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(54) **A GLUEPRESSING MACHINE**

KLEBEPRESSE

PRESSE DE MENUISERIE

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Description

[0001] The present invention relates to a glue press of the kind defined in the preamble of claim 1, for holding glue coated workpieces compressed while the glue hardens.

[0002] The type of wood press to which the invention relates is used normally in the fabrication of composite wooden sheets that have a large surface area and that are comprised of a number of separate, mutually bonded wooden elements, or in the fabrication of blockboard that comprises layers of veneer glued to respective sides of a layer of wood strips. After having applied the requisite glue to the wood concerned, the press functions to press the wooden elements together and hold the same in fixed positions as the glue cures or hardens, wherein a so-called press bar is adapted for insertion between a wood-component lay-up table and an upper movable press plate which extends parallel with the lay-up table and which is intended for exerting pressure on the wood.

[0003] When adjusting the glue press for the fabrication of glued wood products of mutually different dimensions, it is necessary to adapt the thickness of the press-bar to suit the thickness of the products to be produced at that moment in time. More specifically, the thickness of the press-bar must correspond to the distance between the lay-up table and the press plate when said plate is in its lower working position, in contact with the wooden elements.

[0004] Hitherto the thickness of the press-bar of glue presses has been adjusted with the aid of a number of exchangeable strips of mutually different thicknesses. These strips can be removably mounted on a beam-like carrier which extends along the press and which can be moved parallel to the lay-up table in a direction towards the wooden elements, with the aid of piston-cylinder means. The strips are normally exchanged manually, which is both time consuming and expensive and which also subjects the operator to the risk of being pinched in the press and to stress and strain. The cost of making alterations in the press constitutes a large part of the price asked for the product, and one way of lowering the price is thus to shorten press adjustment times.

[0005] Simplification of the adjustments to the thickness of the press-bar has long been desired, with the intention of making the fabrication of glued wood products less expensive. Accordingly, one object of the invention is to provide a glue press which satisfies this desideratum and which, more specifically, enables the thickness of the press-bar to be changed much more readily.

[0006] Moreover, a different type of wood press is known from DE 210 6059 A, comprising an outer, frame like, press plate and a center press plate.

[0007] The objects described above are achieved in accordance with the present invention with a glue press that has the characteristic features set forth in claim 1.

Embodiments of the invention are described by the dependent claims 2 to 6.

[0008] Because the press includes a carrier which carries a series of mutually superimposed, elongated generally sheet-like elements, grippers that are adapted to grip a selectable number of said sheet-like elements, said number of gripped elements representing the press-bar and being controlled with respect to the desired thickness of the press-bar, and means for moving the grippers along the lay-up table between the press-plate and the lay-up table towards the stop means, there is obtained a glue press which can be readily adapted for the fabrication of glued wood products of mutually different dimensions in a time saving and environmentally friendly manner. The design of the glue press also enables it to be automated and computerized to deal with the thickness of the incoming wooden elements to be glued.

[0009] In a further embodiment of the invention the total combined thickness of the press-bar can be varied very widely, by varying the mutual thickness of the sheet-like elements.

[0010] Other advantages of the invention will be evident from the following description of an exemplifying embodiment of the invention made with reference to the accompanying drawings, in which **Fig. 1** is a schematic side view of an inventive glue press, partly in section, showing alternative working positions of the press elements; **Fig. 2** is a sectional view of the press taken on the line II-II in Fig. 1; **Fig. 3** is a section view of the press taken on the line III-III in Fig. 2; **Fig. 4** is a sectioned view of a press-bar having associated grippers forming part of the inventive press; and **Fig. 5** is a broken view of the press-bar of Fig. 4 from above.

[0011] Figure 1 is thus a side view of an inventive glue press, which typically includes a fixed lay-up table 1, a raisable and lowerable press-plate 2 which is maneuverable by means of piston-cylinder devices 3, an elongated press-bar which is shown generally at 5 and which can be moved reciprocatingly by means of piston-cylinder devices 4, and a press-bar abutment or stop means 6.

[0012] As will be evident from the Figure, the piston-cylinder devices for maneuvering the press-bar are mounted on a carrier beam 7 and function to move the press-bar 5 in a plane parallel with the plane of the lay-up table and the upper press-plate respectively. When gluing together a plurality of glue-coated wooden elements positioned or superimposed to form a wood pack 8, the pack is placed on the lay-up table 1 and the upper press plate 2 is then lowered into abutment with the wood pack or stack. To compress the pack in a plane which extends parallel with the plane of the lay-up table 1, normally at right angles to the grain of the wood, the press-bar 5 is inserted between the upper movable press-plate 2 and the lower, fixed press-plate 1 and pressure is applied to the wood pack 8 until the glue has hardened.

