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(54) **Flexible coated abrasive sheet material.**

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Description

The present invention relates to immediately useful abrasive products comprising a flexible backing on at least one side of which are adhered abrasive grits, such products being referred to in the art as coated abrasives; more particularly it relates to endless abrasive belts formed from such coated abrasive products.

Coated abrasives, in general, have been made on backings ranging from paper, cloth, leather, to plastic films and metal sheets. Except for specialty items the greater majority of all coated abrasive products are made on paper or woven cloth backings.

Coated abrasives, often subject to high stresses in operation, are made from strong paper backings, vulcanized fiber backings, or, for strength and flexibility, woven cloth backings. Laminates of various of these materials have also been used and taught in the patent literature.

Problems connected with the use of woven cloth as a backing for coated abrasive articles, and for belts in particular, are the elongation characteristic inherent in woven cloth, due to the repeated curvature in the yarns, inherently produced by the interlaced nature of the material, and a weakening of the material in certain circumstances due to the inherent presence of "knuckles" at the cross-over points in the yarn. Knuckles are the small bumps on the surface of woven cloth caused by yarns curving to cross over other yarns. The presence of such knuckles is believed to be responsible for the catastrophic failure of coated abrasive articles, particularly belts, in certain severe grinding operations.

U.S. Patent 3,146,560 shows an abrasive article in which six glass fiber strands are immersed in a resin bath and the resulting mass passed through a discharge slot. Abrasive particles are then pressed into the resulted reinforced plastic web. The six strands are described as being "substantially in parallelism" (col. 8, lines 48—90). There is only one array of such strands.

In accordance with the present invention there is provided a flexible coated adhesive sheet material having abrasive grains adhesively bonded to at least one side of a backing comprising at least two arrays, each of said arrays being of non-interlaced substantially coplanar and coparallel reinforcing textile yarns, said arrays being oriented in at least two respective distinct directions in the plane of the backing, most of the tensile strength of the coated abrasive sheet material along each of said at least two directions being furnished by the yarns of all the arrays of non-interlaced substantially coplanar and coparallel yarns oriented in said direction.

The desirable properties of woven textiles as a backing material for coated abrasives are retained, and many of the undesirable properties are avoided by the use, in the present invention, of arrays of substantially coplanar and coparallel textile yarns, which are not woven but are bonded into the structure of the coated abrasives by other means.

Theoretically ideal properties for coated abrasives would be expected for backings in which the arrays of yarns are exactly coplanar and coparallel. However, such exactitude in the arraying of the yarns is neither practical nor necessary to derive benefit from the use of this invention.

For the purposes of the present invention, an array of yarns is substantially coplanar if all the yarns of the array can be accommodated in the space between two parallel planes which are separated by a distance of four times the average diameter of the yarns in the array. An array is substantially coparallel if the largest angular difference in direction between any two yarns in the array is no more than thirty degrees.

The use of such fabrics as stitch bonded Malimo fabrics, or adhesive bonded layers of oriented yarns, results in the elimination of many of the disadvantages referred to above in connection with the use of conventional woven cloth.

Thus, the elongation and failure problems caused by the presence of knuckles in the woven cloth are avoided.

A major advantage of the non-interlaced fabrics when employed as substrates for coated abrasive is the fact that such fabrics can be produced at much higher rates of speed than can conventional woven textiles, thus increasing the productivity and lowering the cost of manufacture.

Referring specifically to the stitch bonded, Malimo type fabrics, these materials are produced by laying fill yarns over warp yarns and, with a third yarn, stitching the warp and fill yarns together. Because of the space requirement for the multiple stitching needles, there is an upper limit on the number of warp ends per inch in such fabrics. Because of this, the stitch bonded fabrics tend to be or may be of more open construction than conventional woven cloth for coated abrasive use. The greater openness, combined with the use of strong multifilament yarns permits design of fabric having lower weight than conventional woven fabrics of the same or lower strength and tear resistance, thus economizing on the use of raw materials. Thus special procedures may be required in filling the spaces between the yarn in such fabrics. The overall production of coated abrasive from stitch bonded fabrics is, however, closely analogous to production from conventional woven cloth.

