



- (51) **International Patent Classification:**  
*B27D 5/00* (2006.01) *B23Q 7/04* (2006.01)  
*B23Q 7/00* (2006.01)
- (21) **International Application Number:** PCT/IB2012/050980
- (22) **International Filing Date:** 1 March 2012 (01.03.2012)
- (25) **Filing Language:** Italian
- (26) **Publication Language:** English
- (30) **Priority Data:**  
BO2011A000096 1 March 2011 (01.03.2011) IT
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— without international search report and to be republished upon receipt of that report (Rule 48.2(g))

(54) **Title:** METHOD AND MACHINE FOR PROCESSING WOOD PANELS OR ALIKE

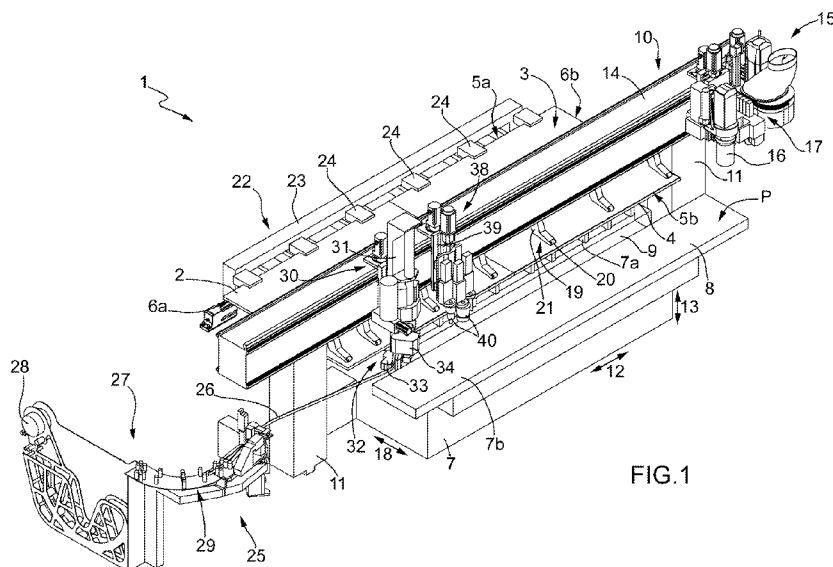


FIG. 1

(57) **Abstract:** Method and machine for processing wood panels (2; 41) or alike, according to which a panel (2; 41) is held in correspondence to a first portion (5a; 44a) of a lateral contour (4; 43) thereof by a grip and transport device (22), and is edgebanded in correspondence to a second portion (5b, 6a; 44b, 44c) of the lateral contour (4; 43) thereof by combining the movements of the panel (2; 41) in a first direction (18) with the movements of an edgebanding device (32) in a second direction (12) transverse to the first direction (18) and around a rotation axis orthogonal to the first and the second direction (18, 12) and without ever releasing the panel (2; 41) from the grip and transport device (22).



## METHOD AND MACHINE FOR PROCESSING WOOD PANELS OR ALIKE

TECHNICAL FIELD

The present invention relates to a method for  
5 processing wood panels or alike.

BACKGROUND ART

In the field of processing wood panels or alike, it  
is known to provide a machine comprising a base defining  
a substantially horizontal support plane for at least  
10 one wood panel or alike; and a grip and transport device  
adapted to grip the panel in correspondence of a first  
lateral face thereof.

The grip and transport device is mobile in a given  
first direction in order to move the panel along the  
15 support plane and through a cutting and edgebanding  
station provided with a cutting blade, which protrudes,  
in use, above the support plane, and is mobile in a  
second direction transversal to the first direction in  
order to separate at least one component from the panel  
20 or to provide a groove on the panel itself.

The cutting and edgebanding station has,  
furthermore, an edgebanding device for applying a  
finishing edge on a second lateral face of the panel  
which is substantially parallel and opposite to the  
25 aforementioned first lateral face.

The edgebanding device normally comprises two

rollers arranged in succession to each other in the second direction, and between which one, for example, is a glueing roller adapted to apply glue on the second lateral face of the panel and/or on the finishing edge  
5 and the other is a pressing roller adapted to press the finishing edge onto said second lateral face.

Known machines for processing wood panels or alike of the above-described type have a relatively low flexibility as they are capable of edgebanding only the  
10 aforementioned second lateral face of the panel, i.e. the flat lateral face which is parallel and opposite to the first lateral face of the panel itself. In other words, known machines for processing wood panels or alike of the above-described type are unable to edgeband  
15 lateral faces of the panel which are shaped and/or inclined with respect to the aforementioned first lateral face.

#### DISCLOSURE OF INVENTION

It is an object of the present invention to provide  
20 a method for processing wood panels or alike which is free from the above-described drawbacks and which is simple and cost-effective to implement.

According to the present invention, a method for processing wood panels or alike is provided as claimed  
25 in the claims from 1 to 8.

