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(72) Inventor: **BOIX JAÉN, José**
E-03349 San Isidro de Albatera (Alicante) (ES)

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(74) Representative: **Ungria López, Javier et al**
UNGRIA Patentes y Marcas, S.A.,
Avda. Ramon y Cajal, 78
28043 Madrid (ES)

(71) Applicant: **Boix Maquinaria, S.L.**
03349 San Isidro De Albatera (Alicante) (ES)

(54) **MACHINE FOR ASSEMBLING A CARDBOARD BOX**

(57) The invention relates to a machine for assembling a cardboard box including an initial device for placing the laminar bodies on horizontal guides, the sides of which include a front device that acts on each laminar body, raising the structure thereof in order to begin assembling the box, and a rear device that assembles the bottom of the box, first folding the inner flaps and then the outer flaps on top of the former, joining said flaps by

means of an adhesive. The invention is characterized in that the rear device includes a scissor mechanism (6) defined from a linearly moveable head (19), to which two mobile arms (20) are separately linked, the oscillating movements of which are guided by means of inner rails (23) linked to arched grooves (21), the front ends of said mobile arms (20) including roller guides (25) that contact the inner flaps (5) during the folding down of same in one of the assembly stages of the bottom of the box (3).

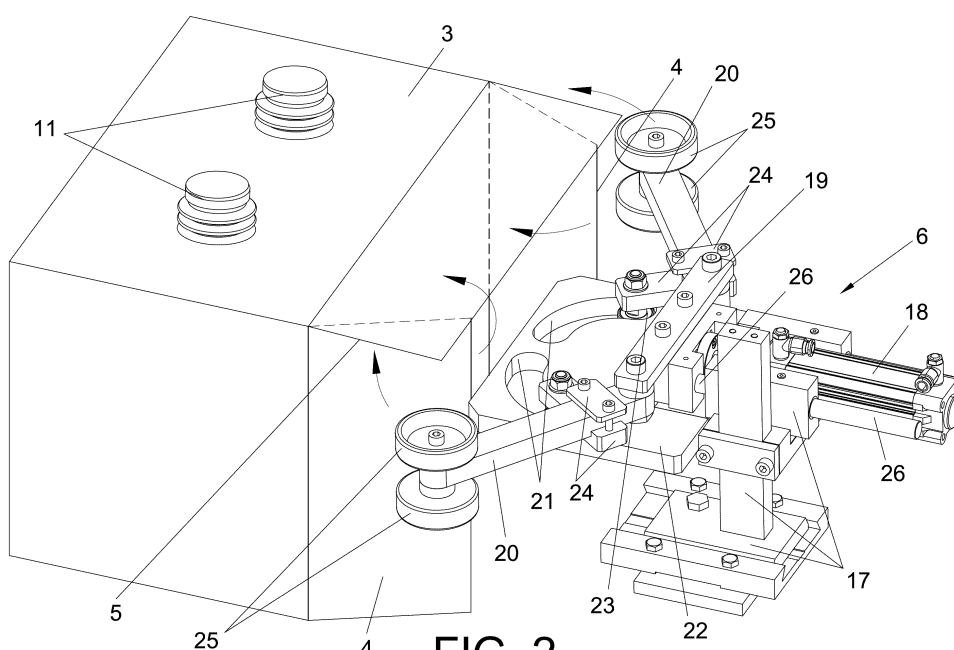


FIG. 2

Description

OBJECT OF THE INVENTION

[0001] The present invention as expressed in the statement of this specification refers to a machine for assembling cardboard boxes that includes improvements regarding currently known machines, designed to improve its performance and simplify certain movements or actions produced to the cardboard sheet during the process of opening and folding flaps and gluing the bottom.

[0002] Therefore, the machine of the invention is intended for automatic assembly of a type of box where it is necessary to initially unfold the main body of the box, to later fold down the flaps and finally glue the bottom made up by said flaps.

BACKGROUND OF THE INVENTION

[0003] Currently, there are known machines for assembling cardboard boxes which are designed to completely assemble a cardboard box starting from a stamped sheet by means of different mechanisms, particularly the machines that incorporate a front mechanism for lifting the structure of a folded main body making up the box itself, in such a way that through this mechanism, the box to be conformed opens with its bottom flaps unfolded, then in another stage, using a rear device for folding said bottom flaps and forming the bottom having previously applied an adhesive to such flaps.

DESCRIPTION OF THE INVENTION

[0004] The machine for assembling cardboard boxes which is the subject of the invention, includes among its elements, an initial mechanism that is responsible for positioning each laminar body making up each folded box, from a stacking station to placing each said laminar body on horizontal guides that pull said laminar body to an area where there is a lifting mechanism and a characteristic scissor mechanism, the lifting mechanism and the scissor mechanism positioned facing each other and the two of them located on either side of said horizontal guides.

