(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 February 2005 (24.02.2005)

PCT

(10) International Publication Number
WO 2005/016774 A1

(51) International Patent Classification[7]: B65D 30/14

(21) International Application Number:
PCT/KR2003/001861

(22) International Filing Date:
15 September 2003 (15.09.2003)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2003-0056319 14 August 2003 (14.08.2003) KR
10-2003-0063299 9 September 2003 (09.09.2003) KR

(71) Applicant and
(72) Inventor: **YOON, Wan Hyuk** [KR/KR]; 10-431, Bupyong 4-dong,, BuPyong-gu,, Incheon-shi 403-014 (KR).

(74) Agent: **LEE, Myoung-Taek**; Moden Patent Law Office #109, Byucksan Digital Valley II, 481-10, Gasan-dong, Geumcheon-gu, Seoul 153-783 (KR).

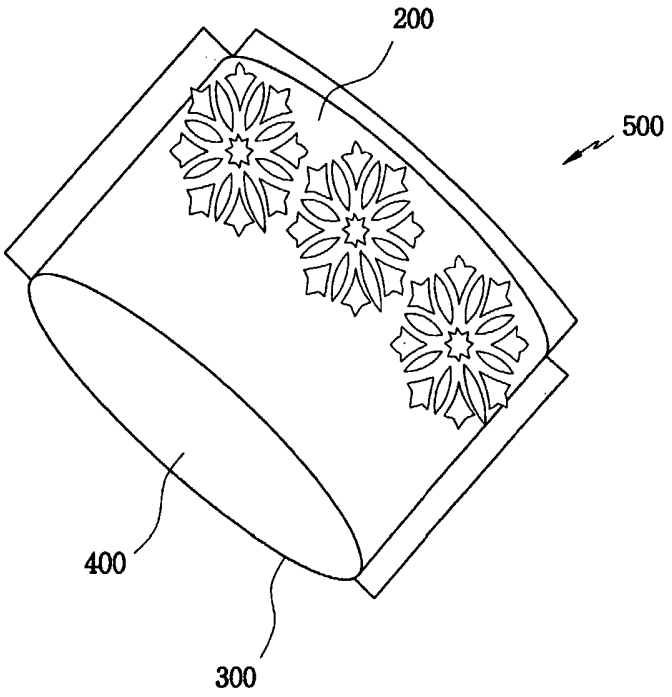
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FILM WITH DIFFERENT HEGHT OF PROTUBERANCES, MANUFACTURING METHOD AND VACUUM BAG USING THEREOF



(57) Abstract: Disclosed is a sealing film having two-floor protrusions, a method of manufacturing the same and a sealing bag using the same. The sealing film includes a base layer, and a heat-sealing resin layer laminated on the base layer and having protrusions on an inner surface thereof to form air passages, in which the protrusions have first protrusions and second protrusions having a height higher than that of the first protrusions. Further, the first and second protrusions have an irregular structure which is not oriented in any specific direction, whereby various patterns can be realized. As for the sealing film, the protrusions are formed in a two-floor and have a total floor area that is enlarged, whereby an output flux of air increases and an internal chamber of the sealing bag can be easily made to the state of vacuum. Further, sizes and arrangements of the protrusions are irregularly formed, thus realizing various patterns and increasing productivity of end products according needs of users.

WO 2005/016774 A1

COPY FOR IB

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/KR2003/001861	15 SEPTEMBER 2003 (15.09.2003)	14 AUGUST 2003 (14.08.2003)

Applicant

YOON, WAN HYUK

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
      ☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
   b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☐ the text is approved as submitted by the applicant.
   ☒ the text has been established by this Authority to read as follows:
   FILM WITH DIFFERENT HEGHT OF PROTUBERANCES, MANUFACTURING METHOD AND VACUUM BAG USING THEREOF
5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 3
      ☒ as suggested by the applicant.
      ☐ because the applicant failed to suggest a figure.
      ☐ because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

FILM WITH DIFFERENT HEGHT OF PROTUBERANCES, MANUFACTURING METHOD AND VACUUM BAG USING THEREOF

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates, in general, to sealing films, and manufacturing methods thereof and sealing bags using the same. More specifically, the present invention is directed to a sealing film, a method of manufacturing the same, and a sealing bag using the same, characterized in that two-floor protrusions are formed on the sealing film, whereby a total floor area of the protrusions becomes wider and an output flux of air increases, and, as well, sizes and arrangements of the protrusions are irregularly formed, thus realizing various patterns.

2. Description of the Related Art

In various countries including the United States, methods of storing foods, such as meats or processed meats, for long periods have been employed, including the steps of receiving such foods into a plastic bag in which the state of vacuum may be maintained to prevent contamination by air, and subjecting the bag to a vacuum treatment by use of an air pump or other vacuum units, followed by sealing an inlet of the bag.

With reference to FIG. 1, there is shown a conventional sealing bag 500, including an upper sheet 200 and a lower sheet 300 each having both surfaces made of a plastic material. Further, to form an internal chamber receiving contents to be stored, both side edges and lower edges of the upper sheet 200 and the lower sheet 300 are thermally seamed to form a seamed part S. Furthermore, to eject internal air of the bag 500 after the contents are received into the internal chamber of the bag 500, upper edges of the upper sheet 200 and the lower sheet 300 are open to form an open part 400. The inner surfaces of the sealing bag 500 are made of a thermoplastic resin, such as polyethylene, capable of being melted while being non-toxic to humans, and the outer surfaces of the sealing bag 500 include a multi-layered structure formed of a blockable material, such as nylon, for storage of long periods after the vacuum treatment.

The storing contents are received into the sealing bag 500 through the open part 400 of the sealing bag 500, after which air in the bag 500 is ejected by use of an air pump or other vacuum units, whereby the internal chamber of the sealing bag 500 gets to the state of vacuum. Then, the open part 400 is heated to be higher than predetermined temperatures, and compressed and seamed. However, in cases where the bag 500 is sealed by use of the vacuum unit, while air of the upper

portion of the bag 500, present near the vacuum unit, is suddenly ejected, the upper sheet 200 and the lower sheet 300 constituting the bag 500 are mutually seamed (this is called 'early collapse'). Thus, the complete vacuum state of the internal chamber of the bag 500 cannot be achieved due to residual air of the lower portion of the bag 500, and it is difficult to store the contents.

To prevent such early collapse, techniques for forming an air passage by subjecting the film made of a thermoplastic material to an embossing treatment have been developed. In this regard, the film having air passages is disclosed in U.S. Patent Nos. 2,778,171, 3,311,517, and RE34,929.

The known techniques disclose air passages 26 formed only by protrusions 22 having regular heights, intervals and shapes, as shown in FIG. 2. However, by means of thusly formed air passages, a vacuum performance becomes inferior, and thus it is difficult to realize various patterns. Further, there are caused problems concerning transcribing patterns to surfaces of the sheets 200 and 300 or embossing surfaces of the sheets 200 and 300, according to various needs of the consumers.

As such, the vacuum performance depends on the heights, arrangement structures and total floor areas of the protrusions. As for the heights of the protrusions,

when higher protrusions are used, there is no phenomenon of the so-called 'collapse' caused by powerful outer suction force of air. In addition, since the protrusions are formed to aid the natural flow of air in the bag, they are preferably arranged so that respective air passages are linearly connected to the open part of the bag. Also, an output flux of air per unit time is proportional to the total floor area of the protrusions. Thus, as the total floor area of the protrusions is wider, the output rate of the internal air becomes faster.

SUMMARY OF THE INVENTION

Accordingly, an aspect of the present invention is to alleviate the problems encountered in the related art and to provide a sealing film, characterized by having an enlarged total floor area of protrusions, so that an early collapse does not occur upon a vacuum treatment by use of a vacuum unit, thereby improving a vacuum performance.

Another aspect of the present invention is to provide a sealing film, characterized by having irregularly arranged protrusions thereon, thereby realizing various patterns, and functioning to increase productivity of a sealing bag according to a variety of needs of the users.

A still another aspect of the present invention is to provide a sealing bag using the sealing film.

A further aspect of the present invention is to provide a method of manufacturing the sealing film.

To achieve the above aspects of the present invention, there is provided a sealing film having two-floor protrusions, including a base layer, and a heat-sealing resin layer laminated on the base layer and having protrusions on an inner surface of the heat-sealing resin layer to form air passages, wherein the protrusions have first protrusions, and second protrusions having a height higher than that of the first protrusions.

As for the sealing film, the first protrusions and the second protrusions have an irregular arrangement structure which is not oriented in any specific direction, to realize various patterns.

As for the sealing film, the first protrusions and the second protrusions have various sizes.

As for the sealing film, the first protrusions and the second protrusions have irregular shapes.

As for the sealing film, the patterns comprise the shapes of fruits, animals, plants, characters, or diagrams.

As for the sealing film, the first protrusions each are 0.8-1.5 times thicker than a thickness of the heat-sealing resin layer.

As for the sealing film, the second protrusions each are 1.0-2.0 times thicker than a thickness of the heat-sealing resin layer.

The sealing film further comprises an adhesive layer between the base layer and the heat-sealing resin layer.

As for the sealing film, the base layer comprises polyamide, polyester, or ethylene vinyl alcohol.

