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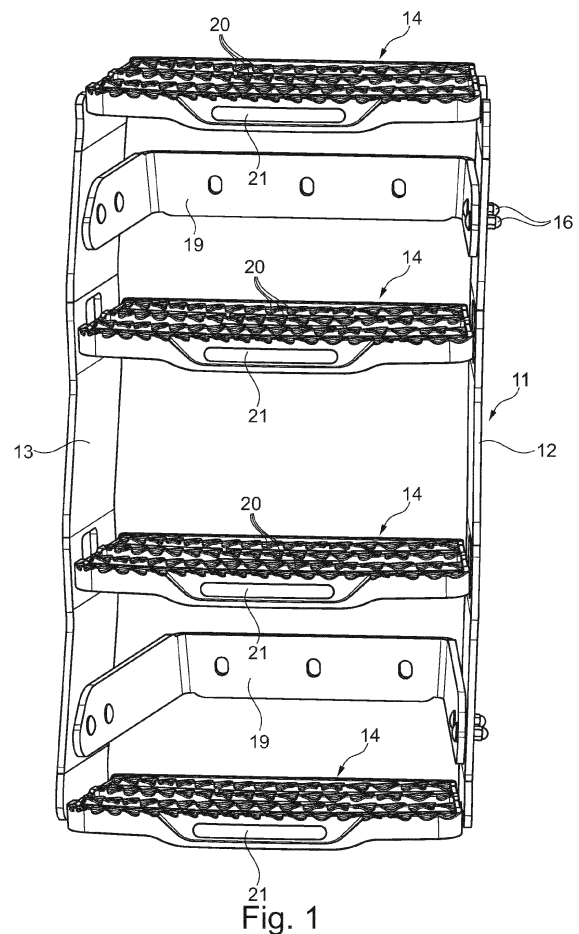
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(54) **MODULAR SECTIONAL LADDER**

(57) A modular sectional ladder (11) comprising two side uprights (12,13) between which steps (14) are arranged, wherein said uprights (12,13) are produced by moulding and said steps (14) are produced by die-casting, each step (14) providing a tread surface provided with a series of standard undulations (20) and being constrained at its ends to a respective upright (12,13) by means of freely removable fixing means (16).



Description

[0001] The present invention relates to a modular sectional ladder.

[0002] The ladders currently in use for cars, trucks, tanks, etc. are made of welded metal parts.

[0003] Structures of this type generally have weak points, they must be painted to protect the materials from corrosion or for disguising unsightly welds, and they must be stored in various sizes in order to meet the requirements of the individual type of vehicle. The welds must also be ground and finished to make them acceptable.

[0004] Specifically because of the way they are formed, moreover, they have important dimensions that create storage problems and transportation costs when they are sent to the vehicle manufacturer for their installation.

[0005] Furthermore, specifically as a result of their construction in parts assembled by welding, should the single step become damaged, they must be eliminated without the possibility of reuse.

[0006] The welds, furthermore, can be easily damaged due to the vibrations induced by the engine of the vehicle, generating danger of use and breakage of the ladder.

[0007] The general objective of the present invention is to provide a ladder, in particular for use and installation on vehicles, capable of solving the above-mentioned drawbacks of the prior art in an extremely simple, economical and particularly functional way.

[0008] A further objective of the present invention is to provide a ladder that can be easily stored and is transportable, even during the shipping and storage phase.

[0009] Another objective of the present invention is to provide a ladder with great safety and aesthetic value.

[0010] Last but not least, yet another objective of the present invention is to provide a ladder in which it is possible to intervene in the case of deformation or breakage of a single step.

[0011] The above-mentioned objectives are achieved by a ladder produced according to independent claim 1 and the following subordinate claims.

[0012] The structural and functional characteristics of the present invention and its advantages with respect to the known art will become even more evident from the following description, referring to the attached schematic drawings, which show an embodiment example of the invention. In the drawings:

figure 1 is a perspective view of a ladder produced according to the present invention in a first front position;

figure 2 is a perspective view of a ladder produced according to the present invention of figure 1 in a second position rotated from above;

figure 3 is a further perspective view of the ladder of figure 1 in a side view;

figure 4 is a perspective view of the ladder of figure 1 with its component parts exploded;

figure 5 is a diagram illustrating the ladder of figure 1 to which projectors are applied; and
figure 6 is a diagram of a particular blockage by means of a silent block of a single step.

