PATENT SPECIFICATION

(11) S85583

(21) Application No. S2009/0718

(22) Date of Filing of Application: 18/09/2009

(30) Priority Data:
(31) 0817113.4 (32) 18/09/2008 (33) United Kingdom (GB)
(31) S2008/0758 (32) 18/09/2008 (33) Ireland (IE)

(45) Specification Published: 18 August 2010

(51) Int. Cl. (2009)
A45C 7/00

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(54) Title: A re-usable bag system

(72) Inventor: PAUL DOYLE

(73) Patent Granted to: PAUL DOYLE, An Irish citizen, Downings Tullow Co. Carlow, Ireland

"A RE-USABLE BAG SYSTEM"

INTRODUCTION

The present invention relates to a re-usable bag system suitable for use in a shopping trolley. In particular, the present invention relates to a re-usable bag system comprising at least one re-usable bag having an upper edge forming an opening, wherein the re-usable bag system further comprises a plurality of elongate rails which are connectable to the re-usable bag adjacent its upper edge and are adapted to engage the top of the sides of a shopping trolley.

The use of re-usable shopping bags is becoming increasingly common. This increased usage is due mainly to the increased awareness of the disadvantages of single-use plastic shopping bags. Such single-use bags are not considered to be particularly environmentally friendly and their use is discouraged. In some jurisdictions, single use plastic bags now carry a charge or levy to discourage their use and encourage the use of re-usable bags.

The practice of using re-usable bags can be awkward for the shopper as firstly they must be stored when not required and can take up space in a shopping trolley while the user is carrying out his shopping. Additionally, the re-usable bags can be awkward to transport.

US Patent No. 5,531,366 discloses a re-usable shopping bag assembly comprising a plurality of bags fitted with hanger bars to allow them to be disposed in a trolley ready to receive goods. The patent also discloses a carry case for storing and transporting the re-usable bags when they are not required. The carry case is cumbersome and awkward to use. The re-usable bags must be rolled up so that they can the stowed in the carry case. This can be a time-consuming and difficult task.

It is an object therefore of the present invention to provide a re-usable bag system that overcomes at least some of the above-mentioned problems.

STATEMENTS OF INVENTION

According to the invention there is provided a re-usable bag system for use in a shopping trolley, the re-usable bag system comprising at least one re-usable bag having an upper edge forming an opening, wherein the re-usable bag system further comprises a plurality of elongate rails which are connectable to the re-usable bag adjacent its upper edge and are adapted to engage the top of the sides of a shopping trolley; characterised in that

the at least one re-usable bag further comprises

a base and a retaining side extending between the base and the upper edge;

a first tab member located adjacent the upper edge; and

a second tab member located in the vicinity of the base

such that, when not in use in the trolley, the second tab member may be brought into engagement with the first tab member so that the retaining side envelops the re-usable bag.

In this way, the re-usable bag, when connected to the elongate rails may be disposed quickly and easily in the trolley with the elongate rails resting on the sides on the trolley. The bag will be then suspended in the trolley. When not in use in the trolley, the user may simply bring the second tab member up to the first tab member so as to envelop the body of the re-usable bag, forming a small package from the re-usable bag. In essence, when the two tab members are brought together in this manner, the retaining side of the bag functions as a sling for the remaining parts of the re-usable bag. This package is convenient to store and transport. Additionally, it is very simple and efficient to transform the re-usable bag into this smaller, convenient package.

In one embodiment of the invention there is provided a re-usable bag system in which, in use, the elongate rails are connected to the at least one re-usable bag and the second tab member may be brought into engagement with the first tab member so that the retaining side envelops the re-usable bag system. In this way, the whole re-usable bag system is included in the package, and can be stored and transported conveniently. The retaining side of the re-usable bag now functions as a sling for the remaining parts of the re-usable bag system.

In another embodiment of the invention there is provided a re-usable bag system in which each elongate rail has a releasable connection mechanism for temporary connection to another elongate rail. In this way, an elongate rail of one re-usable bag may connect with the elongate rail of another re-usable bag, combining the bags in the re-usable bag system.

In a further embodiment of the invention there is provided a re-usable bag system comprising a plurality of re-usable bags, each connected to one or more elongate rails. In this way, the user may combine a number of re-usable bags together in the re-usable bag system so as to provide carrying space for more articles. Furthermore, all the re-usable bags will be contained within the package formed by bringing the first and second tab members together, providing a quick and easy way to store and carry the plurality of re-usable bags. In this case, the retaining side of the first re-usable bag will act as a sling for all the re-usable bags in the re-usable bag system and the associated elongate rails. It will be understood that all the re-usable bags may be of the same configuration, that is, comprising first and second tab members. In this case, only the first and second tab members of one bag will be used to envelop all the bags, with the first and second tab members of the remaining re-usable bags being unused within the package formed of all the bags. Alternatively, the re-usable bag system may comprise only one re-usable bag having the first and second tab members according to the invention.

In an alternative embodiment of the invention there is provided a re-usable bag system in which the first tab member comprises a handle. This is a particularly convenient manner of providing a first tab member of the invention. A handle is generally present on re-usable bags and therefore, by combining the handle and first tab member, the manufacturing cost and complexity of the re-usable bag is lowered. Furthermore, the handle may be used to carry the package formed of the re-usable bag when the first and second tab members have been brought together.

In an embodiment of the invention there is provided a re-usable bag system in which the in which the second tab member comprises a handle. Again, this is a particularly convenient manner of providing the second tab member of the invention. In this case, when the first tab member is a handle, the pair of tab members comprise a pair of

handles, which when brought together, enclose the remaining parts of the re-usable bag and re-usable bag system, providing a package. The package has two handles and is therefore very easily carried. Furthermore, the manner of enclosing the re-usable bags is very straightforward, simply by bringing the two handles together a single package is provided.

In one embodiment of the invention there is provided a re-usable bag system in which the second tab member comprises a releasable fastening mechanism adapted to engage a complementary fastening mechanism adjacent the upper edge of the re-usable bag. In this way, the second tab member may be brought into contact with the top of the re-usable bag and secured there so as to form package from the re-usable bags or re-usable bag system.

In another embodiment of the invention there is provided a re-usable bag system in which the complementary fastening mechanism is comprised in the first tab member. This is a particularly convenient method of enclosing the re-usable bag system within the retaining side of the re-usable bag. By securing the first and second tab members together, the re-usable bags will remain in the convenient package formation as required. In particular, it is very convenient if one or both of the tab members comprise both a handle and part of a fastening mechanism for securing the tabs together. In this way, the handles will both secured the convenient package in place and provide a manner of carrying the package. In one aspect of the invention, the handles may be secured together simply by threading one handle through the other.

In a further embodiment of the invention there is provided a re-usable bag system in which the retaining side is shaped to envelop the re-usable bag. In this way, the retaining side may include fold lines, seams or the like which allow the retaining side to more easily encompass the remaining parts of the re-usable bags or re-usable bag system. In particular, the retaining side may contain fold-lines or seams that facilitate the retaining side assuming a channel shape when the first and second tab members are brought together to envelop the re-usable bags.

