Feb. 11, 1936. F. C. VANCE 2,030,776

FOLDING GRANDSTAND

Filed July 2, 1935 4 Sheets-Sheet 1

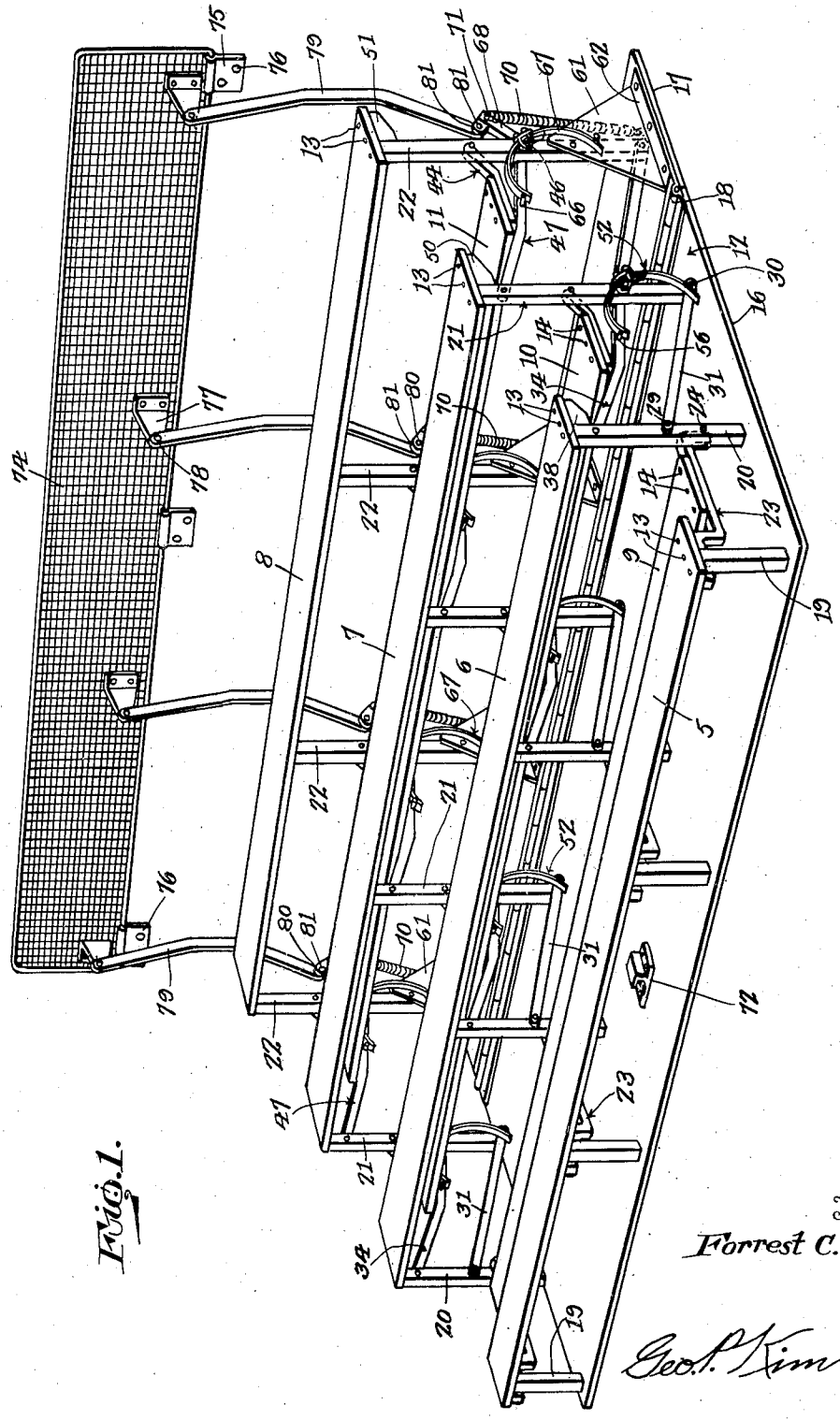

Fig. 1.

