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J. H. TWOMEY

2,717,427

RUB APRON

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FIG - 1

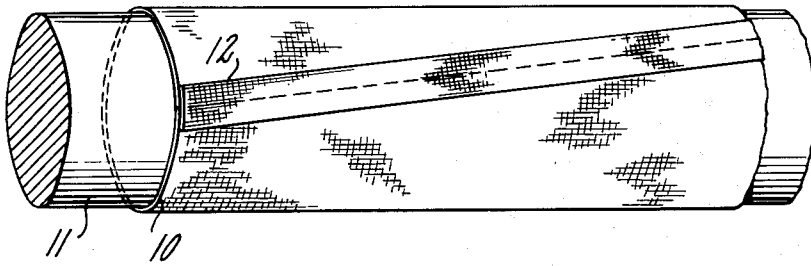


FIG - 2

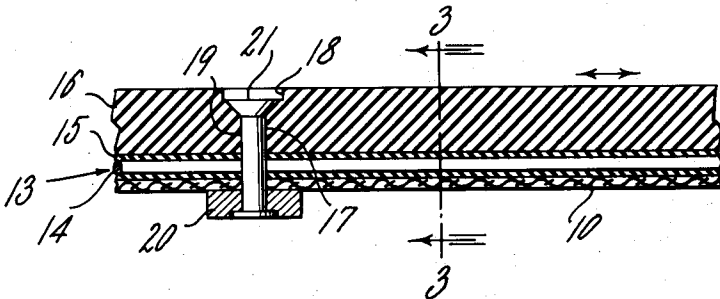
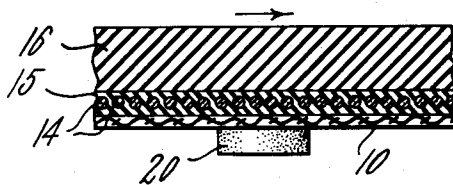


FIG - 3



INVENTOR.
JEREMIAH J. TWOMEY

BY

David B. Miller

ATTORNEY

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2,717,427

RUB APRON

Jeremiah J. Twomey, Providence, R. I., assignor to United States Rubber Company, New York, N. Y., a corporation of New Jersey

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9 Claims. (Cl. 19—153)

This invention relates to rub aprons for use in forming strands of textile-like material.

In spinning wool yarns, it is customary to divide the carded lap into narrow strips and to run these strips through condensers where the strips are rolled into roving. These condensers comprise a pair of rub aprons each running on spaced rollers. The rub aprons with the strip held therebetween are advanced longitudinally and at the same time they are reciprocated transversely by the rollers which rotate and reciprocate simultaneously, so that the ribbon of fibers which is being advanced between the aprons is rolled up by the transverse reciprocating motion of the aprons into a sliver. Spaced buttons are fastened to the rub aprons along each side of the aprons to keep them from creeping longitudinally of the cylindrical rollers to creep off the rollers as the latter are reciprocated transversely of the direction of advance of the aprons.

Heretofore rub aprons which are to be used for this and similar operations have been made of several layers of fabric to which the buttons may be anchored firmly, so that the buttons will not be torn from the apron under the strains imposed on them in their normal operation. Over these fabric layers, a layer of rubber-like material is applied to form a rub surface for the apron. These rub aprons of the prior art have had disadvantages in use because they are relatively stiff and inflexible owing to the many layers of fabric used in them to provide a firm anchoring base for the buttons. These stiff aprons do not track well on their rollers, and consequently a heavy strain is thrown on the buttons at the edges of the apron as the rollers reciprocate, so that these buttons are sheared off. A properly tracking apron should have little or no strain at the buttons when the apron is running, and when an apron is broken-in, it should run without the buttons coming in contact with the ends of the rollers.

