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(54) Machine to mill and drill the joining heads of wood or wood-metal profiles in the manufacturing of frames, in particular door and window frames

(57) The invention consists in a drilling and milling machine which allows the drilling and milling of joining heads of wood and wood-metal profiles in manufacturing door/ window frames. The machine operates simultaneously on two miter cut profile sections so that the milling and drilling on both the joining heads match perfectly when they are coupled by means of positioning dowels inserted in the millings and of fixings inserted in two diameter holes. The machine consists of a structure bearing the positioning assembly (1) for two profile sections to be coupled, the two piece locking cylinders (6) and (9), the mill-motor assembly (11) and (8) mounted on roll-off horizontal sliding guide (7) moved by an extension cylinder (2), the lifting cylinder (3) which moves along the vertical axis the mill-motor assembly and also acts as its oscillating fulcrum, and two electric motors mounted on roll-off horizontal slide guides (4) and (12) which drive bits (4) and (10) to drill two diameter holes perpendicularly to the miter cuts.

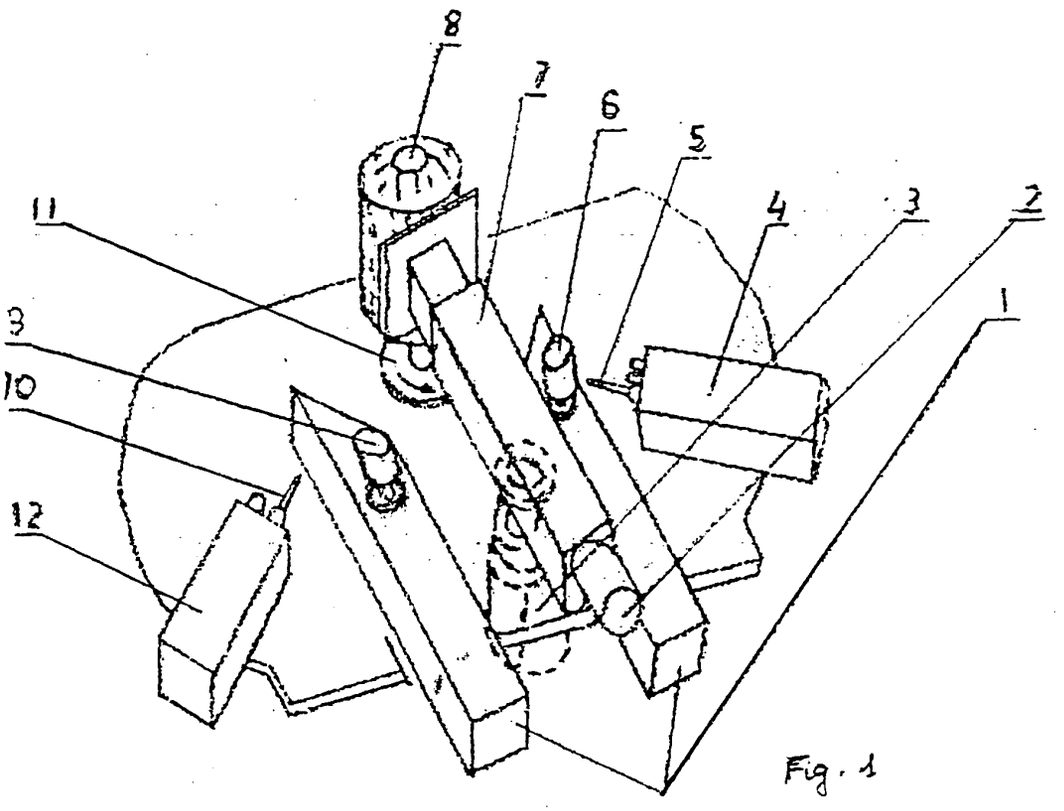

Fig. 1

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Description

[0001] The purpose of the invention is the construction of a milling-drilling machine to prepare the junction heads of wood or wood-metal profiles, cut to size and at an angle of 45° with respect to their longitudinal axis (mitre cut), that have to be coupled to manufacture rectangular frames, sashes or fixed frames.

[0002] Currently door and window frames are obtained by coupling perpendicularly the profile extremities with mortise and tenons or by joining them along the 45° mitre cuts by means of dowelled joints.

[0003] The preparation of the junctions heads to produce frames, door or window frames using these systems requires a long time, the work of skilled artisans and, having a scarce precision, frequently it is necessary to carry out manual adjustments on finished products.

