The present invention discloses interconnected series of articles such as bags, gloves, sacks, paper towels etc. and a dispenser for those articles. The articles are formed from one or more web-material where at least one article's wall is provided with a retainer or retainers for cooperation with dispenser's guide. The retainer is continuous and cooperates with dispenser's guide and a cooperation portion having at least one separation line per article situated transversally to longitudinal direction of the retainer. An end of the separation line being positioned at or adjacent to a retainer's free edge, where the separation line is configured to postpone a separation of articles until an article next in series reaches a ready-to-be-loaded position at the dispenser. Dispensing of the articles operates without auxiliary energy using only the energy developed by movement of user's hand.
INTERCONNECTED SERIES OF ARTICLES AND DISPENSER FOR SAME

BACKGROUND—PRIOR ART

[0001] The following is a tabulation of some prior art that presently appears relevant:

[0002] 1) U.S. Pat. No. 6,488,222 (LARRY G. W. et al.)
[0003] 2) U.S. Pat. No. 4,698,051 (JACOBSON R. S.)
[0004] 3) U.S. Pat. No. 4,921,193 (BENESCH M. C.)
[0006] 5) U.S. Pat. No. 4,558,556 (JOSTLER J.)
[0007] 6) WO 02/083506 A1 (JOSTLER J. et al.)
[0008] 7) WO 97/12816 A1 (JOSTLER J. et al.)
[0009] 8) U.S. Pat. No. 6,604,660 (GOCHANOUR G. G.)

[0011] Bags, sacks and other similar un-rigid containers have been used for packaging, storing, holding and protection of various types of products, goods and objects. These articles also provide a convenient way for a consumer to transport products wherever and whenever that consumer wants it. Generally, flexible materials like polymers, paper, and textile have been used to produce various types and shapes of those articles. When interconnected, the articles are arranged in a roll, a stack, a strip etc. The roll or stack form is commonly used since it is self-packing, requires less storage space and prevents the sliding of the bags.

[0012] Plastic bags and gloves are articles commonly provided by supermarkets at predefined locations to serve consumers during shopping. Cash registers and areas with fruits and vegetables are predefined locations in supermarkets where bags and/or gloves are available. In addition, these articles can also be found in stores, outlets, gas stations i.e. mostly gloves, homes, as a part of an industrial process and in other places where there is a need for those articles.

[0013] Almost every human being, on a daily basis, uses or manipulates those articles. The manipulation of mutually interconnected bags, for instance at a supermarket’s cash register, for the purpose of this document, can be divided into four operations: (I) the first operation—the consumer retrieves a bag from a roll, using both hands to separate an engaged bag from the next bag, (II) the second operation—the consumer has to expand the opening of the engaged bag by the usage of both hands, (III) the third operation—the consumer maintains with the use of one hand the opening expanded—at this point the bag is ready to be loaded—and then starts to load the products by using of the other hand, (IV) the fourth operation—the consumer takes away the loaded bag from the cash register. For the usage of gloves, this already given clarification of aforesaid operations is appropriate, however with certain deviations. A glove has to be generally retrieved from the stack with one or both hands—the first operation—then opened by both hands—the second operation—in order to insert a hand in the glove’s use-space—the third operation.

[0014] Analyzing those four operations, it can be concluded that for aforesaid article process to function properly, there is a need to use both hands in order to make those operations smooth and reliable. In many fields, such as food service, dental, medical, laboratory and precision manufacturing fields reducing the possibility of contamination is of a primary concern—in detail elaborated by U.S. Pat. No. 6,604,660 and US 2011/0263402. This aforesaid need for the usage of both hands during the manipulation of a bag or gloves is a notable limiting factor which needs to be surpassed in order to resolve such issues especially when contamination is concerned.

[0015] Furthermore, duration of action of the second operation is quite unpredictable especially with plastic bags of very fine gauge. Known facts, i.e. static electricity, surface adhesion and slippery bag surface make this operation problematic and time-consuming particularly if only one hand is used. It is obvious, that usage of only one hand during all operations will be a helpful support to consumers. Thus, these operations can be performed even in cases when one hand is briefly disabled; during a phone call, by holding kid’s hand etc., or for a longer period of time. During the third operation, if it were possible to have both hands free only for the loading process, the problem of prolonged loading, would be evidently minimized.

[0016] Considering problems described above there is a need in the art for interconnected bags with receptive dispenser which allows single hand operating process and the usage of both hands only to load products in a bag without the need for touching the bag. In addition, there is a need for interconnected gloves with receptive dispenser which allows putting on of the gloves easily and reliably, without the contact with external walls of the glove by means of hands to avoid contamination of gloves and makes it possible to use gloves hygienically. There is also a need in the art for interconnected articles with receptive dispenser which makes it easy for consumers to open an article, particularly for consumers who have difficulty in grasping materials such as polymer films and other thin materials. Considering all aforesaid places and locations where articles are provided and used, there is a need for interconnected articles with receptive dispenser which is compact, adaptable, manually used, in order to allow a flexible installation (vertical, horizontal, inclined), installation in ex-proof areas, and is suitable for installation and easy integration into cash registers, garbage containers etc.

[0017] Relevant previous art for the purpose of this document can be divided in two categories from the standpoint of energy development:

[0018] “manual”—all operations done by hand, and
[0019] “automatic”—with the use of additional power such as electric energy.

[0020] There is no known solution in “manual” category that resolves aforesaid problems integrally. For instance: U.S. Pat. No. 6,488,222; U.S. Pat. No. 4,698,051 and U.S. Pat. No. 4,921,193 solutions are focused only on the first, second and third operation respectively.

[0021] Common problem of the first operation that is not mentioned above—unwanted unwrapping of bag roll—remains unsolved apart from a few designs which have complicated system.

[0022] In “automatic” category, teaching disclosed in U.S. Pat. No. 4,558,556; and two later documents WO 97/12816 A1 and WO 02/083506 A1 demonstrate that articles can be guided through the process (opening, filling, closing, sealing, labelling, storing etc.) with use of additional power, additional devices etc. However, the guiding arrangement is not compact, what makes the system inadequate for a lot of aforesaid locations. Interconnected articles, as well as guiding arrangement, were designed to focus on the needs of the automatic process; however those needs are different from the needs of a manual process and consumer’s needs. Thus, the
manual removal of a loaded article by one or two hands—the forth operation—is not possible nor disclosed within those systems.

[0023] Teaching disclosed in EP-A2-0381914—automatic bag dispenser system—is an example from the automatic category with such a design that is focused to serve consumer’s needs during shopping in particular at cash registers. This system performs first three operations automatically so there is no need to use hands. Every time when consumer needs a bag, the bag is opened and ready to be loaded with both hands. The cited solution provides a valuable service to consumer with a system that operates with a lot of moving parts and the usage of additional energy.

SUMMARY OF THE INVENTION

[0024] The present invention meets the aforementioned needs by providing an interconnected series of articles and a dispenser for those articles.

[0025] In general, interconnected series of articles according to one embodiment comprise articles that have wall or walls provided with one or more retainers formed from a portion of the web-material or an additional material or combination thereof. One or more retainers are configured to mutually connect adjacent articles. The retainer has operable cross sections that cooperate with a dispenser’s guide. The retainer has at least one separation line per article that is situated transversally to longitudinal direction of retainer. The end of separation line is positioned adjacent to or at a retainer’s free edge.

[0026] The separation line is configured to postpone a separation of articles until the article next in series reaches a ready-to-be-loaded position at the dispenser.

[0027] In another embodiment, the retainer generally has at least one discontinuity per article in addition to the separation line.

[0028] In yet another embodiment, the retainer of tunneled shape generally has at least one release line that spreads along longitudinal direction of retainer in addition to separation lines. The release line has at least one non-release segment per article.

[0029] In yet another embodiment, the retainer of tunneled shape in addition to the separation line generally has at least one discontinuity per article. The retainer also has a release line that spreads along longitudinal direction of retainer. The release line has at least one non-release segment per article.

[0030] In both cases, i.e. retainer of tunneled or thickened shape, where each article in series can be further provided with expanding lines, where one of the expanding lines is situated adjacent to the separation line.

[0031] The corresponding dispenser for disclosed interconnected series of articles generally comprises a storage means for storing the interconnected series of articles. At least one guide is fixed with at least one fixing element at the storage means. The guide has cross sections and a form configured to receive and support the articles’ retainer that spreads along the guide. One or more guides comprise at least one cooperation portion configured to cooperate with the article’s retainer.

[0032] Dispensing of articles operates without an auxiliary energy using only an energy developed by movement of user’s hand.

BRIEF DESCRIPTION OF FIGURES

[0033] FIG. 1 shows perspective view of a first embodiment of invention, in which retainer of tunneled shape has separation lines.

[0034] FIG. 2 shows perspective view of a second embodiment of invention, in which retainer of tunneled shape has separation lines and discontinuities.

[0035] FIG. 3 shows perspective view of a third embodiment of invention, in which retainer of tunneled shape has separation lines and release line that has a non-release-segments, while

[0036] FIG. 4 shows the retainer without the non-release-segments.

[0037] FIGS. 5 and 6 represent perspective view of variants of a single article with different types of the retainer of tunneled shape.

[0038] FIG. 7 shows perspective view of a forth embodiment of invention, in which retainer of thickened shape has discontinuities.

[0039] FIGS. 8 and 9 represent perspective view of variants of a single article with different types of retainers of thickened shape.

[0040] FIG. 10 shows perspective view of a fifth embodiment of invention, in which two retainers of tunneled shape have separation lines and release line that has non-release-segments, while

[0041] FIG. 11 represents a variant with retainers having expansion lines.

[0042] FIG. 12 shows perspective view of a sixth embodiment of invention, in which two retainers of tunneled shape have separation lines and release lines that have non-release-segments.

[0043] FIG. 13 shows perspective view of a seventh embodiment of invention, in which four retainers of tunneled shape have separation lines, discontinuities, and release lines that have non-release-segments, while

[0044] FIG. 14 represents a variant without discontinuities.

[0045] FIGS. 15, 16, 17, 18, 19 and 20 represent perspective view of variants of a single article.

[0046] FIGS. 21 and 22 represent perspective view of operational aspects of a first embodiment, while

[0047] FIGS. 23 and 24 schematically represent examples of pressure distributions of the first embodiment.

