A multi-unit package includes a plurality of layers of pads stack one on top of another to form a stack of pads and a retainer coupling the stack of pads together for shipment.
MULTI-UNIT PACKAGE INCLUDING STACKS OF MULTI-PAD UNITS

[0001] This application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Application No. 61/059,611 filed Jun. 6, 2008, which is expressly incorporated by reference herein.

BACKGROUND

[0002] The present disclosure relates to a pad, and to a method for manufacturing multiple pads. More particularly, the present disclosure relates to the manufacture of pads particularly suited for generally automated manufacturing processes.

SUMMARY

[0003] A pad, in accordance with the present disclosure, includes a top surface and an oppositely facing bottom surface arranged to lie spaced apart relation to the top surface. The pad is shaped to allow manufacture with minimized operator interaction.

[0004] In illustrative embodiments, the pads are stored and transported in a multi-unit package including multiple layers of pads joined together to form a four-pad unit. The multiple layers of four-pad units cooperate to establish a four-pad unit stack. The pads are coupled together so that an operator can break the pads apart for use after removing the top four-pad unit from the opened multi-unit package.

[0005] In illustrative embodiments, the four-pad unit is formed by coupling generally octagon-shaped pads together so that each pad is coupled to two other pads along sides of the pads. The sides are joined by frangible perforated line segments formed between each pad. The perforated line segments permit the bending of a pad relative to the neighboring pads to sever the connection between the pads so that a single pad is freed for its intended use.

[0006] In illustrative embodiments, the multi-unit package is formed by a generally automated manufacturing method. A corrugated sheet is cut in two ways by a rotary die cutter wherein a first cut type severs all layers of the corrugated sheet and a second cut type severs through all the layers except one leaving the perforated line segments in the corrugated sheet. Subsequent manufacturing steps remove scrap after the cutting, stacks the blanks formed by the cutting, and breaks the stacks of blanks along break lines to form a four-pad unit stack. The four-pad unit stack is then wrapped in shrink-wrap material and heated to form the multi-unit package which is ready for storage or transportation.

[0007] Additional features of the present disclosure will become apparent to those skilled in the art upon consideration of illustrative embodiments exemplifying the best mode of carrying out the disclosure as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The detailed description particularly refers to the accompanying figures in which:

[0009] FIG. 1 is a perspective view of a multi-unit package in accordance with the present disclosure, showing the multi-unit package including a stack of four-pad units enclosed in a shrink-wrap cover to form a multi-unit package and showing that the four-pad unit on the top of the stack includes four separate pads joined together;

[0010] FIG. 2 is a view similar to FIG. 1 showing removal of the upper four-pad units from the stack after the shrink-wrap cover has been opened and showing how one can break apart a four-pad unit to provide for two separate two-pad units and then each two-pad unit is broken apart to provide a total of four separate pads;

[0011] FIG. 3 is an illustrative perspective view of a pad as provided as suggested in FIG. 2, showing that the pad may be used by a consumer to place a cooked pizza on the pad lying on a table;

[0012] FIG. 4 is a perspective view showing a method for forming a multi-unit package of the type shown in FIG. 1, wherein the illustrative process starts in the upper left corner of FIG. 1 and comprises the steps of: (a) taking a corrugated sheet from the sheet supply stack and placing the sheet on a conveyor to move the sheet through a series of stations to produce a multi-unit package as seen in the lower right corner of FIG. 1, using the conveyor to move the sheet to a first station where a rotary die cutter cuts the sheet to form a blank, exterior waste, and interior waste and the exterior waste and interior waste falls from the rotary die cutter and is collected in a scrap receiver, (c) causing the blanks to exit the rotary die cutter and forming a shingled strip where one multi-pad strip lays partially on top of another multi-pad strip so they exit the rotary die cutter, (d) causing the shingled strip to be carried by a conveyor to a second station where the shingled multi-pad strips are accumulated and stacked to form a multi-pad strip stack and the multi-pad strip stack is then rotated 90 degrees about line 4 and then released, (e) causing the multi-pad strip stack to be carried to a third station where the multi-pad strip stack is broken along a break line to form a four-pad unit stack, (f) causing the four-pad unit stack then to be carried to a fourth station where a shrink-wrap material is applied to the four-pad unit stack, and then (g) using a fifth station to apply heat to tighten the shrink-wrap material to establish a multi-unit package exiting from the fifth station on the conveyor;

[0013] FIG. 5 is a plan view of a corrugated sheet after passing through the cutting station, showing that multiple cuts have been applied by a rotary die cutter and showing that the rotary die cutter makes a first cut line (thick line weight) which passes completely through the sheet along a dotted longitudinal line down the center of the sheet, a perimeter line (thick line weight) which passes completely through the sheet around the perimeter of the blank, an interior cut line (thick line weight) which passes completely through the sheet around each of the interior waste pieces, and a perforated-cut line (thin line weight) which only partially passes through the corrugated sheet;

