

AUSTRALIA
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NOTICE OF ENTITLEMENT

We, DIETMAR KUBEIN-MESSENBURG and HANS NÄGERL
respectively of Burgweg 1a, D-3350 Kreiensen and Lange Hecke 41, 3407
Gleichen/OT Klein-Lengden both of Germany

being the Applicant in respect of the Application No. 51830/90, state the
following:-

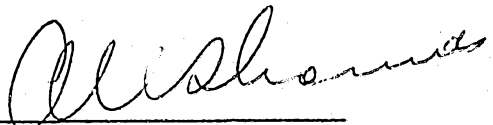
- The persons nominated for the grant of the patent;
are the actual inventors.

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The persons nominated for the grant of the patent are;
the applicants of the basic applications listed on the patent request
form.

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The persons nominated for the grant of the patent are;
the applicants of the applications listed in the declaration under Article
8 of the PCT.

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Dated this 17th day of September 1991

DIETMAR KUBEIN-MESSENBURG
AND HANS NÄGERL
By their Patent Attorneys
COLLISON & CO.


ALUN THOMAS



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(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 647018

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- (74) Attorney or Agent
COLLISON & CO , 117 King William Street, ADELAIDE SA 5000
- (56) Prior Art Documents
AU 78535/87 A61F 2/30
US 3748662
US 3916451
- (57) Claim

1. An artificial joint for replacing human joints and comprising:
at least two joint elements with moving spherical functional surfaces;
the curvatures of the functional surfaces being circular in cross section and
being convex-concave and having centers of rotation M_1 and M_2 within the
joint element with the convex functional surface;
a pressure distribution element slideably located between the two functional
surfaces and having opposed sliding surfaces that articulate with the
functional surfaces and have a correspondingly curved configuration, with the
path of movement of the joint being determined by two joint axes passing
through the centers of rotations M_1 and M_2 of the functional surfaces with radii
 R_1 and R_2 , where R_1 is the radius of the circular cross-sectional contour of the
functional surface with the center of rotation M_1 and R_2 is the radius of the
circular cross-sectional contour of the functional surface with the center of
rotation M_2 ; and wherein the thickness D of the pressure distribution element
on a line connecting the centers of rotation M_1 and M_2 is such that the joint
axes of the centers of rotation M_1 and M_2 move on a path having a radius $R =$
 $R_2 - R_1 - D$, so that the center of rotation M_1 is between the pressure
distribution element and the center of rotation M_2 .

OPI DATE 22/10/90

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(51) Internationale Patentklassifikation ⁵ : A61F 2/30		A1	(11) Internationale Veröffentlichungsnummer: WO 90/11062 (43) Internationales Veröffentlichungsdatum: 4. Oktober 1990 (04.10.90)
(21) Internationales Aktenzeichen: PCT/EP90/00368 (22) Internationales Anmeldedatum: 7. März 1990 (07.03.90) (30) Prioritätsdaten: P 39 08 958.4 18. März 1989 (18.03.89) DE (71)(72) Anmelder und Erfinder: KUBEIN-MESENBERG, Dietmar [DE/DE]; Burgweg 1a, D-3350 Kreiensen (DE). NÄGERL, Hans [DE/DE]; Lange Hecke 41, D-3407 Gleichen/OT Klein-Lengden (DE). (74) Anwälte: ZAPF, Christoph usw.; Schloßbleiche 20, Postfach 13 01 13, D-5600 Wuppertal 1 (DE).		(81) Bestimmungsstaaten: AT (europäisches Patent), AU, BE + (europäisches Patent), CH (europäisches Patent), DE (europäisches Patent), DK (europäisches Patent), ES (europäisches Patent), FR (europäisches Patent), GB (europäisches Patent), HU, IT (europäisches Patent), JP, LU (europäisches Patent), NL (europäisches Patent), SE (europäisches Patent), SU, US. Veröffentlicht <i>Mit internationalem Recherchenbericht.</i> 647018	
(54) Title: ARTIFICIAL JOINT (54) Bezeichnung: KÜNSTLICHES GELENK			
(57) Abstract An artificial joint, especially one designed to replace a human joint, consisting of at least two joint components with spherical operational surfaces moving in mutual relation. The curvature relationships of the operational surfaces of circular cross-section are mutually convex-convex, convex-concave or concave-concave and the joint geometry is determined by a joint chain with two joint axes which pass through the centres of rotation M_1 and M_2 of the operational surfaces with the radii R_1 and R_2. Here, R_1 is the radius of the circular cross-section of the operational surface with mid-point M_1, and R_2 is that of the operational surface with mid-point M_2.			
(57) Zusammenfassung Künstliches Gelenk zum Ersatz insbesondere von menschlichen Gelenken, bestehend aus mindestens zwei Gelenkteilen mit zueinander sich bewegenden sphärischen Funktionsflächen. Die Krümmungsverhältnisse der eine kreisförmige Schnittkontur aufweisenden Funktionsflächen sind zueinander konvex-konvex, konvex-konkav oder konkav-konkav und die Gelenkgeometrie ist durch eine Gelenkkette mit zwei Gelenkachsen bestimmt, die durch die Rotationszentren M_1 und M_2 der Funktionsflächen mit den Radien R_1 und R_2 verlaufen. Hierbei ist R_1 der Radius der kreisförmigen Schnittkontur der Funktionsfläche mit dem Mittelpunkt M_1 und R_2 der Radius der kreisförmigen Schnittkontur der Funktionsfläche mit dem Mittelpunkt M_2.			

