

Sept. 26, 1967

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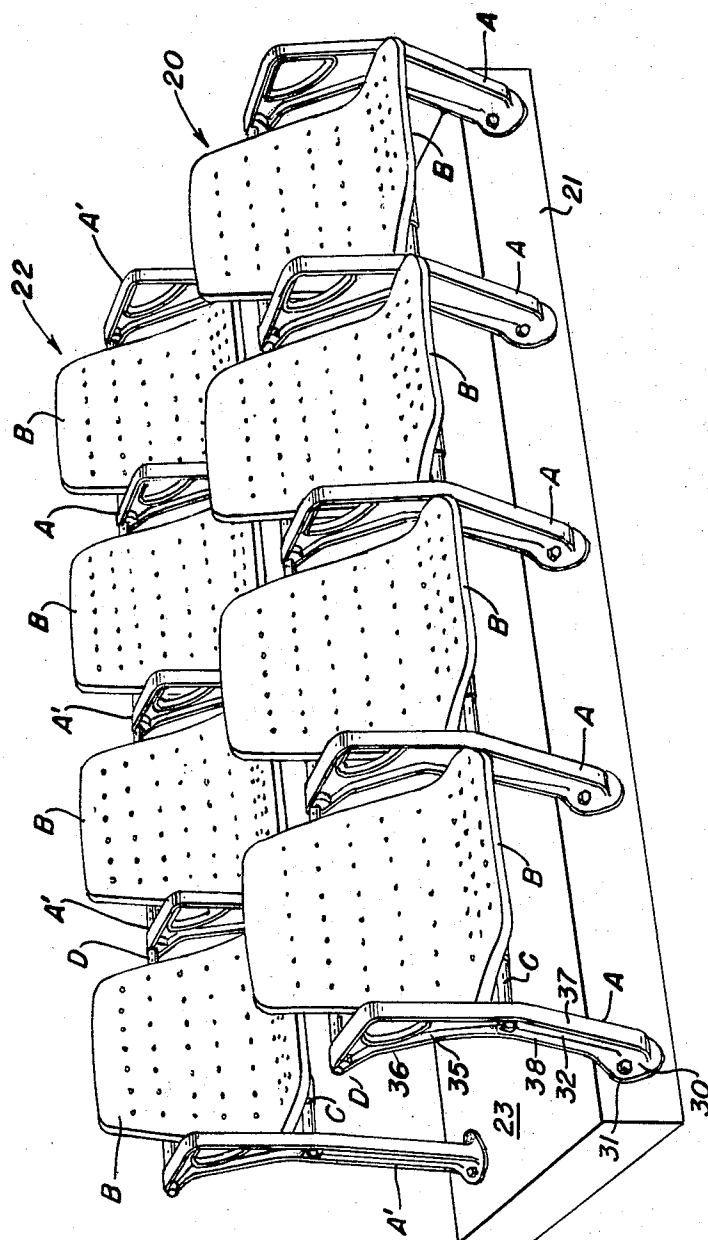
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STADIUM SEATING

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6 Sheets-Sheet 1

Fig. 1.



