



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.03.2022 Bulletin 2022/11

(51) International Patent Classification (IPC):
B31B 70/26 ^(2017.01) **B31B 70/81** ^(2017.01)

(21) Application number: **20196090.3**

(52) Cooperative Patent Classification (CPC):
B31B 70/8135; B31B 70/262; B31B 70/8123;
B31B 2155/001; B31B 2155/0014; B31B 2160/10;
B65D 33/28

(22) Date of filing: **14.09.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventor: **Pach, Rafa**
62-262 Wierzyce (PL)

(74) Representative: **Wroblewski, Marcin Jan**
Fert, Jakubiak vel Wojtczak
Wróblewski rzecznicy patentowi
Sp. P. / ul. Gdanska 126/A103
90-520 Lodz (PL)

(71) Applicant: **Schur Flexibles Poland Sp. z o.o**
62-006 Bogucin (PL)

(54) **A METHOD FOR MANUFACTURING A BAG FOR HYGIENE PRODUCTS**

(57) A method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, in which a continuous package material (1) comprising a central portion (2) and side portions (3) is supplied (101) in the operating direction of the production line A with the preliminary formation (102) of channels (5) intended for the tapes (4) by folding the package material (1) in such a manner that, in a cross-section relative to the operating direction of the production line A, the package material (1) takes on a shape resembling the letter M, in which the central portion (2) constitutes the inclined arms of the letter M connected in its lower vertex, the channels (5) being defined by spaces between the side portions (3) and the central portion (2), or folding the package material (1) in such a manner that, in a cross-section relative to the operating direction of the production line A, the package material (1) takes on a shape resembling the letter M, in which the central portion (2) constitutes the inclined arms of the letter M connected in its lower vertex, and by at least partial overlapping of the outer surfaces of the free ends of the package material (1) along the operating direction of the production line by strips (6) made of a material thermally compatible with the package material (1), the channels (5) being defined by spaces between layers of the package material (1) and the strips (6), or folding the package material (1) in the central portion (2) along a fold line B extending in the operating direction of the production line A, in such a manner that the folded layers of the package material (1) are arranged substantially parallel relative to each other, and at least partial overlapping of the outer surfaces of layers of the package material (1) along the operating direction of the production line by strips (6) made of a material thermally com-

patible with the package material (1), the channels (5) being defined by spaces between layers of the package material (1) and the strips (6). Subsequently, the openings (7) are cut out (103) in the package material (1) next to the preliminarily formed channels (5), upon which the tape (4) made of a material thermally compatible with the package material (1) is introduced (104) into each of the preliminarily formed channels (5) in the operating direction of the production line A with the positioning (105) of the tapes (4) in the channels (5) next to the cut out openings (7). This is followed by final formation (106) of the channels (5) by welding combined or overlapping layers of the package material (1) in the operating direction of the production line A, with the formation of (107) individual bags by welding the package material (1) in a cross direction relative to the operating direction of the production line A and cutting off (108) the individual bags (12) from each other.

A method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, in which a continuous package material (1) comprising a central portion (2) and side portions (3) is supplied (201) in the operating direction of the production line A, and the tapes (4) are placed (202) next to the central portion (2) of the package material 1, near the side portions (3) in the operating direction of the production line A.

This is followed by the preliminary formation (203) of channels (5) intended for the tapes by folding the side portions of the package material (1), in such a manner that the tapes (4) are placed in spaces between the central portion (2) and the side portions (3). Subsequently, the package material (1) is folded (204) in the central portion (2) along the fold line B extending in the operating

direction of the production line A, in such a manner that the folded layers of the package material (1) are arranged substantially parallel relative to each other, upon which the openings (7) are cut out (205) in the package material (1) next to the preliminarily formed channels (5) above or below the tapes (4). In the next step, the tapes (4) are positioned (206) in the preliminarily formed channels (5) next to the openings (7). This is followed by final formation (207) of the channels (5) by welding the folded side portions (3) of the package material (1) to the central portion (2) in the operating direction of the production line A near the free edges of the side portions (3), in such a manner that the tapes (4) are freely positioned in the channels (5). Subsequently, individual bags (12) are formed (208) by welding the package material (1) in a cross direction relative to the operating direction of the production line A, and the individual bags (12) are cut off (209) from each other.

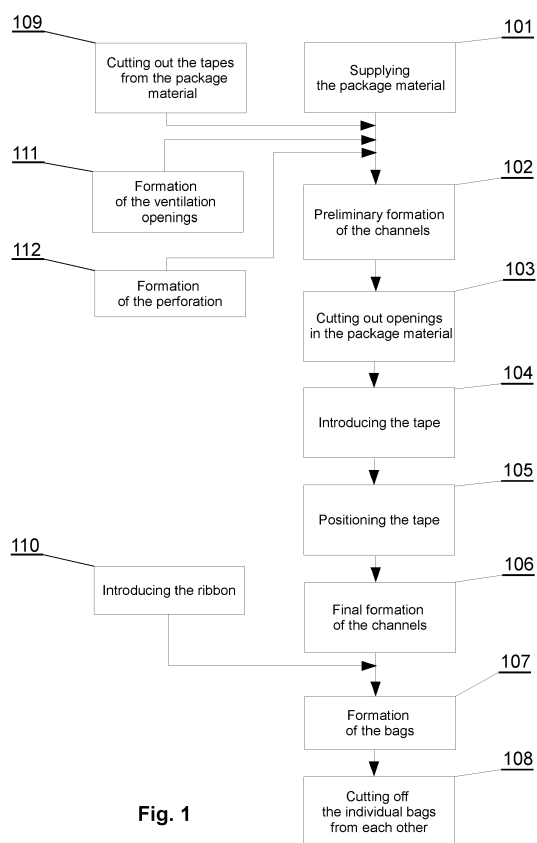


Fig. 1

Description

Technical field

[0001] The object of the invention is a method for manufacturing a bag, in particular for hygiene and/or food products, with channels comprising tapes enabling the closure of the bag.

Background of the invention

[0002] From European patent application EP1764067A1 there is a known method for manufacturing a bag for hygiene products, in which a continuous package material is supplied in the direction of the production line, and subsequently, the continuous package material is folded in such a manner that the package material takes on an M-shaped cross-section in a cross direction which extends perpendicular to said direction of the production line. In the next step of the disclosed method, a continuous material in the shape of a string is supplied in said direction of the production line to each of the two ends of the folded continuous M-shaped package material, said material in the shape of a string being thermally incompatible with said package material. Subsequently, a channel for the string-shaped material is formed by welding the continuous package material, therefore enclosing the string-shaped material inside the channel. This is followed by hot cutting of the package material in a cross direction, which results in the formation of chambers forming bags, upon which the formed bags are moved away from the package material in the production line and said bags are supplied to a cut and join unit, where two string materials are cut and joined directly in the vicinity of the ends of the channels.

[0003] From Chinese utility model CN209649622U there is a known method which includes folding a first and second layer of package material, cutting out openings in the folded layers of the package material in order to form a perforation, and, after forming the cut-outs, a tape is introduced through the openings of the first and second layer of the bag, upon which it is wrapped by the front layer of the bag to trim the body of the bag in one of the following steps of the method.

[0004] From American patent US10464702B2 there is in turn known a method in which a package material is supplied for the bag, cut-outs are formed in the material for the bag, a tape is introduced and the sides of the package material are folded towards each other, forming channels for the tape. Moreover, said patent discloses a step during which the bag is formed by welding a film in a direction perpendicular to the direction of the production line.

[0005] It is the object of the invention to develop a universal method for manufacturing a bag, in particular for hygiene products, which would constitute a simplification of the existing solutions.

The Essence of the Invention

[0006] The first object of the invention is a method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, in which a continuous package material comprising a central portion and side portions is supplied in the operating direction of the production line A, followed by preliminary formation of channels intended for the tape by:

- folding the package material in such a manner that, in a cross section relative to the operating direction of the production line A, the package material takes on a shape resembling the letter M, in which the central portion of the package material constitutes the inclined arms of the letter M connected in its lower vertex, the channels being defined by spaces between the side portions and the central portion, or
- folding the package material in such a manner that, in a cross section relative to the operating direction of the production line A, it takes on a shape resembling the letter M, in which the central portion of the package material constitutes the inclined arms of the letter M connected in its lower vertex, and by at least partial overlapping of the outer surfaces of the free ends of the package material (side portions) along the operating direction of the production line A by strips made of a material thermally compatible with the package material, the channels being defined by spaces between layers of the package material and the strips, or
- folding the package material in the central portion along a fold line B extending in the operating direction of the production line A, in such a manner that the layers of the folded package material are arranged substantially parallel relative to each other, and by at least partial overlapping of the outer surfaces of layers of the package material along the operating direction of the production line by strips made of a material thermally compatible with the package material, the channels being defined by spaces between layers of the package material and the strips.

[0007] This is followed by cutting out openings in the package material, enabling access to tapes for closing the bag, next to the preliminarily formed channels, upon which a tape made of a material thermally compatible with the package material is introduced into each of the preliminarily formed channels in the operating direction of the production line A, with the positioning of the tapes in the channels next to the cut out openings. This is followed by the final formation of the channels by welding the combined or overlapping layers of the package material in the operating direction of the production line A, with the formation of individual bags by welding the package material in a cross direction relative to the operating

direction of the production line A, upon which the individual bags are cut off from each other.

[0008] Preferably, the introduction of the tapes and their positioning in the channels are executed simultaneously.

[0009] Positioning of the tapes allows the correction of their path of guidance in order to fix them in positions ensuring free movement within the channels. Simultaneous introduction and positioning of the tapes facilitates and expedites the process of manufacturing the bags. Preferably, simultaneous introduction and positioning of the tapes proceeds with a change in their guidance angles relative to the operating direction of the production line, preferably using devices with a guide slit, which also reduces the risk of wrinkling of the tapes after their introduction into the channels.

[0010] In cases where the channels are defined by spaces between layers of the package material and the strips, narrow strips are preferably used, which completely overlap the outer surfaces of the package material.

[0011] Preferably, the strips are cut out of the side portions of the package material.

[0012] Preferably, the openings in the package material are cut out in such a manner that their centres are apart from each other by a distance equal to the width or two times the width of the manufactured bag. The cutting out of openings whose centres are apart from each other by a distance equal to the width of one bag results in the ends of the tapes enabling the closure of the bag, introduced into the channels, being free within the area of the formed openings, whose centres are placed on the side edges of the bag. The ends of the tapes placed in the area of each of the openings are welded to each other and thus form a tape for closing the bag, which can be freely pulled inside the channels in both directions. In the case of making openings whose centres are apart from each other by a distance of two widths of the bag, in each one of the manufactured bags there is only one opening, whose centre is placed on the edge of the bag, enabling free access to the welded ends of the tapes introduced into the channels. On the other side of the bag, the ends of the tapes are welded to the channels. In this second case, an end user's pulling of the free, welded ends of the tapes causes the closure of the bag. In the case of making openings whose centres are apart from each other by a distance of two times the width of the bag, it is also possible to realise it in such a manner in which the opening enabling access to the tapes is made between the edges of the bag, and the ends of the tapes placed in the channels are welded to the channels on the edges of the bag.

[0013] Preferably, the forming and cutting off of individual bags from each other is performed in a single cycle (simultaneously), preferably with the use of a welding machine or a cutting-welding device.

[0014] Preferably, cutting off of individual bags from each other is performed in the axis of symmetry of at least one opening cut out in the package material.

[0015] Preferably, discontinuous welds are formed during final formation of the channels, which ensures smaller shrinkage of the package material on the weld and its more stable guidance.

5 **[0016]** Preferably, wide welds are formed when cutting off the individual bags from each other by heating.

[0017] Preferably, tapes for closing the bag are cut off from the side portions of the package material before preliminary formation of the channels of the bag, and they are guided simultaneously with the processed package material. The cutting out of the tapes from the side portions of the package material before preliminary formation of the channels and the simultaneous guidance of the processed package material and the tapes ensure their uniform tension and enable avoiding their wrinkling and stretching.

[0018] Preferably, a material suitable for recycling or composting or other bioprocessing is used as the package material and the tapes for closing the bag. Due to this, the resulting end product in the form of the bag with the tape for its closure can undergo recycling, composting or other bioprocessing.

[0019] Preferably, before the formation of individual bags, at least one ribbon for suspending the bag is introduced between the channels or from at least one outer side of the channels, said ribbon being introduced in the operating direction of the production line A at the level of the channels and being offset relative to the tapes.

