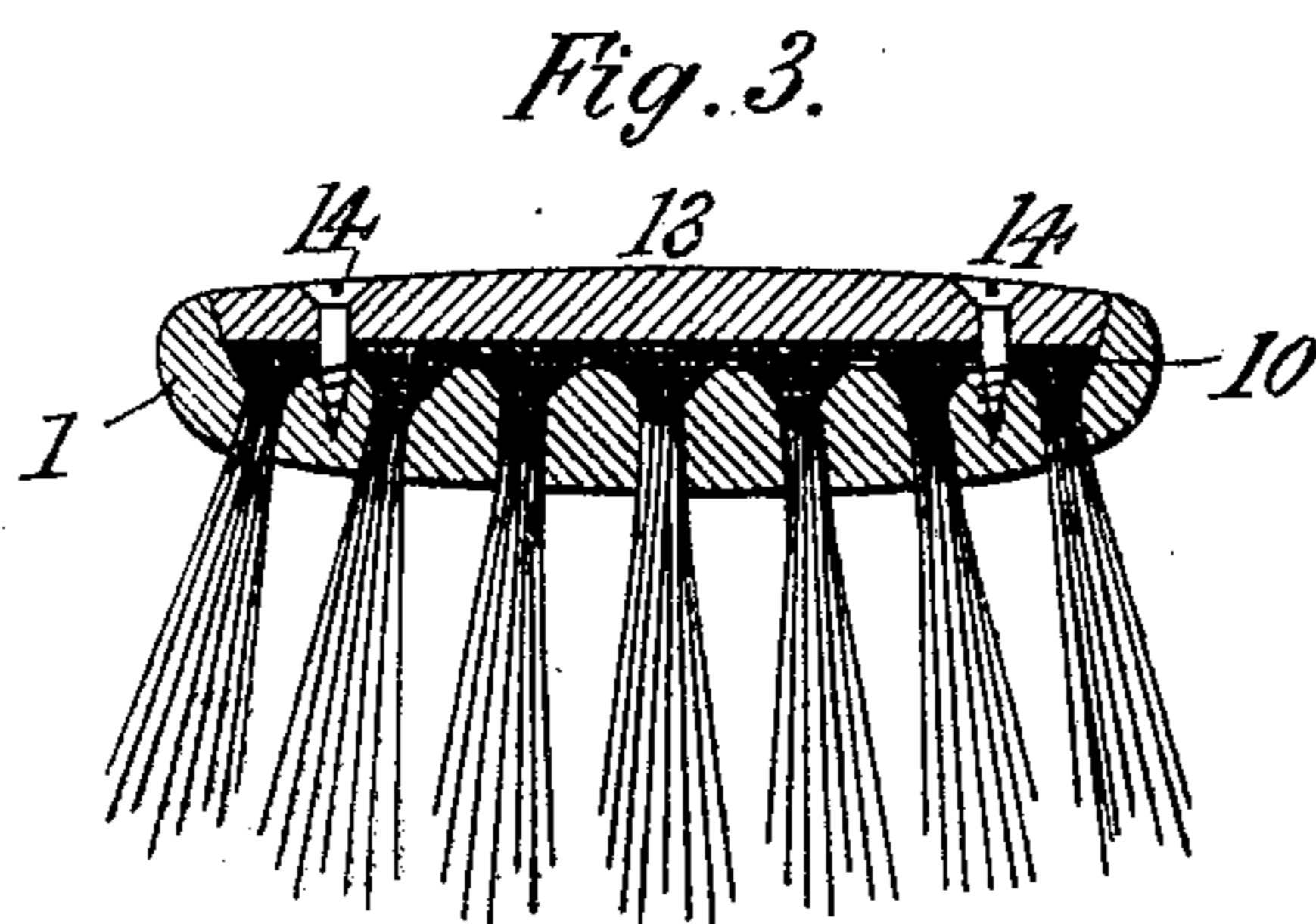
