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(54) PACKAGING FOR SPECTACLE LENSES

(57) The invention relates to a packaging for a plurality of spectacle lenses (6). The packaging comprises a flexible sheet material (1) for radially holding the lens circumference, the flexible sheet material further comprising radially inward protruding sheet material portions (5) for axial support of the lens rim. The invention further relates to methods for packing spectacle lenses into such packagings.

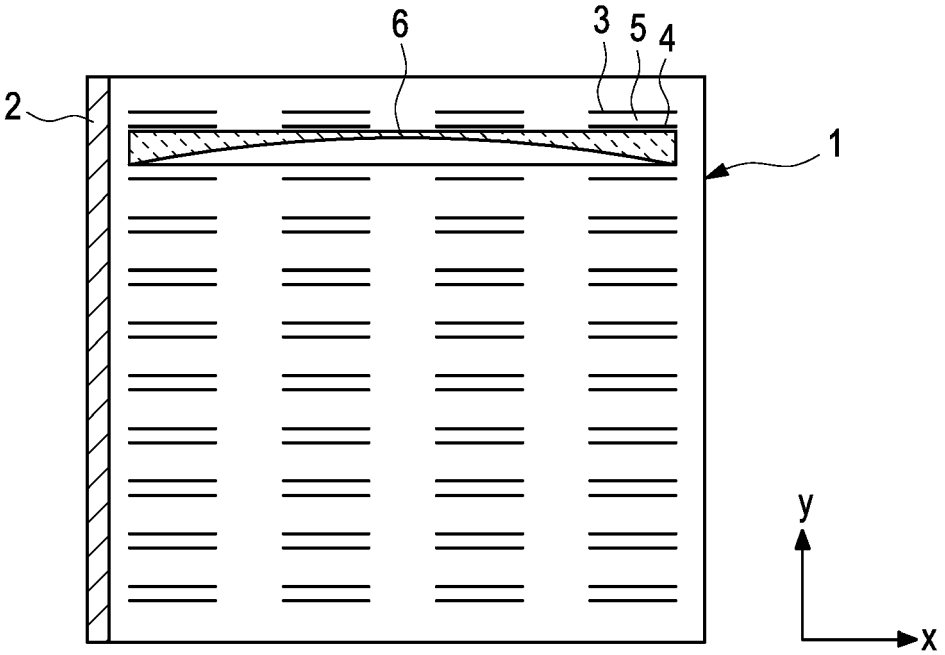

Fig. 1

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Description

[0001] The invention relates to a packaging for spectacle lenses and a method for packing spectacle lenses into a packaging.

[0002] Semifinished or finished spectacle lenses are currently packed into individual packagings for transport to the optician or another destination where the lenses are further finished and/or fitted into frames. Packing and unpacking spectacle lenses into such individual packagings is laborious and time-consuming and requires a substantial amount of packaging material. In many cases such packagings require additional inlays made of foam or other soft materials for adequate protection of the individual lens and in particular the optical surfaces of the lens.

[0003] It is the object of the present invention to provide a packaging for spectacle lenses and methods for packing spectacle lenses into such a packaging which are more efficient and require less packaging material.

[0004] According to a first aspect, the invention provides a packaging for a plurality of spectacle lenses, characterized in that it comprises a flexible sheet material for radially holding the lens circumference, the flexible sheet material further comprising radially inward protruding sheet material portions for axial support of the lens rim.

[0005] First, some terms used in the context of the invention are defined.

[0006] The packaging for spectacle lenses of the invention provides sufficient protection for spectacle lenses during transport and storage. Typically, such spectacle lenses comprise at least one finished surface (either the front or rear surface) and may comprise two finished surfaces. The term spectacle lens, as used herein, includes spectacle lens blanks and spectacle lens semi-finished products. A spectacle lens blank is understood to mean a usually pre-shaped piece of material for producing a lens, in any state before the surface treatment has been completed. Spectacle lens semi-finished products are lens blanks where the optical processing has only been finished on one surface In most cases, such spectacle lenses are essentially cylindrical and do not comprise the final circumferential shape for fitting into a frame. The packaging is typically used for transport and storage prior to this final fitting. The lens circumference is defined by the radially most outward protruding part of the lens.

[0007] The packaging is designed for a plurality of spectacle lenses. A plurality is two or more. Often, packaging is designed for 5 to 20 spectacle lenses, preferably 10 spectacle lenses. The packaging may carry as many lenses as possible as long as it can securely hold the lenses.

[0008] The packaging comprises a flexible sheet material. The flexibility of the material is sufficient to fit the sheet material around the lens circumference so that it can radially hold this lens circumference. This provides radial support to each spectacle lens in the packaging.

[0009] The flexible sheet material further comprises radially inward protruding sheet material portions for axial support of the lens rim. In this context, the terms "radial" and "axial" refer to the plane of the spectacle lenses packed into the packaging. The plurality of spectacle lenses is stacked into the packaging on top of each other in axial direction. Axial support therefore means that lenses stacked on top of or above each other are secured against axial dislocation. While the packaging often will have an essentially cylindrical shape with the circumference of each spectacle lens forming essentially a circle, the invention is not limited thereto. The circumference of the lens and the corresponding shape of the packaging might have a different shape, e.g. oval. The term "radial", as used herein, is not intended to limit the invention to a cylindrical shape.

[0010] This axial support is provided for the lens rim, i.e. an area of the lens close to its outer circumference. It is provided by radially inward protruding sheet material portions. This means that the axial support is provided by the sheet material itself, not by separate mounts affixed to the sheet material. Parts of the sheet material are protruding radially inward thereby providing axial support for the respective parts of the lens rim.

