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71 Applicant: **PANDROL LIMITED**
1, Vincent Square
London, SW1P 2PN(GB)

72 Inventor: **Conroy, Brian George**
61 Bracebridge Avenue
Worksop Nottinghamshire(GB)

72 Inventor: **Hewitt, John Robert**
31 Gosforth Drive
Dronfield Woodhouse Sheffield(GB)

74 Representative: **Andrews, Robert Leonard et al,**
HASELTINE LAKE & Co. Hazlitt House, 28 Southampton
Buildings Chancery Lane
London WC2A 1AT(GB)

54 **Fastening railway rails.**

57 A railway sleeper is in the form of an inverted trough narrower at the top (16) than at the bottom and having a gap (13) in its upper side. The sleeper supports a rail (14) with the bottom of a flange (15), which is at the bottom of the rail, in the gap and lower than the top of the sleeper. The rail is secured by a clip (D), part of which is inside the sleeper and constrained by the narrowness of the top of the sleeper so that the clip cannot turn through a large angle about a

vertical axis. The rail may be further secured by a portion (17) of the sleeper overhanging one side of the flange. The clip may be a bent bar of the same cross-section throughout its length and comprising a short upper limb (A) and a longer lower limb (B), slightly arched (1A) and ending in an up-turned part (9), the limbs extending generally in the same direction from a bend (C) which joins them.

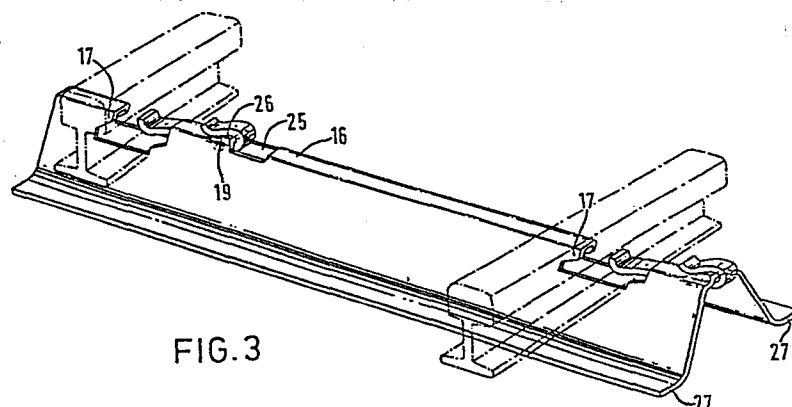


FIG. 3

Fastening Railway Rails

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According to a first aspect of the invention,
there is provided a railway sleeper in the form of an
inverted trough which has at least one of its two side
5 walls inclined to the vertical so that the sleeper is
narrower at the top than it is at the bottom, the sleeper
having a gap in its upper side such that the sleeper can
support a railway rail with the bottom of a flange, which
is at the bottom of the rail, in said gap and lower than
10 the top of the sleeper.

According to a second aspect of the invention,
there is provided an assembly comprising a railway
sleeper in the form of an inverted trough which has at
least one of its two side walls inclined to the vertical
15 so that the sleeper is narrower at the top than it is at
the bottom, the sleeper having a gap in its upper side,
a railway rail having the bottom of a flange, which is at
the bottom of the rail, in said gap and lower than the
top of the sleeper and a clip engaging the sleeper and
20 one side of the flange and holding the rail down, the
clip having a part inside the sleeper at its top, said
part being constrained by the narrowness of the top of
the sleeper so that the clip cannot turn through a large
angle about a vertical axis.

25 Part of the top of the sleeper could overhang and
hold down the other side of the flange of the rail.

According to a third aspect of the invention,
there is provided a clip which is suitable for use in an
assembly according to the second aspect of the invention,
30 the clip comprising a bent steel bar having substantially
the same shape of cross-section over its entire length
and having a long lower limb and, above it, a shorter
upper limb, the two limbs extending in the same general
direction as one another away from a bend which joins
35 them and there being an up-turned part at that end of the
lower limb which is remote from the bend, the lower limb
being slightly arched.

1 Examples in accordance with the invention are
described below with reference to the accompanying
drawings, in which:-

 Figures 1 and 2 show an end view and a side view,
5 respectively, of part of an assembly in a railway track,

 Figure 3 shows a perspective view of another such
assembly, and

 Figures 4 and 5 show an end view and a plan view,
respectively, of part of a third such assembly.

