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(54) **Apparatus for fitting quilting braces to mattresses**

Vorrichtung zum Steppen von Matratzen

Dispositif pour la fixation de boutons de capitonnage sur des matelas

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Description

[0001] The present invention relates to an apparatus for fitting quilting braces to mattresses.

[0002] Mattresses, in order to avoid retaining the external padding and an excessive swelling caused by compression of the internal springs or of the filling material (wool or horsehair), are kept flat by a plurality of quilting braces which are known in the jargon as tufts, stitches or pompons. These devices are tufts of woolly material arranged on the opposite faces of the mattress and mutually connected by a tie element (cord or tape) which is driven through the mattress. In practice, the tufts act as coupling points for the cords or tapes when they are tensioned.

[0003] Quilting braces are currently applied with mostly manual methods and therefore with excessively long times and at high cost.

[0004] A mattress tufting machine is disclosed in document US.A.2089252, which represents the preamble of claim 1. This known apparatus does not permit to have an automatic insertion of the second tuft fastened to the tie element.

[0005] The aim of the present invention is therefore to provide an apparatus which is capable of automating the application of quilting braces to mattresses, thus obviating the drawbacks of conventional systems.

[0006] Within the scope of this aim, an object of the present invention is to provide an apparatus which is versatile in operation in relation to the possibility of varying the location of the quilting braces as required.

[0007] This aim and this object are achieved with an apparatus for applying quilting braces to a mattress, said quilting braces being composed of a tie element, a first tuft being fastened to one end of said tie element, said tie element having, at its opposite end, a toggle or head which is adapted to be driven through a hole of a second tuft in order to engage said second tuft after the tie element has been driven through the mattress, characterized in that it comprises: a structure for locking a mattress; a plurality of devices for applying a quilting brace which can be positioned on said structure at the points of application of said quilting braces, each device being composed of a first unit and a second unit; said first unit being installed on one side of said mattress and comprising a needle which can move at right angles to said mattress and is provided, proximate to its tip, with a seat which is adapted to detachably retain inside it said toggle manually inserted by an operator, said needle having such a diameter that it passes through said hole; an actuator for pushing said needle through said mattress until said seat protrudes from the side opposite to the one wherein said needle was driven and said first tuft of the quilting brace, pulled by said needle, abuts against the mattress and causes a partial compression thereof; said second unit being installed on the opposite side of said mattress with respect to the side of said first unit and comprising a rod which is guided coaxially to

said needle on the side opposite to the insertion side of said needle and has an end which is directed towards said mattress; means for retaining a plurality of tufts, meant to constitute the second tuft of each quilting brace and superimposed on said rod; pusher means which are adapted to push said tufts towards said retention means so as to form a stack of tufts; elastic means, which are adapted to actuate said rod against said retention means, whereat the front tuft of said stack is at the end of said rod; a separator, which is actuated by an actuator between a position for separating said front tuft from the directly adjacent one and a position for disengaging from said tufts, said actuators of the needle and of the separator being actuated so that during a first step said separator is kept in the position for separating said front tuft from the remaining tufts of the stack whilst said needle, after passing through said mattress, engages the end of said rod and causes the simultaneous spacing of said stack from said front tuft and the transfer of said front tuft from said rod onto said needle and therefore the release of said toggle from said needle when the expansion force applied by the compressed mattress exceeds the force that keeps the toggle in its seat in the needle, so that said toggle can pull said separated front tuft against said mattress; and so that during a second step, said separator is actuated into the disengagement position and said needle is returned to the initial position, whilst said stack of tufts is pushed by said pusher means against said retention means.

[0008] Other particular embodiments of the invention are set out in claims 2-6.

[0009] Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment, illustrated by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of the apparatus;
figure 2 is a perspective view of a device for applying a quilting brace;
figure 3 is a partially sectional perspective view of a part of the device shown in figure 2;
figure 4 is a perspective view of a constructive detail;
figure 5 is a partially sectional view of the tip of the needle of the device;
figures 6, 7 and 8 are views of three successive operating positions of the device during the application of a quilting brace to a mattress; and finally
figure 9 is a view of a different embodiment of the apparatus.

[0010] With reference to the figures, the apparatus comprises a structure composed of two rectangular frameworks 1 and 2 which are connected by cross-members 3, 4, 5, 6 so that one is flat and parallel with respect to the other.

[0011] The cross-members 3 to 6 vertically support

two rectangular, flat and parallel frames 8 and 9; a plurality of mutually parallel posts 10 and 11 lies between the upper and lower stringers of said frames and give said frames the appearance of grilles. The frame 8 is fixed to the cross-members 3-6, whilst the frame 9 is guided on said cross-members and can move with respect to the frame 8 by means of pneumatic jacks 9a, 9b, 9c and 9d whose cylinders are coupled by flanges at the corners of the frame 2 and whose stems are rigidly coupled to the frame 9.