As for the sealing film, the base layer comprises a multi-layered structure including at least one layer.

As for the sealing film, the heat-sealing resin layer comprises polyethylene.

As for the sealing film, a surface of the heat-sealing resin layer comprises a flat part which is not embossed, first protrusions and second protrusions.

As for the sealing film, a surface of the heat-sealing resin layer comprises first protrusions and second protrusions.

In addition, there is provided a sealing bag, including an upper sheet and a lower sheet superimposed mutually, in which lower edges and both side edges of the upper sheet and the lower sheet are seamed to form an internal chamber of the sealing bag, and upper edges of the upper sheet and the lower sheet are open to form an open part to receive contents into the sealing bag, and at least one of the upper sheet and the lower sheet includes the sealing film as mentioned above.

Further, there is provided a method of manufacturing a sealing film, including the following steps of melt-extruding a heat-sealing resin layer on a base layer made of an air-impermeable material through a nozzle of a T-die extruder, to prepare a film, and passing the film through a layering unit with a recessed roll having recesses and a cooling roll, wherein the recessed roll of the layering unit has first recesses and second recesses, and thus the heat-sealing resin layer has first protrusions and second protrusions on an inner surface thereof, corresponding to each position of the first recesses and the second recesses of the recessed roll, to form air passages.

Furthermore, there is provided a method of manufacturing a sealing film, including the following steps of passing a heat-sealing resin layer through a protrusion-forming unit with a recessed roll having recesses and a flat roll, to form protrusions on an inner surface of the heat-sealing resin layer, and passing a base layer made of an air-impermeable material and the heat-sealing resin layer with protrusions through a layering unit with two layering rolls, wherein the recessed roll of the protrusion-forming unit has first recesses and second recesses, whereby the heat-sealing resin layer passed through the protrusion-forming unit has first protrusions and second protrusions on an inner surface of the heat-

sealing resin layer, corresponding to each position of the first recesses and the second recesses of the recessed roll, to form air passages.

As for the method, the first recesses and the second recesses of the recessed roll have an irregular arrangement structure which is not oriented in any specific direction, to realize various patterns on the inner surface of the heat-sealing resin layer.

As for the method, the first recesses and the second recesses of the recessed roll have various sizes.

As for the method, the first recesses and the second recesses of the recessed roll have irregular shapes.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of a conventional sealing bag;

FIG. 2 is a perspective view of another conventional sealing bag;

FIG. 3 is a perspective view of a

sealing bag using a sealing film of the present invention;

FIG. 4 is a perspective view of a sealing film, according to a first embodiment of the present invention;

FIG. 5 is an exploded view of a part of the sealing film shown in FIG. 4;

FIG. 6 is a perspective view of a sealing film, according to a second embodiment of the present invention;

FIG. 7 is an exploded view of a part of the sealing film shown in FIG. 6;

FIGS. 8a to 8q are bottom views of various patterns formed on an inner surface of the sealing film of the present invention;

FIG. 9 is a view to show a process of manufacturing the sealing film, according to an embodiment of the present invention; and

FIG. 10 is a view to show a process of manufacturing the sealing film, according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 3, there is a perspective view of a sealing bag using a sealing film of the present invention. The sealing bag 500 includes an upper sheet 200, and a lower sheet 300 having a size corresponding

to that of the upper sheet 200. In addition, lower edges and both side edges of the upper sheet 200 and the lower sheet 300 are seamed to form an internal chamber of the sealing bag 500, and upper edges of the upper sheet 200 and the lower sheet 300 are open to form an open part 400, which is used to receive contents into the sealing bag 500.

The lower sheet 300 of the sealing bag 500 includes two or more layers, and preferably, five layers, of polyamide and polyethylene layered alternately.

The lower sheet 300 having five layers has a thickness of 60-100 μm, in which polyamide for use in blocking gas is 15-20 μm thick, and polyethylene is 40-50 μm thick.

FIG. 4 is a perspective view of a sealing film (upper sheet), according to a first embodiment of the present invention. A surface of a heat-heat-sealing resin layer 20 of the sealing film includes a flat part 24 which is not subjected to an embossing treatment, first protrusions 22a and second protrusions 22b.

FIG. 5 is an exploded view of a part of the sealing film shown in FIG. 4. On the surface of the upper sheet 200 having two layers, a plurality of the first protrusions 22a being 60 μm high with a cylindrical shape are formed. Also, 9 second protrusions 22b being 80 μm high are bundled at a central portion of the first protrusions, to form a total pattern shape resembling that of human eyes.

Although the protrusions 22 having predetermined sizes with a cylindrical shape are shown in FIG. 5, they are not limited thereto and may include various shapes,

such as rectangles or octagons, and various sizes.

The upper sheet 200 of the sealing bag 500 includes a base layer 10 and a heat-sealing resin layer 20 laminated on the base layer 10.

The upper sheet 200 is layered by means of a dry-laminating process or a T-die process. According to the dry-laminating process, an adhesive layer is inserted into the base layer 10 and the heat-sealing resin layer 20.

The adhesive layer is preferably made of polyethylene.

According to the T-die process, the upper sheet 200 includes two layers, which are a base layer 10 and a heat-sealing resin layer 20 laminated on the base layer 10. The base layer 10 is 20 μm thick, and the heat-sealing resin layer 20 is 40-60 μm thick. Thus, the upper sheet 200 having the thickness not less than 60 μm can be manufactured.

The base layer 10 is preferably made of polyamide, polyester, or ethylene vinyl alcohol (EVOH). More preferably, the base layer 10 is made of polyamide.

The heat-sealing resin layer 20 is made of polyethylene. This is because the protrusions 22 can be easily formed on the inner surface of the resin layer 20 made of polyethylene as a thermoplastic resin.

In the present invention, the protrusions 22 are formed only on the upper sheet 200. However, the protrusions 22 may be formed on an inner surface of the lower sheet 300.

When the surface of the heat-sealing resin layer 20 includes the flat part 24 without embossments, the first protrusions 22a and the second protrusions 22b,

the shape of the mouth or eyes of the smiling face shown in FIG. 4 or 5 is not distinctly viewed. However, a total floor area of the protrusions 22 is enlarged, thus improving the vacuum speed and vacuum performance.

FIG. 6 is a perspective view of a sealing film, according to a second embodiment of the present invention, in which a surface of a heat-sealing resin layer 20 of the sealing film includes only first protrusions 22a and second protrusions 22b.

As shown in FIG. 6, the shapes of smiling faces of humans is formed on the surface of the heat-sealing resin layer 20. The second protrusions 22b are responsible for the total shapes of smiling faces of humans, and the first protrusions 22a are formed on the portions of the eye and mouth and the portion outside the smiling face at heights lower than those of the second protrusions 22b. Thereby, the shape of the smiling face is realized.

FIG. 7 is an exploded view of a part of the sealing film shown in FIG. 6. On the surface of an upper sheet 200 including two layers, a plurality of first protrusions 22a are formed as 50 μm high cylinders, and a plurality of second protrusions 22b being 80 μm high are formed. In such a case, the portion formed with the second protrusions 22b is shown as embossments, and the portion formed with the first protrusions 22a is relatively shown as depressions.

When the surface of the heat-sealing resin layer 20 is formed with only the first protrusions 22a and the second protrusions 22b, the total floor area of the protrusions 22 increases, thus increasing the vacuum speed and vacuum performance. As well, various designs

may be applied and pattern outlines are further distinct.

In addition, the first protrusions 22a and the second protrusions 22b have an irregular arrangement structure which is not oriented in any specific direction, whereby a whole pattern is variously formed.

Although conventional protrusions have a regular pattern and various patterns cannot be reliably formed on an upper sheet, the protrusions 22 are irregularly arranged in the present invention, thereby realizing various designs.

FIGS. 8a to 8m show various patterns by two-floor protrusions formed on the upper sheet 200, in which the two-floor protrusions have an irregular arrangement structure.

FIG. 8a shows the shape of clovers patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8b shows the shape of conchs patterned on an inner surface of a heat-sealing resin layer of the upper sheet. FIG. 8c shows the shape of ships patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8d shows the shape of leaves patterned on an inner surface of a heat-sealing resin layer of the upper sheet. Further, FIG. 8e shows the shape of flowers patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8f shows the shape of cosmos patterned on an inner surface of a heat-sealing resin layer of the upper sheet. In addition, FIG. 8g shows the shape of Christmas trees patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8h shows the shape of orchids patterned on an inner surface of a heat-sealing

resin layer of the upper sheet. Also, FIG. 8i shows the shape of petals patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8j shows the shape of turf patterned on an inner surface of a heat-sealing resin layer of the upper sheet. FIG. 8k shows the shape of fish and marine plants patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8l shows the shape of a plurality of doors patterned on an inner surface of a heat-sealing resin layer of the upper sheet. FIG. 8m shows the shape of autumnal leaves patterned on an inner surface of a heat-sealing resin layer of the upper sheet.

As shown in FIGS. 8a to 8m, various patterns may be realized by the flat part which is not subjected to an embossing treatment, the first protrusions and the second protrusions.