Furthermore, these aprons generally are built on a cylindrical mandrel, but the rollers on which they run when in use are spaced apart cylindrical members, so the ideal track of an apron when in use in substantially oval shaped. But these stiff aprons of the prior art tend to retain their original cylindrical shape when in use, and this prevents their tracking on the rollers to best advantage. Furthermore, those experienced in the art feel that an apron to track properly must stretch somewhat transversely of the apron at its areas of contact with the rollers and must neck in somewhat at its edges outside the rollers. These relatively stiff and heavy aprons of the prior art will not stretch as easily as might be, hence for this additional reason they do not track on their rollers as well as they might.

It is an object of this invention to provide an improved rub apron having greater flexibility than those of the prior art, hence one which will track better on its spaced supporting rollers when in service. A still further object is to provide a relatively light rub apron which has

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an anchoring base that will hold the buttons fixed firmly to the apron.

These objects are achieved by providing a rub apron which comprises a backing fabric of strong closely woven duck-like fabric woven of cotton, nylon, rayon or other strong fibers. Over this backing fabric there is applied a sheet of rubber treated heavy cord fabric, such as the common tire cord fabric. This cord fabric is applied to the backing fabric with the cords extending transversely of the rub apron. A layer of rubber or the like which is adapted to form the rub surface of the apron is applied over this layer of cord fabric, and the customary buttons are fixed to the thus formed rub apron by suitable fastening means along the edges of the rub apron; conveniently these buttons can be riveted to the rub apron.

A rub apron formed in this manner will be light and will have great flexibility. Consequently it will have improved tracking properties over the aprons of the prior art because it will flex and stretch more readily to assume the proper shape over the rollers when in use. This greater flexibility is achieved primarily by the elimination of the heavy base which has heretofore been necessary to anchor the buttons to the rub apron. The strength necessary to anchor the buttons to the rub apron is provided according to this invention by the layer of cord fabric which has its cords disposed transversely of the rub apron. Although this cord fabric has substantial strength only in the direction of the cords, for it may be entirely weftless or it may have infrequent wefts spaced a great distance apart, it has been found that this cord fabric provides a very firm anchoring base for the buttons which is as strong or stronger than the multi-thickness fabric layer heretofore used to anchor these buttons. Since this cord fabric has no weftwise strength, it might be supposed that the means holding the buttons would slip laterally of the fabric between adjacent cords, which also extend laterally of the apron, and hence that the buttons would be anchored but weakly to the rub apron. However, such has been found not to be the case; rather it has been found that if the buttons are to be pulled from the rub apron the cords must be broken. Since these cords have great strength, the buttons are held quite firmly in the apron.

For a better understanding of the nature of this invention, reference should be had to the following description when read in conjunction with the accompanying drawing wherein:

Fig. 1 is a perspective view of part of a mandrel used for building the rub apron in accordance with this invention having the layer of backing fabric applied thereto;

Fig. 2 is a longitudinal sectional view through a portion of a rub apron in accordance with this invention showing the disposition of the cord fabric, and

Fig. 3 is a sectional view substantially on the line 3—3 of Fig. 2.

Referring now to the drawing, there is illustrated one specific embodiment of a rub apron in accordance with this invention. As illustrated in Fig. 1, the present apron, like the aprons used heretofore, may be built on a cylindrical mandrel. To this end there is provided the cylindrical mandrel 11 about which is wrapped a strong closely woven sheet 10 of duck-like fabric which may be formed of cotton, nylon, rayon or any other suitable strong textile fibers. Since the mandrel 11 will have a circumference which is substantially equal to the desired circumference of the apron track when in use, the fabric 10 has a length such that it will just extend completely around the mandrel 11. Preferably the ends of the fabric 10 are cut on a bias so that when this fabric is wrapped about the mandrel 11 these ends will form a butt seam that is inclined about 15° to a plane passing through the axis of the mandrel, as shown in Fig. 1. To strengthen

this butt seam a tape-like strip 12 of fabric is applied over the seam and firmly cemented to the fabric 10 on opposite sides of the seam to form a closed loop in the fabric 10. The fabric 10, as will the cord fabric 13 and rub surface layer 16 to be described, will have a width substantially equal to the width of the rub apron.

