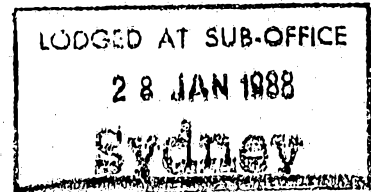


593711

FORM 1

SPRUSON & FERGUSON

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952



APPLICATION FOR A STANDARD PATENT

Armstrong World Industries, Inc., of Liberty & Charlotte Streets, Lancaster, Pennsylvania, 17604, UNITED STATES OF AMERICA, hereby apply for the grant of a standard patent for an invention entitled:

Surface Covering Product

which is described in the accompanying complete specification.

Details of basic application(s):-

Basic Applic. No: Country:

8,732 UNITED STATES OF AMERICA
127,036 UNITED STATES OF AMERICA

Application Date:

30 January 1987
27 November 1987

The address for service is:-

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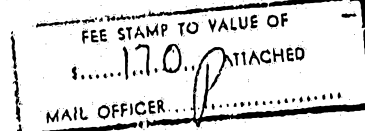
DATED this TWENTY EIGHTH day of JANUARY 1988

Armstrong World Industries, Inc.

By: *[Signature]*

Registered Patent Attorney

TO: THE COMMISSIONER OF PATENTS
OUR REF: 47439
S&F CODE: 50670



5845/2

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 30.11.89



DECLARATION IN SUPPORT OF A
CONVENTION APPLICATION FOR A PATENT

In support of the Convention Application made for a
patent for an invention entitled:

AUSTRALIA
CONVENTION
STANDARD
& PETTY PATENT
DECLARATION
SFP 4

Title of Invention

SURFACE COVERING PRODUCT

Full name(s) and
address(es) of
Declarant(s)

I/~~We~~ Claude Leo Beaudoin
of 508 Whitby Drive
Wilmington, Delaware 19803
U.S.A.

do solemnly and sincerely declare as follows:—

Full name(s) of
Applicant(s)

1. ~~I am/we are the applicant(s) for the patent~~
(or, in the case of an application by a body corporate)
1. I am/~~We are~~ authorised by
ARMSTRONG WORLD INDUSTRIES, INC.

the applicant(s) for the patent to make this declaration on
its/~~their~~ behalf.

2. The basic application(s) as defined by Section 141 of the
Act was/were made

Basic Country(ies)

in United States of America

Priority Date(s)

on January 30, 1987 and November 27, 1987

Basic Applicant(s)

both by RAYMOND GRAHAM DAVEY and MARTIN DEES, JR.

Full name(s) and
address(es) of
inventor(s)

3. ~~I am/we are the inventor(s) of the invention~~
(or where a person other than the inventor is the applicant)

3. RAYMOND GRAHAM DAVEY and MARTIN DEES, JR.

of 564 Norlam Drive, Lancaster, Commonwealth of Pennsylvania 17601, United
States of America; and 779 Eastside Drive, Landisville, Commonwealth of
Pennsylvania 17538, United States of America,
(respectively)

is/are the actual inventor(s) of the invention and the facts upon
which the applicant(s) is/are entitled to make the application are
as follows:

The said Company is the assignee of the actual inventors.

Set out how Applicant(s)
derive title from actual
inventor(s) e.g. The
Applicant(s) is/are the
assignee(s) of the
invention from the
inventor(s)

4. The basic application(s) referred to in paragraph 2 of this
Declaration was/were the first application(s) made in a Convention
country in respect of the invention(s) the subject of the application.

Declared at Lancaster, PA this
U.S.A.

10th day of December, 19 87

ARMSTRONG WORLD INDUSTRIES, INC.

By:

Signature of Declarant(s)

11/81

Claude Leo Beaudoin
Assistant Secretary

To: The Commissioner of Patents

(12) PATENT ABRIDGMENT (11) Document No. AU-B-10941/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 593711

(54) Title
SURFACE COVERING PRODUCT

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(56) Prior Art Documents
US 4320163
US 4214028
US 4126727

(57) Claim

1. A surface covering product comprising:
 - a) a substrate material,
 - b) an impervious coating bonded to at least one surface of said substrate material, and
 - c) raised elements having a height between 0.003 inch and 0.080 inch selectively disposed upon said coating, comprising a thixotropic plastic containing particles of solid material, wherein said thixotropic plastic contains at least one thixotrope chosen from the group consisting of fumed silicas, precipitated silicas, finely powdered organophilic clays, highly substituted sorbatols and calcium/organic complexes.

