



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 396 427 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**10.03.2004 Bulletin 2004/11**

(51) Int Cl.7: **B65B 7/04**, B65B 61/24,  
B65B 51/14

(21) Application number: **03252496.9**

(22) Date of filing: **17.04.2003**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(72) Inventor: **Akaho, Masao**  
**Koshigaya-shi, Saitama-ken (JP)**

(74) Representative: **Franks, Robert Benjamin**  
**Franks & Co.,**  
**9 President Buildings,**  
**Saville Street East**  
**Sheffield S4 7UQ (GB)**

(30) Priority: **05.09.2002 JP 2002259533**

(71) Applicant: **Shinsei Co., Ltd.**  
**Koshigaya-shi, Saitama-ken (JP)**

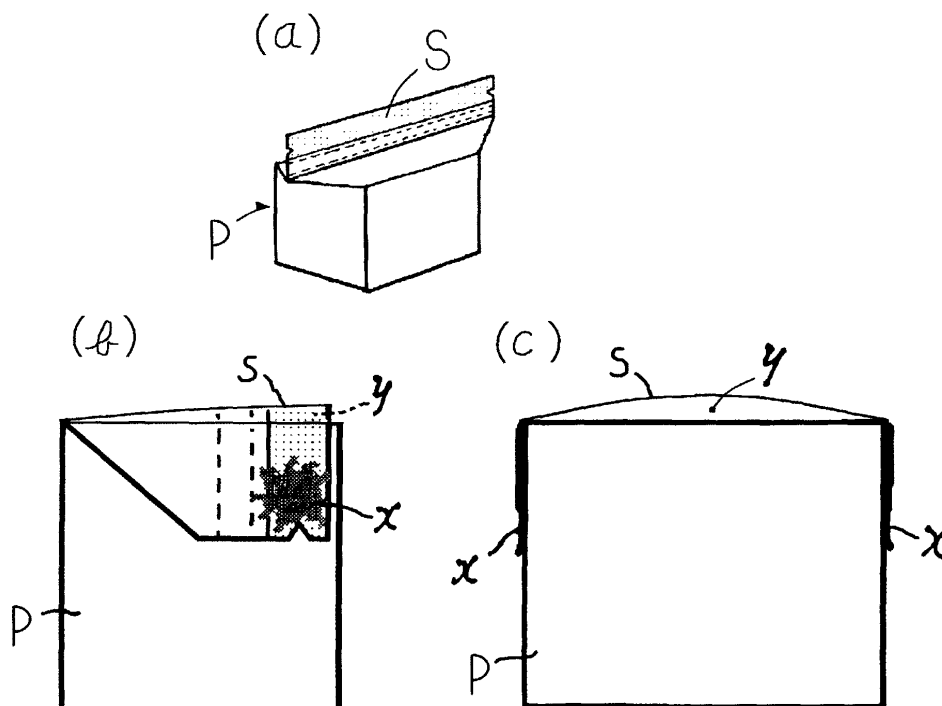
(54) **Method and apparatus for folding and bonding a closing seal part of box-shaped package**

(57) A method and apparatus for folding and bonding a closing seal part of a box-shaped package (1) comprising the steps and corresponding members of folding a strip-shaped closing part (1b) of the package on an intermittently running conveyor (2), preheating outer surfaces of the package beneath said both-side overhanging portions (1c) into semi-weldable state, folding

said overhanging portions (1c) along both outer sides of the package, pressing the folded strip-shaped closing seal portion against upper surface of the package without generating any gap therebetween and heat pressing the folded overhanging portions from outsides; and

folding said both-sided overhanging portions during transfer and just before the stop position for heat pressing from outside.

*Fig. 10*



## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

**[0001]** The present invention relates to a method for folding a closing seal part of the upper end of the box-shaped package along the package to bond, and relates to an apparatus thereof.

#### 2. Description of the Prior Art

**[0002]** Conventionally, the package of this type *P* is obtained as shown in Fig. 10(a), by butt-closing an upper opening into strip shape to form a heat seal *S* after filling with contents such as tea bags, folding down the heat seal to one side, and folding both-side overhanging portions along both outer sides of the package to weld them to the package by applying high heat and pressure from outside to melt insides thereof.

**[0003]** However, there is a problem that outer sides of the both-side overhanging portions are also melted, and wrinkles *x* in welding by applying high heat from outside of the folded overhanging portions as shown in Fig. 10(b). Also there is a problem that the folded strip-shaped closing seal part floats from upper surface of the package *P*, resulting in formation of a gap *y* between them, this detracts from a finished appearance as shown in Figs. 10(b), 10(c).

**[0004]** Furthermore, since both processes, one for folding the both-side folded overhanging portions along the outer sides of the package and the other for heat pressing the folded overhanging portions from outsides to weld insides thereof, are processes with passage of time therebetween and are not carried out simultaneously, it is required to carry out firstly the process for folding both-side folded overhanging portions along the outer sides of the package at one stop position, and secondly the process for heat pressing the folded overhanging portions from outside to weld insides thereof at the next stop. Therefore, guide rails to hold the folded overhanging portions from outsides are required as that the folded overhanging portions do not revert back during transfer. However there is a problem that thus folded overhanging portions along the sides of the package are crushed as shown in Fig. 11 by friction with the guide rails during transfer because they are not yet welded at this point.

**[0005]** In order to prevent this situation, it is necessary that folding member is transferred in synchronism with the transfer of a conveyor in stead of providing the guide rails. However, there is a problem that provision of such folding member as having a complex structure for the motions of folding, transferring and high-speed returning to the starting point takes quite bit of money and may cause the trouble in early stage.

**[0006]** Another means for solving the problems is to

carry out the folding process and the heat press process sequentially at one stop place. However two processes are carried out in a short stopping time, which result in difficulty in securing enough heat-pressing time for welding. Therefore, if the stopping time is set as long as enough to meet that needed for these two processes, there may be caused a problem that the efficiency in operation speed is not improved because of an unnecessarily long stopping time at other work positions.

