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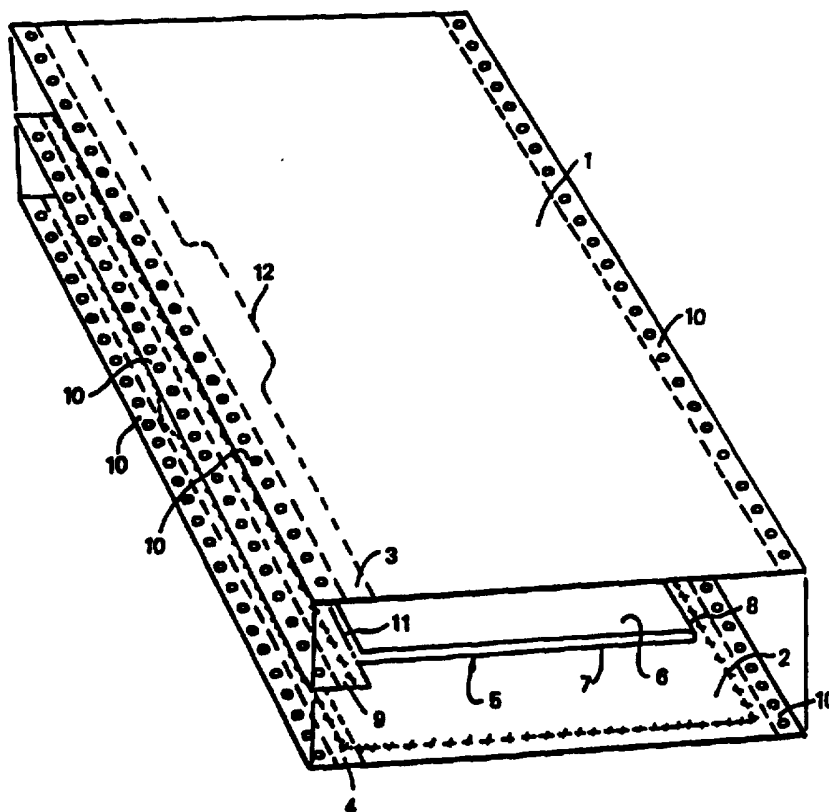
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(71)(72) Applicant and Inventor: KAVANAGH, Conor [IE/IE];
"Rathmore", Adelaide Road, Glenageary, Co. Dublin (IE).(74) Agents: HANNA, Peter, William, Derek et al.; Tomkins & Co.,
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(54) Title: AN ENVELOPE ASSEMBLY WITH FOLDED INSERT

(57) Abstract

A separable multiple ply envelope assembly or mailer and process for making same is described, comprising superimposed outer plies (1, 2) adhered together at their peripheral edges so as to form an envelope and including at least one extractible insert sheet (5) formed from a respective inner ply, and a removable tear-off stub portion (3) along at least one side or face of the assembly to which a corresponding side (4, 9) of the envelope and the insert are both attached, characterized in that the insert sheet (5) is folded prior to its insertion between, and adherence together of the outer plies (1, 2). Processes for constructing such an assembly are also disclosed.



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"AN ENVELOPE ASSEMBLY WITH FOLDED INSERT"

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Technical Field

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The present invention relates to an envelope assembly including a folded insert, in particular to a separable multiple ply envelope assembly adapted for continuous computer printing of both outer and inner plies, commonly known as a mailer.

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Background Art

20 Free insert mailers are known, as for example described in my International Patent Application WO-A-9321022. In general, removal of a tear-off stub portion along one side of the mailer allows free withdrawal of the inner ply or plies which are not otherwise attached to the assembly. A basic free insert mailer may comprise front and
25 back outer plies which comprise the envelope, and inner plies comprising for example business forms. Two inner plies may be superimposed and glued together to form a smaller return envelope. This is not a prefolded envelope but may comprise a foldable closure flap. The inner plies may for example be die cut or chipped on three
30 sides so that glue lines running transverse of the web to join the outer plies do not attach the inner plies, which are normally glued longitudinally along a fourth side to attach to the stub portion.

It will be appreciated that the multiple ply assembly is constructed
35 from a plurality of webs which are generally pre-printed and subjected to successive and various transverse and longitudinal chipping, glueing, slitting and perforating steps during collation. The final collated assembly may, for example, be folded in a zig-zag fashion for

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delivery to a customer. The mailers when still connected may be run at speed through a computer printer before final separation.

