Sept. 7, 1965 D. W. GORDON 3,204,259

CUSHION APPARATUS FOR LANDING PITS FOR JUMPERS, VAULTERS, DIVERS, ETC.

Filed Aug. 12, 1963 2 Sheets-Sheet 1

FIG. 1.

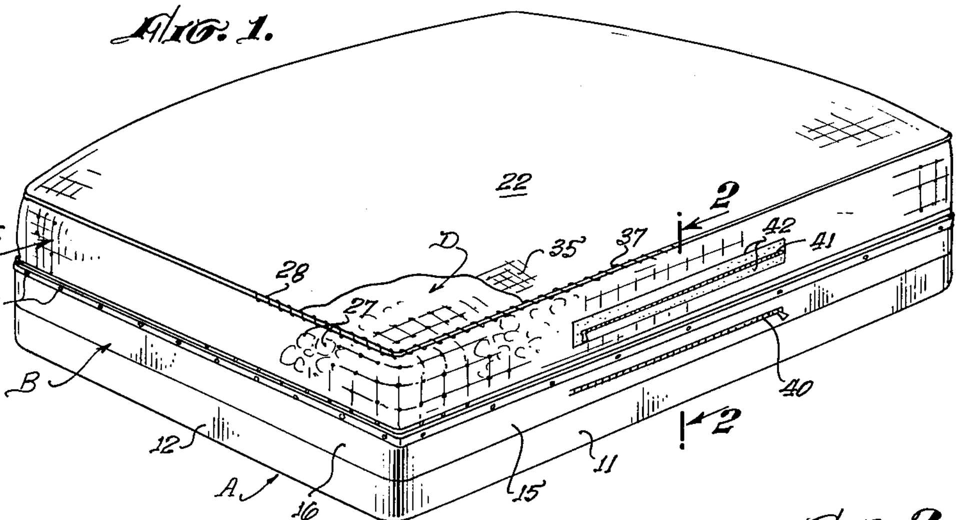

FIG. 2.

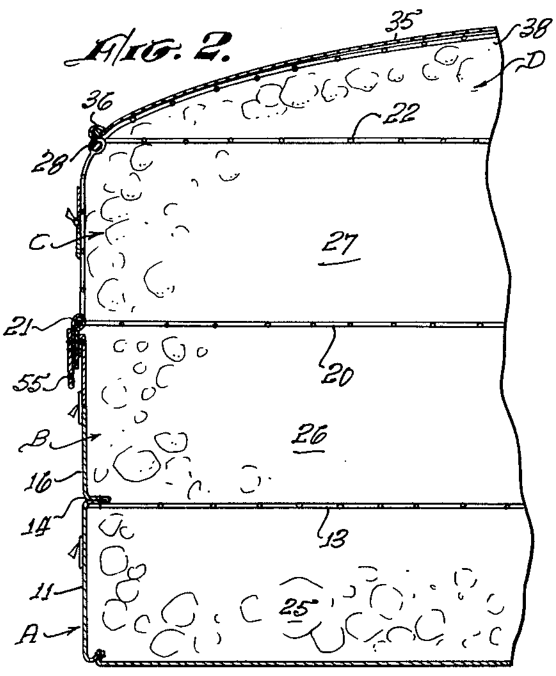

FIG. 3.

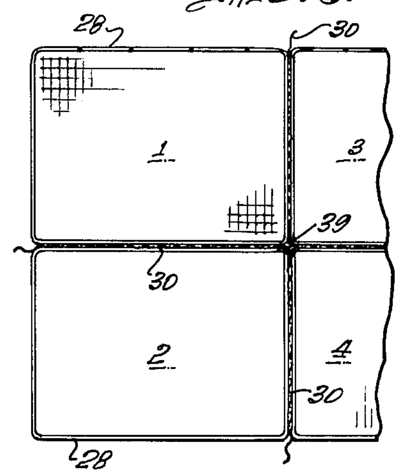

FIG. 4.

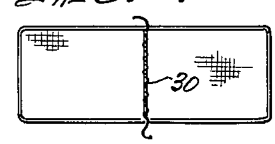

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FIG. 5.

