659321

AUSTRALIA

PATENTS ACT 1990

PATENT REQUEST: STANDARD PATENT

We, HUNTER DOUGLAS INTERNATIONAL N.V., being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow. AMENDED

Applicant: HUNTER DOUGLAS INTERNATIONAL N.V.

Address: Caracasbaaiweg 40, Curacao, Netherlands Antilles

Nominated Person: AS ABOVE

Address: AS ABOVE

Invention Title: "COIL COATING STRIP MATERIAL"

Name of actual inventor: Hendrikus De Jong

BASIC CONVENTION APPLICATION DETAILS:

Application Number:	9214019.3
Country:	United Kingdom
Country Code:	GB
Date of Application:	1st July, 1992
Basic Applicant:	Hunter Douglas International N.V.

Drawing number recommended to accompany the abstract: Figure 1

Address for service is: SHELSTON WATERS
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SYDNEY NSW 2000

Attorney Code: SW

DATED this 6th day of September, 1994
HUNTER DOUGLAS INTERNATIONAL N.V.

by

Fellow Institute of Patent Attorneys of Australia
of SHELSTON WATERS

To: The Commissioner of Patents
WODEN ACT 2606

File: 17023
Fee: Previously Paid

HD ref.: HD-018.00-301

CONVENTION - COMPANY - NON-PCT

P/00/008b
Section 29(1)
Regulation 3.1(2)

AUSTRALIA

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NOTICE OF ENTITLEMENT

We, HUNTER DOUGLAS INTERNATIONAL N.V., of Caracasbaaiweg 40, Curacao, Netherlands Antilles, being the applicant in respect of Application No. 41623/93, state the following:-

1. The person nominated for the grant of the patent is the assignee of Hunter Douglas Industries B.V., Hunter Douglas Industries B.V. is the assignee of Hunter Douglas Europe B.V. which is entitled to all rights to the invention through contract of employment with the inventor.

2. The person nominated for the grant of the patent has entitlement from the applicant of the basic application listed on the patent request form by assignment.

3. The basic application listed on the patent request form is the first application made in a Convention country in respect of the invention.

For and on behalf of
HUNTER DOUGLAS INTERNATIONAL N.V.

..... January 20, 1994

(Signature) (Date)

Name: Frits W. van der Greft

Title: President

File: 16977

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55 CLARENCE STREET, SYDNEY, AUSTRALIA

GL25(l)

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-41623/93
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 659321

(54) Title
COIL COATING STRIP MATERIAL

(51)[5] International Patent Classification(s)
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C09D 175/04

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(30) Priority Data

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9214019 01.07.92 GB UNITED KINGDOM

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(56) Prior Art Documents
US 4761312

(57) Claim

1. A sheet material comprising a substrate and, on at least one face of the said substrate, a heat-dried or heat-cured lacquer layer comprising fibres which affect the uniformity of the surface of the dried or cured lacquer layer, thereby obtaining a textured surface, said fibres optionally being dispersed within a film-forming binder.

3. A sheet material according to claim 1 or 2, wherein the fibres are acrylic, polyester, nylon or cellulose fibres.

10. A process for the manufacture of a sheet material with a textured surface, comprising a heat-dried or heat-cured lacquer layer on at least one face of a substrate, which process comprises applying to at least one face of a substrate a lacquer layer comprising fibres which are capable of affecting the uniformity of the lacquer layer, said fibres optionally being dispersed within a film-forming binder; and heat-drying or heat-curing the lacquer layer thus formed.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

Name of Applicant: HUNTER DOUGLAS INTERNATIONAL N.V.

Actual Inventor: Hendrikus De Jong

Address for Service: SHELSTON WATERS
55 Clarence Street
SYDNEY NSW 2000

Invention Title: "COIL COATING STRIP MATERIAL"

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

COATING SHEET MATERIAL

This invention relates to a sheet material having a textured surface.

Coated sheet materials are conventionally made in a roller-type apparatus in which a sheet substrate, which may be in the form of a strip, is coated on at least one face by passage between two rollers one or both of which serves to apply lacquer to the sheet. A process of this kind is used in so-called coil-coating in which the substrate, typically of thin metal, is coiled up both before and after the coating procedure. Sheet materials having a textured (for example, granular) surface cannot be prepared in such roller-type apparatus. This is because the distance between the rollers determines the thickness of the wet lacquer layer. If any granules or particles present in the wet lacquer layer have a diameter greater than the nip between the rollers, the particles will be squashed or crushed as they travel between the rollers. There are also limits to the maximum thickness of the wet lacquer layer in the usually high speed coil coating and subsequent storing processes.

The present invention provides a sheet material with a textured surface which may be prepared in a roller-type apparatus, and a process for its manufacture.