[0005] The lifting mechanism unfolds each laminar body to open and shape the volume of the box structure, raising the structure of the box, so that in this unfolded position, the bottom of the box that includes pairs of outer and inner flaps, is situated facing the scissor mechanism, by which the inner flaps are folded, placing on these inner flaps, in turn, in another later stage, the outer flaps to make up the final bottom of the box, having previously applied an adhesive to said inner flaps.

[0006] The lifting mechanism comprises an articulated structure attached to a fixed support while said articulated structure is coupled to a vertical support with suction pads for handling the box, lifting said box from the flat folded position to an unfolded position in which its bottom faces

the scissor mechanism. The whole lifting mechanism is moved by means of a power element, such as a pneumatic or a hydraulic cylinder or otherwise.

[0007] The scissor mechanism is defined from a front support element that incorporates a linear motor, such as a horizontal cylinder, whose rod is connected to a head in which two mobile arms are articulated, being said mobile arms guided by arched grooves, incorporating the free ends of such mobile arms roller guides to fold down the outer flaps of the bottom of the box, in such a way that when activating the scissor mechanism, the mobile arms perform an oscillating movement towards the inside, bringing together the pairs of roller guides that unfold the outer flaps of the bottom of the box to form such bottom, joining said outer flaps with the inner flaps, the inner flaps having previously been coated with an adhesive.

[0008] Hereinafter to provide a better understanding of this specification and forming an integral part thereof, some figures are attached representing the subject invention, by way of non-limitative example.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

Figure 1 shows a perspective view of the machine for assembling cardboard boxes object of the invention. It incorporates among its elements, a characteristic lifting mechanism to unfold the boxes from a flat folded position, to an unfolded position and a characteristic scissor mechanism to make up the bottom of the boxes.

Figures 2 and 3 show respective perspective views of the scissor mechanism in different positions.

Figures 4 and 5 show perspective views of the lifting mechanism in different positions too.

Figure 6 represents a perspective view in which essentially the process of unfolding the box and the forming of its base is shown.

DESCRIPTION OF THE FORM OF THE PREFERRED EMBODIMENT

[0010] Taking into account the numbers adopted in the figures, the machine for assembling cardboard boxes includes, among its elements, an initial mechanism, not represented in the figures, that is responsible for placing each laminar body (3') constitutive of each folded box from a stacked station (28) to placing each laminar body (3') on horizontal guides (29) that pull said laminar body (3') to an area where a lifting mechanism (2) and a scissor mechanism (6) are found facing each other and the two of them located on either side of the horizontal guides (29).

[0011] The lifting mechanism (2), unfolds each laminar body (3') to open and make up the volume of the box (3), lifting its structure upwards, in such a way that in this unfolded position, the bottom of the box (3) that includes

pairs of outer flaps (5) and inner flaps 4, is located facing the scissor mechanism (6), by means of which the inner flaps (4) are folded down, placing against these inner flaps (4) in a subsequent phase, the outer flaps (5), by means of a mechanism not shown in the figures, to finally make up the bottom of the box, having previously applied an adhesive, by means of a device that is not shown in the figures, which is coated onto the inner flaps (4).

[0012] The lifting mechanism (2) comprises an articulated structure made up by two parallel bars: an upper bar (7) and a lower bar (8), both articulately connected by their front ends to a crossbar (9), which is integral with a vertical support structure (10) where suction pads (11) are connected to handle each laminar body (3') (folded box), lifting the laminar body (3') upwards making up the volume of the box (3) and facing the scissor mechanism (6), subsequently assembling its bottom. The suction pads (11) are joined to a crossbar guide of the vertical support structure (10) by means of front rails (12), in order to modify the distance between said suction pads (11).

[0013] In turn, the lower bar (8) is articulately attached by its free end to a fixed support (13) by means of a lower rotating body (14'), while the free back end of the upper bar (7) is attached to the upper rotating body (14) coupling said fixed support (13), to the rotating body (14) which is integral with a crank (15) connected to a vertical cylinder (16), whereby the movement of the whole lifting mechanism (2) is performed in order to place each laminar body (3') from a folded position to an unfolded position with its bottom facing the scissor mechanism (6).

[0014] This scissor mechanism (6) is determined from a front support (17) where a horizontal cylinder (18) is coupled, whose rod connects to a linearly moveable head (19) wherein two mobile arms (20) are separately linked by their back ends, said arms being guided by arched grooves (21) on a lower plate (22) joined to the front support (17).

[0015] For this, the mobile arms (20) include inner rails (23) guided by such arched grooves (21) to direct the oscillating movement of said arms (21), coupling the inner rails (23) to the mobile arms (20) by means of anchoring clamps (24).

