

March 10, 1959

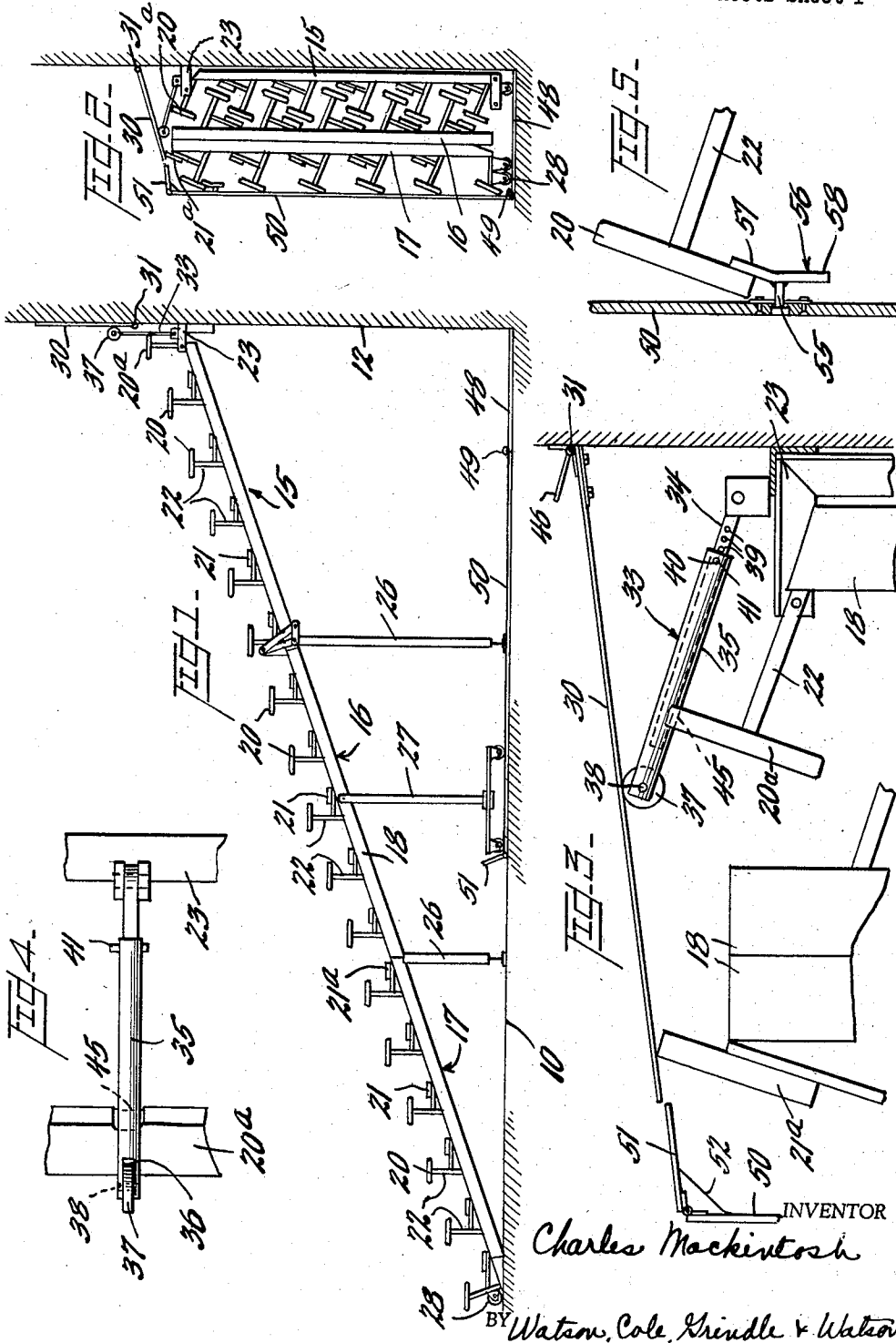
C. MACKINTOSH

2,876,503

COVER FOR FOLDING GRANDSTANDS

Filed July 22, 1954

2 Sheets-Sheet 1



Charles Mackintosh

BY Watson, Cole, Krindle & Watson

ATTORNEYS

March 10, 1959

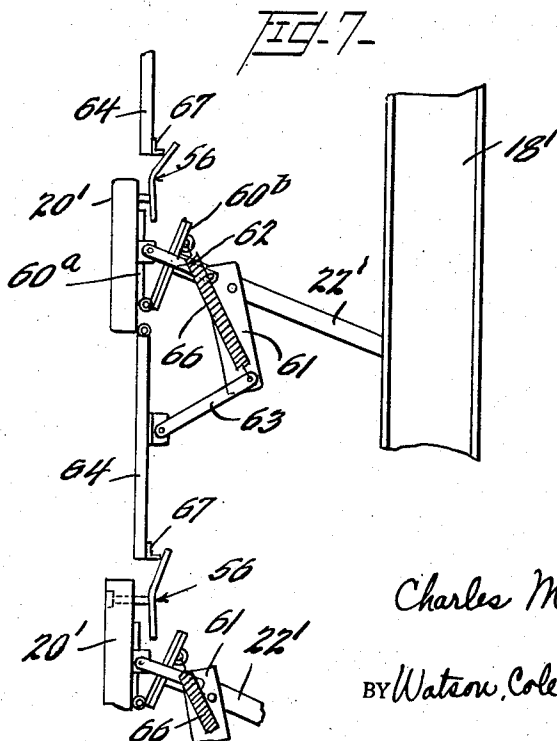
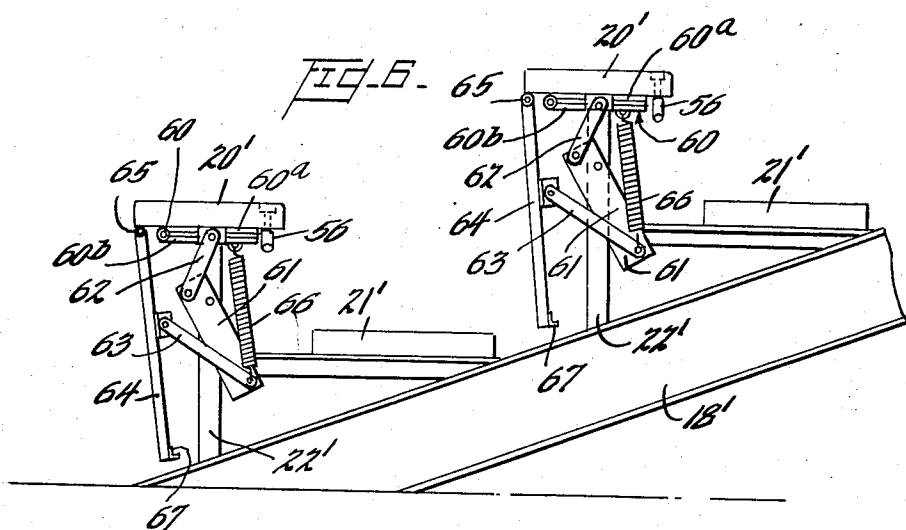
C. MACKINTOSH

2,876,503

COVER FOR FOLDING GRANDSTANDS

Filed July 22, 1954

2 Sheets-Sheet 2



INVENTOR
Charles Mackintosh
BY Watson, Cole, Shindle & Watson
ATTORNEYS

1

2,876,503

COVER FOR FOLDING GRANDSTANDS

Charles Mackintosh, Los Angeles, Calif.

Application July 22, 1954, Serial No. 445,037

7 Claims. (Cl. 20—1.126)

The present invention broadly relates to the art of folding grandstands and is directed more particularly to a cover or enclosure for such grandstands.

Folding grandstands are peculiarly well adapted for use in indoor gymnasiums, auditoriums, arenas and the like where floor space is at a premium and are, in fact, more frequently found installed here than elsewhere since when folded they occupy a small fraction of the floor space required for fixed extended stands and yet are capable of extension to provide a seating capacity fully comparable with that of fixed stands. Normally, gymnasiums are designed so as to provide a plurality of practice playing surfaces or courts when the stands are folded but usually only a single central tournament court surrounded by stands when the latter are extended to open or operative position. As a consequence of this arrangement, the folded stands must be closely adjacent the borders of the practice courts. Frequently, and particularly at the present time where the school population has increased at so rapid a rate and has far exceeded the ability of municipal authorities to provide adequate facilities, it is necessary to use all the available floor space in a gymnasium to its fullest extent. When the practice courts are thus fully occupied, the exposed understructure of the folded stand with its sharp edges and projecting parts represents a distinct hazard to players, especially when they are in the heat of a close contest and are not exercising normal caution.

