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(54) **Machine for machining wooden frames or similar**

Holzbearbeitungsmaschine zur Bearbeitung von Rahmenhölzern oder dergleichen

Machine pour l'usinage de cadres en bois ou analogues

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## Description

[0001] The present invention relates to a machine for machining wooden frames or similar as per the preamble of claim 1. Such a machine is disclosed by DE 19637954.

[0002] In the following description, the term 'frames' is intended to mean doors, windows, and furniture doors and/or relative supporting frames.

[0003] Wooden frames are worked on a machine comprising an elongated base with two longitudinal guide members parallel to a first substantially horizontal direction; a number of cross members mounted between the longitudinal guide members and parallel to a second substantially horizontal direction crosswise to the first; at least one clamp fitted to each cross member to secure at least one frame to a first given supporting surface; and a bridge crane, which extends over the base in the second direction, has a machining head, and is movable along the base in the first direction.

[0004] The machine usually also comprises a number of supporting bars, which extend between the cross members in the second direction, define a second substantially horizontal supporting surface parallel to the first, and are movable, in a substantially vertical third direction, between a raised position, in which the second supporting surface is positioned above the first, and a lowered position, in which the first and second supporting surface are coplanar.

[0005] When the supporting bars are in the raised position, the frame is transferred between the second supporting surface and a third horizontal supporting surface normally defined by a number of belt conveyors parallel to one another and to the second direction.

[0006] Known machines of the above type for machining wooden frames or similar have several drawbacks, mainly due to the frame being loaded and unloaded manually on and off the third supporting surface, i.e. a horizontal supporting surface a given height off the floor, which makes for hard work on the part of the machine operators, in proportion to the size and weight of the frame.

[0007] It is an object of the present invention to provide a machine for machining wooden frames or similar, designed to eliminate the above drawbacks, and which is also cheap and easy to produce.

[0008] According to the present invention, there is provided a machine for machining wooden frames or similar, as claimed in the attached Claims.

[0009] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which :

Figure 1 shows a schematic view in perspective, with parts removed for clarity, of a preferred embodiment of the machine according to the present invention; Figures 2 to 4 show three schematic views in perspective, with parts removed for clarity, of the Figure 1 machine in three different operating positions.

[0010] Number 1 in Figure 1 indicates as a whole a machine for machining wooden frames 2 or similar, which are substantially flat and rectangular, are defined in the example shown by door, window and/or furniture door frames, and are assembled on a so-called clamping machine.

[0011] Machine 1 comprises an elongated, substantially U-shaped base 3, which extends in a horizontal direction 4, has two lateral longitudinal guide members 5 parallel to direction 4, and supports a number of cross members 6 - hereinafter referred to as 'work surfaces' - which extend between longitudinal members 5 in a horizontal direction 7 crosswise to direction 4, and are fitted to longitudinal members 5 to slide manually, or by means of respective known actuating devices (not shown), along longitudinal members 5 in direction 4.

[0012] Work surfaces 6 are fitted with a number of clamps 8 arranged substantially according to the size of and the work to be carried out on frames 2, and which comprise respective coplanar bottom jaws 9 defining a supporting surface P1 for at least one frame 2; and respective top jaws 10 movable between a lock position clamping frame 2, and a release position releasing frame 2.

[0013] Base 3 also supports a bridge crane 11 comprising an upright 12, which is fitted in known manner to base 3, is moved straight along base 3 in direction 4 by a known actuating device (not shown), and is fitted on its free end with a cross member 13 extending over base 3 in direction 7.

[0014] Bridge crane 11 supports a known machining head 14, which is fitted in known manner to cross member 13, is moved straight along cross member 13 in direction 7 by a known actuating device (not shown), and comprises an electrospindle 15, which is fitted in known manner to head 14, is movable straight with respect to head 14 in a vertical direction 16 perpendicular to directions 4 and 7, is designed to receive and retain at least one tool and/or aggregate 17 (Figure 4), and cooperates with a known tool store 18 looped through upright 12 to change tools and/or aggregates 17.

[0015] Base 3 is also fitted with a number of supporting bars 19, which extend in direction 7, alternate with work surfaces 6, are bounded at the top by respective coplanar flat surfaces, and define a horizontal supporting surface P2 for at least one frame 2.

[0016] By means of respective actuating cylinders 20, bars 19 are movable, with respect to base 3 and in direction 16, between a raised position (Figures 2 and 3) in which surface P2 extends above surface P1, a lowered position in which surface P2 extends below surface P1 to machine frames 2, and an intermediate position in which surface P2 is substantially coplanar with surface P1.

[0017] Machine 1 also comprises a store 21 comprising a trolley 22 with a rack 23, which extends upwards from the bed of trolley 22 and defines a number of parallel pockets 24, each extending in a substantially vertical

plane perpendicular to direction 7, and each housing a frame 2 positioned on edge and projecting outwards of pocket 24 in direction 4.

**[0018]** Frames 2 are transferred between bars 19 and store 21 by a transfer assembly 25, which is connected to store 21 at an input station 26, faces base 3, and comprises a base 27 extending in direction 4 and fitted to two guides 28, parallel to direction 7, to slide straight in direction 7 with respect to base 3.

