



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

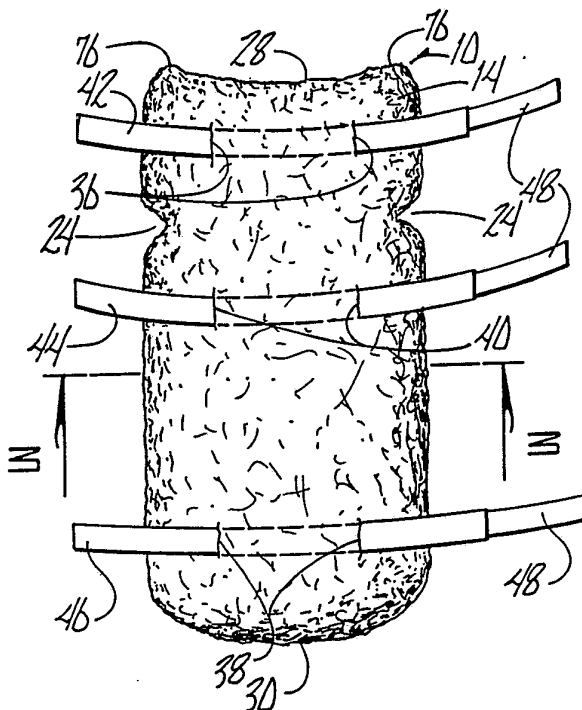
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306,808 3 February 1989 (03.02.89) US(71) Applicant: L'NARD ASSOCIATES, INC. [US/US]; 12201
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Moines, IA 50309 (US).(81) Designated States: AT (European patent), BE (European
patent), CH (European patent), DE (European patent),
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patent), LU (European patent), NL (European patent),
SE (European patent).**Published***With international search report.**Before the expiration of the time limit for amending the
claims and to be republished in the event of the receipt of
amendments.*

(54) Title: METHOD AND APPARATUS FOR PREVENTING SKIN ABRASIONS



(57) Abstract

The method of this invention pertains to preventing skin abrasions and the like in patients whose legs are substantially locked together in juxta-position. The method comprises placing a pad (10) between the patient's legs so that the opposite sides of the pad (10) cover the inner surface of at least one leg from a point above the knee to a point substantially to the bottom of the foot of one leg. The pad (10) is affixed to one leg of the patient at points above the knee and above the ankle of one leg. The apparatus of this invention is a flexible planar pad having a top (28), bottom (30), side edges (32, 34) and opposite leg engaging surfaces (14). The leg engaging surfaces (14) comprise a soft, resilient material. Fastening straps are provided along the pad (10) for fastening (42, 44, 46) the pad (10) to a leg.

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Method and Apparatus for Preventing Skin Abrasions

BACKGROUND OF THE INVENTION

Many bedridden patients, usually paralysis victims, have their legs substantially locked together in close juxtaposition. This condition is known as valgus wherein the muscles of the hip contract so that the legs cannot be spread. Such patients normally lay on their sides in a fetal position. Skin abrasions, sores and ulcers often are created at the knees, ankles and feet where the non-muscular portions of the legs tend to more forcibly engage. Slight movement of either leg aggravates this situation.

Pillows or the like are often forcibly inserted between such a patient's legs. However, pillows are often of improper thickness, and do not stay in place.

Therefore, a principal object of this invention is to provide a method and means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which will prevent abrasion between the patient's legs as they bear against each other.

A further object of the invention is to provide a method and means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which will prevent abrasion between the

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patient's legs as they bear against each other, and which will maintain this protection regardless of patient movement.

A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which is easily attached to the patient.

A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which is comfortable to the patient.

A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which can be easily removed, cleaned and reused.

A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which will not interfere with the blood circulation in the patient's legs.

A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which will only partially encompass one of the patient's legs to keep the leg from become unduly warm.

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A still further object of this invention is to provide a means for preventing skin abrasions for patients having legs substantially locked in juxtaposition which can be used on either leg of the patient.

These and other objects will be apparent to those skilled in the art.

SUMMARY OF THE INVENTION

The method of this invention pertains to preventing skin abrasions and the like in patients whose legs are substantially locked together in juxtaposition. The method comprises the taking of an elongated flexible planar pad with a length extending from above the patient's knees to the bottom of the patient's foot. The width of the pad is approximately one-half of the girth of one of the patient's legs. The pad is placed between the patient's legs so that the opposite sides of the pad cover the inner surface of at least one leg from a point above the knee to a point substantially to the bottom of the foot of one leg. The pad is affixed to one leg of the patient at points above the knee and above the ankle of one leg to hold the pad against any substantial movement with respect to the one leg.

