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[56] **References Cited**

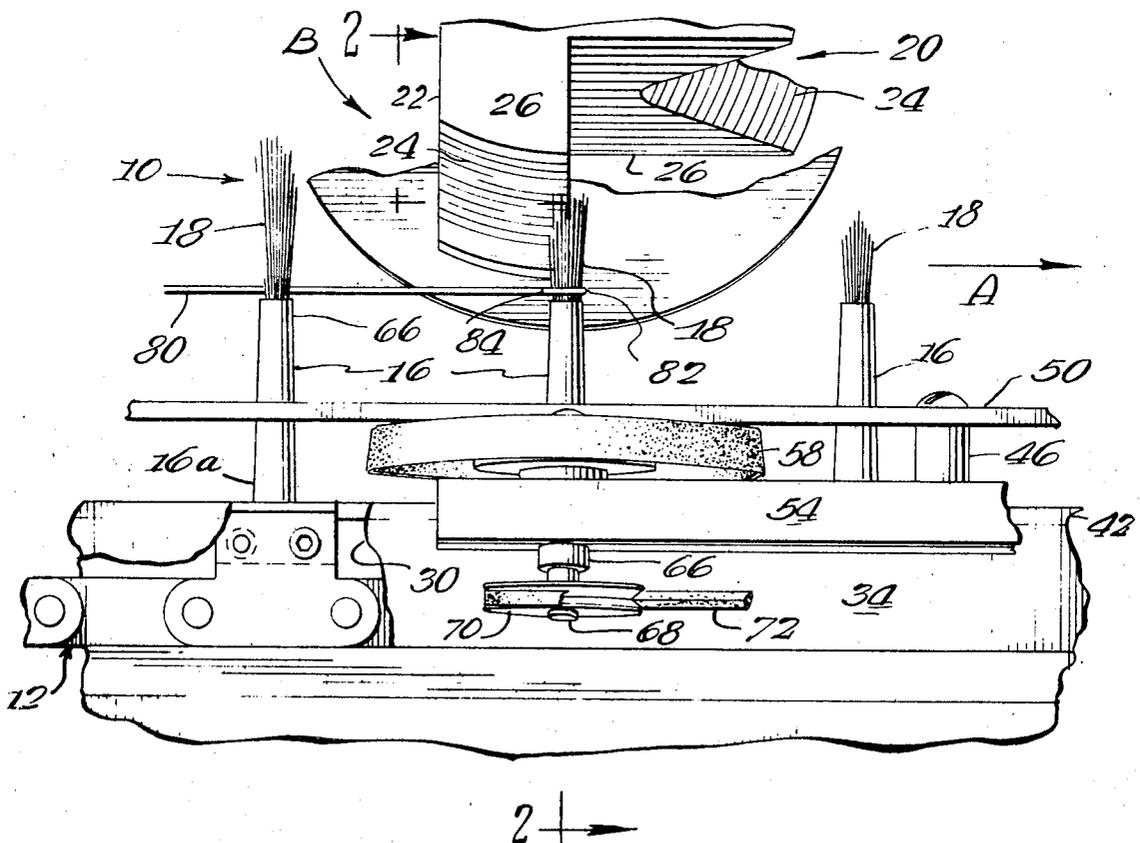
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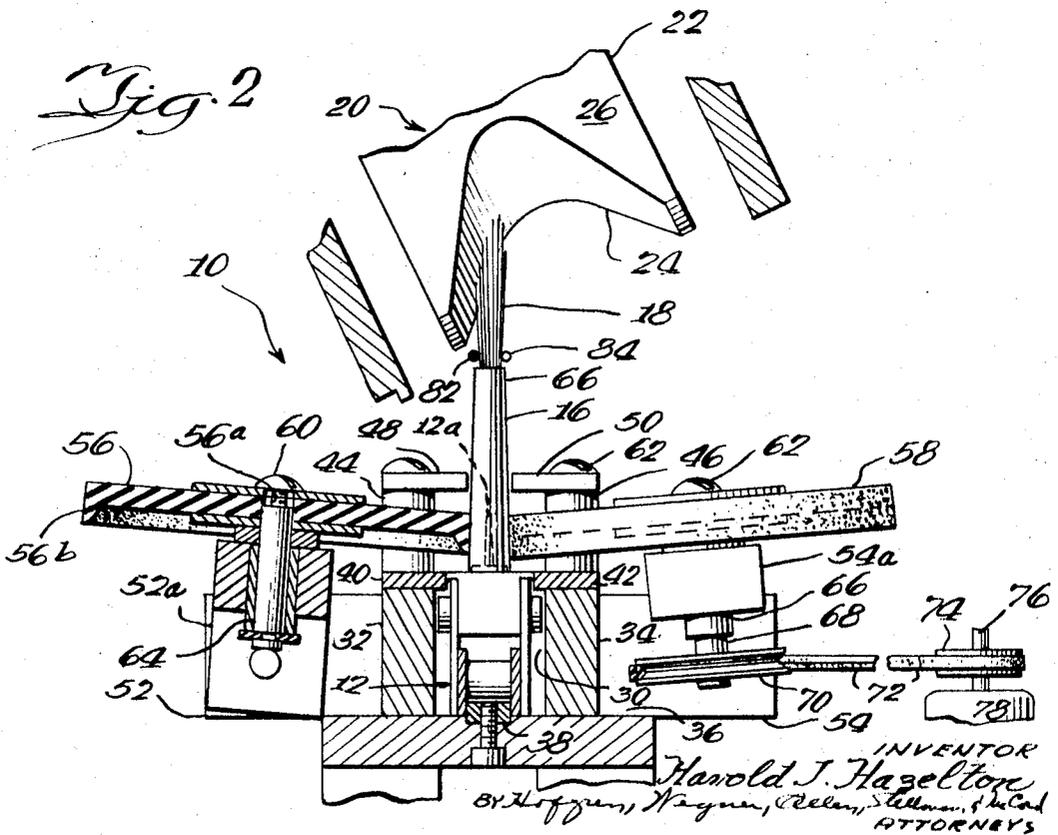