The steps of sizing the yarn, back filling or sizing, saturating, front sizing, applying a maker coat, applying abrasive, and finally applying a "sand" size coat may or be used in coated abrasive production from the Malimo type, or stitch bonded fabrics.

Adhesive bonded fabrics may be produced in a similar manner as the stitch bonded, but with an application of suitable adhesive, at the point in the manufacture where otherwise the third yarn would be used to stitch bond the warp and crossing threads together.

Similarly the thermally bonded fabrics may be produced by applying heat at the points of junction of the warp and cross threads to fuse or soften the yarns or a coating previously applied to the yarns.

In some cases it may be desirable to insert a thin tissue sheeting between the warp and fill yarns, to aid in preventing the back-fill treatment from penetrating too far into the cloth. This can be done in the Malimo machine during the manufacture of the backing.

The present invention is particularly suitable for producing coated abrasive stock suitable for forming coated abrasive belts. The ability to control the longitudinal strength and stretch properties of the material are important in this regard. While the total strength of a woven fabric in the warp direction cannot always be predicted by summing the strengths of the individual warp yarns and the strength properties can almost never be predicted from the stretch of the individual yarns, both these properties can be more readily controlled and predicted in the fabric designs employed in the present invention. In addition any tendency of coated abrasive belts to split when subject to stresses in use due to the effect of the interlaced filling (weft) yarns is eliminated by the use of the non-interlaced backing construction disclosed herein. By "non-interlaced backing", I mean a backing reinforced with non-interlaced arrays of substantially coplanar and coparallel yarns as described above.

The particular finishing materials employed are not critical and many variations are possible provided proper cover and adhesion are achieved.

Important aspects of the finishing are obtaining good adhesion to the backing, properly filling the cloth and preparing its surface for the maker coat to hold the abrasive, and adequately bonding the yarns so that the end product resists delamination, splitting, and tearing. Adequate flexibility for the end use intended is also important. Thus the particular chemical structure of the finishing compositions is not critical, except to the extent that it affects the physical properties described above.

Other methods than the Malimo machine may be used to produce the arrays of yarns which are useful in preparing the non-interlaced backings of this invention. For example, prepared cut-to-length crossing yarns may be laid across an array of warp yarns, for example at right angles, by a suitable machine, or manually. The warp and overlaid yarns may then be consolidated by a stitching yarn or by adhesive means. U.S. Patent 3,250,655 shows an adhesively bonded fabric of this type. Other machines are known which wind a filling (so-called) array of yarns around the longitudinal warp yarns arrayed in a tubular configuration. Other machines or methods such as weft insertion machines can be employed to produce yarns arrays suitable for the present invention.

The presently preferred material for the warp yarns is continuous filament polyester having relatively high strength and low elongation properties. Obviously other yarns of similar or higher strength properties and similar or lower elongation under load, may be used. In less critical applications yarns with less strength and higher elongation could be used, and other advantages of the present invention be still retained.

Besides the various synthetic organic yarns, glass or metal yarns may be employed as part or all of the yarn arrays.

The preferred yarns in the fill direction are texturized continuous filament synthetic yarns, as in the example below. Natural and synthetic staple fiber textile yarns may be employed. Continuous filament yarns are particularly useful if they are texturized, given a false twist, or are otherwise produced to have a high bulk or surface area so that good adhesion to the cloth finishing materials is achieved.

The following are examples of specific embodiments of the invention.

Example 1

This example, a preferred construction, employs a stitch bonded backing of the type disclosed in Figure 9 of U.S. Patent 2,890,579. The fabric of the example was made on Malimo machine (available from Unitecha Aussenhandelgesellschaft mbH, DDR-108 Berlin, Mohrenstrasse 53/54 GDR). The approximately 10.2 cm (4 inch) wide carrier for the fill yarns holds 61 ends, and makes one complete cycle from one edge of the web and back for every 4 inch longitudinal forward motion of the web. For a 152 cm (60 inch) wide machine this produces a fill which crosses the warp yarns at an angle of about 88° in one direction and 92° in the other. The switch yarns, which bind the warp to the fill arc 70 denier continuous filament polyester. The stitch length is 1.2 mm. The warp yarns are 1000 denier duPont type 68 continuous filament high tenacity polyester (9.2 grams per denier breaking strength), and the warp count is 14 ends per 2.54 cm (inch). The fill yarns are continuous filament 170 denier (containing 33 filaments) available from Celanese Corporation as type 731 polyester. These yarns have a low twist (0.25 per 2.54 cm (inch) and are texturized to provide a bulky yarn for optimum adhesion to coatings later applied. The tenacity is 3.5 to 3.9 grams/denier and the elongation is 18 to 24% at break. The yarn is preferably not treated with a coning oil.

