May 27, 1930. C. H. WETZEL 1,760,801

GRANDSTAND

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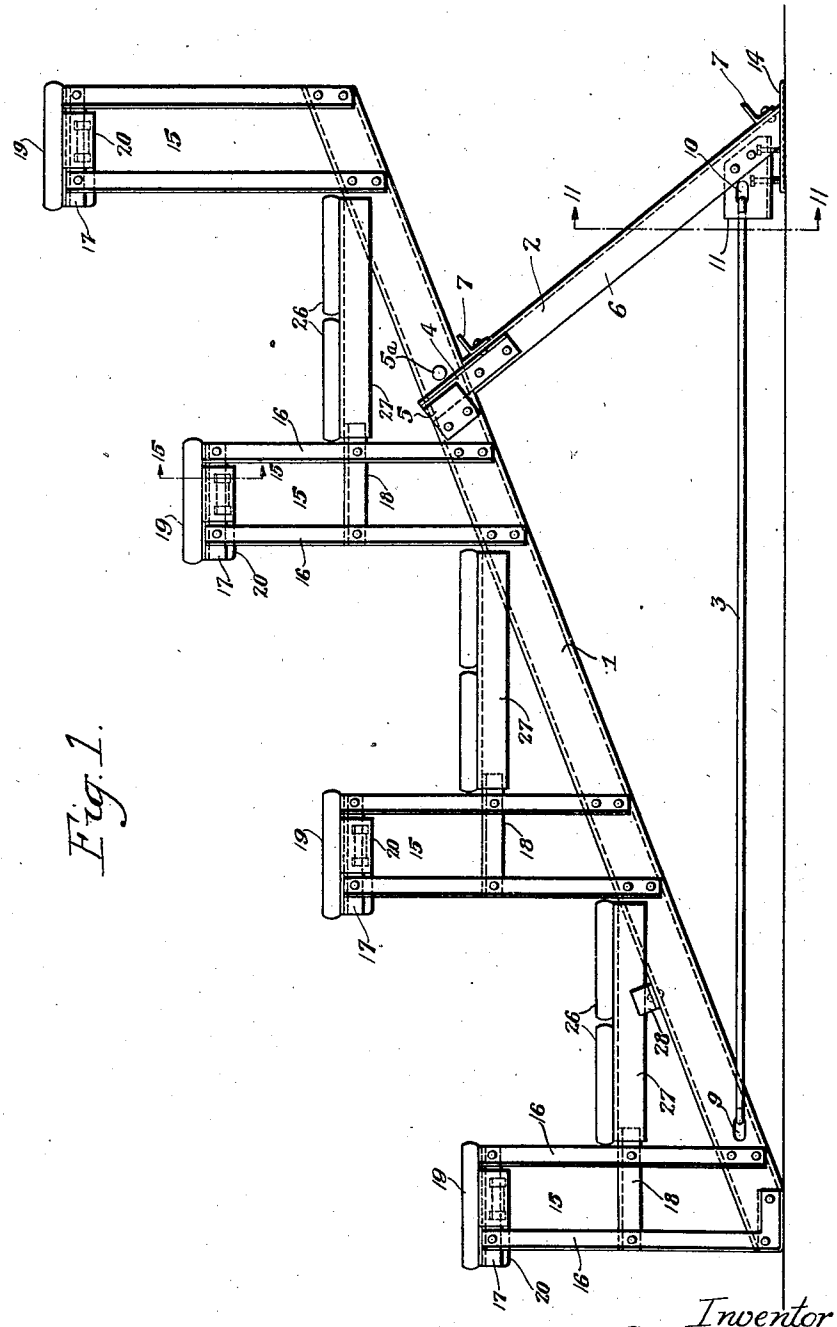


Fig. 1.

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Fig. 2.