**[0019]** Assembly 25 may obviously be mounted on either of the sides of base 3 parallel to direction 4. And when assembly 25 is mounted on the rear side of base 3, i.e. the side bridge crane 11 is fitted to, the front side of base 3 is completely clear.

**[0020]** Base 27 supports a roller bed 29, which is fitted to the opposite side of base 27 from base 3, extends in direction 4 from station 26, and cooperates with a draw device 30 comprising a horizontal slide 31 fitted to base 27 to slide straight with respect to base 27 in direction 4; and a substantially S-shaped draw member 32 fitted to slide 31, and which is slid straight in direction 7, with respect to slide 31, between a withdrawn position and an extracted position by an actuating cylinder 33.

**[0021]** Assembly 25 also comprises a rotating frame 34, which is hinged to base 27 to rotate, with respect to base 27, about a hinge axis 35 parallel to direction 4, is mounted beneath surface P1, and supports a number of belt conveyors 36, which extend crosswise to axis 35 and have respective coplanar transportation branches 37 defining a supporting surface P3 for at least one frame 2.

**[0022]** Surface P3 is rotated by frame 34 between a second work position (Figure 2), in which surface P3 is substantially parallel to pockets 24 and therefore tilted at a given angle with respect to surfaces P1 and P2, and a first work position (Figures 3 and 4), in which surface P3 is parallel to surfaces P1 and P2 and coplanar with surface P2 when bars 19 are in the raised position.

**[0023]** Operation of machine 1 will now be described with reference to Figures 2 to 4, and as of the instant in which :

trolley 22 has been moved up to station 26, with pockets 24 parallel to direction 4;  
surface P3 is in the second work position;  
supporting bars 19 are in the raised position;  
base 27 has been moved in direction 7 along guides 28 to align roller bed 29 and draw device 30 with the pocket 24 furthest from base 3; and  
member 32 is in the withdrawn position in station 26.

**[0024]** As shown in Figure 2, member 32 is moved into the extracted position to latch onto frame 2 in the pocket 24 referred to; and slide 31 is moved in direction 4 to withdraw frame 2 from pocket 24 and onto roller bed 29.

**[0025]** At this point, member 32 is moved back into the withdrawn position to release frame 2; and frame 34 is rotated about axis 35 to move surface P3 from the second work position to the first work position (Figure 3). As frame

34 rotates about axis 35, frame 2 is held in position on surface P3 by a number of retainers 38 equal in number to conveyors 36, each associated with a respective conveyor 36, and which are mounted to the rear of respective conveyors 36 to prevent frame 2 from sliding off transportation branches 37 of conveyors 36.

**[0026]** As shown in Figure 4, frame 2 is then fed by conveyors 36 onto surface P2 of bars 19. This may be done entirely by conveyors 36, or may be commenced by conveyors 36 and completed by a draw pin 39 (Figure 3) fitted to electrospindle 15 and parallel to direction 16.

**[0027]** Once frame 2 is positioned on surface P2, and clamps 8 positioned inside the perimeter of frame 2, bars 19 are lowered to move surface P2 into position coplanar with surface P1; a tool and/or aggregate 17, in particular for milling the outer edge of frame 2, is substituted for pin 39; clamps 8 are moved along relative work surfaces 6 to engage frame 2; and jaws 10 are moved into the lock position (Figure 4) to secure frame 2 to surface P1 and machine it with tool and/or aggregate 17.

**[0028]** Obviously, frame 2 is unloaded off surface P1 and inserted into relative pocket 24 by performing the above operating sequence in reverse.

**[0029]** In variations not shown :

store 21 is eliminated, and frames 2 are fed successively straight from the clamping machine to input station 26 of transfer assembly 25;

draw device 30 is eliminated, and frames 2 are withdrawn from respective pockets 24 and fed onto roller bed 29 by hand;

conveyors 36 are replaced with respective pushers, in particular, pneumatic or linear actuators, to move frames 2 between surfaces P2 and P3;

conveyors 36 are eliminated, and frames 2 are transferred between surfaces P2 and P3 by pin 39; and pin 39 is replaced with a gripper fitted to electrospindle 15 or bridge crane 11.

**[0030]** Transfer assembly 25 thus provides for handling relatively heavy, bulky frames 2, and for turning each frame 2 between a substantially vertical and a substantially horizontal position. When equipped with store 21, machine 1 can complete an entire production lot, defined by frames 2 in store 21, fully automatically, with no operator assistance required.

