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TEXTILE ROLL AND METHOD OF MAKING THE SAME

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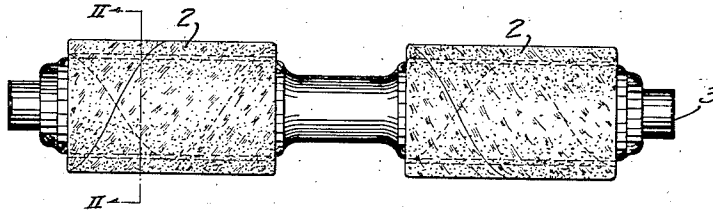


Fig 1

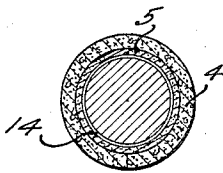


Fig 2

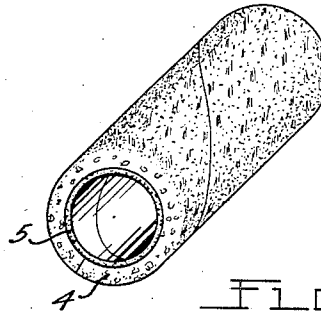


Fig 3

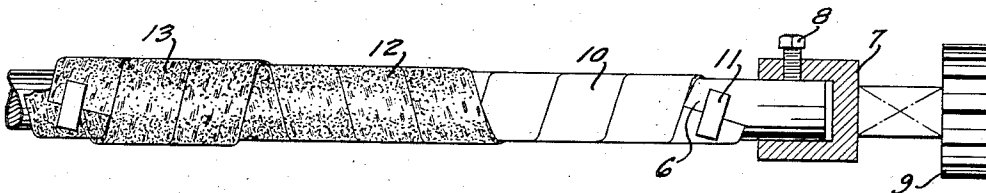


Fig 4



Fig 5

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TEXTILE ROLL AND METHOD OF
MAKING THE SAME

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The present invention relates to textile rolls and method of making the same and more especially to textile rolls having working surfaces of compressed artificial cork.

5 The invention is illustrated as applied to the drawing rolls used on a spinning frame but it will be understood that it may be employed on other rolls in the textile industry. The drawing rolls on the spinning frame are disposed in
10 pairs, the lower roll being usually a steel roll and an upper roll in contact with it being a roll provided with a friction sleeve or facing. These rolls are commonly known as the top roll. Heretofore the top drawing rolls have been usually
15 covered with leather provided with a felt backing or lining to increase the resiliency. These leather coverings are of quite limited life and the recovering of them is a specialized task.

In recent years coverings made of composition
20 cork have been gradually replacing the old type leather coverings. Seamless cork cots made in accordance with Busch Patent No. 1,532,682 have proven quite satisfactory. The Busch cot is made from blocks of cork composition. The sleeve or
25 cot is died or punched from the compressed cork composition so that the cork granules which are flattened by compression when the blocks are formed lie at an angle to the working surface of the roll. The advantage of such composition
30 cork as a working face for textile rolls is fully discussed in the Busch patent and commercial use and acceptance by the mills has proved these advantages. The Busch cots, however, are somewhat expensive to produce, due to the waste attending the punching of the tubular sleeves from
35 solid cork blocks.

In accordance with my invention, a composition cork cot is produced which may have a working surface possessing the characteristics of the
40 Busch cot. My cot moreover has substantially the same advantages as a seamless cot, but it is more readily manufactured and it is considerably cheaper to produce.

The working surface of my textile roll is formed
45 preferably of a composition cork in which the granules are disposed at an angle to the working surface of the roll. A cork composition having the desired characteristics may be produced in accordance with the Busch Patent No. 1,646,187.
50 According to the Busch patent, granulated cork together with a gelatin-glycerine binder is compressed and set under heat. During the compression, the individual granules are flattened into small pancake shaped granules, the planes
55 of compression of which lie, of course, normally

to the direction of the compression. These slabs are mounted for rotation and cut to cylindrical form. A revolving knife engages the rotating cylinder and slices a ribbon from the periphery of the cork block. The flattened compressed granules are disposed at a substantial angle to the face of the ribbon thus formed. The cork granules are firmly rooted to the body of the ribbon and the flattened granules will not subsequently puff up or scale off. As brought out in the Busch
10 textile patent, such puffing and scaling is objectionable in a drawing roll for textiles.