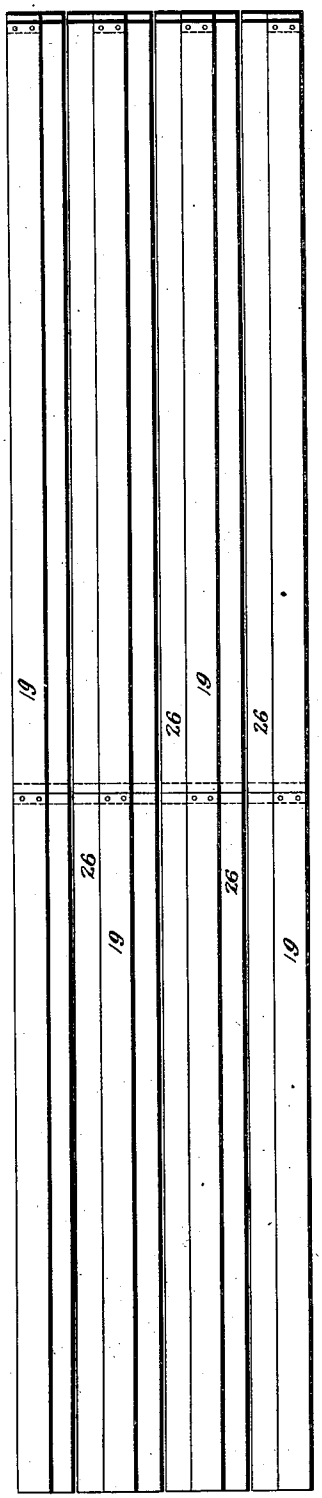
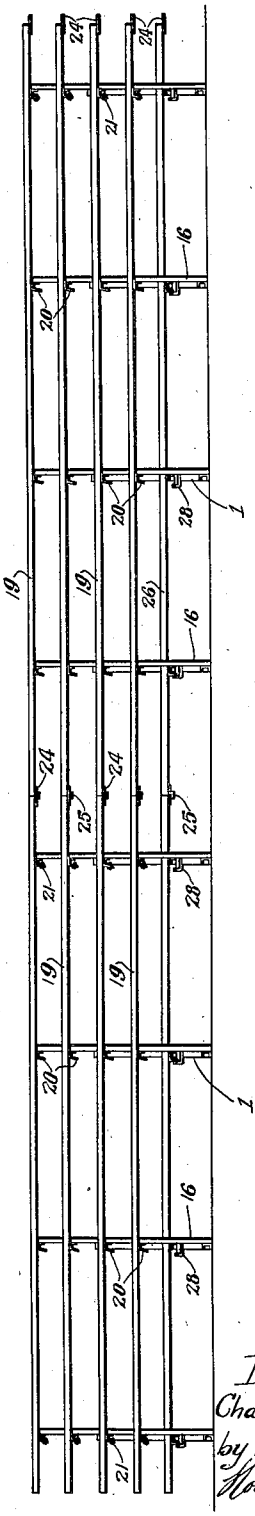


Fig. 3.



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Fig. 7

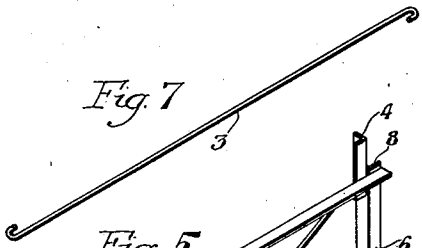


Fig. 8



Fig. 5.

Fig. 6.

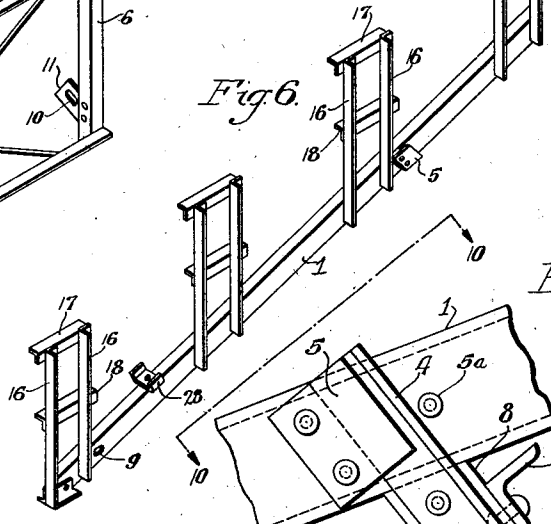


Fig. 9.

