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(54) **Assembly and method for mattress packing**

(57) An assembly and a method of packing a mattress wherein the mattress is enclosed in an essentially airtight foil, air is drawn from the mattress, and the mat-

ress is rolled up into a roll. The distance between two bars (12,13) extending transversally over the mattress is adjusted so that the mattress is clamped between the two bars (12,13) prior to the rolling up of the mattress.

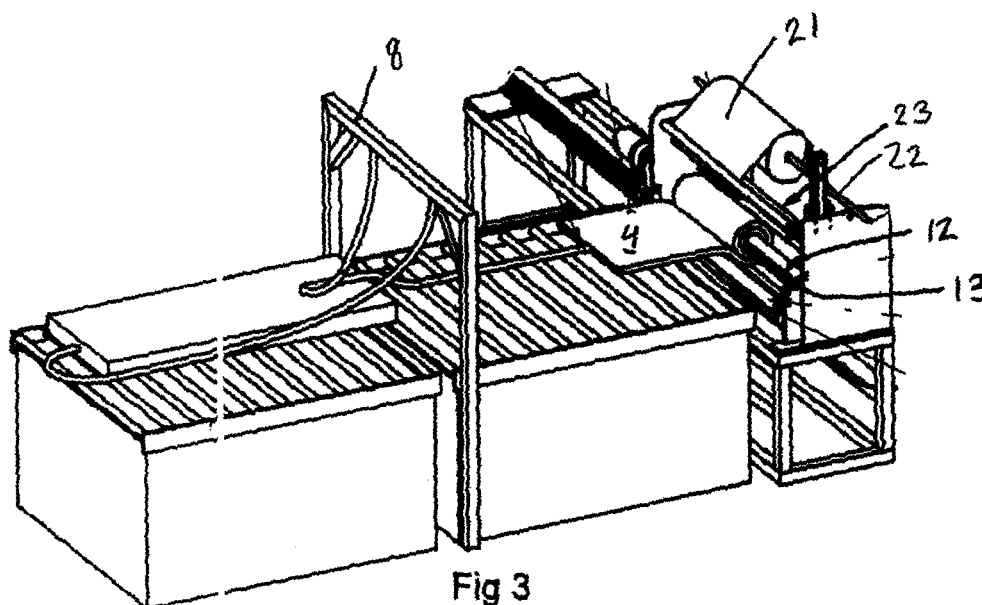


Fig 3

Description

Technical Field of the Invention

[0001] The present invention relates to an assembly and a method for packing a mattress according to the preamble of claim 1 and claim 9, respectively.

Background Art

[0002] When transporting mattresses for beds a number of aspects have to be considered. These products are often both large and heavy, and care has to be taken so that no damage or soiling of the mattresses occurs during the handling thereof. Currently, there are a number of different types of mattresses on the market. One common type comprises a spring system and is equipped with a wooden frame, whereon legs can be attached. Another, increasingly popular type of mattress is known as turnable or reversible mattress. This type of mattress does not contain a wooden frame, but is instead placed on top of a mattress with a wooden frame in a so-called continental bed, or on top of a bedstead base which in turn is placed in a bed frame. The latter configuration is often used in an adjustable or articulated bed. The turnable mattress might or might not contain a spring system.

[0003] As is shown in US 6 098 378 a mattress without a spring system and containing one layer of foam rubber or latex foam can be rolled up and then transported and stored in the rolled up state. However, a more advanced turnable mattress containing more than one layer of material and optionally a spring system is not suited for this simple rolling up, since it would cause strain between different layers of material in the mattress and would damage the connection between the layers as well as the spring system.

[0004] US 6 739 107 describes an apparatus for packing, in a rolled up form, a mattress having a C-shaped border wire. The apparatus has gripping elements in the form of hand portions which grip an end portion of the mattress and roll the mattress. A vacuum source can be connected to compress the mattress.

[0005] A disadvantage with the apparatus of US 6 739 107 is that the mattress easily could be damaged by the gripping of the hand portions and the subsequent rolling. In US 6 739 107 a mattress is enclosed having an especially adapted border which does not get damaged by the rolling process. With a standard turnable mattress there would still be a risk of damage using the apparatus according to US 6 739 107.