However, the webs employed in the construction of the outer envelope and free inserts are normally of substantially the same width. This means that the inserts must comprise either single sheets, or single sheets attached together in a further glueing step as in the case of an inserted return envelope, of no greater width than the outer webs comprising the envelope proper. In other words, it has not been attempted to include a folded insert sheet of say twice the width of the outer plies in its unfolded condition, since this would involve the introduction of a web of substantially different width out of register with the other plies and necessarily involves a difficult folding operation. Nevertheless, the advantages of such an insert must be evident; a four-page form, promotional sheet or brochure can be printed on two sides of a single web; a folded insert is easier to read and allows more flexible graphic layout design on the side opened out; opening a folded insert to lie flat is possible, whereas two sheets placed one above the other and glued along one side are difficult to open out and to lie flat and may become detached; a folded insert designed as a brochure has a better appearance and does not have the feel and look of a business form.

25 Disclosure of the Invention

An object of the present invention is therefore to provide a free-insert mailer including a folded insert. A further object is to provide a process and apparatus for constructing a free-insert mailer assembly including a folded insert.

Accordingly the present invention provides a separable multiple ply envelope assembly comprising superimposed outer plies adhered together at their peripheral edges so as to form an envelope and including at least one extractible insert sheet formed from a respective inner ply,

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and a removable tear-off stub portion along at least one side or face of the assembly to which a corresponding side of the envelope and the insert are both attached, characterized in that the insert sheet is folded prior to its insertion between, and adherence together of, the outer plies.

The insert sheet is preferably longitudinally folded once about a pre-formed score line in the said inner ply. A plurality of insert sheets may be superimposed and folded together and optionally attached together by glueing along one side of the score line, or hinge line. For example, six folded sheets may be superimposed and glued together along a hinge line to form a 24-page insert booklet.

The present invention also provides a process for constructing a separable multiple ply envelope assembly comprising superimposed outer plies adhered together at their peripheral edges so as to form an envelope and including at least one extractible insert sheet formed from a respective inner ply, and a removable tear-off stub portion along at least one side or face of the assembly to which a corresponding side of the envelope and the insert are both attached characterized by steps including:

a) advancing a first web having a first width from an unwind station to a sprocket feed guide means of corresponding width,

b) further advancing the first web to a chipping station where cutting die means cut out a series of successive free sections of the web to define said insert sheets, which web is then guided only by one side of the sprocket feed guide means,

c) further advancing the first web in this manner to a folding means, suitably comprising a flat fold bed arranged adjacent to one part of the web and a fold guide arranged so as to twist another part of the web progressively downstream so as to lie directly over and above the fold bed, thereby to guide and progressively fold the first web through about 180° about a longitudinal fold line,

d) further advancing the folded first web in between front and back

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outer webs aligned with said sprocket feed guide means,

e) subjecting the superimposed webs to a cross-glueing step to adhere the front and back outer webs together at locations in between the free
5 sections of the first web,

f) subjecting the superimposed webs to subsequent drying and cross-cutting steps before removing the final assembly from the feed guide means for folding.

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The longitudinal fold line is preferably pre-scored onto the first web during an earlier process.

The fold bed may comprise a stationary fold plate arranged in a
15 horizontal plane.

The fold guide may comprise a plurality of parallel guide fingers laterally offset to one side of, and in a plane parallel to, the fold plate, but twisted progressively out of that plane in a single twist
20 running downstream so as to lie directly over and above the fold plate. The fingers are preferably made of a flexible material and adapted for adjustability in the degree of twist, and width adjustability with respect to the sprocket feed guide means.

25 Alternatively, the fold guide may comprise a first belt laterally offset to one side of, and in a plane parallel to, the fold bed, but twisted progressively out of that plane in a single twist running downstream so as to lie directly over and above the fold bed. The fold bed in this instance is preferably substituted by a second belt
30 arranged in a substantially horizontal plane. Both first and second belts are advantageously arranged to travel at the same speed as the web, thereby minimizing frictional drag on the web as it passes over and between the belts.

35 Following step c), the folded first web is preferably subjected to a subsequent pressing step along the line of the fold, for example by means of a nip wheel co-acting against a press roller.

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Front and back outer webs having a second width are advantageously introduced at step d) from a second unwind station to be taken up by sprocket feed guide means downstream of the folding means being of substantially lesser width than the sprocket feed guide means of step a). The advantage of such an arrangement includes a space saving, in that the front and back outer webs would otherwise have to be temporarily diverted away from the insert web(s) while these pass through the chipping station at step b), were the front and back webs to be introduced at the beginning of the process.

