Title: PROCESS FOR PRODUCING BAGS IN FILM OF PLASTIC MATERIAL, FOR THE REALIZATION OF PACKAGES WITH HANDLE

Abstract: A process for producing bags in film of plastic material, comprising a phase of gluing a strip (21, 121) of thin material on a film (11) in plastic material forming the material of the bag (S, SI) being processed before the filling thereof with the product to be packaged; this strip (21, 121) is glued in such a manner that at least one portion (2 IB, 121B) thereof is free in the part comprised between two opposite ends (2 IA, 121A) fixed on the film (11), to define a handle for the bag being processed.
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"PROCESS FOR PRODUCING BAGS IN FILM OF PLASTIC MATERIAL, FOR THE REALIZATION OF PACKAGES WITH HANDLE"

DESCRIPTION

Technical Field

The present invention relates to the field of packages in film of plastic material, and more in particular the object of the present invention is a process for producing bags in film of plastic material preferably for the realization of packages with handle of soft sanitary products, such as for instance toilet paper, diapers and the like, as well as a bag in film of plastic material for the realization of a package with handle. Moreover, the present invention concerns also an apparatus for producing such bags.

State of the Art

Plastic bags for packaging sanitary products such as toilet paper, diapers and the like, must be provided with a handle for take away the filled package, which usually has a significant volume with a quite limited weight.

To satisfy this need, different solutions have been proposed and marketed, which are generally functional but always expensive, due to the addition of more or less sophisticated handles, with processes that, in any case, significantly reduce the speed of production of these packages.

All the applications with glued strips, hitherto used as handles, provide that the overlapped strip have been made adhesive in the end areas of its length, whilst the central area, with a length equal to about the half of the total, is devoid of glue (or with protected adhesive) so that it can be used as handle. The gluing areas are on the lateral flanks of the package.

This configuration of handle is common on the packs of rigid packages, for instance bottles, but it cannot be used in a simple manner for bags filled with soft products such those described in the foreword, i.e. soft sanitary products such as toilet paper, diapers and the like.

Actually, in the first case the handle is applied to the package when this latter has already been filled with the rigid product, and the lateral flanks of the package offer therefore an adequate contrast to the pressing action for gluing the handle. In the second case, i.e. with packages of soft products, this contrast is not present, and the handle cannot therefore be glued.

To overcome this drawback, the handles are produced on the bag before the
phase of filling it with the soft product. This embodiment provides the feed of a film in plastic material in a preselected direction and the overlapping of said film with a tape, which is cut and welded on this film according to a direction parallel to the direction of feed of the film itself. This cut and welded tape is then punched to-measure with the desired shape to obtain the shape of the handle of the package.

This operation of cutting, welding and punching the handle is an extremely complex processing, which furthermore leads to have a lot of scraps.

Object and summary of the invention

The object of the present invention is to provide a process for producing bags in film of plastic material for the realization of packages with handle of soft sanitary products such as toilet paper, diapers and the like, which is simple to be performed and which presents reduced scraps.

A further important object of the present invention is to provide a bag in a film of plastic material for the realization of packages with handle, which is simple and resistant in the structure, and which can be used also to package soft sanitary products such as toilet paper, diapers and the like.

Another important object of the present invention is to provide an apparatus for producing a bag in a film of plastic material for the realization of packages with handle, which is simple and resistant in the structure, and which can be used also to package soft sanitary products such as toilet paper, diapers and the like.

These objects and further objects, which will be more apparent hereunder, are achieved with a process for producing bags in film of plastic material for the realization of packages with handle of soft sanitary products such as toilet paper, diapers and the like, which comprises a phase of gluing a strip of thin material on a film in plastic material forming the material of the bag under processing before filling the bag with the product to be packaged; this strip is glued so that at least one portion thereof is fixed at two opposite ends to the film and that this portion is free in the part comprised between said ends so as to define a handle for the bag being processed.

