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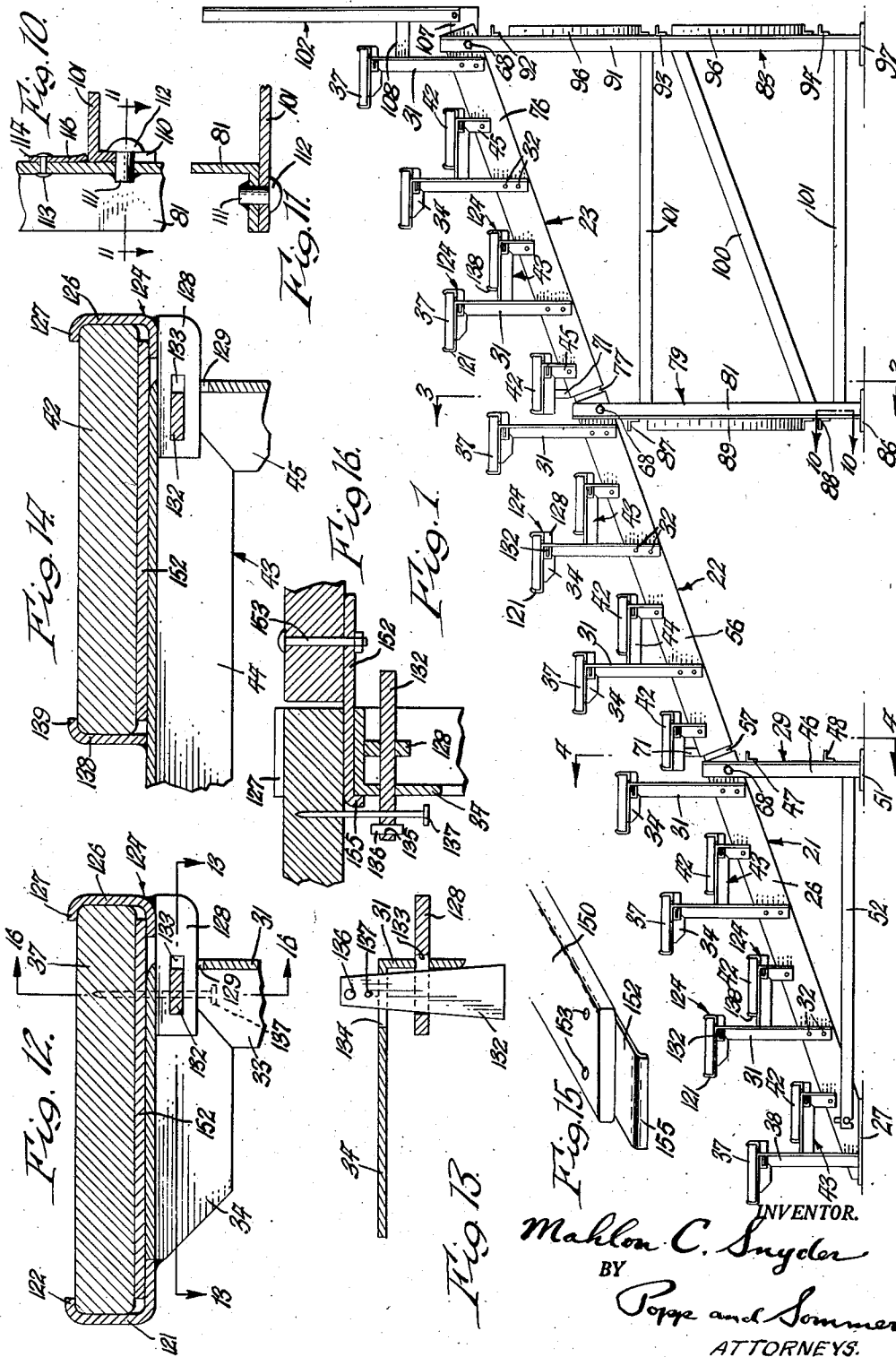
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BLEACHER SEATING STRUCTURE