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Brief Description of the Drawings

15 Figure 1 is an exploded perspective view of a mailer with a single sheet folded free insert in accordance with a first embodiment of the invention,

Figure 2 is an exploded perspective view of a mailer with multiple sheet free inserts including free sheets and a folded sheet in accordance with a second embodiment of the invention,

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Figure 3 is a sketch to show a method of glueing together a multiple sheet folded free insert in accordance with a third embodiment of the invention,

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Figure 4 is a schematic plan view of a production line for use in a process for producing a mailer in accordance with the invention,

30 Figure 5 is a sketch of a folding means employed in that part of the process of constructing a folded free insert, and

Figure 6 is a sketch of an alternative folding means employed in that part of the process of constructing a folded free insert.

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Detailed Description of Embodiments of the Invention

5 Figure 1 shows the most basic mailer construction in accordance with a first embodiment of the invention comprising an envelope front 1, an envelope back 2, a front stub margin 3, a back stub margin 4, a folded free insert sheet 5 comprising front and back leaves 6, 7 and a fold line 8 and an insert stub margin 9. Sprocket margins 10 are common to
10 all sheets 1, 2 and 5. Length-related die cut slits 11 enable the stub margins 3, 4 and 9 to be removed together, cleanly, and thumb notch 12 enables the folded insert 5 to be withdrawn from the envelope when opened. It will be noted that only the back leaf 7 of the folded insert is actually joined to the stub margin 9, but that there need
15 only be a very small difference in the width of the leaves 6, 7 when the folded insert is separated from the stub margin and removed, i.e. it may not be noticeable in practice that the two outer side edges of the folded insert do not coincide exactly. The die cut slits 11 produce clean outer side edges, and may for example have only three ties
20 between the slits holding the folded insert to the stub margin prior to separation.

Figure 2 shows an alternative mailer construction in accordance with another embodiment of the invention. It is similar to the embodiment
25 illustrated in Figure 1, except that several plain insert sheets 13, joined together by glue lines 14 are included on top of (or inside) the folded sheet 15. It will be appreciated that various different combinations of plain free inserts, inserts with tear-off sections, and folded free inserts are possible according to the particular
30 application.

Figure 3 shows a method of constructing a multi-page brochure or booklet as a folded free insert, in this instance made from six webs superimposed and folded together by means of a single folding device,
35 to produce a 24-page booklet. Line glue is applied to five of the sheets at 16 along the hinge or score line so that the sheets are attached together when folded.

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A process and apparatus for constructing a basic mailer with a folded free insert as shown in Figure 1 will be described with reference to Figures 4 to 6.

- 5 A first web of paper 17 is fed from an unwind station 18 comprising pre-printed rolls ready for production and pre-scored with a medial score line 19, onto a sprocket feed guide which engages sprocket hole margins 10 on the web (see Fig. 1). The web 17 is advanced to a chipping station 20 comprising die-cutting cylinders 21 for cutting out transverse and longitudinal sections of the web at intervals to create a series of successive sections of the web joined only to a margin portion of the web along one side of the sprocket feed but this is sufficient to advance the web.
- 15 At this stage the web 17 is advanced through a table folder 22, comprising a flat fold plate 23 and a series of parallel guide fingers 24, twisted in a manner which is best described by reference to Figure 5. The guide fingers 24 lie firstly to one side of the flat fold plate 23, the web 17 passing between these two. The fingers 24 are then twisted out of the plane of the fold plate 23 progressively downstream so as to lie directly over and above the fold plate 23, thus folding the web 17 in half about the score line 19 and in effect reducing the width of the web by half. A nip wheel 25 (see Fig 4.) bearing on the folded web and against a press roller underneath then presses the fold.
- 25 At this stage, front and back webs 26,27 are introduced above and below the folded web 17 from unwind station 28 so as to align with sprocket feed guide wheels 29 which are set at a width approximately half the width of web 17.
- 30 Cross perforations and line perforations are effected as appropriate and need not be described.
- The superimposed webs 17, 26, 27 are then subjected to a cross-glueing and line-glueing step at 30, and a drying station at 31, before coming off the sprocket guide and folded zig-zag fashion at 32.

