platform substantially as shown at *d*, Fig. 2. Each of these weights is of a size sufficient to cover a sheet of paper to be dried; and is constructed of a series of parallel and cross bars, similar to the bars of a grate or of lattice work, as represented in the drawings. These bars are of sufficient thickness and depth to produce a weight heavy enough to keep the paper from warping. Their lower edges are sharpened to an angle, as represented by the weights B, and C, or notched to points, as shown by the weight D, Figs. 2 and 3; so that no appreciable surface of contact shall be presented to the sheets of paper, when let down upon them; because, if, there should be such a contact that a portion of the paper should be excluded from the atmosphere, it would be impossible to dry the paper uniformly. As soon as the paper, which at first is in a pulpy state, has dried sufficiently to receive the weights without becoming injuriously indented by the edges or points thereof, said weights are let down upon the sheets, and in that position, prevent them from warping till perfectly dried. The weights are then raised, and the sheets removed, to be supplied by fresh sheets.

For the purpose of conveniently raising and lowering the weights, a frame work E, may be erected above the platform, and provided with pulleys *e*, *e*, over which cords, or chains, *f*, *f*, attached to the several weights, pass, as shown on the drawings. Each of the weights is described as composed of parallel and cross bars, which form is most convenient; but it is obvious that any other form of arrangement may be employed, provided the under edges of the bars are sharpened or pointed substantially as described.

What we claim as our invention and desire to secure by Letters Patent, is—

Our improved artificial process of drying

thick paper and at the same time preventing it from warping out of shape; to wit; by placing the sheets in a pulpy state, upon heated tables or platforms and allowing them to remain until they harden to such a degree as to begin to warp out of shape, and then causing open, or lattice, weights to be let down upon them, which rest upon thin edges or points at different parts of the sheets, and preserve them in flat positions until entirely dry, substantially as herein set forth.

The above specification of our new and improved machine for drying paper signed and witnessed this 11th day of April 1854.

EPHRAIM CUSHMAN.
JOHN R. CUSHMAN.

Witnesses to the signature of Ephraim Cushman:

I. N. HALL,
A. R. CUSHMAN.

Witnesses to the signature of John R. Cushman:

E. CUSHMAN, Jr.,
L. MERRICK.