Advantageously, the invention also comprises a bag in film of plastic material for the realization of packages with handle for soft sanitary articles such as toilet paper, diapers and the like, comprising a handle formed by a strip glued at the ends on respective portions of the bag that will form two opposite lateral flanks of a package.
Adequately, the invention also comprises a bag in film of plastic material for
the realization of packages with handle for soft sanitary articles such as toilet paper,
diapers and the like, comprising a handle formed by a closed-loop shaped strip which
is glued for at least one its own part on a portion of the bag that will form the upper
face of a package. The part of the closed loop which is not glued, i.e. the free part
thereof, forms the pick-up portion of the handle.

The invention also comprises an apparatus for producing bags in film of
plastic material, comprising
- a first reel on which is wound a film plastic material,
- a second reel on which is wound a tape of plastic material to be overlapped to the
  film,
- gluing means providing glue on a face of the tape to be overlapped to the film,
- means for cutting or pre-cutting the tape to form strips,
- an area of adhesion of the tape to the film arranged downstream of said gluing
  means and downstream of said means for cutting or pre-cutting the tape to form
  strips provided with glue, on said area of adhesion being arranged means for
  pressing together at least a portion of the tape and said film and for separating said
  strips glued to the film from the tape,
- a folding frame for folding the film 11 with the strips glued thereon.

Said apparatus can be perform all the embodiments of the process according to
the invention, better described below, or combination of said embodiments.

**Brief description of the drawings**

The invention will be better understood by following the description below
and the attached drawings, in which:

- figure 1 is a schematic axonometric view of an apparatus for implementing the
  process according to the present invention, according to a first embodiment;
- figure 2A is a schematic side view of a portion of a bag produced with the
  apparatus of figure 1;
- figure 2B is a schematic side view of the portion of the bag of figure 2A with
  the handle extracted from the bellows-like folding area;
- figure 2C is a schematic side view of a portion of package produced with the
  bag shown in figures 2A and 2B;
- figure 3 is a schematic axonometric view of the package of figure 2C;
- figure 4 is a schematic axonometric view of an apparatus for implementing the
process according to the present invention, according to a second embodiment;

figure 5 is a schematic axonometric view of a strip realizing a handle for a bag
as in the previous figures;

figure 6 is a schematic axonometric view of an apparatus for implementing the
process according to a third embodiment;

figures 7A, 7B, and 7C are perspective axonometric views of closed-loop strips realizing handles for bags produced according to the present invention;

figure 8A is a schematic side view of a portion of a bag produced with the apparatus of figure 6;

figure 8B is a schematic side view of the portion of the bag of figure 8A with the handle extracted from the bellows-like folding area;

figure 8C is a schematic side view of a portion of package produced with the bag shown in figures 8A and 8B;

figure 9 is a schematic axonometric view of the package of figure 8C;

figure 10 is a schematic axonometric view of an apparatus for implementing the process according to a fourth embodiment;

figure HA is a portion of tape for producing closed-loop strips suitable to realize handles for bags produced according to the process relating to figure 10;

figure HB shows a closed-loop strip suitable to produce a handle for bags produced according to the process relating to figure 10;

figures 12 and 13 are schematic side view of apparatuses to implement processes according to the present invention relating respectively to figures 4 and 10;

figure 14 show a realistic side view, simplified, of an embodiment of apparatus referred to apparatuses and process steps according to figures 4 and 12;

figure 15 shows a realistic top view, simplified, of a portion of the apparatus of figure 14.

**Detailed description of an embodiment of the invention**

With reference to the previously cited figures, in which to identical parts correspond identical reference numbers, the production of a bag with handle
according to the present invention provides for the use of a film in plastic material 11 wound on a first reel 12.

The film is unwound towards (arrow fl) an area P in which, on a traditional folding frame (not shown in the figure), the film is folded in two in the longitudinal direction, substantially at the longitudinal centerline Lm of the film. From this
folding area P the film 11 continues to move forwards (arrow £2) in a direction orthogonal to the direction of unwinding of the reel 12.

The folded film is further folded at the longitudinal centerline Lm, to produce a bellows-like folding, indicated with Ls. This latter will correspond to the upper part 13 of the package formed by the bag under processing.

The two respectively facing edges HA and HB of the film will produce the bottom 14 of the package formed by the bag under processing.

Subsequently, the film is welded in transverse direction according to the line Lt to define the closing of a closed flank 15 of the package / bag, and then cut at this welding. The bags are pitch cut, and the line Lt practically represents therefore the welding of the flank 15 of the bag being formed in figure 1 (end of the film 11) but also the welding of the flank 16 of the subsequent bag being formed, and the cut line for separating the bag being formed from that formed immediately after in succession.

