

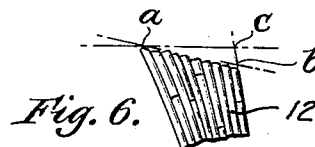
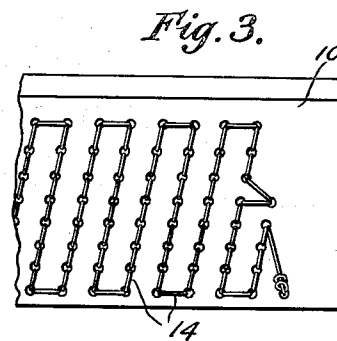
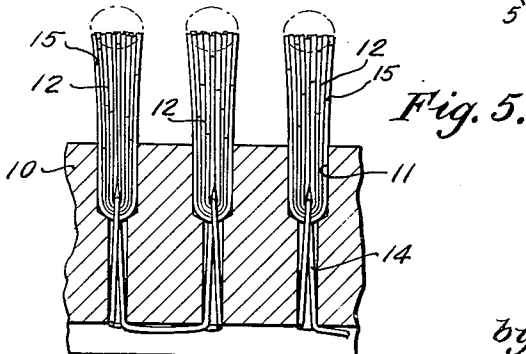
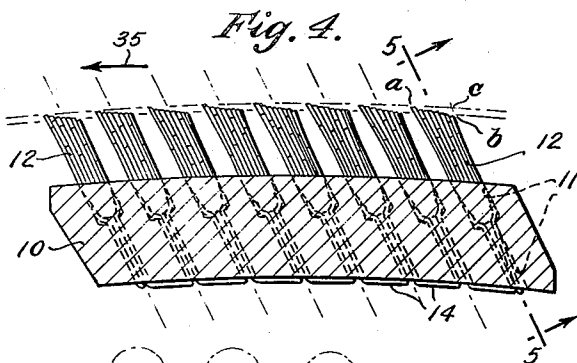
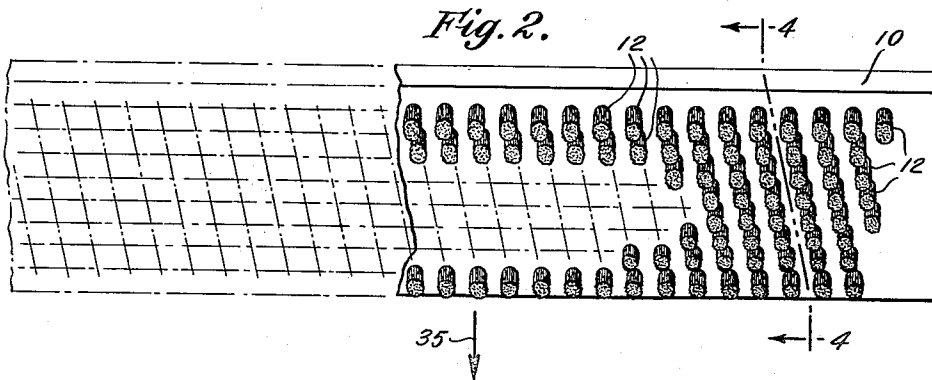
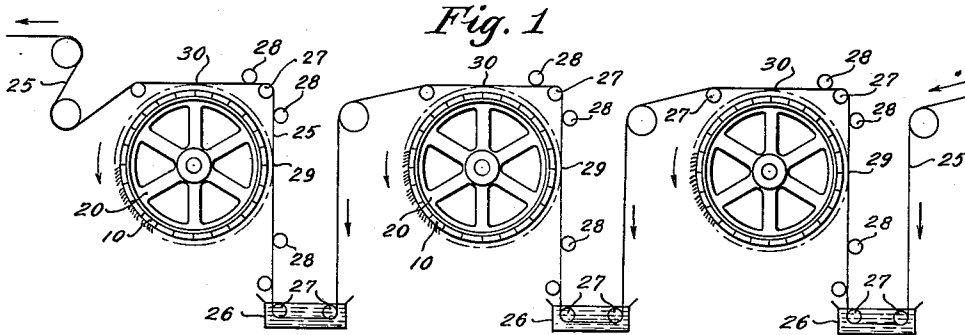
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BRISTLE GIGGING BRUSH

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BRISTLE GIGGING BRUSH

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2 Claims. (Cl. 26—31)

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This invention relates to a bristle gigging brush, designed to replace the well-known teasel gig used in finishing textile fabrics, and particularly woolens and worsteds.

