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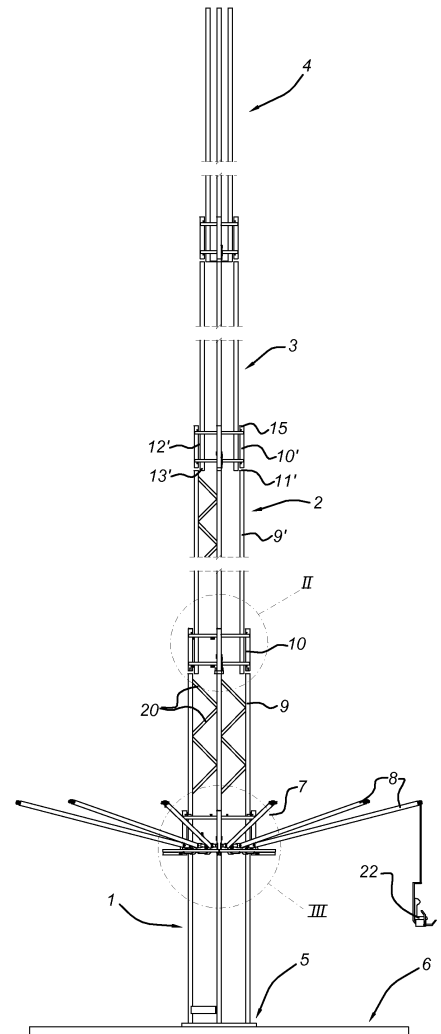
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(54) **Telescopic mast assembly**

(57) A mast assembly comprises a vertically erectable mast made up of a plurality of telescopic mast parts. Furthermore, a carriage is provided which can be moved along the mast parts. This is made possible by the fact that the mast parts consist of two mast sections. The topmost of said mast sections can be coupled to the carriage and to one another, respectively, and can be moved up and down with the carriage along the extended bottom mast sections which have been locked with respect to one another.

Fig 1



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Description

[0001] The invention relates to a mast assembly, comprising a vertically erectable mast made up of a plurality of mast parts which are connected to one another, a carriage which can be guided along the mast, as well as lifting means for moving the carriage along the mast.

[0002] A mast assembly of this type is known and comprises a number of identical mast parts. During construction of the mast assembly, these mast parts have to be placed on top of one another by means of a crane and subsequently attached to one another. In this manner, a uniform mast having fixed transverse dimensions over its height is obtained, along which the carriage can be guided up and down. Such a known mast assembly is often used as a fairground attraction, which means that it frequently has to be assembled and disassembled.

[0003] However, in this connection it has been found that the complicated way in which the mast assembly has to be assembled and disassembled results in problems. The most important one of these is the fact that a crane always has to be used, which entails high costs. Furthermore, assembly and disassembly of the mast assembly takes a relatively long time. However, until now, these problems had been regarded as being inevitable, since the carriage had to be guided in a uniform manner along the entire height of the mast.

[0004] However, particularly with the ever-increasing loads, these problems become more and more pressing. There is therefore a need for a mast assembly which is simpler to assemble and by means of which the carriage can nevertheless be guided along the entire height of the mast in a reliable manner.

[0005] It is therefore an object of the invention to provide a mast assembly of the type mentioned in the preamble which does not have these drawbacks with respect to assembly and disassembly, while the desired secure guidance of the carriage along the mast is maintained.

[0006] This object is achieved by the fact that:

- at least two of the mast parts can slide telescopically with respect to one another,
- in each case the outer mast part of two telescopic mast parts comprises two mast sections which are fitted to one another by means of removable mounting means,
- the top mast section of said two mast sections has guide elements for guiding said top mast section and the inner mast part with respect to one another,
- the carriage and said top mast section are provided with coupling means for coupling said carriage to the top mast section,
- the inner mast part and the bottom mast section are provided with support means for supporting said inner mast part and said bottom mast section with respect to one another in the position in which the inner mast part is moved upwards with respect to the outer mast part,

- and control means are provided by means of which the mounting means, coupling means and support means can be activated and deactivated, respectively, depending on the position of the carriage along the mast, in such a manner that the mounting means are activated and the coupling means deactivated if the carriage is positioned along the bottom mast section, that the mounting means are deactivated and the coupling means are activated if the carriage is positioned along the top mast section, and that the mounting means are deactivated and the coupling means as well as the support means are activated if the carriage together with the top mast section coupled thereto is positioned along the inner mast part supported by the bottom mast section.

