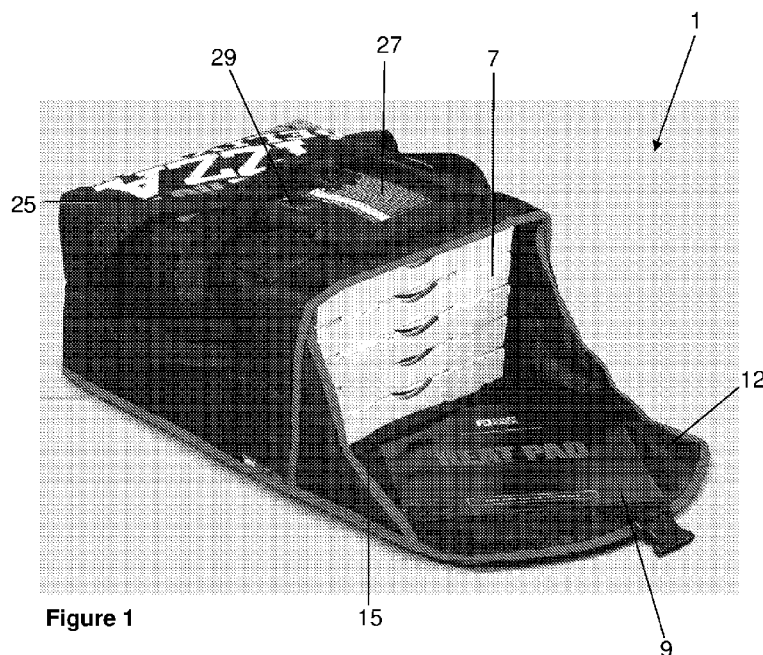




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(54) **Title:** HEATED FOOD DELIVERY BAG



(57) **Abstract:** A heated food delivery bag (1) for carrying pizzas packaged in cardboard boxes, the delivery bag (1) includes a plurality of insulated panel members defining an enclosure for accommodating therein one or more pizza boxes, a heat pad (9) housed in an internal pocket of the bag (1) for heating the enclosure and includes a sensor for measuring the temperature of the heat pad (9), and a rechargeable battery pack housed in an exterior storage pocket (27) of the bag (1) for powering the heat pad (9); the battery pack includes a display screen and a control button for selecting a desired temperature for the heat pad (9). In response to the measured temperature of the heat pad (9), the battery pack selectively provides power to a heating element of the heat pad (9) to maintain the desired temperature.



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HEATED FOOD DELIVERY BAG

FIELD OF THE INVENTION

[0001] The present invention relates to a heated food delivery bag. More specifically, the present invention relates to a heated food delivery bag which is particularly suited for carrying pizzas packaged in cardboard pizza boxes. It should however be understood that the invention is not limited to that example application and is suitable for carrying other food items.

BACKGROUND TO THE INVENTION

[0002] Food delivery bags are typically used to keep take away food items such as pizza warm during transportation to consumers. Pizzas are normally packaged in cardboard boxes which are stacked into a delivery bag. Delivery bags are typically insulated in order to keep the pizzas warm during transit. However, without a heat source to keep the pizzas warm, the temperature within the bag begins to steadily decrease as soon as it leaves the store or kitchen where it was made. The longer the food or pizza within the bag, remains without an additional heat source the more warmth will dissipate until the food/pizza is too cold to consume. This can happen quite quickly depending on the temperature of the vehicle used for delivery. All forms of transport are used for food deliveries including cars, electric and motor scooters, motorcycles and bicycles. Obviously heat retention will be far less effective in an open mode of transport such as a bicycle or a scooter.

[0003] Known heated food delivery bags include some form of heat source which is powered by either a mains power supply while the bag is being packed at the store for delivery, or a car power socket into which the delivery bag is plugged during transportation. However, it is particularly inconvenient to have the delivery bag plugged into a car power socket as the delivery bag needs to be disconnected upon arrival at each delivery destination such that the bag can be

carried to the door of the consumer. Furthermore, most car power sockets are only able to power one delivery bag at a time. In addition, the temperature of the heat source within bag begins to drop quickly if the bag is disconnected from the power source for any length of time.

