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(54) **Sawing machine for cutting wood panels or the like**

(57) A sawing machine is provided with a cutting device (15) mobile on a cutting plane (T) orthogonal to a direction of advancement (4) of a wood panel (2) or the like, of two cross members (23) arranged on opposite sides of the cutting plane (T) for securing the panel (2) against a supporting plane (P), and at least a pushing

element (31), which is mounted between the cross members (23), and is mobile on a pushing plane substantially parallel to and distinct from the cutting plane (T) for moving the panel (2) into contact with a corresponding abutting element (32).

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Description

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

[0002] Specifically, the present invention relates to a sawing machine of the type described, for example, in patent application EP-A-1321252 and comprising supporting means defining a supporting plane for at least one panel; conveying means for feeding the panel in one first given direction; cutting means mobile in a second direction transversal to the first direction and on a cutting plane orthogonal to the supporting plane for sawing the panel; abutting means mounted transversally with respect to the supporting plane to allow a correct positioning of the panel in the second direction; pushing means mobile in the second direction for securing the panel against the abutting means; and pressing means mobile in a third direction orthogonal to the supporting plane for securing the panel against the supporting plane itself.

[0003] The cutting means comprise a carriage, which is mobile underneath the supporting plane for moving at least one cutting blade along a slot obtained through the supporting means, and supports a pushing element, which extends on the cutting plane, and is mobile orthogonally to the supporting plane to and from a raised position, in which the pushing element protrudes over the supporting plane to move the panel into contact with the abutting means.

[0004] As the pushing element is carried by the cutting means carriage, the known sawing machines of the above-described type present some drawbacks mainly deriving from the fact that each operating cycle of the sawing machine is relatively long because it firstly implies a movement of the carriage to allow the pushing element to move the panel into contact with the abutting means and then a movement of the carriage to allow the cutting blade to saw the panel itself.

[0005] Furthermore, as the pushing element needs to move along the mentioned slot, the above-described sawing machine of the known type present the further drawback constituted in that the thickness of the pushing element, measured in the first direction, must be relatively small and may compromise both the stability of the pushing element, and the correct movement of the panel against the abutting means.

[0006] It is an object of the present invention to provide a sawing machine for wood panels or the like which is free from the above-described drawbacks and which is simple and cost-effective to implement.

[0007] According to the present invention, there is provided a sawing machine for wood panels or the like as claimed in the accompanying claims.

[0008] The present invention will now be described with reference to the accompanying drawings which illustrate a non-limitative example of embodiment thereof, in which:

figure 1 is a diagrammatic plan view, with parts re-

moved for clarity, of a preferred embodiment of the sawing machine of the present invention;

figure 2 is a first diagrammatic side view, with parts removed for clarity, of the sawing machine in figure 1;

figure 3 is a second diagrammatic side view, with parts removed for clarity, of the sawing machine in figure 1 shown in a first operating mode; and

figure 4 is similar to figure 3 and shows the sawing machine in figure 1 in a second operating mode.

[0009] With reference to figures 1 and 2, numeral 1 indicates as a whole a sawing machine for sawing wood panels 2 or the like, each of which presents a substantially parallelepiped shape with substantially rectangular section.

[0010] Machine 1 comprises an elongated base 3, which extends in a horizontal direction 4, and supports a roller conveyor 5 comprising, in turn, a plurality of rollers 6, which define a supporting plane P for at least one panel 2, and are mounted to turn, with respect to base 3, about corresponding longitudinal axes 7 parallel to a horizontal direction 8 transversal to direction 4.

[0011] Base 3 further presents two side longitudinal members 9, which extend parallel to direction 4, and which support a gripping and conveying unit 10 of known type comprising a horizontal cross member 11, which extends between longitudinal members 9 parallelly to direction 8, is slidably coupled to longitudinal members 9 to perform intermittent rectilinear movements in direction 4, along longitudinal members 9 and under the bias of an actuating device of known type and not shown, and is provided with a plurality of pincer-like gripping members 12 distributed along cross member 11 itself.

[0012] Panels 2 are fed by unit 10 in direction 4 and to a cutting station 13 provided with a supporting table 14 coplanar to plane P and with a cutting unit 15.