In one embodiment of the invention there is provided a re-usable bag system in which the re-usable bag system comprises a hook member adapted to engage the shopping

trolley so as to releasably secure the re-usable bag system in place in the shopping trolley. In this way, all the re-usable bags within the re-usable bag system will be secured in place by the use of the hook member, as each re-usable bag is secured to another re-usable bag to the rear thereof until the rearmost re-usable bag which is secured to the back of the trolley by the hook member.

In another embodiment of the invention there is provided a re-usable bag system in which the hook member is comprised in the first tab member. This is particularly efficient manner of providing the hook member, reducing the complexity and cost of manufacturing the re-usable bag system. In a particularly convenient aspect of the invention, the first tab member comprises a handle which also functions as a hook member to engage the trolley and secure the re-usable bag system thereto.

In a further embodiment of the invention there is provided a re-usable bag system in which the elongate rails are adapted to slidably engage the sides of the shopping trolley. In this way, the re-usable bag system may be disposed within the trolley in a simple and convenient manner. When not in use, the elongate rails will rest adjacent each other such that the opening of the re-usable bag is closed. When it is desired to use the shopping bag, the elongate rails may be slid apart along the top of the sides of the trolley such that the opening of the re-usable is open and ready for the reception of goods.

In an alternative embodiment of the invention there is provided a re-usable bag system in which the elongate rails are substantially rigid. In this way, the elongate rails will rest securely on the top of the sides of the trolley and provide stability to the re-usable bag system.

In an embodiment of the invention there is provided a re-usable bag system in which the releasable connections mechanism comprise Velcro fastening. Velcro is a particularly effective and convenient manner of releasably connecting two or more re-usable bag systems of the invention together.

In one embodiment of the invention there is provided re-usable bag system in which the re-usable bags comprise non-woven fabric. Non-woven re-usable bags are particularly suitable for use in the invention.

In a further embodiment of the invention there is provided a re-usable bag system in which the elongate rails are secured to the re-usable bag. In this way, the rails may not be removable from the bag, which reduces the risk of the rails being lost of damaged.

In an alternative embodiment of the invention there is provided a re-usable bag system in which the upper edge of the re-usable bag comprises a sleeve for reception of one or more elongate rails. In this way, the sleeves for the elongate rails may be formed integrally with the re-usable bag, allowing for subsequent insertion of rigid rails so as to form the elongate rails.

In an embodiment of the invention there is provided a re-usable bag system in which the base of the re-usable bag comprises a pouch for reception of a base reinforcing insert. In this way, the base reinforcing insert may be kept in place while the re-usable bag is in use or in storage. This makes it easier for the bag to be folded, stowed and enveloped by the retaining side when the first and second tabs are brought together.

In an alternative embodiment of the invention there is provided a re-usable bag system in which the plurality of re-usable bags comprise a set of re-usable bags wherein each bag is narrower than the previous bag. In this way, given that the normal shopping trolley tapers in width from back to front, the set of re-usable bags will also taper in width from the back of the trolley to the front of the trolley, such that the storage space in the trolley is used efficiently.

In an embodiment of the invention there is provided a re-usable bag system in which the plurality of re-usable bags comprise a set of re-usable bags wherein each bag is shallower than the previous bag. In this way, given that the normal shopping trolley decreases in depth from back to front, the set of re-usable bags will also decrease in depth from the back of the trolley to the front of the trolley, such that the storage space in the trolley is used efficiently.

DETAILED DESCRIPTION OF THE INVENTION

The invention will now be more clearly understood from the following description of an embodiment thereof given by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view of a re-usable bag system according to the invention;

Fig. 2 is a diagrammatic representation of an elongate rail of the invention;

Fig. 3 is a perspective view of the re-usable bag system comprising a set of re-usable bags in usage position;

Fig. 4 is a perspective view of the re-usable bag system comprising a set of re-usable bags in storage position;

Fig. 5 is a perspective view of an alternative embodiment of re-usable bag system;

Fig. 6 is a side view of the re-usable bag system comprising a set of re-usable bags disposed in a trolley;

Fig. 7 is a front view of the re-usable bag system comprising a set of re-usable bags disposed in a trolley;

Fig. 8 is a perspective view of the re-usable bag system comprising a set of re-usable bags disposed in a trolley;

Fig. 9 is a perspective view of an alternative embodiment of re-usable bag system comprising a set of re-usable bags in usage position;

Fig. 10 is a side view of an alternative embodiment of re-usable bag system comprising a set of re-usable bags disposed in a trolley;

Fig. 11 is a top view of a re-usable bag system according to the invention disposed in a trolley; and

Fig. 12 is a diagrammatic representation of a portion of a re-usable bag during manufacture.

Referring to the drawings, and initially to Fig. 1 thereof, there is shown a re-usable bag system indicated generally by the reference numeral 100, comprising a substantially cuboid bag 102 having a base (not shown), four sides 104, 106, 108, 110 and an opening at the top. A pair of elongate rails 112 are connected adjacent the upper edges of the longitudinal sides 104, 108 of the bag 102. The longitudinal sides each comprise a handle 114 connected thereto. One longitudinal side forms a retaining side which has a first tab member connected thereto. In this case, the first tab member comprises the handle 114 connected to one longitudinal side 104. The re-usable bag system 100 further comprises a second tab member (not shown) on or near the base of the re-usable bag 102.

Referring now to Fig. 2, in which like parts have been given the same reference numerals as before, there is shown an elongate rail 112, comprising a substantially rigid flat rail having a pair of Velcro (registered trade mark) patches 116 affixed to one side thereof. The elongate rail 112 is longer than the width of the re-usable bag such that the ends of the elongate rails 112 will extend beyond the sides of the re-usable bag 102.

In use, a user can place the re-usable bag system 100 into a shopping trolley (not shown), resting the elongate rails 112 on the sides of the shopping trolley (not shown). The back of the re-usable bag system 100 is secured to the back of the shopping trolley (not shown), holding one elongate rail 112 in place. The other elongate rail is then slid along the sides of the shopping trolley such that the top of the bag 102 forms an open-mouth for reception of items. The handle 114, which acts as the first tab member, may also act as a hook member to hook onto part of the shopping trolley (not shown) and maintain the re-usable bag system 100 in place on the trolley.

Referring now to Fig. 3, in which like parts have been given the same reference numerals as before, there is shown a re-usable bag system comprising a set of re-usable bags 102 in an expanded arrangement, the set being indicated generally by the reference numeral 300. The set 300 comprises four re-usable bags 302, 304, 306, 308.

