



12

**EUROPEAN PATENT APPLICATION**

21 Application number: 89850436.0

51 Int. Cl.<sup>5</sup>: **A47C 27/08**

22 Date of filing: 15.12.89

30 Priority: 09.01.89 NO 890079

43 Date of publication of application:  
18.07.90 Bulletin 90/29

84 Designated Contracting States:  
**DE IT NL SE**

71 Applicant: **Barbulla, Winfried Peter  
Bregneveien 22  
N-1825 Tomter(NO)**

72 Inventor: **Barbulla, Winfried Peter  
Bregneveien 22  
N-1825 Tomter(NO)**

74 Representative: **Onn, Thorsten et al  
AB STOCKHOLMS PATENTBYRA Box 3129  
S-103 62 Stockholm(SE)**

54 **An arrangement in connection with a water bag for a water mattress, and a method of manufacturing the same.**

57 An arrangement in connection with a water bag (1) for a water mattress, comprising a mattress base (2) of a flexible material with a recess (3) in its top face for receiving water bag (1) which is designed with a flat top (1a) and a at least in filled condition downwards curved bottom (1b) consisting of two sheets (1a', 1b') which are joined by welding or glueing along their lateral edge portions. Said two joined sheets (1a', 1b') form a reinforcing framelike edge portion (4) around water bag (1) which is intended to sit in contact with the top face portions (2a) of mattress base around recess (3), thus, to reduce folding when there is a load on the water bag and to prevent ruptures due to fatigue and water leakage.

The framelike edge portion (4) may be made so wide as to hang down along the lateral faces (2b) of mattress base (2), and it may, if desired, be folded in under the mattress base. The hanging down frame portions (4a - 4d) are joined at their lateral edges by welding to form a frame casing (5) the lower portions of which (4a', 4b') are folded inwards and joined by welding to form a convergence (5a) so that water bag (1) is firmly held on mattress base (2).

FIG.2

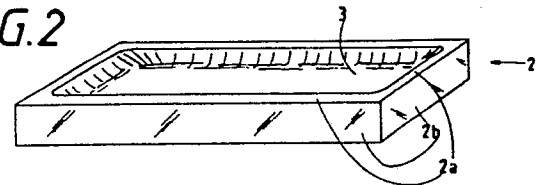


FIG.4

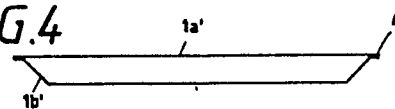
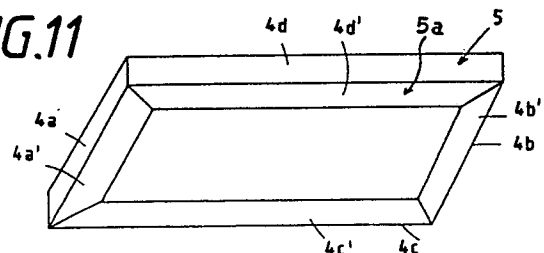


FIG.11



**AN ARRANGEMENT IN CONNECTION WITH A WATER BAG FOR A WATER MATTRESS, AND A METHOD OF MANUFACTURING THE SAME**

The present invention relates to an arrangement of a water mattress, as stated in the preamble of the following independent claim 1, and a method of manufacturing the same.

Water beds and water mattresses are built with a water bag which sits on a support and is surrounded by a soft or firm frame.

Water bags with large or small depth of water are used. Water bags having a small depth of water are used in so called light weight water mattresses of the kind mentioned above.

This kind of water bags having a small depth of water and being placed in a recess, e.g. on top of a mattress base, e.g. of foamed plastic or foamed rubber, tend to fold or wrinkle in the edge zones at the head and foot ends of the water bag when there is a load on top of the water bag. This is due to the fact that there is no large volume of water and, thus, load of water at the edges of the water bag to force it down into frictional contact with the top face portions of the mattress base around said recess. The edges of the water bag, thus, are readily pulled down towards the middle of the water bag in case of a load, resulting in said wrinkling. In case of such a load diagonal folds occur from the edge portions of the water bag at the foot and head ends, and with undulations of the water in the water bag when it is in use, such folds will cause sequential bending of the water bag material. Such repeated bending in connection with tensional load on the water bag material may cause ruptures of the material and water leakage.

