

ARTICULATED VEHICLE TRACKS FOR ARMoured VEHICLES

This invention relates to vehicle tracks such as those
5 found on tanks. Road pads are often incorporated into the
tracks to cushion the impact between the tracks and the
surface upon which the vehicle is driven. Between adjacent
plates of the track, track links are located, coupled to
the plates via bushes, to allow articulation of the track.
10 The road pads are usually fixed to the track links.

An example of an arrangement as described above can be
found in UK patents nos. 1077444 and 1405742. In each
case, the pad consists of a metallic backing plate and a
15 rubber cushion bonded to one side of the backing plate.
The edges of the backing plate project beyond the cushion
and acts as guides which enable the pad to be slid into
cooperating grooves in the track link. Part of the backing
plate is cut out and raised to form a latching projection
20 which cooperates with a latch on the track link to retain
the pad in place.

One problem with this kind of arrangement is that the pads
can be difficult, once installed, to remove from the link
25 for replacement. Indeed, a special tool is often required
to depress the latching projection before the pad can be
released.

It is an object of the present invention to address this
30 problems. Accordingly, the present invention provides an
articulated vehicle track unit comprising:

- a link having a depending skirt and a depending web
with an aligned bore passing through the skirt and the web;
- a pad having a backing plate upon which is formed a
35 barrel with a bore passing through the barrel;
- the link and the pad being adapted to cooperate with
one another such that the bore in the barrel lines up with
the bores in the skirt and the web.

The pad can be retained in the link by passing a suitable retaining element through the skirt, the barrel and the bored out web. The retaining element may be fixed in place in a number of ways such as by a clip (a circlip or a split
5 pin) or may be designed as an interference fit. It will be understood that the present invention therefore provides a means of retaining the pad on the link without resorting to resilient latches which are difficult to disengage.

10 The retaining element may be a rollpin adapted to be inserted into the bore in the skirt, through the bore in the barrel and into the bore of the corresponding depending web to secure the pad to the link.

15 Preferably, the link is provided on each side with such a depending skirt and depending web and the pad is correspondingly provided with at least two such barrels. The link is preferably provided on each side with a plurality of such aligned bores and the pad is
20 correspondingly provided with a plurality of such barrels.

For ease of insertion of the retaining element, it is preferred that the or each web is positioned inside its corresponding skirt.

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Preferably, a second depending web is provided inside the or each bored depending web. In such a case, the gap between the bored out depending web and the second depending web is preferably greater than the length of the
30 retaining element. This allows the retaining element to be removed by being knocked in and through the bored out web into the gap between the two webs, which is particularly advantageous if the retaining element is an interference fit.

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The present invention also provides an articulated vehicle track unit comprising:

a link having a depending skirt with a detent;

a pad having a backing plate and a spring clip projecting from the backing plate;

the link and the pad being adapted to cooperate with one another such that when the pad is offered up to the link from below, the spring clip resiliently engages the detent.

In this case, the pad is retained by resilient clips. However, the resilient clips do not have to withstand the enormous stresses imposed upon the latches of UK patents nos. 1077444 and 1405742. Thus latches directly oppose lateral movement of the pad relative to the track which arise when the vehicle is cornering. In the present invention, such stresses may be taken up by suitably designed abutment of the pad against the link; the clips are present in the main to ensure that the pad also cannot be dislodged from the link by forces other than the shear forces produced from contact between the pad and the ground.

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Preferably, the spring clip includes a head at the end remote from the pad. The head of the clip may project outwardly from the clip.

Preferably, the detent comprises a recess or opening in a depending skirt provided on the link. If the detent is an opening, the pad may be relatively easily removed by pushing a tool into the opening to compress the clip.

Preferably, the skirt is also provided with a shoulder which biases the spring clip away from the detent as the pad and link are brought into proximity, the head of the clip riding over the shoulder and engaging the detent as the pad and link mate with one another. The purpose of the shoulder is self-evident.

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The link may be provided with at least one such detent on either side and the pad with a corresponding number of spring clips.

The present invention will now be described by way of example with reference to the accompanying drawings in which:

fig. 1 is a plan view of a track link according to a first embodiment of the invention;

fig. 2 is a side view of the link of fig. 1;

fig. 3 is a cross-section taken on the line A-A of fig. 1;

fig. 4 is an underneath plan view of a track link according to a second embodiment of the invention;

fig. 5 is a side view of the link of fig. 4;

fig. 6 is a cross-section taken on the line A-A of fig. 5;

fig. 7 is a plan view of a track link according to a third embodiment of the invention;

fig. 8 is a side view of the link of fig. 7;

fig. 9 is a cross-section taken on the line A-A of fig. 7.

The cast steel track link of figure 1 comprises a link plate 1 and a pair of end connectors 2. The link plate 1 is divided into two sections, separated by a spine 4. The link plate 1 is laterally recessed on either side of the spine 4. Each side of the track link plate 1 is bored through, to allow passage of an elongate pin 5. The end connectors 2 are clamped onto the pin 5 such that they lie flush with the ends of the pin 5. An additional connector 6 is provided on each side of the spine 4 and also clamped onto the pin 5. Cushioning rubbers 3 are installed on each section of the track link 1.

When the link of figure 1 is attached to a adjacent links to form an articulated track, it will be understood that the end connectors 2 and the middle connector 6 clamp onto adjacent pins 5 of adjacent track plate 1. The spines 4 locate the assembled track onto the wheels of a track vehicle and allow steering forces to be delivered from one to the other. Overhanging projections 7, of which there are two on each side of the track link 1, effectively serve

to close the gap between adjacent link plates 1, without interfering with their ability to articulate with respect to one another about the pins 5.

5 Figure 2 shows in greater detail the end connector 2. The end connector consists of a continuous loop of metal, formed so as to provide a pair of apertures 8, each of which is shaped to correspond with the end of the connecting pin 5. The connecting pin 5 has a flattened
10 land 9 and each of the apertures 8 in the end connector 2 has a corresponding flattened portion 10. This prevents rotation of the pin in the end connector and consequently prevents one from working free of the other as a result of the repeated cycles of rotation when the articulated track
15 is in use. A bolt 11 passes through an aperture in one side of the end connector and engages a thread tapped into the other side. Tightening the bolt 11 tightens the connector onto its two corresponding connecting pins 5.

