

E. A. HILL.

Manufacture and Vulcanization of Rubber for Making
Brush-Backs, &c.

No. 142,911.

Patented September 16, 1873.

Fig. 1.

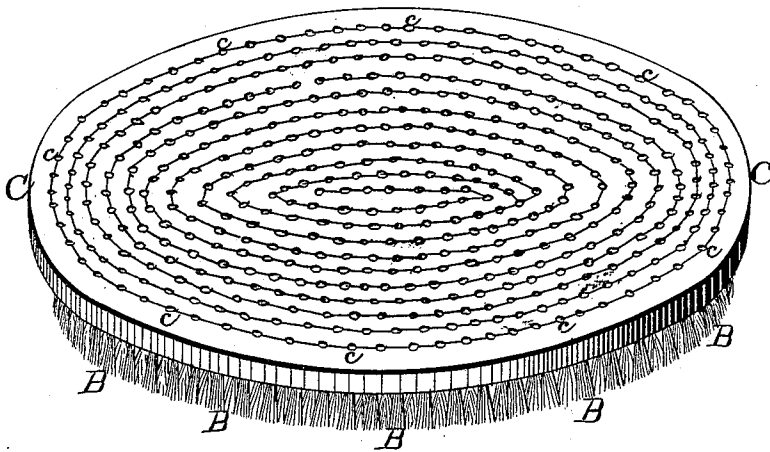
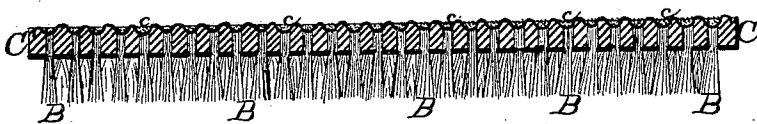


Fig. 2.



WITNESSES:

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Fig. 3.

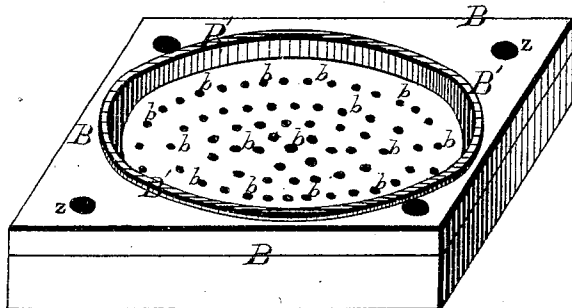
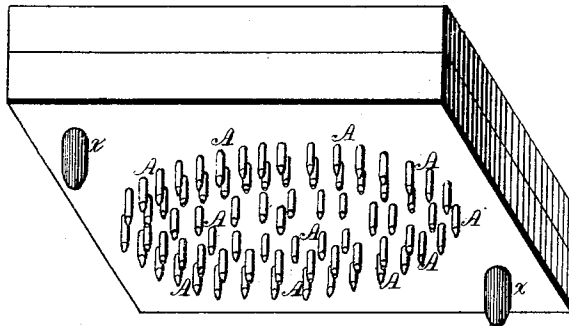
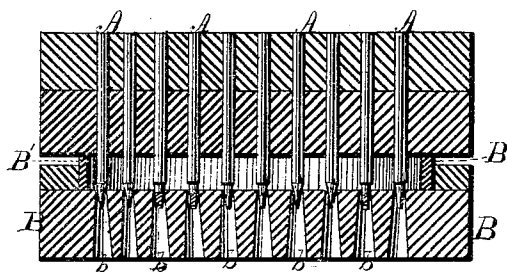


Fig. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWIN A. HILL, OF EAST CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE AND VULCANIZATION OF RUBBER FOR MAKING BRUSH-BACKS, &c.

Specification forming part of Letters Patent No. **142,911**, dated September 16, 1873; application filed September 12, 1873.

To all whom it may concern:

Be it known that I, EDWIN A. HILL, of East Cambridge, in the county of Middlesex and in the State of Massachusetts, have invented certain new and useful Improvements in the Manufacture and Vulcanization of Rubber for the Production of Perforated Brush-Backs, &c.; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a perspective view of the upper side of a brush constructed in accordance with my improved method and by my improved mechanism. Fig. 2 is a longitudinal section of the same. Fig. 3 is a perspective view of said mechanism, showing the relative positions of the upper and lower dies; and Fig. 4 is a vertical central section of said dies as combined during the vulcanizing process.