[0013] In the following description, for the illustration of the figures, identical reference numbers are used for indicating construction elements with the same function. Furthermore, for the clarity of illustration, some numerical references may not have been repeated in all the figures.

[0014] Indications such as "vertical" and "horizontal", "upper" and "lower" (in the absence of other indications) should be read with reference to the assembly (or operating) conditions and referring to the normal terminology used in current language, where "vertical" indicates a direction substantially parallel to that of the force of gravity vector "g" and horizontal a direction perpendicular to it.

[0015] With reference to the exemplary and non-limiting figures, these show an embodiment of a ladder according to the present invention, indicated as a whole with 11, which is modular and sectional.

[0016] As this type of ladder 11, is modular, it has two side uprights 12, 13 between which steps 14 are arranged.

[0017] The uprights 12, 13 are produced, for example, by moulding thick sheets and have half-cut supports or stands 22 at a regular distance. These supports or stands 22, protruding squarely from each upright 12, 13, have holes 15 suitable for receiving bolts 16 for fixing the single step 14, once each support 22 has been inserted in a housing 25. The bolts 16 define freely removable fixing means of the step 14 constrained at its ends to a respective upright 12, 13.

[0018] The upright 12, 13, as shown in the figures, is produced as right 12 and left 13, but in a simplified form it can be used for both sides of the ladder in a single general type.

[0019] Furthermore, the upright 12, 13, for purely aesthetic purposes, has a sinusoidal longitudinal development (figure 3) which, from a technical point of view, entails the fact that it can be arranged on site protruding with respect to a supporting wall 17, such as a part of a vehicle schematized again in figure 3 with respective fixing holes 18. U-shaped brackets 19, in fact, applicable between the uprights 12, 13, and also for the individual steps 14, and fixed to the same by means of bolts 16, constrain the ladder 11 or the uprights 12, 13 to the wall 17 or to any bearing structure.

[0020] The steps 14 are produced in die-casting and are customizable so as to have a great aesthetic impact. They can in fact receive logos or lettering so as to have a versatile and customizable look according to the tastes and style results desired.

[0021] The tread surface is produced by means of a series of surface undulations with transversal standard streaks or toothings 20 which guarantee, while maintaining their function, a unique aesthetic aspect of its kind. The adherence of the tread surface thus guarantees

maximum safety for the user when climbing as required by regulations. In the front, they provide a levelling 21, suitable for receiving a logo or lettering. Further behind this step, backlighting can be inserted for climbing safety and illuminating any possible logo located on the step.

[0022] Figure 5 is a diagram illustrating the scale of figure 1 to which downward light projectors 24 are applied. In this way, the light beams guarantee a complete view of the ascent and exit for the operator. The lighting of the underlying area is produced for guaranteeing greater safety and can be actuated manually or by means of sensors, remote controls, or various types of switches.

[0023] There are multiple possibilities for customizing the switching on and/or off of the ladder and lighting.

[0024] The assembly of the individual steps 14 inside the two uprights 12, 13 is extremely rapid as the steps 14 are without weldings, but can be blocked by means of bolts 16 or similar fixing means.

[0025] A modular sectional ladder according to the present invention allows it to be shipped in the form of a kit by the customer and assembled on the assembly line with a consequent saving in transportation and storage costs.

[0026] The steps 14, subjected to impact and wear due to the walking path, are guaranteed for life against corrosion as they are die-cast and therefore maintain their initial aesthetics over time. In the event, however, of collisions or damage, the damaged step or part of the frame of the ladder can be changed without having to completely replace it. This is thanks to the fact that the fixing of the steps is extremely rapid and is effected by screwing screws with a support obtained directly from the sheet metal shoulder.

[0027] A further great possibility can be provided, which is to use the step 14 for a direct support for the tank using its connections, as already mentioned, obtained in the form of side housings 25 in which a silent block is inserted, schematized in 23, thus avoiding breakages of the tank itself.

[0028] Figure 6 is a diagram of a particular blockage by means of a silent block of a single step 14 to an underlying structure, such as a wall of a motor vehicle or a tank (not shown).

[0029] These silent blocks 23 can be in the form of rubber rings, internally lined with a metal bushing (through which the bolt screw passes) which are applied to reduce vibrations in the couplings and avoid breakages on the tank made of a material different from the parts of the ladder, allowing dilations between the parts.

[0030] The objective mentioned in the preamble of the description has thus been achieved.