The present invention further relates to a machine

for processing wood panels or alike.

According to the present invention, a machine for processing wood panels or alike is provided as claimed in the claims from 9 to 17.

#### 5 BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described with reference to the accompanying drawings, which illustrate an embodiment thereof by way of non-limiting example, in which:

10 figure 1 is a diagrammatic perspective view of a preferred embodiment of the machine for processing wood panels or alike according to the present invention;

figure 2 is a diagrammatic side view, with parts in section, parts enlarged and parts removed for clarity,  
15 of the machine in figure 1;

figure 3 is a diagrammatic plan view, with parts removed for clarity, of a detail of the machine in figure 1 shown in two different operating positions; and

figure 4 is a diagrammatic plan view of a variation  
20 of the panels made by the machine in figure 1.

#### BEST MODE FOR CARRYING OUT THE INVENTION

With reference to figures 1 and 2, numeral 1 indicates, as a whole, a machine for processing wood panels 2 and alike, each of which has a substantially  
25 rectangular shape, and comprises two major faces 3 which are parallel to each other and a lateral contour 4,

which extends between the two faces 3, is substantially perpendicular to the faces 3, and comprises, in this case, two minor faces 5a, 5b which are parallel to each other and two minor faces 6a, 6b which are parallel to  
5 each other and perpendicular to the faces 5a, 5b.

Machine 1 comprises a substantially rectangular-shaped base 7, which is upwardly limited by a flat wall 8 defining a substantially horizontal support plane P for at least one panel 2, and comprises two support  
10 blocks 7a, 7b which are separated from each other by a cavity 9.

Machine 1 further comprises a fixed portal 10 comprising, in turn, two vertical uprights 11, which are arranged on the opposite sides of base 7 in a horizontal  
15 direction 12, extend in a vertical direction 13 transversal to direction 12, and carry connected to the free ends thereof a horizontal crosspiece 14, which extends above base 7 parallel to the direction 12 itself.

20 Crosspiece 14 supports an operating head 15 of the known type, which is coupled in a known manner to crosspiece 14 to perform, along the crosspiece 14 itself, rectilinear movements in direction 12, and is provided, in this case, with at least an electro-spindle  
25 16 and at least a drilling device 17 coupled in a known manner to head 15 in order to perform, with respect to

head 15 itself, rectilinear movements in direction 13.

Electro-spindle 16 is shaped to receive and hold known tools and/or assemblies (not shown) adapted to carry out a machining by stock removal of the panels 2 (e.g. milling and/or cutting and/or finishing machining processes of an edge applied on contour 4 of the panels 2), while device 17 is provided with a plurality of drill bits (not shown) mounted to rotate about respective longitudinal axes parallel to direction 12 and/or direction 13 and/or to a horizontal direction 18 orthogonal to directions 12 and 13.

Crosspiece 14 further supports a plurality of pressing members 19, which are distributed along crosspiece 14 in direction 12 in order to press panel 2 against plane P, and each comprises a respective pressing roller 20 pivotally mounted on a support arm 21 connected to crosspiece 14 by means of interposing a known damper device (not shown).

Machine 1 further comprises a grip and transport device 22, which moves panel 2 along plane P and through portal 10 in both senses of direction 18, and has a slide 23, which extends above base 7 in direction 12, and is coupled in a known manner to base 7 in order to perform, with respect to said base 7, rectilinear movements in direction 18.

Slide 23 supports a plurality of clamping vices 24,

which are fixed along slide 23, facing portal 10, and each comprises a respective lower jaw and a respective upper jaw which are mobile with respect to one another in direction 13 between a locking position and a releasing position of panel 2.

According to a variation (not shown), the vices 24 are mobile with respect to each other along slide 23 in direction 12.

According to a further variation (not shown), the vices 24 are coupled in a known manner to slide 23 in order to perform, with respect to slide 23, rectilinear movements in direction 18 and be positioned irrespective of one another depending on the shape of the panels 2.

Machine 1 further comprises a edgebanding assembly 25 for edgebanding panel 2 with a finishing edge 26. Assembly 25 comprises a support and unwinding unit 27 of the known type, which is mounted next to base 7 in correspondence of the portal 10, and comprises, in turn, a support 28 for a reel (not shown) of edge 26 and an unwinding device 29 for unwinding edge 26 from reel itself (not shown).

Edge 26 is fed from device 29 to an edgebanding head 30, which is coupled in a known manner with crosspiece 14 in order to perform, with respect to crosspiece 14, rectilinear movements in direction 12, and supports a vertical slide 31 coupled in a known

manner with head 30 in order to perform, with respect to said head 30, rectilinear movements in direction 13.

Head 30 has an edgebanding device 32 comprising a support plate 33 which is pivotally coupled to slide 31 in order to rotate, with respect to said slide 31, about an axis of rotation (not shown) parallel to direction 13.

