(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 524 018 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
20.04.2005 Bulletin 2005/16

(51) Int Cl.[7]: **A63H 19/18**

(21) Application number: **04105018.8**

(22) Date of filing: **13.10.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK

(30) Priority: **14.10.2003 IT MI20031980**

(71) Applicant: **LIMA S.P.A.**
25135 BRESCIA (IT)

(72) Inventor: **Infanti, Stefano**
25135, Brescia (IT)

(74) Representative: **Ripamonti, Enrico, Dr. Ing. et al**
Ing. A. Giambrocono & C. s.r.l.,
19/B, Via Rosolino Pilo
20129 Milano (IT)

(54) **Quick coupling device for carriages, trucks and locomotives of miniature electric trains**

(57) A quick coupling device for carriages, trucks and locomotives of miniature electric trains, comprising a first and a second component (1, 1A) connectable to a first and second carriage respectively, in which said first and second component present substantially horizontal pins (8, 8a) presenting grooves (9, 9a) cooperating with coupling means (16, 18) present in said components, said pins (8, 8a) being guided towards said coupling means, during the coupling operation, by apertures (11, 11a) also provided in said components.

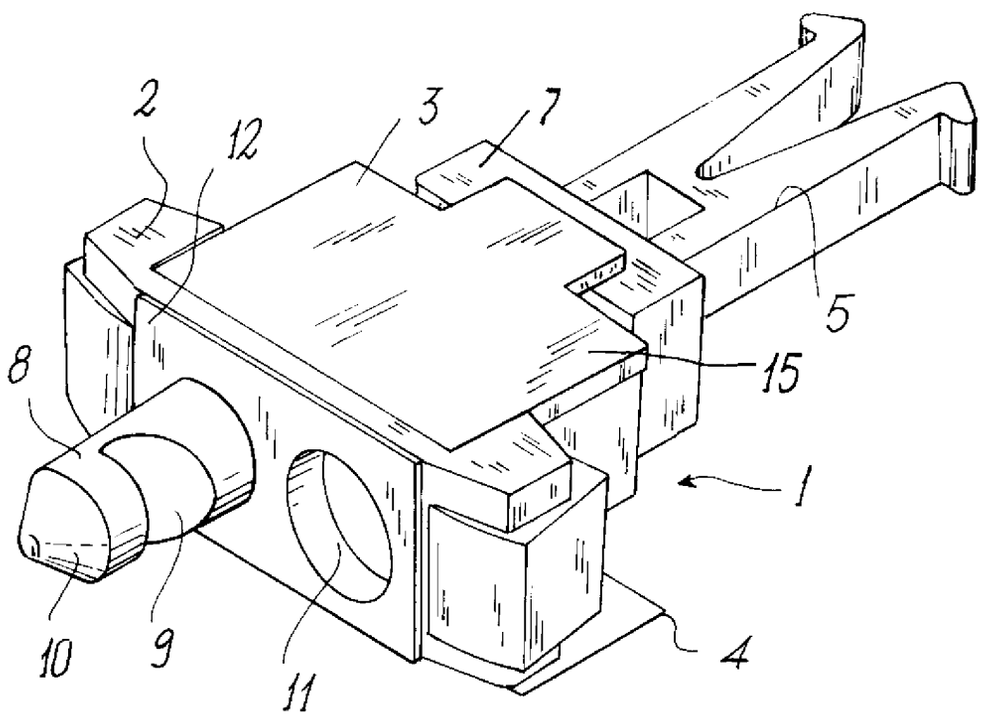

FIG. 2

EP 1 524 018 A1

Description

[0001] The present invention relates to a quick coupling device for carriages, trucks and locomotives of miniature electric trains.

[0002] Extremely accurate reproductions of miniature trains have been commercially available for some time. In this respect, railway model engineering tends increasingly to imitate and reproduce in ever increasing detail all the characteristics of actually existing railway models.

[0003] In the case of locomotives, carriages, and goods trucks in general, no characteristic is omitted, all being faithfully reproduced.

[0004] However the couplings between vehicles are not yet faithfully reproduced. Such couplings are used to connect the vehicles together, two mutually acting couplings then forming a coupler unit. Both the couplings are usually of the same shape, but if different, connection is only possible if they are correctly matched.

