United States Patent [19]

Mackie

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[54] **CARD CLOTHING**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **19/97,** 19/112

[51] **Int. Cl.** **D01g 15/26**

[58] **Field of Search** ..... 19/97, 112, 114, 19/129 R; 29/23, 121

[56] **References Cited**

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[57] **ABSTRACT**

Clothing for the cylinder of a card particularly for use with wool and synthetic fibers comprises a stave having pins mounted in it at a density greater than ten pins per square centimeter with each pin projecting from the stave by a length of less than 2½ mm. The length of taper of each pin is greater than the projecting length so that part of the taper is located within the body of the stave thus leading to improved carding of fine denier material.

7 Claims, 2 Drawing Figures

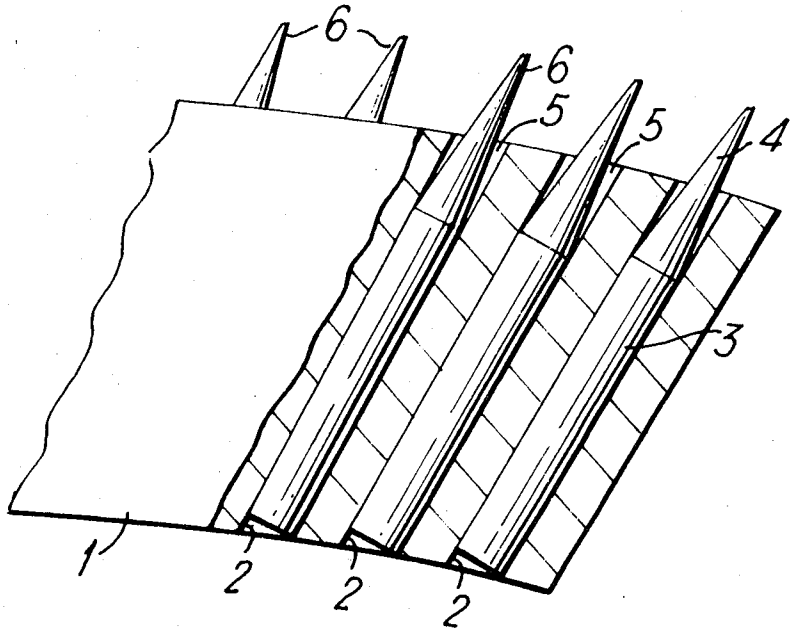
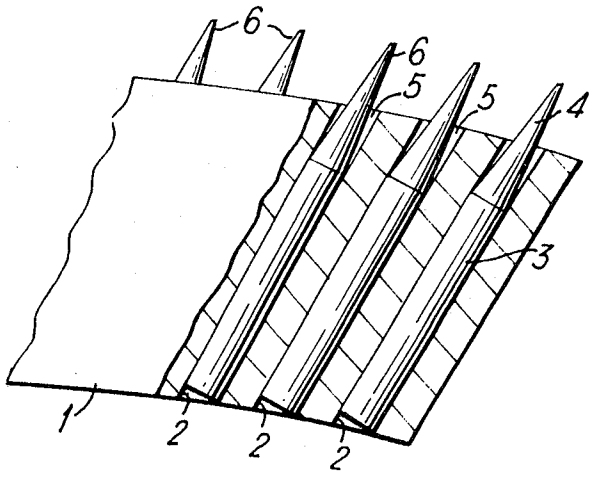


FIG. 1



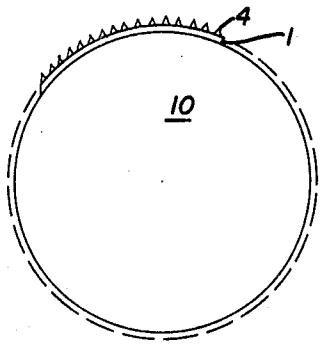


FIG. 2

CARD CLOTHING

In the carding of wool and synthetic fibers the normal form of clothing for the cylinder of the card is of the metallic or fillet variety. As described in my British Pat. specification No. 967,801, however, the clothing of the card is constituted by needle-pointed pins which prior to that date had been used in the bast fiber industry rather than for the carding of wool and synthetic fibers. As described in the earlier specification the pins were mounted at a spacing finer than 64 pins per square inch (10 pins per square cm.) and had flattened tips achieved by grinding the tips of the pins to give a truly cylindrical surface. Such pinning when used in combination with metallic or fillet clothing on the other rollers has been found to lead to surprisingly good results.

A complication is, however, introduced when working very fine denier material in that there is a tendency for lapping of the cylinders to occur; in other words fibers become lodged in the free space at the root of the pins and so lap the cylinder with resultant loss of carding efficiency. Similar problems arise with natural fibers such as jute and flax.

These difficulties are overcome in accordance with the present invention by the use of pins at the density mentioned above, i.e., greater than 10 per square cm. and which have a length projecting from the stave of less than 2½ mm. and a length of taper greater than this. Most surprisingly it is found that this largely prevents fibers becoming lodged in the free space at the root of the pins and thus effectively prevents lapping. Clothing of this type is completely contrary to established practice in connection with needle-pointed pins in two separate respects. In the first place this length of pin is very appreciably less than the shortest which has ever been used in the past, i.e., approximately one-eighth inch (4 mm.). As mentioned above needle-pointed pins made of hardened steel have traditionally been used in the bast fiber industry and the length of 4 mm. has always been regarded as the smallest possible pin projection. The standard procedure for avoiding problems due to lapping had always been to reduce the free space round the root of the pins by an increase in density of the pinning and this principle applied generally to all forms of card clothing. It is therefore completely contrary to this established practice to reduce the effective length of pin appreciably below what was previously considered possible.

