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(54) **CONSTRUCTION REINFORCEMENT CONNECTOR**

VERBINDER FÜR DIE BAUBEWEHRUNG

CONNECTEUR DE RENFORCEMENT DE CONSTRUCTION

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Description

[0001] The subject of the invention is a construction reinforcement connector intended, in particular, for joining an external ferroconcrete panel, a terrace slab in particular, with a ferroconcrete structural element of a building, for example with a ferroconcrete ceiling, a ferroconcrete girder or a wall.

[0002] A range of construction reinforcement connector designs is known in the art, including known solutions containing dedicated thermal insulation elements cooperating with the connector. In buildings and structures, a terrace slab is attached to a structural element using a number of connectors according to the invention.

[0003] In a solution known from the patent disclosure EP 3613910, a building connector with thermal insulation is known, which contains at least one pair of load bearing elements, one located above the other, and a thermal insulation layer located around and between such load bearing elements. The load bearing element in this known solution is a section of a steel profile with steel reinforcing bars attached to its both ends, comprising extensions of said profile. The free ends of those bars are an extension of the profile. In this known solution, the steel profile is an open profile with an omega-shaped cross-section, wherein one steel reinforcing bar is attached to each end of this profile, in the bends of its arms. The aforementioned reinforcing bar includes a loop and two arms within its length. The loop covers the spine of the steel profile in this solution. The reinforcing bar is attached within bends of the omega steel profile, between the outwards bent arm and the side wall of the spine of this profile perpendicular to this arm. In a pair of steel profiles comprising a single connector, both profiles are parallel, one located above the other and facing each other with the spines of the omega-shaped profiles. The arms of both omega steel profiles, bent outwards, lie in parallel planes. Within each pair of the omega steel profiles, the middle sections of both profiles are located within the thermal insulation layer. The thermal insulation layer includes three zones. The bottom zone of the insulation layer has a protrusion matching the shape of the interior of the bottom profile spine. The middle insulation zone includes a bottom channel and the top channel meshing with the spines of both steel profiles within this insulation zone. In this known solution, the top insulation zone includes a spine shaped to match the external shape of the top steel profile. In this known solution, each steel bar of the reinforcement has two free ends pointing away from the omega steel profile to which the bar is attached and a loop in its middle section, including the spine of this omega steel profile. Each of the omega steel profiles has one steel bar with the aforementioned loop attached to each of its ends. Two free ends of the steel bar of the reinforcement fixed to the end of the omega steel profile with its loop cooperate with the ferroconcrete structural element of the structure. The second steel bar of the reinforcement, fixed to the second end of this omega steel profile with its loop, cooperates with the ferroconcrete structural element attached to the aforementioned structural element of the structure via a number of the disclosed connectors. The structural element of the structure or building may be a monolithic ceiling or a tie beam. The element attached to the structural element of a structure or a building may be a terrace slab. These two example elements are joined using a number of connectors according to this known solutions, including dedicated thermal insulation in the form of shaped and complementary beams made of structural foam, running across a number of the described connectors.

[0004] In a solution according to the international patent application no. WO 00/47834, a solution of a connector used to fix supporting panels, for example terrace slabs, onto a wall structure or onto a ceiling structure inside a building was disclosed. Said connector includes at least one connecting profile and a number of elements improving traction and pressure. These parts are running through the wall structure or through the ceiling structure of the building, together with multiple elements improving traction and pressure, running through the supporting plate, for example a terrace slab. The device according to the invention also includes an insulating body, connected with the connector. The reinforcing elements are connected via connection points with the reinforcing profile, in the form of a stainless steel reinforcing profile, within the highest strain area. A single connector usually includes two steel profiles, which are also preferably connected. In particular, the connector is provided as a single element with two steel profiles and four extended arms made of reinforcing bars. The insulation element is passing only through the middle zone of each of the reinforcing profiles, where it is not connected to U-shaped bends of both reinforcing bars. Said connector intended for connecting supports to a structure of a wall or of a ceiling thus includes at least one, and usually two, sections of a steel profile located one above the other and at least two, and usually four, arms of the U-shaped reinforcing bar, the bends of which are connected by both said steel profiles. Thus, a number of the described connectors includes multiple elements in the form of bars running inside the structure of the wall or of the ceiling, and multiple elements in the form of bars running inside a supporting panel, for example inside a terrace slab. The connector according to this known solution also includes an insulating body. Steel profiles according to this known solution have a C-shaped or a H-shaped cross-section and comprise thin-walled reinforcing profiles. These profiles are connected in pairs using the disclosed, U-shaped reinforcing bars, within the bend area of said bars. Connections of every steel profile with reinforcing bars are provided as welded joints. According to this known solution, reinforcing bars connecting each pair of steel profiles are also welded to the arms of the C-shaped or of the H-shaped profiles. In this known connector, the pair of steel profiles is connected on each of the sides with a U-shaped reinforcing bar. The ends of the bottom profile

and of the top profile are welded on the left and on the right sides within the bends of these two reinforcing bars. Thus, on the right side and on the left side, the four free arms of the U-shaped reinforcing bars comprise an extension of steel profiles to one side, intended to cooperate with the ceiling slab of the building or of a structure. Another two, U-shaped reinforcing bars are welded at their bends to the opposite ends of said two steel profiles. The four free arms of these two additional reinforcing bars are intended to cooperate with the terrace slab, intended to be connected with the structure of the building. In the working position of the connector, in this known solution, the four aforementioned U-shaped reinforcing bars are located in two parallel, vertical planes. These bars connect two steel profiles and together with them form a complete connector intended for installation at a construction site. A number of connectors connect a terrace slab or another external element to the construction site. According to this known solution, the reinforcing bars are reinforcing bars made of reinforcing steel. The outer surface of reinforcing bars is provided with ribbed walls in order to improve anchoring in the supporting panel or in the terrace slab. In a connector according to this known solution it is foreseen that two arms of the U-shaped reinforcing bar may be connected using at least one additional element connecting them transversely in the area of the steel profile. In a device according to this solution, the insulating body may be made of several individual, complementary elements or bars placed on reinforcing profiles or partially enclosing such profiles.