[0020] Preferably, ventilation openings are formed and/or a perforation is formed in the package material. The ventilation openings provide protection against disadvantageous impact on the surfaces of the bag caused by the pressure occurring when packing it with hygiene products. The forming of the perforation is in turn meant to provide the possibility to open the bag by the final customer.

[0021] The second object of the invention is a method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, in which a continuous package material comprising a central portion and side portions is supplied in the operating direction of the production line A, followed by placing the tapes enabling the closure of the bag next to the central portion of the package material, near the lateral portions, in the operating direction of the production line A. This is followed by the preliminary formation of channels intended for tapes enabling the closure of the bag by folding the lateral portions of the package material in such a manner that these tapes are placed in the spaces between the central portion and the lateral portions. Subsequently, the package material is folded in the central portion along the fold line B extending in the operating direction of the production line A, in such a manner that the folded layers of the package material are arranged substantially parallel relative to each other, upon which openings are cut out in the package material next to the preliminarily formed channels above or below the tapes enabling the closure of the bag. In the next step, the tapes are positioned in the prelimi-

narily formed channels next to the openings. This is followed by the final formation of the channels by welding the folded side portions of the package material to the central portion in the operating direction of the production line A near the free edges of the side portions, in such a manner that the tapes are freely positioned in the channels. Subsequently, the individual bags are formed by welding the package material in a cross direction relative to the operating direction of the production line A and cutting off the individual bags from each other.

[0022] Preferably, after folding the package material along the fold line B, the package material is further folded in such a manner that, in a cross section relative to the operating direction of the production line A, the package material takes on a shape resembling the letter M, in which the central portion constitutes the inclined arms of the letter M connected in its lower vertex.

[0023] Preferably, the openings in the package material are cut out in such a manner that their centres are apart from each other by a distance equal to the width or two times the width of the manufactured bag. The cutting out of openings whose centres are apart from each other by a distance equal to the width of one bag results in the ends of the tapes enabling the closure of the bag, introduced into the channels, being free within the area of the formed openings, whose centres are placed on the side edges of the bag. The ends of the tapes placed in the area of each of the openings are welded to each other and thus form a tape for closing the bag, which can be freely pulled inside the channels in both directions. In the case of making openings whose centres are apart from each other by a distance of two widths of the bag, in each one of the manufactured bags there is only one opening, whose centre is placed on the edge of the bag, enabling free access to the welded ends of the tapes introduced into the channels. On the other side of the bag, the ends of the tapes are welded to the channels. In this second case, the end user's pulling of the free, welded ends of the tapes causes the closure of the bag. In the case of making openings whose centres are apart from each other by a distance of two times the width of the bag, it is also possible to realise it in such a manner in which the opening enabling access to the tapes is made between the edges of the bag, and the ends of the tapes placed in the channels are welded to the channels on the edges of the bag.

[0024] Preferably, the forming and cutting off of individual bags from each other is performed in a single cycle (simultaneously), preferably with the use of a welding machine or a cutting-welding device.

[0025] Preferably, cutting off of the individual bags from each other is performed in the axis of symmetry of at least one opening cut out in the package material.

[0026] Preferably, discontinuous welds are formed during final formation of the channels, which ensures smaller shrinkage of the package material on the weld and its more stable guidance.

[0027] Preferably, wide welds are formed when cutting

off the individual bags from each other by heating.

[0028] Preferably, tapes for closing the bag are cut off from the side portions of the package material before preliminary formation of the channels of the bag, and they are guided simultaneously with the processed package material. The cutting out of the tapes from the side portions of the package material before preliminary formation of the channels and the simultaneous guidance of the processed package material and the tapes ensure their uniform tension and enable avoiding their wrinkles and stretching.

[0029] Preferably, a material suitable for recycling or composting or other bioprocessing is used as the package material and the tapes for closing the bag. Due to this, the resulting end product in the form of the bag with the tape for its closure can undergo recycling, composting or other bioprocessing.

[0030] Preferably, before the formation of individual bags, at least one ribbon for suspending the bag is introduced between the channels or from at least one outer side of the channels, said ribbon being introduced in the operating direction of the production line A at the level of the channels and being offset relative to the tapes.

[0031] Preferably, ventilation openings are formed and/or a perforation is formed in the package material. The ventilation openings provide protection against disadvantageous impact on the surfaces of the bag caused by the pressure occurring when packing it with hygiene products. The perforation is in turn meant to provide the possibility to open the bag by the end client.

Advantages of the invention

[0032] The method according to the invention constitutes a simplification of the existing solutions, which results in providing lower than before consumption of components needed to produce the bag, in particular for hygiene products, since tapes enabling the closure of the bag originate from the same roll of material as said bag. This also results in, depending on the material used, said bag having the properties of full recycling and/or composting.

[0033] The manufacturing of said bag and tapes from the same roll also allows simplification of the supply chain compared to previous solutions.

[0034] The method according to the invention also allows applying any imprint on the tapes for closing the bag.

[0035] The method according to the invention ensures expediting the process of manufacturing bags, in particular for hygiene products, compared to solutions known from prior art, since the present method omits actions related to proper preparation of an additional material for tapes, including its storage or supply.

[0036] Simplifying and expediting the method according to the invention compared to existing solutions also entails the elimination of some of the elements of the production line, due to which it is easier to handle and repair, which as a consequence lowers the costs of its

maintenance.

[0037] The method for manufacturing the bag according to the invention enables the use of commercially available machines with no need to design and construct new ones, and the only requirement involves the assembly of several subsystems.

[0038] The method for introducing tapes used in the method according to the present invention can also be used to manufacture a bag with a handle, which causes such a bag to retain the properties of full recycling and/or composting depending on the material used for its production.

Description of the drawings

[0039] The subject of the invention is shown in the embodiments in a drawing, in which:

Fig. 1 presents a flow chart of the method for manufacturing the bag, in particular for hygiene products, according to the first object of the invention;

Fig. 2 presents a flow chart of the method for manufacturing the bag, in particular for hygiene products, according to the second object of the invention;

Fig. 3 presents schematically the implementation of the method according to the invention in a production line according to the first embodiment, from the step of the preliminary formation of channels;

Fig. 4 presents schematically the implementation of the method according to the invention in a production line according to the second embodiment, from the step of the preliminary formation of channels;

Fig. 5 presents schematically the implementation of the method according to the invention in a production line according to the third embodiment, from the step of the preliminary formation of channels;

Fig. 6, 7 present schematically the implementation of the method according to the invention in a production line according to the fifth embodiment, from the step of the preliminary formation of channels;

Fig. 8 presents schematically the implementation of the method according to the invention in a production line according to the seventh embodiment, from the step of the preliminary formation of channels;

Fig. 9 presents schematically the implementation of the method according to the invention in a production line according to the eighth embodiment, from the step of the preliminary formation of channels;

Fig. 10 presents schematically the implementation of the method according to the invention in a produc-

tion line according to the eleventh embodiment, from the step of the preliminary formation of channels;

Fig. 11 presents schematically the implementation of the method according to the invention in a production line according to the twelfth embodiment, from the step of the preliminary formation of channels;

Fig. 12 presents schematically the implementation of the method according to the invention in a production line according to the thirteenth embodiment, from the step of the preliminary formation of channels;

Fig. 13 presents a cross-section of the bag manufactured using the method according to the invention in a production line according to the first, fifth (relative to the first) and thirteenth embodiments during the step of the preliminary formation of channels;

Fig. 14 presents a cross-section of the bag manufactured using the method according to the invention in a production line according to the second, fifth (relative to the second) and seventh embodiments during the step of the preliminary formation of channels;

Fig. 15 presents a cross-section of the bag manufactured using the method according to the invention in a production line according to the third embodiment during the step of the preliminary formation of channels;

Fig. 16 presents a cross-section of the bag manufactured using the method according to the invention in a production line according to the eighth, eleventh and twelfth embodiments during the step of the preliminary formation of channels;

Fig. 17 presents a cross-section of the bag manufactured using the method according to the invention in a production line according to the eighth, eleventh and twelfth embodiments during the step of folding the package material in the central portion;

Fig. 18 presents schematically the execution of the step of cutting out the tape from the same roll of package material from which the bag is manufactured.

Detailed description of the invention

The first embodiment of the method for manufacturing the bag, in particular for hygiene products

[0040] The method for manufacturing the bag 12, in particular for hygiene products, with channels 5 comprising tapes 4 enabling its closure according to the first embodiment (Fig. 1, Fig. 3, Fig. 13) begins by supplying 101

a continuous package material 1 comprising a central portion 2 and side portions 3 in the operating direction of the production line A. The production line used to implement the method according to the invention operates cyclically with a speed of 50 to 120 cycles/minute. The package material 1 constitutes a material suitable for recycling, composting or other bioprocessing. The package material 1 may constitute a film, for example a PP or PE film, or a multi-layered laminate made of a CPP/PP film.

[0041] This is followed by the preliminary formation 102 of channels 5 intended for the tapes 4 by folding the package material 1 in such a manner that, in a cross section relative to the operating direction of the production line A, the package material 1 takes on a shape resembling the letter M, in which the central portion 2 constitutes the inclined arms of the letter M connected in its lower vertex, the channels 5 being defined by spaces between the side portions 3 and the central portion 2.

[0042] Subsequently, openings 7 enabling free access to the tapes 4 are cut out 103 in the package material 1 next to the preliminarily formed channels 5 by means of a device for cutting out openings 14, for example drifts. Said openings 7 can be cut out in such a manner that their centres are apart from each other by a distance equal to the width or two times the width of the manufactured bag 12. The cutting out 103 of the openings 7 whose centres are apart from each other by a distance equal to the width of one bag 12 results in the ends of the tapes 4 enabling the closure of the bag, introduced into the channels 5, being free within the area of the formed openings 7, whose centres are placed on the side edges of the bag 12. The ends of the tapes 4 placed in the area of each of the openings are welded to each other and thus form a tape for closing the bag, which can be freely pulled inside the channels in both directions. In the case of making the openings 7 whose centres are apart from each other by a distance of two widths of the bag 12, in each one of the manufactured bags 12 there is in turn only one opening 7, whose centre is placed on the edge of the bag 12, enabling free access to the welded ends of the tapes 4 introduced into the channels 5. On the other side of the bag, the ends of the tapes 4 are welded to the channels 5. In this second case, the end user's pulling of the free, welded ends of the tapes 4 causes the closure of the bag 12. In the case of making openings 7 whose centres are apart from each other by a distance of two times the width of the bag 12, it is also possible to realise it in such a manner in which the opening 7 enabling access to the tapes 4 is made between the edges of the bag 12, and the ends of the tapes 4 placed in the channels 5 are welded to the channels on the edges of the bag 12.

[0043] Subsequently, the tape 4 with a width of 8 to 12 mm, made of a material thermally compatible with the package material 1, is introduced 104 into each one of the preliminarily formed channels 5 in the operating direction of the production line A. Due to the use of thermally compatible materials, the resulting end product in the form of the bag 12 with the tape 4 can undergo recy-

cling, composting or other bioprocessing (depending on the materials used), and not just disposal, like in solutions known from prior art.

[0044] The introduced tapes 4 are used to close the bag 12 by their tightening. Said tapes 4 may also serve as a hanger, e.g. used by the end user of the bags according to the present invention.

[0045] In the next step, the tapes 4 are positioned 105 in the channels 5 next to the cut-out openings 7.

[0046] The introduction and positioning of the tape 4 in each of the channels 5 proceed with a change in the angle of its guidance relative to the operating direction of the production line A, which in turn allows a correction of its guidance path in order to fix its position ensuring free movement within the channel 5 formed in the consecutive steps of the present method. The introduction of the tape 4 is executed with the use of a device with a guide slit 15 cut out at an angle of 45°, through which the tape 4 is introduced, which reduces the risk of its wrinkling after its introduction into the channels 5.

[0047] The tension of the material from which the bag 12 and the tapes 4 are manufactured during the present process amounts to 120 N +/-15%.

[0048] The next step 106 involves the final formation of the channels 5 with the tapes 4 by welding the combined or overlapping layers of the package material 1 by means of the first welding device 16 in the operating direction of the production line A. Discontinuous welds are formed during welding. This provides smaller shrinkage of the package material 1 on the weld and its more stable guidance. Usually, the width of the formed channels 5 ranges from 16 to 20 mm, which provides up to 5 mm of play from each of the edges of the channels 5 for the introduced tapes 4.

[0049] In the next step, individual bags 12, in particular for hygiene products, are formed 107 by welding the package material 1 in a cross direction relative to the operating direction of the production line A, which is accompanied by the formation of wide welds. The temperature of welding during the manufacturing of the bag 12 with the tape 4 ranges from 200 to 400°C. Also, the welding of the ends introduced into the channels 5 of the tapes 4 for closing the bag 12 by tightening occurs during the formation 107 of the bag 12 via welding. In the end, the individual bags 12 are cut off 108 from each other.