Figure 6 shows an alternative folding mechanism, which is very similar

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to the arrangement shown in Figure 5, except that the stationary fold plate 23 is substituted with a moving belt 33, and the stationary guide fingers 24 are substituted by a moving belt 34 incorporating a twist. The two belts 33,34 are preferably arranged to move at the same speed
5 as the web is advancing so as to make physical contact with the web but avoid even the slightest frictional drag effects inherent in the stationary fold guides 23,24. The moving belt arrangement therefore has a lesser tendency for snagging or catching of the advancing web as it is being folded. Belt tension and speed can more easily be
10 adjusted, and furthermore the degree of twist in belt 34 can more readily be altered, for fine adjustment of the folding step. All of these features result in potentially less down time during a production run.

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CLAIMS

- 5 1. A separable multiple ply envelope assembly comprising superimposed outer plies (1,2) adhered together at their peripheral edges so as to form an envelope and including at least one extractible insert sheet (5) formed from a respective inner ply, and a removable tear-off stub portion (3) along at least one side or face of the assembly to which a
10 corresponding side (4,9) of the envelope and the insert are both attached, **characterized in that** the insert sheet (5) is folded prior to its insertion between, and adherence together of, the outer plies (1,2).
- 15 2. An assembly according to claim 1, in which the insert sheet (5) is longitudinally folded once about a pre-formed score line (8) in the said inner ply.
- 20 3. An assembly according to claim 2, in which a plurality of folded insert sheets are superimposed and folded together prior to their insertion between the outer plies (1,2).
- 25 4. A process for constructing a separable multiple ply envelope assembly comprising superimposed outer plies (1,2) adhered together at their peripheral edges so as to form an envelope and including at least one extractible insert sheet (5) formed from a respective inner ply, and a removable tear-off stub portion (3) along at least one side or face of the assembly to which a corresponding side (4,9) of the envelope and the insert are both attached **characterized by steps**
30 including:
- a) advancing a first web (17) having a first width from an unwind station to a sprocket feed guide means of corresponding width,
- 35 b) further advancing the first web (17) to a chipping station (20) where cutting die means (21) cut out a series of successive free sections of the web to define said insert sheets, which web is then guided only by one side of the sprocket feed guide means,

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- c) further advancing the first web (17) in this manner to a table folding means (22) comprising a flat fold bed (23,33) arranged adjacent to one part of the web (17) and a fold guide (24,34) arranged so as to
5 twist another part of the web progressively downstream so as to lie directly over and above the fold bed, thereby to guide and progressively fold the first web through about 180° about a medial fold line,
- 10 d) further advancing the folded first web (17) in between front and back outer webs (26,27) aligned with said sprocket feed guide means,
- e) subjecting the superimposed webs (17,26,27) to a cross-glueing step (30) to adhere the front and back outer webs together at locations in
15 between the free sections of the first web,
- f) subjecting the superimposed webs to subsequent drying (31) and cross-cutting steps before removing the final assembly from the feed guide means for folding (32).
- 20
5. A process according to claim 4, wherein the fold bed comprises a stationary fold plate arranged in a horizontal plane.
6. A process according to claim 5, wherein the fold guide comprises a
25 plurality of parallel guide fingers (24) laterally offset to one side of, and in a plane parallel to, the fold bed (23), but twisted progressively out of that plane in a single twist running downstream so as to lie directly over and above the fold bed.
- 30 7. A process according to claim 6, wherein the fingers are made of a flexible material and adapted for adjustability in the degree of twist, and are adapted for width adjustability with respect to the sprocket feed guide means.
- 35 8. A process according to claim 4, wherein the fold guide comprises a first belt (33) laterally offset to one side of, and in a plane parallel to, the fold bed, but twisted progressively out of that plane in a single twist running downstream so as to lie directly over and

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above the fold bed.

9. A process according to claim 8, wherein the fold bed comprises a second belt (34) arranged in a substantially horizontal plane.

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10. A process according to claim 9, wherein both first and second belts (33,34) are arranged to travel at the same speed as the web (17), thereby minimizing frictional drag on the web as it passes over and between the belts.