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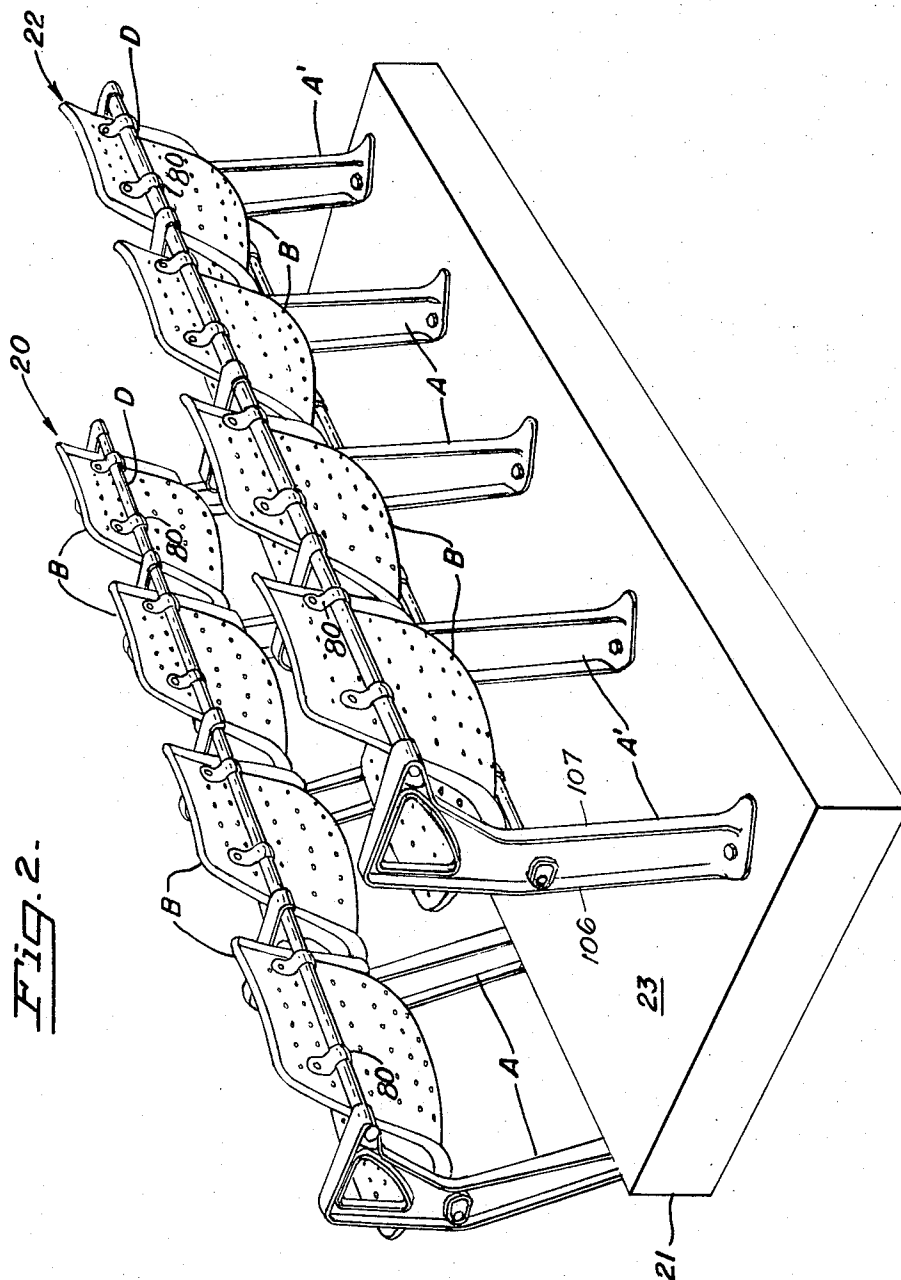
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STADIUM SEATING

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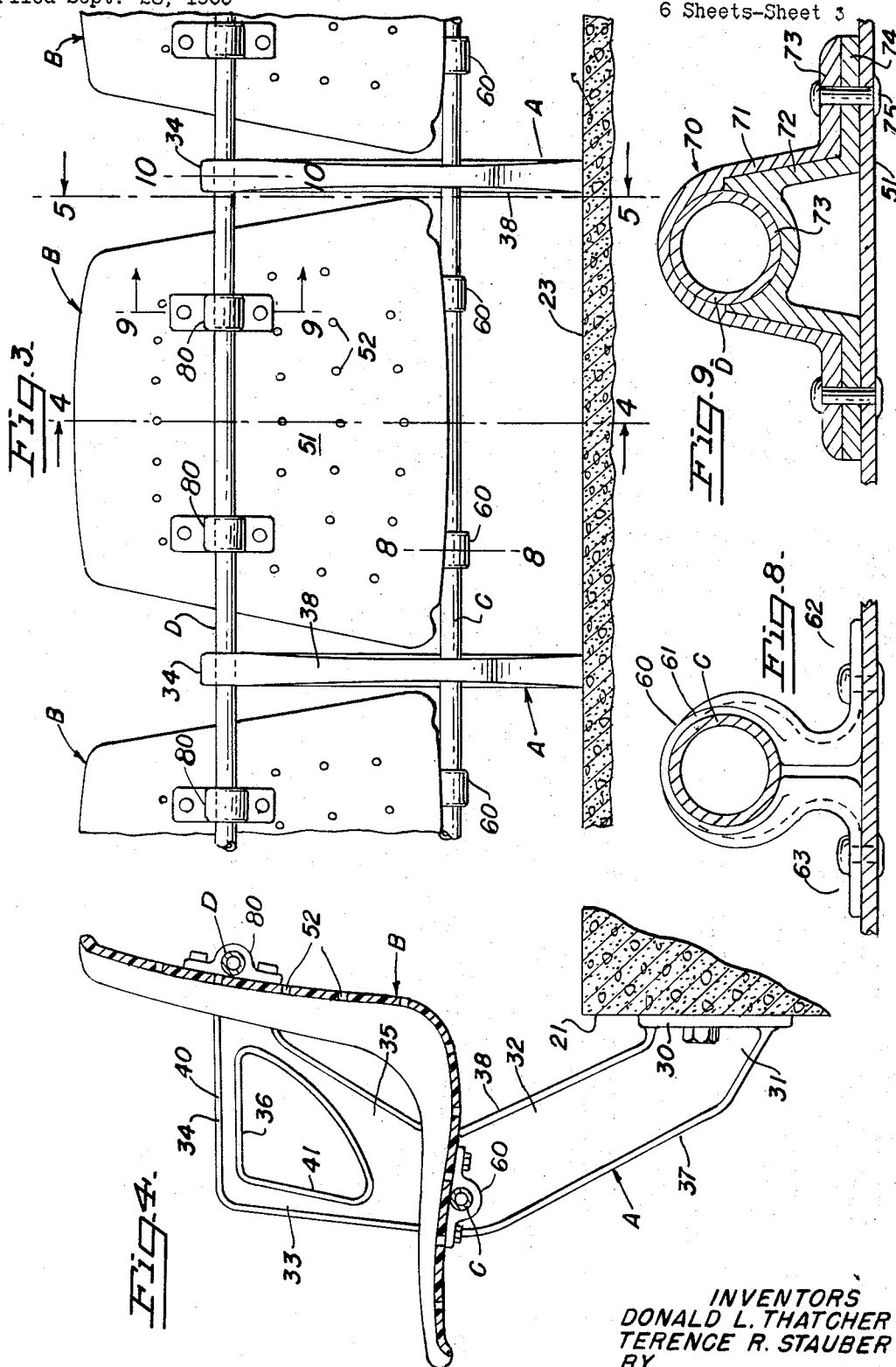
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## STADIUM SEATING