The above described backing was then saturated with a resin and acrylic latex composition to prepare it for front-filling, back-filling, and coating with maker grain and size coat. A heat setting step is combined with the drying of the saturant. The fabric finishing steps will now be described in more detail.

Saturation and heat setting

Standard sizing rolls are employed to apply the following composition in the amount of 1360 to 1814 g. (3 to 4 pounds) per sandpaper makers ream (S.P.M.R.) 30.6 m (330 square feet). The fill yarn side of the fabric was facing up.

Saturant Composition:

Cymel 482, available from American Cyanamid, a melamine-formaldehyde resin syrup 80% solids, pH 8 to 9	160 parts
Beetle 7238, available from American Cyanamid, a urea formaldehyde resin syrup	124 parts
water	120 parts
aqueous solution containing 15% NH_4Cl and 24% 2 amino 2 methyl propanol	13 parts
5 to 7 parts pigment dispersions may be added to color backing.	

Upon completion of the application of the saturant the fabric is dried on a tenter frame for at least 3 minutes in a hot air oven in which the temperature in the entry zone is 96.1°C, (205°F), and the temperature at the exit zone is 176.7°C (350°F). A tension of at least 907 g (2 pounds) per 2.54 cm (inch) of width is maintained on the fabric during its travel through the oven. This process not only dries the saturant but also heat-sets the fabric.

Front fill coating

The composition of the front fill coating, applied to the fill yarn side in this example, but which can instead be applied to the warp yarn side if desired, is as follows:

(1) phenol-formaldehyde A state resol resin syrup having a formaldehyde to phenol ratio of 1.5 and a solids content of 78%	199 parts
(2) $CaCO_3$	160 parts
(3) sodium lauryl sulfate	2 parts
(4) Hycar 2600×138, a latex of an acrylic acid ester polymer having a glass transition temperature at 25°C available from B. F. Goodrich Chemical Company	54 parts

The front fill coating composition is applied with a box knife in the amount of 10 to 11 pounds per ream, and water may be added as necessary to maintain the required viscosity for proper coating. The coated cloth is again dried on a tenter frame with a tension of at least 907 g (2 pounds) per inch of width by passing through a hot air oven in which the entry temperature is 205°F and the exit zone temperature is 300°F.

Back fill coating

To the side not coated with the front fill is applied a back fill of the following composition.

(1) Beetle 7238 urea formaldehyde resin syrup available from American Cyanamid	133 parts
(2) Nopco NXZ anti-foam agent, available from Nopco Chemical Co., Newark, New Jersey	5.3 parts
(3) UCAR 151 adhesive, a polyethylene, polyvinyl acetate 60% aqueous dispersion, available from Union Carbide Corporation, having a pH of 4 to 6	133 parts
(4) air washed clay	176 parts
(5) aqueous solution containing 15% NH_4Cl and 24% 2 amino 2 methyl propanol	5.3 parts
(6) water—to adjust viscosity to 11 Pas (11000 cps) at room temperature, as needed (pigment may be added if desired to color backing).	

The composition is applied by knife coating in the amount of 45.4 Kg (10 pounds) per 30.6 m^2 (S.P.M.R), and dried in an oven having an entry zone temperature of 150°F and an exit zone of 200°F.

The thus coated fabric is now ready for application of a maker coat of phenolic resin, the application of abrasive, and the application of an abrasive size coat, as is conventional and well known in the art. A suitable formulation to be applied to the front sized side of the backing is as follows:

(1) phenol-formaldehyde alkaline catalyzed resol resin, F/P* factor 2.08, pH 8.7, solids 78% in water	7 parts
(2) phenol-formaldehyde alkaline catalyzed resol resin, F/P* 0.94, pH 8.1, solids in H_2O 78%	3 parts
(3) $CaCO_3$	1.54×total solids

*Formaldehyde/phenol mole ratio.

