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H. M. BACON ET AL

2,621,375

RUB APRON

Filed March 7, 1946

FIG 1

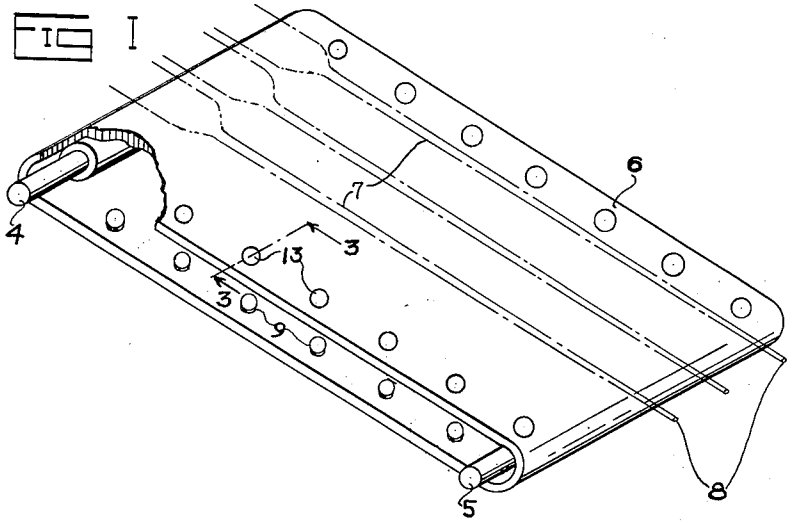


FIG 2

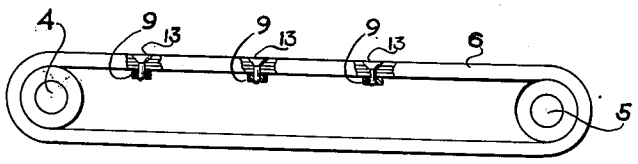
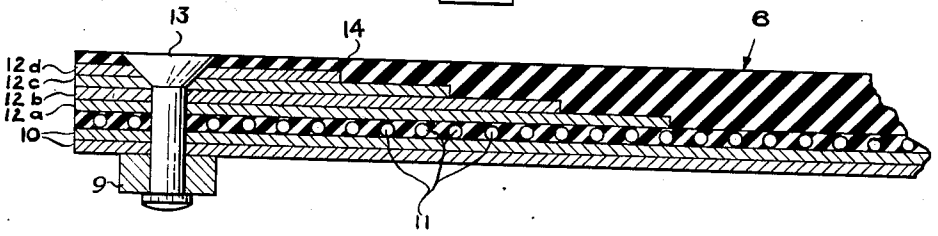


FIG 3



INVENTOR
HENRY M. BACON
JOSEPH ROCKOFF

By Toulmin & Toulmin
ATTORNEYS

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RUB APRON

Henry M. Bacon and Joseph Rockoff, Dayton, Ohio, assignors to The Dayton Rubber Company, a corporation of Ohio

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10 Claims. (Cl. 19—153)

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This invention deals with rub aprons for processing wool fibers on the so-called woolen system including asbestos fibers, waste cotton and the like, and with methods of making such aprons.

The textile processing for which the aprons of this invention are used is carried out in a so-called condenser which consists of two pairs of rotating rollers, one set placed on top of the other and parallelly arranged. Each pair of rollers is covered with an apron which provides for sufficient friction with the fibrous material. The rollers together with the aprons rotate and at the same time oscillate with regard to each other, and by this combined motion the transformation of the flat ribbons between the aprons into the circular mass is performed.

It is an object of our invention to provide aprons for such condensers which have a high degree of oil resistance and thus are not harmed by the oil or grease contained in wool.

It is another object of this invention to provide a rub apron which does not accumulate electrostatic charges and thus does not cause lapping up of the fibers during use, which would necessitate discontinuation of the operation.

It is another object of this invention to provide rub aprons which have a high resistance to abrasion and consequently a long service life.

It is still another object of this invention to provide rub aprons which are weather-independent, that means which do not lose their valuable properties, such as fiber-gripping characteristics, etc., as the humidity changes.

It is still another object of this invention to provide rub aprons which retain their size and shape perfectly and which, when subjected to distorting stresses, return to their original dimensions and thus are self-adjusting.

It is consequently another object of this invention to provide aprons which maintain a good contact with the rollers at all times and do not travel laterally thereon, which in turn prevents the retaining buttons attached at the edges of the aprons from tearing off.

It is a further object of this invention to provide rub aprons which are greatly resistant to tear, so that, should the apron once become torn at the edge by some unusual accident, this rent will not increase.

It is still a further object of this invention to provide rub aprons with which the time required for mounting and adjusting is essentially reduced due to the long service life and the self-adjustability of these aprons.

It is still another object of this invention to

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provide rub aprons which are highly flexible, a feature which is responsible for their running more easily than stiff aprons, for not showing a tendency of becoming bell-shaped at their edges and thus for not having areas of uneven wear.