According to what is shown in figures 1 and 3, plate 33 supports a tank 34 containing glue, a glueing roller 35 to transfer the glue taken from tank 34 onto contour 4 of panel 2, a return roller 36 to correctly position edge 26, and a pressing roller 37 adapted to press edge 26 against said contour 4.

Rollers 35, 36, and 37 are mounted to rotate, with respect to plate 33, about respective longitudinal axes (not shown) which are parallel to direction 13, and are moved by plate 33 about the aforementioned axis of rotation (not shown) between a first operating position (figure 3a), in which rollers 35 and 37 are aligned with each other in direction 12, and a second operating position (figure 3b), in which rollers 35 and 37 are aligned with each other in direction 18.

According to some variations (not shown):

the entire edgebanding assembly 25 is slidably coupled to crosspiece 14; and

operating head 15 and edgebanding head 30 are

mounted on the opposite lateral faces of crosspiece 14;

Head 30 cooperates, in this case, with an auxiliary pressing device 38 comprising a horizontal slide 39 coupled in a known way to crosspiece 14 in order to  
5 perform, with respect to crosspiece 14, rectilinear movements in direction 12, and two pressing rollers 40, which are mounted to rotate about respective longitudinal axes (not shown) parallel to direction 13, and are coupled in a known manner to slide 39 in order  
10 to perform, with respect to the slide 39 itself, rectilinear movements in direction 13, preferably but not necessarily irrespective of one another.

The rollers 40 are shaped to selectively control the bias exerted on edge 26, in particular, in  
15 correspondence of the upper and lower edges of the edge 26 itself. In this case, one of the rollers 40 comprises a cylindrical upper portion and a cylindrical lower portion with a smaller diameter than the upper portion, while the other roller 40 comprises a truncated conical  
20 upper portion and a cylindrical lower portion.

According to some variations (not shown):

device 38 comprises a number of rollers 40 other than two;

each roller 40 comprises a number of portions other  
25 than two;

the portions have different shapes than those shown

in figure 1; and

device 38 comprises a pressing member having, for example, the shape of a rotating column having a polygonal cross-section in order to correctly press edge  
5 26 on the lateral contour of panels 2 having one or more internal edges.

Operation of machine 1 will now be described with reference to figures 1, 2, and 3 and starting from an instant in which panel 2 is held by the clamps 24 of  
10 device 22 in correspondence of the face 5a thereof and in which device 32 is arranged in the first operating position thereof (figure 3a).

Panel 2 is moved forward by device 22 through portal 10 in direction 18 so as to protrude with face 5b  
15 within cavity 9; if necessary, operating head 15 performs a machining by stock removal of face 5b, e.g. a milling machining, and/or a machining by stock removal of faces 3, e.g. a milling and/or drilling machining; the assembly defined by edgebanding head 30 and pressing  
20 device 38 is moved in direction 12 with a forward travel of unwinding of the edge 26 and with a return travel of edgebanding of the face 5b; and edge 26, as soon as it is applied on face 5b, is finished by means of operating head 15, which is firstly lowered within cavity 9, and  
25 then moved in direction 12.

Once edgebanding of face 5b has been carried out,

device 32 is moved into the second operating position thereof (figure 3b); panel 2 is moved by device 22 in direction 18 in order to allow said device 32 to edgeband at least face 6a; and edge 26, as soon as it is  
5 applied on face 6a, is finished by means of operating head 15 combining the movements of panel 2 in direction 18 and the movements of head 15 in direction 12.

At this point, panel 2 is released by the clamps 24, is rotated by 180° on plane P, either manually or by  
10 means of an automatic device (e.g. a robot), and is held by device 22 in correspondence of the face 5b in order to allow device 32 to edgeband at least face 5a.

Obviously, face 6b may be edgebanded both when panel 2 is locked within the clamps 24 in correspondence  
15 of the face 5a, and when panel 2 is locked within the clamps 24 in correspondence of the face 5b, and the edges 26 applied on faces 5a and 6b are also finished by means of operating head 15.

From what is described above, it therefore follows  
20 that at least faces 5b and 6a are edgebanded without ever releasing panel 2 from the clamps 24.

Figure 4 shows a panel 41 comprising two major faces 42 which are parallel to each other and a lateral contour 43, which extends between the two faces 42, is  
25 substantially perpendicular to the faces 42, and comprises, in this case, a flat minor face 44a, a minor

face 44b which is perpendicular and adjacent to face 44a, and a shaped face 44c extending between faces 44a and 44b.

In use, panel 41 is held by device 22 in  
5 correspondence of the face 44a, and is edgebanded in  
correspondence of the faces 44b and 44c without ever  
being released from the clamps 24. Panel 41 is therefore  
released from device 22, is rotated, is held by device  
22 in correspondence of the face 44b, and is edgebanded  
10 in correspondence of the face 44a.

