

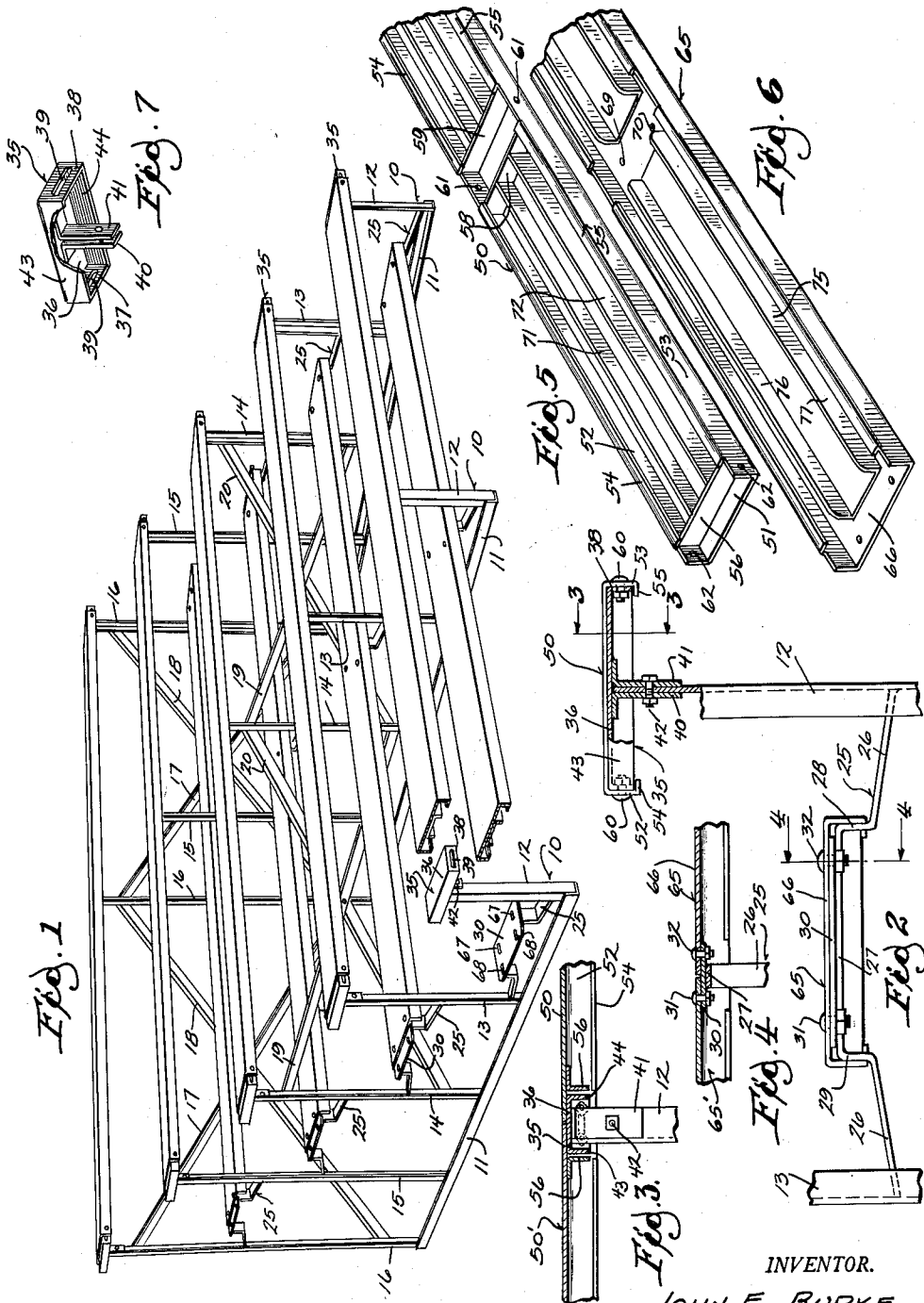
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KNOCK-DOWN BLEACHER

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KNOCK-DOWN BLEACHER

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This invention relates to a knock-down bleacher.

