

COMPOSITE PROFILE PROVIDED WITH A SUPPORT BODY MADE OF A
LIGHT METAL MATERIAL AND A PROFILED STRIP AND A METHOD FOR
PRODUCING SAID PROFILE

The invention concerns a composite profile having a rail-like support body extruded from light metal material and a profile strip spanning its top surface and made of a harder metal. Also, the invention covers a method for making such a composite profile.

In DE 24 32 541 A1 can be found a method for making conductor rails consisting of a carrier profile and at least one covering which forms at least part of the upper surface of the carrier profile serving as the conductor and consists of a profile strip of a different metal as a covering profile with high abrasion resistance. During an extrusion process, the carrier profile is produced by forcing a bar out through the shaping cross-section of an extrusion die, and at the same time the profile strip passes through the die aperture or shaping cross-section parallel to the longitudinal axis of the die. During the extrusion process, an intimate metal bond is produced between the two profile components. For example, if the conductor rail is used to electrify rail-mounted vehicles, detachment of the profile strip from its support profile made of light metal takes place in the long term in cases of particularly high load in spite of the intimate metal bond.

In DE 44 10 688 A1 can be found a composite profile having a carrier profile made of light metal and a profile strip bonded thereto. The latter spans the upper surface of a

rail head of the carrier profile, is channel-shaped in cross-section and comprises in its side arms - projecting from its inner surface on the support body side at a distance from each other - bulges which are embedded in the support body. These bulges define undercut gaps which are filled by the metallic material of the support body in form-locking relationship. This form-locking connection does not have the problems described for the metallic bond.

A composite conductor rail element for the power supply of a railway vehicle having a covering made of a material with high mechanical resistance which is rigidly attached to a rod made of material which is a good conductor of electricity, and forms the sliding or contact surface for current collectors of the vehicle, is disclosed by DE 25 46 026 A1. The covering is fixed to the conductive rod which serves as the carrier by clamping or squeezing the edges of the covering in the conductive rod. At least one indentation running in the longitudinal direction forms in the covering, penetrating into the conductive rod. For locking the edges of the covering, in the conductive rod is provided a groove which separates off a lip. The latter leads to locking of the covering to the conductive rod as soon as it has been at least partially folded over and pressed against the edge of the covering.

Conductor rails of which the wear components are attached to the live carrier profile by screws or additional insertion members passing through them laterally, have also proved to be disadvantageous. Other known manufacturing methods may disadvantageously lead to undulations on the

upper surface of the covering profile which originate from stepwise caulking or stamping of the carrier profile.

Knowing this state of the art, the inventor set himself the aim of further improving the bond between carrier profile and profile strip while retaining the special possibilities of economic manufacture.

The instruction of the independent claim leads to achieving this object; the subsidiary claims provide advantageous developments. Also, all combinations of two or more of the characteristics disclosed in the description, the drawings and/or the claims come within the scope of the invention. Where ranges of designation are given, values within the limits mentioned are also intended to be disclosed as limit values and can be used as desired.

According to the invention, attached to the profile strip or covering profile which more or less rests on the top or upper surface of the carrier profile and is preferably made of special steel, on each of its longitudinal sides, is an anchor or insertion rod which is parallel to the longitudinal axis of the profile strip and which on the other side engages in a lateral insertion slot in the carrier profile; the insertion rod or insertion profile is preferably made of the material of the profile strip and joined to the latter by a weld seam. The insertion rods complement the profile strip on both sides and, owing to the welded connection, form a reliable protection for the inside surface of the live carrier profile.

According to a further characteristic of the invention, the thickness of the insertion end of the profile-like insertion rod corresponds to the width of the insertion slot in the carrier profile, so that the components are firmly seated on each other.

With a profile strip of channel-like shape which rests on the rail head of a rail-like carrier profile, it proved advantageous to connect the insertion rod to a side arm formed integrally on a base plate of the profile strip, and on the other side to insert it with at least one rod section projecting from that side arm, in the correspondingly arranged insertion slot in the carrier profile. The weld seam is advantageously to run at the end face of the side arm of that profile strip.

