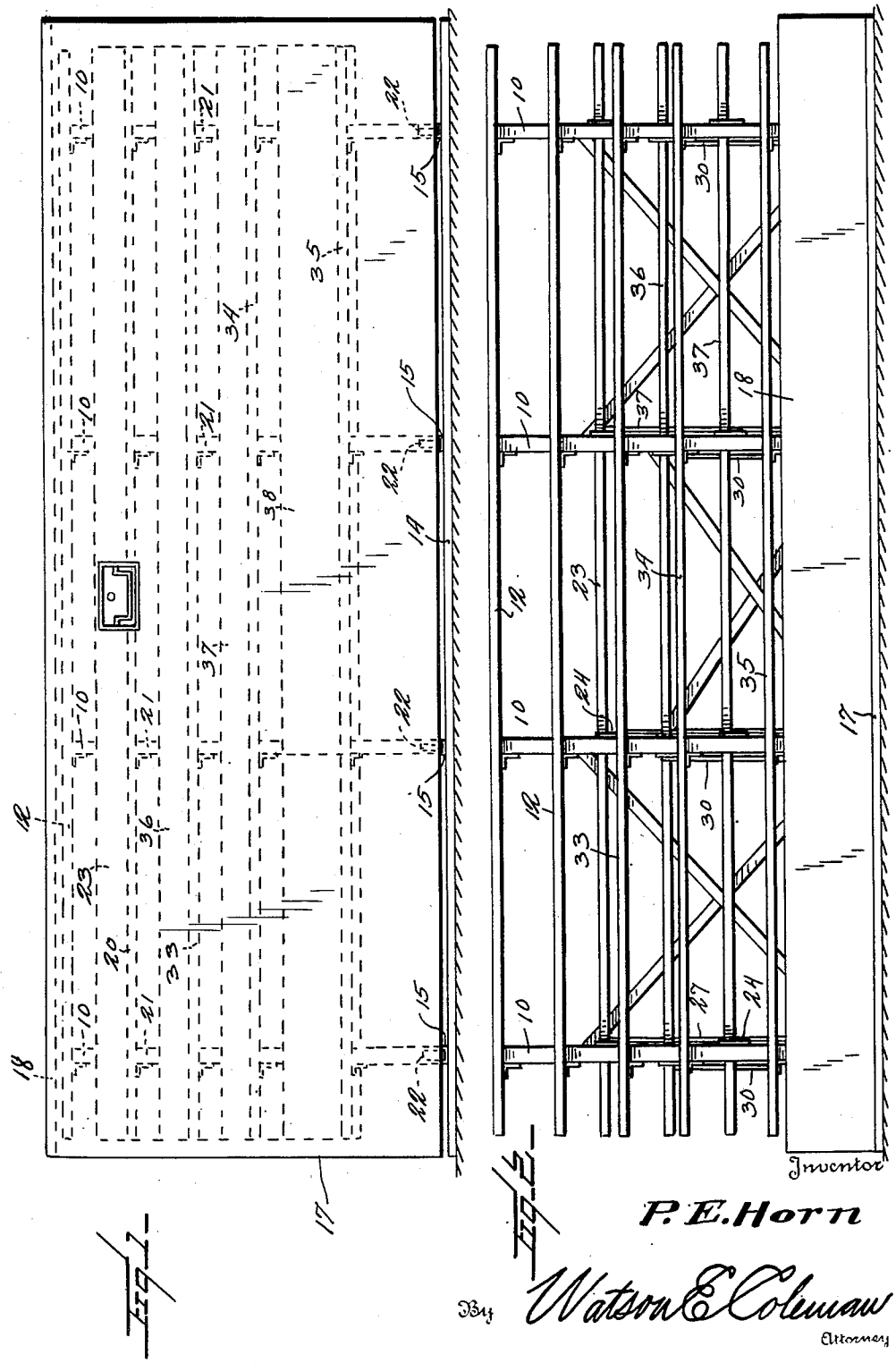
Nov. 17, 1936. P. E. HORN 2,061,235

FOLDABLE BLEACHER SEAT

Filed March 3, 1936 3 Sheets-Sheet 1



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Filed March 3, 1936 3 Sheets-Sheet 2