[0013] That which has been described up to this point constitutes, in principle, the known technique with this type of glue press and does not form part of the present invention. It will be understood that the structural design and dimensions shown in the drawings are meant only to show the principle of this technique.

[0014] In accordance with the invention, the press-bar comprises a series of generally elongated, sheet-like elements 9 (see also Fig. 2) which are carried by a raisable and lowerable carrier 10. The carrier is guided for movement at 11 relative to the press frame and can be maneuvered vertically with the aid of a drive means 12 and a movement converter. The drive means 12 includes a reversible electric motor 13 which can be controlled stepwise by electric pulses, preferably a stepping motor, and which is fixedly connected to the press frame. The movement converter, i.e. the part that is used to convert rotary movement of the stepping motor to vertical movement of the carrier 10, includes a first gear 14 which is connected to the output shaft of the stepping motor 13 and which transfers rotary movement to a drive shaft 15 mounted in the press frame and extending in its longitudinal direction.

[0015] Rotary movement of the drive shaft 15 is converted to vertical movement through a series of second gears 16 mounted on the press frame, and via a movement screw in the form of ball screws 17 and associated nuts extending perpendicular to the drive shaft 15, i.e. vertically as evident from Fig. 2. This type of gear with associated nut for a ball screw is generally known and will not therefore be described here.

In order to translate vertical movement of the ball screw 17 to a carrier lifting movement, the upper end of the ball screw is rotatably mounted at 18 to the underside of the carrier. When the drive shaft 15 is caused to rotate by the drive means and the first gear 14, the ball screws 17 move synchronously in a vertical direction via the gears 16. As indicated by the double-headed arrow in Fig. 2, the carrier 10 can be adjusted vertically in steps, by rotating the drive shaft 15 stepwise in different directions, through the medium of the stepping motor 13.

[0016] The inventive glue press also includes a number of grippers identified generally at 19. The grippers 19 are disposed equidistantly along the carrier and function to grip and localize a chosen number of said superimposed sheet-like elements 9 so as to form a press-bar 5 of desired thickness, said chosen number of elements corresponding to the relative height of the carrier. The sheet-like elements 9 gripped and supported by the grippers 19 represent the press-bar 5 and can be inserted in between the press-plates 1, 2 by the piston and cylinder device 4.

[0017] As will best be seen from Fig. 3, the movable upper press-plate 2 includes a number of recesses 20 which are open to the grippers 19 and which extend in the movement direction of the press-bar 5. Extending in the recesses 20 is a respective pair of shafts 21 which form forcing slide guides for the grippers 19. The recess-

es 20 function to accommodate the grippers 19 as the press-bar 5 moves in between the press-plates 1, 2.

[0018] Each shaft pair 21 is carried rigidly by the press and extends parallel with the plane of the fixed, lower press-plate 1. As will best be seen from Fig. 1, each shaft pair 21 extends between the carrier beam 7 and an attachment 22 mounted on the underside of the frame part in the upper part of the glue press. When maneuvering the press-bar 5 for compression of the wood pack 8, the shafts 21, and therewith also the grippers 19 moving with said shafts, are always located at the same relative distance from the lower press-plate 1, with the lower edge of the lowermost of the gripped sheet-like parts 9 in line with the upper edge of the fixed lower plate 1, irrespective of the relative height position of the movable upper press-plate 2.

Each gripper 19 includes first and second clamping jaws 23 and 24 which can move relatively towards one another and each of which has a tooth 27 at its lower part. To enable the clamping jaws 23 and 24 to move along the shafts 21, the jaws are forcibly guided on the shafts through holes provided in the jaws. The grippers also coact with piston-cylinder devices 25, preferably pneumatic devices, which are at right angles to the upper side of the sheet-like elements and which are carried on plates 26. The plates 26 are forcibly guided for movement along the shafts 21, through the medium of holes. The holes in the jaws are not shown in the drawings, but are merely indicated by chain lines in Fig. 4.

