



(11) **EP 1 886 922 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.02.2008 Bulletin 2008/07

(51) Int Cl.:
B65B 35/58 (2006.01)

(21) Application number: **06425579.7**

(22) Date of filing: **08.08.2006**

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

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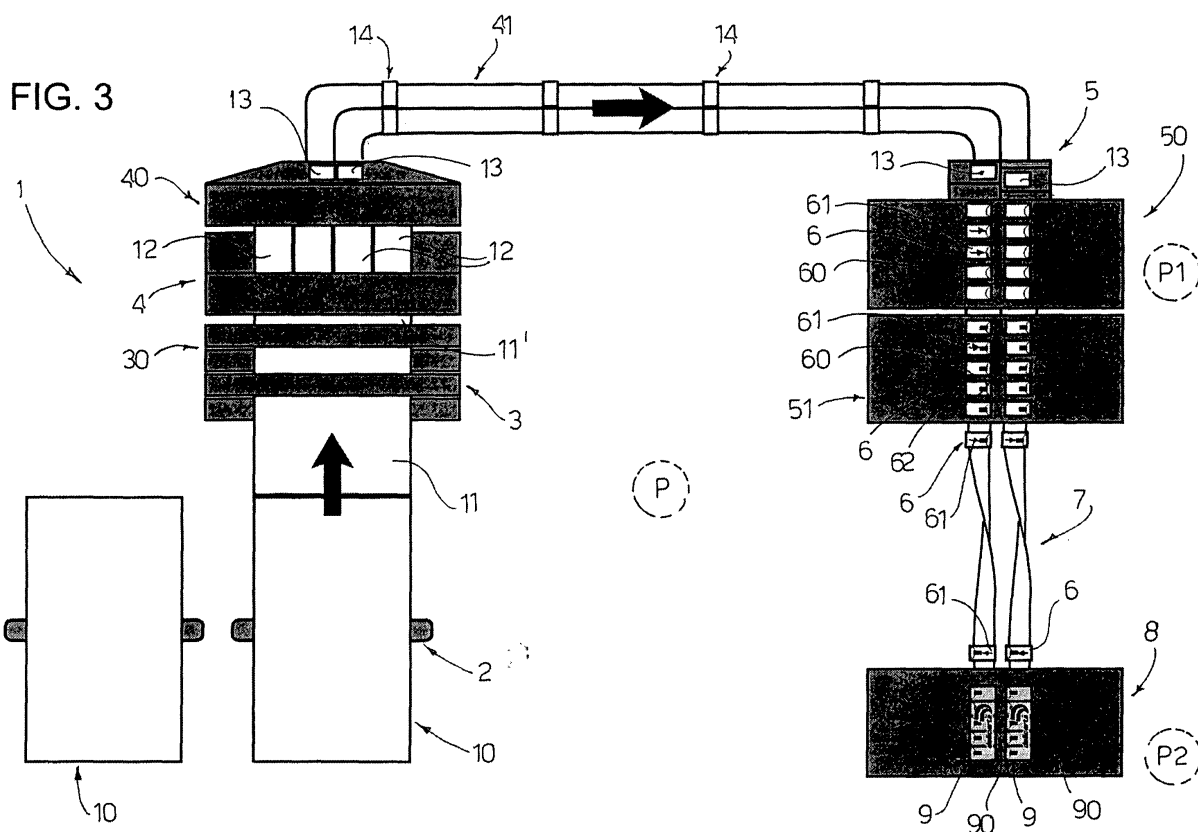
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(54) **System and method for packing paper handkerchiefs and relative pack**

(57) A system (1) is described for packing paper handkerchiefs comprising at least one transfer track (41) whereon the paper handkerchiefs (13) are made to advance, folded and possibly piled in stacks (14), a packaging unit (5, 50, 51) adapted to form packets (6) of paper handkerchiefs (13), a packing unit (8) adapted to form

packs (9) of packets (6) of paper handkerchiefs (13) grouped in blocks, and a tipping device (7) disposed between said packaging unit (5, 50, 51) and said packing unit (8) to turn the packets of handkerchiefs (6) 180°, so as to reverse the orientation (61) of the images and/or writing on the packet (6) of handkerchiefs.



Description

[0001] The present invention refers to a system and a method for packing paper handkerchiefs and a relative packet of paper handkerchiefs.

