

(19)



(11)

EP 1 588 810 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
10.12.2008 Bulletin 2008/50

(51) Int Cl.:
B27C 9/02 *(2006.01)* **B23Q 1/48** *(2006.01)*
B27F 1/00 *(2006.01)*

(21) Application number: **05425236.6**

(22) Date of filing: **15.04.2005**

(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**

Maschine zum Fräsen und Bohren der zu verbindenden Enden von Profilen aus Holz oder Holz-Metall zur Herstellung von Rahmen, insbesondere Tür- und Fensterrahmen

Machine à usiner les joints d'extrémité de profilés en bois ou bois-métal pour la fabrication de cadres, notamment de cadres de porte et de fenêtre

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**

(30) Priority: **15.04.2004 IT CZ20040007**

(43) Date of publication of application:
26.10.2005 Bulletin 2005/43

(73) Proprietor: **Scagis s.r.l.**
53048 Scrofiano di Sinalunga (Siena) (IT)

(72) Inventor: **Scaramuzzino, Francesco Luigi**
88064 Chiaravalle Centrale (Catanzaro) (IT)

(56) References cited:
EP-A- 1 222 986 DE-U1- 9 300 194
FR-A- 2 352 644 US-A- 2 621 686

EP 1 588 810 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

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 overcome 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 preferred 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 defined in the claims.

[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) driven by electric motors on roll-off horizontal slide guides (4) to carry out the drilling of the two diameter holes perpendicularly to the miter cuts; the positioning assembly (1); the two piece locking cylinders (6).

[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). 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) 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 (8-11) to the pre set horizontal position.
3. the vertical pneumatic lifting cylinder (3) places the milling device (8-11) in the first vertical position.
4. the milling device (8-11) 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 (8-11) 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).

Claims

1. Automatic milling-drilling machine to prepare the joining heads of profiles provided previously with a mitre cut, i.e, cut at an angle of 45° with respect to their longitudinal axis, to be assembled in order to obtain frames, window frames and fixed frames, the machine comprising a positioning assembly (1, 6) for the profiles, a milling device (8, 11) mounted on a horizontal displacement unit (2, 7) which is, in turn,

displaceable vertically by a vertical lifting cylinder (3) and, horizontally, is capable of rotating around the lifting cylinder, and two drilling units (5) mounted on horizontal slides (4) to drill holes perpendicularly to the mitre cut junction heads.

2. Automatic milling-drilling machine, as claimed in claim 1 **characterized in that** the positioning assembly is composed by two parallel templates (1) and two vertical pneumatic cylinders (6) to lock the profiles in the set position during the milling and drilling phases.
3. Automatic milling-drilling machine as claimed in claim 1 and 2 **characterized by** a horizontal sliding guide (7) in which are housed an extension cylinder (2) and said milling device (8, 11) capable of making incisions on the linear element of any profile.
4. Automatic milling-drilling machine as claimed in claim 1, 2 and 3 **characterized in that** said two drilling units (5) are mounted on roll-off horizontal guides (4) to carry out the drilling of two diameter holes in the two profiles that have to be joined in correspondence of their mitre cuts.
5. Automatic milling-drilling machine as claimed in claim 1, 2, 3 and 4 **characterized in that** said vertical lifting cylinder (3) moves vertically the horizontal sliding guide (7), in which is housed the milling device (8, 11), to various positions and, acting as a fulcrum for it after the stop in a vertical position, allows the milling device, moved on a horizontal plane, to carry out the milling of grooves in the two joining heads in the corresponding vertical position.
6. Automatic milling-drilling machine as claimed in claim 1, 2, 3, 4 and 5 **characterized by** the fact that it allows in each of the mitre cut joining heads the drilling of a two diameter hole and the milling of two or more 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** articulated joints that allow oscillations of the milling device in a horizontal plane.