[0050] The formation 107 and cutting off 108 of the individual bags 12 from each other can be performed in a single cycle (simultaneously) using a second device for welding 17, for example a welding machine or a cutting-welding device (a welding and cutting press). Moreover, said cutting off of the individual bags 12 from each other is performed in the axis of symmetry of the opening 7 cut out 103 in the package material 1.

The second embodiment of the method for manufacturing the bag, in particular for hygiene products

[0051] The second embodiment (Fig. 1, Fig 4, Fig. 14)

of the method for manufacturing the bag 12, in particular for hygiene products, is like the first embodiment, the difference being that the preliminary formation of the channels 5 intended for the tape 4 proceeds by folding the package material 1 in such a manner that, in a cross section relative to the operating direction of the production line A, the package material 1 takes on a shape resembling the letter M, in which the central portion 2 constitutes the inclined arms of the letter M connected in its lower vertex, and by at least partial overlapping of the outer surfaces of the free ends of the package material along the operating direction of the production line by strips 6 made of a material thermally compatible with the package material 1, the channels 5 being defined by spaces between layers of the package material 1 and the strips 6.

The third embodiment of the method for manufacturing the bag, in particular for hygiene products

[0052] The third embodiment (Fig. 1, Fig. 5, Fig. 15) of the method for manufacturing the bag 12, in particular for hygiene products, is like the first embodiment, the difference being that the preliminary formation of channels 5 intended for the tape 4 proceeds by folding the package material 1 in the central portion 2 along the fold line B extending in the operating direction of the production line A, in such a manner that the folded layers of the package material 1 are arranged substantially parallel relative to each other, and by at least partial overlapping of the outer surfaces of layers of the package material along the operating direction of the production line by strips 6 made of a material thermally compatible with the package material 1, the channels 5 being defined by spaces between layers of the package material 1 and the strips 6. Moreover, the strips 6 can be cut out of the side portions 3 of the package material 1.

The fourth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0053] The method for manufacturing the bag 12, in particular for hygiene products, is like in the second or third embodiment, the difference being that the strips 6 made of a material compatible with the package material and used for overlapping the outer surfaces of the layers of the package material 1 are narrow strips which completely overlap the outer surfaces of the package material 1.

The fifth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0054] The method for manufacturing the bag 12, in particular for hygiene products, is like in the first embodiment or the second embodiment, the difference being that the introduction 104 of the tape 4 and its positioning 105 in the channels 5 are executed simultaneously (Fig.

1, Fig. 6, Fig. 13) (Fig. 1, Fig. 7, Fig. 14). The simultaneous introduction of the tape 4 may also be used in other embodiments.

[0055] Moreover, the introduction and positioning of the tape 4 proceed with a change in the angle of its guidance relative to the operating direction of the production line A, which in turn allows a correction of its guidance path in order to fix its position ensuring free movement within the channel 5 formed in the consecutive steps of the present method. Furthermore, the introduction of the tape 4 is executed with the use of a device with a guide slit 15 cut at an angle of 45°, through which the tape 4 is introduced, which reduces the risk of its wrinkling after its introduction into the channels 5.

The sixth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0056] The method for manufacturing the bag 12, in particular for hygiene products, is like in any of the preceding embodiments, the difference being that the tapes 4 are cut out 109 of the side portions 3 of the package material 1 before preliminary formation 102 of the channels 5, and they are guided simultaneously with the processed package material 1, which results in a uniform tension of the package material 1 and the tapes 4 and allows avoiding their wrinkling and stretching. The tapes 4 are cut out using a set of three blades 21 per one or per both sides of the package material 1; for example, a set of razor blades or a set of circular knives.

[0057] The waste 13 produced during cutting can undergo bioprocessing like the package material 1 and the tapes 4.

The seventh embodiment of the method for manufacturing the bag, in particular for hygiene products

[0058] The method for manufacturing the bag 12, in particular for hygiene products (Fig. 1, Fig. 8, Fig. 14), is like in the second embodiment, the difference being that after the delivery 101 of the package material 1, and before the preliminary formation 102 of the channels 5 intended for the tapes 4 near the axis of symmetry of the central portion 2 of the package material 1, ventilation openings 9 are formed 111 and a perforation 10 is formed 112 by means of a device for forming the ventilation openings and the perforation 18. The ventilation openings 9 and the perforation 10 can also be formed in this manner in other embodiments.

[0059] The perforation 10 may constitute a linear perforation, and the openings forming it can have the form of an ellipse or a circle. Depending on the configuration of the bag 12, both the ventilation openings 9 and the perforation can be placed on the side opposite to the subsequently formed channels 5 and parallel to them.

[0060] The ventilation openings 9 provide protection against disadvantageous impact on the surfaces of the bag 12 caused by the pressure occurring when packing

hygiene products, e.g. cotton pads. The ventilation openings allow discharging the air from the bag 12, preventing its rupture.

[0061] The perforation 10 in turn provides the possibility to open the bag 12 by the end client, after the free ends of the bag 12 have been welded upon the introduction of a hygiene product, for example cotton pads, inside it.

The eighth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0062] The method for manufacturing the bag 12, in particular for hygiene products, with the channels 5 comprising the tapes 4 enabling its closure according to the eighth embodiment (Fig. 2, Fig. 9, Fig. 16, Fig. 17) begins by supplying 201 the continuous package material 1 comprising the central portion 2 and the side portions 3 in the operating direction of the production line A. The production line used to implement the method according to the invention operates cyclically with a speed of 50 to 120 cycles/minute. The package material 1 constitutes a material suitable for recycling, composting or other bioprocessing. The package material 1 may constitute a film, for example a PP or PE film.

[0063] Subsequently, the tapes 4 with a width from 8 to 12 mm are placed 202 in the operating direction of the production line A, next to the central portion 2 of the package material 1, near the side portions 3. The tapes 4 are made of a material thermally compatible with the package material 1. Due to the use of the materials, the resulting end product in the form of the bag 12 with the tapes 4 can undergo recycling, composting or other bioprocessing, and not just disposal, like in solutions known from prior art.

[0064] The following step 203 involves the formation of channels 5 intended for the tapes 4 by folding the side portions 3 of the package material 1 in such a manner that the tapes 4 are placed in spaces between the central portion 2 and the side portions 3.

[0065] Subsequently, the package material 1 is folded 204 in the central portion 2 along the fold line B extending in the operating direction of the production line A (preferably in the axis of symmetry of the package material 1), in such a manner that the layers of the folded package material 1 are arranged substantially parallel relative to each other, upon which openings 7 enabling free access to the tapes 4 are cut out 205 in the package material 1 next to the preliminarily formed channels 5 above or below the tapes 4, for example using a punching device.

[0066] Said openings 7 can be cut out in such a manner that their centres are apart from each other by a distance equal to the width or two times the width of the manufactured bag 12. The cutting out 205 of the openings 7 whose centres are apart from each other by a distance equal to the width of one bag 12 results in the ends of the tapes 4 enabling the closure of the bag, introduced into the channels 5, being free within the area of the formed open-

ings 7, whose centres are placed on the side edges of the bag 12. The ends of the tapes 4 placed in the area of each of the openings are welded to each other and thus form a tape for closing the bag, which can be freely pulled inside the channels in both directions. In the case of making openings 7 whose centres are apart from each other by a distance of two widths of the bag 12, in each one of the manufactured bags 12 there is in turn only one opening 7, whose centre is placed on the edge of the bag 12, enabling free access to the welded ends of the tapes 4 introduced into the channels 5. On the other side of the bag, the ends of the tapes 4 are welded to the channels 5. In this second case, the end user's pulling of the free, welded ends of the tapes 4 causes the closure of the bag 12. In the case of making openings 7 whose centres are apart from each other by a distance of two times the width of the bag 12, it is also possible to realise it in such a manner in which the opening 7 enabling access to the tapes 4 is made between the edges of the bag 12, and the ends of the tapes 4 placed in the channels 5 are welded to the channels on the edges of the bag 12.

[0067] This is followed by positioning 206 of the tapes 4 in the preliminarily formed channels 5 next to the openings 7. The positioning of the tapes 4 is executed with the use of tools comprising two parallel guide slits 21, preferably cut at an angle of 45° relative to the operating direction of the production line A.

[0068] The tension of the material from which the bag 12 and the tape 4 are manufactured during the present process amounts to 120 N +/-15%.

[0069] The next step involves the formation 207 of the channels 5 by welding the folded side portions 3 of the package material 1 to the central portion 2 by means of a first welding device 16 in the operating direction of the production line A near the free edges of the side portions 3 in such a manner that the tapes 4 are freely positioned in the channels 5, and thus they do not get stuck during formation welding 208. Discontinuous welds are formed during said welding. This provides smaller shrinkage of the package material 1 on the weld and its more stable guidance. Moreover, the width of the formed channels 5 ranges from 16 to 20 mm, which provides up to 5 mm of play from each of the edges of the channels 5 for the introduced tape 4.

[0070] This is followed by the formation 208 of individual bags 12 by welding the package material 1 in a cross direction relative to the operating direction of the production line A, which is accompanied by the formation of wide welds. The temperature of welding during the manufacturing of the bag 12 with the tape 4 ranges from 200 to 400°C. Also, the welding of the ends of the introduced tapes 4 for closing the bag 12 by their tightening occurs during the formation 208 of the bag 12 via welding. The welded tapes 4 may also serve as a hanger, e.g. used by the end user of the bags according to the present invention.

[0071] In the end, the individual bags 12 are cut off 209 from each other.

[0072] The formation 208 and cutting off 209 of the individual bags 12 from each other can be performed in a single cycle (or simultaneously) using a second device for welding 17, for example a welding machine or a cutting-welding device. Moreover, said cutting off of the individual bags 12 from each other is performed in the axis of symmetry of the opening 7 cut out 205 in the package material 1.

The ninth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0073] The method for manufacturing the bag 12, in particular for hygiene products, is like in the eighth embodiment, the difference being that after folding 204 the package material 1, the package material 1 is folded 210 in such a manner that, in a cross section relative to the operating direction of the production line A, the package material 1 takes on a shape resembling the letter M, in which the central portion 2 constitutes the inclined arms of the letter M connected in its lower vertex.

The tenth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0074] The method for manufacturing the bag 12, in particular for hygiene products, is like in the eighth or ninth embodiment, the difference being that the tapes 4 are cut out 211 from the package material 1 before their placement 202 next to the central portion 2 of the package material 1, and the processed package material 1 with the tapes 4 are guided simultaneously, which results in uniform tension of the package material 1 and the tapes 4 and allows avoiding their wrinkling and stretching. The tapes 4 are cut out using a set of three blades 22 per one or per both sides of the package material 1; for example, a set of razor blades or a set of circular knives.

[0075] The waste 13 produced during cutting can undergo bioprocessing like the package material 1 and the tapes 4.

The eleventh embodiment of the method for manufacturing the bag, in particular for hygiene products

[0076] The method for manufacturing the bag 12, in particular for hygiene products (Fig. 2, Fig. 10, Fig. 16, Fig. 17), is like in the eighth embodiment, the difference being that after folding 204 the package material 1 in the central portion 2 and before cutting out 205 the openings 7 in the package material, the ventilation openings 9 are formed 213 by means of a device for forming ventilation openings 19. The ventilation openings 9 can also be made in other embodiments of the method according to the invention.

[0077] The ventilation openings 9 provide protection against disadvantageous impact on the surfaces of the bag 12 caused by the pressure existing when packing hygiene products, e.g. cotton pads. The ventilation open-

ings allow discharging the air from the bag 12, preventing its rupture.

The twelfth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0078] The method for manufacturing the bag 12, in particular for hygiene products (Fig. 2, Fig. 11, Fig. 16, Fig. 17), is like in the eleventh embodiment, the difference being that after the final formation 207 of the channels 5 and before the formation 208 of individual bags 12, a perforation 11, which is situated parallel to the channels 5, is formed 214 by means of a perforating device 20. The perforation 11 can also be made in other embodiments of the invention.

[0079] The perforation 11 provides the possibility to open the bag 12 by the end client, after the free ends of the bag 12 have been welded upon the introduction of a hygiene product, for example cotton pads, inside it.

The thirteenth embodiment of the method for manufacturing the bag, in particular for hygiene products

[0080] The method for manufacturing the bag 12, in particular for hygiene products (Fig. 1, Fig. 12, Fig. 13), is like in any of the preceding embodiments, the difference being that before the formation 107, 208 of individual bags 12, at least one ribbon 8 for suspending the bag is introduced 110, 212 between the channels 5 or from at least one outer side of the channels 5, said ribbon being introduced in the operating direction of the production line A at the level of the channels 5 and being offset relative to the tapes 4.

