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(54) **DEVICE AND METHOD FOR APPLYING A PIECE OF FILM OF MATERIAL TO A CONTAINER**

VORRICHTUNG UND VERFAHREN ZUM AUFBRINGEN EINES MATERIALFILMS AUF EINEN BEHÄLTER

DISPOSITIF ET PROCÉDÉ POUR APPLIQUER UN MORCEAU DE FILM DE MATÉRIAU SUR UN RÉCIPIENT

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Description

[0001] The present invention relates to a device and a method of applying a piece of film of material to a container, preferably a device and a method for closing a container with a disk of material.

[0002] The present invention is mainly applied in the food sector, more particularly in the technical field of making capsules for infusion products, such as coffee, tea or the like.

[0003] In the known art, the filling and closing stations of the capsules provide for ordering the capsules on one or more parallel rows by means of suitable alveolus feed systems.

[0004] Usually, such systems comprise a plurality of concatenated modules, each provided with an array of alveoli aligned orthogonally to the feed direction, each of which belonging to a row.

[0005] In this configuration, typically with the capsules facing upwards, the infusion product is dispensed so as to fill the containers, which are then carried towards a closing station.

[0006] In this station a plurality of cutting heads is generally provided, arranged side by side orthogonally to the feed direction, each one designed to close the capsules of a single row.

[0007] For this purpose, a film material advancement system is provided, operatively interposed between the cutting heads and the capsules, so that each cutting head, descending towards the container, fastens the material to the edges of the capsule to cut it.

[0008] More precisely, the cutting heads are generally provided, within a welding device/ring adapted to act preliminarily (and coaxially) to the cut in order to ensure/engage the film of material to the capsule before it is cut according to the desired shape, generally countershaped to the edges of the capsule.

[0009] Following the cut, the film of blank, or waste, material, is advanced by one pitch to allow a portion of "virgin" film to position itself under the cutting heads and then discarded.

[0010] It should be noted, however, that the always reduced margins linked to the sale of infusion capsules (coffee in particular) have made coffee roasters very sensitive to the reduction of waste.

[0011] One of the parameters that are gradually becoming important, given the not insignificant cost of the material, is consumption of the film of closing material, which is why machine manufacturers have in recent years tried to reduce the waste thereof as much as possible, or to maximize the surface use during cutting/closing steps.

[0012] In this regard, the most recent developments have focused mainly on the miniaturization of the cutting head components, to allow the flanking of a large number of heads, each one acting on the capsules of a respective row, with a limited transverse footprint.

[0013] These solutions are, even if they are expensive due to the aforementioned miniaturization, still particularly efficient in reducing the waste relative to the "large" format capsules, but are very disadvantageous when the manufacturer has to change the format.

[0014] In fact, given the distance between the fixed and calibrated cutting heads on the maximum workable format, upon obtaining cuts very close to each other along the transverse direction, during the machining of smaller formats the transverse distance between the cuts necessarily increases, significantly reducing the cuts surface occupation and, therefore, significantly increasing the waste.

[0015] The aim of the present invention is therefore to provide a device and a method for applying a piece of film of material to a container which are able to overcome the aforementioned drawbacks of the known art.

[0016] In particular, it is an object of the present invention to provide a device and a method for applying a piece of film of material to a container which are particularly versatile and allow to minimize material waste regardless of the format of the containers.

[0017] Furthermore, it is an object of the present invention to provide a device and a method for applying a piece of film of material to a container which are easily adjustable and cost-efficient to manufacture.

[0018] Said objects are achieved by a device for applying a piece of film of material to a container having the characteristics of the subsequent claims from 1 to 9, as well as by a method for applying a piece of film of material to a container having the characteristics of claim 10.

[0019] The applying device comprises first feed means movable along a predetermined movement path and comprising a plurality of seats for housing a corresponding plurality of containers.

[0020] The seats are arranged in succession on at least a first and a second row parallel to each other and developing along an operating direction. Second feed means of a film of material arranged along said movement path and configured so that at least one operating section of the film faces the first feed means and is movable along said operating direction are also provided.

[0021] The device also comprises an application station arranged along said movement path, at said operating section of the film.

[0022] The application station is preferably provided with pressing means configured to fasten said film to at least one container placed in a first seat of the first row and at least one container placed in a second seat of the second row.

[0023] At least one first cutting head arranged along the first row of seats, associated thereto and configured to cut the film along a predetermined closed fracture line at said first seat is provided.

[0024] According to an aspect of the present invention, the application station further comprises a second cutting head arranged along the second row of seats, operatively associated thereto and configured to cut the film along a predetermined closed fracture line at said second seat

wherein, with reference to the operating direction, the second cutting head is placed downstream of the first cutting head.

[0025] Advantageously, in this way it is possible to further reduce the distance between the two cutting heads, even without a miniaturization thereof, as the position of the cuts on the film can also change.

[0026] Preferably, the distance between the interaxle spacings of the first and second cutting heads, measured along the operating direction, is an integer multiple of the distance between the interaxle spacings of two successive seats of said first or said second row.

[0027] Advantageously, in this way the two cutting heads can operate simultaneously, speeding up the production process.

[0028] In addition, said second feed means comprise at least one compensation member configured to adjust the length of the film running between the first cutting head and the second one.

[0029] Advantageously, in this way the movement of the first feed means is released and decoupled from that of the second feed means, allowing to maximize the surface occupation of the cuts with respect to the "virgin" film.

[0030] In fact, due to the presence of the compensating member it is possible to release the length of the film running between the two cutting heads from the effective distance between them, allowing to optimize the positioning of the cuts as a function of the diameter of the container.

[0031] Preferably, the second feed means comprise a pair of rewind rollers spaced from each other and at least partially delimiting said operating section, wherein the compensation member comprises an adjustment element operatively interposed between said rewind rollers and rotatably or slidingly associated to the film.

[0032] The adjustment element is movable with respect to said rewind rollers in order to change the length of the film running between them.

[0033] In other words, the adjustment element, due to its movement, determines a deviation in the path of the film between the two cutting heads, whose entity is related to the length to be obtained.

[0034] With reference to the method for applying, it envisages preparing a succession of containers arranged on at least a first and a second row parallel to one another and developing along an operating direction.

[0035] The containers have an entrance opening perimetrically delimited by a ring-shaped edge and are preferably oriented with said opening facing upwards.

[0036] A film of material developing at least partly along said operating direction and facing the opening of said containers, in correspondence with at least one application station, is also provided.

[0037] The containers succession is being fed of a first feed pitch along said operating direction;

[0038] The film of material is being fed of a second feed pitch along said operating direction, in the same or opposite direction with respect to the containers.

[0039] In the application station, the film of material is fastened to at least one first container of the first row and to at least one second container of the second row.

[0040] Preferably, contextually or subsequently, to have the film of material fastened to the first and the second container, an engaging step, preferably welding, of said film of material to the first and the second container is provided.

[0041] The film of material is then cut along a predetermined (first) closed fracture line at the first container.

[0042] Similarly, the film of material is also cut along a predetermined (second) closed fracture line at the second container. According to an aspect of the present invention, the second container is placed, with reference to said operating direction, operatively downstream of the first container.

[0043] In other words, the second container is placed on a different row with respect to the first container, therefore it is transversely misaligned to it, and displaced with respect to it along the operating direction, so it is longitudinally misaligned thereto.

[0044] Moreover, the method provides for an adjusting step of the length of the film (along the operating direction) running between the interaxle spacings of said first and said second container as a function of the area of said entrance opening of the containers.

[0045] More preferably, also the second feed pitch is adjusted as a function of the area of said entrance opening of the containers and of said length of the film running between the interaxle spacings of said first and said second container.

