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(54) **ASSEMBLY OF A CARRIER AND A FILLING ELEMENT, SUCH A FILLING ELEMENT, AND A METHOD FOR THE APPLICATION THEREOF**

ANORDNUNG EINES TRÄGERS UND EINES FÜLLELEMENTS, SOLCH EIN FÜLLELEMENT UND VERFAHREN ZUR ANWENDUNG DAVON

ENSEMBLE COMPRENANT UN SUPPORT ET UN ÉLÉMENT DE REMPLISSAGE, UN TEL ÉLÉMENT DE REMPLISSAGE ET SON PROCÉDÉ D'APPLICATION

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**EP-A2- 2 463 452 WO-A1-2010/151135
WO-A1-2015/087070 CN-A- 106 869 325
DE-U1- 29 504 650 US-A1- 2004 244 330**

EP 3 450 645 B1

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Description

[0001] The present invention relates to an assembly of a carrier and a filling element, more particularly to an assembly of a skeletal structure of a building, comprising at least carrier and a filling element.

[0002] The invention is further related to such a filling element, and a method for the application thereof.

[0003] Applicant develops floor systems that comprise filling elements, which are an integral combination of ceiling, installation space and subfloor. Construction and installations are integrated by utilizing an installation space between the ceiling and the subfloor. A filling element of such a floor system comprises supporting steel beams and concrete plates, which are combined in prefabricated elements that may be topped with a subfloor of choice. European patent EP-B1-0928354 describes such a floor system.

[0004] The wind load on a facade of a building is absorbed through the steel beams or concrete plates of the filling elements directly. The load is transferred to the skeletal structure through a so-called diaphragm action. The individual filling elements are traditionally connected on site by welding operations. Steel connection plates are welded between a steel beam of a filling element and a steel part of the skeletal structure.

[0005] Welding has a number of disadvantages. Besides being laborious and time consuming, it also requires skilled craftsmen that are trained in welding. Sparks that are inevitably caused by the welding operation may damage the building, and cause corrosion. Moreover, the sparks may leave dark spots that are undesirable and that result in a perception of diminished quality.

[0006] DE 295 04 650 U1 discloses an assembly wherein a beam comprises two flanges that are supported on protrusions of a carrier. A bolted connection secures the beam to the carrier. At least the feature that a lower flange is embedded in the plate to define the beam as a structurally integrated part of the filling element with the plate is novel relative to DE 295 04 650 U1.

[0007] European patent application EP 2 463 452 A2 discloses an assembly, wherein an I-shaped beam is bolted to a carrier.

[0008] International patent applications WO 00/46459 A1, WO 2015/087070 A1, Chinese patent application CN 106 869 325 A, United States patent application US 2004/244330 A1 and WO2010/151135 are acknowledged as further prior art.

[0009] An object of the present invention is to provide an assembly that is improved relative to the prior art and wherein at least one of the above stated problems is obviated.

[0010] Such objectives as indicated above, and/or other benefits or inventive effects, are attained according to the present disclosure by the assembly of features in the appended independent device claim, directed to an assembly, and in the appended independent method claim.

[0011] By providing a bolted connection, there is no need for welding operations anymore. Bolted connections are easy and quick to arrange and may be applied by any worker. There is no need for skilled craftsmen trained in welding. Moreover, a bolt connection is releasable, which may allow for a release, e.g. for decommissioning.

[0012] Relative to European patent application EP 2 463 452 A2, the extension of the first plate is supported on the carrier. As a result, the filling element may be placed on the carrier as a first step. In a second step, the bolted connection may additionally be arranged to connect the beam to the carrier. After the filling element being placed on the carrier, it is already securely supported, i.e. securely resting on the carrier. There is no need to suspend the filling element by any hoisting equipment during arrangement of the bolted connection, reducing the time and need for heavy hoisting equipment, such as cranes. A crane may be used to successively place a plurality of filling elements on carriers of the assembly, while the second step of arranging the bolted connections is delayed until a later time, when the crane may be gone. There is no need for the crane to support the filling elements when they are bolted to the carrier, as is required according to the prior art solutions disclosed in EP 2 463 452 A2, WO 00/46459 A1, CN 106 869 325 A and US 2004/244330 A1.

[0013] The beam being a structurally integrated part of the filling element with the plate provides a robust and stiff filling element that, via the extension, may be easily supported on a carrier as a whole.

[0014] The vertical offset between the bolted connection and the extension provides a stiff assembly after the bolted connection has been arranged.

[0015] According to a preferred embodiment, the extension is plate-shaped and oriented in a lying plane on the carrier. In this way, the extension has a relatively large contact surface over which the load of the filling element is distributed to the carrier.

[0016] According to a further preferred embodiment, the extension is freely supported on the carrier. Due to the extension being freely supported, i.e. supported in a non-fixed manner, it is effectively prevented that the assembly is overconstrained. As a result, unnecessary stresses in the assembly are prevented, contrary to the bolted assemblies as proposed in the prior art.

[0017] According to the invention, the first flange of the I-shaped beam is an upper flange extending at a distance from the plate and comprising the extension supported on the carrier, and the second flange of the I-shaped beam is a lower flange that is embedded in the plate. If the upper flange of the I-shaped beam is provided with the extension, it can be easily placed on top of a carrier, without the need of tilting the filling element in order to move the extension past an upper flange of a carrier before it can be positioned on a lower flange of said carrier.

[0018] According to an even further preferred embodiment, the bolted connection is configured to connect a

connector of the filling element and the carrier. The connector may be arranged on the plate of the filling element. For example, if the plate is made out of concrete, the plate may be a metal plate that comprises extensions that extend inside the concrete of the plate. Typically, the connector may comprise extensions that are poured into the concrete during manufacturing of the plate of the filling element.

