



(11) **EP 1 258 320 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:  
**20.08.2008 Bulletin 2008/34**

(51) Int Cl.:  
**B25B 11/00<sup>(2006.01)</sup> B23Q 7/04<sup>(2006.01)</sup>**  
**B27M 1/08<sup>(2006.01)</sup> B27F 5/12<sup>(2006.01)</sup>**

(21) Application number: **02008821.7**

(22) Date of filing: **19.04.2002**

(54) **Drilling and milling machine for applying metal elements to furniture pieces**

Bohr- und Fräsmaschine zum Anbringen von metallischen Elementen an Möbelstücken

Perceuse-fraiseuse pour appliquer des éléments métalliques à des pièces de meuble

(84) Designated Contracting States:  
**DE ES**

(30) Priority: **17.05.2001 IT MI20011032**

(43) Date of publication of application:  
**20.11.2002 Bulletin 2002/47**

(73) Proprietor: **Alberti Vittorio S.p.A.**  
**20060 Gessate MI (IT)**

(72) Inventor: **Alberti, Luigi**  
**20063 Cernusco sul Naviglio (IT)**

(74) Representative: **Cicogna, Franco**  
**Ufficio Internazionale Brevetti**  
**Dott.Prof. Franco Cicogna**  
**Via Visconti di Modrone, 14/A**  
**20122 Milano (IT)**

(56) References cited:  
**EP-A- 0 808 689 EP-A- 0 875 346**  
**EP-A- 1 075 904 EP-A- 1 099 510**  
**DE-A1- 19 618 993 US-A- 3 990 570**  
**US-A- 4 243 084 US-A- 5 758 869**  
**US-A- 5 964 568**

**EP 1 258 320 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

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to a drilling and milling machine according to the preamble of independent claim 1, which has been specifically designed for applying metal elements or fixtures to furniture pieces. Such a machine is known from document EP 0 875 346 A.

[0002] As is known, furniture pieces conventionally comprise panels having a parallelepiped configuration, which panel, in order to make a finished furniture article, must be subjected to a plurality of drilling and/or milling operations, as suitably spaced from one another.

[0003] Some or all of the thus made holes or milled portions are provided for receiving metal elements or fixtures, usually comprising metal inserts such as ring nuts, coupling elements, hinges and so on, to allow an individual panel to be coupled to other panels for forming a furniture article, an equipped wall or other construction.

[0004] In prior drilling and milling machines for furniture articles, each panel is engaged by gripping means on a side edge thereof, and is driven along a supporting and handling device, usually including a roller assembly.

[0005] A drawback of the gripper driving and locating system is that the grippers would occupy regions of the panel which could be affected by the drilling or milling operations, thereby rendering the panel assembling a rather difficult operation.

### SUMMARY OF THE INVENTION

[0006] Accordingly, the aim of the present invention is to provide such a drilling and milling machine, for making furniture articles, which comprises a panel driving system specifically designed for overcoming the above mentioned drawback of prior drilling and milling machines.

[0007] Within the scope of the above mentioned aim, a main object of the present invention is to provide such a drilling and milling machine including a workpiece driving system, designed for driving the workpieces or panels so as to leave the edges of the panels substantially free in order not to hinder further panel processing operations.

[0008] Another object of the present invention is to provide such a drilling and milling machine including a workpiece or panel driving system allowing the individual panels to be accurately located, without damaging said panels.

[0009] According to one aspect of the present invention, the above mentioned aim and objects, are achieved by a drilling and milling machine, specifically designed for applying metal elements or fixtures to furniture pieces, according to independent claim 1.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0010] 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 general perspective view illustrating the drilling and milling machine according to the invention;

Figure 2 is an enlarged-broken away perspective view of the driving device included in the drilling and milling machine according to the present invention; Figure 3 is a front elevation view illustrating the suction cup device included in the drilling and milling machine according to the present invention;

Figure 4 is a perspective view illustrating the suction cup device;

Figure 5 is a side elevation view of the suction cup device; and

Figure 6 is a top plan view of the suction cup device.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] With reference to the number references of the above mentioned figures, the drilling and milling machine according to the present invention, which has been generally indicated by the reference number 1, comprises a supporting device, designed for supporting one or more panels or workpieces to be processed, said supporting device comprising roller assemblies 2 including a plurality of idle rollers 3, coupled to a supporting framework 4.

[0012] The supporting device is adapted to support a workpiece, not shown, which typically comprises a panel to which metal elements or fixtures must be applied by an operating head 5 which can be displaced on a cross guide 6 traversing the top of the supporting device.

[0013] The operating head 5, in particular, comprises, in a per se known manner, a tool exchanging device 7, a screwing on and off device 8, an insert supplying device 9 for supplying insert elements, not specifically shown, to be applied to the workpiece.

[0014] On a working bench 10, in a working position of the operating head 5, the subject machine further comprises a clamping device 11 for clamping the workpiece to be processed.

[0015] Said clamping device 11 comprises an aligning element, arranged in front of the bench 10, on the other side of the workpiece supporting device, and comprises moreover a plate 12 including a plurality of transversally movable vertical axis rollers 13, which can be driven in the longitudinal direction of the supporting device 2, so as to clamp the workpiece in its working position, as counterbalanced by guiding rollers 14 and 15 of a translating device 16.

[0016] The translating or deriving device 16 is designed for driving the workpiece on the roller assemblies, or transport device 2, and comprises a longitudinally extending guide 17 which extends along a side of the trans-

port device and comprises guide rollers, respectively 14 having a vertical axis and 15 having a horizontal axis, adapted to respectively engage the outer edge and bottom edge of the workpiece.

**[0017]** The longitudinal guide 17 slidably supports a floating suction cup device 18, designed for sliding along the guide 17 and for clamping the workpiece to drive it, along the roller assemblies, to a set working position, and being furthermore designed for unloading said workpiece.

