A. W. ANDERSON.

Making Fiber-Faced Paper.

No. 211,207. Patented Jan. 7, 1879.

Fig. 1.

Fig. 2.

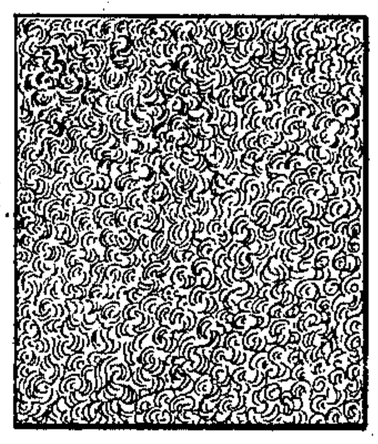

Fig 3

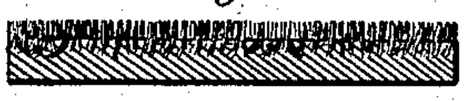

Fig. 4.

Fig. 5

Fig. 6.

WITNESSES

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IMPROVEMENT IN MAKING FIBER-FACED PAPER.

Specification forming part of Letters Patent No. **211,207**, dated January 7, 1879; application filed August 7, 1878.

To all whom it may concern:

Be it known that I, AXEL W. ANDERSON, of Bedford, in the county of Bedford and State of Pennsylvania, have invented a new and valuable Improvement in the Art of Making Fiber-Faced Paper and the Manufacture thereof; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a plan view of a postage-stamp illustrating this invention. Fig. 2 is an enlarged view of the paper, showing the confused disposition of the fibers forming the surface. Fig. 3 is a sectional view, also enlarged, showing the fibers embedded by their lower ends in the pulp, and having their superficial ends raised to form a nap. Fig. 4 is an enlarged sectional view, showing the fibers laid down and sized. Figs. 5 and 6 show a letter printed on the paper before and after washing, the views being enlarged.

This invention has relation to the manufacture of a paper having an invisible, confused, fibrous character, whereby it is especially adapted for postage and other revenue stamps, bank-bills, checks, drafts, and other financial or important papers.

The invention consists in the novel process of manufacture—to wit, embedding in the pulp, on one or both sides thereof, a layer of fibers, the outer ends of which are then raised in the form of a nap, confused, or intermingled by rotary brushes or other suitable means, and sized to form a surface for printing or writing, as hereinafter more fully shown and described.

The invention also consists in the paper manufactured under this process having a confused fibrous face and a firm body or back, in which the interior ends of the fibers are embedded in an intimate and secure manner; and, further, in the printed stamp, bill, note, check, draft, bond, or ticket which is produced from this paper, all as hereinafter specified.

In the accompanying drawings the construction of the paper is illustrated by enlarged views, which will aid in affording a clear understanding of the invention, the object of which is to provide a paper which, having once undergone the process of printing or writing, cannot, after washing or erasing, be restored to the original printed or written form, thereby affording a secret or defensive paper, the peculiarity of which is not easily discovered, and which, when known, will serve as a warning and safeguard, because of the manifest impossibility of restoration of the surface of the paper after it has been tampered with.

The process of manufacture is as follows: The preparation of the pulp is not different from that of any other fine paper until it is ready to pass through the machine whereby it is converted into sheets. Then, as the pulp is spread, and while it is yet soft, fibers of silk or other suitable tough material, which have been previously prepared by being cut, carded, or otherwise loosened up, so that they will easily separate, are spread or scattered, by means of fans or otherwise, over the pulp, which then passes under a roller, embedding the fibers solidly into the body or back of the paper. The pulp now passes over the ordinary wire screen, so that the surplus water will be taken from the paper as completely as posssible, and the paper can be passed under a second roller, providing the pressure employed is not too great. The paper is then acted upon by brushes made of wire or other suitable material having sufficient stiffness, and being of a clean character, so that the paper will not be soiled. These brushes are usually arranged in sets, and are so constructed and operated by suitable mechanism that they will rise and fall at very short intervals, and in this way raise the fibers on the surface of the paper in the form of a nap, as indicated in an enlarged view in Fig. 3 of the drawings. The fibers after the action of these rising and falling brushes or nappers now standing erect on its surface, the paper is passed over heated or calendering rollers, so as to be nearly dried with the superficial ends of its fibers in this upright form. Then the paper is passed under brushes having a horizontal rotary zigzag or irregular motion, whereby the fibers, which were before erect, will be bent down and thoroughly confused or intermingled.

The confusing-brushes are preferably made

small and circular, and arranged to revolve in different directions on vertical axes; but, if thought proper, the brushes can be arranged on horizontal axes.

Several sets of brushes acting in succession upon the fibers as the paper passes are advisable, in order to thoroughly confuse the fibers, laying them in so many and such varying directions that no regularity or order can be perceived.

The paper has now a confused nap, and is ready to be sized. In the sizing some difference is observed, according to the use for which the paper is designed, being light for postage and other revenue stamps, so as not to withstand too much moisture, while for bank-notes, drafts, and financial papers it should be well sized, so as to withstand moisture as much as possible, scratching being the main test for this class of papers; or a spot or portions of the paper may be left without sizing as a proof of its genuine character. After the sizing the confused nap is laid down, and, being clean or of the color of the paper is invisible. The fibers employed in this process may be of different lengths, according to the character of the paper desired, and it is apparent that in the action of the lifting or napping brushes only their superficial ends are raised, to be afterward laid down in the confused manner stated, and sized, so that their deep or embedded ends are rooted in the base of the paper, forming a part thereof. The paper, therefore, can have a solid base without fibered character, so far as its under or back surface is concerned, this being the usual or preferred form of manufacture; but both sides of the paper may be provided with the fibered surface if thought desirable.

The paper, having been sized, is ready for writing or printing, being chiefly adapted to the latter operation for the production of stamps and printed bills and forms of financial paper. The printing is done upon the fibered surface, and it is apparent upon the fibers in their confused and irregular position, in which they are sized down, the letters, designs, or figures being produced, nevertheless, in a clear and perfect manner, and remaining in form until the paper is tampered with by washing, scratching, or erasing, when the fiber ends will be disturbed and move out of their normal position with those portions of the printed marks which they carry. Now, as these fibers together form or aid in forming the design, letter, or figure, because of their marked portions, when in the original position in which they were sized down and printed upon, it is evident that after the disarrangement which will inevitably occur in the erasing the figures, letters, or design will be so affected and marred that there will be direct evidence of the tampering on the face of the paper; and it is also apparent that the fibers, having been carried or moved out of position with their portions of the common design, cannot be rearranged and put back into their original positions, so as to show a clean and perfect print.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In the manufacture of paper, the process of embedding fibers in the pulp, raising the ends of the same from the rolled sheet in the form of an upright nap, brushing the fiber ends down in different directions in a confused manner, and sizing the surface thus formed, substantially as specified.

2. A fibered paper having the inner or deep ends of the fibers embedded in a pulp body, and the superficial ends of said fibers irregularly laid and sized to form a fibered surface of confused character, substantially as specified.

3. A paper composed of pulp and fibers partly embedded therein and partly exposed and laid down in a confused or irregular manner with size, to form the surface for printing or writing, substantially as specified.

4. A revenue-stamp or financial bill or note having its body of pulp and fibers embedded therein, and its face composed of the confused superficial ends of said fibers laid down with size, and carrying the printed letters, figures, or design, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

AXEL WILLIAM ANDERSON.

Witnesses:

H. OSCAR KLINE,

T. J. TROUT.