June 30, 1936. H. W. PRENTIS, JR 2,046,137

TEXTILE ROLL

Filed Oct. 7, 1932

Fig 1

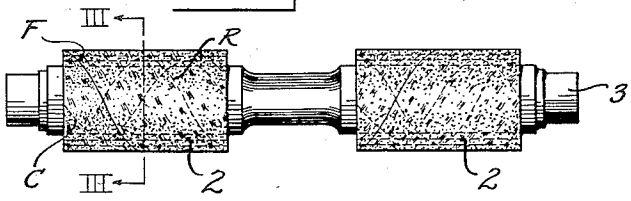


Fig 2

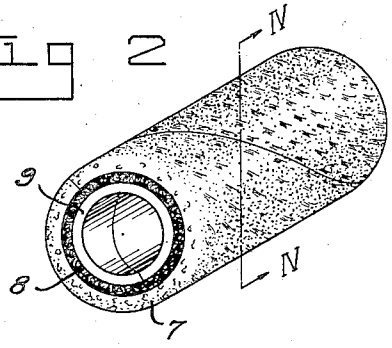


Fig 3

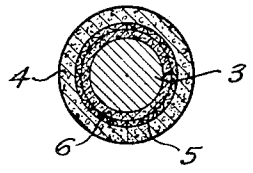


Fig 4

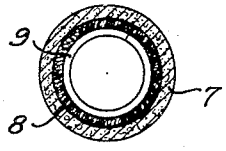


Fig 5

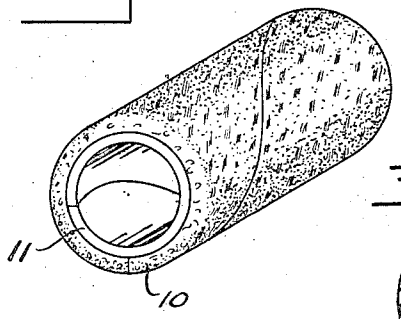


Fig 6

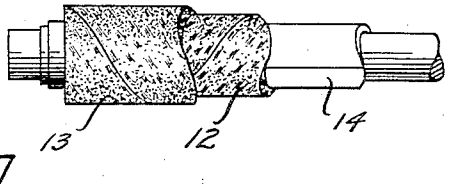
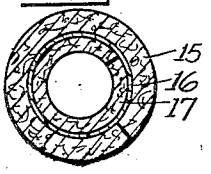


Fig. 7



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TEXTILE ROLL

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13 Claims. (Cl. 19—143)

The present invention relates to textile rolls and more particularly to textile rolls having working surfaces of compressed artificial cork.

The invention is illustrated as applied to the drawing rolls used on the 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 pairs, the lower roll usually having a metal face and the complementary upper roll having a non-slipping surface. These rolls with non-slipping surfaces are commonly disposed above the metal face rolls and are, therefore, known as top rolls. Heretofore the top drawing rolls have been 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 the rolls is a specialized task.

In recent years coverings made of composition cork have been gradually replacing the old type leather coverings. Seamless cork cots made in accordance with Busch Patent No. 1,532,682 have proved quite satisfactory. The Busch cot is made from blocks of cork composition. The sleeve or 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 advantages of such composition 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 solid cork blocks.

It has also been proposed to form cork coverings for textile rolls by applying a layer of composition cork to a backing of vulcanized fiber. The cork and fiber are secured together by glue. The vulcanized fiber is substantially unyielding and the problem of applying and securing the coverings to the rolls is serious. The diameter of the rolls varies considerably. It is not unusual for a single mill to have rolls which vary as much as one thirty-second of an inch in diameter. 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 break loose from the roll under compression; the bonding agent being broken by flexing as the roll is rotated under pressure. It will be apparent, therefore, that cots having hard, substantially inextensible cores are unsatisfactory for textile usage because of the problem of applying and securing them to the variously sized rolls found in current practice.