**[0018]** The floating suction cup device 18, which is shown in a more detailed manner in figures 3-6, comprises a suction cup assembly 19, supported by a slide 20 which can be slidably driven along the mentioned longitudinal guide 17.

**[0019]** The driving of the slide 20 and, accordingly, of the suction cup assembly 19 along the guide 17 is controlled by a motor-reducing unit 21, driving a belt coupled to said slide 20.

**[0020]** As shown, the suction cup assembly 19 is supported by said slide 20 through a guide carriage 23, so as to be vertically displaced with respect to said slide, as controlled by a pneumatic piston 22.

**[0021]** Thus, the vertical displacement of the suction cup assembly 19 allows the suction cups included therein to be moved toward the bottom surface of the piece.

**[0022]** Moreover, in order to overcome or compensate for possible workpiece aligning unevennesses, the suction cup assembly is coupled to the vertical guide carriage 23 through a horizontal guide 24 designed for allowing the suction cup assembly to be horizontally and transversely driven with respect to the workpiece longitudinal driving direction.

**[0023]** The suction cup assembly is centered by a pair of spring urged pusher elements 25, which essentially comprise a small plunger operating against a coaxial coil spring, said pusher elements being adapted to hold at a centered position said suction cup assembly, while allowing, owing to the elastic properties of the spring, a slight cross displacement, in both directions with respect to the middle longitudinal line, in order to compensate for possible workpiece unevennesses, due, for example, to a non perfectly rectilinear edge thereof.

**[0024]** As shown, the suction cup assembly 19 comprises, in this embodiment, two suction cups 26, but, as it should be apparent to one skilled in the art, it could also comprise three or more suction cups, depending on requirements.

**[0025]** As disclosed, in this embodiment the suction cup assembly 19 comprises a double tray construction 27, designed for defining two recesses and comprising an edge 32 including a gasket 28 made of rubber or any other suitable resilient materials.

**[0026]** In each said recess or cavity, a ball shutter element 29 is provided, said ball shutter element comprising a ball 30 adapted to obstruct a hole, as said ball is urged by an urging spring 31.

**[0027]** The shutter element 29, as shown, is coupled

to a suction source, or vacuum source through suitable ducts 33 thereby, as a panel is contacted by the suction cup assembly, the lower surface of said panel will be caused to bear on said gasket 28, thereby deforming it so as to contact the ball 30 which will be downward driven, thereby partially freeing the hole and providing a negative pressure in the cavity of the suction cup 26.

**[0028]** Upon having processed the workpiece and having removed it from the working station, said workpiece or panel will be disengaged by lowering the suction cup assembly 19, by a control piston 22.

**[0029]** As the panel does not further downward press on the ball 30, the latter will again obstruct the suction hole, as urged by the urging spring 31, thereby automatically shutting off the suction operation.

**[0030]** As it should be apparent, the suction cup assembly 19 is adapted to engage a workpiece and drive it, along the roller assemblies, to the working or processing bench.

**[0031]** At the end of the working process, the suction cup assembly will drive the workpiece rightward with reference to figure 1, to the following unloading position thereof.

**[0032]** Advantageously, said suction cup assembly 19 comprises a double chamber, so as to allow the individual suction cups 26 thereof to be supplied in a mutual independent manner.

**[0033]** The operating speed and accelerations, as the workpiece is driven, are suitable adjusted to allow an accurate locating of the workpiece to a set working position, and in order to prevent the workpiece from being damaged.

**[0034]** The workpiece driving adjusting is performed by a driving control system, comprises a cam assembly or set 34, controlling three microswitches.

**[0035]** A first microswitch reduces the workpiece feeding speed, a second microswitch controls the assembly so as to be properly located at a starting position thereof, and a third microswitch operates as a safety control element, i.e. a limit switch, operating to stop the assembly in the case in which limit positions would be exceeded.

**[0036]** The driving control system comprises moreover a pair of wheel pusher elements 35, designed for operating on the top surface of the work piece to hold it in its working position, in cooperation with a second pair of pusher wheel elements 36 of the plate aligner 12.

**[0037]** Each said pusher element 35 comprises a pair of photocells 37 and 38 provided for respectively detecting the inlet and outlet of the workpiece edge, in order to control the operation of the pusher elements.

**[0038]** As the machine according to the present invention is switched on to operate, the workpiece, typically a wood or other material panel used for making furniture articles, is caused to slide along said roller assemblies from a supplying or feeding position, at the left with reference to figure 1, to a working position at the operating head 5, by operating the suction cup assembly 19.

**[0039]** The latter, as disclosed, affects only the bottom

surface of the panel while leaving the side edges and top edge of the panel free.

[0040] As the panel is arranged on the roller assembly, the suction cup assembly 19 is raised and brought to contact the panel bottom surface, thereby automatically providing a negative pressure, through the above disclosed ball shutter elements.

[0041] Accordingly, the panel is brought to its working position, where on the panel are performed all the necessary processing operations, which are performed by the mentioned operating head.

[0042] At the end of the working operations, the panel is driven by the suction cup assembly along the roller assembly, rightward with reference to figure 1, to an unloading position or a following processing station.

[0043] Thus, it should be apparent that the machine according to the present invention provides, owing to the provision of the disclosed suction cup assembly, great advantages, since the perimetrical edges of the panel are left fully free, thereby preventing the panel from hindering further processing operations.

[0044] Thus, it is not necessary to program the driving pattern of the panel, as it is necessary in prior panel drilling and milling machines and, moreover, it is not necessary to relocate the panel for performing the desired processing operations thereon.

[0045] A further advantage of the machine according to the invention is that, owing to the specifically designed suction cup assembly, it is possible to accurately drive the panel without damaging it, owing to the self-centering characteristics and self-adjusting properties of the assembly during the driving thereof.

[0046] It has been found that the invention fully achieves the intended aim and objects.

[0047] In fact, the subject drilling and milling machine allows to easily apply metal elements and fixtures to the panels for forming the furniture pieces, in a manner which does not damage the panels or obstruct the processing steps.

