



(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication of patent specification :
06.07.94 Bulletin 94/27

(51) Int. Cl.⁵ : **A63B 23/04**

(21) Application number : **90915651.5**

(22) Date of filing : **25.09.90**

(86) International application number :
PCT/US90/05446

(87) International publication number :
WO 91/04767 18.04.91 Gazette 91/09

(54) **ADJUSTABLE STEPPING STRUCTURE FOR AEROBIC EXERCISES.**

(30) Priority : **06.10.89 US 418159**

(43) Date of publication of application :
22.07.92 Bulletin 92/30

(45) Publication of the grant of the patent :
06.07.94 Bulletin 94/27

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB IT LI LU NL SE

(56) References cited :
CA-A- 901 614
US-A- 2 933 850
US-A- 4 301 766
US-A- 4 561 652

(73) Proprietor : **The Step Company**
400 Interstate North Parkway
Suite 1500
Atlanta, Georgia 30339 (US)

(72) Inventor : **IRWIN, Lyle, Ray**
205 Bankside Point
Kennesaw, GA 30144 (US)
Inventor : **HAND, Peter H.**
9 Ansley Drive
Atlanta, GA 30309 (US)
Inventor : **LEFTWICH, Edward F.**
211 Parkside Circle
Decatur, GA 30030 (US)

(74) Representative : **Flint, Adam**
Gill Jennings & Every
Broadgate House
7 Eldon Street
London EC2M 7LH (GB)

EP 0 494 970 B1

Note : Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

Description

The present invention relates to aerobic exercise devices and, more particularly, to an adjustable stepping structure for aerobic exercises.

It is known in aerobic exercising to use a conditioning program based on stair climbing to develop, simultaneously, strength and improved cardiovascular endurance. For instance, during a 60-minute aerobic workout, the participant may, using optional hand-held weights, climb on and off platforms that are available at a number of different heights. Such stepping sessions may last for from five to twenty-five minutes per period during such workouts and are combined with traditional aerobic movements.

The disadvantage of the present stair climbing programs is that they utilize fixed-height platforms which do not easily accommodate participants of varying degrees of physical height or expertise in aerobics. Also, the fixed platforms or steps make it more difficult to vary the intensity of the exercise. In group classes, the participant may be forced to use a step at a particular height based only upon availability and not upon proper sizing. This can make a workout either too hard or too easy. Also, in the home market, the fixed-height platform does not allow for interval training or improved conditioning of the participant.

DE-C-3136451 discloses an example of a gymnasium vaulting box. As is common with vaulting boxes, this is a large structure having a number of support elements of different size/shape and a flared base.

US-A-4561652 discloses an exercising device having a platform, the height of which is adjustable by using spacer bars.

According to the present invention, there is provided an adjustable stepping structure for step aerobic exercises, the structure comprising:

a platform section having a top stepping surface for receiving thereon the feet of a participant, an underside surface opposite the top stepping surface, and a side wall interconnecting the top stepping surface and the underside surface; and,

means for elevating the platform section a selected distance above and in a plane substantially parallel to a support surface, the elevating means comprising a plurality of support elements each having an underside surface, an opposite top surface and a side wall interconnecting the underside surface and top surface; characterised by:

each support element and platform section underside surface being contoured, the support element top surface being contoured to be complementary in shape to and detachably and interchangeably engageable with at least a portion of the underside surface of the platform section and the underside surface of another of the support elements, the contoured underside surface of the platform section and of the support elements providing an opening capable of receiving therein and matingly engaging with a protruding portion of the contoured top surface of the support element, whereby a participant may adjust said distance by utilising a selected one or more of the support elements with the platform section.

Specifically, two structures are described, each structure including a rectangular platform section that has a flat top surface and a plurality of equally dimensioned support elements which are stackable, one upon the other, each of the elements capable of being detachably engageable with the underside of the platform section so that it is elevated a selected distance above the floor, depending upon the skill and physical characteristics of the user.

The present invention incorporates into one space-saving structure the necessary features of the individual stepping structures of varying heights.

In the drawings:

Fig. 1 is a perspective view of the first embodiment of the present invention;

Fig. 2 is an exploded, perspective view of the structure of the first embodiment of the present invention;

Fig. 3 is a front view of the first embodiment of the present invention with a portion broken away for clarity;

Fig. 4 is an exploded perspective view of the second embodiment of the present invention;

Fig. 5 is a front view of a portion of the second embodiment of the present invention;

Fig. 6 is a bottom plan view of a portion of one of the support elements of the support elements of the second embodiment of the present invention; and,

Fig. 7 is a view of the second embodiment of the present invention taken along line 7-7 in Fig. 5.