According to my invention a cork surfaced cot is formed having a resilient backing or core which is readily deformable and permits of easy application to rolls varying within wide tolerances. My preferred cot is provided with a substantially inextensible, non-yielding layer interposed between the resilient core and the outer cork working face. This layer serves as a reenforcing lamella which restricts the deformation under the pressure of application to the resilient core, and prevents any strains incident to forcing the cot onto an oversized spindle from being transmitted to the outer working layer. Consequently, the outer diameter of the cot remains unchanged even when applied to an oversized spindle. The reeinforcing layer is particularly advantageous when the outer working surface of the cot is formed of a wrapped cork facing layer. It obviates open joints or seams which might otherwise occur due to stretching of the outer layer.

The core should be resilient, readily deformable under compression and should preferably possess a relatively high coefficient of friction. A core of this character permits forcing of the cot onto oversized rolls with subsequent expansion of the core and frictional gripping of the roll, thus firmly holding the cot in position.

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

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

Figure 2 is an oblique view showing a modified cot structure;

Figure 3 is a sectional view taken along the lines III—III of Figure 1;

Figure 4 is a sectional view taken along the lines IV—IV of Figure 2;

Figure 5 is an oblique view showing a modified form of covering;

Figure 6 is a plan view, partly broken away, illustrating a further modification of my invention; and

Figure 7 is a sectional view illustrating a modified form of covering.

Referring to the preferred embodiment illustrated in Figure 1, there is shown a pair of cots **2** mounted on a roll **3** of the usual type. The cot **2** is shown in section in Figure 3, and comprises

a working surface layer 4, a reenforcing lamella 5 and a core 6.

The working layer 4 is preferably formed of a cork ribbon such as is described in Busch Patent No. 1,646,187. 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 is added to coagulate the binder. The mass is then placed in a suitable mold and compressed to approximately ⅛ of its initial size. 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 composition 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 composition decreases somewhat in proportion to the size of the granules used. A relatively strong binder should be employed in order to prevent puffing of the granules under humid conditions.

The reenforcing layer 5 is preferably fabric. A double faced adhesive tape as shown in Figure 3 has proved highly satisfactory for this purpose. Such a tape comprises an open mesh fabric provided on either side with a suitable adhesive, such for example as glue. In place of fabric, tough kraft paper, metal foil, vulcanized fiber or even reticulated metal may be employed. The reenforcing layer should preferably be substantially inextensible. The reenforcement may be formed of two or more layers if desired.

The backing layer 6 of my preferred cot is made of composition cork which is firm, yet possesses a relatively high degree of compressibility. A cork ribbon similar to the preferred working material forms a highly satisfactory backing layer. A relatively cheaper grade of cork composition may be used as the core 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. A relatively soft rubber core layer may be employed with good results.

The core and reenforcing may be formed as a compound sheet. This may be conveniently produced by calendering the core forming material upon a fabric, paper or other reenforcing web and thereafter cutting the thus formed sheet into the desired ribbon or strip. In some instances it will be found desirable to "duplex" the core layer to the reenforcing layer as by adhesively securing the reenforcing web to the core layer. This may be done before or after the ribbon or strip is formed.

The backing layer 6 may be thinner than the facing layer 4. The working layer is usually 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 of similar cork composition and the reenforcement is gummed tape, as illustrated in Figure 3, the backing may be $\frac{1}{32}$'' thick and the facing ⅛'' thick.

