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(54) **HEAVY DUTY PRE-CUT ADHESIVE COATED TAPES**

VORGESCHNITTENE ,STARKE KLEBESTREIFEN

BANDES PREDECOUPEES, RECOUVERTES D'ADHESIF ET A RESISTANCE ELEVEE

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(73) Proprietor: **3M Innovative Properties Company**
St. Paul, MN 55133-3427 (US)

(72) Inventors:
• **ELEOUET, Bernard, J., B.**
Saint Paul, MN 55133-3427 (US)
• **CRAWFORD, Dennis, L.**
Saint Paul, MN 55133-3427 (US)

- **BYRAM, David, C.**
Saint Paul, MN 55133-3427 (US)
- **SCHLEIF, Larry, A.**
Saint Paul, MN 55133-3427 (US)
- **DOTTERMAN, Perry, S.**
Saint Paul, MN 55133-3427 (US)

(74) Representative: **Voortmans, Gilbert J.L.**
3M Europe S.A.,
Hermeslaan 7
1831 Diegem (BE)

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EP-A- 0 638 438 **GB-A- 2 181 992**
US-A- 5 086 946 **US-A- 5 518 144**

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Description

Technical Field

[0001] The present invention relates to pre-cut adhesive coated sheets for joining one surface to another and to a dispenser particularly suitable for dispensing a large number of such sheets.

Background of the Invention

[0002] The art is replete with structures for adhesive coated sheets adapted to connect or join one surface to another surface. Tape from #810 MAGIC brand transparent tape available from 3M, St. Paul, MN is used extensively for a variety of purposes and is conventionally dispensed from a roll of such tape on a roll type dispenser such as the dispensers disclosed in U.S. Patent No. 4,928,864 and U.S. Design Patent No. 116,599. Such a roll of tape must be manually cut by cutting means that is located on the dispenser. It is difficult for the user to manually cut precise, uniform lengths of the adhesive coated tape from the roll, as it is difficult to repeatedly measure the lengths precisely. Such a tape/dispenser combination is not suitable for situations that require quick and efficient dispensing of precisely uniform, pre-cut lengths of adhesive coated tape.

[0003] South African patent application no. ZA 903889 discloses individual strips of adhesive coated tape mounted on a backing tape. The backing tape with the individual strips thereon may be rolled and included in a dispenser. Individual tape strips of pre-determined length can be readily removed by pulling the backing tape from the dispenser and peeling a tape strip therefrom. However, this solution creates a large waste of tape backing and it may be difficult to remove a tape strip by only one hand.

[0004] GB 2 181 992 discloses a block of superimposed, individual adhesive tape strips, wherein each adhesive tape strip has an edge region free of adhesive to allow the individual tape strips to be easily lifted and removed from the block one after the other. The adhesive free edge piece needs to be removed after removal of the tape strip from the block that is cumbersome. In another embodiment, a non-adhesive element is provided to cover at least an edge region of the adhesive layer. This too is cumbersome and requires use of two hands, which does not allow for quick taping operations such as in gift-wrapping.

[0005] Similarly, U.S. Patent No. 5,153,043 discloses a roll of adhesive tape that has several cuts extending parallel with the longitudinal axis of the roll and radially through the tape so as to divide the tape into a plurality of laterally tearing tape strips. A portion of the tape and therefore each individual tape strip has an area free of adhesive near one edge to serve as a lead edge for easy removal of a tape strip. Again, this does not provide easy and quick dispensing of the individual tape strips. More-

over, the individual tape strips will vary in width throughout the roll with the tape strip near the core of the roll having the smallest width.

[0006] It is also known to dispense transparent tape from a pad of tape strips as described in U.S. Patent No. 4,650,706. '706 discloses a pad of tape strips where the length of a tape tab formed at one end of each tape strip extending from one end toward an opposite end is progressively greater from one side of the pad to the other. '706 teaches that separation of the tape strip with the longest tape tab may be accomplished by grasping the tape tab and peeling the strip from the pad without separation of the next adjacent strip. Thus, a person desiring a sheet must manually separate an edge of a top sheet from the rest of the sheets in the stack and peel that sheet away, which is inconvenient, particularly when only one hand is available to remove the sheet. Such a stack is not suitable for situations where the user requires the use of both hands for operations other than the dispensing of the tape, such as, for example, gift-wrapping.

[0007] U.S. Patent No. 4,895,746 discloses a stack of adhesive coated sheets, such as labels comprising release means and attachment means that provide means for easy release of the top sheet in the stack of sheets. '746 does not disclose placing the release means on alternating opposite edges of the sheets in the stack. Thus, similar to the tape strips taught by '706, a person desiring a sheet must manually separate an edge of a top sheet from the rest of the sheets in the stack and peel that sheet away, which is inconvenient, particularly when only one hand is available to remove the sheet. '746 also does not disclose a container for the adhesive coated sheets adapted to enclose and protect the sheets.

[0008] U.S. Patent Nos. 5,401,547, 5,086,946 and 5,518,144 teach a stack of adhesive coated pre-cut sheets that have attachment means and release means alternating between opposite ends through the stack. These patents also disclose a dispenser for easy dispensing individual sheets. Individual adhesive sheets can thus be easily and manually dispensed from the stack by one hand. However, the number of sheets in such a stack is generally limited because a large number of sheets in a stack would create too big of a gap between the dispensing window of the dispenser and the stack once the end of the stack is approaching. This may lead to difficulties in dispensing the last sheets from the stack. Accordingly, the stacks of adhesive coated sheets in these patents is less suitable for use by heavy duty users that need easy and convenient access to a large number of adhesive coated sheets.

[0009] EP 638438 discloses a sheet dispenser or sheet dispenser subassembly including a coherent stack of tape flags or other adhesive-bearing sheets that can be unobtrusively permanently or removably adhered on a page of a book, catalog, brochure, etc., because it has a supple cover layer that is a thin, tear-re-

sistant polymeric film. The dispenser subassembly has a pressure-sensitive adhesive layer on a peripheral portion of the cover layer by which it can be adhered to the page which then serves as a back layer for the dispenser, whereas the dispenser includes a bottom layer on an outer surface of which is a layer of pressure-sensitive adhesive layer by which the dispenser can be adhered to a surface. There is further disclosed a roll having a plurality of sheet dispenser subassemblies.

Summary of the Invention

[0010] The present invention provides a set of stacks of adhesive coated sheets (70) comprising on a major surface of a substrate (50) at least two stacks (51, 51A, 51B) adhered to the substrate (50), each stack (51, 51A, 51B) being a stack of sheets disposed one on top of another, each of the sheets (11, 12, 14, 16) having first (19) and second (20) spaced ends and a predetermined length between the first (19) and second (20) ends, comprising a backing (10) having opposite major first and second surfaces, and having a layer of pressure sensitive adhesive (2, 2A, 2B) on a major side of the sheet, the sheets being releasably adhered to each other by releasable adhesion of the layers of pressure sensitive adhesive (2, 2A, 2B) to the surfaces of underlying sheets to form the stack, with the first end (19) of each sheet being in alignment with the second end (20) of an adjacent sheet in the stack, and the sheets having first release means (8, 8A, 8B) for providing a first adhesion level along a first end portion (15) of each of the sheets adjacent the first end (19) between the layer of adhesive (2, 2A, 2B) and the surface of the adjacent sheet in the stack to which the layer of adhesive is releasably adhered that affords easy separation of surfaces of adjacent sheets along the first end portion (15), and second release means (9, 9A, 9B) for providing a second adhesion level along a second end portion (17) of each of the sheets adjacent the second end (20) between the layer of adhesive (2, 2A, 2B) and the surface of the adjacent sheet in the stack, which second adhesion level (9, 9A, 9B) provides a release force that is higher than the release force along the first end portion (15) and firmly adheres the sheet to the adjacent sheet in the stack during separation of the sheets along the first end portion (15) while affording peeling away of the sheet from the stack along the second end portion (17). The set of stacks of adhesive coated sheets is in the form of a belt.

Brief Description of the Drawing

[0011] The following drawings are provided to illustrate various embodiments of the present invention without however the intention to limit the invention thereto:

Figure 1 is schematic drawing of a set of stacks of adhesive coated sheets according to the invention.
Figure 2 is a schematic drawing of a stack of adhe-

sive coated sheets.

Figure 3A and 3B schematically illustrate two embodiments of an adhesive coated sheet according to the present invention.

Figure 3C is diagrammatic representation of an adhesive coated sheet stack showing the portions containing the first release means and the second release means.

Figures 4A to 4C illustrate three embodiments of a stack of the set of adhesive coated sheets.

Figure 6A to 6D are schematic representation of a partial cross-sectional view across a dispensing window of a dispenser.

Figure 11 is a cross-sectional view of a dispenser that can be used with the set of stacks of adhesive coated sheets of this invention.

Figures 12A-G illustrate a further dispenser that can be used with the set of stacks of adhesive coated sheets of this invention.

Figures 13A-C illustrate a further dispenser that can be used with the set of stacks of adhesive coated sheets of this invention.

Description of the Preferred Embodiment(s)

[0012] The present invention provides a set of stacks of adhesive coated pre-cut sheets. The stacks are adhered to a rigid or flexible substrate typically to form a preferably continuous string of stacks. As used in this application "flexible substrate" means a substrate that can be readily and repeatably bent without causing damage to the substrate. Examples of flexible substrates include plastic film, light cardboard and paper. As used in this application "rigid substrate" means a substrate that cannot be readily bent without causing damage to the substrate. Examples of rigid substrates include rigid plastic body, wood or a thick metal. When the substrate is a rigid substrate, it is preferred that the substrate is substantially non-planar. For example, the rigid substrate can be an arcuate or cylindrical substrate. The stacks are adhered to the substrate such that during the dispensing of individual pre-cut sheets from the stack, the stack does not normally release from the substrate. In connection with the present invention, the substrate may also comprise a combination of substrates. For example, the individual stacks may be adhered to a back sheet having about the same dimensions as the stack and these stacks may then be chained to each other by means of for example strips of adhesive linking the back sheets of two neighbouring stacks to each other. In such a case the substrate will comprise the back sheets of the individual stacks and the adhesive strips chaining the stacks together, to form the set of stacks of adhesive coated sheets.