[0005] In another known solution, pairs of C-shaped steel profiles are used, penetrating the layer formed of thermally insulating material profiles. Each pair of the C-shaped profiles, the top and the bottom profiles, are connected with a U-shaped reinforcing bar on one side and with a U-shaped reinforcing bar on the other side. An identical connection using two more U-shaped bars is provided on the other side, in the area of the second ends of the same pair of C-shaped profiles. Thus, a pair of C-shaped profiles is connected on each side using two bars, each of which is U-shaped, wherein arms of these bars provide an extension of said C-shaped profiles. Thus placed four bar arms on one side of the pair of C-shaped profile are intended for connection with reinforcement of an external building element, for example of a terrace slab, while four bar arms on the opposite side of the same pair of C-shaped profiles are intended for connection with reinforcement of an internal building element, for example, of a ceiling. Each pair of the C-shaped profiles with the bars, the top and the bottom C-shaped profile, is free of reinforcing bars in the middle section of its length. A range of such pairs of C-shaped profiles with reinforcing bars, comprising connectors, is intended for installation between neighbouring edges of a terrace slab and of a building ceiling.

[0006] In the known solution, the C-shaped profiles in such multiple connector pairs are free of reinforcing elements in the middle section of their length. This area along the edge of the building ceiling and along the edge of the terrace slab is intended for installation of thermal insulation profiles in order to remove a potential thermal bridge. Another known solutions are shown in documents number EP 1881119 A2 and DE 20003008 U1.

[0007] The problem to be solved is to increase the resistance of said connector by increasing the structural reliability of welded joints. The problem to be solved also includes improvement of logistics of pre-fabricated panels with installed connectors and improvement of thermal insulation of connections by improving the dimensional accuracy of connector execution. This should result in improvement in terms of further removal of thermal bridges in said areas of connections of external structural elements, such as terrace slabs, for example, with internal structural elements, such as ceiling slabs, for example. In the known structure of the connector, the ends of two steel profiles are connected with a U-shaped reinforcing bar on one side and with a similarly shaped bar on the right side, within the bend area of said bars. The second ends of these steel profiles are connected similarly, using two additional U-shaped bars. Each four ends of said reinforcing bars thus protrude far away from steel profiles, comprising extensions of such profiles to both sides. The attachment of steel profiles to the U-shaped reinforcing bars within the bend area of such bars comprises a difficult to overcome challenge, related to maintaining the dimension repeatability of individual connectors. Reinforcing bars with significant cross-sectional diameters, up to 12 - 16 mm, cause difficulties in maintaining a repeatable distance between steel profiles attached to them during and after welding, within the bend area. Even small differences between dimensions arising during connector welding or after the welding as a result of flexible deformations within the bend area of the U-shaped bars result in loss of tightness in insulation bars laid out within multiple connectors at a construction site. This contributes to formation of thermal bridges inside the final building or a structure. Welding of reinforcing bars with steel profiles near the bends of the previously formed reinforcing bars may also significantly weaken the entire structure of the reinforcing connector. The previously bent bars usually exhibit weaker bend areas, and welding operations in the known solutions were performed exactly in such bend areas of the reinforcing bars. The invention is intended to remove such disadvantages.

[0008] These problems were solved by a change to the configuration of the U-shaped reinforcing bars within the connector. In the previously disclosed solutions, the U-shaped reinforcing bars were located within the connector installed in a building or a structure within a vertical plane. Each of these U-shaped bars was welded to two steel profiles, the top profile and the bottom profile, within the bend area of the bar, while free ends of each of the U-shaped bars protruded outside the connector on both sides.

[0009] On the other hand, the solution according to the invention proposes attaching each of the U-shaped re-

inforcing bars within a horizontal plane. On both sides of the steel profile, two free ends of each of the two reinforcing bars are welded to the end of the same steel profile, while the bends of said bars protrude outside the connector and outline the reach of said bars. In special cases, the bottom steel profile in the reinforcement connector may lack the welded reinforcing bars. On the other hand, the connection between two profiles in each connector was provided according to the invention by welding straight, vertical bars of specific length between them, two straight vertical bars at one and two vertical bars at the other end of these profiles.

[0010] According to the invention, the construction reinforcement connector contains at least one pair of steel profile sections, one located above the other. A U-shaped reinforcing steel bar is attached to at least one steel profile, at each of its ends, where said steel bars comprise an extension of the profile to both sides. Straight sections of the reinforcing bar connecting the two steel profiles are also attached between the steel profiles, at their ends.

[0011] According to the invention, the construction reinforcement connector is characterised in that two free ends of the U-shaped reinforcing bar are attached to each end of the steel profile and comprise an extension of the steel profile. In the working position of the connector, each of the U-shaped reinforcing bars encompasses the spine of the steel profile with its free ends.

[0012] In the solution according to the invention, the steel profile is preferably an open profile with omega-shaped cross-section.

[0013] The U-shaped reinforcing bar according to the invention is preferably placed in a plane parallel to the plane of arms of the omega-shaped cross-section steel profile.

[0014] In a pair of steel profiles in a connector, both profiles are parallel, one located above the other and preferably facing each other with the spines.

[0015] In a pair of omega-shaped cross-section steel profiles, the profiles are preferably placed such that the arms of both steel profiles bent outward are located in planes parallel to each other.

[0016] In each pair of the steel profiles, the middle sections of both steel profiles, between the attachment points of the reinforcing bars and of the straight bars, are preferably located within the layer of thermal insulation.

[0017] In a preferable embodiment of the solution according to the invention, the reinforcing bars are bent at a right angle at least on one side of the steel profile.

[0018] At least one U-shaped reinforcing bar is bent at at least one point, on one side of the connector, in the area of the extension of the steel profile, according to the shape of the cross-section of the structural element of a building or of a structure in which the connector is installed.