As is well known in the textile art, woolens and worsteds, particularly, are subjected to finishing processes after the cloth is woven, the primary purpose of which is to enhance the quality of the cloth, by improving its appearance and feel or handle and thus make it more attractive to the purchaser. Wet finishing operations include raising, a process which consists in lifting out from the body of the fabric to the surface a layer of fibers, variously termed nap, pile or cover, by engaging the fibers with the sharp points of teasels or wire rollers. Raising operations in turn are of two types known as gigging or teaseling, and napping. In gigging or teaseling the fibers are laid flat in one direction by the teasels and treated to give them a lustrous appearance, and is generally applied to broadcloth finishes, where an evenly laid down nap with a lustrous appearance is desired. In napping on the other hand, the fibers are lifted with the sharp points of steel wires arranged on rotating cylindrical drums or rollers, or by teasels arranged on rotating spindles and in turn mounted on large rollers. In napping the fibers are lifted into a nearly upright position, which produces a finish on woolen cloth similar to that on velvets and plushes, and the types of naps vary according to the length of the fiber and include suede, duvetyn and velour finishes.

As is well known, teasels are the dried flower heads of a species of thistle plant having stiff spines or thorns. In gigging or teaseling, the teasels are mounted on slats on a large rotating frame or drum, known as a teasel gig. The drum is rotated at a speed of approximately 100 R. P. M., and the cloth is unrolled from large rolls usually immersed in water, and brought into direct contact with the teasel filled drum. The sharp points of the teasels engage the cloth fibers to lay them down in one direction on the surface of the cloth. The direction of rotation of the drum is the same as that of the cloth but it runs at higher speed. The process is continued until the desired finish is achieved.

The use of teasels involves many objectionable features and disadvantages. During the gigging process the teasels become filled with wool fibers and it is necessary to brush them frequently by hand or with a brushing machine to restore them to use. The teasels lose strength after they have been softened by being wetted by the water in the

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cloth, and it is necessary to let them dry out. The teasels deteriorate rapidly and have a very short life. They have to be replaced after 6, 8 or 10 hours' use. During replacement of the teasels the gigging machines are out of use for several hours. The teasels themselves lack uniformity in size, length of thorns and other characteristics, and in a short time the teasels become worn or broken, thus developing voids and uneven spacing of the teasels in the gigging machine. In addition, the teasels must be examined and graded and a large number of approximately similar dimensions are required to be selected to equip a machine, one machine requiring 2500 to 4000 teasels, depending on the size of the teasel. Despite their many shortcomings and disadvantages, teasels have been used for 150 years or more and are still used today in great numbers in finishing woolens and worsteds particularly. Many attempts have been made to find satisfactory substitutes for teasels, such as metal needles with flexible points or hooks on them, but they have all been unsuccessful for one reason or another.

I have succeeded, however, in devising a form of brush for gigging or teaseling, which brush is provided with relatively stiff flexible bristles, preferably made of nylon, but not limited thereto, which in commercial use has proved greatly superior to teasels and can be used in the standard teasel gig in place of the teasels. My brush construction is mounted on a slat back which in turn can be mounted in the standard teaseling gig. My brush has the advantages of uniform construction, whereby the depth of penetration of the bristles into the fabric can be closely determined, and the tufts of bristles are uniformly spaced, thus providing complete and uniform coverage of the cloth and eliminating the voids and uneven spacing common to teasel gigs. My brush has an infinitely longer life than teasels, and has as yet shown no signs of wear after several months of continuous experimental use. A much superior broadcloth finish of the high luster type can be obtained by using my brush in the same number of gigging machines, or as good a finish as presently obtainable from teasel gigs can be obtained with half the number of runs per cloth through the gigging machines (or by using half the number of gigging machines). Thus great savings in the raising process, or superior results can be achieved by the use of my brush in standard gigging machines.