The cots may be readily produced by helically wrapping ribbons of the various materials upon a revolving mandrel. According to my preferred method, a layer of oiled paper is first helically wound over the mandrel to prevent the core layer from sticking thereto and to permit ready removal of the completed tube from the mandrel. If a collapsible mandrel is used, however, the oiled paper may be omitted. The backing layer 6 is helically wrapped over the paper; no adhesive being applied to this layer during the winding operation. The edges of the ribbon are forced into abutting engagement to form a continuous tube with no open joints or seams. The tube is held in position on the mandrel by the aid of pieces of adhesive tape which are attached to the mandrel and to either end of the ribbon. The reenforcing layer 5 is next applied over the backing layer 6. When double faced gummed adhesive tape is used, it may simply be wetted on one side and then helically wrapped over the backing layer. If vulcanized fiber, kraft paper or other reenforcing ribbon be employed, an adhesive is applied to the entire under surface. In some instances it may be found advantageous to apply the adhesive to the previously wound core layer. The adhesive may be applied by means of a brush while revolving the spindle over which the core layer has been wound.

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 75° 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 twelve hours. A suitable flexiblized gelatin adhesive may be used if desired. If the core be formed of soft rubber, rubber cement may be used to secure the reenforcing layer to the core.

The reenforcing layer is wound helically over the backing layer; the helices being preferably of opposite hand so that there is no possibility of coincident joints. The helices of the layers may be of the same hand provided the joints are staggered. If a compound core and reenforcing be employed, the helices of the core and reenforcing will, of course, be of the same hand.

The working or face layer is helically wound over the reenforcing layer, with the helices preferably of opposite hand. The adhesive may be applied to the under surface of the working layer or, if gummed fabric be used, the outer surface of the fabric is simply wetted prior to application of the working layer. The adhesive which is used to secure the working layer is forced out between the joints and firmly secures the adjacent edges of the ribbon. Considerable pressure is applied so that the abutting edges are forced into close engagement with one another and a good tight joint is insured. The working surface may be formed by building up a plurality of layers of helically wound ribbons and a par-

ticularly strong structure will result where the helices of adjacent ribbons are of opposite hand.

In Figure 1, the direction of the helices of the core layer 6 and the reenforcing lamella 5 are indicated by dotted lines. The core layer is provided with a right hand helix indicated at C. The reenforcing layer is wound in the opposite direction; the direction of the helix indicated by the letter R. The facing layer is wound in the same direction as the core layer and the direction of the helix is shown by the line F.

After the layers are wound on and the adhesive permitted to set, the tube is removed from the mandrel and the paper liner is pulled from the inside of the tube. The tubes thus produced are cut to the desired cot lengths for use in the textile mills. The cot 2 is slipped over the roll 3 to which a suitable cement may be first applied. The cot may be frictionally held in place on the roll if desired, in which case, the internal diameter of the cot should be slightly less than the diameter of the roll to which it is to be applied. The rolls are held in centers on a suitable buffing apparatus while the working face is finished to produce a smooth cylindrical surface. This insures 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.

Figures 2 and 4 illustrate a modified cork cot which comprises a cork composition working layer 7, an intermediate reenforcing 8 of impregnated fiber and a backing 9 of rubber or rubber composition. This type of cot may be produced in a manner similar to my preferred cot. In the illustrations, the layers are shown as being helically wound in opposite directions. The reenforcement, however, may be in the form of a seamless tube which is slipped over the backing or core layer 9 and held in position by friction or by the aid of an adhesive. The core layer may be in the form of a rubber tube formed by extrusion or otherwise as is well known in the rubber tube making art.

In some instances the reenforcing layer may be omitted. In Figure 5 I have illustrated a helically wrapped textile cot provided with a cork composition working surface 10 and a relatively thick soft rubber core layer 11. It is preferable in such a structure to have the core layer relatively soft and resilient in order to prevent the transmission of harmful strains from the core layer to the facing layer which would result in open joints or seams. For example, the facing layer may be $\frac{1}{8}$'' thick and the core $\frac{3}{32}$'' thick.

In Figure 6, I have illustrated a roll covering in which the reenforcing layer 12 is formed of cork composition which may be of a character similar to the cork composition working surface 13. The layers may be helically wrapped, with the helices of opposite hand, over a backing of rubber indicated at 14. In this modified type of covering, the core layer may be formed by wrapping the same squarely around the mandrel and thereafter helically wrapping on the reenforcing and facing layers. The covering may be formed by applying the core layer directly to the roll and thereafter securing, by friction or with adhesive, a preformed cot provided with a cork composition working surface and a reenforcing which is less compressible and extensible than the core.

