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(54) Title: MACHINE WITH AN ENDLESS BAND-KNIFE FOR CUTTING SPONGE PANELS INTO PIECES

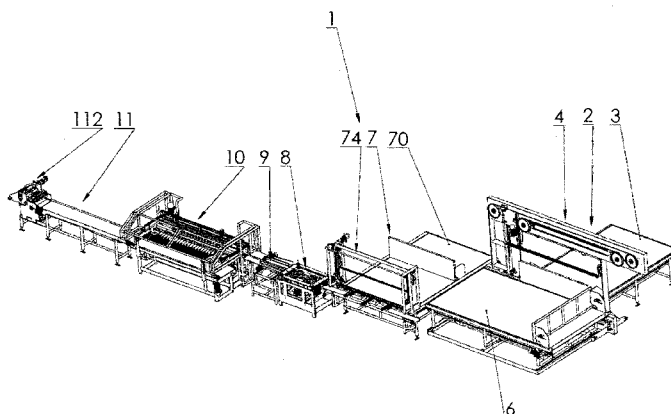


FIGURE 1

(57) Abstract: The present invention relates to the machine (1) with an endless band-knife for cutting sponge panels into pieces which consists of multiple devices: a device (2) for preparing and cutting sponge panels into sponge strips which consists of an inbound table (3), an outbound table (6) and a device (4) for cutting sponge panels into strips that is located in-between them, a device (4) for cutting sponge panels into sponge strips which consists of a frame (41) on which the mechanism (42) for driving and guiding band saw (43) and mechanism (55) for pressing sponge panels are mounted, a device (7) for receiving cut sponge strips and separating single strips which consists of a workbench (70) with a means (72) for pushing sponge strips and a mechanism (74) for placing a single sponge strip onto the conveyor belt transporter (79), a device (8) for profiling lateral sponge strip sides which consists of a housing (80) within which two pairs of disc (81, 82) for profiling lateral sides of sponge strips and two conveyor belt transporters (84, 86) are arranged, a device (9) for rotating the sponge strip prior to being cut into final sponge piece products which consists of a workbench (90), a straight inlet (92) and an inlet (92) for rotating sponge strip through 90°, a device (10) for cutting sponge strip into final sponge piece products which consists of a first pushing means assembly (102), a carrier (103) with stop-pins, a second pushing means assembly (104), a circular saw array assembly (107), a pressing means (108) and an exit conveyor belt transporter (109), and a device (11) for placing final sponge piece products onto the transporter of a packaging machine which consists of a transporter (111) and an inserting means (112).



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MACHINE WITH AN ENDLESS BAND-KNIFE FOR CUTTING SPONGE PANELS INTO PIECES

FIELD OF THE INVENTION

The present invention relates to the field of performing operations, more precisely to the field of cutting and cutting-out processing operations, and even more precisely to the field of machines for cutting and cutting-out and their related construction elements.

According to the International Patent Classification (**IPC**⁸), the scope of the invention is marked and classified by the primary classification symbols: **B 26 D 1/46** relating to the devices having an endless band-knife or the like, **B 26 D 3/28** relating to cutting work characterized by the nature of the cut made and apparatus therefor splitting layers from work-pieces or mutually separating layers by cutting, and **B 26 D 7/01** relating to means for holding or positioning work of apparatus for cutting and cutting-out.

TECHNICAL PROBLEM

The technical problem that the present invention tries to solve consists of as follows: how to conceive a machine, from a constructional point of view, with multiple devices and means employing an endless band-knife for cutting sponge panels into smaller pieces, the material that is highly soft and flexible and which is prone to "escaping" when processed, where the machine would be stabile during the

operation, practical and simple to assemble, maintain, and operate, would be highly productive and would meet the rigid criteria of all relevant global quality standards, especially those regarding the precision and quality of cuts made, processing quality and dimensions of pieces obtained.

BACKGROUND OF THE INVENTION

When cutting machines or cutting devices are in question, known are the machines for cutting work-pieces that are characterized by type or by movement performed by their working elements. Such, known are the machines with cutting means that is not movable in relation with the work-piece, machines with cutting means that revolve around a given axis, machines with cutting means in form of a cup, and machines with cutting means in the form of an endless band-knife. All these devices allow for various types of processing operations to be performed, such as cutting, punching-out, cutting-out, engraving, splitting layers, etc. on work-pieces made of different materials (wood, plastic, metal, food) and in plethora of different shapes.

Known cutting machines (mostly those for tree trunks) commonly contain cutting means embodied in the forms of circular or band knives, where the band knives can be arranged in the form of continuous endless bands (such as horizontal band-saw cutting lines), or bands that are limited in length (such as hacksaw machines with straight saw blades of limited length that are secured to a frame).

One of the known devices of this type is described in the Serbian patent document No. 48140B titled "*Vertical saw blade*". Described device has the vertical saw blade mounted on the machine base, has means for feeding the work-pieces, has the depression for the cutting-band, and has essentially vertically mounted operating wheel carrier around which operating wheels the endless cutting-band is placed. Cutting-band passes through guides that are located above and below the work-piece level and which are connected to the carrier. Work-piece can perform horizontal and mutually directed movements so that the cutting process can be performed as desired. It is envisaged that the operating wheel carrier can be turned about the vertical axis and that it can be fixed in each of the positions taken.

In addition to the extensive and thorough search through the patent and non-patent literature, the Applicant is unaware of existence of such machines with multiple devices and means employing an endless band-knife, especially those with the means for holding and feeding work-pieces, e.g. sponge panels (an extremely soft and flexible material), into the position required for processing, where the cutting of sponge panels would be performed with the high quality of the obtained cuts and where the high processing quality and precise dimensions of resulting pieces would be obtained.

SUMMARY OF THE INVENTION

The invention relates to the cutting machine with the blade embodied in the form of an endless band-knife intended for cutting the sponge panels into strips. The machine consists of multiple devices: a device for preparing and cutting sponge panels into strips consisting of an inbound table, outbound table and a cutting device placed in-between, a device for cutting sponge panels into strips consisting of a portal frame on which the means for driving and guiding the band-knife and means for pressing the sponge panel are mounted, a device for receiving sponge strips and separation of single strips consisting of a table with the pushing means and means for placing a single sponge strip onto the conveyor belt transporter, a device for profiling lateral sponge strip sides consisting of a housing within which the pair of profiling discs and two conveyor belts are arranged, a device for rotating the sponge strip prior to cutting it down into final sponge piece products consisting of a workbench, an orthogonal feeding means and feeding means for rotating the sponge strip through 90°, a device for cutting the sponge strips into final sponge piece products consisting of a second pushing means assembly, assembly with the set of circular saws, pressing means, and exiting conveyor belt, and a device for placing the final sponge piece product onto the packaging machine transporter consisting of the transporting means and inserting means.

The novelty of the invention is that the separate devices and mechanisms, such as the device for cutting the sponge panel into strips which employs the band-knife and the means for pressing the panel, the device for receiving sponge strips

and separating them into single strips which are then placed onto the conveyor belt, the device for profiling lateral sides of sponge strips, the device for rotating the sponge strip with an inlet for rotating the strip through a 90°, the device for cutting sponge strips into final pieces, and, the device for inserting final sponge piece products onto the packing machine transporter are of a completely new design.

Special novelty of the present invention is also that the machine according to the invention is embodied as a processing line with multiple devices and mechanisms that mutually interact and where each of them could present a separate working unit.

It is important to emphasize that for the machine according to the invention, the work-piece is a sponge panel, preferably with the dimensions of 2x2 m made out of polyester and with the material density between 12 and 30 kg/m³, which is an extremely soft and flexible material that is prone to "escaping" when processed and/or cut. Sponge panel is first cut into sponge strips that have the rectangular cross section, which are then each further processed and cut into final sponge piece products. This final sponge pieces are primarily intended for household use, but can also be utilized for various different purposes.

Present invention – the machine with an endless band-knife for cutting sponge panels into pieces – according to this patent application, has more advantages where some of the most important ones are:

- extreme efficiency with high processing quality,
- reliable and safe operation,
- practical and simple to assemble and operate,
- does not require special maintenance,
- virtually unlimited service life.

BRIEF DESCRIPTION OF DRAWINGS

In order to facilitate better understanding of the present invention, as well as to show how it can be achieved in practice, the Applicant refers to accompanied drawings in which:

Figure 1 presents the machine with an endless band-knife for cutting sponge panels according to the invention in general appearance and in axonometric projection.

