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Mackintosh

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[54] **DRAWER-TYPE GRANDSTAND ARRANGEMENT**

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[52] **U.S. Cl.** **52/9,** 52/183
[51] **Int. Cl.** **E04h 3/12**
[58] **Field of Search** 52/9, 10, 183, 184, 64

[56] **References Cited**

UNITED STATES PATENTS

3,168,761	2/1965	Graf	52/9
3,429,081	2/1969	Robinson et al.	52/9

FOREIGN PATENTS OR APPLICATIONS

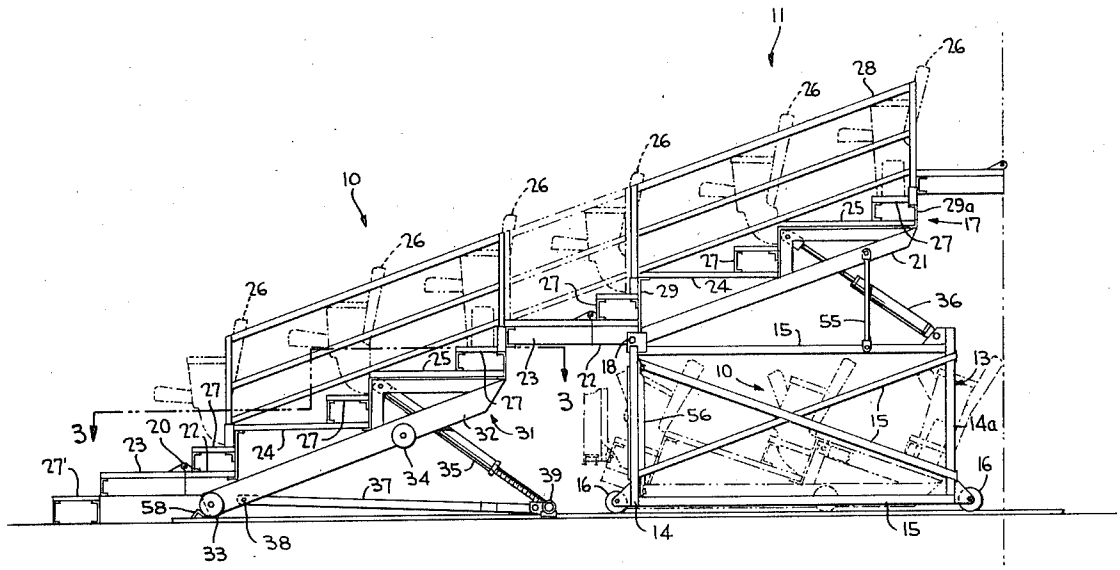
124,122	8/1931	Germany	52/9

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Attorney, Agent, or Firm—Watson, Cole, Grindle & Watson

[57] **ABSTRACT**

A grandstand arrangement of the drawer-type comprises a plurality of seating sections supported at different levels, each section having a seating platform sloping downwardly in a forward direction with all but the rearwardmost platform being pivotally mounted at its forward end for lowering into a horizontal position. The height and width of each pivotally mounted section in the horizontal position of its seating platform is less than the corresponding height and width of the structural framework of an adjacent section so that each section may be telescoped one within the other into a compact storage position.

