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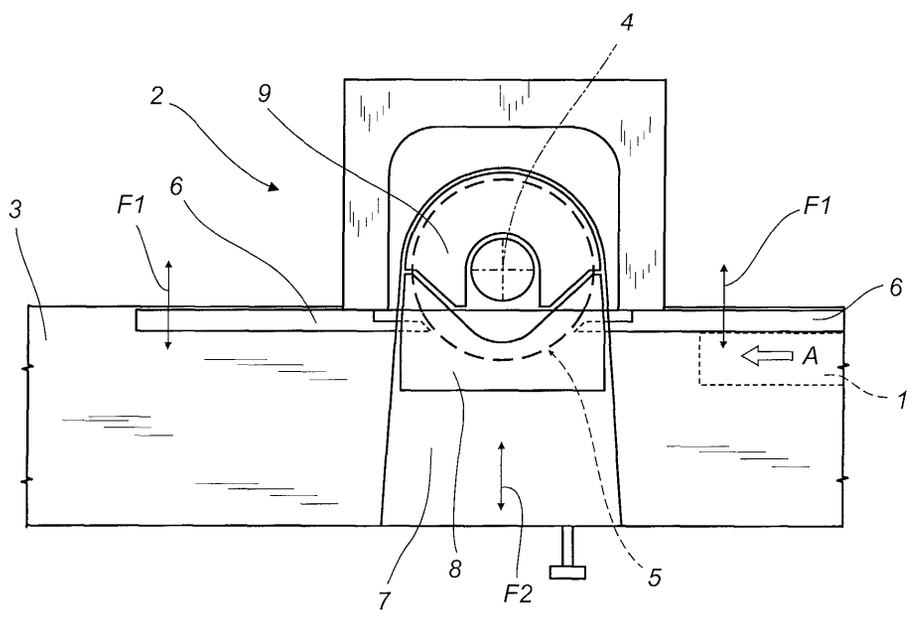
(54) A machine for working wooden panels or similar workpieces

(57) A machine for working wooden panels (1) or similar workpieces comprises: a horizontal work table (3) on which the wooden panel (1) rests; a vertical machining axis (4), at the side of the work table (3) and presenting at least one tool (5) for working on the panel (1); a pair of fences (6), one on each side of the machining axis (4), adjustably mounted relative to the cutting tool (5), perpendicular to the work table (3) and designed to define the position at which the panel (1) stops relative to the tool (5) and to guide the panel (1) towards the tool (5) in a feed direction (A). A section (7) of the work table (3) close to the machining axis (4) is equipped with a first plate (8), lying in the same plane as the work table (3), and shaped to match at least the front circular area of the machining axis (4). Further, the shaped edge of the first plate (8) extends at an angle to form a V-like figure converging on the inside of the first plate (8).

FIG.1



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Description

[0001] The present invention relates to a machine for working wooden panels or similar workpieces.

[0002] The machine forming the subject-matter of this specification is called a lower vertical router or, in the jargon of the trade, "spindle moulder".

[0003] This type of machine is used for various types of machining operations on wooden panels (for example, moulding or cutting tenons on crosspieces or uprights which will be used to make door or window frames) and has average productivity.

[0004] The machine basically comprises a horizontal work table on which the wooden panels rest and a vertical machining axis, at the side of the horizontal table, all supported by a base.

[0005] The machining axis comprises a motor-powered spindle, which supports and drives one or more tools designed to allow panel machining. On both sides of the machining axis, there are fences adjustably mounted relative to the cutting tool, perpendicular to the work table and designed to define the position at which the panel stops relative to the tool (thus determining the cutting depth) and to guide the panel towards the tool. Normally, in simple machine models, the panel is fed manually by an operator.

[0006] The section of the work table in the working area of the tool is mobile along an axis perpendicular to the panel feed direction so that it can adapt to cutting tools of different sizes and, when necessary, to tilting of the motor-powered spindle. On the end of it closest to the tool, this section is equipped with an extension and guard plate lying in the same plane as the work table and facing a shaped counterplate that partly encompasses the back of the machining axis in the same plane as the work table. This makes it possible to protect the area under and near the tool (that is, the drive area and the area for adjusting the height and tilt of the machining axis) thanks to the matching shapes of the plates.

[0007] The two plates also allow the part of the work table close to the tool to be adapted to tools of different sizes and to the movements of the bilateral fences when adjusting the cutting depth. This provides a larger working surface for supporting the panel around the tool.