The sheet material of the invention comprises a substrate and, on at least on face of said substrate, a heat-dried or heat-cured lacquer layer comprising fibres which affect the uniformity of the surface of the dried or cured lacquer layer, thereby obtaining a textured surface, said fibres optionally being dispersed within a film-

forming binder.

The invention also provides a sheet material as defined above in which the said fibres have, during the heat-drying or heat-curing, altered their dimensions or otherwise affected the uniformity of the surface of the dried or cured lacquer layer.

The invention further provides a process for the manufacture of a sheet material with a textured surface, on at least one face of said material, which process comprises applying to at least one face of a substrate a lacquer layer comprising fibres which are capable of affecting the uniformity of the surface of the lacquer layer, said fibres optionally being dispersed within a film-forming binder; and heat-drying or heat-curing the lacquer layer thus formed.

The invention further provides a process as defined above, wherein said fibres alter their dimensions on heat-drying or heat-curing or are otherwise capable of affecting the uniformity of the surface of the lacquer on drying or curing. The lacquer layer is preferably applied to the substrate by a coil-coating process.

The fibres which may be used are, for example, acrylic, polyester or nylon fibres. The following commercially available fibres may for example be used. Acryl fibrous material FPAC 247/050, Polyester fibrous material FPES 1130060, and Dralon (acrylic) short-cut fibres 17 D tex/2 mm. Natural fibres may also be used,e.g.

cellulosic fibres such as sisal, e.g. that sold under the designation Sisal fibrous material F 506/200.

The average length of the fibres is preferably from 0.01 to 6.0 mm, more preferably not more than 3.0 mm, and the average diameter is preferably from 1 to 60 μm, more preferably 30 to 40 μm.

The lacquer layer usually comprises the fibres dispersed within a film-forming binder, in which case the fibres are generally present in a proportion of from 10 to 40%, preferably from 14 to 32%, based on the weight of the dried or cured lacquer layer. A fibre content which is too low will produce a finish which looks like dirty paint; a fibre content above 40% can lead to low film integrity and can have an unfavourable effect on the texture. The minimum proportion of binder depends on the fibres used. For example it is possible to avoid using a binder when using sufficiently fine nylon fibres. If no binder is present the fibres may be dispersed in a dispersing medium, comprising for example, any substance mentioned below as a solvent, or water. Thus, the relative proportion of fibres in the lacquer layer depends upon the desired effect and can vary according to the size and type of the fibre used.

The film-forming binder may be of any type conventionally used in lacquers for coating the particular substrate chosen. Synthetic resins are generally preferred, especially polyester, polyacrylic or polyurethane resins. While the film-forming binder is

usually dissolved in an appropriate solvent, it is within the scope of the invention to use a lacquer in which the binder is in an emulsion, e.g. in water.

The lacquer may comprise, in addition to the fibres and the film-forming binder (when present), the usual pigments, fillers and other ingredients usually present in such lacquers. A matting agent (e.g. Syloid) may, for example, be present. Thus the fibre-containing lacquers for use in the invention are conveniently made by adding to a suitable commercially available lacquer the required amount of the chosen fibre material.

The lacquer comprising the fibres is wet when applied to the substrate and is subsequently heat-dried or cured. Any solvent may be used in the lacquer as long as the fibres themselves do not dissolve in the solvent. When no binder is present any appropriate liquid can be used to disperse the lacquer comprising the fibres, for example water. Mainly aromatic solvents are suitable for use with polyester and polyurethane fibres. In particular, a mixture of Solvesso 100 and Solvesso 150 with some butanol is suitable for use with polyester fibres and a mixture of Solvesso 100 and Solvesso 150 with about 25% diacetone alcohol is suitable for use with polyurethane fibres. In some cases, the solvent is absorbed by the fibres and the latter may swell without, however, dissolving.

The lacquer may be dried or cured, for example by stoving under the usual conditions for coil coating. For

example the lacquer layer may be dried or cured in an oven kept at a temperature of e.g. about 325°C for (say) 24 seconds. The peak temperature of the lacquer layer is then about 240°C.

The nature of the substrate has no effect on the texture of the coated sheet material. Thin metal sheets are typically used, for example of aluminium, steel or galvanised steel.

The sheet material of the invention may show various visual and textured effects depending on, for example, the choice of substrate (e.g. reflective, non-reflective or coloured), the film-forming binder (e.g. thickness of the lacquer layer formed, its degree of transparency, and its colour), fibres (e.g. their chemical constitution, size and colour), and the temperature and duration of the heat-treatment.

For example, when the lacquer is dried at high temperature the fibres may contract and lift the lacquer, thus forming an uneven granular surface with a suede-like look. Such an effect is obtainable with, for example, acrylic fibres.

If the lacquer solvent has been absorbed by the fibres, and continues to evaporate from the fibres after it has evaporated from the binder, bubbles may be formed in the surface of the lacquer by the later-evaporating solvent. Such an effect is obtainable using, for example, polyester fibres.