[0013] The use of a flexible substrate is preferred in connection with this invention as it can be used with all of the various dispensers of the invention. In case the set of stacks of adhesive coated sheets is to be used

with a dispenser that comprises a conveyable carrier it will be preferred that the set of stacks of adhesive coated sheets contains means for firmly attaching the set to the conveyable carrier. In accordance with one embodiment, the substrate may be provided with attachment means at the side of the substrate opposite to the side containing the stacks of adhesive coated sheets. For example, a repositionable adhesive may be provided at the side of the substrate opposite to the side that has the stacks adhered thereto. Instead of using a repositionable adhesive, other attachment means can be used as well such as a hook and loop attachment commercially available from 3M Company under the brand SCOTCH™ or interlocking fasteners also available from 3M Company. Further, the surface of the conveyable carrier may be provided with a fabric or non-woven surface and the side of the substrate of the set of stacks of adhesive coated sheets opposite to the side that has the stacks adhered thereto, may be provided with fabric cubicle grips available from 3M Company under the brand SCOTCH™. According to an alternative embodiment, a lead edge and/or trailing edge free of adhesive coated sheet stacks may be provided on the set of stacks of adhesive coated sheets so that the set may be firmly attached to the conveyable carrier by inserting the lead and/or trailing edge in one or more slots on the carrier. As a still further embodiment to firmly attach the set of stacks of adhesive coated sheets to a conveyable carrier, that can be used with conveyable carriers that are in the form of a wheel or a core that can be rotated, the set of stacks of adhesive coated sheets may be provided as a belt that has a diameter large enough such as to allow to slide the set of stacks of adhesive coated sheets over the conveyable carrier to mount the set thereon while having a diameter small enough to avoid slipping of the set relative to the conveyable carrier during movement, i.e. rotation, of the conveyable carrier. As a variation of this embodiment, the belt may be provided with a diameter smaller than the diameter of the conveyable carrier and the substrate of the set of stacks of adhesive coated sheets may comprise an elastic material such that the diameter of the belt can be stretched to fit the belt over the conveyable carrier.

[0014] In case the set of stacks of adhesive coated sheets is to be used in a dispenser comprising a conveyor channel to allow for conveyance of the individual stacks to the dispensing window, it will generally be preferred that next to the last stack of the set a dummy pad is adhered to the substrate. The presence of such a dummy pad will substantially improve dispensing adhesive coated sheets from the last stack of the set of stacks of adhesive coated sheets because without this dummy pad, unwanted up and down movement of the last stack in the dispenser may occur. As an alternative to the use of a dummy pad, the dispenser may be provided with a means for temporarily blocking the substrate of the set of stacks of adhesive coated sheets. Such a means includes for example a lever or a plunger. A set of stacks

of adhesive coated sheets having a flexible substrate is provided in the form of a belt.

[0015] Each stack in the set of stacks is a stack of pre-cut sheets disposed one on top of another, each sheet comprising a backing and having first and second opposite major sides and first and second opposite ends with the first end of each sheet being in alignment with the second end of an adjacent sheet in the stack, and a layer of adhesive permanently adhered to the first major side of the sheet, the layer of adhesive of each sheet being releasably adhered along the second major side of the adjacent (lower) sheet in the stack. Each of the sheets comprises first release means for providing a first adhesion level along a first end portion of each of the sheets adjacent the first end of the backing between the layer of adhesive and the second major side of the adjacent (lower) sheet in the stack. The first adhesion level provides a sufficiently low release force (e.g. preferably less than 50 grams per inch; 1.97 grams/mm) between the adhesive coating and the adjacent (lower) sheet to afford separation (which may include "sliding movement") between the side surfaces of the adjacent sheets along the first end portion. The adhesion level can be conveniently measured by the method ("Release Force") described in US 5,401,547 at column 21, lines 31 to 47.

[0016] Second release means are present for providing a second adhesion level along a second end portion of each of the sheets adjacent the second end of the sheet between the layer of adhesive and the second major side of the adjacent (lower) sheet in the stack to which the layer of adhesive is releasably adhered. The second adhesion level provides a release force (preferably between 4 and 15 ounces per inch; which is between 5 grams/mm and 17 grams/mm) that is higher than the low release force along the first end portion and firmly adheres the sheet to the adjacent (lower) sheet in the stack during separation of the sheet relative to the adjacent sheet along the first end portion while affording peeling away (e.g. manual) of the sheet along the second end portion.

[0017] The first release means for providing the first adhesion level and the second release means for providing the second adhesion level can comprise a variety of structures including, but not limited to one or combinations of (1) providing a uniform coating of the same pressure sensitive adhesive on each of the sheets together with a coating of low adhesion backsize on the portion of the upper surface of each sheet only along the first end portion, or providing different low adhesion backsizes on the upper surface of each sheet along the first and second end portions, with the low adhesion backsize in the first end portion having the greatest release factor (that is, lowest release value); (2) making the coating of pressure sensitive adhesive along each of the sheets discontinuous along the first end portion and continuous along the second end portion, or discontinuous along both portions with greater discontinuities

along the first end portion than along the second; and/or (3) using different pressure sensitive adhesives along the two end portions. For example, a stack of the sheets may comprise a layer of adhesive coated over an entire first major side surface of the backing of each of the sheets, the second release means may comprise a layer of medium release low adhesion backsize (LAB) coated over at least a portion of the second major side surface adjacent the second end of the sheet, and the first release means may comprise a layer of premium release low adhesion backsize (LAB) coated over a portion of the second major side surface adjacent the first end of the sheet. In this example, the sheets in the stack may have a length along a longitudinal axis and a width along a direction perpendicular to the longitudinal axis of the stack. The layer of premium release low adhesion backsize (LAB) is continuous, extends from the first end of the backing along the length of the sheet and comprises between ten (10) and eighty (80) percent of the area of a side of the backing of each sheet in the stack. Preferably the premium release low adhesion backsize (LAB) layer comprises generally about thirty-seven and one-half percent of the area of a side of the backing of each sheet in the stack.

[0018] Preferably, each stack of the set of stacks of adhesive coated sheets has a tab releasably adhered to the first sheet of the stack. Such a tab has opposite first and second ends and comprises a backing. On a major side of the backing along the first end there is provided an adhesive layer and at least a portion of that major side of the backing along the second end of the tab will be free of adhesive. Preferably, the tab has a length that is less than the length of the adhesive coated sheets in the stack. Preferably, the tab will have a length that is about half the length of the adhesive coated sheets. The tab is preferably adhered to the stack such that the first end of the tab containing the adhesive layer is aligned with an end of the stack. The tab releasably adhered to each stack provides for an easy way to grab the first adhesive coated sheet of a stack.

[0019] Generally, as used herein, "sheet material" means a generally flat, flexible structure, preferably acetate, brightened acetate film, unbrightened acetate film, thermoset film, thermoplastic film, polyester, polypropylene, polyethylene, vinyl, paper, metal foil, non-woven or combinations of the above mentioned materials. Preferably the sheet material is transparent to allow a user to see the underlying substrate but the sheet material may also be opaque.

[0020] Low adhesion backsize refers to a material which readily releases from a layer of pressure sensitive adhesive and includes, but is not limited to, silicones, fluorocarbons, acrylates, urethanes, chrome complexes, grafted or block siloxane hydrocarbons, and blends of these materials. Examples of various low adhesion backsizes are found in U.S. Patent Nos. 4,421,904; 4,313,988; and 4,279,717 the entire specifications of which are herein expressly incorporated by reference.

Other low adhesion backsizes that may be used according to the present invention are described in U.S. Patent Nos. 2,607,711; 2,876,894; and 2,532,011 the entire specifications of which are also herein incorporated by reference.

[0021] Generally, as used herein, "premium release low adhesion backsize" means an adhesive/backsize interaction with a maximum release force of 100 grams per inch or lower, and "medium release low adhesion backsize" means an adhesive/backsize interaction with a release force of at least 150 grams per inch or higher.

[0022] The pressure sensitive adhesive may be of an acrylic, silicone, rubber-resin, or any other suitable composition. For example, the adhesive may comprise acrylic adhesive IOA(95%)/AA (4.5%) iso-octyl acrylate/acrylic acid. Adhesives for use with the present invention are described in U.S. Patent Nos. 4,699,842; 3,578,622; 3,331,729; 2,926,105 and 4,835,217 the entire specifications of which are herein expressly incorporated by reference. Repositionable adhesives such as acrylic-based microspheres (IOA-ammonium acrylate) is also contemplated as an adhesive for use according to the present invention. For example, repositionable adhesives may be prepared according to U.S. Patent No. 3,691,140, the entire specification of which is also herein incorporated by reference.

[0023] Various dispensers can be used with the set of stacks of adhesive coated sheets of the invention. The dispenser typically is capable of holding a set of stacks of adhesive coated sheets containing at least 4 stacks, preferably at least 8 stacks and more preferably at least 16 stacks. The invention should include a dispensing window through which individual sheets from a stack can be dispensed. Further, the dispensing window and set of stacks of adhesive coated sheets should be movable relative to each other so that each of the individual stacks can be brought under the dispensing window once a stack of the set has been consumed. Preferably, the movement is incrementally and means are provided so as to keep an individual stack in a temporarily fixed position relative to the dispensing window.

[0024] In accordance with one set of embodiments, the dispenser comprises one or more walls defining its shape and a dispensing means comprising an opening in one of the walls. The opening of the dispensing means, also called dispensing window hereinafter, typically has a width slightly larger than the width of the adhesive coated sheet stack and a length which is somewhat less than the length of the adhesive coated sheet stack. For example, the width of the dispensing window can be between 100 and 120% the width of a stack and the length of the dispensing window can be between 20% and 90% the length of a stack. While it is generally important that the length of the dispensing window is less than the length of the stack of adhesive coated sheets, the width of the dispensing window is less critical and the width may be large enough to accommodate two or more stacks in the dispensing win-

dow such that dispensing can take place from several stacks at the same time.