[0019] The table 10 is raised to a pre-selected level, via the drive means 12 and the movement converter, so as to grip a chosen number of sheet-like elements 9 with grippers 19, by first activating the piston-cylinder device 25 so as to press the sheet-like elements 9 together to form a compact unit and thereafter gripping a selected number of said elements by clamping the elements between the movable jaws 23, 24, and by moving the tooth 27 on the bottom of each jaw into a corresponding recess 28 on the underside of the sheet-like elements, such that the tooth 27 located in the recess 28 will form a stop for the piston-cylinder device 25, see Figs 4 and 5. With the grippers 19 continuously activated, i.e. with the clamping jaws 23, 24 in clamping engagement with the sheet-like elements 9, and with the piston-cylinder devices compressing the elements 9 from above in coaction with the teeth accommodated in said recesses, it is guaranteed that the gripped elements 9 that represent the press-bar 5 will be essentially embraced during a working movement and form a compact unit, a press-bar, of substantially uniform thickness overall.

[0020] Relative movement between the jaws 23 and 24 is effected by means of a piston-cylinder device 29 connected to the first jaw 23, in coaction with the second jaw 24, which is arranged directly at the end of the piston-cylinder device 29 for maneuvering the press-bar.

[0021] As will be evident from Figs 4 and 5, the edges of the sheet-like elements 9 have formed therein recesses 30 that correspond to the first and second clamping

jaws 23, 24, whereby at least that part of the thus formed press-bar which lies against the wooden elements 8 will present an essentially smooth surface so as not to damage the wooden elements placed in the press.

[0022] Thus, a glue press is provided in which a press-bar of required thickness can be readily obtained through the medium of a series of mutually superimposed, generally sheet-like elements that can be gripped selectively in any chosen number by grippers that can be moved by piston-cylinder devices to localize and grip said elements, and therewith reduce the cost of fabricating glued wood products.

[0023] It will be understood that the invention is not restricted to the above described and illustrated embodiment and that changes and modifications can be made within the scope of the following claims.

Claims

1. A glue press for compressing glue coated wooden elements (8) while the glue hardens, wherein the press includes a frame having a lay-up table (1) on which the wooden elements (8) to be pressed together are placed, a press-plate (2) which is located parallel with the lay-up table (1) and movable relative to and towards said table, and a press-bar (5) which is movable along the lay-up table (1) and which has a stop means (6) on respective sides of the lay-up table (1), **characterized in that** the glue press further includes a carrier (10) which carries a series of mutually superimposed, elongated, generally sheet-like elements (9), grippers (19) which are adapted to grip a selected number of said sheet-like elements (9), wherein the gripped sheet-like elements represent the press-bar (5) and the number of sheet-like elements that are gripped is controlled with respect to the desired thickness of said press-bar, and means for moving the grippers (9) along the lay-up table in between the press-plate (2) and said lay-up table (1) in a direction towards the stop means (6).
2. A glue press according to Claim 1, **characterized in that** the carrier (10) can be raised and lowered; and **in that** the grippers (19) are guided on shafts (21) that are rigidly mounted on the press-frame and extend parallel with the plane of the lay-up table (1), wherein the grippers are adapted to grip a selected number of sheet-like elements (9) that corresponds to the relative height position of said grippers (19), and wherein the press-plate (2) includes recesses (20) that are open to the grippers (19) and extend in the movement direction of the press-bar, such as to accommodate the grippers (19) during their movement towards the stop means (6).
3. A glue press according to any one of the preceding

Claims, **characterized in that** the means for moving the grippers (19) towards the stop means (6) include piston-cylinder devices (4).

4. A glue press according to any one of the preceding Claims, **characterized in that** each gripper (19) includes two clamping jaws (23, 24) that have bottom-mounted teeth and that are movable towards one another, and piston-cylinder devices (25) that act perpendicularly to the upper side of respective sheet-like elements (9) so as to press together the sheet-like elements and therewith form a compact unit, wherein gripping of the elements is effected by clamping the sheet-like elements between said clamping jaws (23, 24) on the one hand and by insertion of the tooth on the bottom of each jaw into a corresponding recess (28) on the underside of the sheet-like elements (9) on the other hand, said recess (28) forming a stop means for the piston-cylinder device (25) acting on the upper side of the sheet-like elements (9).
5. A glue press according to Claim 4, **characterized in that** the edge part of the sheet-like elements (9) that when the press-bar (5) is constructed is intended to lie against the wooden elements (8) placed on the lay-up table (1) is provided with a recess (30) which corresponds to the second clamping jaw (24) and the dimensions of which are chosen so that said edge part of the constructed press-bar will have an essentially smooth and even surface for avoiding damage to the wooden elements (8) placed in the glue press.
6. A glue press according to Claim 4 or Claim 5, **characterized in that** relative movement between the clamping jaws (23, 24) is effected with the aid of a pneumatic piston-cylinder device (29) connected to one (23) of said jaws during coaction with the other (24) of said jaws, wherein said other jaw is connected to the end of the piston-cylinder device (4) for maneuvering the constructed press-bar (5).

