

C. E. GRAHAM.

BRUSH.

APPLICATION FILED MAY 5, 1904.

912,306.

Patented Feb. 16, 1909.

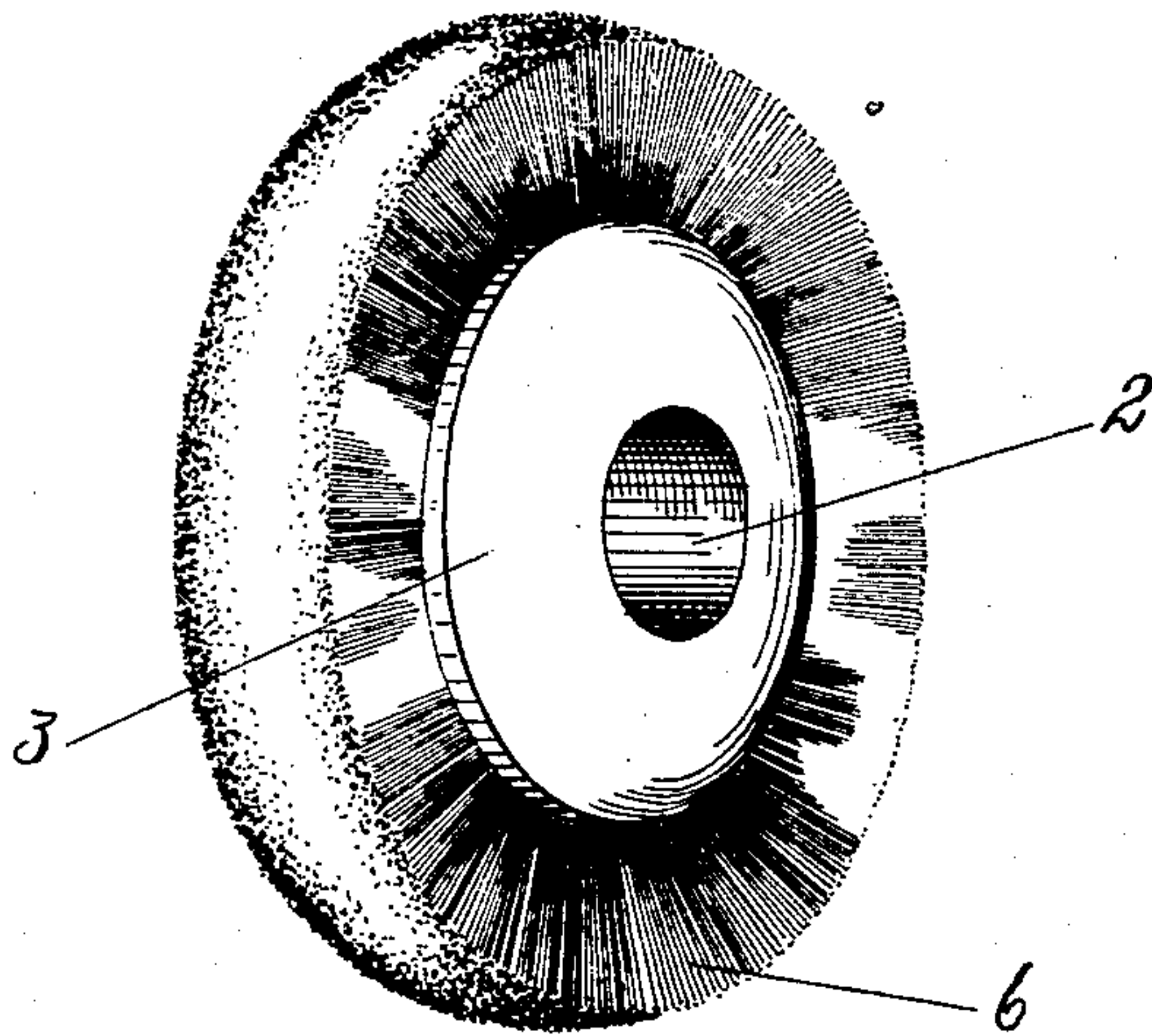


Fig. 1.