[0008] The edge of the extension and guard plate that is in contact with the counterplate consists of two straight-line segments parallel to the fences: the Applicant has found that this set-up may be dangerous for the operator especially when the extension and guard plate and the fences are moved towards each other (the movement being performed manually or with the aid of a servomechanism) to form a "crushing" area. Thus, an extraneous object or, worse still, the operator's hand, may get trapped by the "shearing" effect created in the space between the plate and the fences, resulting in serious damage or injury.

[0009] The aim of the present invention is to overcome the above mentioned drawback by providing a machine for working wooden panels or similar workpieces structured in such a way as to improve the design of the area close to the cutting tool to make it safer, without significantly altering the machine's general structure.

[0010] This aim is accomplished through a machine for working wooden panels or similar workpieces comprising: a horizontal work table on which the wooden panel rests; a vertical machining axis, at the side of the work table and presenting at least one tool for working on the panel; a pair of fences, one on each side of the machining axis, adjustably mounted relative to the cutting tool, perpendicular to the work table and designed to define the position at which the panel stops relative to the tool and to guide the panel towards the tool in a feed direction. A section of the work table close to the machining axis is equipped with a first plate, lying in the same plane as the work table, and shaped to match at least the front circular area of the machining axis. Further, the shaped edge of the first plate extends at an angle to form a V-like figure converging on the inside of the first plate.

[0011] The technical characteristics of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred embodiment of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 schematically illustrates a machine according to the present invention, for working wooden panels or similar workpieces, in a top plan view with some parts cut away in order to better illustrate others;
- Figure 2 is a schematic perspective view, with some parts cut away in order to better illustrate others, of a part of the machine of Figure 1;
- Figure 3 illustrates a detail, namely, a guard plate, of the machine of Figures 1 and 2 in a top plan view;
- Figures 4, 5 and 6 are top plan views of another detail of the machine of Figures 1 and 2, in three different constructional solutions.

[0012] With reference to the accompanying drawings, and in particular with reference to Figure 1, the machine according to the invention is used for machining wooden panels 1 (indicated by the broken line in Figure 1).

[0013] The machine, labelled 2 in its entirety, is called a lower vertical router or, in the jargon of the trade, "spindle moulder".

[0014] The structure of the machine 2, essentially comprises:

- a horizontal work table 3 on which the panel 1 rests, the work table 3 being mounted on a base which is not illustrated in the drawings;
- a vertical machining axis 4, at the side of the work

table 3 and presenting at least one tool 5 for working on the panel 1 and being adjustably mounted for height and, when necessary, tilt relative to the work table 3;

- at least one fence 6, at the side of the machining axis 4, adjustable with respect to the tool 5, and perpendicular to the work table 3.

[0015] As shown in Figures 1 and 2, the fence is made up of two halves, one on each side of the tool 5 and mobile perpendicularly to the direction in which the work table 3 extends: the adjustment of the fences (see arrows F1 of Figures 1 and 2), normally servo controlled, determines the position at which the panel 1 is stopped relative to the tool 5 (thus defining the cutting depth) and also guides the panel 1 towards the tool 5 in a feed direction indicated by the arrow A in Figure 1.

[0016] Again with reference to Figure 1, a section 7 of the work table 3 close to the machining axis 4 is equipped with a first plate 8, lying in the same plane as the work table 3, and shaped to match at least the front circular area of the machining axis 4.

[0017] The first plate 8 faces a matching second plate 9 positioned behind the machining axis 4 to form, together with the first plate 8, an element for covering the machining axis 4 under the work table 3.

[0018] The first plate 8 is used as a work table extension of the section 7, which can be moved (see arrow F2 in Figure 2) towards and away from the machining axis 4 in a direction perpendicular to the direction of feed A, so as to adapt to the size of the tool 5 and, when necessary, to tilting of the machining axis 4 (this adjustment may be manual or servo controlled).

[0019] With reference to Figure 2 and 3, the shaped edge of the first plate 8, facing the second plate 9, extends at an angle to form a V-like figure converging on the inside of the first plate 8.

[0020] The V-like profile of the first plate 8 constitutes a very useful feature since it creates an extension of the section 7 defined by two converging escape lines, labelled L1 and L2, that make it possible to remove an extraneous object T (see Figure 2) that would otherwise be trapped between the first plate 8 and the bilateral fences 6 during their adjustment movements.

[0021] Looking in more detail (see Figure 3), the profile of the first plate 8 comprises a first inclined segment 8a and a second inclined segment 8b on each side of a central arc-shaped third segment 8c connected to each other without a break.