[0012] The posts 10 and 11 form pairs of guides; each guide associated with the frame 8 is arranged opposite to a corresponding pair of guides of the frame 9. The posts 10 and 11 are constituted by bars having a quadrangular cross-section (see figure 3) and are arranged so that their faces are oblique with respect to the plane of the frames 8 and 9.

[0013] The frame 9, by means of the jacks 9a-9d, can move between a position for spacing from the frame 8, which allows to insert a mattress M between said frames, and a mutually adjacent position, at which the mattress remains locked between the frames 8 and 9. Below the frames 8 and 9 there is provided a conveyor 12 which is closed in a loop around guiding pulleys and places the mattress M between the frames 8 and 9.

[0014] A plurality of devices 13 (see figure 2) for applying the quilting braces through the mattress are installed on the various pairs of posts 10 and 11.

[0015] Each device 13 is composed of a first unit 14, which can be positioned on a pair of posts 10 of the frame 8, and a second element 15, which can be positioned on the pair of posts 11 of the frame 9.

[0016] The unit 14 is composed of a bracket 16, on the arms of which two respective blocks 17 and 18 are internally fixed; said blocks have vertical and mutually opposite grooves 19. Two respective jaws 20 and 21 are arranged between the blocks 17 and 18 and are provided with grooves 23 which lie opposite to the grooves 19. Each one of the grooves 19 and 23 is formed by two perpendicular faces in order to couple perfectly to the faces of the posts 11.

[0017] The jaws 20 and 21 can be moved adjacent to, or spaced from, the blocks 17 and 18 by means of wing nuts 24 and 25, so as to form clamps for fixing the units 14 to the posts 10 of the frame 8.

[0018] A pneumatic cylinder 26 is rigidly coupled to the bracket 16; its stem 27 lies at right angles to the frame 8, on the side opposite to the one where the bracket 16 is coupled to the posts 10.

[0019] A plate 28 is fixed to the end of the stem 27, and two respective rods 29 and 30 are rigidly coupled to said plate; said rods are parallel to the stem 27 and can slide in a flange 31 of the cylinder 26. A needle 32 is coaxially rigidly coupled to the rod 30, protrudes outside the cylinder and is provided with means for coupling a quilting brace P to be applied transversely to the mattress.

[0020] As shown more clearly in figure 5, the quilting

brace P is composed of a tie element R, which in this case is constituted by a tape at one end of which two toggles T are fixed in order to retain two tufts S and Z (in figure 5, the tuft Z has not been applied yet). The toggles T are constituted in practice by a cylindrical pin whose ends are hemispherical and whose diameter is such that it can pass through the central hole F of the tufts S and Z and remain coupled thereto in order to complete the quilting brace P. The tufts S and Z are constituted in practice by disks made of woolly material, at the center of which an eyelet for the passage of the toggles is fixed, forming the hole F. The tuft S can also be permanently fixed to the end of the tie element R.

[0021] The means provided on the needle to fasten the quilting brace to be applied to the mattress comprise a seat 33 which is formed proximate to the tip of the needle 32 and can be accessed through a slot 34 whose breadth allows to insert the toggle T in the seat 33. The seat 33 continues towards the tip of the needle 32 with a recess 35 and, on the opposite side, with a seat in which a pin 36 can slide; said pin is actuated by a spring 37 towards the recess 35, so that by inserting the toggle in the seat 33 said toggle is retained inside the seat 33, between the pin 36 and the recess 35. The force of the spring 37 is set so as to allow the needle 32 to pass through the mattress M without disengaging the toggle T from the seat 33.

[0022] The diameter of the needle 32 is such that it can pass through the central hole of the second tuft Z, which is fed by the second unit 15.

[0023] As shown more clearly by figures 2 and 3, said element 15 comprises a bracket which is formed by two arms 38 and 39 which support two clamps fully identical to those described earlier with regard to the reference numerals 17 to 25. Said clamps are in fact composed of two blocks 40 and 41 provided with mutually opposite V-shaped grooves 42.

[0024] Two respective jaws 43 and 44 are provided in opposition to each block 40 and 41; each jaw also has V-shaped grooves 45 which are arranged opposite the grooves 42 of the blocks 40 and 41. The grooves 42, 45 are formed by two mutually perpendicular faces in order to perfectly couple to the faces of the posts 11.

[0025] Wing nuts 46 are screwed into the jaws 43 and 44; their actuation allows to move the jaws 43, 44 mutually closer or further apart with respect to the respective blocks 40 and 41, thus forming two clamps by means of which the unit 15 can be applied to a pair of posts 11.

