

June 9, 1964

F. REITERER  
CARD CLOTHING

3,136,005

Filed Dec. 1, 1959

3 Sheets-Sheet 1

FIG. 1

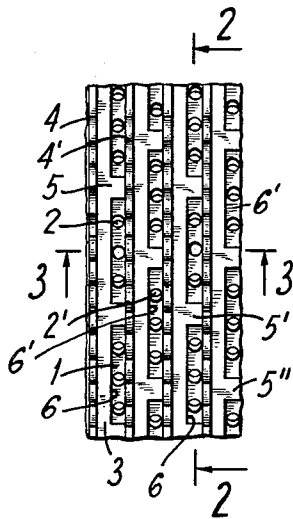


FIG. 2

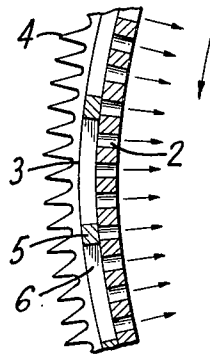
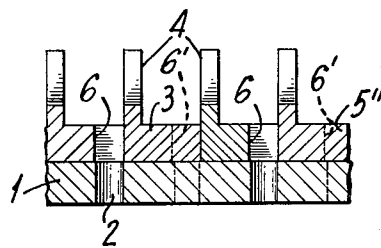


FIG. 3



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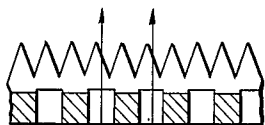


