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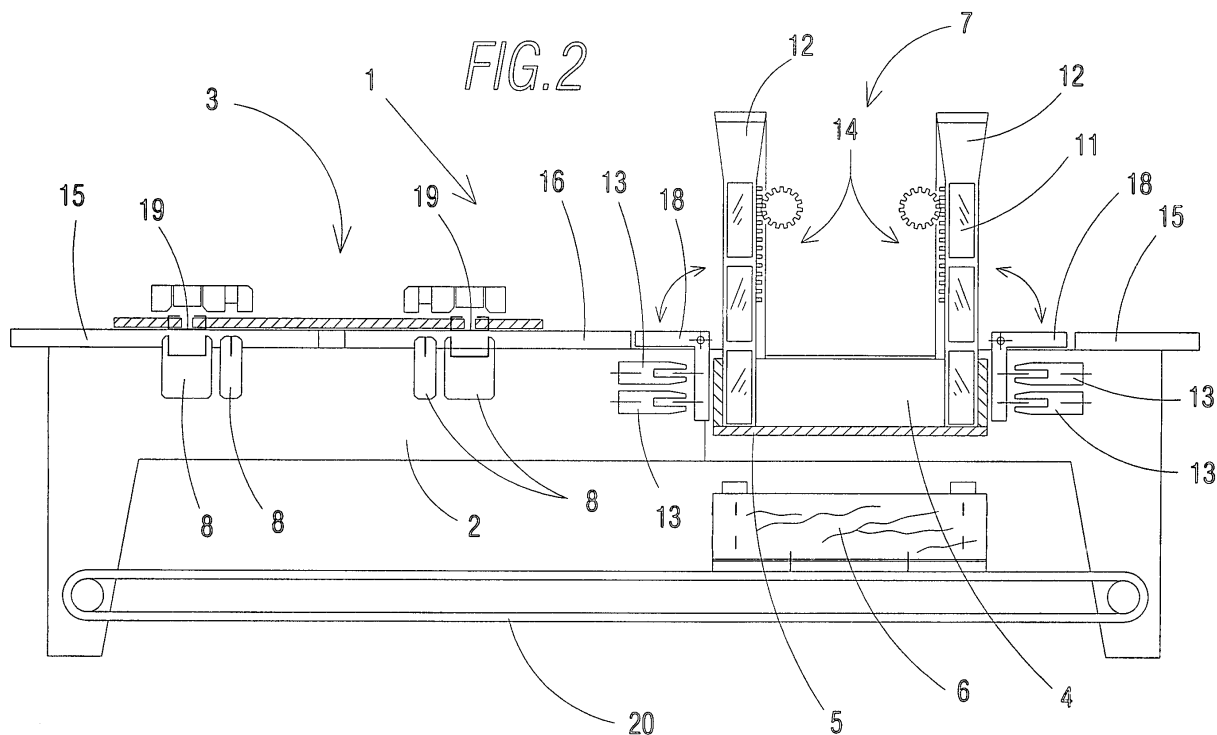
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(54) **Assembly device for wooden boxes and the assembly procedure for the wooden boxes**

(57) Assembly device (1) for wooden boxes, that is made up of a bench (2) that includes a first stapling device (3) for the side walls to the base of the box (6), and a second device for the placement of the reinforcements (7), characterised in that the stapling device (3) has at least eight stapling heads (8) which allows the stapling of the four side walls (4) and means of positioning (9) of

said base (5) and said side walls (4), and by the fact that the reinforcement locating device (7) has some means of turning (18) and four reinforcement loaders (12) that are movable axially and vertically and by at least four stapling heads (13) that fix the side walls at an angle of 90° to the base (5) and simultaneously staple each one of the reinforcements (11) to two side walls (4).



Description

OBJECT OF THE INVENTION

[0001] This invention refers to an assembly device for wooden boxes and the assembly procedure for the boxes by means of the stated device that incorporates appreciable innovations and advantages over the devices and machines currently used for the same purpose.

[0002] More specifically, it makes reference to a device especially for wooden boxes made up from a base, four side walls and four corner reinforcements held together by means of staples, said device being made up from a bench that includes a first device for the stapling of the four side walls to the base of said box, said base and sides being in a horizontal position and a second device for the fitting of the corner reinforcements.

BACKGROUND TO THE INVENTION

[0003] Currently, the type of box that is used is well known in the packaging industry, for example, for the packaging of differing types of fruit and vegetables. Said boxes are made of wood and to a greater extent are made from a base, four side walls and four corner reinforcements that act by way of strengtheners, being fitted to each one of the corners of the box, and all of the elements of the box being held together by a number of staples.