BEST MODE OF CARRYING OUT THE INVENTION

A. First Embodiment

Referring to the Figs. 1-3 of the drawings, the numeral 10 denotes generally the first embodiment of the adjustable stepping structure which comprises a platform section 12 and a plurality of means for elevating

the platform section 12 a pre-determined distance above a support surface, namely, support elements 14. The section 12 is rectangular in shape and includes a top, stepping surface 16 with depending, parallel side walls 18 and opposed, parallel end walls 20. The surface 16 preferably has a non-slip coating thereon.

Means are provided on the bottom of the section 12 to allow the detachable securing of one of the support elements 14 thereto. Basically, such means comprise at least one opening in underside of section 12 into which is received a portion of the top of one of the support elements 14 as seen in Figs. 2 and 3. A rectangular frame 22 is provided on the bottom surface of side walls 18 and end walls 20. The frame 22 is comprised of end members 24 which underlie end walls 20 and side members 26 which run along the bottom of side walls 18. The members 24, 26 are offset from the outer respective edges 28, 30 of end walls 20 and side walls 18 so as to be complementary to and engage the top surface of the support elements 14, as described below.

Laterally extending between side walls 18 are ribs 32, the distance between the respective side wall 18 and rib 32 being equal to the width of the support elements 14. Elongated, rectangular column members 34 are formed at the intersections of rib 32 and side walls 18 and end walls 20 and side walls 18. Rectangular pads 36 are disposed on the bottoms of the column members 34 and extend below the frame 22. As seen in Fig. 2, a pair of struts 38 longitudinally extend between end walls 20 and the respective ribs 32, with struts 40 longitudinally extending between the ribs 32. The struts 38, 40 provide a means of strengthening the section 12.

The support elements 14 are squares and are of equal dimensions to each other, comprising sides 42 and top 44. An upper element 46 overlies top 44 except at the respective corners and adjacent the upper edges 43 of the sides 42, where top 44 is exposed. The upper element 46 includes an upper surface 48 and depending sides 50, each of which is offset from edges 43 and terminates adjacent their ends in inwardly directed edges 52. The space defined by converging edges 52 is dimensioned to receive therein the columns 34 and pads 36 of the platform section 12. When the columns 34 are received within the above-described spaces on support elements 14, the bottom surface of the ribs 38 engage the upper surface 48 and end members 24 and side members 26 engage the top 44 exposed between upper edges 43 and sides 50.

The under surface of each support element 14 is complementary to both the upper element of the other support elements 14 (so that they may be stacked upon each other), and the underside of the platform section 12 (so that each support element 14 is capable of detachably engaging and supporting the platform section 12 above the floor). Each support element 14 includes column members 54 with pads 56 on their bottom surfaces and a pair of strengthening ribs 58. The support elements 14 are stackable upon each other in the same manner as each is capable of engaging the platform section 12, namely, the columns 34 are received within the space formed by edges 52 and top 44 and the upper surface 48 engages the bottom surfaces of ribs 58.

The dimensions of a typical platform section 12 are either 122cm x 36cm x 10cm or 91cm x 36cm x 10cm (48" x 14" x 4" or 36" x 14" x 4") and the dimensions of a typical support element 14 are 36cm x 36cm x 5cm (14" x 14" x 2"). The stepping surface 16 can be elevated off the ground from 15cm to 30cm (6" to 12"), in 5cm (2") increments, by adding the required number of support elements 14.

Also, the interlocking, stackable support elements 14 provide stability as the height is increased.

B. Second Embodiment

Figs. 4-7 depict the second embodiment of the present invention, denoted generally by the numeral 100, and comprising a platform section 112 and a plurality of support elements 114 which provide means for vertically adjusting the height of platform section 112 above a support surface, such as a floor. The second embodiment 100 is constructed of a moulded high impact plastic materials and functions or operates in the same manner as the first embodiment 10. The basic difference between the two is their respective outward appearance, the second embodiment 100 having a more "modern" look than the first.