Filed Dec. 21, 1951

3 Sheets-Sheet 1



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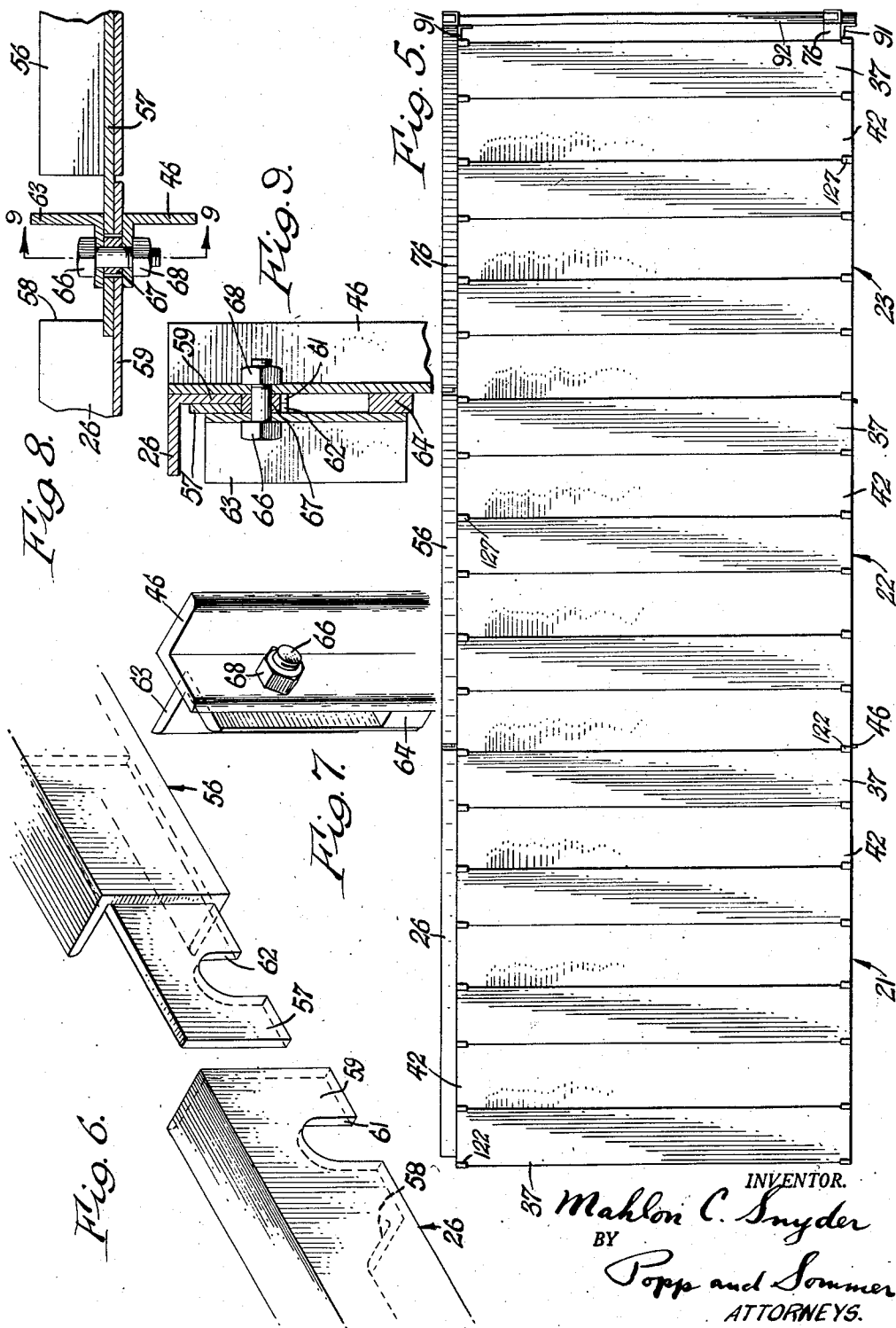
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BLEACHER SEATING STRUCTURE

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2 Claims. (Cl. 20—1.126)

This invention relates to seating structures of the type known as bleachers and particularly to portable, knock-down bleachers.

It is an object of the present invention to provide a portable bleacher of the type described which, when erected in assembled form, is strong and rigid, but is so designed and constructed as to be readily erected or dismantled, thus permitting its convenient use where permanent seating structures are not required or where particular conditions require the provision of auxiliary seating.

Another object of the invention is to provide a bleacher of the character described which is constructed from a number of portable sub-assemblies so that it may be quickly set up or taken down.

It is a further object of the invention to provide a bleacher of the character described which comprises a plurality of identical sub-assemblies and parts so that its erection is simplified.

Another object of the invention is to provide a bleacher of the character described which may be erected without difficulty on ground which is somewhat uneven.

