

WEB OF BAGS AND WEB OF BAG SERIES WITH A GUIDE, BAG AND METHODS
FOR PRODUCING AND FILLING BAGS ON A WEB

Field of the Invention

5 The present invention relates to a web of bags and a web of bag series configured to be guided through a filling station. The web of bags and web of bags series comprise a continuous guide of a guide material configured to be guided through the filling station. The present invention also relates to a bag for forming part of a web of bags or a web of bag series. The present invention further relates to a method for producing a
10 web of bags or a web of bag series and a method of filling bags on a web of bags or a web of bag series.

Background of the Invention

Effective filling of bags with content or articles on an industrial scale is an important
15 technical area. Filling stations have been developed over many years and have been configured to operate effectively.

Filling stations may be those disclosed in EP1087890 or EP3160862 or EP3160863 or EP3307641 or EP3277595 or W02020108719 and known as Schur®Star or
20 Schur®StarLight. Other similar filling stations or alternative filling stations may be used.

Bags often serve a purpose beyond keeping the content or articles in portions for delivery. Bags may provide protection to the content or articles and improve or even
25 enable delivery and presentation of their content. Bags may further serve a purpose of protecting the content of the bag from contamination.

Such filling stations and webs of bags have been co-developed and mutually adopted to work effectively.

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Polymers have shown to provide both effective handling and operation as a guide and operational interface with a filling station. Polymers or the likes have shown to be

very suitable as guides on a web bag since they are flexible, i.e. durable and tear resistant. Therefore, webs or webs of bags are effectively produced in the same material.

5 However, bags of a material optimized and e.g. with automated or semi-automated processes have shown to pose a negative impact on the environment when disposed.

10 Presents day production processes fill web of bags, where the bags are of uniform and identical size and shape. However, some product types may consist multiple components and may require packaging in several bags of different shape and size.

Accordingly, there is a need to improve and provide alternatives to the art of industrial filling of bags on an industrial scale. There is a need to provide a durable bag that can be disposed with low environmental impact.

15 There is also a need to provide a bag that can be filled and i.e. withstand automated or semi-automated industrial processes to provide high quantities of environmentally sound bags.

20 There is further a need to provide a bag that can be produced without contamination of the bag interior and thus without contamination of the content.

There is further a need to provide web of bag and a method for filling multiple bags with different or similar content simultaneously.

25 At the same time there is a need to secure and maintain existing effective production systems, i.e., effective filling stations that are automated or semi-automated.

Object of the Invention

30 The object of the invention is to provide a web of bags, a web of bags series, and a bag for forming part of a web of bags or a web of bag series that are environmentally sound and can be produced without contaminating the bag interior.

It is further an object of the invention to provide a method for producing a web of bags or a web of bag series and methods of filling bags on a web of bags or a web of

bag series that are efficient, enable filling with of two or more contents simultaneously, and prevent contamination of the bag interior.

Description of the Invention

- 5 An object of the invention is achieved by a web of bags configured to be guided through a filling station. The web of bags comprises
- a continuous guide of a guide material configured to be guided through the filling station and wherein the continuous guide is connected to one or more bags of a bag material having a bag opening enabling access to a bag interior,
- 10 wherein the one or more bags comprises two opposing bag walls, each bag wall comprises
- a first side, wherein said first sides substantially faces each other, thereby defining the bag interior, and
 - a second side opposite to the first side, wherein the continuous guide is attached to each of the second sides.
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Thus, achieving that existing configurations and compositions of guides can be maintained and used on existing filling stations whilst allowing that bag materials with a reduced environmental impact can be provided. Thus, bags of a more environmentally

20 friendly material than the guide materials, which typically is a polymer, can be filled in an optimized fashion in an automated or semi-automated process. Even on an industrial scale.

A further advantage is achieved by providing durability; that is, a bag that is durable

25 during the filling process and during use as a bag per se, and a bag that can be disposed with low environmental impact or even recycled. Namely, the bag can withstand an automated or semi-automated industrial process, and thus be filled to provide high quantities of environmentally friendly bags.

30 In some embodiments the guide material and the bag material may be the same type of material, thereby providing a more recyclable bag. In other embodiments the guide material and the bag material may be different types of material.

A further advantage is achieved by the continuous guide being attached to the second side of the opposing bag wall, i.e. to the outside of the bag, as contamination of the bag interior is prevented during production of the web of bags, since only the exterior of the bag is affected. This is especially advantageous for web of bags used for packing food products or medicaments or other product types, where contaminations are highly problematic and compromise the products.

The continuous guide attached to the outside of the bag furthermore enables a more efficient and faster production process of the web of bags, as the loose bags comprised in the web of bags can be manufactured on standards equipment, and the continuous guide is attached in a later production stage. Thus, manufacturing of the bags is faster and cheaper.

The continuous guide may be attached to the second side near or at the bag opening of the one or more bags. The connection may further be placed substantially along the bag opening of one or more of the bags of the web of bags. Thereby, the overlap between the continuous guide and the bag is minimized, which limits material waste and provides a more environmentally friendly web of bags, as contamination of the guide and bag materials from mixing different material types is reduced.

The continuous guide may further be attached to the second side by means of a sealing agent or other sealing or attachment means.

In an embodiment, the web of bags may be attached to the guide by means of a splicing. The bag material may be prepared with a print on the second side defining a splicing path and the bag and the guide may be connected along at least part of the splicing path. A splicing may be a way of connecting the guide and bag material.

The splicing may be performed by welding, including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing.

Furthermore, the guide material shares the same advantageous characteristics after use as mentioned for the bag.

In some aspects of the web of bags, the bag material is a fibrous material or paper or metallic foils or aluminum.

5 In an embodiment, the bag material of the web of bags is pure paper, thereby providing a recyclable bag that is environmentally friendly. The pure paper may be produced with as little additives as possible, such as less than or equal to 5 weight%, such that the bag is below a contamination limit for recyclable packaging, thus providing a recyclable bag.

10 A bag material made of paper with a weight% of additives equal to or below 5 % is preferred because most of the EU has a limit on the amount of additives in recyclable paper.

15 By pure paper is understood a paper pulp part. The pulp may be so-called virgin pulp or recycled pulp. The additives may be additives mixed into the paper or provided as a full or partial coating on one or more sides of the paper or as printing on the paper.

20 In another embodiment, the bag material of the web of bags is paper. The paper used may vary according to the need. The paper may be coated with a protective barrier for blocking moisture and grease. The coating may constitute less than 5 weight% of the total bag material, thereby providing a durable paper bag that is disposable and environmentally sound. The paper may be partially or fully coated paper.

25 The paper may have a density of 30 to 150 g/m² or even 30 to 250 g/m². The paper may be laminated or layered structure of for example 25g/m² and a 50 g/m² but not limited to these values.

30 In example, a paper bag made of paper with a density of 60-70 g/m² may be produced with as little additives as possible such as less than 5 weight%.

The thickness may be in the order of 10-500 μm, such as 50-200 μm, or say about 100-120 μm. The tensile stiffness (MD) may be in the order of 10 kNm/g.

The paper or fibrous material may be carton or cardboard types or paperboard types.

In other embodiments, the bag material of the web of bags may be aluminum or aluminum foils. These materials are especially advantageous for use in the pharmaceutical industry for packaging of medicaments.

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Such fibrous materials and metallic foils generally have lower flexibilities and are subject to tear during handling and in particular during industrial scale handling. Such materials, however, possess advantageous properties in respect of environmental soundness or protective properties.

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In some aspects of the web of bags, the first sides comprise a polymer coating for moisture blocking and/or friction reduction.

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Thereby providing a moisture and grease barrier, which prevents deterioration of the bag material due to moisture and grease in the content.

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An advantage is achieved by the friction reduction of the polymer coating which ensures a smooth surface of the first side, thus preventing or reducing wear of the product or content to be contained in the bag. This is especially advantageous for plastic products or contents, or other types of contents having a surface susceptible to wear by friction.

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A further advantage is achieved by the friction reduction of the polymer coating which eases the filling process, as the content more easily enters the bags.

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A further advantage of the polymer coating is that the polymer coating may act as a sealing agent for closing the bag after filling; that is, the polymer coating may weld directly to itself. The bag thus is closed by sealing the two opposing first sides to each other by means of the polymer coating for example by applying heat. Thereby no additional sealing agents or other sealing or attachment means are needed for closing the bags, which simplifies the filling process.

In some aspects of the web of bags, the polymer coating has a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

- 5 The coating may constitute less than 5 weight% of the total bag material. Thereby providing a durable paper bag that is disposable and environmentally sound. The bag may be partially or fully coated.

10 In some aspects of the web of bags, the guide material is a polymer or a fibrous material such as paper or paper with a polymer coating or the same material as the bag material.

15 In some embodiments the guide material and the bag material may be the same type of material, thereby providing a more recyclable bag and a more environmentally friendly bag.

The guide material shares the same advantageous characteristics after use as mentioned for the bag.

20 Guide materials may be a polymer, such that existing configurations and compositions of guides can be maintained and used on existing filling stations. Thus, bags of a more environmentally friendly material than the guide materials, can be filled using existing filling station in an automated or semi-automated process.

25 In an embodiment, the guide material of the web of bags is a plastic, such as a thermoplastic or thermoplastic polymer.

30 In an embodiment, the guide material is a polymer, and the bag material is paper. This particular combination of a polymer and paper provides an effective production on an industrial scale of environmentally sound bags with content, where the bags can be disposed or recycled.

In some aspects of the web of bags, the guide material is a polymer selected from polypropylene (PP) or polyethylene (PE).

A person skilled in the art will appreciate the differences and be able to select configurations providing the flexibility and durability suitable for existing filling stations. Such polymers exist with different sealing and densities suitable for specific packaging or filling purposes. The polymers are sealable, temperature resistant, and have suitable mechanical properties in respect of sufficient puncture resistance and flexibility balanced with rigidity.

The particular combination of a polypropylene or polyethylene guide, and a paper bag provides an effective production on an industrial scale of environmentally sound bags with content, where the bags can be disposed or recycled.

In some aspects of the web of bags, the continuous guide is attached to each of the second sides using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

In an embodiment, the bag may be prepared with a print on the second side defining a splicing path for attaching the continuous guide to each of the second sides. The print on the bag may be made by a lacquer or glue. A lacquer or varnish as well as glue with binding properties may be selected.

A person skilled in the art may use polymer dispersion that is aqueous and acid-modified. Polyolefin dispersion may be used and may be designed or formulated according to specific uses of guide materials and bag materials. For paper and polymer combinations such polyolefin dispersion may be mixed and serve as a starting point and base can be modified with rheology modifiers, waxes, etc. as required and thereby forming a resistant bonding upon proper treatment such as thermal curing.

In some aspects of the web of bags, the continuous guide comprises two substantially parallel guide parts, wherein each of the guide parts is attached to one of the second sides.

