S. S. Crocker & G. E. Marshall

Calendering Paper

No. 24,377. Patented Jun. 14, 1859.

Fig. 1.

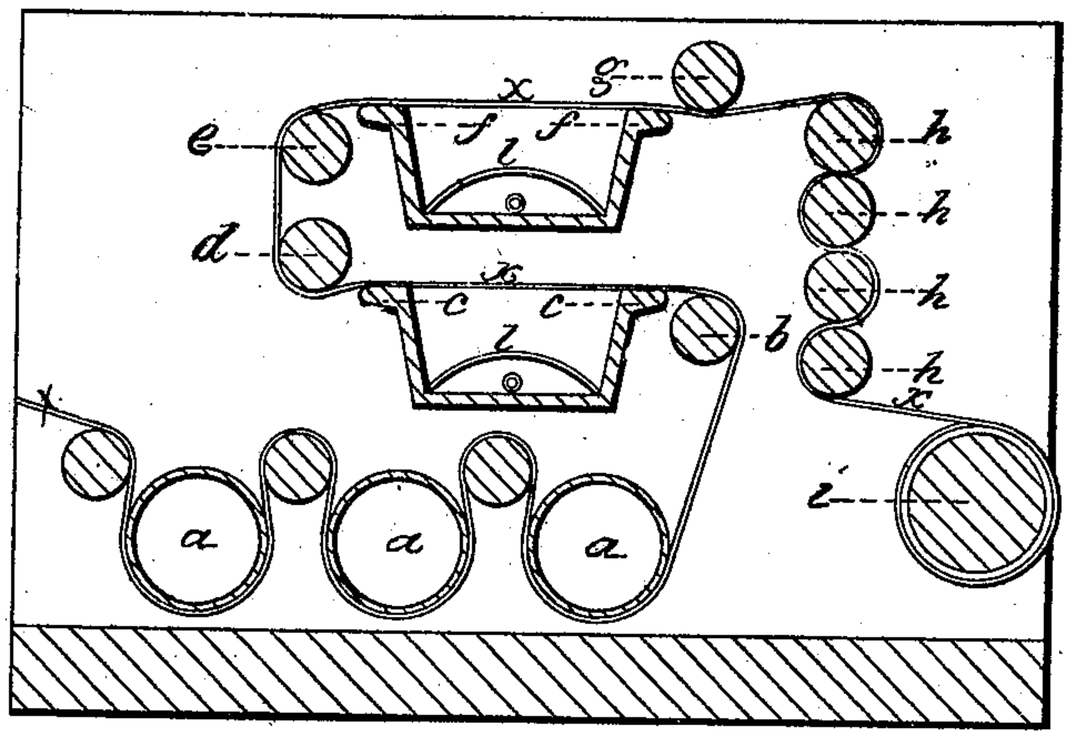


Fig. 2.

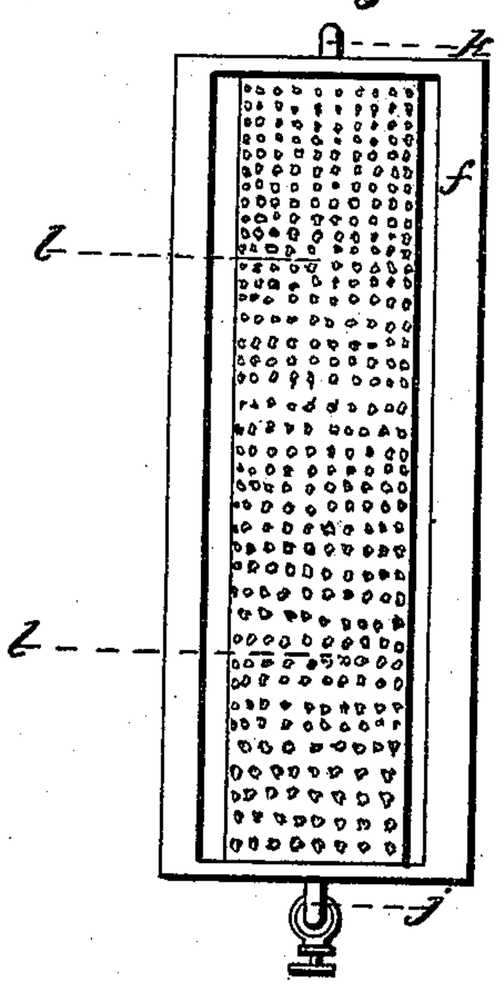
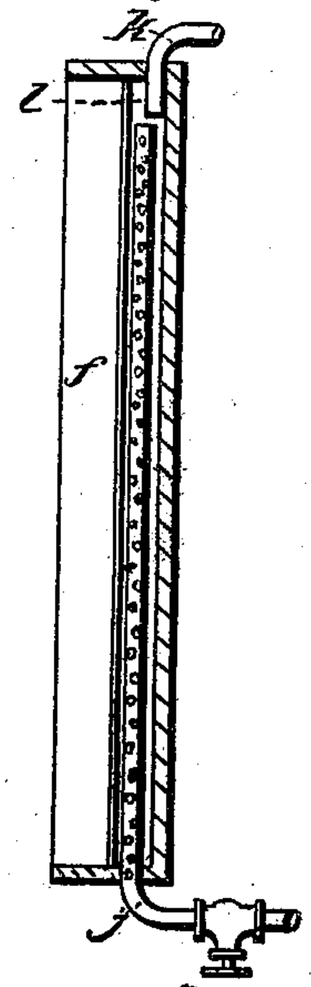


Fig. 3.