A channel-like insertion rod of approximately V-shaped cross-section which abuts by one channel arm against the inside of the side arm of the profile strip is preferred; the other channel arm is then directed towards the longitudinal axis of the profile strip. With this design, the cross-section of the slot in the rail head of the carrier profile is in turn V-shaped, the slot arm running in the side or longitudinal surface of the rail head being formed by a longitudinal indentation.

Another insertion rod according to the invention is of angular cross-section, which with one channel arm abuts against the inside of the side arm; the other channel arm is inclined away from the base plate of the profile strip, or alternatively towards it. In this case the angle defined

by the two channel arms is to measure more than 90° , preferably about 110° .

Within the scope of the invention is also an insertion rod of approximately semicircular cross-section, which at the vertex of its curvature is welded by the outer surface to the edge of the end face of the side arm of the profile strip in such a way that the two insertion rods of the profile strip are arranged in a common centre axis and open towards each other. This centre axis intersects the cross-sectional axis of the composite profile, which is in turn parallel to its side surfaces. Also, the centre axis of the insertion rods in each of the two longitudinal surfaces of the rail head is to define the position of a bead of which the cross-section is adapted to the shape of the interior of the insertion rod to be joined to it, and which is defined on each of two sides by an insertion slot for the free edge of the insertion rod.

The cross-section of another embodiment of the insertion profile or rod for the rail head according to the invention consists of a quadrant section and a linear section, which latter abuts on the inside against the side arm of the profile strip and is welded to its end face. These quadrant sections of the two insertion rods can be directed towards the base plate of the profile strip or away from it. The slot in the rail head for the linear section of the insertion rod is here to contain a longitudinal indentation in the longitudinal surface of the rail head. Furthermore, care must be taken that the pairs of identical insertion rods provide an inversely symmetrical design.

According to another characteristic of the invention, an insertion rod of hook-shaped cross-section having a free hook section directed towards the base plate of the profile strip and running at a distance from the side arm is welded at the other end to the end face of the side arm.

Also, it proved favourable to let a longitudinal rib formed integrally at a distance from the surface of the rail head and defined by the lower surface of the rail head engage under the slot-like indentation in the rail head.

In an alternative embodiment to the above-described mounting of the insertion rod of hook-shaped cross-section having a free hook section running at a distance from the inner surface of the side arm of the profile strip, the free hook section points away from the base plate of the profile strip, that is, towards the bottom region of the composite profile. This insertion rod too is welded to the end face of the side arm.

Another embodiment covers an insertion rod of step-shaped cross-section which at one end is welded to the inner surface of the side arm of the profile strip and at the other end with its free hook end engages behind a peg strip in the longitudinal surface of the rail head.

Also within the scope of the invention are insertion rods of linear cross-section, that is, strip-shaped, which are laid on the inside against the side arms of the profile strip and project beyond their respective end face to which they are joined by means of a continuous weld seam. Such an insertion rod of linear cross-section is according to the

invention at one end welded to the end face of a side arm of the profile strip and inclined to the longitudinal axis of the cross-section of the composite profile at an angle of approximately 60° to 80° , preferably 70° to 75° .

It proved favourable to fix to the inner side of the side arm of the profile strip in the region of its end face a linear insertion rod parallel to the longitudinal axis of the profile strip, namely a round bar having a diameter of 5 to 10 mm, for example. For this, in the flank or longitudinal surfaces of the rail head of this composite profile is preferably formed in each case a longitudinal groove of which the bottom is arcuate in cross-section, in adaptation to the round bar.

A different shape of the rail body is also within the scope of the invention, namely a box-shaped carrier profile on the upper surface of which rests a plate-shaped profile strip at the longitudinal edges of which in each case an insertion rod is held by a weld seam. Here, the width of the profile strip is shorter than the width of the carrier profile, and each of the insertion rods is inserted in a slot which is allocated to a step indentation in the carrier profile.

The invention also covers a composite profile for making a composite profile in which a carrier profile having a top surface and insertion slots accompanying the latter on both sides is extruded from light metal material, also an insertion rod is introduced into each insertion slot and a profile strip overlapping the top surface is laid against a section of the insertion rod extending out of the insertion

slot. The insertion rod is continuously welded to the profile strip.

First, therefore, the anchoring strips, anchor rods or insertion rods are laid or pressed or rolled into the light metal profile, in particular an aluminium base profile, or before welding or afterwards rolled or pressed hard by plastic deformation of the carrier profile. There is then provision for pressing the special steel covering profile onto the light metal carrier profile by means of a large-diameter pressure roller, and welding the anchoring strips or insertion rods on the right and left at the same time to the covering profile under this bias.

