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(72) Inventors:  
• **Van de Moortel, Geert**  
**9790 WORTEGEM-PETEGEM (BE)**  
• **Vandenhoute, Heikki**  
**9890 GAVERE (BE)**

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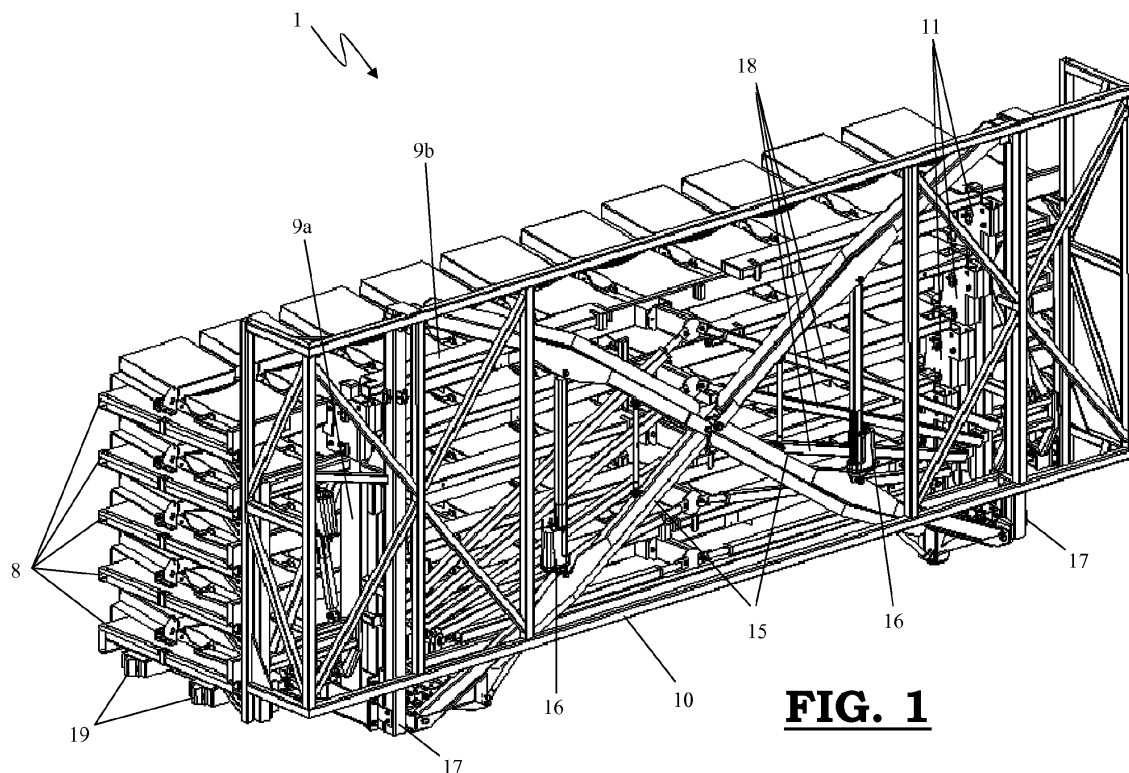
(74) Representative: **Hostens, Veerle et al**  
**KOB NV**  
**Patents**  
**President Kennedypark 31 C**  
**8500 Kortrijk (BE)**

(71) Applicant: **COS nv**  
**9700 Oudenaarde (BE)**

(54) **Telescopic grandstand with multiple telescopic partial grandstands**

(57) The present invention relates to a telescopic grandstand (7) comprising a plurality of telescopic part-grandstands (1, 2, 3, 4, 5, 6), at least one part-grandstand (1) of which is designed to be vertically displaceable, in which said vertically displaceable part-grandstand (1) comprises a plurality of telescopic platforms (8) which

are displaceable with respect to one another and comprises a frame (10) from which all platforms (8) are suspendeable and in which said frame (8) is vertically displaceable in order to displace the part-grandstand (1) vertically, thus making it possible to produce a greater variation of composite telescopic grandstands (7) in a flexible manner.



**FIG. 1**

## Description

**[0001]** The present invention comprises a telescopic grandstand with a plurality of telescopic part-grandstands, in which at least one part-grandstand is designed to be vertically displaceable.

**[0002]** On the one hand, telescopic grandstands may be grandstands which are arranged in a space in which, depending on the use of the space, the floor is to be cleared to enable performances where the audience is standing, or tables and seats are to be placed on the floor, or sports activities are to take place on said floor, or an all-seating grandstand is desired which takes up the entire floor, for example for performances where the audience is to be seated, etc. On the other hand, such telescopic grandstands may also be readily transportable all-seating grandstands which will be pulled in to form a compact shape for transportation and will be pulled out in situ when an event is scheduled. The state of the art of such telescopic grandstands already comprises a considerable number of grandstands which can be installed and retracted in a short period of time. In the retracted position, these can be very compact. Such grandstands always comprise a plurality of telescopic platforms which, in the retracted position of the grandstand, are arranged one above the other and, in the extended position of the grandstand, are arranged in a stepped manner with respect to each other. Often, folding seats are provided on the platforms of said telescopic grandstands which, in the extended position and in the retracted position of the grandstand, each extend between two platforms.

**[0003]** In many cases, in order to produce large telescopic grandstands, these are divided into smaller part-grandstands which can be coupled to one another in order to form a larger composite grandstand.

**[0004]** A drawback of most such grandstands is the fact that these part-grandstands always have to be assembled in the same manner, so that the grandstands which have thus been assembled always have the height of a part-grandstand and a width which is a multiple of the width of the part-grandstands placed next to one another.

**[0005]** FR 2 959 262 A1, US 2011/0099915 A1 and US2010/0192477 A1 disclose grandstands which comprise vertically displaceable part-grandstands, thus offering more possibilities of producing composite grandstands.

However, the solutions described herein firstly require a large number of parts in order to lift the platforms of the part-grandstands, resulting in many failures and much wear.

In addition, the lift system of the vertically displaceable part-grandstand from US 2011/0099915 is very complicated and expensive. The grandstand comprises different base platforms which remain at a fixed level and on which vertically displaceable platforms are fitted.

In addition, the lift system with the vertically displaceable part-grandstand from US 2010/0192477 A1 does not al-

low the bottom platform of this part-grandstand to be placed in a base position or in a position with a normal low step, as a result of which this part-grandstand can never be placed at the front of the composite grandstand, which obviously does not have a beneficial effect on the flexibility of the unit.

**[0006]** It is an object of the present invention to provide a telescopic grandstand with a plurality of part-grandstands which can be arranged in a more flexible manner and can be coupled to one another to form a larger variation of composite telescopic grandstands comprising a part-grandstand which are displaceable vertically in a simpler manner and which is less susceptible to failures and wear.

**[0007]** This object of the invention is achieved by providing a telescopic grandstand comprising a plurality of telescopic part-grandstands, in which at least one part-grandstand is designed to be vertically displaceable and in which said vertically displaceable part-grandstand comprises a plurality of telescopic platforms which are displaceable with respect to one another and comprises a frame from which all platforms are suspendable, in which said frame is vertically displaceable in order to displace the part-grandstand vertically.

**[0008]** In this case, the frame may more specifically be, for example, vertically displaceable by means of electric spindles. Alternatively, the frame may be, for example, vertically displaceable by means of linkage arms and actuators.