[0046] Advantageously, therefore, by adjusting that length of film (along the operating direction) running between the interaxle spacings of said first and said second container, together with the second feed pitch, as a function of the size of the containers, it is possible to optimize the distribution of the cuts on the film, minimizing the waste.

[0047] These and other features and relating advantages will become more apparent from the following exemplary, therefore non-limiting, description of a preferred, therefore not exclusive, embodiment of a device and a method for applying a piece of film of material to a container according to the appended drawings show, wherein:

Figure 1 shows a perspective view of device for applying of a piece of film of material to a container according to the present invention;

Figure 2 shows a sectional view of the device of figure 1, with the addition of the first feed means;

Figure 2a shows a detail of figure 2 in two different operating positions;

Figure 3 shows the chessboard of the first feed means and the waste of film of material obtained carrying out the method for applying a piece of film of material to a container with the device of figure 1;

Figure 4 shows the chessboard of the first feed

means and the waste of film of material obtained carrying out the method for applying a piece of film of material to a container with an alternative embodiment of the device.

[0048] With reference to the appended figures, number 1 refers to a device for applying a piece of film of material to a container according to the present Invention.

[0049] It should be noted that, preferably, such a device can be applied in the food industry and, in particular, in the application of disks of material to containers for infusion products, such as for example coffee, tea or similar capsules.

[0050] More preferably, the device 1 is designed to apply the closure disks to the capsules once they have been filled; however, the present invention is not to be considered limited to such an application, but can be advantageously used also in other similar operations, such as for example the application of filtering pieces from a film of continuous material.

[0051] Preferably, in any case, the device 1 for applying is placed in a machine for filling containers "C", such as for example coffee capsules. The device 1 comprises first feed means 2 movable along a predetermined movement path and comprising a plurality of seats 3 for housing a corresponding plurality of said containers "C".

[0052] Preferably, the seats 3 are adapted to keep the containers "C" with their own opening accessible from the top (i.e. from above).

[0053] In the preferred embodiment, the seats 3 are defined by housing alveoli, more preferably of circular shape.

[0054] The first feed means (2) are adapted so that the seats (3) are arranged in succession on at least a first "F1" and a second "F2" row parallel to each other and developing along an operating direction "A". The operating direction "A" corresponds to the movement path. Preferably, the first feed means 2 comprise at least two first rows "F1" and at least two alternating second rows "F2", with reference to a direction transverse to the operating direction "A".

[0055] In other words, each first row "F1" is flanked by at least a second row "F2", and vice versa.

[0056] Preferably, the first feed means 2 comprise a plurality of modules 2a, 2b arranged in succession along said operating direction "A", each containing at least one seat 3.

[0057] In the preferred embodiment, each module 2a, 2b comprises at least two seats 3 mutually side by side transversely to the operating direction "A".

[0058] Preferably, with reference to the operating direction "A", each seat "3" of the first row "F1" is interposed between two subsequent seats "3" of the second row (F2), and vice versa.

[0059] In other words, the seats 3 of a first row "F1" are arranged in mutually alternated along the operating direction "A" with respect to the seats 3 of the adjacent second row "F2".

[0060] In this regard, preferably the first feed means comprise a plurality of first modules 2a, containing one or more seats 3 of the first row "F1", and a plurality of second modules 2b, containing one or more seats 3 of the second row "F2".

[0061] More precisely, each first module 2a comprises exclusively seats 3 of the first row "F1" and each second module 2b comprises exclusively seats 3 of the second row.

[0062] The first modules 2a and the second modules 2b are arranged mutually alternated along the operating direction "A".

[0063] From the point of view of the movement, preferably the first feed means 2 are of the discontinuous type (i.e. intermittent) and have a first feed pitch P1, preferably corresponding to the axial distance (measured along the operating direction "A") between two first modules 2a or two subsequent second modules 2b.

[0064] In any case, the movement of the first feed means 2 can be set by an operator and driven by a control unit (not shown).

[0065] It should be noted that, preferably, operatively upstream of the first feed means 2a loading station (not shown) is provided, configured to supply one or more rows of containers "C" in succession and provided with a selector (or *revolver*) configured to arrange said containers "C" in the seats 3, i.e. on a plurality of parallel rows.

[0066] The device 1 further comprises second feed means 4 of a film 5 of material arranged along said movement path.

[0067] The film 5 of material is preferably a strip of suitable material, usable as a filtering, sealing or closing element for the containers "C".

[0068] The second feed means (4) are configured so that at least one operating section 5a of the film 5 is faced to the first feed means 2 and movable along said operating direction "A".

[0069] More precisely, in the operating section 5a the film 5 of material faced to the seats 3.

[0070] In the preferred embodiment, the second feed means 4 comprise a plurality of movement rollers on which the film 5 is partially wrapped so as to be moved linearly, along the operating direction "A" in response to a rotation thereof.

[0071] With reference to the appended figures, the second feed means 4 comprise a pair of rewind rollers 6 spaced apart (along the operating direction A) and at least partly delimiting said operating section 5a. Said rewind rollers 6 can be driven by means of said control unit.

[0072] In this regard, also the second feed means 4 are of the discontinuous type (i.e. intermittent) and have a second feed pitch P1 which can be set by the operator.

[0073] Preferably, as will be better explained in the following, the first "P1" and the second feed pitch "P2" can be set independently.

[0074] The device also comprises an application station 7 arranged along said movement path at said operating section 5a of the film 5 of material of the second

feed means 4.

[0075] The application station 7 comprise pressing means 8 configured to fasten said film 5 to at least one (first) container "C1" placed in a first seat of the first row "F1" and at least one (second) container "C2" placed in a second seat of the second row "F2".

[0076] Such pressing means 8 are therefore movable towards and away from the first feed means 2, along a transverse direction, preferably orthogonal to the first direction "A".

[0077] In particular, the pressing means 8 are vertically movable between a raised, distal position of the first advancing means 2, and a lowered position, in contact with the first feed means 2.

[0078] Therefore, the operating section 5a of the film 5 is interposed between the pressing means 8 and the first feed means 2.

[0079] In this way, a movement of the pressing means 8 towards the first feed means 2 involves moving the film 5 of material in contact with them, at least at the first seat and the second seat.

[0080] Preferably, the pressing means 8 comprise at least a first pressing element 8a associated with the first seat and at least a second pressing element 8b associated with the second seat.

[0081] With reference to the illustrated embodiment, the first feed means 2 comprise two first seats side by side (located in the same first module 2a) and two second seats side by side (located in the same second module 2b).

[0082] Preferably, therefore, the pressing means 8 comprise respective first 8a and second pressing elements 8b associated with each first and second seat.

[0083] Preferably, each pressing element 8a, 8b comprises at least one welding ring 9 configured to engage the film 5 to the ring-shaped edge of the container "C" contained in the first or in the second seat.

[0084] Such a welding ring 9 is therefore in turn movable towards and away from the first feed means 2 between a rest position, wherein it is distal from the first feed means 2, and a working position, wherein it is fastened to the first feed means 2 and coaxial to a respective (first or second) seat.

[0085] The pressing element 8a, 8b, and in particular the welding ring 9 are therefore coaxial to the interaxle spacing of the first seat or of the second seat in the application station 7.

[0086] This application station 7 further comprises at least a first cutting head 10 arranged along the first row "F1" of seats 3 and associated therewith.

[0087] The first cutting head 10 is configured to cut the film 5 along a predetermined (first) closed fracture line at the first seat.

[0088] Such first cutting head 10 is operatively placed (not necessarily structurally) downstream of the pressing means 8 in order to carry out the cut only upon the welding of the film 5 to the container "C", avoiding the creation of not very aesthetic folds or functional defects.

