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(54) EVACUATION OR RESCUE DEVICE FOR A NON-AMBULATORY PERSON

EVAKUIER- ODER RETTUNGSVORRICHTUNG FÜR EINE NICHT-AMBULANTE PERSON

DISPOSITIF D'EVACUATION OU DE SAUVETAGE POUR PERSONNES ALITEES

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EP 0 505 516 B1

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to rescue and/or evacuation devices for non-ambulatory or bed-ridden persons. More particularly, the invention relates to such a device in which a patient may be rapidly and securely enclosed before transfer or evacuation.

2. Prior Art of the Invention

An Evacuation Mattress is disclosed in International Application Number PCT/NL 86/00015 published December 18, 1986 under No. WO 86/07253 based on a Netherlands application filed June 12, 1985. The mattress is characterized by belts or ropes to be put around the patient, which are permanently fastened to the mattress.

Other prior art devices for evacuating non-ambulatory persons have also included boards or mats to support a patient. For example, U.S. patent 4,793,008 issued December 27, 1988 to Johansson discloses rigid yet flexible mats for placing under the patient with a strap each for securing the patient across the chest and thighs. A relatively complicated Rescue Transportation Device is disclosed in U.S. patent 4,736,474 issued April 12, 1988 to Moran et al, wherein an inflatable support member and crossed straps are used to secure the person being transported.

A Child Restraint Device With Removable Semi-Rigid Support is disclosed in U.S. patent 4,627,428 issued December 9, 1986 to Brooks. It includes a semi-rigid base and a cover attachable to the base so as to secure the child between the base and the cover. A restraining harness on top of the cover secures the entire arrangement to a transporting device.

EP 0 165 043 A3 discloses a child safety restraint for restraining a child in a flat position. The apparatus includes a base and a cover attachable to the base so as to secure the child therebetween.

There are numerous other patents and patent applications employing rigid or semi-rigid supports and belts or straps to secure the person transported to the support. One apparent disadvantage to the use of straps or belts is that they could exert undue or excessive pressure on the bodies of some evacuees, such as in the case of recent surgery patients. Another disadvantage that is not obvious is that the use of straps or the like harnesses delays the process of readying the patient for rescue and evacuation such as in the case of a hospital fire.

SUMMARY OF THE INVENTION

The present invention endeavors to provide a rescue/evacuation device that is rapidly deployable and that does not adversely affect the patient's body once deployed, and permits evacuation thereof by one person if necessary.

Accordingly, the present invention provides an evacuation device for a non-ambulatory person according to the features of claim 1.

In one aspect the invention provides such a device wherein said sheet means comprises at least one sheet of flexible material and said securement means comprises at least one first securement member, at least one second securement member and at least one third securement member, said first member securing said sheet means to said support (mattress) such that said sheet means is deployable so as to cover a substantial portion of said person and of the upper surface of said support, said second member being secured to said support, and said third member being engageable with said second member to enclose said person between said support and said sheet means.

In another and preferred embodiment the invention provides such a device for transporting a bed-ridden person, and adapted to remain under a bed mattress until needed, comprising;

A central sheet portion having approximately the size of said support and adapted to underlie the support, a panel portion at each of the foot and head of the central sheet, adapted to remain folded under the support while not in use, and to unfold when needed to overlie the person by covering the head and foot ends of the support, and meet at a central part of the support, with a means for fixing the meeting portions removably in place, whereby to form a retaining panel over the person,

said head end portion presenting an aperture for the head of the person,

strand operated means adapted to draw the retaining panel downwardly towards the central underlying sheet to tighten the retaining sheet against the support and retain the person securely within,

said strand operated means comprising on each side of the device a strand attached to a first anchorage point on the edge of the foot end panel intermediate the forward moving edge and the central sheet portion edge of the foot end panel, and passing through a guide attached to the central sheet, and terminating at a second anchorage point on the foot end panel adjacent to the forward moving edge thereof;

whereby when the foot end panel is deployed by pulling it up over the person and affixing it to the meeting portion of the head end panel the strand on each side is pulled longitudinally along the support, and the first and second anchorage points are drawn further apart, whereby the side edge of the central sheet is drawn towards the adjacent side edge of the retaining sheet formed by the foot and head end sheets, whereby to retain the person firmly in place against the support. Suitably, the guide comprises a slotted runner adapted to move along a bead forming an edge of the central sheet, and the guide includes a passage for the strand to permit movement of the strand through the guide during deployment, and facilitate tightening of the strand.

An improvement of the device of the present invention provides an evacuation or rescue device for a non-ambulatory person, comprising:

at least one sheet for covering substantially all of said person;

at least one cord for enclosing said person between said at least one sheet and a support for said person; and

at least one cleat, attached to a respective first area of said at least one sheet and for deployment along the upper surface of said support.

A further improvement on the above invention provides an evacuation device for a non-ambulatory person adapted to cooperate with, and be secured to, a mattress, stretcher, or like horizontal rest means, comprising

at least two sheets of use in covering said person;

at least two pairs of cords, each pair fixedly attached to a respective sheet of said at least two sheets and slidably attached to respective handles attached to respective sheets of said at least two sheets;

and securement means engaging said cords, to securely enclose said person between said sheets and said securement means;

said securement means comprising for each pair of cords at least two cleats, each of which is fixed to a respective edge of one of said at least two sheets and having an opening for travel of a respective one of said at least four cords.

BRIEF DESCRIPTION OF THE DRAWINGS

Certain embodiments of the invention will now be described in detail with reference to the annexed drawings, in which:

Figures 1, 2, and 3 are sequential perspective views showing deployment of an evacuation device according to the present invention;

Figure 4 is a perspective view of a variation of the evacuation device shown in Figure 3, fully deployed and in use;

Figure 5 is an exploded perspective view of the evacuation device shown in Figure 4;

Figure 6 is a plan view of the evacuation device shown in Figure 1, with the mattress omitted;

Figure 7 is a cross-sectional view along the line A-A in Figure 6;

Figure 8 is a plan view of a detail of the device showing the lower left-hand corner of Figure 6;

Figures 9, 10, and 11 are sequential, partial perspective views illustrating the securement of a sheet to a mattress;

Figures 12 and 13 are, respectively, plan and side views of a sled useful for rolling the embodiment shown in Figures 1 to 3;

Figure 14 is a plan view of a detail of the sled depicted in Figures 12 and 13;

Figure 15 is a cross-sectional view along the line B-B in Figure 14;

Figure 16 is a plan view of a detail of an alternative arrangement to that shown in Figure 8;

Figures 17 and 18 are sequential perspective partly broken away views of the device depicted in part in Figure 16, in use;

Figure 19 is an exploded perspective view of the device shown in Figures 16, 17 and 18;

Figure 20 is a side detail view of part of the device shown in Figures 17 and 18;

Figure 21 is a cross-sectional view along the line C-C in Figure 20;

Figure 22 is a plan detail view partly broken away of a segment of a sled for use in the present invention:

Figure 23 is a partial plan view of an alternative arrangement to that shown in Figure 16;

Figure 24 is a cross-sectional view along the line D-D in Figure 23;

Figure 25 is a detailed plan view of the cleat shown in Figures 23 and 24;

Figure 26 is a side view of an alternative cleat to that shown in Figure 25;

Figures 27, 28, 29 and 30 are sequential perspective views illustrating the securement of a sheet to a mattress;

Figures 31, 32 and 33 are sequential side views illustrating the securement of a sheet to a mattress;

Figures 34, 35 and 36 are sequential perspective views showing deployment of an evacuation device according to an improvement on the invention shown in the previous figures;

Figure 37 is a partially broken away plan view of the evacuation device shown in Figures 34, 35 and 36 with pouch cover and mattress omitted;

Figure 38 is a cross-sectional side view along the line E-E' shown in Figure 37, with the pouch cover in place;

Figure 39 is a side view of a detail of the portion F of the device shown in Figure 38;

Figure 40 is a side view of a handle that is part of the device shown in Figures 34 to 39;

Figure 41 is a plan view of the handle shown in Figure 40;

Figure 42 is an end view of the handle shown in Figure 40;

Figure 43 is a cross-sectional end view along the line G-G' in Figure 37;

Figures 44 and 45 show a means of attaching an element to the fabric;

Figures 46, 47 and 48 show a preferred embodiment of the device; and

Figures 49 and 50 show some variations of a means for removably anchoring the device to a bed.

DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENTS

Referring to Figure 1 of the drawings, it shows a person 103 lying on a mattress 109 on a bed frame 125. Visible at the foot end of the bed frame 125 is a handle 108 attached to the evacuation device, which is disposed under the mattress ready for deployment. A handle similar to the handle 108 extends beyond the head end of the mattress 109.

Figure 2 shows that by pulling the handle 108 of an evacuation device shown generally at 100, a top cover 101 is drawn out from its place of storage beneath the foot end of the mattress 109. Along with such a top cover 101 a further handle 105, which is preferably a cord, is drawn out, releasably held against the top cover 101 by a loop 118. The "cords" and "strands" referred to herein are preferably pre-stretched sailing rope 3/16 of an inch (0.47 cm) in diameter. Each end of the cord 105 is fastened to an edge of the top cover 101 by stitching at an edge point (as well as on the other, unseen, side) 106 and runs through loops 114 along the edges of the top cover 101. (The routing of the cord 105 between the head and foot ends of the mattress 109 and the longitudinal lower edges thereof, below the edge point 106, will be described in detail below in conjunction with Figures 5 through 15.) One end of the loop 118 is sewn to the top cover 101 and the other end is releasably fastenable by a hook-and-loop type closure to enclose and retain the cord 105 when the cord 105 is drawn out with the top cover 101.

By pulling the top cover 101 over the person 103 and the foot of the mattress 109, towards the opposite (head) end of the mattress 109, the cord 105 and top cover 101 are disposed to facilitate securely enclosing the person 103 between the top cover 101 and the mattress 109.

Referring to Figures 3 and 4, the top cover sheet 101' at the head end of the mattress 109 includes an opening 123 for the head of the person 103. The top covers 101 and 101' preferably are made of a PVC sheet material reinforced by polyester mesh and sold by Herculite Products Inc. of New York, New York under the trademark Staph Check 20. A flexible high tensile strength sheet material, preferably including a heat reflective material such as metallic coated polyethelene terephthalate, may be used as an alternative.

It is also preferred that each top cover 101 and 101' be longer than half the length of the mattress 109. In use, the top covers 101 and 101' are extended toward the head and foot ends of the mattress 109 respectively, and they overlap. They are then fastened to one another, suitably by hook-and-loop type closure strips 104. By pulling on the cords 105, the long edges of the top covers 101 and 101' are drawn down towards the lower edge of the mattress 109, securely enclosing the person 103 between the top covers 101 and 101' and the mattress 109.

Referring to the embodiment shown in Figure 4, each top cover 101 and 101' includes handles 107 on its upper surface. Such further handles 107 are of use in lifting the device and person 103 from a bed to a floor. Thereafter, the device and person 103 may be pulled along the floor using either cord 105.

With reference now to Figure 5, when the top covers 101 and 101' are drawn together they secure the person 103 to a sled 110, to a sheet 111, or to a sled-sheet assembly described in detail below with reference to Figures 5 through 15.

Enclosure of the person 103 by the top cover sheets 101 and 101' secures the person 103 onto the mattress 109.

Referring to Figure 5, a device shown generally at 100 includes a sheet 111, between the mattress 109 and the rest of the device 100. The sheet 111 includes, at each end, a flap 121 for covering the respective top covers 101 and 101' when they have been stored in pockets 102. The pockets referred to herein are not essential to the invention but are preferred, to keep the top covers 101 and 101' out of the way of bed clothes. The sheet 111 is attached to the rest of the device 100 by hook-and-loop type closure strips 122 on the corners of the lower face of the sheet 111 which engage matching Velcro strips 124 on the top of coverings 113. The coverings 113 cover grooves through which the cord 105 is originally placed.

In Figure 6, the sheet 111 has been omitted in the device 100, for the purposes of clarity. At each end of the device 100 a cord 105 extends from the loop 118 through the back of the pouch 102, into grooves 115 near the corners of the sled 110. Exiting from the grooves 115,

the cord 105 extends back toward the pouches 102 on each side of the cover 101. The cords 105 extend along grooves 112 under the covers 113 and then pass into the pouches 102, under the pouch lids 121. In the pouches 102 the cords 105 are folded up along the lateral edges of the top covers 101 and 101'. The cords 105 are kept in place therealong by the loops 114 and by being attached to the top covers 101 and 101' at points 106.

Referring to Figure 7, top cover 101 is stored in an accordion-folded manner under the foot end of the mattress 109. For the purposes of clarity, the cord 105 has not been included in the Figure.

Before use, each folded top cover 101 and 101' is stored in a respective pouch 102. Such pouches 102 are connected to the sled 110 and/or the sheet 111 which is preferably of a low friction material such as cloth coated with Teflon® (trade mark for polytetrafluoroethylene). The device 100 then forms a single unit, the lower surface of which is attached to the upper surface of a bed frame 125. Alternatively, the upper surface of the device 100 is attached to the lower surface of the mattress 109. In either event, Velcro may be used to affix the device 100. Also in either event, as shown in Figure 8, a pair of guide grooves 112 adjacent to each pouch 102 receives the cord 105 to facilitate the cord 105 moving past corners of the mattress 109 when the cord 105 is pulled.

Top cover 101 is attached to pouch 102 by stitching at 119. A suitable closing means is provided at 120 to keep the lid 121 closed until the device is to be used. A sheet plastic closing means such as the closure known by the trade mark Zip-Loc may be used. Any other means which is satisfactory for hospital use, such as Velcro, may also be used.

Referring to Figure 8, the grooves 112 are parallel to the direction in which the cord 105 is pulled and are covered by flexible coverings 113. Preferably, a leading edge and a trailing edge of the covering 113 of each groove 112 is angled to aid in the cord 105 clearing the corner of the mattress 109.

The first guide grooves 112 are below the mattress 109 corners and configured such that upon the cord 105 being pulled, the cord 105 passes out of the coverings 113 and guide grooves 112 without catching on the corners or the mattress 109. For each guide groove 112 an openable loop 114 is attached to the top cover 101 through which the cord 105 passes when the cord 105 is pulled. If, along the edge of each top cover 101 and 101' parallel to where the grooves 112 would be, a plurality of such loops 114 are attached then they suffice to cause the cord 105 to clear the corresponding corner of the mattress 102, and the grooves 112 are not needed.

Once the top covers 101 and 101' are extended over the person 103 and joined to one another by the Velcro 104 the attachments 106 are approximately opposite transverse openings at the ends of the second grooves 115. By pulling the cords 105, away from the device 100 at each end of the device 100, each cord 105 passes along the grooves 115, drawing its associated cover sheet 101 or 101' down toward the sled 110 and sheet 111. That process will now be described in further detail with reference to Figures 9 to 11.

Referring to Figure 9, before the cord 105 is pulled, a portion 105' of it is in the groove 112, under cover 113, below the mattress 109. Another portion 105" is along the side of the mattress 109 between the end of the mattress 109 (and groove 112) and the attachment 106. The remainder, 105"', is between the other end of the groove 112 and the sled 110 (not shown) and also extends into and through the sled 110. When the cord 105 is initially pulled the portion 105"' moves, in the plane of the sled 110 (not shown), in the direction shown by the arrow in the Figure.

Referring to Figure 10, as the cord 105 is pulled, the cord 105 passes out of the groove 112, covering 113 and loop 114 and moves toward the opposite end of the mattress 109 and towards a position generally below the attachment 106. The force of pulling on the cord 105 detaches the "Velcro" end of the loop 114 from the sheet 101.

Referring to Figure 11, in the final stage of securing the top cover 101 over the mattress 109 the cord 105 extends from attachment 106 on top cover 101, passes under the mattress 109 and through the sled 110 (along guide grooves 115 in the sled 110) and exits from beneath the end of the mattress 109.

Referring to Figures 12 and 13, the sled 110 is preferably made of a rigid material such as injection molded plastic. Such a sled 110 preferably has in its lower surface, runners or bumps for ease of moving the device 100 along a surface, such as a bed frame or floor. In the embodiment shown in Fig. 12, a wheel-axle assembly is mounted in openings 132 in the lower surface of such a sheet 110, such that a wheel 129 in such an assembly will roll on the surface below the device 100. The sled 110 is segmented at 128 to facilitate its conforming to the shape of the mattress 109.

A wheel-axle assembly comprises a wheel 129 having cylindrical cross-section and a rotational axis parallel to the lower surface of the sled 110. Each wheel-axle assembly also comprises an axle 131 attached to the wheel 129 and mounted in the opening 132. Preferably, the wheels 129 are constructed of nylon.

In many cases it will be desirable to include an area of high friction material on the lower surface of the sled 110, to slow the device 100 in its travels e.g. down stairways.

Referring to the embodiments of Figures 14 and 15, the sled 110 further comprises a cleat or ratchet 116 engageable with the cord 105 to retain the tautness of the top cover 101 against the mattress 109 and person 103. The cleat or ratchet 116 is engageable with the cord 105 by plugs or knots 117, extending from the cord 105. The plugs or knots 117 inhibit movement of the cord 105 into the guide grooves 115. The cord 105 can be partly withdrawn from the sled 110 while the cleat or ratchet 116 is disengaged from the cord 105. Such disengagement is achieved by pressing release pin 130 against ratchet 116 such that ratchet 116 pivots about post 125,

subject to restraint from spring 127, so that cleat 116 rotates away from cord 105. The cord 105 can then be pulled back along the groove 115 while cleat 116 is disengaged from the cord 105.

In an alternative to the above-described preferred embodiment, a further embodiment need not include the sled 110 and will now be discussed with reference to Figures 16 through 22, which also disclose other features differing from the previous embodiments.

Referring to Figure 16, an upper cord 105A and lower cord 105B pass through a slidable guide 133. The slidable guide 133 is slidable along the cords 105A and 105B and is attached to a pre-stretched cord 105C at 143. The cord 105C is preferably made of a rubberized elastic material and is attached to the guide 133 by an end of the cord 105C being inserted through a hole in the guide 133 and then heating and flattening that end so that its lateral dimensions exceed the size of that hole. The pouch lid or flap 121, fastened as in the previous embodiment, helps to keep the guide 133 and sheet 101 in place inside the pouch 102 and the cord 105C in its pre-stretched condition. A post 144 inside pocket 102 projects upwardly from the base thereof near the corner of the pocket 102. Covering 113, and groove 112 thereunder, together with post 144 also help to keep the guide 133 and cord 105C in their original positions.

Referring to Figure 17, the Figure shows the device after the guide 133 has cleared the post 144 and left the pocket 102 but before the guide 133 has cleared the end of the mattress 109, drawn the cord 105B out of the groove 112 under the cover 113 and shuttled along the cords 105A and 105B. The pre-stretched cord 105C is fixedly attached to the slidable guide 133 at 143, and to the sheet 111 by stitching at 134, and extends along the lower edge of the mattress 109. The upper cord 105A is fixedly attached to the top cover 101 by stitching at 136 and at 106A and extends between 106A and 136 through the slidable guide 133. The stitching 136 is preferably mid-way between the top and base of the mattress 109 at an area along the edge of the top cover 101 where the top cover 101 ultimately covers the end face of the mattress 109. The lower cord 105B is fixedly attached to the sheet 111 at 106B. extends through guide groove 112 (under cover 113) and through slidable guide 133 and is fixedly attached to top cover 101 by stitching at 136. Once the handle 108 has been grasped and pulled a sufficient distance, the slidable guide 133, and most of the top cover 101, are drawn out of the pocket 102. When that occurs, the guide 133 rotates about the post 144. The guide 133 is then substantially free to draw together cords 105A and 105B, in a zipper-like fashion, using the energy stored in the cord 105C.

Figure 18 shows the mattress 109 finally secured between the top cover 101 and sheet 111 by the advancement, under the energy stored in the cord 105C, of the guide 133 and cords 105A and 105B. The cord 105C has, as a result of such advancement, correspondingly shortened but preferably still applies force to the guide 133 to secure the top cover 101. Guide 133 may be a self-locking type to hold the cords 105A and B securely in place.

The device and mattress 109 can then be slid to the floor by pulling on the handles 107. Once on the floor, the device and mattress 109 can be moved by pulling the handle 135. The handle 135 is attached to the top cover 101 or sheet 111 near the base of the end of the mattress 109 by stitching 137.

