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GB 2395664 A **WO 2004/043312 A1**
WO 2001/019302 A1 **WO 1998/003135 A1**
JP 2001238905 A **US 6440159 B1**
US 4805620 A **US 4118946 A**
US 20080237209 A1 **US 20080195012 A1**
US 20050256556 A1 **US 20050228464 A1**

(58) Field of Search:
INT CL **A61F**
Other: **ONLINE: EPODOC, WPI**

(54) Title of the Invention: **Improvements in and relating to thermal treatment devices**
Abstract Title: **Thermal treatment device**

(57) A thermal treatment device 10 for wrapping around a human or animal subject, or a part thereof to modify the local temperature of the person or animal at the device 10, comprising a generally flexible jacket 12 having an inner surface and an outer surface; a resistive heating element 38; at least one concave region 22, 24, 26 for accommodating a body part in use, and attachment means 14, 16 for maintaining the device in position on the body part in use. Preferably there are four concave portions, with four straps connecting the corner portions.

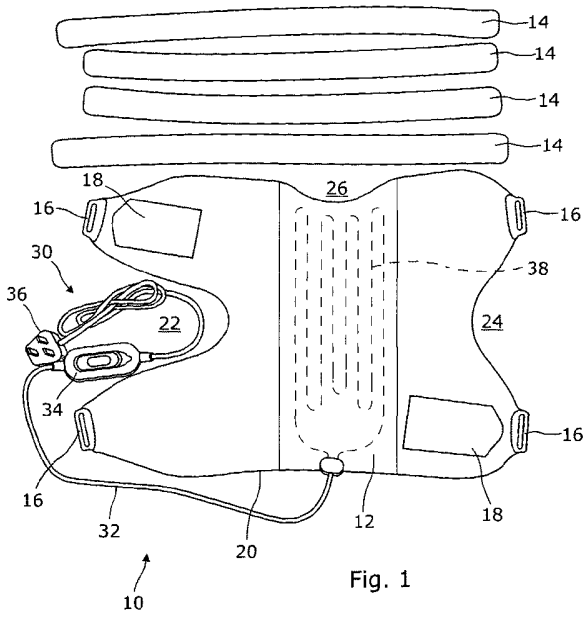

Fig. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

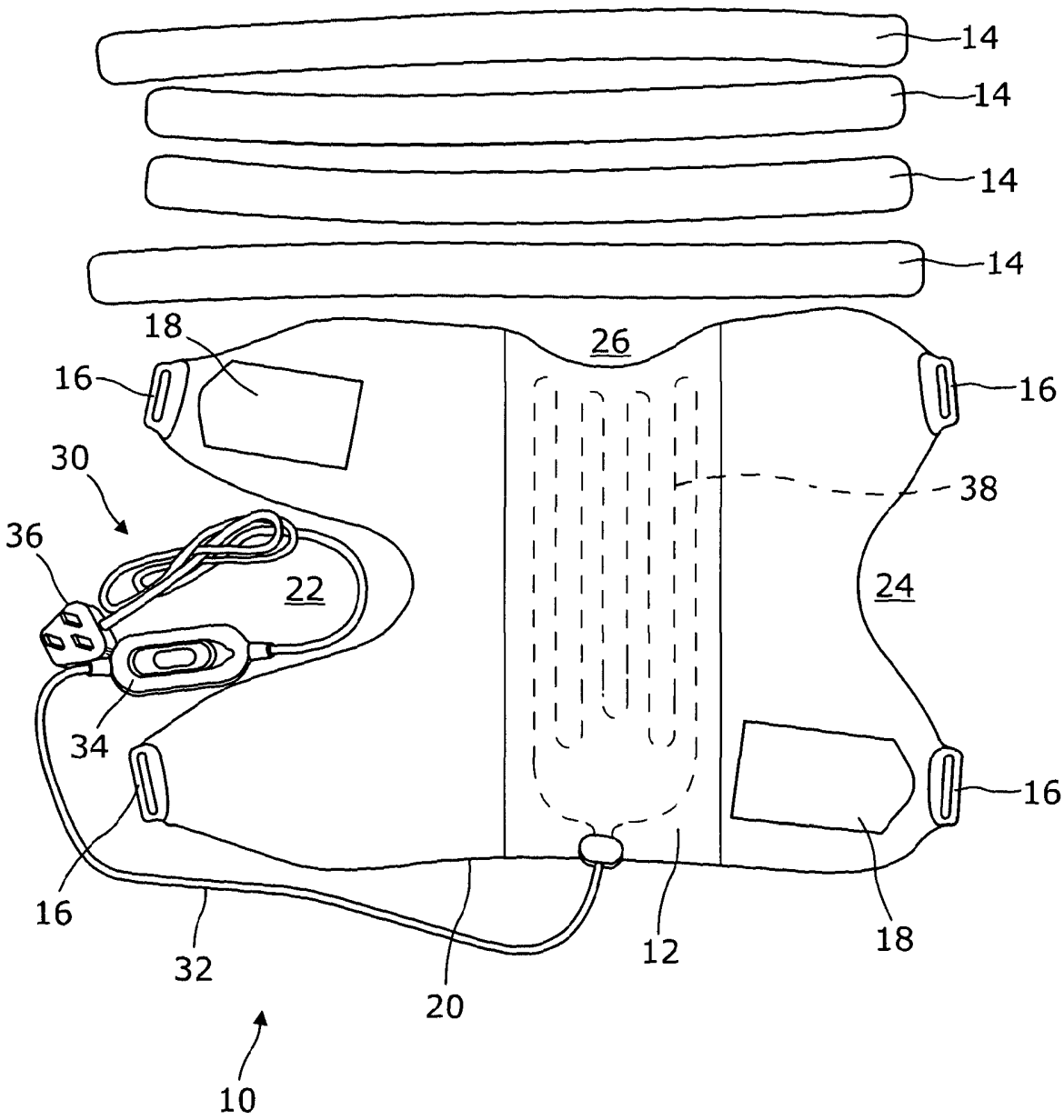

Fig. 1

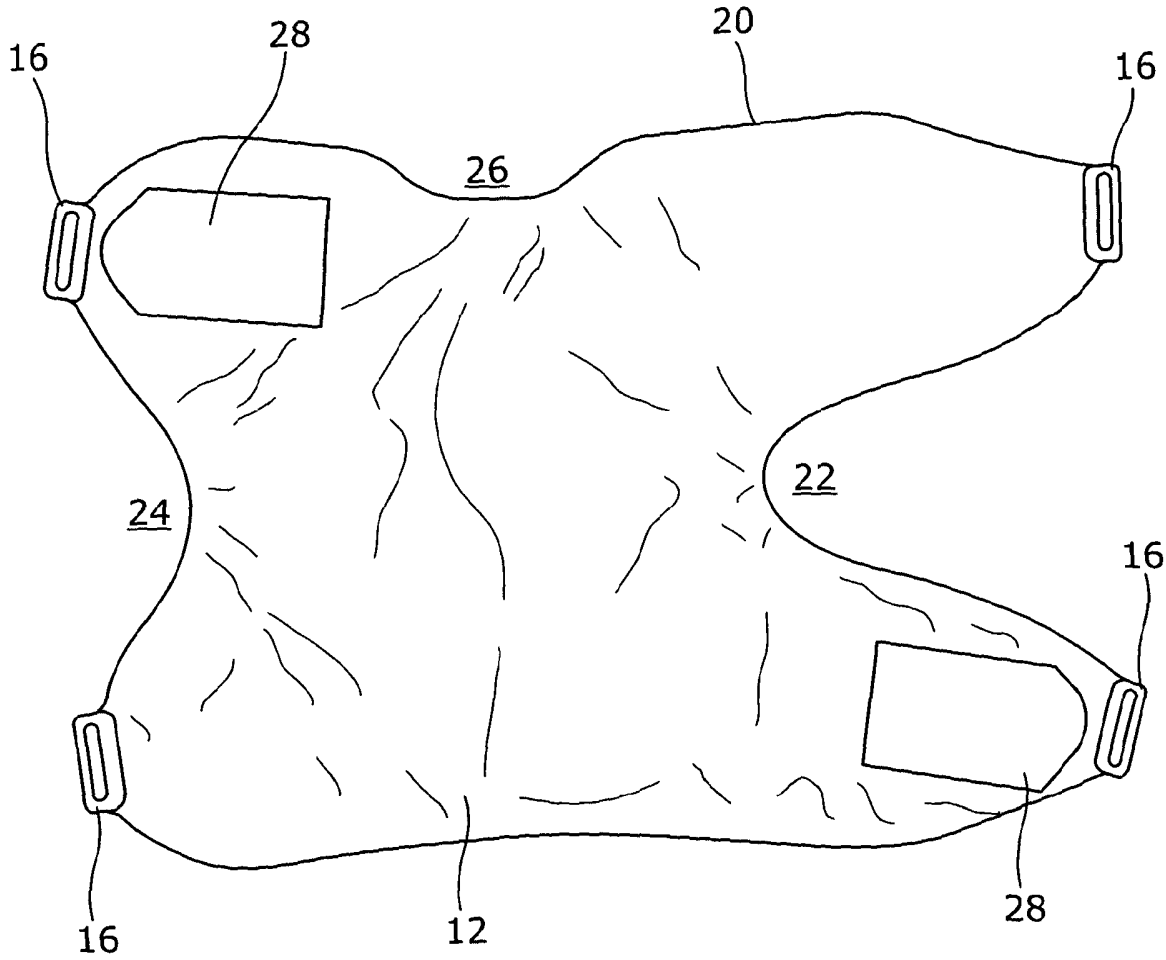

Fig. 2

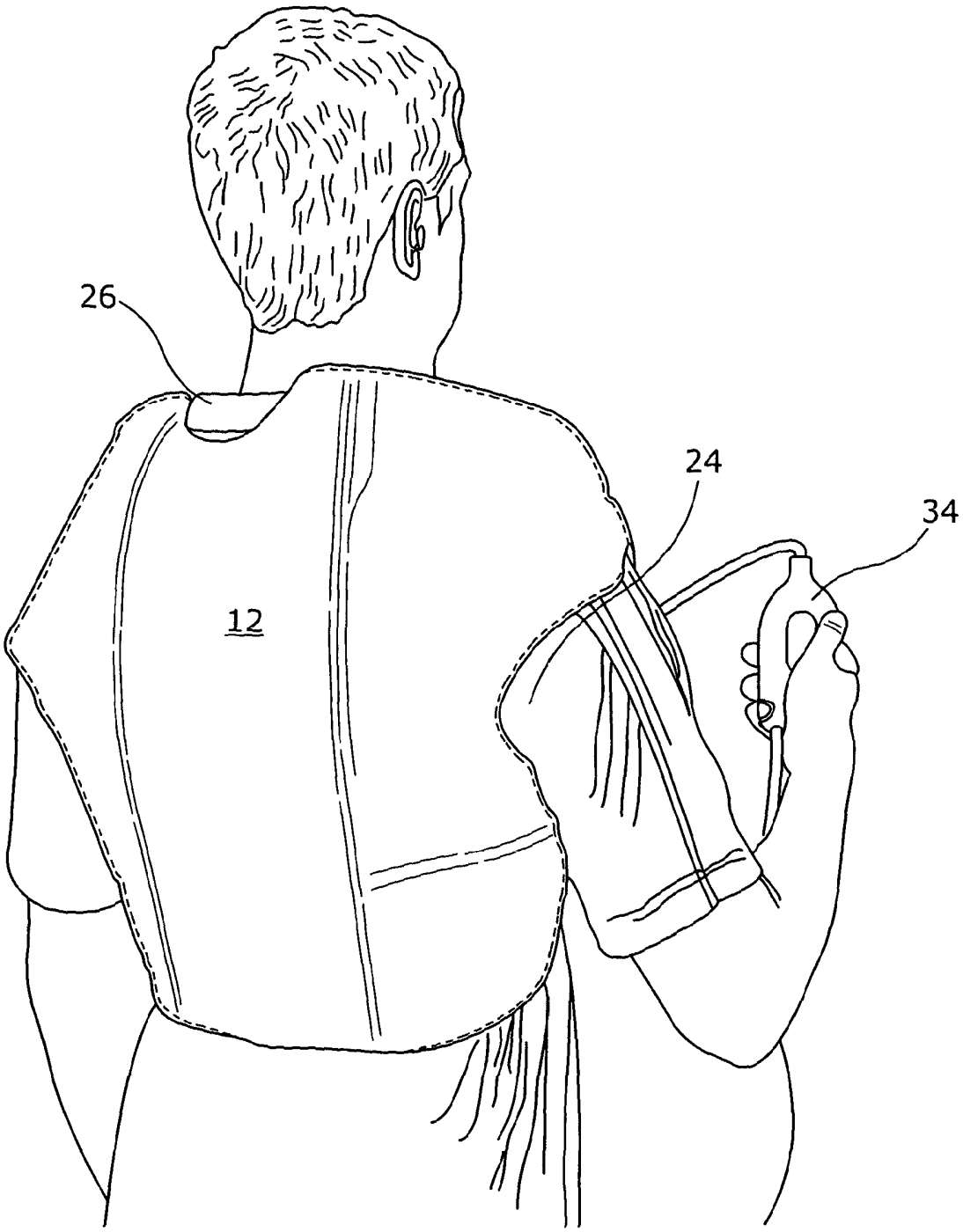

Fig. 3

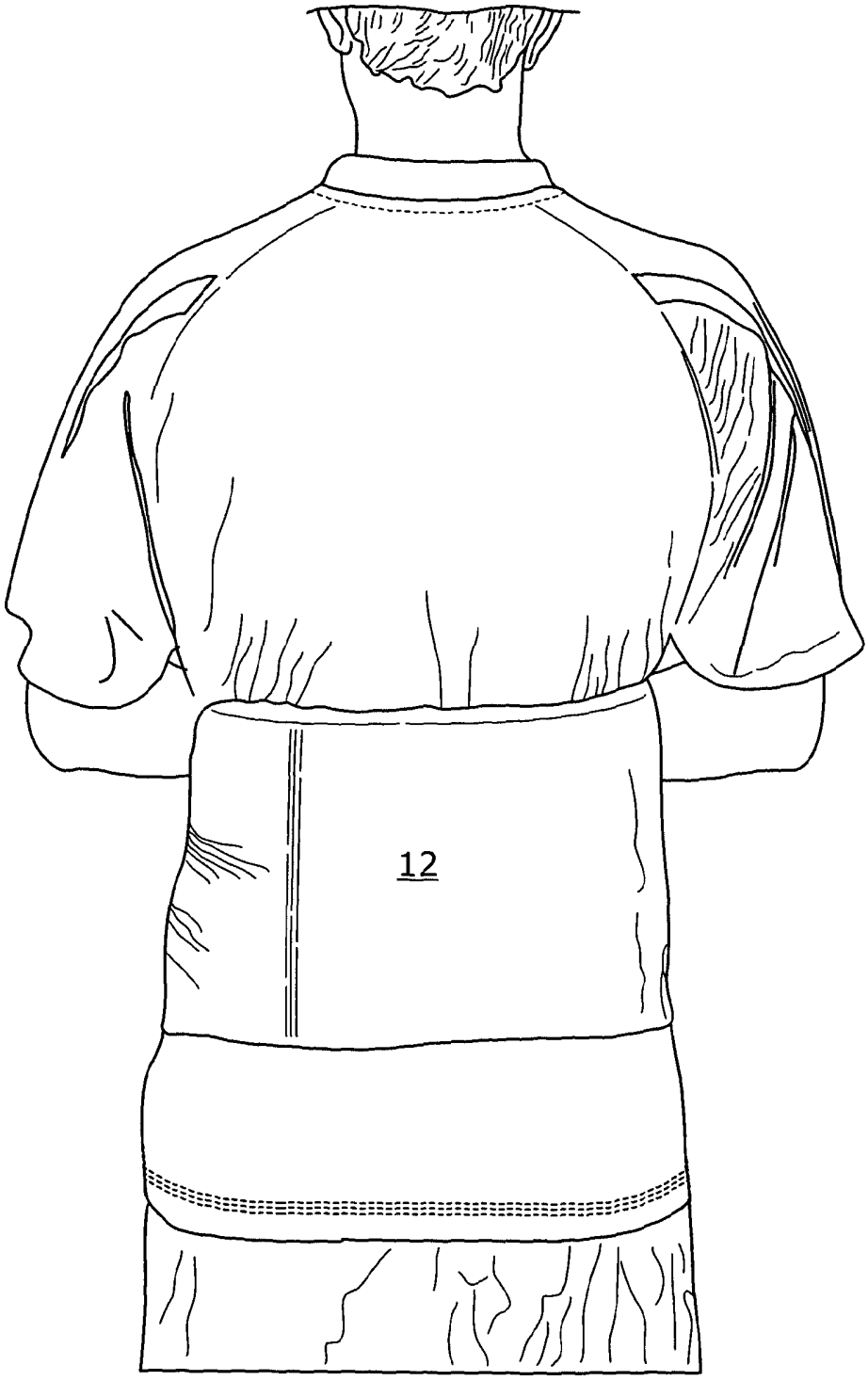

Fig. 4

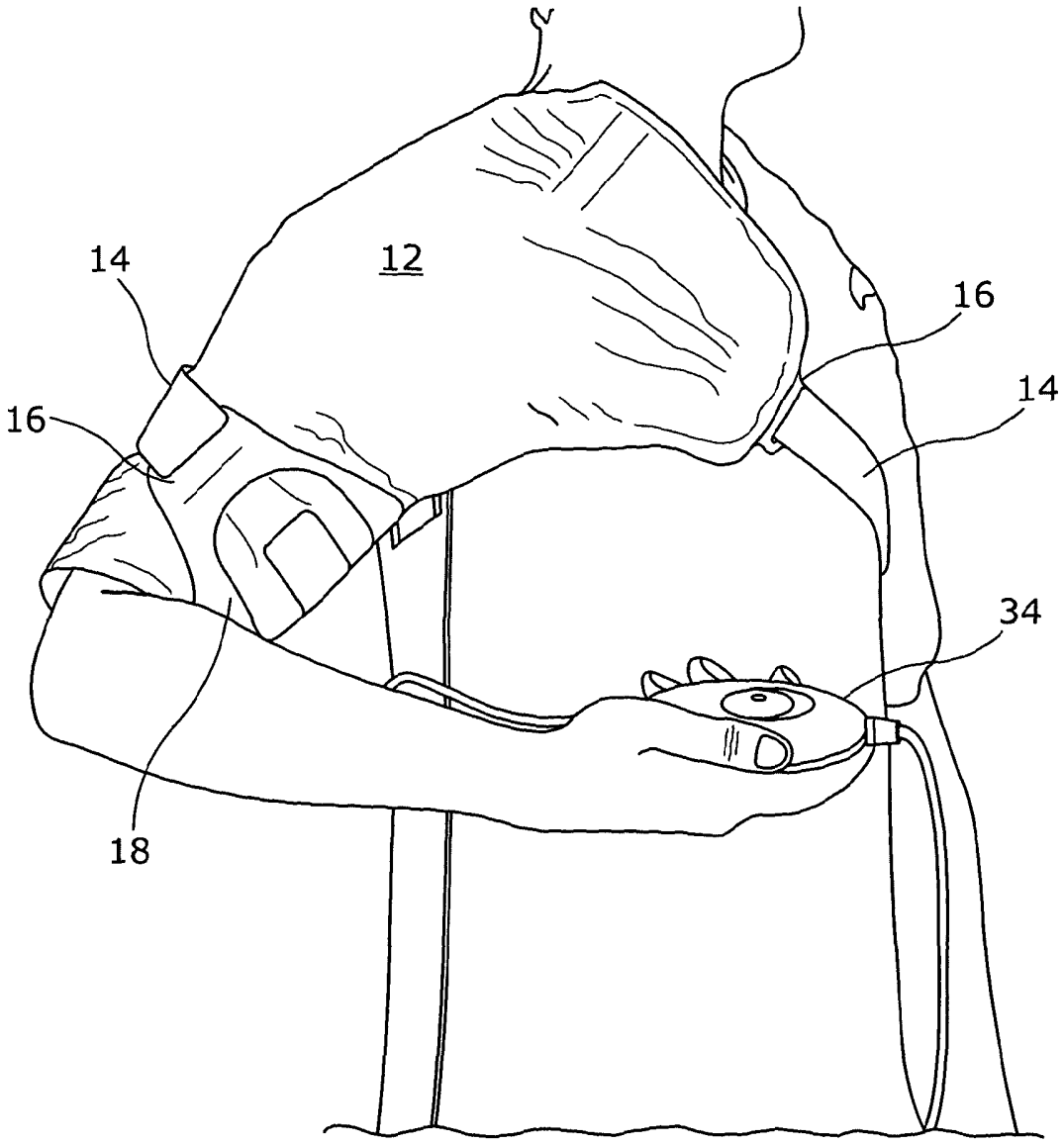

Fig. 5

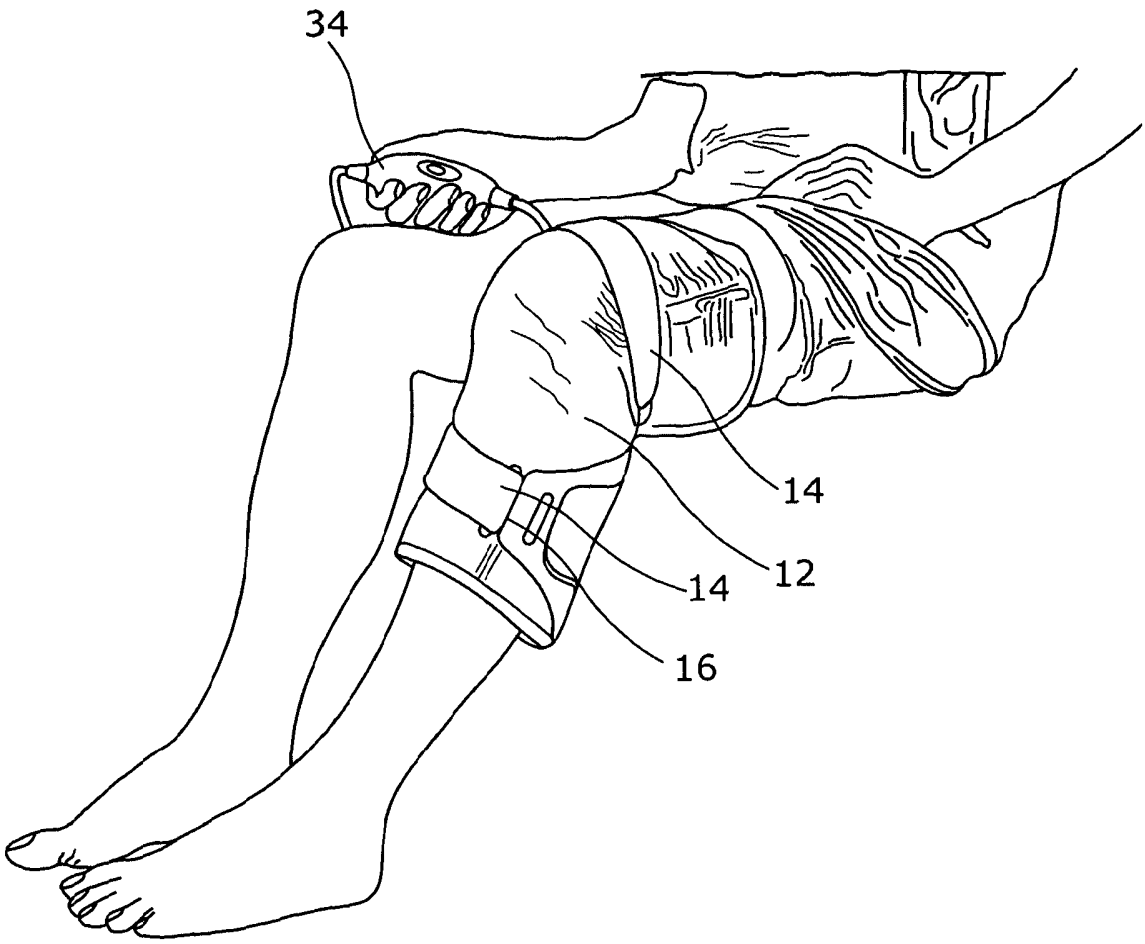

Fig. 6

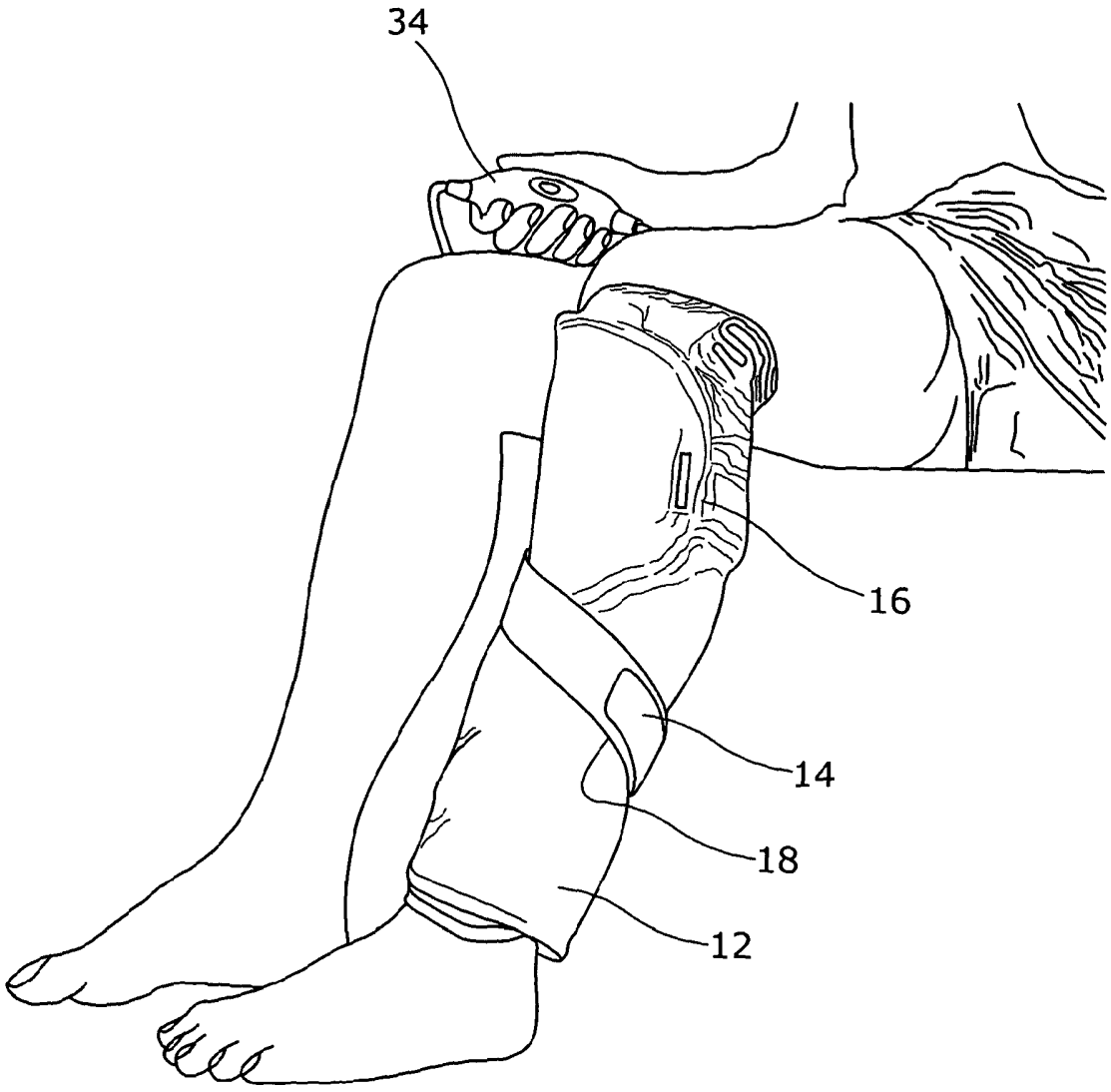

Fig. 7

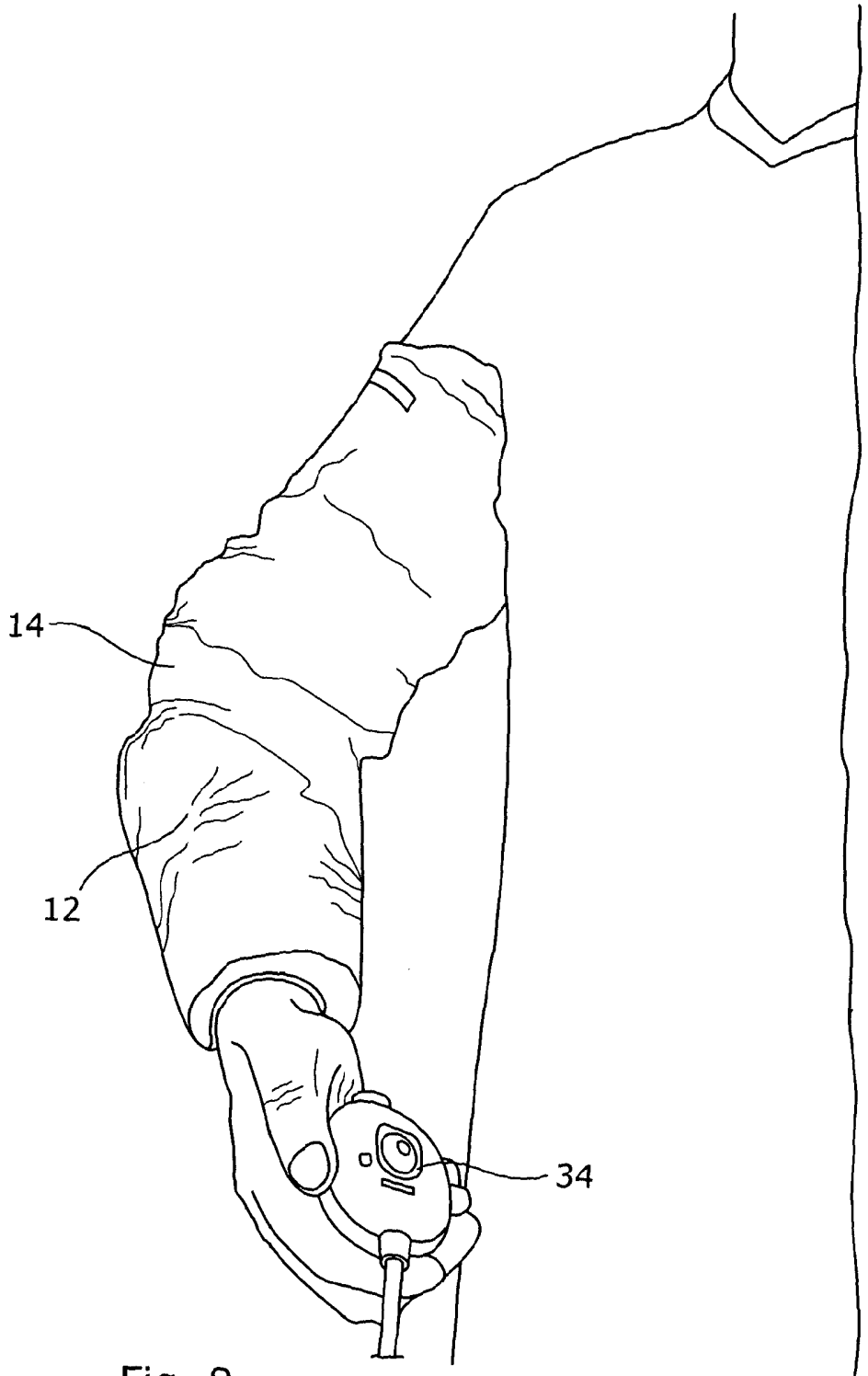

Fig. 8

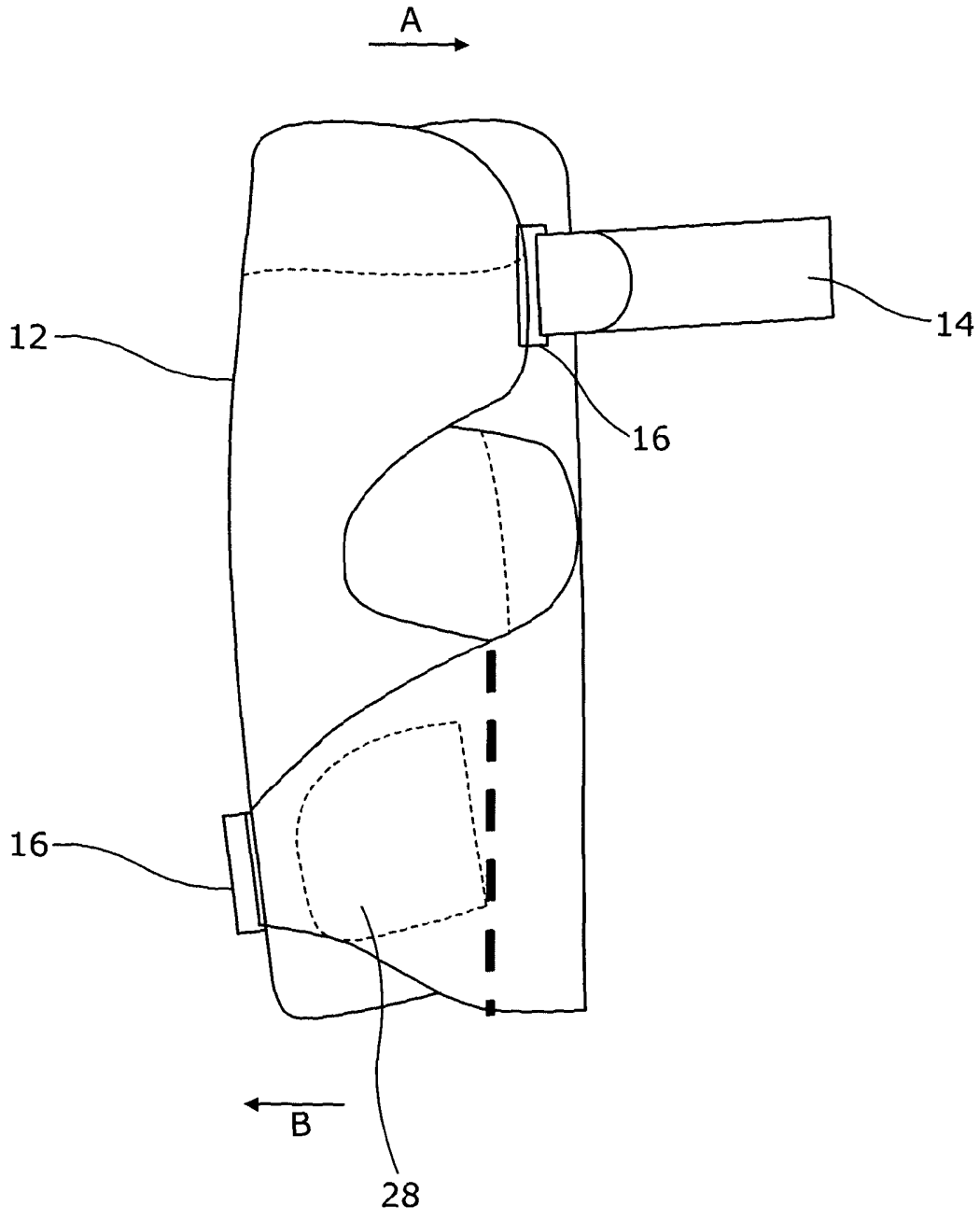

Fig. 9

Improvements in and relating to thermal treatment devices

This invention relates to a thermal treatment device for wrapping around a human or animal subject.

The use of heated materials to treat subjects is known. Such materials can be placed adjacent a joint, for example to ease joint pain. Keeping the heated material in place is usually achieved by using straps or