

Feb. 8, 1966

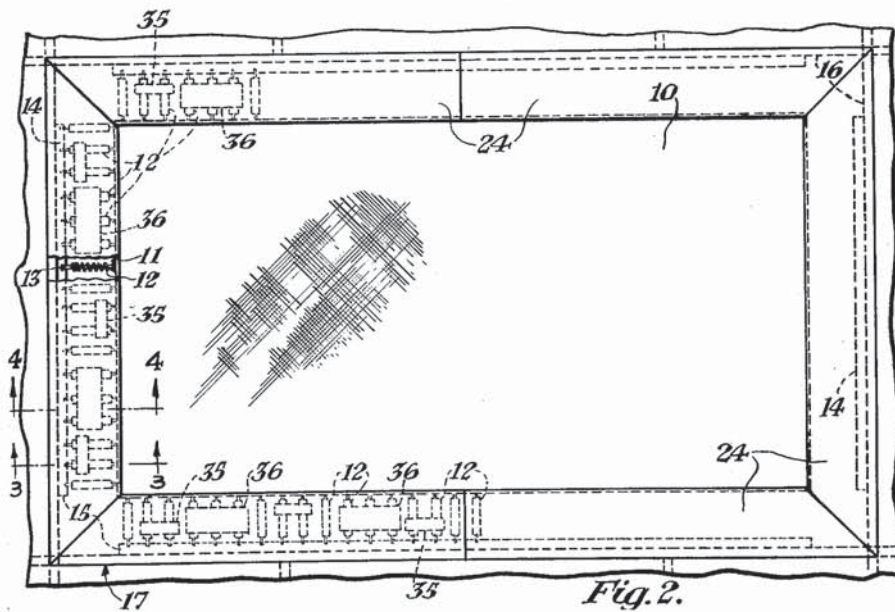
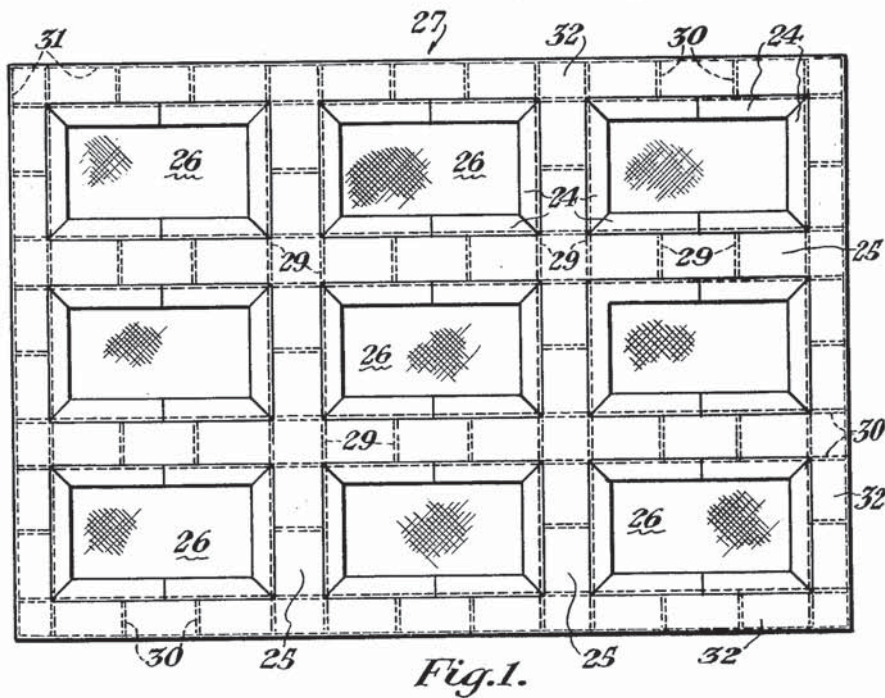
A. C. GRELLE ET AL