[0016] Furthermore, the free front ends of the mobile arms (20) include pairs of roller guides (25) that contact the outer flaps (5) of the bottom of the box (3) for its folding, so that when activating the scissor mechanism (6), the mobile arms (20) perform a oscillating movement inwards, bringing the pairs of roller guides (25) towards each other, which fold down the inner flaps (4) of the bottom of the box (3), and applying thereon at a later stage, an adhesive to the outer flaps (5) by means of another mechanism and the outer flaps (5) are glued to the inner flaps (4), thus making up the bottom of the box.

[0017] The head (19) comprises a pair of bars (26) coupled in parallel guides (27) of the front support (17) in order to ensure the correct guiding of such linearly moveable head (19).

Claims

1. Machine for assembling cardboard boxes, designed to make up cardboard boxes from laminar bodies constituent of the cardboard boxes, which have lateral sides and a bottom made up by outer flaps and inner flaps, the machine including various elements and devices, among which an initial device, for positioning the laminar bodies on horizontal guides the sides of the horizontal guides include a front device that operates on each laminar body lifting its structure to begin the assembly of the box, and a rear device that assembles the bottom of the box, first folding the inner flaps and then the outer flaps on top of the inner flaps, joining said inner flaps by means of an adhesive; the machine is **characterized in that** the rear device comprises a scissor mechanism (6) defined from a linearly moveable head (19), to which two mobile arms (20) are separately linked, the oscillating movement of these arms (20) is guided by means of inner rails (23) linked to arched grooves (21), the front ends of said mobile arms (20) includes roller guides (25) that contact the inner flaps (5) during the folding down of the inner flaps (5) in one stage of the assembly stages of the bottom of the box (3).
2. Machine for assembling cardboard boxes, according to claim 1, **characterized in that** the head (19) is integral with the rod of a horizontal cylinder (18) that is integral with a front support (17), being a lower plate (22) also integral with said front support (17), and the lower plate (22) incorporating the arched grooves (21) for guiding the mobile arms (20).
3. Machine for assembling cardboard boxes, according to claim 2, **characterized in that** the head (19) is joined to a linear guide defined from bars (26) integral with the head (19) and which are coupled in parallel guides (27) additionally set on the front support (17).
4. Machine for assembling cardboard boxes, according to any one of the previous claims, **characterized in that** the front device comprises a lifting mechanism (2) defined from an articulated structure made up by two parallel bars: upper (7) and lower (8), whose front ends are articulately joined to a crossbar (9) which is integral with a vertical support structure (10) bearing suction pads (11), while the back ends of said parallel bars (7-8) are articulately joined to a fixed support (13), incorporating a motor element that moves said articulated structure.
5. Machine for assembling cardboard boxes, according to claim 4, **characterized in that** the parallel bars, upper (7) and lower (8), are articulately joined to the fixed support (13) with interposition of rotating bodies: upper (14) and lower (14').

6. Machine for assembling cardboard boxes, according to claim 5, **characterized in that** the upper rotating body (14) is integral with a crank (15) connected to the rod of a vertical cylinder (16) joined to the vertical support (13) as the driving element of the linked structure of the lifting mechanism (2). 5
7. Machine for assembling cardboard boxes, according to any of the claims 4 to 6, **characterized in that** the suction pads (11) of the lifting mechanism (2) are supported by front rails (12) joined to a transversal guide of the vertical support (10). 10