The rearmost re-usable bag 302 is slightly wider and deeper than the next re-usable bag 304, which is turn slightly wider and deeper that the next bag 306 and so on until the foremost bag 308 which is the shallowest and narrowest of the set of bags 300. In this way, the overall shape of the set 300 of re-usable bags mimics the shape of a shopping trolley (not shown). The re-usable bags 302, 304, 306, 308 are connected together at the upper edges of their longitudinal sides by a plurality of elongate rails 112, the external sides thereof being fitted with Velcro patches 116. The re-usable bags are connected together by connecting the elongate rails 122 of adjoining re-usable bags together using the Velcro patches 116 affixed thereto. The foremost re-usable bag 308 comprises a handle 310 adjacent its upper edge. Each of the re-usable bags 302, 304, 306, 308 comprises a recess 312 located substantially centrally in the upper edge of each longitudinal side thereof, below the elongate rails 112. These recesses allow the elongate rails 112 to function as carrying handles for the re-usable bags 302, 304, 306, 308 by providing a space for a user to place his hand so as to grasp the elongate rails 112.

Referring now to Fig. 4, in which like parts have been given the same reference numerals as before, there is shown the re-usable bag system of the invention comprising the set 300 of re-usable bags in a contracted, storage position. The set 300 of re-usable bags comprises a first and second tab members, in this case a pair of handles 402, 404. The first handle 402 is connected to the back of the rearmost bag 302 of the set 300 and the second handle 404 is connected to the base of the rearmost bag 302. The forward re-usable bags 304, 306, 308 are stored in a folded position such that the rearmost re-usable bag 302 forms a sling around them, with one side thereof forming the retaining side and assuming a channel shape in which the remaining re-usable bags 304, 306, 308 are enveloped. In this way, the set of re-usable bags 300 forms an easily stored and transportable package. In this way a user may carry the set 300 of re-usable bags using the first and second tab members of the re-usable bag system, in this case the handles 402, 404 of the rearmost bag 302.

Referring now to Fig. 5, in which like parts have been given the same reference numerals as before, there is shown an alternative embodiment of re-usable bag system indicated generally by the reference number 200 comprising a re-usable bag 202 having a base (not shown), four sides 104, 106, 108, 110 and an opening at the top.

The re-usable bag 202 comprises a recess 312 located substantially centrally in the upper edge of each longitudinal side thereof, below the elongate rails 112. The re-usable bag system 200 comprises first and second tab members, that is, its pair of handles 402, 404, both of which are affixed to the rear longitudinal side 406 of the re-usable bag 202. In this case, the rear longitudinal side 406 of the re-usable bag 202 function as the retaining side. The first handle 402 is affixed adjacent the upper edge of the re-usable bag 202 and the second handle 404 is affixed adjacent the lower edge of the re-usable bag 202. In this way, the second handle 404 may be used when the re-usable bag system comprises the set 300 of re-usable bags has been folded such that the re-usable bag 202 is wrapped under the remaining bags 304, 306, 308, forming a carrying sling for these bags, as illustrated in Fig. 4.

Referring now to Figs. 6, 7 and 8, in which like parts have been given the same reference numerals as before, there is shown a set 300 of bags 302, 304, 306, 308 forming a re-usable bag system disposed in a shopping trolley 500, having a handle 504 extending rearwards from the back thereof. Each bag 302, 304, 306, 308 within the set 300 of re-usable bags comprises a pair of elongate rails 112 affixed to the upper longitudinal edges of the re-usable bags 302, 304, 306, 308. The ends of the elongate rails 112 rest on upper edges of the sides of the shopping trolley 502. The rearmost bag 302 comprises a cord 502, functioning as a hook member, affixed to its rearmost side adjacent the elongate rail 112.

In use, a user places the set 300 of re-usable bags forming the re-usable bag system of the invention into a shopping trolley 500. The rearmost bag 302 is secured to the back of the shopping trolley using a hook member, in this case a cord 502 which is fastened to the back of the rearmost bag 302 and, in use, is hooked around the handle 504 of the shopping trolley 500. The elongate rails 112 are then slid along the upper edges of the aides of the trolley 500 thereby extending the set 300 of re-usable bags 302, 304, 306, 308 such that they occupy the majority of the space within the shopping trolley 500, and that each re-usable bag presents an open mouth at the top thereof for the reception of items. When the bags have been filled and it is necessary to remove them from the trolley, each bag may be separated from its neighbouring re-usable bags and can be then carried using the handles (not shown) or carrying handles formed by the recesses 312 and elongate rails 112. Once emptied, the set 300 of re-usable bags may be re-

connected by engaging the Velcro patches 116 on the elongate rails 112 with the corresponding patches on adjacent rails 112. The set 300 of re-usable bags may then be stored and carried conveniently using the handles 402, 404 of the rearmost bag 302, such that the rearmost re-usable bag 302 essentially wraps under the other bags, containing them.

Referring now to Figs. 9 and 10, in which like parts have been given the same reference numerals as before, there is shown an alternative embodiment of re-usable bag system comprising a set of re-usable bags, the set being indicated generally by the reference numeral 900. The set 900 comprise four re-usable bags 902, 904, 906, 908 of equal size. Each re-usable bag is substantially cuboid in shape comprising a base (not shown), four sides having upper edges forming an opening. The upper edges of the longitudinal sides of the re-usable bags 902, 904, 906, 908 comprise elongate rails 112 that extend beyond the sides of the re-usable bags 902, 904, 906, 908 and are fitted with Velcro patches so that the elongates rails 112 of adjoining bags may be connected together. Each of the re-usable bags 902, 904, 906, 308 comprises a recess 312 located substantially centrally in the upper edge of each longitudinal side thereof, below the elongate rails 112. These recesses allow the elongate rails 112 to function as carrying handles for the re-usable bags 902, 904, 906, 308 by providing a space for a user to place his hand so as to grasp the elongate rails 112. The foremost re-usable bag 902, which is foremost in the drawing but would be rearmost when the set 900 of re-usable bags were disposed in a trolley, comprises a first tab member in the form of a handle 402 located near the upper edge of one longitudinal side 910 of the re-usable bag 902, wherein this longitudinal side 910 forms the retaining side of the re-usable bag 902. The foremost re-usable bag 902 further comprises a second tab member comprising a second handle 404 that is connected to the re-usable bag 902 adjacent the base thereof.

In use, the set of re-usable bags 902, 904, 906, 908 is disposed in a shopping trolley 500 such that the elongate rails rest on the sides of the trolley. By sliding the rails along the sides of the trolley, the re-usable bags 902, 904, 906, 908 are spread open such that will substantially fill the trolley. To store the empty bags, the elongate rails 112 are brought together and the second handle 404 of the foremost re-usable bag 902 is brought under the remaining bags 904, 906, 908 and then up to engagement with the

first handle 403. In this way, the retaining side 910 will form a sling under the remaining bags 904, 906, 908, enveloping them into a single bundle or package.

Referring now to Fig. 11, in which like parts have been given the same reference numerals as before, there is shown a top view of the re-usable bag system 200 shown in Fig. 5 disposed in a trolley 500. The rear of the trolley comprises a projection 914 located substantially centrally on the top rear edge of the trolley cage. The handle 402 of the re-usable bag 202 in this case acts as a hook member and hooks around the projection 914 at the rear of the trolley 500, and so secures the re-usable bag 202 and re-usable bag system 200 in place in the trolley 500.