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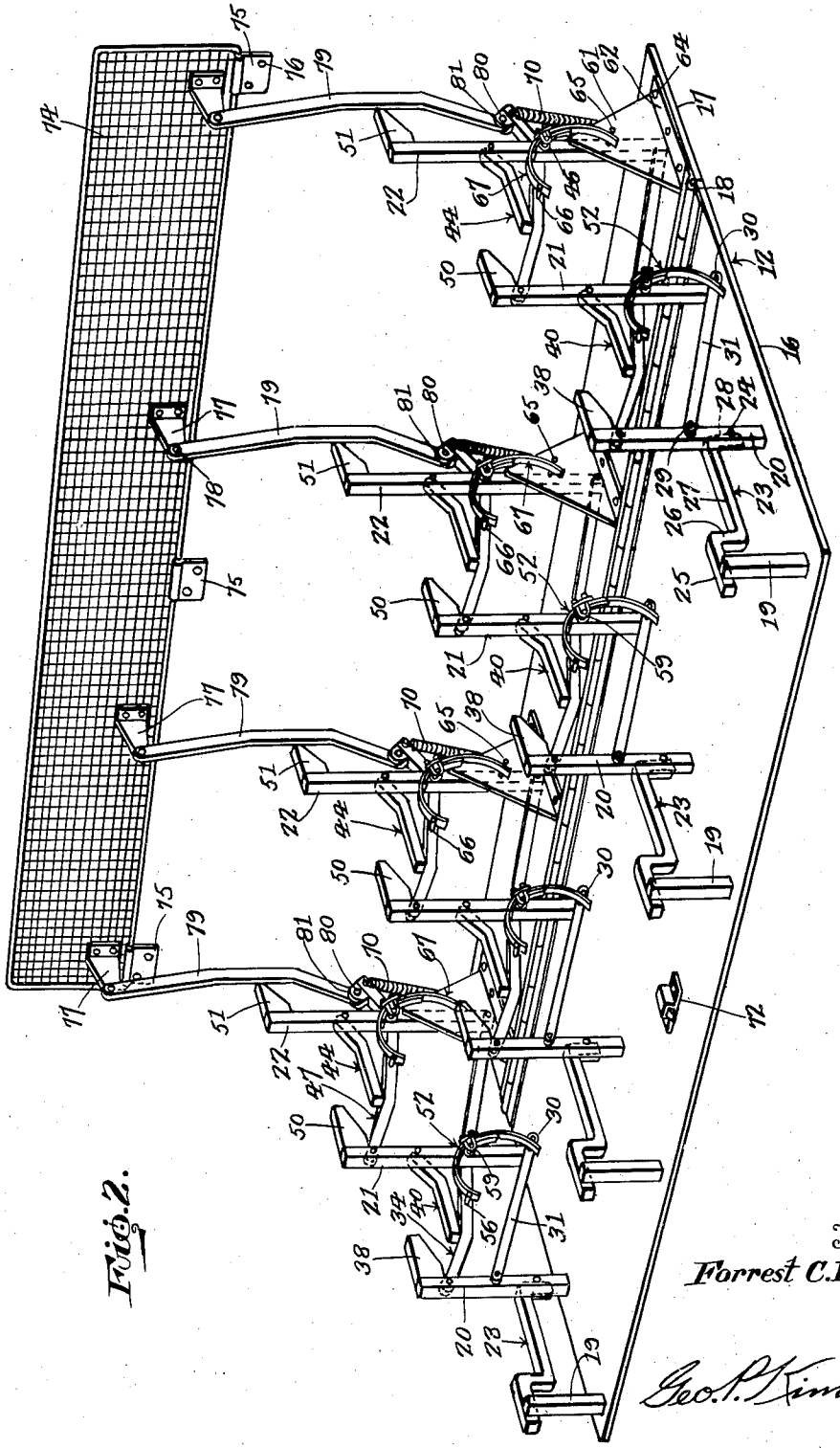

Fig. 2.