FIG. 4A

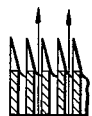


FIG. 4B

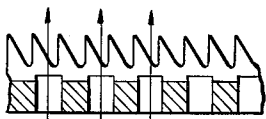


FIG. 5A

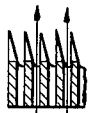


FIG. 5B

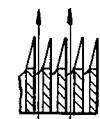


FIG. 5C

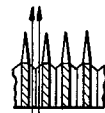


FIG. 5D

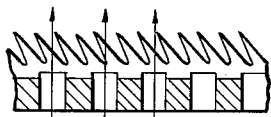


FIG. 6A



FIG. 6B

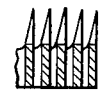


FIG. 6C

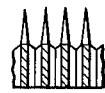


FIG. 6D

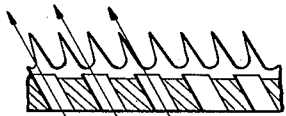


FIG. 7A



FIG. 7B

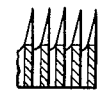


FIG. 7C

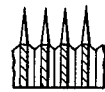


FIG. 7D



FIG. 8A

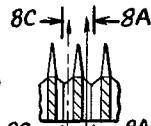


FIG. 8B

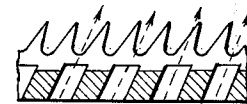


FIG. 8C



FIG. 9A



FIG. 9B

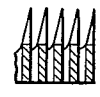


FIG. 9C

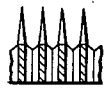


FIG. 9D



FIG. 10A



FIG. 10B

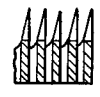


FIG. 10C

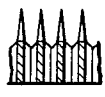


FIG. 10D



FIG. 11A

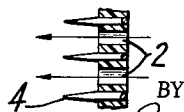


FIG. 11B

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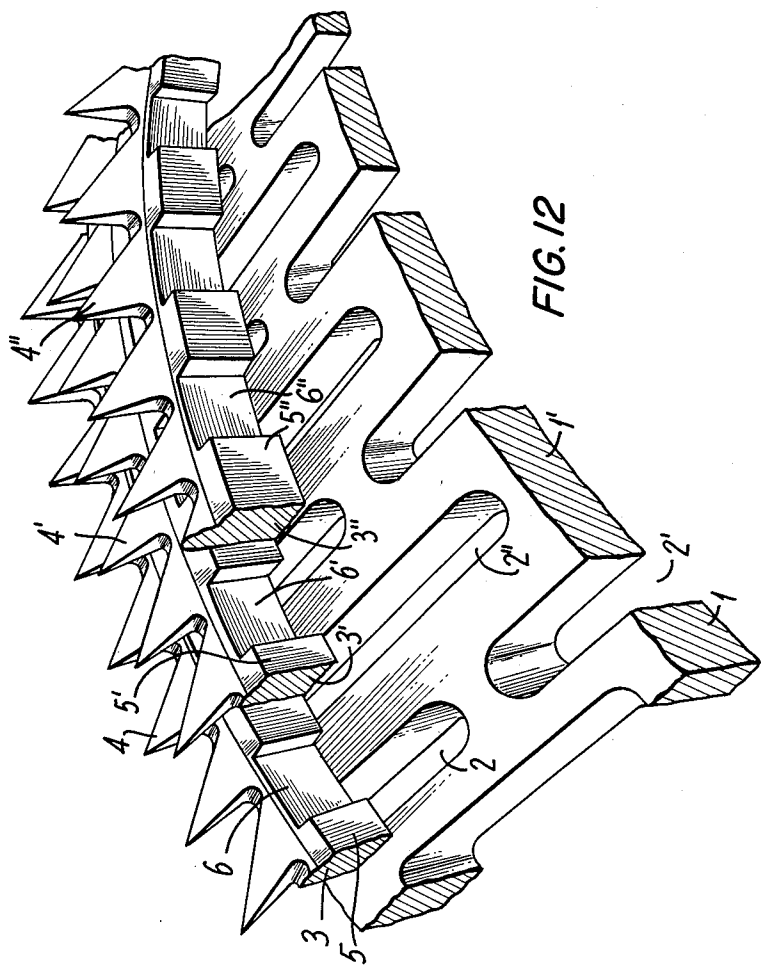
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CARD CLOTHING

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3 Sheets-Sheet 3



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1

3,136,005

## CARD CLOTHING

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Filed Dec. 1, 1959, Ser. No. 856,545

Claims priority, application France Dec. 4, 1958  
18 Claims. (Cl. 19—114)

The present invention relates to saw-toothed or needle-covered garnishings used in the textile industry, and more particularly, although not exclusively, in carding machines.

In carding machines of conventional type, the carding is effected by the mechanical action of protruding parts placed on the periphery of revolving cylinders. These protruding parts may have any shape or dimensions, according to the nature of the material to be carded.

Generally, they are constituted by teeth, wire staples or needles in the form of saw-toothed or needle-covered ribbons, which are wound helicoidally on the periphery of the plain wall cylinder, preferably in connecting whorls, so that the bases of two contiguous whorls lean laterally against each other, which increases the mechanical resistance of the system. These ribbons with protruding parts are commonly called "card clothing."

When the protruding parts are wire staples or needles, the ribbon carrier is generally made of leather or plastic material: It is then called soft card clothing. On the contrary, when the protruding parts are saw-toothed, the ribbon generally consists of a metallic band, which is integral with said teeth, and the bottom portion of which is wider than the tooth itself, so as to maintain the teeth separated when the bands are placed next to each other: It is then called rigid card clothing.

Whatever the manner in which the protruding parts are applied to the surface of the cylinder, the density of said teeth on said surface must be predetermined and is usually as large as possible, to enable the card clothing to effect its proper function in the carding process.

Certain carding processes utilizing a pneumatic action are also known. In such devices, the revolving cylinders are hollow, and their outside walls are provided with a certain number of apertures, the inside space of said cylinders being connected with a pneumatic device, effecting suction or blowing through said apertures.

The object of the present invention is a card clothing permitting to effect simultaneously the mechanical action of the protruding parts and the pneumatic suction or blowing action through the apertures of the cylinder and between the protruding parts, these results being obtained without the necessity of reducing the density of the protruding parts, which density may be the same as in the conventional card clothing.

The card clothing covered by this invention is essentially characterized by the fact that it comprises at the same time protruding parts as well as apertures or openings, so as to effect simultaneously a mechanical action and a pneumatic action.

Such card clothing may present various embodiments, without departing from the scope of the present invention.

According to one embodiment of the invention, the garnishings carrying the protruding parts are wound spirally on the cylinder and are maintained separated from one another by wedges arranged in such a manner that the pneumatic action effected through the apertures of the cylinder can pass at the same time between the card coverings; said wedges may be integral with the cylinder, or on the contrary integral with the card coverings.

