Sept. 10, 1968 R. T. SCAGGS ETAL 3,400,502

TELESCOPING PLATFORM STRUCTURE

Filed Sept. 22, 1966 2 Sheets-Sheet 1

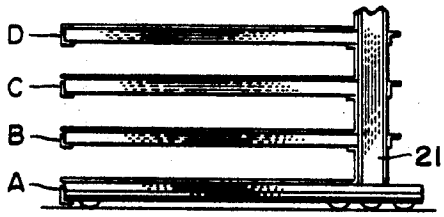

FIG. 1

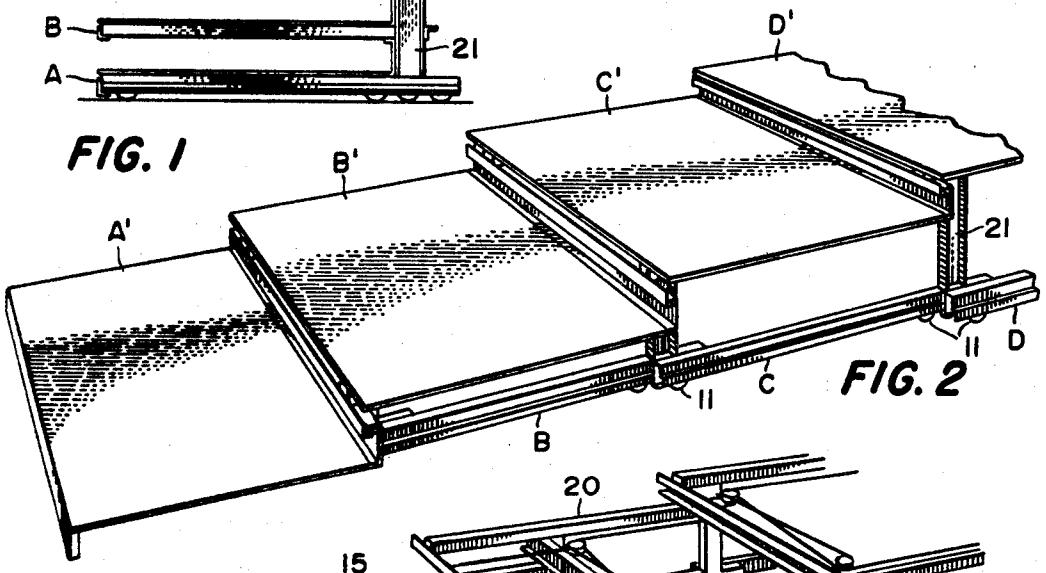

FIG. 2

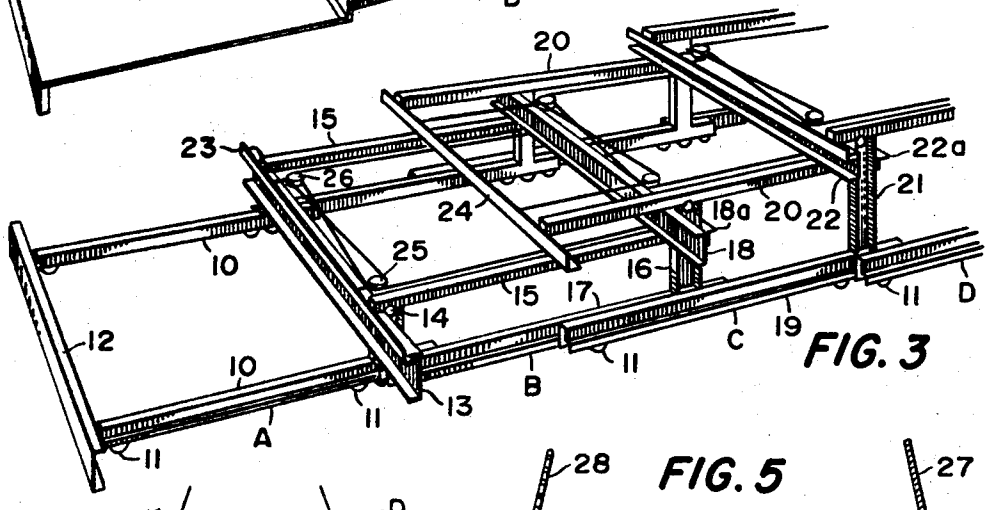

FIG. 3

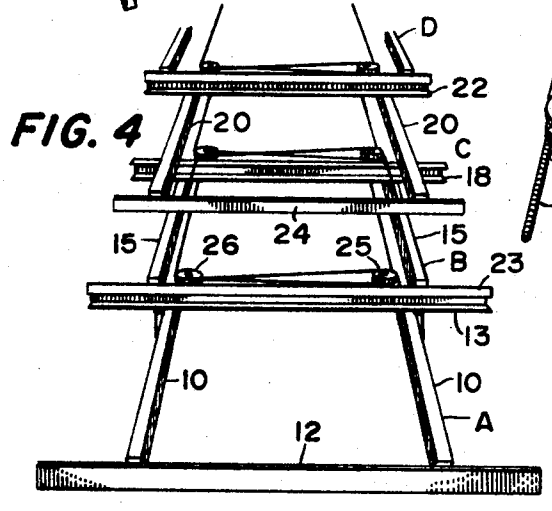

FIG. 4

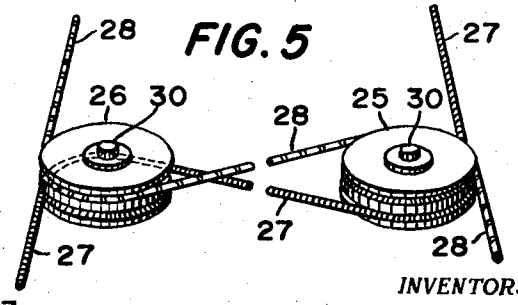

FIG. 5

INVENTORS

Robert T. Scaggs
Henry A. Meares
Lloyd D. Lindsey

BY Dawson, Tilton, Fallon, Lungmus, and Alexander
ATTORNEYS

Sept. 10, 1968 R. T. SCAGGS ETAL 3,400,502

TELESCOPING PLATFORM STRUCTURE

Filed Sept. 22, 1966 2 Sheets-Sheet 2

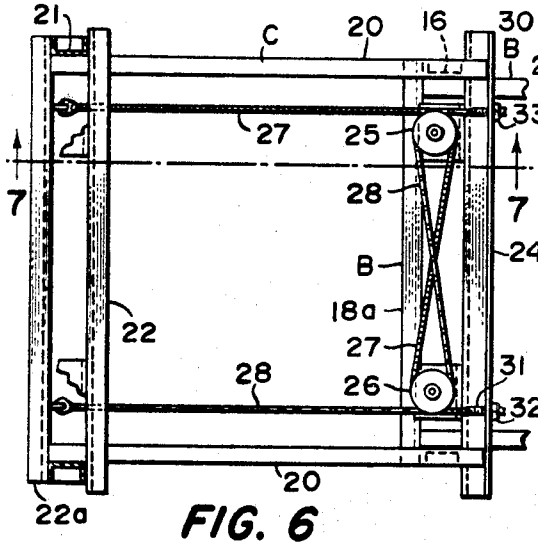

FIG. 6

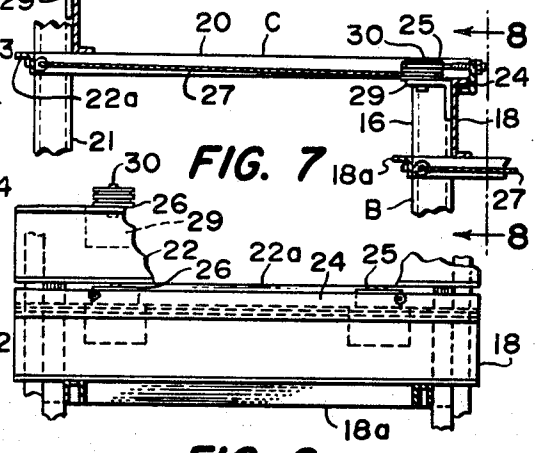

FIG. 7

FIG. 8

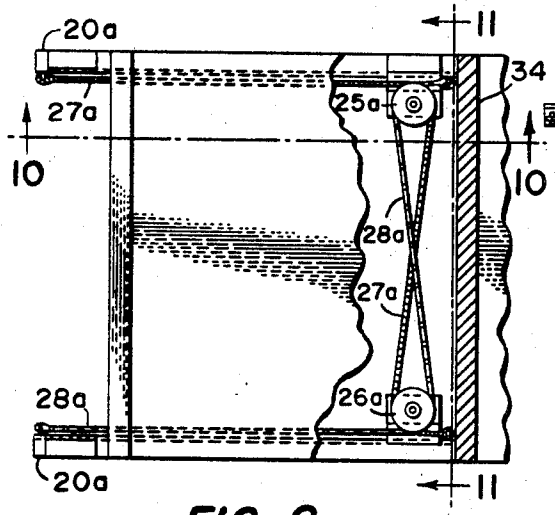

FIG. 9

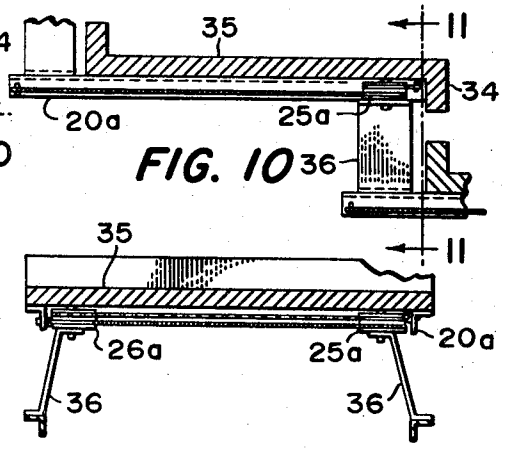

FIG. 10

FIG. 11

INVENTORS

Robert T. Scaggs
Henry A. Meares
Lloyd D. Lindsey

BY Dawson, Tilton, Fallon, Lungmus, and Alexander
ATTORNEYS

United States Patent Office 3,400,502 Patented Sept. 10, 1968

3,400,502

TELESCOPING PLATFORM STRUCTURE

Robert T. Scaggs, Urbana, Henry A. Meares, Champaign, and Lloyd D. Lindsey, St. Joseph, Ill., assignors, by mesne assignments, to American Seating Company, Grand Rapids, Mich., a corporation of Delaware

Filed Sept. 22, 1966, Ser. No. 581,243
9 Claims. (Cl. 52—9)

ABSTRACT OF THE DISCLOSURE

