(No Model.) 2 Sheets—Sheet 1.

J. A. WILLIAMS.

BRUSH.

No. 345,941. Patented July 20, 1886.

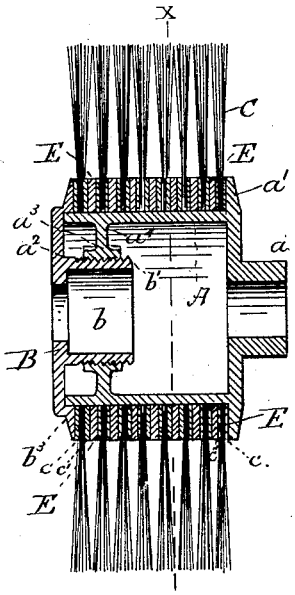

Fig. 1.

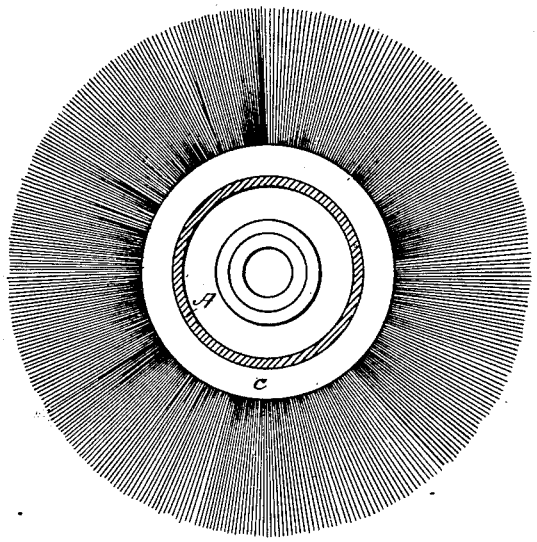

Fig. 2.

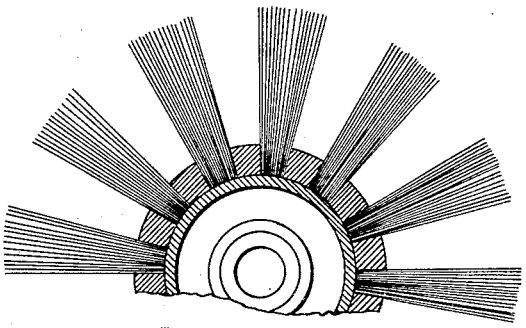

Fig. 3.

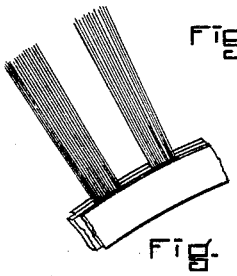

Fig. 5.

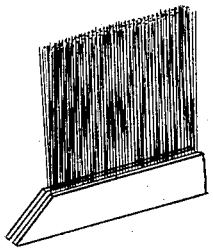

Fig. 6.

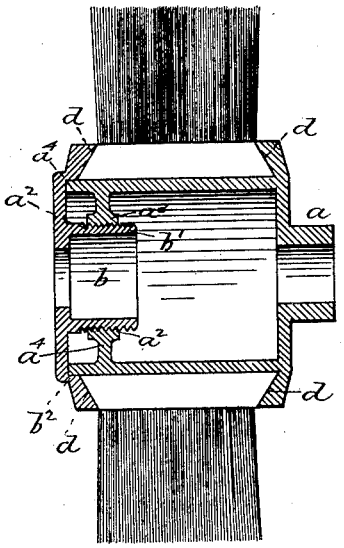

Fig. 4.

WITNESSES.

J. M. Dolan

Fred. B. Dolan.

INVENTOR.

James A. Williams

by his attys

Charles Raymond.

(No Model.) 2 Sheets—Sheet 2.

J. A. WILLIAMS.

BRUSH.

No. 345,941. Patented July 20, 1886.