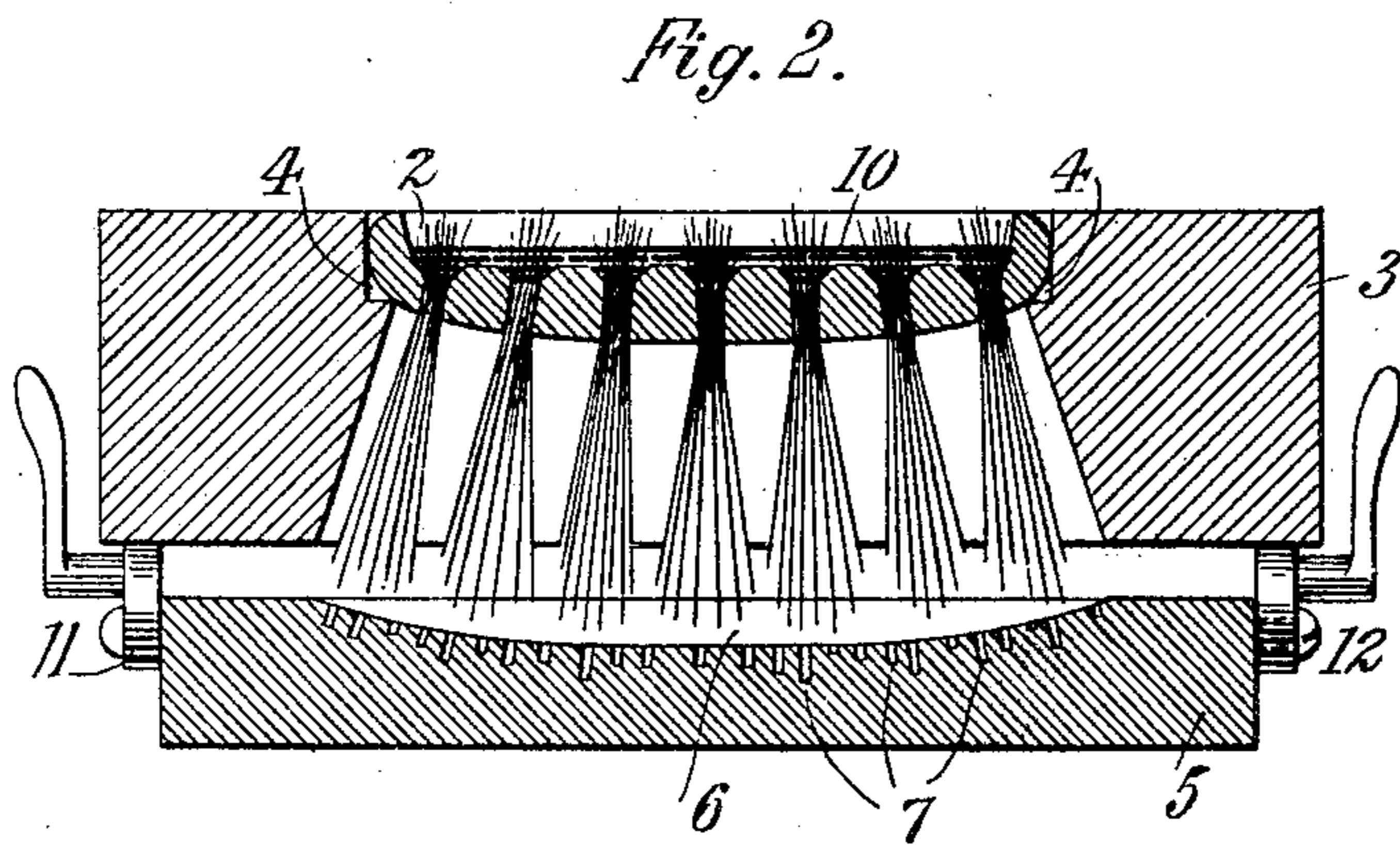