Thereby providing the web of bags with an open top. This avoids the need of cutting/slicing the continuous guide for opening the web of bags for filling in the filling station. An advantage of this is that the filling process is simplified.

5 In some aspects of the web of bags, each of the two opposing bag walls comprises an outwardly fold at the bag opening relative to the bag interior, thereby forming two outwardly-facing strips of the first sides, wherein the continuous guide is attached to the two outwardly-facing strips.

10 A wider opening of the bag opening of the one or more bags is thereby provided, as the two opposing bag walls are pulled slightly away from each other due to the tension from the outwardly fold. This eases the filling of the bags in the filling station.

The outwardly fold is especially advantageous for embodiments where the continuous
15 guide is made of a polymer, such as polyethylene or polypropylene, or paper with a polymer coating; and the bag material comprises a polymer coating on the first side, e.g. a paper bag with a polymer coating. The outwardly-facing strips of the first sides comprises the polymer coating, that can weld directly to another polymer coating or directly to a polymer such as polyethylene or polypropylene. Thus, the continuous
20 guide can be attached directly to the outwardly-facing strips with no additional sealing agents or other attachment means needed. Thereby, the polymer coating may act as a sealing agent in itself and the continuous guide may be attached to the outwardly-facing strips by only applying for example heat.

25 Thereby providing as simple, effective, and easy attachment of the continuous guide to the one or more bags.

In some aspects of the web of bags, each outwardly-facing strips is attached to the second side using an adhesive or a glue or lacquer or hot-melt or seams or stitched
30 seams or polymer dispersion or a combination thereof.

Thereby adhering the outwardly-facing strip to the second side and preventing the outwardly facing strips from unfolding.

A lacquer or varnish as well as glue with binding properties may be selected.

5 A person skilled in the art may use polymer dispersion that is aqueous and acid-modified. Polyolefin dispersion may be used. Such polymer dispersion may be designed or formulated according to specific uses of guide materials and bag materials. For paper and polymer combinations such polyolefin dispersion may be mixed and serve as a starting point and base can be modified with rheology modifiers, waxes, etc. as required, and thereby forming a resistant bonding upon proper treatment such as thermal curing.

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In some aspects of the web of bags, the continuous guide comprises two substantially parallel guide parts, wherein each of the guide parts is attached to one of the outwardly-facing strips.

15 Thereby providing the web of bags with an open top. This avoids the need of cutting/slicing the continuous guide for opening the web of bags for filling in the filling station. An advantage of this is that the filling process is simplified.

20 An object of the invention is achieved by a web of bag series configured to be guided through a filling station. The web of bag series comprises

- a continuous guide of a guide material configured to be guided through the filling station and wherein the continuous guide is connected to a repeating pattern of two or more bags of different size and/or shape, wherein the two or more bags is made of a bag material and comprises a bag opening enabling
25 access to a bag interior,

wherein the two or more bags comprises two opposing bag walls, each bag wall comprises

- a first side, wherein said first sides substantially faces each other, thereby defining the bag interior, and
30 - a second side opposite to the first side, wherein the continuous guide is attached to each of the second sides.

Thereby, achieving existing configurations and compositions of guides can be maintained and used on existing filling stations whilst allowing that bag materials with

a reduced environmental impact can be provided. Thus, bags of a more environmentally friendly material than the guide materials, which typically is a polymer, can be filled in an optimized fashion in an automated or semi-automated process. Even on an industrial scale.

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A further advantage is achieved by providing durability; that is a bag that is durable during the filling process and during use as a bag per se, and a bag that can be disposed with low environmental impact or even recycled. That is, the bag can withstand an automated or semi-automated industrial process and thus be filled to provide high quantities of environmentally friendly bags.

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In some embodiments the guide material and the bag material may be the same type of material, thereby providing a recyclable bag. In other embodiments the guide material and the bag material may be different types of material.

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The web of bag series enables filling of two or more bags of different size and/or shape in a repeating pattern, thereby facilitating a packaging process of multiple products simultaneously or of products consisting of multiple components or of the same product in bags of different shapes and/or size. An advantage of this is that a more efficient packaging and filling process is achieved, and that packing and filling multi-component products is possible.

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The resulting packed goods may be two or more bags of different shape and/or size connected to each other by the continuous guide, thereby forming a string of two or more bags.

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For example, a cake mixture for baking may contain several components to be mixed by the consumer. In packaging of the cake mixture, it would be advantageous to pack the components simultaneously, such that a complete cake mixture is packed at the time. This is possible with a web of bag series, where a repeating pattern of a number of bags corresponds to the number of components, where the bags may be of different shapes and sizes that matches the amount and nature of the components. In the filling station, the components can then be filled into the bags simultaneously, whereafter

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each pattern of bags may be separated from the web of bag series. Thereby obtaining a string of bags that constitute the whole cake mixture.

5 A further advantage is achieved by the continuous guide being attached to the second side of the opposing bag walls, i.e., to the outside of the bags, as contamination of the bag interior is prevented during production of the web of bag series, since only the exterior of the bag is affected. This is especially advantageous for web of bag series used for packing food products or medicaments or other product types, where contaminations are highly problematic and compromise the products.

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The continuous guide attached to the outside of the bags furthermore enables a more efficient and faster production process of the web of bag series, because the loose bags of different shape and/or size comprised in the web of bag series can be manufactured on standards equipment, and the continuous guide is attached in a later production stage. Thus, manufacturing of the bags is faster and cheaper.

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The continuous guide may be attached to the second side near or at the bag opening of the two or more bags. The connection may further be placed substantially along the bag opening of the two or more bags of the web of bag series. Thereby minimizing the overlap between the continuous guide and the bags, which limits material waste and provides a more environmentally friendly web of bag series, as contamination of the guide and bag materials from mixing different material types is reduced.

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The continuous guide may further be attached to the second side by means of a sealing agent or other sealing or attachment means.

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In an embodiment, the web of bag series may be attached to the guide by means of a splicing. The bag material may be prepared with a print on the second side defining a splicing path and the two or more bags and the guide may be connected along at least part of the splicing path. A splicing may be a way of connecting the guide and bag material.

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The splicing may be performed by welding, including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing.

Furthermore, the guide material shares the same advantageous characteristics after use, as mentioned for the bag.

- 5 In some aspects of the web of bag series, the bag material is a fibrous material or paper or metallic foils or aluminum.

In an embodiment, the bag material of the web of bag series is pure paper, thereby providing a recyclable bag that is environmentally friendly. The pure paper may be
10 produced with as little additives as possible such as less than or equal to 5 weight%, such that the bag is below a contamination limit for recyclable packaging, thereby providing a recyclable bag.

A bag material made of paper with a weight% of additives equal to or below 5 % is
15 preferred because most of the EU has a limit for the amount of additives a recyclable paper

By pure paper is understood a paper pulp part. The pulp may be so-called virgin pulp or recycled pulp. The additives may be additives mixed into the paper or provided as a
20 full or partial coating on one or more sides of the paper or as printing on the paper.

In another embodiment, the bag material of the web of bag series is paper. The paper used may vary according to the need. The paper may be coated with a protective barrier for moisture and grease blocking. The coating may constitute less than 5 weight%
25 of the total bag material. Thereby providing a durable paper bag that is disposable and environmentally sound. The paper may be partially or fully coated paper.

The paper may have a density of 30 to 150 g/m² or even 30 to 250 g/m². The paper may be laminated or layered structure of for example 25g/m² and a 50 g/m² but not
30 limited to these values.

In example, a paper bag made of paper with a density of 60-70 g/m² may be produced with as little additives as possible such as less than 5 weight%.

The thickness may be in the order of 10-500 μm , such as 50-200 μm , or say about 100-120 μm . The tensile stiffness (MD) may be in the order of 10 kNm/g.

The paper or fibrous material may be carton or cardboard types or paperboard types.

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In other embodiments, the bag material of the web of bag series may be aluminum or aluminum foils. These materials are especially advantageous for use in the pharmaceutical industry for packaging of medicaments.

10 Such fibrous materials and metallic foils generally have lower flexibilities and are subject to tear during handling and in particular during industrial scale handling. Such materials, however, possess advantageous properties in respect of environmental soundness or protective properties.

15 In some aspects of the web of bag series, the first sides comprise a polymer coating for moisture blocking and/or friction reduction.

Thereby, providing a moisture and grease barrier, which prevents deterioration of the bag material due to moisture and grease in the content.

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An advantage is achieved by the friction reduction of the polymer coating which ensures a smooth surface of the first side, thereby preventing or reducing wear of the product or content to be contained in the bags. This is especially advantageous for plastic products or contents, or other types of contents having a surface susceptible to wear by friction.

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A further advantage is achieved by the friction reduction of the polymer coating which eases the filling process as the content more easily enters the bags.

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A further advantage of the polymer coating is that the polymer coating may act as a sealing agent for closing the two or more bags after filling; that is, the polymer coating may weld directly to itself. The bags are thus closed by sealing the two opposing first sides to each other by means of the polymer coating for example by applying heat.

Thereby, no additional sealing agents or other sealing or attachment means are needed for closing the bags, which simplifies the filling process.

5 In some aspects of the web of bag series, the polymer coating has a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

The coating may constitute less than 5 weight% of the total bag material. Thereby providing a durable paper bag that is disposable and environmentally sound. The bag may be partially or fully coated.

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In some aspects of the web of bag series, the guide material is a polymer or a fibrous material such as paper or paper with a polymer coating or the same material as the bag material.

15 In some embodiments the guide material and the bag material may be the same type of material, thereby providing recyclable bags and more environmentally friendly bags.

The guide material shares the same advantageous characteristics after use as mentioned for the bag.

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Guide materials may be a polymer and existing configurations and compositions of guides can thereby be maintained and used on existing filling stations. Thus, bags of a more environmentally friendly material than the guide materials, can be filled using existing filling station in an automated or semi-automated process.

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In an embodiment, the guide material of the web of bag series is a plastic, such as a thermoplastic or thermoplastic polymer.

30 In an embodiment, the guide material is a polymer, and the bag material is paper. This particular combination of a polymer and paper provides an effective production on an industrial scale of environmentally sound bags with content, where the bags can be disposed or recycled.

In some aspects of the web of bag series, the guide material is a polymer selected from polypropylene (PP) or polyethylene (PE).

5 A person skilled in the art will appreciate the differences and be able to select configurations providing the flexibility and durability suitable for existing filling stations. Such polymers exist with different sealing and densities suitable for specific packaging or filling purposes. The polymers are sealable, temperature resistant, and have suitable mechanical properties in respect of sufficient puncture resistance and flexibility balanced with rigidity.

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The particular combination of a polypropylene or polyethylene guide with paper bags provides an effective production on an industrial scale of environmentally sound bags with content, where the bags can be disposed or recycled.

15 In some aspects of the web of bag series, the continuous guide is attached to each of the second sides using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

20 In an embodiment, the bags may be prepared with a print on the second side defining a splicing path for attaching the continuous guide to each of the second sides. The print on the bags may be made by a lacquer or glue. A lacquer or varnish as well as glue with binding properties may be selected.