Patentansprüche

1. Klebepresse zum Zusammenpressen von klebstoff-beschichteten Holzelementen (8), während der Klebstoff aushärtet, wobei die Presse einen Rahmen mit einem Auflagetisch (1), auf dem die zusammenzupressenden Holzelemente (8) platziert werden, eine Pressplatte (2), die parallel zu dem Auflagetisch (1) angeordnet und relativ zu und zu dem Tisch hin bewegbar ist, und einen Pressenblock (5), der entlang des Auflagetisches (1) bewegbar ist und der einen Anschlag (6) an jeweiligen Seiten des Auflagetisches (1) besitzt, enthält, **dadurch gekennzeichnet,**

dass die Klebepresse weiter einen Träger (10), der eine Reihe übereinander gestapelte, längliche, im allgemeinen plattenähnliche Elemente (9) trägt, Greifer (19), die zum Greifen einer ausgewählten Anzahl der plattenähnlichen Elemente (9) ausgebildet sind, wobei die gegriffenen plattenähnlichen Elemente den Pressenblock (5) darstellen und die Anzahl der plattenähnlichen Elemente, die gegriffen werden, bezüglich der gewünschten Dicke des Pressenblockes gesteuert werden, und Einrichtungen zum Bewegen der Greifer (19) entlang des Auflagetisches zwischen der Pressplatte (2) und dem Auflagetisch (1) in eine Richtung zu dem Anschlag (6) enthält.

2. Klebepresse nach Anspruch 1, **dadurch gekennzeichnet**, **dass** der Träger (10) angehoben und abgesenkt werden kann; und dass die Greifer (19) auf Wellen (21) geführt sind, die fest an dem Pressenrahmen befestigt sind und parallel zu der Ebene des Auflagetisches (1) verlaufen, wobei die Greifer zum Greifen einer ausgewählten Anzahl plattenähnlicher Elemente (9) ausgebildet sind, die der relativen Höhenposition der Greifer entspricht, und wobei die Pressplatte (2) Ausnehmungen (20) aufweist, die zu den Greifern (19) offen sind und sich in der Bewegungsrichtung des Pressenblockes erstrecken, so dass sie die Greifer (19) während deren Bewegung zu dem Anschlag (6) aufnehmen.
3. Klebepresse nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, **dass** die Einrichtungen zum Bewegen der Greifer (19) zu dem Anschlag (6) Kolben-Zylinder-Vorrichtungen enthalten.
4. Klebepresse nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, **dass** jeder Greifer (19) zwei Spannbacken (23, 24), die unten befestigte Zähne aufweisen und aufeinander zu bewegbar sind, und Kolben-Zylinder-Vorrichtungen (25), die senkrecht zu der Oberseite der jeweiligen plattenähnlichen Elemente (9) wirken, enthält, um so die plattenähnlichen Elemente zusammenzupressen und damit eine kompakte Einheit zu bilden, wobei das Greifen der Elemente durch Einspannen der plattenähnlichen Elemente zwischen den Spannbacken (23, 24) einerseits und durch Einführen des Zahnes am Boden jeder Backe in eine entsprechende Ausnehmung (28) an der Unterseite der plattenähnlichen Elemente (9) andererseits bewirkt wird, wobei die Ausnehmung (28) einen Anschlag für die auf die Oberseite der plattenähnlichen Elemente (9) wirkende Kolben-Zylinder-Vorrichtung (25) bildet.

5. Klebepresse nach Anspruch 4, **dadurch gekennzeichnet**, **dass** die Kante der plattenähnlichen Elemente (9), die, wenn der Pressenblock (5) aufgebaut ist, gegen die auf dem Auflagetisch (1) platzierten Holzelemente (8) zu liegen kommt, mit einer Ausnehmung (30) versehen ist, welche der zweiten Spannbacke (24) entspricht und deren Abmessungen so gewählt sind, dass die Kante des aufgebauten Pressenblockes eine im wesentlichen glatte und gerade Oberfläche zur Vermeidung von Beschädigungen an den in der Klebepresse platzierten Holzelementen (8) besitzt.