In addition, FIG. 8n shows the shape of bamboo patterned on an inner surface of a heat-sealing resin layer of the upper sheet, and FIG. 8o shows the shape of ancient characters patterned on an inner surface of a heat-sealing resin layer of the upper sheet. FIGS. 8p and 8q show the shape of leaf textures patterned on an inner surface of a heat-sealing resin layer of the upper sheet.

As shown in FIGS. 8n to 8q, various patterns may be formed by the first protrusions 22a and the second protrusions 22b.

Below, a method of fabricating the sealing film is described, with reference to FIGS. 9 and 10.

A sealing film 100 of the present invention is manufactured according to a dry-laminating process or a

T-die process.

FIG. 9 shows the dry-laminating process of manufacturing the sealing film 100. For this, a heat-sealing resin layer 20 having first protrusions and second protrusions on an inner surface thereof is previously prepared as follows.

When the heat-sealing resin layer 20 made of polyethylene is passed through a protrusion-forming unit 600 including a recessed roll 610 with recesses and a flat roll 620, protrusions 22 are formed on the inner surface of the heat-sealing resin layer 20.

At this time, the recessed roll 610 of the protrusion-forming unit 600 has first recesses and second recesses. Thus, the resin layer 20 is passed through the protrusion-forming unit 600, whereby first protrusions and second protrusions are formed on the inner surface of the resin layer 20, corresponding to each position of the first recesses and the second recesses of the recessed roll 610. Further, air passages are formed.

The first recesses and the second recesses of the recessed roll 610 have an irregular arrangement structure which is not oriented in any specific direction. Therefore, various patterns can be wholly formed on the inner surface of the heat-sealing resin layer 20.

The first recesses and the second recesses of the recessed roll 610 have various sizes, and, as well, irregular shapes.

Together with the previously prepared heat-sealing resin layer 20 with two-floor protrusions, a base layer

10 made of an air-impermeable material is passed through a layering unit 700 with two layering rolls. As such, an adhesive 32 is introduced into the base layer 10 and the heat-sealing resin layer 20. Thereby, the base layer 10 is adhered to the heat-sealing resin layer with the two-floor protrusions, and an adhesive layer is intercalated into the base layer 10 and the heat-sealing resin layer 20.

According to the dry-laminating process, the thickness of the base layer 10 and the heat-sealing resin layer 20 is not limited, and thus the sealing film 100 having various thicknesses can be manufactured. Also, upon preparing the heat-sealing resin layer 20 with two-floor protrusions, defective heat-sealing resin layers are previously removed, whereby productivity of the sealing bag improves. However, since the adhesive 32 is expensive, manufacturing costs are relatively increased.

FIG. 10 shows the T-die process for use in the preparation of the sealing film. A heat-sealing resin layer 20 is melt-extruded on a base layer 10 made of an air-impermeable material through a nozzle 832 of a T-die extruder 830, and then passed through a layering unit 800 with a recessed roll 810 having recesses and a cooling roll 820, thereby obtaining a desired sealing film.

The recessed roll 810 of the layering unit 800 has first and second recesses. Thus, the heat-sealing resin layer 20 has first and second protrusions on the inner surface thereof, corresponding to each position of the first and second recesses of the recessed roll 810. Also, air passages are formed.

It is preferred that the first and second recesses of the recessed roll 810 have various sizes and irregular shapes.

As described above, the present invention provides a sealing film, a manufacturing method thereof and a sealing bag using the same, which is advantageous in that two-floor protrusions are formed on the sealing film, whereby a total floor area of the protrusions becomes wider and an output flux of air increases. Thus, an internal chamber of the sealing bag can be easily made to the state of vacuum. Further, arrangements, sizes and shapes of the protrusions are irregularly formed, thereby realizing various patterns. Therefore, productivity of end products is increased according to a variety of needs of the users.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. A sealing film, comprising:

a base layer; and

a heat-sealing resin layer laminated on the base layer and having protrusions on an inner surface of the heat-sealing resin layer to form air passages,

wherein the protrusions have first protrusions, and second protrusions having a height higher than that of the first protrusions.

2. The sealing film as defined in claim 1, wherein the first protrusions and the second protrusions have an irregular arrangement structure which is not oriented in any specific direction, to realize various patterns.

3. The sealing film as defined in claim 2, wherein the first protrusions and the second protrusions have various sizes.

4. The sealing film as defined in claim 2, wherein the first protrusions and the second protrusions have irregular shapes.

5. The sealing film as defined in claim 2, wherein the patterns comprise a fruit shape.

6. The sealing film as defined in claim 2, wherein the patterns comprise an animal shape.

7. The sealing film as defined in claim 2, wherein the patterns comprise a character shape.

8. The sealing film as defined in claim 2, wherein the patterns comprise a plant shape.

9. The sealing film as defined in claim 2, wherein the patterns comprise a diagram shape.

10. The sealing film as defined in claim 1, wherein the first protrusions each are 0.8-1.5 times thicker than a thickness of the heat-sealing resin layer.

11. The sealing film as defined in claim 1, wherein the second protrusions each are 1.0-2.0 times thicker than a thickness of the heat-sealing resin layer.

12. The sealing film as defined in claim 1, further comprising an adhesive layer between the base layer and the heat-sealing resin layer.

13. The sealing film as defined in claim 1, wherein the base layer comprises polyamide, polyester, or ethylene vinyl alcohol.

14. The sealing film as defined in claim 13, wherein the base layer comprises a multi-layered structure including at least one layer.

15. The sealing film as defined in claim 1, wherein the heat-sealing resin layer comprises polyethylene.

16. The sealing film as defined in claim 1, wherein a surface of the heat-sealing resin layer comprises a flat part which is not embossed, first protrusions, and second protrusions.

17. The sealing film as defined in claim 1, wherein a surface of the heat-sealing resin layer comprises first protrusions and second protrusions.

18. A sealing bag, comprising an upper sheet and a lower sheet superimposed mutually, in which lower edges and both side edges of the upper sheet and the lower sheet are seamed to form an internal chamber of the sealing bag, and upper edges of the upper sheet and the lower sheet are open to form an open part to

receive contents into the sealing bag,

wherein at least one of the upper sheet and the lower sheet comprises the sealing film according to any one of claims 1 to 17.

19. A method of manufacturing a sealing film, comprising the following steps of:

melt-extruding a heat-sealing resin layer on a base layer made of an air-impermeable material through a nozzle of a T-die extruder, to prepare a film; and

passing the film through a layering unit with a recessed roll having recesses and a cooling roll,

wherein the recessed roll of the layering unit has first recesses and second recesses, and thus the heat-sealing resin layer has first protrusions and second protrusions on an inner surface thereof, corresponding to each position of the first recesses and the second recesses of the recessed roll, to form air passages.

20. A method of manufacturing a sealing film, comprising the following steps of:

passing a heat-sealing resin layer through a protrusion-forming unit with a recessed roll having recesses and a flat roll, to form protrusions on an inner surface of the heat-sealing resin layer; and

passing a base layer made of an air-impermeable material and the heat- sealing resin layer with

the protrusions through a layering unit with two layering rolls,

wherein the recessed roll of the protrusion-forming unit has first recesses and second recesses, whereby the heat-sealing resin layer passed through the protrusion-forming unit has first protrusions and second protrusions on an inner surface thereof, corresponding to each position of the first recesses and the second recesses of the recessed roll, to form air passages.

21. The method as defined in claim 19 or 20, wherein the first recesses and the second recesses of the recessed roll have an irregular arrangement structure which is not oriented in any specific direction, to realize various patterns on the inner surface of the heat-sealing resin layer.

22. The method as defined in claim 19 or 20, wherein the first recesses and the second recesses of the recessed roll have various sizes.

23. The method as defined in claim 19 or 20, wherein the first recesses and the second recesses of the recessed roll have irregular shapes.

