

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 552 318 A1

(12)

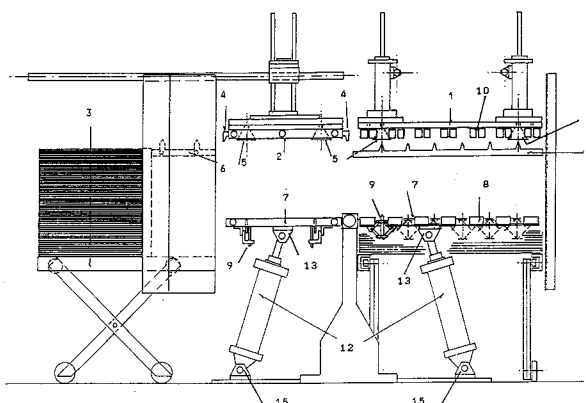
EUROPEAN PATENT APPLICATION
published in accordance with Art.
158(3) EPC

(21) Application number: **92907092.8**(51) Int. Cl.⁵: **B31F 1/20**(22) Date of filing: **11.03.92**(86) International application number:
PCT/ES92/00026(87) International publication number:
WO 93/02852 (18.02.93 93/05)(30) Priority: **08.08.91 ES 9101860**(43) Date of publication of application:
28.07.93 Bulletin 93/30(84) Designated Contracting States:
CH DE ES FR GB IT LI(71) Applicant: **COLLAZOS MARTINEZ, Sixto**
c/de los Artesanos, 6,
E-03690 San Vicente del Raspeig(ES)(72) Inventor: **COLLAZOS MARTINEZ, Sixto**
c/de los Artesanos, 6,
E-03690 San Vicente del Raspeig(ES)(74) Representative: **Urizar Anasagasti, José**
Antonio
Doctor Fleming, 43
E-28036 Madrid (ES)(54) **MACHINE FOR SHAPING AND MOUNTING CARDBOARD PANELS.**

(57) Machine for shaping and mounting cardboard panels, which may be used to produce cardboard panels having a high degree of rigidity and firmness, starting from two cardboard sheets wherein is formed a series of protuberant ribs by means of two upper shaping platforms overlaying two lower shap-

ing platforms, the ribs of one sheet or plate being in orthogonal orientation with respect to the rib of the other plate, the two plates being nested with each other by the rocking of the lower platforms from a horizontal position to a vertical position bringing the plates on top till they fit together.

FIG. 1



EP 0 552 318 A1

The present invention relates, as indicated in its title, to a machine for shaping and mounting cardboard panels with the purpose of providing said panels with rigidity and firmness thus to be used as boards or palletes for supporting and handling loads, said machine presenting the particular feature of being able to fit and stick together two cardboard sheets in which previously a series of parallel ribs have been formed by means of respective shaper mechanisms to shape said ribs incorporated in the machine, the ribs of one sheet being in orthogonal orientation with respect to those of the other, in such a manner that by fitting both sheets together a panel with higher firmness and strength is formed.

BACKGROUNDS OF THE INVENTION

There is a variety of machines for working on cardboard sheets in order to give them one shape or another for different manufacturing purposes in the industry or the commerce, the majority of which comprise the use of cardboard sheets for packaging, covering or isolating products in order to provide them with better protection.

Up until the present time machines for shaping cardboard panels, in order to use them as boards or palletes or panels proposed to support or handle loads are not known. In fact, these types of tasks have always been carried out on boards made of materials which feature the highest possible firmness and the lowest possible weight at the same time.

For this purpose, a material which has more extensively been employed is wood. However, even though wood is a light material in comparison to other types of materials which may be used for similar purposes, such as metals for example, when panels or palletes of considerable dimensions are dealt with, wood may create problems as to the weight of the wooden board itself.

In other cases, as mentioned above, metals are used in the form of rods or rigid profiles being located parallel and separated with respect to each other, normally two or three of them being used in order to avoid heavy weights, thus forming a pallet which present large open zones.

This type of palletes present the inconvenience that they do not form a plane surface due the existence of rods or separated profiles, such that in the cases where loads of reduced dimensions are to be handled, said loads would not cover the open space between two separated profiles giving rise to possibilities of falling of the load; at the same time said palletes present considerable weight which would require higher effort of the handling mechanism as to lifting or displacing the load.

In order to solve the aforementioned problems, the machine for shaping and mounting cardboard panels, as the object of the present invention, is proposed.

Said machine produces reinforced cardboard panels by means of joining two sheets of cardboard which are fitted and stuck together each sheet presenting a series of salient and parallel ribs which are elaborated by means of a special mechanism provided by the machine, fitting the ribs of one cardboard sheet with the ones of the other sheet, the orientation of the ribs of one sheet being orthogonal with respect to that of the ribs of the other sheet, in such a manner that the resulting panel presents inwardly an array of joined ribs articulated between each other thus giving rise to the reinforcement and the rigidity of the panel.