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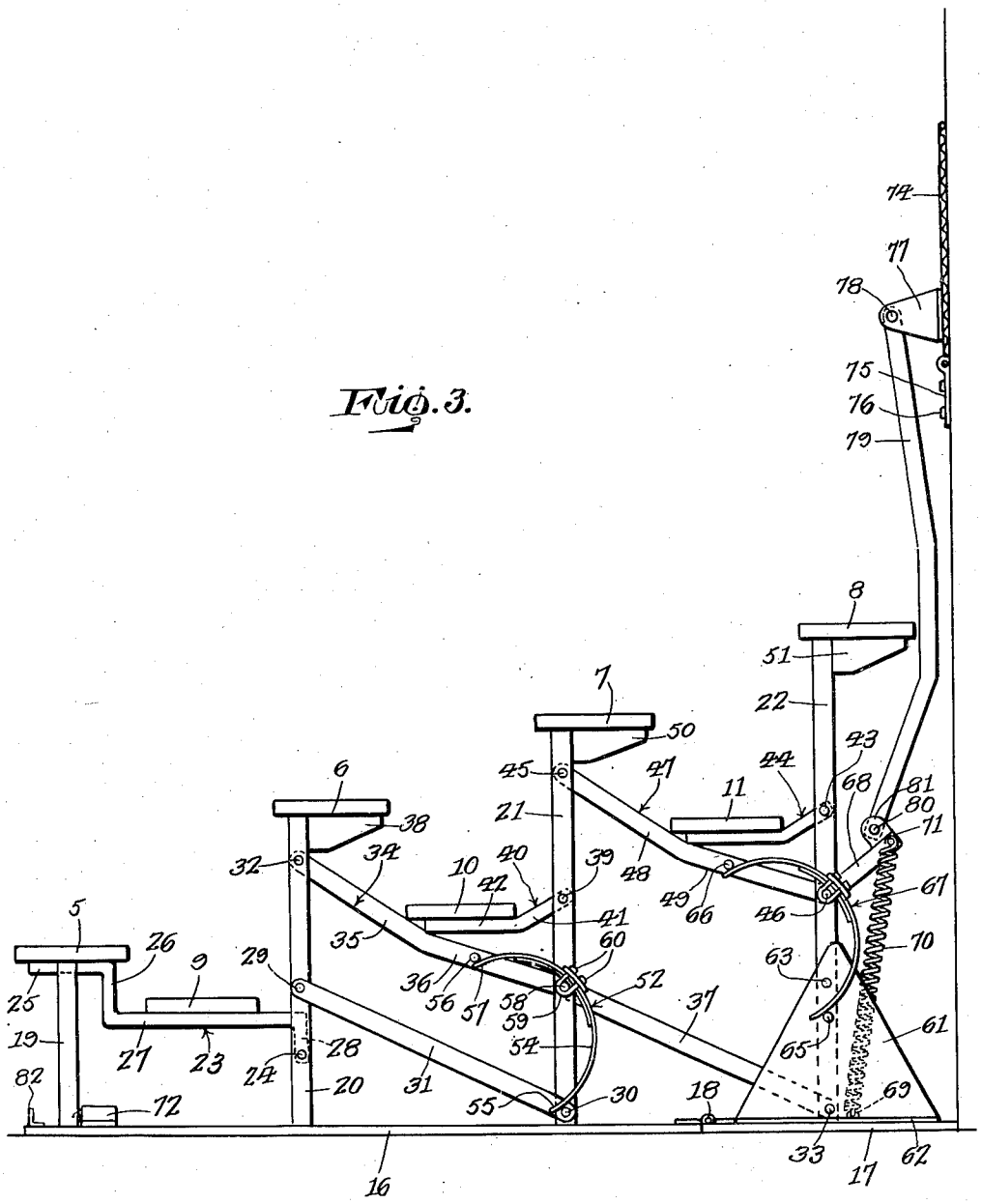
Fig. 3.



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Filed July 2, 1935 4 Sheets-Sheet 4

