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'Overhead conveying device having a self-supporting supporting framework'

15 The invention relates to an overhead conveying device for integration in an assembly plant for transporting vehicle components in accordance with the preamble of claim 1.

In assembly plants for manufacturing vehicles, a great variety of types of conveying devices and overhead conveying devices are employed. Based
20 on the fact that assembly plants are individually adjusted to each type of vehicle to be manufactured and that the conveying devices are correspondingly configured, the overhead conveying devices under consideration are correspondingly individually designed and manufactured. Here, an overhead conveying device of the type at hand
25 relates to those conveying devices below which at least enough free movement space remains to allow a person to freely walk below them. Usually, free headroom of 2.5 m or more is the aim so that forklift trucks or other transport vehicles are also able to cross below the overhead conveying device. Overhead conveying devices of this kind are also
30 employed in order to obtain additional assembly space, wherein, standing

on the ground, another conveying device or another kind of assembly plant is arranged underneath the overhead conveying device.

To integrate overhead conveying devices of this kind into a complete assembly plant in a building, it is common in the state of the art to put a supporting framework together from steel girders or the like for erecting
5 the actual conveying device on-site in the building, wherein the struts and pillars are usually welded together. This allows for the best possible adaptation to the conditions at hand both with regard to the assembly plant and with regard to the possibilities of the building, and assembly
10 plants or building facilities already present can in particular be taken into account.

The commonly found practice of putting the supporting framework together on site on the basis of the local conditions leads to structural calculations or a previous detailed construction of the supporting
15 framework of the overhead conveying device usually not being carried out. Due to said calculations of the supporting framework not being carried out, said supporting framework, for safety reasons, is usually designed with a significant oversize (however, without having a guarantee that sufficient safety is given).

20 However, the design of an overhead conveying device known from the state of the art is particularly disadvantageous in the light of the high amount of time that is required for setting up the corresponding overhead conveying device in the assembly plant. During such setup works, the assembly plant is inevitably unavailable for other purposes in the area of
25 the overhead conveying device to be constructed. In particular when making structural alterations to the assembly plant, switching from one design, for example for manufacturing a particular vehicle model, to a new design of the assembly plant for manufacturing a changed vehicle model, this leads to undesired production downtimes while the overhead
30 conveying device is set up.

Therefore, it is the object of the invention at hand to accelerate the procedure of setting up of an overhead conveying device in an assembly plant as compared to previously known techniques.

Said object is attained by an inventive embodiment according to claim 1.

- 5 Advantageous embodiments are the subject-matter of the dependent claims.

For a start, the generic overhead conveying device is intended for integration in an assembly plant for transporting vehicle components. The type of the vehicle components is irrelevant in this case. The
10 substantial feature is that the overhead conveying device is integrated in a complete assembly concept, making it possible here to manufacture a vehicle by transporting the assigned vehicle parts. For this purpose, the overhead conveying device has a supporting framework and at least one conveying device.

- 15 In accordance with the generic nature of the invention, the supporting framework has a length of more than 5 m and a width of more than 2 m. The height at which the supporting framework of the overhead conveying device is arranged above the ground of the designated building is irrelevant for the invention at hand, but the free headroom below the
20 supporting frame has to be at least 2 m so as to guarantee a suitable useful height below the supporting framework. The supporting framework itself is realized by longitudinally and/or transversely oriented and/or diagonally interconnected supporting beam elements. Said supporting beam elements are usually designed in the shape of rods
25 and can have tubular profiles, T-girder or other shapes and they can be designed as traction girders, pressure girders or as girders under a bending moment.

The associated conveying device is mounted on the supporting framework and allows transporting corresponding vehicle components,

framework prior to erection at the place of use. Thus, all that is needed for realizing the overhead conveying device in the assembly plant is clearing corresponding space and creating corresponding counter bearings for receiving the bearing means, wherein the preassembled
5 overhead conveying device then has to be erected only by means of a crane. Hereby, the assembly time for erecting the overhead conveying device is drastically reduced in comparison to all known devices. Even though this is associated with a slight disadvantage with regard to flexible adaptation to the local realities, the advantages with regard to
10 little idling of the assembly plant prevail.

It is particularly advantageous if the supporting framework is designed in the manner of a spatial truss. This means that the self-supporting supporting framework is formed by longitudinally oriented, transversely oriented, diagonal and upright interconnected supporting beam elements.
15 This truss structure can ensure high stiffness of the supporting framework while weight is low, which in particular facilitates the transport of the preassembled overhead conveying device.

Furthermore, it is particularly advantageous if the supporting framework is formed by a welded structure. This means that the self-supporting
20 supporting framework is substantially formed by steel struts and, if need be, by other steel elements, such as gusset plates, which are welded together. If the conveying device is light or if saving weight is generally very important, it is also conceivable to manufacture the supporting framework from aluminum, for example, and to similarly weld together
25 the individual elements, such as struts and gusset plates.