20 As can be seen from Figure 2, the link plate 1 is provided at its end with a depending skirt region 12. The skirt carries a pair of bores 13,14, the purpose of which will be described below. Also shown is a rubber road pad 15 fitted to the bottom of the link plate 1.

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Figure 3 shows the link plate and road pad assembly in cross-section. In addition to the depending skirt 12, the link plate 1 also includes at each end an inner depending web 16 and a plurality of more central depending webs 17.
30 The bores 13,14 in the depending skirt 12 are continued into and through the depending webs 16, but not into the more central webs 17. The road pad 15 includes a polymeric backing plate 18 and a rubber pad 19 vulcanised onto the backing plate. At each end of the backing plate 18 is a
35 raised barrel 20, which carries bores aligned with those passing through the skirt 12 and inner web 16. This arrangement allows the road pad 15 to be secured to the link plate 1 by steel rollpins 21, passing through the bores 13,14 in the depending skirt, the corresponding bores

of the road pad barrel 20 and finally the bores in the inner depending web 16. The rollpins 21 may be stored simply by pushing them through from either end and this may be done while the track links are separate or when they are
5 assembled into an articulated track.

The distance between the inner depending web 16 and the outer most of the more central depending web 17 is greater than the length of the rollpin 21. This means that the road
10 pad 15 can be removed from the link plate 1 by pushing the rollpins 21 inwards until they pass right through the barrel 20 and inner depending web 16 and into the space between that web 16 and the more central webs 17. Once
15 this has been done for all the rollpins 21, the road pad 15 is free from the link plate and may be removed, together with the loose rollpins 21. The ease with which the road pads may be attached to and removed from the track makes services of the track that much easier.

20 Figure 4 is an underneath plan view of a cast steel track link of the single pin type. Such a link does not require connecting elements to allow it to be connected to adjacent links in the track. In stead, the central link plate 1 is provided with complimentary bearing sleeves 22 on either
25 side. It will be understood that the bearing sleeves of adjacent link plates are interleaved with one another and that a connecting pin (not shown) is passed through from one end to the other to provide the necessary articulation. A rubber road pad 15 with a pressed steel backing plate 18
30 is shown attached to the link plate 1.

Figure 5 shows the track link of figure 4 from the side. Again, a central spine 4 is provided to impart steering forces from the wheels of the tracked vehicle with which
35 the track is used. A depending skirt is again provided, as is a bore 13, with a steel rollpin 21 installed.

Figure 6 shows the arrangement in cross-section, and it can be seen to be similar to the arrangement shown in Figure 3.

The main difference is the provision at either end of the link plate 1 with a spacer 23, the outermost wall of which includes an aperture 24 through which the rollpin 21 is inserted as it is installed. This aperture accommodates the sprockets of the vehicle wheels to transmit drive to the track.

The cast steel track link plate 1 of figure 6 is in all respects to that illustrated in figure 1 and will not be described further. The same goes for figure 7 and figure 2, but it will be noted that the depending skirt 12 does not include any bore as described with reference to figure 2.

As can be seen from figure 9, the road pad 15 is secured to the link plate 1 by a pair of resilient spring steel clips 25. Each clip 25 includes a horizontal anchoring region 26, an upstand 27 and a rolled over head region 28. The anchor region 26 is moulded in between the polymeric backing plate 18 and the rubber pad 19 of the road pad 15. The inner surface of the depending skirt 12 is provided with an inclined shoulder 29 and, above that, an aperture 30, into which fits the head 28 of the resilient spring clip 25. The spring clip will typically be manufactured from high grade spring steel.

Assembling the road pad 15 and link plate 1 of figure 9 is a relatively simple matter. The pad is offered up to the plate from below and the springs 25 are compressed as their heads 28 rise up the inclined shoulder 29. Once the heads 28 have cleared the shoulder 29, they spring back out to occupy the aperture 30 in the depending skirt 12. Removing the pad 15 is also a relatively simple matter. All that is required is that a tool be inserted into the aperture 30 and pressure applied to the head of the spring 25 so as to compress the spring until the head 28 is released from the aperture 30. At this point, the pad 15 may be removed from the link plate 1.

CLAIMS

1. An articulated vehicle track unit comprising:
a link having a depending skirt and a depending web
5 with an aligned bore passing through the skirt and the web;
a pad having a backing plate upon which is formed a
barrel with a bore passing through the barrel;
the link and the pad being adapted to cooperate with
one another such that the bore in the barrel lines up with
10 the bores in the skirt and the web.
2. A unit according to claim 1 in which the link is
provided on each side with such a depending skirt and
depending web and the pad is correspondingly provided with
15 at least two such barrels.
3. A unit according to claim 1 or claim 2 in which the
link is provided on each side with a plurality of such
aligned bores and the pad is correspondingly provided with
20 a plurality of such barrels.
4. A unit according to any preceding claim in which the
or each web is positioned inside its corresponding skirt.
- 25 5. A unit according to claim 4 in which a second
depending web is provided inside the or each bored
depending web.
6. A unit according to any preceding claim further
30 including a rollpin adapted to be inserted into the bore in
the skirt, through the bore in the barrel and into the bore
of the corresponding depending web to secure the pad to the
link.
- 35 7. A unit according to claim 6 in which the gap between
the bored out depending web and the second depending web is
greater than the length of the rollpin.
8. An articulated vehicle track unit comprising:





a link having a depending skirt with a detent;

a pad having a backing plate and a spring clip projecting from the backing plate;

the link and the pad being adapted to cooperate with one another such that when the pad is offered up to the link from below, the spring clip resiliently engages the detent.