[0089] The application station 7 further comprises at least a second cutting head 11 arranged along the second row "F2" of seats 3 and operatively associated therewith.

[0090] Said second cutting head 11 is configured to cut the film 5 along a predetermined (second) closed fracture line at said second seat. According to the present invention, with reference to the operating direction "A", the second cutting head 11 is located downstream of the first cutting head 10.

[0091] In other words, the first 10 and the second cutting head 11 are not side by side orthogonally to the operating direction "A", but they are "staggered", or arranged in succession.

[0092] Preferably, the distance "D" between the interaxle spacings of the first 10 and of the second cutting head 11, measured along the operating direction "A", is an integer multiple of the distance between the interaxle spacings of two successive modules of the first feed means 2. It should be noted that the distance between the first 10 and the second cutting head 11 corresponds, preferably, to the distance between the first and the second seat.

[0093] Preferably, each cutting head 10, 11 comprises a ring-shaped cutting blade 10a, 11a, moving towards and away from the first feed means 2 between a rest position and a cutting position, wherein it is in contact with the film 5 of material (already engaged/welded to the container).

[0094] In the preferred embodiment, each cutting head 10, 11 is associated with a respective pressing element 8a, 8b.

[0095] More precisely, the application station 7 comprises a plurality of operating groups 12, 13 each comprising a pressing element 8a, 8b and a corresponding cutting head 10, 11, arranged coaxially with each other to act in combination on the same first or second seat.

[0096] In the illustrated embodiment, the operating group 12, 13 comprises a welding ring 9 and a ring-shaped cutting blade 10a, 11a fit around said welding ring 9 (i.e. around the pressing element) and movable, towards or away from the first feed means 2 with a predetermined delay with respect to the welding ring 9.

[0097] In other words, each cutting head 10, 11a has a ring-shaped blade surrounding the pressing element 8a, 8b in order to cut the film 5 of material externally with respect to the engaging/welding line with the container "C".

[0098] With reference to the appended figures, therefore, the application station 7 comprises at least two first operating groups 12, arranged along respective first rows "F1" and comprising a first pressing element 8a and a first cutting head 10.

[0099] Preferably, such first operating groups 12 are side by side and, at least in part, jointly moved.

[0100] The application station 7 further comprises at least two second operating groups 13, arranged along respective second rows "F2" and comprising a second

pressing element 8b and a second cutting head 11.

[0101] Preferably, such second operating groups 13 are side by side and, at least in part, jointly moved.

[0102] According to a further aspect of the present invention, the second feed means 4 comprise at least a compensation member 14 configured to adjust the length of the film 5 running between the first 10 and the second cutting head 11.

[0103] Advantageously, in this way it is possible to release the second feed pitch "P2" (of the second feed means) from the first feed pitch "P1" (of the first feed means), considerably increasing the flexibility of the device 1.

[0104] With reference to figures 3 and 4, for example, it is possible to appreciate how to change the container format (large in figure 3, small in figure 4) it is possible to change the second feed pitch "P2", optimizing the surface occupation of the film 5 and minimizing the waste.

[0105] Preferably, the compensation member 14 comprises an adjustment element 15 operatively interposed between said rewind rollers 6 and rotatably or slidingly associated with the film 5.

[0106] Such adjustment element 15 is movable with respect to said rewind rollers 6 in order to change the length of the film 5 running between them.

[0107] In other words, the adjustment element 15 defines at least in part a deviation or rewinding along the operating section 5a of the film, the entity of which is of adjustable length.

[0108] In this way, it is possible to optimize the second feed pitch "P2" with respect to the first one with a minimizing view of the waste coming from the film 5.

[0109] In the preferred embodiment, the compensation member 14 comprises two first rollers 14a substantially parallel to each other and transversal to said operating direction "A", arranged along the operating section 5a.

[0110] A second roller 15a is operatively interposed between the first rollers 14a so as to define a rewinding of the film 5 between said first rollers and defining the adjustment element.

[0111] Such second roller 15a is selectively translatable towards and/or away from said first rollers 14a in order to change the length of the film 5 running between them.

[0112] More precisely, the second roller 15a is movable towards and/or away from the first feed means 2.

[0113] In this way, moving away from the first feed means 2, the forward section and the return section of the deviation or rewinding are lengthened, with consequent elongation of the operating section 5a (broken line in figure 2a).

[0114] Likewise, moving towards the first feed means 2, the forward section and the return portion of the deviation or rewinding are shortened, with a consequent shortening of the operating section 5a (continuous line in figure 2a).

[0115] It should be noted that, in the position proximal to the feed means 2 of the second roller 15a, the operating section 5a is linear and has a length corresponding to the distance, measured along the operating direction "A", between the rewind rollers 6.

[0116] It should be noted that the adjustment element 15 can be driven manually or mechanically.

[0117] An object of the present invention is also a method of applying a piece of film 5 of material to a container "C", preferably but not exclusively carry out by means of the device 1 described up to now.

[0118] In any case, for simplicity, the reference numbers where compatible will be kept unchanged also in the following method description.

[0119] The method provides for a succession of containers "C" arranged on at least a first "F1" and a second row "F2" parallel to each other and developing along an operating direction "A".

[0120] In the preferred embodiment, the containers "C" are arranged on at least two first "F1" and two second "F2" rows side by side and alternated.

[0121] Each container "C", as already mentioned above, has an entrance opening perimetrically delimited by a ring-shaped edge.

[0122] Preferably, the containers are coffee or tea capsules.

[0123] It should be noted that, preferably, the method provides that the containers "C" to be filled with food products, preferably produced by infusion, such as coffee or tea.

[0124] The film 5 of material is then prepared, developing at least partially along said operating direction "A" and provided with at least an operating section 5a facing the opening of said containers "C" (at least one application station).

[0125] The method then provides to feed the succession of containers "C" of a first feed pitch "P1" along said operating direction "A" and to feed said film 5 of material of a second feed pitch "P2" along said operating direction "A".

[0126] The second pitch "P2" may have indistinctly the same or the opposite direction with respect to the first pitch "P1" of the containers "C". Preferably, however, the movement direction of the containers "C" is opposite to that of the film 5.

[0127] When a predetermined application station 7 is reached, the film 5 is fastened to (i.e. pressed/pushed until it is in contact with) at least a first container "C1" of the first row "F1" and at least a second container "C2" of the second row "F2".

[0128] The first "C1" and the second container "C2" are placed in the first and in the second seat previously described.

[0129] Preferably, contextually or after having fastened the film 5 of material to the first "C1" and to the second container "C2", the method provides an engaging step, preferably welding, of said film 5 of material to the first "C1" and to the second "C2" container.

[0130] Subsequently, or simultaneously, the film is cut along a predetermined (first) closed fracture line at the first container "C1".

[0131] According to the present invention, the method provides to cut said film 5 of material along a predetermined closed fracture line at said second container "C2" operatively placed downstream of said at least one first container "C1" of the first row "F1", with reference to said operating direction "A".

[0132] Preferably, the cutting steps are performed simultaneously.

[0133] In particular, the interaxle spacing of said at least one first container "C1" of the first row "F1" and the interaxle spacing of said at least one second container "C2" of the second row "F2" are placed at a distance which is an integral multiple of the distance between the interaxle spacings of two successive containers "C" (i.e. two modules 2a, 2b). Furthermore, a step for adjusting the length of the film 5 running between the interaxle spacing of said at least one first container "C1" of the first row "F1" and the interaxle spacing of said at least one second container "C2" of the second row "F2" as a function of the area of said entrance opening of the containers "C" is provided. Advantageously, the adjusting step is preliminary to the cutting steps. In this way, the first "P1" and the second feed pitch "P2" can be set independently.