3,233,895

TRAMPOLINES

Filed Oct. 13, 1961

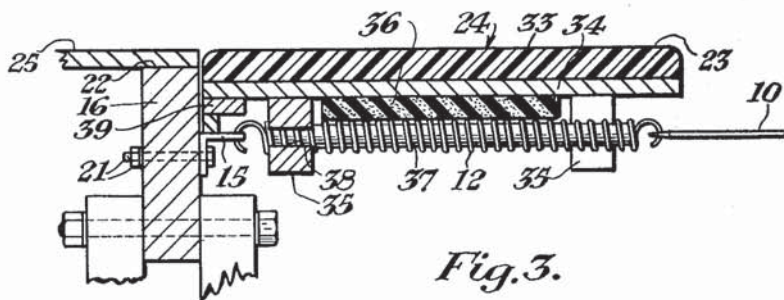
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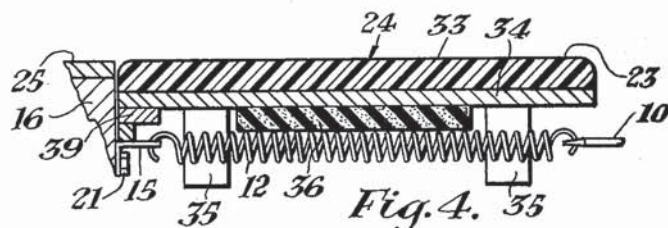
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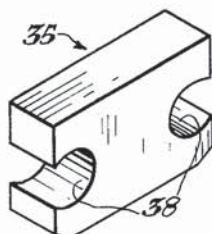
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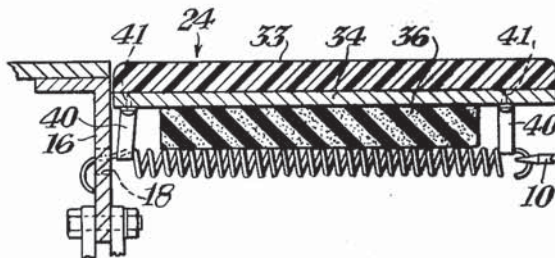
*Fig. 3.*



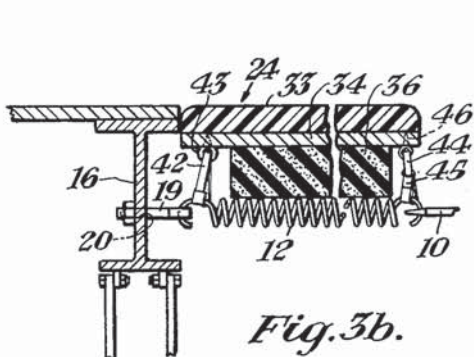
*Fig. 4.* 35



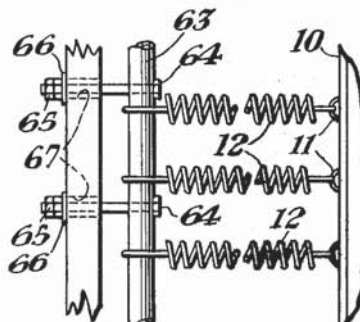
*Fig. 5.*



*Fig. 3a.*



*Fig. 3b.*



*Fig. 3c.*

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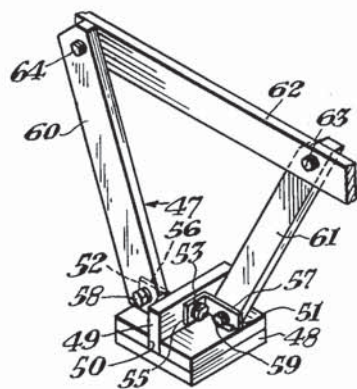


Fig. 6.

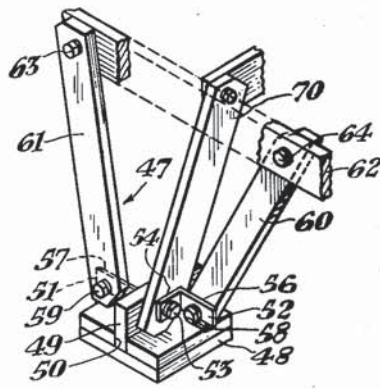


Fig. 7.

