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(54) **Shaping machine for longitudinally shaping component parts of wood or similar, in particular, component parts of door and window frames**

(57) A component part (2) of wood or similar is shaped longitudinally by inserting the component part (2) between a bottom jaw (19) and a top jaw (24) of a gripping device (17,18); the jaws (19,24) of the gripping device (17,18) defining between them a channel (28), which has no stop members for arresting the component part (2) in an insertion direction (11) of the component part (2) between the jaws (19,24), so that the component part (2) can be fed through the channel (28) from one end to the other.

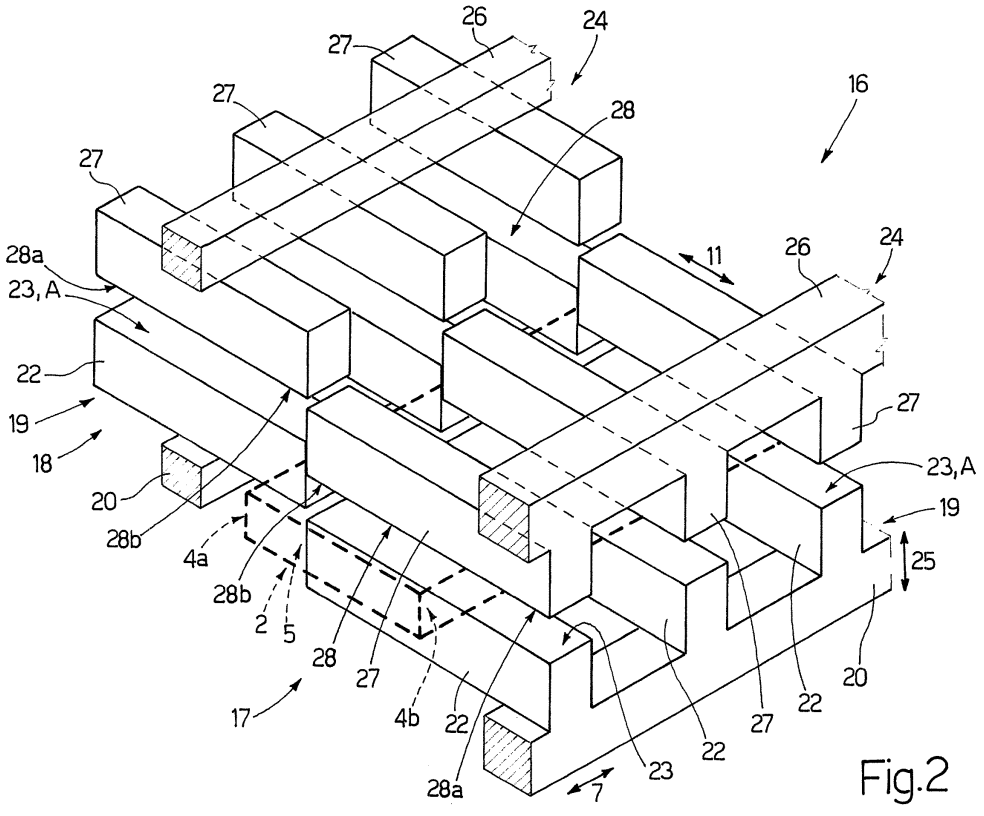

Fig.2

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Description

[0001] The present invention relates to a shaping machine for longitudinally shaping component parts of wood or similar, in particular, component parts of door and window frames.

[0002] In woodworking, a component part having two substantially parallel, longitudinal lateral faces is shaped longitudinally using a shaping machine comprising at least one gripping device for gripping the part; and a work unit for shaping the longitudinal lateral faces of the part.

[0003] The gripping device normally comprises at least one bottom jaw and at least one top jaw, which receive the part in an insertion direction substantially perpendicular to the longitudinal lateral faces of the part, and are movable with respect to each other between a part gripping position and a part release position. The part is inserted between the jaws to rest against a stop member, which extends between the jaws to position the part correctly in the insertion direction and permit shaping of the longitudinal lateral face projecting from the jaws.