[0014] FIG. 6 is a sectional view taken along line 6-6 of FIG. 4, showing that exterior and interior scrap have been removed, two multi-pad strips have been formed, the first multi-pad strip has exited and a second multi-pad strip has come to rest partially on top of the first multi-pad strip, the multi-pad strips continue to exit from the rotary die cutter forming a shingled strip of multi-pad strips, and each multi-pad strip includes three four-unit pads coupled to one another in series;

[0015] FIG. 7 is a sectional view taken along line 7-7 of FIG. 4, showing a multi-pad strip stack after accumulation and rotation by the second station suggested in FIG. 4;

[0016] FIG. 8 is a sectional view taken along line 8-8 of FIG. 4, showing a four-pad unit stack that has passed through a fourth station where the four-pad unit stack has been separated from the multi-pad strip stack;
**0017** FIG. 9 is a perspective view of a portion of the two multi-pad strips of FIG. 6, with portions broken away, to expose portions of a corrugated layer and a top layer, a perforated line segment characterized by a series of alternating nicked cuts and nicked links produced as suggested by FIG. 10a-Fig. 10c;

**0018** FIG. 10a is an enlarged sectional view taken along line 10a-10a of FIG. 4, showing a cutter including teeth and a teeth support wherein the teeth are spaced apart from another to define a gap space between adjacent pairs of teeth and the teeth and teeth support are coupled to an upper drum and arranged to lie above the corrugated sheet so that during cutting, the teeth when cutting pass into the corrugated sheet and an unvill located below the corrugated sheet;

**0019** FIG. 10b is an enlarged sectional view taken along line 10a-10a of FIG. 4, showing the cutter passing through the top layer and the corrugated layer and showing only the teeth passing through the bottom layer establishing the perforated line segment suggested in FIG. 11;

**0020** FIG. 10c: an enlarged sectional view taken along line 10a-10a of FIG. 4, showing the cutter retracted from the corrugated sheet to establish a perforated line segment comprising an alternating series of nicked cuts and nicked links in the bottom layer and showing the top layer and core layer completely separated;

**0021** FIG. 11 is a perspective view similar to FIG. 8, showing the four-pad unit folded along a dotted fold line 13;

**0022** FIG. 12 is an enlarged partial perspective view of a portion of FIG. 11 taken in the direction of arrow 13, showing a detailed view of the perforated line segment formed illustratively in FIGS. 10a-10c;

**0023** FIG. 13 is a perspective view of the two-pad unit of FIG. 2 showing the two-pad unit being split apart to form two separate pads that have each been placed under a round cake to support the round cake; and

**0024** FIG. 14 is a perspective view of the two-pad unit of FIG. 2 showing the two-pad unit being split apart and coupled to opposite ends of a cylinder having a material wrapped around the cylinder so that the cylinder is supported between the pads.

**DETAILED DESCRIPTION**

A pad 311, for use by a consumer 11, may be used illustratively to support a food item on top of the pad. As an example, a cooked pizza 48 may be placed on pad 311 as shown in FIG. 3. In an alternative example, a cake 47 may be placed on pad 311 as shown in FIG. 14. Alternatively, pad 311 may be used in an industrial application as an end pad on a spool 45 as shown in FIG. 14.

Illustratively, consumer 11 obtains a pad 311 by opening a first embodiment of a multi-unit package 10 including a four-pad unit stack 12 and a shrink-wrap cover 14 as suggested illustrated in FIG. 2. Consumer may also obtain a pad 311 by opening another embodiment of multi-unit package 10 that includes a two-pad unit stack 34 enclosed in a shrink-wrap cover 14. Each pad 311 is formed to include eight sides that are arranged to establish an octagon-shaped perimeter. The octagon shape of pad 311 permits the use of automated manufacturing process like the ones shown in FIG. 4.

As suggested in FIGS. 1 and 2, a multi-unit package 10 includes a first two-pad unit 31, a second two-pad unit 32, and a retainer 14. First two-pad unit 31 includes a first pad 311 and a second pad 322 coupled to first pad 311 along a first perforated line segment 411. Second two-pad unit 32 includes a first pad 321 and a second pad 322 coupled to first pad 321 along a first perforated line segment 421. Second two-pad unit 32 is arranged to lie above the first two-pad unit 31 to form a second two-pad unit stack 34 as shown in FIGS. 1 and 2.

First pad 321 of second two-pad unit 32 lies above first pad 311 of first two-pad unit 31 to form a column 35 of first pads as suggested in FIG. 1. Second pad 322 of second two-pad unit 32 lies above second pad 312 of first two-pad unit 31 to form a column 36 of second pads as suggested in FIG. 1. First perforated line segment 421 of second two-pad unit 32 is arranged to lie above first perforated line segment 411 of first two-pad unit 31. Retainer 14 is arranged to mate with first and second two-pad units 31, 32 in two-pad unit stack 34 to retain first pads 311, 321 second pads 312, 322, and first perforated line segments 411, 421 in aligned relation to one another as shown in FIGS. 1 and 2.