### SUMMARY OF THE INVENTION

**[0007]** It is an object of the present invention to prevent any wrinkles from being caused by melting outer sides of both-side overhanging portions. To prevent any wrinkles, an upper opening part of a box-shaped package filled with a preset number of contents such as tea bags is butt-closed into a strip shape with overhanging portions on both sides to form a strip-shaped closing seal part for closing said package, said strip-shaped closing seal portion is folded down to one side, preheating is applied on part of outer sides of the package beneath said overhanging portions so that thus folded overhanging portions may be folded down along said outer sides preheated part of the package on an intermittently running conveyor by which motions of running for transfer and stopping for work are repeated.

**[0008]** Furthermore, it is an object of the present invention to be welded inside more firmly by heat pressing the folded overhanging portions from the outside without melting the outer sides of the overhanging portions in welding inside.

**[0009]** Furthermore, an object of the present invention is to prevent the finished appearance of the package from being damaged, which damage is caused by the strip-shaped closing seal part floating from the upper surface of the package *P* while producing a gap between them. To prevent this floating, the folded strip-shaped closing seal part is pressed against the upper surface of the package without any gap while inside welding.

**[0010]** Still furthermore, said folding of the overhanging portions is carried out during transfer of the package and just before the stop position for heat pressing the outsides thereof with the result that any kink due to friction with guide rails is not produced in long transfer, said guide rails being located at a position often the overhanging portions have been folded down.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0011]**

Fig. 1 is a perspective view of a box-shaped package placed on a conveyer before the contents such as tea bags are filled in;

Fig. 2 is a perspective view, a front view, a side view and a plan view respectively showing a state in that an opening of the package is butt closed and sealed

after the contents have been filled in;

Fig. 3 is a plan view of an apparatus of the present invention;

Fig. 4 is a view illustrating a working process, wherein the left shows running and stopping motions of the conveyor, the center shows a state where the conveyor is stopped, and the right shows a state where folding and bonding operation are carried out;

Fig. 5 is a side view showing a state where overhanging portions are held and supported by an upper holding bar and a lower supporting bar;

Fig. 6 is a fragmentary front view showing a state where side surfaces of the package are preheated with preheating members;

Fig. 7(a) is a fragmentary front view of the package positioned below folding members, and Fig. 7(b) is a fragmentary front view showing a state where the overhanging portions are folded along the package;

Fig. 8(a) is a fragmentary front view illustrating processes for pressing a strip-shaped part against the upper surface of the package by a pressing member and for welding insides with heat pressing members, and Fig. 8(b) is a side view of the same, which heat pressing members omitted;

Fig. 9 is a side view of the package after finish;

Fig. 10(a) is a perspective view of a conventional example before processing, Figs. 10(b), 10(c) are enlarged side and front views of a conventional example after finish respectively; and

Fig. 11 is a side view of the package showing a state where folded overhanging portions are crushed due to friction during transfer in a conventional example.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0012]** Referring first to Fig. 1, into a box-shaped package 1 made of heat-weldable synthetic resins etc, a preset number (such as 10) of contents such as tea bags *t* is filled sequentially, a closing seal part 1b is formed by butt-closing an upper opening 1a into a strip shape to weld it as shown in Fig. 2. These operations are carried out at each stop position on an intermittently running conveyor 2. Reference numeral 1c indicates overhanging portions projecting respectively horizontally beneath the closing seal part 1b. Reference numeral 1d indicates a zipper part for opening and closing the package 1.

**[0013]** Referring now to Figs. 3, 4, a preferred embodiment of an apparatus of the present invention comprises,

an upper holding bar 3 for folding down the closing seal part 1b standing upright with the overhanging portions 1c over said conveyor 2 and for stably supporting the package 1;

a pair of lower supporting bars 4a, 4b which prevent

the overhanging portions 1c from hanging down to both sides of the package;

two pairs of preheating members 5a, 5b which are disposed at above both sides of the conveyor 2 and are free to move back and forth facing to the both side surfaces 1e so as to preheat part of both said side surfaces 1e as shown in Fig. 3, 4 and 6;

a pair of folding members 6a, 6b which fold down the overhanging portions 1c along the both sides 1e of the package as shown in Figs. 3, 7;

a pair of guide rails 7a, 7b which suppress upheaval of the overhanging portions 1c as shown in Figs. 3, 4;

two pairs of heat pressing members 8a, 8b pressing and heating the folded overhanging portions 1c against the part preheated weldably on the side surfaces 1e of the package 1, said heat preheating members applying such a heat that close not to melt the outside surfaces of the overhanging portions 1c as shown in Figs. 3, 4 and 8(a);

a pressing member 9 pressing the closing seal part 1b which has been folded to one side without leaving any gap in contact with the upper surface of the package 1, said pressing member 9 being provided above the center of the conveyor 2 and at the same position as the first heating members 8a, 8b (the lowers in Fig. 3) ; and

a pair of cooling members 10a, 10b as shown in Fig. 4 to stimulate both stability and fixation in shape by cooling inside welded part while lowering the temperature thereof.

**[0014]** In addition, to minimize friction as low as possible, well-known materials such as fluorocarbon resin are used at contact surfaces of the members such as the folding members 6a, 6b and the guide rails 7a, 7b by which friction is produced.

**[0015]** Although, two pairs of preheating members 5a, 5b, two pair of heat pressing members 8a, 8b are provided in Figs. 3, 4, they may be of one or three pairs.