[0004] In order to carry out the assembly of the box described in the previous paragraph, the companies specialised in the industry use machinery that carries out the assembly of the wooden box in different stages, the first stage being the locating of the corner reinforcements and their stapling onto two of the side walls, said reinforcements being fixed, a second stage that consists of the stapling of the four side walls that are connected to each other and finally; as the third and last stage the locating and fixing of the base of the wooden box to the sides.

[0005] However, the described assembly process has the main disadvantage that in order to carry it out out, the use of three or more automated machines is required, in the great majority of cases, being large sized, and with a considerable financial investment, that has a direct effect on the final cost of the product.

[0006] On the other hand, in the assembly process it is necessary to have four employees for the handling of the different machines and likewise the boxes themselves.

[0007] Another no less outstanding disadvantage, is the fact that the machinery used cannot easily be transported to places where, at differing times of the year, it is necessary, for example during the harvest season when a large production of boxes is required for their subsequent use. This effect is due to the fact that large sized machines are being dealt with and them having considerable weight.

[0008] Therefore, said boxes can only be produced in the factory of origin and this also makes the price of the box more expensive, in addition to the price of the product that has to be packed and the transport of the boxes themselves. In addition, the space that said boxes occupy once finished makes them quite voluminous for their transportation.

DESCRIPTION OF THE INVENTION

[0009] The present invention has been developed for the purpose of providing an assembly device for wooden boxes and a procedure for their assembly with said device that solves the previously mentioned disadvantages, in addition bringing other advantages that will be clear from the description that is attached below.

[0010] The assembly device for wooden boxes of the present invention, specially for boxes with a base, four side walls and four corner reinforcements held together by means of staples. Said device is made up from a bench that includes a first device for the stapling of the four side walls to the base of said box, said base and sides being in a horizontal position and a second device for the fitting of the corner reinforcements. This is characterised by the fact that stapling device has at least eight stapling heads that allow the stapling of the four side walls and the base to be carried out in a simultaneous manner. It also has means for the positioning of said base and said side walls, and because of the fact that the locating device for the reinforcements has a means of turning the four side walls and four reinforcement loaders that are movable axially and vertically. There are at least eight stapling heads that are arranged at each end of a housing that positions the side walls at 90° in respect to the base and that staple each one of the reinforcements simultaneously to the two walls facing their ends.

[0011] Thanks to these characteristics, a device is obtained for the manufacture of wooden cases aimed mainly at the assembly and transport that carries out all the phases of the assembly of the wooden box in an optimal manner and with great advantages in regard to the machines used at the present time for the same purpose.

[0012] In addition, the assembly device described has a lower investment cost, requires the presence of less employees for the handling of same and thanks to its working and the assembly characteristics of the boxes, provides increased productivity of boxes per useful working hour.

[0013] All of the above-mentioned factors mean a reduction in the manufacturing cost of the wooden boxes, an aspect very much to be taken into account at the present time.

[0014] Another advantage that has to be highlighted in the device of the invention is the fact that the dimensions of same are very much reduced compared to machines presently known in the market. In this way, their

siting is made easier as less space is required and they are easier to transport.

[0015] Preferably, the four loaders of the reinforcements of the device are movable axially and vertically by means of a rack and pinion system. It must be highlighted that there is the possibility of using any other system of movement for the loaders, such as, for example, by means of a pneumatic or hydraulic system.

[0016] In accordance with another aspect of the present invention, the bench is made up from at least four independent tables that move both longitudinally and transversally by means of a multitude of guides arranged on the lower part of the bench. In this way, the dimensions of the bench can be adjusted to the manufacture of different sized boxes without having to apply any substantial modification to the device.

[0017] Preferably, the bench will also have two independent central tables; moveable transversally by means of a multitude of guides arranged on the lower part of the bench the same as the previously mentioned tables.

[0018] In accordance with other characteristics of the present invention, each one of the four loaders and the four heads of the reinforcement location device are directly connected to four of the independent tables.

[0019] Preferably, four of the six independent tables are made up of at least two stapling heads, being positioned in a set of two heads and each group having been arranged at an approximate angle of 90° to each other.

[0020] In accordance with other characteristics of the present invention, the means of positioning the stapling device is made up of a width equivalent to the thickness of the base of the box. In this way, when the side walls are turned against the base, they are perfectly positioned and fitted at an angle of 90°.

