



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.11.2016 Bulletin 2016/48

(51) Int Cl.:
B65B 25/00 (2006.01) **B65B 63/02** (2006.01)
B65B 5/04 (2006.01) **B65B 11/10** (2006.01)
B65B 11/12 (2006.01) **B65B 43/46** (2006.01)

(21) Application number: **16171545.3**

(22) Date of filing: **26.05.2016**

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

(72) Inventors:
• **RESTA, Paolo**
48018 Faenza RA (IT)
• **RESTA, Roberto**
48018 Faenza RA (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

(30) Priority: **28.05.2015 IT UB20150963**

(71) Applicant: **Resta S.R.L.**
48018 Faenza, RA (IT)

(54) **STATION FOR CLOSING A COVERING FOR BLOCKS MADE OF DEFORMABLE MATERIAL AND METHOD OF COVERING BLOCKS MADE OF DEFORMABLE MATERIAL**

(57) A station (1) for closing a covering for blocks (A) made of deformable material, which comprises a resting surface (2) for at least one block (A); the station (1) comprises at least one clamping pusher (3a, 3b), which is aligned with at least one head (B) of the block (A) and can translate toward the surface of the block (A) until it is pressed for the compression of a covering sheet (4)

on the block (A), and comprises grip means (5) for retaining juxtaposed end flaps (4a, 4b), (4c, 4d) of the sheet (4) that protrude from the block (A), the grip means (5) being able to translate according to a stroke for approach/spacing apart with respect to the block (A) in order to pull the sheet (4).

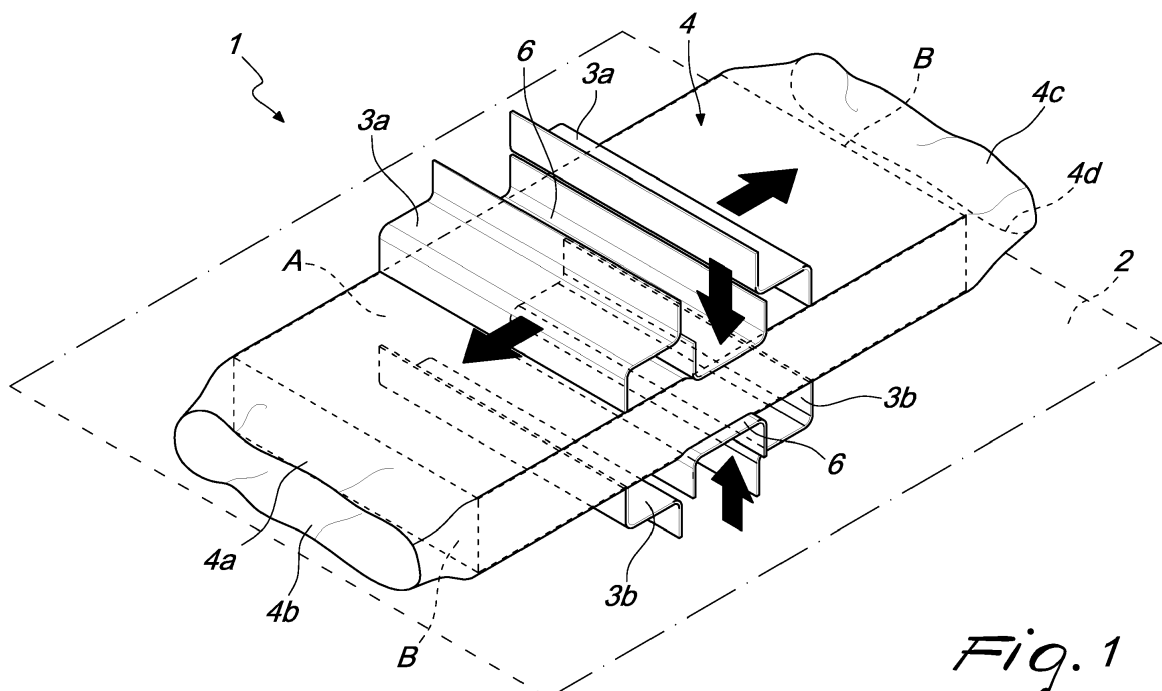


Fig. 1

Description

[0001] The present invention relates to a station for closing a covering for blocks made of deformable material and a method of covering blocks made of deformable material.

[0002] The need is known to cover blocks (with or without stratification) made of elastically deformable material, such as elastomers in general, rubber, latex, polymeric foams (including the polyurethane foams known with the commercial name "memory foam") and latex foam, silicone slabs and the like.

[0003] The covering is usually done by way of sheets of material of the type of fabric, knitted material and the like: merely for the purposes of example it is possible to use fabrics of the type known in the textile sector with the names "tricot" and "jersey"; in any case an integral part of the present discussion is a covering that entails the use of non-yielding fabrics made of natural and/or synthetic textile fibers.

[0004] There are many reasons for this covering: firstly, the surfaces of the block are kept from contact with the external environment (thus preventing the deposit of dust, dirt or other contaminants); it hides any superficial irregularities of the block that would compromise its overall appearance while not affecting its mechanical characteristics in any way; it defines a separation surface interposed between the block and the other components with which it will come into contact during use; it results in a finished mattress that is simple and low cost.

[0005] In particular this need is felt in the sector of making mattresses and pillows, and also in the sector of upholstered furnishing elements (sofas, armchairs and other furnishing components) in which it is increasingly common to use a block made of deformable material to provide the core of the mattress (or of the pillow) and couple suitable layers of covering to the two mutually opposite substantially flat surfaces.

[0006] The ability to remove the covering from the mattress, and therefore the ability to separate the layers of covering from the inner core, makes it possible for the end user to clean the outer covering.

[0007] Due to the typical characteristics of polymeric foams, latex foams and rubber (and the other materials cited previously with which it is possible to provide the blocks), it is preferable if the end user cannot come into direct contact with the block, and instead finds it conveniently covered.

[0008] The operations for covering the block are usually carried out manually; substantially it involves inserting the block into a respective covering case.

[0009] Even though the finished mattress is constituted by a deformable block covered with a single layer of non-yielding fabric, need for a covering is still felt.

[0010] Resorting to manually covering the block is dictated by the need to provide a covering that is particularly adherent and tight-fitting: between the outer surface of the block and the covering cover there is extremely strong

friction and, therefore, only by using stuffing machines and availing of the operator's skill is it possible to correctly fit the case over the block while avoiding the formation of wrinkles or irregularities in the covering.

[0011] Even in partially automated processes, closing the flaps of the covering case is always done by an operator who checks the correct arrangement thereof.

[0012] It is usually essential that the operator also checks that the dimensions of the block meet the standards specified, in order to prevent the covering case (which was mass-produced previously) from being too big or too small: if the dimensions do not comply then it will be necessary to run up a dedicated covering case for the particular block to be covered.

[0013] Obviously the intervention of operators makes the operation of covering the block particularly costly, to the point that it is a major factor in calculating the final cost of the finished manufactured article (for example the mattress or the pillow).

[0014] It should be noted that the case is usually shaped like a bag of preset dimensions and is provided with at least one opening through which to insert the block.

[0015] Coupling the flaps of the sheet that constitutes the covering case can occur by heat-sealing, stitching, adhesive bonding and the like.

[0016] The aim of the present invention is to solve the above mentioned drawbacks, by providing a station for closing a covering for blocks made of deformable material which is completely automated, and does not require any intervention from the operator.

