(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 253 441 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.11.2010 Bulletin 2010/47

(51) Int Cl.:
B27M 1/08 *(2006.01)*

(21) Application number: **10163077.0**

(22) Date of filing: **18.05.2010**

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

(30) Priority: **18.05.2009 IT BO20090323**

(71) Applicant: **BIESSE S.p.A.**
Pesaro (IT)

(72) Inventor: **Pritelli, Giuseppe**
47033 Cattolica (IT)

(74) Representative: **Jorio, Paolo et al**
STUDIO TORTA
Via Viotti 9
10121 Torino (IT)

(54) **device and method for the squaring of a wooden plate or of a plate of similar material**

(57) Squaring and edging of a panel (2) made of wood or the like being substantially rectangular in shape are carried out by squaring and edging first and second sides (5, 6) of the panel (2) with reference to two parallel guides (28, 30, 32) opposed to each other, squaring and edging a third side (7) of the panel (2) with reference to one of the two guides (28, 30, 32), and squaring and edging a fourth side (8) of the panel (2) once the distance of the third side (7) from a given reference plane (R) has been measured and once the panel (2) has been moved according to the measured distance.

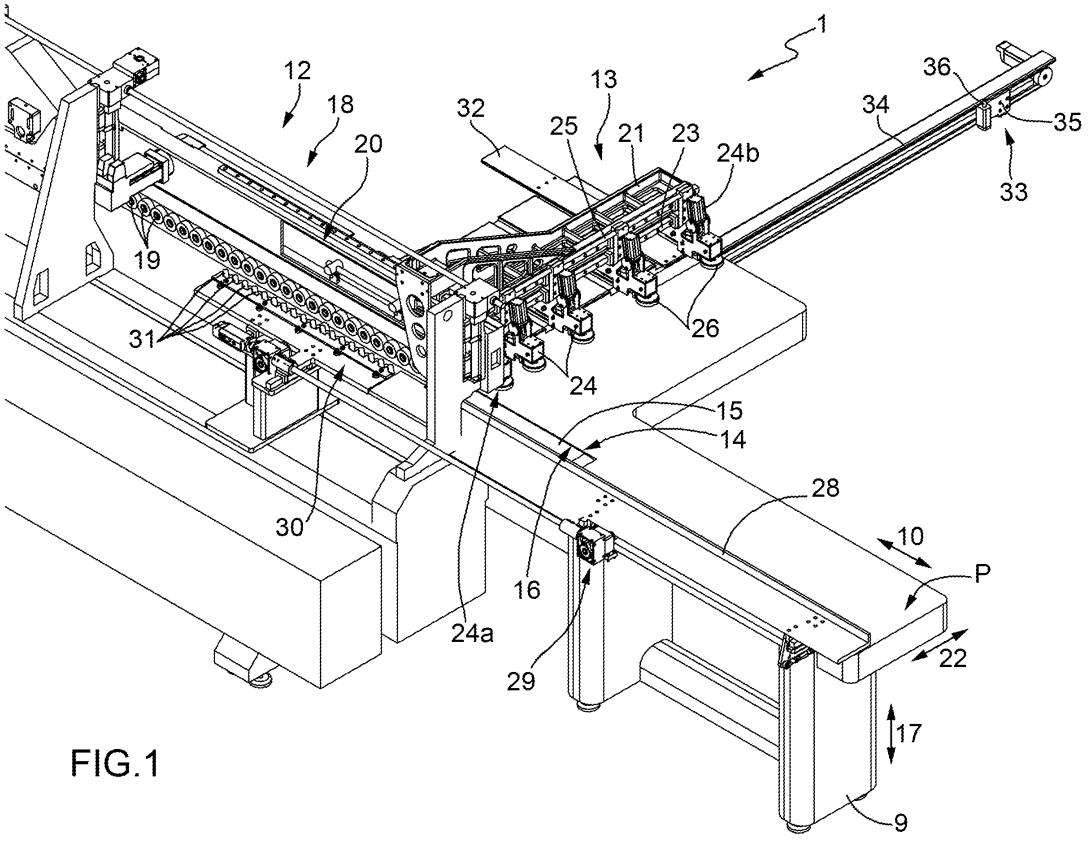


FIG.1

EP 2 253 441 A1

Description

[0001] The present invention relates to a method for squaring and edging panels made of wood or the like.

[0002] The present invention is particularly advantageously applied to edging machines of semiautomatic type, i.e. edging machines in which the panel is to be manually positioned, to which explicit reference will be made in the following description without therefore loosing in generality.

[0003] In the field of edging panels made of wood or the like, it is known to provide a machine comprising an elongated base extending in a given first direction; a feeding unit to move a panel forward through a rectifying station and an edging station arranged in sequence along the base; first stopping means for correctly positioning the panel in a second direction, substantially transversal to the first direction; second stopping means opposed to the first stopping means for correctly positioning the panel in the second direction; third stopping means for correctly positioning the panel in the first direction; and a grip and transfer unit for transferring the panel to the feeding unit.

[0004] In use, the panel is manually moved to bring a first side thereof in contact with the first stopping means, and it is then moved forward in the first direction through the rectifying and edging stations to rectify and edge the first side, respectively.

[0005] At this point, once the second stopping means have been correctly positioned in the second direction, the panel is manually moved to bring the first side in contact with the second stopping means themselves, and it is then moved forward in the first direction through the rectifying and edging stations to rectify and edge a second side of the panel opposed to the first side, respectively.

[0006] Next, the panel is manually moved to bring the first side in contact with the third stopping means and to bring a third side thereof in contact with the first stopping means, and it is then moved forward in the first direction through the rectifying and edging stations to rectify and edge the third side, respectively.

[0007] Finally, once the second stopping means have been correctly positioned in the second direction, the panel is manually moved to bring the second side in contact with the third stopping means and the third side in contact with the second stopping means themselves, and it is then moved forward in the first direction through the rectifying and edging stations to rectify and edge a fourth side of the panel opposed to the third side, respectively.