593711

S & F Ref: 47439

FORM 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

Class Int Class

Complete Specification Lodged:

Accepted:

Published:

Priority:

Related Art:

This document contains the
amendments made under
Section 49 and is correct for
printing.

Name and Address
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Complete Specification for the invention entitled:

Surface Covering Product

The following statement is a full description of this invention, including the
best method of performing it known to me/us

SURFACE COVERING PRODUCT

Abstract of the Disclosure

5 A surface covering product is disclosed which comprises a substrate material, an impervious coating upon said material, and raised elements selectively printed upon said coating, which raised elements comprise a thixotropic plastic containing particles of solid material. A method for the preparation of the product is also disclosed.

SURFACE COVERING PRODUCT

Background of the Invention

The present invention relates to a surface covering product. In particular, the present invention relates to a surface covering product comprising a substrate material having an impervious coating applied thereon, with raised elements of a plastic material containing solid materials selectively disposed upon said coating.

In the prior art, it is known to provide surface covering products having disposed thereon raised elements which contain particles of solid material. For example, U. S. Patent 4,348,447 to Miller and Petzold shows non-skid plastic flooring structures in which inorganic particles are embedded in a cured plastic matrix in a substantially abutting relationship. Since the adhesive can be printed in a selective pattern, the raised elements give the appearance of an embossed-in-register flooring material. Because such particles are applied to the adhesive surface of the matrix, however, particles applied in this manner typically do not penetrate uniformly throughout the plastic matrix. In addition, the number of particles is substantially limited and the particles must be covered over with a thin coating of a clear plastic material to fully bond them to the material. In coating the particles with such a thin film, the underlying coating, interstitial to the raised elements, is coated also.

In each of these references, however, the raised elements, while they may have some decorative value, would have interfered with and obscured any underlying decoration, if such decoration were present. Further, such raised elements while useful for increasing wear resistance and slip resistance, create additional difficulties in the maintenance of the surfaces, and additional care must be taken in the maintenance of flooring employing such devices.

It is an object of the present invention to provide an improved surface covering object and an improved method of producing such an article.

This invention in one broad form provides a surface covering product comprising:

- a) a substrate material,
- b) an impervious coating bonded to at least one surface of said substrate material, and
- c) raised elements having a height between 0.003 inch and 0.080 inch selectively disposed upon said coating, comprising a thixotropic plastic containing particles of solid material, wherein said thixotropic plastic contains at least one thixotrope chosen from the group consisting of fumed silicas, precipitated silicas, finely powdered organophilic clays, highly substituted sorbatols and calcium/organic complexes.

This invention in a further broad form provides a method for the preparation of a surface covering product, which method comprises:

- a) providing an impervious coating upon at least one surface of a substrate material,
- b) selectively printing raised elements with a screen printer on said coated substrate, which raised elements comprise a thixotropic plastic containing particles of solid material, said raised elements being spaced apart to provide depressed areas therebetween and said raised elements being from .003 to .080 inches in height, and
- c) fusing the material formed in this manner.



~~prises providing an impervious coating upon a substrate material, selectively positioning raised elements of a thixotropic plastic containing particles of solid material, and fusing the raised elements to the substrate to provide a covering product of unitary construction.~~

Brief Description of the Drawings

Figure 1 shows a cross-sectional view of the product of the present invention; and

Figure 2 shows a cross-sectional view of the product of the prior art as shown in U.S. Patent No. 4,348,447.

Detailed Description of the Invention

Raised surface elements, and particularly raised surface elements containing solid particles, have long been employed as a way of increasing the slip resistance or abrasion resistance of surface coverings. In the present invention, a product having such raised surface elements of a thicker aspect can be provided in a process which does not require coating of the elements and surrounding areas.

In the prior art, such a construction as that shown in Figure 2 has been produced by preparing a substrate 7 with a suitable coating 8 and selectively applying an adhesive material 15, such as an ungelled plastisol. Solid particles, such as elements 10 and 11, are then applied uniformly but adhere only in the adhesive portions with the remainder being removed. In order to hold the particles in position, the material is then coated with a uniform layer of clear wear layer material 13.

In the present invention as shown in Figure 1, a substrate 20 is prepared with a suitable impervious coating 22 and then selectively provided with raised elements 24 comprised of a thixotropic plastic material 26 containing particles of solid material 28. Since no clear wear layer need be employed to permanently bind the particles as in the prior art, portions of the



underlying coating 22, represented as 30, may be left uncoated in the final product.

