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(54) **Rail construction, particularly for bridges or viaducts**

Schienenvorrichtung, insbesondere für Brücken und Viadukte

Construction de rail, plus particulièrement pour ponts et viaducs

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**EP-A- 0 628 660 DE-A- 4 242 077
DE-B- 1 241 476**

• **STRASSEN UND TIEFBAU, vol. 44, no. 7/8, 7
August 1995, ISERNHAGEN DE, pages 559-565,
XP000195371 HAUCK ET AL.: "Untersuchungen
zur Verringerung der Schallabstrahlung von
"Festen Fahrbahnen" durch absorbierende
Fahrbahnbeläge"**

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EP 0 771 908 B1

Description

[0001] The invention relates to a rail construction, particularly for bridges or viaducts, with a bottom plate connected to a support construction, particularly connected to the bridge or viaduct construction, a rail bar construction connected to the bottom plate and a standing safety rail close to the rail bar construction and running roughly parallel to the rail bar.

[0002] As seen in the height, a bridge or viaduct spans a part of for instance a river at a relatively deeper location or other part at a lower level. In order to obviate the danger in the case of a possible derailment of the railway carriages falling a great distance, safety rails are arranged which stand relatively high and prevent the carriage falling from the viaduct or bridge in the case of derailment.

[0003] Heretofore the safety rail has been fixed to the substructure using bolts. This requires much labour time, which makes this construction expensive.

[0004] From DE-A-12 41 476 a rail construction is known in which a plate is bent into a trough. At the upperside of the trough a horizontal beam is welded to the trough serving as safety rail. The safety rail is horizontally directed and flush with the upperside of the rail bar.

[0005] From DE-A-42 42 077 a railway construction is known in which on both sides of the rail bar an acoustic damping layer is provided.

[0006] From EP-A-0 628 660 a rail bar construction is known according to which both sides of the rail bar are embedded in moldable material, for instance Corkelast®.

[0007] It is the object of the invention to provide a solution herefor. This is achieved according to the invention in that the bottom plate is bent on either side of the rail bar construction to form a trough, wherein the safety rail is an integral bent part of the bottom plate and extends to above the upper surface of the rail bar, and in that the rail bar is embedded in a sound absorbing material, like Corkelast®.

[0008] In this manner it becomes possible to place the rail bar construction in a trough-shaped part of the bottom plate, which is favourable in respect of noise nuisance.

[0009] The rail bar is preferably embedded in Corkelast® and the bed of Corkelast® material is sealed with a sound-damping layer while leaving free an acoustic chamber. It has been found that the arrangement of a sound-damping layer on the Corkelast® considerably reduces production of noise.

[0010] According to another embodiment the upwardly extending bent parts are covered with a sound-insulating layer, which effects a further improvement in the noise nuisance.

[0011] In preference the cross-sectional surface of the part of the bridge or viaduct construction supporting the bottom plate is chosen considerably larger than the cross-sectional surface of the bottom plate.

[0012] It has been found that the noise radiation is considerably reduced by this step.

[0013] The rail construction according to the invention can be embodied with a bottom plate of steel or concrete.

[0014] The invention will be further elucidated with reference to the figures of an embodiment.

[0015] In the figures:

Fig. 1 shows a perspective view of a rail construction according to the invention,

Fig. 2 shows a sectional view of a rail construction according to the invention,

Fig. 3 shows a perspective view according to arrow III in fig. 2,

Fig. 4 shows a rail construction according to the invention with steps for noise reduction,

Fig. 5 shows a further embodiment of the invention, and

Fig. 6 shows yet another embodiment of the invention.

[0016] A support construction, for instance a frame construction or girder construction 3, is arranged on columns 1, 2. The girder construction or frame construction 3 supports a bottom plate 4 on which the actual rail construction is placed.

[0017] According to the invention the bottom plate 4 is formed by a part 5, 6 which is bent into the form of a trough and which can be of symmetrical construction. The parts 5, 6 are mutually connected via a plate 7 which is connected to parts 5, 6 by welding. It is also possible to form the parts 5, 6 and 7 integrally. The bent portion 8, 9 forms the safety rail. The rail bar 10 is embedded in Corkelast® material 11 while leaving clear cylindrical openings 12 and 13. The rail bar 10 lies on a plate 14 of sound-damping material. The combination of the Corkelast® material and the recessed placing of the rail bar provides considerable limitation of the noise production. A further improvement in noise production is obtained by covering the bent portions with plates 15, 16 of sound-damping material.