It is also possible to obtain a leather-look surface with a very low relief using fibres which are not very sensitive to high stoving temperatures, for example, acrylic fibres. The fibres curl slightly when the lacquer is nearly dry but they remain substantially in the plane of the substrate.

In some cases the fibre is partly decomposed into gaseous products under the stoving conditions. The gases form bubbles providing a foam-look surface. Such an effect is obtainable with, for example, Sisal fibres.

The invention is further described with reference to the accompanying drawings, in which Figures 1 to 4 show different textures and effects which can be achieved in the sheet materials of the invention. These figures are further described in the Examples below.

Figure 5 shows a substrate being coated in a conventional coil-coating process, suitable for use in the invention. The diagram shows a coating being applied to both sides of the substrate. The strip substrate (2) shown travels from left to right, typically at a speed of from 40 to 100 m/s. The film-forming binder (4) comprising fibres (8) is applied to the strip by rollers (10,12), which smooth out the lacquer to provide a layer on the substrate of substantially even thickness. The coatings are then heat-dried or heat-cured onto the substrate by means not shown.

The following Examples illustrate the invention. In particular, the Examples illustrate the way in which different textures can be achieved by varying the type of film-forming binder, fibres and proportion of fibres in the dried lacquer layer.

EXAMPLES

EXAMPLES 1 TO 4

The Examples were all prepared in a coil-coating process in which the lacquer was applied with a wire-bar. It is conventional to use a wire-bar to apply lacquers to a substrate in a coil-coating process in a laboratory. Similar results are to be expected in an industrial scale process when the lacquer is applied by rollers.

The solvents used were mainly aromatic: a mixture of Solvesso 100 and Solvesso 150 with some butanol was used for the polyester lacquers and a mixture of Solvesso 100 and Solvesso 150 with approximately 25% diacetone alcohol was used for the polyurethane lacquers. These solvents are conventionally used with the binders chosen.

The "special" gloss binders used in Examples 2 and 4 differed from the binders used in Examples 1 and 3 in that the "special" gloss binders additionally comprised a matting agent ("Syloid" silica).

The fibres used in the samples are listed below, together with their lengths and diameters:

Fibre	Length (mm)	Diameter (μm)
Acryl fibre FPAC 247/050	0.2-2	20-60
Polyester fibre FPES 1130060	0.5-2	40-60
Dralon 17D	2	approx 20
Sisal F506/200	0.5-2	approx 50

The samples were cured at an oven temperature of 325°C for 24 seconds.

Table 1 below shows the types of fibres and film-forming binder used and the proportion of fibres in the dried lacquer (as a weight percentage of the dried lacquer layer) for each sample. The appearance and texture of the samples has been assessed. Photocopies of samples 1 to 4 themselves are shown in Figures 1 to 4 respectively.

TABLE 1

SAMPLE NO	FIBRE USED	PROPOR-TION OF FIBRES (%)	BINDER	APPEARANCE TEXTURE
1	none	0	glossy polyester	flat and smooth; white; discrete fine grains, most densely packed in 1C; near-suede look
1A	acryl fibre FPAC 247/050	14%	glossy polyester	
1B	acryl fibre FPAC 247/050	25%	glossy polyester	
1C	acryl fibre FPAC 247/050	30%	glossy polyester	
1D	polyester fibre FPES 1130060	14%	glossy polyester	surface rough, higher relief than 1A-C (1F highest relief), uneven surface due to different sized clusters of bubbles in lacquer surface; white
1E	polyester fibre FPES 1130060	25%	glossy polyester	
1F	polyester fibre FPES 1130060	30%	glossy polyester	
1G	Dralon 17D tex/2mm	20%	glossy polyester	individual fibres clearly visible as short "hairs" in lacquer; very low relief; white; near-leather look.
1H	Dralon 17D tex/2mm	20%	glossy polyester	
2	none	0	special gloss polyester	flat and smooth, off-white; discrete fine grains - most densely packed in 2C; cream-brown; near-suede look.
2A	acryl fibre FPAC 247/050	14%	special gloss polyester	
2B	acryl fibre FPAC 247/050	25%	special gloss polyester	
2C	acryl fibre FPAC 247/050	30%	special gloss polyester	
2D	polyester fibre FPES 1130060	21%	special gloss polyester	surface rough, bubbles more spread out than 1D-F; cream-brown
2E	polyester fibre FPES 1130060	26%	special gloss polyester	
2F	polyester fibre FPES 1130060	31%	special gloss polyester	
2G	Sisal fibre F 506/200	15%	special gloss polyester	highest relief of all samples 1 to 4; largest bubbles clearly visible; small patches of lacquer exist which are undisturbed; foam-look; cream-brown

CONTINUED TABLE 1:

SAMPLE NO	FIBRE USED	PROPORTION OF FIBRES (%)	BINDER	APPEARANCE TEXTURE
3	none	0	glossy polyurethane	flat and smooth; mid-brown
3A	acryl fibre FPAC 247/050	32%	glossy polyurethane	similar to 2A in appearance, but slightly higher relief; mid brown.
3B	polyester fibre FPES 1130060	26%	glossy polyurethane	similar to 2D in appearance but clusters of bubbles more isolated in lacquer; mid brown
4	none	0	polyurethane special gloss	flat and smooth; grey-white
4A	acryl fibre FPAC 247/050	16%	polyurethane special gloss	similar to 2A-C; grey-white
4B	acryl fibre FPAC 247/050	26%	polyurethane special gloss	
4C	acryl fibre FPAC 247/050	31%	polyurethane special gloss	
4D	polyester fibre FPES 1130060	21%	polyurethane special gloss	some individual fibres visible - clusters of bubbles but none broken as in 1D-F and 2D-F; grey-white.
4E	polyester fibre FPES 1130060	27%	polyurethane special gloss	
4F	polyester fibre FPES 1130060	32%	polyurethane special gloss	

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A sheet material comprising a substrate and, on at least one face of the said substrate, a heat-dried or heat-cured lacquer layer comprising fibres which affect the uniformity of the surface of the dried or cured lacquer layer, thereby obtaining a textured surface, said fibres optionally being dispersed within a film-forming binder.

2. A sheet material according to claim 1, wherein the said fibres have, during the heat-drying or heat-curing, altered their dimensions or otherwise affected the uniformity of the surface of the dried or cured lacquer layer.

3. A sheet material according to claim 1 or 2, wherein the fibres are acrylic, polyester, nylon or cellulose fibres.

4. A sheet material according to claim 1, 2 or 3, wherein the film-forming binder is a polyester, polyacrylic or polyurethane resin.

5. A sheet material according to any one of the preceding claims wherein the average length of the fibres is from 0.01 to 6.0 mm.

6. A sheet material according to claim 5, wherein the average length of the fibres is not more than 3.0 mm.

7. A sheet material according to any one of the preceding claims, wherein the diameter of the fibres is from 1 to 60 μm.

8. A sheet material according to any one of the preceding claims, wherein the fibres are present in a proportion of from 10 to 40% based on the dried lacquer layer.

9. A sheet material according to claim 8, wherein the fibres are present in a proportion of from 14 to 32% based on the dried lacquer layer.

10. A process for the manufacture of a sheet material with a textured surface, comprising a heat-dried or heat-cured lacquer layer on at least one face of a substrate, which process comprises applying to at least one face of a substrate a lacquer layer comprising fibres which are capable of affecting the uniformity of the lacquer layer, said fibres optionally being dispersed within a film-forming binder; and heat-drying or heat-curing the lacquer layer thus formed.

11. A process according to claim 10, wherein the said fibres alter their dimensions on drying or curing or are otherwise capable of affecting the uniformity of the lacquer layer on drying or curing.

12. A process according to claim 10 or 11, wherein the lacquer layer is applied to the substrate in a coil-coating process.

13. A process for the manufacture of a sheet material with a textured surface substantially as herein described with reference to Figure 5 of the accompanying drawings.

DATED this 29th Day of June, 1993

HUNTER DOUGLAS INTERNATIONAL N.V.

Attorney: PETER HEATHCOTE
Fellow Institute of Patent Attorneys of Australia
of SHELSTON WATERS

