Oct. 14, 1930. W. K. EVERSOLE 1,778,067

PORTABLE BLEACHER

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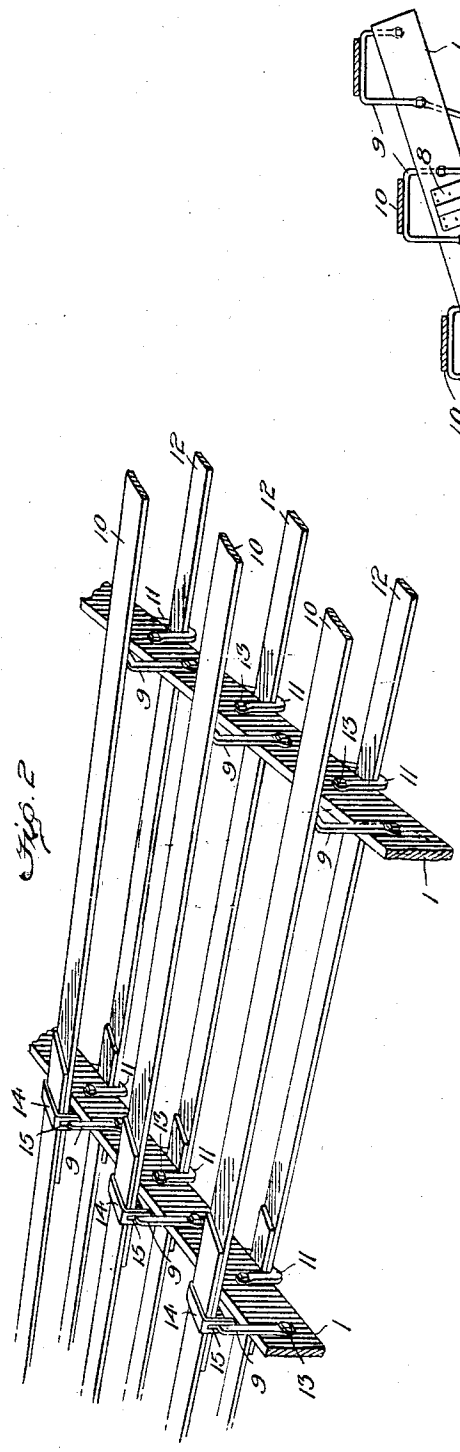