Horizontal platforms in sections are arranged one over the other in telescoping relation for movement to expanded position or inwardly to contracted position, a first section having at its rear a pair of spaced pulleys on opposite sides thereof mounted for rotation in a horizontal plane and in the plane of the second section a pair of cables, each secured to the rear of the second section adjacent a side thereof and extending along said side and about the front portion of the pulley adjacent said side and about the rear portion of the pulley at the other side of said section, each cable being secured to the front portion of said second section. With this structure, the mobile sections which are free of outside support are individually guided in their parallel travel to the expanded and contracted positions.

This invention relates to a telescoping platform or bleacher structure, and is particularly useful in connection with sectional telescoping platforms used in auditoriums, athletic fields, stadiums, and the like.

Telescoping sectional platforms are highly useful in fields of sports, stadiums, and other areas in that the platform sections can be readily folded so as to occupy little space and thus afford larger free areas in the fields while, in times of exhibitions, the platform sections can be drawn forwardly to provide areas for receiving chairs, benches, etc. for seating spectators. In the operation of such sectional telescoping platforms which are usually of relatively large area, it is found that the sections tend to zigzag and bind in operation, thus requiring the services of several people and often damages the equipment and causing excessive wear in areas.

We have discovered that by the use of inexpensive pulley and cable means, it is possible to guide the platform sections so that they move accurately in alignment without binding, and further enable a person or persons to effectively open the sections or close them.

A primary object, therefore, is to provide a sectional telescoping platform structure in which the sections are guided for parallel movement toward open or folded positions. A further object is to provide in a telescoping platform structure having sections of varying heights, cable and elevated pulley means whereby the sections are guided for parallel movement without binding. Yet another object is to provide means for tightening the cables to provide taut cable sections for aligning and guiding the platform section. A still further object is to provide in a sectional platform structure cable and pulley guiding means permitting any selected platform section to be moved to any desired degree with respect to the other sections. Other specific objects and advantages will appear as the specification proceeds.

Summary

By the use of inexpensive pulley and cable means, it is possible to guide the horizontal platform sections which are mounted one over the other for movement to and from expanded positions without binding and without requiring support from outside frame structures. On a first section

is mounted a pair of spaced cables on opposite sides thereof and at a point in the plane of a second section and a pair of cables each secured to the rear of the second section extend about the pulleys and engage opposite sides of the second section at the front thereof.