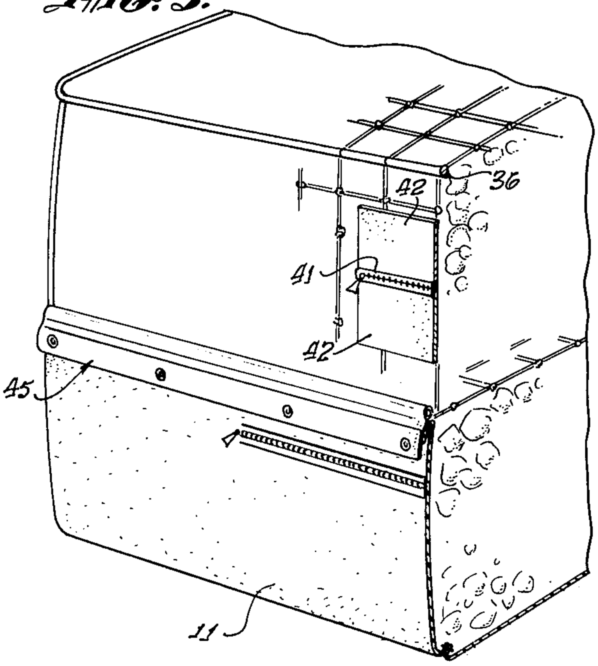


FIG. 6.

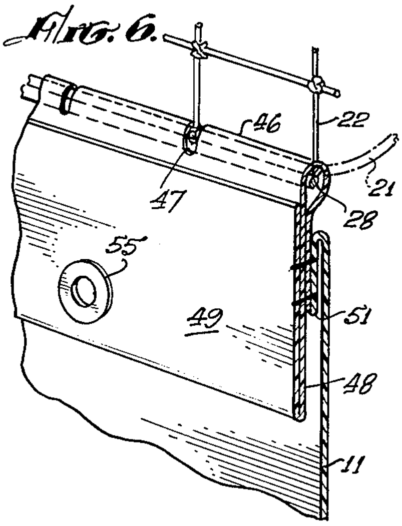


FIG. 7.

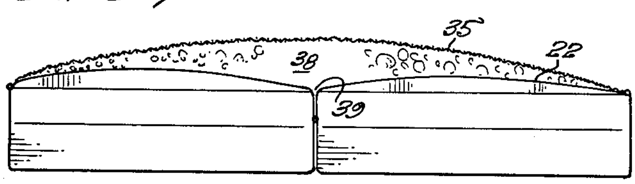


FIG. 9.

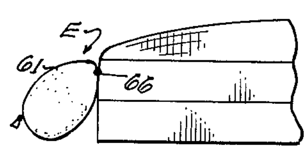
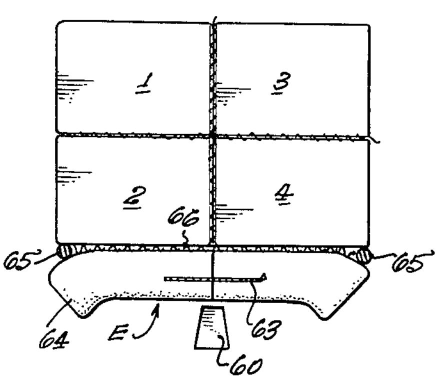


FIG. 8.



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3,204,259
United States Patent Office
Patented Sept. 7, 1965

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3,204,259

CUSHION APPARATUS FOR LANDING PITS FOR JUMPERS, VAULTERS, DIVERS, ETC.

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Filed Aug. 12, 1963, Ser. No. 301,342
18 Claims. (Cl. 5—355)

This invention relates to landing pits such as are used for cushioning the fall of athletes in vaulting, high jumping, dry land diving and other gymnastic activities, and has as its general object to provide an improved cushioning apparatus especially adapted for such use. The invention is also useful for cushioning practice parachute jumps from low altitudes, and other jumps and falls that may be required in the training of military personnel and as a substitute for firemen's landing nets, and other analogous uses which will suggest themselves to those skilled in the art.