Figure 2 presents the device from Figure 1 for preparing and cutting sponge panels into strips in axonometric projection,

Figure 3 presents the device from Figure 1 for cutting sponge panels into strips in axonometric projection,

Figure 4 presents the device from Figure 1 for receiving sponge strips and separating single strips in axonometric projection,

Figure 5 presents the device from Figure 1 for profiling lateral sides of sponge strips with the means for rotating sponge strips prior to being cut into final pieces in axonometric projection,

Figure 6 is an enlarged detailed view of the device from Figure 5 for profiling lateral sides of sponge strips presented in axonometric projection,

Figure 7 presents the device from Figure 1 for cutting sponge strips into pieces in axonometric projection,

Figure 8 shows an enlarged detailed view of the device from Figure 7 for cutting sponge strips in axonometric projection,

Figure 9 presents the rear view of the device from Figure 1 for placing final sponge piece products onto the packaging machine transporter in axonometric projection,

Figure 10 presents the front view of the device from Figure 9 for placing final sponge piece products onto the packaging machine transporter in axonometric projection.

DETAILED DESCRIPTION OF THE INVENTION

Machine 1 with an endless band-knife for cutting sponge panels into pieces according to the invention and Figures 1 through 10, has the general form of a processing line that consists of multiple devices and mechanisms: device 2 for preparing and cutting sponge panels into sponge strips, device 4 for cutting sponge panels into sponge strips, device 7 for receiving sponge strips and separating single strips, device 8 for profiling lateral sides of sponge strips, device 9 for rotating sponge strips prior to cutting into final sponge piece products, device 10 for cutting sponge strips into final sponge piece products and device 11 for placing final sponge piece products onto the transporter of the packaging machine.

Device 2 for preparing and cutting sponge panels into sponge strips, according to the Figures 1 and 2, consists of an inbound table 3, outbound table 6 with a cutting device 4 for cutting sponge panels into strips placed in-between. On the inbound table 3 which is mounted on the frame 31, there is a vertical pushing means 32 placed in the farthest left position. The pushing means 32 is in its starting point brought into the farthest right position. One or more sponge panels are placed on the table 3. If more than one panel is placed on the table 3, the panels must be stacked and mutually aligned. Functioning principles of the machine according to the invention are the same in both cases: when multiple sponge panels, or when a single sponge panel is processed. For the sake of simplification of presented constructional and functional features of the machine 1, hereafter is assumed that only one sponge panel is being cut on the machine 1. Sponge panel work-piece placed on the table 3 is moved by the pushing device 32 in synchronization with the cutting device 4 so that the panel displacement is equal to the desired width of a single sponge strip. The width of strips to which the sponge panel is being cut is determined programmatically and in preset steps, which is achieved by the driving mechanism 33 of the pushing device 32 which displaces it towards the cutting device 4. After being cut by the device 4, each cut sponge strip is transferred onto the outbound table 6 by means of further displacement of the remaining sponge panel by further movement of the pushing means 32 through the width of a single sponge strip. On the outbound table 6, which is mounted onto the frame 61, the vertical pushing means 62 is placed in the furthest right, starting position. When the entire sponge panel, placed on the table 3, has been cut into sponge strips and when the last of the strips has been pushed onto

the table 6, the vertical pushing means 62 transfers all sponge strips onto the workbench 70 of the device 7 for receiving sponge strips and separating them into single strips (Figures 1 and 4). Longitudinal sliding movement of the pushing means 62 vertically mounted on the table 6 is facilitated by the driving mechanism 64 of the pushing means 62. Tables 3, 6 can be separated in order to facilitate the replacement of the band-knife of the cutting device 4. Driving mechanisms 33, 63 for pushing devices 32, 62 are preferably made with an electromotor, a toothed belt and a pulley. The direction of the longitudinal sliding movement of the pushing means 32, 62, as well as a table 6, is clearly indicated by arrow on Figure 2.

The device 4 for cutting sponge panels into strips (shown on Figures 1, 2 and 3) consists of a portal frame 41 on which the driving mechanism 42 for driving and guiding the band saw 43 and mechanism 55 for pressing the sponge panel during operation (i.e. being cut by the saw 43). Driving mechanism 42 for driving and guiding the band saw 43 consists of the lower non-displaceable driving wheel 44, upper non-displaceable driven wheels 45, 46 and tightening wheel 47 of the saw 43. The saw 43 is placed over the driving wheel 44 actuated by an electromotor, upper non-displaceable driven wheels 45, 46, lower displaceable wheel 47, upper displaceable wheel 48 and tightening wheel 49, whereas the wheel 49 provides the constant tension force exerted by the means of a pneumatic cylinder located on the back side of the device 4. In order to enable the cutting of the panels, the saw 43 is rotated by 90° (i.e. in the direction of cutting) in the area between the lower displaceable wheel 47 and upper wheel 48 by action of the lower saw deflector 40 and upper moveable saw shielding deflector 51. The saw shielding deflector 51 can be moved in the vertical direction and its position is dependable on the thickness of the material being cut, i.e. the number of stacked sponge panels. The lower displaceable wheel 47 and the upper displaceable wheel 48 are being moved together with the band saw 43 in the horizontal direction (indicated by the arrows T), i.e. in the direction of cutting. Since the saw is serrated on the both sides, this movement provides cutting in the both directions – in the right as well as in the return left direction. Horizontal movement of the wheels 47, 48 together with the saw 43 is provided by the assembly 52 by means of toothed belts (not shown) and upper and lower guides 53, 54.

The mechanism 55 for pressing sponge tables during cutting operation (Figure 3) consists of a pressing means 56, upper and lower horizontal axles 57, 58 and left

and right cylinders 59. The pressing means 56 is designed as a horizontal rail that is roughly placed at the end of the sponge panel by using axles 57, 58, and then precisely aligned with the sponge panel being cut by using the left and right cylinders 59 placed on the lateral sides of the portal frame 41 in order to exert the correct amount of operational pressure. Axles 57, 58 are moved by the toothed belt (not shown). In the starting position the pressing means 56 is raised in it's farthest upper position. The pushing means 32 displaces the sponge panel from the inbound table 3 onto the outbound table 6 so that the panel travels the distance equal to the width of a single strip. Following that, the pressing means 56 descends to exert pressure again on the sponge panel. Rough pressure that is applied by axles 57, 58 is immediately followed by exerting the fine (operational) pressure on the strip of the sponge table by cylinders 59. Following this, the working strokes of the saw 43 and displaceable wheels 47, 48 are engaged and cutting of the sponge panel into strips commences in the direction from left to right. Following the fully performed cut, the pressing means 56 is raised to release the remaining sponge panel, the pushing means 32 further displaces the remaining sponge panel from the inbound table 3 onto the outbound table 6 so that the panel again travels the distance equal to the width of a single strip, pressing means 56 with it's axles 57, 58 descends to exert rough pressure on the sponge panel following with the fine (operational) pressure applied by the cylinders 59. Now the saw 43 and displaceable wheels 47, 48 are engaged again to perform the cut by making the return trip traveling from right to left. This method of cutting in both directions is repeated until the last sponge strip has been cut from the panel and pushed onto the outbound table 6.

As previously stated, when the entire sponge panel placed on the table 3 has been cut into strips and when the last of the strips has been displaced by the pushing device 32 onto the table 6, the vertical pushing means 62 with a single stroke displaces the entire batch of the sponge strips onto the workbench 70 of the device 7 for receiving sponge strips and separating single strips. According to the present invention and Figures 1 and 4, the device 7 is mounted on the frame 71 and consists of a workbench 70, a sponge strip pushing means 72 with the displacing mechanism 73 and of a mechanism 74 for placing a single sponge strip onto the conveyor belt transporter 79. Vertical pushing means 72 can slidably perform longitudinal movement on the workbench 70 driven the displacing mechanism 73. Mechanism 73

for actuation of the pushing means 72 is best facilitated with an electromotor, a toothed belt and a pulley. The mechanism 74 for placing the single sponge strip onto the conveyor belt transporter 79 consists of pressing means 75 with the displacing mechanism which is mounted onto the vertical (portal) part of the frame 71. At the end of the workbench 70, beneath the pressing means 75, the cart 76 with the cylinders 77 for horizontal movement, grippers 78 mounted on the L-profile rack and transporter 79 for transferring a single sponge strip to the device 8 for profiling lateral sponge strip sides are arranged. Grippers 78 are designed in the form of pneumatic pliers with jaws for grabs the sponge strip which is abutted against the L-profile rack. The sponge strips that are placed on the workbench 70 of the device 7 are displaced by the pushing means 72 towards the mechanism 74 and pressing means 75. Pressing means 75 descends together with the displacing mechanism and exerts the pressure on the second sponge strip in line. The first sponge strip, which is left free, is abutted by the L-profile rack of the gripper 78. Simultaneously, this sponge strip is caught in the jaws of the gripper 78 and by the effect of the cylinders 77 with horizontal backward movement of the cart 76, placed onto the transporter 79. Transporter 79 further transfers this single sponge strip onto the next device 8 for profiling lateral sponge strip sides.