FIG 1

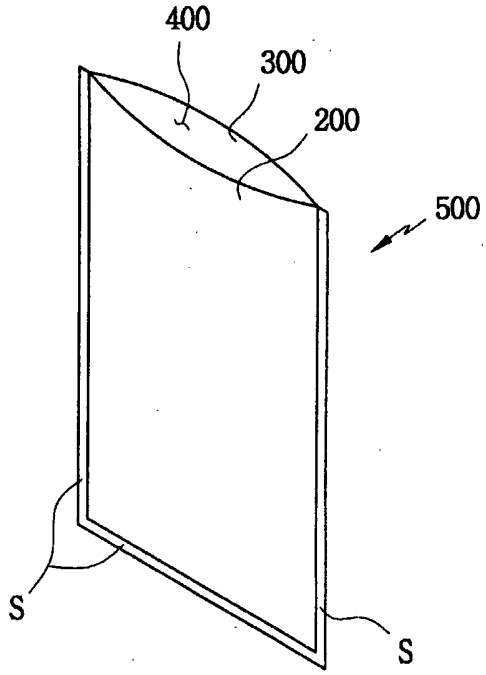


FIG 2

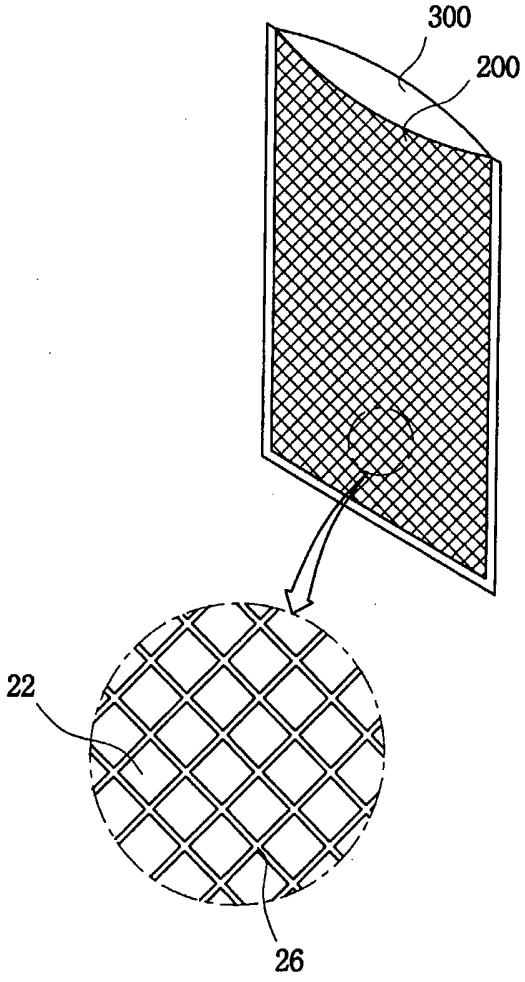


FIG 3

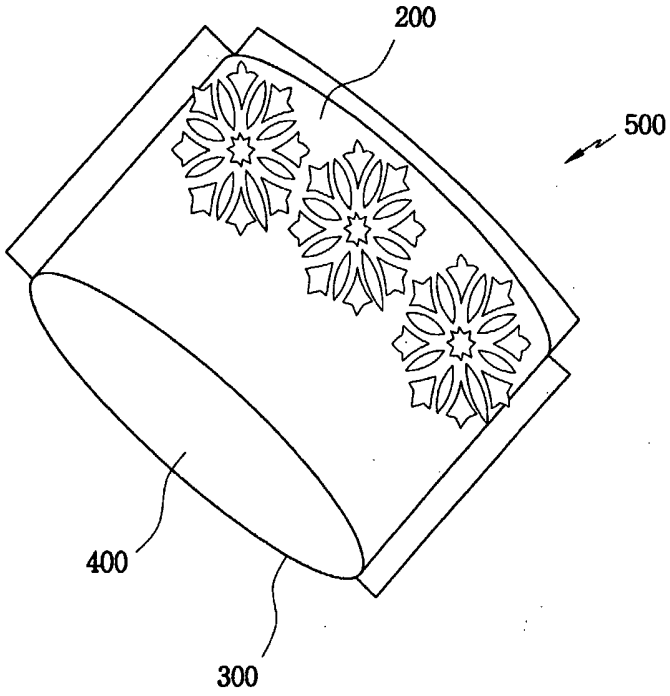


FIG 4

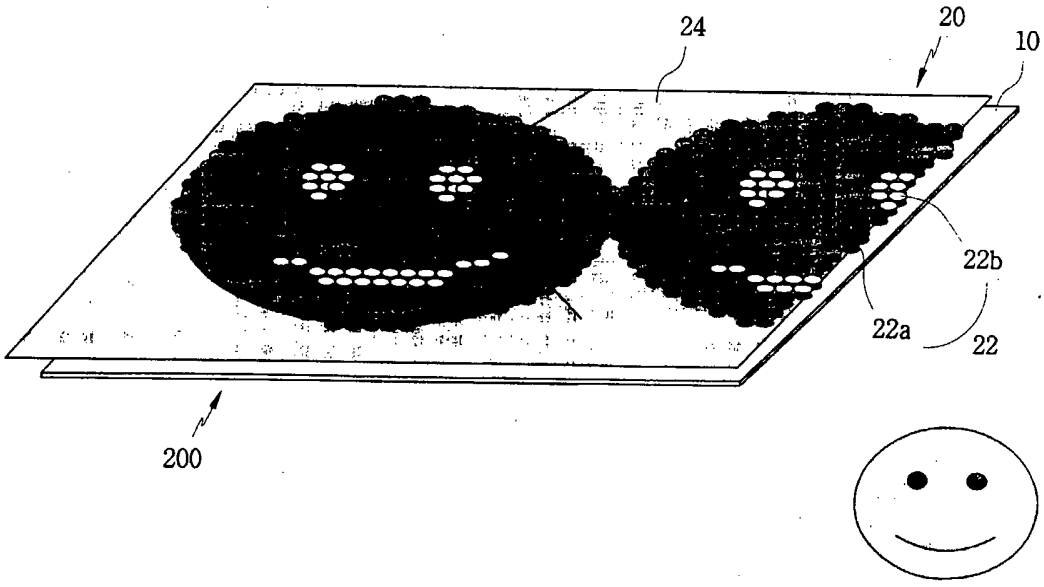


FIG 5

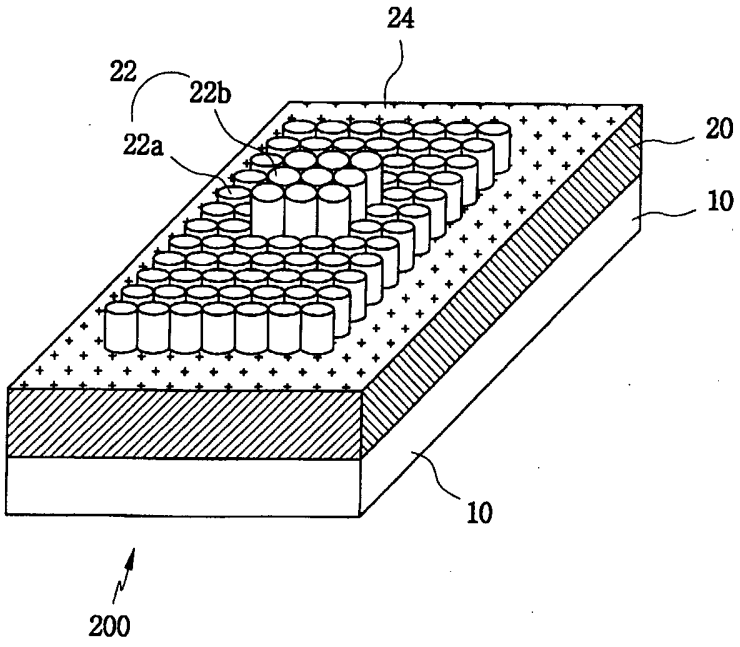


FIG 6

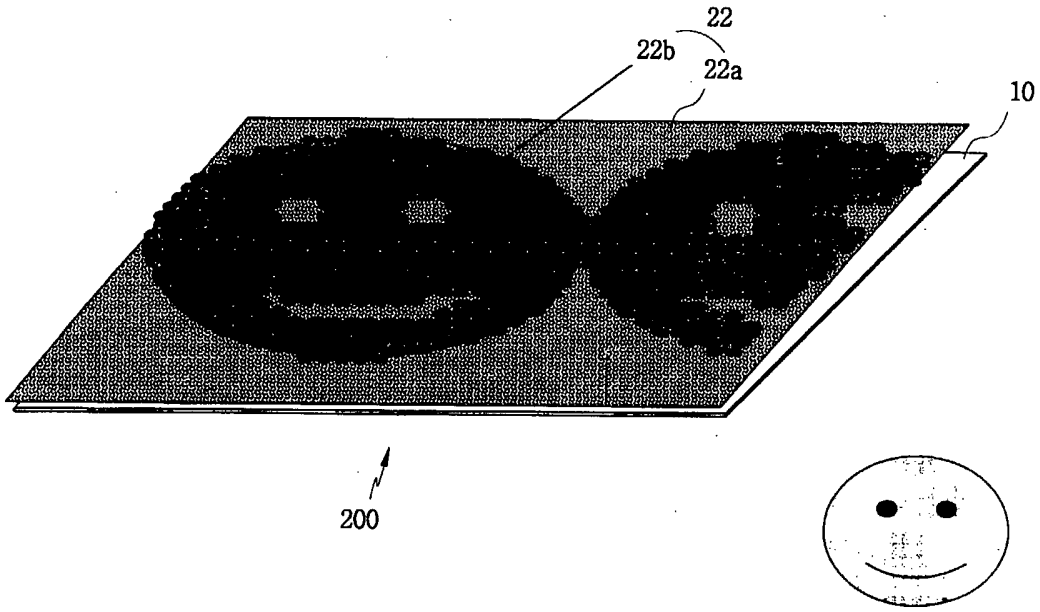


FIG 7

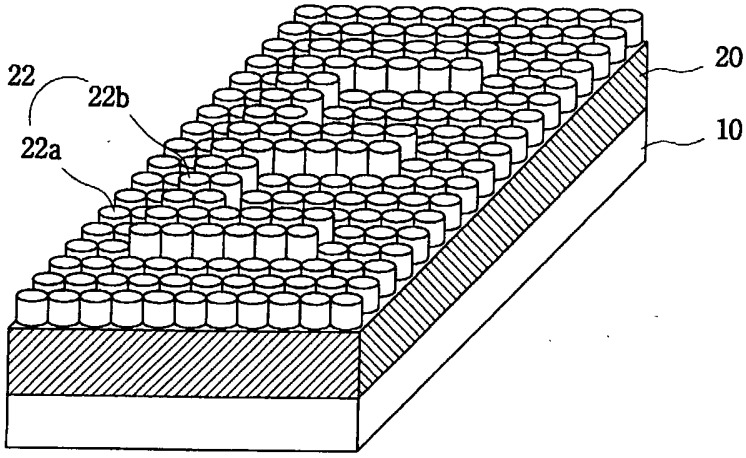