The package / bag is therefore open only at its bottom 14 for inserting the products to be packaged.

Obviously, the order of the welding and / or cutting operations can be different from that indicated, according to the requirements. Also the part of the package / bag which remains open for the filling can be different from that indicated, and it can be formed for instance by the flank of the package / bag.

A tape in plastic material 18 is unwound from a second reel 19 according to a direction parallel to the unwinding of the film 11 from the first reel 12. For a part, this tape is overlapped to and faces the film 11 and runs in the same direction (arrow β) as this film before the first folding phase in the area P. The width of the tape 18 is smaller than the width of the film 11.

On the face of the tape 18 facing the film 11 when it runs in the same direction, along the flanks of the tape, there are two longitudinal bands of glue 20. Before the film 11 enters in the folding area P, i.e. in the so called gluing area I, from the tape 18 a transverse strip 21 is separated, for instance by cutting it, which is open (i.e. which presents not matching opposite ends), and which comprises at its ends glue areas 21A formed by the portion of band 20 with glue of the tape itself. In this embodiment, the gluing area I and the area of separation of the strip from the tape practically match.

The methods for applying the glue to the tape can be the most various,
according to the requirements; preferably, the glue is distributed in bands 20 on the tape 18 during unwinding from the reel 19, for instance starting from the area A. Alternatively, the tape can be for example already provided with glue when is wound on the relative reel, with the adequate measures to avoid to leave residues on the opposite face of the tape during winding. The glue can be present only in the two opposite bands or it can be present on all the surface, but covered with adequate protection on the central part between the two bands, so as to make it not functional.

The strip 21 is applied on the film 11, transversally and astride the longitudinal centerline Lm, for example through a pressing member O not shown in figure 1 but present in figures 12 and 13.

Once the film 11 has been folded in the area P around the line Lm, also the strip 21 glued to the film is folded. Furthermore, in the bellows-like folding phase Ls of the film 11, the strip 21 is arranged transversally to the bellows-like foldlines, so that it is folded inside the bellows, following the fold thereof.

The position for gluing the strip 21 on the film 18 is such that, once the film has been folded to form the bag, the gluing ends 21A of the strip 21 are glued on the parts of film 11 which will constitute two opposite lateral faces 22 of the package C (figures 2C and 3) formed by the bag under processing.

Once the bag has been produced, the strip 21 is glued at the opposite ends to portions of the bag that will constitute opposite flanks of a package. The part of free strip between the glued ends 21A defines a handle for the bag / package.

Figure 2A shows the bag S with the strip / handle inside the bellows-like folded portion; figure 2B shows the handle extracted from the bellows-like portion, whilst figure 2C shows the bag filled to form a package C of soft sanitary products.

Figure 4 shows an embodiment of the process described above which provides for the realization of transverse pre-cutting lines 23 on the tape 18, defining the lateral edges of the strips 21 to be glued. Advantageously, according to a preferred variant, in particular, on the tape 18 there are also a pair of longitudinal pre-cutting lines 24, close and parallel to respective edges of the tape, so that the strips 21 are delimited between the longitudinal pre-cutting lines 24 and the transverse pre-cutting lines 23. The two bands of glue 20 are arranged close to the longitudinal pre-cutting lines 24.

These pre-cutting lines 23 and 24 can be produced after the unwinding of the tape 18 from the corresponding reel, through adequate means such as for example a
puncher, not shown in the figures, arranged upstream of the gluing area I, or they can be produced before the winding in reel.

The part of tape 18 downstream of the area I of separation of the strips 21 and gluing thereof on the film 11 is formed by two separate bands 25, each of which has width equal to the distance between a respective longitudinal pre-cutting line 24 and edge of the tape 18. These bands 25 are wound on take-off means, such as further motorized reels 26.

Figures 6 and 10 show another embodiment of the process according to the present invention, wherein the tape, from which the handle must be obtained, is now indicated as a whole with number 118, whilst the strip obtained from this tape is indicated with number 121.

