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(54) **PACKAGE CONVEYOR**

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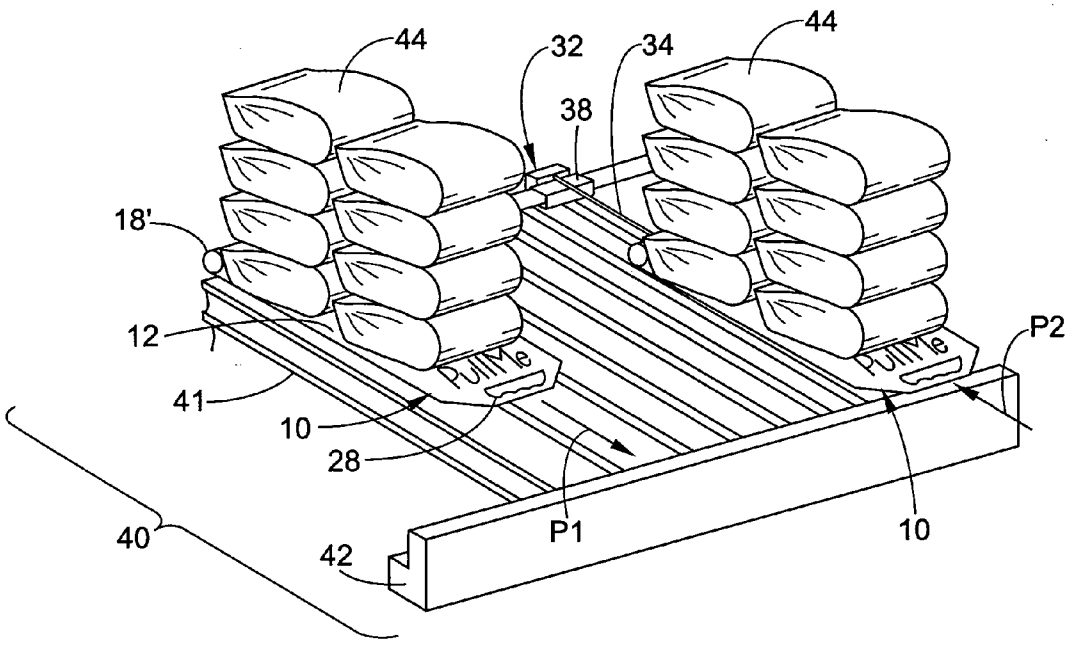
(52) **U.S. Cl.** **211/59.3**; 211/189

(57) **ABSTRACT**

A product puller for moving products or items within a shelving or other storage unit. The product puller includes a sheet having a surface for supporting one or more products thereon, a product backstop, and a means for moving the product puller in a desired direction. For example, the product puller finds use in moving a product located thereon forward or backward relative to a front edge of a shelf or storage unit.



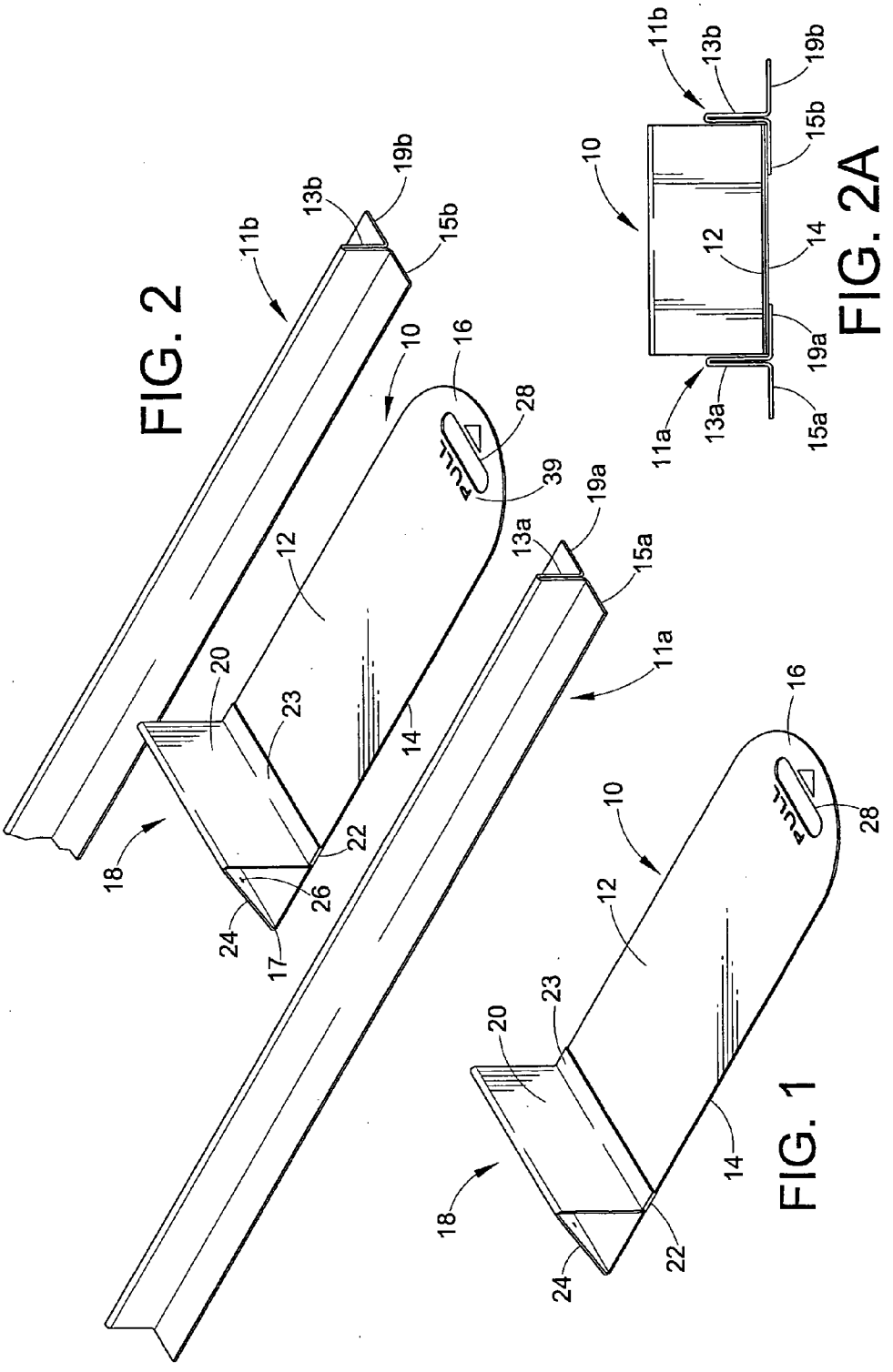


FIG. 2

FIG. 2A

FIG. 1

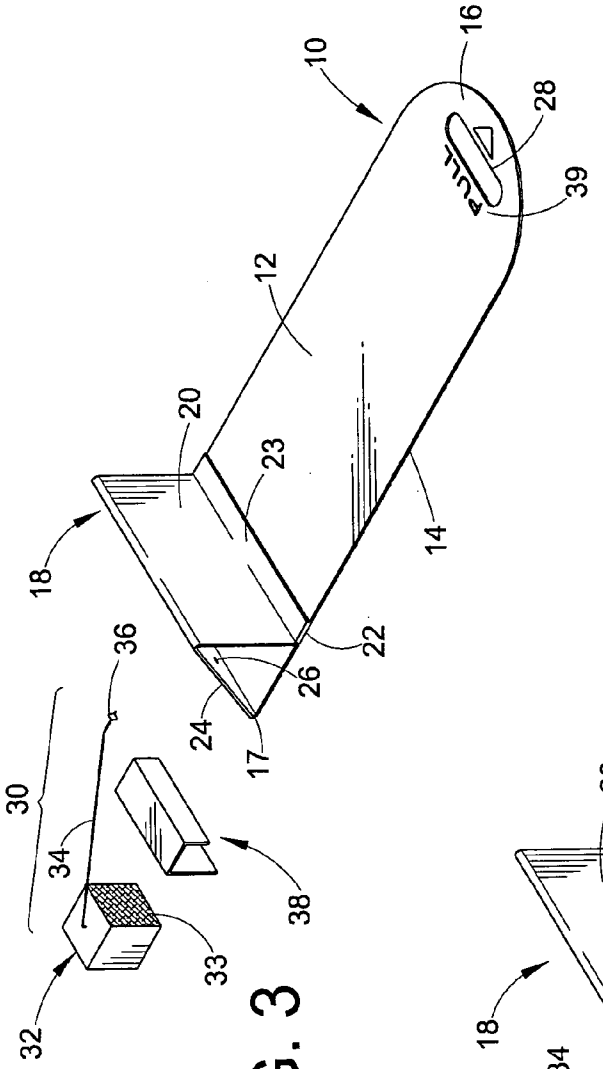
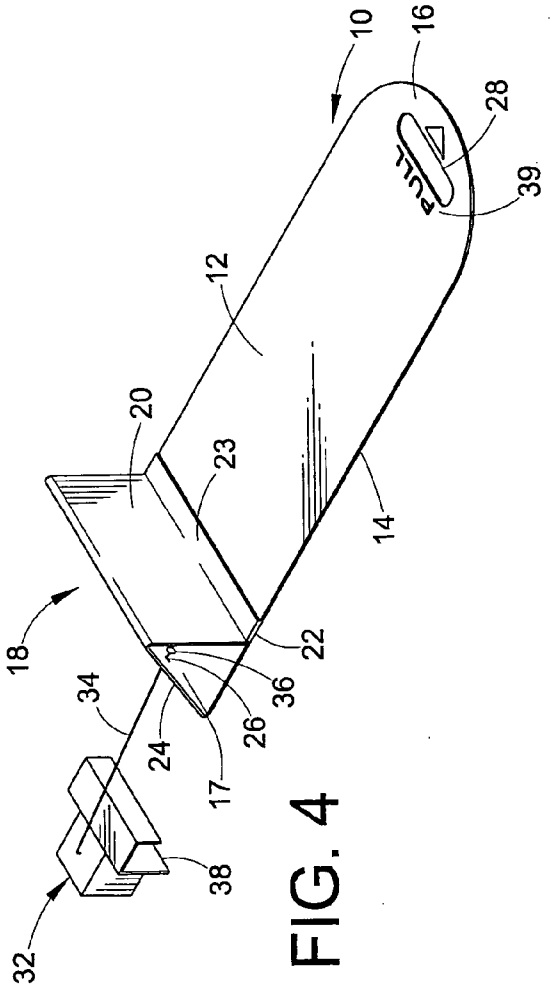