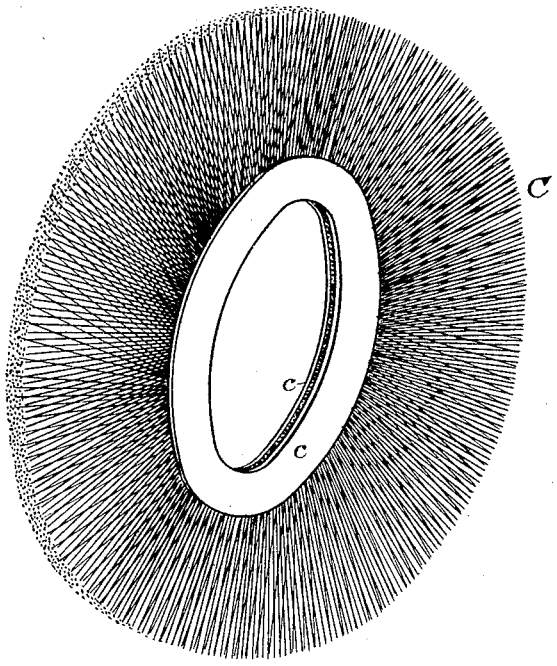

Fig. 7.

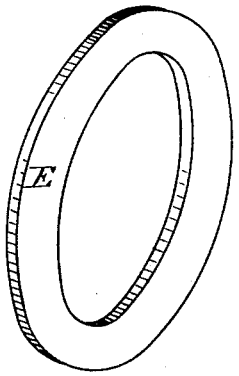

Fig. 8.

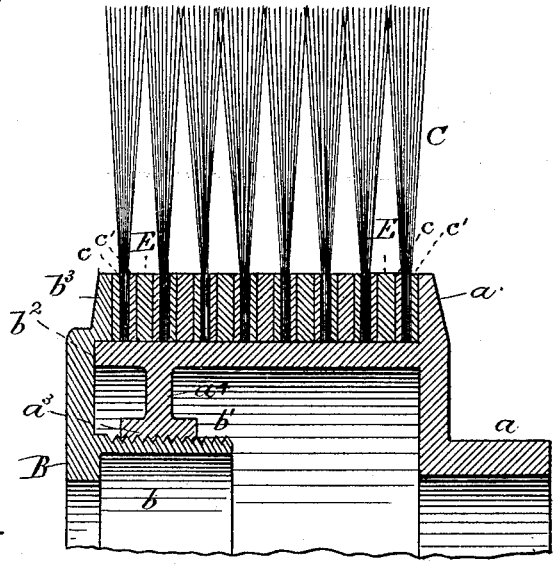

Fig. 9.

WITNESSES.

J. M. Dolan

Fred. B. Dolan.

INVENTOR.

James A. Williams
by his attys
Clarke & Raymond.

UNITED STATES PATENT OFFICE.

JAMES A. WILLIAMS, OF BOSTON, MASSACHUSETTS.

BRUSH.

SPECIFICATION forming part of Letters Patent No. 345,941, dated July 20, 1886.

Application filed April 27, 1885. Serial No. 163,609. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. WILLIAMS, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Brushes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification in explaining its nature.

The invention is an improvement upon that described in my application for Letters Patent of the United States filed January 2, 1885, Serial No. 151,732.

Referring to the drawings, Figure 1 is a vertical central section of a brush containing the features of my invention. Fig. 2 is a vertical cross-section upon the dotted line *x x* of Fig. 1. Fig. 3 is a portion of a horizontal section illustrating a modification in the arrangement of the bristles hereinafter specified. Fig. 4 is a longitudinal vertical section, also showing a slight change in the arrangement of the bristles. Fig. 5 is a detail view in perspective further showing the construction of the bristle-holding devices. Fig. 7 is a perspective view enlarged of a complete ring of bristles, showing the manner in which they are held together between two holding or clamping plates. Fig. 8 is a perspective view enlarged of the spacing-ring hereinafter referred to. Fig. 9 is a portion of a longitudinal vertical section enlarged of the construction shown in Fig. 1.

The brush comprises three essential elements: first, the hub, preferably made of metal, and having upon one side a projecting flange; second, the bristles, which are held between holding-plates, as hereinafter specified, arranged or shaped to fit the hub; and, third, a nut having a flange which is adapted to be screwed upon the bristle-holding plates to clamp them against the hub-flange with sufficient pressure to properly solidify them and hold them and the bristles in position on the hub.