The Substrate

5 The present invention is not believed to be dependent on the substrate employed. Rather, it is believed that any of the substrates normally employed in this field can be employed in the practice of the present invention. A suitable substrate can be the below described plastisol saturated glass mat of the Example
10 or a wet-laid felted sheet, also common in the surface covering art, could be employed with equal advantage. Further, either substrate could be back-coated with a foamed or compact coating to form an interliner product.

15 Certainly, it is not envisioned that the present invention will be limited in anyway by the choice of substrate. Choices among available substrates would be made on some basis such as manufacturing convenience or physical property requirements of the end product.

The Coating

20 Once a substrate is chosen, it should be coated with a suitable impervious material. While it would be possible to apply the raised plastic elements directly to a wet-laid felt, without the application of an impervious layer to protect the interstitial felt,
25 the product would have limited commercial value. At the very least, a decorative coating would normally be applied even if the final product is to be wear layered for protection.

30 Of course, a glass mat must be prepared with an impervious coating, usually a plastisol which may or may not be foamable, to impregnate the mat and seal over the glass fibers.

35 Thus, the coating which must be employed may be as simple as a sealant for a wet-laid felt or as complex as a multilayered, multi-element construction. In all cases the impervious coating must be of wear layer quality, i.e. capable of standing up to normal wear for a floor covering. The practice of the present invention

is not intended to be bound by the particular impervious coating employed. Many coatings and coating methodologies are known to the art which would have application to the present invention, including foamable and non-foamable plastisols, resinous dry blends, stencil lay-ups and the like.

The coating should, however, be impervious to the material deposited thereon so that the thixotropic material deposited remains on the surface to form a raised element.

The Raised Elements

Over the impervious coating, raised elements are created by depositing beads of a pseudoplastic thixotropic liquid containing solid particles. Such deposition can be carried out using various methods known to the art, however, screen printing, though normally employed to deposit inks on porous surfaces, has been employed with good success and is described in the example which follows.

The raised elements may be in any shape or pattern, however, geometrics such as repeated patterns of raised circles, squares, diamonds and the like have been demonstrated to be effective visually. As in other products in this field, the number of such elements per unit should be complete enough to effectively form a wear surface for the covering. The depressed areas between the raised areas serve both as a decorative element and a structural function, such as channels to carry away liquid spills, and the like.

The raised elements may be from about three one-thousandths of an inch (0.003") to about eight one-hundredths of an inch (0.08") above the underlying substrate material, preferably from about fifteen one-thousandths of an inch (0.015") to about forty-five one-thousandths of an inch (0.045"), and most preferably about three one-hundredths of an inch (0.03"). Further, the raised elements should cover from about thirty percent (30%) to about eighty percent (80%) of the total

surface area in the final product in order to provide an effective wear surface, with the exact percentage a function of the geometry of the raised elements.

The Thixotropic Material

5 The present invention is made possible through the combination of an impervious coated substrate and the rheological characteristics of the plastic material applied. With an application methodology such as a rotary screen, a pseudoplastic thixotropic material can
10 be deposited on the coated substrate in thicknesses exceeding that of normal printing inks. Because of the properties of the material, lateral flow can be controlled or substantially eliminated.

 Thixotropic materials are materials that
15 exhibit dual rheological behavior, that is, they exhibit high viscosity under low shear and low viscosity under high shear.

 Fumed and precipitated silicas are probably the most often used thixotropic agents, or thixotropes,
20 although various inorganic and organic materials are known to be operative, including such inorganic materials as very fine particle organophilic clays and such organic materials as highly substitute sorbatols or calcium/organic complexes. In the Example which
25 follows, fumed silica, available commercially from the Degussa Company, under the trade designation Aerosil 200, has been employed to advantage.