[0007] The mast assembly according to the invention uses telescopic mast parts, as a result of which assembly of the mast can be effected in a quick and simple manner. To this end, the mast assembly may have dedicated mast drives, so that the mast parts can be moved independently with respect to one another. Returning the mast to the transport position can also be effected in a simple manner by enabling the mast parts to slide into one another again. To this end, it is not necessary to use a crane. In addition, the assembly and disassembly of the mast can be carried out quickly, as the step of accurately positioning the mast parts with respect to one another and the subsequent attachment of the mast parts to one another can be omitted.

[0008] The mast assembly according to the invention may also be equipped with more than two mast parts which can be accommodated inside one another. In this connection, at least three telescopic mast parts may be provided, with the top mast section of an outer mast part as well as the top mast section of a mast part which is situated directly inside the latter being provided with auxiliary coupling means for coupling said top mast sections to one another, in such a manner that the auxiliary coupling means are deactivated if the top mast section of the outer mast part is situated along the bottom mast section of the mast part which is situated directly inside the latter, and activated if the top mast section of the outer mast part is situated along the top mast section of the mast part which is situated directly inside the latter.

[0009] With such a design, it is even more advantageous that the mast assembly can be assembled without using a crane. The mast assembly can, for example using four or five mast parts, reach such a height that the crane which would have to be used would have to be correspondingly tall. The costs of using such a crane are likewise high.

[0010] The mast parts can be designed in various ways. Preferably, they consist of framework structures which have a low weight and a high degree of strength and rigidity. In particular, each mast part may comprise at least three uprights, which are connected to each oth-

er, so that the uprights of different mast parts are placed directly next to one another and can be guided with respect to one another. The uprights may be connected to one another by means of framework structures. Preferably, four uprights are used, and each mast part is square in cross section.

[0011] The carriage may be designed in a variety of ways. If the mast assembly is used as a fairground attraction, the carriage may have a number of transversely extending arms which are evenly distributed in the circumferential direction with respect to the longitudinal axis of the mast. At the end of each arm, a seat structure for at least one person may be provided. The persons situated in the seat structures may undergo the sensation of moving upwards along the extended mast, with the ultimate view being determined by the height of the mast. In addition, a rotating movement of the carriage can be achieved if a base is provided and the mast is arranged on the base so as to be able to rotate with respect to its longitudinal axis.

[0012] The invention will be explained in more detail below with respect to an exemplary embodiment illustrated in the figures, in which:

Fig. 1 shows a side view of the amusement device in the extended and folded-out position;

Fig. 2 shows detail II from Fig. 1 on an enlarged scale and in perspective;

Fig. 3 shows detail III from Fig. 1 on an enlarged scale and in perspective;

Fig. 4 shows a detail in perspective in which case the carriage of the amusement device has reached the highest position on the mast;

Fig. 5 shows a side view of an amusement device in the retracted and folded-in position.

[0013] The mast assembly according to the invention illustrated in Fig. 1 comprises four mast parts 1-4, the bottom mast part 1 of which is supported on a basis 6 by means of a slewing ring 5, for example on a suitably supported semitrailer, on which the retracted and folded-in mast assembly (as illustrated in Fig. 5) can be accommodated for the purpose of transportation. It is also possible to attach the bottom mast part rigidly, without a slewing ring, on the basis 6. The second mast part 2 is accommodated inside the bottom mast part 1 so as to slide telescopically; the third mast part 3 is accommodated inside the second mast part 2 so as to slide telescopically and the fourth mast part 4 is accommodated inside the third mast part 3 so as to slide telescopically. The carriage 7 has already moved upwards over a certain distance along the bottom mast part 1. Said carriage 7 has a number of arms 8 which extend radially outwards with respect to the mast assembly and which are evenly distributed in the circumferential direction.