**[0016]** Each package 1 with the opening part 1b is placed on the conveyor 2 to be filled with contents and transferred intermittently. The closing seal part 1b is folded to press to one side after filling with the upper holding bar 3, and the backsides of the overhanging portions 1c are supported by the lower supporting bars 4a, 4b during transfer, this results in a stable shape thereof as shown Figs. 4 through 6. Part of both side surfaces 1e of the package are preheated into a weldable semi-melted state by the preheating members 5a, 5b which approach to the sides of the package at stop positions, then the package is released from the upper holding predetermined bar 3 and the lower supporting bars 4a, 4b during further transfer as shown in Figs. 4, 6. The overhanging portions 1c released from the lower supporting bars 4a, 4b are folded along the side surfaces 1e of the package 1 together with the folding members 6a, 6b which are arranged to move down just before the pack-

age 1 reaches the next stop position in transfer as shown in Figs. 4, 7(a), 7(b). Fig. 4 shows that, with upheaval of the overhanging portions 1c suppressed by the guide rails 7a, 7b, closing seal part 1b thus as shown in Figs. 8(a), 8(b) is pressed against the upper surface of package 1 without leaving any gap by a pressing member 9. Insides of the overhanging portions 1c is welded by the heat pressing members 8a, 8b advancing from outside through notches of the guide rails 7a, 7b to press the insides of the overhanging portions 1c against the opposite sides as semi-melted by preheating of side surfaces of the package 1. Then, with the preheated areas of the side surfaces 1e of the package kept in a semi-melted state, the overhanging portions 1c are welded onto the opposite surfaces 1e by the heat pressing members 8a, 8b more steadily without melting the outer surfaces of the overhanging portions. As above, folding and bonding processes are carried out as shown in Fig. 9 without producing any wrinkle on the surfaces of the overhanging portions due to welding and any floating of the closing seal part 1b.

[0017] In this apparatus mentioned above, though these processes such as the preheating by the preheating members 5a, 5b and the inside welding by the heat pressing members 8a, 8b are carried out at each stop position in intermittent running, only the folding process of the overhanging portions 1c by the folding members 6a, 6b is carried out while running and just before the inside welding process as described above. This results in that the next stop position(s) can be used so that the inside welding process by heat pressing, leading the welding inside process may be carried out steadily and with sufficient time. Execution of the folding process just before the heat pressing process prevents generation of any distortion such as a kink of the overhanging portions 1c due to friction which occurs during long distance of transfer on the conveyor in case where both processes are carried out at two distanced stop positions respectively, prevents occurrence of any mistake in inside welding process due to lack of time in case where the two processes are carried out at one stop position, and also prevents speed and efficiency from being reducing by increasing the stopping time to avoid these kind of mistakes. Additionally, this allows minimum stopping time in intermittent operation for firmly welding insides of the overhanging portions by heat pressing to be set.

[0018] According to the present invention, there arises such an advantage that folding of the both-side overhanging portions together with the strip-shaped closing seal part along such part of outer sides of the package that is semi-melted by preheating, prevents generations of any wrinkle on the outer sides of the packages due to application of high heat and pressure from outside.

[0019] Also, there arises such an advantage that in said inside welding process, pressing of the strip-shaped closing seal part against the upper surface of the package and folding the overhanging portions along outer sides of the package prevent generations of any

float of the upper surfaces of the package. Further, this allows the package of excellent appearance to be provided.

[0020] The folding process of the overhanging portion is carried out during transfer of the package just before the inside welding process by heat pressing and prevents generation of such kink on the overhanging portion, that is generated by friction during transfer. This assures the package to provide excellent appearance in the welding and forming processes, and improves the speed and efficiency without any unnecessary extension of stopping time in the whole working processes.

## Claims

1. A method for folding and bonding a closing seal part of a box-shaped package comprising the steps of,

placing the package made of heat-weldable synthetic resin on an intermittently running conveyor, with top end thereof being opened;  
filling a preset number of contents in the package on said conveyor sequentially;  
butt-welding an upper opening of thus filled package into a strip shape with overhanging portions on both sides to form a strip-shaped closing seal part with said overhanging portions;  
folding down said strip-shaped closing seal portion to one side;  
preheating outer sides of said package beneath said both-side overhanging portions; and  
folding said both-side overhanging portions along said preheated areas on outer sides of the package to weld inside of said overhanging portions onto the outer surfaces of said package.

2. A method as set forth in Claim 1, wherein said both-side overhanging portions are folded against the outer sides of said package and then heat-pressed from outsides of said overhanging portions to weld insides of said overhanging portions onto the outer sides of said package.

3. A method as set forth in Claim 1 or 2, wherein said folded strip-shaped closing seal part on upper part of said package is pressed against the upper surface of said box-shaped package without any gap and said both-side overhanging portions are folded against outer sides of said package to weld insides thereof.

4. A method as set forth in any one of Claims 1 to 3, wherein each process starting with filling of the contents except for the process for folding said both-side overhanging portions along said preheated ar-

eas of the outer sides of the package is carried out during rests of intermittent operation, said filling process being carried out just before intermittent stopping of the conveyer to heat press the overhanging portions from outside at the first.

5

5. An apparatus for folding and bonding a closing seal part of a box-shaped package comprising,

an intermittently running conveyor for transferring the package made of heat-weldable synthetic resin and placed thereon;

10

means for forming a strip-shaped closing seal part with overhanging portions on both sides by butt-closing an upper opening of said package;

15

means for folding said closing seal part to one side;

means for preheating outer sides of said package beneath said both-side overhanging portions; and

20

means for folding said both-side overhanging portions onto the preheated areas on outer sides of said package to weld insides of said overhanging portions to outer sides of said package.

25

6. An apparatus as set forth in Claim 5, comprising means for heat pressing said both-side folded overhanging portions onto outer sides of said package to weld insides of said portions.

30

7. An apparatus as set forth in Claim 5 or 6, comprising means for pressing said folded strip-shaped closing seal part of said package against upper surface of said package without generating any gap.

35

8. An apparatus as set forth in any one of Claims 5 through 7, wherein said means for folding said both-sided overhanging portions along outer sides of said package is operated in a travel section on the conveyor and just before the process for heat pressing said both side folded overhanging portions from outside at the first.

