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3,186,019

CIRCULAR BRUSH

Filed Dec. 13, 1963

Fig. 1

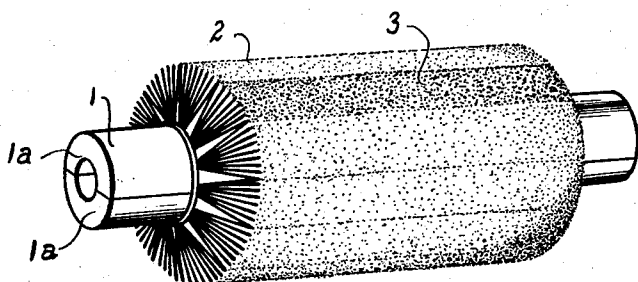


Fig. 2

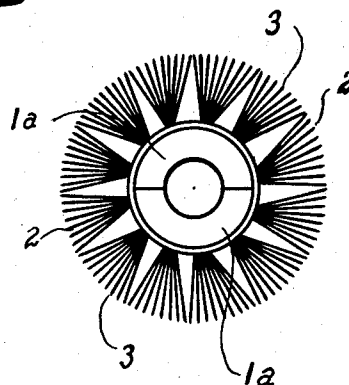


Fig. 3

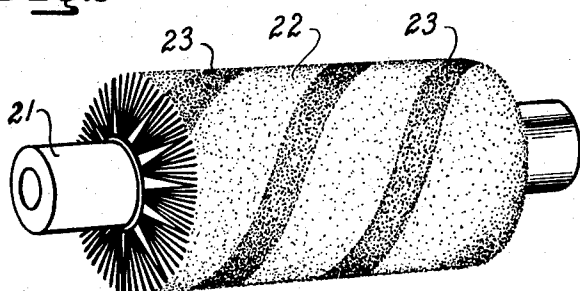
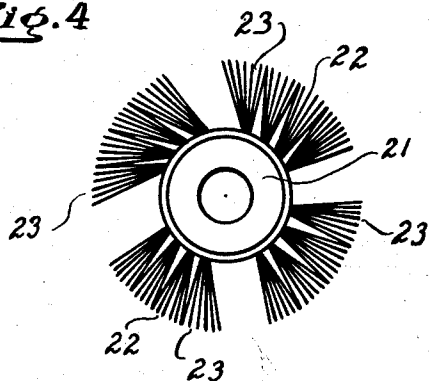


Fig. 4



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CIRCULAR BRUSH

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9 Claims. (Cl. 15-179)

This invention relates to circular, rotating brushes, and more particularly to cylinder roller brushes for comb cylinders. Still more particularly, the invention concerns a new cylinder roller brush having a cylindrical core, to the cylindrical surface of which the roots of uniformly arranged clusters of bristles of natural fibers are affixed, and the roots of clusters of bristles of thin metal wire or clusters of bristles of natural fibers mixed with thin metal wire are affixed between the said clusters of bristles of natural fibers. The invention is a continuation-in-part of my co-pending application Serial Number 193,544 filed May 9, 1962, now abandoned.

Cylinder roller brushes are conventionally used for the purpose of removing short fibers which adhere to comb cylinders when such cylinders comb sliver laps. For this purpose, as is well known, a cylinder roller brush is made up of cylindrical core and clusters of natural fiber bristles, such as vegetable fibers or animal fibers, the clusters being affixed at their roots in a uniform pattern on the cylindrical surface of the said cylindrical core, and the cylinder roller brush is rotated at a rotational speed which is approximately ten times that of the aforesaid comb cylinder to brush the needles fixed on the surface of the cylinder.

In a conventional cylinder roller brush, its fiber bristles become severely worn within a short time, when they brush the needles of the comb cylinder, due to the friction caused by the brushing action. This wearing of the fiber bristles seriously lowers the cleaning action of the brush with respect to the comb cylinder. As a result, the combing action of the cylinder is impaired, or small lumps of short fibers of nap form are permitted to form on the cylinder and become mixed with the product, whereby the quality of the product is lowered. In order to prevent this result, it has been necessary, heretofore, to replace the cylinder roller brush at frequent intervals, a necessity which is extremely uneconomical.

