



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 266 835 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.12.2002 Bulletin 2002/51

(51) Int Cl.7: **B65D 19/00**

(21) Application number: **01113756.9**

(22) Date of filing: **05.06.2001**

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

(72) Inventor: **Hariri, Ali Asghar**
Farmanieh, Tehran (IR)

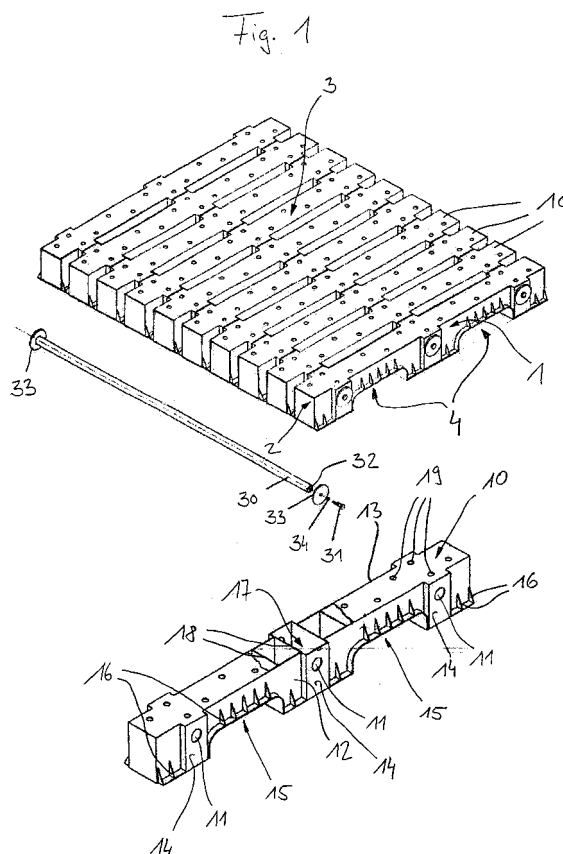
(74) Representative: **Viering, Jentschura & Partner**
Postfach 22 14 43
80504 München (DE)

(71) Applicant: **Hariri, Ali Asghar**
Farmanieh, Tehran (IR)

(54) **Modular pallet**

(57) A pallet for supporting freight, goods or other materials is transportable by a lifting mechanism and comprises a plurality of first segments (10) made of a synthetic material and having a substantially oblongness form defined by a longitudinal edge (1) and a narrow edge (2). The first segments (10) have upper surfaces defining a supporting plate (3). Each of the first segments (10) comprises at least two openings (11) extending in transverse direction thereof. The first segments (10) are arranged side by side in such a way that the openings (11) are in alignment and define a passage. A rod (30) is introduced into the respective passage and is provided with fastening means (31, 32, 33, 34) at its respective ends for fastening the first segments (10) therebetween.

Such a pallet has a modular design, which allows an easy and quick assembly of the pallet in different dimensions.



Description

[0001] The present invention generally relates to a pallet for supporting freight, goods or other materials and more particularly to a pallet being transportable by a lifting mechanism.

[0002] There are a wide variety of pallets available for supporting materials above the ground and for transporting these materials from place to place. These pallets are generally adapted for use with lifting mechanism such as forklifts. Forklifts facilitate the transportation of materials placed on the pallets from one location to another by inserting its forks into channels beneath the surface of the pallet.

[0003] Most commercially available pallets are typically made of wood, since in the past, wooden pallets have provided advantages of economy. However, wooden pallets are heavy; are subject to warpage, splintering and splitting; are nonuniform in strength; and gain significant weight when wet. Moreover, wooden pallets are unsatisfactory regarding natural deficiencies, such as the limitation of natural resources; have a poor chemical resistance; and are comparatively complicated to manufacture.

[0004] Metallic pallets are also available, but they are expensive and typically heavy and subject to corrosion. Therefore, metallic pallets are inadequate for supporting certain goods, for instance in the foodstuff industry or pharmaceutical industry.

[0005] In the past decades, a wide variety of pallets made of a synthetic material such as plastics have been designed. Plastic pallets can easily be moulded and are stronger, lighter in weight, and more durable than for instance wooden pallets. Usually, plastic pallets are formed from upper and lower halves of identical construction. The two identical halves are formed in a single mould and, then, assembled to each other in face-to-face relationship to form the completed pallet. Consequently, an enormous moulding machine is required to mould a pallet having large dimensions. Therefore, such a pallet is typically quite expensive.

[0006] Although, while a number of plastic pallets have been proposed, there remains a need for a plastic pallet that is light in weight, durable, capable of supporting heavy loads and, above all, is easy and economical to manufacture and have a minimum number of parts that are preferably exchangeable, for example in case of damage.

[0007] It is the **object** of the present invention to provide a pallet that has a modular design allowing an easy and quick assembly of the pallet in different dimensions.