40

45

50

55

Fig. 1

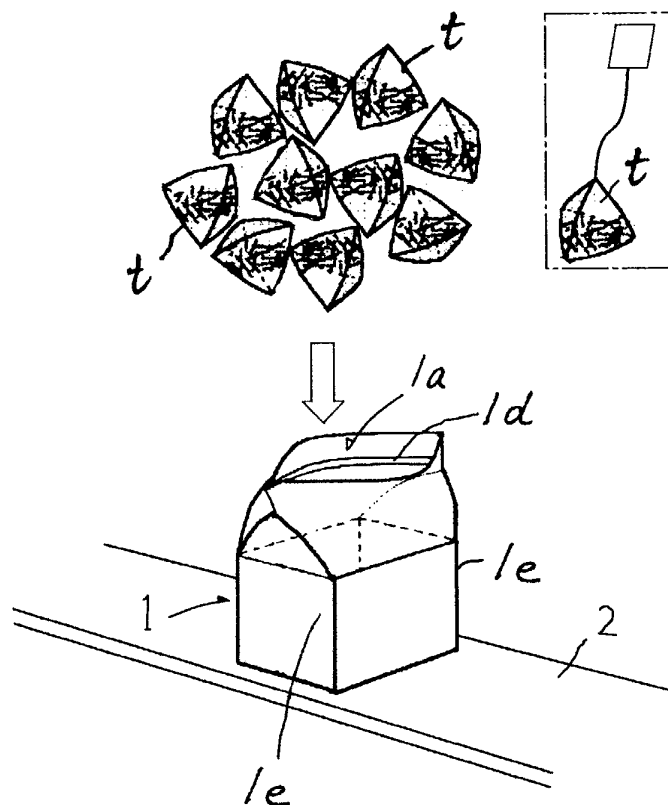
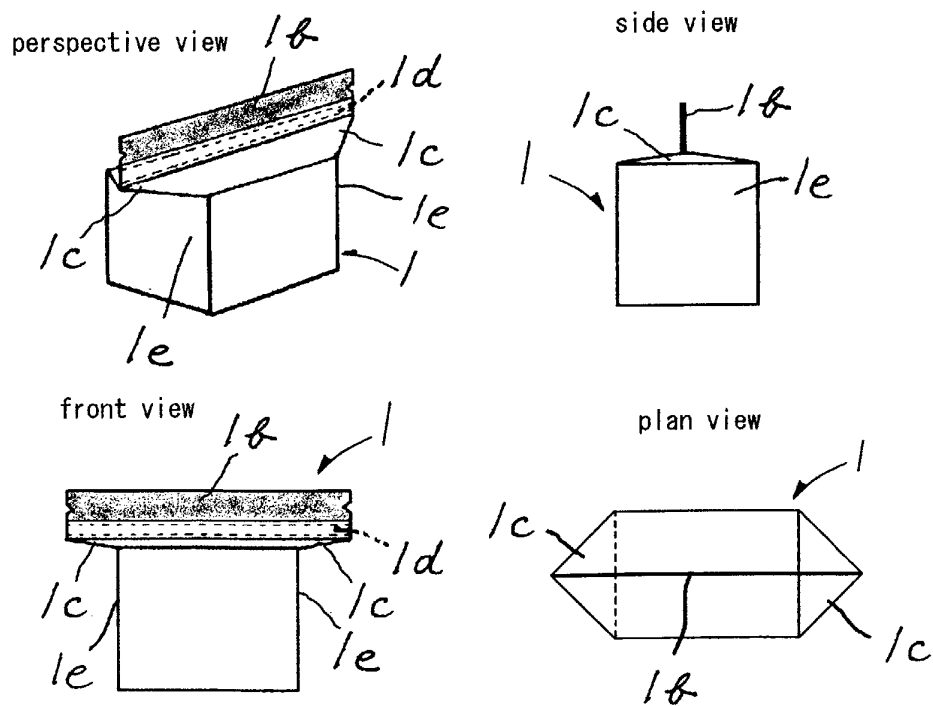
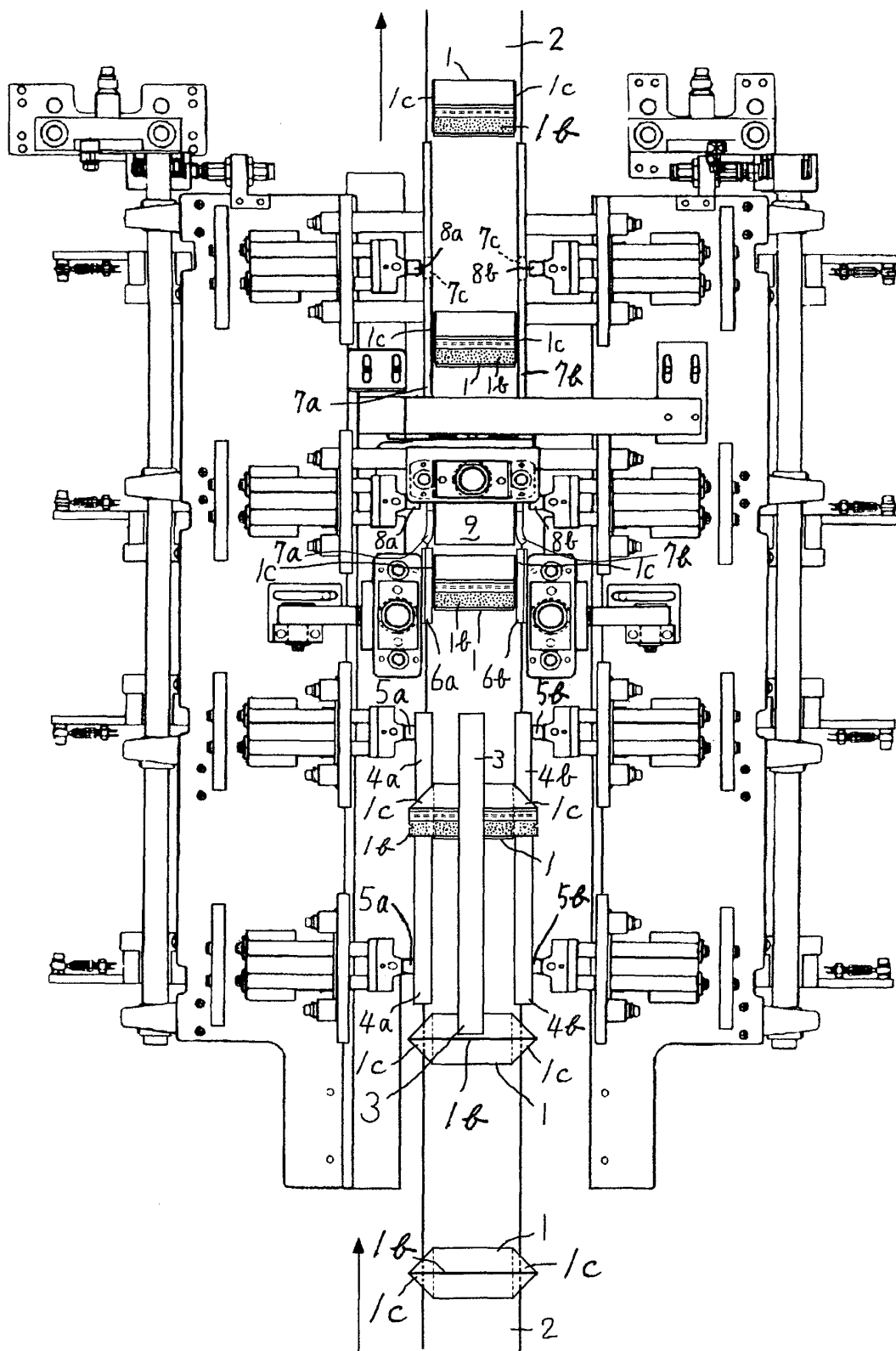


