

Connection of trapezoidal steel sheeting elements with a supporting structure in a roofing or ceiling slab in the form of a composite concrete-steel construction

Description

The invention concerns a connection of trapezoidal steel sheeting elements with a supporting structure in a roofing or ceiling slab in the form of a composite concrete-steel construction.

It is known, from the brochure "Hoesch Trapezprofil TRP 200" from Hoesch Siegerlandwerke GmbH, Info 4110.2, 07.91, B + F, for trapezoidal steel sheeting elements which serve as roof construction elements to be connected with the supporting structure in such a way that mounting strips are fixed to the supporting structure, e.g. roof trusses, to which in turn V-shaped supporting elements, the height of which is matched to the height of the corrugation peaks of the trapezoidal steel sheeting elements, are attached upside-down. The trapezoidal steel sheeting elements are laid with the underside of their corrugation peaks, especially the corners, resting on the points of the supporting elements and are fixed to the supporting structure. However, this construction has the disadvantage that, as a result of the trapezoidal steel sheeting elements and roof trusses being arranged on top of one another, the overall construction height of this roof construction is very high.

In addition, a lightweight steel roof is known from German patent 30 04 615 which consists of trapezoidal steel sheets with their corrugation troughs lying directly on a supporting structure over which a layer of concrete which fills the troughs and covers the corrugation peaks is laid. The connection between the lightweight steel roof or trapezoidal steel sheets and the supporting structure is effected by means of dowel pins which are fixed to the supporting structure, and which penetrate through the sheeting in the area of the troughs and project into the

concrete layer. Apart from the fact that, with this design too, the construction height results from the total of the height of the supporting structure plus the height of the roof slab, the load-bearing capacity of the concrete is only used constructively here. The concrete has a load-distributing function and a physical constructive function. A deliberate and especially economical incorporation of the supporting girders as part of a composite steel construction with the trapezoidal steel sheets is not possible.

In addition, U.S. patent 3,108,662 shows a roofing or ceiling construction of steel box sections which are arranged on a supporting structure, whereby the upper flanges of the box sections also lie on bars attached to the girders of the supporting structure which run continuously from girder to girder. These continuous bars have the function of increasing the rigidity of the box sections over their entire length and thus creating reinforced cross sections.

It is therefore the purpose of the invention to create a connection of the type described in the introduction which, in a simple way, allows a low construction height to be achieved in roofing or ceiling slabs of concrete-steel composite construction.

According to the invention, the problem is solved by means of a connection of the above type and which is characterized in that the corrugation peaks of the trapezoidal steel sheeting elements lie with the underside of their inner corners on beams which project, in cantilever-fashion, in a transverse direction beyond the supporting structure.

The beams may be positioned on the upper side of the supporting structure and can be fixed thereto. Preferably, the beams are of steel and are welded to the supporting structure which is also of steel. The beams can be screwed and/or riveted to the supporting structure. The beams can be held to the supporting structure by means of

booms extending transversely over the beams and fixed to the supporting structure. The beams may be in the form of cantilever arms projecting beyond the longitudinal sides of the supporting structure. Preferably, the beams abut approximately flush with the upper side of the supporting structure.

The advantages of the invention are, in particular, that the construction height of a construction of this sort can be kept low, which, where used in ceiling slabs, reduces the height of individual storeys, which is multiplied accordingly over several storeys. In addition, a deliberate incorporation of the supporting structure as part of a composite steel construction with the roofing or ceiling slab is only made possible by the lowering of the so-called slab level to the composite plane through the suspension of the trapezoidal steel sheeting element.

The invention is described in greater detail below with reference to the drawings.

Fig. 1 shows a construction form in perspective view. Fig. 2 shows the construction form as shown in Fig. 1 for roofing slabs in cross section.

As can be seen from Figs. 1 and 2, cantilever-type beams 2 are fixed transversely to a supporting structure in the form of composite girders 1, with trapezoidal steel sheeting elements 4 suspended at the inner corners 5 of their corrugation peaks 6 on the ends 3 of the beams which project beyond the composite girders 1. The corrugation peaks 6 are thus lowered almost to the level of the composite girder 1.

In the construction form shown in Fig. 2, the trapezoidal steel sheeting element 4 has been given a continuous concrete coating 8 which fills the corrugation troughs 7 and covers the corrugation peaks 6. This allows an intimate bond to be achieved between the concrete-filled corrugation troughs 7 and the composite girders 1.