The invention is shown, in specific embodiments, by the accompanying drawings, in which—

FIG. 1 is a side view in elevation of a sectional platform structure shown in closed or folded position; FIG. 2, a broken perspective view of the sections shown in open or extended position; FIG. 3, a view similar to FIG. 2 but with the top of each platform section removed; FIG. 4, a perspective view taken from the front of the structure shown in FIG. 3; FIG. 5, a broken perspective view of the pulleys and cable portions attached thereto; FIG. 6, a broken top plan view of the third section equipped with cables and a rear portion of the second section equipped with pulleys mounted for rotation in a horizontal plane; FIG. 7, a sectional detail view, the section being taken as indicated at line 7—7 of FIG. 6; FIG. 8, a detail view, the view being taken as indicated at line 8—8 of FIG. 7; FIG. 9, a view similar to FIG. 6 but showing a modified form of structure in which the rear ends of the cables are secured to guide rails of the third section; FIG. 10, a sectional detail view, the section being taken as indicated at line 10—10 of FIG. 9; and FIG. 11, a sectional detail view, the section being taken as indicated at line 11—11 of FIG. 10.

In the illustration given in FIGS. 1–8 inclusive A designates the lowermost or front platform section, B a second section thereabove, C a section above section B, and D the uppermost section. It will be understood that the platform structure may have any desired number of sections, but for the purpose of illustration here only four sections are shown. Each of the sections is provided with a top upon which chairs or seats may be placed, the tops being indicated by the letters A′, B′, C′ and D′.

As shown best in FIGS. 2 and 4, the front section A has side beams **10** supported on rollers **11** and equipped at its front with a depending member **12**. At a point spaced from the rear of each beam **10** is mounted a vertically-extending crossbar **13** carrying at its top antifriction pad **14**. The pads **14** support the upper beams **15** of the second section B, beam **15** being supported by the vertical standard **16** mounted on the lower beam **17** of section B. The lower beam **17** is likewise equipped with antifriction means **11** for supporting it together with the standard **16**, crossbeam **18** and the forwardly extending upper beams **15**.

Section C is similar to section B having a lower beam **19** and an upper beam **20** and having a high mast **21** supporting the crossbeam **22**.

Rails **15** of section B are provided at their front with a depending crossbar **23**, and rails **20** of section C are provided at their front with a crossbar **24**. Since the sections B, C and D are substantially the same in structure except for the varying heights of the masts carrying the crossbars, it is believed unnecessary to describe these structures in further detail. Telescoping structures of this type are well known in the art.

In accordance with our invention, we provide a lower section at its rear with a pair of double-grooved pulleys supported in alignment with a succeeding upper section, and the upper section is provided with cables secured to the front and rear portions thereof and extending about the pulleys to provide taut, parallel portions for guiding the upper section in its movement with respect to the lower section. For example, in FIGS. 6, 7 and 8, sections B and C are shown in assembled relation, with pulleys carried at the rear of section B and cables engaging the pulleys and secured to the front and rear portions of section C.

As shown best in FIGS. 6, 7 and 8, pulleys **25** and **26** are supported on section B for rotation in a horizontal plane and they are engaged by cables **27** and **28** carried by section C. The pulleys **25** and **26** are supported upon brackets **29** by pivot pins **30**, as shown in FIG. 7, the standard **16** being provided on its front side with the cross rail or beam **18** and on its rear side with the rail **18***a* to which cable **27** is attached.

Referring to FIG. 6, a cable **27** is secured to the rear rail **22***a* of section C and its extends forwardly around the front portion of pulley **25** and thence around the rear portion of pulley **26**, and the end of the cable **27** is secured to the front rail **24** of section C by a threaded bolt **31** engaging a nut **32**. Similarly, cable **28** is secured by an eye bolt to the rear rail **22***a* and it extends forwardly around the front portion of pulley **26** and thence around the rear portion of pulley **25**, and the end of the cable terminates in a threaded member passing through an opening in rail **24** and engaged by nut **33**. The nuts **32** and **33** permit tightening of the cables **27** and **28** to maintain them in taut condition. If desired, the adjustment bolts may extend through the rear rail **22***a*, instead of the front rail **24**, so that nuts at the rear of rail **22***a* may be used to tighten the cables.

The arrangement of the pulleys and cables is illustrated in FIG. 5. Cable **27** passes around the front portion of the double-grooved pulley **25** and thence around the rear portion of pulley **26** and extends forward for attachment to the front rail **24** of section C. Similarly, cable **28** passes around the front portion of pulley **26** and thence around the rear portion of pulley **25** and extends forwardly for adjustable attachment to the front rail **24**. In the preferred arrangement shown, the cables **27** and **28** provide parallel portions extending from the rear of section C to the pulley aligned therewith so that as the lower section B is moved rearwardly, the pulleys engage such parallel portions of the cable and maintain the sections B and C in alignment.