[0026] The arms 40 and 41 are firmly joined together by a plate 47, shown more clearly in figure 4. Said plate is provided, on its front face, with a guide 48 formed by two strips 49 and is centrally provided with a circular opening 50 whose diameter is complementary to the diameter of the tuft Z.

[0027] A secondary plate 52 rests on the rear face 51 of the plate 47 and is termed separator plate owing to its function, which is described hereinafter. Two parallel

slots 53 are formed in the secondary plate 52, and on its lower edge there is provided a semicircular notch 54 which is located on the centerline of said secondary plate, between the slots 53.

[0028] Two screws 55 are slidably driven through the slots 53 and are screwed into the face 51; said screws keep the secondary plate 52 in sliding contact on the face 51. The plate 52 has two lateral expansions 56 which are inserted in diametrical slits 57 formed at the upper ends of tubular stems 58 of two pneumatic jacks 59. Two respective auxiliary rods 60 rest on the expansions 56 and have a lower head which is guided in the tubular stems 57 and acts on the expansions 56. The auxiliary rods 60 are slidably inserted in holes 62 of a strip 63 and in holes 64 of a bridge 65; said strip and said bridge are fixed to the plate 47 so as to cantilever out from the face 51 by means of screws 66.

[0029] The bridge 65 and the strip 63 have notches 67 and 68 through which the secondary plate 52 is passed.

[0030] Respective springs 69 are guided on the auxiliary rods 60 and rest, in an upward region, against the strip 63 and, in a downward region, on the heads of the secondary rods 60, so as to keep the expansions 56 of the plate 52 engaged in the slits 57 of the ends of the stems 58.

[0031] A half tube 70 for containing the tufts Z is fixed in a cantilevered fashion to the plate 47 on the side of the face 51; said half tube is open upward and is coaxial to the opening 50. Two elements 71, 72 are fixed at the end and in an intermediate position of the half tube 70 and have a disk-like shape that couples to the half tube 70. The elements 71 and 72 are chamfered in an upward region so as to form two inclined planes 73 and 74 which converge towards respective central holes 75 and 76 which are open upward.

[0032] A tubular rod 77 for supporting the tufts Z is guided in the hole 76 and is retained in said hole 76 by a fork provided with two prongs 78 which can be inserted in the element 72 at right angles to the rod 77. The fork 78 can be extracted from the element 74 when the rod 77 is to be replaced with a full one, particularly to remove a rod which has already been emptied of the tufts Z.

[0033] A ring 79 is axially rigidly coupled to the rod 77 and acts as abutment for a spring 80 which lies on the portion of the rod 77 arranged between the disk-like elements 71 and 72. The spring, on the opposite side with respect to the ring 79, abuts against a bush 81 which is accommodated in the hole 75 and through which the rod 77 passes slidably.

[0034] Respective pairs of guiding holes 82, 83 are also formed in the elements 71 and 72, below the central hole 75 and 76, for a pair of parallel rods 84 and 85 which protrude towards the plate 47. A pusher 86 is fixed to the ends of the rods 84 and 85 which lie between the element 72 and the plate 47 and is constituted by a disk wherein there is provided a radial slit 87 wider than the diameter of the rod 77.

[0035] Springs 88 are arranged on the portions of the rods 84, 85 that lie between the element 72 and the disk 86 and move the plate 86 towards the plate 47 in order to push forward a plurality of tufts Z arranged on the rod 77 so as to form a stack.

[0036] The tufts Z on the rod 77 are retained axially by an elastic retainer 89, which is constituted by a highly elastic wire folded so as to form an arc which is accommodated in a recess of the rod. The retainer 89 protrudes from the surface of the rod and can retract into it when it is pushed radially in order to allow the passage of the tufts.

[0037] The ring 79 retains the rod 77 in the position wherein the front tuft Z_a of the stack, which abuts against the retainer 89 owing to the thrust applied by the pusher 86, is inserted in the opening 50.

[0038] Two sliding blocks 90, 91 can slide in the guide 48 of the plate 47 and can be moved mutually closer or further apart by means of respective pneumatic jacks 92 and 93. The jacks 92 and 93 are fixed to brackets 94, 95 (see also figure 2) which protrude from the plate 47 and the stems of which are connected to L-shaped elements 96, 97 which are fitted laterally with respect to the respective sliding blocks 90, 91.

[0039] The sliding blocks 90, 91 have, on the face directed towards the mattress M, respective conical cavities 98, 99 which, in the position wherein the sliding blocks are mutually adjacent, form a sort of funnel which converges towards a central hole 100 formed by complementary notches provided in the surfaces of the sliding blocks that make mutual contact. When the sliding blocks are in the mutual contact position, the central hole 100 is aligned with the needle 32 in order to guide it against the front end of the rod 77.

[0040] The operation of the described apparatus is as follows.

