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(54) **DEVICE, INSTALLATION AND PROCESS FOR PRODUCING A PACKAGE FROM A SHEET OF FLEXIBLE MATERIAL**

VORRICHTUNG, ANLAGE UND VERFAHREN ZUR HERSTELLUNG EINER VERPACKUNG AUS EINER FOLIE AUS EINEM FLEXIBLEN MATERIAL

DISPOSITIF, INSTALLATION ET PROCEDE DE PRODUCTION D'UN EMBALLAGE A PARTIR D'UNE FEUILLE D'UN MATERIAU SOUPLE

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US-A- 5 324 249 **US-A1- 2002 053 190**

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Description

[0001] The invention firstly relates to a device for producing a package from a sheet of flexible material, especially board, plastic or paper, and also to shape such a material. The invention also relates to an installation for producing such a package and also for filling it with a pulverulent or nonpulverulent product, using such a device. Finally, the invention relates to a process for producing such a package, as well as for filling it with a pulverulent or nonpulverulent material.

[0002] In the packaging field, and especially the packaging of agri-foodstuff products, it is becoming increasingly desirable to produce a wide variety of shapes and other formats while seeking to comply with sanitary or hygiene requirements, especially in terms of sealing and preservation.

[0003] To satisfy this desire for a multiplicity of shapes, it has been proposed to produce packages from a flat or sheet material, intended to form the body of the package. This sheet is given the desired shape by means of a mandrel and grippers that take hold of the two extreme edges of the sheet, so as to overlap them, edge over edge, typically with a width of two to five millimeters, and then to fasten them together over their entire height, this fastening operation typically being carried out via high-frequency ultrasonic welding or even by adhesive bonding or heat sealing. The body of the package thus produced receives, at its base, a bottom and, after being filled, its upper part receives a lid.

[0004] Although the packages thus obtained allow this multiplicity of shapes to be produced, their automation and their filling, however, still pose many problems. This is because the step of shaping the sheet material, by the use of grippers, firstly is difficult to automate and secondly results in relatively slow production rates. What is more, the operation of fitting the bottoms and caps on a sheet material, which is therefore generally flexible, also poses a problem because of the lack of rigidity of the body of the package thus formed.

[0005] Forming a package body by forming a flat sheet material is disclosed in US-A-3 603 220. Document US-A-2002/0053190 shows the making of packages from a flat sheet material, the provision of a bottom, filling the packages and closing them by a lid.

[0006] Document GB-A-1 335 454 has described a device for shaping a package made from a sheet of board, which is provided with a shaping member incorporating a female part and a male part that is intended to cooperate with the female part, besides a member for fastening together the two edges of the sheet of board after the shaping operation.

[0007] The female part is fastened to means for moving in translation along a first direction, in this case horizontally, and comprises two hinged jaws intended to define by themselves the desired shape of the package when they are actuated, and especially to define the envelope of the package to be produced.

[0008] This shaping member also includes a male part, consisting of a sleeve or mandrel of cylindrical shape, complementary in shape to the internal shape of the female part and intended to cooperate with the latter.

[0009] It is apparent from the operating method described in that document that the sheet of board, shaped by the shaping member, is systematically held in place on the mandrel at each of the various stations of the device in question, in such a way that said mandrel is present during each of the steps after the actual shaping step, since this mandrel is not required to be moved relative to the reference frame formed by the female part.

[0010] Accordingly, this device can be envisioned only for the production of packages that are cylindrical and also in a single format, that is to say having a single height of the body of the package.

[0011] The objective of the present invention is firstly to propose a device for shaping the body of the package to the desired shape in a simple, effective and automatic manner. It then consists in allowing a multiplicity of formats, something which hitherto it was not known how to do in a simple manner and with high production rates.

[0012] To do this, such a device for shaping a package made from a sheet of flexible material, stored on one of its sides in a storage magazine, comprises:

- a shaping member, which itself comprises:
 - a female part, fastened to means for translation along a first direction, and also including at least one hinged jaw, intended to define at least partly the desired shape when it is actuated and especially to define the envelope of the package to be produced,
 - a male part, consisting of a sleeve or mandrel complementary in shape to the internal shape of the female part and intended to cooperate with the latter;
- a fastening member for fastening together the two edges of the sheet of flexible material after shaping, that is to say after cooperation of the male part with the female part.

[0013] According to the invention:

- the female part furthermore includes a recessed region, at the edge of which the jaw or jaws is or are hinged, and intended to define, with this jaw or these jaws, the very at least partial envelope of the package to be produced;
- the female part is provided with suckers, or equivalent systems, which are intended to receive the sheet of flexible material taken from the storage magazine; and
- the sleeve or mandrel constituting the male part can be driven in a translational movement along a direction perpendicular to said first direction, so as to be

positioned level with the female part.

[0014] In other words, the device according to the invention consists in shaping the body of the package using the punch-and-die principle, in an automatic manner, while furthermore allowing the mandrel constituting the male part to undergo relative displacement perpendicular to the displacement of the female part.

[0015] According to one feature of the invention, the actuation of the jaws, causing the recessed region to be closed, does not terminate in the integral circumference of the envelope of the package to be produced, but defines a slit intended to leave clear the access to the fastening member. The latter typically consists of a sonotrode, but another device may be envisioned, especially one emitting high frequencies, or heating to seal the body of the package by heat sealing.

[0016] This or these jaws are actuated by cylinder actuators fastened to the recessed region of the female part.

[0017] The mandrel is made of a material having a low coefficient of friction and typically made of polytetrafluoroethylene or polyacetal. The objective of this is to make it easier to remove said mandrel during the following operations, especially those of fitting the bottom and the cap, and in general the closure components.

[0018] According to another feature of the invention, the entire female part is capable of rotating in the vertical or horizontal plane through an adjustable angle so as, after removal of the mandrel and fitting of a first closure component, to allow said package to be directed toward a station for filling it with a pulverulent or nonpulverulent product, and fitting a second closure component.

[0019] The invention also relates to an installation for producing a package, made from a sheet of flexible material and provided with a bottom and a cap, and for filling it with a pulverulent or nonpulverulent product.

[0020] This installation comprises:

- a magazine for storing said sheets of flexible material, within which the sheets are stored on one of their sides;
- a member for advancing N shaping devices of the type described above, these being uniformly distributed along its direction of advance, said member being intended to position said devices at the various stations needed for the production and filling of the package, said member being capable of moving in stepwise mode, the advance step of which corresponds to 1/N of the length of said member;
- a gripping member provided with suckers or equivalent systems, which is driven in a horizontal translational movement and intended to take said sheets of flexible material one by one and, after rotation, to position them on the suckers or equivalent systems, with which the edge or edges of the recessed region of the female part of the shaping device is or are provided;
- a member for fitting a closure component at one of

the ends of the body of the package resulting from the shaping by the shaping device;

- a member for filling the package, provided with its bottom, with a pulverulent or nonpulverulent product; and
- a member for fitting a second closure component of the type similar to the member described above.

[0021] In other words, the installation according to the invention makes it possible for the operations of producing the package and of filling and sealing it to be carried out automatically, something which hitherto it was not known how to do effectively.

[0022] According to the invention, the mode of advance may be linear, and in this situation the advancing member is a linear conveyor.

[0023] According to another embodiment, the mode of advance may be rotary, and in this configuration, the advancing member consists of a rotary carousel having a vertical rotation axis, the N shaping devices then being periodically distributed around its periphery, the carousel being capable of moving in stepwise mode, the rotation step of which corresponds to 1/N of a revolution.

[0024] According to the invention, the members for fitting the closure components consist of a carousel, which rotates about a vertical axis, on which a plurality n of work stations are mounted, distributed periodically around its periphery, said carousel being capable of moving in a stepwise mode, the rotation step of which corresponds to 1/n of a revolution, said stations being used, respectively:

- to grip a closure component indexed in a suitable receptacle;
- to convey said closure component to a member for coating the internal or external periphery of said component with adhesive; and
- to position the closure component thus coated with adhesive on one of the ends of the body of the resulting package produced by the shaping device or after the package has been filled;

each of these stations being provided with a gripping member, especially a suction gripper, driven in a vertical movement, the actual advance of the advancing member bearing the shaping members and the carousels bearing the members for fitting the closure components being synchronized in such a way that the gripping member of the carousels, when it is in a positioning configuration, is centered with respect to the upper face of the male part of the shaping device located vertically in line with the carousels in question.

[0025] The invention also relates to a process for producing, and even filling, a package made from a sheet of flexible material. This process consists:

- firstly in producing the body of the package from said flexible sheet, by shaping the latter according to the

desired shape of the package, by means of a male part and a female part of a shaping member that cooperate with each other, and by fastening together two of the edges of said sheet;

- then in positioning, at one of the ends of the body of the package thus produced, a first closure component, precoated with adhesive on the internal or external face of its periphery; and
- then in rotating the container thus obtained, consisting of the body and said first closure component, in such a way as to allow it either to be filled, then, during the next step, a second closure component to be positioned, or for a second closure component to be positioned immediately.

[0026] According to the invention, the step of positioning the first closure component is carried out while the male part of said shaping member is still present, at least in part, within the body of the package.

[0027] On the other hand, the step of positioning the second closure component is carried out in the absence of any male part inside the body of the package.

[0028] The manner in which the invention can be implemented and the advantages that derive therefrom will become more clearly apparent from the illustrative example that follows, given by way of nonlimiting example and supported by the appended figures.

Figure 1 is a schematic representation in perspective of the installation according to the invention.

Figure 2 is a schematic representation in perspective of a shaping member according to the invention.

Figure 3 is a schematic representation in perspective of the gripper of the sheet of flexible material according to the invention.

Figure 4 is a schematic representation in perspective of the member for fastening together the two edges of the sheet material after shaping.

Figure 5 is a schematic representation in perspective of a member for positioning a closure component according to the invention.

Figure 6 is a schematic representation in longitudinal section of a package according to the invention, according to a first embodiment.

Figure 7 is a schematic representation in longitudinal section of a package according to the invention, according to a second embodiment.

Figures 8 to 14 are schematic representations illustrating the particular embodiment of a package according to the invention but with a flared profile.

[0029] The installation according to the invention is shown overall in figure 1.

[0030] It firstly comprises a magazine (1) for storing sheets of flexible material, especially board or plastic, which are stored on one of their sides, and are subjected to moderate pressure in such a way that they are always in a perfectly flat form, at the point where they are gripped.

[0031] These sheets of flexible material are intended to form the body of the package to be produced, after the shaping and fitting of a bottom and a cap, these being called hereafter the closure components.

5 **[0032]** At the front face of this magazine (1), a gripper (2), described in greater detail in relation to figure 3, takes hold of said sheet material by one of its two faces, so as to position it at a shaping member (4), positioned approximately facing the magazine (1), at this stage of operation of the machine.

10 **[0033]** The gripper (2) firstly comprises a gripping arm (26), provided with four suckers (25) or equivalent systems, which are connected to a vacuum source. These suckers (25) are mounted in the same plane and are intended to take a sheet of flexible material from the storage magazine (1). This gripping arm is mounted on a rotary shaft (27) capable of rotating through 180° by means of a motor (28), for example a pneumatic or electric motor.

20 **[0034]** Consequently, the assembly thus formed is mounted on a carriage (29), that can be actuated so as to move in horizontal translation by means of a worm (36) rotated by a motor (37), said carriage thus being capable of moving along guides (30). This translational movement is intended to allow the arm (26) to move up to the storage magazine (1) and grasp a sheet of flexible material.