[0025] In accordance with an embodiment of the present invention, the opening in the wall through which the individual sheets are to be dispensed may have a width and length substantially larger than desired for the dispensing of the adhesive coated sheets. In such embodiment, the size of the opening in the wall may be adjusted by superimposing on the opening a second opening having smaller dimensions. Thus, in such embodiment, the dispensing means will comprise an opening in one of the walls and an opening superimposed thereon having dimensions smaller than the opening in the wall of the dispenser. The use of a dispensing window superimposed on a larger opening in the wall can be of particular use to accommodate the use of different sets of adhesive coated sheet stacks having stacks of a different width and/or length. As a further alternative, a shuttling dispensing window may be provided on top of the opening in the wall of the dispenser. Such a shuttling window will typically include a small slot (slightly larger than the thickness of a sheet) through which a sheet can extend and during the dispensing operation, the shuttling dispensing window will shuttle from one edge to the other over the opening along the length of the opening. This alternative has the advantage that the sheet is always in an upright position and easier to grab. While the dispensing window is preferably rectangular, other shapes can be used as well such as a circular opening, an oval opening or an opening with one or more straight edges and one or more rounded edges. The dispensing window in these embodiments is fixed, i.e. non-movable relative to the set of stacks of adhesive coated sheets and accordingly, the set of stacks of adhesive coated sheets will have to be moved relative to the dispensing window to bring a stack to the dispensing window. Therefore, the dispenser will include a means to allow conveyance of the individual stacks of the set to the dispensing window. Such means for conveyance includes a conveyable carrier such as a rotating wheel, rotating core or belt. Preferably, the direction of conveyance of the set of stacks of adhesive coated sheets will be parallel to the longitudinal direction of the set of stacks of adhesive coated sheets.

[0026] In a dispenser having a conveyable carrier, the set of stacks of adhesive coated sheets will be firmly attached to that carrier and by moving it, each of the individual stacks of the set can be transported to the dispensing window to dispense individual sheets from a stack.

[0027] The set of stacks of adhesive coated sheets of the present invention and dispenser for use therewith will now be described in more detail with reference to the drawings.

[0028] Referring now to Figures 1, 2, 3A through 3C, 4A through 4C, there is shown an embodiment of a set of stacks of adhesive coated sheets 70 (Fig. 1,5), comprising stacks 51 adhered to a substrate 50.

[0029] Figure 2 schematically represents a stack 51 of adhesive coated sheets containing a plurality of adhesive coated sheets 12, 14 releasably adhered to each other. According to a first embodiment of a stack 51 of sheets 11 (Figure 3A) according to the present invention, each sheet 11 comprises a backing 10 having a coating of pressure sensitive adhesive 2 on a first major side surface 3 by which the sheet 11 may be adhered to a sheet beneath it in the stack 51, a second major side surface 5, and opposite first 19 and second 20 edges with the first end 19 of each sheet in alignment with the second end 20 of an adjacent sheet to form the stack 51.

[0030] Release means 8 provide a first adhesion level along a first end portion 15 of each of the sheets 11 adjacent the first end 19 of the backing 10 between the layer of adhesive 2 and the second side surface 5 of the adjacent (lower) sheet in the stack 51. The first adhesion level provides a sufficiently low release force (e.g. preferably less than 50 grams per inch; 1.97 grams/mm) between the adhesive coating 2 and the adjacent (lower) sheet to afford sliding movement (e.g. see Figures 6A-6D) between the side surfaces 3, 5 of the adjacent sheets (e.g. the sheet 14 beneath the uppermost sheet and the sheet 16 below the sheet 14, Figure 6B) along the first end portion 15. Attachment means 9 provide a second adhesion level along a second end portion 17 of each of the sheets adjacent the second end 20 of the backing 10 between the layer of adhesive 2 and the second side surface 5 of the adjacent (lower) sheet in the stack to which the layer of adhesive 2 is releasably adhered. The second adhesion level provides a release force (preferably between 4 and 15 ounces per inch; 5 grams/mm and 17 grams/mm) that is higher than the low release force along the first end portion 15 and firmly adheres the sheet (e.g. 12) to the adjacent sheet (e.g. 14) in the stack during separation of the sheet (e.g. 14) relative to the adjacent sheet (e.g. 16, see Figure 6B) along the first end portion 15 while affording peeling away (e.g. manual) of the sheet (e.g. 12) along the second end portion 17 (see Figure 6C-6D).

[0031] Preferably, the layer of pressure sensitive adhesive is uniform, of the same adhesive composition, and has an adhesion to glass of greater than 10 ounces per inch (17 grams/millimeter). For example, the adhesive may comprise acrylic adhesive IOA(95%)/AA (4.5%) iso-octyl acrylate/acrylic acid. Adhesives for use with the present invention are described in U.S. Patent Nos. 4,699,842; 3,578,622; 3,331,729; 2,926,105 and 4,835,217, the entire specifications of which are herein expressly incorporated by reference.

[0032] Figure 3B is similar to Figure 3A except that a primer 7 has been added to the second major side surface 5 of the backing 10 of the sheet 11. Additionally, a primer (not shown) may be added to the first major side surface 3 of the backing 10 of the sheet 11. The primers are optional and where the first release means 8 or the adhesive 2 does not naturally adhere to the sheet 11,

primers known in the art may be used without affecting the release performance of the first release means 8 or the adhesive 2.

[0033] Figure 3C illustrates a generally rectangular sheet 11 having a longitudinal axis A defining a length L (preferably 2.0 inches, 5.08 centimeters) and a width Z. The area of the first end portion 15 of the sheet 11 shown in Figure 3C is the length Y (preferably 0.75 inches, 1.90 centimeter) of the first release means 8 multiplied by the length Z (the width of the sheet, preferably 0.75 inches, 1.90 centimeters). The area of the second end portion 17 of the sheet 11 shown in Figure 3C is the length X of the second release means 9 multiplied by the length Z (the width of the sheet). Generally, the first end portion 15 extends from the first edge 19 along the length of the sheet 11 and comprises between ten (10) and eighty (80) percent of the area of a side of each sheet 11 in the stack 51.

[0034] Preferably, the first end portion 15 comprises generally about thirty-seven and one-half percent of the area of a side (for example 5) of the backing 10 of each sheet 11 in the stack. Correspondingly, the second end portion 17 extends from the second edge 20 along the length of the sheet 11 and comprises between twenty (20) and ninety (90) percent of the area of a side of the backing 10 of each sheet in the stack 51. Preferably, the second end portion 17 comprises generally about sixty-two and one-half percent of the area of a side of each sheet in the stack. It should be noted that the sheet 11 shown in Figure 3C is rectangular, however, various shapes are included within the scope of the invention including but not limited to square, circular, triangular and polygonal shapes and combinations thereof.

[0035] In order to individually dispense a single sheet 11 from the stack 51 of sheets, the first release means 8 should provide a release force of less than about 50 grams per inch (1.97 grams/mm) along the first end portion 15, and the second release means 9 should provide a release force of greater than about 4 ounces per inch (5 grams/mm) and less than about 15 ounces per inch (17 grams/mm) along the second end portion 17. If the release force of the first release means 8 is too high (e.g. greater than about 50 grams per inch), only one sheet will peel off the top of the stack 51 since the high release force would prevent the sliding movement of the two uppermost sheets 12 and 14 in the stack 51 relative to the subsequent adjacent sheet 16, which prevents separation of sheets 14 and 16 (For example, see Figures 6A-6D). If the release force of the second release means 9 is too high (e.g. greater than 15 ounces per inch), it becomes difficult to peel the uppermost sheet 12 from the sheet 14 beneath it. If the release force of the second release means 9 is too low (e.g. less than 4 ounces per inch), however, there is no separation of the two uppermost sheets 12 and 14 in the stack 51 relative to the subsequent adjacent sheet 16 since the uppermost sheet 12 would peel off the sheet 14 below the uppermost sheet before the sliding could occur. Preferably the

first release means 8 has a release force of about 2 grams per inch (0.097 grams/mm) along the first end portion 15 and the second release means 9 should provide a release force of about 4 ounces per inch (5 grams/mm) along the second end portion 17.

[0036] Referring now to Figure 4A of the drawing, there is shown an example of a first embodiment of a stack of sheets according to the present invention, generally designated by the reference numeral 51. The stack 51 of sheets 11 may comprise a layer of adhesive 2 coated over an entire first major side surface 3 of the backing 10 of each of the sheets 11, a first layer of medium release low adhesion backsize 1 (LAB) coated over a second major side surface 5 of the backing 10 along at least the second end portion 17 adjacent the second edge 20 of the sheet 11, and a second layer of premium release low adhesion backsize 1' (LAB) coated over the second major side surface 5 along the first end portion 15 adjacent the first edge 19 of the sheet 11. The backing 10 may comprise for example, an acetate backing as described in U.S. Pat. No. 2,927,868 the entire specification of which is herein incorporated by reference. The sheets 11 are stacked with the premium release low adhesion backsize 1' (LAB) on each successive sheet disposed along alternative opposite ends of adjacent sheets 11 in the stack 51 with the first end 19 of one sheet aligned with the second end 20 of the adjacent sheets and with the adhesive coating 2 of one sheet releasably adhering the one sheet to the second major side surface 5 of a successive (lower) sheet to maintain the sheets in the stack 51. It should be noted that while Figure 4A illustrates the premium release low adhesion backsize 1' coated on top of the medium release low adhesion backsize 1, the stack 51 could be constructed with the premium release low adhesion backsize 1' coated directly to the second major side surface 5 of the backing 10 of the sheet 11.