[0013] Unit 15 comprises a carriage 16, which extends underneath plane P, is slidably coupled to base 3 for performing rectilinear movements in direction 8, with respect to base 3 under the bias of an actuating device of known type and not shown, and supports a cutter 17 and a cutting blade 18 rotationally coupled to carriage 16 to turn, with respect to carriage 16 itself, about corresponding longitudinal axes 19, 20.

[0014] Cutter 17 and blade 18 extend on a vertical cutting plane T orthogonal to direction 4, and are fed by carriage 16 along a slot 21 obtained through table 14 parallelly to direction 8 to cut panels 2.

[0015] Station 13 is further provided with a pressing device 22 comprising two cross members 23, which extend over plane P parallelly to direction 8, are arranged on opposite sides of plane T in direction 4, and are slidably coupled to base 3 to perform, with respect to base 3 and under the bias of an actuating device of the known type and not shown, rectilinear movements in a vertical direction orthogonal to directions 4 and 8 between a raised rest position (figure 3), in which cross members 23 are arranged at a given distance from panels 2, and

a lowered working position (figures 2 and 4), in which panels 2 are stabilised by cross members 23 to ensure a correct operative cycle of cutting unit 15.

[0016] Finally, as shown in figures from 2 to 4, station 13 is provided with a pushing and aspirating unit 25 comprising two cross members 26, which are fixed to base 3 over cross members 23, extend in direction 8, and support a carriage 27, which extends between cross members 26, and is slidably coupled to cross members 26 themselves to perform, with respect to base 3 and under the bias of an actuating device of the known type and not shown, rectilinear movements in direction 8.

[0017] Carriage 27 supports a runner 28, which is fixed to an outlet rod 29 of an actuator cylinder 30 fitted on carriage 27, extends between cross members 23 of pressing device 22, and is mobile in direction 24 between a raised position (not shown) and a lowered position (figures 3 and 4).

[0018] Runner 28 is substantially fork-shaped and comprises two pushing arms 31 (only one of which is shown in figures 3 and 4), which extend in direction 24, are arranged on opposite sides of plane T in direction 4 to be crossed by cutter 17 and blade 18 when runner 28 is arranged in its lowered position, and are adapted to move panels 2 onto contact with a side abutting element 32 extending parallelly to direction 4 and over plane P.

[0019] Regarding the above, it must be noted that pushing arms 31 may be made by blade 18, which saws runner 28 during a first operating cycle of cutting unit 15.

[0020] Runner 28 is fixed to an aspirating pipe 33, which defines part of a pneumatic aspirating device 34 for aspirating the shavings and/or the machining waste generated by cutting unit 15, extends upwards between cross members 23 of pressing device 22, and presents a lower inlet mouth 35, which extends about plane T, and is shaped so as to be crossed by cutter 17 and blade 18 when runner 28 is arranged in its lowered position (figure 2).

[0021] Pipe 33 is fluid-tightly coupled to cross members 23 by means of the interposing of two seals 36, which are fixed to the upper edges of cross members 23 parallelly to direction 8, are formed by flexible material with a low friction coefficient, and prevent the passage of shavings and/or machining waste between cross members 23 and pipe 33 itself.

[0022] According to a variant (not shown), runner 28 is substantially L-shaped and comprises a mobile pushing arm in direction 8 on a pushing plane substantially parallel to and distinct from plane T.

[0023] A first operating mode of sawing machine 1 will now be presented with reference to figures 1, 2, and 3, assuming the sawing of a group of three reciprocally stacked panels 2, from when:

panels 2 are loaded onto plane P;
runner 28 is arranged in its lowered position; and
cross members 23 of pressing device 22 are arranged in their raised rest position.

[0024] At this point, carriage 27 is fed in direction 8 to firstly move runner 28 into contact with panels 2 and then panels 2 into contact with side abutting element 32 (figure 3), panels 2 are clamped between pincer-like gripping members 12, cross members 23 of pressing device 22 are lowered, and carriage 16 is fed in direction 8 to move cutter 17 and blade 18 firstly through lower inlet mouth 35 of aspirating pipe 33, then through pushing arms 31, and finally through panels 2.

[0025] After cutting panels 2, cross members 23 are raised, panels 2 are fed in direction 4 by means of gripping and conveying unit 10, cross members 23 are lowered again and cutting unit 15 is actuated to perform a new cut.

