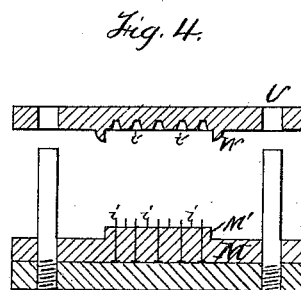
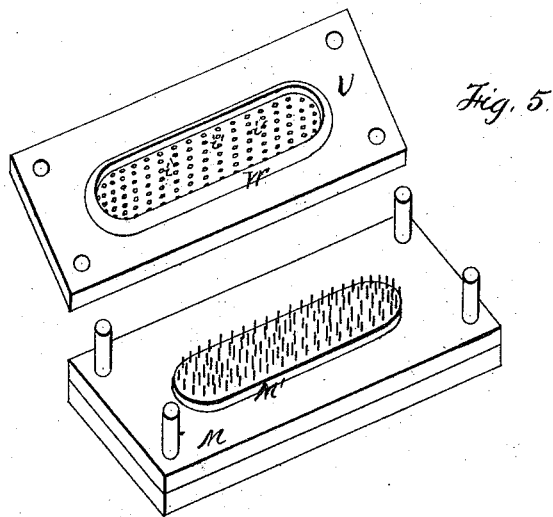
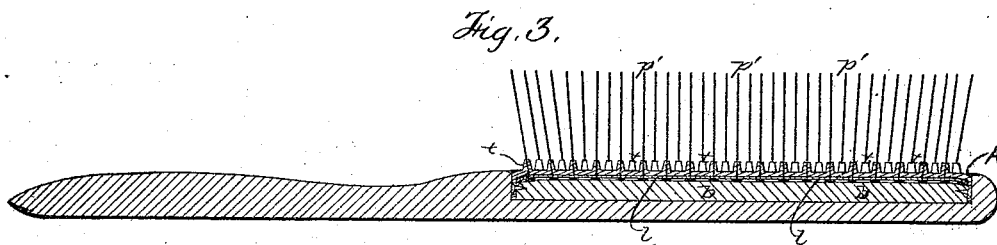
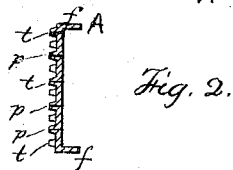
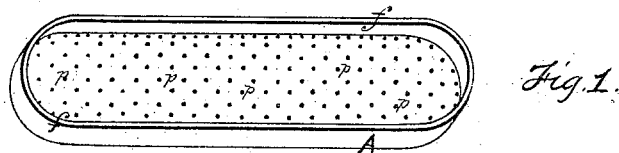


D. B. LOVEJOY.  
 Manufacture of Metallic Brushes.  
 No. 220,297.                      Patented Oct. 7, 1879.



Witnesses,

Geo. W. Pierce  
 C. T. Brown

Inventor

Daniel B. Lovejoy

# UNITED STATES PATENT OFFICE.

DANIEL B. LOVEJOY, OF READING, MASSACHUSETTS.

## IMPROVEMENT IN THE MANUFACTURE OF METALLIC BRUSHES.

Specification forming part of Letters Patent No. **220,297**, dated October 7, 1879; application filed October 19, 1878.

*To all whom it may concern:*

Be it known that I, DANIEL B. LOVEJOY, of Reading, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in the Manufacture of Metallic Brushes, of which the following is a specification.

This invention relates to so-called "metallic" hair-brushes, or those in which metallic or other rigid teeth or pins are set in an elastic pad of rubber or other analogous material attached to a suitable rigid back or body; and the invention consists in a novel construction of the elastic pad itself, and also in the means for uniting said elastic pad to the rigid back or frame, all which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a perspective view of the pad or backing. Fig. 2 represents a transverse section of same. Fig. 3 represents a longitudinal section of a completed brush. Fig. 4 represents a sectional view of a mold employed in making the backing.

Similar letters of reference indicate corresponding parts.

A represents the rubber pad, having the pin-receiving perforations *p*, and the flange *f*, which extends around the margin of the pad and projects from the back side of the same, and, in connection with the pad, forms a recess to receive a rigid supplemental back, as hereinafter described. The pad, with its perforations and flange, is formed in the manner and by the means which I will now describe.

M U represent dies or half-molds, which are so constructed that when brought together a mold or cavity will be formed between them adapted to form the pad and flange from suitable plastic material placed between the dies, the part M having a raised portion, M', and the part U a flange or wall, W, adapted to inclose the raised portion M', as shown in Fig. 4. The parts M U are suitably guided in their motion toward and from each other, so that they will always coincide in forming the mold or cavity. The part M has a series of cores or points, *i*, of small wire, corresponding to the size of the pins of the brush, and adapted to

easily perforate a plastic or yielding material, such as crude rubber or cloth, without punching out or tearing the same. These points are arranged to correspond with the desired arrangement of the pins in a metallic brush. The part U is provided with a series of orifices, *v*, which are arranged to register with and receive the points *i*, as shown, said orifices being of such size as to fit somewhat closely on the points *i*.