10
16
28
39
12
20
23
14
18
22
26
24
17
36
30
34
38
33
32

FIG. 3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16
28
39
12
20
23
14
18
22
36
34
26
24
17
38
32

FIG. 4

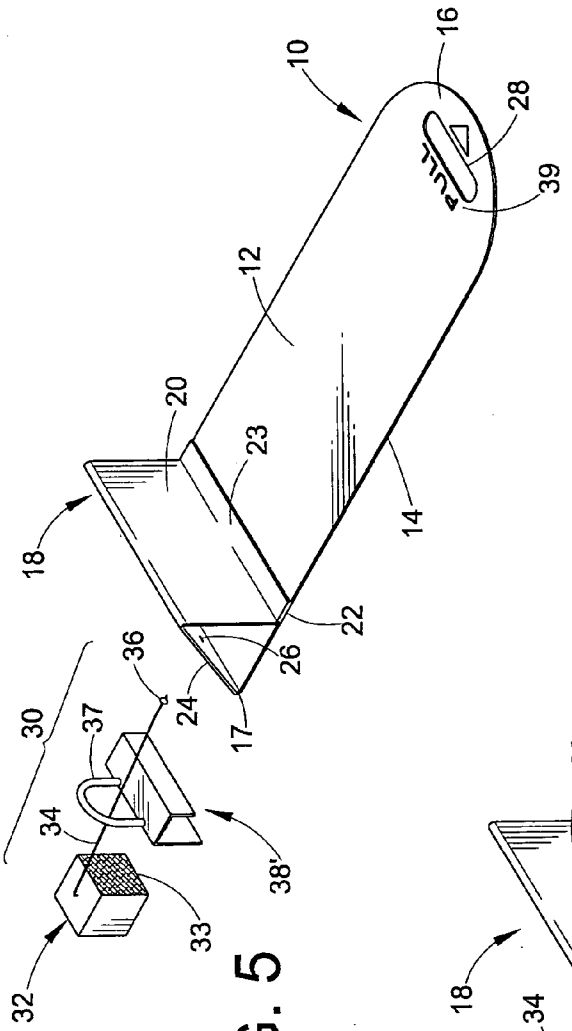

10
16
28
39
12
20
23
14
18
22
26
24
17
36
30
37
34
38'
33
32

FIG. 5

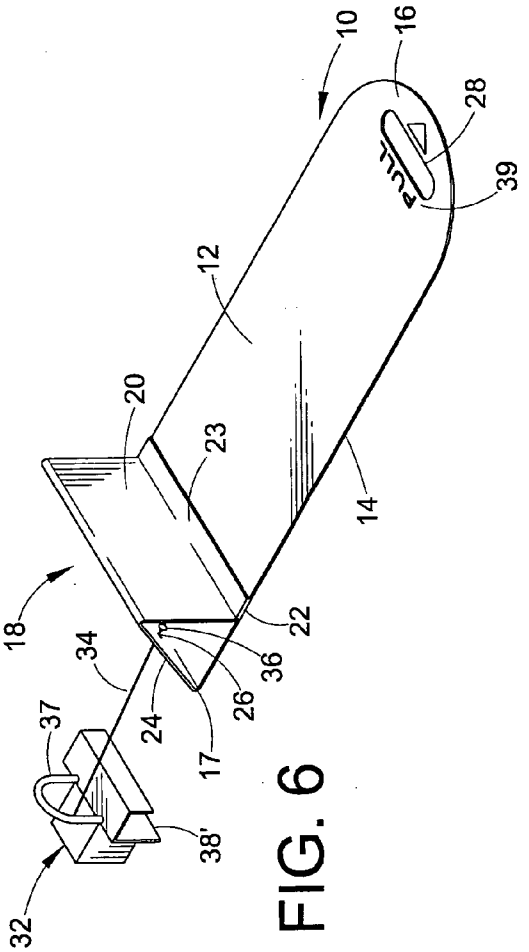

10
16
28
39
12
20
23
14
18
22
36
34
26
24
37
17
38'
32

FIG. 6

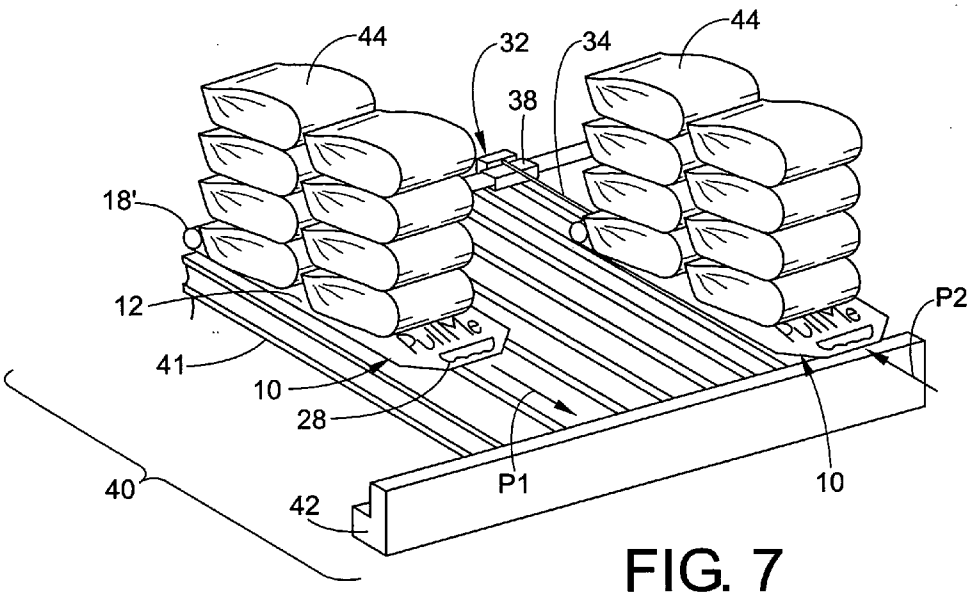

44
32
34
44
38
18'
12
41
10
28
40
