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(54) Machine for processing wood panels used for making furniture pieces

Holzpaneele Bearbeitungsmaschine für Möbelstücke

Machine pour le traitement de panneaux de bois utilisés dans des meubles

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(56) References cited:
DE-A1- 2 408 250 **DE-A1- 3 916 013**
DE-A1- 3 916 013 **DE-A1- 10 246 602**
DE-A1- 10 259 285 **DE-A1-102007 038 462**
DE-C1- 19 652 756 **DE-U1- 8 514 296**
GB-A- 2 259 886 **US-A1- 2004 027 038**

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a machine for processing wood panels used for making furniture pieces, according to the preamble of claim 1. Such a machine is known from the document DE 2408250 A1.

[0002] As is known, in one of the most common assembling patterns, the panels forming the horizontal elements of the furniture piece are usually provided with pins and/or engaged by insertion on two sides thereof.

[0003] These horizontal panels are then assembled with other panels provided for receiving the pin elements thereof, and forming the vertical elements of the furniture piece.

[0004] Usually, the above mentioned processing or machining operations are performed starting from large size panels having a parallelepiped configuration and which must be subjected to cutting, drilling and other like operations by processing machines which are generally provided with a horizontal loading surface comprising a roller assembly or the like.

[0005] The panels are moreover conventionally handled by conveying assemblies including a plurality of suction cups which are caused to perform rectilinear reciprocating movements.

SUMMARY OF THE INVENTION

[0006] The aim of the present invention is to provide such a furniture piece making machine allowing to engage and glue in said panels a plurality of wood pins or pegs, or insert elements in general, for coupling to corresponding horizontal elements.

[0007] Within the scope of the above-mentioned aim, a main object of the invention is to provide such a furniture piece making machine which allows the mentioned pins and/or insert elements to be aligned with a very high precision, independently from the panel thickness and the panel thickness variation along the panel itself.

[0008] Another object of the present invention is to provide such a furniture piece making machine which facilitates an automatized managing of the panel processing operations, thereby allowing the operator to save time and cost.

[0009] Another object of the present invention is to provide such a panel processing or machining operation which has a very reduced machine size, corresponding approximately to 50% of a size of a conventional like horizontal processing furniture piece making machine.

[0010] Yet another object of the present invention is to provide such a machine allowing to easily and quickly processing furniture piece panels having a very large size and a variable pattern.

[0011] Yet another object of the present invention is to provide such a furniture piece making machine which allows to easily process or machine furniture piece ver-

tical panel elements for assembling the latter to respective furniture piece horizontal panel elements.

[0012] Yet another object of the present invention is to provide such a furniture piece making machine which is suitable for a continuous type of processing or machining work.

[0013] Yet another object of the present invention is to provide such a furniture piece making machine suitable for using a control software assembly cooperating with a CAD/CAM system designed in a customized manner for specifically processing furniture pieces and adapted to omit, in the most part of cases, a description or specification step for providing a description of the individual furniture piece elements by an operator, with a very high saving of the furniture piece making cost.

[0014] Yet another object of the present invention is to provide such a furniture piece making machine construction which, owing to its specifically designed structural features is very reliable and safe in operation.

[0015] Yet another object of the present invention is to improve the capacity of a furniture piece making machine, to operate furniture pieces panels of a large size and of a variable pattern.

[0016] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a machine for processing wood panels used for making furnishing pieces, characterized in that said machine comprises three discrete working stations: a first station and a second station for processing horizontal elements of a furniture pieces, and a third station for processing vertical elements of said furniture piece; all said stations including locating means for vertically locating said panel and for adjusting size references to constructional characteristics used for assembling the furniture piece; said machine having different operating modes including two main operating modes: the first operating mode allowing to process horizontal elements forming said furniture pieces, to provide perforating, glueing and pin and/or metal element applying operations, said components being used as reference and stiffening components for a following assembling operation; said second operating mode being related to a possibility of performing perforating and milling operations on the vertical elements of the furniture pieces, which perforating and milling operations are necessary for a following assembly step; said modes of operation being adapted to be carried out on the same machine by using the same operating assemblies and central control unit, of a numerical control type, including a specifically designed CAD/CAM system for working or processing the furniture piece.

[0017] The above provides an integrated solution, which advantageously reduces the furniture piece making time and required operating spaces.

[0018] Accordingly, it is possible to greatly reduce the furniture piece making cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a perspective view, taken from an operator side, of the furniture piece making machine according to the present invention;

Figure 2 is a perspective view of a bracketing or clamping system included in a third machining station for processing vertical elements in the furniture piece making machine according to the present invention;

Figure 3 is a further perspective view showing the machining or processing assembly of the third processing station included in the furniture piece making machine according to the present invention;

Figure 4 is yet another perspective view showing a laser detecting system for detecting a reference zero point of the vertical elements;

Figure 5 is yet another perspective view showing a drilling operation performed through a vertical element;

and

Figure 6 is a perspective view showing a spot-facing operation performed by the furniture piece making machine according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] With reference to the number references of the above mentioned figures, the furniture piece making machine according to the present invention, which has been generally indicated by the reference number 1, comprises three discrete furniture piece panel processing or machining stations: a first station, indicated by the reference number 2, a second station, indicated by the reference number 3, for processing or machining horizontal panel elements of a furniture piece, and a third station, indicated by the reference number 4, for processing the furniture piece vertical panel elements.

[0021] To all the above mentioned processing stations is common a vertical arrangement of the panels and the reference of the size dimensions of the panels to the constructional characteristics used for assembling the furniture piece.

[0022] The above machine allows to perform different operating functions, which can be considered as included in two processing operations: the first allows to process horizontal panel elements forming the furniture piece, by performing, in particular, drilling, glueing and pin and/or iron element engaging operations in general.

[0023] The above components are used as a reference

and stiffening pattern for the following assembling operations.

[0024] The second operating function is specifically related to a possibility of performing drilling and milling operations on the furniture piece vertical elements, as necessary for the following assembling operations.

[0025] In the horizontal element processing stations 2 and 3, the panel to be processed or machined is arranged in a vertical plane and the machining operations are carried out on the panel edges parallel to the axis-y of the machine.

[0026] Both said stations 2 and 3 provide to perform a clamping or bracketing operation using a vertical axis eccentric cylinder, pneumatically driven, designed for clamping or lock a thickness and height range as required, without performing manual operations.