[0006] In view of the above there is a need for an improved manner of mattress packing, wherein any turnable mattress can be packed in a space saving configuration without any damage to the mattress.

Summary of the Invention

[0007] An aim of the present invention is to provide a mattress packing assembly and method which alleviates the above mentioned disadvantages. To this end, a mattress packing assembly according to the appended claim 1, as well as a method according to the appended claim 8 are provided. Preferred embodiments are found in the dependent claims 2-7 and 10, respectively.

[0008] A mattress packing assembly according to the invention comprises a vacuum system and a rolling-up device, said vacuum system being connectable to a mattress, for drawing air from the mattress, said rolling-up device being arranged to roll up the mattress, wherein the rolling-up device comprises two elongated slats which are arranged to extend essentially transversally in relation to the mattress, above and below the mattress, respectively, and clamp the mattress between them, the slats being arranged at a variable distance between them so that they are capable of accommodating mattresses of varying thicknesses.

[0009] The gives a mattress packing assembly which can be used to pack mattresses in a highly space-saving, rolled up configuration. The system can advantageously be used to roll up turnable mattresses comprising a spring system without any damage to the spring system or to any gluing connecting different layers in the mattress. The latter advantage also applies to mattresses without a spring system. Since the distance between the slats is variable, the assembly is flexible and can be used for mattresses of all standard thicknesses. Since the slats extend over the mattress, there is no risk of inflicting damage to the mattress by applying a force only to the border of the mattress, or by extending any elements into the borders of the mattresses.

[0010] The slats are preferably arranged to rotate around a common axis for rolling up the mattress. This provides an efficient rolling up of the mattress and at the same time a secure grip of the mattress.

[0011] The slats can comprise an upper slat and a lower slat, the upper slat being movable towards and away from the lower slat. This has the advantage of providing a secure grip of the mattress, while still giving a relatively uncomplicated mounting of the rolling-up device

[0012] The slats can be movable laterally in order to be pulled out from a rolled up mattress. This makes it easy to remove a mattress from the rolling up device after it has been rolled up.

[0013] The rolling up device preferably comprises means for wrapping the rolled up mattress in a foil, making the rolled up configuration of the mattress stable and the mattress ready for transport or storage.

[0014] To further secure the rolled-up configuration of the mattress, the rolling up device preferably comprises means for applying adhesive strips to retain the rolled up shape of mattress.

[0015] The vacuum source preferably has at least a first and a second nozzle which are connectable to a first

and a second mattress, respectively, for essentially simultaneously drawing air from the first and the second mattress, respectively. This has the advantage of providing a faster packing of the mattresses, since a more or less continuous flow of mattresses can be subjected to vacuum suction

[0016] The method according to the invention also provides the advantages listed above.

[0017] The above and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

Brief Description of the Drawings

[0018]

Fig. 1 shows a mattress packing assembly in a perspective view from above in a state where two mattresses are connected to the vacuum source,

Fig. 2 shows the mattress packing assembly according to Fig. 1 in a perspective view from another direction,

Fig. 3 shows the mattress packing assembly in a perspective view in a state where one of the mattresses is in the process of being rolled up,

Fig. 4 shows the mattress packing assembly in a perspective view with one of the mattresses rolled up,

Fig. 5 shows the mattress packing device of Fig. 4 in a front view, and

Fig. 6 shows the mattress packing device with the feeders only schematically shown, in order to show the rolling up device in more detail.

Detailed Description of Preferred Embodiments of the Invention

[0019] According to Fig. 1 a mattress packing assembly 1 comprises two mattress feeders 2a and 2b and a rolling-up device 3. On the mattress feeders in Fig. 1, a mattress 4 is placed. Prior to being placed on the mattress feeders, the mattress 4 has been enclosed in an essentially air-tight foil by being placed in a foil sleeve and the opposite edges of this sleeve being welded together. After this, the mattress is placed by hand on the rolls 5 of the entrance feeder 2a.