Referring to Figure 19, it is preferred that the areas of attachment 106B of the lower cords 105B from one end of the device 100' are also the areas of attachment for the cords 105C from the opposite end of the device 100'. The Figure also shows that, unlike the embodiment shown in Figures 1 to 15, in this alternative embodiment not only is a sled 110 not necessary in tightening the covers 101 and 101' but unlike cords 105 the cords 105A, 105B and 105C do not run through a sled 110. The pockets 102 are attached to the sheet 111 as in the previous embodiment. To keep the cords 105B and 105C out of the way of bed clothes, such as sheets and blankets, the cords 105B and 105C may run under the sheet 111 in a reinforced lip adjacent to, and under the edge of, the sheet 111. For the sake of clarity that lip is not shown in the drawings.

If a sled is to be included in the embodiment shown in Figure 19 such a sled can be a sled 110' fastened to the lower face of sheet 111. Such a sled 110' can be the sled 110 described above but need not include guide grooves 115 or the cleat assembly shown in Figures 12 and 13.

Referring to Figures 20 and 21, the guide 133 comprises a base 138 to which the cord 105C is attached at one end at 143. A cover 139 extends over most of the remainder of the base 138. Within the cover 139 are channel walls 140 running along the length of the guide 133. The cords 105A and 105B enter the guide 133, near the attachment 143, via the gap between the channel walls 140. The cords 105A and 105B tend not to tangle but rather to stay next to the channel walls 140 as a result of (i) small clearance between the bottom of the cover 139 and the top of the cords 105A and 105B, (ii) the preferred converging arcuate perimeters of the channel walls 140 and (iii) a wedge shaped cleat 141. The cleat 141 narrows in the direction of travel of the guide 133 i.e. in the direction the guide 133 travels along the edge of the mattress 109 as the cover 101 is being secured. The cleat 141 preferably has teeth 149 to bite the cords 105A and 105B if force is applied to the guide 133 that would tend to direct the guide 133 back along cords 105A and 105B to the starting position of the guide 133. However, it is also preferred that the cleat 141 is positionable in an opening 150 in the cover 139. Preferably, the opening 150 is near the trailing end of the guide 133. A pin 142 extends from the cleat 141 through the opening 150. By grasping the pin 142 and pulling the cleat 141 in the direction opposite to the ordinary direction of travel of the guide 133 the teeth 149 can be sufficiently distanced from the cords 105A and 105B to allow the guide 133 to be drawn back along the cords 105A and 105B,

restretching the cord 105C, and allowing for the evacuee to exit the device and for the device to be reused.

In a still further embodiment, the pre-stretched cord of the first alternative embodiment runs through a sled. In this further embodiment it is preferred that the pre-stretched cord not run the length of the sled. With transverse segmentations (such as 128 in Figures 14 and 15) the cord would tend to force the sled to curve upwardly at its ends. Rather, as shown in Figure 22 it is preferred that the elastic cord 105C' be stretched within a single segment of the sled 110". In this embodiment, the cord 105C' is fixedly attached to the sled 110" at anchorage 148 and extends along groove 151. From attachment 148 the cord 105C' extends to and bears first on pulley 147, then extends to and bears on pulley 146 and finally extends to and bears on pulley 145 before exiting from the sled 110" at 152. The cord 105C' then extends to attachment 106A on top cover 101. The cord 105C' is kept stretched, preferably by being secured by a latch (not shown), which is opened by drawing the top cover 101 out of the pocket 102.

A further embodiment, in which a sled is not required, will now be described with reference to Figures 23 to 30.

As in the embodiments described above, such as Fig. 19, the top covers 101 and 101' are drawn out of respective pouches 102 by pulling on handles 108 and 108' attached to the respective top covers 101 and 101'. The configuration of the device before that occurs will now be described, with reference to Figure 23.

Referring to Figure 23, there is shown a sheet 111' including pouches 102 having lids 121, grooves 112 and groove coverings 113, for use on a bed frame 125 as described above. The sheet 111' further comprises a lip 154 spanning a substantial length of each long edge of the sheet 111', beginning at the backs of the pockets 102. A cleat 153 slidably engages the lip 154 which preferably has a thickened portion 167 at each end to stop the cleat 153 from sliding off either end of the lip 154. A looped cord 105D extends through the cleat 153. The looped cord 105D passes through the cleat 153 and extends along the grooves 112, under the covers 113 and is respectively attached to the cover sheet 101 at connection points 106 and 155 inside the pockets 102.

Referring to Figure 24, lip 154 is formed by a cord 170 tightly enclosed in a hem of the edge of the sheet 111' by stitching 169. The lip 154 is parallel, and adjacent, to each long edge of the sheet 111'. Near the side edges of the back of each pocket 102 the lip 154 and the edge of the sheet 111' are covered by a flap 168 to keep the cleat 153 and lip 154 out of the way of bed clothes such as sheets and blankets. One edge of the flap 168 is secured to the sheet 111' by stitching 166 and the other edge has a hem 171.

Referring also to Figure 25, the cleat 153 is tubular and has a C-shaped transverse cross-section. Along the full length of its base an opening 158 extends. The opening 158 communicates along its length with a passage 159 which also runs the full length of the cleat 153. The passage 159 is substantially the same shape as, but larger than, the lip 154.

The cleat 153 and lip 154 are made of material that is sufficiently flexible to allow the lip 154 to be pushed through the opening 158 into the passage 159.

Above the passage 159 and also extending the full length of the cleat 153 is a passage 160. The passage 160 has a large enough cross-section to allow the cord 105D to travel through it.

At one end of the passage 160 a notch 157 extends from that end of the passage 160 towards the top of the middle of the cleat 153, as best shown in Figures 25 and 26. Referring to Figure 26, the notch 157 narrows toward the middle of the top of the cleat 153. That narrowing provides a way to secure the cleat 153 to the cord 105D. By pulling upwardly on the portion of the cord 105D extending out of the wide end of the notch 157, the cord 105D is wedged in the notch 157.

Care should be taken to balance the flexibility of the lip 154, cleat 153 and cord 105D to ensure that the notch 157 can bite and hold the cord 105D without the cleat 153 popping off the lip 154.

Referring to Figure 26, the upper portion of a variant cleat 153' is not as long as the lower portion of the variant cleat 153'. As a result, the passage 160' in the cleat 153' is relatively shorter than the passage 160 in the cleat 153. As well, the distance between the narrow end of the notch 157 and the opposite end of the upper portion of the cleat 153' is shorter than the corresponding distance on the cleat 153. With the cleat 153' a larger force F can be applied to the cord 105D to make the notch 157 bite and hold the cord 105D with less likelihood of the cleat popping off the lip 154.

In Figures 27 to 30 the flap 168 is omitted for the purposes of clarity. Referring to Figure 27, the handle 108 in this embodiment is not attached to the loose end of the top cover 101 but rather is attached to the underside of it by sewing approximately 30 cm from that end. Approximately 30 cm of the top cover 101 doubles back from the handle 108 over top of the rest of the top cover 101. The cord 105D is attached, by sewing, to the top cover 101 at points 106 and 155, 106 being approximately 60 cm from the loose end of the top cover 101 and 155 being near that end. The portion of the cord 105D attached at 155 extends out of the notched end of the passage 160 and then doubles back to attach at 155. The portion of the cord 105D attached at 106 extends out of the other end of the passage 160, directly to attachment 106.

Referring to Figure 28, as the sheet 101 is drawn out still further by pulling on handle 108 the cleat 153' moves toward the middle of the lower edge of the mattress 109, along the lip 154.

Referring to Figure 29, once the top cover 101 is fully drawn out of the pocket 102 the cleat 153' has travelled a substantial distance along the lip 154. The portion of the top cover 101 folded over the remainder of the top cover 101 is unfolded, by grasping the corners of the loose end of the top cover 101, and the last 30 cm or so

of the top cover 101 are advanced in the direction of the arrows towards the opposite end of the mattress 109.

Referring to Figure 30, the steps depicted in Figures 27, 28 and especially 29, have resulted in the cleat 153' advancing substantially the full length of the lip 154. In so doing the portion of the cord 105D between the attachment 155 and the cleat 153' has lengthened at the expense of the portion between the cleat 153' and the attachment 106, which has shortened. The top cover 101 has been drawn towards the mattress 109 and sheet 111'.

A further aspect of the invention combines aspects of the embodiment depicted in Figures 28 to 30 with aspects of the embodiment depicted in Figures 17 to 21. This further aspect of the invention will now be described with reference to Figures 31 to 33.

Referring to Figure 31, the Figure shows the device once the top cover 101 has begun to be drawn out from under the mattress 109. The handle 108 on the top cover 101 is attached to the underside of the top cover 101, by sewing, approximately 30 cm from the free end of the top cover 101. Approximately 30 cm of the top cover 101 doubles back from the handle 108 over top of the rest of the top cover 101. A cord 105F is attached to the edges of the top cover 101, by sewing, at points 106 and 173, 173 being along the edge of the top cover 101 approximately 60 cm from the free end of the top cover 101 and 106 being approximately 30 cm from that end. A cord 105G is attached to the edge of a sheet 111 by stitching 172 approximately 30 cm from the end of the mattress 109. The cord 105G is also attached to the top cover 101 by stitching 173. The cords 105F and 105G run through a guide 133 in a manner similar to the cords 105A and 105B depicted in Figures 20 and 21. A cord 105E is attached to the edge of the free end of the top cover 101 by stitching 155 and to the leading end of the cleat 133 by clip 174.

Referring to Figure 32, as the top cover 101 is drawn out still further by pulling on handle 108 the guide 133 moves in the same direction along the cords 105F and 105G.

Referring to Figure 33, once the top cover 101 is fully drawn out, the folded portion of it is unfolded to fully tighten the cords 105E, 105F and 105G and the guide 133 has travelled a substantial distance along the cords 105F and 105G.

In an alternative to the above-described embodiments, the person 103 is covered by a single top cover sheet 101 made of flexible material. The single sheet is drawn out from side to side across the mattress 109 or sled 110 or from one end of the mattress 109 or sled 110 towards the other end of the mattress 109 or sled 110.

To force such a sheet 101, or a plurality of sheets 101, against the mattress 109 or sled 110 at least one first clasp, at least one second clasp and at least one third clasp may be used. The first clasp secures the sheet 101 to the mattress 109 or sled 110 or a sheet 111, with the result that the sheet 101 is dispensable to cover a substantial portion of the person 103 and of the upper surface of the mattress 109 or sled 110 or sheet 111. The second clasp is accordingly secured to the mattress 109 or to the at sled 110 or sheet 111, depending on whether the first clasp is secured to the mattress 109 or to the sled 110 or sheet 111. The third clasp is engageable with the second clasp to enclose the person 103 between the cover sheet 101 and, as the case may be, the mattress 109 or the sled 110 or sheet 111. In either event, the first clasp may be replaced by stitching and the second clasp may be a clip attached to the mattress 109 and specially adapted to engage the third clasp.

A further embodiment of the present invention will now be described in detail with reference to Figures 34 to 43.

Referring to Figure 34, the improved device 200 is initially placed under the mattress 109 which supports the person 103 on the bed 125 as shown in Figure 1. A portion of a flexible sheet 201 is accordion folded under a corresponding end of the mattress 109. For brevity and clarity this detailed description largely refers to one side and one end of the bed, i.e. single sheets, single cords, single cleats and single handles. It should be understood, however, that the device 200 will normally be substantially symmetric on either side of the mattress 109. It will also be understood that except for a hole in the sheet for the person's head, the device 200 will normally be symmetric at the foot- and head-ends of the mattress 109, i.e. that it comprises either one sheet under the mattress emerging at the foot- and head-ends or two sheets similar to the sheet 201 which are joined together below the lower face of the mattress 109 and which in use fasten to one another above the upper face of the mattress 109. Similarly, it should be understood that there are preferably two handles 206 and 207 on each long edge of the device. The device 200 further consists of two cords 202 and 203, two cleats 204 (not shown) and 205 and two slotted handles 206 (not shown) and 207.

In use, by grasping the handle 208 the accordion folded portion of the sheet 201 is pulled towards, and then up and over the closest end of the mattress 109, such that the sheet 201 can then be pulled over the mattress 109 and over the person laying on that mattress 109. An aspect of the folding of the sheet 201 is that a last fold remains once the sheet 201 has been pulled over the person on the mattress 109 (Figure 35). By then grasping the free end of the sheet 201 and pulling it towards the far end of the mattress 109 much of the length of each cord 202 and 203 passes through its respective cleat 204 and 205; the lower end of each cord 202 and 203 is movably secured to a respective handle 209 (not shown) and 210; and, as a result, the person is securely enclosed between the sheet 201 and the mattress 109 (Figure 36). The handles 206 (not shown) and 207 can then be grasped to remove the mattress 109, with the person 103 secured to it, from the bed 125.

The sheet 201 is preferably made of vinyl reinforced with polyester. "Staph Check 20" (trade mark) is such a material namely a PVC sheet material reinforced with polyester mesh. The sheet 201 is approximately the size

of the lower face of the mattress 109 with which it is to be used. (Of course, if a single sheet is used, rather than two joined sheets, then its length should be approximately twice that of the mattress.) Before being used the sheet 201 sits below approximately half of the lower face of the mattress 109. The part of the sheet 201 that is below an end of that mattress 109 is arranged in an accordion folded manner.

Pulling on the handle 208 tends to pull the edges of the sheet 201 away from the edges of the mattress 109. A batten 209 is attached to the cleats 204 and 205. The batten 209 is preferably a semi-rigid plastic strip approximately 1/8 of an inch (0.32 cm) thick and 1 1/2 inches (3.81 cm) wide. The batten 209 helps keep the sheet 201 at full width while the handle 208 is pulled.

Referring to Figures 37 and 41, the slotted handle 207 is generally C-shaped, preferably made of injection molded plastic, approximately 7 inches (17.78 cm) long and includes hand grips 210. It is attached and parallel to a respective lower side of the sheet 201, such that when the device 200 is positioned for use the handle 207 will be approximately 20 inches (50.8 cm) from the end of the mattress 109. A bore 211 in the slotted handle 207 is parallel to its longitudinal axis. The bore 211 extends completely to one end of the slotted handle 207 and the diameter of the bore 211 is greater than the diameter of the respective cord 202 with which it is to be used. An opening 212 extends from the base of the handle 207 to the bore 211. The width of the opening 212 is greater than the diameter of the cord 202 and less than the diameter of the bore 211.

It is preferred that the handle 207 be attached to the sheet 201 a few inches from its edge so that, towards the end of pulling action of the cord 202, the handle 207 is pulled out from under the mattress 109 and the lower portion of the sheet 201. Attaching the handle 207 at that location keeps the handle under the sheet 201 and out of the way of bedding and of the bed 125 until the device 200 is being deployed. Setting the handle 207 back from the edge of the sheet 201 also facilitates the cord 202 clearing the corner of the mattress 109 as the sheet 201 is drawn out of the pouch 213.

The cleat 205 is an injection molded plastic tube fixed to a respective side edge of the sheet 201 approximately 60 inches (152.4 cm) closer to the end of the sheet 201 than is the corresponding slotted handle 207 as measured along the sheet 201. A longitudinal opening in each cleat 205 runs the length thereof and is large enough for the cord 202, with which it is to be used, to move through the opening. The cleat may be of the same general shape as the cleat depicted in Figure 25. Other suitable cleats may of course, be used.

The cord 202 is preferably 1/8 of an inch (0.32 cm) in diameter and made of high tensile strength material. An upper end of the cord 202 is stitched to a corresponding corner of the sheet 201. The other end of the cord 202 is then run through the longitudinal opening of the corresponding cleat 205, inserted into the opening 212 of the corresponding slotted handle 207 and run along and out the end of the bore 211 and secured against withdrawal from the opening 212 and bore 211. Suitably, withdrawal may be prevented by heating the inserted end until it is malleable, and then, while it is still malleable, thickening and flattening it so that its diameter is greater than the width of the slot 212 of that slotted handle 207 but not larger than the bore 211. Alternatively a nut can be secured to the inserted end of the cord 202 to prevent withdrawal. As a result of the above described structure the lower ends of the cords 202 and 203 are movably fixed in the bores 215 and 211 of respective slotted handles 206 and 207 near the bottom outside edges of the sheet 201 and mattress 109.

Referring to Figure 38, before use the sheet 201 is folded into a tray-like pouch 213. Preferably, the pouch 213 is, from top to bottom, approximately 1/2 inch thick and is made of injection molded plastic. Along an upper face 217, of the pouch 213, farthest from the end of the mattress 109, the sheet 201 passes between the top of the pouch 213 and the bottom face of a pouch cover 218. In that region the pouch cover 218 is sewn to the top face of the sheet 201.

Near the face 217 a groove 219 in the pouch 213 runs substantially the length of the face 217. An edge 220 of a strip 221 of a PVC sheet material reinforced with polyester mesh is sewn to the bottom face of the sheet 201 parallel to the groove 219. The strip 221 is then puckered to form a ridge of material that will snap into the groove 219. The other edge 222 of the strip 221 is then also sewn to the bottom face of the sheet 201, taking care to preserve the required pucker of the strip 221. As an alternative to the strip 221 a cord made of squeezable material may be used to form the ridge of material that will snap into the groove 219.

Referring to Figure 39, the front face 223 of the pouch 213 includes a groove 224 running for substantially the length of the face 223. The cover 218 extends over the accordion folded portion of the sheet 201 and over the face 223. The cover 218 overlaps enough of the front face 223 that a 3/16 inch diameter rip cord 225 can be laid against the portion of the cover 218 that extends over the groove 224 and, together with that portion of the cover 218, snapped into the groove 224. The groove 224 extends around the sides of the pocket 213. Snapping the puckered strip 221 into the groove 217, together with snapping the rip cord 225 and cover 218 into the groove 224, keeps the accordion folded portion of the sheet 201 largely sealed away from dirt and out of the way of bed clothes such as blankets and mattress covers.

The pouch 213 should be positioned close enough to the end of the mattress 109 that the rip cord 225 can readily be grasped and pulled. The sheet 201 should be so folded in the pouch 213 that by pulling the rip cord 225 a looped cord handle 208 attached one fold back from the end of the sheet 201 will be exposed so that it can be grasped to pull the sheet 201 out of the pocket 213 and over the person who is on the mattress 109. The pouch 213 can then be snapped off of the puckered strip 221. Stability of the device 200 before use, and removal

of the pouch 213 from the device 200 during use, are facilitated by the pouch 213 having been attached to the bed 125, suitably by means of Velcro (trade mark).

The manner of attaching the handle 207 to the sheet 201 and stowing the attached handle 207 will now be described with reference to Figures 40 through 43. In the region of handle 207 the width of the sheet 201 is sufficient to allow the handle 207 to lay on the bed 125 and for the sheet 201 to overlap and cover the handle 207. (See Figure 43.) About an inch of the edge of the sheet 201 is folded to produce a hem-like feature (not shown.) The hem-like feature is then inserted into the slot-like openings 228 and 229 in the handle 207. The slots 228, 229 are widened over part of their extent, as at 230 and 231, to allow a dowel 232 to be inserted into the widened portion 231, between the closed end of the hem-like feature and the open end of the hem-like feature. Together with screws (not shown) screwed into holes 233 in the handle 207, the dowel 232 serves to secure the handle 207 to the sheet 201.

It should be understood that variations on the above-described improvement are possible. For example, the sheet 201 may be attached to the mattress 109, as may the handles 207, particularly if the device 200 does not include pouch 213.

As shown in Figs. 44 and 45, the plastic molded components including the handles, tow cord fasteners, sled sections, and the like, may conveniently be attached to the main PVC sheet fabric utilizing a technique known as hot air cold staking. In this process the plastic component 250 is provided with a stub (male) piece 251 and a matching opening portion 252 (female). The fabric 253 is sandwiched between the stub and the opening, with the stub 251 passing through the fabric and projecting through the opening 252, as shown in Figures 44 and 45, and hot air is blown onto the stub 251 until it is soft, normally about five seconds. Then a "cold stake" flattens the stub into the opening portion, where it hardens and permanently retains the fabric in place.

Continuous seam sonic welding may conveniently be used to form the seams in the fabric and to weld sheet plastic components (such as the Ziploc closures) to the fabric. By such techniques the enclosures for the panel may be hermetically sealed so that spilled liquids and dirt and the like are prevented from entering into the enclosures when the device is dormant, in place under a mattress.

Figure 47 shows a partially schematic perspective view of a corner of the device of Figure 46, showing the sheet 201 in its folded position, with the cord 202 loosely held in the same pocket.