Where the top of the folded stand is open, it is also likely that playing equipment, such as balls and the like, will fall between the sections of the stand and become lodged therein so that it becomes necessary to go to the trouble and inconvenience of at least partially opening the stand to gain access to the article.

Furthermore, it is virtually impossible to maintain a completely dust-free gymnasium and hence dust tends to accumulate on the exposed surfaces thereof, which dust must be removed before the stands can be used in order to avoid soiling the clothes of persons sitting thereon.

The need for a cover for folding grandstands is therefore readily apparent. Attempts have been made heretofore to enclose a grandstand by means of sheet members permanently attached to the under surface of the foremost section of the stand which member is outermost when the stand is folded, or by manually operated cover flaps. In the first case, it is impossible to close off the top of the folded stand by an element permanently attached to the stand unless that element takes the form of a barrier placed in front of the first row of seats, which is obviously impractical in most instances, and, in the second case, as the height of a folded stand usually considerably exceeds that of a normal individual, special tools, step-ladders or the like are required to close the flaps, particularly that at the top of the stand. It would therefore be highly desirable if at least parts of the closure not readily accessible to a person of normal height were controlled or operated automatically, thus

2

greatly simplifying the task of moving the stand to and from its folded position.

It is, therefore, an object of this invention to provide a folding grandstand with a cover with in combination with the wall or other supporting structure to which the stand is mounted and the floor beneath the stand effectively encloses the folded stand, such cover including a sheet member bridging the top of the stand which is operated automatically by the movement of the stand from closed to open position and vice versa.

Another object of the invention is to provide a foldable grandstand with an automatically operated top cover member and a front cover member which may be moved to enclosing position by a person of normal height.

A further object is to provide an alternative form of front closure which is also automatically brought into enclosing position by the movement of the stand from open to closed position.

Other objects and advantages will be apparent from the following detailed description when read in connection with the accompanying drawings in which

Fig. 1 is a right elevation of a folding grandstand in extended position having associated therewith the automatically operated top closure of the present invention and one form of front closure which may be employed therewith;

Fig. 2 is a view of the grandstand of Fig. 1 in enclosed folded position;

Fig. 3 is an enlarged view of a portion of Fig. 2 showing the details of the automatic operating means for the top closure;

Fig. 4 is a top plan view of the top closure operating means with the top closure removed;

Fig. 5 is an enlarged view of locking means for retaining the front closure of Fig. 1 in enclosing position;

Fig. 6 is a fragmentary side elevation of a grandstand having associated therewith an automatically operated front closure, the stand being in extended position; and

Fig. 7 is a view similar to Fig. 6 but showing the stand in folded position and the front closure in enclosing position.

The cover of the present invention is particularly adapted for use with folding grandstands of the type described and illustrated in my prior Patents 2,663,913 and 2,663,914 for "Grandstands" which issued December 29, 1953, and my co-pending application, Serial No. 250,509 for "Grandstands," filed October 9, 1951, now Patent 2,817,121 although it will be understood that the utility of the invention is by no means limited to these three specific designs. In Figures 1 and 2 the invention is shown in association with a grandstand of the type described and claimed in my co-pending application just referred to, the grandstand being installed in a gymnasium, auditorium or arena having a floor 10 and a wall 12. In general, the grandstand consists of a plurality of frame sections, in this case three, 15, 16, 17. All three sections are generally similar in construction and comprise principally spaced parallel beams 18 on which are mounted suitable transversely extending seat boards 20 and foot boards 21, the seat boards being preferably supported a short distance above the level of parallel beams 18 by means of vertical posts 22. The upper frame section 15 is pivotally attached to a horizontal bracket 23 fixedly mounted to the wall 12 and is hingedly connected to intermediate section 16 which, in turn, is hingedly connected to lower section 17, the hinge means being placed on alternating sides of parallel beams 18 in the manner of a rule joint in order that the beams may collapse in folding fashion to the position shown in Figure 2. Suitable supporting means 26 is provided at each joint and, preferably, a wheeled supporting means 27 is secured to intermediate section 16 about midway

of its length. It is desirable that rollers 28 be provided on the front end of lower section 17 in order to facilitate the folding operation. The other details of the grandstand per se have no particular relation to the present invention and a description of such details may be found in my co-pending application.