Furthermore, the so-called covering profile is preferably a special steel strip which is cut from a coil and which is given the desired shape by roll-shaping or used directly as a cut tape. The insertion rod is a special steel strip - preferably the same alloy as the covering profile - which advantageously has been cut from the coil and given the desired shape by roll-shaping/chamfering/folding the edge up or over.

To remedy the above-mentioned faults, a continuously progressing composite profile is proposed - such as extrusion for the carrier profile and roll-shaping - over the whole profile length of covering profile and insertion rods or anchoring profiles. Joining is carried out by continuous welding over the profile length.

A requirement is a maximum possible width of the sliding surface with the possibility of brushing from the side and

mechanical anchoring which, even when the wear profiles are completely worn down, ensures anchoring of the sliding surfaces of which two then remain. Also, a reduction of the fitted height tolerances compared with known composite profiles is desirable. The possibility of local manufacture worldwide without having to upgrade a large light metal extruder is also desirable.

Further advantages, characteristics and details of the invention are apparent from the description below of preferred embodiments as well as with reference to the drawings; these show

Figures 1, 9: in each case an oblique view of a section of a rail-shaped composite profile consisting of two composite partners;

Figure 2: the cross-section through the composite profile of Figure 1 full size with a component removed from the composite profile;

Figures 3, 4: in each case a smaller cross-section than Figure 2 through a composite profile of a different design;

Figures 5, 6, 7, 8: in each case two halves of the cross-sections of two different composite profiles;

Figure 10: the cross-section through the composite profile of Figure 9;

Figure 11: an end view of one composite partner;

Figure 12: a side view of two elements of the composite partner of Figure 11;

Figure 13: the two composite partners of Figure 10 before assembly;

Figures 14 and 18: two further embodiments of composite profiles consisting of two composite partners;

Figures 15 and 19: an end view of one composite partner in Figure 14 or 18;

Figures 16 and 20: a side view of two elements of the composite partner of Figure 15 or 19;

Figures 19, 20: views of Figures 14 and 18 corresponding to the elements of Figures 11, 12;

Figures 17 and 21: in each case the two composite partners of Figure 14 or 18 before their assembly;

Figures 22 to 24: three other embodiments of composite profiles in an end view.

A composite profile 10 having a height h of 105 mm here and a maximum width b of 92 mm comprises according to Figure 1 a rail-shaped carrier profile 12 with a rail base 14 and an endless rail head 22 formed integrally on the rail base 14

by means of a rail stem 20. Two longitudinal edges 17 with a height c of 10 mm defining the bottom surface 16 of the rail base 14 run parallel to each other at a distance b_1 of 80 mm here.

From these longitudinal edges 17, the two roof surfaces 18 of the rail base 14 are inclined slightly upwards to the cross-sectional centre axis Q traversing the longitudinal axis A of the composite profile 10, and merge with that rail stem 20 having a height h_1 of approximately 30 mm and a thickness e of approximately 18 mm. From the upper end of the rail stem 20 extend the lower surfaces 26 of the rail head 22 which are inclined approximately upwards to the longitudinal edges 24 of this rail head 22, which has a width b_2 of 78 mm and of which the outside height n of approximately 28 mm defines the position of the upper surface 28 of the rail head 22.

From each of the longitudinal edges 24 of the rail head 22 in Figure 1 extends an insertion slot 30 which is inclined upwards at an angle w of approximately 60° and has a width a of 4 mm here and a depth t of 18 mm, and of which the lower wall surface in Figure 2 merges with a kind of longitudinal rib 34 of the rail head 22, the outside of which is formed by that lower surface 26. In the longitudinal edge 24 is formed a longitudinal indentation 32 as a spatial extension of the slot 30 of V-shaped cross-section, which also provides its width a .

This rail or carrier profile 12 of the composite profile 10 is formed from a light metal material in an extruder, not shown in the drawings for reasons of clarity.

The top or upper surface 28 of the rail profile 12 or its rail head 22 is spanned in the final state by a profile strip 40 having a thickness f of 6 mm, which is made from a ferrous or non-ferrous metal. This profile strip 40 is channel-shaped in cross-section, and its side arms 46 which extend from a base plate 42 and are parallel to each other and to the longitudinal axis B of the profile strip 40 and which have a height c_1 of 20 mm abut against the longitudinal edges 24 of the rail head 22. In this position the outer surface 44 of the profile strip 40 forms the upper surface of the composite profile 10.

Associated with parallel axis with each side arm 46 of the profile strip 40 resting on the upper surface 28 of the rail head 22 in the embodiment of Figures 1 and 2 on the inside is a channel-shaped insertion rod 50 of approximately V-shaped cross-section having an apex angle w_1 of approximately 65° , of which the channel arms 49, 49_i provide a thickness a_1 which corresponds with a slight clearance to the width a of the insertion slot 30. One of these channel arms 49 which are linear in cross-section abuts with its outer side - running parallel to the cross-sectional longitudinal axis Q - against the side arm 46 of the profile strip 40 on the inside in a contact width c_2 of 5 mm and is welded thereto in sealing fashion by a weld seam shown at 48. The latter runs at the end face 47 of the side arm 46 of the profile strip. The other channel arm 49_i is inserted in the adjacent slot 30 in the rail head 22. Thus a permanent and sealing combination of the two composite partners 12, 40 of the composite profile 10 is formed.

The rail head 22_a of the composite profile 10_a according to Figure 3 has, instead of a V-shaped slot, an insertion slot 30_a of angular cross-section which has a width (radius 4 mm) for a correspondingly shaped insertion rod 50_a of the profile strip 40, which is inherently shaped according to Figure 2. Towards the rail base 14, the insertion slot 30_a is defined by an upwardly inclined longitudinal rib 34_a of the rail head 22_a. This insertion slot 30_a receives the free end 55 of the cross-section of the insertion rod 50_a which in a side view is a longitudinal strip.

The profile strip 40 of Figure 4 too is essentially designed according to Figure 2; with this composite profile 10_b, however, the two insertion profiles or insertion rods 50_b are semicircular in cross-section and in each case welded at their vertex to the end face 47 of a side arm 46 of the profile strip 40. The insertion rods 50_b opening towards each other at a centre axis M intersecting the cross-sectional longitudinal axis Q encompass at the rail head 22_b a bead 36 of arcuate cross-sectional contour which is defined on both sides by longitudinal ribs 34_b, forming insertion slots 35 for the cross-sectional ends of the insertion rod 50_b.

Figure 5 shows in each case one half of two composite profiles 10_c, 10_d ending at the cross-sectional longitudinal axis Q; the other halves, not shown, are shaped accordingly. Associated with the profile strip 40 of the left design in Figure 5 is an insertion rod 50_c having a thickness a_1 of which the cross-section consists of an arcuate section 54 and a linear section 49_c which is welded

to the corresponding side arm 46 of the profile strip 40. That arcuate section 54 extends towards the rail base 14. In the embodiment on the right side of Figure 5, the insertion rod 50_c is fixed in such a way that the arcuate section 54 is directed towards the base plate 42 of the profile strip 40. In both composite profiles 10_c, 10_d the linear section rests in a longitudinal indentation 32 of the rail head 22_c or 22_d, which merges with a slot 30_c of curved cross-section.

Figure 6 too shows two insertion profiles or insertion rods 50_e directed in opposite directions to each other and having an angled or hooked - and inherently identical - cross-sectional shape with corresponding slots in the rail head 22_e or 22_f of the composite profile 10_e, 10_f. These insertion rods 50_e too are welded to the end face 47 of the side arm 46 of the profile strip, and with their free hook section 56 engage behind a parallel-axis peg strip 37 having the width k_1 of the rail head 22_e or 22_f.

An insertion rod 50_g which is essentially stepped in cross-section runs in the composite profile 10_g of Figure 7; it is firstly welded to the inner surface of the side arm 46 and secondly engages with its free hook end 56 behind a peg strip 37 in the longitudinal surface 24 of the rail head 22_g.

An insertion rod 51 of linear cross-section and having a thickness a_2 of 4 mm is laid on the inside against the side arm 46 of the profile strip 40 of composite profile 10_h of Figure 7 and is welded to the end face 47 of the side arm 46 in such a way that the free cross-sectional end - which

is parallel to the latter - engages behind a peg strip 37 of the rail head 22_h.