Referring now to Fig. 12, which like parts have been given the same reference numerals as before, there is shown a portion of a re-usable bag suitable for use with the invention showing the formation of a pouch in the base of the re-usable bag for reception of a base reinforcing insert (not shown). The base insert is known in re-usable bags to provide shape and structure to the base and consequently the re-usable bag itself. In this case, an elongate strip, indicated generally by the reference numeral 950, of re-usable bag material, generally non-woven fabric, is used to form two sides of the re-usable bag, the base thereof and the pouch for reception of the base reinforcing insert. A segment 952 of the strip forms the base, and then, on each side, further material is folded partially over the base segment and then folded back on itself, thus forming a pair of flaps 954, 956. The sides of the flaps are stitched in place, along the dotted lines, thus forming a pouch between the flaps 954, 956 and the base segment 952. The opening of the pouch is formed between the flaps 954, 956. The presence of the pouch allows the base reinforcing insert (not shown) to be kept in place while the re-usable bag is in use, storage or transit and while the re-usable bag is being folded or otherwise compacted for envelopment by the retaining side.

A number of embodiments of re-usable bag system have been described herein comprising a single re-usable bag or sets thereof. It will be understood that the re-usable bag system of the invention may comprise a single re-usable bag or a set of re-usable bags. The re-usable bags within a set may be similar or different. A set of re-usable bags may be the same size or may be of different sizes. Some or each of the re-usable bags

within a set may comprise first and second tab members or, alternatively, only one on the re-usable bags within a set may comprise the first or second tab members.

Ideally the elongate rail will comprise a substantially rigid bar covered in a sleeve of non-woven fabric, to which the patches of Velcro are attached. The sleeve of non woven fabric may be formed integrally with the re-usable bag so as to facilitate fast and convenient manufacture of the re-usable bags, which will in turn reduce manufacturing costs. The elongate rail may also be separate from the re-usable bag and may be attachable there by any standard means such as further Velcro, zips, buttons or the like. Furthermore, it will be understood that the Velcro patches on the elongate rails may comprises a single Velcro patch, a pair of Velcro patches or a series of Velcro patches without affecting the operation of the invention.

It will be understood by the person skilled in the art that the re-usable bag of the invention is not limited to being cuboid in shape and may comprise any suitably shaped bag. Furthermore, it will be understood that the re-usable bag system of the invention is not limited to use with shopping trolleys and for use with shopping, it may be used for temporary or general storage of goods in any system comprising a pair of substantially parallel support rails on which the elongate rails may rest and slide.

In the specification the terms 'comprise', 'comprises', 'comprised' and 'comprising' or any variation thereof and the terms 'include', 'includes', 'included' or 'including' or any variation thereof are considered to be totally interchangeable and they should all be afforded the widest possible interpretation.

The invention is not limited to the embodiment herein described, but may be varied in both construction and detail within the terms of the claims.

CLAIMS

1. A re-usable bag system for use in a shopping trolley, the re-usable bag system comprising at least one re-usable bag having an upper edge forming an opening, wherein the re-usable bag system further comprises a plurality of elongate rails which are connectable to the re-usable bag adjacent its upper edge and are adapted to engage the top of the sides of a shopping trolley; characterised in that

   the at least one re-usable bag further comprises

      a base and a retaining side extending between the base and the upper edge;

      a first tab member located adjacent the upper edge; and

      a second tab member located in the vicinity of the base

      such that, when not in use in the trolley, the second tab member may be brought into engagement with the first tab member so that the retaining side envelops the re-usable bag.

2. A re-usable bag system as claimed in claim 1 in which, in use, the elongate rails are connected to the at least one re-usable bag and the second tab member may be brought into engagement with the first tab member so that the retaining side envelops the re-usable bag system.

3. A re-usable bag system as claimed in any preceding claim comprising a plurality of re-usable bags, each connected to one or more elongate rails.

4. A re-usable bag system as claimed in any preceding claim in which one or both of the first tab or second tab member comprises a handle.