[0008] In order to accomplish the above object, the present invention provides a pallet for supporting freight, goods or other materials, particularly being transportable by a lifting mechanism, that comprises a plurality of first segments made of a synthetic material and having a substantially oblongness form defined by a longitudinal edge and a narrow edge, wherein the first segments

have upper surfaces defining a supporting plate, wherein each of the first segments comprises at least two openings extending in transverse direction thereof and in particular being arranged parallel to each other, wherein the first segments are arranged side by side in such a way that the respective openings are in alignment and defining a passage, and wherein a rod is introduced into the respective passage and is provided with fastening means at its respective ends for fastening the first segments therebetween.

[0009] Such a pallet consists of a plurality of identically shaped first segments that are secured together by the rod. Thus, a modular design is achieved allowing to modify the pallet regarding various dimensions by addition or removal of a appropriate number of first segments. Since the first segments are designed as modular units having a substantially oblongness form, moreover, mould costs could be minimized. Furthermore, the rod securing the first segments together ensures an easy and economical assemblage.

[0010] In accordance with a preferred embodiment of the present invention, the respective rod is made of steel or a synthetic material depending on the loads the pallet is used for. Further in accordance with a preferred embodiment of the present invention, the fastening means is a screw connection consisting of a screw and a threaded hole in the respective end faces of the rod. Such a fastening means is both simple in construction and reliable in securing. Preferably, the screw connection comprises a flat washer and a spring washer that are arranged between the screw and an opposing front face of the outer ones of the first segments in order to enhance the strength of the pallet.

[0011] Still further in accordance with a preferred embodiment of the present invention, each of the first segments comprises several, in particular at least three, openings that are arranged parallel, wherein a corresponding number of rods is provided. In this manner, the force tightening up the first segments can significantly be increased. Preferably, three openings are provided, wherein one of the openings is located in the centre and the two other openings are arranged in the region of the respective ends of the first segments. Such an arrangement ensures an equal spreading of the forces caused by the fastening means along the longitudinal edge of the first segments.

[0012] According to another embodiment of the present invention, the first segments have plane areas surrounding the openings and protruding outwardly from the front face and an opposing back face of the first segments that extends parallel to the front face along the longitudinal edge. In this manner, there are provided supporting surfaces between the first segments, which assure an exact arrangement of the first segments. In another aspect of the present invention, each of the first segments is provided with two spaced apart recesses defining a fork-inserting mouth on the longitudinal edge for receiving a pair of laterally separated forks of a lifting

mechanism. Such an construction is adapted for use with lifting mechanism such as forklifts. As regards a favourable structure, preferably, each of the recesses is arranged between two adjacent openings.

[0013] In a preferred embodiment, the first segments are provided with numerous ribs that are integrally formed on the front face and on the back face for reinforcing the first segments. With regard to a lightweight construction, preferably, the first segments have a hollow interior. The hollow interior can be divided by walls in order to increase the stiffness of the first segments. Furthermore, the supporting plate can be provided with a plurality of bores, spots and/or buttons. In this case, the bores, spots and buttons can be used for attaching loads on the supporting plate.

[0014] In line with a preferred embodiment of the present invention, spacers separate the first segments. A pallet having such a configuration is adequate for transporting light loads. Preferably, the spacer is a tube that embraces the rod between two contiguous first segments, thereby ensuring an easy assemblage. Regarding a lightweight and low-priced construction, the spacer can be made of a synthetic material.

[0015] According to another embodiment of the present invention, there are provided second segments that are made of a synthetic material and have a form substantially similar to that of the first segments, wherein the second segments have a shorter height than that of the first segments and are arranged between the first segments in such a way that a fork-inserting mouth is defined beneath the second segments on the narrow edge. In this way, a fork-inserting mouth is provided on each of all four sides of the pallet.

[0016] Moreover, in accordance with a preferred embodiment of the present invention, at least one bottom plate is arranged on the underside of the first segments and/or the second segments in direction of the narrow edge. The bottom plate improves the stability of the pallet. In connection with an easy assemblage, preferably, the bottom plate is a frame that has cross connections spaced apart in a distance corresponding to the width of the first segments or the second segments. In this manner, there is provided a bottom plate having a relative small weight and being sufficiently robust. Additionally, the bottom plate can have at least one bridge between two adjacent cross connections in order to increase the rigidity of the bottom plate.

[0017] The various features and advantages of the present invention may be more readily understood with reference to the following detailed description taken in conjunction with the accompanying drawings, wherein like reference numerals designate like parts, and in which:

FIG. 1 is a schematic view showing a pallet consisted of a plurality of first segments according to a first embodiment of the present invention;

FIG. 2 is a schematic view showing a pallet consisted of a plurality of first segments that are spaced apart by spacers according to a second embodiment of the present invention;

FIG. 3 is a schematic view showing a pallet consisted of a plurality of first segments and second segments according to a third embodiment of the present invention;

FIG. 4 is a schematic view showing the pallet of FIG. 3 along with a number of bottom plates according to a fourth embodiment of the present invention.

[0018] Reference is now made to FIG. 1, which illustrates a pallet consisting of a plurality of first segments 10. The first segments 10 are made of a synthetic material, i. e. a polymer, by injection moulding. Each of the first segments 10 has a substantially oblongness form, which is defined by a longitudinal edge 1 and a narrow edge 2. The first segments 10 are arranged alongside in such a way that they abut against each other along the longitudinal edge 1. An upper surface of the first segments 10 defines a supporting plate 3 for supporting loads such as freight, goods or other materials. The supporting plate 3 is provided with a plurality of bores 19, which can be used for attaching the loads thereon. In addition to the bores 19 or as an alternative thereto, spots and/or buttons may be provided.

[0019] As further shown in FIG. 1, the first segments 10 comprise numerous ribs 16 integrally formed on a front face 12 and a back face 13, which extend parallel in direction of the longitudinal edge 1. The ribs 16 serve to reinforce the first segments 10. Furthermore, the first segments 10 are provided with a hollow interior 17 ensuring a lightweight construction. The hollow interior 17 is divided by walls 18 into several chambers, thereby increasing the stiffness of the first segments 10.

[0020] Each of the first segments 10 comprises three openings 11, which extend in transverse direction thereof and are arranged parallel. One of the openings 11 is located in the centre and the two other openings 11 are arranged in the region of the respective ends of the first segments 10. The openings 11 of the first segments 10 arranged side by side are in alignment. Thus, three parallel passages are defined. A rod 30 made of steel or an appropriate synthetic material is introduced into each passage and is provided with fastening means. The fastening means are a screw connection that consists of a screw 31 and a threaded hole 32 in the respective end faces of the rods 30. Moreover, the screw connection comprises a flat washer 33 and a spring washer 34 that are arranged between the screw 31 and the respective opposing front face 12 of the outer ones of the first segments 10. The rods 30 along with the screw connection at their respective ends serve to secure the first segments 10 together. In this manner, an easy and econom-

ical assemblage of the pallet is achieved.

[0021] The first segments 10 further comprise plane areas 14, which surround the openings 11 and protrude outwardly from the front face 12 and the back face 13, respectively. The plane areas 14 represent supporting surfaces between the first segments 10, thereby ensuring an exact arrangement of the first segments 10 in their side-by-side arrangement. Additionally, each of the first segments 10 is provided with two spaced apart recesses 15. The recesses 15, each of them is arranged between two adjacent openings 11, define a fork-inserting mouth 4 on the longitudinal edge 1 of the first segments 10 for receiving a pair of laterally separated forks of a lifting mechanism, i. e. a forklift. By providing such a fork-inserting mouth 4, the pallet can easily be transported from one place to another.

[0022] Turning now to FIG. 2, a variation of the above described pallet is illustrated. While the pallet shown in FIG. 1 serve for supporting heavy loads, the pallet according to FIG 2. is mainly suited for goods having a low weight. The pallet consists of first segments 10 and spacers 40 that separate the first segments 10 in direction of the narrow edge 2. The spacers 40 made of a synthetic material are formed as tubes that embrace the rods 30 and are arranged between two contiguous first segments 10. By providing the spacers 40 between the first segments 10, the pallet has a comparatively low tare.

[0023] FIG. 3 illustrates an embodiment of a pallet, which is similar to the pallet according to FIG 1. As shown in FIG. 3, the pallet consists of a plurality of first segments 10 and second segments 20. The second segments 20 are made of a synthetic material, e. g. a polymer, and have a form substantially comparable to that of the first segments 10. Consequently, the second segments 20 also comprise openings 21, plane areas 24, ribs 26, an hollow interior 27, walls 28 dividing the hollow interior 27, and bores 29 on the upper surfaces thereof. As opposed to the first segments 10 having a height h_1 perpendicular to the longitudinal edge 1 or the narrow edge 2, the second segments 20 have a height h_2 that is shorter than the height h_1 of the first segments 10. To be precise, the second segments 20 correspond to the first segments 10 without the portion having the recesses 15. The second segments 20 are arranged between the first segments in such a way that a fork-inserting mouth 5 is defined beneath the second segments 20 on the narrow edge 2. In this way, there are provided fork-inserting mouths 4, 5 on each of all four sides of the pallet.

[0024] Reference is finally made to FIG. 4, which illustrates a pallet equivalent to that according to FIG. 3. The pallet according to FIG. 4 comprises additionally a plurality of bottom plates 50, which are attached to the underside of the first segments 10 and the second segments 20 in direction of the narrow edge 2. The bottom plates 50 improve the stability of the pallet and are configured as a frame that has cross connections 51 spaced

apart in a distance corresponding to the width of the first segments 10 and the second segments 20. By forming the bottom plates 50 as frame having cross connections 51, the bottom plates 50 have a relative small weight and are sufficiently robust. Moreover, the bottom plates 50 have a bridge 52 between two adjacent cross connections 51 in regions of the bottom plates 50 attaching to the second segments 20. The bridges 52 serve to increase the rigidity of the bottom plates 50.

[0025] In summary, the various embodiments of a pallet discussed above have in common that they are relatively light in weight, durable, and capable of supporting loads by a lifting mechanism such as forklifts. Furthermore, the various embodiments of a pallet are easily and economically to manufacture and have a minimum number of parts, thereby ensuring a quick assembly. Last but not least, the several parts of the various embodiments of a pallet, in particular the first segments 10 and the second segments 20, represent modular units and, therefore, are easily to exchange, for example in case of damage.

List of reference signs

[0026]

- | | |
|----|----------------------|
| 1 | longitudinal edge |
| 2 | narrow edge |
| 3 | supporting plate |
| 4 | fork-inserting mouth |
| 5 | fork-inserting mouth |
| 10 | first segment |
| 11 | opening |
| 12 | front face |
| 13 | back face |
| 14 | plane area |
| 15 | recess |
| 16 | rib |
| 17 | hollow interior |
| 18 | wall |
| 19 | bore |
| 20 | second segment |
| 21 | opening |
| 24 | plane area |
| 26 | rib |
| 27 | hollow interior |
| 28 | wall |
| 29 | bore |
| 30 | rod |
| 31 | screw |
| 32 | threaded hole |
| 33 | flat washer |
| 34 | spring washer |

40 spacer
50 bottom plate
51 cross connection
52 bridge

h₁ height
h₂ height

Claims

1. A pallet for supporting freight, goods or other materials, particularly being transportable by a lifting mechanism, comprising:

a plurality of first segments (10) made of a synthetic material and having a substantially oblongness form defined by a longitudinal edge (1) and a narrow edge (2);
said first segments (10) having upper surfaces defining a supporting plate (3);
each of said first segments (10) comprising at least two openings (11) extending in transverse direction thereof;
said first segments (10) being arranged side by side in such a way that the respective openings (11) being in alignment and defining a passage; and
a rod (30) being introduced into the respective passage and being provided with fastening means (31, 32, 33, 34) at its respective ends for fastening said first segments (10) therebetween.

2. A pallet according to claim 1,
characterised in that the respective rod (30) is made of steel or a synthetic material.
3. A pallet according to claim 1 or 2,
characterised in that said fastening means is a screw connection consisting of a screw (31) and a threaded hole (32) in the respective end faces of said rod (30).
4. A pallet according to claim 3,
characterised in that said screw connection comprises a flat washer (33) and a spring washer (34) that are arranged between said screw (31) and an opposing front face (12) of the outer ones of said first segments (10).
5. A pallet according to any of the claims 1 to 4,
characterised in that each of said first segments (10) comprises at least three openings (11) that are arranged parallel, wherein a corresponding number of rods (30) is provided.

6. A pallet according to claim 5,
characterised by three openings (11), wherein one of said openings (11) is located in the centre and the two other openings (11) are arranged in the region of the respective ends of said first segments (10).
7. A pallet according to claim 5 or 6,
characterised in that said first segments (10) have plane areas (14) surrounding said openings (11) and protruding outwardly from said front face (12) and an opposing back face (13) of said first segments (10) that extends along said longitudinal edge (1).
8. A pallet according to any of the claims 1 to 7,
characterised in that each of said first segments (10) is provided with two spaced apart recesses (15) defining a fork-inserting mouth (4) on said longitudinal edge (1) for receiving a pair of laterally separated forks of a lifting mechanism.
9. A pallet according to claim 8,
characterised in that each of said recesses (15) is arranged between two adjacent openings (11).
10. A pallet according to any of the claims 1 to 9,
characterised in that said first segments (10) are provided with numerous ribs (16) being integrally formed on said front face (12) and on said back face (13) for reinforcing said first segments (10).
11. A pallet according to any of the claims 1 to 10,
characterised in that said first segments (10) have a hollow interior (17).
12. A pallet according to claim 11,
characterised in that said hollow interior (17) is divided by walls (18).
13. A pallet according to any of the claims 1 to 12,
characterised in that said supporting plate (3) is provided with a plurality of bores (19).
14. A pallet according to any of the claims 1 to 13,
characterised in that said first segments (10) are separated by spacers (40).
15. A pallet according to claim 14,
characterised in that said spacer (40) is a tube embracing said rod (30) between two contiguous first segments (10).
16. A pallet according to claim 14 or 15,
characterised in that said spacer (40) is made of a synthetic material.
17. A pallet according to any of the claims 1 to 16,

characterised by second segments (20) made of a synthetic material and having a form substantially similar to that of said first segments (10), said second segments (20) having a shorter height (h_2) than that (h_1) of said first segments (10) and being arranged between said first segments (10) in such a way that a fork-inserting mouth (5) is defined beneath said second segments (20) on said narrow edge (2).

10

18. A pallet according to any of the claims 1 to 17, **characterised in that** at least one bottom plate (50) is arranged on the underside of said first segments (10) and/or said second segments (20) in direction of said narrow edge (2).

15

19. A pallet according to claim 18, **characterised in that** said bottom plate (50) is a frame having cross connections (51) spaced apart in a distance corresponding to the width of said first segments (10) or said second segments (20).

20

20. A pallet according to claim 19, **characterised in that** said bottom plate (50) has at least one bridge (52) between two adjacent cross connections (51).

25

30

35

40

45

50

55

Fig. 1

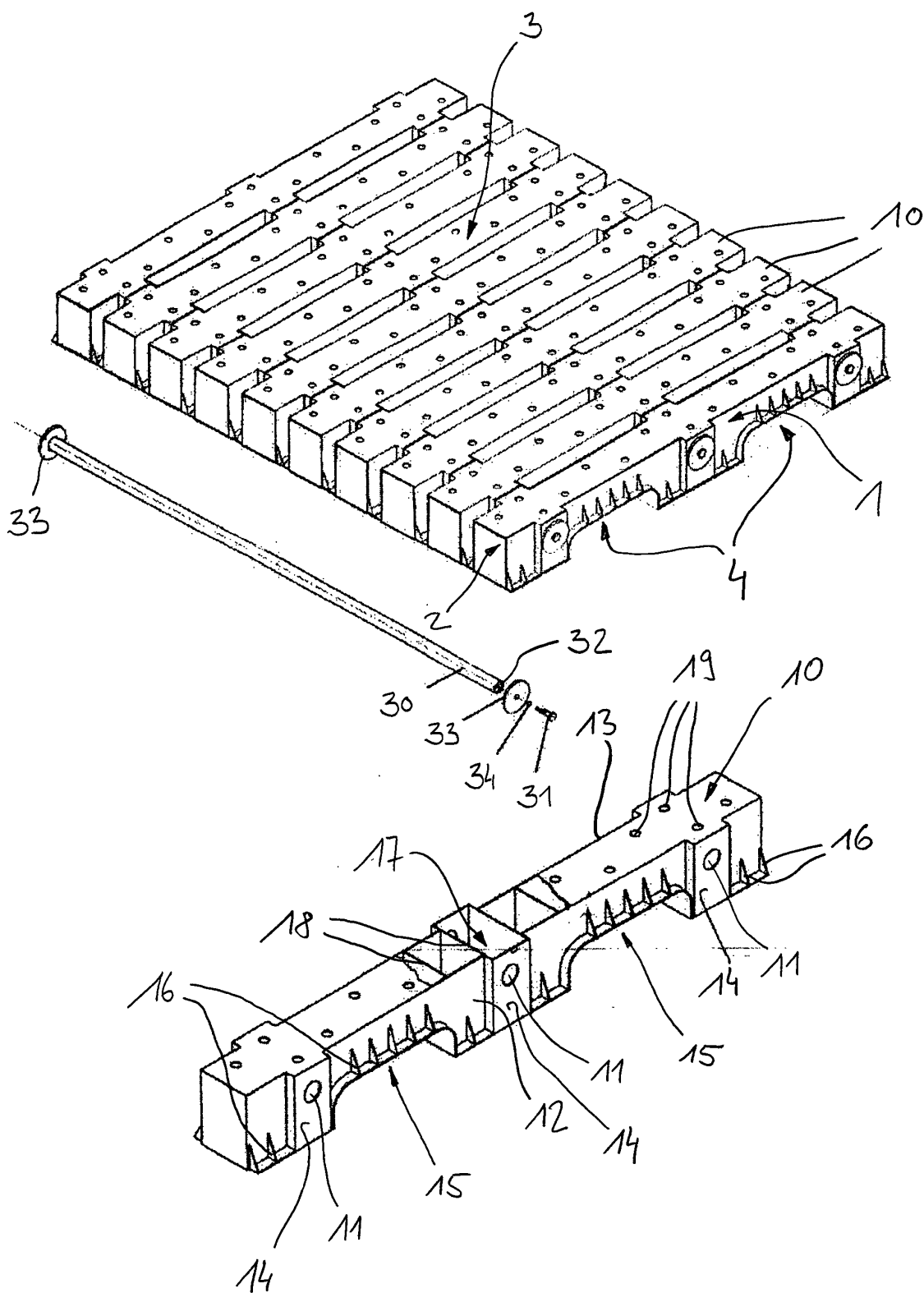


Fig. 2

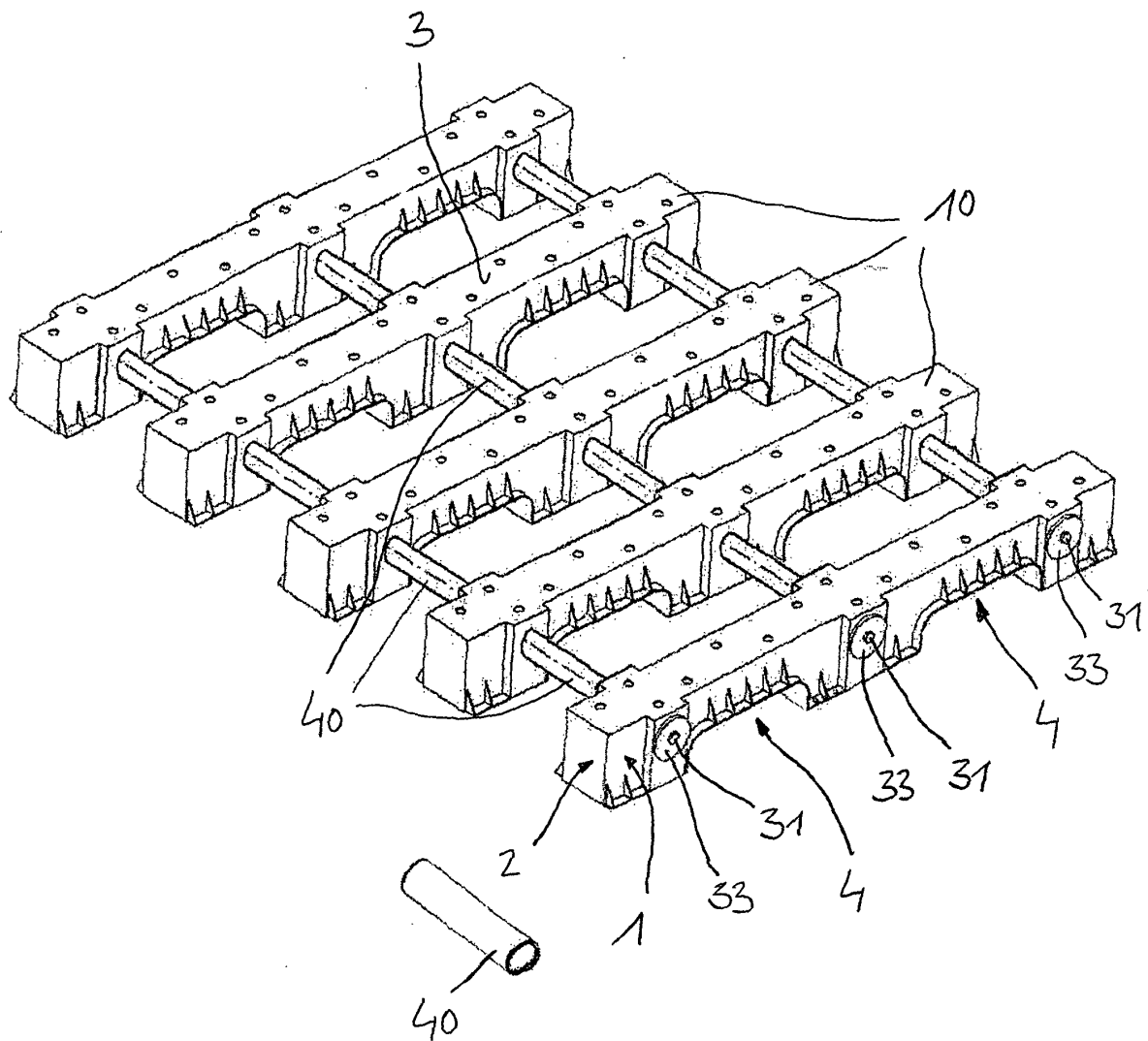


Fig. 3

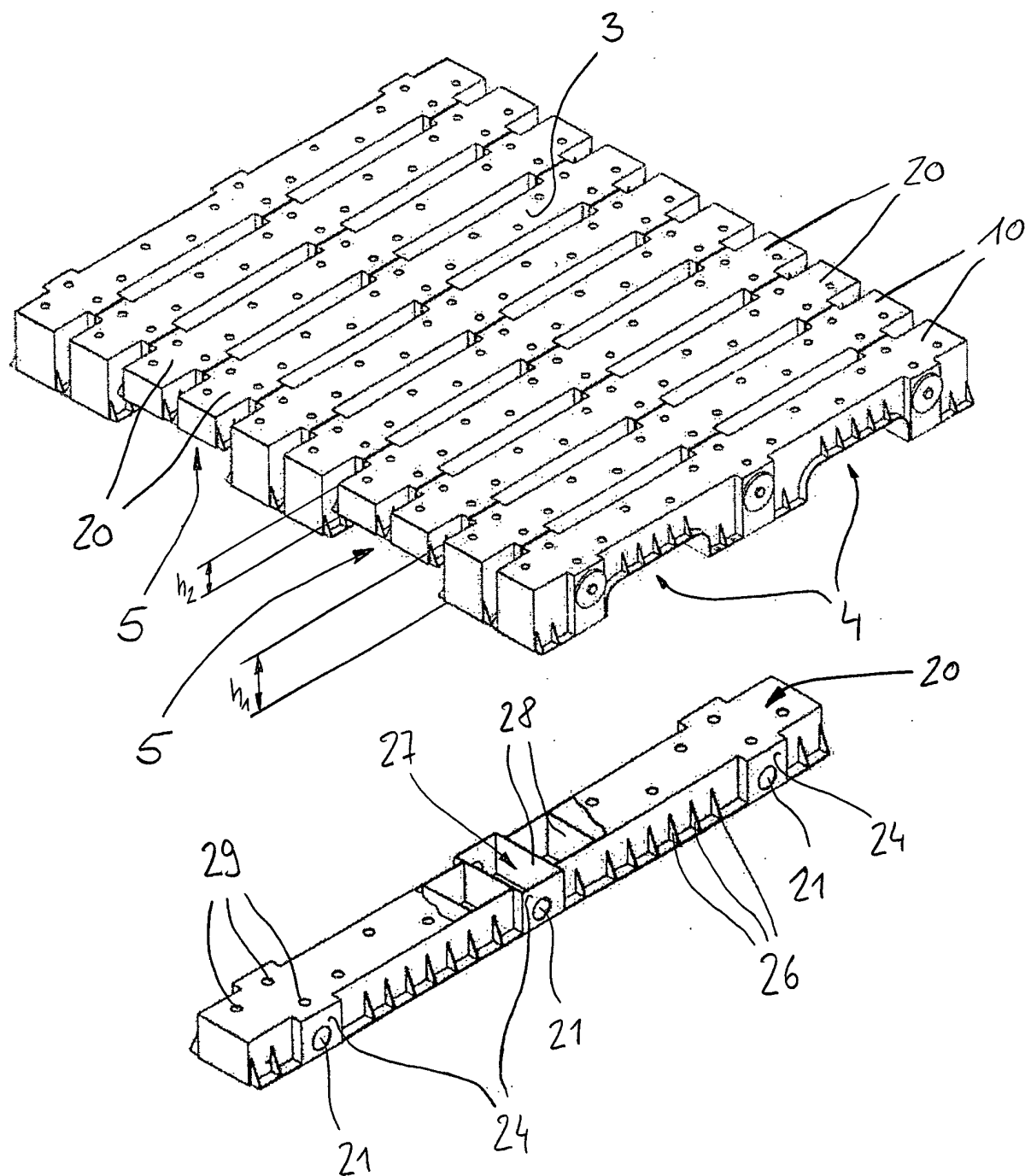
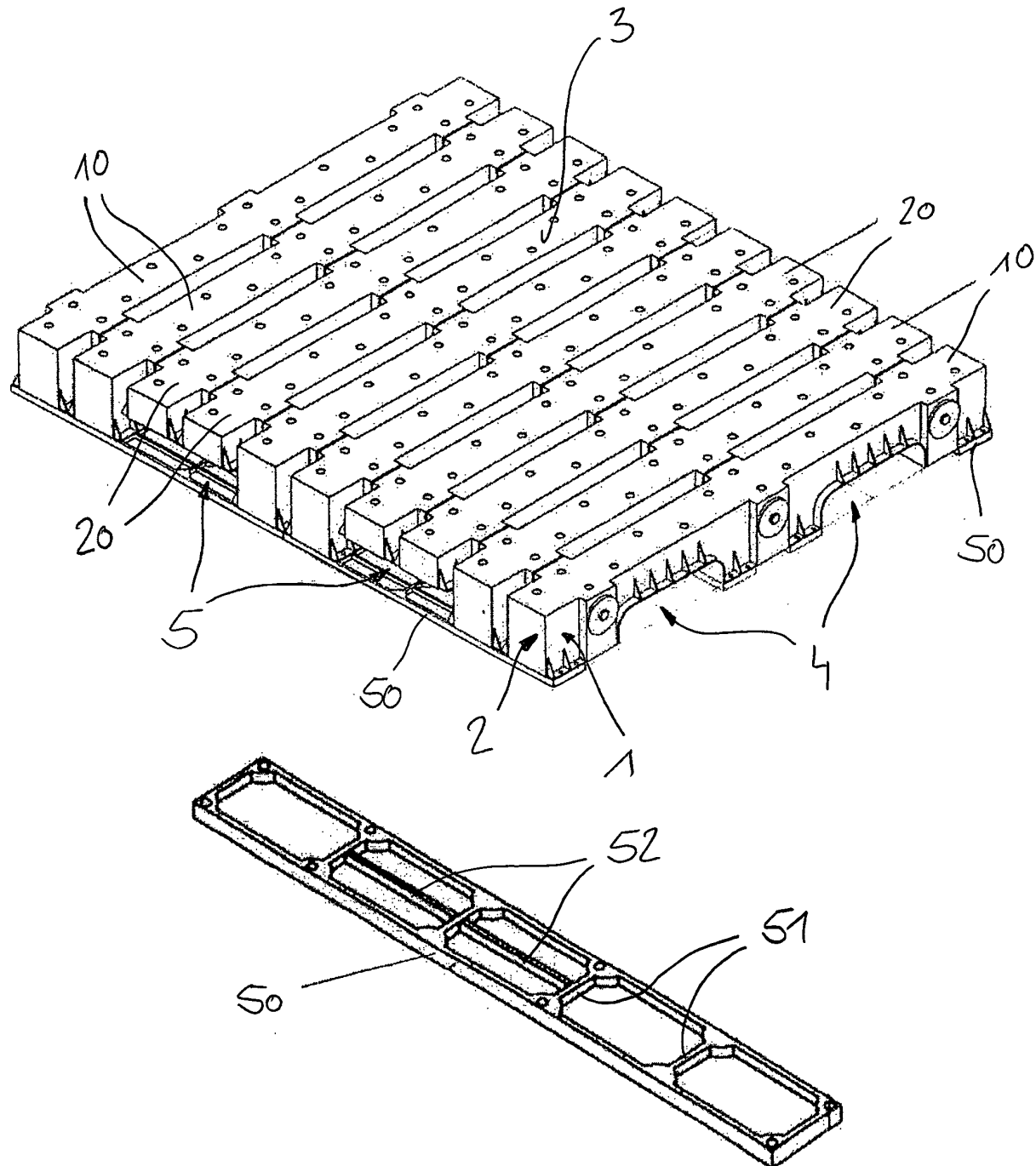


Fig. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 11 3756

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	US 5 579 701 A (FOOK WAH CHARLES H) 3 December 1996 (1996-12-03) * column 3, line 4 - column 4, line 15; figure 4 *	1-6,8,9, 13,14,16	B65D19/00
X	--- US 4 834 001 A (TENQVIST LENNART ET AL) 30 May 1989 (1989-05-30) * column 3, line 12 - column 6, line 17; figures 1-7,18 *	1,2,5-9, 11,12	
X	--- US 5 218 913 A (LEE STANLEY M ET AL) 15 June 1993 (1993-06-15) * column 10, line 15 - column 11, line 19; figure 13 *	1,17	
A	--- US 4 869 179 A (SMITH LARRY D ET AL) 26 September 1989 (1989-09-26) * column 2, line 32 - column 3, line 34; claim 1; figure 9 *	1-10,18	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
BERLIN		2 November 2001	Scheuer, J
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 01 11 3756

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.

02-11-2001

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5579701	A	03-12-1996	AU 687818 B2	05-03-1998
			AU 6894794 A	02-03-1995
			CN 1108209 A	13-09-1995
			GB 2281280 A ,B	01-03-1995
			JP 7096940 A	11-04-1995
			SG 47464 A1	17-04-1998

US 4834001	A	30-05-1989	AT 45322 T	15-08-1989
			AU 586645 B2	20-07-1989
			AU 4861085 A	08-04-1986
			BR 8506930 A	23-12-1986
			DE 3572150 D1	14-09-1989
			DK 221986 A ,B,	13-05-1986
			EP 0192757 A1	03-09-1986
			FI 861981 A ,B,	12-05-1986
			JP 62500164 T	22-01-1987
			NO 861843 A	07-05-1986
			NO 164226 B	05-06-1990
			WO 8601786 A1	27-03-1986
			SU 1630609 A3	23-02-1991

US 5218913	A	15-06-1993	CA 2090230 A1	28-02-1992
			EP 0693430 A2	24-01-1996
			SG 64331 A1	27-04-1999
			US 4979446 A	25-12-1990
			AT 175640 T	15-01-1999
			AU 670928 B2	08-08-1996
			AU 3140793 A	15-06-1993
			CA 2123577 A1	27-05-1993
			CZ 9401198 A3	12-04-1995
			DE 69228192 D1	25-02-1999
			DE 69228192 T2	15-07-1999
			EP 0611354 A1	24-08-1994
			ES 2127223 T3	16-04-1999
			JP 7503437 T	13-04-1995
			PL 170505 B1	31-12-1996
			SG 46470 A1	20-02-1998
			SK 57194 A3	10-05-1995
			US 5357875 A	25-10-1994
			WO 9310011 A1	27-05-1993
			WO 9529103 A1	02-11-1995
			US 5487345 A	30-01-1996
			AU 667621 B2	28-03-1996
			AU 5913194 A	02-06-1994
			AU 655757 B2	12-01-1995
			BR 9008043 A	21-11-1995

EPO FORM P0459

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

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 11 3756

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.

02-11-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5218913 A	EP	0544659 A1	09-06-1993
	JP	6502827 T	31-03-1994
	WO	9203344 A1	05-03-1992
	AT	160544 T	15-12-1997
	DE	69031764 D1	08-01-1998
	DE	69031764 T2	28-05-1998
	DK	693430 T3	10-08-1998
	ES	2113144 T3	16-04-1998
	DE	69028719 D1	31-10-1996
	DE	69028719 T2	30-04-1997
	DK	544659 T3	17-02-1997
	FI	930869 A	26-02-1993

US 4869179 A	26-09-1989	NONE	