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The apparatus of this invention comprises a pad for the foregoing method. The pad is a flexible planar pad having a top, bottom, side edges, and opposite leg engaging surfaces. The leg engaging surfaces comprise a soft resilient material so that the skin and flesh of the inner portion of a patient's legs will be protected from abrasive action. A first strap means is secured to the pad adjacent its upper end for securing the pad to a patient's leg just above the knee. A second strap means is secured to the pad adjacent the bottom thereof for securing the pad to the patient's leg just above the ankle. A third strap means can be used alternately and it is secured to the pad just below the knee portion to again secure the pad to the leg of the patient just below the knee.

The pad is formed by a layer of canvas material to which is affixed the soft resilient material which forms the padding thereof. The canvas material is folded along a central seam, and the outer periphery of the overlapped portions of the pad are then sewn together.

Opposite notch elements are cut into the pad at the side edges towards the upper portion thereof. These notched edges are not sewn and form an access to the interior compartment of the pad.

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The strap means are threaded through opposite pairs of vertical slots in one surface of the pad.

The upper portion of the pad is formed in a downwardly extending concave shape, and the bottom of the pad is formed in a downwardly extending convex shape.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a plan view of the pad of this invention;

Figure 2 is a plan view of the pad of this invention during an initial stage of fabrication with the strap elements omitted therefrom;

Figure 3 is an enlarged scale sectional view taken on line 3-3 of Figure 1;

Figure 4 is a partial sectional view at an enlarged scale taken through one of the strap elements;

Figure 5 is an elevational view of one leg of a patient;

Figure 6 is a partial perspective view of the opposite side of the leg shown in Figure 5 with the pad attached thereto; and

Figure 7 is a perspective view of the pad of this invention affixed to the leg of a patient in a position different than that of Figure 6.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The numeral 10 designates the pad of this invention which is comprised of canvas layer 12, with a soft resilient padding material 14 secured to one surface thereof. The material 14 is a washable polyester fiber having the texture of wool fleece and is available under the trademark "Kodel". The pad 10 is symmetrically cut about a center fold 16 and is thereupon folded on both center folds 16 and fold 18 into the configuration shown in Figure 2. At that stage of the fabrication, the canvas layer 12 is on the outside. The lower portion of the pad is then secured together by sewn seam 20. The pad is then turned inside out so that the material 14 appears on the outside thereof, and seam 22 is then put in place to substantially enclose the interior of the pad.

V-shaped notches 24 are cut in opposite sides of the pad near the top thereof. The notches are not sewn closed and serve as access to the interior compartment 26 of the pad. Access to the interior compartment 26 is desirable as will be described hereafter.

The pad 10 includes a top 28 which has a concave shape that extends downwardly, and a bottom 30 which has a convex shape which also extends downwardly.

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The numerals 32 and 34 designate the side edges of the pad.

A first pair of vertical cuts or slots 36 are located in the upper portion of the pad. A second pair of spaced vertical slots 38 are located towards the bottom portion of the pad; and a third pair of spaced vertical slots 40 are located immediately below the notches 24. A first strap 42 is threaded through slots 36; a second strap 44 is threaded through slots 38; and a third strap 46 can be threaded through slots 40 if it is desired to have a securing means at that point on the leg. The first strap 42 is adapted to secure the pad to the leg immediately above the knee; the second strap 44 is adapted to secure the pad to the leg immediately above the ankle; and the third strap 46, if needed, is adapted to secure the pad to the leg immediately below the knee. It should be noted that the horizontal space between slots 36 is slightly greater than the horizontal space between the lower slots 38 (six inches versus four inches). A conventional Velcro strap 48 is secured to one end of each of the straps and is adapted to fix the free ends of the straps together in conventional fashion.

Each of the straps is comprised of three felt layers 50 (see Figure 4) which have foam layers 52

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interposed therebetween. These straps are soft and are slightly resilient and are intended to be very comfortable to the leg of the patient.