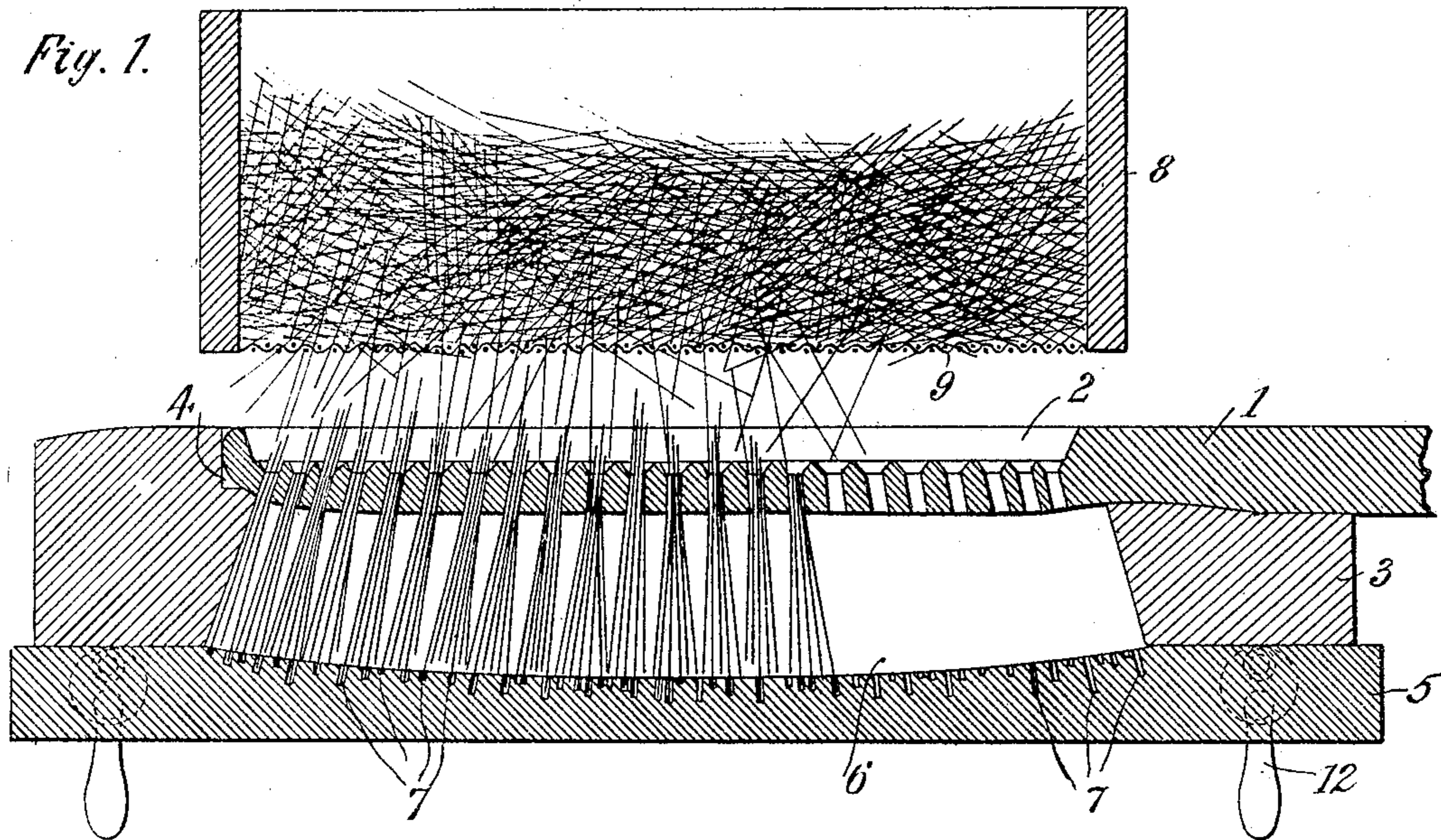