**[0009]** Preferably, said vertically displaceable part-grandstand is displaceable in this case between a base position, in which said part-grandstand can be coupled laterally to another telescopic part-grandstand in the base position in order to produce a composite telescopic grandstand, and a raised position, in which said part-grandstand can be coupled behind another telescopic part-grandstand in the base position to form a composite telescopic grandstand.

**[0010]** In a particular embodiment of a telescopic grandstand according to the present invention, said vertically displaceable part-grandstand comprises a plurality of telescopic platforms which are displaceable relative to one another, in which each platform is supported at its rear side by means of columns and in which the columns of each platform are vertically displaceable in order to displace the part-grandstand vertically.

**[0011]** More specifically, each said column of such a grandstand may comprise, for example two or a plurality of part-columns which are hingedly displaceable with respect to one another. Still more specifically, each said column of such a grandstand may comprise at least two part-columns which are displaceable with respect to one another through essentially 90°. In this way, one or a plurality of part-columns can be arranged substantially horizontally on the rear side of the part-grandstand in the base position of the part-grandstand, in which case said part-columns are hingedly displaceable to assume a substantially vertical position in order to be able to lift the

part-grandstand to its raised position.

**[0012]** Alternatively, the columns could also be constructed, for example, telescopically so that they can be extended telescopically in order to displace them vertically.

**[0013]** Preferably, each said platform of a grandstand according to the present invention with a plurality of telescopic platforms which are displaceable with respect to one another and with a frame, in which each of the platforms is supported on its rear side by columns, comprises one or a plurality of guide blocks for guiding the platform when displacing the frame vertically with respect to the columns. These guide blocks are preferably detachably connected to the frame. This may be achieved, for example, by means of fastening hooks which automatically hook the platforms to the frame in the retracted position when the frame is being lifted and displace these along with the frame.

**[0014]** Said vertically displaceable part-grandstand of a telescopic grandstand according to the present invention furthermore preferably comprises locking means for locking the part-grandstand in the position in which it has been placed.

**[0015]** The present invention will now be explained in more detail by means of the following detailed description of a number of preferred embodiments of telescopic grandstands according to the present invention. The sole aim of this description is to give illustrative examples and to indicate further advantages and features of the invention and can therefore by no means be interpreted as a limitation of the area of application of the invention or of the patent rights defined in the claims.

**[0016]** In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- **Fig. 1** shows a vertically displaceable part-grandstand of a first embodiment of a telescopic grandstand according to the present invention in perspective from behind, in its base position and in the retracted position, with folded-down part-columns;
- **Fig. 2** shows the part-grandstand from Fig. 1 in rear view, in its base position and in the retracted position, with folded-down part-columns;
- **Fig. 3** shows a longitudinal section of the part-grandstand from Fig. 1 through its part-columns, viewed from behind, in its base position and in the retracted position, with folded-up part-columns;
- **Fig. 4** shows a longitudinal section of the part-grandstand from Fig. 1 in front of its part-columns, viewed from behind, in its base position and in the retracted position, with folded-down part-columns;
- **Fig. 5** shows the part-grandstand from Fig. 1 in side view, in its base position and in the retracted position, with folded-down part-columns;
- **Fig. 6** shows a cross section of the part-grandstand from Fig. 1 through a guide block, in its base position and in the retracted position, with folded-up part-columns;

- **Fig. 7** shows the part-grandstand from Fig. 1 in side view, in its raised position and in the retracted position;
- **Fig. 8** shows the part-grandstand from Fig. 1 in perspective from behind, in its raised position and in the retracted position;
- **Fig. 9** shows two part-grandstands of the first embodiment of a telescopic grandstand according to the present invention in side view which are coupled one behind the other, in which the rear part-grandstand has assumed its raised position and extended position and the front part-grandstand has assumed its base position and retracted position;
- **Fig. 10** shows the two coupled part-grandstands from Fig. 9 in side view, in which the rear part-grandstand has assumed its raised position and extended position and the front part-grandstand has assumed its base position and extended position;
- **Fig. 11** shows a vertically displaceable part-grandstand of a second embodiment of a telescopic grandstand according to the present invention in side view, in its base position and retracted position, with folded-up part-columns;
- **Fig. 12** shows two part-grandstands of the second embodiment of a telescopic grandstand according to the present invention in side view which have been coupled one behind the other, in which the rear part-grandstand has assumed its raised position and extended position and the front part-grandstand has assumed its base position and retracted position;
- **Fig. 13** diagrammatically shows a ground plan of a first arrangement of six part-grandstands of an embodiment of a telescopic grandstand according to the present invention, in which the part-grandstands are coupled to each other laterally;
- **Fig. 14** diagrammatically shows a ground plan of a second arrangement of the six part-grandstands from Fig. 13, in which the part-grandstands are coupled one behind the other in pairs and the part-grandstands which are coupled in pairs are coupled to each other laterally;
- **Fig. 15** diagrammatically shows a ground plan of a third arrangement of the six part-grandstands from Fig. 13, in which the part-grandstands are coupled one behind the other in sets of 3 and the part-grandstands which are coupled in sets of 3 are coupled to each other laterally.

**[0017]** A telescopic grandstand (7) according to the invention, some examples of which are illustrated in Figs. 9, 10 and 12 to 15, in each case comprises a plurality of part-grandstands (1, 2, 3, 4, 5, 6). At least one of said part-grandstands (1) is in each case designed to be vertically displaceable. Such a telescopic grandstand (7) may also comprise one or a plurality of part-grandstands (2) which are not designed to be vertically displaceable. In the embodiments of a grandstand (7) as illustrated in Figs. 9, 10 and 12, in each case one part-grandstand (1)

is designed to be vertically displaceable and one part-grandstand (2) is not designed to be vertically displaceable. In the embodiment as illustrated in Figs. 8 to 10, four part-grandstands (1, 3, 5, 6) are designed to be vertically displaceable, while two part-grandstands (2, 4) are not designed to be vertically displaceable. The part-grandstands (1, 2, 3, 4, 5, 6) can in each case be coupled to each other laterally, as is illustrated in Figs. 13 to 15, and can also be coupled one behind the other, as is illustrated in Figs. 8, 9 and 12 to 15.

**[0018]** The part-grandstands (2, 4) which are not vertically displaceable may substantially be designed, for example, as telescopic grandstands according to the prior art, as described, for example, in EP 2 345 780 A1, in which case these are provided with coupling means in order to be able to couple them to the vertically displaceable part-grandstands (1, 3, 5, 6) according to the present invention.

**[0019]** The vertically displaceable part-grandstands (1, 3) may, for example, be designed as illustrated in Figs. 1 to 8 or 11. The part-grandstands (1) illustrated in these figures in each case comprise a number of platforms (8) which are displaceable with respect to one another in order to be able to retract or extend the part-grandstand (1, 3) telescopically. Retracting and extending said platforms (8) may be achieved, for example, in a way similar to that of the telescopic grandstands according to the prior art. Each of these platforms (8) is supported by columns (9) at its rear side. These columns (9) comprise two part-columns (9a, 9b) which can be hingedly displaced with respect to each other, as is illustrated in Figs. 1, 3, 4, 9 and 10. In Figs. 1-3, 5-6 and 11, the upper part-columns (9b) of said columns are hingedly tilted through substantially 90° with respect to the bottom part-columns (9a), so that these upper part-columns (9b) extend substantially horizontally on the rear side of the part-grandstand (1). In Figs. 4, 7-10 and 12, these upper part-columns (9b) extend substantially in line with the bottom part-columns (9a). In this position, these part-columns (9a, 9b) can be locked with respect to each other by means of the security shells (21) so that the platforms (8) can subsequently be displaced vertically with respect to said columns (9). In the illustrated vertically displaceable part-grandstands, the height of the columns (9) of the part-grandstand (1) can thus be doubled. If a part-grandstand (1) has to be raised even higher, for example, in order to be able to arrange three part-grandstands behind one another in a stepped manner, as in the arrangement illustrated in Fig. 15, an additional part-column (not shown) which hinges in a similar manner could be attached to the highest part-column (9b).

