May 27, 1924. 1,495,747

R. IZAWA

MACHINE FOR TAPERING BRISTLES

Filed April 9, 1921

Fig. 1.

Fig. 2.

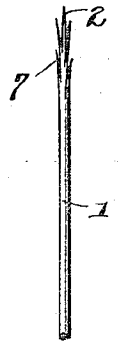


Fig. 3.

Fig. 4.

Fig. 5.

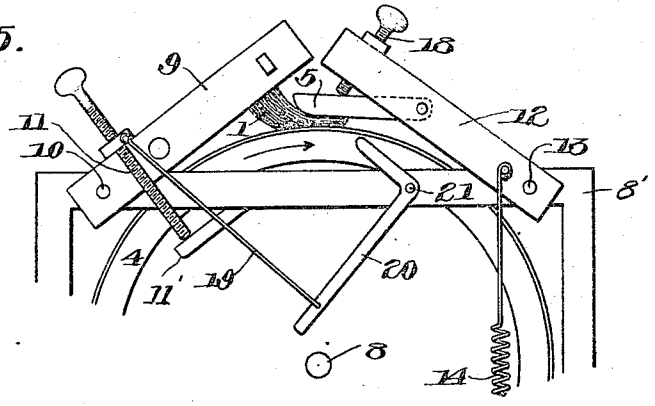


Fig. 6.

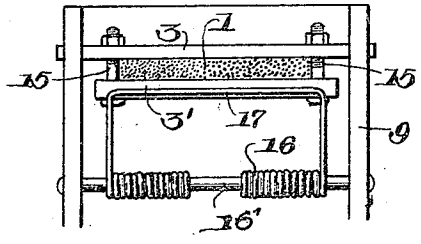
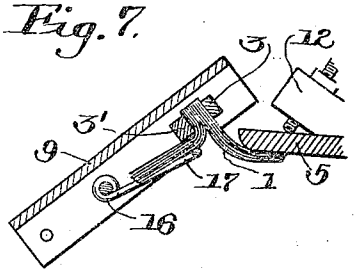


Fig. 7.



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UNITED STATES PATENT OFFICE.

RIICHIRO IZAWA, OF KYOTO, JAPAN.

MACHINE FOR TAPERING BRISTLES.

Application filed April 9, 1921. Serial No. 460,003.

To all whom it may concern:

Be it known that I, RIICHIRO IZAWA, subject of the Emperor of Japan, residing at No. 7 Furunishi Machi; Nishikikoji Agaru, Nishi-no-Toin Dori, Shimogyo ku, Kyoto, Japan, have invented new and useful Improvements in Machines for Tapering Bristles, of which the following is a specification.

This invention relates to apparatus for tapering hairs or bristles by means of abrasion, the object of the invention being to provide an improved machine of this character by means of which the proper taper can be readily and quickly imparted to the bristles to render them suitable as a filler for brushes, and which machine is comparatively simple in construction and efficient and economical in operation.

In the drawings accompanying and forming part of this specification, Fig. 1 is a side elevation, on a very much enlarged scale, of a bristle artificially pointed or tapered according to the present invention;

Fig. 2 is a similar view of a bristle which has become split at its tapered end;

Fig. 3 is a similar view of a bristle before treatment;

Fig. 4 is a similar view of a sinuous bristle such as is commonly found among naturally tapered bristles;

Fig. 5 is a side view of an apparatus adapted for treating the bristles so as to produce the desired taper;

Fig. 6 is a bottom plan view of a frame employed in the apparatus herein described, for holding the bristles in position for treatment; and

Fig. 7 is a sectional side view of the frame shown in Fig. 6, illustrating the finished bristles separated from the unfinished and held away from the grinder.

The same characters of reference designate the same parts in the different figures of the drawings.

As is well known, brushes for applying paint, varnish, paste, or the like, are principally made from bristles of swine, tails of horses, hairs of sheep, or the like, and the requisite quality for such bristles or filaments is that they should be pointed, because otherwise the brushes made therefrom will not uniformly spread the substance applied therewith. Naturally pointed bristles and hairs, however, form only a small part of the brushes on the market and are expensive. By means of the present invention, I have provided a machine by means of which blunt or unpointed bristles, such, for instance, as that shown in Fig. 3, may be abraded, thus giving to said bristles a tapered formation, as shown at 2, Fig. 1. The following is an example of the apparatus for accomplishing this result:

Referring to the drawings, 4 is a circular grinder which is secured to a shaft or axle 8 mounted for rotation in a frame structure 8′ and adapted to rotate in the direction of the arrow shown in Fig. 5. A bristle-holding frame 9 is pivoted to the frame 8′ at 10 and maintained at any desired inclination by means of an adjusting screw 11 which is threaded through frame 9 and bears at its inner end against a projecting portion or bracket 11′ formed on the structure 8′. A second frame 12 is pivoted to the structure 8′ at 13 in opposed relation to the frame 9, said frame 12 being flexibly pulled downward toward the grinding member 4 by means of a spring member 14. The frame 9 has secured thereto, near its upper end, a transversely extending bar 3, and attached to this bar by means of adjusting bolts 15 is another transverse bar 3′, this bar being adjustable toward and from the companion bar 3 by means of the threaded bolts 15 so as to form a space between said bars for the accommodation of a mass of bristles, which can be firmly retained between the bars by tightening the bolts 15. The frame 9 is also provided with a U-shaped member 17 adapted to bear against the bar 3′, the ends of said U-shaped member terminating in coil springs 16, the ends of which are held fast on a rod 16′ secured in the frame 9. To the frame 12 is pivoted a pressing member or board 5, which is retained in operative position by means of an adjusting screw 18 threaded through the frame 12 and bearing at its inner end against said board. A bell-crank or elbow lever 20 is pivoted to the frame 8′ at 21, the shorter arm of which lever is normally in a line coincident with the circumference of the grinder 4, the longer arm of the lever being connected with the frame 9 by means of a cable or similar flexible member 19, whereby when the grinding operation is completed and the frame 9 raised the lever 20 will be swung on its pivot so that its shorter arm will contact with the frame 12 and raise the same against the action of the spring 14, thus carrying the board 5 out of contact with the grinding surface of the

member 4, which surface is provided with a suitable abrasive material, either placed directly thereon or with an intermediate of felt or other elastic material.

The operation of the machine is as follows: The bristles to be pointed are first "stacked" or arranged so that they are even at one end, and are then placed between the bars 3 and 3′ and the bolts 15 tightened so as to securely clamp the bristles between said bars. The inclination of the frame 9 is then adjusted so that the even ends of the bristles lie on the grinding surface of the member 4, as shown in Fig. 5, and the board 5 adjusted so that it bears upon said ends and holds them so that when the grinding member is rotated the ends of the bristles will be ground to a taper. As soon as the lower layer of bristles has been abraded sufficiently, this layer is separated from the remaining bristles and turned down behind the U-shaped member 17, whereby they are held out of contact with the abrading surface of the grinder. This operation is repeated with successive layers until the bristles are all ground to the proper taper. After the operation is completed, the frame 9 is raised, whereupon the bellcrank lever 20 will be swung on its pivot until the shorter arm engages the frame 12 and will thus prevent the board 5 from contacting with the abrasive surface of the grinder.

Experiments have demonstrated that with some kinds of bristles treated in the manner above described, the bristles split at and near the end, as shown at 7 in Fig. 2.

Bristles treated in accordance with the present invention not only make good substitutes for naturally pointed bristles, but present certain advantages over the latter. Naturally pointed bristles are usually more or less sinuous, as shown at 6, Fig. 4, and require certain treatment to make them straight, while the bristles tapered as herein set forth, require no further treatment for the purposes for which they are intended. Moreover, with naturally pointed bristles, the tapering portion is unnecessarily long and slender, thus making the bristles very difficult to handle, especially when putting them into position to be manufactured into brushes, and sometimes it is necessary to cut off the ends. With the bristles treated as herein described, however, since they are manufactured from straight bristles, any desired degree of taper can be given thereto. Furthermore, some naturally pointed bristles are too flexible throughout their entire length, while bristles treated as herein set forth retain their natural strength at the base or root and increase in flexibility only toward the free ends which is a very desirable quality in brushes.

Having thus described my invention, what I claim is:

1. A machine for tapering bristles, comprising a framework, a rotatable abrading member mounted therein, a frame pivotally secured to said framework, said frame having means for clamping therein a mass of bristles and adapted to carry said bristles into contact with the abrading member, a second frame pivotally secured to said framework in opposing relation to said first frame, means carried by said second frame for pressing the bristles on said abrading member, flexible means for retaining said pressing means in contact with the bristles, means carried by said first frame for holding the finished bristles away from the abrading member, and means operated by the swinging of the first frame on its pivot for holding the second frame out of contact with the abrading member.

2. A machine for tapering bristles, comprising a framework, a rotatable abrading member mounted therein, a frame pivotally secured to said framework, said frame having means for clamping therein a mass of bristles and adapted to carry said bristles into contact with the abrading member, a second frame pivotally secured to said framework in opposing relation to said first frame, means carried by said second frame for pressing the bristles on said abrading member, flexible means for retaining said pressing means in contact with the bristles, means carried by said first frame for holding the finished bristles away from the abrading member, and a bellcrank lever operated by the swinging of the first frame on its pivot for holding the second frame out of contact with the abrading member.

3. A machine for tapering bristles, comprising a framework, a rotatable abrading member mounted therein, a frame pivotally secured to said framework, said frame having means for clamping therein a mass of bristles and adapted to carry said bristles into contact with the abrading member, a second frame pivotally secured to said framework in opposing relation to said first frame, adjustable means carried by said second frame for pressing the bristles on said abrading member, flexible means for retaining said pressing means in contact with the bristles, a spring-pressed frame pivotally carried by said first frame for holding the finished bristles away from the abrading member, and a bellcrank lever operated by the swinging of the first frame on its pivot for holding the second frame out of contact with the abrading member.

In testimony whereof I have signed my name to this specification.

RIICHIRO IZAWA.