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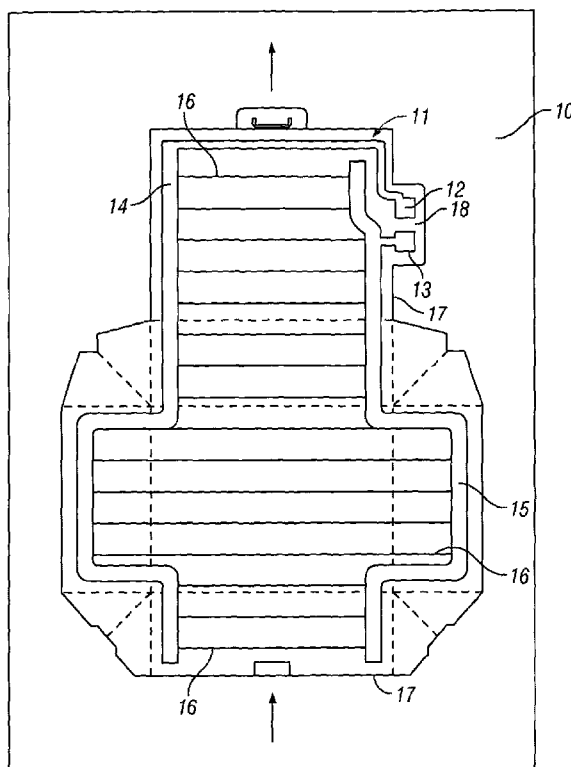
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(54) Title: HEATED CONTAINER

FIG. 1



(57) Abstract: A heated container for use in transporting take-away food and the like, the container comprising a substrate (10) on which a heating element (11) is printed and a detachable cable (23) that extends from the heating element (11) for connecting to an external power supply. Also disclosed is a method for forming a heated packaging container comprising web-feeding a substrate to a printing station and printing a heating element onto the substrate. heated container.



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Heated Container

This invention relates to a heated container and more particularly but not solely to a heated packaging container.

5 GB2127678 discloses a heated container in the form of a bag for use in transporting take-away food. The bag comprises a wall having a pair of layers between which an electrical element is disposed. The element is of strip or wire form and has its ends connected to a cable. The distal end of the cable comprises a plug which can be inserted into a 12 volt outlet socket of the kind commonly provided in motor vehicles.

10 In use, purchased take-away food can be placed in the bag, which can then be connected to the 12 volt supply so that the bag keeps the food warm during transportation.

15 A disadvantage of the above-mentioned bag is that it is relatively complex and costly in construction.

We have now devised an improved heated container.

20 In accordance with the present invention, there is provided a heated container comprising a substrate on which a heating element is printed.

The element is printed on the substrate and thus the container can be manufactured inexpensively and to the extent that at least the substrate can be disposable. In this manner, the container can be provided free of charge by food vendors and the like.

25 In one embodiment, the container may comprise an integral power supply, such as a battery. In a preferred embodiment, a cable extends from the heating element for connecting to an external power supply. Preferably the cable is detachable from the substrate to reduce the cost and environmental implication of providing a disposable container substrate.

30 Preferably said heating element comprises terminals printed on the substrate, the cable comprising a connector at its proximal end for detachably engaging said terminals.

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Preferably the terminals are printed adjacent an edge of the substrate, the connector being adapted to engage the edge of the substrate.

5 In one embodiment, the connector comprises a socket which receives a portion of the substrate carrying said terminals. In an alternative embodiment, the connector comprises a jaw which can be closed to engage a portion of the substrate carrying said terminals.

10 Preferably the substrate is shaped for engagement with a complementary a portion of the connector, the arrangement serving to correctly align the connector with said terminals.

15 Preferably the connector comprises a projection which extends through an opening in the substrate, so as to keep the connector in-situ and to prevent inadvertent disengagement or misalignment with the terminals.

One embodiment, the substrate forms a pad which can be placed inside a walled body member of the container such as a box.

20 In a preferred embodiment, the container comprises a walled body member which is at least partially formed of said substrate.