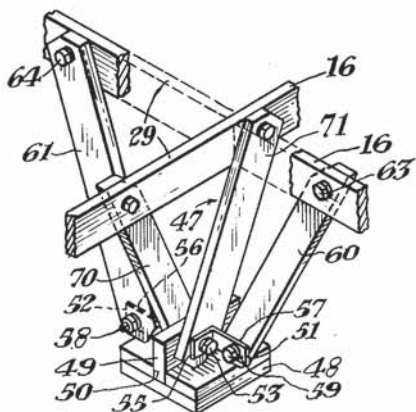


Fig. 8.

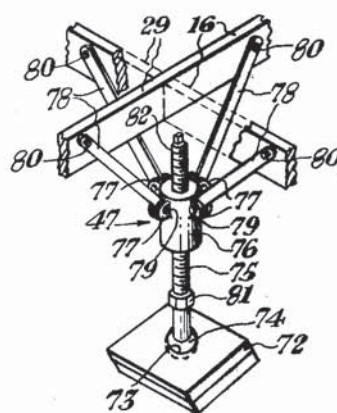


Fig. 9.

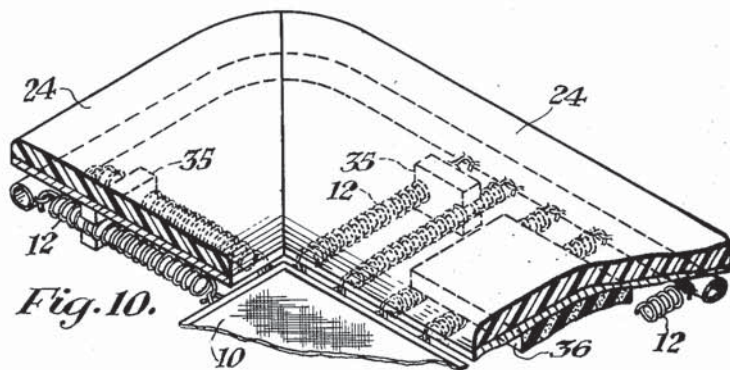


Fig. 10.

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## TRAMPOLINES

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9 Claims. (Cl. 272-65)

This invention relates to trampolines and specifically to a safe, detachable construction for a trampoline which can be applied to a single trampoline or to multiple-unit trampoline centers.

The primary object of this invention is the construction of a portable above-ground trampoline center which eliminated the hazards of injury to a jumper from striking the trampoline frame or from slipping between the springs and which may be installed satisfactorily on uneven terrain.

More specifically, the objects of this invention are:

To construct a trampoline eliminating the tubular trampoline frame and consequently the injury hazard it presents.

To provide a protective cover for the rebound springs of a trampoline of sufficient rigidity that it will protect against a person slipping between springs but will not interfere with the action of the springs.

To provide a rigid protective cover for the rebound springs of a trampoline of sufficient rigidity that it will protect against a person on the trampoline slipping between adjacent springs but which will present a resilient shock absorbing surface to prevent injury to a jumper falling on to the spring area or edge of the trampoline.

To provide a rigid protective cover which can be used on frameless trampolines or on trampolines having a frame to prevent injury to jumpers falling on to the spring and frame area.

To construct a portable trampoline center employing a minimum of different elements in its construction.

To provide braces or supports for the elevated deck of a trampoline center which supports are constructed of a minimum of different elements and can be erected to levelly support the deck over uneven terrain sloping in one or more directions.

These and other objects and the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIGURE 1 is a plan view illustrating the general layout of a multiple unit trampoline center constructed in accordance with this invention.

FIGURE 2 is a more detailed view of a single trampoline unit illustrating the attachment of the rebound springs and the location and manner of attachment of the spring covers.

