

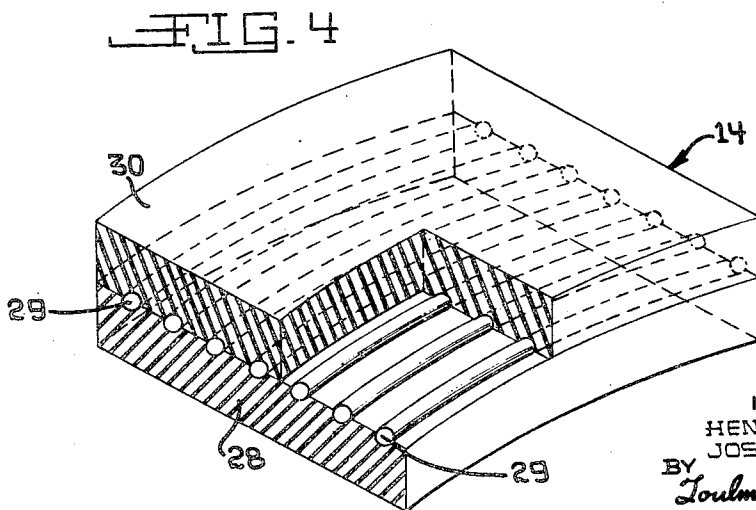
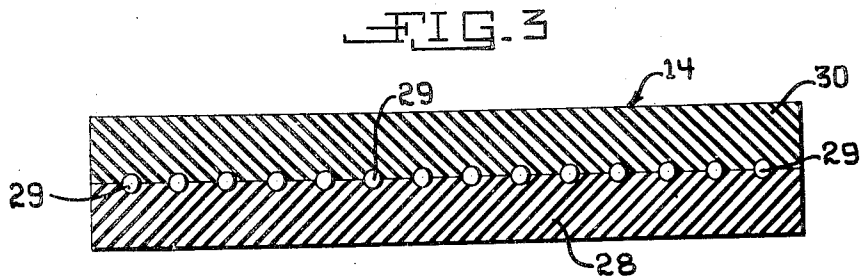
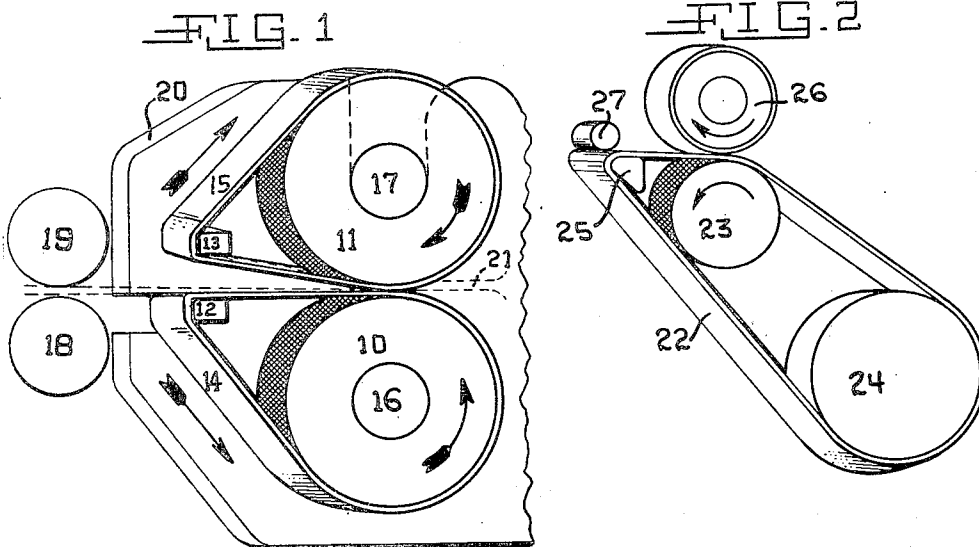
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SPINNING APRON

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## SPINNING APRON

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1

This invention relates to textile machine units, and in particular to new and improved spinning aprons for so-called long draft systems.