[0026] According to a variant (not shown), after having moved panels 2 into contact with abutting element 32 and lowered cross members 23, runner 28 is arranged in its raised position, carriage 27 is moved along cross members 26 so as to position mouth 35 over panels 2 and downstream of cutter 17 and blade 18 in feeding direction 8 of carriage 16, and the two carriages 16, 27 are fed in direction 8 with corresponding laws of motion substantially identical to each other to allow pipe 33 to aspirate the shavings and/or the machining waste generated by cutting unit 15.

[0027] Regarding the above, it must be noted that the operating mode just described is specifically used for sawing panels 2 arranged reciprocally side by side in direction 8 and oriented with their larger dimension parallel to direction 4.

[0028] A second operating mode of sawing machine 1 will now be described with reference to figures 1, 2, and 4, assuming the sawing of a group of three reciprocally stacked panels 2, and from when:

panels 2 are loaded onto plane P and are clamped between pincer-like gripping members 12 at a given distance from abutment element 32;
cross members 23 of pressing device 22 are arranged in their lowered working position;
pushing and aspirating unit 25 is arranged between panels 2 and abutting element 32; and
runner 28 is arranged in its lowered position with mouth 35 in position facing panels 2.

[0029] At this point, carriage 16 is fed in direction 8 to move cutter 17 and blade 18 firstly through panels 2, then through lower inlet mouth 35, and finally through pushing arms 31, and pneumatic aspirating device 34 is activated to allow pipe 33 to aspirate the shavings and/or machining waste generated by cutting unit 15 avoiding the dispersion of such shavings and/or machining waste within a free space 37 defined between cross members 23, supporting table 14, abutting element 32, and runner 28.

[0030] Finally, cross members 23 are raised, panels 2 are fed in direction 4 by means of gripping and conveying unit 10 and cutting unit 15 is operated to perform a new cut.

[0031] According to a variant (not shown), runner 28

is moved to its raised position, pushing and aspirating unit 25 is moved along cross members 26 so as to position mouth 35 over panels 2 and downstream of cutter 17 and blade 18 in feeding direction 8 of carriage 16, and carriages 16 and 27 are fed in direction 8 with corresponding laws of motion substantially identical to each other to keep mouth 35 at a minimum distance from blade 18 and allows pipe 33 to instantaneously aspirate the shavings and/or the machining waste generated by cutting unit 15 reducing the dispersion thereof to the minimum.

[0032] Regarding the above, it must be noted that the operating mode just described is specifically used for sawing single or reciprocally stacked panels 2 oriented with their larger dimension parallel to direction 8.

Claims

1. A sawing machine for wood panels (2) or the like comprising supporting means (5, 14) defining a supporting plane (P) for at least one panel (2); conveying means (10) for feeding the panel (2) in a first given direction (4); cutting means (15) mobile in a second direction (8) transversal to the first direction (4) and a cutting plane (T) orthogonal to the supporting plane (P) for sawing the panel (2); abutment means (32) transversally mounted to the supporting plane (P) for allowing a correct positioning of the panel (2) in said second direction (8); mobile pushing means (31) in the second direction (8) to secure the panel (2) against abutment means (32); and mobile pressing means (22) in a third direction (24) orthogonal to the supporting plane (P) for securing the panel (2) against the supporting plane (P) itself, the pressing means (22) comprise first and second pressing means (23) arranged on opposite sides of the cutting plane (T) in said first direction (4); and **characterised in that** the pushing means (31) comprise at least one pushing arm (31), which is mounted between first and second pressing means (23), and is mobile in the second direction (8) on a pushing plane substantially parallel to and distinct from the cutting plane (T).
2. A sawing machine according to claim 1, wherein the pressing means (22) comprise two cross members (23) arranged on opposite sides of the cutting plane (T) in said first direction (4); the pushing means (31) comprise two pushing arms (31), which are mounted between the cross members (23), are arranged on opposite sides of the cutting plane (T) in the first direction (4), and are adapted to be crossed by the cutting means (15) during the movement of the cutting means (15) themselves in the second direction (8).
3. A sawing machine according to claim 2 and further comprising actuator means (30) for moving the pushing arms (31) between the cross members (23) in said third direction (24).
4. A sawing machine according to any of the preceding claims, and further comprising aspirating means (34) for aspirating the shavings and/or the machining waste generated by the cutting means (15); the aspirating means (34) being mobile in said second direction (8) and along said cutting plane (T).
5. A sawing machine according to claim 4, wherein said pushing and aspirating means (31, 34) are mobile in said second direction (8) with corresponding laws of motion substantially identical to each other.
6. A sawing machine according to claim 4 or 5, wherein the aspirating means (34) comprise at least one aspirating pipe (33) presenting an inlet (35) of the shavings and/or machining waste into the aspirating pipe (33) itself; the inlet (35) being shaped so as to be crossed by the cutting means (15) during the movement of the cutting means (15) themselves in said second direction (8).
7. A sawing machine according to any of the preceding claims from 4 to 6 and further comprising a first slide (27), which carries connected said pushing and aspirating means (31, 34) connected, and is mobile in said second direction (8) to move the pushing and aspirating means (31, 34) themselves between the pressing means (22) with corresponding laws of motion substantially identical to each other.
8. A sawing machine according to claim 7 and further comprising a second slide (28), which carries connected said pushing and aspirating means (31, 34), and is slidably coupled to the first slide (27) to move the pushing and aspirating means (31, 34) themselves in said third direction (24) between a raised position and a lowered position.
9. A sawing machine according to any of the preceding claims, wherein said cutting, pushing and aspirating means (15, 31, 34) are mobile with corresponding laws of motion substantially identical to each other.

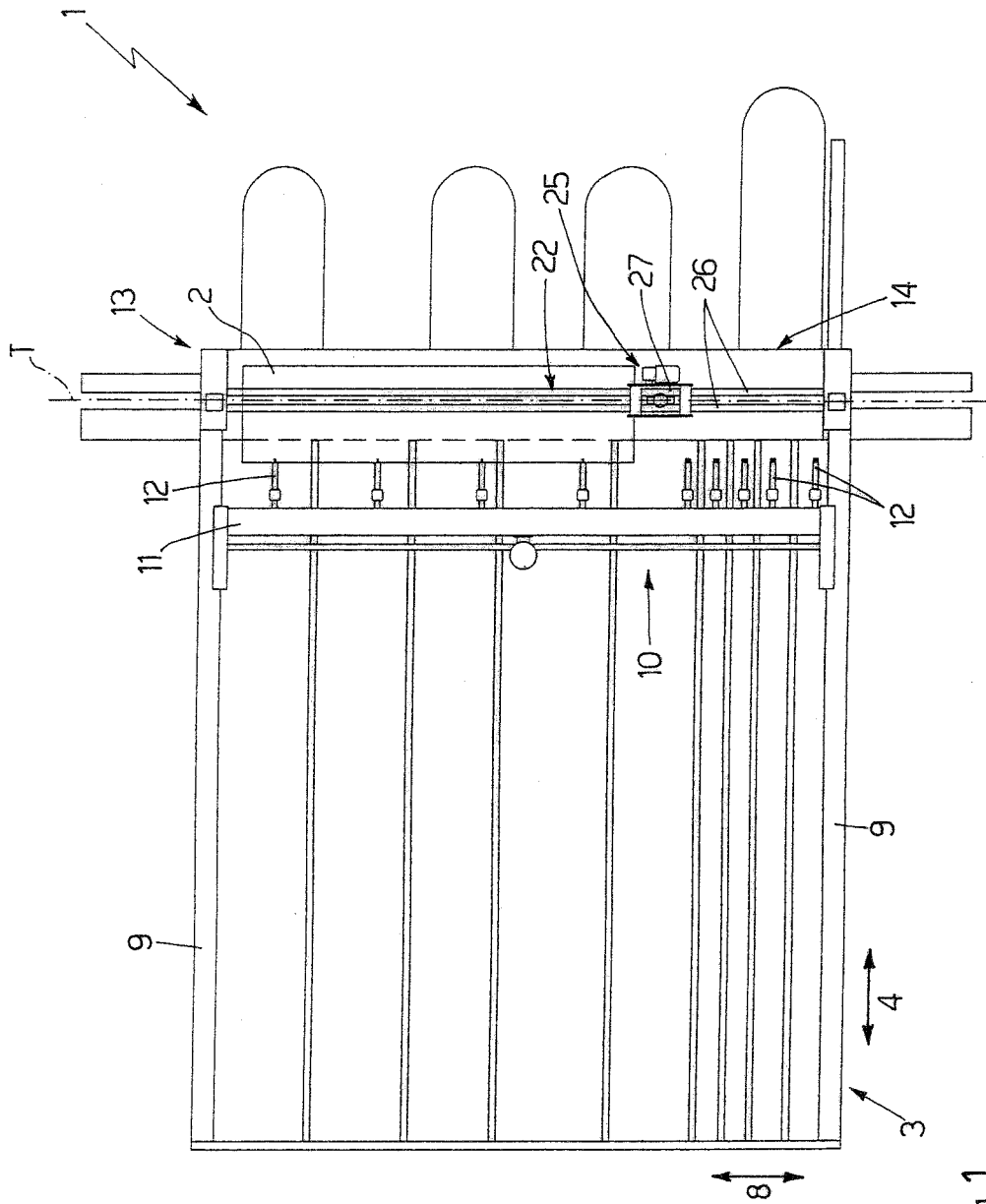


Fig.1

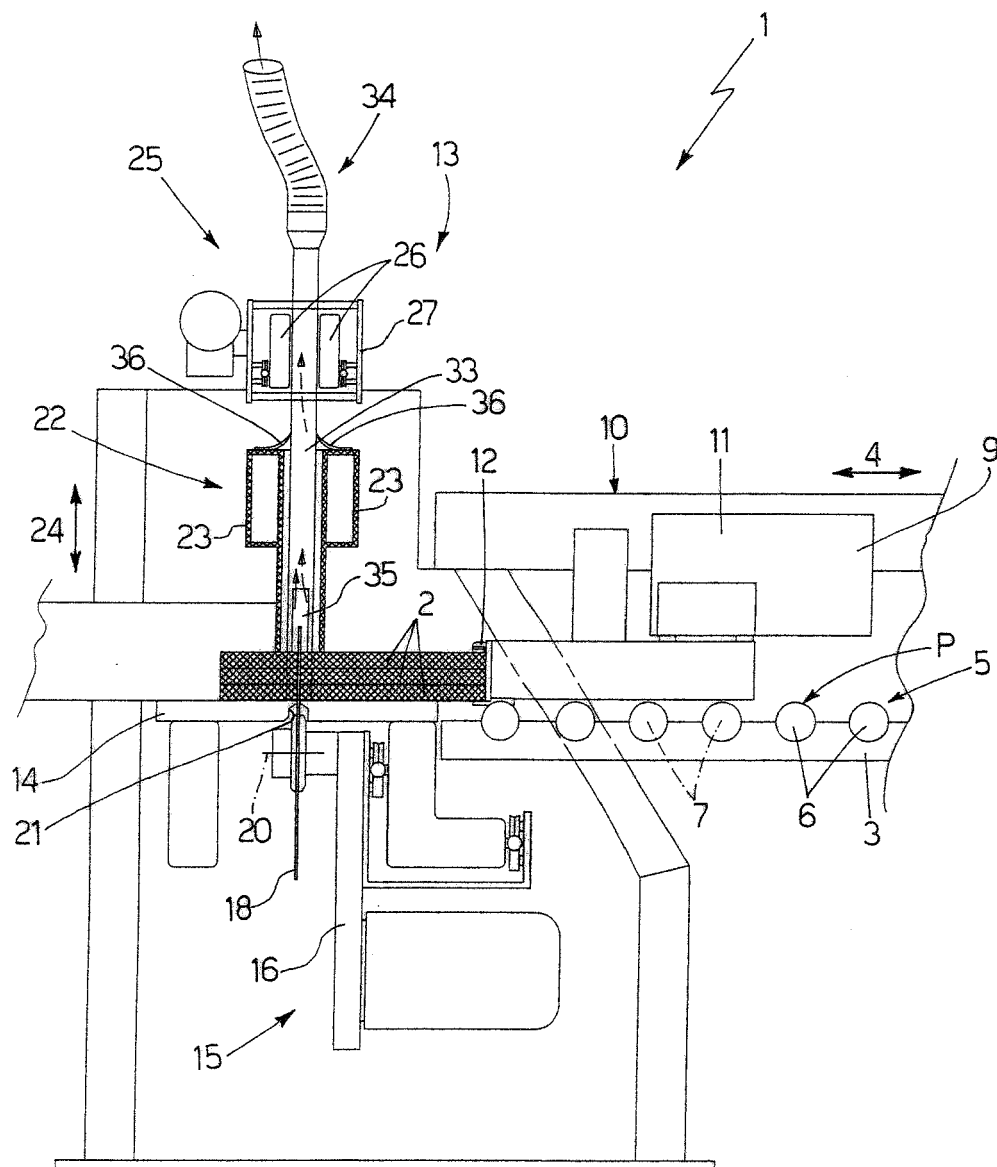


Fig.2

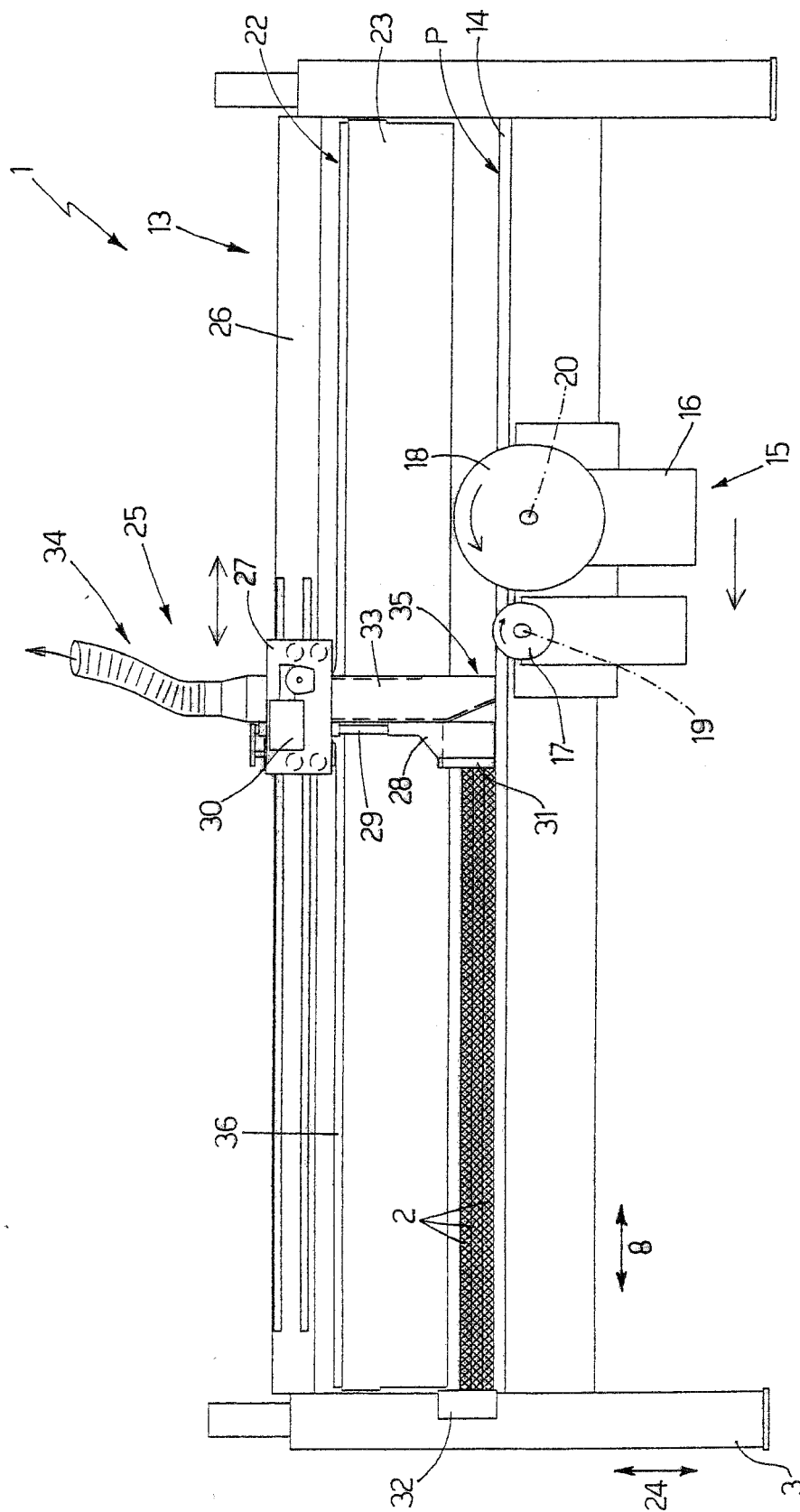


Fig.3

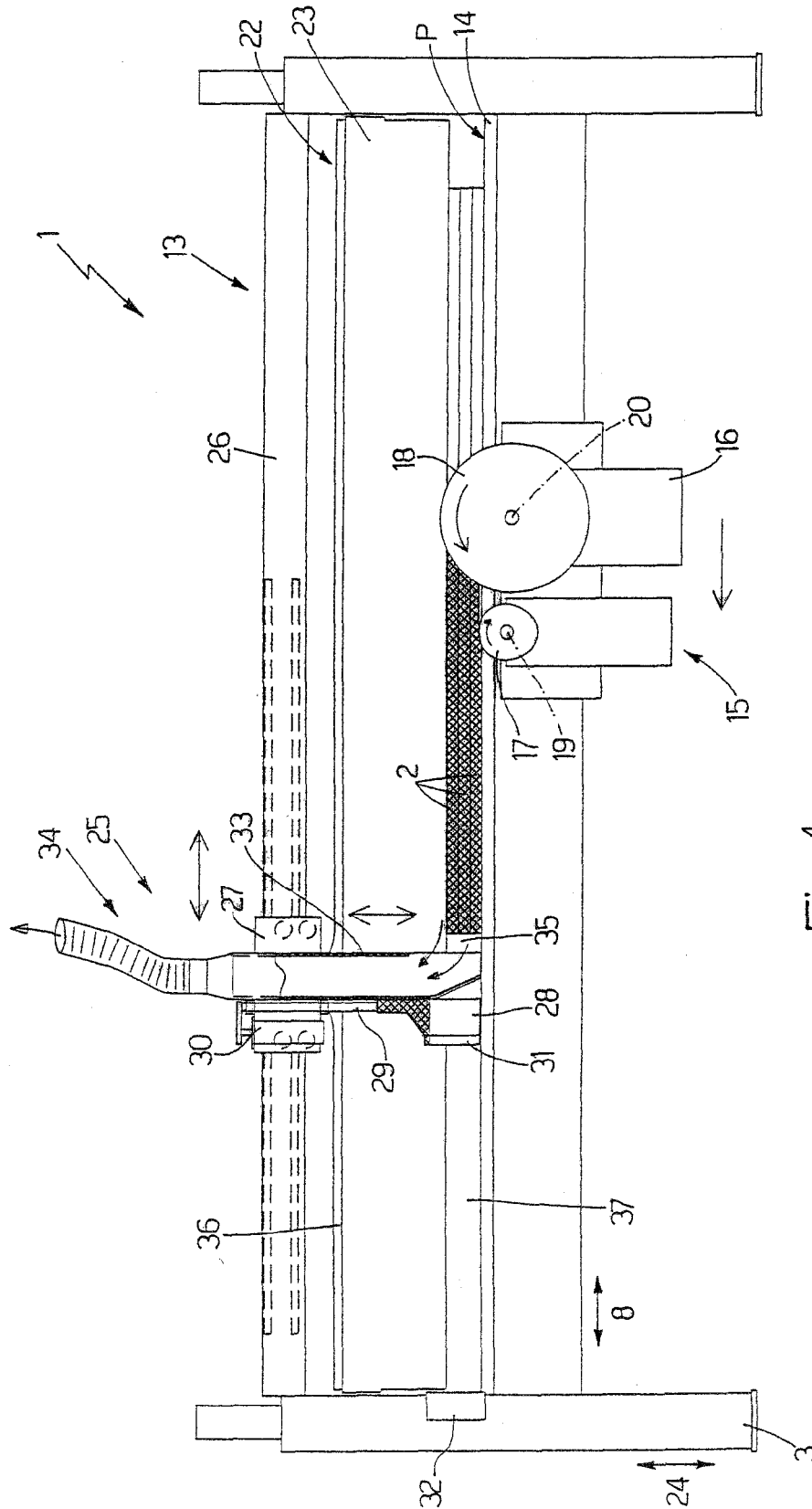


Fig. 4



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Place of search The Hague		Date of completion of the search 11 September 2007	Examiner Chariot, David
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 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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