[0048] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements and the status of the art.

## Claims

1. A drilling and milling machine (1) for applying metal elements or fixtures to furniture article elements, comprising supporting means (2) for supporting a workpiece to be machined by an operating head (5) in a working station, driving means (16) for driving said workpiece along said supporting means from at least a supplying position to the working station and from the working position to an unloading position, and clamping means (11) for clamping said workpiece in said working station, **characterized in that** said driving means comprise suction cup means adapted to affect only a surface of the workpiece

while leaving the perimetrical edges and top edge of said workpiece free, that said driving means (16) comprise a translating device, for translating the workpiece on said supporting means (2) and including a longitudinal guide (17) extending along a side of said supporting means comprising roller assemblies (3), said translating device comprising guide rollers, respectively (14) having a vertical axis and (15) a horizontal axis, for respectively engaging the outer edge and bottom edge of said workpiece, that said longitudinal guide slidably supports thereon a floating suction cup device (18), adapted to slide along said longitudinal guide (17) and to hold the workpiece for driving it along said roller assemblies (3), to a working position and then adapted to unload said workpiece, that said floating suction cup device (19) comprises a suction cup assembly (19) supported by slide (20) slidable along said longitudinal guide (17), that the translating movement of said slide (20) and hence of said suction cup assembly (19), along said guide (17) is controlled by a motor reducing unit (21) driving a belt coupled to said slide (20), that said suction cup assembly (19) is supported by said slide (20) through a guide carriage (23), supported by said a guide so as to allow said suction cup assembly to be vertically driven with respect to said slide (20), as controlled by a pneumatic piston (22), that, in order to compensate for possible alignment unevennesses of said workpiece, said suction cup assembly (19) is coupled workpiece, said suction cup coupled to said vertical guide carriage (23) through a horizontal guide (24) adapted to allow said suction cup assembly (19) to be horizontally driven, and transversely driven with respect to said workpiece longitudinal driving direction, that said suction cup assembly (19) is centered by a pair of spring pusher elements (25), essentially comprising a small piston operating against a coaxial coil spring, said pusher elements (25) holding in a centered position said suction cup assembly (19) while allowing, owing to the resilient properties of said spring, a slight cross displacement of said suction cup assembly (19), in both directions, with respect to a longitudinal middle line, in order to compensate for possible workpiece unevennesses, and that said suction cup assembly (19) comprises a double tray construction (27) defining two cavities and comprising an edge (32) engaged by a rubber gasket (28), in each said cavity being arranged a shutter element (29) coupled to a vacuum source.

2. A machine, according to claim 1, **characterized in that** said ball shutter element comprise a ball adapted to shut off a hole and that said shutter element is coupled to a suction source by coupling pipes, thereby, as a panel contacts said suction cup assembly, the bottom surface of said panel is caused to bear on said gasket by deforming up to reach said ball,

which is downward driven thereby partially freeing said hole and providing a vacuum in the cavity of the suction cup.

3. A machine, according to claim 1, **characterized in that** said suction cup assembly comprises a double chamber, to allow the suction cups to be independently supplies, 5
4. A machine, according to claim 1, **characterized in that** said machine further comprises a control system for adjustably driving said workpiece. 10
5. A machine, according to claim 4, **characterized in that** said control system comprises a cam assembly driving three microswitches, of which a first microswitch decreases a workpiece feeding speed, a second microswitch controls an arrangement of said assembly at a starting position and a third microswitch operates as a safety limit switch. 15
6. A machine, according to claim 4, **characterized in that** said driving control system further comprises a pair of wheel pusher elements operating on the top surface of said workpiece to hold said workpiece in its working position in cooperation with a second pair of wheel pusher elements of a plate aligner. 20
7. A machine, according to claim 6, **characterized in that** each of said wheel pusher elements comprises a pair of control photocells for detecting respectively an inlet and an outlet of an edge of said workpiece. 25
8. A machine, according to claim 1, **characterized in that** said means for clamping said workpiece in its working position comprise an aligner, arranged in front of the operating head, at an opposite position of the roller assembly, and comprising a plate including a plurality of rollers having a vertical axis and transversely movable with respect to the longitudinal extension of the roller assembly thereby clamping the workpiece in its clamping position, as counter-biased by the guide rollers of the translating device. 30

#### Patentansprüche

1. Bohr- und Fräsmaschine (1), zum Anbringen metallener Elemente oder Halter an Möbelstückelementen, umfassend Tragemittel (2), zum Tragen eines Werkstücks, welches durch einen Arbeitskopf (5) in einer Arbeitsstation zu bearbeiten ist, Antriebsmittel (16), zum Antreiben des Werkstücks entlang dem Tragemittel, aus wenigstens einer Zufuhrposition zu der Arbeitsstation, und aus der Arbeitsposition zu einer Ausgabe- und Klemmposition, und Klemmmittel (11), zum Klemmen des Werkstücks in die Arbeitsstation, **dadurch gekennzeichnet, dass** die Antriebsmittel 35