It is an object of the present invention to provide a new and improved cylinder roller brush with excellent cleaning performance and durability.

For the attainment of the above object, the cylinder roller brush of the present invention has clusters of thin straight metal wire bristles, of the same fiber size and thickness as the natural fibers, which also are of equal length and thickness, or clusters of thin metal wire bristles mixed with natural fiber bristles affixed at their roots to the cylindrical surface of the cylindrical core, between the clusters of natural fiber bristles. Through experiments it has been found that, although a cylinder roller brush with bristles of thin metal wire exhibits excellent cleaning action with respect to the comb cylinder, the metal bristles lack elasticity and have the further disadvantage of causing wear of the needles of the cylinder. In the present invention, by mixing thin straight metal wire bristles between the natural fiber bristles, full utilization of the pliant bending elasticity possessed by the natural fibers has been made, and it is thereby possible to attain a great improvement in the cleaning performance of the cylinder roller brush. This remarkable increase in the cleaning capacity makes it possible to reduce the rotational speed of the brush, which, however, still is independent of the speed of the comb cylinder and still may rotate faster than the latter. This, in turn, affords a greater reduction in the

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wearing rate of the natural fibers of the brush. As a result, it is possible to prolong the life of the brush to a great extent.

The instant requirement of a pliant, elastic and freely bending natural bristle rules out the use of wooden bristles, broom straw and bamboo. Also, the metal wire bristles must be of straight wire, not one to which helical or spiral turns have been imparted since this would obviate the requirement of equal thickness of all bristles.

It furthermore is of importance for efficient action of the brush according to the invention that the metal wire bristles are distributed between the natural fiber bristles in a definite orderly pattern such as straight or helical rows. A variety of such patterns can be used, as will become apparent later in this specification. Finally, it has been found a distinct advantage to affix all bristles to the surface of the brush cylinder rather than imbedding them therein, e.g., inserting them in holes drilled in the cylinder. The natural fiber bristles and the straight metal bristles, being of like length and thickness, are of substantially equal distance from each other at their outer extremities even though they might be affixed in clusters to the cylinder. Their setting on the cylinder in clusters and their length determines the equal distance of the respective bristles relative to each other.

It is another object of this invention to provide a cylinder roller brush which is capable of accomplishing the most suitable cleaning function with respect to the comb cylinder in accordance with the kind of starting material fiber of the sliver lap and the kind of product being combed by the comb.

That is, when the comb cylinder combs a sliver lap, and fibers cling to the needles on the cylinder, such factors as the quantity of clinging fibers and their lengths vary with the kind of starting material fiber and the kind of product, and the most appropriate cleaning action with respect to these factors must be accomplished. The above object has been achieved by the present invention by affixing the aforesaid thin metal wire bristles between the natural fiber bristles in a certain orderly pattern, as stated above, whereby a cylinder roller brush exhibiting the maximum cleaning performance in accordance with the kind of starting material fiber and the kind of product can be provided.

The nature, principle, and details of the invention, as well as the manner in which the foregoing objects may best be achieved will be more clearly apparent by reference to the following description of a few embodiments of the invention when taken in conjunction with the accompanying illustrations in which like parts are designated by like reference numerals, and in which:

FIG. 1 is a perspective view showing one embodiment of the cylinder roller brush according to the invention;

FIG. 2 is a cross sectional view of the embodiment of FIG. 1;

FIG. 3 is a perspective view showing another embodiment of the cylinder roller brush according to the invention;

FIG. 4 is a cross sectional view of a further embodiment of this invention.