**[0020]** In both illustrated embodiments, the vertically displaceable part-grandstands (1, 3) comprise a frame (10) from which all platforms (8) can be suspended. In the first embodiment, as illustrated in Figs. 1 to 10, the frame (10) comprises cross pieces which are provided with entrainment elements (23) from which the platforms (8) can be suspended.

On the rear side, each platform (8) of the illustrated vertically displaceable part-grandstands (1) is furthermore provided with a guide block (11).

In the second embodiment, each of these guide blocks (11) is detachably hooked onto the frame (10) by means of fastening hooks (22) in order to suspend the platforms (8) from the frame (10), as is illustrated in Fig. 12. These fastening hooks (15) can clearly be seen in Fig. 12.

In the first embodiment, the frame (10) is vertically displaceable by means of linkage arms (15), said linkage arms (15) being actuated by means of electric actuators (16). In this embodiment, telescopic wind bracings (18) are provided on the columns (9) of each platform (8) in order to ensure that the displacement takes place smoothly. The platforms (8) are entrained by the entrainment elements (23) which engage underneath the platforms (8) in the retracted position and thus with the frame (10) in order to displace the former vertically with respect to the columns (9). To this end, the part-columns (9a, 9b) obviously have to be arranged in line with one another first. In this way, the part-grandstand (1) can be displaced between its base position, as illustrated in Fig. 1, and its raised position, as illustrated in Fig. 8.

**[0021]** In the second embodiment, the frame (10) is vertically displaceable by means of electric spindles. In this second embodiment, the platforms (8) hook onto this frame (10) by means of the fastening hooks (22) in the retracted position. If the frame (10) is displaced vertically, the platforms (8) can thus be entrained by this frame (10) so that these can be vertically displaced with respect to the columns (9).

During displacement of the frame (10), the movement of the platforms (8) with respect to the columns (9) is guided in both embodiments by means of the guide blocks (11).

These guide blocks (11) comprise thrust bearings (12) in order to guide the guide blocks (11) smoothly along the columns (9).

**[0022]** In the first embodiment, the displacement of the frame (10) with respect to guide profiles (17) is additionally guided by means of guide wheels.

**[0023]** After the part-grandstand (1) has been moved to its raised position, as illustrated in Fig. 5, the position of the platforms (8) with respect to the columns (9) can be locked by means of, for example, locking pins which are fitted in locking apertures (20) (see Fig. 7) or, for example, by means of locking hooks (13) and optionally by means of an additional shaft (14) (see Fig. 11). When moving the part-grandstand (1) out of the base position, it is possible to remove the locking pins or to open the locking hooks (13), respectively, to this end and, in the raised position, to arrange the locking pins in the locking apertures (20) or to hook the locking hooks (13) onto the frame (10) again. Conversely, when moving the part-grandstand (1) from the raised position to the base position, the locking pins can be removed from the locking apertures (20) again or the part-grandstand (1) can first be slightly raised to unlock the locking hooks (13) and can subsequently be moved freely to the base position

by means of the frame (10), respectively.

[0024] After it has been locked in the raised position, the frame (10) does not have to remain in this raised position, but can be lowered again, as is illustrated in Fig. 12. In the second embodiment, this causes the platforms (8) to be unhooked from said frame (10) as a result of which they can be displaced telescopically with respect to each other so as to be able to retract and extend the part-grandstand (1). In the first embodiment, the frame (10) does not have to be lowered for this purpose, as can be seen in Figs. 9 and 10.

[0025] When the part-grandstand (1) is in its raised position, it can be coupled behind another part-grandstand (2) which is in its base position, as is illustrated in Figs. 9, 10 and 12. In this case, the front part-grandstand (2) serves to support the front platform of the part-grandstand (1) which is in its raised position. Both telescopic part-grandstands (1, 2) can then be extended telescopically as a composite telescopic grandstand (7), as can be seen in Fig. 10.

[0026] Part-grandstands (1, 2, 3, 4, 5, 6) can also be coupled to each other laterally. To this end, the vertically displaceable part-grandstand (1) of the first embodiment comprises lateral coupling pieces (19).

[0027] Figs. 13 to 15 furthermore illustrate how different composite telescopic grandstands (7) can be produced using 6 part-grandstands (1, 2, 3, 4, 5, 6), two of which part-grandstands (2, 4) are not vertically displaceable, two of which part-grandstands (1, 3) can be lifted by the height of these part-grandstands (1, 3) and two of which part-grandstands (5, 6) can be lifted by the height of two of these part-grandstands (1, 3). In the arrangement illustrated in Fig. 13, these six part-grandstands (1, 2, 3, 4, 5, 6) are all in their base position and they are coupled laterally to one another to form one elongate telescopic grandstand (7). In the arrangement illustrated in Fig. 14, three part-grandstands (1, 3, 5) have been lifted to their raised position and coupled behind three part-grandstands (2, 4, 6) which are in their base position. In the arrangement illustrated in Fig. 15, the part-grandstands (5, 6) which can be lifted even further have been lifted to their highest position and coupled behind the two part-grandstands (1, 3) which can be lifted by the height of the part-grandstands (1, 3) and are in their raised position, and are in turn coupled behind the part-grandstands (2, 4) which are in the base position.

## Claims

1. Telescopic grandstand (7) comprising a plurality of telescopic part-grandstands (1, 2, 3, 4, 5, 6), in which at least one part-grandstand (1) is designed to be vertically displaceable, **characterized in that** said vertically displaceable part-grandstand (1) comprises a plurality of telescopic platforms (8) which are displaceable with respect to one another and comprises a frame (10) from which all platforms (8) are

suspendeable, in which said frame (8) is vertically displaceable in order to displace the part-grandstand (1) vertically.

2. Telescopic grandstand (7) according to Claim 1, **characterized in that** the frame (10) is vertically displaceable by means of electric spindles.
3. Telescopic grandstand (7) according to Claim 1, **characterized in that** the frame (10) is vertically displaceable by means of linkage arms (15) and actuators (16).
4. Telescopic grandstand (7) according to one of the preceding claims, **characterized in that** said vertically displaceable part-grandstand (1) is displaceable between a base position, in which said part-grandstand (1) can be coupled laterally to another telescopic part-grandstand (2, 3, 4, 5, 6) in the base position in order to produce a composite telescopic grandstand (7), and a raised position, in which said part-grandstand (1) can be coupled behind another telescopic part-grandstand (2, 3, 4, 5, 6) in the base position to form a composite telescopic grandstand (7).
5. Telescopic grandstand (7) according to Claim 4, **characterized in that** said vertically displaceable part-grandstand (1) comprises a plurality of telescopic platforms (8) which are displaceable relative to one another, in which each platform (8) is supported at its rear side by means of columns (9) and in which the columns (9) of each platform (8) are vertically displaceable in order to displace the part-grandstand (1) vertically.
6. Telescopic grandstand (7) according to Claim 5, **characterized in that** each said column (9) comprises two or a plurality of part-columns (9a, 9b) which are hingedly displaceable with respect to one another.
7. Telescopic grandstand (7) according to Claim 6, **characterized in that** each said column (9) comprises at least two part-columns (9a, 9b) which are displaceable with respect to one another through essentially 90°.
8. Telescopic grandstand (7) according to one of Claims 5 to 7, **characterized in that** each said platform (8) comprises one or a plurality of guide blocks (11) for guiding the platform (8) when displacing the frame (8) vertically with respect to the columns (9).
9. Telescopic grandstand (7) according to Claim 8, **characterized in that** the guide blocks (11) are detachably connected to the frame (8).