[0027] For both said stations 2 and 3, a single processing assembly is provided, said processing assembly comprising a drilling bit, a glue metering/injecting device, a pin or peg inserter device and/or an optional iron part inserting device.

[0028] The processing or machining assembly comprises moreover a laser detecting system for detecting in real time the height of the panel (the so-called dimension y).

[0029] The system has three freedom degrees, all of which are associated to the processing assembly: a motorized axis-x (horizontal), a motorized axis-y (vertical) and a pneumatically driven (binormal) axis-z.

[0030] In the third processing station 4, for processing the furniture piece vertical panel elements, the panel is arranged in a vertical plane.

[0031] The processing operations are herein carried out with reference to this plane: the drilling operations being performed in an orthogonal direction (axis z' in figure 3), whereas the milling operations are performed on the same plane (axes x' and y' in figure 3).

[0032] As is shown in figure 2, the panel 5 is bracketed or clamped by a small size gripper 6 operating near the bottom edge of the panel 5, which is cause to slide to idle rollers 7.

[0033] The gripper is pneumatically closed and opened, and is adapted to operate through the overall range of the provided panel thicknesses.

[0034] Figure 3 shows the four processing assemblies of the third processing or machining station 4, that is: a drilling assembly 8, a facing or blade assembly 9, a right electrical spindle 10 and a left electrical spindle 11.

[0035] More specifically, said drilling assembly 8 is used for performing drilling operations on the vertical panel elements and comprises a drilling bit set 21 arranged according to a reversed "L" shape, in two horizontal rows including each five drilling bits and in a column of eleven drilling bits.

[0036] In this connection it should be apparent that the arrangement and number of drilling bits can be selected according to the contingent machining needs.

[0037] The selection of the drilling bits to be respec-

tively used each time is performed by a pneumatic set-up or arrangement, having a matching software and numerical control arrangement.

[0038] Said electro-spindles or mandrels 10 and 11 are used for performing panel milling operations.

[0039] Each said electro-spindle is associated with an independent motor, and being vertically arranged in the recess of the reversed "L" of the drilling assembly 8.

[0040] The blade assembly 9 is designed for performing a spot facing operation along the panel plane parallel to the axis x' .

[0041] The blade assembly 9 comprises an independent motor and is housed at a head portion of said electro-spindles or mandrels.

[0042] The processing or working-machining assemblies of the third station 4 are integral or rigid with the assembly operating on the stations 2 and 3 (for performing drilling-injecting-inserting operations).

[0043] As a reference, the axis z is associated with the working depth of a single tool, and, for this reason, is herein considered a second reference system, indicated by the reference mark "", which is offset by 90° with respect to the preceding system about the axis y .

[0044] Thus, there are obtained the following relationship between the original axes and derivate axes:

| Original | Derivate |
|----------|----------|
| x | z' |
| y | y' |
| z | $-x'$ |

[0045] Accordingly, the axes y' and z' are motor-driven axes and associated with the working or processing assemblies operating in the third processing station 4.

[0046] On the contrary, the axis x' is associated with the panel being processed or machined.

[0047] The driving along the axis x' (figure 2) is performed by the gripper 6 which clamps the panel, and is driven by a driving pinion/rack system.

[0048] With said gripper 6 cooperates a plurality of idle rollers 7, rigidly supported by the machine framework, and operating for bearing thereon the panel at points of the latter whereat it is not engaged by said clamping gripper.

[0049] Figure 4 shows a detecting or sensing system for detecting or sensing the dimension x' .

[0050] The reference "zero" position of the vertical element is obtained by a laser detecting system allowing to map the several operating positions.

[0051] More specifically, as the panel is arranged near the detecting system or sensor 12, said sensor will sense the panel passing by and will assign a machining operation reference.

[0052] This method is the so-called "on the fly zero assigning method".

[0053] The machine according to the present invention comprises moreover and is managed by a numerical type

of control device cooperating with a CAD/CAM type of software made and developed in a customized manner for controlling the furniture piece making operations.

[0054] Said system is designed for processing the furniture piece working cycle, based on an indication of a furniture piece actually desired by the operator, without causing said operator to process details of the single elements of the chosen furniture piece.

[0055] The operation of the machine according to the present invention comprises the following working or processing steps, with reference to a so-called three-area pendulum type of processing operation assembly.

[0056] At first, the panel is manually arranged either in the first or second station, for a horizontal panel element, or in the third station, for a vertical panel element.

[0057] Then, said panel or panels is/are automatically clamped, by an eccentric clamping cylinder for the horizontal panel elements or by the gripper 6 for the vertical panel elements.

[0058] Then, the panel height is automatically detected or sensed, for the horizontal panel elements, or a starting point x' is herein detected for the vertical panel elements.

[0059] In the meanwhile, the free station, either the first or the second, is preloaded, if the third station operates, or the preloading being performed in the third free station, if the first and second stations operate.

[0060] The working or machining operations on the horizontal panel elements comprise a drilling, cleaning of the drilled hole by blowing air, a glue injection by a glue metering nozzle (only for a pinned arrangement) and a pin or peg or iron part inserting.

[0061] The machining operations on the vertical panel elements comprise a drilling of the panel in multiple drilling stages, as shown in figure 5, and a milling and facing operations, as shown in figure 6.

[0062] For both types of panels, the operating sequence ends by automatically unlocking or disengaging said panel or panels.

[0063] All the panel machining or processing steps, from the automatic detection of the panel height to the automatic unlocking or disengaging of the processed panel, are repeated whilst the machined panel is manually unloaded.

[0064] It has been found that the invention fully achieves the intended aim and objects.

[0065] In fact, the invention has provided a furniture piece making machine in which a reference to the structural origins of the horizontal elements, which is common to all the machine processing stations, allows to perform a very precise or accurate alignment of the coupling pins or pegs and/or insert elements independently from the panel thickness and the panel thickness variation along the panel itself.

[0066] The laser detecting system for detecting the panel dimension y allows to easily automatize all the machining operations, thereby greatly reducing the labor time.

[0067] The vertical arrangement of the panel for all the

processing or machining operations allows to greatly reducing the occupied space, which approaches to 50% with respect to a horizontal processing conventional machine.