[0041] First of all, the devices 13 are arranged according to the intended layout of the quilting braces P on the mattress M. For this purpose, the units 14 and 15, by means of the clamps 17-25 and 40-46, are placed along the posts 10 and 11, taking care to align each needle 32 with a respective tubular rod 77.

[0042] Once this preparatory step has ended, the mattress M is inserted between the frames 8 and 9 and is locked by means of the jacks 9a-9d.

[0043] The operating steps of each device 13 include the mutually adjacent arrangement of the sliding blocks 90, 91 by means of the actuation of the jacks 92 and 93 and the descent of the separator plate 52 caused by the thrust of the springs 69 and the lowering of the stems 58 of the jacks 57. In this situation, shown in figure 6, the front tuft Z_a of the stack of tufts Z superimposed on the rod 77 is inside the opening 50 of the plate 47, interposed between the sliding blocks 90, 91 and the secondary plate 52.

[0044] The jack 26 is then actuated and pushes the needle 32 through the mattress M; the tie element R, provided with the tuft S by inserting the toggle T in the

seat 33, has been applied beforehand to said needle 32.

[0045] When the needle 32 has passed through the mattress, it is guided by the funnel 98, 99 of the sliding blocks 90, 91 into the hole 100 and then engages the end of the rod 77. As the stroke of the pneumatic jack 26 continues, the rod 77 is pushed backward in contrast with the elastic reaction of the spring 80. When the thrust applied by the needle 32 to the rod 77 is such that the spring 89 is forced to retract into the rod 77, the front tuft Z_a separates from the rod and remains inserted on the tip of the needle 32 (figure 7).

[0046] As the advancement stroke of the needle continues, the rod 77 is kept rested against the tip of the needle by means of the thrust of the spring 80, whilst the pusher 86, by means of the action of the springs 88, returns the tufts Z of the stack that follow the tuft Z_a into abutment against the retainer 89. The elastic thrust applied by the springs 88 is of course very weak, in order to prevent the tufts Z of the stack from moving beyond the elastic retainer 89.

[0047] As the needle 32 advances, the mattress M is gradually compressed and therefore the traction applied by the tape R to the toggle T in the seat 33, and thus on the pin 36, increases; by retracting in contrast with the thrust of the springs 37, said pin, once the return force of the spring 37 has been exceeded, disengages from the seat 33 (figure 7). Since the mattress M is no longer retained under compression by the traction element R, it can expand and pull the toggle T against the tuft Z_a .

[0048] At this point the sliding blocks 90, 91 are opened, allowing the tuft Z_a to rest against the mattress. At the same time, the jacks 59 and the jack 26 are actuated and lift the secondary plate 52 into a position for disengaging from the tufts and respectively extract the needle from the mattress M (figure 8). Finally, the springs 80 and 88 return the stack of tufts Z to the initial position, wherein the secondary plate 52 is moved downward again in order to separate a new front tuft. The apparatus is thus in the condition shown in figure 6 and the operating cycle can be repeated in the above-described manner.

[0049] It is evident that the described invention perfectly achieves the intended aim and objects. In particular, the apparatus has proved itself highly versatile in relation to the possibility of positioning the quilting brace application devices in a preset pattern by moving the units 14 and 15 along the posts 10 and 11.

[0050] One advantage of the invention is the fact that the rod can be removed from its seat after extracting the fork 78 to replace it with another one, already loaded with a new series of tufts Z.

[0051] The described apparatus is susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

[0052] Figure 9 illustrates a solution in which instead of the elastic retainer 89 at the end of the rod 77 there are provided two needles 101, 102 which are guided diametrically in the plate 47 and protrude into the opening

50. The needles 101, 102 are connected to respective pistons 103, 104 which can slide in cylinders 105, 106 formed in the plate 47.

[0053] The cylinders 105, 106 are connected to a compressed air source which moves the needles 101, 102 towards the hole 50 in contrast with the return action of elastic means 107, 108 interposed between the pistons 103, 104 and the bottom of the cylinders 105, 106.

[0054] Ducts 109, 110 extend from the cylinders 105, 106, lead onto the rear face 51 of the plate 47 and are orientated so that the air jets converge towards the rod 77.

[0055] Additional holes 111, 112 are formed in the supporting element 74 of the rod 77 and are orientated axially towards the plate 47.

[0056] During the advancement of the needle 32, the needles 101, 102 retain the front tuft Z, whilst the compressed air that flows out of the holes 109, 110 pushes back the stack of tufts Z, allowing the toggle T to engage only the front tuft Z_a . As soon as the toggle has engaged the front tuft Z_a , the needles 101, 102 are retracted and the sliding blocks 90, 91 are opened to allow the released tuft to rest against the mattress. Compressed air is then sent through the holes 111, 112 so as to push the stack of tufts Z towards the plate 47 and allow the needles 101, 102 to retain a new front tuft.