[0005] A common coupling type is the screw coupling, however this is not very suitable for use in model railways as it transmits only traction forces and can be coupled and uncoupled only by hand.

[0006] In model railways, couplings which transmit both traction forces and thrust forces are usually used.

[0007] Coupling usually takes place automatically by pushing the vehicles one against the other. Uncoupling is accomplished either manually or by a decoupler situated at determined points of the track. Uncoupling at any point of the installation at will is also possible if suitable mechanical or electromechanical devices are present on the vehicle.

[0008] The couplings can be provided with supplementary devices which predispose them for uncoupling by means of a decoupling device. The vehicles separate only by changing their running direction or by a shoving operation. These couplings are known as "couplings with pre-release".

[0009] Currently available couplings usually present a head with stem, a seat connected to a support and a drawbar; height and length adjustment devices are often present.

[0010] A particular type of coupling is the short coupling, which allows straight-line running with the buffers in contact. They allow the vehicle ends to withdraw when traversing a curve. Only those coupling types which form a rigid link when in the coupled position are suitable for short coupling.

[0011] Eye bracket couplings have a movable eye bracket and a fixed hook. The eye bracket is usually tiltable upwards and falls onto the hook of the other coupling. If both the couplings are provided with an eye bracket, the two slide one on the other. These couplings can also be formed with the hooks projecting beyond the front edge of the eye bracket, during coupling they positioning themselves one adjacent to the other. In the coupled position the eye brackets of this variant are not superposed.

[0012] Hook couplings have a movable hook and a fixed eye bracket. The hook is usually tiltable upwards and falls into the eye bracket of the other coupling. If both the couplings are provide with a hook, the two slide one adjacent to the other. These couplings can also possess an eye bracket that projects beyond the hook; during coupling, these eye brackets slide one on the other.

[0013] Jaw couplings are formed either with a fixed jaw or with a movable jaw, which engages the counter-jaw by pushing the vehicles one against the other. For automatic uncoupling the jaws are raised or opened by a suitable device on the track.

[0014] In addition, engaging couplings often present a male and a female part and are therefore not identical; hence the problem arises of having to mount them in pairs, and of not being able to change the coupling direction for example of a truck, without replacing the couplings themselves.

[0015] Currently available couplings are also of complex form with a large number of pieces, and are very costly given their intrinsic complexity.

[0016] An object of the present invention is to provide a quick coupling device for carriages, trucks and locomotives of miniature electric trains which is improved compared with the known art.

[0017] Another object of the present invention is to provide a quick coupling device for carriages, trucks and locomotives of miniature electric trains which is formed from identical pieces and does not present a male and a female part.

[0018] Another object of the present invention is to provide a quick coupli ng device for carriages, trucks and locomotives of miniature electric trains which is economical and consists of just a few simple pieces.

[0019] Another object of the present invention is to provide a quick coupling device for carriages, trucks and locomotives of miniature electric trains which can be coupled and uncoupled without manual operation, and hence in a totally automatic manner.

[0020] The technical aim, together with these and other objects are attained according to the present invention by a quick coupling device for carriages, trucks and locomotives of miniature electric trains in accordance with the technical teachings of the accompanying claims.

[0021] Advantageously the invention also presents a shape which is similar in appearance to the coupling devices present on real vehicles.

[0022] Further characteristics and advantages of the invention will be more apparent from the description of a preferred but non-exclusive embodiment of the quick coupling device for carriages, trucks and locomotives of miniature electric trains in accordance with the invention, illustrated by way of non-limiting example in the accompanying drawings, in which:

Figure 1 is an exploded view of the device of the

present invention;

Figure 2 is a perspective view of the device of Figure 1;

Figure 3 shows the operation of the device of Figure 1 when coupled to form a coupler unit, in one working condition;

Figure 4 shows the operation of the device of Figure 1 when coupled to form a coupler unit, in a different working condition;

Figure 5 shows the operation of the device of Figure 1 when coupled to form a coupler unit, in yet a different working condition;

Figure 6 is a schematic partial view of a detail of the device when coupled to form a coupler unit;

Figure 7 is a schematic partial view of a detail of the device when coupled to form a coupler unit, shown during its uncoupling; and

Figure 8 is a schematic view of two trucks coupled by the device of the present invention as they are about to be uncoupled.