[0037] Referring now to Figure 4B of the drawing, there is shown a second alternative embodiment of a stack of sheets according to the present invention, generally designated by the reference numeral 51A which has many parts that are essentially the same as the parts of the stack 51 of sheets 11 and which have been identified by the same reference number to which the suffix "A" has been added. In Figure 4B, the first release means 8A for providing the first adhesion level, and the second release means 9A for providing the second adhesion level comprise making the coating of pressure sensitive adhesive 2A on the backing 10A of each of the sheets 11A discontinuous 18 along the first end portion 15A and continuous 18' along the second end portion 17A. Such a stack 51A may include only a single layer 1A of low adhesion backsize along the second major surface 5A of the backing 10A of sheet 11A. Alternatively the first release means 8A for providing the first adhesion level, and the second release means 9A for providing the second adhesion level may comprise making the coating of pressure sensitive adhesive 2A on the

backing 10A of each of the sheets 11A discontinuous in both portions (not shown) with greater discontinuities in the first end portion 15A than in the second end portion 17A.

[0038] Referring now to Figure 4C of the drawing, there is shown a third alternative embodiment of a stack of sheets according to the present invention, generally designated by the reference numeral 51 which has many parts that are essentially the same as the parts of the stack 51 of sheets 11 and which have been identified by the same reference number to which the suffix "B" has been added. In Figure 4C, the first release means 8B for providing the first adhesion level and the second release means 9B for providing the second adhesion level comprise changing the composition of the coating of pressure sensitive adhesive 2B along the first 15B and the second 17B end portions. Like the stack 51A, the stack 51B may include only a single layer 1B of low adhesion backsize along the second major surface 5B of the backing 10B of sheet 11B. As an example of the stack 51B, the adhesive 13 used along the first end portion 15B may be a relatively weak or low aggressive adhesive, such as described in U.S. Pat. No. 3,691,140. An adhesive that is particularly suitable for use along the first end portion 15B may comprise acrylic adhesive or acrylic microspheres. The adhesive 13B used in the second adhesion zone 17B may be a relatively aggressive or strong adhesive, such as acrylic adhesive, rubber resins, or KRATON™. Adhesives for use with the present invention may be prepared according to U.S. Patent Nos. 4,699,842 and 4,835,217.

[0039] The pre-cut sheets of the present invention are particularly useful for tasks which generally require the use of both hands for operations other than the dispensing of the tape, such as for example, gift wrapping, packaging, book covering, box closing, medical taping, wire marking and highlighting. Further, dispensing of the individual adhesive coated sheets does not require a cutting operation and the dispensing is therefore easy and fast. Moreover, with the dispensers and set of stacks of adhesive coated sheets of this invention, the user can have a large number of pre-cut sheets available.

[0040] The substrate 50 to which the stacks 51, 51A or 51B are adhered can be a flexible substrate as well as a rigid substrate. A flexible substrate is preferred for use with the dispensers of the invention that have a conveyor channel or the dispensers of the invention that contain a conveyable carrier for bringing a fresh stack under the dispensing window of the dispenser. If the dispenser contains a conveyable carrier to which the set of stacks of adhesive coated sheets is to be attached, the substrate 50 will preferably be coated with a repositionable adhesive at the side opposite to the side containing the stacks of adhesive coated sheets. By the term "repositionable adhesive" in connection with this invention is meant an adhesive that allows for the substrate 50 to be firmly attached to the conveyable carrier during the dispensing operations while allowing removal from the

conveyable carrier after the set of stacks of adhesive coated sheets has been consumed without leaving substantial amounts of residues of adhesive. An example of a suitable adhesive is the pressure sensitive adhesive used on POST-IT® notes. Alternatively, the substrate 50 may be firmly attached by providing for a lead and/or trailing edge on the substrate 50 that is free of stacks 51 of adhesive coated sheets. A set of stacks of adhesive coated sheets including a lead edge 53 is shown in Figure 5. This lead and/or trailing edge can then be inserted in one or more slots adapted to receive the lead or trailing edge and provided on the conveyable carrier. The use of a repositionable adhesive or the use of a lead and/or trailing edge may also be preferred to hold a set of stacks of adhesive coated sheets in a fixed position with dispensers of this invention that have a movable dispenser window.

[0041] When the substrate 50 is a flexible substrate, it will generally be preferred to provide the set of stacks of adhesive coated sheets in the form of a belt dummy-pad that is adhered to the substrate 50 after the last stack of the set of stacks of adhesive coated sheets may be provided. Generally, this dummy pad is a pad that has about the same dimensions as the individual stacks of the set but does not contain the adhesive coated sheets. An example of dummy pad includes a hollow plastic rod. The use of a dummy pad can be of an advantage in dispensers that employ a conveyor channel. In those dispensers, the dummy pad will avoid substantial movement of the set when sheets are dispensed from the last stack in the set of stacks of adhesive coated sheets.

[0042] Examples of flexible substrates to which the stacks may be adhered include polyethylene film, cellulose acetate, polypropylene film, polyester film, non-woven and woven fabrics, polyethylene or polypropylene coated paper, plain paper and light cardboard. The thickness of the flexible substrate is typically between 0.05mm and 1mm, preferably between 0.15mm and 0.5mm. The individual stacks 51, 51A or 51B are preferably adhered to the flexible substrate with the length of each stack aligned with the width of the flexible substrate. Stacks 51, 51A or 51B are preferably adhered to the flexible substrate by means of the adhesive layer of the last sheet in a stack. However, it is also possible to adhere the last sheet in a stack to a backing and to then adhere that backing to the flexible substrate by means of adhesive, for example a pressure sensitive adhesive.

[0043] When the substrate 50 is provided as a rigid substrate, it is preferred that the set of adhesive coated sheets is substantially non-planar. When the rigid substrate is substantially planar, neighbouring stacks in the set may be adhered to each other causing difficulties in dispensing individual sheets from a stack. Preferably, the rigid substrate is arcuate or is a core such as for example a cylindrical core with the individual stacks adhered to the outer surface of the arcuate substrate or core.

[0044] A set of stacks of adhesive coated sheets in connection with the present invention can be manufactured by producing the individual adhesive coated sheet stacks as illustrated in the examples of US 5,401,547. In this instance, the individual adhesive coated sheet will be z-stacked on a backsheet having the same dimensions as the individual adhesive coated sheets. Accordingly, such stacks will contain as the bottom most sheet a backsheet. In order to obtain a set of stacks of adhesive coated sheets of this invention, these individual stacks may be attached to a substrate by means of an adhesive such as a pressure sensitive adhesive or a hot melt adhesive. Alternatively other second release means may be employed to adhere the individual stacks to the substrate 50. Such other second release means include so-called hook and loop attachment commercially available from 3M Company under the brand SCOTCH™ or interlocking fasteners also available from 3M Company. In accordance with a particular embodiment of the present invention, the individual stacks can be adhered to an adhesive tape by placing the individual stacks next to each other as a continuous string on the adhesive coated side of the adhesive tape.

[0045] According to an alternative embodiment for producing the set of stacks of adhesive coated sheets of this invention, a single pad of adhesive coated sheets having a length L and a width W may be produced generally in accordance with the procedure illustrated in the examples of US 5,401,547. As described above, the lowest sheet in this pad of adhesive coated sheets will be a backsheet and the individual adhesive coated sheets are z-stacked so that the first release means 8 and second release means 9 alternate between the edges defining the width of the pad. To obtain the set of stacks of adhesive coated sheets of this invention, the pad of adhesive coated sheets is cut at regular distances R along length L. The cutting of the pad is however carried out such that each of the adhesive coated sheets is cut through but without completely cutting through the backsheet, so-called kiss-cutting. With the term "without completely cutting through" is meant that at least 10% and preferably at least 20% of the thickness of the backsheet is uncut. Accordingly, n stacks of a width R (the product of n and R corresponding to the length L of the single pad except for a potential remainder) and a width W (corresponding to the width of the single pad) which are attached and held together on the backsheet, serving as substrate 50, are obtained. Kiss-cutting of the pad may be carried out in various ways. For example, the kiss-cutting may be carried out with a knife that cuts completely through a part of the backsheet along width W while leaving the backsheet partially uncut in other parts along width W. For example, a knife may be used that cuts completely through the backsheet at both edges of the pad while leaving the backsheet partially uncut in the middle along width W of the pad, or vice-versa the backsheet may be left partially uncut at the edges while cutting completely through in the middle along width W.

The advantage of partially cutting completely through the backsheet and partially not, is that the flexibility of the substrate 50 can be further increased.

[0046] As an alternative to the embodiment described in the previous paragraph, the single pad of Z-stacked adhesive coated sheets may be wound around a core and the single pad may then be kiss-cut at regular intervals along the circumference of the core so as to provide a set of stacks of adhesive coated sheets having a rigid core as the substrate.

[0047] Dispenser 130 illustrated in Figure 11 is a dispenser that includes a conveyable carrier as the means for conveyance. As shown in Figure 11, the dispenser 130 includes a cover including an opening 132 through which individual adhesive coated sheets can be dispensed. The cover 136 is provided with a hinge 137 allowing the cover to be opened to get easy access to the interior of the dispenser and to mount a set of stacks of adhesive coated sheets therein. The set of stacks of adhesive coated sheets is firmly attached to the conveyable carrier comprising rotatable wheel 131. The outer surface of wheel 131 is provided polygonal and wheel 131 further includes an axial extending slot 133 in which the lead and trailing edge of the substrate of the set of stacks of adhesive coated sheets can be inserted. This will assure that the set of stacks of adhesive coated sheets does not slip relative to wheel 131 when wheel 131 is rotated. Further the width of each side of the polygonal outer surface of wheel 131 preferably corresponds to the width of the stacks of the set of stacks of adhesive coated sheets. Instead of wheel 131, it is also possible to use a cylindrical core. Wheel 131 may be manually rotated by means of knob 135. Advantageously, the wheel also includes means for keeping the wheel in a fixed position while dispensing adhesive coated sheets from a stack.