In one embodiment, the walled body member comprises a bag formed at least partially of the substrate.

25 In an alternative embodiment, the walled body member comprises a box formed at least partially of the substrate.

30 Preferably the heating element is printed on an inwardly facing surface of the substrate. A coating may be applied to said surface to prevent shorting of the heating element by food or liquid inside the container.

Preferably the outwardly facing surface of the substrate is printed with text and/or images.

Preferably the substrate is biodegradable and comprises a material such as a starched-based or bio-based hydrodegradable film.

5 The substrate may form a layer of the walled body member: other layers may include layers of impervious materials and/or insulating materials.

Also in accordance with this invention, there is provided a method of forming a heated packaging container comprising printing a heating element onto a substrate of the container.

10

Preferably the substrate is web-fed to a printing station where the element is printed.

Preferably heating elements for respective containers are successively printed on the web-fed substrate.

15

Preferably the web-fed substrate is cut following printing to form blanks for forming into respective containers.

Embodiments of the present invention will now be described by way of examples only and with reference to the accompanying drawings, in which:

20

Figure 1 is a plan view of an embodiment of printed blank for forming into a heated container in accordance with the present invention;

25 Figure 2 is a perspective view of a region of an alternative embodiment of heated container in accordance with the present invention;

Figure 3 is a sectional view along the line III-III of Figure 2; and

30 Figure 4 is a perspective view of an alternative embodiment of heated container in accordance with the present invention.

Referring to Figure 1 of the drawings, there is shown a substrate 10 comprising a biodegradable film which is fed through a printing apparatus in the direction of the arrows from a first reel to a second reel via a printing station.

35

The printing station is arranged to print successive heating elements 11 onto the substrate 10 for respective containers. Each element 11 comprises a pair of printed terminal pads 12, 13 which are connected to respective bus bars 14, 15. A plurality of conductive tracks 16 extend electrically in parallel between the bus bars 14, 15 across the substrate 10. The conductive ink used for the track 16 has a resistance such that power losses occur in the tracks 16 when current flows therethrough. These power losses generate heat.

10 The length and width of each track 16 is controlled such that each track 16 preferably carries the same current and therefore generates the same temperature. However, the temperature at certain parts of the element 11 can be varied by varying the width and/or length of the tracks 16. The opposite side of the substrate 10 may be printed with images and/or text. A protective layer may be applied over the substrate 10 to cover the element 11.

Following printing, the substrate 10 is cut to form blanks for forming into respective boxes. The blanks are formed by cutting along the solid line 17 shown extending around each element 11. The blank can then be formed into a box by folding along the dotted lines and it will be appreciated that the element 11 extends over the bottom and all four side walls of the box as well as the lid. The terminals 12, 13 are provided on an edge of the blank such as on the portion which forms the lid of the box. The terminals 12,13 are disposed on a tab 18 which extends outwardly.

25 In use, food to be warmed or kept warm can be placed in the box. The box can then be connected to a power source by inserting the tab 18 into a specially-adapted connector provided on the end of a remote power lead (not shown). Current then flows in parallel between the bus bars 14, 15 along respective tracks 16 to generate heat inside the box. Following use, the box can be discarded or re-used. Whilst the embodiment shown comprises a box, it will be appreciated that any kind of container such as a bag or tray could be formed in the same manner.

Referring to Figures 2 and 3 of the drawings, in an alternative embodiment, a single track 20 extends between the terminals 12, 13. The track 20 follows a tortuous path

to cover the required surface area of the substrate 10. The terminals 12, 13 are provided adjacent an edge of the substrate 10.

5 A detachable power lead 23 has a connector 22 at its proximal end which comprises a pair of jaws A,B that can be opened to engage the edge of the substrate 10. One of the jaws A carries a pair of inwardly facing contacts 24, 25 for respectively contacting the terminals 12, 13. The connector 22 comprises side formations 26 which are received in respective cut-outs 21 provided in the edge of the substrate 10, the arrangement serving to ensure that the contacts 24, 25 correctly align with the terminals 12, 13. The jaw A of the connector 22 also carries a projection 28 which is received in a corresponding opening 27 in the substrate, such that the connector 22 is firmly held in situ on the substrate 10 in such a manner that it cannot become inadvertently dislodged. The connector 22 is connected via an elongate cable 29 to a plug 30 for inserting into an electrical outlet.