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6 Sheets-Sheet 3



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Fig. 6.

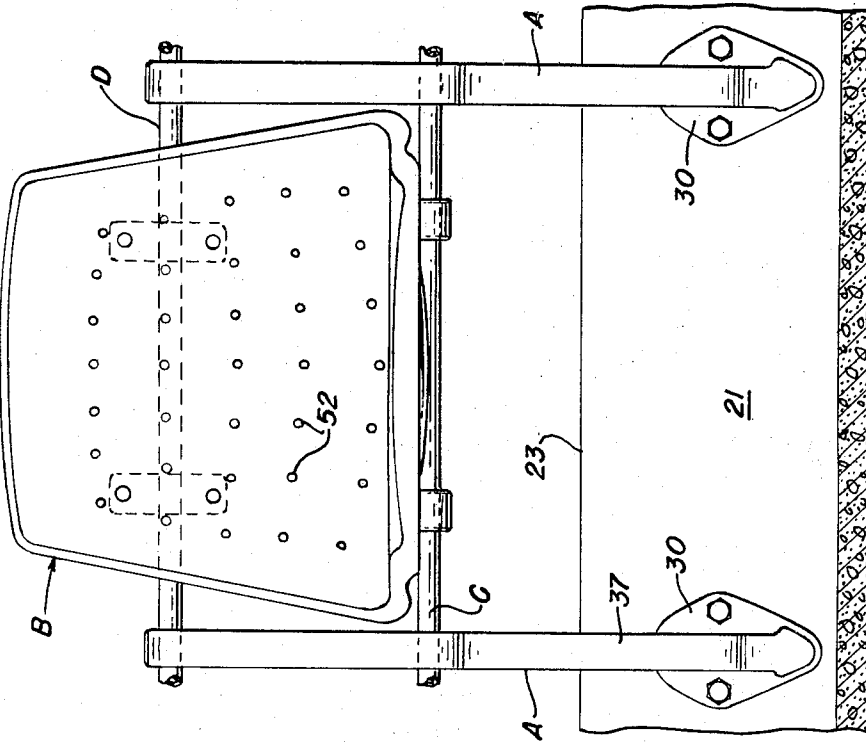
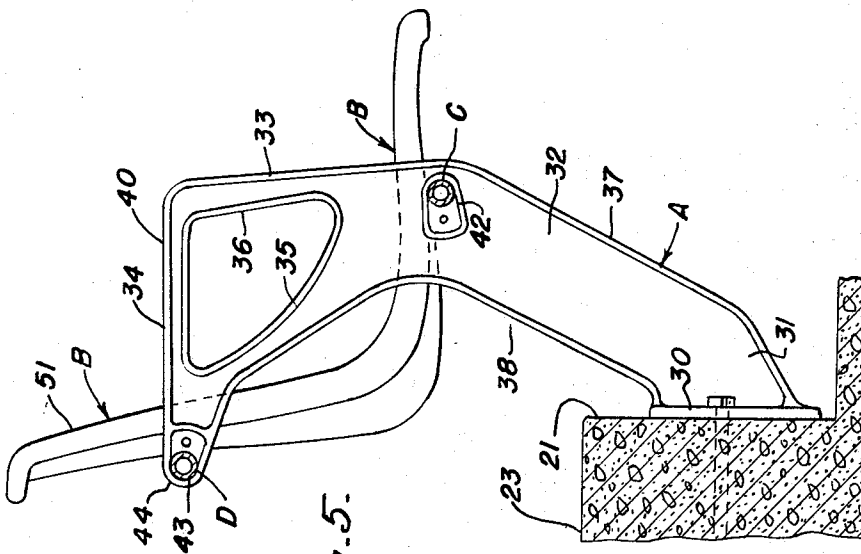


Fig. 5.

