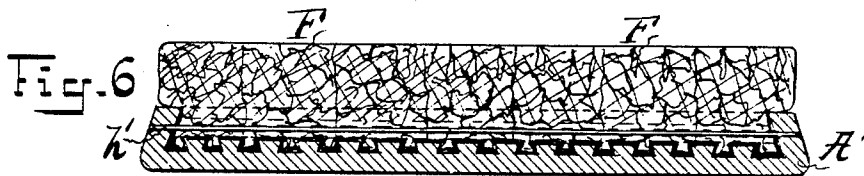
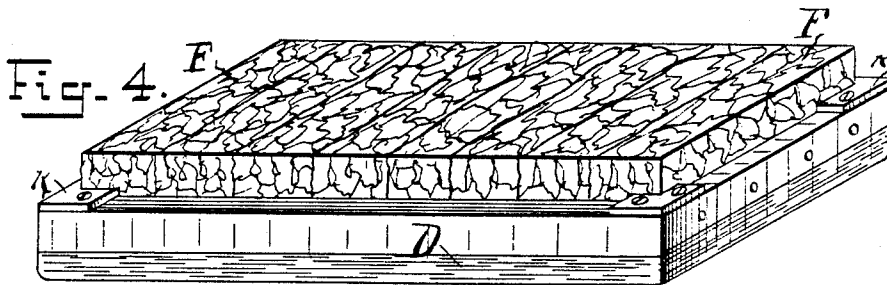
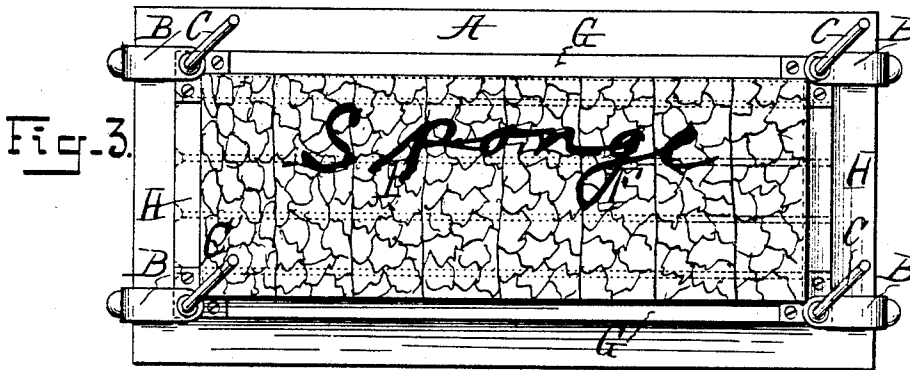
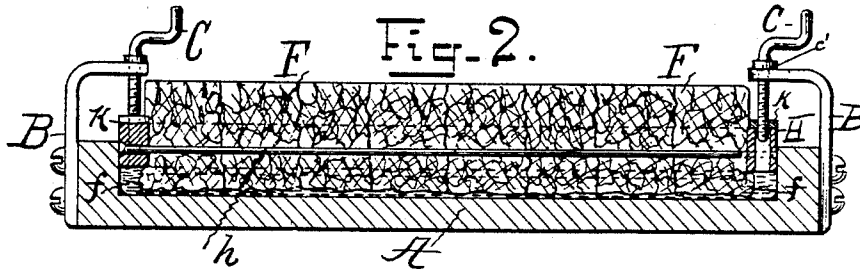
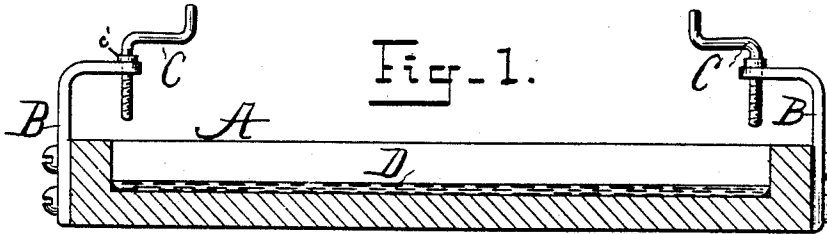


DE LACY E. BALLAM.
SPONGE FABRIC AND PROCESS OF MAKING SAME.

No. 565,590.

Patented Aug. 11, 1896.



Witnesses
Chas. Hanemann,
Henry V. Brown,

Inventor,
DeLacy E. Ballam
By his Attorney D. Miller Brown

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Fig. 5.