9. A unit according to claim 8 in which the spring clip includes a head at the end remote from the pad.

10. A unit according to claim 9 in which the head of the clip projects outwardly from the clip.

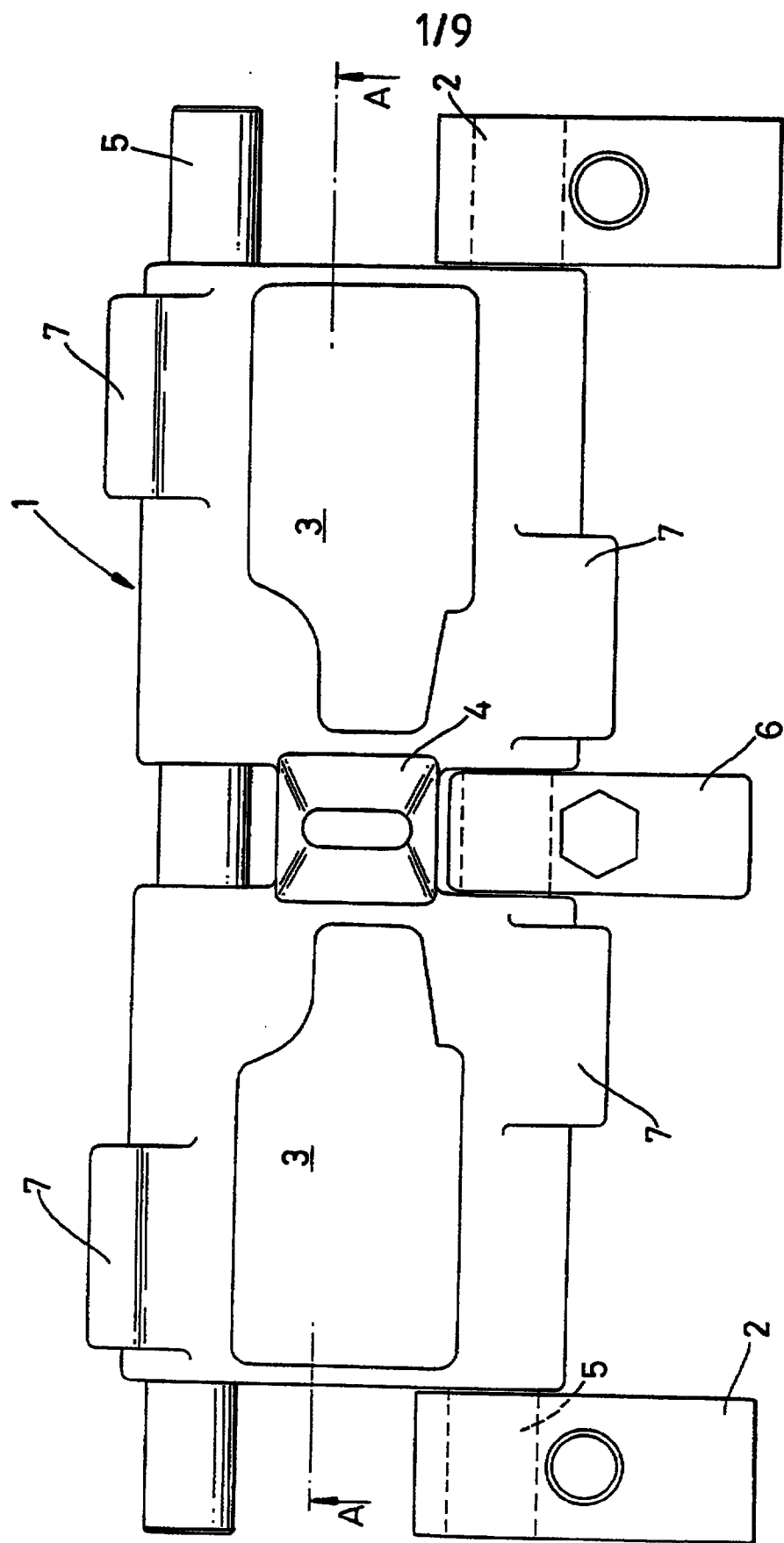
11. A unit according to claim 9 or claim 10 in which the detent comprises a recess or opening in a depending skirt provided on the link.

12. A unit according to any one of claims 9-11 in which the skirt is also provided with a shoulder which biases the spring clip away from the detent as the pad and link are brought into proximity, the head of the clip riding over the shoulder and engaging the detent as the pad and link mate with one another.

13. A unit according to any one of claims 8-12 in which the link is provided with at least one such detent on either side and the pad is provided with a corresponding number of spring clips.

14. An articulated vehicle track unit substantially as described herein with reference to the accompanying drawings.





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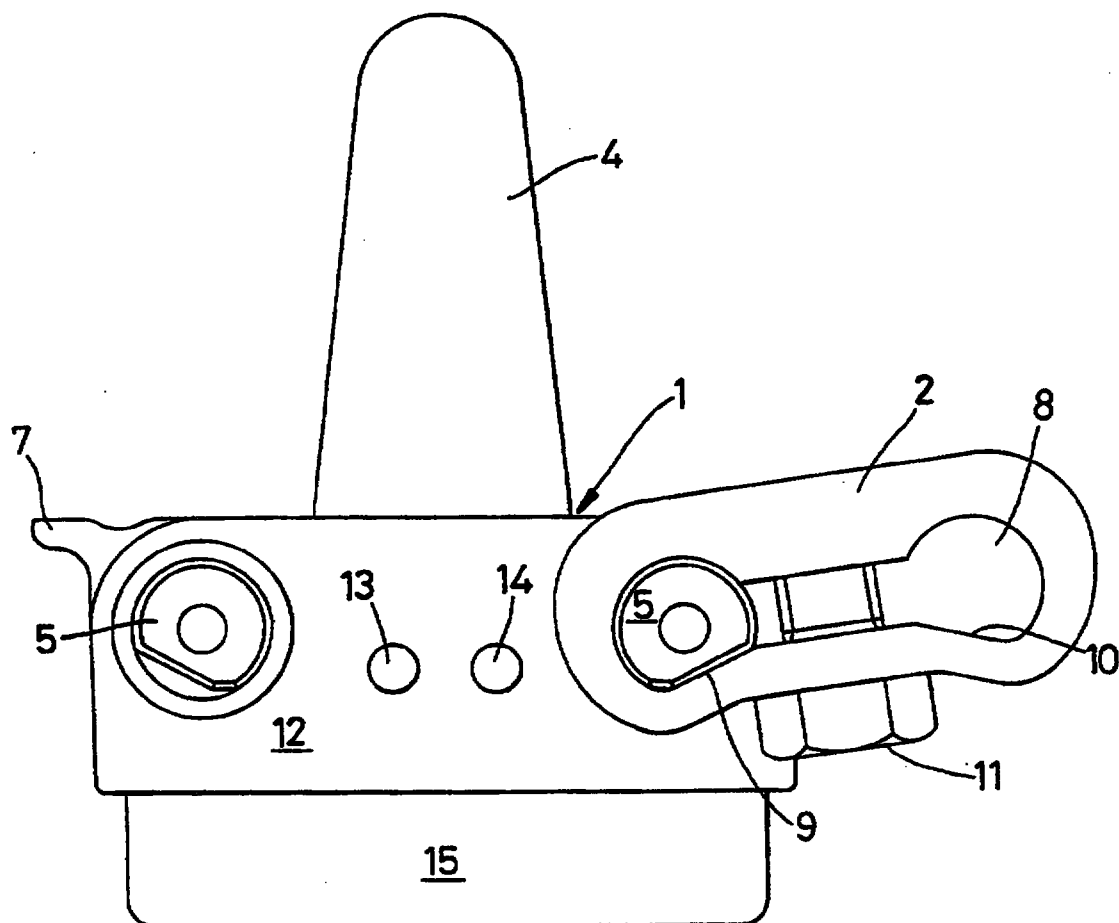