There are currently in use in the textile industry two principal types of apron assemblies. One is the Casablancas or Whitin system in which two aprons run one above the other and between which the fibrous material is conveyed. The aprons in the Casablancas system are guided, the bottom apron around a knurled driving roller and a stationary nose bar, and the top apron around a knurled idler roller and a stationary top nose bar. The nose bars are considerably smaller in cross-section than the driver and idler rollers. Consequently, the aprons have to change their degree of curvature continuously, namely from that of a larger curvature which they have while on the roller to that of a smaller curvature corresponding to the thickness of the nose bars. One requirement of aprons is that they have satisfactory contact at all times with the rollers as well as with the nose bars and they therefore have to be highly flexible, so that there will be no bellying effect as the aprons approach and leave the nose bars. By providing aprons which maintain their proper coefficient of friction and dimension and thus have a good contact on the rolls at all times, variation in the uniformity of apron will be reduced or completely eliminated. The aprons furthermore have to be elastic so that they can stretch whenever necessary, for example during mounting them on the rollers. The most important factor however, is that the aprons always recover their original dimensions after the stretching effects have ceased to exist. This is so important because they have to readjust themselves immediately in order snugly to fit the nose bars.

The other kind of long drafting assembly commonly used in the art is the so-called Roth or Saco-Lowell system. This type uses only one apron which is guided around a knurled driven roller, around a weighted idler roller and also around a nose bar. Such an apron is considerably longer than the apron of the system previously discussed. In the Roth unit a weighted top roller rotates on the apron which is driven by the knurled bottom roller, and a weighted slip roller rotates on the apron as it passes over the nose bar. The slip roller keeps the thin web of fibrous material from billowing up and floating away from the front drafting roll. The contact of the apron around the nose bar is very sharp, and an apron, in order to be usable in such a system, must have an extremely high degree of flexibility. This

2

is why aprons for the Roth units are usually made of relatively thin materials. In addition to the high flexibility, however, the aprons still have to possess high strength and wear resistance. Heretofore a compromising solution had always to be chosen which was intermediate the extreme of high flexibility (thin apron) and consequently low strength, and on the other hand that of low flexibility (apron of greater thickness) and consequently high strength.

It is an object of this invention to provide an apron for long draft textile machine units which at the same time has a high degree of flexibility and great strength.

It is another object of this invention to provide an apron for long draft textile machine units which is built as a very thin unit and yet shows an extraordinary high degree of strength.

It is another object of this invention to provide an apron for long draft textile machine units which is of considerable elasticity and at the same time free from growth in the longitudinal as well as in the transverse directions.

It is still another object of this invention to provide an apron for long draft textile machine units which has an unusually long service life.

These and other objects are accomplished by building an apron which comprises a layer of nylon cords longitudinally arranged therein. Nylon is a synthetic linear polyamide commonly used in the manufacture of synthetic textile fibers.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic perspective view of aprons of this invention used in a Casablancas or Whitin assembly;

Figure 2 is a diagrammatic perspective view of an apron of this invention used on a Roth or Saco-Lowell unit;

Figure 3 is a fragmentary enlarged cross-sectioned view of an apron of this invention; and

Figure 4 is a fragmentary perspective view, partly in cross-section, of an apron of this invention shown on an enlarged scale.

Referring to the drawings in detail, and particularly to Figure 1, the numeral 10 designates a bottom roller which has a knurled surface and drives the top or idler roller 11. Over the bottom roller 10 and the nose bar 12 there runs an apron 14, whereas an apron 15 runs over a top roller 11 and a nose bar 13. The nose bars 12 and 13 are stationary and mounted in a cradle 20 which also carries two axles 16 and 17 on which the rollers

3

10 and 11 rotate, respectively. Fibrous material 21 is guided between the two aprons and between two so-called front rollers 18 and 19, which exert a pull on the fibrous material 21 and provide for a uniform running of the drafting operation and for continuous removal of the fibrous material.

It will be seen from the drawing that the aprons have to adjust themselves to the relatively wide circumference of the rollers and also have to fit snugly around the thin nose bars. It will therefore be clear why flexibility and recovery of the original dimensions of the aprons are of such great importance.

In Figure 2 an apron of this invention is shown as used in a Roth or Saco-Lowell unit. There an apron 22 is guided over a knurled driven roll 23, over a weighted idler roll 24 which may be provided with flanges (not shown) so as to hold the apron in place and over a nose bar 25. A top roller 26, which is also weighted, is arranged above the roll 23; it receives its rotary movement from the bottom roller 23. By the top roller 26 the apron is pressed onto the bottom roller. A self-weighted slip roller 27 is arranged above the nose bar 25; it presses the apron closely onto the nose bar and also holds the web of fibers down in form of a parallel ribbon which is picked up by a pair of front rolls (not shown) similar to those of Figure 1. It will be seen that in this type of drafting units the apron is even more exposed to changes in curvature than is the case in the Casablancas unit. Therefore the flexibility of the apron is of still greater importance here than for the Casablancas type.