Haftsaugermittel umfassen, welche angepasst sind, nur auf eine Fläche des Werkstücks einzuwirken, während sie die umlaufenden Ränder und den oberen Rand des Werkstücks frei lassen, dass die Antriebsmittel (16) eine Translationsvorrichtung umfassen, zum translatorischen Bewegen des Werkstücks auf den Tragemitteln (2), wobei sie eine Längsführung (17) aufweisen, welche sich entlang einer Seite der Tragemittel, welche Rollenbaugruppen (3) umfassen, erstreckt, wobei die Translationsvorrichtung Führungsrollen umfasst, welche jeweils (14) eine vertikale Achse und (15) eine horizontale Achse aufweisen, um jeweils mit dem äußeren Rand und dem unteren Rand des Werkstücks in Eingriff zu sein, dass die Längsführung, auf derselben, verschiebbar eine frei bewegliche Haftsaugervorrichtung (18) trägt, welche angepasst ist, entlang der Längsführung (17) zu gleiten und das Werkstück zu halten, um es entlang der Rollenbaugruppen (3) anzutreiben, zu einer Arbeitsposition, und danach angepasst ist, das Werkstück auszugeben, dass die frei bewegliche Haftsaugervorrichtung (19) eine Haftsaugerbaugruppe (19) umfasst, welche durch einen Schlitten (20) getragen ist, welcher entlang der Längsführung (17) verschiebbar ist, dass die translatorische Bewegung des Schlittens (20), und daher der Haftsaugerbaugruppe (19), entlang der Führung (17), durch eine Motoruntersetzungseinheit (21) gesteuert ist, welche einen Riemen antreibt, welcher mit dem Schlitten (20) gekoppelt ist, dass die Haftsaugerbaugruppe (19) durch den Schlitten (20), durch einen Führungsträger (23), getragen ist, um so zu erlauben, dass die Haftsaugerbaugruppe vertikal betrieben wird, bezogen auf den Schlitten (20), gesteuert durch einen pneumatischen Kolben (22), dass, um mögliche Ausrichtungsunebenheiten des Werkstücks auszugleichen, die Haftsaugerbaugruppe (19) mit dem vertikalen Führungsträger (23) durch eine horizontale Führung (24) gekoppelt ist, welche angepasst ist, zu erlauben, dass die Haftsaugerbaugruppe (19) horizontal betrieben wird, und quer betrieben, bezogen auf die Werkstück-Längsantriebsrichtung, dass die Haftsaugerbaugruppe (19) durch ein Paar Federdrückelemente (25) zentriert ist, welche im Wesentlichen einen kleinen Kolben umfassen, welcher gegen eine koaxiale Schraubenfeder wirkt, wobei die Drückelemente (25) die Haftsaugerbaugruppe (19) in einer zentrierten Position halten, während sie, auf Grund der elastischen Eigenschaften der Feder, eine leichte Querverschiebung der Haftsaugerbaugruppe (19), in beide Richtungen, erlauben, bezogen auf eine Mittellinie in Längsrichtung, um mögliche Werkstückunebenheiten auszugleichen, und dass die Haftsaugerbaugruppe (19) eine Doppelwannenkonstruktion (27) umfasst, welche zwei Hohlräume definiert, und welche einen Rand (32) umfasst, welcher in Eingriff mit einer Gumdichtung (28) ist, wobei in jedem dieser Hohlräume 45

me ein Schließelement (29) angeordnet ist, welches mit einer Vakuumquelle gekoppelt ist.

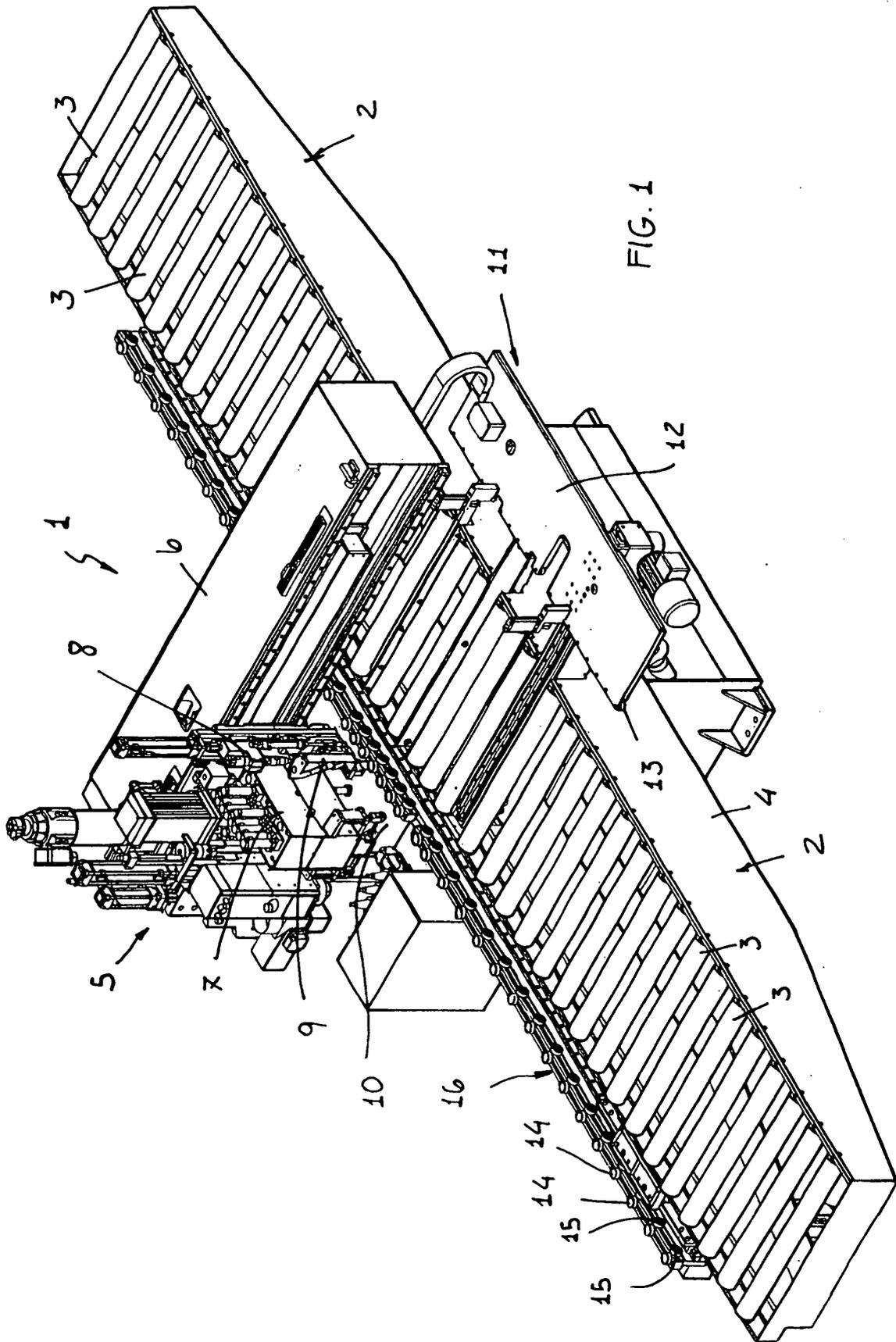
2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** das Kugelschließelement eine Kugel umfasst, welche angepasst ist, ein Loch zu verschließen, und dass das Schließelement mit einer Saugquelle durch Verbindungsrohre gekoppelt ist, wodurch, wenn ein Paneel die Haftsaugerbaugruppe berührt, bewirkt wird, dass die untere Fläche des Paneels die Dichtung niederdrückt, wodurch diese verformt wird, bis die Kugel erreicht ist, welche nach unten getrieben wird, wodurch das Loch teilweise frei gemacht und ein Vakuum in dem Hohlraum des Haftsaugers geschaffen wird. 5
3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Haftsaugervorrichtung eine Doppelkammer umfasst, um zu erlauben, dass die Haftsauger unabhängig versorgt werden. 10
4. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Maschine ferner ein Steuersystem zum einstellbaren Antreiben des Werkstücks umfasst. 15
5. Maschine nach Anspruch 4, **dadurch gekennzeichnet, dass** das Steuersystem ferner eine Kurvenanordnung umfasst, welche drei Mikroschalter betätigt, von welchen ein erster Mikroschalter eine Werkstück-Vorschubgeschwindigkeit senkt, ein zweiter Mikroschalter eine Anordnung der Baugruppe an einer Startposition steuert, und ein dritter Mikroschalter als ein Sicherheitsgrenzschalter wirkt. 20
6. Maschine nach Anspruch 4, **dadurch gekennzeichnet, dass** das Antriebssteuersystem ferner ein Paar Rad-Drückelemente umfasst; welche an der oberen Fläche des Werkstücks wirken, um das Werkstück in seiner Arbeitsposition zu halten, in Zusammenarbeit mit einem zweiten Paar Rad-Drückelemente eines Plattenausrichters. 25
7. Maschine nach Anspruch 6, **dadurch gekennzeichnet, dass** jedes der Raddrückelemente ein Paar Steuerphotozellen umfasst, zum Detektieren jeweils eines Eintritts und eines Austritts eines Rands des Werkstücks. 30
8. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Mittel zum Klemmen des Werkstücks in seine Arbeitsposition einen Ausrichter umfassen, welcher vor dem Arbeitskopf angeordnet ist, an einer gegenüberliegenden Position an der Rollenbaugruppe, wobei er eine Platte umfasst, welche mehrere Rollen aufweist, welche eine vertikale Achse aufweisen, und welche quer beweglich ist, bezogen auf die Längsausdehnung der Rollenbaugrup-