Figure 48 is a partly schematic perspective view of an embodiment of the present invention, embodying features of the device shown in Figure 34. The figure shows the device in a deployed configuration (with the mattress and patient omitted for clarity).

A "tear-strip" 305 is provided around the edge of the units cooperating with Ziploc closures 306, 307 to seal the complete unit cover 308 against entry of dirt, liquid spills, and the like. The cover 308 also serves to retain the handles 206 and 207 in a safe place, where they will not interfere with normal hospital bed routines.

Figure 46 shows a partly schematic perspective view of the device, in its fully folded and dormant position. This unit would normally underlie the mattress and be placed on top of the bed.

Normally it will be desirable to attach the unit of Figure 46 to the bed in an easily removable manner, which will however permit thorough cleaning of the space under the foot and head of the bed without disassembly, or any undue difficulty or trouble.

A convenient way to do this is by the provision of a cradle unit which can be attached to the bed by adhesive, screws, or any conventional suitable means, as shown in Figs. 49 and 50. This can suitably be effected by means of a cradle 320 and snap-in pin device as shown in Figures 49 and 50 in a partial side elevation and a plan view. The spring loaded bevelled pin 300 which is mounted on the bottom of a sled segment 110, towards the pelvis area of the bed, engages slidably with the double tapered slot 302.

The embodiments shown in Figures 49 and 50 provide a connector pin 303 cooperating with double tapered slot 304, with detent or stop means provided by slotted protrusions 305. The adjacent cylindrical sled wheel 306 also slides into a slot 307. Typically the cradle portion 320 which is to be affixed to the bed will be approximately six millimetres thick and thus will not interfere with normal use and operation of the bed, whether the sled unit of the present invention is deployed on the bed or not.

Claims

1. An evacuation device for a non-ambulatory person (103), comprising a support, (109) like a mattress,

   sheet means (101) for enclosing said person between said support and said sheet means;

   securement means (105, 106, 116) for forcing said sheet means against said support;

   characterized by

   moving means (110) underneath said support comprising rolling means (129) mounted in said moving means.

2. A device as claimed in claim 1, characterized in that said sheet means comprises at least one sheet (101) of flexible material and said securement means comprises at least one first securement member (106), at least one second securement member (105) and at least one third securement member (116), said first member (106) securing said sheet means (101) to said support (109) such that said sheet means (101) is deployable so as to cover a substantial portion of said person (103) and of the upper surface of said support (109), said second member (105) being secured to said support (109), and said third member (116) being engagea-

ble with said second member (105) to enclose said person between said support (109) and said sheet means (101).

3. A device as claimed in claim 1, characterized in that said sheet means (101) comprises at least one sheet of flexible material and said securement means comprises at least one first securement member (106), at least one second securement member (105) and at least one third securement member (116), said first member (106) securing said sheet means (101) to said moving means (110) such that said sheet means (101) is deployable so as to cover a substantial portion of said person (103) and of the upper surface of said moving means (110), said second member (105) being secured to said moving means (110), and said third member (116) being engageable with said second member (105) to enclose said person (103) between said moving means (110) and said sheet means (101).

4. A device as claimed in claims 1, 2 or 3, characterized in that at least part of said sheet means (101) is arranged to be stored proximally to said support (109).

5. A device as claimed in claim 4, characterized in that said arrangement is by accordion type folding of said part.

6. A device as claimed in claim 4 or claim 5, characterized in that said part is under said support (109).

7. A device as claimed in any one of claims 1, 2, 3, 4, 5 or 6, characterized in that said moving means (110) comprises at least one sheet (111) of low friction flexible material covering at least part of the lower surface of said support (109).

8. A device as claimed in claim 7, characterized in that said low friction material comprises polyhexamethyleneadipamide.

9. A device as claimed in any one of claims 1, 2, 3, 4, 5, 6, 7 or 8, characterized in that said rolling means (129) comprises a plurality of wheel-axle assemblies (131, 132).

10. A device as claimed in claim 9, characterized in that said moving means (110) comprises at least one sheet of rigid material having in the lower surface thereof said plurality of wheel-axle assemblies (131, 132).

11. A device as claimed in claim 10, characterized in that said sheet of rigid material is segmented to facilitate said sheet conforming to the shape of said support (109).

12. A device as claimed in claims 10 or 11, characterized in that said sheet of rigid material is of injection molded plastic.

13. A device as claimed in claim 9, characterized in that wheels in said wheel-axis assemblies are of nylon (aliphatic polyamide).

14. A device as claimed in any one of claims 1, 2, 3, 4 or 5, characterized in that said moving means (110) further comprises braking means.

15. A device as claimed in claim 14, characterized in that said moving means (110) comprises a sheet of rigid material (110') and said braking means comprises an area of high friction material mounted on the lower surface thereof.

16. A device according to claim 1, characterized by a central sheet portion (111) having approximately the size of said support (109) and adapted to underlie the support (109),

a panel portion at each of the foot and head ends of the central sheet, adapted to remain folded under the support while not in use, and to unfold when needed to overlie the person (103) by covering the head and foot ends of the support (109), and meet at a central part of the support (109), with a means (104) for fixing the meeting portions removably in place, whereby to form a retaining panel (101, 101') over the person,

said head end portion (101') presenting an aperture (123) for the head of the person (103),

strand operated means (105) adapted to draw the retaining panel (101, 101') downwardly towards the central underlying sheet to tighten the retaining sheet (101, 101') against the support and retain the person securely within,

said strand operated means (105) comprising on each side of the device a strand attached to a first anchorage point (136) on the edge of the foot end panel intermediate the forward moving edge and the central sheet portion edge of the foot end panel, and passing through a guide (133, 153) attached to the central sheet, and terminating at a second anchorage point (106A) on the foot end panel adjacent to the forward moving edge thereof;

whereby when the foot end panel is deployed by pulling it up over the person (103) and affixing it to the meeting portion of the head end panel the strand on each side (105B) is pulled longitudinally along the support, and the first and second anchorage points are drawn further apart, whereby the side edge (106B) of the central sheet is drawn towards the adjacent side edge (106A) of the retaining sheet formed by the foot and head end sheets, whereby to retain the person Firmly in place against the support (109).

17. A device as claimed in claim 16 characterized in that the guide (153) attached to the central sheet is moveable along the edge of the sheet (111') to facilitate the tightening of the strand during deployment.

18. A device as claimed in claim 17 characterized in that the guide (153) comprises a slotted runner adapted to move along a bead (154) forming an edge of the central sheet, and the guide includes a passage (160) for the strand to permit movement of the strand through the guide during deployment.

19. A device as claimed in claim 16, 17 or 18 characterized in that head and foot panels, when deployed, partially overlap across a central region of the support (109)

20. A device as claimed in claim 16, characterized by means for cleating (141) said strand when pulled to tighten said retaining panel across said support.

21. A device according to claim 1, characterized by

at least two sheets (201, 201') of use in covering said person (103),

at least two pairs of cords (202, 203), each pair fixedly attached to a respective sheet of said at least two sheets and slidably attached to respective handles (206, 207) attached to respective sheets (201, 201') of said at least two sheets; wherein said securement means engage said cords, to securely enclose said person (103) between said sheets (201, 201') and said securement means;

said securement means comprising for each pair of cords at least two cleats (204, 205), each of which is feed to a respective edge of one of said at least two sheets and having an opening for travel of a respective one of said at least four cords.

22. A device according to claim 1 characterized by

at least one sheet (101) for covering substantially all of said person (103),

at least one cord (105) for enclosing said person (103) between said sheet (101) or sheets, and the support (109) for said person (103), and

at least one cleat (141), attached to a respective first area of said sheet or sheets, and adapted for deployment along the upper surface of said support (109).

23. A device as claimed in claim 22, further characterized by a batten attached to said sheet parallel to the transverse axis of said sheet and serving to keep said sheet spread across the full width of said support (109) while said device is being used.

24. A device according to claim 1, characterized by

a central sheet portion (111) having approximately the size of said support (109) and adapted to underlie the support (109),

a panel portion (101, 101') at each of the foot and head ends of the central sheet, adapted to remain folded under the support (109) while not in use, and to unfold when needed to overlie the person (103) by covering the head and foot ends of the support (109), and meet at a central part of the support (109), with a means (104) for fixing the meeting portions removably in place, whereby to form a retaining panel over the person (103),

said head end portion presenting an aperture (123) for the head (103) of the person (103), and

strand operated means adapted to draw the retaining panel downwardly towards the central underlying sheet (111) to tighten the retaining sheet against the support and retain the person securely within,

said strand operated means comprising on each side of the device a strand (105A, 105B) attached to two anchorage points (106A, 136) and an intermediate guide (133), on the side edges of the foot end panel adjacent to the forward moving edge thereof and the central underlying sheet portion,

whereby when the foot end panel is deployed by pulling it up over the person and affixing it to the meeting portion of the head end panel the strand on each side is pulled longitudinally along the support (109), and the two anchorage points (106A, 136) are drawn further apart, whereby the side edge of the central sheet (111) is drawn towards the adjacent side edge of the retaining sheet (101) formed by the foot and head end sheets, whereby to retain the person (103) firmly in place against the support (109).

25. A device as claimed in claim 24, characterized in that the strand operated means comprises on each side of the device a strand attached to a first anchorage point (106A) on the edge of the foot end panel (101) adjacent to the forward moving edge of the foot end panel, and passing through a guide (133) attached to the foot end panel intermediate the forward moving edge and the central sheet (111) portion edge of the foot end panel, and terminating at a second anchorage point (106B), in the area of the central sheet portion.

26. A device as claimed in claim 25, characterized in that the head end panel (101') of the device is similarly provided with strand operated means on each side thereof.

27. A device as claimed in claim 1, characterized in that the sheet means is provided with a mounting means for removable attachment of the device to a bed,

said mounting means comprising an upper base unit adapted to cooperate with a lower cradle (320), when said cradle is affixed to a bed,

said upper base unit comprising an engagement pin (303) adapted to project downwardly from

the base, and to engage releasably a slot (304) in said cradle.

28. A device as claimed in claim 27 characterized in that said engagement pin includes an outwardly tapered section at its lower end, said tapered section adapted to cooperate with a matching vertically tapered slot in the cradle, said slot being disposed laterally with respect to said bed.

29. A device as claimed in claim 28 characterized in that the slot is also laterally tapered for easy entry of said engagement pin.

30. A device as claimed in claim 28 characterized in that said engagement pin is spring loaded so as to be movable from a resting position in said upper base unit, to a loading position extending downwardly therefrom, said spring urging said pin upwardly for firm contact of the tapered end portion thereof with the matching vertically tapered slot of the cradle.

31. A device as claimed in claim 30 characterized in that the slot in the lower cradle is provided with at least one detent means (305) for removable retention of the engagement pin in the slot during use of the device on a bed.

Patentansprüche

1. Vorrichtung zum Abtransport einer unbeweglichen Person (103), welche einen Träger (109), wie eine Matratze, eine Platteneinrichtung (101) zum Einschließen der Person zwischen dem Träger und der Platteneinrichtung;
eine Sicherungseinrichtung (105, 106, 116), um die Platteneinrichtung an den Träger zu zwingen, umfaßt, gekennzeichnet durch
eine Bewegungseinrichtung (110) unter dem Träger, die eine an der Bewegungseinrichtung angebrachte Rolleinrichtung (129) umfaßt.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Platteneinrichtung wenigstens eine Platte (101) aus flexiblem Material umfaßt und die Sicherungseinrichtung wenigstens ein erstes Sicherungselement (106), wenigstens ein zweites Sicherungselement (105) und wenigstens ein drittes Sicherungselement (116) umfaßt, wobei das erste Element (106) die Platteneinrichtung (101) so an dem Träger (109) befestigt, daß die Platteneinrichtung (101) entfaltbar ist, um einen wesentlichen Teil der Person (103) und der Oberseite des Trägers (109) zu bedecken, wobei das zweite Element (105) am Träger (109) befestigt ist und das dritte Element (116) in das zweite Element (105) eingreifen kann, um die Person zwischen dem Träger (109) und der Platteneinrichtung (101) einzuschließen.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Platteneinrichtung (101) wenigstens eine Platte aus flexiblen Material umfaßt und die Sicherungseinrichtung wenigstens ein erstes Sicherungselement (106), wenigstens ein zweites Sicherungselement (105) und wenigstens ein drittes Sicherungselement (116) umfaßt, wobei das erste Element (106) die Platten (101) an der Bewegungseinrichtung (110) so befestigt ist, daß die Platteneinrichtung (101) entfaltbar ist, um einen wesentlichen Teil der Person (103) und der Oberseite der Bewegungseinrichtung (110) zu bedecken, wobei das zweite Element (105) an der genannten Bewegungseinrichtung (110) befestigt ist und das dritte Element (116) in das zweite Element (105) eingreifen kann, um die Person (103) zwischen der Bewegungseinrichtung (110) und der Platteinrichtung (101) einzuschließen.

4. Vorrichtung nach den Ansprüchen 1, 2 oder 3, dadurch gekennzeichnet, daß wenigstens ein Teil der Platteneinrichtung (101) so angeordnet ist, daß er in der Nähe des Trägers (109) aufbewahrt werden kann.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Anordnung durch akkordeonartiges Falten des Teils geschieht.

6. Vorrichtung nach Anspruch 4 oder Anspruch 5, dadurch gekennzeichnet, daß der Teil unter dem Träger (109) ist.

7. Vorrichtung nach einem der Ansprüche 1, 2, 3, 4, 5 oder 6, dadurch gekennzeichnet, daß die Bewegungseinrichtung (110) wenigstens eine Platte (111) aus flexiblem Material mit geringer Reibung umfaßt, das wenigstens einen Teil der Unterseite des Trägers (109) bedeckt.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß das Material mit geringer Reibung Polyhexamethylenadipamid umfaßt.

9. Vorrichtung nach einem der Ansprüche 1, 2, 3, 4, 5, 6, 7 oder 8, dadurch gekennzeichnet, daß die Rolleinrichtung (129) eine Vielzahl von Rad-Achsen-Aufbauten (131, 132) umfaßt.

10. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die Bewegungseinrichtung (110) wenigstens eine Platte aus steifem Material umfaßt, die an ihrer Unterseite die Vielzahl von Rad-Achsen-Aufbauten (131, 132) aufweist.

11. Vorrichtung nach Anspruch 10, dadurch gekennzeichnet, daß die Platte aus steifem Material segmentiert ist, um eine Anpassung der Platte an die Gestalt des Trägers (109) zu ermöglichen.

12. Vorrichtung nach den Ansprüchen 10 oder 11, dadurch gekennzeichnet, daß die Platte aus steifem Material aus gespritztem Kunststoff besteht.

13. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß Räder in den Rad-Achsen-Aufbauten aus Nylon (aliphatischem Polyamid) bestehen.

14. Vorrichtung nach einem der Ansprüche 1, 2, 3, 4 oder 5, dadurch gekennzeichnet, daß die Bewegungseinrichtung (110) weiterhin eine Bremseinrichtung umfaßt.

15. Vorrichtung nach Anspruch 14, dadurch gekennzeichnet, daß die Bewegungseinrichtung (110) eine Platte aus steifem Material (110') umfaßt und die Bremseinrichtung einen Bereich aus Material mit hoher Reibung umfaßt, die an deren Unterseite angebracht ist.

16. Vorrichtung nach Anspruch 1, gekennzeichnet durch einen Mittelplattenabschnitt (111), der ungefähr die Größe des Trägers (109) hat und angepaßt ist, unter dem Träger (109) zu liegen,
einen Plattenabschnitt an jedem der Fuß- und Kopfenden der Mittelplatte, die so ausgelegt sind, daß sie unter dem Träger gefaltet bleiben, wenn er nicht in Gebrauch ist, und sich bei Bedarf entfalten, um durch Bedecken des Kopf- und Fußteils des Trägers (109) über der Person (103) zu liegen, und an einem Mittelteil des Trägers (109) aneinanderstoßen, mit einer Einrichtung (104), um die aneinanderstoßenden Teile lösbar an ihrem Platz zu befestigen, wodurch eine Rückhalteplatte (101, 101') über der Person gebildet wird,
wobei der Kopfendabschnitt (101') eine Öffnung (123) für den Kopf der Person (103) bietet,
eine durch Seile betätigte Einrichtung (105), die dafür ausgelegt ist, die Rückhalteplatte (101, 101') zur darunterliegenden Mittelplatte nach unten zu ziehen, um die Rückhalteplatte (101, 101') an den Träger festzuziehen, um die Person sicher im Inneren zu halten,
wobei die durch Seile betätigte Einrichtung (105) auf jeder Seite der Vorrichtung ein Seil umfaßt, das an einem ersten Verankerungspunkt (136) an der Kante der Fußendplatte zwischen der sich vorwärts bewegenden Kante und der Kante des Mittelplattenabschnitts der Fußendplatte befestigt ist und durch eine Führung (133, 153) hindurchgeht, die an der Mittelplatte befestigt ist, und an einem zweiten Verankerungspunkt (106A) an der Fußendplatte, ihrer sich vorwärts bewegenden Kante benachbart, endet; wodurch, wenn die Fußendplatte entfaltet wird, indem sie über die Person (103) nach oben gezogen wird und sie an dem anstoßenden Abschnitt der Kopfendplatte befestigt wird, das Seil auf jeder Seite (105B) in Längsrichtung entlang des Trägers gezogen wird und die ersten und zweiten Verankerungspunkte weiter auseinandergezogen werden, wodurch die Seitenkante (106B) der Mittelplatte zur benachbarten Seitenkante (106A) der durch die Fuß- und Kopfendplatten gebildeten Rückhalteplatte hin gezogen wird, wodurch die Person fest an ihrem Platz auf dem Träger (109) gehalten wird.

17. Vorrichtung nach Anspruch 16, dadurch gekennzeichnet, daß die an der Mittelplatte befestigte Führung (153) entlang der Kante der Platte (111') beweglich ist, um ein Festziehen des Seils während des Entfaltens zu ermöglichen.

18. Vorrichtung nach Anspruch 17, dadurch gekennzeichnet, daß die Führung (153) eine geschlitzte Schiene umfaßt, die so ausgelegt ist, daß sie sich entlang einer Rippe (154) bewegt, die eine Kante der Mittelplatte bildet, und die Führung einen Durchgang (160) für das Seil beinhaltet, um eine Bewegung des Seils durch die Führung während des Entfaltens zu verhindern.

19. Vorrichtung nach Anspruch 16, 17 oder 18, dadurch gekennzeichnet, daß die Kopf- und Fußplatten, wenn sie entfaltet sind, teilweise einen mittleren Bereich des Trägers (109) überlappen.

20. Vorrichtung nach Anspruch 16, gekennzeichnet durch eine Einrichtung zum Fixieren (141) des Seils, wenn es gezogen ist, um die Rückhalteplatte über den Träger festzuziehen.

21. Vorrichtung nach Anspruch 1, gekennzeichnet durch wenigstens zwei Platten (201, 201') zum Gebrauch beim Bedecken der Person (103),
wenigstens zwei Paar Schnüre (202, 203), wobei jedes Paar an einer entsprechende Platte der wenigstens zwei Platten fest angebracht ist und an entsprechenden, an entsprechenden Platten (201, 201') der wenigstens zwei Platten befestigten Griffen (206, 207) verschiebbar angebracht ist, worin die Sicherungseinrichtung an den Schnüren angreift, um die Person (103) zwischen den Platten (201, 201') und den Sicherungsmitteln sicher einzuschließen, wobei die Sicherungseinrichtung für jedes Paar Schnüre wenigstens zwei Fixierleisten (204, 205) umfaßt, von denen jede an einer entsprechenden Kante einer der wenigstens zwei Platten befestigt ist und eine Öffnung zum Hin- und Herbewegen einer entsprechenden der wenigstens vier Schnüre aufweist.

22. Vorrichtung nach Anspruch 1, gekennzeichnet durch wenigstens eine Platte (101) zum Bedecken im wesentlichen der ganzen Person (103),
wenigstens eine Schnur (105) zum Einschließen der Person (103) zwischen der Platte (101) oder den Platten und dem Träger (109) für die Person (103)

und
wenigstens eine Fixierleiste (141), die an einem entsprechenden ersten Bereich der Platte oder Platten angebracht und zum Entfalten entlang der Oberseite des Trägers (109) ausgelegt ist.