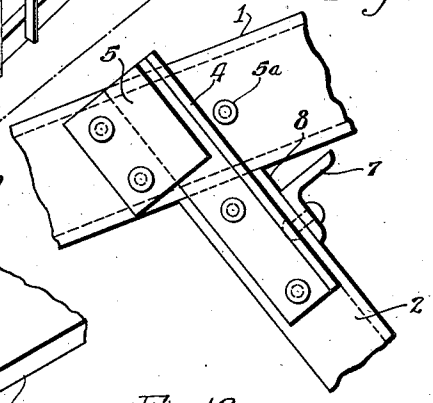


Fig. 12. Fig. 13.

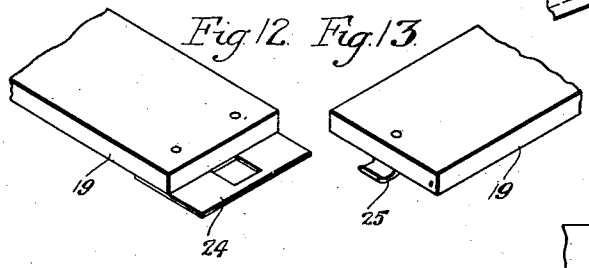


Fig. 10.

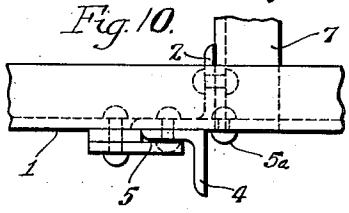
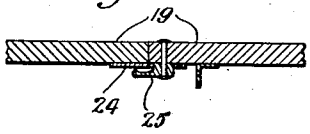


Fig. 14.



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Fig. 4.

