

[54] **PORTABLE BLEACHER CONSTRUCTION**

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[51] Int. Cl.² E04H 3/12

[58] Field of Search 52/6-10, 64, 52/122, 143

[56]

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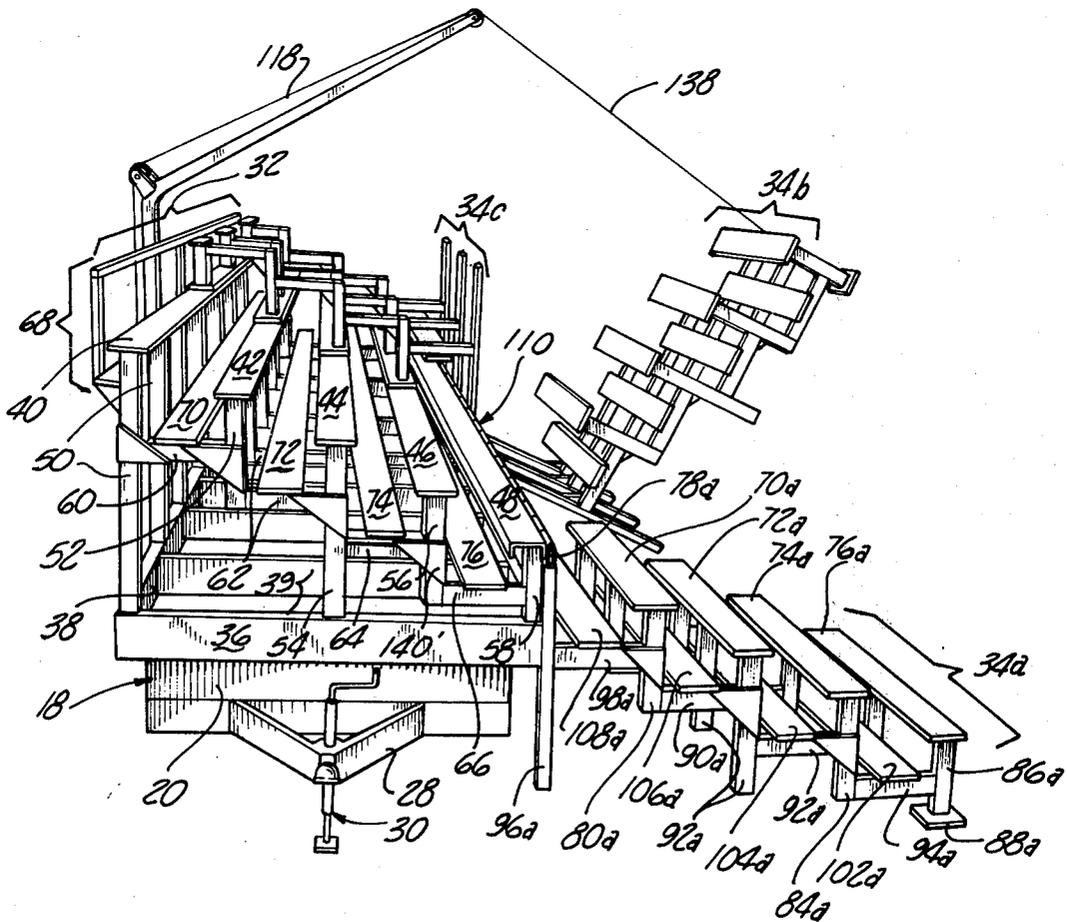
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[57] **ABSTRACT**

A bleacher construction which has a plurality of hinged sections which interfit when pivotally folded together to define a readily portable assembly.

16 Claims, 4 Drawing Figures



PORTABLE BLEACHER CONSTRUCTION

SUMMARY BACKGROUND OF THE INVENTION

The present invention relates to bleacher constructions and more particularly to a portable bleacher construction.