[0021] In accordance with the preferred embodiment of the invention, the bench includes a conveyor belt in the lower part of the reinforcement locating device. In this way, the removal of the box when assembled is made easier.

[0022] By preference, the means of turning are made up of a multitude of turning elements located on the bench, each one being made from a pair of wings situated at an angle of 90° to each other.

[0023] In accordance with another aspect of the present invention, a procedure for the assembly of the wooden boxes from the device is defined in accordance with the above-stated claims that is made up of the steps of:

- a) Locating the side walls and the base of the box in a horizontal position on the section of the bench situated in the stapling device;
- b) Simultaneously stapling the four side walls to the base of the box by means of both heads;
- c) Locating the set of walls and base of the box on the independent tables in the reinforcement locating device;

d) Lowering the reinforcement loaders and pivot the turning device through a 90° angle in order to turn the side walls of the box with the stapled base at an approximate angle of 90° to the box base:

e) Simultaneously stapling each one of the side walls of the box by means of the respective heads to the respective reinforcements and;

f) Removing the assembled and stapled wooden box in order to subsequently place it on a conveyor belt.

[0024] Thanks to this procedure, the assembly time for the wooden box is considerably reduced in comparison with the procedures being currently used. This is basically due to the fact that the stapling of the side walls and the base are carried out simultaneously and under circumstances in different stages.

[0025] Other characteristics and advantages of the assembly device for wooden boxes object of the present invention will be obvious from the description of a preferred embodiment, but not exclusive, which are illustrated in the attached drawings, by way of example but are not by way of limitation, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Figure 1. - This is a plan view of an assembly device for wooden boxes for packaging of the present invention;

Figure 2. - This is a sectioned side elevation of the assembly device represented in the previous figure;

Figure 3. - This is a sectioned front view of the assembly device represented in the previous figures, seen from the part of the device for the locating of the reinforcements;

Figure 4. - This is a plan view of the wooden box spread out, of the type that can be assembled in the assembly device of the present invention; and

Figure 5. - This is a projected view of an embodiment of a wooden box with the reinforcements assembled, obtained from the device represented in the previous figures.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0027] As and how described in figures 1 and 2, the assembly device (1) for wooden boxes of the present invention, for example, of the type that is used for transporting and packaging fresh fruit, is basically made up of a bench (2) that includes a first stapling device (3) for the side walls (4) to the base (5) of the wooden box (6), said base (5) and said walls (4) being in a horizontal position and in addition having a second device for the locating of the reinforcements (7).

[0028] As can be seen in the stated figures, the stapling device (3) includes eight stapling heads (8) located

under the tables of the box (6) that allow the stapling to be carried out in a simultaneous manner for the four side walls (4) and the base (5) and means of positioning (9) between said base (5) and said side walls (4).

[0029] It is worth pointing out that the means of positioning (9) the stapling device (3) is made up of some elements (9) that have the areas situated between the side walls (4) and the base (5) with a width equivalent to the thickness of the base (5) of the box (6).

[0030] In the other hand, the reinforcement locating device (7) of the assembly device (1) of the present invention is made up of a bench area (2) a housing (10) for the location of the different elements that make up the box (6) including four reinforcements (11) having a triangular profile, that act as reinforcement for the box (6). The stated device (7) also includes four loaders (12) for the reinforcements (11) that are moveable axially and vertically and eight stapling heads (13) arranged at each end of the housing (10) that staple the reinforcements (11) to two side walls (4) meeting at their ends. The four loaders (12) move axially and vertically in this specific embodiment by means of a rack and pinion system (14).

[0031] On the other hand, the bench (12) of the assembly device (1) has four upper independent tables (15) moveable longitudinally and transversally by means of a multitude of guides (not shown) arranged on the lower part of the bench (2) and two upper central tables (16) which only move transversally.

[0032] The stapling heads (13) are positioned in two sets of two heads (17) and each set having been arranged at an approximate angle of 90° to each other. Additionally, the reinforcement locating device (7) has means of turning (18) which consists of a set of turning elements (18) situated on the bench (2), each one of them being made up from a pair of wings located at and angle of 90° to each other.

[0033] Next, there is a brief explanation with greater clarity of the workings of the assembly device for the reinforcements (7) of the present invention.

[0034] In the first place, the box (6) spread out in a horizontal position (see figure 4) that comes from the stapling device (3), is located over the upper part of the central housing (10). Next said spread structure of the box (6) descends towards the inside of the housing (10) for the turning of the side walls (4). Said turning is carried out by means of the turning of the revolving elements (18) located on the upper part of the bench (2), which turn their wings through 90°, finishing up in the position shown in figure 2.