The dimensions for a typical pad 10 adapted for use on an adult are as follows: The vertical height of the pad is approximately 23 inches. The notches 24 are approximately 1-1/2 inches in vertical height, and extend no more than 2-1/2 inches into the body of the pad from the side edges thereof. The vertical slots described above are approximately two inches in length. The width of the pad at the top is approximately 12 inches, and the width at the lower end is approximately eight inches. The slots 36 are approximately two inches from the top 28, and the slots 38 are approximately two inches from the bottom 30. The first strap 42 is approximately 18-1/2 inches in length and the lower strap 44 is approximately 15 inches in length. The third strap 46, if used, should be approximately 15-18-1/2 inches in length, and preferably closer to 18-1/2 inches in length. The notches 24 are approximately five inches from the top 28 of the pad. The thickness of the material 14 is approximately three inches, but obviously can be compressed to 1/2 inch - 3/4 inches.

Figures 6 and 7 show a patient's legs 54 and 56. With reference to Figure 5, the numeral 58 designates

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a patient's thigh; the numeral 60 designates the knee area; the numeral 62 designates the kneecap; the numeral 64 designates the knee joint. The numeral 66 shows the area of the thigh which includes the quadracep muscle group. The numeral 68 designates the ankle, with the numerals 70, 72 and 74 designating the patient's heel, calf and foot.

The normal operation of the device of this invention is as follows: With at least the straps 42 and 44 attached to the pad, the pad is inserted between the legs 54 and 56 of the patient. The ends of the straps 42 and 44 are secured together just above the knee and just above the ankle as described above by utilizing the Velcro fastener 48. Since the spacing between slots 36 and slots 38 are approximately the "diameter" of the patient's leg at those respective points, the straps pull the pad into close engagement with the leg but do not serve to squeeze the leg so as to impede blood circulation in the leg. With the lower strap 44 being between the ankle and the calf of the leg, and the upper strap 42 being between the knee and the major diameter of the thigh, the pad 10 is held substantially immobile on the leg. However, as slight bending of the knee takes place, the notches 24 permit the lower portion of the pad below the notches to flex freely even though the

- 10 -

portion of the pad above the notches and above the knee remain substantially stationary. Preferably, the notches 24 are positioned slightly below the kneecap 62. The corners 76 of the pad serve to maintain padded material between the legs of the patient even though the leg may flex slightly to slightly displace the pad above the knee.

It is important that the lower end or bottom 30 of the pad extend substantially to the medial distal heel to cover all pressure points that might exist between the patient's two legs.

The pad 10 serves to equalize the pressure exerted by the weight or pressure of one leg on the other and relieves the high pressure points between the heels, ankles, and knees of the patient.

The straps of the pad can be washed by removal thereof, and they can be replaced when necessary. This is accomplished by reaching the hand inside the interior of the pad and manipulating the strap out of the vertical slots in which the strap is mounted.

Similarly, the pad can be removed from the patient, laundered, and reused.

Thus, from the foregoing, it is seen that this device will accomplish at least all of its stated objectives.

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What is claimed is:

1.

The method of preventing skin abrasions and the like in patients whose legs are substantially locked together in juxtaposition, comprising,

taking an elongated flexible planar pad having a

length extending from above the patient's knees to the bottom of the patient's feet, and having a width of approximately one-half of the girth of one of the patient's legs,

placing said pad between the patient's legs so that

opposite sides of the pad cover the inner surface of at least one leg from a point above the knee to a point substantially to the bottom of the foot of said one leg,

affixing said pad to said one leg at points above the knee and above the ankle of said one leg to hold said pad against any substantial movement with respect to said one leg.

2.

The method of claim 1 wherein said pad is affixed to said one leg by straps that extend around said pad and said one leg at points above the knee and above the ankle thereof.

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3.

The method of claim 2 wherein one strap extends around said one leg above the kneecap thereof and below the quadracep muscle group thereof.

4.

The method of claim 3 wherein the other of said straps extend around said one leg above the ankle and below the calf muscles thereof.

5.

The method of claim 2 wherein said straps are maintained free from contact with said other leg.

6.

A pad for preventing skin abrasions and the like for use between the legs of patients whose legs are substantially locked together in juxtaposition, comprising,

a flexible planar pad having a top, bottom, side edges, and opposite leg engaging surfaces,

said leg engaging surfaces comprising a soft resilient material so that the skin and flesh of the inner portion of a patient's legs will be protected from abrasive friction when said pad is placed between the legs of a patient whose legs are substantially locked together in juxtaposition, and first strap means secured to said pad adjacent the top thereof for securing said pad to a patient's leg above the knee,

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and a second strap means secured to said pad adjacent the bottom thereof for securing said pad to a patient's leg above the ankle.

7.

The device of claim 6 wherein notches are formed in the side edges of said pad adjacent the top thereof and normally positioned just below a patient's knee to facilitate the deflection of said pad when the patient's leg bends at the knee.

8.