Textile roll coverings are preferably formed into individual cots which may be readily slipped over the metal body of the roll to permit quick
15 replacement. It has been proposed to apply a layer of cork to a backing of vulcanized fiber. The cork and fiber are secured together by glue. The covering is applied to the roll and secured thereto by means of a suitable adhesive. The vulcanized fiber is substantially unyielding and the problem of securing the coverings to the rolls is serious because the diameter of the rolls vary considerably. It is desirable therefore, when producing coverings for textile rolls which are applied in the form of sleeves or cots, to have a cot
25 which is sufficiently yielding to permit ready application to variously sized rolls. It is not unusual for a single mill to have rolls which vary as much as one thirty-second of an inch in diameter. It will be apparent, therefore, that a hard, unyielding cot is unsatisfactory for textile usage because of the problem of application to the roll. Textile cots which have a base or inside layer of hard unyielding material must be so produced that the internal diameter of the cot is substantially equal to the diameter of the roll. If the diameter of the roll is greater, it is impossible to force the cot onto the roll without breakage. If the roll is smaller, the cot will
40 break loose from the roll under compression; the bonding agent being broken by flexing as the roll is rotated under compression.

It is well known that the size of rolls will vary considerably in every mill. The rolls are made
45 from rough turned castings and the type of cutting tool used by the different manufacturers varies; some of the tools cutting relatively deep helical grooves in the roll and others cutting relatively flat grooves. The cotton mills sometimes
50 have their replacement rolls manufactured by local machine shops and rigid standards are quite often neglected.

When a cot or covering wears away so that it is no longer useful and a new covering must be
55

applied, the old covering is cut off. Some of the adhesive used to secure the cot to the roll will usually remain on the roll and for that reason the rolls are "rumbled" in sawdust or other material to remove the adhesive. The abrasion caused by "rumbling" will, of course, more readily wear down a deep narrow tool mark than a relatively flat shallow groove. A cot or sleeve manufacturer must, therefore, produce a cot or sleeve which is suitable for application to variously sized rolls.

According to my invention a cork cot is formed having a permanently resilient backing or base which is readily deformable and which permits ready application to variously sized rolls. My preferred type of cot can be applied to a roll which is as much as $\frac{1}{2}$ " over size. A soft cork composition backing or base layer provides a resilient, readily deformable material suitable for my purpose. It possesses sufficient resilience to permit stretching of the cot onto oversize rolls and due to its springy nature contracts and securely holds the cot to the roll. Moreover, its high coefficient of friction renders it secure when installed. The joints have no tendency to open as often occurs in cork facings applied to rigid backings.

My invention will be readily understood by reference to the accompanying drawing illustrating a preferred embodiment of my invention and certain modifications thereof, and in which,

Figure 1 is an elevation of the usual top roll for a spinning frame provided with my cork covering;

Figure 2 is a view along lines II—II of Figure 1;

Figure 3 is a perspective view of one of my cork cots;

Figure 4 is a side elevation, partly broken away, illustrating a method of forming the cork cots, and;

Figure 5 is a view similar to Figure 4 showing the production of a modified form of cork covering.

Referring to the preferred embodiment of my invention illustrated in Figure 1, there is shown a pair of cots 2 mounted on a roll 3 of the usual type. The cot 2, as shown in perspective in Figure 3, comprises a working surface layer 4 of cork composition and a backing layer 5 of cork composition, the layers 4 and 5 being adhesively secured together and forming a unitary laminated structure.

The working layer 4 is preferably formed of a cork ribbon such as is described in Busch Patent No. 1,646,187, above referred to. The composition for producing such ribbon may be formed by mixing 100 pounds of granulated cork with 10 pounds of glycerine and 5 pounds of gelatin. The cork should preferably be of a size which will pass through a 14 mesh to the inch screen and be retained on a 20 mesh to the inch screen. The cork and the glycerine-gelatin binder are thoroughly mixed and about 20 ounces of commercial formaldehyde are added to coagulate the binder. The mass is then placed in a suitable mold and compressed to approximately $\frac{1}{2}$ of its initial form. The mass while confined in the mold is heated to about 250° F. to set the binder. Other types of binders may be substituted for the glycerine-gelatin binder provided they produce a composition cork which is flexible and does not disintegrate under the humid atmosphere of the cotton mills where the rolls are used.