25 A person skilled in the art may use polymer dispersion that is aqueous and acid-modified. Polyolefin dispersion may be used. Such polymer dispersion may be designed or formulated according to specific uses of guide materials and bag materials. For paper and polymer combinations such polyolefin dispersion may be mixed and serve as a starting point and base, which can be modified with rheology modifiers, waxes, etc. as required and thereby form a resistant bonding upon proper treatment
30 such as thermal curing.

In some aspects of the web of bag series, the continuous guide comprises two substantially parallel guide parts, wherein each of the guide parts is attached to one of the second sides.

Thereby providing the web of bag series with an open top. This avoids the need of cutting/slicing the continuous guide for opening the web of bag series for filling in the filling station. An advantage of this is that the filling process is simplified.

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In some aspects of the web of bag series, each of the two opposing bag walls comprises an outward fold at the bag opening relative to the bag interior, thereby forming two outwardly-facing strips of the first sides, wherein the continuous guide is attached to the two outwardly-facing strips.

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Thereby providing a wider opening of the bag opening of the two or more bags, because the two opposing bag walls are pulled slightly away from each other due to the tension from the outwardly fold. This eases the filling of the bags in the filling station.

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The outwardly fold is especially advantageous for embodiments, where the continuous guide is made of a polymer, such as polyethylene or polypropylene, or paper with a polymer coating; and the bag material comprises a polymer coating on the first side, e.g., a paper bag with a polymer coating. Because the outwardly-facing strips of the first sides comprises the polymer coating, they can weld directly to another polymer coating or directly to a polymer such as polyethylene or polypropylene. Thus, the continuous guide can be attached directly to the outwardly-facing strips with no additional sealing agents or other attachment means needed. Thereby, the polymer coating may act as a sealing agent in itself and the continuous guide may be attached to the outwardly-facing strips by only applying for example heat.

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Thereby providing as simple, effective, and easy attachment of the continuous guide to the two or more bags.

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In some aspects of the web of bag series, each outwardly-facing strip is attached to the second side using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

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Thereby adhering the outwardly-facing strip to the second side and preventing the outwardly facing strips from unfolding.

A lacquer or varnish as well as glue with binding properties may be selected.

5 A person skilled in the art may use polymer dispersion that is aqueous and acid-modified. Polyolefin dispersion may be used. Such polymer dispersion may be designed or formulated according to specific uses of guide materials and bag materials. For paper and polymer combinations such polyolefin dispersion may be mixed and serve as a starting point and base can be modified with rheology modifiers, waxes, etc. as required, and thereby form a resistant bonding upon proper treatment such as thermal curing.

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In some aspects of the web of bag series, the continuous guide comprises two substantially parallel guide parts, wherein each of the guide parts is attached to one of the outwardly-facing strips.

15 Thereby providing the web of bag series with an open top. This avoids the need of cutting/slicing the continuous guide for opening the web of bag series for filling in the filling station. An advantage of this is that the filling process is simplified.

20 An object of the invention is achieved by a bag for forming part of a web of bags according to any of claims 1 to 11 or a web of bag series according to claims 12 to 22 configured to be guided through a filling station. The bag comprising a bag opening enabling access to a bag interior, and the bag is made of a bag material, and wherein the bag comprises two opposing bag walls, each bag wall comprises

- 25 - a first side, wherein said first sides substantially faces each other thereby defining the bag interior,
- a second side opposite to the first side, wherein each of the second sides are configured for connecting to a guide part of a continuous guide.

30 Thereby providing durability; that is, a bag that is durable during the filling process and during use as a bag per se, and a bag that can be disposed with low environmental impact or even recycled. That is, the bag can withstand an automated or semi-automated industrial process and thus be filled to provide high quantities of environmentally friendly bags. Because existing configurations and compositions of guides can be maintained and used on existing filling stations whilst allowing that bag mate-

rials with a reduced environmental impact can be provided. Thus, bags of a more environmentally friendly material than the guide materials, which typically is a polymer, can be filled in an optimized fashion in an automated or semi-automated process, even on an industrial scale.

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A further advantage is achieved by the second side being configured for connecting to a guide part of a continuous guide, i.e. the bag is configured for connecting to a guide part on the outside of the bag, as contamination of the bag interior is prevented during production of a web of bags or a web of bag series, since only the exterior of the bag is affected. This is especially advantageous for bags used for packing food products or medicaments or other product types, where contaminations are highly problematic and can compromise the products.

This is further advantageous, since the bags can be manufactured on standards equipment, and the continuous guide attached to the bag in a later production stage. Thus, manufacturing of the bags is faster and cheaper.

The second side may be configured for connecting to the guide part near or at the bag opening. The connection may further be placed substantially along the bag opening of bag. Thereby minimizing the overlap between the bag and the guide part, which limits material waste and provides a more environmentally friendly bag, as contamination from mixing different material types is reduced.

The bag may further be configured for connecting to the continuous guide by means of a sealing agent or other sealing or attachment means.

In an embodiment, the bag may be prepared with a print on the second side defining a splicing path and the bag may be configured for connecting with the guide part along at least part of the splicing path. A splicing may be a way of connecting the guide and bag material.

The splicing may be performed by welding, including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing.

In some aspects of the bag, the bag material is a fibrous material or paper or metallic foils or aluminum.

5 In an embodiment, the bag material is pure paper, thereby providing a recyclable bag that is environmentally friendly. The pure paper may be produced with as little additives as possible such as less than or equal to 5 weight%, such that the bag is below a contamination limit for recyclable packaging. Thereby providing a recyclable bag.

10 A bag material made of paper with a weight% of additives equal to or below 5 % is preferred because most of the EU has a limit for the number of additives in recyclable paper.

15 Pure paper is to be understood as a paper pulp part. The pulp may be so-called virgin pulp or recycled pulp. The additives may be additives mixed into the paper or provided as a full or partial coating on one or more sides of the paper or as printing on the paper.

20 In another embodiment, the bag material is paper. The paper used may vary according to the need. The paper may be coated with a protective barrier for moisture and grease blocking. The coating may constitute less than 5 weight% of the total bag material. A durable paper bag that is disposable and environmentally sound is thereby provided. The paper may be partially or fully coated paper.

25 The paper may have a density of 30 to 150 g/m² or even 30 to 250 g/m². The paper may be laminated or layered structure of for example 25g/m² and a 50 g/m² but not limited to these values.

For example, a paper bag made of paper with a density of 60-70 g/m² may be produced with as little additives as possible such as less than 5 weight%.

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The thickness may be in the order of 10-500 µm, such as 50-200 µm, or say about 100-120 µm. The tensile stiffness (MD) may be in the order of 10 kNm/g.

The paper or fibrous material may be carton or cardboard types or paperboard types.

In other embodiments, the bag material may be aluminum or aluminum foils. These materials are especially advantageous for use in the pharmaceutical industry for packaging of medicaments.

5

Such fibrous materials and metallic foils generally have lower flexibilities and are subject to tear during handling and in particular during industrial-scale handling. Such materials, however, possess advantageous properties in respect of environmental soundness or protective properties.

10

In some aspects of the bag, the first sides comprise a polymer coating for moisture blocking and/or friction reduction.

15

Thereby providing a moisture and grease barrier, which prevents deterioration of the bag material due to moisture and grease in the content.

20

An advantage is achieved by the friction reduction of the polymer coating which ensures a smooth surface of the first side, thereby preventing or reducing wear of the product or content to be contained in the bag. This is especially advantageous for plastic products or contents, or other types of contents having a surface susceptible to wear by friction.

25

A further advantage is achieved by the friction reduction of the polymer coating which eases the filling process as the content more easily enters the bags.

30

A further advantage of the polymer coating is that the polymer coating may act as a sealing agent for closing the bag after filling; that is, the polymer coating may weld directly to itself. Thus, the bag is closed by sealing the two opposing first sides to each other by means of the polymer coating for example by applying heat. No additional sealing agents or other sealing or attachment means are thus needed for closing the bag, which simplifies a filling process.

In some aspects of the bag, the polymer coating has density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

- 5 The coating may constitute less than 5 weight% of the total bag material. Thereby providing a durable paper bag that is disposable and environmentally sound. The bag may be partially or fully coated.

10 In some aspects of the bag, each of the second sides are configured for connecting to a polymer guide part.

15 In some embodiments the second sides may be configured for connecting to a polymer guide part near or at the bag opening of the bag. The connection may further be placed substantially along the bag opening of the bag. Thereby minimizing the overlap between the continuous guide and the bag, which limits material waste and provides a more environmentally friendly bag, as contamination from mixing different material types is reduced.

20 In an embodiment, the bag may be configured for connecting to polymer guide part of a guide material selected from polypropylene (PP) or polyethylene (PE).

25 The combination of paper bag and polymer guide such as a polypropylene or polyethylene guide in particular provides an effective production on an industrial scale of environmentally sound bags with content, where the bags can be disposed or recycled.

30 In some aspects of the bag, each of the two opposing bag walls comprises an outwardly fold at the bag opening relative to the bag interior, thereby forming two outwardly-facing strips of the first sides, wherein each of the two outwardly-facing strips are configured for connecting to a guide part of a continuous guide.

Thereby providing a wider opening of the bag opening, as the two opposing bag walls are pulled slightly away from each other due to the tension from the outwardly fold. This eases filling of the bag in a filling station.

The outwardly fold is especially advantageous for embodiments where the continuous guide is made a polymer, such as polyethylene or polypropylene, or paper with a polymer coating; and the bag material comprises a polymer coating on the first side, e.g. a paper bag with a polymer coating. The outwardly-facing strips of the first sides
5 comprises the polymer coating that can weld directly to another polymer coating or directly to a polymer such as polyethylene or polypropylene, and thus the continuous guide can be attached directly to the outwardly-facing strips with no additional sealing agents or other attachment means needed.

10 In some aspects of the bag, each outwardly-facing strip is attached to the second side using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof, thereby adhering the outwardly-facing strip to the second side and preventing the outwardly facing strips from unfolding.

15 A lacquer or varnish as well as glue with binding properties may be selected.

A person skilled in the art may use polymer dispersion that is aqueous and acid-modified. Polyolefin dispersion may be used. Such polymer dispersion may be designed or formulated according to specific uses of bag materials.

20

An object of the invention is achieved by a method for producing a web of bags or a web of bag series configured to be guided through a filling station. The method comprises steps of

- 25 - placing two bag walls opposite to each other, wherein each bag wall comprises a first side and a second side opposite to the first side, wherein said first sides substantially faces each other thereby defining a bag interior,
- connecting lateral edges of the two bag walls such that a bag opening is formed;
- connecting a continuous guide of a guide material to the two second sides,
- 30 thereby producing a web of bags or a web of bag series.