the like. Although heated pads which can be secured around a person are commercially available, such as those described in GB patent application no. 2,395,664 and US patent application no. US2005/0256556, these known devices do not readily fit all parts of the body where the pads may be needed. The present invention seeks to overcome this problem.

According to the invention, there is provided a device for fitting to a part of the body of a person or animal for modifying the local temperature of the person or animal at the device, the device comprising a generally flexible jacket having an inner surface and an outer surface, a resistive heating element, the device further including an outer periphery having at least one concave region for accommodating a body part in use and attachment means for maintaining the device in position on the body part when in use.

In an embodiment the device further includes, spaced around the periphery, at least one pair of opposed strap means or strap retaining means as attachment means.

In an embodiment the at least one pair of strap means or strap retaining means are at least a strap buckle and at least one removable strapping piece.

In an embodiment said strap means or strap retaining means comprises a strap and a complementary buckle attached to the periphery of the jacket.

In an embodiment, said at least one buckle is positioned at a corner of the jacket. A further buckle is ideally situated in the diagonally opposite corner of the jacket from the first buckle. Further still, a buckle is located at each of the four corners of the jacket.

In an embodiment the jacket includes at least one region having one half of a hook and loop type fastening means and at least one region having a complimentary half of a hook and loop type fastening.

In an embodiment the jacket further includes regions adjacent one or more of the buckles at which is formed one half of a hook and loop type fastening.