Claims

1. A method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, comprising the following steps:

- supplying a continuous (101) package material (1) comprising a central portion (2) and side portions (3) in the operating direction of the production line A,
- preliminary formation (102) of channels (5) intended for the tapes (4) by:

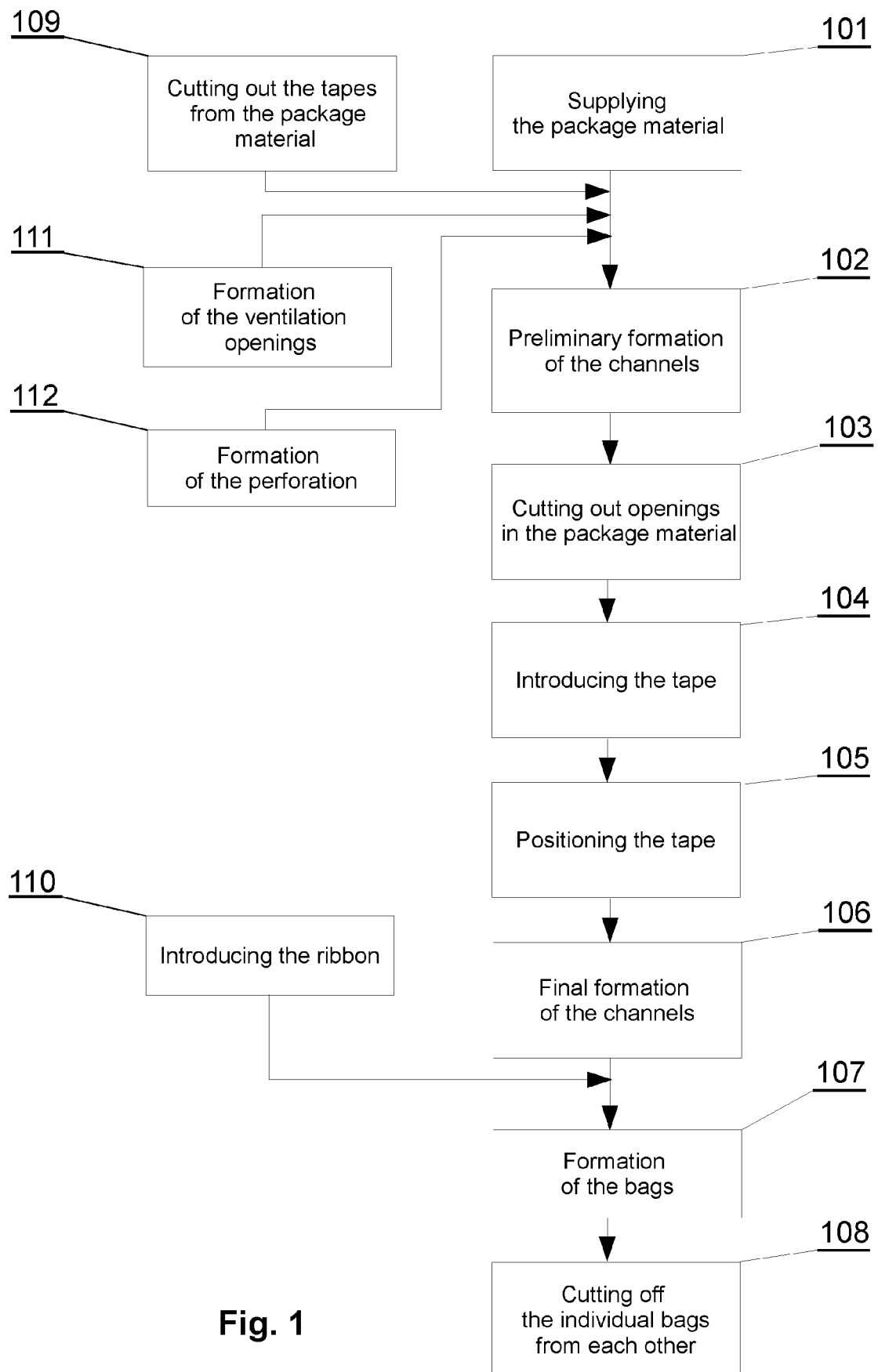
- folding the package material (1) in such a manner that, in a cross section relative to the operating direction of the production line A, the package material (1) takes on a shape resembling the letter M, in which the central portion (2) of the package material (1) constitutes the inclined arms of the letter M connected in its lower vertex, the channels (5) being defined by spaces between the side portions (3) and the central portion

- (2); or
- folding the package material (1) in such a manner that, in a cross section relative to the operating direction of the production line A, the package material (1) takes on a shape resembling the letter M, in which the central portion (2) of the package material (1) constitutes the inclined arms of the letter M connected in its lower vertex, and by at least partial overlapping of the outer surfaces of the free ends of the package material along the operating direction of the production line A by strips (6) made of a material thermally compatible with the package material (1), the channels (5) being defined by spaces between layers of the package material (1) and the strips (6); or
 - folding the package material (1) in the central portion (2) along a fold line B extending in the operating direction of the production line A, in such a manner that the layers of the folded package material (1) are arranged substantially parallel relative to each other, and by at least partial overlapping of the outer surfaces of layers of the package material along the operating direction of the production line by strips (6) made of a material thermally compatible with the package material (1), the channels (5) being defined by spaces between layers of the package material (1) and the strips (6);
 - cutting out (103) openings (7) in the package material (1) next to the preliminarily formed channels (5), enabling access to the tapes for closing the bag,
 - introducing (104) the tape (4) of a material thermally compatible with the package material (1) into each one of the preliminarily formed channels (5) in the operating direction of the production line A,
 - positioning (105) of the tapes (4) in the channels (5) next to the cut-out openings (7),
 - final formation (106) of the channels (5) by welding the combined or overlapping layers of the package material (1) in the operating direction of the production line A,
 - the formation (107) of individual bags (12) by welding the package material (1) in a cross direction relative to the operating direction of the production line A,
 - cutting off (108) the individual bags (12) from each other.
2. The method according to claim 1, wherein the introduction (104) of the tape (4) and its positioning (105) in the channels (5) are executed simultaneously.
3. The method according to claim 1 or 2, **characterised in that** it uses narrow strips (6), which completely overlap the outer surfaces of the package material (1).
4. The method according to any of the claims from 1 to 3, **characterised in that** the strips (6) are cut out of the side portions (3) of the package material (1).
5. A method for manufacturing a bag with channels comprising tapes enabling the closure of the bag, comprising the following steps:
- supplying (201) a continuous package material (1) comprising a central portion (2) and side portions (3) in the operating direction of the production line A,
 - placing (202) the tapes (4) next to the central portion (2) of the package material (1), near the side portions (3) in the operating direction of the production line A,
 - preliminary formation (203) of channels (5) intended for the tapes (4) by folding the side portions (3) of the package material (1) in such a manner that the tapes (4) are placed in spaces between the central portion (2) and the side portions (3);
 - folding (204) the package material (1) in the central portion (2) along the fold line B extending in the operating direction of the production line A, in such a manner that the folded layers of the package material (1) are arranged substantially parallel relative to each other;
 - cutting out (205) the openings (7) in the package material (1) next to the preliminarily formed channels (5) above or below the tape (4),
 - positioning (206) the tape (4) in the preliminarily formed channels (5) next to the openings (7),
 - final formation (207) of the channels (5) by welding the folded side portions (3) of the package material (1) to the central portion (2) in the operating direction of the production line A near the free edges of the side portions (3), in such a manner that the tapes (4) are freely positioned in the channels (5);
 - the formation (208) of individual bags (12) by welding the package material (1) in a cross direction relative to the operating direction of the production line A,
 - cutting off (209) the individual bags (12) from each other.
6. The method according to claim 5, **characterised in that** after folding (204) the package material (1) along the fold line B, the package material (1) is further folded (210) in such a manner that, in a cross section relative to the operating direction of the production line A, the package material (1) takes on a

shape resembling the letter M, in which the central portion (2) constitutes the inclined arms of the letter M connected in its lower vertex.

claims, **characterised in that** ventilation openings (9) are formed (111, 213) and/or a perforation (10, 11) is formed (112, 214) in the package material (1).

7. The method according to any of the preceding claims, **characterised in that** the openings (7) in the package material (1) are cut out (103, 205) in such a manner that their centres are apart from each other by a distance equal to the width or two times the width of the manufactured bag (12). 5
10
8. The method according to any of the preceding claims, **characterised in that** the formation (107, 208) and cutting off (108, 209) of the individual bags (12) from each other are performed simultaneously, preferably with the use of a welding machine or a cutting-welding device. 15
9. The method according to any of the preceding claims, **characterised in that** cutting off (108, 209) the individual bags (12) from each other is performed in the axis of symmetry of at least one opening (7) cut out (103, 205) in the package material (1). 20
10. The method according to any of the preceding claims, **characterised in that** discontinuous welds are formed during the final formation (106, 207) of the channels (5). 25
11. The method according to any of the preceding claims, **characterised in that** wide welds are formed when cutting off (108, 209) the individual bags (12) from each other by heating. 30
12. The method according to any of the preceding claims, **characterised in that** the tapes (4) are cut out (109, 211) of the side portions (3) of the package material (1) before the preliminary formation of the channels (5) of the bag (12), and the processed package material (1) and tapes (4) are guided simultaneously. 35
40
13. The method according to any of the preceding claims, **characterised in that** the material used as the package material (1) and the tapes (4) is suitable for recycling or composting or other bioprocessing. 45
14. The method according to any of the preceding claims, **characterised in that** at least one before the formation (107, 208) of individual bags (12), at least one ribbon (8) for suspending the bag (12) is introduced (110, 212) between the channels (5) or from at least one outer side of the channels (5), said ribbon (8) being introduced in the operating direction of the production line A at the level of the channels (5) and being offset relative to the tapes (4). 50
55
15. The method according to any of the preceding