[0048] FIGS. 25, 26 and 27 represent perspective view of an operational cycle of the second embodiment.

[0049] FIG. 28 represents perspective view of operational aspects of a third embodiment, while

[0050] FIG. 29 represents operational aspects of a variant of the third embodiment.

[0051] FIG. 30 represents perspective view of operational aspects of a fifth embodiment, while

[0052] FIG. 31 represents operational aspects of articles with retainer having expansion lines.

[0053] FIGS. 32, 33 and 34 schematically represent examples of pressure distributions of the third embodiment, while series of

[0054] FIGS. 35 to 37 and series of

[0055] FIGS. 38 to 40 represent examples of pressure distributions for two variants of embodiments.

[0056] FIG. 41 represents perspective view of operational aspects of a forth embodiment.

[0057] FIG. 42 represents perspective view of operational aspects of sixth embodiment, while

[0058] FIG. 43 shows dispensers’ guides.
FIGS. 44 and 45 represent perspective view of operational aspects of a seventh embodiment.

FIG. 46 shows perspective view of dispenser with a single guide for a retainer of tunneled shape, while FIG. 47 shows a dispenser with single guide for articles with retainer of thickened shape.

FIG. 48 shows perspective view of dispenser with a pair of guides for a retainer of tunneled shape.

FIG. 49 shows perspective view of dispenser with two pairs of guides where each guide comprises two cooperation portions.

FIG. 50 shows perspective view of a dispenser with single guide that is provided with cutting means.

DEFINITIONS

The term “article”, and grammatical variation thereof, as used herein refers to bag, glove, sack, other non-rigid container and paper towel made of web-material, used for packaging, covering or manual cleaning.

The term “packaging” as used herein is not only limited to a usage of article or articles for packaging of object, it refers also to any other form of usage of articles, such as storing, holding, protection and transportation of articles, but not limited to those.

The term “covering” as used herein refers to a usage of article or articles to prevent a direct contact between an object and a part of user’s body such as hand, foot etc. covered by the article.

The term “manual cleaning” refers to an usage of article for manual cleaning of objects, hand or hands and other parts of body i.e. for manual removal or visible and non-visible foreign matters such as dust, grime, fluids, dirt, and like from objects or body which are required to be devoid of same.

The term “paper towel” refers generally to an absorbent paper or other suitable material used for wiping or drying.

The terms “bag”, “gloves”, “sacks” and “paper towel” are used hereinafter as a matter of convenience and are not limiting to the scope of the invention.

The term “web-material” as used herein refers to various forms of web, such as sheets, films, tubular films, tubular web, multilayer sheets or films and other forms being commonly used by those skilled in the art to produce articles, and a material of which the web is produced such as plastic, paper, absorbent paper, paper composite, knitted or woven fabrics and the like, composite material and other flexible material used to produce articles.

The term “use-space” as used herein refers to article’s space surrounded by web and an opening or openings, being used to contain objects.

The term “transversal edge” as used herein refers to an article’s edge ending at a retainer and being situated generally transversally to longitudinal direction of retainer.

The term “opening” as used herein refers to an open space or open spaces of article serving as a passage or a gap for object to enter or exit from use-space.

The term “object” as used herein refers to any physical object or objects which may be inserted into articles’ use-space. As such, object, as used herein, includes without any limitations products and goods of various state of matter, user’s hand etc.

The term “retainer” as used herein, refers to retaining means having continuous form, having tunneled or thickened shape, with operable cross sections, being a part of each article, enclosed by dispenser’s guide or enclosing dispenser’s guide once being at the guide.

The term “tunneled shape” as used herein, refers to a retainer having a hollow portion surrounded by retainer’s web-material, spreading all along longitudinal direction of retainer.

The term “thickened shape” as used herein, refers to a retainer having a thickening, spreading all along longitudinal direction of the retainer.

The term “operative cross sections” as used herein, refers to transversal retainer’s cross sections being of such dimensions and shape so that the retainer is supported by the dispenser’s guide when retainer is positioned at the dispenser guide and while moving along the dispenser’s guide.

The term “ready-to-be-loaded” as used herein, refers to a position of an article on the dispenser when a separation line belonging to the article being situated at cooperation portion of guide. In one embodiment that refers to a position of an article on the dispenser when a discontinuity belonging to the article being situated at cooperation portion of guide. In other embodiment that refers to a position of an article on the dispenser when non-release-segment belonging to the article being situated at cooperation portion of guide.

The term “engaged article” as used herein, refers to an article at which an external force has been applied by the user.

The term “line of weakening” as used herein, refers to any region or area of weakened material, preferably having a length, but not necessarily a defined width. A “line of weakening” can include linear and nonlinear patterns, such as curvilinear patterns of weakness, or other shapes, such as circles, rectangles, and so forth. A line of weakening includes a perforation or other kind of material bridging between adjacent portions of material that is more easily torn or broken than the adjacent portions, or combinations thereof.

The term “separation line” as used herein, is a line of weakening situated at a retainer, and is positioned as specified in disclosed embodiments and depicted in relevant figures.

The term “discontinuity” as used herein, refers to a portion of retainer having different transversal cross sections from the adjacent retainer’s portions. In one embodiment it means that transversal cross sections of discontinuity being smaller than transversal cross sections of adjacent retainer’s portions. In other embodiment it means that transversal cross sections of discontinuity being greater than transversal cross sections of adjacent portions of retainer.

The term “release line” as used herein, is a continual line of weakening at retainer, spreading along retainer’s longitudinal direction.

The term “non-release-segment” as used herein, is a portion of release line where its continuity is disrupted by altering a structure of release line.

The term “expansion line” as used herein, is a slot or a line of weakening or combination thereof, situated at retainer, being positioned as specified in disclosed embodiments and depicted in relevant figures.

The term “connected” as used herein, refers to the joining, adhering, bonding, connecting, or the like, of web. Two elements will be considered to be connected together when they comprise an integral part with one another, or are
attached directly to one another or indirectly to one another, such as when each element is directly bonded to intermediate elements.

The term “cord” as used herein, refers to any flexible means which may be used to close, reduce or bound an article’s opening. As such, flexible means, as used herein, include without limitations, a cord, a band, a rim or a strip.

The term “retainer’s free edge” as used herein, refers to a portion or a fraction of retainer’s edge positioned, generally, transversally to a separation line and being not connected with article’s wall or walls. It should be understood that term “retainer’s free edge” refers also to a portion or a fraction of retainer’s edge situated, generally, transversally to a separation line and being not connected with article’s wall or walls after a line of weakening situated at a retainer or at a common region is torn or broken.

The term “unexpanded” as used herein, refers to an article’s state while being substantially flat (i.e. articles having the walls nestled and opening or openings closed) for production, storage or marketing purposes.

The term “overfolding” as used herein, means a fold that results in more than two layers of web-material when an article is in an unexpanded state.

As used herein the terms such as “vertical”, “horizontal”, “top”, “bottom”, “left”, “right”, “side”, “uppermost”, “above”, “end”, “bellow”, are referenced according to the views presented in figures. It should be understood, however, that the terms are used only for the purpose of description, and are not intended to be used as a limitation. Accordingly, orientation of an object or a combination of the objects may change without departing from the scope of this invention.

The term “cutting means” as used herein refers to any suitable element or elements, such as a knife, a blade, a razor, a scalpel etc., capable of cutting the retainer longitudinally.

DRAWINGS—REFERENCE NUMERALS

1 article
2.1 wall
2.3 transversal edge
2.4 bottom edge
2.5 opening edge
2.6 layer of material
2.7 folded edge
2.8 hands’ hole
2.9 retainer
2.10 first retainer’s edge
2.11 second retainer’s edge
3.1 retainer’s front edge
2.13 thickened portion of retainer
2.14 flat portion of retainer
2.15 separation line
2.16 end of separation line
2.17 separation pressure distribution diagram
2.18 separation pressure surface
2.19 4 discontinuity
2.20 release line
2.21 5.1 non-release-segment
2.22 5.2 release pressure distribution diagram
2.23 5.3 release pressure surface
2.24 6 expansion line
2.25 6L, 6R left and right part of expansion line
2.26 7 compartment
2.27 7.1 cord
2.28 10 dispenser
2.29 11 storage means
2.30 11.2 holder
2.31 11.3 slot
2.32 11.4 transparent shield
2.33 12 guide
2.34 12.1 cooperation portion
2.35 12.11 additional cooperation portion
2.36 12.2 fixing element
2.37 12.3 cutting means
2.38 12.4 slit
2.39 13 weight measuring device
2.40 13.1 control unit
2.41 13.2 position(s) referring to 2nd article in series
2.42 13.3 position(s) referring to 3rd article in series
2.43 13.4 position(s) referring to 2nd article, 2nd transversal edge, 1st retainer and its features, and 1st guide
2.44 13.5 position(s) referring to 3rd retainer and its features, and 3rd guide
2.45 13.6 position(s) referring to 4th retainer and its features, and 4th guide

DETAILED DESCRIPTION

In the following detailed description, reference is made to accompanying drawings referring to specific embodiments in which the inventions may be practiced. Elements of embodiments that characterize present invention are described in sufficient detail to enable a person skilled in the art to practice the invention without assumptions beyond the standard of the engineering practice. The elements of invention, already known in the art, and their way of construction, are defined along with details required to clearly comprehend the scope of this invention. It is to be understood that other embodiments may be utilized and that mechanical, procedural, and other changes may be made without departing from the spirit and scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense, and the scope of present invention is defined only by the appended claims, along with the full scope of equivalents to which such claims are entitled.

The relative position of articles within series will be denoted as follows: 1st article without extra notation—1; 2nd article with 1’ and 3rd article with 1”. Therefore, three consecutive articles are 1, 1’, 1”, and their walls are 1.2, 1.2’, 1.2”.

First Embodiment—Single Retainer

An article—in form without a retainer—of this embodiment is well known in the art and can be classified as inherently planar article i.e. an article can be in an unexpanded state without overfolding. There are various shapes of the article, various construction techniques to produce such article and as well various materials and material forms from which such article is produced.

The first embodiment of an interconnected series of articles is illustrated in FIG. 1. The FIG. 1 shows the first three articles 1, 1’, 1” in an expanded state and other articles in series are omitted for the purpose of clarity.