To the adhesively coated fabric is then applied by conventional electrostatic means 16.06 Kg. (35.4 lbs.)/sandpaper maker's ream (S.P.M.R) 30.6 m^2 (330 square feet) grit 60 high purity aluminum oxide abrasive grain. The abrasive-adhesive coated backing member is then heated for 25 minutes at 170°F., 25 minutes at 190°F., and 47 minutes at 225°F. to provide a dry adhesive layer 11.89 Kg/30.6 m^2 (17.4 lbs./S.P.M.R.) and to anchor the abrasive grains in the desired orientation.

Afterwards, a size coat 4.8 Kg/30.6 m^2 (10.6 lbs./S.P.M.R. dry) of the same composition as the maker coat, except of lesser viscosity, is then applied according to usual techniques. The wet adhesive layer is then dried: 25 minutes at 51.7°C (125°F.), 25 minutes at 57.2°C (135°F.), 18 minutes at 82.2°C (180°F.), 25 minutes at 87.8°C (190°F.), and 15 minutes at 107.2°C (225°F.), after which a final cure at 110°C (230°F.) for 8 hours is given. The coated abrasive material is then ready to be converted according to usual techniques, into belts, discs, and other desired abrasive products.

While the above example described finishing the backing with the abrasive coat on the fill side of the cloth, in other cases it may be more desirable to coat on the warp side.

It should be noted that a central feature of the invention is the use of yarn arrays which are not interlaced as in conventional woven fabrics, and the use of the terms "warp" and "fill" in the description of fabrics bonded by other means than weaving does not imply such interlacing.

The abrasive sheet material of the above example can be formed into belts by conventional joining techniques well known in the art. Particularly suitable are the butt joints described in U.S. Patents 3,665,600 and 3,787,273. Lapped joints as described in U.S. Patent 4,194,618 may also be used. In such cases it may be desirable to apply the front fill coating and the abrasive and maker on the warp side of the backing, instead of on the fill side. In the case of butt joints the backing may be coated on either one side or the other.

Example 2

An adhesively bound coated abrasive backing of this invention was prepared by crossing two sets of substantially parallel spun polyester-yarn (3—5 gm/denier tenacity, 19 singles, cotton count) between the top and bottom platens of a photographic dry mounting press (manufactured by Seal, Inc.), the upper platen of which is electrically heated to a temperature of 171.1°C to 176.7°C (340° to 350°F). A sheet of polyamide hot melt adhesive web (Bostik No. 5350 available from USM Corp.) was inserted between the yarn layers and the press closed to fuse and set the adhesive. A laminating time of approximately 45 seconds was used. The press was opened, the cross-direction yarn beam cut free, and the machine direction yarn beam advanced to bring the next adjacent portion of yarn over the bottom platen of the press. The cross-direction yarn beam was then brought through the press to cross the other beam and the bonding process repeated. Approximately 7.3 m. 8 yards of fabric was prepared in this manner. The fabric so prepared contained a density of 93 yarns 2.54 cm (inch) in the machine direction and 47 yarns/2.54 cm (inch) in the cross-direction, yielding a calculated areal weight of 2.5×10^{-4} g/mm^2 (6.81 oz/yd^2). The count and density of fabrics thus prepared are readily varied by varying the counts and weights of yarn(s) used in the respective beams.

The fabric was then heat-stretched by passing it over a catenary-shaped surface at a speed of 6.08 m. (20 ft)/min while under a linear tension of 6.8 Kg. (15 lbs)/2.54 cm (inch) of width. During this operation, the fabric was heated to 204.4°C. (400°F) by infrared radiators on the opposite side of the web from the catenary surface. In this way the machine direction breaking strength of the fabric was increased from 71.7 Kg. (158 lbs)/2.54 cm. (inch) of width to 81.2 Kg (179 lbs)/2.54 cm (inch) of width, and the elongation to break of the fabric was reduced from 32% to 20%.