[0019] The proposed solution using omega-shaped cross-section steel profiles enabled the distance between two steel profiles, and thus the size of the connector, to be independent of the length of the welded vertical bars. Depending on the requirements of the designer, execution of connectors of different sizes thus became dependent on the use of straight, unbent vertical bars of the required length, wherein the length of said bars determines the precise dimension of the connector, according to the project of the construction site. The production process of connectors according to the invention has thus been freed of the difficult technological operation of precise bending of the reinforcing bar with a significant cross-section, with the precise, required distance between arms in the area of the bend of such a bar. In known solutions, this distance determined the size of the connector required by the site designer. At the same time and according to this invention, provision of welded joints connecting only straight reinforcing bars with steel profiles eliminated the unfavourable influence of welding on resistance of the joint, previously made weaker by bending the bar.

[0020] The solution according to the invention enables production of larger numbers of individual profiles with U-shaped reinforcing bars attached to them on both sides, to be stored at a warehouse. The same components enable preparation of ready connectors of various sizes, depending on the requirements of the construction site. In the case of the solution according to the invention, these parameters depend only on the length of the straight bars used, which were not previously weakened by bending.

[0021] At the same time, it was shown that the U-shaped reinforcing bar with its bend directed outwards transfers loads much better than two free ends of an identical bar installed with its bend directed towards the steel profiles. In the case of the solution according to the invention, this enabled the required length of the bar, protruding outside both ends of the steel profile, to be shorter. This decreased the external dimension of the connector according to the invention, which in turn facilitated storage and transport of connectors to the construction site.

[0022] The object of the invention has been presented in embodiments in the attached drawing, in which individual figures of the drawing represent as follows:

Fig. 1 - a view of the connector with two reinforcing bars.

Fig. 2 - a view of the connector with four reinforcing bars.

Fig. 3 - a top view of the connector.

Fig. 4 - a side view of the connector with four reinforcing bars.

Fig. 5 - a cross-section through the connector anchored in the ceiling and in the terrace slab, at the same ordinal coordinate.

Fig. 6 - a cross-section through the connector anchored in a continuous ceiling.

Fig. 7 - a cross-section through the connector according to Fig. 5, with a reinforcing bar formed because of the collision with reinforcement inside the ceiling.

Fig. 8 - a cross-section through the connector according to Fig. 5, with the level of the ceiling moving upwards.

Fig. 9 - a cross-section through the connector anchored in a wall and in the terrace slab, with downward anchoring inside a wall.

Fig. 10 - a cross-section through the connector according to Fig. 9, with upwards anchoring inside a wall.

Fig. 11 - a cross-section through the connector according to Fig. 10, with downwards anchoring inside a ferroconcrete beam with any level of the ceiling.

Fig. 12 - a cross-section through the connector according to Fig. 11, with upwards anchoring inside a ferroconcrete beam

Fig. 13 - a cross-section through the connector with anchoring inside a ferroconcrete beam using a U-shaped reinforcing bar bent downwards into a loop.

Fig. 14 - a cross-section through the connector according to Fig. 13 with the reinforcing bar bent upwards into a loop.

[0023] Fig. 1 shows the connector according to the invention in the first embodiment, in a perspective view. In this embodiment, the connector includes a top steel profile 1 and a bottom steel profile 2. Profiles 1, 2 comprise open steel profiles with an omega-shaped cross-section and face each other with their spines 3. Fig. 1 presents an embodiment of the connector with two U-shaped reinforcing bars 4. In this embodiment, both reinforcing bars 4 are welded to two ends of the top steel profile 1. It is shown here that each of the reinforcing bars 4 encompasses the terminal part of the spine 3 with its free ends and is welded both to the sides of this spine 3, and to both arms of the omega-shaped cross-section steel profile 1, 2.

[0024] Both steel profiles 1, 2 are are connected with straight reinforcing bars 5 welded to the sides of the spine 3 of the profile 1, as well as to arms 6 of this profile 1. As it can be seen in this figure, the length of straight bars 5 determines the connector height, which may be adjusted by selecting the length of said straight bars 5 according to the requirements of the design of the construction project. This figure also shows that the middle section of the length of steel profiles 1, 2 is free of welded elements. This section of the connector is dedicated for use of thermal insulation profiles made of insulating foam, known in the art. These known profiles have the form of beams passing through this middle section of the number of profiles. These beams are formed according to the shape of the aforementioned middle section of steel profiles of the connector. The shape of these profiles is known from documents listed in the description of the prior art. For this reason, Fig 5 to Fig. 14 present this thermal insulation zone intended to remove thermal bridges within the building as item 10 and its presence is only generally outlined in these figures.

[0025] Fig. 2 presents the second embodiment of the connector according to the invention. In this embodiment, the bottom steel profile 2 is also provided with U-shaped reinforcing bars 4. Each of both steel profiles 1, 2 has one reinforcing bar 4 welded to its both ends. All four reinforcing bars 4 are attached to four ends of the steel profiles 1, 2 with their free ends. Two bars 4 comprise extensions of the terminal parts of each of the steel profiles 1, 2. These extensions cooperate with the ferroconcrete terrace slab 7 on one side, and on the other - with the ferroconcrete structural element of the building or of the structure, for example a ceiling 8, to which this terrace slab 7 is connected.

[0026] Fig. 1 and Fig. 2, as well as subsequent figures show that the U-shaped bar 4 is located in a generally horizontal plane in this solution. This distinguishes the solution according to the invention from solutions known from the prior art, where each of the U-shaped bars 4 is located in a generally vertical plane. As shown in the figures, in the solution according to the invention each of the U-shaped bars 4 is attached at its free ends to one steel profile 1, 2. In solutions known from the prior art, each of the bars 4 is attached at its bent part to two profiles 1, 2. The plane has been defined here as generally vertical and generally horizontal. The execution conditions of these elements for construction industry show that the connectors include the disclosed bars 4 in an approximately horizontal position and thus the terms generally vertical and generally horizontal were used. This is shown in the following Fig. 3 and Fig. 4, as well as in the subsequent figures. Fig. 3 shows a top view of the connector according to Fig. 1 and Fig. 2, while Fig. 4 shows a side view of the connector according to Fig. 2

[0027] The U-shaped bars 4 comprise extensions of the steel profiles 1,2. This is shown in Fig. 1 and Fig. 2, as well as in the subsequent figures. However, contrary to solutions known from the prior art, the bends 9 of these bars 4 are pointing outwards. The distance between the bends 9 of bars 5 thus determines the total length of the connector according to the invention, which includes the length of the steel profile 1, 2 and the length of bars 4 comprising its extension towards both sides, attached to the profile. In this embodiment, the reinforcing bars 4

have a diameter of 12 mm and include the notched surface, while the length of arms of bars 4 to the bend area 9 is 324 mm. The free arms of the U-shaped bar 4 are located 32 mm away from each other, while the bending radius 9 is 24 mm. The example length of the omega-shaped cross-section steel profile 1, 2 is 300 mm and its dimensions are: width - 58 mm, height - 26 mm.