pe, wodurch er das Werkstück in seine Klemmposition klemmt, gegengehalten durch die Führungsrollen der Translationsvorrichtung.

## Revendications

1. Machine de forage et de fraisage (1) permettant d'appliquer des éléments ou des accessoires métalliques sur des éléments de mobilier, comprenant des moyens de support (2) permettant de supporter une pièce devant être usinée grâce à une tête d'actionnement (5) sur un poste de travail, des moyens d'entraînement (16) permettant d'entraîner ladite pièce le long desdits moyens de support entre au moins une position d'alimentation du poste de travail et de la position de travail et une position de déchargement, et des moyens de serrage (11) permettant de serrer ladite pièce dans ledit poste de travail, **caractérisé en ce que** lesdits moyens d'entraînement comprennent des moyens de ventouse conçus pour affecter uniquement une surface de la pièce tout en laissant libres les bords du périmètre et le bord supérieur de ladite pièce, **en ce que** lesdits moyens d'entraînement (16) comprennent un dispositif de translation, permettant de déplacer en translation la pièce sur lesdits moyens de support (2) et incluant un guide longitudinal (17) qui s'étend le long d'un côté desdits moyens de support, comprenant des ensembles de rouleau (3), ledit dispositif de translation comprenant des rouleaux guides respectivement (14) ayant un axe vertical et (15) un axe horizontal, afin de s'engager respectivement sur le bord extérieur et le bord inférieur de ladite pièce, **en ce que** ledit guide longitudinal supporte en coulissement sur celui-ci un dispositif de ventouse flottante (18) conçu pour coulisser le long dudit guide longitudinal (17) et pour maintenir la pièce afin de l'entraîner le long desdits ensembles de rouleau (3) jusqu'à une position de travail, et conçu ensuite pour décharger lesdites pièces, **en ce que** ledit dispositif de ventouse flottante (19) comprend un ensemble de ventouse (19) supporté par une glissière (20) pouvant coulisser le long dudit guide longitudinal (17), **en ce que** ledit mouvement de translation de ladite glissière (20) et donc dudit ensemble de ventouse (14) le long dudit guide (17) est commandé par un moteur réducteur (21) entraînant une courroie couplée à ladite glissière (20), **en ce que** ledit ensemble de ventouse (19) est supporté par ladite glissière (20) à travers un chariot de guidage (23), de façon à permettre que ledit ensemble de ventouse soit entraîné verticalement par rapport à ladite glissière (20), en étant commandé par un piston pneumatique (22), **en ce que**, pour compenser un éventuel manque d'alignement de ladite pièce, ledit ensemble de ventouse (19) est couplé audit chariot de guidage vertical (23) par l'intermédiaire d'un guide horizontal