Still another object of the invention is to provide bleachers of the character described which are adapted for combination to form seating structures or stands of large capacity.

A further object of the invention is to provide a bleacher of the character described which may readily be varied in size within wide limits.

Another object of the invention is to provide a bleacher of the character described in which the floor boards and seat boards need not be sized, drilled or cut but are securely and solidly held in place, thereby increasing the rigidity and strength of the bleacher.

An additional object of the invention is to provide a bleacher of the character described in which the seat boards and floor boards are free of attached brackets or clamps but are held firmly in place in such fashion as to minimize warping and end checking or splitting.

Still other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a side elevation of an assembled bleacher structure according to one embodiment of the present invention;

Figure 2 shows the bleacher illustrated in Figure 1 in rear elevation and also a modification thereof;

Figure 3 is a transverse, vertical sectional view on line 3—3 of Figure 1;

Figure 4 is a transverse, vertical sectional view on line 4—4 of Figure 1;

Figure 5 is a plan view of the bleacher illustrated in Figure 1;

Figure 6 is an enlarged perspective detail view showing the interlocking ends of the side frame members of the bleacher illustrated in Figure 1;

Figure 7 is an enlarged, perspective detail view of the top portion of one of the supporting posts for the bleacher shown in Figure 1;

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Figure 8 is a fragmentary, horizontal sectional view illustrating the interlocking engagement of the girders and post shown in Figures 6 and 7;

Figure 9 is a fragmentary, vertical sectional view taken on line 9—9 of Figure 8;

Figures 10 and 11 are enlarged, fragmentary, detail views showing the way in which the longitudinal side braces for the bleacher supporting frames are held in place, Figure 10 being a vertical sectional view taken on the line 10—10 of Figure 1 and Figure 11 being a horizontal sectional view taken on the line 11—11 of Figure 10;

Figure 12 is a fragmentary sectional view showing the locking arrangement preferably employed for holding the seat boards and auxiliary seat boards in place on the bleacher illustrated in Figure 1;

Figure 13 is a fragmentary sectional view taken on line 13—13 of Figure 12 showing details of the board locking arrangement illustrated in Figure 12;

Figure 14 is a fragmentary sectional view similar to that of Figure 12 showing the same board locking arrangement as applied to the floor boards of the bleacher shown in Figure 1;

Figure 15 is a fragmentary perspective view of the end of one of the auxiliary seat boards; and

Figure 16 is a fragmentary sectional view taken on line 16—16 of Figure 12 which shows more clearly the manner in which the auxiliary seat and floor boards are supported.

In the drawings, in which like parts are designated by the same reference characters, the bleacher of the present invention is shown as a unit comprising a plurality of tandem seat sections—a lower section 21, an intermediate section 22, and an upper section 23. The lower seat section comprises a pair of identical, laterally spaced girders 26 which serve as side frame members and are preferably formed of channel shaped bars set on edge. Each of the frame members 26 is bevelled at its lower forward end and has secured thereto at that point a foot plate 27 adapted to rest on the ground or floor. The spaced channel girders 26 slope upwardly from their forward ends in parallel relation and are supported at their rear ends by a transverse frame 29.

A plurality of upwardly extending seat posts 31 which may conveniently be formed of angle bars are mounted along the girders 26 at equal intervals and at such an angle that the seat posts are vertical when the girders are supported at their rear ends by the frame 29. The seat posts 31 are rigidly and permanently secured to the out-sides of the central webs of the girders 26 by suitable means such as the rivets 32. Adjacent its upper end, as best shown in Figure 12, each seat post 31 has the flange 33 of the angle bar which is parallel to the girder 26 cut to permit bending the top of the bar forwardly at right angles thereby to form a horizontal, longitudinal seat board support 34. A plurality of seat boards 37 are mounted transversely of the lower seat section 21 with the ends of each board resting on aligned supports 34 to which they are removably attached by novel means which will be described in more detail hereinafter.

Adjacent the front or forward end of each of the side frame members 26 of the lower seat section 21 there is provided a seat post 38 which is somewhat shorter than the posts 31. The seat posts 38 on the parallel girders 26 are aligned and are preferably secured to the flat outer sides of the girders and to the respective foot plates 27 by welding. At their upper ends the seat posts 38 are bent like the posts 31 to form horizontal, longitudinal seat board supports 34. A transverse seat board 37 extends between and is removably attached to such

supports 34 by means preferably identical with those used to secure the other boards 37 removably in place.

