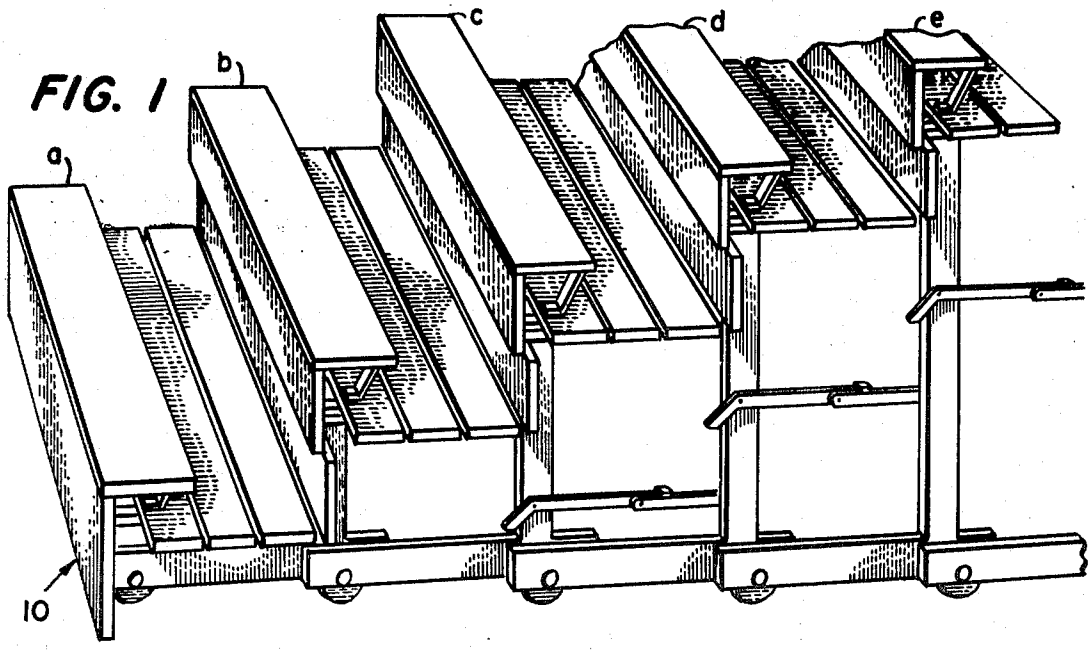
Sept. 28, 1971 R. T. SCAGGS 3,608,251

UPPER ROW LOCK LINKAGE

Filed June 12, 1970

3 Sheets-Sheet 1

FIG. 1



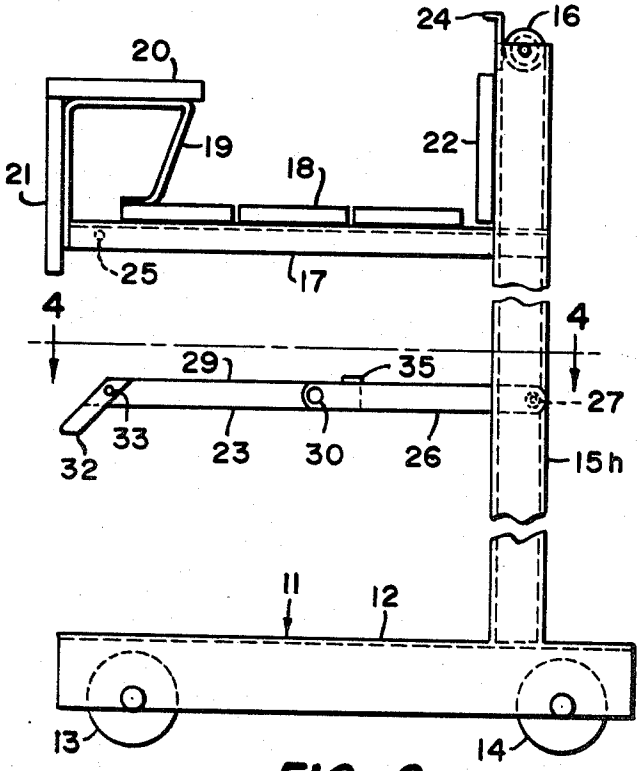


FIG. 2

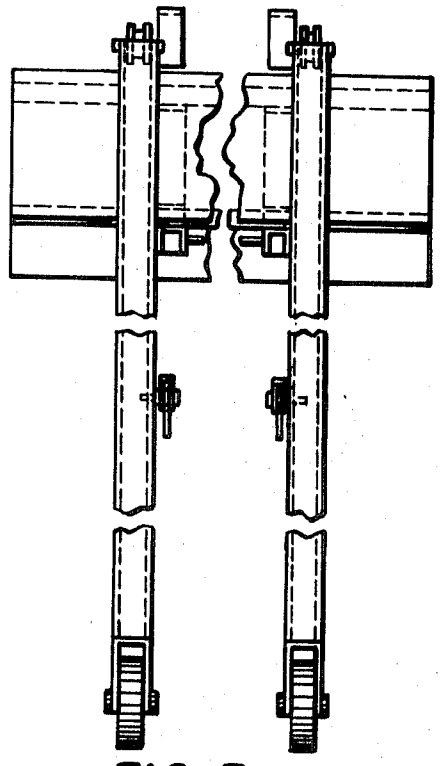


FIG. 3

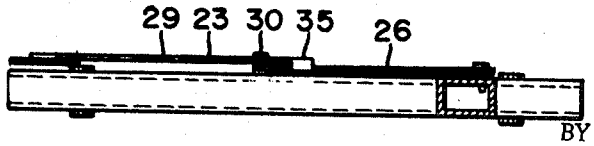


FIG. 4

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Sept. 28, 1971 R. T. SCAGGS 3,608,251