[0008] The known machines for edging panels of the above-described type have some drawbacks mainly deriving from that the operator must necessarily move the panel in contact with the second stopping means for correctly rectifying and edging the fourth side of the panel. Therefore, a possible error in positioning the panel in contact with the first stopping means compromises the rectifying and edging operations of the fourth side and causes the panel itself to be rejected.

[0009] It is an object of the present invention to provide a method for squaring and edging panels made of wood or the like, which is free from the above-described drawbacks, and which is simple and cost-effective to be implemented.

[0010] According to the present invention, there is provided a method for squaring and edging panels made of wood or the like as claimed in the claims from 1 to 10.

[0011] The present invention further relates to a machine for squaring and edging panels made of wood or the like.

[0012] According to the present invention, there is provided a machine for squaring and edging panels made of wood or the like as claimed in the claims from 11 to 19.

[0013] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limitative embodiment thereof, in which:

figure 1 is a first diagrammatic perspective view, with parts removed for clarity, of a preferred embodiment of the machine of the present invention;
figure 2 is a second diagrammatic perspective view, with parts removed for clarity, of the machine in figure 1;
figure 3 is a diagrammatic plan view, with parts removed for clarity, of the machine in figures 1 and 2; and
figures from 4 to 7 diagrammatically show the operating principle of the machine in figures 1, 2 and 3.

[0014] With reference to figures 1, 2, and 3, numeral 1 indicates, as a whole, a machine for squaring and edging panels 2 made of wood or the like, each of which is substantially rectangular in shape, has a lower face 3 and an upper face 4 parallel to each other, and is laterally delimited by a profile comprising a first pair of sides 5, 6, opposed to each other, and a second pair of sides 7, 8, opposed to each other.

[0015] Machine 1 comprises an elongated base 9, which extends in a horizontal direction 10, and defines a supporting plane P for at least one panel 2; a rectifying station 11 (figures from 4 to 7) and an edging station (not shown) mounted in sequence along the base 9; a feeding unit 12 to move forward the panels 2 through the rectifying station 11 and the edging station; and a grip and transfer unit 13 for transferring the panels 2 to unit 12.

[0016] Unit 12 comprises a lower belt conveyor 14, which has an upper transport branch 15 extending along a slit 16 obtained through the base 9 in a vertical direction 17 orthogonal to plane P, and an upper pressor device 18, which is adapted to secure the panels 2 against the branch 15, is provided with a plurality of rollers 19, and comprises an inlet portion 20, mobile between a raised resting position, in which the corresponding rollers 19 are arranged at a greater distance from the plane P than the thickness of a panel 2, and a lowered working position in which the corresponding rollers 19 engage the upper

face 4 of panel 2.

[0017] Unit 13 comprises a supporting arm 21, which extends over the base 9 in a horizontal direction 22 orthogonal to the directions 10 and 17, and is coupled to the base 9 in a known manner to carry out rectilinear movements in direction 10 with respect to the base 9 itself along a path substantially extending by the side of the portion 20.

[0018] Arm 21 is provided with a guide 23 fixed to the arm 21 parallel to direction 22, and supports a plurality of grip and transport elements 24, which are selectively distributed along the arm 21, are slidingly coupled to the guide 23, and are fixed to a coupling bar 25 parallel to direction 22 and mobile along the arm 21 in the direction 22 itself, under the bias of an actuating device (not shown) and by interposing a shock-absorbing device (not shown).

[0019] Each element 24 comprises a suction cap 26, which is connected to a pneumatic suction device of known type and not shown, and is mobile between a lowered working position, in which the suction cap 26 is arranged in contact with the upper face 4 of a panel 2, and a raised resting position, in which the suction cap 26 is arranged at a predetermined distance from the panel 2 itself.

[0020] Element 24 (hereinafter indicated by numeral 24a) facing the device 18 and the element 24 (hereinafter indicated by numeral 24b) mounted at the free end of arm 21 each cooperate with a respective stopping element 27a, 27b (figures from 4 to 7), which is provided with a sensor (not shown) adapted to detect the contact of a panel 2 with the element 27a, 27b itself, and is mobile with respect to the corresponding element 24a and 24b, between a lowered working position in which the element 27a, 27b is arranged at a smaller distance from the plane P than the thickness of a panel 2, and a raised resting position in which the element 27a, 27b is arranged at a greater distance from the plane P than the thickness of a panel 2.

[0021] Furthermore, the suction cap 26 of element 24a is pivotally coupled to the element 24a to rotate about a longitudinal axis thereof, parallel to direction 17, with respect to the element 24a itself and under the bias of an actuating device (not shown).

[0022] Machine 1 further comprises a first stopping bar 28, which extends in direction 10 from one end of the base 9, and is slidingly coupled to the base 9 to carry out rectilinear movements in direction 22 with respect to the base 9 itself and under the bias of an actuating device 29; and a second stopping bar 30, which extends in direction 10, is arranged in sequence with the bar 28, is slidingly coupled to the base 9 to carry out rectilinear movements in direction 22, with respect to the base 9 itself and under the bias of the device 29, and is provided with a plurality of supporting elements 31 distributed along the bar 30 in the direction 10 itself.

[0023] Each element 31 is slidingly coupled to the bar 30 to carry out rectilinear movements in direction 22 with respect to the bar 30, is normally kept in an extracted position, in which the element 31 protrudes from the bar 30 and is coplanar with a supporting surface of the bar 28, by a shock-absorbing device interposed between the bar 30 and the element 31, is mobile under the bias of a panel 2 to a retracted position, and is adapted to be blocked in its extracted position (figure 4).

[0024] Machine 1 further comprises a third stopping bar 32, which extends in direction 10, faces the bar 30 and is slidingly coupled to the base 9 to carry out rectilinear movements in direction 22 with respect to the base 9 itself.

[0025] Machine 1 is finally provided with a measuring device 33 comprising a guide 34, which protrudes from the base 9 in direction 22, faces the bar 28 and supports a cursor 35 slidingly coupled to the guide 34 to move a sensing element 36 in direction 22, the distance of which from a reference plane R orthogonal to direction 22 is measured, in this case by means of a metric scale (not shown) mounted to the base 9 parallel to the direction 22 itself.