25 **[0035]** The shaping members (4), also described in greater detail in relation to figure 2, are distributed periodically around the periphery of a carousel (3) with a vertical rotation axis, which therefore constitutes the advancing member, said carousel being rotated in stepwise mode by means of a motorized indexation system.

30 **[0036]** In the example described, the carousel (3) has six shaping members (4), therefore distributed around the periphery of said carousel (3) every sixth of a revolution.

35 **[0037]** Consequently, the rotation step of the carousel (3) also corresponds to one sixth of a revolution, allowing each of the shaping members (4) to be positioned at defined locations in which a certain number of steps can be carried out, these being necessary, firstly, for producing the actual package and secondly to fill it.

40 **[0038]** The installation also includes members for fitting the closure components for these packages.

45 **[0039]** These members (6) and (7) both consist of a carousel, again with a vertical rotation axis, these being described in greater detail in relation to figure 5.

[0040] The first of these carousels (6) is intended to position one of the closure components at one of the ends of the body of the package thus shaped, which is always held in place onto the shaping member (4), while the second carousel (7) is intended, after filling, to close off the package thus filled, with a second closure component.

50 **[0041]** The next step consists in ejecting the filled and sealed package onto a conveyor (10), which takes the filled packages to their storage locations, before being shipped.

[0042] The shaping member (4) according to the invention will now be described in greater detail.

[0043] This comprises basically a male part (18) and a female part (11-17), which are intended to cooperate with each other, so as to produce the actual shape of the body of the package.

[0044] As already mentioned, the gripping member (2) ensures that a sheet of flexible material is positioned against the female part of the shaping member. This female part basically comprises a recessed region (12), in this case defining a semicylindrical volume, which is a fastened to a motor (11) fixed to the periphery of the carousel (3). This recessed region may, however, adopt another profile, for example parallelepipedal, triangular, etc., depending on the shape that it is desired to give the package.

[0045] This recessed region (12) can be made to undergo, in the example described, a horizontal translational movement by means of an electrical or pneumatic displacement system.

[0046] The two free edges (14) of the recessed region (12) house firstly suckers (13), four suckers in this case, which are connected to vacuum source, positioned in the same plane and intended to take the sheet of flexible material placed thereat by the gripper (2).

[0047] Two jaws (15) are hinged along the edges (14) and can be actuated by means of cylinder actuators (16) in such a way as to define, in relation with the recessed region (12), the external envelope of the body of the package to be produced when said jaws are closed up.

[0048] In other words, in the example described, when the jaws (15) are actuated, that is to say closed up, they define with the recessed region (12) an approximately cylindrical shape.

[0049] Advantageously, the recessed region (12) also includes two suckers (17) or equivalent (only a single one has been shown), which are incorporated into the structure defining it, and therefore not forming a projection from its internal surface, allowing the body of the package, after being shaped, to be held in place.

[0050] The male part of the shaping member (4) consists of a sleeve (18), which in the example described is cylindrical, positioned on a base (19). This base (19) can be actuated in translation along a direction perpendicular to the direction of translation of the female part, and therefore in the example described in a vertical direction. This displacement is carried out along guides (20) by means of a cylinder actuator or equivalent, in such a way as to allow said mandrel (18) to rise up to the female part (12-16).

[0051] This mandrel (18) is advantageously made of a material having a very low coefficient of friction, typically polytetrafluoroethylene (Teflon®) or polyacetal (Delrin®) so as to make it easy for it to be extracted from the body of the package thus shaped.

[0052] The body of the package is produced in the following manner.

[0053] The sheet of flexible material is positioned by

the gripper (2) against the suckers (13) of the female part of the shaping member (4), said sheet still being in flat or substantially flat form, the plane being slightly short of the closest generatrix of the mandrel (18). The carousel (3) then undergoes a rotation of one sixth of a revolution.

[0054] The mandrel (18) is then raised vertically in line with said female part, and when this translational movement has been completed, said female part undergoes a horizontal translational movement, causing the sheet of flexible material to be pushed by the mandrel (18) into the recessed region (12). Of course, the inside diameter of said recessed region (12) and of the jaws (15) and the outside diameter of the mandrel (18) are substantially identical to each other with a clearance.

[0055] The horizontal translational movement of the recessed part (12) pushes said flexible sheet into the recessed region (12) and, correspondingly, activation of the closure of the jaws (15) thus causes the jaws (15) to close, which correspondingly brings the two lateral ends of the sheet of flexible material to come together edge to edge along the mandrel (18), or with a slight overlap of two to five millimeters, from one edge to the other, approximately along the generatrix of the mandrel (18) on the opposite side to the generatrix facing the recessed region (12).

[0056] In addition, owing to the relative stiffness of the board or plastic of which the sheet material is made, it exerts pressure against the jaws and against the recessed region while it is being shaped.

[0057] The jaws (15) are produced in this way so that, when they close around the mandrel (18), they are not contiguous but define a slot, for example a vertical slot, allowing the insertion of a member for fastening together the two edges, typically a sonotrode (32) shown in greater detail in figure 4. To facilitate the action of the sonotrode, the mandrel has, plumb with it, a structure (23) in the form of a welding insert, especially made of polymer or metal, extending along its entire generatrix facing the fastening member (32).

[0058] According to one advantageous feature of the invention, prior to the welding of the sheet of flexible material in the shaper, edge to edge or one edge over the other, the upper end of the cylindrical envelope thus produced is leveled, that is to say made level by means of a jogger (5), also called a leveler, positioned above the carousel (3), plumb with the welding station.

[0059] This jogger (5) basically comprises a lower vertical plate that can undergo a vertical translational movement by means of a cylinder/slideway assembly.

[0060] After this phase of welding, and therefore producing, the body, in this case cylindrical body, of the package to be produced, the carousel (3) undergoes a new rotation of one sixth of a revolution so as to be brought to a station for fitting a closure component.

[0061] At this stage, the mandrel (18) is withdrawn to a greater or lesser extent from the body of the package, depending on the type of closure component to be fitted and in particular depending on the desired adhesive coat-

ing method. This is because such closure components have a peripheral ring, and it may be desirable to fasten this ring to the body of the package on its external face or its internal face.

[0062] Figure 6 thus shows a package in which the peripheral ring (56) with which the closure component (55) is provided is fastened to the internal face (57) of the body (58) of the package. In this configuration, it may be seen and readily understood that an internal relief inherent to the ring relative to said internal face of the body of the package is created.

[0063] Thus, if it is desired to fit such a closure component and fasten it to the internal face of the body of the package, the mandrel (18) moves vertically downwards slightly in order to leave clear access to the ring (56) of said component inside the body of the package.

[0064] This retraction of the mandrel (18) is, however, of small amplitude and therefore keeps the body of the package sufficiently rigid for said bottom or said cap to be fitted.

[0065] However, if the closure component to be fitted is fixed to the external face (59) of the body of the package (58), as shown in figure 7, the mandrel (18) is left in place, that is to say it remains flush with the upper level of the body, again with the purpose of giving it sufficient stiffness, without any risk of it being bent or being damaged. In this configuration it may therefore be seen that there is no relief projecting from the internal face (57) of the body of the package, which configuration may be particularly desirable for certain applications, insofar as the products that can be contained in the package can then slide freely out of it.

[0066] The closure component is fitted by means of the device (6) shown in figure 5.

[0067] This consists of a carousel (40) with a vertical rotation axis, rotated in a stepwise mode by means of a motorized indexing system.

[0068] In the example described, this carousel has three stations (42), (43), (44) distributed periodically around the periphery of the carousel (40) every third of a revolution.

[0069] Consequently, the rotary displacement step of the carousel is also one third of a revolution.

[0070] Each of the three stations (42), (43) and (44) is identical and provided with a sucker (45) or equivalent, which can be rotated on itself relative to a motorized vertical spindle (46). Furthermore, each of the three stations (42-44) is mounted on a carriage (54) that can undergo a vertical translational movement by means of a worm (not shown), rotated by a motor (48), causing said carriage (54) to be displaced along guides (53).

[0071] In this regard, it should be pointed out that the displacement travel of said carriage (54), and consequently of the stations (42-44), can be adapted according to the main dimension of the body of the package to be produced.

[0072] In the example described, the station (43) grips a closure component, conveyed by an accumulation con-

veyor (8) or (9) to a receptacle (49) located vertically beneath the station (43).

[0073] This accumulation conveyor is provided with a lug (50), which releases a closure component present on said conveyor as soon as the closure component stored at (49) has been taken up by the station (43), and to do so by means of presence detection cells, or equivalent system.

[0074] In figure 5, after a closure component has been gripped by the sucker (45) of the station (43) at the accumulation receptacle (49), the carousel (40) rotates through one third of a revolution to the left, corresponding to the station (44) shown. At this station, an adhesive coating system comprising a coating nozzle (47) positions a bead of adhesive around the external or internal periphery of the ring (56) of said closure component (55), said component being rotated by the rotation of said sucker by the spindle (46).

[0075] This coating nozzle (47) is mounted on a carriage (51) that can move in horizontal translation by means of a cam system (not shown) which is itself actuated by means of a motor (52).

[0076] Thus, when it is desired to fasten the ring (56) of the closure component (55) to the internal face (57) of the body of the package, the nozzle (47) will deposit a bead of adhesive on the external face of said ring, running continuously at its station (44).

[0077] On the other hand, when it is desired to fasten the ring (56) of said closure component to the external face (59) of the body of the package, said coating nozzle (47) is moved translationally by means of the carriage (51) so as to be plumb with the sucker (45), which is lowered so as to allow said nozzle to be covered by the closure component with which said sucker is provided, and thus allow the internal face of said ring to be coated with adhesive.

[0078] After coating, the carousel (40) then rotates a further one third of a revolution, corresponding to the station (42) shown in figure 5.

[0079] In this position, the sucker (45) is centered with respect to the upper face of the mandrel (18), and consequently of one of the ends of the body of the package.

[0080] This being so, since the axis of deposition of the closure component is automatically collinear with the axis of revolution of the mandrel (18), it becomes possible to operate the installation according to the invention irrespective of the cross section of the package and irrespective of its format.

[0081] The motor (48) is then actuated, in order to lower the carriage (54) of the station (42), and therefore the sucker (45) and the adhesive-coated closure component with which it is provided, in order to position it on the upper part of the cylindrical body, which is subjacent at that moment, thus allowing said closure component to be effectively fitted.

[0082] Once this operation has been carried out, the mandrel (18) is completely withdrawn by moving vertically downwards, the cylindrical body provided with the

closure component being, however, held in position in the recessed region (12), on the one hand due to the presence of the suckers (17) and on the other hand due to the relative stiffness of the board or plastic of which the sheet material is made, which exerts pressure against the jaws and against the recessed region.

[0083] After the carousel (3) has performed a new rotation through one sixth of a revolution, the entire female part, thus provided with the cylindrical body of the package, undergoes a rotation in the vertical plane, for example through 180°, by means of a gear motor system (not shown).

[0084] Thereafter, in the next station, the package consisting of the body of the package and its closure component, is presented with its upper end open to the filling station (not shown).

[0085] The filling material may be a pulverulent or non-pulverulent, or even liquid or pasty material and, if this material is confectionary, and more generally any fragile product, the rotation of the female part is not 180° but less, so as for the body of the package to be sloping to a greater or lesser degree, reducing the extent to which the product in question has to drop, and correspondingly reducing the risk of said product breaking or being partly damaged.