[0019] According to the invention, the bolted connection is configured to connect the I-shaped beam of the filling element and the carrier. The I-shaped beam is a very robust and rigid structural component of the filling element, and is therefore perfectly suited for obtaining a rigid and reliable connection.

[0020] Also, the invention relates to a method according to independent claim 13.

[0021] Preferred embodiments are the subject of the dependent claims.

[0022] In the following description preferred embodiments of the present invention are further elucidated with reference to the drawing, in which:

Figure 1 is a perspective view of a skeletal structure of a building comprising carriers and a filling element according to the invention;

Figure 2 is a detailed perspective view of an I-shaped carrier of the skeletal structure of the building of Figure 1, and a filling element according to the invention;

Figure 3 is a detailed cross sectional side view of the assembly of Figure 2; and

Figure 4 is a detailed cross sectional exploded view of the assembly of Figure 2.

[0023] The assembly 1 shown in the Figures comprises a skeletal structure 2 of a building 3, wherein said skeletal structure 2 comprises at least one carrier 4, and a filling element 5 extending from the carrier 4. In the shown embodiments, carrier 4 is an I-shaped carrier. The filling element 5 comprises a plate 6 and an I-shaped beam 7. A first flange 8 of the I-shaped beam 7 extends at a distance from the plate 6 and comprises an extension 9 supported by the carrier 4. A second flange 10 of the beam 7 is connected to the plate 6. The assembly 1 further comprises a bolted connection 11 connecting the I-shaped beam 7 of the filling element 5 and the carrier 4. The bolted connection 11 allows the filling element 5 to be connected to the carrier 4 of the skeletal structure 2 without any welding operations. In this way, disadvantages that are associated with welding can be prevented, while a secure connection is maintained.

[0024] Preferably, the filling element 5 is arranged between carriers 4 that are part of opposite structural walls of the building 3. The filling element 5 then spans from a first structural wall to a second structural wall of the building 3.

[0025] As can be best seen in the perspective side view of Figure 3, the extension 9 and the bolted connection 11 are vertically offset. This improves the diaphragm ac-

tion. Preferably, the bolted connection 11 is arranged closer to the second flange 10 of the beam 7 of the filling element 5 than to the first flange 8 thereof. More preferably, the bolted connection 11 is arranged at or near the second flange 10 of the beam 7 of the filling element 5.

[0026] The bolted connection 11 comprises a bracket 12. In the shown embodiment, this bracket 12 has a L-shape of which a first section 13 extends substantially in line with a longitudinal direction of the filling element 5. A second section 14 of the L-shaped bracket 12 extends transverse to the first section 13 and substantially parallel to a web 15 of the carrier 4. Although the second section of the L-shape of the bracket 12 may abut directly against the web 15 of the carrier 4, alternatively one or more than one spacer 16 may be arranged between the bracket 12 and the web 15 of the carrier 4. Such a spacer 16 may be used to fill a gap and allow the bracket 12 to abut indirectly against the web 15 of the I-shaped carrier 4 via said intermediate spacer 16. Using spacers 16, the bolted connection 11 is easily adjustable on site.

[0027] The second section 14 of the bracket 12 comprises a first through hole 17, and the web 15 of carrier 4 comprises a second through hole 18. In an assembled state of the assembly 1, the through holes 17, 18 are aligned, and a bolt 20 is arranged through a passage formed by said through holes 17, 18. If a spacer 16 is applied, a corresponding through hole 19 is arranged in said spacer 16. A nut 21 may be arranged on bolt 20 to clamp the bracket 12 against the carrier 4.

[0028] The beam 7, which is preferably made out of steel, is embedded in the plate 6 with the second flange 10 thereof. The plate is preferably made of concrete, although it may also be manufactured from other materials, such as composites or epoxy. A plate 6 made out of concrete is strong enough to be walked on by craftsmen. On the one hand, the concrete plate 6 acts as a support for building installations. On the other hand, plate 6 provides horizontal stability of the construction of the building 3. Moreover, concrete offers fire resistance and acoustic insulation.

[0029] A secure and accurate positioning of the bolted connection 11 may be obtained if the filling element 5 further comprises a support 22 configured to support the bolted connection 11. If such a support 22 is applied, the bolted connection 11 is connected indirectly to the I-shaped beam 7 of filling element 5, i.e. via said support 22. Preferably, the support 22 is arranged on the second flange 10 of the beam 7. As can be best seen in Figure 3, the support 22 of the shown embodiment extends from the second flange 10 of the beam 7 towards the first flange 8 thereof. In a preferred embodiment, the support 22 extends from the second flange 10 past the plate 6. In this way, the support 22 is a little bit higher than the concrete of plate 6, and provides a reliable support for the bolted connection 11. The support 22 is preferably made out of steel and provides an engagement surface 23 for the bracket 12 of the bolted connection 11. The first section 13 of the L-shaped bracket 12 abuts against

the engagement surface 23 in an assembled state of the assembly 1.

[0030] The support 22 may further comprise one or more than one protrusion 24, such as shafts 25. These protrusions 24 allow the bracket 12 to be positioned securely. If the shafts 25 are provided with an external screw thread, a nut 26 may secure the bracket 12 on the support 22.

[0031] The filling element 5 according to the invention thus comprises a plate 6 and an I-shaped beam 7 of which a first flange 8 extends at a distance from the plate 6 and comprises an extension 9 configured to be supported by the carrier 4, and of which a second flange 10 is connected to the plate 6, and further comprising a support 22 configured to support a bolted connection 11. Such a filling element 5 may be prefabricated and provided with a bolted connection 11 on site.

[0032] In Figure 4, a connector 27 is arranged on the plate 6 of the filling element 5. The connector 27 may be provided with one or more than one protrusion 28, such as shafts 29, i.e. similar to support 22 as discussed above. If the shafts 29 are provided with an external screw thread, a nut 26 may secure the bracket 12 on the connector 27 similar to the connection described for support 22. The connector 27 may be a metal part that comprises extensions that are poured into a concrete plate 6 of the filling element 5.