The platform section 112 is generally rectangular in shape with a top, stepping surface 116 having a non-slip, textured coating 117 thereon. The side and end walls 118, 120 slant outwardly from the top surface 116 and terminate in horizontally extending, continuous rib 121. The walls 118, 120 then curve downwards in sections 123, 125 which terminate in flat bottom 127. As seen more clearly in Fig. 5, handholds 129 are provided through section 123 to aid in manoeuvring the platform section 112. As seen in Fig. 7, the platform section 112 includes an interior wall 127 laterally extending between side walls 118 adjacent each end wall 120 and which projects downwardly from the underside of top surface 116 in sloping direction which parallels approximately the slope of end wall 120. The wall 127 terminates in a horizontal base 129 that is directed toward end wall 120.

Each support element 114 is capable of being telescopically received within the bottom of the platform section 112, as well as being so received within the bottom of another support element 114 so that they are vertically stackable, as shown in Fig. 4. The support element 114 is a square shaped unitary member and is

open through its center. Each element comprises three sections with the top section 131 having a slightly rounded top 133 and a downwardly curved shoulder 135 which terminates in horizontal ledge 137 with wall 139 depending therefrom. The ledge 137 and wall 139 form the middle section 141. The lower section 143 includes a bulbous portion 145 that terminates in rib 147. Inwardly curved bottom portion 149 extends beneath rib 147 and concludes with a flat bottom 151. Hand-inserts 153 are formed in the center of each bottom portion 149 to provide a location for gripping when the support elements 114 are moved about.

As seen in Fig. 6, a square-shaped lug 155 is located at each corner on bottom 151 and are in registry with similarly shaped depressions 157 located on portion 145, as seen in Fig. 4. When the support elements 114 are placed upon each other, the lugs 155 on an upper element 114 are received within a respective lower element 114 to aid in stabilizing the stacked elements 114.

As seen most clearly in Fig. 7, each element 114 includes interior walls 159, 161 joined by curved section 163 with the slope of walls 159, 161 being the same as that of interior wall 127 of the platform section 112. The bottom edge of wall 161 terminates in horizontally extending base 165.

When a support element 114 is telescopically received within the bottom of platform section 112, the shoulder 135 contacts interior wall 127 and ledge 137 engages the underside of base 129. When an additional support element 114 is added, it is received within an upper support element 114 by having shoulder 135 rest against the underside of curved portion 163 and wall 161, with base 165 resting on ledge 137.

The above-described support elements 14, 114 and the structural means employed to allow them to be stackable in vertical alignment and to support the platform section 12, 120 are merely an example of the currently operable ones. However, any number of other designs could be used such as, for example, having up-standing ribs or plugs on the top of the support elements 14, 114 which are complementary in shape and engage slots on the underside of both the platform section and each support element 14, 114.

A guide for choosing the proper height of the stepping surface 16 is as follows:

HEIGHT OF SURFACE 16

HEIGHT OF PARTICIPANT

6" 15cm

Under 5' 150cm tall, a novice to aerobic exercise or pregnant

8" 20cm

5' to 5'6" 150 to 168cm

10" 25cm

5'6" - 6'0" 168 to 183cm

12" 30cm

6'1" and above 185+cm

The major advantage of both embodiments of the present invention is its adjustability which allows the safe matching of a person's height and level of fitness with the correct height of stepping surface 16, 116. By being able to vary the step height, the participant can vary the intensity of the exercise to meet their individual needs. The structures 10, 100 can be adjusted during an exercise session by either adding or removing support elements 14, 114. This helps to maintain the intensity at the correct level within the target heart range.

The structures 10, 100 are used to elevate the heart rate of the participant. By using various elements in conjunction with an instructor or video cassette, the participant achieves a high intensity, low impact workout within their target heart range.

Claims

1. An adjustable stepping structure (10) for step aerobic exercises, the structure comprising:
 - a platform section (12) having a top stepping surface (16) for receiving thereon the feet of a participant, an underside surface opposite the top stepping surface, and a side wall (18) interconnecting the top stepping surface and the underside surface; and,
 - means for elevating the platform section (12) a selected distance above and in a plane substantially parallel to a support surface, the elevating means comprising a plurality of support elements (14) each having an underside surface, an opposite top surface and a side wall interconnecting the underside surface and top surface; characterised by:
 - each support element and platform section underside surface being contoured, the support ele-

ment top surface being contoured to be complementary in shape to and detachably and interchangeably engageable with at least a portion of the underside surface of the platform section (12) and the underside surface of another of the support elements (14), the contoured underside surface of the platform section and of the support elements providing an opening capable of receiving therein and matingly engaging with a protruding portion of the contoured top surface of the support element, whereby a participant may adjust said distance by utilising a selected one or more of the support elements with the platform section.