[0004] It would be desirable to provide a heated food delivery bag which has one or more improved features.

[0005] Any discussion of documents, devices, acts or knowledge in this specification is included to explain the context of the invention. It should not be taken as an admission that any of the material formed part of the prior art base or the common general knowledge in the relevant art on or before the priority date of the claims herein.

SUMMARY OF THE INVENTION

[0006] In accordance with the present invention there is provided a heated food delivery bag for transporting food. The bag includes a plurality of insulated panel members defining an enclosure for accommodating therein one or more food containers. The bag further includes a heat pad for heating the enclosure. The heat pad includes a sensor for measuring the temperature of the heat pad. The bag further includes a rechargeable battery pack for powering the heat pad. The battery pack includes means for selecting a desired temperature for the heat pad, wherein in use, in response to the measured temperature of the heat pad, the battery pack selectively provides power to a heating element of the heat pad to maintain the desired temperature.

[0007] Preferably one of the panel members defines a bottom panel of the enclosure. The bottom panel including a pocket on an interior side for storing the heat pad therein. The heat pad preferably includes a flexible outer insulating body, the heating element being housed within the insulating body. In a

particularly preferred embodiment, the heating element is a heating wire made of nichrome and the outer insulating body is made of silicon rubber.

[0008] The battery pack preferably includes a visual display for displaying the temperature sensed by the sensor and/or the battery charge level. The battery pack may further include a charging lead for connecting the battery pack to a battery charging adaptor to facilitate recharging of the battery pack, and a supply lead for connecting the battery pack to the heat pad.

[0009] The heat pad preferably includes a connecting lead for selectively connecting the heat pad to the supply lead of the battery pack or directly to an AC power source via an AC power adaptor.

[0010] One of the panel members may define a top panel which includes a storage compartment on an exterior side for storing the battery pack therein. The storage compartment preferably includes a transparent window for enabling the visual display of the battery pack to be viewed when the battery is housed within the storage compartment. The storage compartment may include a bottom opening through which the charging lead and supply lead of the battery pack can protrude when the battery pack is located in the storage compartment. A cable port may be provided in the top panel to provide a passageway to an exterior of the delivery bag for the connecting lead of the heat pad. In this regard, the cable port is ideally located below the storage compartment. The top panel of the bag may also include a cable cover flap for covering the charging lead and supply lead protruding from the storage compartment.

[0011] The battery pack preferably includes a plurality of lithium/ion batteries which enable the heating element of the heat pad to keep the enclosure continually hot at the desired temperature for up to four hours without the need to recharge. The battery pack may also include one or more USB ports to enable the battery pack to be used as a charging device, for example to charge a mobile phone. The means for selecting a desired temperature for the heat pad may be a

multi-functional control button which may also function to provide on-off powering of the battery pack.

[0012] Further benefits and advantages of the food delivery bag according to the present invention will become apparent in the following description of the preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The preferred embodiments of the invention will now be described. The preferred embodiments should not be considered as limiting any of the statements in the previous section. The preferred embodiments will be described with reference to the following figures in which:

[0014] Figure 1 is a perspective view of a food delivery bag, in accordance with an embodiment of the invention, in an open configuration;

[0015] Figure 2 is an image of the battery pack of the food delivery bag illustrated in Figure 1;

[0016] Figure 2A is an image of the battery pack shown in Figure 2 housed in a storage compartment on an exterior of the food delivery bag shown in Figure 1;

[0017] Figure 3 is a perspective view of the heat pad of the food delivery bag illustrated in Figure 1; and

[0018] Figure 4 is an image of the insulated panel members forming the enclosure of the delivery bag laid flat.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] With reference to the accompanying drawings there is shown a heated food delivery bag 1 for transporting food. The delivery bag 1 includes a plurality of insulated panel members 3 defining an enclosure of the bag for accommodating therein one or more food containers which may be in the form of cardboard pizza boxes 7 containing pizzas. As shown in Figure 4, the insulated panel members 3 defining the enclosure include a base or bottom panel 13 providing a floor, a pair of opposing side panels 8, a back panel 10, a roof or top panel 25 and a lid or closure flap 12. The delivery bag 1 further includes a heat pad 9 for heating the enclosure containing the pizza boxes 7. In addition, the delivery bag 1 includes a rechargeable battery pack 11 for powering the heat pad 9.

