Nov. 7, 1944. H. M. BACON 2,362,340

LONG DRAFT TEXTILE APRON

Filed April 19, 1941 2 Sheets-Sheet 1

FIG. 1

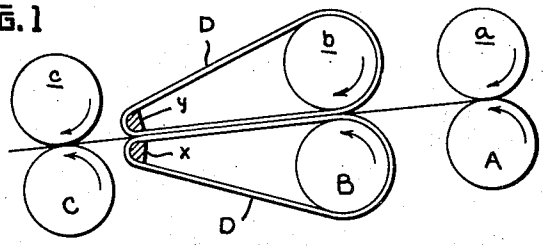


FIG. 2

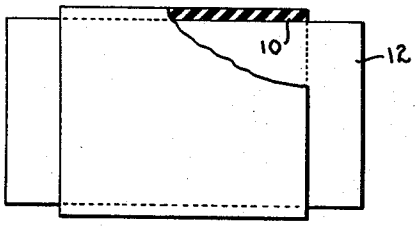


FIG. 3

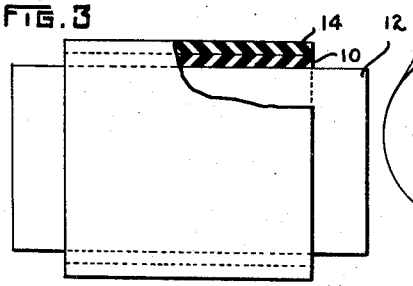


FIG. 4

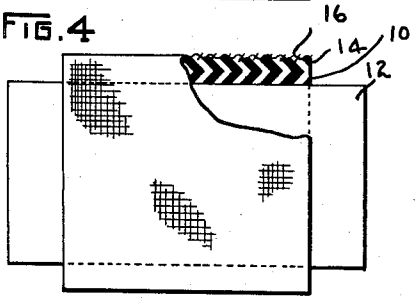


FIG. 5

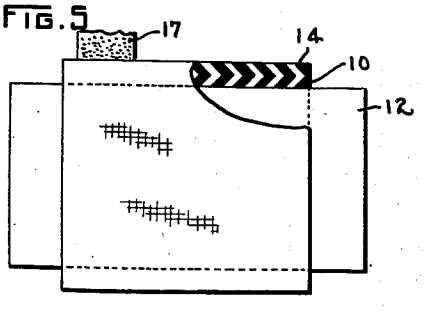


FIG. 6

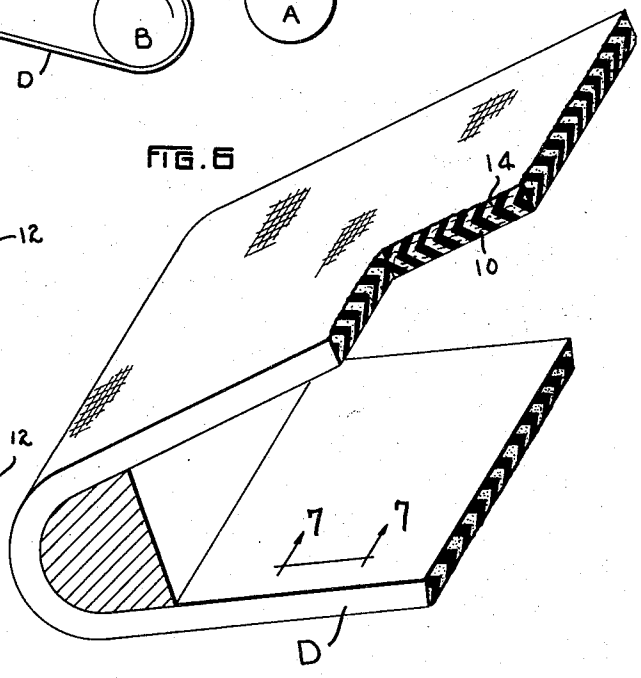
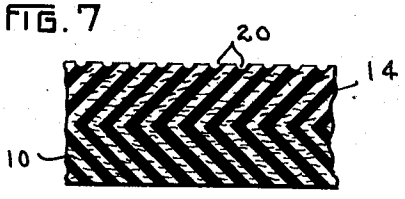