[0035] After this, the loaders of the reinforcements (12) place said reinforcements (11) in the stapling position in each one of the corners of the box (6), where they remain to receive the corresponding side walls (4), turned and positioned at angles of 90° and which have been previously attached to the base (5) of the box (6). At this moment and simultaneously the four stapling heads (13) come into action which staple the four side walls (4) by means of staples (19) to the reinforcements

(11) that support the box (6), the box (6) finishing up assembled as shown in figure 5. After this, the heads (13) withdraw towards their initial position and the box (6) is ready to be removed directly to a container or equally to place it on a conveyor belt (20) arranged under the bench (1).

[0036] The details, the manner, the dimensions and other accessory elements, likewise the materials used in the manufacture of the wooden box assembly device of the invention can be suitably substituted for others that are technically equivalent and do not depart from the basic essentials of the invention or from the scope defined by the claims that are included next.

Claims

1. Assembly device (1) for wooden boxes, particularly for boxes (6) made up from a base (5), four side walls (4) and four reinforcements (11) all of the aforementioned being joined by means of staples (19) that is made up of a bench (2) which includes a first stapling device (3) for the side walls to the base of the box (6), said base (5) and said walls (4) being in a horizontal position and a second device for the locating of the reinforcements (7), is **characterised by** the fact of being a stapling device (3) being made up of at least eight stapling heads (8) that allow the stapling of the four side walls (4) and the base (5) to be carried out in a simultaneous manner and there being a means of positioning (9) between said base (5) and said side walls (4), and by the fact that the reinforcement locating device (7) includes some means of turning (18) the side walls (4) and four loaders for the reinforcements (12) that are movable axially and vertically and by having at least four stapling heads (13) arranged at each end of the housing (10) which positions the side walls at 90° to the base (5) and simultaneously staples each one of the reinforcements (11) to two side walls (4) brought together at the ends.
2. Assembly device (1) for wooden boxes according to claim 1 **characterised in that** the four reinforcement (11) loaders (12) move axially and vertically by means of a rack and pinion system (14).
3. Assembly device (1) for wooden boxes according to claims 1, 3 or 4, **characterised in that** the bench (2) has at least four independent tables (15) that are movable longitudinally and transversally by means of a multitude of guides arranged on the lower part of the bench (2).
4. Assembly device (1) for wooden boxes according to claims 1, 3 or 4, **characterised in that** the bench (2) has two independent central tables (16) that are movable transversally by means of a multitude of

guides arranged on the lower part of the bench (2).

5. Assembly device (1) for wooden boxes according to claims 1 and 3, **characterised in that** each one of the four loaders (12) and at least eight stapling heads (13) of the reinforcement locating device (7) are directly connected to four of the independent tables (15) and (16). 5

6. Assembly device (1) for wooden boxes according to claims 1, 3 and 4, **characterised in that** four of the six independent tables (15) and (16) have at least two stapling heads (13), being positioned in a set of two heads and each set having been arranged at an approximate angle of 90° to each other. 10
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7. Assembly device (1) for wooden boxes according to claim 1, **characterised in that** the means of positioning (9) of the stapling device (3) has a width equivalent to that of the thickness of the base (5) of the box (6). 20

8. Assembly device (1) for wooden boxes according to claim 1, **characterised in that** on the lower part of the bench (2) of the device for the locating of the reinforcements (7) there is a conveyor belt (20). 25