**Fig. 1**

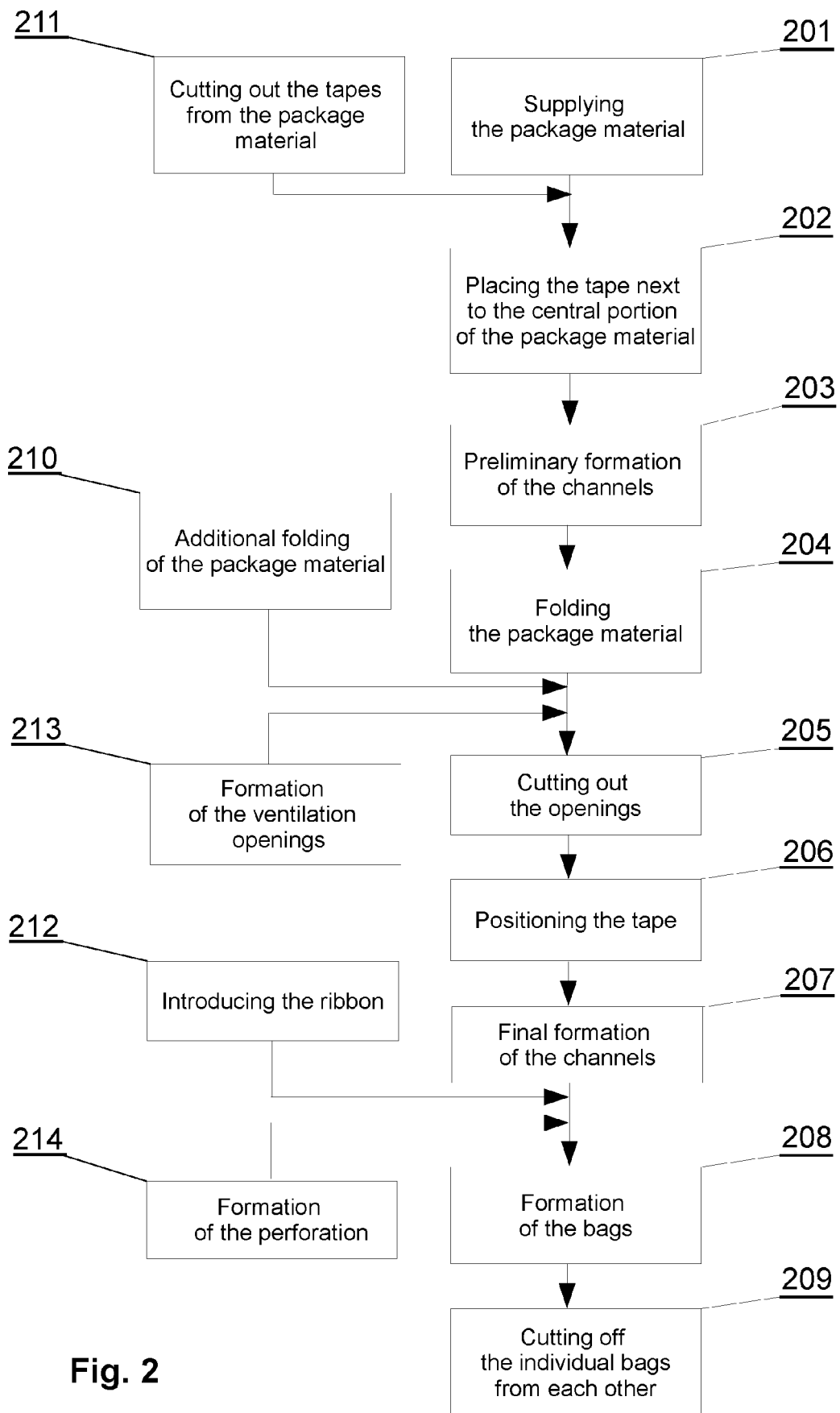


Fig. 2

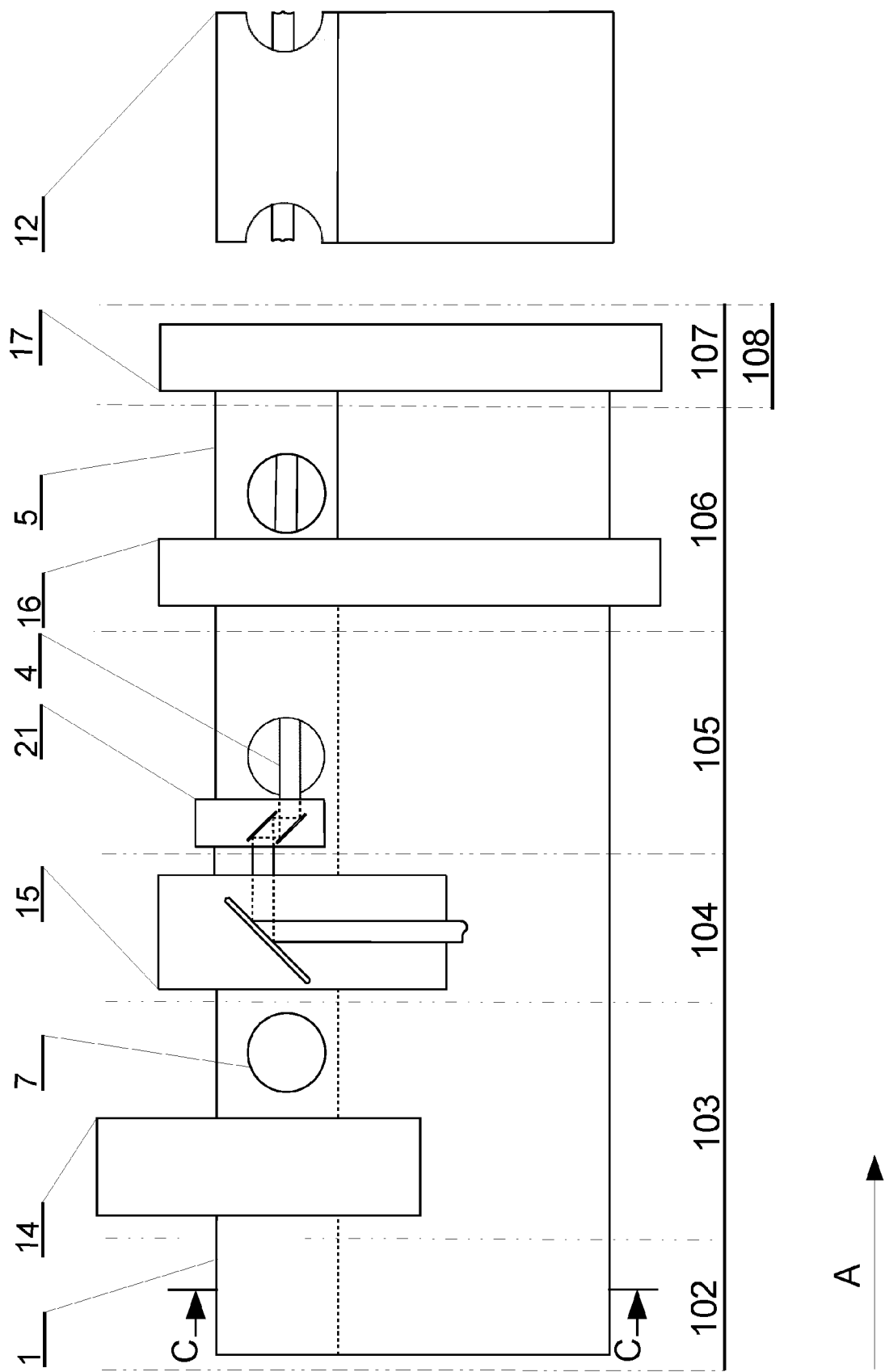


Fig. 3

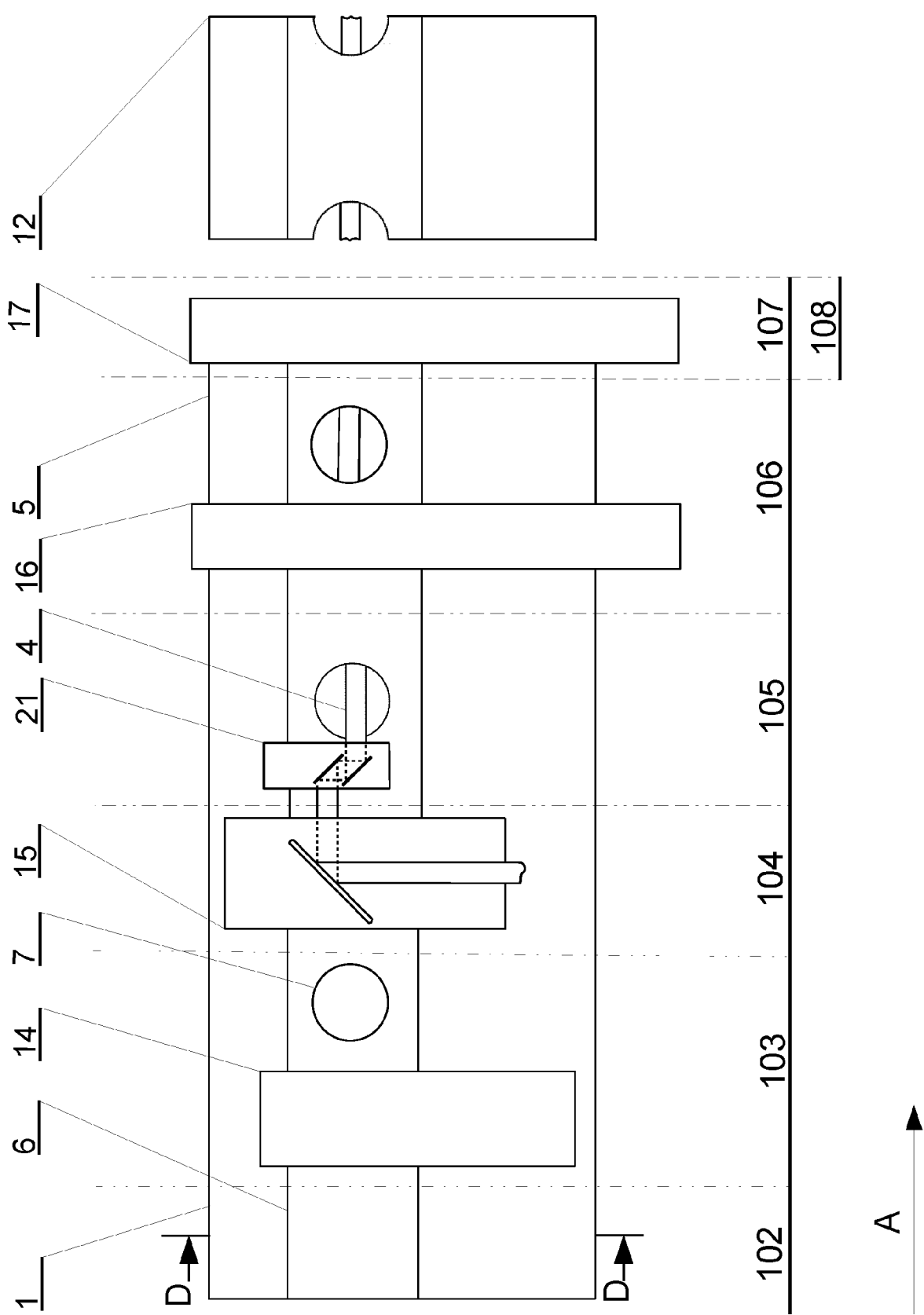


Fig. 4

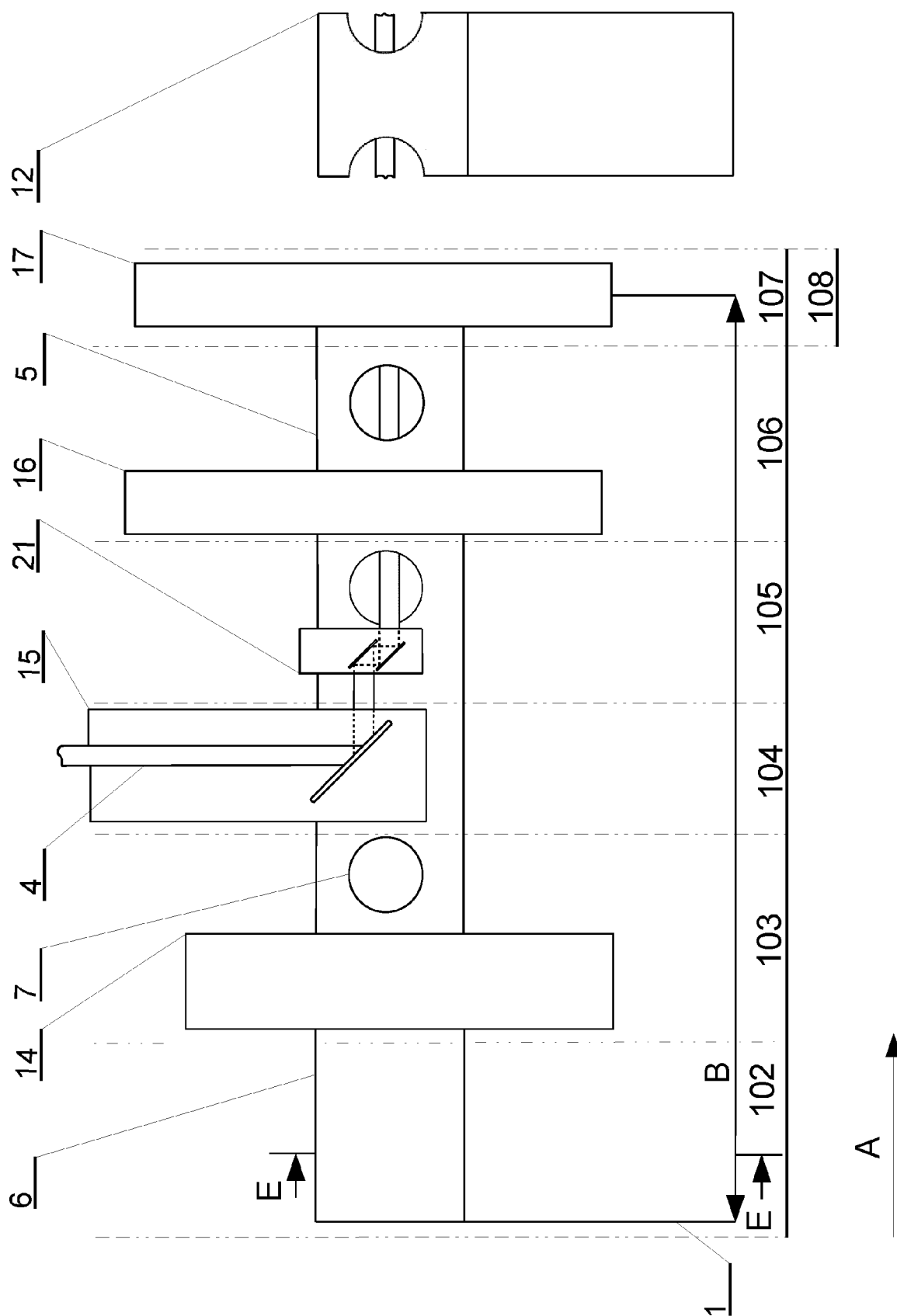