DESCRIPTION OF THE INVENTION

The machine of the invention comprises two upper cardboard-shaper platforms which are movable and are located on the upper part of the machine. Said platforms can be displaced horizontally towards the stacking zone of the cardboard sheets which are initially in flat form. By performing said displacement towards the sheets, a series of glue injectors, situated in transversal direction with respect to that of the displacement, and at the edges of the devices, deposit glue on the upper surface of each sheet, said sheet being picked up and adhered to the respective platform by means of a pair of suction cups incorporated in each platform.

Once the picking up and the adhesion of the sheet is produced by said suction cups, each platform returns to the zone where it was initially positioned, said zone being the zone of shaping of the sheets. While said return or displacement is produced, a second series of glue injectors situated on the lower part and also in transversal direction with respect to that of the displacement of the cardboard, deposit glue on the lower surface of the sheet.

Once the shaper platforms are returned to the shaping zone having the respective cardboard sheets adhered to them, said platforms move down in vertical direction until they are situated on another pair of lower supporting platforms, each of the latter is formed by means of a number of rectangular and parallel tracks each having short width.

Between each two adjacent tracks there are a number of rib forming devices each having a sharp-pointed element such as a bar with small diameter, capable of being displaced upwards due to a lifting mechanism designed for that purpose.

The upper shaper platforms, have in turn, a series of double tracks being also parallel and in transversal direction with respect to each other, each double track being composed of a pair of rods of prismatic, rectangular and elongated shape, capable of being displaced horizontally in opposite directions with respect to each other.

In this manner, by placing the upper platform on the lower platform, having the cardboard sheet in the middle, the tracks of the upper platform are in a position of facing those of the lower platform. In order to form the ribs in the sheet, the rib forming device is activated by the horizontal displacement of each pair of adjacent lower tracks which in turn transfer, by means of the mentioned lifting mechanism of the rib forming device, a movement in vertical and upward direction, the effect of which is to exert pressure on the lower surface of the sheet. At the same time the pair of the upper rods are separated in horizontal direction, i.e. each rod corresponding to each pair is displaced in opposite direction to that of the respective adjacent rod of the same pair, thus producing the approaching of a pair of rods belonging to two adjacent double tracks between which the corresponding rib is to be formed. Thus by approaching to each other the pair of the lower adjacent tracks, as well as the pair of the mentioned rods, the sheet suffers inwardly oriented pressures produced from both sides facing towards the center where the rib forming element is also exerting an upwardly oriented pressure to the sheet.

As a result of the effects of said forces, two of them in horizontal direction oriented towards inside, which in turn help the third force, and one in the vertical direction, the sheet is folded upwardly thus forming a perpendicularly salient rib on the surface of the sheet. This process is carried out on the whole surface of the sheet simultaneously producing ribs between each two parallel tracks.

Once the ribs are formed, each of which is firmly fixed by means of glue since in the interior zone between the lateral walls of each rib there is glue which was previously deposited on the lower surface of the cardboard sheet in the manner described hereinabove.

In the next phase of the operation of the machine, the upper shaper platforms are elevated, leaving the already formed sheets on the lower platforms. Each of the latter is attached by means of a lower rotation axis, to a pair of tilting cylinders each of said cylinders incorporating an inside piston capable of going up and down in the interior of the respective cylinder which is in turn secured at its lower end to the ground, thus being able to tilt around respective rotation axes.

The final forming is effected once the platforms, carrying each one a cardboard sheet with

ribs are lifted and tilted in opposite facing directions due to the elevation of the pistons of the mentioned cylinders, rotating around the axis which joins each of them to the end of the piston, until both platforms come to join each other in vertical position, thus fitting into each other the two cardboard sheets that each is carrying thereon.

As mentioned before, the ribs corresponding to a sheet are oriented in the orthogonal direction with respect to those of the other sheet. In order to produce a perfect fitting between both sheets, the respective ribs of each one is introduced in certain openings which have been previously made in each sheet. Said openings are situated in exact predetermined positions, in such a manner that by forming the ribs, they are located in suitable positions for receiving the ribs of the facing sheet at the moment of carrying out the fitting. For such a purpose cardboard sheets are used which already incorporate the mentioned openings.

By fitting the ribs, they are at the same time stuck together due to the fact that they have glue on the point where the fitting is being made because of the effect of glue injectors described hereinabove.

DESCRIPTION OF THE DRAWINGS

Figure 1 is an elevation view of the machine for shaping and mounting cardboard panels.

Figure 2 is a plan view of the machine of figure 1.

Figure 3 is an elevation view of the machine of the invention with the upper platforms superposed over the lower platforms having the respective cardboard sheets in between.