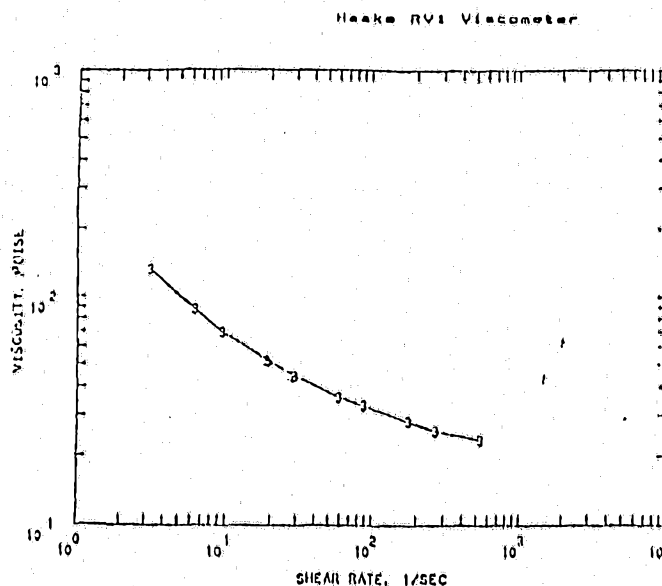
 The quantity of such material added to the resin paste system will determine the thixotropic nature
30 of the resulting system, and its viscosities under various rates of shear. Such properties will determine the lateral flow of the plastisol deposited as raised elements on the substrate. The viscosity and shear rate of plastisol thixotropic material are related and the
35 viscosity of the thixotropic material is measured to ensure the desired lateral flow of the material deposited.

The measurement of viscosity when taken with a Brookfield viscometer ranges from 80 to 160 poise using a No. 6 spindle at 20 revolutions per minute. Viscosity is adjusted by varying the amount of plasticizer or other suitable viscosity depressants.

Various resinous materials may be employed as the thixotropic material in the present invention and these include virtually any useful resinous plastisols, while polyvinyl chloride resins have been employed with advantage in the Example which follows.

To be useful in the practice of the present invention, sufficient thixotropic material must be present to enable the resin system to remain plastic under shear, losing its pseudoplastic characteristics rapidly when the shear force is removed.

The pseudoplastic characteristics is illustrated by the Haake RV-1 Viscometer graph below:



It can be seen from the graph that the thixotropic material herein, a PVC slurry plastisol, exhibits high viscosity under low shear and low viscosity under high shear.

The Particles

Although the thixotropic material itself provides a wear surface on the end product, the abrasion properties of such wear surface will typically be

5 greatly improved by the addition of solid particles. Such particles may be an organic material such as rubber or a plastic material, such as vinyl, or an inorganic material such as silica quartz or the like. These particles may be clear or coated or colored in some way,
10 such as resin-coated sands which are known to the art.

In order to be useful in the present invention, the particles should be of suitable dimension to pass through a No. 10 U. S. Standard seive series mesh, a screen (U. S. Standard) with openings of about two
15 millimeters (2.0 mm) and yet be retained on a No. 200 mesh screen (U. S. Standard), with openings of about seventy microns (70 u.m.). Preferred results, however, have been obtained with particles which would pass
20 through a No. 25 mesh screen (U. S. Standard) with openings of about six hundred microns (600 u.m.) and be retained on a No. 50 mesh screen (U. S. Standard), with openings of about two hundred fifty microns (250 u.m.). The particles of solid material are of a MOHS hardness of 7 to 9, and preferably about 7.

Example 1

A sixteen hundred foot (1,600 ft.) roll of four meter wide (4 m.) fiber glass mat obtained commercially from the Schuller Company was saturated with 500 grams per square meter of a plastisol of the following
30 composition and gelled in contact with an oil-filled drum preheated to 290-295°F.

<u>Component</u>	<u>Trade Name</u>	<u>Source</u>	<u>Weight Percent</u>
PVC Resin	(Lucovyl PB-1702	ATO Chemcial Products (UK)	65.3
PCV Resin	(Pevikon PE-820)	KemaNord Plastics (UK)	23.9
PCV Resin	(Vinnol C65V)	Wacker (W. Germany)	11.7
Plasticizer	(Hexaplas OPN)	Imperial Chem. Ind. (UK)	5.1
Plasticizer	(Santicizer DP-268)	Monsanto Europe (Brussels)	9.2

Plasticizer	(TXIB)	Eastman Chemical	2.5
Plasticizer	(Cereclor S-45)	Imperial Chem. Ind. (UK)	2.5
Stabilizer	(Ingestab BZ-505)	Ciba Geigy	1.5
Plasticizer	(ED-6)	Lankro Chemicals Ltd. (UK)	0.8
Filler	Alumina trihydrate	BA Chemicals Ltd. (UK)	21.0
Grey pigment paste			<u>6.5</u>
			100.0

Following this, the smooth surface of the plastisol saturated mat was coated with 380 grams per square meter of a plastisol of the following composition and gelled in contact with a second oil-filled drum pre-heated to 285-290°F. to form the impervious coating of wear layer quality.