A method for producing a web of bags or a web of bag series, where existing configurations and compositions of guides can be maintained and used on existing filling stations, while allowing bag materials with a reduced environmental impact to be provided.

ed, is thereby achieved. Thus, bags of a more environmentally friendly material than the guide materials, which typically is a polymer, can be produced for filling in an optimized fashion in an automated or semi-automated process. Even on an industrial scale.

5

A further advantage is achieved by providing durability; meaning that the method produces a bag that is durable during the filling process and during use as a bag per se, and a bag that can be disposed with low environmental impact or even recycled. That is, the produced web of bags or web of bag series can withstand an automated or semi-automated industrial process, and thus be filled to provide high quantities of environmentally friendly bags.

10

In some embodiments the guide material and the bag material may be the same type of material, thereby providing a more recyclable bag. In other embodiments the guide material and the bag material may be different types of material.

15

The bag material may be a fibrous material or paper or metallic foils or aluminum.

In some embodiments the first sides may comprise a polymer coating for moisture blocking and/or friction reduction. Thereby, providing a moisture and grease barrier, which prevents deterioration of the bag material due to moisture and grease in the content; and friction reduction, which prevents or reduces wear of the product or content to be contained in the bag.

20

The guide material is a polymer selected from polypropylene (PP) or polyethylene (PE), or a fibrous material such as paper or paper with a polymer coating or the same material as the bag material.

25

The step of connecting the lateral edges of the two bag walls may be a step of welding including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing.

30

In an embodiment the web of bags or web of bag series is formed from a single piece of bag material, e.g., a sheet or a roll. The step of placing the two bag walls opposite

to each other may thus be a step of folding the single piece of bag material, whereby the fold constitutes the bottom of the bag. Further, the step of connecting the lateral edges thereby forms individual bags with separate bag interiors of a string of bags.

5 A further advantage is achieved by the step of connecting the continuous guide to the two second sides of the opposing bag wall, i.e., to the outside of the bag, as contamination of the bag interior is prevented during production of the web of bags or web of bag series, since only the exterior of the bag is affected. This is especially advantageous for web of bags or web of bag series for packaging of food products or
10 medicaments or other product types, where contaminations are highly problematic and can compromise the products.

The step of connecting the continuous guide to the two second sides may be a step of connecting the continuous guide to the second side near or at the bag opening of the
15 bags. The connection may further be placed substantially along the bag opening of the bags of the web of bags or web of bag series. Thereby minimizing the overlap between the continuous guide and the bag, which limits material waste and provides a more environmentally friendly web of bags or web of bag series, as contamination of the guide and bag materials from mixing different material types is reduced.

20 The continuous guide may further be connected to the two second sides by means of a sealing agent or other sealing or attachment means.

In an embodiment, the web of bags or web of bag series may be connected to the continuous guide by means of a splicing. The method may comprise a step of preparing
25 the bag material with a print on the two second sides defining a splicing path and the step of connecting the continuous guide to the two second sides may be a step of connecting along at least part of the splicing path. A splicing may be a way of connecting the guide and bag material.

30 The splicing may be performed by welding, including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing or by using an adhesive or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

Furthermore, the guide material shares the same advantageous characteristics after use as mentioned for the bag.

- 5 In some aspects of the method, the step of connecting is a step of connecting two substantially parallel guide parts of the continuous guide, wherein each of the guide parts is attached to one of the second sides.

10 Thereby producing a web of bags or web of bag series with an open top. This avoids the need of cutting/slicing the continuous guide for opening the web of bags or web of bag series for filling in the filling station. An advantage of this is that the filling process is simplified.

15 In some aspects of the method, the method further comprises a step of folding before the steps of connecting, wherein the step of folding is a step of folding a part of each bag wall outwardly relative the bag interior, thereby forming two outwardly-facing strips of the first sides, and the step of connecting is a step of connecting the continuous guide to the two outwardly-facing strips.

20 Thereby producing a web of bags or web of bag series with a wider bag opening, because the two opposing bag walls are pulled slightly away from each other due to the tension from the outwardly fold. This eases the filling process of the bags in the filling station.

25 The step of folding is especially advantageous for embodiments where the continuous guide is made of a polymer, such as polyethylene or polypropylene, or paper with a polymer coating, and where the bag material comprises a polymer coating on the first side, e.g. a paper bag with a polymer coating. Because the two formed outwardly-facing strips of the first sides comprises the polymer coating, they can weld directly to
30 another polymer coating or directly to a polymer such as polyethylene or polypropylene. Thus, the continuous guide can be connected directly to the outwardly-facing strips with no additional sealing agents or other attachment means needed. Thereby, the polymer coating may act as a sealing agent in itself and the continuous guide may be connected to the outwardly-facing strips by only applying heat, for example.

Thereby providing as simple, effective, and easy way of connecting the continuous guide to the bags.

5 In some embodiments, the method may further comprise a step of attaching each of the outwardly-facing strips to each of the two second sides using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

10 Thereby adhering the outwardly-facing strips to the second sides and preventing the outwardly facing strips from unfolding.

In some aspects of the method, the step of connecting is a step of connecting two substantially parallel guide parts of the continuous guide, wherein each of the guide parts
15 is attached to one of the outwardly-facing strips.

Thereby a web of bags or web of bag series with an open top is produced. This avoids the need for cutting/slicing the continuous guide for opening the web of bags or web of bag series for filling in the filling station. An advantage of this is that the filling
20 process is simplified.

In some aspects of the method, the method is a method for producing a web of bags according to any of claims 1 to 11 or a web of bag series according to any of claims
25 12 to 22.

An object of the invention is achieved by a method for filling a bag in a web of bags according to any of claims 1 to 11 with content. The method comprises steps of

- providing a web of bags as a continuous guide configured to be guided through the filling station and wherein the continuous guide of a guide material connects one or more bags, wherein the one or more bags are made of a
30 bag material and comprise a bag opening;
- guiding the web of bags through a filling station in the continuous guide;
- filling content into the one or more bags;
- closing the one or more bags;

- separating the one or more bags from each other, thereby obtaining separated filled bags.

5 The continuous guide may connect one or more bags of a bag material and with a bag opening. The bag material and the guide material may be of the same type of material or of a different type of material. In case of the latter, the bag material may be less flexible than the guide material.

10 The method therefore also allows for environmentally friendly guide material.

The method allows for effective industrial production of environmentally sound, disposable and/or recyclable bags, packed with content or articles.

15 In an embodiment, one or more bags of a different material than the guide material, which is effective and/or optimized for filling stations, may be effectively produced. Such bags may be of an environmentally friendly and/or recyclable and/or disposable material compared to the guide material. The guide material may be a polymer, e.g. polypropylene or polyethylene, and the bag material may be a paper, e.g. pure paper or paper with a polymer coating. The guide material and the bag material may be as
20 previously disclosed. This particular combination of a polymer, such as polypropylene or polyethylene, and paper, provides an effective production on an industrial scale of environmentally friendly bags with content, which bags can be disposed with low environmental impact or recycled. Hence a filled product bag, or consumer product bag, of a specific material such as paper being an environmentally sound material may be
25 provided.

Existing filling stations as exemplified and disclosed in the mentioned patent documents and similar devices may be constructed or used without or with few adjustments, thereby reusing existing industrial capacity to effectively produce environmentally friendly packaging.
30

Other existing filling stations suitable for a flexible guide as disclosed may be constructed or used as well.

In another embodiment, the bag material and the guide material may be of the same type of material, e.g. pure paper or paper with a polymer coating. The guide material and the bag material may be as previously disclosed. Hence, bags and guides of more environmentally friendly materials can be filled in an optimized fashion in an automated or semi-automated process. Even on an industrial scale. Using the same material for the bags and the continuous guide provides a recyclable bag.

Another advantage of using the same type of material for the continuous guide and the one or more bags is that the materials may be disposable, recyclable and/or environmentally friendly to the same extend.

Furthermore, the guide material shares the same advantageous characteristics after use as mentioned for the bag. That is the guide material is recyclable and/or disposable with a low environmental impact. Thus, the guide may be recycled or disposed.

A further advantage is that highly effective filling systems and machinery can be used and maintained for filling web of bags with content and thereby existing effective production systems, i.e. effective filling stations that are automated or semi-automated can be used.

The bags may be closed along a splicing path by use of splicing, welding, or gluing as disclosed previously.

In embodiments where bag material of the one or more bags comprises a polymer coating on the inside of the bag, the step of closing may be step of sealing the one or more bag by means of the polymer coating. The polymer coating may act as a sealing agent for closing the bags after filling, since the polymer coating may weld directly to itself. Thus, the bag is closed by sealing the two opposing side walls of the bags comprising the polymer coating to each other by means of the polymer coating for example by applying heat. Thereby no additional sealing agents or other sealing or attachment means are needed for closing the bags, which simplifies the method for filling the web of bags.

The step of separating the one or more bag from each other is a step of separating the one or more bag from each other to produce individual consumer bags with content or articles. The bags may be cut of or otherwise separated. The bags may be cut or otherwise separated along the lateral edges of the one or more bags.

5

In some aspects of the method, the step of closing is a step of closing by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.

10 Thereby obtaining a tight seal of the one or more bags.

In some aspects of the method, the step of separating is a step of disconnecting the one or more bags from the continuous guide.

15 The step of disconnecting is an act of disconnecting the bags from the guide to produce individual consumer bags with content or articles, where the bags may be cut or otherwise separated may be substantially along the bag opening above the splicing path where the bags are closed, and below, or at the continuous guide. Thereby separating them from the continuous guide leaving no or little guide material on individual
20 bags.

Therefore, the bags have significantly less or no guiding material left. Residual guiding material may be included in the accounts of additives as outlined previously. The weight % of additives may still be less than 5 weight%, such that the bag is below a
25 contamination limit for recyclable packaging. Thereby providing a recyclable bag or disposable bag within environmental requirements.

Since the continuous guide may be completely removed from the resulting bag, the purity of the resulting bag is increased, and it becomes easier to recycle the bag.
30 Thereby, it is possible to produce filled bags of paper sheets with a weight of 30-65 g/m², while having additives being equal to or less than 5 weight %. This enables the bags to be recyclable in at least the EU.

Furthermore, the disconnected guide material shares the same advantageous characteristics after use as mentioned for the bags. That is, the guide material is recyclable and/or disposable with a low environmental impact.

- 5 An object of the invention is achieved by a method for filling bags in a web of bag series according to any of claims 12 to 22 with content. The method comprising steps of
- 10 - providing a web of bag series as a continuous guide configured to be guided through the filling station and wherein the continuous guide of a guide material connects a repeating pattern of two or more bags of different size and/or shape, wherein the two or more bags are made of a bag material and comprise a bag opening;
 - 15 - guiding the web of bag series through a filling station in the continuous guide, wherein the filling station comprises two or more filling means configured for administering different and/or identical contents;
 - filling different and/or identical contents into the two or more bags simultaneously;
 - closing the two or more bags;
 - 20 - separating each series of two or more bags from each other, thereby obtaining separated filled bag series.