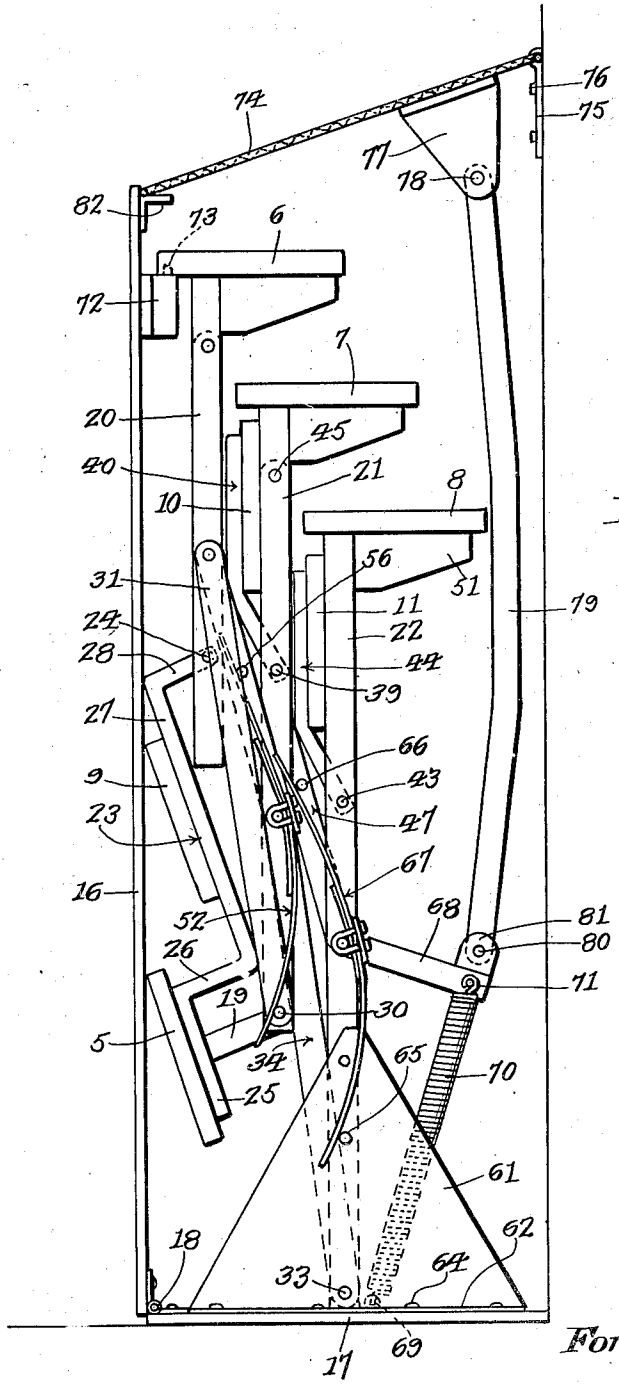

Fig. 4.

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FOLDING GRANDSTAND

Forrest C. Vance, Champaign, Ill.

Application July 2, 1935, Serial No. 29,556

16 Claims. (Cl. 189—1)

This invention relates to a new and useful improvement in folding structures, more particularly to a structure of such class designed for use as a grandstand.

The invention has for its object to provide, in a manner as hereinafter set forth, a foldable and extendible structure for the purpose referred to which may be expeditiously folded and extended at will and, when folded, will be arranged in a compact manner and occupy a relatively small area.

A further object of the invention is to provide, in a manner as hereinafter set forth, a foldable and extendible structure for the purpose referred to, having as elements thereof spaced springs disposed and arranged to facilitate the extending of the structure, as well as acting to assist in retaining the structure, after being extended in extended position.

A further object of the invention is to provide, in a manner as hereinafter set forth, a portable structure capable of being arranged at a suitable point with respect to a playing field or court and out of the way of the athletics on the field and court, and further capable of being extended to constitute a grandstand and further capable of being expeditiously folded in a compact manner to occupy a relatively small area.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a foldable and extendible structure for the purpose referred to, which is comparatively simple in its construction and arrangement, strong, durable, thoroughly efficient in use for the purpose intended thereby, conveniently extended and folded when occasion requires, readily assembled and comparatively inexpensive to set up with respect to structures employed for the same purpose.

With the foregoing and other objects which may hereinafter appear, the invention consists of a novel construction, combination and arrangement of parts as will be more specifically herein referred to and as are illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a perspective view of the structure when in extended position,

Figure 2 is a view similar to Figure 1, with the seat members and foot-rest members removed,

Figure 3 is an end view of the structure when extended, and

Figure 4 is an end elevation of the structure when folded.

The structure includes a set of seat members and a set of foot-rest members. These members may be constructed of metal or wood and are shown by way of example as formed of wood. When the seat and foot-rest members are formed from metal, they are welded, riveted or bolted to other elements of the structure, but when formed of wood, they are suitably secured by holdfast means to the said other elements of the structure. As illustrated the structure is provided with four seat members **5**, **6**, **7** and **8**, and three foot-rest members **9**, **10** and **11**. The number of seat and foot-rest members may be increased if desired. The length of the seat and foot-rest members corresponds substantially to the length of the base **12** of the structure. When the latter is extended, the seat members are arranged progressively at different levels increasing in height from the front to the rear of the base **12**. This arrangement also applies to the foot-rest members. The member **9** is arranged between and below the members **5** and **6**. The member **10** is arranged between and below the members **6** and **7**, and the member **11** is arranged between and below the members **7** and **8**. As before stated, the seat members are illustrated as being constructed of wood and the holdfast means for anchoring them in position to elements of the structure to be referred to are indicated at **13**. It is also stated that the foot-rest members as shown are constructed of wood and holdfast means indicated at **14** are employed for anchoring the foot-rest members to elements of the structure to be referred to.