Fig. 2



*Fig. 3*



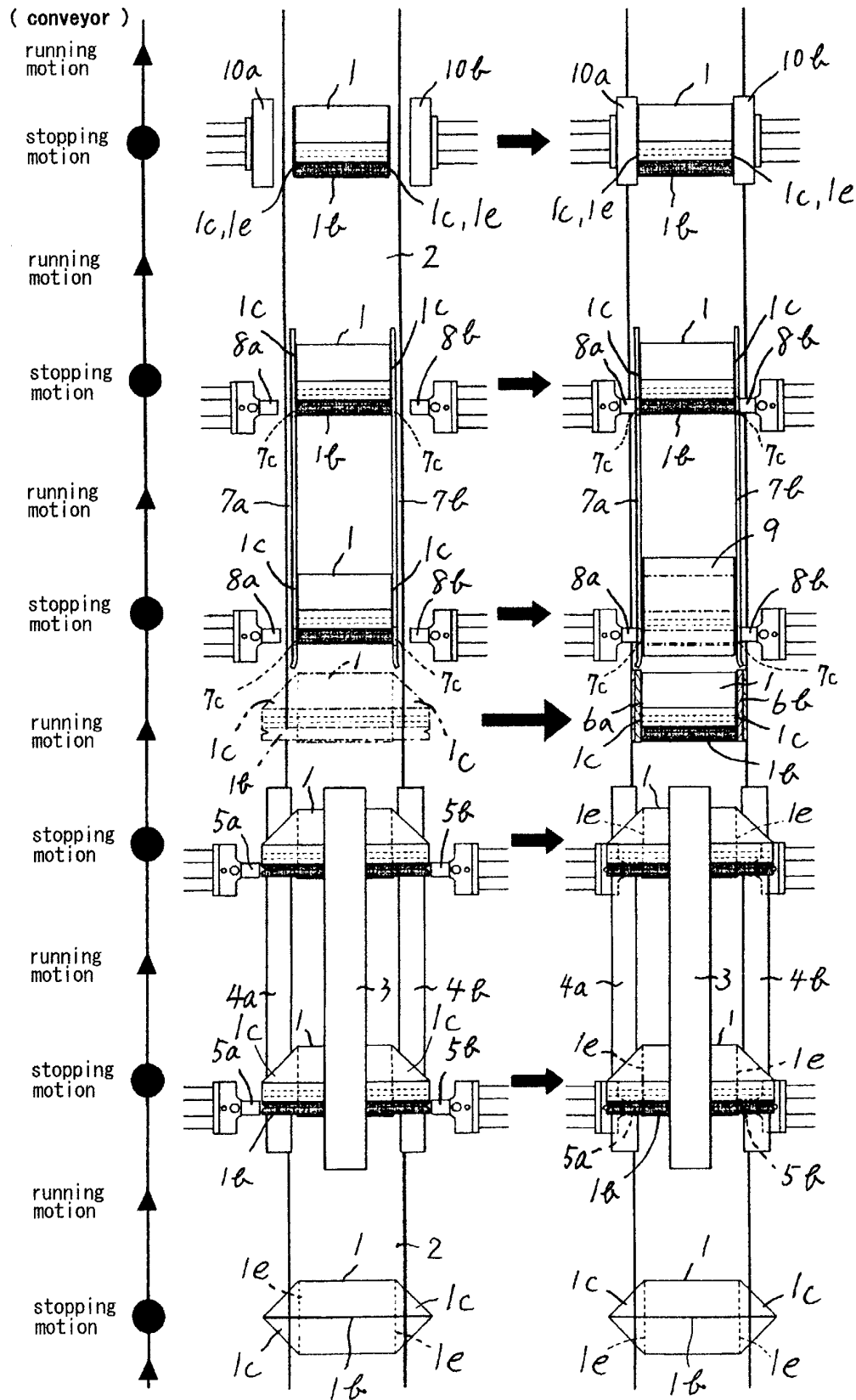
*Fig. 4*

Fig. 5

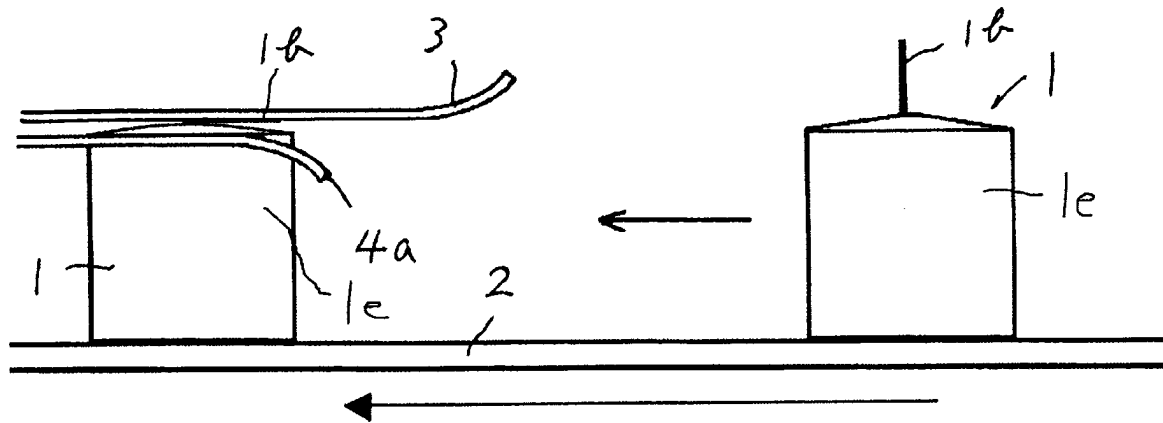


Fig. 6