Fig.1

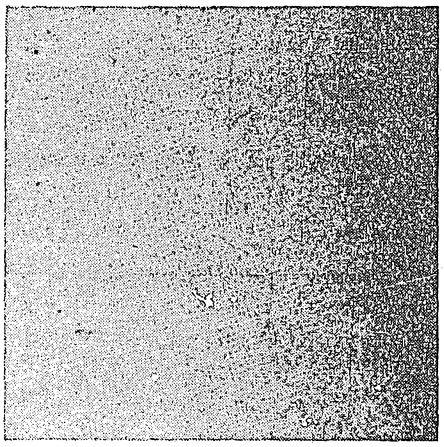


Fig.1A

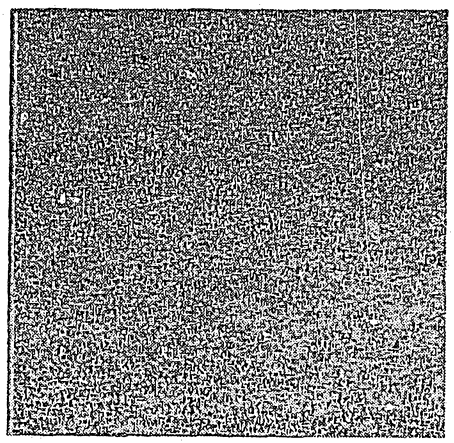


Fig.1B

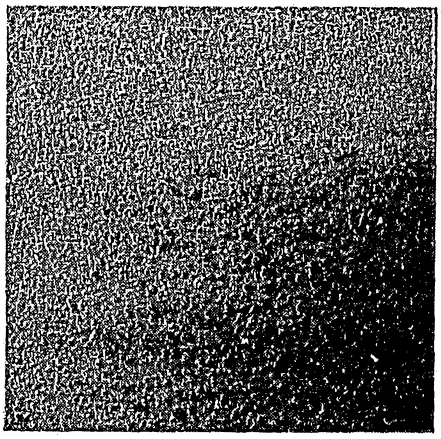


Fig.1C

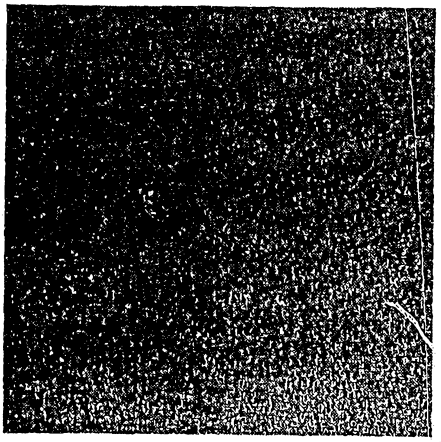


Fig.1

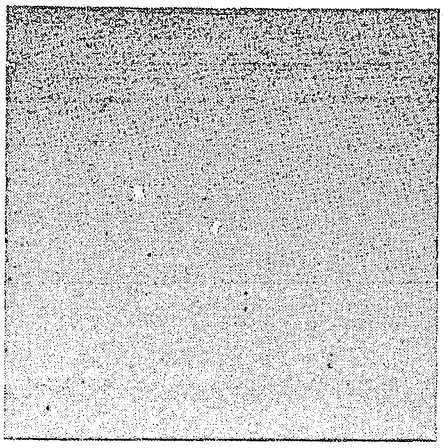


Fig.1D

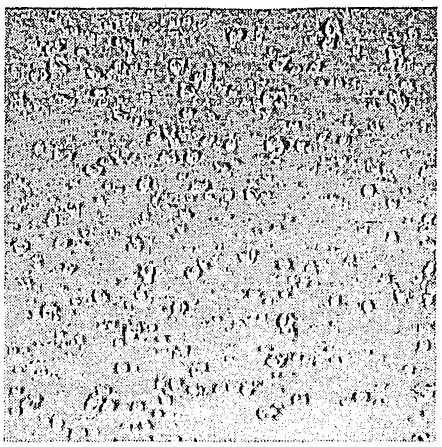


Fig.1E

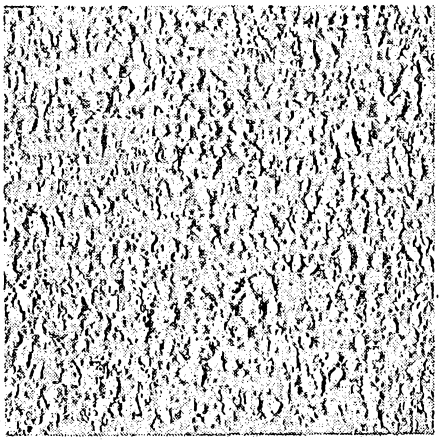


Fig.1F

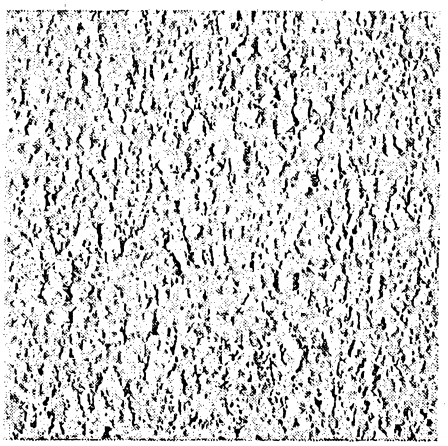


Fig.1G

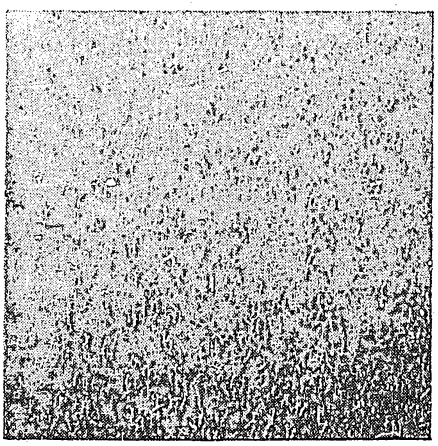