[0048] Referring to Figures 12a-12c, there is illustrated a further embodiment of a dispenser containing a conveyable carrier. Figure 12a shows a front view of dispenser 140. Dispenser 140 is a tilted cylindrical dispenser having an opening 142 through which individual adhesive coated sheets can be dispensed. Figure 12b shows a cross-section of the dispenser 140 along a plane that is parallel to the axis of the cylindrical dispenser and Figure 12c shows a cross-section of dispenser 140 along a plane perpendicular to the axis of the cylindrical dispenser. As shown in Figures 12b and 12c, dispenser 140 contains a conveyable carrier comprising rotatable wheel 145. Wheel 145 can be removed from the top of dispenser 140 for mounting a set of stacks of adhesive coated sheets on wheel 145. Similarly as described above for dispenser 130, the wheel includes an axial extending slot 147 in which the lead and trailing edge of a set of stacks of adhesive coated sheets can be inserted to firmly attach the set to wheel 145.

[0049] In Figures 12d-g, further variants of the dispenser 140 are shown. As shown in Figure 12d, the

opening 142 may be provided with half spheres 200 attached to the short edges of the opening 142 and centered at about the middle of the short edges. Such embodiment has the advantage of reducing the risk of the adhesive sheet accidentally disappearing in the opening 142. In Figure 12e, there is shown a variant of dispenser 140 wherein on opening 142 of the dispensing means, an opening 202 of a different shape can be superimposed on the opening 142 via engagement means 201 provided in the wall of the dispenser 140. Figure 12f shows a variant of dispenser 140 wherein a shuttling window 203 has been provided on top of the opening 142. As shown by arrows 204, the shuttling window 203 will shuttle up and down along the length of opening 142 during the dispensing operation. Finally, Figure 12g shows a variant of dispenser 140 wherein a hinging opening 205 is superimposed on the opening 142 of the dispensing means. Hinging opening 205 can pivot around hinge 206 revealing larger opening 142. This offers the advantage that the user can easily restart the dispensing in case of malfunction for example when a sheet has disappeared in the opening and there is no longer a sheet ready for grabbing. When closed, hinging opening 205 will lock wheel 145 and avoid possible up and down movement of wheel 145 during the dispensing operation.

Claims

1. A set of stacks of adhesive coated sheets (70) comprising a substrate (50) and at least two stacks (51), each stack being a stack of sheets (11, 12) disposed one on top of another, each of the sheets having first (19) and second (20) spaced ends and a predetermined length between the first (19) and second (20) ends, comprising a backing (10) having opposite major first and second surfaces, and having a layer of pressure sensitive adhesive (2) on a major side of the sheet, the sheets being releasably adhered to each other by releasable adhesion of the layers of pressure sensitive adhesive (2) to the surfaces of underlying sheets to form the stack, with the first end (19) of each sheet being in alignment with the second end (20) of an adjacent sheet in the stack, and the sheets having first release means (8) for providing a first adhesion level along a first end portion (15) of each of the layer sheets adjacent the first end (19) between the layer of adhesive (2) and the surface of the adjacent sheet in the stack to which the layer of adhesive is releasably adhered that affords easy separation of surfaces of adjacent sheets along the first end portion (15), and second release means (9) for providing a second adhesion level along a second end portion (17) of each of the sheets adjacent the second end (20) between the layer of adhesive (2) and the surface of the adjacent sheet in the stack, which second adhesion level pro-

vides a release force that is higher than the release force along the first end portion and firmly adheres the sheet to the adjacent sheet in the stack during separation of the sheets along the first end portion (15) while affording peeling away of the sheet from the stack along the second end portion (17), **characterized in that** on a major surface of said substrate (50) said at least two stacks (51) have been adhered and said set of stacks of adhesive coated sheets is in the form of a belt.

2. The set of stacks of adhesive coated sheets according to claim 1 wherein the substrate is a flexible substrate.
3. The set of stacks of adhesive coated sheets according to claim 2, wherein the substrate comprises on the side opposite to the side to which the stacks of adhesive coated sheets are adhered, attachment means for adhering the set of adhesive coated sheets to a surface.
4. The set of stacks of adhesive coated sheets according to claim 2, wherein the flexible substrate has opposite first and second ends and the stacks are adhered to one side of the flexible substrate next to each other from the second end towards the first end while leaving a portion of the flexible substrate at the first end free of the stacks of adhesive coated sheets so as to provide a lead edge to the set of stacks of adhesive coated sheets.
5. The set of stacks of adhesive coated sheets according to claim 4, further comprising a portion free of the stacks of adhesive coated sheets at the second end.
6. The set of stacks of adhesive coated sheets according to claim 2, wherein the flexible substrate has opposite first and second ends, the stacks of adhesive coated sheets being adhered to the flexible substrate as a continuous string between the first and second ends and the flexible substrate further comprising a dummy pad adhered thereto adjacent to the stack of adhesive coated sheets at one of the first and second ends.
7. The set of stacks of adhesive coated sheets according to claim 2, wherein the flexible substrate is selected from the group consisting of plastic film and paper.

Patentansprüche

1. Satz aus Stapeln von Klebeblättern (70), aufweisend einen Träger (50) und mindestens zwei Stapel

(51), wobei jeder Stapel ein Stapel aus Blättern (11, 12) ist, die aufeinander angeordnet sind, wobei jedes der Blätter ein erstes (19) und ein zweites (20) voneinander beabstandetes Ende und eine vorbestimmte Länge zwischen dem ersten (19) und dem zweiten (20) Ende aufweist, aufweisend eine Unterlage (10), die gegenüberliegende erste und zweite Hauptflächen aufweist, und aufweisend eine Schicht aus Haftklebstoff (2) an einer Hauptseite des Blatts, wobei die Blätter durch trennbares Kleben der Schichten aus Haftklebstoff (2) an die Flächen der darunterliegenden Blätter trennbar aneinander geklebt sind, um den Stapel zu bilden, wobei das erste Ende (19) jedes Blatts in einer Ausrichtung mit dem zweiten Ende (20) eines benachbarten Blatts im Stapel steht, und die Blätter ein erstes Trennmittel (8) aufweisen, um entlang eines ersten Endabschnitts (15) eines jeden der Blätter neben dem ersten Ende (19) einen ersten Haftgrad zwischen der Klebstoffschicht (2) und der Fläche des benachbarten Blatts im Stapel, an das die Klebstoffschicht trennbar geklebt ist, bereitzustellen, der eine leichte Trennung der Flächen von benachbarten Blättern entlang des ersten Endabschnitts (15) gestattet, und ein zweites Trennmittel (9) aufweisen, um entlang eines zweiten Endabschnitts (17) eines jeden der Blätter neben dem zweiten Ende (20) einen zweiten Haftgrad zwischen der Klebstoffschicht (2) und der Fläche des benachbarten Blatts im Stapel bereitzustellen, welcher zweite Haftgrad eine Trennkraft bereitstellt, die höher als die Trennkraft entlang des ersten Endabschnitts ist und das Blatt während der Trennung der Blätter entlang des ersten Endabschnitts (15) fest an das benachbarte Blatt im Stapel klebt, während er ein Ablösen des Blatts vom Stapel entlang des zweiten Endabschnitts (17) gestattet, **dadurch gekennzeichnet, dass** zumindest zwei Stapel (51) auf eine Hauptfläche des Trägers (50) geklebt wurden, und der Satz aus Stapeln von Klebeblättern in der Form eines Bands ist.

2. Satz aus Stapeln von Klebeblättern nach Anspruch 1, wobei der Träger ein biegsamer Träger ist.
3. Satz aus Stapeln von Klebeblättern nach Anspruch 2, wobei der Träger an der Seite, die jener Seite gegenüberliegt, an die die Stapel von Klebeblättern geklebt sind, Anbringungsmittel zum Kleben des Satzes aus Klebeblättern an eine Fläche aufweist.
4. Satz aus Stapeln von Klebeblättern nach Anspruch 2, wobei der biegsame Träger gegenüberliegende erste und zweite Enden aufweist und die Stapel nebeneinander vom zweiten Ende zum ersten Ende hin an eine Seite des biegsamen Trägers geklebt sind, während ein Abschnitt des biegsamen Trägers am ersten Ende von den Stapeln von Klebe-

blättern frei gelassen wird, um dem Satz aus Stapeln von Klebeblättern eine Vorderkante bereitzustellen.

5. Satz aus Stapeln von Klebeblättern nach Anspruch 4, ferner aufweisend einen Abschnitt am zweiten Ende, der von den Stapeln von Klebeblättern frei ist.
6. Satz aus Stapeln von Klebeblättern nach Anspruch 2, wobei der biegsame Träger gegenüberliegende erste und zweite Enden aufweist, die Stapel von Klebeblättern als fortlaufende Folge zwischen dem ersten und dem zweiten Ende an den biegsamen Träger geklebt sind, und der biegsame Träger ferner eine Blindlage aufweist, die neben dem Stapel von Klebeblättern an einem aus dem ersten und dem zweiten Ende an den Träger geklebt ist.
7. Satz aus Stapeln von Klebeblättern nach Anspruch 2, wobei der biegsame Träger aus der Gruppe gewählt wird, die aus Kunststofffilm und Papier besteht.

25 Revendications

1. Ensemble de piles de feuilles revêtues d'adhésif (70) comprenant un substrat (50) et au moins deux piles (51), chaque pile étant une pile de feuilles (11, 12) disposées les unes sur les autres, chacune des feuilles comportant une première extrémité (19) et une deuxième extrémité (20) espacées et une longueur prédéterminée entre les première (19) et deuxième (20) extrémités, comprenant un support (10) ayant une première surface principale et une deuxième surface principale opposées, et comportant une couche d'adhésif sensible à la pression (2) sur un côté principal de la feuille, les feuilles étant collées de façon dissociable les unes sur les autres par l'adhésion dissociable des couches d'adhésif sensible à la pression (2) aux surfaces de feuilles sous-jacentes pour former la pile, la première extrémité (19) de chaque feuille étant alignée sur la deuxième extrémité (20) d'une feuille adjacente dans la pile, et les feuilles comportant un premier moyen de dissociation (8) pour produire un premier niveau d'adhésion le long d'une première partie d'extrémité (15) de chacune des feuilles adjacente à la première extrémité (19) entre la couche d'adhésif (2) et la surface de la feuille adjacente dans la pile sur laquelle la couche d'adhésif est collée de façon dissociable pour permettre de séparer facilement les surfaces de feuilles adjacentes le long de la première partie d'extrémité (15), et un deuxième moyen de dissociation (9) pour produire un deuxième niveau d'adhésion le long d'une deuxième partie d'extrémité (17) de chacune des feuilles adjacente à la deuxième extrémité (20) entre la couche d'ad-

hésif (2) et la surface de la feuille adjacente dans la pile, lequel deuxième niveau d'adhésion produit une force de décollement qui est supérieure à la force de décollement le long de la première partie d'extrémité et fait adhérer solidement la feuille à la feuille adjacente dans la pile durant la séparation des feuilles le long de la première partie d'extrémité (15), tout en permettant le décollement de la feuille de la pile le long de la deuxième partie d'extrémité (17), **caractérisé en ce que** lesdites deux piles au moins (51) ont été collées sur une surface principale dudit substrat (50) et ledit ensemble de piles de feuilles revêtues d'adhésif est sous la forme d'une bande.