10 A clip D shown in Figures 1 and 2 has been made by
bending a bar of resilient steel. The shape of
cross-section of the bar is substantially rectangular and
substantially the same over the whole length of the bent
bar, although there are small and unavoidable departures
15 from the truly rectangular cross-section, due to the
bending process. The clip consists of two limbs A and B
extending in the same general direction as one another
(to the right, considering Figure 1) away from a bend C
which joins them, the limb B being below the limb A and
20 longer than the limb A. When the clip is placed in the
particular position in which it is illustrated and it is
free from stress, a first portion 1 of it, which extends
over by far the greater part of the length of the clip,
is nearly straight, being slightly arched at 1A, and
25 horizontal, the left-hand end of the first portion being
adjoined by a second portion 2 which extends upwardly and
to the left, this being followed by a third portion 3
which extends upwardly, then a fourth portion 4 which
extends upwardly and to the right, then a fifth portion 5
30 which extends to the right, a sixth portion 6 which
extends downwardly and to the right, a seventh portion 7
which extends to the right and an eighth portion 8 which
extends upwardly and to the right. The right-hand end of
the arch in the first portion 1 is adjoined by a ninth
35 portion 9 which extends upwardly and to the right at an
angle of between 30° and 80° , in the illustrated case
about 65° , to the horizontal.

1 Figures 1 and 2 show a steel railway sleeper in
the form of an inverted trough of triangular cross-
section. The side walls of the trough are referenced 11
and 12. Both of them are inclined to the vertical
5 (although in principle one could be vertical and the
other inclined to the vertical) so that the sleeper is
narrower at the top than it is at the bottom. A part has
been cut out of the sleeper to form a gap 13. Portions
have been cut out of the side walls and parts of the side
10 walls, between the cut out portions, have been bent over
inwardly to form ledges 11A and 12A. A railway rail 14
of a light-weight narrow-gauge railway has a flange 15 at
its foot and the bottom of the flange lies in the gap 13
and lies on the ledges 11A and 12A, whereas a portion 15A
15 of the flange, between the side walls 11 and 12, has no
part of the trough vertically beneath it. The whole of
the flange 15 is lower than the top 16 of the sleeper.
The rail is located by vertical faces 21 and 22, and
above the faces 21 there are inclined faces 23, one on
20 each of the side walls 11 and 12, to assist the operation
of placing the rail in position.

A portion 17 of the sleeper overhangs the flange 15
on one side of the rail, i.e. the side nearer the other
rail which lies on the same sleeper, and holds the rail
25 down on that side. The other side of the rail is held
down by the clip D, of which the junction between the
parts 1A and 9 bears downwardly on the upper face of the
flange. The clip is initially put, in a factory or
depot, in a preparatory position, to the left of the
30 position shown in Figure 1, with the legs A and B of the
clip forced apart by the sleeper and the free end of the
portion 9 of the clip vertically below the portion 18 of
the top of the sleeper, the portion 7 of the clip
engaging the top of the sleeper near the top of a ramp 19
35 on the sleeper. This ramp prevents the clip falling away
from the sleeper when it is held in various positions
during storage, transportation and assembly. When the

1 sleeper and the rail have been positioned as shown, the
clip is driven to the right to the illustrated position,
where the portion 7 of the clip is still on the ramp 19,
which prevents the clip from moving to the left. In
5 contrast to what is shown in Figure 1, the ramp 19 is
preferably inclined to the horizontal by an angle equal
to or greater than the angle which the upper face of the
flange 15 makes with the horizontal.

In a modified version of what is shown in Figure 1,
10 the top of the sleeper at its extreme left-hand end is
flat and horizontal and the left-hand end of the ramp 19
is a few millimetres from the left-hand end of the
sleeper.