[0028] A number of the disclosed connectors connecting the terrace slab or a different element with the building or the structure is provided at the junction between the terrace slab 7 and the structural element of the building or of the structure. This is shown and disclosed in patent documents known from the prior art.

[0029] Fig. 5 presents an example embodiment of a connector anchored within a structural element of a building or of a structure in the form of a ferroconcrete ceiling 8 and in a terrace slab 7 on the other side. In this embodiment, the top level of the ceiling and of the terrace slab 7 are located at the same ordinal. The wall of 11 of the building or of the structure, to which the terrace slab 7 is connected, is also shown here. In this embodiment, the connector includes two U-shaped bars, welded to the top steel profile 1.

[0030] Fig. 6 presents an example embodiment of a connector anchored within a structural element of a building or of a structure in the form of a ferroconcrete ceiling 8 and in a terrace slab 7 on the other side. In this embodiment, the top level of the ceiling 8 and of the terrace slab 7 are located at the same ordinal. The wall of 11 of the building or of the structure, to which the terrace slab 7 is connected, is also shown here. In this embodiment, the connector includes four bars 4 welded to the top steel profile 1 and to the bottom steel profile 2. In this embodiment, the connector ensures indirect support of the terrace.

[0031] Fig. 7 presents an embodiment of the connector according to Fig. 5, however, in this embodiment, arms of the bar 4 anchored within the structural element 8 of the building or of the structure in the form of a ceiling are shaped by bending to avoid collision with the known, neighbouring frame placed perpendicular inside the structural element of the building or of the structure, not shown in this figure. In this embodiment, the top level of the ceiling and of the terrace slab 7 are located at the same ordinal, as shown in Flg. 5.

[0032] Fig. 8 presents another embodiment of a connector anchored within a structural element of a building or of a structure in the form of a ferroconcrete ceiling 8 and in a terrace slab 7 on the other side. In this embodiment, the ceiling level jumps upwards and is located above the level of the terrace slab 7. In this embodiment, the connector includes two bars 4, welded to the top steel profile 1. The bottom lining 12 of bars 4 inside the ceiling 8 comprising the structural element of the building or of the structure has the minimum thickness of 40 mm in this embodiment.

[0033] Fig. 9 presents another example embodiment of a connector anchored within a structural element of a building or of a structure in the form of a ferroconcrete wall 11 and in a terrace slab 7 on the other side. In this embodiment, the bar 4 is generally bent downwards at a right angle and anchored inside the wall 11 of the building or of the structure.

[0034] Fig. 10 presents another example embodiment of a connector anchored within a structural element of a building or of a structure in the form of a ferroconcrete wall 11 and in a terrace slab 7 on the other side. In this embodiment of the invention, contrary to the example shown in Fig. 9, In this embodiment, the bar 4 is generally bent upwards at a right angle and anchored inside the wall 11.

[0035] Fig. 11 shows an embodiment of the connector anchored inside a ferroconcrete beam 13, where the ferroconcrete ceiling 8 may be located at any level. On the other side, the connector is anchored to the terrace slab 7. The wall 11 of the building or of the structure is also shown here. In this embodiment, the connector includes two bars 4, welded to the top steel profile 1. The bar 4 anchored inside the ferroconcrete beam 13 is generally bent downwards at a right angle, according to the shape of the beam 13.

[0036] Fig. 12 presents an embodiment of the connector anchored inside a ferroconcrete beam 13, similar to the embodiment shown in Fig. 11. In this embodiment, however, the bar 4 anchored inside the ferroconcrete beam 13 is generally bent upwards at a right angle, according to the shape of the beam 13. Similar to the embodiment shown in fig. 11, the ferroconcrete ceiling 8 may be located at any level.

[0037] Fig. 13 presents an embodiment of the connector anchored inside a ferroconcrete beam 13, however, the beam 13 has a different cross-section than that shown in Fig. 11 and Fig. 12. Because of the cross-section of beam 13 comprising the structural element of the building or of the structure to which the connector should be anchored, the bar 4 anchoring to the beam 13 is bent into a downward oriented loop. Similar to the embodiments shown in Fig. 11 and Fig. 12, the ferroconcrete ceiling 8 may be located inside the building or the structure at any level.

[0038] Fig. 14 presents another embodiment of the connector anchored inside a ferroconcrete beam 13, similar to the beam shown in Fig. 13, but with a different cross-section. In this embodiment, the bar 4 anchoring the connector within the beam 13 is bent into an upwards oriented loop.

[0039] In all embodiments shown in Fig. 7 and in Fig. 9 to Fig. 14, where the bar 4 is shown as bent, the bend applies to both arms of the U-shaped bar 4. Both bent arms of this bar 4 remain generally parallel, as shown in the listed fig. 7 and in Fig. 9 to Fig. 14.

[0040] In other embodiments of the connector according to the invention, different dimensions or cross-sections of steel profiles 1, 2 and of reinforcing bars 4 and straight bars 5 may be used. The indicated locations of bars 4 in structural elements of the building or of the struc-

ture are exemplary and do not exclude other embodiments of the connector according to the invention. Omega-shaped cross-section steel profiles shown in the embodiments also should be considered as preferable and not excluding the use of steel profiles with different cross-sections.