[0004] The invention permits to overcame the mentioned drawbacks and, having an extreme precision , allows the use of pre-glazed wood profiles.

[0005] The invention consists in a drilling and milling machine which allows the drilling and milling of joining heads of wood and wood-metal profiles in manufacturing door/ window frames. The machine operates simultaneously on two miter cut profile sections so that the milling and drilling on both the joining heads match perfectly when they are coupled by means of positioning dowels inserted in the millings and of fixings inserted in two diameter holes.

[0006] A milling device and a drilling device prepare the joining heads of wood profiles cut at an angle of 45° with respect to their longitudinal axis (mitre cut). The milling device consists in a mill cutter, driven by an electric motor, which, operating in a horizontal plane by means of articulated joints that allow its oscillations, moves perpendicularly to the longitudinal axis of the profile and carries out the incision or milling on the section joining head to obtain grooves in the desired positions and of the pre set depth.. The drilling device consists in two drills driven by electric motors on roll-off horizontal slide guides that moving perpendicularly to the profiles joining heads to carry out the drilling of a two diameter holes for the lodging of fixings on each of them.. The machine is fully automatic and the only thing that has to be done manually is the positioning of the profiles sections previously cut at 45° with respect to the profile axis in the positioning assembly.

[0007] The machine, hereafter described with the help of the fig. (1) of the drawing represents the solution implemented. Obviously in building the machine it is possible to bring changes held advantageous without changing the concept of the invention. However, the assembling diagram and the corresponding described parts are supplied only as explanation of the object and they do not, in any way, constitute a limitation a limitation to the concept of the invention.

[0008] The machine consists in a bearing structure that acts as a bed on which are positioned, according to the working logic, utensils, mechanisms and protection devices. Except the electric motors that drive the drills and the slot cutter all the other parts are moved by pneumatic devices.

[0009] On the machine bed are fixed: an electric motor (8) which drives a horizontal mill cutter (11); the horizontal pneumatic extension cylinder (2) on the roll-off horizontal sliding guide (7) which allows the horizontal movement of group electric motor-slot cutter; the vertical pneumatic lifting cylinder (3) which allows the vertical movement of the electric motor- mill cutter assembly (8-11) and also acts as its oscillating fulcrum in its movement toward the joining heads of the profiles; two drills (5) and (10) driven by electric motors on roll-off horizontal slide guides (4) and (12) to carry out the drilling of the two diameter holes perpendicularly to the miter cuts; the positioning assembly (1); the two piece (6) and (9).

[0010] Once the two profiles, previously cut at 45°, are placed in the positioning assembly (1), they are locked in position by the two pneumatic locking cylinders (6) and (9). At this point the machine is started simply by pushing a button and it automatically carries out the following work sequence.

1. The drilling devices (4-5 and 10-12) carry out the drilling of the profiles moving perpendicularly to the joining heads.
2. The horizontal pneumatic extension cylinder (2) moves by means of the roll-off horizontal sliding guide (7) the milling device (8) and (11) to the pre set horizontal position.
3. the vertical pneumatic lifting cylinder (3) places the milling device (8) and (11) in the first vertical position.
4. the milling device (8) and (11) first rotates clockwise and mills a groove in the joining head of one of the profiles, then it rotates counterclockwise and it mills a groove in the the joining head of the other profile.
5. the vertical pneumatic lifting cylinder (3) places the miling device (8) and (11) in the second vertical position.
6. the sequence described in 4 is repeated in the second vertical position.
7. the machine returns to the initial position and stops.
8. the profiles can be extracted after having released the two piece locking cylinders (6) and (9)..

Claims

1. Automatic milling-drilling machine to prepare the joining heads of profiles cut at the appropriate length and at an angle of 45° with respect to their longitudinal axis (mitre cut) to be assembled in order to obtain frames, window frames and fixed

frames. The machine is **characterized by** a positioning assembly (1), a milling device (8) and (11) mounted a roll-off horizontal sliding guide (7) moved by a horizontal pneumatic extension cylinder (2) and capable of rotating around the vertical lifting cylinder (3).

2. Automatic milling-drilling machine, as claimed in claim 1), **characterized by** a positioning assembly (1) and two locking cylinders (4(and (9) to lock the profiles in the set position during the drilling and milling phases.