[0011] The invention provides a simple, cost efficient and easy-to-use packaging for the plurality of spectacle lenses. The lenses are stacked in the packaging so that the packaging filled with the plurality of spectacle lenses typically has an essentially cylindrical shape, the diameter corresponding to the diameter of the spectacle lenses plus the comparatively small thickness of the sheet material, and the height approximately corresponding to the sum of the axial space requirement of the spectacle lenses plus the sum of the axial distances between the spectacle lenses within the packaging.

[0012] Axial support of the lens rim preferably is provided on both sides, front and back surface of the lens. Preferably, the lens rim fits between two axial supports so that the lens is secured against axial dislocation, i.e. the axial distance between these axial supports essentially corresponds to the axial thickness of the lens rim.

[0013] The sheet material preferably comprises or consists of paper, cardboard, and/or a polymeric material. Paper and/or cardboard are preferred. Preferred values for the specific weight of paper or cardboard are 80 to 500 g/m^2, preferably 120 to 250 g/m^2. These sheet materials are readily available, easy to handle and recyclable.

[0014] In a particularly preferred embodiment, the packaging comprises an essentially rectangular sheet with two opposing edges (sides) joined together so as to form an essentially cylindrical packaging. For joining the edges together, the rectangular sheet may comprise appropriate adhesive stripes or other appropriate affixing means. The rectangular sheets may be stored as flat sheets prior to use and assembled to form an essentially cylindrical packaging during the packing process. The assembly process is very simple compared to prior art

folded boxes. An essentially rectangular sheet is rectangular within the limits and tolerances of manufacture and measurement of such a sheet. An essentially cylindrical packaging is adapted to the shape of the lens circumference and therefore may deviate from a cylindrical shape to the extent this lens circumference deviates from a cylindrical shape. In one embodiment, an essentially rectangular sheet can be an isosceles trapezoid and an essentially cylindrical packaging can be in a form of oval.

[0015] In one embodiment of the invention, the axial distance between two axial supports for two neighboring spectacle lenses is adapted to the maximum axial space requirement of a spectacle lens. The maximum axial space requirement is measured from the respective parts of the front face and rear face of the lens which are the most outward protruding parts in front and rear axial direction. For a typical lens with a front face curvature, this axial space requirement is the axial distance from the rearward facing edge of the lens rim to the center of the front face of the lens. The maximum axial space requirement typically is larger than the maximum thickness (or maximum axial thickness) of the lens which may be the thickness at the lens rim or the thickness in the center of the lens. Adaptation to the maximum axial space requirement allows prefabrication of the packaging according to previously provided lens specifications including this maximum axial space requirement. Alternatively, it is possible to provide the inward protruding sheet material portions on site immediately prior to packing the lenses (details see below) so that the axial distance can be adapted to the axial space requirement of the actually packed lenses.

[0016] In a preferred embodiment, the packaging comprises axial and/or radial perforations for opening the packaging. Axial perforations run along the axial length of the packaging cylinder and allow an easy opening of the packaging to remove all lenses. A radial perforation preferably runs along the complete circumference of the packaging between two neighboring lenses and allows easy removal of a single lens or some lenses through circumferential opening of the packaging. The packaging may comprise more than one such radial perforation, and may comprise a radial perforation between each of the adjacent neighboring lenses. The term perforation as used herein includes tear strips.

[0017] In a particularly preferred embodiment, the sheet comprises pairs of parallel circumferential cuts, each pair enclosing a sheet portion radially protruding inward (cutout portion) for providing axial support of the lens rim.

[0018] This embodiment enables to provide the radially inward protruding sheet material portions from the simple flat sheet material. A pair of parallel circumferential cuts encloses a circumferential, essentially rectangular sheet material portion separated from the remaining sheet material through the circumferential cuts (in axial direction) and being connected to the remaining sheet material at its circumferential end portions. When the complete sheet material forms an essentially cylindrical packaging, this sheet material portion can be pushed radially inwards and remains in this position due to the tension of the sheet material. The cutout sheet material portions flexed radially inwards therefore provides axial support for the lens rims in a simple and efficient manner. The circumferential cuts and the corresponding sheet portions can easily be adapted to provide axial support for lenses of varying thickness.

[0019] Preferably, the packaging comprises at least two, preferably at least three, further preferred four pairs of parallel circumferential cuts around the circumference of the packaging. This provides axial support of the lens rim in at least two, preferably three, further preferred four areas around the circumference of the lens. Preferably, these supports are essentially distributed around the circumference in an equidistant manner.

[0020] Preferably, the circumferential length of each cut is 5 to 25%, preferably 10 to 20% of the circumference of the packaging. This provides sufficient axial support of the lens rim while maintaining a sufficient overall strength of the packaging. Of course, a circumferential cut having a length of the maximum 25% can only be used for a packaging having less than four pairs of parallel circumferential cuts around the circumference of the packaging.

[0021] In a preferred embodiment, the axial distance between the two cuts of a pair of cuts is 15 to 60%, preferably 30 to 40% of the axial distance between two axial supports for two neighboring spectacle lenses. This feature describes the relative axial length of the cutout portions protruding radially inwards and the sheet material portions between two such cutout portions. This relation provides for sufficient overall mechanical strength of the packaging. The sheet material portions between two such cutout portions must be adapted to the maximum axial space requirement of the lenses.