Fig. 5

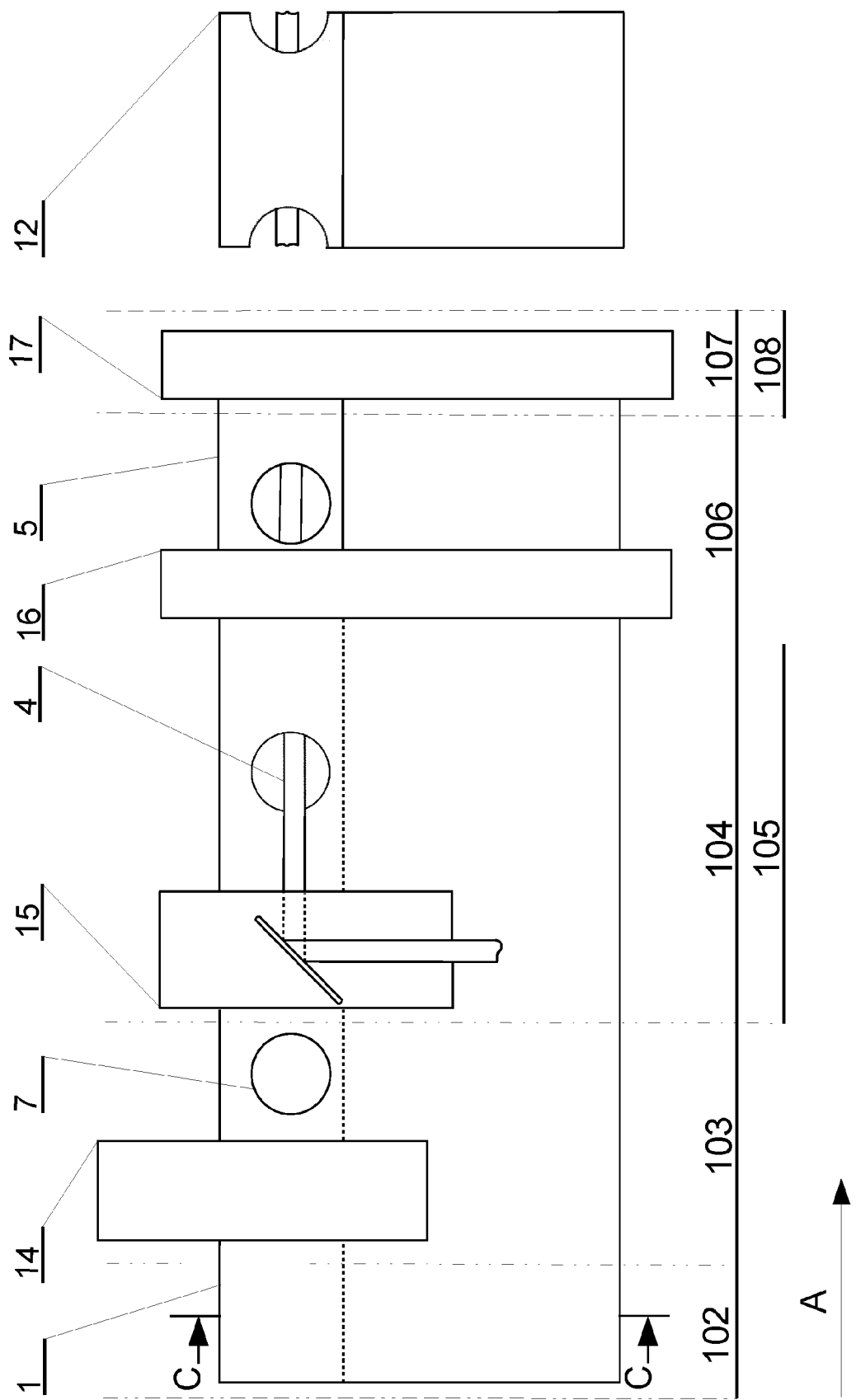


Fig. 6

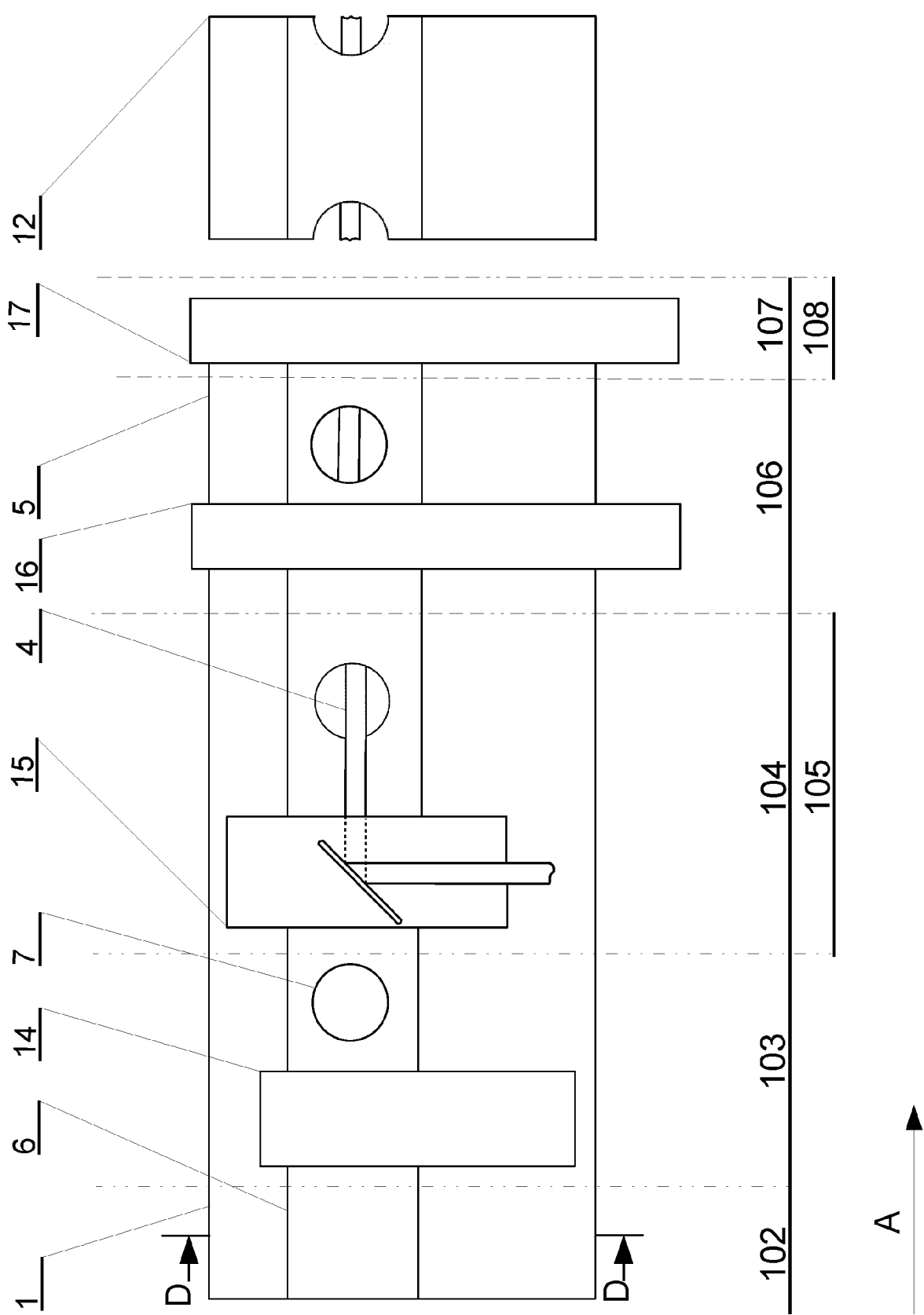
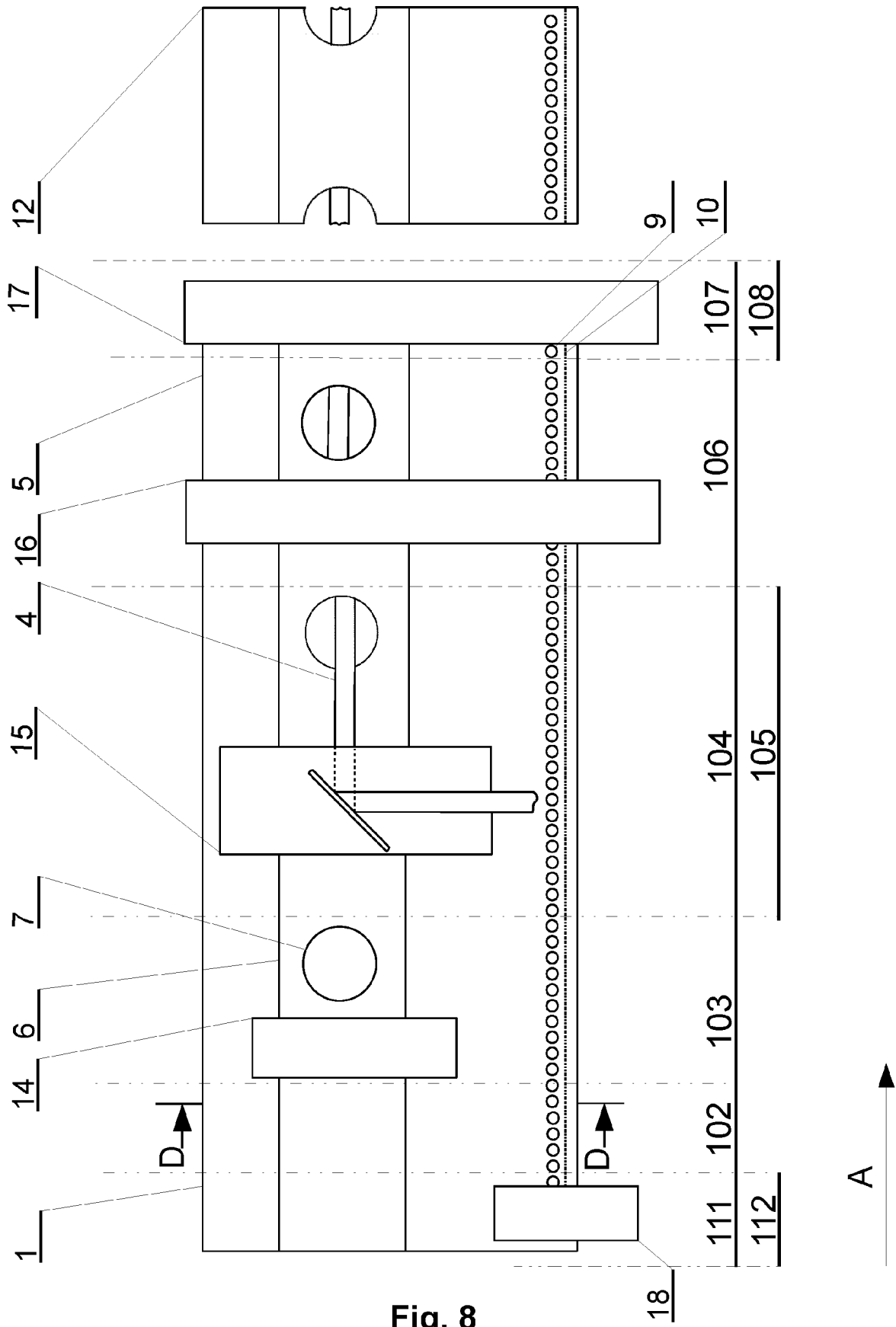
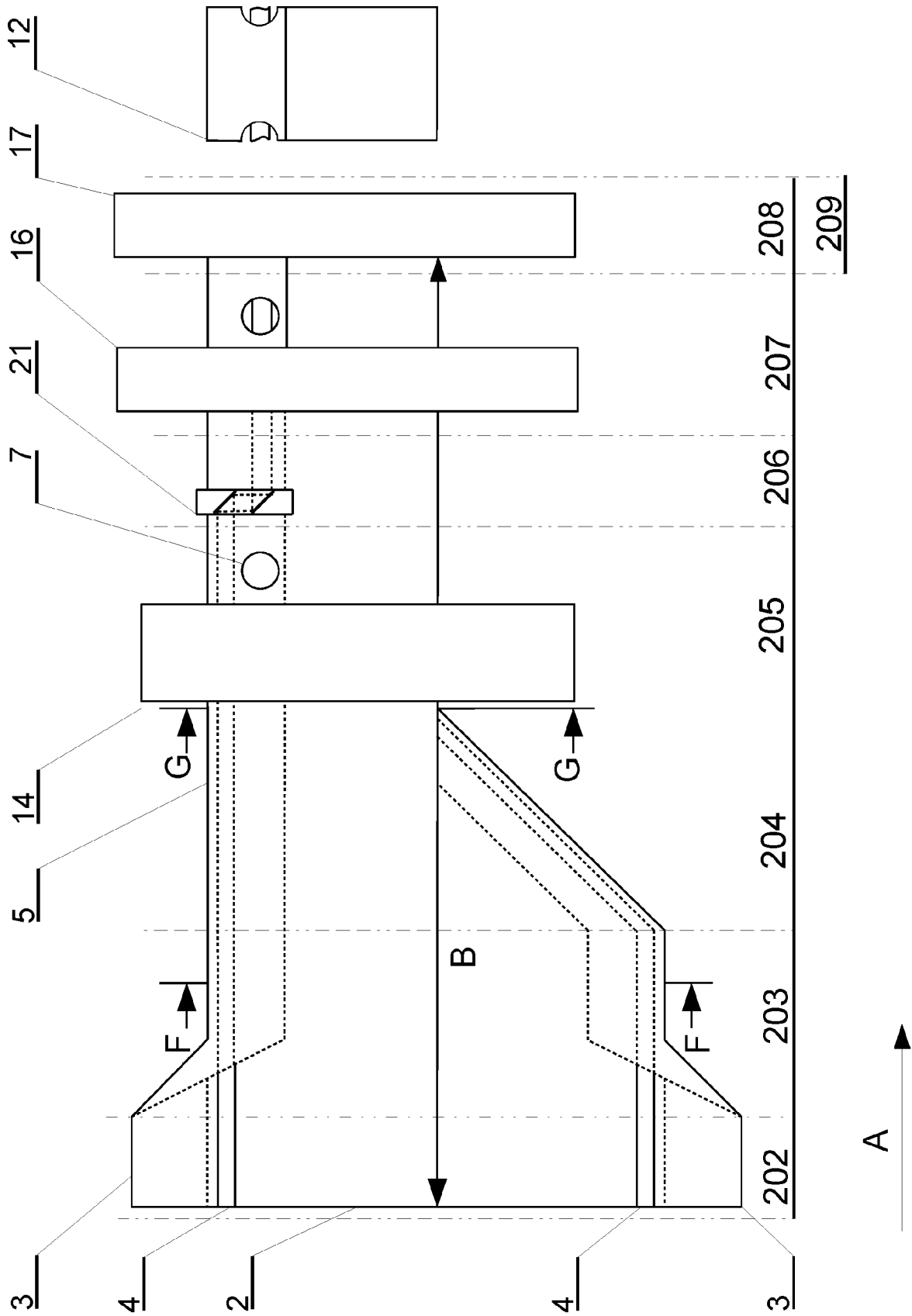