Although I prefer to use a cork composition such as is above described, a composition in which the flattened cork particles lie in a plane substantially parallel to the working face may be used such as a ribbon formed of ordinary gasket com-

position in which the direction of compression is substantially parallel with the face of the ribbon. When such a cork composition is employed, it is preferable to use a finer granulation of cork. This produces a somewhat more dense product. The resilience of cork decreases somewhat in proportion to the size of the granules used. A relatively strong binder should be employed so as to prevent puffing of the granules under humid conditions.

The backing layer 5 may be made of any resilient cork material which is firm and yet possesses a relatively high degree of compressibility. A cork ribbon similar to the preferred working material forms a highly satisfactory backing layer. When the backing and working layers are made of the same composition there is no shrinkage differential tending to open the joints. A relatively cheaper grade of cork composition may be used as the backing layer 5 so long as it has sufficient deformability to permit application of the cots to rolls varying within coarse limits. A ribbon of cork composition having a rubber binder forms a highly frictional, resilient backing which is satisfactory for my purpose. The backing layer 5 may be thinner than the facing layer 4. The working layer 4 is thicker in order that the cots may be refinished by buffing from time to time as they become worn. When the working and backing layers are similar cork composition, the backing may be $\frac{1}{8}$ " thick and the facing $\frac{1}{8}$ " thick.

A preferred method of making the cots is illustrated in Figure 4. A mandrel 6 is secured to a revolving spindle head 7 by means of a set screw 8. The spindle head is driven by means of a gear 9 which intermeshes with a suitable driving gear not shown. The apparatus is not shown in detail.

A layer of paper 10 is helically wound over the mandrel 6. The paper may be oiled or otherwise treated in order to prevent sticking and permit ready removal of the completed tube from the mandrel. The paper is secured to the mandrel at either end by means of small pieces of adhesive tape 11. If a collapsible mandrel is used the paper may be omitted. The paper is used because it has little or no frictional qualities and permits ready removal of the completed tube from the mandrel. If the backing layer were wound directly onto the solid mandrel it would be difficult to remove the completed tube. In place of paper, a layer of fabric, cellulose hydrate or other substantially non-frictional material may be used.

A backing layer 12 is next helically wound over the paper. The backing layer is preferably wound in a direction opposite to the helical winding of the paper. There is no adhesive applied to the backing layer. The edges of the ribbon are forced into abutting engagement so that no open joints are had. The backing layer is secured to the mandrel by means of adhesive tape similar to that used to secure the paper. A working layer 13 is next adhesively secured to the backing layer 12. The adhesive is applied to the entire under surface of the working ribbon 13.

A flexible tenacious binder should be used which is not affected by humidity. A highly satisfactory cement for this purpose may be produced by forming a manila gum solution having a specific gravity of about .952 to .975 at 70° F. This may be produced by mixing 158 parts by weight of manila gum with 100 parts by weight of ethyl alcohol. To each gallon of manila gum solution as prepared above is mixed 1.65 pounds of finely pulverized kaolin. This produces a

water-resistant, tough, flexible cement which sets in about 12 hours. A suitable flexiblized gelatin adhesive may be used if desired.

The working ribbon 13 is wound helically over the backing layer 12. The helices are preferably of opposite hand so that there is no possibility of co-incident joints. The helices of the layers may be of the same hand provided the joints are staggered. This latter method of wrapping requires considerable care due to minor deviations in dimensions of the two ribbons causing progressive "creep" which results in co-incident joints at recurrent points. If the mandrel 6 is relatively short however, co-incident joints in outer and inner layers may be avoided. I prefer to wind the layers in helices of opposite hand however, as the laminated structure is uniformly strong without requiring constant care on the part of the operator. Also the "grain" of the ribbon in the outer layer crosses the "grain" of the ribbon of the inner layer and uniform strength is assured, thus any tendency to reexpand, in the humid atmosphere of the mill under the rolling pressure of the drawing operations, is minimized by the crossed ribbons mutually retaining each other in the relative positions in which they were wound.

The adhesive which is applied to the back of the facing layer is forced out between the joints and firmly secures the ribbon where the adjacent edges abut. Considerable pressure is applied so that the abutting edges are forced into close engagement with one another. The adhesive is also forced into the joints of the backing ribbon so that a unitary structure is formed upon setting of the binder. It will be understood that more than two layers of cork may be employed if desired, and a particularly strong structure will result where the helices of adjacent linings are of opposite hand.