The top cover member of the present invention is generally indicated by the numeral 30 and consists of a rectangular planar or sheet member, formed of plywood or the like, pivoted, as at 31, to the wall 12 at a point spaced above the bracket 23. Normally, a number of the top cover members are employed, placed end to end along the wall, the precise number required being dependent upon the length of the grandstand. For the purposes of illustration, however, only a single member has been shown and it will be understood that all of the sheet members are virtually identical.

The actuating means for the top cover member bears the generic designation 33 and is shown in detail in Figures 3 and 4. This actuating means consists of a rod member 34 pivoted at one end to the bracket 23 and having telescoping relation with an elongated tubular member 35. The tubular member is slotted at its free end, as at 36 for the reception of a roller 37 which is retained in position by a suitable pin or axle 38. It is desirable that the actuating means 33 be lengthwise adjusted and to this end the rod 34 is formed with a series of apertures 39 adopted to be placed in registration with a pair of diagonally opposite apertures 40 drilled in tubular member 35, a cotter pin or similar device 41 being inserted therethrough to retain the elements 34 and 35 in any given position.

The actuating member 33 is slidably engaged by the rear edge of the uppermost of the seat members 20, specifically designated 20a, and to prevent the member 33 from moving laterally during closure of the stand the rear edge of seat board 20a is notched or slotted as at 45, tubular member 35 resting within this notch and being guided thereby.

Roller 37 is in rolling contact with the under surface of top cover member 30 and when the grandstand is in its closed or collapsed position, shown in Figures 2 and 3, the top cover member is supported by roller 37, the combined length of rod 34 and tubular member 35 being so adjusted that top cover member 30 assumes a slightly downwardly inclined position. Although such position is not essential, it is desirable in that balls or other sports gear which might become thrown on top of the folded stand thus tend to roll or slide off the top rather than remaining thereon. When the grandstand is opened to its fully extended position shown in Figure 1, the upper stand section 15 pivots about its connection with bracket 23 carrying with it seat board 20a. The movement of seat board 20a is transmitted to the top cover member 30 by the actuating means 33 so that the top cover member 30 is caused to assume a generally vertical position flush against the wall 11 as can be seen in Figure 1. In this position, top cover member 30 does not interfere with the activities of persons seated on the grandstand and cannot constitute a hazard to such persons as it is held firmly and securely until the stand is once more folded. During the folding operation, the upper stand section 15 pivots downwardly and inwardly allowing the top cover member to swing outwardly from wall 11 under its own weight. To insure that top cover member 30 does not dwell in its vertical or "dead center" position, a V-shaped leaf spring 46 is secured to the inner edge of top cover member 30, the force of the spring being such as to urge the cover member slightly outwardly from wall 11, after which the member will move of its own accord.

It is desirable that some secondary means be supplied for assisting the actuating member in supporting top cover member 30 in horizontal position. In the particular grandstand illustrated in Fig. 1, the connection between

stand sections 16 and 17 occurs at a point such that the uppermost foot board 21a is in a position to fulfill this function. In stands of other lengths, a seat board will be in the necessary position while in still other cases it may be necessary to attach to the upper end of the lowest stand section a bracket or steady rest which will contact and support the outer end of member 30.

The seat board 20a and its associated vertical post act, of course, as a lever, the movement of the seat board being transmitted to top cover member 30 through actuating member 33. It will be noted that due to the particular arrangement of these elements the moment arm of the force applied to the member 33 is at maximum when the top cover member is approximately horizontal and the load to be moved is at a maximum. On the other hand, as top cover member 30 approaches its vertical position, the moment arm of the applied forces decreases but as the load also lessens the actuating member does not become overstressed. The operation of the device is fully automatic, depending solely on the movement of the grandstand to and from closed position. While the showing of only one actuating member in association with the member 30 is deemed adequate for an understanding of the invention, obviously any member may be utilized that is required to move the member 30 without bending or failure.