As shown in FIGS. 1 and 2, multi-unit package 10 further comprises a third two-pad unit 33 including a first pad 331 and a second pad 332 coupled to first pad 331 of third two-pad unit 33 along a first perforated line segment 431. Illustratively, the first, second, and third two-pad units 31, 32, 33 cooperate to form two-pad unit stack 34. First pad 331 of third two-pad unit 33 lies above first pads 311, 321 of first and second two-pad units 31, 32. Second pad 332 of third two-pad unit 33 lies above the second pads 312, 322 of the first and second two-pad units 31, 32. First perforated line segment 431 of third two-pad unit 33 lies above first perforated line segments 411, 421 of first and second two-pad units 31, 32.

As shown in FIGS. 1-3, the first and second pads 311, 312, 321, 322, of first and second two-pad units 31, 32 are octagon-shaped. Retainer 14, as shown in FIGS. 1 and 2, is illustratively a shrink-wrap cover 14. Shrink-wrap cover 14 is formed to include an interior region 15 that contains columns 35, 36 of first and second pads.

As further suggested in FIGS. 1 and 2, multi-unit package 10 further comprises a first supplemental two-pad unit 31a. First supplemental two-pad unit 31a includes a first pad 311a and a second pad 312a coupled to first pad 311a of first supplemental two-pad unit 31a along a second perforated line segment 412. A second supplemental two-pad unit 32a includes a first pad 321a and a second pad 322a coupled to first pad 321a along a second perforated line segment 422.

Second supplemental two-pad unit 32a is arranged to lie above first supplemental two-pad unit 31a to form a supplemental two-pad unit stack 34a. First pad 321a of second supplemental two-pad unit 32a lies above first pad 311a of first supplemental two-pad unit 31a to form an auxiliary column 35a of first pads. Second pad 322a of second supplemental two-pad unit 32a lies above second pad 312a of first supplemental two-pad unit 31a to form an auxiliary column 36a of second pads. Second perforated line segment 422 of second supplemental two-pad unit 32a is arranged to lie above second perforated line segment 412 of first supplemental two-pad unit 31a. As shown in FIGS. 1 and 2, retainer 14 is arranged to mate with first and second supplemental two-pad units 31a, 32a in second supplemental two-pad unit stack 34a to retain in aligned relation first pads 311a, 321a, second pads 312a, 322a, and second perforated line segments 412, 422.