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2. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 1, dans lequel le substrat est un substrat flexible.
3. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 2, dans lequel le substrat comprend, sur le côté opposé au côté sur lequel les piles de feuilles revêtues d'adhésif sont collées, un moyen de fixation pour le collage de l'ensemble de feuilles revêtues d'adhésif sur une surface.
4. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 2, dans lequel le substrat flexible comporte une première extrémité et une deuxième extrémité opposées et les piles sont collées sur un côté du substrat flexible les unes à côté des autres à partir de la deuxième extrémité vers la première extrémité, tout en laissant une partie du substrat flexible à la première extrémité exempte des piles de feuilles revêtues d'adhésif afin de fournir un bord avant à l'ensemble de piles de feuilles revêtues d'adhésif.
5. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 4, comprenant en outre une partie exempte des piles de feuilles revêtues d'adhésif à la deuxième extrémité.
6. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 2, dans lequel le substrat flexible comporte une première extrémité et une deuxième extrémité opposées, les piles de feuilles revêtues d'adhésif étant collées sur le substrat flexible sous la forme d'une chaîne continue entre les première et deuxième extrémités, et le substrat flexible comprenant en outre une pile factice collée sur celui-ci de façon adjacente à la pile de feuilles revêtues d'adhésif à l'une des première et deuxième extrémités.
7. Ensemble de piles de feuilles revêtues d'adhésif selon la revendication 2, dans lequel le substrat flexible est sélectionné dans le groupe constitué des

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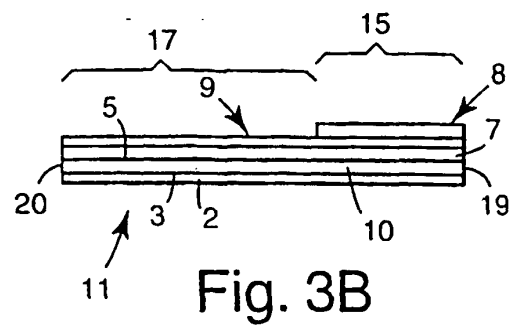
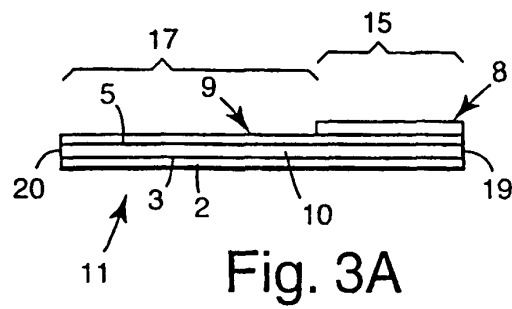
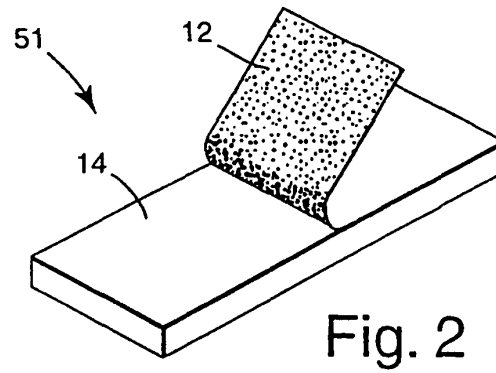
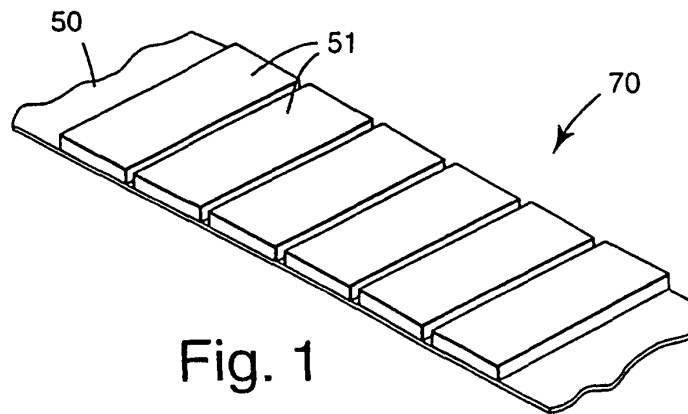
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films en plastique et du papier.