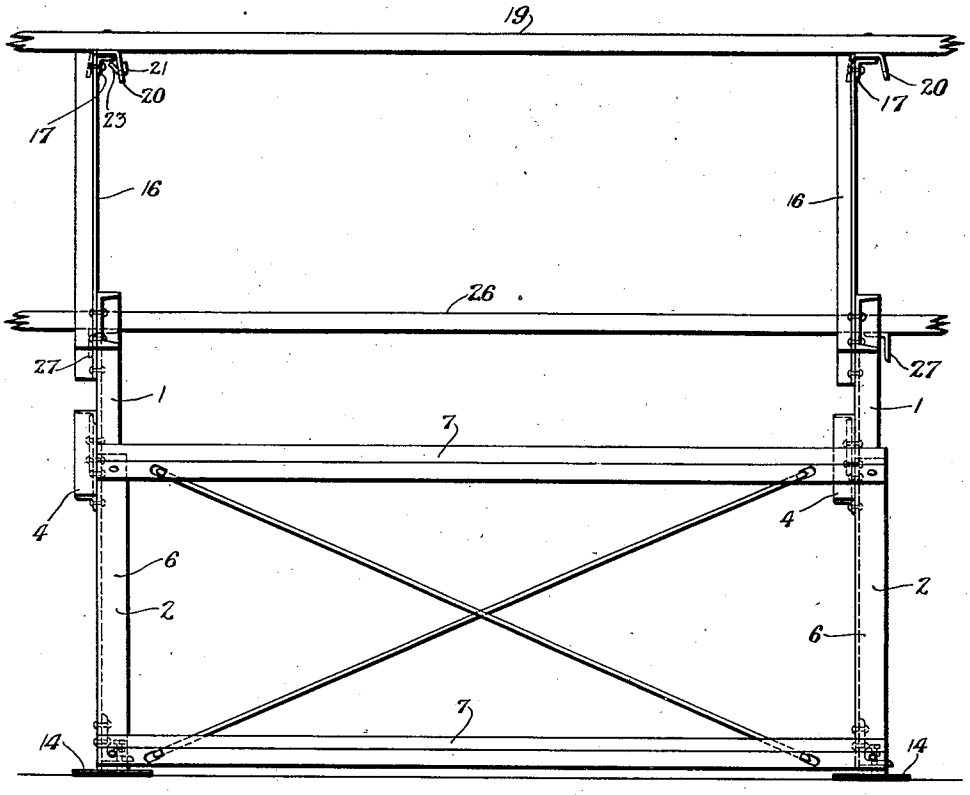


Fig. 15.

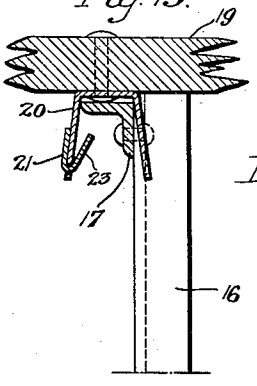


Fig. 16.

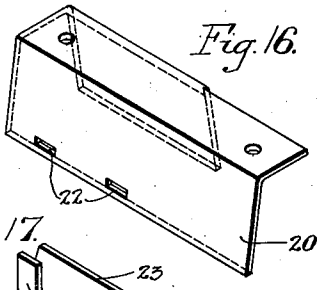


Fig. 17.

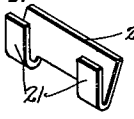
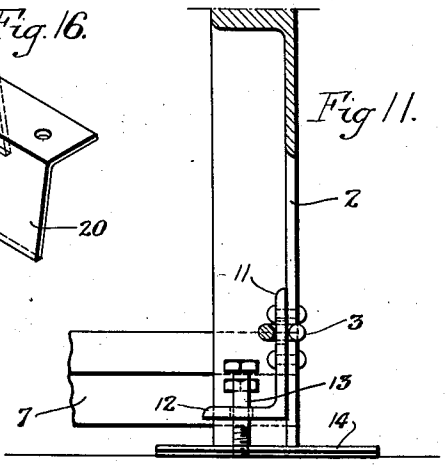


Fig 11.



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UNITED STATES PATENT OFFICE

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GRANDSTAND

Application filed April 16, 1928. Serial No. 270,304.

This invention relates to improvements in grandstands and similar structures, and the principal object of the invention is to provide a knock-down structure of this class which may be easily and quickly assembled and disassembled.

Another object of the invention is to provide a structure of the stated type which shall be composed of a plurality of like units, each unit being composed of a plurality of easily connected and separated parts, and the parts of the units being standardized so that those of one unit are interchangeable with those of the other units.

Another object of the invention is to so form the individual parts of the grandstand that the total number of differing parts is reduced to a minimum.

The invention further resides in certain novel structural details including the means of securing the parts of the units together, a novel self-adjustable pedestal foot for the rear base sections of the units, and a novel and ingenious device for locking the seats to the framework.

In the attached drawings:

Figure 1 is a side elevation of a grandstand made in accordance with my invention;

Fig. 2 is a reduced plan view of the grandstand;

Fig. 3 is a front elevation of the grandstand illustrated in Fig. 2 omitting the rear understructure;

Fig. 4 is an enlarged fragmentary rear elevation illustrating one of the structural units of which the grandstand is composed;

Fig. 5 is a view in perspective of the rear support element of one of the units;

Fig. 6 is a view in perspective of one of the side stringers which is supported at the rear upon the element shown in Fig. 5;

Fig. 7 is a view in perspective of one of the tie rods utilized for connecting the lower ends of the rear support and the associated side stringers;

Fig. 8 is a detached perspective of one of the self-adjusting pedestal plates;