In this example, the tape 118 is tubular and allows to obtain closed-loop strips 121. These strips can be separated for example in the same manner as that indicated in the previous example, i.e. through cutting (figure 6) or through separation through pre-cutting lines (figure 10).

Each strip is provided with glue preferably along all the face that must be put into contact with the film 11, so that a portion 121A of the loop is glued to the film 11 and a portion 121B of the loop comprised between the ends 121' of the area of gluing to the film is free to define a handle for the bag being processed.

Preferably, on the tape 118 a single central band 120 of glue is provided. In the example of figure 10, this single band 120 is distributed in a uniform manner between the longitudinal pre-cutting lines 124.

To obtain a loop strip 121, the tape 118 can be conveniently continuous tubular (see figure 7A) or tubular with overlapped edges 121' (see figure 7B) or it can be simply folded by 180° (in this latter case, not shown in the figures, a phase is necessary to join the free edges of the tape); figures 7A and 7B show a closed-loop strip without lateral folds, whilst figure 7C shows a closed-loop strip with bellows-like lateral longitudinal folds.

Obviously, in the event of longitudinal pre-cutting lines 124 and loop strips, the tape 118 (or anyway the strips 121) shall be welded longitudinally close to the flanks of the longitudinal pre-cutting lines facing the centre of the tape, to avoid that the strips "open" once they have been separated from the tape. Figure HA shows a portion of tape 118 wherein are visible the closed-loop development, the longitudinal pre-cutting lines 124 and the longitudinal weldings T. Figure HB shows a closed-
loop strip separated from the tape 118 through the longitudinal pre-cutting lines 124.

Preferably, the film 11 is folded so that the gluing part of the loop strip is glued on the face of film that will be constitute the upper face of the package C formed by the bag under processing, as it is shown in figures 8 and 9.

Also with a configuration of closed-loop strip, this latter is preferably glued transversally to the direction of feed of the film 11 and astride the longitudinal centerline Lm of the film. Furthermore, it is also preferably folded inside the bellows-like folding area Ls (figures 8A and 8B).

Obviously, the terms gluing and glue are here indicated in a generic manner. The term "gluing" means a fixing through adhesive material distributed on a means or anyway activated on any means in any manner, whilst the term "glue" means an adhesive material which can be simply constituted by an intrinsic characteristic of one of the element to be fixed.

Obviously, the examples described above can be combined with each other, so as to obtain the operating modes more adequate for the production of desired bags with handle.

Figures 2A and 2B show a bag S in film of plastic material according to the present invention, for the realization of packages with handle for soft sanitary products such as toilet paper, diapers and the like, comprising a handle formed by a strip 21 glued at the ends 21A on respective portions of the bag that will form two opposite lateral flanks of a package. The corresponding package is shown in figure 3.

Figures 8 and 8B show a bag S1 in film of plastic material according to the present invention, for the production of packages with handle, characterized by comprising a handle formed by a closed-loop strip 121 glued on a portion of the bag that will form the upper face 113 of a package. This strip is substantially glued for a half of the length of the loop on said portion of the bag that will form the upper face 113. The corresponding package is shown in figures 10 and 8C.

In both the illustrated examples of bag S and S1 there is a bellows-like folded portion, wherein said handle 21 or 121 is arranged transversally to the bellows-like foldlines, thus assuming a similar bellows-like fold.

Figures 12 and 13 show two schematic side views (with highlighted also overturned portions of the tape 18-118) of the apparatus for the production of the bags S and S1 respectively. In these figures it should be noted how the path of the film 11 can also comprise return areas R (in form of direction changing rollers).
before arriving to the area I of separation and gluing of the strips 21-121. In the same figures a pressing member O is shown, which can be actuated manually or in an automated manner, which is pressed on the strips 21-121 when they are still attached to the tape 18-118, thus putting them into contact with the film 11, with contemporaneous separation from the pre-cutting lines and gluing on the film 11.