Floor boards 42 are provided between and parallel to the seat boards 37 on the lower seat sections 21 for use by the persons seated therein. The boards 42 are supported above and between the girders 26 on brackets or supports 43 carried by the girders. The brackets 43 are preferably formed from angle bars and are aligned transversely of the section 21. Each bracket comprises a longitudinal, horizontal, supporting portion 44, the forward end of which is rigidly fastened by welding to the seat post immediately in front and a vertical leg 45 which is attached by suitable means such as riveting or welding to the outer flat face of one of the side frame members 26. Thus the brackets 43, while being in part supported by the seat posts, at the same time serve as braces for said posts. The floor boards 42 are detachably mounted at their ends on the horizontal bracket portions 44 preferably in the same manner that the seat boards 37 are removably attached to the supports 34.

The transverse frame 29 which provides support for the rear end of the lower seat section 21 comprises a pair of vertical posts 46 which are preferably formed from steel angle bars and which are maintained in spaced position by rigid bars 47 and 48, that extend between and are preferably welded to the posts 46. The lower end of each of the posts 46 is provided with a foot plate 51 and adjacent each of said lower ends there is provided a reinforcing tie bar or brace 52 which extends forwardly from the post 46 to one of the side frame members 26 adjacent the lower end thereof and is removably secured to both post and frame member. For convenience in fastening, the horizontal flange of the angle bar 52 may be cut off for a short distance at one or both ends of the bar.

The intermediate seat section 22 comprises a pair of identical transversely spaced girders or side frame members 56 similar to the frame members 26, each of which carries a plurality of aligned seat posts 31, seat supports 34, and seat boards 37 like those on the lower seat section 21. The floor boards 42 in the intermediate seat section 22 are supported on brackets 43 as in the lower section 21. Except for the lowermost one on each girder 56, the forward end of which is supported by a short upright bar 71 rigidly attached at its ends to the girder and the bracket, the brackets 43 are supported on the girders 56 and seat posts 31 just as on the lower seat section 21.

Figures 6-9 show in detail the manner in which the girders 56 of the intermediate seat section are respectively connected to the girders 26 of the lower seat section 21 and the way in which they are supported by the posts 46 of the transverse frame 29. Referring to Figure 6, it will be seen that the girder 56 is provided with a longitudinal extension or tongue 57 which comprises a flat plate fitting within the channel of the member 56 and rigidly secured therein as by welding. The outwardly projecting end of the tongue 57 is adapted to be received in the channel of the side frame member 26. The bottom flange of the girder 26 is cut away at its upper end as indicated at 58 and the central web 59 thereof has a notch or slot 61 formed in the lower edge thereof. When the girders 26 and 56 are brought together in end-to-end alignment, the notch 61 may be caused to register with a similar slot or notch 62 formed in the lower edge of the tongue 57 of the girder 56.

Adjacent the top of each of the posts 46 of the transverse frame 29 there is provided, as shown in Figures 7-9, a locking bar 63. Each locking bar 63 is secured in spaced position from one outer face of its associated post 46 by a spacing block 64 interposed between the lower portion of the locking bar and the post and welded to each, and by a bolt 66 that passes through the locking bar and post and carries between the bar and post a spacing collar or washer 67. The spacing block 64 and the collar 67 are made of such thickness as to permit entry

into the vertical slot formed between the locking bar 63 and the post 46 of the vertical central web 59 of a frame member 26 and the vertical tongue 57 of a girder 56. When so positioned, the registering slots 61 and 62 in the girder 26 and tongue 57, respectively, are adapted to fit over and engage the spacing collar 67 in the manner best shown in Figure 9. The girders 26 and 56 are thereby held together in longitudinal alignment, with the tongue 57 of the latter in close, parallel relation to the central web 59 of the girder 26, and are supported by the post 46.

It will be understood that each of the side frame members 56 is joined to the corresponding frame member 26 in the manner described and that when the frame members and posts are so assembled, they may be held securely in assembled position by tightening the nuts 68 of the bolts 66.