UPPER ROW LOCK LINKAGE

Filed June 12, 1970 3 Sheets-Sheet 2

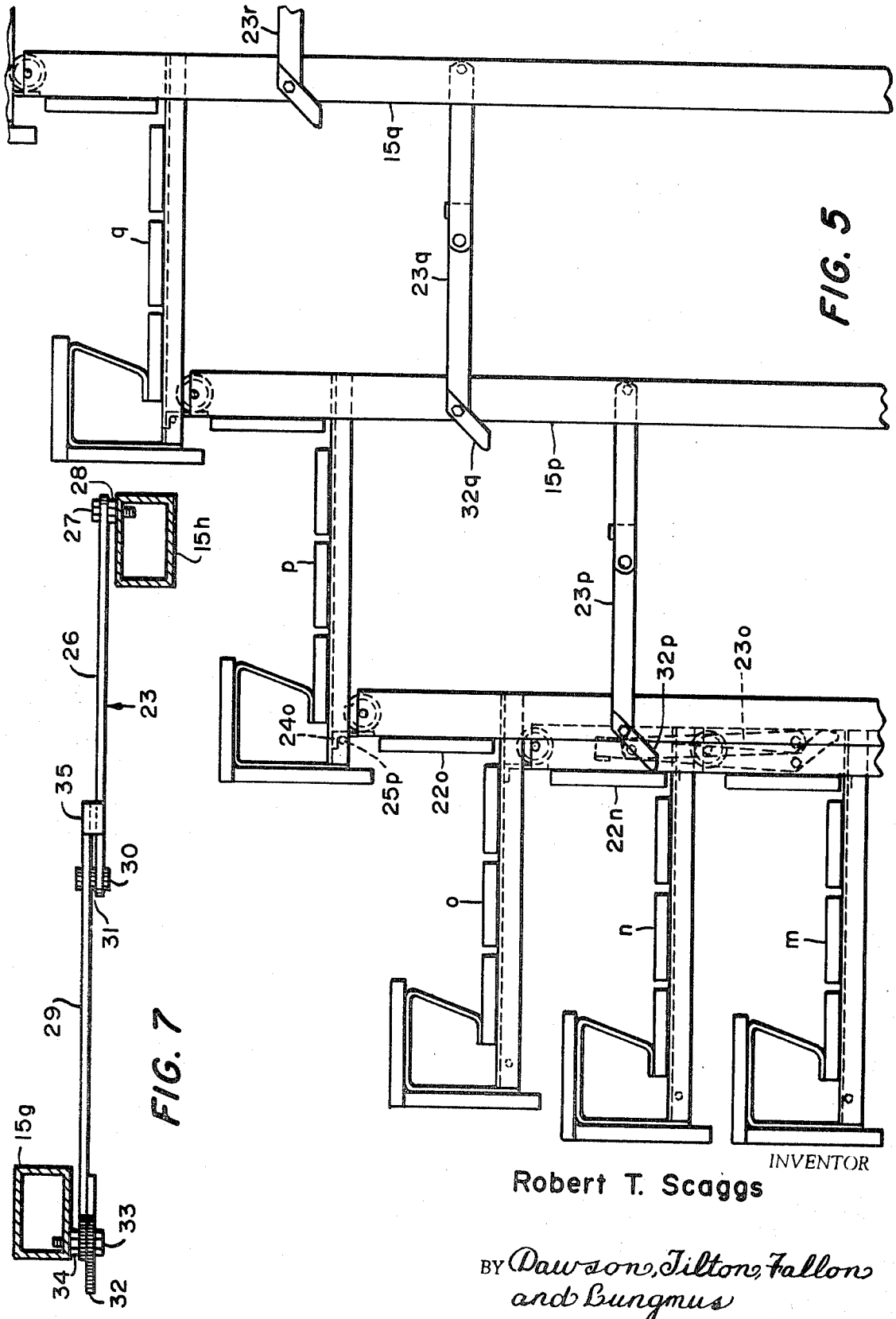


FIG. 5

FIG. 7

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UPPER ROW LOCK LINKAGE

Filed June 12, 1970 3 Sheets-Sheet 3

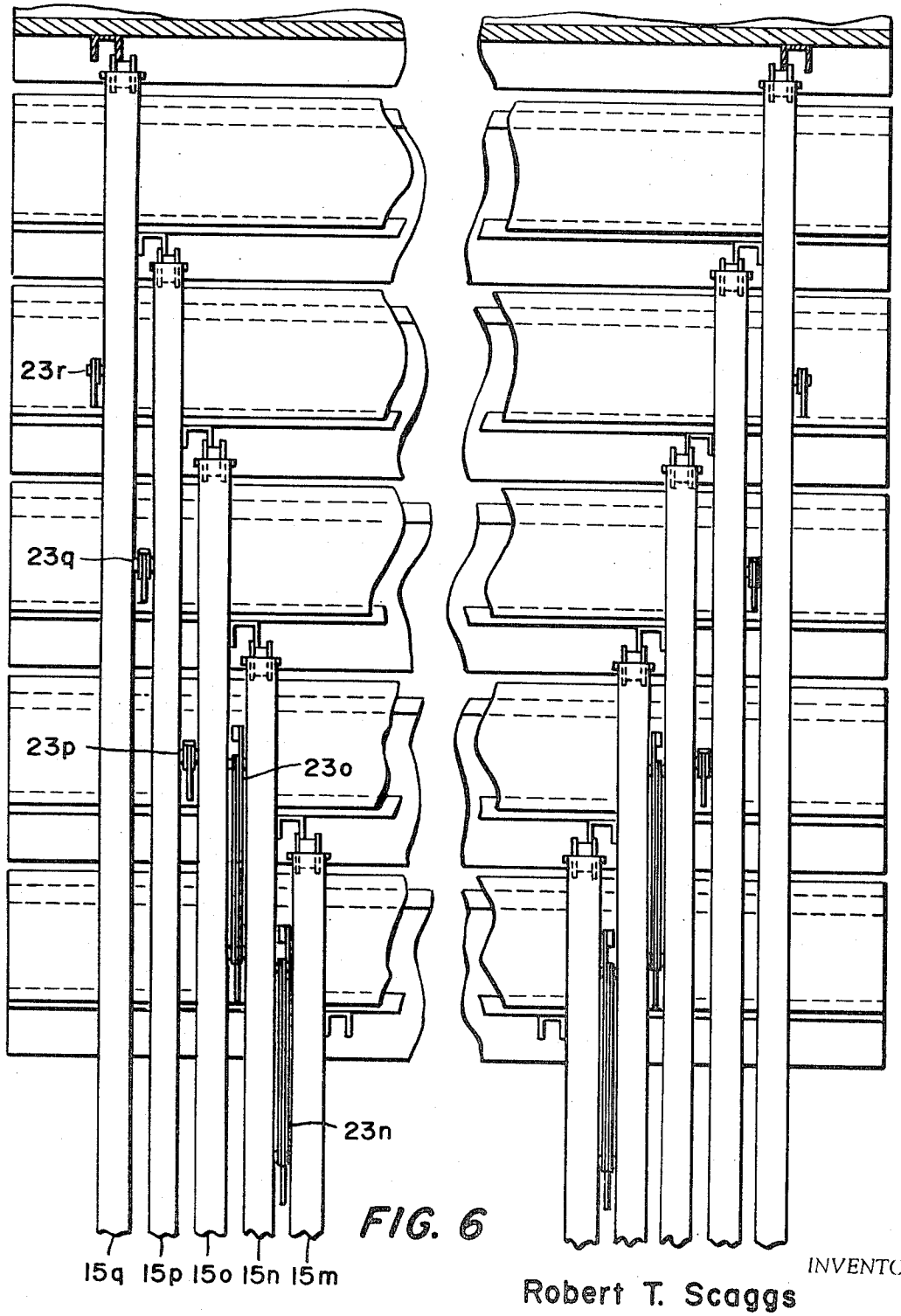


FIG. 6

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United States Patent Office 3,608,251 Patented Sept. 28, 1971

3,608,251

UPPER ROW LOCK LINKAGE

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Filed June 12, 1970, Ser. No. 45,799
Int. Cl. E04h 3/12
U.S. Cl. 52—9 6 Claims

ABSTRACT OF THE DISCLOSURE

The upper rows particularly of post-supported telescoping platforms, such as bleachers and the like, are automatically locked and braced by linkage between the posts when the posts are opened to expanded position and automatically unlocked as the platforms are moved one by one to closed position.

BACKGROUND AND SUMMARY

In telescoping bleacher seating or other telescoping platform structures employing traveling posts, the upper rows particularly which are carried by higher posts become less steady and, if light construction materials are to be employed, there is a problem in providing bracing and locking means without interfering with the easy and accurate opening and closing of the rows. Also, when the posts reach closed or stored position, it is important to have such bracing means nested between the adjacent posts.