[0086] After a further rotation through one sixth of a revolution of the carousel (3), the container formed by the package provided with its first closure component, and filled with product that it is intended to contain, is conveyed to the next station (7) for a second closure component to be fitted, which operates in an identical manner to that described in relation to figure 5, and closes off the package. However, the stiffness of the body of the package can no longer be provided at this stage by the mandrel (18) considering that the latter has been retracted in order to allow effective filling of said package with products. This stiffness is provided by the body of the package being held in place by the jaws (15) in cooperation with the recessed region (12) of the female part of the shaping member (4), and is furthermore inherent in the relative stiffness of the board or plastic that makes up the sheet material, which exerts pressure against the jaws and against the recessed region. It should also be pointed out that the suckers (17), with which the recessed region (12) of the female part is provided, also contribute to preventing the body of the package from slipping while said second closure component is being fitted.

[0087] At this stage, if it is desired for there to be a quality seal, this second closure component is necessarily fitted as shown in figure 6, that is to say the ring (56) is fastened to the internal face (57) of the body of the package.

[0088] However, if such a seal is not required, for example in the case of packages intended to contain powdered detergent or the like, that is to say if only relatively good sealing is sufficient, this second closure component may be fitted as depicted in figure 7.

[0089] After a further rotation of the carousel (3)

through one sixth of a revolution, the station carrying the filled and sealed package is conveyed to an ejection area, the package being placed on a conveyor (10) which takes it to a temporary storage area or to a packing area.

[0090] The above example was described in relation to a packaging body having a constant cross section. However, the installation according to the invention can also be used to produce such packaging bodies but with a variable cross section, especially one that flares out toward the bottom or toward its upper face.

[0091] To do this, the mandrel (18) and the female part of the shaping member are profiled according to the desired shape.

[0092] The principle of operation remains the same. However, for fitting the closure components, and especially the first of them, either the mandrel is withdrawn at the opening of the body having the largest cross section, or else, use may be made of a mandrel of the retractable type, that is to say one with a cross section that can vary, making it possible, by actuating a suitable device, to reduce its volume so as to allow it to be retracted from the body of the package so as to be level with the opening with the smallest cross section, thus making it possible for the ring of the closure component to be internally coated with adhesive.

[0093] In such a configuration, the closure component fitted to the end of the body of the package having the smallest cross section is always fitted with the peripheral ring (56) fastened to the internal face (57) of said body.

[0094] Moreover, if it is desired to have a closure component at that end of the package which is provided with the largest cross section, with the peripheral ring (56) fastened to the internal face (57) of said body, the positioning member (6) is used to fit the closure component at the end of said body having the smallest dimension and, after the mandrel (18) has been withdrawn, the positioning member (7) is used to fit the closure component at that end of the body having the largest dimension.

[0095] On the other hand, if it is desired to have a closure component at that end of the package which is provided with the largest cross section, having a peripheral ring (56) fastened to the external face (59) of said body, the positioning member (6) is used to fit this closure component, the mandrel (18) then entirely filling said body. This mandrel is then withdrawn via that end of said body with the smallest dimension, by retracting the latter parallel to its axis of symmetry or of revolution, in such a way as to give it a compatible cross section over its entire height, and especially one less than the cross section of that end of the body of the package having the smallest dimension. The positioning member (7) is then used to fit the second closure component at this end with the smallest dimension.

[0096] Thus, an embodiment of such a package with a nonconstant cross section has been shown in figures 8 to 14.

[0097] In the first step (figure 8), the sheet of flexible material constituting the body (58) of the package, of suit-

able shape and dimensions, is brought up against the female part (4) of the shaping member, and especially up to the suckers (13). According to the general process described above, the mandrel (18), whose shape corresponds to the desired shape of the final package, is brought up to the female part (4), the latter wrapping said sheet around the mandrel (18) by means of the jaws (15). After the shaping operation, the ends of the sheet are welded together.

[0098] As may be seen, the mandrel (18) is of approximately trapezoidal longitudinal section. Of course, with this configuration, the shape of the female part of the shaping member is matched to that of the mandrel. The package body (58) resulting therefrom therefore has two ends of circular section, but of different diameter, respectively an end arbitrarily called the upper end (60) with a small cross section and an end arbitrarily called the lower end (61), with a large cross section.

[0099] In the next step (figure 9), a closure component (62) is attached to the upper end (60). For this purpose, the mandrel (18) is slightly withdrawn from the body (58) of the package thus formed (during the preceding step).

[0100] The mandrel (18) is then fully withdrawn and, thereafter, the female part (4) of the shaping member is rotated through 180°, which thus results in rotation through the same angle of the body of the package provided with its first closure component (62) (see figure 10).

[0101] Thereafter, with the actual package closed off at its lowest end, it may now be filled (figure 11), for example by simple gravity, said package still being held in place by the female part of the shaping member.

[0102] Once this filling operation has been carried out, the second closure component (63) is fitted (figure 12), this time at what is called the lower end (61) of the package.

[0103] Said female part, and therefore the package thus filled and closed off, then undergoes a further rotation of 180° (figure 13), before said package is deposited on a conveyor (10), by simply opening the jaws (15) of the female part.

[0104] In a variant of the invention, the sheet of flexible material is not flat, rather it has one or more excrescences, for example of a decorative purpose, forming projections or reliefs relative to the plane that contains the sheet, said excrescences being obtained by any process, such as by thermoforming.

[0105] This or these excrescences are always located at the same place on the sheet, so that they remain perfectly stackable and storable in a normal fashion within the storage magazine (1).

[0106] It is simply necessary to ensure that the free edges of said sheet, and especially those intended to be fastened to each other during the shaping step, remain flat, in order for this fastening operation to proceed correctly.

[0107] In general, such excrescences whether they be directed toward the inside or the outside of the package, are localized, making it possible in particular for the sheet

to be picked up by the suckers (25) of the gripper (2) and to be picked up again by the suckers (13) of the female part of the shaping member (4).

[0108] Moreover, if the excrescences are intended to be directed toward the outside of the package, the recessed region (12) and/or the jaws (15) are machined so as to allow said excrescences to be housed during the shaping step, without interfering with the actual shaping operation. For this purpose, a cavity is made within the internal wall of the recessed region (12) and/or of the jaws (15), with substantially standardized dimensions, greater than those of the possible excrescences, thus preventing any difficulty in terms of positioning the sheet when shaping it.

[0109] On the other hand, if these excrescences are intended to be directed toward the inside of the package, the same principle is adopted, but this time it is the mandrel (18) that has such a cavity made in its external surface, in order in this way to allow said excrescence(s) to be housed without impeding the shaping operation.

[0110] It will be appreciated just how beneficial the installation and the shaping member according to the invention are, insofar as they allow, in a relatively simple manner, the simultaneous manufacture of a package, from a sheet of flexible material, which is preprinted and also capable of having decorations in the form of excrescences, and therefore capable of giving it any possible shape, and the filling of said package continuously, something which hitherto was not known how to be done efficiently with packages whose body is made of a flexible material stored in the form of flats, or in the form of pre-dimensioned sheets or formats, and also with closure components fitted at both ends in a sealed manner.

[0111] The advantage of producing such a package was mentioned in the preamble of the present description.

[0112] Furthermore, when it is desired to change the shape, all that is required to do is to replace the male and female members of the shaping member with tools of the desired shape, which can be carried out very easily and very quickly.

[0113] At the same time, when it is desired to change the size of the package, for a given cross section, all that is required to do is to use correspondingly sized jaws (15), and to increase, or, on the contrary, decrease, the travel of the mandrel in its region of cooperation with the female part of the shaping member.

Claims

1. A device for shaping a package made from a sheet of flexible material, stored on one of its sides in a storage magazine (1), comprising :

- a shaping member (4), which itself comprises :

• a female part, fastened to means for trans-

lation along a first direction, and also including at least one hinged jaw (15), intended to define at least partly the desired shape when it is actuated and especially to define the envelope of the package to be produced,

- a male part, consisting of a sleeve or mandrel (18) complementary in shape to the internal shape of the female part and intended to cooperate with the latter;

- a fastening member (31) for fastening together the two edges of the sheet of flexible material after shaping, that is to say after cooperation of the male part with the female part,

characterized :

- **in that** the female part furthermore includes a recessed region (12), at the edge or edges of which the jaw or jaws (15) is or are hinged, and intended to define, with this jaw or these jaws, the very at least the partial envelope of the package to be produced;

- **in that** the female part is provided with suckers (13), or equivalent systems, which are intended to receive the sheet of flexible material taken from the storage magazine; and

- **in that** the sleeve or mandrel (18) constituting the male part can be driven in a translational linear movement along a direction perpendicular to said first direction, so as to be positioned level with the female part.

2. The device for shaping a package made from a sheet of flexible material as claimed in claim 1, **characterized in that** the actuation of the jaw or jaws (15), causing the recessed region (12) to be closed, does not terminate in the integral circumference of the envelope of the package to be produced, but defines a slit intended to leave clear the access to the fastening member (31).

3. The device for shaping a package made from a sheet of flexible material as claimed in either of claims 1 and 2, **characterized in that** the jaw or jaws (15) are actuated by cylinder actuators (16) fastened to the recessed region (12) of the female part.

4. The device for shaping a package made from a sheet of flexible material as claimed in one of claims 1 to 3, **characterized in that** the mandrel (18) is made of a material having a low coefficient of friction and especially made of polytetrafluoroethylene or polyacetal.

5. The device for shaping a package made from a sheet of flexible material as claimed in one of claims 1 to

4, **characterized in that** the entire female part is capable of rotating in a vertical plane through an adjustable angle so as, after removal of the mandrel (18) and fitting of a closure component (55) onto the body of the package thus shaped, to allow said package to be directed toward a station for filling it with a pulverulent or nonpulverulent product, and then to be closed off.

6. The device for shaping a package made from a sheet of flexible material as claimed in one of claims 1 to 5, **characterized in that** the sheet has an excrescence forming a projection out of the plane that contains it, intended to be directed toward the outside of the package, and **in that** the internal wall of the recessed region (12) and/or of the jaws (15) of the shaping member (4) has a cavity having dimensions greater than those of said excrescence, so as to allow the latter to be housed therein during the shaping step, without impairing said excrescence.

7. The device for shaping a package made from a sheet of flexible material as claimed in one of claims 1 to 5, **characterized in that** the sheet has an excrescence forming a projection out of the plane which contains it, intended to be directed toward the inside of the package, and **in that** the external wall of the mandrel (18) of the male part of the shaping member (4) has a cavity having dimensions greater than those of said excrescence, so as to allow the latter to be housed therein during the shaping step, without impairing said excrescence.

8. An installation for producing a package provided with closure components (55) from a sheet of flexible material, and for filling it with a pulverulent or nonpulverulent product, **characterized in that** it comprises :

- a magazine (1) for storing said sheets of flexible material, within which the sheets are stored on one of their sides;

- a member (3) for advancing N shaping devices as claimed in one of claims 1 to 7, these being uniformly distributed along its direction of advance, said member being intended to position said devices at the various stations needed for the production and filling of the package, said member being capable of moving in stepwise mode, the advance step of which corresponds to $1/N$ of the length of said member;

- a gripping member (2) provided with suckers (25) or equivalent systems, which is driven in a horizontal translational movement and intended to take said sheets of flexible material one by one and, after rotation, to position them on the suckers (13) or equivalent systems, with which the edge or edges (14) of the recessed region

(12) of the female part of the shaping device (4) is or are provided;

- a member (6) for fitting a first closure component (55) at one of the ends of the body of the package resulting from the shaping by the shaping device (4);

- a member for filling the package, provided with its first closure component, with a pulverulent or nonpulverulent product; and

- a member (7) for fitting a second closure component (55) of the type similar to the member described above.