[0134] The invention achieves the intended aims and achieves important advantages.

[0135] In fact, the arrangement of two cutting heads acting on distinct rows and placed in succession along the operating direction allows to limit the transverse footprint of the cuts, with the same size of the same, thus promoting greater flexibility of the device.

[0136] Furthermore, the introduction of a compensation member allows not only to improve flexibility, but to optimize the waste in a dedicated manner according to the diameter of the capsules/containers, thus making the device universal.

Claims

1. Device for applying a piece of film of material to a container, comprising:

   first feed means (2) movable along a predetermined movement path and comprising a plurality of seats (3) for housing a corresponding plurality of containers (C) arranged in succession on at least a first row (F1) and a second row (F2), running parallel to each other and developing along an operating direction (A);
   second feed means (4) of a film (5) of material arranged along said movement path configured so that at least one operating section (5a) of the film (5) faces the first feed means (2) and can move along said operating direction (A);
   an application station (7) arranged along said movement path, at said operating section (5a) of the film (5), provided with:
   pressing means (8) configured to fasten said film (5) to at least one container placed in a first seat of the first row (F1) and at least one container placed in a second seat of the second row (F2);
   a first cutting head (10) arranged along the first row (F1) of seats (3), associated thereto and configured to cut the film (5) along a predetermined closed fracture line at said first seat;
   wherein said application station (7) further comprises a second cutting head (11) arranged along the second row (F2) of seats (3), operatively associated thereto and configured to cut the film (5) along a predetermined closed fracture line at said second seat (3b) wherein, with reference to the operating direction (A), the second cutting head (11) is placed downstream of the first cutting head (10), **characterized in that** said second feed means (4) comprise at least one compensation member (14) configured to adjust the length of the film (5) running between the first cutting head (10) and the second cutting head (11).

2. Applying device according to claim 1, **characterized in that** said second feed means (4) comprise a pair of rewind rollers (6) mutually spaced apart and delimiting at least part of said operating section (5a), wherein the compensation member (14) comprises an adjustment element (15) operatively interposed between said rewind rollers (6) and rotatably or slidingly associated with the film (5); said adjustment element (15) being movable with respect to said rewind rollers (6) in order to modify the length of the film (5) running between them.

3. Applying device according to claim 2, **characterized in that** said compensation member (14) comprises two first rollers (14a) substantially parallel to each other and transverse to said operating direction (A) and a second roller (15a) operatively interposed between the first rollers (14A) so as to define a rewinding of the film (5) between said first rollers (14a), wherein the second roller (15a) is selectively movable towards and/or away from said first rollers (14a) in order to modify the length of the film (5) running between them and define the adjustment element (15).

4. Applying device according to any one of the previous claims, **characterized in that** said first (2) and said second feed means (4) are of the discontinuous type and have respectively a first feed pitch (P1) and a second feed pitch (P2) which can be set independently from each other.

5. Applying device according to any one of the previous claims, **characterized in that**, with reference to the operating direction (A), each seat (3) of the first row (F1) is interposed between two following seats (3) of the second row (F2), and vice versa.

6. Applying device according to any one of the previous claims, **characterized in that** said first feed means (2) comprise at least two first rows (F1) and at least two alternating second rows (F2), with reference to a direction transverse to the operating direction (A); said application station (7) comprising in turn at least two first cutting heads (10) and at least two second cutting heads (11).

7. Applying device according to any one of the previous claims, **characterized in that** said pressing means (8) comprise at least one pressing element (8a, 8b) for each cutting head (10, 11).

8. Applying device according to claim7, in which said containers (C) have an entrance opening perimetrically delimited by a ring-shaped edge and said seats (3) are adapted to keep the containers (C) with their opening accessible from the top; said pressing element (8a, 8b) comprising at least one welding ring (9) configured to engage the film (5) with the ring-shaped edge of the container (C).

9. Applying device according to any one of the previous claims, **characterized in that** the application station (7) comprises a plurality of operating groups (12, 13) each comprising:

a welding ring (9) movable towards and away from the first feed means (2) between a rest position, wherein it is distal from the first feed means (2), and a working position, wherein it is fastened to the first feed means (2) and coaxial to a respective first or second seat;
a ring-shaped cutting blade (10a, 11a) fitted around said welding ring (9) and movable towards and away from the first feed means (2) with a predetermined delay with respect to the welding ring (9).

10. Method of applying a piece of film of material to a container, comprising the following steps:

providing a succession of containers (C) arranged on at least a first (F1) and a second row (F2) parallel to one another and developing along an operating direction (A); said containers having an entrance opening perimetrically delimited by a ring-shaped edge;
providing a film (5) of material having at least one operating section (5a) developing at least partly along said operating direction (A) and facing the opening of said containers (C) in correspondence with at least one application station (7);
feeding said succession of containers (C) of a first feed pitch (P1) along said operating direction (A);
feeding said film (5) of material of a second feed pitch (P2) along said operating direction (A), in the same direction or against the containers (C);
fastening the film (5) of material to at least one first container (C1) of the first row (F1) and to at least one second container (C2) of the second row (F2) in the application station (7);
cutting said film (5) of material along a predetermined closed fracture line at said first container (C1) with a first cutting head (10);
cutting said film (5) of material along a predetermined closed fracture line at said second container (C2) with a second cutting head (11) operatively placed downstream of said at least one first container (C1) of the first row (F1), with reference to said operating direction (A),
characterized in that it comprises a step for adjusting the length of the film (5) running between said at least one first container (C1) of the first row (F1) and the interaxle spacing of said at least one second container (C2) of the second row (F2) as a function of the area of said

Patentansprüche

1. Vorrichtung zum Aufbringen eines Materialfilms auf einen Behälter, umfassend:

erste Zuführungselemente (2), die entlang einer zuvor festgelegten Bewegungsbahn beweglich sind und eine Vielzahl von Sitzen (3) zum Aufnehmen einer entsprechenden Vielzahl von der Reihenfolge nach in mindestens einer ersten Reihe (F1) und einer zweiten Reihe (F2), die parallel zueinander und entlang einer Arbeitsrichtung (A) verlaufen, angeordneten Behältern (C) umfassen;
entlang des genannten Bewegungspfads angeordnete zweite Zuführungselemente (4) eines Materialfilms (5), die so ausgelegt sind, dass mindestens ein Arbeitsabschnitt (5a) des Materialfilms (5) den ersten Zuführungselementen (2) gegenüberliegt und sich entlang der genannten Arbeitsrichtung (A) bewegen kann;
eine Aufbringungsstation (7), die entlang des genannten Bewegungspfads auf dem genannten Arbeitsabschnitt (5a) des Materialfilms (5) angeordnet und mit Folgendem ausgestattet ist:

Anpresselementen (8), die darauf ausgelegt sind, den genannten Materialfilm (5) an

mindestens einem, in einem ersten Sitz der ersten Reihe (F1) positionierten Behälter und an mindestens einem in einen zweitem Sitz der zweiten Reihe (F2) positionierten Behälter zu befestigen;
einem ersten Schneidkopf (10), der entlang der ersten Reihe (F1) Sitze (3) angeordnet und mit dieser verbunden und darauf ausgelegt ist, den Materialfilm (5) entlang einer zuvor festgelegten Frakturlinie an dem genannten ersten Sitz zu schneiden;
wobei die genannte Aufbringungsstation (7) außerdem einen entlang der zweiten Reihe (F2) Sitze (3) angeordneten, operativ mit dieser verbundenen zweiten Schneidkopf (11) umfasst, der darauf ausgelegt ist, den Materialfilm (5) entlang einer zuvor festgelegten Frakturlinie an dem genannten zweiten Sitz (3b) zu schneiden, wobei der genannte zweite Schneidkopf (11) im Verhältnis zu der Arbeitsrichtung (A) nach dem ersten Schneidkopf (10) angeordnet ist,
dadurch gekennzeichnet, dass die genannten zweiten Zuführungselemente (4) mindestens ein Ausgleichsglied (14) umfassen, das darauf ausgelegt ist, die Länge des zwischen dem ersten Schneidkopf (10) und dem zweiten Schneidkopf (11) durchlaufenden Materialfilms (5) anzupassen.