[0031] The protection scope of the present invention is defined by the enclosed claims.

uprights (12,13) between which steps (14) are arranged, wherein said uprights (12,13) are produced by moulding and said steps (14) are produced by die-casting, each step (14) providing a tread surface provided with a series of standard undulations (20) and being constrained at its ends to a respective upright (12,13) by means of freely removable fixing means (16).

2. The ladder (11) according to claim 1, **characterized in that** each step (14) has housings (25) at its opposite ends suitable for receiving supports (22) projecting squarely from each upright (12,13).

3. The ladder (11) according to claim 2, **characterized in that** each support (22) has holes (15) suitable for receiving bolts (16) for fixing the single step (14) to the respective upright (12,13), once each support (22) has been inserted into a housing (25) of the respective upright (12,13).

4. The ladder (11) according to one or more of the previous claims from 1 to 3, **characterized in that** each step (14) provides a levelling (21) at the front, suitable for receiving a logo or lettering.

5. The ladder (11) according to one or more of the previous claims from 1 to 4, **characterized in that** backlighting is inserted behind each step (14) for climbing safety and a possible logo located on the step.

6. The ladder (11) according to claim 5, **characterized in that** said backlighting consists of at least one downward light projector (24).

7. The ladder (11) according to one or more of the previous claims from 1 to 6, **characterized in that** U-shaped brackets (19) can be applied between the uprights (12,13) fixed to the same by means of bolts (16) in order to constrain said ladder 11 (i.e. the uprights 12,13) to a wall (17) or to any bearing structure.

8. The ladder (11) according to one or more of the previous claims from 1 to 7, **characterized in that** each of said uprights (12,13) has a sinusoidal longitudinal development.

Claims

1. A modular sectional ladder (11) comprising two side

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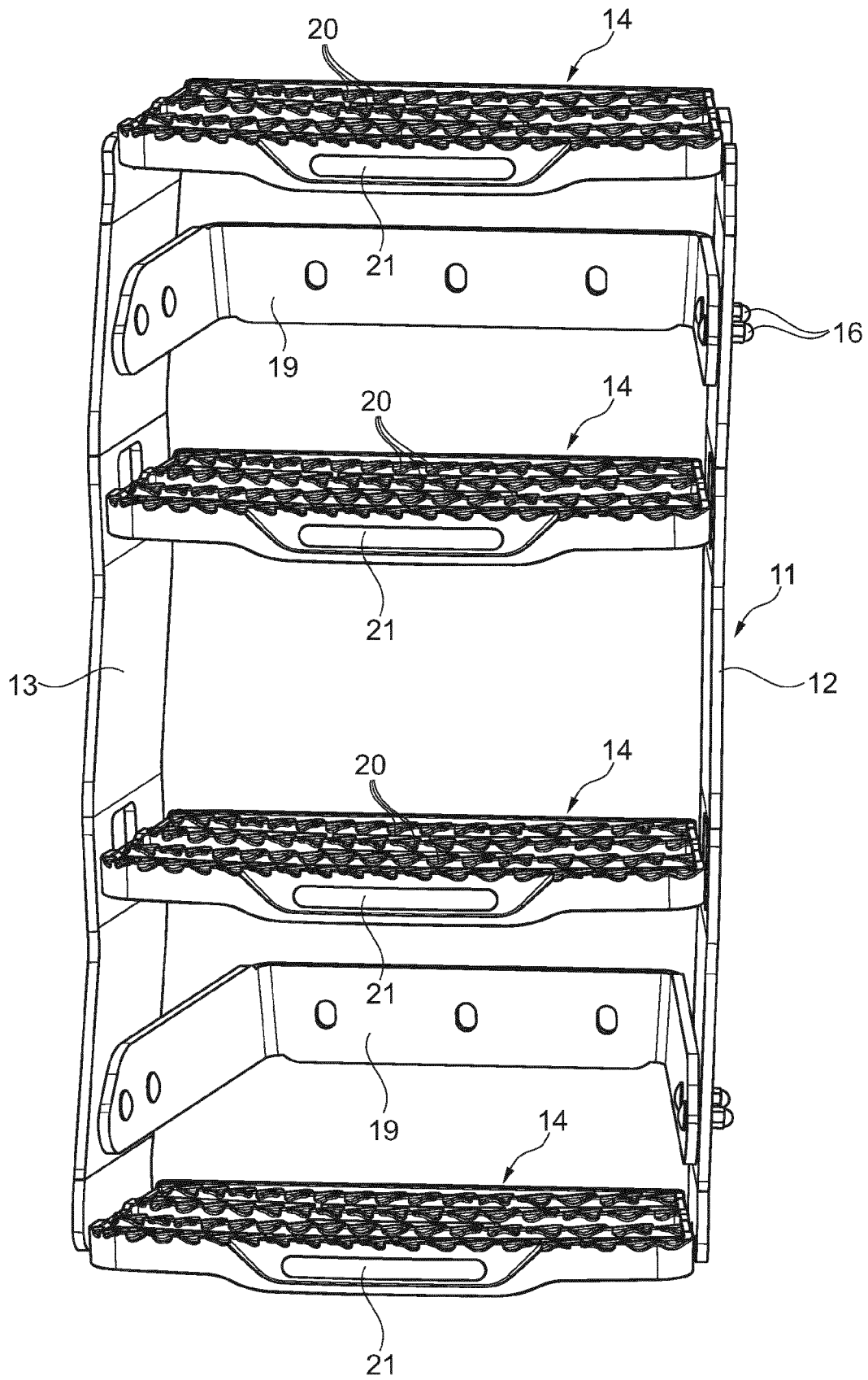