The device of claim 6 wherein said pad has an interior compartment defined by the top, bottom, side edges and opposite leg engaging surfaces, a first pair of spaced substantially vertical slots adjacent the top of one of said surfaces, said first strap means being threaded through said first pair of slots; and a second pair of spaced substantially vertical slots adjacent the bottom of said one of said surfaces, said second strap means being threaded through said second pair of slots.

9.

The device of claim 8 wherein a third pair of spaced substantially vertical slots are positioned between said first and second pair of slots, and a third strap means is threaded through said third pair of straps and being adapted to secure said pad to a patient's leg below the knee.

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10.

The device of claim 8 wherein access openings are provided in said pad so that manual access can be had to said interior compartment to facilitate manipulation of said strap means.

11.

The device of claim 6 wherein the top of said pad has a downwardly extending concave shape.

12.

The device of claim 6 wherein the bottom of said pad has a downwardly extending convex shape.

13.

The device of claim 8 wherein access openings are provided at notches formed in the side edges of said pad adjacent the top thereof and normally positioned just below a patient's knee to facilitate the deflection of said pad when the patient's leg bends at the knee.

14.

The device of claim 6 wherein fastening means are secured to said straps.

15.

The device of claim 6 wherein said strap means are padded and are resilient.

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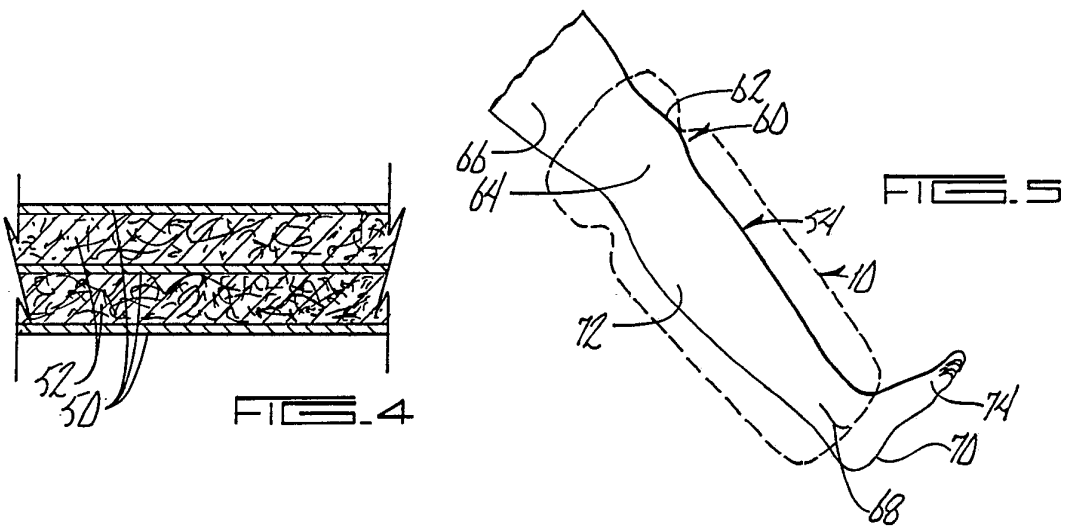
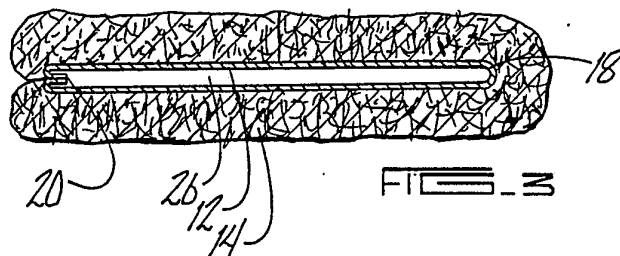
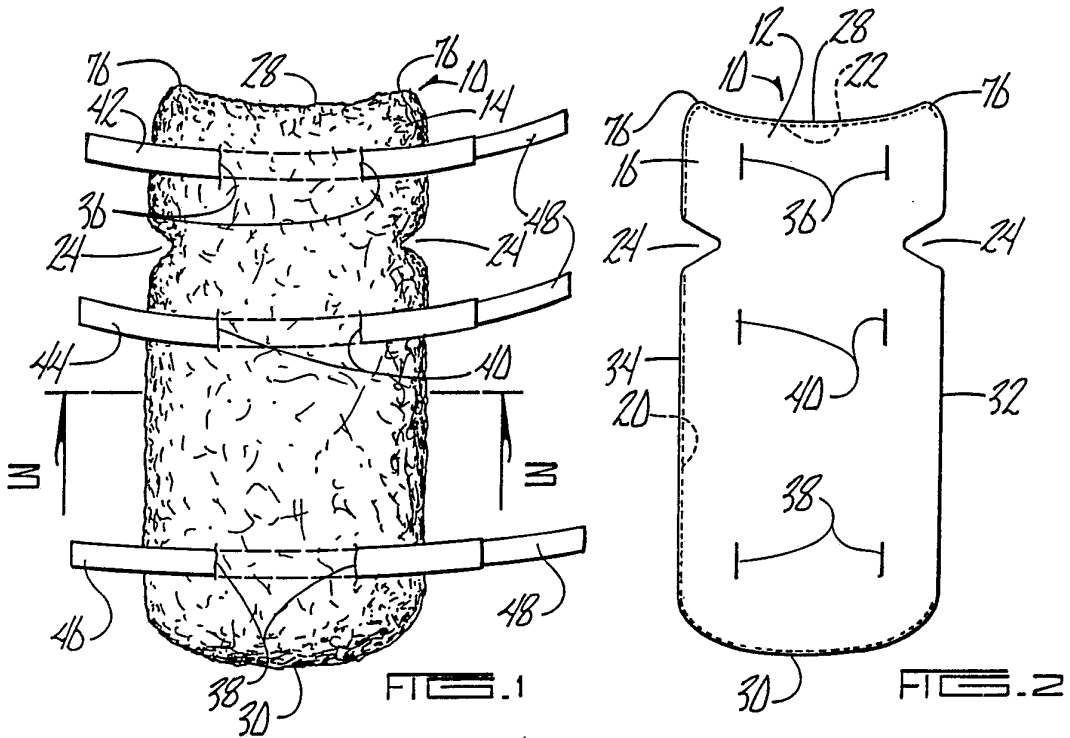
16.