There are numerous instances where events, especially outdoor events, are to be staged which require the availability of seating for the viewing audience. Where the event is to be transported from one location to another portable seating is almost a necessity unless the event is to be limited to areas having permanent seating. The difficulty with portable seating is that it is cumbersome, difficult to transport and time consuming to erect. The result is either unavailability of adequate seating or the utilization of an expensive, portable seating arrangement requiring the expenditure of a large number of man hours in set up and tear down. In the present invention these problems are solved. Here a portable bleacher is provided having all seats in tact and in the form of sections which pivotally fold into each other in a nested arrangement. One section of seats is permanently secured to a wheeled, trailer frame and the other section is pivotally connected thereto. A winch or other mechanical device can be used to pivot the movable section into and out of its nested position. With the present construction it is possible to set up the bleacher sections in a very short time with the assistance of only two men.

Therefore it is an object of the present invention to provide a novel portable bleacher construction in which one section is pivotally mounted for nesting with a fixed section whereby a compact, portable structure is provided which can quickly and easily be set up or taken down.

It is another object to provide a portable bleacher construction of the above described type having means for mechanically pivoting the movable section.

It is a general object to provide a new and improved portable bleacher construction.

Other objects, features, and advantages of the present invention will become apparent from the subsequent description and the appended claims, taken in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevational of one form of bleacher construction embodying features of the present invention shown with a vehicle (partially shown) for towing it;

FIG. 2 is a perspective view of the bleacher construction of FIG. 1 shown with one section unfolded in place, another section partially unfolded and a final section fully folded in place;

FIG. 3 is a side elevational view, to enlarged scale, of the bleacher construction of FIG. 1 taken in the direction of the arrow 3, with one section of the bleacher construction shown in its folded position and shown in phantom in its partially unfolded position; and

FIG. 4 is a perspective view to enlarged scale of the hinge construction pivotally connecting a movable section to its associated fixed section.

Looking now to the drawings, a portable bleacher construction 10 is shown as connected to a vehicle 12 (partially shown) via a suitable hitch assembly 14. The bleacher construction 10 includes a bleacher assembly 16 mounted onto a trailer assembly 18. The trailer assembly 18 can be constructed in a conventional manner with a frame 20 and a suspension system 22. The

suspension system 22 is located towards the rear of the assembly 18 and includes tandem axle assemblies 24 supported via leaf springs 26. The front of the frame 20 terminates in a towing structure 28 and a support rod 30 such that when the vehicle 12 is unhitched the support rod can be threadably moved downwardly to support the forward end of the trailer assembly 18. Other supports, such as 19 (FIG. 3) could be located along the frame 20 to provide additional support and also relieve the trailer suspension 22 from the static load when the bleachers are being used.

The bleacher assembly 16 includes a fixed bleacher section 32 and three movable bleacher sections 34a, 34b and 34c associated therewith.

The fixed bleacher section 32 is fixed directly to the frame 20 via a ladder-link base structure 36 formed with longitudinal and lateral supports 38 and 39 respectively. Bleacher section 32 includes a plurality of longitudinally extending seating stringers 40, 42, 44, 46 and 48. Alternate stringers 40, 44 and 48 are connected to and supported on vertical supports 50, 54 and 58, respectively, which connected directly from the base 36 to the associated stringer. The vertical supports 50, 54 and 58 are to progressively decreasing height, as shown, to provide the desired tiered seating arrangement. The remaining intermediate stringers 42 and 46 are connected to and supported on vertical supports 52 and 56, respectively. Vertical supports 52 are in turn supported by vertical supports 50 and 54, with lateral struts 60 connected between supports 50 and aligned supports 52 and with lateral struts 62 connected between supports 52 and aligned supports 54. In a similar manner vertical supports 56 are supported by vertical supports 54 and 58, with lateral struts 65 connected between supports 54 and aligned supports 56 and with lateral struts 66 connected between supports 56 and aligned supports 58. The struts 60, 62, 64 and 66 are located a preselected vertical distance down from seating stringers 40, 42, 44 and 46, respectively, to provide ample leg room for spectators. The leg support stringers 70, 72, 74 and 76 extend longitudinally of the trailer 18 and are connected to and supported on struts 60, 62, 64 and 66, respectively. A fence-like railing 68 is secured to the back of vertical supports 50 and extends above the top seat stringer 40 to provide a guard for persons seated on the top row.

The movable bleacher sections 34a, b, and c are identical with one another and like structure will be given the same numeral designation with the addition of the appropriate letter postscript a, b or c for the section 34a, b or c with which that part is associated. Each of the movable sections 34a, b and c extends for one third the longitudinal length of the fixed bleacher section 32.