9. The installation as claimed in claim 8, **characterized in that** the advancing member consists of a rotary carousel (3) having a vertical rotation axis, and **in that** the N shaping devices (4) that it has are distributed around its periphery, the carousel (3) being capable of moving in stepwise mode, the rotation step of which corresponds to 1/N of a revolution.

10. The installation as claimed in either of claims 8 and 9, **characterized in that** the gripper (2) comprises a gripping arm (26) provided with four suckers (25) or equivalent systems, which are mounted in the same plane, connected to a vacuum source and intended to take a sheet of flexible material from the storage magazine (1), said gripping arm (26) being mounted on a rotary shaft (27) capable of rotating through 180° by means of a motor (28), the whole assembly thus formed being mounted on a carriage (29) that can be actuated so as to undergo horizontal translation by means of a worm (36) rotated by a motor (37), said carriage (29) being capable of moving along guides (30), the translational movement resulting therefrom being intended to allow the arm (26) to move up to the storage magazine (1) and to grasp a sheet of flexible material.

11. The installation as claimed in one of claims 8 to 10, **characterized in that** the members for fitting the closure components (6, 7) each consist of a carousel (40), which rotates about a vertical axis, on which a plurality n of work stations (42, 43, 44) are mounted, distributed periodically around its periphery, said carousel (40) being capable of moving in a stepwise mode, the rotation step of which corresponds to 1/n of a revolution, said stations being used, respectively :

- to grip a closure component (55) indexed in a suitable receptacle (49);
 - to convey said closure component (55) to a member (47) for coating the periphery of said closure component with adhesive ; and
 - to position the closure component thus coated with adhesive on one of the ends of the body of the resulting package produced by the shaping

device (4) or after the package has been filled ;

each of these stations being provided with a gripping member (45), especially a suction gripper, driven in a vertical movement, the actual advance of the advancing member (3) bearing the shaping members (4) and the carousels (40) bearing the members for fitting the closure components being synchronized in such a way that the gripping member (45) of the carousels (40), when it is in a positioning configuration, is centered with respect to the upper face of the male part (18) of the shaping device (4) located vertically in line with the carousels in question.

12. The installation as claimed in claim 11, **characterized in that** the adhesive coating member consists of a coating nozzle (47) mounted on a carriage (51) that can move in horizontal translation and **in that** said coating nozzle (47) is dimensioned so as to be able to be covered by the closure component in order to be able to deposit a bead of adhesive on the internal surface of the peripheral ring (56) that forms part of it.

13. A process for producing a package from a sheet of flexible material, **characterized in that** it consists :

- firstly in producing the body (58) of the package from said sheet of flexible material, by shaping the latter according to the desired shape of the package by means of a male part and a female part of a shaping member (4) that cooperate with each other, and that are translated one in regard of the other along perpendicular linear paths, and by fastening together two of the edges of said sheet;

- then in positioning, at one of the ends of the body of the package thus produced, a first closure component (62), precoated with adhesive on the internal or external face of its periphery; and

- then in rotating the container thus obtained, consisting of the body and said first closure component, in such a way as to allow a second closure component to be positioned at the open end of said component then formed.

14. The process for producing a package from a sheet of flexible material as claimed in claim 13, **characterized in that** the first closure component is positioned while the male part (18) of said shaping member (4) is still completely or almost completely within the body (58) of the package, held in place by the female part of said shaping member, in such a way as to ensure maximum gripping between the peripheral ring (56), with which the closure component is provided, and the body of the package, which is held in place at this point by said male part (18), and thus

sealing the resulting package very well.

15. The process for producing a package from a sheet of flexible material as claimed in claim 14, **characterized in that** the positioning of the first closure component does not lead to the formation of any region projecting from the internal wall (57) of the body of the package. 5
16. The process for producing a package from a sheet of flexible material as claimed in one of claims 13 to 15, **characterized in that** the second closure component is positioned in the absence of any male part inside the body of the package. 10
17. A process for producing a package from a sheet of flexible material and for filling it with a pulverulent or nonpulverulent product, **characterized in that** it consists : 15
- firstly in producing the body (58) of the package from said sheet of flexible material, by shaping the latter according to the desired shape of the package, by means of a male part and a female part of a shaping member (4) that cooperate with each other, and that are translated one in regard of the other along perpendicular linear paths, and by fastening together two of the edges of said sheet; 20
 - then in positioning, at one of the ends of the body of the package thus produced, a first closure component (62), precoated with adhesive on the internal or external face of its periphery; and 25
 - then in rotating the container thus obtained, consisting of the body and said first closure component, in such a way as to allow the container thus formed to be filled with a pulverulent or nonpulverulent product; and 30
 - finally, in positioning a second closure component (63) on the second end of the package. 35
18. The process for producing a package from a sheet of flexible material and for filling it with a pulverulent or nonpulverulent product as claimed in claim 17, **characterized in that** the first closure component (62) is positioned while the male part (18) of said shaping member (4) is still completely or almost completely within the body (58) of the package, which is held in place by the female part of said shaping member, in such a way as to ensure maximum gripping between the peripheral ring (56), with which the closure component is provided, and the body of the package, held in place at this point by said male part (18), and thus sealing the resulting package very well. 40 45 50 55

Patentansprüche

1. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials, der auf einer seiner Seiten in einem Speichermagazin (1) gelagert ist, umfassend:
- ein formgebendes Glied (4), das Folgendes aufweist:
 - einen Aufnahmeteil, der an einem Mittel zur Translation entlang einer ersten Richtung befestigt ist und auch mindestens eine schwenkbar angebrachte Klemmbacke (15) aufweist, die dazu vorgesehen ist, bei einer Betätigung zumindest teilweise die gewünschte Form zu definieren und insbesondere die Umhüllung der zu produzierenden Verpackung zu definieren,
 - einen Steckteil, der aus einer Hülse oder einem Dorn (18) besteht, der formkomplementär zur Innenform des Aufnahmeteils gebildet ist und dazu vorgesehen ist, mit letzterem zusammenzuwirken;
 - ein Befestigungsglied (31) zum Zusammenfügen der beiden Ränder des Bogens aus flexiblem Material nach dem Formen, also nach dem Zusammenwirken des Steckteils mit dem Aufnahmeteil,
- dadurch gekennzeichnet,**
- **dass** der Aufnahmeteil weiterhin einen zurückgesetzten Bereich (12) aufweist, an dessen Rand oder dessen Rändern die Klemmbacke oder die Klemmbacken (15) angelenkt ist oder angelenkt sind, und der dazu bestimmt ist, mit dieser Klemmbacke oder diesen Klemmbacken zumindest teilweise die Umhüllung der zu produzierenden Verpackung zu definieren,
 - **dass** der Aufnahmeteil mit Saughaltern (13) oder äquivalenten Systemen ausgestattet ist, die dazu vorgesehen sind, den dem Speichermagazin entnommenen Bogen des flexiblen Materials anzunehmen und
 - **dass** die Hülse oder der Dorn (18), welche(r) den Steckteil bildet, in einer linearen Translationsbewegung entlang einer zu der ersten Richtung senkrechten Richtung angetrieben werden kann, um so bündig mit dem Aufnahmeteil positionierbar zu sein.
2. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach Anspruch 1, **dadurch gekennzeichnet, dass** die Betätigung der Klemmbacke oder Klemmbacken (15), die zu einem Verschluss des zurückgesetzten Bereichs (12)

führt, nicht am Gesamtumfang der Umhüllung der zu produzierenden Verpackung endet, sondern einen Spalt definiert, der dazu vorgesehen ist, den Zugriff zu dem Befestigungsglied (31) frei zu lassen.

3. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** die Klemmbacke oder die Klemmbacken (15) durch Stellzylinder (16) betätigt wird bzw. werden, die an dem zurückgesetzten Bereich (12) des Aufnahmeteils befestigt sind. 10
4. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der Dorn (18) aus einem Material mit einem niedrigen Reibungskoeffizienten besteht und insbesondere aus Polytetrafluorethylen oder Polyacetal. 15
5. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** der gesamte Aufnahmeteil um einen einstellbaren Winkel in einer vertikalen Ebene verschwenkbar ist, damit die Verpackung nach dem Entfernen des Doms (18) und dem Aufsetzen eines Verschlussteils (55) auf den so geformten Verpackungskörper in Richtung einer Befüllstation zur Befüllung mit einem pulverförmigen oder nicht pulverförmigen Produkt ausgerichtet werden kann und dann verschlossen werden kann. 20 25 30
6. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Bogen eine Ausstülpung aufweist, die einen Vorsprung aus der sie enthaltenden Ebene bildet und dazu vorgesehen ist, zur Außenseite der Verpackung gerichtet zu sein, und dass die Innenwand des zurückgesetzten Bereichs (12) und/oder der Klemmbacken (15) des formgebenden Glieds (4) eine Aus- 35 40
höhlung aufweist/aufweisen, dessen Abmessungen größer sind, als die der Ausstülpung, damit letztere während des Verformungsschritts darin ohne eine Beeinträchtigung der Ausstülpung aufnehmbar ist. 45
7. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** der Bogen eine Ausstülpung aufweist, die einen Vorsprung aus der sie enthaltenden Ebene bildet und dazu vorgesehen ist, zur Innenseite der Verpackung gerichtet zu sein, und dass die Außenwand des Doms (18) des Steckteils des formgebenden Glieds (4) eine Aus- 50
höhlung aufweist, deren Abmessungen größer sind, als die der Ausstülpung, damit diese während des Verformungsschritts darin ohne eine 55

Beeinträchtigung der Ausstülpung aufnehmbar ist.