[0014] The mast assembly as illustrated in Fig. 1 can be brought from the completely extended position to the retracted position illustrated in Fig. 5. In addition, the arms

8 can be folded in alongside the bottom mast part 1. From the position shown in Fig. 5, the assembly can subsequently be tilted through 90 degrees and lowered onto the semitrailer 6 which is only illustrated diagrammatically.

[0015] The manner in which the carriage 7 can move upwards along the mast assembly and, in particular, how it can pass from the bottom mast part 1 to the second mast part 2 will be described below with reference to Fig. 1 et seq. In this connection, reference is first made to Fig. 2, which shows the transition between the bottom mast part 1 and the second mast part 2. The bottom mast part 1 comprises a bottom mast section 9 and a top mast section 10, which are initially fitted to one another by means of the mounting means 11. The top mast section 10 is provided with guide elements 12, which guide the second mast part 2 when it is moved with respect to the first mast part 1.

[0016] Furthermore, support means 13 are provided, by means of which the second mast part 2 can be securely supported with respect to the bottom mast section 9 of the bottom mast part 1. When the second mast part 2 has indeed been moved so far upwards with respect to the bottom mast part 1 that it has reached the outer extended position illustrated in Fig. 2, the support means 13 are activated. The second mast part 2 is then attached to and supported on the bottom mast section 9 of the bottom mast part 1.

[0017] In a subsequent step, the mounting means 11 between the bottom mast section 9 and the top mast section 10 of the bottom mast part 1 can be deactivated. In said position, the top mast section 10 can be moved upwards along the second mast part 2. The guide elements 12 now act as means by means of which the top mast section 10 is guided along the second mast part 2. However, said displacement of the top mast section 10 of the bottom mast part 1 does not take place immediately, but only after the carriage 7, of which only the top section is partially and diagrammatically shown by means of broken lines, has reached said top mast section 10, and has been coupled thereto by means of the coupling means 14. In said position, the coupled combination of the top mast section 10 of the first mast part 1 and the carriage 7 is moved upwards along the second mast part 2. The guide elements 17 (see Fig. 4) of the top mast section 10 of the first mast part 1 in this case provide secure guidance for the combination of the carriage 7 and the top mast section 10 along the mast assembly.

[0018] This coupled combination of the top mast section 10 of the first mast part 1 and of the carriage 7 subsequently moves upwards along the second mast part 2. Said second mast part 2 in turn also comprises a bottom mast section 9' and a top mast section 10', which are releasably coupled to one another by the mounting means 11'. In addition, support means 13' are provided there, by means of which the third mast part 3 can be supported with respect to the bottom mast section 9' of the second mast part 2. Furthermore, guide elements 17'

are present, by means of which the third mast part 3 can be guided up and down with respect to the second mast part 2. In addition, auxiliary coupling means 15 are provided, the purpose of which will be explained below.

[0019] As soon as the combination comprising the carriage 7 and the top mast section 10 has reached the top mast section 10' of the second mast part 2, the sequence of activating and deactivating the mounting means 11' and the support means 13' repeats. This means that the top mast section 10' of the second mast part 2 can be moved upwards along the third mast part 3. However, before the displacement in an upward direction starts, the top mast section 10 of the first mast part 1 is coupled to the top mast section 10' of the second mast part 2, in particular by the auxiliary coupling means 15. In this position, the combination consisting of the carriage 7, the top mast section 10 of the first mast part 1 which is coupled thereto via the coupling means 14, and the top mast section 10 of the first mast part 1 which is coupled via the auxiliary coupling means, and the top mast section 10' of the second mast part 2 can be moved upwards along the third mast part 3. The guide elements 12' in this case provide guidance for said combination along the third mast part 3.

