Dec. 9, 1952 W. H. HOWE ET AL 2,621,080

METHOD OF PRODUCING BENT BRISTLE BRUSHES

Filed Jan. 15, 1948

Fig. 1

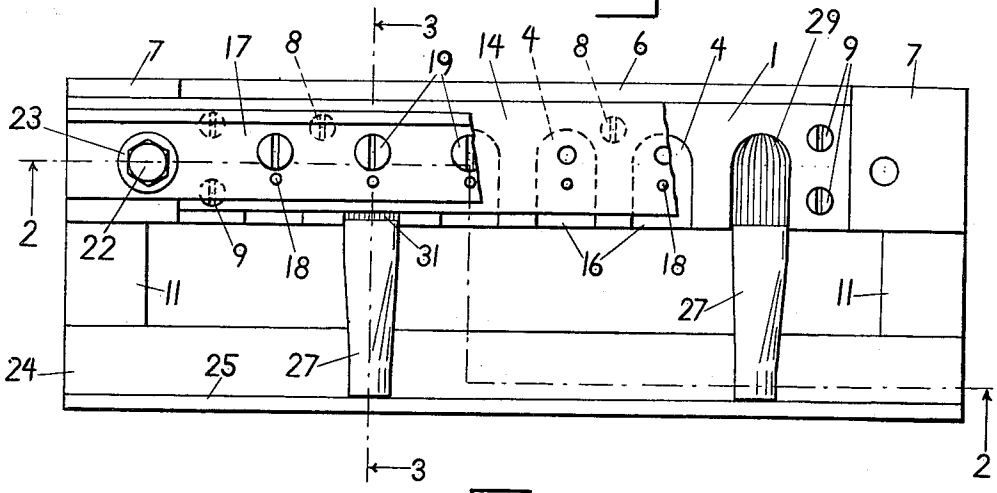


Fig. 2

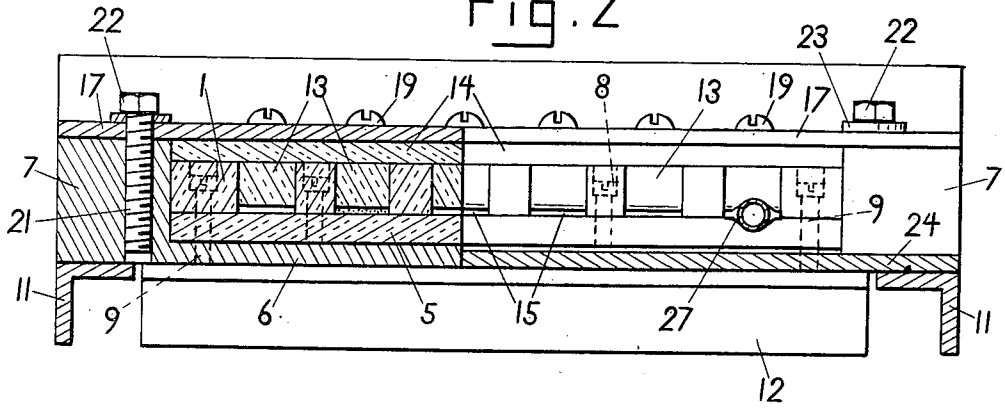


Fig. 3

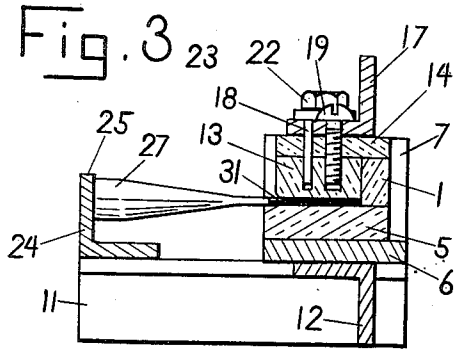
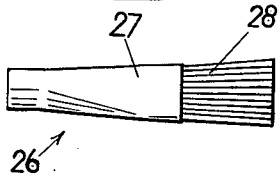


Fig. 4



Inventors:
WILLIAM H. HOWE
HAROLD W. REED

By Maurice Block

Attorney

Patented Dec. 9, 1952 2,621,080

UNITED STATES PATENT OFFICE

2,621,080

METHOD OF PRODUCING BENT BRISTLE BRUSHES

William H. Howe, Bronxville, and Harold W. Reed, Brooklyn, N. Y., assignors, by mesne assignments, to Harry G. Liese, New York, N. Y.