At the other end of the sleeper there is a clip on
15 the right-hand side of the other rail and an overhanging
portion 17 on the left-hand side. However, because the
overhanging portions 17 are on the left-hand side of one
rail and on the right-hand side of the other rail, there
are difficulties when it is desired to replace a single
20 sleeper without dismantling joints between adjacent
lengths of rail and this can be done only by turning the
rails about their longitudinal axes. In contrast, Figure
3 shows an assembly in which it is only necessary to
remove the clips, raise the rails and the sleeper
25 vertically, remove the sleeper from the rails, put a new
sleeper in its place on the rails, lower the rails and
the sleeper and re-insert the clips. Each of the
overhanging portions 17 is on the left-hand side of its
associated rail, the right-hand clip, which is
30 substantially as shown in Figure 1, being driven into
position as described above with reference to Figure 1
and the other clip, of exactly the same shape as the
right-hand clip, being positioned by inserting its leg B
into a hole 25 which passes through the flat top 16 of
35 the sleeper. The portion 7 of this clip is caused to
engage the top of a ramp 19 or a flat horizontal surface
26 between the top of the

1 ramp and the hole 25 and then the clip is driven to the
left into a position where its portion 9 bears upon the
flange of the rail.

If the right-hand end of the sleeper is
5 inconveniently far from the nearest rail, so that if the
right-hand clip were to be positioned as shown in Figure
3 the clip would have to be inconveniently long, the
right-hand clip could have its leg B inserted in a hole
like the hole 25, between the rail and the end of the
10 sleeper.

In the example shown in Figures 4 and 5 the
sleeper has the same shape of cross-section as that shown
in Figure 3 and two gaps 13 and one hole 25 in its top.
The example differs from that shown in Figures 1 and 2 as
15 follows. A rib 28 extends across the top of the sleeper
to prevent the clip moving away from the rail and the
portion 7 of the clip bears on the flat top of the
sleeper between this rib and the end of the sleeper in
the above-mentioned preparatory position of the clip.
20 The top of the arched portion 1A of the clip is
vertically below the bottom of the portion 7. The gap 13
is bounded by vertical faces 30 below which there are
inclined faces 31 and the portion 17 has a slightly
different shape. The clip D for the right-hand rail is
25 shown, inserted through a hole 25, and there is an
overhanging portion 17 on the other side of the
right-hand rail.

Instead of there being the overhanging portions
17, which is an arrangement which is particularly useful
30 for railways in mines, there could if desired, for mine
railways and other narrow-gauge railways or even
wider-gauge railways, be four clips per sleeper. All
four could have their limbs B inserted in holes like the
hole 25 or the arrangement could be that only the clips
35 which are between the rails have their limbs B inserted
into holes, whilst the other clips are positioned as
shown in Figure 1.

The sleepers shown in Figures 3 to 5 could have

1 the ledges 11A and 12A, as in the example according to
Figures 1 and 2. In all three examples, the parts of the
side walls of the sleeper between the above-mentioned cut
out portions could be bent over outwardly, instead of
5 inwardly, to form the ledges 11A and 12A, in other words
the ledges could extend away from one another instead of
towards one another as shown in Figure 2.

Figures 3 to 5 also show outwardly- directed
flanges 27 at the bottom of the side walls 11 and 12 of
10 the sleeper, in order to strengthen the sleeper. These
flanges could be provided on the sleeper shown in Figures
1 and 2.

In all three examples each clip has a width which
is equal to or slightly less than the width of the
15 interior of the top of the sleeper so that part of the
clip which is inside the sleeper is constrained so that
the clip cannot turn, or can turn through only a few
degrees, preferably no more than ten degrees, about a
vertical axis.

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CLAIMS:

1. A railway sleeper in the form of an inverted trough which has at least one of its two side walls inclined to the vertical so that the sleeper is narrower at the top than it is at the bottom, the sleeper having a gap in its upper side such that the sleeper can support a railway rail with the bottom of a flange, which is at the bottom of the rail, in said gap and lower than the top of the sleeper.

2. An assembly comprising a railway sleeper in the form of an inverted trough which has at least one of its two side walls inclined to the vertical so that the sleeper is narrower at the top than it is at the bottom, the sleeper having a gap in its upper side, a railway rail, having the bottom of a flange, which is at the bottom of the rail, in said gap and lower than the top of the sleeper and a clip engaging the sleeper on one side of the flange and holding the rail down, the clip having a part inside the sleeper at its top, said part being constrained by the narrowness of the top of the sleeper so that the clip cannot turn through a large angle about a vertical axis.