<u>Component</u>	<u>Trade Name</u>	<u>Source</u>	<u>Weight Percent</u>
PVC Resin	(Lucovyl PB-1702)	ATO Chemical Products (UK)	20.7
PVC Resin	(Pevikon PE-820)	KemaNord Plastics (UK)	32.4
PVC Resin	(Vinnol C65V)	Wacker (W. Germany)	15.9
Plasticizer	(Hexaplas OPN)	Imperial Chem. Ind. (UK)	6.9
Plasticizer	(Santicizer DP-268)	Monsanto Europe (Brussels)	9.0
Plasticizer	(TXIB)	Eastman Chemical	3.4
Plasticizer	(Cereclor S-45)	Imperial Chem. Ind. (UK)	3.4
Stabilizer	(Ingestab BZ-505)	Ciba Geigy	2.0
Plasticizer	(ED-6)	Lankro Chemicals Ltd. (UK)	1.0
Grey pigment paste			<u>5.3</u>
			100.0

A particle containing plastisol of the following composition was then screen printed in a regular geometric pattern onto the surface of the gelled impervious coating.

<u>Component</u>	<u>Trade Name</u>	<u>Source</u>	<u>Weight Percent</u>
PVC Resin	(Pevikon PE 820)	KemaNord Plastics (UK)	43.1
PVC Resin	(Vinnol C65V)	Wacher (W. Germany)	10.8
Plasticizer	(Santicizer DP-268)	Monsanto Europe (Brussels)	11.9
Plasticizer	(Hexaplas OPN)	Imperial Chem. Ind. (UK)	2.7
Plasticizer	(TXIB)	Eastman Chemical	10.8
Epoxy Oil		Lankro Chemical (UK)	1.6

Stabilizer	(Ingestab BZ 505)	Ciba Geigy	1.1
Fumed Silica	(Aerosil 200)	Degussa Corp.	0.5
Quartz particles			15.0
Gray pigment paste			<u>2.5</u>
			100.0

The viscosity of the plastisol with particles set forth above must be between 80 to 160 poise for the desired results. Viscosity is adjusted by varying the amounts of TX18 plasticizer.

10 The printed plastisol was then gelled and fused by passing through a hot air oven maintained at approximately 390°F for two minutes.

15 The resulting composite product had regularly-placed raised elements simulating an embossed-in-register design, which elements contained a substantially uniform dispersion of solid particles throughout.

Example 2

It is possible to form the product herein with a flat surface.

20 The product herein is made the same way as the product of Example 1 except that an additional coating is added prior to fusion of the product. After the raised elements are gelled, an overall coating of the impervious coating material above is applied to fill in
25 the depressed areas around the raised elements. When the grey pigment paste is removed from the impervious coating material, the coating filling in the depressed areas will be transparent and the Example 1 and 2 products will look substantially the same, but the Example 2
30 product will have a flat upper surface.

The claims defining the invention are as follows:

1. A surface covering product comprising:
 - a) a substrate material,
 - b) an impervious coating bonded to at least one surface of said substrate material, and
 - c) raised elements having a height between 0.003 inch and 0.080 inch selectively disposed upon said coating, comprising a thixotropic plastic containing particles of solid material, wherein said thixotropic plastic contains at least one thixotrope chosen from the group consisting of fumed silicas, precipitated silicas, finely powdered organophilic clays, highly substituted sorbatols and calcium/organic complexes.
2. The surface covering product of claim 1 wherein said raised elements have a height between 0.015 and 0.080 inches.
3. The surface covering product of claim 1 or claim 2 wherein the substrate material is a fiber glass mat.
4. The surface covering product of claim 1 wherein the substrate material is a wet-laid fibrous composite sheet.
5. The surface covering product of claim 1 wherein the particles of solid material are of a MOHS hardness of 7 to 9.
6. The surface covering product of claim 4 wherein the particles of solid material are, at least in part, organic.
7. The surface covering product of claim 5 wherein the particles are, at least in part, chips of vinyl resin.
8. The surface covering product of claim 5 wherein the particles of solid material are, at least in part, inorganic.
9. The surface covering product of claim 8 wherein the particles are, at least in part, silica quartz.
10. The surface covering product of claim 1 or claim 2 wherein the raised elements are disposed in a regular geometric pattern.
11. The surface covering product of claim 1 or claim 2 wherein the raised elements are arranged to form a means simulating an embossed-in-register product and the raised elements cover 30% to 80% of the surface area of the surface covering.
12. The surface covering product of claim 1 or claim 2 wherein the area between the raised areas is filled in to provide a flat surface sheet.