In this embodiment each article is formed, without limitations, by two web-materials in form of a polymer sheet of rectangular shape using one of the common techniques known in the art. As a result, web-materials of the article 1 form two walls 1.2, 1.2’ that are arranged together by connecting
walls 1.2 and 1.2a along a bottom edge 1.4 and transversal edges 1.3 and 1.3a to define article’s use-space. Thus, there is an opening opposed to the edge 1.4 that allows insertion of object into the article’s use-space. It is known in the art, that an article can be made without edges by molding or otherwise forming a sheet or film of plastic, rubber or other material into an article’s shape of the desired size. In this case, an article is formed of web-material that forms an article’s walls. Where the article’s walls are arranged together in order to define the use-space without being connected along the edges.

[0145] A retainer 2 is formed by additional material. In the first embodiment additional material is web-material in form of a rectangular polymer strip. The strip is folded along retainer’s first edge 2.1 and connected to the retainer’s wall along retainer’s second edge 2.2. A location of the first retainer’s edge 2.1 is offset from midpoint of rectangular sheet. Thus, an area of retainer above the retainer’s second edge 2.2 is formed and it serves to connect retainer 2 to articles’ walls 1.2, 1.2a, 1.2b. As a result, there is the continuous retainer 2 of tunneled shape.

[0146] As shown in FIG. 1, the wall 1.2 of article 1 is partially connected with retainer 2. Thus, a portion of retainer left from transversal edge 1.3 and a portion of retainer right from transversal edge 1.3a are not connected to respective portion of the wall 1.2. It is obvious that retainer 2 can also be connected from edge 1.3 to edge 1.3a to articles’ wall 1.2. Two other articles 1’ and 1” are connected to retainer 1 in an analogous way as article 1. Before retainer 2 was connected with walls 1.2, 1.2a and 1.2b, the edges 1.4, 1.4a, 1.4b were aligned with each other, keeping a gap between two adjacent articles. It is understood that, an overlap of adjacent articles edges is possible, without limiting article’s usage. The walls 1.2, 1.2a, 1.2b are provided with a retainer 2 of a tunneled shape—formed by additional material—that is configured to mutually connect adjacent articles 1, 1’, 1’’. A tunneled retainer 2 has openable cross sections that cooperate with a dispenser’s guide as explained in operational part of this embodiment.

[0147] The retainer 2 has separation lines 3, 3’, 3” that are situated transversally to a longitudinal direction of the retainer. The separation line 3, as well as others, can be formed by any means, know in the art, which will facilitate separation of retainer 2 along the separation line 3 when it gets exposed to force greater than a separation line breaking force. In the first embodiment, separation lines 3, 3’, 3” are formed in a form of a perforated linear patterns that are mutually aligned one after another as straight line when retainer 2 is in an unexpanded state. The separation lines 3, 3’, 3” can be made, for example, by mechanical perforation of the web-material. As shown in the FIG. 1, separation lines 3, 3’, 3” are inclined at 30° to the retainer’s second edge 2.2 and traverse the retainer. A retainer’s front edge 2.3 has the same inclination as the separation lines 3, 3’, 3”. It is understood that, retainer’s front edge 2.3 can have different inclination than that of the separation lines 3, 3’, 3”. An end of separation line 3.1 of article 1 is positioned at a portion of the retainer’s free edge between the transversal edges 1.3a and 1.3b. Ends of separation lines 3.1’, 3.1” are arranged in analogous way just as the end of the separation line 3.1.

[0148] While in illustrated embodiment the separation line 3 is inclined at 30° to generate the separation of separation line 3 earlier at a portion of retainer 2 close to the retainer’s first edge 2.1, it is understood that separation line, if required, in other embodiments can be inclined at a different angle. The end of separation line 3.1 towards the use-space is not necessarily arranged at the portion of retainer between nearby transversal edges 1.3 and 1.3a. Stated another way, end of separation line 3.1 toward use-space can be arranged at any position along retainer’s edge, left and right from the gap, that is not connected to respective portion of the walls 1.2 and 1.2a along retainer’s free edge. Furthermore, it is not necessary in the present invention for the end of separation line 3.1 to be located at retainer’s free edge. In this case, the end of separation line 3.1 should be sufficiently close to retainer’s free edge in order for the retainer 2 to be separated along the separation line 3 without requiring much additional force. While in this embodiment the separation line 3 is a straight line—when retainer 2 is in an unexpanded state—it is understood that separation line 3 in this and other embodiments can be in other shapes such as an arc line, zig-zag line etc. The separation line 3 has to be structured in such a way that it has sufficient strength to withstand friction force generated by dispenser’s guide 12 and retainer 2 and forces created by subsequent articles, without rupture until it is situated at cooperation portion of dispenser’s guide. Stated another way, in case of this embodiment, that means that ratio between perforated and non-perforated parts of separation line 3 should be 60:40. In this embodiment and other embodiments of this invention, structure of separation line 3, notwithstanding of its shape, depends on material, material’s mechanical characteristics and designed separation line braking force.

[0149] A structure of separation line 3 and separation line angle configure separation line 3 so that separation of two adjacent articles 1 and 1’ is postponed until separation line 3 is at the cooperation portion of the dispenser’s guide.

Operation of the First Embodiment

[0150] Interconnected series of articles cooperates via retainer 2 with dispenser’s guides in order to operate as designed.

[0151] FIGS. 21 and 22 show the dispenser’s guide 12 that cooperates with articles of FIG. 1. The dispenser’s guide 12 has cross sections that are configured to receive and support the retainer 2 which is spread along the guide 12. The guide comprises a cooperation portion 12.1 that provokes separation of separation line 3. In addition the dispenser’s guide 12 has a cutting means 12.3 that cuts retainer 2 to ensure the release of retainer 2 from the dispenser’s guide 12.

[0152] An article 1 of the first embodiment is loaded onto guide 12 by pulling article 1 manually over the guide’s length until the article 1, i.e. retainer 2 with its front edge 2.3, reaches the beginning of the cooperation portion 12.1, depicted as a part with progressively increasing diameter. The part of retainer 2 belonging to the article 1 encloses the guide 12. At this point, the first article 1 is in a ready-to-be-loaded position, as depicted in FIG. 21. The form of the guide and gravitational force that acts on the wall 1.2a facilitates an entrance of an object in the article’s use-space. Then after that, user takes by hand the article walls 1.2 and 1.2a and performs the movement denoted with the arrow, in FIG. 21. As a result, front edge 2.3—instructed with the rest of the retainer 2—moves towards a cutting means 12.3 over the cooperation portion 12.1. The cooperation portion 12.1 facilitates longitudinal cutting of retainer 2 by exerting tension upon the retainer 2. The release of retainer 2, by cutting, continues with similar dynamic until the separation line 3 reaches the beginning of the cooperation portion 12.1. The structure of separation lines
3, 3', 3" and their angle are designed considering all technical elements of cooperation portion 12.1, direction of user's force and desired direction of article's movement once the separation starts. The friction force created between the guide 12 and retainer 2 is a leading force acting upon separation line 3 before it encounters the cooperation portion 12.1. In this moment cooperation between separation line 3 and cooperation portion 12.1 starts. The tension between cooperation portion 12.1 and retainer 2 starts to create a load on separation line 3. As a result, the area or areas without perforations of the separation line 3 close to retainer's first edge 2.1 start to break before the separation line 3 reaches the cutting means 12.3, as shown in FIG. 22. Separation advances along separation line 3 from the area close to first retainer's edge 2.1 towards the retainer's free edge. Thus, direction of article 1 is imposed, to some extent, by inclination of separation line 3. At the end, engaged article's retainer part is separated from a part of retainer belonging to an article next in series and the article next in series 1 is at the ready-to-be-loaded position at the dispenser's guide 12.

[0153] FIGS. 23 and 24 schematically illustrate an example of a pressure distributions, at shown cross-section, that appear when retainer 2 and cooperation portion 12.1 are in tension. As shown in FIG. 23, the pressure between retainer 2 and cooperation portion 12.1 is distributed on both sides of the separation line 3 situated on the retainer 2; on one side of the separation line 3 there is a release pressure acting upon release pressure surface 5.3 and on the other side of the separation line 3 there is a separation pressure acting upon separation pressure surface 3.3. The distribution of the release and separation pressure is represented by release pressure distribution diagram 5.2 and separation pressure distribution diagram 3.2 respectively, and where shadowed areas indicate pressure value exerted on the surfaces 3.3 and 5.3 respectively. When separation line 3 moves toward the cutting means 12.3, the release pressure and the pressure surface 5.3 get smaller. At other side of separation line 3, the separation pressure and the pressure surface 3.3 grow and that increases the friction force. As shown in FIG. 24, it is convenient, for stability of this process, that friction force gets greater than the separation line breaking force before separation line 3 reaches cutting means 12.3. The separation line 3, 3', 3"... dispenser's guide 12, cooperation portion 12.1 and cutting means 12.3 ensure a dispensing closed cycle that operates without auxiliary energy thus using only the energy developed by movement of user's hand.

Second Embodiment—Single Retainer

[0154] When recycled material of unproven quality is used to produce articles, that results in an uneven mechanical properties of retainer. So it is possible that a separation line of engaged article leaves the cooperation portion without the separation line being separated—i.e. engaged article is still connected to the next article in series. The present embodiment has discontinuities that besides making the separation of separation lines reliable, they also facilitate the separation of separation lines.

[0155] FIG. 2 depicts the second embodiment with an interconnected series of articles where only the first three articles 1, 1', 1" are shown and where article 1" is shown in an expanded state and other articles in series are omitted for the purpose of clarity.

[0156] In the second embodiment, without limitations, a web-material is a rectangular polymer sheet. The web-material is folded so as to form articles' walls 1.2, 1.2', 1.2" and 1.2a, 1.2a', 1.2a". The web-material is folded along the line that is offset from midpoint of rectangular sheet. Thus, an area of web-material above the opening edges 1.5, 1.5', 1.5" is formed, that serves to form a retainer 2. The walls 1.2, 1.2', 1.2" and 1.2a, 1.2a', 1.2a" are connected together along transversal edges 1.3, 1.3', 1.3" and 1.3a, 1.3a', 1.3a" to define each article's use-space. As a result, there are three articles 1, 1', 1" with corresponding walls 1.2, 1.2', 1.2" and 1.2a, 1.2a', 1.2a" that are arranged together along the transversal edges 1.3, 1.3', 1.3" and 1.3a, 1.3a', 1.3a" in order to define each article's use-space and having an opening at the top of each article. The web-material lying out of each article's use-space is cut away. The continuous portion of web, above the opening edges 1.5, 1.5', 1.5" is folded along the first retainer's edge 2.1 inwardly to the use-space. Next, the second retainer's edge 2.2 of retainers' wall is jointed to the walls 1.2, 1.2', 1.2" above opening edges 1.5, 1.5', 1.5". A portion of walls 1.2, 1.2', 1.2" defined by projection of opening edges 1.5, 1.5', 1.5" at the walls 1.2, 1.2', 1.2" from one side and second retainer's edge 2.2 from the other side is considered to be a part of the retainer 2.