[0004] Known shaping machines of the above type have various drawbacks, mainly due to the fact that, once the first longitudinal lateral face of the part is shaped, shaping the second longitudinal lateral face means moving the jaws into the release position, extracting the part from the jaws, rotating the part 180°, reinserting the part between the jaws, and moving the jaws back into the gripping position. The above sequence is fairly complicated and time-consuming, requires the assistance of an operator, and may impair correct, accurate shaping of the two faces.

[0005] To eliminate the above drawbacks, a shaping machine is known comprising two gripping devices of the type described, and on which the part is gripped between the jaws of one gripping device to shape one longitudinal lateral face, and is transferred to the jaws of the other gripping device to shape the other longitudinal lateral face. Featuring two gripping devices, however, obviously makes the shaping machine fairly complicated, bulky, and expensive.

[0006] Another drawback common to both the above known types of shaping machine is that, once inserted between the jaws of the gripping device, the component part projects outwards of the jaws by a portion whose width, measured parallel to the insertion direction, varies alongside a variation in the width of the component part, also measured parallel to the insertion direction, and may, over and above a given width, impair the stability of the part as it is being shaped.

[0007] It is an object of the present invention to provide a shaping machine for longitudinally shaping component parts of wood or similar, in particular, component parts of door and window frames, designed to eliminate the aforementioned drawbacks.

[0008] According to the present invention, there is provided a shaping machine for longitudinally shaping component parts of wood or similar, in particular, component parts of door and window frames, as claimed in the accompanying Claims.

[0009] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic plan view of a preferred embodiment of the shaping machine according to the present invention;

Figure 2 shows a schematic view in perspective of a detail of the Figure 1 shaping machine;

Figure 3 shows a schematic side view of one possible operating cycle of the Figure 1 shaping machine.

[0010] Number 1 in Figure 1 indicates as a whole a shaping machine for longitudinally shaping component parts 2 of wood or similar, in particular, component parts 2 of door and window frames. In the example shown, each component part 2 is in the form of an elongated, substantially rectangular-section parallelepiped, and has two parallel major lateral faces 3; two parallel minor lateral faces 4 perpendicular to faces 3; and two parallel minor lateral faces 5 perpendicular to faces 3 and 4.

[0011] Machine 1 comprises an elongated bed 6 extending in a horizontal direction 7 and supporting a conveyor device 8, which extends in direction 7 and comprises a belt 9 looped about two pulleys (not shown), one of which is powered, and which are mounted to rotate about respective longitudinal axes 10 parallel to a horizontal direction 11 crosswise to direction 7.

[0012] Belt 9 has a substantially horizontal top conveying branch 12, on which component parts 2 are positioned "flat", i.e. with one face 3 resting on branch 12, with faces 4 perpendicular to direction 11, and with faces 5 perpendicular to direction 7.

[0013] Component parts 2 are fed successively by device 8 along a path P, parallel to direction 7, to a transfer station 13 having a number of (in the example shown, two) stop members 14 arranged successively along path P. Each member 14 extends crosswise to direction 7 to position component 2 correctly in direction 7, and is movable between a work position (Figure 1), in which member 14 projects onto path P, and a rest position (not shown), in which member 14 clears path P.

[0014] Bed 6 is fitted with two guides 15, which extend parallel to direction 11 and support a grip-and-carry unit 16 comprising two grip-and-carry devices 17, 18, of which device 17 is located between device 8 and device 18, and is connected to device 8 at station 13.

[0015] As shown in Figures 1 and 2, each device 17, 18 comprises a comb-like bottom jaw 19 extending over bed 6 in direction 7, and comprising a supporting bar 20, which extends in direction 7, is fitted in sliding manner to guides 15 by two skids 21, and is moved linearly in direction 11 along guides 15 by a known actuating device not shown. Bar 20 has a number of parallel teeth 22, each of which projects from bar 20 in direction 11, and is bounded at the top by a flat horizontal surface 23 co-

planar with surfaces 23 of the other teeth 22 and with top conveying branch 12 of belt 9 to define a supporting surface A for component parts 2.