10. Telescopic grandstand (7) according to one of the preceding claims, **characterized in that** said vertically displaceable part-grandstand (1) comprises locking means (13, 14, 20) for locking the part-grandstand (1) in the position in which it has been placed. 5

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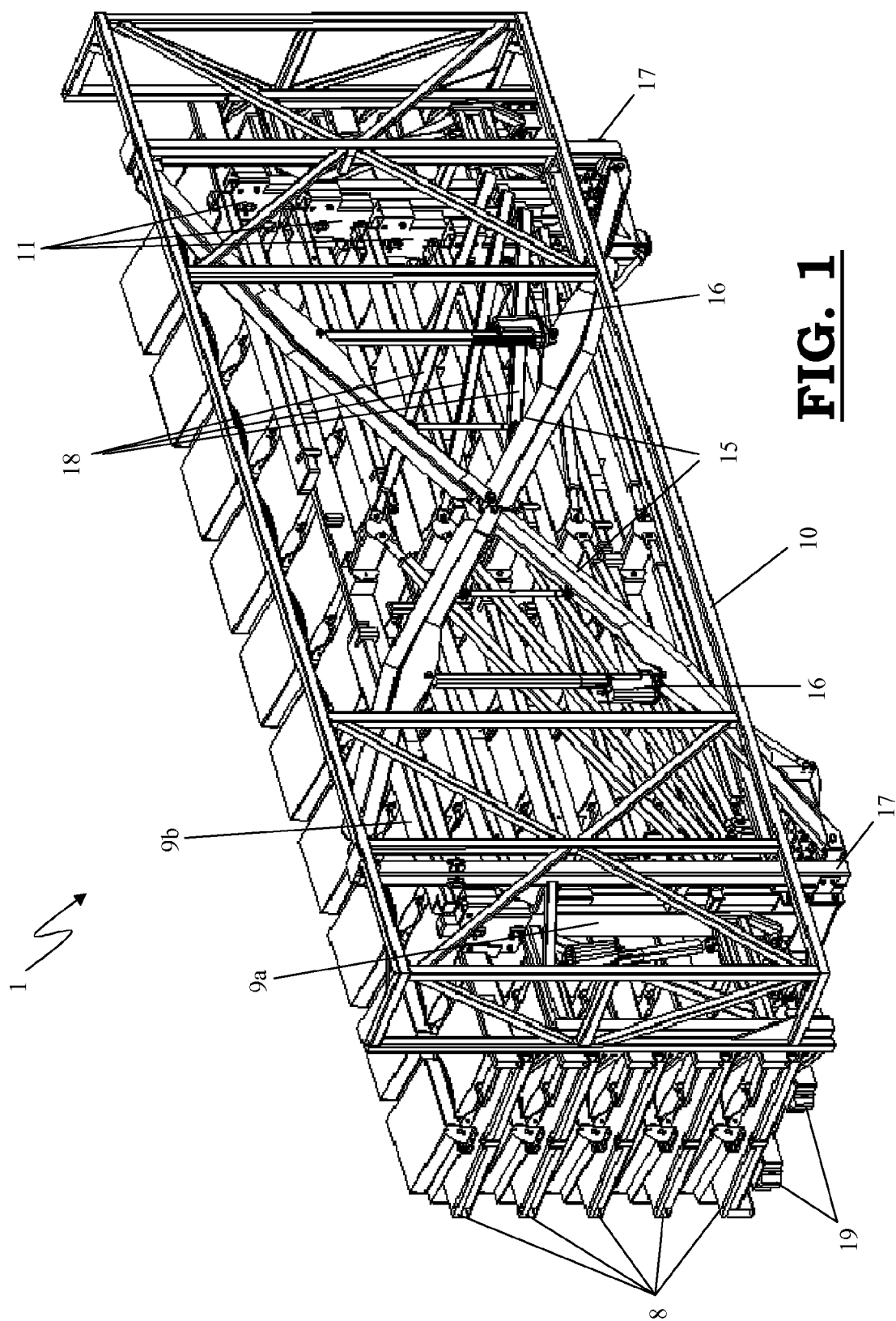