Figures 14 and 15 show a more detailed view of an embodiment of the apparatus shown in figure 12 (also sketched in figure 4), now indicated as a whole with reference number 200. The apparatus 200 comprises a first reel (not indicated in figure 14 but indicated with 12 in figure 4) on which is wound a film plastic material 11. Downstream the first reel 12 a plurality of return or direction changing rollers R allowing the film 11 to arrive with the wished face on the gluing area I, are provided. Said gluing area I is defined by an inclined frame 201 at the upper end of which a first calender 202 with a first lower roller R1 supporting the film 11 and changing the direction of the film for the arrangement on the frame is provided. In a halfway position of the development of the frame 201, corresponding to the gluing area I, a second calender 203 is provided, comprising a second lower roller 203A supporting the film 11 and a second upper roller 203B. The second calender 203 provides for the pressing action of the film 11 with the tape 18, allowing the gluing of the latter on the film itself and the separation from the tape 18 of the strips 21, as better described below. The gluing area I is provided on the folding area P (the folding frame is not indicated).

The tape 18 is wound in a motorized second reel 19 facing the inclined frame 201. Downstream the second reel 19, means 204 for realizing the longitudinal pre-cutting lines 24 on the tape 18 are provided. Such longitudinal pre-cutting means 204 comprise two pair of faced cutting wheels 204A (cutting wheel and counter cutting wheel) in contact with each other to perform the cutting action. Said couples of wheels 204A have rotation axis parallel to the rotation axis of the second reel 19 and orthogonal to the moving direction of the tape 18 in the longitudinal pre-cutting area. The cutting wheels are motorized and can be controlled independently from the speed of the tape.

Downstream the longitudinal pre-cutting means 204, towing means 205 for towing the tape 18 are provided. In particulars said towing means 205 comprises two subsequent couples of parallel towing rollers through which the tape 18 is fed and towed. Said two couples of towing rollers 205 are connected by transmission belt
205A and actuated by a motor 205B (the speed of which can be adjusted). Between the two couples of towing rollers 205, gluing means are provided, in the form of two gluing dispensers 206 designed to realize two bands of glue 20 on the upper face of the tape, in proximity of the longitudinal pre-cutting lines 24.

Downstream the towing rollers 205, transversal pre-cutting means are provided, in the form of a cylinder 207 (with rotation axis parallel to the axis of the towing rollers 205) with a superficial transversal blade 207A (the length of the blade 207A is substantially equivalent to the distance between the longitudinal pre-cutting lines), such that transverse pre-cutting lines 23 can be made on the tape 18, between the longitudinal pre-cutting lines 24, therefore defining the series of strips 21. The cylinder 207 is motorized and can be controlled independently from the speed of the tape (e.g. independently from the speed of the towing rollers 205).

In correspondence of said cylinder 207 a direction changing roller 208 is provided, for moving the tape 18 towards the second calender 203.

As said before, the second calender 203 comprises a second lower roller 203A supporting the film 11 and a second upper roller 203B. Through said second calender 203 film 11 and tape 18 are fed, with the tape overlapping the film. The lower roller 203A is pushed against the second upper roller allowing the adhesion of the tape 18 in correspondence of the band 20 with glue. Downstream the nip of the second calender 203, the tape 18 change its direction being wound on the second upper rollers 203B, allowing the separation of the strips 21 (which are fixed on film 11) from the tape 18. The latter, after the separation of the strips 21, consist of bands 25 which are wound on the further reels 26. Downstream the nip of the second calender 203, the film 11 with the strips 21 is folded by the folding frame and changes its direction according to f2.

It is understood that what illustrated purely represents possible non-limiting embodiments of the present invention, which may vary in forms and arrangements without departing from the scope of the concept on which the invention is based. Any reference numbers in the appended claims are provided for the sole purpose of facilitating the reading thereof in the light of the description hereinbefore and the accompanying drawings and do not in any way limit the scope of protection of the present invention.
CLAIMS

1) A process for producing bags in film of plastic material, comprising a phase of gluing a strip (21, 121) of a thin material on a plastic film (11) forming the material of the bag (S, SI) being processed before the filling thereof with the product to be packaged, said strip (21, 121) being glued in such a manner that at least one portion (2IB, 121B) thereof is free in the part comprised between two opposite ends (21A, 121') fixed on said film (11), to define a handle for the bag being processed.

2) A process according to claim 1, wherein said strip (21, 121) is glued to said film (11) before the phases of folding (P, Ls) the film to produce the bag.