I have discovered that it is possible to employ linkage between posts with connections which automatically lock rows in extended position so as to provide strong bracing between adjacent posts while at the same time the linkage is automatically folded between posts as the rows are moved inwardly one by one to closed position.

DRAWINGS

In the accompanying drawings, FIG. 1 is a perspective view of a bleacher section of five rows showing the third, fourth and fifth rows locked in place; FIG. 2, a side view of one row showing the locking device extended as it would be in locked position, if there were a preceding row; FIG. 3, a fragmentary rear view of the row shown in FIG. 2; FIG. 4, a sectional view of the post, locking device, and foot of one row, the section being taken as indicated at line 4—4 of FIG. 2; FIG. 5, an enlarged fragmentary view of the upper portion of six rows, showing the locking device in both locked and folded positions; FIG. 6, a broken rear view of the six rows shown in FIG. 5, two locking devices being shown folded and three locking devices shown in locked position; and FIG. 7, a top plan view on an enlarged scale of the locking device in the opened and locked position between two posts.

DETAILED DESCRIPTION

The invention is illustrated and described herein in connection with bleacher sections containing several rows of seating and each having a stand platform, but the invention may be used in any post-supported telescoping platform structure in which there is need for bracing in intermediate or higher rows.

In the drawings, a bleacher section **10** is shown, the section containing several rows of seating as indicated by the letters *a*, *b*, *c*, *d* and *e* in FIG. 1. It will be understood that the section may contain twenty or more rows, the need for bracing being greatest when the number of rows is increased.

Each row consists of two end structures **11** stabilized by suitable cross bracing (not shown). Each end structure consists of a base channel **12** with two or more casters or

rollers **13** and **14**, a post **15** which may be in the form of a channel or any desired cross section but preferably in the form of a rectangular tubing, an upper caster or roller **16**, a platform supporting channel **17** holding a platform **18**, a seat support frame **19**, a seat board **20**, and if desired, a front board **21**. There is also provided a cross beam or kick board **22** which not only unites a row of posts to support the structure but also serves another purpose which will be later described. The end structure includes also a locking device **23**, a post stopping bracket **24**, and a post stopping pin **25**.