23. Vorrichtung nach Anspruch 22, weiter gekennzeichnet durch eine Leiste, die an der Platte parallel zur Hauptachse der Platte angebracht ist und dazu dient, die Platte über die gesamte Breite des Trägers (109) auszubreiten, während die Vorrichtung benutzt wird.

24. Vorrichtung nach Anspruch 1, gekennzeichnet durch einen Mittelplattenbereich (111), der etwa die Größe des Trägers (109) hat und angepaßt ist, um unter dem Träger (109) zu liegen,
einen Plattenabschnitt (101, 101') an jedem der Fuß- und Kopfenden der Mittelplatte, der dafür ausgelegt ist, unter dem Träger (109) gefaltet zu bleiben, während er nicht in Gebrauch ist, und sich bei Bedarf zu entfalten, um durch Bedecken der Kopf- und Fußenden des Trägers (109) über einer Person (103) zu liegen, und die an einem mittleren Teil des Trägers (109) aneinanderstoßen, mit einer Einrichtung (104), um die aneinanderstoßenden Abschnitte lösbar an ihrem Platz zu befestigen, wodurch eine Rückhalteplatte über der Person (103) gebildet wird, der Kopfendabschnitt eine Öffnung (123) für den Kopf (103) der Person (103) bietet, und
eine durch Seile betätigte Einrichtung, die dafür ausgelegt ist, die Rückhalteplatte zur darunterliegenden Mittelplatte (111) hin zu ziehen, um die Rückhalteplatte an den Träger festzuziehen und die Person sicher im Inneren zu halten,
wobei die durch Seile betätigte Einrichtung auf jeder Seite der Vorrichtung ein Seil (105A, 105B), das an zwei Verankerungspunkten (106A, 136) und einer dazwischenliegenden Führung (133) angebracht ist, an den Seitenkanten der Fußendplatte, ihrer sich vorwärtsbewegenden Kante benachbart, und dem darunterliegenden Mittelplattenabschnitt umfaßt,
wodurch, wenn die Fußendplatte entfaltet wird, indem sie über die Person nach oben gezogen und an dem anstoßenden Abschnitt der Kopfendplatte befestigt wird, das Seil auf jeder Seite in Längsrichtung entlang des Trägers (109) gezogen wird und die beiden Verankerungspunkte (106A, 136) weiter auseinandergezogen werden, wodurch die Seitenkante der Mittelplatte (111) zur benachbarten Seitenkante der von den Fuß- und Kopfendplatten gebildeten Rückhalteplatte (101) hin gezogen wird, wodurch die Person (103) fest an ihrem Platz auf dem Träger (109) gehalten wird.

25. Vorrichtung nach Anspruch 24, dadurch gekennzeichnet, daß die durch Seile betätigte Einrichtung auf jeder Seite der Vorrichtung ein Seil umfaßt, das an einem ersten Verankerungspunkt (106A) an der Kante der Fußendplatte (101) der sich vorwärts bewegenden Kante der Fußendplatte benachbart angebracht ist und durch eine Führung (133) hindurchgeht, die an der Fußendplatte zwischen der sich vorwärts bewegenden Kante und der Kante des Mittelplattenabschnitts (111) der Fußendplatte angebracht ist, und an einem zweiten Verankerungspunkt (106B) im Bereich des Mittelplattenabschnitts endet.

26. Vorrichtung nach Anspruch 25, dadurch gekennzeichnet, daß die Kopfendplatte (101') der Vorrichtung auf jeder ihrer Seiten in ähnlicher Weise mit einer durch Seile betätigten Einrichtung versehen ist.

27. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Platteneinrichtung mit einer Montageeinrichtung zum lösbaren Anbringen der Vorrichtung an einem Bett versehen ist,
wobei die Montageeinrichtung eine obere Basiseinheit umfaßt, die dafür ausgelegt ist, mit einem Untergestell (320) zusammenzuwirken, wenn das Gestell an einem Bett befestigt ist,
wobei die obere Basiseinheit einen Eingriffsstift (303) umfaßt, der dafür ausgelegt ist, von der Basis nach unten vorzustehen und lösbar in einen Schlitz (304) in dem Gestell einzugreifen.

28. Vorrichtung nach Anspruch 27, dadurch gekennzeichnet, daß der Eingriffsstift einen nach außen verjüngten Abschnitt an seinem unteren Ende beinhaltet, wobei der verjüngte Abschnitt dafür ausgelegt ist, mit einem dazu passenden vertikal verjüngten Schlitz in dem Gestell zusammenzuwirken, wobei der Schlitz in bezug auf das Bett seitlich angeordnet ist.

29. Vorrichtung nach Anspruch 28, dadurch gekennzeichnet, daß der Schlitz für einen leichten Eintritt des Eingriffsstifts ebenfalls seitlich verjüngt ist.

30. Vorrichtung nach Anspruch 28, dadurch gekennzeichnet, daß der Eingriffsstift gefedert ist, um von einer Ruheposition in der oberen Basiseinheit zu einer sich davon nach unten erstreckenden Lastposition beweglich zu sein, wobei die Feder den Stift zum festen Kontakt seines verjüngten Endabschnitts mit dem dazu passenden vertikal verjüngten Schlitz des Gestells nach oben drückt.

31. Vorrichtung nach Anspruch 30, dadurch gekennzeichnet, daß der Schlitz im Untergestell mit wenigstens einer Feststelleinrichtung (305) zum lösbaren zurückhalten des Eingriffsstifts im Schlitz während der Verwendung der Vorrichtung auf einem Bett versehen ist.

Revendications

1. Dispositif d'évacuation pour une personne ne pouvant se déplacer (103), comprenant un support (109) analogue à un matelas, des moyens formant drap (101) pour enfermer ladite personne entre ledit support et lesdits moyens formant drap, des moyens de fixation (105, 106, 116) pour forcer lesdits moyens formant drap contre ledit support ; caractérisé par des moyens mobiles (110) en dessous dudit support comprenant des moyens roulants (129) montés dans lesdits moyens mobiles.

2. Dispositif selon la revendication 1, caractérisé en ce que lesdits moyens formant drap comprennent au moins un drap (101) de matériau flexible et lesdits moyens de fixation comprennent au moins un premier élément de fixation (106), au moins un deuxième élément de fixation (105) et au moins un troisième élément de fixation (116), ledit premier élément (106) fixant lesdits moyens formant drap (101) audit support (109) de telle sorte que lesdits moyens formant drap (101) puissent être déployés de façon à recouvrir une partie importante de ladite personne (103) et de la surface supérieure dudit support (109), ledit deuxième élément (105) étant fixé audit support (109), et ledit troisième élément (116) pouvant venir en prise avec ledit deuxième élément (105) pour enfermer ladite personne entre ledit support (109) et lesdits moyens formant drap (101).

3. Dispositif selon la revendication 1, caractérisé en ce que lesdits moyens formant drap (101) comprennent au moins un drap de matériau flexible et lesdits moyens de fixation comprennent au moins un premier élément de fixation (106), au moins un deuxième élément de fixation (105) et au moins un troisième élément de fixation (116), ledit premier élément (106) fixant lesdits moyens formant drap (101) auxdits moyens mobiles (110) de telle sorte que lesdits moyens formant drap (101) puissent être déployés de façon à recouvrir une partie importante de ladite personne (103) et de la surface supérieure desdits moyens mobiles (110), ledit deuxième élément (105) étant fixé auxdits moyens mobiles (110), et ledit troisième élément (116) pouvant venir en prise avec ledit deuxième élément (105) pour enfermer ladite personne (103) entre lesdits moyens mobiles (110) et lesdits moyens formant drap (101).

4. Dispositif selon la revendication 1, 2 ou 3, caractérisé en ce qu'au moins une partie desdits moyens formant drap (101) est disposée de façon à être stockée à proximité dudit support (109).

5. Dispositif selon la revendication 4, caractérisé en ce que ladite configuration se fait par pliage du type en accordéon de ladite partie.

6. Dispositif selon la revendication 4 ou 5, caractérisé en ce que ladite partie est située en dessous dudit support (109).

7. Dispositif selon l'une quelconque des revendications 1, à 6, caractérisé en ce que lesdits moyens mobiles (110) comprennent au moins un drap (111) en un matériau flexible à faible frottement recouvrant au moins une partie de la surface inférieure dudit support (109).

8. Dispositif selon la revendication 7, caractérisé en ce que ledit matériau à faible frottement comprend du polyhexaméthylène-adipamide.

9. Dispositif selon l'une quelconque des revendications 1, à 8, caractérisé en ce que lesdits moyens roulants (129) comprennent une pluralité d'ensembles roue-essieu (131, 132).

10. Dispositif selon la revendication 9, caractérisé en ce que lesdits moyens mobiles (110) comprennent au moins un drap en un matériau rigide, comportant sur sa surface inférieure ladite pluralité d'ensembles roue-essieu (131, 132).

11. Dispositif selon la revendication 10, caractérisé en ce que ledit drap en matériau rigide est segmenté pour faciliter la conformation dudit drap à la forme dudit support (109).

12. Dispositif selon la revendication 10 ou 11, caractérisé en ce que ledit drap en matériau rigide est fait en plastique moulé par injection.

13. Dispositif selon la revendication 9, caractérisé en ce que les roues dans lesdits ensembles roue-essieu sont en polyamide aliphatique tel que "nylon"

14. Dispositif selon l'une quelconque des revendications 1, à 5, caractérisé en ce que lesdits moyens mobiles (110) comprennent en outre des moyens de freinage.

15. Dispositif selon la revendication 14, caractérisé en ce que lesdits moyens mobiles (110) comprennent un drap en un matériau rigide (110') et lesdits moyens de freinage comprennent une zone en un matériau à frottement élevé montée sur leur surface inférieure.

16. Dispositif selon la revendication 1, caractérisé par une partie de drap centrale (111) ayant approximativement la taille dudit support (109) et adaptée pour se trouver sous le support (109), une partie de panneau à chacune des extrémités de pied et de tête du drap central, adaptée pour rester pliée sous le support quand on ne l'utilise pas, et à se déplier quand c'est nécessaire pour recouvrir la personne

(103) en couvrant les extrémités de tête et de pied du support (109) et rejoindre une partie centrale du support (109), avec des moyens (104) pour fixer en place et de façon séparable les parties de jonction, de façon à former un panneau de maintien (101, 101') au-dessus de la personne, ladite partie d'extrémité de tête (101') présentant une ouverture (123) pour la tête de la personne (103), des moyens formant sangles (105) étant adaptés pour tirer le panneau de maintien (101, 101') vers le bas en direction du drap sous-jacent central pour bloquer le drap de maintien (101, 101') contre le support et maintenir la personne de façon sûre à l'intérieur, lesdits moyens formant sangles (105) comprenant sur chaque côté du dispositif une sangle fixée à un premier point d'ancrage (136) sur le bord du panneau d'extrémité de pied intermédiaire entre le bord mobile avant et le bord de partie de drap centrale du panneau d'extrémité de pied, et passant à travers un guide (133, 153) fixé au drap central, et se terminant à un deuxième point d'ancrage (106A) sur le panneau d'extrémité de pied adjacent à son bord mobile avant, de telle manière que, lorsque le panneau d'extrémité de pied est déployé quand on le tire sur la personne (103) et qu'on le fixe à la partie de jonction du panneau d'extrémité de tête, la sangle sur chaque côté (105B) est tirée longitudinalement le long du support, et les premier et deuxième points d'ancrage sont encore écartés, grâce à quoi le bord latéral (106B) du drap central est tiré en direction du bord latéral adjacent (106A) du drap de maintien formé par les draps d'extrémités de pied et de tête, de façon à maintenir la personne fermement en place contre le support (109).

17. Dispositif selon la revendication 16, caractérisé en ce que le guide (153) fixé au drap central est mobile le long du bord du drap (111') pour faciliter le serrage de la sangle au cours du déploiement.

18. Dispositif selon la revendication 17, caractérisé en ce que le guide (153) comprend un rail rainuré adapté pour se déplacer le long d'un rebord (154) formant un bord du drap central, et le guide comprend un passage (160) pour la sangle afin de permettre le mouvement de la sangle à travers le guide au cours du déploiement.

19. Dispositif selon la revendication 16, 17 ou 18, caractérisé en ce que les panneaux de tête et de pied, quand ils sont déployés, se chevauchent partiellement sur une région centrale du support (109).

20. Dispositif selon la revendication 16, caractérisé par des moyens pour bloquer (141) ladite sangle quand on la tire pour serrer ledit panneau de maintien en travers dudit support.

21. Dispositif selon la revendication 1, caractérisé par au moins deux draps (201, 201') utilisés pour couvrir ladite personne (103) ; au moins deux paires de cordes (202, 203), chaque paire étant fixement attachée à un drap respectif desdits draps au nombre d'au moins deux et attachée de façon à pouvoir coulisser sur des poignées respectives (206, 207) attachées aux draps respectifs (201, 201') desdits draps au nombre d'au moins deux, lesdits moyens de fixation venant en prise avec lesdites cordes, pour enfermer de façon sûre ladite personne (103) entre lesdits draps (201, 201') et lesdits moyens de fixation, lesdits moyens de fixation comprenant, pour chaque paire de cordes, au moins deux serre-câbles (204, 205) dont chacun est fixé à un bord respectif d'un desdits draps au nombre d'au moins deux, et comportant une ouverture pour le déplacement d'une corde respective parmi lesdites cordes au nombre d'au moins quatre.

22. Dispositif selon la revendication 1, caractérisé par au moins un drap (101) pour recouvrir pratiquement toute ladite personne (103), au moins une corde (105) pour enfermer ladite personne (103) entre ledit drap (101) ou lesdits draps et le support (109) pour ladite personne (103), et au moins un serre-câble (141), fixé à une première zone respective dudit drap ou desdits draps, et adapté pour le déploiement le long de la surface supérieure dudit support (109).

23. Dispositif selon la revendication 22, caractérisé en outre par une tringle fixée audit drap parallèlement à l'axe transversal dudit drap et servant à maintenir ledit drap déployé sur toute la largeur dudit support (109) quand ledit dispositif est utilisé.

24. Dispositif selon la revendication 1, caractérisé par une partie de drap centrale (111) ayant approximativement la taille dudit support (109) et adaptée pour se trouver en dessous du support (109), une partie de panneau (101, 101') à chacune des extrémités de pied et de tête du drap central, adaptée pour rester pliée sous le support (109) quand on ne l'utilise pas, et à se déplier quand c'est nécessaire pour recouvrir la personne (103) en couvrant les extrémités de tête et de pied du support (109) et rejoindre une partie centrale du support (109), avec des moyens (104) pour fixer en place de façon amovible les parties de jonction, de façon à former un panneau de maintien au-dessus de la personne (103), ladite partie d'extrémité de tête présentant une ouverture (123) pour la tête (103) de la personne (103), et des moyens formant sangles adaptés pour tirer le panneau de maintien vers le bas en direction du drap sous-jacent central (111) afin de serrer le drap de maintien contre le support et de maintenir la personne de façon sûre à l'intérieur, lesdits moyens formant sangles comprenant, sur chaque côté du dispositif, une sangle (105A, 105B) fixée à

deux points d'ancrage (106A, 136) et un guide intermédiaire (133) sur les bords latéraux du panneau d'extrémité de pied adjacent à son bord mobile avant et à la partie de drap sous-jacente centrale, de telle manière que, lorsqu'on déploie le panneau d'extrémité de pied en le tirant sur la personne et en le fixant à la partie de jonction du panneau d'extrémité de tête, la sangle sur chaque côté est tirée longitudinalement le long du support (109), et les deux points d'ancrage (106, 136) sont encore écartés, grâce à quoi le bord latéral du drap central (111) est tiré en direction du bord latéral adjacent du drap de maintien (101) formé par les draps d'extrémités de pied et de tête, de façon à maintenir la personne (103) fermement en place contre le support (109).

25. Dispositif selon la revendication 24, caractérisé en ce que les moyens formant sangles comprennent, sur chaque côté du dispositif, une sangle attachée à un premier point d'ancrage (106A) sur le bord du panneau d'extrémité de pied (101) adjacent au bord mobile avant du panneau d'extrémité de pied, et passant à travers un guide (133) fixé au panneau d'extrémité de pied intermédiaire entre le bord mobile avant et le bord de partie de drap centrale (111) du panneau d'extrémité de pied, et se terminant au niveau d'un deuxième point d'ancrage (106B) dans la zone de la partie de drap centrale.

26. Dispositif selon la revendication 25, caractérisé en ce que le panneau d'extrémité de tête (101') du dispositif est muni, de façon similaire, de moyens formant sangles sur chacun de ses côtés.

27. Dispositif selon la revendication 1, caractérisé en ce que les moyens formant drap comprennent des moyens de montage pour la fixation amovible du dispositif à un lit, lesdits moyens de montage comprenant un élément de base supérieur adapté pour coopérer avec un cadre inférieur (320), quand ledit cadre est fixé à un lit, ledit élément de base supérieur comprenant une broche de mise en prise (303) adaptée pour faire saillie vers le bas à partir de la base, et pour venir en prise de façon libérable avec une fente (304) dans ledit cadre.

28. Dispositif selon la revendication 27, caractérisé en ce que ladite broche de mise en prise comprend une section effilée vers l'extérieur au niveau de son extrémité inférieure, ladite section effilée étant adaptée pour coopérer avec une fente effilée verticalement correspondante dans le cadre, ladite fente étant disposée latéralement par rapport audit lit.

29. Dispositif selon la revendication 28, caractérisé en ce que la fente est aussi effilée latéralement pour entrer facilement dans ladite broche de mise en prise.

30. Dispositif selon la revendication 28, caractérisé en ce que ladite broche de mise en prise est chargée par un ressort de façon à pouvoir se déplacer depuis une position de repos dans ledit élément de base supérieur, vers une position de charge s'étendant vers le bas à partir de celui-ci, ledit ressort poussant ladite broche vers le haut pour faire venir fermement en contact la partie d'extrémité effilée de celle-ci avec la fente effilée verticalement correspondante du cadre.

31. Dispositif selon la revendication 30, caractérisé en ce que la fente dans le cadre inférieur est pourvue d'au moins un moyen de détente (305) pour le maintien amovible de la broche de mise en prise dans la fente quand le dispositif est utilisé sur un lit.