The bleacher comprises stringer frame units extending from front to rear and each comprising a series of posts of progressively increasing height upon which the seats are mounted and a series of foot rest supports connecting the posts at progressively increasing levels. The stringer units are connected with each other at rear and intermediate points by cross bracing. The several posts and foot rest supports are all provided with adapters and carriers adapted to fit into inverted channels which serve as seat and foot rests, the adapters and carriers at the ends of each such channel projecting to receive connection with aligned inverted channels whereby successive bleacher units may be continuously added as desired.

The invention is particularly concerned with the form of the inverted channels used to provide seats and foot rests, each being interiorly re-inforced and each having open spaces to receive adapters or carriers at its ends and at intermediate points.

The adapters and foot board carriers constitute further important features of the invention. Adapters at the tops of the posts comprise spaced mounting plates each receiving a flange of the respective post and bolted thereto, each adapter being box like in form with slots at its ends for the bolted connection of one or more seat channels. The carriers used for the foot boards comprise plates mounted on raised central portions of the generally horizontal supports connected at their ends to the vertical posts which carry the seats.

In the drawings:

Fig. 1 is a view in perspective of a bleacher unit embodying the invention, portions of one seat channel and one foot board channel being broken away to expose an adapter and foot board carrier.

Fig. 2 is a fragmentary view in end elevation of portions of the vertical posts and associated seat and foot board members.

Fig. 3 is a fragmentary detailed view taken in section on line 3—3 of Fig. 2.

Fig. 4 is a fragmentary detailed view taken in section on line 4—4 of Fig. 2.

Fig. 5 is a fragmentary view in perspective showing an inverted seat member.

Fig. 6 is a view similar to Fig. 5 showing an inverted foot board member.

Fig. 7 is a view in perspective showing the seat adapter, portions being broken away.

A unit bleacher embodying the invention comprises two or more stringer units generically designated by reference character 10, three such units being used in the bleacher section shown in Fig. 1. Each of these units comprises a base 11 which may comprise a piece of angle iron, from which arise posts 12, 13, 14, 15 and 16 of graduated height. The posts may also comprise angle irons. The posts 16 at the rear ends of respective units are cross connected by diagonal bracing

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17, 18. Diagonal bracing 19, 20 is desirably used to provide further connection between the posts 14 intermediate the front and back of each stringer unit.

In each bleacher unit, adjacent posts are cross connected at progressively increasing height by foot rest supports 25. The first of these is located at a point not far distant from the bottom ends of the front posts 12 and 13. The next connects posts 13 and 14 at a higher level. Others connect the remaining posts, each being at a pre-determined distance below the top of the rearmost of the two posts which it connects.

As is best shown in Fig. 2, each of the foot rest supports 25 is welded at its ends to one of the posts. From its welded connection, each foot rest support end has an upward inclination as shown at 26. The entire central portion 27 is substantially horizontal and is offset upwardly from the ends 26 by the vertically extending portions 28, 29. The spacing between the upright portions 28 and 29 is just sufficient to enable these to be received within the flanges of the channeled foot rest hereinafter to be described.

Welded, or otherwise fastened, to the horizontal portion 27 of support 25 is a foot board carrier 30 which is a plate that projects laterally at both sides of the portion 27 of support 25 and is apertured near its margins to receive the bolts 31, 32 used to connect the foot rest channel or channels of one or more bleacher sections.

Each of the posts of the respective stringer units is provided at its top with a box-like adapter 35 separately illustrated in Fig. 7, and shown in use in Figs. 1, 2, and 3. Each of the adapters 35 is in the nature of a shallow inverted tray having a top surface 36 upon which a seat or seats may be mounted, and having end walls 37, 38 provided with slots 39 to receive connecting bolts. To the under surface of the top wall 36 are welded a pair of spaced legs 40, 41 which receive between them one of the flanges of the supporting post. Aligned holes in the legs 40 and 41 register with holes in the post to receive a securing bolt 42. The top of the post carries the load, being engaged with the under surface of the top wall 36 of the adapter. The bolt 42 is, therefore, subjected to no great strain. It secures the adapter to the post and prevents it from tilting or other displacement on the post.

