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(54) **MACHINE FOR FORMING PACKING BOXES**

MASCHINE ZUR HERSTELLUNG VON VERPACKUNGSSCHACHTELN

MACHINE DESTINEE A FORMER DES BOITES D'EMBALLAGE

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Description

Technical Field

[0001] The present invention relates to a machine for forming boxes, of the type now known as a "quadrangular" machine, in particular for producing packing boxes from paper or cardboard blanks.

Background Art

[0002] Prior art box production devices substantially consist of machines which fold a blank to form the lateral walls of a box and of sealing heads which seal together the corners formed between the initially open lateral walls of the box.

[0003] The box corners are usually sealed by sealing heads with "V"-shaped pressers extending parallel with the lateral walls of the box. Said pressers are fed along the bisecting lines of the base of the box until they make contact with the end portions of the lateral walls, so that they are placed over the corner of the box.

[0004] The sealing heads then apply heat-sealing strips or tapes to the corners in contact and, by means of the pressers, join said strips to the corners, making the lateral walls of the box integral with one another.

[0005] The prior art devices briefly described above can automatically produce quadrangular boxes for which the bisecting line of the basic corners, and therefore the approach direction, is always at 45°.

[0006] However, if the lateral walls of the box form different angles, these machines cannot apply the sealing tape correctly without radically changing sealing head assembly on the worktable so that the sealing head operating direction coincides with the bisecting line of the corner of the box to be formed.

[0007] GB 325741 describes a quadrangular machine in which the opposite sealing heads can be rotated about a shared axis, so that it is easy to change the size, that is to say, vary the dimensions of the box, and/or pass from a square shape to a rectangular shape and vice versa.

[0008] EP 1609585 describes a machine with sealing heads able to oscillate relative to an axis in order to vary the approach direction. In this solution, the sealing heads are mounted in pairs on opposite parallel sliding cross-members, angled according to a first direction and able to move relative to one another in a perpendicular direction.

[0009] US 2641973 describes a machine with sealing heads arranged in pairs, in such a way that each pair of heads can be slided in perpendicular directions.

[0010] The sealing heads are adjusted by moving the cross-members and therefore the sealing heads along the cross-members to position the pressers at the corners of the boxes, then making the heads oscillate until the desired approach angle is found.

[0011] However, this solution is relatively complex due to the adjustments involved, and at the same time rigid, since the pairs of sealing heads are constrained to move in a dependent way along the shared cross-members.

[0012] Consequently, with this solution it is, for example, impossible to form the box if the box plan extension does not have at least one pair of parallel sides, that is to say, if the pressers must be positioned independently of one another along the cross-members.

Disclosure of the Invention

[0013] In this context, the technical purpose of the present invention is to propose a quadrangular machine which is free of the above-mentioned disadvantages.

[0014] In particular, the present invention has for an aim to provide a machine for producing boxes which allows the production of boxes with any plan extension and preferably boxes with more than four sides.

[0015] The technical purpose indicated and the aims specified are substantially achieved by a machine for producing boxes comprising the technical features described in one or more of the claims 1 - 14 herein.

Brief Description of the Drawings

[0016] Further features and advantages of the present invention are more apparent in the detailed description below, with reference to a preferred, non-limiting, embodiment of the invention, illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a machine for producing boxes in accordance with the present invention, with some parts cut away to better illustrate others;
Figure 2 is a side view of the machine of Figure 1;
Figures 3a and 3b are plan views of two different embodiments of a detail of a machine in accordance with the invention;
Figure 4 is a side view of the machine of Figure 3a;
Figures 5a and 5b are schematic plan views of machines for forming boxes respectively having an octagonal and irregular quadrilateral shape;
Figure 6 is a detail of formed box extracting means;
Figures 7a - 7c illustrate blanks for automatically forming boxes with a plan that respectively has a pentagonal, hexagonal and octagonal shape;
Figure 8 is a schematic illustration of the step of folding an octagonal blank with a machine in accordance with the invention;
Figure 9 illustrates an octagonal box produced with the machine in accordance with the invention;
Figure 10 illustrates a blank in accordance with the invention for automatically forming boxes with an octagonal plan;
Figure 11 is a schematic illustration of the step of folding the octagonal blank of Figure 10;
Figure 12 illustrates an octagonal box produced starting with the blank of Figure 10.

Detailed Description of the Preferred Embodiments of the Invention

[0017] With reference to the accompany Figures 1 - 9, a machine 1 is described, in particular designed for producing boxes which are not quadrangular.

[0018] The machine 1 comprises a base frame 2 and at least one turret 3, but usually a plurality of turrets, associated with the frame 2.

[0019] Each turret 3 comprises a sealing head 4, or presser, designed to stably join the corners of a box being formed by applying a heat-sealed or glued material tape to the corner.

[0020] Each sealing head 4 preferably has an angular profile with an amplitude that differs according to the angle of the corner formed by the lateral walls of the box.

[0021] For example, to form quadrangular boxes the head 4 opening will be 90°, whilst for boxes with a regular hexagonal plan the opening will be 120°.

[0022] For this reason, the sealing heads 4 may be removably associated with the turret 3, so that, depending on the angle formed by the corner of the box to be formed, the most suitable sealing heads 4 can be mounted on the turrets 3.

[0023] An example of this advantage is given in Figures 5a, 5b, in which the amplitude of the different corners to be sealed varies noticeably, so that the turrets 3 can be equipped with pressers having a different angle, if necessary contained in a change-over magazine accessible manually or of the automatic type.

[0024] The machine 1 also comprises means 5 for feeding a blank (schematically illustrated in Figure 2) acting on the base frame 2 to feed a blank to a start of forming table 30 in a position between the sealing heads 4.

[0025] It should be noticed that the term blank, in the context of this invention, refers to a sheet of paper or plastic material 31 comprising a plurality of pre-creasing lines 32 along which the blank is folded to create the box being formed.

[0026] The means 5 preferably comprise a stepping elevator 50 with a pick up mechanism (of the known type) which picks up blanks 31 one after another from the elevator 50 and feeds them to a conveyor belt 51 which in turn places the blanks on the table 30.

[0027] As is schematically indicated in Figure 2, the machine also comprises a counter-mould 10 having the same shape and size as the base wall 34 of the box to be produced and vertically movable driven by an actuator 33.

[0028] During the box folding step, performed in the conventional way, the counter-mould 10 performs a downstroke until it is positioned over a base section 34 of the blank on the table 30, and drags down the blank until it is positioned on a box forming table 6 below the table 30 and around which the various turrets 3 are located.

[0029] During this step, the blanks are folded by the combined action of the counter-mould 10 and folder elements 7, schematically illustrated in Figure 4, positioned at and outside the sides of the base section of the box so as to intercept the downstroke of the sides 35 and fold them against the mould 10.

[0030] Once the box 36 is on the forming table 6, with the sides drawn near the counter-mould 10 (Figure 4), the box closing or sealing step begins, carried out in the known way as the turret 3 sealing heads 4 place strips 52 of heat-sealed or glued material along the open corners 49.

[0031] In accordance with the invention, and in particular with reference to Figures 3a, 3b, 4, 5a and 5b, the machine 1 also comprises a turret holder unit 13 associated with each turret 3 and comprising a "cross carriage" type mechanism consisting of two slides 38, 39 which can slide relative to one another.

[0032] Each turret holder unit 13 can therefore slide in an adjustable way along two directions B, C perpendicular to one another (respectively horizontal/vertical with reference to Figure 5a) relative to the base frame 2 and the position of the mould 10, so that they adapt to the dimensions of the box to be formed and to the positions occupied by the vertices of the corners 49 of the box to be sealed.

[0033] In the preferred embodiment described, each turret holder unit 13 is mounted on a cross-member 53 moved by screws 75 and in a direction C along guides 54 fixed on the frame 2.

[0034] With this solution each unit 13 slides in the direction C together with the respective cross-member 53 (first controlled movement), and can also be moved independently in directions B, C (second controlled movement) relative to the position of the cross-member 53, thanks to the slides 38, 39.

[0035] In the example described there is a shared cross-member for pairs of two units 13 positioned on the same side of the frame 2, but independent cross-members 53 may also be used for each unit 13.

[0036] In more detail, the second independent movement of the units 13 is controlled by respective first guide means 14, for example worm screws angled in the direction B and acting on the slide 38 and associated with the cross-member 53 so that the first slide 38 can slide in an adjustable way on linear prismatic guides located on the cross-member 53.

[0037] Again in direction B there are means for adjusting the position of the slide 38 relative to the cross-member 53.

[0038] In the case described (for example, Figure 5a) said means consist of a movable adjusting screw 14' integral with the screw 14 and engaging in a bushing 77 integral with the slide 38 (movement B).

[0039] The movement in direction C is adjusted by second guide means 15, for example a worm screw angled in the direction C, associated with the slide 38 and engaging with the slide 39 in such a way that the second slide 39 can slide in an adjustable way on linear prismatic guides 40 located on the slide 38, for movement of the

slides 38 and 39 relative to one another in direction C.