The present invention concerns an artificial joint for replacing human joints in particular, consisting of at least two joint parts with spherical functional surfaces that move relative to each other.

5 In any human joint, smooth lubricated functional surfaces slide and roll against each other and their movement is influenced only by minor speed-dependent frictional forces because of the fluid lubrication. If the joint has an especially well-defined direction of operation, then the body part guided by the joint most commonly will execute a planar motion relative to the part that is
10 connected to it and can be regarded as stationary. Around this movement, the general movement range is limited to a relatively narrow angular range in both directions (e.g., with the jaw, knee and other hinge-like joints). It has been found that the known artificial joints do not adequately simulate the functions of a natural joint so they are subject to early wear and lead to
15 impairment for the person who must rely on such joints.

U.S. Patent A 3,916,451 discloses an artificial joint for replacing human joints that consists of at least two joint parts with spherical functional surfaces that can move relative to each other. In this joint, the curvature relationships of the
20 functional surfaces having a circular cross-sectional contour are convex/concave relative to each other, and the geometric design of the joint is determined by a joint chain with two joint axes that pass through the two centers of rotation of the functional surfaces with the respective radii. However, the joint system known from this prior art document is a joint system
25 that is unstable with regard to pressure and is stable only with regard to tension. However, such joint systems that are stable only with respect to tension cannot be used as artificial joints in the human body because systems that are stable with respect to compressive forces are required for use in the human body.

30 This invention is based on the problem of creating artificial joints with a structure that assures functionality that largely corresponds to that of natural joints and thus yields unimpaired function free of complaints for a long period of time when used to replace a human joint.



According to this invention there is provided an artificial joint for replacing human joints and comprising:

- at least two joint elements with moving spherical functional surfaces;
- 5 the curvatures of the functional surfaces being circular in cross section and being convex-concave and having centers of rotation M_1 and M_2 within the joint element with the convex functional surface;
- a pressure distribution element slideably located between the two functional surfaces and having opposed sliding surfaces that articulate with the
- 10 functional surfaces and have a correspondingly curved configuration, with the path of movement of the joint being determined by two joint axes passing through the centers of rotations M_1 and M_2 of the functional surfaces with radii R_1 and R_2 , where R_1 is the radius of the circular cross-sectional contour of the functional surface with the center of rotation M_1 and R_2 is the radius of the
- 15 circular cross-sectional contour of the functional surface with the center of rotation M_2 ; and wherein the thickness D of the pressure distribution element on a line connecting the centers of rotation M_1 and M_2 is such that the joint axes of the centers of rotation M_1 and M_2 move on a path having a radius $R = R_2 - R_1 - D$, so that the center of rotation M_1 is between the pressure
- 20 distribution element and the center of rotation M_2 .