[0018] The cross section of the parts 21, 22 of the bridge or viaduct construction supporting the bottom plate 4 is chosen so as to be considerably larger than the cross sectional surface of bottom plate 4 and therefore of the bent parts 5, 6. Tests have shown that the sound radiation is hereby reduced considerably.

[0019] A still further improvement is obtained if the Corkelast® material is covered with a plate 18, 19 of sound-damping material while leaving free an acoustic chamber 17.

[0020] According to fig. 5 the support construction is embodied in concrete 20 while in the embodiment of fig. 1-4 the support construction is of steel.

Claims

1. Rail construction, particularly for bridges or viaducts, with a bottom plate (4) connected to a support construction, particularly connected to the bridge or viaduct construction (3), a rail bar construction connected to the bottom plate (4) and a standing safety rail (8, 9) close to the rail bar construction and running roughly parallel to the rail bar (10), **characterized in that** the bottom plate (4) is bent on either side of the rail bar construction to form a trough, wherein the safety rail (8, 9) is an integral bent part of the bottom plate (4) and extends to above the upper surface of the rail bar (10), and **in that** the rail bar (10) is embedded in a sound absorbing material, like Corkelast®.
2. Rail construction as claimed in claim 1, **characterized in that** the bed of Corkelast® material is sealed with a sound-damping layer (19) while leaving free an acoustic chamber (17).
3. Rail construction as claimed in claims 1 or 2, **characterized in that** the upwardly extending bent parts are covered with a sound-insulating layer (15, 16).
4. Rail construction as claimed in claim 1, **characterized in that** the cross-sectional surface of the part (21, 22) of the bridge or viaduct construction (3) supporting the bottom plate (4) is chosen considerably larger than the cross-sectional surface of the bottom plate (4).
5. Rail construction as claimed in any of the claims 1-4, **characterized in that** the bottom plate is of steel.
6. Rail construction as claimed in any of the claims 1-4, **characterized in that** the bottom plate is of concrete.
7. Rail construction as claimed in any of the claims 1-6, **characterized in that** a mastic material is arranged between the sound-damping layer and the rail bar.

Patentansprüche

1. Schienenvorrichtung, insbesondere für Brücken oder Viadukte, mit einer Bodenplatte (4), die mit einer Trägerkonstruktion verbunden ist, die insbesondere mit dem Brücken- oder Viaduktaufbau verbunden ist, einem Schienenprofilaufbau, der mit der Bodenplatte (4) verbunden ist, und einer stehenden Sicherheitsschiene (8, 9) nahe an dem Schienenprofilaufbau und im wesentlichen parallel zu dem Schienenprofil (10) verlaufend, **dadurch gekennzeichnet**

zeichnet, daß die Bodenplatte (4) auf jeder Seite des Schienenprofilaufbaus aufgebogen ist, um einen Durchlaß zu bilden, wobei die Sicherheitschiene (8, 9) ein einstückig gebogener Teil der Bodenplatte (4) ist und sich oberhalb der oberen Fläche des Schienenprofils (10) erstreckt und daß das Schienenprofil (10) in ein schallabsorbierendes Material wie Corkelast® eingebettet ist.

2. Schienenvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** das Bett aus Corkelast®-Material mit einer Schalldämpfungsschicht (19) abgedichtet ist, während eine Akustikkammer (17) freigelassen ist.
3. Schienenvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** die sich nach oben erstreckenden gebogenen Teile mit einer Schallisolierschicht (15, 16) abgedeckt sind.
4. Schienenvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, daß** die Querschnittsfläche des Teils (21, 22) des Brücken- oder Viaduktaufbaus (3), der die Bodenplatte (4) trägt, deutlich größer ausgewählt ist als die Querschnittsfläche der Bodenplatte (4).
5. Schienenvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, daß** die Bodenplatte aus Stahl besteht.
6. Schienenvorrichtung nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, daß** die Bodenplatte aus Beton besteht.
7. Schienenvorrichtung nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, daß** ein Mastixmaterial zwischen der Schalldämpfungsschicht und dem Schienenprofil angeordnet ist.

Revendications

1. Construction de rail, particulièrement pour des ponts et des viaducs, comportant une plaque de fond (4) reliée à un support de construction, en particulier reliée à la construction (3) de pont ou de viaduc, une construction de barre de rail reliée à la plaque de fond (4) et un rail de sécurité stationnaire (8, 9) proche de la construction de barre de rail et orienté sensiblement parallèlement à la barre de rail (10), **caractérisée en ce que** la plaque de fond (4) est courbée de chaque côté de la construction de barre de rail pour former une goulotte, dans laquelle le rail de sécurité (8,9) est une partie courbée intégrante de la plaque de fond (4) et s'étend au-dessus de la surface supérieure de la barre de rail (10), et **en ce que** la barre de rail (10) est encastrée dans

un matériau isolant phoniquement, comme le Corkelast®.

2. Construction de rail selon la revendication 1, **caractérisée en ce que** le lit de matériau Corkelast® est recouvert par une couche d'amortissement sonore (19) tout en laissant libre une chambre acoustique (17). 5
3. Construction de rail selon la revendication 1 ou 2, **caractérisée en ce que** les parties courbées s'étendant vers le haut sont recouvertes d'une couche d'isolation acoustique (15, 16). 10
4. Construction de rail selon la revendication 1, **caractérisée en ce que** la surface en coupe transversale de la partie (21, 22) de la construction (3) de pont ou de viaduc qui supporte la plaque de fond (4) est choisie considérablement plus grande que la surface en coupe transversale de la plaque de fond (4). 15 20
5. Construction de rail selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** la plaque de fond est en acier. 25
6. Construction de rail selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** la plaque de fond est en béton.
7. Construction de rail selon l'une quelconque des revendications 1 à 6, **caractérisée en ce qu'un** matériau formant mastic est disposé entre la couche d'amortissement sonore et la barre de rail. 30

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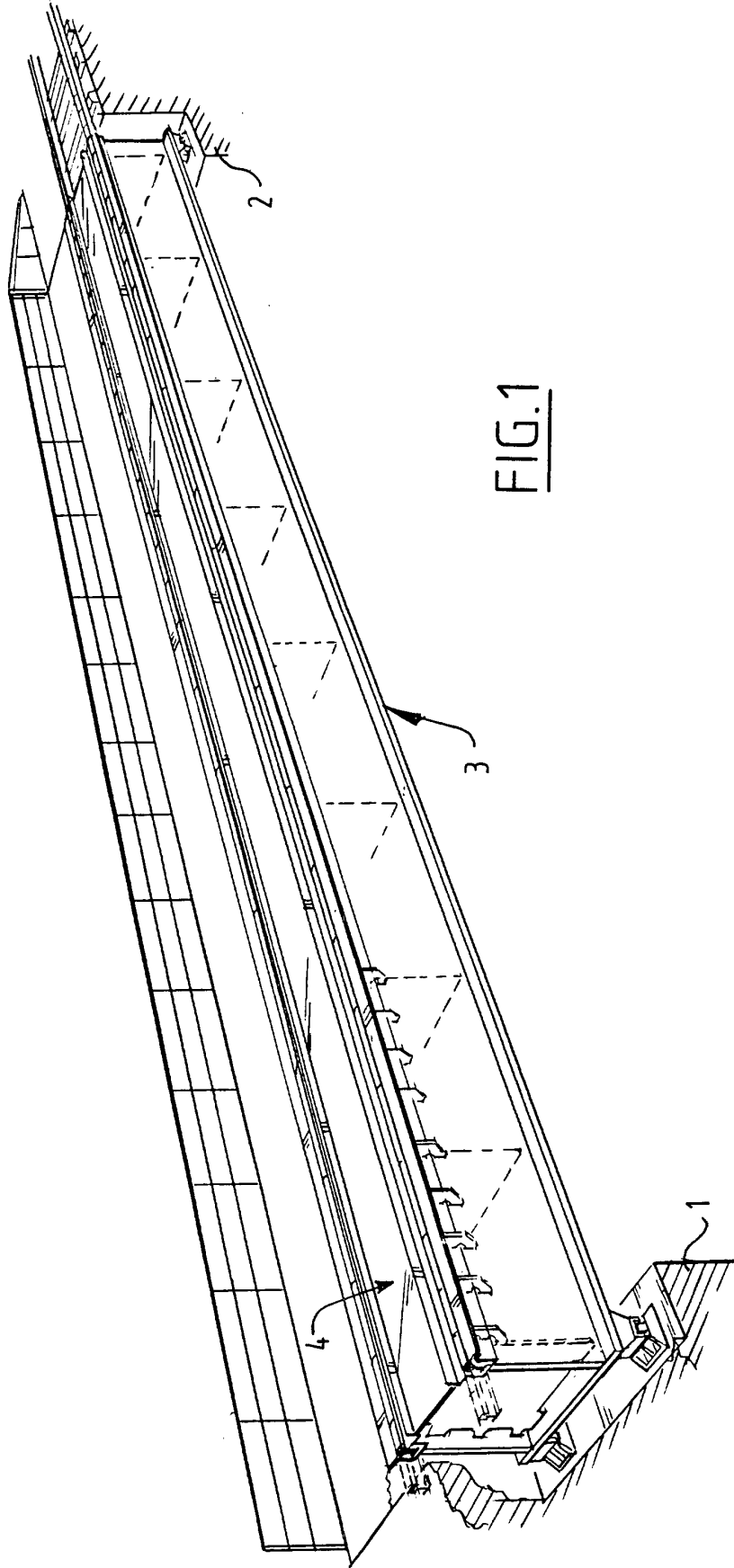


FIG.2

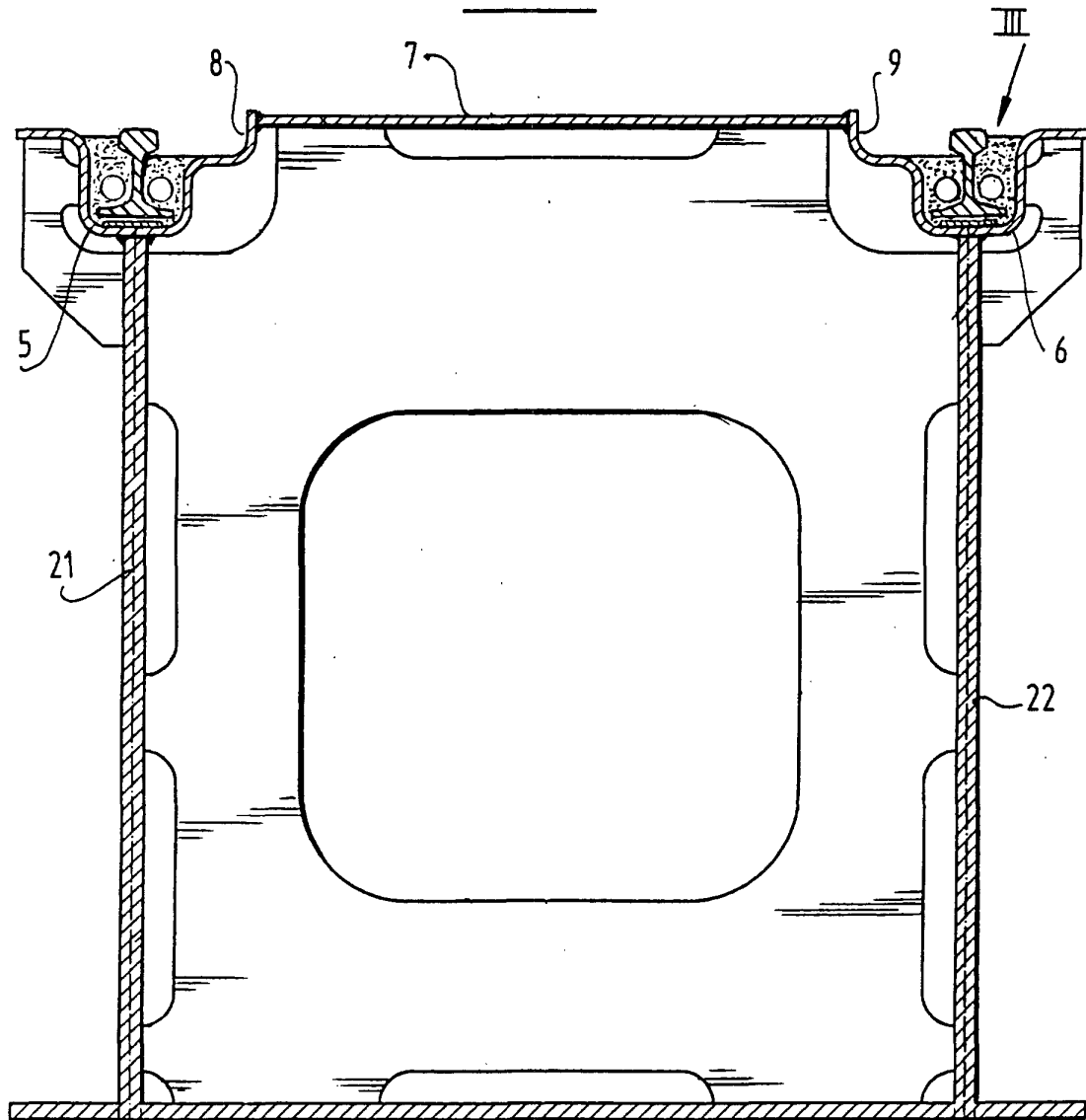


FIG.3

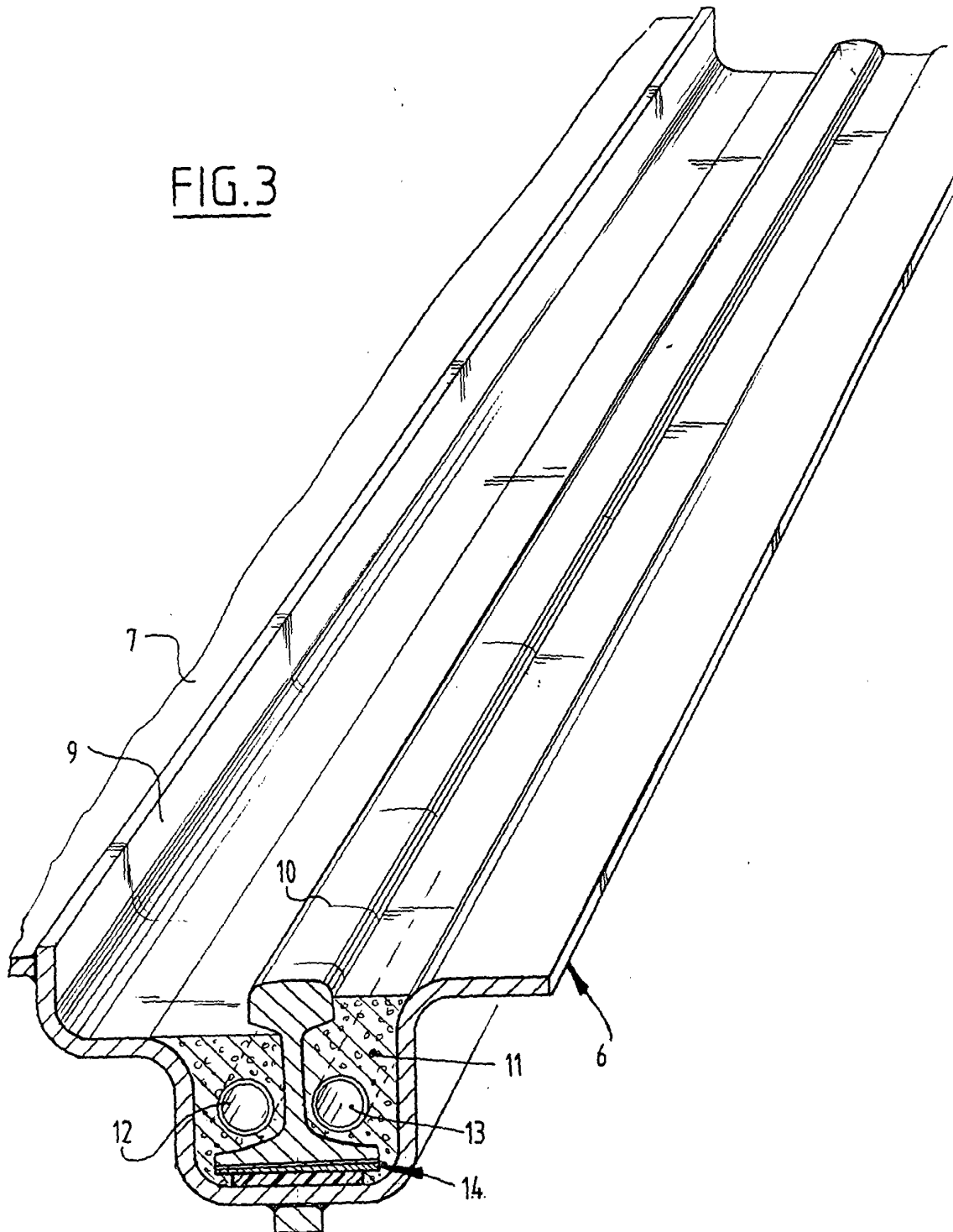