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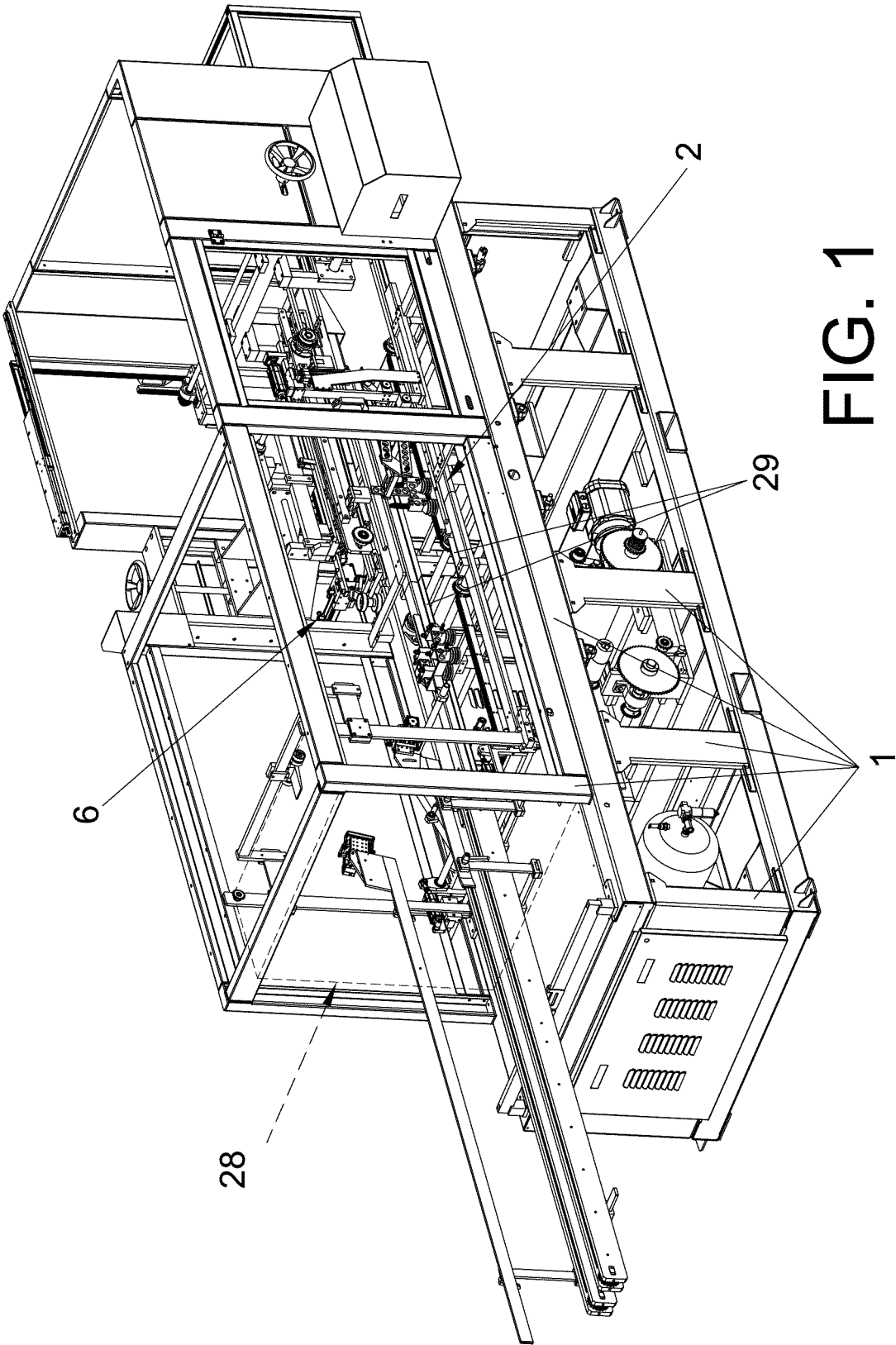