2. A structure according to claim 1, wherein the platform section (12) is substantially rectangular.
3. A structure according to claim 2, wherein the platform section (12) comprises end walls (20) depending from the top stepping surface and its underside surface receives therein a support element adjacent each of the end walls.
4. A structure according to any of claims 1 to 3, wherein the support elements are substantially square.
5. A structure according to any of claims 1 to 4, further comprising first stabilising means (56;155) on the underside surface of each of the support elements (14) and second stabilising means (52;157) on the top surface of each of the support elements (14), the first and second stabilising means being complementary in shape and engageable with one another for providing lateral stability to the structure.
6. A structure according to claim 5, further comprising stabilising means (36) on the underside surface of the platform section (12) complementary in shape and engageable with the second stabilising means (52) on the support elements (14) for providing further lateral stability to the structure.
7. A structure according to claim 5 or claim 6, wherein the first stabilising means comprises a protrusion (36,56;155) and the second stabilising means comprises a complementary depression (52;157).
8. A structure according to any of claims 1 to 7, wherein the vertical plane of the side wall of each support element extends laterally no further than the vertical plane of the corresponding side wall of the platform section.

Patentansprüche

1. Einstellbarer Trittaufbau (10) für Step-Aerobikübungen mit:
 einem Plattformteil (12), der eine obere Trittfläche (16) zum Aufnehmen der Füße eines Teilnehmers, eine Unterseitenfläche gegenüber der oberen Trittfläche und eine Seitenwand (18) als Verbindung der oberen Trittfläche mit der Unterseitenfläche aufweist; und
 einer Einrichtung zur Erhöhung des Plattformteiles (12) um einen gewählten Abstand über und in einer Ebene, im wesentlichen parallel zu einer Stützfläche, wobei die Erhöhungseinrichtung mehrere Stützelemente (14) aufweist, von denen jedes eine Unterseitenfläche, eine gegenüberliegende obere Fläche und eine Seitenwand als Verbindung der Unterseitenfläche mit der oberen Fläche aufweist, dadurch gekennzeichnet, daß
 jede Unterseitenfläche der Stützelemente und des Plattformteiles geformt ist, wobei die obere Fläche des Stützelementes so geformt ist, daß sie komplementär in der Form zu und lösbar und austauschbar mit mindestens einem Abschnitt der Unterseitenfläche des Plattformteiles (12) und der Unterseitenfläche eines anderen der Stützelemente (14) in Eingriff bringbar ist, daß die geformte Unterseitenfläche des Plattformteiles und der Stützelemente eine Öffnung bildet, die zur Aufnahme und zum entsprechenden in Eingriff bringen mit einem vorstehenden Abschnitt der geformten oberen Fläche des Stützelementes vorgesehen ist, wobei ein Teilnehmer die Höhe durch wahlweise Verwendung eines oder mehrerer der Stützelemente mit dem Plattformteil einstellen kann.
2. Aufbau nach Anspruch 1, wobei das Plattformteil (12) im wesentlichen rechteckig ausgebildet ist.
3. Aufbau nach Anspruch 2, wobei das Plattformteil (12) Endwände (20) aufweist, die von der oberen Trittfläche ausgehen und seine Unterseitenfläche darin jeweils ein zu den Endwänden benachbartes Stützelement aufnimmt.
4. Aufbau nach einem der Ansprüche 1 bis 3, wobei die Stützelemente im wesentlichen quadratisch aus-

gebildet sind.

- 5 5. Aufbau nach einem der Ansprüche 1 bis 4, mit ersten Stabilisiereinrichtungen (56; 155) an der Unterseitenfläche jedes der Stützelemente (14) und zweiten Stabilisiereinrichtungen (52; 157) an der oberen Fläche jedes der Stützelemente (14), wobei die ersten und zweiten Stabilisiereinrichtungen zur Schaffung der Querstabilität des Aufbaus komplementär in der Form und miteinander in Eingriff bringbar sind.
- 10 6. Aufbau nach Anspruch 5 mit Stabilisiereinrichtungen (36) an der Unterseitenfläche des Plattformteiles (12), die zur Schaffung von zusätzlicher Querstabilität des Aufbaus komplementär in der Form und mit den zweiten Stabilisiereinrichtungen (52) an den Stützelementen (14) in Eingriff bringbar sind.
7. Aufbau nach Anspruch 5 oder 6, wobei die ersten Stabilisiereinrichtungen einen Vorsprung (36, 56; 155) und die zweiten Stabilisiereinrichtungen eine komplementäre Vertiefung (52; 157) aufweisen.
- 15 8. Aufbau nach einem der Ansprüche 1 bis 7, wobei sich die vertikale Ebene der Seitenwand jedes Stützelementes seitlich nicht weiter als die vertikale Ebene der entsprechenden Seitenfläche des Plattformteiles erstreckt.

