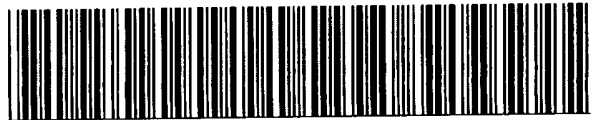


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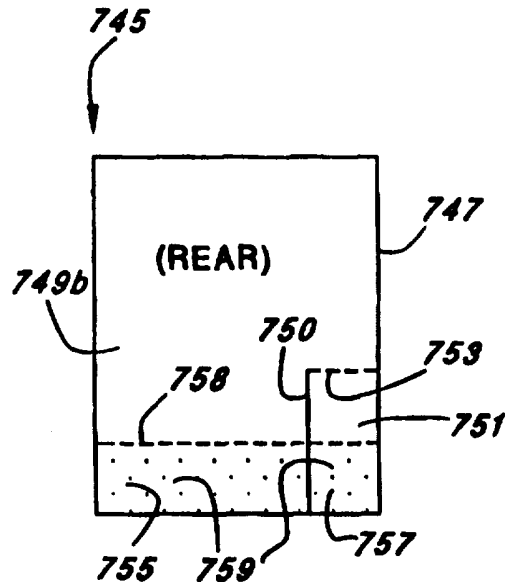
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(54) Title: POP-UP PROMOTIONAL ITEMS AND METHODS OF MAKING

(57) Abstract

Pop-up items (745) are provided which can either be mounted in three-dimensional form on a suitable supporting surface by means of pressure-sensitive adhesive carried by the item or can be affixed to facing panels of a letter or pages of a book. Some preferred items include a pop-up element (745) in the form of one or two panels (749b) carrying strategically located pressure-sensitive adhesive (759) which permits instant mounting, e.g. between facing panels so that, upon opening, the pop-up element (745) assumes a three-dimensional configuration as a result of the pressure-sensitive adhesive (759) bonding to the surfaces of facing panels or pages. A variety of methods for the mass production of such pop-up elements (745) from a continuous web, e.g., a printed and die-cut web from a web press, facilitate their inexpensive fabrication. Sheets containing multiple, single-thickness pop-up elements (745) in blank form are specially adapted for customized printing by electronic imaging.



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**POP-UP PROMOTIONAL ITEMS AND METHODS OF MAKING**

This invention relates generally to novelty items made of paper or other sheet material, more particularly to promotional pop-ups multiple copies of which can be fabricated from separate sheets or from one  
5 or more continuous webs and also to mass production methods of making such items from one or more continuous webs, as supplied from a web-press or the like, which items assume three-dimensional configuration and are designed to permit mounting in such orientation.

10

**BACKGROUND OF THE INVENTION**

Pop-ups have fairly recently become frequently used in advertising and in other promotional endeavors, whereas they had been used in the greeting card field and  
15 in children's books for a number of years. Such pop-up pieces have become generally available to the advertising field as a result of the developments shown in several earlier patents, particularly U.S. Patent No. 3,995,388, which discloses methods for making pop-up paper products  
20 having significant advantages over hand-assembly methods that had been generally theretofore employed. U.S. Patent No. 4,146,983 discloses other methods for making novel promotional items, particularly those which are designed to present a plurality of coupons or the like to  
25 a recipient upon the opening of a folder. U.S. Patent No. 4,337,589 discloses manufacturing techniques, specifically suited for mass production on a web-press or the like, for making pop-up advertising pieces and the like, as does U.S. Patent No. 5,181,901.

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The foregoing patents describe different manufacturing techniques useful for making advertising and promotional pop-ups as a part of a continuous web arrangement, and pop-ups such as these have been  
5 frequently used to create impact and enjoyment in books, in greeting cards and in advertising inserts. The foregoing advances in designs and in manufacturing methods have enabled volume production of such products at significant cost savings and thus have increased their  
10 use.

A general characteristic of such pop-ups is the movement of the pop-up element from a flat, substantially single plane into a three-dimensional orientation upon the opening of a pair of cover pieces or basepieces,  
15 generally in the form of a folder inside which the pop-up is located. By attaching the pop-up elements to opposite panels of the basepieces, for example, along angles created by lines of weakness, such as score lines and/or perforations, in combination with adhesive bonds,  
20 pressure or stress points are created which, upon opening of one cover, cause the pop-up to be erected. However, the pressure or stress which is created upon opening is sufficient so that, when the cover is manually released, it will draw the cover either partially or entirely  
25 closed.

Although a pair of basepieces have heretofore been utilized in such pop-up units, it has now been found that improved pop-up designs are feasible that eliminate one or more of the basepieces, as are methods for mass  
30 production of such improved designs.

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**SUMMARY OF THE INVENTION**

Improved pop-up items and methods for making such items are provided in the form of individual pop-up elements, the exterior surfaces of which carry  
5 pressure-sensitive adhesive. The adhesive-carrying surfaces are optionally covered by release liners or the like. Once such optional release liners are removed from exterior surfaces, the pop-up element can be affixed to a supporting surface in attention-attracting  
10 three-dimensional orientation, or between facing panels or pages where it will assume such orientation upon opening of such pivotally interconnected panels.

Such pop-up elements can be adhesively attached in sheets or rolls for distribution as a part of an  
15 arrangement which facilitates handling, storage and distribution thereof, or the pop-up elements can be fabricated in multiples and distributed in the form of strips or a stack or pad from which the recipients can one-by-one remove and utilize individual items. Sheets  
20 of blank, or partially blank, pop-up elements can be provided which are suitable for customized printing by Electronic Imaging (EI), e.g. by a computer-driven laser printer or the like. Such sheets can be in cut, single sheet form, or they may be in fan-folded or roll form,  
25 from which individual sheets can be detached following EI-treatment, if desired. Pop-up elements can also be fabricated in back-to-back configuration to eliminate liner sheets. Mass production methods of manufacturing such pop-up elements are likewise provided which  
30 facilitate volume production at affordable cost.

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**BRIEF DESCRIPTION OF THE DRAWINGS**

FIGS. 1A and 1B show the fabrication of sheets of multiple pop-up elements, having various features of the invention, which sheets are suitable for preparing  
5 customized pop-ups via EI (electronic imaging).

FIG. 2A is a rear view of a pop-up element taken from the sheet shown in FIG. 1B.

FIG. 2B is a front view of the pop-up element of  
FIG. 2A;

10 FIG. 3 is a perspective view of the pop-up element of FIGS. 2A and 2B showing it mounted in display position between a pair of hinged-together panels of sheet material;

FIG. 4 is a schematic view showing the bringing  
15 together of a plurality of sheet material webs in the mass production fabrication of a composite web containing a series of pop-up elements having still another design embodying various features of the invention;

FIG. 5 is a view similar to FIG. 4 showing the  
20 individual webs following lamination with one another;

FIG. 6 is a perspective view showing a single pop-up element created from the composite web of FIG. 5;

FIG. 7 is a side view showing the pop-up element  
of FIG. 6 mounted in display position on a pair of  
25 hinged-together panels with an item removably affixed to the front surface;

FIG. 8 is a perspective view of the pop-up  
element of FIG. 7 showing an item, e.g. a business card,  
mounted in display position;

30 FIG. 9 is a perspective view of yet another continuous web which has been printed to define a series of blanks, each containing panels and subpanels, which is schematically shown as being subjected to a series of steps to create lines of weakness and to apply release

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coatings and adhesive, before being severed into individual pop-up elements;

FIG. 10 is a schematic perspective view showing a stack of pop-up elements being formed from the web of  
5 FIG. 9;

FIG. 11 is a perspective view showing one pop-up element following its removal from the stack shown in FIG. 10;

FIG. 12 is a view showing the pop-up element of  
10 FIG. 11 being applied to a pair of hinged panels or basepieces;

FIG. 13 is a perspective view showing the assemblage of FIG. 12 after the folding and then unfolding of the pair of basepieces;

15 FIG. 14 is a plan view showing a web of transparent sheet material, along a center longitudinal region of which pressure-sensitive adhesive is applied, which transparent web is being mated with a web of sheet material one-half its width which has been printed to  
20 define a series of blanks designed for the creation of a plurality of structurally identical pop-up elements, and which printed web is die-cut prior to the remaining half of the transparent web being folded thereover to sandwich the web of pop-up elements therebetween;

25 FIG. 15 is a front view of a pop-up element cut from the web of FIG. 14 following removal of the transparent overcoating;

FIG. 16 is a rear view of a pop-up element of FIG. 15;

30 FIG. 17 is a perspective view showing the pop-up element in FIGS. 15 and 16 in display position between a pair of panels or basepieces connected by a fold-line;

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FIG. 18 is a schematic plan view showing a pair of webs of sheet material which are each printed so as to define a series of blanks for creating a plurality of structurally identical pop-up elements;

5 FIG. 19 is a perspective view, in slightly exploded form, showing a pair of back-to-back pop-up elements produced from the web of FIG. 18;

FIG. 20 is a view similar to FIG. 19 showing the upper pop-up element being peeled from the lower pop-up element;

10

FIG. 21 is a perspective view of the pair of pop-up elements of FIG. 20 following separation and preliminary folding of one subpanel of each to ready each pop-up element for attachment to a pair of panels or basepieces;

15

FIG. 22 is a perspective view showing one such pop-up element attached to a pair of hinged basepieces that are opened to an angle of about 90° to each other; and

20 FIG. 23 is a perspective view of the arrangement shown in FIG. 22 after the basepieces have been opened to about 180°.