Hitherto, it has been the universal practice to utilize a loose body of sawdust, sand, wood shavings, foam rubber scraps, and other materials having a sufficiently yielding character in a loose pile or body of particles, for jumpers' and vaulters' landing pits. When a pole vaulter, jumper or diver lands in such a body of loose material, the material is splattered horizontally from the center of impact, and must be raked, swept, shoveled etc. back into the pit or pile in which it is associated, to receive the next descending vaulter etc. This requires constant operation by an attendant after each jump or vault, since it is always necessary to have the material piled to a maximum height at the center of the landing area for maximum cushioning effect. But even with the best care in shaping the pile with a suitably crowned contour, the body of the descending jumper or vaulter tends to penetrate the center of the pile of cushioning material and to bottom out against the unyielding bottom of the pit or the ground supporting the pile. This is especially true where the cushioning material comprises scraps of foam rubber or foamed synthetic plastic material such as polyurethane foam, which is desirable because of its extremely light density. This light density causes the material to yield laterally with almost no resistance under the impact, and it appears that to some extent the light material may actually be blown aside by the air being displaced laterally by the descending body. In any event, actual experience has proven that the athletes' body will penetrate such loose light-weight material without satisfactory utilization of the cushioning properties of the material. There have been only a few discontinued instances of attempts to use such light-weight foam material scraps, and the prevailing practice has been to continue the older practice of using sawdust etc. up to the time of the present invention. This no doubt is due to the unsatisfactory penetration of the foam scrap material by the descending body.

With the foregoing in mind, the invention embraces the following objects:

(1) To provide an improved cushioning apparatus embodying layers of light-weight resilient foam material and a light-weight container adapted to contain the material in a body of predetermined dimensions and contours.

(2) To provide a cushioning apparatus adapted for use in a vaulter's or jumper's pit and requiring substantially no re-forming by an attendant between successive landings.

(3) To provide a landing pit cushion apparatus comprising one or more cushion units which are portable and sufficiently light-weight so that they can be easily transported from place to place and carried by two men during set-up and removal operations.

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(4) To provide such a portable cushion unit which is self-sustaining and will stand, without external support, in its predetermined shape, whether contained in a pit or simply resting upon a flat horizontal surface.

(5) To provide a landing cushion apparatus which will maintain a self-contained form in which it will always present an adequate depth of cushioning body to avoid the possibility of injury to an athlete landing thereon.

(6) To provide a self-contained landing cushion apparatus for large-area pits such as pole vaulters' pits, comprising a plurality of units each of sufficiently small size to be readily and easily handled by two men, and adapted to be securetd together to collectively provide a functionally integral cushion for the athletes' landing pit area, wherein the impact of the descending body will not open up gaps between the connected units such as would allow the athletes' elbow to penetrate into injurious contact with the supporting surface.

(7) To provide a landing cushion apparatus embodying an envelope assembly which is especially adapted for containing, supporting and retaining one or more bodies of loose cushioning material (e.g. in the form of chunks or scraps) within a space of selected shape and dimensions such as to maintain the most efficient fall-arresting and cushioning condition throughout repeated landing thereon.

Other objects and advantages will become apparent in the ensuing specification and appeneded drawing in which:

FIG. 1 is a perspective view of a cushion unit embodying my invention;

FIG. 2 is a fragmentary vertical sectional view through one end of a three-level unit;

FIG. 3 is a fragmentary schematic plan layout view of a plurality of cushion units joined together for a vaulter's cushion;

FIG. 4 is a schematic plan view of an optional arrangement of a smaller number of units which can be employed in some situations;

FIG. 5 is a fragmentary perspective view of a two-level unit, showing the joint between the vertically superimposed sections thereof;

FIG. 6 is a fragmentary view of the binding tape joint between two units;

FIG. 7 is a schematic vertical transverse sectional view through a complete cushioning assembly including two of the cushion units joined side-by-side and a top covering unit superimposed over the two units;

FIG. 8 is a schematic plan view of a modified cushioning assembly for a pole vaulter's pit, including four joined units and a threshold unit attached to the front side of the assembly; and

FIG. 9 is a fragmentary vertical transverse sectional view through the threshold portion of the assembly seen in FIG. 8.

Referring now to the drawings in detail, and in particular to FIGS. 1 and 2, I have shown therein, as an example of one form in which the invention may be embodied, a cushion unit of three-layer construction embodying a base section A, an intermediate section B and a top section C. When a plurality of units (such as units 1, 2, 3 and 4 of FIG. 3) are assembled together, a cover unit D, covering the several of the cushion units, is utilized.