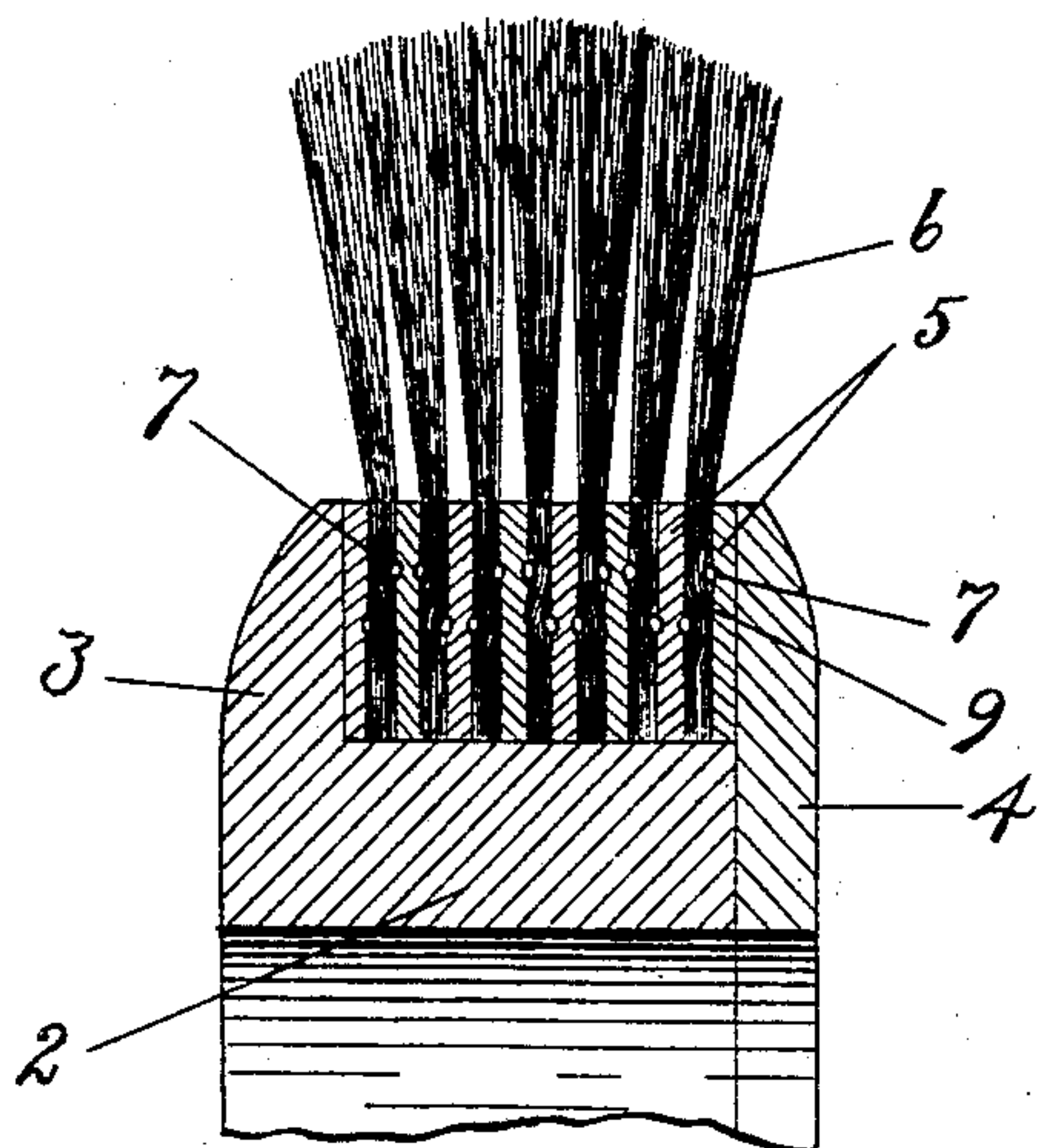


Fig. 2.

WITNESSES.