[0022] At a structural level, the first segment 8a and the second segment 8b are inclined by an angle α ranging from 30° to 50°. In a preferred, non-restricting embodiment, this angle is 35°.

[0023] Further (see Figure 3 again), the areas 8d and 8e of the first plate 8 close to the respective corners formed by the shaped profile are inclined by an angle δ and converge on the inside of the first plate 8. This facilitates sliding of the first plate 8 and avoids undesired contact with the other walls of the work table 3, thus preventing jamming during adjustments.

[0024] Figures 4 to 6 illustrate three different constructional solutions of the second plate 9 with an arc-shaped profile 9c that varies in radius (R1, R2, R3) according to the diameter of the tool 5 mounted on the machine.

[0025] Whatever the case, the second plate 9 is shaped to match at least partly the shape of the first plate 8. That is to say, it has two inclined segments 9a and 9b that diverge away from the centre X defined by the machining axis 4: thus, when the two plates 8,9 are positioned in contact with other, the machining axis 4 is almost completely surrounded.

[0026] Thus, the two segments 9a and 9b of the second plate 9 are inclined by an angle β ranging from 30° to 50° and which is, preferably, approximately 35°. The machine structured as described above therefore achieves the aforementioned aims thanks to the special shape of the first plate, which while maintaining its function as extension of the mobile section of the work table, is especially designed to offer added safety for the area close to the tool during adjustment of the mobile section and fences.

[0027] The escape lines created by this special shape enable an extraneous object located between the first plate and the fences to slide towards the centre of the plate without remaining trapped between the two moving surfaces.

[0028] This improves the working safety features of the machine while keeping the structure of the rest of the machine practically unchanged.

[0029] It will be understood that the invention can be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A machine for working wooden panels (1) or similar workpieces, the machine (2) being of the type consisting of:

   - a horizontal work table (3) on which the wooden panel (1) rests;
   - a vertical machining axis (4), at the side of the work table (3) and presenting at least one tool (5) for working on the panel (1);
   - at least one fence (6) at the side of the machining axis (4), adjustably mounted relative to the cutting tool (5), perpendicular to the work table (3) and designed to define the position at which the panel (1) stops relative to the tool (5) and to guide the panel (1) towards the tool (5) in a feed direction (A);
   - a section (7) of the work table (3) close to the

machining axis (4) being equipped with a first plate (8), lying in the same plane as the work table (3) and shaped to match at least the front circular area of the machining axis (4); the machine (2) being **characterised in that** the shaped edge of the first plate (8) extends at an angle to form a V-like figure converging on the inside of the first plate (8).

2. The machine according to claim 1, **characterised in that** the section (7) of the work table (3) can be moved towards and away from the machining axis (4) in a direction perpendicular to the direction of feed (A) , and **in that** the V-shaped profile of the first plate (8) defines an end extension of the section (7) creating two converging escape lines (L1, L2) when the section (7) and the pair of fences (6) are moved relative to each other.

3. The machine according to claim 1, **characterised in that** the profile of the first plate (8) comprises a first inclined segment (8a) and a second inclined segment (8b) on each side of a central arc-shaped third segment (8c) connected to each other without a break.

4. The machine according to claim 1, further comprising a second plate (9) facing and shaped to match the first plate (8) and positioned behind the machining axis (4) so as to form, together with the first plate, an element for covering the machining axis (4) under the work table (3), the machine being **characterised in that** the second plate (9) is shaped to match at least partly the shape of the first plate (8), that is to say, having two inclined segments (9a, 9b) that diverge away from a centre (X) defined by the machining axis (4).

5. The machine according to claim 3, **characterised in that** the first segment (8a) and the second segment (8b) are inclined by an angle (α) ranging from 30° to 50°.

6. The machine according to claim 5, **characterised in that** the first segment (8a) and the second segment (8b) are inclined by an angle (α) of 35°.

7. The machine according to claim 4, **characterised in that** the two segments (9a, 9b) of the second plate (9) are inclined by an angle (β) ranging from 30° to 50°.

8. The machine according to claim 7, **characterised in that** the two segments (9a, 9b) of the second plate (9) are inclined by an angle (β) of 35°.

9. The machine according to claim 1, **characterised in that** the areas (8d, 8e) of the first plate (8) close to the respective corners are inclined by an angle (δ) and converge on the inside of the plate (8).