25 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

Shown in FIGS. 1-3 is an arrangement of pop-up elements 745 which are preferably made in multiples covering 8-1/2 x 11 sheets or the like. The illustrated assemblage includes nine pop-up elements 745 each of which has a major portion which constitutes a flag section 747 having a front surface 749a and a rear surface 749b. Formed in one of the lower corner regions of the pop-up element by a slit 750 is a leg or link section 751 which forms part of a base section and is hinged at its upper end, preferably along a line of

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weakness 753, to the remainder of the flag section. A pair of subpanels 755, 757 are provided at the very bottom, which are hinged along a single line of weakness 758, respectively, to the wider leg of the base section and to the leg 751. The rear surfaces of both of these subpanels are covered with pressure-sensitive adhesive 759.

As illustrated in FIG. 1A and FIG. 1B, the pop-up elements 745 are preferably fabricated in multiple arrangement on sheets of paper 8-1/2 x 11 inches in dimension designed for EI, e.g. they can be printed in a customized manner through a standard computer-driven laser printer. In the illustrated embodiment, an array of 9 pop-up elements 745 is created, i.e. 3 rows of 3 each, although any other desired arrangement can be used that preferably substantially fills a rectangular sheet of paper 761. If desired, a border can be provided at the outer edge as known in this art. A base or liner sheet 760 is used to which pressure-sensitive adhesive 759 has been preferably applied in the form of a pattern of 4 transversely extending parallel strips of pressure-sensitive adhesive 760a. These strips can be continuous or can be interrupted at locations where the slits 750 are positioned in the final product. The lowermost 3 of the 4 strips are coated over regions of release coating 760b so that the pressure-sensitive adhesive 759 will transfer from the sheet 760 to the undersurface of a sheet 761 that is laminated thereover. If desired, the undersurface of the sheet 761 can be coated with a strip of release coating in the region where the upper edge pressure-sensitive adhesive strip will be located. Alternatively, the pressure-sensitive adhesive pattern can be applied to what will be the rear surface of sheet 761.

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Although two such cut sheets can be laminated to create such an assembly, it may be preferable to laminate two continuous webs, then form the array of pop-up elements in the laminated web structure, and then

5 subsequently create individual sheets of 8-1/2 x 11 inches or the like. For example, the laminated web may be cut directly into individual sheets, or it may be perforated transversely and fan-folded, or it may be supplied in roll form to a point of customized printing

10 by EI and cut into sheets after printing.

To provide such rectangular sheets that are unprinted and therefore ready for customized printing via EI, a first continuous web of suitable sheet material is used that has a width sufficient to accommodate 1, 2 or

15 more rectangular sheets abreast. A second continuous web of liner material of essentially the same width is employed. Although the second web can have an overall release coating on its surface that will be brought into juxtaposition with the first web, preferably

20 longitudinally extending regions of the web are coated with release coating 760b that can be efficiently and economically applied to a fast-moving web, which regions will be aligned with the locations of the subpanels 755,757 in the finished product. After suitably drying

25 the release coating, a pressure-sensitive adhesive pattern 760a is applied to the upper surface of the second web, atop the strips of release coating and additionally in the region that will constitute the upper edge of each sheet so that there will be releasable

30 adherence of the two webs in these four regions. Preferably the rear surface of the first web is coated with a release coating in the upper edge region so that pressure-sensitive adhesive will not transfer to the undersurface of the pop-up elements 745 in what would be

35 the upper edge region of the flag section 747. Another

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method of manufacture of an equivalent product utilizes a second web that is coated substantially entirely with a release coating and then overcoated with a substantially overall pattern of pressure-sensitive adhesive, in  
5 combination with a first web having a rear surface coated in essentially all regions except those of the subpanels 755,757 with a different release coating which has even less attraction for adhesive so that transfer of pressure-sensitive adhesive occurs only in the uncoated  
10 subpanel regions.

Following application of the pressure-sensitive adhesive pattern 760a, the two webs are mated by bringing one web into juxtaposed position atop the other so that the pressure-sensitive adhesive is sandwiched between the  
15 two juxtaposed web surfaces, forming a composite laminated web structure. The superimposed webs are then fed through a kiss-cutting station wherein the desired lines of weakness 753,758 and slits 750 depicted in FIG. 1B are created in the first sheet material web without  
20 also severing the liner sheet material web 760. This kiss-cutting step die-cuts the individual pop-up elements and also compresses the two laminated webs to each other assuring that transfer of pressure-sensitive adhesive 759 occurs in the regions of the undersurfaces of the  
25 subpanels. Preferably, the kiss-cutting die is nicked at the corners where 4 pop-up elements 745 come together so that there is weak joinder at an upper corner of a pop-up element to the pop-up element next thereabove in this integral sheet arrangement, until such time as the pop-up  
30 elements are removed one-by-one, preferably starting at the bottom edge. If desired, additional nicks can be provided in the kiss-cutting die to assure the integrity of the kiss-cut sheet 761 without significantly detracting from the ability of a user to remove the pop-  
35 up elements, one at a time, for individual use.

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Once the kiss-cutting is completed, the composite laminated web structure can be severed into a plurality of individual rectangular sheets as by splitting the web into a desired number of 11-inch wide ribbons, for example, and then transversely cutting each ribbon to the desired rectangular size of the sheets. Alternatively, as described above, these ribbons could be perforated and fan-folded or could be simply rolled in this form for eventual cutting into individual sheets after EI treatment. The laminated web could also be sheeted to form individual rectangular sheets prior to kiss-cutting, in which case the individual rectangular sheets would then be kiss-cut to provide the pattern shown in FIG. 1B. However, kiss-cutting the web prior to severing may be preferable in many instances, particularly when it is desired to mass produce a large number of rectangular sheets of the same pop-up element pattern. In any event, kiss-cutting of the laminated sheet material 760 and 761, either while still in web form or in cut sheet form, provides the pattern shown in FIG. 1B. In this arrangement, an assemblage of 9 separate pop-up elements 745 cover the surface of the sheet; each can be removed individually from the sheet and employed as desired. An individual die-cut sheet 761 can be easily printed on its blank upper surface by simply feeding it through the usual computer-driven laser printer wherein the simultaneous customized printing of 9 identical pop-up elements can be simply accomplished in a straightforward manner. EI can also be used to print such sheets in fan-folded or roll form.

Once printed, the user removes one pop-up element 745 at a time from the sheet, preferably beginning at the bottom, and its removal from the sheet exposes the pressure-sensitive adhesive 759 on the rear surfaces of the subpanels 755 and 757. To ready the pop-

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up element 745 for application, the larger subpanel 755 is bent forward and upward 180° so that it lies against the front surface of 749a of the flag section, with the adhesive 759 which it carries facing forward, as depicted  
5 in FIG. 2B. With the pop-up element 745 in this orientation, it is inserted between a pair of panels or basepieces 763, which can be panels of the same page of a letter or advertisement or the like as shown in FIG. 3. The bottom edge of the subpanel 757 will be located  
10 adjacent a crease or fold line 763a between the two panels so that the adhesive 759 affixes the smaller subpanel 757 in this location. When the panels 763 are folded about the line 763a and brought into superimposition, the adhesive 759 causes the larger  
15 subpanel 755 to become affixed to the facing hinged panel 763.

When the letter is opened by the recipient, the pop-up element 745 assumes the 3-dimensional, attention-attracting configuration shown in FIG. 3. In this  
20 orientation, the front surface 749a is displayed prominently because the flag section 747 leans rearward, and the front surface of the larger subpanel 755, which can itself carry a printed message, e.g. a telephone number, is also displayed as shown in FIG. 3. This  
25 advantageously oriented structure is obtained by constructing the flag section 747 so that it is free of any lines of weakness and thereby constitutes a relatively large, perfectly flat panel and by locating the line of weakness 753 at the upper end of the leg 751,  
30 which provides a sharp hinge line that preserves the flatness in this region. Thus, in this configuration, the total surface area of the flag section 747 and the larger subpanel 755 is available for printing to carry a desired message for promotional purposes.

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Disclosed schematically in FIGS. 4 and 5 is a method for fabricating a composite web for making pop-up elements which are particularly designed for use in displaying a separate item, such as a business card, a photo, a coupon or the like. Four separate webs 765, 766, 767 and 768 are shown as being employed. Although these webs are shown as separate entities, it should be understood that they could all be split from a single web, or they could be formed from two webs which are each folded in half and then the folded edge suitably removed. Other combinations of folding and splitting could alternatively be employed. The four webs are used to produce a series of structurally identical pop-up elements 769 of the type shown in FIGS. 6-8.

Two patterns 771a and 771b of release coating (indicted by initials RC) are applied to the lowermost web 768 on its upper surface, and the uppermost web 765 carries two similar patterns of release coating 771c and 771d on what is now its undersurface in the orientation depicted. The release coatings 771a and 771c are located in regions that will constitute part of the flag section of the ultimate pop-up element 769, and the release coating regions 771b and 771d are located in what will constitute the supporting subpanel regions. The undersurface of the web 767, which is the lower of the two middle webs, is completely coated with pressure-sensitive adhesive 773a (indicated by initials PSA), and the upper surface of the other middle web 766 is similarly completely coated with pressure-sensitive adhesive 773b. In addition, the web 767 is formed with a longitudinally extending line of weakness 775a, which is located at what will be the lower edge of a rear flag section 777a. A second parallel line of weakness 775b in the web 767 constitutes a hinge line between a rear leg panel 777b and a supporting subpanel 777c. A single line

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of weakness 775c is formed in the web 766, it constitutes a hinge line that defines the lower edge of the front flag section 779a and the upper edge of the subpanel. The upper surface of the web 767, in the region of the rear flag section, is coated with a pattern 780 of bonding adhesive (indicated by the initials BA).