Over this fabric layer 10 and adhered thereto, there is applied a layer of coated cord fabric 13 having the cords 14 extending transversely of the apron. This cord fabric 13 comprises the heavy warpwise cords 14 which are closely spaced in the fabric as best shown in Fig. 3, and the fabric may have interwoven therewith widely spaced weft yarns, or the weft yarns may be omitted in which case the rubber coating on the fabric is relied upon entirely to hold the warp yarns in place, all as is well known in the rubber industry. This cord fabric 13 may be the ordinary rubber treated tire cord fabric, and it has a coating of rubber 15, preferably an oil resistant rubber such as Neoprene, applied to both faces thereof.

The sheet of cord fabric 13 is bonded firmly to the layer of duck-like fabric 10 by a suitable cement, preferably by a Neoprene cement, and is disposed in the apron so that its ends will form a straight line butt joint extending transversely of the apron. By disposing the cords transversely of the rub apron, an incidental advantage is had when such rub apron is produced on a mandrel such as that shown at 11, for the fabric will fold easily about the mandrel and the butt joint can be made easily by removing one or more of the cords from the fabric as necessary to provide a good butt joint.

Over the layers of coated cord fabric 13 and backing fabric 10, a rubber sheet 16 is applied which is adapted to form a wear surface for the rub apron. Preferably this rubber sheet 16 is formed of a rubber which has good oil resisting properties, and it has a thickness of about one-tenth of an inch.

If the apron is built on a mandrel such as that shown at 11, this mandrel bearing the layers of fabric, cord fabric and rubber, may then conveniently be subjected to a rubber vulcanizing temperature to vulcanize the rubber in the rub apron. When the rub surface layer 16 of rubber is cured, it is firmly bonded to the underlying coated cord fabric. Thereafter, the rub surface layer 16 may be ground while still on the mandrel 11 to finish the rub surface of the apron.

To complete the rub apron of the instant invention, this apron body is provided with buttons which will prevent the apron from creeping lengthwise on the operating rolls when the rub apron is in operation. To fix the buttons to the apron, the apron has a multiplicity of circular holes 17 cut therethrough and spaced apart along its edges to receive the button fastening means as is customary in these aprons. Preferably a recess 18 is cut in the upper surface of the sheet 16 to receive and counter-sink the heads of the button fastening means beneath the surface of the rub apron, and a fastening means 19 for the buttons is placed in these holes to extend therethrough and receive the buttons 20 of leather or other suitable material which are fixed to the underside of the apron by means of these fastening means. Preferably the fastening means 19 are rivets, for example the common rivets used on automobile brake bands would be satisfactory, having a head 21 adapted to fit in the recess 18, and a shank extending through the apron and a central hole in the button 20 to fit the leather buttons 20 to the rub apron.

The rub apron in accordance with this invention will be provided with a multiplicity of these buttons 20 spaced from one another along each side of the rub apron, so when in use, it will travel on its spaced rollers in the direction indicated by the arrow in Fig. 3, and the reciprocation of these rollers will cause the rub apron to reciprocate transversely in the direction indicated by the double-headed arrow in Fig. 2. The buttons 20, disposed along the edges of the rub apron, will prevent the rub apron

from creeping longitudinally of these rollers, for they run at the ends of the rollers beneath the surface of the rollers. Consequently the buttons 20 may be subjected to a lateral strain tending to pull them from the rub apron.

Although it might be supposed that since the cord fabric 13 has its cords 14 extending transversely of the apron, the rivets 19 carrying the buttons 20 might be pushed transversely of the apron to slip between adjacent cords in the cord fabric in use, tear tests have been conducted on this apron, and it has been found that the buttons cannot be torn out of the apron without tearing the cord fabric. Since the heavy cords 14 extend transversely of the apron, it will require great force to tear this fabric, for the cords must be broken; consequently the buttons 20 are held firmly in the apron.