[0020] It will be clear that the same sequence of activation and deactivation of the various parts of the mast assembly will occur at the transition between the third mast part 3 and the fourth mast part 4, and any further mast parts, if present. In the position illustrated in Fig. 4, the carriage 7 has reached the top of the top mast part 4, with the various inserted top mast sections 10, 10' and 10'' being shown next to one another. The coupling means 14 between the carriage 7 and the top mast section 10, as well as the auxiliary coupling means 15 between the top mast sections 10 and 10' and the auxiliary coupling means 16 between the top mast sections 10' and 10'' can also be seen. Furthermore, the guide elements 17 between the top mast sections 10 and 10' in the form of rollers can also be seen. The guide elements 17' between the top mast section 10' and 10'' as well as the guide elements 17'' between the top mast section 10'' and the fourth mast part 4 are also represented.

[0021] As can also be seen in Fig. 4, the arms 8 are connected to the carriage 2 by means of hinges 17. At the ends of the arms, seating means 22 may be suspended, as is diagrammatically illustrated in Fig. 1.

[0022] As can furthermore be seen in the figures, each mast part 1-4 comprises four uprights 19. These uprights 19 are connected to one another by rods 20 which extend crosswise (illustrated diagrammatically), so that framework structures are formed. Furthermore, the carriage comprises a number of columns 21, each of which is situated near one of the uprights 19.

Claims

1. Mast assembly, comprising a vertically erectable

mast made up of a plurality of mast parts (1-4) which are connected to one another, a carriage (7) which can be guided along the mast, as well as lifting means for moving the carriage (7) along the mast, **characterized**

- **in that** at least two of the mast parts (1-4) can slide telescopically with respect to one another,
 - **in that** in each case the outer mast part of two telescopic mast parts comprises two mast sections (9, 10; 9', 10'...) which are fitted to one another by means of removable mounting means (11, 11'...),

- **in that** the top mast section (10, 10'...) of said two mast sections (9, 10; 9', 10'...) has guide elements (12, 12'...) for guiding said top mast section (10, 10'...) and the inner mast part with respect to one another,

- **in that** the carriage (7) and said top mast section (10) are provided with coupling means (14) for coupling said carriage (7) to the top mast section (10),

- **in that** the inner mast part and the bottom mast section (9, 9'...) are provided with support means (13, 13'...) for supporting said inner mast part and said bottom mast section (9, 9'...) with respect to one another in the position in which the inner mast part is moved upwards with respect to the outer mast part,

- and **in that** control means are provided by means of which the mounting means (11, 11'...), coupling means (14, 14'...) and support means (13, 13'...) can be activated and deactivated, respectively, depending on the position of the carriage (7) along the mast, in such a manner that the mounting means (11, 11'...) are activated and the coupling means (14, 14'...) deactivated if the carriage is positioned along the bottom mast section, that the mounting means (11, 11'...) are deactivated and the coupling means (14, 14'...) are activated if the carriage (7) is positioned along the top mast section, and that the mounting means (11, 11'...) are deactivated and the coupling means (14, 14'...) as well as the support means (13, 13'...) are activated if the carriage (7) together with the top mast section (10, 10'...) coupled thereto is positioned along the inner mast part supported by the bottom mast section (9, 9'...).

2. Mast assembly according to Claim 1, in which at least three telescopic mast parts (1-4) are provided, and the top mast section (10, 10'...) of an outer mast part as well as the top mast section (10, 10'...) of a mast part which is situated directly inside the latter is provided with auxiliary coupling means (15, 16) for coupling said top mast sections (10, 10'...) to one another, in such a manner that the auxiliary coupling

means (15, 16) are deactivated if the top mast section (10, 10'...) of the outer mast part is situated along the bottom mast section (10, 10'...) of the mast part which is situated directly inside the latter, and activated if the top mast section (10, 10'...) of the outer mast part is situated along the top mast section (10, 10'...) of the mast part which is situated directly inside the latter.