Device 8 for profiling lateral sponge strip sides, according to the invention and Figures 1, 5 and 6, consists of a housing 80 within which two pairs of discs for profiling of sponge strip lateral sides and two conveyor belts are arranged. Discs (Figure 6) are composed from two mutually parallel discs 81 for rough profiling of lateral sides of sponge strips which are arranged at the entrance of the device 8, and two mutually parallel discs 82 for precise lateral profiling of sponge strips into final profile which are arranged at the exit of the device 8. Disks 81, 82 receive their actuation from a pair of electromotors 83. Discs 81, 82 of each of the disc pairs are mutually moveable in the horizontal direction so that the distance between them can be adjusted depending on the sponge strip width. Upper transporter 84 and lower transporter 86 are mounted in the vertical plane which passes between discs of each disc pairs 81, 82 and on the longitudinal axis of the device 8. The lower transporter 84 is actuated by the electromotor 85, while the upper transporter 86 is actuated by the electromotor 87. Lower transporter 84 and the upper transporter 86 are moveable in the vertical plane so that they can be positioned relative to each other by the

means of the handles 88 and 88.1. The vertical movement of the lower transporter 84, controlled by the handle 88, determines the height on which the lateral profiling of the sponge strip will be performed. The inlet 89 is placed between the lower transporter 84 and the upper transporter 86. The inlet 89 arranged on the device 8 enables the sponge strip to enter the device 8 from the transporter 79 of the mechanism 74 of the device 7 (for practical reasons only the right arm of this inlet is shown). The sponge strip which has been laterally profiled, after being finely processed, exits the device 8 and driven by transporters 84, 86 travels onto the device 9 for rotating sponge strip prior to being cut to final sponge piece products (Figure 5).

The device 9 for rotating sponge strips (Figures 1 and 5) prior to being cut to final sponge piece products consists of a workbench 90 which has been mounted on the frame 91. Both inlets are arranged on the workbench which is moveable in the horizontal direction (the direction of the arrow). Straight inlet 92 (shown as a left inlet into which the inlet 89 of the device 8 enters on the Figure 5) enables sponge strips to enter in the straight horizontal direction without being rotated through 90°. The actuator 93 with the wheel for forward thrusting (pushing) of the sponge strip towards the device 10 is placed on the exit side of the inlet 92. The inlet 94 (shown as a right inlet on the Figure 5) allows for the sponge strip to be rotated by 90°. The inlet 94 provides sponge strip rotation when it is required to make a vertical cut, i.e. the position in which the sponge strip has been rotated through 90°. The activator 95 with the wheel for forward thrusting (pushing) of the sponge strip towards the device 10 for cutting sponge strips into final sponge piece products is placed on the exit side of the inlet 94.

The device 10 for cutting sponge strips into final sponge piece products, according to the present invention and Figures 1, 7 and 8, is mounted onto the frame 100. The device 10 receives the sponge strips incoming from the device 9 and guided into the inlet part of the transporter 101 before being transversally cut. The device 10 contains the first pushing means assembly 102 and a carrier 103 placed in parallel, where both of them have been placed in the longitudinal direction of the device 10. Stop-pins are vertically arranged on the carrier 103. The first pushing means assembly 102 is moved horizontally so to remove the sponge strip from the transporter 101 by pushing it towards the carrier 103 with stop-pins. In the moment

when the sponge strip, driven by pushing means assembly 102, reaches the second pushing means assembly 104, the stop-pins of the carrier 103 are raised to pierce the sponge strip in order to secure it prior to the pushing means assembly 102 making it's backward movement in order to release the sponge strip. The purpose of the carrier 103 with its stop-pins is to prevent the air stream, created by the fast rotating movement of the circular saw assembly 107, from pushing the sponge strip backwards. The second pushing means assembly 104, which is moveable in both horizontal and vertical directions in order to be able to "hop" over the sponge strip, consists of the carrier with longitudinally placed displaceable forks 105. Raising and hopping-over the sponge strip whilst making a backward movement, is facilitated by two cylinders 106 to which the assembly 104 is connected to. In parallel to the carrier 103 with stop-pins, the circular saw array assembly 107 is placed in order to facilitate the cutting of the sponge strips into final sponge piece products. Saws of the assembly 107 can be moved apart in the axial direction. In front of the assembly 107 and in parallel thereto, the pressing means 108 is arranged above the exit conveyor belt transporter 109. The pressing means 108 is raised when one or more sponge strips have been cut into pieces and when the transporter 109 has been engaged to convey the final sponge piece products onto the conveyor belt transporter 111 of the device 11 for placing the final sponge piece products into the packaging machine.

The conveyor belt transporter 111 of the device 11 for placing the final sponge piece products onto the packaging machine transporter, according to the invention and Figures 1, 9 and 10, which is mounted on the frame 110 feeds the means 112 for inserting final sponge piece products into the packaging machine. Inserting means 112, which is placed on the other end of the transporter 111, consists of a pressing means assembly 113 which can be adjusted in both horizontal and vertical directions, and of a mechanism 114 for adjustment of horizontal position of the device 11 relative to the packaging machine and depending on the final sponge piece product dimensions. Behind the assembly 113 and in the extension of the transporter 111, a short conveyor belt transporter 115 of inserting means 112 is arranged. Behind the pressing means assembly 113 there is a chain transporter 116 of the inserting means 112 which is actuated by an electromotor 117.

The manner of operation of device 1 with an endless band-knife for cutting sponge panels into pieces, according to the invention, is simple and in obvious way

follows from the foregoing description and appended drawings, so it is not necessary to describe it in detail.

INDUSTRIAL OR OTHER APPLICABILITY OF THE INVENTION

Method of application of present invention arises in obvious way from previous description. The successful application of the present invention in economy does not require any special skills, directions or experience other than those of an average subject-matter expert and based on the previous invention description. All constructional and functional characteristics of the present invention have been successfully verified by the Applicant on the developed prototype.

In addition, any structural improvements or changes that would reside within the scope of the described assembly of the machine with an endless band-knife for cutting sponge panels into pieces and which would introduce further functional improvements are considered as covered by this application.

PATENT CLAIMS

1. Machine with an endless band-knife for cutting sponge panels into pieces, **characterized by**, that it consists of devices: a device (2) for preparing and cutting sponge panels into sponge strips which consists of an inbound table (3), an outbound table (6) and a device (4) for cutting sponge panels into strips that is located in-between them, a device (4) for cutting sponge panels into sponge strips which consists of a frame (41) on which the mechanism (42) for driving and guiding band saw (43) and mechanism (55) for pressing sponge panels are mounted, a device (7) for receiving cut sponge strips and separating single strips which consists of a workbench (70) with a means (72) for pushing sponge strips and a mechanism (74) for placing a single sponge strip onto the conveyor belt transporter (79), a device (8) for profiling lateral sponge strip sides which consists of a housing (80) within which two pairs of disc (81, 82) for profiling lateral sides of sponge strips and two conveyor belt transporters (84, 86) are arranged, a device (9) for rotating the sponge strip prior to being cut into final sponge piece products which consists of a workbench (90), a straight inlet (92) and an inlet (94) for rotating sponge strip through 90°, a device (10) for cutting sponge strip into final sponge piece products which consists of a first pushing means assembly (102), a carrier (103) with stop-pins, a second pushing means assembly (104), a circular saw array assembly (107), a pressing means (108) and an exit conveyor belt transporter (109), and a device (11) for placing final sponge piece products onto the transporter of a packaging machine which consists of a transporter (111) and an inserting means (112).
2. Machine according to the Claim 1, **characterized by**, that a vertical pushing means (32) connected with an actuating means (33) is slidably mounted on the

inbound table (3) of the device (2), which itself is mounted on the frame (31), that a vertical pushing device (62) connected to an actuating mechanism (63) is slidably mounted on the outbound table (6), which itself is mounted on the frame (61), that tables (3, 6) are mutually separable, and that the actuating mechanisms (33, 63) are preferably designed with an electromotor, a toothed belt and a pulley.