Fig. 2

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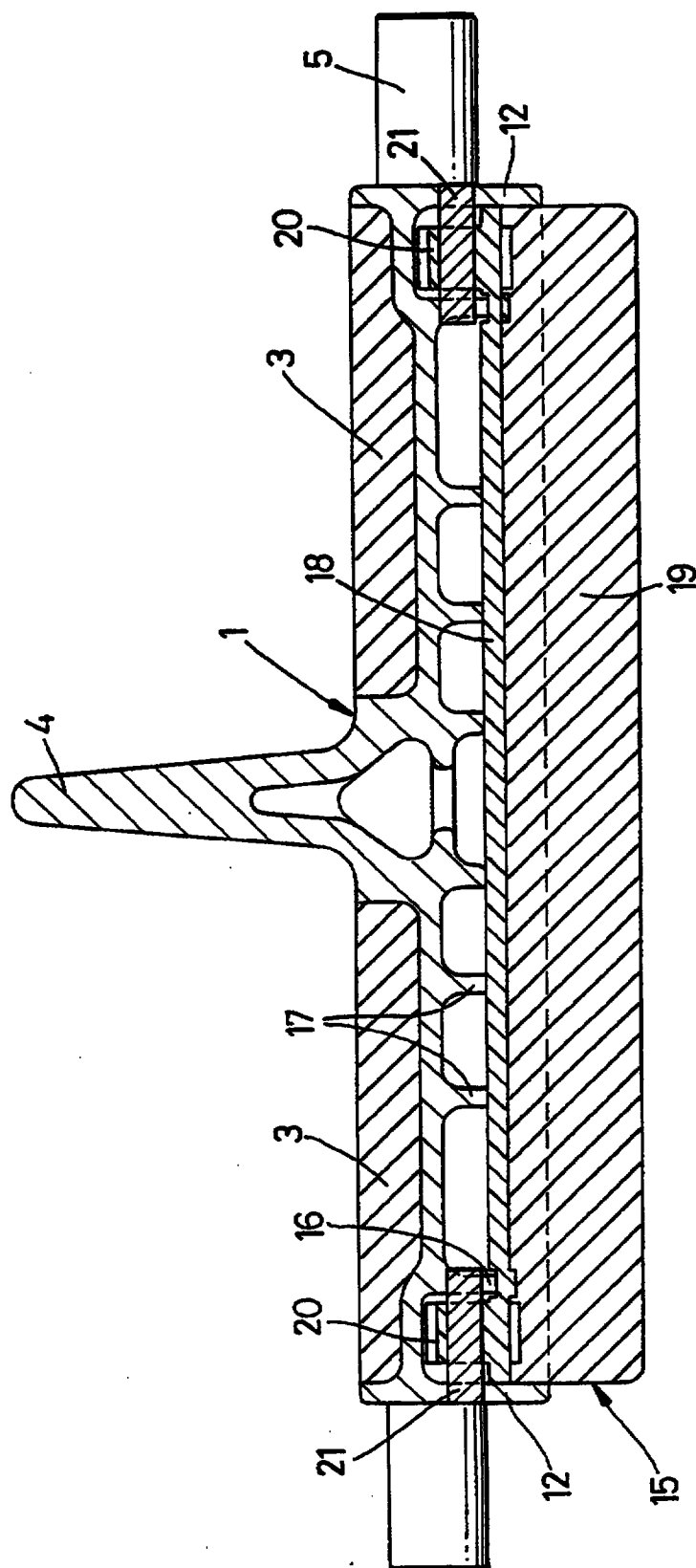