These and other objects are accomplished by making an apron that has an innermost roller-contacting section of fabric layers, a layer of nylon cords thereupon, a plurality of fabric strips substantially equidistantly arranged near the edges of the apron, a retaining button each fastened to the apron in each of these fabric strips, and a rubber top layer forming the fiber-contacting surface.

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

Figure 1 is a perspective view of an apron mounted on two parallel rollers;

Figure 2 is a side-elevational view of the apron shown in Figure 1 with parts thereof broken away in order to show the arrangement of the buttons; and

Figure 3 is an enlarged fragmentary cross-section taken along line 3—3 of Figure 1.

Referring to the drawings in particular, 4 and 5 are rollers on which an apron 6 is mounted. The numeral 7 indicates fibrous strips which are fed between two aprons (the top apron is not shown) where each is converted into a compact mass 8 of substantially circular cross-section. The numeral 9 designates retaining buttons attached to the apron close to its edges; they prevent the apron from traveling on the roller. In Figure 2 only three of such buttons are shown for matter of simplicity and clarity. However, it will be understood that these buttons are arranged all around both edges of the apron. In Figure 3 the details of the construction of the apron are visible. There, the inner portion 10 is illustrated as consisting of two layers of fabric. It is obvious, though, that 3, 4 or more layers of fabric may be applied. An even number, however, is preferred for reasons which will be set forth below. On this fabric portion there is arranged a layer of thin, substantially parallelly running nylon cords 11 embedded in rubber or rubberlike material; these nylon cords extend all the way across the apron up to the very edges. Above this cord layer, close to the edges, there are applied a plurality of reinforcing strips 12 determined for carrying the retaining buttons 9. In the example illustrated in Figure 3 these strips are built from four fabric layers 12*a*, 12*b*, 12*c* and 12*d*. It will be seen that these layers are tapered-

ly arranged, the uppermost layer 12d being the smallest one. In substantially the center of each of these strips there is mounted and fastened a retaining button 9 which, in the example of Figure 3, is secured to the apron by means of a rivet 13. The top layer 14, which contacts the fibrous material, is formed of a rubber or rubber-like material; this layer extends across the entire apron and thus covers also the reinforcing strips.

The aprons are preferably made by first winding several layers of fabric on a mandrel, the outside diameter of which corresponds to the inner width desired of the apron. When applying the fabric layers, it is avoided that the splices of the various layers occur at the same places; it is preferred to have them arranged at different locations of the apron. It is furthermore desirable to alternate the direction of the layers of fabric, that is to wind on the first layer and then to reverse the fabric for the second layer and so forth. By this, stresses which might arise from winding the fabric in one direction are compensated for by the stress of the subsequent layer, since this latter stress is equivalent to that of the previous layer but opposite as to direction. This is the reason for preferring an even number of fabric layers. After the desired number of fabric layers have been applied, they are subjected to a rolling treatment whereby they are strongly pressed onto the mandrel and against each other. Thereafter, the nylon cord is wound onto the fabric layer, the windings being arranged substantially parallelly to each other and to the longitudinal axis of the apron. The cords are advantageously wound by starting from the center of the apron and progressing both ways towards its edges; this specific way of applying the cord is another means for considerably decreasing stresses in the apron. It is advantageous previously to treat the nylon cord with a material that enhances the bond of the cord with the fabric and the rubber material of the top layer. Thereafter, the reinforcing strips, which have been separately prepared from layers of fabric, are mounted on top of the cord layer close to the edges and preferably in equal distances. These reinforcing strips are preferably cemented onto the previous layers by some suitable bonding material known to those skilled in the art. Finally the rubber layer is applied and rolled down tight onto the other layers. The apron is then wrapped, e. g. in a jacket liner and cured whereby the various layers are integrally united. During the curing operation the rubber of the cover and the bonding agents used on the cord and fabric flow together and between the spaced cords under pressure to integrally unite the various components to give the desired final product. Then the aprons are ground to the right dimensions. Thereafter, the ends are trimmed, and holes for the rivets are then placed in the center of the reinforcing strips. A distance of approximately ¾" from the edge is practical for these holes; however, other distances may be chosen depending on the dimensions of the apron and the rollers of the condenser. Any excess gum is then removed from the rivet holes so that the head of the rivet, when in place, is flush with the surface of the apron and does not extend therebeyond. Finally the rivets are inserted and the buttons fastened thereto.

In an apron built according to this invention a number of advantageous features are combined so as to yield an apron of outstanding qualities. It is characterized by excellent operating qualifications and a long service life. The feature of prime importance, however, is its self-adjustability which prevents traveling of the apron on the rollers and buckling. The inner fabric layer provides for a high resistance to abrasion. The nylon cord makes the apron highly elastic and tear resistant, and since these cords extend up to the edges, tearing of the edges will not occur under normal conditions. Due to the intermittent reinforcement for the buttons at the edges, the apron gives a strong support for the buttons without the flexibility of the apron being impaired thereby due to the flexible rubber pieces alternating with the reinforcing strips. When the aprons have to be subjected to stretching, which, for example, occurs during mounting, or when lumps occur in the fibrous material, the apron always entirely recovers its original dimensions after such stretches have ceased. Because the aprons of this invention have such a great durability and because they always retain or recover their original dimensions, mounting of new aprons is rarely required and adjusting of deformed aprons is hardly ever necessary; this represents not only greater economy with regard to material, but also a saving of time.