20 Revendications

- 25 1. Structure ajustable de marchepied (10) pour les exercices de "step-aérobic", la structure comprenant :
 - une partie de plate-forme (12) ayant une surface supérieure de marchepied (16) pour y recevoir les pieds du participant, une surface inférieure opposée à la surface supérieure de marchepied, et une paroi de côté (18) interconnectée à la surface supérieure de marchepied et à la surface inférieure ; et
 - des moyens pour élever la partie de plate-forme (12) à une distance choisie, au-dessus et dans un plan sensiblement parallèle à une surface de support, les moyens d'élévation comprenant une pluralité d'éléments de support (14) chacun ayant une surface inférieure, une surface supérieure opposée et une paroi de côté interconnectée à la surface inférieure et à la surface supérieure ; caractérisée en ce que
 - chaque élément de support et la surface inférieure de la partie de plate-forme sont conformés, la surface supérieure de l'élément de support étant conformée pour être complémentaire en forme à au moins une partie de la surface inférieure de la partie de plate-forme (12), et pouvant être engagée de façon détachable et interchangeable dans ladite au moins une partie de la surface inférieure de la partie de plate-forme, et dans la surface inférieure d'un autre élément de support (14), la surface inférieure conformée de la partie de plate-forme et des éléments de support ménageant une ouverture capable de recevoir et s'engageant de façon accouplée autour d'une partie en saillie de la surface supérieure conformée de l'élément de support, grâce à quoi un participant peut ajuster ladite distance en utilisant au choix un ou plusieurs des éléments de support avec la partie de plate-forme.
- 30 2. Structure selon la revendication 1, dans laquelle la partie de plate-forme (12) est sensiblement rectangulaire.
- 35 3. Structure selon la revendication 2, dans laquelle la partie de plate-forme (12) comprend des parois d'extrémité (20) dépendantes de la surface supérieure de marchepied et sa surface inférieure reçoit un élément de support adjacent à chacune des parois d'extrémité.
- 40 4. Structure selon l'une quelconque des revendications 1 à 3, dans laquelle les éléments de support sont sensiblement carrés.
- 45 5. Structure selon l'une quelconque des revendications 1 à 4, comprenant en outre des premiers moyens de stabilisation (56 ; 155) sur la surface inférieure de chacun des éléments de support (14) et des seconds moyens de stabilisation (52 ; 157) sur la surface supérieure de chacun des éléments de support (14), les premier et second moyens de stabilisation étant complémentaires en forme et s'engageant les uns dans les autres pour assurer une stabilité latérale à la structure.
- 50 6. Structure selon la revendication 5, comprenant en outre des premiers moyens de stabilisation (36) sur la surface inférieure de la partie de plate-forme (12) complémentaires en forme et s'engageant avec les

seconds moyens de stabilisation (52) sur les éléments de support (14) pour assurer une stabilité latérale supplémentaire à la structure.

- 5 7. Structure selon l'une ou l'autre des revendications 5 ou 6, dans laquelle les premiers moyens de stabilisation comprennent une saillie (36, 56 ; 155) et les seconds moyens de stabilisation comprennent un renforcement complémentaire (52 ; 157).
- 10 8. Structure selon l'une quelconque des revendications 1 à 7, dans laquelle le plan vertical de la paroi de côté de chaque élément de support ne s'étend latéralement pas plus loin que le plan vertical de la paroi de côté correspondante de la partie de plate-forme.