Fig. 3

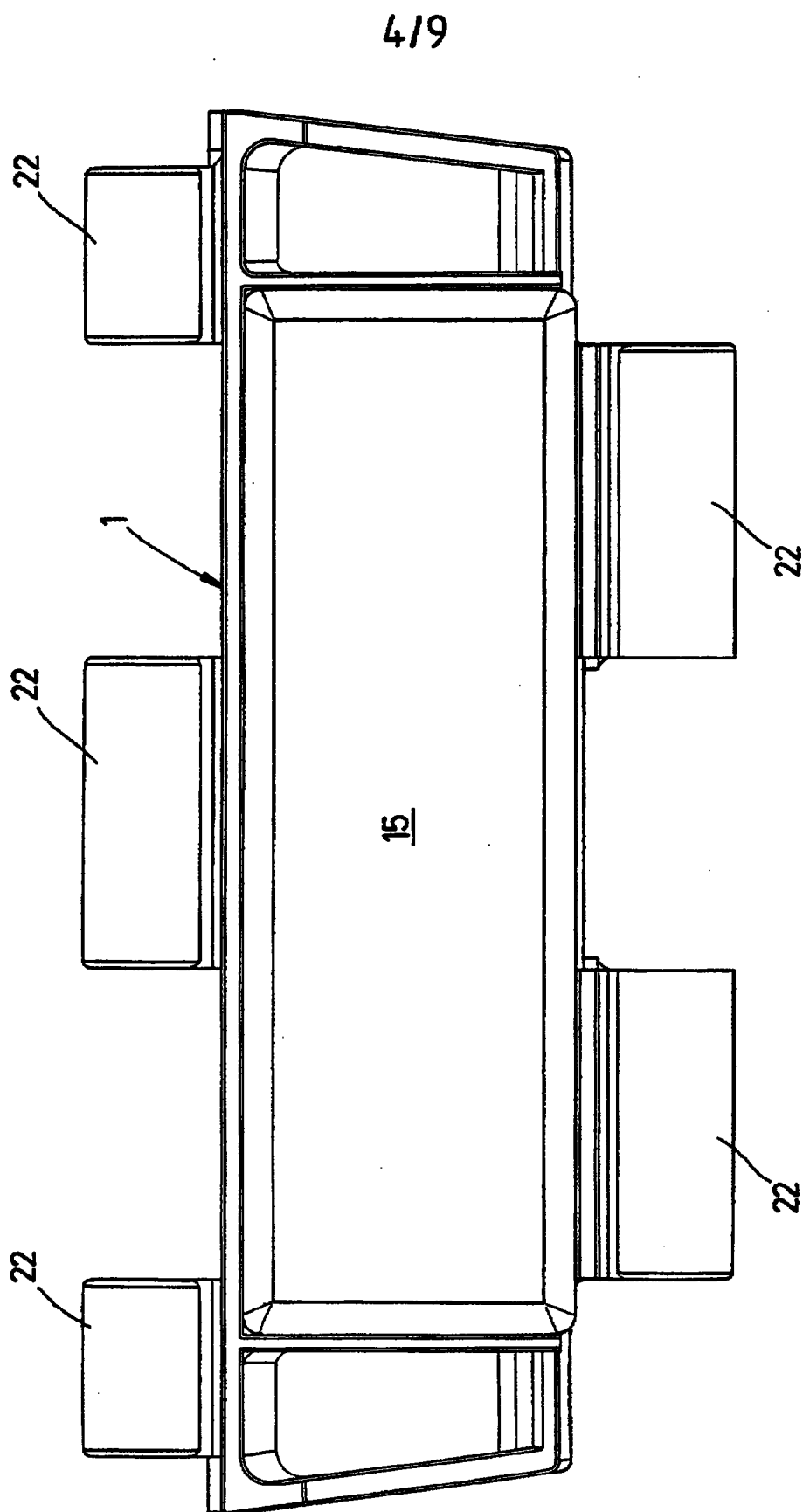


Fig. 4

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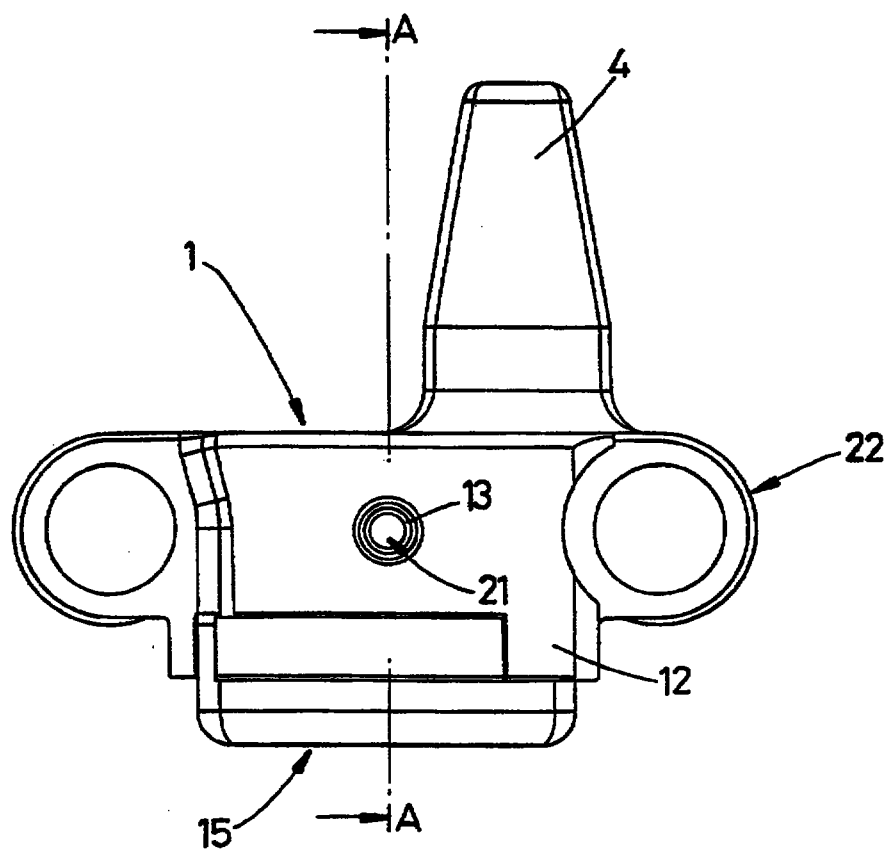