FIG.1

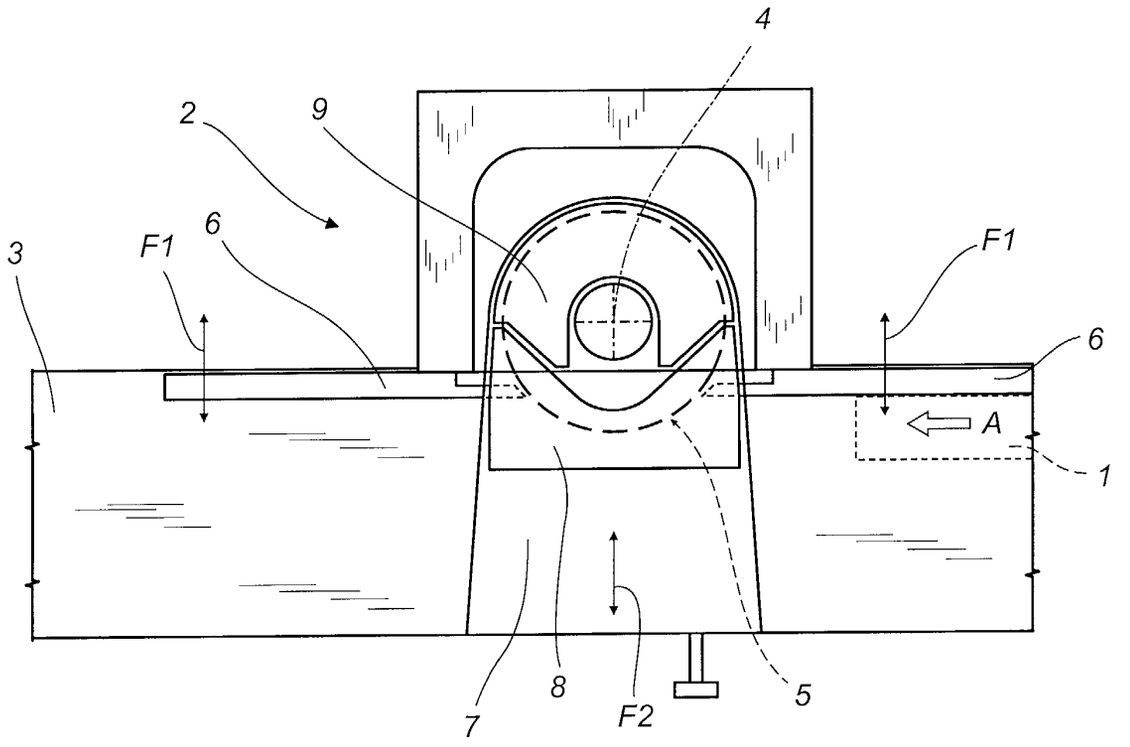

FIG. 2

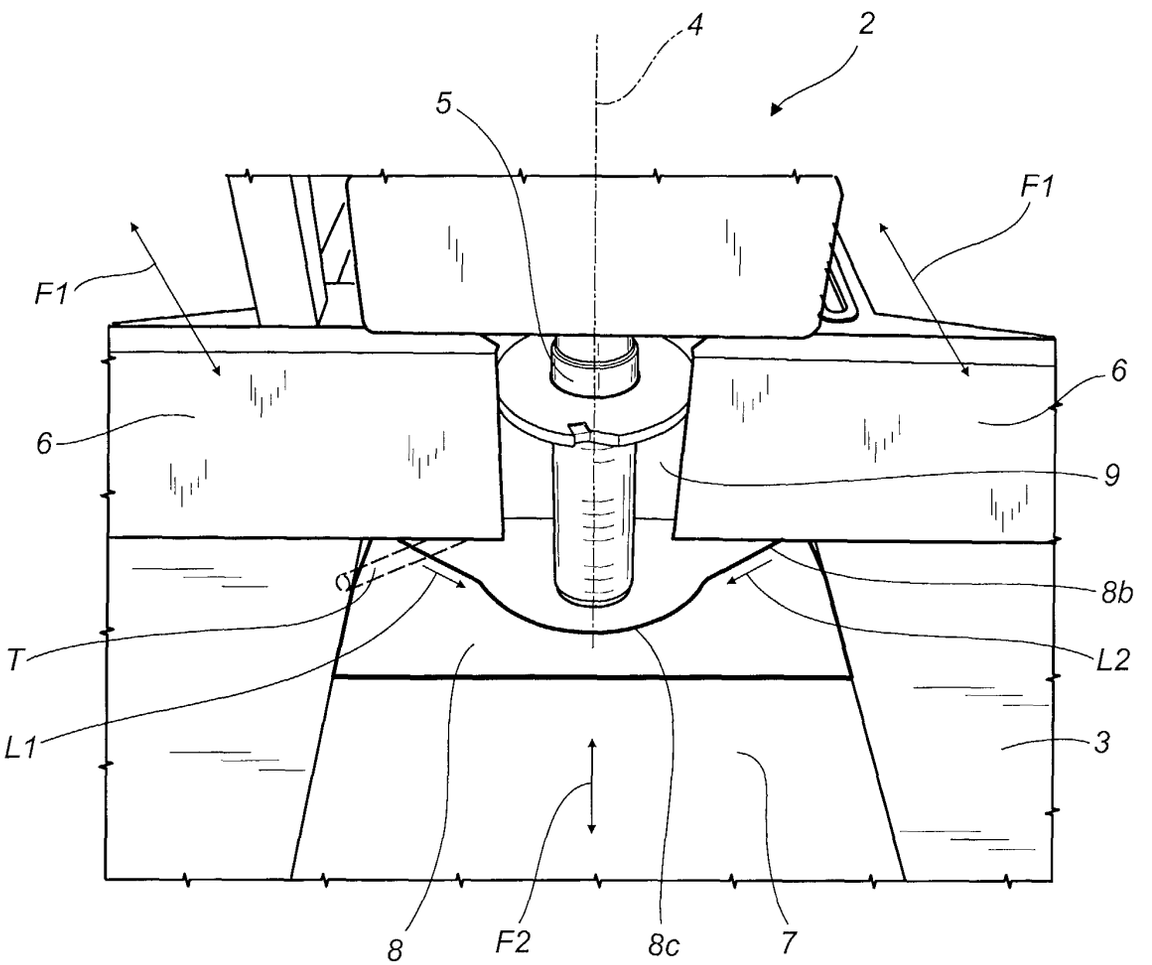

FIG. 3

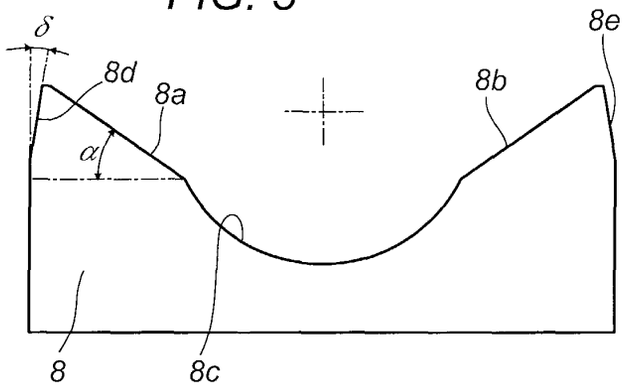