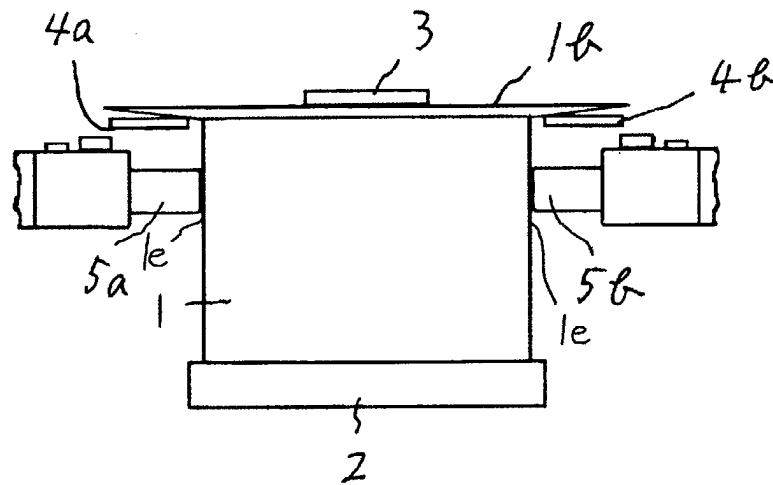


Fig. 7

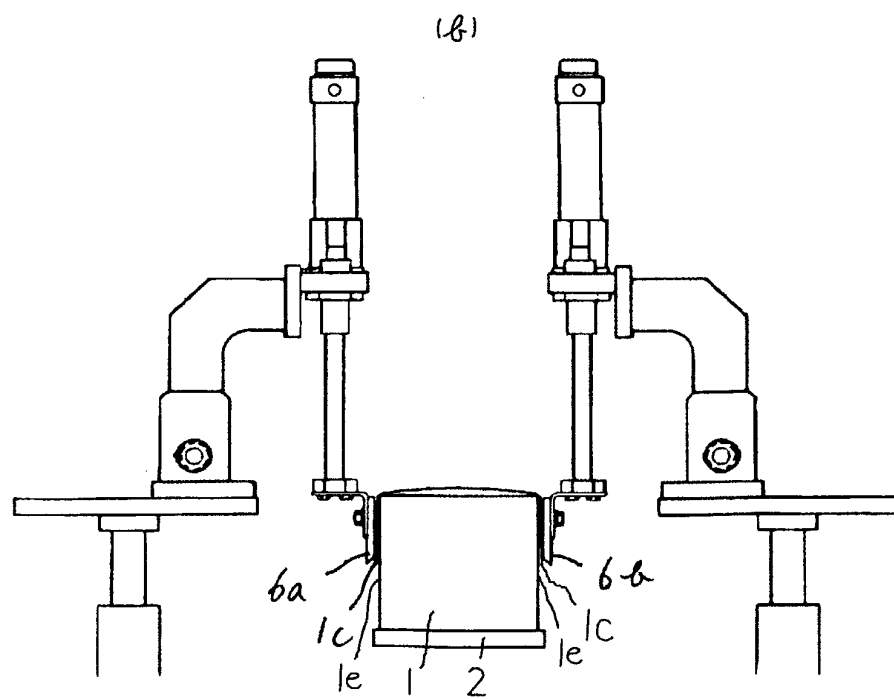
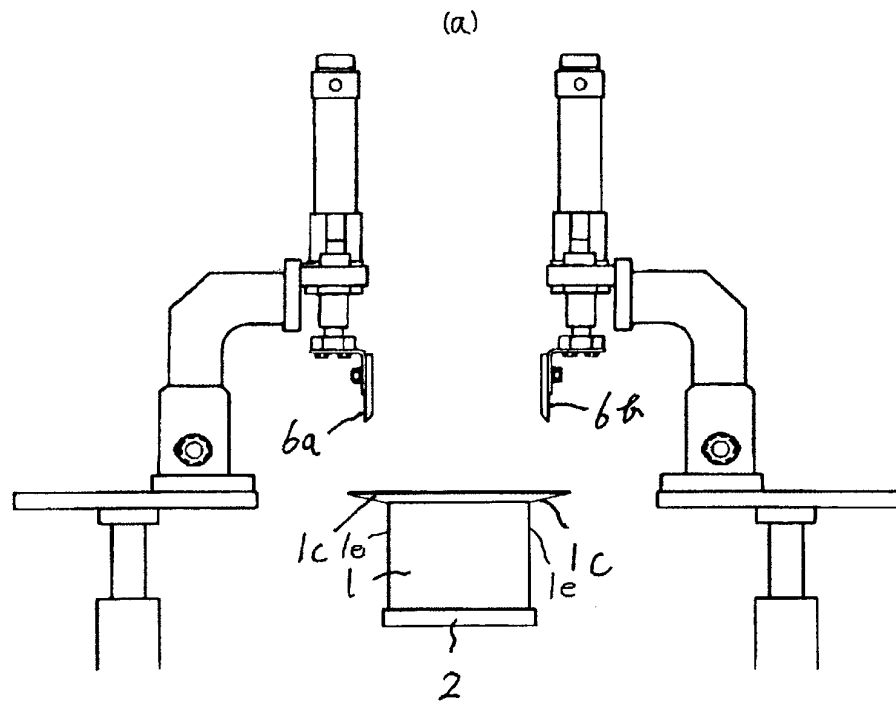