[0157] The walls 1.2, 1.2', 1.2" are provided with a retainer of tunneled shape 2, formed from web-material, and is configured to mutually connect adjacent articles 1, 1', 1". A tunneled retainer 2 has operable cross sections that cooperate with the dispenser's guide 12 as explained in operational part of this embodiment.

[0158] As shown in FIG. 2, transversal edges 1.3a and 1.3', facing each other, are connected at one location along the edges by a common region or regions of web-material having a line of weakening. The line of weakening is situated transversally to longitudinal direction of the retainer. In this and other embodiments the transversal edges 1.3a and 1.3' could be connected at more than one location or all along edges 1.3a and 1.3'. The transversal edges 1.3a and 1.3' are connected in an analogous way as the transversal edges 1.3a and 1.3'.

[0159] A tunneled retainer 2 has separation lines 3, 3', 3" that are situated transversally to a longitudinal direction of the retainer. In the present embodiment, the separation lines 3, 3', 3" traverse the retainer perpendicularly to retainer's second edge 2.2. The separation lines 3, 3', 3" of the second embodiment are formed, without limitations, as a straight line that includes plurality of perforated linear patterns. As shown in FIG. 2, the end of separation line 3.1 toward the transversal is arranged at an area of retainer that is between transversal edges 1.3a and 1.3', i.e. retainer's free edge. Ends of separation lines 3.1, 3.1" are arranged in an analogous way as the end of separation line 3.1.

[0160] The retainer has discontinuities 4, 4', 4". The discontinuity 4 of the article 1 is located adjacent to retainer's front edge 2.3. As shown in FIG. 2 the discontinuity 4' is located adjacent to separation line 3 and discontinuity 4" adjacent to separation line 3'. In this embodiment, discontinuities 4, 4', 4" are constructed at already formed retainer 2 by spot-welding of retainer 2 at location close to the second retainer's edge 2.2 narrowing the inner diameter of the retainer 2, i.e. the operational cross section of the retainer 2, at those aforesaid points. Each discontinuity 4, 4', 4" can be formed by any other method known in the art which results in that portion of the retainer 2 having discontinuities 4, 4', 4" in comparison to adjacent portions of the retainer 2 have smaller operational cross sections.
A discontinuity 4 can be located also distantly from the separation line 3 and there could be more than one discontinuity 4 located between two neighboring separation lines 3.

A structure of separation line 3 and separation line angle configure the separation lines 3 so that separation of two adjacent articles 1 and 1′ is postponed until separation line 3 or discontinuity 4′ is at the cooperation portion of the dispenser’s guide.

Operation of the Second Embodiment

FIG. 50 shows the dispenser’s guide 12 that cooperates with articles 1, 1′, 1″ of FIG. 2. The dispenser’s guide 12 has cross sections that are configured to receive and support the retainer 2 that is spread along the guide 12. The guide 12 comprises a cooperation portion 12.1 and a cutting means 12.3.

An article 1 is positioned in a ready-to-be-loaded position as explained in the previous embodiment. So, there is the article 1 that is in the ready-to-be-loaded position, as depicted in FIG. 25. The form of the guide and gravitational force that acts upon the wall 1.2a facilitates an entrance in the article’s use-space. Thus allowing the user to insert a hand into the article 1 through the opening and to perform the movement denoted with the arrow, FIG. 26. As a result, front edge 2.3, followed by the rest of the retainer, moves towards a cutting means 12.3 over the cooperation portion 12.1. The cooperation portion 12.1 facilitates longitudinal cutting of retainer 2 by exerting tension upon the retainer, FIG. 26. The release of retainer b, by cutting, continues with similar dynamic until the separation line 3 reaches the beginning of the cooperation portion, as shown in FIG. 27. As explained in the operational part of the first embodiment, once separation line 3 reaches the cooperation portion 12.1 it starts to separate. Then, at the moment when discontinuity 4′ encounters the cooperation portion 12.1 the progress of retainer 2 along cooperation portion 12.1 becomes harder, due to the tension developed between discontinuity 4′ and cooperation portion 12.1. When discontinuity 4′ encounters the cooperation portion 12.1, the separation line 3 is still at cooperation portion 12.1 and the tension between discontinuity 4′ and cooperation portion 12.1 creates an additional load at the cooperation line 3. Thus, the separation of separation line 3, which is initiated by the cooperation portion 12.1, is facilitated by discontinuity 4′.

As a result, engaged article’s retainer part is separated from a part of retainer belonging to an article next in series 1′. The article next in series 1′ is in the ready-to-be-loaded position at the dispenser’s guide 12. The portion of retainer of article 1′ that is at the cooperation portion 12.1 is deformed by the form of the cooperation portion 12.1 and that retainer portion tends to recover its original shape. Thus, induced force at the retainer 2 prevents or minimizes slipping of the article 1′ from the guide 12 when it is in the ready-to-be-loaded position.

When the discontinuity 4 is located distantly from the separation line 3; i.e. when discontinuity 4 encounters cooperation portion 12.1, contemporaneously the separation line 3 has already left the cooperation portion 12.1; it may work as a corrective feature when needed. Thus, the discontinuity 4 will cause a separation of those separation lines 3 that were not separated at all at the cooperation point 12.1. In this case, a degree of discontinuity should be higher than in the present embodiment since the load, caused by discontinuity 4, has to separate the separation line 3. The degree of discontinuity determines intensity of tension between a discontinuity 4 and a cooperation portion 12.1. It is obvious that higher tension causes higher additional load at the separation line 3. As mentioned above, there could be more than one discontinuity 4 along the part of retainer 2 that belongs to an article. So, for example, the first discontinuity 4 is located close to the separation line 3 to facilitate separation of separation line 3. The second discontinuity 4 is located distantly so it serves as a corrective feature for those articles 1 which were not properly separated.

Third Embodiment—Single Retainer

In previous embodiments a cutting means is used to release retainer from the guide. The present embodiment has a release line to advantageously release retainer from dispenser’s guide without the usage of cutting means.

FIG. 3 shows interconnected series of article’s having a retainer 2 in accordance with the third embodiment. In addition, FIG. 3 shows the first three articles 1, 1′, 1″ where article 1″ is shown in an expanded state, retainer 2 is transparent and other articles in series are omitted for a purpose of clarity.

The present embodiment is the same as the second embodiment with, three exceptions:

i) the retainer 2 does not have discontinuities,

ii) the retainer 2 has a release-line 5 that has non-release-segments 5.1, 5.1′, 5.1″,

iii) adjacent articles 1 and 1′ and 1″, are mutually connected only by the retainer 2.

The release line 5, without limitations, is in form of perforated linear patterns that are mutually aligned one after another as a straight line. The release line 5 is parallel with a second retainer’s edge 2.2 and located above the second retainer’s edge 2.2. The release line 5 spreads along retainer’s longitudinal direction. A continuity of release line 5 is disrupted so that perforated linear patterns are not formed at the portion of the release line 5 close to separation lines 3, 3′, 3″. Thus, the release line 5 has the non-release-segments 5.1, 5.1′, 5.1″ adjacent to separation lines 3, 3′, 3″. While a non-release-segment 5.1′ of this embodiment is positioned at the left side of respective separation line 3, it can be positioned with a portion of non-release-segment 5.1′ at the right side of the separation line 3. In that case, there are two non-release-segments per article. The abovementioned is valid for other non-release-segments 5.1′, 5.1″.

Shapes of release line 5 other than the one shown in the FIG. 3, parallel and not parallel with retainer’s longitudinal direction may be used without departing from the scope of present embodiment.

Interconnected articles of this embodiment, without limitations, can be formed as explained in the second embodiment. A release line 5 and non-release-segments 5.1, 5.1′, 5.1″ are constructed, on the side of retainer’s wall to the article’s use-space, before retainer’s web material is folded, along the retainer’s first edge 2.1, in order to form the retainer 2. The release line 5 can also be constructed after the retainer 2 has been formed and that results in two congruent release lines 5. A release line 5 can be made, for example, by mechanical perforation of the web material.

A structure of separation line 3 and separation line angle configures the separation line 3 so that separation of two adjacent articles 1 and 1′ is postponed until the non-release-segment 5.1′ is at the cooperation portion of the dispenser’s guide.
Operation of the Third Embodiment

[0177] The retainer 2 of this embodiment has a release line 5 that allows the release of retainer 2 from dispensers' guide 12 without a need for the cutting means 12.3. The FIG. 50 shows the dispenser's guide 12 that cooperates with the articles of FIG. 3. The cutting means 12.3 shown in FIG. 50 should be disregarded for the purpose of this embodiment.

[0178] An article 1 is positioned in a ready-to-be-loaded position as explained in the first embodiment. After that has been done, the user inserts a his or her hand into articles' use-space through the opening and performs a movement. As a result, retainer’s front edge 2.3, followed with the rest of the retainer 2, moves along the cooperation portion 12.1. The cooperation portion 12.1 with its shape exerts tension on the retainer 2, i.e. a part of retainer at the cooperation portion 12.1. The tension provokes a load at the release line 5 so it starts to break, i.e. the non-perforated pattern of release line 5 cannot withstand the load and it breaks. The release of retainer 2 continues with similar dynamic until the non-release-segment 5.1 encounters the cooperation portion 12.1, as shown in FIG. 28. At this moment, the progress of the retainer means 2 along the cooperation portion 12.1 becomes more difficult, due to the tension developed between the non-release-segment 5.1 and the cooperation portion 12.1. In addition, the tension between the cooperation portion 12.1 and the non-release-segment 5.1 starts to develop a load on the separation line 3 and then it breaks. In the end, engaged article’s retainer part is separated from a part of retainer belonging to an article next in series 1. The article next in series 1 is in a ready-to-be-loaded position at the dispenser’s guide 12.