The upper seat section 23 comprises a pair of transversely spaced side frame members 76 which are substantially identical with the girders 56. It is also provided with seat posts 31, seat board supports 34, seat boards 37, floor boards 42, and the like which are substantially identical in construction and arrangement with those on the intermediate seat section 22. The forward ends of the girders 76 are provided with tongues 77 that are substantially identical with the tongues 57 on the side frame members 56 and which cooperate with the rear ends of the latter in substantially the same way that the tongues 57 cooperate with the members 26. A transverse supporting frame 79 comprising a pair of spaced vertical posts 81 supports the rear of the intermediate seat section 22 and the forward end of the upper seat section 23, while a similar but larger transverse frame 83 supports the rear end of the upper seat section 23.

The posts 81 of the transverse frame 79 are each provided with a foot plate 86 and are joined by a pair of vertically spaced rigid bars 87 and 88 and a diagonally disposed bracing bar 89, all preferably welded to the posts. Each of the posts 81 is further provided adjacent its top with interlocking supporting means substantially identical with that carried by the posts 46 including a spaced locking bar 63 and a bolt 66 which permits it to be interlocked with and support the interconnected side frame members 56 and 76 in the same way that the junctions of the pairs of members 56 and 26 are supported.

The third and largest transverse frame 83 which provides a support for the rear of the upper seat section is similar in construction to the frame 79 and comprises a pair of vertical posts 91 having attached foot plates 97. The posts 91 are spaced transversely by rigid horizontal bars 92, 93 and 94 and a pair of diagonal bars 96, all of which are rigidly secured, as by welding, to the posts. At the top of each of the posts 91 there is a bolt 66 that passes through a spaced locking bar 63 substantially identical with that on the posts 46 and 81 and supports the rear end of one of the side frame members 76. Transverse frames 79 and 83 are connected on each side of the bleacher by a plurality of braces 100, 101, each of which is removably attached at its ends to a post 81 and a post 91.

A back rail 102 comprising a pair of spaced uprights 103 and 104 connected by transverse bars 106, preferably welded to the uprights, is provided at the rear of the upper seat section 23. Each of the uprights 103 and 104 is attached at its lower end to a forwardly projecting plate 107 which is adapted to extend through the vertical slot formed between the top of the post 91 and the locking bar 63 thereon into the end of a girder 76. Each of the plates 107 is provided in its lower edge with a slot or notch which like the notches 62 in the tongues 57 and 77 fits over a bolt 66 and thereby supports the plate and upright. Above the plate 107 on each upright 103 and 104 is a forwardly projecting bar 108 that is removably secured by suitable means to the top seat posts 31 on the

respective sides of the seat section 23 to further support and brace the rail 102.

The braces 52, 100 and 101 are, as pointed out above, removably attached. It is preferred, however, that they be secured in position against accidental displacement and, accordingly, means is provided, as shown in detail in Figures 10 and 11, for retaining the braces in place while permitting their quick removal when desired. As shown in Figures 10 and 11, the brace 101 is provided adjacent one end thereof with a slot 110 in its bottom edge which is adapted to engage over the shank of a stud or button 111 secured to the post 81 by convenient means such as welding or riveting. The enlarged head 112 provided at the outer end of the stud 111 prevents lateral movement of the brace 101. Pivotal secured above the stud 111 by suitable means such as a rivet 113 is a latch 114, one arm 116 of which is of such length that when the brace 101 is in place with the slot 110 over the stud 111 the arm 116 may be swung into position to prevent the brace from moving upwardly out of engagement with the stud. The latch may, however, be easily rotated to move the arm 116 so that the brace may be disengaged from the stud 111.

It will be understood that each of the braces 52, 100 and 101 is provided with a slot, similar to the slot 110, adjacent each end thereof and that studs 111 and latches 114 are provided at suitable places on the posts 46, 81 and 91 and adjacent the front ends of the girders 26. The bars 108 may conveniently be removably attached to the top seat posts 31 of the upper seat section 23 in the same manner, each bar 108 being provided with a suitable slot adjacent its forward end and top post having secured thereto a stud 111 and a latch 114. As the side assemblies of sections 22 and 23 are identical, the top seat post 31 on each of the girders 56 and 76 are provided with such a stud and latch.

In Figure 12 there is illustrated the way in which seat boards 37 are removably held in place. At the forward end of each seat board support 34 there is rigidly secured, preferably by welding, a U-shaped or channel member 121. Member 121 is arranged with the channel facing rearwardly above the support 34 and forming a recess into which one edge of a seat board 37 may fit. The other edge of the board is held in a clamp 124 which comprises a channel member 126 substantially like the member 121 but reversed so that short upper flanges 127 and 122, respectively, are in facing relation and restrain the board 37 from upward movement. Channel member 126 is rigidly attached to a plate or tongue 128 which extends, parallel to seat support 34, through a slot 129 formed in the support 34 at the top of the seat post.