Fig. 5

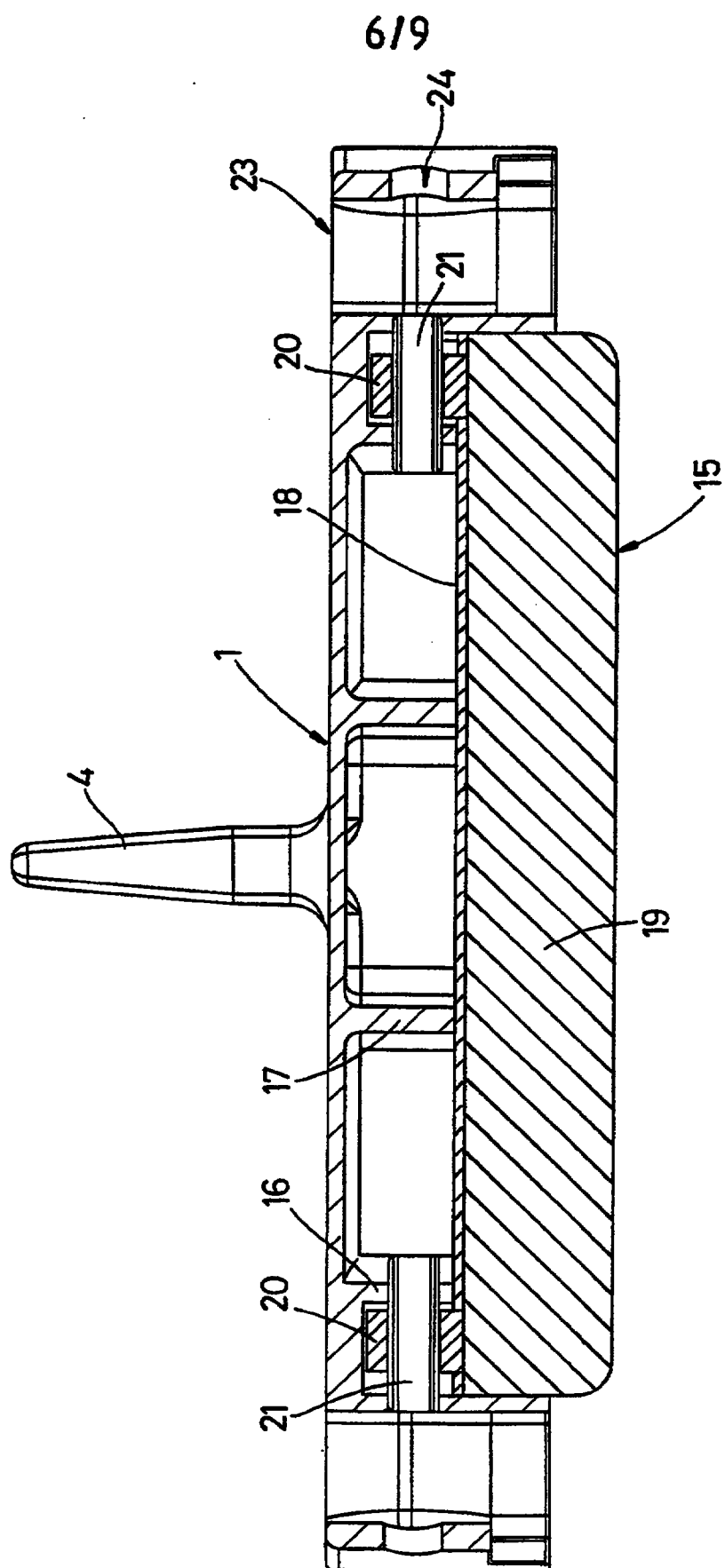


Fig. 6

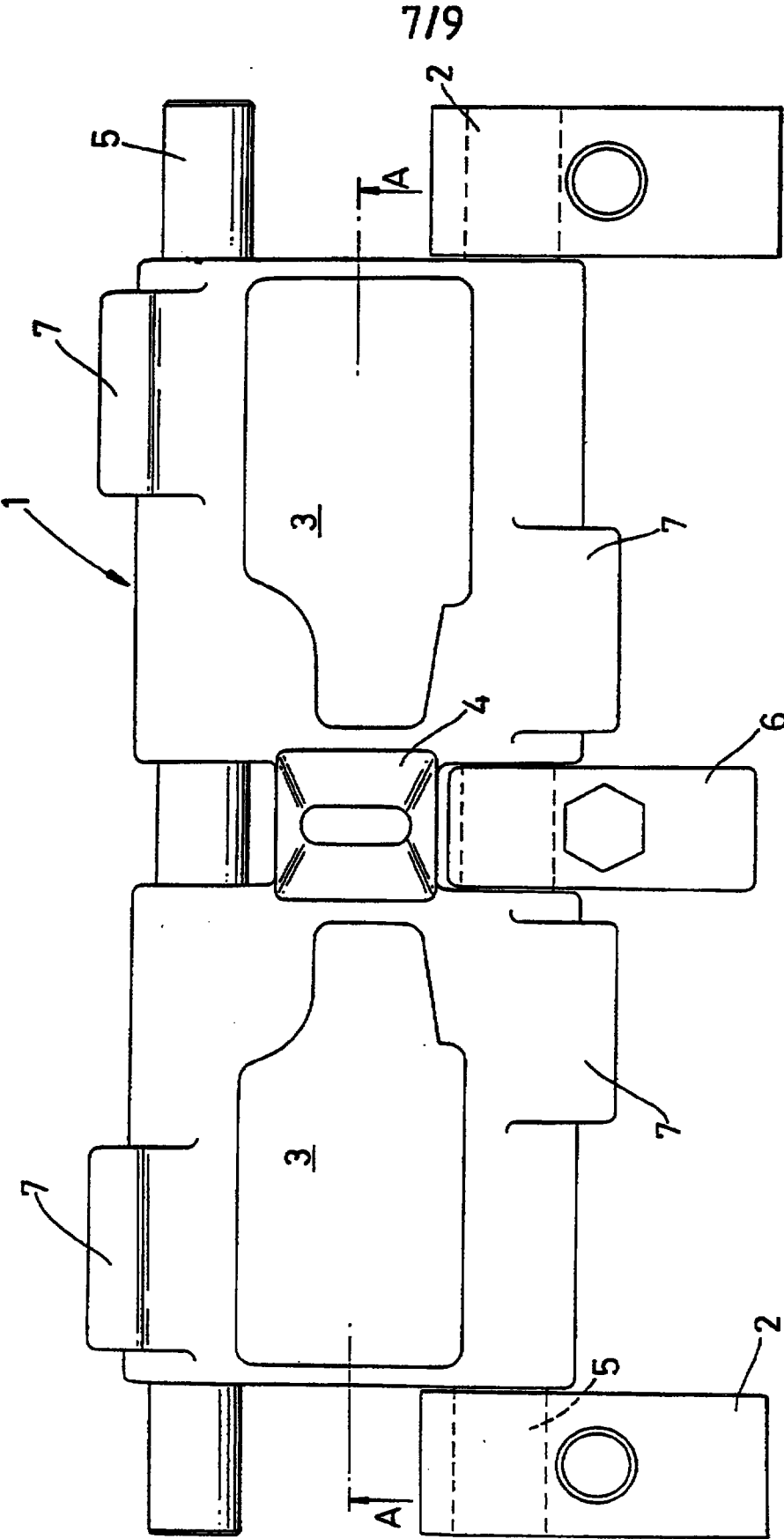


Fig. 7

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