5. A re-usable bag system as hereinbefore described in relation to the accompanying figures.

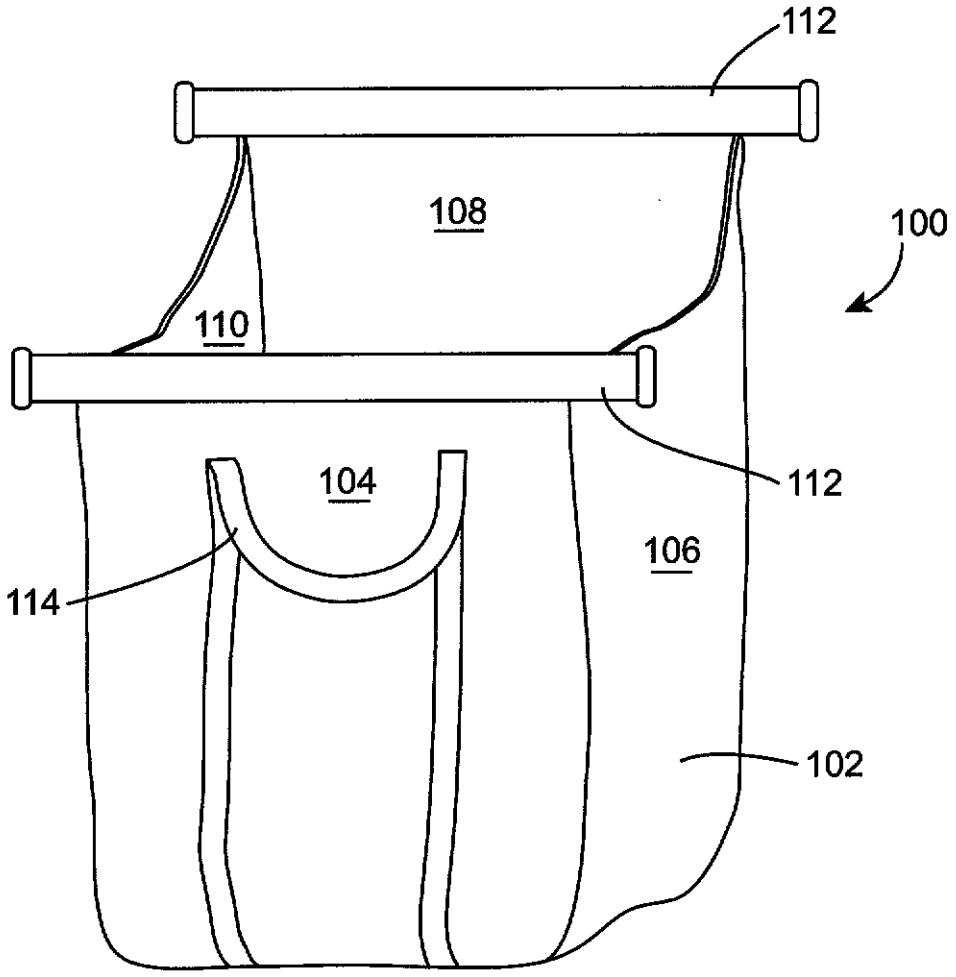

Fig. 1

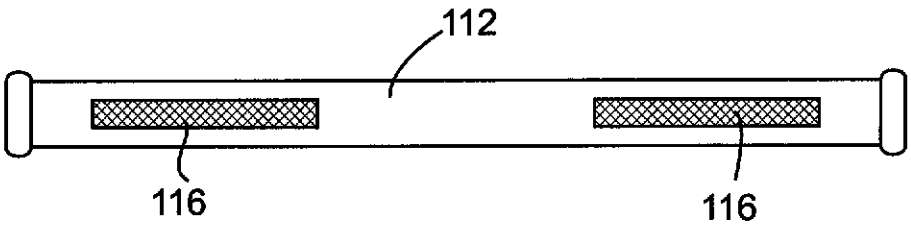

Fig. 2

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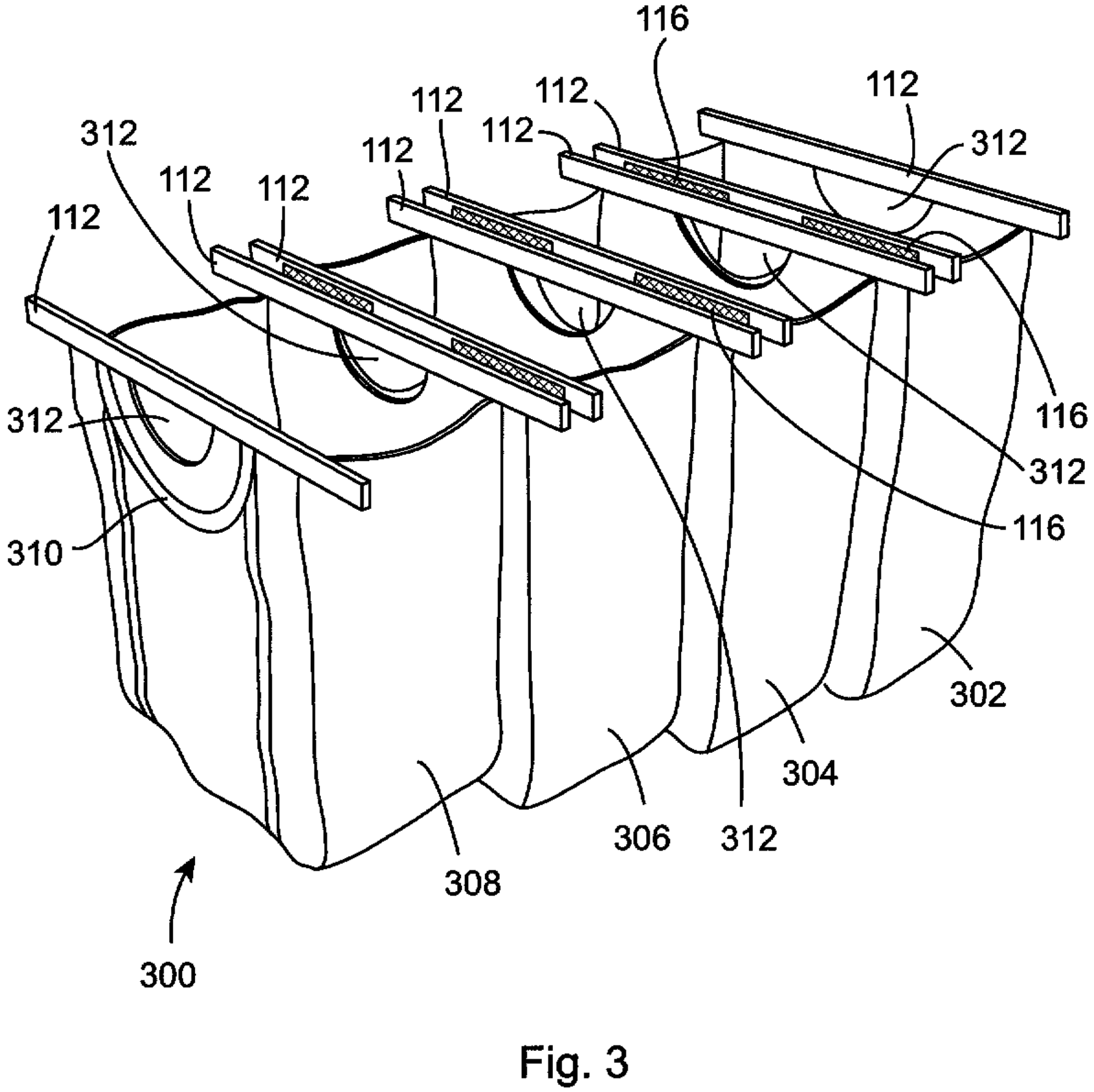
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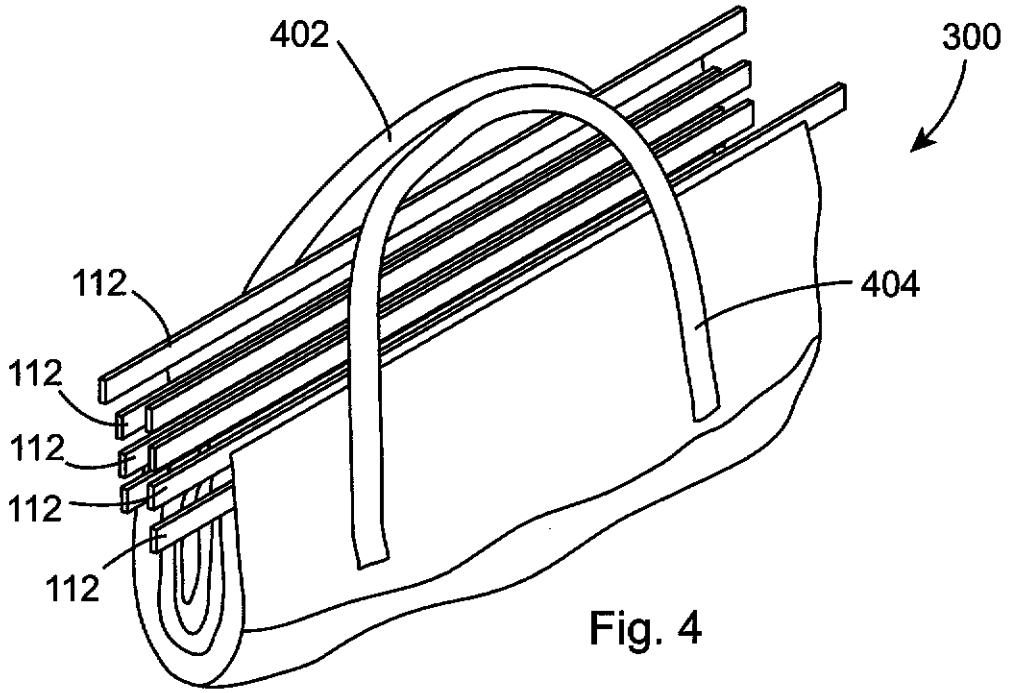
Fig. 3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404
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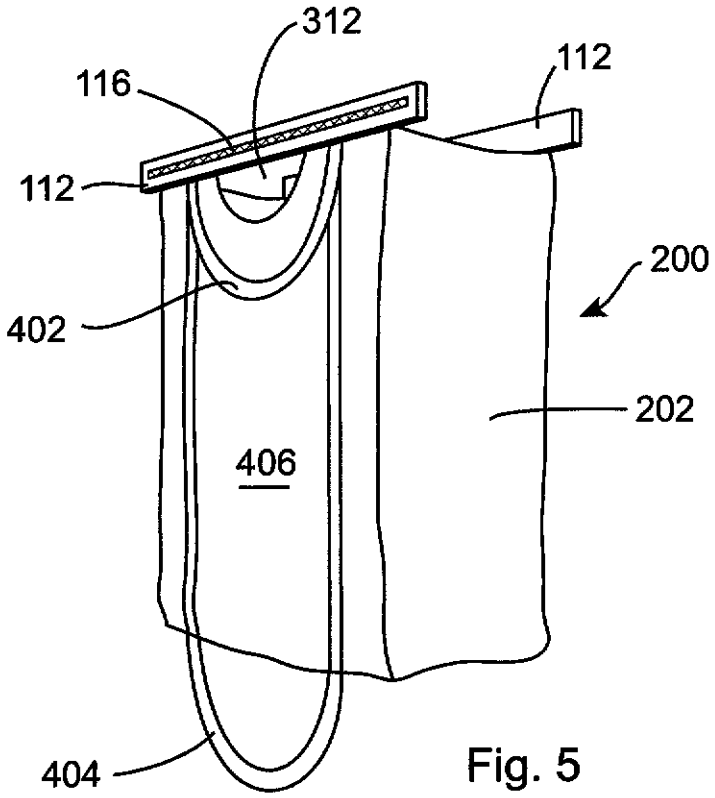
112