## Claims

1. A machine for machining wooden frames (2) or similar, the machine comprising a base (3); a bridge crane (11) movable along the base (3) in a given first direction (4) ; at least two cross members (6) fitted to the base (3) and parallel to a second direction (7) substantially crosswise to the first direction (4); supporting means (19) comprising at least two supporting bars (19), which are parallel to said cross mem-

bers (6), and define a substantially horizontal first supporting surface (P2) for at least one frame (2); a machining head (14) for machining the frame (2); a transfer assembly (25) for transferring the frame (2) to and/or from the first supporting surface (P2); the transfer assembly (25) comprising a rotating device (34), which defines a second supporting surface (P3) for the frame (2), and is movable between a first work position, in which said first and said second supporting surface (P2, P3) are substantially parallel and coplanar, and a second work position, in which the second supporting surface (P3) is tilted at a given angle with respect to the first supporting surface (P2); the transfer assembly (25) further comprising a first transfer device (36, 39) for moving the frame (2) between said first and said second supporting surface (P2, P3) when the rotating device (34) is in said first work position; and at least one clamp (8) fitted to each cross member (6) for securing the frame (2) to a substantially horizontal third supporting surface (P1) parallel to the first supporting surface (P2); the machine being **characterized in that** it further comprises a store (21) comprising a trolley (22), which is connected to the transfer assembly (25) at an input and/or output station (26) for loading and/or unloading the frame (2) onto and/or off the transfer assembly (25), and has a rack (23), which extends upwards from a bed of trolley (22) and defines a number of parallel pockets (24), each extending in a substantially vertical plane perpendicular to the second direction (7), and each housing a frame (2) positioned on edge and projecting outwards of pocket (24) in the first direction (4); the pockets (24) being designed to house the frames (2) parallel to one another and to the second supporting surface (P3) when the second supporting surface (P3) is in said second work position; the transfer assembly (25) further comprising a second transfer device (29, 30) comprising engaging and transfer means (32) for engaging and transferring the frame (2), and which are movable in the first direction (4) to transfer the frame (2) between the input and/or output station (26) and the second supporting surface (P3) when the rotating device (34) is in said second work position; the transfer assembly (25) being movable in the second direction (7) to selectively align the engaging and transfer means (32) with the pockets (24) in the first direction (4).

2. A machine as claimed in Claim 1, wherein the first transfer device (36, 39) comprises first transfer means (36) fitted to the rotating device (34).
3. A machine as claimed in Claim 1 or 2, wherein the bridge crane (11) extends over the base (3) in the second direction (7); the first transfer device (36, 39) comprising second transfer means (39) fitted to the bridge crane (11) and movable along the bridge

crane (11) in the second direction (7).

4. A machine as claimed in any one of Claims 1 to 3, wherein the rotating device (34) comprises a supporting frame (34) mounted to rotate about a given axis of rotation (35); and a number of belt conveyors (36) fitted to the supporting frame (34) to define the second supporting surface (P3) and at least part of the first transfer device (36).
5. A machine as claimed in any one of Claims 2 to 3, wherein the first transfer device (36, 39) comprises a number of thrust members, in particular, pneumatic or linear actuators.
6. A machine as claimed in any one of the foregoing Claims, wherein the supporting means (19) are movable, perpendicularly to the first supporting surface (P2), between a raised position, in which the first supporting surface (P2) is coplanar with the second supporting surface (P3), and an intermediate position, in which the first supporting surface (P2) is coplanar with the third supporting surface (P1).
7. A machine as claimed in any one of the foregoing Claims, wherein the supporting means (19) are also movable, perpendicularly to the first supporting surface (P2), into a lowered position, in which the first supporting surface (P2) extends beneath the third supporting surface (P1).
8. A machine as claimed in any one of the foregoing Claims, wherein the rotating device (34) is mounted to rotate about an axis of rotation (35) extending beneath and parallel to the third supporting surface (P1).

#### Patentansprüche

1. Maschine zum Bearbeiten von Holzrahmen (2) oder dergleichen, umfassend eine Basis (3); einen Brückenkran (11), der entlang der Basis (3) in einer gegebenen ersten Richtung (4) bewegbar ist; wenigstens zwei Querelemente (6), die an der Basis (3) befestigt sind und parallel zu einer zweiten Richtung (7) im Wesentlichen senkrecht zur ersten Richtung (4) verlaufen; Tragmittel (19), umfassend wenigstens zwei Tragstangen (19), die parallel zu den Querelementen (6) verlaufen und eine im Wesentlichen horizontale erste Tragfläche (P2) für wenigstens einen Rahmen (2) bilden, einen Bearbeitungskopf zum Bearbeiten des Rahmens (2); eine Transfereinheit (25) zum Überführen des Rahmens (2) zur und/oder von der ersten Tragfläche (P2); die Transfereinheit (25) umfasst eine Schwenkvorrichtung (34), die eine zweite Tragfläche (P3) für den Rahmen (2) bildet und beweglich ist zwischen einer ersten