FIG.4

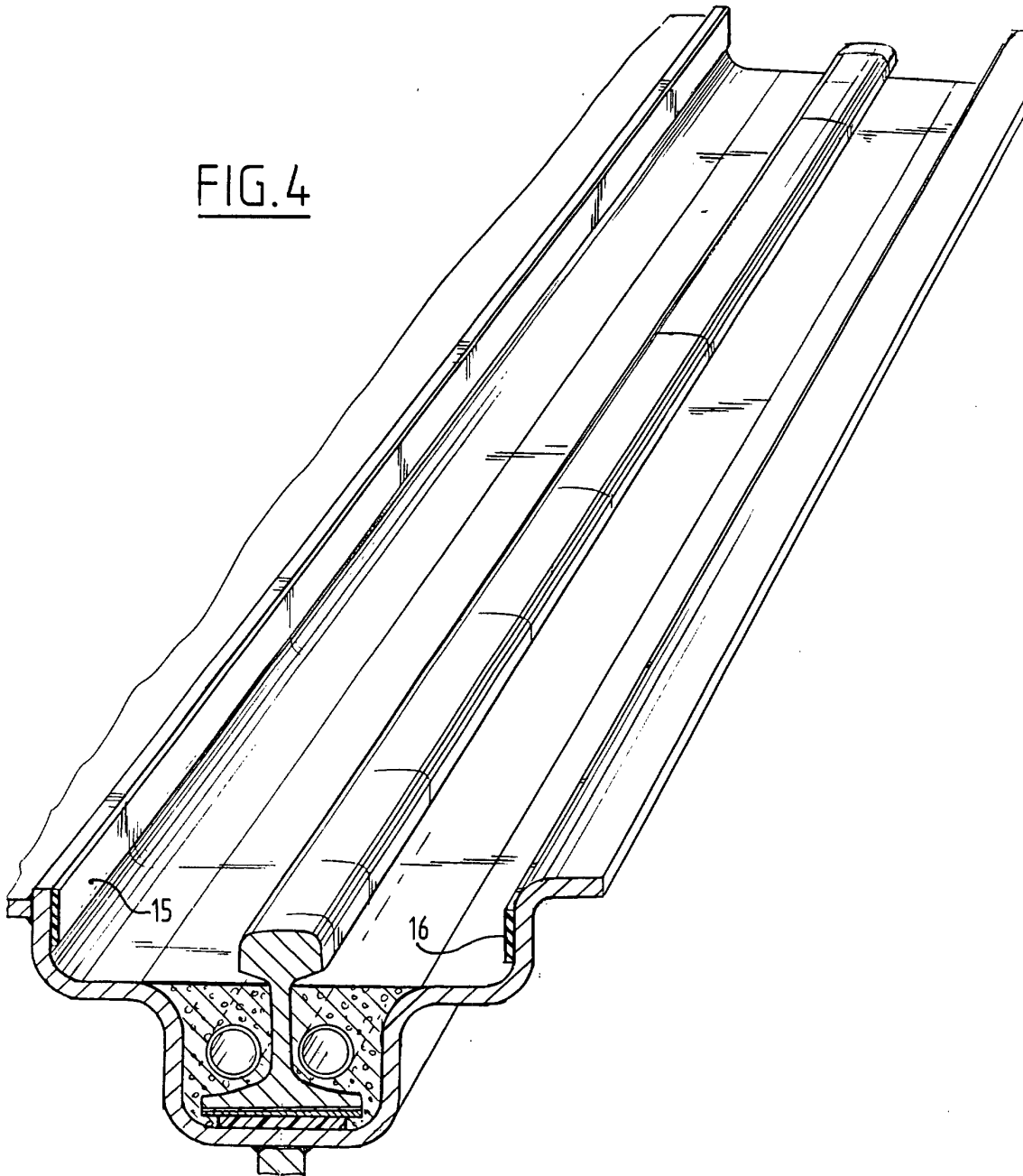


FIG.5