[0017] Within this aim, an object of the invention is to provide a station for closing a covering for blocks made of deformable material which is adapted to cover blocks of various different dimensions, potentially also of various different shapes and/or partially irregular.

[0018] Another object of the invention is to provide a completely automated method of covering blocks made of deformable material.

[0019] Another object of the invention is to provide a method of covering blocks made of deformable material which is adapted to be applied to blocks of any size.

[0020] Another object of the present invention is to provide a station for closing a covering for blocks made of deformable material, and to implement a method of covering blocks made of deformable material, which is low cost, easily and practically implemented and safe in use.

[0021] This aim and these objects are achieved by a station for closing a covering for blocks made of deformable material, of the type comprising a resting surface for at least one block, characterized in that it comprises at least one clamping pusher, which is aligned with at least one head of said block and can translate toward the surface of said block until it is pressed for the compression of a covering sheet on said block, and comprises grip means for retaining juxtaposed end flaps of said sheet that protrude from said block, said grip means being able to translate according to a stroke for ap-

proach/spacing apart with respect to said block in order to pull said sheet.

[0022] Such aim and such objects are also achieved by implementing a method of covering blocks made of deformable material, which consists of clamping said block with respective jaws, which are aligned substantially with the centerline of said block, with consequent compression of said sheet on the two mutually opposite faces of said block on which said jaws act, clamping at least one head of said block, with at least one pusher so as to press said sheet on said block and compress said block, thus reducing its thickness, gripping with appropriate grip means the juxtaposed end flaps of said sheet that protrude from said block, retracting said grip means, integrally with said end flaps, away from said block, with consequent tensioning of said sheet, releasing the at least one head of said block, moving away the at least one pusher, clamping again the at least one head of said block, with at least one pusher so as to press said sheet on said block and compress said block, thus reducing its thickness, releasing the end flaps from said grip means, moving said grip means away from said flaps, mutually coupling the end flaps at their regions that are proximate to said at least one head by way of at least one first coupling unit, interrupting the clamping of said block, performed by the pushers and by said jaws.

[0023] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of the station for closing a covering for blocks made of deformable material and of the method of covering blocks made of deformable material according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of a station for closing a covering for blocks A made of deformable material according to the invention, during a first step of covering;

Figure 2 is a schematic perspective view of the station in Figure 1, during a second step of covering;

Figure 3 is a schematic perspective view of the station in Figure 1, during a third step of covering;

Figure 4 is a schematic perspective view of the station in Figure 1, during a fourth step of covering;

Figure 5 is a perspective view of the completely covered block.

[0024] With reference to the figures, the reference numeral 1 generally designates a station for closing a covering for blocks A made of deformable material.

[0025] The station 1 comprises a resting surface 2 for at least one block A: in practice it is possible to lay the block A on the work surface 2 so that it can be moved thereon thus allowing other components of the station 1 to operate on that block A.

[0026] The station 1 according to the invention comprises at least one clamping pusher 3a, 3b, which is

aligned with at least one head B of the block A.

[0027] The pusher 3a can be single and in such case there will be an abutment, below the block A (for example coinciding with a specific portion of the surface 2), so that a motion thereof toward such abutment determines the pressing of the block A interposed between them.

[0028] Most probably, the pushers 3a and 3b will be two in number, mutually opposite and adapted to be moved along a direction for mutual approach/spacing apart: in this manner the block A can be pressed symmetrically by the action of two mutually opposite pushers 3a and 3b.

[0029] It should be noted that the pusher 3a (or the pushers 3a, 3b) can comprise an end lamina that is substantially perpendicular to the upper face of the block A (therefore parallel to the end wall of the head B).

[0030] The block A, following a previous step of juxtaposing, will have a covering sheet 4 on its outer surface: the action of the at least one pusher 3a, 3b is to compress the said sheet 4 on the block A (and press that block A, which is elastically deformable).

[0031] With particular reference to the embodiment that entails the adoption of a pusher 3a (or of pairs of pushers 3a, 3b) provided with an end lamina, it should be noted that this will be motorized according to two separate movement axes: it can move in the direction of approach/spacing apart with respect to the block A and it can also move parallel to the surface of the block which it faces, from the centerline (or from a position that is substantially proximate to the centerline) toward the head B.

[0032] By analyzing the motion of a single pusher 3a (which corresponds to similar motions of the other pushers 3a, 3b), it will be seen that it will undergo a first approach to the block A, on which the covering sheet 4 is laid, until such point as the edge of its end lamina comes to rest on the sheet 4, stopping.

[0033] The method proceeds with a movement of the pusher 3a (pushers 3a, 3b) in a direction parallel to the surface of the block A, from a position proximate to the centerline of the block A toward the head B, until the end lamina is in alignment with the end wall of the head B (the configuration in which the pusher 3a will stop).

[0034] In this step of movement, the edge of the end lamina slides on the sheet 4 (which in turn is laid on a respective face of the block A), subjecting the sheet 4 to a preventive "ironing", pre-tensioning and eliminating part of the wrinkles present in it.

[0035] The pusher 3a (or the pushers 3a and 3b) will undergo a further approach to the block A with consequent pressing of that block A (elastic deformation consequent to a compression). The protruding portion of the covering sheet 4 will therefore be in abutment on the edge of the end lamina (or substantially "clinched" between facing and proximate edges of the end laminas of two separate pushers 3a and 3b).

[0036] The station 1 according to the invention further comprises grip means 5 for retaining the end flaps 4a,

4b (on a head B of the block A) and 4c, 4d (on the head B arranged opposite), juxtaposed together: such flaps 4a, 4b, 4c and 4d of the sheet 4 are the ones that protrude with respect to mutually opposite heads B of that block A.

[0037] The grip means 5 will further be able to translate according to a stroke for approach/spacing apart with respect to the block A, so as to be able to place the sheet 4 under traction (in that distancing the grip means 5 from the block A, while they grip the flaps 4a and 4b or the flaps 4c and 4d, implies the application of a traction on the sheet 4).

[0038] This traction ensures the minimization (even the total elimination) of wrinkles or irregularities of the sheet 4 with respect to the surface of the block A on which it rests.

[0039] The station 1 according to the invention comprises at least one pair of mutually opposite jaws 6: such jaws 6 are parallel to the at least one first pusher 3a, 3b.

[0040] The jaws 6 are substantially aligned with the centerline of the block A and can move in a direction for mutual approach/spacing apart, with consequent clamping of the block A and compression of the covering sheet 4 on that block A.

[0041] As noted previously, according to a specific embodiment of specific practical and applicative interest, the clamping pushers 3a, 3b are two in number and are mutually opposite.

[0042] The block A is interposeable between the pushers 3a, 3b, therefore the approach of the pushers 3a, 3b causes the compression of the sheet 4 on the block A and the elastic deformation, the pressing, of the block A.

[0043] It should further be noted that the station 1 further comprises at least one coupling unit 7 for the flaps of the sheet 4 (for example the flaps leading to the edges 4a and 4b or the flaps leading to the edges 4c and 4d).

[0044] The unit for coupling 7 is slideable parallel to the clamping pushers 3a, 3b along the end flaps 4a, 4b and 4c, 4d, juxtaposed together, of the sheet 4.

[0045] According to a specific embodiment, the unit for coupling 7 can be a sewing machine, in particular a machine of the type known as "cut and sew": this can couple together, by way of stitching, the juxtaposed flaps 4a, 4b and/or 4c, 4d; if a machine of the "cut and sew" type is used then the machine can simultaneously perform the stitching and elimination of the portions of the flaps 4a, 4b and/or 4c, 4d that protrude with respect to the stitching, thus directly obtaining the finished blank (i.e. the block A correctly covered with the sheet 4).