The continuous guide may connect to a repeating pattern of two or more bags of different size and/or shape, where the two or more bags are made of a bag material and comprise a bag opening. The bag material and the guide material may be of the same
25 type of material or of a different type of material. In case of the latter, the bag material may be less flexible than the guide material.

The method therefore also allows for environmentally friendly guide material.

- 30 The method allows for effective industrial production of environmentally sound, disposable and/or recyclable bags, packed with content or articles.

The filling station comprises two or more filling means configured for administering different and/or identical contents. The method thereby enables filling of two or more

different and/or identical contents into the two or more bags of different size and/or shape in a repeating pattern simultaneously. Thereby facilitating a packaging process of multiple products simultaneously or of products consisting of multiple components or of the same product in bags of different shapes and/or size. An advantage of this is that a more efficient packaging and filling process is achieved, where packing and filling of multi-component products is possible.

The resulting filled bag series may be two or more bags of different shape and/or size connected to each other by the continuous guide, thereby forming a string of two or more bags.

For example, a cake mixture for baking may contain several components to be mixed by the consumer. In packaging of the cake mixture, it is advantageous to pack the components simultaneously, such that a complete cake mixture is packed at the time. This is possible with the method for filling a web of bag series, where the repeating pattern of a number of bags corresponds to the number of components in the cake mixture, and where the bags may be of different shapes and sizes that matches the amount and nature of the components. The filling station may further comprise a number of filling means corresponding to the number of components. In the filling station, each component is administered into the corresponding bags by the corresponding filling means, whereafter each pattern of bags may be separated from the web of bag series. Thereby obtaining a string of bags that constitute the whole cake mixture.

In an embodiment, two or more bags of a different material than the guide material, which is effective and/or optimized for filling stations, may be effectively produced. Such bags may be of an environmentally friendly and/or recyclable and/or disposable material compared to the guide material. The guide material may be a polymer, e.g. polypropylene or polyethylene, and the bag material may be a paper, e.g. pure paper or paper with a polymer coating. The guide material and the bag material may be as previously disclosed. This particular combination of a polymer, such as polypropylene or polyethylene, and paper provides an effective production on an industrial scale of environmentally friendly bag series with content, which bags can be disposed with low environmental impact or recycled. Hence a filled product bag series, or consumer

product bag series, of a specific material such as paper being an environmentally sound material may be provided.

5 Existing filling stations as exemplified and disclosed in the mentioned patent documents and similar devices may be constructed or used without or with few adjustments, thereby reusing existing industrial capacity to effectively produce environmentally friendly packaging.

10 Other existing filling stations suitable for a flexible guide as disclosed may be constructed or used as well.

15 In another embodiment, the bag material and the guide material may be of the same type of material, e.g., pure paper or paper with a polymer coating. The guide material and the bag material may be as previously disclosed. Hence, bags and guides of more environmentally friendly materials can be filled in an optimized fashion in an automated or semi-automated process. Even on an industrial scale. Using the same material for the bags and the continuous guide provides a recyclable bag.

20 Another advantage of using the same type of material for the continuous guide and the two or more bags is that the materials may be disposable, recyclable, and/or environmentally friendly to the same extend.

25 Furthermore, the guide material shares the same advantageous characteristics after use as mentioned for the bags. That is the guide material is recyclable and/or disposable with a low environmental impact, thus, the guide may be recycled or disposed.

The bags may be closed by use of splicing, welding, or gluing as disclosed previously.

30 In embodiments where the bag material of the two or more bags comprises a polymer coating on the inside of the bag, the step of closing may be step of sealing the two or more bag by means of the polymer coating. The polymer coating may act as a sealing agent for closing the bags after filling, since the polymer coating may weld directly to itself. Thus, the bags are closed by sealing the two opposing side walls of the bags comprising the polymer coating to each other by means of the polymer coating for

example by applying heat. Thereby no additional sealing agents or other sealing or attachment means are needed for closing the bags, which simplifies the method for filling the web of bag series.

5 The step of separating each series of two or more bag from each other is a step of separating the two or more bag from the other bag series to produce individual consumer bag series with content or articles. The bag series may be cut of or otherwise separated. The cut may be along the lateral edges of the end bags in the bag series.

10 In some aspects of the method, the step of closing is a step of closing by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.

Thereby obtaining a tight seal of the two or more bags.

15

Description of the Drawing

Embodiments of the invention will be described in the figures, whereon:

- Fig. 1 illustrates a known system with a filling station for filling a web of bags.
- 20 Fig. 2 illustrates a known system with a full-automatic filling station for filling a web of bags.
- Fig. 3 illustrates a filling station for filling a web of bag series.
- Fig. 4 illustrates a web of bags.
- Fig. 5 illustrates a web of bag series.
- 25 Fig. 6 illustrates a cross section of different embodiments of a web of bags or a web of bag series.
- Fig. 7 illustrates a bag separated from a web of bags or a web of bag series.
- Fig. 8 illustrates a method for producing a web of bags or a web of bag series.
- Fig. 9 illustrates a method for filling a bag in a web of bags.
- 30 Fig. 10 illustrates a method for filling bags in a web of bag series.

Item	No.
Web of bags	10
Continuous guide	20

Guide material	22
Guide part	24a, 24b
Bag	30
Bag material	32
Bag opening	34
Bag interior	36
Bag wall	40a, 40b
First side	42a, 42b
Second side	44a, 44b
Lateral edge	46a, 46b
Outwardly fold	50a, 50b
Outwardly-facing strip	52a, 52b
Connection	60
Closure	62
Disconnection path	64
Filling station	80
Filling means	82
Web of bag series	100
Method for producing a web of bags or bag series	1000
Placing	1100
Connecting	1200a, 1200b
Folding	1300
Method for filling a bag in a web of bags	2000
Providing	2100
Guiding	2200
Filling	2300
Closing	2400
Separating	2500
A method for filling bags in a web of bag series	3000
Providing	3100
Guiding	3200
Filling	3300
Closing	3400

Separating	3500
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Detailed Description of the Invention

Figure 1 illustrates a known system with a filling station 80 for filling a web of bags 10. The filling station 80 may be a manual filling station 80 or a semi-automatic filling station 80 or an automatic filling station 80.

The system is designed to fill bags 30 from a roll of web of bags 10, wherein the web of bags 10 is made from a plastic material. The skilled person would know which plastic 10 materials are used. The used plastic materials' characteristics are well known and the systems with filling stations 80 are designed to work with these plastic materials.

There is however a growing need for systems and webs of bags 10 for filling bags 30 made of a more environmentally sound bag material 30, such as paper or aluminium. The problem is that the present systems are designed for polymer or plastic materials and the characteristics of paper differ significantly from the used plastics or polymers. Paper and aluminium's tear resistances are lower than the presently used plastics. Furthermore, paper and aluminium cannot undergo the same elastic or plastic deformation as the polymer. The skilled person would know that presently polypropylene (PP) and polyethylene (PE) are used for producing web of bags 10.

If a polymer web of bags 10 is replaced with a paper or aluminium web of bags 10, the system would tear or damage too many of the bags 30 for it to be viable. Thus, a new system must be designed which takes into account the characteristics of materials such as paper or aluminium, i.e. the limitations of these materials relative to the presently used plastics.

Figure 2 illustrates a known system with a full-automatic filling station 80 for filling a web of bags 10. The web of bags 10 is fed to the system from a box.

The system is designed to be used with a web of bags 10 made of polymers such as polypropylene (PP) or polyethylene (PE). However, it would be desirable if the sys-

tem could be used to fill bags 30 of a more environmentally friendly material such as paper or aluminium or any other kind of material having different mechanical characteristics than plastic polymers.

5 Figure 4 illustrates a web of bags 10, according to the invention which can be used in filling systems as shown in figures 1 and 2 even though the bag 30 is made of a non-plastic material such as fibrous materials, e.g. paper or metallic foils e.g. aluminum. The bag material 32 may comprise polymer coating for providing a protective barrier against moisture and grease.

10

The web of bags 10 comprises a continuous guide 20 of a guide material 22 configured to be guided through a filling station 80 such as but not limited to the filling system in figures 1 and 2. The continuous guide 20 is connected with one or more bags 30 made of a bag material 32. The one or more bags 30 have a bag opening 34 enabling access to a bag interior 36 for retrieving content.

15

The guide material 22 may be a polymer or a fibrous material such as paper or paper with a polymer coating.

20 In some embodiments the guide material 22 and the bag material 32 may be the same type of material, thereby providing a more recyclable bag 30 and a more environmentally friendly bag 30.

In other embodiments, the guide material 22 may advantageously be a polymer material presently used for webs of bags 10, such as polypropylene (PP) or polyethylene (PE), as the systems are designed with said plastic materials in mind. The particular combination of a polypropylene or polyethylene continuous guide 20 and a paper bag 30 provides an effective production on an industrial scale of environmentally sound bags 30 with content, where the bags 30 can be disposed or recycled.

25

30 In an embodiment, the bag material 32 of the web of bags 10 is pure paper, thereby providing a recyclable bag that is environmentally friendly. The pure paper may be produced with as little additives as possible such as less than or equal to 5 weight%, such that the bag is below a contamination limit for recyclable packaging.

By pure paper is understood a paper pulp part. The pulp may be so-called virgin pulp or recycled pulp. The additives may be additives mixed into the paper or provided as a full or partial coating on one or more sides of the paper or as printing on the paper.

5

In another embodiment, the bag material 32 of the web of bags 10 is paper with a polymer coating for moisture and grease blocking and/or friction reduction. The paper used may vary according to the need. The coating may constitute less than 5 weight% of the total bag material. The paper may be partially or fully coated paper.

10

The polymer coating may have a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

15

The paper may have a density of 30 to 150 g/m² or even 30 to 250 g/m². The paper may be laminated or layered structure of for example 25g/m² and a 50 g/m² but not limited to these values.

20

The thickness may be in the order of 10-500 µm, such as 50-200 µm, or say about 100-120 µm. The tensile stiffness (MD) may be in the order of 10 kNm/g.

The paper or fibrous material may be carton or cardboard types or paperboard types.

25

The one or more bags 30 may be formed individually as loose bags 30 and thereafter connected to the continuous guide 20. In other embodiments, the one or more bags 30 may be formed from a single piece of bag material, e.g. a sheet or a roll. Here, the individual bags 30 may be separated by a separation line (not shown), thereby allowing individual movement of the one or more bags 30. The separation line may have a T-shape at the continuous guide 20 for allowing additional movement.

30

Figure 6A further illustrates a cross section of a web of bags where the one or more bags 30 comprises two opposing bag walls 40a, 40b, each bag wall 40a, 40b comprises a first side 42a, 42b, where the first sides 42a, 42b substantially faces each other thereby defining the bag interior 36. The one or more bags 30 further comprises a second side 44a, 44b opposite to the first side 42a, 42b, where the continuous guide 20 is

attached to each of the second sides 44a, 44b. The continuous guide 20 is thereby connected to the outside of the one or more bags 30.

