

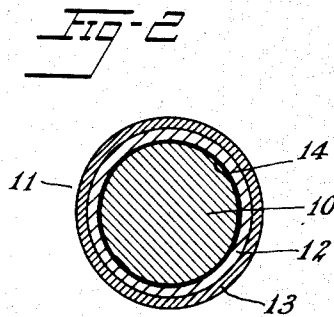
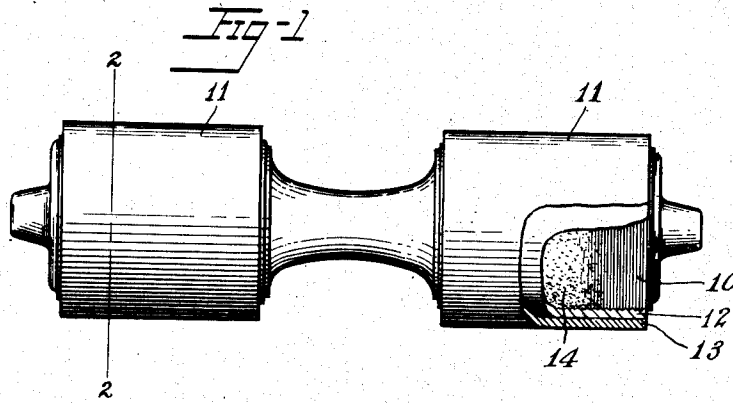
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1,569,826

RUBBER COVERED SPINNING ROLLER

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UNITED STATES PATENT OFFICE.

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RUBBER-COVERED SPINNING ROLLER.

Application filed July 30, 1925. Serial No. 47,154.

To all whom it may concern:

Be it known that I, ALLAN B. MERRILL, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Rubber-Covered Spinning Roller, of which the following is a specification.

This invention relates to drawing or feeding rollers for spinning frames, and its object is to provide a soft-rubber covered roller of this character which shall possess improved fiber-gripping qualities combined with sufficient flexibility not to crush the roving, and which can be made at a lower cost and can be attached to the metal roller core more quickly and easily than the felt-cushioned leather covers now commonly in use.

It has heretofore been proposed to provide covers for spinning rollers having outer surface layers of hard or semi-hard rubber. These rolls have not, so far as I am aware, been used in the industry, since the hard-rubber surfaces of these roll-covers, when the rolls are pressed together with sufficient tension to secure a proper feeding action, have a tendency to crush the roving and thus to interfere with the spinning operation.

The present invention overcomes the defects of such proposed rubber coverings by constructing the roll cover with a cushion and a tread both of a soft-vulcanized rubber, the tread being of a relatively stiff, but flexible soft-rubber, and the cushion being of a relatively compressible soft-rubber. The combination of these soft-rubbers gives to the roller a good gripping surface which is sufficiently pliable to feed the roving without detrimentally deforming it. This improved construction of a rubber cover for spinning rollers is described in my copending application, Serial No. 627,944, filed March 27, 1923, of which the present application is in part a continuation.

Of the accompanying drawings, Fig. 1 is an elevation, partly broken away and in section, showing a spinning roller provided with my improved cover; and Fig. 2 is a cross-section on line 2—2 of Fig. 1.

In the drawings, which show the usual type of double roller employed on spinning frames, 10 is a metal core having duplicate, circumferentially-grooved attaching faces of general cylindrical form, and 11, 11 are the

two covers thereon. Each cover 11 is a cylindrical sleeve or tube of soft-vulcanized rubber comprising an inner cushion layer 12, and an outer tread layer 13 integrally united thereto, preferably by vulcanization.

The inner cushion layer 12 is made of a compressible soft-vulcanized rubber having good cushioning properties. Satisfactory results have been obtained with cushion stocks containing rubber 100 parts by weight; stiffening pigments, 28 parts; softening pigments, 25 parts; and sulfur, 11 parts. Various stiffening and softening pigments may be employed, the following recipe being given by way of illustration only, the proportions herein indicated being by weight: Rubber 100, zinc oxide 12, iron oxide 6, glue 10, palm oil 2, pará-cumerone resin 23, sulfur 11, accelerator 2.

It is to be understood that the above recipe may be varied considerably in the proportions of ingredients employed as well as in the ingredients themselves.

A test of the soft-vulcanized rubber made as in the above recipe shows the following properties: Tensile in lbs. per sq. in 2324, elongation in per cent 806, plastometer reading 1.17 mm. The plastometer test herein referred to is that commonly employed and represents the depth of the indentation in millimeters made by a blunt instrument $\frac{1}{8}$ inch in diameter when loaded with a weight of 1 kilogram for 1 minute.