[0040] The rotation of the screws 14, 15, 75 and the movement of the cross-members 53 can be adjusted and controlled automatically or manually with each size change-over for the boxes being produced, depending on the selected machine operating mode.

[0041] On the whole, each unit 13 is therefore capable of two movements in direction B, one approach movement controlled by the screw 14 and one adjusting movement controlled by the screw 14', and two movements in direction C, one approach movement controlled by movement of the cross-members 53 and one additional adjusting movement controlled by the screw 15.

[0042] According to the invention there is also the possibility of adjusting not just the position in directions B and C, but also the angular position of one or more of the turrets 3.

[0043] For this purpose, with reference to Figure 3b, a turret 3 is rotatably connected on the unit 13 relative to the position of the counter-mould 10 and therefore of the box 36, so that it can define a plurality of directions A1 - An for the sealing head 4 to approach the box being formed, as is schematically illustrated in Figure 3.

[0044] In the example embodiment described, the turrets 3 have pins 41 which engage with circular slots 42 made in the upper surface of the slide 39 and positioned in a circle preferably with a centre R coinciding with the vertex of the sealing head 4 profile.

[0045] In this way, the sealing head 4 of each rotary turret may be adjusted and angled according to one of the approach directions A, guaranteeing that the machine 1 can produce boxes with corners having different amplitudes and orientation, depending on the shape of the box base wall.

[0046] The sealing head 4 may also be able to slide relative to the turret 3 along each approach direction A to perform the operating stroke.

[0047] More particularly, each turret 3 comprises an actuator cylinder 12 on which the sealing head 4 is removably connected. Said actuator 12 therefore allows the sealing head 4 to slide along the approach direction relative to which the turret 3 is angled, to guarantee that the sealing head 4 makes contact with the corner to be sealed, applying the necessary pressure on the heat-sealing tape.

[0048] Each turret 3 also comprises means 18 for feeding sealing tapes to each sealing head 4.

[0049] The feed means 18 are of the known type consisting for example of wheels 60 positioned on each turret 3 and continuously feeding a measured length of sealing tape 43 between the sealing head 4 and the corner of the box to be sealed in combination with a pressure wheel 61.

[0050] Advantageously, each sealing head may have independent feed means, allowing them to feed different lengths of sealing tape for corners of different heights on the same box.

[0051] In the preferred embodiment, said tape is applied by heat-sealing the tape on the corner of the box by heating the sealing head 4.

[0052] However, other embodiments are possible, for example a tape comprising a surface on which there is a layer of adhesive material which is activated by the heat produced by the sealing head 4.

[0053] With reference to Figure 6, the machine 1 also comprises means 20 for extracting the formed box, that is to say the box with the sealed corners, acting on the box to move it away from the forming table 6.

[0054] The extracting means 20 comprise an extractor element which intercepts the box to move it away from the forming table 6.

[0055] More particularly, the element 20 advantageously comprises a suction cup 21 at one end of a rod 22 guided by vertical guides 47 and moved vertically by a drive unit 46.

[0056] In operation, once the walls 35 of the blank 31 have been lifted by the contact elements 7 against the mould 10, the box being formed has its base 36 on the operating table 6, and the open corners 49 positioned at a distance from the centre O of the base 36 equal to a generic value b, c, respectively in directions B and C.

[0057] Figures 5a and 5b show this step from above.

[0058] Therefore, to seal the open corners 49 the heads 4 must be moved immediately next to the coordinates (b, c) point.

[0059] According to the invention, this movement occurs with an approach motion consisting of a first movement of the cross-members 53 in direction C, then independent adjustment in directions C, B of each turret 3 by the adjusting means 14, 40 acting on the slides 38, 39.

[0060] Figure 5b shows the advantage gained from independent adjustment of all of the units 13, allowing sealing of boxes with any irregular plan (for example without axes of symmetry), in which the amplitude of the coordinates (b, c) of the corners 49 to be sealed may be significantly different from one another, both for quadrangular and generically polygonal boxes.

[0061] Once the heads 4 have been drawn near the corners to be sealed 49, the head 4 actuators 12 can perform the operating stroke in direction A and seal the open corners with the heat-sealing tapes.

[0062] Advantageously, in the embodiment in Figure 3b, it is also possible to adjust the angular orientation of the head 4, so that the direction A of the operating stroke coincides with the bisecting line of the corner 49 and improve the uniformity of the pressure applied by the head 4 on the sides adjacent to the corner 49.

[0063] In a different embodiment, the angular orientation of the heads 4 is given not by an adjustment, but by the preset position of one or more heads, angled without the possibility of oscillating so as to make the direction A of the operating stroke coincide with the best bisecting line of the corner 49 for sealing a predetermined corner of the box. In this case, for sealing polygonal boxes a set of one or more heads 4 may be installed, set up to have operating directions with different angles and corre-

sponding to the geometry of the box to be formed.

[0064] Finally, once the box has been sealed, the suction cup 21 makes contact with the base wall of the box 36 and stably connects with it to allow the formed box to be moved from the forming table 6 to an extraction table 45, so that another blank 31 can be fed and a new box formed.

[0065] With reference to Figures 7a - 7c, blanks 31 are described for the production in quadrangular automatic machines of boxes with more than four sides.

[0066] Each blank 31 consists of a single body comprising a polygonal base 34 and a number of individual walls 35/35' overall equal to the number of sides of the base 34.

[0067] In conventional quadrilateral geometry, each wall 35 of the blank 31 is joined to the base 34 by a fold line 32 in such a way that once the blank has been folded in the quadrangular machine, the sealing heads can seal the four open corners 49 to obtain a box closed at all its corners, on the base and lateral.

[0068] The blanks of the invention, illustrated by way of example in Figures 7a - 7c, have at least one side 55 of the base 34 free, and at least one wall 35' joined both to the base 34 by a first fold line 32 and to at least a second wall 35 by a second fold line 56 converging with and at a right angle to the line 32, so as to constitute at least one multiple part 57.

[0069] In the example in Figure 7a, the blank 31 has a pentagonal base 34 joined by two fold lines 32 to two multiple walls 57 consisting respectively of two and three adjacent walls 35/35'.

[0070] In the example in Figure 7b, the blank has a hexagonal base 34, joined by two fold lines 32 to two symmetrically opposite multiple walls 57, both consisting of three adjacent walls 35/35'.

[0071] In the example in Figure 7c, the blank has an octagonal base 34, joined by two fold lines 32 to two multiple walls 57 joined to two opposite sides of the base 34 and each consisting of three adjacent walls 35/35'. In this case the blank is completed by two single walls 35 joined to the opposite sides of the base 34 at right angles to the sides joined to the multiple walls.

[0072] In all of the cases described, and in the other configurations possible, the number of multiple walls 57 is determined in such a way that folding the blank 31 on the counter-mould 10 results in the formation of a box with a number of open corners 49 less than or equal to four and therefore suitable for sealing in a quadrangular machine.

[0073] Advantageously, using a machine in accordance with the invention the independence of the sealing head movements makes it easy for the sealing heads to approach the open corners 49, whatever the polygonal geometry of the box.

[0074] Figure 8 is a schematic illustration of the folding step immediately before sealing of the corners of an octagonal blank with a machine in accordance with the invention.

[0075] In this case, the folding means comprise a contact profile 7 at a first wall 35' for folding the wall 35' on a side 70 of the counter-mould 10 during its downstroke, and additional contact profiles 72 acting at the walls 35 which are open at an angle.

[0076] The contact 7 preferably consists of a bar positioned above folding profiles 72 in turn consisting of curved tubular elements with a stretch 73 acting in the vertical direction on the wall 35 and a second stretch 74 acting in a direction at a right angle to the angled side 71 of the mould 10.

[0077] In operation, during the mould 10 downstroke the walls 35' encounter the bar 7, beginning to fold towards the side 70, until the walls 35 encounter the stretch 73 and then the stretch 74 of the profile 72 and are drawn near the angled sides 71 of the mould.

[0078] As the box downstroke continues, the walls 35' on axes at a right angle to the walls 35' already folded by the bars 7 encounter second bars 7' positioned at a lower level and which, in a known way, fold the remaining walls 35' against corresponding sides 70' of the mould 10, completing box closure so that the heads 4 can seal the open corners of the box.

[0079] Figure 8 illustrates the case of an octagonal box, but it shall be understood that the same solution may be applied to boxes with more than four sides, in which the sides of the base form included angles a with different amplitude.

[0080] Figures 10 - 12 illustrate a polygonal blank in accordance with the invention, in detail an octagonal blank 81, and a polygonal box 88 obtained from the blank.

[0081] The blank 81 comprises a base 80 and peripheral sections 82 positioned at corresponding sides 83 of the base 80 intended to constitute the walls of the box 88 when lifted.

[0082] In particular, at least two sections 82 are joined to sides 83 which are adjacent to the same included side 86, and each lateral section 82 consists of a central portion 84 joined to the side 83 and lateral portions 85 which can be opened by turning relative to the central section 84 and are smaller than the included side 86, preferably half the size of it.