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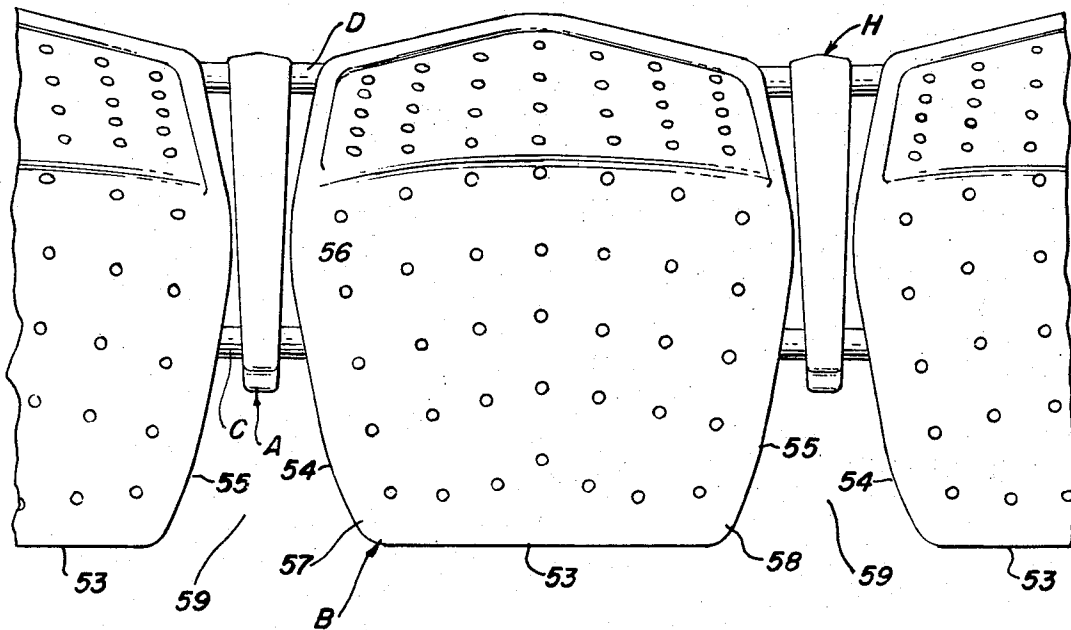


Fig. 7.

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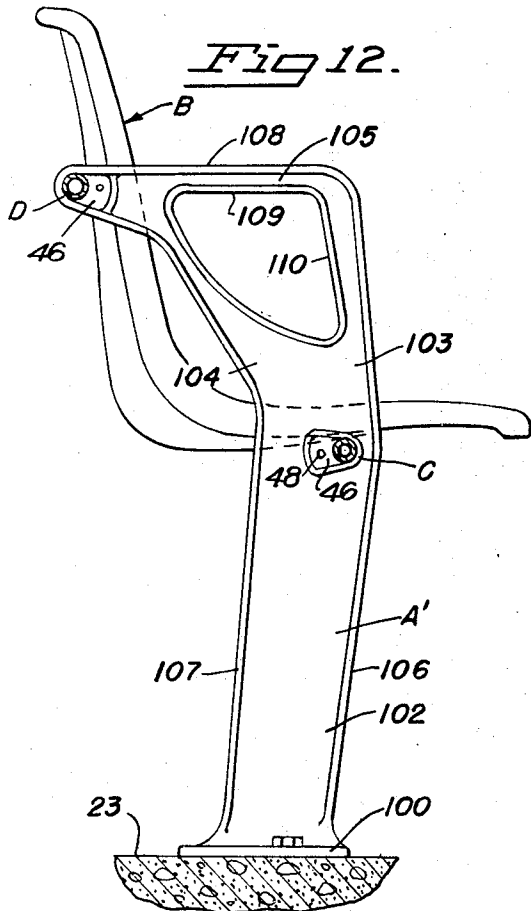
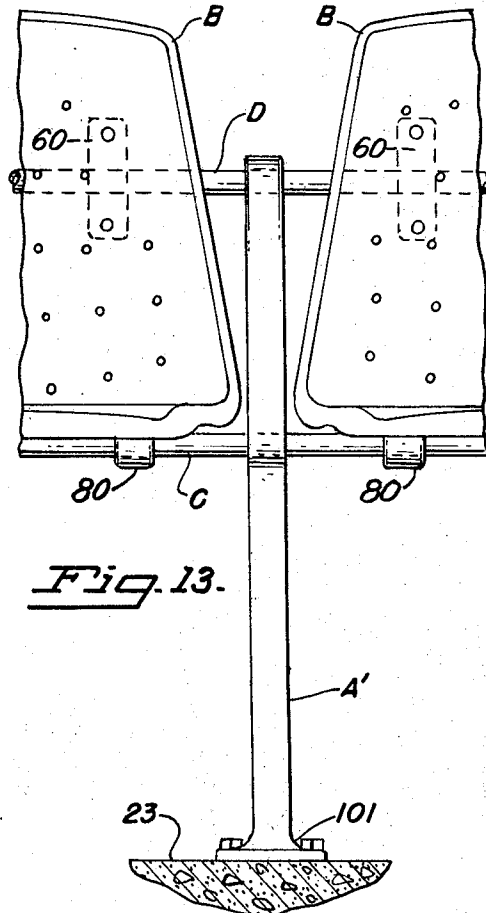
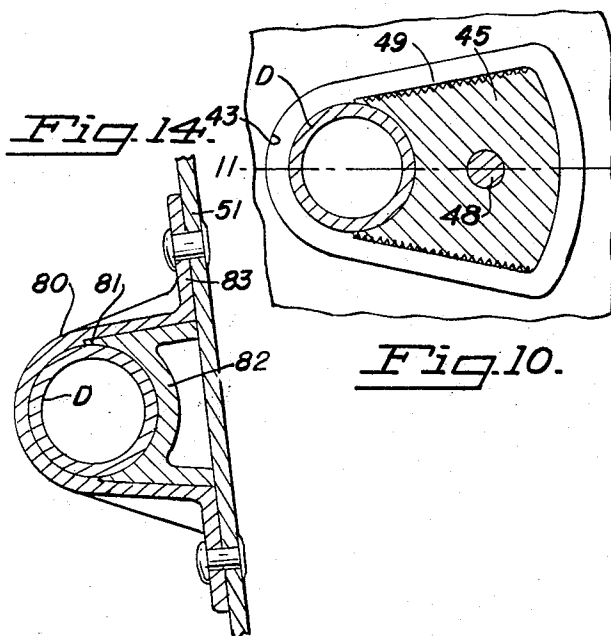
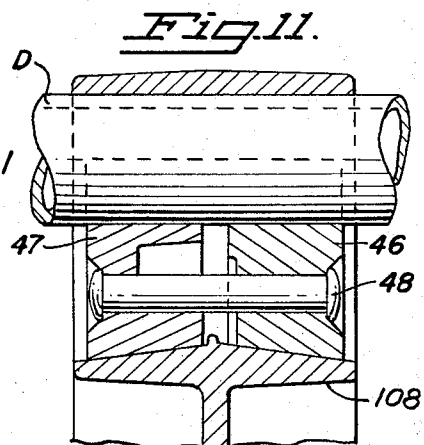