The following formulation was then applied to the cross-direction side of the heat-stretched fabric, using a conventional bar coater with a .017 inch gap:

(1) Duracryl 820, a 45% solids acrylic latex, available from Charles S. Tanner Inc., Greenville, S.C.	133 parts
(2) An alkaline catalyzed bisphenol-formaldehyde resin syrup, F/P* factor 4.18, at 73% solids.	87 parts
(3) Calcium carbonate	200 parts
(4) Alfonic 1012—60, a non-ionic surfactant, available from Charles S. Tanner Co.	7/16 parts
(5) Water	25 parts

*formaldehyde/phenol mole ratio

A drying time of 2 min. at 93.3°C, (200°F) was used. After drying, the machine direction side of this fabric was then coated to 1.07 Kg/30.6 m^2 (20 lbs/sandpaper ream) with a conventional laboratory knife-on-roll coater using the following frontsize formulation:

(1) An alkaline catalyzed bisphenol-formaldehyde resin syrup, F/P* factor 4.18, at 73% solids.	195 parts
(2) An alkaline catalyzed phenol-formaldehyde resin syrup, F/P* factor 0.94, at 78% solids.	20 parts
(3) $CaCO_3$	150 parts
(4) Alfonic 1012—60, a non-ionic surfactant available from Charles S. Tanner Co.	3.6 parts
(5) Water	45 parts

*formaldehyde/phenol mole ratio

This material was then oven dried for 5 minutes at 121.1°C. (250°F).

The thus prepared fabric was now ready for application of a maker coat of phenolic resin, the application of abrasive, and the application of an abrasive size coat, as is conventional and well known in the art.

(In recognition of readiness for the application of maker adhesive and abrasive grain, the thus prepared fabric may be henceforward denoted as a backing). A typical formulation applied to the front sized side (i.e., the side on which machine direction yarns were originally exposed) of the backing was as follows:

(1) phenol-formaldehyde alkaline catalyzed resol resin, F/P* factor 2.08, pH 8.7, solids 78% in water.	7 parts
(2) phenol-formaldehyde alkaline catalyzed resol resin, F/P* 0.94, pH 8.1, solids in H_2O 78%.	3 parts
(3) $CaCO_3$	1.54×total solids

*formaldehyde/phenol mole ratio

To the adhesively bonded backing was then applied by conventional electrostatic means 22.67 Kg (50 lbs)/sandpaper maker's ream 30.6 m^2 (330 square feet) grit 50 eutectic composition, Al_2O_3/ZrO_2 abrasive grain (available from Norton Co., Worcester, Massachusetts). The abrasive-adhesive coated backing member was then heated for 25 minutes at 70.7°C (170°F), 25 minutes at 87.8°C (190°F), and 47 minutes at 107.2°C (225°F) to provide a dry adhesive layer 7.89 Kg/30.6 m^2 (17.4 lbs/S.P.M.R.) and to anchor the abrasive grains in the desired orientation.

Afterwards, a size coat of the same composition as the maker coat, except of lesser viscosity, was then applied according to usual techniques. The wet adhesive layer was then dried: 25 minutes at 51.7°C (125°F), 25 minutes at 57.2°C (135°F), 18 minutes at 82.2°C (180°F), 25 minutes at 87.8°C (190°F) and 15 minutes at

107.2°C (225°F), after which a final cure at 110°C (230°F) for 8 hours is given. The coated abrasive material was then ready to be manufactured according to usual techniques, into belts, discs, and other desired abrasive products.

A sample of coated abrasive material, thus prepared, was converted into 6.35 cm×152 cm (2-1/2"×60") abrasive belt products. Other coated abrasive belts were also prepared, using the same means and formulations as the material of this invention, with the exception that the backing substrate fabric used was a conventionally woven polyester spun yarn backing (2×1 drills construction; 66 ends per 2.54 cm (inch) and 44 picks per 2.54 cm (inch); yarn 3—5 gm/denier, warp, 12's and filling, 15's cotton count). The warp (twill) side of this cloth was used as the frontside. The product of this invention, using the previously disclosed adhesively bound backing (Product A) was compared to the product prepared by using the conventionally interwoven backing (Product B) in a series of grinding operations.

Test #1

Four different bars of AISI C1018 steel (1.27 cm=1/2") 6.35×24.8 cm (2-1/2"×9-3/4") were alternately ground on their narrow faces with a test machine which used a 55 durometer cog tooth contact wheel, at 6.8 Kg (15 lbs) deadweight force, operating at a belt speed of 1520 m (5000 feet) per minute of surface. Two belts of each product type, with the running direction of the belts coinciding with the warp or machine direction of the backing, were tested. The end of the useful life of each belt was judged to have occurred when no more than 5.0 grams of steel could be removed during a 2.0 minute period of continuous grinding.