Fig. 9 is a fragmentary side elevational view illustrating the interlocking juncture between the rear support and one of the side stringers;

Fig. 10 is a view of the fragment shown in Fig. 9 taken from the angle indicated by the line 10—10, Fig. 9;

Fig. 11 is a section on the line 11—11, Fig. 1, illustrating the self-adjusting pedestals for the rear support sections;

Figs. 12 and 13 show in perspective and respectively the abutting ends of two of the seat boards, and illustrate the means for interlocking these parts;

Fig. 14 is a fragmentary sectional view showing the seat boards interlocked;

Fig. 15 is a section on the line 15—15, Fig. 1, illustrating the device for locking the seat planks to the framework of the stand;

Fig. 16 is a detached perspective of one of the elements of the device for locking the seat planks to the frame, and

Fig. 17 is a view in perspective of the latch element.

The structure forming the subject of my invention is made up of a plurality of units, any desired number of which may be used to afford a grandstand of the desired capacity. Referring to the drawings, each of these units consists of a pair of inclined side pieces or stringers 1 whose forward ends rest upon the ground or floor surface and whose rear or elevated ends are supported upon a rectangular support member 2 mounted in a position, as illustrated in Fig. 1, inclined at the top towards the forward edge of the stand structure and at the bottom connected with the lower or forward end of each of the stringers 1 by means of a tie rod 3.

In order that these elements may be readily assembled and disassembled in the stand structure, the following means is provided.

It will be noted that the rear section 2 is provided at each side and at its upper end with an angular extension 4 and that each of the stringers is provided near its upper end with a socket 5 into which the extensions 4 fit, as well shown in Fig. 9, so that the stringers 1 are locked against transverse movement with respect to the supports 2. When the extension 4 occupies the socket piece 5, the head 5^a of a rivet in the stringer 1 lies

closely contiguous or in abutment with the rear edge of the said extension and prevents relative movement of the parts in that direction. It will also be noted that the side upright pieces 6 of the rear sections 2 are extended at the tops slightly above the transverse bar 7, as indicated at 8 in Figs. 5 and 9, the arrangement being such that in assembly the stringers 1 rest upon these upper projecting ends of the side pieces 6, these latter pieces accordingly acting as direct struts supporting the weight of the stringers. The tie rods 3 are hooked at the ends and in each instance are adapted to be passed at one end through an opening 9 in the lower end of the stringer and at the opposite end through an opening 10 in an angle plate 11 secured to the bottom of the rear section 2, one at each side. It will be noted, therefore, that in assembly the separable parts consisting of the stringers 1, 1, the rear section 2 and the tie rods 3, 3 are assembled by simple interlocking means involving no use of bolts or other of the standard securing elements. As a consequence of this construction, assembly and disassembly are rendered a relatively easy matter. Furthermore, the structure in so far as described is extremely strong and stable.

Attention is directed to the pedestal device provided at the lower ends of the side pieces 6 of the rear section 2. This is illustrated in Figs. 1, 4 and 11. Reference has already been made to the flange plate 11 secured to the lower ends of the side pieces 6 and constituting anchors for the rear ends of the tie rods 3. As illustrated, these plates 11 include a horizontal flange 12 projecting transversely, which flanges are provided with spaced apertures which loosely receive bolts 13, 13 which project upwardly from pedestal plates 14, see Fig. 8. The plates 14 are so positioned by the retaining bolts 13 that they underlie the lower extremities of the side pieces 6 of the rear sections, thereby forming extended feet for the latter particularly desirable when the stand is erected on ground surfaces to prevent the lower ends of the said side pieces entering the ground. As clearly illustrated, the length of bolts 13 and the size of the apertures in the flange 12 of the plate 11 are such that the plate 14 is afforded a certain amount of free movement with respect to the lower ends of the side pieces 6 so that with respect to the latter the plates are more or less adjustable. In this manner, the plates are self-adjustable with respect to uneven surfaces upon which the structure may be elevated so that no severe strains are placed upon the elements due to these irregularities. It will be noted that with the arrangement described, the plates will assume a natural position with respect to the uneven supporting surface and that the lower ends of the side pieces 6 will rest normally upon the plates regardless of their angular position.