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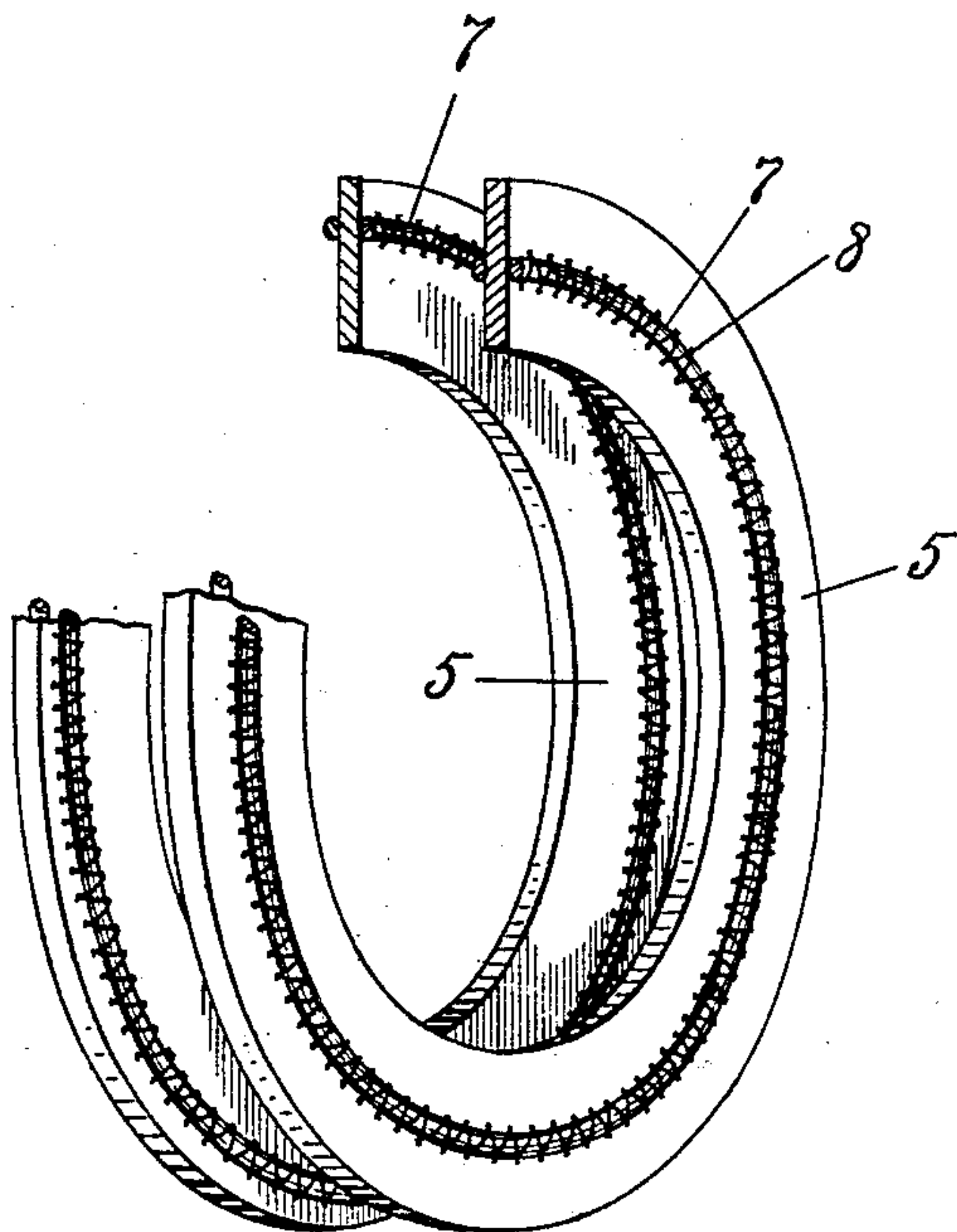


Fig. 3.

INVENTOR.

Charles E. Graham  
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# UNITED STATES PATENT OFFICE.

CHARLES E. GRAHAM, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## BRUSH.

No. 912,306.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed May 5, 1904. Serial No. 206,516.

*To all whom it may concern:*

Be it known that I, CHARLES E. GRAHAM, a citizen of the United States, residing at Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain Improvements in Brushes, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to brushes, and has for its particular object the production of a brush in which the bristles, wires, or equivalent materials, are firmly held or clamped in place.

I describe my invention as embodied in an annular or rotary brush such as is commonly employed for cleaning or polishing various articles. I have found the brush illustrated to be well adapted for finishing boots and shoes. My invention, however, in its broadest aspects, is not at all limited to brushes intended for this specific purpose.

Brushes of the class to which this invention relates usually comprise a "filler" and a holder, or hub, to which the filler is applied and clamped. The filler is composed of a plurality of rows or layers of bristles and corresponding clamping members, strips, or rings alternating with the layers of bristles, the whole being bound together by some adhesive, such as glue, by through bolts, or in any other manner. This general construction is well known in the art and is shown in United States Patent No. 353,038, dated November 23, 1886, to which reference may be had for a detailed description. While such a brush is fairly satisfactory it has been found that the bristles frequently pull out. In my novel brush and filler I overcome this difficulty by interposing a cord, string, or equivalent device, between each layer of bristles and one or both of the adjacent clamping strips or members, which cord embeds itself somewhat in the layer of bristles, and when the clamping strips are of a relatively soft and yielding material, such as strawboard, each cord also is partially embedded in the adjacent strip. Furthermore, I find that the layers of bristles are best secured in place by locating the cord on one side of said layer in an off-set position relative to the cord on the opposite side. Therefore the two cords on

the adjacent sides of adjacent clamping strips are not opposite each other, but are at different points longitudinally of the bristles. By this arrangement, which is an important feature of my invention, the bristles are locked in place, or "bit" by the cords.