[0023] With reference to the said figures, these show a first component of a quick coupling device for carriages, trucks and locomotives of miniature electric trains indicated overall by the reference numeral 1. They also show a second component of the coupler unit, substantially identical to the first and indicated by 1a, to be coupled with the first.

[0024] The components consist of three pieces, a base body 2, 2a, a plate 3, 3a and a counterweight 4, 4a which are identical. In the rear part of the base bodies 2, 2a a dovetail shaped region 6, 6a is provided to act as a height-adjustable connector-guide for engagement with snap connectors 5, 5a able to cooperate with conventional NEM pockets (not shown) present on carriages, trucks, locomotives and vehicles in general.

[0025] The base bodies present pins 8, 8a provided with grooves 9, 9a frontally presenting conical portions 10, 10a. Adjacent to the pins 8, 8a, the base bodies 2, 2a present apertures 11 11a, acting as a guide for the pins 8, 8a respectively during the coupling of the two components 1, 1a. As evident from Figure 3, during coupling the base bodies 1, 1a are disposed such that the faces 12, 12a face each other, and in particular such that the pin 8 faces the aperture 11a; hence the component 1 is in practice reversed relative to the component 1a. In the base bodies 1, 1a there are also provided vertical guide holes 13, 13a for appendices 14, 14a rigid with the plate 3, 3a to which there is fixed at 15, 15a an elastic blade 16, 16a presenting a hook-shaped protuberance 18, 18a which when the plate 3, 3a rests on the top 19 of the base body 2, 2a acts as a coupling means for the respective pin 8, 8a. In this condition the hook 18 penetrates into the groove 9a of the pin 8a, and simultaneously the hook 18a penetrates into the groove 9 of the pin 8; both the components are hence connected together.

[0026] With the plates 3, 3a resting on the base bodies 2, 2a, the appendices 14, 14a project lowerly therefrom and are secured to a counterweight 4, 4a. In addition to presenting holes 20, 20a securing the appendices 14, 14a, the counterweight 4, 4a also presents lead-ins 21, 21a arranged to cooperate with shims 22 for raising said counterweights and consequently the plate 3, 3a, in order to unhook the hooks 18, 18a from the grooves 9, 9a of the pins 8, 8a and hence enable coupling release.

[0027] When engaged the hooks and grooves present a clearance, as evident from Figures 3 to 5. This clearance is essential to enable the coupling to follow the movement of the carriages through a curve and under the various movement conditions.

[0028] With reference to Figure 3, assuming that the component 1a is connected to a locomotive of an electric train and the component 1 is connected to a truck, a braking situation is shown. Movement transmission takes place by contact between the surfaces 12 and 12a of the components. Hooks and grooves are in contact at the points indicated by P.

[0029] Figure 4 shows a condition occurring along a curve, specifically a right hand curve. Hooks and grooves are in contact at the points indicated by P.

[0030] Figure 5 represents a condition in which the locomotive is pulling in a straight line. Hooks and grooves are in contact at the points C.

[0031] These possible conditions are allowed by the horizontal clearance provided between hooks and grooves, substantially deriving from the dimensioning of the pins 8, 8a and blades 16, 16a, ensuring that the pins 8, 8a are able to slide within the apertures 11, 11a to a small extent when the coupling is engaged, to facilitate relative angular movement between the two components 2, 2a.

[0032] In addition to the horizontal clearance there is also a more limited vertical clearance present, enabling the pins to undergo limited vertical movement within the apertures 11, 11a. This vertical movement compensates possible level differences, and supports the height adjustment already provided by the dovetail engagement.

[0033] A preferred embodiment has been described, however others may be devised using the same inventive concept.

Claims

1. A quick coupling device for carriages, trucks and locomotives of miniature electric trains, comprising a first and a second component (1, 1A) connectable to a first and second carriage respectively, **characterised in that** said first and second component present substantially horizontal pins (8, 8a) presenting grooves (9, 9a) cooperating with coupling means (16, 18) present in said components, said pins (8, 8a) being guided towards said coupling means, during the coupling operation, by apertures (11, 11a) also provided in said components.