Fig. 4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202
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404

Fig. 5

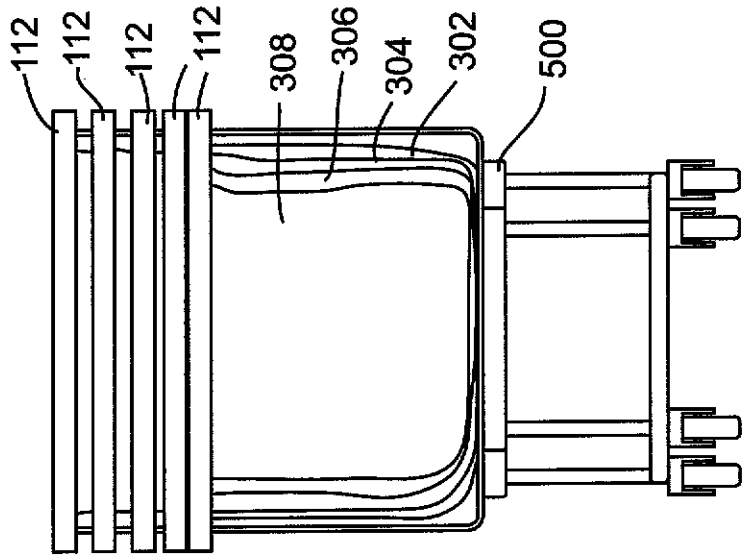
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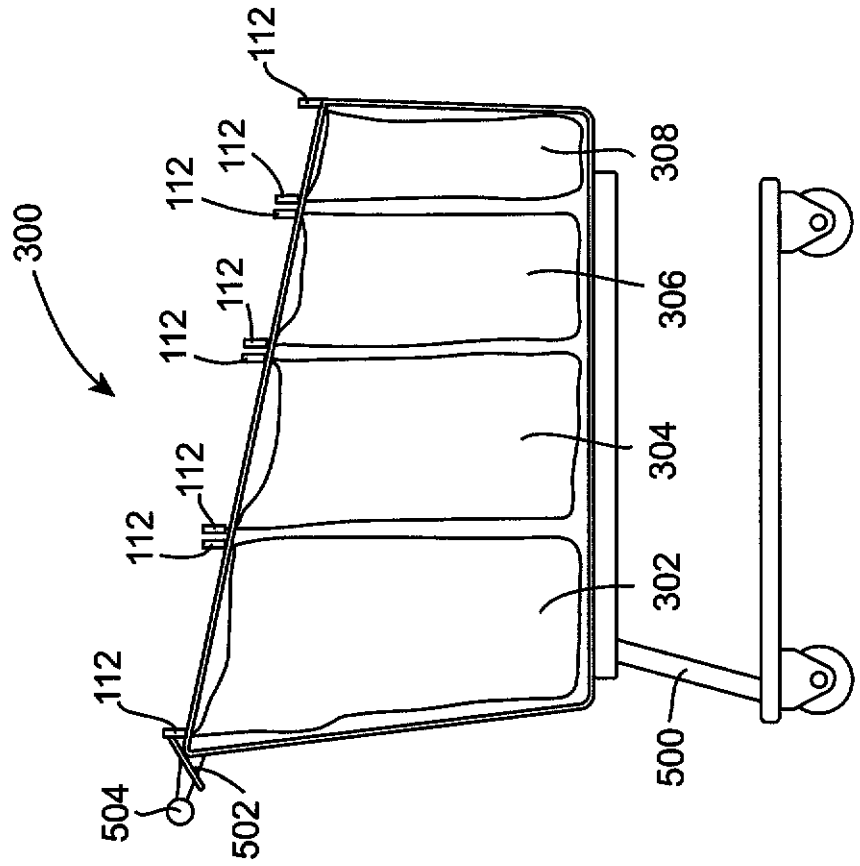
Fig. 7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502