[0179] The separation lines 3, 3', 3", guide 12, cooperation portion 12.1, release line 5 and non-release-segments 5.1, 5.1" ensure a dispensing closed cycle that operates without the need for cutting means and auxiliary energy, thus using only the energy developed by the user.

[0180] FIGS. 4 and 5 show alternative embodiments to the present embodiment. The retainer 2 of the embodiment illustrated in FIG. 4 has a release line 5 that is formed without non-release-segments. The retainer 2 of the article 1, that is extracted from interconnected series of articles, as illustrated in FIG. 5 has discontinuity 4 and release line 5 that is formed without non-release-segments. The separation of separation line 3 in embodiments illustrated in FIGS. 4 and 5 occurs as explained below.

[0181] FIGS. 32, 33 and 34 schematically illustrate examples of pressure distributions of the third embodiment, at the shown cross-section, that occur when cooperation portion 12.1 and retainer are in tension. As shown in FIG. 32, before cooperation portion 12.1 exerts tension upon the non-release-segment 5.1 there is only a release pressure that acts at release pressure surface 5.3—due to that release pressure the release line 5 breaks. The distribution of the release pressure is represented by release pressure distribution diagram 5.2. When the non-release-segment 5.1 is in tension, as shown in FIG. 33, there is also, in addition to release pressure, a separation pressure acting at the separation pressure surface 3.3. The distribution of the separation pressure is represented by separation pressure distribution diagram 3.2. As the non-release-segment 5.1 progresses towards the end of cooperation portion 12.1, the separation pressure and separation pressure surface 5.3 grow, thus increasing the friction force that is generated below the separation line 3. Once, the friction force is higher than separation line breaking force the separation line 3 breaks, as shown in FIG. 34. The length of non-release-segment 5.1 is to be of sufficient size to ensure that non-release-segment 5.1 does not break before the separation line 3.

[0182] FIGS. 35, 36 and 37 schematically illustrate examples of pressure distributions of the embodiment illustrated in FIG. 4, at the shown cross-section, that occur when cooperation portion 12.1 and retainer 2 are in tension. A release pressure and release pressure surface 5.3 are greater than that presented in the third embodiment due to the structure of the release line 5 with larger non-perforated patterns, as shown in FIG. 35. As separation line 3 progresses towards the end of the cooperation portion 12.1, as shown in FIG. 36, the structure of release line 5 initiates the separation pressure acting at separation pressure surface 3.3. The release line 5 and separation line 3 are so structured that friction forces caused by separation pressure become higher than separation line breaking force before a portion of release line 5 bellow separation line 3 breaks, as shown in FIG. 37. The distribution of the release and separation pressure is represented by release pressure distribution diagram 5.2 and separation pressure distribution diagram 3.2 respectively.

[0183] FIGS. 38, 39 and 40 schematically illustrate examples of pressure distributions of the embodiment illustrated in FIG. 5, at shown cross-section, that occur when cooperation portion 12.1 and retainer 2 are in tension. As shown in FIG. 39, when the discontinuity 4 gets in tension with the cooperation portion 12.1 it induces additional separation pressure. At this moment, release line 5 tends to separate at two locations bellow separation line 3. As discontinuity 4 progresses towards the end of cooperation portion 12.1, the separation pressure and separation pressure surface 5.3 grow, thus increasing the friction force that is generated below the separation line 3. Once, the friction force is higher than the separation line breaking force the separation line 3 breaks, as shown in FIG. 40. The distribution of the release and separation pressure is represented by release pressure distribution diagram 5.2 and separation pressure distribution diagram 3.2 respectively.

[0184] FIG. 6 illustrates a single articles 1' extracted from interconnected series of articles that is yet another variant of the third embodiment having a non-release segment 5.1 in the middle of adjacent separation lines 3 and 3'. In this way, the article 1' that is in the ready-to-be-loaded position has a portion of retainer 2 released from the guide once the engaged article 1 has been separated from the article next in series 1 as shown in FIG. 29. So, when dispenser 10 is used only to dispense the article 1, and other articles in series, the article can be released from dispenser’s guide effortlessly, i.e. it is easier to grip the bag and apply pulling force directly at the retainer 2.

Forth Embodiment—Single Retainer

[0185] The forth embodiment of an interconnected series of article's is illustrated in FIG. 7 where the first three articles 1, 1', 1" are shown in an expanded state and other articles in series are omitted for the purpose of clarity.

[0186] The retainer 2 of the forth embodiment is produced from additional material by extrusion. Retainer 2 of thickened shape has a thickened portion 2.4 of circular form and a flat portion 2.5 that is used to connect the retainer 2 with article's walls 1.2, 1.2', 1.2". Each article 1, 1', 1" is made and connected to the retainer 2 as explained in the first embodiment. As a result, we have articles with walls 1.2, 1.2', 1.2" that are
prosecoded with a retainer 2. The retainer 2 is configured to mutually connect adjacent articles 1 and 1', and so on, and has operable cross sections that cooperate with dispenser’s guide 12.

[0187] The retainer 2 has separation lines 3, 3', 3" that are situated transversely to a longitudinal direction of the retainer. The separation lines 3, 3', 3", could be considered as a straight line perpendicular to retainer’s longitudinal direction. A separation line 3 on the thickened portion of the retainer 2.4 is formed as an abrupt reduction of thickness. Rest of separation line 3 on flat portion of retainer 2.5 is formed as a perforated line. The end of separation line 3.1 is positioned adjacent to retainer’s free edge between transversal edges 13a and 1.3'. The retainer 2 has discontinuity 4 that is located between the retainer’s front edge 2.3 and the separation line 3, as shown in FIG. 7. The discontinuity 4 has greater cross sections than the retainer’s thickened portions 2.4. The discontinuity 4 is formed during extrusion of the retainer 2. The separation lines 3', 3", ends of separation lines 3.1', 3.1" and discontinuities 4', 4" are arranged in analogues way as explained above.

Operation of the Forth Embodiment

[0188] FIG. 41 shows the dispenser’s guide 12 that cooperates with articles of FIG. 7. The dispenser’s guide 12 has cross sections that are configured to receive and support the retainer 2 being spread along the guide. The guide 12 comprises a cooperation portion 12.1 that provokes separation of a separation line 3. Although the guide 12 for the retainer of a thickened shape is different from the guide for a retainer of a tunneled shape, the guide 12 has basically the same technical function.

[0189] The retainer’s front edge 2.3 of the article 1 is loaded into the guide 12 via initial portion of the guide. That being done, the article 1 is pulled in such a way that retainer’s front edge 2.3 moves—with the rest of the retainer 2—along the guide. When discontinuity 4 reaches the cooperation portion 12.1, the half of retainer 2 that belongs to the engaged article 1 is released from the guide. At this point, the first article 1 is in the ready-to-be-loaded position. Then, user grips the retainer 2 and pulls it out from the dispenser. Thus, making it possible for discontinuity 4 to pass through cooperation portion 12.1 and the retainer 2 progresses with the same dynamic until discontinuity 4' encounters the cooperation portion 12.1, as shown in FIG. 41. At this moment, the progress of retainer 2 along cooperation portion 12.1 becomes more difficult. As a result, the external load concentrates at the separation line 3 and it starts to break as shown in FIG. 41. In the end, engaged article’s retainer part is separated from a part of retainer belonging to an article next in series. The article next in series 1' is in the ready-to-be-loaded position at the dispenser’s guide 12.

[0190] FIG. 8 illustrates single article 1', extracted from interconnected series of articles, of an alternative embodiment to the present embodiment with retainer 2 that does not have a discontinuity. The retainer of thickened shape 2 is formed from articles’ web-material and additional material such as a rope that forms a core of the retainer 2. When operating with such kind of interconnected series of articles, a cooperation portion 12.1 is in constant tension with retainer 2. So, once separation line 3 encounters the cooperation portion 12.1 it breaks when tension between retainer 2 and cooperation portion 12.1 is higher than breaking load of separation line 3.

Fifth Embodiment—Two Retainers

[0191] FIG. 10 depicts the fifth embodiment with interconnected series of articles where adjacent articles are mutually connected in series by retainer 2 and 2α. Furthermore, the FIG. 10 shows the first three articles 1, 1', 1" in an expanded state and other articles in series are omitted for the purpose of clarity.

[0192] The present embodiment is the same as the first embodiment, with three exceptions:

i) walls 1.2a, 1.2a', 1.2a" are provided with retainer 2a,

ii) separation lines 3, 3', 3", 3a, 3a', 3"a are perpendicular to retainer’s longitudinal direction, and

iii) the retainers 2 and 2α have release-lines 5 and 5α respectively and non-release-segments 5.1, . . . and 5.1α . . . respectively; the release-line 5 and non-release-segments 5.1, 5.1', 5.1"a are hidden by retainer 2a.

Operation of the Fifth Embodiment

[0193] Interconnected series of articles cooperate via retainer 2 and 2α with pair of dispenser’s guides 12 and 12α in order to operate as designed. The FIG. 48 shows the dispenser’s guides 12 and 12α that cooperate with articles of FIG. 10. The dispenser’s guides 12 and 12α have cross sections that are configured to receive and support the retainer 2 that is spread along the guide. Each guide comprises cooperation portions 12.1 and 12.1α that provokes separation of separation lines 3 . . . 3α . . .

[0194] The retainers 2 and 2α of the fifth embodiment are loaded, respectively, onto guides 12 and 12α via initial portion of the guide by pulling the article 1 manually over the guides 12 and 12α. Retainer 2 and retainer 2α start to diverge from each other when sliding upon respective diverging portions of guides 12 and 12α. When retainer’s front edges 2.3 and 2.3α reach the cooperation portions 12.1 and 12.1α, the walls 1.2 and 1.2α are separated from each other at the distance predefined by dispenser’s guides 12 and 12α. At this point, the first article 1 is a ready-to-be-loaded position. The article 1 has an expanded use-space and the user starts to insert object into the article’s use-space. Then, the user grips the article’s walls 1.2 and 1.2α at the position close to retainers 2 and 2α and performs movement denoted with the arrow in FIG. 30. Furthermore, operations of retainers 2 and 2α, along respective guides 12 and 12α, proceed in analogous way as explained in the third embodiment.