Fig. 8

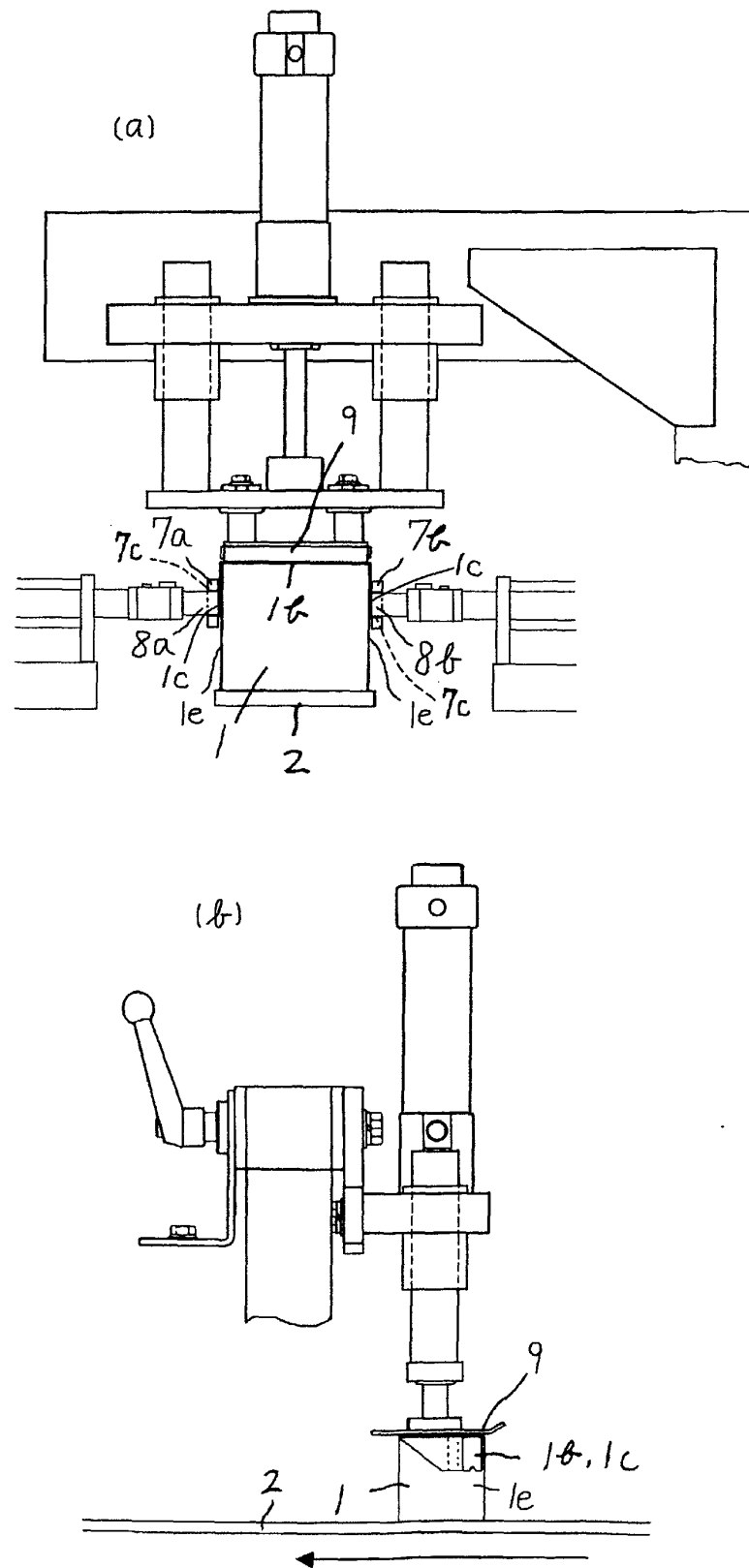


Fig. 9

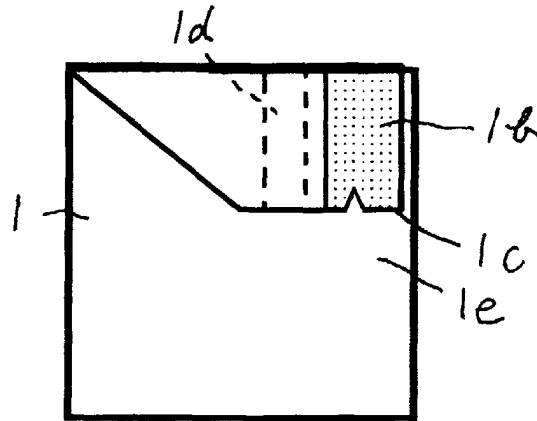


Fig. 10

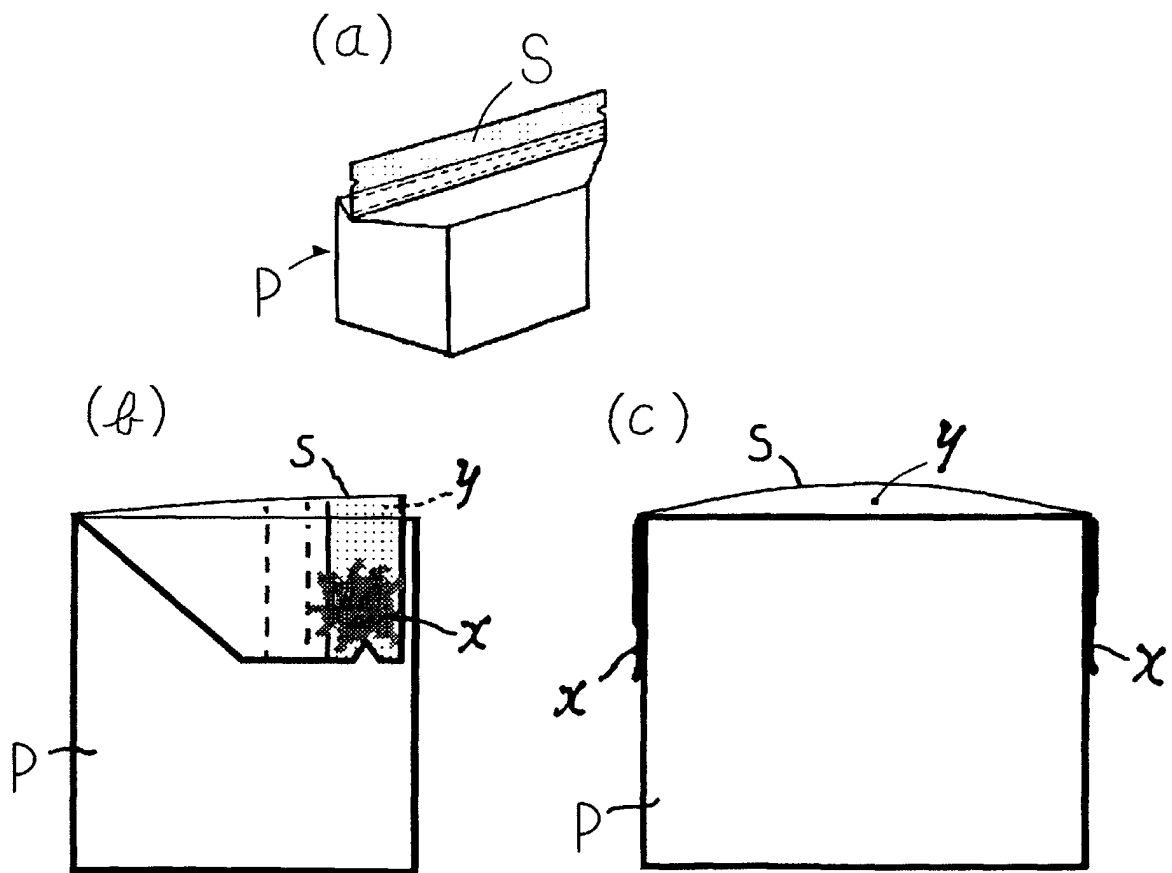
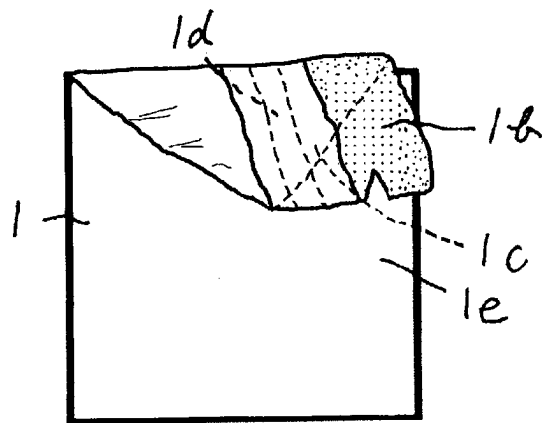


Fig. 11





European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 03 25 2496

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                  |                                                      |                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                                    | Relevant to claim                                    | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FR 1 470 670 A (TEPAR AG)<br>24 February 1967 (1967-02-24)<br>* page 2, left-hand column, line 40 - page 3, left-hand column, line 42; figures 1,3,6,8,9 *                       | 1,5                                                  | B65B7/04<br>B65B61/24<br>B65B51/14           |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EP 1 145 961 A (SHIKOKU KAKOKI CO LTD)<br>17 October 2001 (2001-10-17)<br>* paragraph '0005! - paragraph '0009! *<br>* paragraph '0026! - paragraph '0035!;<br>figures 1,5,6,8 * | 1,5                                                  |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | JP 61 081905 A (DAINIPPON PRINTING CO LTD)<br>25 April 1986 (1986-04-25)<br>* the whole document *                                                                               | 1,5                                                  |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 6 226 964 B1 (VETTORATO NATALE)<br>8 May 2001 (2001-05-08)<br>* column 2, line 57 - column 3, line 35;<br>figures 6-13 *                                                      | 1                                                    |                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                  |                                                      | TECHNICAL FIELDS SEARCHED (Int.Cl.7)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                  |                                                      | B65B<br>B65D                                 |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                  |                                                      |                                              |
| Place of search<br>THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                  | Date of completion of the search<br>19 November 2003 | Examiner<br>Vigilante, M                     |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                                                  |                                                      |                                              |

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 25 2496

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-11-2003

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| FR 1470670                                | A  | 24-02-1967          | NONE                       |                     |
| EP 1145961                                | A  | 17-10-2001          | JP 2001293797 A            | 23-10-2001          |
|                                           |    |                     | CN 1318494 A               | 24-10-2001          |
|                                           |    |                     | EP 1145961 A1              | 17-10-2001          |
|                                           |    |                     | US 2001029721 A1           | 18-10-2001          |
| JP 61081905                               | A  | 25-04-1986          | JP 2544596 B2              | 16-10-1996          |
| US 6226964                                | B1 | 08-05-2001          | IT B0960550 A1             | 30-04-1998          |
|                                           |    |                     | AU 4470297 A               | 22-05-1998          |
|                                           |    |                     | EP 1007408 A1              | 14-06-2000          |
|                                           |    |                     | WO 9818674 A1              | 07-05-1998          |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82