[0068] The driving system, including a clamping gripper and idle roller sliding arrangement, as above disclosed, allows to process panels with a comparatively large and variable size, for example from 250 mm to 3000 mm.

[0069] Moreover, the provision of several processing stations allows the machine to operate in a continuous manner, since the loading of following panels is carried out in a masked time.

[0070] Furthermore, the control software system, cooperating with a customized CAD/CAM system, allows, in the most cases, to omit a description operation for a single furniture piece component element, with a consequent very great saving on the furniture piece making cost.

[0071] Furthermore, depending on the selected processing logic, it is possible to perform a working operating cycle either for producing a full furniture piece or a series of like furniture piece components.

[0072] Furthermore, depending on the selected production or making type, the system, including three working areas, allows to nullify the loading and unloading time for each single furniture piece element.

[0073] Furthermore, the detecting system for detecting the axis-x' origin, allows to further reduce the operating time and to machine with a very high precision the vertical element V.

[0074] Thus, the machine according to the present invention provides two different or discrete operating possibilities for processing both vertical and horizontal elements for making the desired furniture piece on three discrete areas, with a consequent suppression of the loading and unloading time necessary for loading and unloading the panels being processed, since these operations are performed in a masked time.

[0075] The above two modes of operation, in particular, are performed on the same machine by using the same operating assemblies and control central unit of a customized CAD/CAM system specifically designed for processing furniture pieces.

[0076] Thus, the furniture piece making time and required operating spaces are further reduced thereby further reducing in turn the making and capital costs.

[0077] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

Claims

1. A furniture piece making machine (1) suitable for continuously processing furniture piece panels of large size and a variable pattern, said machine comprising three furniture piece panel processing sta-

tions (2, 3, 4) including a first station (2), a second station (3), suitable for processing horizontal panel elements (5), and a third station (4), suitable for processing vertical panel elements, all said stations including locating means for vertically locating said panels, said machine being suitable to perform on said horizontal panel elements drilling, glueing and pin and iron element engaging operations and to perform on said vertical panel elements drilling and milling operations, wherein in said first (2) and second (3) stations, said horizontal panel elements are arranged in a vertical plane parallel to a y-axis of the machine, both said first and second stations (2 and 3) comprising a single processing assembly comprising a drilling bit, a glue metering/injecting device, a pin or peg inserter device and/or an optional iron part inserter device, said third processing station (4) comprising drilling means for drilling said vertical panel elements in a direction orthogonal to their vertical plane (z' axis) and milling means for milling said vertical panel elements on said vertical plane (x' and y' axes), and including a specifically designed CAD/CAM system for working on processing the furniture piece. **characterized in that** in both said first and second stations (2, 3), said horizontal panel elements are clamped by a pneumatically driven clamping means with an eccentric cylinder, and having vertical axis and **that** processing assembly for first and second stations comprises moreover a laser detecting system for detecting in real time the height of the horizontal panel elements, said laser detecting system having three freedom degrees, all of which are associated with said processing assembly, a motorized axis-x, a motorized axis-y and a pneumatically driven binormal axis-z.

2. A machine according to claim 1, **characterized in that** said second station (3) comprises a pneumatically driven gripper (6) engaging and locking a bottom edge of each said first panel (5) as each said first panel is slidably driven on a plurality of idle rollers (7).

3. A machine according to claim 1, **characterized in that** said third station (4) comprises four machining or operating assemblies (8, 9, 10, 11), a drilling assembly (8), a blade spot facing cutting assembly (9), a right electrically driven milling spindle assembly (10) and a left electrically driven milling spindle assembly (11).

4. A machine according to claim 3, **characterized in that** said drilling assembly (8) comprises a set of twenty-one drilling bits arranged with a reversed L-shape in two horizontal rows of five bits each and in a column of eleven bits, each said electrically driven right and left milling spindle assemblies (10, 11) including milling spindles being electrically driven by

an independent electric motor for milling said first panel elements, said blade spot facing cutting assembly (9) being operatively driven along a panel plane parallel to the x axis and comprising an independent motor and being housed at the head portion of said spindles.

5. A machine according to claim 3, **characterized in that** said machining or operating assemblies (8, 9, 10, 11) of said third station (4) are integral with machining or operating assemblies of said first (2) and second (3) station assemblies, derivate y' and z' axes of said machine being motor driven and associated with the machining assemblies (8, 9, 10, 11) of the third station (4), the derivate x axis being associated with said first panel elements.
6. A machine according to claim 2, **characterized in that** the movement along the x axis is performed by said gripper (6) driven by a pinion/rack system and cooperating with said rollers (7).
7. A machine according to one or more of the preceding claims, **characterized in that** said third station comprises a x' axis reference system.

Patentansprüche

1. Maschine (1) zur Erzeugung von Möbelstücken, die zum kontinuierlichen Verarbeiten von Möbelstückpaneelen von großer Größe und mit einem variablen Muster geeignet ist, wobei die Maschine drei Möbelstückpaneel-Verarbeitungsstationen (2, 3, 4) umfasst, welche eine erste Station (2), eine zweite Station (3), die zum Verarbeiten waagrechtcr Paneelemente (5) geeignet sind, und eine dritte Station (4), die zum Verarbeiten senkrechter Paneelemente geeignet ist, umfassen, wobei alle Stationen Positioniermittel zum senkrechten Positionieren der Paneele umfassen, wobei die Maschine geeignet ist, an den waagrechtcr Paneelementen Bohren, Kleben und Stift- und Eisenelement-Einrastvorgänge durchzuführen und an den senkrechten Paneelementen Bohr- und Fräsvorgänge durchzuführen, wobei in der ersten (2) und der zweiten (3) Station die waagrechtcr Paneelemente in einer senkrechten Ebene parallel zu einer Y-Achse der Maschine angeordnet werden, wobei sowohl die erste als auch die zweite Station (2 und 3) eine einzige Verarbeitungsanordnung umfassen, die eine Bohrspitze, eine Klebstoffdosier-/einspritzvorrichtung, eine Stift- oder Zapfeneinsatzvorrichtung und/oder eine optionale Eisenteileinsatzvorrichtung umfasst, wobei die dritte Verarbeitungsstation (4) Bohrmittel zum Bohren der senkrechten Paneelemente in einer Richtung im rechten Winkel zu ihrer senkrechten Ebene (Z'-Achse) und Fräsmittel zum Fräsen der senkrech-