Each of the stringers 1 is provided with a plurality of upright seat-supporting pedestals 15, which pedestals consist in the present instance of a pair of uprights 16 secured at the lower ends to the stringer 1 and joined together at their upper ends by a transverse angular cross bar 17. Each pedestal also comprises an intermediate cross bar 18 also of angular form, both of these cross pieces 17 and 18 including a horizontally projecting flange as illustrated. These pedestals 15 are adapted to support seat planks 19 which rest upon the upper ends of the uprights 16 and upon the cross pieces 17, and extend from the pedestals 15 of one structural unit to those of another, as clearly illustrated. In order to lock these seat planks in position on the pedestals to prevent accidental displacement thereof and to further unite the units in such manner as to prevent relative displacement thereof, I provide on the under sides of the said planks channel irons 20 adapted as shown in Fig. 15 to embrace the transverse cross bars 17 of the respective pedestals 15 intermediate the uprights 16 of the latter. Not only do these channel pieces 20 therefore function to prevent transverse displacement of the planks 19 on the pedestals, but also to unite the units together and effectively prevent transverse displacement of the forward ends of the individual stringers.

I have found it desirable further to provide means for locking the seat planks 19 to the supporting structure in such manner as to prevent accidental elevation. Referring to Figs. 15 to 17, inclusive, it will be noted that in some instances the channel irons 20 are provided in one depending flange with a V-shaped locking element 21, this element having extensions projecting through openings 22 in the channel 20 and being thereafter bent into the V-shape form as illustrated to prevent displacement. This V-shaped latch 21 is capable of rocking so that the inner flange 23 thereof, see Fig. 15, may occupy a position close against the under face of the channel 20 or the extended position, as shown in the drawings. The arrangement permits the channel to be pushed down over the cross bar 17, as illustrated, but the latch 21, assuming by gravity its normal position as shown in Fig. 15, prevents by engagement with the transverse flange of the angle piece 17 elevation of the seat plank 19 until the latch element 23 has been manually shifted. Ordinarily, it is only necessary to have these locks located at the adjacent ends of the seat planks.

To prevent the springing of the ends of the seat planks 19 between the supports, I provide an interlocking arrangement shown in Figs. 12, 13 and 14. In this device, the end of one device is provided with an apertured

plate 24 which projects from the under side of the plank as illustrated in Fig. 12, whereas the abutting end of the adjacent plank is provided with a projecting tongue 25 which fits into the plate 24 and forms an interlock which can be broken only by elevating the opposite end of one or other of the joined planks, and thereafter longitudinally shifting the plank to separate the interlocking pieces.

The stand further comprises a plurality of double tread planks 26 including transverse connecting bars 27 on the under side. These treads are adapted for insertion between the pedestals 15 as shown in Fig. 1. At the forward edge, these treads are supported upon extensions of the intermediate transverse bars 18 of the pedestals 15 and at the rear edges upon the stringers 1. As shown in Fig. 1, the depending flange of the angular transverse bars 27 extends downwardly alongside the stringers 1 whereby the tread members are prevented from longitudinal movement and are held in position. It will be noted that between the two lower pedestals 15, the stringers are provided with a channel element 28 extending upwardly, and the flange of the tread bar 27 is adapted to fit between the sides of this channel in such manner as to further prevent transverse displacement of the stringers from their normal positions. The entire structure is thus interlocked in such manner as to give a structure of great strength and rigidity, capable of withstanding all strains to which it may normally be subjected.

Attention is directed to the fact that the stringers 1 are identical in construction and are interchangeable. Also the rear support sections 2 of the respective units are identical and also are interchangeable.