Looking now to FIG. 2, the movable section 34a includes seating stringers 70a, 72a, 74a and 76a which are connected to and supported by vertical supports 80a, 82a, 84a and 86a, respectively, to provide a tiered seating arrangement. Front vertical supports 86a are provided with enlarged feet 88a to provide good, well distributed ground support. Vertical supports 80a are connected to aligned vertical supports 82a via lateral struts 90a. Vertical supports 82a are connected to aligned vertical supports 84a via lateral struts 92a and vertical supports 84a are connected to aligned vertical supports 86a via lateral struts 94a. Vertical supports 80a are connected to a plurality of aligned vertical supports 96a via lateral struts 98a. A cross bar 78a con-

nects each of the supports 96a at their upper ends. Leg support stringers 100a, 102a, 104a and 108a extend longitudinally of section 34a and are connected to and supported on struts 90a, 92a, 94a and 98a, respectively.

The stringers are approximately 9 inches wide; the seat stringers (of both fixed and movable sections) are approximately 18 inches above the associated leg support stringer to thus provide adequate leg room. The centers of adjacent seat stringers are approximately 21 inches apart with successive seat stringers being approximately 10 inches lower than the preceding one. All of the above is to provide a comfortable seating arrangement. While the stringers of the fixed section 32 and of the movable sections 34a, b and c can be made of wood, aluminum or other suitable material the lower seat stringer 48 of the fixed section 32 is preferably a rugged steel C-channel construction since it provides support for the connection between the fixed section 32 and the movable sections 34a, b, and c. Thus a hinge assembly 110 pivotally connects the movable sections 34a, b and c to the fixed section 32. The assembly 110 (see FIG. 4) includes a plurality of short lengths of steel tubing 112 which are uniformly spaced along the outer leg of the channel stringer 48. The tubing 112 can be welded to the stringer 48. A plurality of similar short lengths of tubing 114a are welded along cross bar 78a at spaced intervals and are adapted to fit in between adjacent tubes 112. A steel rod 116 extends through the tubes 114a and 112 resulting in a hinged connection whereby movable sections 34a, b and c can be pivoted approximately 180°.

Note that the leg support stringer 98a, which in the first stringer on the movable section 34a, provides the associated leg support for the seat stringer 48 on the fixed section 32.

The sections 34a, b and c are designed to nest with fixed section 32 when in the folded condition and hence the width of said movable sections 34a, b or c is no greater than the width of the fixed section 32. Thus in the folded condition, the seat stringers 70a, 72a, 74a and 76a movable section 34a are in confrontation with and engage and rest upon seat stringers 46, 44, 42 and 40, respectively, of the fixed section 32. This is accomplished by locating associated seat stringers 70a and 46, 72a and 44, 74a and 42, and 76a and 40 substantially the same distance from the hinge connection 110 and also by properly selecting the relative vertical height of the associated stringers.

In order to assist in folding and unfolding the movable sections 34a, b and c a boom assembly 118 (FIGS. 2 and 3) is provided. The boom assembly includes a beam structure 120 comprised of a vertical portion 122 and an upwardly angulated portion 124. An end pulley 126 is located at the end of the angulated portion 124 while a mid pulley 128 is located at the bend defined by the juncture of portions 122 and 124. A hand operated winch assembly 130 is located along the vertical beam portion 122 at a height accessible to the operator. The boom assembly 118 can be positionally located manually to three separate locations substantially at points mid way of the length of each of the movable sections 34a, b and c. These locations are defined by suitable slots in the base 36 such as slot 132 (see FIG. 3). A flange 134 on beam portion 122 provides vertical downward support while a pin 136 locks the boom assembly 118 from upward vertical movement. With the

boom assembly 118 in its operative position, i.e. supported in a slot 132, the beam structure 120 extends substantially above the movable sections 34a, b or c when nested with the fixed section 32 (FIG. 3); at the same time the angulated section 124 locates the end pulley 126 substantially in vertical alignment with the axis of the hinge assembly 110. To unfold the movable sections 34a, b, or c, the winch cable 138 can be connected to a connection such as 140c (see FIG. 3) on the movable section 34c and that section can be unfolded as shown in FIG. 3 (see also FIG. 2). The movable section 34c can be raised or folded back in the same manner.