[0083] Figure 11 provides a schematic illustration of the blank folding step, in which the folders 7 lift the sections 82, folding them relative to the sides 83, to form the box 88.

[0084] During this step, the lateral portions 85 are folded relative to the portion 84 so as to drawn near one another along intermediate lines M of the wall of the box 88, that is to say, not coinciding with the corner of the box, and preferably coinciding with the median line of the wall.

[0085] During box formation, along the line M a seal S is applied, for example a heat-sealed strip of the type already described, using sealing heads 4 with a 180° flat pressure profile, that is to say, suitable for appropriately pressing the sealing strip S on the walls of the box rather than at the corners.

[0086] Advantageously, in the example described, the blank is a regular octagon, therefore the heads 4 can have a shared approach direction L passing through a centre C of the base so as to apply a balanced stress on the structure of the machine which supports it during the sealing step.

[0087] However, in the case of different geometries, octagonal, hexagonal or other, the lines L may also not pass through the geometric centre C of the box.

[0088] In the example described there are also four seals S on corresponding opposite walls of an octagonal box and positioned along two approach directions L at a right angle to one another.

[0089] A method according to the invention for producing packing boxes with a polygonal plan having a base and lateral sections which can be folded relative to the base, comprises:

- a step of folding the lateral sections to constitute the walls of the box when lifted,
- a step of sealing the lateral walls to one another, in which at least one seal is made along a lifted intermediate line of at least one wall.

[0090] The method preferably involves making at least two seals positioned at the ends of one or more shared lines (L), at right angles to one another if necessary.

[0091] It must be emphasised that production of the octagonal box formed in this way may advantageously be carried out using a conventional quadrangular machine equipped with flat profile pressers 4.

[0092] The invention is described above with reference to a preferred embodiment, although it shall be understood that equivalent modifications may be made without it thereby departing from the scope of the inventive concept.

Claims

1. A machine for forming boxes (36) starting from hat blanks (31) consisting of a base with multiple sides (34) and the same number of lateral faces (35) joined to the base by creasing lines (32), the machine comprising a counter-mould (10) having the same shape in plan view as the base (34) and folder elements (7, 7') for folding the lateral faces (35) on the counter-mould (10) forming one or more box (36) open corners (49), and also comprising a plurality of turrets (3) movable relative to the counter-mould (10), each turret having a sealing head (4) for applying a sealing tape on said open corner, wherein each turret (3) can move independently of the movement of at least one other turret (3) relative to the counter-mould (10) along at least two directions (B, C) perpendicular to one another, the machine being **characterised in that**
each turret (3) is mounted on a cross-member (53) which can slide relative to the counter-mould in a direction (C), independent cross-members (53) being provided for each turret (3), so that each turret (3) can move independently of the movement of every other turret (3) relative to the counter-mould (10) along at least two directions (B, C) perpendicular to one another.

2. The machine according to claim 1 wherein one or more of the turrets (3) can rotate about its vertical axis of rotation relative to the counter-mould (10) so that it can define a plurality of sealing head (4) approach directions (A) to the corner (49) of the box being formed (36).

3. The machine according to claim 2 wherein each turret (3) is supported by a turret holder unit (13) movable in a first direction (B) by first adjusting means (14') along a cross-member (53) in turn comprising second guide means (54) and adjusting means (75) acting in a second direction (C) perpendicular to the direction (B) for moving the turret holder unit (13) in an adjustable way along the two directions (B, C).

4. The machine according to claim 3 wherein each turret holder unit (13) constitutes a cross carriage structure comprising a first slide (38) movable in the first direction (B) relative to the cross-member (53) and a second slide (39) able to slide relative to the first in the direction at a right angle to it (C).

5. The machine according to claim 4 wherein the second slide (39) has additional guide means (40) and adjusting means (15) for the position relative to the first slide (38) in at least one direction (B, C).

6. The machine according to any of the foregoing claims wherein at least one turret (3) can rotate relative to the counter-mould (10) by means of pins (41) engaging with circular slots (42) made in the upper surface of the slide (39).

7. The machine according to any of the foregoing claims wherein each sealing head (4) is slidably connected to the respective turret (3) along the approach direction (A) to the box being formed.

8. The machine according to any of the foregoing claims, comprising means (18) for feeding a blank, acting on the base frame (2) for feeding a blank between the sealing heads (4).

9. The machine according to any of the foregoing claims, comprising a box forming table (6) integral with the base frame (2) and controlled by the blank feed means (5).

10. The machine according to any of the foregoing

claims wherein the blank folding means (7) operate on the box forming table (6).

11. The machine according to any of the foregoing claims wherein the sealing heads (4) are removably associated with the respective turrets (3).

12. The machine according to any of the foregoing claims wherein each turret (3) comprises independent means (18) for feeding sealing tapes to the sealing head (4), for sealing and closing the corners (49) of the box being formed.

13. The machine according to any of the foregoing claims, comprising means (20) for extracting the formed box, operating on the box to move the formed box away from the forming table (6), wherein the extracting means (20) comprise a suction cup extractor element for intercepting the formed box and moving it away from the forming table (6).

14. The machine according to any of the foregoing claims wherein there is a magazine for sealing heads (4) having different angles relative to the vertical, for closing erect box corners (49) having walls at an angle to a horizontal axis.

Patentansprüche

1. Maschine zur Herstellung von Schachteln (36), ausgehend von flachen Zuschnitten (31), die aus einer Basis mit mehreren Seiten (34) und derselben Anzahl von Seitenflächen (35) bestehen, die mit der Basis durch Rilllinien (32) vereint sind, wobei die Maschine ein Gegenformwerkzeug (10), aufweisend in der Draufsicht dieselbe Gestalt wie die Basis (34), und Falzelemente (7, 7') zum Falzen der Seitenflächen (35) auf dem Gegenformwerkzeug (10), welches eine oder mehrere offene Ecken (49) einer Schachtel (36) herstellt, umfasst, und ferner umfassend eine Vielzahl von Revolvern (3), die gegenüber dem Gegenformwerkzeug (10) beweglich sind, wobei jeder Revolver einen Versiegelungskopf (4) zum Auftragen eines Versiegelungsstreifens auf die offene Ecke aufweist, wobei sich jeder Revolver (3) unabhängig von der Bewegung von mindestens einem anderen Revolver (3) gegenüber dem Gegenformwerkzeug (10) entlang mindestens zweier Richtungen (B, C), die lotrecht zueinander sind, bewegen kann, wobei die Maschine **dadurch gekennzeichnet ist, dass** jeder Revolver (3) auf einem Querträger (53) montiert ist, der gegenüber dem Gegenformwerkzeug in eine Richtung (C) gleiten kann,
wobei für jeden Revolver (3) unabhängige Querträger (53) bereitgestellt sind, sodass sich jeder Revolver (3) unabhängig von der Bewegung aller anderen Revolver (3) gegenüber dem Gegenformwerkzeug (10) entlang von mindestens zwei Richtungen (B, C), die lotrecht zueinander sind, bewegen kann.

2. Maschine nach Anspruch 1, wobei einer oder mehrere der Revolver (3) gegenüber dem Gegenformwerkzeug (10) um seine vertikale Rotationsachse rotieren kann, sodass er eine Vielzahl von Richtungen (A) der Annäherung der Versiegelungsköpfe (4) zur Ecke (49) der in der Herstellung befindlichen Schachtel (36) definieren kann.

3. Maschine nach Anspruch 2, wobei jeder Revolver (3) von einer Revolverhalteeinheit (13) getragen wird, die durch erste Einstellmittel (14') in eine erste Richtung (B) entlang einem Querträger (53) beweglich ist, der wiederum zweite Führungsmittel (54) und Einstellmittel (75) umfasst, die in eine zweite Richtung (C) wirken, die lotrecht zur Richtung (B) ist, um die Revolverhalteeinheit (13) auf einstellbare Art entlang der zwei Richtungen (B, C) zu bewegen.

4. Maschine nach Anspruch 3, wobei jede Revolverhalteeinheit (13) eine Querschlittenstruktur bildet, umfassend ein erstes Gleitstück (38), das in die erste Richtung (B) gegenüber dem Querträger (53) beweglich ist, und ein zweites Gleitstück (39), das dazu fähig ist, gegenüber dem ersten in der Richtung orthogonal zu ihm (C) zu gleiten.

5. Maschine nach Anspruch 4, wobei das zweite Gleitstück (39) zusätzliche Führungsmittel (40) und Mittel (15) zum Einstellen der Position gegenüber dem ersten Gleitstück (38) in mindestens eine Richtung (B, C) aufweist.

6. Maschine nach einem der vorangehenden Ansprüche, wobei mindestens ein Revolver (3) gegenüber dem Gegenformwerkzeug (10) mithilfe von Stiften (41) rotieren kann, die in kreisförmige Schlitze (42) eingreifen, die in der Oberfläche des Gleitstücks (39) ausgebildet sind.