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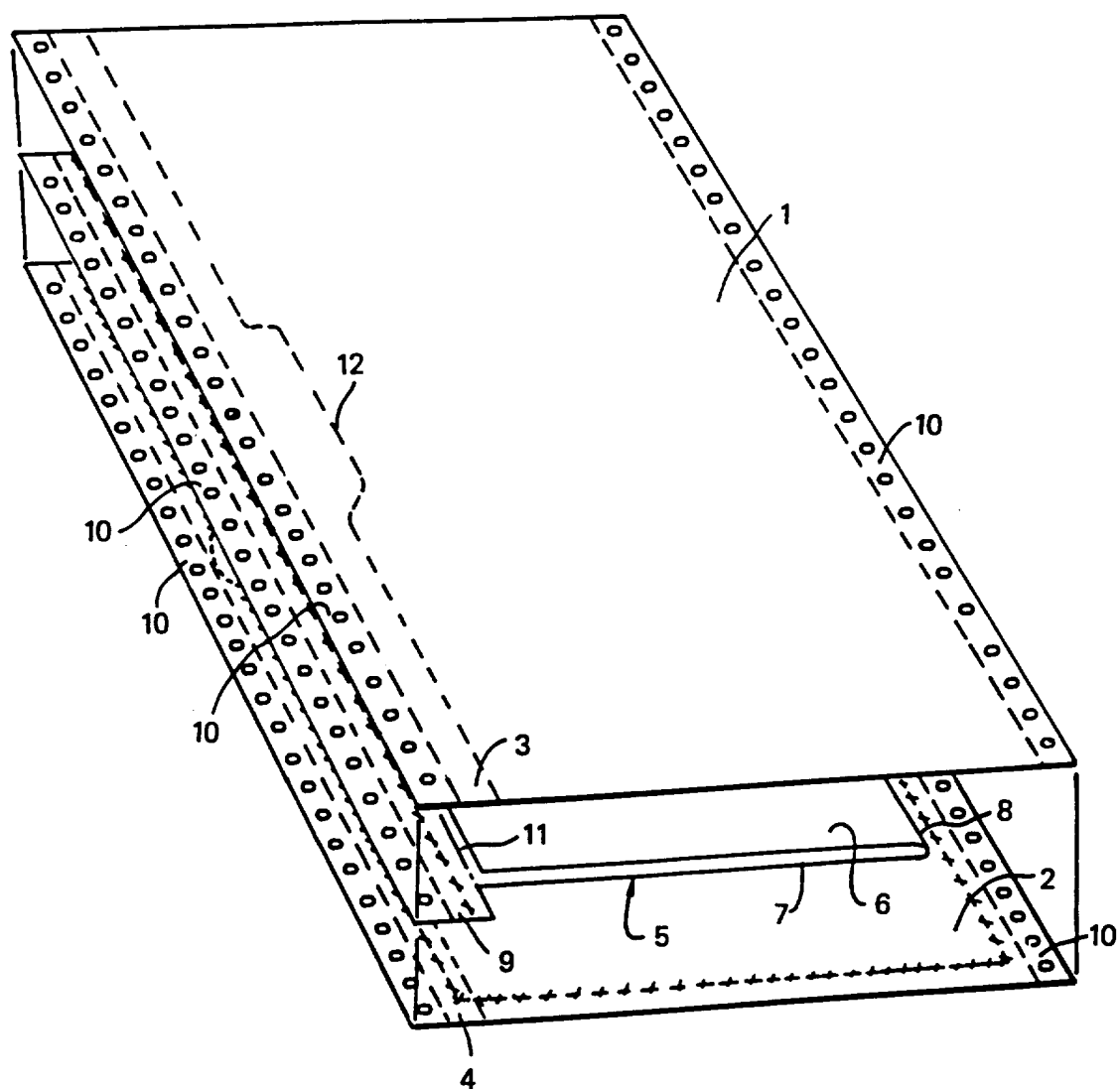
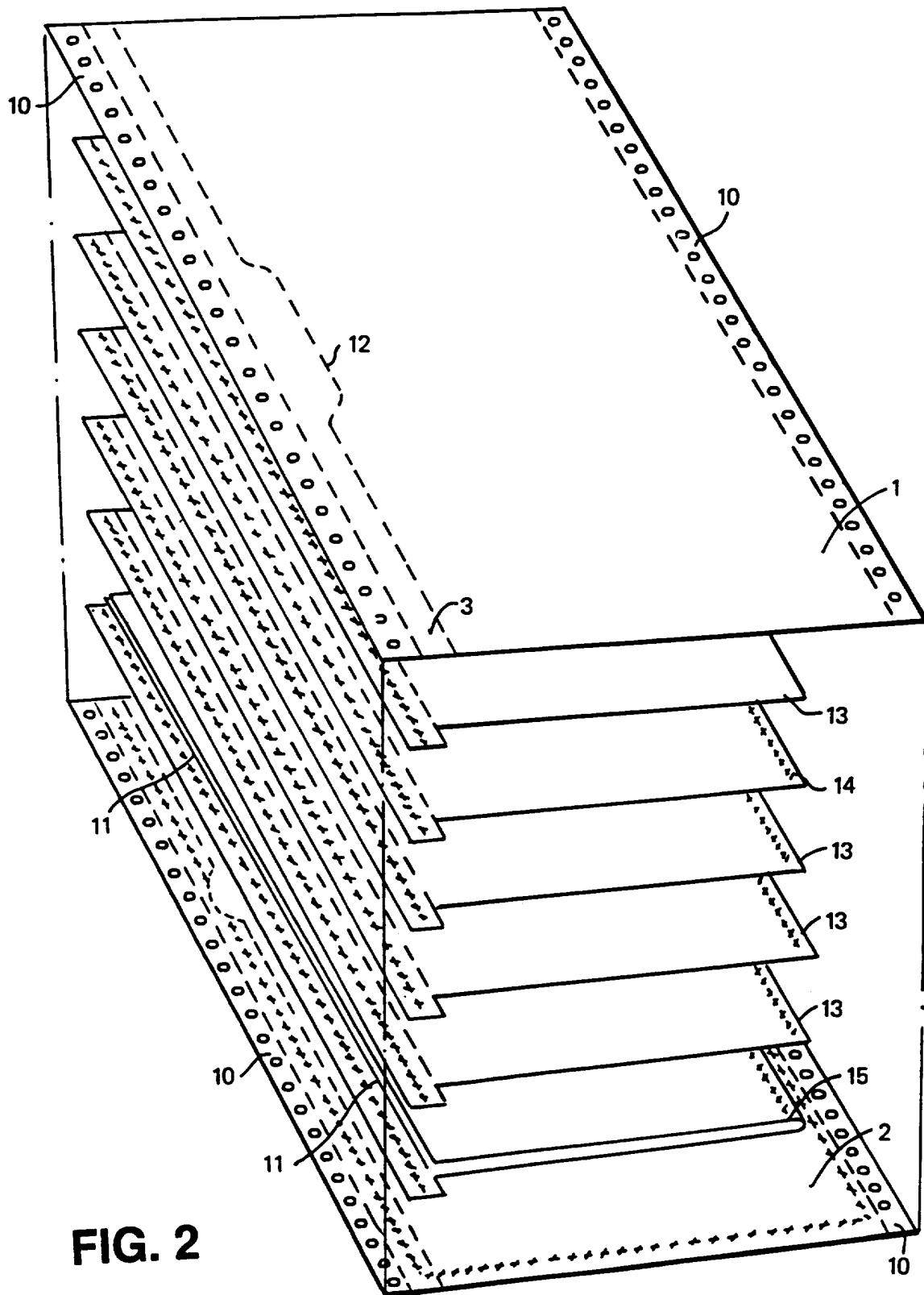