Various forms of front closures may be associated with the top closure just described. One of the simpler of such form is shown in Figures 1-5, consisting of a fixed panel 48 secured to the floor 10 adjacent wall 12 to which is hinged at 49 a panel 50 which, when the stand is folded, may be lifted manually to a vertical position shown in Figure 5. As can be seen in Figures 2 and 3, the top cover member is terminated somewhat short of the full width of the stand when folded and there is provided along the edge of panel 50 remote from hinge 49 a short extension panel 51 held in a position extending angularly from the plane of panel 50 by means of a bracket 52. Upon raising panel 50 to its vertical position, the extension panel 51 acts as a continuation of top cover member 30 to virtually fully enclose the grandstand. Should the angular position of extension panel 51 interfere with the movement of the wheel supporting means 27 during the opening or closing operation, the extension panel may be hinged to panel 50 and suitable detent means provided for retaining it in angular position. Alternatively, the extension panel may be dispensed with and top cover member 30 extended the full width of the stand.

In Figure 5 I have shown a simple form of locking means which may be employed to maintain the front panel 50 in its vertical and enclosing position. This locking means comprises an Allen head bolt 55 mounted in panel 50 for rotation about a horizontal axis, the head of the bolt being accessible from in front of the panel 50. Secured, as by welding, to the inwardly projecting end of bolt 55 is a rod 56, the upper end of which is bent inwardly at a slight angle as at 57 so as to be capable of frictionally engaging the under side of one of the seat boards 20. The lower arm 58 of the rod 56 is somewhat longer than the upper arm 57 and, accordingly, the lock is held by gravity in its open or locking position. It will be evident that this locking means may be actuated from the exterior of the folded stand by means of a common Allen head wrench, the wrench being inserted in the socket of the Allen head bolt and the bolt and rod 56 rotated to the desired position.

A modified form of front closure is depicted in Figures 6 and 7, only just enough of the front or lower grandstand section being illustrated as is necessary to a complete understanding of this embodiment. As was the case with the preceding embodiment, the grandstand consists of parallel beams 18' which support transverse foot boards 21' and seat boards 20', the latter being mounted on vertical post 22'. The modified form of the invention, however, differs from that previously described in that

5

the seat board 20' is connected to the upper end of vertical post 22' by means of a hinge 60 having one leaf 60a connected to the under surface of the seat board 20' and the other leaf 60b connected to post 22'. Secured to post 22' for pivotal movement is an elongated plate member 61, the pivotal axis of member 61 being located somewhat closer to its upper end than to its lower end. Seat board 20' is connected to the upper end of member 61 through a link 62 while the lower end of that member is connected through a link 63 to a rectangular planar or sheet member 64, constructed of plywood or the like, one end of which is swingably attached, as at 65, to the front edge of the underside of seat board 20'. A tension spring 66 is connected to leaf 60b of hinge 60 at one end and to the lower end of plate member 61 at the other. Sheet member 64 corresponds generally in width to the distance between the edges of adjacent seat boards and it will be understood that a sufficient number of sheet members is employed to extend when arranged side by side the full length of the grandstand.

The location of the pivotal axis of the connection of member 61 to post 22' and of links 62 and 63 to member 61 are so selected that when the grandstand is in its extended position indicated in Figure 6 that the leaves 60a and 60b of hinge 60 will be in face-to-face contacting relationship, the seat board 20' extending horizontally while the sheet member 64 is in a slightly out of vertical position "tucked away" beneath the front edge of seat board 20 and the member 61 extending angularly with respect to vertical post 22 and maintained in this position by virtue of spring 66. As the stand is folded, the sheet member 64 swings under its own weight to maintain its position approximately vertical and in so doing pivots the member 61 about its axis which in turn swings the seat board 20' upwardly and outwardly about the pintle axis of hinge 60. When the sheet member has swung to the point where the lower end of member 61 is just left of "dead center," spring 66 comes into play and urges the elements to their fully extended position where they remain until the stand is moved to its closed position, shown in Figure 7. While the weight of sheet member 64 would, in all probability, be adequate to actuate the device, the utilization of spring 66 imparts in the mechanism a positive and direct action, insuring that it does not dwell in "dead center" position. The off-center location of the pivoted axis of member 61 is necessary in order to give sheet member 64 a greater "throw" or extent of movement than seat board 20'. The parts 61, 62, 63 and 66 may be considered as constituting an unbalanced "snap action" linkage which forcefully and positively moves to either of its "rest" positions upon being moved past "dead center."

Locking means of the type described in connection with Figure 5 is provided at the rearward edge of each of the seat boards 20' in order to secure the free edge of sheet member 64 in its vertical position as is clearly shown in Figure 7.