[0026] The operation of machine 1 will now be described with reference to figures 4, 5, 6, and 7 starting from a moment when (figure 4):

- the supporting elements 31 of the stopping bar 30 have been blocked in their extracted positions;
- the supporting arm 21 of the grip and transport unit 13 is arranged at an inlet end of the portion 20 of the pressor device 18;
- the suction caps 26 are arranged in their raised resting positions; and
- the stopping element 27a and the portion 20 are arranged in their lowered working positions.

[0027] Panel 2 is manually moved onto plane P with the side 5 being in contact with bar 28, and with the side 7 being in contact with element 27a (figure 4).

[0028] Once panel 2 has been correctly positioned in directions 10 and 22, the sensor (not shown) associated with element 27a detects the presence of the panel 2 and controls the descent and activation of the suction caps 26; the arm 21 is moved in direction 10 at a slower forward speed than the forward speed of unit 12 to insert the panel 2 between conveyor 14 and device 18; the suction caps 26 are deactivated and moved to their raised resting positions; the arm 21 is moved in direction 10 at a faster forward speed than the forward speed of unit 12 to disengage the element 27a from the panel 2 itself; the element 27a is moved to its raised resting position to allow the passage of panel 2; and the panel 2 itself is moved forward by the unit 12 through the station 11 to rectify the side 5 by means of a milling tool 37, and then through the edging station (not shown) to apply an edge 38 on side 5.

[0029] At this point, elements 31 are released; element 27a is lowered; portion 20 is raised; panel 2 is manually moved on the plane P with the side 6 being in contact

with the bar 28 and with the side 8 being in contact with the element 27a (figure 5a).

[0030] Once panel 2 has been positioned in directions 10 and 22, the sensor (not shown) associated with the element 27a detects the presence of the panel 2 and controls the descent and activation of the suction caps 26 and the raising of the element 27a; the arm 21 is moved in direction 10 at a slower forward speed than the forward speed of the unit 12 to insert the panel 2 under the portion 20 and between the bars 30 and 32; the bar 28 is moved in direction 22 to a retracted position; the bar 32 is moved in direction 22 to correctly position panel 2 in the direction 22 itself (figure 5b); the portion 20 is lowered; the suction caps 26 are deactivated and raised; and the panel 2 is moved forward by unit 12 through the station 11 to rectify the side 6 by means of tool 37, and then through the edging station (not shown) for applying an edge 39 on the side 6 itself.

[0031] With this regards, it is worth noting that possible errors by the operator when positioning the side 6 against the bar 28 are corrected by the rotation of the suction cap 26 of element 24a.

[0032] At this point, the elements 31 are blocked in their extracted positions again; the bar 28 is moved to a forward position again; the elements 27a and 27b and the portion 20 are lowered; and the panel 2 is manually moved on plane P with the side 7 being in contact with the bar 28 and with the side 6 being in contact with the elements 27a and 27b (figure 6).

[0033] Once panel 2 has been correctly positioned in directions 10 and 22, the sensors (not shown) associated with the elements 27a and 27b detect the presence of the panel 2 and control the descent and activation of the suction caps 26; the arm 21 is moved in direction 10 at a slower forward speed than the forward speed of unit 12 to insert the panel 2 between conveyor 14 and portion 20; the suction caps 26 are deactivated and raised; the arm 21 is moved in direction 10 at a faster forward speed than the forward speed of unit 12 to disengage the elements 27a and 27b from the panel 2 itself; the elements 27a and 27b are raised to allow the passage of panel 2; and the panel 2 itself is moved forward by the unit 12 through the station 11 to rectify the side 7 by means of a milling tool 37, and then through the edging station (not shown) to apply an edge 40 on the side 7 itself.

[0034] At this point, the elements 31 are released again; the elements 27a and 27b are lowered; and the panel 2 is manually moved on plane P with the side 8 being in contact with the bar 28 and with the side 5 being in contact with the elements 27a and 27b (figure 6a).

[0035] Once panel 2 has been positioned in directions 10 and 22, the sensors (not shown) associated with the elements 27a and 27b detect the presence of the panel 2 and control the descent and activation of the suction caps 26; the bar 28 is moved to its retracted position; and the cursor 35 is moved forward along the guide 34 in direction 22 to move the sensing element 36 into contact with side 7 and to measure the distance of side 7 from the reference plane R, and thus the dimension of panel 2 in direction 22.

[0036] The coupling bar 25 of the elements 24 is then moved in direction 22 according to the difference between the nominal dimension of panel 2 stored in machine 1 and the actual dimension measured by the device 33 to correctly position the panel 2 in the direction 22 itself.

[0037] By measuring the distance of side 7 from plane R, the device 33 obviously allows to correctly position the panel 2 in direction 22 even if the operator has not arranged the panel 2 in contact with bar 28.

[0038] Finally, the arm 21 is moved in direction 10 at a slower forward speed than the forward speed of unit 12 to insert the panel 2 between conveyor 14 and portion 20; the suction caps 26 are deactivated and raised; the arm 21 is moved in direction 10 at a faster forward speed than the forward speed of unit 12 to disengage the elements 27a and 27b from the panel 2 itself; the elements 27a and 27b are raised to allow the passage of panel 2; and the panel 2 itself is moved forward by unit 12 through the station 11 to rectify the side 8 by means of tool 37, and then through the edging station (not shown) to apply an edge (not shown) on the side 8 itself.