It is an object of the present invention to provide a water bag where the above mentioned disadvantages are substantially reduced or eliminated, which is achieved by the characterizing features appearing from the characterizing part of the following independent claim 1, as well as from the following dependent arrangement claims.

Furthermore, the invention relates to a method of manufacturing such a water bag, which is achieved by the aid of the features stated in the subsequent independent method claim as well as in subsequent dependent claims.

According to the invention reduced wrinkle/fold formation at the edges of the water bag is, thus, achieved by the fact that top and bottom of the water bag consist of two sheets which are mutually connected by welding or glueing along their lateral edge portions, which two mutually connected sheets form a reinforcing framelike edge portion about the water bag, intended for being in contact with the top face portions of the mattress base around the recess of the latter. In this manner a

welded framelike edge portion is achieved about the lateral edges of the water bag which contributes to stiffen the lateral edges of the water bag towards the recess and top face portions of the mattress base and, consequently, there will be reduced wrinkle/fold formation of the top of the water bag and, thus, reduced hazard of ruptures of the material.

Such welding about the edges of the water bag top may be carried out on existing water bags which are, e.g. built from sleeve shaped material with a longitudinal weld, and two transversal welds at the head and foot ends of the water bag. For manufacturing new water bags, the latter are built from two sheets which are welded together, as stated above and in the following claim 1. The sheets which consist of a flexible, waterproof and, preferably, weldable sheet material are combined about all lateral edges, e.g. by a flat weld. The top sheet is plane, whereas the bottom sheet may either be plane or deep drawn by preliminary vacuum forming to form the above mentioned downwards curving bottom, or the bottom sheet may be shaped by corner cutting to provide the bottom sheet with a desired hollow shape.

In order to achieve better grip between mattress base and the framelike edge portion surrounding the water bag, it may be prudent to design the framelike edge portion with so large a width that it will hang down along the lateral faces of the mattress base in use, and the frame portions may be welded together so that all frame portions together form an enclosure surrounding the lateral faces of the mattress base. In order to achieve further improved grip between mattress base and frame portions of the bag, it is possible to extend said frame portions additionally so that they may be folded back beneath the mattress base and welded at the corners to form a convergence which will keep the water bag in place on the mattress base and substantially will reduce folding of the top of the water bag when the latter is loaded.

As mentioned above, top and bottom sheets are used for manufacture of the water bag, which top and bottom sheets are welded together along their opposite longitudinal side portions, and at the head and foot ends by the aid of flat and/or lap welding to form the stiffening framelike edge portion. By using either a top sheet or a bottom sheet which extends beyond the other sheet, it is possible to provide said wide frame portions which by the aid of folding and welding may form said frame enclosure to surround the sides of the mattress base, with further convergence beneath the mat-

ress base.

Some embodiments of the invention will be disclosed in more detail below with reference to the drawings, where

Figure 1 shows a loaded water bag with the mentioned folds/wrinkles formed in the top face and edge portions;

Figure 2 shows a mattress base for use with water bags as mentioned;

Figure 3 shows a water bag according to the invention before top sheet and bottom sheet are welded together;

Figure 4 shows the same in a welded state and in a side elevation;

Figure 5 shows a water bag, as seen directly from above with non-parallel longitudinal edges;

Figure 6 is a perspective view of a water bag with extended frame portions at the head and foot ends;

Figure 7 shows a water bag with extended frame portions at two opposite edges;

Figures 8 and 9 are perspective views of a water bag with a wide surrounding framelike edge portion and with curved lateral edges in Figure 9;

Figure 10 is a perspective view of the water bag with the wide frame portions folded down, torch cut at the corners, and with corner flaps partly removed;

Figure 11 shows the water bag in a perspective view, as seen from below, and with the hanging down frame portions cut into a frame enclosure and with the lower portion of said frame folded in and cut to form a convergence; and

Figure 12 shows various embodiments of the connection between the top and bottom sheets of the water bag.

As shown in Figure 1, a water bag for a water mattress comprises a flat top 1a, and a bottom 1b which is eventually curved downwards. The water bag is intended for lying in contact with a recess 3 in a mattress base 2 and with its top portions 2a around recess 3, with its bottom and lateral portions 1c, as shown in Figure 2.

As shown in Figure 1, in case of a load P, the top of the water bag will form wrinkles or diagonal folds outwards from the edges of the water bag at the foot and head ends when water bag 1 is placed on mattress base 2. In case of wave motion in the water, top 1a and edge portions 1c of the water bag and partly adjacent portions of bottom 1b as well will be subjected to repeated movement which, together with a tension load on the material may cause ruptures of the material and water leakages.

