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H. J. HAZELTON

3,416,262

ABRASIVE DEVICE FOR FINISHING PAINT BRUSHES

Filed Nov. 10, 1965

3 Sheets-Sheet 1

FIG. 1

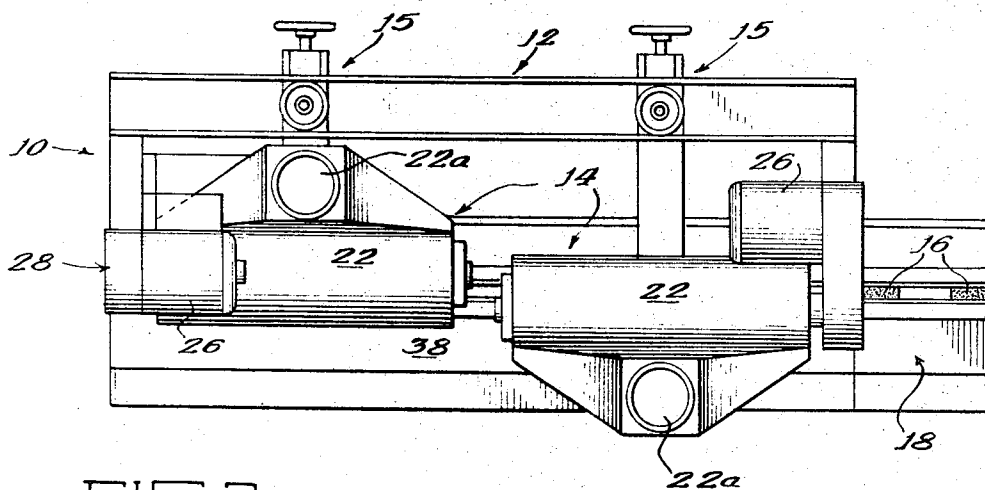
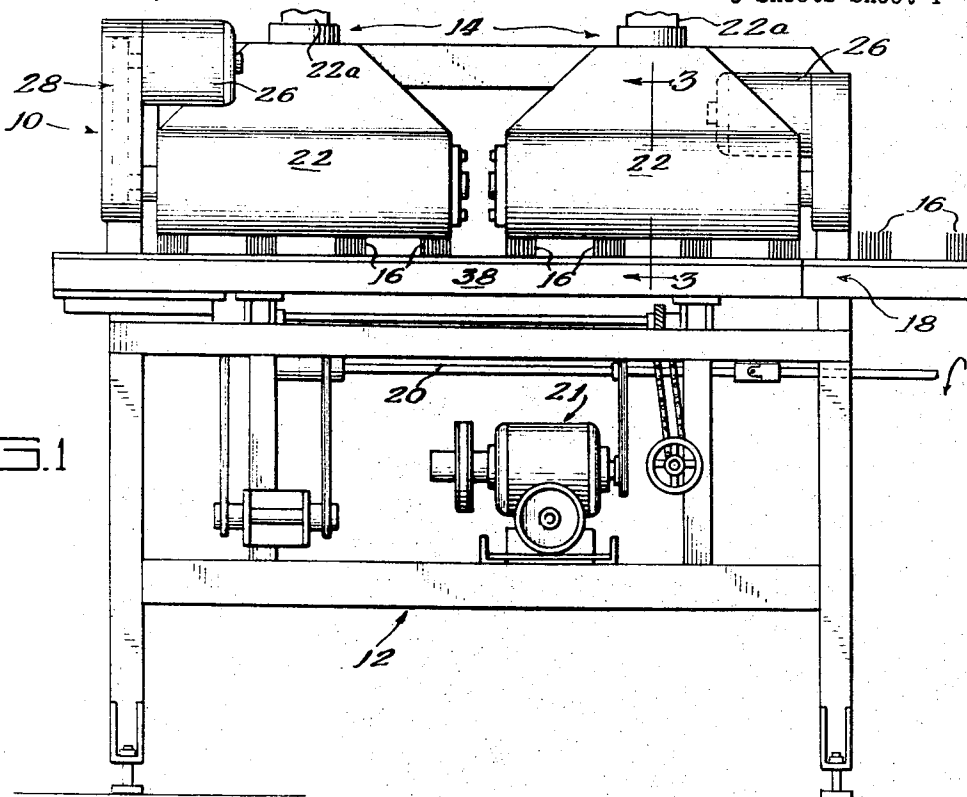