5 The continuous guide 20 may be connected to the second sides 44a, 44b near or at the bag opening 34 of the one or more bags 30. The connection 60 may further be placed substantially along the bag opening 34 of one or more of the bags 30 of the web of bags 10, thereby minimizing the overlap between the continuous guide 20 and the bag 30. This limits material waste and provides a more environmentally friendly web of bags, as contamination of the guide and bag materials from mixing different material types is reduced.

10 The continuous guide 20 may further be attached to the second sides 44a, 44b by means of a sealing agent or other sealing or attachment means. The continuous guide 20 may be attached to each of the second sides 44a, 44b using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

20 In an embodiment, the web of bags 10 may be attached to the continuous guide 20 by means of a splicing. The bag material 32 may be prepared with a print on the second side 44a, 44b defining a splicing path 60, and the bag 30 and the continuous guide 20 may be connected along at least part of the splicing path 60. The splicing may be performed by welding, including warm welding, or by gluing or other means of gluing. Other ways may be by sewing. The print may be a lacquer or glue.

25 In an embodiment, the continuous guide 20 may comprise two substantially parallel guide parts 24a, 24b, wherein each of the guide parts 24a, 24b is attached to one of the second sides 44a, 44b as illustrated in figure 6B.

30 In another embodiment of the web of bags 10, each of the two opposing bag walls 40a and 40b comprises an outwardly fold 50a, 50b at the bag opening 34 relative to the bag interior 36, thereby forming two outwardly-facing strips 52a, 52b of the first sides 42a, 42b, wherein the continuous guide 20 is connected to the two outwardly-facing strips 52a, 52b.

Each outwardly-facing strip 52a, 52b may be attached to the second sides 44a, 44b using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof. A lacquer or varnish as well as glue with binding properties may be selected, thereby adhering the outwardly-facing strips 52a, 52b to the second sides 44a, 44b.

The continuous guide 20 may comprises two substantially parallel guide parts 24a, 24b, where each of the guide parts 24a, 24b is connected to one of the outwardly-facing strips 52a, 52b as illustrated in figure 6C.

In embodiments, where the bag material 32 comprises a polymer coating on the first side 42a, 42b, the polymer coating may act as a sealing agent for closing the bag 30 after filling; that is, the polymer coating may weld directly to itself. Thus, the bag 30 is closed by sealing the two opposing first sides 42a, 42b to each other by means of the polymer coating for example by applying heat.

Figure 5 illustrates a web of bag series 100, according to the invention which can be used in filling systems as shown in figures 1 and 2, even if the bag 30 is made of a non-plastic material such as fibrous materials e.g. paper or metallic foils e.g. aluminum. The bag material 32 may comprise polymer coating for providing a protective barrier against moisture and grease.

The web of bag series 100 comprises a continuous guide 20 of a guide material 22 configured to be guided through a filling station 80 such as but not limited to the filling system in figures 1 and 2. The continuous guide 20 is connected to a repeating pattern of two or more bags 30 of different shape and/or size made of a bag material 32. The two or more bags 30 have a bag opening 34 enabling access to a bag interior 36 for retrieving content.

The guide material 22 may be a polymer or a fibrous material such as paper or paper with a polymer coating.

The web of bag series may further comprise a continuous guide 20 of a guide material 22 configured to be guided through a filling station 80 as illustrated in figure 3. The

filling station 80 comprises a two or more filling means 82 configured for administering different and/or identical contents to the two or more bags 30 along the transport path. Thereby the two or more bags 30 can be filled with different and/or identical contents simultaneously.

5

The web of bag series 100 thereby facilitates a packaging process of multiple products or contents simultaneously or of products consisting of multiple components or of the same product in bags 30 of different shapes and/or size. The resulting packed goods may be two or more bags 30 of different shape and/or size connected to each other by the continuous guide 20, thereby forming a string of two or more bags 30.

10

Returning to figure 5, in some embodiments of the web of bag series 100, the guide material 22 and the bag material 32 may be the same type of material, thereby providing recyclable bags 30 and more environmentally friendly bags 30.

15

In other embodiments, the guide material 22 may advantageously be a polymer material presently used for webs of bags 10 such as polypropylene (PP) or polyethylene (PE), because the filling systems are designed with said plastic materials in mind. The particular combination of a polypropylene or polyethylene continuous guide 20 and paper bags 30 provides an effective production on an industrial scale of environmentally sound bags 30 with content, where the bags 30 can be disposed or recycled.

20

In an embodiment, the bag material 32 of the web of bag series 100 is pure paper, thereby providing recyclable bags 30 that is environmentally friendly. The pure paper may be produced with as little additives as possible, such as less than or equal to 5 weight%, such that the bags 30 is below a contamination limit for recyclable packaging.

25

Pure paper is to be understood a paper pulp part. The pulp may be so-called virgin pulp or recycled pulp. The additives may be additives mixed into the paper or provided as a full or partial coating on one or more sides of the paper or as printing on the paper.

30

In another embodiment, the bag material 32 of the web of bag series 100 is paper with a polymer coating for moisture and grease blocking and/or friction reduction. The

paper used may vary according to the need. The coating may constitute less than 5 weight% of the total bag material 32. The paper may be partially or fully coated paper.

5 The polymer coating may have a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

The paper may have a density of 30 to 150 g/m² or even 30 to 250 g/m². The paper may be laminated or layered structure of for example 25g/m² and a 50 g/m² but not limited to these values.

10

The thickness may be in the order of 10-500 µm, such as 50-200 µm, or say about 100-120 µm. The tensile stiffness (MD) may be in the order of 10 kNm/g.

The paper or fibrous material may be carton or cardboard types or paperboard types.

15

The two or more bags 30 may be formed individually as loose bags 30 and thereafter connected to the continuous guide 20. In other embodiments, the two or more bags 30 may be formed from a single piece of bag material 32, e.g. a sheet or a roll. Here, the individual bags 30 may be separated by a separation line (not shown), thereby allowing individual movement of the two or more bags 30. The separation line may have a T-shape at the continuous guide 20 for allowing additional movement.

20

Figure 6A further illustrates a cross sections of a web of bag series 100, where the two or more bags 30 comprises two opposing bag walls 40a, 40b, each bag wall 40a, 40b comprises a first side 42a, 42b, where the first sides 42a, 42b substantially faces each other, thereby defining the bag interior 36. The two or more bags 30 further comprises a second side 44a, 44b opposite to the first side 42a, 42b, where the continuous guide 20 is attached to each of the second sides 44a, 44b. The continuous guide 20 is thereby connected to the outside of the two or more bags 30.

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30

The continuous guide 20 may be connected to the second sides 44a, 44b near or at the bag opening 34 of the two or more bags 30. The connection 60 may further be placed substantially along the bag opening 34 of two or more of the bags 30 of the web of bags 10. Thereby minimizing the overlap between the continuous guide 20 and the

bags 30, which limits material waste and provides a more environmentally friendly web of bag series 100, as contamination of the guide material 22 and bag material 32 from mixing different material types is reduced.

- 5 The continuous guide 20 may further be attached to the second sides 44a, 44b by means of a sealing agent or other sealing or attachment means. The continuous guide 20 may be attached to each of the second sides 44a, 44b using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

10

- In an embodiment, the web of bag series 100 may be attached to the continuous guide 20 by means of a splicing. The bag material 32 may be prepared with a print on the second side 44a, 44b defining a splicing path 60 and the bags 30 and the continuous guide 20 may be connected along at least part of the splicing path 60. The splicing
15 may be performed by welding, including warm welding, or by gluing or other means of gluing. Other ways may be by sewing. The print may be a lacquer or glue.

- In an embodiment, the continuous guide 20 may comprise two substantially parallel guide parts 24a, 24b, wherein each of the guide parts 24a, 24b is attached to one of the
20 second sides 44a, 44b as illustrated in figure 6B.

- In another embodiment of the web of bag series 100, each of the two opposing bag walls 40a and 40b comprises an outwardly fold 50a, 50b at the bag opening 34 relative to the bag interior 36, thereby forming two outwardly-facing strips 52a, 52b of the
25 first sides 42a, 42b, wherein the continuous guide 20 is connected to the two outwardly-facing strips 52a, 52b.

- Each outwardly-facing strip 52a, 52b may be attached to the second sides 44a, 44b using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof. A lacquer or varnish as well as glue with
30 binding properties may be selected. Thereby adhering the outwardly-facing strips 52a, 52b to the second sides 44a, 44b.

The continuous guide 20 may comprises two substantially parallel guide parts 24a, 24b, where each of the guide parts 24a, 24b is connected to one of the outwardly-facing strips 52a, 52b as illustrated in figure 6C.

5 In embodiments, where the bag material 32 comprises a polymer coating on the first side 42a, 42b, the polymer coating may act as a sealing agent for closing the bag 30 after filling; that is, the polymer coating may weld directly to itself. Thus, the bags 30 are closed by sealing the two opposing first sides 42a, 42b to each other by means of the polymer coating for example by applying heat.

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Figure 7 illustrates a bag 30 separated from a web of bags 10 or a web of bag series 100. The bag 30 corresponds to the bags 30 described in figures 4, 5, and 6.

15 Figure 7 further illustrates the step to be performed on the bag 30 post-filling. The skilled person would know that the post-filling closing of the bag 30 may be done before separating the bag 30 from the web of bags 10 or web of bag series 100. For the web of bag series, it will be a string of two or more bags 30 that is separated from the web instead of an individual bag, and figure 7 is thus only for illustrative purposes.

20 The bags 30 may be closed along a closure 62, which may be a splicing path, by use of splicing, welding, or gluing, as disclosed previously.

25 In embodiments where bag material 32 of the bags 30 comprises a polymer coating on the inside of the bag 30, the closure 62 may be a seal of the bag 30 by means of the polymer coating. The polymer coating may act as a sealing agent for closing the bags 30 after filling, since the polymer coating may weld directly to itself. Thus, the bag 30 is closed by sealing the two opposing first side 42a, 42b of the bags 30 comprising the polymer coating to each other by means of the polymer coating for example by applying heat. Thereby no additional sealing agents or other sealing or attachment means
30 are needed for closing the bags 30.

The bags 30 may be separated from the web to produce individual consumer bags 30 with content or articles. The bags 30 may be separated by cutting or otherwise separating the bags 30 along the lateral edges 46a, 46b of the bags 30.

The bags 30 may furthermore be disconnected from the continuous guide 20 by cutting or otherwise disconnecting the bags 30 from the continuous guide 20 along a disconnection path 64. The disconnection path 64 may be substantially along the bag opening 34 above the closure 62 where the bags 30 are closed, and below, or at the continuous guide 20, thereby separating the bags 30 from the continuous guide 20 leaving no or little guide material 22 on bags 30. The continuous guide 20 may thus be completely removed from the resulting bags 30, and the purity of the resulting bags 30 are therefore increased and it becomes easier to recycle the bag 30.