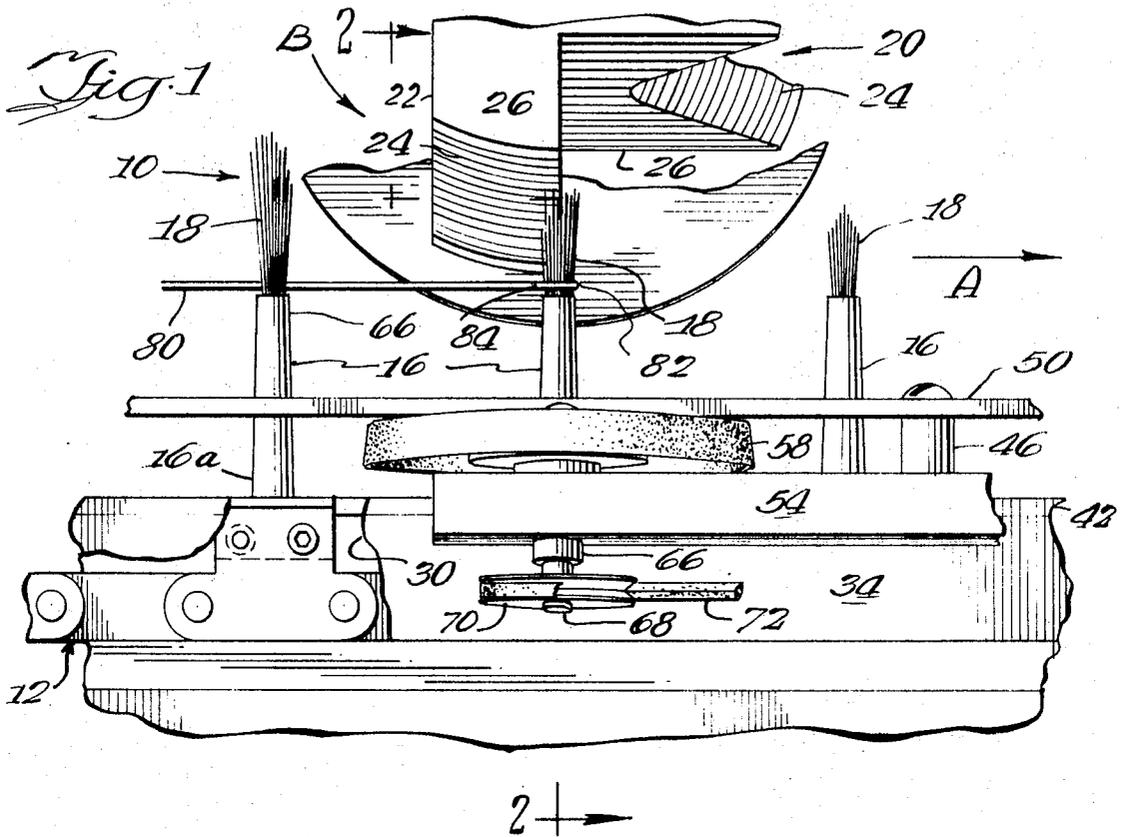
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[54] **TRIMMING STATION FOR BRUSHMAKING MACHINE**  
 10 Claims, 2 Drawing Figs.