In both embodiments of Figure 8, a linear insertion rod 51 having a free length k of 15 mm is welded to the end edge or end face 47 of each of the side arms 46 of the profile strip 40 in such a way that it runs inwardly at an angle w_2 of approximately 70° to 75° to the cross-sectional longitudinal axis Q . In the composite profile 10_i on the left side of the figure, the insertion rod 51 is directed towards the base plate 42, and in the other composite profile 10_k it points away from the base plate 42. The corresponding slots 30 in the rail head 21_i or 22_k run in each case above a longitudinal rib 34 or 34_a.

The composite profile 10_e of Figures 9 to 13 contains two insertion rods 50_a of which the shape has been described for Figure 3. By contrast with that drawing, here the free ends 55 of the insertion rods 50_a point upwards, that is, towards the base plate 42 of the profile strip 40.

In Figure 11 can be seen the exact design of the profile strip 40 of which the straight width q here measures 68 mm with a stretched length of approximately 116 mm and an area of approximately 697 millimetres [Mat. 1.4016 (X 6 Cr 17), with 5373.1 g/m].

The insertion rod 50_a of Figure 12 defines, with its two profile arms 55, 55_i having a length z of 7.8 mm and 5.8 mm (z_i) and the end faces 57, an angle y of 65° . Figure 13 shows the length of the slots 30 described above and longitudinal indentations 32 in the rail head 22_e.

Figures 14 to 17 show the cycle discussed for Figures 10 to 13 for the embodiment of Figure 3. Figure 15 corresponds to Figure 11. In Figure 16 the length z or z_1 of the two profile arms 55, 55_i of the insertion rod 50_a measures 5.6 mm and the angle y here is 76°.

A round bar 52 having a diameter d of 7 mm is welded on the inside in each case to the side arms 46 of the profile strip 40 of Figures 18 to 21. Here, the stretched length is approximately 112 mm, and the area approximately 674 mm [Mat. 14016 (X6Cr17) 5189.8 g/m)].

To receive the round bar 52 in clamping fashion, at the vertical centre of the longitudinal edges or surfaces 24 having a height i of 28 mm of the rail head 22_n is formed in each case a longitudinal groove 60 of which the bottom is cross-sectionally defined by a semicircle.

The box-shaped carrier profile 13 of the composite profile 11 of Figures 22 to 24 has an essentially rectangular cross-sectional shape with a width b_1 of 105 mm and a height h_2 of 50 mm and is provided with an interior 62 which is defined on both sides by profile arms 64 from which in each case project bottom webs 66 aligned parallel to the upper surface 28 and with each other and having a width b_3 of 20 mm. That upper surface 28 is narrower than the carrier profile 13, as each of its upper corner edges has a step indentation 68 with a width b_4 of 5 mm. From the latter in Figure 22 extends a slot 31 which is directed substantially diagonally to the cross-sectional area and which has a width a of approximately 3 mm and a length t_1 of

approximately 9 mm. The slot 31 serves to receive an insertion rod 50_a of angled cross-section which is welded with one profile arm 55_i to the longitudinal edge 70 of a plate-shaped profile strip 44 of which the width *b* measures approximately 95 mm with a thickness *f* of 5 mm. The free profile arm 55 sits in the slot 31.

The composite profiles 11_a and 11_b and their carrier profiles 13 in Figures 23 and 24 differ in the shape of the insertion profiles or insertion rods 51_k or 50 of their profile strips 41. The insertion rod 51_k of Figure 23 is similar to that of the composite profile 10_h, but is slightly bent. The insertion rod 50 of Figure 24 corresponds to that of Figures 1, 2. However, it is laid with one channel arm 49 against the lower surface 41 of the profile strip 41 and thus welded; the weld seam 48 runs at the longitudinal edge 70 of the profile strip 41 and the outer surface of the channel arm 49. The corner region of the carrier profile 13 is correspondingly shaped with a longitudinal indentation 32 in the top or upper surface 28 of the carrier profile 13_b and that step indentation 68, between which a bead 36_a runs parallel to the longitudinal axis of the profile.

Patent claims

1. Composite profile having a carrier profile (12, 13) extruded from light metal material and a profile strip (40, 41) spanning its top surface (28) and made of a harder metal,

characterised in that

attached to the profile strip (40, 41) which more or less rests on the top or upper surface (28) of the carrier profile (12, 13), on each of its longitudinal sides, is an insertion rod (50, 50_a, 50_b, 50_c, 50_e, 50_g; 51, 51_k; 52) which is parallel to its longitudinal axis (B) and which on the other side engages in a lateral slot (30, 30_a, 31, 35) in the carrier profile, the insertion rod being joined to its profile strip by a weld seam (48).

2. Composite profile according to claim 1, characterised in that the profile strip or covering profile (40, 41) is formed from special steel.
3. Composite profile according to claim 1 or 2, characterised in that the anchor or insertion rod (50, 50_a, 50_b, 50_c, 50_e, 50_g; 51, 51_k; 52) is formed from the material of the profile strip or covering profile (40, 41).
4. Composite profile according to any of claims 1 to 3, characterised in that the thickness (a₁, a₂) of the free end of the insertion rod (50, 50_a, 50_b, 50_c, 50_e;

51, 51_k; 52) corresponds to the width (a) of the slot (30, 30_a, 31, 32, 35).

5. Composite profile according to any of claims 1 to 4 having a profile strip of channel-like shape which rests on the rail head of a rail-like carrier profile, characterised in that the insertion rod (50, 50_a, 50_b, 50_c, 50_e; 50_g; 51) is connected to a side arm (46) formed integrally on a base plate (42) of the profile strip (40), and on the other side engages with at least one rod section (49_i; 54, 55; 56, 56_a) projecting from the side arm, in the slot (30, 31, 35) in the carrier profile (12, 13).
6. Composite profile according to any of claims 1 to 5, characterised in that the weld seam (48) runs at the end face (47) of the side arm (46).
7. Composite profile according to any of claims 1 to 6, characterised by a channel-like insertion rod (50) of approximately V-shaped cross-section which abuts by one channel arm (49) against the inside of the side arm (46) of the profile strip (40), the other channel arm (49_i) being directed towards the longitudinal axis (B) of the profile strip (Fig. 2).
8. Composite profile according to claim 7, characterised by a V-shaped cross-section of the slot (30) in the rail head (22) of the carrier profile (12), one of the slot arms being a longitudinal indentation (32) in the side or longitudinal surface (24) of the rail head.

9. Composite profile according to claim 7 or 8, characterised by an apex angle (w_1) of the channel cross-section of approximately 60° to 70° , preferably 65° .
10. Composite profile according to one or more of claims 1 to 6, characterised by an insertion rod (50_a) of angular cross-section, which with one channel arm (55) abuts against the inside of the side arm (46) of the profile strip (40), the other channel arm (55_i) being inclined away from the base plate (42) of the profile strip or towards it (Figs. 3, 10).
11. Composite profile according to claim 10, characterised in that the angle defined by the two channel arms (55, 55_i) is more than 90° , preferably about 110° .
12. Composite profile according to one or more of claims 1 to 6, characterised by an insertion rod (50_b) of approximately semicircular cross-section, which at its vertex is welded to the end face (47) of the side arm (46) of the profile strip (40) (Fig. 4).
13. Composite profile according to claim 12, characterised in that the two insertion rods (50_b) of the profile strip (40) are arranged on a common centre axis (M) and open towards each other.
14. Composite profile according to claim 13, characterised in that the centre axis (M) of the insertion rods (50_b) intersects a cross-sectional longitudinal axis (Q) of the composite profile (10_b).

15. Composite profile according to claim 13 or 14, characterised in that the centre axis (M) of the insertion rods (50_b) in each of the two longitudinal surfaces (24) of the rail head (22_g) defines the position of a bead (36) of which the cross-section is adapted to the shape of the interior of the insertion rod, and which is defined on each of two sides by an insertion slot (35).
16. Composite profile according to one or more of claims 1 to 6, characterised in that the cross-section of the insertion rod (50_c) for the rail head (22_d) consists of a quadrant section (54) and a linear section (49_c), which latter abuts on the inside against the side arm (46) of the profile strip (40) and is welded to its end face (47).
17. Composite profile according to claim 16, characterised in that the quadrant sections (54) of the two insertion rods (50_c) are directed towards the base plate (42) of the profile strip (40) or away from it.
18. Composite profile according to claim 16 or 17, characterised in that the slot (30_c) in the rail head (22_d) for the linear section (49_c) of the insertion rod (50_c) contains a longitudinal indentation (32) in the longitudinal surface (24) of the rail head (22_d).
19. Composite profile according to one or more of claims 1 to 6, characterised in that an insertion rod (50_e) of hook-shaped cross-section having a free hook section