[0020] As shown in Figures 1 and 4, the bottom panel 13 preferably includes a pocket 15 on an interior side of the bottom panel 13 for storing the heat pad 9 therein. The heat pad 9 functions to maintain the enclosure containing the pizzas at a desired hot constant temperature during transportation of the pizzas to customers. With reference to Figure 3, the heat pad 9 includes a flexible outer insulating body 17 within which is housed a heating element of the heat pad 9. The heating element is preferably a heating wire made of nichrome and the outer insulating body 17 is preferably made of silicon rubber. The heat pad 9 is designed to be kept in the pocket 15 in the bottom panel 13 and should not be required to be removed from the pocket 15 under normal operating conditions. The insulating body 17 of the heat pad 9 is generally square and has a width and length of approximately 300mm. The heat pad 9 further includes a heat pad connecting lead 19 having a plug 20 for electrically connecting the heat pad 9 to the battery pack 11. At least one of the side panels 8 includes an internal side flap 16 for holding the connecting lead 19 of the heat pad 9 against the side panel 8 such that the connecting lead 19 does not impede access when pizzas are being inserted and removed from the delivery bag 1. The internal side flap 16 is preferably secured in place with hook and loop fastener strips sewn on the

bag to provide a tunnel for the connecting lead 19. The plug 20 of the heat pad connecting lead 19 can also be used to electrically connect the heat pad 9 to an AC power adaptor (not illustrated) such that the heat pad 9 can be powered directly by mains power. The heat pad 9 further includes a temperature sensor which is preferably built into the insulating body 17. The sensor functions to measure the temperature of the heat pad 9. In response to the measured temperature of the heat pad 9, the battery pack 11 is able to selectively provide power to the heating element of the heat pad 9 to maintain a desired constant temperature for the pizzas stored within the bag 1.

[0021] With reference to Figure 2, the battery pack 11 includes means, which may be in the form of a control button 21, for selecting the desired constant temperature for the heat pad 9. The control button 21 may also be multi-functional and, for example, act as an on-off power button. The battery pack 11 further includes a visual display 23 provided on a body portion 14 of the battery pack 11 for displaying the temperature sensed by the sensor of the heat pad 9, preferably in both Fahrenheit and Celsius. The visual display 23 may for example be in the form of an LED or LCD display and be capable of displaying various operating parameters including the charge level of the battery pack 11. The battery pack 11 further includes a control circuit having a printed circuit board (PCB) which is populated with a plurality of electrical and electronic components including an integrated circuit, the control button 21 and the visual display 23. The components are arranged and connected to provide the required electrical functionality for the battery pack 11 and heat pad 9. The battery pack 11 preferably includes a plurality of high powered long-life rechargeable lithium-ion battery cells along with smart battery circuitry. Externally, the battery pack 11 includes a battery supply lead 22 having a supply plug 24 for electrically connecting with the plug 20 of the heat pad 9. The battery pack 11 further includes a charging lead 26 having a charge plug 28 for facilitating recharging of the battery pack 11 via a battery charging adaptor (not illustrated) which connects the charge plug 28 of the battery pack 11 to an AC power supply such that the battery pack 11 can be recharged by mains power. A 12V charging cable (not illustrated) which connects the charge plug 28 of the battery pack 11 to a 12 volt

power source, for example a 12 volt power socket in a motor vehicle, may also be provided. The battery pack 1 may further include one or more USB ports to enable the battery pack 1 to be used to charge a mobile phone.