- Arbeitsposition, in der die erste und die zweite Tragfläche (P2, P3) im Wesentlichen parallel und koplanar zueinander verlaufen, und einer zweiten Arbeitsfläche, in welcher die zweite Tragfläche (P3) unter einem bestimmten Winkel in Bezug auf die erste Tragfläche (P2) geneigt ist; die Transfereinheit (25) umfasst weiterhin eine erste Transfereinrichtung (36, 39) zum Bewegen des Rahmens (2) zwischen der ersten und der zweiten Tragfläche (P2, P3), wenn die Schwenkvorrichtung (34) sich in der ersten Arbeitsposition befindet; und wenigstens eine Klammer (8), die an jedem Querelement (6) befestigt ist, um den Rahmen (2) an einer im Wesentlichen horizontalen dritten Tragfläche (P1) parallel zur ersten Tragfläche (P2) zu befestigen, die Maschine ist **dadurch gekennzeichnet, dass** sie weiterhin einen Speicher (21) umfasst, umfassend einen Rollwagen (22), der angeschlossen ist an die Transfereinheit (25) an einer Eingangs- und/oder Ausgangsstation (26) zum Beladen und/oder Entladen des Rahmens (2) auf und/oder von der Transfereinheit (25), mit einem Rechen (23), der sich vom Bett des Rollwagens (22) nach oben erstreckt und eine Anzahl von parallelen Taschen (24) bildet, deren jede sich in eine im Wesentlichen vertikalen Ebene senkrecht zur zweiten Richtung (7) erstreckt, und deren jede einen Rahmen (2) aufnimmt, positioniert auf einer Kante, und aus der Tasche (24) in der ersten Richtung (4) nach außen ragend; die Taschen (24) sind derart gestaltet, dass die Rahmen (2) parallel zueinander sowie zur zweiten Tragfläche (P3) dann aufnehmen, wenn sich die zweite Tragfläche (P3) in der genannten zweiten Arbeitsposition befindet; die Transfereinheit (25) umfasst weiterhin eine zweite Transfereinheit (29, 30), mit einem Greif- und Transfermittel (32) zum Greifen und Überführen des Rahmens (2), beweglich in der ersten Richtung (4), um den Rahmen (2) zwischen der Eingangs- und/oder Ausgangsstation (26) und der zweiten Tragfläche (P3) dann zu überführen, wenn sich die Schwenkvorrichtung (34) in der genannten zweiten Arbeitsposition befindet, die Transfereinheit (25) ist in der zweiten Richtung (7) beweglich, um selektiv das Greif- und Transfermittel (32) mit den Taschen (24) in der ersten Richtung (4) zu bewegen.
2. Maschine nach Anspruch 1, wobei die erste Transfereinheit (36, 39) ein erstes Transfermittel (36) umfasst, angeschlossen an die Schwenkvorrichtung (34).
  3. Maschine nach Anspruch 1 oder 2, wobei sich der Brückenkran über die Basis in der zweiten Richtung (7) erstreckt, die erste Transfereinrichtung (36, 39) umfasst zweite Transfermittel (39), die an den Brückenkran (11) angeschlossen sind und entlang des Brückenkranes (11) in der zweiten Richtung beweglich sind.
  4. Maschine nach einem der Ansprüche 1 bis 3, wobei die Schwenkeinrichtung (34) einen Tragrahmen (34) umfasst, montiert zum Verschwenken um eine gegebene Schwenkachse (35); und eine Anzahl von Bandförderern (36), die an den Tragrahmen (34) angeschlossen sind, um die zweite Tragfläche (P2) und wenigstens einen Teil der ersten Transfereinrichtung (36) zu bilden.
  5. Maschine nach einem der Ansprüche 2 oder 3, wobei die erste Transfereinheit (36, 39) eine Anzahl von Stützelementen aufweist, insbesondere pneumatische oder lineare Aktuatoren.
  6. Maschine nach einem der vorausgegangenen Ansprüche, wobei die Tragmittel (19) senkrecht zur ersten Tragfläche (P2) beweglich sind zwischen einer angehobenen Position, in welcher die erste Tragfläche (P2) koplanar zur zweiten Tragfläche (P3) verläuft, und einer Zwischenposition, in welcher die erste Tragfläche (P2) koplanar zur dritten Tragfläche (P2) verläuft.
  7. Maschine nach einem der vorausgegangenen Ansprüche, wobei die Tragmittel (19) ebenfalls senkrecht zur ersten Tragfläche (P2) beweglich sind in eine abgesenkte Position, in welcher sich die erste Tragfläche (P2) unterhalb der dritten Tragfläche (P1) erstreckt.
  8. Maschine nach einem der vorausgegangenen Ansprüche, wobei die Schwenkvorrichtung (34) derart angeordnet ist, dass sie um eine Schwenkachse (35) schwenkt, die sich unterhalb der und parallel zur dritten Tragfläche (P1) erstreckt.
- ### Revendications
1. Machine pour usiner des cadres en bois (2) ou similaires, la machine comprenant une base (3) ; une grue à portique (11) mobile le long de la base (3) dans une première direction (4) donnée ; au moins deux traverses (6) montées sur la base (3) et parallèles à une seconde direction (7) sensiblement transversale par rapport à la première direction (4) ; des moyens de support (19) comprenant au moins deux barres de support (19) qui sont parallèles auxdites traverses (6), et définissent une première surface de support (P2) sensiblement horizontale pour au moins un cadre (2) ; une tête d'usinage (14) pour usiner le cadre (2) ; un ensemble de transfert (25) pour transférer le cadre (2) vers et/ou de la première surface de support (P2) ; l'ensemble de transfert (25) comprenant un dispositif rotatif (34) qui définit une deuxième surface de support (P3) pour le cadre (2), et est mobile entre une première position de travail dans laquelle ladite première et ladite deuxième sur-