Fig. 10.



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## STADIUM SEATING

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10 Claims. (Cl. 297-232)

This invention relates to improvements in stadium seating.

Only recently have attempts been made to do something about the notoriously uncomfortable seating arrangements at stadia. No longer is it considered essential for observers at football, baseball, and other games or at race tracks to sit on hard, flat, backless benches for hours. The vast numbers to be seated in a stadium and the limited space requirements have laid many difficulties in the way of installing comfortable seating arrangements. Even when new stadia are built, their designs can rarely be built around the seating arrangements as such.

Moreover, the shape of the stadium itself causes problems, with the number of seats in a row increasing from row to row in some portions of the stadium and with some areas being curved and other parts being straight. Furthermore, it is not advisable to employ seats having a fixed width because a variation in length of the row may then be required from row to row, and because fixed-width seating cannot always provide rows where the end seats are flush with the aisle.

Still further, stadium seating has to be readily installed and preferably should be readily replaced in the event of damage. The seating must also be able to withstand the outdoor elements for long periods.

Still further, to be comfortable, there must be no crowding, and to change the seat size from row to row or seat to seat is inadvisable for many apparent reasons.

The present invention provides a solution to many of these problems. This invention makes it possible to make changes in the spacing between seats all over the stadium, from row to row, without reducing the size of the seats, and to provide proper spacing of seats in all parts of the stadium, both for giving the best effect from the standpoint of stadium arrangement and from the standpoint of spectator comfort. Also, when all the rows end flush with the aisle, hazards are reduced and the aisles are safer for the spectators.

The invention provides a very simple and convenient installation requiring a relatively small number of parts, and the seating can be installed quickly and easily. It is adapted to installation in both curved and straight rows, with easy adaptations. The seats can be installed on either the tread or on the risers of stadium tiers, so that there is adaptability there also. The seats are separate from each other and can be individually and easily replaced, in case that should become necessary or advisable.

Other objects and advantages of the invention will appear from the following description of some preferred embodiments thereof.

In the drawings:

FIG. 1 is a front view in perspective of two rows of stadium seats embodying the principles of this invention.

FIG. 2 is a rear view in perspective of the rows of FIG. 1.

FIG. 3 is a fragmentary view in rear elevation of one seat and portions of two adjacent seats from the forward row of FIG. 1.

FIG. 4 is a view in section taken along the line 4-4 in FIG. 3.

FIG. 5 is a view in section taken along the line 5-5 in FIG. 3.

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FIG. 6 is a view in front elevation of one such seat of FIG. 1.

FIG. 7 is a top plan view of the seat of FIG. 6.

FIG. 8 is an enlarged view in section of the bottom seat-supporting bracket taken along the line 8-8 in FIG. 3.

FIG. 9 is a similar enlarged view in section of the rear back-supporting bracket taken along the line 9-9 in FIG. 3.