7. Maschine nach einem der vorangehenden Ansprüche, wobei jeder Versiegelungskopf (4) mit dem entsprechenden Revolver (3) entlang der Richtung (A) der Annäherung zur in der Herstellung befindlichen Schachtel gleitfähig verbunden ist.

8. Maschine nach einem der vorangehenden Ansprüche, umfassend Mittel (18) zum Zuführen eines Zuschnitts, die auf den Basisrahmen (2) einwirken, um zwischen den Versiegelungsköpfen (4) einen Zuschnitt zuzuführen.

9. Maschine nach einem der vorangehenden Ansprüche, umfassend einen Schachtelherstellungstisch (6), der in den Basisrahmen (2) integriert ist und von den Zuschnittzuführmitteln (5) gesteuert wird.

10. Maschine nach einem der vorangehenden Ansprüche, wobei die Zuschnittfalzmittel (7) auf dem Schachtelherstellungstisch (6) arbeiten.

11. Maschine nach einem der vorangehenden Ansprüche, wobei die Versiegelungsköpfe (4) abnehmbar an die entsprechenden Revolver (3) angeschlossen sind.

12. Maschine nach einem der vorangehenden Ansprüche, wobei jeder Revolver (3) unabhängige Mittel (18) zum Zuführen von Versiegelungsstreifen zum Versiegelungskopf (4) umfasst, um die Ecken (49) der in der Herstellung befindlichen Schachtel zu versiegeln und zu verschließen.

13. Maschine nach einem der vorangehenden Ansprüche, umfassend Mittel (20) zur Herausnahme der hergestellten Schachtel, die auf der Schachtel arbeiten, um die hergestellte Schachtel vom Herstellungstisch (6) wegzubewegen, wobei die Herausnahmemittel (20) ein Saugnapfherausnehmerelement umfassen, um die hergestellte Schachtel festzuhalten und sie vom Herstellungstisch (6) wegzubewegen.

14. Maschine nach einem der vorangehenden Ansprüche, wobei ein Magazin für Versiegelungsköpfe (4) vorhanden ist, die gegenüber der Vertikalen verschiedene Winkel aufweisen, um aufrechte Schachtelecken (49) zu schließen, die zu einer Horizontalachse geneigte Wände aufweisen.

Revendications

1. Machine destinée à former des boîtes (36) débutant à partir de découpes plates (31) consistant en une base composée de plusieurs côtés (34) et du même nombre de faces latérales (35) unies à la base par des lignes de pliage (32), la machine comprenant un contre-moule (10) ayant la même forme, dans une vue en plan, que la base (34) et des éléments plieurs (7, 7') servant à plier sur le contre-moule (10) les faces latérales (35) formant les angles ouverts (49) d'une ou plusieurs boîtes (36), et comprenant aussi une pluralité de tourelles (3) pouvant se déplacer par rapport au contre-moule (10), chaque tourelle ayant une tête de scellage (4) servant à appliquer un ruban adhésif sur ledit angle ouvert, dans laquelle chaque tourelle (3) peut se déplacer indépendamment du mouvement d'au moins une autre tourelle (3) par rapport au contre-moule (10) le long d'au moins deux directions (B, C) perpendiculaires l'une à l'autre, la machine étant **caractérisée en ce que** chaque tourelle (3) est montée sur une traverse (53) pouvant coulisser par rapport au contre-moule dans une direction (C), des traverses indépendantes (53) étant prévues pour chaque tourelle (3), de sorte que chaque tourelle (3) peut se déplacer indépendamment du mouvement de toutes les autres tourelles (3) par rapport au contre-moule (10) le long d'au moins deux directions (B, C) perpendiculaires l'une à l'autre.

2. Machine selon la revendication 1, dans laquelle une ou plusieurs des tourelles (3) peuvent tourner autour de leur axe vertical de rotation par rapport au contre-moule (10) de manière à pouvoir définir une pluralité de directions d'approche (A) de la tête de scellage (4) par rapport à l'angle (49) de la boîte en formation (36).

3. Machine selon la revendication 2, dans laquelle chaque tourelle (3) est supportée par une unité de support de tourelles (13) pouvant se déplacer dans une première direction (B) par des premiers moyens de réglage (14') le long d'une traverse (53) comprenant à son tour des seconds moyens de guidage (54) et des moyens de réglage (75) agissant dans une seconde direction (C) perpendiculaire à la direction (B) pour déplacer l'unité de support de tourelles (13) de façon réglable le long des deux directions (B, C).

4. Machine selon la revendication 3, dans laquelle chaque unité de support de tourelles (13) constitue une structure de chariots croisés comprenant une première glissière (38) pouvant se déplacer dans la première direction (B) par rapport à la traverse (53) et une seconde glissière (39) pouvant glisser par rapport à la première dans la direction perpendiculaire à cette dernière (C).

5. Machine selon la revendication 4, dans laquelle la seconde glissière (39) possède des moyens de guidage (40) et des moyens de réglage (15) supplémentaires de la position par rapport à la première glissière (38) dans au moins une direction (B, C).

6. Machine selon l'une quelconque des revendications précédentes, dans laquelle au moins une tourelle (3) peut tourner par rapport au contre-moule (10) au moyen de goujons (41) se mettant en prise avec des fentes circulaires (42) réalisées dans la surface supérieure de la glissière (39).

7. Machine selon l'une quelconque des revendications précédentes, dans laquelle chaque tête de scellage (4) est reliée de façon coulissante à la tourelle correspondante (3) le long de la direction d'approche (A) par rapport à la boîte en formation.

8. Machine selon l'une quelconque des revendications précédentes, comprenant des moyens (18) servant à alimenter une ébauche, agissant sur le châssis de base (2) pour alimenter une ébauche entre les têtes

de scellage (4).

9. Machine selon l'une quelconque des revendications précédentes, comprenant une table (6) de mise en forme d'une boîte, solidaire du châssis de base (2) et commandée par les moyens d'alimentation en ébauches (5).

10. Machine selon l'une quelconque des revendications précédentes, dans laquelle les moyens de pliage de l'ébauche (7) agissent sur la table (6) de mise en forme de la boîte.

11. Machine selon l'une quelconque des revendications précédentes, dans laquelle les têtes de scellage (4) sont associées de façon amovible aux tourelles correspondantes (3).

12. Machine selon l'une quelconque des revendications précédentes, dans laquelle chaque tourelle (3) comprend des moyens indépendants (18) servant à alimenter en rubans adhésifs la tête de scellage (4), afin de sceller et refermer les angles (49) de la boîte en formation.

13. Machine selon l'une quelconque des revendications précédentes, comprenant des moyens (20) servant à extraire la boîte formée, agissant sur la boîte pour éloigner la boîte formée de la table de mise en forme (6), dans laquelle les moyens d'extraction (20) comprennent un élément extracteur à ventouse pour intercepter la boîte formée et l'éloigner de la table (6) de mise en forme.

14. Machine selon l'une quelconque des revendications précédentes, dans laquelle se trouve un chargeur de têtes de scellage (4), disposant d'angles différents par rapport à la verticale, servant à fermer les angles droits (49) des boîtes ayant les parois inclinées par rapport à un axe horizontal.