[0057] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An apparatus for applying quilting braces to a mattress (M), said quilting braces (P) being composed of a tie element (R), a first tuft (S) being fastened to one end of said tie element, said apparatus comprising: a structure (8, 9) for locking a mattress (M); a plurality of devices (13) for applying a quilting brace (P), which can be positioned on said structure at the points of application of said quilting braces, each device being composed of a first unit (14) and a second unit (15); said first unit (14) being installed on one side of said mattress (M) and comprising a needle (32) which can move at right angles to said mattress (M) and is provided, proximate to its tip, with a seat (33); an actuator (26) for pushing said needle (32) through said mattress (M) until said seat (33) protrudes from the side opposite to the one in which said needle was driven and said first tuft (S) of the quilting brace (P), pulled by said needle (32), abuts against the mattress (M) and causes a partial compression thereof; said second unit (15) being installed on the opposite side of said mattress (M)

with respect to the side of said first unit (14) **characterized in that** said tie element has, at its opposite end, a toggle (T) which is adapted to be driven through a hole (F) of a second tuft (Z) in order to engage said second tuft after the tie element (R) has been driven through the mattress (M), said seat (33) of the needle is adapted to detachably retain inside it said toggle (T), which is inserted manually by an operator, said needle (32) having such a diameter that it passes through said hole (F), and said second unit (15) comprising a rod (77) which is guided coaxially to said needle on the side opposite to the insertion side of said needle and has an end which is directed towards said mattress (M); means (90, 91) for retaining a plurality of tufts, meant to constitute the second tuft (Z) of each quilting brace (P) and superimposed on said rod (77); pusher means (86) adapted to push said tufts (Z) towards said retention means (90, 91) so as to form a stack of tufts; elastic means (80), which are adapted to actuate said rod (77) against said retention means (90, 91), at which the front tuft (Z_a) of said stack is at the end of said rod (77); a separator (52), which is actuated by an actuator (59) between a position for separating said front tuft (Z_a) from the directly adjacent one and a position for disengaging from said tufts, said actuators (26, 59) of the needle (32) and of the separator (52) being actuated so that during a first step said separator (52) is kept in the position for separating said front tuft (Z_a) from the remaining tufts (Z) of the stack while said needle (32), after passing through said mattress (M), engages the end of said rod (77) and causes the simultaneous spacing of said stack from said front tuft (Z_a) and the transfer of said front tuft (Z_a) from said rod (77) onto said needle (32) and therefore the release of said toggle (T) from said needle (32) when the expansion force applied by the compressed mattress (M) exceeds the force that keeps the toggle (T) in its seat (33) in the needle (32), so that said toggle (T) can pull said separated front tuft (Z_a) against said mattress (M); and so that during a second step, said separator (52) is actuated into the disengagement position and said needle (32) is returned to the initial position, while said stack of tufts (Z) is pushed by said pusher means (86) against said retention means (90, 91).

2. An apparatus according to claim 1, **characterized in that** said second unit (15) comprises a plate (47) which has elements (38-45) for coupling to said structure (9), elements (70-72) for slidably supporting said rod (77) on said plate (47) in contrast with said elastic means (80), and **characterized in that** said retention means comprise two sliding blocks (90, 91) which are guided on said plate (47) at right angles to said rod (77), actuator means (92, 93) for moving said sliding blocks (90, 91) mutually closer

and further apart, said sliding blocks having respective concave regions (98, 99) which, in their mutually adjacent position, form a funnel for guiding said needle (32) so that it abuts against said rod (77) axially.

3. An apparatus according to claim 2, **characterized in that** said separator is constituted by a secondary plate (52) which is slidably supported on said plate (47) and is actuated by an actuator (59) between a position for engagement between said front tuft (Z_a) and the directly adjacent one (Z).
4. An apparatus according to claim 3, **characterized in that** said separator comprises needle means (101, 102) which are actuated by an actuator (103, 106) between a position for retaining the front tuft (Z_a) and a position for releasing it, compressed air jet means (109, 110) being provided in order to separate the tufts (Z) of said stack from said front tuft (Z_a) when said front tuft is retained by said needle means (101, 102) in order to allow only said front tuft (Z_a) to pass on said needle (77), compressed air jet means (111, 112) being also provided in order to return said stack of tufts against said stop means (90, 91) when said toggle (T) has disengaged from said needle (32) and said front tuft (Z_a) has been pulled against said mattress (M).
5. An apparatus according to one of the preceding claims, **characterized in that** said structure for locking the mattress (M) comprises two frames (8, 9) which can move with respect to each other in order to lock a mattress (M) inserted between them, said frames having posts (10, 11) along which said units (14, 15) for applying the quilting braces (P) can be positioned.
6. An apparatus according to claim 5, **characterized in that** said units (14, 15) are provided with clamps (17-21; 40-44) which can be tightened onto said posts (10, 11).