To prevent wear at the front edge of member 64 as a result of repeated contact with the locking means, a short length of angle iron 67 may be attached to this edge.

Although I have described the mechanism in connection with only a single seat board, it will be appreciated that any number of seat boards may have a swinging sheet member and actuating mechanism associated therewith. When the seat boards and the sheet members are in the fully extended position of Figure 7, they present to the exterior a more or less continuous surface which although not smooth nevertheless effectively enclose the front of the stand, preventing persons from inserting their hands or arms between the elements of the stand and keeping sports equipment from being hit or thrown into and behind the stand.

Those skilled in the art will appreciate that minor modifications in design and structural details may be

6

required to meet the requirement of a particular installation and I do not wish to be limited to the specific features of the embodiments described and illustrated except as may be indicated in the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A cover for folding grandstands including at least one section, movable from an open inclined position to a closed vertical position, a vertical support for the rear end of said section, and a plurality of transverse seat boards on said section, said cover comprising a top planar member pivoted at one end to said vertical support and pivotable from an out-of-the-way position substantially co-planar with said vertical support when the stand section is in open position to a generally horizontal position extending over the stand section when the latter is in closed position, an elongated lever member pivoted at one end on a fixed axis to said vertical support adjacent the rear end of said section, the other end of said member abutting the under surface of the top planar member and freely movable laterally thereof, an element fixedly carried by and movable with said section, said element being in sliding engagement with said lever member intermediate the ends of the latter, the movement of said element as said section is moved to and from open position from and to closed position being effective through said lever member to move said top planar member to and from its out-of-the-way position from and to its horizontal position, respectively, said lever member pivoting outwardly and downwardly with respect to said vertical support when the section is moved to closed position, and front closure means cooperating with said top member when said stand section is in closed position to substantially completely cover two sides of said stand.

2. The grandstand cover as in claim 1 wherein the element of said section in sliding engagement with said lever member is the uppermost of said seat boards.

3. The grandstand cover as in claim 1 wherein said front closure means comprises means mounting a plurality of said seat boards for pivotal movement from a horizontal position when said stand is open to a vertical position when said stand is closed and a panel member pivoted to each of said pivoted seat boards, said panel member substantially corresponding in width to the distance said boards are spaced from each other and being swingable from an out-of-the-way position beneath said seat boards when said stand is open to a vertical extended position in substantial alignment with said seat boards when said stand is closed, said panel member and its associated board being connected together by means other than said pivotal connection whereby movement of one of said boards and panel member effects movement of the other.

4. The grandstand cover as in claim 3 wherein means are provided for locking the free edge of said panel member to the rear edge of the next adjacent seat board when said board and panel are in aligned vertical position, said means being accessible from the exterior of the folded stand.

5. The grandstand cover as in claim 3 including a vertical support for said seat boards wherein said other connecting means comprises an elongated plate member pivoted to said vertical support and link means connecting the ends of said plate member to said seat board and said panel member respectively.

6. The grandstand cover as in claim 5 in which the upper end of said plate member is linked to said seat board and the lower end to said panel member, the axis of the pivotal connection of said plate member to said vertical support is located nearer to said upper end than to said lower end, and spring means in tension connects said lower end to said vertical support.

7. The combination with a grandstand having a plurality of sections hingedly connected together for movement from an inclined open position to a vertical and

parallel closed position, and a plurality of transverse seat boards mounted on said sections, of a front closure for said grandstand comprising means mounting a plurality of said seat boards for pivotal movement from a horizontal position when said stand is open to a vertical position when said stand is closed and a panel member pivoted to each of said pivoted seat boards, said panel member substantially corresponding in width to the distance said boards are spaced from each other and being swingable from an out-of-the-way position 5 beneath said seat boards when said stand is open to a vertical extended position in substantial alignment with said seat boards when said stand is closed, said panel

member and its associated board being connected together by means other than said pivotal connection whereby movement of one of said boards and panel member effects movement of the other.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 19,373	Wetzel -----	Nov. 13, 1934
966,019	Huffman -----	Aug. 2, 1910
2,030,776	Vance -----	Feb. 11, 1936
2,054,960	Adamson -----	Sept. 22, 1936
2,061,235	Horn -----	Nov. 17, 1936
2,147,564	Vance -----	Feb. 14, 1939