[0195] In the present embodiment diverging of retainers 2 and 2α from each other, while moving along the guides, is possible because of the portions of retainers 2 and 2α that are not connected to the walls 1.2 and 1.2α, i.e. the retainers’ free edges. In the case of embodiment illustrated in FIG. 11, article 1 is provided with expansion lines 6R and 6L. The expansion lines 6R and 6L have the same function as the retainer’s free edge. Stated another way, the expansion lines 6R and 6L disconnect, along their length, the retainers 2 and 2α from the walls 1.2 and 1.2α after the expansion lines 6R and 6L are torn or broken.

[0196] As shown in FIG. 11, the wall 1.2α of article 1 is provided with expansion lines 6L and 6R. For the purpose of clarity, expansion lines 6L and 6R refer also to congruent expansion lines of wall 1.2. The expansion lines 6L and 6R of the article 1 extend from transversal edges 1.3 and 1.3α respectively, toward each other for predefined length. The minimum length of expansion lines 6L and 6R is predefined.
by a half of maximum distance between two dispenser’s guides 12 and 12a. Each expansion line 6L and 6R is distant from retainer’s second edge 2.2a by length of separation line 3a that extends over retainer’s second edge 2.2a towards the article’s use-space. The other expansion lines 6 are arranged in analogues way as expansion lines 6L and 6R.

[0200] The areas of web-material between expansion lines 6L and 6R and second retainer’s edges 2.2 and 2.2a are considered as a part of the retainer 2.

[0201] FIG. 31 illustrates operations of articles illustrated in FIG. 11 that occur in the analogues way as in the present embodiment.

Sixth Embodiment—Two Retainers

[0202] An article in a form without the retainers of the sixth embodiment is well known in the art and can be classified as inherently non planar article i.e. an article cannot be in an unexpanded state without overfolding.

[0203] The FIG. 12 shows the first three articles 1, 1', 1" in an expanded state and other articles in series are omitted for the purpose of clarity. In the sixth embodiment an article 1 is made from paper sheet and formed by common techniques know in the art. As a result, web-material of the first article 1 forms walls 1.2 and 1.2a that are arranged together to define the use-space of the article 1, i.e. a web is procedurally folded and particular free edges are connected, leaving an opening at the upper part of the article. Other articles 1', 1" are formed in an analogues way as the article 1. The walls 1.2, 1.2', 1.2" and 1.2a, 1.2a', 1.2a" of each article are provided with a hole for the hand 1.8.

[0204] The walls 1.2, 1.2', 1.2" and 1.2a, 1.2a', 1.2a" are provided with retainers of tunneled shape 2 and 2a formed by additional material in form of rectangular paper strip or similar material. The construction aspects of the retainer 2 and 2a of this embodiment are omitted as they are analogues to those explained in the previous embodiments.

[0205] The retainers 2 and 2a are configured to mutually connect adjacent articles 1, 1', 1", as shown in FIG. 12. The tunneled retainers 2 and 2a have operable cross sections that cooperate with dispenser’s guides 12 and 12a as explained in the operational part of this embodiment.

[0206] Retainer 2 has separation lines 3, 3', 3" situated perpendicularly to a longitudinal direction of the retainer. The end of separation line 3.1 is positioned at the retainer’s free edge. The ends of other separation lines 3.1', 3.1" are positioned in analogues way as the end of separation line 3.1. The retainer 2a is arranged in the analogous way as the retainer 2.

[0207] The retainer 2 has a release line 5 that has non-release-segments 5.1, 5.1' and 5.1" positioned close to separation lines 3, 3' and 3" respectively. The release line 5, without limitations, is a straight line formed so as to reduce material thickness. The release line 5 spreads along retainer’s longitudinal direction. The retainer 2a is arranged in analogues way as the retainer 2.

[0208] Structure of separation lines and separation line angle configure separation lines 3 and 3a so that the separation of two adjacent articles 1 and 1' is postponed until the non-release-segments 5.1' and 5.1a' are at the cooperation portion of the dispenser’s guide.

Operation of the Sixth Embodiment

[0209] FIG. 43 shows the dispenser’s guides 12 and 12a that cooperate with articles of FIG. 12. The dispenser’s guides 12 and 12a have cross sections that are configured to receive and support the retainers 2 and 2a that are spread along the guides 12 and 12a. The guides 12 and 12a comprise respectively cooperation portions 12.1 and 12.1a.

[0210] An article 1 of the sixth embodiment is loaded onto the guides 12 and 12a via the initial portions of guides by pulling the article 1 manually over the guides 12 and 12a. While sliding upon diverging portions of the guides 12 and 12a, retainer 2 and retainer 2a respectively start to diverge from each other. This diverging causes an expansion of the walls 1.2 and 1.2a. This expansion is possible due to the folded portions of walls 1.2 and 1.2a. When retiners 2 and 2a with their respective front edges 2.3 and 2.3a reach the beginning of the cooperation portions 12.1 and 12.1a, the first article 1 is in a ready-to-be-loaded position as shown in FIG. 42. At this stage, an article’s opening is opened, supported and shaped by dispenser’s guide, via retainers 2 and 2a. After that, user can insert objects into engaged article’s use-space. Further operations of retainers 2 and 2a, along respective guides 12 and 12a, proceed in analogues way as explained in the third embodiment.

Seventh Embodiment—Four Retainers

[0211] The seventh embodiment is illustrated in FIG. 13 that shows articles 1, 1', 1" where a part of article 1" is in an expanded state. The part of article 1" bellow a cross-section, i.e. the cross-section transversally to retainers’ longitudinal direction, is not drawn.

[0212] An article of seventh embodiment, without retainers, is known in the art as a t-shirt bag and can be classified as inherently non planar article. This kind of articles are usually formed from continues polymer tubular film. To provide wall 1.2 with retainers 2 and 2a and wall 1.2a with retainers 2a and 2c: the common way of producing t-shirt bag, known in the art, has to implement additional operations. That is, before folded edge 1.7 and folded edge 1.7a are formed, release lines 5, 5a, 5b and 5c are formed at a distance predefined by retainer’s position. A release line 5 has non-release-segments 5.1, 5.1' and 5.1" at the positions predefined by the location of discontinuities 4, 4', 4". Other release lines 5a, 5b, 5c are arranged in an analogues way as the release line 5. That being done, the folded edges 1.7 and 1.7a are formed, as known in the art, by forcing sides of tubular film towards each other. Then, retainer 2 is formed by connecting the left part of wall 1.2 with its folded part, i.e. a portion of wall 1.2 between retainer’s first edge 2.1 and folded edge 1.7, along retainer’s second edge 2.2. As shown in FIG. 13, the retainer’s second edge 2.2 has a shape that defines a position, length and form of each discontinuity 4, 4', 4". The discontinuities 4, 4', 4" due to the shape of the retainer’s second edge 2.2, have greater cross-sections than the rest of the belonging retainer. As shown in FIG. 13, the uppermost part of discontinuity 4 is situated in a position that is aligned with the location of an opening edge 1.5, i.e. its horizontal part. The position of discontinuity defines the places where the article is to be opened by the guide. It is obvious that a position of discontinuity can be different from the present embodiment if article needs to be opened at a different location. The retainers 2a, 2b and 2c with belonging discontinuities are formed following the analogues process as explained for the retainer 2.

[0213] The use-space of article 1 is formed by arranging together the walls 1.2 and 1.2a. The walls 1.2 and 1.2a are connected to each other along the transversal edges 1.3 and 1.3a that spread between the retainer’s second edge 2.2 of
retainer 2 and the retainer's second edge 2.2b of retainer 2b. In addition, the article 1 has an opening that is formed by cutting the web-material along an opening edge 1.5. The narrow portions of the walls 1.2 and 1.2a left and right from the opening are used as handles. The use-spaces of other articles 1', 1'' are formed following the analogues process as explained for article 1. An area of web-material between transversal edges 1.3 and 1.3a is considered as a part of retainer means 2.

The retainer 2 has separation line 3 situated perpendicularly to retainer's longitudinal direction and is formed as a perforated line. An end of separation line 3.1 of article 1 is positioned adjacent to retainer's free edge that is formed by cutting retainer's web between transversal edges 1.3a and 1.3' along the opening edge 1.5. Separation lines 3', and 3'' and ends of separation lines 3.1 and 3.1' are arranged in an analogues way to the separation line 3 and the end of separation line 3.1. The retainer 2 has discontinuities 4, 4', 4'', that are formed as explained above. The discontinuities 4, 4', 4'' are positioned between two adjacent separation lines. The retainer 2 has release line 5 spreading along longitudinal retainer's direction that has non-release-segments 5.1, 5.1', 5.1'', as shown in FIG. 13. Tunneled retainers 2, 2a, 2b, 2c, have operable cross sections that cooperate with the dispenser's guides 12, 12a, 12b and 12c as explained in operational part of this embodiment.

A structure of separation line and separation line angle configures separation line 3 so that separation of two adjacent articles is postponed until the non-release-segment 5.1 is at the cooperation portion of the dispenser's guide.

Operation of the Seventh Embodiment

FIG. 49 shows the dispenser 10 with four guides 12, 12a, 12b and 12c that cooperate with articles of FIG. 13. The dispenser's guide 12 has cross sections that are configured to receive and support the retainers 2 that spread along the guide. The guide 12 comprises cooperation portions 12.1 and additional cooperation portion 12.11. The other guides 12a, 12b and 12c are arranged in analogues way as the guide 12.

Only operations along the pair of guides 2 and 2a are explained because the operations along other pair of guides 2b and 2c proceed in the same manner as those simultaneously.

An article 1 of the seventh embodiment is loaded onto guides 12, 12a manually over the guides' length until article 1, i.e. non-release-segments 5.1 and 5.1a, reach the cooperation portion 12.1 and 12.1a. When non-release-segments 5.1 and 5.1a are at the cooperation portions 12.1 and 12.1a, then the article 1 is in the ready-to-be-loaded position, as shown in FIG. 44. Furthermore, part of retainers 2 and part of retainer 2a bellow the discontinuities 4 and 4a, respectively, are released from the guides 12 and 12a by the additional cooperation portions 12.11 and 12.11a.