Claims

1. Method for squaring and edging panels (2) made of wood or the like having a substantially rectangular shape, the method comprising the steps of:

   putting a first side (5) of a panel (2) in contact with first stopping means (28, 30) to correctly position the panel (2) in a given first direction (22);
   moving forward the panel (2) in a second direction (10) substantially transversal to the first direction (22) and through a rectifying station (11) and an edging station for rectifying and, respectively, edging the first side (5);
   putting the first side (5) in contact with second stopping means (32) opposed to the first stopping means (28, 30) to correctly position the panel (2) in the first direction (22);
   moving forward the panel (2) in the second direction (10) and through the rectifying station (11) and the edging station for rectifying and, respectively, edging a second side (6) of the panel (2) opposed to the first side (5);
   putting one of said first and second side (5, 6) in contact with third stopping means (27a, 27b) to correctly position the panel (2) in the second direction (10);
   putting a third side (7) of the panel (2) in contact with the first stopping means (28, 30) or a fourth side (8) of the panel (2) opposed to the third side (7) in contact with the second stopping means

(32) to correctly position the panel (2) in the first direction (22);
moving forward the panel (2) in the second direction (10) and through the rectifying station (11) and the edging station for rectifying and, respectively, edging the third side (7); and
putting one of said first and second side (5, 6) in contact with the third stopping means (27a, 27b) to correctly position the panel (2) in the second direction (10);
and being **characterized in that** it further comprises the steps of:

measuring the distance between the third side (7) and a reference plane (R) substantially orthogonal to the first direction (22);
moving the panel (2) in the first direction (22) according to said distance to correctly position the panel (2) in the first direction (22); and
moving forward the panel (2) in the second direction (10) and through the rectifying station (11) and the edging station for rectifying and, respectively, edging the fourth side (8).

2. Method according to Claim 1, and further comprising the step of:

putting the fourth side (8) in contact with the first stopping means (28, 30) before measuring said distance.

3. Method according to Claim 1 or 2 and further comprising the step of:

putting the second side (6) in contact with the first stopping means (28, 30) before putting the first side (5) in contact with the second stopping means (32).

4. Method according to Claim 3, wherein the steps of putting the panel (2) in contact with the first stopping means (28, 30) and with the third stopping means (27a, 27b) are carried out by hand.

5. Method according to any one of the preceding Claims, wherein the steps of putting the panel (2) in contact with the second stopping means (32) and of moving the panel (2) in the first direction (22) according to said distance are carried out by means of a grip and transfer unit (13) mobile in the first and in the second direction (22, 10).

6. Method according to Claim 5 and comprising the steps of:

moving forward the panel (2) through the rectifying station (11) and the edging station in the second direction (10) by means of a feeding unit (12) comprising a lower supporting device (14) and an upper pressor device (18); and
inserting the panel (2) between the lower supporting device (14) and the upper pressor device (18) by means of the grip and transfer unit (13).

7. Method according to Claim 6 and further comprising the step of:

lifting at least a part of the upper pressor device (18) when the panel (2) is put in contact with the second stopping means (32).

8. Method according to any one of the preceding Claims, wherein the first stopping means (28, 30) comprise at least a supporting element (31) mobile in the first direction (22) by interposing a shock absorbing device; the method comprising the steps of:

locking the supporting element (31) in the first direction (22) when the panel (2) is put in contact with the first stopping means (28, 30); and
releasing the supporting element (31) in the first direction (22) when the panel (2) is put in contact with the second stopping means (32) and when the panel (2) is moved in the first direction (22) according to said distance.

9. Method according to any one of the preceding Claims, wherein said distance is measured by a measuring device (33); the method comprising the step of:

moving the measuring device (33) in the first direction (22).

10. Method according to any one of the preceding Claims, and further comprising the step of:

moving at least a part (28) of the first stopping means (28, 30) in the first direction (22) when the panel (2) is put in contact with the second stopping means (32) and when the panel (2) is moved in the first direction (22) according to said distance.

11. Machine for squaring and edging panels (2) made of wood or the like, having a substantially rectangular shape, the machine comprising first stopping means (28, 30) to correctly position the panel (2) in a given first direction (22); second stopping means (28, 30) opposed to the first stopping means (28, 30) to correctly position the panel (2) in the first direction (22); and a grip and transfer unit (13) to move the panel (2) in the first direction (22); and being **characterized in that** it further comprises a measuring device (33) for measuring the distance between a side (7)

of the panel (2) and a reference plane (R) substantially orthogonal to the first direction (22); the grip and transfer unit (13) being able to move the panel (2) in the first direction (22) according to said distance.

12. Machine according to Claim 11 and further comprising third stopping means (27a, 27b) to correctly position the panel (2) in a second direction (10) substantially transversal to the first direction (22).

13. Machine according to Claim 11 or 12, wherein the measuring device (33) is mobile in the first direction (22).

14. Machine according to any one of Claims 11-13 and further comprising a rectifying station (11) and an edging station for rectifying and, respectively, edging the sides (5, 6, 7, 8) of the panel (2) and a feeding unit (12) for moving forward the panel (2) through the rectifying station (11) and the edging station in a second direction (10) substantially transversal to the first direction (22).

15. Machine according to Claim 14, wherein the feeding unit (12) comprises a lower supporting device (14) and an upper pressor device (18); the grip and transfer unit (13) being mobile in the second direction (10) for inserting the panel (2) between the lower supporting device (14) and the upper pressor device (18).

16. Machine according to Claim 15, wherein at least a part (20) of the upper pressor device (18) is mobile between a lowered working position and a raised resting position.

17. Machine according to any one of Claims 11-16, wherein the first stopping means (28, 30) are mobile in the first direction (22).

18. Machine according to any one of Claims 11-17, wherein the first stopping means (28, 30) comprise at least a supporting element (31) mobile in the first direction (22) by interposing a shock absorbing device, and locking means to lock the supporting element (31) in the first direction (22).

19. Machine according to any one of Claims 11-18, wherein the second stopping means (32) are mobile in the first direction (22).