Preferably the other half of the hook and loop fastening is formed on the or each strapping piece, and/or is formed on further regions of the jacket adjacent the buckles.

More preferably, either the hook or loop portions are arranged adjacent diagonally opposed buckles 16 on the upper surface of the jacket and the complimentary hook or loop portions are arranged on the lower surface of the jacket adjacent the buckles which do not have the hook or loop portions adjacent. In this configuration, the hook and loop portions on the upper portion of the jacket can be connected together as well as the lower hook and loop portions of the jacket. Also, the jacket can be wrapped around a limb by securing the upper left hand complimentary hook or loop portion to the lower left

hand complimentary hook or loop portion and the upper right hand hook or loop portion to the lower right hand hook or loop portion.

The device further includes an electrical cable for supplying power to the heating element.

Preferably, the supply cable includes a control for controlling said power.

Preferably the supply cable is connected to the jacket at its periphery and between opposed buckles.

In an embodiment the at least one concave region is positioned at the side of the jacket.

In an embodiment, the periphery has two concave regions. In a further embodiment these two concave regions extend toward each other.

In an embodiment, the periphery comprises at least three concave regions where a first and second concave region extend toward each other and at least one further concave region extends toward the first and second concave regions.

In an embodiment the invention extends to a generally flat jacket for fitting to a human or animal subject, the jacket having four concave peripheral sides and four corners at each of which strap buckles are provided.

The invention extends also to any novel combination of features of the device described herein.