42
P1
10
P2
PULL

FIG. 7

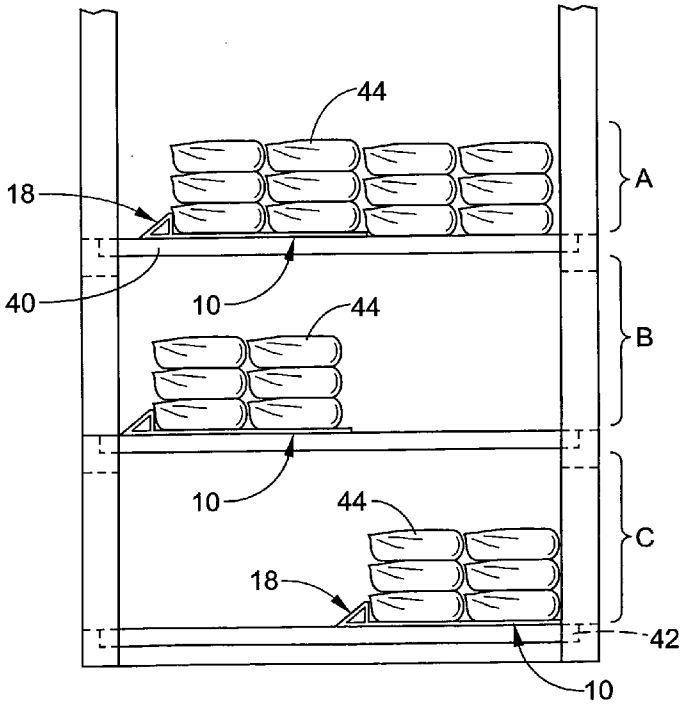

44
18
40
10
44
10
44
18
42
10
A
B
C

FIG. 8

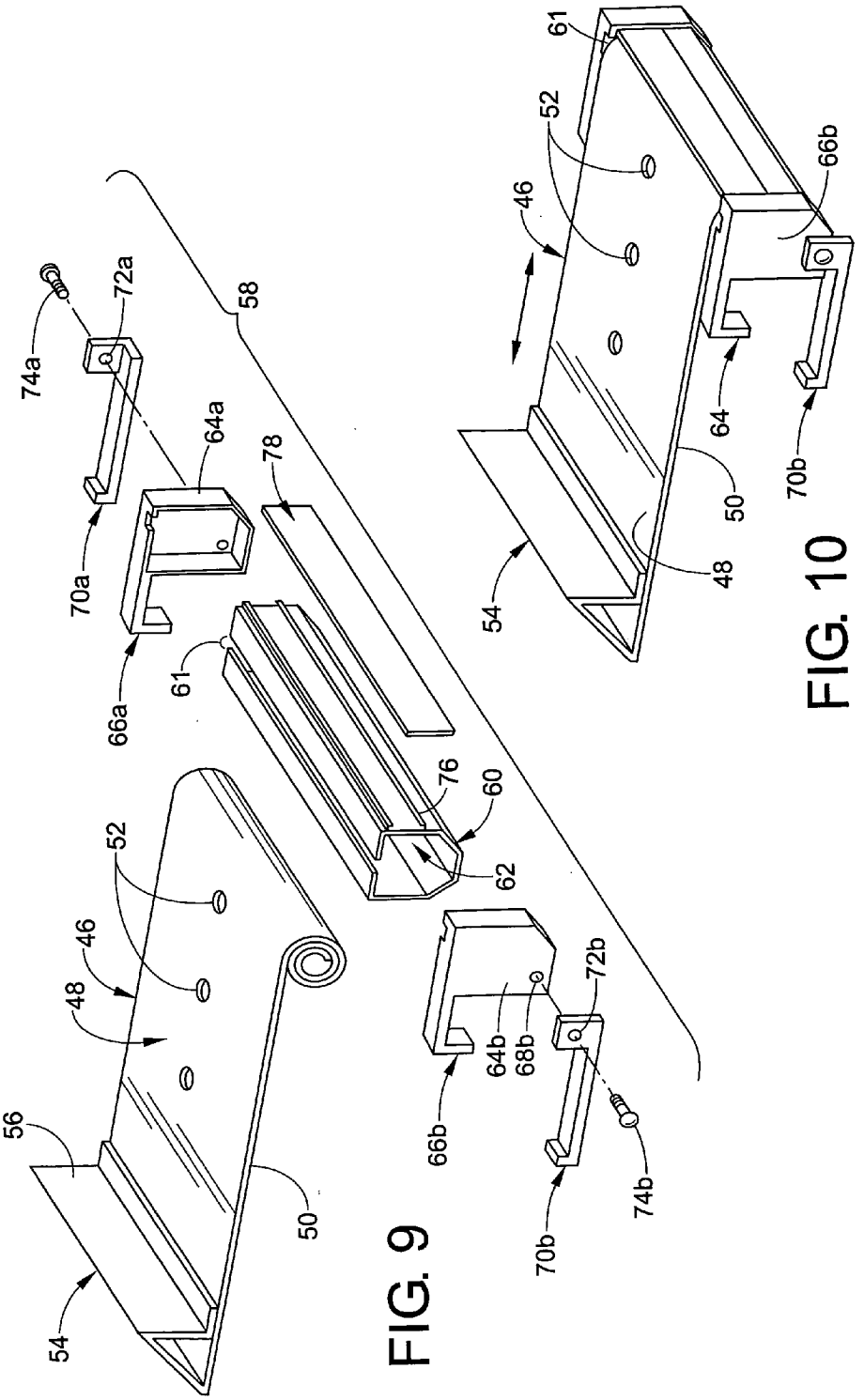

58
74a
72a
70a
64a
78
66a
61
76
60
62
52
46
48
56
50
54
72b
64b
68b
66b
70b
74b

FIG. 9

61
52
46
66b
64
70b
50
48
54

FIG. 10

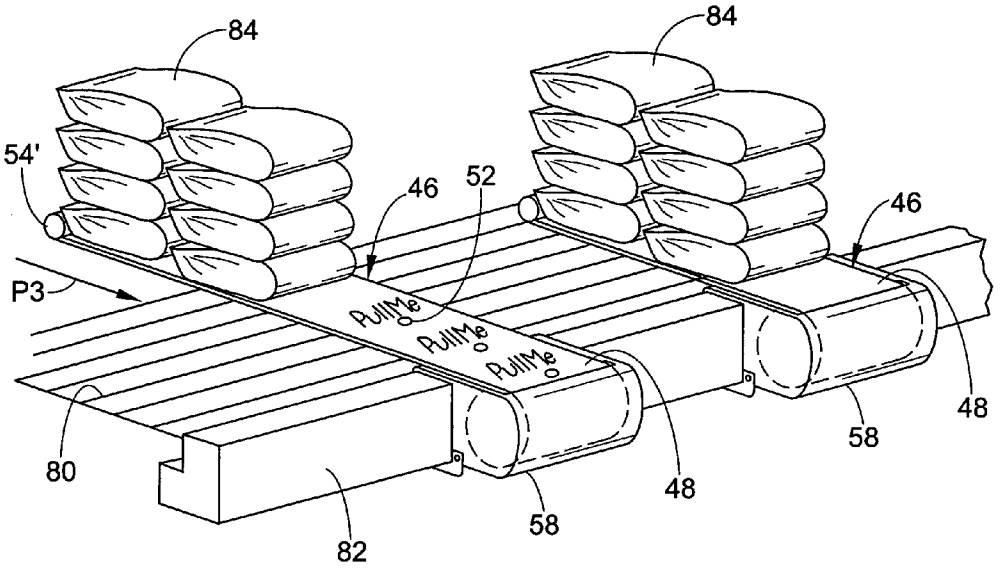

84
84
54'
46
52
46
P3
PULL
PULL
PULL
80
48
58
48
58
82

FIG. 11

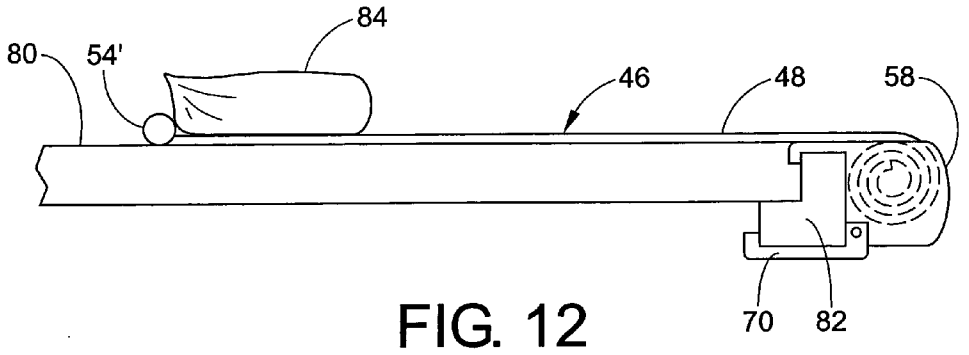

84
80
54'
46
48
58
70
82

FIG. 12