6 Claims, 7 Drawing Figures



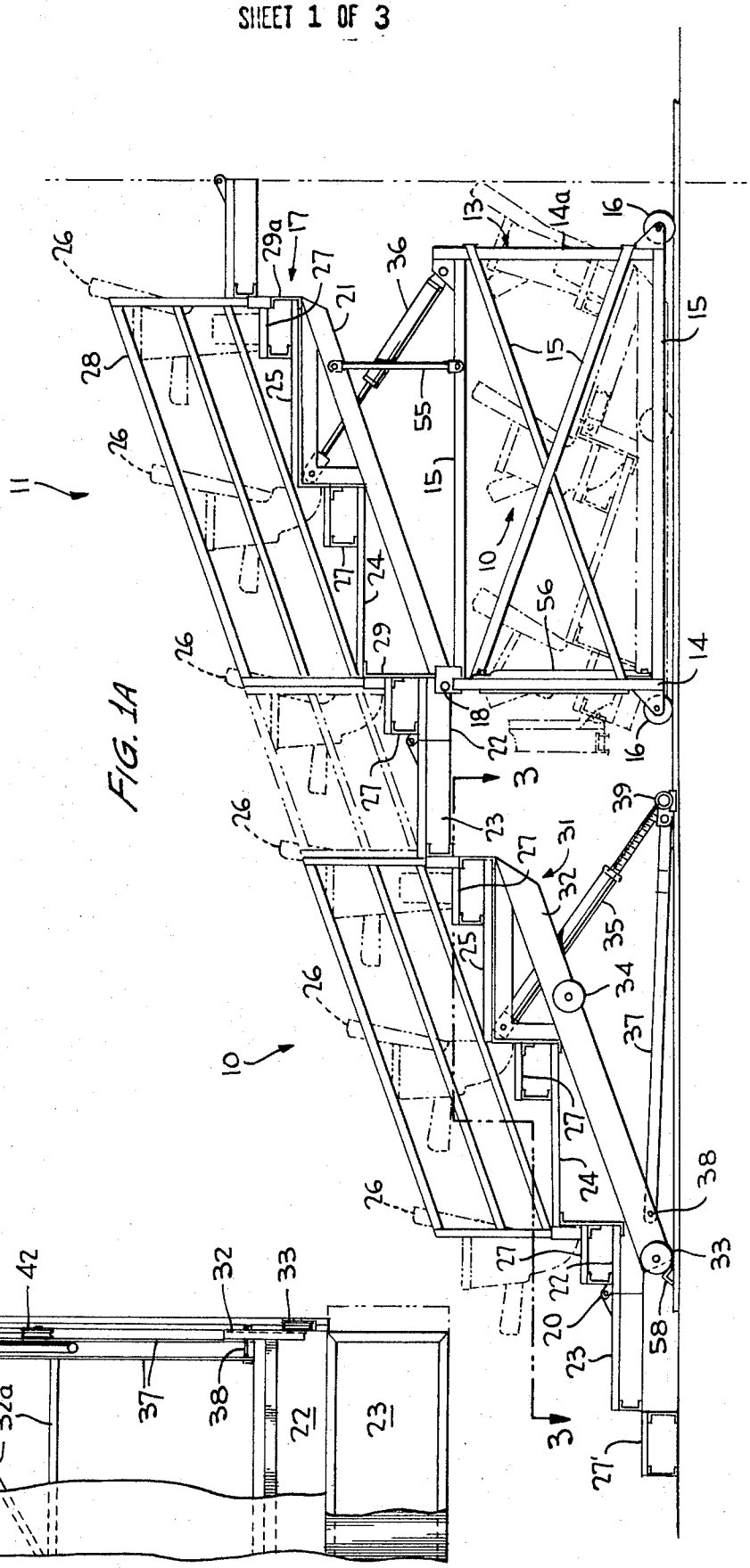


FIG. 1A

FIG. 3

FIG. 2

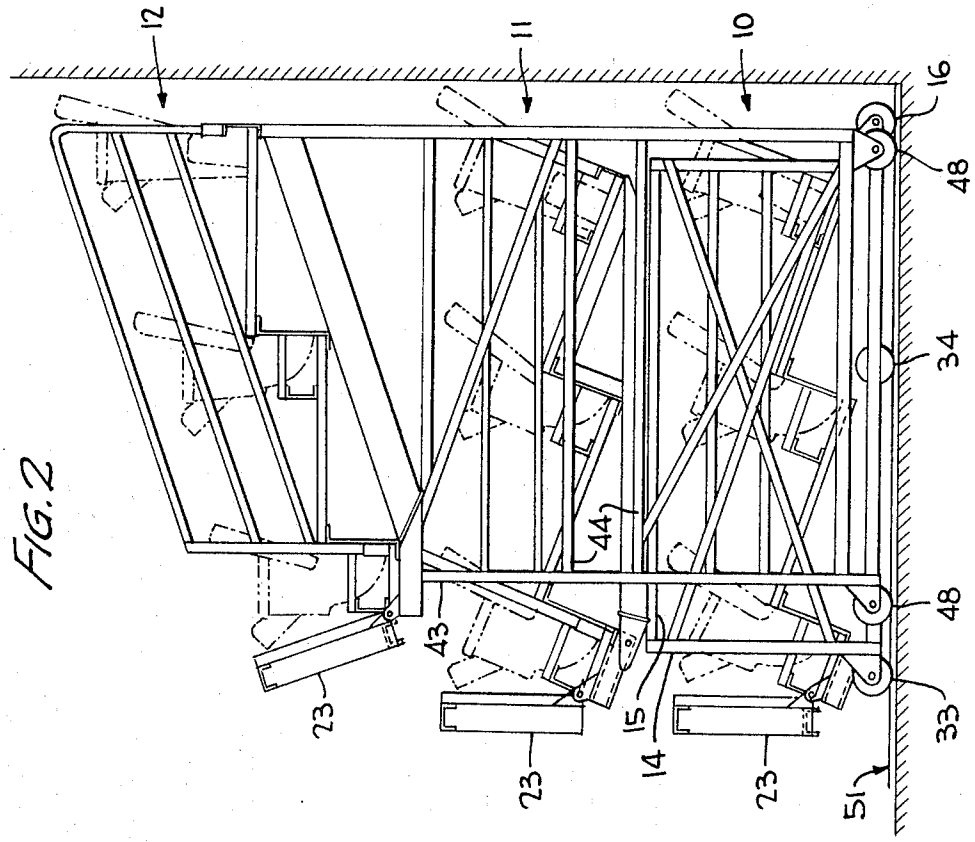

12
11
10
16
48
34
44
48
43
23