As shown in FIG. 8, first two-pad unit 31 and first supplemental two-pad unit 31a are arranged illustratively to lie in side-by-side relation to one another. First pad 311 of first two-pad unit 31 is coupled to first pad 311a of first supplemental two-pad unit 31a along a third perforated line segment 431. Second pad 312 of first two-pad unit 31 is coupled to...
second pad 312a of first supplemental two-pad unit 31a along a fourth perforated line segment 414 to form a four-pad unit 16 as suggested in FIG. 2. [0034] Third and fourth perforated line segments 413, 414 are arranged to lie in a longitudinal reference line 18. Longitudinal reference line 18 is arranged to lie between first two-pad unit 31 and first supplemental two-pad unit 31a as shown in FIG. 2. [0035] First and second perforated line segments 411, 412 are arranged to lie in a transverse reference line 20. Transverse reference line 20 is arranged to lie in perpendicular relation to longitudinal reference line 18. As shown in FIG. 2, first perforated line segment 411 of first two-pad unit 31 and second perforated line segment 412 of first supplemental two-pad unit 31a lie in transverse reference line 20. Transverse reference line 20 is arranged to bisect each of first two-pad unit 31 and first supplemental two-pad unit 31a. [0036] As shown in FIG. 8, first pad 311 and second pad 312 of first two-pad unit 31 and first supplemental two-pad unit 31a cooperate to form a square-shaped opening 38. Illustratively, square-shaped opening 38 is formed in the center portion of four-pad unit 16. [0037] An illustrative use of pad 311 is shown in FIG. 3. A consumer 11 is using a paddle 46 to place a cooked pizza 48 on pad 311 that has been obtained from multi-unit package 10. Consumer 11 obtains pad 311 by opening multi-unit package 10 that includes four-pad unit stock 12 and Retainer 14 (e.g., shrink-wrap cover 14) as illustrated in FIG. 2. Shrink-wrap cover 14 encloses four-pad unit stock 12 to protect four-pad unit stock 12 during storage or transportation. [0038] As suggested in FIG. 2, four-pad unit stock 12 is formed by stacking a series of four-pad units 16 on top of one another. Consumer 11 removes a top four-pad unit 16 from four-pad unit stock 12. Four-pad unit 16 is then broken along longitudinal reference line 18 to form a first two-pad unit 31 and first supplemental two-pad unit 31a. Each two-pad unit 31, 31a is then broken along a transverse reference line 20 to form four pads 311, 312, 31a, 312a. [0039] As illustrated in FIGS. 2 and 8, pad 311 is formed to include eight edges cooperating to define a generally octagonal shape. The octagon shape permits the use of automated manufacturing methods and minimizes scrap required during the manufacturing process. [0040] An illustrative continuous method for forming multi-unit package 10 is illustrated in FIG. 4 and is comprised of several steps. The first step is providing a corrugated sheet 50 to a first station 56. The second step is cutting corrugated sheet 50 in first station 56 to form a blank 58, interior waste 60, and exterior waste 62. The third step is separating blank 58 from interior waste 60 and exterior waste 62. The fourth step is accumulating blanks 58 and forming a multi-pad strip stock 72 in a second station 66. The fifth step is breaking multiple strip stock 72 in a third station 74 forming four-pad unit stock 12. The sixth step is applying a shrink-wrap material 76 to the four-pad unit stock 12 at a fourth station 78. The seventh step is heating shrink-wrap material 76 to form shrink-wrap cover 14 at a fifth station 80. [0041] The first step is accomplished by removing corrugated sheet 50 from a sheet supply stack 53 as illustrated in FIG. 4. Removal and placement of corrugated sheet 50 onto a first conveyor 54 is accomplished by any acceptable method. Corrugated sheet 50 is required to be oriented so that feeding into first station 56 is aided by aligning the corrugation to the conveyor direction 144. [0042] The second step is accomplished by cutting corrugated sheet 50 as suggested in FIG. 4 and illustrated in FIGS. 10a-10c. The cutting step makes two types of cuts into corrugated sheet 50. The first cut type, a shearing cut, passes completely through corrugated sheet 50. The second cut type, a perforating cut, only partially passes through corrugated sheet 50 and is illustrated in FIGS. 10a-10c. The shearing cuts are made along a first cut line 96 along a center line 94 of corrugated sheet 50, a perimeter-cut line 88, and a plurality of interior cut lines 92. The perforating cuts are made along a plurality of perforated line segments 18, 20. First cut line 96 permits the formation of a first and second multi-pad strip 97, 98 from blank 58. [0043] The third step is accomplished by the force of gravity pulling interior waste 60 and exterior waste 62 downward and into a scrap receiver 64. Interior waste 60 is formed as a result of interior cut lines 92. Exterior waste 62 is formed as a result of perimeter-cut line 88. Multi-pad strips 97, 98 are received by a second conveyor 55 moving at a slower speed relative to first conveyor 54. Movement of second conveyor 55 at a slower speed causes shingling of multi-pad strips 97, 98. [0044] The fourth step is accomplished by accumulating the multi-pad strips in second station 66 to form multi-pad strip stock 72 as illustrated in FIGS. 4 and 7. Second station 66 may, if required, rotate multi-pad strip stock 72 about line 4 illustrated in FIG. 4. Rotation, if required, allows for multipad strip stock to be supplied to third station 74 in a manner suitable for breaking multi-pad strip stock 72 to form multiple four-pad unit stock 12. [0045] The fifth step is accomplished by breaking multi-pad strip stock 72. Multi-pad strip stock 72 is conveyed on second conveyor 55 to third station 74. Third station 74 illustratively breaks multi-pad strip stock 72 along a first break line 51 forming four-pad unit stock 12. A partial multi-pad strip stock 114 is then indexed further into third station 74 and broken along a second break line 52 forming a second and third four-pad unit stock 116, 118 as illustrated in FIG. 4. [0046] The sixth step is accomplished by applying shrink-wrap material 76 to four-pad unit stock 12. Shrink-wrap material 76 is applied in any suitable manner so that four-pad unit stock 12 is encased in shrink-wrap material 76 and shrink-wrap cover 14 can be formed in later steps. [0047] The seventh step is accomplished by heating shrink-wrap material 76 to a suitable temperature to cause shrink-wrap material 76 to shrink and form shrink-wrap cover 14. Shrink-wrap cover 14 operates to protect four-pad unit stock 12 during storage or transportation. [0048] The cutting step suggested in FIG. 4 and illustrated in FIGS. 9-10c begins with corrugated sheet 50 entering a first station 56 including a cutting machine 84. Illustratively, cutting machine 84 is a rotary die cutter 84 and scrap receiver 64. Rotary die cutter 84 includes an upper drum 85 and a lower drum 86. Corrugated sheet 50 passes between upper drum 85 and lower drum 86 and is cut by a cutter 108 coupled to upper drum 85. First multi-pad strip 97 exits from rotary die cutter 84 first, and then second multi-pad strip 98 exits. [0049] First multi-pad strip 97 exits from first station 56 and second multi-pad strip 98 exits next and is positioned to lie partially overlapping first multi-pad strip 97 as illustrated in FIG. 6. The overlapping multi-pad strips form a shingled strip 112 as a result of a second conveyor 55 moving slower relative to the exit speed of blank 58 from first station 56.
Cutter 108 includes nicked blades 124 as illustrated in FIGS. 10a-10c and straight blades 126 as suggested in FIG. 4. Straight blades form the shearing cuts and nicked blades 124 form the perforating cuts illustrated in FIGS. 5-9. Nicked blade 124 includes a set of teeth 128 and a teeth support 130. Teeth support 130 interconnects a set of teeth 128 to upper drum 85. Set of teeth 128 is formed by spacing apart a pair of teeth 128a, 128b so as to define a gap space 136a. Gap space 136a is positioned to extend upward into nicked blade 124 to a depth sufficient to avoid cutting through a bottom layer 138 of corrugated sheet 50 as illustrated in FIG. 10b.