In the embodiment illustrated in FIG. 1, the rigid body of the brush is a cylindrical core 1, which is formed by assembling together two semi-cylindrical members 1a, and which has affixed uniformly to its cylindrical surface, a great number of clusters of natural fiber bristles 2 of a material as named above. These natural fiber bristles 2 are affixed in place so as to form a plurality of rows of bristle clusters, said rows being parallel to the rotational axis of the cylindrical core 1. As shown in FIG. 2, of these rows of bristle clusters two rows which are on diametrically opposite sides of the brush axis are substituted by rows of clusters of thin straight metal wire bristles 3

of the same fiber size as the natural fiber bristles or rows of clusters of such thin metal wire bristles with natural fibers mixed therein. That is, clusters of thin metal wire bristles or mixtures thereof with natural fiber bristles are affixed between the natural fiber bristles clusters, parallel to the rotational axis of the cylindrical core.

Cylinder roller brushes of this arrangement are used for most ordinary cases, and the number of rows of metal wire bristles clusters can suitably be selected to be a number above one in accordance with the kind of starting material fiber of the sliver lap to be combed by the comb. There may be more than two rows of wire bristle or wire mixed with natural fiber bristle, present in the cylinder roller. In this case, it is preferable to arrange the metal wire bristle or mixed clusters about the brush axis at equally spaced positions which divide the circumference of the brush into, for example, halves, thirds, and quarters, and in such a manner as to preserve the balance of the cylinder roller brush, with due consideration of the difference in specific gravity of the natural fibers and metal wires.

In the embodiment of the invention shown in FIG. 3, two symmetrical rows of clusters of natural fiber bristles 22 are affixed to the surface of the core in a helical path with respect to the rotational axis of the cylindrical core 21, and a row of clusters of thin straight metal wire bristles 23 of the same size and thickness as the natural fiber bristles or clusters of thin metal wire bristles with natural fiber bristles mixed therewith is affixed in each spiral space between clusters of natural fiber bristles in helical arrangement with respect to the rotational axis of the aforesaid cylindrical core. At their outer extremities, however, all bristles are at like distance relative to each other.

Cylinder roller brushes of this arrangement have high cleaning performance and are effective especially for combers which operate at high speed. Similarly as in the case of the first embodiment, the most suitable cleaning operation can be performed in the case illustrated in FIG. 3 also by appropriately selecting the number of rows of the clusters of thin straight metal wire bristles in accordance with the kind of starting material fiber of the sliver lap to be combed.

FIG. 4 illustrates a further embodiment of this invention wherein the cylinder roller brush comprises four groups, which are symmetrically arranged with respect to the peripheral surface of the cylindrical core 21, each of said groups consisting of one row of clusters of thin straight metal wire bristles 23 and three rows of natural fiber bristles clusters 22. In each of these rows, all bristles, fiber and metal, are of equal length and thickness and are at equal distance from each other at their outer extremities. In this embodiment, said rows may be parallel to the rotational axis of the cylinder roller as in the case of the embodiment of FIG. 1 or may be in helical arrangement with respect to rotational axis of the cylindrical core as in the case of the embodiment of FIG. 3.

It will be apparent from the foregoing description that the present invention provides various forms of cylinder roller brushes which are capable of accomplishing, in an extremely efficient and thorough manner, cleaning of comb cylinders which are combing sliver laps of various kinds of starting material fibers and various kinds of products, and that, moreover, these cylinder roller brushes have great durability. Accordingly, in the use of the cylinder roller brush according to this invention, there is no necessity of frequent replacement of the cylinder roller brush due to wear of the bristles installed in the conventional manner, and economical operation of the comb is afforded. Furthermore, the excellent cleaning performance produced by the cylinder roller brush of this invention increases the combing efficiency of the comb cylinder, whereby stoppage of operation for manual cleaning of the comb cylinder is almost completely eliminated.

Although this invention has been described with respect to a few particular embodiments thereof, it is not to be so

limited as changes and modifications may be made therein which are within the full intended scope of the invention, as defined by the appended claims.