2. A device as claimed in claim 1, **characterised in that** the components (1, 1a) consist of identical pieces, said first and second component being mounted on said carriage, one reversed with respect to the other, to enable them to be coupled together.

3. A device as claimed in claim 1, **characterised in that** said first and second component are connectable to the respective carriages by snap connectors (5, 5a).

4. A device as claimed in claim 3, **characterised in that** said connectors are rigidly securable to said components by dovetail insertion pieces (6, 6a).

5. A device as claimed in claim 1, **characterised in that** each component consists of a base body (2, 2a) presenting vertical guide holes (13, 13a) for a raisable plate (3, 3a) retained in a lowered position by a counterweight (4, 4a).

6. A device as claimed in claim 1, **characterised in that** the coupling means comprise a protuberance (18, 18a) provided on an elastic blade (16, 16a) rigid with the plate (3, 3a), which is raisable to disengage said pins (8, 8a) from said coupling means.

7. A device as claimed in claim 4, **characterised in that** said raisable plate (3, 3a) is guided in its raising by appendices (14, 14a) rigid with it and slidable in vertical holes (13, 13a).

8. A device as claimed in claim 6, **characterised in that** said appendices (14, 14a) are secured to the counterweight (4, 4a), which is arranged to maintain the raisable plate (3, 3a) in the lowered position.

9. A device as claimed in claim 7, **characterised in that** said counterweight presents lead-ins (21, 21a) cooperating with shims (22), said lead-ins facilitating the sliding of said counterweight on said shims and the relative consequent raising of the counterweight, with simultaneous raising of the plate, to permit quick uncoupling of the device.

10. A device as claimed in claim 1, **characterised in that** said pins (8, 8a) present a conical portion (10, 10a) arranged to facilitate their entry into said apertures and their snap locking with the fixing means.

11. A device as claimed in claim 1, **characterised in that** said coupling means and said grooves present a horizontal clearance, which enables the pins to undergo limited sliding movement within the apertures, to facilitate relative angular movement between the two components.

12. A device as claimed in claim 1, **characterised in that** said coupling means and said grooves present a vertical clearance, which enables the pins to undergo limited vertical movement within the apertures.

13. A device as claimed in claim 1, **characterised in that** said components (1, 1a) present different shapes and dimensions. but can nevertheless be coupled together by pins and coupling means.