3. Machine according to the Claim 1, **characterized by**, that a mechanism (42) for driving and guiding the band saw (43) consists of a lower non-displaceable driving wheel (44), upper non-displaceable driven wheels (45, 46) and a tightening wheel (47) of the saw (43), where the saw (43) is placed over the wheels (44, 45, 46, 47, 48, 49), that a lower deflector (50) and an upper vertically moveable deflector (51) with a saw (43) shield are mounted on the frame (41) between the lower displaceable wheel (47) and the upper displaceable wheel (48), and that horizontally displaceable wheels (47, 48) together with the saw (43) are mounted on the assembly (52) consisting of a toothed belt and guides (53, 54).
4. The machine according to the Claim 1, **characterized by**, that the mechanism (55) for pressing sponge panels, which is placed on the lateral sides of the frame (41), consists of a pressing means (56) designed in the form of a rail, a horizontal lower and upper axles (57, 58) for rough positioning of the pressing means (56), and left and right cylinder (59) for fine setting of the operating pressure exerted by the pressing means (56) on the sponge strip.
5. The machine according to the Claim 1, **characterized by**, that on the workbench (70) mounted on the frame (71) a longitudinally slidable vertical pushing means (72) connected to the actuating mechanism (73) is arranged, where the mechanism (73) for actuation of the pushing means (72) is preferably designed with an electromotor, a toothed belt and a pulley, that a mechanism (74) for lowering a single sponge strip onto the conveyor belt transporter (79) consists of a pressing means (75) with an actuating mechanism for displacing the pressing means (75) mounted on the vertical (portal) part of the frame (71), that a cart (76) with cylinders (77) for horizontal movement of the cart (76), grippers (78) that are mounted on the L-profile rack and a transporter (79) for

transporting the single sponge strip to the device (8) for profiling lateral sponge strip sides, are arranged on the end of the workbench (70) and beneath the pressing means (75), and that grippers (78) are designed as a pneumatic pliers with jaws for securing the sponge strip abutted against the L-profile rack.

6. Machine according to the Claim 1, **characterized by**, that a pair of mutually parallel and horizontally displaceable disks (81) for rough profiling of lateral sides of sponge strips is arranged within the housing (80) next to the entrance into the device (8) for profiling lateral sponge strip sides, that a pair of mutually parallel and horizontally displaceable disks (82) for fine profiling of lateral sides of sponge strips is placed next to the exit of the device (8), where disks (81, 82) are actuated by an electromotor (83), that a lower transporter (84) which is actuated by an electromotor (85) and an upper transporter (86) which is actuated by an electromotor (87) are placed in the vertical plane that passes between the disks (81, 82) and on the longitudinal axis of the device (8), that transporters (84, 86) can be mutually adjusted in the vertical plane by means of the handles (88, 88.1), and that an inlet (89) is placed between the lower transporter (84) and the upper transporter (86).
7. Machine according to the Claim 1, **characterized by**, that two mutually parallel inlets (92, 94) are fixed on the workbench (90) of the device (9) for rotating the sponge strip prior to being cut into final sponge piece products which is horizontally moveably mounted on the frame (91), that on the end of the straight inlet (92), which is intended for horizontal guiding of the sponge strips, an actuator (93) with the wheel for forward thrusting of the sponge strip towards the device (10) for cutting sponge strips into final sponge piece products is arranged, and that on the end of the inlet (94), which is intended for rotating the sponge strip through 90°, an actuator (95) with the wheel for forward thrusting of the sponge strip towards the device (10) is arranged.
8. Machine according to the Claim 1, **characterized by**, that the device (10) for cutting sponge strips into final sponge piece products, which is mounted on the frame (100), consists of a first pushing means assembly (102), a carrier (103) with vertical stop-pins which is placed in parallel to the pushing means assembly (102), and a second pushing means assembly (104) placed in parallel

to the carrier (103), that a circular saw array assembly (107) for cutting sponge strips into final sponge piece products is placed in parallel to the assembly (104), wherein the saws of the assembly (107) are mutually displaceable in the axial direction, that a second pushing means assembly (104), which consists of a carrier on which the longitudinally moveable forks (105) are arranged, is connected to two cylinders (106) for vertical and horizontal adjustment of the assembly (104), and that in front of the assembly (107) and in parallel thereto a vertically moveable pushing means (108) is arranged above the exit conveyor belt transporter (109).

9. Machine according to the Claim 1, **characterized by**, that the conveyor belt transporter (111) and inserting means (112) of the device (11) for placing final sponge piece products onto the packaging machine transporter, are arranged on a frame (110), that the inserting means (112) consists of a pressing means assembly (113) which in turn consists of a guiding cylinder and of a mechanism (114) for vertical and horizontal adjustment of location of the said cylinder, that behind the assembly (113) and in extension of the transporter (111) a short conveyor belt transporter (115) is arranged, and that behind the pressing means assembly (113) and above the transporter (115) a chain transporter (116) actuated by an electromotor (117) is arranged.