ten Paneelemente an der senkrechten Ebene (X'- und Y-Achse) umfasst und ein speziell ausgeführtes CAD/CAM-System zum Bearbeiten oder Verarbeiten des Möbelstücks umfasst, **dadurch gekennzeichnet, dass** sowohl in der ersten als auch in der zweiten Station (2, 3) die waagrechtcr Paneelemente durch ein pneumatisch betriebenes Klemmmittel mit einem Exzenterzylinder und mit einer senkrechten Achse geklemmt werden, und dass die Verarbeitungsanordnung für die erste und die zweite Station darüber hinaus ein Laserdetektiersystem zum Detektieren der Höhe der waagrechtcr Paneelemente in Echtzeit umfasst, wobei das Laserdetektiersystem drei Freiheitsgrade, die allesamt der Verarbeitungsanordnung zugeordnet sind, aufweist, eine motorisierte X-Achse, eine motorisierte Y-Achse und eine pneumatisch angetriebene binormale Z-Achse.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die zweite Station (3) einen pneumatisch betriebenen Greifer (6) umfasst, der mit einer Unterkante jedes ersten Paneels (5) in Eingriff kommt und diese arretiert, wenn jedes erste Paneel auf mehreren Mitläuferwalzen (7) verschiebbar angetrieben wird.
3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die dritte Station (4) vier Bearbeitungs- und Betriebsanordnungen (8, 9, 10, 11), eine Bohranordnung (8), eine Klingen-Planbearbeitungs-Schneidanordnung (9), eine rechte elektrisch getriebene Frässpindelanordnung (10) und eine linke elektrisch getriebene Frässpindelanordnung (11), umfasst.
4. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die Bohranordnung (8) einen Satz von einundzwanzig Bohrspitzen umfasst, die in Form eines umgekehrten L in zwei waagrechtcr Reihen zu je fünf Bohrspitzen und in einer Spalte von elf Bohrspitzen angeordnet sind, wobei jede der elektrisch getriebenen Frässpindelanordnungen, die rechte und die linke Frässpindeln (10, 11), die durch einen unabhängigen Elektromotor elektrisch angetrieben werden, zum Fräsen der ersten Paneelemente umfasst, wobei die Klingen-Planbearbeitungs-Schneidanordnung (9) im Betrieb entlang einer Paneelebene parallel zu der X-Achse angetrieben wird und einen unabhängigen Motor umfasst und an dem Kopfabschnitt der Spindeln untergebracht ist.
5. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die Bearbeitungs- oder Betriebsanordnungen (8, 9, 10, 11) der dritten Station (4) mit Bearbeitungs- oder Betriebsanordnungen der ersten (2) und der zweiten (3) Station integriert sind, wobei abgeleitete Y'- und Z'-Achsen der Maschine motorgetrie-

ben sind und den Bearbeitungsanordnungen (8, 9, 10, 11) der dritten Station (4) zugeordnet sind, wobei die abgeleitete X-Achse den ersten Paneelelementen zugeordnet ist.

6. Maschine nach Anspruch 2, **dadurch gekennzeichnet, dass** die Bewegung entlang der X-Achse durch den Greifer (6) ausgeführt wird, der durch ein Ritzel-Zahnstangen-System angetrieben wird und mit den Walzen (7) zusammenwirkt.
7. Maschine nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die dritte Station ein X'-Achsen-Referenzsystem umfasst.

Revendications

1. Machine destinée à fabriquer des meubles (1) appropriée pour traiter de façon continue des panneaux de meuble de grande taille, dans des modèles variables, ladite machine comprenant trois stations de traitement de panneaux de meuble (2, 3, 4), incluant une première station (2), une deuxième station (3) appropriée pour traiter des éléments de panneau horizontaux (5), et une troisième station (4) appropriée pour traiter des éléments de panneau verticaux, lesdites stations comprenant toutes des moyens de positionnement destinés à positionner lesdits panneaux verticalement, ladite machine étant appropriée pour exécuter des opérations de perçage, de collage et d'engagement d'éléments de goupille et d'éléments ferreux, et pour exécuter des opérations de perçage et de fraisage sur lesdits éléments de panneau verticaux, dans laquelle, dans lesdites première (2) et deuxième (3) stations, lesdits éléments de panneau horizontaux sont agencés dans un plan vertical parallèlement à un axe-y de la machine, lesdites première et deuxième stations (2 et 3) comprenant toutes deux un seul ensemble de traitement comprenant une mèche de forage, un dispositif de dosage/injection de colle, un dispositif d'insertion de goupille ou de cheville, et/ou un dispositif facultatif d'insertion de pièce en fer, ladite troisième station de traitement (4) comprenant des moyens de perçage destinés à percer lesdits éléments de panneaux verticaux dans une direction orthogonale à leur plan vertical (axe z') et des moyens de perçage destinés à percer lesdits éléments de panneaux verticaux sur ledit plan vertical (axes x' et y'), et comprenant un système CAD/CAM spécifique pour usiner ou traiter le meuble, **caractérisée en ce que** dans lesdites première et deuxième stations (2, 3), lesdits éléments de panneau horizontaux sont serrés par des moyens de serrage entraînés de façon pneumatique, avec un cylindre excentrique et présentant un axe vertical, et **en ce que** l'ensemble de traitement pour les pre-

mière et deuxième stations comprend en outre un système de détection laser destiné à détecter en temps réel la hauteur des éléments de panneau horizontaux, ledit système de détection laser présentant trois degrés de liberté, lesquels sont tous associés audit ensemble de traitement, un axe x motorisé, un axe y motorisé et un axe z binormal à entraînement pneumatique.