[0046] The adoption is not ruled out of units for coupling operating by adhesive bonding and/or by heat-sealing and/or a combination of such methods for coupling.

[0047] Preferably, the station 1 comprises two pairs of clamping pushers 3a, 3b, each one substantially aligned with a respective head B of the block A.

[0048] Such version is particularly efficient in that it makes it possible to close the covering envelope, which is provided directly with the sheet 4, simultaneously on two mutually opposite heads B.

[0049] In such case the station 1 will also comprise mutually opposite double grip means 5, for retaining respective end flaps 4a, 4b and 4c, 4d of the sheet 4 that protrude from mutually opposite edges (heads B) of the block A. There will also be two coupling units 7, each one able to slide parallel to the respective clamping pushers 3a, 3b: each unit 7 will move along the respective end flaps 4a, 4b and 4c, 4d of the sheet 4. Obviously each unit 7 will be arranged proximate to a respective head B arranged opposite to the one that the other unit 7 is facing.

[0050] In its most generic description, the covering station 1 comprises an assembly for supplying covering sheets 4: such assembly can be constituted by a magazine in which sheets 4 of preset dimensions are mutually stacked or (and preferably) it can be constituted by a reel on which a laminar body is wound starting from which the covering sheets 4 can be made (by cutting portions thereof of the desired length).

[0051] The station 1 according to the invention further comprises locking means for the end edge of the covering sheet 4 (for example the end edge of the portion protruding from the reel): the locking means are arranged proximate to the resting surface 2, and the possibility is not ruled out that they can be directly accommodated and/or comprised in the surface 2.

[0052] The locking means can be constituted by clamps, gripper hands or, according to a particularly efficacious embodiment, by a lamina, controlled by a servomotor, which is parallel to a wall at the side of the surface 2 and adapted to lock the edge of the sheet 4 between it (the lamina) and such wall.

[0053] The station 1 further comprises at least one first pusher for the forced translation of the block A toward the covering sheet 4, parallel to the edge thereof: substantially the block A can then be pushed, making it translate on the surface so as to make it slide with its lower face (facing and proximate to the surface 2) above the sheet 4, and this sheet 4 will enclose the end head B of the block A and will go to cover the upper face of that block A.

[0054] The pusher element can also be constituted by a linear bar (substantially of similar length to the length of the wall/head B of the block A on which it will act in compression) controlled by adapted automatic servomotors adapted for its controlled translation.

[0055] It should further be noted that the station 1 also comprises at least one stroke limiting shoulder, opposite and parallel to the at least one first pusher; the shoulder, in such case, will be arranged at a distance from the locking means of the end edge of the sheet 4 (which, as seen previously, are arranged proximate to the resting surface 2) substantially similar to the width of the block A.

[0056] The shoulder will preferably be cylindrical and, according to a particularly useful embodiment, it can be constituted by an idle roller.

[0057] The shoulder will preferably be installed on trolleys that can move with respect to the chassis of the station 1 so that the position thereof can be varied as a

function of the size of the block A to be covered.

[0058] The block A will therefore end up pressed between the pusher element and the shoulder, undergoing an elastic deformation that will result in a reduction in its length (along the direction in which the compression is applied).

[0059] The station further comprises at least two pressers, for the compression of the sheet 4 on the block A and the juxtaposition of the further end flaps of sheet 4 on mutually opposite faces of that block A.

[0060] According to a particular embodiment the pressers can be constituted by rotating rollers: such rollers will rotate and be able to translate toward each other for the tensioning and compression of the sheet 4 on the block A and the juxtaposition of the end flaps of that sheet 4. The rollers will be coupled to the chassis of the station 1 by way of moveable brackets controlled by specific controlled servomotors.

[0061] The fact that the rollers rotate will make it possible to take advantage of their rotary motion in order to subject the sheet 4 to traction so as to "extract" the flaps of the sheet 4 from the face of the block A in an orderly fashion, while still keeping them parallel to the surface of the block A on which they are laid and preventing the remaining portion of sheet 4 that remains on such surface of the block A from having wrinkles or irregular deformations.

[0062] According to an alternative embodiment, the pressers will be nothing more than bodies acting on the block A, at right angles to its upper and lower face, for the pressing of the sheet 4 on the block A with consequent elastic deformation of the block (compression).

[0063] In such case, in order to ensure that irregularities or wrinkles cannot form in the sheet 4 arranged on the faces of the block A, at least one grip clamp will be adopted, acting on the end flaps of the sheet 4, for the tensioning of that sheet 4.

[0064] As seen previously for the other heads B, the possibility is therefore not ruled out of subjecting the covered block A to a compression through the pressers, gripping the protruding flaps of the sheet 4 with the additional grip clamp, and imposing a distancing of the clamp away from the block A so that the sheet 4 is tensioned.

[0065] At this point it will be possible to take the pressers away from the block A, leaving the sheet 4 to be tensioned completely by the action of the traction exerted by the grip clamps. A further approach of the pressers will therefore cause a new pressing of the block A with locking of the sheet 4 thereon in the perfectly outspread configuration (with no wrinkles).

[0066] At this point the grip clamps can release the respective end flaps of the sheet.

[0067] Independently of whether the configuration is reached in which the block A is covered by a sheet 4 that is conveniently "ironed" (subjected to a traction that has eliminated positioning wrinkles and irregularities therefrom) through the rotating rollers or through the set of pressers and clamps, it is necessary to mutually couple

the flaps of the sheet 4 when the block A is in such configuration.

[0068] Therefore there is at least one additional coupling unit, which can slide parallel to the pressers along the additional juxtaposed end flaps of the sheet 4.

[0069] In this case also, the unit for coupling can be a sewing machine, a sewing machine of the type known as "cut and sew", a heat-sealing apparatus, an adhesive bonding apparatus and the like.

[0070] In order to make the station 1 versatile, i.e. enabling it to correctly cover blocks A of any size, it can comprise at least one processor for acquiring the measurements of the block A (which could be input by an operator by way of an adapted interface device) and calculating the consequent dimensions of the respective covering sheet 4 and of the correct position of the stroke limiting shoulder, if any.

[0071] By ensuring the maximum of autonomy of the machine on which the station 1 will be installed and therefore reducing the need for intervention by an operator, it should be noted that there are automatic detection means, of a type preferably chosen from among mechanical measurement units, optical measurement units, laser measurement units, infrared measurement units and the like, for acquiring the measurements of the block A and sending the same to the processor.

[0072] When the covering operation is complete, the block A will appear as in Figure 5.

[0073] It should be noted that the block A, when completely covered, will have lines of stitches (or heat-sealing or generic coupling) on three sides, while on the remaining side the sheet 4 will be continuous and folded onto itself (such side is the one that came to rest against the shoulder during the covering operation).

[0074] The station 1 described is therefore adapted to the provision of blocks A covered with sheets 4 for providing pillows, mattresses, upholstery for furniture and the like.

[0075] For this reason the material that constitutes the block A will preferably be chosen from among elastomers, rubber, latex, polymeric foams (including the polyurethane foams known with the commercial name "memory foam") and latex foam, silicone slabs and the like.

[0076] The covering sheets 4 on the other hand are constituted by material of the type of fabric, knitted material and the like, in particular fabrics of the type known in the textile sector with the names "tricot" and "jersey". It should be noted that, for some applications, it is preferable to choose covering sheets 4 of the elastic type so that, when they are subjected to traction by the grip means 5 or by the other clamps cited, they yield elastically without being damaged.