[0022] A second aspect of the invention is a method for packing spectacle lenses into a packaging, comprising the steps of:

a. forming an essentially cylindrical packaging from a flexible sheet material for radially holding the lens circumference,
b. forming radially inward protruding sheet material portions in the sheet material for axial support of the lens rim of the first and lowermost spectacle lens,
c. inserting the first and lowermost spectacle lens into the packaging,
d. forming radially inward protruding sheet material portions for axial support of the lens rim of the second spectacle lens,
e. inserting the second spectacle lens into the packaging,
f. repeating steps d. and e. for each subsequent lens.

[0023] In this method, the packaging is formed first, and the spectacle lenses are inserted into this packaging

sequentially.

[0024] A third aspect of the invention is a method for packing spectacle lenses into a packaging, comprising the steps of:

a. placing an essentially rectangular sheet for radially holding the lens circumference into a half-shell having a curvature essentially corresponding to the circumferential curvature of the spectacle lenses,

b. placing the spectacle lenses into the sheet so that the lens rims are partially supported by the sheet laid out on the surface of the half-shell,

c. forming radially inward protruding sheet material portions for axial support of the lens rim of the spectacle lenses over a part of the circumference of the packaging,

d. closing the packing by joining the opposing edges of the essentially rectangular sheet,

e. forming radially inward protruding sheet material portions in the sheet material for axial support of the lens rim of the spectacle lenses over the remaining part of the circumference of the packaging.

[0025] In this method, the packaging placed into the half-shell is filled first with spectacle lenses and subsequently closed by joining the opposing edges of the essentially rectangular sheet. In this method, steps b. and c. can either be carried out sequentially for each lens (after placing the lens into the half-shell, the corresponding radially inward protruding sheet material portions for this lens are formed), or, alternatively, multiple lenses or all lenses can be inserted in step b. and the corresponding radially inward protruding sheet material portions for these lenses formed subsequently in step c.

[0026] Both methods according to the second and third aspects of the invention can be carried out either manually or mechanically/automatically using appropriate machines or robots.

[0027] In both methods, the handling and manipulating of the lenses can be carried out with a suction device. A suction device allows precise and mechanically gentle handling of the lenses.

[0028] The methods of the present invention are preferably carried out so that a packaging as previously described and claimed in product claims 1 to 9 is formed.

[0029] The sheet material used in the claimed methods preferably comprises or consists of paper, cardboard, and/or a polymeric material. Paper and/or cardboard are preferred. Preferred values for the specific weight of paper or cardboard are 80 to 500 g/m^2, preferably 120 to 250 g/m^2. These sheet materials are readily available, easy to handle and recyclable.

[0030] In a particularly preferred embodiment, the method uses an essentially rectangular sheet with two opposing edges (sides) joined together so as to form an essentially cylindrical packaging. For joining the edges together, the rectangular sheet may comprise appropriate adhesive stripes or other appropriate affixing means. The rectangular sheets may be stored as flat sheets prior to use and assembled to form an essentially cylindrical packaging during the packing process. In one embodiment, an essentially rectangular sheet can be an isosceles trapezoid and an essentially cylindrical packaging can be in a form of oval.

[0031] In one embodiment of the methods, the axial distance between two axial supports for two neighboring spectacle lenses is adapted to the maximum axial space requirement of a spectacle lens.

[0032] In a preferred embodiment, the packaging formed according to the claimed methods comprises axial and/or radial perforations for opening the packaging. The packaging may comprise more than one such radial perforation, and may comprise a radial perforation between each of the adjacent neighboring lenses.

[0033] In a particularly preferred embodiment, the sheet used in the claimed methods comprises pairs of parallel circumferential cuts, each pair enclosing a sheet portion radially protruding inward (cutout portion) for providing axial support of the lens rim.

[0034] This embodiment enables to provide the radially inward protruding sheet material portions from the simple flat sheet material. A pair of parallel circumferential cuts encloses a circumferential, essentially rectangular sheet material portion separated from the remaining sheet material through the circumferential cuts (in axial direction) and being connected to the remaining sheet material at its circumferential end portions. When the complete sheet material forms an essentially cylindrical packaging, this sheet material portion can be pushed radially inwards and remains in this position due to the tension of the sheet material. The cutout sheet material portions flexed radially inwards therefore provides axial support for the lens rims in a simple and efficient manner. The circumferential cuts and the corresponding sheet portions can easily be adapted to provide axial support for lenses of varying thickness.

[0035] Preferably, the packaging formed according to the claimed methods comprises at least two, preferably at least three, further preferred four pairs of parallel circumferential cuts around the circumference of the packaging. This provides axial support of the lens rim in at least two, preferably three, further preferred four areas around the circumference of the lens. Preferably, these supports are essentially distributed around the circumference in an equidistant manner.

[0036] Preferably, the circumferential length of each cut is 5 to 25%, preferably 10 to 20% of the circumference of the packaging. This provides sufficient axial support of the lens rim while maintaining a sufficient overall strength of the packaging. Of course, a circumferential cut having a length of the maximum 25% can only be used for a packaging having less than four pairs of par-

allel circumferential cuts around the circumference of the packaging.

[0037] In a preferred embodiment, the axial distance between the two cuts of a pair of cuts is 15 to 60%, preferably 30 to 40% of the axial distance between two axial supports for two neighboring spectacle lenses. This feature describes the relative axial length of the cutout portions protruding radially inwards and the sheet material portions between two such cutout portions. This relation provides for sufficient overall mechanical strength of the packaging. The sheet material portions between two such cutout portions must be adapted to the maximum axial space requirement of the lenses.

[0038] As indicated above, the packaging according to the invention typically is essentially cylindrical according to the circumferential shape of the spectacle lenses.

[0039] Optionally, the packaging might be wrapped into a protective film preferably made from a suitable polymeric material. A protective film provides improved protection against the environment and increases mechanical stability.