The clamp 124 is held in place, with the seat board 37 firmly held between the channel members 121 and 126, by a tapered key or wedge 132 which passes through a longitudinally extending slot 133 in the tongue 128 and a similar aligned slot 134 in the side of the seat support 34. At the inner, smaller end of the tapered key 132 there is provided a hole 135 in which there may be inserted a pin 136 to prevent accidental withdrawal and loss of the key. A nail 137, that passes through a hole in wedge 132 and is driven into the lower face of the board 37, holds the wedge tightly in place. If desired, however, the wedge or key 132 may be held in place by merely twisting or bending over the smaller end thereof, after the key is inserted through the slots 133 and 134. As shown most clearly in Figure 13, the key 132 in conjunction with the angle bar of the seat post and the slot 134 provides a wedging action on the tongue 128 and holds the seat board 37 tightly even though the width of the board may vary slightly from the intended width.

The arrangement used for holding the floor boards 42 in place is substantially like that described above except that instead of the channel members 121 welded to the seat supports 34 upwardly projecting brackets 138, each

having a rearwardly turned flange 139 at its upper end, are welded to the tops of the horizontal portions 44 of the brackets 43. The brackets 138 form with the horizontal portions 44 channels in which edges of the boards 42 are held. Preferably, as shown, the seat boards 37 and floor boards 42 are substantially alike so that they may be used interchangeably if desired. The clamps 124 and wedges 132 used with both sets of boards are identical and may be interchanged as the clamping arrangement permits the use of boards varying considerably in width.

The board holding means above described has numerous advantages. Among these advantages is the lack of need for individual brackets or clamps bolted or nailed to the boards. The number of parts required to erect a bleacher is therefore greatly reduced and the boards require less space when piled. Moreover, it is unnecessary to drill or cut holes or notches in the boards for such brackets. The boards are held solidly and securely by the clamping device of the present invention, thereby giving increased rigidity and strength to the bleacher. In addition, the boards are so held that the usual tendency for their edges to warp upwardly is restrained and there is a reduction in their tendency to check and split, particularly at and near their ends.

From the foregoing description, it will be apparent that by the present invention there is provided an exceptionally useful and convenient portable bleacher which may be used either indoors or outdoors. One factor which contributes greatly to the ease with which the bleacher may be assembled or erected is the construction of many of the elements and sub-assemblies to be identical. Thus, the girders 56 and 76 are identical in construction and on each the seat posts, seat supports and floor board support brackets are identical. Accordingly, any one of the four side frame assemblies may be interchanged with any of the others in forming either the intermediate seat section 22 or the upper seat section 23. In like manner both of the side frame assemblies of the lower seat section 21 are identical and may be interchanged at will. Further, as pointed out above, interchangeability is possible with the seat boards 37 and floor boards 42 and the loose clamping elements 124 and 132 therefor.

Portable bleachers constructed according to the present invention may be readily assembled in a number of different ways. One method which is convenient is to first assemble the transverse frames 79 and 83 in spaced relation with the braces 100 and 101 in place. The girders or side frame members 76 with their attached seat posts and floor board supports may then be mounted on the top of the supporting frames with the notches or slots in the bottom edges of the tongues 77 resting on the bolts 66 of the posts 81 and the similar slots in the central web of the girders at their upper ends resting on the bolts 66 adjacent the tops of the posts 91. The girders 56 may then be put in place, the slots in the upper ends thereof being fitted on the bolts 66 of the posts 81 between the posts and the tongues 77 of the girders 76 and with the slots 62 in the tongues 57 thereof resting on the bolts 66 adjacent the tops of the posts 46 of the transverse frame 29. The frame of the bleacher may be completed by placing the girders 26 of the lower seat section 21 in place with the slots 61 embracing the bolts 66 on the posts 46 between the posts and the tongues 57 of the side frame members 56. The joints between the side girders and posts are easily made without special tools and facilitate erection. The braces 52 may then be connected to the posts 46 and the lower ends of the girders 26 to hold the transverse frame 29 in vertical position.