It is appropriate to specify that, when the clamps  
24 are mobile in direction 18 with respect to slide 23,  
face 44a may also be edgebanded holding panel 2 in  
correspondence of the face 44c.

15 Finally, panel 41 is drilled by device 17 parallel  
to direction 13 so as to have, at the end of the  
operating cycle carried out by machine 1, the edges 26  
and a plurality of holes 45 adapted to allow the  
assembly of the panel 41 itself.

20 The correct position of the holes 45 is determined  
by means of a detecting device (not shown), e.g. a  
photocell or a tracer, which is mobile along crosspiece  
14 in direction 12, and is adapted, e.g. when panel 41  
is locked within the clamps 24 with face 44a parallel to  
25 direction 18 and face 44b parallel to direction 12, to  
detect the position in direction 18 of an external face

26a of edge 26 applied on face 44b and/or the position in direction 12 of face 26a of edge 26 applied on face 44a.

Panel 41 and device 17 are therefore moved along  
5 base 7 in direction 18 and, respectively, along crosspiece 14 in direction 12 depending on a signal of the detecting device (not shown) to position the longitudinal axes of the drill bits (not shown) of device 17 at the correct distance D from the faces 26a.  
10 In this way, it is therefore possible to position the drill bits (not shown) of device 17 taking into account the effective thickness of the edges 26 and correctly carry out the drilling of panel 41.

Obviously, panel 2 may also be drilled by means of  
15 an operating sequence which is exactly the same as the one just described for panel 41, i.e. by detecting the exact position of the faces 26a of the edges 26 applied on contour 4 in directions 12 and/or 18 and consequently positioning the longitudinal axes of the drill bits (not  
20 shown) of device 17.

According to an operating method (not shown), the panels 2, 41 can be obtained by cutting a sheet of wood of large dimensions by means of operating head 15.

Finally, according to some variations (not shown),  
25 machine 1 comprises several auxiliary devices, such as, for example:

devices for inserting pins and/or hardware into the  
panels 2;

labelling devices;

control devices for controlling the machining  
5 carried out, such as, for example, video cameras; and

marking devices to imprint instructions onto the  
panels 2 related, for example, to the correct  
orientation of the panels 2 in the clamps 24, to the  
subsequent mounting of the panels 2, and to the  
10 production of the panels 2 itself.

## CLAIMS

1.- Method for processing wood panels (2; 41) or alike, each of which comprises two major sides (3; 42) parallel to each other and a lateral contour (4; 43) extending between the major sides (3; 42) themselves, the method comprising the steps of:

holding the panel (2; 41) in correspondence to a first portion (5a; 44a) of the lateral contour (4; 43) by means of a grip and transport device (22) mobile in a first direction (18); and

edgebanding a second portion (5b, 6a; 44b, 44c) of the lateral contour (4; 43) by means of an edgebanding device (32) mobile in a second direction (12) transverse to the first direction (18);

and being characterised in that it comprises, furthermore, the step of:

orienting the edgebanding device (32) around a rotation axis substantially orthogonal to said first and second direction (18, 21), so as to edgeband said second portion (5b, 6a; 44b, 44c) by combining the movements of the panel (2; 41) in the first direction (18) with the movements of the edgebanding device (32) in the second direction (12) and around said rotation axis, without ever releasing the panel (2; 41) from the grip and transport device (22).

2.- Method according to claim 1 and comprising,

furthermore, the steps of:

releasing the panel (2; 41);

rotating the panel (2; 41);

holding the panel (2; 41) in correspondence to said  
5 second portion (5b, 6a; 44b, 44c) by means of the grip  
and transport device (22); and

combining the movements of the grip and transport  
device (22) in the first direction (18) with the  
movements of the edgebanding device (32) in the second  
10 direction (12) and/or around said rotation axis, so as  
to edgeband said first portion (5a; 44a).

3.- Method according to claim 1 or 2, wherein the  
panel (2; 41) is edgebanded with at least two finishing  
edges (26) applied in sequence on the lateral contour  
15 (4; 43); the method comprising, furthermore, the step  
of:

trimming each finishing edge (26) by means of an  
operating head (15) mobile in the second direction  
before applying the following finishing edge (26).

20 4.- Method according to any of the previous claims  
and comprising, furthermore, the steps of:

detecting the position in the second direction (12)  
of an external side (26a) of an edge (26) applied on the  
panel (2; 41) parallel to the first direction (18);

25 moving a longitudinal axis of at least one drill  
bit in the second direction (12) at a given distance (D)

from the external side (26a); and

drilling the panel (2; 41).

5.- Method according to any of the previous claims and comprising, furthermore, the steps of:

5 detecting the position in the first direction (18) of an external side (26a) of an edge (26) applied on the panel (2; 41) parallel to the second direction (12);

moving the panel (2; 41) forward in the first direction (18), so as to move said external side (26a)  
10 at a given distance (D) from a longitudinal axis of at least one drill bit; and

drilling the panel (2; 41).