Fig. 3

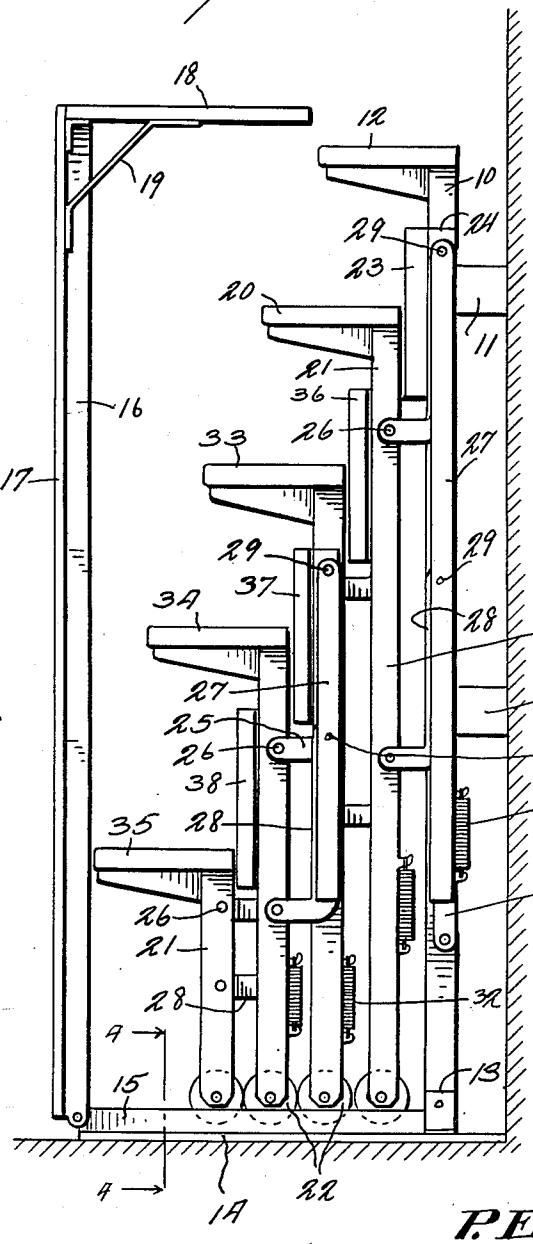
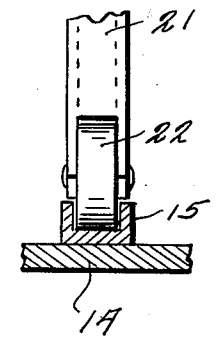


Fig. 4



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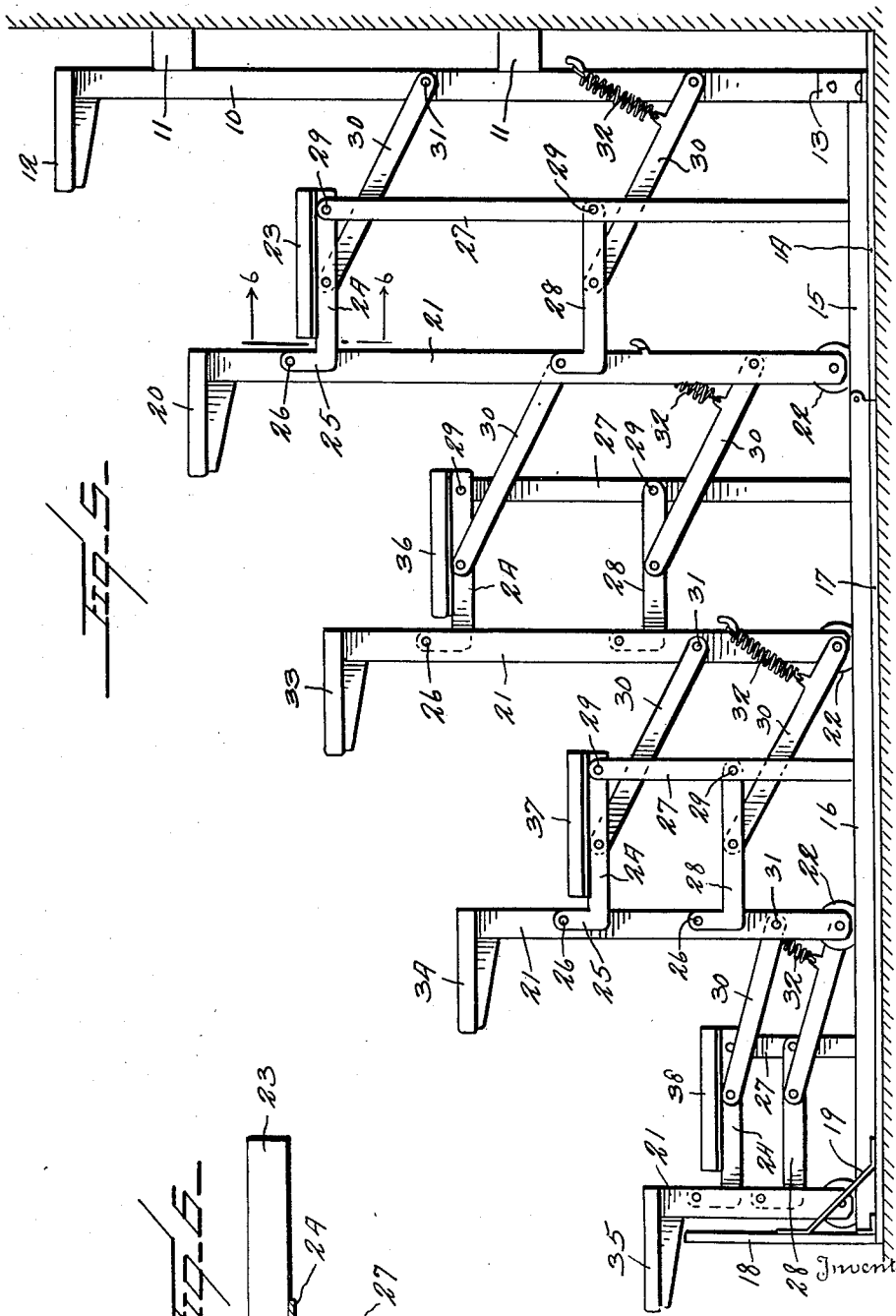