2. Machine selon la revendication 1, **caractérisée en ce que** ladite deuxième station (3) comprend un préhenseur (6) à entraînement pneumatique engageant et bloquant le bord inférieur de chacun desdits premiers panneaux (5) tandis que chacun desdits premiers panneaux est entraîné de façon coulissante sur une pluralité de rouleaux libres (7).
3. Machine selon la revendication 1, **caractérisée en ce que** ladite troisième station (4) comprend quatre ensembles d'usinage ou de commande (8, 9, 10, 11), un ensemble de perçage (8), un ensemble de coupe (9) tourné vers un point de lame, un ensemble de broche de fraisage de droite (10) entraîné électriquement, et un ensemble de broche de fraisage de gauche (11) entraîné électriquement.
4. Machine selon la revendication 3, **caractérisée en ce que** ledit ensemble de perçage (8) comprend un jeu de vingt et une mèches de forage agencées avec une forme de L inversé dans deux rangées horizontales de cinq mèches chacune et dans une colonne de onze mèches, chacun desdits ensembles de broche de fraisage de droite et de gauche (10, 11) entraînés électriquement étant entraînés électriquement par un moteur électrique indépendant pour le fraisage desdits première éléments de panneau, ledit ensemble de coupe (9) tourné vers un point de lame étant entraîné fonctionnellement le long d'un plan de panneau parallèle à l'axe x et comprenant un moteur indépendant logé dans la partie de tête desdites broches.
5. Machine selon la revendication 3, **caractérisée en ce que** lesdits ensembles d'usinage ou de commande (8, 9, 10, 11) de ladite troisième station (4) sont intégrés dans les ensembles d'usinage ou de commande desdits ensembles de la première station (2) et de la deuxième station (3), les axes dérivés y' et z' de ladite machine étant entraînés par moteur et associés aux ensembles d'usinage (8, 9, 10, 11) de la troisième station (4), l'axe dérivé x étant associé auxdits premiers éléments de panneau.
6. Machine selon la revendication 2, **caractérisée en ce que** le mouvement le long de l'axe x est exécuté par ledit préhenseur (6) entraîné par un système à crémaillère et coopérant avec lesdits rouleaux (7).

7. Machine selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ladite troisième station comprend un système de référence à axe x' .

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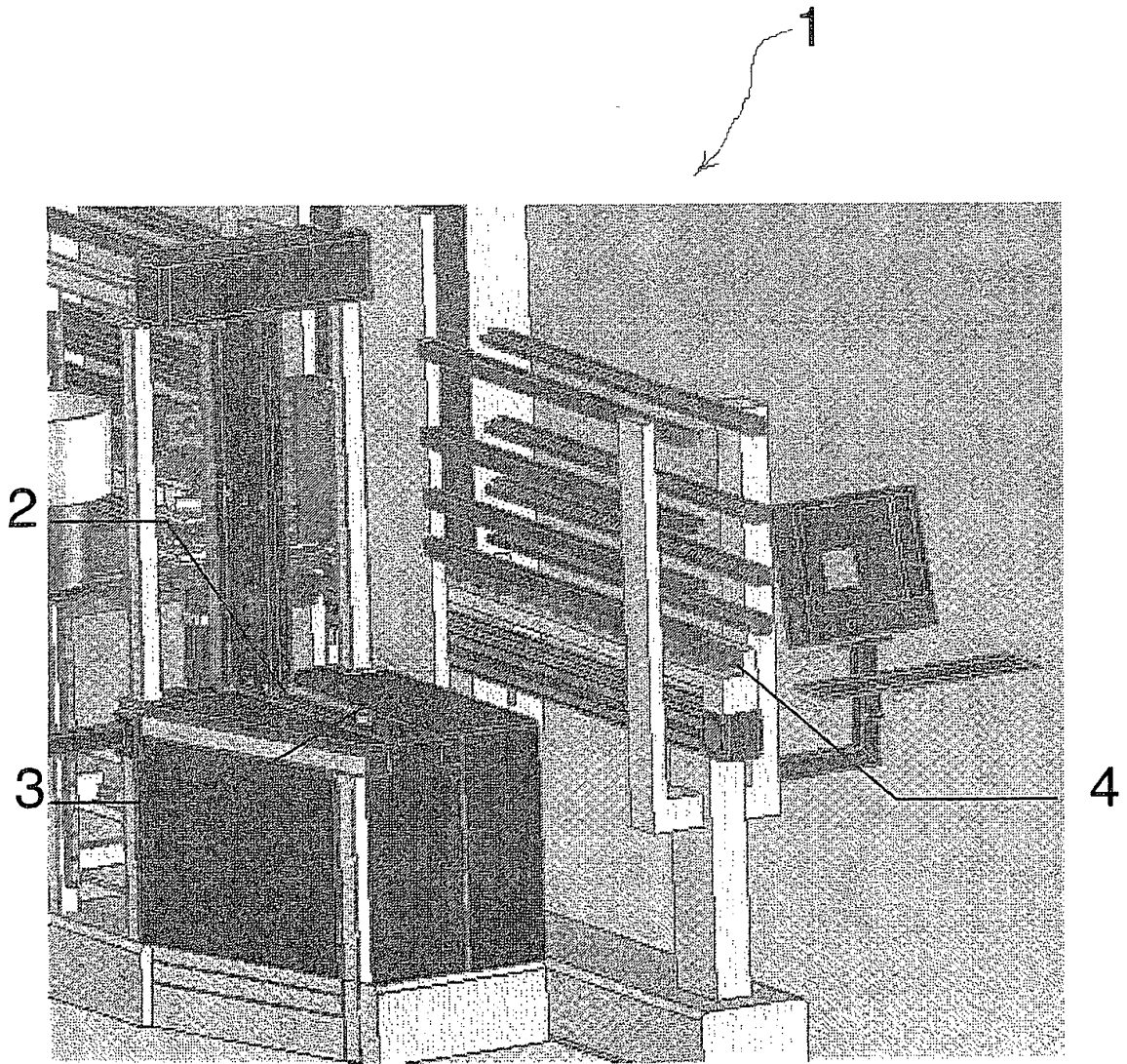