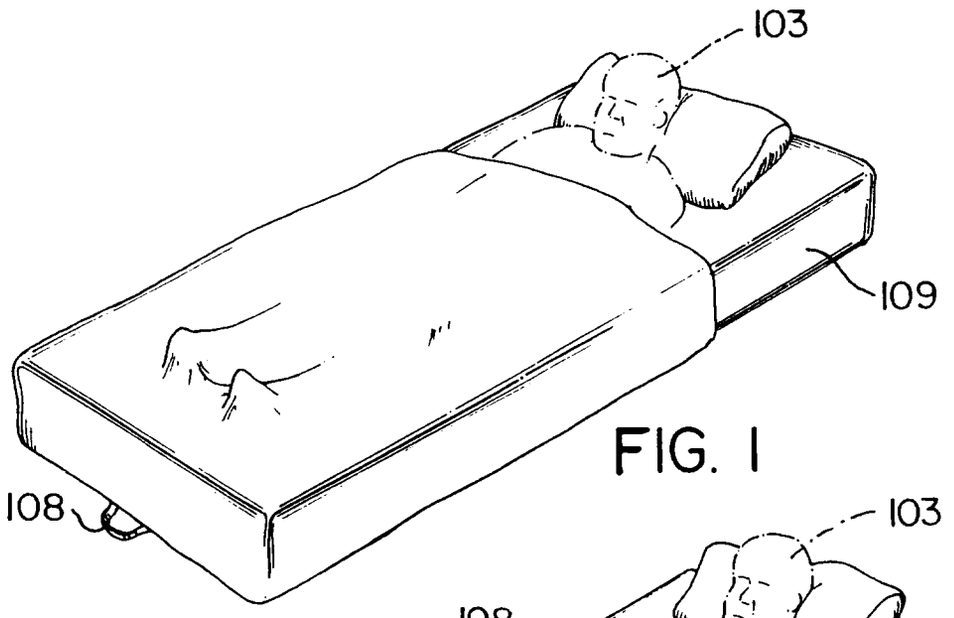


FIG. 1

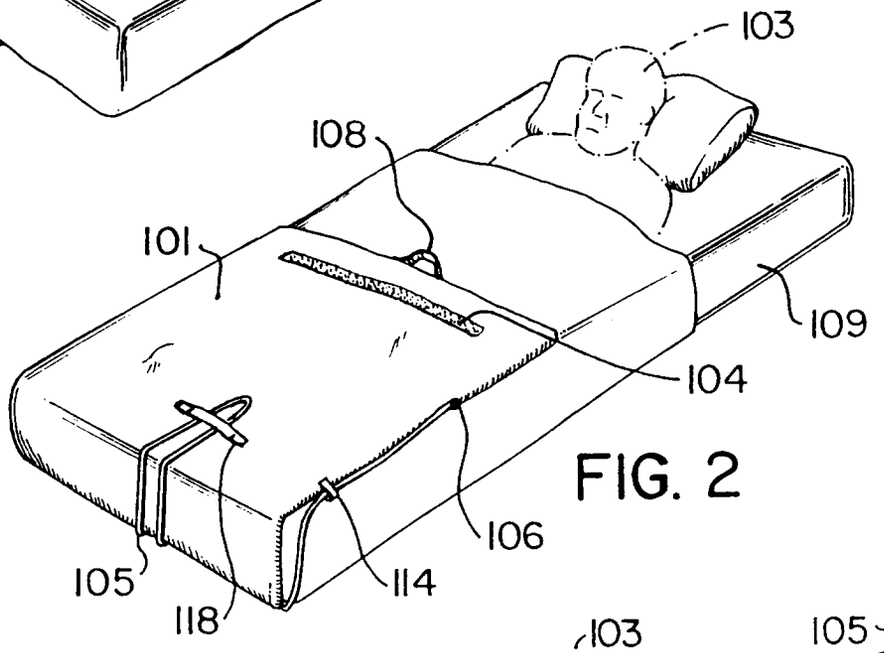


FIG. 2

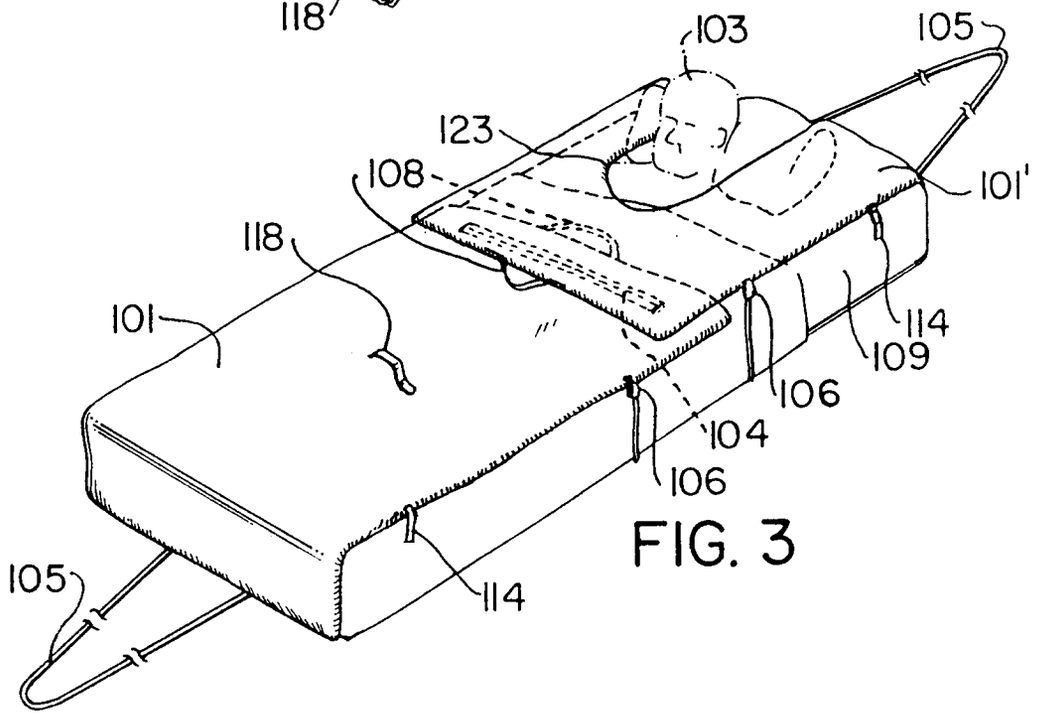


FIG. 3

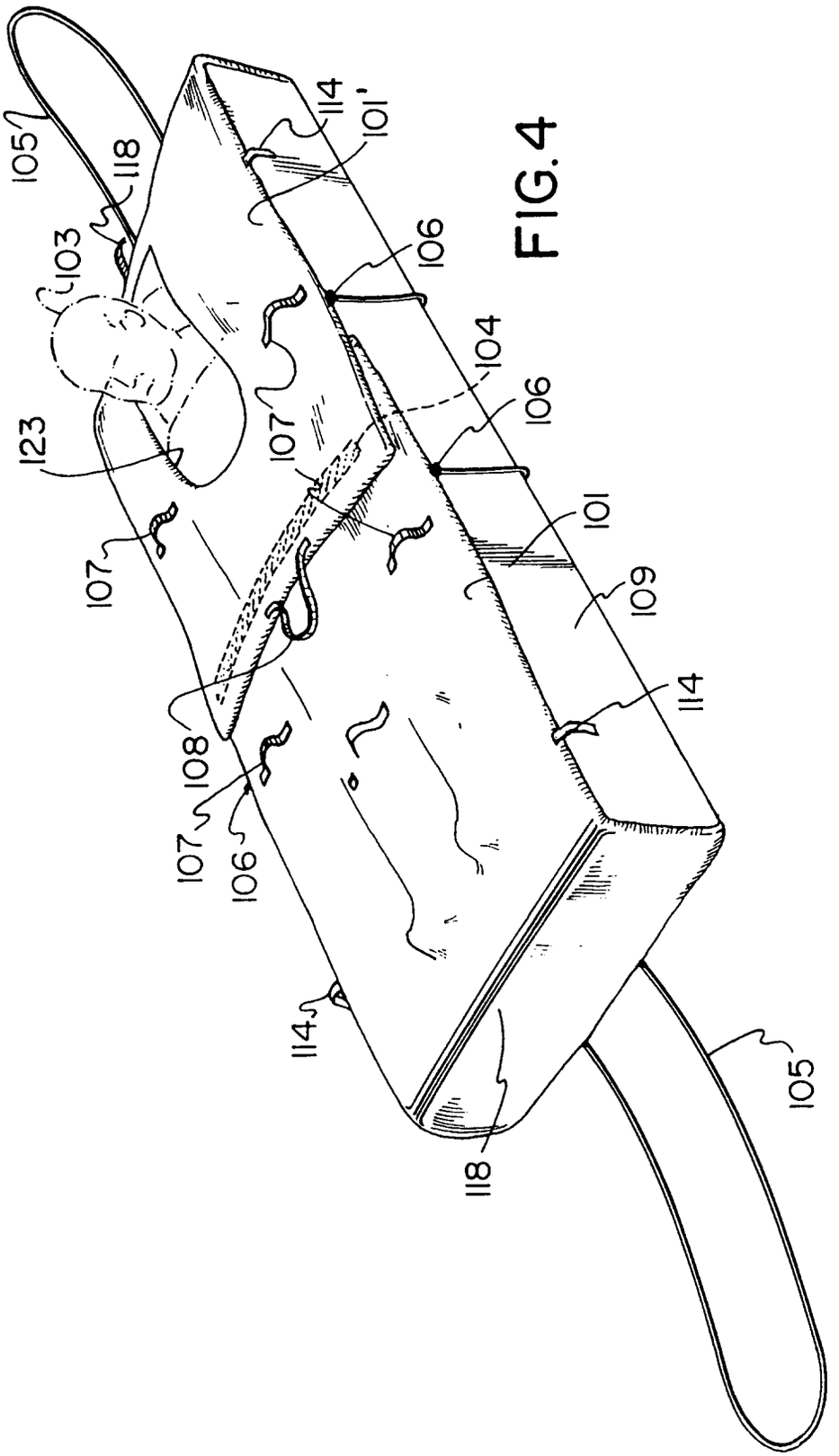

105
118
103
123
107
107
108
107
106
114
101'
106
104
106
101
109
114
114
118
105

FIG.4

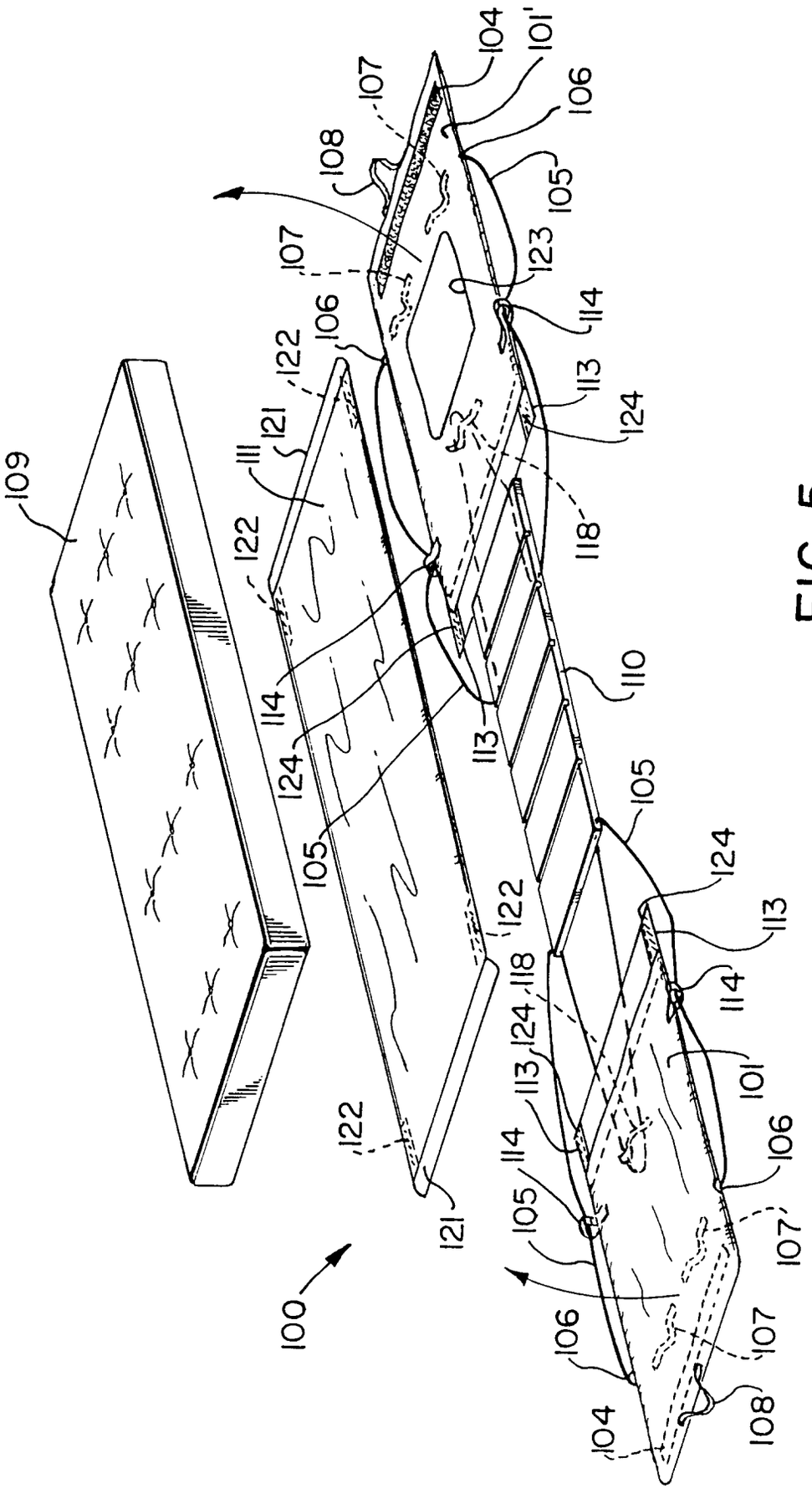

100
101'
104
105
106
107
108
109
110
111
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114
118
121
122
123
124

FIG. 5

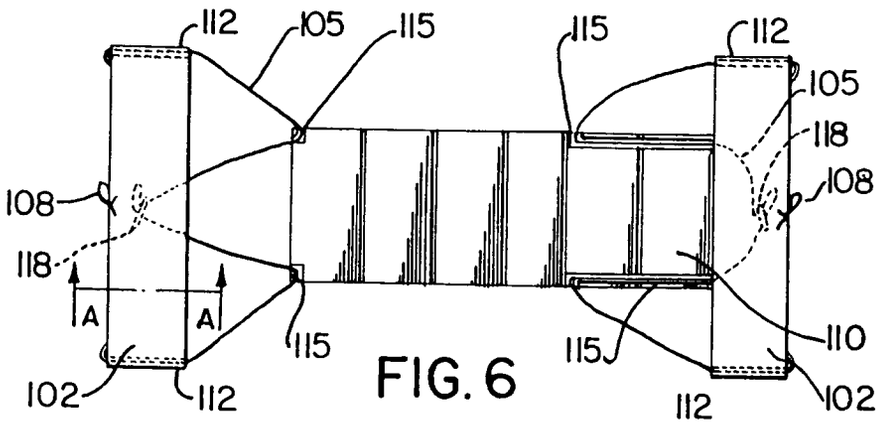


FIG. 6

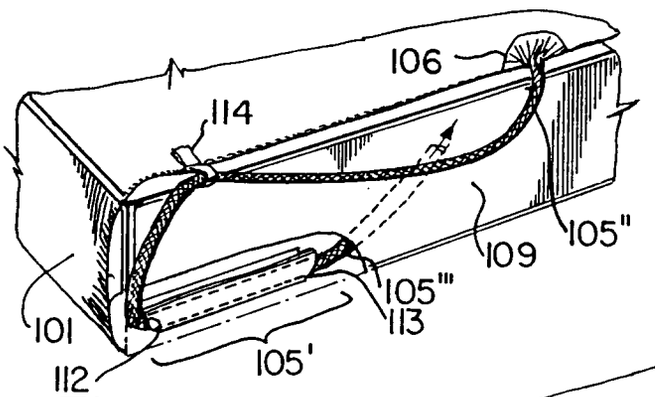


FIG. 9

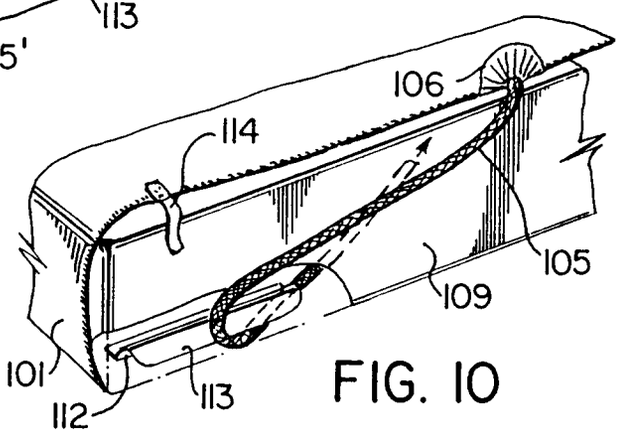


FIG. 10

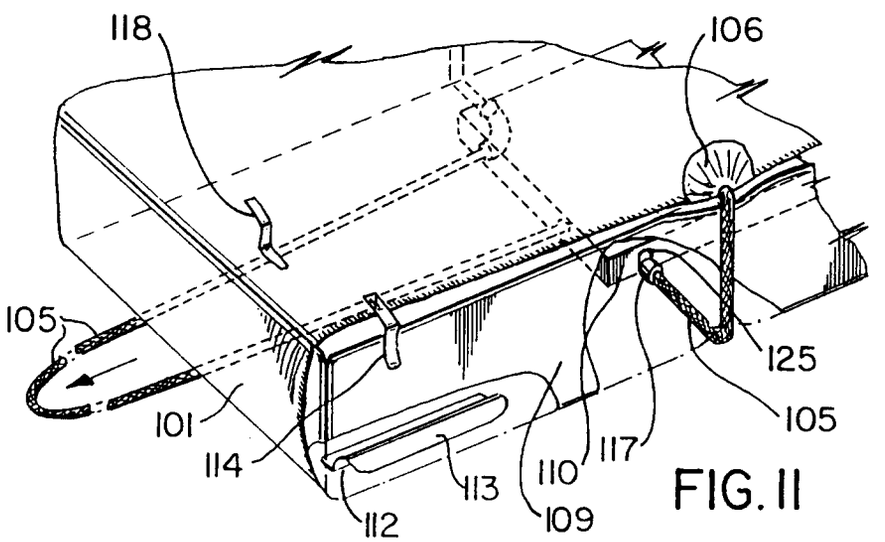


FIG. 11

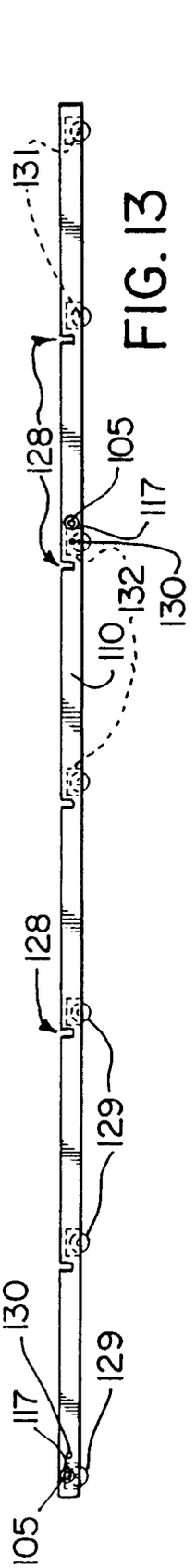

131
128
105
117
132
130
110
128
129
130
117
129
105

FIG. 13

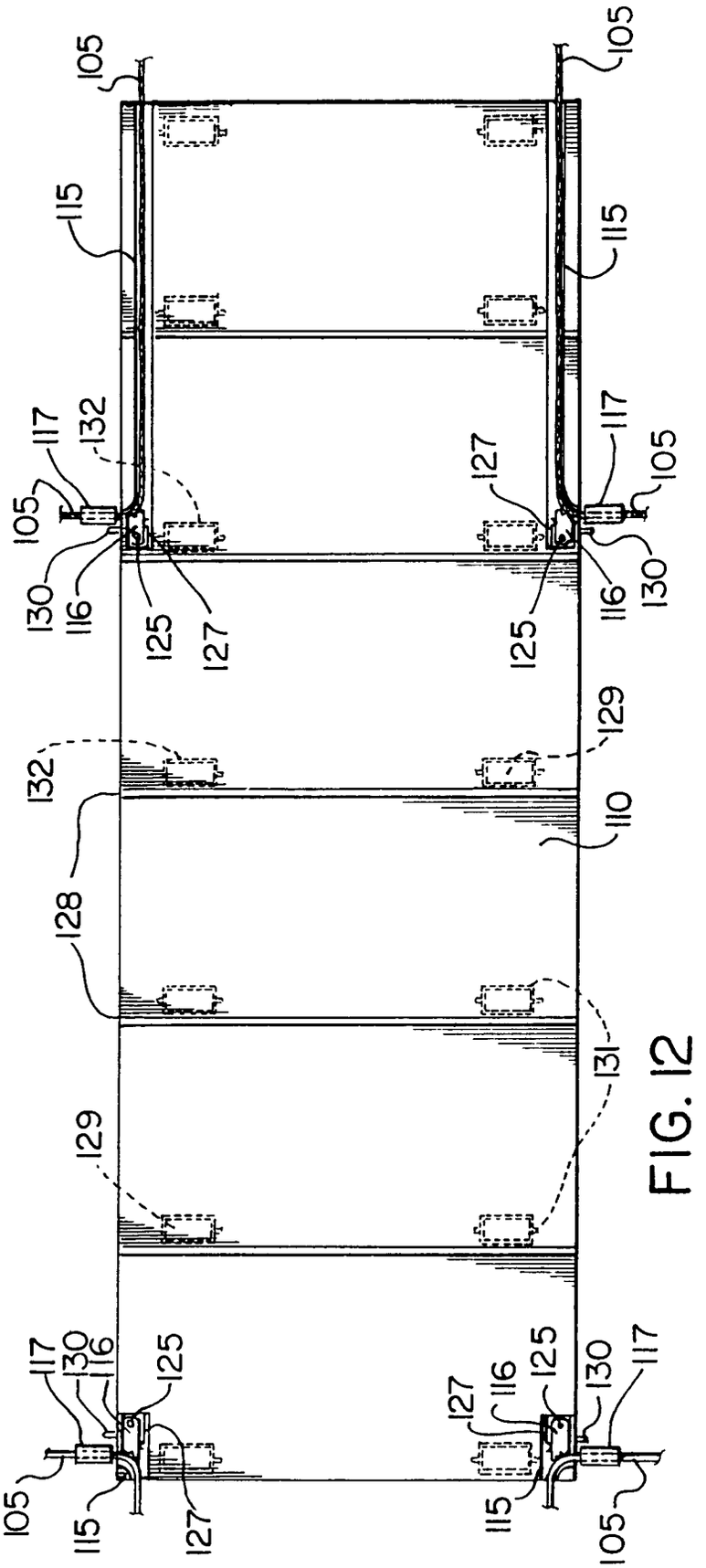

105
115
117
132
105
130
116
125
127
105
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117
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105
130
116
125
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115
127
115
105