The second respect in which clothing in accordance with the invention differs from established practice lies in the fact that the length of taper of the pins is greater than their projecting length. In the past, as illustrated in my earlier specification, for example, the lowest portion of the pin projecting from the stave has always been parallel-sided and the taper has started a short distance above the surface of the stave. A configuration of pin in accordance with the invention in which the whole of the projecting portion of the pin is tapered so that the angle of taper remains the same despite the reduced effective length of pin has been found to make a major contribution to the improved results obtained.

It is found advantageous for the length of taper to exceed the projecting length of pin by an appreciable extent and preferably the length of taper is at least 50 percent greater than the projecting length. For the great majority of fibers a projecting length of approximately

2 mm. and a tapered length of approximately 4 mm. are found to give the best result.

With previous arrangements of pin in which the root portion is parallel-sided the pins have naturally been located in parallel-sided holes in the stave. Despite the fact that with a construction in accordance with the invention the taper starts within the body of the stave it is nevertheless found to be desirable for the holes to be parallel-sided so that there is a small recess around the bottom of the projecting length of each pin. It might be thought that it would be better to avoid this recess by shaping the hole to fit closely round the taper of the pin and thus to eliminate this small recess. In practice, however, the presence of the recess is found to be beneficial and moreover it reduces any risk of the surface of the stave being slightly splintered when the pins are inserted and fitted in position. By using a parallel-sided hole for each pin there is no engagement between the side of the pin and the rim of the hole so that the risk of splintering is negligible.

A construction in accordance with the invention will now be described with reference to the accompanying drawings wherein

FIG. **1** is a view to a greatly enlarged scale of part of a stave for use on the cylinder of a card shown partly in section and

FIG. **2** is a highly schematic view of a cylinder of a card with staves thereon.

Staves are shown formed on a cylinder **10** in FIG. **2** and the body of a stave is shown in FIG. **1** as **1** and is formed with parallel-sided holes **2** at a spacing somewhat greater than **10** per square cm. Needle-pointed pins **3** are fitted in these holes from the rear and are then hammered into position as shown. As can be seen the length of the tapered portion **4** of each pin is appreciably greater than the projecting length and in the example shown is approximately double this length. Since the holes are parallel-sided a small recess or pocket **5** is formed round the root of each pin as previously described. In a particular example the total length of each pin is 16 mm., the tapered length is approximately 4 mm., the projecting length is approximately 2 mm., and the diameter of the cylindrical portions of the pin is 1.0 mm.

Staves fitted with pins as just described may be fitted to the cylinder **10** of a card in the normal way and before being placed in operation the tips of the pins may be subjected to a very light grinding operation so that they are slightly flattened as shown at **6** and lie accurately on a common cylindrical surface thus leading to the improved results described in my earlier specification.

I claim:

1. Clothing for the cylinder of a card comprising: a stave having a plurality of holes therethrough, at least a portion of said holes being cylindrical in cross-section, said portion including an outer portion adjacent the outer surface of the stave, a plurality of pins mounted one in each of said stave holes, said pins having a cylindrical body with a generally conically tapered end, said cylindrical body being located essentially in the cylindrical part of its respective stave hole, and at least a portion of the tapered end also being located in its respective stave hole, said tapered portion of the pin in its stave hole and the said outer portion of the stave hole defining therebetween a recess surrounding said tapered pin, the said tapered end projecting

outward from the surface of the stave a distance less than 2½ mm.

2. A stave according to claim 1, in which the length of taper of each pin is at least 50 percent greater than the total projecting length thereof.

3. A stave according to claim 2, in which said pins project from said stave by approximately 2 mm. and have a total tapered length of approximately 4 mm.

4. A stave according to claim 1, in which each said hole in said stave extends with said cylindrical cross-section for the full thickness of the stave.

5. Clothing for the cylinder of a card comprising: a stave having a plurality of holes therethrough, said holes being parallel sided throughout the thickness of the stave, a plurality of pins mounted one in each of said stave holes, said pins having a parallel sided body conforming to the shape of said parallel sided holes and a tapered end, the base of said tapered end located within its respective stave hole and the tip thereof projecting out of said stave hole a distance less than 2½ mm., said stave hole and the portion of the tapered end therein thus defining a small recess around the portion

of the tapered end within the stave hole.

6. A stave according to claim 5, the total length of the tapered end being at least 50 percent greater than the part thereof which projects out of the stave hole.

7. A cylinder for a card fitted with clothing comprising a plurality of staves, each stave having a plurality of cylindrical holes therethrough, a plurality of pins mounted in said stave holes at a density greater than 10 pins per square cm, each said pin having a cylindrical body within its respective stave hole and a tapered length projecting from the outer surface of said stave for a distance of less than 2½ mm. and the total of said length of taper being at least 50 percent greater than the part thereof projecting beyond the surface of the stave, said tapered length of the pin in its stave hole and the said outer portion of the stave hole defining therebetween a recess surrounding said tapered pin and wherein the tips of said pins have been flattened by grinding so as to lie accurately on a common cylindrical surface.

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