FIG. 1

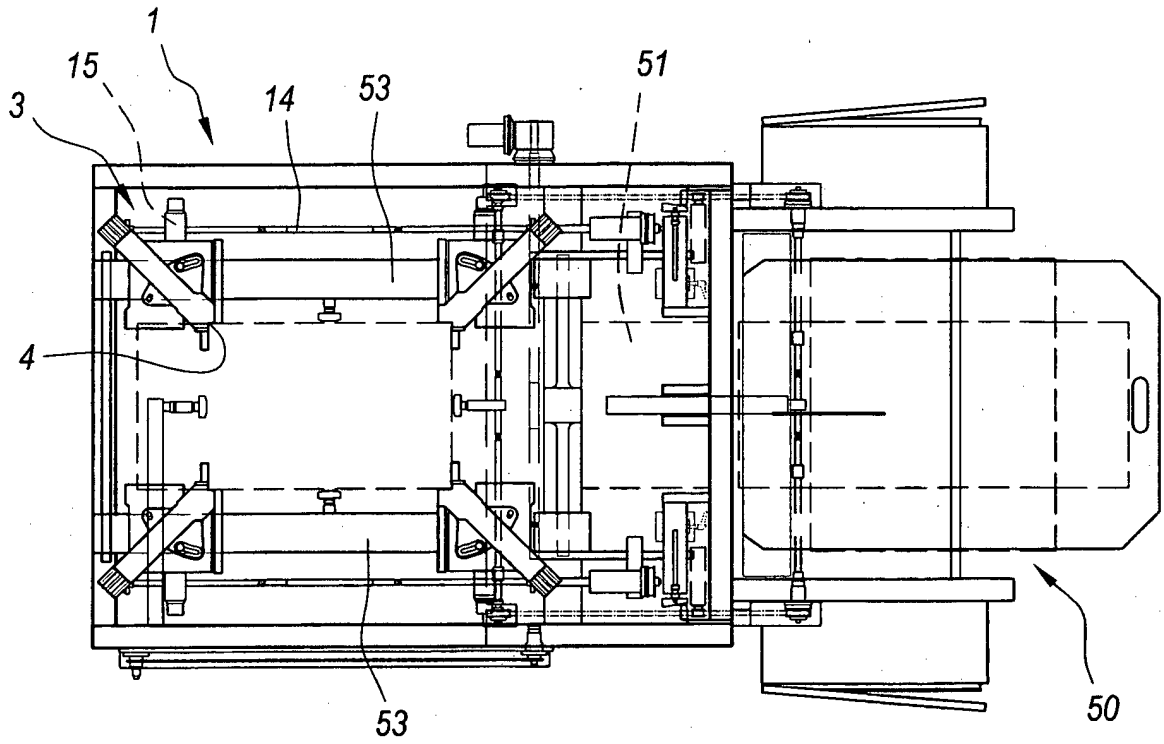


FIG. 3a

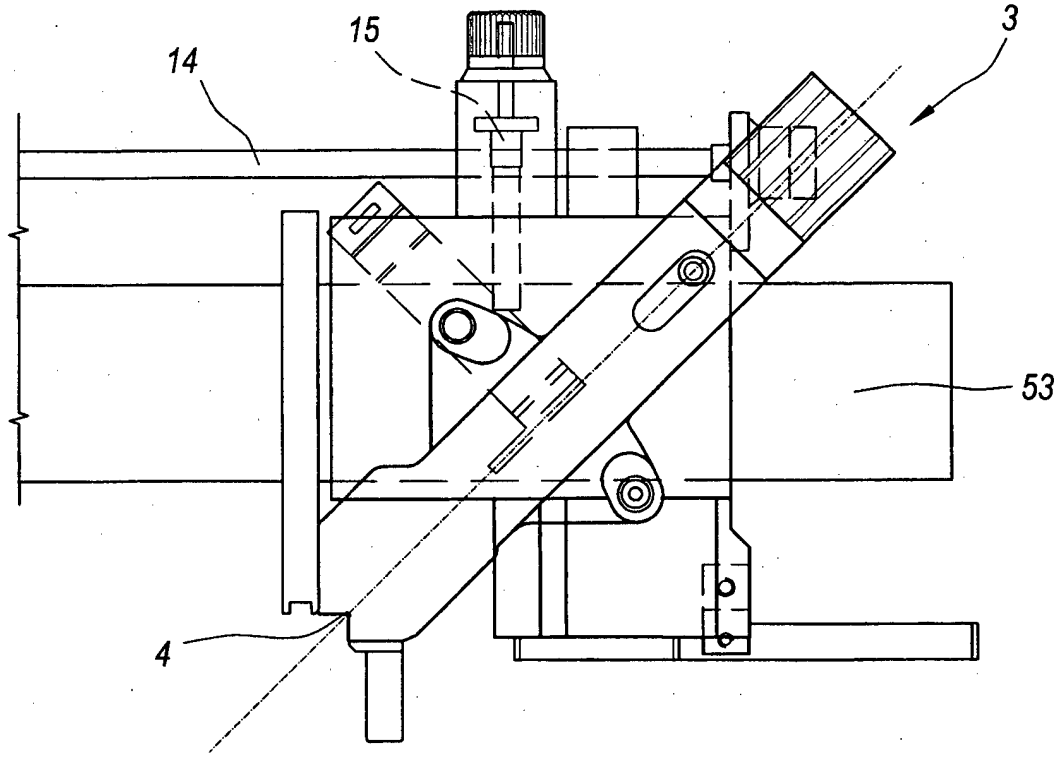


FIG. 2

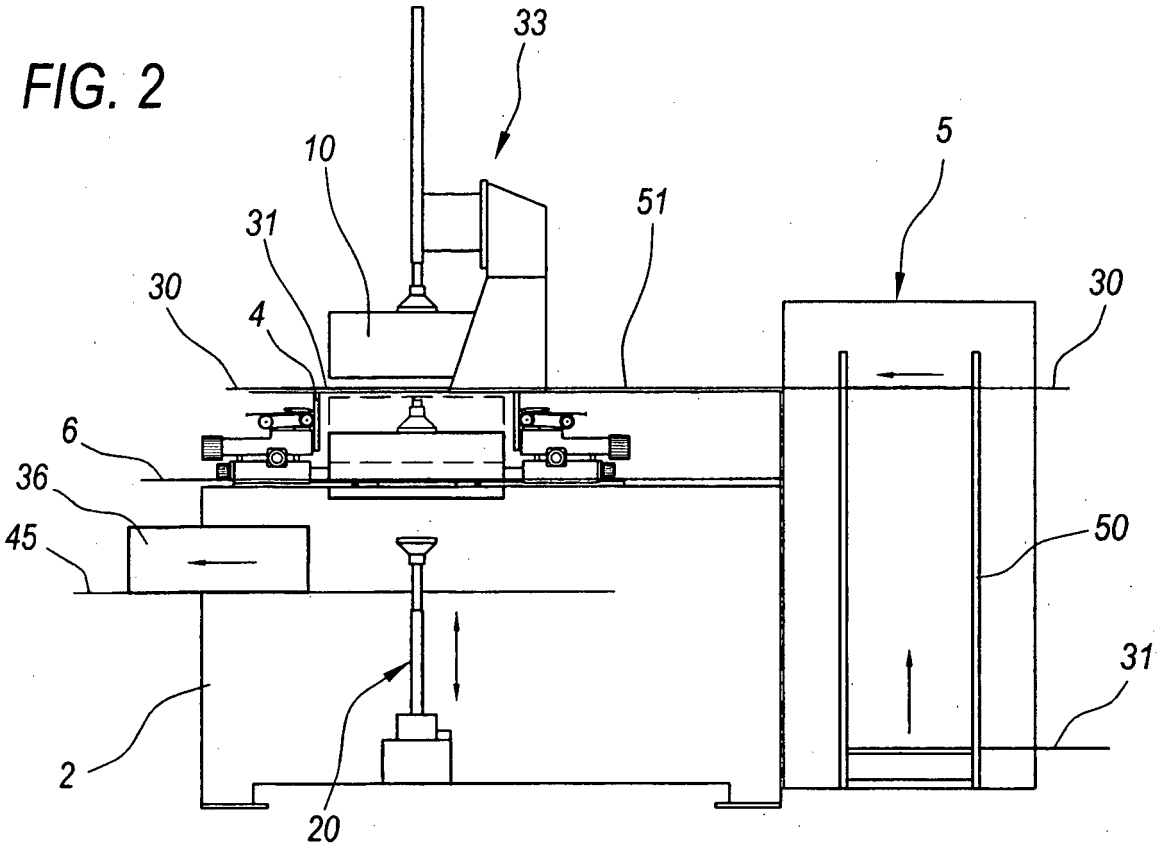

33
10
31
51
5
30
4
30
6
36
45
50
31
2
20

FIG. 4

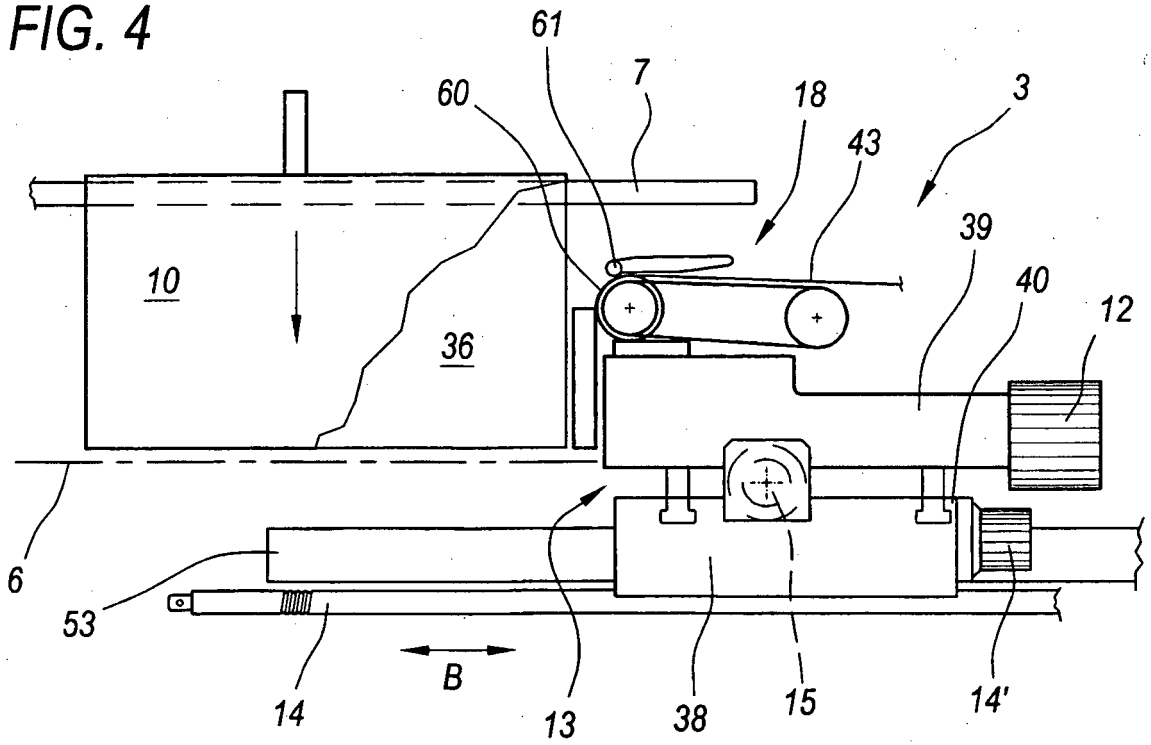

61
60
7
18
3
43
39
40
12
10
36
6
53
14
B
13
38
15
14'