Figure 4 is an elevation view of the machine of the invention in the condition of effecting the fitting between two sheets.

Figure 5 shows two views in detail of the rib forming device.

EXAMPLE OF A PRACTICAL EMBODIMENT

The machine for shaping and mounting cardboard panels consists of two upper shaper platforms (1) and (2), displaceable either in horizontal or vertical direction, in such a manner that the displacement in horizontal direction of the platform (1) is in orthogonal direction with respect to the horizontal displacement of platform (2). Each one of the platforms incorporates a series of horizontal and parallel double tracks (10) with the particularity that each double track consists of two rods of elongated prismatic and rectangular shape being juxtaposed and capable of performing displacements in horizontal and opposite directions with respect to each other (see figure 5). The respective

double tracks of one platform are arranged in orthogonal direction with respect to those of the other platform as it can be observed in figure 2.

Additionally each upper platform has suction cups (5) for picking up and adhering the cardboard sheet while it is displaced by means of platforms (1) or (2). On the side and in the transverse direction with respect to the direction of displacement of each platform, the latter have a series of glue injectors (4) arranged in predetermined positions in order to deposit glue on the upper surface of the cardboard sheet. A second series of lower glue injectors (6) are arranged in horizontal and also transversal position with respect to the direction of the displacement of each platform, and are proposed to deposit glue on predetermined zones of the lower surface of the sheet when the latter returns together with the platform to the position of shaping.

Additionally, the machine object of the invention, consists of two lower shaper platforms (7), each of which being constructed by means of a series of horizontal and parallel tracks (8) of prismatic and rectangular shape, in such a manner that the tracks corresponding to a lower platform are arranged in the orthogonal direction with respect to those of the other lower platform. On the lower part between each two adjacent tracks there is a series of rib forming devices (9), joined on each side to the lower part of the respective track (8). Said device (see figure 5), consists of a sharp-pointed element (91) such as a bar of small diameter surrounded on the lower part by a ring which is in turn joined to two arms each one articulated by means of two respective axes of rotation at the end opposite to that which joins them to the lower surface of the respective track (8). Other two arms are joined to the same rotation axis and are connected to the upper part of the bar (91) forming the four arms a configuration similar to a rhomb. This structure makes it possible that by approaching two adjacent tracks (8), this movement is transmitted to the bar as an upward vertical movement due to the action of the mentioned arms.

On the lower part, the lower platforms (7) are joined to two respective tilting cylinders (12) each of which incorporating in their interior part a piston capable of going up and down, the upper end of the piston being connected to the lower part of the corresponding platform (7) by means of the axis of rotation (13). The tilting cylinders (12) are each connected to the ground at their lower end by means of other two respective rotation axes (15).

With this structure, the machine object of the invention performs a working cycle in the following manner:

In the first place the upper platforms (1) and (2) are displaced towards their respective zones

where cardboard sheets are stacked. In figure 1 the zone where the sheets corresponding to platform (2) are stacked is shown with numeral (3); likewise platform (1) is horizontally displaced in perpendicular direction to that of platform (2), towards its respective zone of stacked cardboard sheets said zone not having a numeral in the figure.

By producing this displacement, the upper glue injectors deposit glue on each cardboard sheet. Once the platform is situated on the stack of sheets, suction cups (5) are activated in order to pick up the first sheet of the pile. Then the platforms, with the sheets adhered thereto, return toward the area of initiating the operation where the process of shaping is continued, while during this returning displacement, the lower glue injectors (6) deposit glue on the lower surface of each sheet.

In the next working phase, platforms (1) and (2) now in the shaping zone, move down until they are situated on the lower platforms (7), having the cardboard sheet (11) situated in the middle (figure 3). At this moment the lower tracks (8) perform a movement in horizontal direction approaching each other, while each pair of upper double tracks (10) are separated from each other, thus exerting pressure in the direction of the displacements both on and beneath the cardboard sheet. At the same time, as it can be observed in figure 5, the displacement of the lower tracks (8) forces bar (91) to perform a movement in upward vertical direction, exerting pressure in the same vertical direction on the cardboard sheet (11) thus making ribs in the latter. Said ribs are tightly fixed because of the effect of the glue already deposited, which at this moment is located between the inside walls of each rib.

After the ribs are made, the upper platforms (1) and (2) are lifted in order to allow sufficient space for the next phase of the operation which is the phase of final shaping.

In the phase of final shaping, the pistons of the tilting cylinders (12) are simultaneously lifted thus producing the elevation and the tilting of platforms (7) until they come to reach each other in position of fitting the cardboard sheets which they carry over into each other (see figure 4).