face de support (P2, P3) sont sensiblement parallèles et coplanaires, et une seconde position de travail dans laquelle la deuxième surface de support (P3) est inclinée à un angle donné par rapport à la première surface de support (P2) ; l'ensemble de transfert (25) comprenant en outre un premier dispositif de transfert (36, 39) pour déplacer le cadre (2) entre ladite première et ladite deuxième surface de support (P2, P3) lorsque le dispositif rotatif (34) est dans ladite première position de travail ; et au moins un collier de serrage (8) monté sur chaque transverse (6) pour fixer le cadre (2) à une troisième surface de support (P1) sensiblement horizontale, parallèle à la première surface de support (P2) ; la machine étant **caractérisée en ce qu'elle** comprend en outre un magasin (21) comprenant un chariot (22), qui est raccordé à l'ensemble de transfert (25) au niveau d'une station d'entrée et/ou de sortie (26) pour charger et/ou décharger le cadre (2) sur et/ou de l'ensemble de transfert (25), et a un râtelier (23) qui s'étend vers le haut à partir d'un lit de chariot (22) et définit un certain nombre de poches parallèles (24), chacune s'étendant dans un plan sensiblement vertical perpendiculaire à la seconde direction (7), et chacune logeant un cadre (2) positionné sur le bord et faisant saillie vers l'extérieur de la poche (24) dans la première direction (4) ; les poches (24) étant conçues pour loger les cadres (2) parallèles les uns par rapport aux autres et par rapport à la deuxième surface de support (P3) lorsque la deuxième surface de support (P3) est dans ladite seconde position de travail ; l'ensemble de transfert (25) comprenant en outre un second dispositif de transfert (29, 30) comprenant des moyens de mise en prise et de transfert (32) pour mettre en prise et transférer le cadre (2), et qui sont mobiles dans la première direction (4) afin de transférer le cadre (2) entre la station d'entrée et/ou de sortie (26) et la deuxième surface de support (P3) lorsque le dispositif rotatif (34) est dans ladite seconde position de travail ; l'ensemble de transfert (25) étant mobile dans ladite seconde direction (7) pour aligner sélectivement les moyens de mise en prise et de transfert (32) avec les poches (24) dans la première direction (4).

2. Machine selon la revendication 1, dans laquelle le premier dispositif de transfert (36, 39) comprend des premiers moyens de transfert (36) montés sur le dispositif rotatif (34).

3. Machine selon la revendication 1 ou 2, dans laquelle la grue à portique (11) s'étend sur la base (3) dans la seconde direction (7) ; le premier dispositif de transfert (36, 39) comprenant des seconds moyens de transfert (39) montés sur la grue à portique (11) et mobiles le long de la grue à portique (11) dans la seconde direction (7).

4. Machine selon l'une quelconque des revendications 1 à 3, dans laquelle le dispositif rotatif (34) comprend un cadre de support (34) monté pour tourner autour d'un axe de rotation (35) donné ; et un certain nombre de courroies transporteuses (36) montées sur le cadre de support (34) afin de définir la deuxième surface de support (P3) et au moins une partie du premier dispositif de transfert (36).

5. Machine selon l'une quelconque des revendications 2 à 3, dans laquelle le premier dispositif de transfert (36, 39) comprend un certain nombre d'éléments de poussée, en particulier des actionneurs pneumatiques ou linéaires.

6. Machine selon l'une quelconque des revendications précédentes, dans laquelle les moyens de support (19) sont mobiles, perpendiculairement à la première surface de support (P2), entre une position relevée dans laquelle la première surface de support (P2) est coplanaire avec la deuxième surface de support (P3) et une position intermédiaire dans laquelle la première surface de support (P2) est coplanaire avec la troisième surface de support (P1).

7. Machine selon l'une quelconque des revendications précédentes, dans laquelle les moyens de support (19) sont également mobiles, perpendiculairement à la première surface de support (P2) dans une position abaissée, dans laquelle la première surface de support (P2) s'étend au-dessous de la troisième surface de support (P1).

8. Machine selon l'une quelconque des revendications précédentes, dans laquelle le dispositif rotatif (34) est monté pour tourner autour d'un axe de rotation (35) s'étendant au-dessous et parallèlement à la troisième surface de support (P1).