The base **12** is rectangular and formed of a front and a rear section **16**, **17** hinged together, as at **18**, in a manner whereby section **16** may be folded upwardly in a direction toward section **17**. The section **16** is of materially greater width than the section **17**. For seating upon the section **16** is a series of parallel spaced uprights **19**, a series of spaced parallel uprights **20** and a series of spaced parallel uprights **21**. When the uprights are seated on base section **16**, the uprights **20** are arranged between, spaced from and parallel to the uprights **19** and **21**. The uprights **20** are of greater height than the uprights **19**. The uprights **21** are of greater height than the uprights **20**. Anchored to the section **17** of base **12** is a series of spaced parallel uprights **22** which are arranged in parallel spaced relation to and are of greater height than the uprights **21**. Secured to one side of the upper end of each upright **19** is a rearwardly directed member **23**. The said mem-

ber 23 provides a support for seat member 5 and also a carrier for foot-rest member 9 and is pivotally connected at its rear end, as at 24, to the lower portion of one side of the uprights 20. Each member 23 includes a horizontal portion 25, a vertical portion 26, a horizontal portion 27 and a vertical portion 28. Each member 23 is formed from a single piece of suitable stock. The portion 25 is secured to a standard 19, preferably by welding, riveting or bolting, and the portion 28 is arranged against one side of a standard 20. The portion 26 depends from the inner end of the portion 25 and the portion 28 depends from the rear end of the portion 27. The seat member 5 is arranged upon the upper end of the standards 19 and the portions 25 of the members 23. The foot-rest member 9 is mounted upon and suitably secured to the portions 27 of the members 23. When the structure is folded, the standards 19, members 23, members 5 and 9 bodily move downwardly upon the pivots 24 with respect to the uprights 20. In this connection see Figure 4.

Pivotally connected, as at 29, to the standards 20 and, as at 30, to the standards 21, are links 31 which when the structure is extended, will incline downwardly from the standards 20 to the standards 21 and constitute braces. Pivotally connected to the standards 20, as at 32, and to the standards 22, as at 33, are elongated links 34 formed of a forward portion 35, an intermediate portion 36 disposed at an angle with respect to portion 35 and a rear portion 37 disposed at an angle with respect to portion 36. The links 34 constitute bracing means between the uprights 22 and the uprights 20 and also a supporting means for the carriers, to be referred to, for the foot-rest member 10. The uprights 20 have secured to their upper ends rearwardly extending supports 38. The seat member 6 is mounted upon the upper end of the uprights 20 and the top of supports 38 and suitably connected therewith. Pivotally connected as at 39 to each upright 21 is a carrier 40 for the foot-rest member 10. The carrier 40 includes a rear portion 41 and a forward portion 42. Portion 40 is disposed at an angle with respect to portion 42. The foot-rest member 10 is mounted on portion 42 and extends forwardly from the latter when the structure is extended. When the structure is extended, the carriers 40 project towards the uprights 20 and seat upon or are supported by the links 34 at the point of joinder or portions 35 and 36. The foot-rest member 10, when the structure is extended, is supported by the portions 35 of the links 34. When the structure is extended, the links 34 extend upwardly from the lower end of the standards 22 to a point in close proximity to the upper end of the uprights 20.

Pivotally connected as at 43 to each of the uprights 22 is a carrier 44 for the foot-rest member 11. The carriers 44 are of the same construction as the carriers 40 but are arranged above these latter when the structure is extended. Pivotally connected as at 45 to each of the uprights 21 and pivotally connected as at 46 to each upright 22 is a link 47 formed of a pair of portions 48, 49 disposed at an angle to each other, and also a rear portion to be referred to. The pivots 46 are arranged at the point of joinder between the portions 49 and the rear portions, to be referred to, of the links 47. The links 47 constitute a bracing means between the uprights 21 and 22 and when the structure is extended, the links 47 extend upwardly from standards 22 to the standards 21. The foot-rest member 11 is arranged relatively to carriers 44 in the same manner as the foot-rest member 10 is arranged relatively to carriers 40. The carriers 44, when the structure is extended, are supported by the links 47 at the point of joinder of the portions 48, 49 of the links and the foot-rest member 11 is supported by the portion 48 of the links. The upper end of each of the uprights 21 is provided with a rearwardly directed support 50. The seat member 7 is mounted on the upper ends of standards 21 and the tops of supports 50 and suitably secured therewith. The upper end of each of the uprights 22 is formed with a rearwardly directed support 51. Seat member 8 is mounted on the upper ends of the uprights 22 and top of the supports 51 and suitably secured therewith. When the structure is extended, the member 10 is arranged above the member 9 and the member 11 above the member 10.