Witnesses:

D. R. Crocker

George P. Briggs.

Inventors:

Samuel S. Crocker

George E. Marshall.

UNITED STATES PATENT OFFICE.

SAMUEL S. CROCKER AND GEORGE E. MARSHALL, OF LAWRENCE, MASSACHUSETTS.

MANUFACTURING PAPER.

Specification of Letters Patent No. 24,377, dated June 14, 1859.

To all whom it may concern:

Be it known that we, SAMUEL S. CROCKER and GEORGE E. MARSHALL, both of the city of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Paper; and we hereby declare the following, taken in connection with the accompanying drawings, which form part of this specification, is a description thereof so full and exact as to enable those skilled in the art to practice our invention.

This relates to means for polishing the surface of the paper, not by spreading over its surface foreign matter, but by operation on the substance of the paper.

It consists, first: in the combination of internally heated drying rolls with mechanical devices for superficially moistening the paper passing from such rolls by the direct application of steam to one or both surfaces of the paper, whereby the paper is first thoroughly dried, and afterward moistened, as aforesaid, for reasons hereinafter specified, in continuous operation and without removal from or change in the machine. Second: in the combination of mechanical means for so moistening one or both surfaces of the paper with rolls which condense and polish the paper by pressure, and which I term herein "calender rolls."

When paper is thoroughly dried, and in that state is subjected to the action of calender rolls, it loses when moistened, prior to being printed upon, the smooth surface and gloss acquired in calendering. As paper is dried from its superficies it follows that, when it is not thoroughly seasoned, the inside may be soft when the outside is hard. In such cases the action of calender rolls is to compress the interior of the paper rather than to polish its surfaces, the lumps, also would then be soft within, and the calendering will spread them out, blotching and disfiguring the paper.

When our invention is practiced it will be found that the paper receives a much higher polish than it is possible to impart to it by calendering when it is thoroughly seasoned and dry upon its surfaces, or when these are dry and the paper moist within; and also that it retains its polish, in a great degree, after dampening by the printers; it is therefore much better suited for printing upon than paper calendered in the old way.

In the drawings (*a*, *a*,) represent the usual steam heated drying cylinders, from which the paper (*x*) passes over roll (*b*), over the steam box (*c*), under roll (*d*), over roll (*e*), over steam box (*f*), under roll (*g*) to the series of calender rolls (*h*, *h*), and thence to the receiving reel (*i*), or to the cutting up machinery. The construction of drying and calender rolls is too well known to need description here. The mechanism which precedes the drying rolls (*a*) is also well known, and as it is not connected with our invention need not here be described. The steam boxes (*c*) and (*f*) are supplied with steam through the pipes (*j*, *j*), the amount being regulated by suitable valves. The water of condensation is allowed to pass off by the water pipes (*k*, *k*). The steam is distributed in (*c*) and (*f*) by stopping the ends of (*j*, *j*,) and letting it escape through small holes formed along their length. Above the pipes (*j*, *j*,) a piece of perforated metal plate, or wire gauze, is placed to equalize and distribute the steam and to prevent spattering of water upon the paper. From inspection of Figure 1 it will be seen that the arrangement there illustrated presents both sides of the paper to the action of the steam, and that the rolls *b*, *d*, *e*, *g* are so arranged as to depress the paper over the boxes *c*, *f*. This straining of the paper (*x*,) over the boxes is found in practice effectually to confine the steam within them, and it is obvious that the arrangement is superior to passing the paper through a slot in a close steam box, for the slot would have to be made large enough to permit the escape of steam, or else the paper would be liable to be abraded and torn, as, prior to calendering, it is apt to be uneven in thickness and lumpy. To regulate the amount of moisture it is desired that the paper should absorb, it is necessary either to vary the speed at which it passes over the steam boxes, or else the width of space where the paper is presented to the action of the steam. As the speed at which the paper can be run is dependent upon the early parts of its manufacture the last mentioned method of regulation is that which is most generally practicable. It can be accomplished by having adjustable metallic slides arranged on the steam boxes to vary the opening; and various widths of paper can be provided for in a similar manner.

Having described our invention, what we claim therein as new, and desire to secure by Letters Patent of the United States, is,

1. The combination of internally heated drying cylinders (*a*), with a steam box or boxes arranged for the purpose of continuously first thoroughly drying paper, and then superficially moistening it by the direct application of steam prior to the operation of calendering.

2. The combination of a steam box or boxes so arranged as to moisten paper superficially by the steam therein contained, with rolls which calender by pressure as described.

But we do not claim that it is new to moisten paper by the direct application of steam thereto, or that it is new to combine a mechanism for this purpose with one that gives a polish, simply by attrition.

SAMUEL S. CROCKER.
GEO. E. MARSHALL.

Witnesses:
DANIEL P. CROCKER,
GEORGE P. BRIGGS.