List of designations used in the drawings

[0041]

1. Top steel profile.
2. Bottom steel profile.
3. Profile spine.
4. U-shaped reinforcing bar.
5. Straight bar.
6. Profile arm.
7. Terrace slab.
8. Ceiling.
9. Bend.
10. Thermal insulation.
11. Wall of the building/structure
12. Bottom lining.
13. Ferroconcrete beam.

Claims

1. A construction reinforcement connector including at least one pair of steel profile (1,2) sections located one above the other, wherein to at least one steel profile (1, 2), on each side, a U-shaped steel reinforcing bar (4) is attached, wherein said reinforcement bars (4) are an extension of this profile (1, 2) to both sides, and between these steel profiles (1, 2), at their ends, straight sections of the reinforcing bar (5) are also attached and connect these two steel profiles (1, 2), **characterised in that,** two free ends of the U-shaped reinforcing bar (4) comprising an extension of the steel profile (1,2) are attached to each end of the steel profile (1, 2), wherein in the working position of the connector, each of the U-shaped bars (4) encompasses the spine (3) of the steel profile with its ends.

2. A construction connector according to claim 1, **characterised in that** the steel profile (1,2) is an omega-shaped cross-section open profile.

3. A construction connector according to claim 2, **characterised in that** the U-shaped reinforcing bar (4) is located in a plane parallel to the plane of arms of the steel profile (1, 2).

4. A construction connector according to claim 1 or 2 or 3, **characterised in that** in a pair of steel profiles (1, 2) in a connector, both profiles (1,2) are parallel, one located above the other, and facing each other with the spines (3).

5. A construction connector according to claim 4, **characterised in that** in a pair of omega-shaped cross-section steel profiles (1, 2), the profiles are placed such that the arms of both steel profiles (1,2) bent outward are located in planes parallel to each other.

6. A construction connector according to any of the claims 1 to 5, **characterised in that** in each pair of the profiles (1, 2), the middle section of both such steel profiles (1, 2), are located within the layer of thermal insulation (10), between the connection points of the reinforcing bars (4) and the connection points of straight bars (5).

7. A construction connector according to any of the claims 1 to 6, **characterised in that** the reinforcing bars (4) are bent at the right angle at least on one side of the steel profile (1, 2).

8. A construction connector according to any of the claims 1 to 6, **characterised in that** at least one reinforcing bar (4) on one side of the connector, in the zone of steel profile (1, 2) extension is bent at at least one point, according to the shape of the cross-section of the structural element of the building or of the structure, where the connector is attached.

Patentansprüche

1. Verbinder für die Baubewehrung, bestehend aus mindestens einem Paar übereinanderliegender Stahlprofilabschnitte (1,2) mit einem U-förmigen Stahlbewehrungsstab (4), der an mindestens einem Stahlprofil (1,2) auf jeder Seite befestigt ist, wobei die Bewehrungsstäbe (4) eine Verlängerung des Profils (1,2) zu einer Seite und zur anderen Seite und zwischen den Stahlprofilen (1,2) zu deren Enden sind, ferner sind gerade Abschnitte des Bewehrungsstabes (5) angebracht, um die beiden Stahlprofile (1,2) zu verbinden, **dadurch gekennzeichnet, dass** zwei freie Enden eines U-förmigen Bewehrungsstabes (4) an jedem Ende des Stahlprofils (1,2) angebracht sind, das eine Verlängerung dieses Stahlprofils (1,2) ist, wobei in der Betriebsposition des Verbinders jeder U-förmige Bewehrungsstab (4) mit seinen freien Enden die Rückseite (3) des Stahlprofils abdeckt.

2. Bauverbinder nach Anspruch 1, **dadurch gekennzeichnet, dass** das Stahlprofil (1, 2) ein offenes Profil mit einem Omega-Querschnitt ist.

3. Bauverbinder nach Anspruch 2, **dadurch gekennzeichnet, dass** der U-förmige Bewehrungsstab (4) in einer Ebene parallel zur Ebene der Arme des

Stahlprofils (1, 2) angeordnet ist.

4. Bauverbinder nach Anspruch 1 oder 2 oder 3, **dadurch gekennzeichnet, dass** bei einem Paar von Stahlprofilen (1, 2) in dem Verbinder die beiden Profile (1, 2) parallel zueinander übereinander angeordnet sind und sich mit ihren Rückseiten (3) gegenüberstehen.

5. Bauverbinder nach Anspruch Bauverbinder nach Anspruch 4, **dadurch gekennzeichnet, dass** in einem Paar von Stahlprofilen (1, 2) mit Omega-Querschnitt die Profile so angeordnet sind, dass die nach außen gebogenen Arme beider Stahlprofile (1, 2) in zueinander parallelen Ebenen liegen.

6. Bauverbinder nach einem der Ansprüche 1, **dadurch gekennzeichnet, dass** bei jedem Profilpaar (1, 2) die mittleren Abschnitte dieser beiden Stahlprofile (1, 2) zwischen den Befestigungspunkten der Bewehrungsstäbe (4) und den Befestigungspunkten der geraden Stäbe (5) in der Wärmedämmschicht (10) liegen.

7. Bauverbinder nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Bewehrungsstäbe (4) auf mindestens einer Seite des Stahlprofils (1, 2) im rechten Winkel gebogen sind.

8. Bauverbinder nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** mindestens ein Bewehrungsstab (4) auf einer Seite des Verbinders in der Verlängerungszone des Stahlprofils (1,2) an mindestens einer Stelle entsprechend der Form des Querschnitts des Bauteils des Gebäudes, in dem der Verbinder befestigt ist, gebogen ist.

Revendications

1. Connecteur de renforcement de construction, comprenant au moins une paire des sections des profilés d'acier (1,2) l'un au-dessus de l'autre, et au moins à un profilé d'acier (1,2), de chaque côté est fixé une barre d'acier (4) d'armature en forme de U, où les barres (4) d'armature mentionnées sont une extension de ce profilé (1,2) à l'un et à l'autre côté, et parmi ces profilés d'acier (1,2) à leurs extrémités, sont fixées également des sections droites de la barre (5) d'armature alliant ces deux profilés d'acier (1,2), **caractérisé en ce qu'**à chaque extrémité du profilé d'acier (1,2) sont fixées deux extrémités libres de la barre (4) d'armature en forme de U, qui une extension de ce profilé d'acier (1,2), et dans la position de travail du connecteur chaque barre (4) en forme de U englobe par ses extrémités libres le dos (3) du profilé d'acier.