15

The arrangement shown in Figures 2 and 3 may form part of a heated box, bag or pad. In the latter case, the pad can be placed within a box, bag or other walled structure. Following use, lead 23 is detached and the substrate 10 discarded. The lead 23 can be retained (e.g. in a user's vehicle) for future use.

20

Referring to figure 4 of the drawings, there is shown a container in the form of a bag. In this embodiment, the heating element 40 is printed onto a film 41, which is then folded and sealed to define a bag having the heating element 40 disposed on its inner surface. The terminals 12, 13 are provided on an end edge of the substrate which is disposed outwardly of the seam 42 along which the substrate is joined. Alternatively, the terminals may be provided on another edge of the substrate.

25

A container in accordance with this invention is simple in construction to the extent that it can be provided inexpensively to customers by food vendors, in order to allow customers to keep their food warm during transportation by connecting the container to a power supply using a separate lead. Following use, the lead is disconnected for re-use and the container is discarded.

30

CLAIMS

1. A heated container comprising a substrate on which a heating element is printed.
5
2. A heated container as claimed in claim 1, wherein the container comprises an integral power supply.
3. A heated container as claimed in claim 1, wherein a cable extends from the
10 heating element for connecting to an external power supply.
4. A heated container as claimed in claim 3, wherein the cable is detachable from the substrate.
- 15 5. A heated container as claimed in claim 4, wherein the heating element comprises terminals printed on the substrate, the cable comprising a connector at its proximal end for detachably engaging said terminals.
- 20 6. A heated container as claimed in claim 5, wherein the terminals are printed adjacent an edge of the substrate, the connector being adapted to engage the edge of the substrate.
7. A heated container as claimed in claim 6, wherein the connector comprises a socket which receives a portion of the substrate carrying said terminals.
- 25 8. A heated container as claimed in claim 6, wherein the connector comprises a jaw which can be closed to engage a portion of the substrate carrying said terminals.
- 30 9. A heated container as claimed in any of claims 5 to 8, wherein the substrate is shaped for engagement with a complementary a portion of the connector.
- 35 10. A heated container as claimed in claim 9, wherein the connector comprises a projection which extends through an opening in the substrate, so as to keep the connector in-situ and to prevent inadvertent disengagement or misalignment with the terminals.

11. A heated container as claimed in any preceding claim, wherein the substrate forms a pad which can be placed inside a walled body member of the container.
- 5 12. A heated container as claimed in any of claims 1 to 10, wherein the container comprises a walled body member which is at least partially formed of said substrate.
- 10 13. A heated container as claimed in claim 12, wherein the walled body member comprises a bag formed at least partially of the substrate.
14. A heated container as claimed in claim 12, wherein the walled body member comprises a box formed at least partially of the substrate.
- 15 15. A heated container as claimed in any of claims 11 to 14, wherein the walled body member comprises a layer of impervious materials.
16. A heated container as claimed in any of claims 11 to 15, wherein the walled body member comprises a layer of insulating materials.
- 20 17. A heated container as claimed in any preceding claim, wherein the heating element is printed on an inwardly facing surface of the substrate.
- 25 18. A heated container as claimed in claim 17, wherein a coating is applied to the inwardly facing surface of the substrate to prevent shorting of the heating element by food or liquid inside the container.
- 30 19. A heated container as claimed in any preceding claim, wherein the substrate is biodegradable.
20. A heated container substantially as herein described with reference to Figure 1, Figures 2 and 3 or Figure 4.
- 35 21. A method of forming a heated packaging container comprising printing a heating element onto a substrate of the container.
22. A method as claimed in claim 21, wherein the substrate is web-fed to a printing station where the element is printed.