Briefly, my brush has a plurality of tufts of stiff flexible bristles mounted in a slat or back of any suitable material, such as wood, metal, plastic

or the like, which slat in turn is adapted to be mounted on the rotating drum of the standard teaseling gig. The tufts are inclined or slantingly mounted in the slat in the direction of rotation of the drum at an angle approximating 30° , and the ends of the tufts of bristles are trimmed at an acute angle to present a sharpened point. The ends of the bristle tufts are drawn "penetrating," that is, are trimmed to an acute angle sharper or more acute than that represented by a cylindrical plane concentric to that of the rotating drum of the gigging machine, which passes through the end of the leading bristles. Thus the length of the bristles in each tuft decrease slightly and gradually from their leading or pointed edge to their trailing edge, in the direction of rotation of the drum. Thus each tuft has a number of bristles of slightly varying length which penetrate the filling yarn of the cloth at different depths varying as much as $\frac{1}{2}$ and of an inch, and thus the brush can "gig" close to the warp threads, to lay the fibers parallel in one direction and produce the high luster broadcloth finish desired. The bristles are preferably made of nylon, but can be made of other suitable flexible material such as orlon or metal spring wire, and the bristle forming the tufts may be set in the slat or back in any suitable manner, such as wire-drawn, rubber-set or the like.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the drawings:

Fig. 1 is a diagrammatic section showing a battery of gigging machines in operation;

Fig. 2 is a plan view of my brush on the bristle side;

Fig. 3 is a plan view of the brush from the bottom or underside;

Fig. 4 is a vertical section on line 4—4 of Fig. 2;

Fig. 5 is an enlarged vertical section on line 5—5 of Fig. 4, and

Fig. 6 is an enlarged detail of a bristle tuft.

In the drawings 10 represents the slat or back in which the bristle tufts 12 are mounted. The slat 10 is made of any suitable material such as wood, metal, plastic or the like, and is drilled by a series of holes 11 in which the bristle tufts are mounted. As shown in Fig. 2 the holes 11 are preferably arranged in a series of horizontal rows, and in the vertical rows are uniformly off-set, to provide a row slightly inclined from the vertical, thus insuring uniform coverage of the cloth to be processed, and leaving no gaps or voids as the slat 10 is rotated on the cylindrical drum 20 of the gigging or teaseling machine shown in Fig. 1. The slat 10 is preferably arcuate in cross sectional shape, and shown more particularly in Fig. 4 having a cylindrical curvature concentric with that of the cylindrical drum 20 of the gigging machine on which it is mounted, shown in Fig. 1. The slats 10, being designed to replace the old teasel slats formerly used on gigging machines, are necessarily of the same dimensions to fit the machines. As shown in the drawings the slats contain eight horizontal rows of bristle tufts and

are of sufficient length to fit the particular machine on which they are to be used, but it will be understood that the dimensions may be varied as desired.

The bristle tufts 12 and holes 11 in which the tufts are mounted are preferably inclined or slantingly mounted in the slat in the direction of rotation of the drum 20 at an angle approximately 30° , but it will be understood that the angle of inclination may be varied as desired. In the drawings (Figs. 2, 4 and 5) the bristle tufts 12 are shown as wire-drawn in the slat 10, but it will be understood that the tufts may be set in the slat in any other suitable manner, as being rubber-set, or the like. When wire drawn it will be noted that the bristle tufts 12 are bent at their center portion and are held in the holes 11 by means of a flexible wire 14 passing through the reversely bent inner ends of the tufts and thence downwardly through the slat to successive tufts.