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P. H. ALEXANDER.
MANUFACTURE OF BRUSHES.
APPLICATION FILED AUG. 31, 1904.



Witnesses:
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UNITED STATES PATENT OFFICE.

PHOEBUS H. ALEXANDER, OF AMSTERDAM, NEW YORK.

MANUFACTURE OF BRUSHES.

No. 798,380.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PHOEBUS H. ALEXANDER, a citizen of the United States, residing at Amsterdam, in the county of Montgomery, State of New York, have invented certain new and useful Improvements in the Manufacture of Brushes, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

My invention relates to the manufacture of brushes, and has for its object to provide a method of making such articles in a simple, expeditious, and inexpensive manner, producing withal a brush which is light in weight and durable in quality.

A common way of making bristle brushes is to arrange the bristles in looped tufts, the bights or bends of which are thrust through holes in the back of the brush. The tufts are then secured in the holes by wires threaded through the loops. This method is costly and requires considerable time in its performance. Another method is to insert straight or unlooped tufts in the perforations of the brush-back and then glue or cement the bristles in place. Another plan in connection with the method last mentioned is to insert the bristles in the back-holes by sifting them from a suitable hopper having a reticulated or perforated bottom. In my method also straight bristles are inserted in the perforations of the back, preferably by sifting. They are then cemented in place in a novel manner, described fully hereinafter. For the purpose of giving the brush "penetration"—that is, to make the bristles project in different lengths—I insert the bristles into the upper or outer face of the blank, and below the blank I employ what may be termed a "penetration-plate." This latter is thickly covered with perforations or pits of various depths, so that some of the bristles dropping into the pits will project from the back of the brush farther than those which strike the surface of the penetration-plate or those which drop into shallower pits. In this way I make my brush "penetrating," and it will be seen that I may use bristles all of the same length or of different lengths, since their relative lengths in the finished article do not depend upon their actual lengths, but upon the depths of the pits in the penetration-plate.

I am aware that it is broadly old to use a

penetration-plate for the purpose described, and I therefore do not claim the exclusive right thereto.

It is essential that the perforations to receive the bristles be countersunk or beveled at their outer edges—that is, around the aperture into which the bristles are inserted. This facilitates the filling of the holes with the bristles by furnishing in each case a wider aperture with sloping walls to guide the bristles downward.

When the tuft-holes in the brush-back have been filled, I cement them in place, preferably in the following manner: Over the back is spread a quantity of cement of any suitable composition, then in liquid form, but which will afterward become hard, so that the projecting ends of the bristles are all engaged by the cement. I prefer to use a cement which is liquefied by heat and to use it in a rather fluid condition, so that the same will readily penetrate the interstices between the projecting bristles, and thus embed each bristle; but, if desired, a more plastic or viscous cement may be employed, the same being worked or kneaded into the bristles. I then raise the brush-back a short distance, generally an extent substantially equal to the thickness of the brush-back—say about three-sixteenths or a quarter of an inch. The bristles, being engaged by the cement, of course are retained in place instead of dropping out. I then force the tufts downward—that is, in the direction in which they project in the finished brush—a distance about equal to the distance the article was raised from the penetration-plate. Each tuft being embedded at its upper end in the plastic cement in being pushed through its hole it carries the cement down into the hole, and so not only affords the cement additional surface to which to adhere, but also, to a certain extent, has an effect of wedging the bristles in the hole. The next step is to finish the back of the article, and I prefer to do this by covering the same with a stiff or rigid panel. In that case the panel may serve as the tool for pushing the tufts through their holes, as just explained, by laying the panel upon the mass of cement and forcing it downward until seated in its proper position on or in the brush-back. The cement serves to hold the panel permanently in place, or it may be secured positively, as by means of screws.

Referring now to the drawings for a more detailed explanation of my invention, Figure 1 shows a convenient apparatus for practicing my method in longitudinal section. Fig. 2 is a transverse section showing the brush raised from the penetration-plate ready for forcing the cement into the tuft-holes. Fig. 3 is a similar section showing the cement forced into the tuft-holes and the finishing-panel in place.

The brush-blank 1 is hollowed out on the back thereof, as shown at 2, and is perforated throughout the extent of this surface. The perforations are arranged so that the tufts are inclined toward the sides of the brush, as shown, except the middle row, and the upper edges are beveled or countersunk, as shown, to facilitate the entrance of the bristles and afterward the penetration of the glue or cement.