Fig. 2

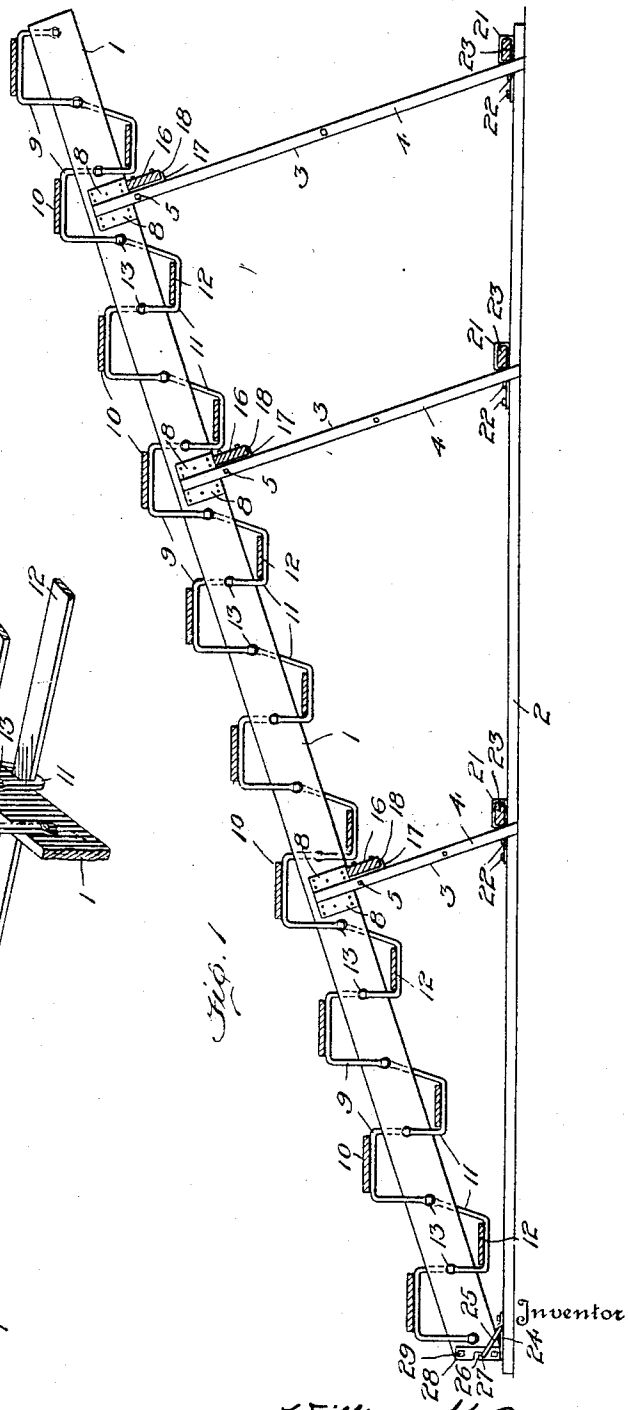


Fig. 1

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Fig. 3

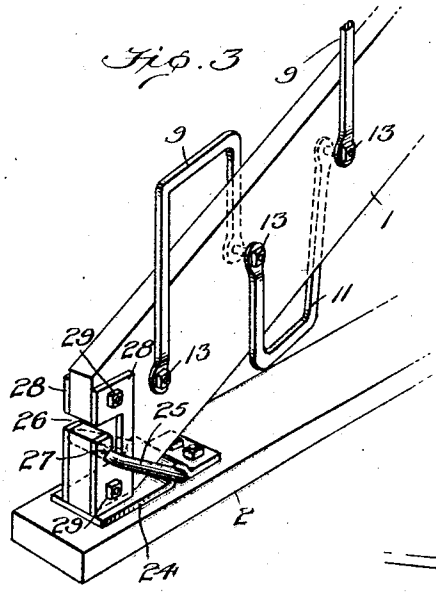


Fig. 6

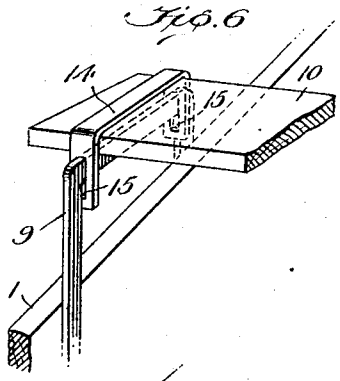


Fig. 4

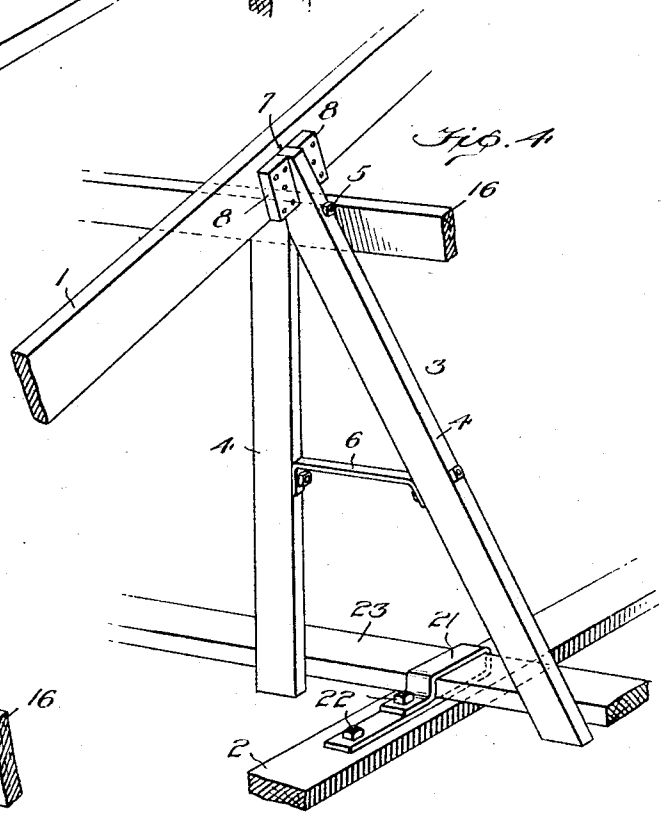
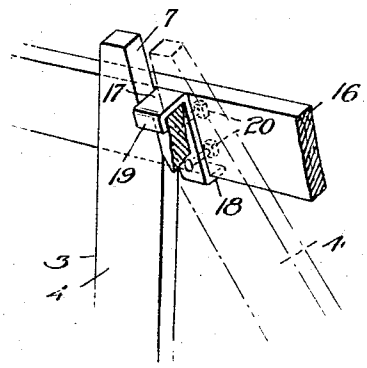