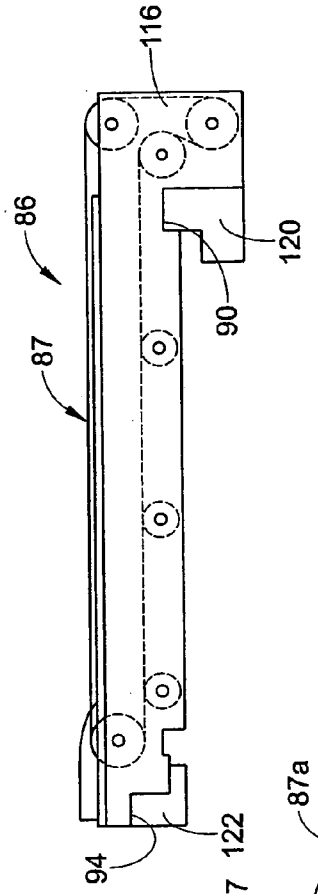

116
86
120
90
87
94
122

FIG. 14

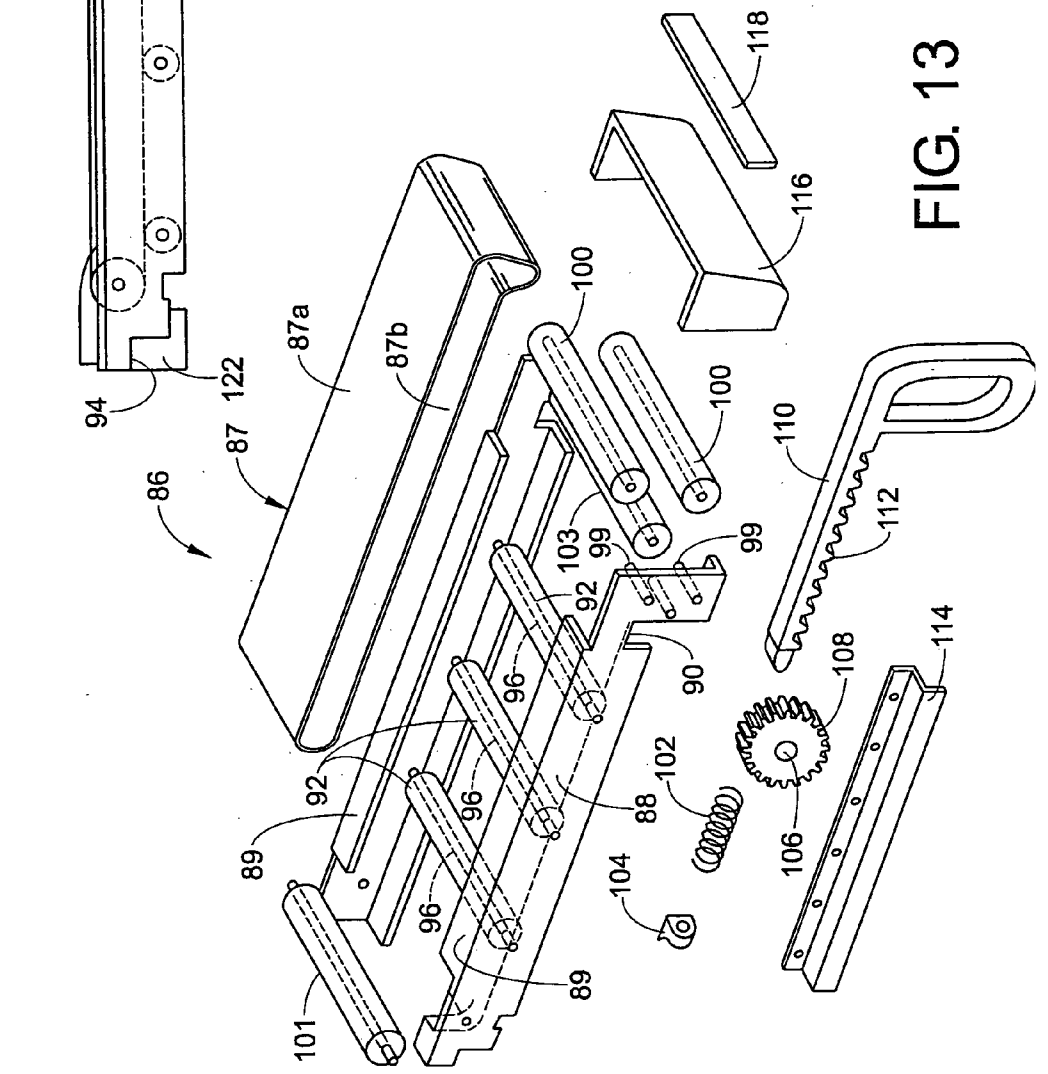

118
116
87a
87b
100
100
86
87
103
99
99
92
110
112
90
108
114
96
92
102
88
89
106
104
96
89
101

FIG. 13

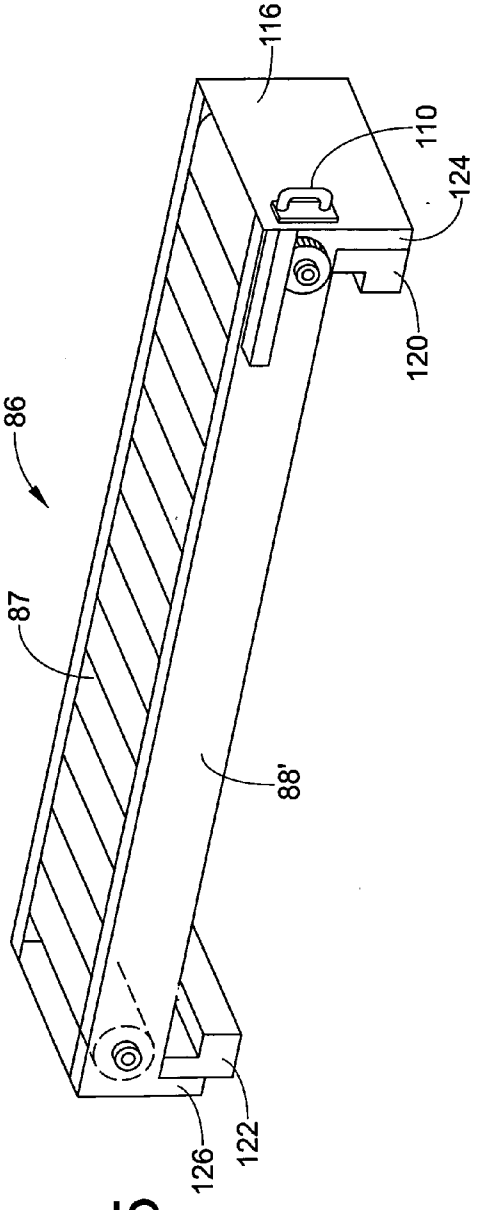


FIG. 15

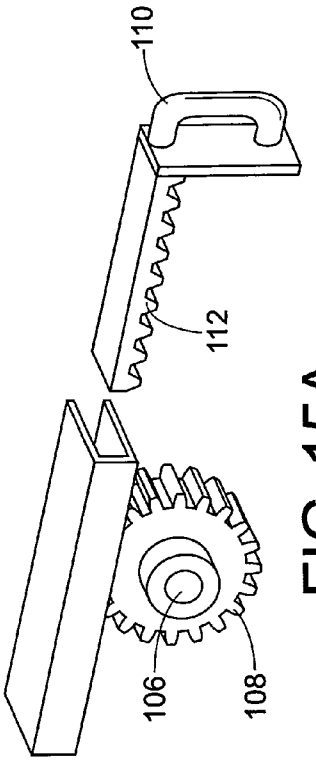


FIG. 15A

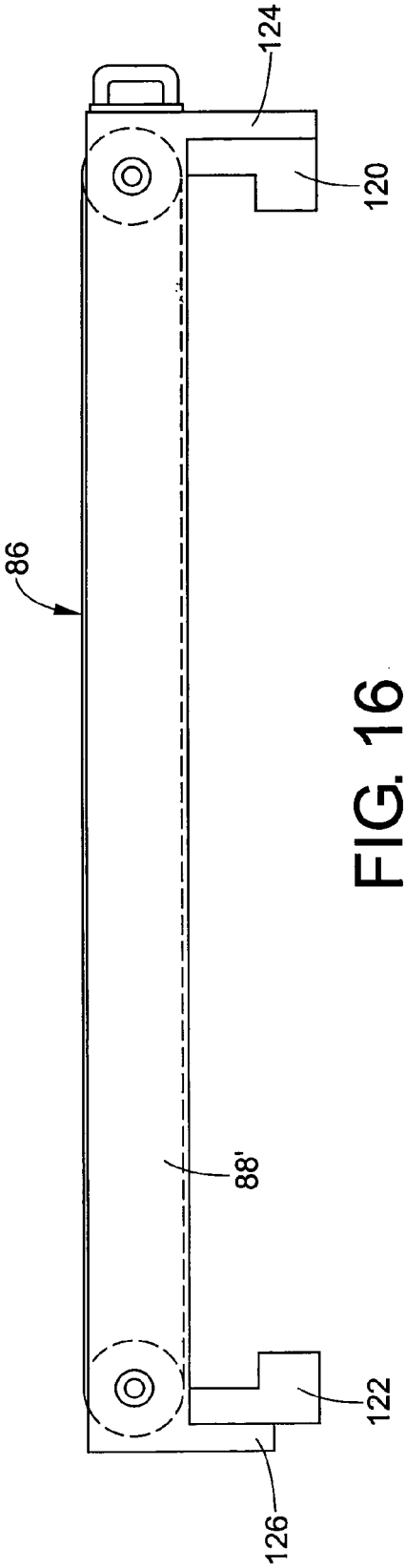


FIG. 16

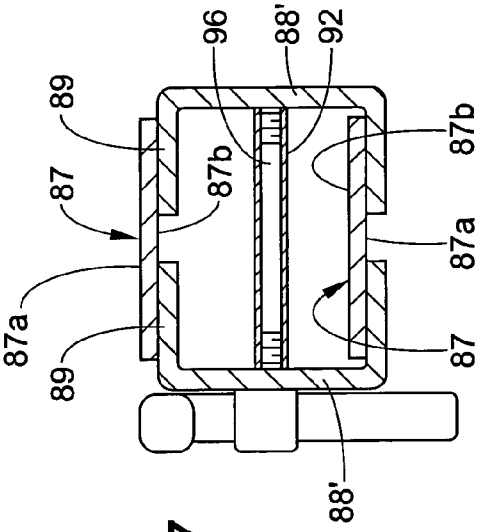
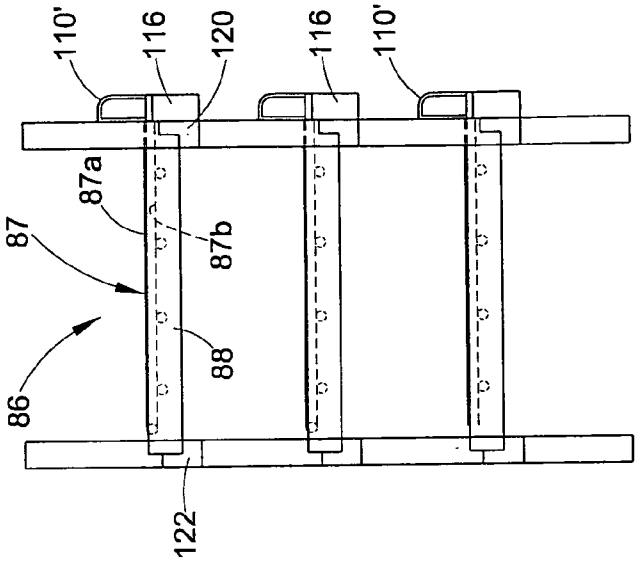