The four webs are superimposed one atop another to provide the composite arrangement schematically depicted in FIG. 5, wherein areas of adhesive alone are depicted by x's and wherein regions where one surface is coated with release coating and the other surface is coated with pressure-sensitive adhesive are depicted by alternating "RC" and "x". This four-layer composite web is then longitudinally slit so as to provide four slits 781a, b, c and d in the uppermost web 765 which completely sever the web 765 but do not extend into the adjacent web 766. These four slits create a segmented liner sheet having four liner panels which overlie the sheet material 766 and together form the front surface of the ultimate pop-up element 769. The lowermost web 788 (which with the sheet material 767 will constitute the rear surface of the pop-up element) is also slit, preferably at the same time, to provide two slits 785a and 785b which are located, respectively, in or at the lower edge of the flag section and at the upper edge of the supporting subpanel 777c, in alignment with the slit 781d. They create in the web 768 a removable liner panel 787a in the region of the flag section and a liner panel 787b in the region of the supporting subpanel. The composite four-layer web is then slit or perforated transversely so as to create individual or groups of identical pop-up elements 769, one of which is depicted in FIG. 6.

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When the pop-up element 769 is to be used, the liner panel 783d is removed from the front supporting subpanel 779b, exposing the pressure-sensitive adhesive 773b as depicted in FIG. 6. One or more of the front  
5 liner panels, 783a and 783b for example, are then removed from the flag section, as depicted in FIG. 7, to expose the pressure-sensitive adhesive 773b in this region, which will allow an item such as a business card 789 to be securely attached by completely covering the exposed  
10 adhesive in this region. If desired, all 3 liner panels, including panel 783c, are removed to more securely attach the item 789. The lowermost rear liner panel 787b is also removed from the other supporting subpanel 777c to expose the pressure-sensitive adhesive 773a in this  
15 region. This readies the pop-up element 769 for insertion between a pair of panels or basepieces 791 near a fold-line 791a along which such pair of panels 791 are hinged together. When the panels 791 are folded about the pop-up element, the respective pressure-sensitive  
20 adhesive patterns 773a and 773b in the regions of the supporting subpanels adhere to the facing surfaces of the juxtaposed panels 791 so that, when the letter or other folded article is opened by recipient, the pop-up element 769 assumes the 3-dimensional configuration shown in  
25 FIGS. 7 and 8 with the business card 789 being prominently displayed. If desired, the upper rear liner panel 787a could also be removed and a second item affixed thereto that would extend beyond the business card 789.

30 Depicted in FIG. 9 is a continuous web 795 of sheet material which has been printed so as to constitute a series of blanks each having a pair of pop-up panels located on opposite sides of the centerline of the web, which together form a pop-up element 797. The web 795 is  
35 treated so as to fabricate a series of structurally

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identical pop-up elements 797 by a single application of pressure-sensitive adhesive, preferably at a single station under which the upper surface of the web travels.

The web can be supplied directly from a web  
5 press, or it can be preprinted and then rerolled before being fabricated into the pop-up elements. At some time, either before or after printing or just prior to the steps depicted in FIG. 9, the web 795 is impressed with four longitudinally-extending lines of weakness 799a, b,  
10 c and d. The line of weakness 799c is located at the centerline of the web, and the flanking lines of weakness 799b and 799d define a pair of supporting subpanels 801a and 801b which are hinged to each other along the centerline 799c. The front subpanel 801b is hinged along  
15 the line 799d to a flag panel 801c which constitutes the front flag section of the pop-up element 797. The line of weakness 799a defines a small rear flag panel 801d and a link or leg panel 801e. One surface of the web 795 in the regions thereof which form the supporting subpanels  
20 801a and b is coated with a pattern 803 of release coating; this surface becomes the undersurface when the web is manipulated prior to adhesive application.

The web 795 is then caused to turn 180° so that what was previously the undersurface becomes the upper  
25 surface, and a pattern 805 of a release coating is applied in the region of the rear flag panels 801d. Alternatively, the release coating can be applied to the upper and lower surfaces of the web at about the same time. Following application of the release coating 805,  
30 patterns 807a and b of pressure-sensitive adhesive are then applied to what is then the upper surface of the web. The pattern 807a is applied over the dried, release coating 805, and the pattern 807b is simultaneously applied in the central region constituting the supporting  
35 subpanels 801a and b. The web is then severed by a

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suitable reciprocating blade 809 or the like to create individual pop-up elements 797 which are accumulated in a stack of, for example, 11 elements with a cover sheet having a central band of release coating being inserted atop each group of 11; such a stack is depicted in FIG. 10. If desired, such a stack can be subjected to compression and then marketed as a group of 10 pop-up elements.

In the stack in the region of the rear flag panels 801d, because the pressure-sensitive adhesive 807a was placed atop the dried release coating 805, it transfers to the surface of the pop-up element 797 next thereabove, and the adhesive in this region on the uppermost pop-up element 797 transfers to the underside of the inserted cover sheet. The pressure-sensitive adhesive 807b applied to the central region of the web stays in place because the underside of the central region of the web was coated with the release coating pattern 803.

To use the pop-up element 797, the uppermost one is removed from the stack and turned over so the central pressure-sensitive adhesive pattern 807b is facing downward, and so that the transferred pressure-sensitive adhesive 807a appears on the upper surface of the panel 801d as shown in FIG. 11. In this orientation, the pop-up element 797 is pressed downward on a sheet having a pair of panels 811 interconnected along a fold or hinge line 811a, as shown in FIG. 12, with the line of weakness 799c at the centerline being aligned with the fold-line 811a. Thereafter, upon folding of the sheet so that the panels 811 are superimposed one atop the other, the exposed pressure-sensitive adhesive pattern 807a on the flag section rear panel 801d attaches to the rear surface of the front flag section panel 801c, and the two support subpanels 801a and 801b become firmly affixed to the

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facing hinged panels 811. When the panels 811 are opened, the pop-up element assumes a prominent 3-dimensional configuration, as illustrated in FIG. 13, with the subpanels 801a and 801b firmly adhering to the hinged basepieces 811 and the flag section 801c displayed prominently as a flat surface inclined at an angle from the recipient to allow easy reading of the message imprinted thereupon.

Illustrated in FIG. 14 is a method of mass production of an assemblage of a plurality of individual, single thickness, pop-up elements. A continuous web 813 of transparent material is mated with a continuous web 815 having a width essentially one-half its width. Alternatively, an opaque or printed web 813 could be used if desired for a particular purpose. The web 815 is printed on the front, or on the front and rear surfaces if desired, to produce a series of structurally identical pop-up elements 821 from the individual blanks which are aligned along the length of the web 815. The transparent web 813 can be release-coated on its entire upper surface, or a polypropylene film having inherent releasing characteristics may be used. In the illustrated method, a release coating 816 is preferably applied at a suitable station along a central region prior to the subsequent application of a pressure-sensitive adhesive pattern 817 in the same location. In the illustrated embodiment, the adhesive pattern 817 straddles the centerline of the transparent web 813 extending equidistantly to both sides thereof. Alternatively, an adhesive pattern could be applied along both edges of the web 813, in which case, the printed web 815 is then aligned so that the release-coated subpanel region lies along one adhesive-coated edge of the wider web.

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The printed web 815 is formed with a longitudinally extending line of weakness 819 which ultimately defines a pair of hinged subpanels for eventual support of the pop-up element 821. Before the two webs are mated, a pattern 822 of release coating is applied to the rear surface of the web 815 in the region of the pop-up element 821 which will constitute the rear surface of larger subpanel 823. A release coating pattern 825 can also be applied at this time to the opposite (front) surface of the web 815, or such can be deferred until after the two webs have been mated. It may be preferable to apply both release coatings at the same time. In any event, a shorter release coating pattern 825 is applied so as to cover the front surface of the smaller subpanel 827, as best seen in FIG. 15.

The printed web 815 is die-cut, preferably by kiss-cutting, to provide a line of contour 829 in the flag section panel 831 and to create a slit 833 that defines a leg 835 and severs the larger and smaller subpanels 823, 827 from each other; preferably a line of weakness 837 is also created in the form of a hinge line at the top of the leg 835. The die-cutting can be performed before the printed web is mated with the transparent web 813; however, the contour line 829, the slit 833 and the line of weakness 837 are preferably created by kiss-cutting after the two webs have been mated. Following the die-cutting, the scrap portion can be stripped from the remainder of the web 815, or it can be simply left in place for the recipient to remove when the pop-up element 821 is used. If it is desired to leave it in place, a further option is the application of a thin line of adhesive along the lower edge of the transparent web 813 that would interconnect the rear surface of the scrap section to the transparent material

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so it will remain therewith when the transparent material is removed from the pop-up element 821.

The mating of the two webs aligns the printed web 815 with the lower half of the transparent web 813, as viewed in FIG. 14, with the subpanel region being in contact with the pressure-sensitive adhesive pattern 817, and then kiss-cutting is performed if such is to be employed. Thereafter, the upper one-half of the transparent web 813 is folded atop the printed web 815, as shown in FIG. 14, causing one-half of the pressure-sensitive adhesive pattern 817 to be superimposed atop the region of the front surface of the subpanels 823 and 827. The folded composite web can be fed through a compression section (not shown) if desired. Compression of the composite web is preferably carried out in combination with the creation of a transverse line 839 of perforations completely across the web, which is located at the line of demarcation between each successive blank, resulting in the creation of a strip of individually detachable pop-up elements 821, each fully protected within a transparent envelope. Thereafter, the perforated web may be severed at, for example, each 10 pop-up elements so that assemblages or strips of 10 pop-up elements 821 are provided, or the perforated composite web may be rolled into a coil and distributed in such form. Alternatively it can be fan-folded or handled in any other way as described hereinbefore.