6.- Method according to any of the previous claims and comprising, furthermore, the step of:

15 carrying out at least one cutting and/or milling operation on the panel (2; 41) by means of an operating head (15) mobile in the second direction (12).

7.- Method according to claim 6, wherein the edgebanding device (32) and the operating head (15) are  
20 moved along a crosspiece (14) extending above the panel (2; 41) in said second direction (12).

8.- Method according to any of the previous claims, wherein the panel (2; 41) is moved by the grip and transport device (22) in both senses of the first  
25 direction (18).

9.- Machine for processing wood panels (2; 41) or

alike, each of which comprises two major sides (3; 42) parallel to each other and a lateral contour (4; 43) extending between the major sides (3; 42) themselves, the machine comprising a base (7) defining a support  
5 plane (P) for at least one panel (2; 41); a grip and transport device (22) suited to hold the panel (2; 41) in correspondence to a first portion (5a; 44a) of the lateral contour (4; 43) and to move the panel (2; 41) along the support plane (P) in a first direction (18);  
10 and an edgebanding device (32) mobile in a second direction (12) transverse to the first direction (18); and being characterised in that the edgebanding device (32) is, furthermore, mobile around a rotation axis orthogonal to said first and second direction (18, 21),  
15 so as to edgeband a second portion (5b, 6a; 44b, 44c) of the lateral contour (4; 43) by combining the movements of the panel (2; 41) in the first direction (18) with the movements of the edgebanding device (32) in the second direction (12) and around said rotation axis,  