In order to reduce said formation of folds, water bag 1 is designed with a slightly more rigid surrounding framelike edge portion 4, as shown in Figure 4, which frame is provided when a top sheet 1a' is welded to a bottom sheet 1b', causing top

and bottom sheets 1a', 1b' to form said more rigid frame 4 in the welded area. The provided framelike edge portion 4 is shown in Figure 4. Top sheet 1a' is preferably plane, whereas bottom sheet 1b' may be curved down in the longitudinal and transversal directions, so that a shape corresponding to recess 3 in mattress base 2 is achieved. This design of bottom sheet 1b' may be achieved by deep drawing in case of vacuum forming, or the sheet may be provided with corner cuts 1c providing bottom sheet 1b' with said shape. If there is, e.g. a smaller distance between corner cuts 1c at the foot end of the water bag or corner cuts 1c at the head end of the water bag, a water bag with non-parallel lateral edges is achieved, as shown in Figure 5. Such a design of the water bag in connection with a corresponding design of recess 3 of mattress base 2 will cause a smaller volume of water in water bag 1 and, thus, a more lightweight water mattress.

The framelike edge portion 4 of water bag 1 may be designed with extended width of opposite frame portions 4a, 4b at the head and foot ends of the water bag, as shown in Figure 6, if desired, of both longitudinal lateral edges 4c, 4d, as shown in Figure 7, or of all its edges, as shown in Figures 8 and 9.

If, e.g. the wide frame portions 4a, 4b, if desired 4c, 4d, or all wide frame portions are folded down between mattress base and frame in a bed where mattress base 2 is provided, the frame portions will be firmly clamped between mattress base and bed frame, which will cause good stabilization of the water bag 1 on mattress base 2, as well as reduced folding at the lateral edges of the water bag.

By taking in the corners of frame portions 4a-4d in Figures 8 and 9 in a folding operation, as shown in Figure 10, and joining the frame portions by welding, a frame enclosure 5 is formed which will surround the lateral faces 2b of mattress base 2. Flaps A which are formed in connection with welding, may be removed in connection with welding operations. A good form-fit is, thus, achieved for water bag 1 on mattress base 2, as well as good grip between mattress base and water bag. In order to achieve further stabilization of water bag 1 on mattress base 2, especially when the water mattress is to be used in beds without side frame pieces, the frame casing 5 may continue down beneath water mattress 2, as shown in Figure 11. The lower portions 4a' - 4d' of frame casing 5 are, thus, folded 90° inwards and welded together at the corners to provide a convergence 5a to form a frame along edge areas of the underside of mattress base 2. When the water mattress is used, the weight of the water mattress, comprising a water bag with water and mattress base as well as the body weight of the user will, thus, urge said lower

portion - convergence 5a - of the frame casing towards the foundation, which will hold frame casing 5 and, thus, framelike edge portion 4 of the water bag and water bag 1 proper in place in recess 3 of mattress base 2.

Joining top sheet 1a' and bottom sheet 1b' of water bag 1 may be carried out in a number of different manners and by using various welds. By different localization of welds as regards the transition between top sheet and bottom sheet different properties may be achieved.

In Figure 12a a top sheet 1a' is shown which is wider than bottom sheet 1b'. Bottom sheet 1b' is here welded to the underside of top sheet 1a' by a flat weld 6. In Figure 12b bottom sheet 1b' is wider than top sheet 1a'. The top sheet is here welded to the bottom sheet by the aid of a lap weld 7. This means that the longitudinal edges of water bag 1 must be welded before the transversal welds are made at the head and foot ends of the water bag.

Figure 12c shows the same as Figure 12a, but with bottom sheet 1b' welded to top sheet 1a' by the aid of a lap weld 7.

Figure 12d shows the same as Figure 12b, but with lap weld 7 displaced further down towards the bottom of the water bag and adapted to a mattress base with approximately vertical recess sides.

## Claims

1. An arrangement in connection with a water bag (1) for a water mattress comprising a mattress base (2) of a flexible material, e.g. foamed plastic or foamed rubber, with a recess (3) in its top face for receiving water bag (1) which is designed with a flat top (1a) and a bottom (1b) that at least in filled condition is curved downwards, and the edge portions (1c) of which are in contact with the top face portions (2a) of mattress base (2) around recess (3), **characterized in** that top (1a) and bottom (1b) of the water bag comprise two sheets (1a', 1b') which are joined by welding or glueing along their lateral edge portions, said joined edge portions form a stiffening framelike edge portion (4) around water bag (1), intended to lie in contact with top face portions (2a) of the mattress base around recess (3).