FIG. 10 is an enlarged fragmentary view in section of a fitting connection taken along the line 10-10 in FIG. 3.

FIG. 11 is a view taken along the line 11-11 in FIG. 10, turned 90°.

FIG. 12 is a view in side elevation of a seat from the rear row of FIG. 1.

FIG. 13 is a fragmentary view in front elevation of portions of two adjacent chairs of the type of FIG. 12.

FIG. 14 is a view in section of a modified form of bracket like that of FIG. 9.

For illustrative purposes FIGS. 1 and 2 show two generally similar but somewhat different structures. A forward row 20 of seating is supported by stadium risers 21 while a rear row 22 is supported by stadium treads 23. Both types are useful, and their differences are fundamentally minor. In both, the row 20 or 21 comprises a series of standards A (for a row 20) or A' (for row 21), a series of seat units B, and two horizontal support members C and D.

The standards A and A' are spaced apart individually and are secured individually to the risers 21 or treads 23. There is, in each row 20 or 22, one more standard A or A' than there are seat units B. These standards A or A' in all cases support the members C and D, and in all instances the members C and D support the seats and backs of the seat units B.

Considering first the row 20, it may consist of any number of seats B, and the standards A may be spaced apart at any desired distance. Data are available which show the generally preferred number of seats for any desired row length and the consequent spacing. For example, some rows may have twenty seats in them, some may have twenty-one, some may have nineteen, and so on. They can always be spaced so that there will be standards at the end of each row without having to stagger the row ends, and the spacing between seats for any one row may be uniform. Or if desired, different intervals may be used between standards, for this invention enables a large degree of flexibility compared to normal procedures. Identical seat units B may be used or, if desired, different sizes of those may be used also, but even when using identical seat units B, a great deal of variation is available simply by varying the distance between standards.

Each standard A is a metal member comprising a vertical base angle 30, an outwardly and somewhat upwardly extending lowest portion 31, a more upwardly inclined and outwardly extending portion 32, which lies below seat level, a generally vertical portion 33 rising above seat level to an upper arm portion 34, and a generally rearwardly inclined portion 35 which extends from the top of the portion 32 to the rear part of the arm portion 34. There may be an opening 36 between the members 33, 34, and 35. Furthermore, the standard A preferably has a wide forward flange 37 and a wide rear flange 38 joined by the web portions 31, 32, 33, and 35 and the upper arm also has a flange 40 on it for the arm rest. The border around the opening 36 may also be provided with a flange 41 to strengthen it, if desired. As shown in FIG. 3, the portion 38 may have a narrow portion in its center part to enable easy installation of the bucket seat when a minimum width between standards is required.

Near the juncture of the portions 32, 33, and 35 is located an elongated opening 42 which is preferably tapered. Another opening 43 of similar but not necessarily identical shape is located adjacent a rear corner 44 where the arm portion 34 meets the portion 35. The openings 42 are rounded at their forward ends to receive snugly a support member C, which may be long tubular pipes. Similarly, the rear of the opening 43 is preferably round, and in it is seated a support member D, which may be substantially identical to the member C. FIGS. 10 and 11 illustrate the securing of the members C and D (which may be tubes) to the standards A, for the securing may be substantially identical with or without minor differences in shape. A wedge 45 preferably fills most of the opening 42 or 43, except where the member C or D passes. The wedge 45 may, as shown in FIG. 11, be made of two pieces 46 and 47 joined together by a suitable bolt, rivet, or other fastening member 48. The wedge members 46, 47 may be suitably tapered and may have serrated surfaces 49 to grip firmly in the openings 42 or 43 and to secure the members C and D quite firmly in place so that there is no play or lost motion between the standards A and the members C and D. At stadium locations where the rows are curved, the standards A are set in place and the members C and D are conformed thereby to the curve.

The seat units B may comprise bucket type bowls with a seat portion 50 and a back portion 51, molded to shape from a durable outdoor plastic or stamped to shape from sheet metal. The units B are preferably provided with a number of openings 52 to provide ventilation and to prevent the collection of water. Other types of seat units B may be employed, if desired, and it is possible to use separate seats and backs where that is desired, or to even have the seats so that they will pivot upwardly. However, it has been found with this invention that there is sufficient space in normal stadium construction to use the fixed in-place bowls in which the seat and back are all one piece, and this bucket-seat type given additional comfort with a minimum of wear and a minimum of maintenance and expense to the stadium owners.

A feature of this invention is that the seat 50 has a narrow front edge 53, and that its side edges 54 and 55 extend from a wide rear portion 56 toward each other, meeting the narrow front edge 53 at smoothly rounded corners 57 and 58 and providing between adjacent seats 50 a large space 59. The size of the space 59 and the shape of the corners 57 and 58 and the shape of the inwardly inclined sides 54 and 59 cooperate to provide a smooth, safe, and comfortable opening between chairs into which seated spectators can easily move their legs when someone is moving between rows. As the seated spectators readily shift their bodies to right or left, their legs automatically slide into the smooth-bounded opening 59 and afford ample passage room for a person moving in front of their seats between rows. The space 59 being between fixed seats 50 make it safe to move the legs thus, whereas a standard tip-up seat presents the danger that one seated spectator might rise while the one next to him remains seated and shifts his legs into the space between chairs, only to be struck by the next chair when his neighbor again sits down and brings his chair back down into that opening.