[0020] A suction nozzle 6, connected through a hose 7 to a vacuum pump (not shown) situated in the body of the feeder 2b, is introduced into one end of the foil wrapping of the mattress 4. The vacuum-pump is switched on and draws air from the mattress 4 enclosed in foil so that the mattress 4 is compressed. Preferably, two suction nozzles 6 are provided separately operable for drawing air from two mattresses at the same time. The mattress 4 is moved onto the rolls 5 to the second feeder 2b towards the rolling-up device and another mattress 4 can then be placed on the entrance feeder 2a and be subjected to vacuum suction by the other nozzle 6.

[0021] The hoses 7 are suspended from a frame 8 to make the connecting and later disconnecting of the nozzles to the mattresses simple. This arrangement of the hoses also makes it easier to connect the hoses to two mattresses at the same time.

[0022] After a suitable vacuum has been obtained in the mattress 4 lying on the feeder 2b, the mattress 4 is brought onto the stop 9 of the rolling-up machine 3.

[0023] A rolling-up cycle is then started. The rod 10 of the vertical servo-motor 11 is pushed out to press the upper catch slat 12 towards the mattress 4 and to the lower catch slat 13, and the bolt 14, supporting the upper slat 12 in its upper position, is pushed out by means of the horizontal servo-motor 15. Thus, a portion of the mattress is caught between the two slats 14 and 15 in a secure grip. The distance between the slats is thus variable to accommodate a mattress of any thickness and still provide a secure and proper grip of the mattress.

[0024] The slats, or bars, 12 and 13 extend over the width of the mattress, the lower slat 13 beneath the mattress and the upper slat above it. The bars are sufficiently long to accommodate all mattress standard widths, from 80 cm up to 180 cm. Since the slats extend over the width of the mattress

[0025] The electric motor 16 is now switched on to start turning, through the drive 17 and the clutch 18, the slats 12 and 13. The mattress 4, supported by the supporting system 19, is rolled up (Fig. 3) being wound around the slats 12 and 13 as these rotate around their respective longitudinal axes. The rolls of the supporting system 19 are pressed to the mattress by means of the supporting servo-motor 20.

[0026] When the half of mattress 4 has been rolled up, the vacuum system with the nozzle 6 is disconnected, and the wrapping foil 21, situated on the axle 22 and fed by the feeding rolls 23, is then moved into the gap of the rolled-up mattress, so that an end portion of it is caught there. The rolling up continues, with the end portion of the foil 21 being pulled along and the axle 22 thus rotated and foil being wrapped around the mattress during its rolling. This goes on until the entire mattress 4 has been rolled up and the repeated wrapping of it with the wrapping foil 21 has taken place.

[0027] The foil 21 is then cut off, and the rolled up mattress 4 is secured by means of self-adhesive strips 24 (Fig. 4). The motor rotation is stopped in such a position that the upper slat 12 is exactly in the upper position. The linear drive 25 is activated to pull out the catch slats 12 and 13 on the sledge 26 from the rolled up mattress 4 (Fig. 5). The supporting system 19 is then lowered and the mattress rolls down on the chute 27 to be transported or stored in the space-saving rolled-up configuration.

[0028] Finally, the linear drive brings the slats 12 and 13 back into their original position, the horizontal servo-motor 15 inserts the bolt 14 between the catch slats 12 and 13, and the vertical servo-motor 11 raises the upper slat 12. The rolling-up device is now prepared for the next work cycle.

[0029] The realisation of the variable distance between the two slats, or bars, 12 and 13 can of course be performed differently than what is described above.

[0030] The compressing of the mattress by application of vacuum reduces any tensions between the different layers and protects the gluing between the layers. It also lessens the tension in any spring system in the mattress and makes rolling up of the mattress possible without damaging the mattress. A turnable or reversible mattress incorporating a spring system is especially well suited to be subjected to the described mattress packing, since it otherwise takes up a lot more space during transport and storing, but other mattress types, such as those not having a spring system can be packed in this way as well.