Although various oil-resistant synthetic rubbers would be suitable for the rub surface 16, it is preferred to use a synthetic rubber which has a relatively high resistance to oil but which is not completely oil-resistant, so the oil will penetrate the rubber somewhat to cause it to expand so that its surface will not become objectionably glazed in use. For this sheet, it is preferred to use a nitrile rubber which comprises a rubber copolymer containing from 18 to 20% combined acrylonitrile and from 82 to 80% combined butadiene.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A thin strong flexible rub apron which comprises a backing fabric sheet, a reinforcing sheet of coated cord fabric wherein the cords extend transversely of the apron bonded to the backing fabric, and a layer of material adapted to form the rub surface bonded to the cord fabric.

2. A thin flexible rub apron which comprises a backing sheet of closely woven fabric, a reinforcing sheet of coated cord fabric wherein the cords extend transversely of the rub apron bonded to the backing fabric, a layer of rubber-like material adapted to form the rub surface bonded to the cord fabric, a plurality of buttons on each side of the rub apron adjacent the backing sheet, and means extending through said rub apron including said cord fabric fixing said buttons to the rub apron.

3. A thin flexible rub apron which comprises a backing sheet of closely woven fabric, a reinforcing sheet of rubber coated cord fabric wherein the cords extend transversely of the rub apron bonded to said backing sheet, a layer of rubber-like material bonded to said coated cord fabric adapted to form the rub surface of the apron, a plurality of buttons on each side of the rub apron adjacent the backing sheet, and rivets extending through said rub apron including said cord fabric fixing said buttons to the rub apron.

4. In a strong flexible rub apron having a plurality of buttons along each side of the rub apron and means securing these buttons to the underside of the apron, a reinforcing fabric forming a part of the apron and adapted to form a strong anchoring base for the button securing means which comprises a sheet of coated cord fabric wherein the cords are disposed transversely of the rub apron.

5. A thin flexible rub apron which comprises a sheet of reinforcing fabric, a sheet of cord fabric wherein the cords extend transversely of the apron bonded to the reinforcing fabric, and a surface coating of rubber-like material bonded to the sheet of cord fabric.

6. A thin flexible rub apron consisting essentially of a backing sheet of closely woven fabric, a reinforcing sheet of coated cord fabric wherein the cords extend transversely of the rub apron bonded to said backing sheet, a coating of rubber-like material adapted to form the wear surface of the rub apron bonded to said coated cord fabric, a plurality of buttons on each side of the rub apron, and means extending through said rub apron including said cord fabric fixing said buttons to the rub apron.

7. A thin flexible rub apron consisting essentially of a backing sheet of closely woven duck-like fabric, a rein-

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forcing sheet of rubber coated cord fabric having its cords extending transversely of the rub apron bonded to said backing fabric, a rubber-like material layer bonded to said cord fabric and adapted to form a rub surface of the apron, a plurality of buttons along each side of the rub apron, and rivets extending through said rub apron including said cord fabric adapted to hold the buttons adjacent the backing fabric.

8. A thin flexible rub apron which comprises a backing sheet of duck-like fabric, a reinforcing sheet of rubber coated cord fabric bonded to the backing sheet wherein the cords extend transversely of the rub apron, a plurality of buttons along each side of the rub apron adjacent the backing sheet, a coating of a rubbery copolymer containing from 18 to 20% combined acrylonitrile and from 82 to 80% combined butadiene bonded to said coated cord fabric forming the rub surface of the apron, and means extending through said cord fabric fixing the buttons to the rub apron.

9. A thin flexible rub apron consisting essentially of a

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backing sheet of closely woven duck-like fabric, a reinforcing sheet of rubber coated cord fabric having its cords extending transversely of the rub apron bonded to said backing fabric, a coating of a rubbery copolymer containing from 18 to 20% combined acrylonitrile and from 82 to 80% combined butadiene bonded to said coated cord fabric forming the rub surface of the apron, rivets extending through said rub apron including said cord fabric, and a plurality of buttons along each side of the rub apron affixed thereto by means of said rivets adjacent the backing fabric.

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