2. An arrangement as stated in claim 1, **characterized in** that said framelike edge portion (4) is reinforced by at least one further flexible ply which is joined with the edge portions of both sheets (1a', 1b').

3. An arrangement as stated in claim 1 or 2, **characterized in** that said framelike edge portion (4) extends all the way out to the lateral edges of mattress base (2).

4. An arrangement as stated in claims 1 - 3,

**characterized in** that the inner corners of said framelike edge portion (4) are rounded.

5. An arrangement as stated in claim 3 or 4, **characterized in** that at least two opposite frame portions (4a,4b; 4c,4d) of said framelike portion (4) extend beyond the lateral edges of mattress base (2) and in a position for use hang down along the side faces (2b) of mattress base (2).

6. An arrangement as stated in claim 5, **characterized in** that the hanging down frame portions (4a-4d) of said framelike edge portion (4) are joined at their lateral edges and form a frame casing (5) for the side faces (2b) of mattress base (2).

7. An arrangement as stated in claim 6, **characterized in** that the hanging down frame portions (4a-4d), i.e. the frame casing (5), are longer than the thickness of mattress base (2) to be folded in under mattress base (2).

8. An arrangement as stated in claim 7, **characterized in** that the lower portions (4a'-4d') of frame casing (5) are folded in 90° and joined at the corners of frame casing (5) to form a convergence (5a) intended to sit tensioned in contact with the underside of mattress base (2) in use.

9. A method for manufacture of a water bag as stated in one or several of the preceding claims 1 - 8, **characterized in** that top and bottom sheets (1a', 1b') of water bag (1) are joined by welding along their opposite longitudinal side edge portions and at their head and foot ends by the aid of a flat and/or lap weld, if desired by glueing, to form the reinforced framelike edge portion (4).

10. A method as stated in claim 9, **characterized in** that the hanging down frame portions (4a-4d) are superimposed at their lateral edges and are flat welded at the same time as any occurring superfluous flaps (A) are removed for forming the frame casing (5).

11. A method as stated in claim 10, **characterized in** that lower portions (4a' - 4d') of frame casing (5) are folded 90° inwards and are welded at the corners to form a convergence (5a) of the frame casing (5), which will extend inwards beneath the bottom of mattress base (2) in a position for use and will hold water bag (1) firmly in its position in recess (3) of mattress base (2).

12. A method as stated in claims 9 - 11, **characterized in** that two sheets are utilized one of which (1a', 1b') is larger than the other and that said sheets are joined by welding with the larger sheet extending outwards, beyond the smaller sheet, causing the frame portions (4a - 4d) of the larger sheet (1a', 1b') to extend outwards, beyond the welded framelike edge portion (4) to be folded and welded to form frame casing (5) and, if desired, its convergence (5a).