My experiments show that the locking or biting is most effective when the cords on the opposite sides of a layer of bristles are only slightly off-set. I therefore place the two cords at a distance apart longitudinally of the bristles approximately equal to from one to two times the thickness of the layer of bristles. Preferably, also, before assembling the bristles and strips, two cords are secured opposite each other on the two sides of each clamping strip. This may be done by zig-zag sewing or in any other convenient manner. It may be desirable, in some cases, to secure two or even more, cords to each side of some or all of the strips. In addition to the clamping or locking function, the cords also have the function of holding the parts of the brush together against the centrifugal force resulting from the high speed at which the brush is run when in use. For this reason, the cords must be made of a material having some degree of tensile strength.

A preferred form of my invention will now be described in detail in connection with the accompanying drawings forming a part of this specification, in which:—

Figure 1 shows the complete brush in perspective; Fig. 2 is an enlarged transverse radial section of one side of the brush; and Fig. 3 is a perspective view showing a pair of the clamping strips or rings.

Referring to the drawings, 2 is a hub having flanges or heads 3 and 4, one being shown as integral with the hub and the other as separable therefrom to permit the filler to be removed and replaced or a new filler to be substituted when the one in use becomes worn. This filler comprises a plurality of clamping strips or rings 5 of strawboard, or similar material, between each two of which is interposed a layer of bristles 6. To opposite sides of each clamping strip are secured in any desired manner the cords, 7. I preferably use for this purpose a firm, hard, fibrous cord or twine and fasten at one operation a ring of it to each side of a clamping strip 5, as by zig-zag stitching 8 (Fig. 3).

An important feature of my invention is



that the cords on opposite sides of a layer of bristles are slightly off-set so as to lock or "bite" the bristles and thus prevent them from pulling out. This locking effect of the  
 5 cords is shown at 9 in Fig. 2, where the bristles are shown as bent around the cords in a double curve. The locking or biting may be increased by bringing the outer cord for each layer of bristles nearer to the inner cord.  
 10 As shown on the drawings, these cords are at a distance apart, radially, equal to about twice the thickness of the layer of bristles, but it is often desirable to increase the "bite" by reducing this distance so that it  
 15 will be no more than half that shown.

In assembling strawboard rings and bristles to form a filler, a clamping ring may be laid in a horizontal position with glue applied to one side. Then the end of a bunch of bristles  
 20 is dipped into the glue and the bristles laid around the ring in a layer of the proper thickness. Another ring, with glue applied thereto, is then laid upon the layer of bristles and the process is continued until a filler of  
 25 the desired width of the face is obtained. The whole is then consolidated by pressure. Since in this preferred embodiment of my invention the clamping rings are made of somewhat soft material, the pressure forces  
 30 the cords partially into the rings. Usually the cords embed themselves about equally in the bristles and in the rings. The cords thus not only lock the bristles, but also re-  
 35 inforce and strengthen the filler to enable it to withstand the centrifugal strains to which it is subjected in use. The cords are useful also as a dam to prevent the glue at the base of the bristles from exuding outward beyond  
 40 the cords into the operative portions of the bristles. If the glue were allowed so to exude it might, after becoming hard, scratch the shoe or other article upon which it should be used.

Although I refer to the part 5 as a "strip",  
 45 any block, bar, or ring having a similar purpose or function is intended to be included within that term.

While I have thus set out one embodiment of my invention with much minuteness, I do not regard it as limited to these details  
 50 nor to the particular kind of brush shown, for it is obvious that the form and construction of the brush may be modified considerably without departing from the spirit and  
 55 gist of my invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a rotary brush, a layer of bristles, strips of yielding material between which  
 60 the bristles are clamped, a cord located between each strip and the layer of bristles, said cord being embedded in both the strip and the bristles, and means for binding the whole together.  
 65

2. In a rotary brush, a plurality of layers of bristles and of alternately arranged annular strips of yielding material for clamping the bristles, a cord secured to each strip and embedded between it and the adjacent layer  
 70 of bristles, and means for binding the whole together.

3. In a rotary brush, a layer of bristles, two annular strips between which the bristles are clamped, one on each side of the  
 75 layer of bristles, a ring of cord interposed between each strip and the bristles, one ring being nearer than the other to the clamped end of the bristles, and means for binding the whole together.  
 80

4. In a rotary brush, a plurality of layers of bristles and of alternately arranged annular strips for clamping the bristles, a ring of cord secured to each bristle-engaging side of  
 85 each strip, the rings on adjacent strips being of different diameters, and means for binding the whole together.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. GRAHAM.

Witnesses:

J. FREDERICK L. EDMONDS,  
 ARTHUR L. RUSSELL.