[0040] Optionally, it is possible to seal one or both axial ends of the packaging with an axial cover. Such an axial cover preferably is made from a material with sufficient rigidity, e.g. plastics or cardboard. The axial cover can be affixed to the packaging using an appropriate adhesive, stapling and/or a friction and/or form fit. The axial cover also increases mechanical stability and improves protection against the environment.

[0041] According to a further preferred embodiment, in a subsequent step this packaging is inserted into an outer packaging. This outer packaging can provide additional mechanical protection and preferably comprises a rectangular cube shape, which makes it easier to store and pile such outer packagings.

[0042] An outer packaging comprising a packaging as previously defined is further subject matter of the invention.

[0043] Embodiments of the invention are described with reference to the attached drawings. These drawings show:

Fig.1: Flexible sheet with cutout portions for axial support of the lenses;

Fig.2: Longitudinal cross-section of the packaging with inserted lenses:

Fig.3: Cross section showing schematically the concept of the cutout portions providing axial support for the lenses;

Fig.4: Schematically the steps of a manual method for packing and unpacking lenses;

Fig.5: Schematically the steps of a first mechanical method for packing and unpacking lenses;

Fig.6: Schematically the steps of a second mechanical method for packing and unpacking lenses.

[0044] Fig.1 shows a front view of a rectangular sheet 1 made from paper material with sufficient flexibility and tensile strength. Along one edge, the sheet comprises an adhesive strip 2 which can be used to join this edge with the opposing edge of the sheet to a cylinder. The sheet comprises pairs of parallel cuts 3, 4 in circumferential direction x. Between each pair, a cutout portion 5 is formed.

[0045] As shown in Fig.3, once the sheet has been formed into cylindrical shape, each cutout portion 5 can be flexed inwards by applying a force in the direction of the arrow 7. Once the cutout portion 5 has been flexed inward, it remains in this position thanks to the tensile strength of the sheet material. Each cutout portion 5 then provides an axial support for a spectacle lens 6.

[0046] As shown in Fig.1, the axial distance in the direction y between two cutout portions 5 corresponds approximately to the maximum axial space requirement of a spectacle lens 6 to be inserted into the packaging. The axial space requirement is determined by both the maximum thickness and the curvature of a spectacle lens.

[0047] Fig.2 shows a longitudinal cross-section of a partially filled packaging according to the invention. It is shown how inward flexed cutout portions 5 provide axial support of a spectacle lens 6. At the same time, the sheet material radially holds the lens circumference.

[0048] By appropriate positioning of the cuts 3, 4 in the paper, the distance can be optimally adjusted depending on the lens thickness and axial space requirement respectively. In the case of thin lenses, choosing a smaller distance leads to less packaging volume.

[0049] In addition to the use of paper sheets with predefined cuts, the individual introduction of the cuts by an appropriate tool (e.g. laser or cutting knife) is another variant.

[0050] There is no need for inlays to protect the glasses. In the case of extremely convex glasses, contact with the neighboring glass can be avoided by choosing a sufficient axial length of the cutout portion 5 so as to provide adequate axial distance between adjacent lenses.

[0051] The invention typically requires only one third of the packaging material which is required for individual packagings of the prior art. As explained above, no inlays are required and thus no material for such inlay is necessary.

[0052] Extra stickers for the specification of glass data are not necessary. All the necessary information can be printed on the material sheet before it becomes a roll.

[0053] Perforations or similar weakenings provided in the sheet help to make it easier to remove the glasses from the roll. Depending on the positioning, the perforation can be optimized for the removal of an individual glass (radial or circumferential perforation) or the complete opening of the packaging (axial perforation).

[0054] Fig.4 schematically shows a manual method for

packing and unpacking of lenses.

[0055] In step A, the sheet material 1 is formed to a cylindrical roll by adhesive connection of the corresponding opposing edges.

[0056] In step B, the spectacle lenses 6 are sequentially manually inserted into the roll.

[0057] In step C, four cutout portions 5 are pushed radially inwards so as to provide axial support for the inserted spectacle lenses 6.

[0058] In step D, each packaging (roll) is inserted into an outer packaging 8 for further transport and storage.

[0059] Step E shows the manual removal of single lenses from a packaging comprising circumferential perforations 9. The lens with the corresponding part of the packaging can be torn apart from the packaging via the corresponding perforation 9.

[0060] Step F shows how another variant of the packaging can be opened using an axial perforation 10 for subsequent removal of all glasses.

[0061] Fig.5 schematically shows a first mechanical method for packing and unpacking of lenses.

[0062] The sheet material 1 is formed to a cylindrical roll by adhesive connection of the corresponding opposing edges. In step A, the spectacle lenses 6 are sequentially mechanically inserted into the roll. This is done using a robot 11 comprising a suction device 12 attached to an arm 13.

[0063] In step B, the cutout portions 5 for the lens previously inserted into the roll are pushed radially inwards using the robot 11 comprising an arm 13 and a suction device 12 so as to provide axial support for the inserted spectacle lenses 6. Steps A and B are repeated for each lens inserted into the roll.

[0064] Each packaging (roll), after having been filled with lenses, is taken up by a robot 14 comprising a four finger gripper 15 (Step C), and is inserted into an outer packaging 8 for further transport and storage (Step D).

[0065] For mechanical removal of single lenses from a packaging comprising circumferential perforations 9, the packaging is taken out of the outer packaging using a robot 14. A single lens with the corresponding part of the packaging can be torn apart from the packaging at the corresponding perforation 9 using the four finger gripper 15 (Step E). In Step F, the paper of the packaging is removed from the lens.