The side walls 43, 44 of the box-like adapter 35 are confined within surfaces provided by the under side of the seat as will hereinafter be described.

The seat and foot rest elements shown in Figs. 5 and 6 are actually interchangeable, requiring only different bolt hole locations to enable either to function for all purposes. In practice, however, it is desired that the device shown in Fig. 5 be used as a seat and the device shown in Fig. 6 as a foot rest.

The seat, generically designated by reference character 50, comprises a shallow channel having a flat top 51 and downwardly turned sides 52, 53 with inwardly turned lower marginal flanges 54, 55. Flanges 54 and 55 are discontinuous, being omitted beneath the center of the seat and adjacent the respective ends. At the ends of each seat, the flanges 54 terminate at a distance from the end which is approximately equal to one half the width of the adapter 35. At this point, a transverse web 56 spans the channel in a position to engage the side wall 44 of the adapter, as shown in Fig. 3. The remaining half of the adapter 35 carried by the posts of the end stringer unit is exposed to receive the end of the seat 50' of the next bleacher section, it being understood that the sections can be extended indefinitely by supplying additional stringer units, additional cross bracing and additional seats and foot rests.

At the center of each seat member 50 where there is

a gap between the flanges 54, 55, as shown in Fig. 5, further cross connection is provided by the longitudinally spaced transverse strips 58, 59. These are so spaced as to receive with a close fit the side members 43, 44 of the adapters 35. Thus, the ends of the adapters are, in all cases, confined between the sides 52, 53 of the seat channels while the sides of the adapters are engaged by the end strips 56 or the intermediate strips 58, 59, as the case may be.

Adapters used on the stringer unit at the center of a given bleacher section are disposed at the center of a given seat member 50 and are, therefore, connected to that seat member only. The bolts 60 which pass through the holes 61 in the seat member into the slots 39 of the adapter will, therefore, be approximately centered in such slots. At each of the end stringer units, the seat members will extend only to the center of the adapter, as shown in Fig. 3, and the bolts 60, used in the holes 62 in the side members 52, 53 of the seat, will be disposed near the ends of the slots.

In the case of the foot rests 65, in which the securing bolts 31, 32 may pass through the top wall 66 of the channel, a simple form of carrier is used comprising, as above described, a flat plate 30 provided near its side margins with four apertures 67, 68 (Fig. 1). The carriers mounted on the end stringer units of a given bleacher section will be lapped only to their center lines by a given foot rest 65, exposing the other half of the carrier to receive connection with, and to provide support for, the foot rest 65' of an adjacent bleacher section, as shown in Fig. 4. The carrier mounted on a support 25 of the center stringer unit will be engaged centrally beneath one of the foot rests 65 which may be provided with diagonally offset holes 69, 70 registering respectively with one of the holes 67 and one of the holes 68 of the carrier.

Both the seat and the foot rest are desirably provided with longitudinal reinforcement. Here again, the types of reinforcement shown are interchangeable but are desirably used as illustrated. In the case of the seat 50, the longitudinal reinforcement comprises longitudinally extending straps 71, 72 welded on edge beneath the top wall 51 and connected at their ends with the transverse members 56, 58. In the case of the foot rest, the longitudinal reinforcement may comprise a secondary channel 75, the web portion of which contacts the under surface of the top wall 66 of the foot rest, while the flanges 76 and 77 extend longitudinally beneath the top wall of the foot rest from one carrier to the next. Separate secondary channels 75 are used beneath respective end portions of the foot rest, being spaced at the sides of the central carrier.

The resulting bleacher may be erected and dis-assembled with unusual facility and yet provides an exceptionally firm structure in which the several parts are all interlocked against relative displacement, thus increasing the rigidity.

I claim:

1. In a bleacher, a channel for the support of persons using the bleacher, said channel comprising a top, depending side walls substantially continuous for the length of the channel, and inwardly turned flanges continuous for portions of said side walls and discontinuous at opposite sides of the center of said channel and discontinuous near the ends of said member.

2. The channel defined in claim 1 further provided with re-inforcing strips extending longitudinally along the lower surface of said top and substantially co-extensive in length with said inwardly turned flanges.