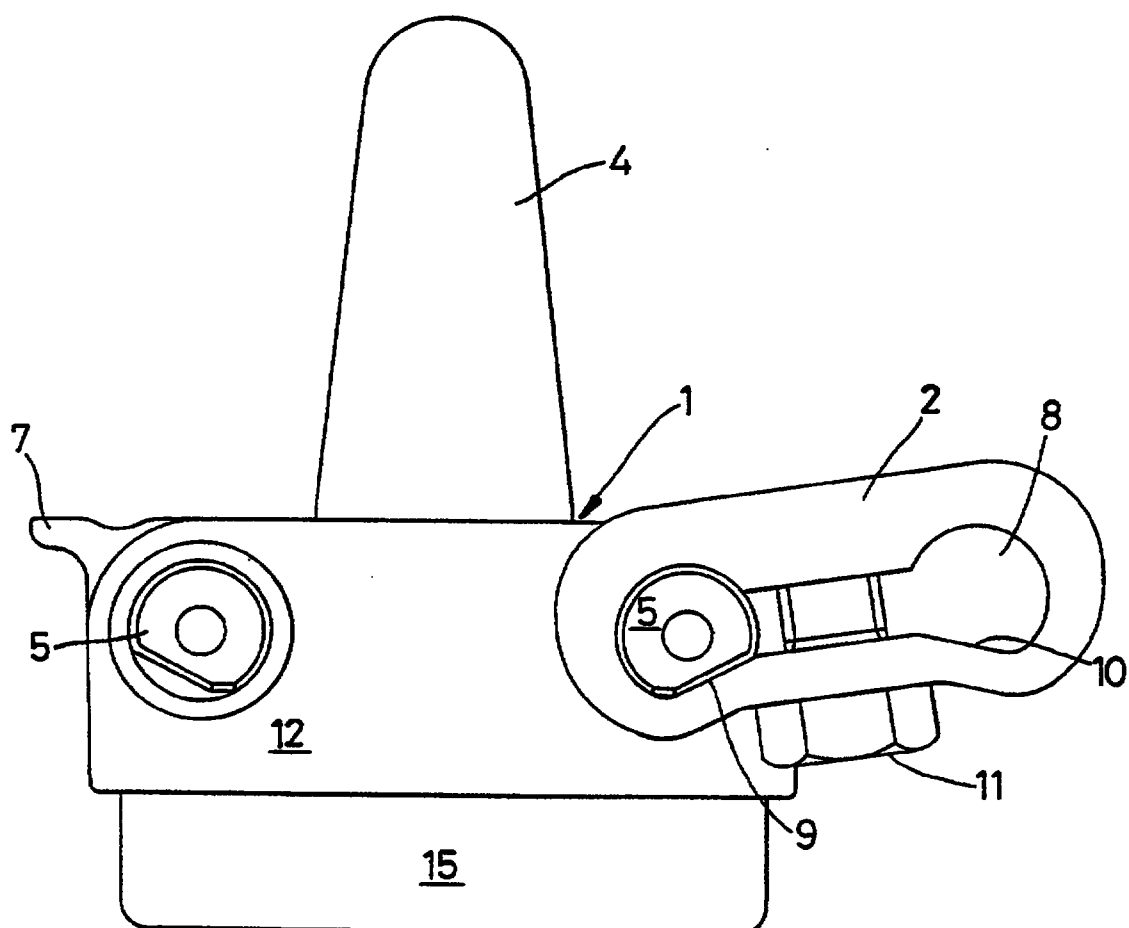


Fig. 8

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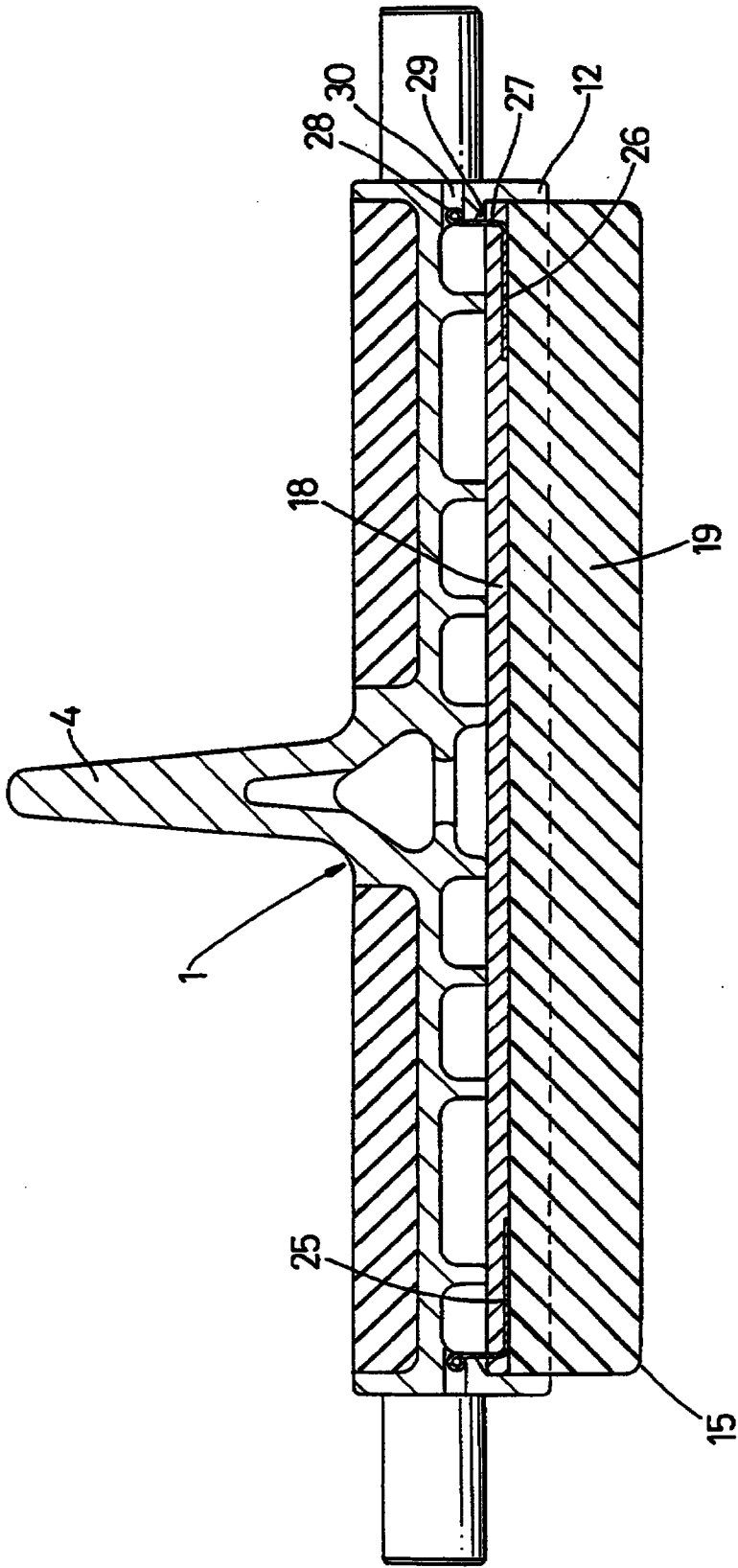