FIG. 17


110'
116
120
116
110'
87a
87
87b
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86
122

FIG. 19

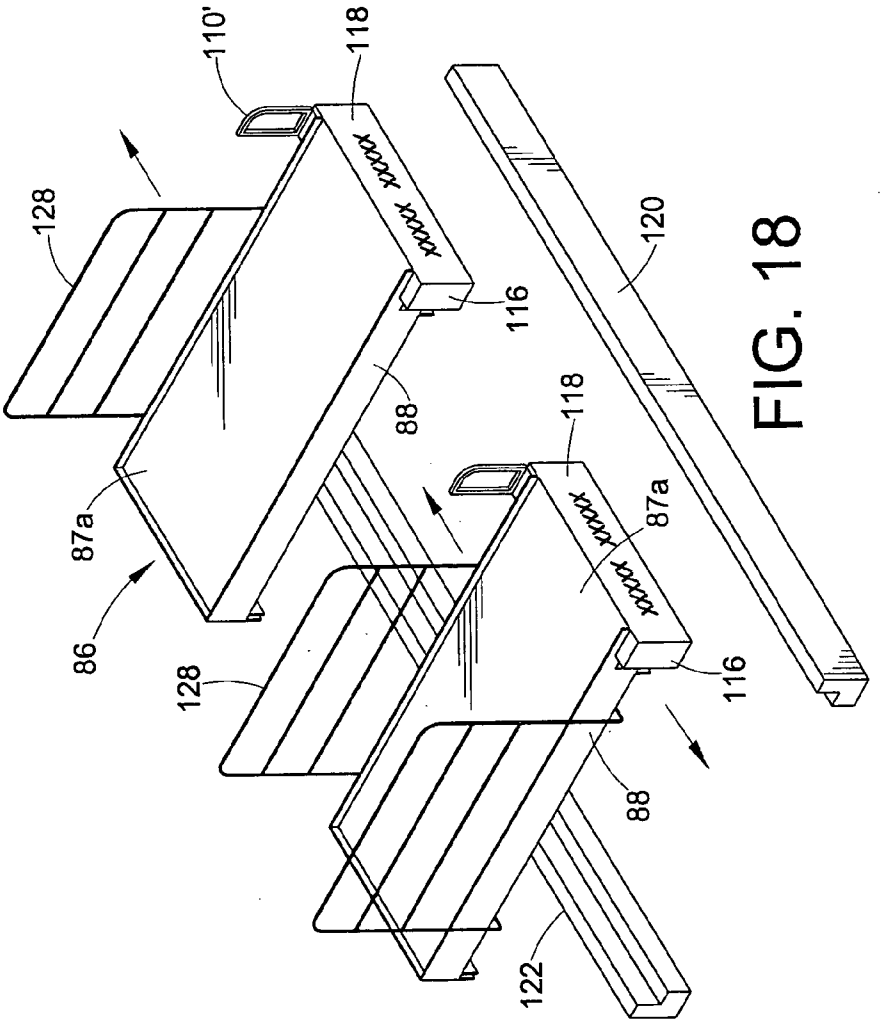
110'
118
128
116
120
88
87a
86
118
87a
128
116
88
122

FIG. 18

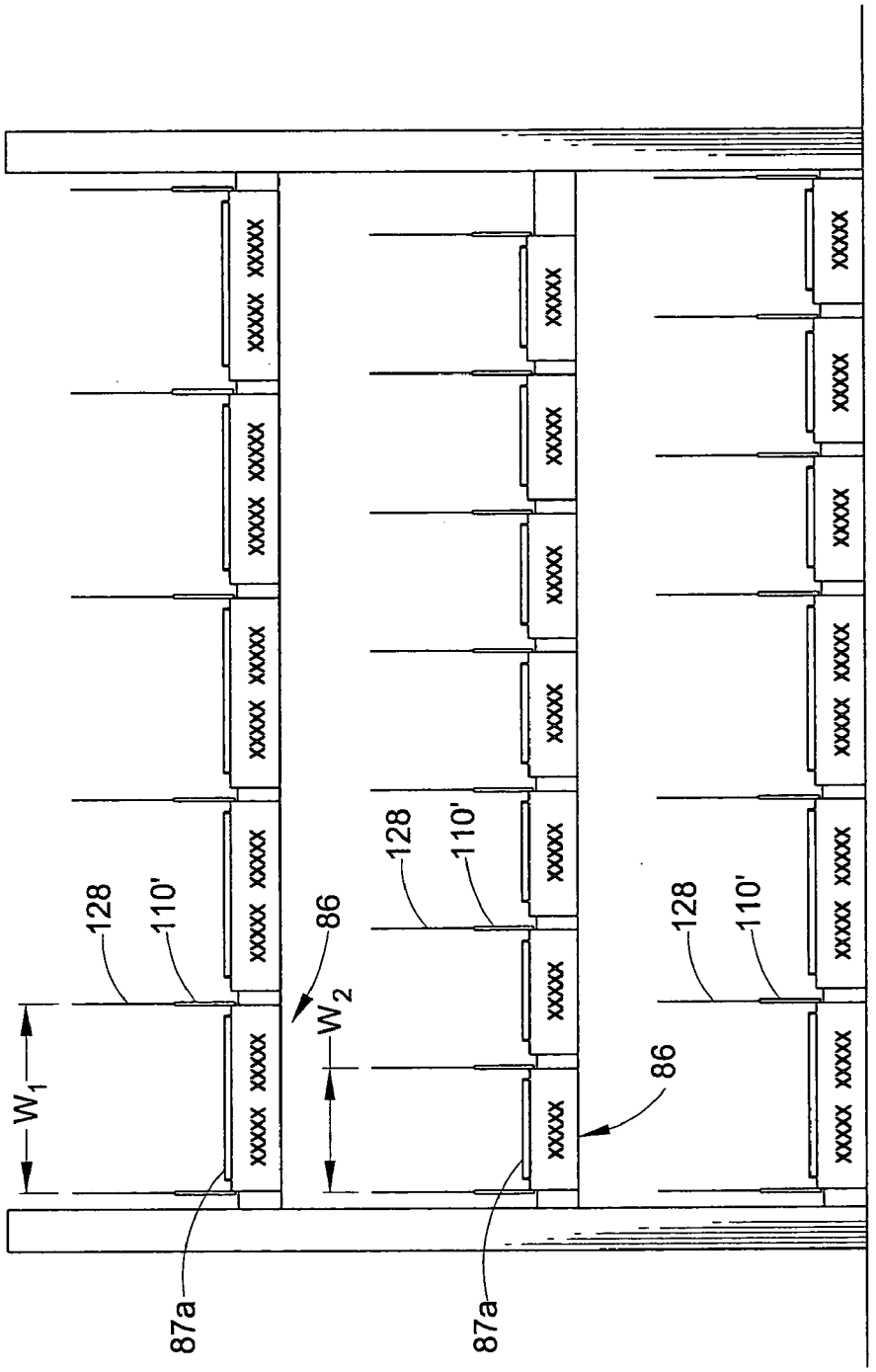

FIG. 20

PACKAGE CONVEYOR

[0001] The present application claims priority to and the benefit of U.S. Provisional Application No. 60/316,694, filed Oct. 7, 2004, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] The present disclosure relates, in various exemplary embodiments, to an apparatus for conveying or moving items or products located near a rear portion of a shelf or storage unit toward a front portion thereof. The present disclosure also relates to a method for using such an apparatus, which can be termed a product puller. A product puller finds particular application in a retail or warehouse-type store, and will be described with reference thereto. However, the product puller is suitable in any environment where it is desirable to store or display items on a shelf or in a storage unit where the product may prove difficult to access.

[0003] Goods or products for sale at both retail stores and wholesale warehouse type stores are often displayed for sale on or in shelves of a storage unit. There is probably an unlimited number of items that may be displayed in such a manner, including, for example, diapers, household items, packages of food, clothing, and the like. As items are shopped and removed from the shelves, items near the back or rearward portion of the shelf may be difficult to reach, and in some instances even difficult to view. This may be the case in particular where the items are located on a high shelf or a relatively deep shelf. Additionally, it may be difficult to reach or obtain a single product located near the back of a shelf where several products are stacked on top of one another.

[0004] In view of the foregoing, it is desirable to provide an apparatus for use in a shelving unit by which a single item or a plurality of items that are positioned near the rear or back portion of a shelf may be conveyed or moved forward toward the front of the shelving unit and thereby made accessible for retrieval and/or viewing by a shopper, store employee, or the like.