Fig. 6

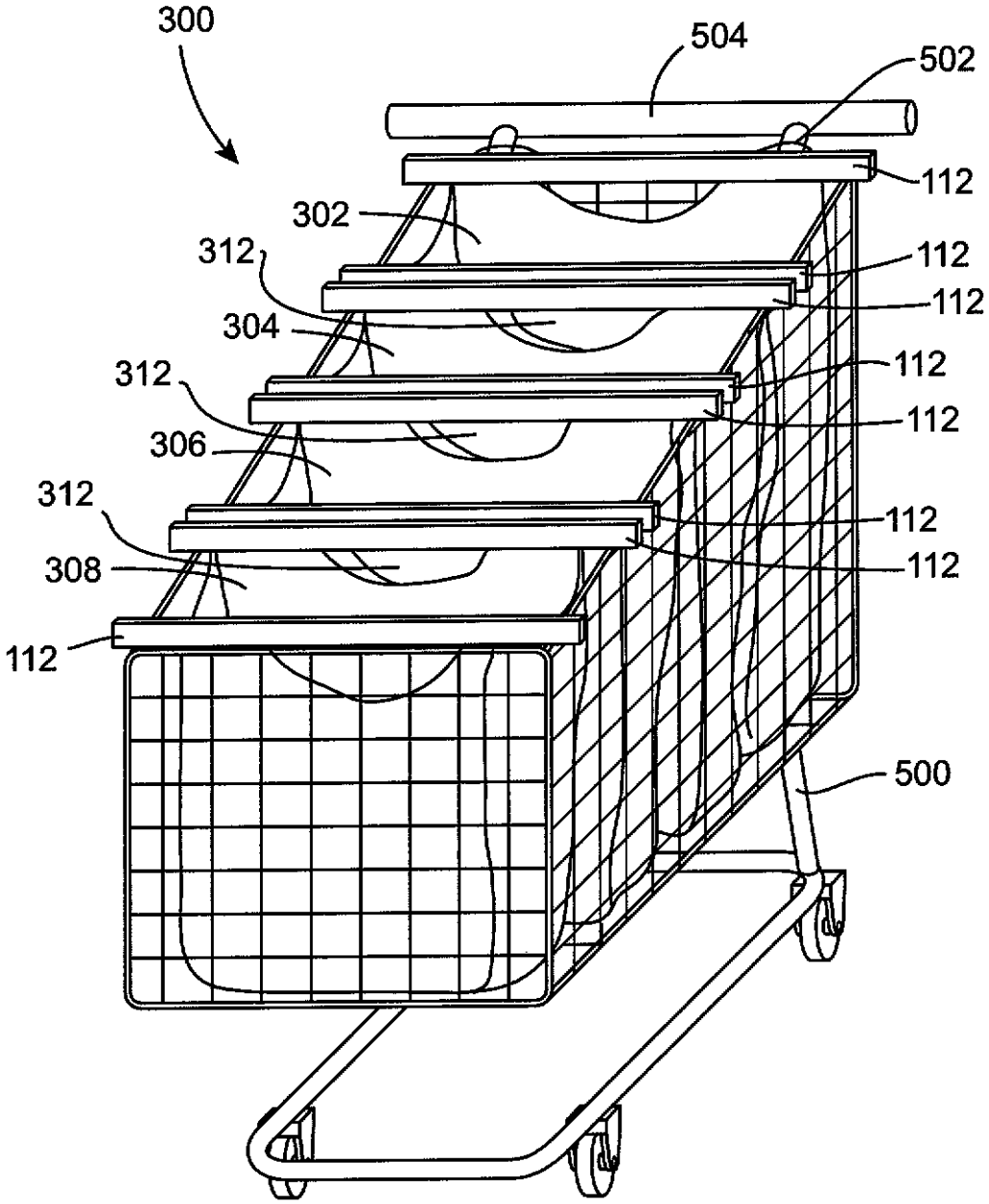
300
504
502
112
302
312
112
304
112
312
112
306
112
312
308
112
112
500