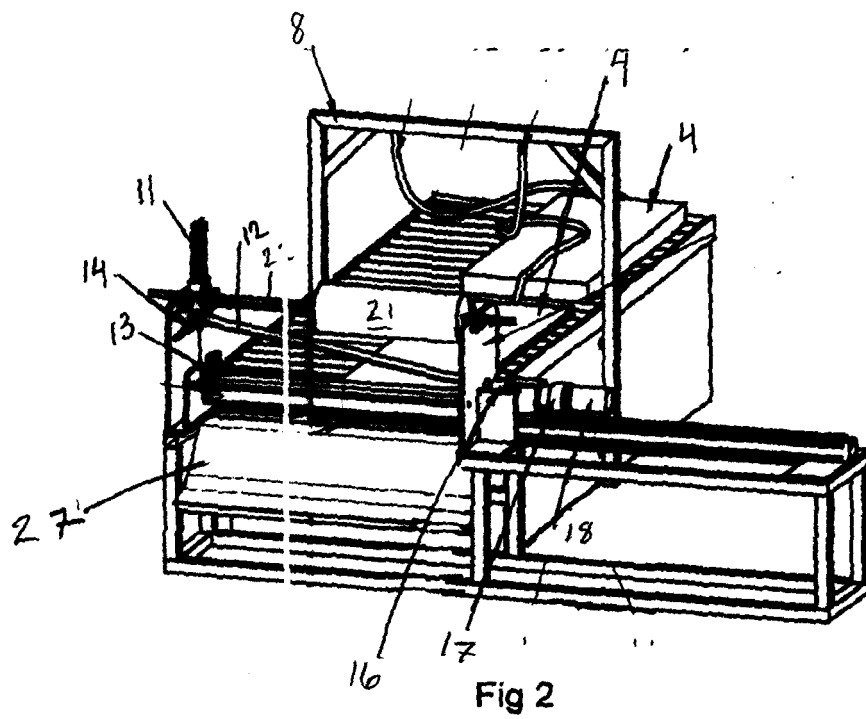
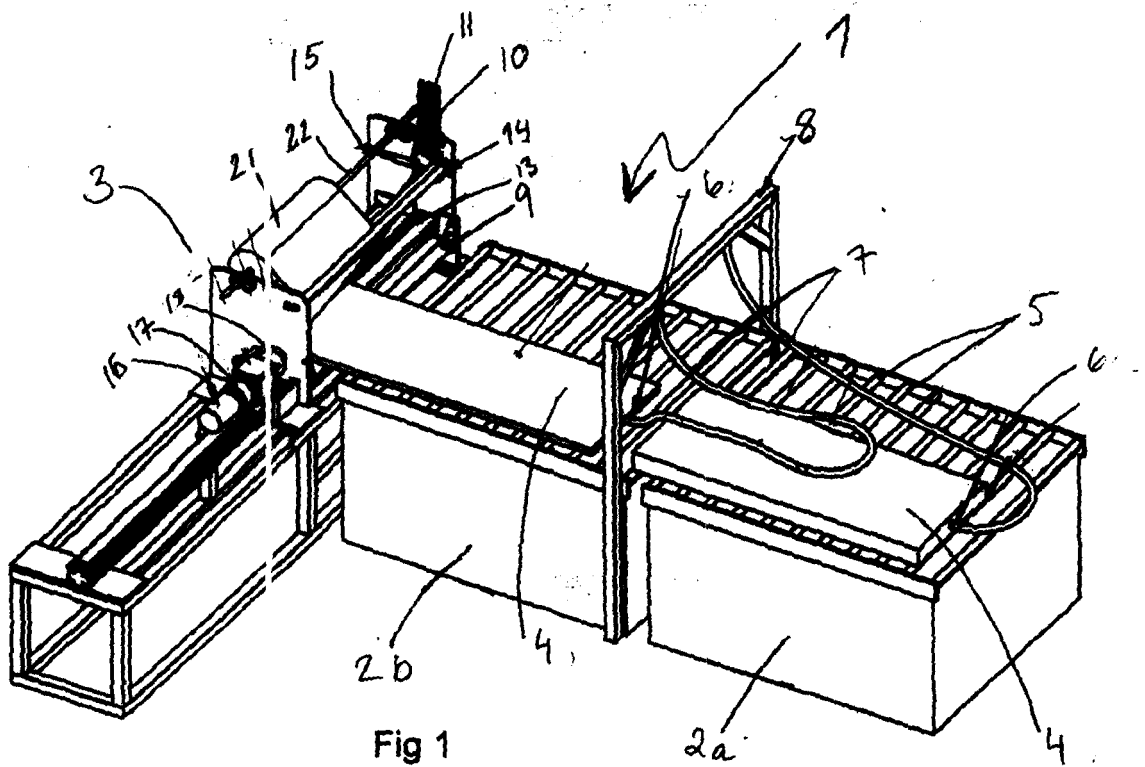
[0031] A turnable mattress being 18-20 cm high in an uncompressed state can be reduced to a height of 4-5 cm after compression, and when transported on a pallet, the amount of mattresses per pallet goes up to 24 mattresses per pallet as compared to previously 18 mattresses per pallet, thus considerably reducing the space occupied by the mattresses during transport and storage. This also leads to a reduction in the costs associated with transporting and storing the mattresses.