[0022] With reference to Figures 1 and 2A, the top panel 25 of the enclosure includes a storage compartment 27 on an exterior side which is specifically designed for storing the battery pack 11 therein. The storage compartment 27 preferably includes a transparent window 29 which enables the visual display 23 and control button of the battery pack 11 to be viewed externally when the battery pack 11 is housed within the storage compartment 27. The battery pack 11 is designed to be kept in the storage compartment 27 and should not require removal from the storage compartment 27 under normal operating conditions. A bottom portion of the storage compartment 27 has an opening 30 through which the supply lead 22 and charging lead 26 of the battery pack 11 protrude for easy access to the charge plug 28 and supply plug 24. Located below the storage compartment 27 is a rubber cable port 32 mounted in the top panel 25. The plug 20 of the heat pad connecting lead 19 is fed through the internal side flap 16 in the side panel 8 and up through the rubber cable port 32 such that the connection with the supply plug 24 can be conveniently made on the exterior of the food delivery bag 1 immediately beneath the storage compartment 27. The top panel 25 may further include a cable cover flap 34 below the storage compartment 27 which can be secured down against the panel 25 with hook and loop fastener strips. The cover flap 34 is shown open in Figure 2A. When the cable cover flap 34 is folded close, the leads and plugs 24, 28 of the battery pack 1 and the lead and plug 20 of the heat pad 9 are covered underneath the cover flap 34.

[0023] The panel members 3 forming the enclosure for accommodating the pizzas each include an outer section which includes an outer layer preferably constructed from heavy duty material, for example black oxford water proof textile 600D (denier) 72T polyester PU2 material. Underlying the outer layer of each panel member 3 is an insulating layer which may be made of a thermal insulating

silk cotton (polyester) having a thickness of approximately 2.5cm and a surface density of about 250 g/m².

[0024] Each panel member 3 further includes an inner section comprising one or more layers which lie adjacent the insulating layer of the outer section. The inner section of the bottom panel 13 may include a rigid panel which is preferably made of plastic, for example polyethylene, having a thickness of about 3mm. The rigid panel functions to make the floor of the enclosure rigid. Immediately above the rigid panel, the inner section of the bottom panel 13 further includes an insulating foam, for example an insulating foam of about 10mm thickness made of polyethylene, having an aluminium backing of about 0.2 mm thickness on one or both sides upon which the heat pad 9 may rest when located in the pocket 15 in the bottom panel 13. The aluminium backing on the insulating foam assists to project heat from the heat pad 9. The opposite side of the insulating foam may have a woven fabric layer which may be made of PET (polyethylene terephthalate). With the exception of the top panel 25, the inner section of all panel members 3 includes an inner lining constructed of polyester material, for example 600 denier non-water proof breathable polyester material. The inner section of the top panel 25 includes an aluminium backed 10mm insulating foam like the bottom panel 13. In addition the inner section of the top panel 25 includes an inner black poly mesh lining, which is moisture absorbing and different to the inner lining of most of the other panel members 3. The inner black poly mesh lining may however also be included in the inner section of the bottom panel 13 between the heat pad 9 and the aluminium backed insulating foam.

[0025] The transparent window 29 of the battery storage compartment 27 is preferably constructed of 0.5mm clear PVC material. The panel members 3 are preferably stitched with extra reinforced stitching for durability and strength. The closure flap 12 is preferably provided with hook-and-loop fastening underneath the flap. Heavy duty webbing straps may also be provided with adjustable locking clips to secure the closure flap 12 in a closed position. The panel members 3 are

preferably designed to withstand a high level of wear and tear and tough treatment within reasonable conditions.

[0026] Before using the bag 1, the battery pack 11 should be charged by connecting the charging plug 28 of the battery pack 11 into the matching charging plug of the battery charging adaptor. When the battery pack 11 is charging, the visual display 23 of the battery pack 11 displays the % charged level. The visual display 23 will indicate 100% charge level when the battery pack 11 is fully charged. The battery pack 11 should not be simultaneously connected to the heat pad 9 while the battery pack 11 is charging. Once the charging of the battery pack 11 is complete, the charging plug 28 is disconnected from the battery charging adaptor. The supply plug 24 of the battery pack 11 is then connected to the plug 20 of the heat pad 9 to power the heat pad 9. The battery pack 11 can be turned on by holding down the control button 21 for a few seconds. The visual display 23 may then optionally begin flashing and display the current measured temperature level from the sensor of the heat pad 9. To set a desired target temperature the control button 21 can be double pressed resulting in the flashing of the target temperature on the visual display 23. To adjust the target temperature, the control button 21 is then pressed once or multiple times to adjust to the desired target temperature. After waiting approximately three seconds, without pressing the control button 21, the target temperature shown will be set. Once the heat pad 9 has started to warm the delivery bag 1, the pizzas can be inserted into the bag 1.