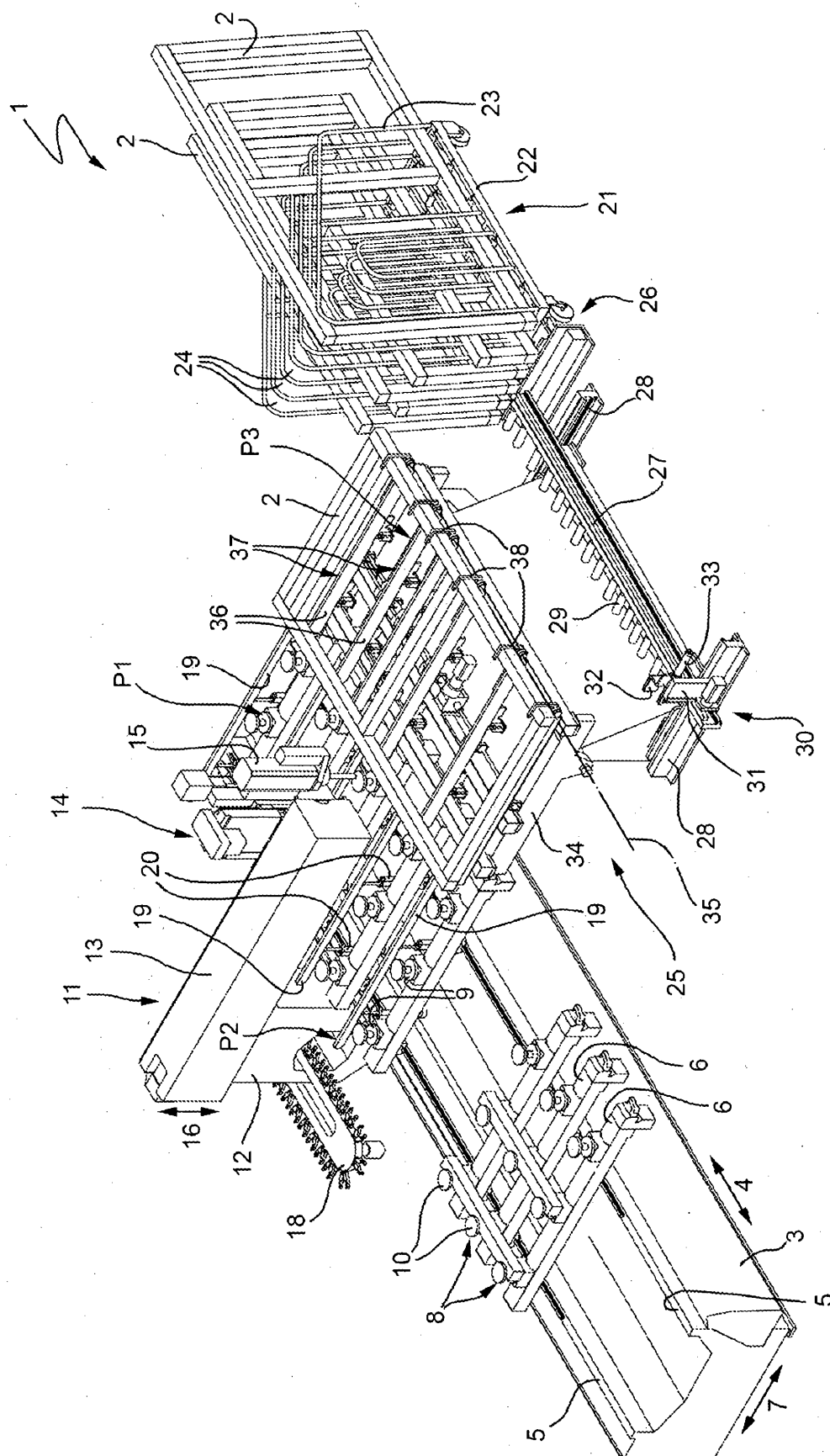


FIG. 1

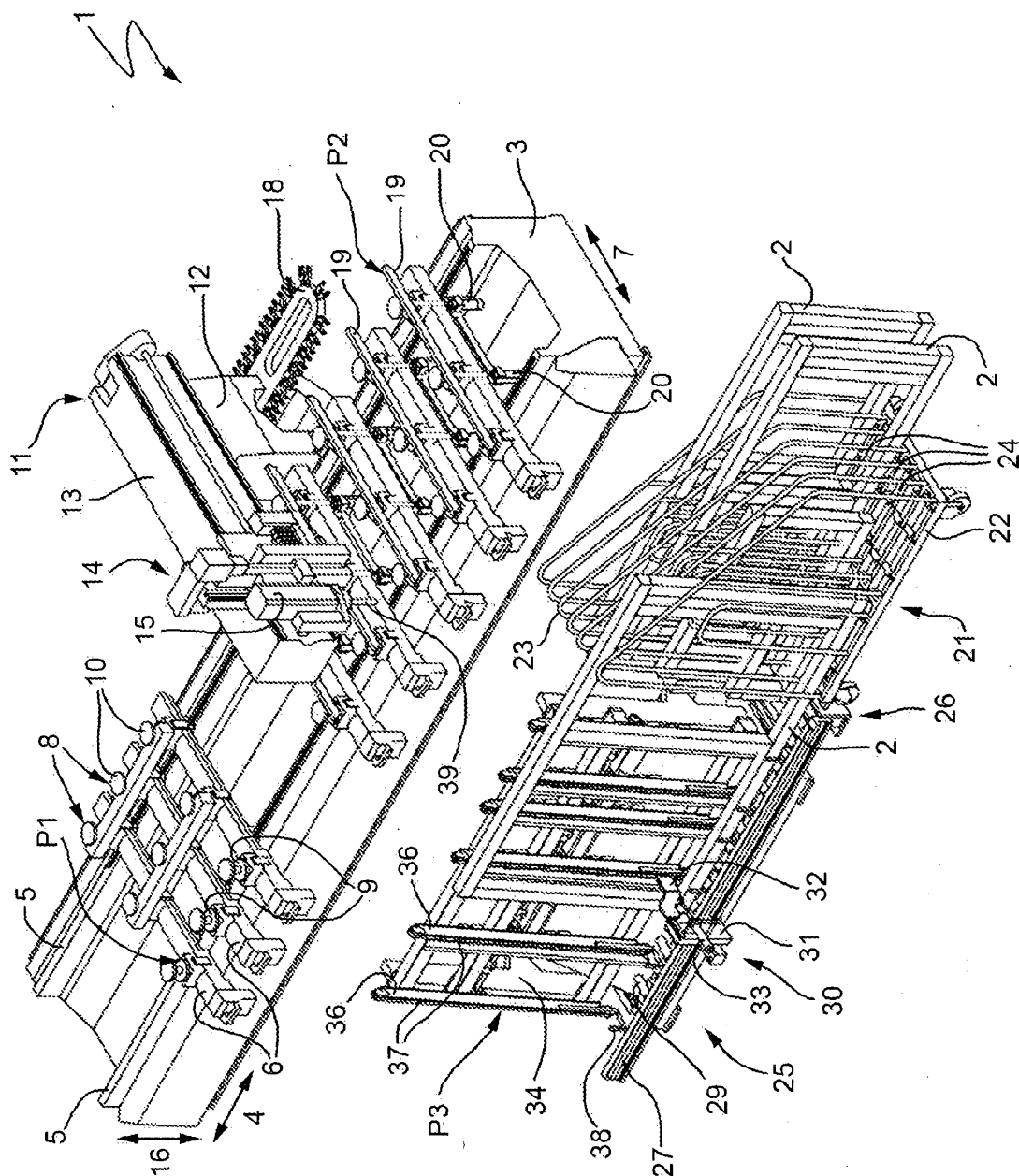


FIG. 2