A cot having a cork composition working surface 15, a metallic reenforcing ribbon 16 and a compressible and expansible core 17 is illustrated in Figure 7.

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 it to be seamless.

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 be otherwise practiced and embodied within the scope of the following claims.

I claim:

1. A cot for textile rolls comprising a cylindrical body having a compressible and expansible core, a composition cork working surface, and a substantially intextensible intermediate reenforcing for confining to the core the stresses incident to application of the cot to a roll.

2. A cot for textile rolls comprising a cylindrical body having a compressible and expansible core, a composition cork working surface, and a substantially inextensible fibrous intermediate reenforcing for confining to the core the stresses incident to application of the cot to a roll.

3. A cot for textile rolls comprising a cylindrical body having a compressible and expansible core, a composition cork working surface, and a fabric intermediate reenforcing for confining to the core the stresses incident to the application of the cot to a roll.

4. A cot for textile rolls comprising a cylindrical body having a compressible and expansible core, a composition cork working surface formed of a helically disposed cork strip and a substantially inextensible intermediate reenforcing, adjacent layers being adhesively secured together to form a unitary structure.

5. A cot for textile rolls comprising a cylindrical body having a working surface formed of a composition cork ribbon, a core layer formed of composition cork, and a fibrous reenforcing layer intermediate the working surface and the core for confining to the core the stresses incident to the application of the cot to a roll, the adjacent layers being adhesively secured to each other and being helically disposed.

6. A cot for textile rolls comprising a cylindrical body having a working surface formed of a composition cork strip, a core layer formed of composition cork, and a fibrous reenforcing layer intermediate the working surface and the core for confining to the core the stresses incident to the application of the cot to a roll, the adjacent layers being adhesively secured to each other and being helically disposed with the helices of adjacent layers being of opposite hand.

7. A cot for textile rolls comprising a cylindrical body having a composition cork working surface, a compressible and expansible core, and a metallic reenforcing interposed between the working surface and the core.

8. A cot for textile rolls comprising a cylindrical body having a composition cork working surface, a compressible and expansible core, and an interposed reenforcing layer formed of a helically disposed metallic ribbon.

9. A cot for textile rolls comprising a cylindrical

body having a working face formed of the exposed granules of a composition cork strip helically disposed, a rubber core and a helically disposed fibrous reenforcing layer interposed between the working surface and the core, the adjacent layers being adhesively secured together.

10. A cot for textile rolls comprising a cylindrical body having a working face formed of the exposed granules of a composition cork ribbon helically disposed, a core formed of a helically disposed ribbon of composition cork, and an interposed reenforcing formed of a helically disposed ribbon of double gummed fabric tape for confining to the core the stresses incident to the application of the cot to a roll.

11. A cot for textile rolls comprising a cylindrical body having a working face formed of the exposed granules of a composition cork strip helically disposed, a rubber core, and a fibrous reenforcing interposed between the working surface and the core and adhesively secured thereto, said reenforcing serving to confine to the core the stresses incident to the application of the cot to a roll.

12. A cork cot for textile rolls comprising a cylindrical body having a cork composition core, a restricting layer secured to the core and serving for confining to the core the strains incident to the application of the cot to a roll and a helically disposed cork composition strip forming the working surface secured to the restricting layer.

13. A cot for textile rolls comprising a helically disposed ribbon of composition cork forming a compressible and expansible core, a helically disposed ribbon of reenforcing material adhesively secured to the composition cork and serving to confine to the core the strains incident to the application of the cot to a roll, and a helically disposed ribbon of composition cork forming the working surface adhesively secured to said reenforcing material, the helices of adjacent layers being of opposite hand.

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