2. Vorrichtung zum Aufbringen nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannten zweiten Zuführungselemente (4) ein Paar in einem Abstand befindlicher Rücklaufrollen (6) umfassen, die mindestens einen Teil des genannten Arbeitsabschnitts (5a) begrenzen, bei der das Ausgleichsglied (14) ein operativ zwischen den genannten Rücklaufrollen (6) eingefügtes Anpassungselement (15) umfasst, das drehbar oder gleitend mit dem Materialfilm (5) verbunden ist; wobei das genannte Anpassungselement (15) im Verhältnis zu den genannten Rücklaufrollen (6) beweglich ist, um die Länge des zwischen diesen verlaufenden Materialfilm (5) zu ändern.

3. Vorrichtung zum Aufbringen nach Anspruch 2, **dadurch gekennzeichnet, dass** das genannte Ausgleichsglied (14) zwei erste im Wesentlichen zueinander parallele und zur der genannten Arbeitsrichtung (A) quer verlaufende erste Rollen (14a) und eine operativ zwischen den ersten Rollen (14A) eingefügte zweite Rolle (15a) umfasst, um einen Rücklauf des Materialfilms (5) zwischen den genannten ersten Rollen (14a) zu definieren, bei der die zweite Rolle (15a) wahlweise zu den genannten ersten Rollen (14a) hin oder von diesen wegbewegt werden kann, um die Länge des zwischen diesen laufenden Materialfilms (5) zu ändern und das Anpassungselement (15) zu definieren.

4. Vorrichtung zum Aufbringen nach einem beliebigen der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die genannten ersten (2) und zweiten Zuführungselemente (4) diskontinuierlichen Typs sind und jeweils eine erste Zuführungshöhe (P1) und eine zweite Zuführungshöhe (P2) aufweisen, die unabhängig voneinander eingestellt werden können.

5. Vorrichtung zum Aufbringen nach einem beliebigen der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** jeder Sitz (3) der ersten Reihe (F1) im Verhältnis zu der Arbeitsrichtung (A) zwischen zwei aufeinanderfolgenden Sitzen (3) der zweiten Reihe (F2) und umgekehrt eingesetzt ist.

6. Vorrichtung zum Aufbringen nach einem beliebigen der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die genannten ersten Zuführungselemente (2) mindestens zwei erste Reihen (F1) und mindestens zwei im Verhältnis zu einer quer zur Arbeitsrichtung (A) verlaufenden Richtung alternierende zweite Reihen (F2) umfassen, wobei die genannte Aufbringungsstation (7) wiederum mindestens zwei erste Schneidköpfe (10) und mindestens zwei zweite Schneidköpfe (11) umfasst.

7. Vorrichtung zum Aufbringen nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die genannten Anpresselemente (8) mindestens ein Anpresselement (8a, 8b) für jeden Schneidkopfs (10, 11) umfassen.

8. Vorrichtung zum Aufbringen nach Anspruch 7, bei der die genannten Behälter (C) eine umlaufend von einem ringförmigen Rand begrenzte Eingangsöffnung aufweisen und die genannten Sitze (3) geeignet sind, die Behälter (C) mit ihren Öffnungen von oben zugänglich zu halten; wobei das genannte Anpresselement (8a, 8b) mindesten einen Schweißring (9) umfasst, der darauf ausgelegt ist, den Materialfilm (5) mit dem ringförmigen Rand des Behälters (C) zu kuppeln.

9. Vorrichtung zum Aufbringen nach einem der vorangegangenen Ansprüche, **dadurch gekennzeichnet, dass** die Aufbringungsstation (7) eine Vielzahl von Arbeitsgruppen (12, 13) umfasst, von denen jede Folgendes umfasst:

einen Schweißring (9), der zwischen einer Ruheposition, in der er sich distal zu den ersten Zuführungselementen (2) befindet, und einer Arbeitsposition, in der er an den ersten Zuführungselementen (2) befestigt und koaxial zu einem entsprechenden ersten oder zweiten Sitz

angeordnet ist, zu den ersten Zuführungselementen (2) hin und von diesen weg bewegt werden kann,
eine um den genannten Schweißring (9) angebrachte ringförmige Schneidklinge (10a, 11a), die zu den ersten Zuführungselementen (2) mit einer zuvor festgelegten Verzögerung im Verhältnis zum Schweißring (9) hin und von diesen wegbewegt werden kann.

10. Verfahren zum Aufbringen eines Materialfilms auf einen Behälter, das die folgenden Schritte umfasst:

Bereitstellung einer Reihe von Behältern (C), die auf mindestens einer ersten (F1) und einer zweiten Reihe (F2) parallel zueinander angeordnet sind und entlang einer Arbeitsrichtung (A) verlaufen; wobei die genannten Behälter eine umlaufend von einem ringförmigen Rand begrenzte Eingangsöffnung aufweisen;
Bereitstellung eines Materialfilms (5) mit mindestens einem, mindestens teilweise entlang der genannten Arbeitsrichtung (A) verlaufenden und der Öffnung der genannten Behälter (C) auf mindestens einer Aufbringungsstation (7) gegenüberliegenden Arbeitsabschnitt (5a);
Zuführung der genannten Reihe von Behältern (C) mit einer ersten Zuführungshöhe (P1) entlang der genannten Arbeitsrichtung (A);
Zuführung des genannten Materialfilms (5) mit einer zweiten Zuführungshöhe (P2) entlang der genannten Arbeitsrichtung (A) in der gleichen oder entgegengesetzten Richtung der Behälter (C);
Befestigen des Materialfilms (5) an mindestens einem ersten Behälter (C1) der ersten Reihe (F1) und an mindestens einem zweiten Behälter (C2) der zweiten Reihe (F2) in der Aufbringungsstation (7);
Schneiden des genannten Materialfilms (5) entlang einer zuvor festgelegten geschlossenen Frakturlinie auf dem genannten ersten Behälter (C1) mit einem ersten Schneidkopf (10);
Schneiden des genannten Materialfilms (5) entlang einer zuvor festgelegten geschlossenen Frakturlinie auf dem genannten zweiten Behälter (C1) mit einem zweiten Schneidkopf (11),
der im Verhältnis zu der genannten Arbeitsrichtung (A) operativ nach dem genannten mindestens einen ersten Behälter (C1) der ersten Reihe (F1) positioniert ist,
dadurch gekennzeichnet, dass es einen Schritt zum Anpassen der Länge des zwischen dem genannten mindestens einen ersten Behälter (C1) der ersten Reihe (F1) laufenden Materialfilms (5) und dem Achsabstand des genannten mindestens einen zweiten Behälters (C2) der zweiten Reihe (F2) abhängig von dem Bereich der genannten Eingangsöffnung des Behälters (C) umfasst.