FIG. 12

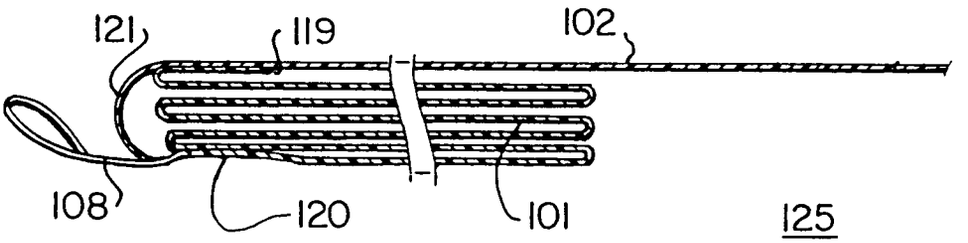


FIG. 7

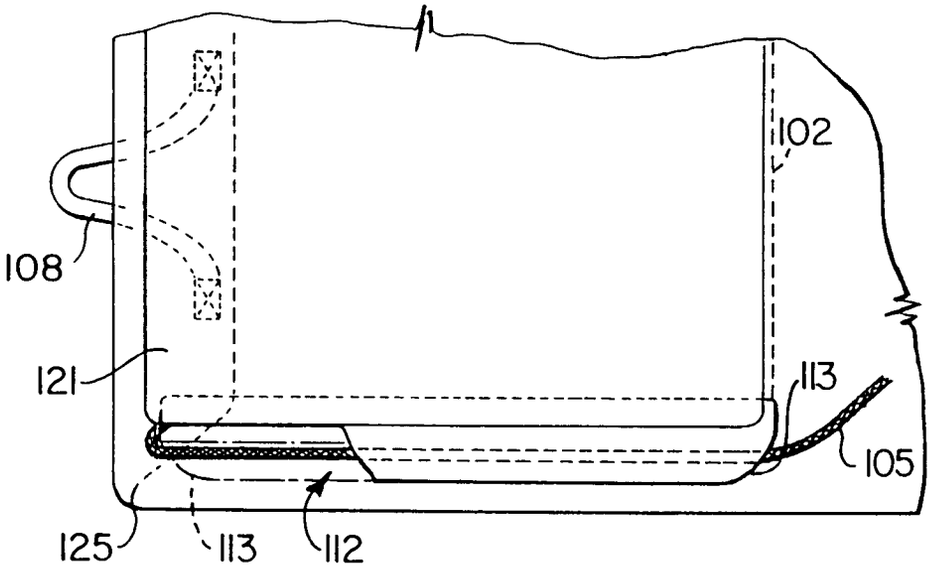


FIG. 8

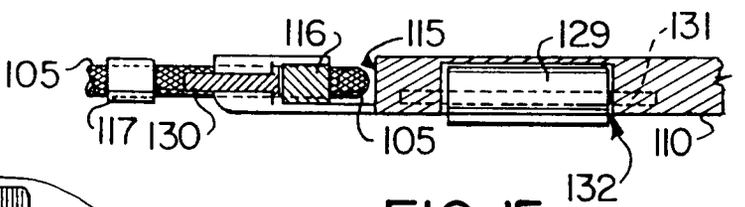


FIG. 15

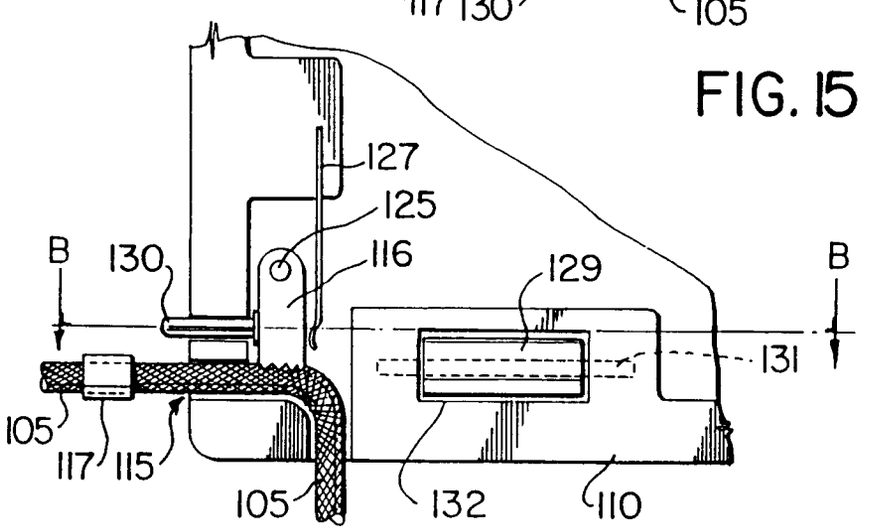


FIG. 14

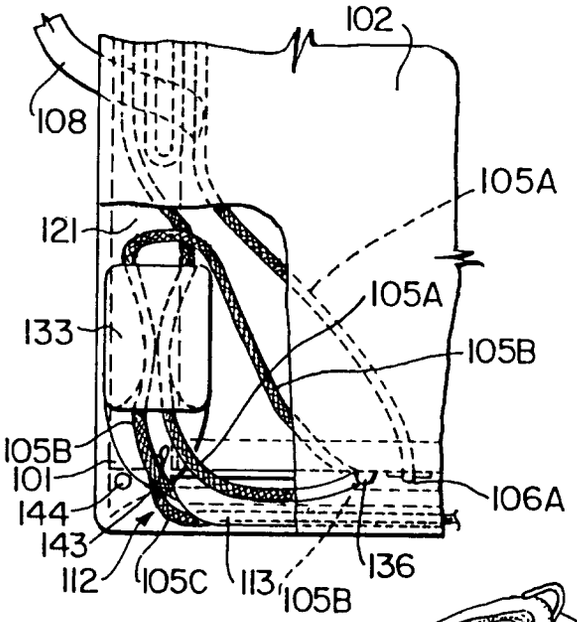


FIG.16

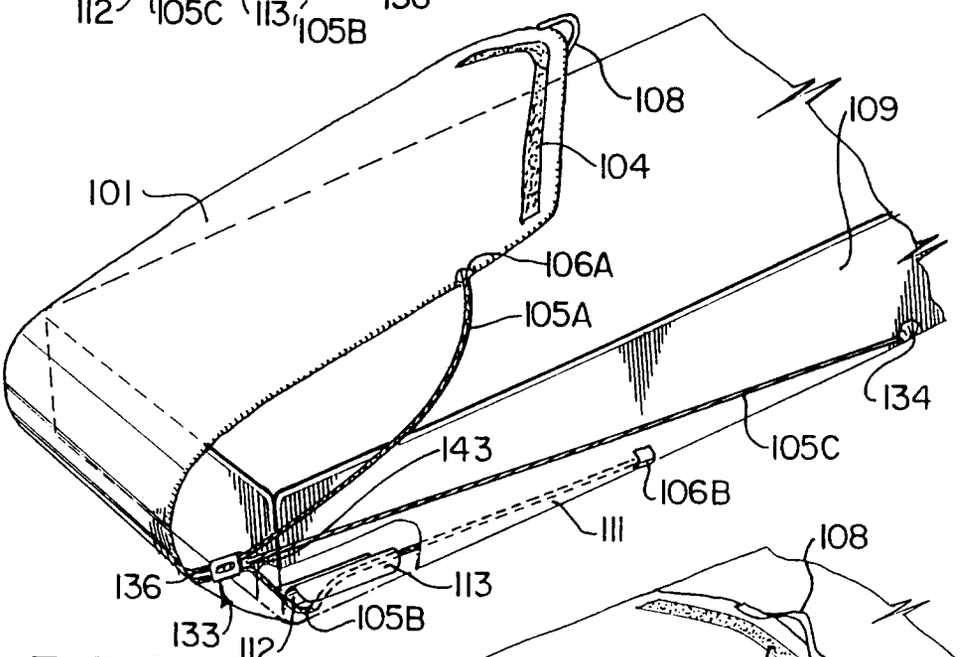


FIG.17

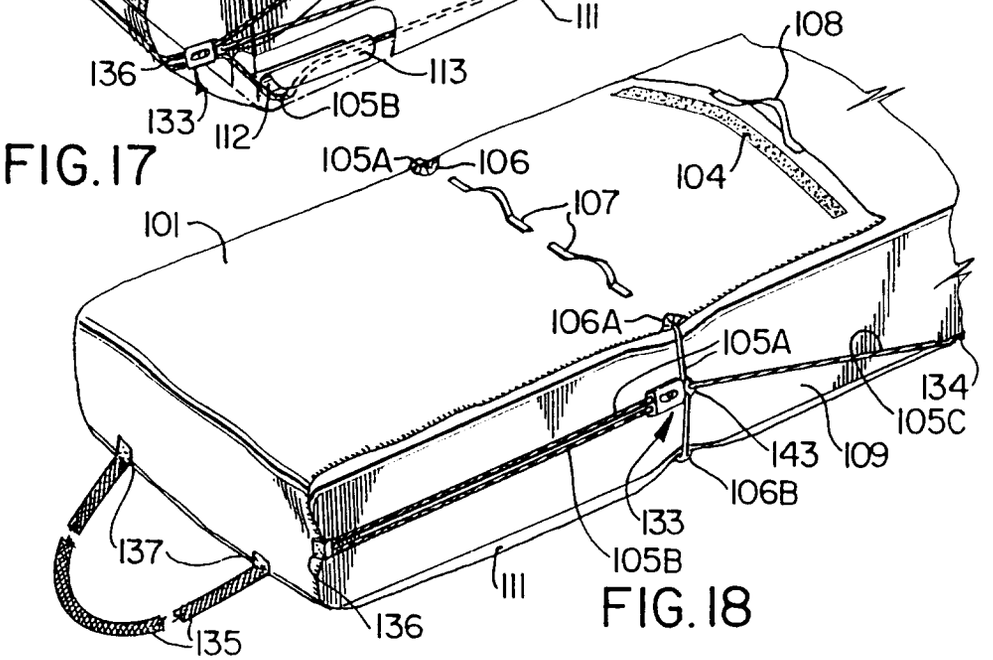


FIG.18

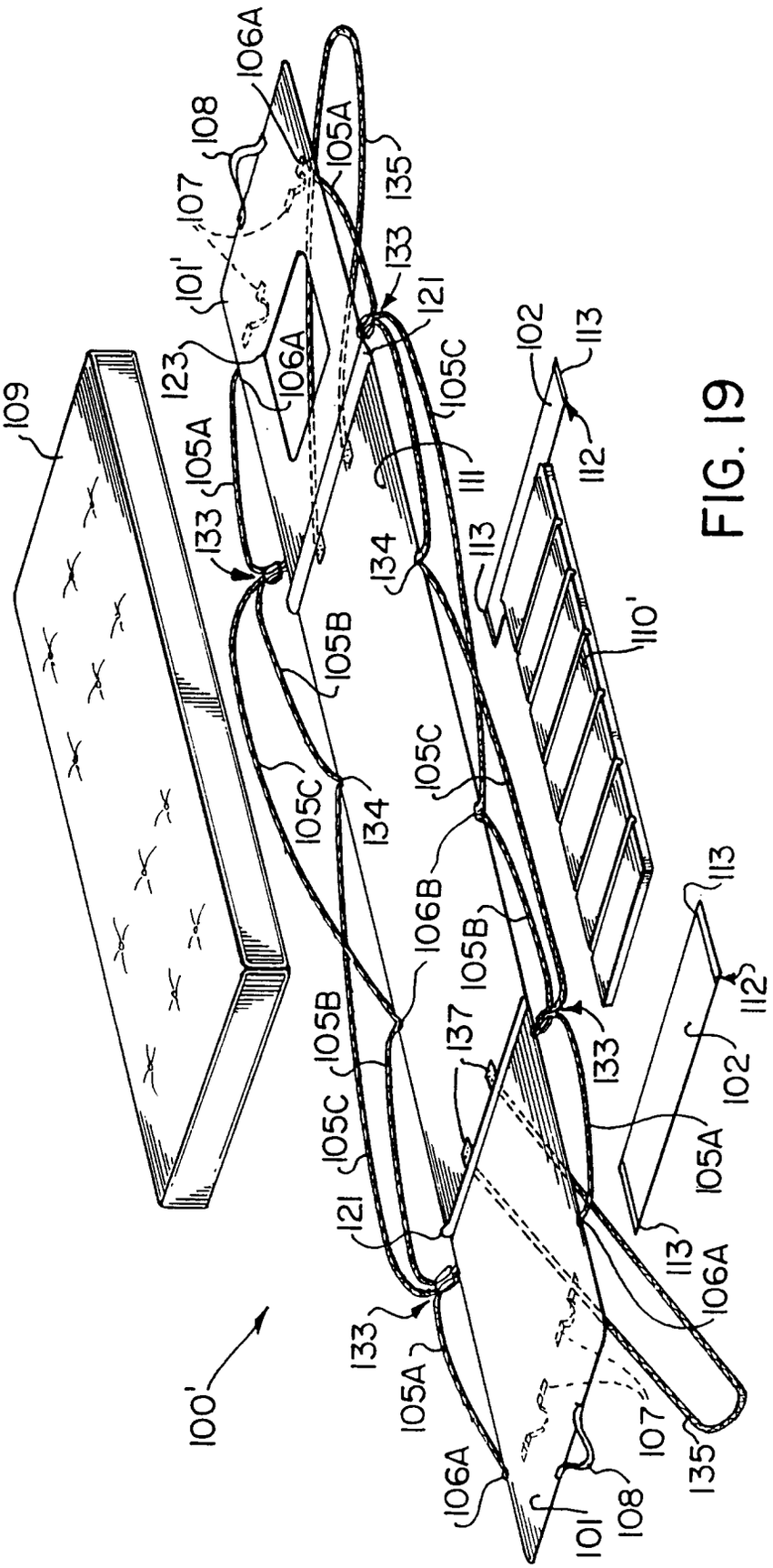

100'
101'
102
105A
105B
105C
106A
106B
107
108
109
110'
111
112
113
121
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134
135
137