This feature of the invention eliminates the need of rising and tipping a seat to afford passage through a row and thus eliminates the interference with the view of spectators to the rear except by the person actually moving. Also, since there are no moving parts, the chair is safer and less maintenance is needed. There is no danger of being caught between seat and back when jumping upon or running down on the seats.

The seat portions 50 are affixed to the tubular members C by means of brackets 60, such as are shown in the enlarged view, FIG. 8. These brackets 60 may be one-piece tubular members with an opening 61 and with side flanges 62 and 63. Somewhat similar brackets 70 may be

employed to secure the back portions 51 to the tubular members D.

In installation, the standards A are bolted to the riser 21 (or the standards A' are bolted to the floor 23), employing drilled holes and suitable anchors. Tubular members C and D are typically inserted from both ends, through the standards, meeting in the center of the row. Joints that may occur between the meeting tubes C or D are filled by short plugs before pressing the tubes together, the plugs lining up the tubes for proper fit and also strengthening the joint. Wedges 46 and 47 are then pressed into the openings 42 and 43 of the standards A or A' in all the standards in that row and are riveted together by the rivets 48. The buckets B are then placed on the members C and D and the clips or brackets 60 and 70 are fastened over the members C and D and are riveted to the buckets B. Where there is curvature in the row, the tubes C and D readily conform to the curve and no additional fittings are required.

The bracket shown in FIG. 9 comprises two pieces 71 and 72, which are held together at flanges 73 and 74 by a rivet 75, which also secures them to the back portion 51. The two members 71 and 72 are curved to provide a tubular opening 76 through which the tube D extends. A slight wedging action may be achieved which enables them to be very firmly affixed to the tubes D. Similarly, the members 60 may be tightened around their tubes C.

In a modified form of fastener 80, shown in FIG. 14, the two members 81 and 82 again match, but the member 82 has no flange and is held in place by the wedging action of the member 81, the flange 83 of which is secured to the seat portion 51.

In the row 22 the only difference is in the standards A'. These each have a floor flange 100 which is secured to the tread by suitable bolts 101, a nearly vertically upwardly extending base portion 102 which goes up to the seat level and then portions 103 and 104 which branch out to reach to the opposite ends of an arm portion 105. Again, these portions 102, 103, 104 and 105 are webs, lying in between flanges 106 and 107, and there is again an arm flange 108 and a flange 109 around the opening 110 in between the portions 103, 104, and 105. The differences are minor and are accounted for mainly by the different ways in which they are mounted.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

We claim:

1. A seating row for installation on a tier of a stadium and the like, including in combination:

a series of identical standards adapted to be secured at evenly spaced-apart intervals to the stadium tier structure, each standard having a base portion for affixation to a said stadium tier and having an arm rest portion and first and second through openings, the first at an upper rear location and the second at a lower forward location below seat level,

a series of identical seat units, one and only one unit midway between each succeeding pair of said standards spaced therefrom and free therefrom, each unit having a seat portion and a back portion, and

two supporting members, one extending through all said first openings and rigidly secured to said standards at said first openings and secured rigidly to the rear of said back portion of said units, the other extending through all said second openings and rigidly secured to said standards at said second openings and secured rigidly to the bottom of said seat portion of said units, said seat units being supported solely by said supporting members,

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whereby said standards may be spaced at any desired regular interval, the regular interval being varied at will before installation, and said standards support said supporting members which, in turn, support said seat units.

2. The row of claim 1 wherein each said seat unit is a stationary unitary bucket seat with its seat portion having smoothly continually converging side edges and a front edge narrower than the rear of the seat portion and the narrowest part of the seat and meeting said side edges at smoothly rounded corners, said rear being more closely adjacent said standards at each side than said front edge with the front edge lying forward of the standards and providing a smoothly bounded tapered recess into which a seated spectator can move his legs to afford passage of a standing person in front of him between rows.

3. A seating row for stadium and the like, including in combination:

a plurality of spaced-apart identical standards each having a base portion adapted to be secured to the stadium, each also having an arm rest portion above seat level, a first through opening at the rear of said arm rest portion, and a second through opening at a lower forward location just below seat level,

a series of identical seat units, one unit and one only between and spaced from each succeeding pair of said standards, each unit having a seat portion and a back portion,

two tubular supporting members, a first one extending through all said first openings just rear of said back portions of said seat units, and a second extending through all said second openings just below the bottom of each of said seat portions of said units,

means for rigidly securing together said supporting members and said standards at each said opening,

means for rigidly securing together each said seat portion and said second supporting member, and

means for rigidly securing together each said back portion and said first supporting member, said seat units being supported only by said supporting members, whereby said standards may be spaced at any desired regular intervals, the intervals being varied at will before installation, and said standards support said supporting member which, in turn, support said seat units.