I claim as my invention:

1. A high-speed cylinder roller brush for comb cylinders, capable of rotational speeds independent therefrom, comprising, in combination, a cylindrical core having a solid and unbroken surface; clusters of bristles uniformly affixed to the entire said surface; said clusters being composed of pliant and elastically bending natural fibers of equal length and thickness, standing at substantially right angles to said surface and extending radially therefrom; and of at least one row of straight metal wire bristles of like dimensions as said natural fiber bristles and standing in the same position as the latter; the entire cylinder brush thus having a substantially cylindrical shape, said metal wire bristles forming a pattern of at least one continuous row within said natural bristles, following the rotational axis of said cylindrical core; the outer extremities of all bristles being essentially equidistant relative to each other.

2. The cylinder roller brush as defined in claim 1, wherein said row of straight metal wire bristles is disposed parallel to the rotational axis of said cylindrical core.

3. The cylinder roller brush as defined in claim 1, wherein said row of straight metal wire bristles is disposed helically with respect to the rotational axis of said cylindrical core.

4. A high-speed cylinder roller brush for comb cylinders, capable of rotational speeds independent therefrom, comprising, in combination, a cylindrical core having a solid and unbroken surface; clusters of bristles uniformly affixed to the entire said surface; said clusters being composed of pliant and elastically bending natural fibers of equal length and thickness, standing at substantially right angles to said surface and extending radially therefrom; and of at least two rows, evenly spaced from each other, of thin straight metal wires of like dimensions as said natural fiber bristles and standing in the same position as the latter; the entire cylinder brush thus having a substantially cylindrical shape, said wire bristles forming a pattern of continuous rows within said natural bristles following the rotational axis of said cylindrical core; the outer extremities of all bristles being essentially equidistant relative to each other.

5. A high-speed cylindrical roller brush for comb cylinders, capable of rotational speeds independent therefrom, comprising, in combination, a cylindrical core having a solid and unbroken surface; clusters of bristles uniformly affixed to the entire said surface; said clusters being composed of pliant and elastically bending natural fibers of equal length and thickness, standing at substantially right angles to said surface and extending radially therefrom; and of at least two rows, evenly spaced from each other, of a mixture of said natural bristles with thin straight metal wire bristles of like dimensions as said natural bristles and standing in the same position as the latter; the entire brush thus having a substantially cylindrical shape, said mixture forming a pattern of continuous rows following the rotational axis of said cylindrical core; the outer extremities of all bristles being essentially equidistant relative to each other.

6. A high-speed cylinder roller brush for comb cylinders, capable of rotational speeds independent therefrom, comprising, in combination, a cylindrical core having a solid and unbroken surface; clusters of bristles symmetrically affixed to said surface in a plurality of groups which are disposed thereon at equal distance from each other; each group consisting of one row of bristles of thin straight metal wire and a plurality of rows of pliant and elastically bending natural fiber bristles, all said bristles having the same length and thickness and, within said groups, equal distance from each other at their outer extremities; said rows and said groups forming a pattern

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of continuous rows following the rotational axis of said cylindrical core.

7. The cylinder roller brush as defined in claim 6, wherein said groups and said rows are disposed parallel to the rotational axis of said cylindrical core.

8. The cylinder roller brush as defined in claim 6, wherein said groups and said rows are disposed helically with respect to the rotational axis of said cylindrical core.

9. A high-speed cylinder roller brush, capable of rotational speeds independent therefrom, comprising, in combination, a cylindrical core having a solid and unbroken surface; clusters of bristles symmetrically affixed to said surface in four groups of rows disposed at equal distance from each other; each said group consisting of one row of bristles of thin straight metal wire bristles and three rows of bristles of pliant and elastically bending natural fibers; all said bristles having the same length

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and thickness and, within said groups, equal distance from each other at their outer extremities; said groups forming a pattern of continuous rows following the rotational axis of said cylindrical core.

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