[0066] Fig.6 schematically shows a second mechanical method for packing and unpacking of lenses.

[0067] The sheet material 1 is placed into a half-shell 16 having a curvature essentially corresponding to the circumferential curvature of the spectacle lenses (Step A). This is done using a robot 11 comprising a suction device 12 attached to an arm 13.

[0068] In step B, the spectacle lenses 6 are sequentially mechanically inserted into the roll using the robot 11/suction device 12. After each insertion of a lens, three of four cutout portions 5 along the circumference are pushed radially inwards using appropriate mechanical devices of the half-shell 16 (not shown in the drawing). These three cutout portions are the cutout portions placed at the bottom and close to the edges of the half-shell 16.

[0069] After placing all lenses into the packaging, the sheet material is formed to a cylindrical roll by adhesive connection of the corresponding opposing edges in Step C. The fourth cutout portions placed in the area of the top of the roll are also pushed radially inwards after closing the roll.

[0070] Each packaging (roll), after having been filled with lenses, is taken up by a robot 14 comprising a four finger gripper 15 (Step D), and is inserted into an outer packaging 8 for further transport and storage (Step E).

[0071] For mechanical removal of the lenses from a packaging comprising an axial perforation 10, the packaging is taken out of the outer packaging using a robot 14 (Step F) and placed into a half-shell 16. Preferably the robot 14 uses a four finger gripper for this task.

[0072] A robot comprising a finger gripper 17 (preferably a two finger gripper) opens the packaging tearing apart the axial perforation 10 (Step G).

[0073] In Step H, the lenses 6 are sequentially removed from packaging using the suction device 12 of the robot.

Claims

1. Packaging for a plurality of spectacle lenses (6), **characterized in that** it comprises a flexible sheet material (1) for radially holding the lens circumference, the flexible sheet material (1) further comprising radially inward protruding sheet material portions (5) for axial support of the lens rim.

2. Packaging according to claim 1, **characterized in that** the sheet material (1) comprises paper, cardboard, or polymer material.

3. Packaging according to claim 1 or 2, **characterized in that** it comprises an essentially rectangular sheet (1) with two opposing edges joined together so as to form an essentially cylindrical packaging.

4. Packaging according to any of the claims 1 to 3, **characterized in that** the axial distance between two axial supports (5) for two neighboring spectacle lenses (6) is adapted to the maximum axial space requirement of a spectacle lens.

5. Packaging according to any of the claims 1 to 4, **characterized in that** it comprises axial and/or radial perforations (9, 10) for opening the packaging.

6. Packaging according to any of the claims 1 to 5, **characterized in that** the sheet (1) comprises pairs of parallel circumferential cuts (3, 4), each pair enclosing a sheet portion (5) radially protruding inward

for providing axial support of the lens rim.

7. Packaging according to claim 6, **characterized in that** it comprises at least two, preferably at least three, further preferred four pairs of parallel circumferential cuts (3, 4) around the circumference of the packaging.

8. Packaging according to claim 6 or 7, **characterized in that** the circumferential length of each cut (3, 4) is 5 to 25%, preferably 10 to 20% of the circumference of the packaging.

9. Packaging according to any of the claims 6 to 8, **characterized in that** the axial distance between the two cuts (3, 4) of a pair of cuts is 15 to 60%, preferably 30 to 40% of the axial distance between two axial supports for two neighboring spectacle lenses.

10. Method for packing spectacle lenses into a packaging , **characterized in** comprising the steps of:

a. forming an essentially cylindrical packaging from a flexible sheet material (1) for radially holding the lens circumference,
b. forming radially inward protruding sheet material portions (5) in the sheet material (1) for axial support of the lens rim of the first and lowermost spectacle lens (6),
c. inserting the first and lowermost spectacle lens (6) into the packaging,
d. forming radially inward protruding sheet material portions (5) for axial support of the lens rim of the second spectacle lens (6),
e. inserting the second spectacle lens (6) into the packaging,
f. repeating steps d. and e. for each subsequent lens (6) .

11. Method for packing spectacle lenses into a packaging , **characterized in** comprising the steps of:

a. placing an essentially rectangular sheet (1) for radially holding the lens circumference into a half-shell (16) having a curvature essentially corresponding to the circumferential curvature of the spectacle lenses (6),
b. placing the spectacle lenses (6) into the sheet so that the lens rims are partially supported by the sheet laid out on the surface of the half-shell,
c. forming radially inward protruding sheet material portions (5) in the sheet material (1) for axial support of the lens rim of the spectacle lenses (6) over a part of the circumference of the packaging,
d. closing the packing by joining the opposing edges of the essentially rectangular sheet (1),
e. forming radially inward protruding sheet material portions (5) in the sheet material (1) for axial support of the lens rim of the spectacle lenses (6) over the remaining part of the circumference of the packaging.

12. Method according to claim 10 or 11, **characterized in that** the steps are carried out manually.

13. Method according to claim 10 or 11, **characterized in that** the steps are carried out mechanically.

14. Method according to claim 13, **characterized in that** the handling of the lenses is carried out with a suction device (12).

15. Method according to any of the claims 10 to 14, **characterized in that** in a subsequent step the packaging is inserted into an outer packaging (8).