It can be seen that the result is a compact readily portable bleacher construction. With the assistance of the boom assembly 118 two men can set the assembly up in a very short time. A group of portable bleacher constructions can be arranged in any fashion to accommodate the shape of the available area, playing field or the like. In addition the portable bleacher construction could be used to supplement existing seating in a stadium for example. Since all components are connected together, loss of components through theft is minimized; also since the bleacher construction can be set up and folded back so easily it is more conducive to quick storage in a safe location again minimizing the possibility of theft, vandalism, etc. The structure is rugged with the vertical and lateral supports being of a tubular construction and with gussets, such as 140' in FIG. 2, providing additional corner support.

While it will be apparent that the preferred embodiments of the invention disclosed are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the invention.

What is claimed is:

1. A portable bleacher construction comprising: a fixed bleacher section, said fixed bleacher section comprising a longitudinally extending base, a plurality of first seating stringers, a plurality of first leg support stringers located between and below adjacent ones of said first seating stringers, first support means for fixedly supporting said first seating and said first leg support stringers to said base in a tiered arrangement terminating at its uppermost end in an uppermost one of said first seating stringers and at its lowermost end in a lowermost one of said first seating stringers, and a guard rail extending above and longitudinally across the back of said uppermost one of said seating stringers, said first seating stringers and said first leg support stringers extending longitudinally for substantially the full length of said base; a plurality of movable bleacher sections located side by side for substantially the full length of said fixed bleacher section, each of said movable bleacher sections comprising a plurality of second seating stringers, a plurality of second leg support stringers located between and below adjacent ones of said second seating stringers, second support means for fixedly supporting said second seating and said second leg support stringers together in a tiered arrangement terminating at its uppermost end in an uppermost one of said second leg support stringers and at its lowermost end of a lowermost one of said second seating stringers, said uppermost second leg support stringer immediately succeeding and hence co-operating with said lowermost first seating stringer; hinge means pivotally con-

necting each said movable bleacher sections to said fixed bleacher section for separate movement of each said movable bleacher sections approximately $\frac{1}{2}^\circ$ from a folded nested condition with said fixed bleacher section to facilitate transportation when not in use to an unfolded position in line with and below said fixed bleacher section when in use, said hinge means connected to said lowermost first seating stringer, and pivot means operatively connected between said fixed bleacher section and each said movable bleacher section and selectively operable with a mechanical advantage for pivoting each said movable bleacher section to its folded and unfolded positions, and wheeled suspension means connected to said base and including a plurality of wheels for supporting said bleacher construction and towing means connectable to a towing vehicle such that said portable bleacher construction can be towed.

2. The portable bleacher construction of claim 1 with said base of said fixed bleacher construction being of a ladder-like construction having longitudinally and laterally extending members connected to each other.

3. The portable bleacher construction of claim 2 with said first support means comprising a first plurality of vertical support members connected to said lateral base members and a first plurality of lateral support members with said first seating stringers connected to said first plurality of vertical support members and with said first leg support stringers connected to said first plurality of lateral support members.

4. The portable bleacher construction of claim 3 with said second support means comprising a second plurality of vertical support members and a second plurality of lateral support members with said second seating stringers connected to said second plurality of vertical support members and with said second leg support stringers connected to said second plurality of vertical support members and with said second leg support stringers connected to said second plurality of lateral support members.

5. The portable bleacher construction of claim 3 with said wheeled suspension means connected as an assembly directly to said base.

6. The portable bleacher construction of claim 4 with said first and second pluralities of vertical support members and said first and second lateral support members being of a tubular construction.

7. The portable bleacher construction of claim 6 with said lowermost first seating stringer being a C-channel member and with said hinge means comprising a first plurality of spaced tubular members connected to the outermost leg of said C-channel member, a second plurality of spaced tubular members connected to each said movable bleacher sections at a position above said uppermost one of said second leg support stringers, and a pivot rod means extending through said first and second pluralities of tubular members.