10

Figure 8 illustrates a method 1000 for producing a web of bags 10 or a web of bag series 100 configured to be guided through a filling station 80. The method 100 comprises a step of placing 1100 two bag walls 40a, 40b opposite to each other, where each bag wall 40a, 40b comprises a first side 42a, 42b and a second side 44a, 44b opposite to the first side 42a, 42b, and where the first sides 42a, 42b substantially faces each other, thereby defining a bag interior 36 as illustrated in figure 6.

15

The method 1000 further comprises a step of connecting 1200a the lateral edges 46a, 46b of the two bag walls 40a, 40b such that a bag opening 34 is formed. The step of connecting 1200a may be a step of welding including warm welding, or by gluing using glues, other means of gluing. Other ways may be by sewing.

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In an embodiment the web of bags 10 or web of bag series 100 may be formed from a single piece of bag material 32, e.g. a sheet or a roll. The step of placing 1100 the two bag walls 40a, 40b opposite to each other may thus be a step of folding the single piece of bag material 32, whereby the fold constitutes the bottom of the bags 30. Further, the step of connecting 1200a the lateral edges 46a, 46b thereby forms individual bags 30 with separate bag interiors 36.

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The step of connecting 1200a is followed by a second step of connecting 1200b a continuous guide 20 of a guide material 22 to the two second sides 44a, 44b, thereby producing a web of bags 10 or a web of bag series 100. Thereby connecting 1200b the continuous guide 20 to the outside of the bag 30

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The step of connecting 1200b the continuous guide 20 to the two second sides 44a, 44b may be a step of connecting 1200b the continuous guide 20 to the second sides 44a, 44b near or at the bag opening 34 of the bags 30. The connection 60 may further be placed substantially along the bag opening 34 of the bags 30, thereby minimizing the overlap between the continuous guide 20 and the bags 30.

The continuous guide 20 may further be connected to the two second side 44a, 44b by means of a sealing agent or other sealing or attachment means.

In an embodiment, the web of bags 10 or web of bag series 100 may be connected to the continuous guide 20 by means of a splicing. The method 100 may comprise a step of preparing the bag material 32 with a print on the two second sides 44a, 44b defining a splicing path 60 and the step of connecting 1200b may be a step of connecting 1200b along at least part of the splicing path 60. A splicing may be a way of connecting the guide material 22 and bag material 32.

The splicing may be performed by welding, including warm welding, or by gluing using glues or other means of gluing. Other ways may be by sewing or by using an adhesive or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

The step of connecting 1200b may further be a step of connecting 1200b two substantially parallel guide parts 24a, 24b of the continuous guide 20, wherein each of the guide parts 24a, 24b is attached to one of the second sides 44a, 44b.

The method 1000 may further comprise a step of folding 1300 before the steps of connecting 1200a, 1200b, wherein the step of folding 1300 is a step of folding 1300 a part of each bag wall 40a, 40b outwardly relative the bag interior 36, thereby forming two outwardly-facing strips 52a, 52b of the first sides 42a, 42b, and the step of connecting 1200b is a step of connecting 1200b the continuous guide 20 to the two outwardly-facing strips 52a, 52b.

The step of folding 1300 is especially advantageous for embodiments, where the continuous guide 20 is made of a polymer, such as polyethylene or polypropylene, or pa-

per with a polymer coating; and the bag material 32 comprises a polymer coating on the first side, e.g. a paper bag with a polymer coating. Because the two formed outwardly-facing strips 52a, 52b of the first sides 42a, 42b comprises the polymer coating, that can weld directly to another polymer coating or directly to a polymer such as polyethylene or polypropylene. Thus, the continuous guide 20 can be connected directly to the outwardly-facing strips 52a, 52b with no additional sealing agents or other attachment means needed. Thereby, the polymer coating may act as a sealing agent in itself and the continuous guide 20 may be connected to the outwardly-facing strips 52a, 52b by only applying heat, for example.

10

In some embodiments, the method may further comprise a step of attaching each of the outwardly-facing strips 52a, 52b to each of the two second sides 44a, 44b using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof, thereby adhering the outwardly-facing strips 52a, 52b to the second sides 44a, 44b and preventing the outwardly facing strips 52a, 52b from unfolding.

15

In some embodiments, the step of connecting 1200b is a step of connecting 1200b two substantially parallel guide parts 24a, 24b of the continuous guide 20, wherein each of the guide parts 24a, 24b is attached to one of the outwardly-facing strips 52a, 52b.

20

The method 100 may be a method 100 for producing a web of bags 10 according to any of claims 1 to 11 or a web of bag series 100 according to any of claims 12 to 22.

Figure 9 illustrates a method 2000 for filling a bag 30 in a web of bags 10 with content. The method 2000 may be a method 2000 for filling a bag 30 in a web of bags 10 according to any of claims 1 to 11. The method 2000 comprises a step of providing 2100 a web of bags 10 as a continuous guide 20 configured to be guided through a filling station 80. The continuous guide 20 of a guide material 22 connects one or more bags 30, where the one or more bags 30 are made of a bag material 32 and comprise a bag opening 34. The web of bags 10 corresponds to the web of bags 10 described in figures 4, 6, and 7.

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The method 2000 further comprises a step of guiding 2200 the web of bags 10 through the filling station 80 in the continuous guide 20, followed by a step of filling 2300 content into the one or more bags 30.

- 5 Existing filling stations 80 as exemplified and disclosed in the mentioned patent documents and figure 1 and 2, as well as similar devices, may be constructed or used without or with few adjustments, thereby reusing existing industrial capacity to effectively produce environmentally friendly packaging.
- 10 The method 2000 further comprises a step of closing 2400 the one or more bags 30. The step of closing 2400 may be a step of closing 2400 the bags 30 along a closure 62, which may be a splicing path, by use of splicing, welding, or gluing as disclosed previously.
- 15 In some embodiments, the step of closing 2400 is a step of closing 2400 by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.

- 20 In embodiments where the bag material 32 of the one or more bags 30 comprises a polymer coating on the inside of the bag 30, the step of closing 2400 may be a step of sealing the one or more bag 30 by means of the polymer coating. The polymer coating may act as a sealing agent for closing the bags 30 after filling 2300, since the polymer coating may weld directly to itself. Thus, the bag 30 are closed by sealing the two opposing first sides 42a, 42b of the bags 30 comprising the polymer coating to each other by means of the polymer coating for example by applying heat. Thereby no additional sealing agents or other sealing or attachment means are needed for closing 2400 the bags 30, which simplifies the method 2000 for filling the web of bags 10.
- 25

- 30 A step of separating 2500 follows the step of closing 2400, where the one or more bags 30 are separated from each other, thereby obtaining separated filled bags 30.

The step of separating 2500 the one or more bags 30 from the web of bags 10 is a step of separating 2500 the one or more bags 30 from each other to produce individual

consumer bags 30 with content or articles. The bags 30 may be cut of or otherwise separated along the lateral edges 46a, 46b of the one or more bags 30.

5 In some embodiments of the method 2000, the step of separating 2500 may be or comprise a step of disconnecting the one or more bags 30 from the continuous guide 20. The step of disconnecting may be an act of disconnecting the bags 30 from the continuous guide 20 to produce individual consumer bags 30 with content or articles, where the bags 30 may be cut or otherwise separated substantially along the bag opening 34 along a disconnection path 64. The disconnection path 64 may be placed above
10 the closure 62 where the bags 30 are closed, and below, or at the continuous guide 20. Thereby separating the one or more bags 30 from the continuous guide 20 leaving no or little guide material 22 on disconnected bags 30.

15 Figure 10 illustrates a method 3000 for filling bags 30 in a web of bag series 100 with content. The method 3000 may be a method 3000 for filling bags 30 in a web of bag series 100 according to any of claims 12 to 22. The method 3000 comprises a step of providing 3100 a web of bag series 100 as a continuous guide 20 configured to be guided through the filling station 80, where the continuous guide 80 of a guide material 22 connects a repeating pattern of two or more bags 30 of different size and/or
20 shape. The two or more bags 30 are made of a bag material 32 and comprise a bag opening 34. The web of bag series 100 corresponds to the web of bag series 100 described in figures 5, 6, and 7.

The method 3000 further comprises a step of guiding 3200 the web of bag series 100
25 though the filling station 80 in the continuous guide 20, wherein the filling station 80 comprises two or more filling means 82 configured for administering different and/or identical contents, followed by a step of filling 3300 different and/or identical contents into the two or more bags simultaneously. The filling station 80 may be similar to the filling station illustrated in figure 3.

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The method 3000 thus facilitates a packaging process for packing multiple products or contents simultaneously or of products consisting of multiple components or of the same product in bags 30 of different shapes and/or size.

The resulting filled bag series may be two or more bags 30 of different shape and/or size connected to each other by the continuous guide 20, thereby forming a string of two or more bags 30.

5 For example, a cake mixture for baking may contain several components to be mixed by the consumer. In packaging of the cake mixture, it is advantageous to pack the components simultaneously, such that a complete cake mixture is packed at the time. This is possible with the method 3000 for filling a web of bag series 100, where the repeating pattern of a number of bags 30 corresponds to the number of components in
10 the cake mixture, and where the bags 30 may be of different shapes and/or sizes that matches the amount and nature of the different components. The filling station 80 may comprise a number of filling means 82 corresponding to the number of components. In the filling station 80, each component is administered into the corresponding bags 30 by the corresponding filling means 82, whereafter each pattern of bags 30 may be
15 separated from the web of bag series 100, thus obtaining a string of bags 100 that constitute the whole cake mixture.

Existing filling stations 80 as exemplified and disclosed in the mentioned patent documents and figures 1 and 2, and similar devices, may be constructed or used with few
20 adjustments, thereby reusing existing industrial capacity to effectively produce environmentally friendly packaging.

The method 3000 further comprises a step of closing 3400 the two or more bags 30. The step of closing 3400 may be a step of closing 3400 the bags 30 along a closure 62,
25 which may be a splicing path, by use of splicing, welding, or gluing as disclosed previously.

In some embodiments, the step of closing 3400 is a step of closing 3400 by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination
30 thereof.

A step of separating 3500 follows the step of closing 3400, where each series of two or more bags 30 the web of bag series 100 thereby obtains separately filled bag series.

The step of separating 3500 each series of two or more bags 30 from the web is a step of separating 3500 the two or more bags 30 from the other bag series to produce individual consumer bag series with content or articles. The bag series may be cut of or otherwise separated along the lateral edges 46a, 46b of the end bags 30 in the bag series.