The tufts 12 preferably have their outer ends trimmed at an acute angle to present a sharpened point with the sharpened edge leading in the direction of rotation of the drum. In cross-sectional view, as shown in Fig. 4, the tufts 12 are preferably trimmed to a sharper or more acute angle than would be represented by a cylindrical plane concentric with that of the axis of rotation of the rotating drum 20 on which the slats 10 are mounted. Thus in cross section the bristle tufts 12 incline downwardly from their leading edge to their trailing edge, in the direction of rotation of the cylindrical drum, as shown more particularly in Fig. 4. The angle of inclination from the leading edge to the trailing edge of the bristle tufts 12 is represented in Figs. 4 and 6 by the small triangle a, b, c in which a is at the leading or pointed edge of the bristle tuft 12, b is its trailing edge and c is a point lying in the same cylindrical plane as point a and concentric with the axis of rotation of the cylindrical drum 20. It will be noted that individual bristles in the bristle tufts 12 thus are trimmed to a sharpened point at approximately the same acute angle as that of the tuft 12 of which it forms a part, and in the same plane as represented by the line a, b in Figs. 4 and 6. Thus the lengths of the individual bristles in the tufts 12 decrease slightly and gradually from the leading or pointed edge of the bristle tuft to its trailing edge, and in actual dimensions by as much as $\frac{1}{2}$ of an inch. In this manner each tuft 12 has a number of bristles of slightly varying length which penetrate the filling yarn of cloth at different depths, varying as much as $\frac{1}{2}$ of an inch, and the brush can thus "gig" close to the warp threads, to engage the fibers and bring them to the surface of the cloth and to lay them flat in one direction on the fabric, thereby producing a lustrous broadcloth finish. It will be understood, however, that if desired the end of the bristle tufts 12 can be trimmed to lie in a cylindrical plane concentric with that of the rotating drum on which they are mounted, without departing from my invention. As shown more particularly in Figs. 4 and 5, not all the ends of the bristles extend to the top or outer end of the bristle 12 (as indicated by the line $a-b$ in Fig. 4, but may be terminated short of the outer end at various lengths in the bristle tuft as indicated at points 15 in Fig. 5. Such shortened bristles are not intended to do actual "gigging" but are provided for better support of the bristle tuft 12.

The bristles are preferably made of nylon, and

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preferably of approximately .022 denier. The bristles are thus relatively stiff but flexible. The bristles, however, are not limited to nylon, but may be made of any other suitable material such as orlon or flexible metal spring wire having similar physical characteristics to that of the nylon bristle above described.

Fig. 1 is a diagrammatic representation of a battery of gigging machines in which a series of slats 10 are mounted on the cylindrical rotating drum 20 of the gigging machine. The fabric 25 from a large roll (not shown) is passed through a trough 26 containing water, to wet the cloth and soften the wool and thence around carrier rolls 27 and contact rolls 28 which carry the cloth into contact with the rotating peripheral surface of the cylinder 20 at contact points 29 and 30 respectively. It will be noted that the strip of cloth 25 will usually be passed through a battery of such gigging machines as indicated diagrammatically in Fig. 1, until the desired degree of finish is obtained. The direction of rotation of the cylindrical drums 20 in the gigging machines is normally the same as that of the cloth (counter-clockwise or from right to left as shown by the arrows in Fig. 1), but the drums 20 rotate at a higher speed. The direction of rotation is similarly indicated by the large arrow 35 in Figs. 2 and 4. It will be understood that the strip of cloth 25 may be caused to come into contact with the bristle tops 12 mounted on the cylindrical drum 20, at two to twelve contact points (similar to points 29 and 30, Fig. 1) as may be desired and as may be found in commercial gigging machines.

It will thus be seen that I have succeeded in devising a bristle brush which can be used in standard gigging machines to replace the costly and short-lived teasel slats previously in use, and at the same time to produce an equal or superior finish to the cloth as can be achieved by present teasel gigging machines.

I claim:

1. In a gigging machine for finishing textile

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fabrics, the combination with a cylindrical rotating drum and means for carrying a web of cloth past the drum and in contact with the surface thereof in the same direction as the movement of the surface of the drum, said drum being provided with tufts of bristles set at an angle to the diameter of the drum and inclined in the direction of rotation of the drum, the bristles composing said tufts being trimmed on a plane at an angle to the tangent to the periphery of the drum, and the bristles at the trailing edge of the tufts being shorter than those nearer the leading edge thereof.

2. In a gigging machine for finishing textile fabrics, the combination with a cylindrical rotating drum and means for carrying a web of cloth past the drum and in contact with the surface thereof in the same direction as the movement of the surface of the drum, said drum being provided with tufts of nylon bristles set at an angle to the diameter of the drum and inclined in the direction of rotation of the drum, the bristles composing said tufts being trimmed on a plane at an angle to the tangent to the periphery of the drum, and the bristles at the trailing edge of the tufts being shorter than those nearer the leading edge thereof.

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