3. A sleeper or an assembly according to claim 1 or 2 in which part of the top of the sleeper overhangs and holds down the flange of the rail on the other side of the rail.

4. A sleeper or an assembly according to any preceding claim in which the sleeper has two gaps in its top, to receive two rails, and a hole through its top, which hole is separated by parts of the top of the sleeper from said gaps, to receive a clip.

5. A sleeper or an assembly according to any preceding claim in which there are outwardly-directed flanges at the bottom of the side walls of the sleeper in order to strengthen the sleeper.

6. A sleeper or an assembly according to any preceding claim having a ramp at one end of the sleeper at its top, the ramp sloping downwardly towards said gap

1 and serving to prevent the clip moving away from the gap.

7. A sleeper or an assembly according to claim 6
in which the upper end of the ramp is a few millimetres
from the extreme end of the sleeper, separated therefrom
5 by a flat horizontal surface.

8. A sleeper or an assembly according to any one
of claims 1 to 5 in which there is a rib extending across
the top of the sleeper to prevent the clip moving away
from the gap.

10 9. An assembly according to any one of claims 2
to 8 in which the clip comprises a bent steel bar having
substantially the same shape of cross-section over its
entire length and has a long lower limb part of which is
below the top of the sleeper and another part of which
15 bears on the rail flange and a shorter upper limb above
the top of the sleeper and bearing thereon, the two limbs
extending in the same general direction as one another
away from a bend which joins them.

10. An assembly according to claim 9, there being
20 an up-turned part at the end of the lower limb of the
clip which is remote from the bend, the lower limb being
slightly arched.

11. An assembly according to claim 9 or 10 in
which the lower limb of the clip has been pushed into the
25 open end of the sleeper.

12. An assembly according to claim 4 and
according to claim 9 or 10 in which the lower limb of the
clip has been inserted through the hole mentioned in
claim 4.

30 13. An assembly according to any one of claims 2
to 12 in which the whole of the flange on the rail is
below the top of the sleeper.

14. A clip which is suitable for use in an
assembly according to any one of claims 2 to 13, the clip
35 comprising a bent steel bar having substantially the same
shape of cross-section over its entire length and having
a long lower limb and, above it, a shorter upper limb,

1 the two limbs extending in the same general direction as
one another away from a bend which joins them and there
being an up-turned part at that end of the lower limb
which is remote from the bend, the lower limb being
5 slightly arched.

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FIG.1

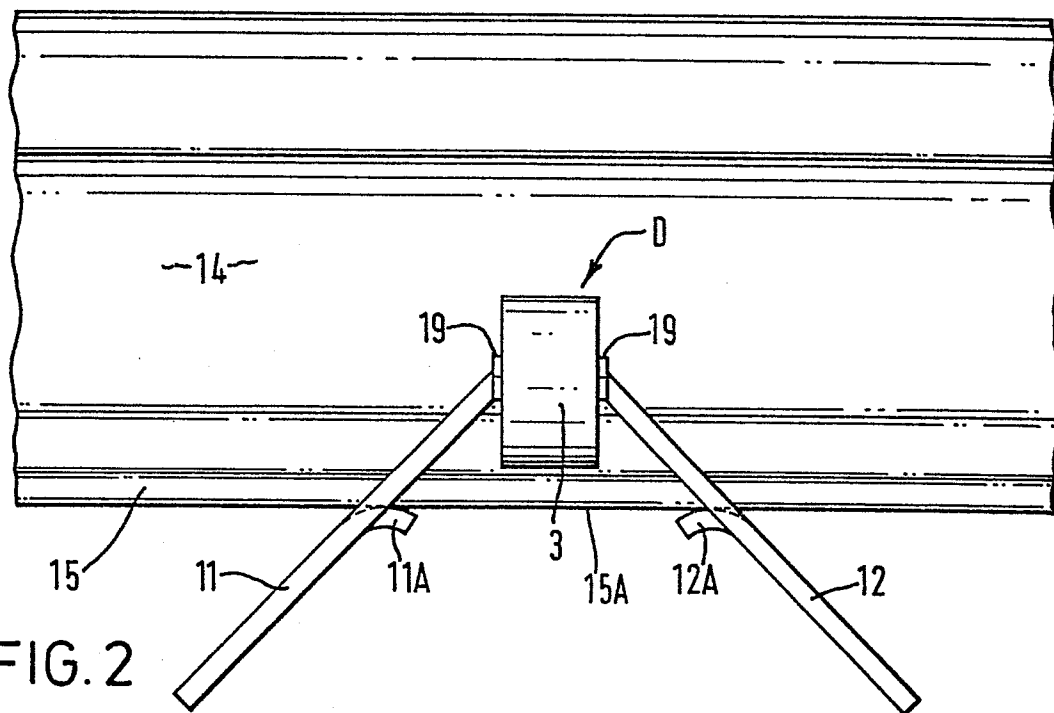
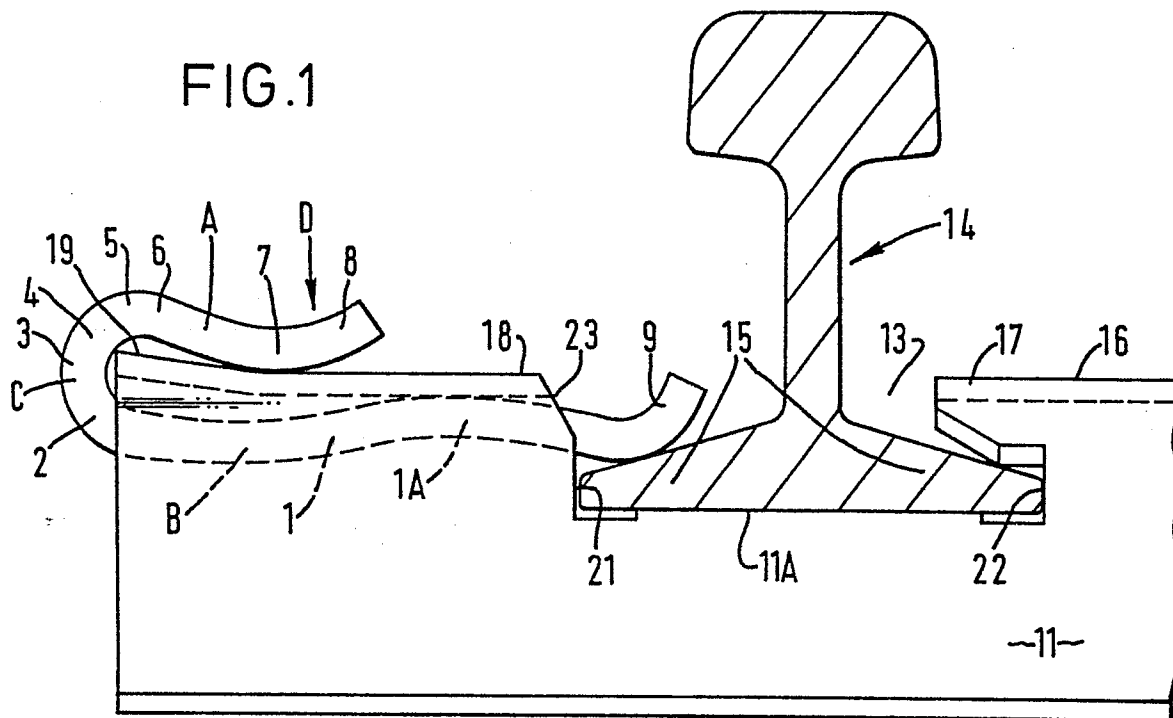