23. A method as claimed in claim 22, wherein the heating elements for respective containers are successively printed on the web-fed substrate.
24. A method as claimed in claim 22 or claim 23, wherein the web-fed substrate
5 is cut following printing to form blanks for forming into respective containers.
25. A method of forming a heated packaging container, the method being substantially as herein described with reference to the accompanying figures.

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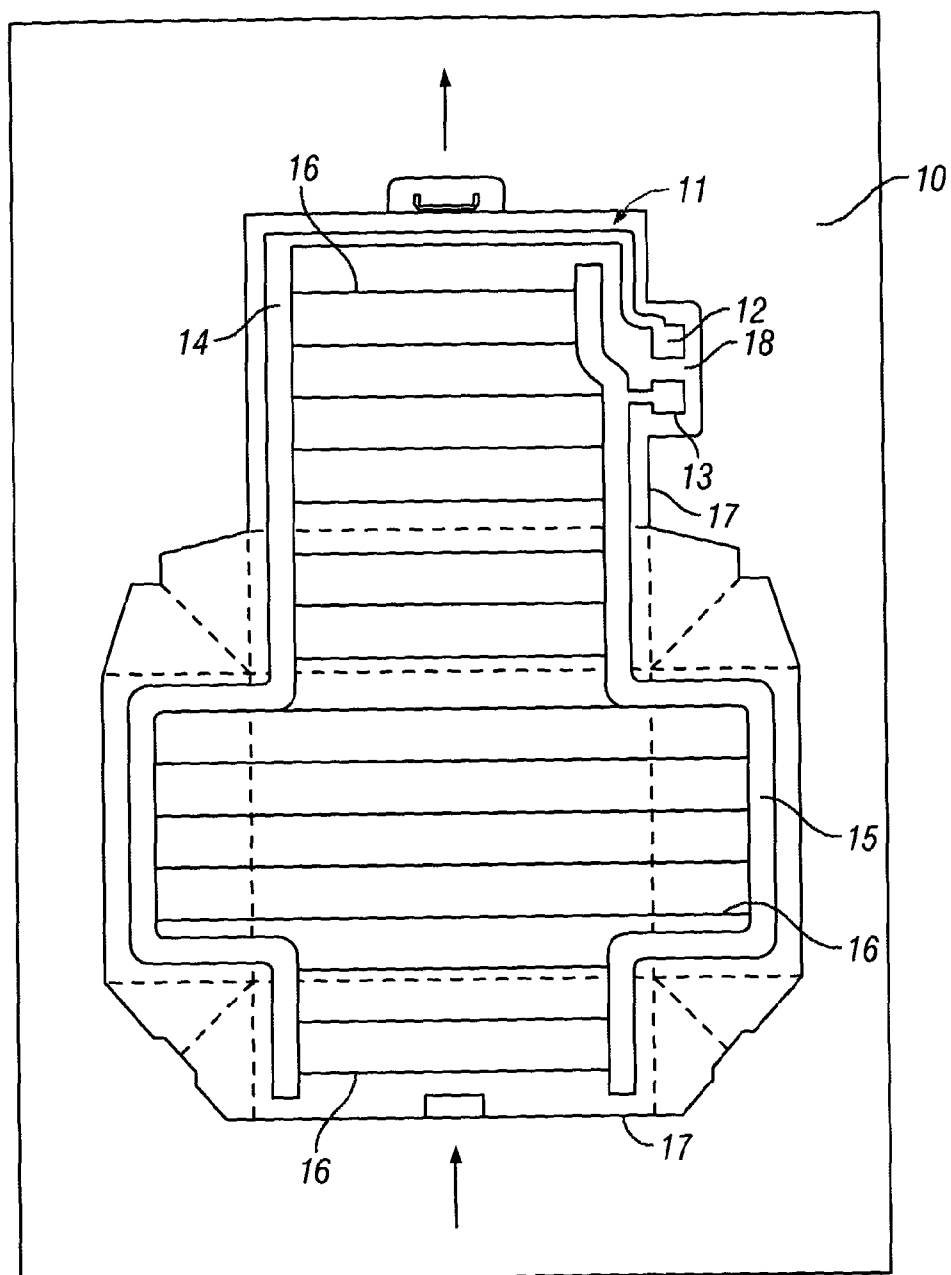