20 without ever releasing the panel (2; 41) from the grip and transport device (22).

10.- Machine according to claim 9 and comprising, furthermore, an operating head (15) mobile in the second direction (12) for carrying out the trimming of each  
25 finishing edge (26) applied on the panel (2; 41) before applying the following finishing edge (26).

11.- Machine according to claim 9 or 10 and comprising, furthermore, a detecting device for detecting the position in the second direction (12) of an external side (26a) of an edge (26) applied on the panel (2; 41) parallel to the first direction (18), and at least one drill bit, which is mobile in the second direction (12), so as to move its longitudinal axis at a given distance (D) from said external side (26a) according to the position detected by the detecting device.

12.- Machine according to any of the claims from 9 to 11 and comprising, furthermore, at least one drill bit and a detecting device for detecting the position in the first direction (18) of an external side (26a) of an edge (26) applied on the panel (2; 41) parallel to the second direction (12); the grip and transport device (22) being suited to move the panel (2; 41) forward in the first direction (18), so as to move said external side (26a) at a given distance (D) from a longitudinal axis of the drill bit according to the position detected by the detecting device.

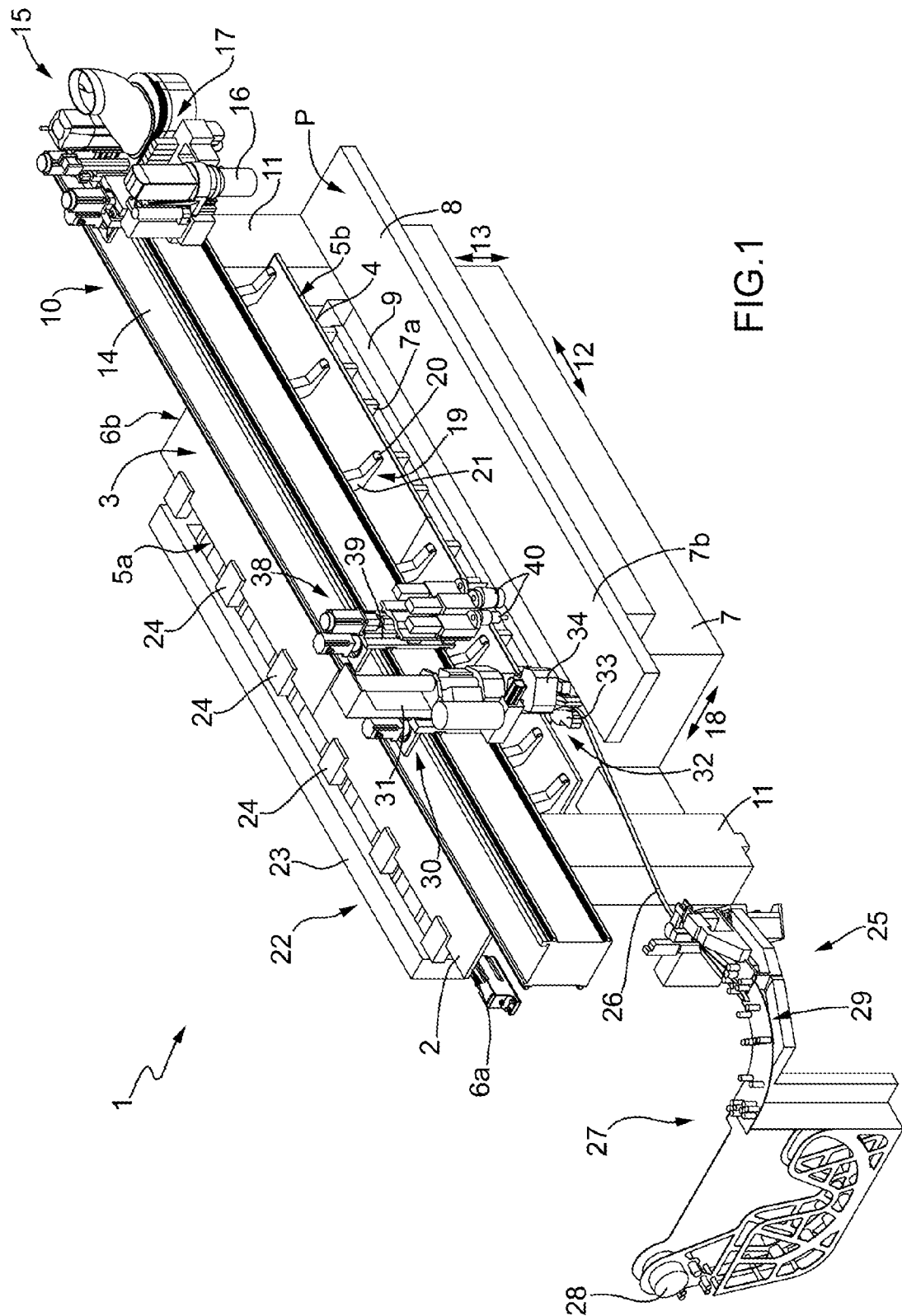
13.- Machine according to any of the claims from 9 to 11 and comprising, furthermore, at least one operating head (15) mobile in the second direction (12) and provided with at least one tool and/or assembly for carrying out a chipping machining of the panel (2; 41).