Referring to the drawings, A represents the hub. It has the projection or collar *a*, by which it is fastened to its holding-shaft, and the flange *a'*, which projects outward from the surface of the hub. It also has the screw-thread a^2, formed upon the inner surface of the sleeve a^3, which is supported within the hub by the web a^4, which, when the hub is of metal, is formed or cast integral therewith. This screw-thread receives the screw-port *b*, which projects inwardly from the end of the disk or cap B, and has the screw-thread *b'*, formed upon its exterior to fit the screw-thread of the sleeve. This end plate has a recess, b^2, of a size to receive the hub, and the portion extending beyond the recess forms the flange b^3, which laps upon the hub, and which is movable in relation to the fixed flange *a'* as the screw-post is turned in the screw-sleeve.

The bristles C are prepared for use upon the hub in two ways. The first is that represented in Figs. 1, 2, 3, and 5, where *c c'* represent two rings or plates of pasteboard or paper or other equivalent material, which inclose the inner ends of the bristles between them, the rings being united with each other and with the bristles by glue. In Figs. 1 and 2 the bristles are shown as forming continuous rings extending from these holding-plates. In lieu, however, of this arrangement, the bristles may be arranged in clumps or sections, as represented in Figs. 3 and 5, in which case the various clumps or sections between the holding-plates will be separated from each other by small pieces of pasteboard or other equivalent material, and the whole be glued together, as above described. In lieu of securing the bristles to these annular holding-plates they may be held by two short holding-plates arranged to extend crosswise the hub instead of around it, and when this construction is used it will be desirable to form the fixed flange of the hub and the movable flange with undercut or extending recesses *d*, so that these cross bristle-holding plates may be held in place by the lapping of the flanges upon their ends and upper surface, as shown in Fig. 4; and it will be desirable to bevel the ends of the holding strips or plates to correspond with the inclination of the undercut sides of the flanges, substantially as shown. The bristles being thus prepared for use are placed upon the hub, and between each section there is arranged one or more spacing rings or plates, E, so that the bristles shall not be packed too closely to-

gether upon the hub. When the annular form of bristle-holding plates is used, the spacing-rings are of course annular in shape, and when the straight form of holding-plates is used then the spacing device is straight. Fig. 7 represents the former and Fig. 6 the latter.

When the bristles are arranged in clumps or sections rather than continuously, I arrange the holding-plates, preferably, so that the various clumps shall not come opposite each other, and this form of arrangement of the bristles is used when it is desired that the bristles of the complete brush shall not be too stiff. The bristles and the spacing-plates having been adjusted on the hub the movable flange is then turned down upon the same, and rigidly and firmly clamps all the holding-plates together, and consequently the ends of the bristles are very firmly and securely held. When the bristle-holding plates or sections are arranged crosswise the hub, they may also be glued together as well as clamped.

In lieu of the pasteboard or paper-clamping plates and spacing rings or pieces shown, I may use any mechanical equivalent therefor.

The advantages which this form of construction give are, first, the ease, facility, and cheapness with which the bristles are arranged for attachment to the hub; second, the cheapness, ease, and facility with which the brush is built up or made from these previously-prepared sections; and, third, the ability to remove certain of the sections as they become worn, and substitute others therefor, or to interchange them upon the hub so that more of the bristles may be worn out than could be in an ordinary brush, and greater durabilty thus provided; fourth, the ability to easily reclothe the hub with fresh sections of bristles.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the hub A, having the flange a', the movable flange or collar b^3, the sections C of bristles secured between two annular disks, $c\ c'$, as specified, and the annular spacing disks or pieces E, all substantially as and for the purposes described.

2. The combination, in a brush, of the hub A, having a flange, a', the sections or rings C of bristles held by their ends between the two holding plates or disks $c\ c'$, the clamping plate or flange b^3, having the recess b^2, the threaded annular sleeve b, and the sleeve a^3, having the screw-thread a^2, all substantially as and for the purposes described.

JAS. A. WILLIAMS.

Witnesses:

F. F. RAYMOND, 2d,

J. M. DOLAN.