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3. Mast assembly according to Claim 1 or 2, in which the top mast section (10, 10'...) is provided with rollers (17, 17'...), by means of which the inner mast part is guided with respect to the outer mast part. 10
4. Mast assembly according to one of the preceding claims, in which each mast part (1-4) comprises at least three uprights (19) which are connected to one another, and the uprights (19) of different mast parts (1-4) are placed directly next to one another. 15
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5. Mast assembly according to Claim 4, in which in each case two uprights (19) situated next to one another form a framework structure.
6. Mast assembly according to Claim 4 or 5, in which four uprights (19) are provided and each mast part (1-4) is square in cross section. 25
7. Mast assembly according to one of the preceding claims, in which the carriage (7) has a number of transversely extending arms (8) which are evenly distributed in the circumferential direction with respect to the longitudinal axis of the mast. 30
8. Mast assembly according to Claim 7, in which a seat structure (20) is provided at the end of each arm (8) for at least one person. 35
9. Mast assembly according to one of the preceding claims, in which a base (6) is provided, and the mast is arranged on the base so as to be able to rotate with respect to its longitudinal axis. 40

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Fig 1

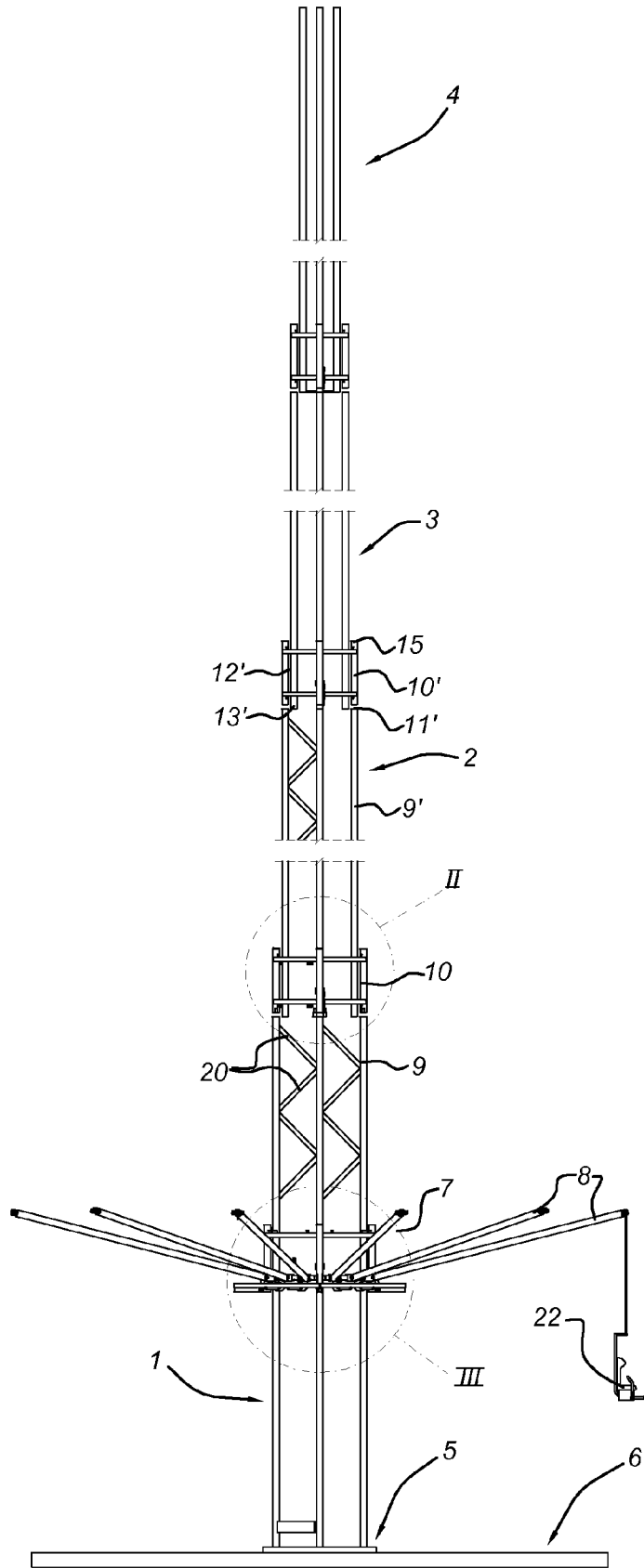


Fig 3

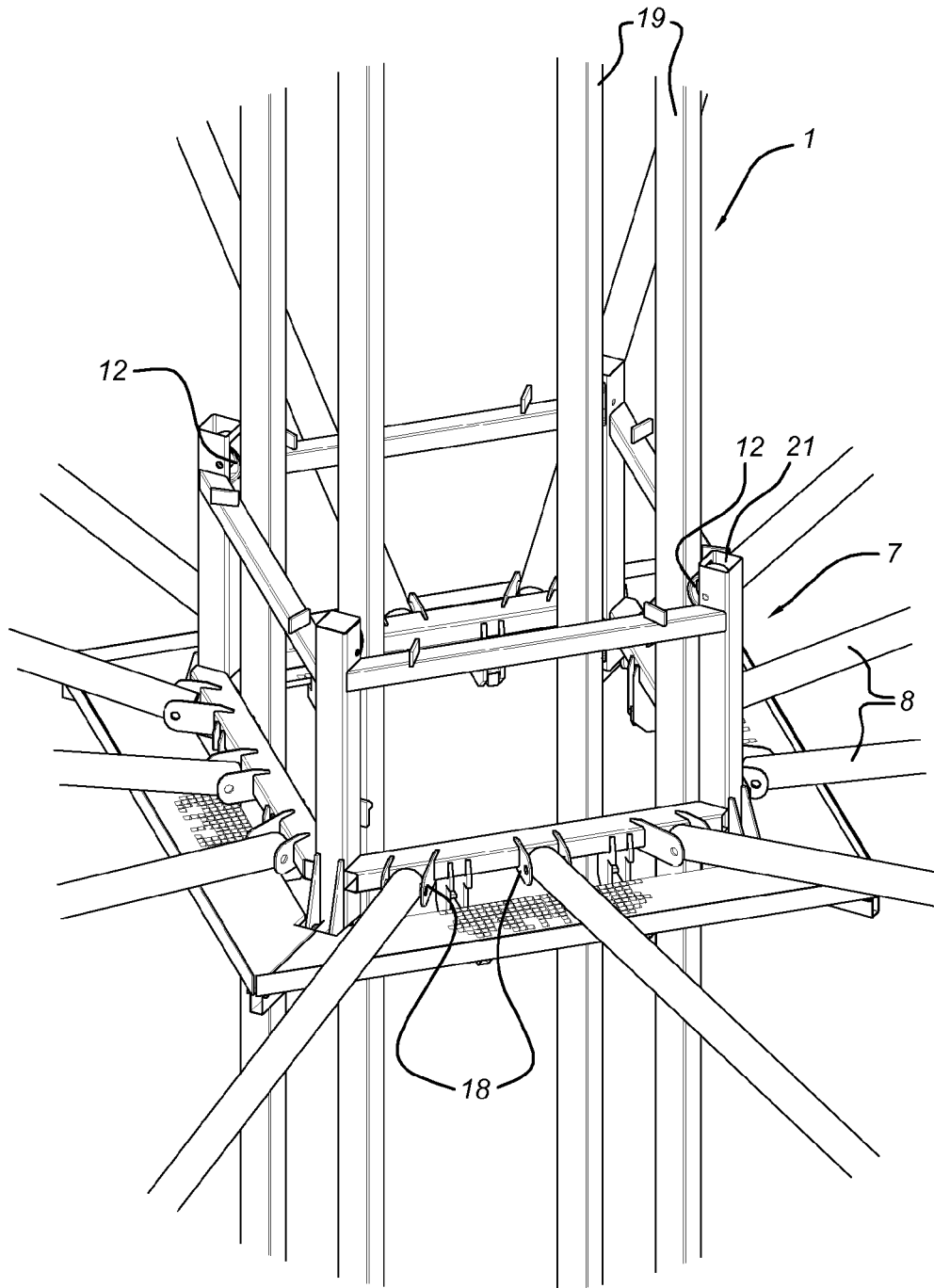


Fig 4

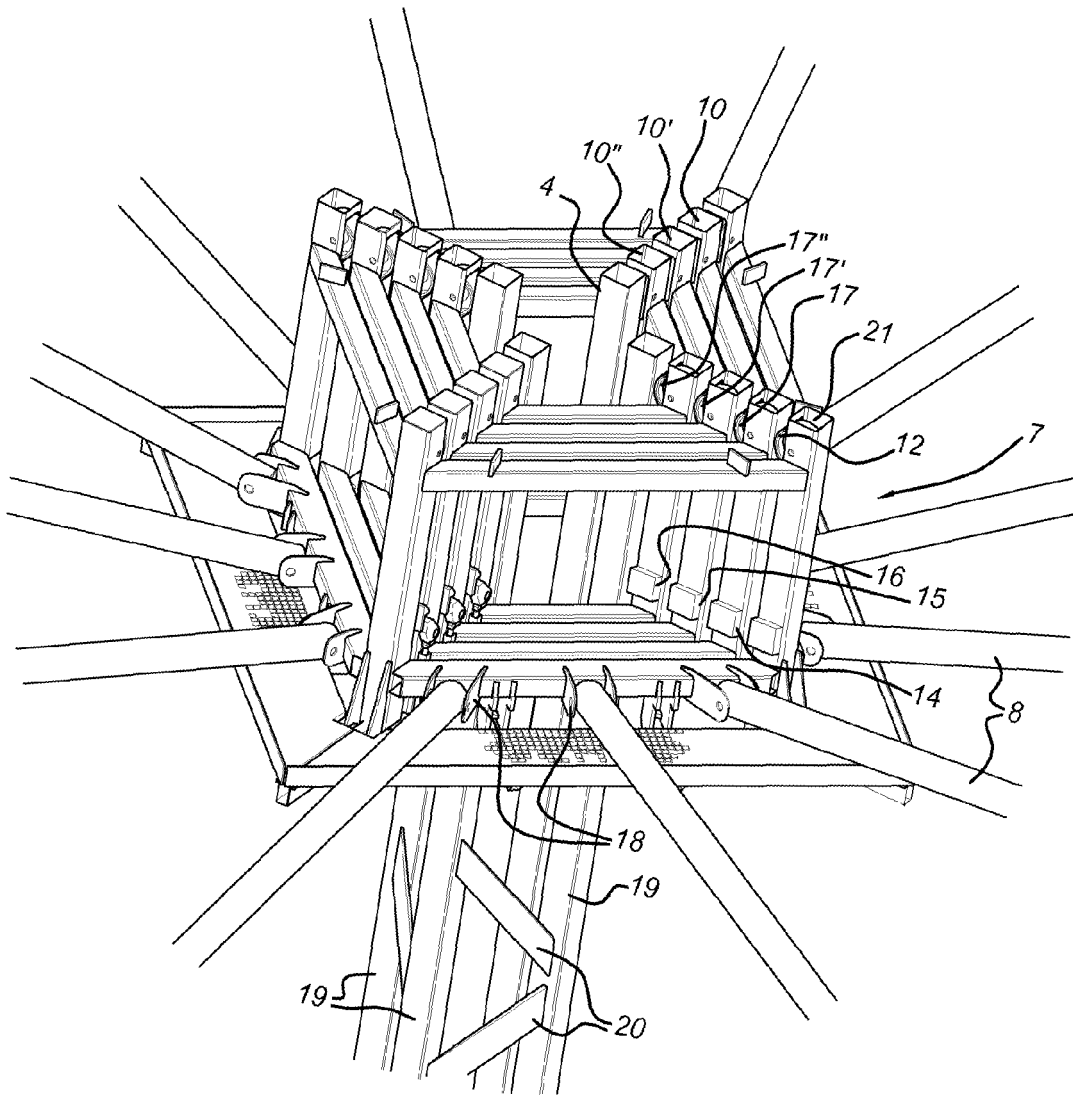