FIG. 1

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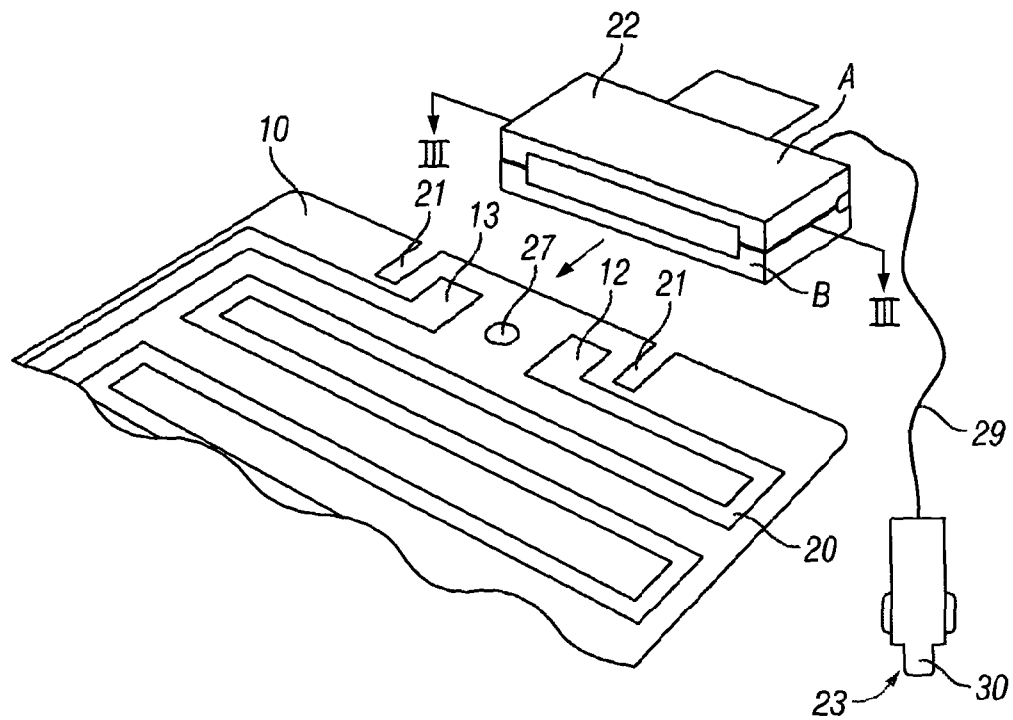