The invention may be performed in various ways. By way of example only one embodiment of the invention is described below, with reference to the accompanying drawings, wherein:-

The invention can be put into effect in numerous ways, one embodiment

only being described in detail below, with reference to the drawings wherein:-

Figure 1 shows a thermal treatment device laid out flat;

Figure 2 shows the reverse side of the device shown in Figure 1; and

Figures 3 to 8 show the device shown in Figures 1 and 2 in use.

Figure 9 shows the device in an in use configuration.

Referring to Figure 1 there is shown a thermal treatment device 10 in the form of a flexible padded jacket 12, which can be attached to a person, or animal, by means of up to four straps 14 which may attach to any one of four strap attachment means 16 spaced around the periphery of the jacket 12. A loose end of the strap 14 can be wrapped around a body part and perhaps the jacket and secured by means of hook and loop type fastening at the securing pads 18.

It will be observed that there are two pairs of strap attachment means 16 in the form of buckles, one pair at the left of the jacket 12 and one pair at the right of the jacket. It will also be observed that between each pair of buckles 16 the periphery 20 has concave regions. Thus, a concave region 22 is formed between the left hand pair of buckles 16 and a concave region 24 is formed between the right hand pair of buckles 16. The concave regions 22 and 24 extend toward each other. In addition, a further concave region 26 is formed between the upper pair of buckles 16. The periphery which is lowermost in Figure 1 is also slightly concave. Thus, the jacket, when laid out flat as illustrated in Figure 1, obtains an approximately X-shaped periphery.

The device 10 has a jacket temperature modifying means in the form of an electrical heating means 30. The heating means is formed from an electrical

resistance heating element 38 between inner and outer surfaces of the jacket 12. The heating element 38 is supplied with power by an external supply cable 32, which in turn is connected to a control unit 34 supplied by an electrical plug 36 connectable to an electric socket. The control unit allows a user to control the power supplied to the heating element 38. Together, the heating element 38, supply cable 32, control unit 34 and supply socket 36 form an electrical heating means 30.

Figure 2 shows the reverse side of the jacket 12. This reverse side of the jacket also includes strap fastening regions 28 for securing the straps 14 with the aid of a hook and a loop type fastening.

The concave regions 22, 24 and 26 aid the fitting of the jacket 12 to a limb, joint or other body part such that the jacket can be fitted to most parts of the body reasonably comfortably.

It will be noted in Figure 1 that the electrical supply cable 32 is attached to the periphery 20 of the jacket 12 opposite the concave region 26. This means that the controller 34 can be operated by the user of the device 10 comfortably in all the anticipated configurations of the jacket on the body.

Figure 3 shows the jacket 12 fitted to the back of a user with the concave regions 26 and 24 providing space for the user's neck and right arm respectively. The controller 34 can be used comfortably in the configuration shown in Figure 3. Firstly, the user lays out the jacket with the outer surface facing up. Secondly, the user attaches straps 14 to the buckles 16 located on the left of the jacket 12 and to the upper right buckle by feeding the strap through the buckle and then fastening back on itself by the hook and loop

fastening means on the strap. The inner surface of jacket 12 is placed against the book of a user such that one concavity accommodates the neck of the user and two concave regions 22, 24 accommodate the arms of the user. The strap 14 from the top left buckle 16 is crossed over the user's chest so that it can be connected to the lower right hand side of the jacket at loop or hook fastening region 18 or buckle 16. The strap 14 from the top right buckle 16 is crossed over the user's chest so that it can be connected to the lower left hand side of the jacket at loop or hook fastening region 28 or buckle 16. The lower strap is passed around the front of the user's waist and is connected at buckle 16 on the lower right hand side.

Of course the user can attach the straps to buckles in any configuration to maintain the jacket in place depending upon the user's requirements.

Figure 4 shows the jacket 12 folded in half and fitted around the lower back of a user with the straps hidden from view. The jacket can be held in place by the straps and buckles or by using the hook and loop fastening regions 18, 28 or by using a combination of both of these.

Figure 5 shows the jacket 12 fitted to the shoulder of a user. In this configuration, one strap 14 extends across the chest of the user and under the user's arm (his left arm in this case) and across the back of the user for securing to an upper portion of the jacket 12. A lower portion of the jacket 12 is wrapped around the user's arm with a further strap 14 connected to a buckle 16 and secured also at the hook and loop-type fastening region 18.

Figure 6 shows the jacket 12 wrapped around a user's knee, and it will be noted that the shape of the jacket 12 allows the user to bend his knee when the

jacket 12 is fitted. In this case, a single strap 14 extends in a generally spiral path around the jacket 12 for securing the same to the user's leg.

The user first lays out the device 10 in the configuration shown in Figure 1. A strap 14 is attached to buckle 16 at the lower left portion of the jacket. The jacket 12 is then lifted onto the knee so that the knee is in communication with the reverse side of the jacket 12. The top left portion of the jacket is passed around the back of the knee and is fastened by hook and loop fastening means 18 to complimentary hook or loop means 28 on the upper right hand portion of jacket 12. Lower left hand portion of the jacket 12 is attached to the lower right hand portion of the jacket by complimentary hook and loop fastening means 18 and 28. The user can apply the desired pressure by pulling the uppermost right portion of the jacket over the uppermost left portion of the jacket and by pulling the lower left portion of the jacket over the lower right portion of the jacket. The strap 14 is wrapped around the knee and is fed through another buckle 16 and held in place by hook and loop fastening means on the strap.

Figure 7 shows a similar arrangement to that shown in Figure 6, with the jacket 12 wrapped around a user's calf. In this case, a single strap 14 is also used to secure the jacket 12 to the user. The device is attached to the user's calf in a similar fashion to that described for the user's knee.

Figure 8 shows a similar arrangement to that shown in Figure 7, however in this case the jacket 12 is secured around a user's arm with a strap 14. The device is attached to the user's arm in a similar fashion to that described above for the user's knee.

Figure 9 shows the device in an in-use configuration. The jacket 12 is

wrapped around a body part and can be secured using the buckle(s) 16 and strap(s) 14 and/or hook and loop fastening regions 18 and/or 28. The upper portion of the jacket extends left over right and the lower portion of the jacket extends right over left. Hook and loop fastening regions 18 and 28 (shown in dotted lines) are arranged so the user can tighten the device around a body part by pulling each part of the jacket with fastening region 28 or the strap(s) 14 in the direction of arrow A and arrow B to ensure adequate pressure is applied. This allows the user to apply to required pressure using only one hand, if necessary. Having the overlap going in opposite directions means there is less chance of the device's position being changed during tensioning than when the overlaps are in the same direction as one another. Although two pairs of hook and loop fastening regions 18 and 28 are shown, one or more pairs can be employed.

