A BUILDING ELEMENT, A BUILDING COMPRISING ONE OR MORE SUCH BUILDING ELEMENTS AND A METHOD FOR JOINING SUCH A BUILDING ELEMENT AND A SUPPORT ELEMENT

The present application concerns a building element, a building comprising the building element and a method of joining building elements and load bearing elements in a building.

During construction of larger buildings, such as parking houses, building elements forming the floors and load bearing elements are arranged with elements of steel which are welded together. This may be difficult and time consuming, because of the restricted space between such elements. After finishing the welding, reinforcement have to be installed across the complete surface, i.e., on top of the load bearing elements and the floor elements. Finally, a layer is cast on top the entire floor, i.e., on top of load bearing elements and the surfaces of the building elements. It is evident that this is a time consuming and cost intensive process.

Consequently, the object of the present invention has been to simplify the work and time for constructing a new building, and thus, reduce the costs.

This object is achieved with a building element as defined in claim 1, a building according to claim 6, with at least one building element as defined in claim 1, and a method for joining building elements and load bearing elements in a building according to claim 11. Further embodiments of the invention are disclosed in the dependent claims.

Thus, there is provided a double T shaped building element for a floor construction and/or roof construction in a building, which building element comprises an upper side, a lower side, at least one first lateral face, at least one first end face and two flange elements extending down from its lower side, wherein the building element comprises reinforcement iron that extend out from the at least one end face for casting into a load bearing element, wherein the at least one lateral face is formed with a longitudinal groove such that a longitudinal upper groove edge and a longitudinal lower groove edge are formed where the upper groove edge and the lower groove edge extend along the whole length of the side face, which upper groove edge has a toothed shape, and wherein the building element comprises at least one rapid coupling device with a sleeve element being cast embedded into the building element and which end in the at least one end face such that a telescoping element, which is arranged in the sleeve element, may be pulled out of the sleeve element.

It is emphasized that the toothed shape runs in the longitudinal direction of the upper groove edge, along the upper side of the building element, and not transversely to the at least one lateral face from the lower side to the upper side. It

is also emphasized that the toothed shape of the longitudinal upper groove edge causes the upper groove edge to be equipped with a wave like form in a corresponding or similar way as the toothed shape of a cog wheel or a pitch rack.

The height of the upper groove edge in relation to the bottom of the groove is preferably stepwise varying in the longitudinal direction of the groove, whereby a toothed shape is formed.

The height of the lower groove edge in relation to the bottom of the groove is at least as high as, and preferably higher than, the maximal height of the upper groove edge in relation to the bottom of the groove. Preferably, the lower groove edge has a uniform height in the longitudinal direction of the groove in relation to the bottom of the groove.

Preferably, possible reinforcement iron extend outward along substantially all of the at least one end face. Usually, the building element comprises a plurality of end faces with reinforcement iron extending from all end faces.

In most practical cases, the building elements will be formed with two lateral faces opposite each other, and two end faces opposite each other.

As mentioned, the building element comprises at least one rapid coupling device with a sleeve element being cast into the building element, and which opens into the at least one end face, such that a telescopic element, arranged in the sleeve element, may be pulled out from the sleeve element. This ensures the possibility of rapidly connecting the building element to an adjacent element in a building during construction of the building.

Preferably, the building element is, but not necessarily, formed as a DT element, i.e., an element having a double T shape. DT elements have two flange elements extending down from the lower side which provides the DT element with increased flexural rigidity. Of course, other types of elements may also be use, if needed.

Preferably, the building element is a parking building element, i.e., it is suitable for use in a parking building, or possibly in a storage building, or similar buildings.