Fig. 8

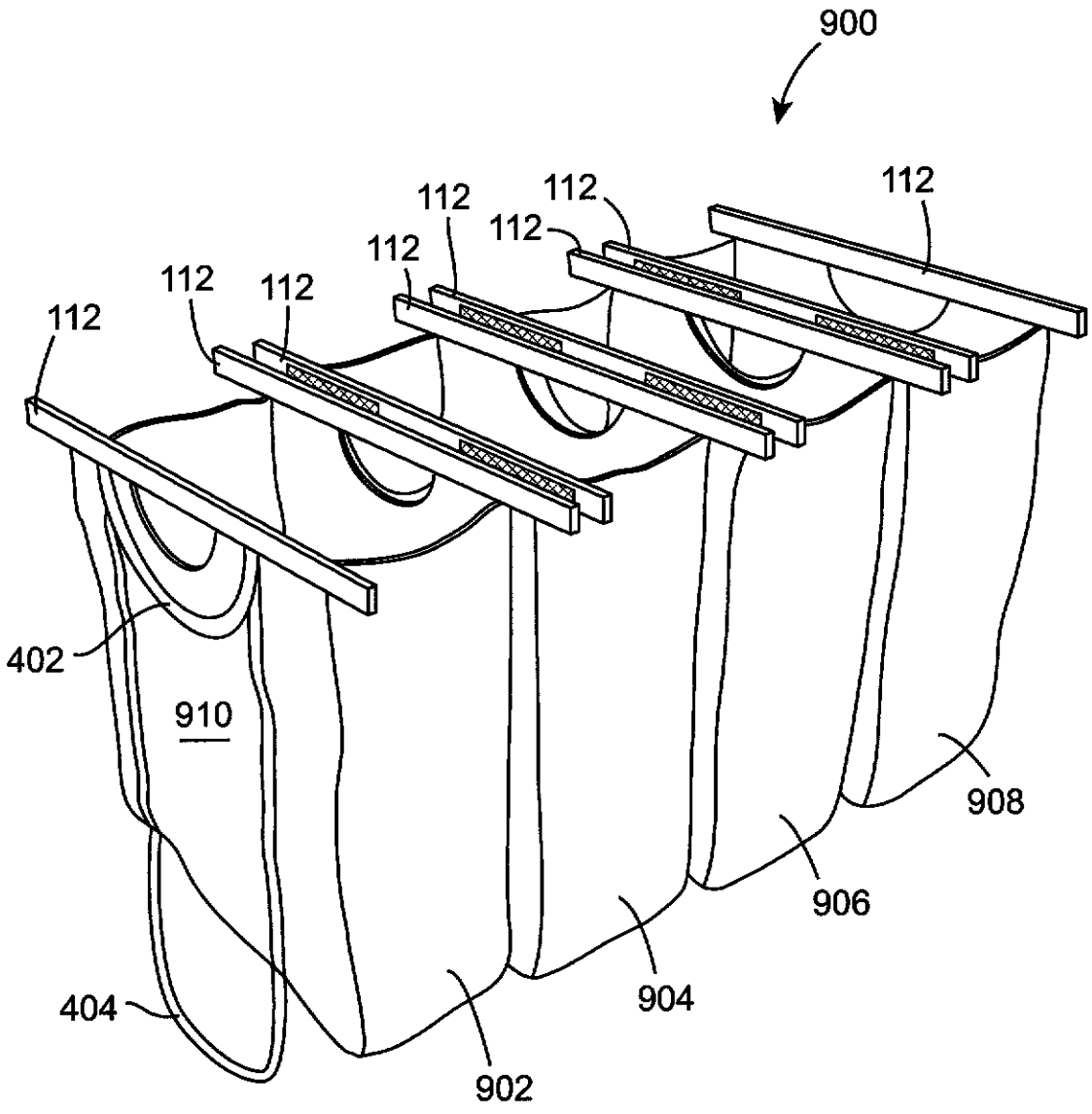

Fig. 9

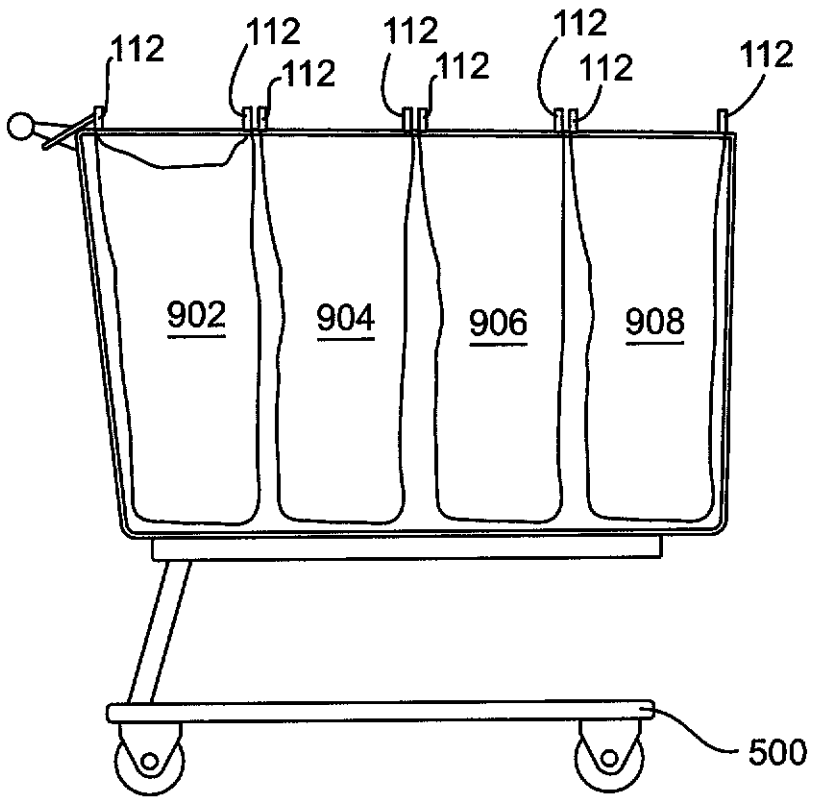
112
112
112
112
112
112
112
112
902
904
906
908
500

Fig. 10

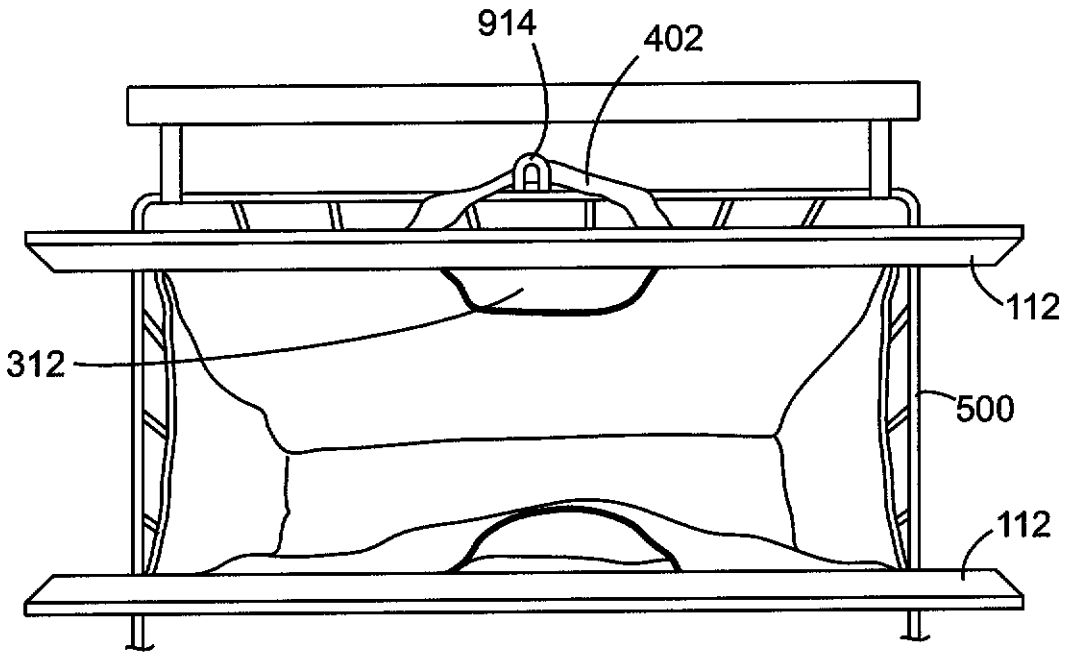
914
402
112
312
500
112

Fig. 11

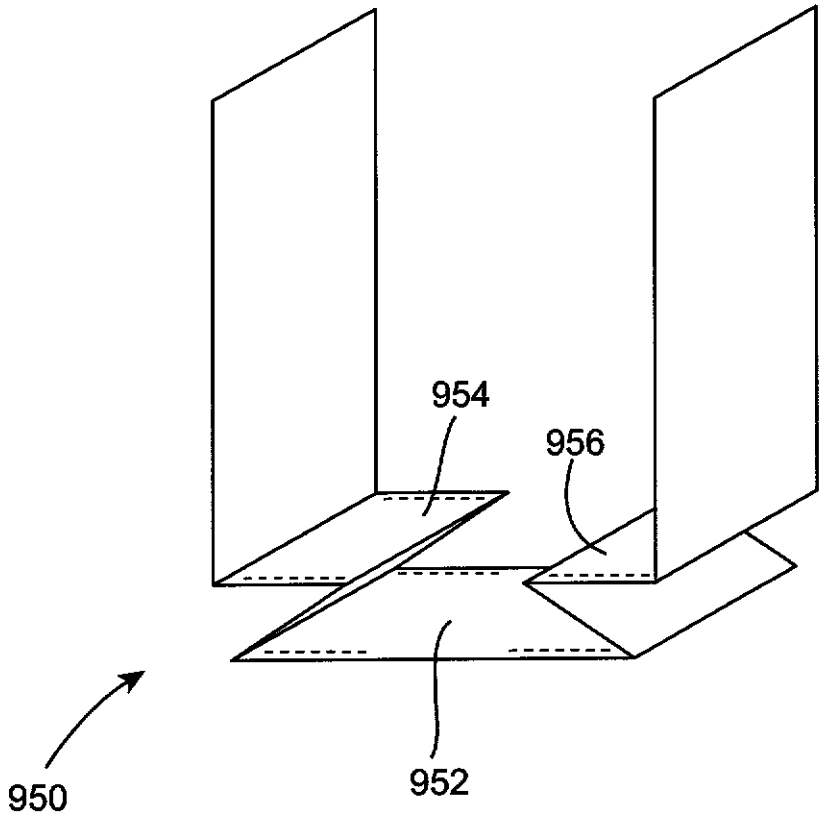

Fig. 12