Fig. 7





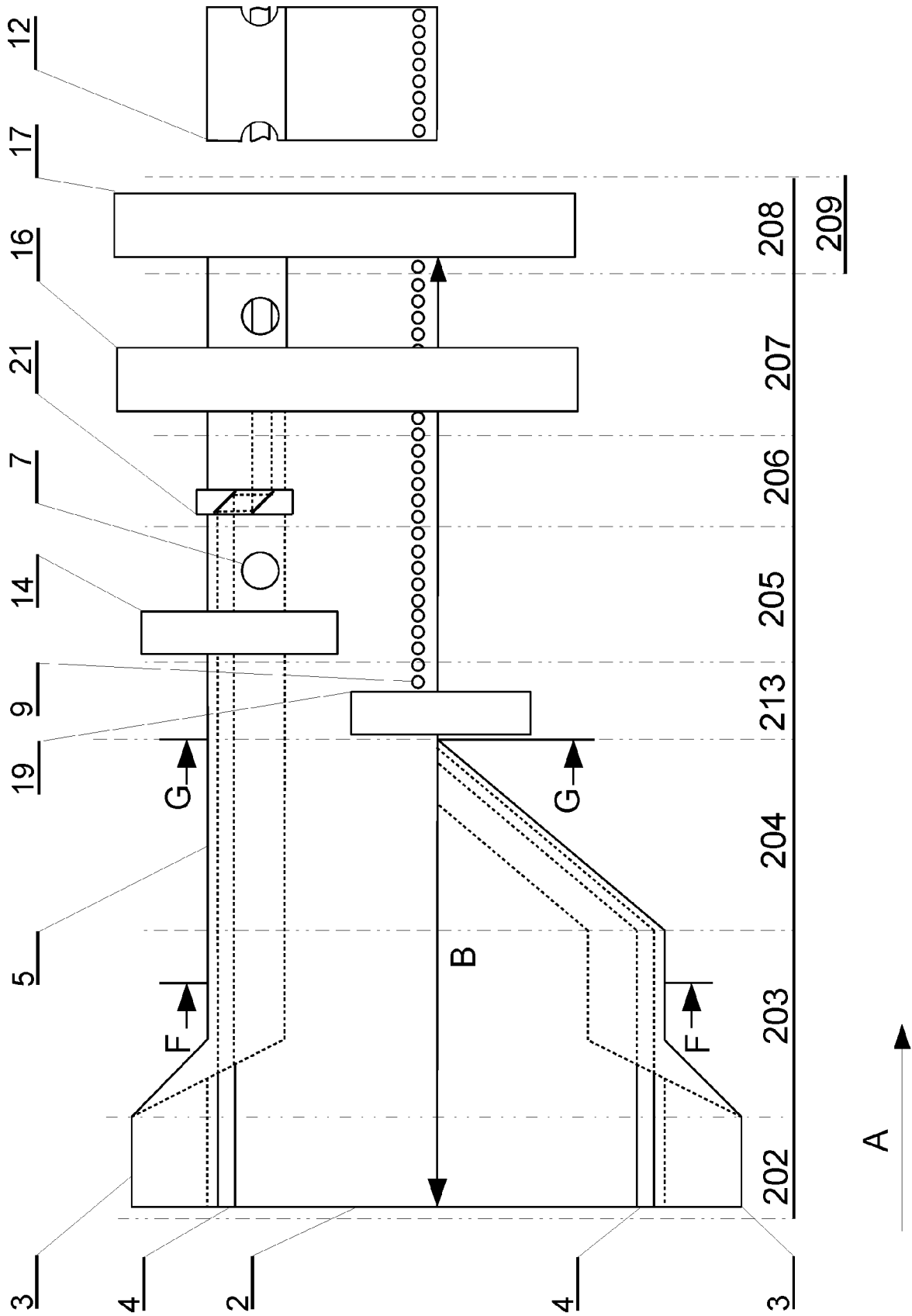


Fig. 10

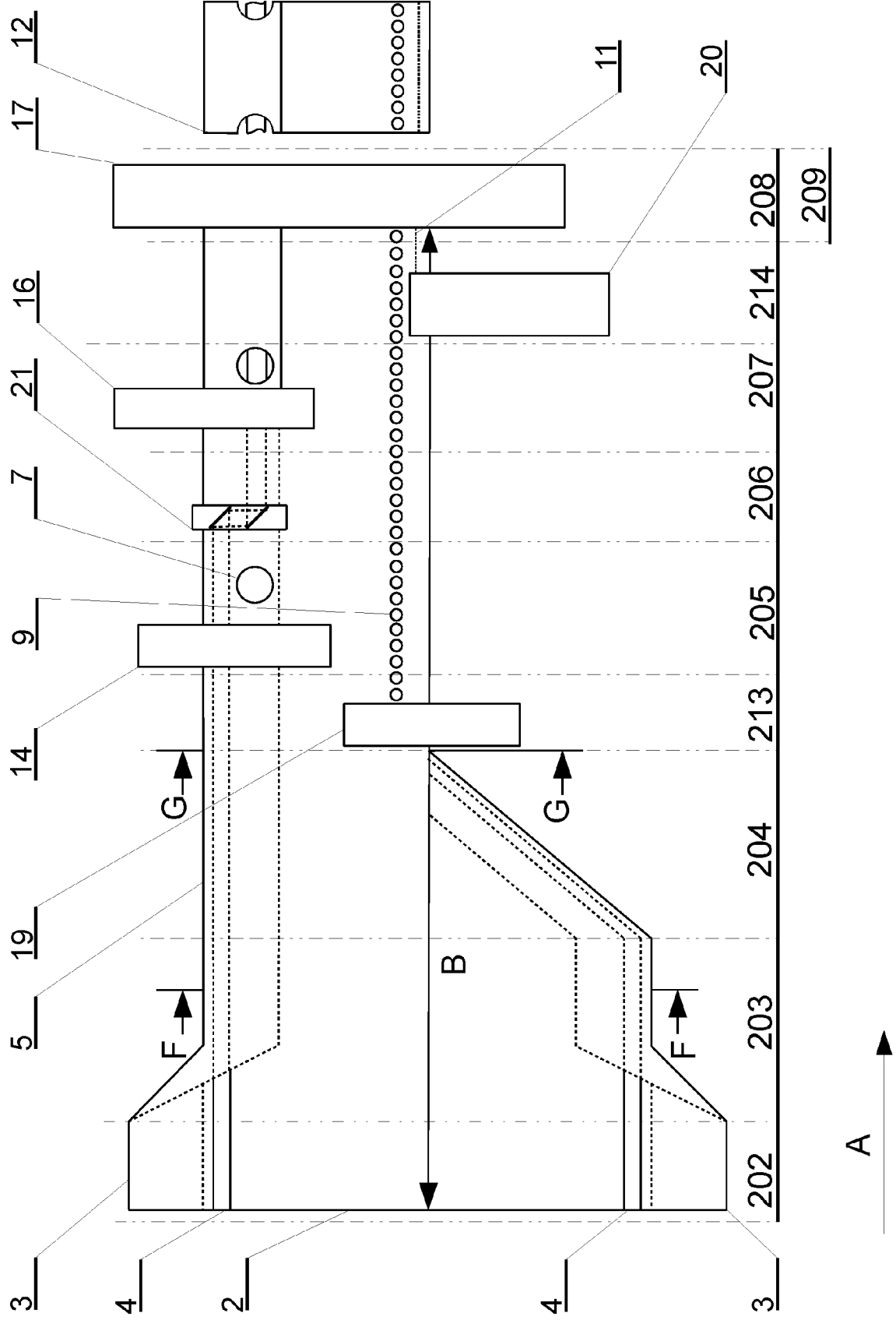


Fig. 11

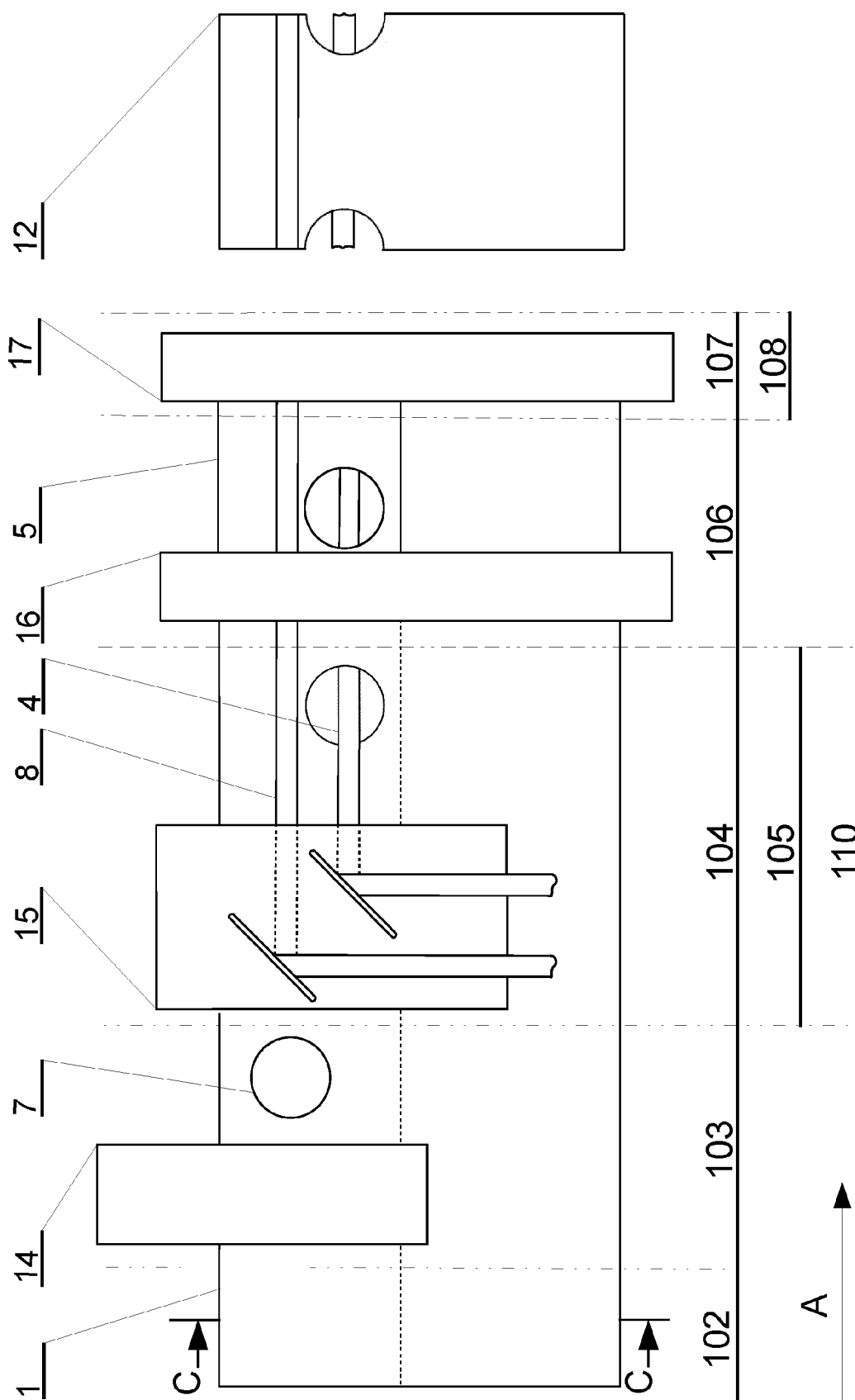


Fig. 12

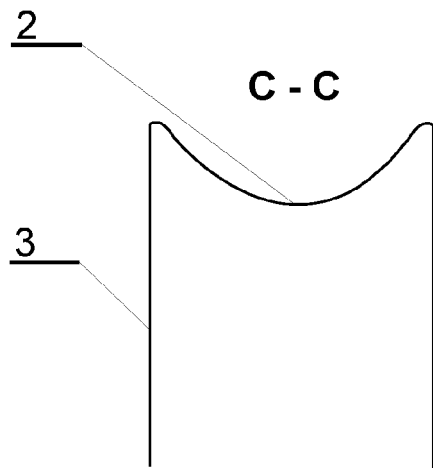


Fig. 13

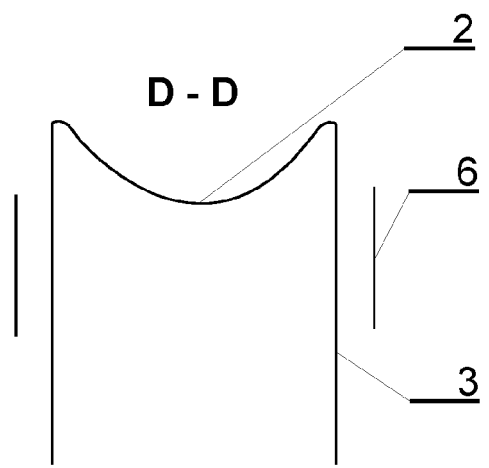


Fig. 14

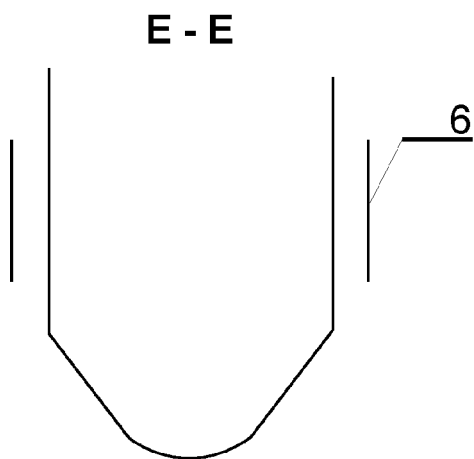


Fig. 15

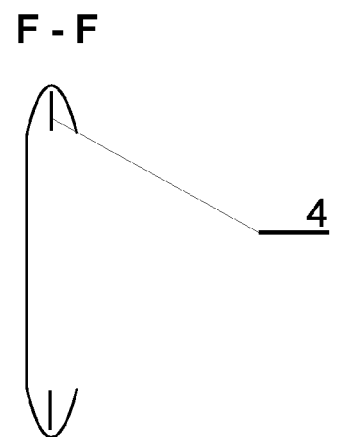


Fig. 16

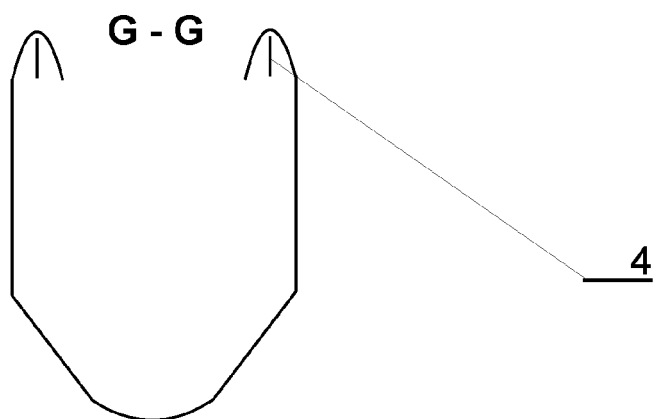


Fig. 17

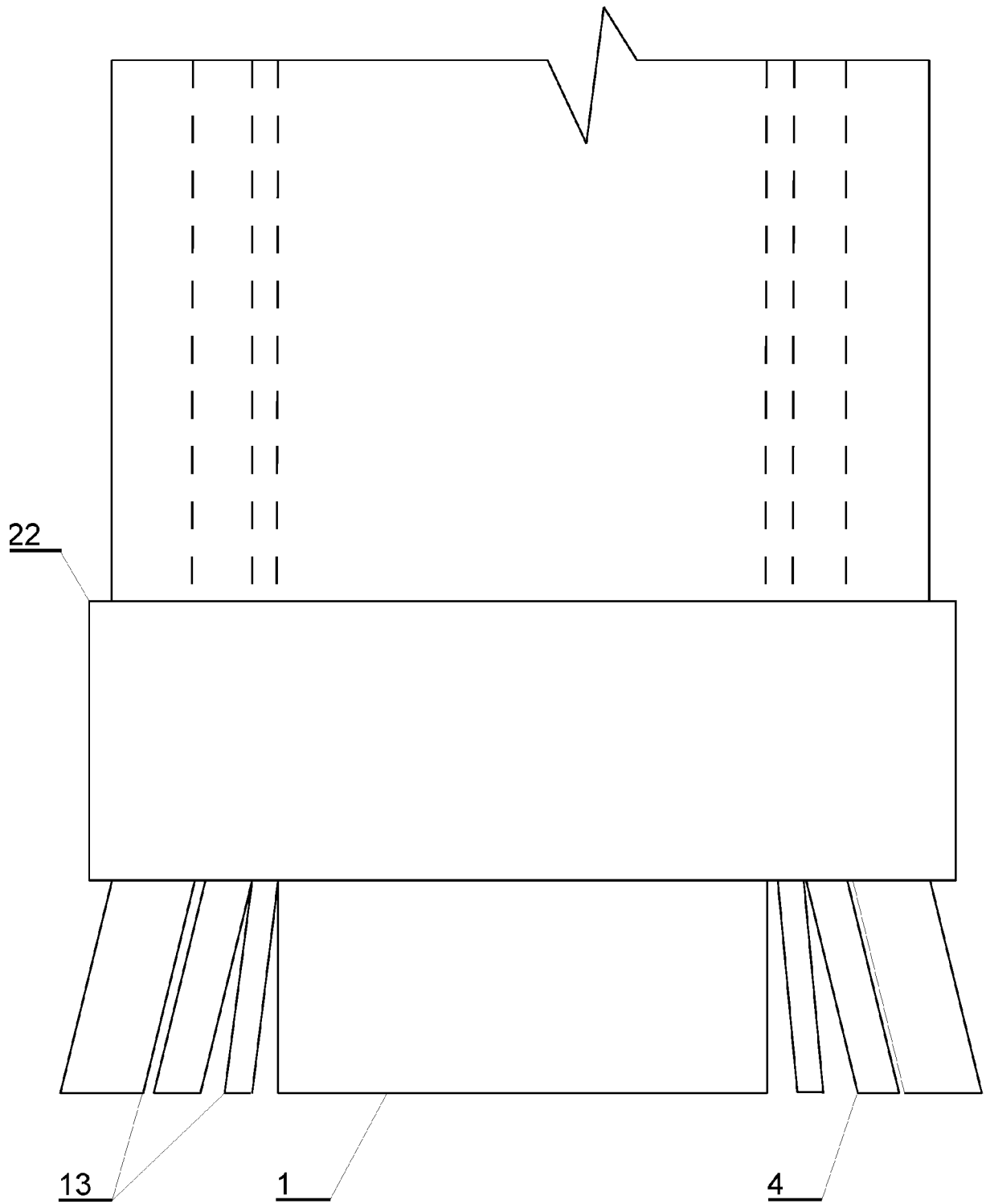


Fig. 18



EUROPEAN SEARCH REPORT

 Application Number
 EP 20 19 6090

5

10

15

20

25

30

35

40

45

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	DE 87 15 752 U1 (PACIMED MED. VERPACKUNGEN GMBH) 10 March 1988 (1988-03-10)	1,2,8,9,11,14,15	INV. B31B70/26
Y	* the whole document *	3,4,13	B31B70/81
X	DE 30 25 203 A1 (BUEHLER OPTIMA MASCHF [DE]) 21 January 1982 (1982-01-21)	1,2	
Y	* the whole document *		
X	US 2006/204716 A1 (BONKE DOUGLAS D [US]) 14 September 2006 (2006-09-14)	5,10,14,15	
Y	* paragraph [0034] - paragraph [0035]; figures 1,4-10 *	6,7,12,13	
X	US 3 196 757 A (BRUCE SAMWAYS) 27 July 1965 (1965-07-27)	5	
Y	* column 3, line 41 - line 70; figures 1-6 *		
Y	US 10 464 702 B2 (S2F FLEXICO [FR]) 5 November 2019 (2019-11-05)	3	
Y	* the whole document *		
Y	DE 12 22 238 B (LEHMACHER & SOHN M) 4 August 1966 (1966-08-04)	4,6	B31B B65D
Y	* paragraph [0013] - paragraph [0014]; figures 1,2 *		
Y	FR 2 797 254 A1 (SP METAL [FR]) 9 February 2001 (2001-02-09)	7	