[0077] Furthermore, it is sometimes preferable to choose sheets 4 made of elastic material so that they can follow the deformations that the block A will undergo during the use thereof.

[0078] The possibility is in any case not ruled out of adopting the station 1 for covering blocks A of different

kinds, using sheets 4 with different characteristics from those described previously by way of example.

[0079] In particular there is definite interest in a covering operation carried out with sheets 4 of non-yielding fabric, such as for example cotton and other natural and/or synthetic fibers that do not exhibit an elastic behavior. In such case, the elastic deformability of the block A is exploited in order to obtain a wrinkle-free deployment of the sheets 4: by executing the stitching while the block A is pressed (deformed), when the block A is released by the pushers 3a and 3b (or by the pressers) the elastic return to its non-deformed configuration will make it possible to tension the sheet 4 thus eliminating the wrinkles therefrom.

[0080] As mentioned earlier, it should be noted that if the supply assembly is constituted by a reel on which the covering material is wound, it will be possible to separate the single sheet 4 that is needed from the remaining part of the material present on the reel by way of a cutter.

[0081] The present invention further relates also to a method of covering blocks A made of deformable material, which consists of the execution of a plurality of consecutive steps.

[0082] In a first step it is necessary to clamp the block A with respective jaws 6, which are aligned substantially with the centerline of the block A, with consequent compression of the sheet 4 on the two mutually opposite faces of the block A on which the jaws 6 act.

[0083] It will therefore be necessary, in a second step, to clamp at least one head B of the block A, with at least one pusher 3a, 3b so as to press the sheet 4 on the block A and compress the block A, thus reducing its thickness.

[0084] At this point a third step involves gripping with adapted grip means 5 the end flaps 4a, 4b and 4c, 4d of the sheet 4, which are in juxtaposed pairs and which protrude from the block A.

[0085] The subsequent fourth step consists of retracting the grip means 5, integrally with the end flaps 4a, 4b and 4c, 4d, away from the block A with consequent tensioning of the sheet 4 (which can deform elastically, if its structure allows it, or induce further deformations of the block A on which it is laid).

[0086] The fifth step involves freeing the at least one head B of the block A, which is achieved by distancing the at least one pusher 3a, 3b from it. At this point the traction exerted by the grip means 5 on the flaps 4a, 4b and 4c, 4d causes a sort of "ironing" of the sheet 4 on the surfaces of the block A (which expands elastically because the pressing action of the pushers 3a, 3b has ended): this therefore eliminates the wrinkles and irregular deployments of the sheet 4 on the block A with respect to the centerline thereof (on which the pressure from the jaws 6 is exerted).

[0087] In a seventh step, it is necessary to clamp again the at least one head B of the block A, with at least one pusher 3a, 3b so as to press the sheet 4 (which has already been subjected to traction and is outspread along the block A) on the block A and compress the block A,

thus reducing its thickness (also stably coupling the sheet 4 on the block A in such configuration).

[0088] With an eighth step, it is necessary to release the end flaps 4a, 4b and 4c, 4d from the grip means 5, moving the grip means 5 away from the flaps 4a, 4b and 4c, 4d: moving the grip means 5 away is necessary in order to prevent them from interfering with and/or obstructing further components that may come into operation in the subsequent steps.

[0089] The ninth step involves mutually coupling the end flaps 4a, 4b and 4c, 4d at their regions that are proximate to the at least one head B by way of at least one first coupling unit 7: more specifically this involves the stitching of the end flaps 4a, 4b and 4c, 4d (or gluing them, or heat-sealing them).

[0090] The tenth and final step involves interrupting the clamping of the block A, performed by the pushers 3a, 3b and by the jaws 6, so that the completely covered block A can be removed.

[0091] It should be noted that, with particular reference to an embodiment that entails the adoption of pushers 3a, 3b provided with a protruding end lamina, the second step of clamping the at least one head B of the block A can in turn comprise some operating sub-steps.

[0092] Firstly, it is necessary to move the at least one pusher 3a, 3b to a portion that is substantially proximate to the centerline of the block A until a protruding end lamina thereof rests on the sheet 4 that is laid on the corresponding surface of the block A.

[0093] As noted previously, the block A (and, on it, the sheet 4) will be clamped at the centerline by the jaws 6.

[0094] At this time the pusher 3a, 3b will be in the raised configuration of rest, substantially proximate to the centerline (or even just at a preset distance from the heads B), and externally with respect to the jaws 6. The sole purpose of its approach toward the block A in this first sub-step is to bring its protruding end lamina into contact with the sheet 4, which in turn is laid on the block A.

[0095] Then the at least one pusher 3a, 3b can be translated parallel to the corresponding surface of the block A (keeping its height constant with respect to the block A), while its end lamina is resting on the sheet 4, until such end lamina is aligned with the end wall of the head B.

[0096] The purpose of this sub-step is to stretch the sheet 4 on the face of the block A on which it is laid, by taking advantage of the action of the protruding end lamina of the pusher 3a, 3b: by sliding on the sheet 4, while resting on it, the protruding end lamina subjects the sheet 4 to a pre-tensioning and reduces the number of positioning wrinkles and irregularities that it presents.

[0097] Then comes a subsequent sub-step, of moving the at least one pusher 3a, 3b closer to the block A until the at least one head B of the block A is clamped, pressing the sheet 4 on the block A and compressing the block A, reducing its thickness. At the end of this last sub-step the end flaps 4a, 4b and 4c, 4d will be substantially clamped between the mutually opposite protruding end laminas

of the respective pushers 3a, 3b (or clamped between a lamina of a pusher 3a or 3b and an abutment).

[0098] In any case, for the purpose of obtaining all the couplings (for example stitching) that make it possible to complete the covering envelope of the block A (constituted by the sheet 4), the method according to the invention entails the execution of further additional steps.

[0099] Firstly it is necessary to couple, to the resting surface 2, a first end edge of a covering sheet 4: the end edge can be the free one, protruding from the supply reel.

[0100] Then the block A to be covered is arranged on the resting surface 2, facing and aligned with the portion of the sheet 4 that protrudes from the resting surface 2: in this step the block A affects the surface 2 through lying on a face of the sheet 4, the sheet 4 will slide on the surface of the block A while the block A comes onto the surface 2; this is because the end edge of the sheet 4 is coupled to the surface 2.

[0101] In order to ensure the complete entry of the block A, and its complete covering with the sheet 4, it is necessary to push the block A against the sheet 4 until a first perimetric frame thereof is obtained which is in substantial alignment with the first end edge of the sheet 4 coupled to the surface 2, up until the abutment of a second frame of the block A, arranged opposite the first frame, on a stroke limiting shoulder.

[0102] At this point it is necessary to exert an additional pressure on the first frame of the block A opposite the shoulder, for the compression of that block A (with consequent elastic reduction of its width).

[0103] Subsequently it is necessary to release the first end edge of the sheet 4 from the surface 2 and arrange a second edge of the sheet 4, which is opposite the first edge, in alignment and juxtaposition with the first edge.

[0104] The method then proceeds to clamp the block A, using respective pressers which are capable of subjecting the sheet 4 and the block A to compression, leaving loose the first and second edges, which are superimposed and protrude from the block A.

[0105] It is then possible to interrupt the transverse compression of the block A exerted toward the stroke limiting shoulder (the purpose of which was to elastically reduce its width).