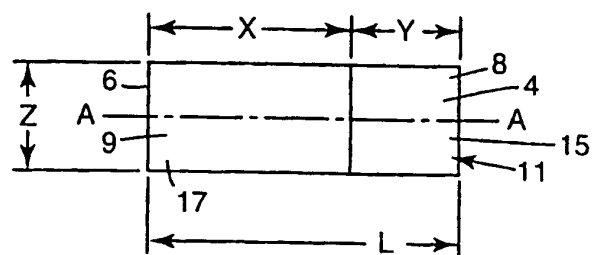


Fig. 3C

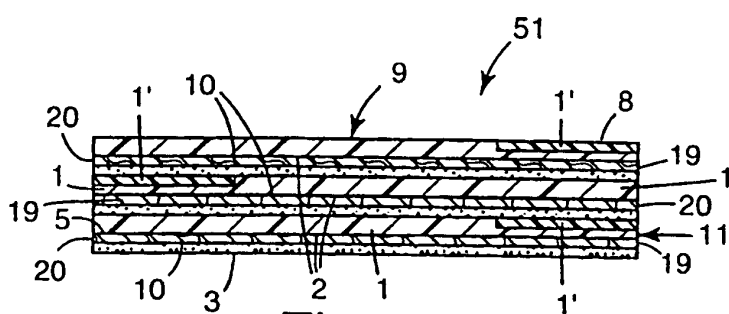


Fig. 4A

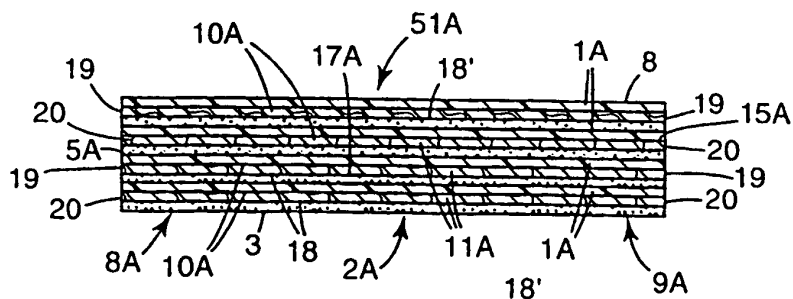


Fig. 4B

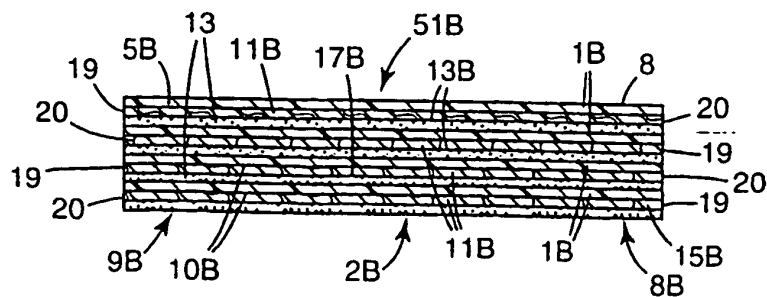


Fig. 4C

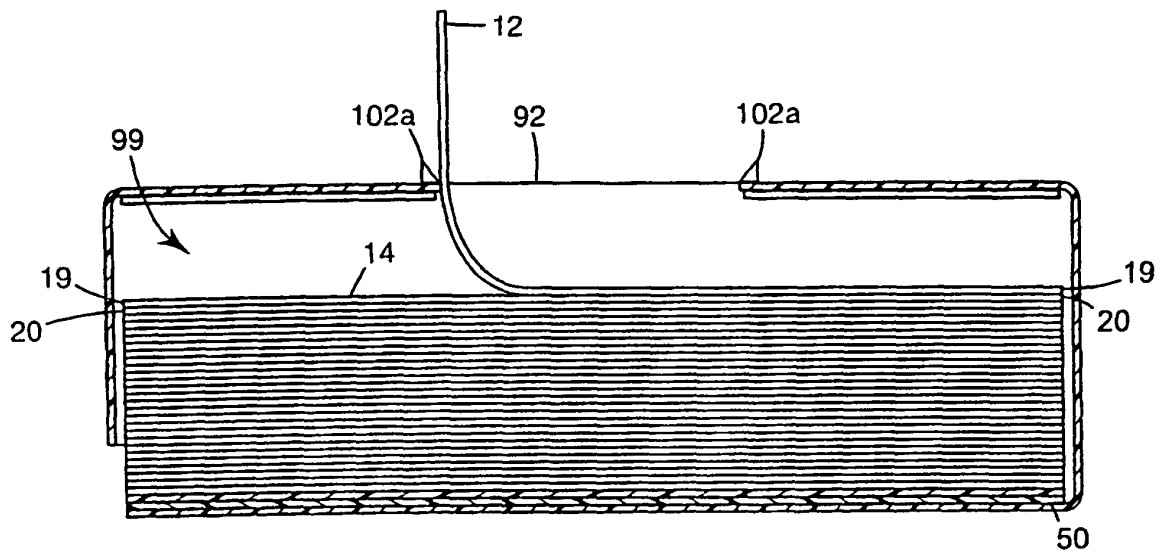


Fig. 6A

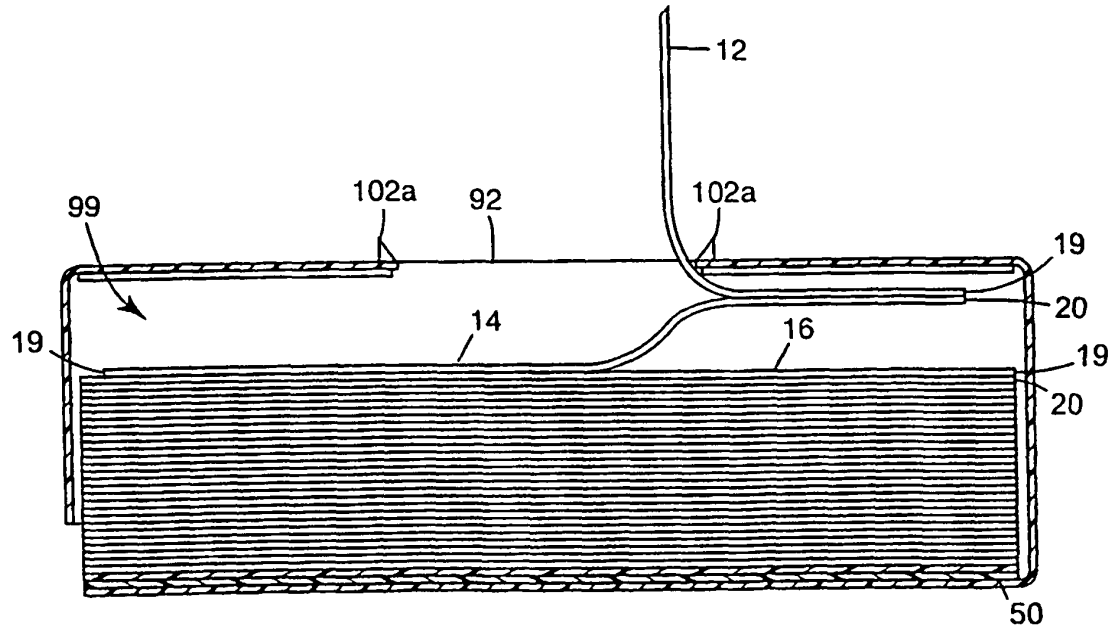


Fig. 6B

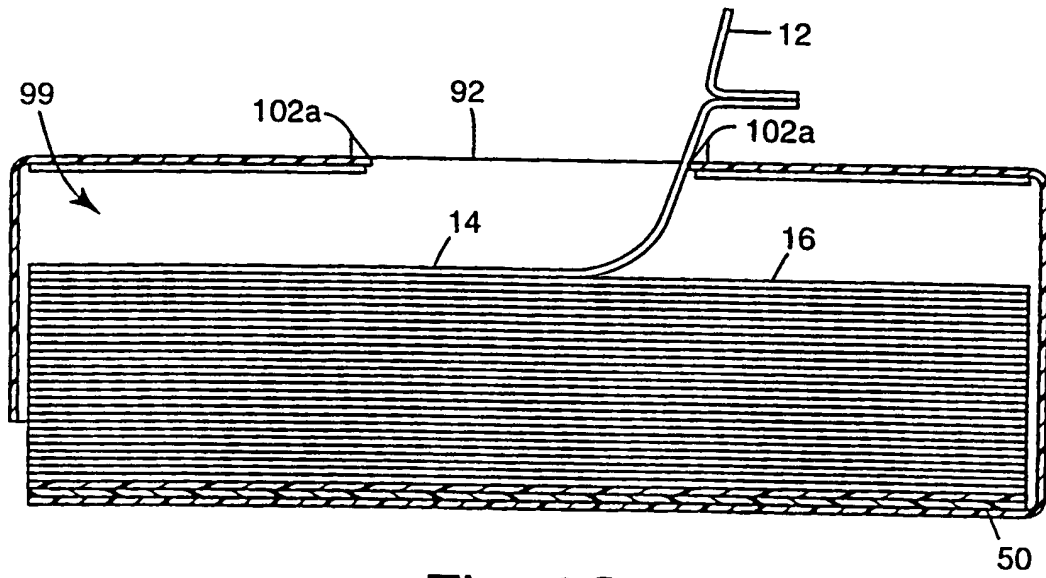


Fig. 6C

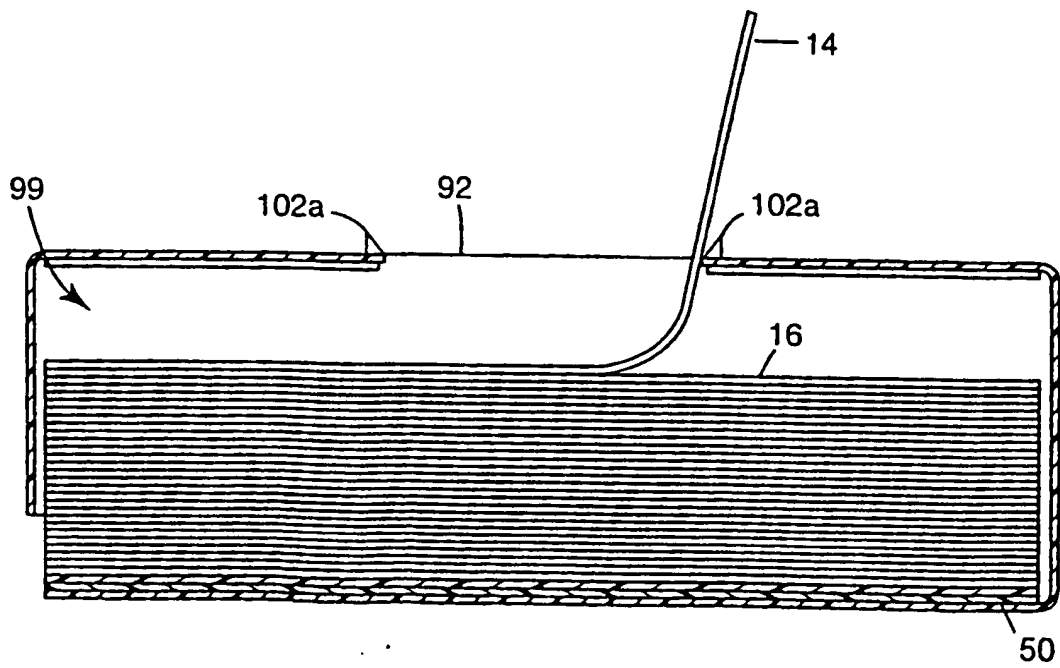


Fig. 6D

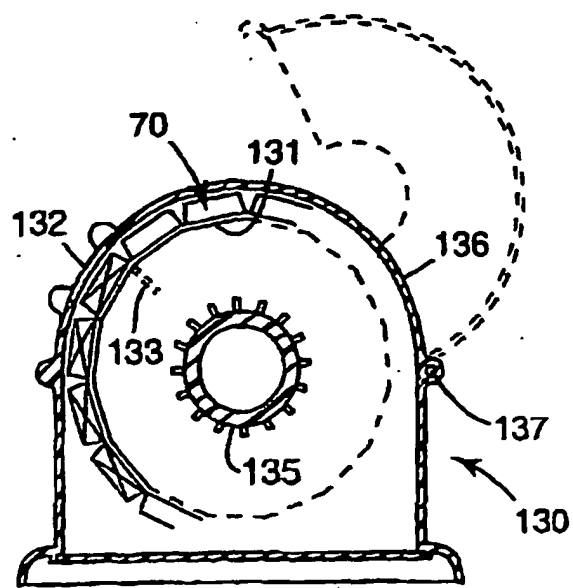
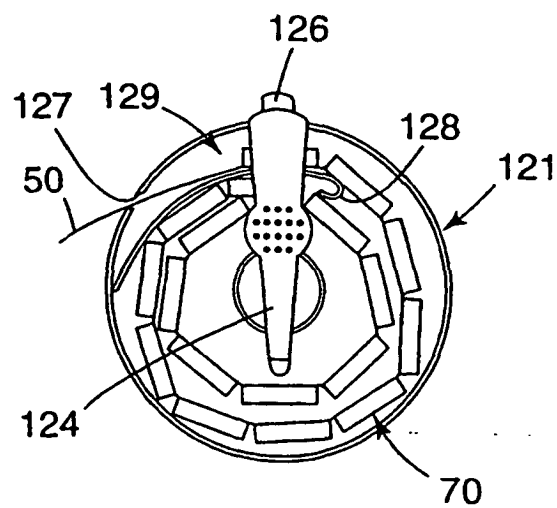
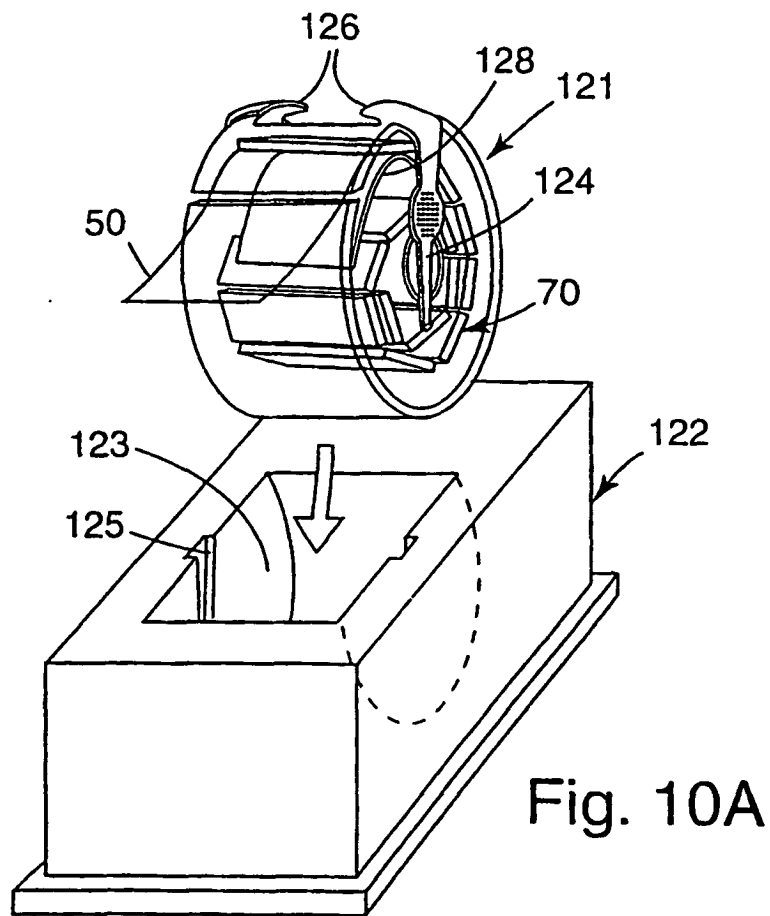