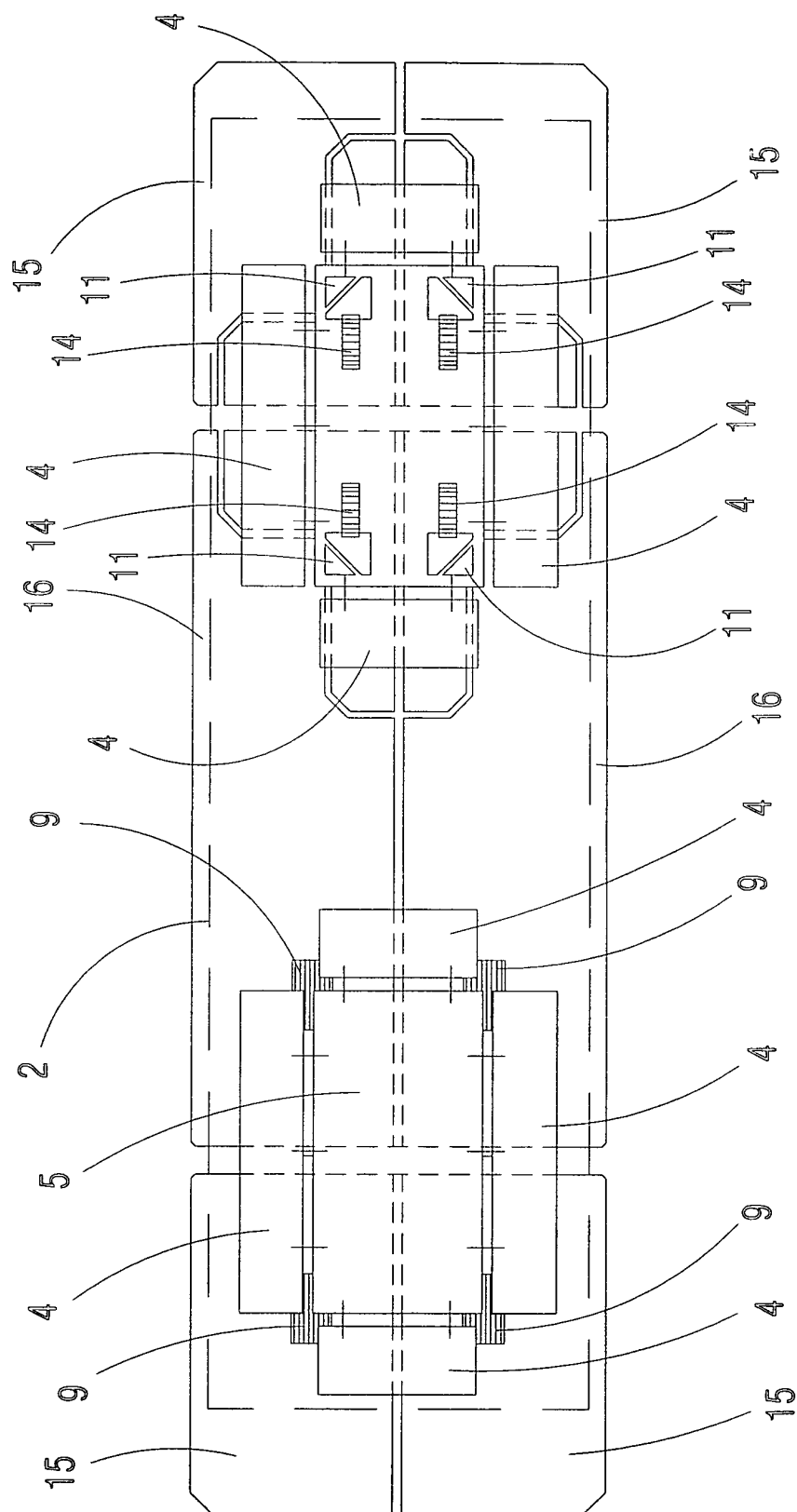
9. Assembly device (1) for wooden boxes according to claim 1, **characterised in that** the means of turning (18) consists of a multitude of turning elements (18) located on the bench (2), each one of them being made up of a pair of wings located at an angle of 90° to each other. 30
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10. Assembly device (1) for wooden boxes, from the device (1) according to the above-stated claims, which includes the following steps:
 - a) The locating of the side walls (4) and the base (5) of the box (6) in a horizontal position on a section of the bench (2) located in the stapling device (3); 40
 - b) To simultaneously staple the four side walls (4) to the base (5) of the box (6) by means of respective heads; 45
 - c) To place the assembly of the four side walls (4) and the base (5) of the box (6) onto the independent tables (15) situated in the reinforcement locating device (7); 50
 - d) To lower the reinforcement loaders (12) and to pivot the turning means (18) through an angle of 90° in order to turn the side walls (4) of the box (6) with the stapled base (5) through an approximate angle of 90° to the base (5) of the box (6); 55
 - e) To simultaneously staple each one of the side walls of the box (6) with the respective re-

inforcements (11) by means of the respective stapling heads (13) and;

f) To remove the assembled and stapled wooden box (6) for its subsequent placement on a conveyor belt (20).