[0106] It is then necessary to mutually couple the regions proximate to the first and to the second superimposed edges, which face and are proximate to the frame of the block A which is opposite the shoulder 6.

[0107] Finally the clamping of the block A performed by the pressers can be interrupted.

[0108] It should be noted that there is also a possible preventive step, in which it is possible to take the measurements of the block A for the correct dimensioning of the corresponding covering sheet 4.

[0109] Conveniently the present invention solves the problems described previously, by providing a covering station 1 for blocks A made of deformable material which is completely automated and which therefore does not require any intervention from the operator.

[0110] Advantageously the covering station 1 is adapted to cover blocks A of various different sizes, potentially also of various different shapes and/or partially irregular. In fact it is possible, for an operator, to enter the measurements of the blocks A by way of a specific interface so that the station 1 will automatically proceed to calculate the correct dimensions of the covering sheet 4 and the position that the various components (which include for example the stroke limiting shoulder, the pressers, the pushers 3a and 3b, the jaws 6, etc.) will have to assume, according to a particular embodiment. According to a particularly efficient embodiment, the measurements of the block A can be taken automatically by way of dedicated sensors (photocells, laser detectors and the like), for the purpose of detecting all the dimensional parameters necessary for adapting to the corresponding format.

[0111] Conveniently the method of covering blocks A according to the invention is completely automated.

[0112] Conveniently the method of covering blocks A is adapted to be applied to blocks A of any size.

[0113] Positively, by using the station 1 and applying the method according to the invention it is possible to provide finished products (ready for use), such as mattresses, pillows and the like, in a simple and low cost manner.

[0114] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0115] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

[0116] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0117] The content of Italian patent application no. 102015000018574 (UB2015A000963), the priority of which is claimed in the present application, is incorporated as a reference.

[0118] Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

1. A station for closing a covering for blocks (A) made of deformable material, of the type comprising a resting surface (2) for at least one block (A), **characterized in that** it comprises:

- at least one clamping pusher (3a, 3b), which is aligned with at least one head (B) of said block (A) and can translate toward the surface of said block (A) until it is pressed for the compression of a covering sheet (4) on said block (A),

and comprises:

- grip means (5) for retaining juxtaposed end flaps (4a, 4b), (4c, 4d) of said sheet (4) that protrude from said block (A), said grip means (5) being able to translate according to a stroke for approach/spacing apart with respect to said block (A) in order to pull said sheet (4).

2. The covering station according to claim 1, **characterized in that** it comprises at least one pair of mutually opposite jaws (6), which are parallel to said at least one first pusher (3a, 3b), are substantially aligned with the centerline of said block (A) and can move in a direction for mutual approach/spacing apart, with consequent clamping of said block (A) and compression of said covering sheet (4) on said block (A).

3. The covering station according to claim 1, **characterized in that** said clamping pushers (3a, 3b) are two in number and are mutually opposite, said block (A) being interposeable between said pushers (3a, 3b), the approach of said pushers (3a, 3b) causing the compression of said sheet (4) on said block (A) and the elastic deformation, the pressing, of said block (A).

4. The covering station according to claim 1, **characterized in that** it comprises at least one coupling unit (7) for the flaps of said sheet (4), which can slide parallel to said clamping pushers (3a, 3b) along juxtaposed end flaps (4a, 4b), (4c, 4d) of said sheet (4).

5. The covering station according to one or more of the preceding claims, **characterized in that** it comprises two pairs of clamping pushers (3a, 3b), each substantially aligned with a respective head (B) of said block (A), mutually opposite double grip means (5) for retaining end flaps (4a, 4b), (4c, 4d) of said sheet (4) that protrude from mutually opposite edges of said block (A), and two coupling units (7), each one able to slide parallel to said clamping pushers (3a, 3b) along the juxtaposed second end flaps (4a, 4b), (4c, 4d) of said sheet (4), said units being arranged proximate to mutually opposite heads (B) of said block (A).

6. The covering station according to one or more of the preceding claims, **characterized in that** it comprises:

- an assembly for supplying covering sheets (4),
- locking means for the end edge of said covering sheet (4), which are arranged proximate to said surface (2);

- at least one first pusher for the forced translation of said block (A) toward said covering sheet (4), parallel to said end edge thereof;

- at least one stroke limiting shoulder, which is arranged opposite and parallel to said at least one first pusher, arranged at a predefined distance from said locking means for locking said end edge of the sheet (4), which are arranged proximate to said resting surface (2), said predefined distance being substantially similar to the width of said block (A);

- at least two pressers, for the compression of said sheet (4) on said block (A) and juxtaposing the additional end flaps of said sheet (4);

- at least one grip clamp, which acts on said additional end flaps of said sheet (4) for the tensioning of said sheet (4);

- at least one additional coupling unit, which can slide parallel to said pressers along the additional juxtaposed end flaps of said sheet (4).

7. The covering station according to one or more of the preceding claims, **characterized in that** it comprises at least one processor for acquiring the measurements of said block (A) and calculating the consequent dimensions of the respective covering sheet (4) and the correct position of said stroke limiting shoulder.

8. The covering station according to the preceding claim, **characterized in that** it comprises automatic detection means, of the type preferably chosen from among mechanical measurement units, optical measurement units, laser measurement units, infrared measurement units and the like, to acquire the measurements of said block (A) and send them to said processor.

9. A method of covering blocks (A) made of deformable material, which consists of:

- clamping said block (A) with respective jaws (6), which are aligned substantially with the centerline of said block (A), with consequent compression of said sheet (4) on the two mutually opposite faces of said block (A) on which said jaws (6) act,

- clamping at least one head (B) of said block (A), with at least one pusher (3a, 3b) so as to press said sheet (4) on said block (A) and compress said block (A), thus reducing its thickness,

- gripping with appropriate grip means (5) the juxtaposed end flaps (4a, 4b), (4c, 4d) of said sheet (4) that protrude from said block (A),

- retracting said grip means (5), integrally with said end flaps (4a, 4b), (4c, 4d), away from said block (A), with consequent tensioning of said sheet (4),

- releasing the at least one head (B) of said block (A), moving away the at least one pusher (3a, 3b),

- clamping again the at least one head (B) of said block (A), with at least one pusher (3a, 3b) so as to press said sheet (4) on said block (A) and compress said block (A), thus reducing its thickness,

- releasing the end flaps (4a, 4b), (4c, 4d) from said grip means (5), moving said grip means (5) away from said flaps (4a, 4b), (4c, 4d),

- mutually coupling the end flaps (4a, 4b), (4c, 4d) at their regions that are proximate to said at least one head (B) by way of at least one first coupling unit (7),

- interrupting the clamping of said block (A), performed by the pushers (3a, 3b) and by said jaws (6).

10. The method according to claim 9, characterized in that the step of clamping the at least one head (B) of said block (A) with at least one pusher (3a, 3b) so as to press said sheet (4) on said block (A) and compress said block (A), reducing its thickness, consists in:

- moving said at least one pusher (3a, 3b) to a portion that is substantially proximate to the centerline of the block (A) until a protruding end lamina thereof rests on the sheet (4) that is laid on the corresponding surface of the block (A),

- translating said at least one pusher (3 a, 3b) parallel to the corresponding surface of the block (A), while said end lamina thereof is resting on said sheet (4), until said terminal lamina is aligned with the end wall of said head (B),

- moving said at least one pusher (3a, 3b) closer to the block (A) until the at least one head (B) of said block (A) is clamped, pressing said sheet (4) on said block (A) and compressing said block (A), reducing its thickness.