[0027] In order to save battery life, the heat pad 9 may be pre-heated by mains power by connecting the plug 20 of the heat pad 9 directly to an AC power supply via an AC power adaptor (not illustrated). Once pre-heating is complete, the plug 20 of the heat pad 9 can be re-connected to the battery pack 11. Battery life can also be increased by turning the battery pack 11 off or to a lower temperature after the pizzas have been delivered to customers.

[0028] The heat pad 9 is advantageously able to continually maintain the enclosure at the desired temperature, up to a temperature of 90° Celsius, for up to four hours without the battery pack 11 needing to be recharged. When the battery charge level indicator in the visual display 23 shows red bars flashing or the % reading is very low, the battery pack 11 requires recharging, which takes approximately 5 hours.

[0029] The delivery bag 1 of the present invention is advantageously able to enable a pizza store operator to transport pizzas, or any other required hot food, to customers at a very hot temperature. Furthermore, the delivery bag 1 is advantageously fully self-contained and is able to maintain the desired constant temperature during delivery transportation.

[0030] As the present invention may be embodied in several forms without departing from the essential characteristics of the invention, it should be understood that the above-described embodiments should not be considered to limit the invention but rather should be construed broadly. Various modifications and equivalent arrangements are intended to be included within the spirit and scope of the invention.

CLAIMS:

1. A heated food delivery bag for transporting food including:
a plurality of insulated panel members defining an enclosure for accommodating therein one or more food containers,
a heat pad for heating the enclosure, the heat pad including a sensor for measuring the temperature of the heat pad, and
a rechargeable battery pack for powering the heat pad, the battery pack including means for selecting a desired temperature for the heat pad,
wherein in use, in response to the measured temperature of the heat pad, the battery pack selectively provides power to a heating element of the heat pad to maintain the desired temperature.
2. A heated food delivery bag as claimed in claim 1 wherein one of the panel members defines a bottom panel of the enclosure, the bottom panel including a pocket on an interior side of the bottom panel for storing the heat pad therein.
3. A heated food delivery bag as claimed in either claim 1 or claim 2 wherein the heat pad further includes a flexible outer insulating body, the heating element being housed within the insulating body.
4. A heated food delivery bag as claimed in claim 3 wherein the heating element is a heating wire made of nichrome and the outer insulating body is made of silicone.
5. A heated food delivery bag as claimed in any one of the preceding claims wherein the battery pack further includes a visual display for displaying the temperature sensed by the sensor and/or battery charge level.
6. A heated food delivery bag as claimed in any one of the preceding claims wherein the battery pack further includes a charging lead for connecting the

battery pack to a battery charging adaptor to facilitate recharging of the battery pack, and a supply lead for connecting the battery pack to the heat pad.

7. A heated food delivery bag as claimed in claim 6 wherein the heat pad includes a connecting lead for selectively connecting the heat pad to the supply lead of the battery pack or directly to an AC power source via an AC power adaptor.

8. A heated food delivery bag as claimed in any one of the preceding claims wherein one of the panel members defines a top panel which includes a storage compartment on an exterior side for storing the battery pack therein.

9. A heated food delivery bag as claimed in claim 8 wherein the storage compartment includes a transparent window for enabling the visual display of the battery pack to be viewed when the battery is housed within the storage compartment.

10. A heated food delivery bag as claimed in claim 8 or 9 wherein the storage compartment includes a bottom opening through which the charging lead and supply lead of the battery pack can protrude when the battery pack is located in the storage compartment.

11. A heated food delivery bag as claimed in claim 10 wherein a cable port is provided in the top panel, the cable port providing a passageway to an exterior of the delivery bag for the connecting lead of the heat pad, the cable port being located below the storage compartment.