[52] U.S. Cl. .... 300/17  
 [51] Int. Cl. .... A46d 9/02  
 [50] Field of Search ..... 300/17;  
 90/20; 51/76, 79, 80, 88, 89

**ABSTRACT:** An improvement in a brushmaking machine for making artist-type paint brushes. The improvement is directed to the means for trimming the bristles following tufting thereof into a ferrule and includes structure at a bristle-trimming station for grasping the tufted ferrules and rotating the same about the longitudinal axis of the ferrules while the tufts thereof are subjected to a trimming blade for finishing the ends of all the bristles thereby.





## TRIMMING STATION FOR BRUSHMAKING MACHINE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This application relates to an improvement in brushmaking machines.

#### 2. Brief Description of the Prior Art

In the brushmaking machinery art there are different types of finishing units which are used for finishing the bristles of different types of brushes. Examples of such finishing units are shown in the following patents all assigned to the assignee of this invention: Hazelton, U.S. Pat. No. 3,416,262, Clemens, U.S. Pat. No. 3,355,839, and Peterson, U.S. Pat. No. 3,233,943.

The finishing units referred to hereinabove generally have not been utilized for small brushes having small tufts of relatively long bristles, such as artist-type paint brushes. The bristles of such brushes, as any other paint brush, must be subjected to a finishing operation. Preferably, the artist-type paint brush has a tip thereon which is generally frustoconical in configuration. Presently known for finishing units such as those specified above were not designed for the intended use of putting a pointed configuration on an artist-type paint brush and accordingly are not satisfactory for that purpose. Thus, a need has arisen in the art to provide an improved trimming station to form the pointed type of end on the bristles of artist-type paint brushes and it is to the satisfaction of this need and desire that the present invention is directed.

### SUMMARY OF THE INVENTION

This invention is directed, in brief, to the provision of an improved brushmaking machine and particularly to an improvement in the means for trimming the ends of bristles after the bristles have been inserted into a ferrule and are presented to a finishing station.

The best mode currently contemplated by me for carrying out the invention includes the provision of a trimming station having a trimming blade which rotates about an axis generally transverse to the longitudinal axis of the presented ferrules. At the trimming station, means are provided for establishing relative rotation between the ferrule and rotating trimming wheel about an axis generally coaxial with the longitudinal axis of the ferrule. Preferably, this is accomplished by providing opposed rotating discs, at least one of which is driven, which are in peripheral engagement with the ferrule. The discs grip the sidewalls of the ferrules and rotate the ferrules while the bristle ends are being trimmed by the rotating trimmer blade. The trimmer blade is preferably one having a generally shallow V-shaped configuration and accordingly, the desired conical end configuration is imparted to the tufted bristles.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary side elevational view of a portion of a trimming station of a brushmaking machine showing the improvement of this invention; and

FIG. 2 is a section view of the trimming station of the brushmaking machine taken generally along the line 2-2 of FIG. 1.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail a specific embodiment therefore, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

### BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Typically, in the brushmaking machinery art, a workpiece blank or ferrule is presented to a tufting station where bristle bundles are inserted into the blank or ferrule. In the case of

solid blanks, it is first necessary to drill holes therein to receive the tufts whereas in the case of generally hollow ferrules, the tufts may be directly inserted into the ferrule. Subsequently, the tufted blank or ferrule is advanced to different trimming stations to impart the desired end configuration to the bristles secured therein.

The present invention is directed to the provision of an improved trimming station 10 as shown in FIG. 1. A continuous conveying means such as the chain 12 is provided for advancing ferrules 16 with bristle tufts 18 positioned therein throughout the path of travel of a brushmaking machine as represented by the arrow A in FIG. 1. One preferred manner of advancing the ferrules is for the ferrules to remain impaled on an upstanding pin like member 12a of the chain 12 as the chain advances through the brushmaking machine.

Trimming station 10 includes a trim head assembly substantially similar to that described and claimed in the patent to Harold C. Peterson, U.S. Pat. No. 3,233,943, issued Feb. 8, 1966, and assigned to the assignee of this invention. By way of brief explanation, the trim head assembly 20 includes a rotary cutter 22 mounted for rotation as indicated by the arrow B in the FIG. 7. Rotary cutter 22 has a generally concave V-shaped cutting edge 24 on a plurality of cutting fingers 26 for trimming the bristle tufts 18 placed in the ferrules 16 at a tufting station as the cutter rotates as indicated by arrow B about an axis generally transverse to the longitudinal axis of the ferrules.

In the area of the trim station 10, the chain 12 travels in a channel means 30. Included in channel means 30 is a plurality of elongate bars 32 and 34 spaced from each other and connected to a base 36 which spans the bottom of the bars 32 and 34. An upstanding chain guide 38 is mounted in channel 30 for guiding the chain through this area of the brushmaking machine.

Inwardly extending rib members 40 and 42 are mounted at the top bars 32 and 34 to limit the lateral movement of the chain in that they terminate closely adjacent the sides of the chain 12. Posts 44 and 46 are mounted on top of the bars 32 and 34 and support guide rails 48 and 50 which extend inwardly toward each other to confine the lateral movement of the ferrule 16 in the area of the trimming station.

Arms 52 and 54 are connected to arm extensions 52a and 54a, respectively, at the trimming station. Each of these arms rotatably mounts a ferrule rotating element such as discs 56 and 58, respectively. It has been found that hard rubber piston cups of the type used in small hydraulic cylinders are most suitable for use as the discs 56 and 58.

Each of the discs has a central opening such as 56a and a slightly, outwardly divergent depending peripheral flange, such as 56b. Fastening means 60 and 62 extend through the aforementioned central opening into a spindle 64 and 66, respectively, which is rotatably mounted within each of the arms 52 and 54. By this arrangement each of the discs 56 and 58 is rotatably mounted with respect to its respective arm. As best seen in FIG. 2, the axis of rotation of each disc is slightly inclined inwardly toward the other disc, generally parallel to the edge of the ferrule.

Spindle 66 for disc 58 has an extension 68 on which a pulley 70 is mounted. An endless belt 72 interconnects pulley 68 and pulley 74 on shaft 76 of motor 78 for rotatably driving disc 58. It is intended that the disc would be arranged so as to be peripherally abut the ferrule 16 which is in a position for trimming by the trim head assembly 20. Thus, as disc 58 is rotated, it will rotate ferrule 16 and, in turn, rotate the idler disc 56.

To insure proper positioning of the tufts 18, the trim station 10 further includes a generally horizontally extending wire member 80 which has a U-shaped loop 82 terminating in a returned end 84. The loop is generally of a size and shape to embrace a tuft of bristles near the ferrule to hold the bristles and give support thereto as the bristles are engaged by the cutting edges 24 of the fingers 26 and trim head assembly 20.

Thus, in operation as the chain 12 is advanced intermittently and a ferrule 16 is brought into position beneath the trim head assembly 20, the tufts 18 will be supported by the loop 82 of wire 80. At the same time, the driven disc 52 and idler disc 56 will engage the sides of the ferrule 16 to rotate the same while the tufts 18 are simultaneously being trimmed by the cutting edges 24 of the trim head assembly 20. Disc 56 may be either continuously or intermittently driven when the ferrule 16 is present beneath the trim head assembly 20. After the trim head assembly 20 has completed its cycle of operation on the tufts 18 of ferrule 16, the chain 12 is again intermittently advanced and the tufts 18 will bend and yield as they are forced passed the loop 82 of wire 80. In this manner, a thorough trimming of all of the bristles of the tuft in a desired pointed fashion as is preferable for artist-type brushes is assured. It is to be noted that it is intended that the axis of rotation of each of the discs 56 and 58 would generally be parallel to the line defined by the opposite sidewalls 16 of the ferrule when viewed in elevation. This is to insure a good facial engagement between the flange area of each of the discs and the ferrules 16.