FIG. 1



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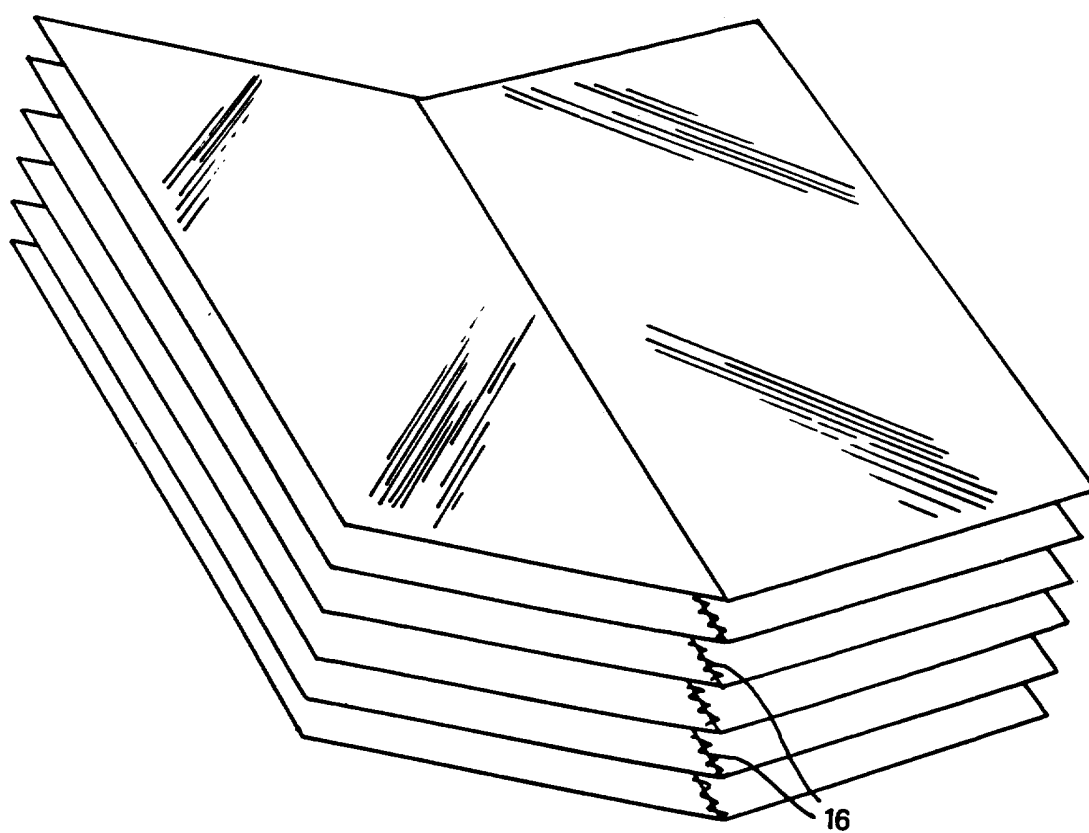