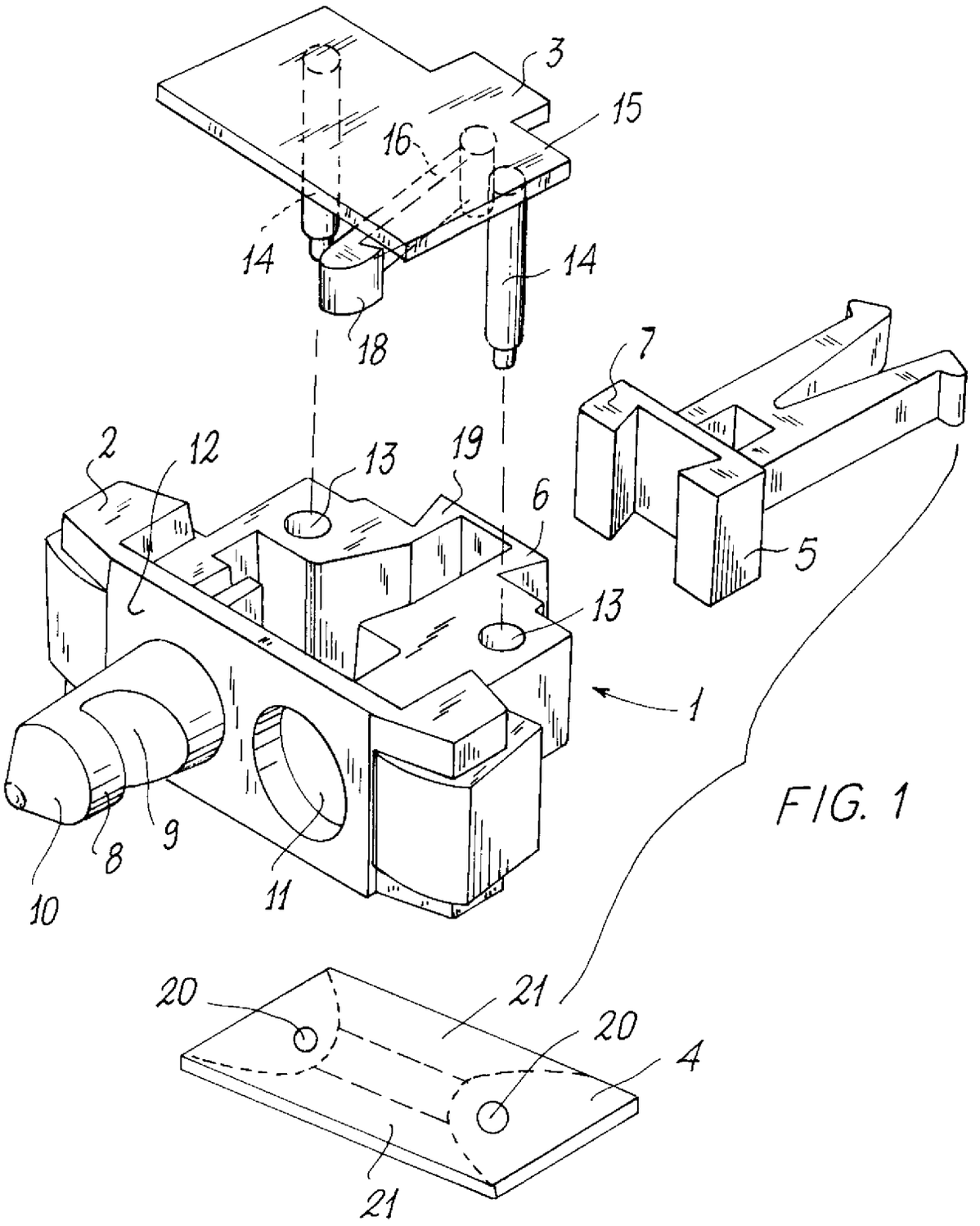

FIG. 1

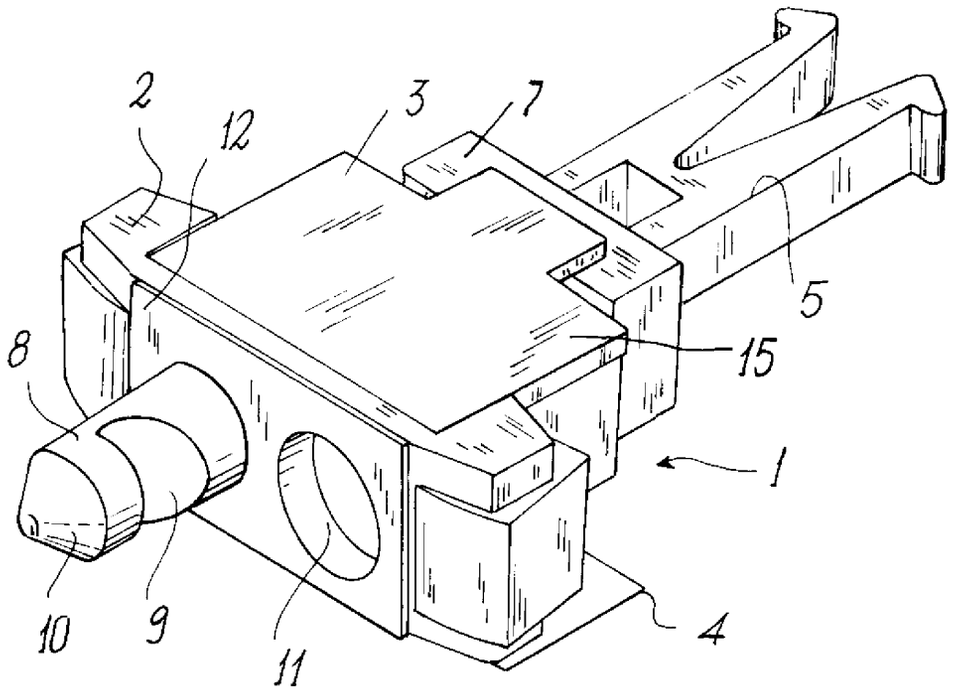
2
12
3
7
5
8
15
1