	Total weight of steel removed
Product A—belt #1	609 grams
Product B—belt #2	608 grams
Product A—belt #2	639 grams
Product B—belt #2	619 grams

Test #2

In this test, a piece of AISI 1020 hot-rolled steel angle iron 3.2 mm×25.4 mm×24,7 mm (1/8"×1"×9-3/4") was ground at a 15° angle to one of its 3.2 mm (1/8") faces. A 90 durometer plain face rubber contact was used with a belt speed of 1520 m (5000 feet) of surface per minute. The force used to apply the abrasive was approximately 3.86 Kg (8.5 lbs) of deadweight. In this application, abrasive grain, and the maker and size adhesive coats are normally shed from the backing at a high rate. The end of the useful life of the product normally occurs when all of the abrasive grain has been stripped from the backing.

	Time to shed	Grams of steel removed
Product A—belt #1	5.0 minutes	166
Product B—belt #1	3.5 minutes	99
Product A—belt #2	5.0 minutes	158
Product B—belt #2	3.5 minutes	94

In the case of product B, wherein the backing used was of conventional woven design, both belts tested showed evidence of severe damage to the filling yarn, with the second belt of the two splitting and breaking apart to terminate the test. No such damage was found to have occurred to the backing of the product A herein disclosed.

Example 2 above has illustrated one of the coated abrasives of this invention having a backing without bonding yarns of any kind. It will be appreciated by those skilled in the art that many variations from this specific example could be made within the scope of this invention. For example, if greater economy in the product were necessary, the cross-direction set of reinforcing yarns could have been eliminated. Belts made from the product would then have had less resistance to splitting but could have been satisfactory for certain uses. The choice of adhesive could be varied within wide limits to give the combination of flexibility and damage resistance most suitable to the intended use of the coated abrasive product.

It should also be readily appreciated that more complex mechanical arrangements could be used to assemble the material described in Example 1 or 2 at high speed A variety of methods for different adhesives are described in U.S. Patent 3,250,655.

Claims

1. A flexible coated abrasive sheet material having abrasive grains adhesively bonded to at least one

side of a backing comprising at least two arrays, each of said arrays being of non-interlaced substantially coplanar and coparallel reinforcing textile yarns, said arrays being oriented in at least two respective distinct directions in the plane of the backing, most of the tensile strength of the coated abrasive sheet material along each of said at least two directions being furnished by the yarns of all the arrays of non-interlaced substantially coplanar and coparallel yarns oriented in said direction.

2. A flexible coated abrasive sheet material according to claim 1, in which at least one of any said arrays oriented in at least two distinct directions contains yarns of high bulk as compared to the yarns of other arrays.

3. A flexible coated abrasive sheet material according to claim 1 or 2, in which at least one of said arrays oriented in at least two distinct directions comprises texturized continuous filament yarns, or staple yarns.

4. A flexible coated abrasive sheet material according to any one of the preceding claims, in which the distinct arrays are bound to each other by a stitching yarn.

5. A flexible coated sheet material according to any one of claims 1—3, in which the arrays are solely adhesively bonded.

6. A flexible sheet material according to any one of the preceding claims, containing a tissue sheet.

7. A flexible coated abrasive sheet material according to any one of the preceding claims, in the form of an endless belt.

8. A flexible coated abrasive sheet material according to any one of the preceding claims, which is prepared by applying the abrasive grains electrostatically to an adhesive coating on the sheet material.

Patentansprüche

1. Flexibles beschichtetes schleifend wirkendes Blattmaterial, in dem Schleifmittelkörper mit mindestens einer Seite eines Tragkörpers verbunden sind, der mindestens zwei Anordnungen enthält, von denen jede aus nicht miteinander verflochtenen, im wesentlichen in einer Ebene liegenden, zueinander parallelen textilen Verstärkungsgarnen besteht wobei diese Anordnungen in der Ebene des Tragkörpers in mindestens zwei deutlich voneinander unterscheidbaren Richtungen orientiert sind und der größte Teil der Zugfestigkeit des beschichtteten schleifend wirkenden Blattmaterials in jeder der Genannten mindestens zwei Richtungen auf die Garne aller in der genannten Richtung angeordneten Anordnungen von nicht miteinander verflochteten, im wesentlichen in einer Ebene liegenden, zueinander parallelen Garnen zurückzuführen ist.