Fig. 5



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UNITED STATES PATENT OFFICE

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PORTABLE BLEACHER

Application filed February 23, 1929. Serial No. 342,172.

This invention relates to portable bleachers or circus seats designed to be erected and removed as occasion may require.

The principal object of the invention is to provide a stand of the bleacher or circus seat type which may be speedily assembled or dismantled without the use of tools and without injury or loss of material; which is formed of structural elements permitting the dismantled seats to be stored in minimum space, and which, when in use, is well adapted efficiently to resist the live and dead loads imposed upon it.

A principal feature of the invention consists in providing a stand of the character indicated with inclined stringers with which are associated a series of metal supports for respectively sustaining the seats and footboards, the said supports forming a continuous metal reinforcement extending lengthwise of the corresponding stringer and being secured to the latter by a series of bolts, each of which cooperates with a plurality of the said supports.

A further feature of the invention consists in supporting the inclined stringers of the stand by means of horses and in associating therewith purlins which extend under a plurality of stringers and are supported by said horses.

A still further feature of the invention consists in providing each of the inclined stringers with a toe iron which is slotted to receive a movable link mounted upon a floor or ground plate extending under the stringer, the slot in the toe iron being so formed that the said link serves to lock the stringer against accidental forward or backward movement.

Another feature of the invention consists in providing means for preventing the seat boards from being accidentally moved from their proper position, the said means being adjustable with respect to the seat board supports and being adapted to cooperate with a single seat board or with a plurality thereof.

Still another feature of the invention consists in supporting the purlins beneath the stringers by means of metal hangers which extend through slots in the supporting horses which also receive the stringers.

Other features of the invention residing in particular combinations of parts and advantageous features of construction will hereinafter appear and be pointed out in the claims.

In the drawings illustrating a preferred form of the invention,—

Figure 1 is a vertical sectional view of portable bleachers embodying the invention.

Figure 2 is a perspective view of a portion of the portable bleachers shown in Figure 1.

Figure 3 is a detail perspective view illustrating the manner of associating the lower ends of the stringers with the bottom plates of the structure.

Figure 4 is a detailed perspective view showing the relationship of the supporting horses to the stringers, purlins, bottom plates and the beams which resist backward thrust of the horses.

Figure 5 is a detail perspective view showing the preferred manner of supporting the purlins by horses.

Figure 6 is a detailed perspective view showing the relation of one of the seat board anchors to a seat board and its support.

The structure comprises a series of parallel stringers 1 which are disposed in an inclined position one end of each resting upon a ground or floor plate 2 associated therewith and extending thereunder. The ground plates extend rearwardly from the lower ends of the respective stringers and preferably underlie said stringers throughout their entire length.

