Patented Oct. 30, 1923. 1,472,165

UNITED STATES PATENT OFFICE.

WILLIAM F. GRAUL, OF NORTHAMPTON, MASSACHUSETTS, ASSIGNOR TO FANNIE S. LOOK, ELDON MACLEOD, WILLIAM CORDES, AND GEORGE H. BURR, TRUSTEES, DOING BUSINESS AS FLORENCE MANUFACTURING COMPANY.

METHOD OF MAKING BRUSHES.

No Drawing. Application filed March 3, 1919. Serial No. 280,504.

To all whom it may concern:

Be it known that I, WILLIAM F. GRAUL, a citizen of the United States, residing at Northampton, county of Hampshire, State of Massachusetts, have invented a certain new and useful Improvement in Methods of Making Brushes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has to do with a new and improved method of making brushes and particularly such toilet and tooth brushes as have a celluloid or pyroxylin back in which are set tufts of bristles. Difficulty has been experienced in the past in the manufacture of brushes of this nature and particularly those in which the tufts of bristles are secured in place by staples because the bristles forming the tufts frequently work loose or crack under the staple and finally break and work out of the hole. This difficulty is caused in part by the strain to which the bristle is subjected as it is being inserted, it being bent sharply upon itself, and in part to the fact that the hole in which the tuft is set is necessarily slightly larger than the diameter of the tuft of bristles, so that the bristle can work back and forth slightly. Although this movement is minute, it eventually causes the bristle to come out. Attempts have been made to compress the celluloid composing the brush back about the tufts of bristles, but such attempts have not been successful for reasons which need not be explained in detail herein.

I have discovered that if the celluloid surrounding the hole in which the tuft of bristles is set is treated with some solvent of celluloid after the tuft of bristles has been set and then the solvent is allowed to dry, the celluloid will be contracted or shrunk about the tuft of bristles and the bristles will be held in place so firmly that they cannot work out of the hole. In practising my improved process, no adhesive such as collodion is employed as has been heretofore suggested, and therefore the bristles employed in my novel process may be said to be in their natural state, even though they may be temporarily moistened with the solvent with which the walls of the holes are treated either directly by application to the walls of the holes or indirectly by application to the bristles and thence to the walls of the holes. My improved method is applicable not only to brushes the tufts of bristles of which are held in by anchors but also to drawn brushes.

Suitable liquids for this purpose are amyl or ethyl acetate, acetone, or a mixture of some of them with certain non-solvent liquids as will be well understood by those skilled in the manipulation of celluloid.

Various methods for treating the celluloid about the holes, all of said methods being within the scope of my present invention, are practical. For instance, a minute drop of solvent may be placed in the hole just before the tuft of bristles is set, or the folded end of each tuft of bristles may be treated with the solvent just before it is set. I find, however, that the work can be more effectively performed in another manner. The holes are drilled and the tufts of bristles are all set in the brush in the well known maner, as for instance, by an automatic drilling and tuft setting machine or the brush may be drawn by hand. Thereafter, the ends of the bristles composing the brush are dipped in a shallow dish containing the solvent and are held there long enough to permit the solvent to pass up the bristle by capillary attraction and to reach the brush back. This occurs almost instantaneously. The portion of the bristle which is wet with the solvent is of slightly different color from the dry bristle, and after the tufts of bristles have been dipped in the solvent, the change in color will be seen to travel upward about as rapidly as the eye can follow it. Thereafter, the brush is removed and allowed to dry with the bristles hanging downward. When the brush is dried, it will be found that the celluloid has been shrunk about the bristles in the tufts, and all the interstices between the bristles and the sides of the hole which formerly existed have disappeared.

The process embodying my invention is very simple to practise and is inexpensive, but it produces a remarkable change in the

character of the brush. Brushes which have thus been treated very seldom shed any bristles.

What I claim is:

1. The method of making brushes which consists in setting tufts of bristles in their natural state in holes formed in celluloid brush backs and by the application of a solvent of celluloid, causing the original material of the brush back about the several tufts to engage the bristles and secure the same in place.

2. The method of making brushes which consists in setting tufts of bristles in their natural state in holes formed in celluloid brush backs and by the application of a solvent containing amyl acetate, causing the original material of the brush back about the several tufts to engage the bristles and secure the same in place.

3. The process of making a brush having a celluloid back and tufts of bristles set therein which consists in applying a solvent of celluloid to a free portion of the bristles and allowing the said solvent to reach the brush back by capillary attraction.

4. The process of making a brush which consists in setting the tufts of bristles in their natural state in a celluloid brush back and then applying a solvent of celluloid to the portion of the brush back immediately about the holes in which the bristles are set to cause the brush back about the tufts of bristles to contract.

5. The process of making a brush which consists in setting tufts of bristles in a celluloid back, then dipping the free ends of the bristles in a celluloid solvent, and then allowing the brush to dry while suspended with the free ends of the bristles down.

In testimony whereof I affix my signature.

WILLIAM F. GRAUL.