FIG. 1

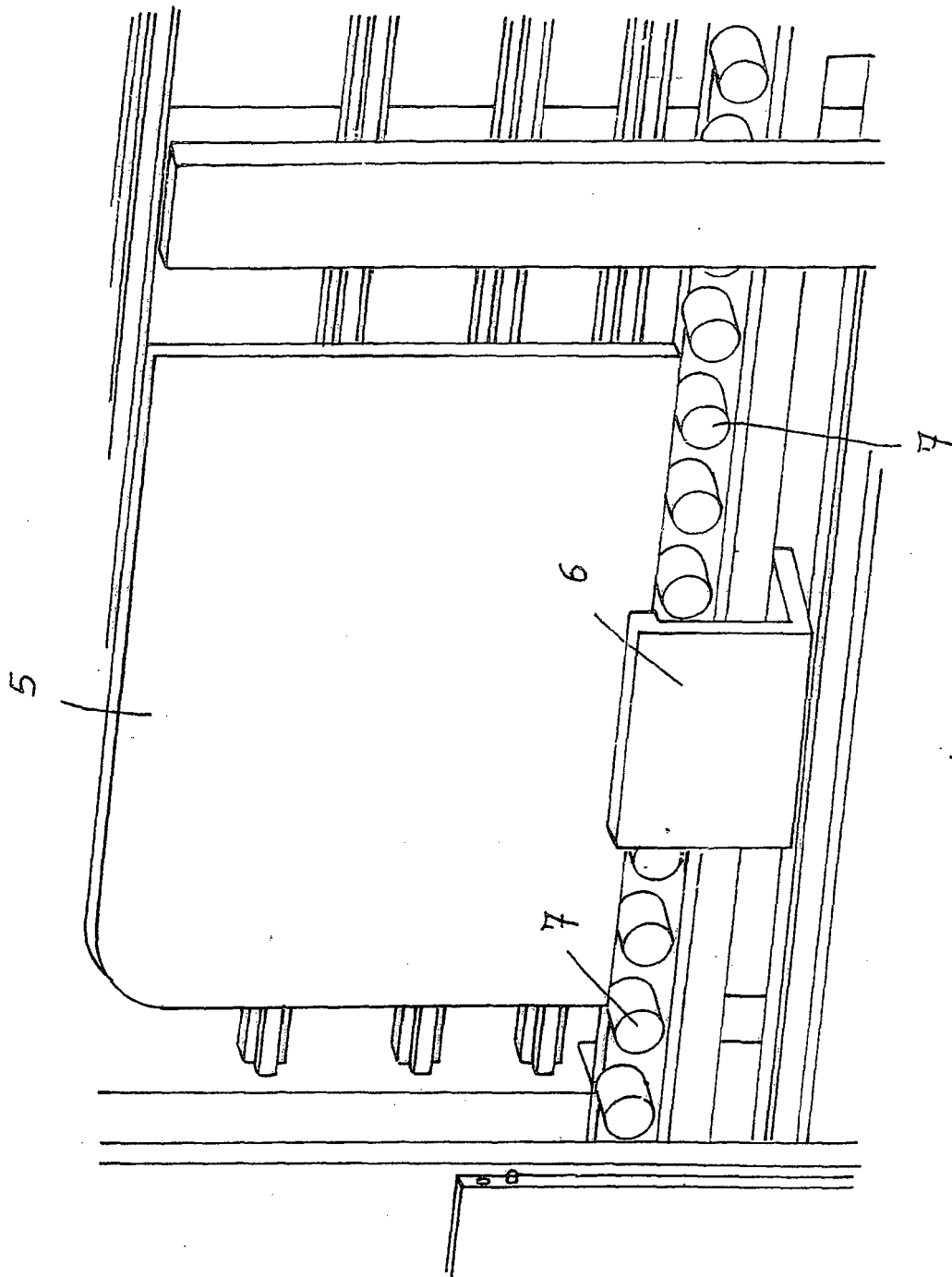


FIG. 2

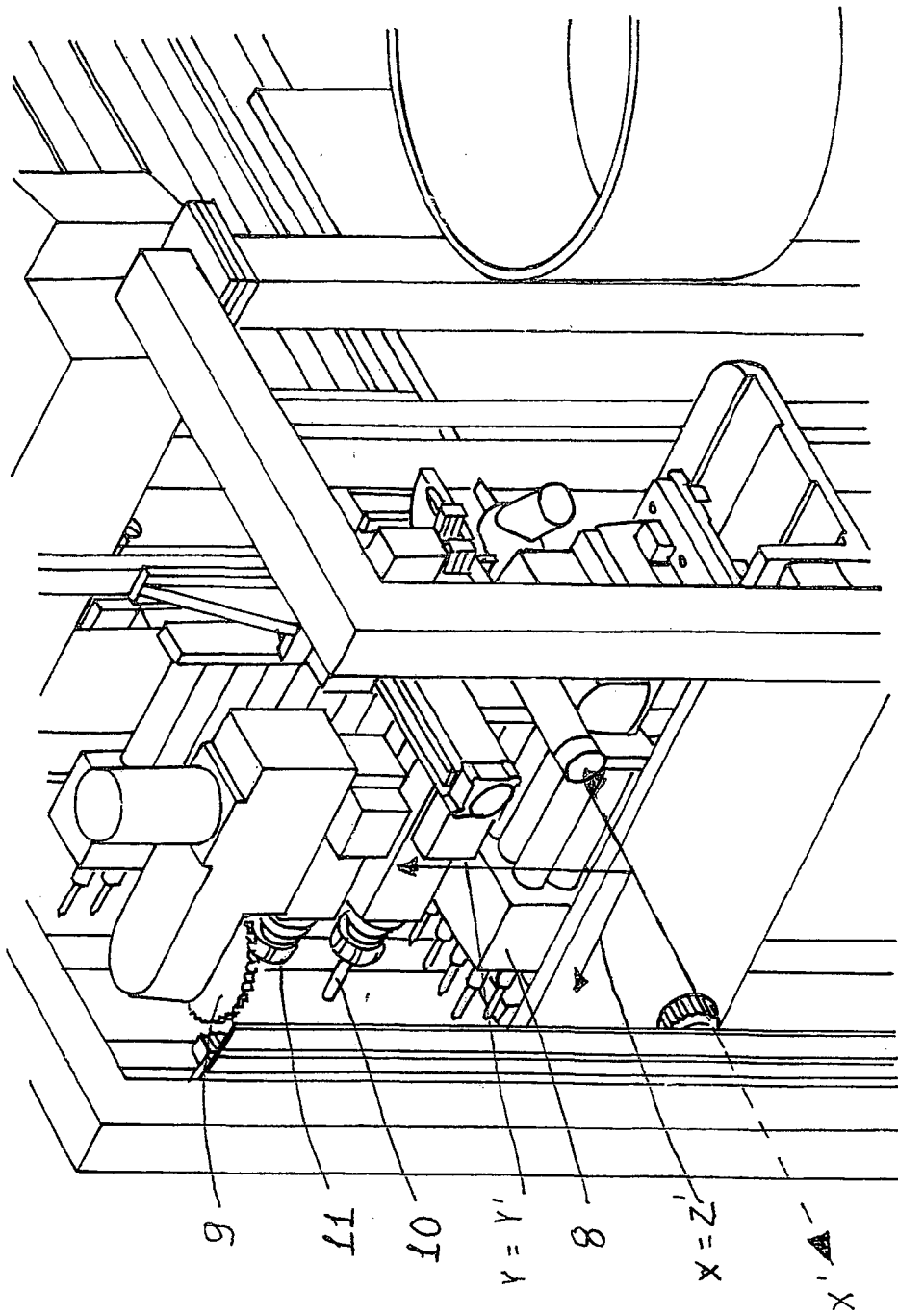


FIG. 3