There is associated with each link 34 and each upright 21 a bow-shaped spring 52 formed of a pair of oppositely disposed overlapping sections 53, 54. The pivots 30 are extended and the sections 54 of the springs 52 have their outer ends bear upon the said pivots 30 as at 55. The portions 36 of the links 34 are formed with studs 56 against which bear the outer ends 57 of the sections 53 of the springs 52. The uprights 54 carry lateral lugs 58 to which are anchored the springs 52 by the means of U-shaped members 59 bearing against and extending from the lugs 58, passing through the spring sections 53, 54 and also through retaining plates 60 positioned against the sections 54 of the springs 52. The ends of the members 59 may be upset or provided with clamping nuts, as indicated at 60, for anchoring members 59 to the springs 52 and also to the lugs 58. The springs 52 act to faciltitate the extending of the structure and further act to assist in retaining the structure in its extended position.

Each of the uprights 22 is anchored to base section 17 by a vertically disposed triangular shaped plate 61 formed at its lower end with a flange 62. The plates 61 are positioned against the side of the uprights 22 and anchored to said uprights by holdfast means 63. The flanges 62 are positioned upon the base section 17 and are anchored thereto by the holdfast means 64. The apices of the plates 61 are disposed rearwardly with respect to the vertical median of the uprights 22. The plates 61 have laterally extending lugs 65. The portions 49 of the links 40 have laterally extending lugs 66. The pivots 46 are extended laterally with respect to the uprights 22. Anchored to the pivots 46 are springs 67 of the same form and construction as that of the springs 52. The springs 67 at one end bear against the lug 66 and at their other ends against the lug 65. The springs 67 are anchored to the pivots 46 in the same manner as the springs 52 are anchored to the lugs 58. The springs 67 function in the same manner as the springs 52 and are arranged above the latter.

The rear end portions of the links 57 are in the form of crank arms as indicated at 68 and extend rearwardly with respect to the uprights 22. Anchored to the base section 17 as at 69 are the lower ends of upstanding coil controlling springs 70 functioning to assist in the folding of the structure. Each spring 70 has its upper end anchored, as at 71, to the free end of an end portion 68 of the link 47.

When the structure is extended, the elements thereof will appear as shown in Figure 3. When

the structure is folded, the uprights 20 will be elevated above the uprights 21 and the uprights 21 will be positioned above the uprights 22. The springs 52 will be extended and arranged forwardly of springs 67. The springs 67 will be extended and the upper portions thereof will bear against the anchored means for the springs 52. The portion 68 will be disposed downwardly and the springs 70 contracted. The foot-rest member 10 and carriers 40 will be arranged between the uprights 20, 21. The foot-rest member 11 and carriers 44 will be arranged between the uprights 21, 22. The end portion 68 of the links 47 will act as a contracting means for the spring 70. When the structure is folded, the base section 16 will be shifted to a position at right angles to the base section 17 whereby the elements carried by base section 17 will be moved to the position referred to and as shown in Figure 4.

The structure includes a means for releasably latching it in folded position and the said means consists of a key-operated latching element 72 carried by base section 16 capable of engaging in seat member 6, as indicated at 73, Figure 2.