15
14
23
23
33
51

FIG. 1B

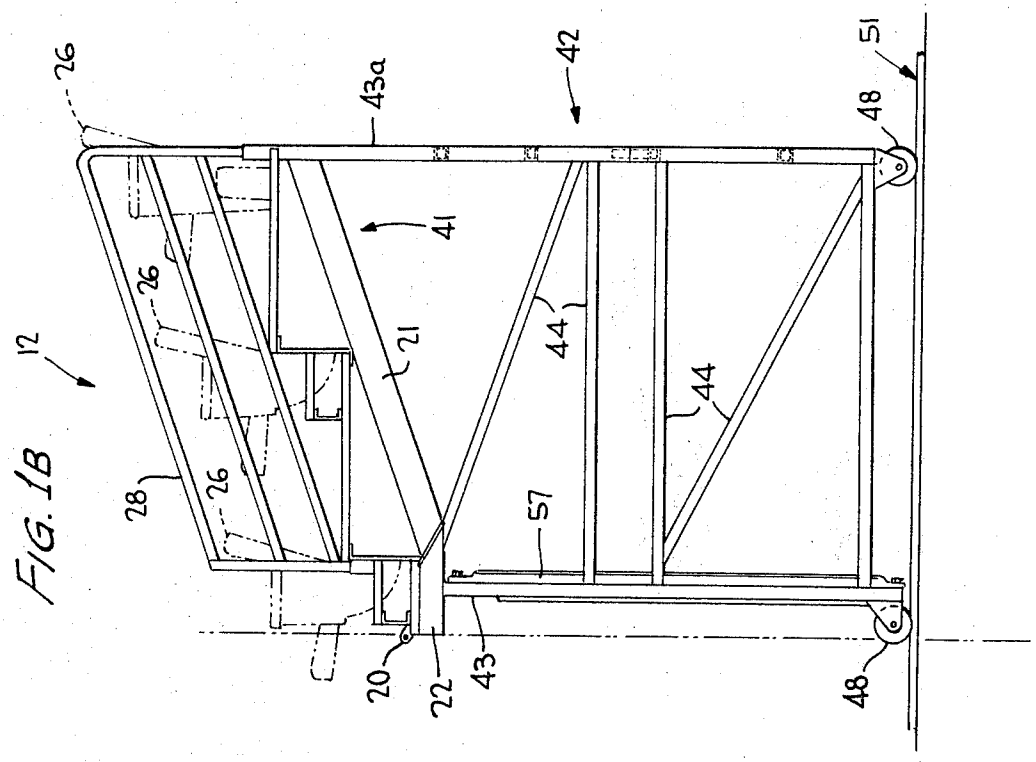

12
26
43a
42
51
48
41
26
21
44
44
28
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20
22
43
48