10
9
11
4

FIG. 2

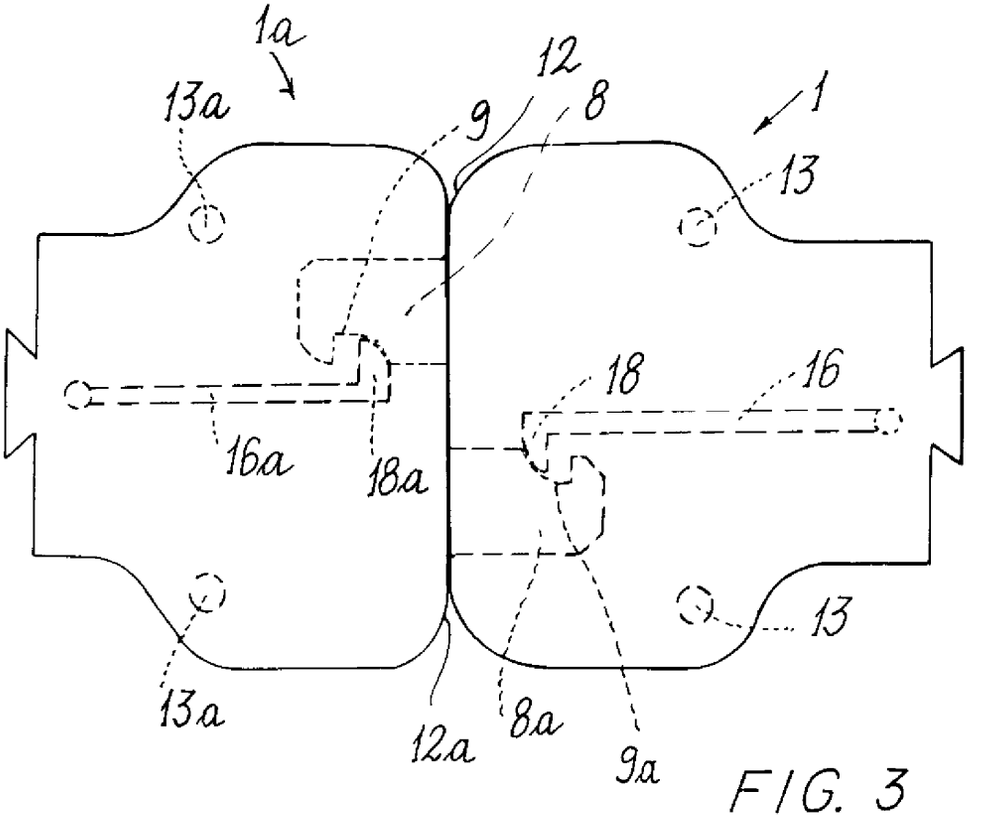
1a
12
13a
9
8
1
13
18
16
16a
18a
13
13a
12a
8a
9a