FIG. 2

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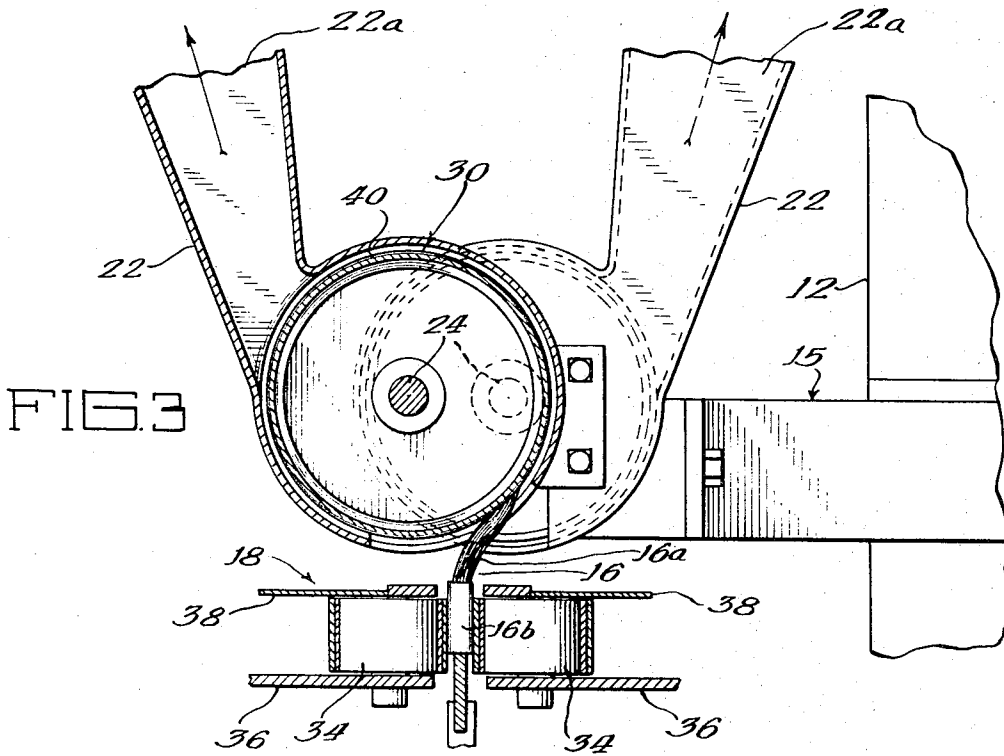


FIG. 4

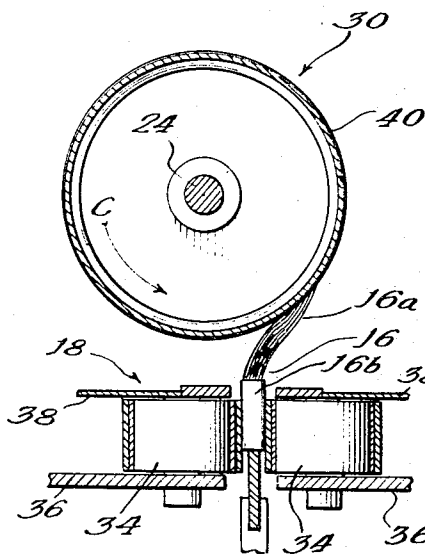
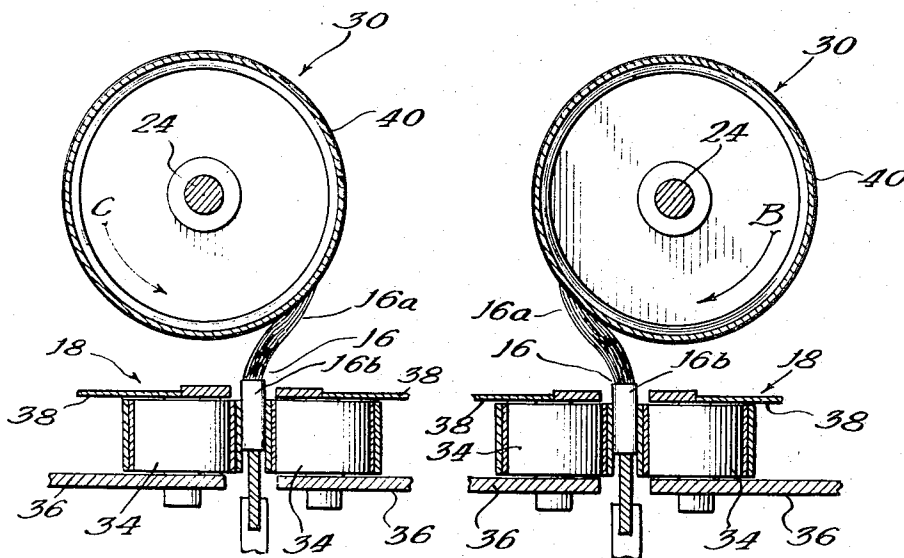