The device of claim 8 wherein said first pair of slots are more widely spaced than said second pair of slots.

17.

The device of claim 6 wherein the vertical length of said pad normally extends from above the patient's knees to the bottom of the patient's feet, and the width of said pad is approximately one-half the girth of one of the patient's legs.

- 1 / 2 -



- 2 / 2 -

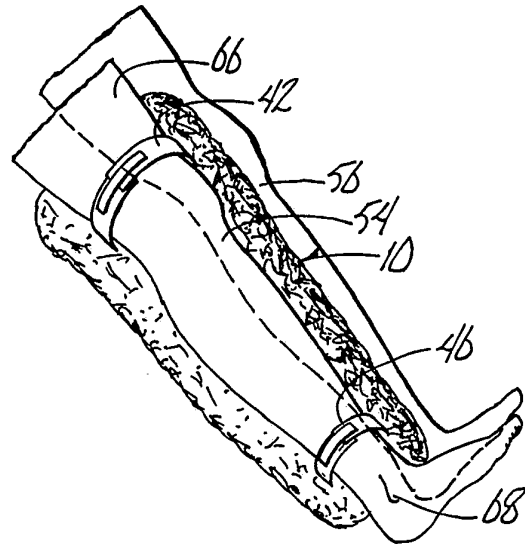


FIG. 6

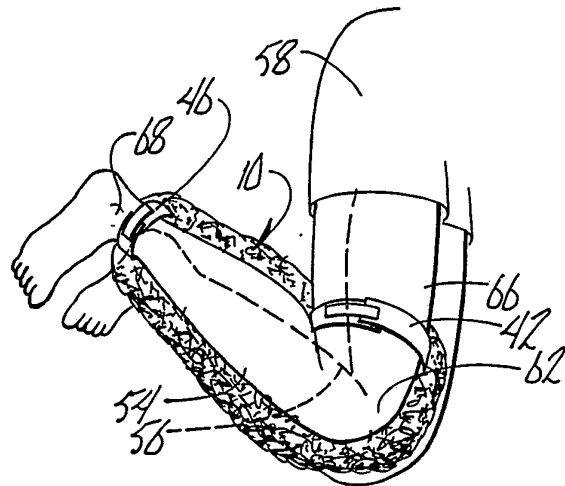
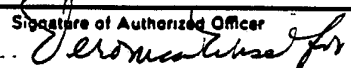
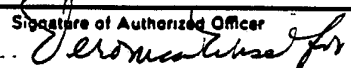
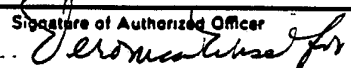