FIG. 4

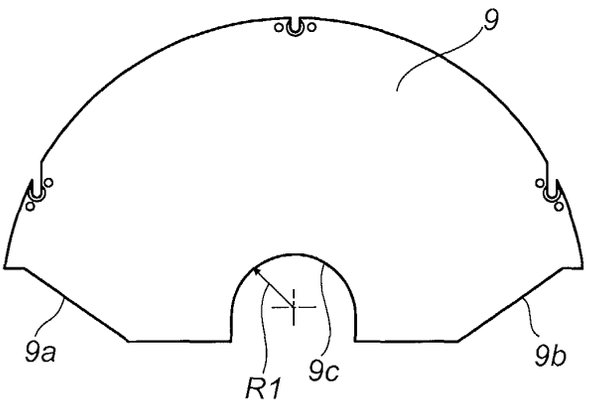

FIG. 5

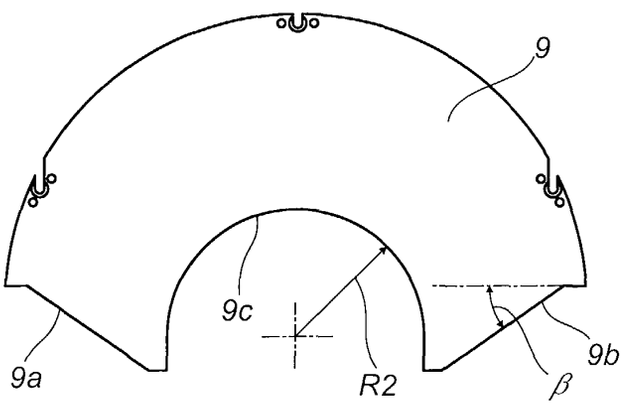

FIG. 6