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

(11) **EP 2 902 160 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.08.2015 Bulletin 2015/32

(51) Int Cl.:
B27D 5/00 *(2006.01)*

(21) Application number: **15153849.3**

(22) Date of filing: **04.02.2015**

(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 RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **04.02.2014 IT BO20140047**

(71) Applicant: **BIESSE S.p.A.**
61100 Pesaro (IT)

(72) Inventors:
- **Forlani, Filippo**
  61121 PESARO (IT)
- **Saltarelli, Roberto**
  61122 PESARO (IT)

(74) Representative: **Manconi, Stefano et al**
Studio Torta S.p.A.
Via Viotti, 9
10121 Torino (IT)

(54) **MACCHINA PER LA BORDATURA DI PANNELLI DI LEGNO O SIMILI**

(57) A machine for edgebanding wood panels (2) or the like is provided with an edgebanding assembly (10) to apply a finishing edge (11) along at least part of a lateral profile (4) of a panel (2), and with a feeding device (16) having a feeding branch (19) provided with at least one outlet (17), which is configured to direct a hot gas at the finishing edge (11) and/or at the lateral profile (4) of the panel (2) and a recirculation branch (25; 32) to cause at least part of the hot gas fed downstream of the outlet (17) itself to be recirculated in the feeding branch (19).

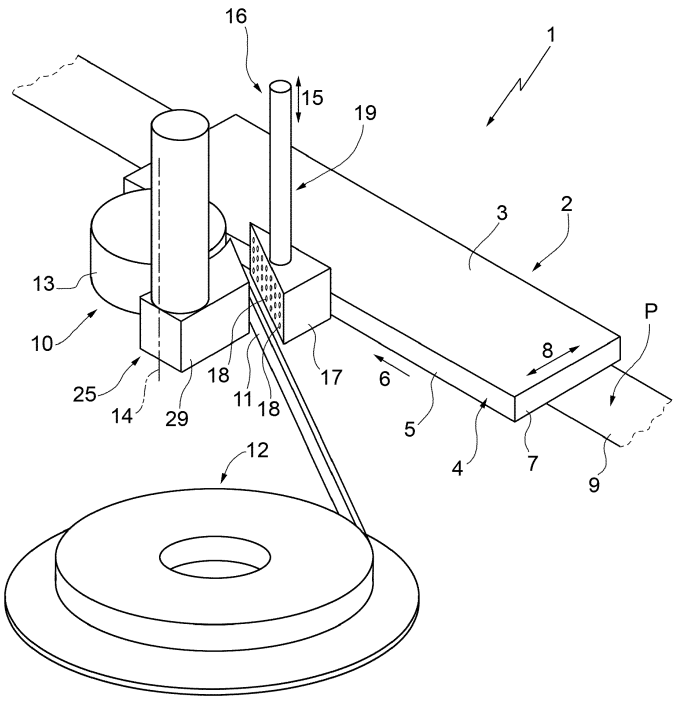

FIG.1

EP 2 902 160 A1

Description

[0001] The present invention relates to a machine for edgebanding wood panels or the like.

[0002] In particular, the present invention relates to a machine for edgebanding wood panels or the like either with a finishing edge with no glue and defined by two overlapping layers of co-extruded plastic materials, or with a finishing edge provided with a layer of glue.

[0003] The machine comprises a support surface for at least one panel; an edgebanding assembly; and a feeding device to feed the panels in succession through the edgebanding assembly and to allow the edgebanding assembly itself to apply a finishing edge along at least part of the lateral profile of each panel.

[0004] The machine comprises, furthermore, a feeding device to feed a hot gas, in particular a hot gas under pressure, onto the finishing edge and/or onto the lateral profile of the panel, and to allow the connection between the finishing edge and the panel itself.

[0005] The gas is heated up progressively by a plurality of heating devices, which are mounted in succession along the feeding device, and is directed onto the finishing edge and/or onto the lateral profile of the panel by means of an outlet nozzle provided with a shut-off valve.

[0006] In the presence of the panel, the shut-off valve is arranged in a closing position, in which the hot gas is fed onto the finishing edge and/or onto the lateral profile of the panel through the outlet nozzle. In the absence of the panel, the shut-off valve is moved to an opening position, in which the hot gas is dispersed into the external environment.

[0007] Known machines for edgebanding panels of the type described above have certain drawbacks mainly due to the fact that the dispersion of the hot gas into the external environment involves an obvious energy waste, may be dangerous for operators and may overheat the mechanical components mounted close to the outlet nozzle.

[0008] It is the object of the present invention to provide a machine for edgebanding wood panels or the like, which is exempt from the above-described drawbacks and is simple and cost-effective to implement.

[0009] According to the present invention, there is provided a machine for edgebanding wood panels or the like, as claimed in the appended claims.

[0010] The present invention will now be described with reference to the accompanying drawings, which illustrate a non-limiting embodiment thereof, in which:

figure 1 is a perspective diagrammatic view, with parts removed for clarity, of a preferred embodiment of the machine of the present invention;

figure 2 is a diagrammatic view of a detail of the machine in figure 1;

figure 3 is a diagrammatic view of a first variant of the detail in figure 2; and

figure 4 is a diagrammatic view of a second variant of the detail in figure 2.

[0011] With reference to figure 1, numeral 1 indicates a machine for edgebanding wood panels 2 or the like, as a whole.

[0012] Each panel 2 has two main faces 3, which are parallel and opposite to one another, and is limited by a lateral profile 4, which extends between the two faces 3, and comprises, in the case in point, two minor lateral faces 5, which are parallel to one another and to a horizontal direction 6 and two minor lateral faces 7, which are parallel to one another and to a horizontal direction 8 that is perpendicular to direction 6 itself.

[0013] Machine 1 comprises a feeding device 9 of known type, which defines a substantially horizontal support surface P for the panels 2 and is configured to feed the panels 2 in succession in direction 6.

[0014] Machine 1 comprises, furthermore, an edgebanding assembly 10 configured to apply a finishing edge 11 onto the lateral profile 4 of panel 2.

[0015] In the case in point, edge 11 is an edge with no glue, defined by two overlapping layers of co-extruded plastic materials, and one of them is melted to allow the union of edge 11 with panel 2.

[0016] According to a variant not shown, edge 11 is provided with a layer of glue, which is activated thermally to allow the union of edge 11 with panel 2.

[0017] Edge 11 is separated from the ribbon of a bobbin 12, and is stabilized on profile 4 by means of a pressure roller 13, which is mounted to rotate about its longitudinal axis 14, which is substantially vertical and parallel to a direction 15 that is orthogonal to directions 6 and 8.

[0018] As shown in figures 1 and 2, assembly 10 comprises, furthermore, a feeding device 16 to feed a hot gas against edge 11, preferably but not necessarily a hot gas under pressure, in the case in point hot air under pressure.

[0019] Device 16 comprises an outlet nozzle 17, which is mounted between panel 2 and edge 11, has a plurality of distribution holes 18, and is connected with a known compressed air pneumatic device (not illustrated) by means of a feeding branch 19.

[0020] The air under pressure fed along branch 19 is heated up progressively by a plurality of heating devices 20 (in the case in point, three heating devices 20), which are mounted in succession along branch 19 itself.

[0021] Each device 20 has a tubular duct 21, which is crossed by the air, is provided with an internal electric resistor 22, and is connected with each adjacent duct 21 by the interposition of a tubular connector 23, which is mounted between the ducts 21.

[0022] The temperature of the hot air fed along branch 19 is measured by a plurality of temperature sensors 24, each inserted inside a respective connector 23.

[0023] According to a variant not shown, nozzle 17 is provided with an electric resistor that is completely similar to the resistors 22, and with a temperature sensor that is completely similar to the sensors 24.

[0024] Device 16 comprises, furthermore, a recirculation branch 25, which extends downstream of nozzle 17 in a feeding direction 26 of the hot air along device 16, and comprises, in the case in point, a first segment 27 having an inlet that is connected to branch 19 by means of the interposition of a shut-off valve 28, and a second segment 29 facing nozzle 17 so as to cause the hot air fed through nozzle 17 itself to recirculate.

[0025] Branch 25 comprises, furthermore, an outlet duct 30, which connects the two segments 27, 29 to one another, extends through a heat exchanger 31, and communicates, downstream of exchanger 31 itself, with the external environment.

[0026] Exchanger 31 is mounted on branch 19 upstream of the heating devices 20 in direction 26, and allows the hot air fed along branch 25, that is to say both the hot air fed through nozzle 17 and the hot air fed through valve 28, to heat up the air under pressure fed along branch 19.

[0027] In the presence of panel 2, valve 28 is moved to a closing position, in which the first segment 27 is closed to feed the hot air firstly through nozzle 17, then against edge 11, and finally along the second segment 29.

[0028] In the absence of panel 2, valve 28 is moved to an opening position, in which the hot air is fed along the first segment 27.

[0029] According to a variant not shown, the heat exchanger 31 is eliminated and the outlet duct 30 is connected with branch 19 upstream of the heating devices 20 in direction 26.

[0030] The variant illustrated in figure 3 differs from that illustrated in figures 1 and 2 in that, in it, exchanger 31 is eliminated and the recirculation branch 25 is eliminated and replaced with a recirculation branch 32 comprising a recirculation manifold 33 having an inlet connected with branch 19 by means of valve 28 and, for each connector 23, a respective recirculation duct 34 configured to connect manifold 33 with connector 23 itself.

[0031] In the absence of panel 2, valve 28 is opened and the hot air fed downstream of nozzle 17 is recirculated again inside the feeding branch 19 at least through the ducts 34.

[0032] Each duct 34 is provided with a pressure adjusting device 35, which is configured to feed the hot air inside the relative connector 23 at a pressure that is at least equal to the pressure of the hot air in branch 19, and to prevent a return of the hot air along manifold 33 and to nozzle 17.

[0033] Manifold 33 is connected with branch 19 upstream of the heating devices 20 in direction 26, and is, furthermore, connected with the external environment by means of the interposition of a shut-off valve 36.

[0034] The hot air is recirculated in the recirculation ducts 34 and in branch 19 when valve 36 is closed, while it is dispersed into the external environment when valve 36 is open.

[0035] About the above disclosure, it is suitable to point out that the hot air is recirculated in branch 19 after having crossed a pressure adjusting device 37 that is completely similar to devices 35.

[0036] The variant illustrated in figure 4 differs from that illustrated in figures 1 and 2 in that, in it, the connectors 23 are eliminated and replaced with respective heat exchangers 38 and the recirculation branch 25 is eliminated and replaced with a recirculation branch 39, which has an inlet connected with branch 19 by means of valve 28, crosses the exchangers 38 in succession, and has an outlet connected with the external environment.

[0037] In the absence of panel 2, valve 28 is opened and the hot air fed downstream of nozzle 17 is fed along the recirculation branch 39 to heat up the air under pressure fed along branch 19.

[0038] According to a variant not shown, branch 39 comprises a first segment extending in succession through the exchangers 38, and a second segment to heat up a tank containing the glue that is to be applied onto the lateral profile 4 of panel 2 or onto edge 11.

[0039] Obviously, similarly to the recirculation branch 25, each recirculation branch 32, 39 may also be provided with a further recirculation segment (completely similar to segment 29) facing nozzle 17 to cause the hot air fed through nozzle 17 itself to be recirculated.

[0040] The presence of the recirculation branches 25, 32 and 39 therefore allows the hot air fed downstream of the outlet nozzle 17 to be reused to heat up the air under pressure fed along the feeding branch 19 and/or to heat up the glue that is to be applied onto the lateral profile 4 of panel 2 or onto edge 11.

Claims

1. A machine for edgebanding wood panels (2) or the like, each of which comprises two main faces (3), which are parallel and opposite to one another, and a lateral profile (4) extending between the main faces (3) themselves, the machine comprising a support surface (P) for at least one panel (2); an edgebanding assembly (10); actuator means (9) to move the panel (2) and the edgebanding assembly (10) relative to one another in at least one direction (6) that is parallel to the support surface (P) and to allow the edgebanding assembly (10) to apply a finishing edge (11) along at least part of the lateral profile (4) of the panel (2); and a feeding device (16) to feed a hot gas, in particular a hot gas under pressure, onto the finishing edge (11) and/or onto the lateral profile (4) of the panel (2), the feeding device (16) comprising a feeding branch (19), which is provided with at least one outlet (17), which is configured to direct the hot gas at the finishing edge (11) and/or at the lateral profile (4); and being **characterised in that** the feeding device (16) comprises, furthermore, a recirculation branch (25; 32) to cause at least part of the hot gas fed downstream of said outlet (17) to recirculate in

the feeding branch (19).

2. A machine according to claim 1 and comprising, furthermore, a plurality of heating devices (20), which are mounted in succession along the feeding branch (19) so as to heat up the gas; the recirculation branch (25; 32) being connected to the feeding branch (19) upstream of the heating devices (20) in a feeding direction (26) of the hot gas along the feeding branch (19) itself.

3. A machine according to claim 1 or 2, wherein the feeding branch (19) and at least one inlet of the recirculation branch (25; 32) are connected to one another by a shut-off valve (28), which is mobile between a closing position, in which the feeding and recirculation branches (19, 25; 32) are separated from one another so at to allow the hot gas to flow through said outlet (17), and an opening position, in which the feeding and recirculation branches (19, 25; 32) communicate with one another so as to allow the hot gas to flow along the recirculation branch (32).

4. A machine according to any of the previous claims and comprising, furthermore, a plurality of heating devices (20), which are mounted in succession along the feeding branch (19) so as to heat up the gas; the recirculation branch (32) comprising a recirculation manifold (33) and at least one recirculation duct (34), which is connected to the recirculation manifold (33) and, furthermore, is connected to the feeding branch (19) between two heating devices (20) that are adjacent to one another.

5. A machine according to claim 4, wherein each recirculation duct (34) is provided with a pressure adjusting device (33) to selectively control the pressure of the hot gas fed by the recirculation duct (32) into the feeding branch (19).

6. A machine according to any of the claims from 1 to 3, wherein the recirculation branch (25) comprises a first segment (27) having an inlet that is connected to the feeding branch (19) by means of the interposition of a shut-off valve (28), and a second segment (29) facing said outlet (17) so as to cause the hot gas fed through the outlet (17) itself to recirculate.

7. A machine according to any of the previous claims and comprising, furthermore, a plurality of measuring devices (24) to measure the temperature of the hot gas in the feeding branch (19).

8. A machine according to claim 7 and comprising, furthermore, a plurality of heating devices (20), which are mounted in succession along the feeding branch (19) so as to heat up the gas; each measuring device (24) being mounted between two adjacent heating devices (20).

9. A machine according to any of the previous claims and comprising, furthermore, a holding tank for the glue used to connect the finishing edge (11) and the lateral profile (4) to one another; the recirculation branch (25; 32) being connected to the holding tank so as to heat up the glue itself.

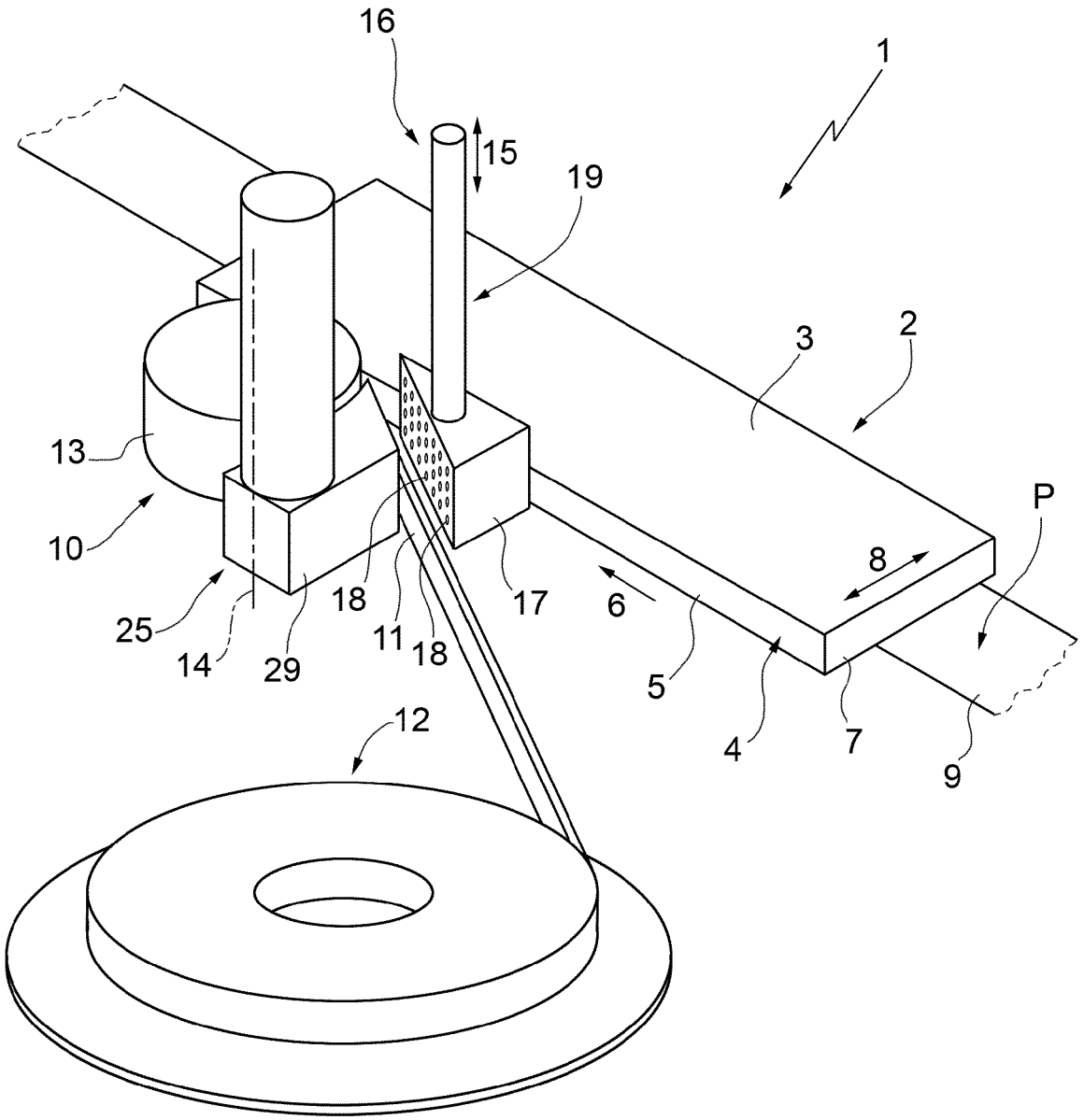

FIG.1

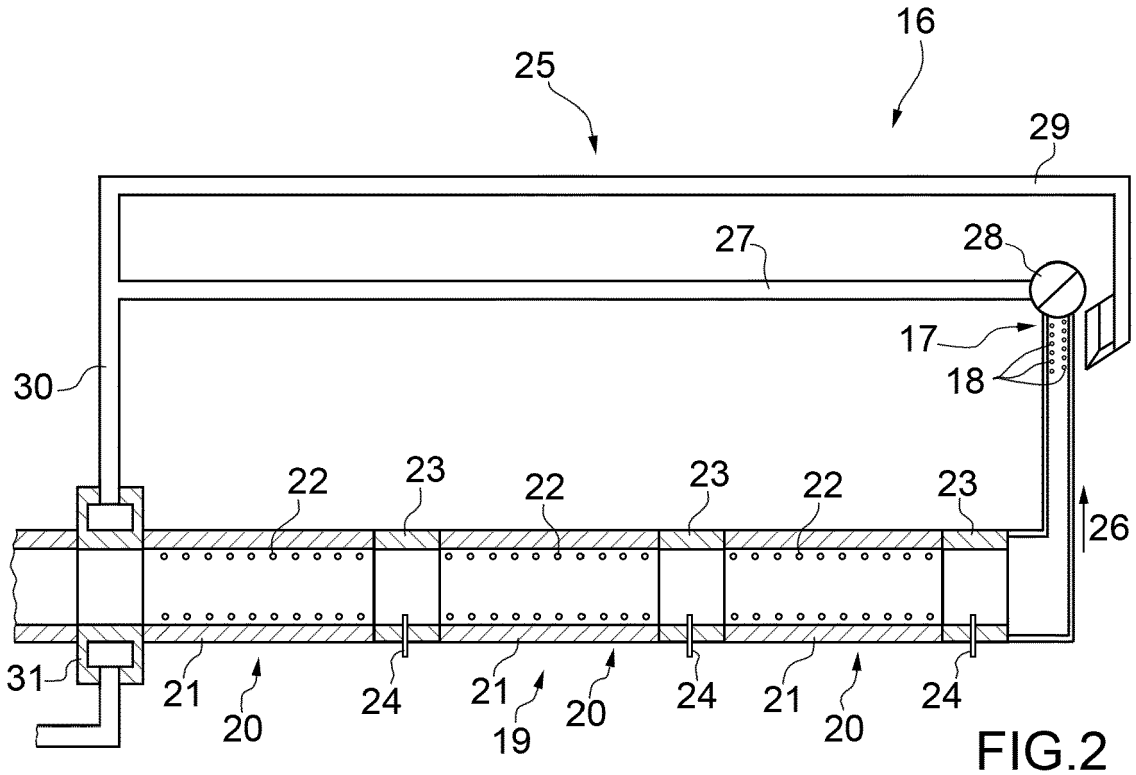
16
25
29
27
28
17
18
30
22
23
22
23
22
23
26
31
21
20
24
21
19
20
24
21
20
24

FIG.2

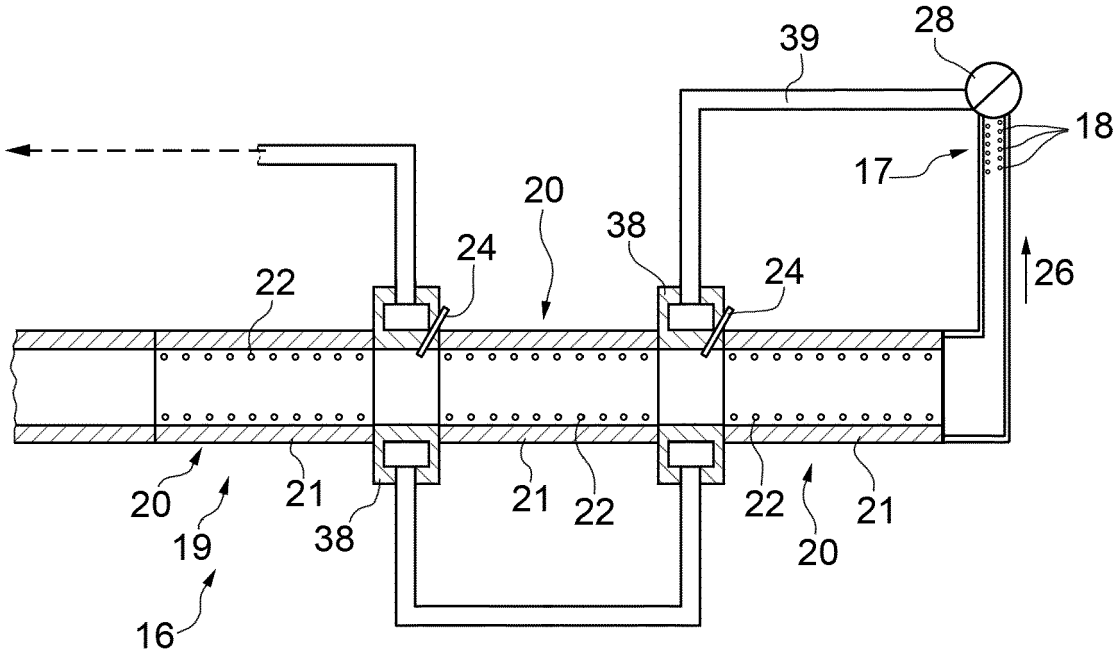
28
39
18
17
20
38
24
24
26
22
20
19
16
21
38
21
22
22
20
21