In Figure 3, a part of an apron 14 is shown in cross-section and on an enlarged scale. The numeral 28 indicates the layer which is arranged inner-most when the apron is mounted on the roller and which contacts the knurled surface thereof. The numeral 29 indicates the layer formed of a plurality of cords longitudinally arranged in the apron. The top layer 30 of the apron performs with its outer surface the conveying operation, and this outer surface may be buffed or ground in order to enhance its gripping action with the fibrous material.

Figure 4 shows the same unit in partly a perspective and partly a cross-sectional view. There the same numbers designate the same elements of the invention as shown in Figures 1 to 3.

According to this invention, the cords are made of nylon material. This entails enormous and unexpected advantages which considerably increase the service life of the apron and which warrant a highly satisfactory operation at all times.

As the materials for the roller contacting and the fiber contacting layers, rubber compositions are best suitable. Materials based on butadiene copolymers, such as styrene butadiene or acrylic nitrile butadiene copolymers have been found especially satisfactory. By far the best results were obtained with Perbunan, which is an acrylic nitrile butadiene copolymer and which is highly oil resistant and static free. However, the invention is not restricted to the rubber compositions mentioned.

It was found especially advantageous to make the roller contacting layer of a tough rubber composition such as a black rubber composition which has a filler of carbon black or the like incorporated therein, and on the other hand to build the fiber contacting layer of a white and relatively soft rubber composition. This has the advantage that the inner-most layer which con-

4

tacts the knurled surface of a roller and is thus exposed to considerable wear, is of relatively resistant material due to the incorporation of carbon filler. On the other hand the top surface, of which essentially good gripping action is required and for which hardening with carbon material is not necessary, may be made of white rubber composition; consequently, no soiling by carbon occurs in the case of the processing of white or light colored fibrous material.

It will be seen that nylon cords, on account of their extraordinary strength, provide an apron which is tougher and has a greater service life than any other apron used heretofore. It will also be seen that the thickness of nylon cords may be incomparably smaller than that of cords made of other material heretofore customary in the art, and that in spite of this considerably reduced thickness the aprons obtained will still be superior to the conventional ones.

Another advantage of the possibility of using thin cords by this invention is that the flexibility is greatly increased by the use of such thin cords, as compared with the customary aprons having heavy cords so that excellent contact with the aprons and the rolls is obtained even around the thin nose bars.

Still another advantage of the use of nylon cords is that whenever they have been subjected to stretch, they instantaneously return to their original dimensions after such stretch forces have ceased to act and thus they always maintain a satisfactory contact with the rollers. This also means that the new aprons do not lose their elasticity and therefore will have a longer service life.

The nylon cords arranged in the apron of our invention absorb every kind of stress or strain which otherwise would be transferred to the outer tension section of the apron. Consequently, undue wear of the outer layer of the aprons is avoided which again contributes to the prolongation of the service life.

It very often happens in fiber processing that lint gets under the apron and forms lumps on the knurled roll. This causes a break in the operation when the customary aprons are used. With the aprons of our invention, however, the operation continues smoothly since the elasticity of the nylon cords provides for adjustment of the apron to the lumps. When the operator eventually removes such lumps, the aprons containing the nylon cords reassume their original size so that they do not have to be discarded after such an occurrence as is the case with the aprons heretofore used.

It will be understood that while certain embodiments of the present invention have been described herein, it is not intended thereby to have this invention limited to or circumscribed by the specific details of construction, arrangement of parts or materials herein described or illustrated in the annexed drawings, in view of the fact that this invention is susceptible to modifications according to individual preferences and conditions without departing from the spirit of this disclosure and the scope of the appended claims.

We claim:

1. A draft apron for textile units consisting of an inner wear-resistant roller contacting layer of a tough black rubber composition having carbon black incorporated therein as a reinforcing material, an outer fiber contacting layer of a soft rubber composition free from carbon black and

5

relatively softer than said inner layer, and a layer of nylon cords substantially parallelly arranged along the longitudinal axis of the apron embedded between the inner and outer layers of said apron.

2. A draft apron according to claim 1 wherein the rubber composition of the outer and inner layers comprises the synthetic rubber-like copolymer of butadiene and acrylic nitrile.

3. A draft apron for textile machine units consisting of an inner roller contacting layer and an outer fiber contacting layer reinforced by a layer of longitudinally arranged parallel cords positioned between said inner and outer layers, said inner layer being composed of a tough black rubber composition having carbon black incorporated therein as a reinforcing material whereby said inner layer resists wear during contact with the roller, and said outer layer being composed of a soft rubber composition free from carbon black and relatively softer than said inner layer

6

whereby said outer layer possesses good fiber gripping action without soiling of the fibers by carbon.

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