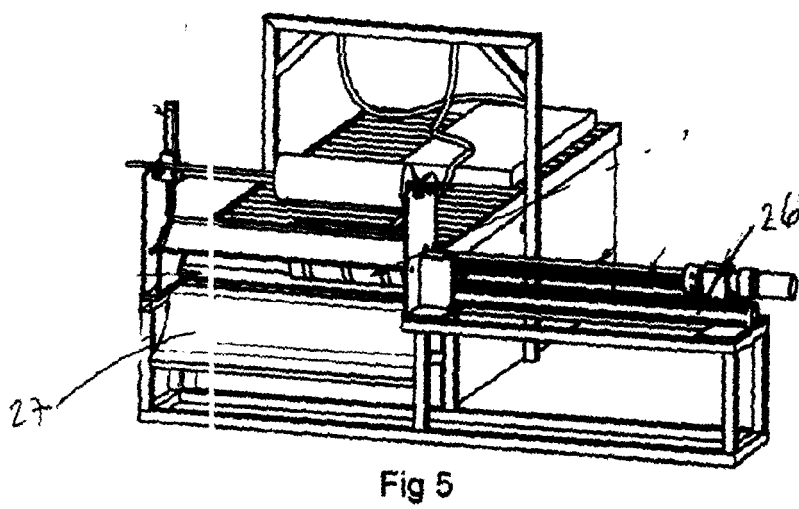
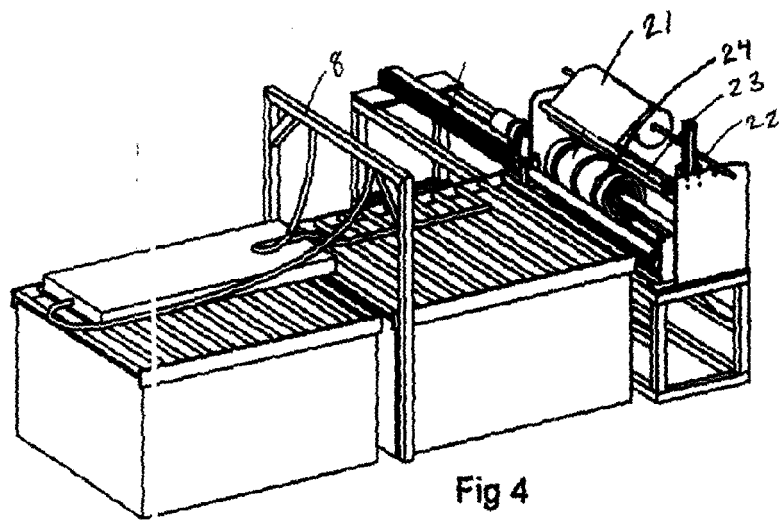
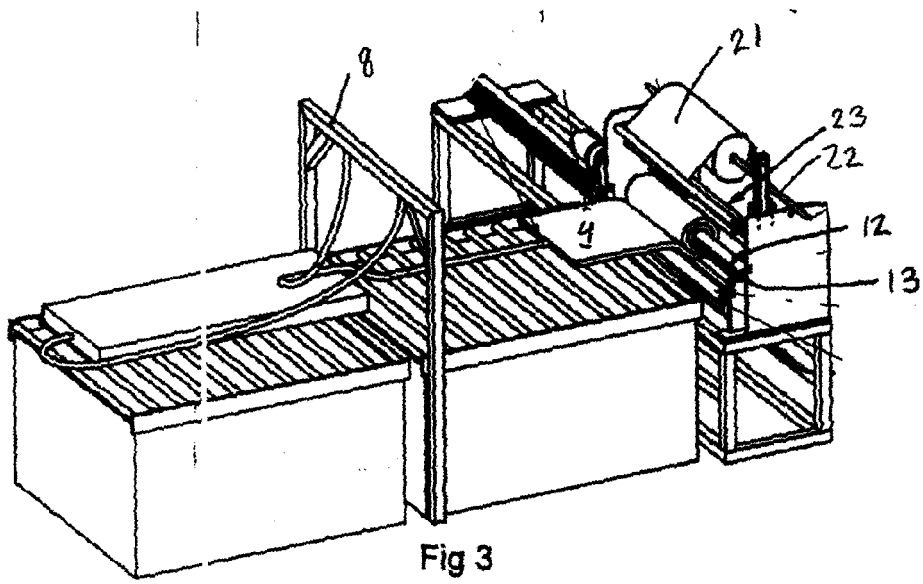
Claims