[0002] As is known, individual paper handkerchiefs are obtained starting from a substantially rectangular or square sheet of multilayer paper which is folded longitudinally and transversally so as to take on a substantially rectangular shape with superimposed layers. The folded handkerchiefs are piled so as to form a stack, for example of 10 handkerchiefs.

[0003] The stack of handkerchiefs is packaged, by means of a printed polyethylene sheet, so as to form a single packet. The packet has an easy-open opening in the upper part (top) thereof. Therefore, the printing on the sheet of polyethylene of the pack is oriented from the bottom towards the top of the packet.

[0004] The packets of handkerchiefs are grouped and compressed in groups, of 5 x 6 packets, for example, so as to form a parallelepiped shaped block. Each block of packets of handkerchiefs is wrapped, by means of a printed polyethylene sheet, so as to form a parallelepiped shaped pack, like that illustrated in Figure 1 and denoted by reference numeral 109.

[0005] The pack 109 is closed by means of heat sealing of the terminal edges of the polyethylene sheet on one side 190 of the package, which corresponds to the top 66 of the packets 6. It must be considered that, when the pack 109 is placed on a surface for display, its upper face corresponds to the heat sealed side 190. Thus, the face 190 destined to face upwards, being heat sealed, cannot have printed writing or images. Therefore, the printed images or writing 194 visible to the consumer can be displayed only on the two side faces 193 of the pack 109, since the other two side faces have heat seals.

[0006] However, for advertising reasons, the market requires packs which, when they are displayed, have the largest printed surface visible to consumers.

[0007] A simple solution to this problem would be to turn the package 109 upside down, to exploit also the visibility of the bottom surface of the pack. However, in this case the writing 194 on the side faces of the pack would be upside down and would become illegible, which would be unacceptable for the consumer.

[0008] To overcome this drawback at least in part, the direction of unwinding of the roll of printed polyethylene sheet which forms the pack could be reversed. As a result a pack 209, like that illustrated in Figure 2, is obtained. In this case, the heat sealed side of the pack 209 is disposed on the supporting surface, thus the upper face 291 of the pack 209 can have printed images or writing 292 visible to the consumer. Furthermore, the writing 294 on the side faces 293 is correctly oriented.

[0009] However, it must be considered that when the pack 209 is placed on a supporting surface, the top of the packets faces downwards. As a result, the images printed on the packets are upside down. Since the sheet

of the pack 209 is partly transparent, the consumer sees the images on the packets 6 upside down with respect to the images 294 on the side faces 293 of the pack 209. Therefore, this type of pack 209 also proves unacceptable for distribution and for the end consumer.

[0010] The object of the present invention is to overcome the drawbacks of the prior art, providing a system and a method for packing paper handkerchiefs that are practical, versatile and suitable to be adapted simply and cheaply to existing handkerchief packing machines.

[0011] This object is achieved according to the invention with the characteristics listed in appended independent claims 1 and 9.

[0012] Another object of the present invention is to provide such a pack for a block of packets of paper handkerchiefs that has the largest printed surface displayed to the consumer whilst at the same time the packets of handkerchiefs are correctly oriented inside the pack.

[0013] This object is achieved according to the invention with the characteristics listed in appended independent claim 13.

[0014] Advantageous embodiments of the invention are apparent from the dependent claims.

[0015] The system for packing paper handkerchiefs according to the invention comprises:

- at least one transfer track whereon the paper handkerchiefs folded and possibly piled in stacks are made to advance,
- a packaging unit adapted to form packets of paper handkerchiefs,
- a packing unit adapted to form packs of packets of paper handkerchiefs grouped in blocks, and
- a tipping device disposed between said packaging unit and said packing unit to turn the packets of handkerchiefs 180° so as to reverse the orientation of the images and/or writing printed on the packet of handkerchiefs.

[0016] In this manner a pack of paper handkerchiefs comprising a block of packets of paper handkerchiefs wrapped with a printed polyethylene sheet is obtained wherein:

- the bottom face of the pack destined to rest on a surface, has the heat sealed end edges,
- the side faces of the pack have printed images and/or writing which are correctly oriented, when the heat sealed bottom surface of the pack is placed on a supporting surface,
- the upper face of the pack has printed images and/or writing, and
- the packets are disposed in the pack so as to have printed images and/or writing oriented with the same orientation as the writing and/or images printed on the side surfaces of the pack.