11. The method according to claim 9, which consists of:

- retaining a first end edge of a covering sheet (4) to a resting surface (2),

- on the resting surface (2), arranging a block (A) to be covered, which faces and is aligned with the portion of said sheet (4) that protrudes from said resting surface (2),

- pushing said block (A) against said sheet (4) until a first perimetric frame thereof is arranged in substantial alignment with said first end edge of said sheet (4) which is coupled to said surface

(2), up until the abutment of a second frame of said block (A), arranged opposite the first frame, on a stroke limiting shoulder and applying an additional pressure on the first frame of said block (A), which lies opposite, to the shoulder for the compression of said block (A),

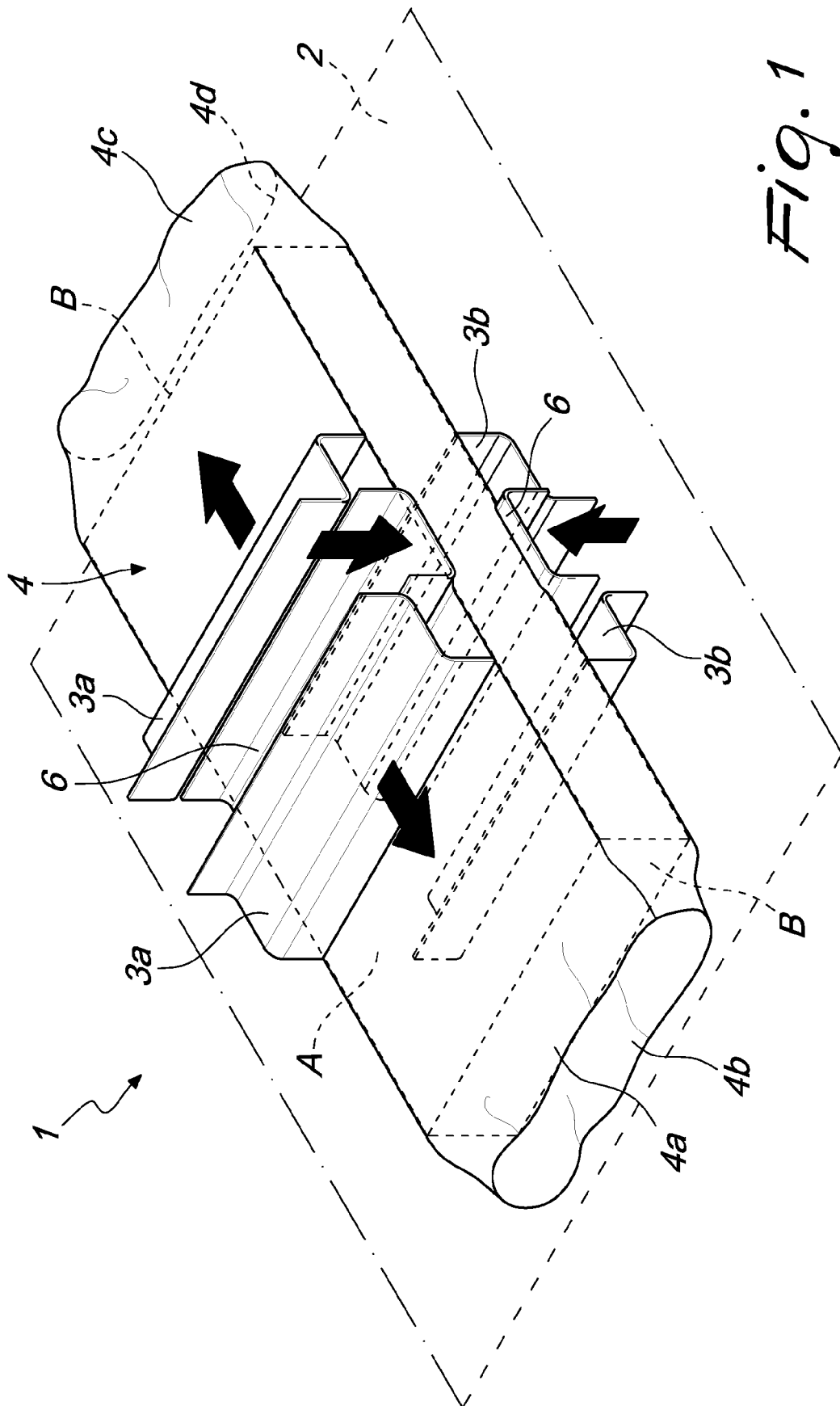
- releasing said first end edge of the sheet (4) from the surface (2) and arranging a second edge of said sheet (4), which is opposite the first edge, in alignment and juxtaposition with said first edge,

- clamping said block (A), with respective pressers, subjecting the sheet (4) and the block (A) to compression, leaving loose the first and second edges, which are superimposed and protrude from the block (A),

- interrupting the compression of the block (A) applied toward the stroke limiting shoulder,

- mutually coupling the regions proximate to the first and to the second superimposed edges, which face and are proximate to the frame of said block (A) which is opposite said shoulder (6),

- interrupting the clamping of said block (A) performed by said pressers.