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However, in a preferred embodiment of the invention, the plurality of apertures or multiplicity of openings provided for the passage of air are effected directly on the card clothing itself, said card clothing being wound on the cylinder and permitting communication between its apertures or openings and the apertures of the cylinder. In the case of a soft card clothing, the apertures are made in the ribbon carrying the protruding parts, and preferably before the application of the latter on the ribbon, and in the case of a rigid card clothing, the apertures are effected in the butts of the teeth.

Because of this latter arrangement, the card coverings, carrying their own ventilation apertures, may be placed in connecting whorls on the cylinder, in conventional manner, without the necessity of maintaining them separated from one another to prevent covering the ventilation apertures. It is understood that the number and the shape of the apertures on the card clothing, as well as the number and shape of the apertures on the cylinder wall, may vary as desired: Circular, rectangular, oval, etc.

The card clothing in accordance with this invention presents numerous advantages.

First, the fact that this card clothing permits at the same time a mechanical action and a pneumatic action, insures more efficient carding, and permits increasing the rotation speed of the carding cylinders, which increases consequently the output of the machines. Moreover, the pneumatic action helps preventing the accumulation of broken ends, lint or waste particles on the teeth or needles, which may hinder the efficiency of the carding. In addition, the wear and tear on the teeth is less pronounced, in view of their improved cleansing. Finally, the total weight of the card clothing is reduced, in view of the apertures provided therein, and the application of the card clothing on the cylinder is rendered easier because the apertures reduce the rubbing coefficient of the card clothing against the cylinder wall, as well as the rubbing between adjacent whorls.

It is well understood that the card clothing may have any number, shape, and distribution of protruding parts. The type of teeth, in particular, may be selected as desired, as well as their density in relation to the nature and characteristics of the material to be treated (cotton, wool, artificial fibers, etc.), and which depends particularly on the coefficient of adhesion of each material. Although in the above description as well as hereinafter, the protruding parts are designated under the term "teeth," it is well understood that this is in no way a restriction or a limitation, and that the protruding parts may be of any desired form.

The invention also extends to the various forms and dispositions of the protruding parts relative to the dispositions of the corresponding apertures, said forms and dispositions being described hereinafter with reference to the attached drawings.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which:

FIGURE 1 is a plan view of a cylinder section with a card clothing in accordance with the invention;

FIGURE 2 is a fragmentary sectional view, taken transversally of the cylinder substantially along line 2—2 in FIGURE 1.

FIGURE 3 is a fragmentary sectional view, taken longitudinally of the cylinder substantially along line 3—3 in FIGURE 1.

FIGURES 4a to 11b illustrate various possible arrangements of teeth and apertures; and

FIGURE 12 is a perspective view of a cylinder section with a card clothing in accordance with the invention.

In FIGURES 1, 2, 3, cylinder wall 1 having perfora-

tions 2, 2' carries the card clothing, comprising a body provided with apertures, such as 6, 6'. The body comprises a ribbon or wire 3 which bears, preferably laterally, a certain number of teeth or protruding staples 4, 4', and is spirally wound on cylinder wall 1. The body also includes wedges or spacers such as 5, 5', 5'', which are preferably, but not necessarily, integral with the ribbon 3, and which preserve the apertures between the consecutive whorls or convolutions of the ribbon 3. In fact, the wedges 5, 5', 5'' may be formed integral with cylinder wall 1, if desired.

FIGURE 4a is a side view of a possible arrangement, i.e., a view taken perpendicularly to the axis of the cylinder, showing a developed row of teeth and apertures. FIGURE 4b, on the contrary, is a view parallel to the axis of the cylinder, showing one tooth and one aperture of several adjacent rows. In these figures, the teeth have a symmetrical outline, and the suction or blowing apertures, disposed between the rows of teeth, are parallel to the axes of the teeth, so that the blowing or suction actions are also effected in a direction parallel to said axis. In the arrangement shown in FIGURE 4b, the apertures are located at the right of the rows of teeth, but the opposite disposition may be adopted just as satisfactorily.

FIGURES 5a, 5b, 5c and 5d show an arrangement in which the teeth have a triangular, dissymmetrical outline, one of the sides being perpendicular to the surface of the cylinder, while the other one is slanted. The air apertures are also perpendicular to the surface of the cylinder, and consequently parallel to the right side of the teeth. FIGURE 5a is a front view of a row of teeth; FIGURE 5b is a side view of several rows of teeth, with the apertures at the right of the teeth; FIGURE 5c is a similar view with the apertures at the left of the teeth; and FIGURE 5d is also a side view of an arrangement in which an aperture is adjacent each of the two sides of each row of teeth, so that there are two contiguous apertures between each row of teeth.