As shown best in FIGS. 2 and 7, the locking device **23** consists of a link **26** attached to the post **15***h* by means of a bolt **27** which threads into a jam nut **28** and to the post **15***h*, and a second link **29** attached to the first link **26** by means of a rivet **30** with a spacer washer **31** between the two links. The far end of the second link **29** has a protruding finger or cam **32** which the kick board or beam **22** strikes when the preceding row is being folded and causes the linkage to fold up, as shown in dotted lines in FIG. 5. The second link **29** is attached to the post **15***g* of the preceding row by means of a bolt **33** which threads into a jam nut **34** and to the post **15***g*. The second link **29** is longer than the first link **26** and has a stop plate **35** welded to its top side which stops the swinging action of the linkage and locks it in the extended position.

As shown best in FIGS. 5 and 6, row M is folded into row N, with the linkage **23***n* folded up between the preceding post **15***m* and post **15***n* as shown in FIG. 6. In like manner, in row O linkage **23***o* is folded up between post **15***o* and post **15***n*.

Referring to FIG. 5, row N is folded nearly all of the way into row O, and its kick board **22***n* is striking finger **32***p* about to unlock the linkage **23***p* so that row O can fold into row P. Likewise, when the kick board **22***o* strikes the finger **32***q*, the linkage **23***q* will unlock and fold allowing row P to fold into row Q.

As shown best in FIG. 6, the locking device **23***p* is shown opened and locked between post **15***o* and post **15***p*. The succeeding locking devices **23***q* and **23***r* are opened and locked.

Referring to FIG. 5, when the row is extended ready for use, as is row P, then the post stopping bracket **24***o* of the preceding row O strikes the post stopping pin **25***p*. This occurs on every row when the bleacher section is open.

In the foregoing operation, the cross beam or kick board **22** not only unites and supports a row of posts in a unitary structure but also serves as a release means for engaging the cam finger **32** of link **29** to unlock the linkage in the following row. The rollers or casters at the top of each post and at the bottom of each post facilitate the movement of the platforms outwardly and the momentum is effective in pulling the links to the locking position automatically as the various sections are being opened. Further, in the folding of the mechanism, the linkage is concealed and housed between the posts, as shown best in FIG. 6.

While in the foregoing specification I have set forth a specific example in considerable detail for the purpose of illustrating 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 my invention.

What is claimed is:

1. In a telescoping structure having transversely-aligned posts and seating rows supported thereon, said posts being in stepped rows and spaced inwardly of each other to permit folding of the posts in side-by-side stored position, links pivotally connected to adjacent posts and to each other bracing said posts, at least one of said links extending past said pivotal connection between links and

having a stop plate bearing against the top of the other link, the foremost of said links having a cam finger, and a cross member connected to transversely-aligned posts and engageable with said finger for lifting said stop plate and pivotal connection to free said links for the folding of the adjacent posts toward each other.

2. The structure of claim 1 in which said cross member is a beam connecting transversely-aligned posts.

3. The structure of claim 1 in which the transversely-aligned posts are equipped with said links and said beam engages and releases simultaneously the links between the following aligned adjacent posts.

4. In a telescoping structure in which rows of posts of successively greater height from front to rear have forwardly-extending arm supporting seats and in which said arms in one row rest at their forward portions on posts in the row ahead when the structure is expanded, said posts being foldable in spaced relation with the higher posts outermost, the improvement which comprises pivotally-connected links having their outer ends pivoted on adjacent posts and bridging the space between said posts and locking said posts in spaced-apart relation when the

posts are in expanded position, stop plate means on one of said links engageable with the other of said links to restrain said links from swinging substantially below horizontal position when the posts are in expanded position, the foremost of said links having a cam finger, and a cam release member extending between and uniting the row of posts and engageable with said cam for moving the pivotal connection between said links upwardly to permit folding of said posts toward each other.

5. The structure of claim 4 in which the foremost of said links is longer than the other link and has an end portion extending beyond the link pivot.

6. The structure of claim 4 in which said posts are provided at their tops with rollers on which flanges of superposed platforms travel in the closing of the linkage.

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JOHN E. MURTAGH, Primary Examiner