[0016] Each device 17, 18 also comprises a top jaw 24, which extends over bed 6 in direction 7, is aligned with relative jaw 19 in a vertical direction 25 perpendicular to directions 7 and 11, and comprises a supporting bar 26 connected in known manner to bar 20 to move in direction 25 between a gripping position and a release position respectively gripping and releasing at least one component part 2.

[0017] Jaw 24 is comb-shaped, and has a number of parallel teeth 27, each of which projects from bar 26 in direction 11, and is aligned in direction 25 with a corresponding tooth 22 of relative bottom jaw 19. In connection with the above, it should be pointed out that teeth 22, 27 of jaws 19, 24 of device 17 are offset in direction 7 with respect to teeth 22, 27 of jaws 19, 24 of device 18.

[0018] Jaws 19, 24 of each device 17, 18 define between them a channel 28 for insertion of component parts 2 in direction 11. Channel 28 has no stop members for arresting component parts 2 in direction 11, so that component parts 2 can be inserted through the channel from one end to the other and along its whole length in direction 11.

[0019] Shaping machine 1 also comprises a work unit 29 comprising a fixed bridge crane 30, which in turn comprises two uprights (not shown), which extend upwards from bed in direction 25, are located on opposite sides of guides 15 in direction 7, and are fitted with a horizontal cross member 31 extending over guides 15 in direction 7.

[0020] Bridge crane 30 supports a machining head 32, which is fitted in known manner to cross member 31 to move linearly in direction 7 along cross member 31 under the control of a known actuating device not shown, and comprises at least one tool spindle 33 fitted in known manner to head 32 to move in direction 25, and having a known shaping tool 34 (Figure 3).

[0021] Operation of shaping machine 1 will now be described with reference to Figures 1 and 3 and to the shaping of one component 2, and as of the instant in which component part 2 has been fed by conveyor device 8 into transfer station 13 and onto relative stop member 14, and top jaws 24 of grip-and-carry devices 17, 18 are in the release position.

[0022] As shown in Figures 1 and 3a, member 14 is moved into the rest position, and component part 2 is inserted in direction 11 between jaws 19, 24 of device 17 by a push bar 35, which extends in direction 7 and is fitted in known manner to bed 6 to move linearly in direction 11 with respect to bed 6, under the control of a known actuating device not shown.

[0023] Since channel 28 defined between jaws 19, 24 of device 17 has no stop members for arresting component part 2 in direction 11, component part 2 is inserted between jaws 19, 24 of device 17 at a first end 28a of channel 28, and is fed along channel 28 so that one of faces 4 (hereinafter indicated 4a) projects in direction 11 from jaws 19, 24 at a second end 28b, opposite first end 28a, of channel 28.

[0024] Component part 2 is fed into contact with an elongated stop member 36, which extends in direction 7, is located a given distance from second end 28b of channel 28, provides for positioning the component part correctly in direction 11, and is fitted in known manner to bed 6 to move linearly in direction 25, with respect to bed 6 and under the control of a known actuating device not shown, between a raised work position (Figure 3a), in which member 36 projects above supporting surface A, and a lowered rest position (not shown), in which member 36 is positioned below surface A.

[0025] At this point, jaw 24 of device 17 is moved into the gripping position, member 36 is moved into the lowered rest position, and face 4a is shaped by shaping tool 34 (Figure 3b) by combining the movements of machining head 32 in direction 7, of tool spindle 33 in direction 25, and of grip-and-carry device 17 in direction 11.

[0026] With reference to Figure 3c, once face 4a is shaped, grip-and-carry device 18 is moved in direction 11, so that teeth 22, 27 of relative jaws 19, 24 fit between teeth 22, 27 of corresponding jaws 19, 24 of device 17 to engage component part 2; jaw 24 of device 18 is moved into the gripping position; jaw 24 of device 17 is moved into the release position; and device 17 is moved in direction 11 to release component part 2.