FIG. 7



Inventor
HENRY M. BACON
by Toulmin & Toulmin
Attorneys

Nov. 7, 1944. H. M. BACON 2,362,340

LONG DRAFT TEXTILE APRON

Filed April 19, 1941 2 Sheets-Sheet 2

FIG. 8

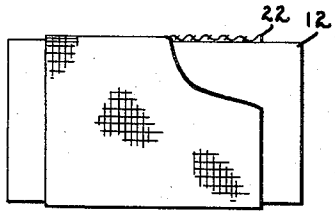


FIG. 9

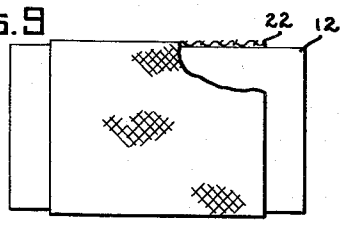


FIG. 10

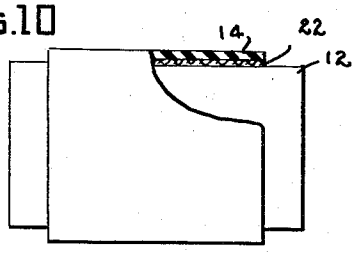


FIG. 11

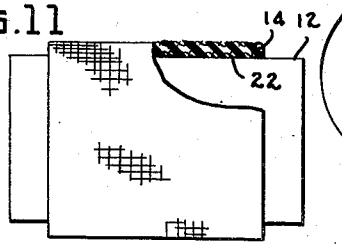


FIG. 12

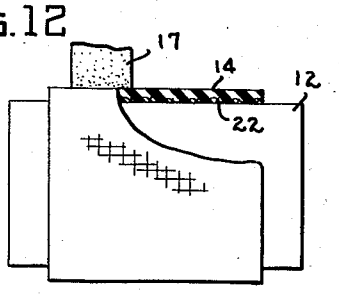
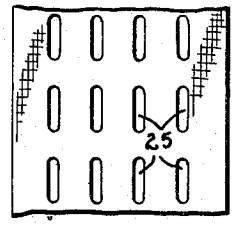


FIG. 13



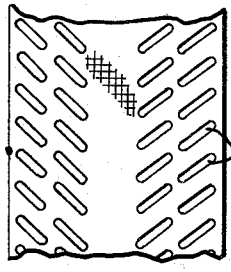


FIG. 14

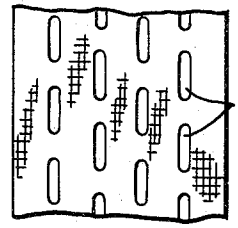


FIG. 15

FIG. 16

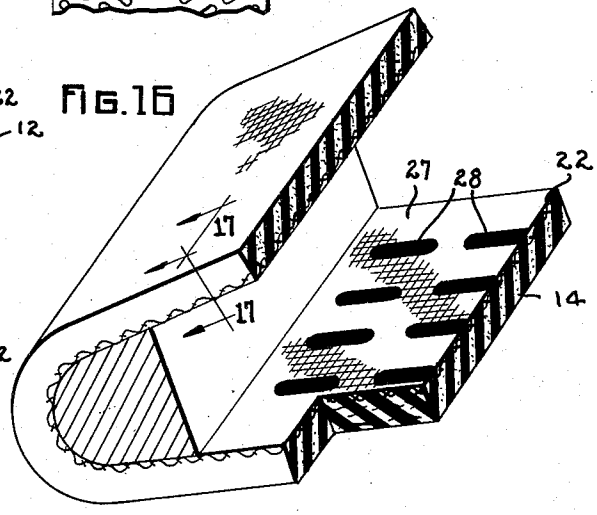
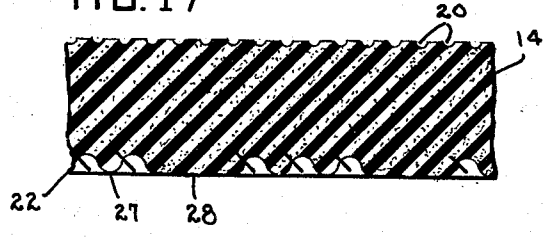


FIG. 17



Inventor
HENRY M. BACON
by Toulmin & Toulmin
Attorneys

Patented Nov. 7, 1944

2,362,340

UNITED STATES PATENT OFFICE

2,362,340

LONG DRAFT TEXTILE APRON

Henry M. Bacon, Dayton, Ohio, assignor to The Dayton Rubber Manufacturing Company, Dayton, Ohio, a corporation of Ohio

Application April 19, 1941, Serial No. 389,477

6 Claims. (Cl. 19—131)

My invention relates to textile draft aprons and their method of manufacture.