In the composite web arrangement, a portion of the pressure-sensitive adhesive pattern 817 applied to the transparent web 813 transfers to the front surface of the larger subpanel 823 and to the rear surface of the smaller subpanel 827 where no release coating was applied. Alternatively, instead of applying the pressure-sensitive adhesive pattern to the web 813, the two stations used to apply the release coating to the web

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815 could be used to apply pressure-sensitive adhesive to the appropriate subpanel regions. When the user then wishes to affix one of the pop-up elements 821, it is simply torn from the strip along the line of perforations  
5 839. The transparent envelope is then stripped from the front of the pop-up element 821 to expose the pressure-sensitive adhesive on the larger subpanel 823 as depicted in FIG. 15, and the remainder of the folded transparent web is thereafter stripped from the rear surface, perhaps  
10 carrying with it the attached scrap section, to also expose the pressure-sensitive adhesive 817 on the rear surface of the smaller subpanel 827, as depicted in FIG. 16.

The pop-up element 821 is then inserted between  
15 panels 841 of the same page of a letter, or between any two panels that are interconnected along a hinge line 841a or the like, so that the bottom edge of each subpanel is adjacent the crease or hinge line 841a. When the panels 841 are then superimposed upon each other,  
20 sandwiching the single thickness, pop-up element 821 therebetween, the subpanels 823, 827 become affixed to the facing panels 841. When the letter is then opened by the recipient, the pop-up element 821 assumes the 3-dimensional attention-attracting configuration shown in  
25 FIG. 17 where the front surface of the flag section 831 is prominently displayed in an orientation where the message carried thereupon will be readily available to the recipient. Thus, this fabrication method allows the particularly efficient production of single thickness,  
30 sheet material pop-ups where the entire adhesive pattern is applied at a single location along the web 813 to a single flat surface; however, the resultant final product has exposed pressure-sensitive adhesive on oppositely facing subpanels and, when removed from the protective

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envelope, can be conveniently and easily affixed between a pair of hinged-together panels.

Illustrated in FIG. 18 is a mass production method for efficiently providing an assemblage of pairs  
5 of pop-up elements 843 arranged back-to-back, using a pair of continuous webs 845, 847 that can be supplied directly from a web press or that are supplied from preprinted rolls of sheet material. If desired, webs  
10 845, 847 can be supplied from the same web press and then split. They can both be similarly printed so the flag section panels carry the same message, or each web can carry its own message, or, if desired, the blanks along each web can carry a variety of different messages. The webs themselves are simply designed to provide a series  
15 of structurally identical pop-up elements once the fabrication process is completed. As an alternative, they might be left blank for the purchaser to print with a personalized message using state-of-the-art computer-driven laser printers.

20 A longitudinal line of weakness 849a is first impressed along web 845 at a location that will define hinged subpanels in the ultimate pop-up element, and a similar line of weakness 849b is impressed along the web 847 in a similar location. Next, a release coating is  
25 applied to each of the webs in the region that will generally constitute the rear surface of the flag section. The release coating 851a applied to the web 845 along a region that is slightly wider than the width of the supporting subpanels of the web 847, and the width of  
30 the release coating 851b applied to the web 847 is similarly slightly wider than the width of the subpanels on the web 845. Depending upon the release coating applied, it may be preferable to subject the coated webs to hot-air drying or the like. Thereafter, a pressure-  
35 sensitive adhesive pattern 853a is applied to the web 845

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in what will constitute the region of the subpanels, i.e. between the line of weakness 849a and the near edge of the web. A pressure-sensitive adhesive pattern 853b is similarly applied to the upper surface of the continuous  
5 web 847 in the region between the line of weakness 849b and the near edge of the web.

The two webs are then laminated together, and the pressure-sensitive adhesive patterns 853a and 853b assure that alignment of the two webs is perfectly  
10 maintained. The laminated composite web is then kiss-cut from both surfaces to create a central subpanel 855 and a hinged leg 857 in each of the webs, and the entire composite web is transversely perforated to define  
15 detachable pairs of back-to-back pop-up elements 843 in series alignment along the web. More specifically, a central subpanel 855a and a hinged leg 857a are cut in the upper web 845 together with a line of weakness 858 so that the hinged leg 857a remains attached along the line of weakness 858 to the main flag section 859a of the pop-  
20 up element. The original longitudinal line of weakness 849a provides a hinge line between the subpanel 855 and the hinged leg 857. The remainder of the pressure-sensitive adhesive coated portion of the web 845 constitutes a U-shaped subpanel 861a having a pair of  
25 arms that remain hinged to the flag section 859a along the original line of weakness 849a which are interconnected by a crossbar portion located along the lower edge of the pop-up element.

A similar, but oppositely oriented, central  
30 subpanel and its hinged leg are kiss-cut in the lower web 847, as can be seen from FIGS. 20 and 21. More specifically, the central subpanel 855b is connected along the original line of weakness 849b to the hinged leg 857b, with the remainder of the subpanel portion  
35 constituting a U-shaped subpanel 861b. The composite,

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perforated web can be handled in any suitable manner, such as by severing it in groups of 5 or 10 pop-up elements 843, fan-folding, or rolling into a coil or the like.

5           To use the pop-up elements 843, a unit consisting of a pair of them, as depicted in FIG. 19, is detached along the line of perforations 863. The release coating allows the flag section of one pop-up element, for example the flag section 859a in FIG. 20, to be  
10 peeled from the region of the underlying pop-up element 843b that contains the pressure-sensitive adhesive, and vice-versa, thus providing a pair of pop-up elements 843a and b with no waste to be discarded. The U-shaped subpanels 861a and 861b are then bent about the original  
15 longitudinal lines of weakness 849a and 849b so as to lie in juxtaposition with the front surface of the flag panels 859a and 859b, readying the pop-up elements for insertion between a pair of hinged-together panels or basepieces 865. One of the pop-up elements 843 depicted  
20 in FIG. 21 is then placed on one of two such hinged-together panels 865 with the lower edge of the central subpanel 855 generally adjacent the hinge line 865a; as a result, the pressure-sensitive adhesive secures the central subpanel 855 (and thus the rest of the pop-up  
25 element 843) in the desired location. Superimposition of the two panels 865 by folding about the line 865a results in the attachment of the U-shaped subpanel 861 to the facing panel 865. When the panels 865 are opened, as shown in FIGS. 22 and 23, the pop-up element 843 assumes  
30 an attractive attention-getting orientation with the flag section 859 prominently exposed. As shown in FIG. 23, the flag section 859 is tilted slightly rearward in the full open position, in which position, not only is a message carried by the front surface of the flag section  
35 prominently displayed, but the front surface of the U-

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shaped subpanel is also aptly positioned to display a portion of the overall message.

Although the invention has been described with regard to certain preferred embodiments, it should be understood that various changes and modifications as would be obvious to one having the ordinary skill in this art may be made without departing from the scope of the invention which is set forth in the claims appended hereto. For example, the pop-up elements can be made in various forms from a single sheet that is die-cut to form a plurality of subpanels. In addition, a single sheet can be folded upon itself to create an interconnected subpanel along the base of a pop-up element which carries adhesive on the exterior surface while a die-cut subpanel portion of the pop-up element carries adhesive on the opposite surface.

Although fabrication from a continuous roll is often preferred, cut sheets containing multiple pop-up elements have advantages in some cases. Instead of die-cutting one blank at a time, two or more blanks might be die-cut as a group, which would allow for the creation of pop-up elements of different shapes within the same cut sheet; in such a case, the pop-up elements which result might have a different appearance but would be structurally identical in that the fold lines would be in precisely the same locations. If desired for a particular web-handling operation, an illustrated folding step may be replaced by severing and manipulating one of the severed portions of the web to superimpose it upon the other. Adhesive patterns may also be applied to the corresponding surface portion of the web from that illustrated when surface-to-surface contact will subsequently be achieved; furthermore, the adhesive patterns can be applied in any suitable manner. Although the term "pop-up" element is used throughout to refer to

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the illustrated sheet material structures, it is intended to broadly encompass any flat sheet material structures that are easily displayable in three-dimensional form as a result of pressure-sensitive adhesive carried  
5 thereupon.

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WHAT IS CLAIMED IS:

1. A single-thickness sheet material assemblage which includes a plurality of pop-up elements comprising
- 5 a single integral piece of sheet material or the like having a front surface and a rear surface, which piece is formed to contain a plurality of pop-up elements each of which has an upper edge and a lower edge, and each of which includes a flag section that is
- 10 located in an upper region thereof and extends to said upper edge and a base section which is connected to and supports said flag section, said base section including at least two side-by-side legs and at least two subpanels which are formed by cut means extending toward said lower
- 15 edge from said flag section, said subpanels being hinged along their upper edges to said legs,
- pressure-sensitive adhesive on either said front surface or said rear surface of said piece in the location of each said subpanel, and
- 20 separate sheet material having releasing characteristics covering said pressure-sensitive adhesive,
- whereby each said pop-up element, upon detachment from said assemblage and separation from said
- 25 separate sheet material having said releasing characteristics, is capable of being readily inserted between and thereby becoming attached to a pair of hinged panels, at a location generally adjacent to a hinge line along which such hinged panels are interconnected in
- 30 hinged relationship one to the other so that, upon the opening of such pair of hinged panels, said pop-up element assumes a three-dimensional orientation and maintains such a three-dimensional orientation upon opening of said pair of hinged panels to a full open
- 35 position where said subpanels are essentially coplanar.