FIG. 4

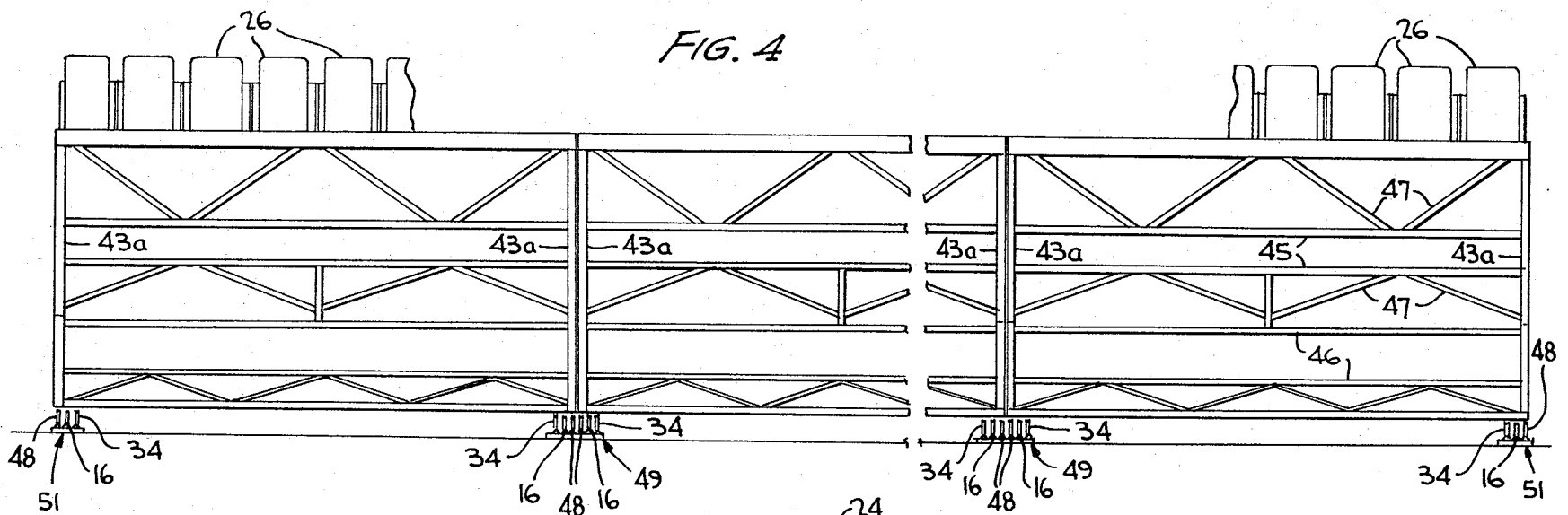


FIG. 5

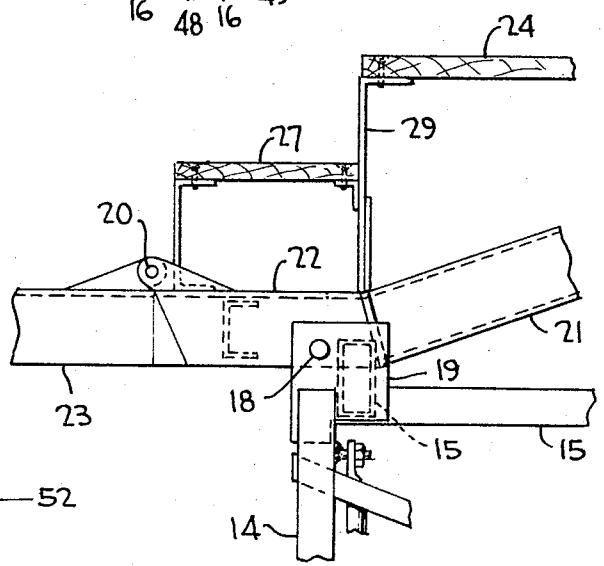
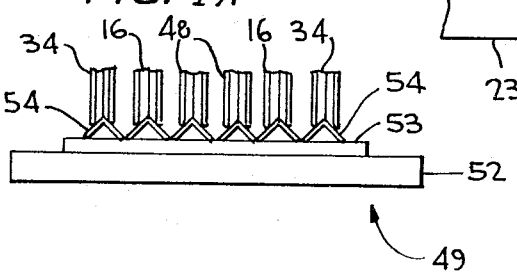


FIG. 4A



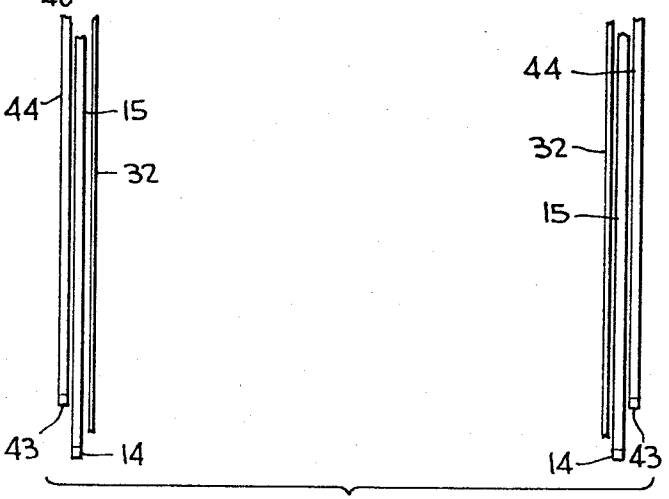


FIG. 6

DRAWER-TYPE GRANDSTAND ARRANGEMENT

This invention relates generally to a telescoping grandstand arrangement, and more particularly to such an arrangement wherein the seating platforms of a plurality of seating sections may be pivotally lowered into a horizontal position for storage of the sections as each are telescopically received one within the other.

The telescoping grandstand arrangement of the present invention makes provision for a maximum seating capacity in auditoriums, arenas and the like, and is further adaptable for a reduced seating capacity depending upon the particular event taking place. For example, the seating capacity of a sports arena for an ice hockey event is generally less than the seating capacity permitted for a basketball event in the same arena because of the larger playing area needed for ice hockey. On the other hand, it often becomes desirable to make a substantial portion of the arena floor available for conventions, circuses and the like, thereby requiring a major dismantling or rearranging operation for the grandstand. The time and cost in adapting the auditorium or arena for different events requiring variable seating capacities become prohibitive for permanent grandstand structures. On the other hand, the foldable or collapsible grandstands heretofore available are either of the bleacher-type or require foldable seats. Such arrangements are, however, completely lacking in seating comfort and appearance.

It is therefore a principal object of this invention to provide a grandstand arrangement wherein seating sections, having fixed theater-type seats thereon, may be telescoped together into a compact area, or the seating capacity may be varied by telescoping one or more sections within one another, in a convenient, simple, economical and highly effective manner.

Another object of this invention is to provide such an arrangement wherein pivotally mounted seating platforms are provided for the sections, so as to permit the fixed and non-folding rows of seats mounted thereon to be lowered along with the platform into a horizontal position for storage.

A further object of the present invention is to provide such an arrangement wherein at least two of such seating sections are provided, each having a seating platform inclined forwardly and downwardly at a common angle, the rearward section being supported at an elevation by means of a structural framework having an open forward end. The seating platform of the forward section is capable of being lowered into a horizontal position, and the height and width of that seating platform and the seats carried thereby are less than the corresponding height and width of the structural framework of the rearward section thereby permitting the forward section to be moved rearwardly into telescoping engagement with such framework.