SUMMARY

[0005] The disclosure provides, in various embodiments thereof, an apparatus for conveying merchandise on a shelf in a selected direction relative to a front edge of the shelf, said apparatus comprising a sheet member having a top surface, a bottom surface, a front end, and a rear end; a means for grasping said sheet member located adjacent said front end of said sheet member; and a backstop located adjacent said rear end of said sheet member.

[0006] The present disclosure also provides, in various embodiments thereof, a product puller for moving objects forward on a shelf, said product puller comprising an elongated sheet member including a top surface for supporting associated merchandise items on an associated shelf having a front end; means for grasping said sheet member to advance said sheet member toward the associated shelf front end; and mounting means for mounting said sheet member to the associated shelf.

[0007] Further, the disclosure provides, in various embodiments thereof, an assembly for conveying items on a shelf, said assembly comprising a one-piece product puller comprising (i) a sheet member comprising a top surface, a bottom surface, a front end, a back end, and a longitudinal axis; (ii) a backstop; and (iii) a slot for grasping said product puller.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The disclosure may take physical form in certain parts and arrangements of parts, several embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings, wherein:

[0009] **FIG. 1** is a perspective view of a product puller according to a first exemplary embodiment of the instant disclosure;

[0010] **FIG. 2** is an exploded perspective view of an assembly comprising the product puller of **FIG. 1**;

[0011] **FIG. 2A** is an assembled front elevational view of the assembly in **FIG. 2**;

[0012] **FIG. 3** is a partially exploded perspective view of a product puller according to a second exemplary embodiment of the instant disclosure;

[0013] **FIG. 4** is an assembled perspective view of the product puller of **FIG. 3**;

[0014] **FIG. 5** is a partially exploded perspective view of a product puller of a third exemplary embodiment with a stop member attached to a mounting bracket;

[0015] **FIG. 6** is an assembled perspective view of the product puller of **FIG. 5**;

[0016] **FIG. 7** is a reduced perspective view of the product puller of **FIG. 3** in a shelving environment;

[0017] **FIG. 8** is a reduced side elevational view of a shelving unit employing the product puller of **FIG. 3**;

[0018] **FIG. 9** is an exploded perspective view of a product puller according to a fourth exemplary embodiment of the instant disclosure;

[0019] **FIG. 10** is an assembled perspective view of the product puller of **FIG. 9**;

[0020] **FIG. 11** is a reduced perspective view of the product puller of **FIG. 9** in a shelving unit;

[0021] **FIG. 12** is an enlarged side elevational view of a shelf employing the product puller of **FIG. 9**;

[0022] **FIG. 13** is an exploded perspective view of a product puller according to a fifth exemplary embodiment of the instant disclosure;

[0023] **FIG. 14** is an assembled, reduced side elevational view of the product puller of **FIG. 13** in a shelving environment;

[0024] **FIG. 15** is a perspective view of an alternative embodiment of the product puller according to the third exemplary embodiment of the instant disclosure;

[0025] **FIG. 15A** is an enlarged exploded perspective view of a pull handle system of the product puller of **FIG. 15**;

[0026] **FIG. 16** is a reduced side elevational view of the product puller of **FIG. 15**;

[0027] **FIG. 17** is a rear cross sectional view of the product puller of **FIG. 15**;

[0028] **FIG. 18** is a reduced perspective of the product puller of **FIGS. 15 and 16** in a shelving environment;

[0029] **FIG. 19** is a reduced side elevational view of the product puller of **FIGS. 15, 16** and **18** in a shelving environment; and

[0030] **FIG. 20** is a front elevational view of the shelving environment of **FIG. 19**.

DETAILED DESCRIPTION

[0031] Generally, a product puller according to the instant disclosure comprises a sheet or sheet-like structure having a top, exposed surface, a bottom surface, and a means for moving the sheet or sheet-like structure in a forward or backward direction relative to a front portion of a shelf or shelving unit. The top surface, which may also be referred to as the support surface of a product puller is suitable for supporting one or more items such as, for example, packages, containers, boxes, or the like. The bottom surface, or at least a portion thereof, contacts another surface, such as the surface of a shelf, and can be slidable or moveable in relation to the shelf. In certain embodiments, the support surface of the sheet can be substantially planar. The product puller is suitable for use in a shelving environment and allows for items resting or placed on the support surface of the sheet to be moved along the shelf in either a forward direction, toward a front portion of the shelf, or in a rearward direction, toward a rear portion of the shelf, as the sheet is moved.

[0032] With reference to **FIGS. 1-6**, product pullers according to first, second, and third exemplary embodiments are shown. With reference to **FIGS. 1-6**, a sheet-like product puller **10** includes a top exposed surface **12**, which also may be referred to as the support surface, a bottom surface **14**, a forward portion **16**, and a rear portion **17**. Adjacent the rear portion **17**, the product puller **10** includes a product backstop **18**, which can be triangular in shape. Product backstop **18** of product puller **10** includes a forward facing wall **20** braced by an angled wall **24**. A foot or flap **23** of the forward facing wall **20** can be suitably secured to the sheet top surface **12**. Forward wall **20** of product backstop **18** is adapted for contacting at least one rearwardly located item or product supported by or placed on the support surface **12**.

[0033] The shape or configuration of product backstop **18** is not critical and not limited in any manner except to the extent that the product backstop provides a wall or surface which is suitable for contacting at least a portion of one or more products or items supported on the surface of the product puller. Product backstop **18** may be attached or connected to the product puller **10** in any suitable manner including, but not limited to by an adhesive, sink welding, stapling, other known fasteners, or the like. For example, backstop **18** can be a rear end of the product puller **10** which is folded over and is attached by sink welding a flap **23** to the surface **12**. However, the product backstop may be a separate structure that is attached to the product puller or may be formed directly as part of the product puller configuration, such as by molding. In one embodiment, it can be a portion of the product puller structure that is configured to form a backstop such as by folding at pre-selected creases or folds.

[0034] The product puller **10** can also include a hand hold, such as a slot **28**, which can be located adjacent the forward portion **16** thereof. In this embodiment, the slot **28** is generally sized and shaped to allow a person to fit one or more fingers in the slot in order to grasp the product puller and move the product puller in a desired direction. The size and shape of slot **28**, and its location, are otherwise not limited in any matter.

[0035] A product puller may also comprise various structures or mounting means for mounting a sheet member to an associated shelf. With reference to **FIGS. 2 and 2**A, for example, a product puller may be mounted between product dividers. In **FIGS. 2 and 2**A, product puller **10** is disposed between product dividers **11***a* and **11***b*, which would generally be mounted or disposed on a shelf. As shown in **FIGS. 2 and 2**A, product divider **11***a* and **11***b* have the same configuration. Referring to product divider **11***a*, the product dividers in this embodiment have a generally vertical wall or member **13***a* and generally horizontal walls **15***a* and **19***a*, which may be generally perpendicular to the vertical wall **13***a*. Product puller **10** is disposed between generally horizontal wall **19***a* of product divider **11***a* and generally horizontal wall **15***b* of product divider **11***b*.

[0036] In one embodiment (not shown), a product puller may be disposed between generally horizontal walls of opposing product dividers such that the bottom surface of a product puller is in contact with a shelf surface. In another embodiment, such as shown in **FIG. 2A**, the bottom surface **14** of product puller **10** may contact the top surfaces of the generally horizontal walls, such as walls **19***a* and **15***b*.

[0037] The shape, configuration, and height of product dividers may be selected as desired for a particular purpose or intended use. Additionally, the product dividers may be formed from any material including, but not limited to, metals, plastics, composites, and the like. The product dividers may be formed or molded single-piece structures or formed by separately connected pieces.

[0038] It will be appreciated that a product divider may include one or two generally horizontal walls. The use of product dividers with two generally horizontal walls facing in opposite directions relative to the general vertical wall allows for a single product divider to separate adjacent sheet members.

[0039] With reference now to **FIGS. 3 and 4**, a product puller assembly can also include a tether system **30** to maintain the product puller **10** in a particular position on the shelf and/or aid in retracting the sheet-like structure of the product puller toward the rearward portion of the shelf/storage unit. In this embodiment, the tether system **30** performs a retractive function such that, after being moved in a forward direction toward a front portion of a shelf, the product puller may be retracted toward the rear portion of the shelf. In the embodiment of **FIGS. 3 and 4**, tether system **30** includes a tether storage box **32**, a tether **34** selectively wound into and out of the box (such as on a spool, not visible), and a mounting bracket **38** to which the storage box **32** can be secured. As is well known in the art, a resilient element, such as a spring can bias a spool rotatably mounted in the tether storage box in order to wind the tether into the box. An end of the tether can be secured to the spool in a known manner. However, the strength of the spring can be weak enough such that it will not retract the product puller

10 if there are any packages held on it. When there are no packages located on the product puller, the tether can be wound back onto the spool and into the storage box **32**. At the same time, the product puller can be repositioned away from a front edge of the shelf, as is illustrated in **FIGS. 3 and 4**.