FIG. 1

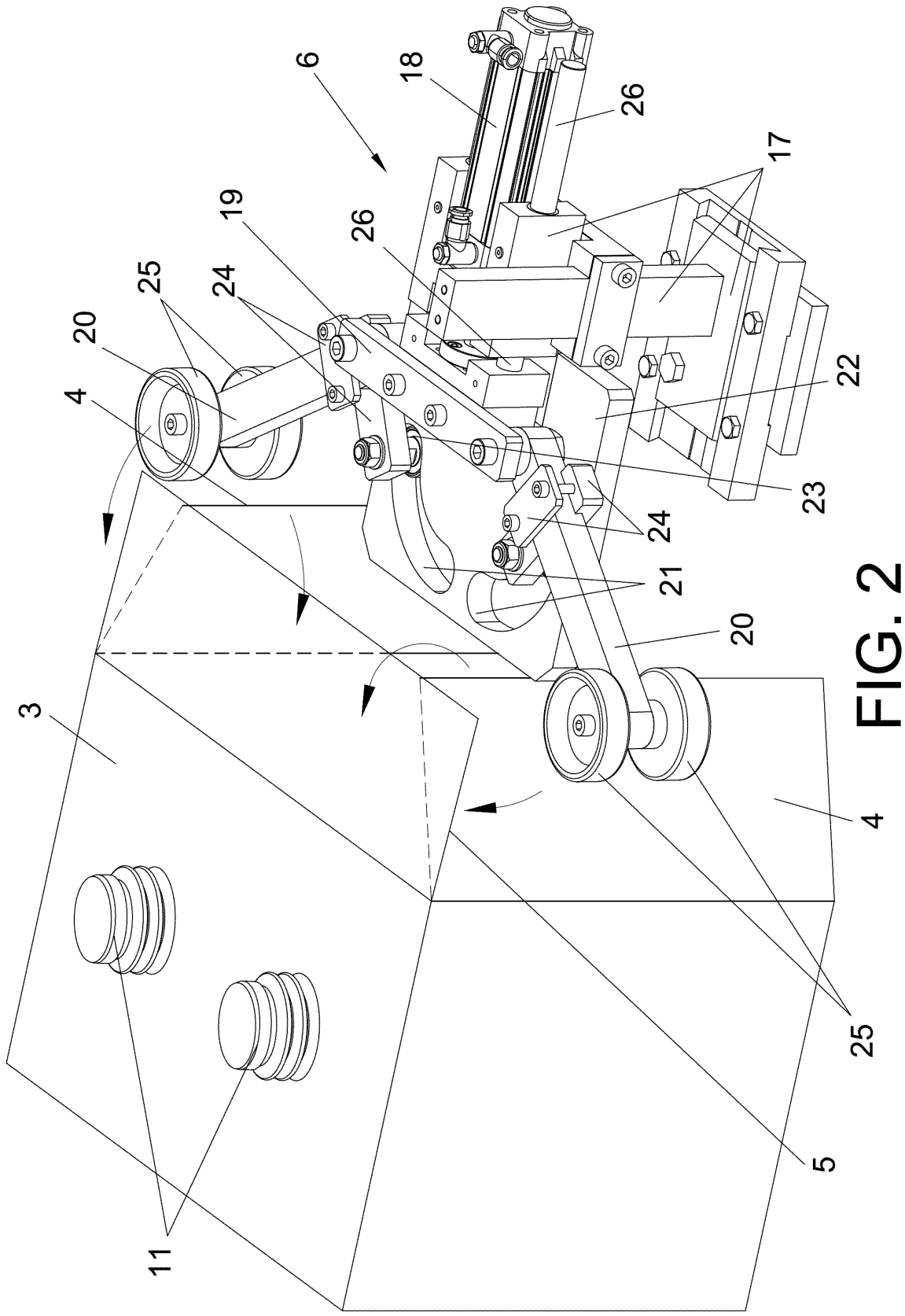


FIG. 2

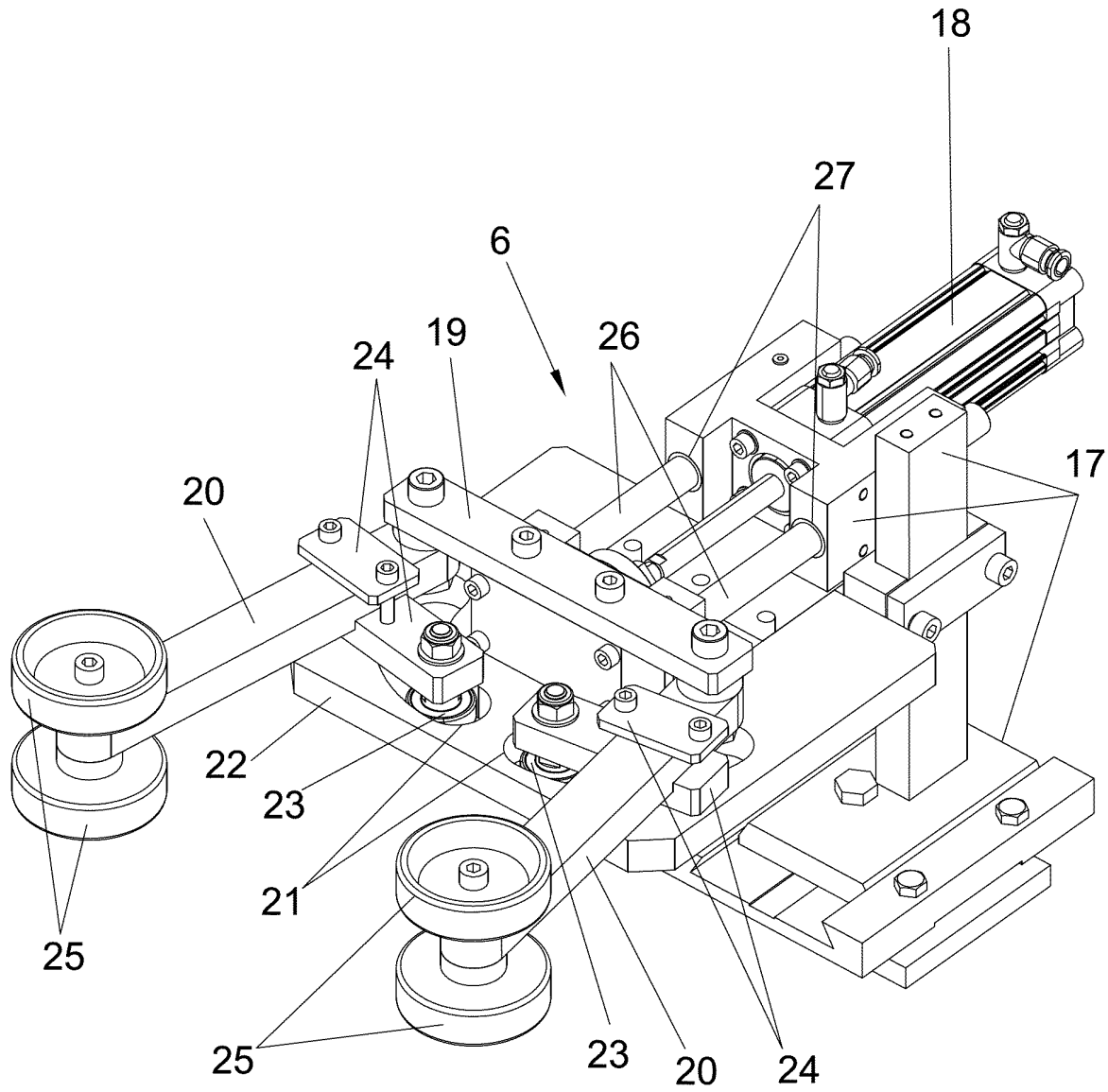