FIG. 3

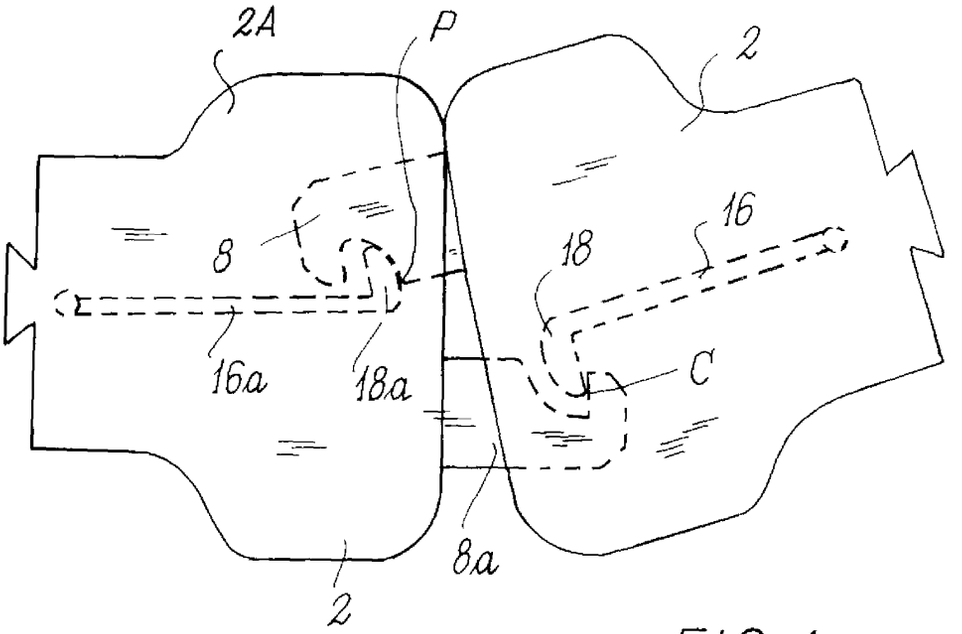

FIG. 4

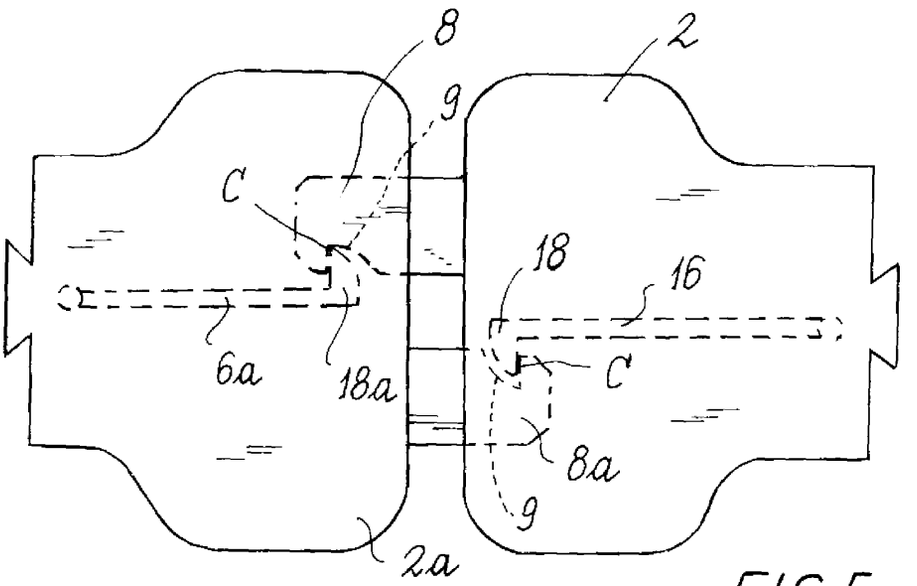

FIG. 5

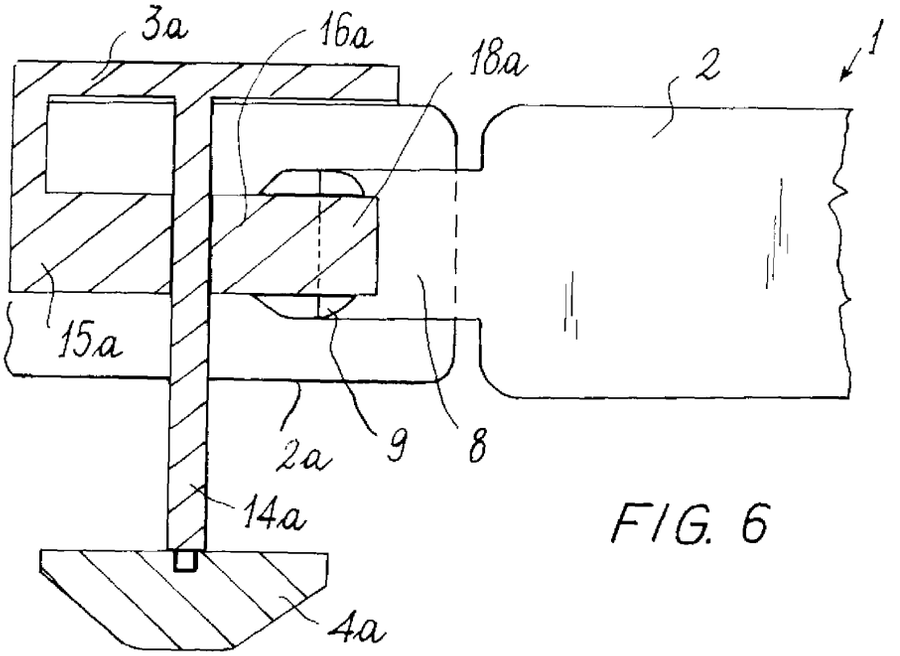

FIG. 6

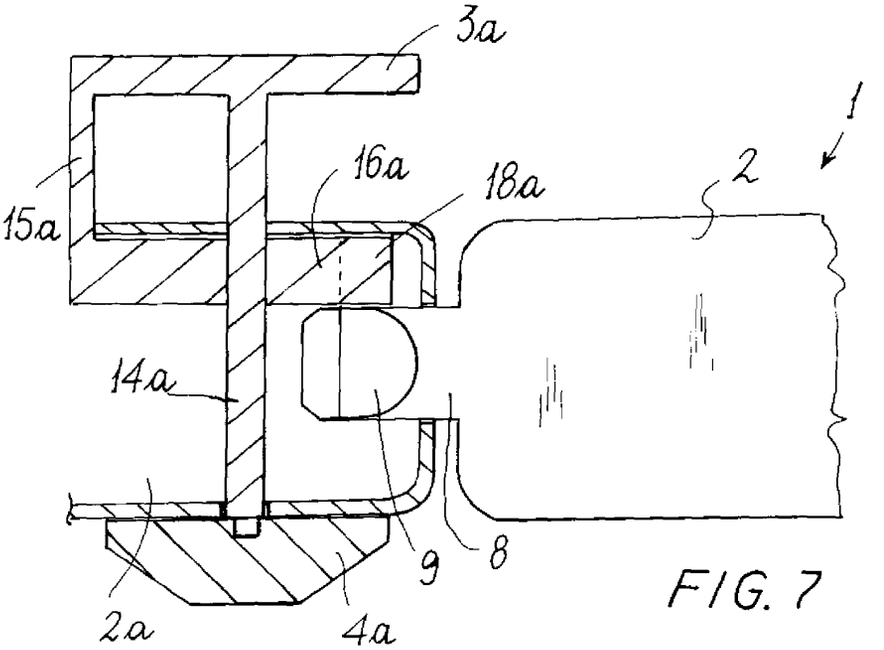

FIG. 7

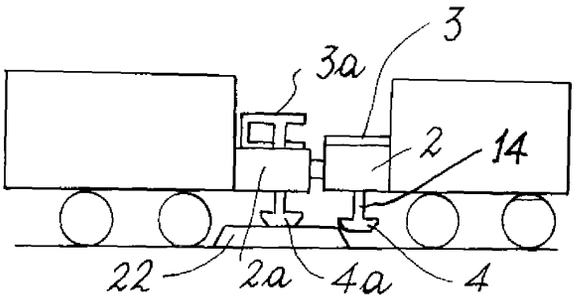

FIG. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 10 5018

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.7)
X	DE 41 21 099 A1 (DAMHOFER, KARL HEINZ; RAUCH, WALTER, 7982 BAIENFURT, DE) 7 January 1993 (1993-01-07) * column 3, line 29 - column 5, line 5; figures *	1-3,11, 12	A63H19/18
X	US 4 893 716 A (DILLER ET AL) 16 January 1990 (1990-01-16) * column 2, line 39 - column 3, line 65; figures *	1,2,11, 12	
A	DE 35 22 735 A1 (ROCO MODELLSPIELWAREN GMBH & CO KG; FA. ING. HEINZ ROESSLER, SALZBURG,) 8 January 1987 (1987-01-08) * column 4, line 13 - line 37 * * column 5, line 20 - line 45; figures *	1-3,11, 12	
A	DE 37 44 494 C1 (GEBR. MAERKLIN & CIE GMBH, 7320 GOEPPINGEN, DE) 26 January 1989 (1989-01-26) * figures *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A63H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 February 2005	Lucas, P

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 10 5018

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4121099 A1	07-01-1993	NONE	
US 4893716 A	16-01-1990	DE 3728240 C1	23-03-1989
		AT 68100 T	15-10-1991
		DE 3865406 D1	14-11-1991
		EP 0306666 A1	15-03-1989
DE 3522735 A1	08-01-1987	NONE	
DE 3744494 C1	26-01-1989	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82