3 indicates a block or support having a downwardly-flaring opening conforming to the contour of the brush-back 1 and having a shoulder 4 around its upper edge. The thickness of the block 3 is slightly less than the length of the bristles projecting from the completed brush. On the shoulder 4 the brush-back 1 is placed, with the hollowed surface uppermost. The support 3 rests on a plate 5, which has a depression 6 in its upper face corresponding in size and contour to the flaring opening in the block. This depressed surface is thickly covered with pits or cavities, as 7, of various depths, as shown, inclined at substantially the same angles as the perforations or tuft-holes in the back 1.

The bristles are contained in a hopper 8 of any suitable kind, having a reticulated or perforated bottom 9. The hopper is agitated over the brush-back, and the bristles falling through the reticulated bottom drop into the tuft-holes down to the penetration-plate 5. There they encounter the depressed surface 6 or drop into the pits and are thus made to project in different lengths from the lower face of the back 1.

When the tuft-holes contain a sufficient quantity of bristles, the block 3 and plate 5, carrying the brush, are withdrawn and into the cavity 2 is placed a mass of cement 10, which is spread evenly over the surface, so as to surround and embed each projecting bristle, as shown in Fig. 2. The block 3 and the brush with it is then raised from the plate 5 about a quarter of an inch, more or less. Any convenient devices may be employed to raise the block—as, for example, cams, such as those indicated by 11 12. The panel 13, shaped to fit the cavity 2, is then laid on the mass of plastic cement and is forced down into the position it is to occupy in the finished article. This forces the tufts downward and outward through the holes, making the projecting tufts longer, but at the same time car-

rying the cement or glue down into the holes, as clearly shown in Fig. 3. The bristles are thereby more firmly secured by the hardened adhesive material, and the holes being filled or substantially filled the brush may be readily cleaned by any cleaning fluid, since but slight crevices, if any, are left for the lodgment of bacteria or other foreign matter. The panel 13 may be fastened in place by any convenient means, as by screws 14. It will of course be evident that the cement may be carried down into the holes by grasping the tufts and drawing them outward a sufficient distance, as well as by forcing them down by pressure on their upper ends.

The countersinking of the tuft-holes plays an important part in securing the tufts in place. The upper end of the column of cement or glue fills the flaring opening of the hole and a "head" is thereby formed, having the effect of anchoring the tuft in position.

The foregoing operations are simple and may be performed in a very short space of time, while the brush so made is very durable in construction. It will therefore be seen that my invention provides a simple and inexpensive method of making a brush of superior quality.

The apparatus herein shown and described is convenient for the purpose; but other devices may be used, since the invention itself is a method, and therefore independent of any particular apparatus.

Having now described my invention, what I claim is—

1. The herein-described method of making brushes, which comprises forming a brush blank or body with perforations or bristle-holes extending through same; inserting bristles through said holes with their upper ends projecting above the orifices of said holes; covering the back of the blank with cement or glue and embedding the projecting bristle ends therein; then moving the bristles downward in the said holes, to cause them to project farther from the lower face of the blank and to carry the embedding cement or glue down into the said holes, as set forth.

2. The herein-described method of making brushes, which comprises forming a brush blank or body with countersunk perforations or tuft-holes therethrough; sifting bristles into the holes through their countersunk orifices, leaving the bristles projecting above the latter; covering the back of the blank with cement or glue and embedding the projecting bristle ends therein; then moving the bristles downward through the holes, causing the bristles to project farther from the lower face of the blank and carrying the cement or glue down into the said holes, as set forth.

3. The herein-described method of making brushes, which comprises forming a brush or

body with countersunk perforations or tuft-
holes therethrough; sifting bristles into said
perforations or tuft-holes, through their coun-
tersunk orifices, leaving the ends of the bris-
5 tles projecting above said orifices; covering
the back of the blank with glue or cement
and embedding the projecting bristle ends
therein; laying a finishing-panel on the glue

or cement and bristle ends; and pressing the
panel downward, whereby the bristles are 10
pushed farther through the holes and the ce-
ment carried down into the holes, as set forth.

PHOEBUS H. ALEXANDER.

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