W. E. SYMS.

PROCESS FOR PRODUCING SAFETY PAPER.

No. 177,896. Patented May 23, 1876.

Fig: 1.

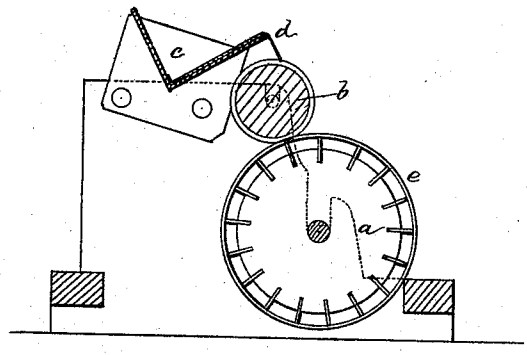
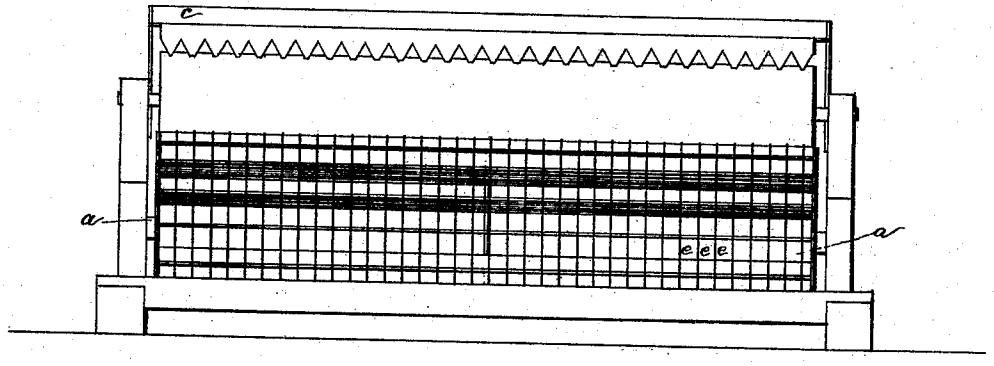


Fig: 2.



Witnesses.

L. N. Latimer.

W. J. Pratt.

Inventor.

Williams & Symes

per Crosby & Gregory

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM E. SYMS, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR TO CROCKER MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN PROCESSES FOR PRODUCING SAFETY-PAPERS.

Specification forming part of Letters Patent No. **177,896**, dated May 23, 1876; application filed March 28, 1876.

To all whom it may concern:

Be it known that I, WILLIAM E. SYMS, of Holyoke, in the county of Hampden and State of Massachusetts, have invented Improvements in the Art of Surface-Coloring Paper, of which the following is a specification:

This invention relates to the manufacture of paper specially adapted for railroad-tickets, bank-bills, checks, &c., wherein it is desired to provide a safeguard against alterations of figures or letters; and the invention consists in a process of surface-coloring the pulp web, the coloring or staining mixture applied to the pulp web spreading on and permeating the surface of the web irregularly, producing lines or spots of color gradually diminishing in intensity, and leaving the paper with a clouded surface.

Figure 1 shows, in section, sufficient of a paper-making machine and the parts necessary to practice my invention; and Fig. 2 is a front view thereof.

In the manufacture of paper in accordance with my invention I employ an ordinary Fourdrinier machine, and prepare the pulp, and form the pulp web and press and dry it, in the usual manner; and as such mechanism is well known I consider it necessary to show by drawing only such mechanism as it is necessary to add to the usual Fourdrinier machine in order to practice my improvement.

In the drawing, *a* denotes the ordinary "dandy-roller," from under which the pulp web issues, and it is to be supported and turned in the usual manner; but the usual fine wire-cloth covering is shown as removed. Above the dandy roll is placed a felt or soft surfaced roller, *b*, which I call the color-roller, as it applies the coloring or staining material or mixture to the dandy-roller, or other equivalent roller that presents the color on the surface of the pulp web.

The color box or trough *c* is shown as provided with a fibrous strip, *d*, or wicks, through which the coloring material is conducted to the surface of the roller *b*.

The pulp may be of any usual or desired kind and color, white or tinted, and thick or thin, and may or may not contain small particles of hair, silk, or fibrous material; and the pulp web will pass, as usual, under the dandy-roller, and between the first pair of press-rollers in advance of it.

In some instances I merely remove the fine wire-cloth covering from the dandy-roller, and apply the coloring matter to the wires *e e*, and they apply the color to the surface of the pulp-web, and it, being yet soft, receives the color and allows it to run or spread a little, the extent to which the color will spread depending on the state of the pulp web; and the color is incorporated in the substance of the surface of the pulp web, or diffused into the surface of the pulp web, presenting a shaded or clouded appearance—an appearance materially different from what would be the case if the color were printed on the surface of the web of paper after calendering.

Instead of using the dandy-roller as the medium by or through which to apply the coloring or staining matter to the pulp web, I may place a roller in advance of the dandy, and between it and the first press-rolls, and the surface of this roller may be of any material adapted to receive and apply color to the pulp web, and may have its surface prepared to apply the color in spots, or as straight, or wavy, or irregular lines, and more or less close together, according to the amount of color it is desired to apply to variegate the surface of the web.

Any desired shade of coloring matter or material may be used.

The coloring or staining mixture may be applied to the surface of the pulp web by means of soft brushes, as of camel's hair.

I do not limit my invention to the means described and shown for practicing it; and it is distinctly understood that the soluble coloring mixture may be applied to the pulp, or green and unsolidified and undried web, by other means than those described.

I claim—

The described process of manufacturing safety-paper, which consists in applying the coloring material directly to but a portion of the surface of the pulp web before pressing or calendering, whereby the coloring material is permitted to partially penetrate and spread in the pulp web, clouding or irregularly coloring its surface, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. SYMS.

Witnesses:
DANIEL P. CROCKER,
GEORGE E. DUDLEY.