Y	* page 7, line 1 - line 18; figure 2 *		
Y	EP 2 275 356 A1 (ULFOSS COMPANY GROUP AS [DK]) 19 January 2011 (2011-01-19)	12,13	
Y	* paragraph [0024] - paragraph [0027]; figure 2 *		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		1 March 2021	Johne, Olaf
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

2

50

55

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 19 6090

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-03-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 8715752 U1	10-03-1988	AT 69404 T	15-11-1991
		AT 69405 T	15-11-1991
		DE 8715752 U1	10-03-1988
		EP 0303726 A1	22-02-1989
		EP 0303732 A2	22-02-1989
		ES 2027269 T3	01-06-1992
		ES 2027668 T3	16-06-1992
		GR 3003128 T3	17-02-1993
		GR 3003129 T3	17-02-1993
DE 3025203 A1	21-01-1982	NONE	
US 2006204716 A1	14-09-2006	US 2006204716 A1	14-09-2006
		US 2009074332 A1	19-03-2009
US 3196757 A	27-07-1965	DK 105010 C	01-08-1966
		GB 1006867 A	06-10-1965
		US 3196757 A	27-07-1965
US 10464702 B2	05-11-2019	EP 3148883 A1	05-04-2017
		FR 3021034 A1	20-11-2015
		US 2017073098 A1	16-03-2017
		WO 2015173340 A1	19-11-2015
DE 1222238 B	04-08-1966	NONE	
FR 2797254 A1	09-02-2001	NONE	
EP 2275356 A1	19-01-2011	DK 2454163 T3	14-05-2018
		EP 2275356 A1	19-01-2011
		EP 2454163 A1	23-05-2012
		ES 2667023 T3	09-05-2018
		PL 2454163 T3	28-09-2018
		WO 2011006505 A1	20-01-2011

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1764067 A1 [0002]
- CN 209649622 U [0003]
- US 10464702 B2 [0004]