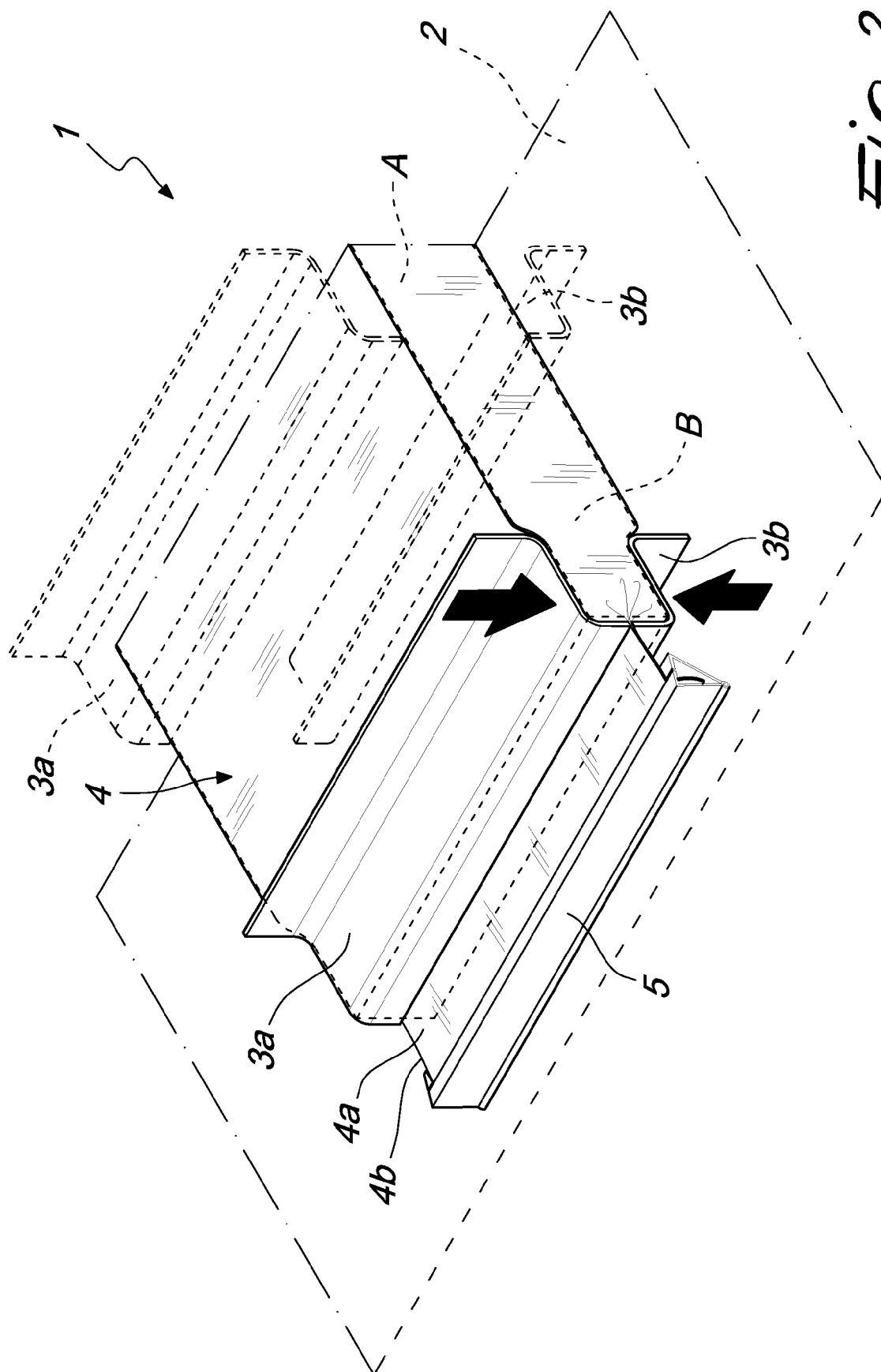
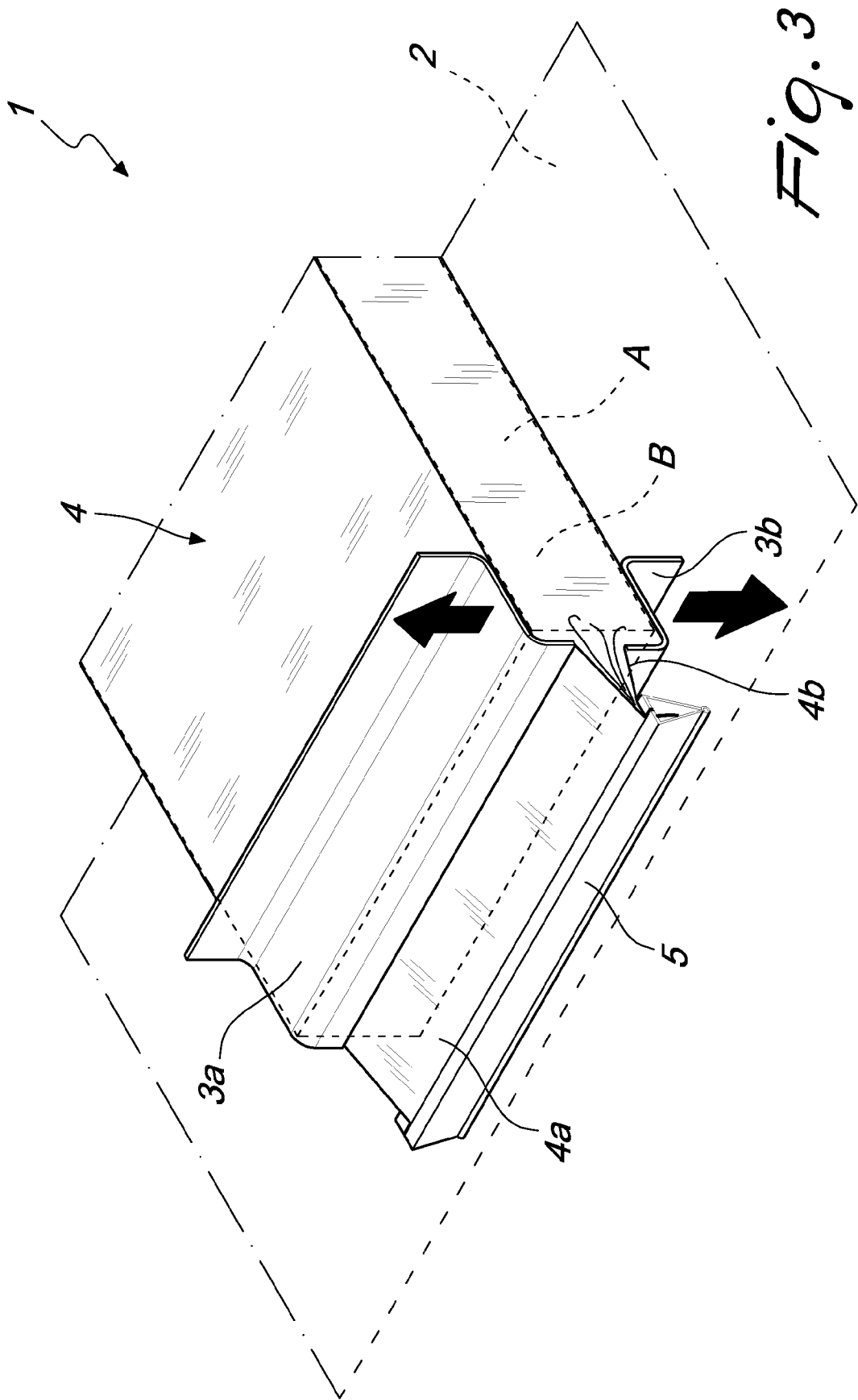
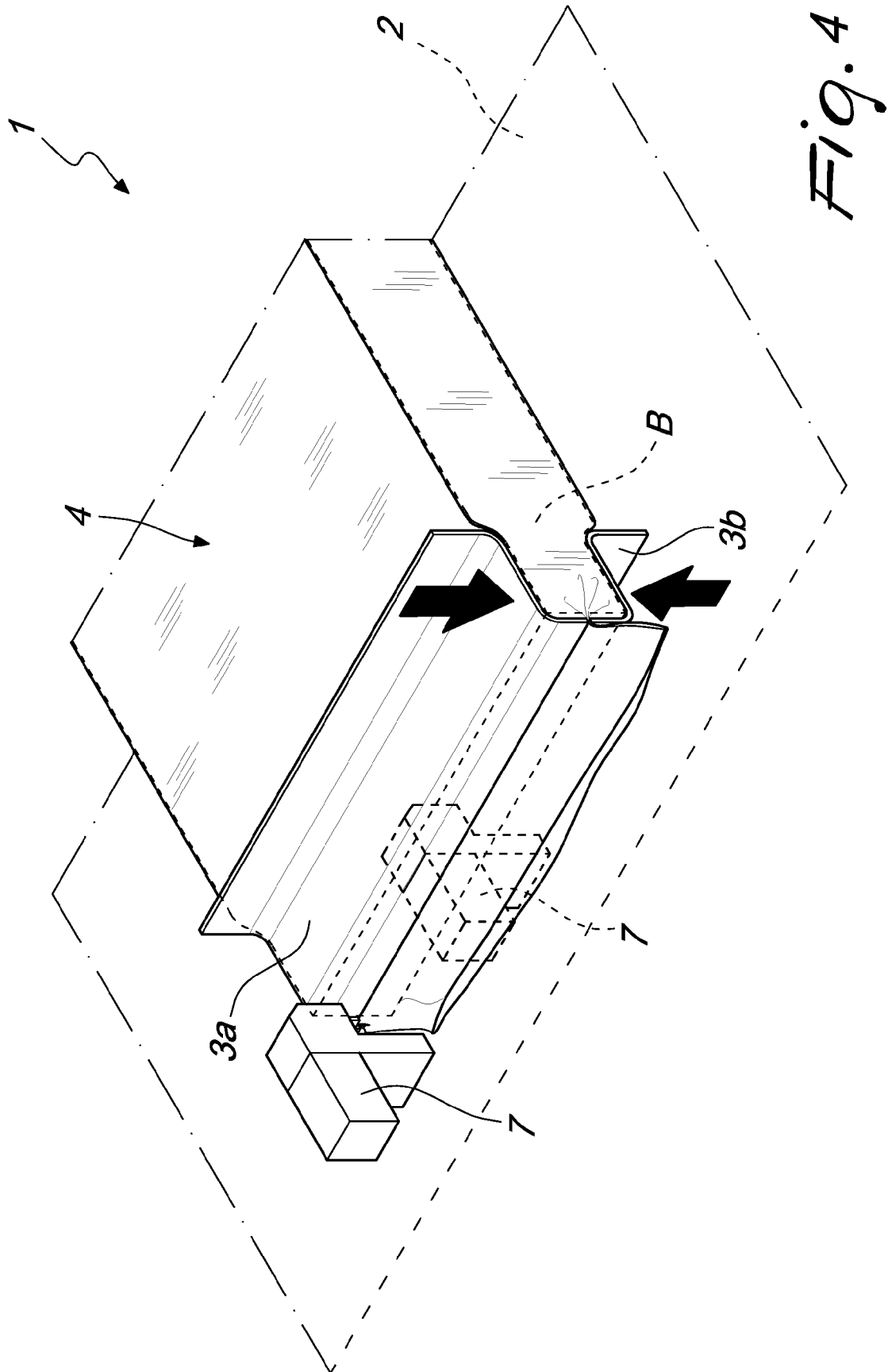