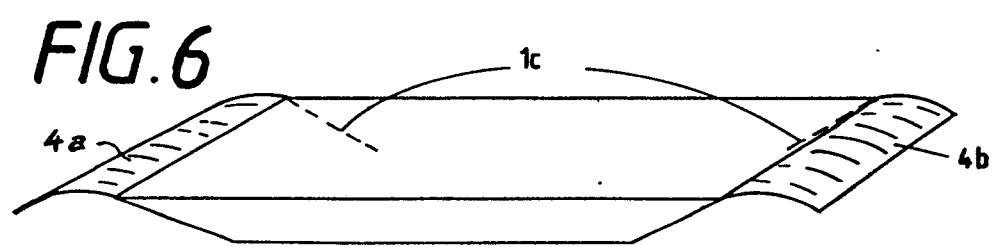
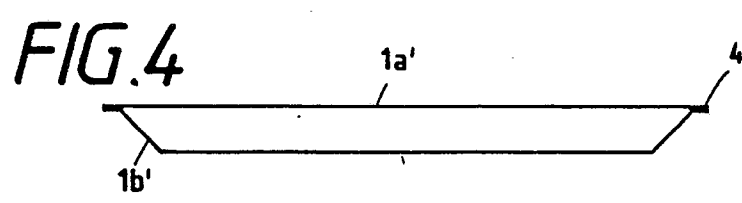
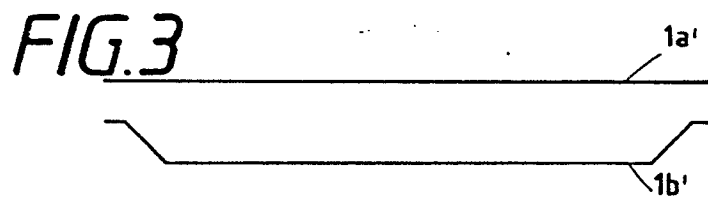
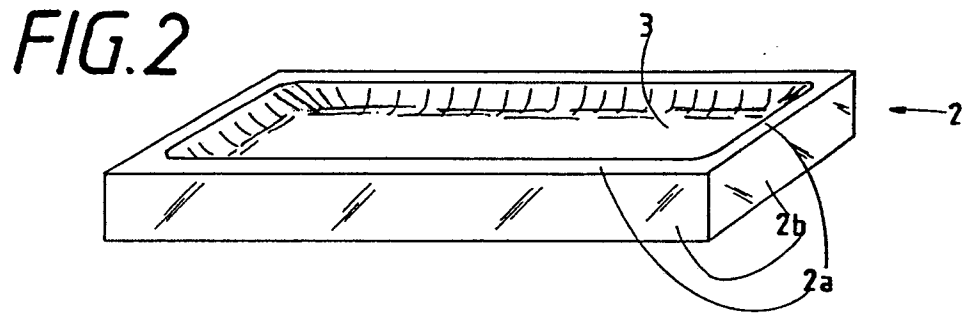
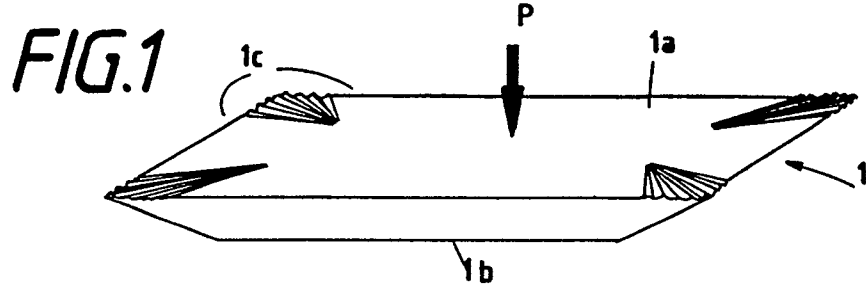