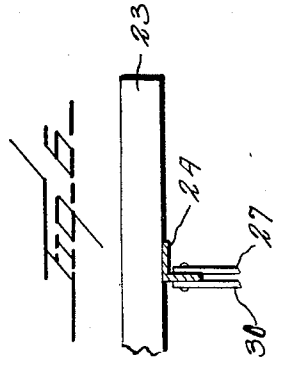

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2,061,235

FOLDABLE BLEACHER SEAT

Paul E. Horn, Fort Dodge, Iowa

Application March 3, 1936, Serial No. 66,919

9 Claims. (Cl. 20—0.5)

This invention relates to seating arrangements for use in gymnasiums, public halls, and under like circumstances, and particularly to "bleacher" seats, that is, a plurality of longitudinally extending seats each capable of holding a number of persons, the seats when in use being disposed one below and in advance of the other, and each seat being associated with a corresponding footboard or foot rest.

The general object of this invention is to provide "bleacher" seats which are nestable or capable of being telescoped one within the other as they are moved back against a wall to thereby conserve as much space as possible and to so construct the series of connected seats that each seat, under all circumstances, whether in use or folded back, shall be supported directly from the floor, or upon tracks in turn supported on the floor.

A further object is to so construct the "bleacher" that it may be folded back without lifting its weight from the floor, and to provide a series of "bleacher" seats in which the height of the structure when folded back is greatly reduced in comparison with other "bleachers" known to me.

A still further object is to do away with the use of springs or equivalent devices for holding the "bleacher" in a folded or inoperative position, and to eliminate the hazard which exists in folding "bleachers" now in use, where the entire weight of the folded "bleacher" when lifted, is dependent on springs which are liable to become defective and which, when defective, only slightly resist the downward movement of the series of "bleacher" seats under their weight, thus endangering the operator or bystanders.

A further object is to provide a construction of this character in which every seat is supported by uprights, the lower ends of which are provided with rollers, and provide tracks upon which these rollers operate, so as to prevent any twisting strain or skew being applied to the series of seats when the "bleacher" is being unfolded or folded up.

A still further object is to provide a front panel carrying track sections, which front panel when swung down onto the floor, carries track sections upon which the vertical members supporting the seats may be guided.