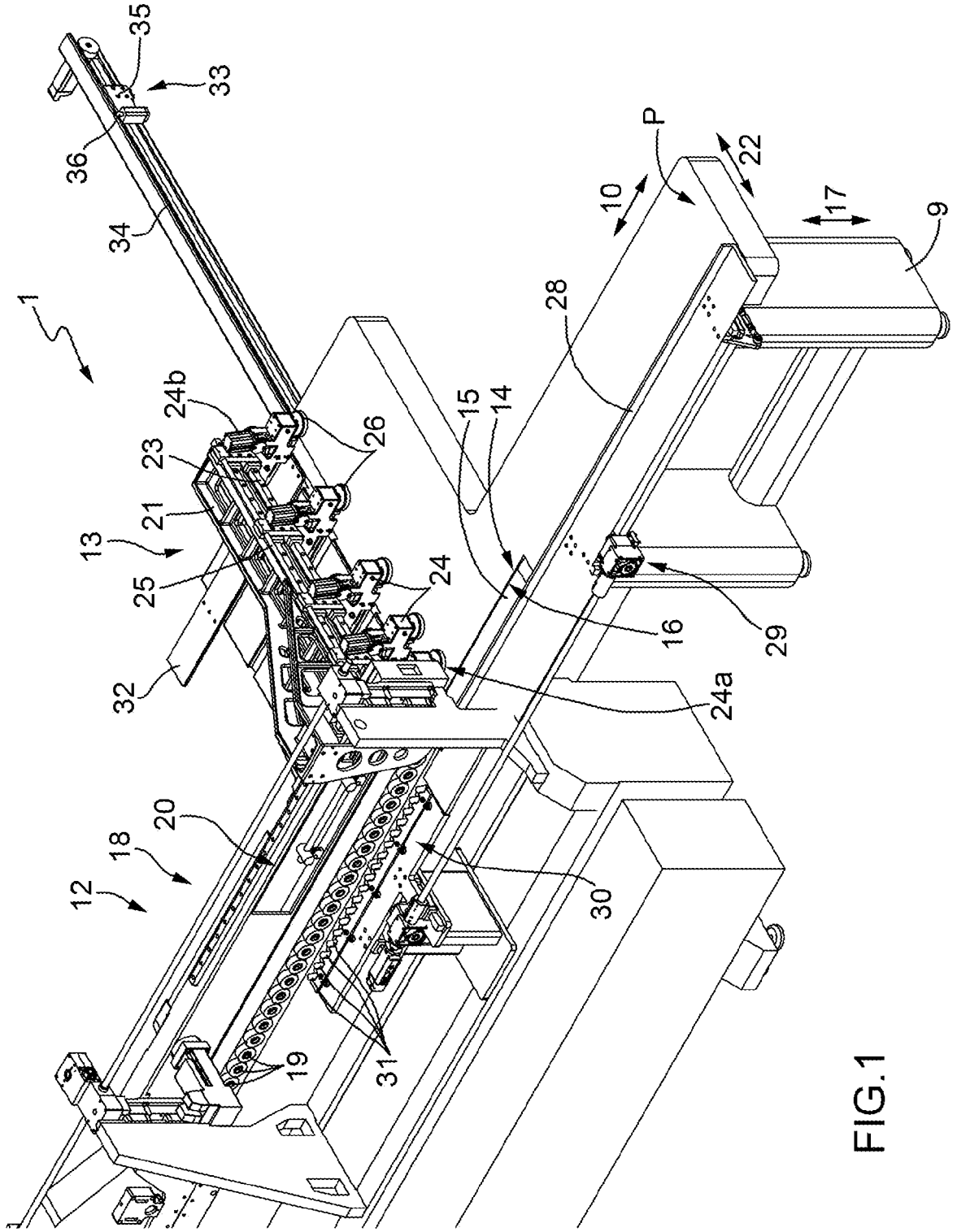

1
9
10
12
13
14
15
16
17
18
19
20
21
22
23
24
24a
24b
25
26
28
29
30
31
32
33
34
35
36
P