FIGURE 3 is a sectional view along the line 3-3 in FIGURE 2 showing in detail the manner of attaching the rebound springs to the box frame, the construction of the spring cover and the mode of attaching it to the springs.

FIGURES 3a, 3b and 3c are views similar to FIGURE 3 but showing different modes of attaching the rebound springs to alternative structures of the box frame. FIGURES 3a and 3b also show alternative means of attaching the spring cover to the rebound springs.

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FIGURE 4 is a sectional view through a cushion or bumper block for the spring covers taken along the line 4-4 in FIGURE 2.

FIGURE 5 is a perspective view of a retaining block which can be used to attach the spring cover to the springs.

FIGURE 6 is a perspective view of a supporting brace for the elevated platform having two supporting arms which can be adjusted to permit the platform to be supported at a level attitude on uneven terrain.

FIGURE 7 is a perspective view of a supporting brace similar to that in FIGURE 6 except that it has three supporting arms.

FIGURE 8 is a perspective view of a supporting brace similar to that shown in FIGURE 6 except that it has four supporting arms.

FIGURE 9 shows an alternative form of supporting brace.

FIGURE 10 shows the spring cover of this invention applied to a trampoline having a tubular frame.

Referring more specifically now to the drawings it will be seen that the numeral 10 refers to the rebound bed of a trampoline. The rebound bed is usually made of a woven material either in one piece or of interlaced webbing. In some cases it is made of perforated sheet material. The material most commonly used is nylon. However, the nature of the bed forms no part of this invention and is recited here merely for information. The bed has a series of loops 11 located around its periphery and suitable to receive one end of a rebound spring 12. In the preferred embodiment of this invention the other end of each spring is hooked through apertures 13 in one leg 14 of an angular spring retaining strip 15 secured to the members 16 of a box frame 17.

Alternatively as shown in FIGURES 3a and 3b the members of the box frame 17 may be made of metal or a rigid plastic of angular or I-beam cross section and provided with spring receiving apertures 18 or other means for attaching the ends of the springs such as the eye bolts 19 secured in apertures 20.

FIGURE 3c shows another alternative construction in which one end of the rebound springs 12 is secured to a rod or tubular bar 63 maintained in a position slightly spaced from the box frame members by bolt, nut and washer assemblies 64, 65, 66. The shanks of bolts 64 fit loosely in bores 67 in the box frame members so they are relatively free to follow vertical and lateral movements of the rod or bar 63 as the springs are deflected under load of a person jumping on the trampoline. Thus only a tensile load is applied to the bolts.

As seen in FIGURE 1 a typical above ground trampoline center may consist of a number of trampolines indicated generally by the numeral 26 set into a platform or deck 27. In the form covered by this invention each trampoline is entirely within its box frame. Deck plates 25 are set on top of and secured to the frame members between adjacent sides of each trampoline to provide a walkway or buffer area. Extensions 29 of the frame members serve to tie the trampolines together and provide an integral platform above the ground. An outer frame 31 completes the platform and together with extensions 30 provides support for an outer walkway 32. The peripheral area between the edge of each rebound bed and the adjacent edge of the deck is covered by substantially rigid spring covers 24.

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It can readily be seen that in the form of this invention there is presented a continuous substantially smooth and level surface over the entire area of the platform. All of this surface is capable of supporting the weight of a person walking on it. In addition the spring covers 24 have a resilient, shock absorbing top layer 33 to protect a jumper from injury if he falls off the rebound bed onto the spring or frame area while performing on the trampoline. The spring covers are preferably made of two layers 33 and 34. The bottom layer 34 is preferably of wood or some other material having sufficient rigidity to support the weight of a person stepping on the spring area. The top layer 33 may be of foam rubber or plastic foam material. In practice an expanded polyurethane foam is preferred because it appears to retain its resilience and is relatively unaffected by exposure to weather and moisture and does not retain water. However, any rubber or plastic material or any other substance having the requisite resilience and shock absorbing characteristics may be used. Foam rubber has a tendency to deteriorate in the presence of heat and moisture and retains water. Therefore, if it or certain other substances are used it is necessary to protect the spring cover with a non-porous, water-repellent sheet material. The spring covers may be made long enough to cover all of the springs on one edge of the rebound bed or to facilitate handling and construction, they may be made shorter than the length of a side of the rebound bed and two or more used at each side. Suitable provision such as mitering is made so the spring covers meet and match at the corners.