As illustrated, the structure is shown as provided with a means to prevent the entrance thereinto from the top thereof of footballs, baseballs, basketballs, and other such objects when the structure is folded and not in use. The said means consists of a reticulated panel 74 corresponding in length and width to that of base section 17. The member 74 has pivotally connected thereto a set of hinge leaves 75 formed with openings 76 for connecting them to a wall or standards arranged at the rear of the structure against which the latter is positioned. It may be stated, however, that the standards not shown may be secured to the base section 17. The member 74 has secured thereto and extending therefrom a set of brackets 77 and to the outer end of said brackets are pivotally connected, as at 78 the outer ends of angle shaped pull bars 79, which are pivotally connected at their inner end, as at 80 to apertured ears 81, carried by the rear end portion 68 of the links 47. The base section 16 carries an angle shaped support or stop 82 for the non-pivoted side of the member 74. When the structure is extended, the end portion 68 of the links 47 moves upwardly carrying the pull bars 79 therewith and which in turn will act to swing the member 74 on its pivots to the position shown in Figure 2. When the end portions 68 of the links 47 are moved downwardly to the position shown in Figure 4, the pull bars 79 will be carried therewith whereby member 74 will be swung on its pivot to the position shown in Figure 4 providing a closure for the upper end of the structure when the latter is folded as is shown in Figure 4.

What I claim is:

1. In a foldable grandstand opposed sets of vertical uprights for seat members one set being fixed, another set being movable to a position to an angle to said fixed set and the others of said sets being vertically movable relative to the fixed set, carriers for a foot-rest member connecting the said another set to one of the sets of the said other sets, a set of links for pivotally connecting the said others of said sets together, a lower set of combined bracing and supporting elements pivotally connecting one of the sets of the said other sets to said fixed set, a set of upper combined bracing and supporting elements pivotally connecting another of the sets of the said other sets to said fixed set, means in connection with said upper and lower sets of elements acting to maintain the grandstand in extended position, foot-rest member supporting means pivotally connected to a set of the said other sets and adapted to be supported by said lower set of elements when the grandstand is extended, and foot-rest member supporting means pivotally connected to said fixed set and adapted to be supported by said upper elements when the grandstand is extended.

2. The invention as set forth in claim 1 combined with anchored resilient means connected to the rear ends of the said upper elements to facilitate the folding of the grandstand.

3. The invention as set forth in claim 1 having combined therewith a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right angles to the rear section to cause the front section to shift said movable sets of uprights towards the fixed set of uprights, said fixed set of uprights being carried by said rear section and the other of said sets of uprights for seating on said front section when the grandstand is extended.

4. The invention as set forth in claim 1 having combined therewith anchored resilient means connected to the rear ends of the said upper elements to facilitate the folding of the grandstand, a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right angles to the rear section to cause the front section to shift said movable sets of uprights towards the fixed set of uprights, said fixed set of uprights being carried by said rear section, and the other of said sets of uprights for seating on said front section when the grandstand is extended.

5. The invention as set forth in claim 1 having combined therewith a seat member anchored to one of the sets of the said others of said sets of uprights, a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right angles to the rear section to cause the front section to shift said movable sets of uprights towards the fixed set of uprights, said fixed set of uprights being carried by said rear section, the other of said sets of uprights for seating on said front section when the grandstand is extended, and means carried by said front section and coacting with said seat member for latching the grandstand in folded position.

6. The invention as set forth in claim 1 having combined therewith spaced anchored resilient means connected to the rear ends of the said upper elements to facilitate the folding of the grandstand, a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right angles to the rear section to cause the front section to shift said movable sets of uprights towards the fixed set of uprights, said fixed set of uprights being carried by said rear section, the other of said sets of uprights for seating on said front section when the grandstand is extended, a seat member anchored to the uprights of one of said sets of the others of said sets of uprights, and means carried by said front section and coacting with said anchored seat member for latching the grandstand in folded position.

7. The invention as set forth in claim 1 having combined therewith a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right

angles to the rear section to cause the front section to shift said movable sets of uprights towards the fixed set of uprights, said fixed set of uprights being carried by said rear section, the other of said sets of uprights for seating on said front section when the grandstand is extended, and an automatically foldable pivoted arresting element connected with the rear ends of the said upper elements for extension across the top of the grandstand when the latter is folded to prevent entrance of foreign bodies into the folded stand at the top of the latter.

8. The invention as set forth in claim 1 having combined therewith spaced anchored resilient means connected to the rear end of the said upper elements to facilitate the folding of the grandstand, a base formed of a front and a rear section hinged together to provide for the folding of the front section upwardly at right angles to the rear section to cause the front section to shift the said movable sets of uprights towards the fixed set of uprights, said spaced resilient means being anchored to said rear section, said fixed set of uprights being carried by said rear section, the other of said sets of uprights for seating on said front section when the grandstand is extended, and an automatically foldable pivoted arresting element for extension across the top of the grandstand when the latter is folded to prevent entrance of foreign bodies in the folded stand at the top of the latter.

