April 12, 1949. E. L. LUACES 2,467,214

SPINNING COT

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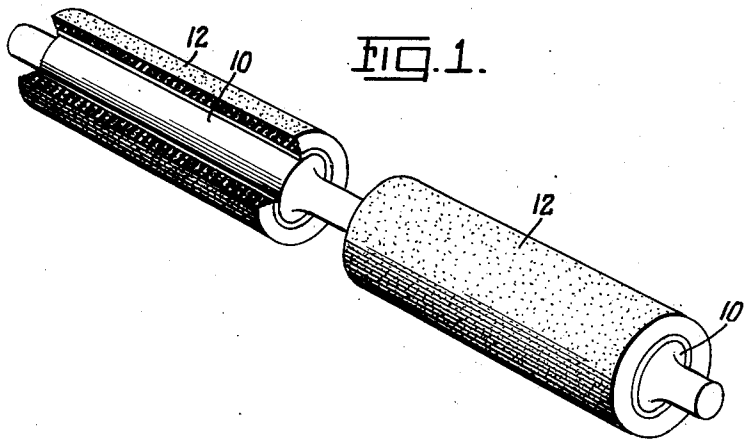


FIG. 1.

FIG. 2.

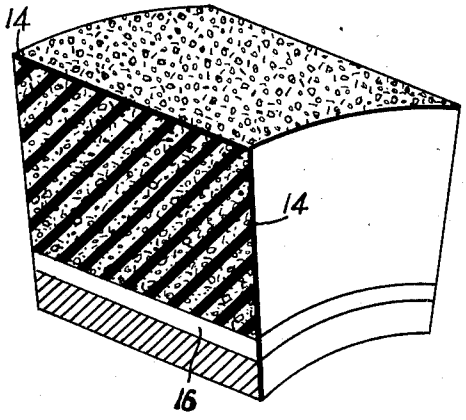


FIG. 3

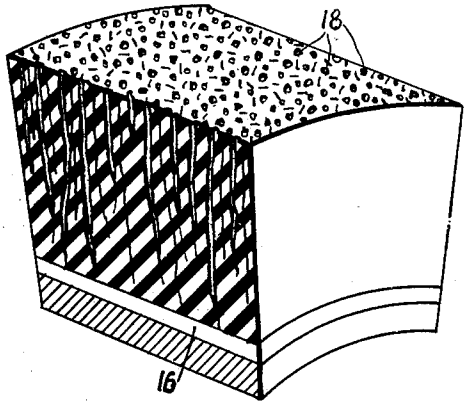
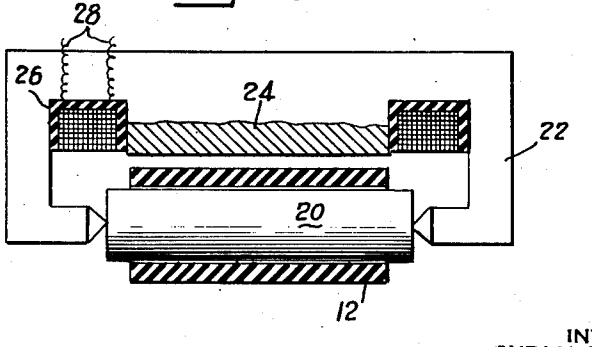


FIG. 4.



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SPINNING COT

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3 Claims. (Cl. 260—41.5)

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This invention relates to textile machinery.

More particularly, this invention relates to spinning cots and roll coverings made of synthetic rubber composition characterized by their non-eyebrowing characteristics.

While this invention will be described in connection with the making of a spinning cot, it will readily be understood, by those skilled in the art, that this invention is as well adapted for forming other textile units such as temple rolls, loom take-up roll coverings, and the like.

A good spinning roll or cot possesses good fiber drafting characteristics, exhibits low static charge build-up, is resistant to attacks by oil and abrasive substances and has good aging and wear resisting properties. A good cot or spinning roll is further characterized by a surface which inhibits eyebrowing throughout the life of the cot and has substantially no tendency toward lapping-up.

The important characteristic of non-eyebrowing is enhanced by a certain degree of physical roughness on the surface of the cot. This roughened surface may be obtained by buffing the cot at the time of manufacture, but such a surface will wear down and ultimately become smooth. It is then necessary to re-buff the cot in order to restore its original quality.