FIG. 5a

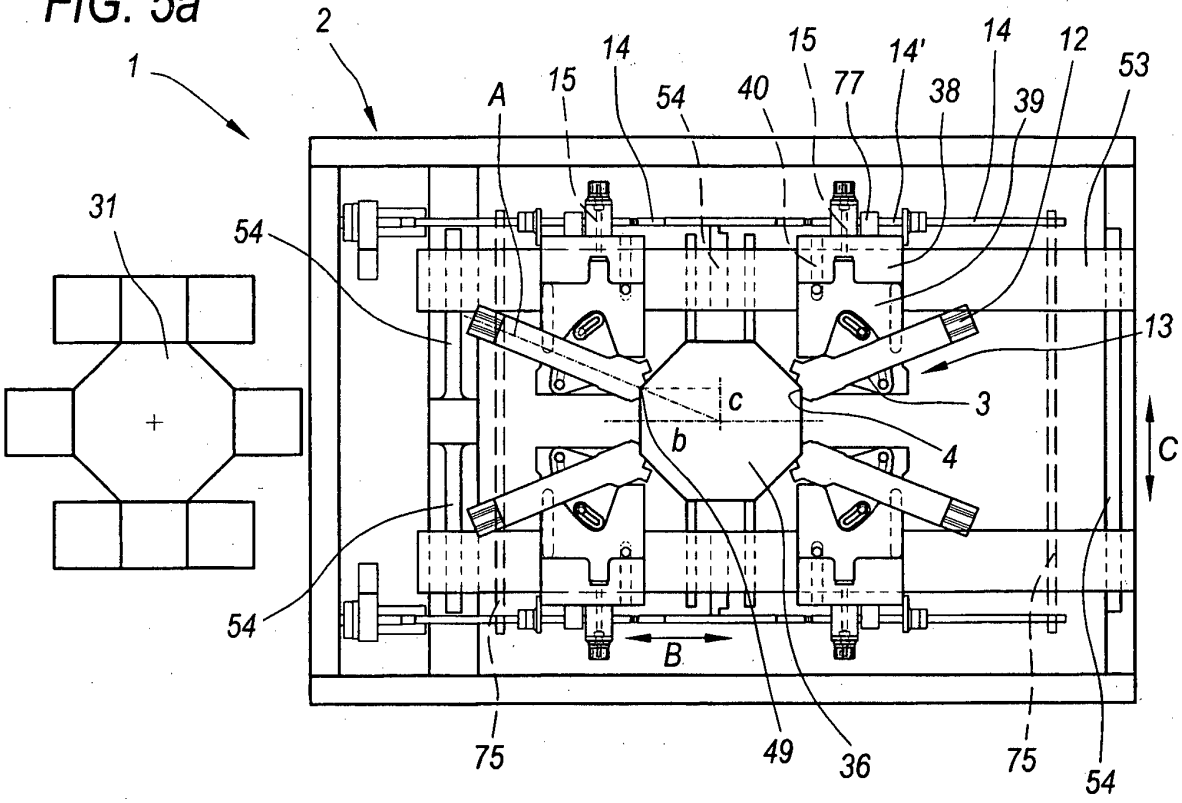

1
2
A
15
14
54
40
15
77
14'
38
14
39
12
53
31
54
13
c
3
b
4
C
54
B
75
49
36
75
54