For the top layer of the apron any material known to those skilled in the art are usable. Synthetic rubbers, for example, in particular chloroprene rubbers and butadiene copolymers such as acrylic nitrile butadiene copolymers, have been found satisfactory.

It will be understood that, although our invention has been described with particular reference to rub aprons, it may be applied with equal satisfaction to draft aprons, cots and other roll covers for textile processing machinery.

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

We claim:

1. As a new article of manufacture, an apron for textile processing units comprising an inner roller-contacting fabric layer, a layer of cords embedded in rubber thereabove, a plurality of reinforcing fabric strips arranged in layers along each edge of the apron and above the cord layer, the strips along one edge being spaced from corresponding strips along the other edge, a top layer of rubber material forming a fiber-contacting surface extending across the entire surface of the apron and covering the fabric strips, and a plurality of buttons each fastened by fastening members passing through said reinforcing strips and spaced along the edges of the apron.

2. As a new article of manufacture, an apron for textile processing units comprising an inner roller-contacting fabric layer, a layer of nylon cords embedded in rubber thereabove, a plurality of reinforcing fabric strips arranged in layers along each edge of the apron and above the cord layer, the strips along one edge being spaced from corresponding strips along the other edge, a top layer of rubber material forming a fiber-contacting surface extending across the entire surface of the apron and covering the fabric strips,

and a plurality of buttons each fastened by fastening members passing through said reinforcing strips and spaced along the edges of the apron.

3. A rub apron for textile processing units comprising an inner roller-contacting fabric layer, a layer of nylon cords thereabove, a plurality of fabric reinforcing strips arranged in layers along each edge of the apron, the layers along one edge being spaced from the layers along the other edge, said layers consisting of a plurality of superposed fabric strips successively narrower from the base of the apron to the top and arranged to abut the edges of the apron and positioned above the cord layer, a top layer of rubber material extending across the entire surface of the apron and covering the fabric strips, and a plurality of spaced buttons each fastened through said fabric strips along the edges of the apron.

4. A rub apron according to claim 2 wherein the fiber-contacting surface layer is composed of a synthetic rubber-like material.

5. A rub apron according to claim 2 wherein the fiber-contacting surface layer is composed of acrylic-nitrile butadiene copolymer synthetic rubber-like material.

6. A rub apron according to claim 2 wherein the fiber-contacting surface layer is composed of a chloroprene polymer synthetic rubber-like material.

7. A method of manufacturing aprons for textile processing units comprising wrapping an even number of fabric layers in alternating directions on a mandrel, winding cords treated with a bonding agent for fabric and rubber onto said fabric layers, arranging a plurality of reinforcing strips in layers along the edges of said apron and above the cord layers, the layers along one edge being spaced from corresponding layers along the other edge, applying a top layer of rubber material across the entire surface of the apron covering the cord layers and the fabric strips, curing the assembled layers to form an integral unit, and fastening a plurality of buttons to the bottom of the apron spaced along the edges thereof by means of fastening members passed through said reinforcing strips.

8. A method of manufacturing aprons for textile processing units comprising wrapping a fabric layer onto a mandrel, winding a layer of nylon cord onto said fabric layer, arranging a plurality of reinforcing strips in layers along the edges of the apron and above the layer of nylon

cords, the layers along one of the edges being spaced from the layers along the other edge, applying a top layer of rubber material over the reinforcing strips and the nylon cord, curing the assembled layers to form an integral unit, and fastening a plurality of buttons along the bottom of the apron spaced along the edges thereof by means of fastening members passing through said reinforcing strips.

9. A method according to claim 8 wherein the nylon cord is wound over the fabric base layer starting from the center and proceeding toward both edges of the apron.

10. A method of manufacturing aprons for textile processing units which comprises wrapping a base fabric layer onto a mandrel, winding nylon cords onto said base layer, arranging a plurality of reinforcing strips in layers along the edges of the apron and above said nylon cords, the layers along one of said edges being spaced from the layers along the other edge, applying a surface fiber-contacting layer of rubber material over the entire surface of said apron and above said reinforcing strips and cord, applying pressure by rolling in order to compress the layer, wrapping said built-up apron, curing the apron to an integral unit, removing the wrapping, grinding said apron to the dimensions desired, forming a plurality of spaced holes through the reinforcing strips along the edges of the apron, inserting a rivet in each hole so that its head is flush with the surface of the cover, and fastening a retaining button to each of said rivets along the bottom edges of the apron.

HENRY M. BACON.
JOSEPH ROCKOFF.

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