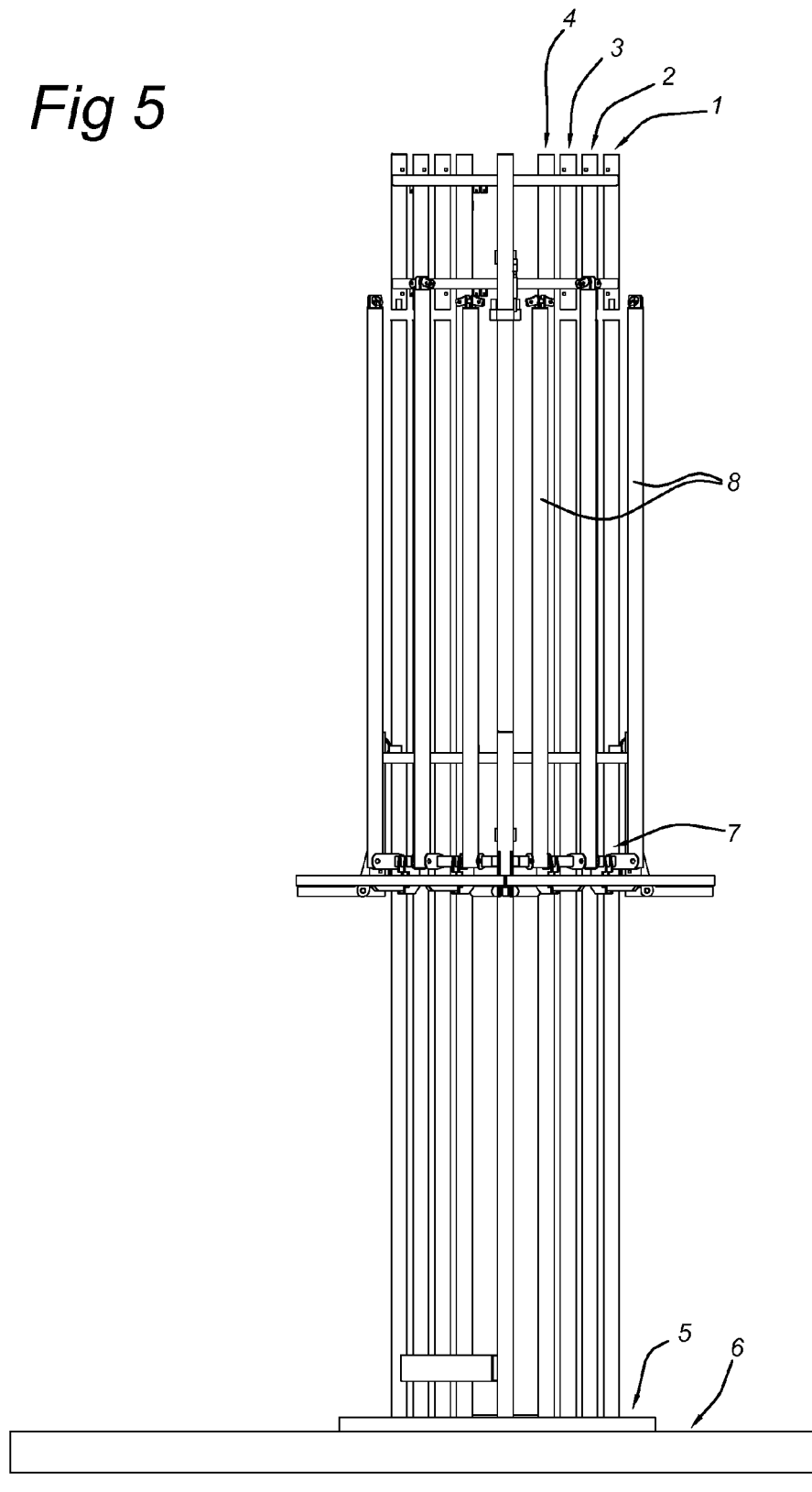


Fig 5





EUROPEAN SEARCH REPORT

Application Number
EP 08 16 6756

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2005/239563 A1 (PONDORFER WALTER [AT] ET AL) 27 October 2005 (2005-10-27) * paragraph [0102] - paragraph [0127]; figures 24-29 *	1	INV. A63G1/28
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 March 2009	Examiner Schut, Timen
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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02-03-2009

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