FIG 8a

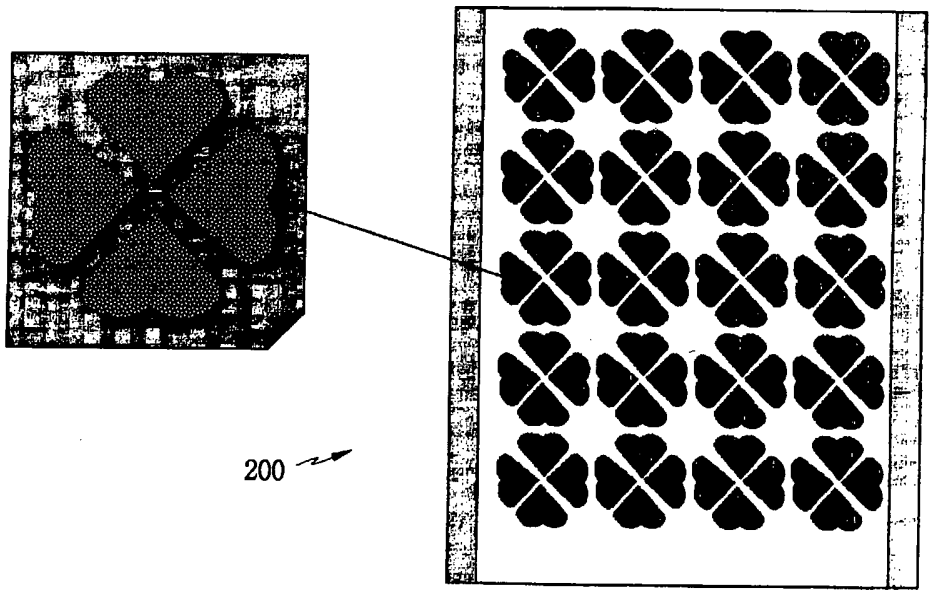


FIG 8b

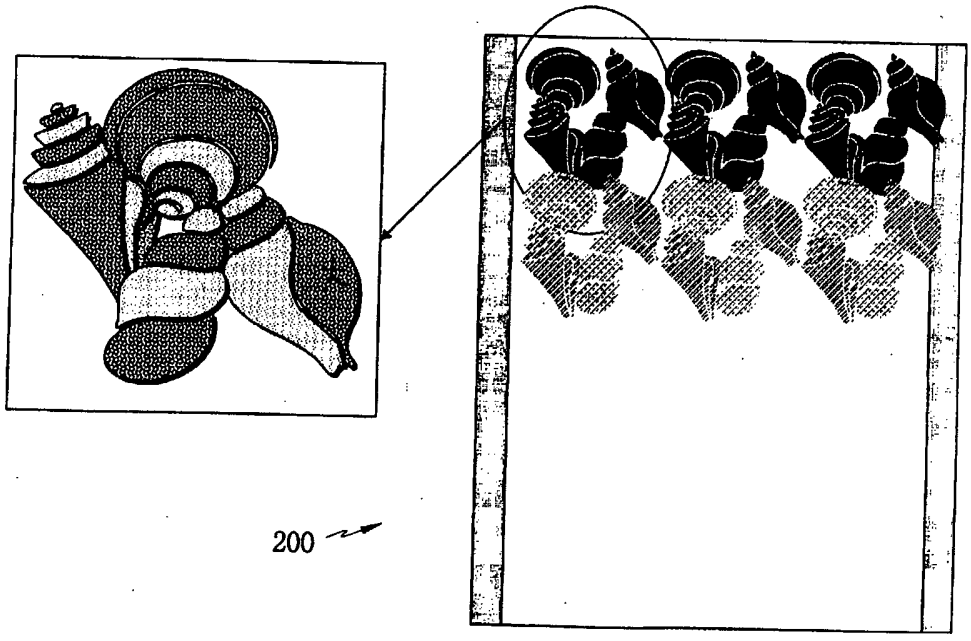


FIG 8c

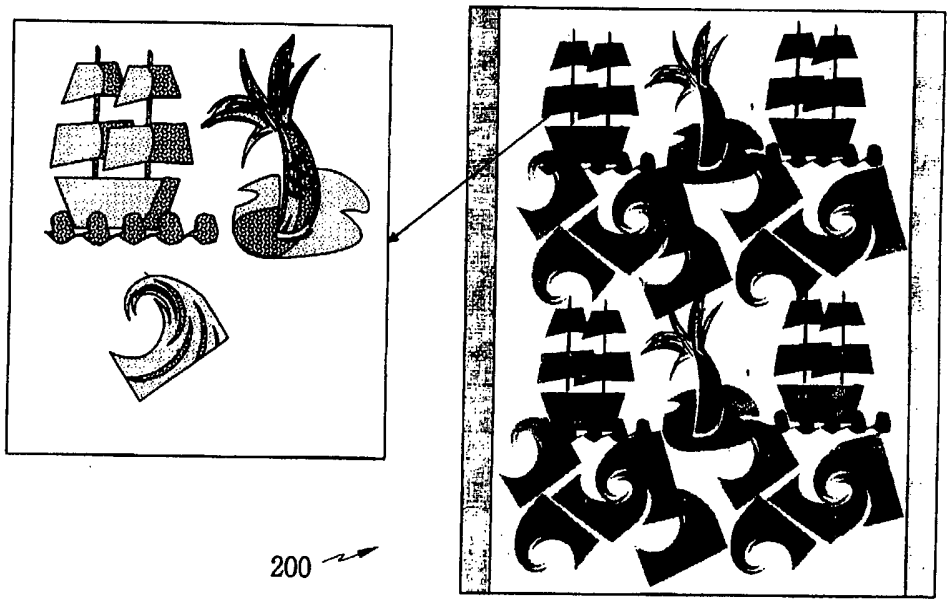


FIG 8d

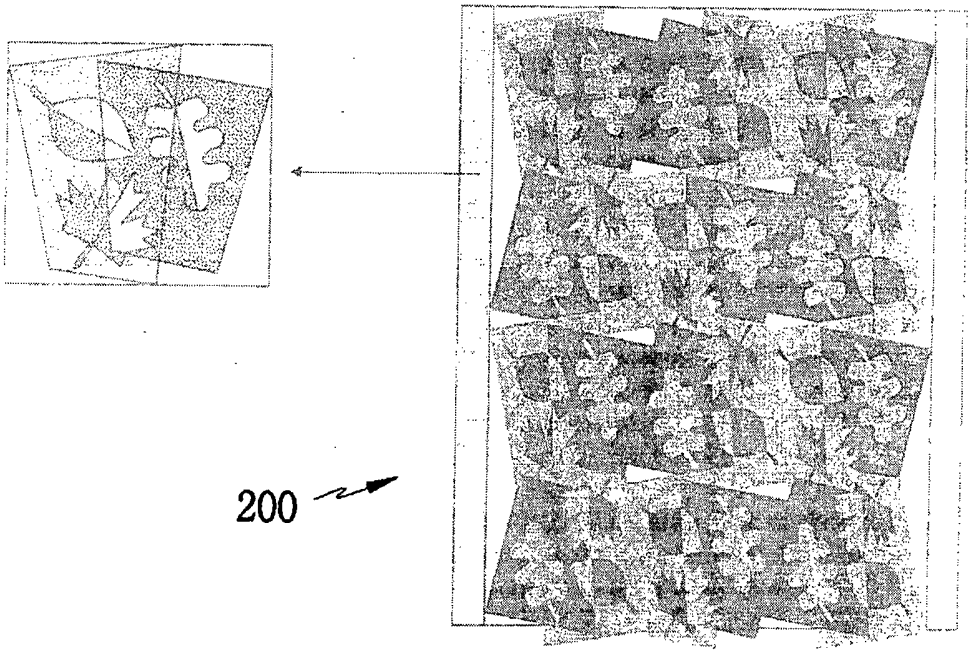


FIG 8e

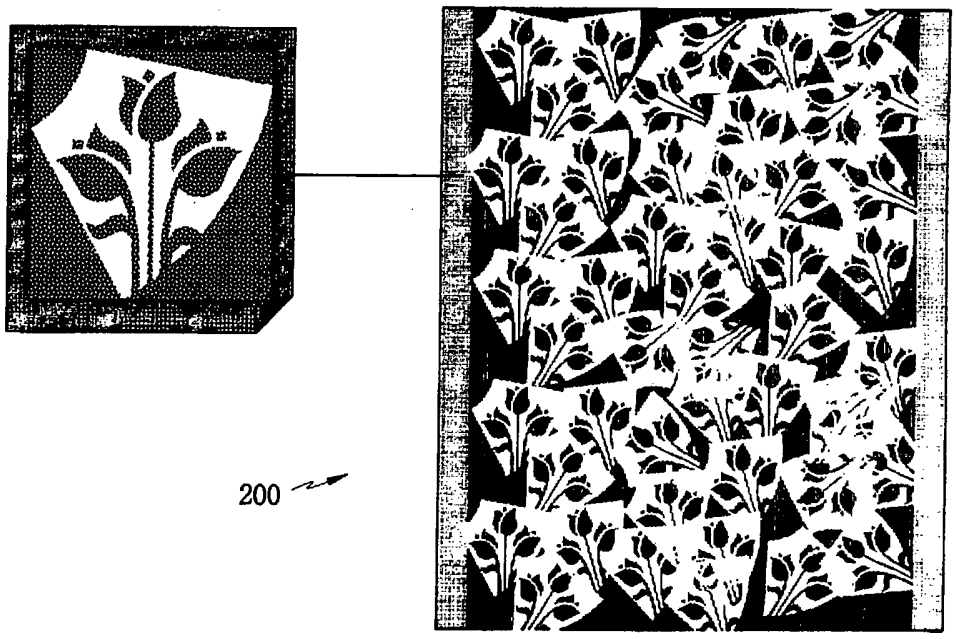


FIG 8f

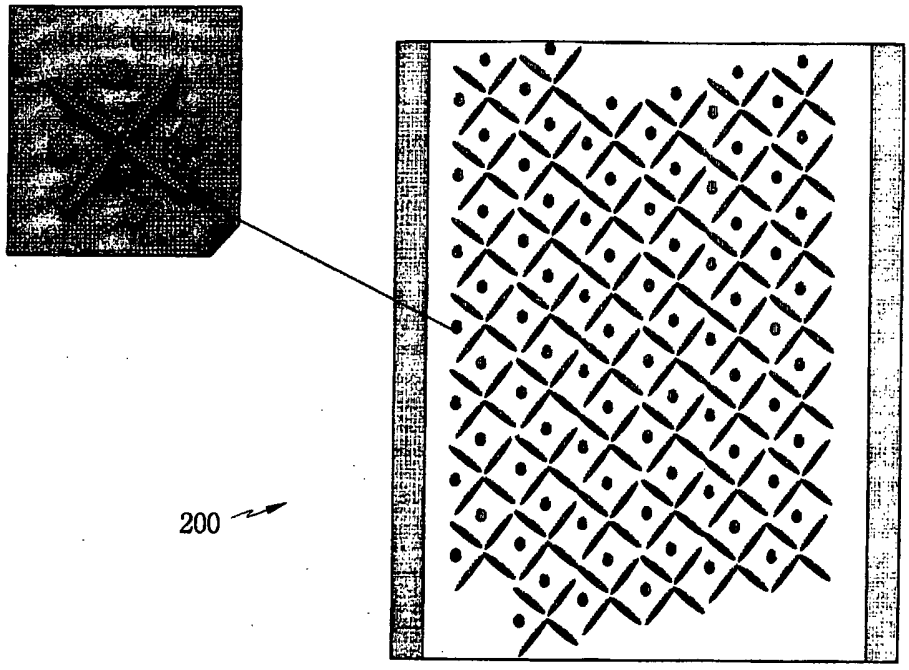
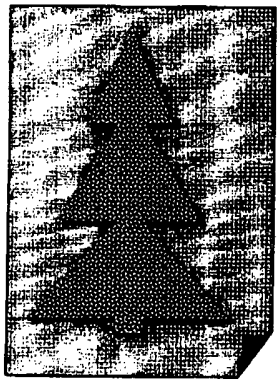