Operation

In the operation of the structure shown in FIGS. 1–8 inclusive, the sections A, B, C and D may be moved together or separately, and in such movement the engagement of the pulleys carried by the lower section with the parallel cables carried by the upper section maintains the sections in alignment. As shown best in FIGS. 6–8, inclusive, each section A and B carries at its rear spaced double pulleys engaging parallel portions of the cable sections, and as one section moves with respect to the other, the pulleys traverse the parallel cable portions. To maintain the cables in taut condition, the threaded and attachments of the cables may be adjusted by nuts **32** and **33**, as shown in FIG. 6.

In the modification shown in FIGS. 9, 10 and 11, the cable **28***a* is attached at its rear to a side rail **20***a* and it extends forwardly around the front portion of pulley **26***a* and thence about the rear portion of pulley **25***a* and is secured to the depending flange **34** of the platform member **35**. Similarly, cable **27***a* is secured to the opposite side wall **20***a* and the cable extends forwardly along the side wall about the front portion of pulley **25***a* and thence around the rear portion of pulley **26***a* and is secured to the depending flange **34** of the platform member **35**. The pulleys **26***a* and **25***a* are supported upon brackets **36** and carried by the section pulley.

While the pulleys **25** and **26** and **25***a* and **26***a* may be supported at any desired elevation, we prefer to support them by the use of brackets, as shown, at an elevated position in general alignment with the upper side rails of the succeeding section. For example, as shown in FIGS. 6–8, the pulleys are supported by brackets so that they are in alignment with the top rail **20** of section C, with the result that the pulleys are aligned with the cables which engage the rail **22***a* and front rail **24** of section C.

While in the specific illustrations given, we have shown the structures in considerable detail for the purpose of illustrating embodiments of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of our invention.

We claim:

1. In a sectional telescoping platform structure, a plurality of telescoping platform sections including a first section and a second section in telescoping relation over said first section, said sections lying in a horizontal plane and spaced vertically from each other, said first section having at its rear a pair of spaced pulleys on opposite sides thereof mounted for rotation in a horizontal plane and in the plane of said second section, a pair of taut cables each secured at the rear of the second section adjacent a side thereof and extending along said side and about the front portion of the pulley adjacent said side and about the rear side of the pulley at the other side of said section, each cable being secured to the front portion of said second section.

2. The structure of claim **1** in which said cables extend in parallel from the rear of the second section and in alignment with the first-engaged pulley.

3. The structure of claim **1** in which said second section is provided at its front with a crossbar and said cables are secured to said crossbar.

4. The structure of claim **1** in which means are provided for adjusting the length of said cables to maintain them in taut condition.

5. The structure of claim **1** in which each cable extends from a rear corner portion of said second section to a diagonally opposite front corner portion of the said section but is looped about said pulleys to provide a guide portion substantially parallel to a side of said section.

6. In a sectional telescoping platform structure, a plurality of horizontal platform sections in telescoping superposed relation mounted on rollers for travel relative to each other, certain of said sections having on their rear portions spaced pulleys mounted on pivots for rotation in a horizontal plane, and parallel cables carried by sections over said pulley-equipped sections and anchored to the front and rear portions of said sections for engagement with said pulleys to maintain said sections in parallel paths during telescoping travel.

7. The structure of claim **6** in which the pulleys are double-grooved pulleys.

8. In combination, a first platform section, a second platform section supported for telescoping movement over said first platform section, said first section having at the rear thereof spaced elevated pulleys supported on vertical pivots in alignment with the front and rear portions of said second section, and cables secured near either side of said second section at the rear thereof, each of said cables extending around the forward side of the adjacent pulley and around the rear side of the opposite pulley and secured in taut condition to the adjacent front portion of said second section whereby when said second section is moved it is held in parallel relation to said first section.

9. The structure of claim **8** in which each section has lower and upper parallel sides and the pulleys of said first section are supported by brackets in elevated position aligned with the upper sides of said second platform section.

References Cited

UNITED STATES PATENTS

1,519,355	12/1924	Brubaker	187—52
2,849,085	8/1958	Hopfeld	187—17
3,222,827	12/1965	Smith	52—9
3,279,131	10/1966	Curra	52—9
3,341,986	9/1967	Brosig	52—67

HENRY C. SUTHERLAND, *Primary Examiner.*