FIG. 3

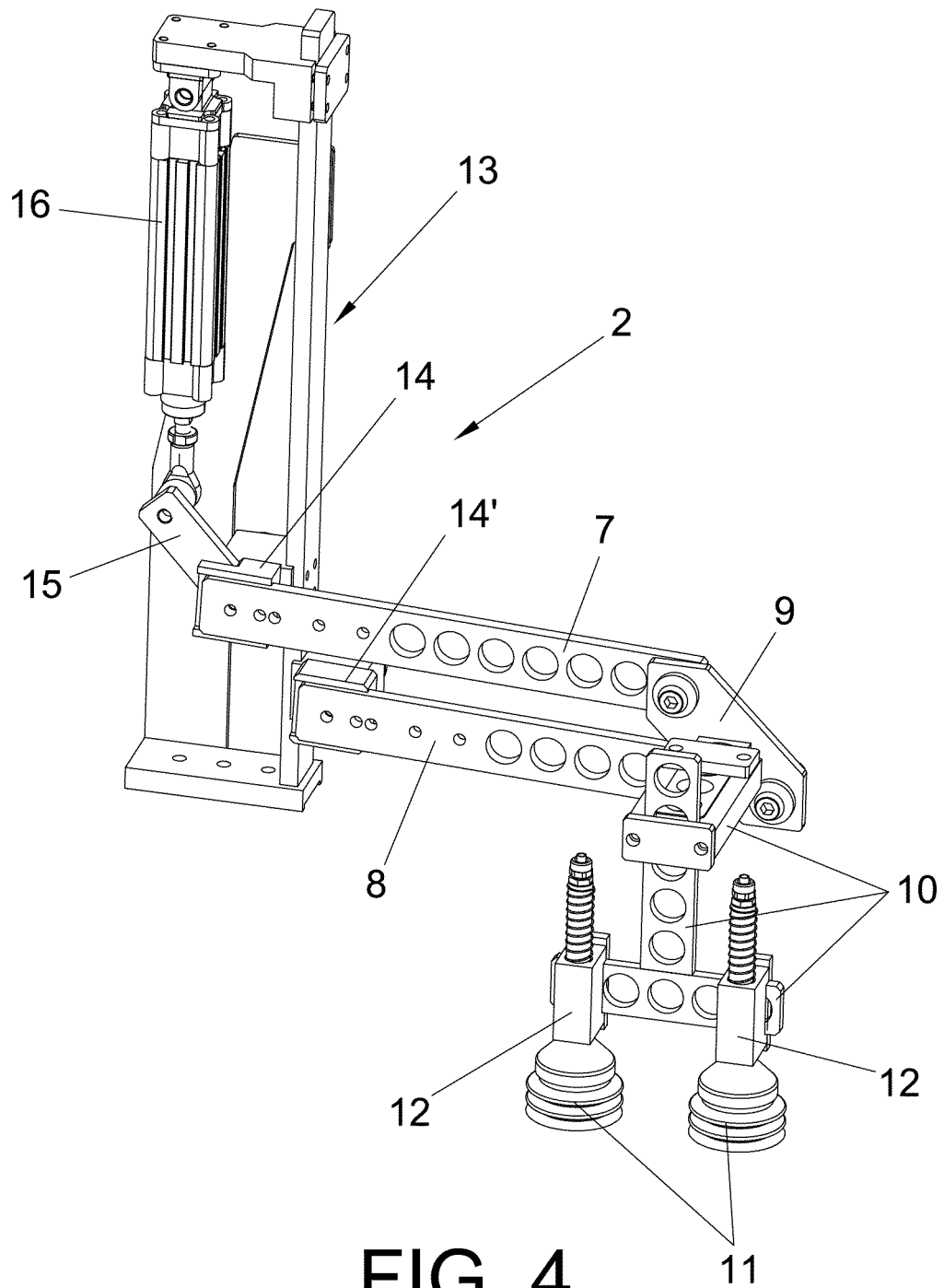


FIG. 4