[0027] Since channel 28 defined between jaws 19, 24 of device 18 has no stop members for arresting component part 2 in direction 11, component part 2 is inserted between jaws 19, 24 of device 18, so that face 4 opposite face 4a (and hereinafter indicated 4b) projects in direction 11 from jaws 19, 24.

[0028] Finally, face 4b is shaped by shaping tool 34 (Figure 3d) by combining the movements of machining head 32 in direction 7, of tool spindle 33 in direction 25, and of grip-and-carry device 18 in direction 11.

[0029] In variations not shown :

- when component part 2 is wider, in direction 11, than the length of channel 28, also measured in direction 11, component part 2 is gripped between jaws 19, 24 of grip-and-carry device 17 with both faces 4a, 4b projecting outwards of channel 28 in direction 11, so that both faces 4a, 4b are shaped by shaping tool 34 without ever releasing component part 2;
- shaping machine 1 may be equipped with two work units 29 for simultaneously shaping faces 4a, 4b of component parts 2 wider, in direction 11, than the length of channel 28, also measured in direction 11;
- device 18 may be replaced with a second push bar located on the opposite side of device 17 to bar 35, so that component part 2 can be pushed between jaws 19, 24 of device 17 both ways in direction 11;
- at least one of jaws 19, 24 of each device 17, 18 may comprise a stop member, e.g. an actuating cylinder, movable between a work position, in which the stop member projects from relative jaw 19, 24 into relative

channel 28 to position component parts 2 correctly in direction 11, and a rest position, in which the stop member is housed inside relative jaw 19, 24 to clear relative channel 28; and

the number and arrangement of work units 29 and grip-and-carry devices 17, 18 may vary, depending on the production cycle of shaping machine 1.

Claims

1. A shaping machine for longitudinally shaping component parts (2) of wood or similar, in particular, component parts (2) of door and window frames, the shaping machine comprising at least one gripping device (17, 18) for at least one component part (2); and at least one work unit (29) for shaping at least one longitudinal lateral face (4a, 4b) of the component part (2); the gripping device (17, 18) comprising a bottom jaw (19) and a top jaw (24), which receive the component part (2) in a given insertion direction (11), and define between them a channel (28) by which to feed the component part (2) in the insertion direction (11); and the shaping machine being **characterized in that** the channel (28) has no stop members for arresting the component part (2) in said insertion direction (11), so that the component part (2) can be fed through the channel (28) from one end to the other.

2. A shaping machine as claimed in Claim 1, and also comprising first stop means (36) for positioning the component part (2) correctly in said insertion direction (11); the first stop means (36) being located outside said channel (28).

3. A shaping machine as claimed in Claim 1 or 2, and also comprising second stop means housed inside one of said jaws (19, 24) and movable between a rest position, in which the second stop means are located outside said channel (28), and a work position, in which the second stop means project inside the channel (28).

4. A shaping machine as claimed in any one of the foregoing Claims, wherein said insertion direction (11) is substantially perpendicular to said longitudinal lateral face (4a, 4b).

5. A shaping machine as claimed in any one of the foregoing Claims, and also comprising a loading station (13) for loading the component part (2) between said jaws (19, 24); and first conveying means (35) for moving the component part (2) and the gripping device (17, 18) with respect to each other in said insertion direction (11) to insert the component part (2) between the jaws (19, 24).

6. A shaping machine as claimed in Claim 5, and also comprising second conveying means (8) for feeding the component part (2) to said loading station (13) in a travelling direction (7) substantially crosswise to said insertion direction (11).

7. A shaping machine as claimed in any one of the foregoing Claims, and comprising a first and second said gripping device (17, 18), each of which comprises a said bottom jaw (19) and a said top jaw (24); the first and second gripping device (17, 18) being movable with respect to each other in said insertion direction (11) to transfer the component part (2) between the first and second gripping device (17, 18).

8. A shaping machine as claimed in Claim 7, wherein each said jaw (19, 24) is a comb-shaped jaw having a respective number of teeth (22, 27) parallel to one another and to said insertion direction (11).

9. A shaping machine as claimed in Claim 8, wherein the teeth (22, 27) of the jaws (19, 24) of the first gripping device (17) are offset, crosswise to said insertion direction (11), with respect to the teeth (22, 27) of the jaws (19, 24) of the second gripping device (18); the teeth (22, 27) of the jaws (19, 24) of the first gripping device (17) being inserted between the teeth (22, 27) of the jaws (19, 24) of the second gripping device (18) when the gripping devices (17, 18) are moved with respect to each other in said insertion direction (11) .

10. A shaping machine as claimed in any one of the forgoing Claims, wherein the component part (2) has two longitudinal lateral faces (4a, 4b) substantially parallel to each other and perpendicular to said insertion direction (11); the shaping machine comprising at least two said work units (29) for simultaneously shaping said longitudinal lateral faces (4a, 4b).

11. A shaping machine as claimed in any one of the foregoing Claims, and comprising conveying means (35) for moving the component part (2) and the gripping device (17, 18) with respect to each other in said insertion direction (11), and for positioning the component part (2) correctly between said jaws (19, 24) both ways in said insertion direction (11).

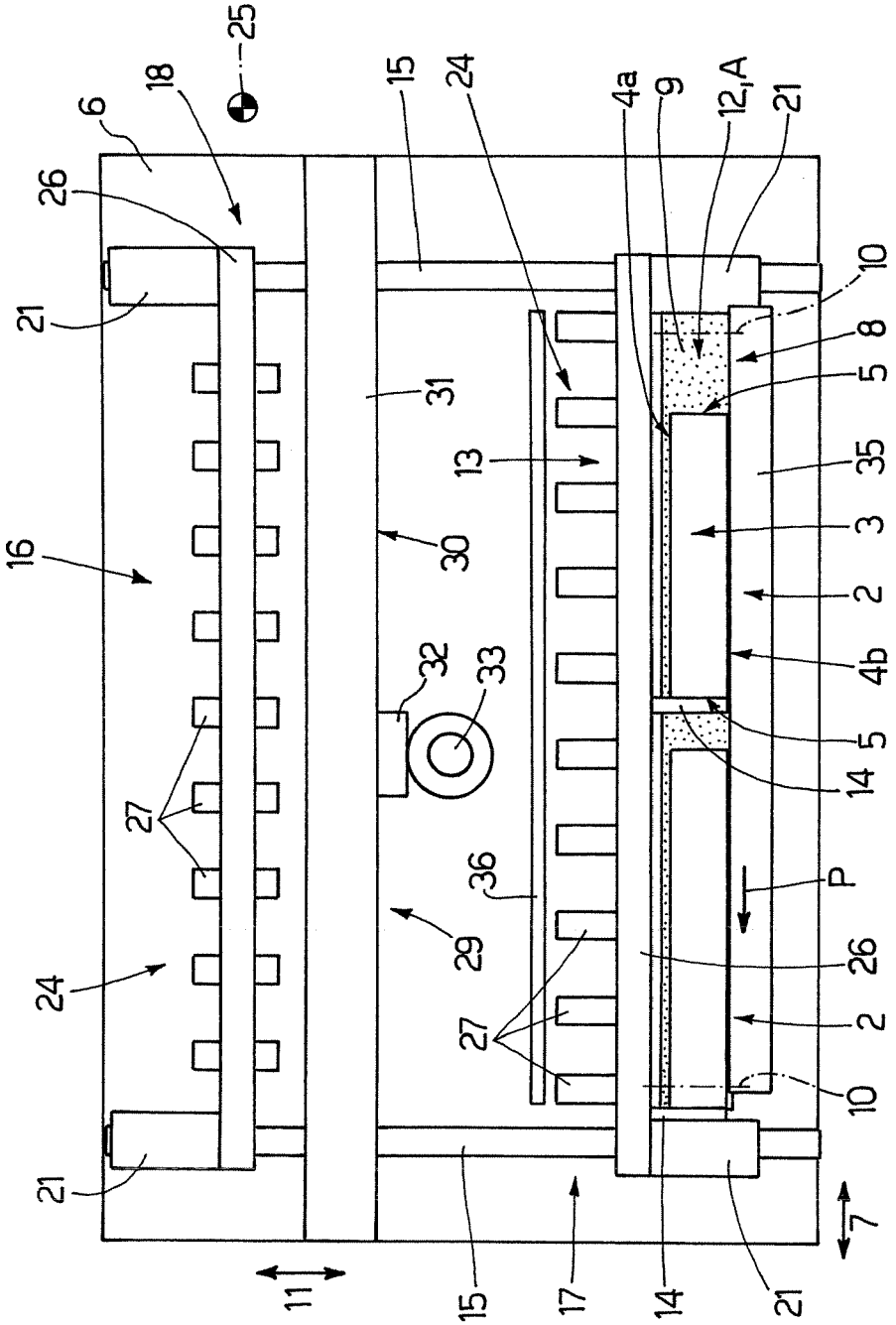
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Fig.1

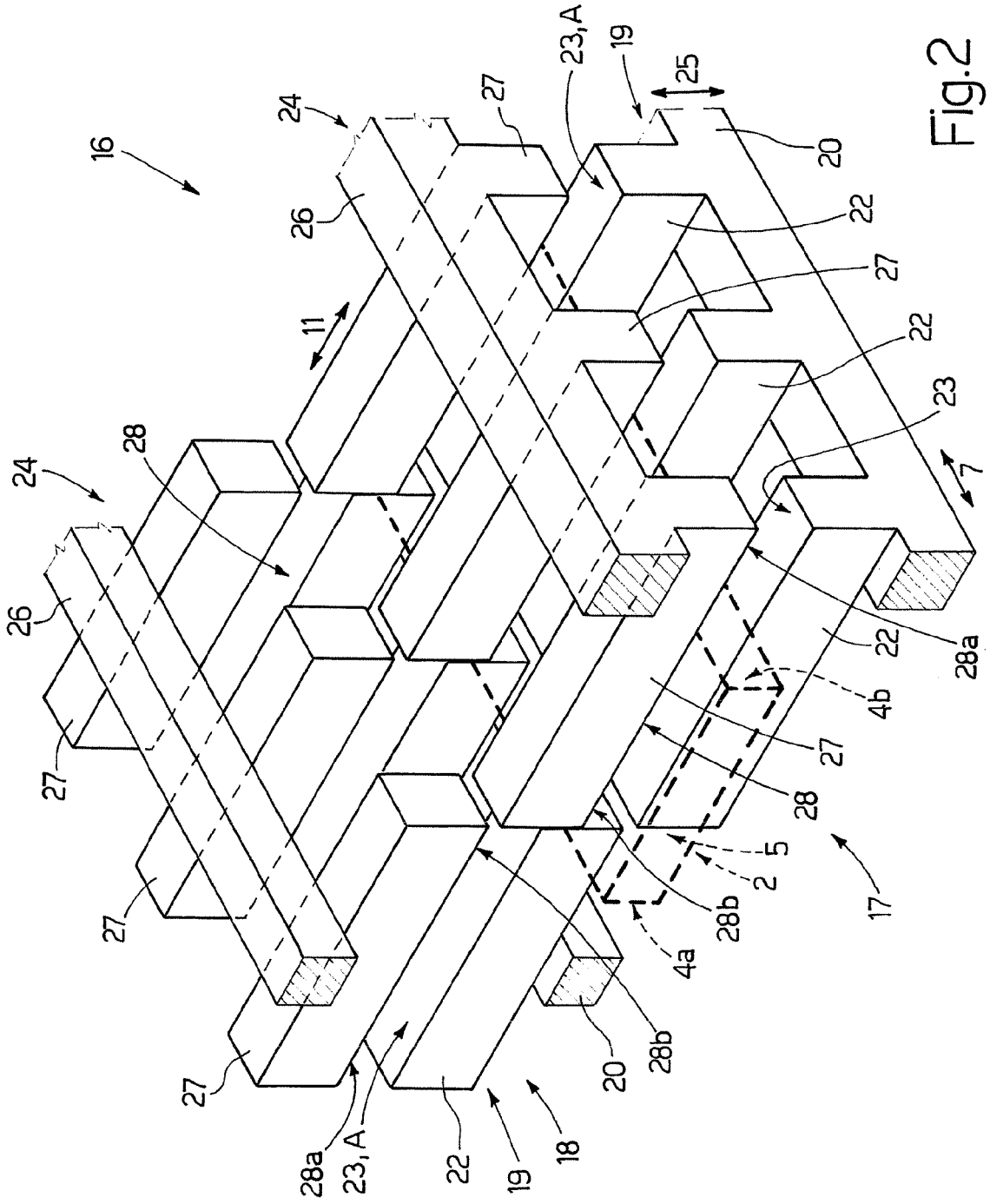

Fig.2

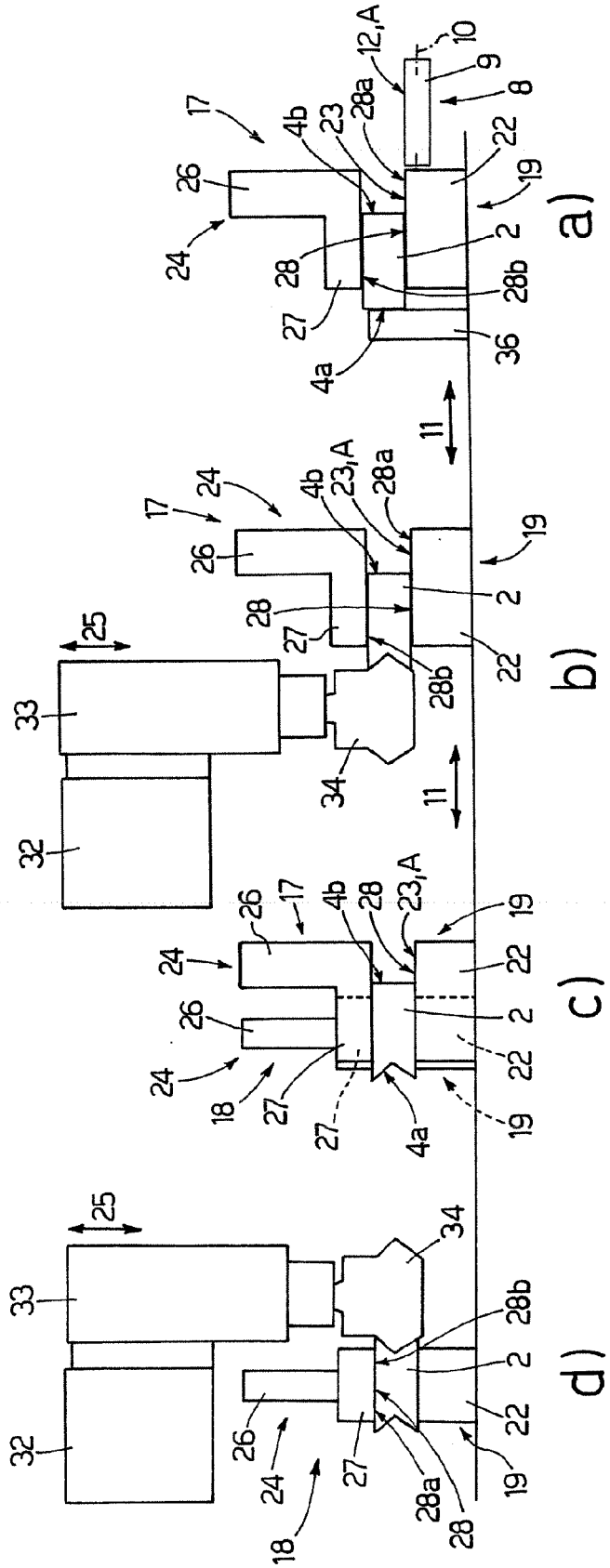
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Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 3893

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TECHNICAL FIELDS SEARCHED (IPC)

B27F
B27M
B23Q
B27C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 June 2007	Meritano, Luciano

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