- (24) conçu pour permettre que ledit ensemble de ventouse (19) soit entraîné verticalement et entraîné transversalement par rapport au sens d'entraînement longitudinal de ladite pièce, **en ce que** ledit ensemble de ventouse (19) est centré grâce à une 5  
 paire d'éléments poussoirs à ressort (25) comprenant essentiellement un petit piston fonctionnant en s'opposant. à un ressort hélicoïdal coaxial, lesdits éléments poussoirs (25) maintenant en une position centrée ledit ensemble de ventouse (19), tout en permettant, grâce aux propriétés élastiques du ressort, un léger déplacement transversal dudit ensemble de ventouse (19), dans les deux sens, par rapport à une ligne médiane longitudinale, afin de compenser un éventuel manque d'uniformité de la pièce, et **en ce que** ledit ensemble de ventouse (19) comprend une construction à double plateau (27) définissant deux cavités et comprenant un bord (32) sur lequel s'engage un joint de caoutchouc (28), dans chacune desdites cavités étant agencé un élément de volet (29) couplé à une source de vide.
2. Machine selon la revendication 1, **caractérisée en ce que** ledit élément de volet à bille comprend une bille conçue pour obstruer un orifice et **en ce que** ledit élément de volet est couplé à une source d'aspiration grâce à des conduits de couplage, grâce à quoi, au moment où un panneau entre en contact avec ledit ensemble de ventouse, la surface inférieure dudit panneau appuie sur ledit joint d'étanchéité en se déformant jusqu'à atteindre ladite bille, qui est entraînée vers le bas ce qui libère ainsi partiellement ledit orifice et qui fournit un vide dans la cavité de la ventouse. 25  
30
3. Machine selon la revendication 1, **caractérisée en ce que** ledit ensemble de ventouse comprend une chambre double, pour permettre que les ventouses soient alimentées de manière indépendante. 35  
40
4. Machine selon la revendication 1, **caractérisée en ce que** ladite machine comprend en outre un système de commande permettant d'entraîner ladite pièce de manière réglable. 45  
50
5. Machine selon la revendication 4, **caractérisée en ce que** ledit système de commande comprend un ensemble de cames entraînant trois microrupteurs, dont un premier microrupteur réduit la vitesse d'alimentation de la pièce, un deuxième microrupteur commande un agencement dudit ensemble dans une position de départ et un troisième microrupteur fonctionne comme une fin de course de sécurité. 55
6. Machine selon la revendication 4, **caractérisée en ce que** ledit système de commande d'entraînement comprend en outre une paire d'éléments poussoirs à roue fonctionnant sur la surface supérieure de ladite pièce afin de maintenir ladite pièce dans sa position de travail en coopération avec une seconde paire d'éléments poussoirs à roue d'un dispositif d'alignement à plateau.
7. Machine selon la revendication 6, **caractérisée en ce que** chacun desdits éléments poussoirs à roue comprend une paire de photocellules de commande permettant de détecter respectivement une entrée et une sortie d'un bord de ladite pièce.
8. Machine selon la revendication 1, **caractérisée en ce que** lesdits moyens de serrage de ladite pièce dans sa position de travail comprennent un dispositif d'alignement agencé devant la tête d'actionnement, dans une position opposée de l'ensemble de rouleau, et comprennent un plateau incluant une pluralité de rouleaux ayant un axe vertical et étant mobiles transversalement par rapport au prolongement longitudinal de l'ensemble de rouleau, en serrant ainsi la pièce dans sa position de serrage, en étant incliné à contresens par les rouleaux guide de dispositif de translation.