Patentansprüche

1. Die automatische Fräs- und Bohrmaschine, benötigt man um die Verbindungsköpfe von den Profilen vorzubereiten, welches vorher mit einem Gehrschnitt ausgestattet wurden, einen Schnitt mit 45°, bezüglich seiner Längsachse, die dann so zusammengesetzt werden kann, um einen Rahmen zu erhalten, einen Fensterrahmen und einen fixierte Rahmen. Die Maschine hat einen Positionierungszusammen-

bau (1,6) für die Profile, eine Fräsvorrichtung (8,11) montiert auf der horizontalen Verlagerungseinheit (2,7) welches, abwechselnd, vertikale Verlagerungen, durch einen vertikalen Hubzylinder erledigen kann (3) und, horizontal, ist es ihm möglich um den Hubzylinder zu rotieren, und zwei Fräseinheiten (5) montiert auf den horizontalen gleitenden Seiten (4) auch Löcher fräsen zu können die lotrecht zu den Verbindungsköpfen des Gehrschnittes stehen.

2. Die Automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1 charakterisiert sie sich durch seinen gleitenden Positionierungszusammenbau, welcher durch zwei parallele Schablonen (1) und zwei vertikalen Luftdruckzylindern (6) zusammengestellt sind, um das Profil zu in der Ausgangsposition während dem Fräs- und Bohrvorgang zu befestigen.
3. Die automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1 und 2 charakterisiert sie sich durch seine gleitenden Führung (7) in welchem sich ein vergrößerter Zylinder (2) und die Fräsvorrichtung (8,11) befindet, welche dazu fähig ist, auf einem linearen Element mit jedem Profil Einschnitte zu machen.
4. Die automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1,2 und 3 charakterisiert sie sich durch die zwei Fräseinheiten (5) welche auf der horizontalen Führung der Walze montiert sind (4) um die Fräsarbeit von zwei Diameterlöchern in den zwei Profilen durchzuführen zu können, welche auf der Höhe mit den Gehrschnitten verbunden sind.
5. Die automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1, 2, 3, und 4 charakterisiert sie sich durch den vertikalen Hubzylinder (3) welcher sich vertikal entlang der horizontalen gleitenden Führung bewegt (7), in welchem sich die Fräsvorrichtung befindet (8,11), verschiedenen Positionen einnimmt und sich als Hebepunkt aktiviert, bevor sie in vertikaler Position stoppet, die Fräsvorrichtung bewegt sich auf der horizontalen Seite um die Fräsarbeit in den Furchen, in der Höhe der zwei Verbindungsköpfen, in vertikaler Position durchzuführen zu können.
6. Die automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1, 2, 3, 4 und 5 charakterisiert sie sich **dadurch**, dass es auf jeden Gehrschnitt der Verbindungsköpfe eine Bohrung von zwei Diameterlöcher zu machen erlaubt und bei der Fräsarbeit zwei oder mehrere parallele Nuten für die Führungspolster zu machen erlaubt.
7. Die automatische Fräs- und Bohrmaschine, so wie in der Ausführung 1, 2, 3, 4, 5 und 6 charakterisiert sie sich durch unterteilte Verbindungen die eine

Schwingung der Fräsvorrichtung auf einer horizontalen Fläche erlaubt.

Revendications

5

1. Fraiseuse-foreuse automatique permettant de réaliser les têtes de joints, par pré découpage à 45° en fonction de l'axe longitudinal des joints, à assembler pour former de nouveaux cadres, cadres de fenêtres et cadres fixes, l'outil comprend (1,6) un fraiseuse (8,11) montée sur une unité pouvant se déplacer (2,7) qui est déplaçable en position verticale à l'aide d'un cylindre d'ajustage vertical (3) et horizontale, permettant de faire tourner l'outil autour du cylindre d'élévation et deux unités de forage (5) montés sur des éléments horizontaux glissants (4) permettant de forer de façon perpendiculaire aux joints. 10 15
2. Fraiseuse-foreuse automatique, comme indiqué dans la section 1 composée de deux modèles parallèles (1) et de deux cylindres pneumatiques verticaux (6) permettant de bloquer les profils en position fixe au cours du forage et du fraisage. 20 25
3. Machine de forage-fraisage comme indiqué en section 1 et 2 équipée d'un système de glissage (7) où se trouve un cylindre d'extension (2) et un outil de fraisage (8,11) capable de réaliser des incisions sur les éléments linéaire de tous les profils. 30
4. Machine de forage-fraisage comme indiqué en section 1, 2 et 3 équipée de deux outils de fraisage/forage (5) montés sur des systèmes horizontaux roulants (4) permettant de forer des trous de 2 diamètres dans les deux profils de joints et qui sont à assembler en fonction de leurs profils. 35
5. Machine de forage-fraisage comme indiqué en section 1, 2, 3 et 4 équipée d'un cylindre d'élévation horizontal (3) se déplaçant verticalement et horizontalement (7), d'un système de forage (8,11), de diverses positions et, pouvant fonctionner comme un pivot après un arrêt en position verticale, l'outil de fraisage peut être placé horizontalement pour disposer les sillons des deux profils à assembler en face l'un de l'autre. 40 45
6. Machine de forage-fraisage comme indiqué en section 1, 2, 3, 4 et 5 permettant de forer les deux joints de deux diamètres et de les placer parallèlement pour pouvoir y ajuster par la suite les systèmes de glissement. 50
7. Machine de forage-fraisage comme indiqué en section 1, 2, 3, 4, 5 et 6 équipée de joints parallèles permettant de pouvoir forer/fraiser sur un plan de travail horizontal. 55