The structure provides a grandstand which may be readily assembled and disassembled and easily manufactured and which is capable of storage in relatively restricted spaces. The entire absence of special fastening means such as bolts in the assembled structure makes for extreme simplicity and ease of assembly and disassembly.

I claim:

1. In a grandstand structure, the combination with a pair of rearwardly inclined stringers, of a forwardly inclined stringer-supporting section including side bars whose upper ends directly engage the under sides of said stringers, interlocking means on the said stringers and on the supporting section preventing transverse relative movements of the parts, and tie rods connecting the forward lower ends of the stringers with the bottom of said supporting section.

2. A structural unit for grandstands comprising a pair of rearwardly inclined stringers, a forwardly inclined stringer-supporting section, a socket on each of said stringers adapted to receive the upper ends of said supporting section, tie rods connecting the lower forward ends of said stringers with the bottom of said supporting section, and means on said stringers for supporting seat planks.

3. A grandstand structure comprising rearwardly inclined stringers, stringer-supporting sections adapted to underlie and to support the rear elevated ends of the stringers, and substantially universally self-adjustable pedestal elements secured to and adapted to underlie the lower end of said supporting section.

4. A grandstand structure comprising rearwardly inclined stringers, said stringers having on one side a projecting part forming a socket, stringer-supporting elements comprising upwardly extending members having at the top projecting parts adapted to fit respectively in the sockets on said stringers and each comprising a shoulder underlying and supporting the associated stringer, means including said socket members for preventing transverse movement of the upper ends of said supports with respect to the stringers, and detachable means for connecting the bottoms of the stringers with the bottoms of said supports.

5. A grandstand structure comprising a plurality of units each comprising a pair of stringers identical in form and each stringer having a projecting element at one side forming a pocket between itself and the side face of the stringer, a strut member adapted to support the rear elevated ends of said stringers and comprising projecting parts adapted to rest in said pockets, whereby the stringers are restrained against transverse displacement upon the support, and detachable elements for connecting the bottoms of the stringers with the bottom of said strut member.

6. A grandstand structure comprising a plurality of rearwardly inclined stringers each having a projecting member forming a socket, a strut member adapted to support the rear elevated ends of a plurality of said stringers, said strut inclining forwardly and having projections adapted to fit in the said stringer sockets and shoulders underlying said projections upon which the respective stringers are adapted to rest, detachable tie rods for connecting the bottom of the strut member with the bottoms of the stringers, and seat members supported on said stringers and transversely uniting a plurality of said stringers.

7. A grandstand structure comprising a plurality of rearwardly inclined stringers each having a projecting member forming a socket, a strut member adapted to support the rear elevated ends of a plurality of said stringers, said strut inclining forwardly and having projections adapted to fit in the said stringer sockets and shoulders underlying said projections upon which the respective

stringers are adapted to rest, detachable tie rods for connecting the bottom of the strut member with the bottoms of the stringers, seat members supported on said stringers and transversely uniting a plurality of said stringers, and means for interlocking said seat members with the stringers.

8. A grandstand structure comprising a supporting frame including substantially horizontal seat-supporting members and seats adapted to rest upon said members and having on the underside thereof channels adapted to embrace said horizontal members, and latches movably secured in said channels and adapted to assume by gravity a position underlying said horizontal members to prevent accidental displacement of said seat members.

9. A grandstand structure comprising a supporting frame including substantially horizontal seat-supporting bars, seat members adapted to be supported by said bars and each including members embracing said horizontal bars and preventing transverse movement of the seat members, each of said embracing members including a gravity-actuated latch adapted to underlie said members to prevent vertical displacement of said seat members and being adapted for adjustment to inoperative positions to permit removal of said seat members.

10. A grandstand structure comprising a supporting frame, means for supporting a series of boards on said frame in end abutting arrangement, means for interlocking the boards with the frame, and means for interlocking the adjacent ends of said boards.

