(No Model.) 2 Sheets—Sheet 1.

G. H. BILLINGS, E. W. CARTER & D. R. SMITH.

FILTERING PAPER.

No. 311,223. Patented Jan. 27, 1885.

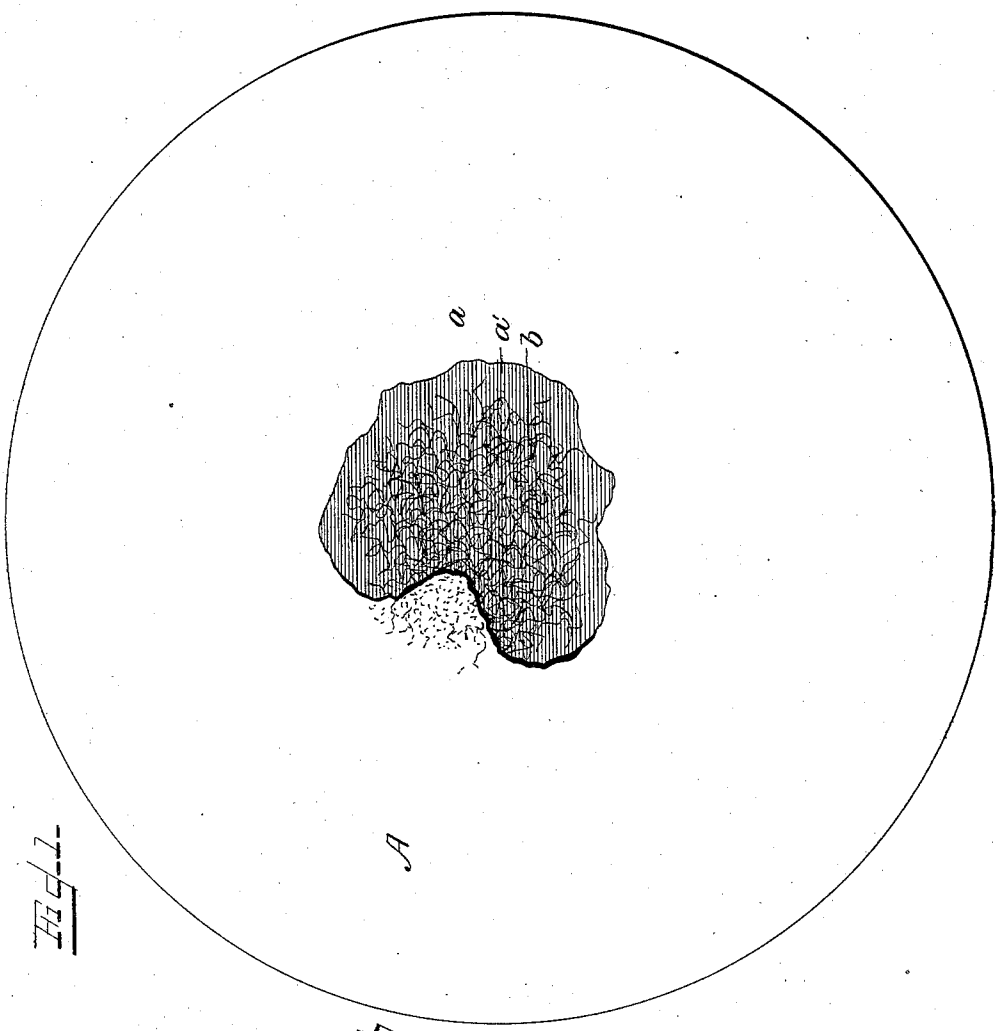


Fig. 1.