FIG.1

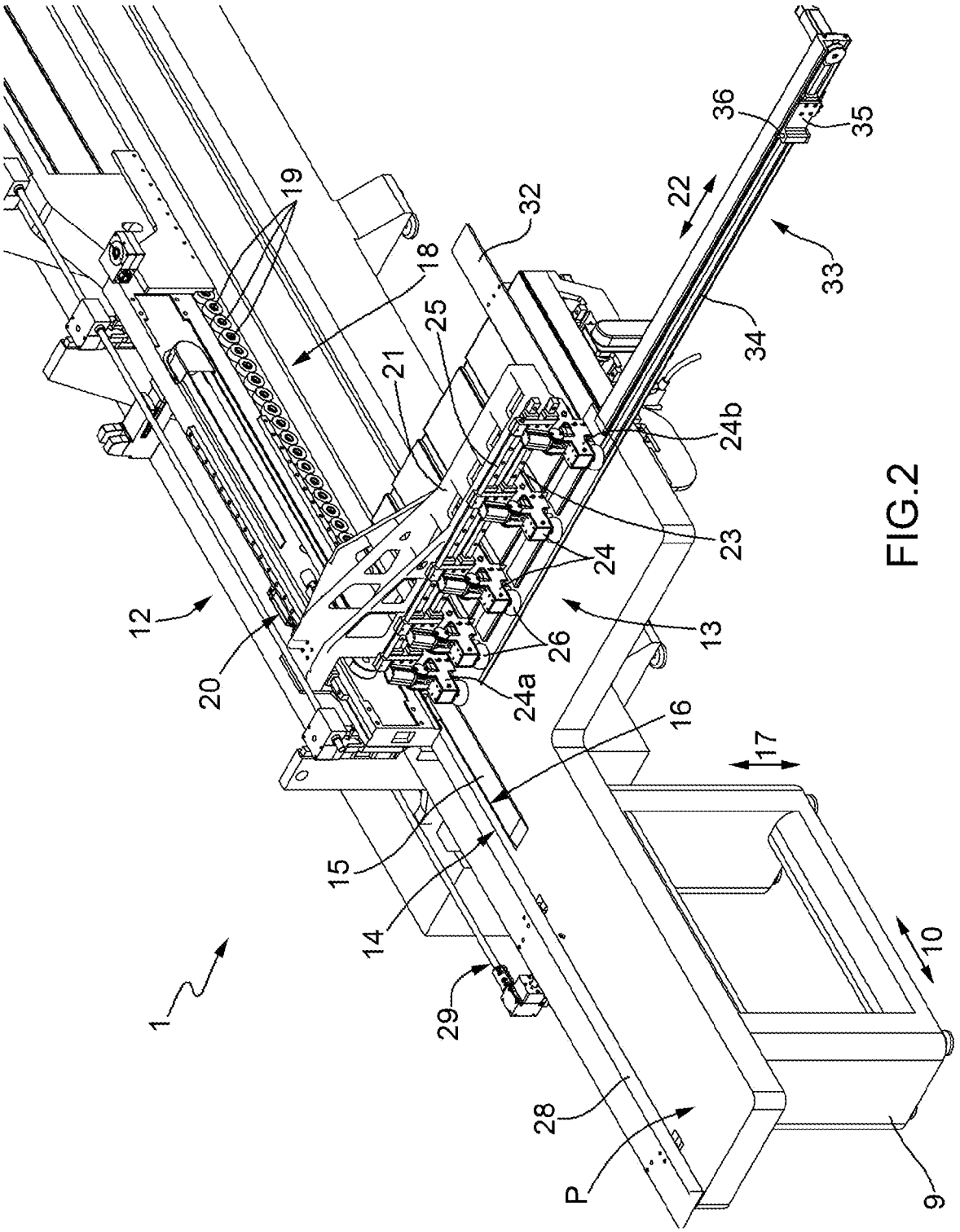

1
9
10
12
13
14
15
16
17
18
19
20
21
22
23
24
24a
24b
25
26
28
29
32
33
34
35
36
P