As illustrated in FIG. 10a, nicked blade 124 is positioned above corrugated sheet 50 prior to passing through rotary die cutter 84. As illustrated in FIG. 10b, nicked blade 124 has been moved to a lowered position in rotation to rotation of rotary die cutter 84 feeding corrugated sheet 50 into contact with cutter 108. Nicked blade 124 has made a complete cut into corrugated sheet 50 cutting through a top layer 152, a corrugated layer 142, and nicking bottom layer 138. As illustrated in FIG. 10c, nicked blade 124 is retracted fully in an upper position leaving the cut illustrated in FIGS. 9, 11, and 12.

The perforating cut forms a series of perforated line segments 411, 412, 413, 414 illustrated in FIGS. 9-12 which permit the four-pad unit 16 to be broken into individual pads 311, 312, 311a, 312a. Each perforated line segment 411, 412, 413, 414 is substantially the same as the other perforated line segments except with respect to their orientation to one another. First perforated line segment 411 and second perforated line segment 412 are arranged to lie in transverse reference line 20. Third perforated line segment 413 and fourth perforated line segment 414 are arranged to lie in longitudinal reference line 18, as shown in FIG. 8.

As shown in FIG. 12, each perforated line segment 411, 412, 413, 414 includes nicked links 154 and nicked cuts 150. Nicked link 154a is formed in response to teeth 128a, 128b passing through bottom layer 138 and leaving a portion of bottom layer 138 not cut that corresponds to gap space 136a. Nicked cut 150 is a space defined in bottom layer 138 by tooth 128a passing through bottom layer 138 during the cutting step. Illustratively, nicked link 150 is positioned to lie in spaced-apart relation to an adjacent nicked link 150a to form nicked cut 148 therebetween as shown in FIG. 12. Coupling is accomplished by use of nicked links 154. After cutter 108 passes through top layer 152 and corrugated layer 142, a cut gap 100 is formed within top layer 152 and corrugated layer 142 such that only bottom layer 138 operates to couple first pad 311 to second pad 312.

Four-pad unit 16 includes a first and first supplemental two-pad unit 31, 31a and third and forth perforated line segments 413, 414. First two-pad unit 31 is interconnected to first supplemental two-pad unit 31a along perforated line segments 413, 414. First two-pad unit 31 includes two pads 311, 312 and first perforated line segment 411.

As suggested in FIG. 9, corrugated sheet 50 includes top layer 152, corrugated layer 142, and bottom layer 138. Corrugated layer 142 is positioned to lie between top layer 152 and bottom layer 138. Corrugated sheet 50 is positioned so that corrugated layer 142 is oriented parallel to conveyor direction 144 to aide in cutting corrugated sheet 50 as it passes through first station 56.

Alternately, consumer 11 may use paddle 46 to place a larger cooked pizza 148 on larger pad 22. The consumer obtains larger pad 22 by opening a multi-unit package comprising a two-pad unit stack 34 and a shrink-wrap cover 14. Shrink-wrap cover 14 encloses two-pad unit stack 34 during storage and transportation.

Two-pad unit stack 34 is formed by stacking a series of two-pad units 31, 32, 33 on top of one another. Consumer 11 removes a top two-pad unit 31 from two-pad unit stack 34. Two-pad unit 31 is substantially the same as two-pad units 32, 33. Two-pad unit 31 is then broken along first perforated line segment 411 to form two pads 22a, 22b.

An illustrative continuous method for forming multi-unit package 100 is comprised of several steps similar to the method for creating four-pad unit stack 12. The first step and second step are substantially the same. The third step is substantially the same except that only single multi-pad strip 197 is formed as a result of a different cut pattern used in the second cutting step. The fourth step is substantially the same except that a multi-pad strip stack 172 is formed which is comprised of multiple two-pad unit stacks 34 rather than multiple four-pad unit stacks 12. The fifth step is substantially the same except that after breaking multi-pad strip stack 172 along a first break line 51, two-pad unit stack 34 is formed. The sixth step and seventh steps remain substantially the same.

The cutting step required to form multi-pad strip 197 begins with corrugated sheet 50 entering a first station 56. First station 56 includes a rotary die cutter 84 and scrap receiver 64. Rotary die cutter 84 includes an upper drum 85 and a lower drum 86. Corrugated sheet 50 passes between upper drum 85 and lower drum 86 and is cut by a cutter 108 to upper drum 85. A series of multi-pad strip 197 exit from the rotary die cutter 84 one after another.