Fig.1H

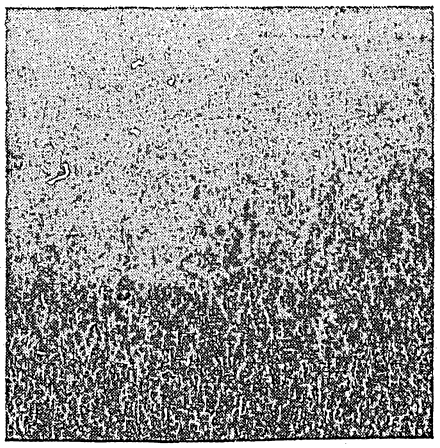


Fig. 2

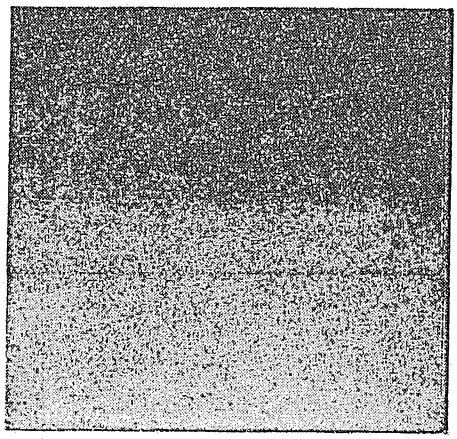


Fig. 2A

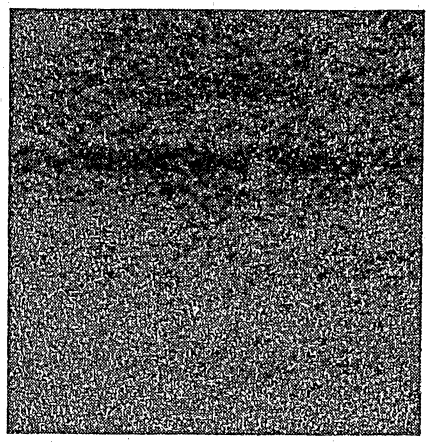


Fig. 2B

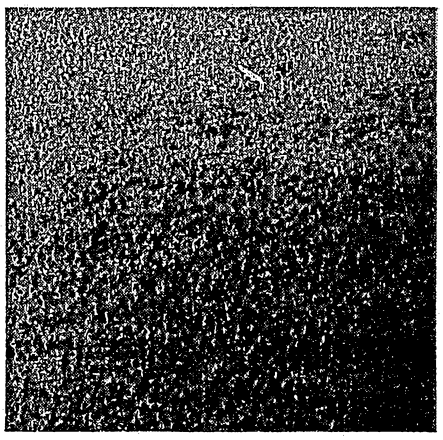


Fig. 2C

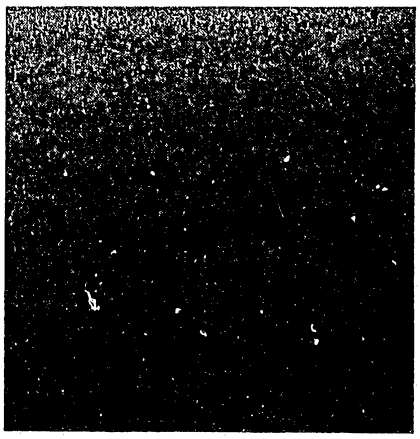


Fig. 2

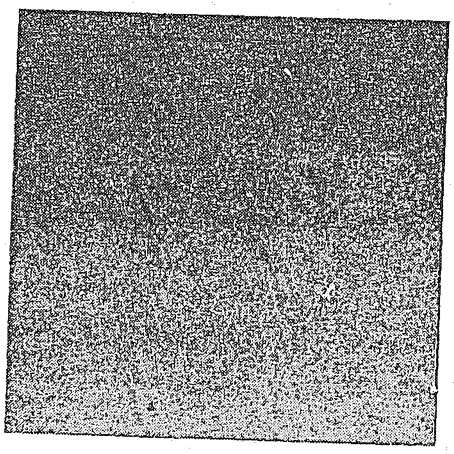


Fig. 2D

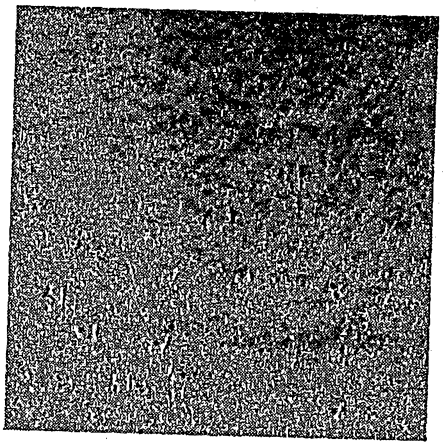


Fig. 2E

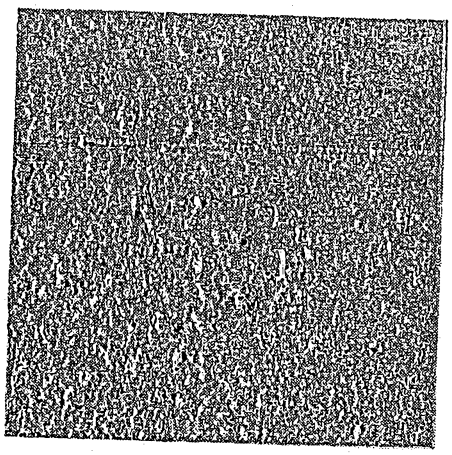
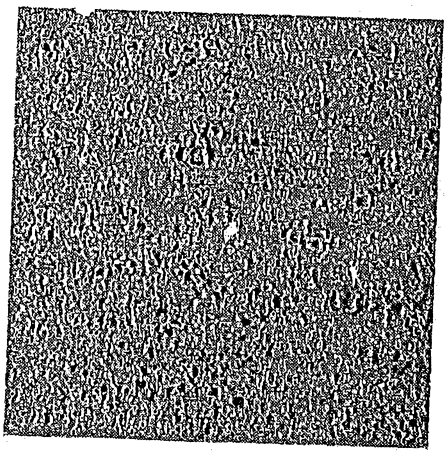