The base section A comprises a casing of moisture-impervious material such as fine woven nylon fabric impregnated with a deterioration-resistant waterproofing material such as neoprene or equivalent material. Such casing embodies a bottom sheet 10 of rectangular form, and side walls 11 and end walls 12 integral with the four margins of the bottom sheet 10 and extending upwardly therefrom. The casing 10–12 is open at the top, except for a separator sheet 13 of open-mesh material such as nylon screen or netting, of rectangular form corresponding to the horizontal cross-sectional configuration of the casing 10–12. The nylon screen herein referred to may be a woven-thread single-filament screen material having an aperture size which may be as small as ⅛ inch, similar to window screen material. It has the advantage of providing maximum containment and separation with respect to the superimposed layers of foam material, together with adequate air-passage capacity, but for some applications it does not have adequate strength to withstand tearing loose from the joint 14 under the handling of the cushion units. The four margins of separator sheet 13 are secured to the upper margins of the four vertical wall members 11 and 12 by a joint which is indicated generally at 14. The joint 14 also secures the lower margins of four vertical wall members of an intermediate casing comprising the separator sheet 13 and a frame consisting of side walls 15 and end walls 16. This frame may be fabricated of a single strip of material which may be of open netting such as tennis-net material having an aperture size of about two inches.

Sections B and C are separated by a separator sheet 20 which can be of nylon screen material but is preferably of a net material having a fairly large aperture size which can be two inches or even four inches, and offering no appreciable resistance to the flow of air between the sections B and C. The separator sheet 20 is of the same rectangular plan and size as sheet 13 and its four margins are anchored to the upper margins of frame B by a joint 21.

The section C is enclosed by a casing 22 of heavy duty nylon netting having an aperture size which is preferably in the range of two inches, sufficiently small to avoid loss of any of the filler material to the exterior. The four sides of frame 15, 16 are preferably fabricated as an integral continuation of the corresponding sides of the casing 22. The material of this frame, of casing 22 and of separator sheet 20 in each instance is a netting material wherein the crossed strands are tied together at the crossings by knots, so as to adequately resist any forces tending to separate the strands at any particular area or to otherwise shift them out of position.

In the preferred form of the invention, a multiple unit assembly such as that shown in FIG. 3 is provided with a top cover which is indicated generally at D in FIG. 2. The top cover D comprises a cover sheet 35 of a soft, unknotted mesh material which is non-abrasive in contact with the skin of the athlete's body during impact (as contrasted to the knotted net material 22 of which the fairly prominent knots tend to have a harsh effect upon the skin). I find that a suitable material for the cover sheet 35 is one embodying braided strands of approximately $\frac{1}{16}$ inch thickness or slightly larger and having approximately a 1 inch mesh (in order to have adequate strength where the strand is of such a fine gage) the intersections of the meshes being fabricated by interbraiding adjoining connections between strands, or by suitably sewing or binding them together without noticeably raised intersections. This can be attained by utilizing a plurality of zig-zag strands having approximately 90° bends joined to similar bends of adjacent strands without cross-over, in a single plane.

The bottom section A is filled with chunks or scraps of light-weight, resilient foamed or sponge material such as foamed polyurethane resin, indicated at 25. The material 25 is of a relatively high density as compared to the materials of the upper sections. The section B is filled with scraps or chunks 26 of a similar material of a medium density. The upper section C is filled with

scraps or chunks of material, indicated at 27, which can be of a still lighter density or which can be the same density as material 26. The ratios of density may be such that the bottom section material 25 may be almost twice as dense as the top section material 27. Using density indicator figures of the sponge plastics industry, the material 25 may be of 28 density, the material 26 may be of 23 density and the material 27 may be of 17 density (or both materials 26 and 27 may be of 23 density). The density of material 26 may be substantially midway between the densities of the bottom and top materials.

The depths of layers A, B and C may be approximately 8 inches for each (but may be as much as 10 inches for the apparatus used for a diving pit).

The upper marginal corners of casing 22 are reinforced by a rectangular ring 28 of nylon rope or equivalent material having the general function of maintaining the planform of the unit. It has adequate strength to contain the casing against lateral expansion of its planform in response to the explosive impact of a valuter's body against the top surface thereof. The rope ring 28 also reinforces the margin of the unit in a manner to provide a sturdy means for connecting adjacent margins of multiple units to one another in a manner to transfer the horizontal strains between units without imposing such strains upon the netting material of casing 22, in a manner which will be described more in detail in connection with FIG. 3.