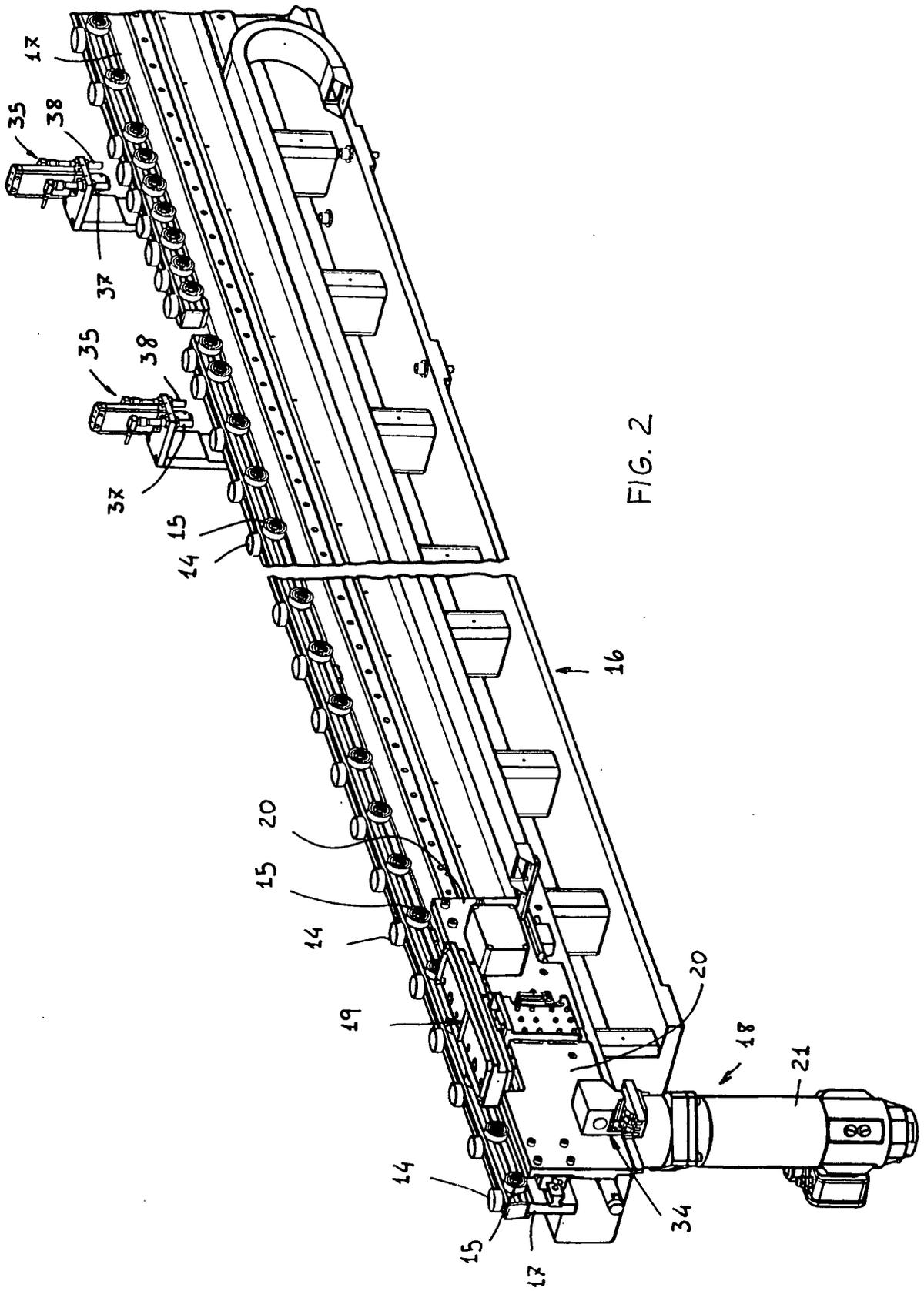


FIG. 2

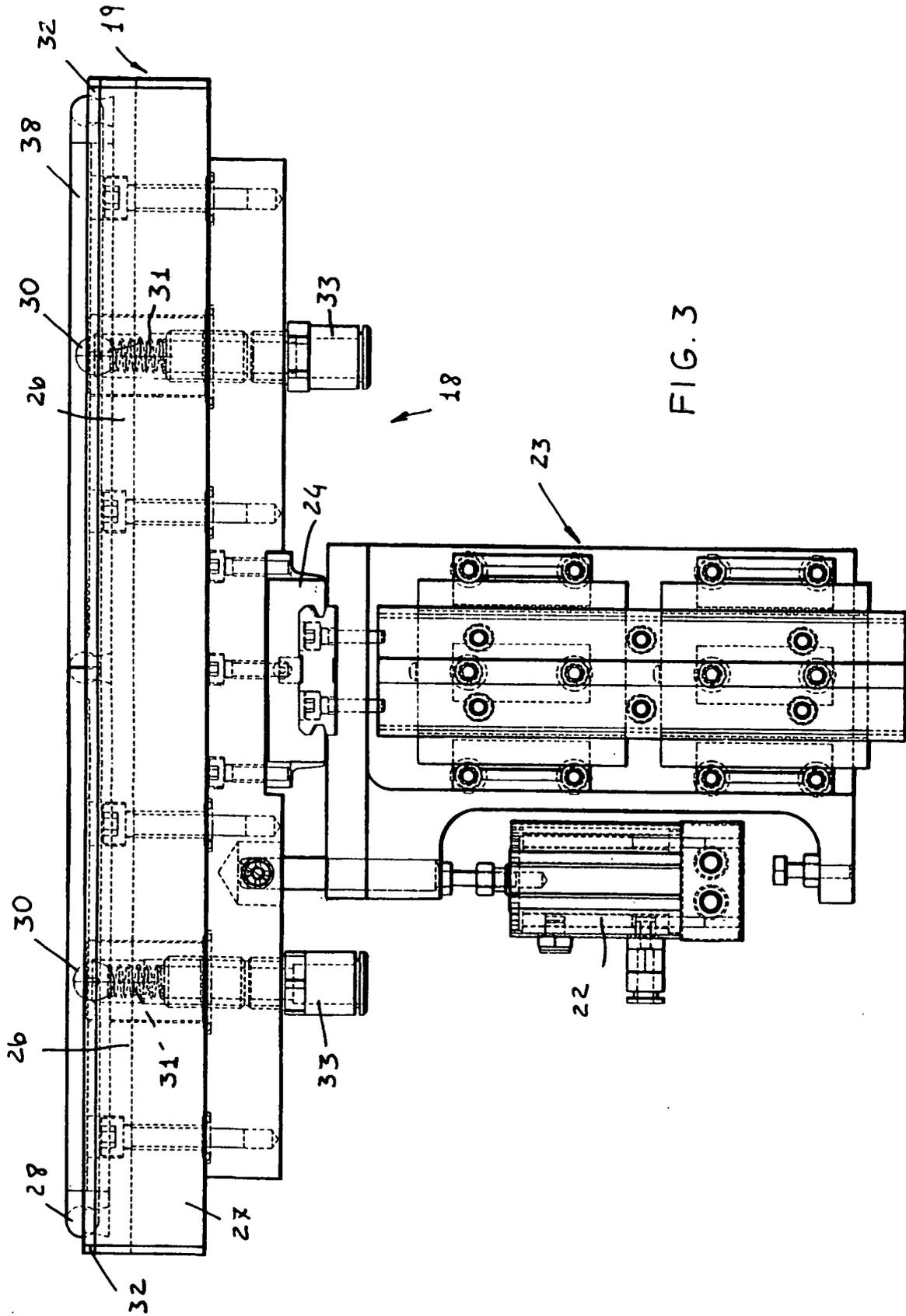
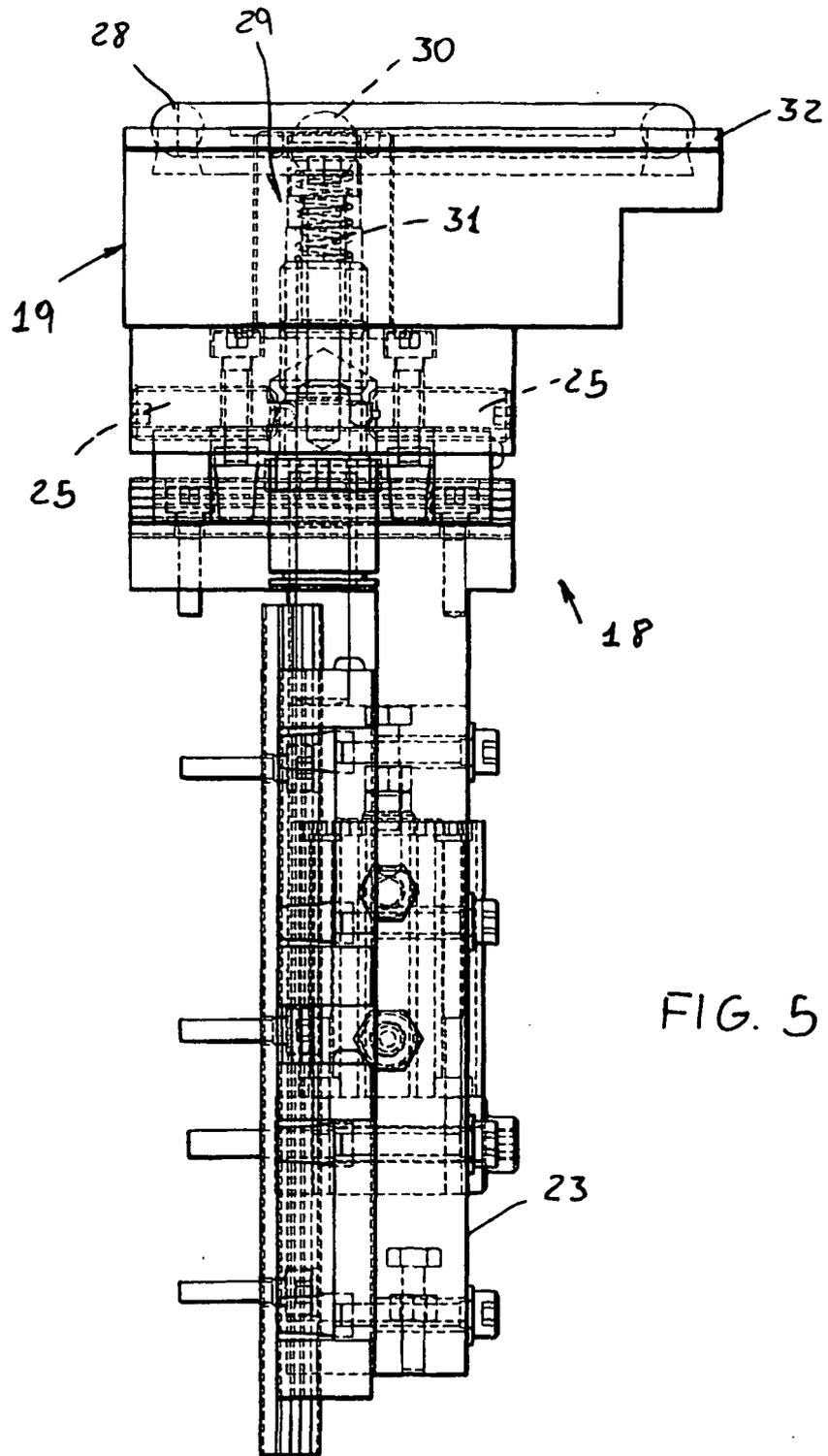