The ideal cot presents a surface to the fibers being drafted which is rough to the required degree throughout the life of the drafting unit. To this end, cots have been made which include a finely divided addition material which is incorporated in the cots when they are compounded. Among the substances which have been used as the addition material are salt, sand, ground hard rubber, buffings, shredded leather, cork, cellulosic material and the like. As the surface of cots compounded in this manner wear down in use, the particulate addition material is brought to the surface and falls off, thus leaving a finely pitted or porous surface which possesses the desired texture.

While the texture of such cots is satisfactory, the use of salt or sand or similar materials has produced unsatisfactory results in other respects. For example, salt will deliquesce in the humid atomsphere of the processing rooms with the result that the surface of the cot becomes moist and gummy. On the other hand, the particles of

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sand incorporated in such cots are highly abrasive and cause damage to bearings and sliding surfaces as they fall thereon from the cot surface. Other addition products may likewise interfere with proper operation of mechanical equipment.

The present invention has for its primary purpose to produce a cot having a suitably pitted or roughened surface while avoiding the disadvantages of salt or sand or other similar addition materials.

According to this invention, a cot is provided which has a more or less uniformly porous structure throughout caused by the removal from the body of the cot addition material uniformly distributed in the unvulcanized cot material. Having a body which is porous throughout, the cot, therefore, presents throughout its life a roughened surface to the textile fibers which it is drafting.

The present invention will be more fully understood from the following description taken in connection with the attached drawing, in which:

Figure 1 is a diagrammatic view of a roll having a cover made according to this invention;

Figure 2 is an enlarged diagrammatic view of the roll having the addition material therin;

Figure 3 is a view similar to Figure 2 but showing, diagrammatically, the condition of the cot subsequent to the removal of the addition material; and

Figure 4 is a diagrammatic view showing one method of removing the addition material.

Referring to the drawings more in detail, the numeral 10 indicates a spinning roller and the numeral 12 indicates the covering thereon.

In Figure 2 the cover 12 is shown as containing a plurality of particles 14 which are dispersed throughout the body of the said cover. The cover 12 may comprise a section 16 at the inner portion thereof which serves as a tension section thereby adding to the strength of the cot or covering.

In Figure 3 the addition particles 14 have been removed and the cover 12 will be seen to contain a plurality of pores or pits 18 which are of various size and extend for different distances into the body of the cover. It will be noted the porosity caused by the said pores is substantially continuous throughout the body of the cover.

In Figure 4 the roll cover 12 is shown as

mounted on a mandrel 20 which is preferably of non-magnetic material. The mandrel 20 is rotatably supported in a substantially C-shaped member 22 which is, preferably, formed of magnetic material. The member 22 comprises a depending portion 24 extending toward the surface of the cover 12 and about which is wound a coil 26.

Any suitable source of electrical energy may be selectively connected with the leads 28 of the coil 26 so as to energize the latter.

The particulate addition material indicated at 14 in Figure 2 comprises particles or flakes of magnetic material which has been thoroughly admixed with the rubber-like composition of the cover prior to the vulcanizing of the latter. After the aforementioned mixing, the cover is molded and vulcanized and the cot or roll cover is placed on the mandrel 20 and electrical energy is supplied to the coil 26 from the leads 28. The mandrel 20 is then rotated at suitable speed so that the particulate material is pulled outwardly from the body of the cot or roll cover, leaving the latter in a finely pitted or porous condition.

Following the manetic treatment of the cot or roll cover, the surface thereof may be ground or buffed or otherwise suitably machined to the proper working finish.

The resulting cot surface is dry and smooth to touch but has minute pits or pores therein and, inasmuch as the addition material was dispersed throughout the body of the cot, wear and regrinding of the surface will not destroy the desirable texture thereof.

While it will be apparent that this invention may be employed with advantage in connection with any type of vulcanizable cot material, I have found that the best synthetic rubber-like material comprises butadiene copolymer of acrylic nitrile compounded with fillers, vulcanizing agents and other ingredients. Such cots have excellent fiber drafting properties and exhibit substantially no tendency to collect fiber on the surface thereof. Neither do they exhibit a tendency to groove, or to collect static charges and are substantially unaffected by oils and greases. In addition, cots formed of butadiene acrylic nitrile copolymer possess substantially greater durability than the best leather cots.