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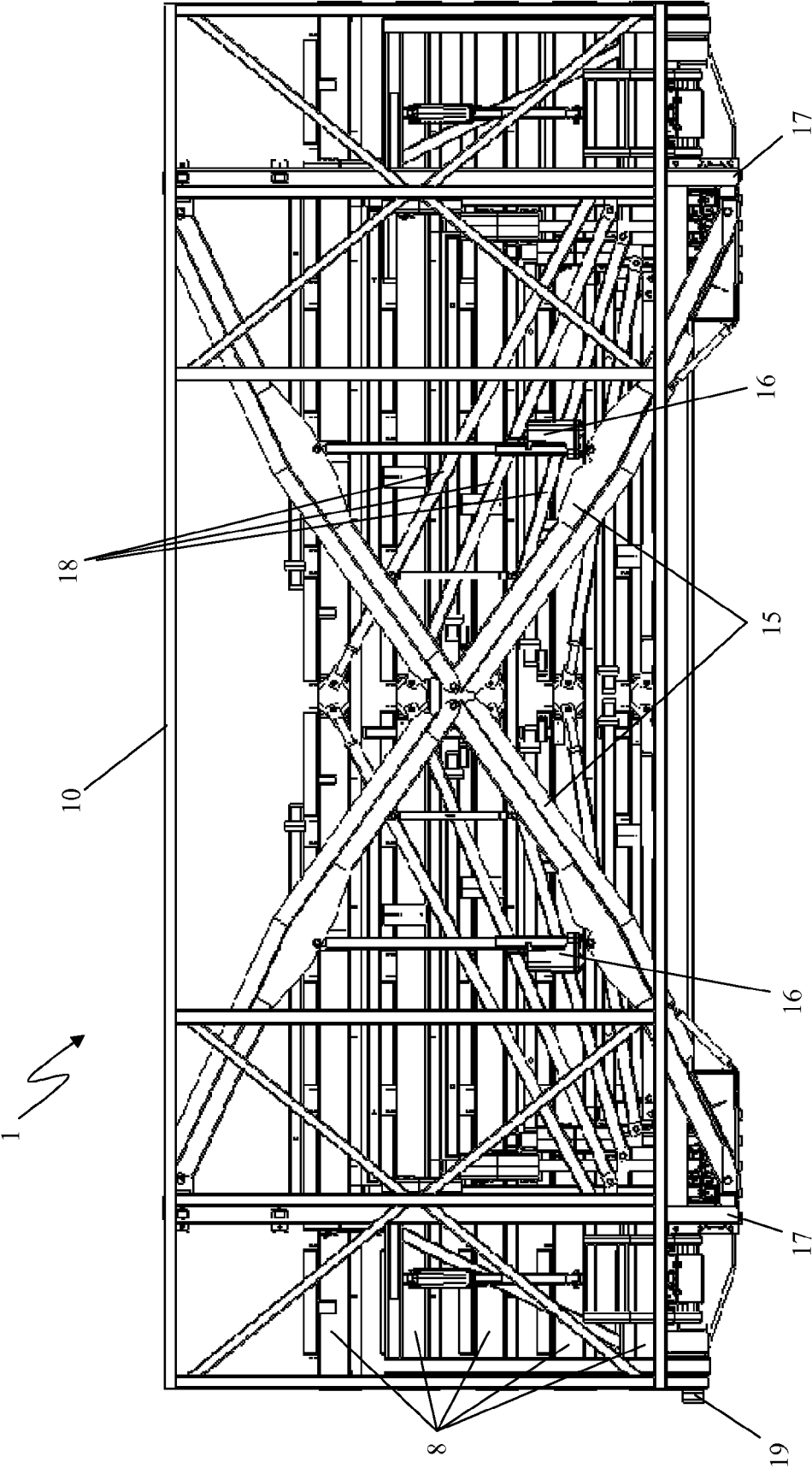
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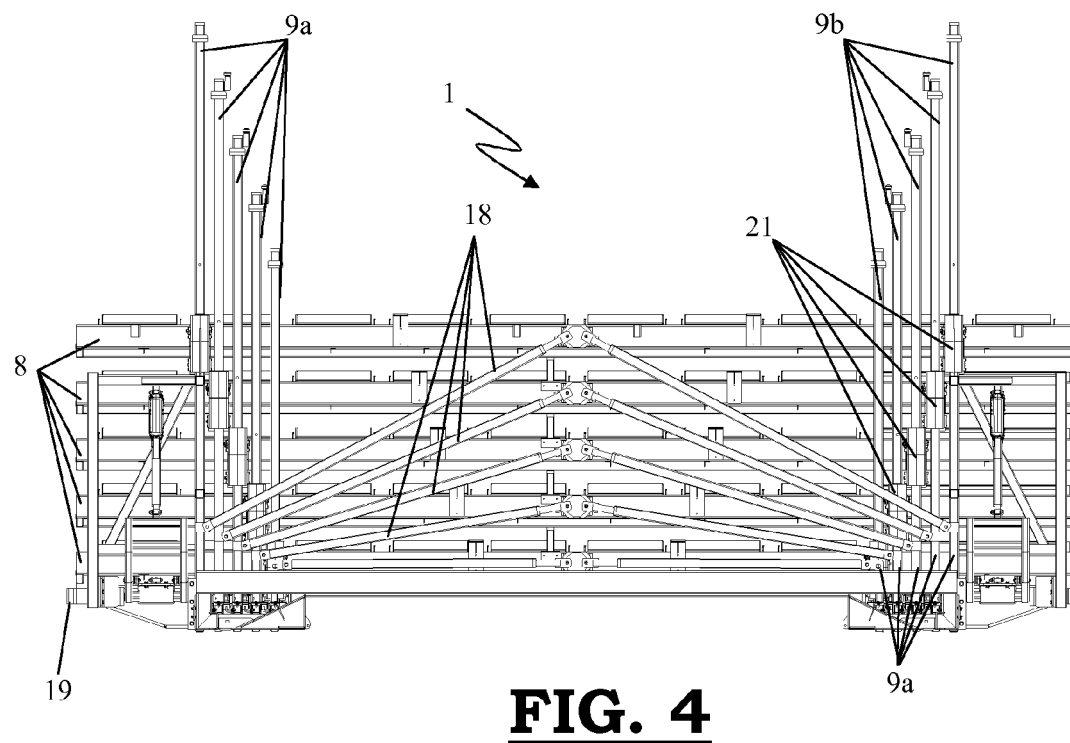
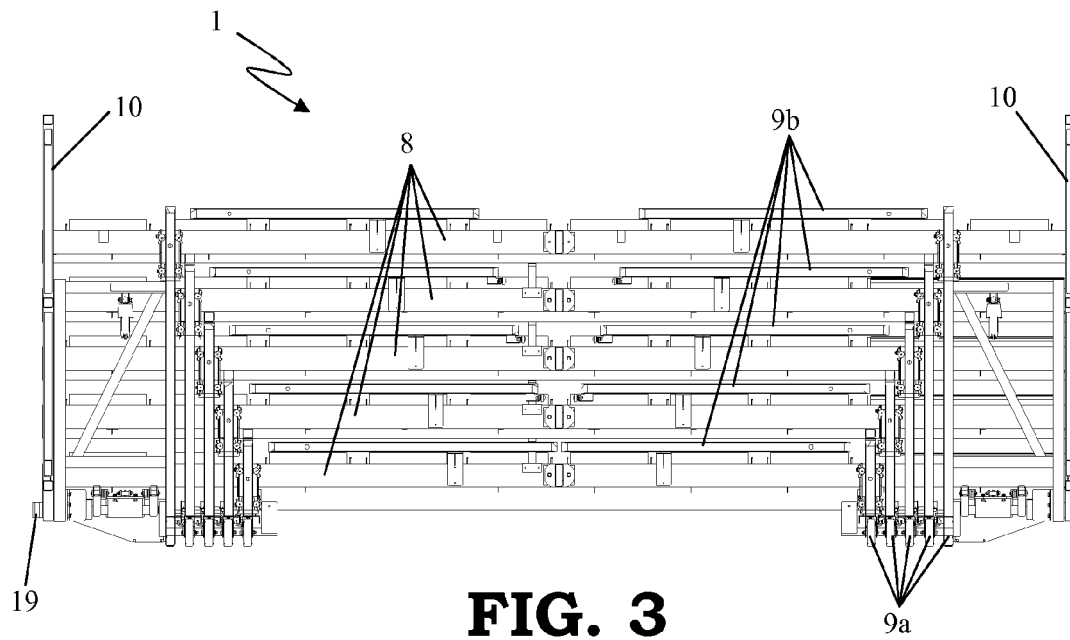
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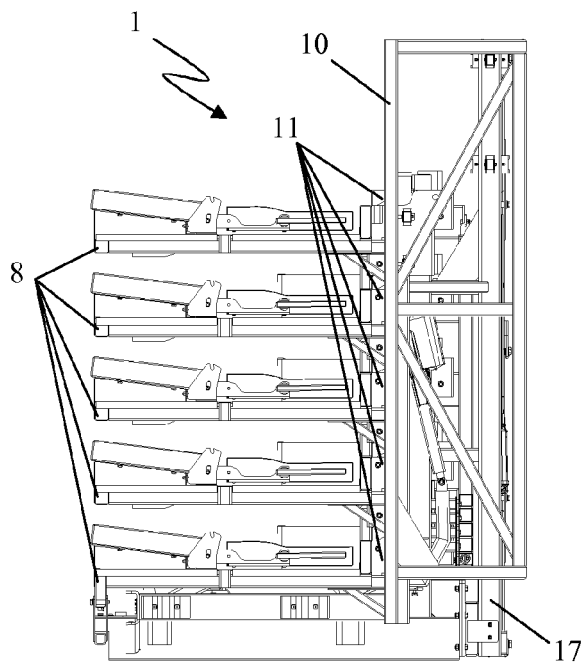
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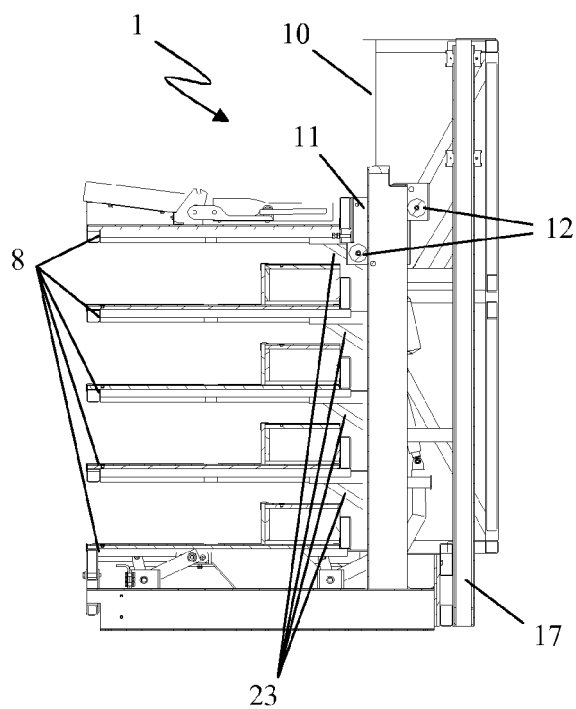