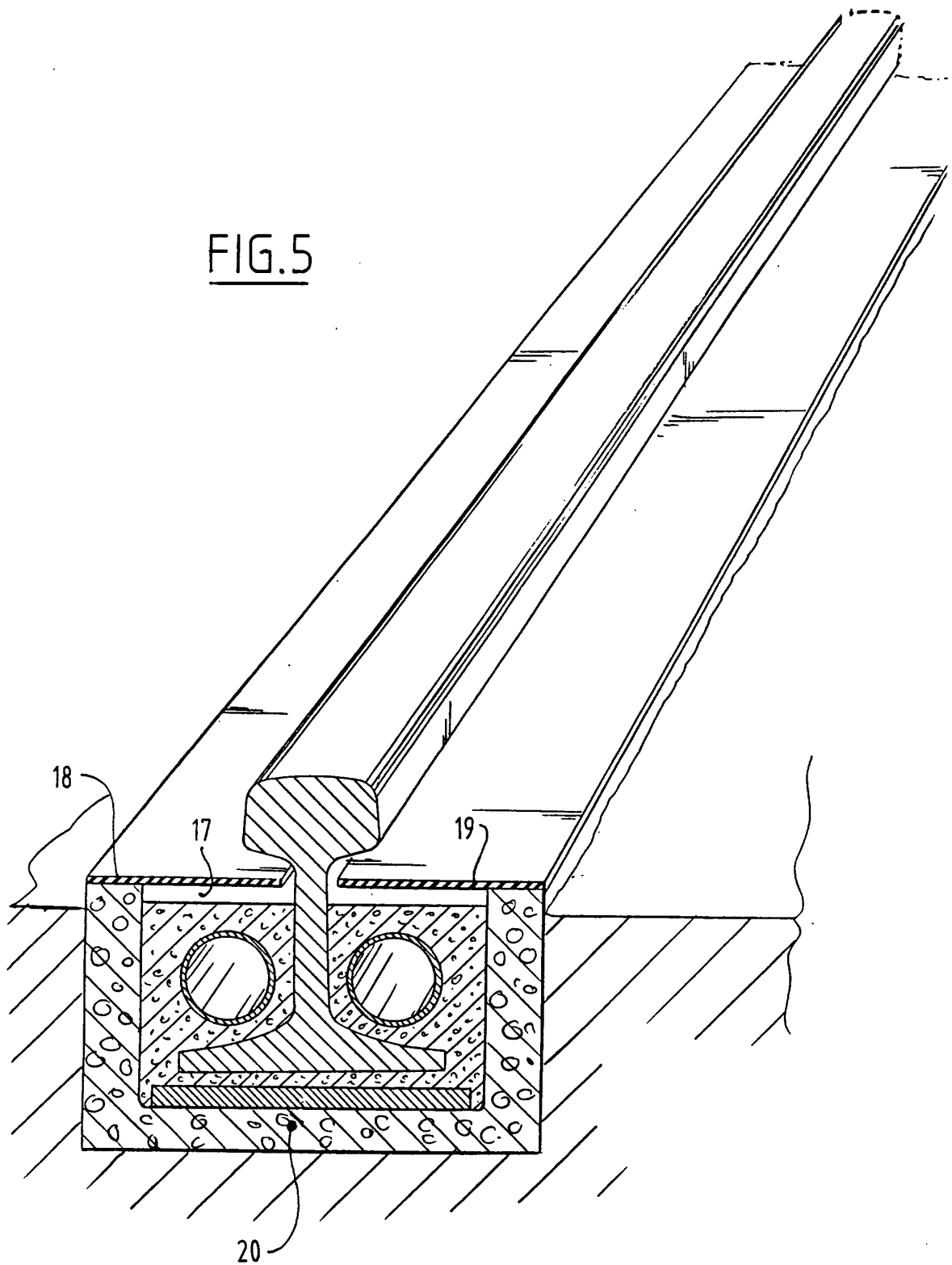


FIG.6