FIG. 19

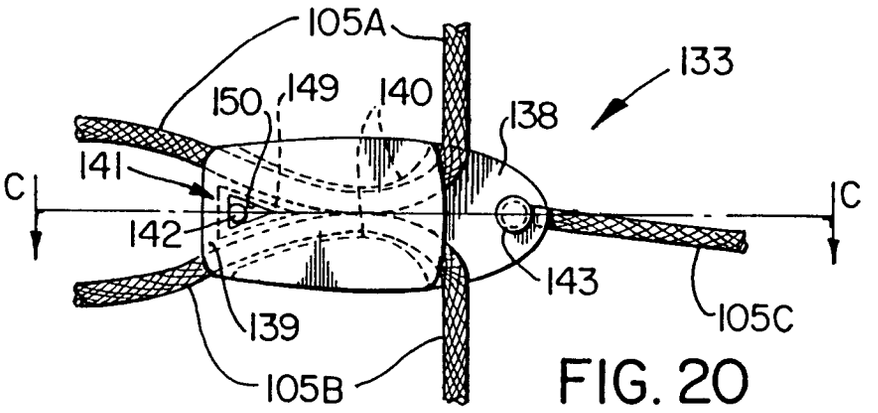


FIG. 20

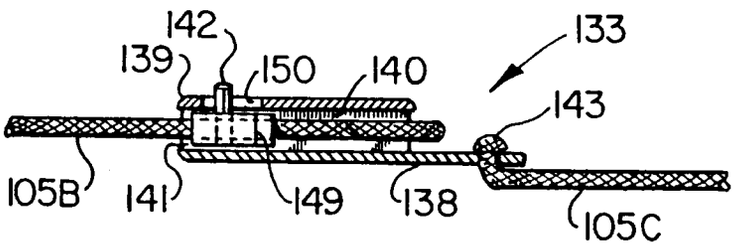


FIG. 21

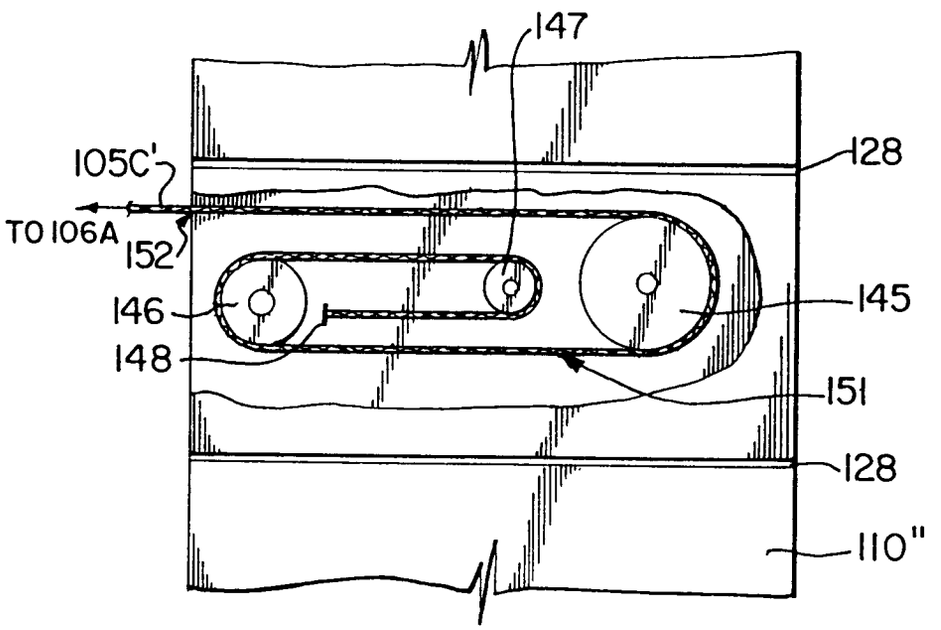


FIG. 22

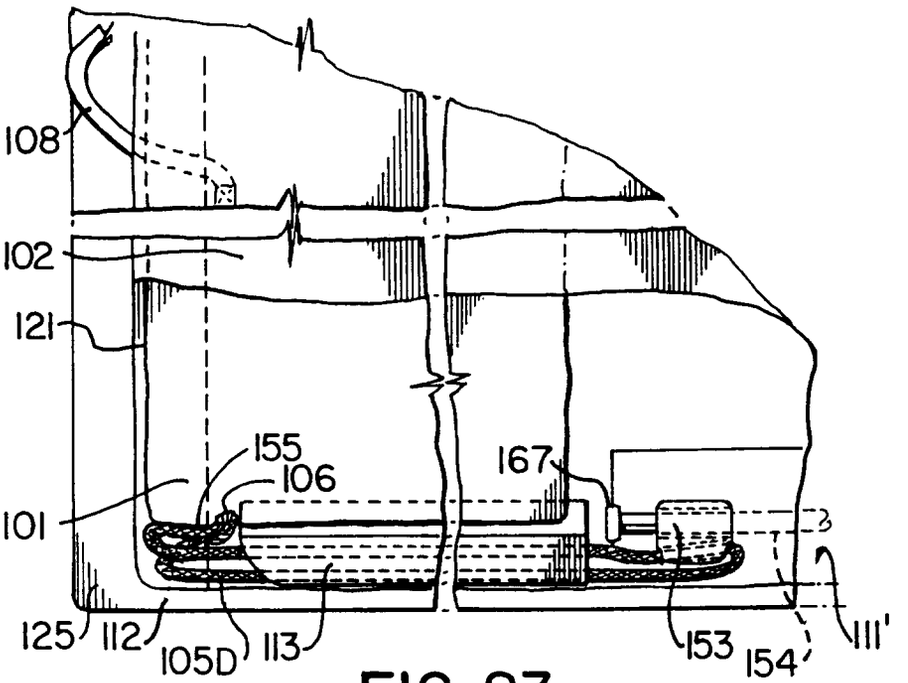


FIG. 23

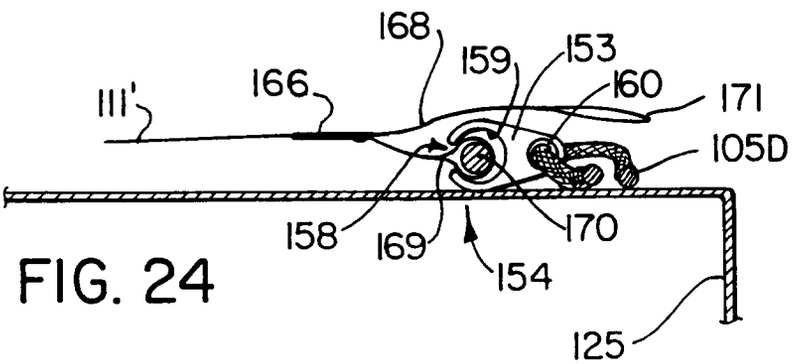


FIG. 24

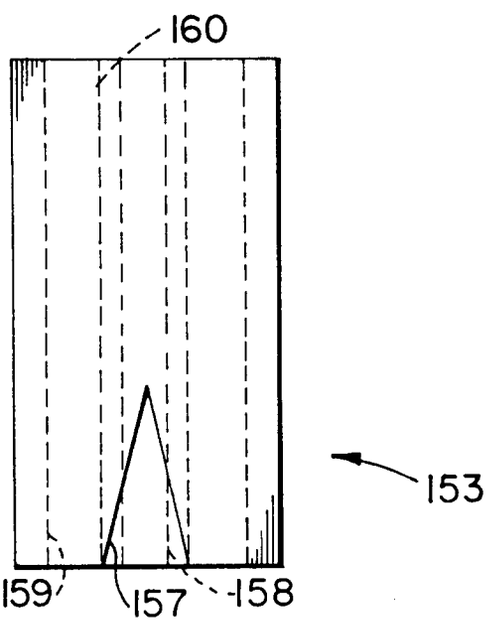


FIG. 25

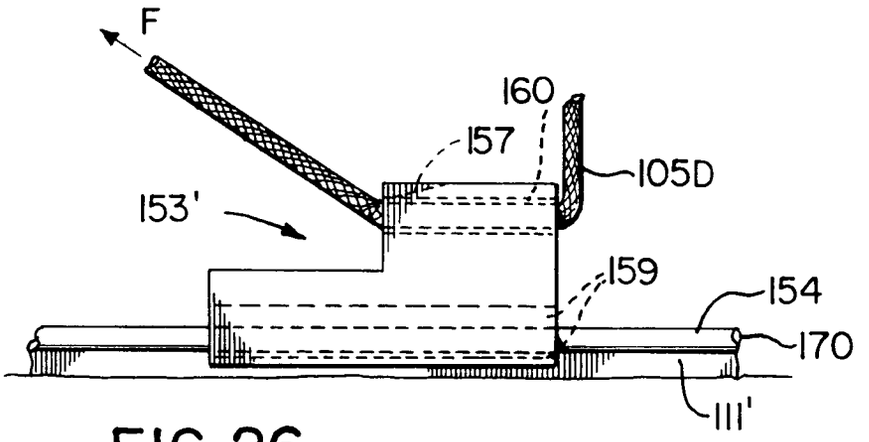


FIG. 26

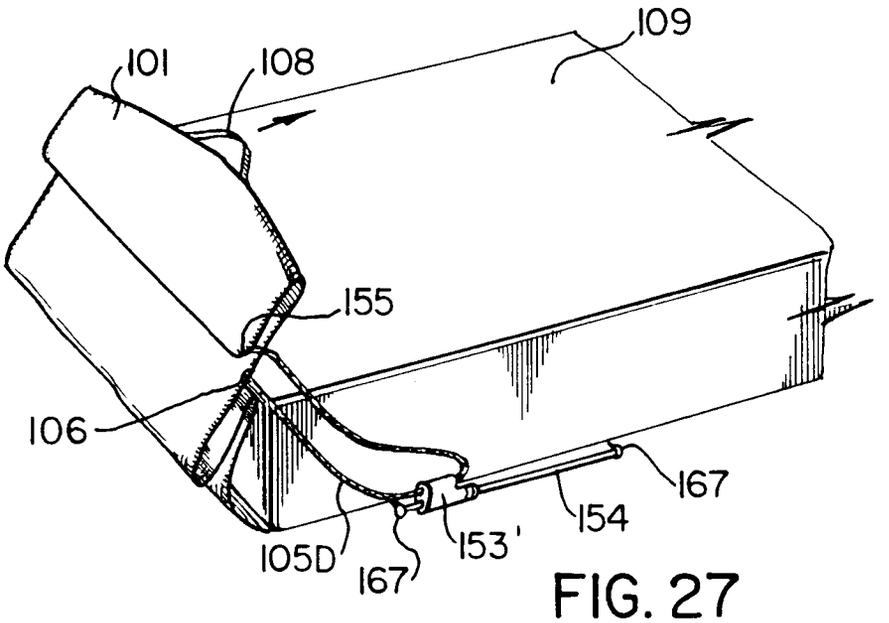


FIG. 27

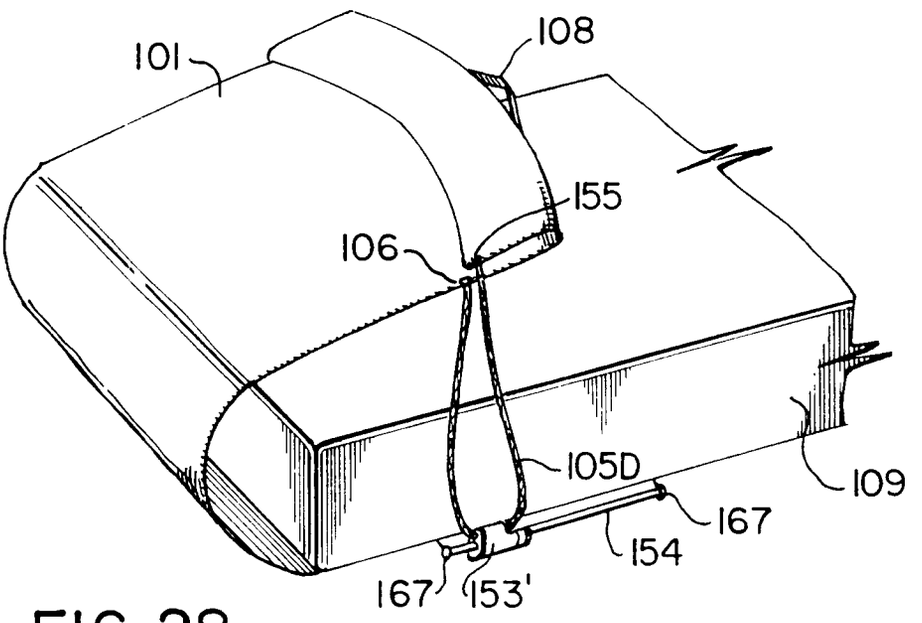


FIG. 28

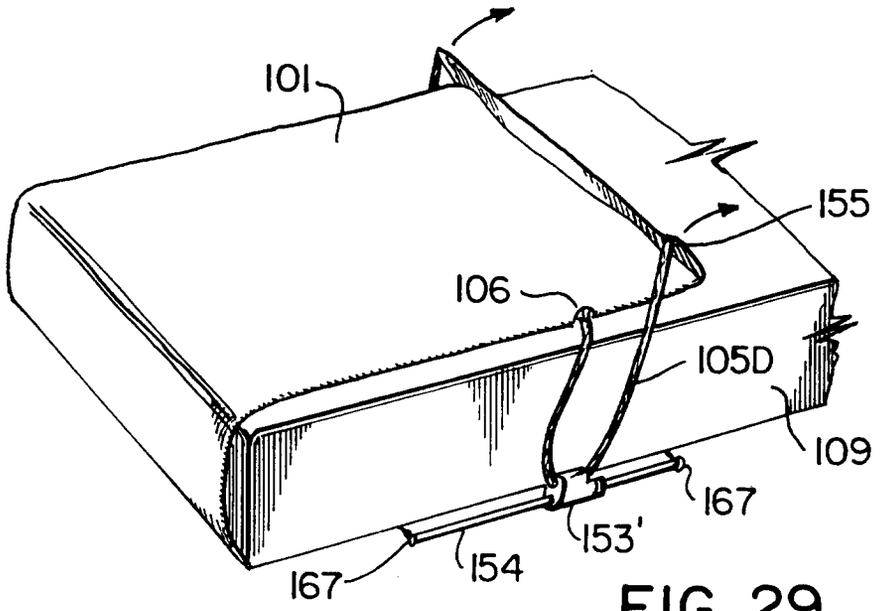

101
155
106
105D
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167
153'
154
167

FIG. 29

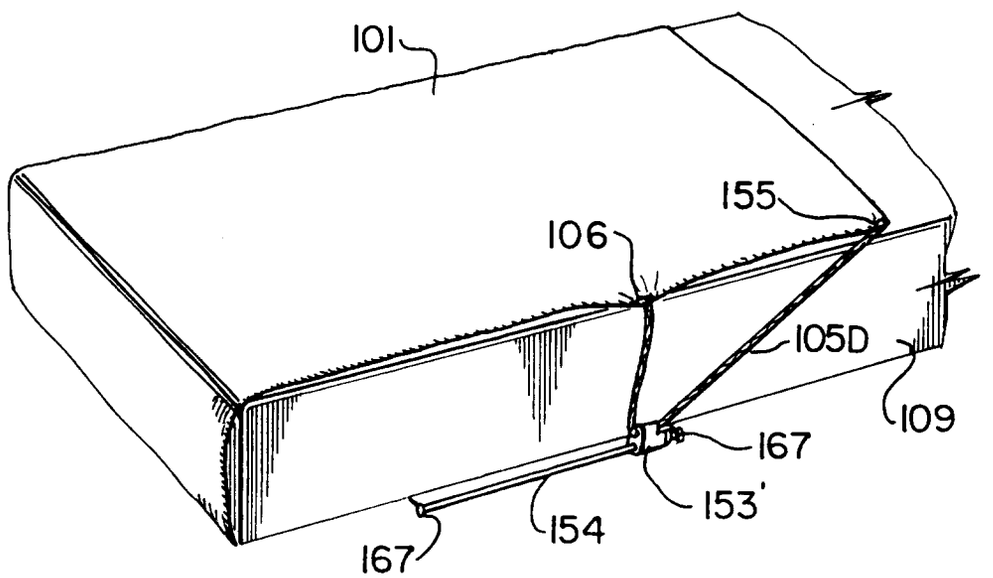

101
155
106
105D
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167
153'
154
167

FIG. 30

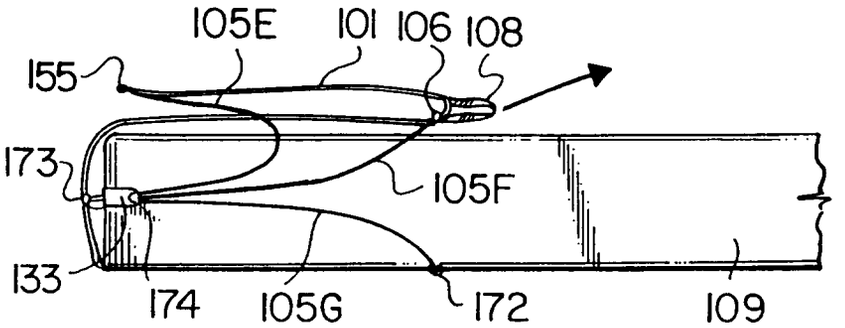


FIG. 31

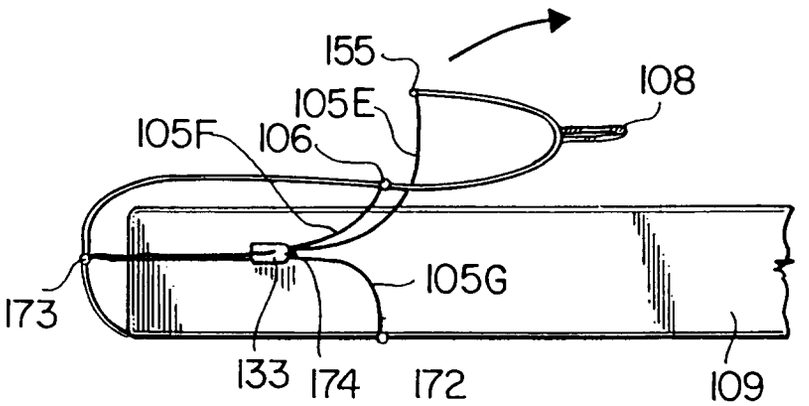


FIG.32

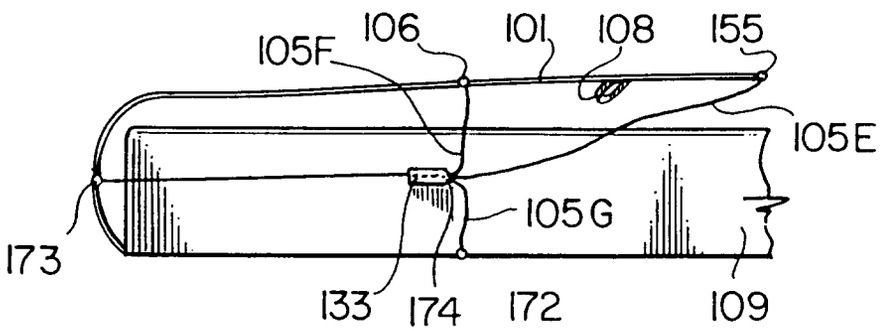


FIG.33

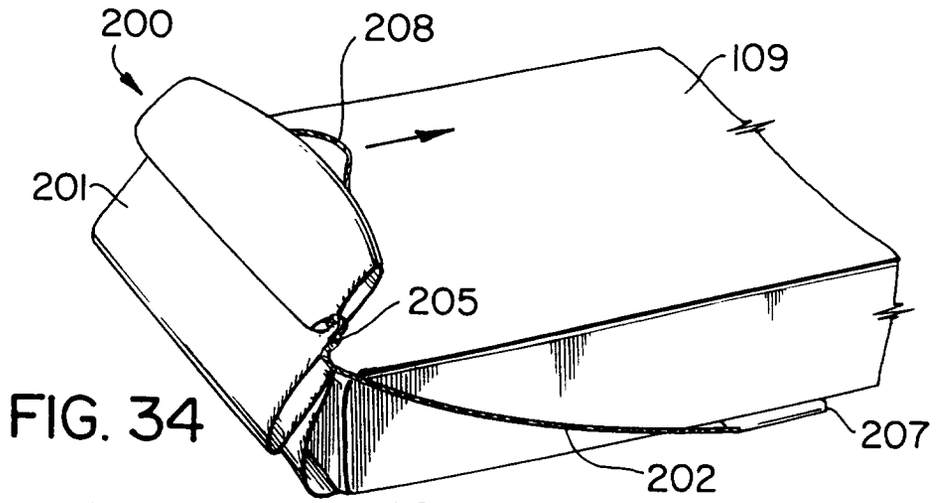


FIG. 34

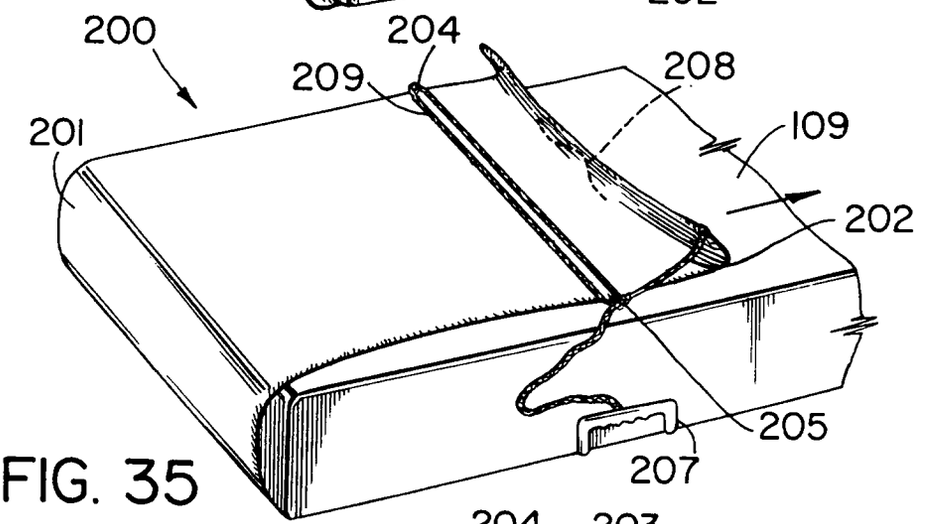


FIG. 35

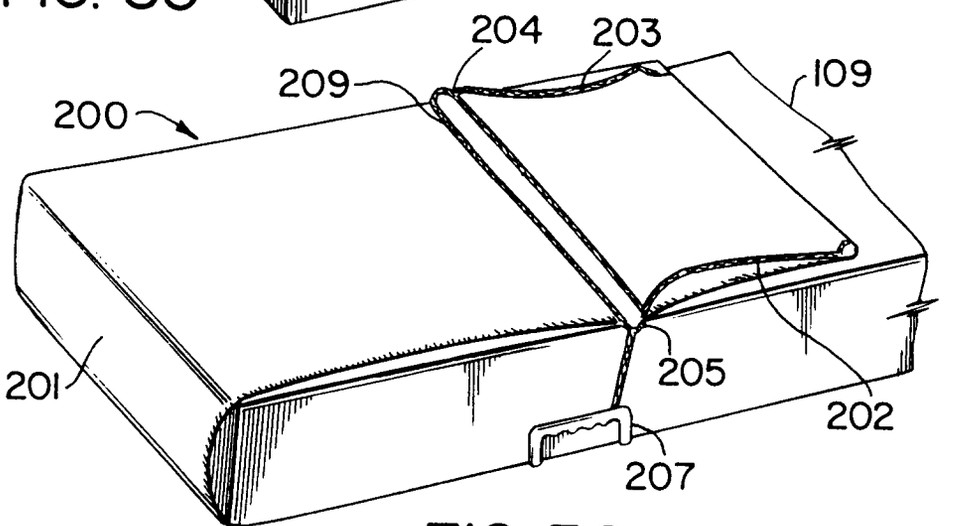


FIG. 36

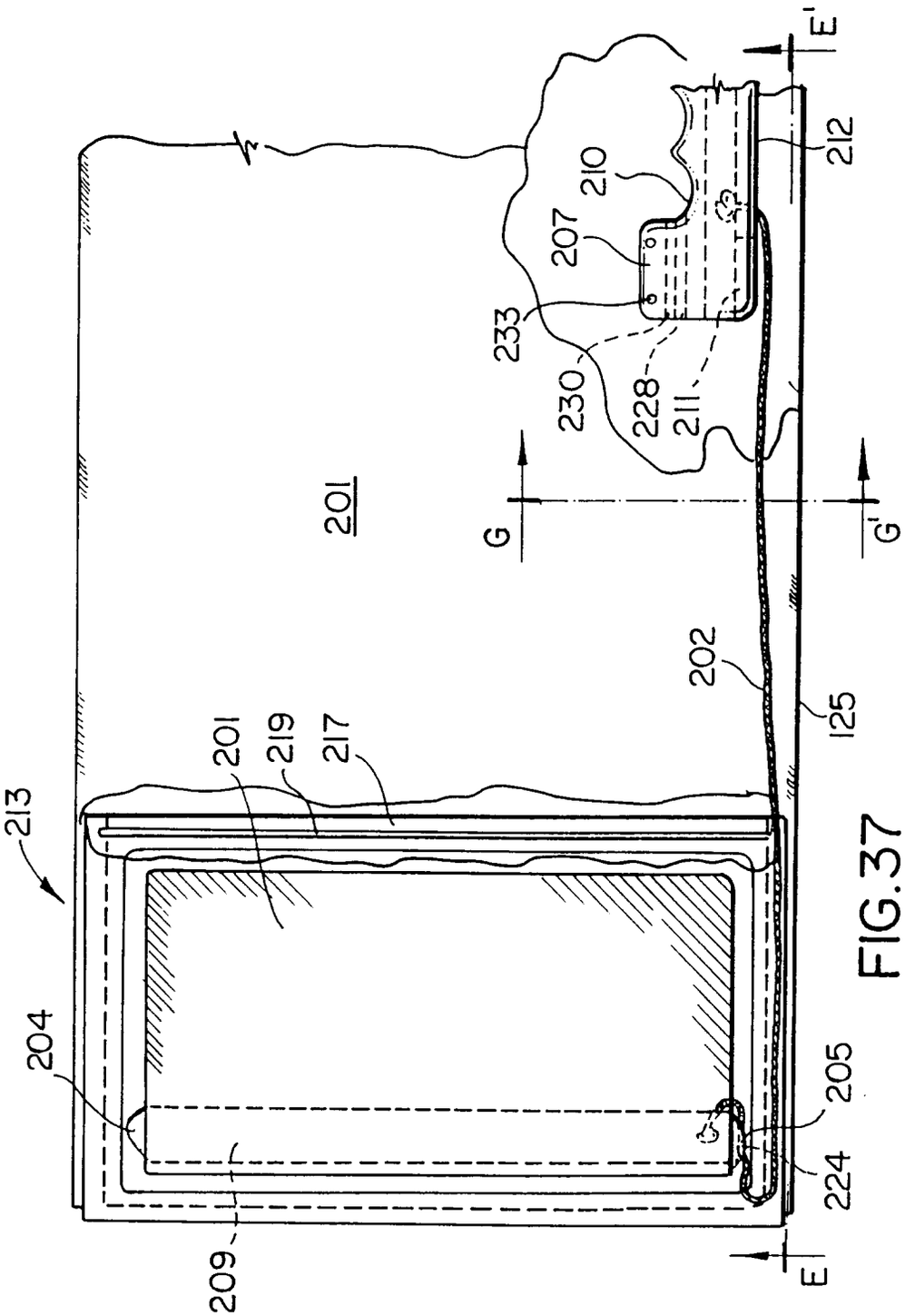

213
204
209
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125
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230
228
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207
210
212
G
G'
E
E'
224
205