8. The portable bleacher construction of claim 1 with said pivot means comprising a movable boom, means on said fixed bleacher section for holding said boom, said boom extending above said fixed bleacher section and extending from the rearward side of said fixed bleacher section to an outer location generally in a vertical position above said hinge means, a cable and winch assembly operatively connected with said boom with said cable extending over said boom to said outer

location for connection to said movable bleacher section.

9. The portable bleacher construction of claim 1 with the width of each said movable bleacher sections being substantially the same width as the width of said fixed bleacher section.

10. The portable bleacher construction of claim 1 with the tiers defined by said first seating and leg support stringers being located from said hinge means distances substantially equal to the distances said second seating and leg support stringers are located from said hinge means whereby when said movable bleacher is in said nested condition said second seating stringers are in supporting engagement with said first seating stringers.

11. A portable bleacher construction comprising: a fixed bleacher section, said fixed bleacher section comprising a longitudinally extending base, a plurality of first seating stringers, a plurality of first leg support stringers, and first support means for fixedly supporting said first seating and said first leg support stringers to said base in a tiered arrangement, said first seating stringers and said first leg support stringers extending longitudinally for substantially the full length of said base; a plurality of movable bleacher sections located side-by-side for substantially the full length of said fixed bleacher section, each said movable bleacher sections comprising a plurality of second seating stringers, a plurality of second leg support stringers, second support means for fixedly supporting said second seating and said second leg support stringers together in a tiered arrangement; hinge means separately pivotally connecting each said movable bleacher sections to said fixed bleacher section for movement of each said movable bleacher sections approximately 180° from a folded nested condition with said fixed bleacher section when in use; a movable boom, means on said fixed bleacher assembly for holding said boom at locations on the rearward side of said fixed bleacher assembly and in line with each said movable bleacher sections, said boom extending above said fixed bleacher section and extending forwardly to an outer location generally in a vertical position above said hinge means, a cable and winch assembly operatively connected with said boom with said cable extending over said boom to said outer location for connection to said movable bleacher section, said winch being operable for pivoting each said movable bleacher section to its folded and unfolded positions and wheeled suspension means connected to said base and including a plurality of wheels for supporting said bleacher construction and towing means connectable to a towing vehicle such that said portable bleacher construction can be towed.

12. The portable bleacher construction of claim 11 with said base of said fixed bleacher construction being of a ladder-like construction having longitudinally and laterally extending members connected to each other, said first support means comprising a first plurality of vertical support members connected to said lateral base members and a first plurality of lateral support members with said first seating stringers connected to said first plurality of vertical support members and with said first leg support stringers connected to said first plurality of lateral support members.

13. The portable bleacher construction of claim 12, with said second support means comprising a second plurality of vertical support members and a second plu-

ality of lateral support members with said second seating stringers connected to said second plurality of vertical support members and with said second leg support stringers connected to said second plurality of vertical support members and with said second leg support stringers connected to said second plurality of lateral support members.

14. The portable bleacher construction of claim 13 with said first and second pluralities of vertical support members and said first and second lateral support members being of a tubular construction.

15. The portable bleacher construction of claim 11 with the width of each said movable bleacher sections

being substantially the same width as the width of said fixed bleacher section.

16. The portable bleacher construction of claim 11 with the tiers defined by said first seating and leg support stringers being located from said hinge means distances substantially equal to the distances said second seating and leg support stringers are located from said hinge means whereby when said movable bleacher is in said nested condition said second seating stringers are in supporting engagement with said first seating stringers.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,914,909 Dated October 28, 1975

Inventor(s) James S. McNeal

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 47, delete "partically" and substitute therefor
--partially--

Column 2, line 16, delete "link" and substitute therefor
--like--

Column 2, line 22, delete "connected" and substitute therefor
--connect--

Column 2, line 24, delete "to" and substitute therefor --of--

Column 2, line 55, delete "FIIG" and substitute therefor
--FIG--

Column 3, line 42, after "76a" insert --of--

Column 4, line 5, delete "agulated" and substitute therefor
--angulated--

Column 4, line 25, delete "conductive" and substitute therefor
--conducive--

Column 4, line 30, delete "FIg" and substitute therefor --FIG--

Column 5, line 3, delete "1/2^o" and substitute therefor
--180^o--

Signed and Sealed this

twenty-seventh Day of *April* 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks