

METAL FORMWORK BEAMS WITH PROTECTION AGAINST CLIMATIC INFLUENCES

TECHNICAL FIELD

5 [0001] The invention relates to a metal formwork having protection against climatic influences.

PRIOR ART

10 [0002] A formwork support is known from DE 10 2013 109 790 B4 whose support body is manufactured from aluminum. The formwork support has two longitudinal webs that run parallel spaced apart from each other. The longitudinal webs are connected via an intermediate transverse web and a top transverse web between the longitudinal webs so that a hollow space is formed between the longitudinal webs and the transverse webs. Strips of wood can be arranged on the transverse webs between the longitudinal webs for fastening the formwork support. Such a formwork support usually has a longer operational life than a wooden formwork support and is comparable to a wooden formwork support with respect to
15 recyclability and portability as well as weight. However, the strips of wood are subject to much stress with respect to their durability, especially in a warm, damp climate.

[0003] It is therefore the object of the invention to provide a formwork support, via which a strip of wood inserted into the formwork support can be better protected against damaging climatic effects in order to prolong its operational life, in particular in a warm,
20 damp climate.

[0004] The object is achieved by a metal formwork support according to claim 1. Advantageous embodiments result from the referenced dependent claims.

DISCLOSURE OF THE INVENTION

25 [0005] According to the invention, the metal formwork support with an upper flange and a lower flange has a connecting web that connects the upper flange and the lower flange. Two longitudinal supports arranged parallel to each other at a distance and connected to each other form the connecting web. The longitudinal supports are connected to each other via a first transverse web. The metal formwork support is characterized in that the stops are designed or arranged opposite to each other on the interior surface of the longitudinal support.
30 A clearance is formed between each of the stops opposite to each other.

[0006] A back-ventilation of a strip of wood can be accomplished via the clearance between the stops if the strip of wood is arranged on the stops in the upper flange or lower flange. This is because an air channel for the strip of wood is formed by the clearance. The clearance can also be used as drainage. The strip of wood can be protected from decay and rot caused by climate via a possibility for back-ventilation ensured by the formation of a channel in the formwork support and the consistent removal of liquid accumulations. This applies particularly to a warm and humid, in particular tropical, climate. The metal formwork support can be recycled easily, as can a strip of wood inserted in the metal formwork support. The clearance can be used as a nail clearance if components are fastened to the strip of wood using nails, in particular to connect additional wood panels to the strip of wood. Different fastening elements such as hammerhead bolts can be inserted into the clearance. Compared to wooden formwork supports, the metal formwork support has an improved durability in warm, damp climates because it is rot resistant. The metal formwork support can be created as an extruded profile.

[0007] An advantageous embodiment of the metal formwork support is characterized in that at least one end of the connecting web has a groove with an open U profile. The groove base is in the form of a first transverse web or of a second transverse web formed between the longitudinal supports. The groove base thus has a greater distance to the upper or lower flange than the stops, at least in the center. A strip of wood can be inserted into a groove with an open U profile in an especially easy manner. The transverse web or second transverse web between the longitudinal plates thus provides for a stable holding of the strip of wood. Because of the different distances of the groove base from the respectively assigned upper and/or lower flange compared to the stops, the groove base in the direction between the groove base or the upper flange is formed, at least in some sections, spaced apart from the stops. There is a clearance inside the groove between the stops and the groove base. The clearance can be used as a ventilation channel for a strip of wood. The groove can be used for holding and guiding other fastening elements, such as hammer-head bolts.

[0008] An additional embodiment of the metal formwork support is characterized in that the groove base has a triangular profile with each side extending obliquely with respect to the longitudinal support. As a result, a clearance can be formed while requiring less space between the stops. The clearance has the greatest width and thus the largest ventilation cross-section in the center at the peak of the triangular profile in the case of a symmetrical triangular profile. The distance between the stops and the groove base is greatest there in the direction

between the groove base and the upper flange or lower flange. If a strip of wood is placed on the stops, a ventilation channel for back-ventilation of the strip of wood is formed by the clearance on one side of the strip of wood, specifically on the lower or the upper side of the strip of wood.

5 [0009] The groove base can have through-holes. Through-holes can further improve the air circulation and back-ventilation of a strip of wood.

 [0010] Advantageously, the stops assigned to the upper and/or lower flanges can be designed in the longitudinal direction of the metal formwork support as continuous or discontinuous supports. Supports opposite to each other at a distance form a stable support for
10 the strip of wood. A clearance, gap between the strips ensures a good back-ventilation of the strip of wood. This back-ventilation can be improved by more extensive contact of the strip of wood with air via interrupted supports.

 [0011] An advantageous embodiment of the metal formwork support is characterized in that channel-like lateral fastening convexities and/or spacers are formed between the upper
15 flange and/or the lower flange and the respectively assigned stops on the interior surfaces of the longitudinal support. The lateral convexities and/or spacers can be used to form additional clearances and thus air channels between strips of wood and the metal formwork support. The back-ventilation of the strip of wood can then occur on a plurality of lateral surfaces of the strip of wood and be thereby improved.

20 [0012] The metal formwork support can be made of a light metal, in particular aluminum. Metal formwork supports that have and/or are made of light metal are distinguished by a high stability with comparatively low weight.

 [0013] In an additional embodiment of the metal formwork support, the exterior surfaces of the longitudinal support have fastening concavities and/or fastening convexities.
25 Fastening concavities and/or fastening convexities on the exterior surfaces of the longitudinal support can be used for holding fastening elements such as anchor clamps, screw clamps and/or hook straps or other components and as bearing surfaces.

 [0014] A nailing strip can be arranged between the longitudinal supports at an open end of the upper flange and or of the lower flange. The strip of wood can then be secured via a
30 nail to the nailing strip in a positionally stable manner against displacement. By means of the nailing strip made from metal, in this case in an embodiment made of aluminum, a wood

panel can also be connected to the strip of wood in a positionally stable manner and with high pull-out resistance.

[0015] The upper flange and/or the lower flange can have stop elements that are arranged opposite to the stops in the direction from the stops to the upper flange and/or lower flange. The stops and the stop elements can bear in a holding manner on opposing side surfaces of the strip of wood, in particular upper and lower sides, in such a manner that the strip of wood cannot fall out of the metal formwork support. Lateral screw connections or holding means are also possible.

[0016] The stops and/or longitudinal supports can have the same design on the upper flange and the lower flange. The two sides of the metal formwork support can then be inserted and used on the upper flange and lower flange in the same manner.

[0017] The stops and/or longitudinal supports can be designed differently on the upper flange and the lower flange. Depending upon the requirement for stability and back-ventilation, the more appropriate side of the metal formwork support can then be used on the upper flange or lower flange.

BRIEF DESCRIPTION OF THE DRAWING

[0018] Further features and advantages of the invention result from the following detailed description of a plurality of exemplary embodiments of the invention, from the claims and in reference to the figures of the drawing, which shows details that are essential to the invention. The various features can each be realized in variants of the invention individually or by any combination of a plurality of features. The features shown in the drawing are depicted in such a way that the special features according to the invention can be made clearly visible.

[0019] Shown in the drawings are:

[0020] Fig. 1 a cross-section through a first embodiment of a metal formwork support according to the invention;

[0021] Fig. 2 an enlarged illustration of fastening convexities on the exterior surfaces of the longitudinal support;

[0022] Fig. 3 a cross-section through a second embodiment of a metal support according to the invention;

[0023] Fig. 4 a cross-section through the groove on the upper flange of the metal formwork support of the second embodiment with an inserted strip of wood;

[0024] Fig. 5 an illustration of the fastening of a wood panel via a nail onto a strip of wood that is inserted into the groove of the metal formwork support of the first embodiment;

5 [0025] Fig. 6 an illustration of the fastening of a wood panel onto a nailing strip via a nail and a strip of wood that is inserted into the groove on the lower flange of the metal formwork support in its second embodiment; and

[0026] Fig. 7 an illustration of the fastening of a wood panel onto a nailing strip via a nail that is inserted into the groove on the upper flange of the metal formwork carrier of the
10 second embodiment.

EMBODIMENTS OF THE INVENTION

[0027] In Fig. 1, a cross-section through a first embodiment of a metal formwork support 10 according to the invention is illustrated. The metal formwork support 10 has an upper flange 12 and a lower flange 14. A connecting web 15 is arranged between the upper
15 flange 12 and the lower flange 14 that connects the upper flange 12 and lower flange 14 together. A first longitudinal support 16 and a second longitudinal support 18 form components of the connecting web 15. The first longitudinal support 16 is arranged parallel to the second longitudinal support 18 at a first distance 20. In this way, the connecting web 15 is stabilized against external force effects with relatively low increase in weight. The first
20 longitudinal support 16 has a first interior surface 22 and the second longitudinal support 18 has a second interior surface 24. The first interior surface 22 is connected to the second interior surface 24 via a first transverse web 26.