Also provided is a building comprising one or more load bearing elements and a plurality of double T building elements as disclosed above, which are connected to the respective load bearing elements. The building elements are arranged adjacent each other such that the lateral faces lie next to each other and the lateral grooves in the lateral faces form toothed joints. The end faces of the building elements face respective load bearing elements such that the reinforcement irons extend into an upper part of the load bearing elements, and the upper part of the load bearing elements and the toothed joints are cemented in such that the load bearing elements, the joints, and the upper sides of the building elements form a smooth surface which lie in substantially the same plane as the upper sides of the building elements.

Any possible reinforcement irons, which extend from the end faces, are preferably cast into the load bearing elements. The reinforcement irons are preferably cast into an upper part of the load bearing elements.

The building may alternatively comprise threaded struts cast into the joints formed between the building elements arranged adjacent to each other, and in respective load bearing elements.

The reinforcement iron and the threaded struts may be cast into an upper part of the load bearing elements.

The telescoping elements of the rapid coupling devices are preferably cast into respective load bearing elements, preferably in an upper part of the load bearing elements.

Moreover, the building is preferably arranged with a layer of a polyurethane membrane overlaid the joints and the load bearing elements such that connections are sealed. Then, penetration of liquid, such as water, is avoided.

The building, as described above, is particularly suitable as a parking building, or possibly a storage building, or the like.

Also provided is a method of joining building elements and load bearing elements in a building, the method comprising the steps of

- providing the load bearing elements with a not-cast upper part,
- putting up the load bearing elements,
- arranging two or more double T building elements as described above, with the lateral faces facing each other such that the grooves in the lateral faces of the building elements arranged adjacent to each other form respective joints, and with the end faces of the building elements facing respective load bearing elements such that the reinforcement irons that extend out from the at least one end face of the DT building elements, extend into the upper part of the load bearing elements,

- pulling the telescoping elements out of the rapid coupling devices either into corresponding cavities in the respective load bearing elements into which they are cast founded, or into the upper part of the load bearing elements for them to be casted into the load bearing elements,
- cast fill the joints between the building elements and the upper part of the load bearing elements such that a smooth surface is formed, which surface substantially lie in the same plane as the upper sides of the building elements.

The reinforcement iron are cast into the respective load bearing elements when the upper part of the load bearing elements is cast.

At least one threaded strut may be arranged in the joints, wherein the threaded struts also extend into the upper part of the respective load bearing elements, and that the threaded struts are cast into the joints of the respective load bearing elements when the upper part of the load bearing elements is cast.

Alternatively, both reinforcement iron and threaded struts may be used, i.e., the building elements are arranged such that reinforcement iron extending from the end faces of the building elements extend into the upper part of respective load bearing elements, and at least one threaded strut is arranged in the joints, wherein the threaded struts extend into the upper part of respective load bearing elements and that the reinforcement iron are cast into the respective load bearing elements and the threaded struts are cast into the joints and the respective load bearing elements when the upper part of the load bearing elements is cast filled.

If threaded struts are used, the length of the threaded struts may be adjusted before being cast into the joints and the load bearing elements.

After the cast filling, preferably a layer of a polyurea membrane is applied to the surface, i.e., the surface which after the cast filling is constituted by the load bearing elements, building elements, and joints, which at least covers connections between building elements, and between building elements and load bearing elements.

In the following, a non-limiting embodiment of the present invention will be described, with reference to the appended figures, wherein:

Figure 1a shows a perspective view of two building elements arranged with the lateral faces placed adjacent each other.

Figure 1b shows an enlarged view the area marked with C in Figure 1a.

Figure 2a shows an end view of the two building elements of Figure 1a.

Figure 2b shows an enlarged view of the area marked B in Figure 2a.

Figure 3 shows a perspective view of the two building elements arranged with the lateral faces placed adjacent each other, and with the end faces facing a load bearing element.

Figure 4a shows the building elements and load bearing element of Figure 3 seen from above.

Figure 4b shows an enlarged view of the area marked A in Figure 4a.

Figure 5 shows a cross section of a building element and a load bearing element before cast filling.

Figure 6 shows the framework in a building before the building elements are joined to the load bearing elements.