8. Anlage zur Herstellung einer mit Verschlussteilen (55) versehenen Verpackung aus einem Bogen eines flexiblen Materials und zur Befüllung der Verpackung mit einem pulverförmigen oder nicht pulverförmigen Produkt, **dadurch gekennzeichnet, dass** sie Folgendes umfasst:
 - ein Speichermagazin (1) zum Lagern der Bögen des flexiblen Materials, in welchem die Bögen auf einer ihrer Seiten gelagert sind;
 - ein Vorschubglied (3) zum Vorschub von N formgebenden Vorrichtungen nach einem der Ansprüche 1 bis 7, die gleichmäßig entlang seiner Vorschubrichtung verteilt sind, wobei das Vorschubglied dazu vorgesehen ist, die formgebenden Vorrichtungen an den verschiedenen zur Herstellung und Befüllung der Verpackung erforderlichen Stationen zu positionieren und wobei das Vorschubglied im Schrittbetrieb vorschubbbar ist und jeder Vorschubschritt 1/N der Länge des Vorschubglieds entspricht;
 - ein mit Saughaltern (25) oder äquivalenten Systemen versehenes Greifglied (2), das in einer horizontalen translatorischen Bewegung angetrieben wird und dazu bestimmt ist, die Bögen eines flexiblen Materials der Reihe nach abzunehmen und sie nach einer Drehung auf den Saughaltern (13) oder äquivalenten Systemen zu positionieren, mit denen der Rand oder die Ränder (14) des zurückgesetzten Bereichs (12) des formgebenden Glieds (4) ausgestattet ist oder sind;
 - ein Glied (6) zum Anbringen eines ersten Verschlussteils (55) an einem der Enden des aus der Formgebung durch das formgebende Glied (4) resultierenden Verpackungskörpers;
 - ein Glied zur Befüllung der mit ihrem ersten Verschlussteil versehenen Verpackung, mit einem pulverförmigen oder nicht pulverförmigen Produkt und
 - ein Glied (7) zum Anbringen eines zweiten Verschlussteils (55), das dem Typ des oben beschriebenen Glieds ähnelt.
9. Anlage nach Anspruch 8, **dadurch gekennzeichnet, dass** das Vorschubglied aus einem drehbaren Karussell (3) mit einer vertikalen Drehachse besteht und dass die N formgebenden Glieder (4), die es besitzt, gleichmäßig um seinen Umfang verteilt sind, wobei das Karussell (3) im Schrittbetrieb bewegbar ist und wobei ein Drehschritt des Schrittbetriebs 1/N einer Umdrehung entspricht.
10. Anlage nach einem der Ansprüche 8 oder 9, **dadurch gekennzeichnet, dass** der Greifer (2) einen Greifarm (26) aufweist, der mit vier Saughaltern (25)

oder äquivalenten Systemen versehen ist, die in der gleichen Ebene angeordnet, mit einer Unterdruckquelle verbunden sind und dazu vorgesehen sind, einen Bogen eines flexiblen Materials aus dem Speichermagazin (1) zu nehmen, wobei der Greifarm (26) auf einer Drehachse (27) gelagert ist, die mittels eines Motors (28) um 180° gedreht werden kann und wobei die gesamte so gebildete Anordnung auf einem Trägerschlitten (29) montiert ist, der mittels einer von einem Motor (37) rotierend angetriebenen Schnecke (36) betätigt und horizontal translatorisch verschoben werden kann, wobei der Trägerschlitten (29) entlang zweier Führungen (30) verschiebbar ist und die daraus resultierende Translationsbewegung dazu bestimmt ist, dem Greifarm (26) die Bewegung nach oben zum Speichermagazin (1) und das Ergreifen eines Bogens flexiblen Materials zu ermöglichen.

11. Anlage nach einem der Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** jedes der Glieder zum Anbringen der Verschlusssteile (6, 7) aus einem Karussell (40) besteht, dass um eine vertikale Achse rotiert und um dessen Umfang eine Vielzahl n von Bearbeitungsstellen (42, 43, 44) gleichmäßig verteilt montiert sind, wobei das Karussell (40) im Schrittbetrieb drehbar ist und ein Drehschritt des Schrittbetriebs $1/n$ einer Umdrehung entspricht und die Bearbeitungsstellen jeweils verwendet werden, um

- ein Verschlusssteil (55) zu greifen, das in einem geeigneten Behältnis (49) indexiert ist
- das Verschlusssteil (55) zu einem Glied (47) zur Beschichtung des Umfangs des Verschlusssteils mit Klebstoff zu befördern und
- das so mit Klebstoff beschichtete Verschlusssteil auf einem der Enden des Körpers der entstandenen, von der formgebenden Vorrichtung (4) hergestellten Verpackung, oder der Verpackung nach der Befüllung zu positionieren,

wobei jede der Bearbeitungsstellen mit einem Greifglied (45), insbesondere mit einem Sauggreifer versehen ist, der in eine vertikale Bewegung versetzt wird, wobei der tatsächliche Vorschub des die formgebenden Glieder (4) tragenden Vorschubglieds (3) und des die Glieder zum Anbringen der Verschlusssteile tragenden Karussells (40) derart abgestimmt ist, dass das Greifglied (45) des Karussells (40), wenn es für eine Positionierung angeordnet ist, relativ zur Oberseite des Steckteils (18) der formgebenden Vorrichtung (4), die vertikal fluchtend zu dem jeweiligen Karussell angeordnet ist, zentriert ist.

12. Anlage nach Anspruch 11, **dadurch gekennzeichnet, dass** das Glied für die Klebstoffbeschichtung aus einer auf einem Trägerschlitten (51) montierten

Beschichtungsdüse (47) besteht, die in einer horizontalen Translationsbewegung verschiebbar ist und dass die Beschichtungsdüse (47) eine derartige Abmessung aufweist, dass sie von dem Verschlusssteil abdeckbar ist, um einen Klebstoffwulst auf die Innenfläche des Umfangrings (56), der Bestandteil des Verschlusssteils ist, aufzutragen.

13. Verfahren zur Herstellung einer Verpackung aus einem Bogen eines flexiblen Materials, **dadurch gekennzeichnet, dass:**

- zunächst der Verpackungskörper (58) aus dem Bogen eines flexiblen Materials hergestellt wird, indem letzterer mittels eines Steckteils und eines Aufnahmeteils eines formgebenden Glieds (4), die miteinander in Wirkverbindung stehen und die entlang senkrecht zueinander verlaufender linearer Bewegungswege aufeinander bezogen translatorisch bewegt werden, der gewünschten Verpackungsform entsprechend geformt wird und indem zwei der Ränder des Bogens zusammengefügt werden, und
- dann an einem der Enden des so hergestellten Verpackungskörpers ein erstes auf der Innenseite oder der Außenseite seines Umfangs mit Klebstoff vorbeschichtetes Verschlusssteil (62) positioniert wird und
- dann der so erhaltene Behälter, der aus dem Verpackungskörper und dem ersten Verschlusssteil besteht, so gedreht wird, dass ein zweites Verschlusssteil an dem offenen Ende des dann gebildeten Teils positionierbar ist.

14. Verfahren zur Herstellung einer Verpackung aus einem Bogen eines flexiblen Materials nach Anspruch 13, **dadurch gekennzeichnet, dass** das erste Verschlusssteil positioniert wird, während der Steckteil (18) des formgebenden Glieds (4) noch vollständig oder nahezu vollständig im Inneren des Verpackungskörpers (58) ist und durch den Aufnahmeteil des formgebenden Glieds so in Position gehalten wird, dass ein maximaler Angriff zwischen dem Umfangring (56), mit dem das Verschlusssteil versehen ist, und dem Verpackungskörper gewährleistet ist, der zu diesem Zeitpunkt von dem Steckteil (18) in Position gehalten wird, wodurch die resultierende Verpackung sehr gut versiegelt wird.

15. Verfahren zur Herstellung einer Verpackung aus einem Bogen eines flexiblen Materials nach Anspruch 14, **dadurch gekennzeichnet, dass** die Positionierung des ersten Verschlusssteils nicht zur Bildung irgendeines von der Innenwand (57) des Verpackungskörpers abstehenden Bereichs führt.

16. Vorrichtung zum Formen einer Verpackung aus einem Bogen eines flexiblen Materials nach einem der

Ansprüche 13 bis 15, **dadurch gekennzeichnet, dass** das zweite Verschlussstück bei Abwesenheit irgendeines Steckteils im Inneren des Verpackungskörpers positioniert wird.

17. Verfahren zur Herstellung einer Verpackung aus einem Bogen eines flexiblen Materials und zur Befüllung der Verpackung mit einem pulverförmigen oder nicht pulverförmigen Produkt **dadurch gekennzeichnet, dass:**

- zunächst der Verpackungskörper (58) aus dem Bogen eines flexiblen Materials hergestellt wird, indem letzterer mittels eines Steckteils und eines Aufnahmeteils eines formgebenden Glieds (4), die miteinander in Wirkverbindung stehen und die entlang senkrecht zueinander verlaufender linearer Bewegungswege aufeinander bezogen translatorisch bewegt werden, der gewünschten Verpackungsform entsprechend geformt wird und indem zwei der Ränder des Bogens zusammengefügt werden, und
 - dann an einem der Enden des so hergestellten Verpackungskörpers ein erstes auf der Innenseite oder der Außenseite seines Umfangs mit Klebstoff vorbeschichtetes Verschlussstück (62) positioniert wird und
 - dann der so erhaltene Behälter, der aus dem Verpackungskörper und dem ersten Verschlussstück besteht, so gedreht wird, dass der so gebildete Behälter mit einem pulverförmigen oder nicht pulverförmigen Produkt befüllbar ist und
 - schließlich ein zweites Verschlussstück (63) am zweiten Ende der Verpackung positioniert wird.

18. Verfahren zur Herstellung einer Verpackung aus einem Bogen eines flexiblen Materials und zur Befüllung der Verpackung mit einem pulverförmigen oder nicht pulverförmigen Produkt nach Anspruch 17, **dadurch gekennzeichnet, dass** das erste Verschlussstück (62) positioniert wird, während der Steckteil (18) des formgebenden Glieds (4) noch vollständig oder nahezu vollständig im Inneren des Verpackungskörpers (58) ist, der durch den Aufnahmeteil des formgebenden Glieds so in Position gehalten wird, dass ein maximaler Angriff zwischen dem Umfangring (56), mit dem das Verschlussstück versehen ist, und dem Verpackungskörper gewährleistet ist, der zu diesem Zeitpunkt von dem Steckteil (18) in Position gehalten wird, wodurch die resultierende Verpackung sehr gut versiegelt wird.

Revendications

1. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple, stocké

sur l'un de ses chants dans un magasin de stockage (1), comprenant :

- un organe conformateur (4), lui-même comprenant :

- une partie femelle, solidarisée à des moyens de translation selon une première direction, et incluant également au moins une mâchoire (15) articulée, destinée à définir au moins en partie la forme souhaitée lorsqu'elle est actionnée et notamment à définir l'enveloppe de l'emballage à réaliser,
- une partie mâle, constituée d'un manchon ou mandrin (18) de forme complémentaire à la forme interne de la partie femelle, et destinée à coopérer avec celle-ci,

- un organe de solidarisation (31) des deux bords l'un avec l'autre de la feuille en matériau souple après conformation, c'est-à-dire après coopération de la partie mâle avec la partie femelle,

caractérisé :

- **en ce que** la partie femelle comprend en outre une zone en creux (12), au niveau du ou des bords de laquelle est ou sont articulées la ou les mâchoires (15), et destinée à définir avec cette (ces) dernière(s) l'enveloppe à tout le moins partielle de l'emballage à réaliser ;
- **en ce que** la partie femelle est munie de ventouses ou systèmes équivalents (13), destinées à recevoir la feuille en matériau souple prélevée dans le magasin de stockage ;
- **et en ce que** le manchon ou mandrin (18) constitutif de la partie mâle est susceptible d'être animé d'un mouvement de translation selon une direction perpendiculaire à ladite première direction, afin de venir se positionner au niveau de la partie femelle.

2. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon la revendication 1, **caractérisé en ce que** l'actionnement de la ou des mâchoires (15) induisant la fermeture de la zone en creux (12), n'aboutit pas à la circonférence intégrale de l'enveloppe de l'emballage à réaliser, mais définit une fente, destinée à libérer l'accès à l'organe de solidarisation (31).
3. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 1 et 2, **caractérisé en ce que** la ou les mâchoires (15) sont actionnées par des vérins (16) solidarisés avec la zone en creux (12) de la partie femelle.

4. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 1 à 3, **caractérisé en ce que** le mandrin (18) est réalisé en un matériau à faible coefficient de frottement et notamment en polytétrafluoroéthylène ou en polyacétal. 5
5. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 1 à 4, **caractérisé en ce que** l'intégralité de la partie femelle est susceptible de subir une rotation dans un plan vertical d'une valeur angulaire réglable afin de permettre, après retrait du mandrin (18) et mise en place d'un composant d'obturation (55) sur le corps de l'emballage alors conformé, l'orientation dudit emballage en direction d'un poste de remplissage en produit pulvérulent ou non, puis son obturation. 10 15
6. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 1 à 5, **caractérisé en ce que** la feuille présente une excroissance formant saillie par rapport au plan qui la contient, destinée à être dirigée en direction de l'extérieur de l'emballage, et **en ce que** la paroi interne de la zone en creux (12) et/ou des mâchoires (15) de l'organe de conformation (4) présente une excavation de dimensions supérieures à celles de ladite excroissance, afin de permettre d'y loger cette dernière lors de l'étape de conformation, sans altérer celle-ci. 20 25 30
7. Dispositif pour réaliser la conformation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 1 à 5, **caractérisé en ce que** la feuille présente une excroissance formant saillie par rapport au plan qui la contient, destinée à être dirigée en direction de l'intérieur de l'emballage, et **en ce que** la paroi externe du mandrin (18) de la partie mâle de l'organe de conformation (4) présente une excavation de dimensions supérieures à celles de ladite excroissance, afin de permettre d'y loger cette dernière lors de l'étape de conformation, sans altérer celle-ci. 35 40 45
8. Installation pour la réalisation d'un emballage muni de composants d'obturation (55) à partir d'une feuille en matériau souple, et pour son remplissage en produit pulvérulent ou non, **caractérisée en ce qu'elle** comprend : 50
- un magasin de stockage (1) desdites feuilles en matériau souple au sein duquel les feuilles sont stockées sur l'un de leurs chants,
 - un organe de progression (3) de N dispositifs de conformation selon l'une des revendications 1 à 7, régulièrement répartis le long de sa direction de progression, et destiné à positionner les-
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9. Installation selon la revendication 8, **caractérisée en ce que** l'organe de progression est constitué par un carrousel rotatif (3) à axe de rotation vertical, et **en ce que** les N dispositifs de conformation (4) qu'il comporte sont répartis à sa périphérie, le carrousel (3) étant susceptible de se déplacer en mode pas à pas, dont le pas de rotation correspond à 1/N tours.
10. Installation selon l'une des revendications 8 et 9, **caractérisée en ce que** le préhenseur (2) comprend une main de préhension (26), munie de quatre ventouses (25) ou systèmes équivalents, montées dans un même plan, reliées à une source de vide et destinées à venir prendre une feuille en matériau souple au niveau du magasin de stockage (1), ladite main de préhension (26) étant montée sur un axe rotatif (27), susceptible de subir une rotation de 180 ° au moyen d'un moteur (28), l'ensemble ainsi constitué étant monté sur un chariot (29), actionnable en translation horizontale au moyen d'une vis sans fin (36) mue en rotation par un moteur (37), ledit chariot (29) étant susceptible de se déplacer sur des guides (30), le mouvement de translation susceptible d'en résulter étant destiné à permettre à la main (26) de se rapprocher du magasin de stockage (1), et de saisir une feuille de matériau souple.
11. Installation selon l'une des revendications 8 à 10, **caractérisée en ce que** les organes de mise en place des composants d'obturation (6, 7) sont chacun constitués d'un carrousel (40), rotatif selon un

axe vertical, sur lequel sont montés une pluralité n de postes de travail (42, 43, 44) répartis périodiquement à sa périphérie, ledit carrousel (40) étant susceptible de se déplacer selon un mode pas à pas, dont le pas de rotation correspond à 1/n tour, lesdits postes assurant respectivement :

- la préhension d'un composant d'obturation (55) indexé dans un réceptacle approprié (49),
- l'acheminement dudit composant d'obturation (55) au niveau d'un organe d'encollage (47) de la périphérie dudit composant d'obturation,
- le positionnement du composant d'obturation ainsi encollé au niveau de l'une des extrémités du corps de l'emballage résultant du dispositif de conformation (4) ou après remplissage de l'emballage,

chacun de ces postes étant pourvu d'un organe préhenseur (45), notamment par aspiration, animé d'un mouvement vertical, la progression effective de l'organe de progression (3) portant les organes de conformation (4) et des carrousels (40) portant les organes de mise en place des composants d'obturation étant synchronisée de telle sorte que l'organe préhenseur (45) des carrousels (40), lorsqu'il se trouve en configuration de positionnement, soit centré avec la face supérieure de la partie mâle (18) du dispositif de conformation (4) situé à l'aplomb des carrousels en question.

12. Installation selon la revendication 11, **caractérisée en ce que** l'organe d'encollage est constitué d'une buse d'encollage (47) montée sur un chariot (51) mobile en translation horizontale, et **en ce que** ladite buse d'encollage (47) est dimensionnée pour pouvoir être recouverte par le composant d'obturation, afin de pouvoir déposer un jonc de colle sur la surface interne de la bague périphérique (56) entrant dans sa constitution.

13. Procédé de réalisation d'un emballage à partir d'une feuille en matériau souple, **caractérisé en ce qu'il** consiste :

- tout d'abord à réaliser le corps (58) de l'emballage à partir de ladite feuille en matériau souple, par conformation de cette dernière en fonction de la forme souhaitée de l'emballage, au moyen d'une partie mâle et d'une partie femelle d'un organe de conformation (4) coopérant entre elles, et par solidarisation de deux des bords de ladite feuille ;
- puis à positionner au niveau de l'une des extrémités du corps de l'emballage ainsi réalisé un premier composant d'obturation (62), préalablement encollé au niveau de la face interne ou externe de sa périphérie ;

- puis à faire subir une rotation au récipient alors obtenu, constitué du corps et dudit premier composant d'obturation, de telle sorte à permettre le positionnement d'un second composant d'obturation au niveau de l'extrémité ouverte dudit récipient alors constitué.

14. Procédé de réalisation d'un emballage à partir d'une feuille en matériau souple selon la revendication 13, **caractérisé en ce que** le positionnement du premier composant d'obturation est réalisé alors que la partie mâle (18) dudit organe de conformation (4) est encore présente totalement **ou sensiblement totalement** au sein du corps (58) de l'emballage, maintenu par la partie femelle dudit organe de conformation, de telle sorte à assurer un pincement maximum entre la bague périphérique (56), dont est muni le composant d'obturation et le corps de l'emballage, maintenu à ce niveau par ladite partie mâle (18), et conférant ainsi à l'emballage en résultant une très bonne étanchéité.

15. Procédé de réalisation d'un emballage à partir d'une feuille en matériau souple selon la revendication 14, **caractérisé en ce que** le positionnement du premier composant d'obturation n'induit la formation d'aucune zone en saillie par rapport à la paroi interne (57) du corps de l'emballage.

16. Procédé de réalisation d'un emballage à partir d'une feuille en matériau souple selon l'une des revendications 13 à 15, **caractérisé en ce que** le positionnement du second composant d'obturation est réalisée en l'absence de toute partie mâle à l'intérieur du corps de l'emballage.

17. Procédé pour la réalisation et le remplissage en produit pulvérulent ou non d'un emballage à partir d'une feuille en matériau souple, **caractérisé en ce qu'il** consiste :

- tout d'abord à réaliser le corps (58) de l'emballage à partir de ladite feuille en matériau souple, par conformation de cette dernière en fonction de la forme souhaitée de l'emballage, au moyen d'une partie mâle et d'une partie femelle d'un organe de conformation (4) coopérant entre elles, et par solidarisation de deux des bords de ladite feuille ;
- puis à positionner au niveau de l'une des extrémités du corps de l'emballage ainsi réalisé un premier composant d'obturation (62), préalablement encollé au niveau de la face interne ou externe de sa périphérie ;
- puis à faire subir une rotation au récipient alors obtenu, constitué du corps et dudit premier composant d'obturation, de telle sorte à permettre le remplissage du récipient ainsi constitué en

produit pulvérulent ou non ;
- et enfin, à positionner au niveau de la seconde
extrémité de l'emballage un second composant
d'obturation (63).

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18. Procédé pour la réalisation et le remplissage en produit pulvérulent ou non d'un emballage à partir d'une feuille en matériau souple selon la revendication 17, **caractérisé en ce que** le positionnement du premier composant d'obturation (62) est réalisée alors que la partie mâle (18) dudit organe de conformation (4) est encore présente totalement ou sensiblement totalement au sein du corps (58) de l'emballage, maintenu par la partie femelle dudit organe de conformation, de telle sorte à assurer un pincement maximum entre la bague périphérique (56), dont est muni le composant d'obturation et le corps de l'emballage, maintenu à ce niveau par ladite partie mâle (18), et conférant ainsi à l'emballage en résultant une très bonne étanchéité.

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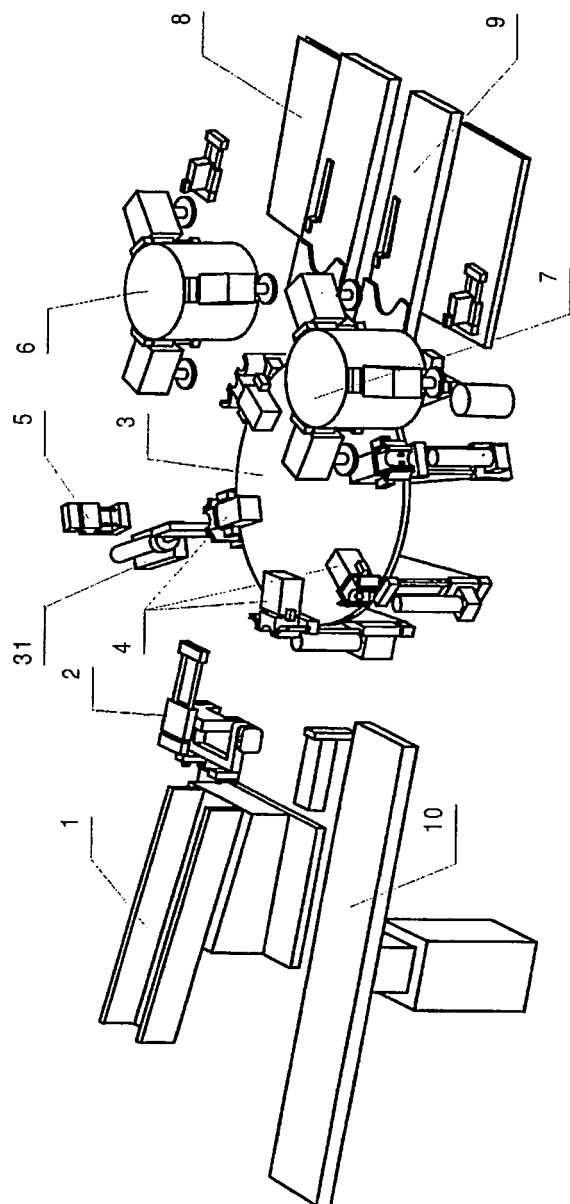