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2. An assemblage according to claim 1 wherein each said pop-up element subpanel is hinged to one of said legs along a line of weakness generally perpendicular to said cut means, and wherein said  
5 pressure-sensitive adhesive on said subpanels is located on the rear surfaces of each of said subpanels so that, prior to insertion between a pair of hinged panels, one of said subpanels is folded 180° about said line of weakness so as to lie in juxtaposition with said leg to  
10 which it is hinged.

3. An assemblage according to claim 2 wherein each said leg has a vertical length longer than the vertical length of said subpanel hinged thereto along  
15 said line of weakness.

4. An assemblage according to claim 2 wherein said separate sheet material comprises liner means which covers substantially the entire rear surface of said  
20 single integral piece, said liner means having releasing characteristics in the region juxtaposed with said subpanels and having additional pressure-sensitive adhesive along an upper edge portion thereof and wherein said rear surface of said integral piece of sheet  
25 material has a release coating along the upper edge region thereof so that said additional pressure-sensitive adhesive adheres preferentially to said liner means.

5. A composite sheet assembly comprising  
30 first and second juxtaposed substantially rectangular sheets of sheet material, said first sheet containing a die-cut array which constitutes said assemblage in the form of a plurality of pop-up elements according to claim 2 wherein

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said pop-up elements are positioned in a plurality of horizontal rows and vertical columns, and said second sheet constitutes said separate sheet material and has dimensions so as to at least cover substantially the entire region of said plurality of pop-up elements in said first sheet,

said rectangular sheets being joined together by said pressure-sensitive adhesive that is located on said rear surfaces of said subpanels and by additional pressure-sensitive adhesive located between said second sheet and an upper edge region of said first sheet with the rear surfaces of said pop-up elements in said horizontal row along the upper edge of said first sheet being formed with a release surface area which interfaces with said additional pressure-sensitive adhesive.

6. A composite sheet assembly according to claim 5 that is designed for sheet-fed printing, wherein said first and second rectangular sheets have dimensions substantially the same as each other, said first sheet constituting a die-cut array of a plurality of said pop-up elements which are positioned side-by-side in said plurality of horizontal rows and vertical columns, and wherein there is a pattern including a plurality of horizontal strips of pressure-sensitive adhesive extending horizontally across said sheets in the region therebetween which strips are located in alignment with said subpanels in each of said rows and constitute said pressure-sensitive adhesive and said additional pressure-sensitive adhesive.

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7. An assemblage according to claim 1 wherein said pressure-sensitive adhesive is located on said front surface of one of said at least two subpanels and on said rear surface of the other of said at least two subpanels  
5 of each pop-up element.

8. An assemblage according to claim 7 wherein each subpanel has a release surface area on the opposite surface from that surface on which said  
10 pressure-sensitive adhesive is located,

wherein separate sheet material is wrapped around said lower edge of said single integral piece of sheet material so as to cover said subpanels on both the front and rear surfaces thereof,

15 wherein said separate sheet material has a pattern of releasing characteristics in regions where it interfaces with said subpanels, and

wherein a continuous strip of pressure-sensitive adhesive is disposed in the region of said subpanels  
20 juxtaposed between the front and rear surfaces thereof and said separate sheet material, whereby said pressure-sensitive adhesive adheres preferentially to the desired surface of each said subpanel which does not have said release surface area.

25

9. An assemblage according to claim 2 wherein each said pop-up element has at least 3 of said legs and 3 of said subpanels, including a central subpanel and 2 flanking subpanels, which flanking subpanels include  
30 interconnecting bar means located along said lower edge of each said pop-up element.

10. An assemblage according to claim 9 wherein a release surface area is present on the rear surface of  
35 said integral sheet material piece in an upper region of

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said flag section generally adjacent the upper edge of said piece and wherein said separate sheet material which covers said pressure-sensitive adhesive on said subpanels is in the form of a second single integral piece of sheet material, identical to said integral sheet material piece, which is oriented with its upper and lower edges aligned, respectively, with said lower and upper edges of said single integral sheet material piece, so as to constitute a second assemblage of pop-up elements in opposite vertical orientation to those of said assemblage.

11. A stack of sheet material pop-up elements comprising a plurality of integral single sheet material pop-ups interconnected to one another and arranged in a vertical alignment, each said integral single sheet having 3 generally centrally located parallel lines of weakness which define a central fold-line and a pair of flanking subpanels and also having a pair of front and rear flag panels hinged to said subpanels along the outermost 2 lines of weakness of said 3 parallel lines of weakness, which flag panels have free edge regions spaced from said hinge lines of weakness,

said single sheets being arranged in alignment in said stack with the undersurface of each of a plurality of said sheets being in juxtaposition with the upper surface of the next adjacent sheet in said stack and with said central fold-lines being in vertical alignment,

the upper surface of each said sheet in the region of said flanking subpanels having a release surface area, and said free edge region of the undersurface of said rear flag panel of each said sheet also having a release surface area,

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two separate patterns of pressure-sensitive adhesive being located between each of said single sheets in said stack, a first said pattern being located on the undersurface of said pair of flanking subpanels and a  
5 second said pattern being located on the upper surface of said rear flag panel at said free edge region thereof,  
so that, following removal of one said single sheet from said stack and disposition on a basepiece with said central fold-line aligned with a fold-line of said  
10 basepiece, folding of the basepiece and said pop-up element sheet along said aligned fold-lines attaches said front and rear flag panels to each other via said second pattern of pressure-sensitive adhesive so that, upon  
opening of said folded basepiece, the pop-up element  
15 assumes a three-dimensional orientation.

12. A stack of pop-up elements according to claim 11 wherein said outermost lines of weakness are spaced equal distances from said central fold-line and  
20 wherein said rear flag panel is formed with a fourth line of weakness that is parallel to said 3 lines of weakness and defines an attachment subpanel at said free edge region, said release surface area and said second pressure-sensitive adhesive pattern being located on  
25 opposite surfaces of said attachment subpanel.

13. A stack of pop-up elements according to claim 12 wherein each said single sheet is rectangular and wherein said free edges of said front and rear flag  
30 panels are parallel to said 3 parallel lines of weakness.

14. A pop-up element designed for displaying a separate item in a prominent location, which pop-up element comprises

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two layers of sheet material or the like interconnected near the upper ends thereof in an upper flag section region which extends to the upper edge of said element, said two sheet material layers each  
5 constituting a leg section below said flag section and a subpanel extending from each said leg sections to the lower edge thereof, which subpanels are hinged along their upper edges to said leg sections, and said layers respectively providing a front surface and a rear surface  
10 for said pop-up element, and

pressure-sensitive adhesive carried by said front and rear surfaces of said element in the regions of each of said subpanels and also by said front surface in the region of said flag section,

15 a first segmented sheet of release liner means completely covering said front surface and said pressure-sensitive adhesive thereon, and a second sheet of release liner means covering said pressure-sensitive adhesive on said rear surface,

20 whereby following removal of an upper segment of said sheet of release liner means, an item can be attached to said flag section by said pressure-sensitive adhesive and whereby said pop-up element carrying said item is capable of being readily inserted between and  
25 thereby becoming attached to a pair of hinged panels, at a location generally adjacent to a hinge line along which said hinged panels are interconnected so that, upon the opening of such pair of hinged panels, said pop-up element assumes a three-dimensional orientation and  
30 displays said item in a prominent location.

15. A pop-up element according to claim 14 wherein said first and second sheets of release liner means completely cover said front surface and said rear  
35 surface.

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16. A pop-up element according to claim 15 wherein said pressure-sensitive adhesive completely covers said front surface and said rear surface.