[0033] A method for applying an assembly 1 according to the invention comprises the steps of claim 13.

[0034] The step of connecting the filling element 5 and the carrier 4 using the bolted connection 11 may comprise one or both of the steps of:

- connecting a connector 27 of the filling element 5 and the carrier 4; and
- connecting the I-shaped beam 7 of the filling element 5 and the carrier 4.

[0035] The method preferably further comprises the steps of:

- placing a bracket 12 of the bolted connection 11 against or near a web 15 of the carrier 4;
- providing a through hole 18 in at least said web 15 of the carrier 4 that is in alignment with a through hole 17 in said bracket 12; and
- arranging a bolt 20 through the through holes 17, 18 of the bracket 12 and the carrier 4.

[0036] Providing a through hole 18 in said web 15 preferably comprises drilling said through hole 18 in situ. The bracket 12 may be provided with a through hole 17 prior to assembling the assembly 1. If the through hole 18 in said web 15 is drilled in situ, it may be perfectly aligned with the through hole 17 in said bracket 12.

[0037] In order to fill a potential gap between the bracket 12 and the carrier 4, the method may comprise the optional step of placing one or more than one spacer 16

between the carrier 4 and the bracket 12.

[0038] The above described embodiment is intended only to illustrate the invention and not to limit in any way the scope of the invention. Although the shown embodiment is directed to a skeletal structure having an I-shaped carrier, the invention may also be applied in conjunction with a wall bearing structure, and in relation to carriers of other shapes. It should be understood that where features mentioned in the appended claims are followed by reference signs, such signs are included solely for the purpose of enhancing the intelligibility of the claims and are in no way limiting on the scope of the claims. The scope of the invention is defined solely by the following claims.

Claims

1. Assembly (1), comprising:

- a skeletal structure (2) and/or a wall bearing structure of a building, comprising at least one carrier (4);
- a filling element (5) extending from the carrier (4), comprising:

- a plate (6); and
- an I-shaped beam (7), said assembly (1) being **characterised in that** said I-shaped beam (7) comprises

- a first flange (8) being an upper flange that comprises an extension (9) extending therefrom and that is supported on the carrier (4), wherein said first flange (8) and said extension (9) are at a distance from the plate (6); and
- a second flange (10) being a lower flange that is embedded in the plate (6) to define the beam (7) as a structurally integrated part of the filling element (5) with the plate (6); and

in that said assembly (1) comprises a bolted connection (11) connecting the beam (7) to the carrier (4) at a vertical offset from the extension (9)

2. Assembly according to claim 1, wherein the extension (9) is plate-shaped and oriented in a lying plane on the carrier (4).

3. Assembly according to claim 1 or 2, wherein the extension (9) is freely supported on the carrier (4).

4. Assembly according to any of the foregoing claims, the bolted connection (11) connecting at least one of:

- a connector (27) of the filling element (5) and

- the carrier (4); and
 - a web of the I-shaped beam (7) of the filling element (5) and the carrier (4).
5. Assembly according to at least one of the foregoing claims, wherein the bolted connection (11) is arranged at least one of:
- closer to the second flange (10) of the beam (7) of the filling element (5) than to the first flange (8) thereof; and
 - at or near the second flange (10) of the beam (7) of the filling element (5).
6. Assembly according to at least one of the foregoing claims, wherein the bolted connection (11) comprises a bracket (12).
7. Assembly according to claim 6, wherein the bracket (12) has a L-shape of which a first section (13) extends substantially in line with a longitudinal direction of the filling element (5) and of which a second section (14) extends transverse to the first section (13) and substantially parallel to a web (15) of the carrier (4), wherein more preferably the second section (14) of the L-shape of the bracket (12) abuts against the web (15) of the carrier (4), and said second section (14) and said web (15) comprises aligned through holes (17, 18) through which a bolt (20) is arranged.
8. Assembly according to claim 6 or 7, wherein one or more than one spacer (16) is arranged between the bracket (12) and the web (15) of the carrier (4).
9. Assembly according to at least one of the foregoing claims, wherein the plate (6) is made out of concrete and/or the beam (7) is made out of steel.
10. Assembly according to at least one of the foregoing claims, further comprising a support (22) configured to support the bolted connection (11).
11. Assembly according to claim 10, wherein the support (22) is arranged on the second flange (10) of the beam (7);
- wherein the support (22) preferably extends:
 - from the second flange (10) of the beam (7) towards the first flange (8) of the beam (7); and/or
 - from the second flange (10) past the plate (6).
12. Assembly according to claim 9 or 10, wherein the support (22) is made out of steel and provides an engagement surface for the bracket (12) of the bolted connection (11).

13. Method, comprising the steps of:

- providing a skeletal structure (2) and/or a wall bearing structure of a building, comprising at least one carrier (4);
- providing a filling element (5) extending from the carrier (4), said filling element (5) comprising a plate (6) and an I-shaped beam (7) of which:
 - a first flange (8) is an upper flange that comprises an extension (9) extending therefrom and that is supported on the carrier (4), wherein said first flange (8) and said extension (9) are at a distance from the plate (6); and
 - a second flange (10) is a lower flange that is embedded in the plate (6) to define the beam (7) as a structurally integrated part of the filling element (5) with the plate (6); and
- wherein the method further comprises the steps of:
 - positioning the extension (9) extending from the first flange (8) on the carrier (4); and
 - connecting the filling element (5) to the carrier (4) at a vertical offset from the extension (9) with a bolted connection (11), while the first flange (8) is resting on the carrier (4), said carrier (4) thereby supporting the filling element (5).

14. Method according to claim 13, wherein the step of connecting the filling element (5) to the carrier (4) using the bolted connection (11) comprises at least one of:

- connecting a connector (27) of the filling element (5) to the carrier (4); and
- connecting a web of the I-shaped beam (7) of the filling element (5) to the carrier (4).