A still further object of this invention is to provide such an arrangement wherein at least the forward section is provided with rollers on its platform to permit sliding movement for storage, the platform being raised and lowered by means of a screw jack or a hydraulic cylinder.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

FIGS. 1A and 1B are side elevational views of the grandstand arrangement of the present invention shown in the fully extended condition thereof;

FIG. 2 is a side elevational view of the arrangement showing the seating sections telescoped within one another in a storage position;

FIG. 3 is a plan view showing a portion of the forwardmost section and one of its raising and lowering means, taken along line 3—3 of FIG. 1A;

FIG. 4 is a rear elevational view of the rearwardmost section of FIG. 1B;

FIG. 5 is a slightly enlarged detail view of the forward portion of the intermediate section; and

FIG. 6 is a top plan view showing only that top portion of the telescoped sections sufficient to indicate the relative widths thereof for effecting a telescoping arrangement.

Turning now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, seating sections shown in FIGS. 1A and 1B are generally designated **10, 11** and **12.** Intermediate section **11** includes a structural framework **13** comprised of uprights **14, 14***a* and bracing members **15** (not all of which being shown for the purpose of clarity). The opening between forward uprights **14** is completely unobstructed as will be described further hereinafter, and rollers **16** are mounted for free rotation at the lower end of each upright **14** and **14***a*.

Intermediate section **11** further includes a seating platform **17** pivotally mounted as at **18** to uprights **14** by means of bracket plates **19** (see FIG. **5**). Platform **17** is comprised of structural end elements **21** having cross bracing (not shown) therebetween, with a platform section **22** secured as by welding at an angle to the forward ends of elements **21.** The top surface of section **22** is covered in some suitable manner as by means of a metal sheet, and another platform section **23** is hingedly secured as at **20** to section **22** for upward movement with respect thereto. Section **23** is likewise covered by means of a metal sheet to thereby serve as a cross aisle for the occupants. Tier sections **24** and **25** extend between end elements **21,** and seats **26** are fixedly secured in some suitable manner along the width of each tier section so as to form rows of seats at some predetermined spacing behind one another to permit easy access thereto by the grandstand occupants. Obviously, sections **24** and **25** serve as cross aisles of the grandstand. Also, risers **27** are mounted at the corners of tier sections **22, 24** and **24, 25** as well as at the rear of section **25** so as to provide steps therebetween. Handrails **28** are mounted along opposite ends of platform **17** in some suitable manner as by means of structural elements **29, 29***a*.

Forward seating section **10** is similar to section **11** except that it does not include a framework such as **13.** Platform section **31** of this seating section includes end elements **32** having cross bracing (not shown) and transverse tier sections **24** and **25** mounted thereon as in section **11.** Risers **27** are also provided as shown, as well as handrails **28** in the same manner as described for intermediate section **11.** Moreover, platform section **22** is secured in place at the forward end of platform elements **32** and at an angle thereto as shown. Likewise, section **23** is hingedly secured thereto as at **20** in a manner similarly described for seating section **11.** In addition, a transversely extending riser **27'** is provided at the forward end of section **23** on the floor

of the auditorium or arena thereby providing a short step for the seating occupants. Rollers **33** are provided at the forward ends of elements **32**, and rollers **34** are provided intermediate the ends of elements **32**, as shown in FIG. 1A.