FIG. 1

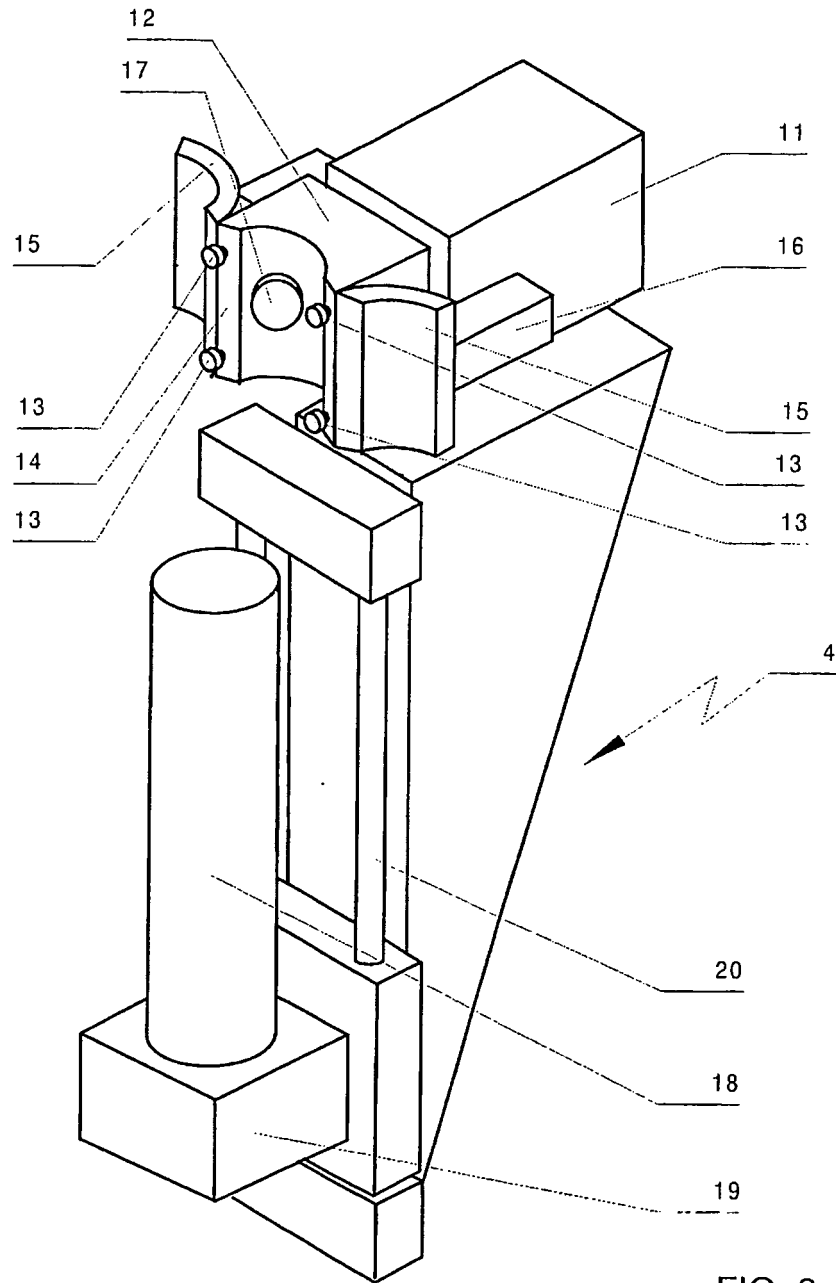


FIG. 2

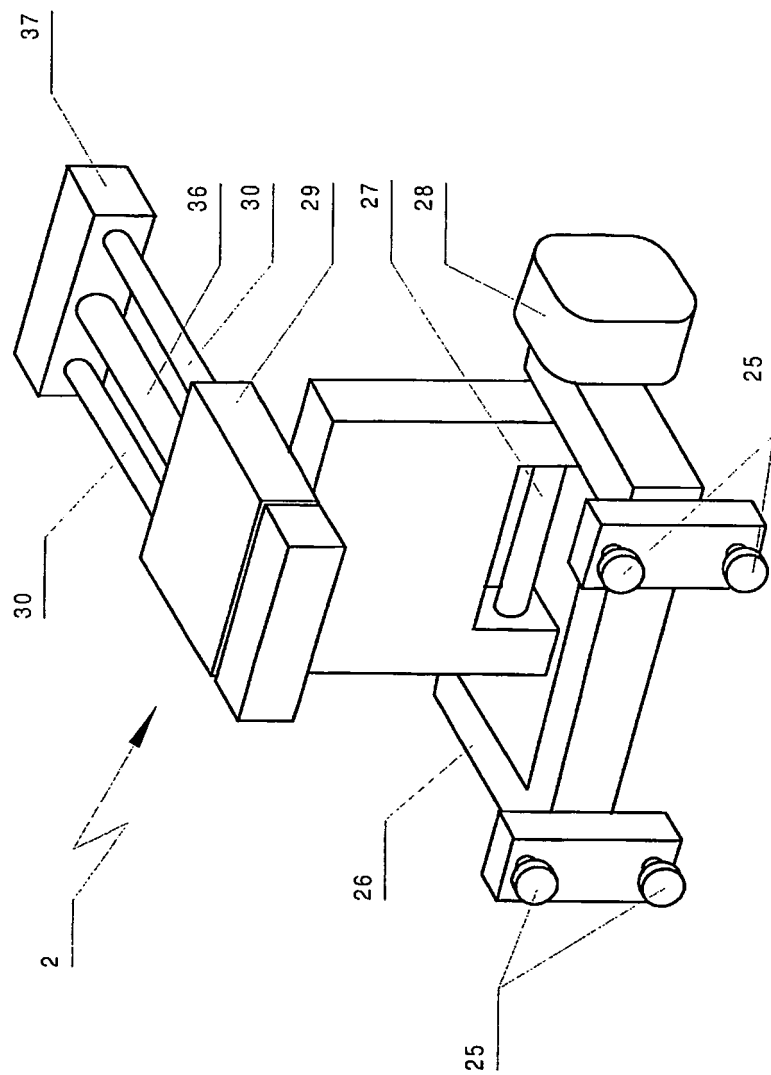


FIG. 3

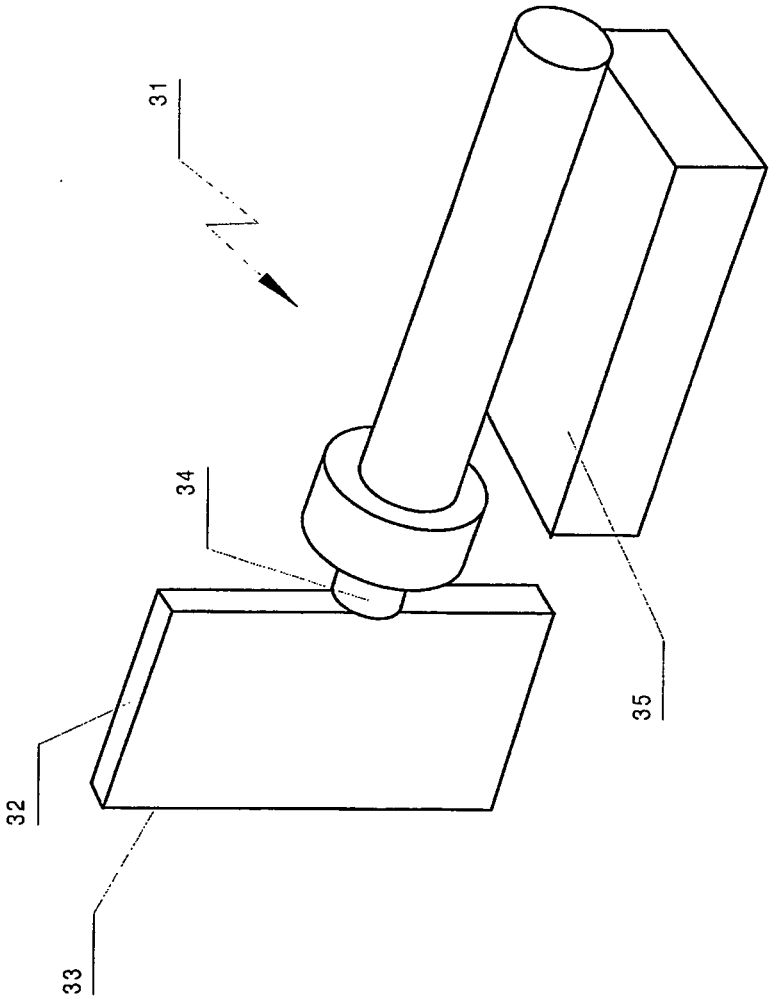


FIG. 4

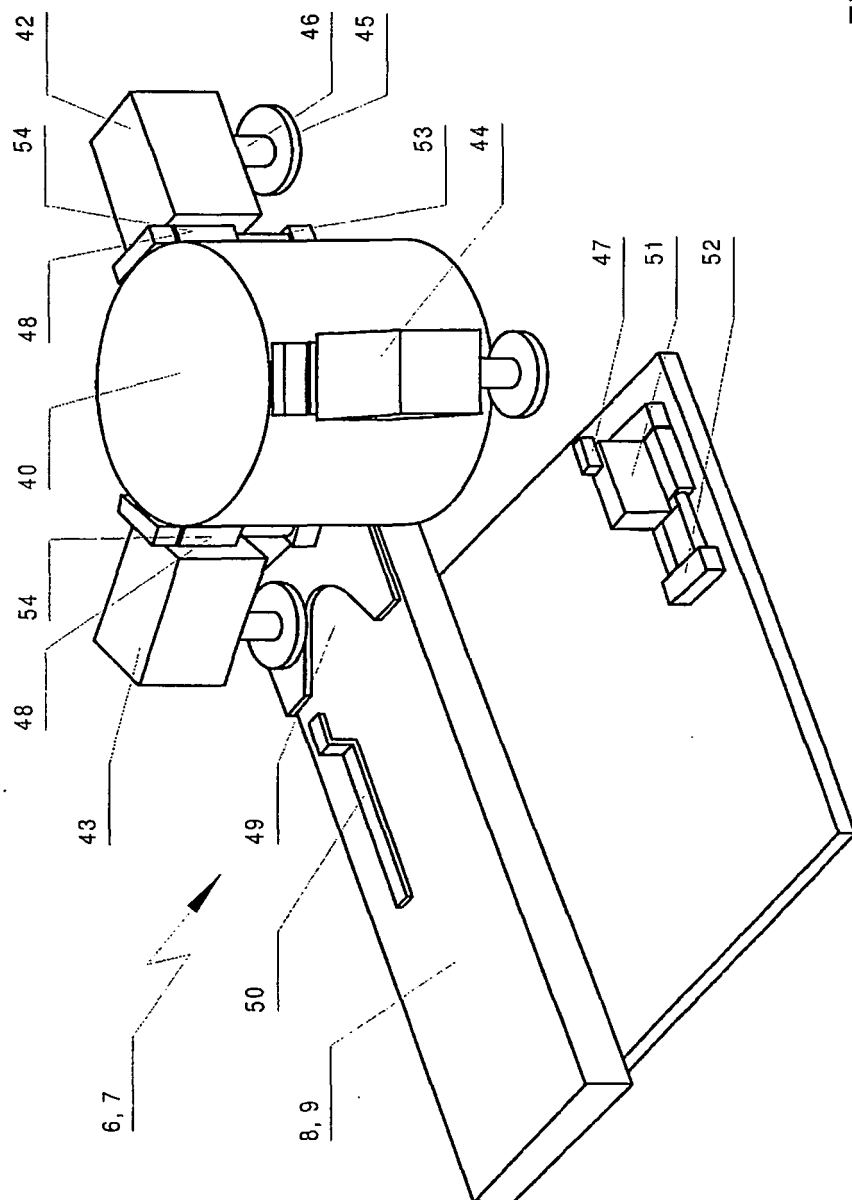


FIG. 5

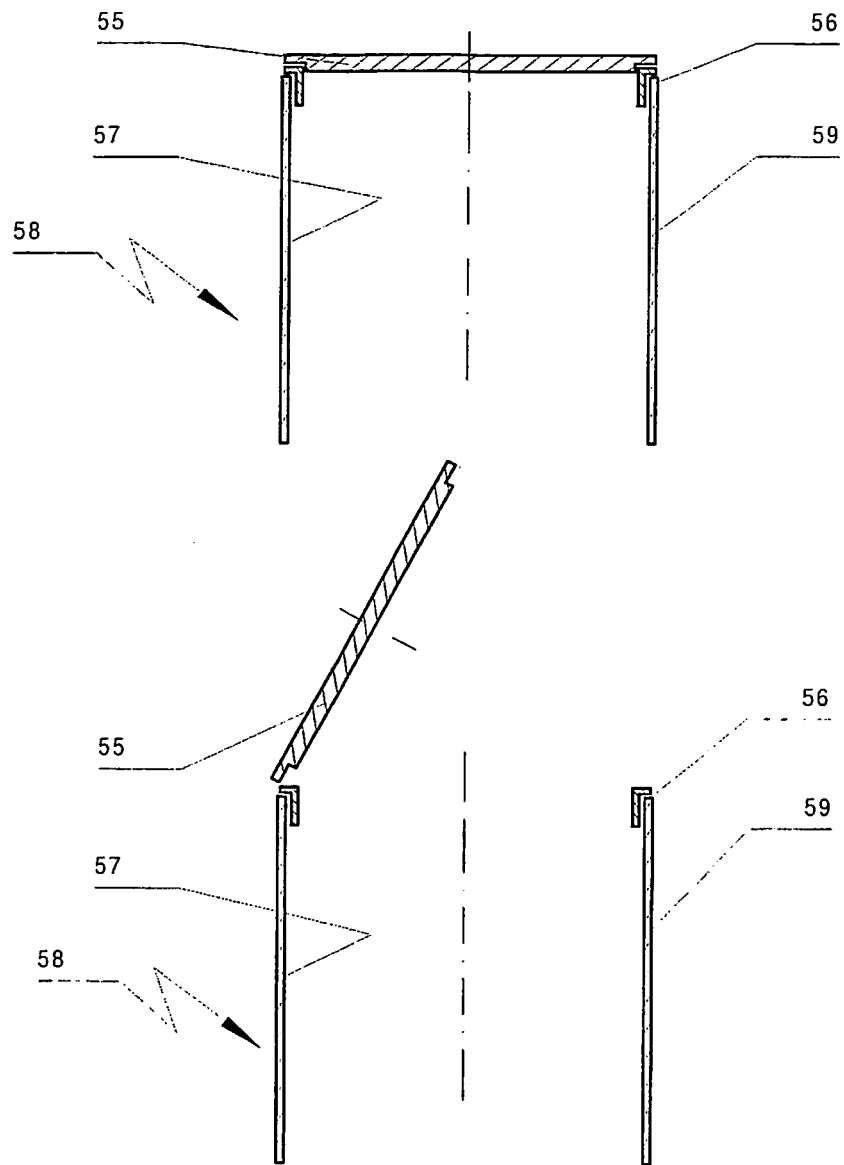


FIG. 6

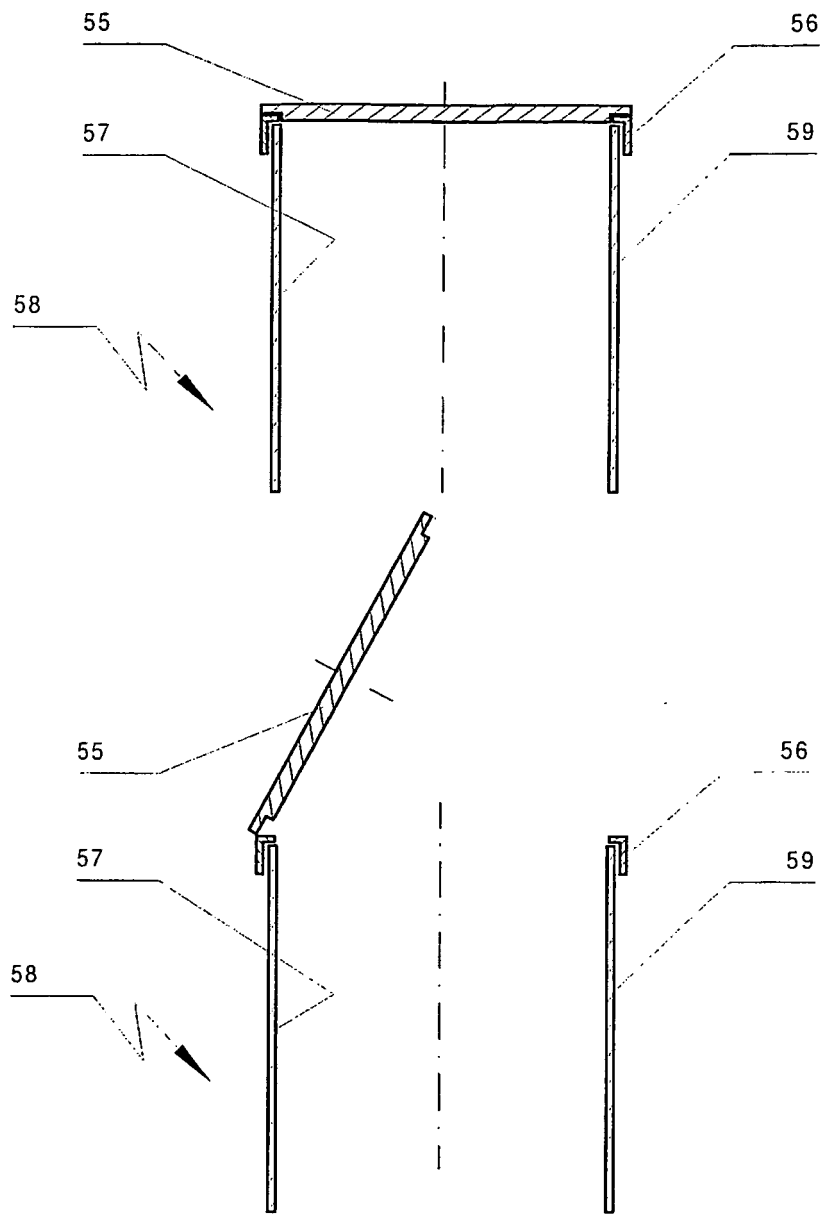


FIG. 7

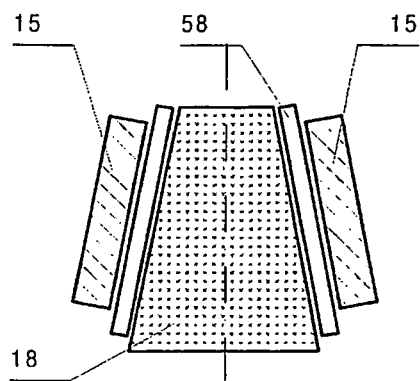