15. Method according to claim 13 or 14, comprising the steps of:

- placing a bracket (12) of the bolted connection (11) against or near a web (15) of the carrier (4);
- drilling a through hole (18) in at least said web (15) of the carrier (4) that is in alignment with a through hole (17) in said bracket (12); and
- arranging a bolt (20) through the through holes (17, 18) of the bracket (12) and the carrier (4); and
- preferably further comprising the step of placing one or more than one spacer (16) between the carrier (4) and the bracket (12).

Patentansprüche

1. Anordnung (1), die aufweist:

- eine Skelettstruktur (2) und/oder eine Wandlagerstruktur eines Gebäudes, die wenigstens einen Träger (4) aufweist;
- ein Füllelement (5), das vom Träger (4) aus verläuft, das aufweist:

- eine Platte (6); und
- einen I-förmigen Balken (7), wobei die Anordnung (1) **dadurch gekennzeichnet ist, dass** der I-förmige Balken (7) aufweist

- einen ersten Flansch (8), der ein oberer Flansch ist, der einen davon aus verlaufenden Fortsatz (9) aufweist und der am Träger (4) gehalten wird, wobei der erste Flansch (8) und der Fortsatz (9) von der Platte (6) beabstandet sind; und
- einen zweiten Flansch (10), der ein unterer Flansch ist, der in der Platte (6) eingebettet ist, um den Balken (7) als ein strukturell integriertes Teil des Füllelements (5) zu der Platte (6) zu definieren; und

darin, dass die Anordnung (1) eine Schraubverbindung (11) aufweist, die den Balken (7) mit dem Träger (4) an einem vertikalen Versatz von dem Fortsatz (9) verbindet.

2. Anordnung nach Anspruch 1, wobei der Fortsatz (9) plattenförmig ist und in einer liegenden Ebene am Träger (4) ausgerichtet ist.

3. Anordnung nach Anspruch 1 oder 2, wobei der Fortsatz (9) frei auf dem Träger (4) gehalten wird.

4. Anordnung nach einem der vorhergehenden Ansprüche, wobei die Schraubverbindung (11) wenigstens eines verbindet von:

- einem Verbindungselement (27) des Füllelements (5) und den Träger (4); und
- einem Steg des I-förmigen Balkens (7) des Füllelements (5) und den Träger (4).

5. Anordnung nach wenigstens einem der vorhergehenden Ansprüche, wobei die Schraubverbindung (11) wenigstens in einer Weise angeordnet ist von:

- näher am zweiten Flansch (10) des Balkens (7) des Füllelements (5) als am ersten Flansch (8) davon; und

- an oder nahe am zweiten Flansch (10) des Balkens (7) des Füllelements (5).

6. Anordnung nach wenigstens einem der vorhergehenden Ansprüche, wobei die Schraubverbindung (11) einen Winkel (12) aufweist.

7. Anordnung nach Anspruch 6, wobei der Winkel (12) eine L-Form hat, von der ein erster Abschnitt (13) im Wesentlichen entlang einer Längsrichtung des Füllelements (5) verläuft und von der ein zweiter Abschnitt (14) quer zum ersten Abschnitt (13) und im Wesentlichen parallel zu einem Steg (15) des Trägers (4) verläuft, wobei mehr bevorzugt der zweite Abschnitt (14) der L-Form des Winkels (12) am Steg (15) des Trägers (4) anliegt, und der zweite Abschnitt (14) des Stegs (15) ausgerichtete Durchgangsöffnungen (17, 18) aufweist, durch die eine Schraube (20) angeordnet ist.

8. Anordnung nach Anspruch 6 oder 7, wobei ein oder mehr als ein Abstandselement (16) zwischen dem Winkel (12) und dem Steg (15) des Trägers angeordnet ist.

9. Anordnung nach wenigstens einem der vorhergehenden Ansprüche, wobei die Platte aus Beton hergestellt ist und/oder der Balken (7) aus Stahl hergestellt ist.

10. Anordnung nach wenigstens einem der vorhergehenden Ansprüche, die weiterhin eine Halterung (22) aufweist, die ausgestaltet ist, um die Schraubverbindung (11) zu halten.

11. Anordnung nach Anspruch 10, wobei die Halterung (22) am zweiten Flansch (10) des Balkens (7) angeordnet ist;

- wobei die Halterung (22) vorzugsweise verläuft:

- vom zweiten Flansch (10) des Balkens (7) in Richtung des ersten Flanschs (8) des Balkens (7); und/oder
- vom zweiten Flansch (10) über die Platte (6) hinaus.

12. Anordnung nach Anspruch 9 oder 10, wobei die Halterung (22) aus Stahl hergestellt ist und eine Eingriffsfläche für den Winkel (12) des Schraubverbindung (11) vorsieht.

13. Verfahren, das die Schritte aufweist:

- Vorsehen einer Skelettstruktur (2) und/oder einer Wandlagerstruktur eines Gebäudes, die wenigstens einen Träger (4) aufweist;

- Vorsehen eines Füllelements (5), das vom Träger (4) aus verläuft, wobei das Füllelement (5) eine Platte (6) und einen I-förmigen Balken (7) aufweist, von dem:

- ein erster Flansch (8) ein oberer Flansch ist, der einen davon aus verlaufenden Fortsatz (9) aufweist und der am Träger (4) gehalten wird, wobei der erste Flansch (8) und der Fortsatz (9) von der Platte (6) beabstandet sind; und
- ein zweiter Flansch (10) ein unterer Flansch ist, der in der Platte (6) eingebettet ist, um den Balken (7) als ein strukturell integriertes Teil des Füllelements (5) mit der Platte (6) zu definieren; und

- wobei das Verfahren weiterhin die Schritte aufweist:

- Positionieren des Fortsatzes (9), der vom ersten Flansch (8) aus verläuft, auf dem Träger (4); und
- Verbinden des Füllelements (5) mit dem Träger (4) an einem vertikalen Versatz von dem Fortsatz (9) mit einer Schraubverbindung (11), wobei der erste Flansch (8) auf dem Träger (4) aufliegt, wobei der Träger (4) dadurch das Füllelement (5) hält.