Patentansprüche

1. Vorrichtung zum Anbringen von Steppungen an einer Matratze (M), wobei die Absteppungen (P) gebildet sind aus einem Verbindungselement (R), einem ersten Knopf (S), der an einem Ende des Verbindungselements befestigt ist, wobei die Vorrichtung umfasst: eine Struktur (8, 9) zum Einspannen einer Matratze (M); eine Vielzahl von Einrichtungen (13) zum Anbringen einer Absteppung (P), die auf der Struktur an den Punkten zum Anbringen der Steppungen positioniert werden können, wobei jede Einrichtung aus einer ersten Einheit (14) und einer zweiten Einheit (15) gebildet ist; wobei die erste

Einheit (14) auf einer Seite der Matratze (M) installiert ist und eine Nadel (32) umfasst, die sich im rechten Winkel zur Matratze (M) bewegen kann und nahe ihrer Spitze mit einem Sitz (33) versehen ist; ein Betätigungselement (26) zum Schieben der Nadel (32) durch die Matratze (M), bis der Sitz (33) an der Seite gegenüberliegend zur Einführseite der Nadel hervorsteht und der erste Knopf (S) der Absteppung (P), gezogen von der Nadel (32), gegen die Matratze (M) anstösst und eine teilweise Kompression derselben bewirkt; wobei die zweite Einheit (15) in Bezug auf die Seite der ersten Einheit (14) auf der gegenüberliegenden Seite der Matratze (M) installiert ist, **dadurch gekennzeichnet, dass** das Verbindungselement an seinem gegenüberliegenden Ende einen Knebel (T) aufweist, der geeignet ist zum Durchführen durch ein Loch (F) in einem zweiten Knopf (Z), um den zweiten Knopf einzuhängen, nachdem das Verbindungselement (R) durch die Matratze (M) hindurchgeführt wurde, der Sitz (33) der Nadel geeignet ist, den Knebel (T) entferntbar darin zu halten, der von Hand durch eine Bedienungsperson eingesetzt ist, wobei die Nadel (32) einen solchen Durchmesser aufweist, dass sie durch das Loch (F) passt, und die zweite Einheit (15) einen Stab (77) umfasst, der auf der Seite gegenüberliegend zur Einführseite der Nadel coaxial zu der Nadel geführt ist und ein Ende aufweist, das zur Matratze (M) gerichtet ist; Mittel (90, 91) zum Aufnehmen einer Vielzahl von Knöpfen, die zur Bildung des zweiten Knopfes (Z) jeder Absteppung (P) gedacht sind und auf dem Stab (77) übereinander gelagert sind; Schiebemittel (86), die geeignet sind, die Knöpfe (Z) zu den Aufnahmemitteln (90, 91) zu schieben, um einen Stapel von Knöpfen zu bilden; elastische Mittel (80), die geeignet sind, den Stab (77) gegen das Aufnahmemittel (90, 91) zu betätigen, wobei der vordere Knopf (Z_a) des Stapels sich am Ende des Stabes (77) befindet; einen Separator (52), der durch ein Betätigungselement (59) zwischen einer Position zum Trennen des vorderen Knopfes (Z_a) von dem direkt anschliessenden und einer Position zum Lösen von den Knöpfen betätigt wird, wobei die Betätigungselemente (26, 59) der Nadel (32) und des Separators (52) so betätigt werden, dass in einem ersten Schritt der Separator (52) in der Position zum Trennen des vorderen Knopfes (Z_a) von den übrigen Knöpfen (Z) des Stapels gehalten ist, während die Nadel (32), nachdem sie durch die Matratze (M) hindurchgetreten ist, am Ende des Stabes (77) eingreift und die gleichzeitige Entfernung des Stapels vom vorderen Knopf (Z_a) und die Übertragung des vorderen Knopfes (Z_a) vom Stab (77) auf die Nadel (32) bewirkt und damit die Freigabe des Knebels (T) von der Nadel (32), wenn die durch die komprimierte Matratze (M) aufgebrachte Expansionskraft die Kraft übersteigt, die den Knebel (T) in seinem Sitz (33) in der Nadel (32)