5

FIG. 1A

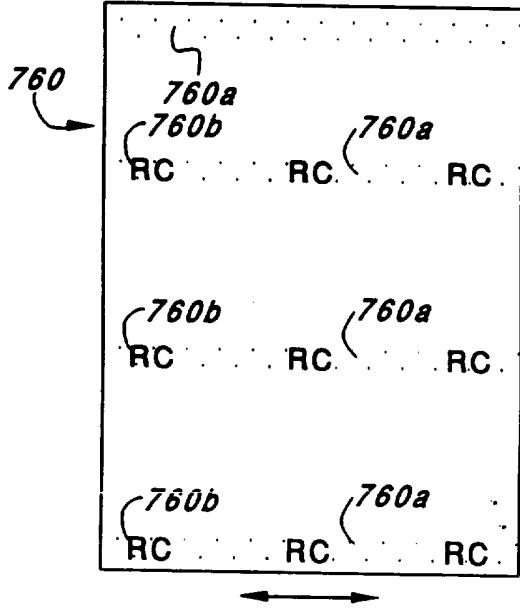


FIG. 1B

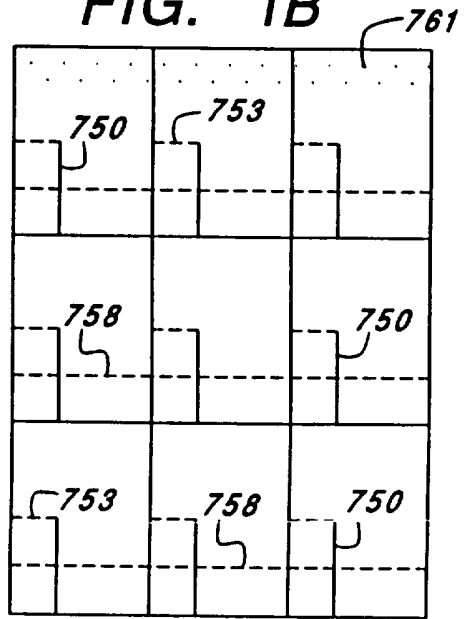


FIG. 2A

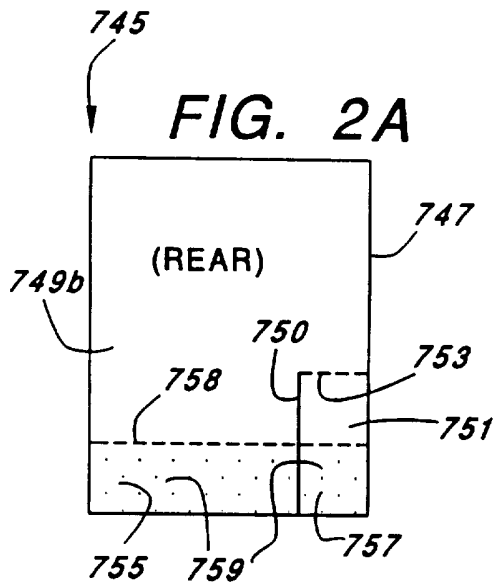


FIG. 2B

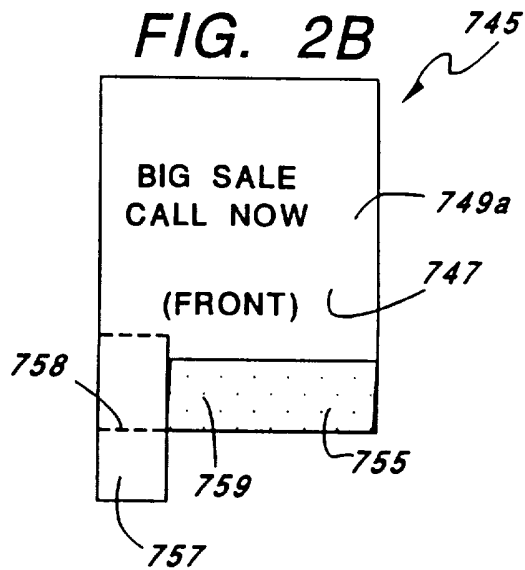
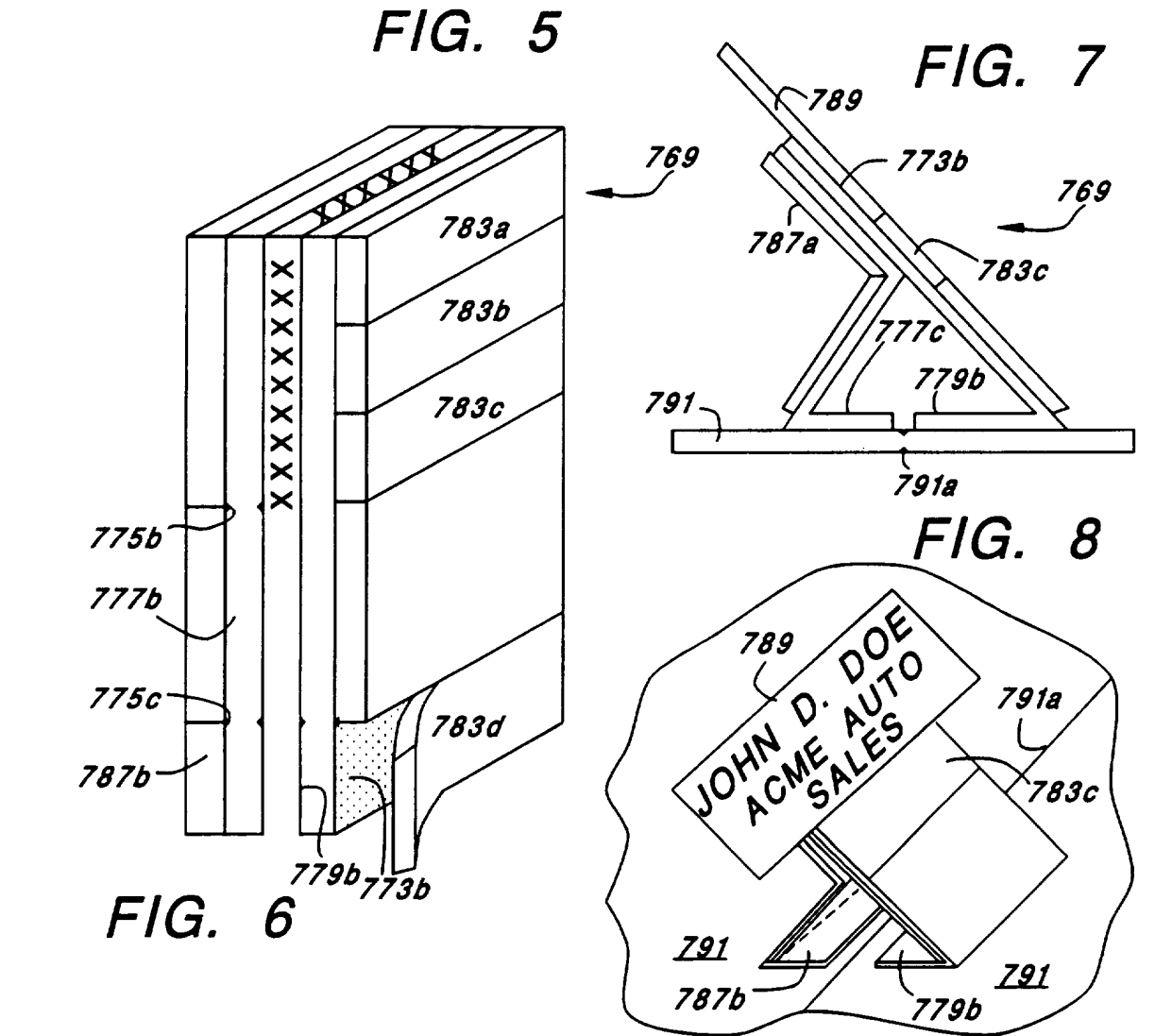
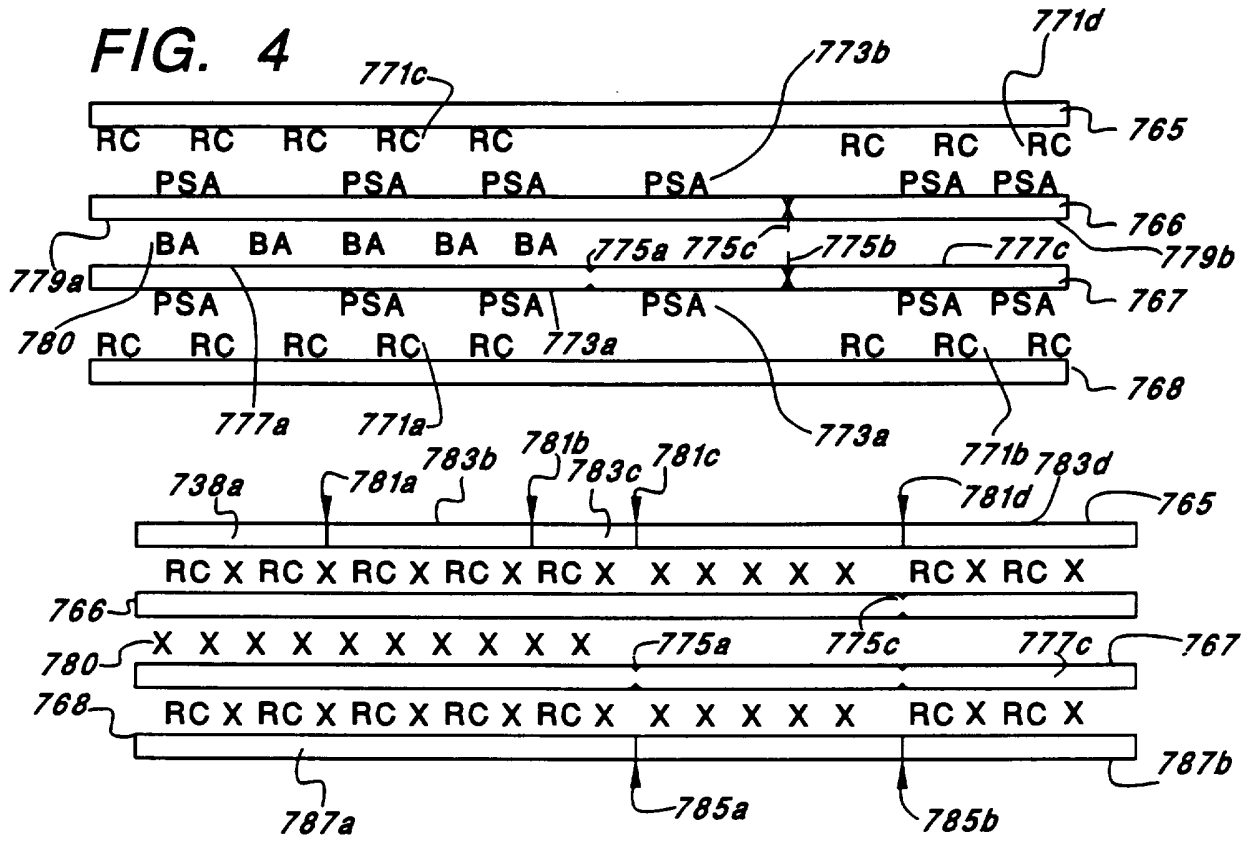