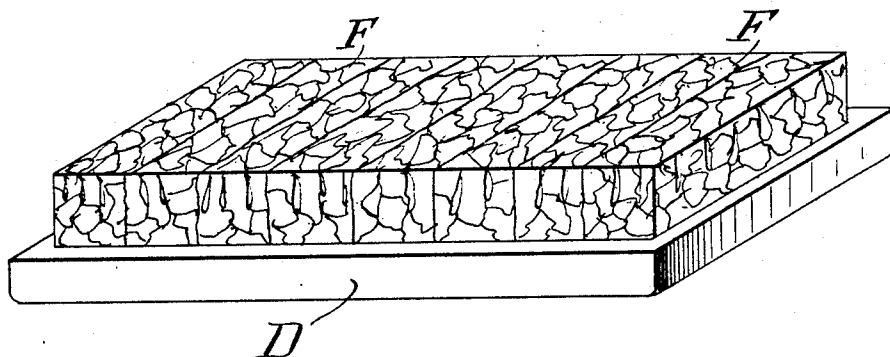
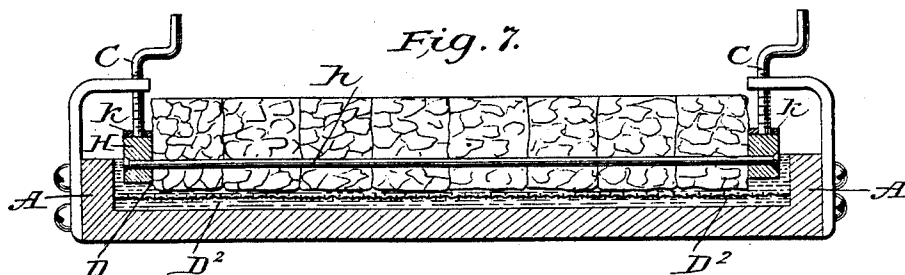


Fig. 7.



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UNITED STATES PATENT OFFICE.

D. LACY E. BALLAM, OF BROOKLYN, NEW YORK, ASSIGNOR TO PATRICK
J. GRACE, OF SAME PLACE.

SPONGE FABRIC AND PROCESS OF MAKING SAME.

SPECIFICATION forming part of Letters Patent No. 565,590, dated August 11, 1896.

Application filed January 28, 1896. Serial No. 577,101. (No specimens.)

To all whom it may concern:

Be it known that I, DE LACY E. BALLAM, a citizen of the United States, and a resident of the city of Brooklyn, Kings county, New York State, have invented certain new and useful Improvements in Sponge Fabrics and Processes of Making the Same, of which the following is a specification.

My invention relates to improvements in fabrics for use on the heads of mops and brushes. Said fabric is composed of small separate pieces of sponge set into plastic materials, which are hardened after the sponge is inserted, so that the sponge is firmly held and a serviceable back produced.

The invention also relates to the process for making the articles and fabrics.

The fabric is particularly useful for mops and brushes and for door-mats. For mops and brushes it can be produced in suitable size and shape for the mop-heads of the mop patented by me in the United States October 29, 1895, No. 548,622. This patent includes a folding head by which the absorbent material is squeezed without using the hands to it, and my present invention is admirably adapted to be applied to the folding head, because its flexibility adapts it to be easily folded on itself to squeeze out the sponge.

I have found that sponge, by reason of its numerous pores, which draw in liquids or even viscous substances with considerable avidity, and its irregular fibers, which give a great number of points for firmly fixing the sponge into a hardening cement-like substance, is peculiarly adapted to making of fabrics and articles which consist of small pieces of sponge united into a single fabric by the cement-like backing. For the backing any material which can be reduced to a liquid or viscous condition and afterward hardened may be employed. Particularly serviceable are rubber gum, plaster-of-paris, and slaked lime.

The process consists in first forming a mold of suitable size and shape, then placing a quantity of the material which is to form the back in the mold in a liquid or viscous condition, then assembling the pieces of sponge into the desired shape in a suitable frame, next placing the sponge with the frame in

the mold and pressing the sponge into the liquid or viscous materials, whereby the capillary action of the sponge and the pressure force the materials far enough into the pores to give a very firm hold on the sponge, and finally hardening the materials and removing the frame.

By a simple change in the mold I am able to utilize the mold as a back or case for the article, and by suitably ornamenting the outside of the mold an article will be produced having any desired design.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a longitudinal section of a mold with a quantity of the backing material. Fig. 2 is a similar section of the mold with frame and sponge in place. Fig. 3 is a top view of the mold with the frame and sponge in place. Fig. 4 is a perspective view of the product before removing the frame. Fig. 5 is a view of the finished product. Fig. 6 is a longitudinal section of a mold left on the article as a back for the same. Fig. 7 is a sectional view showing an open-mesh fabric in the backing material.

A, Fig. 1, is a mold composed of any suitable material, as wood, and shaped in cross-section according to the shape of the article to be made.