3) A process as claimed in claim 1 or 2, wherein said strip (21, 121) is glued transversally to the direction of feed (fl) of the film (11) in the gluing area (I).

4) A process as claimed in claim 3, wherein said strip is glued astride the substantial longitudinal centerline (Lm) of said film (11) being unwound.

5) A process as claimed in one or more of the previous claims, wherein is present a phase of folding in a bellows - like manner (Ls) a portion of said film (11) with one said strip (21, 121) arranged transversally to the bellows - like fold lines, said strip (21, 121) so resulting folded in said bellows - like portion (Ls).

6) A process as claimed in claims 4 and 5, wherein said bellows - like folding (Ls) occurs along said substantial longitudinal centerline (Lm) subsequently to a phase of folding (P) the film (11) along the same longitudinal centerline (Lm).

7) A process as claimed in one or more of the previous claims, wherein said strip (21, 121) is obtained through transversal separation of a tape (18, 118), on a face of which is present the glue for gluing the strip (21, 121) to the film (11), said tape (18, 118) moving forwards (f3) towards the gluing area (I) parallel to the feeding (fl) of said film (11), with said film (11) and said tape (18, 118) facing.

8) A process as claimed in claim 7, wherein said tape (18, 118) has transverse pre - cutting lines (23, 123) defining the lateral edges of the strips to be glued (21, 121).

9) A process as claimed in claim 7 or 8, wherein said tape has a pair of longitudinal pre - cutting lines (24, 124) close and parallel to respective edges of the tape (18, 118), between said longitudinal pre- cutting lines (24, 124) being defined the portion of tape (18, 118) from which said strips (21, 121) are obtained.

10) A process as claimed in claims 8 and 9, wherein said strips (21, 121) are substantially delimited by the intersections of said longitudinal (24, 124) and...
transverse (23, 123) pre-cutting lines.

11) A process as claimed in claim 9 or 10, wherein the part of said tape (18, 118) downstream of the area (I) of separation of said strips (21, 121) and relative gluing thereof on said film (11) is formed by two separate bands (25, 125), each with a width equal to the distance between a respective longitudinal pre-cutting line (24, 124) and edge of the tape (18, 118), said bands (25, 125) being wound on take-off means (26).

12) A process as claimed in one or more of the previous claims, wherein each strip (21) is open and has two opposite ends (21A) designed to be glued on said film (11), the part (21B) of said strip (21) comprised between said ends (21A) being free so as to define the grip of the handle of the bag (S) being processed.

13) A process as claimed in claim 12, wherein in the surface of tape (18) delimited by said longitudinal pre-cutting lines (24), two stripes (20) of glue are provided close to the same longitudinal pre-cutting lines (24).

14) A process as claimed in one or more of the previous claims, wherein, once the strip (21) has been glued on the film (11), this latter is folded so that the gluing ends (21A) of the strip (21) result glued on the parts of film (11) which will constitute two opposite lateral faces (22) of the package formed by the bag (S) being processed.

15) A process as claimed in one or more of claims from 1 to 11, wherein each strip (121) is closed in a loop-like manner, the gluing of said strip (121) to said film (11) comprising the gluing of at least one area (121B) of the loop in such a manner that the portion comprised between the ends (121') of the gluing area is free so as to define the handle of the bag (S1) being processed.

16) A process as claimed in claim 15, wherein on said tape (118) a unique central band (120) of glue is arranged between said longitudinal pre-cutting lines (124).

17) A process as claimed in claim 15 or 16, wherein the tape (118) from which said strip (121) is obtained is continuous tubular or tubular with overlapping edges (121') or simply folded by 180°.

18) A process as claimed in claims 9 and 17, wherein said tape (118) is longitudinally welded close to the sides of said longitudinal pre-cutting lines (124) which face the center of the tape (118).

19) A process as claimed in one or more of claims from 14 to 16, wherein,
once the strip (121) has been glued on the film (11), this latter is folded so that the gluing part (121A) of the loop - like strip (121) results glued on the part of film which will constitute the upper face (113) of the package (C) formed by the bag (SI) being processed.

20) Bag in plastic material for realizing the package of soft, rigid, or semi-rigid articles, realized according to one or more of the previous claims.