As compared to a screwed design, a welded structure has, among other things, the advantage that there is no risk that an inadmissible change to the supporting framework can later be made by the plant operator. In designs from the state of the art, this might not be critical because of the
30 oversize that is usually present. In a specific configuration of the supporting framework to fit the conveying device to be supported, a

The invention claimed is:

1. An overhead conveying device (01) for integration in an assembly plant for transporting vehicle components, having a supporting framework (03) and at least one conveying device, wherein the supporting framework (03) has a length of more than 5 m and a width of more than 2 m and comprises longitudinally and/or transversely oriented and/or diagonal interconnected supporting beam elements (04, 05, 07), wherein the conveying device is mounted on the supporting framework (03) and can implement transport of vehicle components, wherein the supporting framework (03) has bearing means (08) for bearing the overhead conveying device (01) in the assembly plant, characterized in that the supporting framework (03) is designed to be self-supporting and can be transported in preassembled form from the place of manufacture to the place of use, and in that the number N_L of bearing means (08) is higher than the number N_E being required for bearing, wherein the overhead conveying device (01) can be borne at bearing means (08) selected arbitrarily in the required number N_E .

2. The overhead conveying device (01) according to claim 1, characterized in that the conveying device, disregarding interface connections, is preassembled on the supporting framework (03) in an operative condition.

3. The overhead conveying device (01) according to claim 1, characterized in that the supporting framework (03) is designed in the manner of a spatial truss, which comprises longitudinally and transversely oriented and diagonal and upright interconnected supporting beam elements (04, 05, 06, 07).

4. The overhead conveying device (01) according to claim 3, characterized in that the supporting framework (03) is formed by a welded structure.

5. The overhead conveying device (01) according to claim 1, characterized by a maintenance walkway (12a, 12b) along at least one longitudinal side of the conveying device, in particular along both longitudinal sides, the maintenance walkway being arranged at the supporting framework (03) and being accessible on foot substantially without any risk.

6. The overhead conveying device (01) according to claim 5, characterized in that maintenance walkways (12a, 12b), which are present on both sides of the conveying device, are connected to each other at both ends of the overhead conveying device (01) via connecting girders (14).

7. The overhead conveying device (01) according to claim 6, characterized by at least one vertical transport opening (16) between the supporting framework (03) and maintenance walkways (12a, 12b) being present on both sides as well as the connecting girders (14), through which transport opening vehicle components can be transported from the conveying device above the supporting framework (03) to a location below the supporting framework (03).

8. The overhead conveying device (01) according to claim 7, characterized in that the maintenance walkways (12a, 12b) being present on both sides, in the region of the vertical transport opening (16), can be connected to each other with a closing means (15) being adjustable between an open position and a closed position so as to be accessible on foot.

9. The overhead conveying device (01) according to claim 1, characterized by at least six bearing means (08), wherein the required number N_E is smaller than/equal to the number N_L of present bearing means (08) multiplied by 0.72 and rounded up, in particular multiplied by 0.6.

10. The overhead conveying device (01) according to claim 1, characterized by support elements as free-standing support pillars (21) and/or wall brackets and/or freely suspended traction elements, at each of which one bearing means (08) is arranged.

11. The overhead conveying device (01) according to claim 10, characterized in that the number N_S of support elements (21) is higher than the number N_E being required for bearing, wherein any one of the present support elements (21), for example in case of damage, can be removed and/or replaced without limiting the usability of the overhead conveying device (01).

12. An overhead conveying device (01) for integration in an assembly plant for transporting vehicle components, having a supporting framework (03) and at least one conveying device, wherein the supporting framework (03) has a length of more than 5 m and a width of more than 2 m and comprises longitudinally and/or transversely oriented and/or diagonal interconnected supporting beam elements (04, 05, 07), wherein the conveying device is mounted on the supporting framework (03) and can implement transport of vehicle components, wherein the supporting framework (03) has bearings (08) for bearing the overhead conveying device (01) in the assembly plant, characterized in that the supporting framework (03) is designed to be self-supporting and can be transported in preassembled form from the place of manufacture to the place of use, and in that the number N_L of bearings (08) is higher than the number N_E being required for bearing, wherein the overhead conveying device (01) can be borne at bearings (08) being selected arbitrarily in the required number N_E .

13. An overhead conveying device (01) for integration in an assembly plant for transporting vehicle components, having a supporting framework (03) and at least one conveying device, wherein the supporting framework (03) has a length of more than 5 m and a width of more than 2 m and comprises longitudinally and/or transversely oriented and/or diagonal interconnected supporting beam elements (04, 05, 07), wherein the conveying device is mounted on the supporting framework (03) and can implement transport of vehicle components, wherein the supporting framework (03) has bearing means (08) for bearing the overhead conveying device (01) in the assembly plant, characterized in that the supporting framework (03) is designed to be self-supporting and can be transported in preassembled form from the place of manufacture to the place of use; and

a maintenance walkway (12a, 12b) along both longitudinal sides of the conveying device, the maintenance walkways being arranged at the supporting framework (03) and being accessible on foot substantially without any risk, the maintenance walkways being connected to each other at both ends of the overhead conveying device (01) via connecting girders (14), at least one vertical transport opening (16) between the supporting framework (03) and maintenance walkways (12a, 12b) being present on both sides as well as the connecting girders (14), through which transport opening vehicle components can be transported from the conveying device above the supporting framework (03) to a location below the supporting framework (03), the maintenance walkways (12a, 12b) being connected to each other with a closing means (15) adjustable between an open position and a closed position so as to be accessible on foot.