Both sections **10** and **11** are provided with means for raising and lowering their respective platforms from a horizontal position as shown in FIG. **2** to an upwardly inclined position of FIG. 1A. Such means may be in the form of conventional screw jacks **35** or hydraulic cylinders **36** provided at opposite sides of each section. The jacks or cylinders may be used interchangeably and are each pivotally secured at their upper ends to the underside of tier section **25**. For seating section **11**, hydraulic cylinders **36** are pivotally secured at their lower ends to uprights **14***a* of structural framework **13**, while screw jacks **35** are pivotally secured at their respective lower ends to a pair of elongated rods **37**. As more clearly shown in FIG. **3**, rods **37** are together hingedly secured to end element **32** by means of a pin **38**. Another screw jack and interconnected rods **37** are provided for seating section **10** at the side opposite that shown in FIG. **3**. A transverse tie rod **39** interconnects the lower ends of both screw jacks. Accordingly, screw jacks **35** may be collapsed until rollers **34** are made to rest on the auditorium floor and, upon further collapse of the screw jacks, rods **37** at opposite ends of platform **31** and tie rod **39** are together raised slightly upwardly at their rearward ends away from the floor. It should be further noted that conventional seats **26** are also permanently affixed to the tier sections in a manner similar to that described for seating section **11**.

Rear seating section **12** of the three-section grandstand arrangement disclosed herein is shown in FIG. 1B. Here, seating platform **41** is similar to platform **17** of section **11** except that platform **41** is fixedly secured to a framework structure **42**. Such a structure includes uprights **43**, **43***a* and cross bracings **44** at opposite ends of the structure between the uprights. Also, bracing elements **45**, **46** and **47** are provided between uprights **43***a* as shown in FIG. **4**, and rollers **48** are secured at the lower ends of each upright.

A pair of inner tracks **49** as well as a pair of outer tracks **51** are provided for guiding seating sections **10**, **11** and **12** during movement thereof. An inner track **49** is typically shown in FIG. 4A as comprising an elongated strip **52** having an elongated plate **53** secured along the top surface thereof with six adjacent V-shaped guides **54** secured along the length of the plate. Each of these guides opens downwardly so as to provide a pair of intersecting upper guide surfaces along which the respective rollers **48**, **16** and **34** of the seating sections are guided as these rollers move therealong. Each of these V-shaped rollers is complementary in cross-sectional shape to that of their respective guides **54**. Outer tracks **51** are similar in all respects to the inner tracks except that only three of such guides **54** are provided on a plate **53** along which rollers **34**, **16** and **48** are guided in a similar manner as that described with reference to FIG. 4A.

The height of seating section **10** including its handrails **28** in the lowered horizontal position of FIG. **2** thereof is slightly less than the height of framework **13** of seating section **11**. This structural framework is completely unobstructed between uprights **14** and between bracing elementss **15** at opposite ends of the structure. Also, the width of seating section **10** as between its platform end elements **32** is slightly less than the width between uprights **14** of framework **13** (see FIG. **6**). In a similar manner, the height of seating section **11** including its handrails **28** in the lowered horizontal position of the platform of FIG. **2**, is slightly less than the height of uprights **43** of framework structure **42**. Again, this structural framework is completely open between uprights **43** and between cross bracing elements **44** at opposite ends of the framework. Moreover, the width of seating section **11** between bracings **15** is less than the width between uprights **43** and bracings **44** of seating section **12** (see FIG. **6**).

In operation, the three telescoped seating sections may be moved from their stored condition of FIG. **2** to their fully expanded condition of FIG. **1**, after the necessary track length of inner and outer tracks **49** and **51** are disposed along the auditorium or arena floor. Sections **10** and **11** are thereafter together moved outwardly of section **12** along tracks **49** and **51** to the position shown in FIG. 1A with section **10** shown in phantom outline. Section **10** is then moved along the tracks outwardly of section **11** into the position shown in solid outline in FIG. 1A, after which both screw jacks **35** and hydraulic cylinders **36** are actuated and extended into their positions shown therein. Upon actuation thereof, platforms **31** and **17** are respectively moved from their horizontal positions to their upwardly inclined positions of FIG. 1A. Of course, screw jacks can be used for both sections **10** and **11**, or hydraulic cylinders **36** can be used for both sections. If the latter are used, support rods such as **55** pivotally connected at one end to end elements **21** may be lowered into a vertical position shown in FIG. 1A so as to relieve the pressure on the hydraulic cylinders. Also, forward cross bracing elements **56** may be secured between uprights **14** after section **10** is moved outwardly thereof. Likewise, cross bracing elements **57** may be secured between uprights **43** after sections **10** and **11** are moved outwardly thereof.