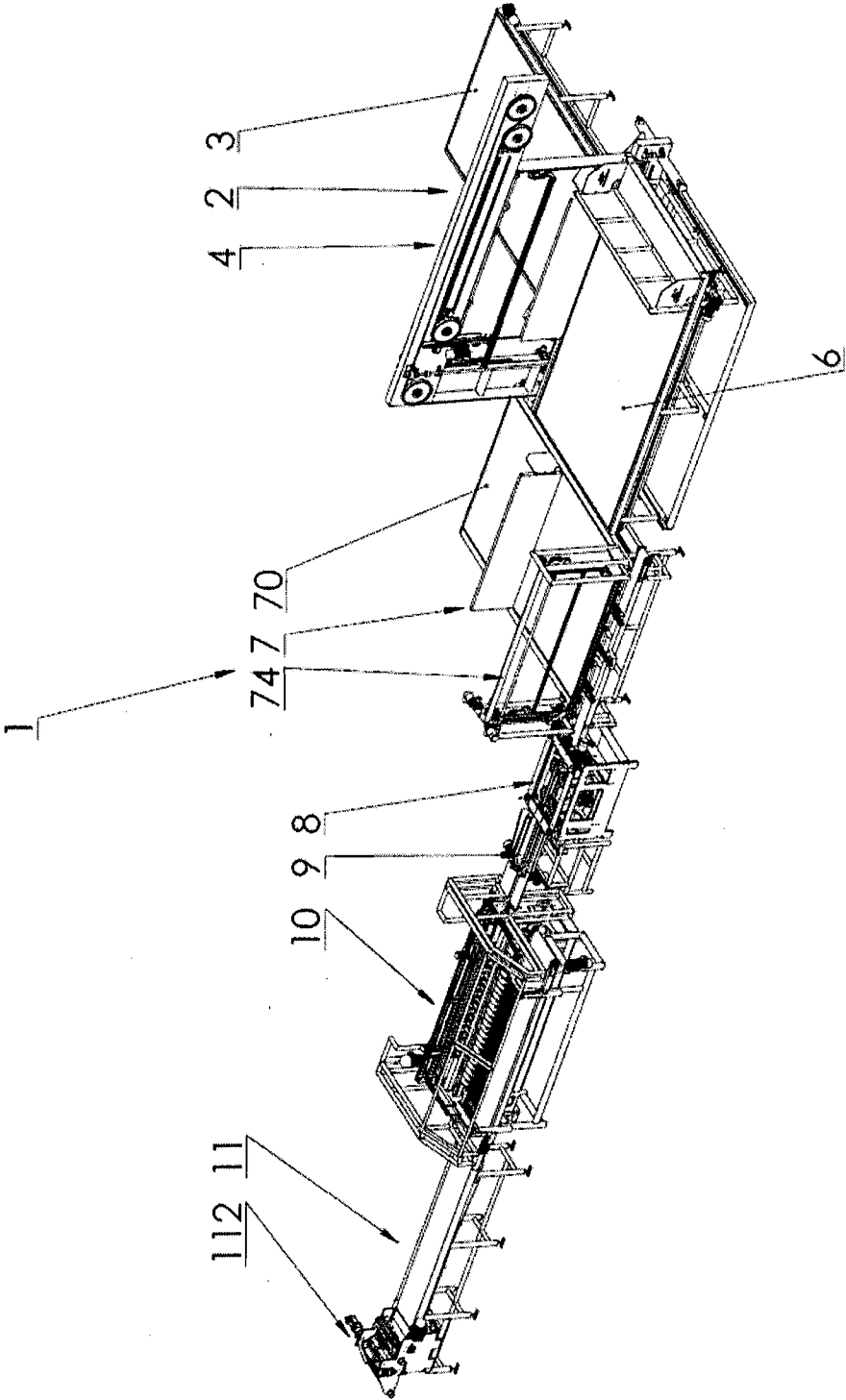


FIGURE 1

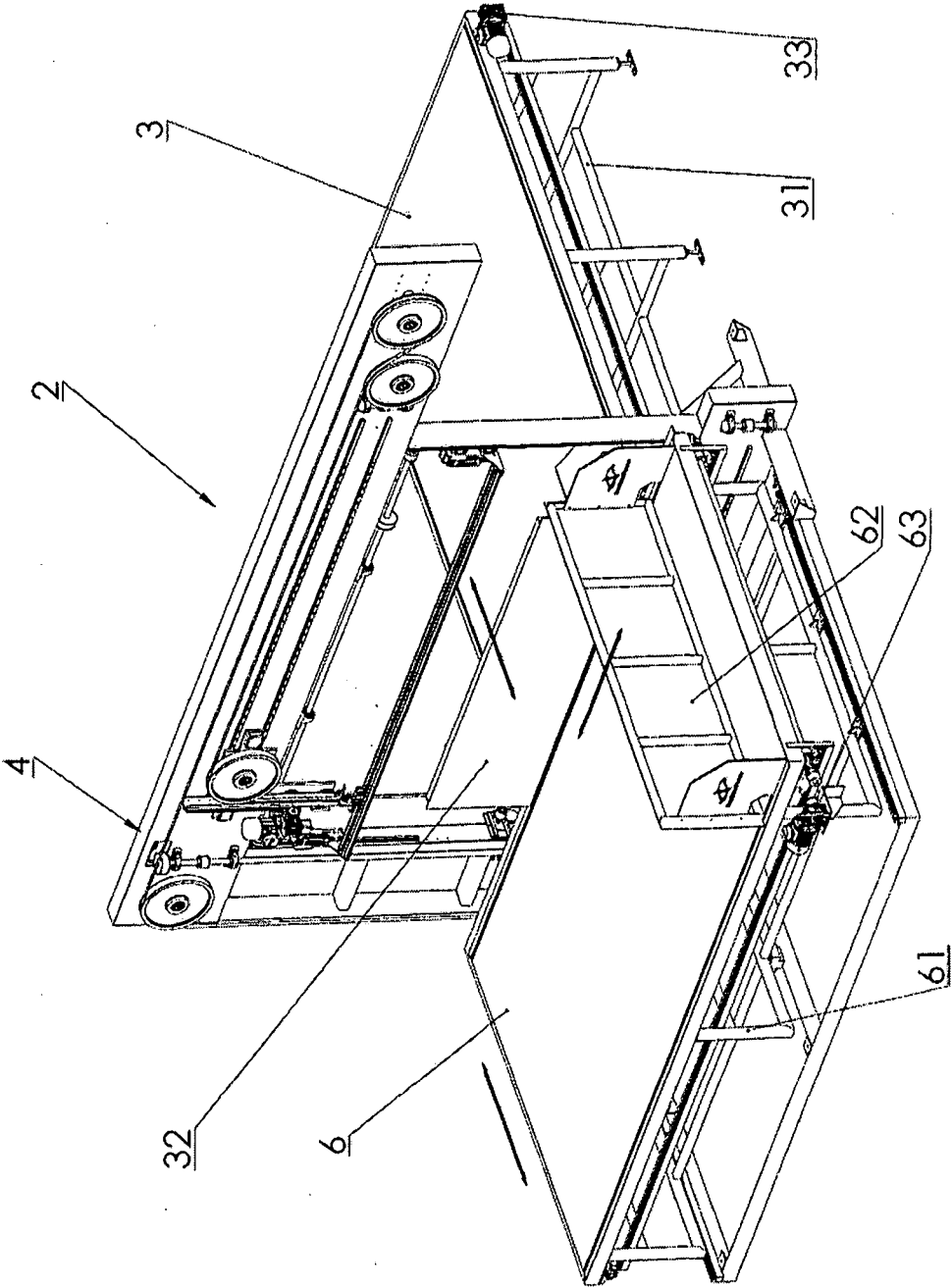


FIGURE 2

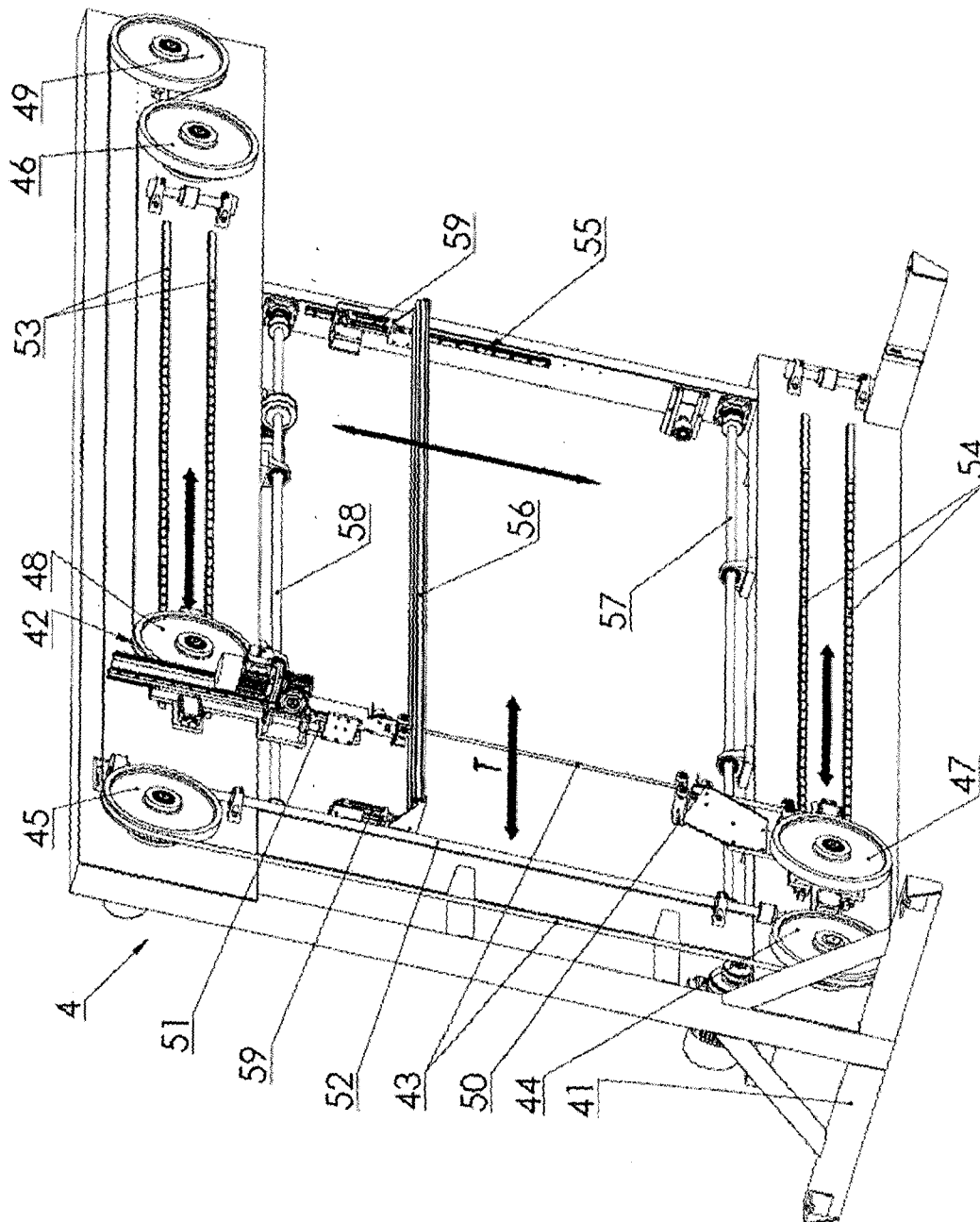


FIGURE 3

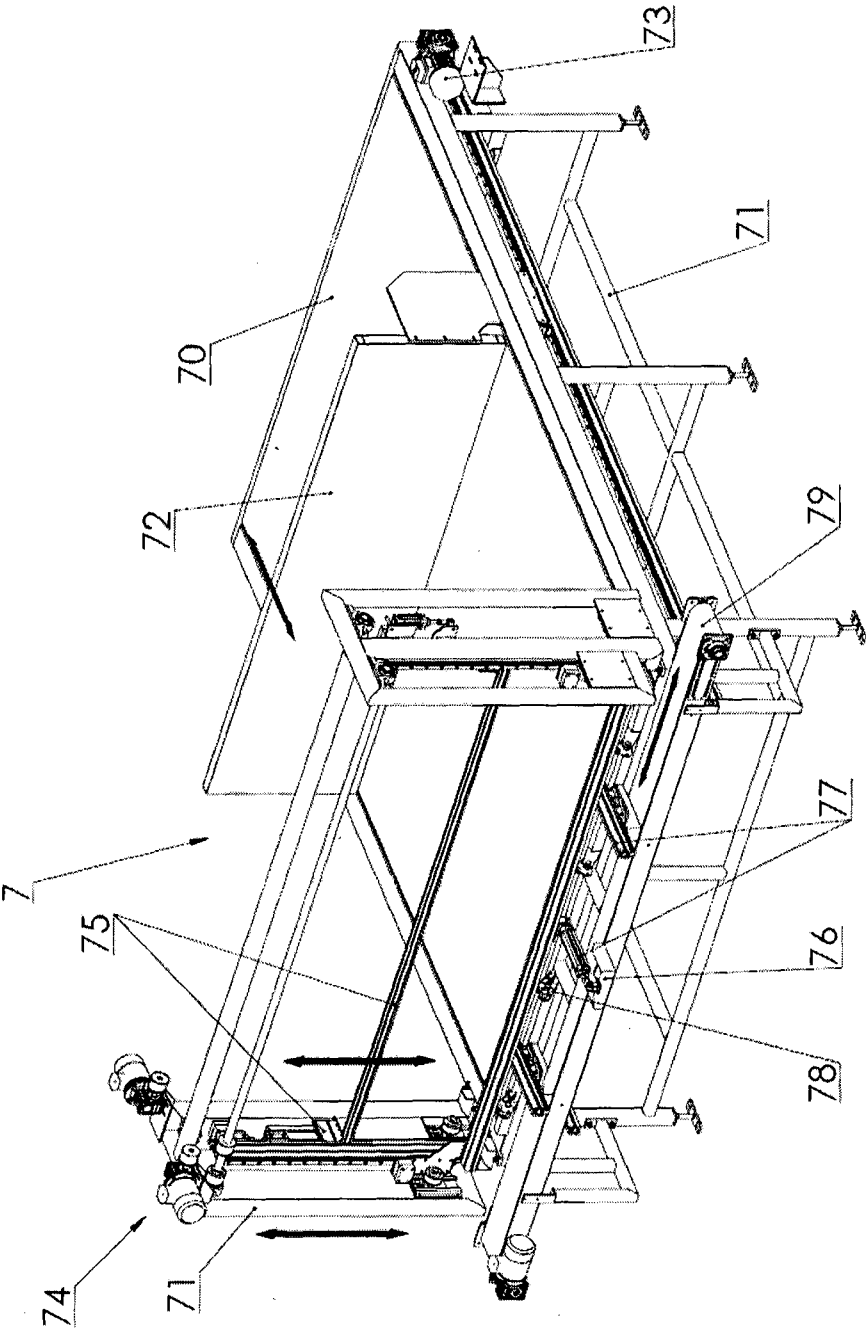


FIGURE 4

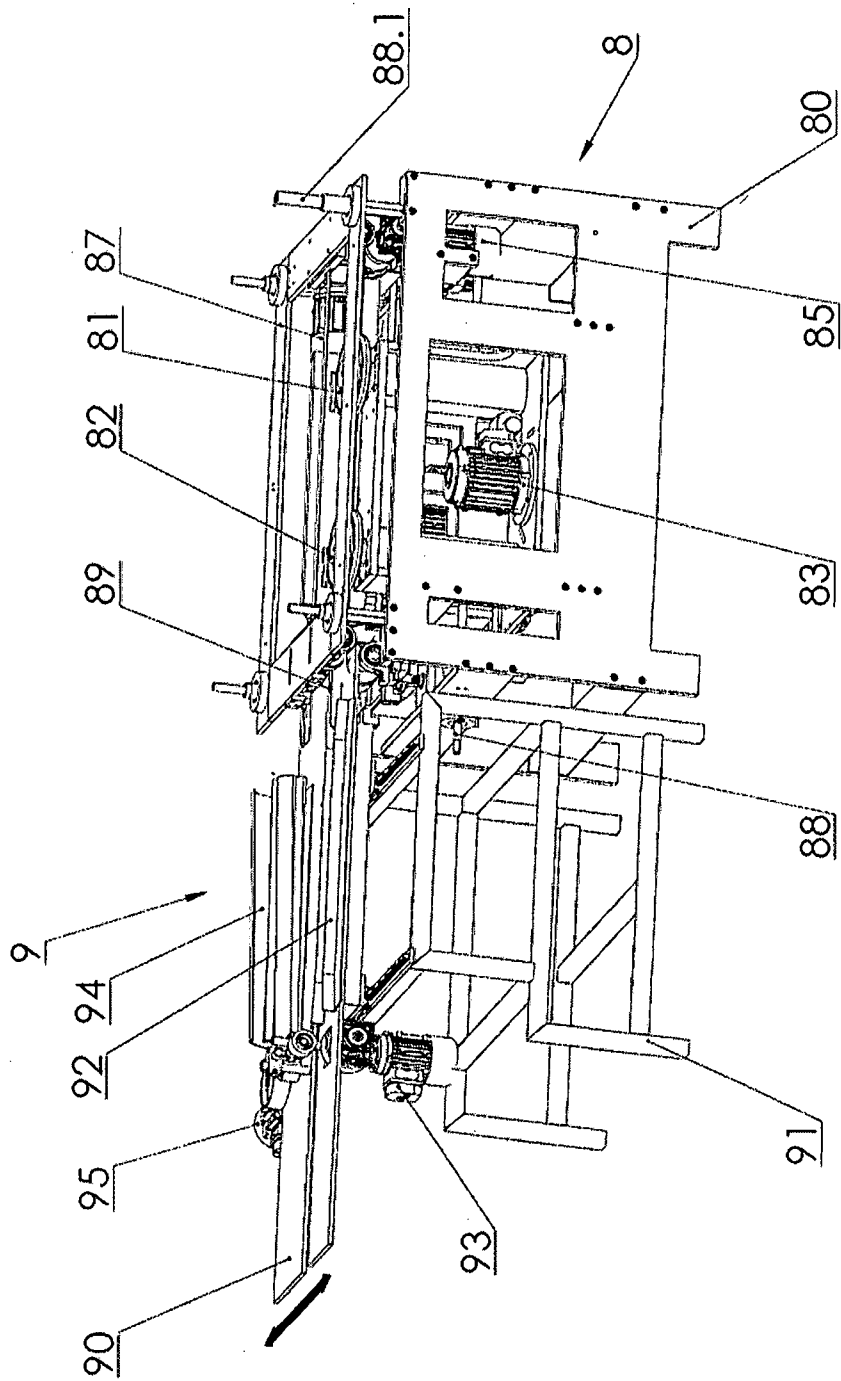


FIGURE 5

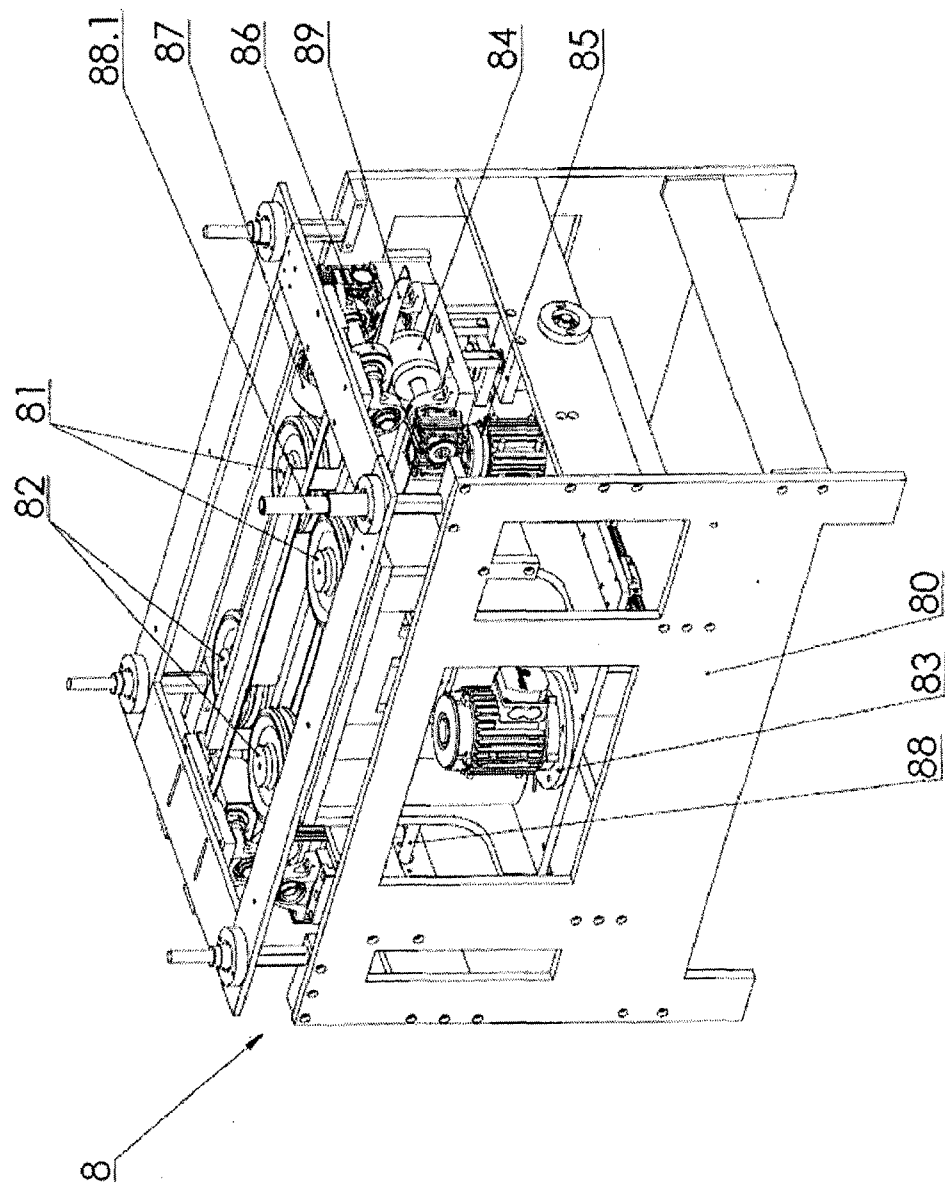


FIGURE 6

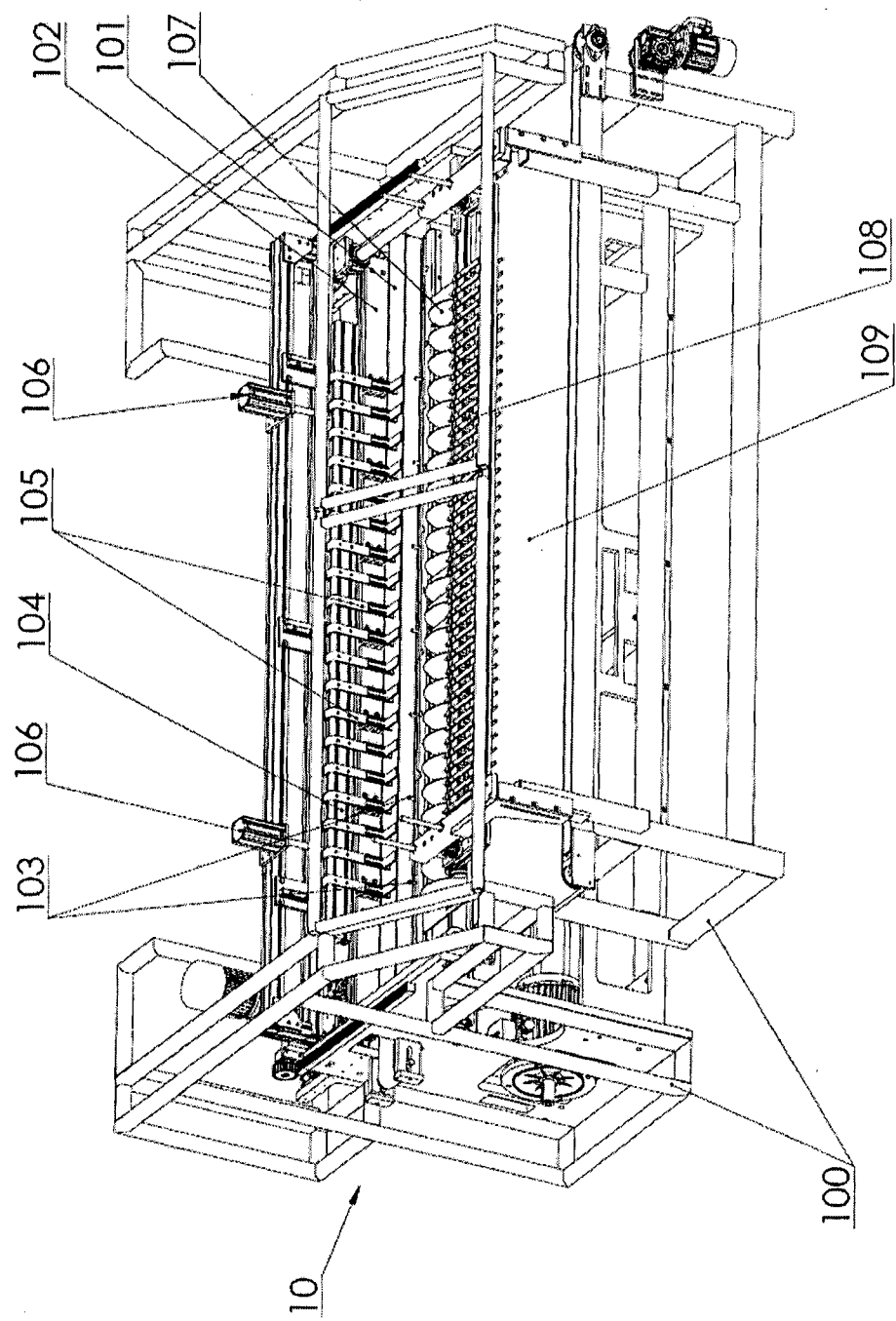


FIGURE 7

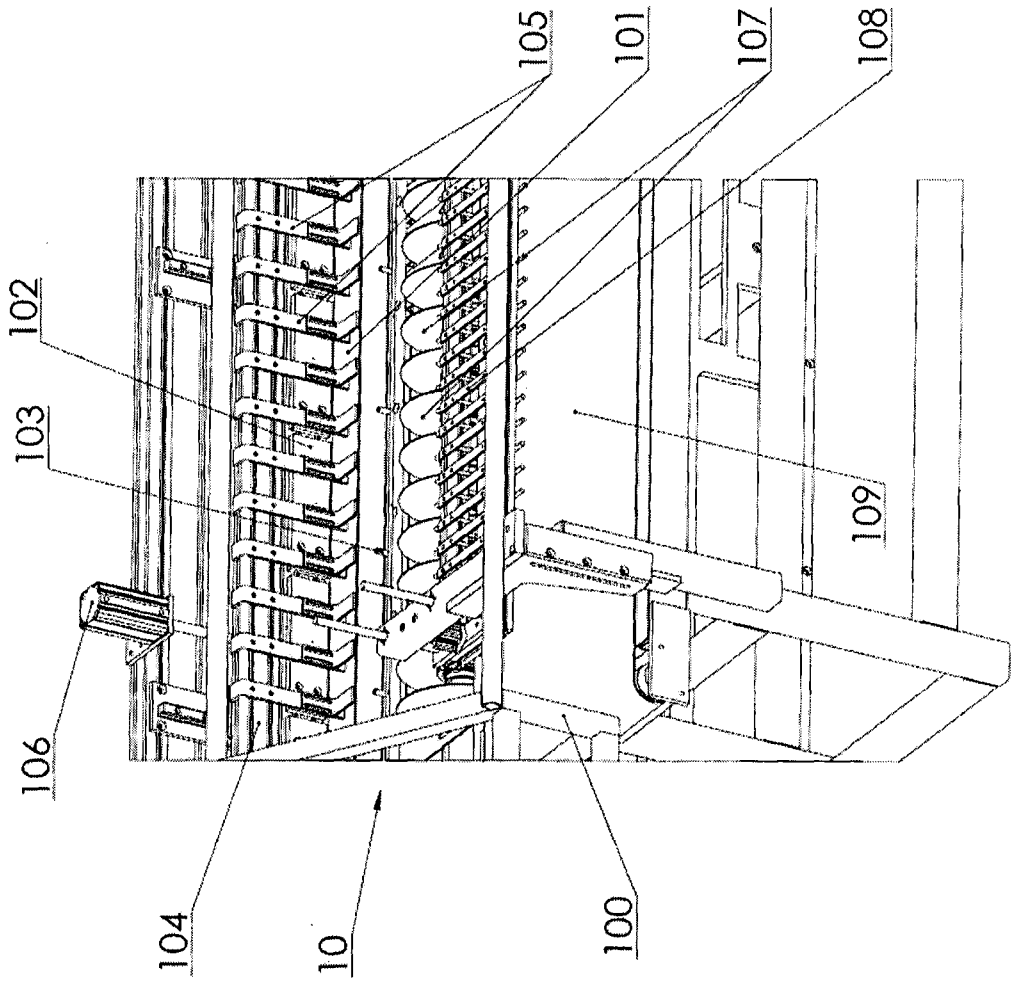


FIGURE 8