14. Verfahren nach Anspruch 13, wobei der Schritt des Verbindens des Füllelements (5) mit dem Träger (4) unter Verwendung der Schraubverbindung (11) wenigstens eines aufweist von:

- Verbinden eines Verbindungselements (27) des Füllelements (5) mit dem Träger (4); und
- Verbinden eines Stegs des I-förmigen Balkens (7) des Füllelements (5) mit dem Träger (4).

15. Verfahren nach Anspruch 13 oder 14, das die Schritte aufweist:

- Anordnen eines Winkels (12) der Schraubverbindung (11) gegen oder nahe einem Steg (15) des Trägers (4);
- Bohren einer Durchgangsöffnung (18) in wenigstens dem Steg (15) des Trägers (4), der mit einer Durchgangsöffnungen (17) in dem Winkel (12) ausgerichtet ist; und
- Anordnen einer Schraube (20) durch die Durchgangsöffnungen (17, 18) des Winkels (12) und des Trägers (4); und
- vorzugsweise weiterhin den Schritt des Anordnens von einem oder mehr als einem Abstandselement (16) zwischen dem Träger (4) und dem Winkel (12) aufweisend.

Revendications

1. Ensemble (1), comprenant :

- 5 une ossature (2) et/ou une structure porteuse de paroi d'une construction, comprenant au moins un support (4) ;
un élément de remplissage (5) s'étendant à partir du support (4), comprenant :

- 10 une plaque (6) ; et
une poutrelle en forme de I (7), ledit ensemble (1) étant **caractérisé en ce que** ladite poutrelle en forme de I (7) comprend

- 15 une première semelle (8) qui est une semelle supérieure qui comprend une extension (9) s'étendant à partir de celle-ci et qui est supportée par le support (4), dans lequel ladite première semelle (8) et ladite extension (9) sont à une certaine distance de la plaque (6) ; et
une deuxième semelle (10) qui est une semelle inférieure qui est encastree dans la plaque (6) afin de définir la poutrelle (7) en tant que partie structurellement intégrée de l'élément de remplissage (5) avec la plaque (6) ; et
en ce que ledit ensemble (1) comprend une liaison boulonnée (11) reliant la poutrelle (7) au support (4) avec un décalage vertical par rapport à l'extension (9).

2. Ensemble selon la revendication 1, dans lequel l'extension (9) est en forme de plaque et orientée dans un plan formé sur le support (4).

3. Ensemble selon la revendication 1 ou 2, dans lequel l'extension (9) est supportée librement par le support (4).

4. Ensemble selon l'une quelconque des revendications précédentes, la liaison boulonnée (11) reliant au moins l'un parmi :

- 45 un coupleur (27) de l'élément de remplissage (5) et le support (4) ; et
une bande de la poutrelle en forme de I (7) de l'élément de remplissage (5) et le support (4).

5. Ensemble selon au moins l'une des revendications précédentes, dans lequel la liaison boulonnée (11) est agencée au moins soit :

- 55 plus près de la seconde semelle (10) de la poutrelle (7) de l'élément de remplissage (5) que de la première semelle (8) de celle-ci ; soit
sur ou à proximité de la seconde semelle (10) de la poutrelle (7) de l'élément de remplissage (5).

6. Ensemble selon au moins l'une des revendications précédentes, dans lequel la liaison boulonnée (11) comprend une potence (12).
7. Ensemble selon la revendication 6, dans lequel la potence (12) présente une forme de L dont une première section (13) s'étend sensiblement dans l'alignement d'une direction longitudinale de l'élément de remplissage (5) et dont une seconde section (14) s'étend transversalement à la première section (13) et sensiblement parallèlement à une bande (15) du support (4), dans lequel, plus préférablement, la seconde section (14) de la forme de L de la potence (12) vient en butée contre la bande (15) du support (4), et ladite seconde section (14) et ladite bande (15) comprennent des orifices traversant alignés (17, 18) à travers lesquels un boulon (20) est agencé.
8. Ensemble selon la revendication 6 ou 7, dans lequel une ou plusieurs entretoises (16) sont agencées entre la potence (12) et la bande (15) du support (4).
9. Ensemble selon au moins l'une des revendications précédentes, dans lequel la plaque (6) est réalisée en béton et/ou la poutrelle (7) est réalisée en acier.
10. Ensemble selon au moins l'une des revendications précédentes, comprenant, en outre, un support (22) configuré de manière à supporter la liaison boulonnée (11).
11. Ensemble selon la revendication 10, dans lequel le support (22) est agencé sur la seconde semelle (10) de la poutrelle (7) ; dans lequel le support (22) s'étend, de préférence :
- à partir de la seconde semelle (10) de la poutrelle (7) vers la première semelle (8) de la poutrelle (7) ; et/ou
- à partir de la deuxième semelle (10) au-delà de la plaque (6).
12. Ensemble selon la revendication 9 ou 10, dans lequel le support (22) est réalisé en acier et présente une surface de couplage pour la potence (12) de la liaison boulonnée (11).
13. Procédé, comprenant les étapes de :
- agencement d'une ossature (2) et/ou d'une structure porteuse de paroi d'une construction, comprenant au moins un support (4) ;
- agencement d'un élément de remplissage (5) s'étendant à partir du support (4), ledit élément de remplissage (5) comprenant une plaque (6) et une poutrelle en forme de I (7) de laquelle :
- une première semelle (8) est une semelle supérieure qui comprend une extension (9) s'étendant à partir de celle-ci et qui est supportée sur le support (4), dans lequel ladite première semelle (8) et ladite extension (9) sont à une certaine distance de la plaque (6) ; et
- une seconde semelle (10) est une semelle inférieure qui est encastrée dans la plaque (6) afin de définir la poutrelle (7) comme partie structurellement intégrée de l'élément de remplissage (5) avec la plaque (6) ; et
- dans lequel le procédé comprend, en outre, les étapes de :
- positionnement de l'extension (9) s'étendant à partir de la première semelle (8) sur le support (4) ; et
- assemblage de l'élément de remplissage (5) sur le support (4) suivant un décalage vertical par rapport à l'extension (9) avec une liaison boulonnée (11), pendant que la première semelle (8) repose sur le support (4), ledit support (4) supportant ainsi l'élément de remplissage (5).
14. Procédé selon la revendication 13, dans lequel l'étape de liaison de l'élément de remplissage (5) sur le support (4) en utilisant la liaison boulonnée (11) comprend au moins l'une de :
- la liaison d'un coupleur (27) de l'élément de remplissage (5) sur le support (4) ; et
- la liaison d'une bande de la poutrelle en forme de I (7) de l'élément de remplissage (5) sur le support (4).
15. Procédé selon la revendication 13 ou 14, comprenant les étapes de :
- mise en place d'une potence (12) de la liaison boulonnée (11) contre ou à proximité d'une bande (15) du support (4) ;
- perçage d'un orifice traversant (18) sur au moins ladite bande (15) du support (4) qui est dans l'alignement d'un orifice traversant (17) sur ladite potence (12) ; et
- agencement d'un boulon (20) à travers les orifices traversant (17, 18) de la potence (12) et du support (4) ; et
- de préférence, comprenant, en outre, l'étape de mise en place d'une ou plusieurs entretoises (16) entre le support (4) et la potence (12).