FIG. 2

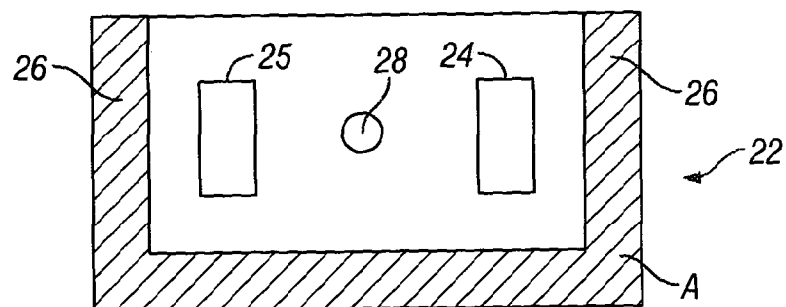


FIG. 3

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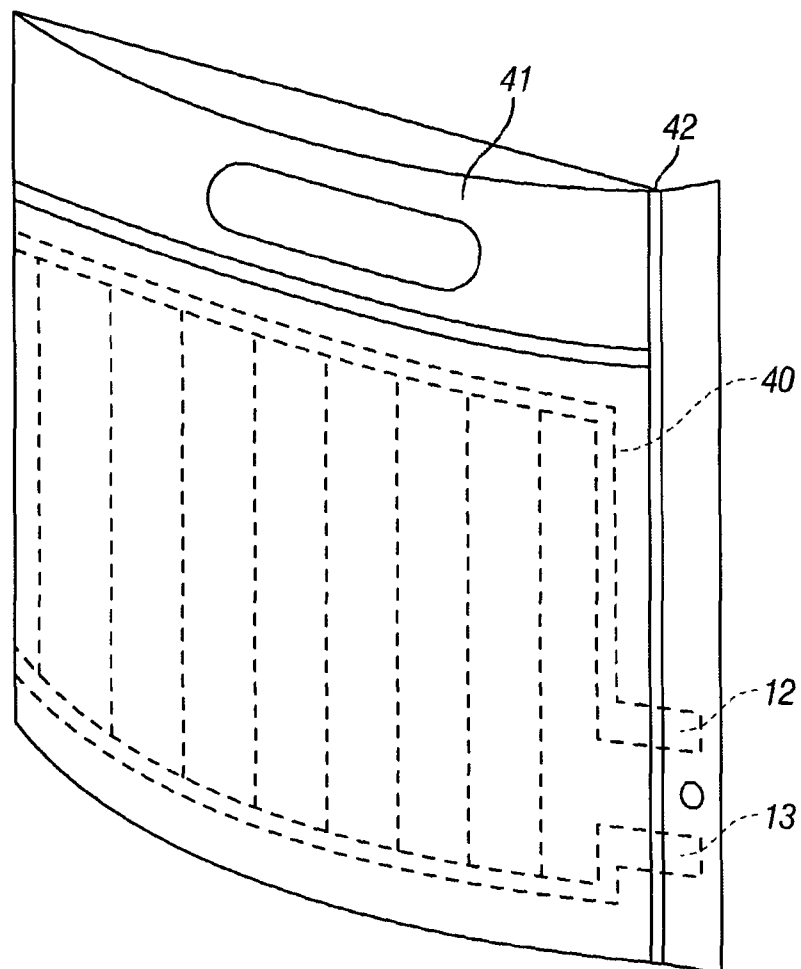


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2012/050735

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A45C7/00 A45C11/20 B65D81/34
 ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A45C B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/17687 A1 (WATLOW POLYMER TECHNOLOGIES [US]) 28 February 2002 (2002-02-28)	1,11-14, 17-25
Y	page 7, line 1 - page 18, line 2; figures 1-16	2
X	US 5 884 006 A (FROHLICH SIGURD [US] ET AL) 16 March 1999 (1999-03-16) column 3, line 35 - column 5, line 45; figures 1-2	1,3-7, 9-14,16, 20
X	US 2002/117494 A1 (ROCK MOSHE [US] ET AL) 29 August 2002 (2002-08-29)	1,3, 11-13, 15,17,18
Y	paragraph [0005] - paragraph [0006] -/--	2



Further documents are listed in the continuation of Box C.



See patent family annex.

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 869 596 A (HOWIE JOHN R) 4 March 1975 (1975-03-04) column 2, line 35 - column 5, line 20; figures 1-5 -----	1,3,11, 12,14, 16-18
A	WO 2008/117146 A2 (CADIF SRL [IT]; STABILE ALDO [IT]) 2 October 2008 (2008-10-02) figures 2, 3 -----	1-19

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/050735

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0217687	A1	28-02-2002	AU 8503001 A 04-03-2002
		US 6519835 B1 18-02-2003	
		US 2002038799 A1 04-04-2002	
		US 2002038801 A1 04-04-2002	
		US 2002040898 A1 11-04-2002	
		US 2002040900 A1 11-04-2002	
		US 2002040901 A1 11-04-2002	
		US 2003121140 A1 03-07-2003	
		WO 0217687 A1 28-02-2002	

US 5884006	A	16-03-1999	NONE

US 2002117494	A1	29-08-2002	NONE

US 3869596	A	04-03-1975	NONE

WO 2008117146	A2	02-10-2008	CA 2684508 A1 02-10-2008
		CN 101743444 A 16-06-2010	
		EP 2135010 A2 23-12-2009	
		JP 2010522958 A 08-07-2010	
		KR 20090129445 A 16-12-2009	
		US 2010038354 A1 18-02-2010	
		WO 2008117146 A2 02-10-2008	