The fitting of the ribs into each other is made possible because of a series of openings which are previously made in the sheets, prior to initiating the process, in predetermined positions in such a form that by shaping the ribs, said openings are located in determined points along each rib and correspond to the zone where the upper edges of the ribs of the facing sheet are introduced, thus allowing a perfect fitting between both sheets. The fitting is tightly fixed by means of glue which was previously deposited on the sheets, joining and sticking them together in the zones of fitting, thus

completing a working cycle with the resulting cardboard panel being shaped.

Having sufficiently described the nature of the present invention, as well as one way of putting it into practice, it only remains to be added that it is possible to introduce changes in form, material and disposition over all the invention or over parts that it is composed of, as long as such alterations do not vary substantially the characteristics of the invention claimed as follows:

Claims

1. Machine for shaping and mounting cardboard panels, applicable for producing cardboard panels with a high degree of rigidity and firmness, characterized in that starting from two cardboard sheets its operation consists of forming in each sheet a series of salient ribs by means of two pairs of platforms consisting each pair of an upper platform and a lower platform in facing positions, said upper platforms being displaceable both in horizontal and vertical directions, and the lower platforms capable of being tilted from a horizontal position to a vertical position by means of a pair of lower tilting cylinders. The ribs in the sheets are formed by means of a series of horizontal and parallel tracks situated on each lower platform and capable of being displaced in horizontal direction, a series of horizontal and parallel double tracks located on each upper platform and capable of being displaced in horizontal direction, and a series of rib forming devices situated between each pair of the adjacent lower tracks. The machine is further characterized because the two sheets on which the ribs are formed fit into each other and are stuck to each other, having the upper platforms removed, and caused by the tilting of the lower platforms until they come to reach and face each other in vertical position where the fitting of the respective sheets carried by each platform is produced and is made tightly fixed by the effect of the glue previously deposited on predetermined places of each sheet. 15 20 25 30 35 40 45
2. Machine for shaping and mounting cardboard panels, according to the previous claim, characterized in that the upper platforms are displaced horizontally but in orthogonal direction with respect to each other in order to carry out the picking up of the cardboard sheets. 50
3. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that each platform consists of a series of glue injectors situated in transverse 55

direction with respect to the direction of displacement of the platform and proposed to deposit glue on the upper surface of the sheet while the platform is displaced towards the zone where the cardboard sheets are piled.

4. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that each upper platform has a number of suction cups proposed for picking up the sheets and adhering them to the respective platform. 10
5. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that once the sheets are picked up and while the platforms return to their initial position, a series of lower glue injectors deposit glue on the lower surface of each sheet, the platforms then moving down until they are situated over the lower platforms having the cardboard sheet in the middle. 15
6. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that the rib forming devices are situated between the tracks of the lower platform each of said devices having a sharp-pointed element, such as a bar, articulated by means of four arms arranged in the form of a rhomb having rotation axes at each vertex thereof, the side vertices of the rhomb being connected to the corresponding adjacent tracks in such a manner that they can convert the horizontal approaching movement of said tracks in a vertical movement of the bar due to which it in turn exerts pressure on the cardboard sheet in vertical and upward direction. 20 25 30 35 40 45
7. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that the ribs are produced because of the combination of three pressure effects on the upper and the lower surface of the cardboard sheet, one of which being caused by the horizontal approaching of two adjacent tracks of the lower platform, another pressure effect caused by the horizontal approach of two facing rods each pertaining to double tracks being adjacent to one another on the upper platform and a third effect caused by the effect of the upward vertical movement of the bar of the rib forming device, thus producing a multitude of parallel ribs on each sheet, being the orientation of the ribs of one sheet in orthogonal direction with respect to those formed on the other. 50 55

8. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that the ribs remain tightly fixed because of the effect of the glue previously deposited on predetermined zones so that when the ribs are produced, said zones form the inside walls of said ribs. 5
9. Machine for shaping and mounting cardboard panels, according to the previous claims, characterized in that the lower platforms with cardboard sheets on which the ribs are formed, are tilted until they come to reach and join each other in vertical position thus fitting the ribs of the sheets into each other in such a manner that each rib is introduced in a series of openings made prior to the beginning of the operation in places which correspond and are proposed to receive the mentioned ribs, said ribs sticking together by means of glue which was already deposited on the sheets. 10 15 20