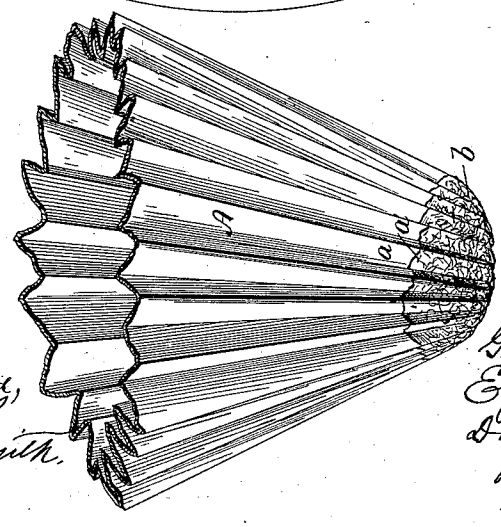


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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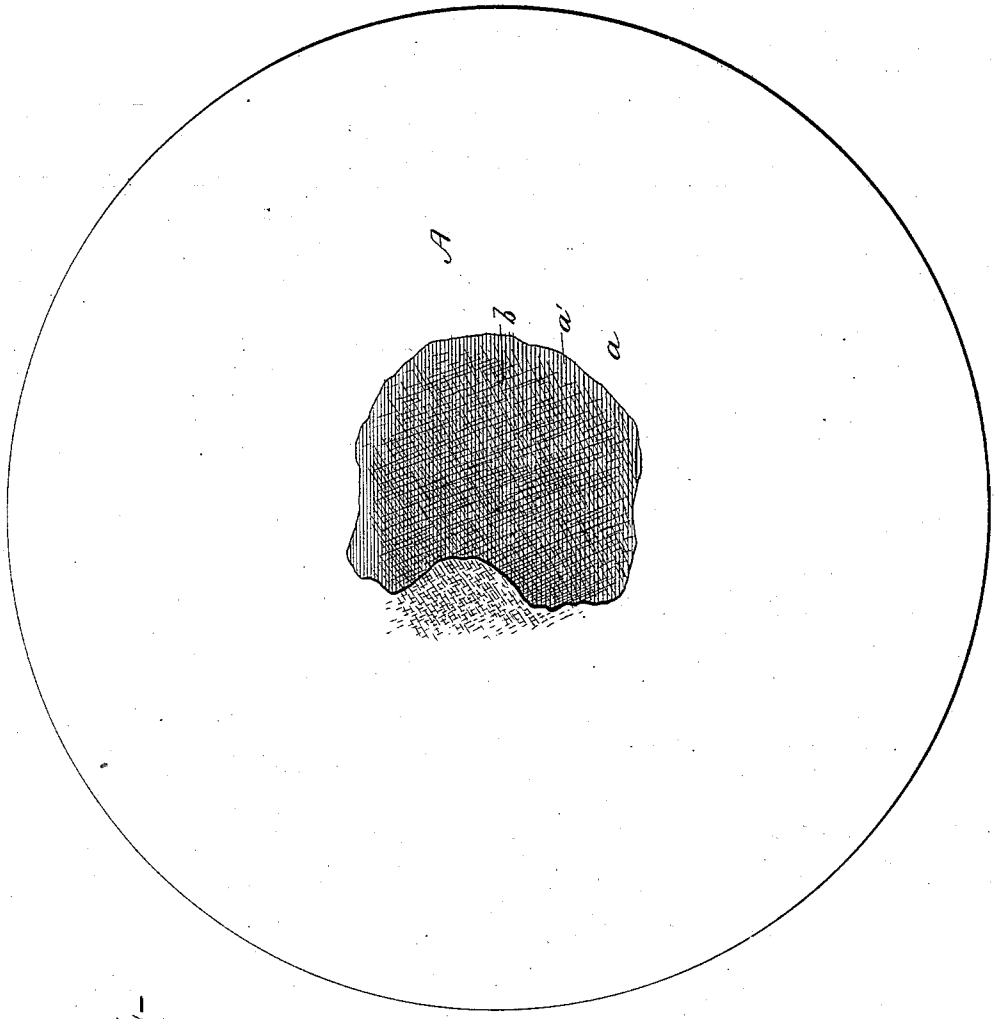


Fig. 1.

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UNITED STATES PATENT OFFICE.

GEORGE H. BILLINGS, EZRA W. CARTER, AND DAVID R. SMITH, OF COHOES, NEW YORK.

FILTERING-PAPER.

SPECIFICATION forming part of Letters Patent No. 311,223, dated January 27, 1885.

Application filed September 18, 1884. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. BILLINGS, EZRA W. CARTER, and DAVID R. SMITH, all of Cohoes, county of Albany, State of New York, have invented a new and useful Improvement in Filtering-Paper, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

Our invention relates to the strengthening of filtering-paper by providing each sheet in its central portion, where the principal strain or weight comes upon it, and where ordinarily it is unsupported in use, with a strengthening-fiber embedded in it either in the pulp or between layers thereof in uniting the latter to form the sheet, as hereinafter explained.

In filtering-paper as heretofore manufactured and in use great difficulty has been experienced in making it sufficiently porous or penetrable for the purpose for which it is designed, and at the same time of sufficient strength to stand the strain or weight thrown upon its central portion, where in the ordinary method of use it is left unsupported and dependent entirely on the tensile strength of the paper in its saturated condition.

The object of our invention is to remedy this difficulty by embedding fibrous material in the central portion of each sheet in the process of manufacture, either by applying it to the pulpy sheet before the same becomes solidified or between two sheets or layers of the pulp by turning one sheet or layer over upon another after the fibrous material has been applied to the central portion of the latter, as will be explained.

In the accompanying drawings, Figure 1 is a plan view of a sheet of filtering-paper with a portion of one layer broken away to show the fibrous material; Fig. 2, a similar view showing a modification in the arrangement of the fibrous material; and Fig. 3 is a perspective view of a similar sheet, also partly broken away, and folded into form for use.

In the drawings, A represents a sheet of filtering-paper, made by preference in the circular form shown, as is usual in hand-made filtering-paper. This sheet is represented as composed of layers *a* and *a'*, made by running the pulp into separate sieves or molds of the desired form and size and of a fibrous material placed between said two layers before they are pressed together between sheets of felt. The fibrous material (indicated at *b*) is applied to the central portion of one of the sheets, *a*, either by sprinkling the same loosely and with the fibers lying irregularly, as shown in Fig. 1, or by laying the fibers regularly and evenly thereon and crossing each other, as shown in Fig. 2. The second layer of pulp or paper, *a'*, is overturned upon the first, covering the fiber, and subsequent pressure between sheets of felt expresses the water and causes the two sheets or layers *a* and *a'* to adhere to each other with the fibrous material between or embedded in them. The fibers should be arranged loosely or openly to avoid interference with the filtering property of the paper, and should interlap and extend sufficiently far from the center to adapt them to mutually support each other and the paper, and thereby to prevent rupture of the paper at that point where the greatest strain or weight comes in use; or the fibers or threads may be previously woven together—as in a third muslin, for example—with interstices of, say, from four to twenty to the inch, and a piece of the woven fabric embedded in the central portion of each sheet.

We do not confine ourselves to the manner or methods of placing or embedding the fibrous material; but,

Having now described our invention, what we desire to secure by Letters Patent is—

As an article of manufacture, a sheet of filtering-paper having a fibrous material embedded in its central portion, substantially as described.

In testimony whereof we have hereunto set our hands.

GEORGE H. BILLINGS.
EZRA W. CARTER.
DAVID R. SMITH.

Witnesses:
MURRAY HUBBARD,
E. C. GAME.