[0028] Stops 28a, 28b are formed on the interior surfaces 22, 24 of the longitudinal supports 16, 18. Stops 28a, 28b form parts of grooves 32a, 32b that are each formed with U
25 profile 34 on an end of the connecting web 15. A second transverse web 36 is arranged between the longitudinal supports 16, 18 so that the first and the second transverse web 26, 36 each form a groove base 37a, 37b of the grooves 32a, 32b configured in the same way. The transverse webs 26, 36 can have through-holes for better ventilation. The grooves 32a, 32b have a widening at the stops so that the stops provide a bearing surface 38a, 38b for strips of
30 wood. Between the stops arranged opposite to each other, a clearance 39 is formed for back-ventilation in the groove 32a, 32b. The clearance 39 forms a hollow space in the metal formwork support 10.

[0029] A second distance 40 between the upper flange 12 or the lower flange 14 and the stops 28a, 28b is smaller than a third distance 42 between the upper flange 12 or the lower flange 14 and the groove base 37a, 37b. The groove base 37a, 37b is thus spaced apart from the stops 28a, 28b. The clearance 39 between the stops 28a, 28b and the groove base 37a, 37b can, for example, serve as a nail clearance and for back-ventilation. In the region of the grooves 32a, 32b on the interior surfaces 22, 24 of the longitudinal supports 16, 18, lateral convexities 44a, 44b are formed for back-ventilation of strips of wood arranged in the grooves 32a, 32b (see. fig. 4). The upper flange and the lower flange have stop elements 45a, 45b that, together with the stops 28a, 28b, can engage around an inserted wooden lath and hold it in position.

[0030] Exterior surfaces 46 of the longitudinal supports 16, 18 have fastening convexities 48 in the region of the grooves 32a, 32b. These serve to hold fastening components. The grooves 32a, 32b and the longitudinal supports 16, 18 have an identical design on the upper flange 12 and lower flange 14 on the two sides of the metal formwork support 10. The two sides of the metal formwork support 10 having upper flange 12 and lower flange 14 can be used in the same manner.

[0031] Depicted in fig. 2 is one of two fastening convexities 48 opposite to each other on the exterior surfaces 46 of the longitudinal supports 16, 18 in a cross-sectional magnification.

[0032] Depicted in fig. 3 is a cross-section through a second embodiment of the metal formwork support 10. The groove base 37a assigned to the upper flange 12 in the form of the second transverse web 36 has a triangular profile 50. Sides 52a, 52b of triangular profile 50 are designed extending obliquely at an angle with respect to the longitudinal supports 16, 18. An additional clearance 53 arises from the extension of the sides 52a, 52b between the stops 28a, 28b. On the interior surfaces 22, 24 of the longitudinal supports 16, 18, spacers 54a are formed in the region of the groove 32c that hold a strip of wood inserted into the groove 32c (see fig. 4) at a distance from the interior surfaces 22, 24 of the longitudinal supports 16, 18 and thus make a back-ventilation possible. In the region of the lower flange 14, a first transverse web 26 is formed as groove base 37b between the interior surfaces 22, 24 of longitudinal supports 16, 18. Between the first transverse web 26 and the lower flange 14, stops 56 are formed in the longitudinal direction of the metal formwork support 10, in particular in the form of strips. These serve as bearing surfaces for strips of wood inserted into the groove 32d (see fig. 6). Inside groove 32d, spacers 54b for the spacing of strips of wood

are formed on the interior surfaces 22, 24 of the longitudinal supports 16, 18. (see fig. 6). A nailing strip 58 is on the lower flange 14 between the longitudinal supports 16, 18. A wood panel can be connected in a positionally fixed manner through the nailing strip 58 (see fig. 6) to the strip of wood (s. Fig. 6) via a nail.

5 [0033] Depicted in fig. 4 is a magnified representation of the groove 32c on the upper flange 12 of the metal formwork support 10 in the second embodiment according to fig. 3 with an inserted strip of wood 60. The additional clearance 53 is formed between the strip of wood 60 and the second transverse web 36 by the triangular profile 50 of the second transverse web 36. The additional clearance 53 has the function of an air channel. The air channel has the
10 largest open cross-section (hollow space) in the center of the second transverse web 36. There, the distance between the second transverse web 36 and the stops 28a, 28b in the direction toward the upper flange 12 is greatest as the difference of the second distance 40 between the stops 28a, 28b and the upper flange 12 and of the third distance 42 between the upper flange 12 and the second transverse web 36. Air channels 64a, 64b, 64c, 64d are formed on the sides
15 of the strip of wood 60 by the spacers 54a on the interior surfaces 22, 24 of the longitudinal support 16, 18 in the region of the groove 32c.

[0034] Depicted in fig. 5 is the fastening by means of a nail 68 of a wood panel 66 to a strip of wood 60 that is inserted into the groove 32a of the metal formwork support 10 in its first embodiment. The strip of wood 60 rests on the stops 28a, 28b, which form a support
20 surface 38 that is in particular horizontal.