Fig. 9

CLAIMS

1. An articulated vehicle track unit comprising:
a link having a depending skirt and a depending web
5 with an aligned bore passing through the skirt and the web;
a pad having a backing plate upon which is formed a
barrel with a bore passing through the barrel;
the link and the pad being adapted to cooperate with
one another such that the bore in the barrel lines up with
10 the bores in the skirt and the web;
the unit further including a rollpin adapted to be
inserted into the bore in the skirt, through the bore in
the barrel and into the bore of the corresponding depending
web to secure the pad to the link;
15 whereby the pad and the link are arranged so that the
roll pin can pass through the aligned bores until it is
free of the bores so releasing the pad from the link.
2. A unit according to claim 1 in which the link is
20 provided on each side with such a depending skirt and
depending web and the pad is correspondingly provided with
at least two such barrels.
3. A unit according to claim 1 or claim 2 in which the
25 link is provided on each side with a plurality of such
aligned bores and the pad is correspondingly provided with
a plurality of such barrels.
4. A unit according to any preceding claim in which the
30 or each web is positioned inside its corresponding skirt.
5. A unit according to claim 4 in which a second
depending web is provided inside the or each bored
depending web.
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6. A unit according to claim 5 in which the gap between
the bored out depending web and the second depending web is
greater than the length of the rollpin.



* C L M S *

7. An articulated vehicle track unit comprising:
a link having a depending skirt with a detent;
a pad having a backing plate and a spring clip projecting from the backing plate;
5 the link and the pad being adapted to cooperate with one another such that when the pad is offered up to the link from below, the spring clip resiliently engages the detent: the skirt having a shoulder which biases the spring clip away from the detent as the pad and link are
10 brought into proximity, the head of the clip riding over the shoulder and engaging the detent as the pad and link mate with one another.
8. A unit according to claim 7 in which the spring clip
15 includes a head at the end remote from the pad.
9. A unit according to claim 8 in which the head of the clip projects outwardly from the clip.
- 20 10. A unit according to claim 8 or claim 9 in which the detent comprises a recess or opening in a depending skirt provided on the link.
- 25 11. A unit according to any one of claims 7 to 11 in which the link is provided with at least one such detent on either side and the pad is provided with a corresponding number of spring clips.
- 30 12. An articulated vehicle track unit substantially as described herein with reference to the accompanying drawings.

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AMENDED SHEET

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7. An articulated vehicle track unit comprising:
a link having a depending skirt with a detent;
a pad having a backing plate and a spring clip
projecting from the backing plate;
- 5 the link and the pad being adapted to cooperate with
one another such that when the pad is offered up to the
link from below, the spring clip resiliently engages the
detent: the skirt having a shoulder which biases the
spring clip away from the detent as the pad and link are
10 brought into proximity, the head of the clip riding over
the shoulder and engaging the detent as the pad and link
mate with one another.
8. A unit according to claim 7 in which the spring clip
15 includes a head at the end remote from the pad.
9. A unit according to claim 8 in which the head of the
clip projects outwardly from the clip.
- 20 10. A unit according to claim 8 or claim 9 in which the
detent comprises a recess or opening in a depending skirt
provided on the link.
- 25 11. A unit according to any one of claims 7 to 11 in which
the link is provided with at least one such detent on
either side and the pad is provided with a corresponding
number of spring clips.

REPLACEMENT SHEET

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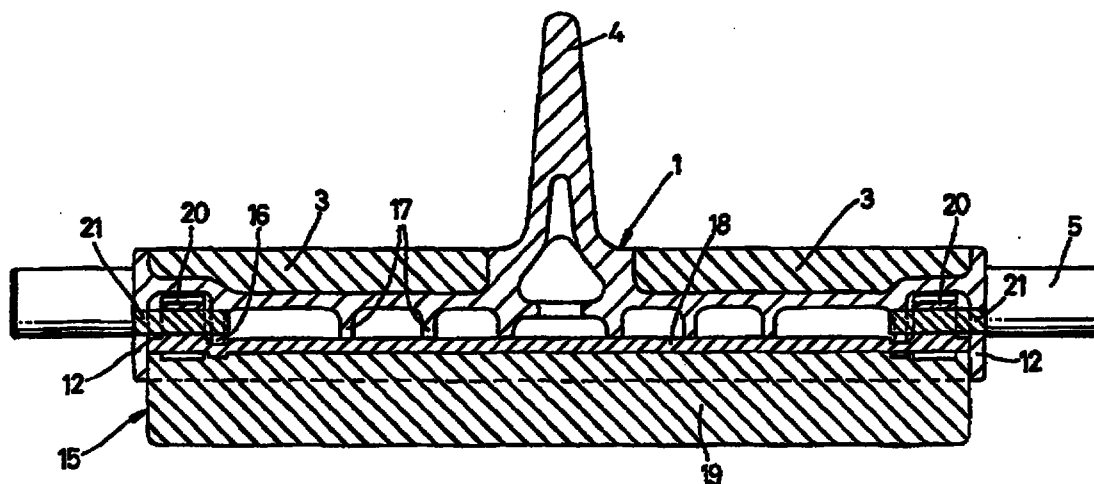
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B62D 55/275	A1	(11) International Publication Number: WO 97/07011 (43) International Publication Date: 27 February 1997 (27.02.97)
(21) International Application Number: PCT/GB96/01918 (22) International Filing Date: 7 August 1996 (07.08.96) (30) Priority Data: 9516941.3 18 August 1995 (18.08.95) GB (71) Applicant (for all designated States except US): WILLIAM COOK CAST PRODUCTS LIMITED [GB/GB]; Parkway Avenue, Sheffield, South Yorkshire S9 4UL (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): BAKER, Peter, Edward [GB/GB]; 15 Balmer Hill, Gainford, County Durham DL2 3EJ (GB). (74) Agents: WALSH, David, Patrick et al.; 117 The Headrow, Leeds, West Yorkshire LS1 5JX (GB).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>

(54) Title: **ARTICULATED VEHICLE TRACKS FOR ARMoured VEHICLES**



(57) Abstract

An articulated track is disclosed. Each unit of the track includes a link (1) and a road pad (15) and the invention provides simple methods of retaining the latter on the former whilst allowing easy release. In one embodiment, the pad (15) is retained by passing a rollpin (21) through aligned bores (13, 14) in the link (1) and the pad (15). The two are released by pushing the rollpin (21) further into the link until it comes free of the aligned apertures. In another embodiment, a spring clip (25) on the pad engages a detent (30) on the link when the pad is offered up to the link from below. The detent is preferably an aperture which allows insertion of a tool to free the clip from the link.