FIG. 5



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FIG. 6

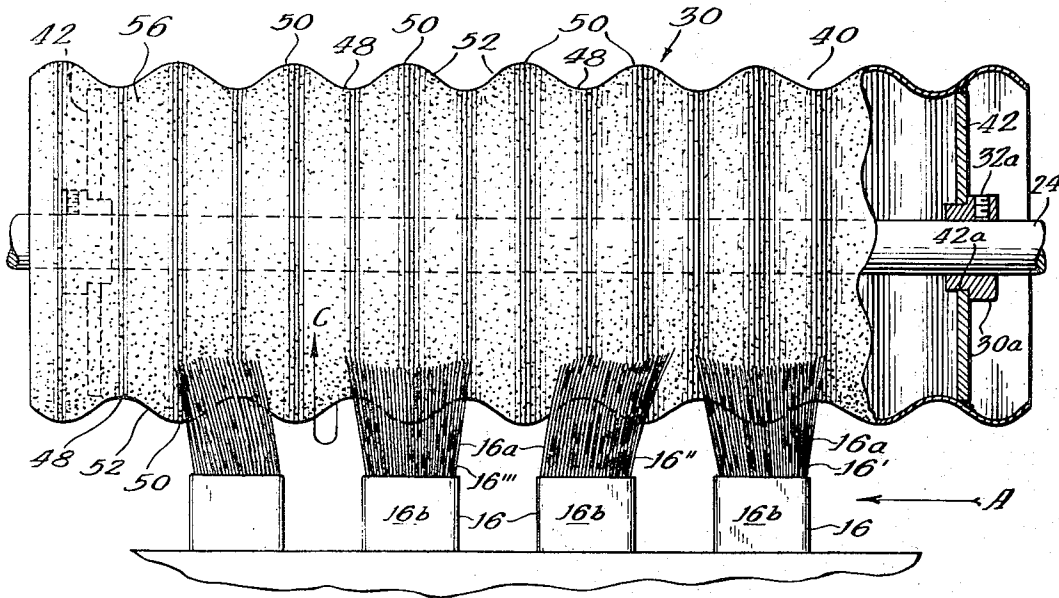
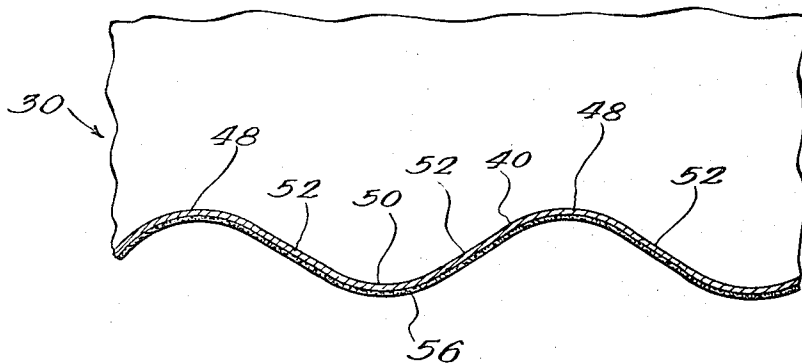


FIG. 7



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ABRASIVE DEVICE FOR FINISHING PAINT BRUSHES

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ABSTRACT OF THE DISCLOSURE

A brush finishing device in the form of an abrasive drum having a sinuous exterior, generally of a sign wave configuration, the drum preferably being utilized by two such drums being tandem mounted in offset relationship with respect to one another on opposite sides of a path of brush travel, the two drums being driven in opposite directions relative to each other to roughen the bristles of brush fed through the path of brush travel.

This invention relates to abrasive devices and more particularly to a novel abrasive drum well suited for finishing bristle-like articles such as brushes and the like.

In the manufacture of articles such as paint brushes which have either artificial or natural hair-like bristles, it is often desirable to subject the tapered end of the brushes to a finishing operation, so as to impart a fuzz-like finish to all of the bristles which is especially desirable in paint brushes for giving the brushes improved paint holding and paint application qualities. Often, abrasive devices performing this function actually work only on the outermost bristles and then fail to engage the entire circumference of the free end of each bristle.