hält, so dass der Knebel (T) den abgetrennten vorderen Knopf (Z_a) gegen die Matratze (M) ziehen kann; und so dass in einem zweiten Schritt der Separator (52) in eine Freigabeposition betätigt wird und die Nadel (32) in die Ausgangsposition zurückkehrt, während der Stapel von Knöpfen (Z) durch das Schiebemittel (86) gegen die Aufnahmemittel (90, 91) geschoben wird.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die zweite Einheit (15) eine Platte (47) umfasst, die Elemente (38-45) aufweist zum Koppeln der Struktur (9), Elemente (70-72) zum verschiebbaren Tragen des Stabes (77) auf der Platte (47) im Gegensatz zum elastischen Mittel (80), und **dadurch gekennzeichnet, dass** die Haltemittel zwei Gleitblöcke (90, 91) umfassen, die auf der Platte (47) im rechten Winkel zu dem Stab (77) geführt sind, Betätigungsmittel (92, 93), um die Gleitblöcke (90, 91) näher zusammen und weiter auseinander zu bewegen, wobei die Gleitblöcke entsprechende konkave Bereiche (98, 99) aufweisen, die in ihrer zueinander benachbarten Position einen Trichter zum Führen der Nadel (32) bilden, so dass sie axial gegen den Stab (77) anstösst.
3. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** der Separator durch eine zweite Platte (52) gebildet ist, die verschiebbar auf der Platte (47) getragen ist und durch ein Betätigungselement (59) zwischen einer Position zum Eingriff zwischen den vorderen Knopf (Z_a) und den direkt daran angrenzenden (Z) betätigt wird.
4. Vorrichtung nach Anspruch 3, **dadurch gekennzeichnet, dass** der Separator Nadelmittel (101, 102) umfasst, die durch ein Betätigungselement (103, 106) zwischen einer Position zum Halten des vorderen Knopfes (Z_a) und einer Position zu seiner Freigabe betätigt wird, wobei Druckluftmittel (109, 110) vorgesehen sind, um die Knöpfe (Z) des Stapels vom vorderen Knopf (Z_a) zu trennen, wenn der vordere Knopf durch das Nadelmittel (101, 102) gehalten wird, um zu ermöglichen, dass nur der vordere Knopf (Z_a) auf die Nadel (77) übergeht, wobei auch Druckluftmittel (111, 112) vorgesehen sind, um den Stapel Knöpfe gegen die Stopmittel (90, 91) zurückzuführen, wenn der Knebel (T) sich von der Nadel (32) gelöst hat und der vordere Knopf (Z_a) gegen die Matratze (M) gezogen wurde.
5. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur zum Einspannen der Matratze (M) zwei Rahmen (8, 9) umfasst, die sich relativ zueinander bewegen können, um eine dazwischen eingesetzte Matratze (M) festzuhalten, wobei die Rahmen Stützen (10, 11) aufweisen, entlang derer die Einheiten

(14, 15) zum Anbringen der Absteppungen (P) positioniert werden können.

6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die Einheiten (14, 15) mit Klammern (17-21; 40-44) versehen sind, die auf den Stützen (10, 11) angezogen werden können.

Revendications

1. Dispositif pour appliquer des brides de capitonnage sur un matelas (M), lesdites brides de capitonnage (P) étant constitués d'un élément de liaison (R), d'une première houppe ou touffe (S) fixée sur une première extrémité dudit élément de liaison, ledit dispositif comportant : une structure (8, 9) pour bloquer un matelas (M), une pluralité de dispositifs (13) pour appliquer une bride de capitonnage (P) qui peuvent être positionnés sur ladite structure au niveau des points d'application desdites brides de capitonnage, chaque dispositif étant constitué d'une première unité (14) et d'une seconde unité (15), ladite première unité (14) étant installée sur un premier côté dudit matelas (M) et comportant une aiguille (32) qui peut se déplacer à angle droit par rapport audit matelas (M) et qui est munie, à proximité de sa pointe, d'un siège (33), un actionneur (26) pour pousser ladite aiguille (32) à travers ledit matelas (M) jusqu'à ce que ledit siège (33) fasse saillie à partir du côté opposé à celui dans lequel ladite aiguille a été entraînée, et ladite première houppe (S) de la bride de capitonnage (P), tirée par ladite aiguille (32), vient en butée contre le matelas (M) et provoque une compression partielle de celui-ci, ladite seconde unité (15) étant installée sur le côté opposé dudit matelas (M) par rapport au côté de ladite première unité (14), **caractérisé en ce que** ledit élément de liaison a, au niveau de son extrémité opposée, un bouton (T) qui est adapté pour être entraîné à travers un trou (F) d'une seconde houppe (Z) pour venir en prise avec ladite seconde houppe après que l'élément de liaison (R) a été entraîné à travers le matelas (M), ledit siège (33) de l'aiguille est adapté pour retenir, de manière amovible, à l'intérieur de celui-ci, ledit bouton (T) qui est inséré manuellement par un opérateur, ladite aiguille (32) ayant un diamètre tel qu'elle passe à travers ledit trou (F), et ladite seconde unité comportant une tige (77) qui est guidée coaxialement par rapport à ladite aiguille, sur le côté opposé au côté d'insertion de ladite aiguille, et a une extrémité qui est dirigée vers ledit matelas (M), des moyens (90, 91) pour retenir une pluralité de houppes, destinés à constituer la seconde houppe (Z) de chaque bride de capitonnage (P), et superposés sur ladite tige (77), des moyens de poussée (86) adaptés pour pousser lesdites houppes (Z) vers lesdits