B B are brackets secured near the corners of the mold. Through holes of said brackets work screws C, which can be used, if desired, to adjust the depth which the article enters into the mold A while absorbing the backing material. A quantity of the backing material D is put into the mold in a liquid or viscous condition. A serviceable material is so-called "rubber compound," which is rubber gum and sulphur in suitable proportions for vulcanizing, first powdered and then reduced to a pasty or viscous condition by benzene or other solvent. Before placing the material in the mold A the bottom and sides of said mold are coated with powdered chalk to prevent the material from sticking to the mold. When using rubber compound, I may find it advantageous to lay on the surface of the backing material a piece of open-mesh fabric, woven for the purpose and cut to the proper

size and shape. The backing material will work up through the mesh, and the mesh will give additional tenacity to the backing, but the mesh is not necessary.

- 5 Pieces of sponge F are assembled in a frame made of side bars II, which bars will be shaped to the general contour of the mold A, so as to fit well therein, and may be connected at the ends by removable cross-bars G. Said bars
- 10 II are provided with through-and-through horizontal holes, through which pins or wires *h* are passed as the pieces of sponge are assembled. Said pins *h* pierce the sponge and hold the pieces thereof at the proper position
- 15 between the bars II. In the assembling I arrange the sponge so that it projects below the bars II, as at *f*, Fig. 2, the amount of such projection determining the thickness of the backing.
- 20 When the sponge is assembled in the frame, said frame is set in the mold, Fig. 2, the screws C caught a proper distance into the holes of the nuts *k*, which are fixed on the upper edges of the bars II, according to the distance which the bars II are to enter the mold,
- 25 and then the frame with the sponge pressed into the mold A by any suitable means until further motion is prevented by the shoulders *c'* on said screws C coming against the brackets B. No great power is required for this purpose, and it can even be done by hand. Shortly after the sponge is pressed into the mold the backing material is taken up into the sponge and rises around its edges to the
- 35 bottom of the bars II. After a short time the mold and all are placed in a furnace and the backing vulcanized and hardened in the usual manner. Then the mold is taken out of the furnace, cooled, the frame and sponge taken
- 40 out of the mold, the frame separated from the sponge by drawing out the pins *h*, and an article like that shown in Fig. 5 is produced, consisting of pieces of sponge firmly cemented into a backing material. Before or after re-
- 45 moving the sponge from the frame its upper surface is trimmed true by suitable knives.

- When plaster-of-paris is used instead of rubber compound, the sponge is assembled in the frame, as before, and the mold and frame
- 50 coated with lard or oil to prevent the plaster-of-paris sticking. Then the plaster-of-paris having been mixed with water, and the solution having been put in the mold A, the frame and the sponge are put in said mold as before,
- 55 the plaster-of-paris soon entering the pores of the sponge and flowing around it, as before, up to the bars II. The plaster-of-paris quickly sets, and after setting the frame is

removed from the mold and separated from the sponge.

In place of plaster-of-paris, solutions or pastes of slaked lime and water can be used. I prefer to use a compound consisting of equal proportions by weight of Portland cement, plaster-of-paris, and paris-white, mixed with

a weight of slaked lime equal to the total weight of the other ingredients, and the whole reduced to a paste with water. In Fig. 6 I show a mold A' made with inwardly-inclined sides, forming a dovetail. The bottom of the mold is roughened or corrugated to give a good hold to the backing material. Through-and-through holes are provided in opposite sides of the mold. The rubber-compound solution having been placed in the mold, the pieces of sponge are pressed in, and wires or pins *h'* inserted in the aforesaid holes, the said holes being countersunk for the ends of the wires. The whole is now put into a vulcanizing-furnace, and the rubber compound vulcanized. It now serves not only to bind the pieces of sponge firmly together, but also to cement the whole sponge fabric into the mold, which now becomes the back.

Now, having described my improvements, I claim as my invention—

1. As a new article of manufacture, a mat-like fabric consisting of separate pieces of sponge and a backing of viscous material hardened on the ends of the sponge fibers, substantially as described.

2. The process of manufacturing sponge fabrics consisting in reducing the backing material to a fluid or viscous condition, and placing the same in a mold, then assembling pieces of sponge into a mass, then working the backing material into the pores of the sponge, and finally hardening the backing material on the sponge, substantially as described.

3. As a new article of manufacture, a mat-like fabric consisting of separate pieces of sponge, backing material hardened in the pores of the sponge, and an open-mesh fabric through the backing material, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 25th day of January, 1896.

DE LACY E. BALLAM.

Witnesses:

DAVID W. BROWN,
HENRY V. BROWN.