[0017] Further characteristics of the invention will be

made clearer by the detailed description that follows, referring to a purely exemplifying and therefore non-limiting embodiment thereof, illustrated in the appended drawings, in which:

Figures 1 and 2 are two diagrammatic perspective views showing two packs of packets of paper handkerchiefs according to the prior art;

Figure 3 is a diagrammatic plan view showing the layout of a system for packing paper handkerchiefs according to the invention;

Figure 4 is a perspective view of a tipping device for packets of paper handkerchiefs according to the invention; and

Figure 5 is a diagrammatic perspective view showing a pack of packets of paper handkerchiefs according to the invention.

[0018] The system for packing paper handkerchiefs according to the invention, denoted as a whole with reference numeral 1, is described with reference for now to Figure 3.

[0019] The system 1 comprises an unwinding unit 2 having a mandrel whereon is mounted the master roll 10 on which a paper web 11 is wound. The paper web 11 unwound from the master roll 10 is sent towards a calendering unit and an embossing roller unit 30, so as to obtain a multilayer embossed web 11'. The paper web 11 coming from the master roll 10 can already be a multilayer web, or alternatively coupling of a plurality of layers can take place in the calendering unit 3 and/or in the embossing unit 30.

[0020] The multilayer embossed web 11' is sent to a slitting unit 4 which performs lengthwise and crosswise slitting of the embossed web 11', so as to obtain handkerchiefs 12 with a substantially rectangular or square shape. The handkerchiefs 12 are sent to a folding machine 40 which is responsible for folding them, for example first into three longitudinal superimposed flaps and then into four superimposed transverse flaps, so as to obtain folded paper handkerchiefs 13.

[0021] The folded handkerchiefs 13 are piled so as to form stacks 14 of a certain number of handkerchiefs and the stacks 14 are made to advance on a double transfer track 41. The transfer track 41 follows a substantially U-shaped course and ends in a packaging device 5 which comprises a cell wheel 5 inserted in a packing machine 50 which is responsible for packing the individual packets 6 of paper handkerchiefs.

[0022] The cell wheel 5 picks up the individual stacks 14 by means of its cells, cuts a printed polyethylene film fed from a roll and performs heat sealing of the end flaps of the sheet of polyethylene to form the packet 6.

[0023] It must be considered that various cut-outs shaped as an arc of circumference are made in a suitable position on the printed polyethylene film. Therefore, when the printed polyethylene film is cut from the cell wheel 5, the cut-out is disposed so as to form an opening 60, for

example of the easy open type, on the top of each packet 6, to allow removal of the handkerchiefs 13. It should be noted that the wrapping of individual packet 6 has printed images and/or writing oriented in the direction of the arrow 61, that is from the bottom toward the top of the packet.

[0024] Downstream of the packing machine 50 there is a labelling machine 51 which is responsible for affixing adhesive labels 62 at the opening 60 of each packet 6. The adhesive label 62 has a removable type adhesive, per se known, to allow successive opening and closing of the label 62.

[0025] The formed packets 6 leaving the labelling machine 51 are sent to a tipping device 7 adapted to turn the packets 6, that is to rotate the packets 6 180°, so as to reverse the direction 61 of the images and/or writing printed on the packet.

[0026] As shown in Figure 4, the tipping device 7 comprises a frame 70, provided with two side members whereon are mounted rotatably a first pair of shafts 71, 72 and a second pair of shafts 71' and 72'.

[0027] The shafts 71, 72 of the first pair are disposed transversally one on top of the other. The shafts of the second pair 71', 72' are disposed transversally one on top of the other and spaced from the shafts of the first pair in the direction of travel of the packets 6. The shafts 71', 72' of the second pair are set in rotation by respective motor means 73 and 74 mounted on the side members of the frame 70. The motors 73 and 74 are synchronized to turn at the same speed.

[0028] Clearly a single motor means that sets in rotation one shaft of the second pair and suitable transmission means, such as gears, chains, belts and the like, which transmit the rotary movement to the other shaft of the second pair can be provided.

[0029] On each shaft 71, 72, 71' and 72' are mounted respectively two pulleys 71A, 71B, 72A, 72B, 71A', 71B', 72A', 72B'. The pulleys 71A, 71B, 72A, 72B, of the shafts 71, 72 of the first pair of shafts are aligned with respective pulleys 71A', 71B', 72A', 72B' of the second pair of shafts. Between the pulleys 71A, 71B, 71A', 71B' of the top shafts 71, 71' and the respective pulleys 72A, 72B, 72A', 72B' of the bottom shafts sufficient space is left to allow the passage of a packet 6, so that the packet 6 is compressed between the two pulleys.