FIG.5

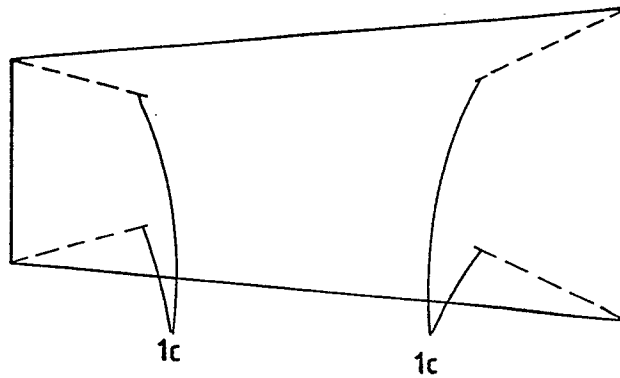


FIG.7

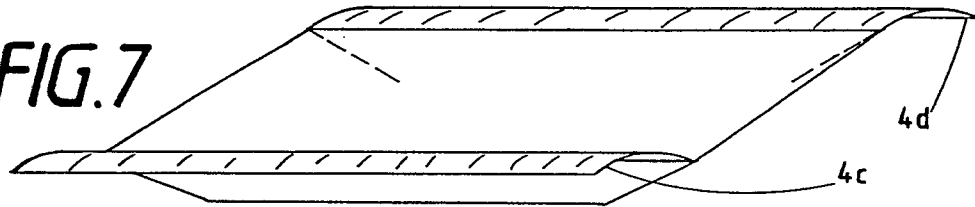


FIG.8

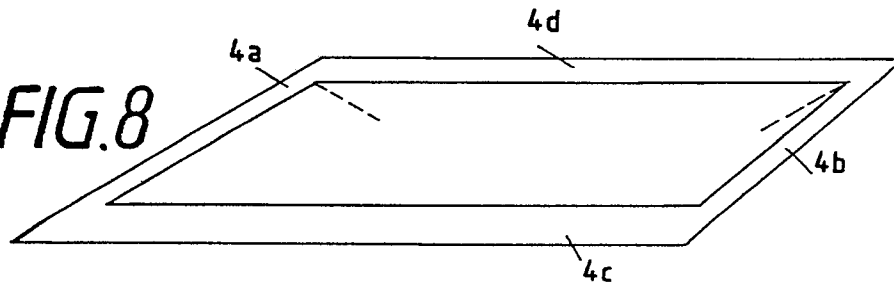


FIG.9

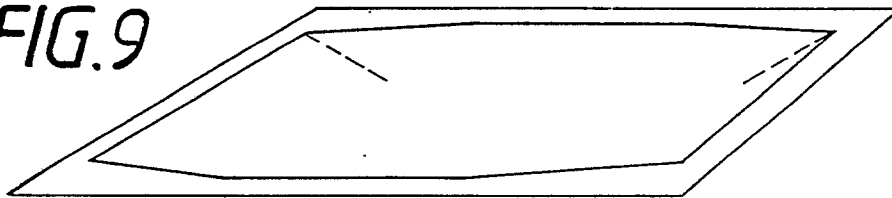
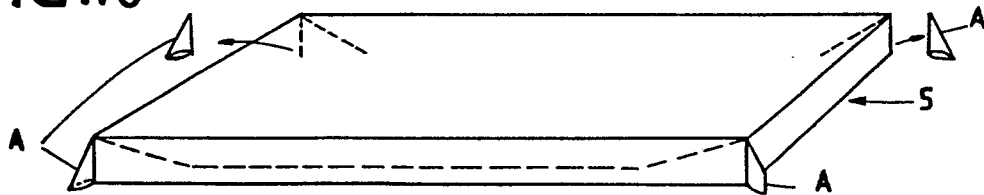
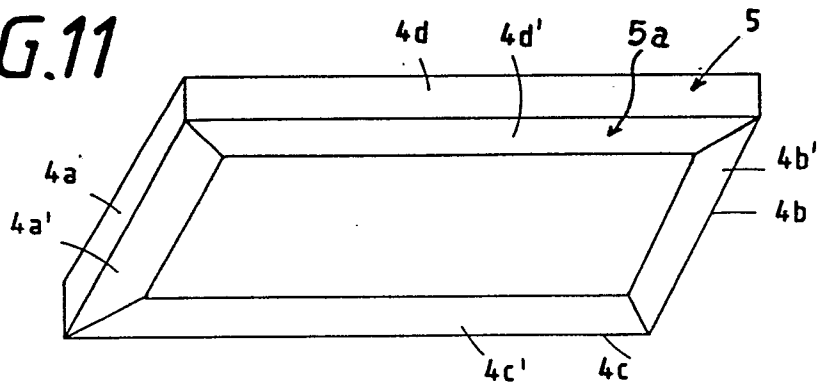


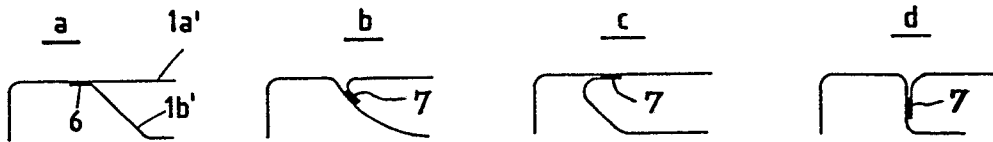
FIG.10



**FIG.11**



**FIG.12**





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.5)
X	US-A-3 456 270 (WEINSTEIN) * Column 4, line 67 - column 5, line 18; column 5, lines 46-51; figures *	1	A 47 C 27/08
A	---	3,5,6,7 8,9	
X	DE-A-1 554 178 (WEINSTEIN) * Page 8, lines 4-7; page 8, line 14 - page 11, line 9; page 14, lines 13-14; figures 1-7 *	1	
Y	---	2,3	
A	---	4	
Y	EP-A-0 240 479 (BARBULLA) * Column 3, line 63 - column 4, line 13; figures 1,2,8-12 *	2,3	
A	FR-A-2 607 387 (PETELET) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06-03-1990	Examiner VANDEVONDELE J.P.H.
<b>CATEGORY OF CITED DOCUMENTS</b> 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	