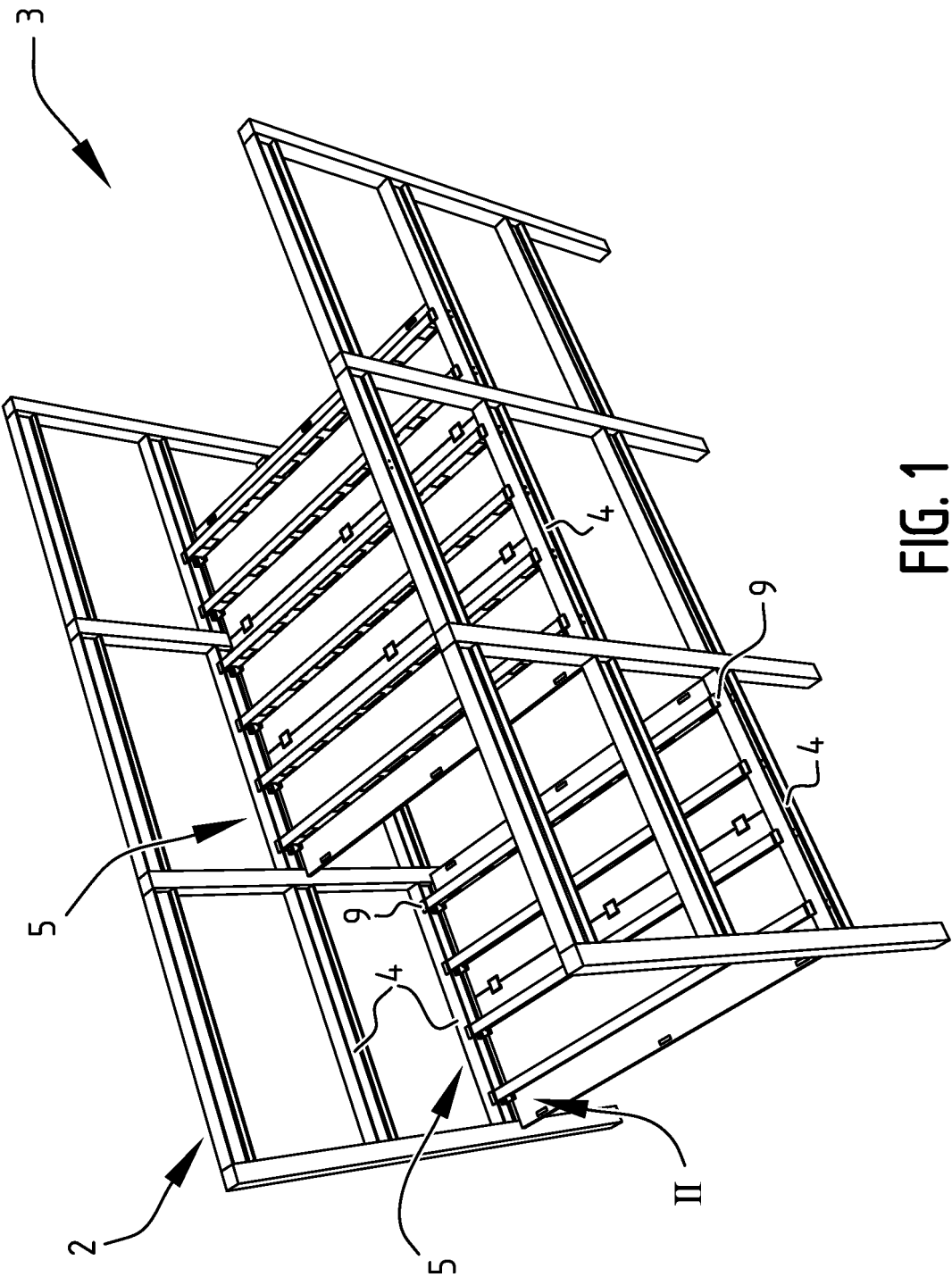