FIG. 3





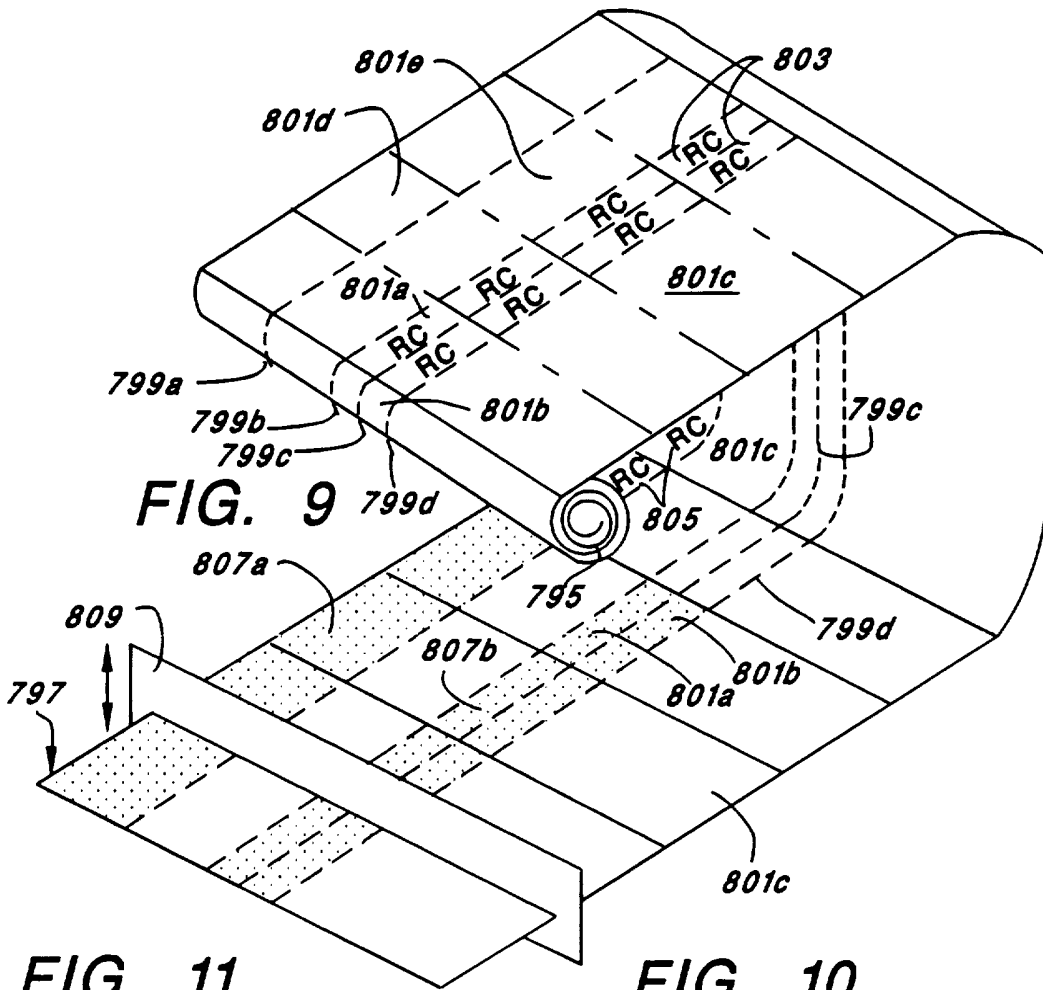


FIG. 9

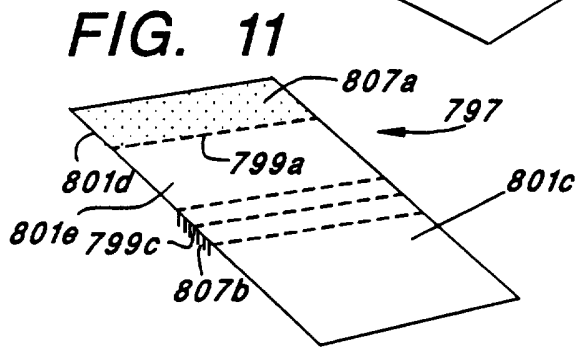


FIG. 11

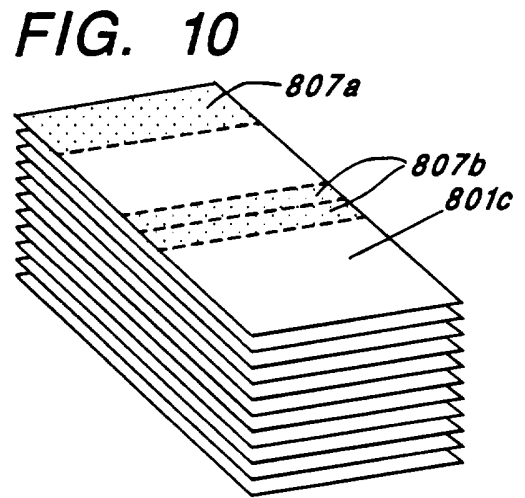


FIG. 10

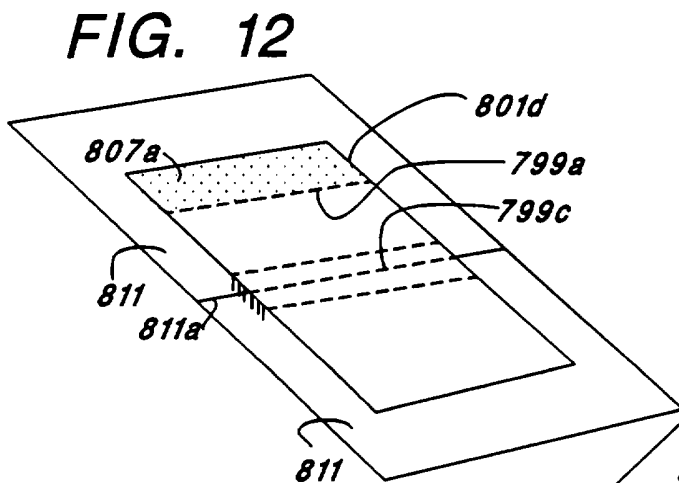


FIG. 12

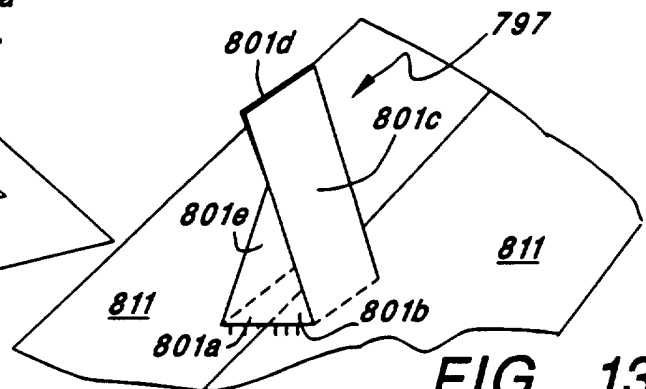


FIG. 13

FIG. 16

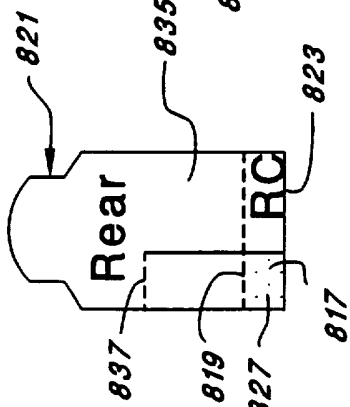


FIG. 15

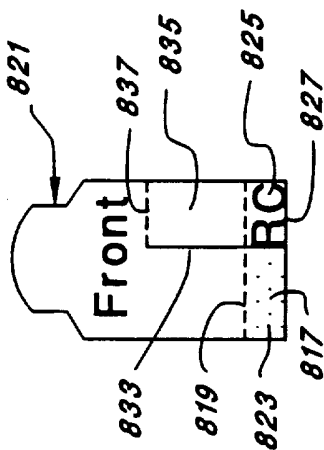


FIG. 17

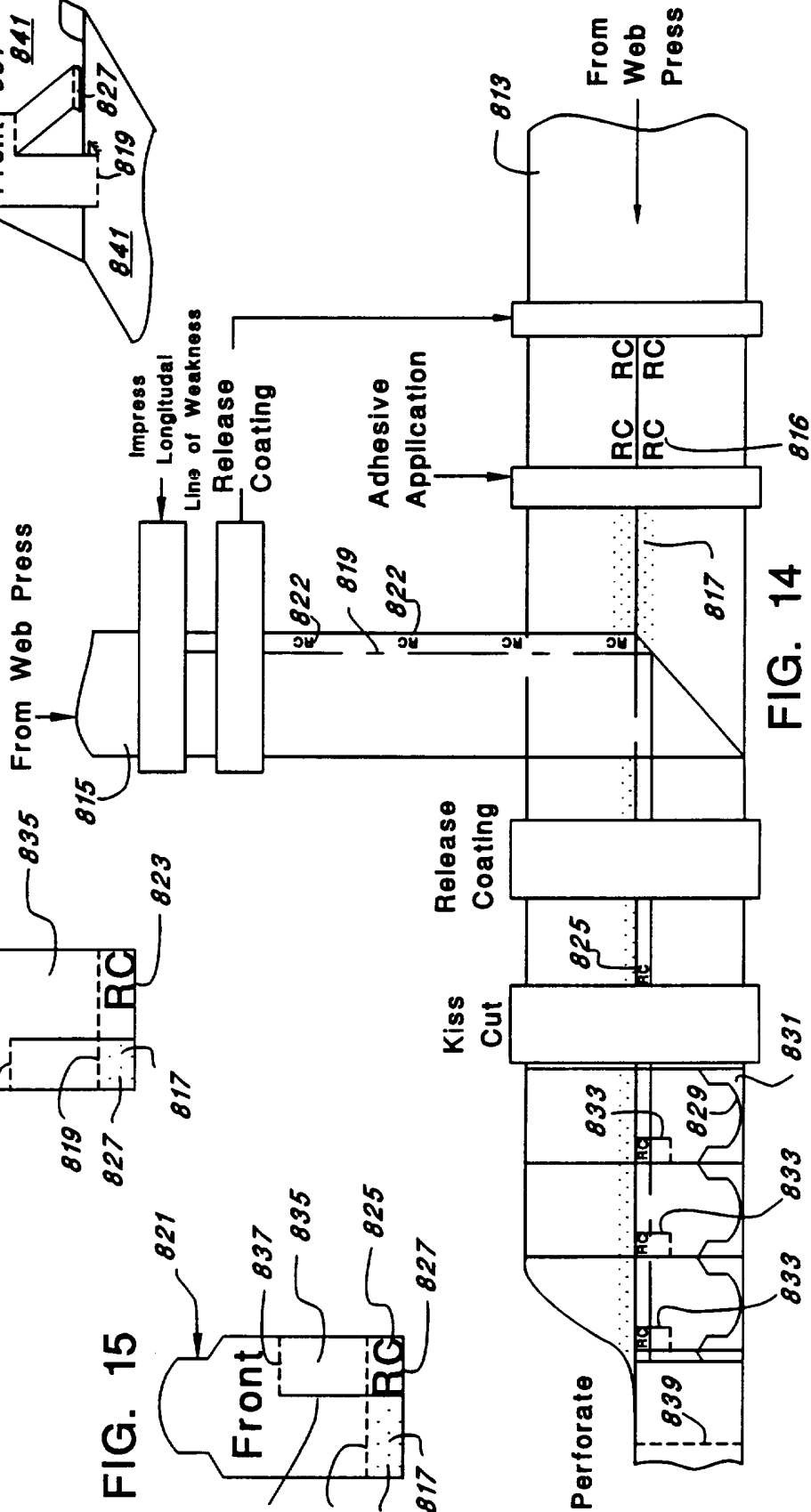
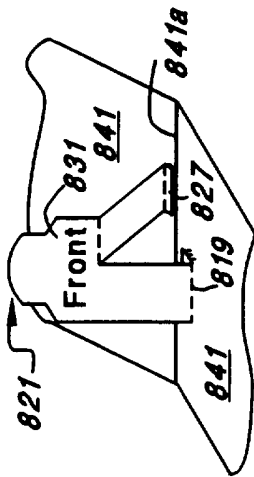


FIG. 14

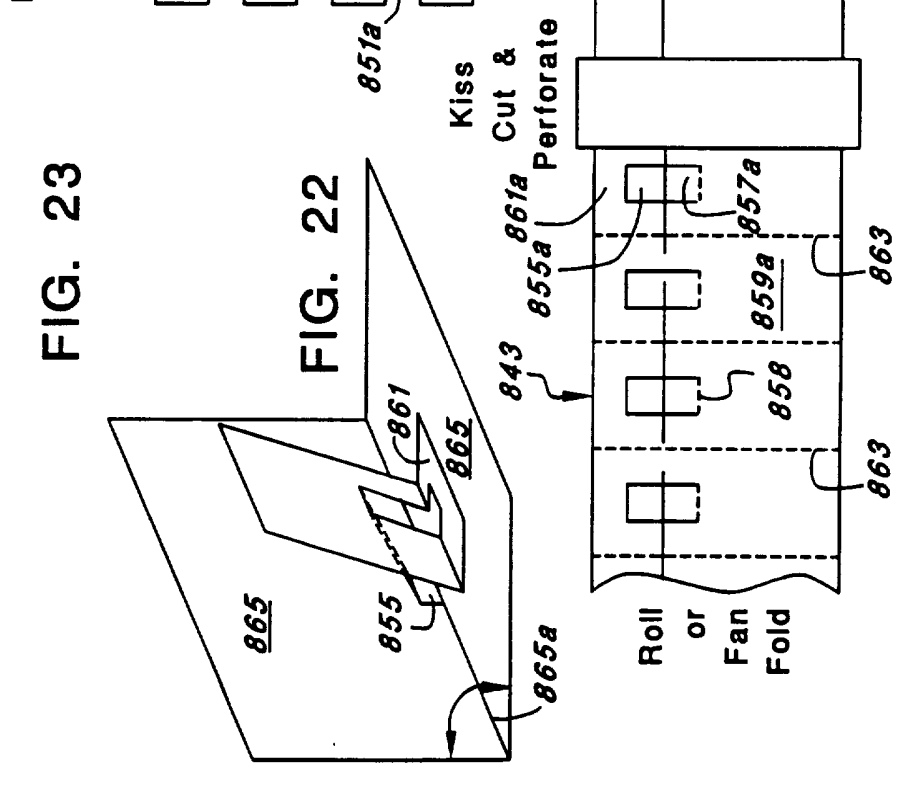
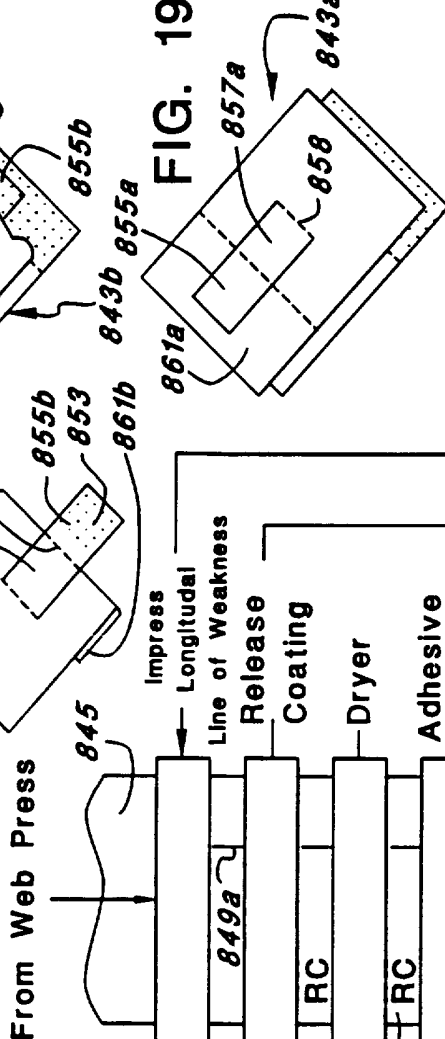
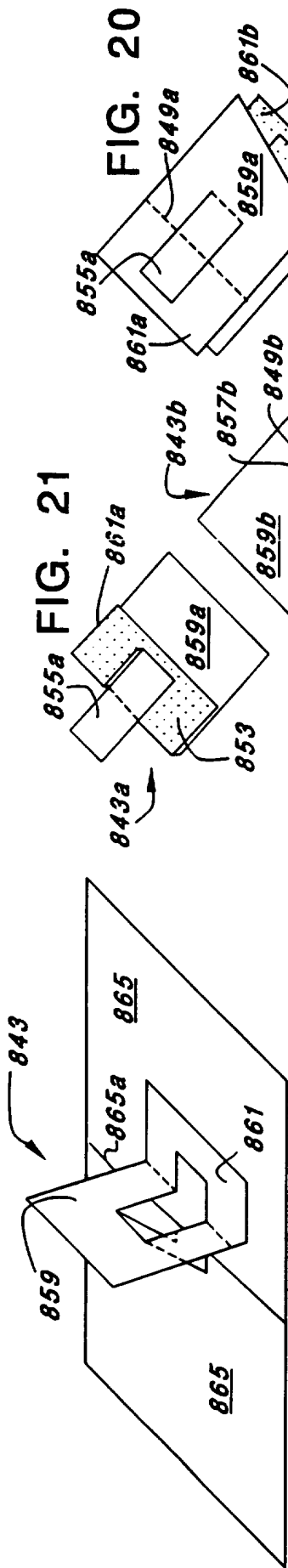


FIG. 23

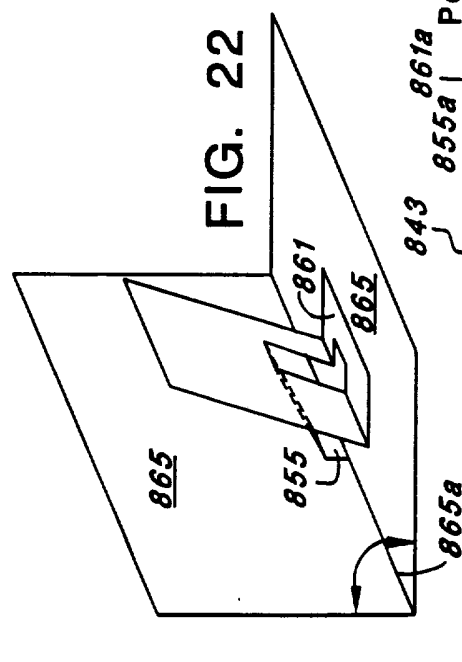


FIG. 18

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/US95/12028

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(6) : B32B 33/00; G09F 1/00  
 US CL : 428/40, 43, 121, 192, 194, 354, 355; 40/124.1; 283/56, 903  
 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)  
 U.S. : 428/40, 43, 121, 192, 194, 354, 355; 40/124.1; 283/56, 903

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 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, A, 4,592,573 (CROWELL) 03 June 1986. See abstract and figures 6 to 13.         | 1-16                  |

Further documents are listed in the continuation of Box C.  See patent family annex.

|   |     |  |
|---|-----|--|
| * Special categories of cited documents:  | *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  |
| *A* document defining the general state of the art which is not considered to be of particular relevance  | *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   |
| *E* earlier document published on or after the international filing date  | *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 |
| *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | *G* | document member of the same patent family  |
| *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  |     |  |

|   |  |
|---|--|
| Date of the actual completion of the international search<br>15 DECEMBER 1995 | Date of mailing of the international search report<br><b>11 JAN 1996</b> |
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