14.- Machine according to any of the claims from 9 to 13, wherein the edgebanding device (32) comprises at least one glueing device (35) for applying glue on the lateral contour (4; 43) and/or on an edge (26) and at least a pressing member (37) for pressing the edge (26) against the lateral contour (4; 43) itself; the glueing device (35) and the pressing member (37) being orientable around said rotation axis.

15.- Machine according to any of the claims from 9 to 14 and comprising, furthermore, a crosspiece (14), which extends above the base (7) in the second direction (12), and supports the edgebanding device (32) and an operating head (15) mobile in the second direction (12) and provided with at least one tool and/or assembly for carrying out a chipping machining of the panel (2; 41).

16.- Machine according to any of the claims from 9 to 15 and comprising, furthermore, at least one auxiliary pressing member (40) mobile perpendicular to the support plane (P) irrespective of the edgebanding device (32).

17.- Machine according to any of the claims from 9 to 16 and comprising, furthermore, at least two auxiliary pressing members (40) mobile perpendicular to the support plane (P) irrespective of one another and/or of the edgebanding device (32).



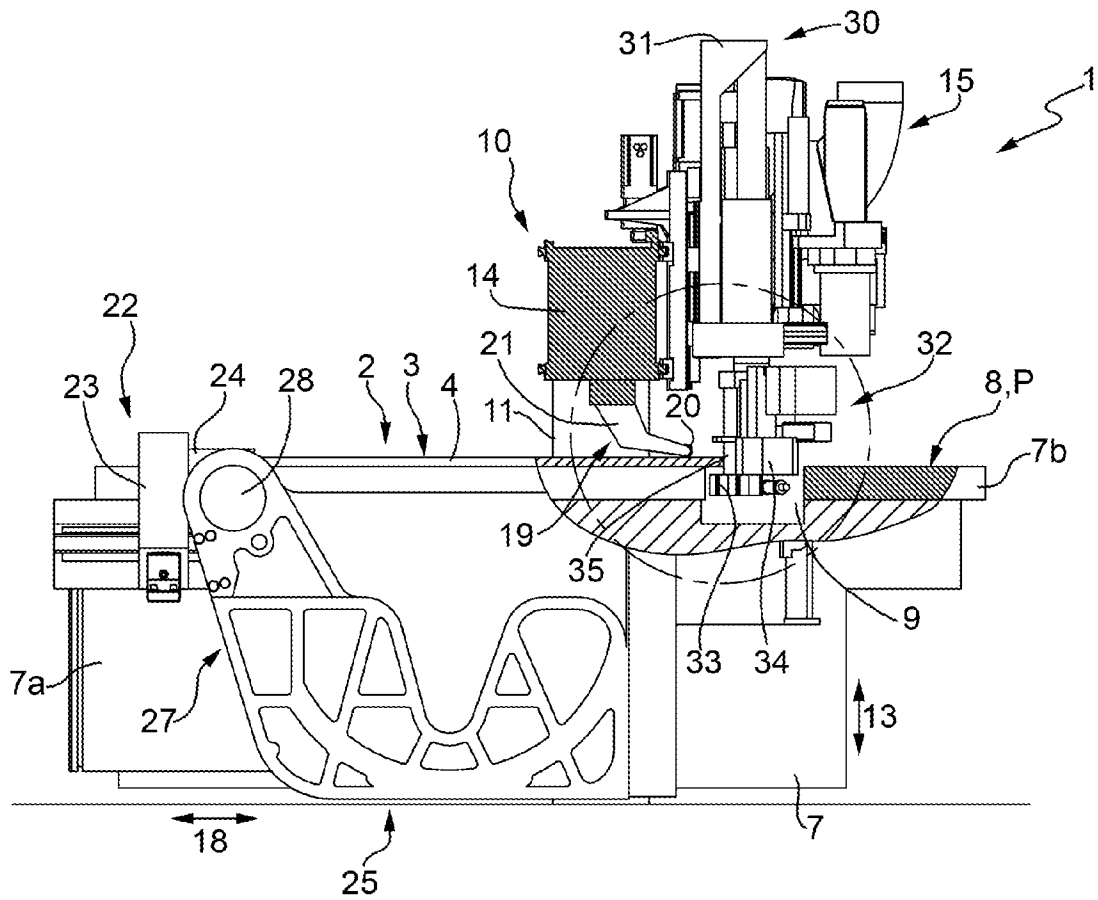
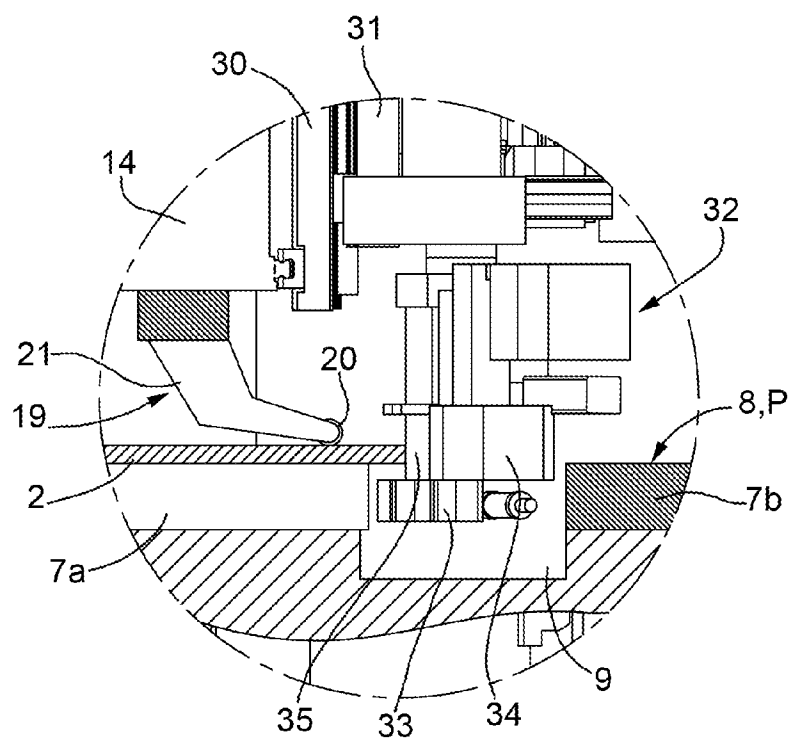