The spring cover is made to follow the vertical deflection of the springs during use of the trampoline by means of retaining blocks 35 shown in detail in FIGURE 5. A series of cushion or bumper blocks 36 which may be of the same material as the top layer 33 of the spring cover help to resiliently support the spring cover on the springs. A sound deadening member 37 may be placed inside each spring contacted by a retaining block to dampen vibrations caused by rubbing contact between the spring and the block and reduce noise.

The retaining blocks are provided with a pair of parallel grooves 38 of generally cylindrical shape, the diameter of the grooves being slightly larger than the outside diameter of the rebound springs. The distance across the block between adjacent edges of grooves being slightly less than the spacing between adjacent springs on which the block will ride. In this manner there is no interference with the action of the springs. The grooves 38 may be so proportioned that the springs must be inserted axially therethrough rather than through the side opening.

In the preferred construction the spring retaining member 15 may be an angle iron of suitable size and strength and may be attached to the frame members by bolts and nuts 21 or by lag screws. The retaining members 15 are attached to the box frame members 16 at a point sufficiently below the level of the top 22 of the frame members that the top surface 23 of the spring cover will be substantially flush with the top surface of the deck plates 25 when the whole is assembled.

A block 39 may be attached along the lower edge of the spring cover so that it rests on the spring retaining member 15 and helps support the spring cover and maintain it in position.

Alternatively as shown in FIGURES 3a and 3b the retaining blocks 35 may be dispensed with and replaced with additional bumpers 36. Attachment between the spring covers and the springs may be by means of elastic attaching strips 40 as shown in FIGURE 3a. The attaching strips may be looped through the hooks on the ends of the springs and the ends of the loop secured by suitable fasteners 41 to the spring cover.

The spring cover may also be held in position on the springs as shown in FIGURE 3b by a releasable clasp

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42 attached to the fixed end of the spring and to a fastener 43 such as a screw eye on the underside of the spring cover. An elastic cord 44 attached to the other end of the spring by means of a releasable clasp 45 and connected to the underside of the spring cover by a fastener 46 causes the spring cover to follow the spring and the edge of the rebound bed. Thus a continuous supporting surface is always presented to a jumper on the trampoline from the edge of the rebound bed to the deck area.

Each box frame is supported from the ground near its corners and at intervals along the length of its members as required to give sufficient rigidity to the box frame and the platform by braces indicated generally by the numeral 47. As shown in FIGURES 6, 7 and 8, respectively, these braces may have two, three or four platform supporting arms or links as required depending on their location under the platform structure. The same basic elements are used in constructing either the two, three or four arm braces.

Each of the braces consists of a base 48 and an upright member 49 resting in a groove 50 in the base. The upright member is relatively free to move longitudinally in the groove 50. A pair of angular brackets 51 and 52 are attached to the center of the upright member by means of a bolt and nut 53 or other suitable fastening means extending through the upright member and one leg 54, 55 of each bracket. The other leg 56, 57 of each bracket extends generally at right angles to its respective one leg. Links or arms 60 and 61 are attached to legs 56 and 57 respectively of the bracket by nut and bolt assemblies 58 and 59 or other suitable fastening means. The other end of each link is secured to the member 62 to be supported by means of bolt and nut assemblies 63 and 64. The member 62 represents either a box frame member or a deck supporting member.