Although only one embodiment of the invention has been described and illustrated, it will be apparent to the skilled addressee that modifications, variants, additions and omissions are possible within the scope of the invention. For example, the straps 14 have been illustrated as separate from the jacket 12 and attachable thereto by means of the strap buckles 16 and/or the hook and loop-type fastening regions 18 and 28. However, such straps may be attached directly to the jacket 12, for example by means of stitching and may be further securable at their other end to the jacket 12 using the hook and loop fastening regions 18 or 28 or by means of further buckles. The straps may be in the form of extensions of the outer periphery 20. Thus, at least one side of the jacket may be extended to form the straps. In addition the straps may be held to the jacket

by means of loops of material formed on the jacket, and such that they are held in position at or adjacent the arms of the X shaped periphery. It may be that the straps are unattached to the jacket and are positioned in use by the user as required. The term strap is herein intended to encompass not only webbing type material and other flat flexible material, for example leather, but also any flexible elongate material for holding the jacket in place. The various strap and buckle options described above are encompassed herein by the term 'strap means' and 'strap retaining means'.

The outer periphery 20 is described as having concave regions 22, 24 and 26 and it is intended that these are of sufficient capacity to fit smoothly around a user's body, for example around their neck, shoulder or leg joints. In addition to the three concave regions described, it is preferred to make all the peripheral regions of the jacket 12 between the buckles 16 generally concave in form. This provides an even more comfortable jacket fitting.

In addition, a vibrating element could be incorporated into the jacket 12 for allowing a massaging action.

In a preferred form, the jacket has exterior inner and outer surfaces formed from flexible woven material stitched together at the periphery 20 and enclosing an insulative material within the jacket. It is intended that four straps 14 would be supplied with the jacket, although as described above, they need not all be used at the same time.

Claims

1. A device for fitting to a part of the body of a person or animal for modifying the local temperature of the person or animal at the device, the device comprising a generally flexible jacket having an inner surface and an outer surface; a resistive heating element; the device further including an outer periphery having at least one concave region for accommodating a body part in use and attachment means for maintaining the device in position on the body part in use.

2. A device according to claim 1 wherein the attachment means are at least one pair of opposed strap means and strap retaining means spaced around the periphery.

3. A device according to claim 2, wherein the at least one pair of strap means and strap retaining means are a removable strapping piece and a strap buckle.

4. A device according to claim 3, wherein said strap buckles are attached to the periphery of the jacket and provide a complementary attachment for said strapping piece or pieces.

5. A device according to claim 1 or claim 2 wherein the attachment means are complimentary halves of hook and loop type fastenings arranged on the outer and inner surfaces of the device.

6. A device according to any preceding claim wherein said attachment means are positioned generally at corners of the jacket.

7. A device according to any preceding claim, wherein the jacket further includes regions adjacent one or more of the strap means, strap retaining means or said buckles at which is formed one half of a hook and loop type fastening.

8. A device according to claim 7, wherein the other half of the hook and loop fastening is formed on the or each strap means, or strapping piece, and/or is formed on further regions adjacent the buckles.

9. A device according to any preceding claim wherein the upper attachment means extends over the upper portion of the jacket in one directions and the lower attachment means extend over the lower portion of the jacket in an opposite direction to the upper portion when in use.

10. A device according to any preceding claim, wherein the device has two concave regions which extend toward each other.

11. A device according to claim 10, wherein at least one further concave region extends towards the two concave regions.

12. A device according to any preceding claim, wherein the jacket includes an electrical cable for supplying power to the heating element.

13. A device according to claim 12, wherein the supply cable includes a control for controlling said power.

14. A device according to claim 13, wherein the supply cable is connected to the jacket at its periphery and between opposed strap means, strap retaining means or said buckles.

15. A generally flat jacket for fitting to a human or animal subject, the jacket having four concave peripheral sides and four corners at each of which strap means or strap buckles are provided.

16. A device for fitting to a part of the body of a person or animal for modifying the local temperature of the person or animal at the device, the device comprising a generally flexible jacket having an inner surface and an outer surface, a resistive heating element; the device further including an outer periphery having four concave regions for accommodating a body part in use; hook or loop type fastening means on the outer surface of the jacket and complimentary loop or hook type fastening means on the inner surface of the jacket adjacent one or more buckles; at least one strap for attachment to the one or more buckles; an electric supply cable attached to the resistive heating element, the supply cable further including a control for controlling power supplied to the heating element.

17. A device or a jacket, substantially as described herein, optionally with reference to the drawings.

INTELLECTUAL PROPERTY OFFICE

Application No:	GB1122274.2	**Examiner:**	Dr Joanna Manning
Claims searched:	1-14, 16, 17	**Date of search:**	26 March 2012

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-14, 16	US 2008/237209 A1 (GIBBONS) Whole document relevant, see especially Figure 4 and paragraph 0016
X	1-14, 16	US 2005/228464 A1 (HAMMAC) Whole document relevant, see especially Figure 2 and paragraphs 0017 and 0022
X	1-14, 16	WO 98/03135 A1 (NAZERIAN) Whole document relevant, see especially Figures 5 and 6 and page 7, lines 1 to 5
X	1-14, 16	US 6440159 B1 (EDWARDS) Whole document relevant, see especially Figures 1 and 6 to 16 and paragraph 0041
X	1-14, 16	GB 2395664 A (GURR) Whole document relevant, see especially Figures 15a and b
X	1-14, 16	US 2005/256556 A1 (COOLSYSTEMS INC) Whole document relevant, see especially Figures 26 and 27
X	1-14, 16	US 4118946 A (TUBIN) Whole document relevant, see especially Figure 2
X	1-14, 16	WO 01/19302 A1 (PROCTER & GAMBLE) Whole document relevant, see especially Figure 1
X	1-14, 16	US 4805620 A (DIVE N SURF INC) Whole document relevant, see especially Figure 1
X	1-14, 16	WO 2004/043312 A1 (PROCTER & GAMBLE) Whole document relevant, see especially Figure 1
X	1-14, 16	US 2008/195012 A1 (COOLSYSTEMS INC) Whole document relevant, see especially Figures 3 to 8

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X	1-14, 16	JP 2001238905 A (SUZUKI) See especially WPI Abstract Accession No. 2001-632030 [73] and Figures 3 to 13

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

A61F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
A61F	0007/02	01/01/2006
A61F	0007/00	01/01/2006
A61F	0007/08	01/01/2006
A61F	0007/00	01/01/2006