Application January 15, 1948, Serial No. 2,538

8 Claims. (Cl. 300—21)

1

Our invention relates to the manufacture of brushes of the "bent bristle" type in which bristles have ends so bent toward the tip of the brush that the bristles converge and form a tapering tuft.

It is well known in the painting art that bent bristle brushes have advantages which ordinary brushes do not have. But, hitherto, the manufacture of bent bristle brushes has been cumbersome and expensive. Objects of our invention are to facilitate the manufacture of bent bristle brushes, to produce brushes with accurately bent and positioned bristles, and to reduce the cost of this production.

Other objects are a method for producing a brush having a tuft consisting of properly bent and arranged bristles, to avoid dislocation of the properly arranged bristles and to secure the properly bent shape of the bristles permanently.

Still other objects and advantages will appear from the following description of an exemplifying embodiment of our invention, from the appended claims and from the accompanying drawing in which:

Fig. 1 shows a top view of a device adapted for the production of bent bristle brushes according to our invention, some top parts of this device being partly broken off, two ferrules provided with tufts being inserted in this device for the purpose of being treated according to our invention.

Fig. 2 shows a cross-section taken along the broken line 2—2 in Fig. 1, a screw bolt crossed by this line being represented non-sectionally.

Fig. 3 shows a cross-section taken along the line 3—3 in Fig. 1, a screw, a pin and a ferrule being represented non-sectionally.

Fig. 4 shows a top view of a ferrule provided with a bristle tuft before insertion and treatment according to our invention.

Referring to Figs. 1 to 3, numeral 1 indicates a flat strip or slat provided with a row of recesses 4. These recesses extend from the front of the strip 1 parallel to each other and have curved ends of that shape which the tufts of the produced brushes shall have. The drawing shows, for example, a strip 1 with six recesses 4. But any other desired number of recesses may be arranged in a strip of a length corresponding to this number.

Another strip 5 is affixed to the lower side of the strip 1 and closes the bottoms of the recesses 4. The strips 1 and 5 together form a unified body which constitutes the concave part of a mould. This body is positioned in a metal

2

frame comprising a strip or ledge 6 supporting the strip 5 and two blocks or walls 7 positioned adjacently to the ends of the strips 1 and 5. The strips 1 and 5 may be secured to each other by screws 8 and 9, some of which may additionally serve to affix the concave mould body to the frame or to its ledge 6. For example, the screws 9 extend from the strip 1 through the strip 5 into the ledge 6.

The frame is supported and re-inforced by angular rails 11 and 12 affixed to the lower side of the ledge 6. There may be two lateral rails 11 symmetrically positioned under the ends of the ledge 6, and a rail 12 running in the longitudinal direction of the ledge 6. The rails 11 and 12 form the feet of the frame and of the entire device.

Blocks or cover bodies 13 are affixed, for example, cemented to a common strip or ledge 14 and fit the recesses 4. One block 13 is provided for each recess 4. When the ledge 14 contacts the top of the strip 1 as shown in the drawing, the blocks 13 reach into the recesses 4 a little less far than the bottoms of these recesses whereby spaces 15 with open front sides are left in the recesses. These narrow spaces are adapted to hold bristle tufts confined in bent condition. The blocks 13 extend from the curved rear sides of the recesses 4 to the front not quite as far as the strip 5 whereby narrow front margins 16 of the strip's 5 upper surface are left uncovered.

The blocks 13 and the ledge 14 together form a unified body constituting a convex mould part which fittingly co-operates with the concave mould part described before. This convex mould part may be re-inforced by a rail 17 of angular cross-section. The rail 17 is positioned on top of the ledge 14 and runs in the longitudinal direction of the latter. The correct positions of the blocks 13 may be secured by pins 18 passing through bores in the rail 17, in the ledge 14 and in the blocks 13. The rail 17 may be affixed to the ledge 14 and to the blocks 13 in suitable manner, for example, by screws 19.

The rail 17 and, thereby, the convex mould part can be secured to the frame and to the other mould part by bolts 21 having screw threads engaging corresponding threads of bores in the frame blocks 7, and having heads 22 contacting washers 23 placed on the top surface of the rail 17. After removal of the bolts 21, the rail 17 can be taken off the blocks 7 whereby the convex and the concave mould parts are separated.

Another rail 24 of angular cross-section is affixed on top of the front ends of the rails 11 and

forms a bridge from one rail 11 to the other. The rail 24 is positioned at a distance in front of the spaces 15 and has an edge 25 running parallel to the strip 5 and rising a little higher than this strip. The distance between the edge 25 and the strip 5 is a little shorter than the ferrules which will be described later.

Bent bristle brushes have been previously made by arranging bent bristles in proper positions and, then, affixing the thus arranged bristles to a ferrule or to a handle. The proper arrangement of the bristles is very difficult and cumbersome and is apt to be disturbed when the bristles are being affixed to the ferrule. According to our invention, natural animal bristles, for example, pig bristles are bent after they are affixed to a ferrule. This method starts with brushes 26 of the type shown in Fig. 4. A brush of this type comprises a ferrule 27 to which a tuft 28 of ordinary or straight bristles is affixed. Such brushes are easy to make by well known methods and are available at low cost.

Further according to our invention, the tuft 28 is forced into the desired curved shape in which bristles are bent toward the tip of the tuft. While held in this shape, the tuft together with its ferrule is treated with hot, preferably boiling water for considerable time, for example, for two hours and a half. Then the tuft is dried while still held in the mentioned shape and while remaining affixed to the ferrule. The drying may take place, for example, in a dryer of ordinary and well known structure, and may last for about four hours.

We have found that the boiling and subsequent drying treatment removes all tendency from the bristles to return to their original shape or to abandon the enforced bent shape. After this treatment, the enforcement of this shape is no longer necessary and the brush may be finished in usual and well known manner, the ferrule being affixed to a handle of any well known type.

The described method is facilitated, and its results are improved by the use of the device shown in Figs. 1 to 3. This device is used in the following manner:

One or, preferably, several brushes of the type shown in Fig. 4 are placed in the device while the upper part of the device comprising the top rail 17, the ledge 14 and the blocks 13 are removed. The drawing shows only two brushes inserted in the device. But there may be as many brushes inserted as there are recesses 4. Each of these brushes is so positioned that the tuft lies in a recess 4 and extends into the area over the margin 16 and that the ferrule 27 rests with its tuft-bearing end on this margin while the opposite end of the ferrule contacts the rail 24 or the edge 25 thereof.

Then, the temporarily removed parts of the device are affixed again to the remaining parts by means of the screw bolts 21. Hereby the concave and convex mould parts engage each other, the blocks 13 entering the recesses 4. When the bolts 21 are tightened, the blocks 13 are in their lowermost positions. The tufts are almost completely confined in the spaces 15 and are forced to assume the shape shown in Fig. 1 at 29. Only very short parts 31 of the bristles emerge from this space and project beyond the blocks 13.

Then, the entire device with the inserted brushes is immersed in water, and the water is kept at boiling temperature for about two hours and a half. The hot water contacts the parts 31 of the bristles and therefrom penetrates the entire tufts positioned in the moulding spaces 15.

Then, the entire device with the inserted brushes is placed into a drying chamber where it is kept as long as necessary for the removal of the moisture from the device and from the bristle tufts, that is, for about four hours. During this drying operation, the moisture of the tufts escapes through the front openings of the spaces 15.

Then, the bolts 21 are unscrewed, the mould is opened by the removal of its upper part, and the brushes are taken out. Thereafter, the bent bristle brushes retain the tuft shape 29 permanently. The device is immediately ready for renewed use.

The strips 1, 5 and 14 and the blocks 13 are made of suitable non-metallic material which does not scorch the bristles under the influence of heat. For example these moulding parts may be made of suitable plastics. The remaining parts of the device are made of stronger, preferably metallic non-corrosive material, for example, of an aluminium alloy. These metallic parts re-inforce the non-metallic parts so that the mould will not be distorted by heat.