[0030] A first endless belt 75 is mounted between the pulley 71B of the top shaft of the first pair and the pulley 72B' of the bottom shaft of the second pair of shafts. The first belt 75 is mounted on the pulleys 71 B, 72B' with a torsion of 180°.

[0031] Similarly a second endless belt 76 is mounted between the pulley 72B of the bottom shaft of the first pair and the pulley 71 B' of the top shaft of the second pair of shafts. The second belt 76 is also mounted on the pulleys 72B, 71B' with a torsion of 180°.

[0032] In this manner the first belt 75 and the second belt 76 define:

- in a first portion, a horizontal plane of travel of the packets 6,
- in an intermediate portion, a rotation of 180° of the plane of travel of the packets 6, and
- in a final portion, a horizontal plane of travel of the packets 6 which have been rotated 180°.

[0033] As a result, the packet 6 leaving the tipping device 7 is turned 180° with respect to its entry position so as to reverse the direction 61 of the images and/or writing printed on the packet.

[0034] In Figure 4, for the sake of greater clarity, the opening 60 and the label 62 are shown both on the packet 6 entering and on that leaving the assembly of belts 75, 76, but it is obvious that, since the packet undergoes upending, said opening and label are visible only on the packet entering or on that leaving the belts.

[0035] Likewise, even if not shown in Figure 4 for the sake of clarity, a third belt twisted 180° is mounted on the pulleys 71A and 72A' and a fourth belt twisted 180° is mounted on the pulleys 72A and 71A'. In this manner the third and fourth belt form a second packet upturning track, parallel to the first track illustrated in Figure 4.

[0036] Returning to Fig. 3, the upturned packets 6 leaving the tipping device 7 are stacked so as to form a parallelepiped block, for example 5 x 6 packets. The block of packets enters a packing machine 8 which is responsible for final packaging of the block of paper handkerchiefs. For this purpose the packing machine comprises a roll of printed polyethylene film which is cut, wrapped around the block of packets of handkerchiefs 6 and closed by means of heat sealing of the end flaps.

[0037] It should be noted that the blocks of packets in the packing machine 8 travel in the direction indicated by the letter F. Therefore the end flaps of the polyethylene sheet which forms the package are heat sealed in the rear surface 90 of the package with respect to the direction of travel F.

[0038] As a result, a final pack 9 is obtained, as shown in Figure 5. The pack 9 is positioned for display with the rear heat sealed face 90 on the supporting surface. Thus the upper face of the pack 9 presents printed writing and/or images. The side faces 93 also present correctly oriented printed images and/or writing.

[0039] Furthermore the packets 6 of paper handkerchiefs present printed writing and/or images oriented in the direction of the arrow 61, thus correctly with respect to the orientation of the writing and/or images 94 of the side faces 93 of the pack.

[0040] Returning to Figure 3, it must be considered that the layout of the packing machine 1 has been designed so that a single operator, situated in a central position, for example that indicated by the circle P, can control the whole production line of the plant 1.

[0041] To obtain a pack 9 like that illustrated in Figure 5, different solutions from that illustrated which avoid the tipping device 7 could be used. For example, the position of the packaging machine 50 could be reversed so as to

obtain packets oriented in the opposite manner to those illustrated on leaving the packaging machine 50. This would lead to a great complexity in producing the packaging machine 50 and it would be necessary also to reverse the position of the labelling machine 51 to obtain correct affixing of the labels 62. Furthermore, a single operator situated in position P could not control the packing machine 50 and the labelling machine 51 anymore. Thus a second operator, situated for example in position P1 to control the packing machine 50 and the labelling machine 51 would be needed.

[0042] Alternatively, the position of the packing machine 8 could be reversed, that is the direction F of travel of the blocks of packets which must be packed could be reversed. This solution also would complicate the packing machine 8 and would require a second operator situated in position P2.

[0043] It should be considered that the machine 1 of Figure 3 has been illustrated with two tracks 41 which convey the stacks 14 of paper handkerchiefs. Thus the cell wheel 5, the packing machine 50 and the labelling machine 51 also have two parallel tracks for formation of the packets of handkerchiefs. Consequently the tipping device 7 also has been shown with two parallel tracks for conveying and upturning the packets 6 of handkerchiefs.