One difference between larger pad 22 and pad 311 is that larger pad 22 is larger in size than pad 311. Illustratively pad 311 includes a pad width 24. Pad width 24 is defined as a distance 26 between any two sides positioned to lie in parallel relation to one another as shown in FIG. 13. Illustratively, distance 26 of pad 311 is less than about 12 inches. Distance 26 of pad 22, for example, is larger than 12 inches. Both pads 22, 311 have substantially the same octagon shape.

In an alternative embodiment, first two-pad unit 31 may be used by consumer 11 as support pads for a cake 47 as shown in FIG. 13. Illustratively, two-pad unit 31 is broken along first perforated line segment 411 to establish first pad 22a and second pad 22b. As shown in FIG. 13, first pad 22a is placed under a first cake 47 and second pad 22b is placed under a second cake 47a.

In yet another alternative embodiment, first two-pad unit 31 may be used by consumer 11 as end supports for spool 45 as shown in FIG. 14. Spool 45 includes a winding cylinder 40, a first pad 1311, and a second pad 1312. As suggested in FIG. 14, first pad 1311 is formed to include a cylinder-mounting feature 102. Illustratively, cylinder-mounting feature 102 is formed in first station 56 by rotary die cutter 84. An illustrative embodiment of cylinder-mounting feature 102 is shown in FIG. 14 as a pair of tabs 103, 104 arranged to be folded and placed inside winding cylinder 40 and to be held in place by friction. In another illustrative embodiment of cylinder-mounting feature 102, a circular aperture is formed in pad 1311 by rotary die cutter 84. Pad 1311 is then slid onto winding cylinder 40 by passing winding cylinder 40 through the circular aperture and is held in place by a friction fit.

As shown in FIGS. 1 and 2, a multi-unit package 10 includes shrink-wrap cover 14 and four-pad unit stack 12.
Shrink-wrap cover 14 is formed to include interior region 15 and is adapted to protect multi-unit package 10 during transportation.

Four-pad unit stack 12, as shown in FIG. 2, is positioned to lie within interior region 15. Each four-pad unit stack 12 includes a plurality of four-pad units 16 stacked on top of one another. Each four-pad unit 16 includes a first pad 311, a second pad 312, a third pad 311a, and a fourth pad 311b. Each four-pad unit 16 also includes joint means 41 for coupling each pad along a first perforated line segment to a first neighboring pad and along a separate second perforated line segment to a second neighboring pad to cause each pad to be separable from the companion first and second neighboring pads in response to bending of a selected pad relative to each of the companion first and second neighboring pads, wherein the first neighboring pad is one of the first, second, third, and fourth pads and the second neighboring pad is another of the first, second, third, and fourth pads.

As an example, first pad 311 is coupled to first neighboring pad (e.g. second pad 312) about first perforated line segment 411. First pad 311 is also coupled to second neighboring pad (e.g. third pad 311a) about separate second perforated line segment 413.

Illustratively, first pad 311 has first, second, third, fourth, fifth, sixth, seventh, and eighth sides. The sides are arranged in series to establish an octagon-shaped perimeter 28 as shown in FIG. 2. Each side is arranged to intersect with an adjacent side to form an obtuse angle 30 therebetween as suggested in FIG. 7. As an example, first perforated line segment 411 is established along a first side of first pad 311 and second perforated line segment (e.g. third perforated line segment 413) is established along the third side of first pad 311.

Joint means 41 includes a first perforated line segment 411, a second perforated line segment 412, a third perforated line segment 413, and a fourth perforated line segment 414. Each perforated line segment 411, 412, 413, 414 includes a series of nicked links 148 extending between each pad 311, 312, 311a, 312a. Each nicked link 148 is arranged to lie in spaced-apart relation to an adjacent nicked link 148a to define a nicked cut 150 therebetween.

As shown in FIGS. 9-10c and 12, each four-pad unit 16 includes top layer 152, bottom layer 138, and corrugated layer 142 that interconnects top layer 152 and bottom layer 138. Illustratively, the series of nicked lines 148 are formed in bottom layer 138 of each four-pad unit 16 along first, second, third, and fourth perforated line segments 411, 412, 413, 414.

A multi-unit package 100 includes a shrink-wrap cover 14 and a two-pad unit stack 34. Shrink-wrap cover 14 is formed to include an interior region 15 and two-pad unit stack 34 is positioned to lie in interior region 15. Illustratively, two-pad unit stack 34 includes a plurality of two-pad units 31, 32, 33 stacked on top of one another. Each two-pad unit stack (e.g. two-pad unit stack 34) includes a first pad 22a, a second pad 22b, and joint means 41 for coupling first pad 22a to second pad 22b along first perforated line segment 411 to cause first pad 22a to be separable from second pad 22b.