15

20

25

30

35

40

45

50

55

FIG 1

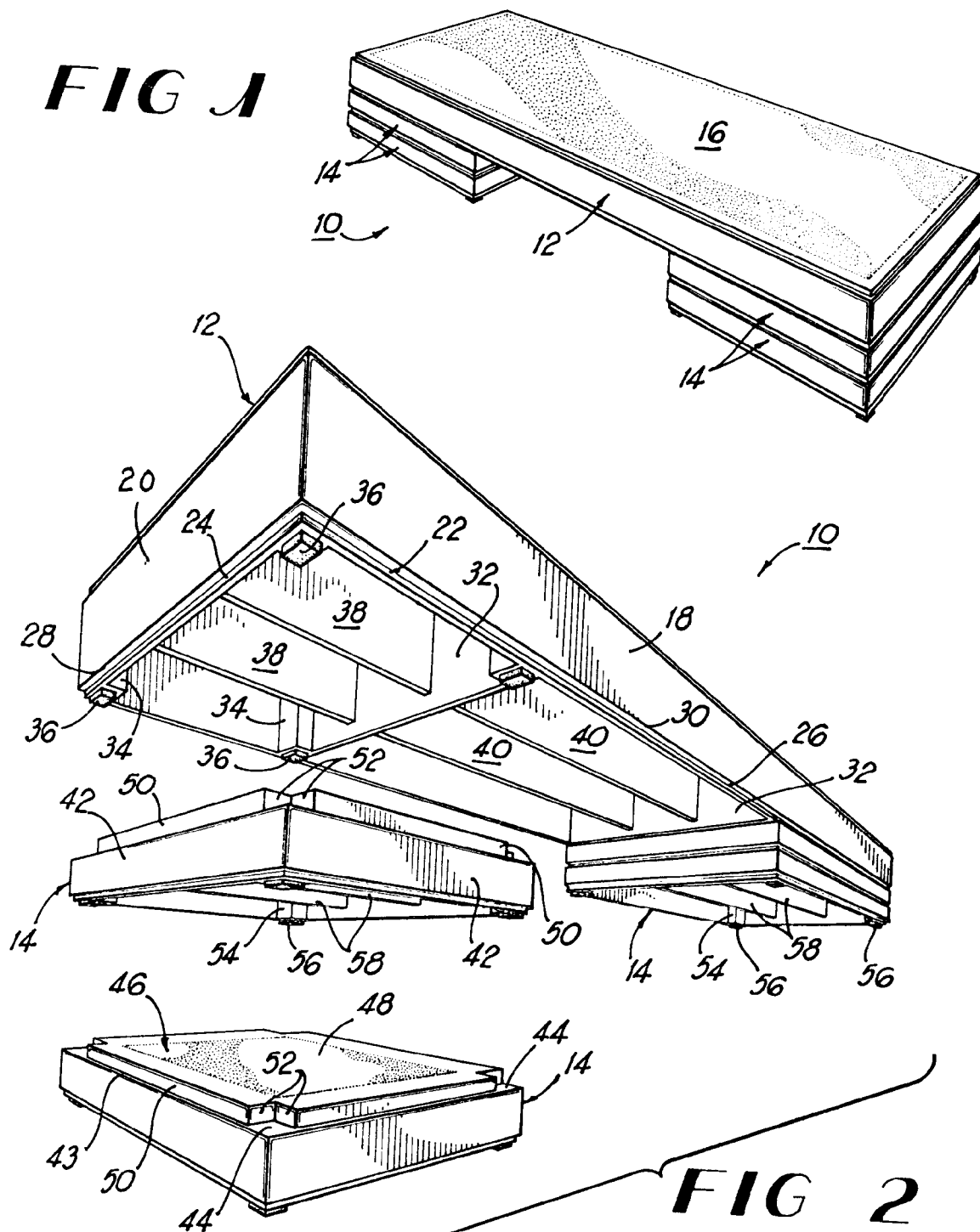


FIG 2

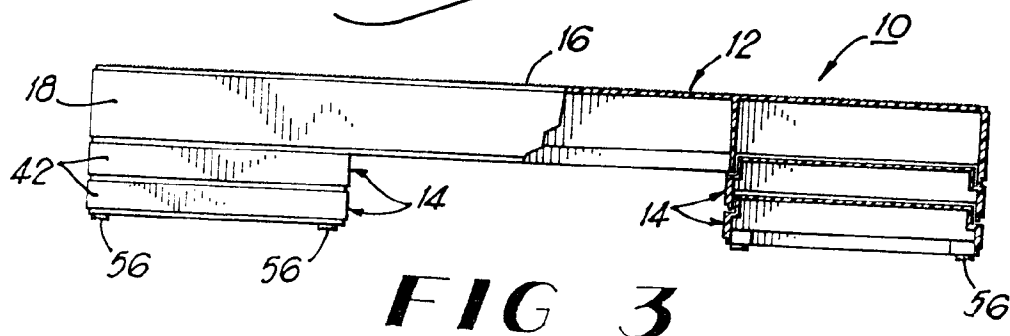


FIG 3