FIG. 3





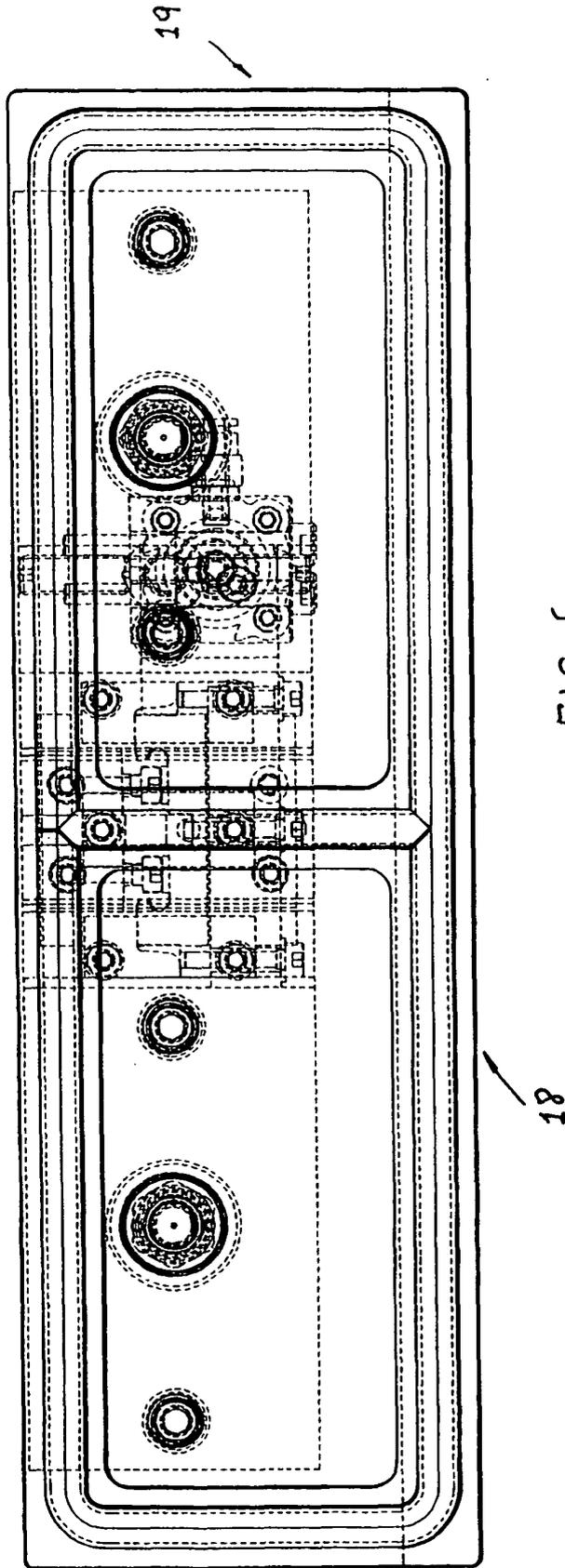


FIG. 6

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- EP 0875346 A [0001]