The invention has for its principal object the making of an improved draft apron having enhanced durability and long service life.

Another object of this invention is to provide a draft apron made of vulcanized rubberized fabric, or synthetic rubber composition, which, in addition to possessing static free properties, high oil resistance, and low stretchability with high recovery, has excellent resistance to abrasion.

Another object is to provide an improved draft apron which possesses proper coefficient of friction at its surface for drafting the fibers and comprises an inner liner which is wear resistant.

Another object is to devise a draft apron and an improved method of making it wherein a long, staple, substantially inextensible apron is provided having an inner working surface of sufficient coefficient of friction and resistance to wear to prevent slippage during operation.

Still another object is to provide an improved draft apron made of synthetic rubber composition, or rubberized fabric, which is of a construction such as to improve the yarn quality and uniformity of drafting, as well as provide a lower cost apron of higher durability and one which does not tend to gather lint and contamination during use.

These and other objects and advantages will become apparent from the following description taken in connection with the drawings.

For the purpose of illustrating my invention, the draft apron and method of making it are shown as embodying a typical two apron drafting system. My invention, however, is not limited to this particular type of drafting system and is adapted for use in single or other type drafting systems, as will be readily recognized by those skilled in the art.

In the drawings, the different steps in the method of making my improved draft apron are diagrammatically illustrated.

Figure 1 illustrates diagrammatically a two apron draft system showing the manner of using my improved draft apron;

Figure 2 illustrates the step of building up my apron on a mandrel in the form of laminated layers, a portion being broken away and shown in section;

Figure 3 is a similar view showing the superimposing of the fiber drafting outer surface layer onto the wear resistant inner body of the apron;

Figure 4 is a similar view illustrating the placing of the rag wrapped or compressing material around the outer surface of the built-up body of the apron preparatory to vulcanizing the same;

Figure 5 is a diagrammatic view, partly in section, illustrating the manner of grinding or abrading the fiber working surface of the apron to produce a proper coefficient of friction and uniform surface as required;

Figure 6 is a perspective view, partly in section, illustrating the finished apron;

Figure 7 is an enlarged fragmentary sectional view taken on the line 7—7 of Figure 6;

Figures 8, 9, 10, 11 and 12 are similar views as Figures 2, 3, 4 and 5 and illustrate a modification wherein a modulated fabric layer is utilized as the inner wear resistant mat surface;

Figures 13, 14 and 15 are fragmentary detail views illustrating different modulated fabric material which may be used to form the wear resistant inner surface of the apron made according to my invention;

Figure 16 is a perspective view, partly in section, illustrating the finished apron made according to my invention and having a wear resistant inner surface;

Figure 17 is an enlarged fragmentary sectional view of the finished belt illustrating the flow of rubber or the resilient body portion of the apron into the spaced openings in the inner fabric layer.

During recent years the processing of staple fibers, both natural and artificial, such as cotton and rayon, has been greatly speeded up by the development of long draft, especially on spinning machines. Draft aprons are an essential part of the drafting system in the spinning of fibers and in order to provide for proper performance and to produce satisfactory yarn quality they must be manufactured to a very close tolerance. In addition, the draft aprons must possess static free properties, be highly resistant to attack by oil and have an abrasive resistant inner working surface. Further, the apron must possess an inner working surface which has a minimum tendency to pick up fibers, such as lint and the like and exhibits a maximum resistance to the cutting action of the knurled roller. Moreover, the apron must have a high gripping force between its own surfaces and must not "grow" or stretch in service.

Referring to the drawings:

In Figure 1 the bottom rolls A, B and C are all driven, while the top rolls *a*, *b* and *c* are driven by friction from the bottom rolls which are directly therebeneath. The bottom rolls are generally made of steel and the surfaces of the rolls A and C are ordinarily fluted, while the surface of the roll B is knurled.

In operation, the fibers are pulled into the slow moving rolls A—*a*, which drive them at a uniformly slow rate to the interengaging draft aprons D. The aprons are encased in rolls B—*b* which rotate somewhat faster than the rolls A—*a*, resulting in effecting a minor drafting and paralleling of the fibers between the rolls A—*a* and B—*b*. The fiber then is drawn between the draft aprons D and delivered at a uniform rate through the rolls C—*c*. The latter rolls run much faster than the other rolls resulting in still more drafting and paralleling of the fibers, so that were it not for the holding and guiding effect of the aprons, the fiber web would break.