Fig. 2F



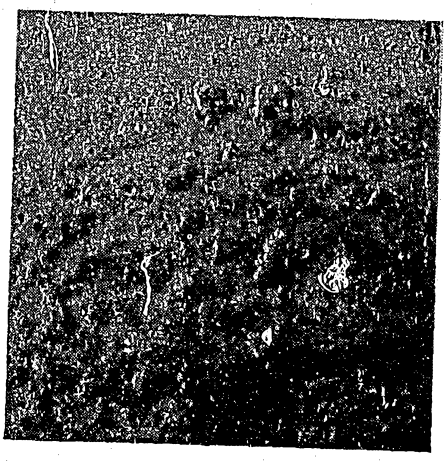


Fig. 2G

Fig.3

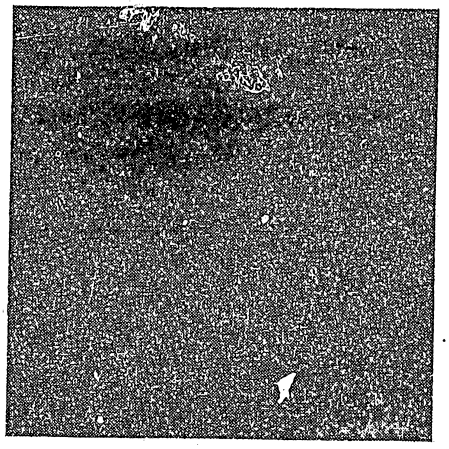


Fig.3A

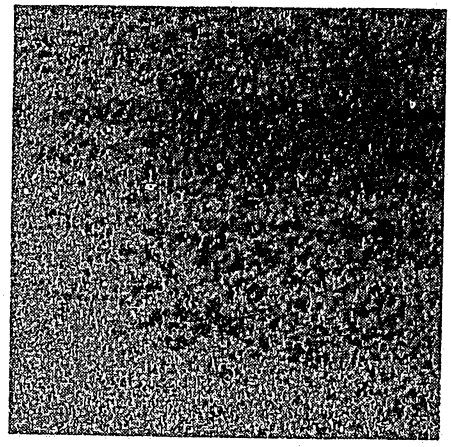


Fig.3B

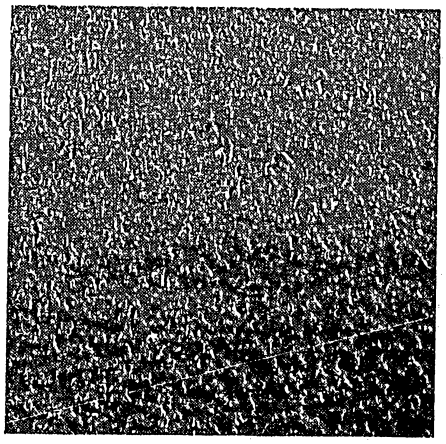


Fig. 4

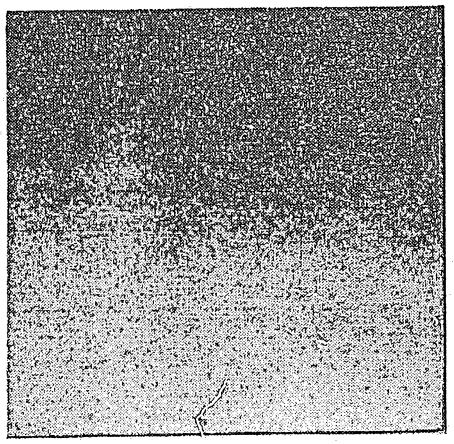


Fig. 4A

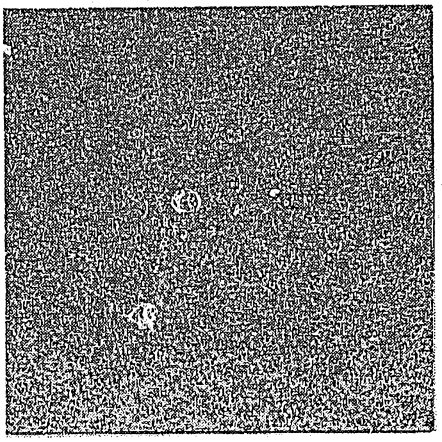