11. A grandstand structure comprising a plurality of rearwardly inclined stringers, seat members supported by and extending transversely of said stringers, strut elements supporting the rear elevated ends of said stringers, and self-adjustable plates underlying the bottom ends of said strut members and constituting a bearing for said struts.

12. A structural unit for grandstands comprising a pair of rearwardly inclined stringers, socket-forming elements on said stringers, a stringer-supporting section having parts adapted to fit within said sockets to interlock the upper end of the said section with the stringers and to prevent transverse displacement of the stringers, and elements connecting the lower ends of the stringers with the bottom of said supporting section.

13. A grandstand comprising a plurality of rearwardly inclined stringers having thereon means for supporting seat elements, a substantially rectangular stringer-supporting frame adapted to underlie the upper ends of each successive pair of stringers, means for slidably interlocking the stringers with their respective supporting frames, means for uniting the lower ends of the stringers with the lower ends of the frames, and seat elements mounted on the said seat-supporting means and extending across the space separating the aforesaid successive pairs of stringers.

14. A grandstand comprising at least one pair of substantially parallel rearwardly inclined stringers, a unitary stringer-supporting frame adapted to underlie the rear elevated ends of said stringers, a flange projecting from a face of each of said stringers and having a rearwardy extending part spaced away from the said face, extensions at the top of said unitary support adapted respectively to lie within the sockets formed by said flanges, and detachable means for uniting the lower forward end of said stringers with the bottom of said stringer-supporting section.

15. A grandstand structure comprising a supporting frame including substantially horizontal supporting bars, flat elongated members adapted to rest upon said bars, and at least one latch element on each of said members adapted to underlie said bars to prevent accidental elevation of said members, said elements being adjustable to positions permitting removal of said elongated members.

16. A grandstand structure comprising a supporting frame, means for supporting a series of planks on said frame in end to end arrangement, an apertured flange projecting from an end lower edge of one of said planks, and a hook element projecting from the under side of the immediately adjacent plank and adapted for insertion in the said aperture, said hook being insertable in said opening when the planks are relatively inclined to each other and preventing longitudinal separation of the ends of said planks when the latter are substantially parallel.

17. In a grandstand, the combination with a supporting frame, of a plurality of substantially parallel spaced supporting bars, planks mounted on said supporting bars, and means on said planks for engaging the under sides of said bars to prevent accidental elevation of the planks from the supporting bars.

18. In a grandstand, the combination with a plurality of inclined stringers, of a stringer-supporting section including uprights, a flange adjacent the bottom of each of said uprights, a plate adapted to underlie the lower ends of each of said uprights, and a bolt loosely projecting through said flange and into said plate for retaining the plate in position beneath the said upright while permitting a substantially universal adjustment movement of the plate upon the ground surface.

19. A structural unit for portable grandstands, which comprises a plurality of inclined stringers, a stringer-supporting section having parts slidably interlocking with

said stringers, and means for preventing relative displacement of the lower ends of the stringers and of the supporting section.

20. A structural unit for portable grandstands, which comprises a plurality of inclined stringers, a stringer-supporting section, said section consisting of a plurality of members adapted in assembly to constitute respectively struts for the said stringers, and means for slidably interlocking the upper ends of said strut members with the stringers.

21. A structural unit for portable grandstands, which comprises a plurality of inclined stringers, a stringer-supporting section consisting of a plurality of members adapted in assembly to constitute respectively struts for the said stringers, and cross braces including at least one diagonal extending between each adjacent pair of strut members, and means for slidably interlocking the upper ends of said strut members with the stringers.

22. A structural unit for portable grandstands, which comprises a plurality of inclined stringers, a stringer-supporting section consisting of a plurality of members adapted in assembly to constitute respectively struts for the said stringers with cross braces including at least one diagonal extending between each adjacent pair of strut members, and means for slidably interlocking the upper portion of said section with the stringers.

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