In forming the pad, a piece of rubber prepared for vulcanization, and of suitable size and shape to form the pad and flange, is placed upon the ends of the points or cores *i* and heated until it becomes sufficiently soft. The part U is then pressed down, forcing the rubber over the points or cores *i*, and pressing it against the raised portion M' of the part M, thus shaping the pad and forming the flange thereof. During this operation the points *i* transfix the rubber and form the perforations *p* therein, and being of small size and slightly pointed at their upper ends, the points do not punch out or remove any appreciable amount of the material in forming the holes, but displace it laterally, so that it is compressed or compacted around the perforations. Each point is of uniform size from end to end and of the same size as the others, the points corresponding with the pins to be used in the brush in size and shape. After the operation described, the rubber is further heated in the parts U M until it is suitably vulcanized and rendered elastic, but not rigid. This completes the pad, and it is ready to receive the pins *p'*, which are inserted therein, as shown, with their heads against the back of the pad.

It will be seen that the perforations are all of uniform size and diameter and have smooth walls or margins, which are somewhat hardened by the described compression of the rubber; hence the perforations are adapted to support the pins uniformly on all sides, and are not liable to become elongated. The brush is therefore rendered more useful and durable, and presents a neater appearance than when the perforations are formed by puncturing the pad after it is vulcanized.

When a layer, *l*, of cloth or other fibrous material is employed to strengthen the pad

upon its back, said material is pressed in advance of the rubber against the part M, and perforated, like the rubber, by the points *z*. The rubber is pressed against the cloth during the described operation while in its soft state, and thus caused to adhere closely to the cloth. The adhesion of the rubber to the cloth causes the rubber to hold open and make permanent the perforations in the cloth, so that the fibers of the cloth will not encroach upon the perforations and displace the pins.

If desired, the part U of the mold may be adapted to form teats *t* around the perforations on the outer surface of the pad; but I do not claim these teats, as they form no part of my invention.

*b* represents the supplemental back to which the pad and its flange are applied, said back being of wood or other comparatively rigid material, and formed to fit snugly within the flange *f* and support the inner surface of the pad. The flange is secured to the edge of the supplemental back by tacks, cement, or any other suitable means, and when so secured the flange and supplemental back are placed in a recessed handled back which covers the fastenings of the flange.

This combination of a recessed back with a supplemental back, to the edges of which a rubber pad is secured, is shown in my patent of May 7, 1878, for metallic brush; but in said patent the pad is not flanged, but is composed of a flat sheet, the edges of which are folded over the edge of the supplemental back, so that the attachment of the pad to the supplemental back is an operation which requires some care and skill, and involves wrinkles or folds in the edges of the pad, the extra thickness of which prevents the recessed back from fitting closely at all points against the rubber pad, and interferes somewhat with the insertion of the pad and its support into the recessed back. The molded flange enables the pad to be easily applied and attached to the supplemental back without wrinkles or folds, and, being of uniform thickness, enables the recessed back to be fitted closely to its outer surface.

I do not limit myself to the employment of the molded flange in connection with a pad

having molded perforations, nor to the employment of the pad having molded perforations in connection with a molded flange.

I am aware that punches have been passed through sheets of heated unvulcanized rubber held in a mold or cavity to form holes, and that the rubber thus treated has been vulcanized while contained in the mold and transfixed by the punches, as shown in Patent No. 142,911, and in Patent No. 42,423, April 19, 1864, for vulcanizing-mold. Therefore I do not claim such a method of preparing a perforated vulcanized-rubber article.

If desired, the supplemental back may be made of rubber vulcanized to a semi-hard condition—that is to say, made harder than the pad—and the pad may be cemented to the back thus formed.

I claim as my invention—

1. In a metallic brush, a pad or backing composed of cloth and rubber united by heat, and provided with perforations which are molded in the rubber, and made permanent in the cloth by the adhesion of the rubber thereto.

2. In a metallic brush, a vulcanized-rubber pad or backing provided with molded perforations, around which the rubber is compressed or compacted, with or without a layer of cloth, combined with a rigid back and metallic headed pins inserted in the perforations, as set forth.

3. In a metallic brush, a vulcanized-rubber pad or backing provided with a molded flange, substantially as and for the purpose specified.

4. The combination of a vulcanized toothed rubber pad or backing having a molded flange with a supplemental back fitted to the interior of the flange, and a recessed back adapted to receive the flange and supplemental back, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of October, 1878.

DANIEL B. LOVEJOY.

Witnesses:

C. F. BROWN,  
GEO. W. PIERCE.