FIG 8g



200

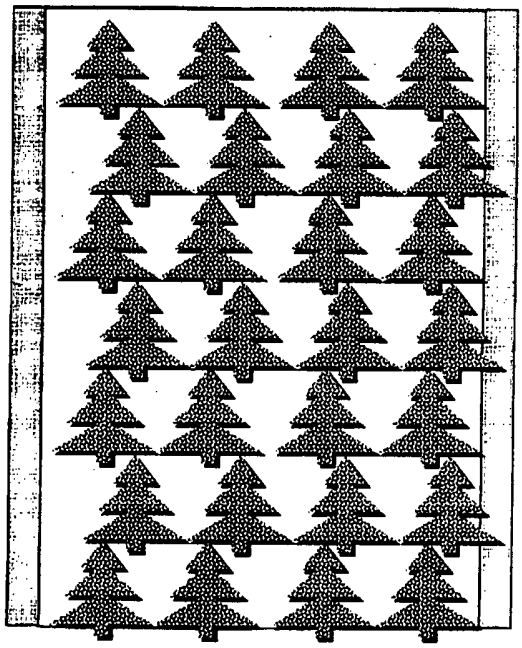


FIG 8h

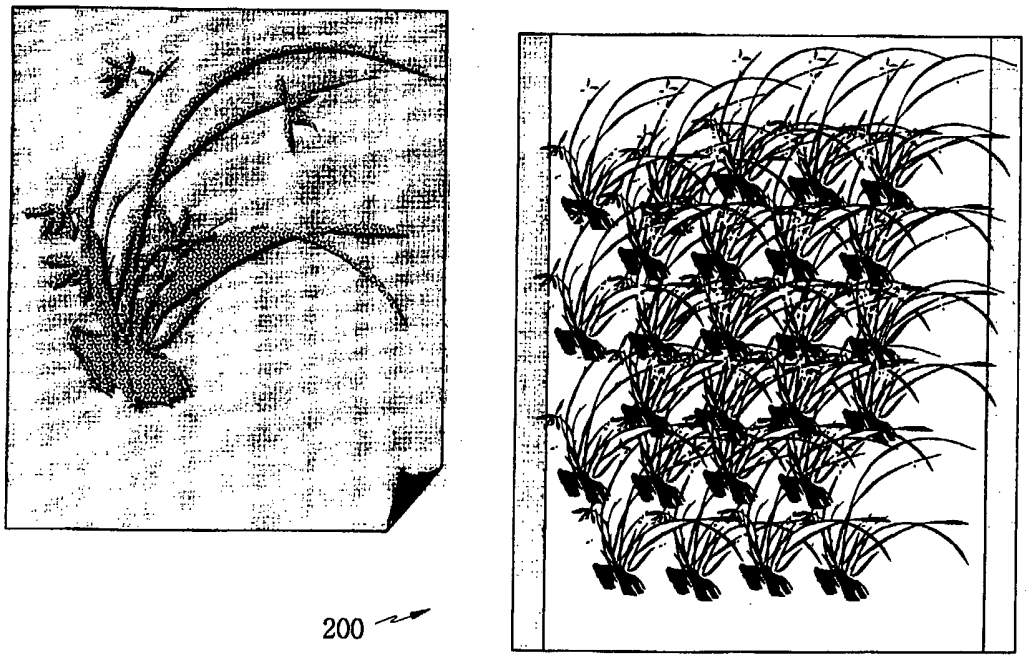


FIG 8i

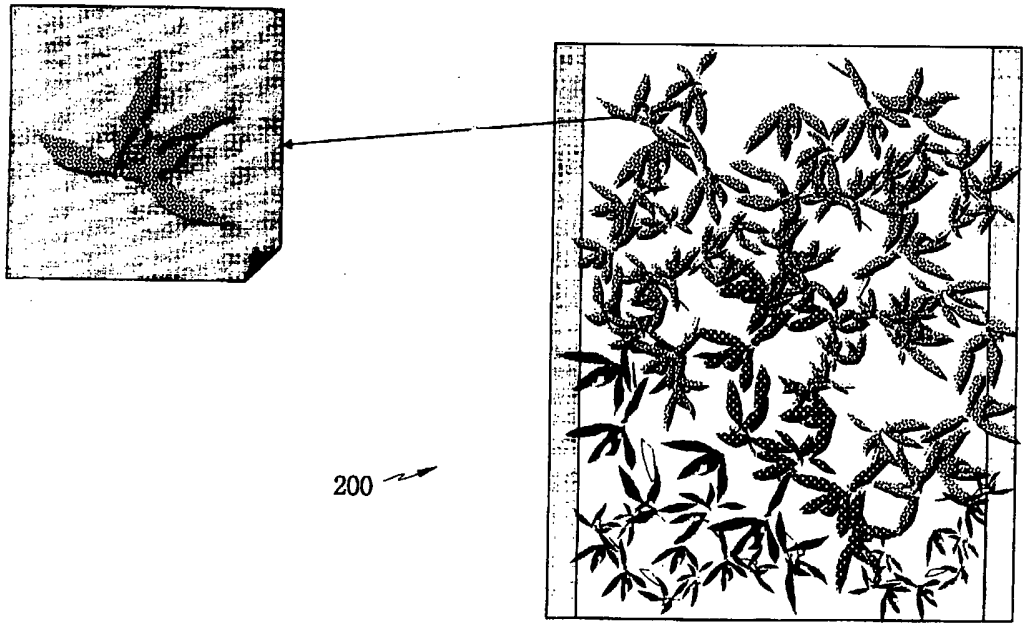


FIG 8j

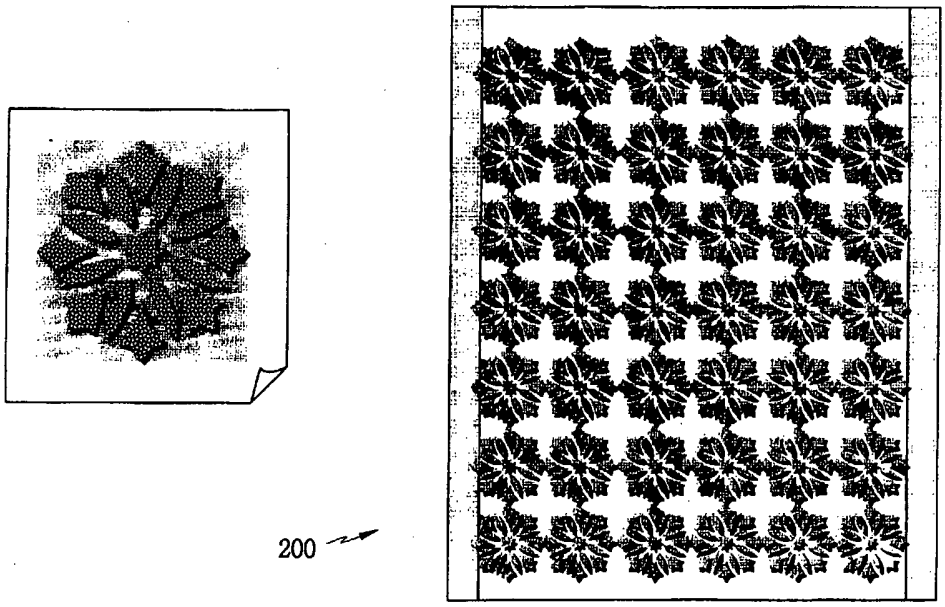


FIG 8k

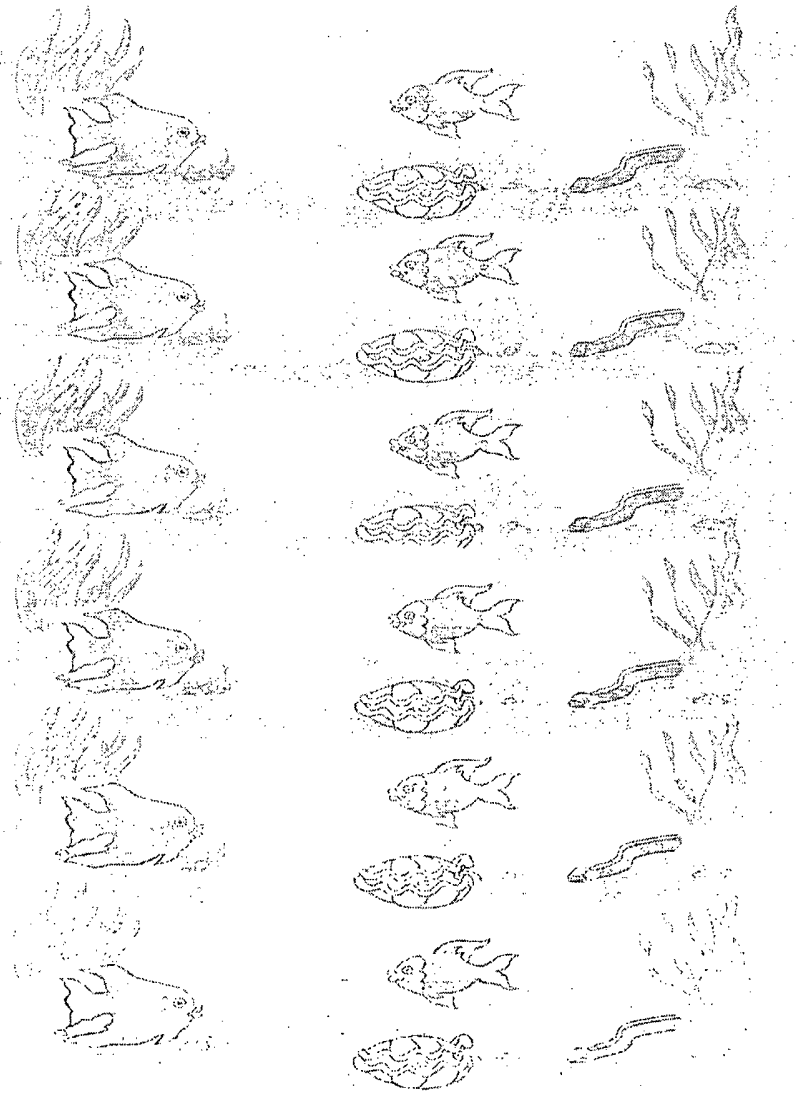


FIG 81

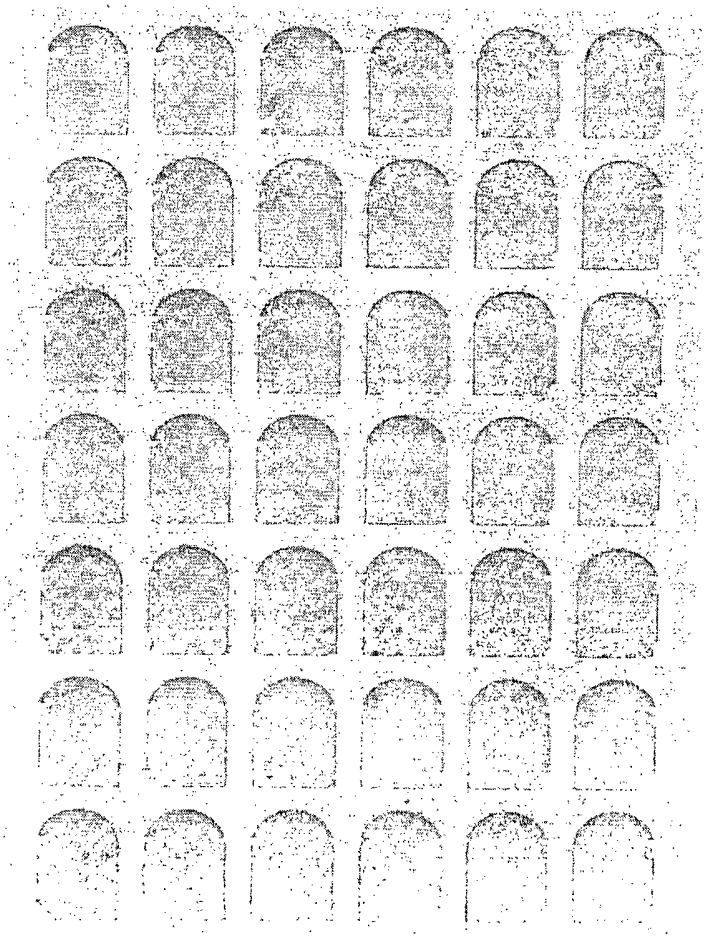


FIG 8m

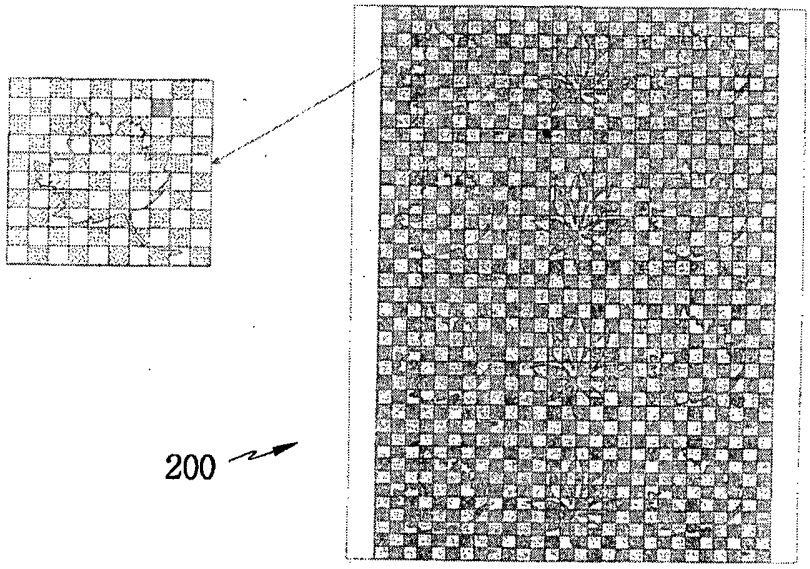


FIG 8n

FIG 8o

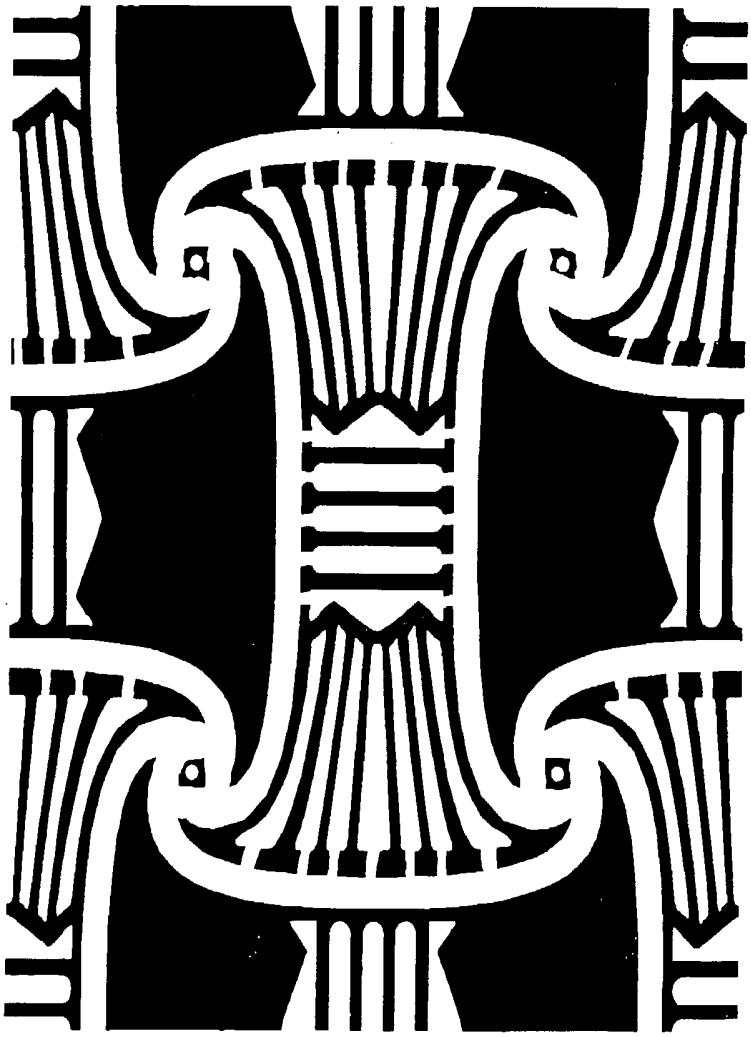


FIG 8p

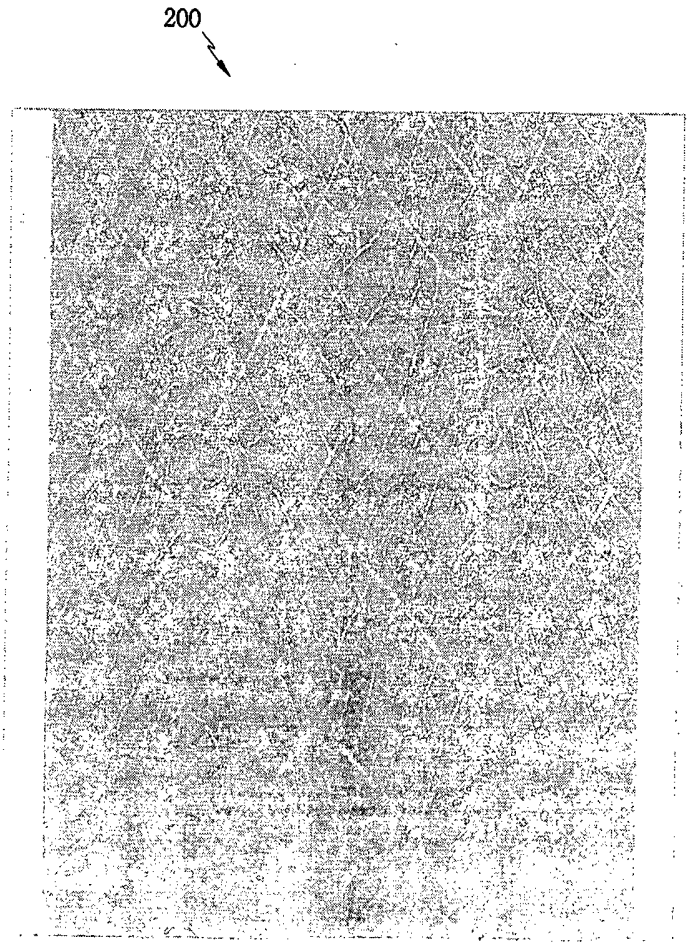


FIG 8q

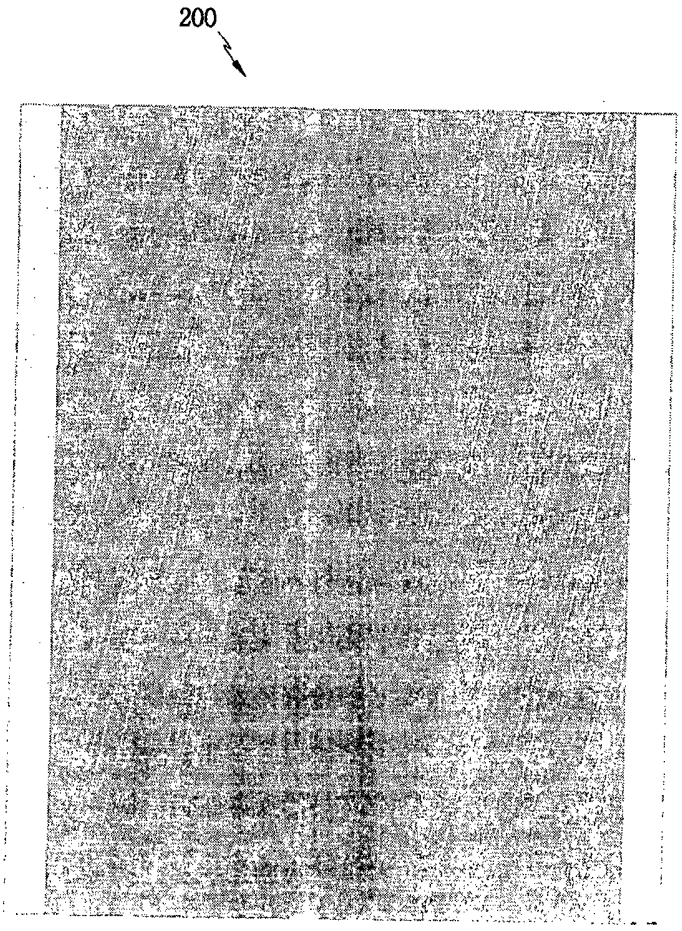


FIG 9

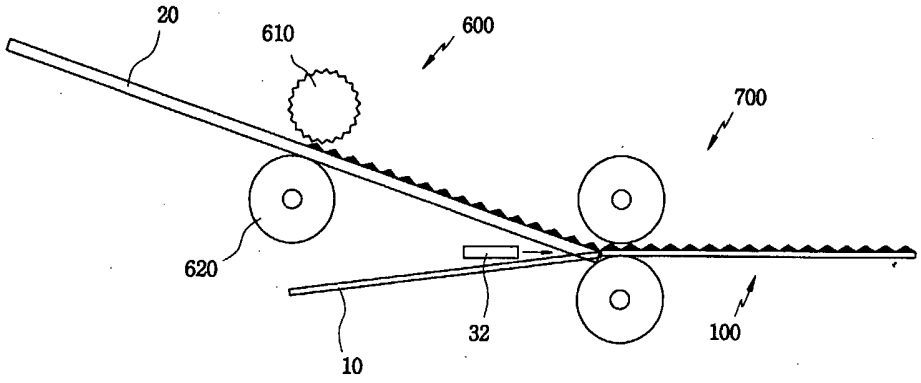
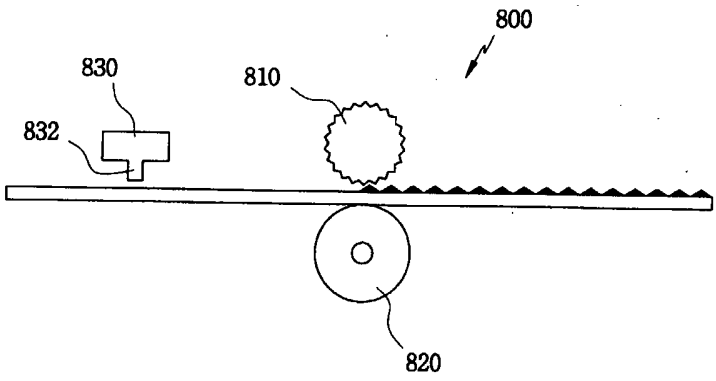


FIG 10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2003/001861

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 B65D 30/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D 30, B65D 33, B65D 35, B65D 37.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP : IPC as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,549,944 A (Luigi F. Abate) 27 AUGUST 1996 See the whole document.	1
A	US 2003/0136798 A1 (Michael Wilford) 24 JULY 2003 See the whole document.	1
A	US 2003/0155269 A1 (Kyul-Joo Lee) 21 AUGUST 2003 See the whole document.	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 APRIL 2004 (22.04.2004)	22 APRIL 2004 (22.04.2004)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

HAN, Deok Won

Telephone No. 82-42-481-5471

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2003/001861

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5,549,944 A	27-08-1996	SI 0648688 T1	29-02-2000
		JP 7251472 A2	03-10-1995
		IT BS930074 U1	13-04-1995
		EP 0648688 B1	12-08-1998
		DK 0648688 T3	17-05-1999
		CA 2118084 AA	14-04-1995
US 2003/0136798 A1	24-07-2003	NONE	
US 2003/0155269 A1	21-08-2003	WO 02074522 A1	26-09-2002
		WO 02066227 A1	29-08-2002
		TW 0530001 B	01-05-2003
		KR 2068468 A	27-08-2002
		CA 2443888 AA	26-09-2002