The stringers are sustained in inclined position by suitable supports which are preferably in the form of horses 3 of triangular shape having downwardly diverging legs 4 between which the respective ground plates 2 extend. The legs 4 of the horses may be rigidly secured together in any desired manner but are preferably connected at their upper ends by bolts 5 and are secured intermediate their ends by transverse braces 6. The upper end of each of the horses is provided with a groove or slot 7 for receiving the adjacent stringer 1. To provide means

for maintaining the upper ends of the horses in assembled relation to the stringers each of the latter is provided with pairs of stop members 8 which are spaced longitudinally of the stringers so as to receive the upper ends of the horses between them. The stop members may advantageously be formed as simple blocks of wood secured to the vertical faces of the stringers.

The horses are spaced longitudinally of the stringers and are made of different lengths so as to maintain the stringers at the desired degree of inclination. When set up in assembled relation to the stringers 1, the horses 3 occupy an upright position, leaning forward at their upper ends and extending at right angles to the stringers.

Each stringer 1 has associated therewith a series of metal supports 9 upon which seat boards 10 rest; and each stringer also has associated therewith a series of metal supports or hangers 11 for sustaining the respective footboards 12. The metal seat and foot supports occur in alternation along each stringer and may advantageously be secured to the stringer with which they are associated by the same series of bolts 13, thus reducing to a minimum the number of bolts for anchoring them to the stringer. As shown in the drawings, the seat board supports 9 and the footboard supports 11, instead of being combined in a unitary piece including one or more seat and foot supports, may advantageously be manufactured as individual units of general U-form fashioned from square or rectangular metal bars or of steel bands twisted to fit the sides of the stringer. To permit the seat and foot supports to be secured to the stringer 1 by the single series of bolts 13, the legs of the seat and foot supports are of unequal length and are positioned so as to lie upon opposite sides of the stringer, the ends of successive supports being in overlapping relation and perforated to receive the bolts 13.

The legs of the seat supports 9 preferably extend downward at right angles to the top section of said support, while the legs of the foot supports 11 extend upwardly at an oblique angle to the intervening portion of the support 11 upon which the footboard rests. In order to position the footboard in the most advantageous relation to its corresponding seat board, the longer leg of the footboard support 11 is inclined to the vertical to a greater extent than the shorter leg of said support.

When secured in place the seat and footboard supports, 9 and 11 respectively, form in effect a continuous band of metal which reinforces the stringer 1 by imparting additional strength and stiffness thereto. By locating the holes for the bolts 13 along the center line or neutral axis of the stringer 1, as it is preferred to do, practically the full strength of the stringer is preserved.

To prevent lateral shifting of the seat boards 10 with respect to the supports 9 upon which they rest, adjustable anchors or clamps 14 are preferably employed. These anchors are employed in association with the seat board supports 9 and as many may be used as desired, but it is usually sufficient to employ them at the ends of the seat boards only. Each of the anchors may be conveniently formed as a metal bar or strap having downwardly extending legs which are slotted, as at 15, to receive the horizontally extending intermediate portion of the seat support 9, the slots 15 in the legs being of sufficient length to permit the anchor 14 to be adjusted vertically so as to accommodate either one or two seat boards between it and the upper end of the seat support 9 with which it is associated. The depending legs of the member 14, being disposed between the legs of the adjacent seat board support 9, prevent the seat board from accidentally shifting transversely to an improper position; and because of the adjustable character of the anchor it projects only slightly above the seat board when in use, whether it embraces two boards or a single board.

Extending continuously under the stringers 1 and at right angles thereto are purlins 16, which may be of wood or metal as desired. These purlins counteract side sway, act as spacers for locating the stringers 1 in erecting, distribute unusual strains or overloads in the event of failure of a horse 3 or any other emergency causing an unusual overload upon a stringer, and generally stiffen the structure throughout. The purlins are held in position by metal hangers 17 (see Fig. 5) which hook through the stringer receiving slots 7 in the upper ends of the respective horses. As the stringers rest upon the purlin hangers or hooks 17, the weight of the stringers and the load upon them holds these hangers securely in place, the greater the load the more securely they are held. Each of the purlin hangers is preferably formed as a hook member having at its lower end a rearwardly extending flange or shelf portion 18 which extends under and engages the purlin, and having at its upper end a down turned lip 19 which projects over the forward face of the horse with which it is associated, so as to prevent it from shifting rearwardly with respect to the horse. The purlin supports or hangers 17 are spaced along the purlins for distances corresponding to the desired spacing of the stringers. Each hanger is associated with its purlin so as to occupy a fixed position with respect thereto when the structure is assembled, bolts 20 which pass through the purlins 16 and the hangers 17 being preferably employed for that purpose.