[0044] However, it is obvious that the present invention also extends to the case of a single track or more than two tracks for conveying folded handkerchiefs, packing and upturning of the packets.

[0045] Numerous changes and modifications of detail within the reach of a person skilled in the art can be made to the present embodiment of the invention without thereby departing from the scope of the invention as set forth in the appended claims.

Claims

1. A system (1) for packaging of paper handkerchiefs comprising:

- at least one transfer track (41) on which the paper handkerchiefs (13) are made to advance folded and possibly piled in stacks (14),
- a packing unit (5, 50, 51) adapted to form packets (6) of paper handkerchiefs (13),
- a packaging unit (8) adapted to form packs (9) of packets (6) of paper handkerchiefs (13) grouped in blocks,

characterized in that it further comprises

- a tipping device (7) disposed between said packing unit (5, 50, 51) and said packaging unit (8) to turn the packets (6) of handkerchiefs 180°, so as to reverse the orientation (61) of the images and/or writing printed on the packet (6) of

handkerchiefs.

2. A system (1) according to claim 1, **characterized in that** said tipping device (7) comprises at least one pair of endless belts (75, 76) running over respective pulleys (71B, 72B', 72B, 71B'), wherein said belts (75, 76) are disposed parallel to each other and twisted 180° around a longitudinal axis, so that the packets (60) can pass in the gap between the two belts (75, 76) and be tipped 180°, around their transverse axis. 5
3. A system (1) according to claim 2, **characterized in that** at least two of said pulleys (71B', 72B') are driven in rotation by means of at least one motor means (73, 74). 10
4. A system (1) according to any one of the preceding claims, **characterized in that** it further comprises a folding machine (40) disposed upstream of the transfer track (41) to fold the handkerchiefs longitudinally and transversally (12). 15
5. A system (1) according to claim 4, **characterized in that** it further comprises a slitter (4) disposed upstream of said folding machine (40) to slit a web of multilayer paper (11) crosswise so as to obtain said handkerchiefs (12). 20
6. A system (1) according to claim 5, **characterized in that** it further comprises a calendering unit (3) and an embossing unit (30) disposed upstream of said slitter (4) to perform calendering and embossing of the paper web (11) coming from a roll (10). 25
7. A system (1) according to any one of the preceding claims, **characterized in that** the layout of the system is substantially U-shaped, so that the whole system can be controlled by a single operator situated in a suitable position (P) inside said U. 30
8. A method of packing paper handkerchiefs comprising the following steps: 35

- feeding the paper handkerchiefs (13) folded and possibly piled in stacks 14 (14), 45
- packaging said handkerchiefs so as to form packets (6) of paper handkerchiefs (13),
- packing (8) said packets (6) of paper handkerchiefs (13) grouped in blocks so as to form packs (9), 50

characterized in that it further comprises the step of

- upturning said packets (6) of handkerchiefs, so as to reverse the orientation (61) of the images and/or writing printed on the packet (6) of handkerchiefs before packing of said blocks of 55

packets of handkerchiefs.

9. A method according to claim 8, **characterized in that** it further comprises the step of folding handkerchiefs (12) so as to obtain folded handkerchiefs (13). 5
10. A method according to claim 9, **characterized in that** it further comprises the step of slitting a multilayer paper web (11) so as to obtain said handkerchiefs (12). 10
11. A method according to claim 10, **characterized in that** it further comprises the step of calendering and embossing the multilayer paper web (11). 15
12. A pack (9) of paper handkerchiefs comprising a block of packets (6) of paper handkerchiefs packed in a sheet of printed polyethylene wherein: 20
 - the bottom face (90) of the pack, destined to rest on a flat surface, has the end flaps heat sealed,
 - the side faces (93) of the pack have printed images and/or writing (94) which are oriented correctly when the heat sealed bottom face (90) of the pack is disposed on a supporting surface,
 - the top face (91) of the pack presents printed images and/or writing (92), and
 - the packet (6) are disposed in the pack (9) so as to present the printed images and/or writing (94) of the side faces (93) of the pack with the same orientation. 25

FIG. 1
Prior Art

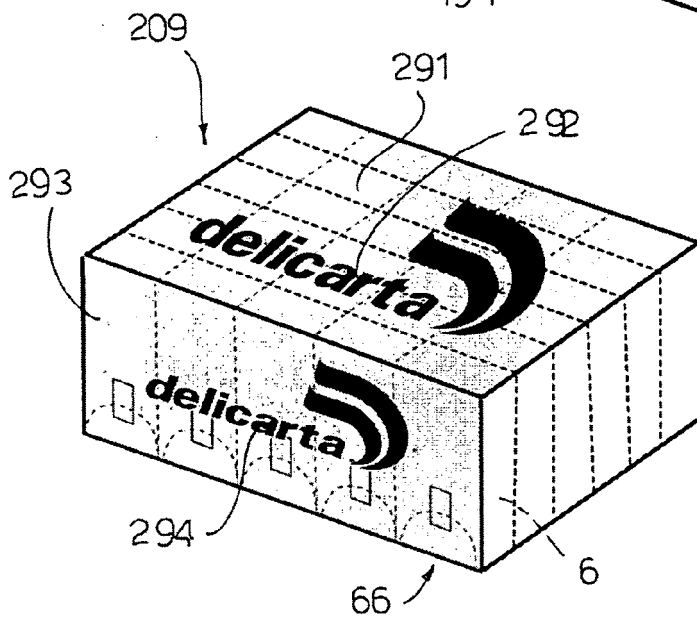
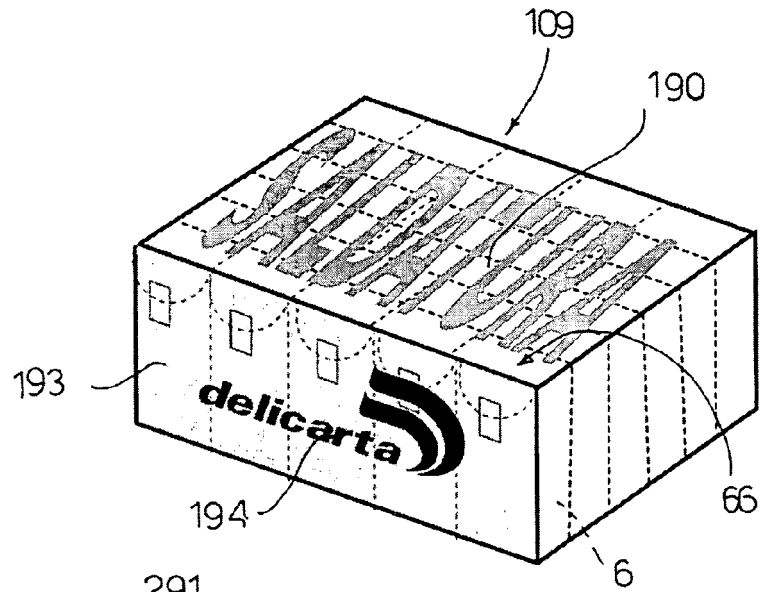
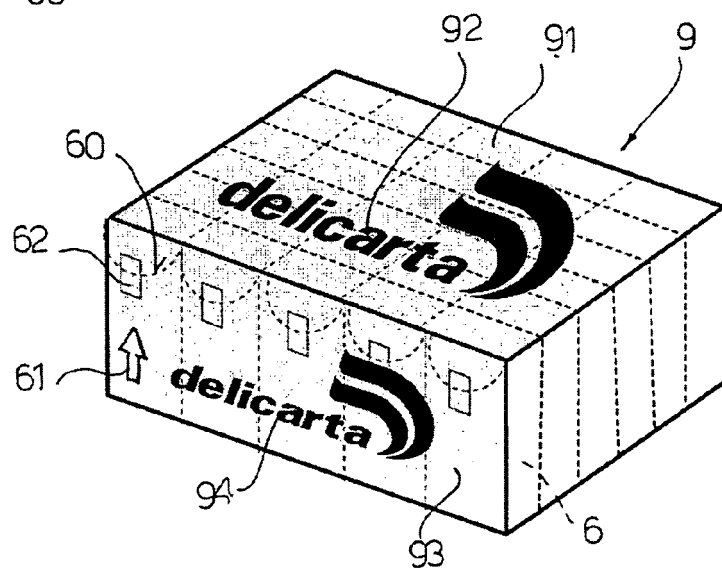
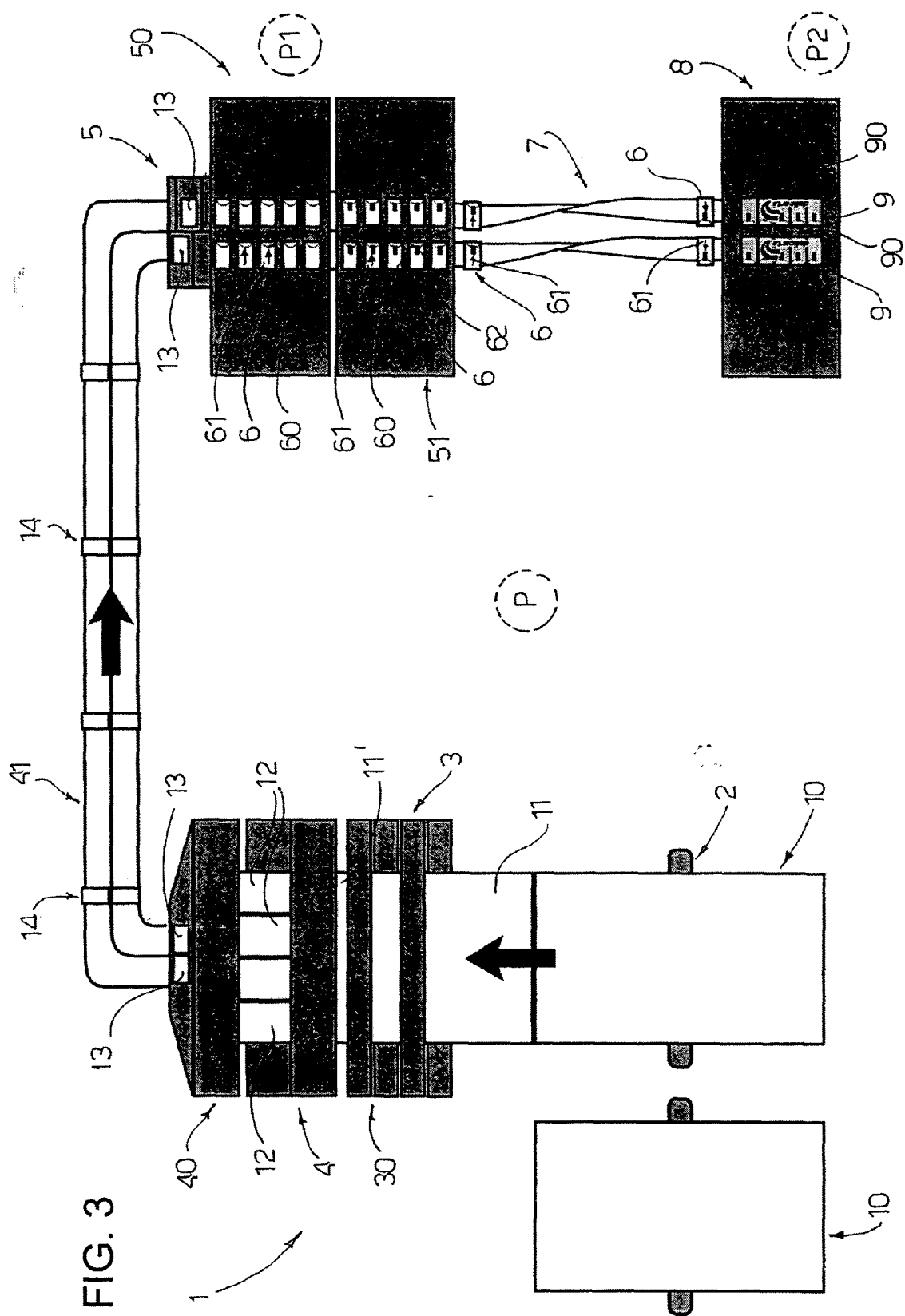
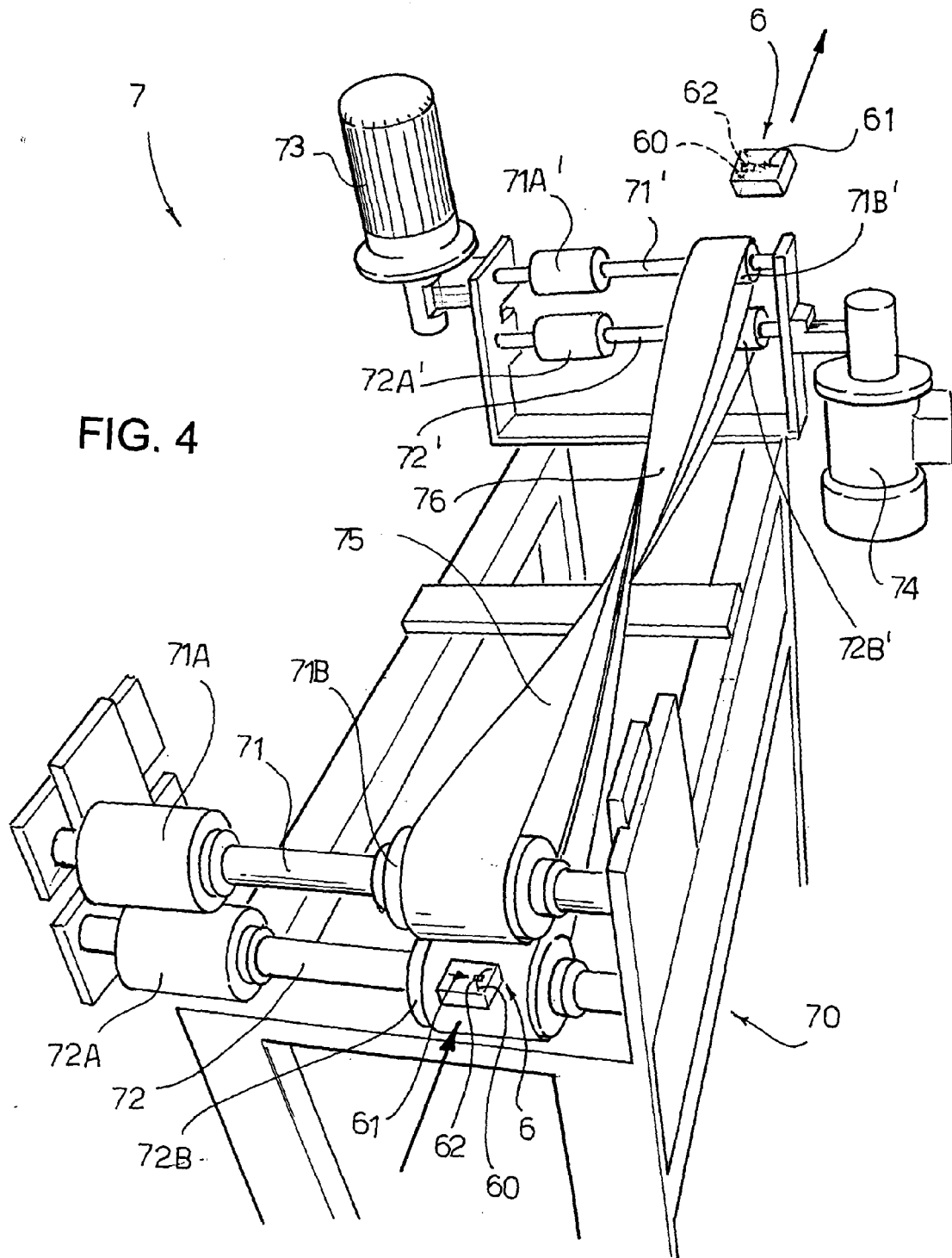


FIG. 2
Prior Art

FIG. 5









European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5579

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 698 569 A (NSM MAGNETTECHNIK GMBH [DE]) 28 February 1996 (1996-02-28) * column 1, lines 6-15 * * column 7, line 41 - column 8, line 40; figures 5-11 *	1-3,8	INV. B65B35/58
X	US 2 370 325 A (RANNEY WILLET B) 27 February 1945 (1945-02-27) * the whole document *	1,8	
X	GB 2 271 104 A (GD SPA [IT]) 6 April 1994 (1994-04-06) * claim 1 *	1,8	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 January 2007	Examiner Schelle, Joseph
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)



European Patent
Office

Application Number

EP 06 42 5579

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-6, 8-12



European Patent
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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
EP 06 42 5579

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-6,8-12

System for and method of packaging paper handkerchiefs including a device for/step of turning over the packets; said system and said method further including devices for/steps of folding, slitting, calendering and embossing.

2. claims: 1,7

A system for packaging of paper handkerchiefs having a device for turning over the packets and a U-shaped layout.

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

EP 06 42 5579

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
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12-01-2007

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