Still another object is to provide foot rests which will be supported entirely from the floor when the "bleacher" is in its operative position.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a front elevation of the seats collapsed and housed;

Figure 2 is a front elevation of the seats in unfolded position;

Figure 3 is an end elevation of the seats collapsed or folded and housed;

Figure 4 is a fragmentary detailed section on the line 4—4 of Figure 3;

Figure 5 is a side elevation of the seats unfolded;

Figure 6 is a fragmentary section on the line 6—6 of Figure 5.

In the drawings I have shown five longitudinally extending "bleacher" seats or seat boards and five foot rests or boards, but it is to be understood that it is within the purview of my invention to provide a greater number of seats and foot boards or a less number than shown.

In the drawings, A designates a wall, as for instance, one wall of a building, and operatively connected to and supported by this wall in any suitable manner are the fixed vertical seat supports 10. The number of these supports will depend upon the length of the "bleacher," but under ordinary circumstances, four of these supports 10 are used. These supports 10 are illustrated in the drawings as being connected to the wall or supported against it by longitudinal members 11, and these supports 10 carry the longitudinally extending seat board 12. All of the supports 10 are connected to each other at their lower ends by a transverse beam or beams 13 which are shown as resting upon the floor. Also resting upon the floor or upon a panel section 14 are a plurality of track sections 15. These tracks are preferably channeled. Pivotally connected to the track sections 15 are the track sections 16 and beneath these track sections 16 is a panel 17, which at its outer end carries the right angularly disposed panel 18 braced from the panel 17 by braces 19. Thus it will be seen that the panel 17 with the track sections 16 may be turned upward into a vertical position, as shown in Figure 3 or turned downward against the floor, as shown in Figure 5.

The next seating board or seat 20 is supported by vertical members 21 which are shorter than the members 10 and which at their lower ends carry rollers 22 which engage within the channels of the track sections 15 and 16. Disposed rearward of the seat 20 and below the level of this seat or seating board is a foot board 23, which is designed for use in conjunction with the seat 12. This is

supported by arms 24 which at their forward ends are angularly extended at 25 and pivoted at 26 to the uprights or supports 21 below the seat 20. The rear ends of these arms 24 are pivoted to and supported by foot board supporting uprights or supports 27. Pivotally connected to the supports 21 and approximately half-way between the members 24 and the floor are the arms 28 of exactly the same character as the arms 24 and pivoted at 29 to the uprights 27. Pivoted to each of the arms 24 and 28, respectively, is a link 30 which is pivoted at its rear end at 31 to the uprights or supports 10.

It will be seen now that as the supports 21 are moved rearward upon the rollers 22, that the links 30 will swing upward and rearward from the position shown in Figure 3 to that shown in Figure 5 and this action of these links will swing the arms 24 and 28 upward upon their pivots 26, and thus the seats 23 will be shifted to a vertical position while the supports 27 will maintain a vertical position in approximate contact with the supports 10 and the supports 21. It will likewise be seen that when the supports 21 are pulled outward from the position shown in Figure 5 to that shown in Figure 3, the links 30 will swing downward and forward, swinging the arms 24 and 28 downward and rearward to a horizontal position in bringing the foot board 23 into a horizontal position beneath and forward of the associated seat 12. Springs 32 are connected to the lowest links 30 and to the uprights 10 and the contraction of these springs will assist in swinging the links 30 upward and rearward when the seat 20 and its supporting structure is collapsed or folded back against the supporting structure for the seat 12.

As before stated, I have illustrated in the drawings five "bleacher" seats. The "bleacher" seats 33, 34 and 35 are supported on uprights 21 of the same character as heretofore described, except that each successive set of uprights are shorter than the uprights for the seat behind. Each of these uprights 21 for the seats 33, 34 and 35 is provided with the supporting arms 24 and 28, as previously described, and the supporting arms 24 carry the successive foot boards 36, 37 and 38. Each of the arms 24 and 28 is pivotally connected by links 30, as previously described, to the next adjacent rear upright 21, and these links are urged upward by the contractile springs 32, as previously described.