To prevent displacement of the horses 3 and to counteract forward thrust in the bottom or ground plates 2, metal anchors 21 are secured at appropriate intervals to the respective plates 2. The members 21 are preferably in the form of a loop fashioned from a metal strap or bar and are rigidly secured to the plates by bolts 22. Beams 23 which extend through the loops of the anchors 21 so as to engage the rear sides of the legs 4 of the horses serve to prevent displacement or any spreading of the horses at their lower ends; and it will also be understood that by this means the forward thrust upon the ground plates 2 which are communicated by the stringers are likewise counteracted.

When in place each stringer 1 preferably rests directly at its lower end upon a metal bearing plate 24 which is rigidly secured to the underlying floor plate 2 by means of suitable bolts. This bearing plate preferably maintains in assembled relation to the ground plate 2 a pivoted latch or link 25 which serves to detachably lock the adjacent stringer 1 to the underlying ground plate 2. For cooperating with the link 25 to lock the stringer in place, each stringer 1 is formed at its forward end with a slot 26 adapted to receive the free end of the pivoted latch or locking link 25. The slot 26 is of angular or shouldered form, its upper part being preferably horizontal and opening outwardly through the end face of the stringer and its lower portion preferably extending vertically and then forwardly so as to provide a shoulder 27 for cooperating with the free end of the link 25. To strengthen the construction and prevent injury to the stringer, the forward end of the stringer is reinforced on opposite sides by metal plates 28 secured in place by bolts 29 which pass through the stringer. Each of these plates is of an appropriate shape to form the slot 26. When the movable link 25 is in assembled position in the slot 26 of the stringer it locks the stringer against any forward or backward movement, while the stringer or bleacher dead load together with the imposed live load prevents any accidental unlocking. The load of the stringer by being imposed directly on the plate 24 assists in maintaining this plate in position and thus practically limits to shear only the stresses on the bolts by which the member 24 is secured to the ground plate 2.

In disassembling the stringer from its underlying ground plate 2, the stringer is shifted rearwardly and the free end of the locking link 25 is elevated until the link escapes from the slot 26 of the stringer.

While it is intended that wood shall be largely employed in the construction of portable circus seats or bleachers constructed in accordance with the invention, it is to be understood that the parts may be formed of other material if desired.

I claim:

1. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, and a plurality of purlins carried by said means, each of said purlins extending transversely with respect to said stringers and overlapping a plurality of the latter and being provided with hangers disposed immediately below the respective stringers, said hangers engaging and being supported by said means for supporting said stringers.

2. Portable bleachers comprising a plurality of stringers, horses for supporting said stringers in inclined position, and a plurality of purlins each extending under a plurality of said stringers, said purlins being provided with means extending between said horses and the respectively adjacent stringers whereby said purlins are detachably supported by said horses, said means serving to space the horses in the direction of length of the purlins.

3. Portable bleachers comprising a plurality of stringers, a plurality of horses for supporting said stringers, each of said horses being provided at its upper end with a slot for receiving one of said stringers, a plurality of purlins each extending under a plurality of said stringers, and hangers for supporting said purlins, each of said hangers extending into the slot of one of said horses in interposed relation to the said horse and adjacent stringer.

4. Portable bleachers comprising a plurality of stringers, a plurality of horses for supporting said stringers, each of said horses having a recess for receiving one of said stringers, a plurality of purlins disposed immediately beneath said stringers and extending under a plurality of the latter, and hangers for supporting said purlins from said horses, each of said hangers being rigidly secured to a purlin and extending into the stringer receiving recess of an adjacent horse and having a depending lip overlapping said horse.

5. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, supporting means for the seat boards, a plurality of footboards, supporting means for the footboards, said seat board supports and said footboard supports being associated with the respective stringers and forming a continuous reinforcement therefor, and means for securing said seat board supports and said footboard supports to the respective stringers.

6. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of supports for

said seat boards, a plurality of footboards, a plurality of supports for said footboards, said supports which are adjacent having overlapping portions which overlap the sides of the respective stringers, and bolts passing through said overlapping portions and serving as a common means for securing said seat board supports and said footboard supports to an adjacent stringer.

7. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of seat board supports, a plurality of footboards, a plurality of footboard supports, said seat board supports and said footboard supports each being provided with a plurality of legs of unequal length which overlap an adjacent stringer, and bolts for securing said seat board supports and said footboard supports to the adjacent stringer, each of said bolts extending through one of the legs of a seat board support and one of the legs of a footboard support.

8. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of seat board supports, a plurality of footboards, a plurality of footboard supports, said seat board supports and said footboard supports each being provided with unequal legs, and a plurality of bolts for securing said seat board supports and said footboard supports to an adjacent stringer, said bolts being located substantially along the center lines of the respective stringers and each extending through one of the legs of a seat board support and through one of the legs of a footboard support, the shorter legs of adjacent seat board supports and footboard supports being in overlapped relation, and the longer legs of adjacent seat board supports and footboard supports being in overlapped relation.

9. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of seat board supports, a plurality of footboards, a plurality of footboard supports, said seat board supports and said footboard supports each being provided with a plurality of legs of unequal length, the legs of each footboard support being inclined at different angles, and means extending through the legs of said seat board supports and said footboard supports for securing said seat board supports and said footboard supports to an adjacent stringer.

10. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of seat board supports, a plurality of footboards, a plurality of footboard supports, and means for securing said seat board supports and said footboard supports to an adjacent stringer, one or more of said seat board supports having adjustably mounted thereon means for retaining a seat board in assembled position.

11. Portable bleachers comprising a plurality of stringers, means for supporting said stringers in an inclined position, a plurality of seat boards, a plurality of seat board supports, a plurality of footboards, a plurality of footboard supports and a plurality of means for maintaining said seat boards in assembled relation to their respective seat board supports, each of said last-named means having a portion extending over an adjacent seat board and having depending portions embracing the adjacent seat board between them, and the said depending portions being slotted to form an adjustable connection to the adjacent seat board support.

12. Portable bleachers comprising a plurality of stringers respectively having slots in the lower ends thereof, ground plates for the respective stringers, the lower end of each stringer bearing upon one of said ground plates, means for supporting said stringers in inclined position, and means for detachably locking the stringers to their respective ground plates and comprising a latch member movably connected to the ground plate and adapted to enter the slot formed in the lower end of the adjacent stringer.

13. Portable bleachers comprising a plurality of stringers respectively having slots in the lower ends thereof, a plurality of ground plates respectively underlying said stringers, the lower end of each of said stringers resting upon a corresponding ground plate, means for supporting said stringers in an inclined position, and means for locking each of said stringers to its ground plate, and comprising a bearing plate rigidly secured to the ground plate and extending under the adjacent stringer, a link movably connected to said bearing plate and adapted to enter the slot in the lower end of the adjacent stringer, and slotted reinforcing means for the lower end of the stringer adapted to receive said link.

14. Portable bleachers comprising a plurality of stringers, ground plates for the respective stringers, means for supporting said stringers in an inclined position, and means for detachably securing each stringer to its ground plate, said last-named means comprising a link movably mounted on the ground plate and reinforcing plates secured to the adjacent stringer, said reinforcing plates being angularly slotted to provide a shouldered slot for receiving said link.

In testimony whereof I affix my signature.

WILLIAM KIRTLAND EVERSOLE.