It can readily be seen that the location of bolts 58 and 59 can be adjusted so that the member 62 is supported at a level attitude by the links 60 and 61 even though the terrain on which the base 48 rests may be inclined. To compensate for slope of the supporting terrain in a direction along the longitudinal axis of the upright member 49, brackets 51 and 52 can be swivelled about the bolt 53 until the arms 60, 61 are parallel to member 62.

Preferably, but not necessarily, brackets 51 and 52 are located so that their link supporting arms are offset from each other approximately the thickness of member 62. The links 60, 61 can thus be attached to opposite sides of member 62 to lend additional rigidity to the structure.

At places in the platform structure where the frame members form a T, as for example at the junction of extensions 30 with the outer frame 31 of the platform, a supporting brace having three supporting arms as shown in FIGURE 7 may be provided. For this structure an additional link or arm 70 is inserted between one of the brackets 51 or 52 and the upright member 49. The arm 70 is secured to the member 49 by the same bolt and nut assembly 53, 54 as is used to attach the brackets.

As seen in FIGURE 8 the braces with four supporting arms are constructed by inserting a fourth arm 71 under the bracket 51 or 52 on the opposite side of member 49. Braces with four supporting arms may be provided at the corners of the box frames. It is obvious of course that all the support braces may be of the type having two supporting arms or that they may be used in any suitable combination with braces having three or four supporting arms.

FIGURE 9 shows another form of support brace. This may consist of a base member 72 having therein a suitable socket 73 for swivelly receiving a ball end 74 of a threaded support bar or jack screw 75. An internally threaded sleeve 76 having trunnions 77 provided with

bolt receiving apertures spaced about its periphery is threaded onto the support bar. Two, three or four supporting arms or links 78, as required may be pivotally attached to the sleeve 76 by bolt and nut assemblies 79 or other suitable fastening means passing through bolt receiving apertures near the ends of the supporting arms 78 and the trunnions 77. The other end of each supporting arm is provided with an aperture 80 for receiving fastening means for attaching the arm to the member to be supported, such as the frame members 16 and extensions 29 and 30.

In the structure shown in FIGURE 9 the height of the support brace may be adjusted by rotating the support bar or jack screw 75 as required. This may be necessary to compensate for settling of the ground under a support brace after initial installation or to simplify installation of a brace over a pronounced depression without requiring extreme adjustment in the angle between the supporting arms. Vertical adjustment can be made without detachment of any parts and while the brace is under load. Polygonal lands 81 or extensions 82 may be provided on the jack screw to permit application of a wrench.

As shown in FIGURE 10 the spring cover of this invention can be applied to a conventional trampoline having a tubular frame. FIGURE 10 shows the spring cover attached by retaining blocks 35 but it is apparent that the alternative means described in connection with FIGURES 3a and 3b may be used or suitable means may be employed to attach the spring cover to the tubular frame.

In any of these structures the spring covers may be attached alternatively or additionally to the deck or box frame by suitable means.

Obviously many modifications and variations of this invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What we claim as our invention is:

1. A trampoline comprising a rebound bed secured by a peripheral row of springs to a rigid frame and a protective spring cover consisting of a flat substantially rigid sheet member having a resilient shock absorbing top surface and extending from an edge of the rebound bed over the area occupied by the springs attached to said edge.

2. In a trampoline comprising a rectangular rebound bed supported by four rows of tensioning springs one each of said rows being stretched between one edge of said rebound bed and the adjacent inner periphery of a box frame surrounding the rebound bed, a spring cover for at least one of said rows of springs consisting of a flat substantially rigid member having a resilient shock absorbing top surface and extending substantially from the edge of the rebound bed over the area occupied by the springs.

3. A trampoline comprising a rebound bed secured by a peripheral row of springs to a rigid frame and a protective spring cover supported solely by the springs and secured solely thereto said cover extending substantially over the entire area occupied by the springs and being sufficiently rigid to support the weight of a person jumping thereon to prevent the foot of a person landing on the area occupied by the springs from slipping between adjacent springs.

4. A trampoline center comprising a platform structure having a plurality of rigid frames arranged in parallel rows and connected by frame extensions to form a deck area to receive a plurality of rows of trampolines, said frame extensions supporting walkways separating said rows of trampolines and additional frame extensions supporting an outer walkway around the periphery of said platform structure, each trampoline comprising a rebound bed secured by a peripheral row of springs to one of said rigid frames, the level of the rebound bed being slightly below the level of the top surface of the walkways, and a

protective spring cover for each trampoline, said spring cover being of substantial thickness and resting on the springs, the top surface of the spring cover being substantially flush with the top surface of the walkways and said spring cover overlying the area between the edges of the rebound bed and the contiguous edges of the walkways so that a substantially smooth continuous surface is provided over the entire area of the trampoline center.

5. A trampoline center comprising a platform structure having a plurality of rigid rectangular frames arranged in parallel rows and connected by frame extensions to form a deck area to receive a plurality of rows of trampolines, said frame extensions supporting walkways separating said rows of trampolines and additional frame extensions supporting an outer walkway around the periphery of said platform structure; each trampoline comprising a rebound bed secured by a peripheral row of springs to one of said rigid rectangular frames, the level of the rebound bed being slightly below the level of the top surface of the walkways; and a substantially rigid protective spring cover for each trampoline resting on said springs, said spring cover being of substantial thickness and having a resilient, shock absorbing top surface, the top surface of the spring cover being substantially flush with the top surface of the walkways when the trampoline is not in use and said spring cover overlying the area between the edges of the rebound bed and the contiguous edges of the walkways.

6. A trampoline center comprising a decklike structure including a series of trampolines arranged in parallel rows separated by walkways and surrounded by an outer walkway, each trampoline comprising a rebound bed secured by a peripheral row of springs to a rigid frame, a protective cover over the springs secured solely to said springs, said cover consisting of a flat substantially rigid sheet member having a resilient shock absorbing top surface and extending from an edge of the rebound bed over the area occupied by the springs attached to said edge, and a plurality of supports for said decklike structure to hold it in elevated position above the ground.

7. A trampoline center comprising a decklike structure including a series of trampolines arranged in parallel rows separated by walkways and surrounded by an outer walkway; each trampoline comprising a rebound bed secured by a peripheral row of springs to a rigid rectangular frame, the level of the rebound bed being slightly below the level of the top surface of the walkways; a substantially rigid protective spring cover for each trampoline resting on said springs, said spring cover being of substantial thickness and having a resilient, shock absorbing top surface, the top surface of the spring cover being substantially flush with the top surface of the walkways when the trampoline is not in use and said spring cover overlying the area between the edges of the rebound bed and the contiguous edges of the walkways; and a plurality of similar supports to maintain said decklike structure in a level position elevated above the supporting terrain.

8. A trampoline center comprising a decklike structure including a series of trampolines arranged in parallel rows separated by walkways and surrounded by an outer walkway; each trampoline comprising a rebound bed secured by a peripheral row of springs to a rigid rectangular frame, the level of the rebound bed being slightly below the level of the top surface of the walkways; a substantially rigid protective spring cover for each trampoline resting on said springs, said spring cover being of substantial thickness and having a resilient, shock absorbing top surface, the top surface of the spring cover being substantially flush with the top surface of the walkways when the trampoline is not in use and said spring cover overlying the area between the edges of the rebound bed and the contiguous edges of the walkways; and a plurality of supports to maintain said decklike structure in a level position elevated above the supporting terrain, each of said supports comprising a base member, an upstanding member

resting on said base and extending in a generally vertical position from said base and at least two support links pivotally supported from said upstanding member and extending diagonally in a generally upward direction toward the structure to be supported.

9. A platform structure comprising a peripheral horizontal deck area in the shape of a closed rectangle supported above the ground by a deck supporting structure including a box frame defining the inner boundary of said deck area and forming an integral part of the deck supporting structure, a trampoline surrounded by said deck and comprising a rebound bed supported at its edges by springs attached to the members of said box frame.

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