(56) directed towards the base plate (42) of the profile strip (40) and running at a distance (k_1) from the side arm (46) of the profile strip is welded at the other end to the end face (47) of the side arm (Fig. 6).

20. Composite profile according to one or more of claims 1 to 19, characterised in that a longitudinal rib (34, 34_a) formed integrally at a distance from the top surface (28) and defined by the lower surface (26) of the rail head (22, 22_a to 22_e) engages under the slot-like indentation (30, 30_a, 30_c; 35) in the rail head (22, 22_a to 22_e).
21. Composite profile according to one or more of claims 1 to 6, characterised in that the insertion rod (50_e) of hook-shaped cross-section having a free hook section (56) running at a distance (k_1) from the side arm (46) of the profile strip (40) and directed away from its base plate (42) is welded at the other end to the end face (47) of the side arm (Fig. 6).
22. Composite profile according to one or more of claims 1 to 6, characterised by an insertion rod (50_g) of step-shaped cross-section which at one end is welded to the inner surface of the side arm (46) of the profile strip and at the other end with its free hook end (56) engages behind a peg strip (37) of the longitudinal surface (24) of the rail head (22_g) (Fig. 7).
23. Composite profile according to one or more of claims 1 to 6, characterised by an insertion rod (51) of linear

cross-section which is laid on the inside against the side arm (46) of the profile strip and projects beyond its end face (47) to which it is welded.

24. Composite profile according to one or more of claims 1 to 6, characterised by an insertion rod (51) of linear cross-section which at one end is welded to the end face (47) of a side arm (46) of the profile strip and is inclined to a longitudinal axis (Q) of the cross-section of the composite profile (10_i ; 10_k) at an angle (w_2) of approximately 60° to 80° , preferably 70° to 75° (Fig. 8).
25. Composite profile according to one or more of claims 1 to 6, characterised in that fixed to the inner side of the side arm (46) of the profile strip in the region of its end face (47) is a linear insertion rod (52) parallel to the longitudinal axis (B) of the profile strip (40).
26. Composite profile according to claim 25, characterised by a round bar (52) having a diameter (d) of approximately 5 to 10 mm.
27. Composite profile according to claim 25 or 26, characterised in that in the flank or longitudinal surfaces (24) of the rail head (22_m) of the composite profile (10_m) is formed in each case a longitudinal groove (60) of which the bottom is arcuate in cross-section and adapted to the round bar (52).

28. Composite profile according to any of claims 1 to 4, characterised in that the carrier profile (13) is box-shaped and on its upper surface (28) rests a plate-shaped profile strip (44) at the longitudinal edges (70) of which in each case an insertion rod (50, 50_a, 51_k) is held by a weld seam (48).
29. Composite profile according to claim 28, characterised in that the width (b) of the profile strip (44) is shorter than the width (b₁) of the carrier profile (13), and each of the insertion rods (50, 50_a, 51_k) is inserted in a slot (31) which extends from a step indentation (68) in the carrier profile (Fig. 22).
30. Composite profile according to claim 29, characterised in that the step indentation (68) is arranged in two mutually opposed corner regions of the carrier profile (13).
31. Method for making a composite profile according to one or more of the preceding claims, characterised in that a carrier profile having a top surface and insertion slots accompanying the latter on both sides is extruded from light metal material, in that an anchor or insertion rod is introduced into each insertion slot and a profile strip or covering profile made of harder material and overlapping the top surface is laid against a section of the insertion rod extending out of the insertion slot.

32. Method according to claim 31, characterised in that the insertion rod is rolled or pressed hard against the carrier profile.
33. Method according to claim 31 or 32, characterised in that the profile strip is pressed onto the carrier profile with a bias.
34. Method according to any of claims 31 to 33, characterised in that the insertion rod is continuously welded to the profile strip.