2. Flexibles beschichtetes schleifend wirkendes Blattmaterial nach Anspruch 1, dadurch gekennzeichnet, daß mindestens eine der Anordnungen, die in mindestens zwei deutlich unterscheidbaren Richtungen orientiert sind, Garne enthält, die eine höhere Bauschigkeit besitzen als die Garne anderer Anordnungen.

3. Flexibles beschichtetes schleifend wirkendes Blattmaterial nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß mindestens eine der mindestens zwei deutlich unterscheidbaren Richtungen orientierten Anordnungen texturierte Endlosfadengarne oder Stapelfasergarne enthält.

4. Flexibles beschichtetes schleifend wirkendes Blattmaterial nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die deutlich unterscheidbaren Anordnungen durch ein Nähgarn miteinander verbunden sind.

5. Blattmaterial nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Anordnungen nur durch Kleben gebunden sind.

6. Flexibles Blattmaterial nach einem der vorhergenden Ansprüche, dadurch gekennziechnet, daß es ein dünnes Blatt enthält.

7. Flexibles beschichtetes schleifend wirkendes Blattmaterial nach einem der vorhergehenden Ansprüche in Form eines endlosen Bandes.

8. Flexibles beschichtetes schleifend wirkendes Blattmaterial nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß zu seiner Herstellung die Schleifmittelkörper elektrostatisch auf einen Klebstoffüberzug auf dem Blattmaterial aufgetragen worden sind.

Revendications

1. Une matière en feuille flexible revêtue d'un abrasif ayant des grains abrasifs fixés de manière adhésive sur au moins une face d'un support comprenant au moins un réseau de fils textiles de renforcement non-entrelacés, situés sensiblement dans un même plan et parallèles entre eux, ces fils textiles, en même temps que les fils de tous autres réseaux distincts éventuels, fournissant la majeure partie de la résistance à la traction de la feuille revêtue d'abrasif dans au moins une direction dans le plan de la matière en feuille flexible revêtue d'abrasif, ce réseau ou chacun de ces réseaux distincts étant formés de fils textiles de renforcement non-entrelacés, situés sensiblement dans un même plan et parallèles entre eux, présents dans le support et orientés dans la même direction.

2. Une matière en feuille flexible revêtue d'un abrasif selon la revendication 1, dans laquelle il y a au moins deux réseaux distincts de fils textiles de renforcement non-entrelacés respectivement situés sensiblement dans un même plan et parallèles entre eux, ces réseaux comprenant au moins un réseau

orienté dans chacune d'au moins deux directions distinctes dans le plan du support, la majeure partie de la résistance à la traction de la feuille revêtue d'abrasif le long de chacune d'au moins deux de ces directions étant fournie par les fils de tous les réseaux de fils non-entrelacés sensiblement coplanaires et parallèles entre eux orientés dans ladite direction.

3. Une matière en feuille flexible revêtue d'un abrasif selon la revendication 2, dans laquelle au moins un de ces réseaux orientés dans au moins deux directions distinctes contient des fils d'un volume important par rapport aux fils d'autres réseaux.

4. Une feuille flexible revêtue d'un abrasif selon la revendication 2 ou 3, dans laquelle au moins un des réseaux orientés dans au moins deux directions distinctes comprend des fils de filaments continus texturés ou des fils de fibres discontinues.

5. Une matière feuille flexible revêtue d'un abrasif selon la revendication 1, qui contient une nappe textile orientée au hasard.

6. Une matière en feuille flexible revêtue d'un abrasif selon l'une quelconque des revendications précédentes, dans laquelle les réseaux distincts sont liés entre eux par un fil de couture.

7. Une matière en feuille selon l'une quelconque des revendications 1—5, dans laquelle les réseaux sont liés entre eux seulement de manière adhésive.

8. Une matière en feuille flexible selon l'une quelconque des revendication précédentes, contenant une feuille de tissu.