In the use of this structure, the several seats are nested, as shown in Figure 3, one against the other with the arms 24 extending vertically and the foot boards or rests 36 disposed in a vertical plane bearing against the uprights at the rear and front. The panel 17 is turned upward to a vertical position and the panel section 18 is carried in a horizontal position to partially house the seats. When it is desired to use the seats, the panel 17 is simply drawn downward to the floor, then the foremost seat 35 is drawn outward and as it is drawn outward, the links 30 turn from a vertical position to an upwardly and forwardly inclined position, as illustrated, causing the arms 24 and 28 to turn from a vertical position to a horizontal position, and bringing the uprights 27 down against the floor, so that when the seats have been fully unfolded or drawn out, all of the seats will be supported by the uprights 21 and 10, and all of the foot rests 23 will be supported by the uprights 27, which will rest upon the floor. When it is desired to fold up the seats, they are simply pushed rearward and the links 30 swing upward and rearward, as previously described, folding the arms 24 and 28 into a vertical position, such movement swinging the supporting members 27 upward into parallel relation to the supports 21 and 10, and the series of seats and their supports are folded into the compact position shown in Figure 3.

It will be seen that with this construction, all the seats are folded compactly below the top seat 12 instead of being hoisted above the top seat. This makes it possible to nest the seats in a relatively small space. Furthermore, it will be seen that the weight of these seats is never lifted from the floor but is at all times supported by the uprights 21 moving rectilinearly upon the track sections, and thus there is no danger of the "bleacher" falling down due to broken springs or defective parts. Preferably while the seats are of wood, the under supporting structure is of steel. The rise per row of seats is sufficient to give perfect visibility to all the spectators. Since the entire weight of the "bleacher" or series of "bleacher" seats is transmitted directly to the floor underneath, no special provisions need be made, and the seats can be installed in old or new buildings. When closed, the "bleacher" seats are nested neatly behind the closure panel 17, thus giving a smooth and unmarred wall against which hand-ball or other games can be played. Five rows of seats such as illustrated in the figures, will occupy when unfolded, a distance of approximately 8 feet from the wall, and when closed as shown in Figure 3, they will occupy a distance of approximately 2 feet. When closed, the height of the folded seats will be approximately 5 feet 2 inches. I do not wish to be limited, as before stated, to the number of rows of seats used, as in actual practice, this structure has been made with as many as twelve rows of seats and as few as two rows of seats.

While I have illustrated certain details of construction and arrangement of parts, I do not wish to be limited thereto, as it is obvious that many of the details might be changed without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:—

1. A seating structure including a plurality of series of upright supports, each series being shorter than the series behind, a longitudinally extending seat mounted on each series of supports, all of the supports except the tallest being movable rectilinearly toward or from the tallest support and at all times operatively engaging a supporting surface at their lower ends, and operative connections between each series of seat supports and the next adjacent rearward seat supports constructed and arranged to swing into planes coincident with the plane of the next adjacent rearward series of supports.

2. A seating structure including a plurality of series of upright supports, each series being shorter than the series behind, a longitudinally extending seat mounted on each series of supports, all of the supports except the tallest being movable rectilinearly toward or from the tallest support and at all times operatively engaging a supporting surface at their lower ends, operative connections between each series of seat supports and the next adjacent rearward seat supports constructed and arranged to swing into planes coincident with the plane of the next adjacent rearward series of supports, rollers carried at the lower ends of the supports of each series, and floor supported tracks upon which said rollers move.

3. A seating structure including fixed floor

supported track sections and swingable track sections pivoted to the fixed track sections, a panel swingable with and to which the swingable track sections are attached, a series of upright supports, each series being shorter than the one behind, all of said supports except the tallest being movable rectilinearly toward or from the tallest series of supports and all of said movable supports having rollers engaging said tracks, a longitudinally extending seat mounted on each of the series of supports, and operative connections between each series of supports in the next adjacent series constructed and arranged to fold into planes coincident with said seat supports as the movable supports are shifted rearward or shiftable into angular relation to the seat supports as the seat supports are shifted outward away from each other and from the tallest series of seat supports.

4. A seating structure including a plurality of longitudinally extending parallel seats, each seat being disposed in a horizontal plane below the seat behind, a series of vertical supports for each seat and to which the seat is attached, all of said supports extending downward to a common plane and all of said supports except the tallest series of supports being movable rectilinearly in this plane, a series of foot boards one for each seat, each foot board being operatively supported upon the seat support in advance and extending rearward therefrom and operative connections between each series of seat supports and the next adjacent series constructed and arranged for folding movement into a vertical position within the plane of the seat supports behind as pressure is applied to move the seat supports rearward, and means for automatically turning the foot boards into a vertical position as the seat supports are moved rearward into abutting relation with each other.