Revendications

1. Dispositif pour appliquer un morceau de film de matériau sur un récipient, comprenant :

des premiers moyens d'avancement (2) mobiles le long d'un parcours de mouvement prédéterminé et comprenant une pluralité de sièges (3) pour le logement d'une pluralité correspondante de récipients (C) disposés en succession sur au moins un premier rang (F1) et un deuxième rang (F2), se trouvant parallèles l'un à l'autre et se développant le long d'un sens de marche (A) ;
des deuxièmes moyens d'avancement (4) d'un film (5) de matériau disposés le long dudit parcours de mouvement configurés de sorte qu'au moins une section opérationnelle (5a) du film (5) se trouve face aux premiers moyens d'avancement (2) et puisse se déplacer le long dudit sens de marche (A) ;
une station d'application (7) disposée le long dudit parcours de mouvement, en correspondance de ladite section opérationnelle (5a) du film (5), munie de :

moyens de pressage (8) configurés pour fixer ledit film (5) sur au moins un récipient placé dans un premier siège du premier rang (F1) et au moins un récipient placé dans un deuxième siège du deuxième rang (F2) ;
une première tête de coupe (10) disposée le long du premier rang (F1) de sièges (3), associée à celui-ci et configurée pour couper le film (5) le long d'une ligne de fracture fermée prédéterminée en correspondance dudit premier siège ;
dans lequel ladite station d'application (7) comprend en outre une deuxième tête de coupe (11) disposée le long du deuxième rang (F2) de sièges (3), associée opérationnellement à celui-ci et configurée pour couper le film (5) le long d'une ligne de fracture fermée prédéterminée en correspondance dudit deuxième siège (3b), dans laquelle, en référence au sens de marche (A), la deuxième tête de coupe (11) est placée en aval de la première tête de coupe (10), **caractérisé en ce que** lesdits deuxièmes moyens d'avancement (4) comprennent au moins un élément de compensation (14) configuré pour régler la longueur du film (5) se trouvant entre la première tête de coupe (10) et la deuxième tête de coupe (11).

2. Dispositif d'application selon la revendication 1, **caractérisé en ce que** lesdits deuxièmes moyens d'avancement (4) comprennent une paire de rouleaux de rembobinage (6) réciproquement espacés et délimitant au moins une partie de ladite section opérationnelle (5a), dans lequel l'élément de compensation (14) comprend un élément de réglage (15) opérationnellement interposé entre lesdits rouleaux de rembobinage (6) et associé de façon pivotante ou coulissante au film (5) ; ledit élément de réglage (15) étant mobile par rapport auxdits rouleaux de rembobinage (6) afin de modifier la longueur du film (5) se trouvant entre ceux-ci.

3. Dispositif d'application selon la revendication 2, **caractérisé en ce que** ledit élément de compensation (14) comprend deux premiers rouleaux (14a) sensiblement parallèles l'un à l'autre et transversaux audit sens de marche (A) et un deuxième rouleau (15a) opérationnellement interposé entre les premiers rouleaux (14a) de façon à définir un rembobinage du film (5) entre lesdits premiers rouleaux (14a), dans lequel le deuxième rouleau (15a) est sélectivement mobile vers et/ou en provenance desdits premiers rouleaux (14a) afin de modifier la longueur du film (5) se trouvant entre ceux-ci et définir l'élément de réglage (15).

4. Dispositif d'application selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits premiers (2) et lesdits deuxièmes moyens d'avancement (4) sont de type discontinu et ont respectivement un premier pas d'avancement (P1) et un deuxième pas d'avancement (P2) qui peuvent être établis indépendamment l'un de l'autre.

5. Dispositif d'application selon l'une quelconque des revendications précédentes, **caractérisé en ce que**, en référence au sens de marche (A), chaque siège (3) du premier rang (F1) est interposé entre les deux sièges successifs (3) du deuxième rang (F2), et vice versa.

6. Dispositif d'application selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits premiers moyens d'avancement (2) comprennent au moins deux premiers rangs (F1) et au moins deux deuxièmes rangs (F2) alternés, en référence à un sens transversal au sens de marche (A) ; ladite station d'application (7) comprenant à son tour au moins deux premières têtes de coupe (10) et au moins deux deuxièmes têtes de coupe (11).

7. Dispositif d'application selon l'une quelconque des revendications précédentes, **caractérisé en ce que** lesdits moyens de pressage (8) comprennent au moins un élément de pressage (8a, 8b) pour chaque tête de coupe (10, 11).

8. Dispositif d'application selon la revendication 7, dans lequel lesdits récipients (C) ont une ouverture d'entrée délimitée périmétralement par un bord annulaire et lesdits sièges (3) sont adaptés pour maintenir les récipients (C) avec leur ouverture accessible au sommet ; ledit élément de pressage (8a, 8b) comprenant au moins une bague de soudage (9) configurée pour mettre en prise le film (5) avec le bord annulaire du récipient (C).

9. Dispositif d'application selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la station d'application (7) comprend une pluralité de groupes opérationnels (12, 13), chacun comprenant :

   une bague de soudage (9) mobile vers et en provenance des premiers moyens d'avancement (2) entre une position de repos, dans laquelle elle est distale des premiers moyens d'avancement (2), et une position de travail, dans laquelle elle est fixée aux premiers moyens d'avancement (2) et coaxiale à un premier ou deuxième siège respectif,
   une lame de coupe annulaire (10a, 11a) adaptée autour de ladite bague de soudage (9) et mobile vers et en provenance des premiers moyens d'avancement (2) avec un décalage prédéterminé par rapport à la bague de soudage (9).

10. Procédé pour appliquer un morceau de film de matériau sur un récipient, comprenant les étapes suivantes :

    fournir une succession de récipients (C) disposés sur au moins un premier (F1) et un deuxième rang (F2) parallèles l'un à l'autre et se développant le long d'un sens de marche (A) ; lesdits récipients ayant une ouverture d'entrée délimitée périmétralement par un bord annulaire ;
    fournir un film (5) de matériau ayant au moins une section opérationnelle (5a) se développant au moins partiellement le long dudit sens de marche (A) et faisant face à l'ouverture desdits récipients (C) en correspondance avec au moins une station d'application (7) ;
    faire avancer ladite succession de récipients (C) d'un premier pas d'avancement (P1) le long dudit sens de marche (A) ;
    faire avancer ledit film (5) de matériau d'un deuxième pas d'avancement (P2) le long dudit sens de marche (A), dans le même sens ou dans le sens inverse par rapport aux récipients (C) ;
    fixer le film (5) de matériau sur au moins un premier récipient (C1) du premier rang (F1) et sur au moins un deuxième récipient (C2) du deuxième rang (F2) dans la station d'application (7) ;
    couper ledit film (5) de matériau le long d'une

ligne de fracture fermée prédéterminée en correspondance dudit premier récipient (C1) avec une première tête de coupe (10) ;
couper ledit film (5) de matériau le long d'une ligne de fracture fermée prédéterminée en correspondance dudit deuxième récipient (C2) avec une deuxième tête de coupe (11) placée opérationnellement en aval dudit au moins un premier récipient (C1) du premier rang (F1), en référence audit sens de marche (A),
caractérisé en ce qu'il comprend une étape pour régler la longueur du film (5) se trouvant entre ledit au moins un premier récipient (C1) du premier rang (F1) et l'espacement d'entraxe dudit au moins un deuxième récipient (C2) du deuxième rang (F2) en fonction de la zone de ladite ouverture d'entrée des récipients (C).