FIG. 3

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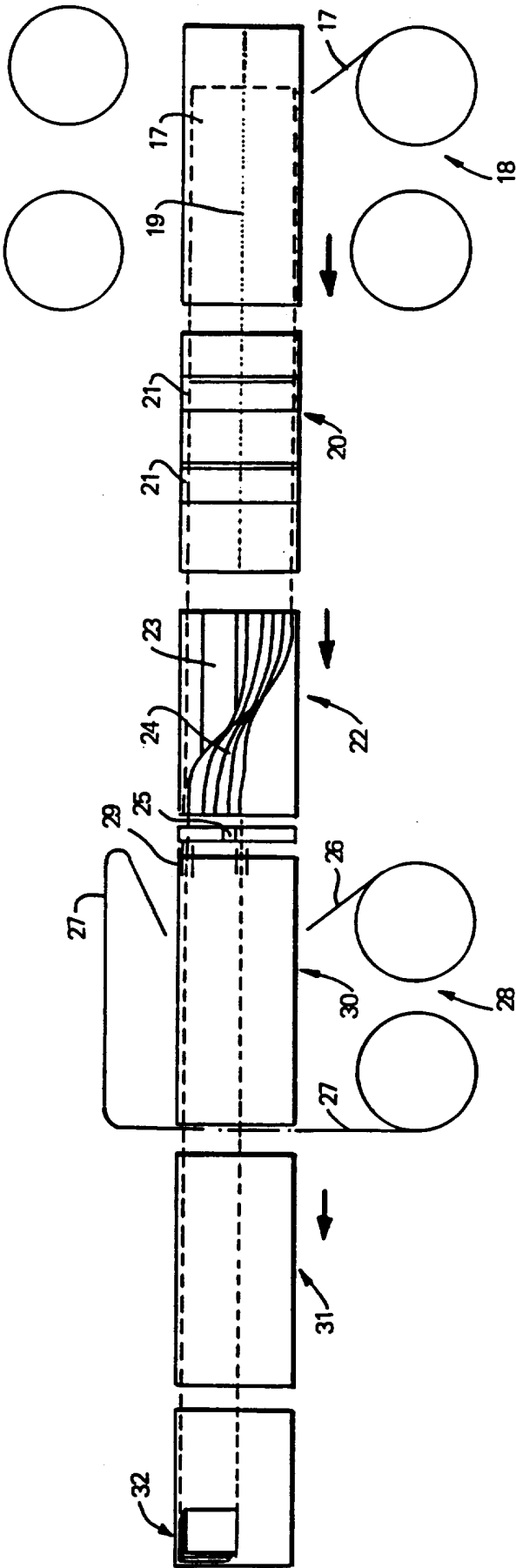