This invention is based on the finding that the sliding movement of two spherical functional surfaces against each other can be reduced to the sliding of two curves against each other in the case of planar movement. These two

25 curves are formed according to this invention by the two cross-sectional contours through the joint surfaces.

Artificial joints may also comprise according to other forms of this invention a parallel or serial arrangement of at least two joints, each according to the form

30 of joint discussed above. They may also comprise one joint according to this invention and one other joint in parallel or series.

This invention will now be illustrated in greater detail on the basis of the embodiments illustrated in the accompanying figures which show the

35 following:

FIG 1 shows a schematic diagram of the functional surfaces of a joint according to this invention with convexity/concavity.



FIG 2 shows a schematic diagram of a joint according to this invention as a human hip joint.

5 FIG 3 shows a schematic diagram of a joint according to this invention as a knee joint.

As FIG 1 shows, a joint according to this invention consists of joint part 21 and joint part 22. The two joint bodies 21 and 22 have different spherical
10 curvatures. Joint body 21 has a concave functional surface 23 and joint body 22 has a convex functional surface 24.

A pressure distributing body 25 is provided between joint parts 21 and 22. This pressure distributing body 25 has friction surfaces 26 and 27. Joint part
15 22 has center of rotation M_1 and the circular cross-sectional contour of the functional surface 24 of joint part 22 has the radius R_1 . Joint part 21 has center of rotation M_2 and its concave functional surface 23 has the radius R_2 for its circular cross-sectional contour. The centers of rotation are located inside the joint part with the convex functional surface 24. Radius R of the
20 path of the joint axes is obtained from the equation $R = R_2 - R_1 - D$ where D is the thickness of the pressure distributing body 25 on the line connecting the centers of rotation M_1 and M_2 .

FIG 2 shows the embodiment of a joint according to this invention as a human
25 hip joint which is an application of the joint design according to FIG 1. In other words, this is a case of convexity/concavity. Hip bone 41 as a concave functional surface has socket 43. The center of rotation of the hip bone or the socket is M_2 and the radius of the circular functional surface of the socket is R_2 . The other joint part is formed by femur 42 which has a convex functional
30 surface 44 with the center of rotation M_1 and radius R_1 as the radius of curvature. Pressure distributing body 45 is provided between the two joint parts 41 and 42. Its friction surfaces 45 and 46 which are in contact with functional surfaces 43 and 44 have curvatures that correspond to the curvature of the functional surfaces. It is advantageous for pressure
35 distributing body 45 to be designed in such a way that it extends over the center of the hemispherical part of femur 42 in such a way that the joint according to this invention as illustrated here can also withstand some tension and will not fall apart due to the force of gravity in the leg or calf, for example.



This also applies with respect to the outer friction surface 47 of the pressure distributing body 45 which also extends over half of hemispherical functional surface 43.

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According to this invention, this locking of the joint by means of the pressure distributing body in the hollow sphere formed by functional surface 43 need not take place at all points around the curvature.

- 10 FIG 3 illustrates the exterior design of a joint system to simulate the human knee joint. This joint system consists of a parallel connection of two joints according to this invention as illustrated in the joint design in FIG 1, where the femur 51 is provided with two joint parts 52 and 53 that are arranged parallel to each other with each part having a convex functional surface 54. Convex functional surfaces 54 each have a center of rotation M_1 and a radius R_1 of their circular cross-sectional contour. The tibia 55 has two functional surfaces 56 arranged so they are parallel and are both concave and their center of rotation M_2 is located inside femur 51. These functional surfaces 56 each have a circular cross-sectional contour with the radius R_2 . A pressure distributing body 57 is provided between the functional surfaces or joint parts 51, 55. This pressure distributing body is designed so that its friction surfaces 58 and 59 each extend beyond half of the hemispherical functional surfaces of joint parts 51 and 55 in such a way that the joint parts 51 and 55 are locked in position.

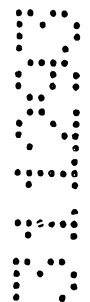
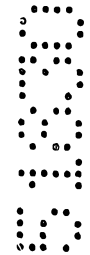
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In addition, it is possible according to this invention to provide a series connection of such a joint to form a joint system in addition to providing the parallel connection of the individual joint parts according to FIG 1.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An artificial joint for replacing human joints and comprising:
 - 5 at least two joint elements with moving spherical functional surfaces; the curvatures of the functional surfaces being circular in cross section and being convex-concave and having centers of rotation M_1 and M_2 within the joint element with the convex functional surface;
 - a pressure distribution element slideably located between the two functional
 - 10 surfaces and having opposed sliding surfaces that articulate with the functional surfaces and have a correspondingly curved configuration, with the path of movement of the joint being determined by two joint axes passing through the centers of rotations M_1 and M_2 of the functional surfaces with radii R_1 and R_2 , where R_1 is the radius of the circular cross-sectional contour of the
 - 15 functional surface with the center of rotation M_1 and R_2 is the radius of the circular cross-sectional contour of the functional surface with the center of rotation M_2 ; and wherein the thickness D of the pressure distribution element on a line connecting the centers of rotation M_1 and M_2 is such that the joint axes of the centers of rotation M_1 and M_2 move on a path having a radius $R =$
 - 20 $R_2 - R_1 - D$, so that the center of rotation M_1 is between the pressure distribution element and the center of rotation M_2 .
2. An artificial joint system comprising a parallel arrangement of at least
- 25 two joints, each joint being according to Claim 1.
3. An artificial joint system comprising a serial arrangement of at least
- two joints, each joint being according to Claim 1.
4. An artificial joint system comprising a joint according to Claim 1 in
- 30 one of either a serial or parallel combination with another artificial joint in which the functional surfaces of the other joint elements are convex in configuration, their centers of rotation M_1 and M_2 lie in the associated joint element, and the path of the joint axes of the other joint has a radius $R = R_1 + R_2 + D$.

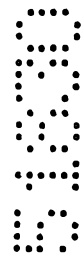


5. An artificial joint system comprising a joint according to Claim 1 in one of either a serial or parallel combination with another artificial joint in which both functional surfaces of the other joint are of concave configuration, their centers of rotation M_1 and M_2 lie in the pressure distribution element of the other joint, and the path of the joint axes of the other joint has a radius $R = R_2 + R_1 - D$.

6. An artificial joint system comprising a joint according to Claim 1 in one of either a serial or parallel combination with another artificial joint, in which one functional surface of one joint element of the other joint is of convex configuration and the other functional surface of the opposing element of the other joint is of concave configuration, the center of rotation M_2 of the joint element of the other joint with the convex functional surface of the other joint lies in this joint element and the center of rotation M_1 of the joint element with the concave functional surface lies in the pressure distribution element of the other joint, and the path of the joint axes of the other joint has a radius $R = R_2 - R_1 + D$.

DATED this 31st day of December 1993

DIETMAR KUBEIN-MEESENBURG
AND HANS NÄGERL
By their Patent Attorneys
COLLISON & CO



51830/90

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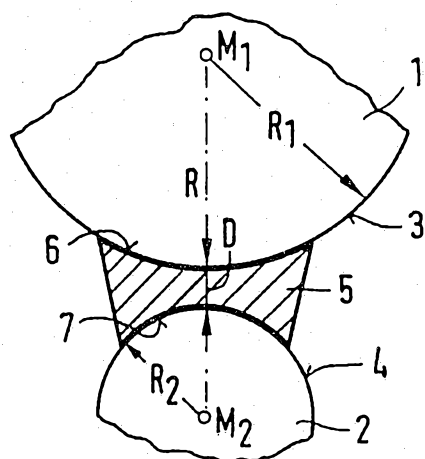