FIG. 5b

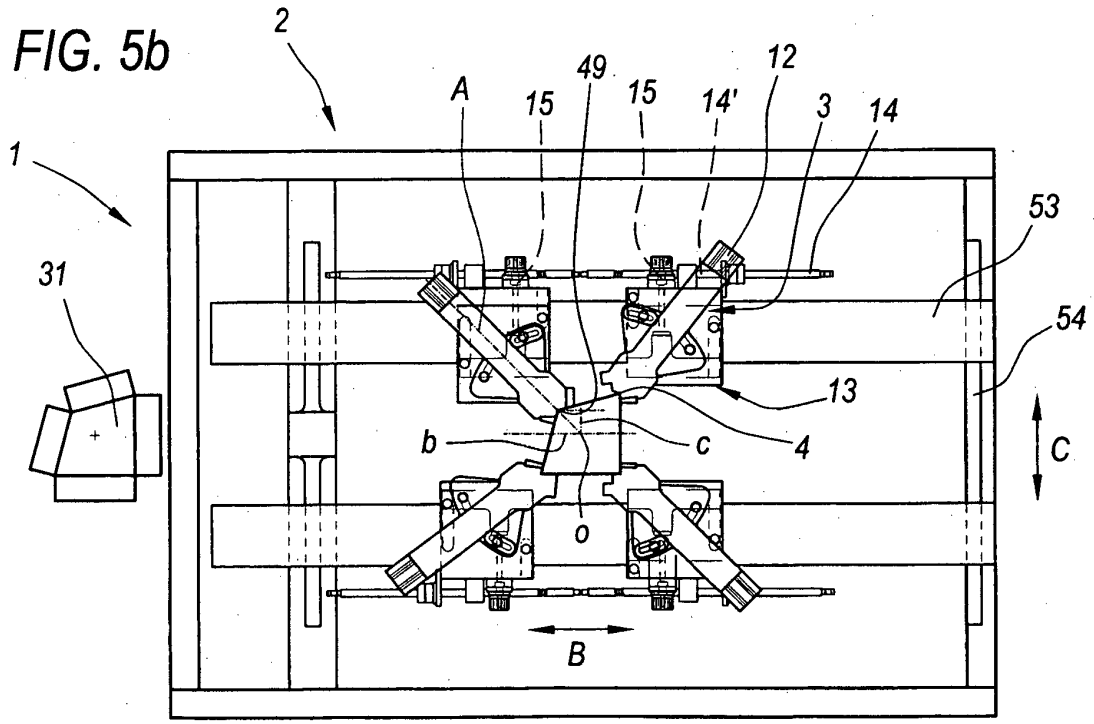

2
A
15
49
15
14'
12
3
14
1
53
31
54
13
b
c
4
C
o
B

FIG. 6

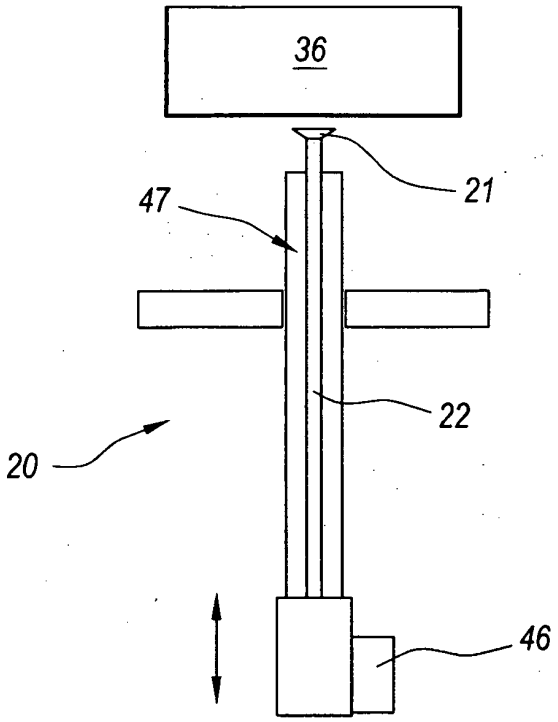

36
21
47
22
20
46

FIG. 3b

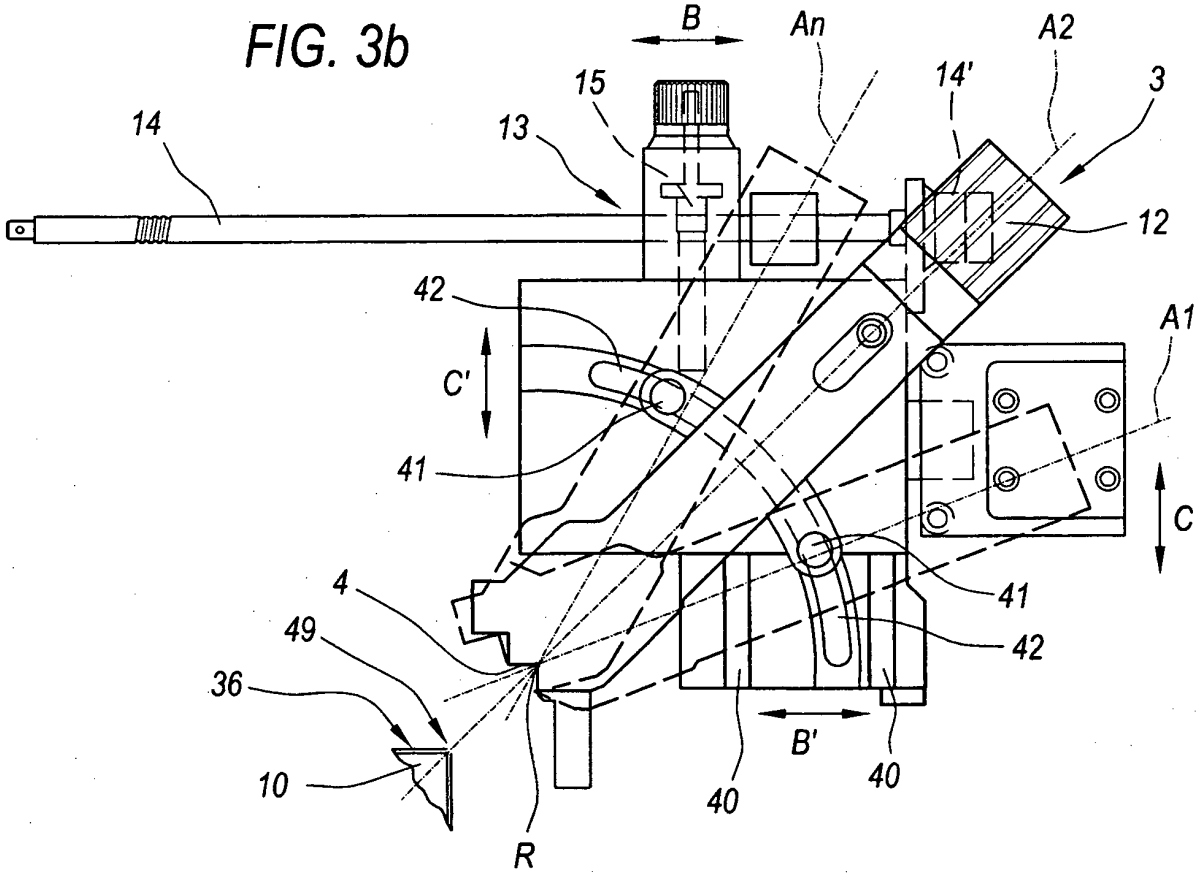

B
An
A2
14'
3
15
13
14
12
42
A1
C'
41
C
4
41
49
42
36
B'
10
40
40
R

FIG. 7a

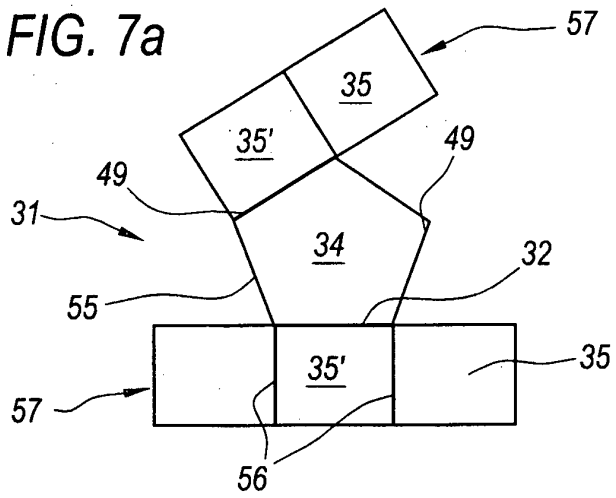


FIG. 7b

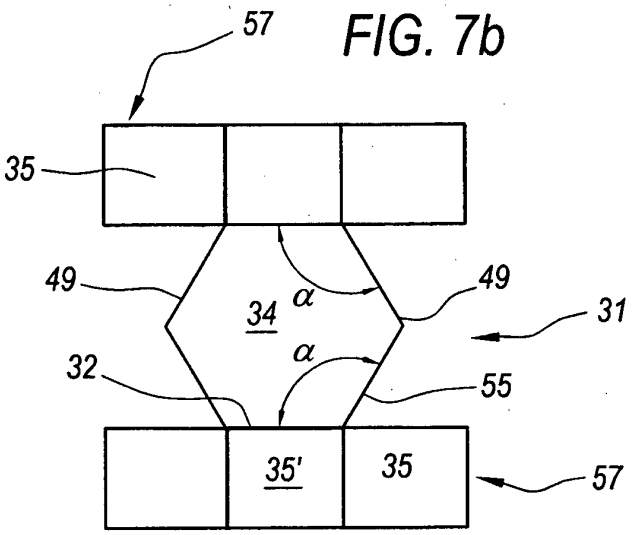