For stability, a stop block **58** may be disposed transversely of the tracks forwardly of rollers **33**, as in the manner shown in FIG. 1A. Moreover, platform sections **23** may be locked onto the rearward side of its adjacent seating section after each of these platform sections are moved downwardly from their position shown in FIG. **2** to that of FIG. 1A.

When it is desired to move the seating sections into their telescoping condition of FIG. **2**, each of the platform sections **23** is moved about their respective hinges into an upper position as shown in FIG. **2**, and screw jacks **35** are collapsed until platform **31** is lowered onto the underlying tracks. After rollers **34** engage with their respective track guides, jacks **35** are collapsed slightly further so as to cause rods **37** and **39** to raise slightly upwardly of the tracks out of interference therewith. Bracings **56** and **57** are then returned to their vertical positions, and seating section **10** is manually moved rearwardly along the tracks until it lies fully within framework structure **13**. Rods **55** are then disengaged and hydraulic cylinders **36** are collapsed until platform **17** is lowered into its horizontal position resting along the top portion of structure **13**. The two sections are then simply moved rearwardly into a position lying wholly within structure **42**, as seen in FIG. **2**.

Of course, only two of the three seating sections may be used due to specific space requirements for the arena or auditorium without departing from the scope

of the invention. Moreover, a fewer or greater number of seating sections other than the number shown may be provided for a particular purpose so long as adjacent seating sections are made to be telescoped one within the other as in the manner aforedescribed.

The provision of fixed, non-folding seats on sections which may be easily stored one within the other provides all the advantages of uniquely storing or varying the seating capacity of the auditorium, without those disadvantages of otherwise uncomfortable or complex seating structures. The raising and lowering means for platforms **17** and **31** are located within the elevation of their respective inclined platforms thereby utilizing a space that would be otherwise wasted. Also, roller stops for any of the section rollers may be provided in any normal manner for added stability, and any conventional type of seats **26** may be provided so long as they are of the fixed, nonfolding type.

Obviously, many other modifications and variations are made 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 is claimed is:

1. A grandstand arrangement, comprising at least two seating sections disposed one behind the other with at least the forward section mounted on rollers for horizontal movement, the rearward section being supported on a structural framework having an open forward end, said rearward section further including a seating platform mounted at an inclination to the horizontal on said framework at the upper portion thereof, seats carried by said seating platform, said forward section including a seating platform and seats carried thereby, means for raising and lowering said forward section seating platform about the forward end thereof between a horizontal position and an angle having the same inclination as said rearward section seating platform, the height and width of said forward section in the horizontal position of its seating platform being less than the corresponding height and width of said structural framework, whereby said forward section is capable of being telescoped within said framework through its open end when said forward section seating platform is lowered into its horizontal position and is moved rearwardly thereinto.

2. The grandstand arrangement according to claim **1** comprising at least three of said seating sections, the third of which including structural framework having an open forward end and a seating platform mounted on its framework at the upper portion thereof at an angle having the same inclination as said forward and rearward section seating platforms, seats carried by said third section seating platform, means for raising and lowering said rearward section seating platform about the forward end thereof between a horizontal position and its angle of inclination, said rearward section framework being mounted on rollers, the height and width of said rearward section in the horizontal position of its seating platform being less than the corresponding height and width of said third section framework when said rearward section seating platform is lowered into its horizontal position and is moved rearwardly thereinto.

3. The grandstand arrangement according to claim **2** wherein said raising and lowering means comprises screw jacks.

4. The grandstand arrangement according to claim **2** wherein said raising and lowering means comprises hydraulic jacks.

5. The grandstand arrangement according to claim **1** wherein guide tracks are provided for said rollers for guiding said forward section during its forward and rearward movement.

6. The grandstand arrangement according to claim **2** wherein guide tracks are provided for said rollers for guiding said forward and said rearward sections during their forward and rearward movements.

* * * * *