FIG. 2

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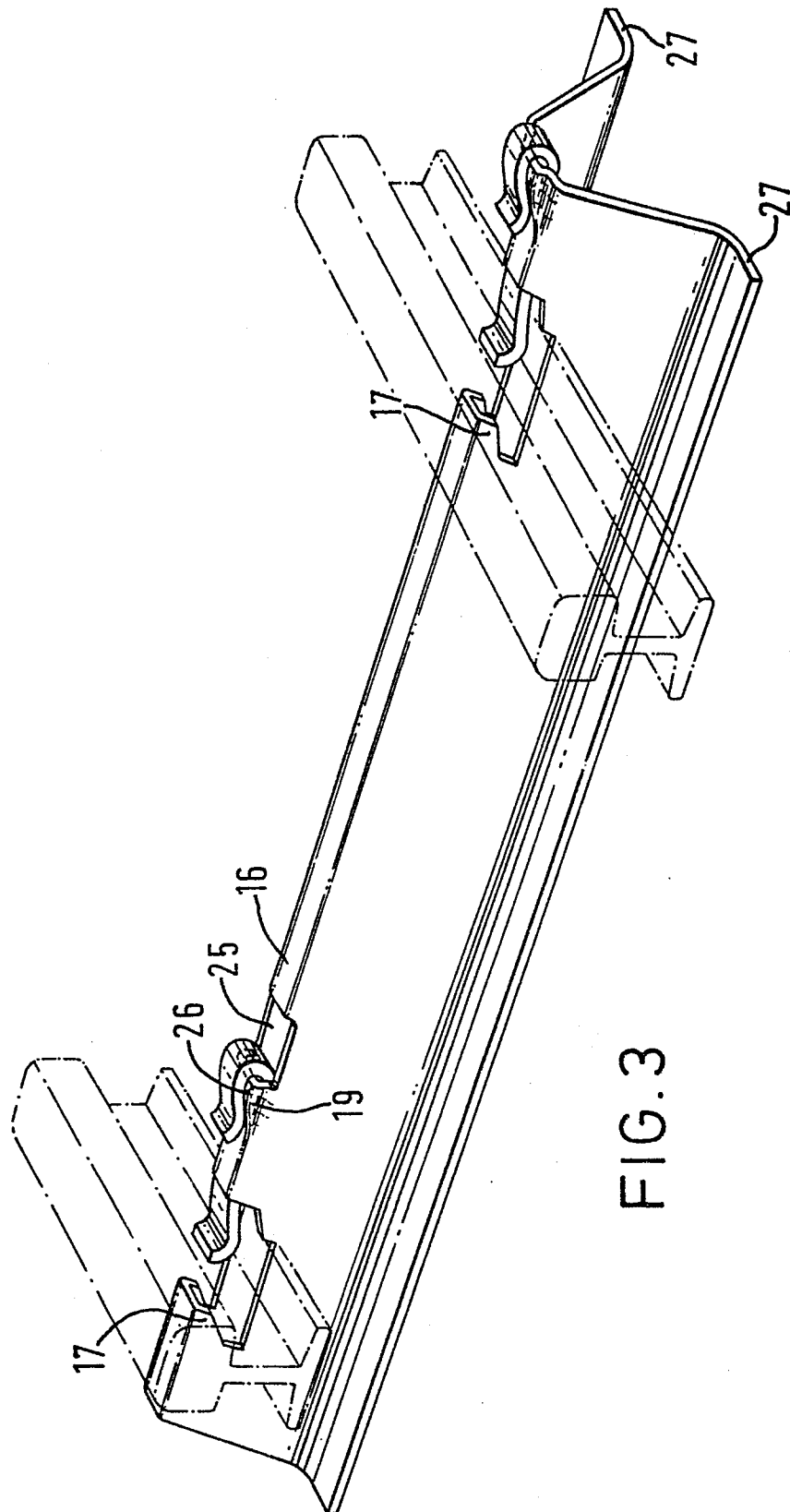


FIG. 3

FIG. 4.