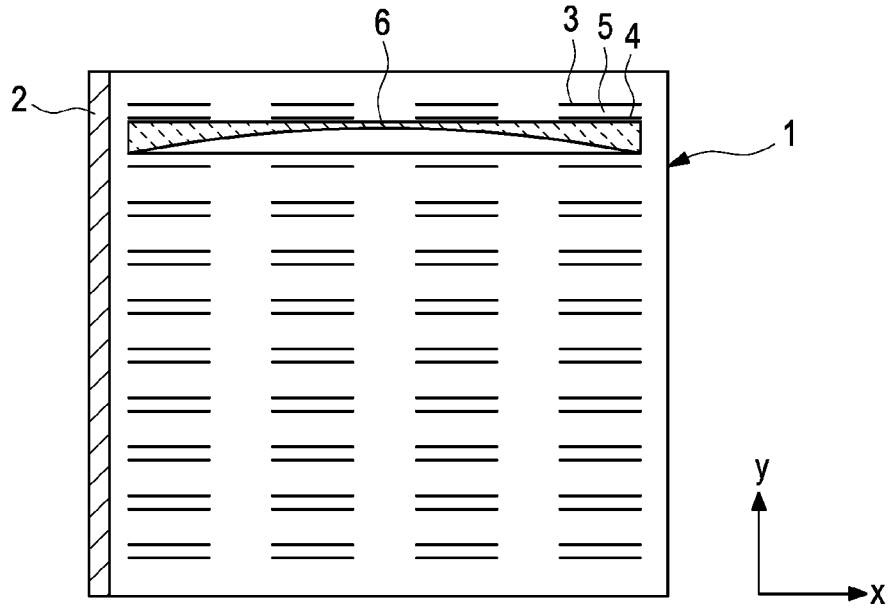

Fig. 1

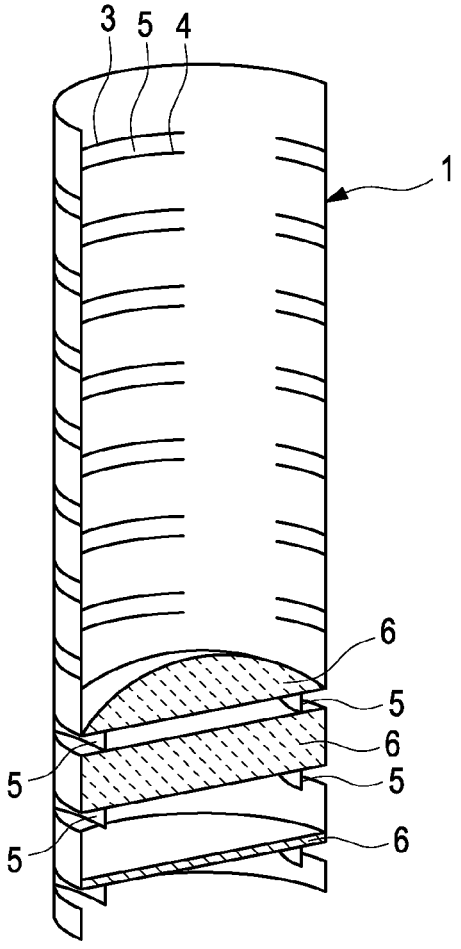

Fig. 2

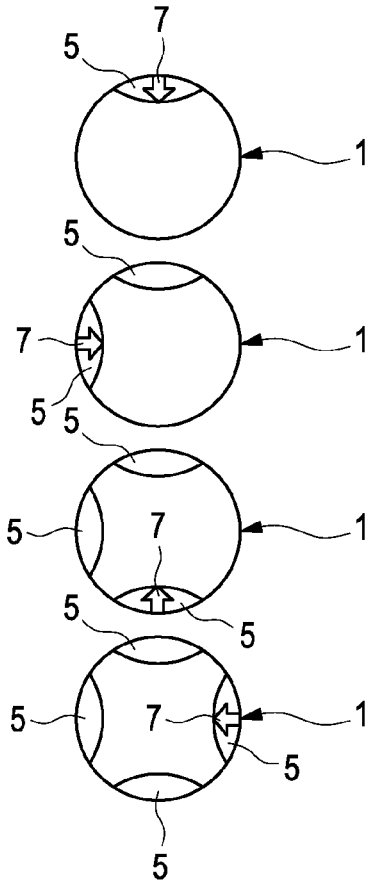

Fig. 3

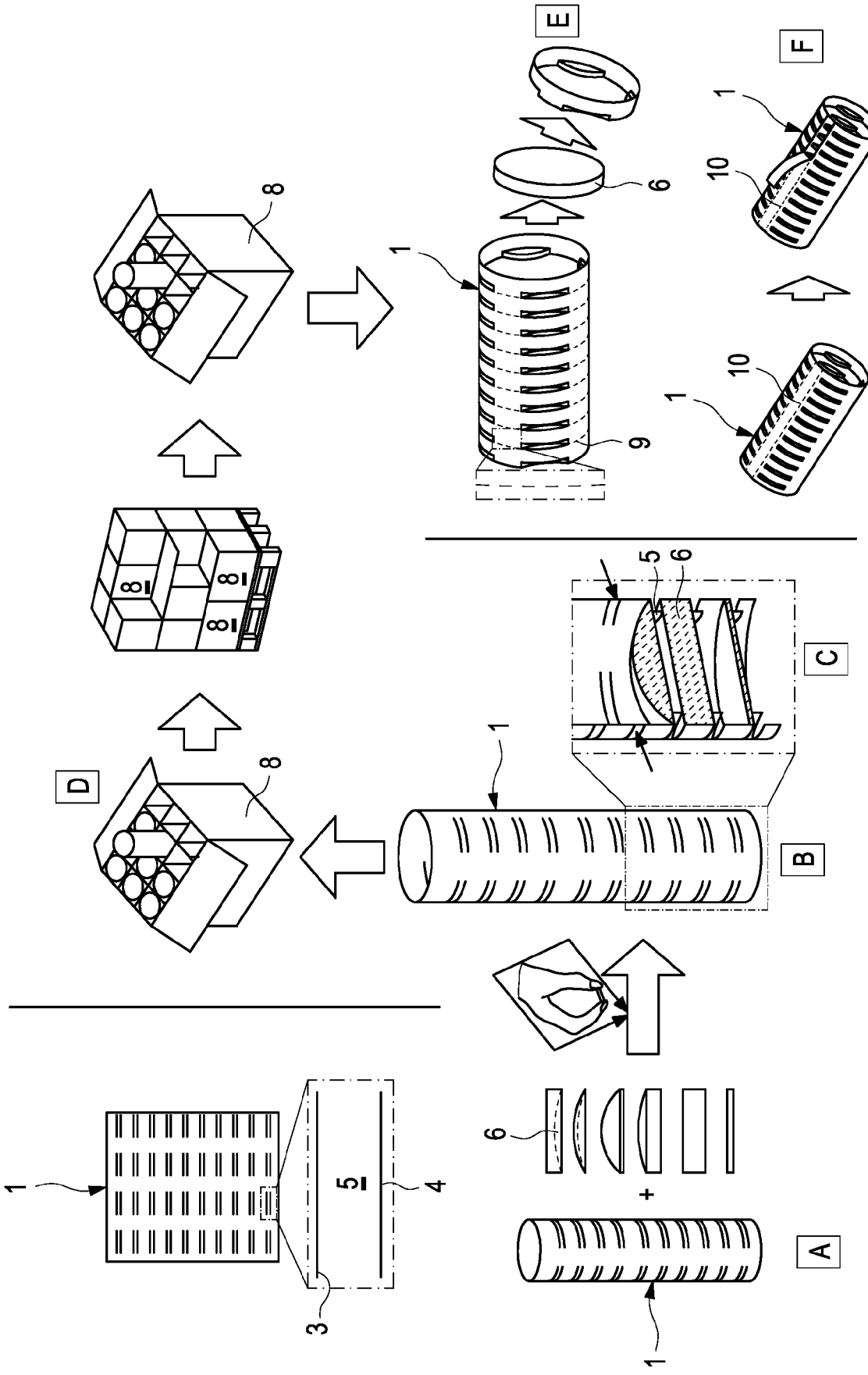

Fig. 4

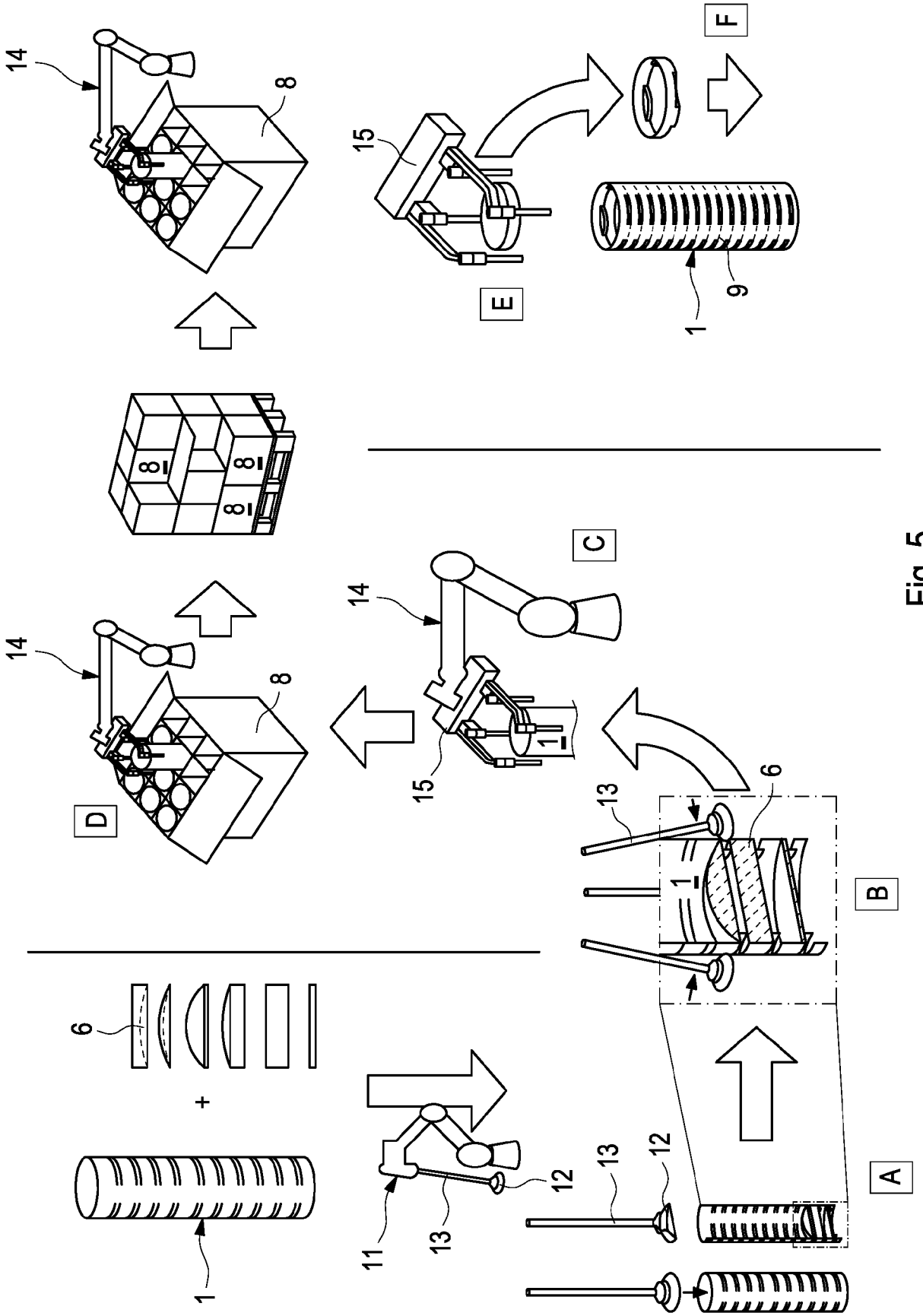

Fig. 5

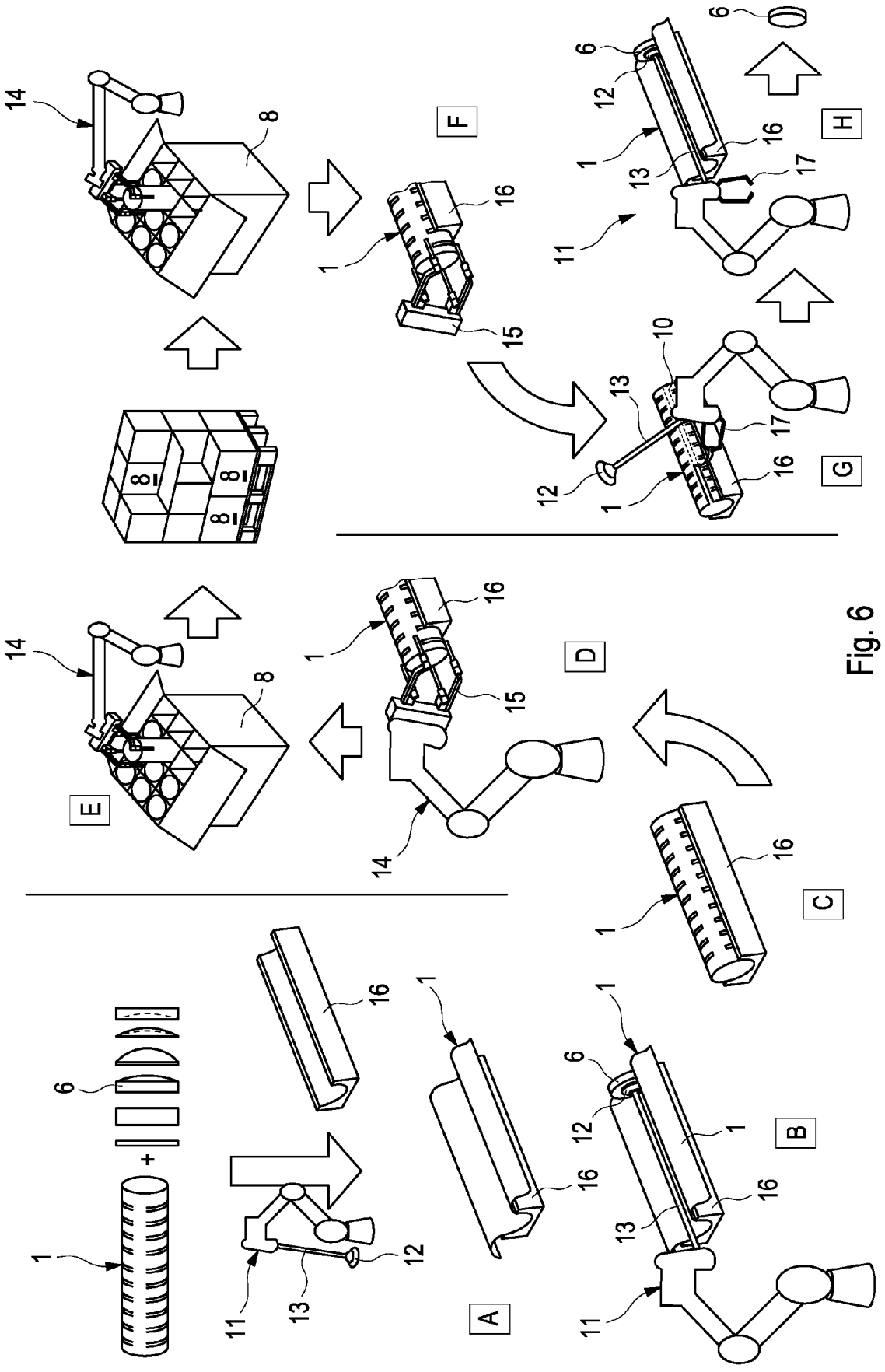

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 7085

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	WO 00/12408 A1 (RECOT INC [US]) 9 March 2000 (2000-03-09) * page 5, line 27 - page 9, line 16; figures 1-9 * -----	1-6, 8-10,12, 13,15 14 11	INV. B65D5/489 B65D85/38 B65B23/20 B65D5/50
Y	EP 1 533 249 A2 (NORVILLE GROUP LTD [GB]) 25 May 2005 (2005-05-25) * paragraph [0022]; figures 1-6 * -----	14	
X	EP 0 549 874 A1 (NESTLE SA [CH]) 7 July 1993 (1993-07-07) * column 3, line 38 - column 4, line 40; figures 1-6 * -----	1-4, 6-10,12, 13	
X	FR 2 474 445 A1 (SOCAR STE CONTINENT CARTON OND [FR]) 31 July 1981 (1981-07-31) * page 5, line 18 - page 6, line 11; figures 1-5 * -----	1-4, 6-10,12, 13	

TECHNICAL FIELDS SEARCHED (IPC)

B65D
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 February 2021	Grondin, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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