Horizontal containment against expansion of the horizontal area of the cover is quite important in avoiding the creation of a recess or pit in the center of the top section as a result of the repeated landings thereon. Furthermore, such horizontal containment functions to distribute the impact horizontally with maximum cushioning resistance thereto as a result of the horizontal cushioning action in the top layer 27 and this partially relieves the effect of the downward impact against the lower layers 26 and 25, so that the lower sections of the apparatus will function more efficiently in absorbing the balance of the force of impact which is not absorbed by the upper section. The same horizontal containing action is provided for by the joints 14 and 21 between the several sections of the apparatus, and there is a combination of both vertical and horizontal cushioning action in each of the sections, especially in the two upper sections.

I find that it is important that the apparatus provide for maximum rapidity of escape of the air, especially in the two upper sections of the apparatus, so that the absorption of the momentum of the falling body is handled almost solely by the inherent cushioning action of the layers of material 25, 26 and 27 in both vertical and horizontal directions.

As to the lower section, there is somewhat more limited air escape, since the air expelled from the lower cushioning body 25 will travel first outwardly and then upwardly to escape through the lower area of the intermediate frame 15, 16, in competition with the body of air escaping from the intermediate section B. This adds a small amount of pneumatic cushioning action to the operation of the lower section A, which improves the stiffening resistance of the bottom section to any bottoming out of the descending body.

Referring now to FIG. 3, which may be regarded as largely schematic, the ropes 28 are indicated by the double line defining the margins of the four units, which are numbered 1, 2, 3 and 4 respectively. The adjacent sides of units 1 and 2 are secured together by a lacing cord 30 which is laced helically around the two reinforcing ropes 28 along the adjacent sides of these two units. The same lacing cord extends the full length of the assembly of four units, being extended across the intersection of the four adjoining corners thereof, and on between the adjoining sides of units 3 and 4, securing these sides together by being laced around the adjacent sections of the reinforcing ropes along these sides. In a similar manner, a single lacing cord laces together the adjoining ends of units 1 and 3 and the adjoining ends of units 2 and 4 in a lacing which extends the full width of the assembly from side to side thereof. As the lacing progresses, the lacing cord is drawn tight, thus drawing the adjoining sides (or ends) of adjacent units snugly into contact with one another and substantially closing the gaps between the units. At the completion of the lacing operations, the ends of the lacings are secured in any suitable manner as by tying them to the ropes 28 at the four ends of the junction gaps between units. The provision of a reliable strong continuous binding connection between the adjoining margins of the several units of an assembly is extremely important in the overall functioning of the apparatus, since it prevents the development of gaps between the units at or near the upper surface of the assembly, thus avoiding any "bottoming out" of a falling athlete's body which otherwise would result from separation of the units under a blow delivered approximately at their center of junction.

The marginal sides and ends of cover sheet 35 are reinforced by a reinforcing rope 36 which may be of substantially the same diameter as rope 28. Reinforcing rope 36 is in the form of a rectangular ring of the same circumference and planform as rope 28, and is joined thereto by a lacing 37 along the respective sides and ends of the two units C and D, the laced joint being substantially the same as the lacings 30.

Between the cover shet 35 and the casing 22 of unit C is a body 38 composed of chunks or scraps of sponge material of relatively light density which can be of the same density as the material of layer C. The cushioning body 38 covers the joints between sections 1, 2, 3 and 4 (at bindings 30) so as to distribute some of the force of impact to the four units 1–4 in advance of the direct impact which results after the cushioning action in body 38 has been exhausted. This relieves to some extent the strain on the bindings 30, further diminishes the tendency of the falling body to pierce between the four units 1–4, and further graduates the cushioning action with an initial softening of the impact.

The area of cover 35 corresponds generally to the combined areas of the four units 1, 2, 3 and 4, although preferably the area of the cover sheet 35 when laid out flat is somewhat greater than the planform of the four units 1–4 so as to allow for the upward crowning of the cover 35 when the cushioning body 38 is introduced beneath it. Correspondingly, the perimeter of reinforcing rope 36 is generally equivalent to the total perimeter of the planform of units 1–4 when assembled as in FIG. 3. The two perimeters can be exactly the same, in which case it is preferable to have the perimeter of the sheet of netting material 35 somewhat larger and to compensate for the excess by a slight gathering of the four margins of the cover sheet 35 as attached to the rope 36 (which can be accomplished by folding the four margins of sheet 35 around the four stretches of rope 36 and sewing or otherwise securing them back again the underside of the body of sheet 35 to provide tubular hems encompassing the rope 36). Alternatively, the perimeters of cover sheet 35 and of rope 36 may be the same and in that instance the rope 36 will have a larger perimeter than binding rope 28. In this case, the excess length of the rope can be taken up at the four corners of the assembly of four cushion units (e.g. as by drawing the corner bends of the rope 36 downwardly and securing them below the level of rope 28).

FIG. 7 illustrates the fact that there will be some crowning of the individual cover sheets 22 of the four units 1–4, so that a depression will occur at the intersection between the four inside corners of these units, indicated at 39. This depression will be immediately below the top of the crown (at the center) of cover sheet 35 and thus the depth of cushioning body 38 will be at a maximum at this central point. This provides for maxi-

mum efficiency in attaining the intital stage cushioning action referred in the preceeding paragraph and the intitial distribution of the impact to the four units 1–4 by the cushioning body 38. The depth of the cushioning body at the central area may be approximately in the range between 8 inches and 16 inches, and the depth of the body 38 in the more peripheral areas of the planform of the assembly may range approximately between 6 and 12 inches.

FIGS. 5 and 6 disclose some of the detailed features of construction, especially in the marginal joints. Each of the individual cushion units 1–4 is provided, in its bottom and intermediate levels A and B, with respective openable mouths 40 and 41 each closed by a zipper fastener as indicated. The mouth 40 is near the top of the lower level A. The mouth 41, which is formed in the wide mesh netting of sides and ends 15, 16, is bordered by respective attachment tapes 42 which are suitably sewed to the netting material, and is placed as near the top of level B as possible. The mouths 40 and 41 are utilized for the introduction of the scraps or chunks of sponge material. The mouths 40 and 41 may have a length approximately half the length of the respective unit (e.g. 4 feet length in the mouths and 8 feet overall length of the individual cushion unit, whereby the assembly of four units will have an aggregate length of 16 feet).

FIGS. 5 and 6 disclose details of the joints between levels. The loose netting material of intermediate casing 22 is bound along its lower margin by a binding tape indicated generally at 45. As shown in detail in FIG. 6, the tape 45 includes a central web section consisting of a series of loops 46 separated by gaps or slots 47 which receive the successive vertical cords of the netting 22, the loops 46 being looped around the marginal horizontal cords thereof. On the outer side, the loops 46 are integrally joined to an intermediate fold 48 extending downwardly therefrom, and this fold is reinforced by an outer fold 49 which is folded upwardly from the lower margin of intermediate fold 48 and terminates in a free edge just below the series of slots 47. On the inner side of the binding tape 45, the groups 46 are integrally joined to a continuous inner margin 50 which is interleaved between the intermediate fold 48 and a downwardly folded flap 51 of the end and side walls 12 and 11 of the bottom casing. The flap 51, the inner marginal web 50, the intermediate fold 48 and the outward flap 49 are sewed together by lines of stitching 52 extending through all of these members.

The joint 21 is of a construction similar to that shown in FIG. 6 and just described, with the exception that it omits the neoprene impregnated cover material of the bottom level A (the parts designated 11 and 51 in FIG. 6) and utilizes only the marginal tape 45 including its parts 46, 48, 49 and 50 and the sewing 52 as seen in FIG. 6, and instead, the separator sheet 20 of FIG. 2 is secured to the inner side of inward flap 50 approximately as indicated in phantom at 21 in FIG. 6, with the downwardly continued portion of cover member 22 interposed between the inward flap 50 and the margin separator sheet 21. Thus, FIG. 6 illustrates, in the alternative, the joint 45 between sections A and B (full line shown) and the joint 21 between sections C and B. In this instance, the loops 46 will be looped around paired horizontal strands of cover sheet 22 and separator sheet 20 (both of the large mesh knotted netting material) with the meshes of the two sheets registering with one another.

FIGS. 5 and 6 also illustrate a means for securing the adjoining margin of the four assembled sections of FIG. 3 to one another at the level of the lower separator sheet 13 between layers A and B. Such means may comprise grommets 55 bound into apertures in the folds 48 and 49 of binding tape 45, the grommets of adjoining sections being registered with one another and the adjoining tapes 45 then being laced together by laces (not shown) in a manner similar to the lacings 30.

FIG. 4 illustrates a modified assembly of only two cushion units joined end-to-end (e.g. units **1** and **3** of FIG. 3). The laced joint between the adjoining ends, the same as the joints **30** of FIG. 3, can be employed, and with exception that the assembly is half the area of FIG. 3, the overall construction can be the same as that described above including two or three levels (layers A and B or A, B and C) and preferably also including the covering layer D. Such an assembly will normally be used for high jump landings, and if set up only for that purpose, would normally have only the layers A, B and D.

Referring now to FIGS. 8 and 9, there is shown therein an additional cushion unit, indicated generally at E, which I choose to designate as a "threshold" unit since it is arranged along the forward side of the assembly of four units **1, 2, 3, 4** as the assembly is faced by the pole vaulter approaching his vaulting jump (the vaulting box in which the free end of the vaulter's pole is inserted being schematically indicated at **60**).

The threshold cushion E is in the form of a long cylindrical roll including an envelope (FIG. 9) of the wide mesh netting material of intermediate cover unit **22**, with closed ends and a zippered mouth **63**, filled with chunks of sponge material similar to that used in the units. Longitudinally, the threshold cushion E is sufficiently flexible so that its two ends can be bent forwardly, as at **64**, to lie forwardly of the jumping standards **65**. The intermediate portion (a majority) of the length of the cushion E is laced by a lacing **66** to the reinforcing rope **28** of the upper intermediate layer C of the Assembled units **1–4**, or to the reinforcing rope **36** of the top layer D.

The bent portions **64** will tend to straighten into alignment with the intermediate body portion of the cushion E and thus will bear lightly against the standards **65**, partially enveloping them so as to provide maximum coverage to protect the vaulter's body in the event he should roll or fall into one of the standards at the end of the fall.

I claim:

1. In an athlete's landing pit cushion apparatus, a cushion unit comprising: a bottom casing of sheet fabric including a bottom sheet and a peripheral frame extending upwardly therefrom; a separator sheet of air-pervious sheet fabric having its margins attached to the upper margins of said peripheral frame; a second casing including a second peripheral frame of air-pervious sheet fabric the lower margins of which are attached to the upper margins of said bottom casing frame, and a covering sheet of air-pervious sheet material peripherally joined to the upper margins of said second frame; the sheet materials of said second peripheral frame and of said covering sheet in each instance having air passage apertures with an aggregate area more than 50% of the total area of the sheet material; and separate bodies of cushioning material filling said bottom and second casings, said bottom and second casings having respective mouths for the insertion of said cushioning material and including closure means for said respective mouths.

2. Cushion apparatus as defined in claim **1**, wherein said second casing comprises a plurality of vertical walls defining a rectangular peripheral planform; and means for detachably fastening adjoining upper margins of said vertical walls of a plurality of units of said cushion apparatus to one another provide a landing cushion of enlarged area as a composite of the several units.

3. Cushion apparatus as defined in claim **2**, including a top cover sheet having an area corresponding to multiple of the area of one of said cushion units and adapted to cover several of said units when peripherally attached together, said top cover sheet having respective margins secured to the periphery of the assembled units at the upper margins thereof; and a continuous body of cushioning material filling the area between said top cover and the composite area of the several assembled cushion units.

4. Apparatus as defined in claim **3**, wherein said cushioning material comprises fragments of sponge material.

5. Apparatus as defined in claim **1**, wherein said second peripheral frame is of rectangular-mesh netting and includes a peripheral binding tape having, along one side thereof, a plurality of integral loops separated by transverse slots, said loops encircling and being secured to succeeding marginal portions of said second peripheral frame, the other side portion of said tape extending downwardly in overlapping relation to upper portions of said bottom casing frame; and separable fastener elements secured to the overlapping portions of said binding tape and said bottom casing and in separable coupling engagement with one another, to attach said second peripheral frame to said bottom casing frame in superimposed relation thereto.

6. In an athelete's landing pit cushion apparatus, a cushion unit comprising: a bottom casing of impervious sheet fabric including a bottom sheet and a peripheral frame extending upwardly therefrom; a separator sheet of netting having its margins attached to the upper margins of said peripheral frame; a second casing utilizing said separator sheet as a bottom and including a peripheral frame of netting material the lower margins of which are attached to the upper margins of said bottom casing frame, and a covering sheet of netting material integral with the upper margins of said second frame; said casings being of rectangular peripheral planform; and separate bodies of sponge fragments filling said bottom and second casings, said bottom and second casings having respective mouths for the insertion of said sponge fragments and including closure means for said respective mouths.

7. Cushion apparatus as defined in claim **6**, wherein said second casing includes a peripheral reinforcing cord in the form of a rectangular ring bound into the upper margins thereof; and means for detachably fastening portions of the reinforcing cords along adjoining margins of a plurality of units of said cushion apparatus to one another to provide a landing cushion of enlarged area as a composite of the several units.

8. Cushion apparatus as defined in claim **7**, including a rectangular top cover sheet having an area corresponding to a multiple of the area of one of said cushion units and adapted to cover several of said units when peripherally attached together, said top cover sheet having a reinforcing cord along respective margins of its periphery and secured to the periphery of the assembled units at the upper margins thereof; and a loose body of sponge fragments filling the area between said top cover sheet and the composite area of the several assembled cushion units.

9. Cushion apparatus as defined in claim **8**, wherein said top cover sheet is of braided mesh material of finer mesh than said second casing, and free of abrasive surface projections.

10. Cushion apparatus as defined in claim **6**, wherein said second casing is of knotted mesh netting similar to tennis net material and wherein said sponge fragments are of a size greater than the aperture of size of said netting.

11. Cushion apparatus as defined in claim **6**, including a second-level separator sheet closing the top of said second casing; a top casing comprising vertical walls constituting integral continuations of the vertical walls of said second casing and a top sheet integrally joined to the upper margins of said vertical walls and covering said top casing; and sponge fragments filling said top casing.

12. Cushion apparatus as defined in claim **6**, including a second-level separator sheet closing the top of said second casing; a top casing comprising vertical walls constituting integral continuations of the vertical walls of said second casing and a top sheet integrally joined to the upper margins of said vertical walls and covering said top casing; sponge fragments filling said top casing; and a binding tape having, along one side thereof a plurality of integral loops separated by transverse slots, said loops encircling and being secured to succeeding marginal portions of said level separator sheet and of said second casing side walls, with the meshes of said separator sheet and second casing registering with one another.

13. Cushion apparatus as defined in claim **6**, wherein the sponge fragment material of said second casing is of greater yieldability than the material of said bottom casing.

14. Apparatus as defined in claim **6**, including a threshold cushion attachable to a forward margin of said cushion unit.

15. Cushion apparatus as defined in claim **6**, wherein said second casing includes a peripheral reinforcing cord in the form of a rectangular ring bound into the upper margins thereof; means for detachably fastening portions of the reinforcing cords along adjoining margins of a plurality of units of said cushion apparatus to one another to provide a landing cushion of enlarged area as a composite of the several units; an elongated threshold cushion having a length corresponding to the length of two of said cushion units arranged end-to-end; and means for attaching said threshold cushion to the upper forward margins of said two cushion units in a position depending from said upper forward margins.

16. In an athlete's landing pit cushion apparatus, in combination: a plurality of cushion units each including a bottom sheet, peripheral frame means extending upwardly therefrom, a cover sheet of air-pervious sheet material peripherally joined to the upper margins of said means, and cushioning material filling the space between said bottom sheet, said frame means and said cover sheet, said cushioning material comprising separate cushioning bodies, said casing having a mouth for the insertion of said cushioning bodies and including closure means for said mouth; means connecting the peripheral frames of the respective cushion units to one another in horizontally opposed relation in a multiple-area assembly; a top cover sheet having an area corresponding to the aggregate horizontal area of said assembled cushion units, said top cover sheet having respective margins secured to the peripheries of the assembled units at the upper margins thereof; and a continuous body of cushioning material filling the area between said top cover and the composite area of the several assembled cushion units, said cover sheets of the cushion units and said top cover sheet each being of highly air-previous material having a plurality of apertures with an aggregate area more than 50% of the total area thereof, whereby to provide for substantially unrestricted escape of air from said cushioning material in response to impact of a falling body upon said apparatus.

17. Cushion apparatus as defined in claim **16**, wherein said casing of each cushion unit includes a bottom casing portion of imprevious sheet fabric comprising a bottom sheet and a peripheral frame extending a portion of the height of the cushion units, whereby to impart a moderate pneumatic cushioning action to the operation of the lower level area of said apparatus.

18. Apparatus as defined in claim **16**, wherein said top cover sheet is of soft netting material such as to minimize skin injury to the skin of a falling human body.

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