FIG.2



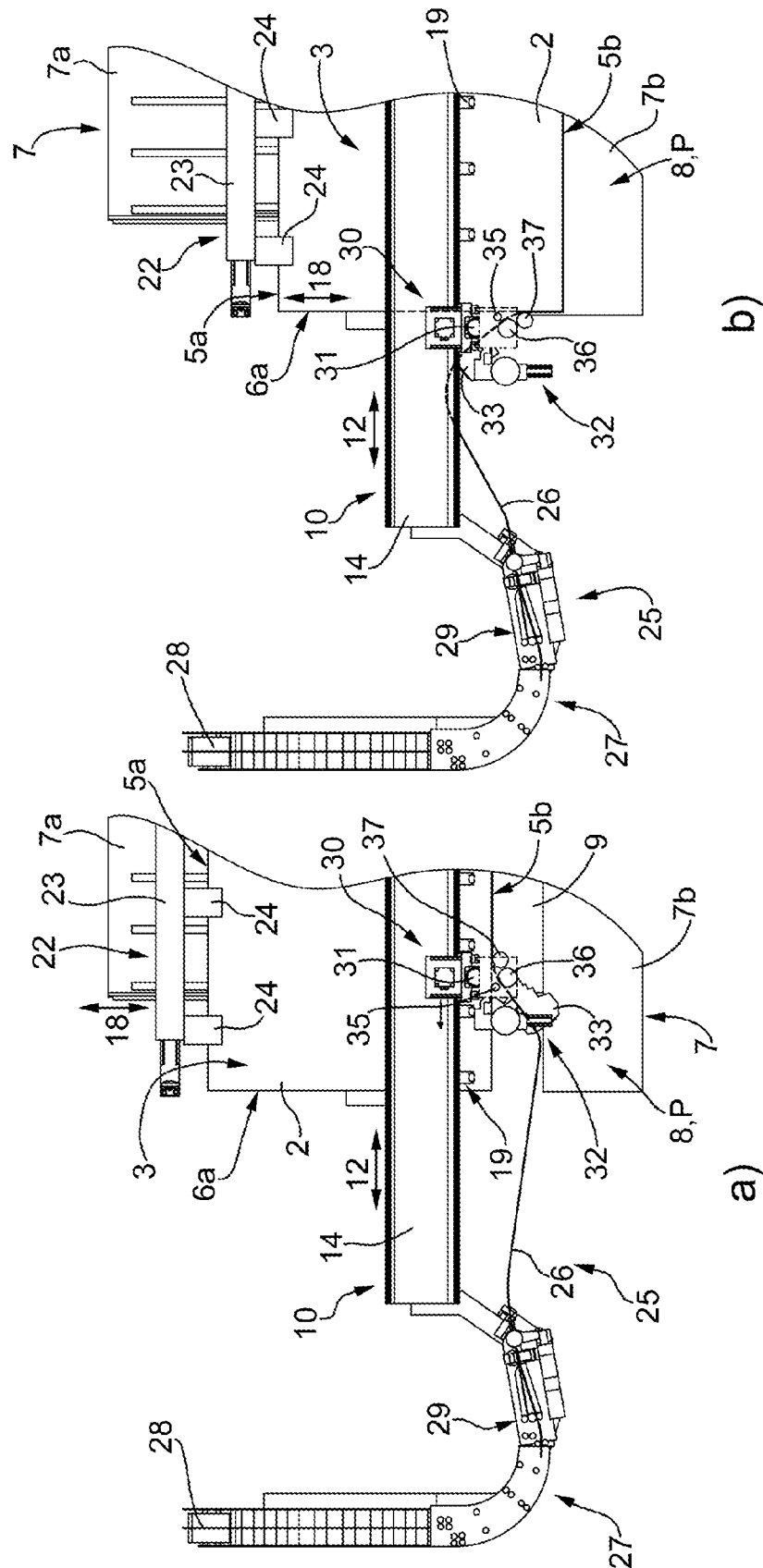


FIG. 3

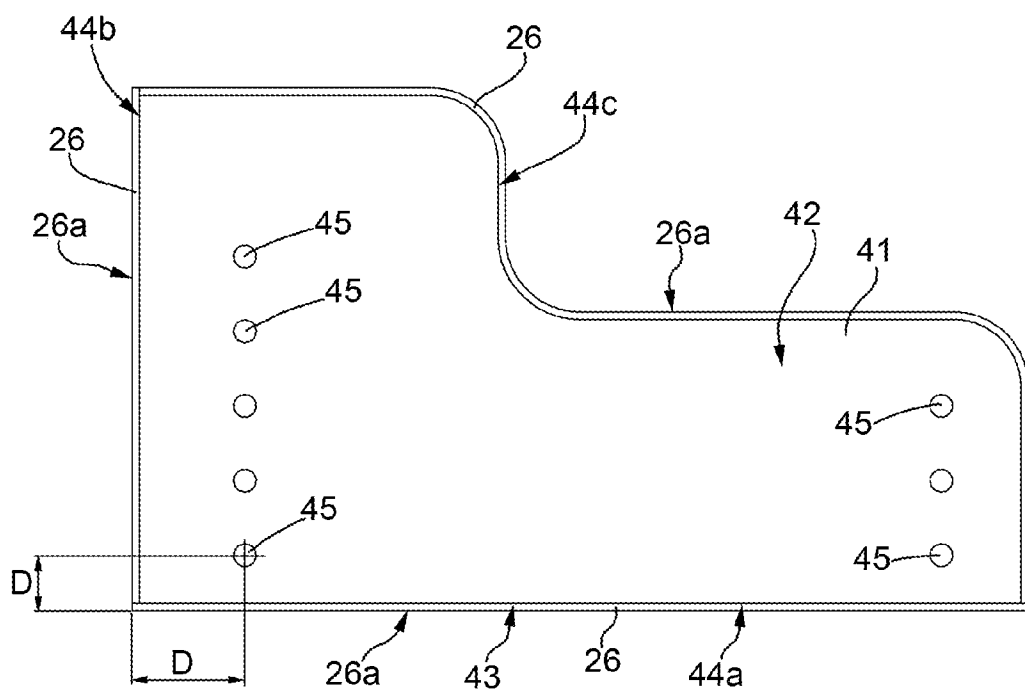


FIG.4