6. Klebepresse nach Anspruch 4 oder Anspruch 5, **dadurch gekennzeichnet**, **dass** eine Relativbewegung zwischen den Spannbacken (23, 24) mit Hilfe einer pneumatischen Kolben-Zylinder-Vorrichtung (29) bewirkt wird, die während des Zusammenspiels mit der anderen (24) der Backen mit einer (23) der Backen verbunden ist, wobei die andere Backe mit dem Ende der Kolben-Zylinder-Vorrichtung (4) zum Steuern des aufgebauten Pressenblockes (5) verbunden ist.

Revendications

1. Presse à coller pour comprimer des éléments en bois (8) recouverts de colle, pendant que la colle durcit, dans laquelle la presse inclut un cadre possédant une table de support (1), sur laquelle les éléments en bois (8) devant être pressés l'un contre l'autre sont disposés, un plateau de presse (2) qui est disposé parallèlement à la table de support (1) et est déplaçable par rapport à ladite table et vers cette dernière, et une barre de presse (5) qui est déplaçable le long de la table de support (1) et comporte des moyens d'arrêt (6) situés sur les côtés respectifs de la table de support (1), **caractérisée en ce que** la presse à coller comporte en outre un support (10) qui porte une pluralité d'éléments allongés en forme générale de feuilles (9), qui sont superposés entre eux, des organes de saisie (19) qui sont adaptés pour saisir un nombre sélectionné desdits éléments en forme de feuilles (9), les éléments en forme de feuilles saisis représentant la barre de presse (5), et le nombre des éléments en forme de feuilles, qui sont saisis est commandé en rapport avec l'épaisseur désirée de ladite barre de presse, et des moyens pour déplacer les dispositifs de saisie (9) le long de la table de support (1) entre le plateau de presse (2) et ladite table de support (1) en direction des moyens d'arrêt (6).
2. Presse à coller selon la revendication 1, **caractérisée en ce que** le support (10) peut être soulevé et abaissé; et **en ce que** les dispositifs de saisie (19)

sont guidés sur des arbres (21) qui sont montés rigidement sur le cadre de la presse et s'étendent parallèlement au plan de la table de support (1), les organes de saisie étant adaptés de manière à saisir un nombre sélectionné d'éléments en forme de feuilles (9) qui correspond à la position en hauteur relative desdits dispositifs de saisie (19), et dans laquelle le plateau de presse (2) inclut des renforcements (20) qui s'ouvrent en direction du dispositif de saisie (19) et s'étendent dans la direction de déplacement de la barre de presse, de manière à loger les dispositifs de saisie (19) pendant leur déplacement en direction des moyens d'arrêt (6).

3. Presse à coller selon l'une quelconque des revendications précédentes, **caractérisée en ce que** les moyens de déplacement des dispositifs de saisie (19) en direction des moyens d'arrêt (6) incluent des dispositifs à piston et cylindre (4).

4. Presse à coller selon l'une quelconque des revendications précédentes, **caractérisée en ce que** chaque dispositif de saisie (19) inclut deux mâchoires de serrage (23,24), qui possèdent des dents montées sur une base et qui sont déplaçables les unes vers les autres, et des dispositifs à piston et cylindre (25) qui agissent perpendiculairement au côté supérieur des éléments respectifs en forme de feuilles (9) de manière à presser l'un contre l'autre les éléments en forme de feuilles et former conjointement avec ces éléments une unité compacte, la saisie des éléments étant exécutée par serrage des éléments en forme de feuilles entre lesdites mâchoires de serrage (23,24) d'une part et par insertion de la dent de la base de chaque mâchoire dans un renforcement correspondant (28) situé dans la face inférieure des éléments en forme de feuilles (9) d'autre part, ledit renforcement (28) formant des moyens d'arrêt pour le dispositif à piston et cylindre (25) agissant sur le côté supérieur des éléments en forme de feuilles (9).

5. Presse à coller selon la revendication 4, **caractérisée en ce que** la partie de bord des éléments en forme de feuilles (9) qui, lorsque la barre de presse (5) est formée, est destinée à s'appliquer contre les éléments en bois (8) placés sur la table de support (1), est pourvue d'un renforcement (30), qui correspond à la seconde mâchoire de serrage (24), et dont les dimensions sont choisies de telle sorte que ladite partie de bord de la barre de presse construite possède une surface essentiellement lisse et unie pour éviter tout endommagement des éléments en bois (8) placés dans la presse à coller.