Illustratively, joint means 41 includes first perforated line segment 411 having a series of nicked links 148 extending between first pad 22a and second pad 22b. Each nicked link 148 is positioned to lie in spaced-apart relation to an adjacent nicked link 148a as suggested in FIG. 12 to define a nicked cut 150 therebetween.

First pad 22a includes a pad width 42 defined as a distance 44 between any two sides of first pad 22a that is in parallel relation to one another. Illustratively first pad 22a has a distance greater than about 12 inches.

1. A multi-unit package comprising
a first two-pad unit including a first pad and a second pad coupled to the first pad of the first two-pad unit along a first perforated line segment,
a second two-pad unit including a first pad and a second pad coupled to the first pad of the second two-pad unit along a first perforated line segment, the second two-pad unit being arranged to lie above the first two-pad unit to form a two-pad unit stack wherein the first pad of the second two-pad unit lies above the first pad of the first two-pad unit to form a column of first pads, the second pad of the second two-pad unit lies above the second pad of the first two-pad unit to form a column of second pads, and the first perforated line segment of the second two-pad unit is arranged to lie above the first perforated line segment of the first two-pad unit, and
a retainer arranged to mate with the first and second two-pad units in the two-pad unit stack to retain the first pads, second pads, and first perforated line segments in aligned relation to one another.

2. The multi-unit package of claim 1, further comprising a third two-pad unit including a first pad and a second pad coupled to the first pad of the third two-pad unit along a first perforated line segment, wherein the first, second, and third two-pad units cooperate to form the two-pad unit stack, the first pad of the third two-pad unit lies above the first pads of the first and second two-pad units, the second pad of the third two-pad unit lies above the second pads of the first and second two-pad units, and the first perforated line segment of the third two-pad unit lies above the first perforated line segments of the first and second two-pad units.

3. The multi-unit package of claim 2, wherein each of the first and second pads in the first and second two-pad units is octagon-shaped.

4. The multi-unit package of claim 2, wherein the retainer is a shrink-wrap cover formed to include an interior region containing the columns of first and second pads.

5. The multi-unit package of claim 1, wherein the retainer is a shrink-wrap cover formed to include an interior region containing the columns of first and second pads.