1. A mattress packing assembly comprising a vacuum system and a rolling-up device (3), said vacuum system being connectable to a mattress (4) enclosed in an essentially air-tight foil, for drawing air from the mattress (4), said rolling-up device (3) being arranged to roll up the mattress (4), **characterised in that** the rolling-up device (3) comprises two elongated slats (12, 13) which are arranged to extend essentially transversally in relation to the mattress (4), and clamp the mattress (4) between them, the slats (12, 13) being arranged at a variable distance between them so that they are capable of accommodating mattresses of varying thicknesses.
2. A mattress packing assembly according to claim 1, wherein the slats (12, 13) are arranged to rotate around a common axis for rolling up the mattress (4).
3. A mattress packing assembly according to any of the preceding claims, wherein the slats (12, 13) comprise an upper slat (12) and a lower slat (13), the upper slat (12) being movable towards and away from the lower slat (13).
4. A mattress packing assembly according to any of the preceding claims, wherein the slats (12, 13) are movable laterally in order to be pulled out from a rolled up mattress.
5. A mattress packing device according to any of the preceding claims, wherein the rolling up device (3)

further comprises means for wrapping the rolled up mattress in a foil.

6. A mattress packing device according to any of the preceding claims, wherein the rolling up device further comprises means for applying adhesive strips to retain the rolled up shape of mattress.
7. A mattress packing device according to any of the preceding claims, wherein the vacuum system has at least a first and a second nozzle (6) which are connectable to a first and a second mattress (4), respectively, for essentially simultaneously drawing air from the first and the second mattress (4), respectively.
8. A method of packing a mattress comprising the steps of enclosing the mattress (4) in an essentially airtight foil, drawing air from the mattress (4), rolling up the mattress (4) into a roll, **characterised by** the step of adjusting the distance between two slats (12, 13) extending transversally over the mattress (4) so that the mattress (4) is clamped between the two slats (12, 13) prior to the rolling up of the mattress (4).
9. A method of packing a mattress according to claim 8, further comprising the step of, at a time during the rolling up the mattress (4), providing a foil (21) and wrapping the foil (21) around the mattress (4) during the rolling up.
10. Use of a mattress packing device according to any of claims 1-8 for packing a turnable mattress comprising a spring system.