5

CLAIMS

1. A web of bags (10) configured to be guided through a filling station (80), the web of bags (10) comprising
- a continuous guide (20) of a guide material (22) configured to be guided through the filling station (80) and wherein the continuous guide (20) is connected to one or more bags (30) of a bag material (32) having a bag opening (34) enabling access to a bag interior (36),
- wherein the one or more bags (30) comprises two opposing bag walls (40a, 40b), each bag wall (40a, 40b) comprises
- a first side (42a, 42b), wherein said first sides (42a, 42b) substantially faces each other thereby defining the bag interior (36), and
 - a second side (44a, 44b) opposite to the first side (42a, 42b), wherein the continuous guide (20) is attached to each of the second sides (44a, 44b).
2. A web of bags (10) according to claim 1, wherein the bag material (32) is a fibrous material or paper or metallic foils or aluminum.
3. A web of bags (10) according to any of claims 1 or 2, wherein the first sides (42a, 42b) comprise a polymer coating for moisture blocking and/or friction reduction.
4. A web of bags (10) according to claim 3, wherein the polymer coating has a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².
5. A web of bags (10) according to any of claims 1 to 4, wherein the guide material (22) is a polymer or a fibrous material such as paper or paper with a polymer coating or the same material as the bag material.
6. A web of bags (10) according to any of claims 1 to 5, wherein the guide material (22) is a polymer selected from polypropylene (PP) or polyethylene (PE).
7. A web of bags (10) according to any of claims 1 to 6, wherein the continuous guide (20) is attached to each of the second sides (44a, 44b) using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.

8. A web of bags (10) according to any of claims 1 to 7, wherein the continuous guide (20) comprises two substantially parallel guide parts (24a, 24b), wherein each of the guide parts (24a, 24b) is attached to one of the second sides (44a, 44b).

5

9. A web of bags (10) according to any of claims 1 to 6, wherein each of the two opposing bag walls (40a, 40b) comprises an outwardly fold (50a, 50b) at the bag opening (34) relative to the bag interior (36), thereby forming two outwardly-facing strips (52a, 52b) of the first sides (42a, 42b), wherein the continuous guide (20) is attached to the two outwardly-facing strips (52a, 52b).

10

10. A web of bags (10) according to claim 9, wherein each outwardly-facing strip (52a, 52b) is attached to the second side (44a, 44b) using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

15

11. A web of bags (10) according to any of claims 9 or 10, wherein the continuous guide (20) comprises two substantially parallel guide parts (24a, 24b), wherein each of the guide parts (24a, 24b) is attached to one of the outwardly-facing strips (52a, 52b).

20

12. A web of bag series (100) configured to be guided through a filling station (80), the web of bag series (100) comprising

- a continuous guide (20) of a guide material (22) configured to be guided through the filling station (80) and wherein the continuous guide (20) is connected to a repeating pattern of two or more bags (30) of different size and/or shape (30), wherein the two or more bags (30) is made of a bag material (32) and comprises a bag opening (34) enabling access to a bag interior (36),

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wherein the two or more bags (30) comprises two opposing bag walls (40a, 40b), each bag wall (40a, 40b) comprises

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- a first side (42a, 42b), wherein said first sides (42a, 42b) substantially faces each other thereby defining the bag interior (36), and
- a second side (44a, 44b) opposite to the first side (42a, 42b), wherein the continuous guide (20) is attached to each of the second sides (44a, 44b).

13. A web of bag series (100) according to claim 12, wherein the bag material (32) is a fibrous material or paper or metallic foils or aluminum.

5 14. A web of bag series (100) according to any of claims 12 or 13, wherein the first sides (42a, 42b) comprise a polymer coating for moisture blocking and/or friction reduction.

10 15. A web of bag series (100) according to claim 14, wherein the polymer coating has density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

15 16. A web of bag series (100) according to any of claims 12 to 15, wherein the guide material (22) is a polymer or a fibrous material such as paper or paper with a polymer coating or the same material as the bag material.

17. A web of bag series (100) according to any of claims 12 to 16, wherein the guide material (22) is a polymer selected from polypropylene (PP) or polyethylene (PE).

20 18. A web of bag series (100) according to any of claims 12 to 17, wherein the continuous guide (20) is attached to each of the second sides (44a, 44b) using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or polymer dispersion or a combination thereof.

25 19. A web of bag series (100) according to any of claims 12 to 18, wherein the continuous guide (20) comprises two substantially parallel guide parts (24a, 24b), wherein each of the guide parts (24a, 24b) is attached to one of the second sides (44a, 44b).

30 20. A web of bag series (100) according to any of claims 12 to 17, wherein each of the two opposing bag walls (40a, 40b) comprises an outwardly fold (50a, 50b) at the bag opening (34) relative to the bag interior (36), thereby forming two outwardly-facing strips (52a, 52b) of the first sides (42a, 42b), wherein the continuous guide (20) is attached to the two outwardly-facing strips (52a, 52b).

21. A web of bag series (100) according to claim 20, wherein each outwardly-facing strip (52a, 52b) is attached to the second side (44a, 44b) using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

5

22. A web of bag series (100) according to any of claims 20 or 21, wherein the continuous guide (20) comprises two substantially parallel guide parts (24a, 24b), wherein each of the guide parts (24a, 24b) is attached to one of the outwardly-facing strips (52a, 52b).

10

23. A bag (30) for forming part of a web of bags (10) according to any of claims 1 to 11 or a web of bag series (100) according to claims 12 to 22 configured to be guided through a filling station (80), the bag (30) comprising a bag opening (34) enabling access to a bag interior (36), and the bag (30) is made of a bag material (32), and

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wherein the bag (30) comprises two opposing bag walls (40a, 40b), each bag wall (40a, 40b) comprises

- a first side (42a, 42b), wherein said first sides (42a, 42b) substantially faces each other thereby defining the bag interior (36),
- a second side (44a, 44b) opposite to the first side (42a, 42b), wherein each of the second sides (44a, 44b) are configured for connecting to a guide part (24a, 24b) of a continuous guide (20).

20

24. A bag (30) according to claim 23, wherein the bag material (32) is a fibrous material or paper or metallic foils or aluminum.

25

25. A bag (30) according to any of claims 23 or 24, wherein the first sides (42a, 42b) comprise a polymer coating for moisture blocking and/or friction reduction.

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26. A bag (30) according to any of claim 25, wherein the polymer coating has a density of 1-10 g/m² or 2-8 g/m² or 3-7 g/m² or 3-6 g/m² or 4-5 g/m² or 4 g/m² or less than 4 g/m² or less than 3 g/m² or less than 2 g/m².

27. A bag (30) according to any of claims 23 to 26, wherein each of the second sides (44a, 44b) are configured for connecting to a polymer guide part (24a, 24b).

28. A bag (30) according to any of claims 23 to 26, wherein each of the two opposing bag walls (40a, 40b) comprises an outwardly fold (50a, 50b) at the bag opening (34) relative to the bag interior (36), thereby forming two outwardly-facing strips (52a, 52b) of the first sides (42a, 42b), wherein each of the two outwardly-facing strips (52a, 52b) are configured for connecting to a guide part (24a, 24b) of a continuous guide (20).

29. A bag (30) according to claim 28, wherein each outwardly-facing strip (52a, 52b) is attached to the second side (44a, 44b) using an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or polymer dispersion or a combination thereof.

30. A method (1000) for producing a web of bags (10) or a web of bag series (100) configured to be guided through a filling station (80), wherein the method (1000) comprises steps of

- placing (1100) two bag walls (40a, 40b) opposite to each other, wherein each bag wall (40a, 40b) comprises a first side (42a, 42b) and a second side (44a, 44b) opposite to the first side (42a, 42b), wherein said first sides (42a, 42b) substantially faces each other, thereby defining a bag interior (36),
- connecting (1200a) lateral edges (46a, 46b) of the two bag walls (40a, 40b) such that a bag opening (34) is formed,
- connecting (1200b) a continuous guide (20) of a guide material (22) to the two second sides (44a, 44b), thereby producing a web of bags (10) or a web of bag series (100).

31. A method (1000) according to claim 30, wherein the step of connecting (1200b) is a step of connecting (1200b) two substantially parallel guide parts (24a, 24b) of the continuous guide (20), wherein each of the guide parts (24a, 24b) is attached to one of the second sides (44a, 44b).

32. A method (1000) according to claim 30, wherein the method (1000) further comprises a step of folding (1300) before the steps of connecting (1200a, 1200b), wherein the step of folding (1300) is a step of folding (1300) a part of each bag wall (40a, 40b) outwardly relative the bag interior (36), thereby forming two outwardly-facing strips

(52a, 52b) of the first sides (42a, 42b), and the step of connecting (1200b) is a step of connecting (1200b) the continuous guide (20) to the two outwardly-facing strips (52a, 52b).

5 33. A method (1000) according to claim 32, wherein the step of connecting (1200b) is a step of connecting (1200b) two substantially parallel guide parts (24a, 24b) of the continuous guide (20), wherein each of the guide parts (24a, 24b) is attached to one of the outwardly-facing strips (52a, 52b).

10 34. A method (1000) according to any of claims 30 to 33, wherein the method (1000) is a method (1000) for producing a web of bags (10) according to any of claims 1 to 11 or a web of bag series (100) according to any of claims 12 to 22.

15 35. A method (2000) for filling a bag (30) in a web of bags (10) according to any of claims 1 to 11 with content, the method (2000) comprising steps of

- providing (2100) a web of bags (10) as a continuous guide (20) configured to be guided through the filling station (80) and wherein the continuous guide (20) of a guide material (22) connects one or more bags (30), wherein the one or more bags (30) are made of a bag material (32) and comprise a bag opening (34),
- 20 - guiding (2200) the web of bags (10) through a filling station (80) in the continuous guide (20),
- filling (2300) content into the one or more bags (30),
- closing (2400) the one or more bags (30),
- 25 - separating (2500) the one or more bags (30) from each other, thereby obtaining separated filled bags.

30 36. A method (2000) according to claim 35, wherein the step of closing (2400) is a step of closing (2400) by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.

37. A method (2000) according to claims 35 or 36, wherein the step of separating (2500) is a step of disconnecting the one or more bags (30) from the continuous guide (20),

38. A method (3000) for filling bags (30) in a web of bag series (100) according to any of claims 12 to 22 with content, the method (3000) comprising steps of

- 5 - providing (3100) a web of bag series (100) as a continuous guide (20) configured to be guided through the filling station (80) and wherein the continuous guide (20) of a guide material (22) connects a repeating pattern of two or more bags (30) of different size and/or shape, wherein the two or more bags (30) are made of a bag material (32) and comprise a bag opening (34),
- 10 - guiding (3200) the web of bag series (100) through a filling station (80) in the continuous guide (20), wherein the filling station (80) comprises two or more filling means (82) configured for administering different and/or identical contents,
- filling (3300) different and/or identical contents into the two or more bags (30) simultaneously,
- 15 - closing (3400) the two or more bags (30),
- separating (3500) each series of two or more bags (30) from each other, thereby obtaining separated filled bag series.

39. A method (3000) according to claim 38, wherein the step of closing (3400) is a
20 step of closing (3400) by use of an adhesive or a glue or lacquer or hot-melt or seams or stitched seams or a combination thereof.