6. The multi-unit package of claim 1, further comprising a first supplemental two-pad unit including a first pad and a second pad coupled to the first pad of the first supplemental two-pad unit along a second perforated line segment,
a second supplemental two-pad unit including a first pad and a second pad coupled to the first pad of the second supplemental two-pad unit along a second perforated line segment, the second supplemental two-pad unit being arranged to lie above the first supplemental two-pad unit to form a supplemental two-pad unit stack wherein the first pad of the second supplemental two-pad unit lies above the first pad of the first supplemental two-pad unit to form an auxiliary column of first pads, the second pad of the second supplemental two-pad unit lies above the second pad of the first supplemental two-pad unit to form an auxiliary column of second pads, and the second perforated line segment of the second supple-
mental two-pad unit is arranged to lie above the second perforated line segment of the first supplemental two-pad unit, and
the retainer is arranged also to mate with the first and second supplemental two-pad units in the supplemental two-pad unit stack to retain in aligned relation the first pads, second pads, and first perforated line segments of the two-pad unit stack and the first pads, second pads, and second perforated line segments of the supplemental two-pad unit stack.
7. The multi-unit package of claim 6, wherein the first two-pad unit and the first supplemental two-pad unit are arranged to lie in side-by-side relation to one another.
8. The multi-unit package of claim 7, wherein the first pad of the first two-pad unit is coupled to the first pad of the first supplemental two-pad unit along a third perforated line segment and the second pad of the first two-pad unit is coupled to the second pad of the first supplemental two-pad unit along a fourth perforated line segment to form a four-pad unit.
9. The multi-unit package of claim 8, wherein each of the third and fourth perforated line segments lies in a longitudinal reference line arranged to lie between the first two-pad unit and the first supplemental two-pad unit.
10. The multi-unit package of claim 9, wherein each of the first and second perforated line segments lies in a transverse reference line arranged to lie in perpendicular relation to the longitudinal reference line.
11. The multi-unit package of claim 8, wherein each of the first and second pads of the first two-pad unit and the first supplemental two-pad unit cooperate to form a square-shaped opening therebetween.
12. The multi-unit package of claim 7, wherein the first perforated line segment of the first two-pad unit and the second perforated line segment of the first supplemental two-pad unit lie in a transverse reference line arranged to bisect each of the first two-pad unit and the first supplemental two-pad unit.
13. The multi-unit package of claim 6, wherein each of the first and second pads in the first and second two-pad units and in the first and second supplemental two-pad units is octagon-shaped.
14. A multi-unit package comprising
a shrink-wrap cover formed to include an interior region,
the shrink-wrap cover adapted to protect the multi-unit package during transportation and
a four-pad unit stack positioned to lie in the interior region, each four-pad unit stack including a plurality of four-pad units stacked on top of one another, each four-pad unit including a first pad, a second pad, a third pad, a fourth pad, and joint means for coupling each pad along a first perforated line segment to a first neighboring pad and along a separate second perforated line segment to a second neighboring pad to cause each pad to be separable from the companion first and second neighboring pads in response to bending of a selected pad relative to each of the companion first and second neighboring pads, wherein the first neighboring pad is one of the first, second, third, and fourth pads and the second neighboring pad is another of the first, second, third, and fourth pads.
15. The multi-unit package of claim 14, wherein the first pad has first, second, third, fourth, fifth, sixth, seventh, and eighth sides arranged in series to establish an octagon-shaped perimeter edge, each side is arranged to intersect with an adjacent side to form an obtuse angle therebetween, the first perforated line segment is established along the first side and the second perforated line segment is established along the third side.
16. A multi-unit package comprising
a shrink-wrap cover formed to include an interior region,
the shrink-wrap cover adapted to protect the multi-unit package during transportation and
a four-pad unit stack positioned to lie in the interior region, each four-pad unit stack including a plurality of four-pad units stacked on top of one another, each four-pad unit including a first pad, a second pad, a third pad, a fourth pad, and joint means for coupling each pad along a first perforated line segment to a first neighboring pad and along a separate second perforated line segment to a second neighboring pad to cause each pad to be separable from the companion first and second neighboring pads in response to bending of a selected pad relative to each of the companion first and second neighboring pads, wherein the first neighboring pad is one of the first, second, third, and fourth pads and the second neighboring pad is another of the first, second, third, and fourth pads, and each nicked link is arranged to lie in spaced-apart relation to an adjacent nicked link to define a nicked cut therebetween.
17. The multi-unit package of claim 16, wherein each four-pad unit includes a top layer, a bottom layer, and a corrugated layer arranged to interconnect the top layer and the bottom layer and the series of nicked links are formed in the bottom layer of each four-pad unit along the first perforated line segment and the second perforated line segment.
18. The multi-unit package of claim 17, wherein the top layer and the corrugated layer are broken along the first perforated line segment and the second perforated line segment to cause a cut gap to be formed between each pad and the neighboring first and second pads above the series of nicked links formed in the bottom layer.
19. The multi-unit package of claim 16, wherein each first pad has first, second, third, fourth, fifth, sixth, seventh, and eighth sides arranged in series to establish an octagon-shaped perimeter edge, each side is arranged to intersect with an adjacent side to form an obtuse angle therebetween, the first perforated line segment is established along the first side and the second perforated line segment is established along the third side.
20. The multi-unit package of claim 19, wherein the first pad includes a pad width defined as a distance between any two sides positioned to lie in parallel relation to one another and the distance is less than about 12 inches.
21. The multi-unit package of claim 19, wherein the first pad, the second pad, the third pad, and the fourth pad cooperate to establish a square-shaped opening.
22. The multi-unit package of claim 16, wherein each four-pad unit includes a first two-pad unit including the first pad and the second pad coupled together along the first perforated line segment, a second two-pad unit including the second pad and the fourth pad coupled together, and the second two-pad unit is coupled to the first two-pad unit along the second perforated line segment.
23. A multi-unit package comprising
a shrink-wrap cover formed to include an interior region and
a two-pad unit stack positioned to lie in the interior region,
the two-pad unit stack includes a plurality of two-pad
units stacked on top of one another, each two-pad unit includes
a first pad, a second pad, and joint means for
coupling the first pad to the second pad along a first
perforated line segment to cause the first pad to be separable
from the second pad in response to bending of the
first pad relative to the second pad and wherein the joint
means includes a series of nicked links extending
between the first pad and the second pad and each nicked
link is arranged to lie in spaced-apart relation to an
adjacent nicked link to define a nicked cut therebetween.

24. The multi-unit package of claim 23, wherein the first
pad has first, second, third, fourth, fifth, sixth, seventh, and
eighth sides arranged in series to establish an octagon-shaped
perimeter edge, each side is arranged to intersect with an
adjacent side to form an obtuse angle therebetween, the first
perforated line segment is established along the first side and
the second perforated line segment is established along the
third side.

25. The multi-unit package of claim 24, wherein the first
pad includes a pad width defined as a distance between any
two sides positioned to lie in parallel relation to one another
and the distance is greater than about 12 inches.

26. A method of producing a multi-unit package of pads,
the method comprising the steps of
providing corrugated sheets by a conveyor to a cutting
machine,
cutting the corrugated sheets with the cutting machine to
form blanks formed to include a plurality of perforated
line segments therein and waste,
accumulating the blanks to form a multi-pad strip stack
including a plurality of blanks stacked vertically on top of
one another,
breaking the multi-pad strip stack along the plurality of
perforated line segments formed by the cutting machine
to form a multi-pad unit stack, and
applying packaging to the multi-pad unit stack to produce
the multi-unit package.

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