The device makes it unnecessary to touch or to handle the brushes directly during the boiling and drying treatment, and makes it possible to place a large quantity of brushes into the boiling bath and into the drying chamber by less work than the handling of the individual brushes would require.

We desire it understood that our invention is not confined to the particlar embodiment shown and described, the same being merely illustrative, and that our invention may be carried out in other ways without departing from the spirit of our invention as it is obvious that the particular embodiment shown and described is only one of the many that may be employed to attain the objects of our invention.

Having described the nature of our invention, what we claim and desire to protect by Letters Patent is:

1. A method of making a bent bristle brush from an assembled tuft thereof, said method comprising the steps of holding one end of a tuft of natural animal bristles by a ferrule in permanently connected condition at such end, forcing said tuft edgewise, while it is in said condition, so that the opposite free end has the bristles in the tuft forced into a curved shape tapering toward the connected end of said tuft and, thereby, bending bristles of said tuft, confining said tuft in said enforced shape and, simultaneously with the confined condition, first treating said tuft with hot water and then drying said tuft.

2. A method of making a bent bristle brush from a brush assembly, said method comprising the steps of holding one end of a tuft of natural animal bristles by a ferrule in permanently connected condition at such end, forcing said tuft edgewise, while it is in said condition, into a curved shape tapering toward the connected end of said tuft and, thereby, bending bristles the free bristle ends of said tuft, towards each other confining the ends so bent and immersing said tuft connected with said ferrule and so confined in boiling water, and drying said tuft, the enforcement of said shape in confined condition being continued during said immersing and drying operations.

3. A method of making a bent bristle brush from a tuft thereof held in a ferrule, said method comprising the steps of holding one end of a tuft of natural pig bristles by the ferrule in permanently connected condition, forcing said tuft, while it is in said condition edgewise at the free end, into a curved shape tapering toward the connected end of said tuft by pressure applied to the sides of the bristles of said tuft fanning out the same and curving the free ends towards each other and, thereby, bending free ends of the bristles of said tuft, soaking said tuft with boiling water and then drying said tuft, the enforcement of said shape being continued during said soaking and drying operations.

4. A method of making a bent bristle brush from a tuft of natural bristles held in a ferrule, said method comprising the steps of holding one end of the tuft by said ferrule in permanently connected condition, forcing said tuft edgewise, while it is in said condition, into a curved shape tapering toward the connected end of said tuft by pressure applied to the surface of said tuft except to a part of said surface adjacent to the end held by said ferrule and, thereby, bending bristles of said tuft, penetrating said tuft from said unpressed surface with boiling water and then drying said tuft by evaporation of water through said unpressed surface, the enforcement of said shape being continued during said penetrating and drying operations.

5. A method of making a bent bristle brush from a tuft of natural bristles held in a ferrule in which the ferrule end pinches the tuft into a fan shape at its free end, comprising the steps of forcing the tuft edgewise into a confining space which guides the side edges of the tuft into a curve towards the center, holding the tuft in said confining space while immersing the same in boiling water, first to soften

the tuft within said confining space and then drying the tuft within said space.

6. A method in accordance with claim 5 wherein the immersing time in boiling water is continued for about two and one-half hours and the drying time is about four hours.

7. A method for imparting to a bundle of straight bristles a permanent curvature adjacent their painting ends which comprises the steps of exposing and bending the bristles in a wet state toward a central portion of the bundle and holding the same in a bent condition, and while so held boiling the bristles and thereafter drying the bristles in the so-held condition aforesaid.

8. A method for imparting to a bundle of straight bristles a permanent curvature in accordance with claim 7 wherein the bristles are boiled for a period of about two and one-half hours before drying the bristles in the so-held condition as set forth.

WILLIAM H. HOWE.
HAROLD W. REED.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,948,605	Whitehouse	Feb. 27, 1934
1,953,980	Teller	Apr. 10, 1934
2,055,321	Teller	Sept. 22 1936
2,055,322	Teller	Sept. 22, 1936
2,157,118	Heckert	May 9, 1939
2,226,529	Austin	Dec. 31, 1940
2,240,388	Calva	Apr. 29, 1941
2,419,864	Westin	Apr. 29, 1947

FOREIGN PATENTS

Number	Country	Date
410,070	Great Britain	May 10, 1934