2. Connecteur de renforcement de construction selon la revendication 1, **caractérisé en ce que** le profilé d'acier (1,2) est un profilé ouvert en oméga.

3. Connecteur de renforcement de construction selon la revendication 2, **caractérisé en ce que** la barre (4) d'armature en forme de U est située dans le plan parallèle au plan des bras du profilé d'acier (1,2).

4. Connecteur de renforcement de construction selon la revendication 1 ou 2 ou 3, **caractérisé en ce que** dans la paire des profilés d'acier (1,2) dans le connecteur, les deux profilés (1,2) sont disposés parallèlement l'un au-dessus de l'autre et dirigés par les dos l'un vers l'autre (3).

5. Connecteur de renforcement de construction selon la revendication 4, **caractérisé en ce que** dans la paire des profilés d'acier (1,2) en oméga, les profilés sont disposés de sorte que les bras pliés vers l'extérieur des deux profilés d'acier (1,2) se trouvent dans les plans parallèles l'un à l'autre.

6. Connecteur de renforcement de construction selon l'une quelconque des revendications de 1, **caractérisé en ce que** dans chaque paire des profilés (1,2), les sections centrales de ces deux profilés d'acier (1,2), parmi les points de fixation des barres (4) d'armature et les points de fixation des barres droites (5), se trouvent dans la couche d'isolation thermique (10)

7. Connecteur de renforcement de construction selon l'une quelconque des revendications de 1 à 6, **caractérisé en ce que** les barres (4) d'armature au moins à l'un côté du profilé d'acier (1,2) sont pliées à angle droit.

8. Connecteur de renforcement de construction selon l'une quelconque des revendications de 1 à 6, **caractérisé en ce qu'e** au moins une barre (4) d'armature à l'un côté du profilé, dans la zone d'extension du profilé d'acier (1,2) au moins dans un point est pliée selon la forme de la section de l'élement structurel du bâtiment dans lequel le connecteur est installé.