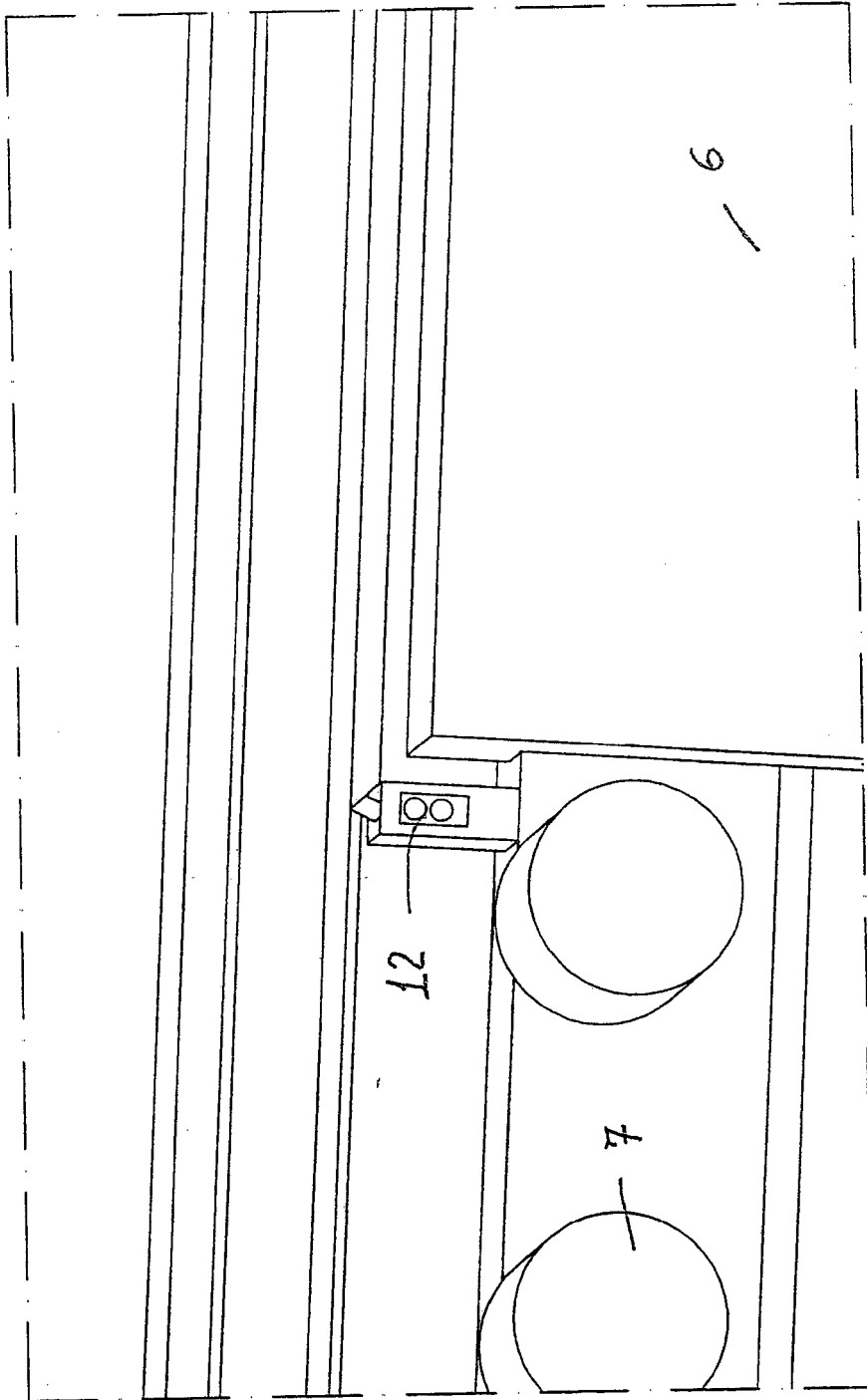


FIG. 4

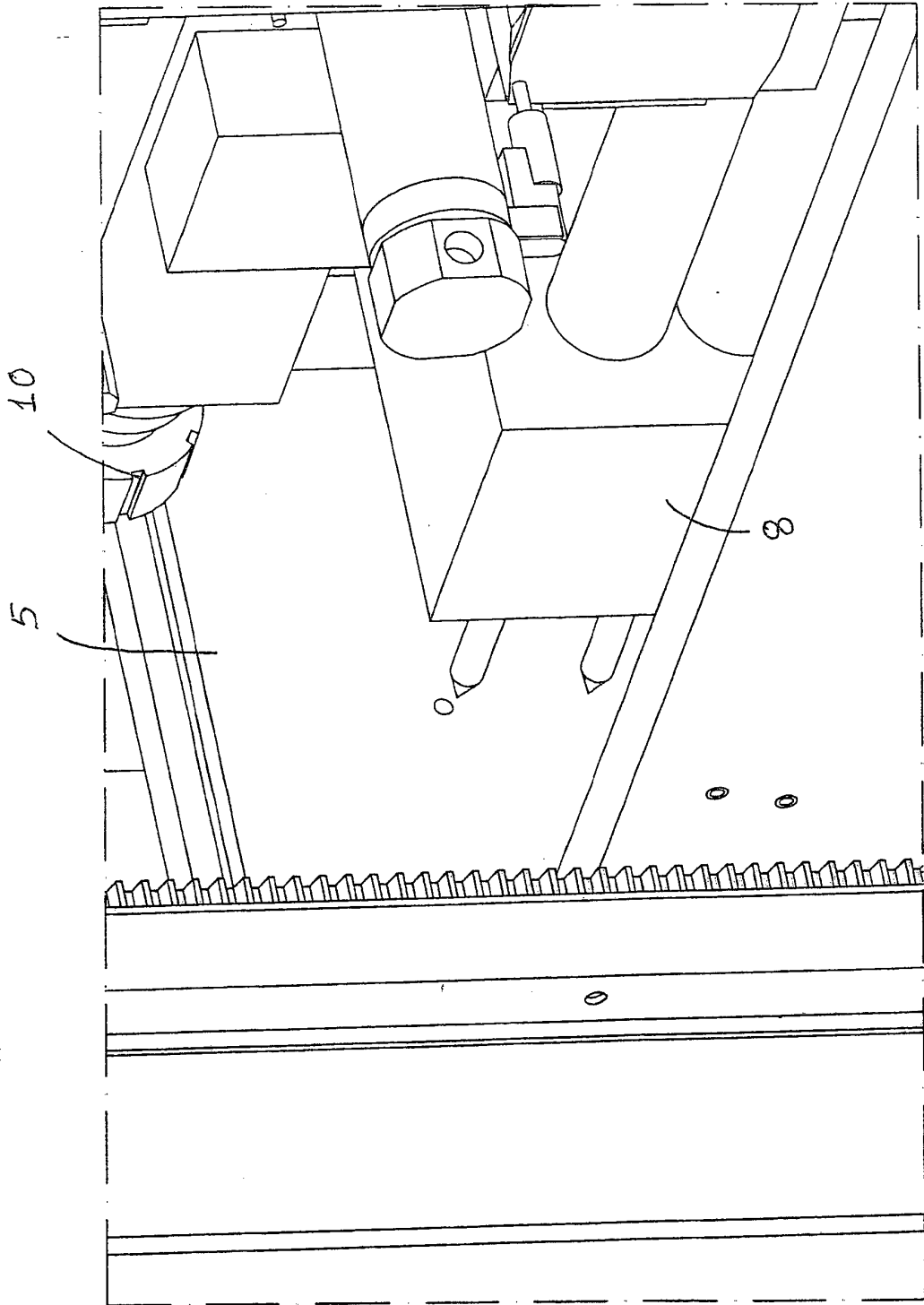


FIG. 5