FIG.4

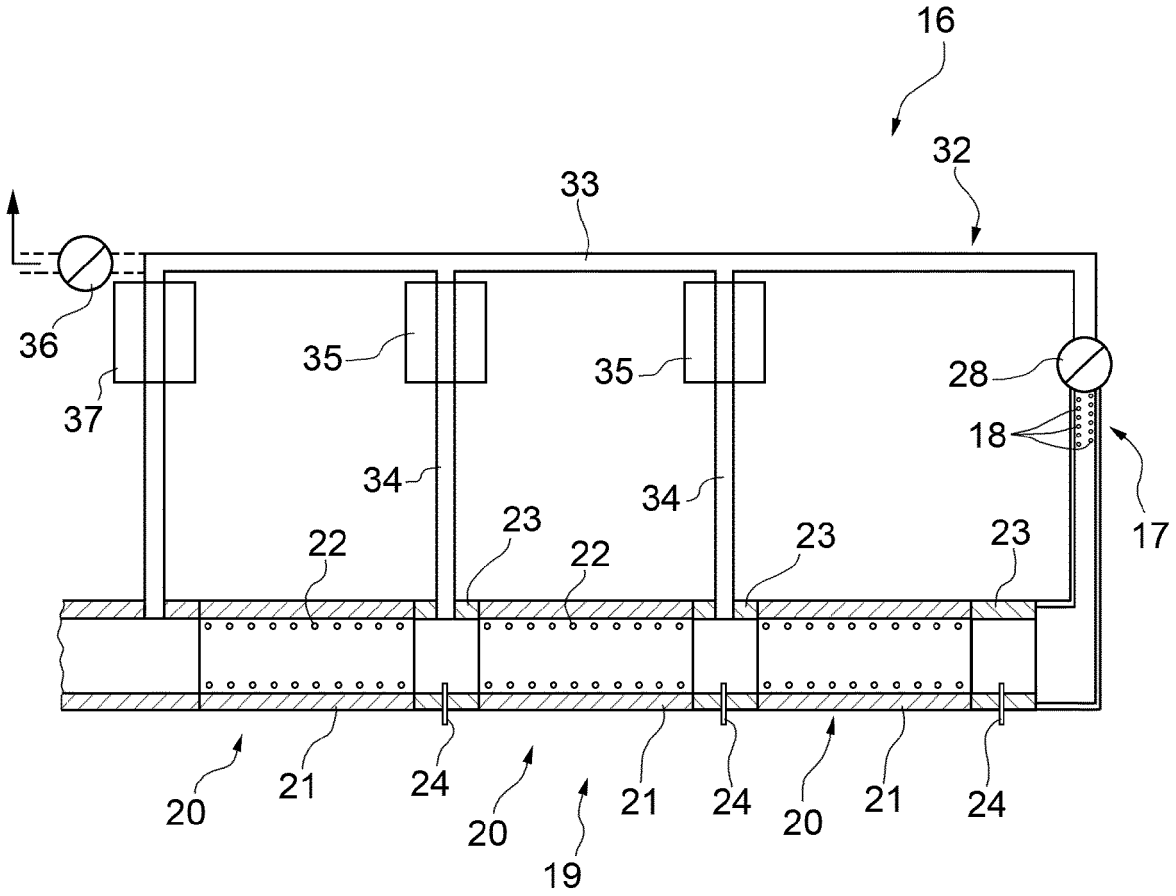
16
32
33
36
35
35
28
37
18
34
34
17
22
23
22
23
23
20
21
24
20
19
21
24
20
21
24

FIG.3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 15 15 3849

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,P	WO 2014/019847 A1 (HOMAG HOLZBEARBEITUNGSSYSTEME [DE]; BRANDT KANTENTECHNIK GMBH [DE]) 6 February 2014 (2014-02-06) * abstract * * page 3, line 35 - page 4, line 3 * * page 10, line 33 - page 11, line 4 * * page 14, line 18 - line 23 * * figure 1 *	1	INV. B27D5/00
X	DE 103 42 723 A1 (DELLE VEDOVE MASCHB GMBH [DE]) 4 August 2005 (2005-08-04) * abstract * * paragraph [0016] * * paragraph [0033] - paragraph [0035] * * paragraph [0042] * * figure 1 *	1-4,6-9	
A	EP 2 428 340 A1 (BRANDT KANTENTECHNIK GMBH [DE]) 14 March 2012 (2012-03-14) * paragraph [0021] - paragraph [0022]; figure 3 *	9	TECHNICAL FIELDS SEARCHED (IPC) B27D
A	US 4 222 812 A (DUEWEL RONALD E) 16 September 1980 (1980-09-16) * abstract * * column 5, line 17 - line 30 * * column 5, line 46 - line 51 * * column 7, line 23 - line 26 * * figures *	6	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 June 2015	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 15 15 3849

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.

22-06-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014019847 A1	06-02-2014	DE 102012213796 A1	06-02-2014
		EP 2879847 A1	10-06-2015
		WO 2014019847 A1	06-02-2014
DE 10342723 A1	04-08-2005	NONE	
EP 2428340 A1	14-03-2012	CN 102581895 A	18-07-2012
		EP 2428340 A1	14-03-2012
		ES 2426604 T3	24-10-2013
US 4222812 A	16-09-1980	NONE	

EPO FORM P0459

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