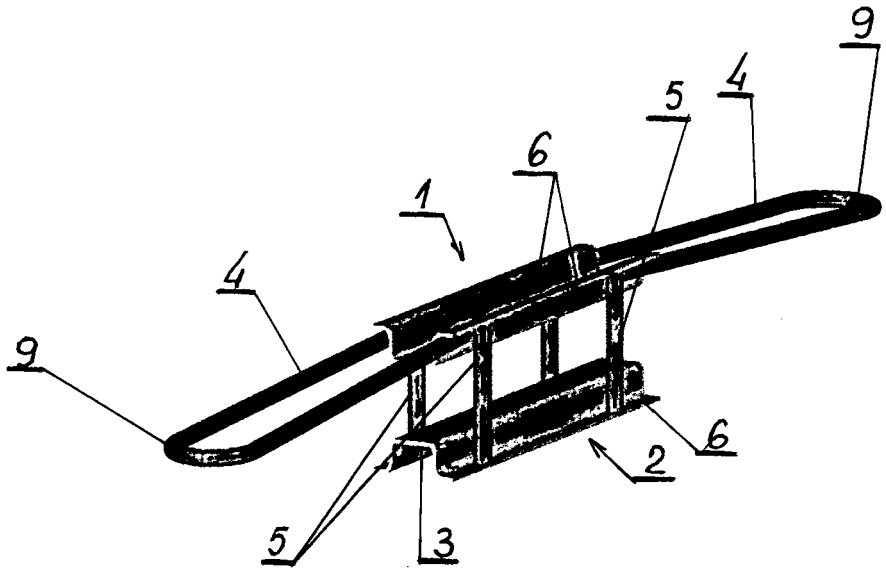

Fig. 1

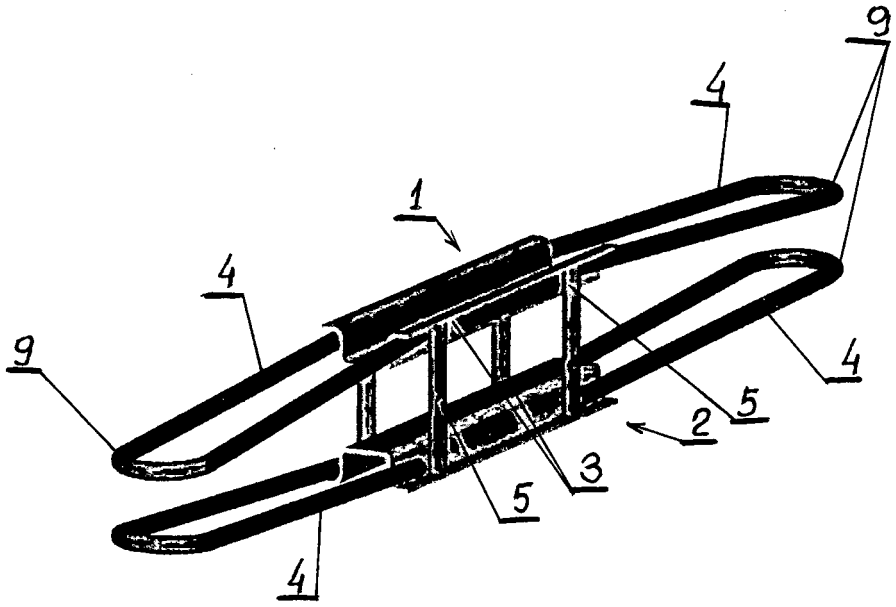

Fig. 2

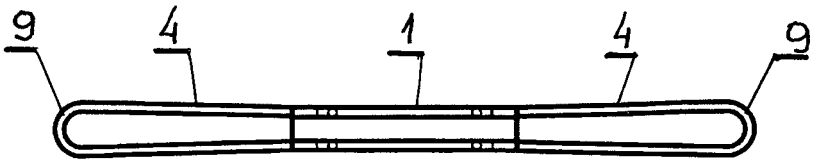

Fig. 3

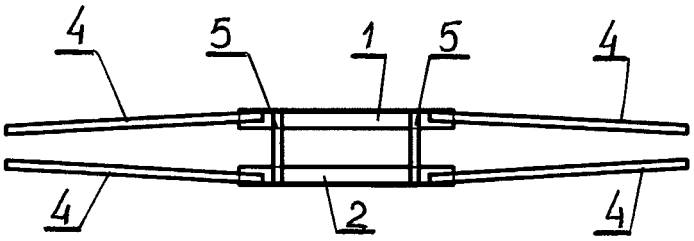

Fig. 4

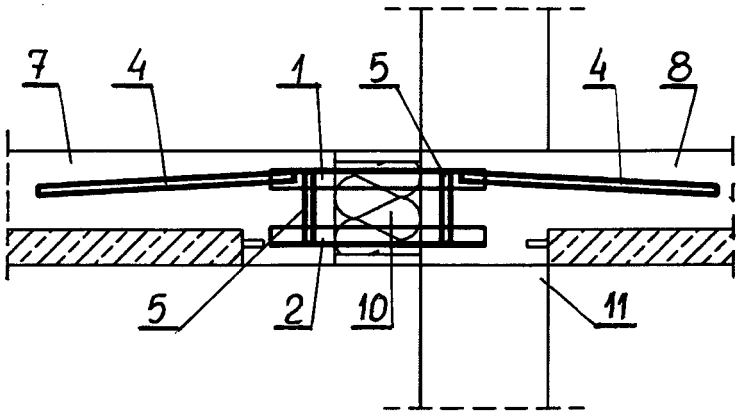

Fig. 5

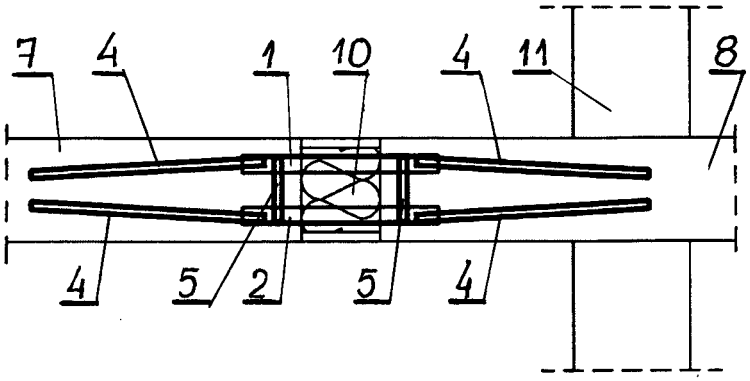

Fig. 6

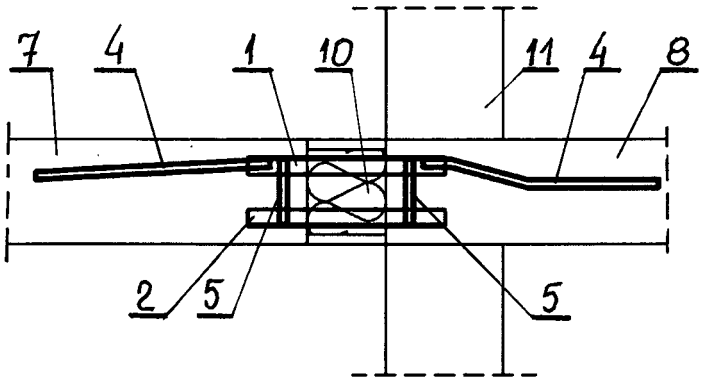

Fig. 7

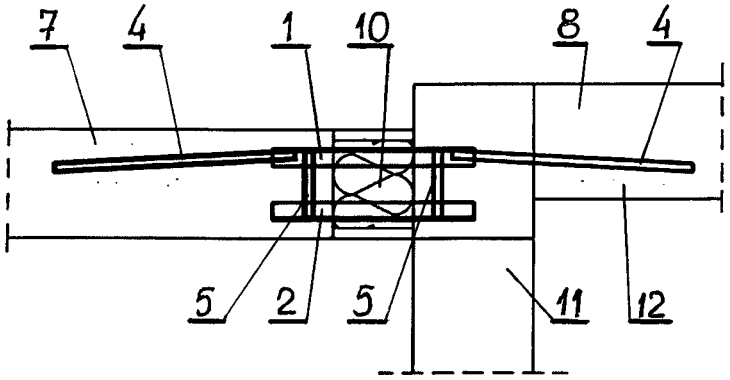

Fig. 8