FIG.2

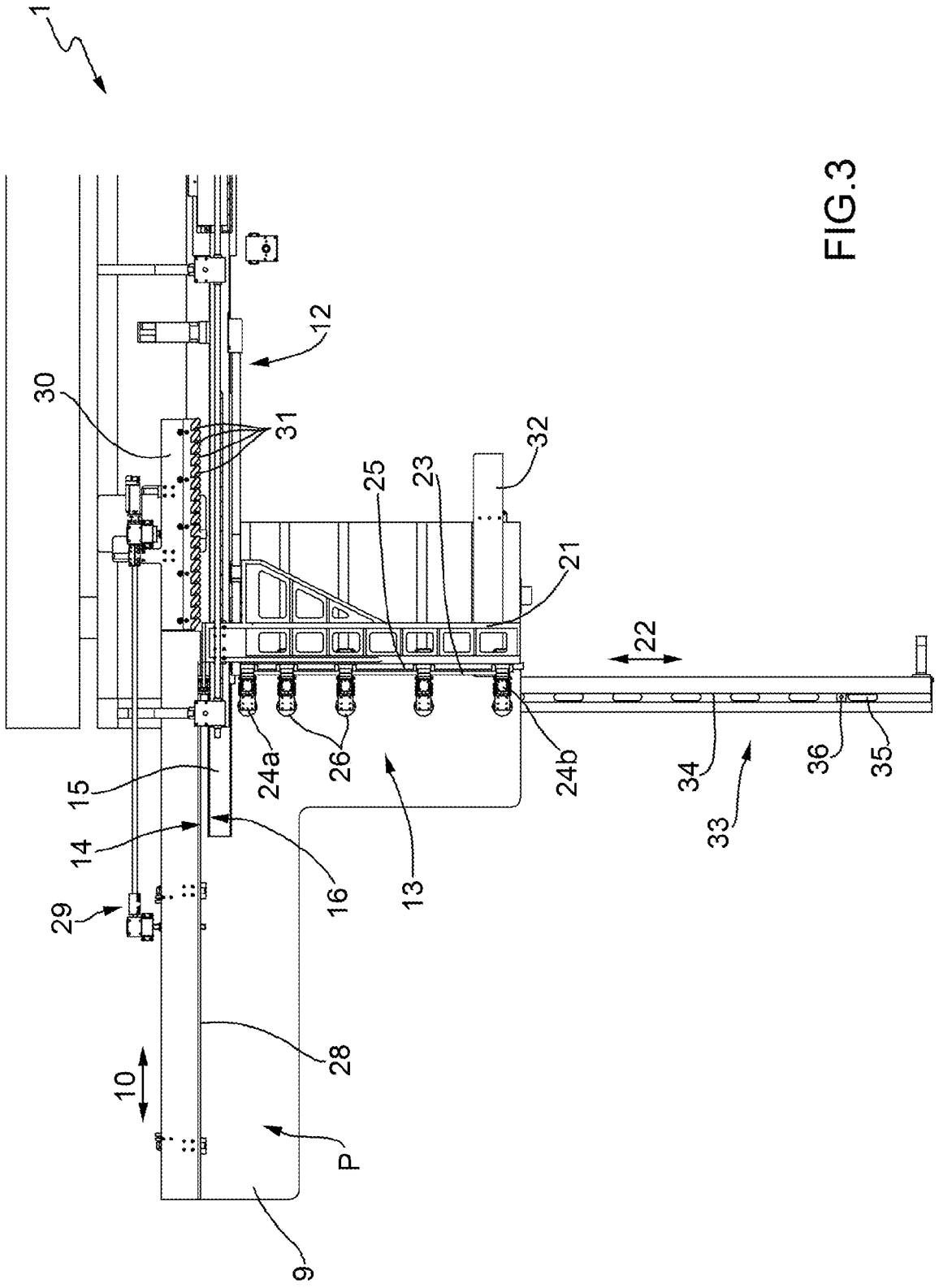


FIG.3

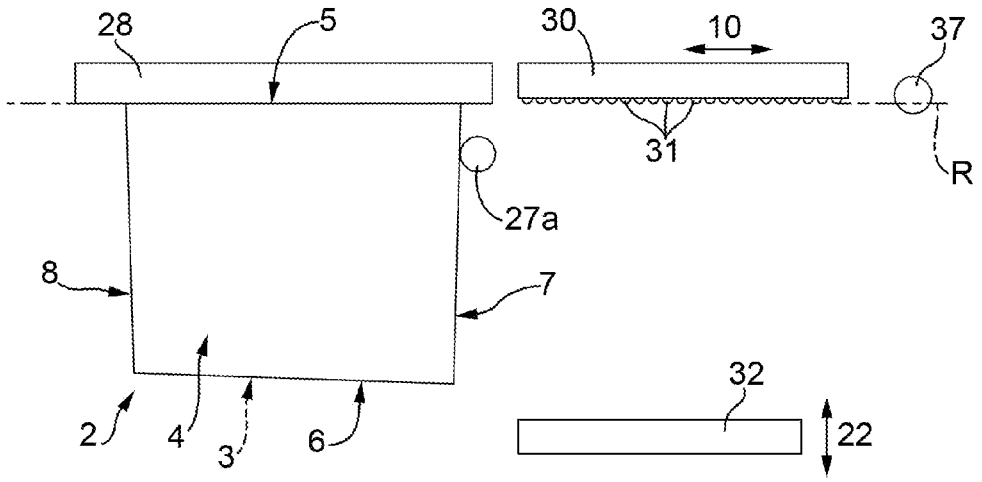
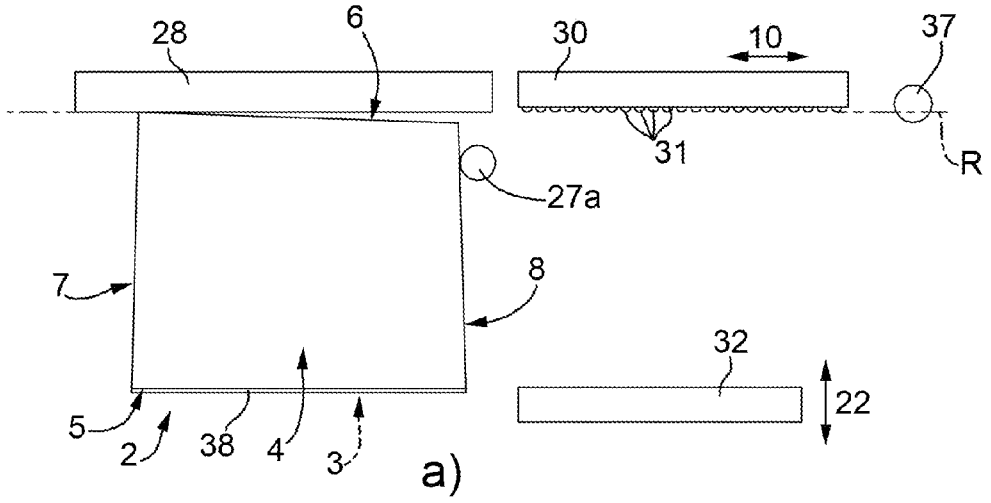
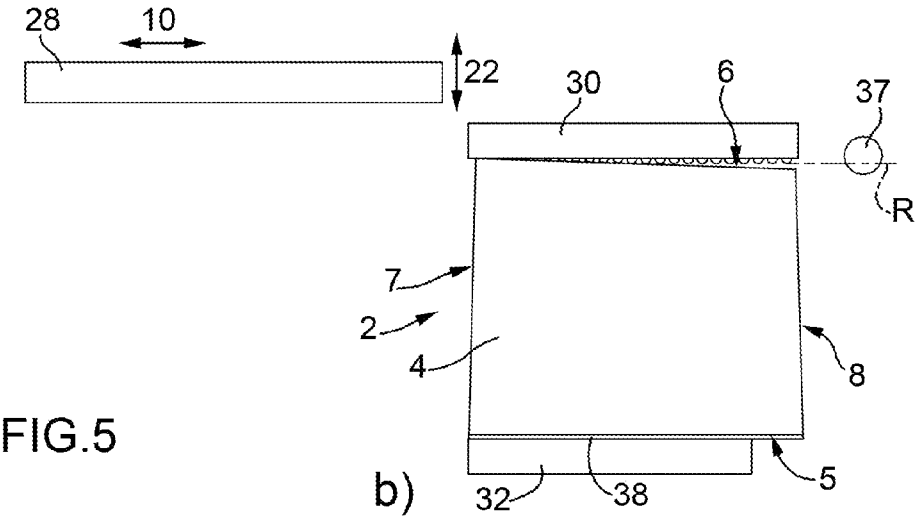

28
5
30
10
37
31
R
27a
8
7
32
22
2
4
3
6

FIG.4


28
6
30
10
37
31
R
27a
7
8
32
22
5
2
38
4
3

a)


28
10
22
30
6
37
R
7
2
4
8
5
32
38

b)