CLAIMS:

1. Connection of trapezoidal steel sheeting elements with a supporting structure in a roofing or ceiling slab in the form of a composite concrete-steel construction, characterised in that the corrugation peaks (6) of the trapezoidal steel sheeting elements (4) lie with the underside of their inner corners (5) on beams (2) which project, in cantilever-fashion, in a transverse direction beyond the supporting structure.

2. Connection in accordance with claim 1, characterised in that the beams (2) are positioned on the upper side of the supporting structure and are fixed to this.

3. Connection in accordance with claim 1 or 2, characterised in that the beams (2) are of steel and are welded to the supporting structure which is also of steel.

4. Connection in accordance with claim 1 or 2, characterised in that the beams (2) are screwed and/or riveted to the supporting structure.

5. Connection in accordance with one of claims 1 to 4, characterised in that the beams (2) are held to the supporting structure by means of booms extending transversely over the beams and fixed to the supporting structure.

6. Connection in accordance with one of claims 1 to 5, characterised in that the beams (2) are in the form of cantilever arms projecting beyond the longitudinal sides of the supporting structure.

7. Connection in accordance with claim 6, characterised in that the upper side of the beams abut approximately flush with the upper side of the supporting structure.

CONNECTION OF TRAPEZOIDAL STEEL SHEETING ELEMENTS WITH A
SUPPORTING STRUCTURE IN A ROOFING OR CEILING SLAB IN THE
FORM OF A COMPOSITE CONCRETE-STEEL CONSTRUCTION

ABSTRACT

In order to create a connection between trapezoidal steel sheeting elements (4) of roof coverings and/or ceiling slabs with or without concrete and a supporting structure which has a small construction height and which, in the case of roof coverings and/or ceiling slabs made with concrete, allows a composite steel construction to be formed with the supporting structure, the corrugation peaks (6) of the trapezoidal sectional sheet elements (4) are suspended on their undersides from beams (2) projecting transversely beyond the supporting structure.