Fig. 4B

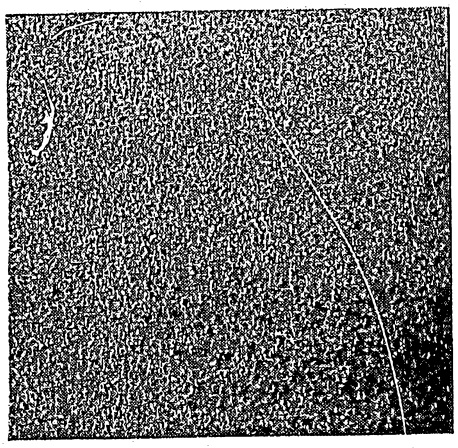


Fig. 4C

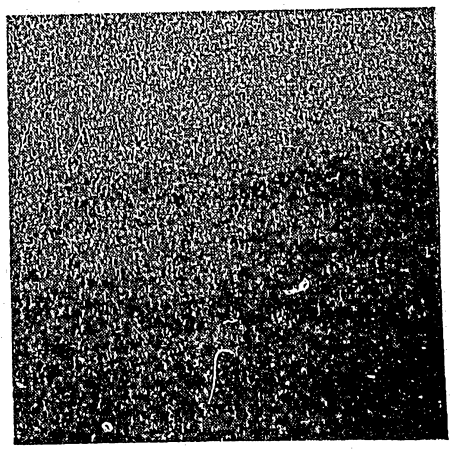


Fig. 4

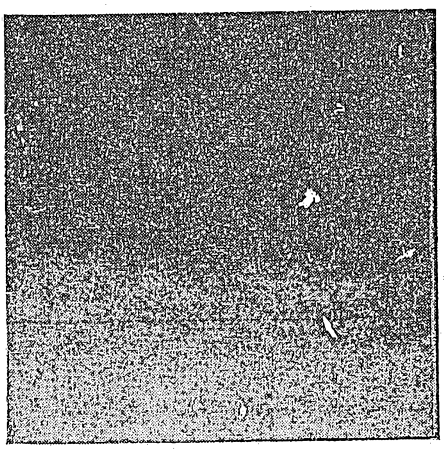


Fig. 4D

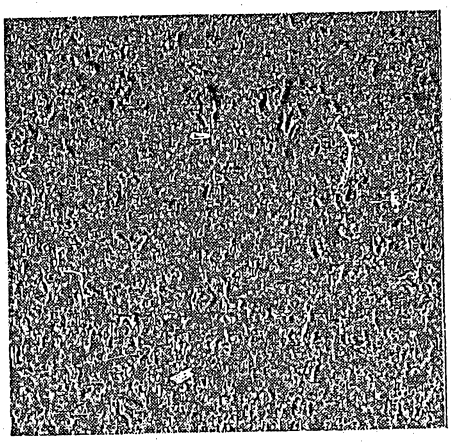


Fig. 4E

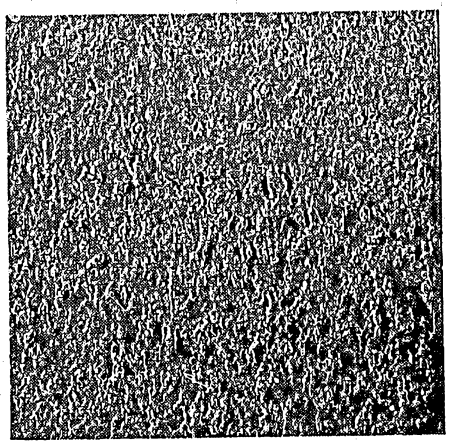


Fig. 4F

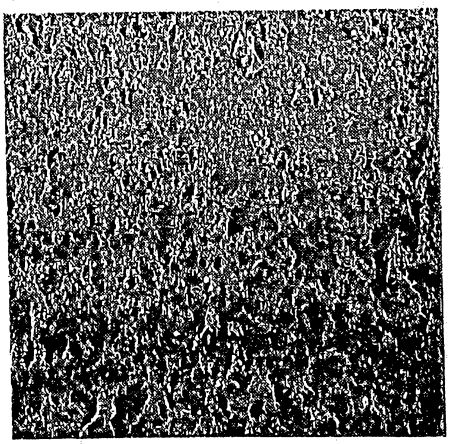


Fig. 5.