FIG.37

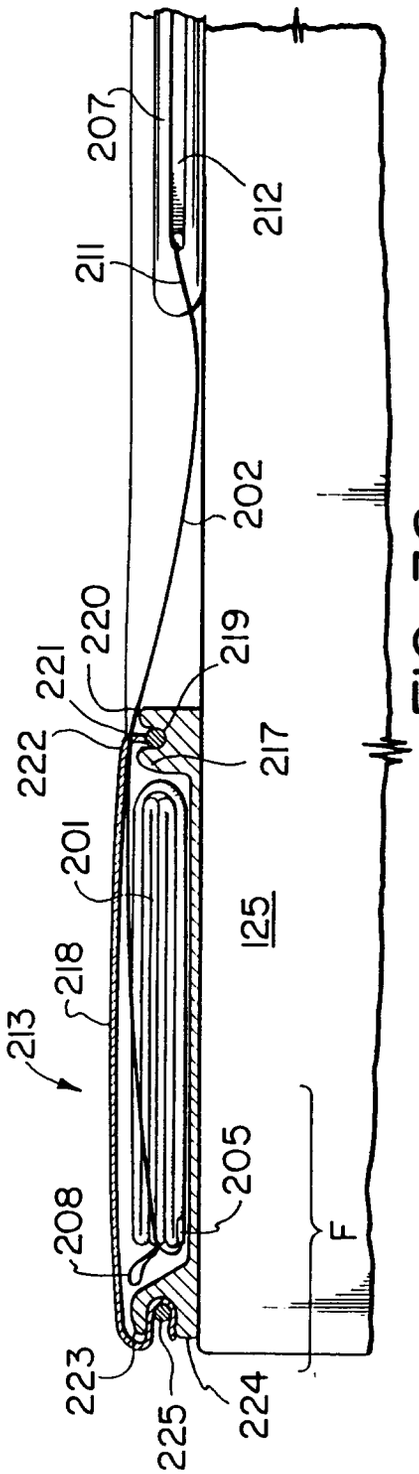
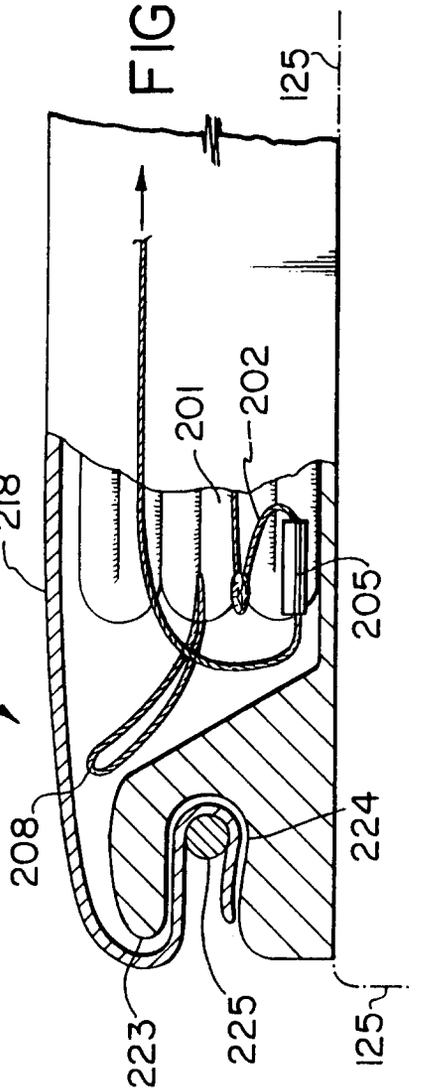

207
212
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FIG. 38

FIG. 39


125
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125

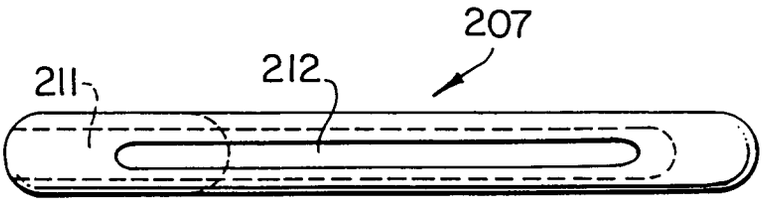


FIG.40

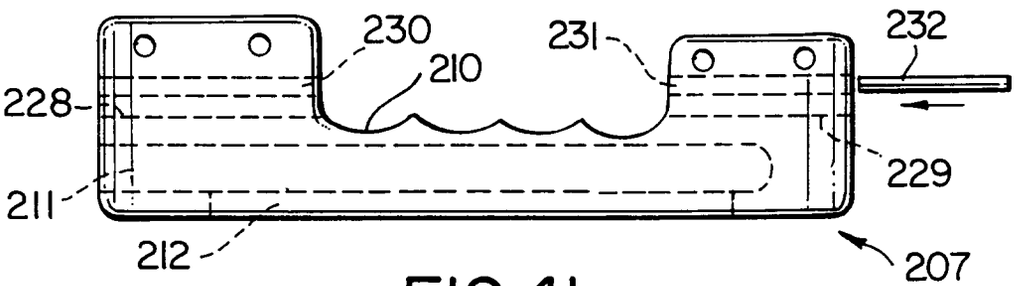


FIG.41

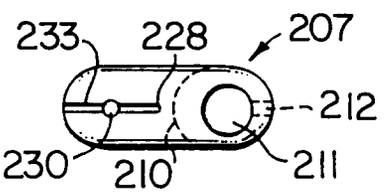


FIG.42

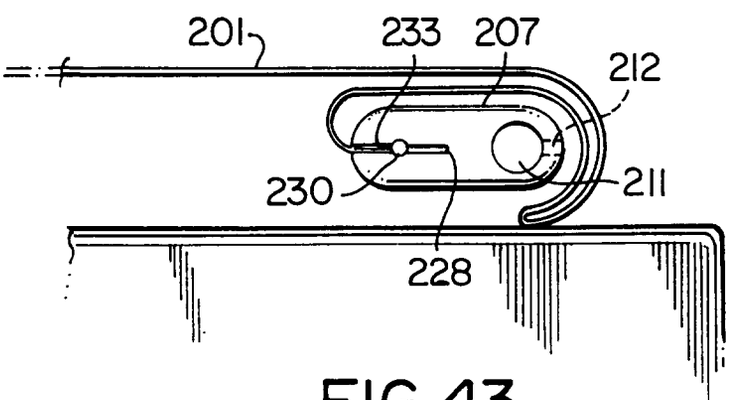


FIG.43

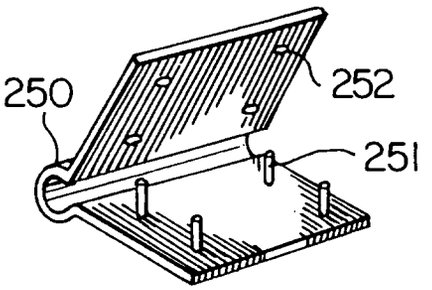


FIG.44

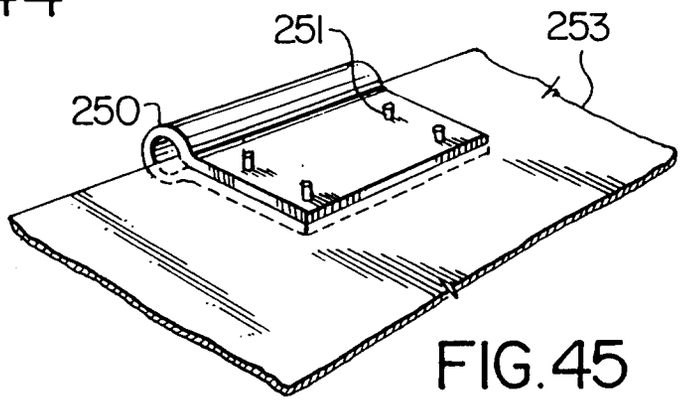


FIG.45

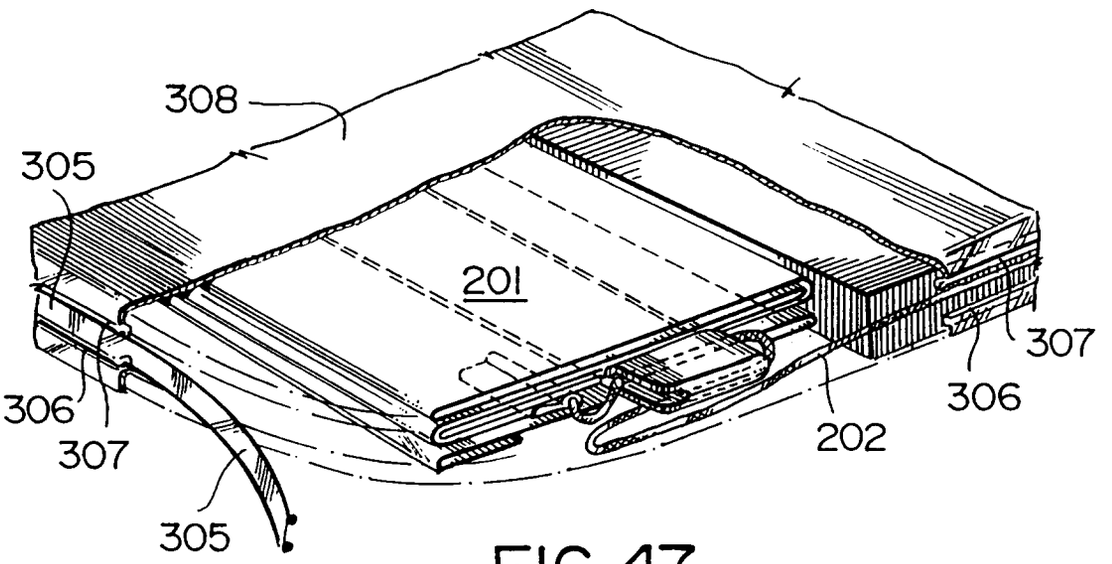


FIG.47

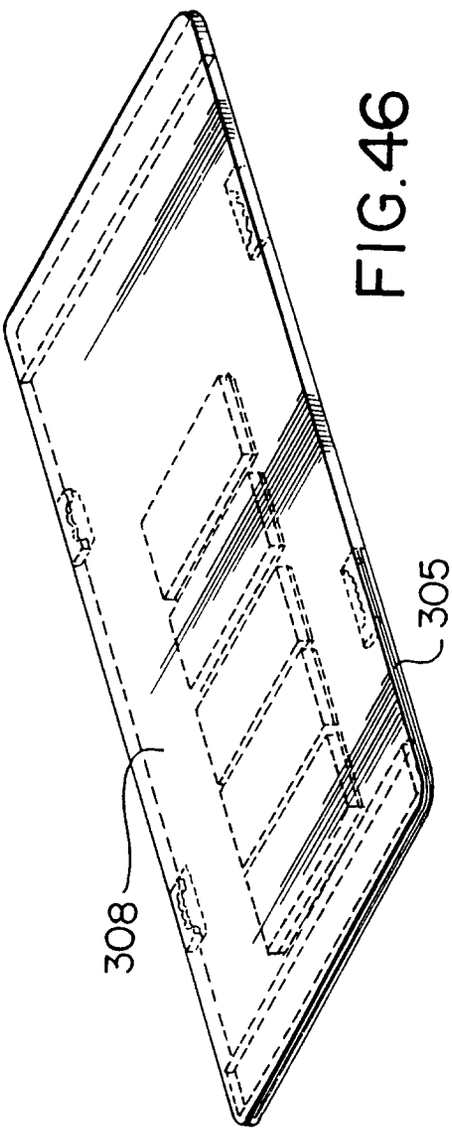


FIG.46

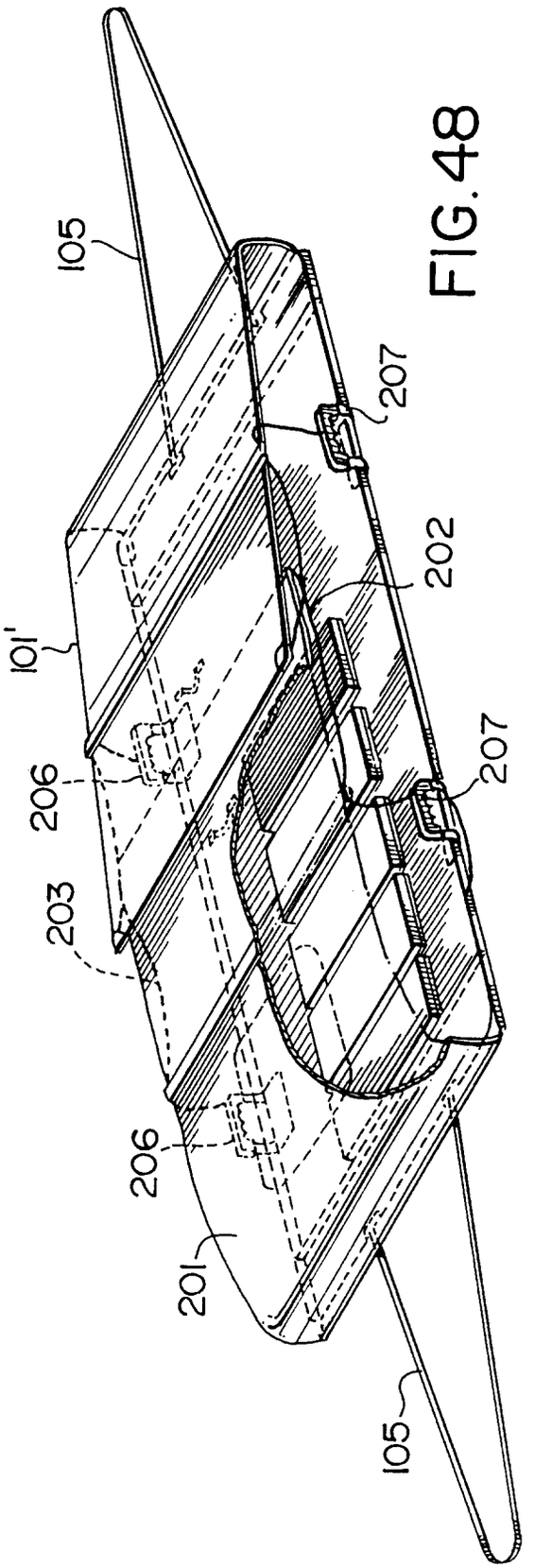


FIG.48

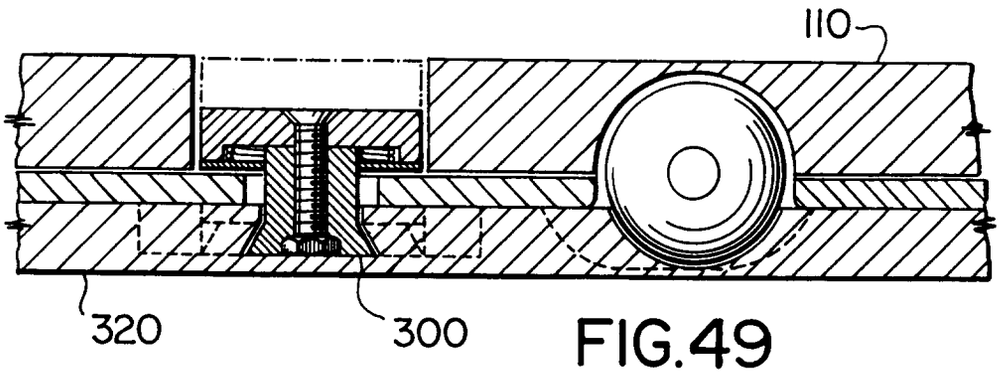


FIG.49

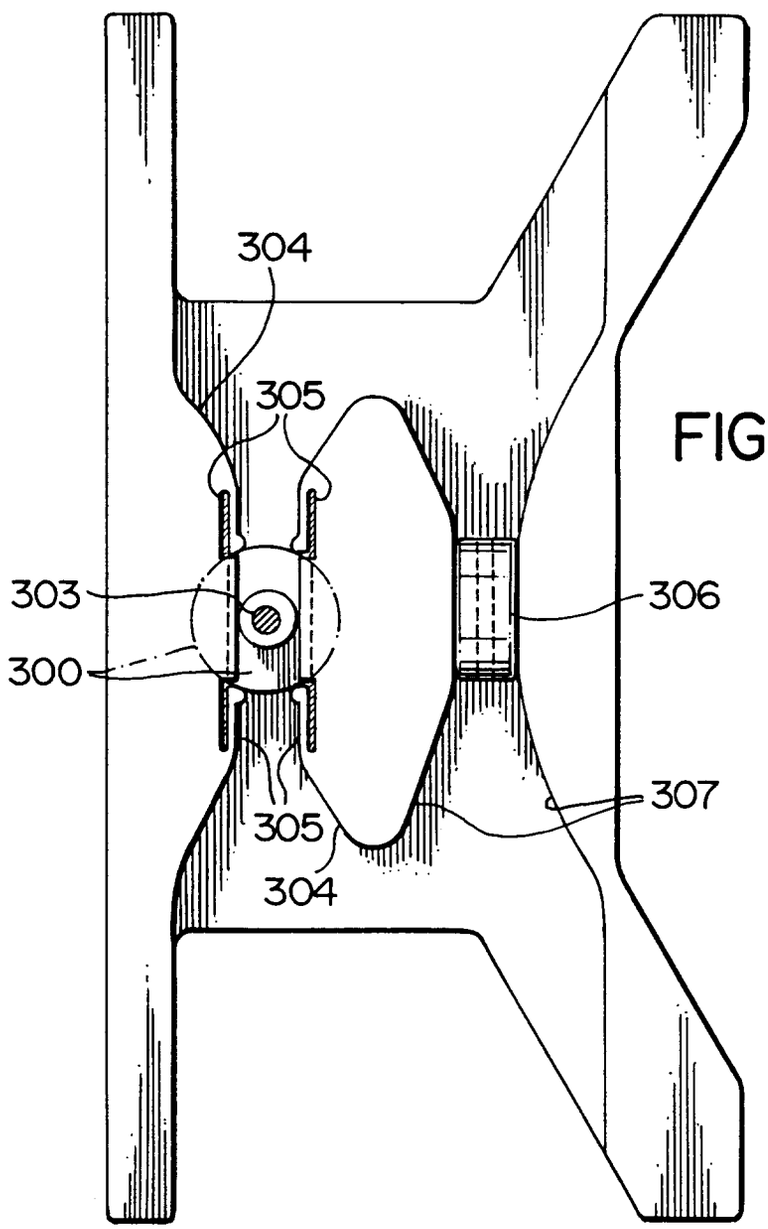


FIG.50