Before above mentioned occurred, the tension between retainers 2 and 2a and the additional cooperation portions 12.11 and 12.11a provoked a tensile load that broke release lines 5 and 5a. Only the portion of release line 5 and the portion of release line 5a along discontinuities 4 and 4a were not broken because of discontinuities' cross-section that is greater than the cross-sections of additional cooperation portions 12.11 and 12.11a. In this way, discontinuity 4 and continuity 4a could diverge from each other along the guides 12 and 12a without being obstructed by transversal edges 1.3 and 1.3a.

As shown in FIG. 44, the folded portions of walls 1.2 and 1.2a are expanded and the opening of article 1 is opened. After that, the user starts to insert an object into the article's use-space. Once insertion is completed, the user takes handles and pulls the article 1. As a result, the non-release-segments 5.1 and 5.1a break due to the tensions generated by the cooperation portion 12.1 and 12.1a and engaged article 1 starts to pull the article next in series 1'. A continuity of operations is ensured by separation lines 3 and 3a that remain unbroken. As shown in FIG. 45, once non-release-segments 5.1' and 5.1a' encounter the cooperation portions 12.1 and 12.1a, the tension between the cooperation portion 12.1 and the non-release-segment 5.1' and the tension between the cooperation portion 12.1a and the non-release-segment 5.1a' initiate separation of separation lines 3 and 3a respectively. In the end, engaged article's retainer part is separated from a part of retainer belonging to an article next in series 1' in a ready-to-be-loaded position at the dispenser's guides 12, 12a, 12b and 12c. The article remains still in the ready-to-be-loaded position due to the tension between cooperation portions 12.1 and 12.1a and non-release-segments 5.1' and 5.1a'.

A variation of the present embodiment is shown in FIG. 14. The retainer 2 does not have discontinuities along retainer means. In this case, a separation line 3 has to be so structured that the load to break the separation line 3 is higher than maximum tension created between an additional cooperation portion 12.11 and non-release-segment 5.1. Thus, making it possible for the non-release-segment 5.1 to pass the cooperation portion 12.11 and cooperation line 3 remains unbroken. Once, the non-release-segment 5.1 encounters a cooperation portion 12.1, the tension load, at this point, is higher than the load necessary to break the separation line 3 and then it breaks. To operate with such interconnected series of articles, the guides 12, 12a, 12b and 12c have to be equipped with cutting means 12.3 positioned close to cooperation portions 12.1, 12.1a, 12.1b, 12.1c.

Additional Embodiments

An article—in form without a retainer—of embodiment illustrate in FIG. 15 is well known in the art as a paper towel. There are various shapes of the article, various construction techniques to produce such article and as well various materials and material forms from which such article is produced.

An article 1' extracted from interconnected series of articles where article 1' has a wall 1.2' made of web-material. The web-material, without limitations, is absorbent paper of rectangular shape. The article’s wall 1.2' is provided with a retainer 2 of tunnelled shape formed by a portion of the web-material. The retainer 2 has a separation line 3 and a release line 5 that has a non-release-segment 5.1' as shown in FIG. 15. Transversal edges, facing each other, of two adjacent articles are connected at two locations along the transversal edges by two common regions of web-material having a line of weakening. The line of weakening has the same direction as the transversal edges. FIG. 29 shows the dispenser 10 suitable for cooperating with articles of FIG. 15.

If there is a need to separate two or more articles per separation process, a separation line or lines between those articles are not formed. Stated another way, there are two or more articles between two adjacent separation lines. In such a case, those articles between two adjacent separation lines are considered as a single article in this document.
FIG. 16 illustrates an article 1' extracted from interconnected series of articles that is a variant of embodiment illustrated in FIG. 15. In case of this embodiment, an article's wall 1.2' is provided with two retainers 2 and 2a.

FIG. 17 shows an article 1' extracted from interconnected series of articles that has a wall 1.2' provided with a layer of material 1.6' that is made, without limitations, of absorbent material. The article with retainer is formed by plastic film and connected to the layer of article 1.6'. In this way, article's web material ensures dispensing, efficient hand cleaning, and prevents contact of an engaged hand with, for instance, a fluid absorbed by the absorbent layer of material 1.6'. In yet another variation, the layer of material 1.6' can be formed to cover both sides of the article's use-space.

FIG. 18 illustrates an article 1' extracted from interconnected series of articles that has a retainer 2 formed from the articles' web material and an additional material.

FIG. 19 shows an article 1' extracted from interconnected series of articles being provided with a portion of retainer above retainer's first edge 2.1. The portion of retainer above the retainer's first edge 2.1 is not continuous, i.e., it is not connected to equivalent portion of adjacent article. It is provided with a hole for hand 1.8 that is used to pull the article from the guide in order to easily manipulate the article later on. The portion of retainer can be formed from material of retainer as illustrated on FIG. 19 or by additional material. Furthermore, it can be continuous if a separation line 3 extends towards the end of that portion. In this way, the portion of retainer below retainer's first edge 2.1 will be separated together with the rest of the retainer 2.

FIG. 20 illustrates an article 1' extracted from interconnected series of articles that has an article's use-space in form of a shoe and two retainers 2 and 2a having, respectively, release lines 5 and 5a of semisyndial form.

FIG. 9 depicts a variant of a single article 1' extracted from interconnected series of articles having been provided with one compartment 7 at both walls 1.2' and 1.2a that accommodate a cord 7.1'. The compartments 7' and the cord 7.1', i.e., closure system, are used to close the opening of use-space when required by particular usage of article. The construction and the operational aspects of closure system are already known in the art so it is not considered necessary to further explain this.

It is understood that an article can have more than one opening if the article's use-space is divided in two or more sections or if an article such as a glove has openings that enable portions of fingers to be released from the use-space.

It is also understood that retainers of all previous embodiments can be constructed with different arrangement of retainers than ones presented. For example, the retainers of sixth embodiment can be formed without release line if dispenser is equipped with cutting means. Also, a retainer 2 and article's walls can be made from different material. It is further understood that web material used to form article's walls may comprise hole or holes or may be optionally printed or otherwise provided with graphics, text, and so on, of various colors and forms. Although presented as a straight series of articles on most figures, it is understood that interconnected series of articles can be in a form of a roll, zig-zag stock and other folded forms that are suited for packaging, shipping and for later convenient use. Although articles of each disclosed embodiment have the same shape and dimensions, the shape and dimensions of one or more article in series can be different from each other.

It is understood that a separation line and other above cited features of the retainer can be made in-situ. Although angles between separation lines and longitudinal direction of retainer are presented as invariable along the retainer, it can vary. It is also understood that retainer 2 can have more than one separation line per article and that may provide a redundancy in separation of article if needed by some special application or applications.

Dispenser's Embodiments

The suitable dispensers for above mentioned embodiments will be discussed in detail within the present section.

With reference to FIG. 46, dispenser 10 in accordance with one embodiment comprises a storage means 11 for storing interconnected series of articles with single retainer of tunneled shape, and a guide 12 being fixed at the storage means 11 by a fixing element 12.2. The storage means comprises a holder 11.2 in order to accommodate the roll of interconnected series of articles. In addition it comprises a slot 11.3 through which the articles pass while leaving the storage means 11. The guide 12 has a circular cross section and is formed as an arc of length close to the dimension of an article. The rest of the guide 12 is curved towards the storage means 11 and connected to the storage means 11. The portion of the guide curved towards the storage means 11 is considered as the fixing element 12.2. To facilitate the receiving of an article from storage means 11, the guide 12 has an initial portion that gradually increases in cross section to the designed dimension of the guide 12.

In this way, the guide 12 has cross sections that are so configured to receive and support the articles' retainer that is spread along the guide. In addition, both form and length of the guide facilitate handling of the articles.

In general, the largest outer cross section of the guide 12 has to be smaller than the smallest inner cross-section of article's retainer of tunneled shape. In addition to ensure the unhindered movement of articles' retainer along the guide there should be certain clearance between the guide 12 and article's retainer. The unhindered movement means a movement of articles along the guide in such a way that separation line between engaged article and article next-in-series does not break before the article next in series reaches the ready-to-be-loaded position. Aforementioned clearance is influenced by various factors such as: elasticity and smoothness of article's material, configuration, smoothness and length of the guide 12.

If article is made of material with low elasticity such as paper and the guide 12 is curved, the clearance between the guide 12 and article's retainer has to be greater than the one in a case of elastic material. The elastic material, unlike low-elastic material, can compensate tensions caused by the curved portion of the guide 12.

If the guide 12 is straight and short, an outer cross section of the guide can be even greater than the inner cross section of retainer of tunneled shape. This is possible if material of article is elastic, such as LDPE plastic film, and guide is straight and of such length that friction load generated along the guide is lower than the separation line breaking force.

The guide can be made of steel, plastic, glass-fiber, aluminum and aluminum alloys and any another suitable material and combinations thereof. The guide can be con-
structed by bending of steel, aluminum and other metal profiles, or by injection molding or any other method known in the art.

[0241] The guide 12 comprises a cooperation portion 12.1 that is configured as an integral portion of the guide 12 at upper portion of the arc. To form this cooperation portion 12.1, the guide’s cross section gradually increases over the cooperation portion’s length. The cooperation portion 12.1 cooperates with an article’s retainer so as to provoke the tensile load that separates two adjacent articles in series. Thus, cross-sections and shape of cooperation portion 12.1 of this and other embodiments are defined by required tension load to be developed between the cooperation portion 12.1 and the retainer.

[0242] In general, a cooperation portion 12.1, for articles with a retainer of tunneled shape, has at least one outer cross-section that is larger than the largest guide’s outer cross-section situated below the cooperation portion 12.1. In the case of low-elastic material, such as paper, the cooperation portion 12.1 can be formed as an abrupt curvature of the guide 12, as shown in FIG. 43.

[0243] The length of cooperation portion 12.1 is influenced by the angle of article’s separation line. So, for example, if the angle between the separation line and the guide axis is 45°, the cooperation portion should be longer than in the case of a right angle arrangement of article’s separation line.

[0244] FIG. 47 illustrates one embodiment of dispenser 10 that comprises a storage means 11 for storing interconnected series of articles with single retainer of thickened shape, and a guide 12 being fixed at the storage means 11 by a fixing element 12.2. The storage means comprises a slot 11.3 through which the articles pass while leaving the storage means 11. The holder 11.2 of articles’ roll is not shown for the purpose of clarity of FIG. 47.