The draft aprons D are arranged to slide over the metal holders *x* and *y*, as illustrated in Figure 1, which are held rigidly in position and there is no pressure applied between the aprons at any point except at the contact of rolls B—*b*.

It will thus be seen from Figure 1 that the lower apron is subjected to relatively heavy load. As shown, the lower apron is driven by the roll B and is drawn around the forward guide bar *x* and must hold and deliver the fibers while imparting positive movement to the upper engaging apron by frictional contact therewith. The power and motion of the entire apron assembly are transmitted by the roll B and to prevent slippage of this roll it is knurled, as is also the upper roll *b*. Under these conditions, however, slippage of the apron and stoppage of the drafting operation often result at which time the knurled roll B wears or cuts through the apron which necessitates its replacement.

Some other and more common reasons for slippage of the apron and stoppage of the drafting operation are as follows:

(1) The choking up of the knurls on the rolls. This happens when the space between the sharp knurls becomes filled with foreign material which eliminates the teeth-like gripping surface of the rolls.

(2) The weights holding the top rolls in place become dislocated or loose which results in lowering the friction normally maintained by the proper positioning of the weights on the rolls.

(3) The choking up of the aprons. This occurs when the fibers break between the rolls C—*c* and the *x*—*y* guide members and the fiber web adheres to either of the aprons building up a sizable layer of fibers. Under this condition, the building up of the fiber layers in between the aprons finally brings about jamming of the aprons at *x*—*y*. Choking of the apron also occurs when a lump of accumulated material inside the apron becomes wedged along the inner side of the apron as it passes over the guide members *x* or *y*.

My improved draft apron is designed to eliminate the difficulties encountered with ordinary draft aprons which have not been made according to my invention. After a great deal of experimentation and research I have discovered that a draft apron which is made having a highly abrasive resistant inner body portion substantially eliminates the above difficulties and a long wearing apron is provided.

One embodiment of my improved method of making draft aprons is illustrated in Figures 2 to 7 wherein the apron is built up in two stages. As illustrated, an inner friction resistant layer **10** of rubberized composition is laid on the mandrel **12** so as to form a friction resistant layer of substantially uniform thickness. The composition for forming the inner layer **10** preferably comprises "Stiflex" and contains fibers arranged parallel and extending circumferentially of the layer. The composition preferably is compounded similarly as in making the outer tire casing so as to be resistant to abrasion and temperature conditions under which the aprons are subjected in use. The gauge thickness of the layer **10** may be varied somewhat depending upon the particular type and size of apron.

Over this layer of wear resistant rubberized fabric **10** is laid the outer fiber working cover layer **14**, containing fibers which are arranged parallel and extend lengthwise of the apron as shown in Figures 6 and 7. This material may comprise any suitable resilient synthetic resin or rubber composition which is flexible and has a high coefficient of friction. The composition, for example, may be of the improved static free, oil resistant, synthetic rubber composition, as disclosed in the application of Joseph Rockoff, Serial No. 349,517, filed August 2, 1940.

After laying on this outer fiber working layer **14** over the inner wear resistant layer **10**, a wrapped layer of fabric **16** is wound over the outer surface of the built-up apron under tension to compress the layers together. Thereafter the mandrel and built-up apron are placed in a suitable curing appartus and the material vulcanized to a unitary apron structure.

Following the vulcanization the rag wrapper **16** is removed and the outer working surface of the layer **14** ground or skived off by application of abrasive means **17** so as to produce a finished apron having the proper friction resistant outer fiber working surface. The outer fiber working surface of the apron is merely abraded off to remove protuberances leaving the impression of the fabric, such as shown at **20**, on the surface to provide the proper coefficient of friction at the surface for drafting the fiber material.

As illustrated in Figures 6 and 7, the finished aprong comprises a laminated body of unitary structure having an inner wear resistant layer **10** integrally united to the outer fiber working surface layer **14**. This provides a draft apron which has the desired fiber working surface layer and a strengthening inner surface portion. Such an apron resists the cutting action of the knurled rolls and does not have a tendency to accumulate dust, lint and becoming clogged.

In Figures 8 to 17 there is illustrated a modified method of making the improved draft apron of this invention. In this instance, the inner wear resistant layer comprises fabric, such as shown at **22**. The fabric layer **22** is positioned on the mandrel **12** and the fiber working surface cover portion **14** laid thereover and the material vulcanized similarly as set out above. After the apron body is vulcanized the surface is abraded, as shown in Figure 12, similarly as in Figure 5.