FIG. 4

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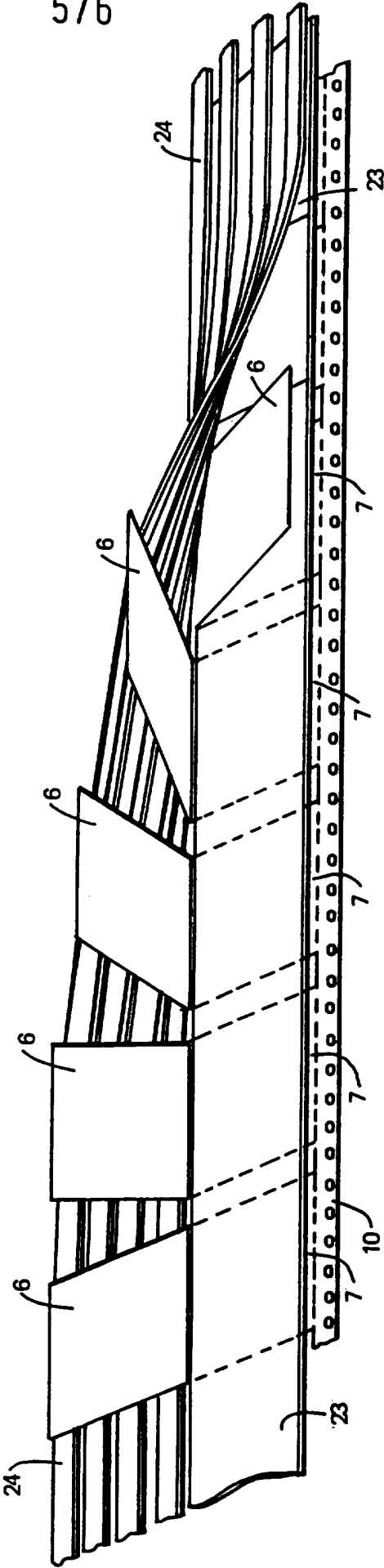


FIG. 5

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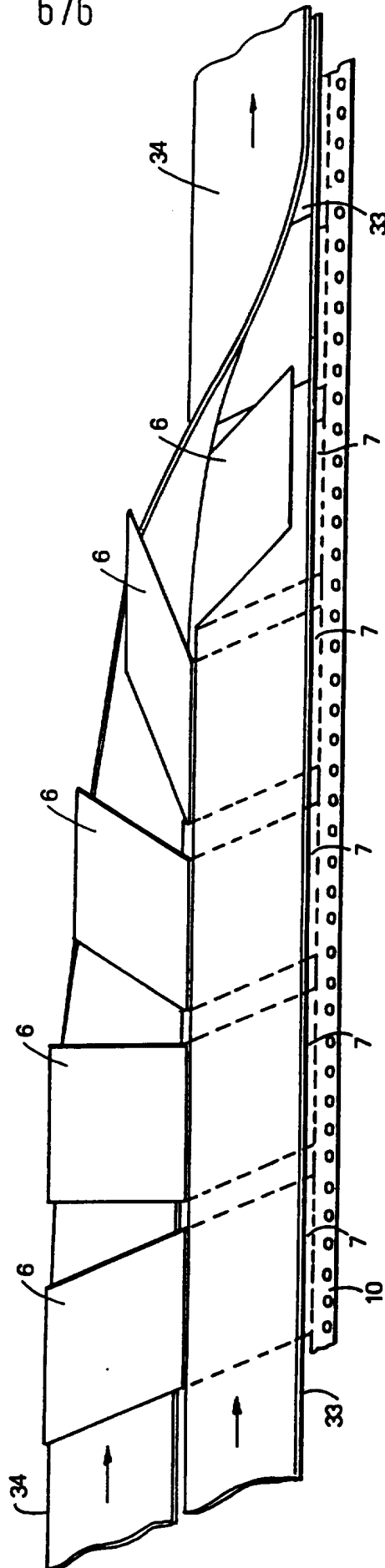


FIG. 6

INTERNATIONAL SEARCH REPORT

International Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B42C3/00 B42D5/02

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 6 B42D B42C

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

Electronic data base consulted during the international search (name of data base and, where practical, 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.
X	US,A,4 931 035 (SCHMIDT) 5 June 1990 see the whole document ---	1,2
X	EP,A,0 019 703 (JOS HUNKELER) 10 December 1980 see the whole document ---	1,2
X	US,A,3 337 120 (STEIDINGER) 22 August 1967 see the whole document ---	1,2
X	FR,A,2 676 395 (DANEL FERRY) 20 November 1992 see page 6, line 31 - page 7, line 21; figures 1A,1B ---	1,2
A	US,A,4 012 268 (JOHNSEN) 15 March 1977 see the whole document -----	4

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IE 95/00045

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4931035	05-06-90	CA-A- 1332822 US-A- 5000373	01-11-94 19-03-91
EP-A-19703	10-12-80	NONE	
US-A-3337120	22-08-67	NONE	
FR-A-2676395	20-11-92	NONE	
US-A-4012268	15-03-77	JP-A- 50102477	13-08-75