[0035] Depicted in fig. 6 is the fastening by means of a nail 68 of a wood panel 66 to a strip of wood 60 that is inserted into the groove 32d on lower flange 14 of the metal formwork support 10 in its second embodiment. The nail 68 is guided through the nailing strip 58 so that it connects the wood panel 66 and strip of wood 60, which are each arranged on one side of
25 the nailing strip 58. The strip of wood 60 rests on the stops 56 in the longitudinal direction of the metal formwork support. 10.

[0036] Depicted in fig. 7 is the fastening by means of a nail 68 of a wood panel 66 to a strip of wood 60 that is inserted into the groove 32c on the upper flange 12 of the metal formwork support 10 in its second embodiment. The strip of wood 60 rests on the second
30 transverse web 36 with a triangular profile 50 between the longitudinal supports 16, 18. The nail 68 is guided through the second transverse web 36 for an improved fastening. To do this,

the second transverse web 36 can have, for example, through-holes or a reduced material thickness.

[0037] Regarding all figures of the drawing in an overview, the invention as a whole relates to a metal formwork support 10 having a connecting web 15 and an upper flange 12
5 and a lower flange 14, each on an end of the connecting web 15. Two longitudinal supports 16, 18 spaced parallel to each other at a distance with stops 28a, 28b, 56 arranged opposite to each other form part of the connecting web 15. A clearance 39 is formed between each of the stops 28a, 28b, 56 spaced apart opposite to each other.

CLAIMS

1. A metal formwork support (10) having an upper flange (12) and a lower flange (14) and a connecting web (15) that connects the upper flange (12) and a lower flange (14) and has two longitudinal supports (16, 18) arranged parallel to each other at a distance (20) that are
5 connected via a first transverse web (26),

characterized in that

stops (28a, 28b; 56) are formed or arranged opposite to each other on the interior
surfaces (22, 24) of the longitudinal supports (16, 18),

and that a clearance (39; 53) is formed between each of the stops (28a, 28b; 56)
10 opposite each other.
2. The metal formwork support according to claim 1, **characterized in that** at least one end of the connecting web (15) has a groove (32a, 32b, 32c, 32d) with an open U profile (34), the groove base (37a, 37b) being designed in the shape of a first transverse web (26) or a second transverse web (36) between the longitudinal supports (16, 18) and the groove base
15 (37a, 37b) having in the center a greater distance (42) to the upper and/or lower flange than the stops (28a, 28b; 56).
3. The metal formwork support according to claim 2, **characterized in that** the groove base (37a, 37b) has a triangular profile (50) with each side (52a, 52b) extending obliquely with respect to the longitudinal support (16, 18).
- 20 4. The metal formwork support according to either of claims 2 or 3, **characterized in that** the groove base (37a, 37b) has through-holes.
5. The metal formwork support according to any of claims 1 to 4, **characterized in that** the stops (28a, 28b, 56) assigned to the upper and/or lower flange (12, 14) are formed in the longitudinal direction of the metal formwork support (10) as continuous or discontinuous
25 strips.
6. The metal formwork support according to any of claims 1 to 5, **characterized in that** channel-like lateral fastening convexities (44a, 44b) and/or spacers (54a, 54b) are formed between the upper flange (12) and/or the lower flange (14) and the respectively assigned stops (28a, 28b, 56) on the interior surfaces (22, 24) of the longitudinal support (16, 18).

7. The metal formwork support according to any of claims 1 to 6, **characterized in that** the metal formwork support (10) is manufactured from a light metal, in particular aluminum.

8. The metal formwork support according to any of claims 1 to 7, **characterized in that** the exterior surfaces (46) of the longitudinal support have fastening concavities and/or

5 fastening convexities (48).

9. The metal formwork support according to any of claims 1 to 8, **characterized in that** a nailing strip (58) is arranged on an open end of the upper flange (12) and/or the lower flange (14) between the longitudinal supports (16, 18).

10. The metal formwork support according to any of claims 1 to 9, **characterized in that** the upper flange (12) and/or the lower flange (14) have stop elements (45a, 45b) that in the direction from the stops (28a, 28b, 56) to the upper flange (12) and/or lower flange (14) are arranged opposite to the stops (28a, 28b, 56).

11. The metal formwork support according to any of claims 1 to 10, **characterized in that** the stops (28a, 28b; 56) and/or the longitudinal supports (16, 18) on the upper flange (12) and
15 the lower flange (14) have the same design.

12. The metal formwork support according to any of claims 1 to 10, **characterized in that** the stops (28a, 28b; 56) and/or the longitudinal supports (16, 18) are formed differently on the upper flange (12) and the lower flange (14).