An important feature of the bleacher construction of the present invention is that it is unnecessary to have the ground upon which the bleachers are erected precisely level. One or more of the foot plates upon which the bleacher frame rests may be appreciably higher or lower than the adjacent foot plates without interference with the assembly or use of the bleacher. The novel joints

between the supporting posts and the side girder members described above are sufficiently flexible as to permit differences in level of several inches between adjacent foot plates without putting undue strain on any of the posts.

When the frame of the bleacher has been thus erected the seat boards 32 may be attached to the supports 34 and the floor boards 42 may be mounted on the supporting brackets 43, thus tying together the girders or side frame members of the bleacher and forming a rigid structure. The back rail 102 may then be mounted on the top seat posts of the upper seat section 23 and interlocked with the bolts 66 at the tops of the posts 91 in the manner heretofore described, and, if desired, railings of any suitable and convenient design may be provided along the sides of the bleacher.

It will be understood that a plurality of bleacher units such as are the subject of this invention may be provided in side-by-side relation and that, if required, aisles may be provided between adjacent units. It will be further understood that the size of the seat sections forming a bleacher according to the present invention may be varied to make the bleacher of greater or less capacity and that instead of having only three seat sections as illustrated, additional sections may be provided and supported in a manner similar to that herein disclosed.

As shown in Figure 2 auxiliary seat and floor boards 150 may be supported between adjacent and parallel bleachers. The auxiliary boards are substantially identical and are provided at each end with a metal mounting plate 152, best shown in Figures 15 and 16. Each plate 152 is firmly secured at one end to the bottom of the board 150 by suitable means such as bolts 153 and each has at its other end a depending flange 155. In setting up bleachers with auxiliary boards extending between them, the sections 21, 22 and 23 of each bleacher are erected in properly spaced position. Then the auxiliary boards are put in place between the sections with the metal mounting plate 152 resting on the aligned seat supports 34 and brackets 43. The seat and floor boards 37 and 42 are then placed over the plates 152 in position to be held by the clamping members 121, 126 and 128. When clamped, the ends of the boards hold the plates 152 and auxiliary boards 150 firmly in place. Metal shims may be provided, if necessary, under the ends of the boards 37 and 42 which do not rest on plates 152. This will usually be unnecessary, however, as the clamping members may easily be so shaped as to permit of considerable variation in board thickness or height.

Bars 157 may be secured to adjacent posts 103 and 104 of the bleachers above and to the rear of the auxiliary boards to form an auxiliary back rail. To facilitate assembly the bars 157 may be provided with slots and the posts 103 and 104 with studs and latches so as to detachably join them in the same way that the braces 100 and 101 are joined to the posts 81 and 91.

Short auxiliary boards 150 may be used to provide an aisle between adjacent bleachers or, if desired, the bleachers may be separated a greater distance and longer auxiliary boards may be used. In the latter case the

seating capacity of stands constructed in accordance with the invention may be greatly increased without providing additional supporting frames. The cost per seat will therefore be materially reduced. Since the auxiliary boards 150 are substantially identical, the erection and dismantling of stands using them will be easily accomplished.

While it is contemplated that the frames of bleachers constructed according to the present invention will be formed of steel, it is evident that various parts may be formed of other materials and that numerous modifications of the construction and parts shown may be employed without departing from the spirit of the invention. Consequently, it is intended that the invention shall be construed broadly and shall not be limited except by the terms of the appended claims.

The invention claimed is:

1. In a portable bleacher of the character described, means for removably supporting one end of a horizontal board, comprising a metal support arranged under said one end of said board and extending transversely of said board, a channel member fixed to one end of said support and extending upwardly to engage the corresponding edge of said board, a clamping channel member engaging the opposite edge of said board, a vertical tongue fixed to said clamping channel member and projecting horizontally through a vertical slot in said support toward said first channel member, and a flat horizontal drive wedge extending through horizontal slots in said tongue and support, respectively, and coacting with the opposite ends of said horizontal slots to draw said clamping channel member toward said first clamping channel member.

2. In a portable bleacher of the character described, a vertical metal post having an upwardly opening slot in its upper end, a pair of longitudinally aligned channel frame members each having a top wall, a bottom wall and a vertical side wall, one end of the bottom wall of one of said frame members being cut away to permit the adjacent side wall part to be inserted into said slot, a vertical tongue projecting longitudinally from within the opposing end of the other frame member in face-to-face relation with the inner face of the side wall of said one of said frame members, and fastening means extending through said post, side wall of said one of said frame members, and said tongue.

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