Letters of like name and kind refer to like parts in each of the figures.

Heretofore it has been found impracticable to construct brush-backs of or from flexible rubber, in consequence of the impossibility of forming suitable openings for the bristles, while, in the use of hard rubber, it has been necessary to drill each opening separately, by which means the cost of the finished article has been rendered excessive.

To obviate these objections is the design of my invention, which consists, principally, in the process for making perforated vulcanized rubber articles, such as brush-backs, &c., substantially as is hereinafter specified. It consists, further, in the means employed for forming said articles, and for containing the same during vulcanization, substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A and A represent a series of punches, secured within a suitable head, A', which latter is so arranged as to give to said punches a longitudinally-reciprocating movement. At their lower ends, and for a short distance upward from the same, each of the punches A is reduced to the desired size, and at the upper end of such reduced portion *a* is formed a square shoulder,

a', which, when said punch is in use, constitutes a cutting-face. If desired, said shoulder may be cupped, so as to sharpen its angle and produce an easier cut. The bed plate or die B is provided with openings *b*, which correspond in size to and receive the reduced ends *a* of the punches, so that when any suitable material is interposed between said die and punches, and the latter are forced downward, portions of the material being operated upon will be pressed through said die-openings *b*, so as to form holes in said material. As these punches are intended more especially for use in the construction of horse-brushes, they are relatively arranged within their head, at distances which correspond to the positions of the openings *c* formed within the brush-back C, for the reception of the bristles D, and their longitudinal motion so adjusted as to carry the larger cutting-face *a'* nearly through to the die-plate, leaving sufficient substance only as a shoulder to prevent the bristles from being drawn through said hole when drawn into the same with the fastening-wire. As thus arranged the smaller cutting-face, *a*, will remove a corresponding piece of material from the back C, while the larger cutting-face, *a'*, will increase the size of the opening *c* by driving before it the chip cut from the sides of the latter, and render the interior of said opening smooth, hard, and firm. The bristles D are inserted within the openings *c* and confined by wire, in the usual manner. The bed plate or die B is provided upon its upper face with a rim or flange, B', which extends upward so as to meet the lower face of the punch-head when the latter reaches its lowest point, and incloses a space that corresponds in size and shape to the like features of the finished brush-back. The punch-head is provided with two or more dowel-pins, *x x*, which fit into corresponding openings *z z* in the bed-plate B, and when said parts are closed together insure their relative horizontal positions.

A piece of rubber prepared for vulcanization, and corresponding in size and shape to the space formed by the flange B', is placed within the same, and the punch-head moved downward until its face nearly rests upon said

flange, and the punches A have punctured said rubber, after which heat is applied to said parts, and when said rubber has become soft said punch-head is moved downward to its farthest limit, where it remains until said rubber has become thoroughly vulcanized.

Upon separating the dies and removing the rubber it is found that the bristle-openings are smooth and uniform in shape, results which could not have been obtained by merely punching out the surplus material.

For the purpose named the punches may have a tapering form, as shown in Fig. 4; or those before described may be employed, the result desired—viz., a shoulder or contraction of the bristle-opening to prevent the bristles from pulling through—being obtained in either case.

The rubber brush-back thus constructed may be made hard, semi-hard, or flexible, as desired, is impervious to and uninjured by water, possesses great durability, and can be produced at a materially less cost than the leather backs, and but slightly greater than

those constructed of or from wood, while, from the perfect uniformity in size and relative position of the openings for bristles, a more perfect and better appearing article is produced.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The hereinbefore-described process for making perforated vulcanized-rubber articles, substantially as and for the purpose specified.

2. The means employed for constructing perforated articles from vulcanized rubber, consisting of the punches A and head A', combined with the die B provided with the openings b and flange B', in the manner and for the purpose substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 12th day of September, 1873.

EDWIN A. HILL.

Witnesses:

GEO. S. PRINDLE,
JOHN R. YOUNG.