Fig. 2





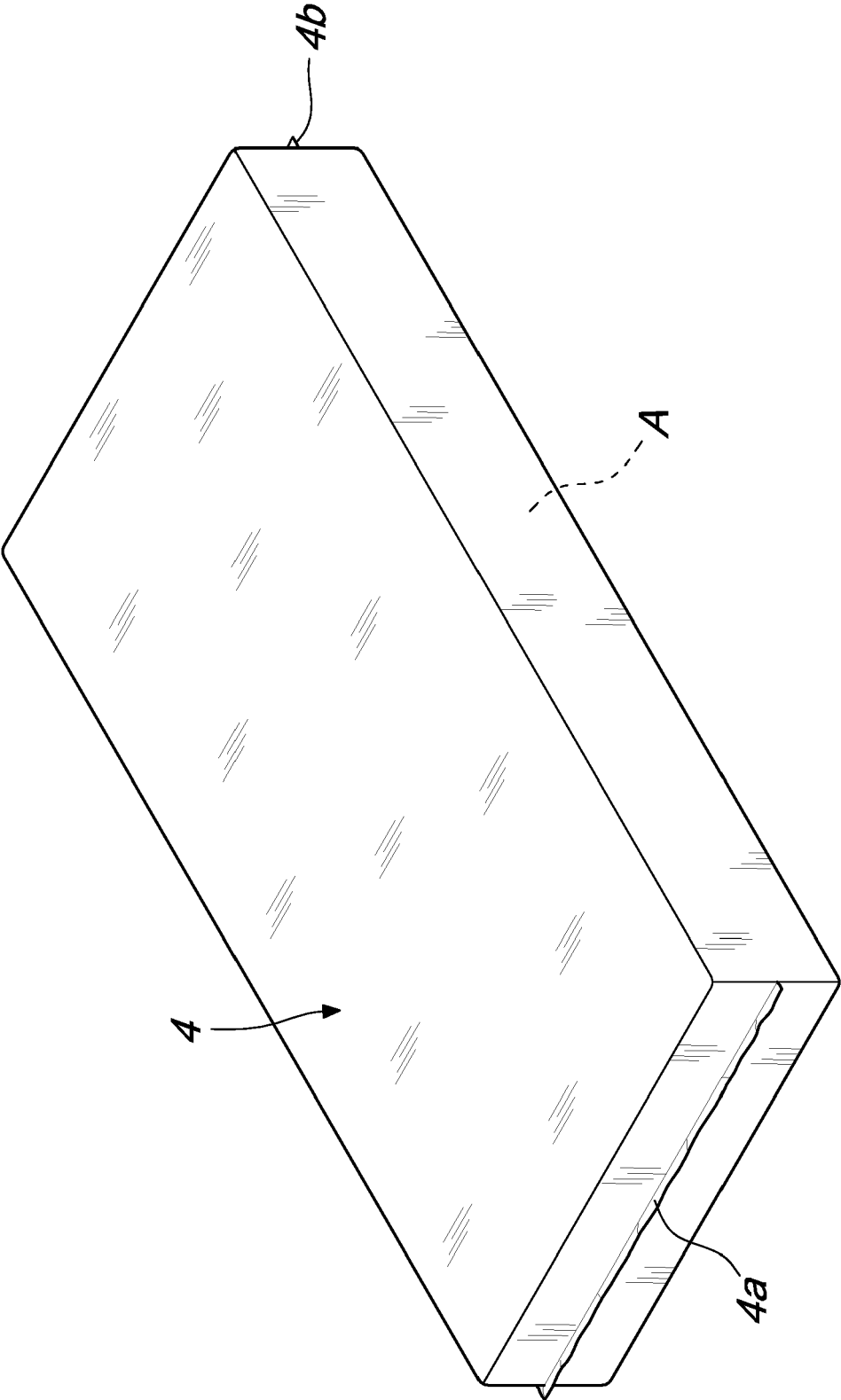


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 16 17 1545

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 1 108 995 A (DUPLAN AB) 10 April 1968 (1968-04-10) * figures *	1-11	INV. B65B25/00 B65B63/02 B65B5/04 B65B11/10 B65B11/12 B65B43/46
A	US 2009/241487 A1 (ACTIS) 1 October 2009 (2009-10-01) * abstract; claim 1; figures 16d-16k *	1-11	
A	US 4 711 067 A (MAGNI) 8 December 1987 (1987-12-08) * abstract; figures *	1-11	
A	DE 10 2010 003764 A1 (CHRIS HEYNEN SYSTEMS B V) 17 March 2011 (2011-03-17) * abstract; figures *	1-11	
A	US 2002/121073 A1 (MCGRANE ET AL) 5 September 2002 (2002-09-05) * abstract; figures *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B68G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 August 2016	Examiner Kis, Pál
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/02 (P04C01)

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

EP 16 17 1545

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

26-08-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1108995 A	10-04-1968	BE 665500 A	18-10-1965
		CH 448866 A	15-12-1967
		DE 1290476 B	06-03-1969
		DK 121048 B	23-08-1971
		FI 43832 B	01-03-1971
		GB 1108995 A	10-04-1968
		NL 6507677 A	20-12-1965
		NO 123637 B	20-12-1971
		SE 319722 B	19-01-1970

US 2009241487 A1	01-10-2009	US 2009241487 A1	01-10-2009
		US 2013283730 A1	31-10-2013

US 4711067 A	08-12-1987	NONE	

DE 102010003764 A1	17-03-2011	NONE	

US 2002121073 A1	05-09-2002	US 2002121073 A1	05-09-2002
		US 2003037510 A1	27-02-2003

REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- IT 102015000018574 [0117]
- IT UB2015000963 A [0117]