FIG.1



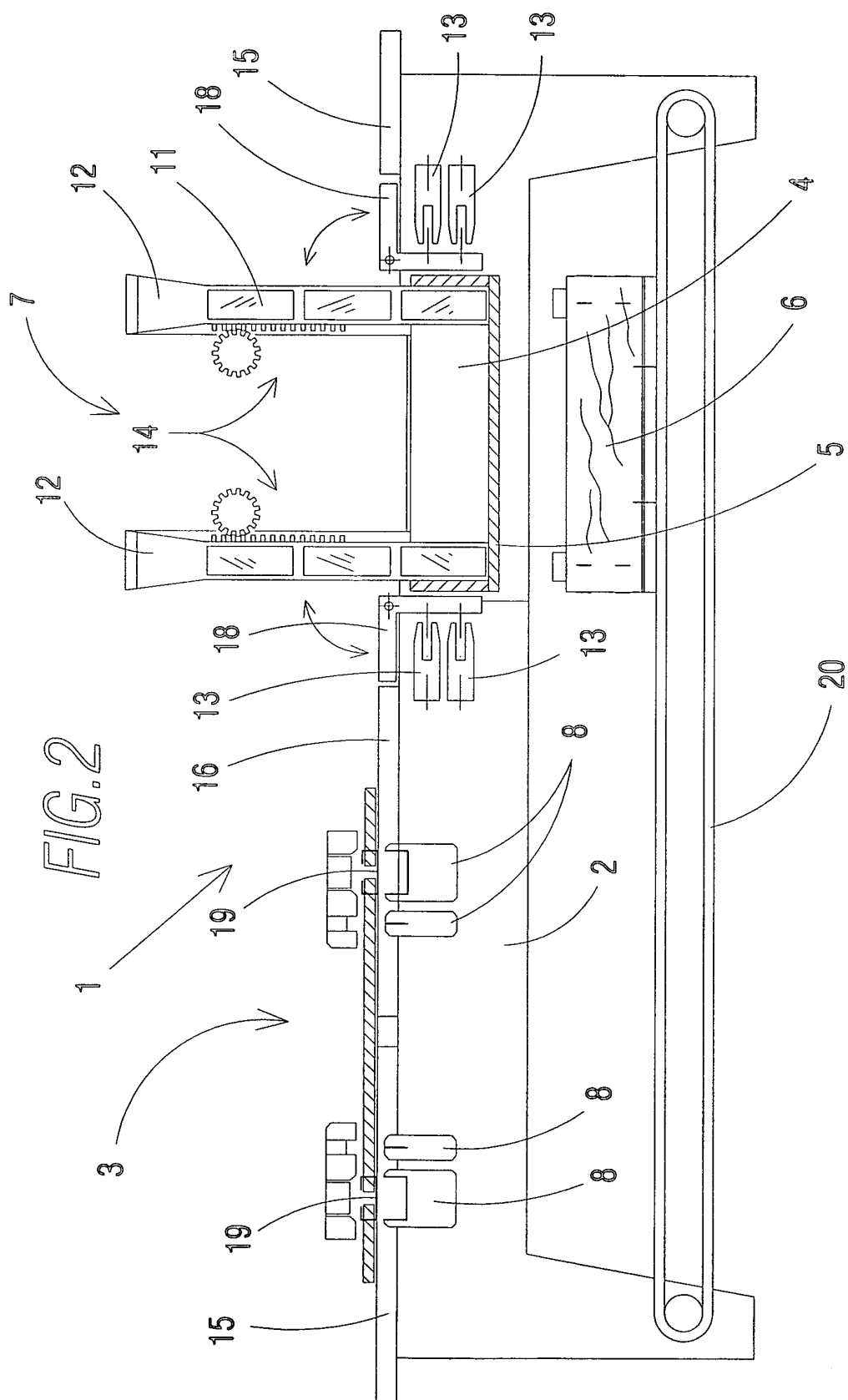
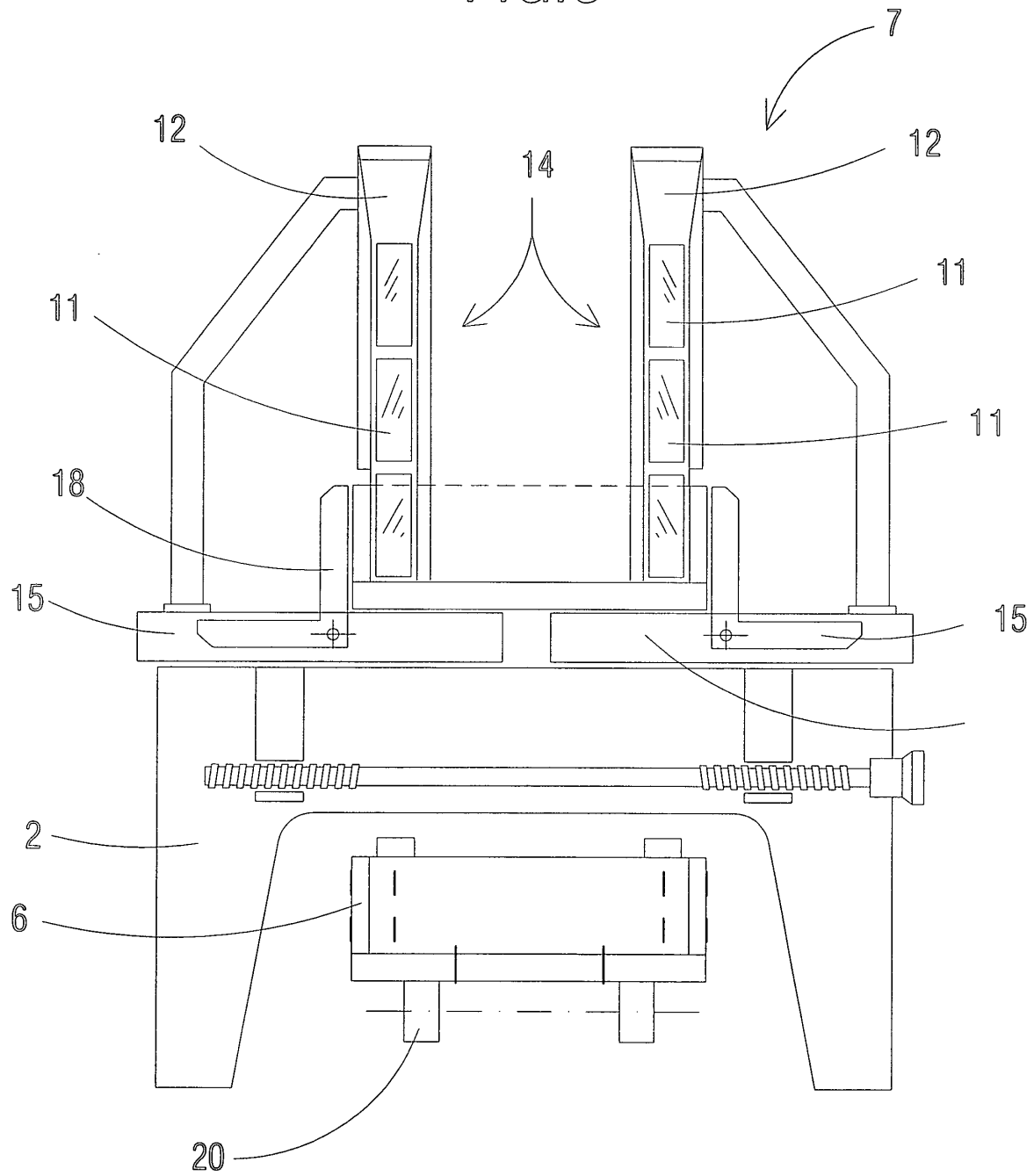
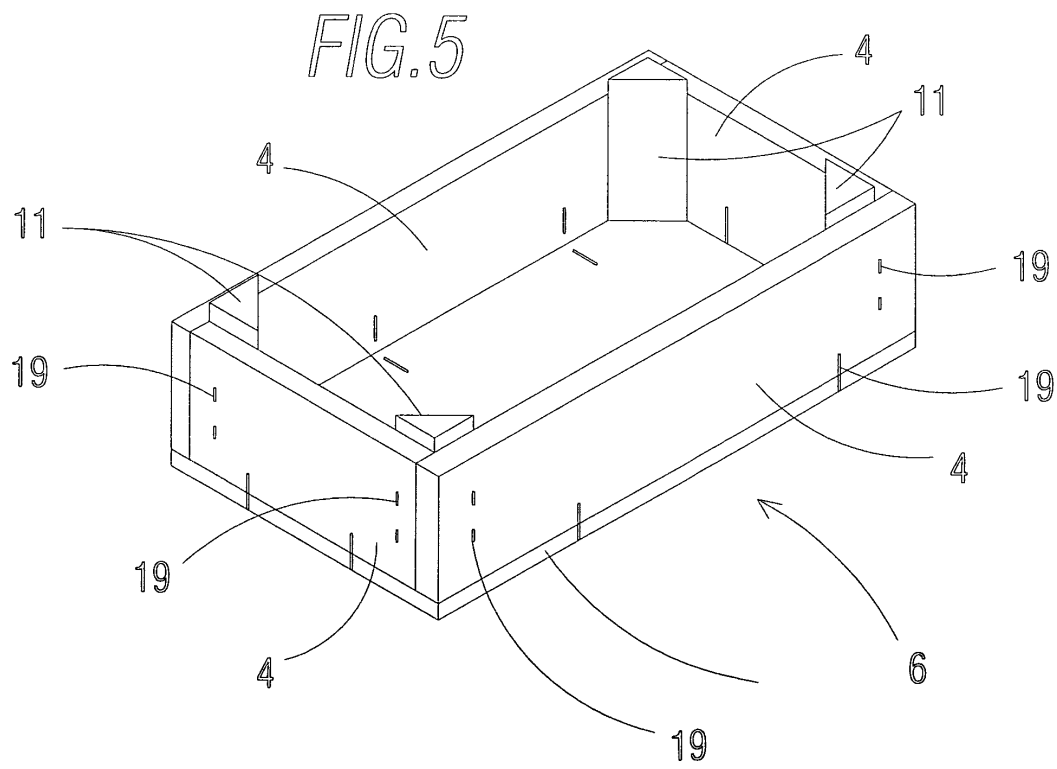
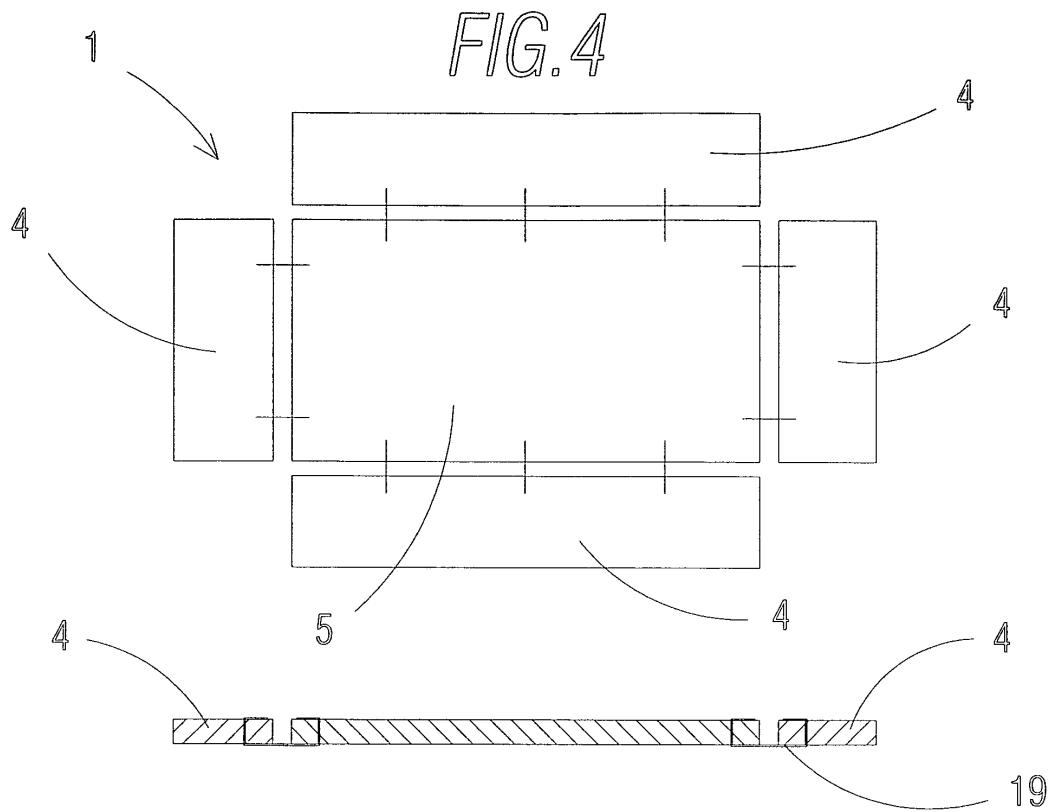


FIG. 3







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 02 4587

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	FR 2 336 219 A (ETS RICHARD FRERES ET CIE) 22 July 1977 (1977-07-22) * page 5, lines 11-29; figures 1-4,7-9 *	1,10	B27M3/34
A	FR 2 235 768 A (CARMONA ROYO ANTONIO) 31 January 1975 (1975-01-31) * claim 1; figure *	1,10	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B27M B27F B65D
Place of search		Date of completion of the search	Examiner
Munich		1 March 2005	Meritano, L
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			

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EPO FORM 1503 03.82 (P4/C01)

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

EP 04 02 4587

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
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01-03-2005

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