**FIG. 2**

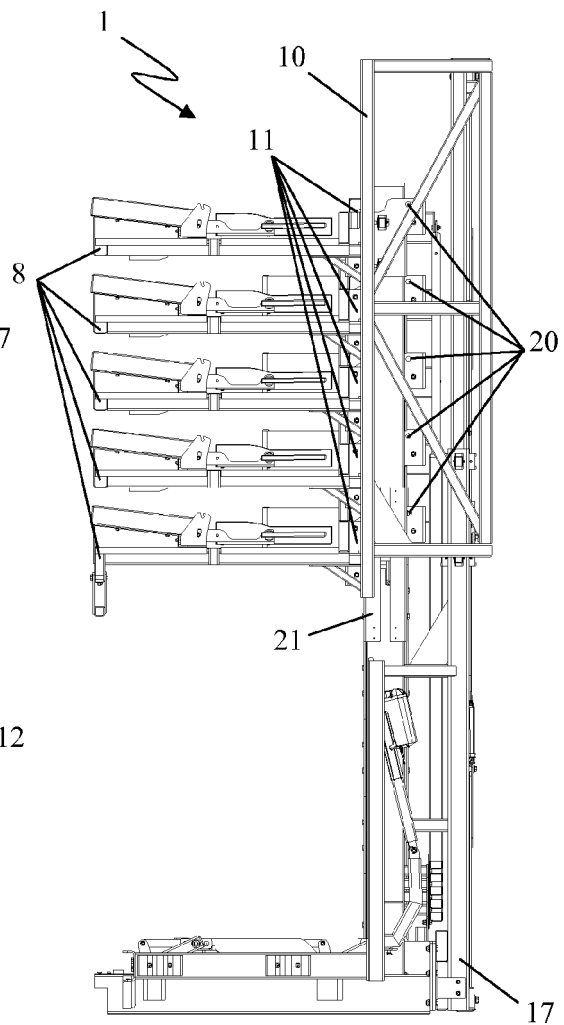




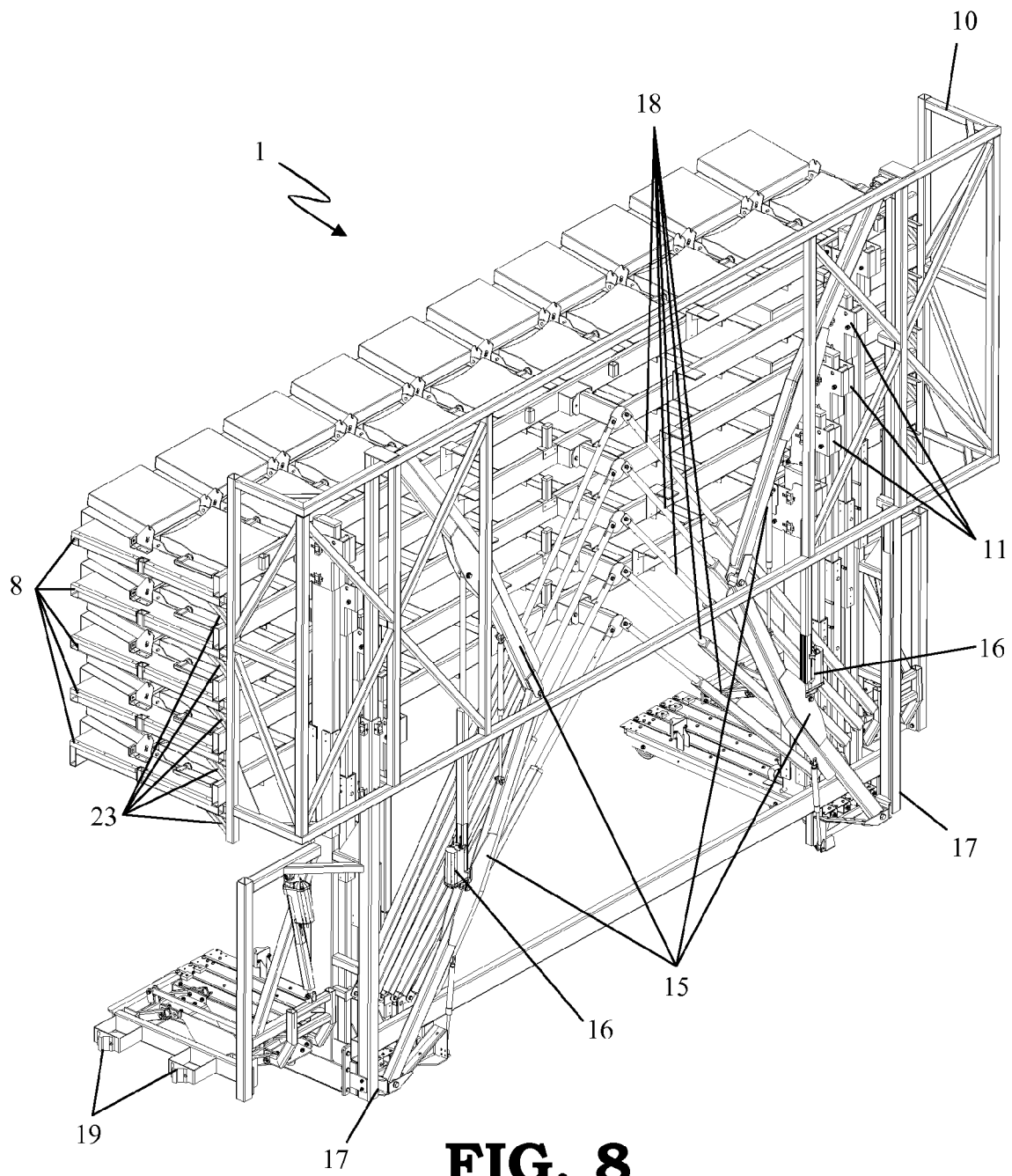
**FIG. 5**



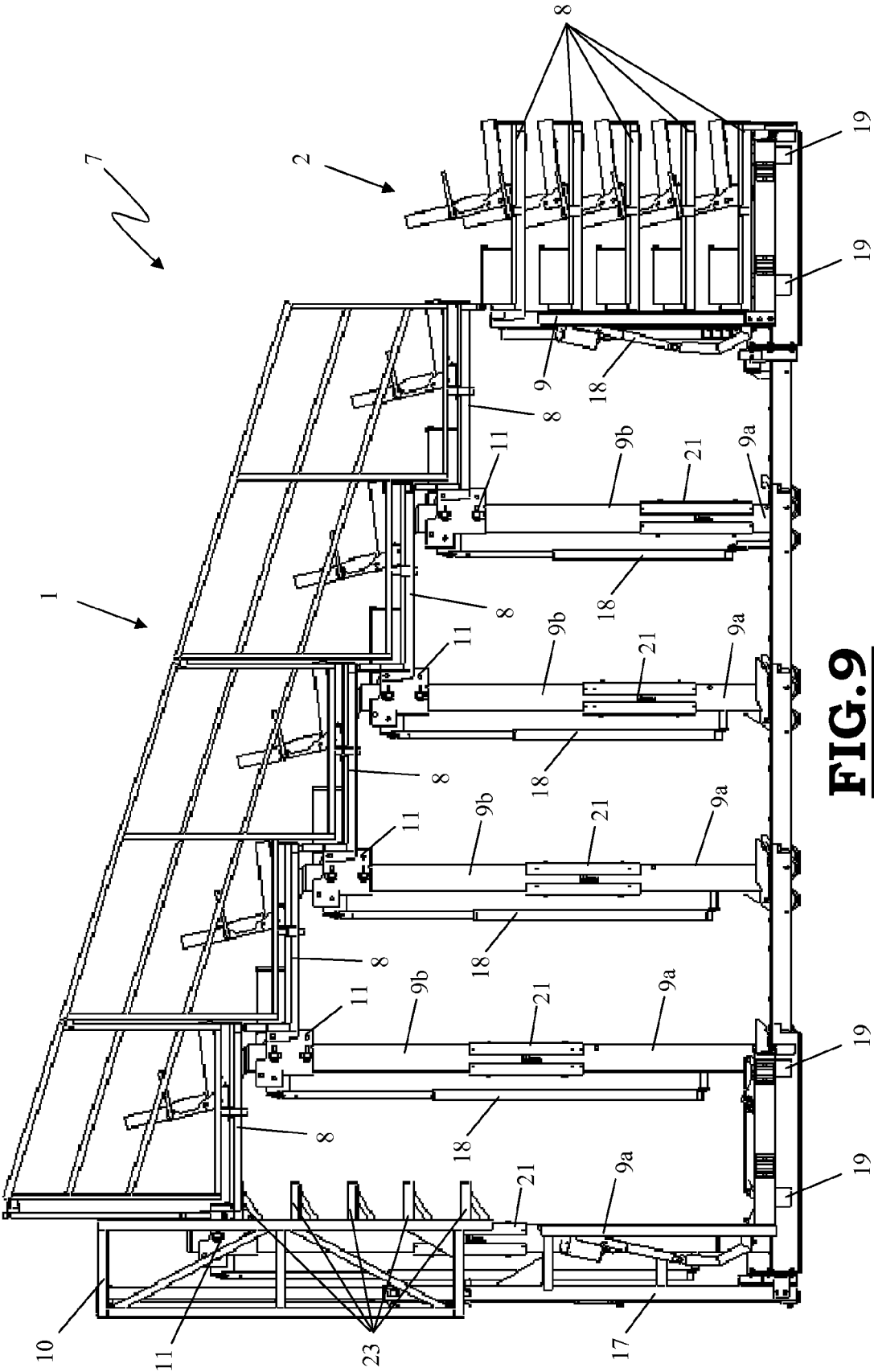
**FIG. 6**



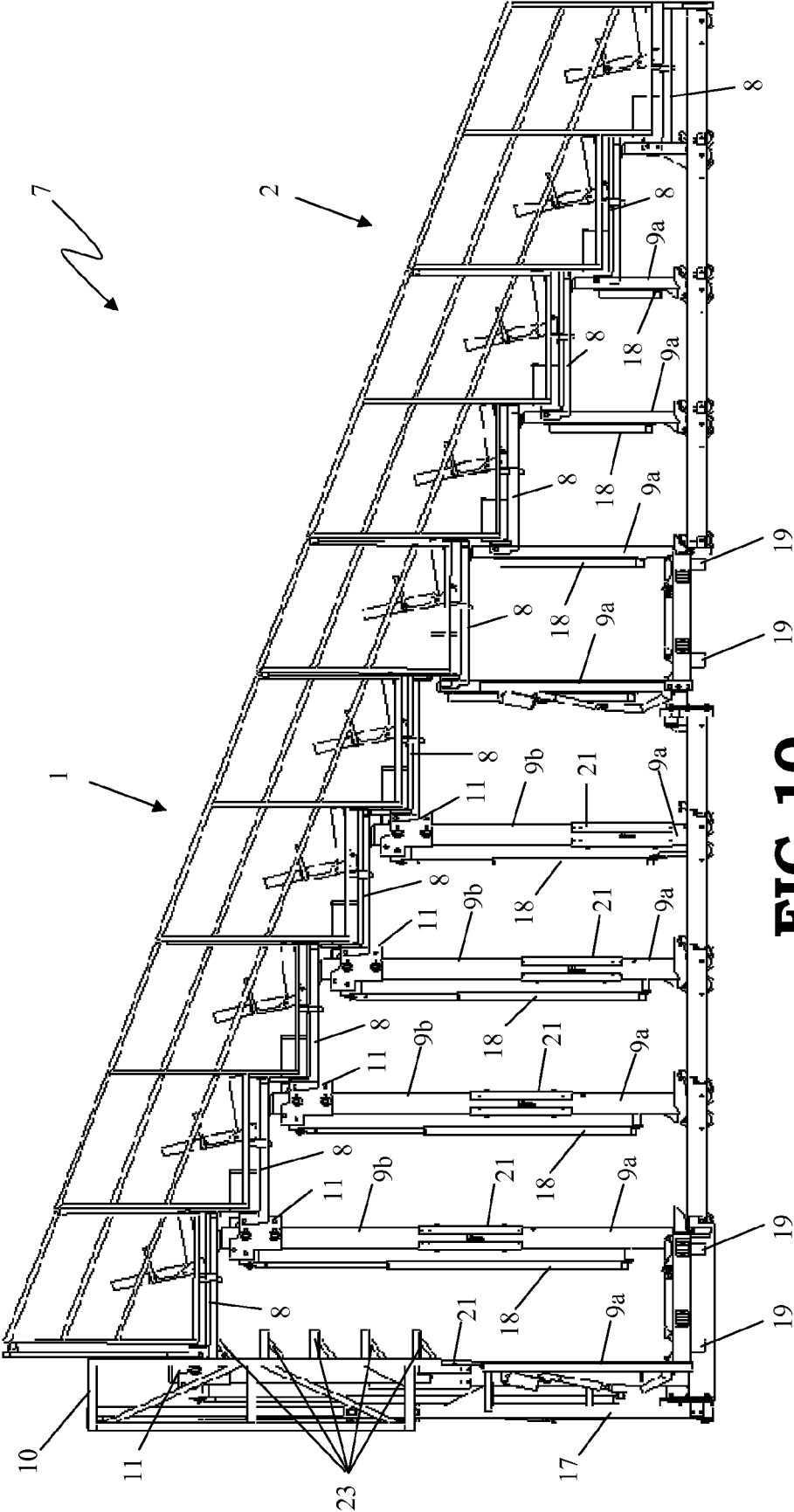
**FIG. 7**



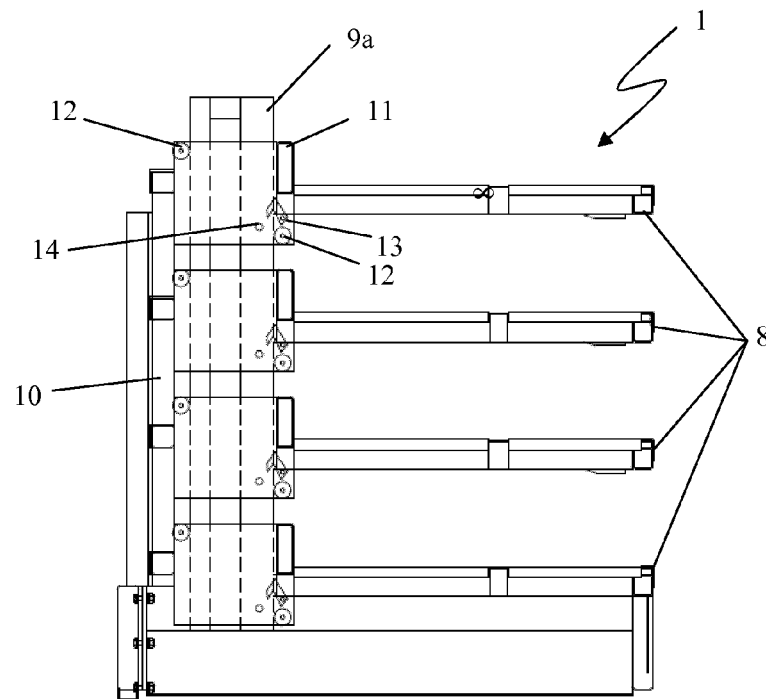
**FIG. 8**



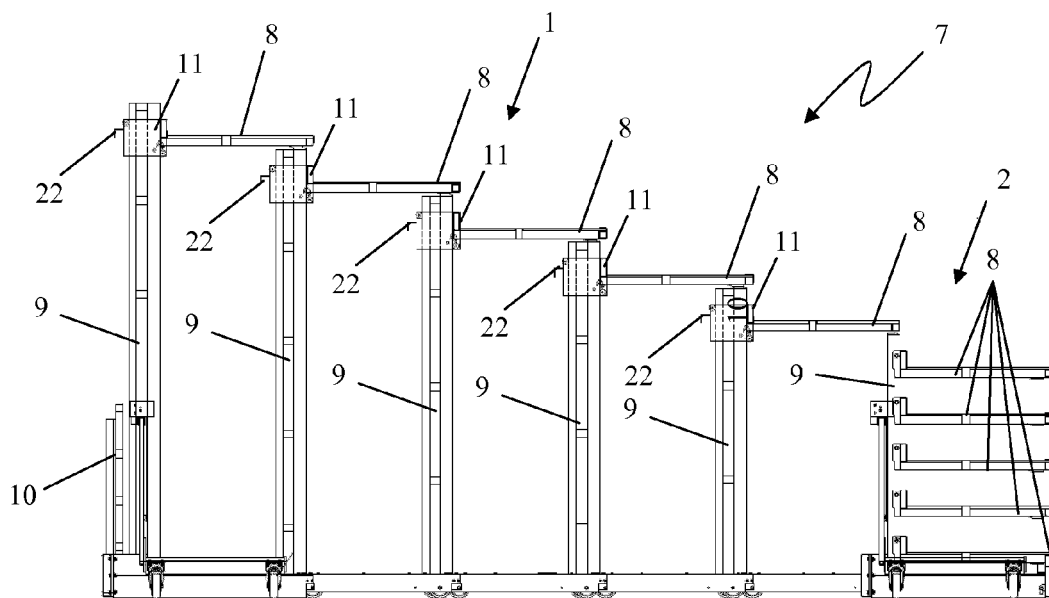
**FIG. 9**



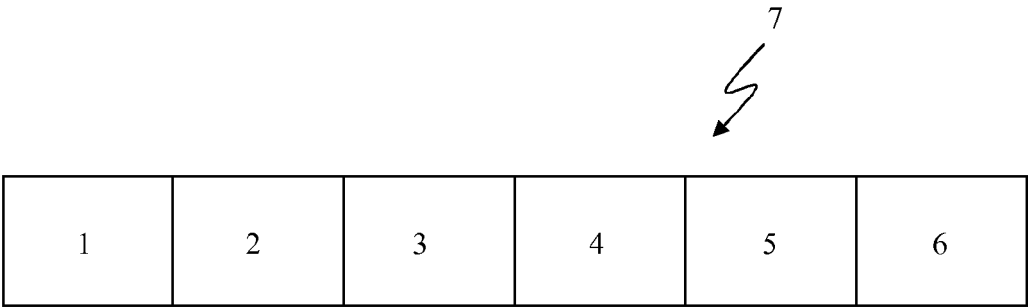
**FIG. 10**



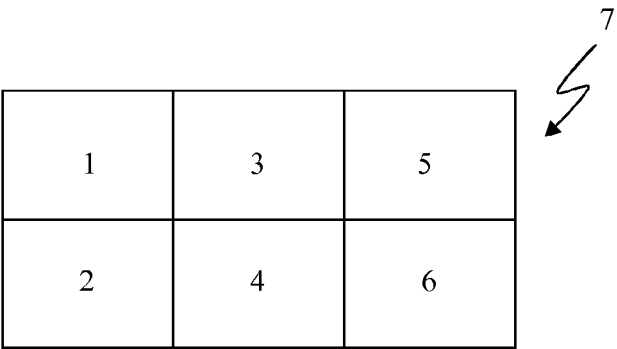
**FIG. 11**



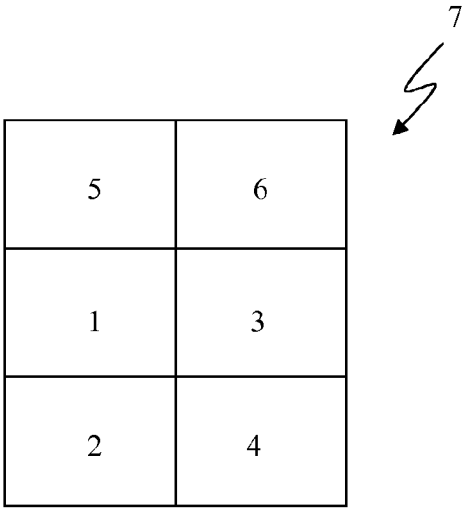
**FIG. 12**



**FIG. 13**



**FIG. 14**



**FIG. 15**



## EUROPEAN SEARCH REPORT

Application Number  
EP 12 19 7224

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                     |                                  |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                       | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (IPC) |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FR 2 959 262 A1 (COMPAGNONE ROCCO [FR])<br>28 October 2011 (2011-10-28)<br>* claims 1-3; figures *  | 1,4-7,10                         | INV.<br>E04H3/12                        |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 2011/099915 A1 (SUDKAMP JOE B [US] ET AL)<br>5 May 2011 (2011-05-05)<br>* claims; figures *      | 1,4,5,10                         |                                         |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | US 2010/192477 A1 (WISNER DONALD W [US] ET AL)<br>5 August 2010 (2010-08-05)<br>* claims; figures * | 1,4-7,10                         |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                     |                                  | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                     |                                  | E04H                                    |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                     |                                  |                                         |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                     | Date of completion of the search | Examiner                                |
| The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                     | 11 March 2013                    | Fordham, Alan                           |
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