FIGURE 1

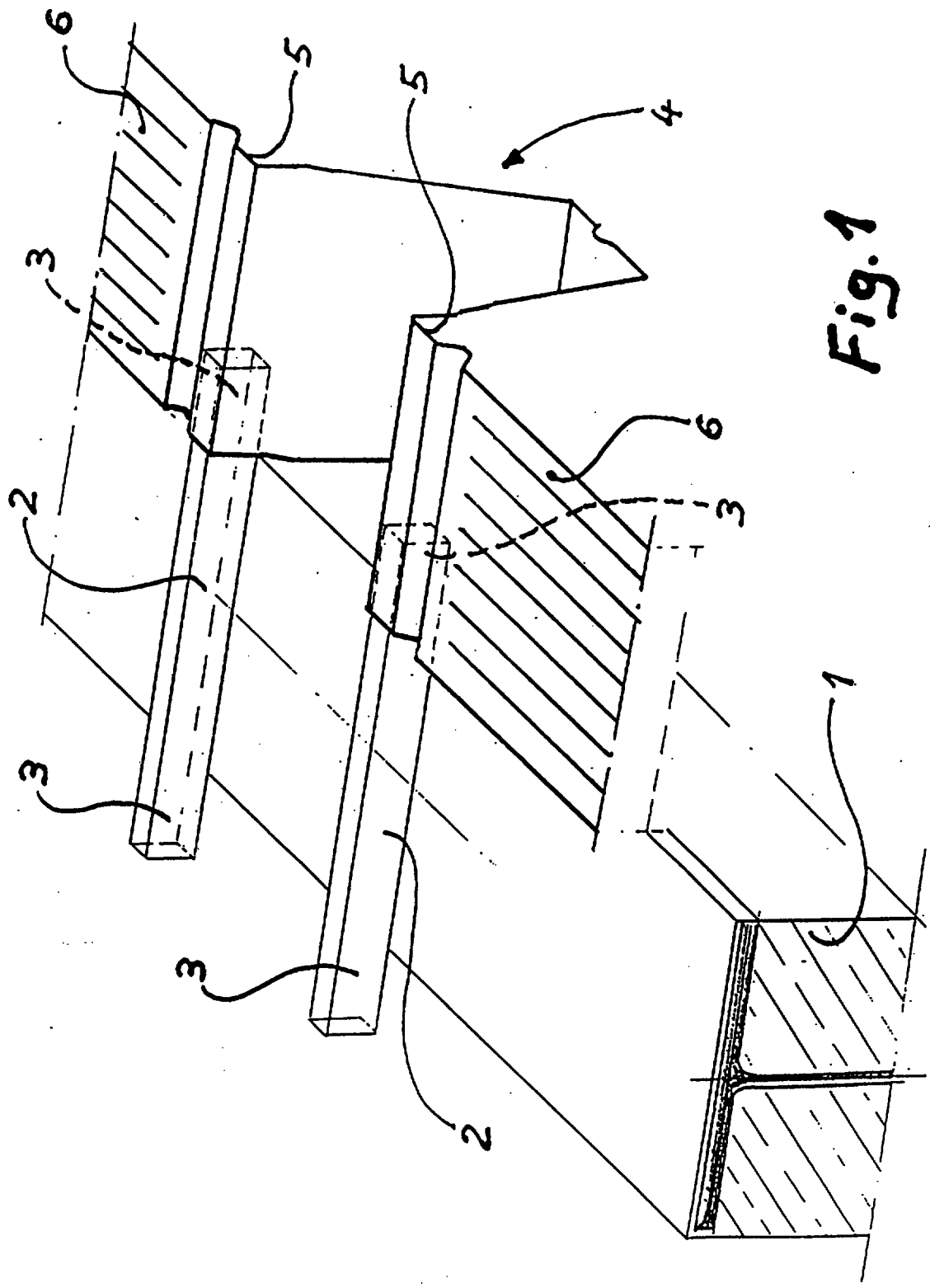


Fig. 1

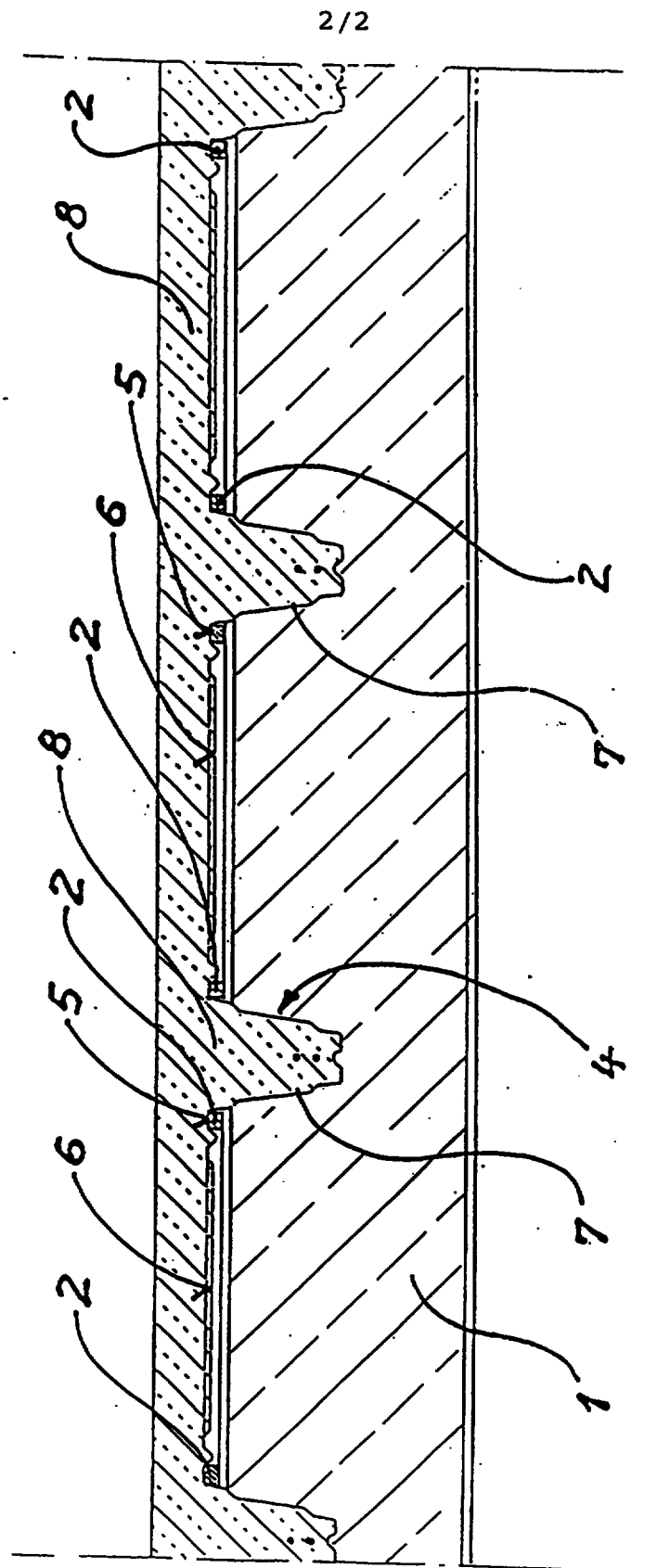


Fig. 2