3. The device of claim 2 in further combination with webs extending transversely of said channel substantially at the ends of said flanges and strips, two of said transverse webs being spaced longitudinally of said channel adjacent the center thereof to provide, with the sides

of said channel, a downwardly opening pocket of materially smaller area than the member.

4. In a bleacher, the combination with a series of stringer units each including supporting means and means detachably connecting said units, of adapters on the tops of the respective supporting means and a personnel-supporting inverted channel spanning the several units and resting on the several adapters, said channel having at least one adapter intermediate its ends and lapping approximately half of the width of adapters carried by supporting means at the ends of the series, the said channel having re-inforcement extending substantially continuously along its under side between said adapters and being connected centrally to the intermediate adapter and being connected to opposite sides of the adapters at its respective ends.

5. The device of claim 4 in which the supporting means comprises upright posts with which the respective units are provided, the personnel-supporting channel constituting a seat.

6. The device of claim 4 in which the supporting means comprises upright posts with which the respective units are provided, the personnel-supporting channel constituting a seat, each adapter comprising a shallow inverted tray having spaced legs embracing and connected with the upper end of the post and having horizontally slotted end walls, said channel having depending sides provided with holes and with bolts extending to the holes and the slots and connecting the channel with the adapter.

7. The device of claim 4 in which the several units comprise upright posts, the supporting means constituting transverse members connected at their ends with adjacent posts and having raised centers on which the adapters are mounted, the personnel-supporting channel constituting a foot rest having side wall portions embracing the respective adapters and the raised central portions of the supporting means.

8. A knock-down bleacher comprising the combination with spaced stringer units comprising vertical posts of progressively increasing height from front to rear and supports extending between adjacent posts at successively increasing elevations, of means providing cross connection between said units, adapters on respective posts, carriers on the respective supports, and seat and footrest channels each mounted on a plurality of said units and connected at their ends and at intermediate points with respective adapters and carriers, each of said supports having a raised central portion and each footrest channel comprising depending flanges engaged with the raised central portions of the several supports across which it extends.

9. A knock-down bleacher comprising the combination with spaced stringer units comprising vertical posts of progressively increasing height from front to rear and supports extending between adjacent posts at successively increasing elevations, of means providing cross connection between said units, adapters on respective posts, carriers on the respective supports, and seat and footrest channels each mounted on a plurality of said units and connected at their ends and at intermediate points with respective adapters and carriers, the adapter on each post comprising an inverted tray having a central depending leg connected with the post, each seat channel having depending flanges embracing the ends of the trays on the posts of the several units with which the seat channel is connected.

10. A knock-down bleacher comprising the combination with spaced stringer units comprising vertical posts of progressively increasing height from front to rear and supports extending between adjacent posts at successively increasing elevations, of means providing cross connection between said units, channel mounting means comprising adapters on respective posts and carriers on the respective supports, and seat and footrest channels each fixed at their ends and at intermediate points on the mounting means of a plurality of said units, each such

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channel having depending side walls respectively embracing the mounting means and also having longitudinally extending internal reinforcement intermediate said walls and substantially continuous between said units and substantially abutting at its ends the respective adapters and carriers on which the channel is mounted, the internal reinforcement terminating short of the end of the channel having a gap intermediate the ends of the channel to accommodate the respective adapters and carriers within the channel.

11. In a bleacher the combination with a series of stringer units each including upright posts and supports connecting said posts and having raised intermediate portions, carriers on said portions, and a footrest comprising a channel having its ends lapping approximately half the width of carriers of the stringer units at the ends of the series and having flanges embracing the respective carriers and the raised intermediate portions of said supports, said channel further having reinforcement extending substantially continuously along its under side between carriers, said series of stringer units including an intermediate unit having a carrier engaged with an intermediate portion of said channel, the channel reinforcement being interrupted to clear the carrier of the intermediate unit.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,985,924

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John E. Burke

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 65, and column 4, line 2, for "member", each occurrence, read -- channel --.

Signed and sealed this 17th day of October 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

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Commissioner of Patents

USCOMM-DC