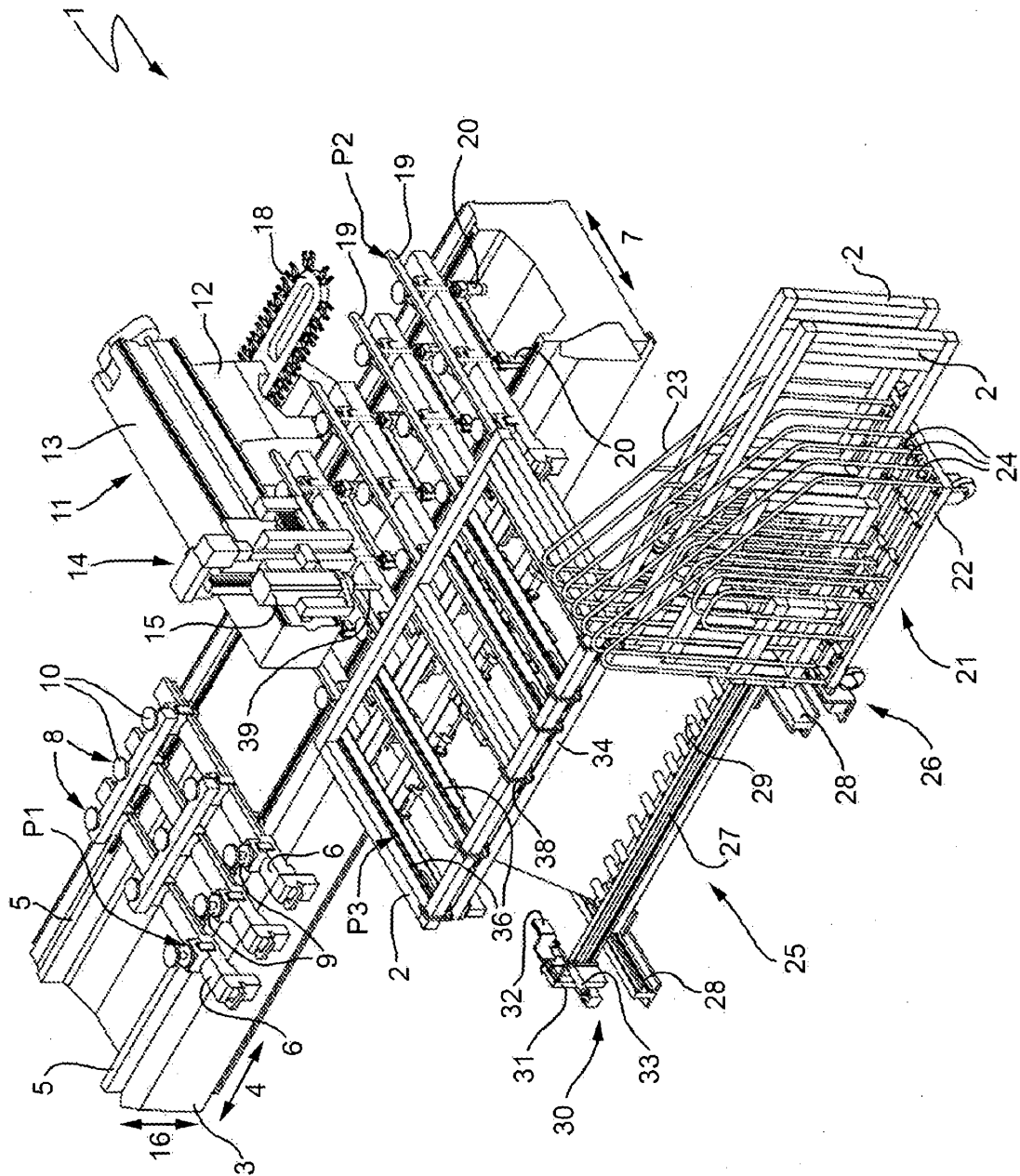


FIG. 3

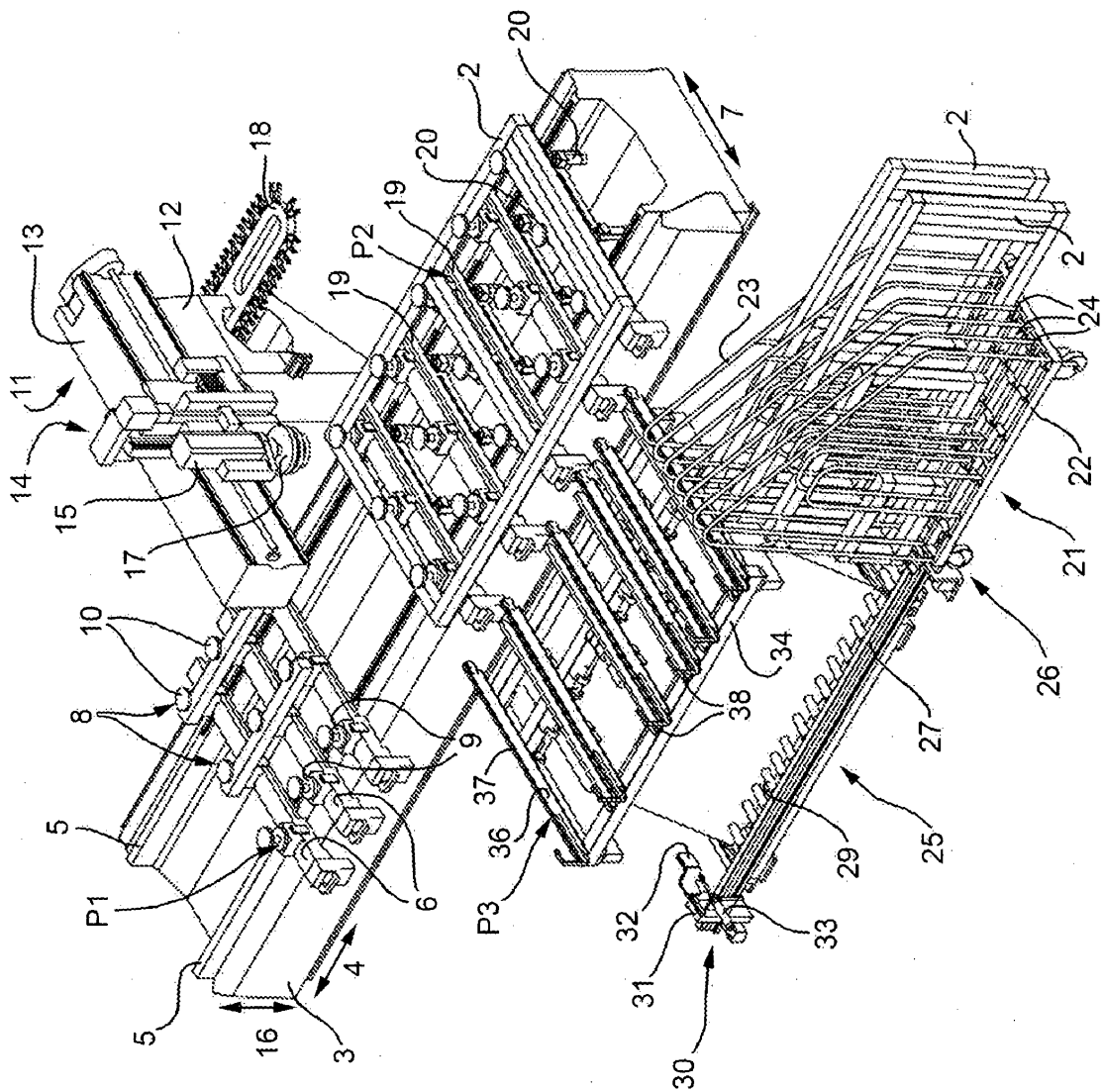


FIG. 4

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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