Fig. 11



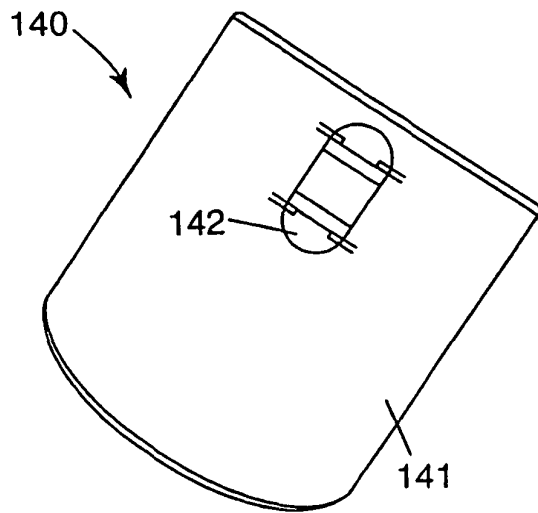


Fig. 12A

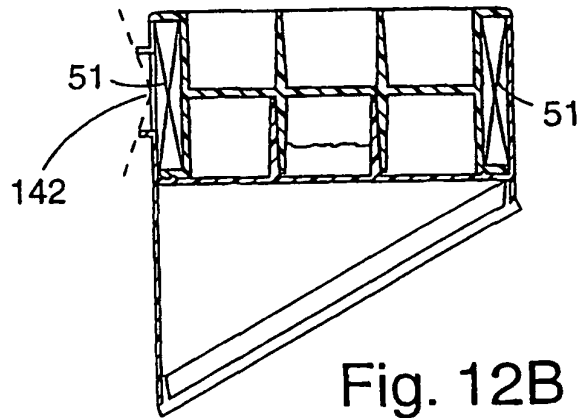


Fig. 12B

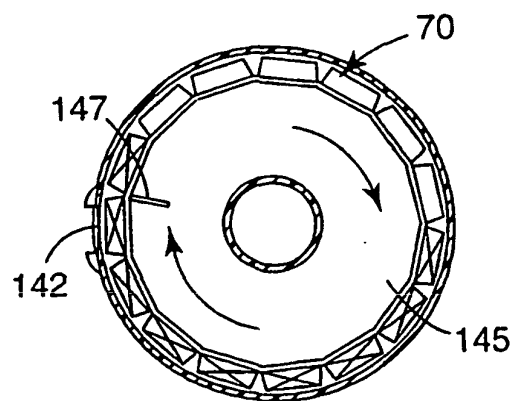


Fig. 12C

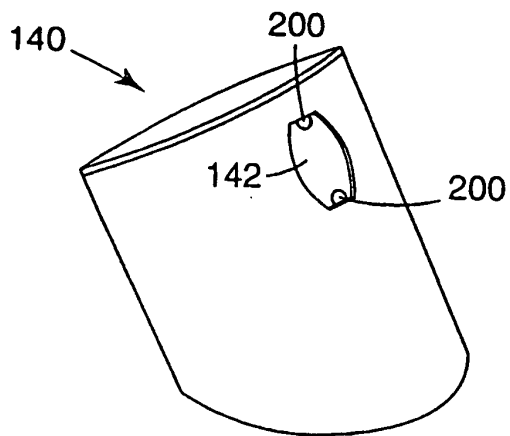


Fig. 12D

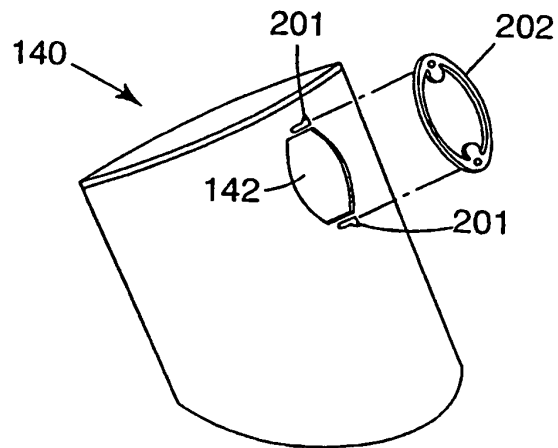


Fig. 12E

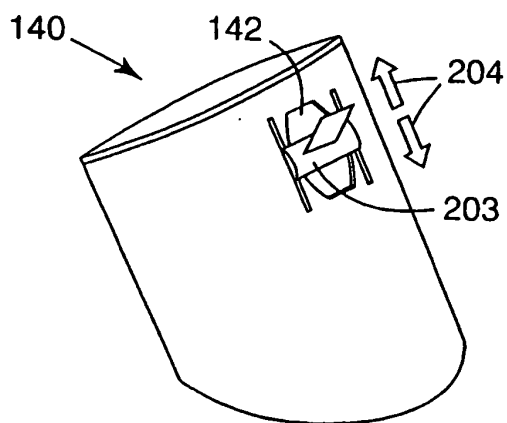


Fig. 12F

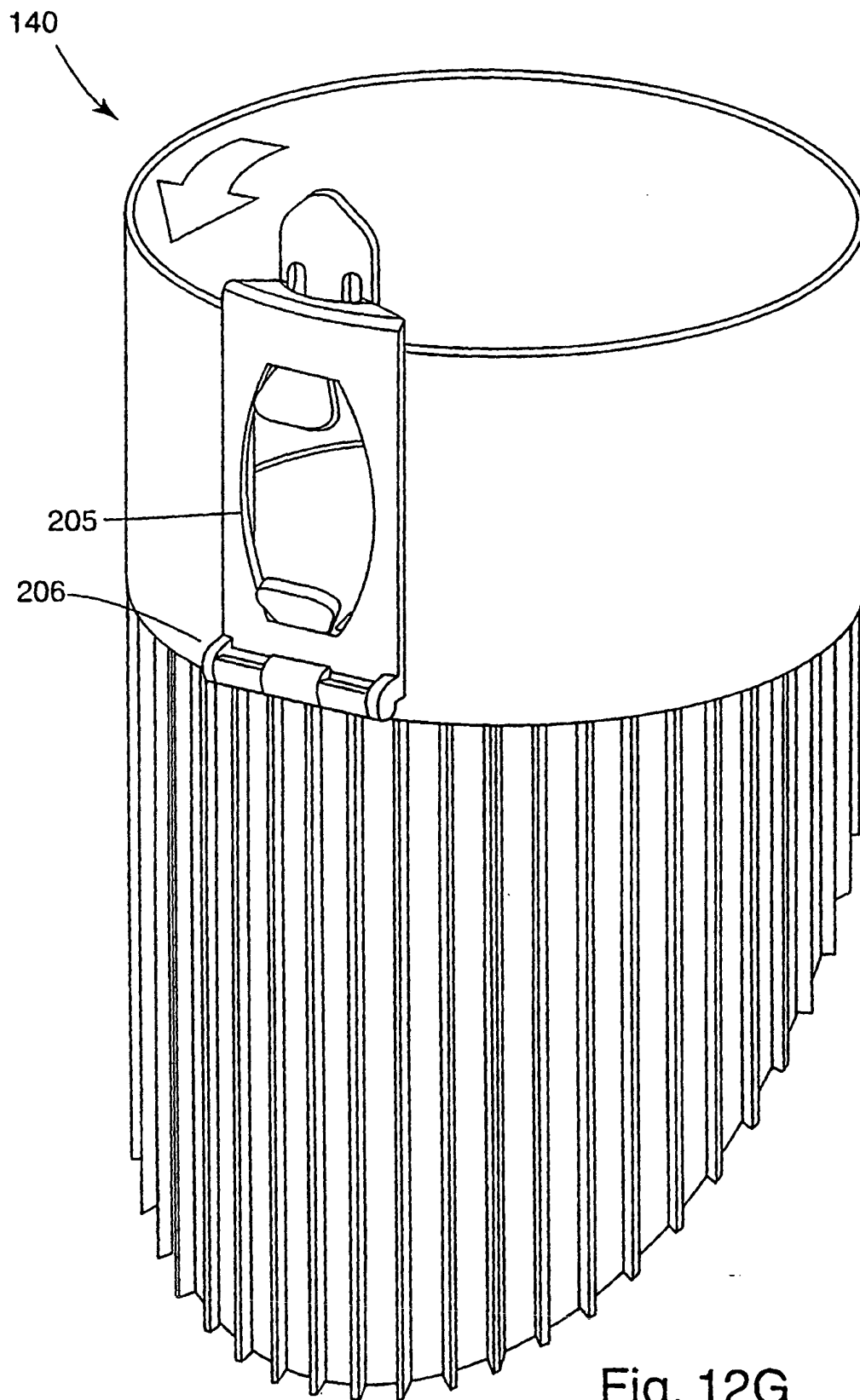


Fig. 12G