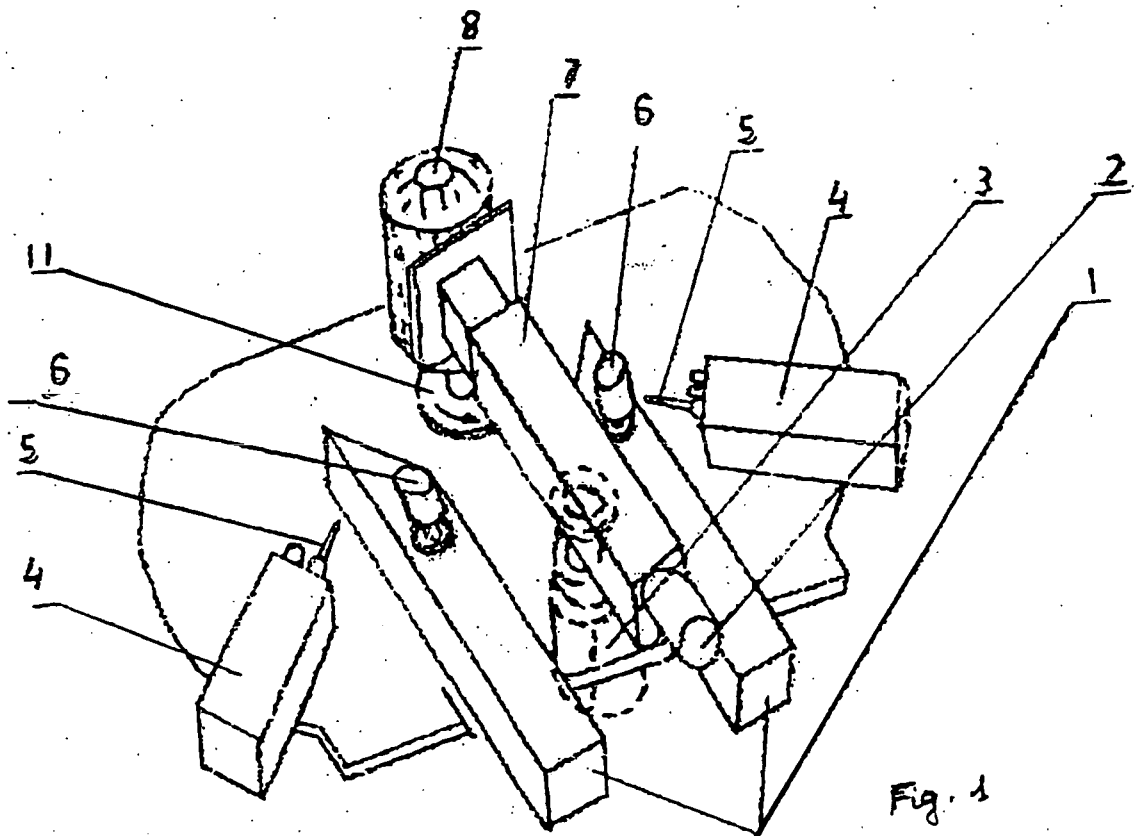


Fig. 1