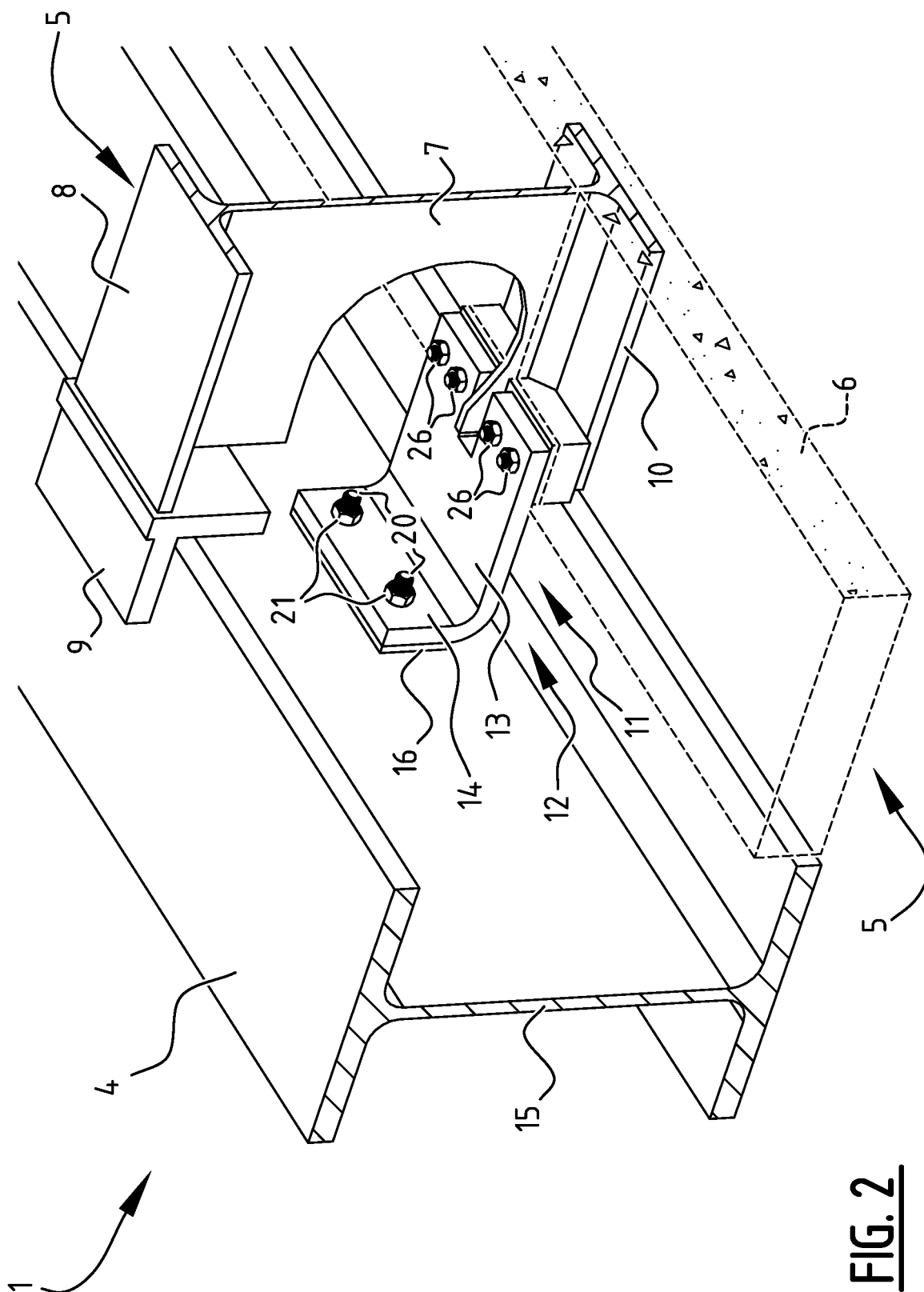