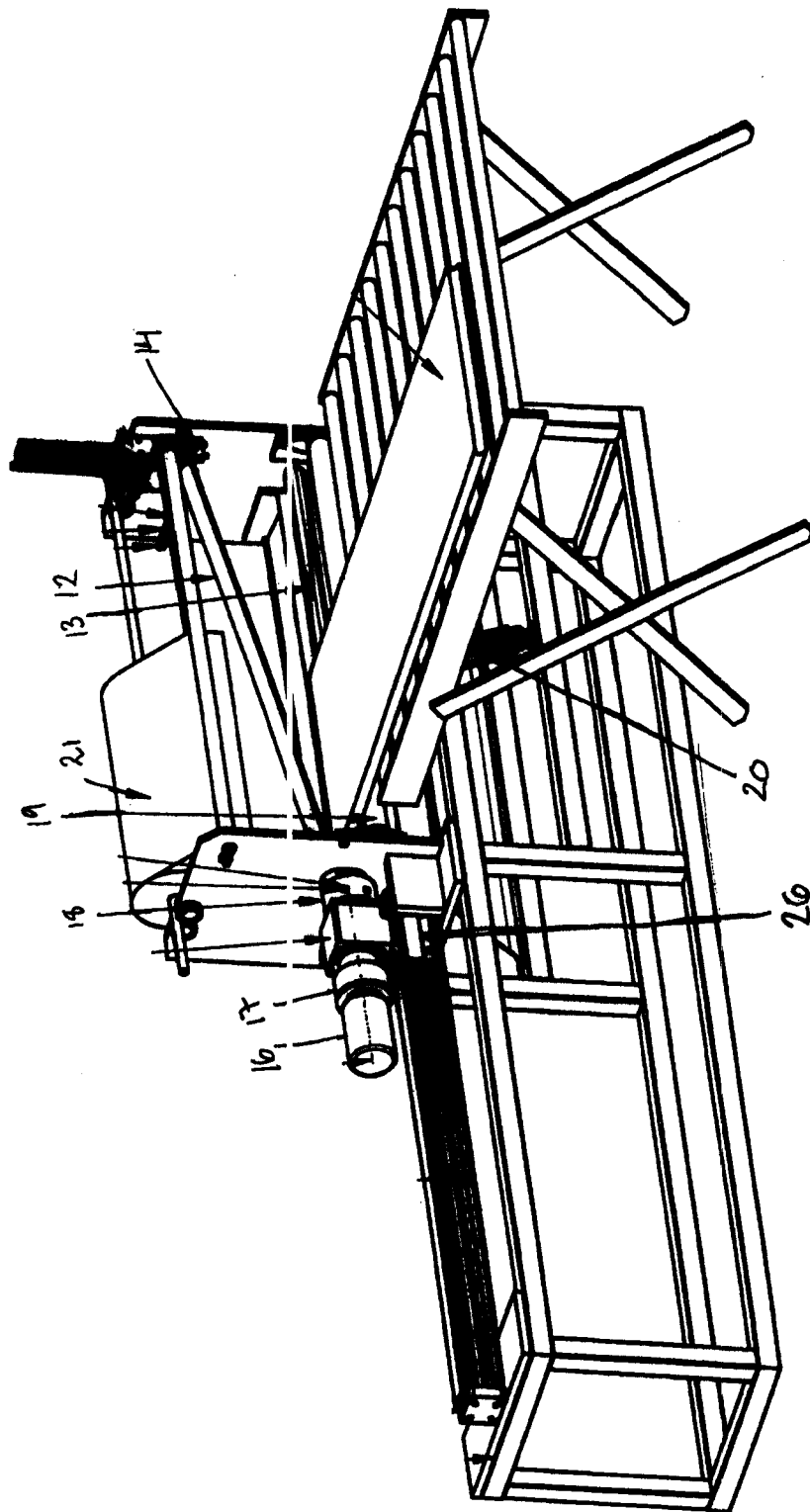


Fig 6



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 10 6247

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 December 2005	Examiner Schelle, J
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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27-12-2005

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