[**0040**] To tether the product puller **10**, an attachment piece **36** is mounted to a rear portion of the product puller. With respect to **FIGS. 3 and 4**, the attachment piece **36** can include a barb which is mounted to the backstop **18** of the product puller **10** by inserting the barb through a hole **26** in, for example, the angled wall **24**. Attachment piece **36** is not limited in any manner and may be any suitable structure that is capable of attaching tether **34** to the product puller **10** including, but not limited to, a barb, prong, fastener, snap, button, tie, or the like. The tether, such as tether **34**, is not critical and may be any structure suitable as a tether including, but not limited to, a spring, a string, chord, cable, chain, wire, strap, band, or the like. The tether system **30** may be mounted to the rear portion of the shelf either directly or, as shown in **FIG. 3**, by mounting the storage box **32** via an adhesive **33** on a surface of the storage box **32** to a formed box mounting bracket **38** which is adapted to clip on to a portion of a shelf.

[**0041**] With reference now to **FIG. 5**, in another embodiment, mounting bracket **38'** may include a stop member to limit the rearward travel of a product puller. With reference to **FIGS. 5 and 6**, mounting bracket **38'** includes a stop member **37**. The stop member **37** is shown as in the form of a loop or arch. A stop member, however, may be of any shape or height as desired for a particular purpose or intended use. Additionally, the stop member may be a solid block structure. The stop member may be made from any suitable material, including, metals, plastics, composites, and the like.

[**0042**] It will be appreciated that various systems may be combined to form a product puller apparatus. For example, in one embodiment a product puller could employ a sheet member, product dividers, and a tether system.

[**0043**] With reference to **FIGS. 7 and 8**, product puller **10** is shown in a shelving environment. In **FIG. 7**, bottom surface (not shown) of product puller **10** rests on rods **41** which form the support surface of shelf **40**. Product puller **10** supports products or items **44** on top surface **12** of product puller **10**. As shown in the left hand side of **FIG. 7** items **44**, which are supported on product puller **10**, are located near the rear portion of shelf **40**. Such items **44** can be moved toward the front portion of shelf **40**, as depicted on the right hand side of **FIG. 7**, by grasping product puller **10** via slot **28**, and pulling or otherwise applying a force to move product puller **10** in the direction P**1**. Alternatively, products or items **44** on product puller **10** may be moved away from the front portion of shelf **40** toward the rear portion there by applying a force in the direction P**2**.

[**0044**] As shown in **FIG. 7**, a backstop **18'** is different in form than backstop **18** illustrated in **FIGS. 1-6** and **8**. In this embodiment, the backstop is cylindrical and can be secured to a rear end by any known attachment means. Alternatively, the backstop can be simply an enlarged rear end of the product puller. As previously mentioned, the backstop can assume a variety of forms.

[**0045**] Product puller **10** is moved on shelf **40** by sliding the bottom surface of the shut member along the shelf surface. Such a product puller may be used in any shelving system and is not limited by shelf type. For example product puller **10** may be used on a solid shelf surface, a frame or screen shelf surface, or a shelf surface comprised of slats, rods, or tubes running either perpendicular to or horizontally to the front and rear edges of a shelf. To this end, the product puller **10** can be made of a material that includes a relatively slidable lower surface, such as polytetrafluoraethylene or another suitable conventional material. Also, the product puller **10** can be made from a flexible material if so desired.

[**0046**] With reference to **FIG. 8**, the use of product puller **10** is shown in a shopping or warehouse environment. Section A represents a fully loaded shelf comprising a plurality of items or products. As the items or products are removed from the shelf, as depicted by the removal of the first two vertical rows of items near the front edge **42** of the shelf, other items or products remain near the back portion of the shelf. As shown in Section B of **FIG. 8**, the last two vertical rows of products or items are supported by product puller **10**. As the items are shopped or removed from the shelves such that the fully loaded shelf in Section A comes to resemble the half loaded shelf in Section B, the products or items supported by product puller **10** may be moved forward to the position represented by Section C by pulling or moving the product puller toward the front portion of the shelving unit.

[**0047**] With reference to **FIGS. 9-12**, a second exemplary embodiment of a product puller is shown. With reference to **FIG. 9**, a product puller **46** comprises a top, exposed or product support surface **48**, a bottom surface **50**, and product backstop **54**. Product puller **46** can also includes slots or holes **52** which may be used to advance the product puller **46** toward a front portion of a shelf. Slots or holes **52** can be sized to accommodate at least one finger of a user who is trying to advance the product puller **46**. The system can also include a support body **60**. Support body **60** defines a slot-like opening **61** located near the upper portion thereof communicating with a hollow interior **62**. The support body **60** can be located adjacent a front edge **82** (**FIG. 11**) of a shelf. Support body **60** may be positioned along the shelf by any suitable means to hold the support body in place, including, for example by an adhesive, fasteners, clips, and the like.

[**0048**] In the embodiment shown in **FIGS. 9-12**, end panels **64***a*, **64***b* are shaped to mate with respective ends of support body **60**. End panels **64***a*, **64***b* define an overhanging portion **66***a*, **66***b* that is sized or adapted to fit over a top surface of a shelving beam, such as beam **82** (**FIG. 12**), to effectively clip the support body **60** onto a shelf. In other embodiments, the product puller **46**, and particularly the support body **60**, may be further secured to a shelf by one or more hold down brackets **70***a*, **70***b*, which define an opening adapted to fit or mate with the underside of a shelf beam, and is attached to the end panels **64***a*, **64***b* of the support body. The brackets can be attached to the end panels by any suitable known means, including, for example, an adhesive, a fastener, or the like. In the embodiment of **FIGS. 9 and 10**, hold down brackets **70***a*, **70***b* are attached to end panels **64***a*, **64***b* by fasteners **74***a*, **74***b*, which are inserted through aligned holes **72***a*, **72***b* in the hold down brackets and holes **70***a*, **70***b* in end panels **68***a*, **68**, respectively.

[**0049**] Support body **60** may include other optional items for display purposes. For example, support body **60** may

include a C-channel **76** adapted to hold a graphic display, ticket holder, such as ticket holder **78**, or the like.

[**0050**] With reference now to **FIG. 11**, products **84** are supported on the product puller **46**. Such products may be advanced toward the front edge **82** of the shelf by grasping one of the holes **52** and applying a force, such as, for example, by pulling, to move product puller **46** in a direction P**3** toward the front portion of a shelf **80**. As product puller **46** is advanced forward in the direction P**3**, the sheet-like structure passes through opening **61** of support body **60** and winds in the interior **62** of the support body. If desired, the product puller **46** can be made of conventional material that is self-coiling so that it rolls up on itself within the interior **62** of support body **60**. That is, the product puller feeds into the front mounted support body. The self-coiling action of the product puller **46** can be weaker than the weight of a package **84** held thereon so that the product puller will not wind into the support body **60** unless a person pulls it forward, such as by using holes **52**.

[**0051**] The product puller **46** can have a length, including the length of the product backstop that is less than, equal to, or greater than the depth of the shelf. It will be appreciated that product puller **46** can be employed with a tether system, such as, for example, tether system **30** shown in **FIGS. 5 and 6**, to hold the product puller in a particular position transversely on the shelf and/or to resist the self-coiling action of the product puller **46** as it retracts into the support body **60**.

[**0052**] It is noted that a backstop **54** in **FIGS. 11 and 12** is different in form from backstop **54** shown in **FIGS. 9 and 10**. As previously mentioned, the backstop can assume a variety of forms. In this embodiment, the backstop is cylindrical and can be secured to a rear end of the product puller **46** by any known attachment means. Also, the backstop can be simply an enlarged rear end of the product puller, if so desired.

[**0053**] With reference to **FIGS. 13-19**, another embodiment of a product puller is shown. In this embodiment, a product puller **86** includes an endless belt **87** that is fitted over a plurality of rollers. To this end, rollers **100** and **101** mount the belt **87** in a frame including frame sides **88**. The frame can be sized to fit between the front and rear beams of a conventional shelving unit. As shown in **FIG. 13**, a rear flange **94** can be adapted to rest on a rear beam **122** of a shelving unit, and a cut out portion **90** near the front of the frame is adapted to fit over a front beam **120** of a shelving unit. Frame sides **88** are separated by spacer tubes **92** which can be held in place by connecting threaded rods **96** and lock nuts **98**. The frame sides **88** can also include a flange **89** that forms a top surface of each of the frame sides. Rollers **100** are positioned on the frames by pins **99**. The frame can also include a front cover **116** to which can be mounted a display type item such as a tag **118**.

[**0054**] Belt **87** includes an outer surface **87***a* that is exposed or situated outboard of rollers **100** and **101**, and an undersurface **87***b* that makes engaging contact with rollers **100** and **101**. Additionally the undersurface **87***b* of belt **87** also contacts top surface **89** of the frame sides **88**. As best shown in **FIG. 17**, top surface **89** of frame sides **88** provides a support surface for belt **87** such that outer surface **87***a* of belt **87** is substantially planar and capable of supporting or housing products or items.