FIG.5

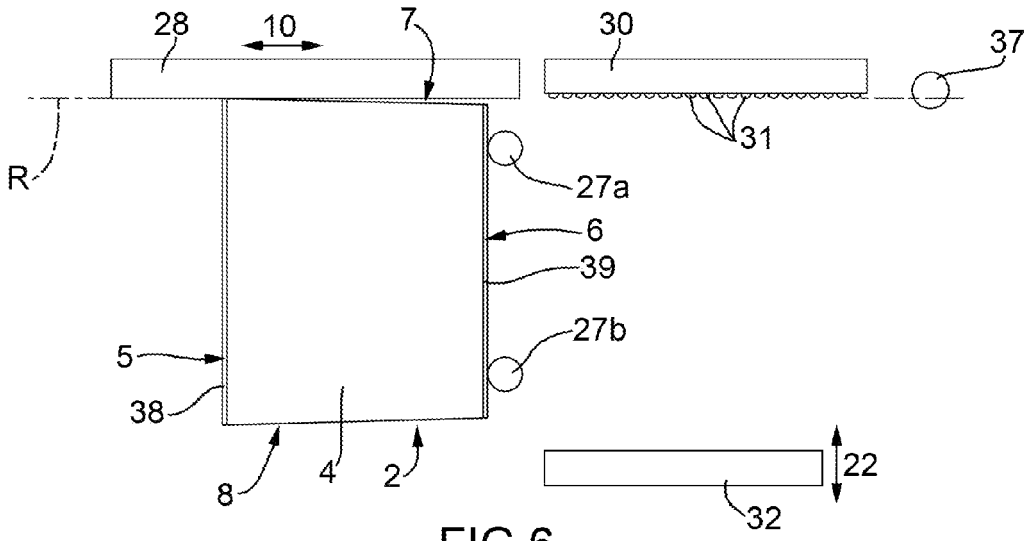
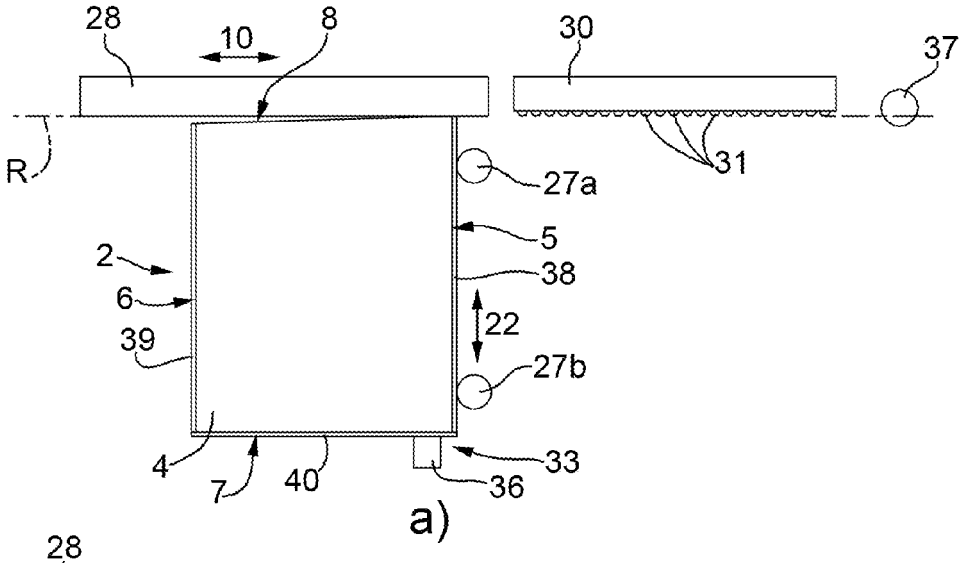

28
10
7
30
37
R
31
27a
6
39
27b
5
38
8
4
2
22
32

FIG.6


28
10
8
30
37
R
31
27a
5
2
38
6
22
39
27b
4
7
40
33
36

a)

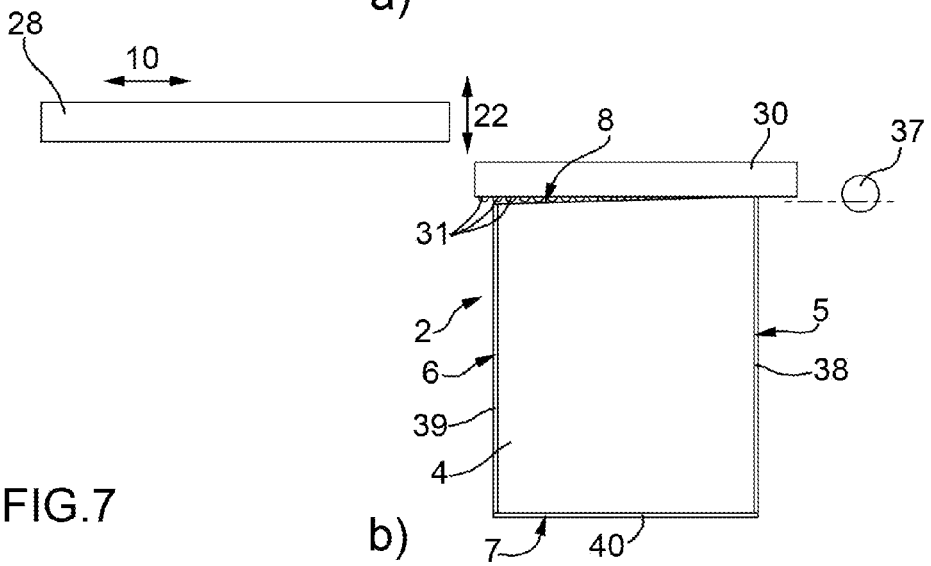

28
10
22
8
30
37
31
2
5
6
38
39
4
7
40

FIG.7

b)

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 16 3077

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	EP 1 475 204 A (IMPRESA 2000 DI SACCHI PARIDE [IT]) 10 November 2004 (2004-11-10) * abstract * * paragraph [0002] * * paragraph [0006] * * paragraph [0009] * * paragraph [0014] * * paragraph [0016] * * paragraph [0029] * * paragraph [0030] * * claims 1-3 * * figures *	11-13, 17,19 1-7,9, 10,14-16	INV. B27M1/08
Y	DE 199 26 834 A1 (WEINMANN & PARTNER GMBH [DE]) 21 December 2000 (2000-12-21) * figures * * column 1, lines 3-15 *	1-7,9,10	
Y A	US 2 207 782 A (CHARLES CARLSON) 16 July 1940 (1940-07-16) * figures *	14-16 6	TECHNICAL FIELDS SEARCHED (IPC)
A	DE 296 07 976 U1 (BRIZZOLARI ETTORE [IT]) 22 August 1996 (1996-08-22) * page 3, line 1 - line 6 * * figures *	1	B27C B27M B27D B24B B27B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 September 2010	Hamel, Pascal

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 16 3077

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

30-09-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1475204 A	10-11-2004	AT 385881 T	15-03-2008
		DE 602004011699 T2	19-02-2009
		ES 2298682 T3	16-05-2008
DE 19926834 A1	21-12-2000	NONE	
US 2207782 A	16-07-1940	NONE	
DE 29607976 U1	22-08-1996	FR 2748413 A3	14-11-1997

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82