Fig.1

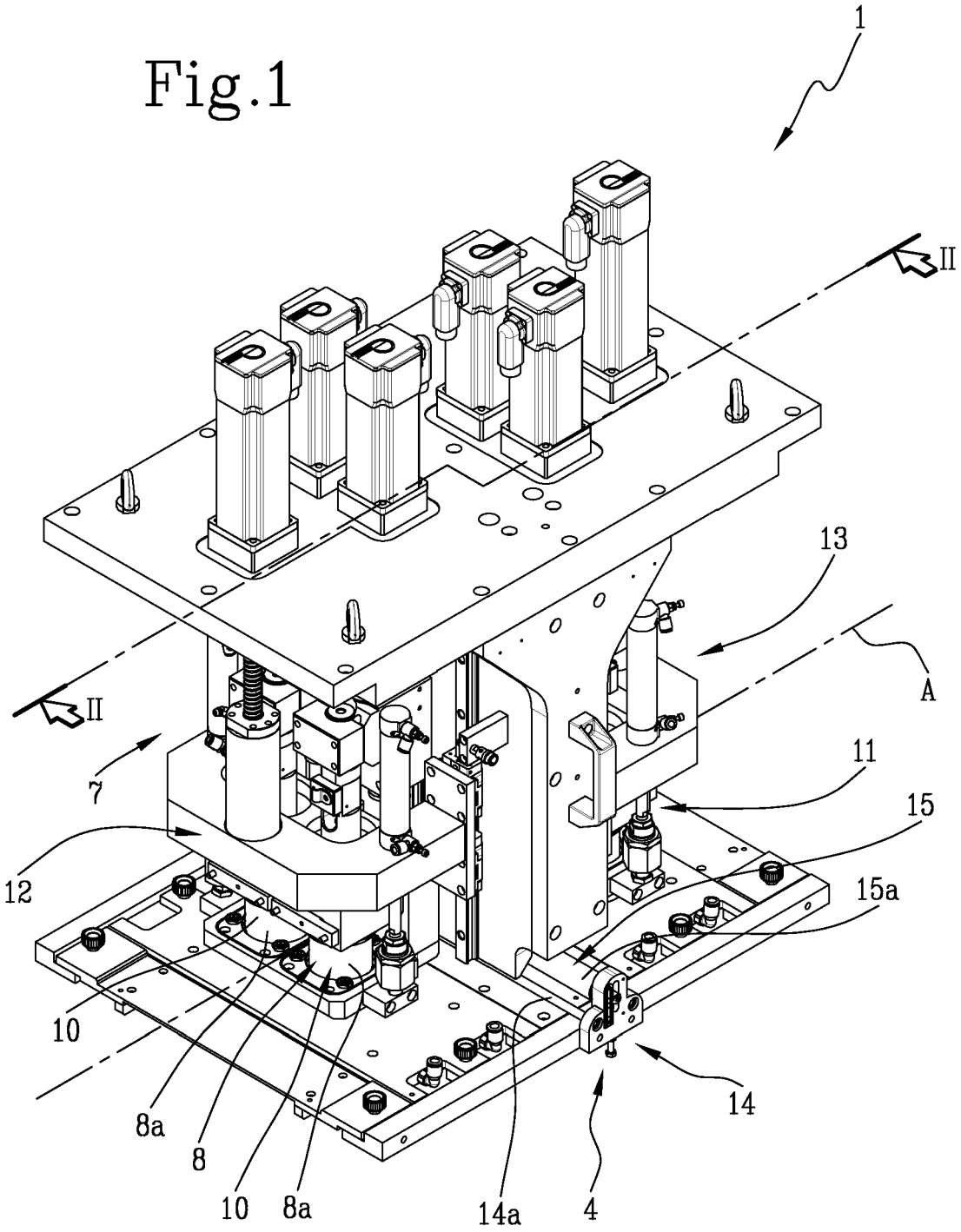


Fig.2

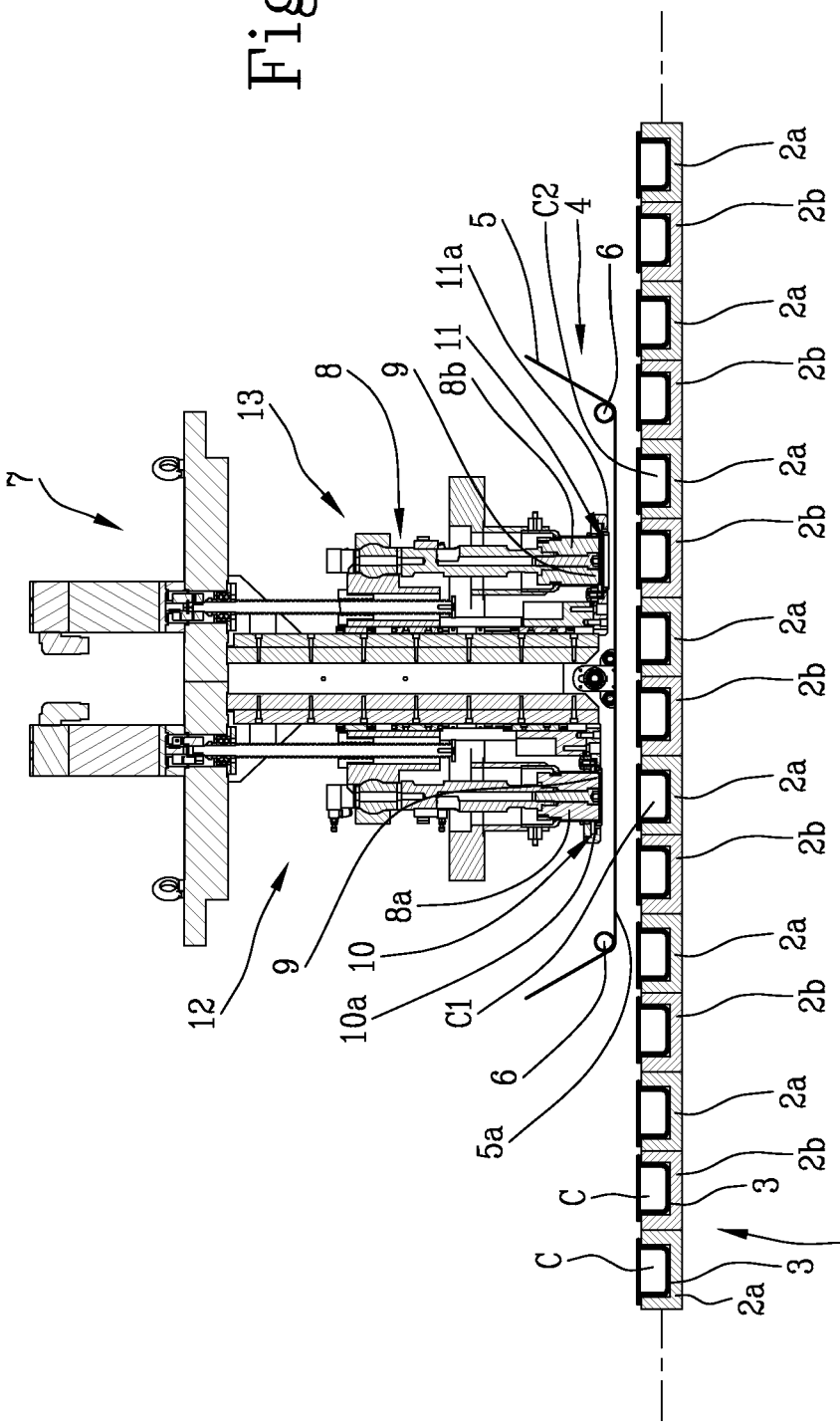
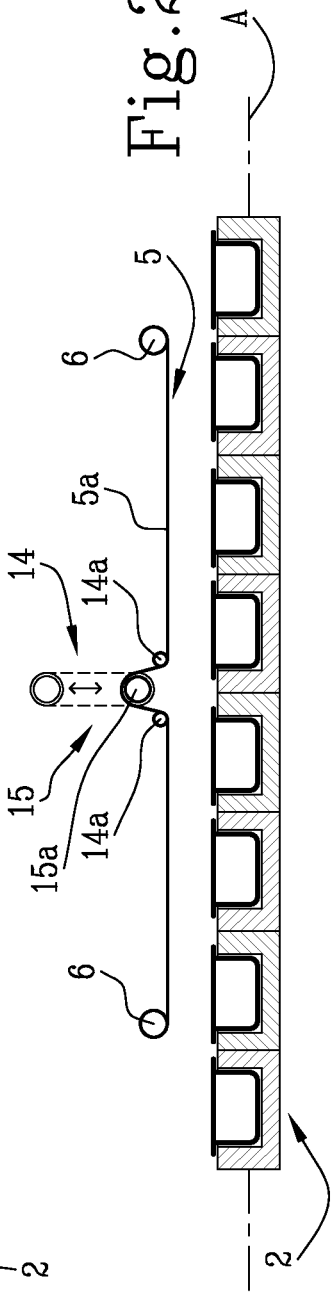

