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(54) **INLINE SKATE HAVING A FRAME AND METHOD FOR THE PRODUCTION THEREOF**

EINSPURIGER ROLLSCHUH MIT EINEM CHASSIS UND SEIN HERSTELLUNGSVERFAHREN  
PATIN A ROULETTES POSSEDANT UN SEUL ALIGNEMENT DE ROULETTES ET UN CHASSIS,  
SON PROCEDE DE FABRICATION

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**EP-A- 0 853 963** **WO-A-97/37731**  
**US-A- 5 388 846** **US-A- 5 829 758**

## Description

**[0001]** The present invention relates to a frame for an in-line roller skate according to the preamble of claim 1, and also to a method for manufacturing such frame according to the preamble of claim 8. Such a frame and such a method are known from US-A-5 388 846.

**[0002]** This prior art document discloses the manufacture of a frame for an in-line roller skate starting from an extruded aluminium section including two parallel solid side walls and three transverse members interconnecting the side walls. The top transverse member is intended to form the support for the heel of the shoe, the middle transverse member is meant to form the support for the toe of the shoe, and the bottom transverse member forms bridges connecting the side walls at locations between holes formed in the side walls for accommodating the wheels. For the manufacture of the final frame, which is preferably made as light and as rigid as possible, a large part of each of the transverse members is removed, for example by milling or other operations.

**[0003]** In the case of the known in-line roller skate the stiffness of the frame is not yet ideal. Furthermore, a very large amount of the material of the transverse members must be removed in order to obtain the final frame. This makes the production costs undesirably high.

**[0004]** The present invention aims to solve the above-mentioned problem. A further object of the present invention is to provide an in-line roller skate that is light and rigid, in particular that has a considerable torsional and/or bending stiffness. In addition, the invention aims to provide a suitable production method.

**[0005]** The present invention provides a frame for an in-line roller skate according to the preamble of claim 1, which is characterized in that each side rail of the frame has one or more internal chambers, formed during the extrusion of the section and extending substantially along the length of the side rail.

**[0006]** The invention therefore proposes not making the side rails with a solid cross section, as in the case of the prior art frame disclosed in US-A-5 388 846, but with internal chambers, so that a double walled or multiple-walled construction of each side rail is obtained. During the extrusion of the section, preferably from light metal, by means of a suitable extrusion die, one or more of such axial chambers can be formed in a relatively simple manner into a side rail.

**[0007]** In case of a single internal chamber, each side rail preferably forms a closed peripheral wall around the chamber along the entire length of that chamber. Alternatively, in case of a plurality of internal chambers, each side wall may form a closed peripheral wall along the entire length of the chamber around at least one of the internal chambers. The side rail then comprises, as it were, a tube extending along the length thereof and free from openings in the periphery. Such a tube has a great stiffness and is light.

**[0008]** In a possible embodiment, each side rail is provided with one or more holes in a bottom edge strip thereof, for wheel shafts belonging to the wheels, the side rail being of a solid construction in the region of the bottom edge strip.

**[0009]** In an advantageous embodiment, the side rails are connected only by transverse elements obtained by working a top and a bottom transverse member formed between the side rails during the extrusion. In this case the top transverse member is then preferably subjected to a finishing operation, in order to form the heel support for the shoe, and the bottom transverse member is subjected to a finishing operation, in order to form the support for the toe of the shoe. The presence of one or more chambers extending in the longitudinal direction in each side rail means that the stiffness thereof increases to such an extent that, compared with the known in-line roller skate mentioned earlier, it is possible to omit a third transverse member during the extrusion. This produces a considerable saving in the finishing operation of the extruded section.

**[0010]** The present invention also provides an in-line roller skate including a frame of the type defined above, and a method for manufacturing such a frame.

**[0011]** The invention will be explained in greater detail below with reference to the drawing, in which:

Fig. 1 shows a view in perspective of a frame for an in-line roller skate according to the invention;  
Fig. 2 shows the frame of Figure 1 in front view;  
Fig. 3 shows the frame of Figure 1 in side view; and  
Fig. 4 shows the frame of Figure 1 in top view.

**[0012]** Figures 1-4 show a frame 1 of an in-line roller skate, which is not shown in any further detail. The frame 1 is equipped for fixing wheels - in this example five - in a line one after the other. The roller skate further comprises a shoe (not shown), the frame 1 being mounted in the longitudinal direction under the shoe, possibly by means of a hinged connection.

**[0013]** The frame 1 is manufactured by first extruding an elongated section, for example made of aluminium, an aluminium alloy or another suitable material.

**[0014]** The basic shape of the extruded section can be seen in Figure 2. The section has two substantially parallel side rails 3, 4 situated at a distance from each other, and also a top transverse member 5 and a bottom transverse member 6. The side rails 3, 4 project under the bottom transverse member 6.

**[0015]** The extruded section is subjected to one or more material-removing finishing operations, in order to obtain the frame 1 shown in Figures 1-4. In these operations a support 7 for the heel of the shoe is made from the top transverse member 5, the part of the bottom transverse member 6 situated below it forming an additional transverse member 8 in said heel support 7. In addition, a support 9 for the toe of the shoe is formed from the bottom transverse member 6.

**[0016]** In particular in Figure 2, it can be seen clearly that the side rails 3, 4 are not made with a solid cross section, but are each provided with an internal chamber 10, 11 extending substantially along the entire length of the side rail 3, 4. The chambers 10, 11 form a cavity in the side rail with a greater height than the width of the cavity. The chambers 10, 11 provide, as it were, a double-walled construction of the side rails 3, 4.

**[0017]** For the stiffness of the frame 1, in particular the torsional stiffness, it is very advantageous for each side rail 3, 4 to form a closed peripheral wall in that chamber 10, 11 along the entire length thereof. A tubular part with closed peripheral wall that has great stiffness and is low in weight can thus be seen in each side rail 3, 4.

**[0018]** Apart from the axial chambers 10, 11, several transverse openings, for example openings 13, 14, are also formed in the side rails 3, 4, at the position of the heel support and the toe support. Said transverse openings 13, 14 are not in communication with the chambers 10, 11, in order to ensure in this way that the peripheral wall around said chambers 10, 11 is left intact.

**[0019]** Each side rail 3, 4 is further provided with one or more holes 17, 18 in a bottom edge strip 15, 16 thereof, for wheel shafts belonging to the wheels. The side rails 3, 4 are made of a solid construction in the region of the appropriate bottom edge strip 15, 16, so that a stable base is provided for fixing the wheel shafts thereon.

**[0020]** In a variant, one or both axial ends of the chambers 10, 11 are sealed off. The seals can be loose stops that prevent dirt and the like from entering the chambers. On the other hand, ends of the chambers can also be sealed off by a stop immovably connected to the side rail 3, 4, for example, a welded stop, so that the shut-off stop contributes to the stability of the side rail 3, 4.

**[0021]** It will be clear that, instead of a single chamber 10, 11 in each side rail 3, 4, several chambers can also be formed, for example, several chambers one above the other, separated by transverse walls.

**[0022]** Owing to the great stiffness of the side rails 3, 4, it is in principle not necessary to go on to fit transverse connections between the side rails at a level below the toe support, which considerably reduces production costs compared with the known frames, which are made from an extruded (metal) section. Of course, the idea of the invention can also be applied in the case of frames with three tiers of transverse members between the side rails or a transverse connection designed in a totally different way between the side rails.

### Claims

1. Frame (1) for an in-line roller skate, which frame comprises an elongated extruded section with two substantially parallel side rails (3, 4), and one or more transverse members between the side rails, which frame has a top side that is equipped for the

fitting of a shoe, the side rails (3, 4) being equipped to fix several wheels in a line one after the other between the side rails, **characterized in that** each side rail (3, 4) of the frame has one or more internal chambers (10, 11) formed during the extrusion of the section and extending substantially along the length of the side rail.

2. Frame (1) for an in-line roller skate according to claim 1, **characterized in that** each side rail (3, 4) has a single internal chamber (10, 11) and forms a closed peripheral wall around the chamber (10, 11) along the entire length of that chamber (10, 11).

3. Frame (1) for an in-line roller skate according to claim 1, **characterized in that** each side rail (3, 4) has a plurality of internal chambers, and forms a closed peripheral wall along the entire length of the chamber around at least one of the internal chambers.

4. Frame (1) for an in-line roller skate according to any one of the preceding claims, **characterized in that** each side rail (3, 4) is provided with one or more holes (17, 18) in a bottom edge strip (15, 16) thereof, for wheel shafts belonging to the wheels, and **in that** the side rail is made of a solid construction in the region of the bottom edge strip.

5. Frame (1) for an in-line roller skate according to any one of the preceding claims, **characterized in that** the side rails (3, 4) are connected only by transverse elements (7, 8, 9) obtained by working a top and a bottom transverse member (5, 6) formed between the side rails (3, 4) during extrusion.

6. Frame (1) for an in-line roller skate according to claim 5, **characterized in that** the top transverse element (7) forms a heel support for the shoe and one (9) of the bottom transverse elements (8, 9) forms a toe support for the shoe.

7. In-line roller skate provided with several wheels in a line one after the other, which roller skate has a shoe and a frame (1) according to any one of the preceding claims for fixing of the wheels, the extruded section of the frame (1) extending in the longitudinal direction on the bottom side of the shoe.

8. Method for manufacturing a frame (1) for fixing the wheels of an in-line roller skate having several wheels, in which method an elongated section is extruded, which section has two parallel side rails (3, 4) and one or more transverse members (5, 6), which connect the side rails to each other, which section is subsequently subjected to one or more machining finishing operations, **characterized in that** during the extrusion of the metal section one

or more internal chambers (10, 11) extending along the length of the metal section are formed in each side rail (3, 4).

9. Method according to claim 8, **characterized in that** during the machining finishing operation of the extruded metal section the peripheral wall formed by the metal of the side rail (3, 4) remains closed around at least one of the internal chambers (10, 11) in each side rail.

10. Method according to claim 8 or 9, **characterized in that** during the extrusion of the metal section a bottom edge strip (15, 16) on each side rail is made of a solid construction, in which edge strip the holes for the wheel shafts of the wheels are subsequently fitted.

11. Method according to any one of claims 8 to 10, **characterized in that** during the extrusion only a top and a bottom transverse member (5, 6) are formed, and **in that** during the machining finishing operation the top transverse member (5) is formed into a heel support (7) for a shoe of the in-line roller skate, and the bottom transverse member (6) is formed into a toe support (9) for the shoe.

#### Patentansprüche

1. Rahmen (1) für einen einspurigen Rollschuh, wobei der Rahmen einen länglichen extrudierten Abschnitt mit zwei im wesentlichen parallelen Seitenschiene (3, 4) sowie ein oder mehrere Querelemente zwischen den Seitenschiene umfasst, wobei der Rahmen eine obere Seite aufweist, die zum Montieren eines Schuhs ausgerüstet ist, wobei die Seitenschiene (3, 4) ausgerüstet sind zum Befestigen mehrerer Räder in einer Spur eines nach dem anderen zwischen den Seitenschiene, **dadurch gekennzeichnet, dass** jede Seitenschiene (3, 4) des Rahmens eine oder mehrere innere Kammer(n) (10, 11) aufweist, die während der Extrusion des Abschnitts gebildet wird (werden) und sich im Wesentlichen entlang der Länge der Seitenschiene erstreckt (erstrecken).

2. Rahmen (1) für einen einspurigen Rollschuh gemäß Anspruch 1, **dadurch gekennzeichnet, dass** jede Seitenschiene (3, 4) eine einzelne innere Kammer (10, 11) aufweist und entlang der Gesamtlänge dieser Kammer (10, 11) eine geschlossene Außenwand um die Kammer (10, 11) herum bildet.

3. Rahmen (1) für einen einspurigen Rollschuh gemäß Anspruch 1, **dadurch gekennzeichnet, dass** jede Seitenschiene (3, 4) eine Vielzahl von inneren Kammern aufweist und entlang der Gesamtlänge der

Kammer um mindestens eine der inneren Kammern herum eine geschlossene Außenwand bildet.

4. Rahmen (1) für einen einspurigen Rollschuh gemäß irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** jede Seitenschiene (3, 4) mit einem oder mehreren Loch (Löchern) (17, 18) in einem unteren Kantenstreifen (15, 16) davon versehen ist, für zu den Rädern gehörenden Radschäfte, und dass die Seitenschiene im Bereich des unteren Kantenstreifens aus einer Vollkonstruktion gemacht ist.

5. Rahmen (1) für einen einspurigen Rollschuh gemäß irgendeinem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Seitenschiene (3, 4) nur durch Querelemente (7, 8, 9) verbunden sind, die während der Extrusion durch Bearbeiten eines oberen und eines unteren Querelements (5, 6), die zwischen den Seitenschiene (3, 4) gebildet sind, erhalten wurden.

6. Rahmen (1) für einen einspurigen Rollschuh gemäß Anspruch 5, **dadurch gekennzeichnet, dass** das obere Querelement (7) eine Absatzstütze für den Schuh bildet und eines (9) der unteren Querelemente (8, 9) eine Zehenstütze für den Schuh bildet.

7. Einspuriger Rollschuh, der, eins nach dem anderen, mit mehreren Rädern in einer Spur ausgestattet ist, wobei der Rollschuh einen Schuh sowie einen Rahmen (1) gemäß irgendeinem der vorangehenden Ansprüche zum Befestigen der Räder aufweist, wobei der extrudierte Abschnitt des Rahmens (1) sich in der Längsrichtung auf der unteren Seite des Schuhs erstreckt.

8. Verfahren zum Herstellen eines Rahmens (1) zum Befestigen der Räder eines mehrere Räder aufweisenden, einspurigen Rollschuhs, wobei im Verfahren ein länglicher Abschnitt extrudiert wird, wobei der Abschnitt zwei parallele Seitenschiene (3, 4) sowie ein oder mehrere Querelement(e) (5, 6) aufweist, das (die) die Seitenschiene miteinander verbindet (verbinden), wobei der Abschnitt anschließend einem oder mehreren abschließenden Bearbeitungsoperationen unterworfen wird, **dadurch gekennzeichnet, dass** während der Extrusion des Metallabschnitts eine oder mehrere innere Kammer(n) (10, 11), die sich entlang der Länge des Metallabschnitts erstrecken, in jeder Seitenschiene (3, 4) gebildet wird (werden).

9. Verfahren gemäß Anspruch 8, **dadurch gekennzeichnet, dass** während der abschließenden Bearbeitungsoperationen der extrudierte Metallabschnitt die durch das Metall der Seitenschiene (3, 4) gebildete äußere Wand in jeder Seitenschiene

um mindestens eine der inneren Kammern (10, 11) geschlossen bleibt.

10. Verfahren gemäß Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** während der Extrusion des Metallabschnitts ein unterer Kantenstreifen (15, 16) in jeder Seitenschiene aus einer festen Konstruktion gemacht ist, wobei in dem Kantenstreifen anschließend die Löcher für die Radschafte der Räder montiert werden.
11. Verfahren gemäß irgendeinem der Ansprüche 8 bis 10, **dadurch gekennzeichnet, dass** während der Extrusion nur ein oberes und ein unteres Querelement (5, 6) gebildet werden, und dass während der abschließenden Bearbeitungsoperation das obere Querelement (5) zu einer Absatzstütze (7) für einen Schuh des einspurigen Rollschuhs gebildet wird, und das untere Querelement (6) in eine Zehenstütze (9) für den Schuh gebildet wird.

### Revendications

1. Châssis (1) pour un patin à roulettes en ligne, ce châssis comprenant une partie extrudée allongée avec deux rails latéraux (3, 4) sensiblement parallèles, et un ou plusieurs éléments transversaux montés entre les rails latéraux, ce châssis possédant une face supérieure qui est équipée pour le montage d'une chaussure, les rails latéraux (3, 4) étant équipés pour pouvoir fixer plusieurs roulettes alignées les unes à la suite des autres entre les rails latéraux, **caractérisé en ce que** chaque rail latéral (3, 4) du châssis possède une ou plusieurs chambres intérieures (10, 11), formées au cours de l'extrusion de la partie et s'étendant sensiblement sur toute la longueur du rail latéral.
2. Châssis (1) pour un patin à roulettes en ligne selon la revendication 1, **caractérisé en ce que** chaque rail latéral (3, 4) possède une chambre intérieure (10, 11) unique et constitue une paroi périphérique fermée autour de la chambre (10, 11), sur toute la longueur de cette chambre (10, 11).
3. Châssis (1) pour un patin à roulettes en ligne selon la revendication 1, **caractérisé en ce que** chaque rail latéral (3, 4) possède une pluralité de chambres intérieures et constitue une paroi périphérique fermée sur toute la longueur de la chambre autour d'au moins l'une des chambres intérieures.
4. Châssis (1) pour un patin à roulettes en ligne selon l'une quelconque des revendications précédentes, **caractérisé en ce que** chaque rail latéral (3, 4) est pourvu d'un ou plusieurs perçages (17, 18) ménagés dans une bande formant bord inférieur (15, 16)

de celui-ci, destinés à des essieux appartenant aux roulettes, et **en ce que** le rail latéral est plein dans la zone de la bande formant bord inférieur.

5. Châssis (1) pour un patin à roulettes en ligne selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les rails latéraux (3, 4) ne sont reliés que par des éléments transversaux (7, 8, 9) obtenus en travaillant un élément transversal supérieur et inférieur (5, 6) formé entre les rails latéraux (3, 4) lors de l'extrusion.
6. Châssis (1) pour un patin à roulettes en ligne selon la revendication 5, **caractérisé en ce que** l'élément transversal supérieur (7) forme un support de talon pour la chaussure, et l'un (9) des éléments transversaux inférieurs (8, 9) forme un support d'orteils pour la chaussure.
7. Patin à roulettes en ligne équipé de plusieurs roulettes alignées les unes après les autres, ce patin à roulettes possédant une chaussure et un châssis (1) selon l'une quelconque des revendications précédentes pour fixer les roulettes, la partie extrudée du châssis (1) s'étendant, dans la direction longitudinale, sur la face inférieure de la chaussure.
8. Procédé de fabrication d'un châssis (1) conçu pour permettre la fixation des roulettes d'un patin à roulettes en ligne comportant plusieurs roulettes, selon lequel une partie allongée est extrudée, partie qui comporte deux rails latéraux (3, 4) parallèles et un ou plusieurs éléments transversaux (5, 6) qui relient les rails latéraux l'un à l'autre, cette partie étant ensuite soumise à une ou plusieurs opérations de finissage, **caractérisé en ce que**, lors de l'extrusion de la partie métallique, une ou plusieurs chambres intérieures (10, 11), s'étendant sur la longueur de la partie métallique, sont formées dans chaque rail latéral (3, 4).
9. Procédé selon la revendication 8, **caractérisé en ce que**, lors de l'opération de finissage de la partie métallique extrudée, la paroi périphérique formée par le métal du rail latéral (3, 4) reste fermée autour d'au moins l'une des chambres intérieures (10, 11) présente(s) dans chaque rail latéral.
10. Procédé selon la revendication 8 ou 9, **caractérisé en ce que**, lors de l'extrusion de la partie métallique, une bande formant bord inférieur (15, 16), présente sur chaque rail latéral, est formée pour qu'elle soit pleine, les perçages destinés aux essieux des roulettes étant ensuite ménagés dans cette bande formant bord.
11. Procédé selon l'une quelconque des revendications 8 à 10, **caractérisé en ce que**, lors de l'extrusion,

seuls un élément transversal supérieur et un élément transversal inférieur (5, 6) sont formés, et **en ce que**, lors de l'opération de finissage, l'élément transversal supérieur (5) est formé pour devenir un support de talon (7) pour une chaussure du patin à roulettes en ligne, et l'élément transversal inférieur (6) est formé pour devenir un support d'orteils (9) pour la chaussure.

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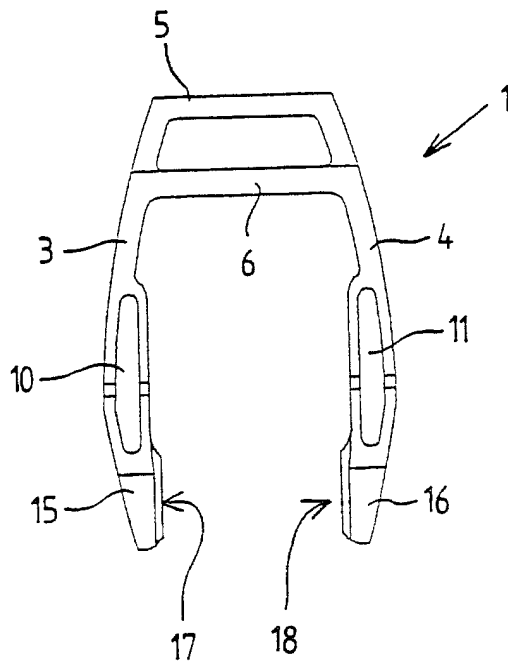
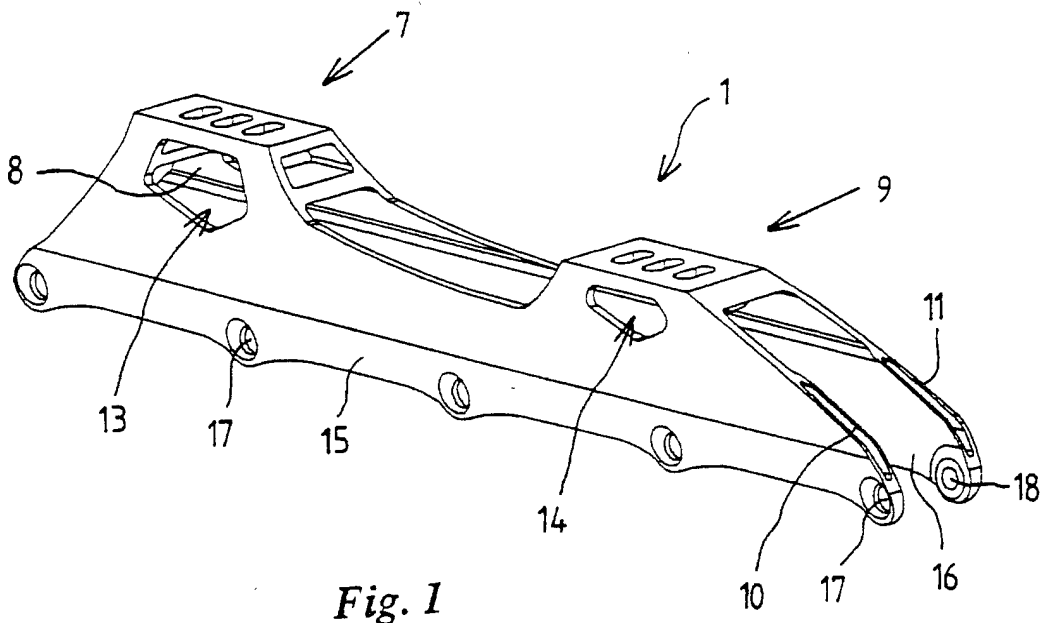
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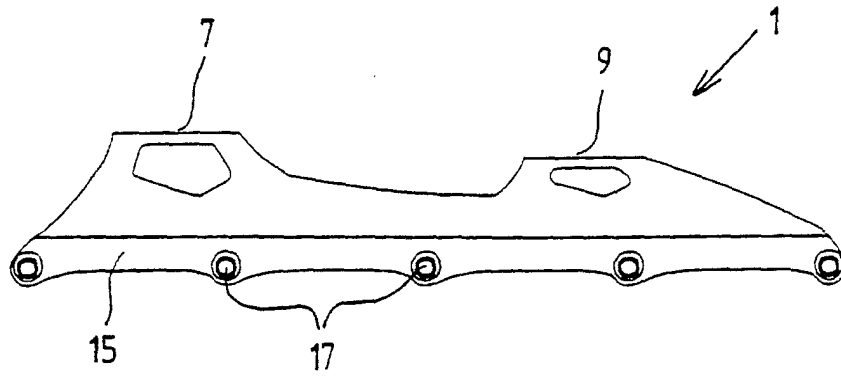
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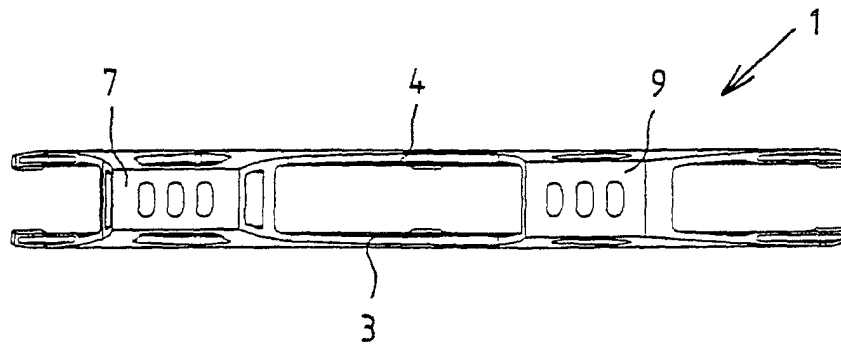
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**Fig. 3**



**Fig. 4**