FIG. 1

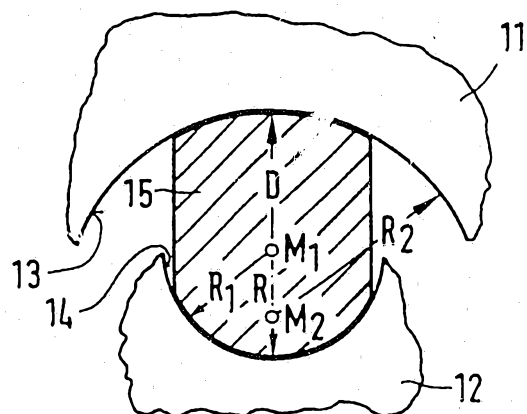


FIG. 2

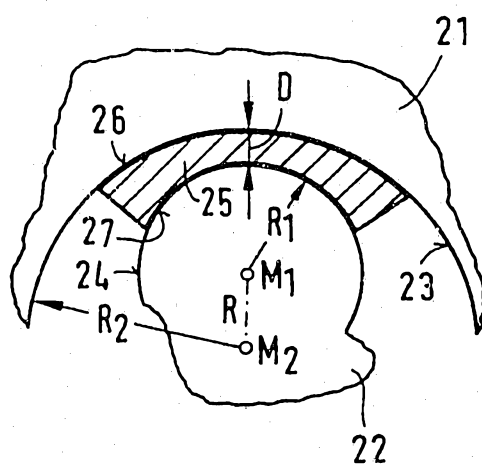


FIG. 3

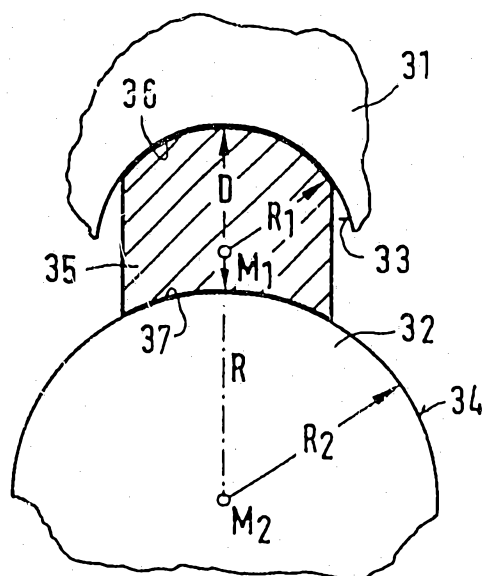


FIG. 4

INTERNATIONAL SEARCH REPORT

International Application No. PCT/EP90/00368

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁴ According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl ⁵ : A61F 2/30																	
II. FIELDS SEARCHED Minimum Documentation Searched ⁷ <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 25%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="padding: 5px;">Int.Cl⁵</td> <td style="padding: 5px;">A61F</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸			Classification System	Classification Symbols	Int.Cl ⁵	A61F											
Classification System	Classification Symbols																
Int.Cl ⁵	A61F																
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Category [*]</th> <th style="width: 70%; padding: 5px;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 20%; padding: 5px;">Relevant to Claim No. ¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">FR, A, 2085013 (AGA AKTIEBOLAG) 17 December 1971, see figure 5 description page 8, lines 1-31 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,3,8</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 4003095 (GRISTINA) 18 January 1977, see the whole document ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,5</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 3916451 (BUECHEL ET AL) 4 November 1975 see figures 2,3,21, claims 1-17 ---</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,2,4,6</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, Re. 29757 (HELFET) 12 September 1978, see figure 7, claims 1-16 -----</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,2,7</td> </tr> </tbody> </table>			Category [*]	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	FR, A, 2085013 (AGA AKTIEBOLAG) 17 December 1971, see figure 5 description page 8, lines 1-31 ---	1,3,8	X	US, A, 4003095 (GRISTINA) 18 January 1977, see the whole document ---	1,5	X	US, A, 3916451 (BUECHEL ET AL) 4 November 1975 see figures 2,3,21, claims 1-17 ---	1,2,4,6	X	US, A, Re. 29757 (HELFET) 12 September 1978, see figure 7, claims 1-16 -----	1,2,7
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X	US, A, Re. 29757 (HELFET) 12 September 1978, see figure 7, claims 1-16 -----	1,2,7															
[*] Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Δ" document member of the same patent family																	
IV. CERTIFICATION <table style="width: 100%; border-top: 1px solid black; border-bottom: 1px solid black;"> <tr> <td style="width: 50%; padding: 5px;">Date of the Actual Completion of the International Search</td> <td style="width: 50%; padding: 5px;">Date of Mailing of this International Search Report</td> </tr> <tr> <td style="text-align: center; padding: 5px;">16 May 1990 (16.05.90)</td> <td style="text-align: center; padding: 5px;">12 June 1990 (12.06.90)</td> </tr> <tr> <td style="padding: 5px;">International Searching Authority</td> <td style="padding: 5px;">Signature of Authorized Officer</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;">European Patent Office</td> </tr> </table>			Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	16 May 1990 (16.05.90)	12 June 1990 (12.06.90)	International Searching Authority	Signature of Authorized Officer	European Patent Office								
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International Searching Authority	Signature of Authorized Officer																
European Patent Office																	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/EP 90/00368**