7
13
8
9
8b
11
11a
5
C2
4
6
2a
2b
12
9
10
8a
10a
C1
6
5a
C
3
2

Fig.2a


A
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15
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2

Fig.3

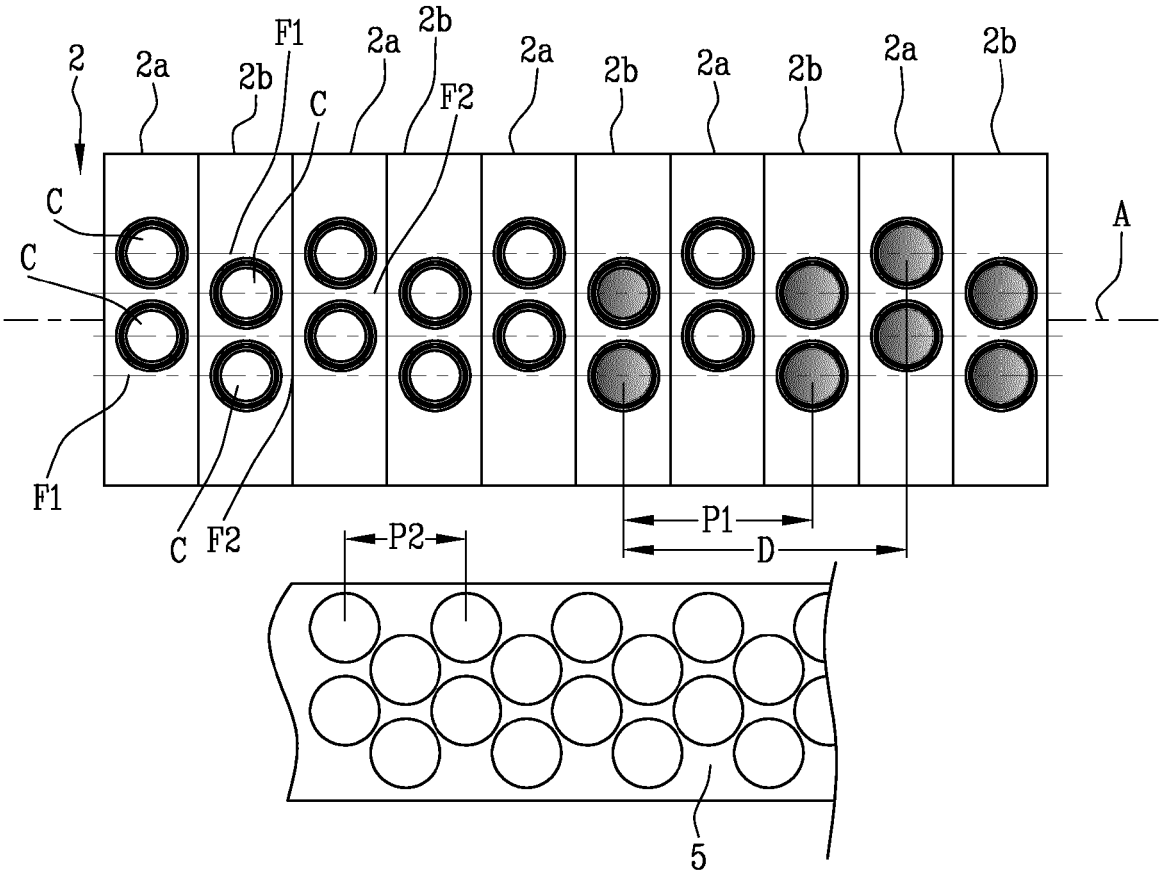
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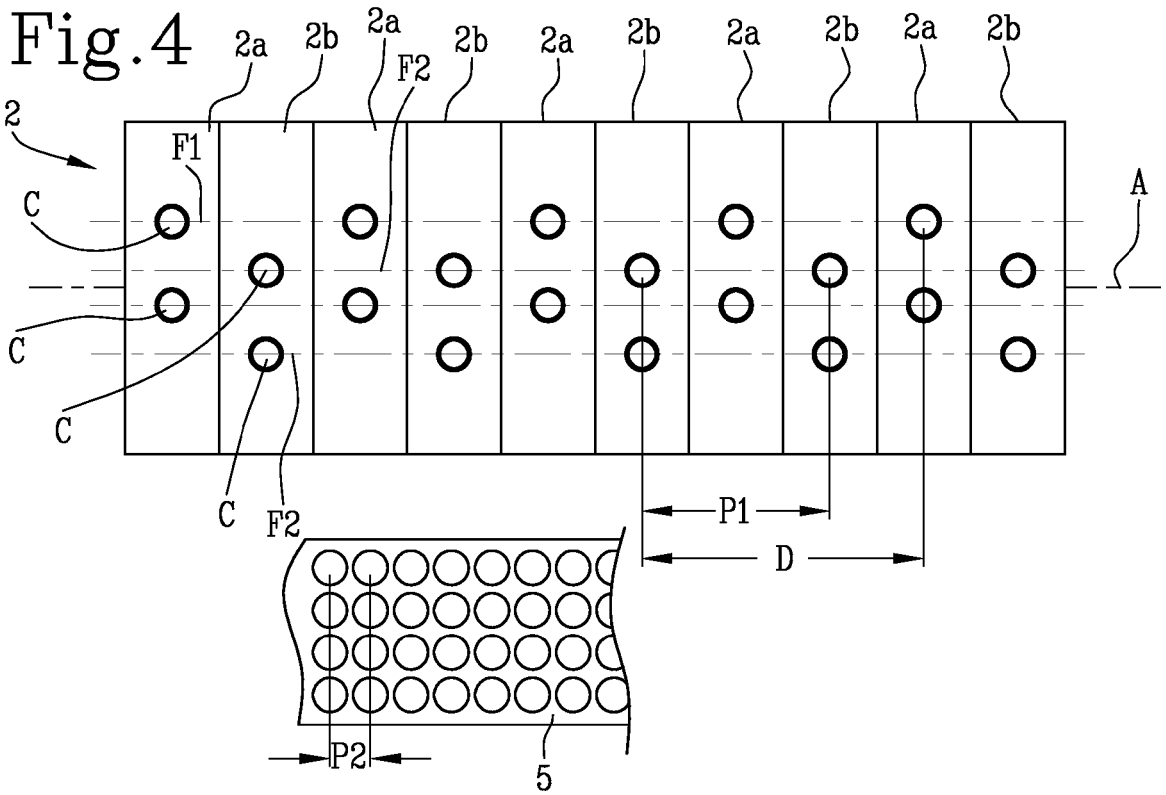
Fig.4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C
F2
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