FIG. 8

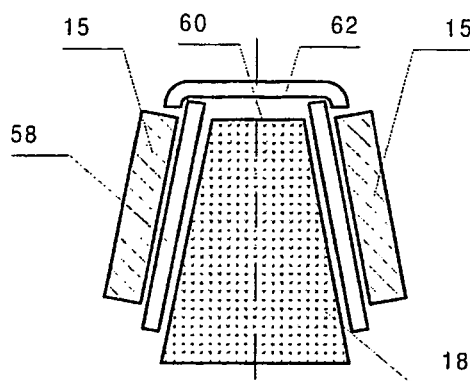


FIG. 9

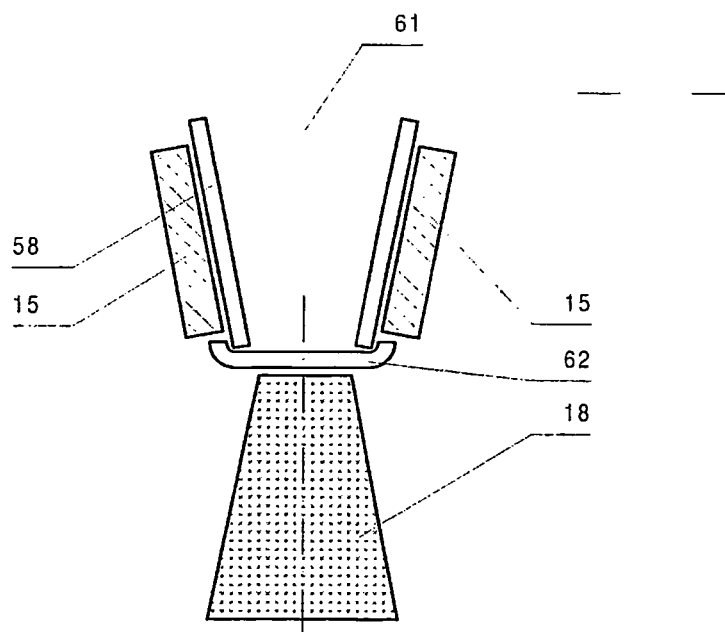


FIG. 10

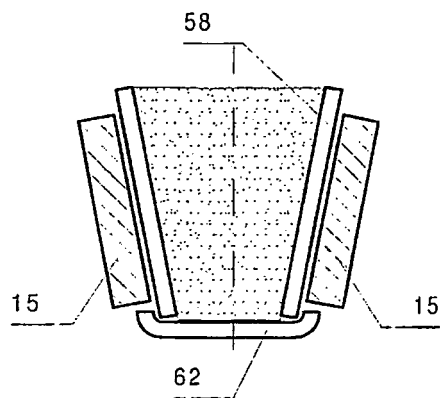


FIG. 11

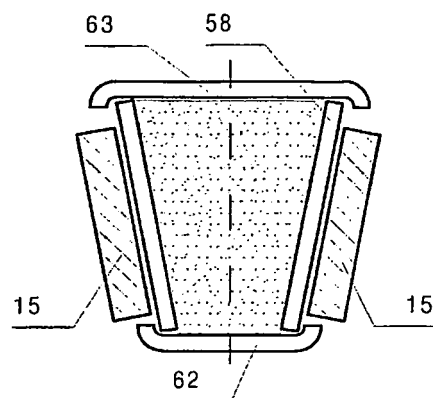


FIG. 12

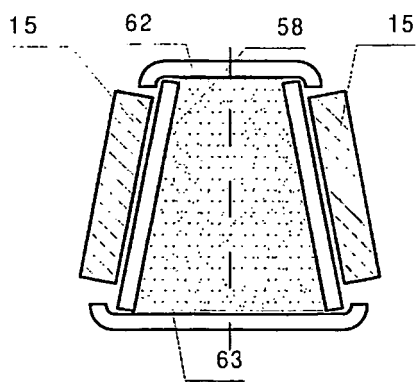


FIG. 13

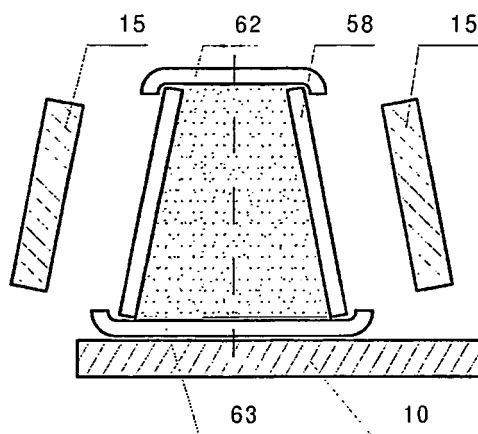


FIG. 14