4. The row of claim 3 wherein said means for securing said seat portion to said second supporting member and said means for securing said back portion to said first supporting member each comprises two matching portions that substantially surround a said supporting member and means for wedging them toward each other and into snug contact with their said supporting member.

5. The row of claim 3 wherein said means for securing said supporting members to said standards include wedging members for wedging said supporting members snugly against said standards.

6. A seating row for installation on a riser of a stadium and the like, including in combination:

a series of identical standards adapted to be secured at evenly spaced-apart intervals to the stadium tier structure, each standard having a vertical base flange adapted for affixation to a said riser and having a horizontal arm rest portion and first and second through openings, the first at an upper rear location and the second at a lower forward location below seat level,

a series of identical bucket seat units, one unit between each succeeding pair of said standards and spaced away from said standards, each unit having a seat and a back integral with said seat, and

two supporting tubes, one extending through all said first openings and rigidly secured to said standards at said first openings; and secured rigidly to the rear of said backs of said units, the other extending through all said second openings and rigidly secured

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to said standards at said second openings; and secured rigidly to the bottom of said seats of said units, said supporting tubes providing the sole direct support of said seat units, which are independent from said standards, said standards supporting said tubes, whereby said standards may be spaced at any desired regular interval, the intervals being varied at will before installation, and said seat units installed thereafter unaffected by variations in such intervals.

7. The row of claim 6 wherein each said seat is narrowest at a forward edge and has continually converging side edges extending from a rear edge and meeting said forward edge at smoothly rounded corners, said corners lying forward of said standards to provide a space between seats for receiving the legs of a seated spectator when affording passage of another spectator in front of him between rows.

8. A seating row for installation on a floor, including in combination:

a series of identical standards adapted to be secured at spaced-apart intervals to said floor, each standard having a horizontal base flange for affixation to a said floor and having a horizontal arm rest portion and first and second through openings, the first at an upper rear location and the second at a lower forward location below seat level,

a series of identical bucket seat units, one unit between and spaced from each succeeding pair of said standards, each unit having a seat and a back integral with said seat,

two cylindrical tubes, providing the sole direct supports for said seat units, one said tube extending through all said first openings and rigidly secured to the rear of said backs of said units, the other extending through all said second openings and rigidly secured to the bottom of said seats of said units, said first and second openings each having a semicircular portion the same radius as its said tube at one extremity, against which said tube bears, and an oversize portion of larger width than the diameter of said tubes, enabling easy insertion of said tubes, and

a pair of wedge members in each of said first and second openings and means in each of said first and second openings forcing said pair of wedge members toward each other and for securing them together, so that they wedge said tubes into place against said semicircular portion.

9. A seating row, including in combination:

a plurality of spaced-apart identical standards each having a vertical base flange adapted to be secured to a vertical surface, each also having an arm rest portion above seat level, a first through opening at the rear of said arm rest portion, and a second through opening at a lower forward location just below seat level, each of said first and second through openings having a semicircular extremity and a wide oversize portion facing said extremity,

a series of identical seat units, one unit between and spaced from each succeeding pair of said standards, each unit having a seat and a back integral with said seat,

two supporting cylindrical tubes, a first tube the same radius as the semicircular extremity of said first openings and extending horizontally through all said first openings just rear of said backs of said seat units, and a second tube the same radius as the semicircular extremity of said second openings and; extending through all said second openings just below the bottom of each said seat of said units,

wedge means in said oversize portions for rigidly securing said tubes and said standards together at each said opening, each said wedge means comprising two wedge members and a member securing them together to wedge said tubes against the semicircular extremities,

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brackets for rigidly securing each said seat to said second tube, and  
brackets for rigidly securing each said back to said first tube, so that said tubes provide the sole direct supports for said seat units.

10. A seating row, including in combination:

a plurality of spaced-apart identical standards each having a horizontal base flange adapted to be secured to a horizontal surface, each also having an arm rest portion above seat level, a first through opening at the rear of said arm rest portion, and a second through opening at a lower forward location just below seat level, each of said first and second through openings having a semicircular extremity and a wide oversize portion facing said extremity,

a series of identical seat units, one unit between each succeeding pair of said standards, each unit having a seat and a back integral with said seat,

two supporting cylindrical tubes, a first tube the same radius as the semicircular extremity of said first openings and extending through all said first openings just rear of said backs of said seat units, and a second tube extending through all said second openings just below the bottom of each said seat of said units, wedge means in said oversize portions, for rigidly securing said tubes and said standards together at each said opening, each said wedge means comprising two wedge members and a member securing them to-

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gether to wedge said tubes against the semicircular extremities,

brackets for rigidly securing each said seat to said second tube, and

brackets for rigidly securing each said back to said first tube so that said tubes provide the sole direct supports for said seat units.

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