3. Automatic milling-drilling machine, as claimed in claim 1) and 2), **characterized** a horizontal lsliding guide (7) in which are housed an extension cylinder (2) and a lifting cylinder (3) adjustable in height and a milling device (8) and (11) capable of making the incision on the linear element of any profile

4. Automatic milling-drilling machine, as claimed in claim 1), 2) and (3) **characterized by** two electric motors (4) and (12) fitted with bits mounted on roll-off horizontal guides (5) and (10), to carry out the drilling of two diameter holes in the profiles that have to be joined in correspondence to their mitre cuts.

5. Automatic milling-drilling machine, as claimed in claim 1), 2), 3) and 4), **characterized by** a lifting cylinder (3) that allows, acting as fulcrum on the roll-off horizontal guide, to the milling device (8) and (11) to carrie out the milling of a groove in each of the mitre cuts and then, after having changed the vertical position, repeats the milling of a groove in each of the mitre cut surfaces.

6. Automatic milling-drilling machine, as claimed in claim 1), 2) , 3), 4) and 5) **characterized by** the fact that it allows in of each of the joining heads of the profiles (mitre cut), the drilling in the center of a two diameters hole and the milling of two parallel slots for the housing of guiding pads.

7. Automatic milling-drilling machine, as claimed in claim 1), 2) , 3), 4), 5) and 6) **characterized by** piece blocking cylinders (9)and (6) and by guides to insert the profiles to be processed up to a stop point.

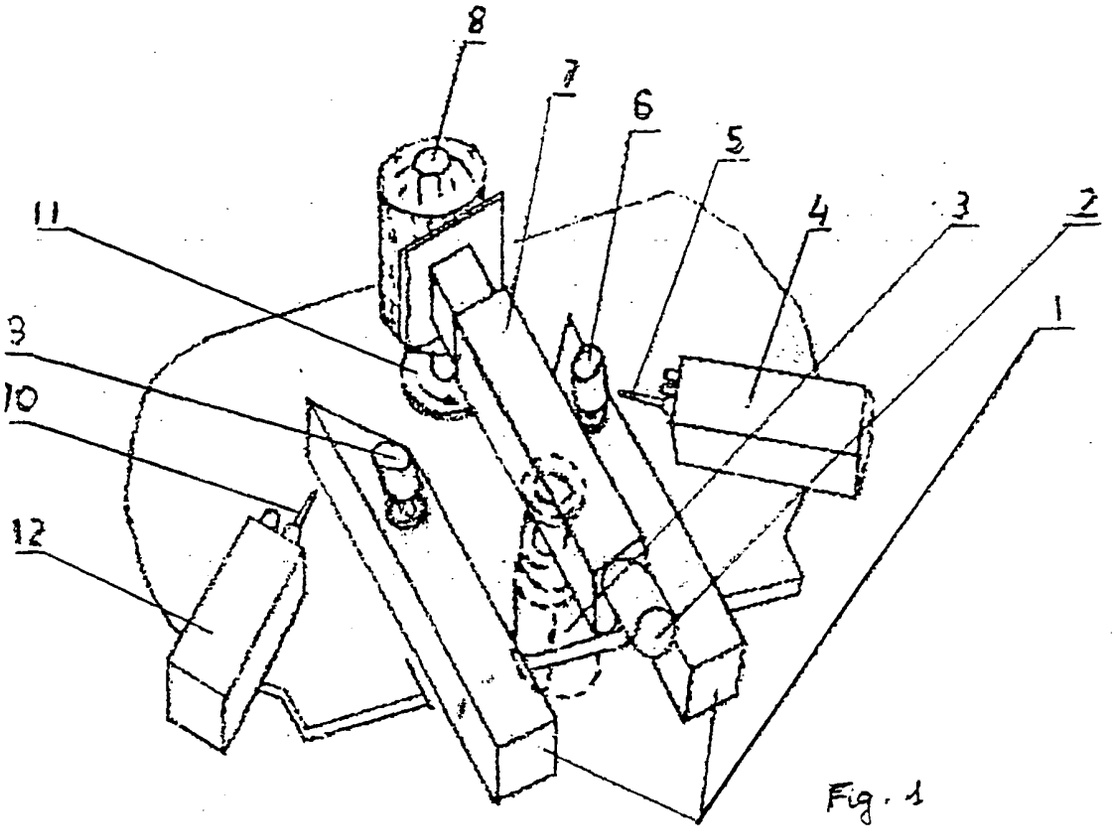

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5236

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B27C
B23Q
B27F
B23D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	1 September 2005	Meritano, L

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