FIG. 7c

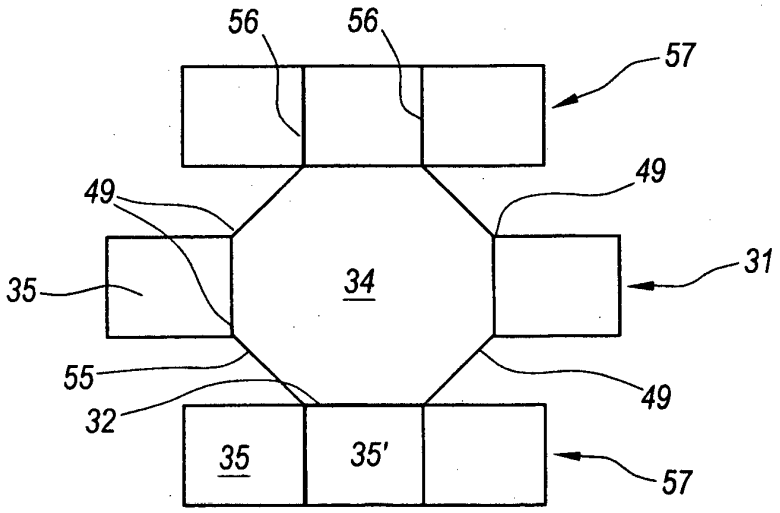


FIG. 8

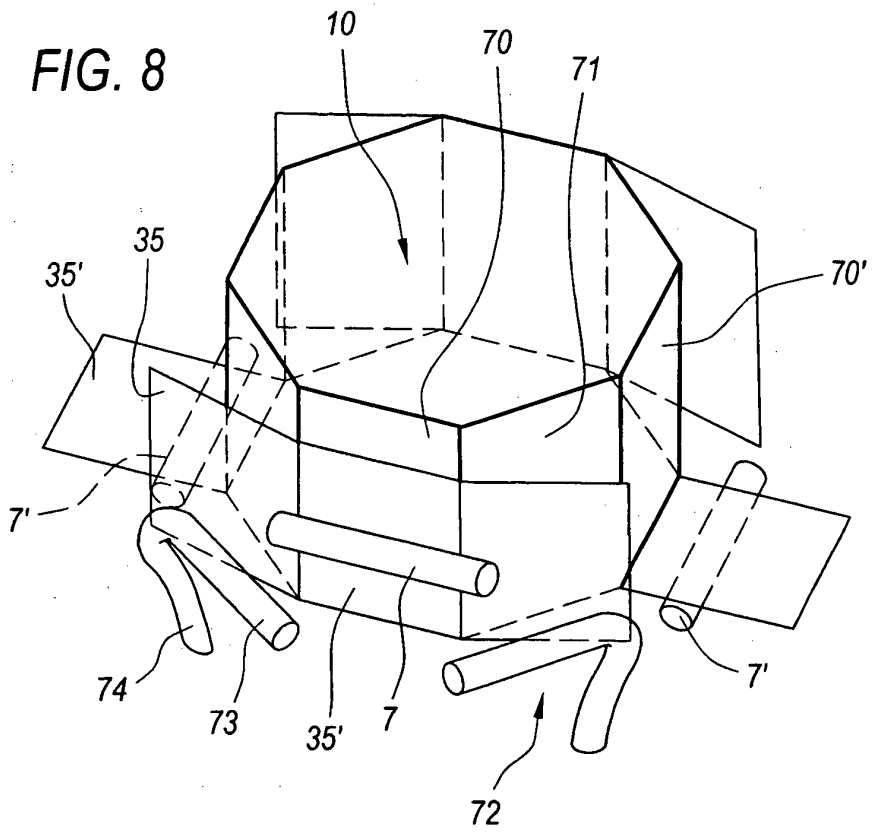


FIG. 9

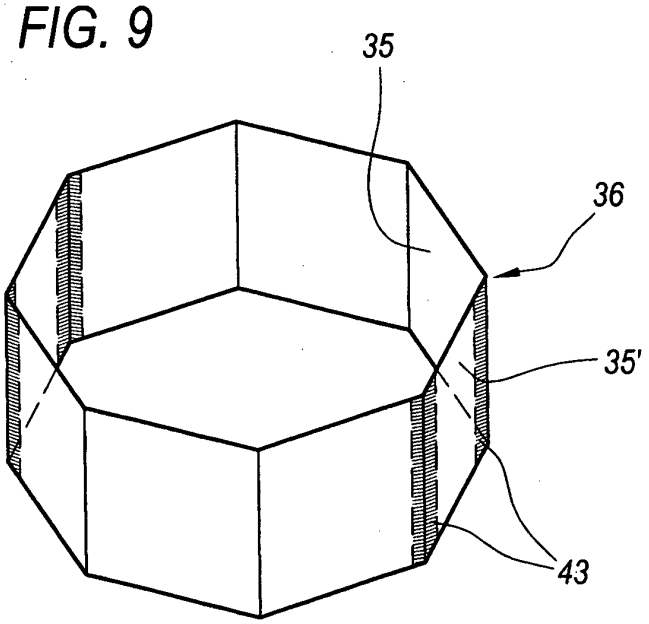


FIG. 10

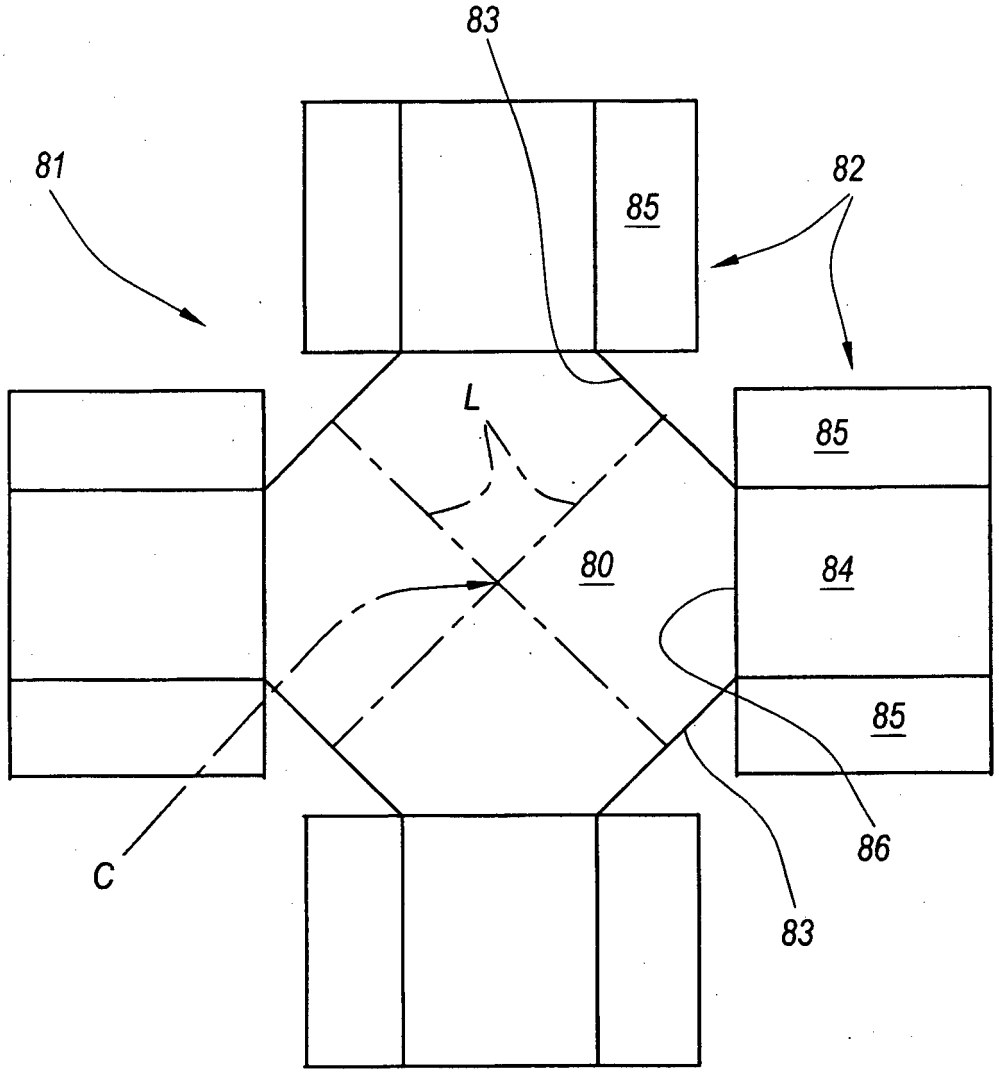


FIG. 11

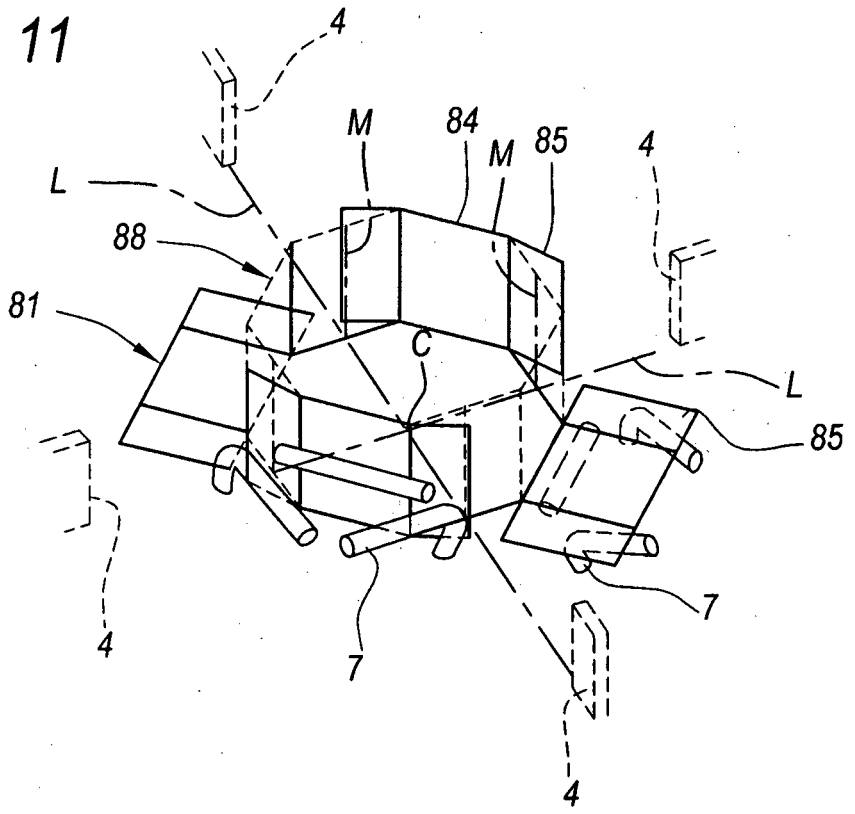
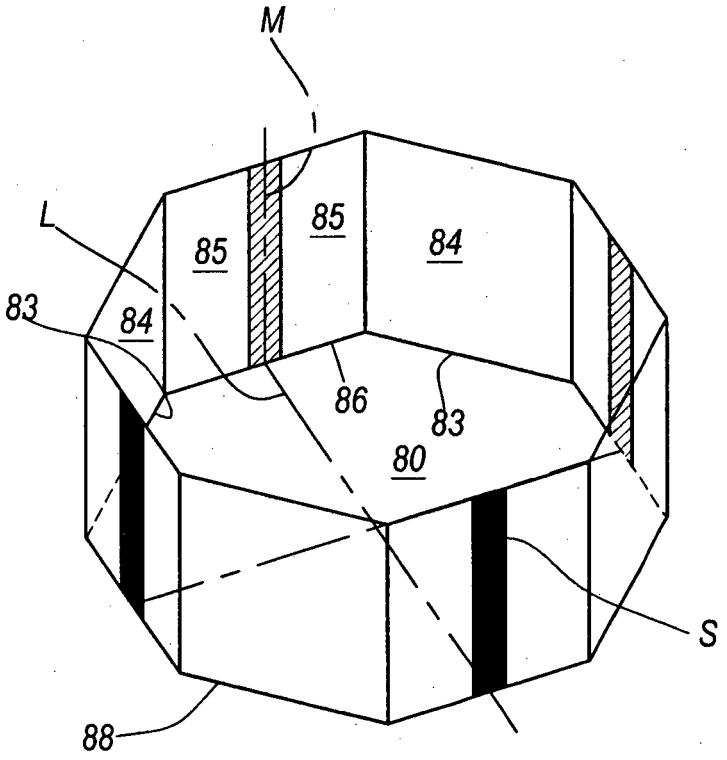


FIG. 12



REFERENCES CITED IN THE DESCRIPTION

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