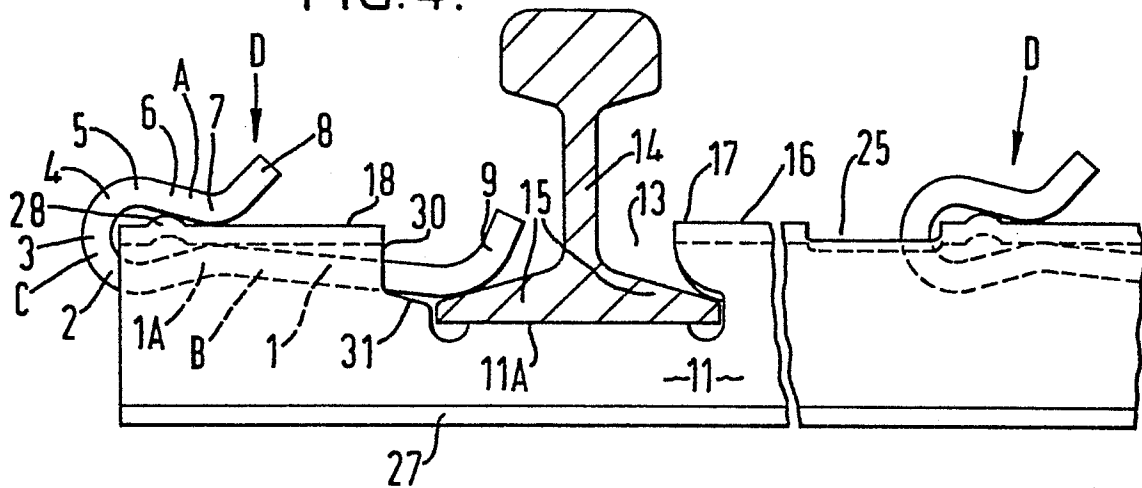
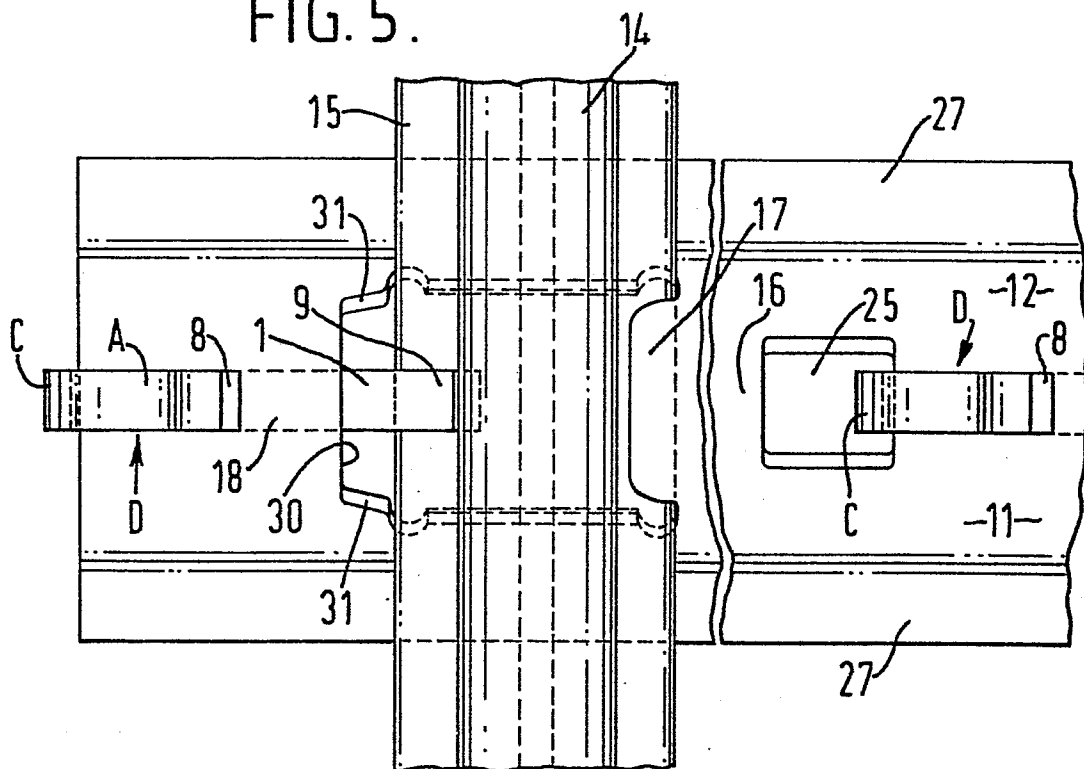


FIG. 5.





European Patent
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EUROPEAN SEARCH REPORT

0117028

Application number

EP 84 30 0085

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	US-A-1 533 000 (GURNOVITZ) * Page 1, lines 44-75; figures 1-8 *	1-3, 13	E 01 B 3/16 E 01 B 9/34
A	US-A-1 380 235 (MOELL) * Page 1, lines 11-18, 45-83; figures 1-5 *	1-3, 13	
A	GB-A-2 086 966 (SERNI) * Page 1, lines 115-128; figures 1-4 *	1-3, 11, 13	
A	FR-A-2 470 188 (OMARK INDUSTRIES)		
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			E 01 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10-04-1984	Examiner RUYMBEKE L.G.M.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	