FIG. 7

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US90/00714

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) * According to International Classification (IPC) or to both National Classification and IPC IPC(5): A61F 5/30 U.S. CL.: 128/892																																			
II. FIELDS SEARCHED <div style="text-align: right; font-size: small;">Minimum Documentation Searched 7</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">Classification System</th> <th style="width: 80%;">Classification Symbols</th> </tr> <tr> <td style="text-align: center; vertical-align: top;">U.S.</td> <td>128/85, 87R, 87C, 94, 89R, 90, 153, 156, 165, 889, 891, 892, 894 2/22, 23, 24, 61, 62</td> </tr> </table> <div style="text-align: center; font-size: x-small;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8</div>			Classification System	Classification Symbols	U.S.	128/85, 87R, 87C, 94, 89R, 90, 153, 156, 165, 889, 891, 892, 894 2/22, 23, 24, 61, 62																													
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III. DOCUMENTS CONSIDERED TO BE RELEVANT 9 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%;">Category *</th> <th style="width: 60%;">Citation of Document, 11 with indication, where appropriate, of the relevant passages 12</th> <th style="width: 30%;">Relevant to Claim No. 1</th> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 696,764 (SHIBE) 01 April 1902</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 1,801,437 (LOWN) 21 April 1931</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 2,532,955 (SHOOK) 05 December 1950</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 2,606,554 (SIMON) 12 August 1952</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 3,785,371 (LEWIS) 15 January 1974</td> <td></td> </tr> <tr> <td style="text-align: center;">Y</td> <td>US, A, 3,911,497 (LEWIS, JR. ET AL) 14 October 1975, see figure 1</td> <td style="text-align: center; vertical-align: top;">8-10,16</td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 3,934,583 (HOLLINGSHEAD ET AL) 27 January 1976</td> <td></td> </tr> <tr> <td style="text-align: center;">Y</td> <td>US, A, 4,177,806 (GRIFFIN) 11 December 1979 see figure 1</td> <td style="text-align: center; vertical-align: top;">5</td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 4,198,708 (FUGERE ET AL) 22 April 1980</td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td>US, A, 4,433,682 (BADRA) 28 February 1984</td> <td></td> </tr> </table>			Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 1	A	US, A, 696,764 (SHIBE) 01 April 1902		A	US, A, 1,801,437 (LOWN) 21 April 1931		A	US, A, 2,532,955 (SHOOK) 05 December 1950		A	US, A, 2,606,554 (SIMON) 12 August 1952		A	US, A, 3,785,371 (LEWIS) 15 January 1974		Y	US, A, 3,911,497 (LEWIS, JR. ET AL) 14 October 1975, see figure 1	8-10,16	A	US, A, 3,934,583 (HOLLINGSHEAD ET AL) 27 January 1976		Y	US, A, 4,177,806 (GRIFFIN) 11 December 1979 see figure 1	5	A	US, A, 4,198,708 (FUGERE ET AL) 22 April 1980		A	US, A, 4,433,682 (BADRA) 28 February 1984	
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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 50%;"> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"A" document member of the same patent family</p> </div> </div>																																			
IV. CERTIFICATION <table style="width: 100%;"> <tr> <td style="width: 50%;">Date of the Actual Completion of the International Search</td> <td style="width: 50%;">Date of Mailing of this International Search Report</td> </tr> <tr> <td style="text-align: center;">24 April 1990</td> <td style="text-align: center; font-size: 1.5em;">07 JUN 1990</td> </tr> <tr> <td>International Searching Authority</td> <td>Signature of Authorized Officer</td> </tr> <tr> <td style="text-align: center;">TSA/US</td> <td style="text-align: center;">  Kevin G. Rooney </td> </tr> </table>			Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	24 April 1990	07 JUN 1990	International Searching Authority	Signature of Authorized Officer	TSA/US	 Kevin G. Rooney																									
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FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

$\frac{X}{Y}$	US, A, 4,736,477 (MOORE) 12 April 1988 see figure 3	$\frac{1-3}{4-17}$
$\frac{X}{Y}$	US, A, 4,327,714 (SPANN) 04 May 1982 see figures 1 and 2	$\frac{1-6,14,15,17}{4,6-17}$
$\frac{X}{Y}$	US, A, RE30,444 (SPANN) 09 December 1980 see figures 1 and 5	$\frac{1-6,14,15,17}{4,6-17}$

V ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE:

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____ because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers _____ because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out ¹³, specifically:

3. ☐ Claim numbers _____ because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING:

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims: it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority invites payment of any additional fee.

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.