After the layers are wound on, the mandrel is removed from the spindle head and placed in a rack while the adhesive is permitted to set. After the adhesive has set, the pieces of tape are taken off and the tube removed from the mandrel. The paper liner 10 is easily pulled from the inside of the cork tube. The cork tubes are cut to the desired lengths of the cot for use in the textile mills.

The cot is slipped over the roll 3 to which a suitable cement 14 is first applied. The rolls are held in centers in a suitable buffing apparatus while the working surface is finished to produce a smooth, frictional, cylindrical working surface. This assures an absolute parallelism between the cylindrical surface of the two cots mounted on the same roll and insures even continuous lines of contact between the cork working surface and the bottom roll so that the fiber for even the finest yarns is drawn uniformly.

While I prefer to make the cots in two layers of composition cork, the cots may be otherwise made. For example, a ribbon of artificial cork 15, as shown in Figure 5, may be helically wound over a spindle 16 to which has been applied a layer of paper 17. Care must be taken in applying the adhesive to the ribbon 15 so that only the edges which are in abutting relationship are coated, but in order to preclude any possibility of the ribbon 15 adhering to the paper 17, the paper is preferably coated with a layer of grease or oil which prevents adhesion. The edges of the facing ribbon are forced into abutting relationship so that a good tight joint is had. After the

binder has been permitted to set, the tube is removed from the mandrel and the paper removed from the inside of the tube. The cots formed by this method are resilient and, although not as strong as the cots previously described, they are strong enough to permit application to the rolls within very coarse limits.

In the drawing the joints where the edges of the cork ribbon abut are shown in relatively heavy lines for purposes of illustration. In the final cork cot after grinding, however, the lines of demarcation where the edges abut are almost invisible. Such a fine, tight joint is obtained that one viewing a completed cot without the aid of a magnifying glass would be led to believe that it was seamless.

The cork composition I prefer to use is one which is quite dense and close knitted with a high degree of resiliency and free from interparticle voids. Such a composition is obtained by subjecting the cork granules to a pre-treatment with glycerine prior to bonding them together into the dense composition. As an example, I prefer a cork ribbon, both for the working surface layer and the backing layer, which is made of 14 to 20 mesh cork with possibly some 20 to 30 mesh cork bonded with the binder set forth above but softened by treatment with glycerine which treatment comprises coating the particles with glycerine and storing them over night in a relatively warm atmosphere, say 150° F., whereby the glycerine is absorbed into the cork making it more soft and compressible. When these particles are compressed in a mat in the ratio of 6 or 8 to 1, the composition is dense and firm but the surface particles exhibit a softness and fineness of texture making the composition highly desirable for drawing roll purposes. I prefer to use a composition of this type in a ribbon structure in which the direction of compression of the granules is at a right angle to the face of the ribbon whereby the particles are rooted into the body of the ribbon and the working face of the cot formed from such ribbon comprises the exposed edges of the flattened particles firmly bound into the structure. It will be understood, however, that other compositions may be used and other ribbon structures will be found suitable for certain services. The backing layer of cork for example may be a relatively low grade cork composition even in the better grade cots; and the working layer may be a relatively low grade composition for coarser yarns.

The terms "artificial cork", "cork composition" and "composition cork" are used interchangeably throughout the specification and claims. These terms are synonymous by common acceptance in the industry.

While I have illustrated and described the present preferred embodiment of my invention and the method of carrying the same into effect with particular reference to specific examples, it will be understood that my invention is not so limited but may otherwise be practiced and embodied within the scope of the following claims.

I claim:

1. The method of forming a cork cot for textile rolls which consists in forming a composition cork strip, winding the strip helically in a cylindrical shape while applying an adhesive so that abutting edges of the strip are adhesively joined and holding said abutting edges in compressive relationship.

2. A cot for textile rolls comprising a cylin-

dricul body of a composition cork strip disposed in the form of a helix, the adjacent edges only of the strip being adhesively united, the composition being of a firmness imparted by a compression of at least 6 to 1.

3. A cot for textile rolls comprising a cylindrical body formed of a strip of composition cork having a firmness imparted by a compression of at least 6 to 1, said strip being helically disposed with adjacent edges adhesively united, the outer surface of the cot having a softened texture imparted by the absorption of a softening agent distributed on the cork particles.

4. A cot for textile rolls comprising a cylindrical body formed of a cork composition strip held as a helix solely by a flexible adhesive uniting adjacent edges of the strip, the interior of the cot being formed substantially entirely of the inner face of the cork composition strip and being substantially free of the adhesive applied to the edges of the strip.