moyens de retenue (90, 91) de manière à former une pile de houppes, des moyens élastiques (80) qui sont adaptés pour actionner ladite tige (77) contre lesdits moyens de retenue (90, 91), au niveau desquels la houppe avant (Z_a) de ladite pile se trouve au niveau de l'extrémité de ladite tige (77), un séparateur (52) qui est actionné par un actionneur (59) entre une position de séparation de ladite houppe avant (Z_a) de celle directement adjacente, et une position de dégagement à partir desdites houppes, lesdits actionneurs (26, 59) de l'aiguille (32) et du séparateur (52) étant actionnés de sorte qu'à une première étape, ledit séparateur (52) est maintenu en position pour séparer ladite houppe avant (Z_a) des houppes restantes (Z) de la pile, tandis que ladite aiguille (32), après être passée à travers ledit matelas (M), vient en prise avec l'extrémité de ladite tige (77) et provoque l'écartement simultané de ladite pile à partir de la houppe avant (Z_a), et le transfert de ladite houppe avant (Z_a) à partir de ladite tige (77) sur ladite aiguille (32), et par conséquent la libération dudit bouton (T) par rapport à de ladite aiguille (32) lorsque la force d'expansion appliquée par le matelas comprimé (M) dépasse la force qui maintient le bouton (T) dans son siège (33) dans l'aiguille (32), de sorte que ledit bouton (T) peut tirer ladite houppe avant séparée (Z_a) contre ledit matelas (M), et de sorte qu'à une seconde étape, ledit séparateur (52) est actionné dans la position de dégagement, et ladite aiguille (32) est ramenée jusqu'à la position initiale, tandis que ladite pile de houppes (Z) est poussée par lesdits moyens de poussée (86) contre lesdits moyens de retenue (90, 91).

2. Dispositif selon la revendication 1, **caractérisé en ce que** ladite seconde unité (15) comporte une plaque (47) qui a des éléments (38-45) pour accouplement à ladite structure (9), des éléments (70-72) pour supporter de manière coulissante ladite tige (77) sur ladite plaque (47) contrairement auxdits moyens élastiques (80), et **caractérisé en ce que** lesdits moyens de retenue comportent deux blocs coulissants (90, 91) qui sont guidés sur ladite plaque (47) à angle droit par rapport à ladite tige (77), des moyens d'actionnement (92, 93) pour déplacer lesdits blocs coulissants (90, 91) en rapprochement ou en éloignement mutuel, lesdits blocs coulissants ayant des zones concaves respectives (98, 99) qui, dans leur position mutuellement adjacente, forment un entonnoir pour guider ladite aiguille (32) de sorte qu'elle vienne en butée contre ladite tige (77) axialement.
3. Dispositif selon la revendication 2, **caractérisé en ce que** ledit séparateur est constitué par une plaque secondaire (52) qui est supportée de manière coulissante sur ladite plaque (47), et est actionné

par un actionneur (59) entre une position de mise en prise entre ladite houppe avant (Z_a) et celle directement adjacente (Z).

4. Dispositif selon la revendication 3, **caractérisé en ce que** ledit séparateur comporte des moyens formant aiguille (101, 102) qui sont actionnés par un actionneur (103, 106) entre une position de retenue de la houppe avant (Z_a) et une position de libération de celle-ci, des moyens formant jet d'air comprimé (109, 110) étant fournis pour séparer les houppes (Z) de ladite pile par rapport à ladite houppe avant (Z_a) lorsque ladite houppe avant est retenue par lesdits moyens formant aiguille (101, 102), pour permettre uniquement à ladite houppe avant (Z_a) de passer sur ladite aiguille (32), des moyens formant jet d'air comprimé (111, 112) étant également fournis pour ramener ladite pile de houppes contre lesdits moyens d'arrêt (90, 91) lorsque ledit bouton (T) a été libéré de ladite aiguille (32), et que ladite houppe avant (Z_a) a été tirée contre ledit matelas (M).

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5. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite structure de blocage du matelas (M) comporte deux châssis (8, 9) qui peuvent se déplacer l'un par rapport à l'autre pour bloquer un matelas (M) inséré entre eux, lesdits châssis ayant des montants (10, 11) le long desquels on peut positionner lesdites unités (14, 15) pour appliquer les brides de capitonnage (P).

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6. Dispositif selon la revendication 5, **caractérisé en ce que** lesdites unités (14, 15) sont munies d'attaches (17-21 ; 40-44) qui peuvent être serrées sur lesdits poteaux (10, 11).

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