5. A seating structure including a plurality of longitudinally extending horizontal seats, each seat being disposed in a plane below the seat behind and in advance thereof, a series of vertical supports for each seat to which the seat is attached, all of said supports extending downward to a common horizontal plane and all of said supports except the rearmost being movable toward or from the rearmost series of supports, arms pivoted to each support of each series and extending rearward therefrom, the uppermost arm being disposed below the level of the seat to which the arm is pivoted, vertical supports pivoted to the free extremities of said arms and links each pivoted at its forward end to one of said arms and at its rearward end to the next rear seat support, and foot rests mounted upon the uppermost arms.

6. A seating structure including a plurality of longitudinally extending horizontal seats, each seat being disposed in a plane below the seat behind and in advance thereof, a series of vertical supports for each seat to which the seat is attached, all of said supports extending downward to a common horizontal plane and all of said supports except the rearmost being movable toward or from the rearmost series of supports, arms pivoted to each support of each series and extending rearward therefrom, the uppermost arm being disposed below the level of the seat to which the arm is pivoted, vertical supports pivoted to the free extremities of said arms and links each pivoted at its forward end to one of said arms and at its rearward end to the next rear seat support, foot rests mounted upon the uppermost arms, and springs urging said links into a vertical position.

7. A seating structure of the character described, including a series of longitudinally extending horizontally disposed seats, each seat being disposed in a plane below the seat behind, a series of fixed vertical supports supporting the rearmost seat, a series of vertical supports for each seat in advance of the rearmost seat and to which the seats are attached, said last named supports having rollers at their lower ends, a rear fixed track section, a track section pivotally engaged with each rear track section, a panel movable with and normally supporting the pivoted track section, the rollers on the lower ends of said supports being shiftable on said fixed and pivoted track sections, a series of arms having upwardly turned forward ends, the forward ends of each series of arms being pivoted to the supports for the seat in advance, the uppermost arm of each series carrying a foot rest, intermediate vertical supports pivotally connected to the rear ends of each series of arms, links pivotally connected to each of said arms midway of its length and pivotally connected each at its rear end to the next adjacent rearward series of seat supports and when the series of seat supports are in extended position extending upward and forward whereby as the series of seat supports are pushed rearward, the links will swing upward and rearward into parallel relation to the seat supports to which they are pivoted and in so doing will swing said arms upward and forward into a vertical position.

8. A seating structure of the character described, including a series of longitudinally extending horizontally disposed seats, each seat being disposed in a plane below the seat behind, a series of fixed vertical supports supporting the rearmost seat, a series of vertical supports for each seat in advance of the rearmost seat and to which the seats are attached, said last named supports having rollers at their lower ends, a rear fixed track section, a track section pivotally engaged with each rear track section, a panel movable with and normally supporting the pivoted track section, the rollers on the lower ends of said supports being shiftable on said fixed and pivoted track sections, a series of arms having upwardly turned forward ends, the forward ends of each series of arms being pivoted to the supports for the seat in advance, the uppermost arm of each series carrying a foot rest, vertical supports pivotally connected to the rear ends of each series of arms, links pivotally connected to each of said arms midway of its length and pivotally connected at its rear end to the next adjacent rearward series of supports and when the series of supports are in extended position extending upward and forward whereby as the series of supports are pushed rearward, the links will swing upward and rearward into parallel relation to the supports to which they are pivoted and in so doing will swing said arms upward and forward into a vertical position, and contractile springs connected to certain links and to certain rearward vertical supports whereby to assist in moving the supports into abutting parallel relation to each other.

9. A seating structure of the character described, including a series of longitudinally extending horizontally disposed seats, each seat being disposed in a plane below the seat behind, a series of fixed vertical supports supporting the rearmost seat, a series of vertical supports for

each seat in advance of the rearmost seats and to which the seats are respectively attached, a series of arms having upwardly turned forward ends, the forward ends of each series of arms being pivoted to the supports of the seat in advance, the uppermost arm of each series carrying a foot rest, vertical intermediate supports pivotally connected to the rear ends of each series of arms, links pivotally connected to each of said arms midway of its length and pivotally connected each at its rear end to the next adjacent rearward series of seat supports and when the series of seat supports are in extended position extending upward and forward whereby as the series of seat supports are pushed rearward, the links will swing upward and rearward into parallel relation to the seat supports to which they are pivoted and in so doing will swing said arms upward and forward into a vertical position.

PAUL E. HORN.