It is, therefore, a primary object of this invention to provide a new and improved abrasive means for finishing fibrous articles.

It is another object of this invention to provide a new and improved abrasive drum for finishing the free ends of brush bristles which is provided with a configuration capable of engaging substantially the entire surface of the free ends of all brush bristles as the brush is moved along the drum.

Still another object of this invention is to provide a new and improved abrasive drum for finishing brush bristles having an undulated exterior which causes the brush bristles to progressively fan out and compact as a brush is moved axially of the drum with the free ends of the bristles in engagement with the periphery of the drum.

Yet another object of this invention is to provide a new and improved brush finishing machine for abrasively finishing substantially all of the free end surfaces of all the bristles of both sides of a brush.

Other objects, features and advantages of the present invention will be apparent from the following description of the preferred embodiments illustrated in the accompanying drawings, in which:

FIGURE 1 is a front elevational view of a brush finishing machine utilizing the finishing means of this invention;

FIGURE 2 is a top plan view of the machine shown in FIGURE 1;

FIGURE 3 is a section view taken along the line 3—3 of FIGURE 1 showing the lateral offset of the tandem mounted abrasive drums with respect to each other and showing a brush moved through a path which is medial with respect to the axes of the drums;

FIGURE 4 is a fragmentary sectional view showing the relative position of a brush and first drum shown in FIGURE 3;

FIGURE 5 is a fragmentary sectional view similar to

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FIGURE 4 showing the relative position of a brush and the second drum shown in FIGURE 3;

FIGURE 6 is a fragmentary enlarged view partially broken away in section of the novel abrasive drum of this invention and illustrating the various stages of engagement between the brush bristles and the undulated exterior of the abrasive drum; and

FIGURE 7 is a fragmentary enlarged sectional view showing the sectional configuration of the undulating wall of the novel abrasive drum of this invention.

The brush finishing unit 10 illustrated in FIGURES 1 and 2 includes a generally indicated frame 12 having brush finishing accessories 14 mounted on the frame by means 15 which permits vertical and horizontal movement of the accessories relative to the frame. Preferably the accessories are mounted in tandem in the same general horizontal plane and slightly laterally offset with respect to their longitudinal axes.

The accessories 14 are provided for performing a finishing operation on brushes 16, and in particular, upon the bristles 16a held in the brush handle or heel 16b as they are fed by a conveyor means 18 through the unit 10 past the finishing accessories 14. A driven shaft 20 which is driven by a motor means 21 is provided for supplying power to drive the conveyor means 18 for advancing the brushes through the unit.

Each finishing accessory 14 includes a housing 22 having an exhaust duct 22a for carrying away abrasive dust and the like. An accessory drive shaft 24 is rotatably mounted within the housing and driven by a motor means 26 through a pulley and belt means generally indicated 28 shown in dotted outline in FIGURE 1. The abrasive drum 30 of this invention is mounted within the housing on the shaft 24 by a collar and set screw 30a and 32a, respectively.

With reference to FIGURES 3, 4 and 5, the conveyor means 18 may include two opposed driven belts 34, each mounted on a conveyor base 36 and defining a brush driving channel between the belts. A housing 38 may be provided for enclosing the belt assemblies. The brushes are advanced by the facial engagement of the opposed faces of the brush heel or handle 16b with the opposed parallel faces of the driven belts to move the brushes longitudinally of the unit or axially with respect to the shafts 24 of the abrasive drum.

Each drum 30 comprises a hollow cylinder 40 having end walls 42 spaced slightly inwardly of each end of the cylinder. The end walls are provided with openings 42a in which the collar 30 is positioned for fixing the drums to the accessory drive shaft 24.

Each cylinder has an undulated exterior which consists of annular relieved portions 48 and raised portions 50 formed generally concentrically about the shaft and parallel to each other in planes which are generally perpendicular to the shaft 24. Preferably the raised portions all have the same diameter and the relieved portions likewise have the same diameter. The raised and relieved portions are joined by a smooth interconnecting frusto-conical section 52 so that, as illustrated in FIGURE 7, a section view through the wall of the cylinder 40 shows a configuration which is similar to the well-known sine wave.

The exterior of the cylinder 40 is coated with an abrasive material, preferably a nickel clad tungsten carbide. As the brushes are moved in the direction of the arrow A in FIGURE 6, or axially relative to the axes of the drums, and the drums are rotated as illustrated by the arrows B and C in FIGURES 3 through 6, the brush bristles traverse the undulated exterior of the abrasive drum 30 in such a fashion as to expose substantially the entire surface of the free ends of the bristle to the abrasive action of the drum.