6. Presse à coller selon la revendication 4 ou la revendication 5, **caractérisée en ce qu'un** déplacement relatif entre les mâchoires de serrage (23,24) est

effectué à l'aide d'un dispositif à piston et cylindre pneumatique (29) raccordé à l'une (23) desdites mâchoires pendant une action conjointe avec l'autre (24) desdites mâchoires, dans laquelle ladite autre mâchoire est raccordée à l'extrémité du dispositif à piston et cylindre (4) pour manipuler la barre de presse construite (5).

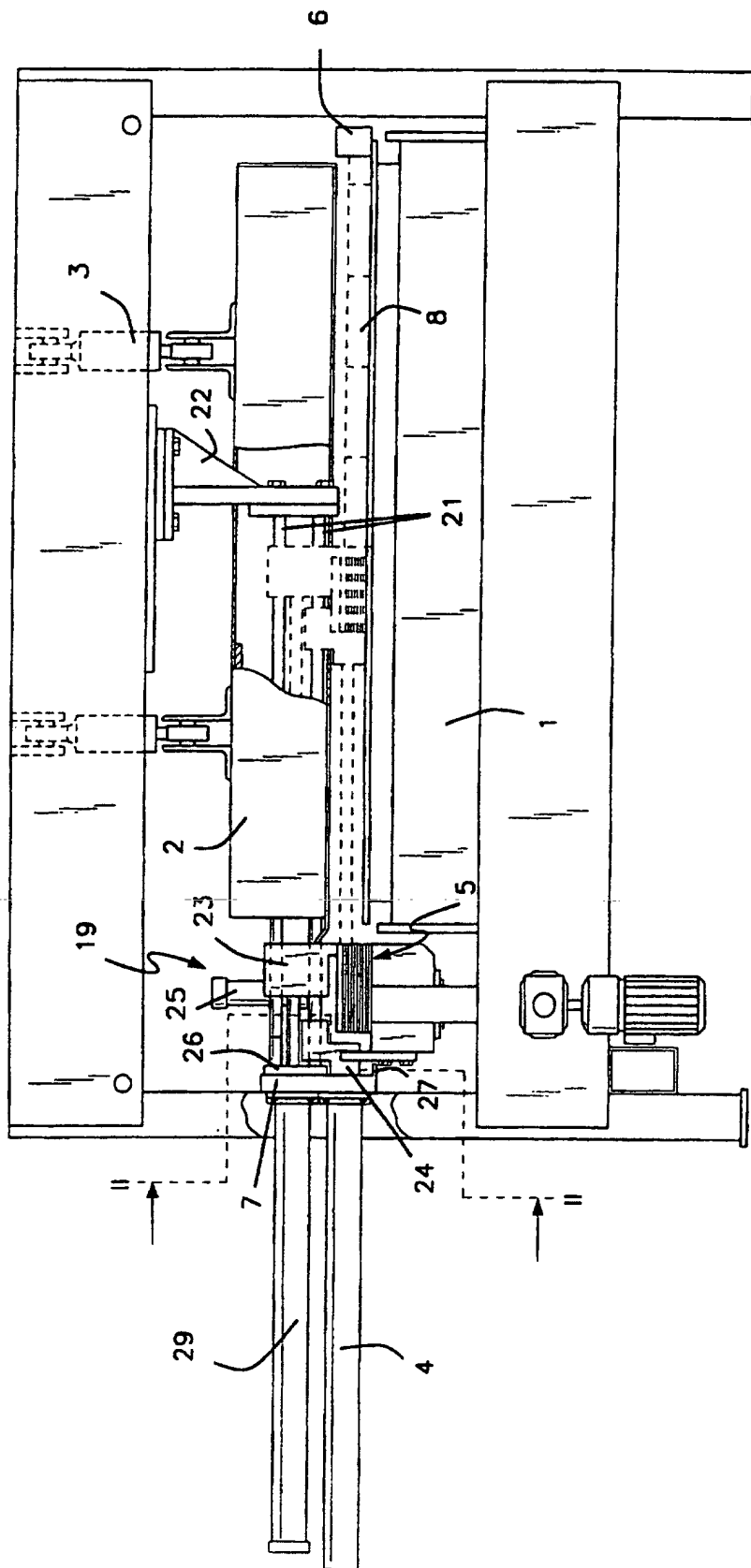
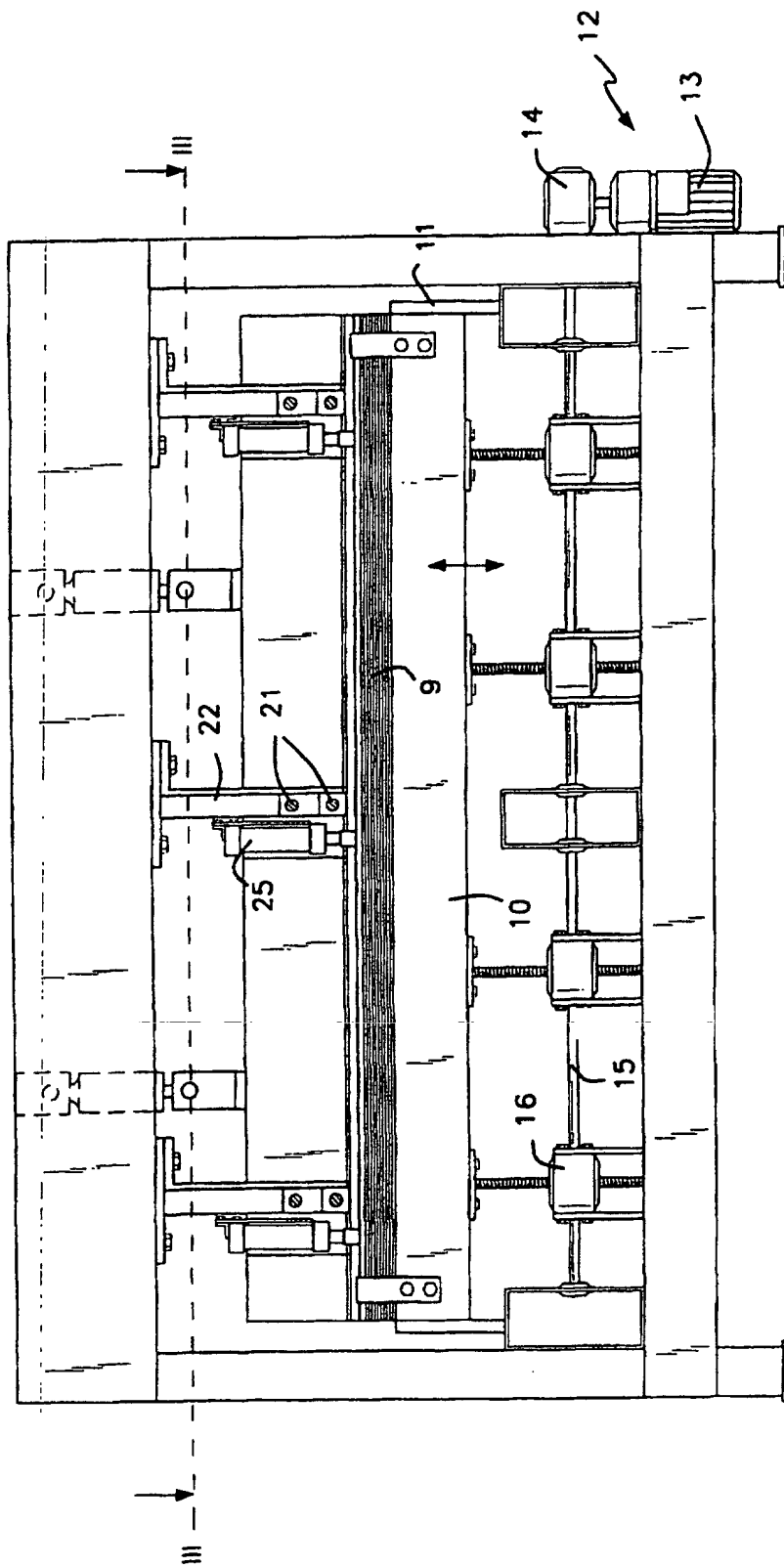