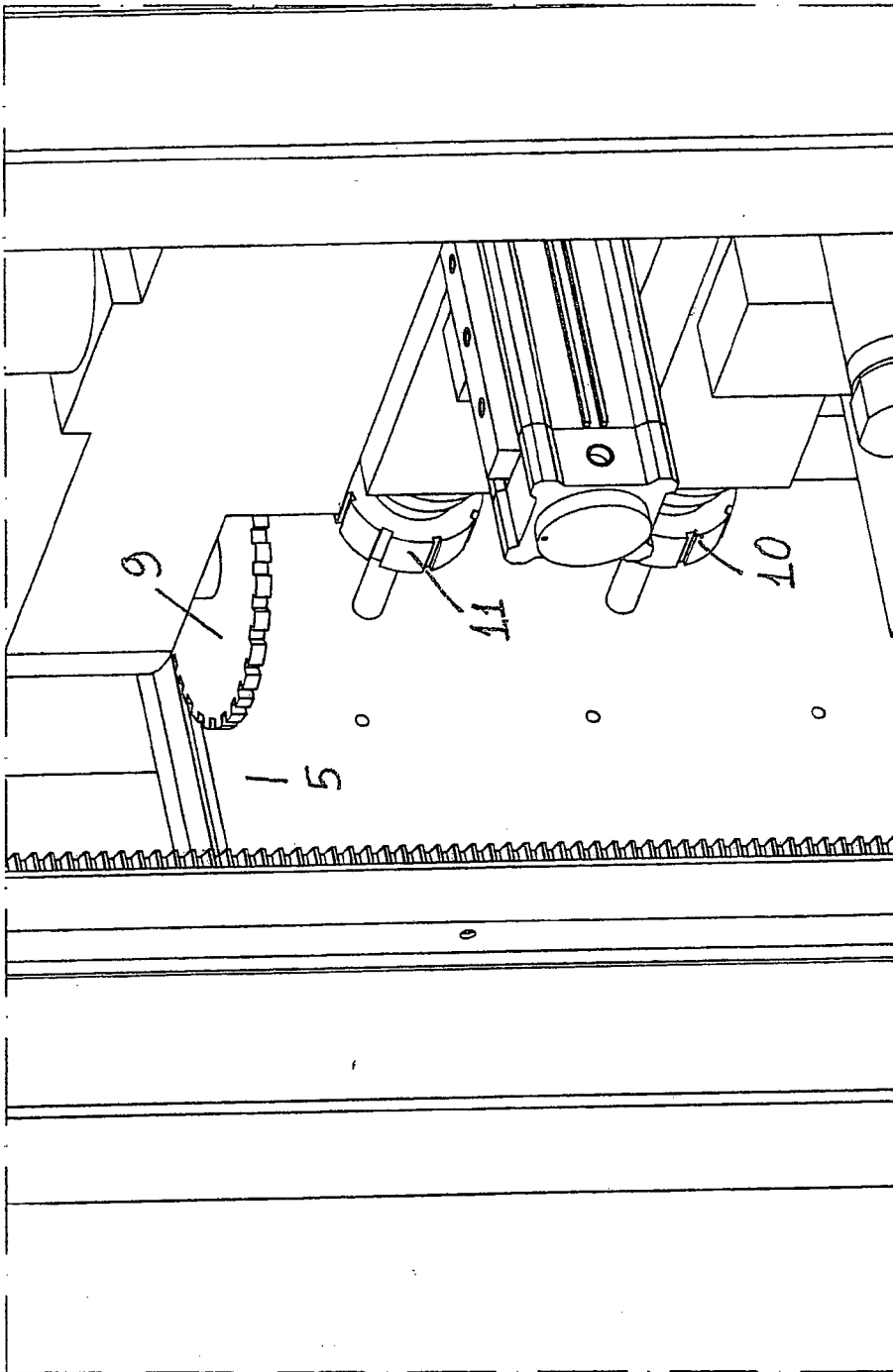


FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 2408250 A1 [0001]