25

30

35

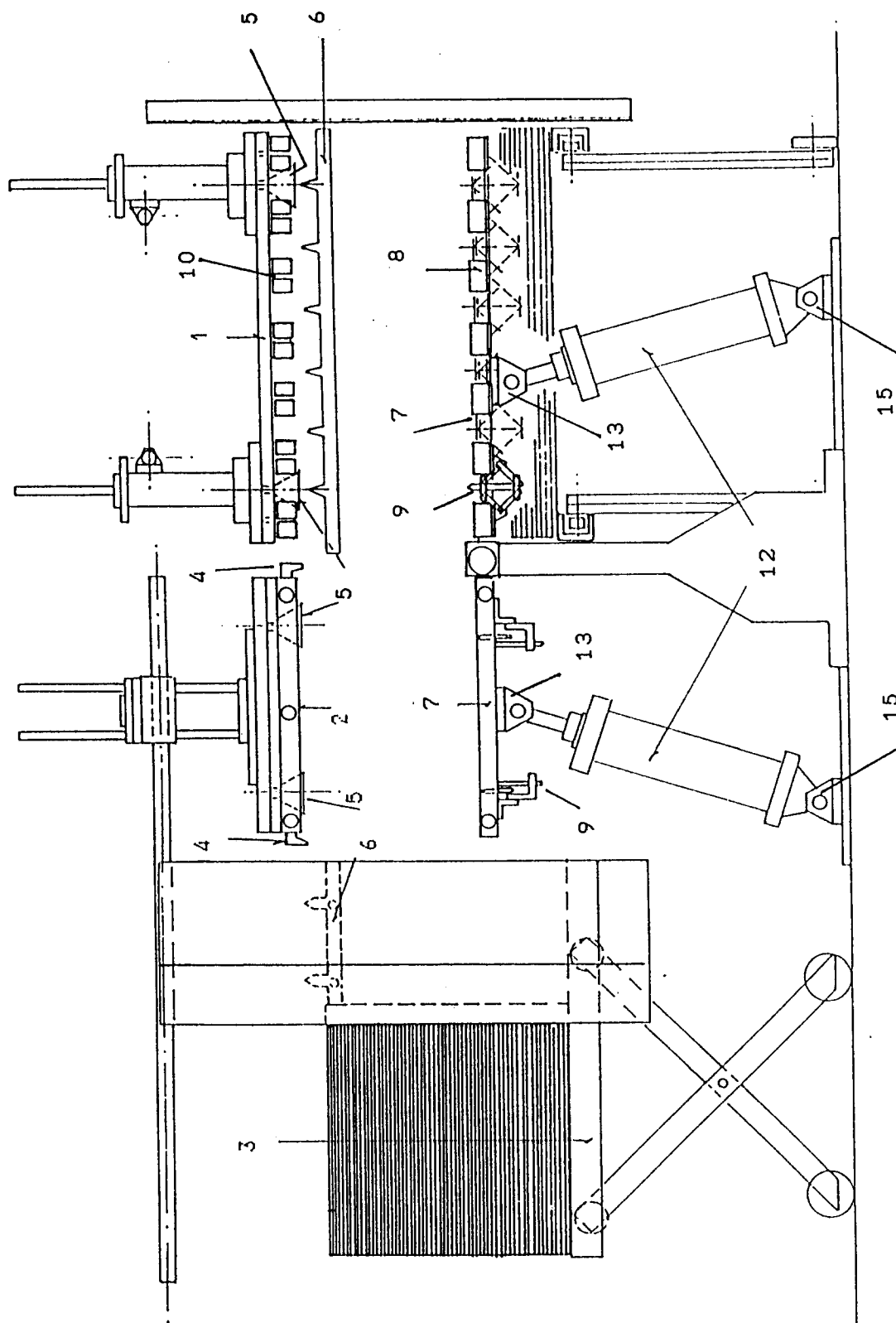
40

45

50

55

FIG. 1



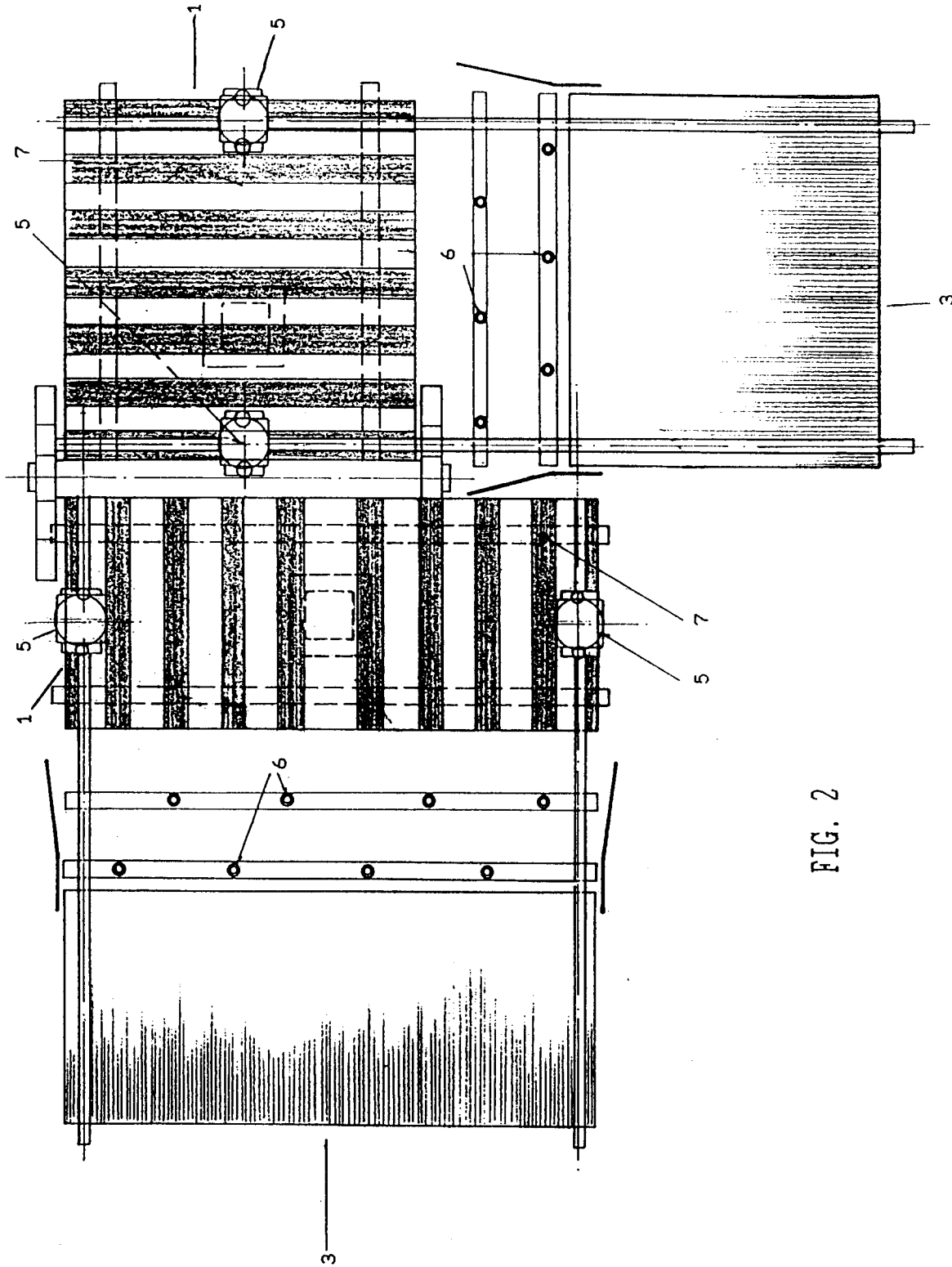


FIG. 2

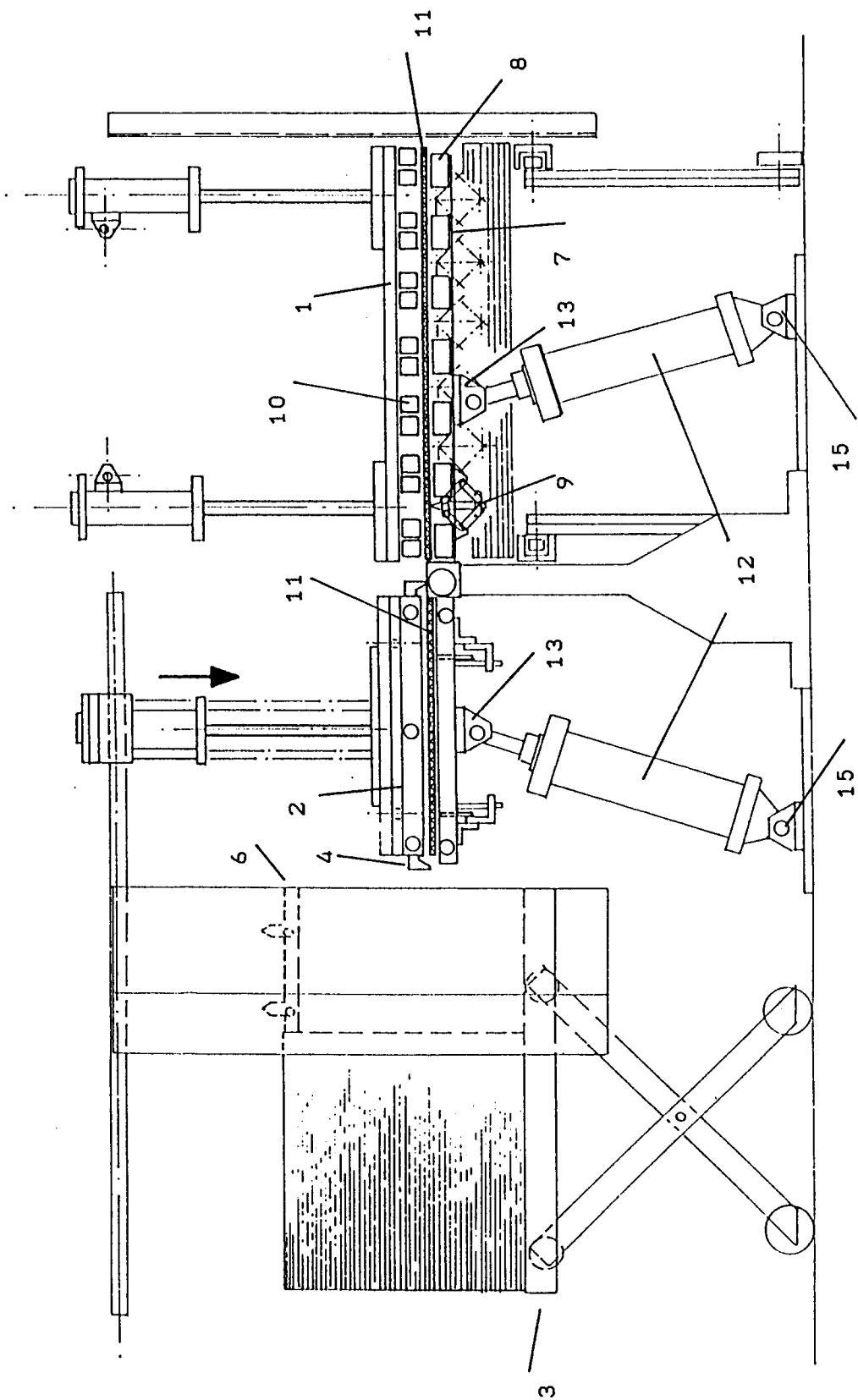


FIG. 3

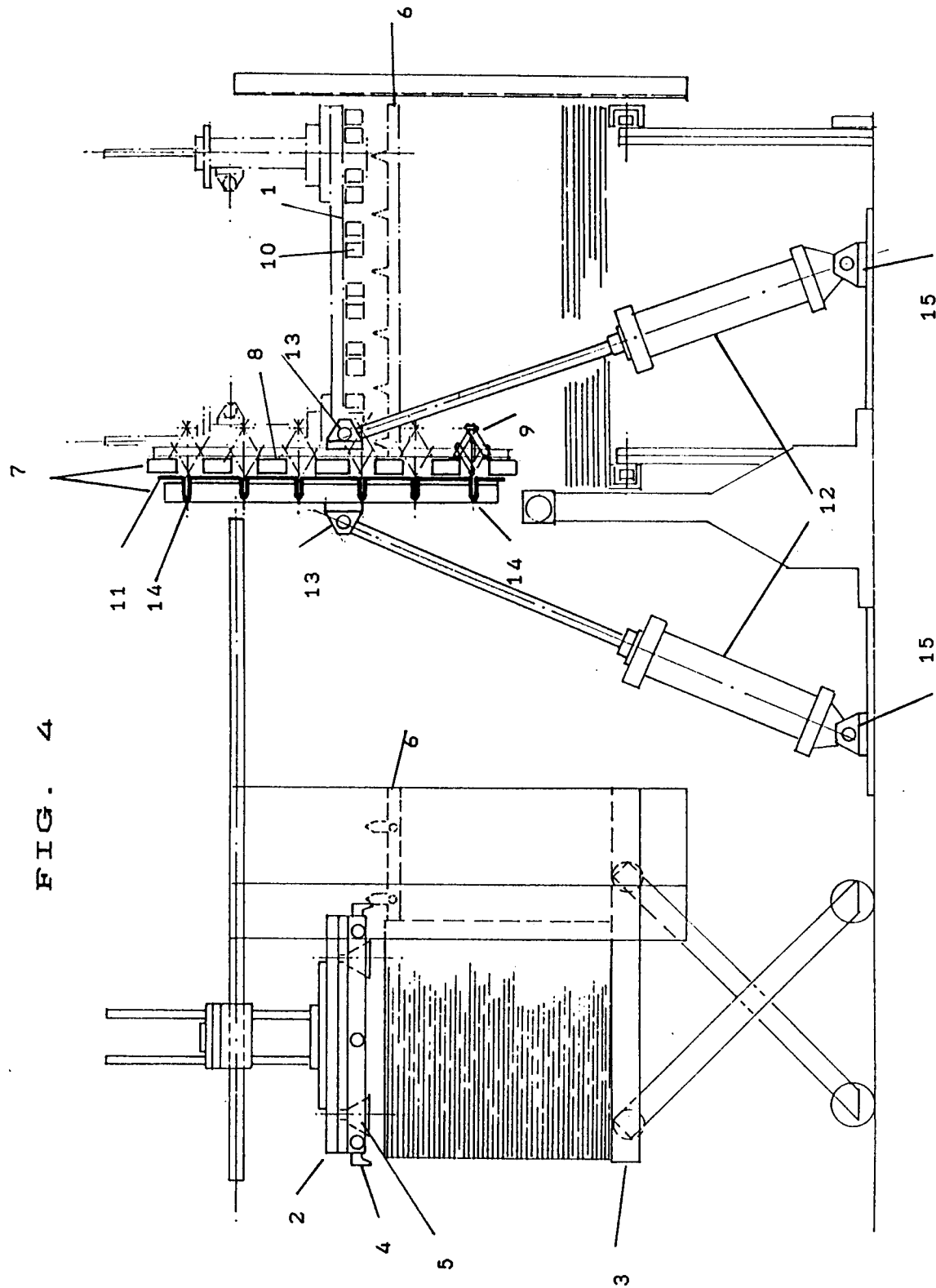


FIG. 4

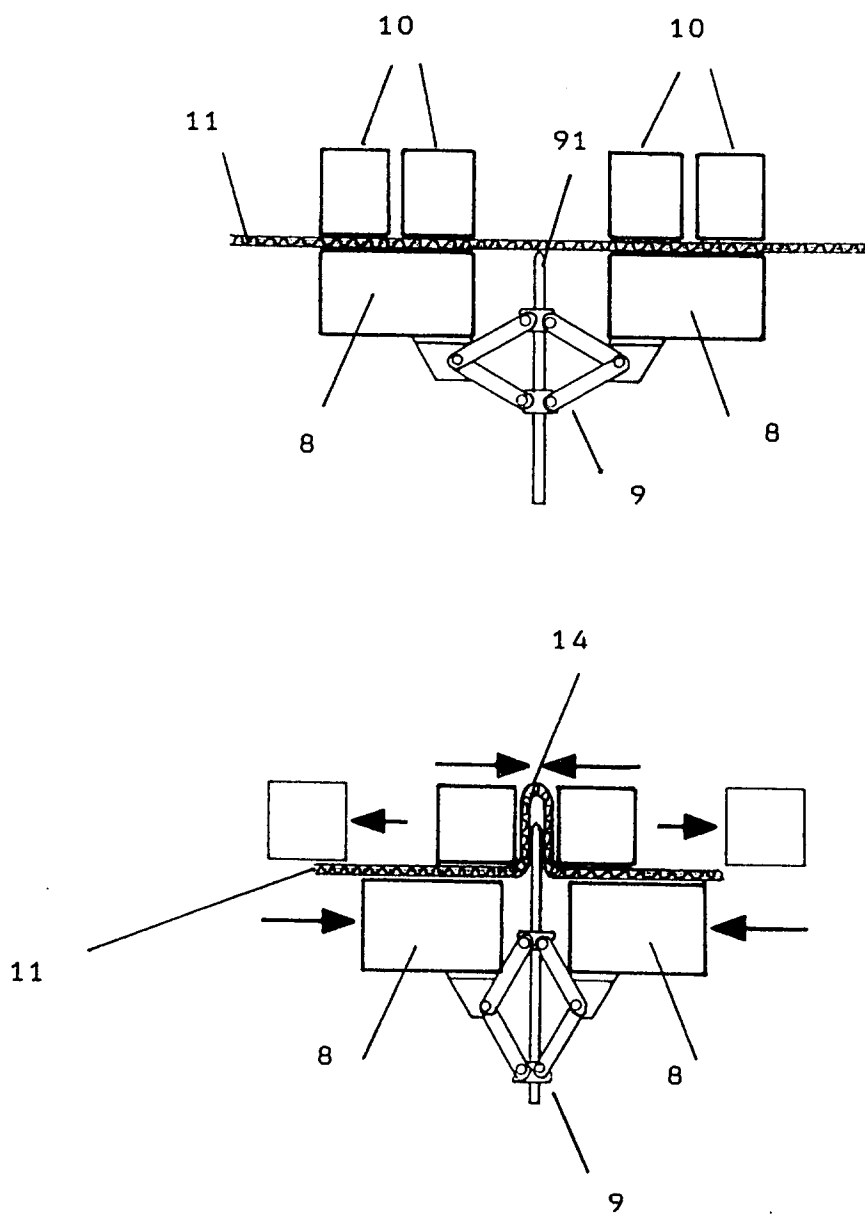


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ES 92/00026

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl.5 B31F 1/20

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)

Int.Cl.5 B 31 F B 31 D

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 3492188 (WANDEL) 27 January 1970 -----	1
A	DE, C, 578439 (MOLL) 14 June 1933 ---	1
A	US, A, 4201119 (WOLF) 6 May 1980 -----	
A	FR, A, 1494318 (CREUSOT) 8 September 1967 -----	
A	FR, A, 1180114 (KRAFT) 2 June 1959 -----	

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

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

30 June 1992 (30.06.92)

Date of mailing of the international search report

26 August 1992 (26.08.92)

Name and mailing address of the ISA/

EUROPEAN PATENT OFFICE

Facsimile No.

Authorized officer

Telephone No.