FIGURES 6a, 6b, 6c and 6d illustrate an arrangement in which the teeth also have a triangular, dissymmetrical outline, but without any perpendicular side, both sides being slanted in the same direction; however, the apertures between the rows of teeth are perpendicular to the surface of the cylinder, so that the blowing is not effected in a direction parallel to one side of the teeth. FIGURE 6a is a front view of a row of teeth and apertures; FIGURE 6b is a side view showing the parallel rows of teeth, the apertures being at the right of the latter; FIGURE 6c shows a similar disposition, with the apertures at the left of the teeth; and FIGURE 6d illustrates a disposition similar to that shown in FIGURE 5d, with two adjacent rows of apertures between two rows of teeth.

FIGURES 7a, 7b, 7c and 7d show a disposition in which the teeth have two slanted sides, as in FIGURE 6, but the axes of the apertures are approximately parallel to the axes of the teeth. FIGURES 7a, 7b, 7c and 7d, in this variation, are similar to the views of FIGURES 5a, 5b, 5c and 5d.

FIGURES 8a, 8b and 8c show a disposition in which the axes of the teeth are slanted, as in FIGURES 6 and 7, but each row of teeth is associated with two series of apertures located respectively on each side of said row, the apertures of one of the series being parallel to the axis of the teeth, while the apertures of the other series are on the contrary oriented in a direction opposite said axis.

FIGURES 8a, 8b and 8c illustrate clearly this disposition: FIGURE 8a is a front view of a row of teeth, showing the apertures located in front of said row and oriented in a direction opposite said teeth, while FIGURE 8c is a back view of the same row of teeth, showing the apertures located in back of said row and oriented in the direction of the teeth. Thus, apertures of opposite inclinations are located on each side of each row of teeth, securing cross blowing, as shown by the arrows in FIGURE 8a.

FIGURE 8b is a sectional view showing the rows of teeth and the series of apertures.

FIGURES 9a, 9b, 9c and 9d show a disposition in which the teeth are slanted as in the preceding examples, but the apertures, which start out as perpendicular to the cylinder, curve next to the teeth and become parallel to the axis of said teeth; blowing is thus deviated as shown by the arrows in FIGURE 9a. FIGURES 9b, 9c and 9d are, as above, sectional views.

FIGURES 10a, 10b, 10c and 10d show a disposition with slanted teeth, and conical air apertures narrowing toward the teeth, which focuses the air stream at the exit and gives it more strength. In this arrangement also, the air stream may either be parallel to the axis of the teeth, or in a direction opposite said axis. The conical apertures may also widen toward the teeth.

FIGURES 11a and 11b illustrate, as an example, a soft needle-covered ribbon, and are respectively plan and sectional views. In these figures, as above, 4 designates the teeth or needles, and 2 the apertures, which may have any desired form.

In FIGURE 12, 1 and 1' represent the cylinder wall supporting the card clothing; 2, 2' and 2'' represent the apertures of said cylinders; 3, 3' and 3'' represent the bottom portion of the ribbon in its normal width, 6, 6' and 6'' being the air apertures provided in the ribbon, 4, 4' and 4'' being the teeth of the ribbon which are integral with the bottom portion of the ribbon. 5, 5' and 5'' also represent the portions of the ribbon which serve as wedges between the successive whorls of the ribbon.

In the drawings and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. As an article of manufacture, clothing formed as an elongated member adapted to be wound around a perforated supporting member in carding apparatus and the like comprising an elongated central body portion which is linearly continuous and uninterrupted between spaced parallel planes extending parallel to the direction of elongation of the body portion and contiguous with two opposite sides thereof and has a bottom surface adapted to be supported on the perforated supporting member and an outer surface opposite thereto, a plurality of teeth on the outer surface confined between said parallel planes and extending generally parallel thereto in a direction generally away from the continuous body portion, and a plurality of projecting elements extending laterally away from one of the two opposite sides of the body portion to provide a multiplicity of openings between the bottom surface and the outer surface of the elongated clothing member.