[**0055**] A known ratchet type system can be used to advance or move the belt in a desired direction. For example, the ratchet system can include a known non reversible clutch bearing **106** which drives a sprocket **108** having a plurality of teeth **112**. The non reversible clutch bearing **106** can be attached to the side panel via one of the pins **99** such that as the clutch bearing is moved in one direction the roller attached to that pin is also moved in a similar direction. The clutch bearing may be moved in a particular direction by a pull handle **110** with rack teeth **112**. The system operates in a ratchet-like manner.

[**0056**] As the pull handle is pulled toward a user, rack teeth **112** engage the teeth of clutch bearing **106** to move clutch bearing **106** and, consequently, roller **100** in a clockwise direction to advance belt **87**. When the pull handle **110** is moved in toward the shelving unit, the clutch bearing **106** is not engaged and belt **87** is not moved. With respect to the embodiments in **FIGS. 13-17**, the pull handle is used to move the belt forward by moving pull handle **110** toward the shopper, i.e. in a direction parallel with a shelving unit or the ground. With reference to **FIGS. 18 and 19**, a different embodiment of pull handle **110'** is shown. In this embodiment, the pull handle **110'** is pulled from an upright position downward in an arcuate fashion, i.e., in a motion similar to the motion of the arm on a slot machine.

[**0057**] In another embodiment, instead of employing a ratchet-type system, the product puller **86**, and in particular belt **87** may be provided with one or more slots or openings (such as are shown in **FIGS. 1 and 9**) which can be grasped manually. In such an embodiment, belt **87** may be moved in a desired direction in a manner similar to the sheet-like structure of the product pullers in the first and second exemplary embodiments.

[**0058**] With reference to **FIGS. 15-19**, another embodiment of a support frame is shown. In this configuration, a frame side **88'** includes a front leg **124** and rear leg **126**, as opposed to flange **94** and cut out **90** shown in **FIGS. 12 and 13**. As shown in **FIG. 16**, the frame sides **88'** straddle the shelf beams **120** and **122** of a shelving unit.

[**0059**] The size and shape of a product puller is not critical and a product puller may be sized and shaped to for use on/in shelves of various depths and to accommodate products of various sizes and shapes. For example, with reference to **FIG. 20**, product pullers of the type described with reference to **FIGS. 13-19** are employed in a shelving unit. As shown in **FIG. 20**, a plurality of product pullers having different widths, W**1**, W**2** are employed to accommodate or match different width packages. For example, the sheet-like structure may be sized as desired to support a particular sized item or package.

[**0060**] A product puller may be separated from an adjacent product puller in any known manner. For example, as shown in **FIGS. 18 and 20**, a product puller system may employ a known product divider, such as product divider **128** for separating it from an adjacent product puller. In an alternative embodiment, a divider may be attached or fastened to an individual product puller rather than to a shelf.

[**0061**] It will be appreciated that the shelf-like structure may have configurations other than those described herein. For example, and with reference to **FIG. 1**, the sheet-like structure may have raised sides adjacent the longitudinal

sides of the sheet-like structure and perpendicular thereto, so as to define a tray. Raised sides may be integrated with the sheet-like structure or may be separately secured to the sheet-like structure. Such raised sides may be shaped and sized as desired for a particular purpose.

[0062] The sheet-like structure of the product puller may be formed from any suitable material. For example, the product puller can be formed from polymeric materials including but not limited to plastics, rubbers, and the like. The rigidity and thickness of the material may vary depending on the type of product which may be placed on the product puller and/or the configuration of the product puller. Generally, in embodiments where the sheet-like structure is to bend or roll up on itself (such as, for example, the product pullers of **FIGS. 9-12** and **FIGS. 13-19**, respectively) the sheet-like structure should be relatively pliable. Additionally, in such embodiments, the sheet-like structure should not be too thick.

[0063] The top surface of the sheet-like structure may be made to have a surface with a coefficient of friction that is high enough to prevent packages or containers resting thereon from being slidable on the top surface. Additionally, the bottom surface of the sheet-like structure is made of a material or coating that allows the bottom surface to be slidable along a surface upon which it rests so that the product puller and sheet may be moved along that surface in a desired direction. The bottom surface of the sheet-like structure may contain texture, perforations, embossed features, or the like, to reduce friction, static, and/or vacuum between the bottom surface of the product puller and its supporting shelf-like surface. The two faces of the product puller can exhibit different characteristics.

[0064] The sheet-like structure may contain graphics including, for example, product or store logos, or, as shown in **FIGS. 1-7** and **11**, an instruction, such as, for example, a graphic **39** directing a user to pull at a particular location.

[0065] As shown in the various exemplary embodiments a product puller is suitable for use in a shopping or storage environment. In other words, a product puller is suitable for use in either shopping or retrieving items positioned toward the rear portion of a shelf or storage unit by moving the product puller in a direction toward the front of a storage unit, thereby moving the products or items situated thereon toward the front portion of a storage unit. Alternatively, a product puller may be used to restock items in a shelving unit. Items may be placed on a product puller tray end then moved toward the rear of the storage unit by moving the product puller toward the rear portion of the storage unit.

[0066] Such product pullers can be useful for moving large, bulky items, such as packages of diapers or laundry detergent, large packages of paper towels or toilet paper and the like toward the front edge of the shelf. In a club or warehouse store environment, which can have particularly deep shelves, such product pullers can find use for moving a variety of packages of goods sold in such stores toward the front edges of shelves.

[0067] A product puller has been described with reference to the various exemplary embodiments. Obviously, modifications and alterations will occur to others upon reading and understanding the proceeding detailed description. It is intended that the exemplary embodiments by construed as including all such modifications and alterations in so far as they come within the scope of the appended claims or the equivalents thereof.

1. An apparatus for conveying merchandise on a shelf in a selected direction relative to a front edge of the shelf, said apparatus comprising:

a sheet member having a top surface, a bottom surface, a front end, and a rear end;

a means for grasping said sheet member located adjacent said front end of said sheet member; and

a backstop located adjacent said rear end of said sheet member.

2. The apparatus according to claim 1, wherein said grasping means comprises at least one of a slot, a hole, and a handle.

3. The apparatus according to claim 1, further comprising a sheet housing located adjacent a front end of an associated shelf, said sheet housing defining a generally hollow interior and comprising an opening located adjacent an upper portion of said housing, said opening being dimensioned for receiving said sheet member wherein said sheet member enters said sheet housing as said sheet member is advanced forward on an associated shelf.

4. The apparatus according to claim 1, wherein said backstop comprises a generally vertical wall.

5. The apparatus according to claim 4, wherein said backstop further comprises a generally horizontal wall and an angled wall located distal to said generally horizontal wall.

6. The apparatus according to claim 1, further comprising a tether system connected to an associated shelf, said tether system comprising a tether connected to said sheet member.

7. The apparatus according to claim 6, wherein said tether is connected to said backstop.

8. The apparatus according to claim 7, wherein said tether system further comprises a mounting bracket connected to the associated shelf.

9. The apparatus according to claim 8, wherein a portion of said mounting bracket serves as an end stop to limit a rearward movement of said sheet member.

10. The apparatus according to claim 1, wherein said sheet member comprises a self-coiling material.

11. A product puller for moving objects forward on a shelf, said product puller comprising:

an elongated sheet member including a top surface for supporting associated merchandise items on an associated shelf having a front end;

means for grasping said sheet member to advance said sheet member toward the associated shelf front end; and

mounting means for mounting said sheet member to the associated shelf.

12. The product puller according to claim 11, wherein

said mounting means comprises (i) first and second opposing side members, said side members being transversely disposed relative to a front end of an associated shelf, and (ii) a plurality of rollers disposed between said side members; and

wherein said sheet member comprises a continuous belt, said sheet member being disposed about said plurality of rollers.

13. The product puller according to claim 11, wherein said mounting means comprises first and second product dividers, said product dividers each comprising a generally vertical wall, and a generally horizontal wall, wherein said generally horizontal of each divider extends toward the other divider.

14. The product puller accordingly to claim 11, wherein said mounting means comprises a pair of opposing product dividers disposed generally transverse to a front of an associated shelf, said product dividers comprising a generally vertical wall, a first lower flange generally perpendicular to said vertical wall and oriented toward said opposing product divider, and a second lower flange, generally perpendicular to said vertical wall and opposite said first lower flange for mounting a sheet member of an adjacent product puller.

15. An assembly for conveying items on a shelf, said assembly comprising:

a one-piece product puller comprising (i) a sheet member comprising a top surface, a bottom surface, a front end, a back end, and a longitudinal axis; (ii) a backstop; and (iii) a slot for grasping said product puller.

16. The assembly according to claim 15, further comprising a tether system mounted to an associated shelf, said tether system comprising a tether connected to said sheet member.

17. The assembly according to claim 16, wherein said sheet member is slidable along a surface of an associated shelf, and said tether includes a resilient material and exhibits a biasing force sufficient to bias an empty sheet toward a back of an associated shelf, said biasing force being too weak to bias said sheet member towards the back of the associated shelf when at least one item is disposed on said top surface of said sheet member.

18. The assembly according to claim 15, wherein said front end of said sheet member is rounded, and said back end of said sheet member is generally square.

19. The assembly according to claim 15, wherein said slot is oriented transverse to said longitudinal axis of said sheet member.

20. The assembly according to claim 15, wherein said backstop includes a generally vertical wall portion of said sheet member.

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