The fabric wear resistant layer **22** may be either straight or bias cut. The flexibility of the fabric is improved when cut at a bias up to approximately 45 degrees. Moreover, where desired, one or more plies may be utilized or a combination of bias and straight cut fabric. The essential feature is the provision of a wear resistant inner layer having a high coefficient of friction for the fiber draft apron. Fabric has a high resistance to knurl cutting and various types of fabric with or without bonding or impregnated abrasive resistant material may be used.

Preferably the fabric inner layer material **22** is provided with spaced slots, as illustrated in Figures 13, 14 and **15**. As shown in Figure 13,

the fabric layer is provided with spaced slots 25 which are arranged in rows and spaced parallel to the longitudinal axis of the draft apron. If desired, the slots 25 may be staggered, as illustrated in Figure 14. These slots extend only through the fabric and during vulcanization of the inner layer to the outer fiber working cover 14 the rubberized material is pressed through the slots and provides an inner working surface having alternate fabric and rubber composition, such as shown at 27 and 28, respectively, in Figure 17. In this way, the apron is provided with an inner wear resistant mat surface similar to a tire tread and has enhanced gripping action on the cured roll surface while at the same time resisting wear and slippage of the rolls.

The belts disclosed in Figures 13 to 17 are provided with the same working cover as shown in Figures 1 to 7 and this working cover may be provided with fibers arranged parallel and extending circumferentially of the layer as stated in connection with the description of Figures 1 to 7. These fibers are shown in Figure 16 as constituting part of the cover portion 14.

In Figure 15 the spaced slots 25 in the inner fabric layer are arranged at an angle to the longitudinal axis of the draft apron so as to exert a cleaning action during operation to keep the knurls on the rolls free from foreign material. The arrangement of the slots, as will be observed when the apron is moved in the direction of the arrow shown in Figure 15, will tend to carry foreign material to the edge of the apron preventing its accumulation.

The outer fiber working surface 20 comprises the imprinting of the jacket wrapper which is wound around the material before vulcanization and which imprint is modified by grinding or abrading so as to produce a fairly even surface, as illustrated in Figure 12, similarly as in the apron illustrated in Figures 6 and 7.

It will be understood that other methods of combining the desired fiber processing surfaces with a long wearing resilient, friction inner surface layer may be used which will provide a long draft apron having both a fiber working surface and an integrally united inner wear resistant layer.

It will be further understood that this invention is not limited to the specific method steps and particular composition of the fiber working layer and inner wear resistant portion, as illustrated, but may be modified to suit different conditions and uses as required within the scope of this invention and the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. As an article of manufacture, a draft apron comprising an outer resilient fiber working surface composition layer and an inner surface adapted for contacting the draft roll, said inner surface comprising a fabric layer provided with a plurality of relatively large spaced openings cut through the fabric distinct from and forming no part of but larger in area than the interstices of said fabric layer through which portions of the composition forming the working surface layer protrude, said protrusions being of substantial size and adapted to provide a tread having enhanced gripping action.

2. As an article of manufacture, a draft apron according to claim 1 wherein the fiber working surface layer comprises a vulcanized resilient composition reinforced with fine textile fibers lying substantially parallel to each other.

3. As an article of manufacture, a draft apron comprising an outer surface layer of rubber composition and an inner roll contacting surface layer of reinforced fabric construction, said fabric being provided with a plurality of relatively large spaced openings cut through the fabric distinct from and forming no part of but larger in area than the interstices of said fabric layer through which portions of the rubber composition forming the outer surface layer protrude, said protrusions being of substantial size and adapted to provide a tread surface having enhanced gripping action.

4. As an article of manufacture, a draft apron according to claim 3 wherein the outer surface layer comprises a vulcanized resilient composition reinforced with fine textile fibers lying substantially parallel to each other.

5. As an article of manufacture, a draft apron consisting of an integral body having an outer fiber working resilient composition surface and an inner wear resistant gripping surface, said gripping surface comprising a fabric layer provided with a plurality of relatively large spaced openings cut through the fabric distinct from and forming no part of but larger in area than the interstices of said fabric layer arranged at an angle to the longitudinal axis of said apron, said apron having portions of the composition forming the outer fiber working surface protruding through said openings forming protrusions of relatively large size.

6. As an article of manufacture, a draft apron according to claim 5 wherein the outer fiber working resilient surface comprises rubber composition reinforced with fine textile fibers which lie parallel to each other.

HENRY M. BACON.