2. Clothing according to claim 1, wherein the body portion is wider than the teeth.

3. Clothing according to claim 1, including another plurality of projecting elements extending laterally from the other of the two opposite sides of the body portion and extending from the bottom surface to the outer surface.

4. Clothing according to claim 1, wherein the multiplicity of openings formed by the projecting elements extend from the bottom surface to the outer surface at an oblique angle thereto.

5. Clothing according to claim 1, wherein the plurality of teeth are inclined in the direction of elongation of the body portion and wherein the multiplicity of openings formed by the projecting elements are curved from a direction generally perpendicular to the bottom surface adjacent to the bottom surface to a direction generally parallel to the direction of inclination of the teeth adjacent to the outer surface.

6. Clothing according to claim 2, wherein the multiplicity of openings formed by the projecting elements are

tapered inwardly toward the outer surface of the body portion.

7. In combination, a cylinder having a peripheral surface formed with a plurality of apertures, and a separate clothing member mounted on the cylinder comprising a narrow elongated body portion formed with a bottom surface, at least one side surface, and an outer surface and wound around the cylinder with the side surface of each loop of the clothing member disposed in adjacent relation to the next loop of the clothing member, the bottom surface being supported on the peripheral surface of the cylinder, a plurality of teeth on the outer surface of the body portion, and means forming a plurality of projecting portions extending laterally from said one surface and abutting said next loop of the clothing member to provide a multiplicity of openings therebetween which extend from the bottom surface to the outer surface of the clothing member.

8. In combination, a cylinder having a peripheral surface formed with a plurality of apertures, and a separate clothing member mounted on the cylinder comprising an elongated body portion formed with a bottom surface and an outer surface, the bottom surface being supported on the peripheral surface of the cylinder, a plurality of teeth on the outer surface of the body portion, and means forming a multiplicity of openings extending between the bottom and outer surfaces, wherein said body portion comprises a wire wound on the cylinder.

9. The apparatus as set forth in claim 7, wherein said body portion comprises a ribbon wound on the cylinder.

10. The apparatus as set forth in claim 8, wherein the means forming a multiplicity of openings comprises a plurality of wedges on the side of said wire which when abutted against the next adjacent turn of the wire forms the multiplicity of openings therebetween.

11. Card clothing according to claim 1, characterized in that said teeth have a symmetrical outline, and the multiplicity of openings are parallel to the axis of the teeth.

12. Card clothing according to claim 1, characterized in that said teeth have a right side and a slanted side, and

the multiplicity of openings are parallel to one side of the teeth.

13. Card clothing according to claim 1, characterized in that said teeth have two slanted sides, and the multiplicity of openings are perpendicular to the bottom of said body portion.

14. Card clothing according to claim 1, characterized in that said teeth have two slanted sides, and the multiplicity of openings are approximately parallel to the axis of the teeth.

15. Card clothing according to claim 3, characterized in that said teeth form a row and have two slanted sides, and the multiplicity of openings are distributed in two series, one on each side of said row of teeth, the multiplicity of openings of one series being slanted in the same direction as the teeth, and the multiplicity of openings of the other series being slanted in the opposite direction.

16. Card clothing according to claim 1, characterized in that said teeth are slanted, and the multiplicity of openings are perpendicular to said bottom surface of said body portion adjacent thereto, and then curve, next to the teeth, and become substantially parallel to said teeth.

17. Card clothing according to claim 1, characterized in that said multiplicity of openings are conical.

18. Card clothing according to claim 17, characterized in that said conical openings are narrower toward the outer surface.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

|           |               |               |
|-----------|---------------|---------------|
| 6,579     | Bailey        | July 3, 1849  |
| 11,861    | Heneage       | Oct. 31, 1854 |
| 1,007,900 | Stocker       | Nov. 7, 1911  |
| 1,220,952 | Cary          | Mar. 27, 1917 |
| 1,575,985 | Galvin et al. | Mar. 9, 1926  |
| 2,893,064 | Rusca et al.  | July 7, 1959  |

##### FOREIGN PATENTS

|         |               |              |
|---------|---------------|--------------|
| 1,083   | Great Britain | of 1872      |
| 462,201 | Great Britain | Mar. 4, 1937 |