9. In a foldable grandstand a rear vertically disposed stationary supporting means for a seat member, spaced vertically movable intermediate supporting means for seat members and having free lower ends, upper and lower pivotal connection means between said intermediate and rear supporting means and being so formed to provide for the vertically moving of the said intermediate supporting means relative to the rear supporting means when the stand is folded and extended and for suspending the intermediate supporting means when the stand is folded, an upstanding angularly shiftable front supporting means for a seat member having its lower end free, a pivotal connection between said front supporting means and one of said intermediate supporting means and being so formed to provide for moving said front supporting means upwardly and downwardly when the stand is folded and extended, suspending said front supporting means at an angle to the intermediate supporting means when the stand is folded and constituting a foot-rest member carrying means, foldable spaced foot-rest members carrying means arranged rearwardly of the other foot-rest member carrying means and pivotally connected to said rear supporting and to another one of said intermediate supporting means, said foldable foot-rest members carrying means being disposed relatively to the said upper and lower pivotal connections to be supported by these latter when the stand is extended.

10. The invention as set forth in claim 9 having combined therewith spaced resilient means carried by said rear supporting means and extending rearwardly and forwardly therefrom, spaced resilient means carried by one of said intermediate supporting means and extending rearwardly and forwardly therefrom, the said several spaced resilient means acting to retain the stand in extended position, upper and lower abutment means arranged relatively to said rear and one of said intermediate supporting means, and the said several resilient means being slidably mounted against said abutment means.

11. The invention as set forth in claim 9 having combined therewith spaced upstanding lower end anchored resilient means attached at their upper ends to the rear ends of said upper pivotal connection means for retaining the stand in folded position.

12. The invention as set forth in claim 9 having combined therewith spaced resilient means carried by said rear supporting means and extending rearwardly and forwardly therefrom, spaced resilient means carried by one of said intermediate supporting means and extending rearwardly and forwardly therefrom, the said several spaced resilient means acting to retain the stand in extended position, upper and lower abutment means arranged relatively to said rear and one of said intermediate supporting means, the said several resilient means being slidably mounted against said abutment means, and spaced upstanding lower end anchored resilient means attached at their upper ends to the rear ends of said upper pivotal connection means for retaining the stand in folded position.

13. The invention as set forth in claim 9 having combined therewith a base formed of a front and a rear section hinged together, the former being adapted to have seated thereupon the lower ends of the front and intermediate supporting means when the stand is extended and being foldable upwardly at right angles to the rear section for moving upwardly and folding the front and intermediate supporting means together relative to said rear supporting means, and said rear section being provided with means for anchoring said rear supporting means thereon.

14. The invention as set forth in claim 9 having combined therewith a base formed of a front and a rear section hinged together, the former being adapted to have seated thereupon the lower ends of the front and intermediate supporting means when the stand is extended and being foldable upwardly at right angles to the rear section for moving upwardly and folding the front and intermediate supporting means together relative to said rear supporting means, said rear section being provided with means for anchoring said rear supporting means thereon, and said front section having means coacting with the seat member carried by one of said intermediate supporting means for latching the stand in folded position.

15. The invention as set forth in claim 9 having combined therewith a base formed of a front and a rear section hinged together, the former being adapted to have seated thereupon the lower ends of the front and intermediate supporting means when the stand is extended and being foldable upwardly at right angles to the rear section for moving upwardly and folding the front and intermediate supporting means together relative to said rear supporting means, said rear section being provided with means for anchoring said rear supporting means thereon, said front section having means coacting with the seat member carried by one of said intermediate supporting means for latching the stand in folded position, resilient means carried by said rear and one of said intermediate supporting means for retaining the stand in extended position, upper and lower abutment means arranged relative to said rear and the said one of the said intermediate supporting means, and said resilient means being slidably mounted against said abutment means.

16. The invention as set forth in claim 9 having combined therewith a base formed of a front

and a rear section hinged together, the former being adapted to have seated thereupon the lower ends of the front and intermediate supporting means when the stand is extended and being movable upwardly at right angles to the rear section for moving upwardly and folding the front and intermediate supporting means together relative to said rear supporting means, said rear section being provided with means for anchoring said rear supporting means thereon, and an automatically foldable pivoted arresting element connected with said upper pivotal connections for extension across the top of the grandstand when the latter is folded to prevent entrance of foreign bodies into the folded stand at the top of the latter.

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