SA 34892

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 07/05/90. The European Patent office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
FR-A- 2085013	17/12/71	CA-A-	958852	10/12/74
		DE-A-	2114323	14/10/71
		GB-A-	1352188	08/05/74
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		LU-A-	77083	01/12/77
		NL-A-	7702714	01/11/77
		US-A-	4040131	09/08/77
		US-A-	4179758	25/12/79

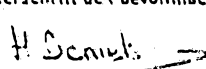
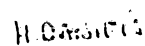
US-A- 3916451	04/11/75	NONE		

US-A- Re. 29757	12/09/78	NONE		

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

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen PCT/EP 90/00368

I. KLASSEFIZKATION DES ANMELDUNGSGENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben) ⁶		
Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC Int.Cl. ⁵ A 61 F 2/30		
II. RECHERCHIERTE SACHGEBIETE		
Recherchierter Mindestprüfstoff ⁷		
Klassifikationssystem Int.Cl. ⁵	Klassifikationssymbole A 61 F	
Recherchierte nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen ⁸		
III. EINSCHLÄGIGE VERÖFFENTLICHUNGEN ⁹		
Art *	Kennzeichnung der Veröffentlichung ¹¹ , soweit erforderlich unter Angabe der maßgeblichen Teile ¹²	Betr. Anspruch Nr. ¹³
X	FR, A, 2085013 (AGA AKTIEBOLAG) 17 Dezember 1971, siehe Figur 5 Beschreibung Seite 8 Zeilen 1-31 --	1,3,8
X	US, A, 4003095 (GRISTINA) 18 Januar 1977, siehe Dokument insgesamt --	1,5
X	US, A, 3916451 (BUECHEL ET AL) 4 November 1975, siehe Figuren 2,3,21, Ansprüche 1-17 --	1,2,4,6
* Besondere Kategorien von angegebenen Veröffentlichungen¹⁰: "A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist "E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist "L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt) "O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht "P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist "T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist "X" Veröffentlichung von besonderer Bedeutung, die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden "Y" Veröffentlichung von besonderer Bedeutung, die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist "&" Veröffentlichung, die Mitglied derselben Patentfamilie ist		
IV. BESCHEINIGUNG		
Datum des Abschlusses der internationalen Recherche 16. Mai 1990		Absendedatum des internationalen Recherchenberichts 12. 06. 90
Internationale Recherchenbehörde Europäisches Patentamt		Unterschrift des bevollmächtigten Bediensteten  H. Schmitt  H. Dambitz

III. EINSCHLAGIGE VERÖFFENTLICHUNGEN (Fortsetzung von Blatt 2)		
Art *	Kennzeichnung der Veröffentlichung, soweit erforderlich unter Angabe der maßgeblichen Zeile	Betr. Anspruch Nr.
X	US, A, Re. 29757 (HELFET) 12 September 1978, siehe Figur 7, Ansprüche 1-16 -- -----	1,2,7

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT
 ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR. PCT/EP 90/00368

SA 34892

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben.
 Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 07/05/90.
 Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

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Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82