5. The method of making a cot for textile rolls consisting in wrapping a strip of composition cork helically around a cylindrical forming surface and securing said strip in cylindrical form by adhesive applied to the edges only of the strip and uniting said edges by maintaining the same in abutting relationship until the adhesive sets, the interior of the cot being formed substantially entirely of the inner face of the cork composition strip and being substantially free of the adhesive applied to the edges of the strip whereby the cot embraces the roll to which it is applied with a substantially uninterrupted smooth, resilient cork surface.

6. The method of making a cork cot for textile rolls, said cot presenting a substantially smooth, resilient cork surface on its interior and exterior and formed of a strip being held as a helix to form a cylindrical body solely by a flexible adhesive uniting adjacent edges of the strip, the steps consisting in coating cork granules with a softening agent, bonding said granules together under a compression ratio of at least 6 to 1, forming a strip therefrom, winding said strip helically around a cylindrical forming surface, adhesively uniting adjacent edges of said strip under compression and removing said forming surface.

7. A cot for textile rolls comprising a cylindrical body formed of a strip of cork composition having a firmness imparted by a compression of at least 6 to 1 and having its working surface formed of the exposed edges of flattened cork granules, said strip being helically disposed and held as a helix solely by a flexible adhesive uniting adjacent edges of the strip.

8. The method of making cork cots for textile rolls which consists in forming a composition cork strip, applying adhesive to a longitudinal edge thereof, winding said strip helically in a cylindrical shape about a forming surface, urging the abutting edges into firm engagement, holding said abutting edges in firm engagement until the adhesive has set, and removing the hollow composition cork cylinder so formed from the forming surface.

9. The method of making cork cots for textile rolls which consists in winding a strip of material about a forming surface, said strip presenting a non-frictional surface for contact with said forming surface, helically wrapping a ribbon of composition cork having adhesive applied to a

longitudinal edge thereof about said strip, urging the abutting edges of said ribbon into firm engagement, maintaining said abutting edges in firm engagement until the adhesive has set, and removing the hollow composition cork cylinder so formed from the forming surface.

10. The method of making cork cots for textile rolls which consists in winding a strip of material about a forming surface, said strip presenting a non-frictional surface for contact with said forming surface, helically wrapping a backing in the form of a composition cork ribbon over said strip with the abutting edges in firm engagement, helically wrapping a facing in the form of a composition cork ribbon over said backing with an interposed adhesive securing said composition cork layers together, urging the abutting edges of said facing ribbon into firm engagement, maintaining said abutting edges in firm engagement until the adhesive has set, and removing the hollow cylinder of composition cork so formed from the forming surface.

11. A cot for textile rolls made wholly from cork composition strips comprising a cylindrical body having a working surface formed of a helically disposed cork composition strip, a backing layer formed of a helically disposed cork composition strip of lesser thickness than the facing strip, the helical joints in the adjacent strips being non-coincident, and an interposed flexible adhesive securing the strips together, with the abutting edges of the facing strip adhesively secured and in close engagement.

12. The method of making cork cots for textile rolls which consists in winding a strip of cork composition helically about a mandrel to form a cylindrical body, adhesively securing an outer strip of cork composition in helical form to the first-mentioned strip with the helical joints of the strip in non-coincident relationship, urging the abutting edges of the outer strip into firm engagement prior to setting of the adhesive, holding the same in position until the adhesive has set, and removing the hollow cork composition cylinder so formed from the mandrel.

13. A cot for textile rolls made wholly from cork composition strips comprising a cylindrical body having a working layer formed of a helically disposed cork composition strip, said strip having a firmness imparted by a compression of at least 6 to 1 and having its working surface formed of the exposed edges of flattened cork granules, a backing layer formed of a helically disposed cork composition strip of substantially lesser thickness than the facing strip and an interposed adhesive securing the strips together, with the abutting edges of the facing strip adhesively secured and in close engagement.

14. The method of making cork cots for textile rolls which consists in helically winding a strip of cork composition about a forming surface, applying adhesive to a face of a strip of cork composition, helically wrapping said strip over the previously applied strip with the adhesive interposed therebetween, urging the edges of the last named strip into firm abutting engagement while forcing adhesive out between the joints thus formed, holding this strip with its edges in engagement until the adhesive has set, and removing the hollow cork composition cylinder so formed from the mandrel.

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