Preferably, two such drums are mounted as shown in the drawings so that their axes of rotation are positioned on opposite sides of the brush 16 as it is fed by the conveying means through the brush finishing machine. Furthermore, one of the drums is rotated in a clockwise direction as indicated by arrow C in FIGURES 5 and 6, and the other drum is driven in a counterclockwise direction as indicated by the arrow B in FIGURES 3 and 4. This, in combination with the offset of the drums relative to the center line of the brush feeding channel, causes the brushes to be flipped to one side when advanced past the periphery of the first drum and then flipped to the other side when advanced past the periphery of the second drum so that both sides of the brush bristles are exposed to the unique abrasive action of the abrasive drum of this invention.

With particular reference to FIGURES 3 through 6, as the brushes are fed axially relative to the shafts 24, each brush will first contact the periphery of one of the laterally offset drums which will cause the brush bristles to be flipped or fanned to one side as shown in FIGURES 3 and 4 where the drum is driven in a counterclockwise direction indicated by arrow B. As the brush is further advanced in the direction indicated by the arrow A, it will travel beyond the first laterally offset drum and contact the second laterally offset drum which is rotated in the opposite direction as indicated by arrow C. This will cause the bristles to be flipped to the other side of the path of brush travel.

As the brush bristles are fed axially along the periphery of each rotating drum, the bristles are subjected to an action which is shown in FIGURE 6. When the bristles are positioned relative to the drum so that a raised portion 50 is generally midway of the bristles, the bristles drape downwardly along the two adjacent connecting portions 52 as illustrated by the brush 16' in FIGURE 6. As the brushes are further moved in the direction indicated by arrow A, so that the leading edge of the brush begins moving across the recessed portion 48 and "up hill" toward the next raised portion 50 along section 52, the bristles will tend to compact along the leading edge while still being fanned out along the trailing edge as indicated by brush 16". Then as the brush advances so that it again effectively straddles a raised portion 50 with leading edge portions draped over both adjacent sections 52, the bristles will have the same position relative to the drum as formerly described and as shown by brush 16".

It has been found that with the use of a rotating drum having this configuration approximating a sine wave, as the bristles are advanced past the periphery of the drum the compacting and fanning out of the bristles exposes all of the bristles to the drum periphery and further tends to twist the bristles so that the entire circumference of the free end of each bristle is exposed to the bristle exterior. It has been further found that by laterally offsetting the tandem related drums and driving them in opposite directions so that the bristles are flipped first to one side and then to the other to be subjected to the finishing action of these drums that an even more thorough uniform abrasive action is obtained on each bristle of the brush. Thus with this type of an abrasive drum for the first time a brush, such as a paint brush, may be subjected to a finishing operation wherein the entire peripheral extent of the free ends of all of the brush bristles, from the innermost

to the outermost of such bristles, will be subjected to the finishing action of the drum so that the desired fuzzy or velvet-like feel and appearance can be imparted to these bristle ends to provide paint brushes of improved paint holding and paint applying qualities.

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. A brush finishing machine, comprising: a frame; conveyor means on said frame for carrying brushes through a brush finishing path; first and second rotatably driven drums on said frame in tandem relation to each other, both drums being positioned so that portions of the peripheries of each drum intersects the brush finishing path to engage brush bristles of a brush carried therethrough, each of said drums having an uninterrupted sinuous exterior coated with an abrasive material; one of said drums mounted for rotation on an axis which is laterally offset to one side of the brush finishing path; the other of said drums mounted for rotation on an axis which is laterally offset to the other side of the brush finishing path.

2. The brush finishing machine of claim 1 wherein one of said drums is driven in clockwise direction and the other of said drums is driven in counterclockwise direction so that opposite sides of the brush bristles will be finished by said drums as the brushes are moved through said brush finishing path.

3. A brush finishing machine, comprising: a frame; conveyor means on said frame for carrying brushes through a brush finishing path; a rotatably driven drum on said frame, said drum being positioned so that portions of the periphery of said drum intersect the brush finishing path to engage brush bristles of a brush carried therethrough, said drum having an uninterrupted sinuous abrasive exterior with arcuate raised and arcuate relieved portions; said drum being mounted on the frame for rotation on an axis which is laterally offset to one side of the brush finishing path.

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U.S. Cl. X.R.

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