FIG. 1



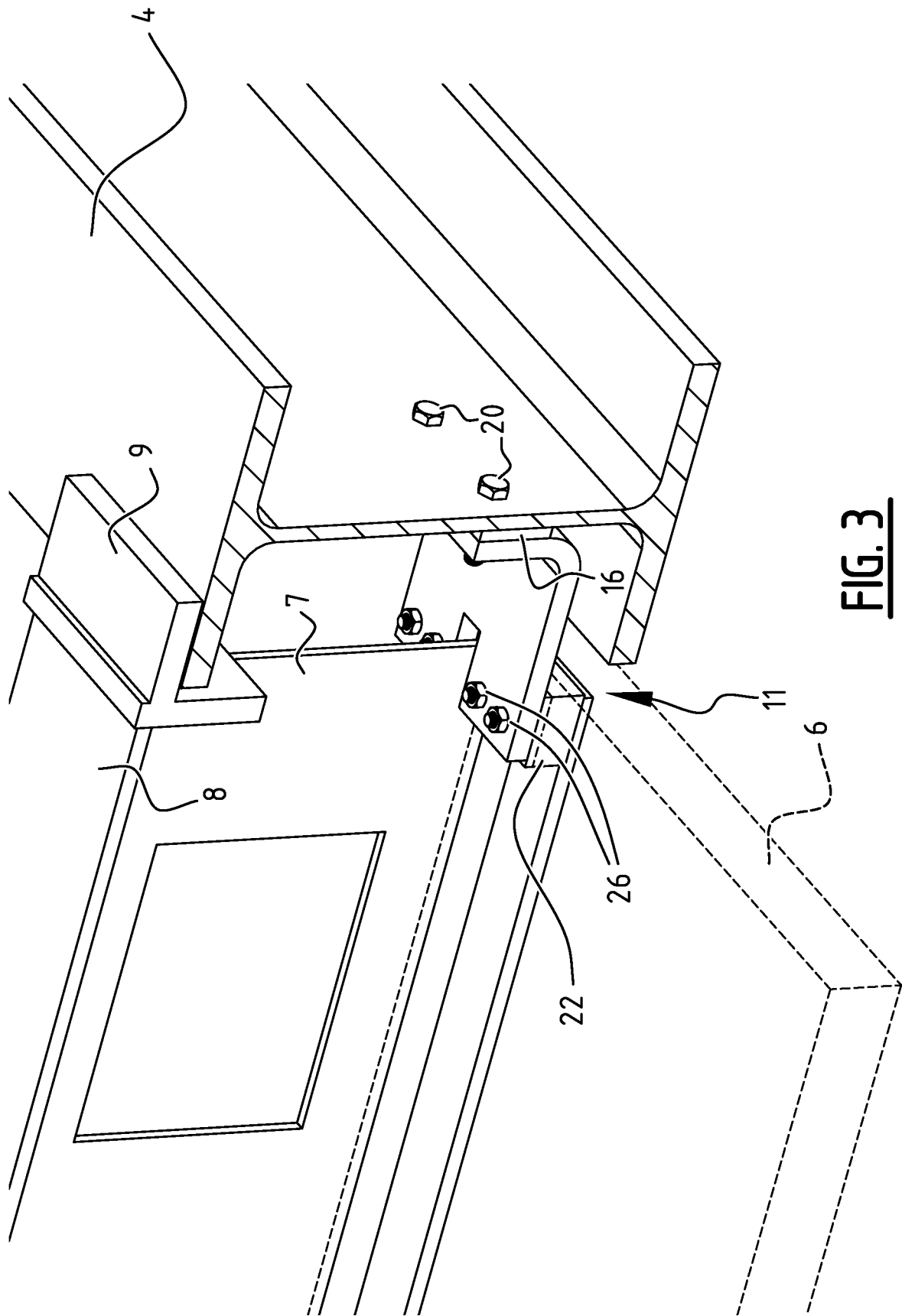


FIG. 3

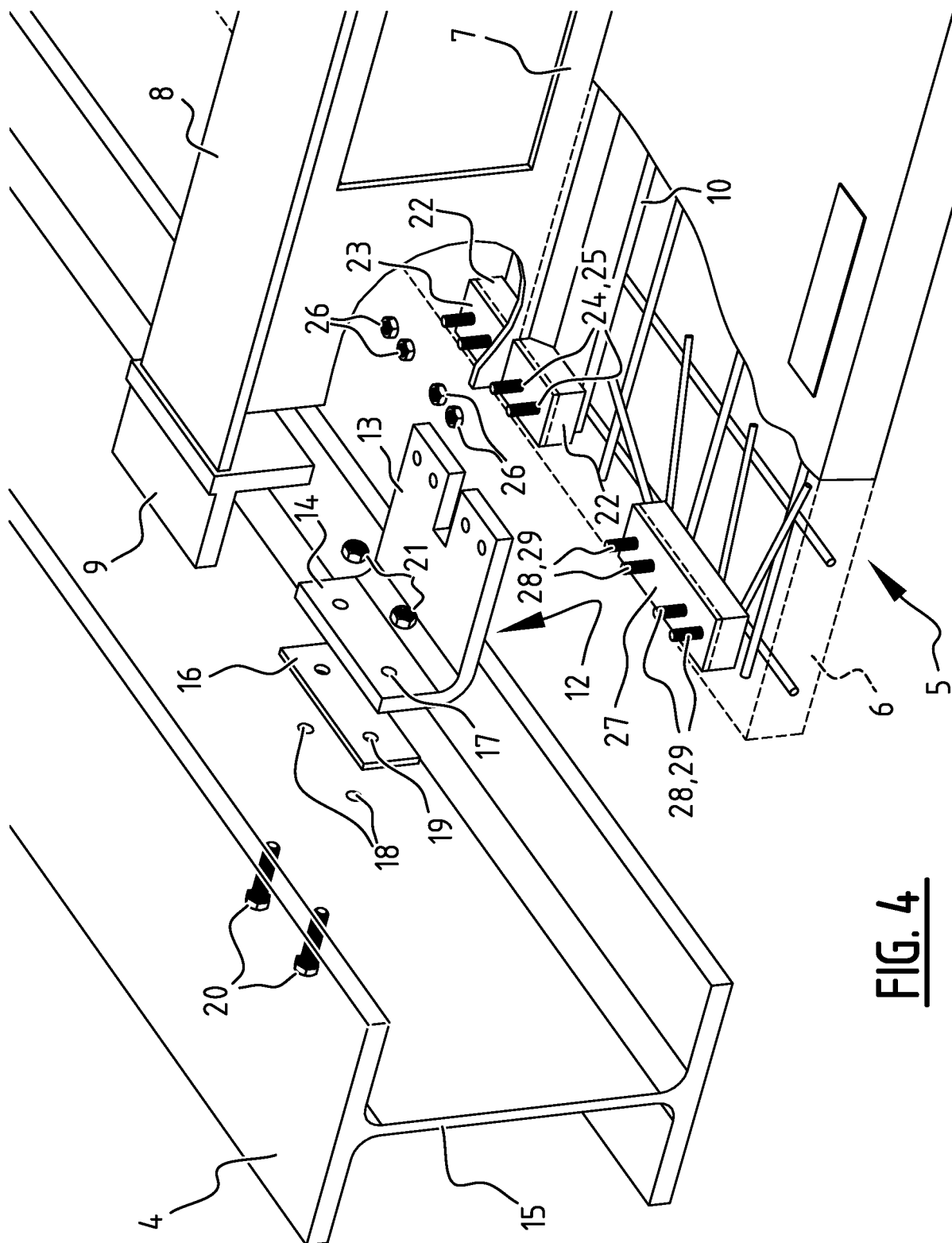


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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