13. A method for the preparation of a surface covering product, which method comprises:

- a) providing an impervious coating upon at least one surface of a substrate material,
- b) selectively printing raised elements with a screen printer on said coated substrate, which raised elements comprise a thixotropic plastic containing particles of solid material, said raised elements being spaced apart to provide depressed areas therebetween and said raised elements being from .003 to .080 inches in height, and
- c) fusing the material formed in this manner.

14. A method as defined in claim 13 wherein said raised elements are from 0.015 to 0.080 inches in height.

DATED this TWENTIETH day of NOVEMBER 1989
Armstrong World Industries, Inc.

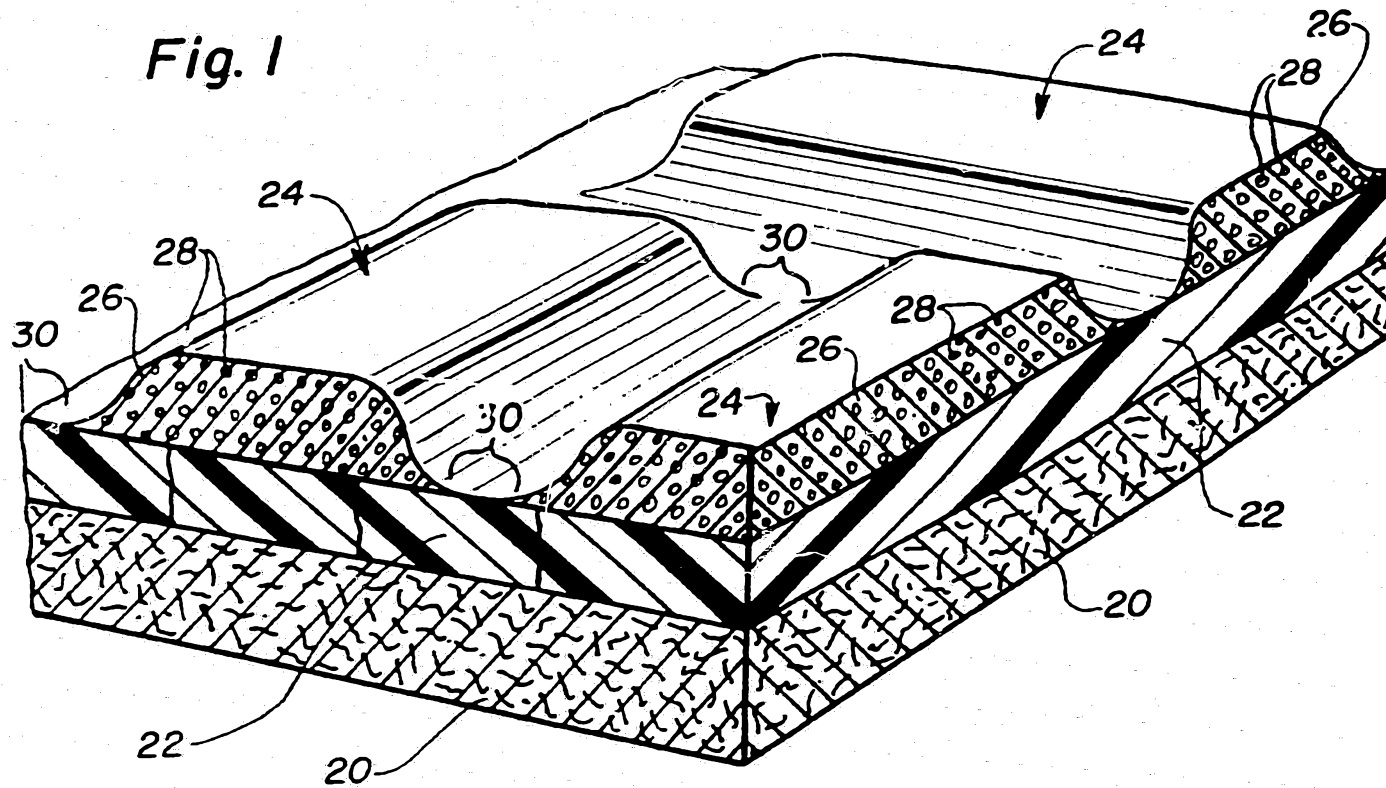
Patent Attorneys for the Applicant
SPRUSON & FERGUSON

JMR/995h



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

Fig. 1



10941/88

Fig. 2
PRIOR ART