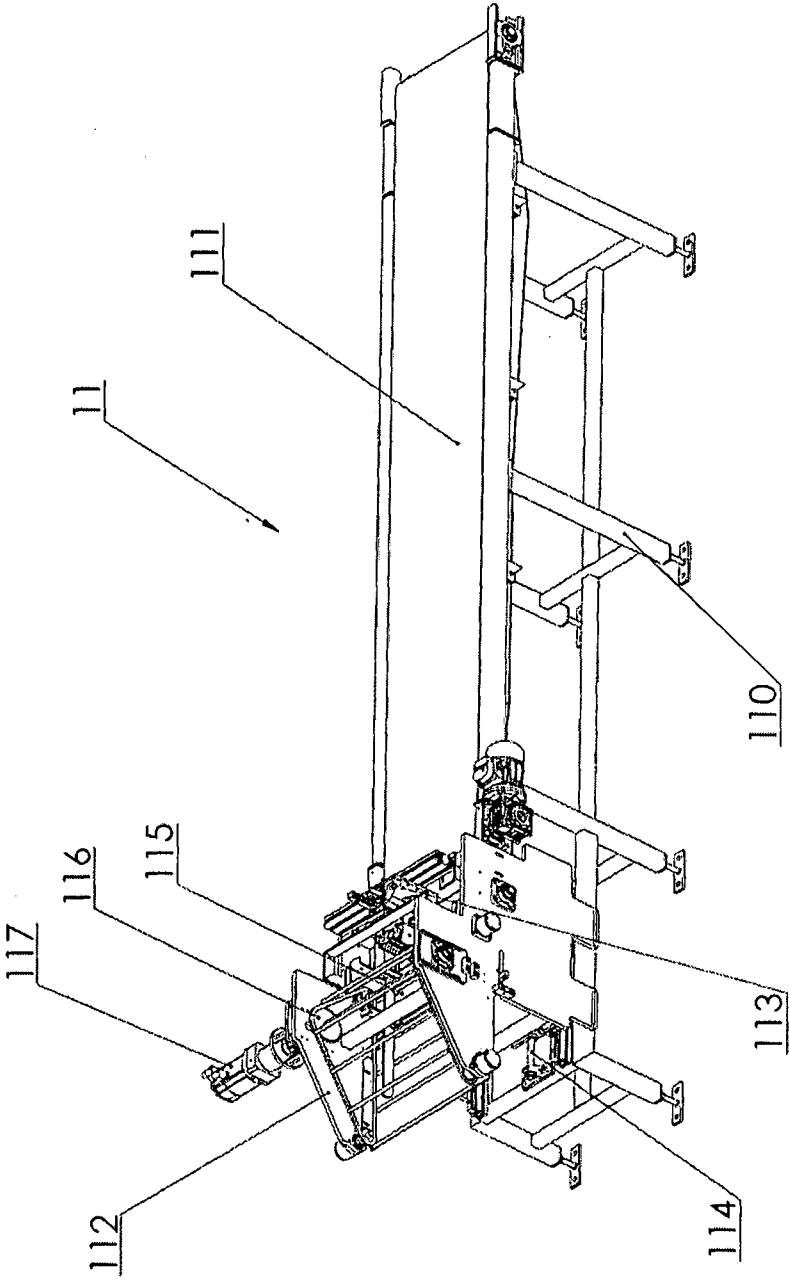


FIGURE 9

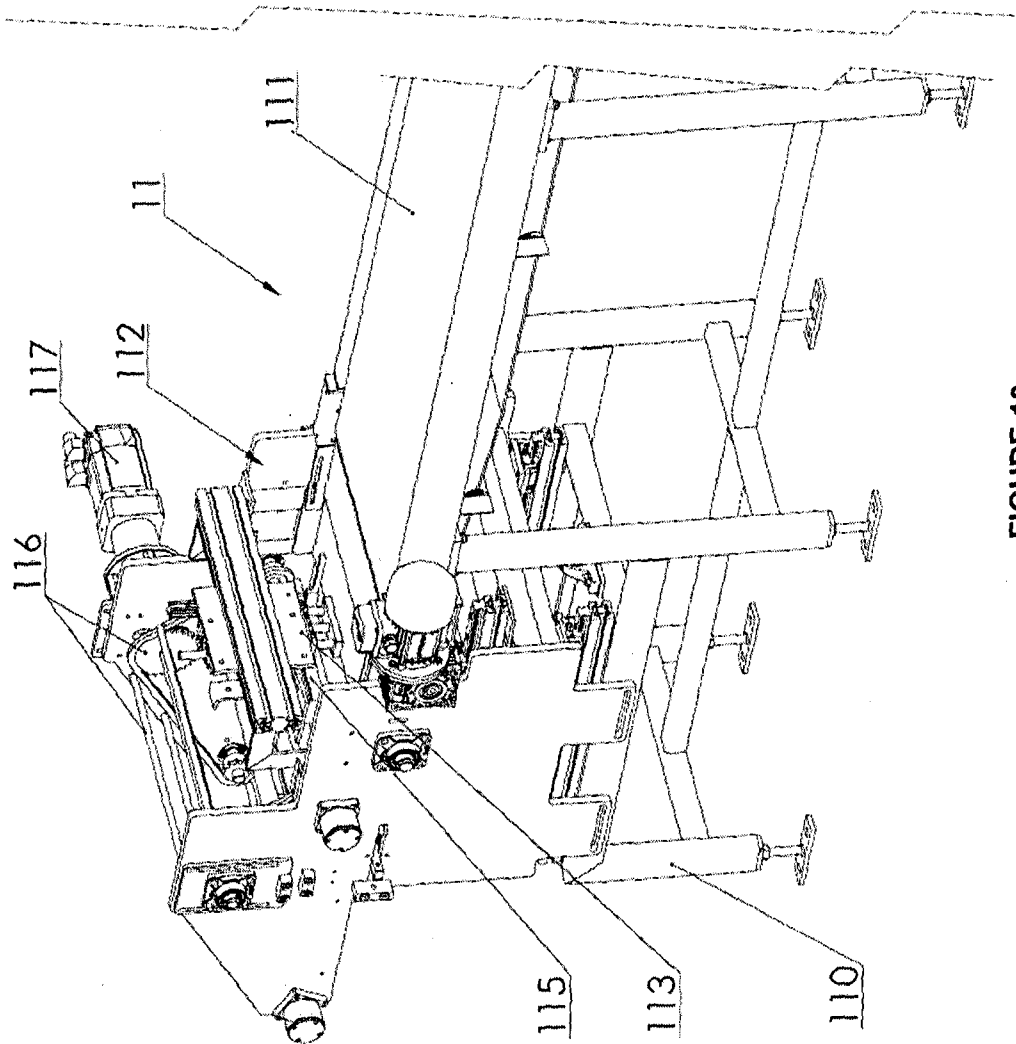


FIGURE 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/RS2014/000011

A. CLASSIFICATION OF SUBJECT MATTER

INV. B26D1/46 B26D3/28 B26D7/02 B26D3/00 B26D3/16
B26D7/01 B26D7/06 B26D11/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B26D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 542 325 A (BANE III WILLIAM W [US]) 6 August 1996 (1996-08-06) abstract; figures 2,3 -----	1-9
A	EP 0 401 573 A2 (KUEHNEMUTH GERHARD [DE]) 12 December 1990 (1990-12-12) column 2, line 30 - column 3, line 20; figure 1 -----	1-9
A	US 3 797 344 A (HATTMAN H) 19 March 1974 (1974-03-19) abstract; figures 1-3 -----	1-9
A	US 4 175 455 A (GENIS JAMES [US] ET AL) 27 November 1979 (1979-11-27) abstract; figure 1 ----- -/--	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

11 March 2015

Date of mailing of the international search report

23/03/2015

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Authorized officer

Müller, Andreas

INTERNATIONAL SEARCH REPORT

International application No
PCT/RS2014/000011

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/RS2014/000011

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			EP 0401573 A2	12-12-1990

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GB 1556729	A	28-11-1979	NONE	