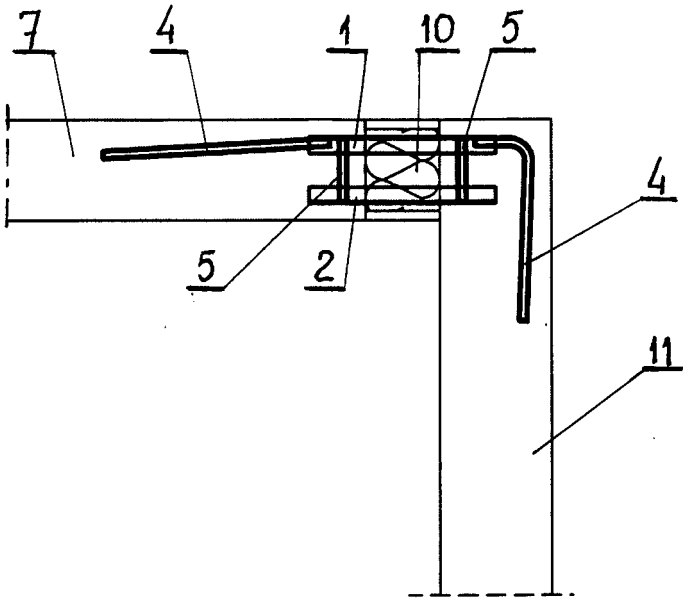

Fig. 9

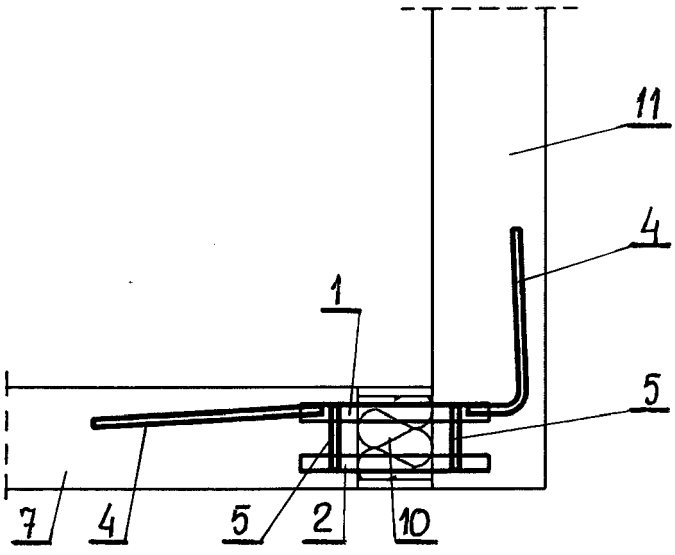

Fig. 10

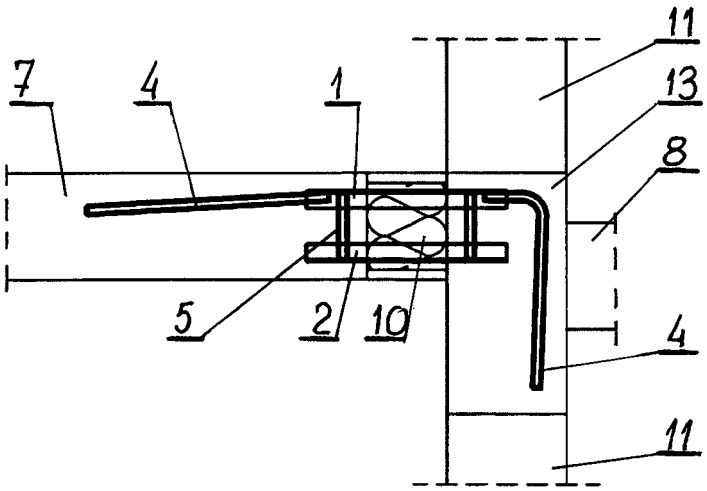

Fig. 11

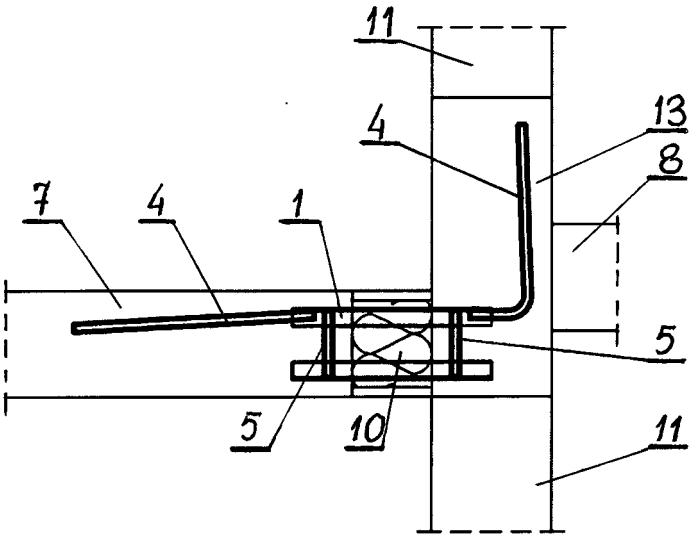

Fig. 12

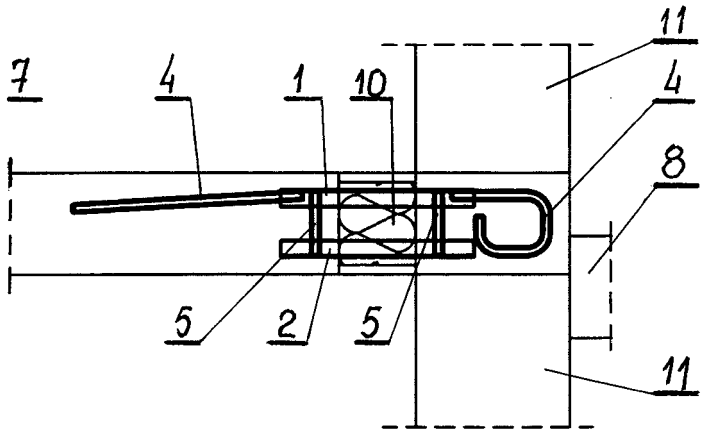

Fig. 13

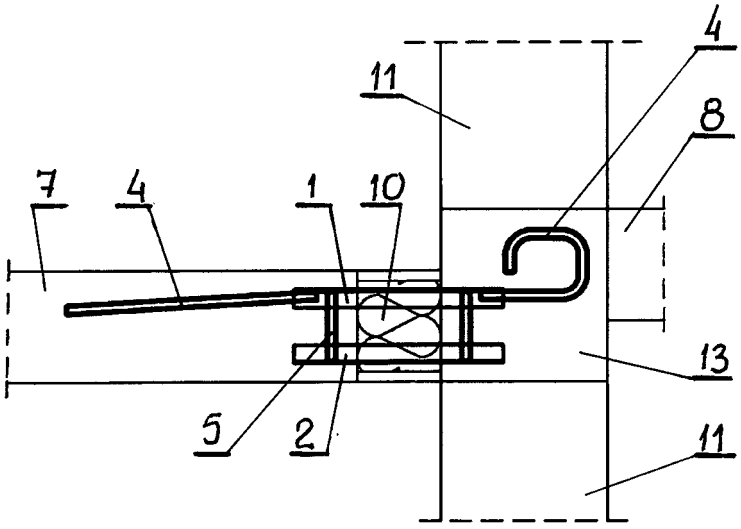

Fig. 14

REFERENCES CITED IN THE DESCRIPTION

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