As a typical example of a spinning cot composition employing butadiene acrylic nitrile copolymer, I submit the following formula:

Example

	Parts by weight
Butadiene-acrylic nitrile copolymer	80–125
Dibenzyl ether	10–25
Cumarone resin	6–12
Zinc Oxide	4–8
Whiting	40–70
Sulfur	1–2
Benzothiazyl disulphide	0.9–1.5

It will be understood that the particular amount of butadiene acrylic acid copolymer given in the example above may be varied considerably in order to control the characteristics of the finished cot, but I prefer to use from 30 to 55% by weight of the composition.

The hardness of the cots as measured on the Shore type "A" durometer is preferably within the range of 50 to 95 and may be controlled, as well as the toughness and resiliency of the finished article by suitable additions of carbon black, zinc oxide, clays and other materials well known in the art of compounding natural and synthetic rubbers.

While it will be apparent that this invention is not necessarily limited to any specific composition, in order to produce a cot having improved drafting characteristics, in order to realize the greatest advantages, it is necessary to use a copolymer of butadiene similar to the one given in the example. Copolymers of butadiene and styrene, for example, may be used advantageously in the practice of my invention.

It will be understood by those skilled in the art that my improved cot or roll covering having porous characteristics may be used in making a great variety of fiber-working machine elements for use in the textile industry. For example, various types of rolls, covers, jackets, aprons and the like used in drafting, conveying, rubbing and fiber-working may be advantageously manufactured using my improved method.

It will also be understood by those skilled in the art that the degree of vulcanization or curing may be so controlled as to produce any specific physical property desired. Also, the amounts of the different ingredients may be varied or have equivalents substituted therefor in order to produce a product of any desired degree of hardness, elasticity and frictional characteristics. In each case the ingredients are preferably compounded with a copolymer of butadiene and thoroughly mixed with the finely divided magnetic addition material, molded to the desired shape or form, vulcanized, magnetically treated to remove the addition material and, when necessary, the surface ground, buffed, abraded, or otherwise treated or processed to give it the desired surface characteristics.

It will be apparent that the particles of magnetic material need not, necessarily, be completely removed from the body of the unit in order to accomplish the objects of this invention. For example, the body may be treated magnetically in order to displace the particles from their original positions thereby breaking whatever bond exists between the said particles and the rubber-like body. Then, as the cot wears down the loose particles will fall off the surface thereof leaving the same suitably porous.

In addition, it will be understood that it is not my intention to be limited to the specific details herein set forth, but that I desire to comprehend such modifications as may come within the spirit of this disclosure and the scope of the appended claims.

I claim:

1. The method of making a fiber working unit for textile spinning machine which comprises compounding a rubber-like composition of acrylic nitrile and butadiene copolymer with fillers, a vulcanizing agent, and a finely divided magnetic substance, vulcanizing the mixture to a relatively hard, resilient, wear resisting product in which the divided substance is thoroughly dispersed, and drawing the divided substance outwardly through the surface of the said unit by magnetic influence whereby the resulting product has a finely porous texture throughout.

2. The method of making a fiber-working unit for a textile spinning machine which comprises compounding a rubber material from the group consisting of butadiene acrylic nitrile and butadiene styrene copolymers, a vulcanizing agent, and a finely divided magnetic substance, vulcanizing the mixture to a relatively hard, resilient, wear resisting product in which the divided sub-

stance is thoroughly dispersed, and drawing the divided substance outwardly through the surface of the said unit by magnetic influence whereby the resulting product has a finely porous texture throughout.

3. The method of making a fiber-working unit for a textile spinning machine which comprises compounding butadiene styrene copolymer rubber, a vulcanizing agent, and a finely divided magnetic substance, vulcanizing the mixture to a relatively hard, resilient, wear resisting product in which the divided substance is thoroughly dispersed, and drawing the divided substance outwardly through the surface of the said unit by magnetic influence whereby the resulting product has a finely porous texture throughout.

ENRIQUE L. LUACES.

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