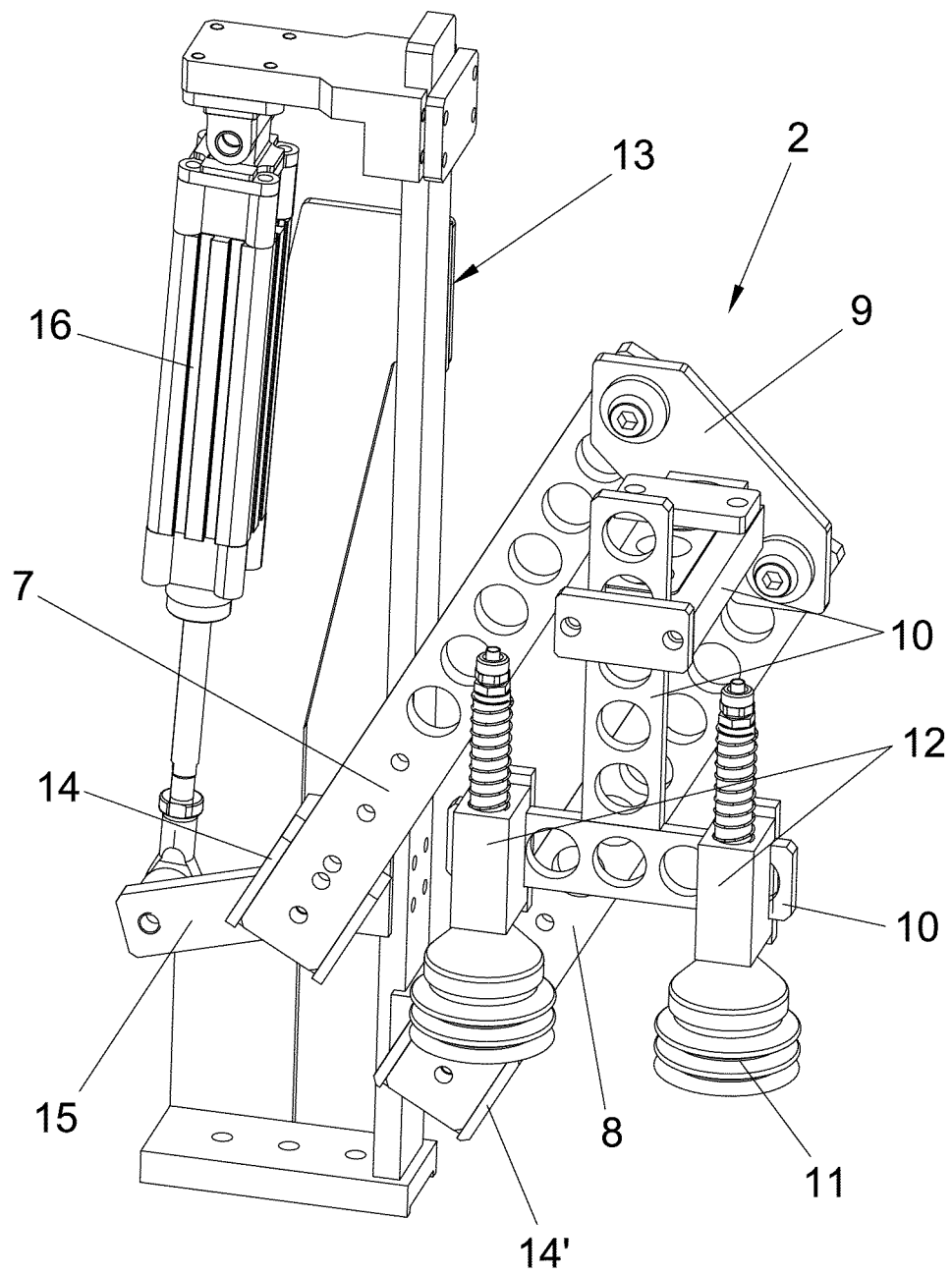
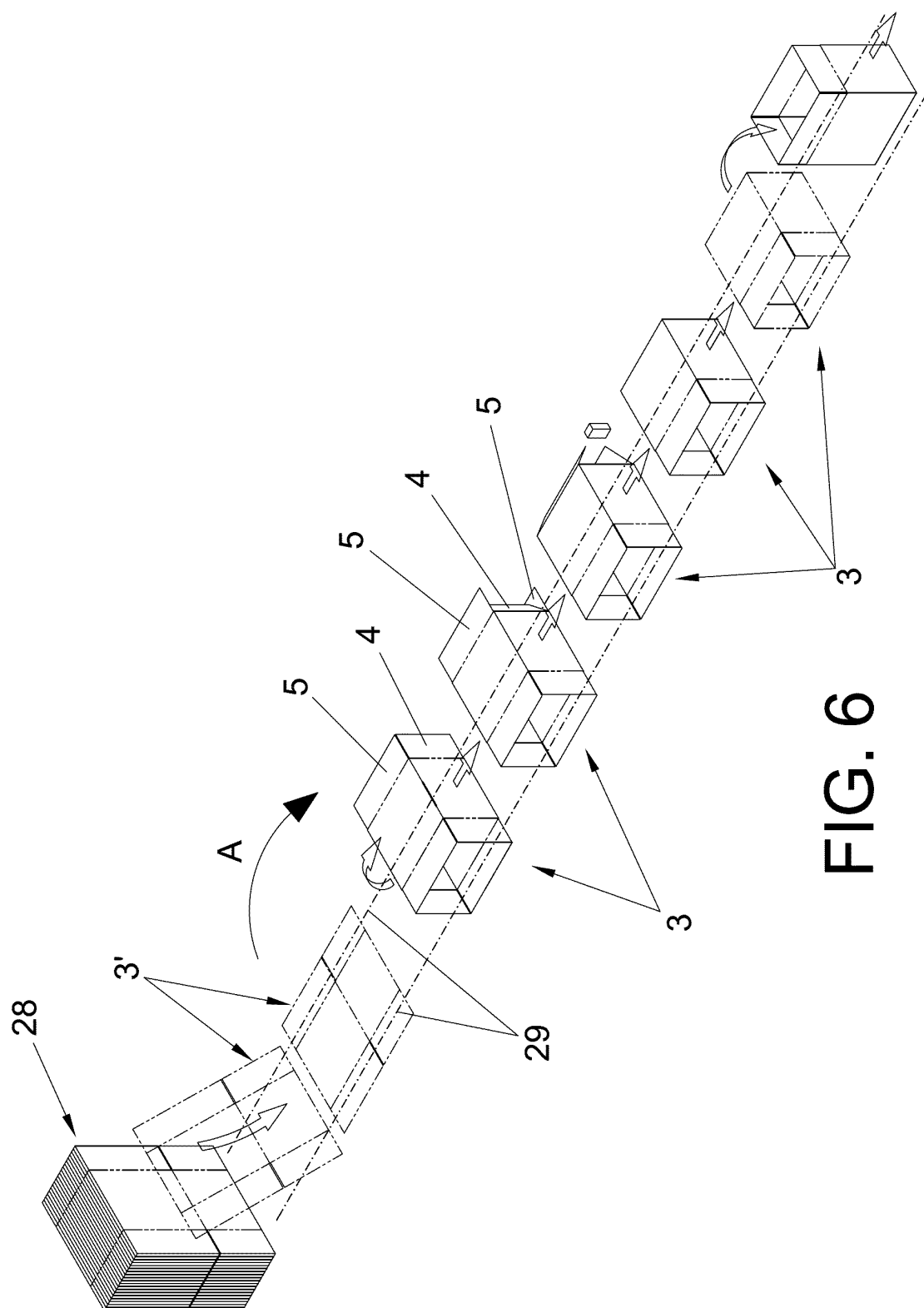