The tread layer is preferably of a relative stiff, resilient, flexible, soft-vulcanized rubber. Excellent results have been obtained with compound containing rubber, 100 parts by weight, stiffening pigments, 100 to 275 parts; softener, 5 to 30 parts; color (gas black), 25 to 75 parts; zinc oxide, 10 to 30 parts; organic accelerator, 2 to 3 parts; and sulfur, 5 to 7.5 parts. The following recipe will serve as an example of such a compound: Rubber 100, blanc fixe 70, gas black 25, glue 21, zinc oxide 12, petrolatum 5, sulfur 5.5, accelerator 2.

It will be noted that a relatively high percentage of glue is used in the above recipe. This gives to the tread layer a high resistance to oil, which is a desirable property in the surface layer of a spinning roller.

A test of the soft-vulcanized rubber tread made in accordance with the above recipe shows the following properties: Tensile in

lbs. per sq. in. 2453, elongation in percent 494, plastometer reading .57 mm.

Another somewhat stiffer tread composition than that of the example above recited and one which has given satisfactory results in practical use consists in: Rubber 100, fossil flour 50, whiting 140, blanc fixe 75, gas black 60, mineral rubber 20, soft tar 5, palm oil 2.5, zinc oxide 25, sulfur 7.5, accelerator 3.

A tread made in accord with the above recipe shows upon test the following properties: Tensile in lbs. per sq. in. 746, elongation in percent 206, plastometer reading .35 mm.

The covers 11 are made by wrapping layers of the above described rubber compounds successively upon a long mandrel whose diameter is slightly, yet materially, less than that of the core 10, the tread stock of the layer 13 being superimposed on the cushion stock of the layer 12. When the cover tube has thus been built up, it is wrapped in wet cloth and cured upon the mandrel, the two layers 12 and 13 being thereby integrally united or welded together.

The tube is then removed and immersed in sulfuric acid for a few minutes to check the surface of the rubber for the purpose of forming a good cementing surface on the inner periphery. The tube is then mounted with a snug fit on another mandrel which is placed in a lathe and the tread portion is ground to give it a smooth, cylindrical outer surface of proper diameter, after which the long tube is cut up into proper lengths to form the roll covers 11.

In applying the covers 11 to a core 10, the grooved surfaces of the latter are painted with one or more coats of shellac, 14, which is allowed to dry, and the covers 11 are then stretched over and properly positioned on the grooved surfaces of the core, after which the roller is heated sufficiently to melt the shellac and thus to form a secure bond between the core and the checked inner surface of the covers. The outer tread being less extensible than the cushion layer, the stretching on of a cover 11 over the grooved cylindrical face of a core 10, which face has a greater outer diameter than the inner diameter of the cover, places the cushion layer 12 under radial compression between the tread layer 13 and the core face and also places the outer tread surface under a slight peripheral tension, thereby giving to it a somewhat greater firmness, which adapts the tread surface the better to grip the roving being fed to the spinning frame.

It is to be understood that both the cushion

and tread of the roller cover hereinabove described may be made of rubber stocks compounded with a wide range of pigments, the essential of all of such compounds being that each should be a soft-rubber stock having a low combined-sulfur content, the cushion having a low proportion of stiffening pigments to rubber and the tread a high proportion of stiffening pigments.

Various modifications may be resorted to without departing from the principles of my invention, and I therefore do not wholly limit my claims to the specific embodiment shown.

I claim:

1. A spinning roll comprising a core, and a cover thereon having an outer portion of relatively-stiff, flexible, soft rubber, and an underlying cushion of relatively-soft rubber.

2. A spinning-roll cover having an outer, cylindrical tread layer of relatively-stiff, flexible, soft rubber, and an inner, cylindrical cushion layer of relatively-soft rubber vulcanized thereto.

3. A spinning roll comprising a core and a sleeve initially of slightly-smaller aperture than the periphery of said core, stretched over the latter and consisting of an outer cylindrical layer of relatively-stiff, flexible, soft rubber, and an inner, cushion layer of relatively-soft rubber vulcanized thereto.

4. A roll-cover comprising an outer layer of relatively-stiff, flexible rubber, and an inner cushion layer of relatively-soft rubber vulcanized thereto, said inner layer having an acid-checked cementing surface.

5. A spinning roll comprising a metal core having a roughened cementing surface, and a flexible cover of initially smaller aperture than the periphery of said core, stretched thereover and consisting of an outer layer of relatively-stiff, vulcanized rubber and an inner, cushioning layer of relatively-soft, vulcanized rubber integrally united thereto and having an acid-checked inner surface, together with a layer of cement uniting said acid-checked surface to the roughened surface of the core.

6. A spinning roll comprising a metallic core and a covering of soft-vulcanized rubber therefor consisting of a normally extensible and compressible cushion layer and a materially less extensible tread layer, the cushion layer being held under compression between the core and the tread layer.

In witness whereof I have hereunto set my hand this 29th day of July, 1925.

ALLAN B. MERRILL.