Fig. 1

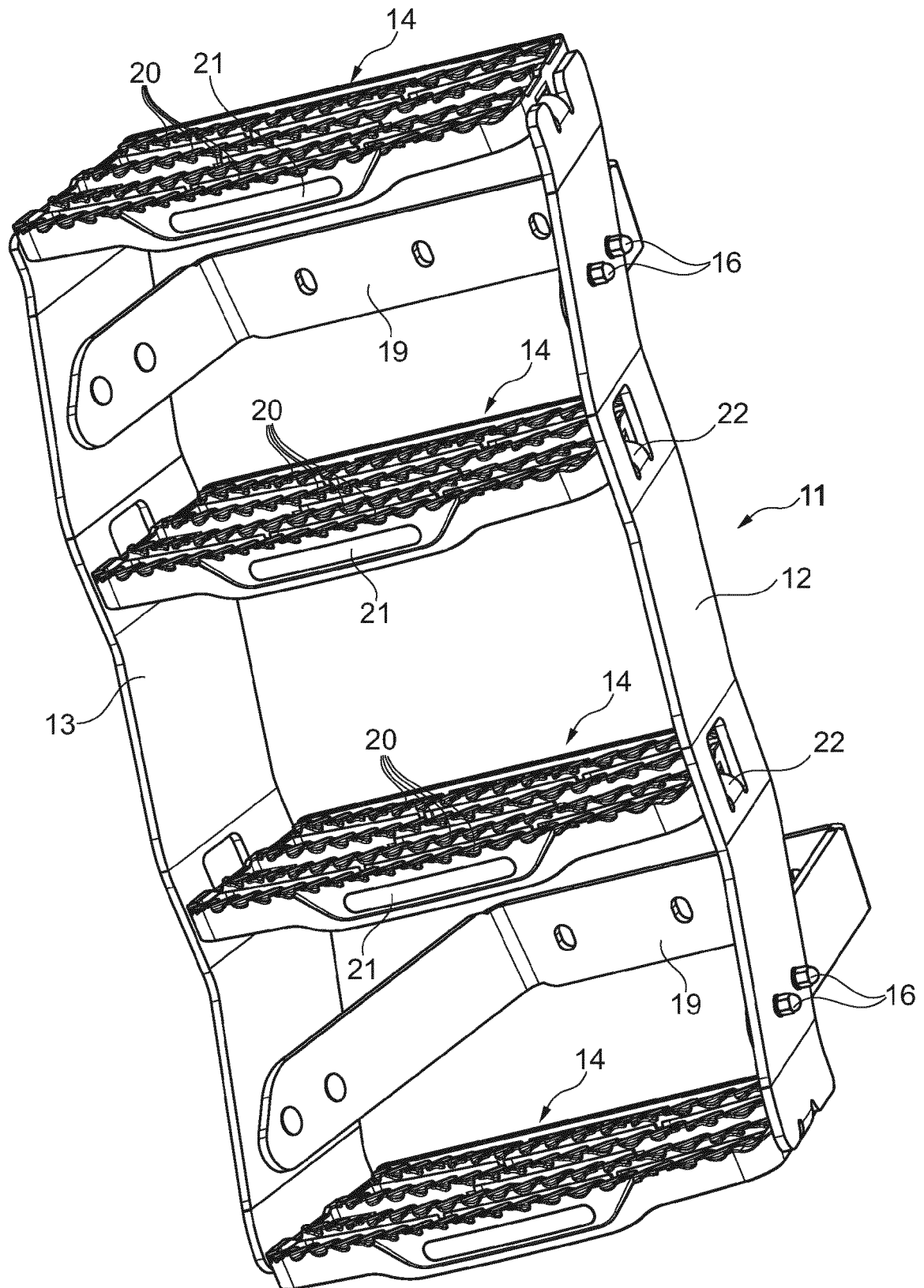


Fig. 2

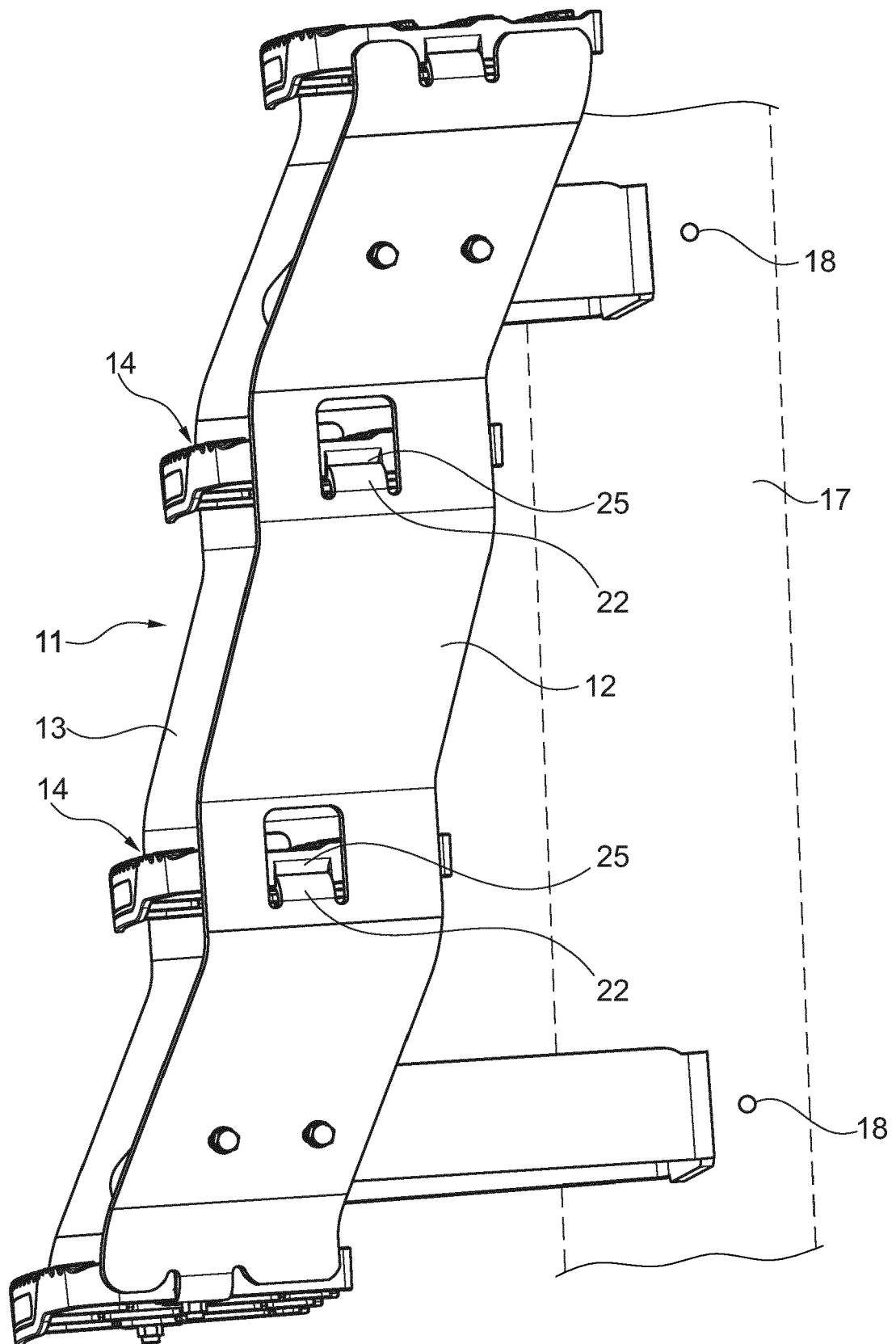


Fig. 3

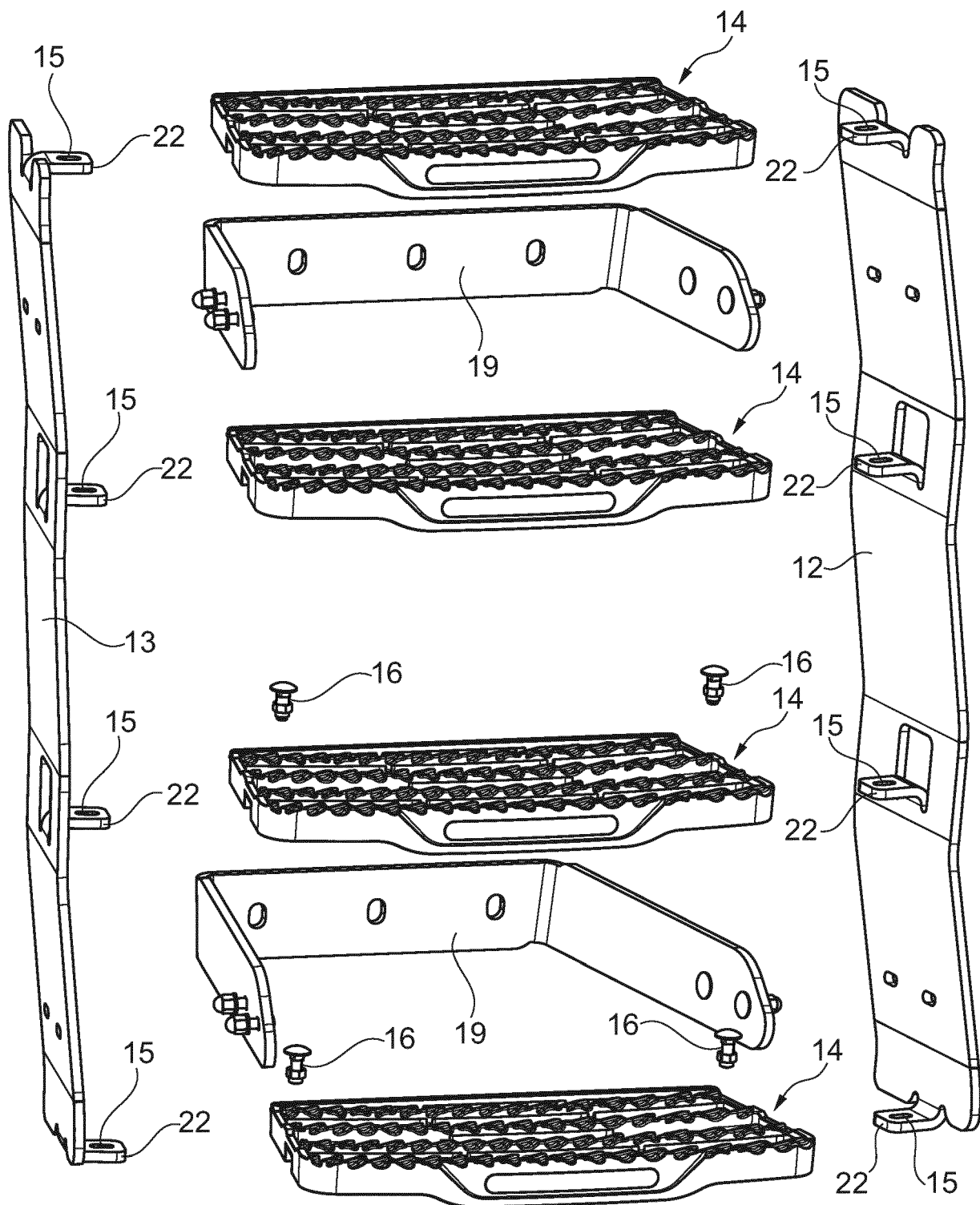


Fig. 4

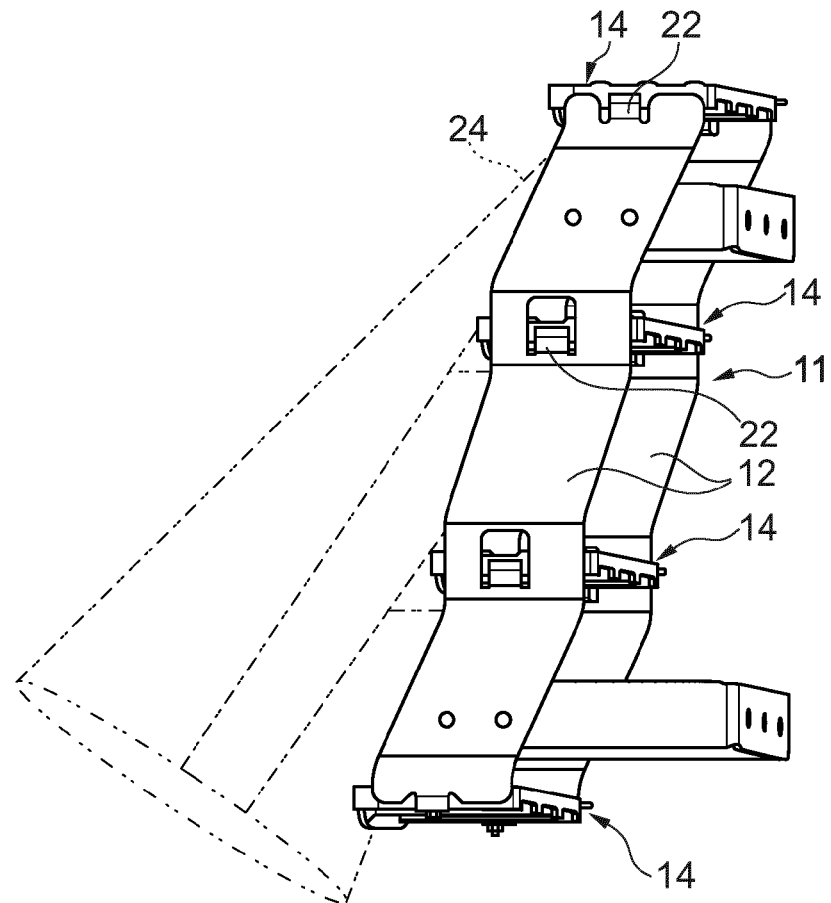


Fig. 5

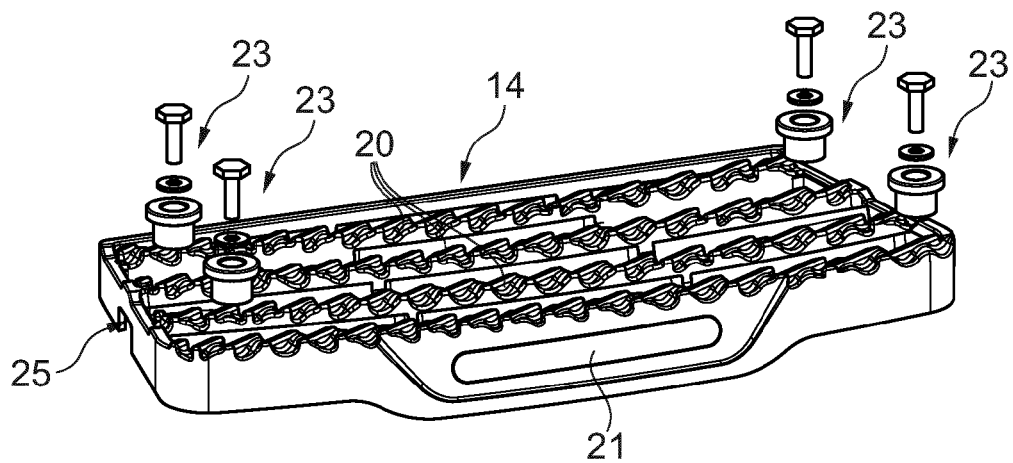


Fig. 6



EUROPEAN SEARCH REPORT

Application Number

EP 21 21 1100

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Y	* figures 2, 3 *	4-6	

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A	EP 2 548 430 A1 (CLAAS SELBSTFAHR ERNTEMASCH [DE]) 23 January 2013 (2013-01-23)	6	
	* figure 2 *		

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E06C
Place of search		Date of completion of the search	Examiner
The Hague		6 April 2022	Bauer, Josef
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 21 21 1100

5 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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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