FIG. 5



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2011/070273

A. CLASSIFICATION OF SUBJECT MATTER

B31B3/52 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B31B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ES 2265274 A1 (KAPPA IBEROAMERICANA, S.A.) 01/02/2007, Columnas 3-4; figures 1-4	1
A	ES 2154148 A1 (ASSIDOMAN IBEROAMERICANA, S.A.) 16/03/2001, Columnas 1-2; figure 1	1
A	ES 446969 A1 (MONTLEO ROMAN RAMON) 01/06/1977, Pages 4-10; figures 1, 4-5	1
A	FR 1135132 A (ANCIENS ETABLISSEMENTS M LEVY) 24/04/1957, Page 2; figures 1-4	1
A	DE 1941497 A1 (MASCHINE ZUR HERSTELLUNG VON BEHAELTERN) 25/02/1971, Abstract; figure 12	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search
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Date of mailing of the international search report
(09/08/2011)

Name and mailing address of the ISA/

Authorized officer
J. Hernández Cerdán

OFICINA ESPAÑOLA DE PATENTES Y MARCAS
Paseo de la Castellana, 75 - 28071 Madrid (España)
Facsimile No.: 91 349 53 04

Telephone No. 91 3495339

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES2011/070273

Information on patent family members

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Form PCT/ISA/210 (patent family annex) (July 2009)