[0245] The guide 12 has a pipe-like hollow body with circular inside and outside cross sections, and slit 12.4 formed across the whole guide’s body ensuring that a thickened portion of article’s retainer is guided through it while the rest of article’s retainer an article’s use-space is hanging out of the aforesaid guide 12. The guide 12 has a form of an arc and length close to a dimension of an article. The fixing element 12.2 connects the guide 12 with storage means 11 as shown in FIG. 47. To facilitate the receiving of the article from storage means 11, the guide 12 has an initial portion with larger cross-sections than the rest of the guide. In this way, the guide 12 has cross sections that are configured to receive and support the articles’ retainer that is spread along the guide. In addition, both form and length of the guide facilitate the handling of the articles.

[0246] In general, the smallest inner cross section of the guide 12 has to be larger than the largest outer cross section of article’s retainer of thickened shape. In addition to ensure unhindered movement of articles’ retainer along the guide there should be a certain clearance between the guide 12 and article’s retainer.

[0247] The guide 12 comprises a cooperation portion 12.1 that is configured as an integral portion of the guide 12 at the upper portion of the arc. To form the cooperation portion 12.1, the guide’s cross section gradually decreases over the cooperation portion’s length. The cooperation portion 12.1 cooperates with an article’s retainer so as to provoke the tensile load that separates two adjacent articles in series.

[0248] In general, a cooperation portion 12.1, for articles with a retainer of thickened shape has at least one inside cross-section that is smaller than the smallest guide’s inside cross-section.

[0249] FIG. 41 illustrates yet another variant of the embodiment illustrated in FIG. 47 with a guide that has a circular cross section and straight form. The length of the guide is close to a half of the article dimension, as shown in FIG. 41.

[0250] With reference to FIG. 48, dispenser 10 in accordance with yet another embodiment comprises a storage means 11 for storing interconnected series of articles with two retainers of tunneled shape, and a pair of guides 12 and 12a being fixed at the storage means 11 by fixing elements 12.2 and 12.2a. The storage means comprise a slot 11.3 at the top of the storage means. The holder 11.2 of articles’ roll is not shown for clarity of FIG. 48. The storage means further comprises a transparent shield 11.4 that is considered as a part of storage means 11.

[0251] Each guide has the “S” elongated shape of a length close to the dimension of an article and a circular cross section that increases, from bottom part, smoothly along the guide. The guides 12 and 12a are mirror symmetric and so arranged to form, in their own plane, an area that is approximately the shape of a wine glass. The portion of guides, where guides diverge from each other, is directed downstream of article’s movement. In this way, each guide 12 and 12a has cross sections that are so configured to receive and support the articles’ retainer that is spread along the guide. In addition, both the form and length of the guides 12 and 12a facilitate the handling of the articles.

[0252] The guide 12 comprises a cooperation portion 12.1 configured as a separated component mounted on the upper end of the guide 12. The upper portion of the guide 12 is configured to receive the cooperation portion 12.1. The cooperation portion is formed, without limitations, as a truncated cone. The initial radius of the cooperation portion 12.1 is the same as a radius of the guide 12. The cooperation portion 12.1 is connected with the guide 12 over the fixing element 12.2 with storage means 11, as shown in FIG. 48. The guide 12a is arranged in the same way as the guide 12. The cooperation portion cooperates with retainer so as to provoke a tensile load that facilitates the release of retainer. In addition, cooperation portion provokes tensile load that separates two adjacent articles in series.

[0253] When cooperation portion 12.1 is arranged as a separate component, it can be made of material that is different from the material of the guide 12. It can be made as well from more than one part.

[0254] FIG. 50 illustrates a dispenser 10 that is a version of this embodiment that has only one guide and it is equipped with cutting means 12.3. The cutting means 12.3 is placed in a slot at cooperation portion 12.1 and with its upper side fixed to the fixing element 12.2. The cutting means 12.3 of this and other embodiments can be formed as the cooperation portion 12.1 where first portion of cutting means functions as a cooperation portion and second portion of cutting means, being generally sharper than the first portion, has a function of cutting a retainer. Furthermore, the cutting means 12.3 can be fixed only at the cooperation portion 12.1 or at both the fixing element 12.2 and the cooperation portion 12.1 and as such it is considered as a part of the cooperation portion 12.1.

[0255] FIG. 49 illustrates yet another embodiment of dispenser 10 that comprises four guides 12, 12a, 12b and 12c organized in two pairs of guides. The dispenser 10 comprises
a storage means 11 for storing interconnected series of articles with four retainers of tunneled shape, and four guides 12, 12a, 12b, 12c being fixed at the storage means 11 by fixing elements 12.2, 12.2a, 12b and 12c. The storage means has bottom and top portion in a form of a rectangular box. The bottom portion has a slot 11.3 at the top plane and a holder 11.2 for articles’ roll, arranged inside of the bottom portion. The uppermost plane of the top portion is provided with a rectangular opening that allows insertion of objects in the article’s use-space and handling with article.

Each guide has the “S” elongated shape of a length longer than length of an article and a circular cross section that increases, from bottom part, smoothly along the guide. The pairs of guides 12-12a are mirror symmetrical and arranged to form, in their own plane, an area that is approximately the shape of a wine glass. The portion of guides 12 and 12a, where guides 12 and 12a diverge from each other, is directed downstream of article’s movement. The pair of guides 12b and 12c are arranged in the same way as the pair of guides 12 and 12a and located in the equidistant plane to the plane of the guides 12 and 12a. The distance between two planes should not be larger than a width of an article when in an unexpanded state. In this way, guides 12, 12a, 12b and 12c have cross sections that are configured to receive and support the articles’ retainer that is spread along the guide. In addition, both form and length of the guide facilitate handling of the articles.

The guide 12 comprises a cooperation portions 12.1 and additional cooperation portion 12.11 configured as an integral part of the guide 12. The cooperation portion 12.1 is situated at the upper end of the guide 12. The additional cooperation portion 12.11 is situated bellow diverging portion of the guide 12. The guides 12a, 12b and 12c are arranged in the same way as the guide 12. The pairs of guides 12 and 12a and 12b and 12c are fixed over fixing elements 12.2, 12.2a, 12b and 12c to the storage means 11 at the corners of rectangular opening as shown in the FIG. 49.

A dispenser can be equipped with the weight measuring device 13 in the manner similar to this depicted in FIG. 42, with the control unit 13.1. It is evident that the guide’s weight should be subtracted from the total mass neglecting the article weight.

In embodiment of FIG. 42 and generally in other embodiments of dispenser, all parts except for guides 12 and 12a, fixing elements 12.2 and 12.2a and cooperation portions 12.1 and 12.1a are considered as parts of storage means 11.

Although storage means 11 in presented embodiments is provided with articles’ holder 11.2, the storage means 11 can be arranged to hold a roll without holder 11.2. In this case, the storage means holds a roll of articles which freely rotate in the storage means.

In yet another embodiment where a dispenser 10 has only one guide 12, that cooperates with plastic interconnected series of articles of a very thin gauge, the dispenser 10 can be equipped with electrostatic means. The electrostatic means generates an electrostatic force that is generated solely by moving series of articles through dispenser’s unit in the manner already known in the art. A friction between an article and the electrostatic means generates static electricity that assists with opening of articles’ wall.

Accordingly, the present invention provides the interconnected series of articles and the respective dispensers thereof that enable the release of an engaged article from the guide and an advantageous separation of an adjacent articles, i.e. the engaged article from the article next in series, which occurs reliably when the article next in series is in the desired condition. Furthermore, the present invention enables the managing of series of articles with energy developed only by the user, hygienically and by means of only one hand. For instance, one solution of the present invention enables that a user, at a gas station, can take a glove by means of only one hand, without the need of touching outside walls of the glove. Similarly, another solution of the present invention allows that a user, with a hand briefly or permanently disabled, puts an object into the plastic bag—fully expanded and supported by dispenser; performs weight measuring and tears-off the plastic bag from the series of bags by using only one hand.

While the invention has been described in conjunction with the exemplary embodiments described above, many equivalents modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the spirit and scope of the invention.

1. An interconnected series of articles where one or more article’s walls being formed from one or more web-material being provided with one or more retainers formed from a portion of the web-material or an additional material or combination thereof;

2. The interconnected series of articles as claimed in claim 1 wherein said retainer being of tunneled shape and having at least one discontinuity per article, where the first article in series is optionally formed with or without said discontinuity.

3. The interconnected series of articles as claimed in claim 1 or in claim 2 wherein said retainer being of tunneled shape and having at least one release line spreading along the longitudinal direction of said retainer.

4. The interconnected series of articles as claimed in claim 3 wherein said release line having at least one non-release segment per article, where the first article in series is optionally formed with or without said non-release segment.

5. The interconnected series of articles as claimed in claim 1 wherein said retainer being of thickened shape and having at least one discontinuity per article, where the first article in series is optionally formed with or without said discontinuity.

6. The interconnected series of articles as claimed in any of previous claims wherein the articles being provided with expanding lines, where one of said expanding lines being situated adjacent to or at said end of separation line.

7. The interconnected series of articles as in any of previous claim wherein said article’s walls are provided with at least one compartment accommodating a cord.

8. The interconnected series of articles as in any of previous claims wherein transversal edges of said adjacent articles, facing each other, being connected at one location or more than one location or all along said transversal edges by a common region or regions of web-material, where said com-
mon region of web-material having a line of weakening being situated transversally to the longitudinal direction of said retainer.

9. A dispenser for interconnected series of articles; comprising a storage means for storing said interconnected series of articles, and at least one guide being fixed with at least one fixing element at the storage means; the guide having cross sections and form configured to receive and support an articles’ retainer being spread along the guide wherein said guide comprising at least one cooperation portion being configured to cooperate with the article’s retainer.

10. The dispenser as claimed in claim 9 wherein said cooperation portion having at least one outer cross-section larger than an adjacent guide’s outer cross-section.

11. The dispenser as claimed in claim 9 wherein said cooperation portion being formed as an abrupt curvature of said guide.

12. The dispenser as claimed in claim 10 or claim 11 wherein having at least one cutting means formed as said cooperation portion, or a part of said cooperation portion or being inserted into said cooperation portion.

13. The dispenser as claimed in claim 9 wherein said cooperation portion having at least one inner cross-section smaller than an adjacent inner guide’s cross-section.

14. The dispenser as claimed in any of the claims 9-13, wherein being equipped with a weight measuring device connected to said guide.

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