FIG.1



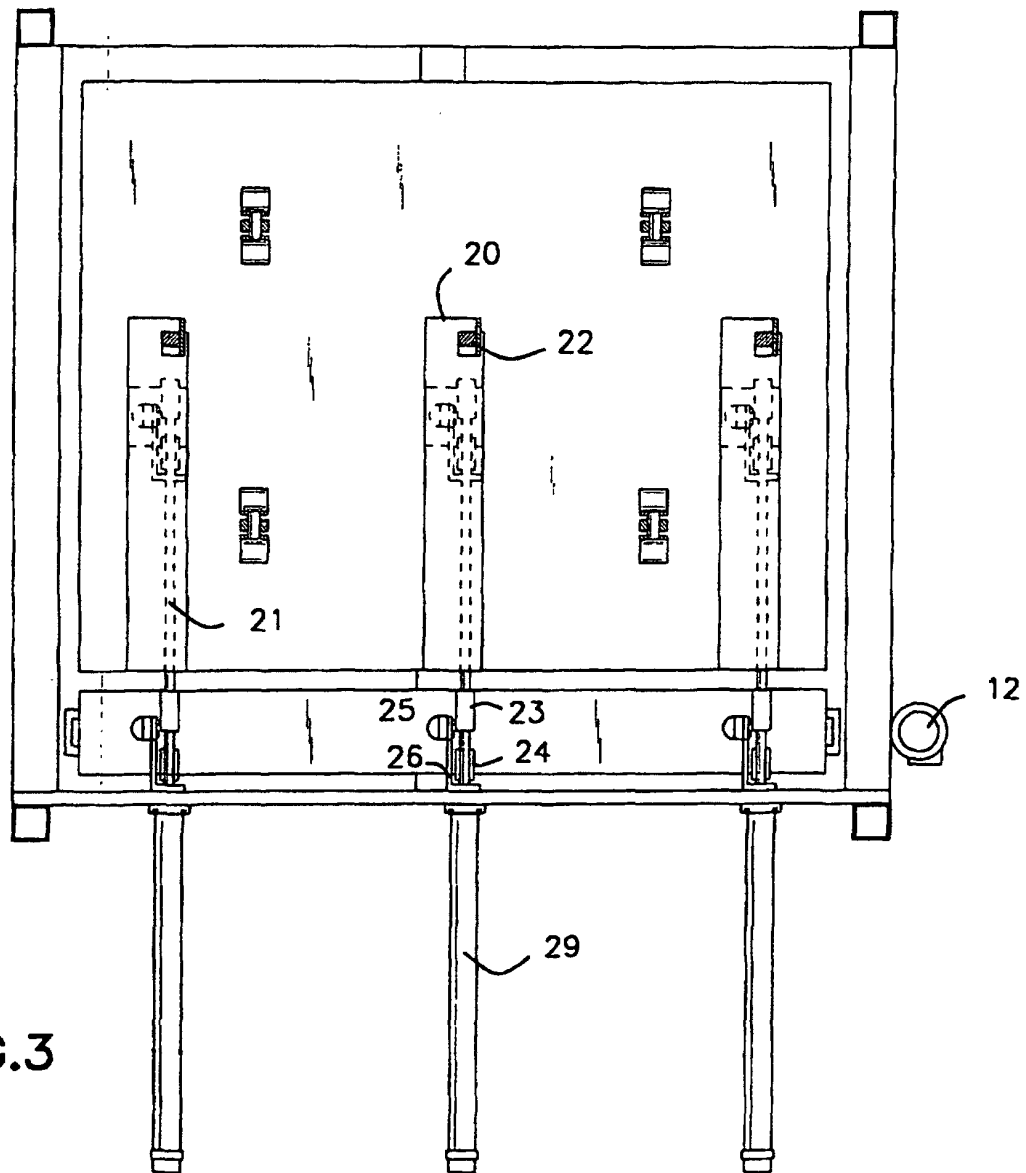


FIG. 3

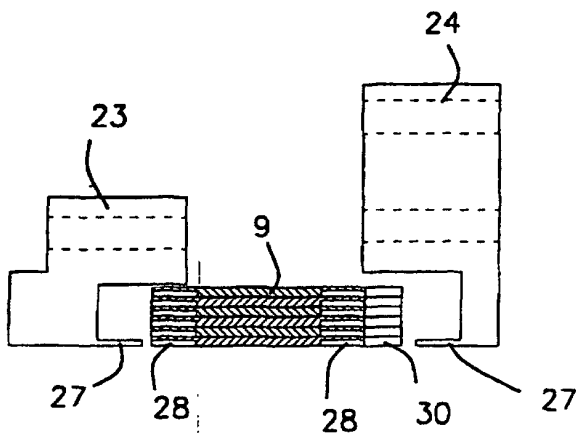


FIG. 4

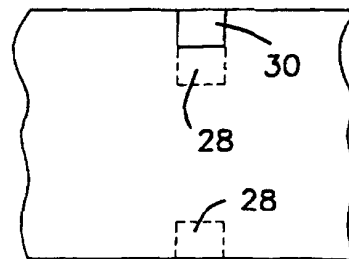


FIG. 5