21) A bag (S) in a film of plastic material, for the realization of packages with handle for soft sanitary articles such as toilet paper, diapers and the like, characterized in that it comprises a handle formed by a strip (21) glued at the ends (21A) on respective portions of the bag that will form two opposite lateral sides (22) of a package (C).

22) A bag in a film of plastic material, for the realization of packages with handle for soft sanitary articles such as toilet paper, diapers and the like, characterized in that it comprises a handle formed by a closed loop - like strip (121) glued for at least one part (121B) thereof on a portion of the bag that will form the upper face (113) of a package (C).

23) A bag as claimed in claim 22, wherein said loop - like strip (121) is in a single continuous piece to realize said closed development or realized through fixing of opposite ends (121') of an open strip.

24) A bag as claimed in claim 22 or 23, wherein said strip (121) is glued substantially for an half of the length of said loop on said portion of the bag (S) which will form the upper face (113) of a package (C).

25) A bag as claimed in one or more of claims 21 to 24, which comprises a portion folded in a bellows - like manner (LS), wherein said handle is arranged transversally to the lines of bellows - like folding, thus assuming an analogous bellows - like fold.

26) Package (C) with a handle comprising a bag (S, SI) in a film of plastic material according to one or more of the previous claims.

27) Apparatus for performing a process or manufacturing a bag according to one or more of the previous claims.

28) Apparatus for producing bags in film of plastic material, comprising - a first reel (12) on which is wound a film plastic material (11), - a second reel (19) on which is wound a tape (18) of plastic material to be overlapped to the film (11),
- gluing means (206) providing glue on a face of the tape (18) to be overlapped to the film (11),
- means (204, 205) for cutting or pre-cutting the tape (18) to form strips (21),
- an area (I) of adhesion of the tape (18) to the film (11) arranged downstream of said gluing means (206) and downstream of said means (204, 205) for cutting or pre-cutting the tape (18) to form strips (21) provided with glue, on said area of adhesion being arranged means for pressing together at least a portion of the tape (18) and said film (11) and for separating said strips glued to the film from the tape (11),
- a folding frame for folding the film (11) with the strips (21) glued thereon.

29) Apparatus according to claim 28, wherein said means (204, 205) for pre-cutting the tape (18) to form strips (21) are provided upstream the area of adhesion (I) and comprise blades to realize longitudinal and transversal pre-cutting lines with reference to the feeding direction of the tape (18), thus defining a longitudinal series of said strips (21), the opposite ends (21A) of said strips (21) being provided with glue for the adhesion to the film (11).

30) Apparatus according to claim 29, wherein said blades are provided on motorized rollers (204, 207) which can be actuated independently from the speed of the tape (18).

31) Apparatus according to claim 28, 29 or 39, wherein towing means (205) upstream the area of adhesion (I) are provided.

32) Apparatus according to claim 31, wherein said towing means (205) comprises two couples of towing rollers (205); said gluing means (206) being arranged between said two couples of towing rollers (205).

33) Apparatus according to one or more of the preceding claims, wherein means for pressing together at least a portion of the tape (18) and said film (11) and for separating said strips glued to the film from the tape (11) comprise a calender (203) through which said film (11) and tape (18) are fed, with the tape overlapping the film and the lower roller (203A) of the calender (203) pushing against the second upper roller, thus allowing the adhesion of the tape (18) in correspondence of the glue (20); downstream the nip of second calender (203) being provided means for changing the direction of the tape (18) with respect to the direction of feeding in the nip, becoming detached from the film (11) thus allowing the separation of the strips (21) from the tape (18).
According to International Patent Classification (IPC) or to both national classification and IPC.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal**

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
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<tr>
<td>Y</td>
<td>column 7, line 32 - column 7, line 68; figure 8</td>
<td>68; 9-11, 13, 15-19</td>
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<td>Y</td>
<td>column 5, line 65 - column 7, line 58; figures 1-10</td>
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<td>Y</td>
<td>page 12, line 16 - page 13, line 26; figures 18-22</td>
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**D** Further documents are listed in the continuation of Box C

**X** See patent family annex

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**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**X** document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**Y** document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

**&** document member of the same patent family

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<table>
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<tr>
<td>DE 3634238 A1</td>
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<td>US 5186542 A</td>
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