The rotational mounting of each of the discs 56 and 58 about an axis which is slightly inclined upwardly and inwardly toward each other not only insures that the periphery of each disc will be generally parallel to the edge of the ferrule 16 which is presented to the trimming station, but further gives the advantage of continually urging the ferrule 16 downwardly relative to its impaled mounting on pin 12a of chain 12. Generally speaking, the peripheries of the discs 56 and 58 are spaced apart a distance generally equal to the cross-sectional thickness of a ferrule to be presented at the trimming station. Because it is contemplated that the preferred form of the disc would be made of a yieldable material, it is thereby possible for the chain to advance ferrules to a position between the discs and for the discs to sufficiently contact the ferrule to rotate the same without the need for moving the discs toward and away from the ferrules each time a ferrule is presented and then removed from the trimming station. It is to be understood that it is contemplated that the mounting arrangement for the ferrules such as the arms 52 and 54 can be connected to the remaining structure of the machine by suitable well known means, such as pin and slot arrangement, so that the distance between the discs may be adjusted to accommodate ferrules of different thickness. It is to be further understood that while the particular cutting blade shown herein has a V-shaped cutting edge, and has proven to be most satisfactory for use in combination with the components of the trim station of this invention, it is contemplated that the cutting blades of other configurations might also be utilized, the thrust of this invention being to provide a means for uniformly finishing all edges of the tufted bristles preferably in the tear drop or frustoconical configuration common with artist-type paint brushes.

The trim station improvement of this invention provides a structure for forming the uniformly tapered end configuration on the tuft of bristles so that the resultant bristle bundle has the generally frustoconical tip desired with artist-type paint brushes. This is accomplished by rotating the ferrule about its longitudinal axis by means of the driven and idler discs which embrace the sides of the ferrule while the bristle bundle is subjected to the trimming action of a known trimming head assembly. The structural additions at the trim station are minimal and can be provided in existing machinery with little modification therein.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom as some modifications may be obvious to those skilled in the art.

I claim:

1. In a brushmaking machine having a trimming station for trimming the free ends of bristles tufted into a ferrule presented to the trimming station, the trimming station including a trimming head having a rotatable trimming element which is oriented to rotate about an axis generally transverse to the longitudinal extent of presented bristles and ferrules, and to intersect the bristle ends to accomplish the trimming function thereby, the improvement which comprises, in combination with a means for presenting the tufted ferrules for trimming at the station, a means for establishing relative rotation between the trimming head and ferrules generally about an axis of rotation substantially transverse to the axis of rotation of the trimming element to insure uniform cut of all free edges of the bristles of the tuft, said means including rotatable members which engage the periphery of the ferrules in the area of the trimming station to rotate the same.

2. The brushmaking machine of claim 1 wherein the rotatable members are disclike members having a ferrule engaging periphery.

3. The brushmaking machine of claim 2 wherein one of the disclike members is driven and the other of the disclike members is freely rotatable.

4. The brushmaking machine of claim 2 wherein the axis of rotation of the disclike members is generally parallel to the periphery of the ferrule.

5. The brushmaking machine of claim 4 wherein the axis of rotation of the discs is inclined.

6. The brushmaking machine of claim 5 wherein the rotatable discs are positioned opposite each other with an axis of rotation of each of the discs being inclined toward each other.

7. In a brushmaking machine having a trimming station for trimming tufts of bristles mounted in ferrules presented relatively uprightly at the trimming station, the combination of a cutting blade mounted at the trimming station for rotation about an axis generally transverse to the relative upright presentation of the ferrule, the cutting blade having a generally V-shaped cutting edge for trimming the bristles of the ferrule, and a driven ferrule engaging member having a ferrule engaging periphery for continuously rotating the ferrule about its relative upright axis and thereby relatively rotate the bristles of the tuft with respect to the V-shaped cutting edge of the rotating cutting blade during the presence of the ferrule at the trimming station.

8. The combination of claim 7 wherein the driven ferrule engaging member is mounted for rotation about an axis which is inclined toward the relative upright axis of the ferrule.

9. In a brushmaking machine having a trimming station for trimming tufts of bristles mounted in ferrules presented relatively uprightly at the trimming station, the combination of a cutting blade mounted at the trimming station for rotation about an axis generally transverse to the relative upright presentation of the ferrule, the cutting blade having a generally V-shaped cutting edge for trimming the bristles of the ferrule, and a driven ferrule engaging member mounted for rotation about an axis which is inclined toward the relative upright axis of the ferrule and having a ferrule engaging periphery for rotating the ferrule about its relative upright axis and thereby relatively rotate the bristles of the tuft with respect to the V-shaped cutting edge of the rotating cutting blade.

10. The combination of claim 9 wherein a second rotatable ferrule engaging member is positioned opposite the said ferrule engaging member with both said ferrule engaging members being spaced apart a distance substantially equal to the cross-sectional thickness of a ferrule intended for presentation to the cutting blade with the second rotatable ferrule engaging member being similarly mounted on an axis inclined relative to the relative upright axis of the ferrule.