12. A heated food delivery bag as claimed in claim 11 wherein the top panel further includes a cable cover flap for covering the charging lead and supply lead protruding from the storage compartment.

13. A heated food delivery bag as claimed in any one of the preceding claims wherein the battery pack includes a plurality of rechargeable lithium-ion batteries.

14. A heated food delivery bag as claimed in any one of the preceding claims wherein the battery pack includes one or more USB ports to enable the battery pack to be used as a charging device.

15. A heated food delivery bag as claimed in any one of the preceding claims wherein the means for selecting the desired temperature for the head pad is a multi-functional control button which also functions to provide on-off powering of the battery pack.

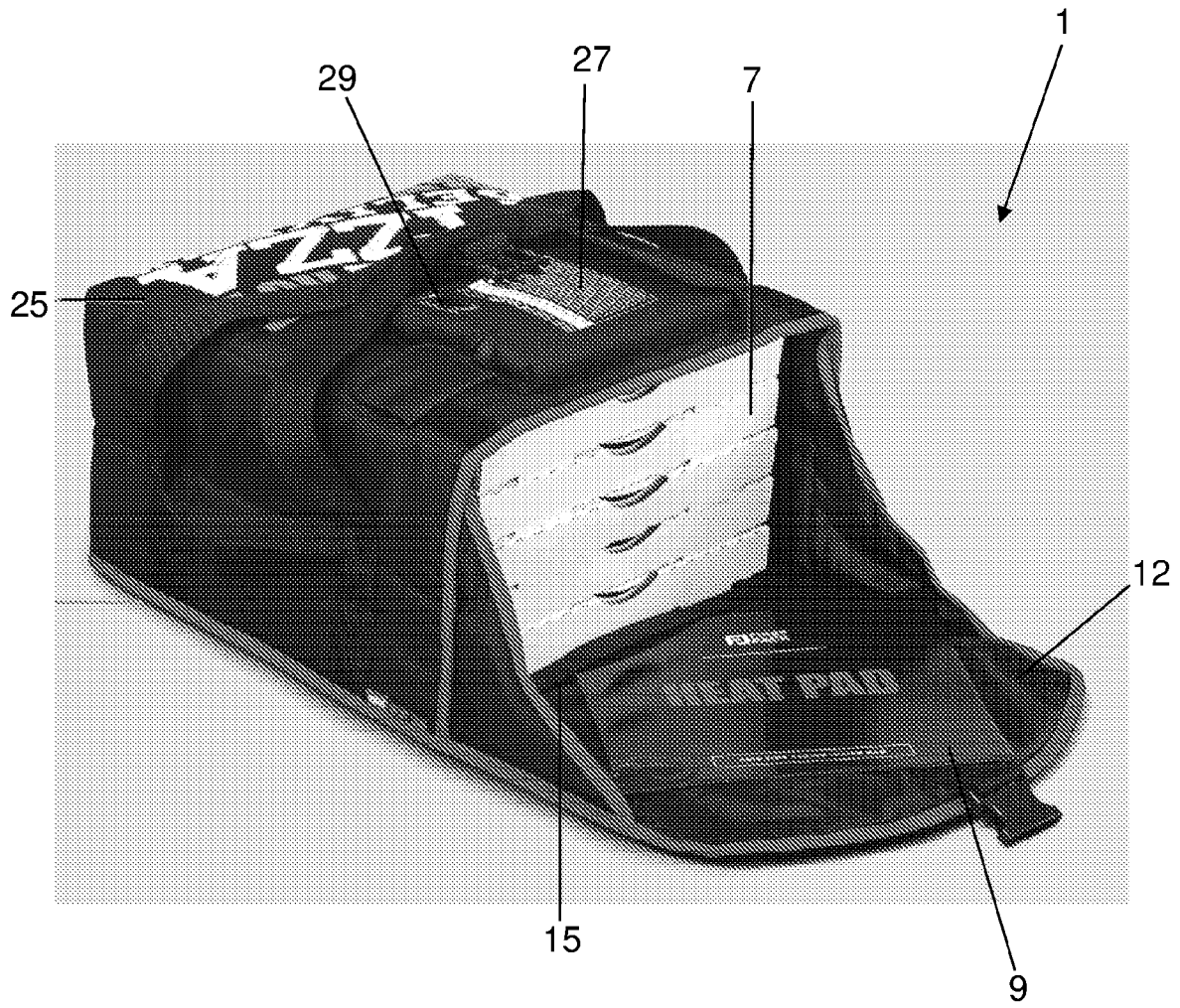


Figure 1

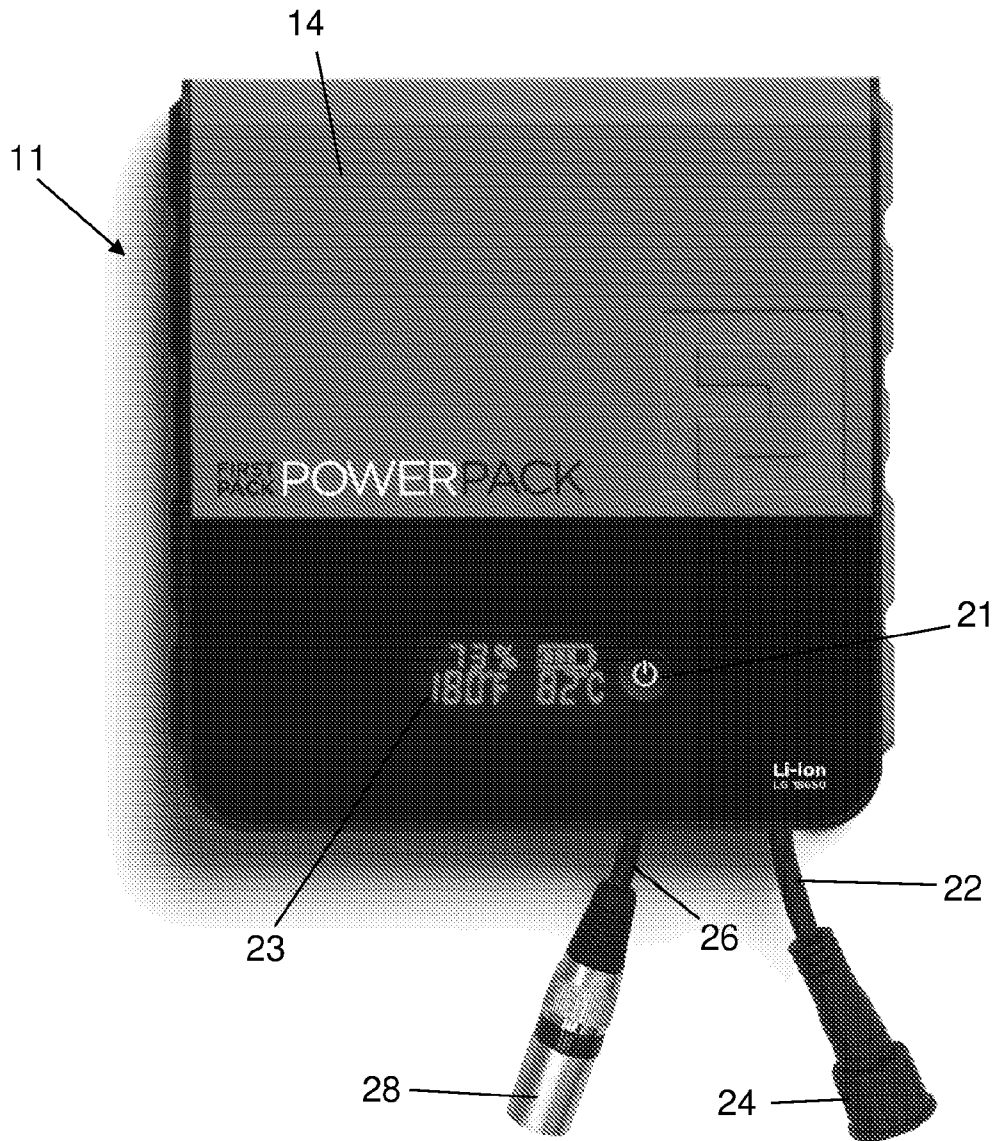


Figure 2

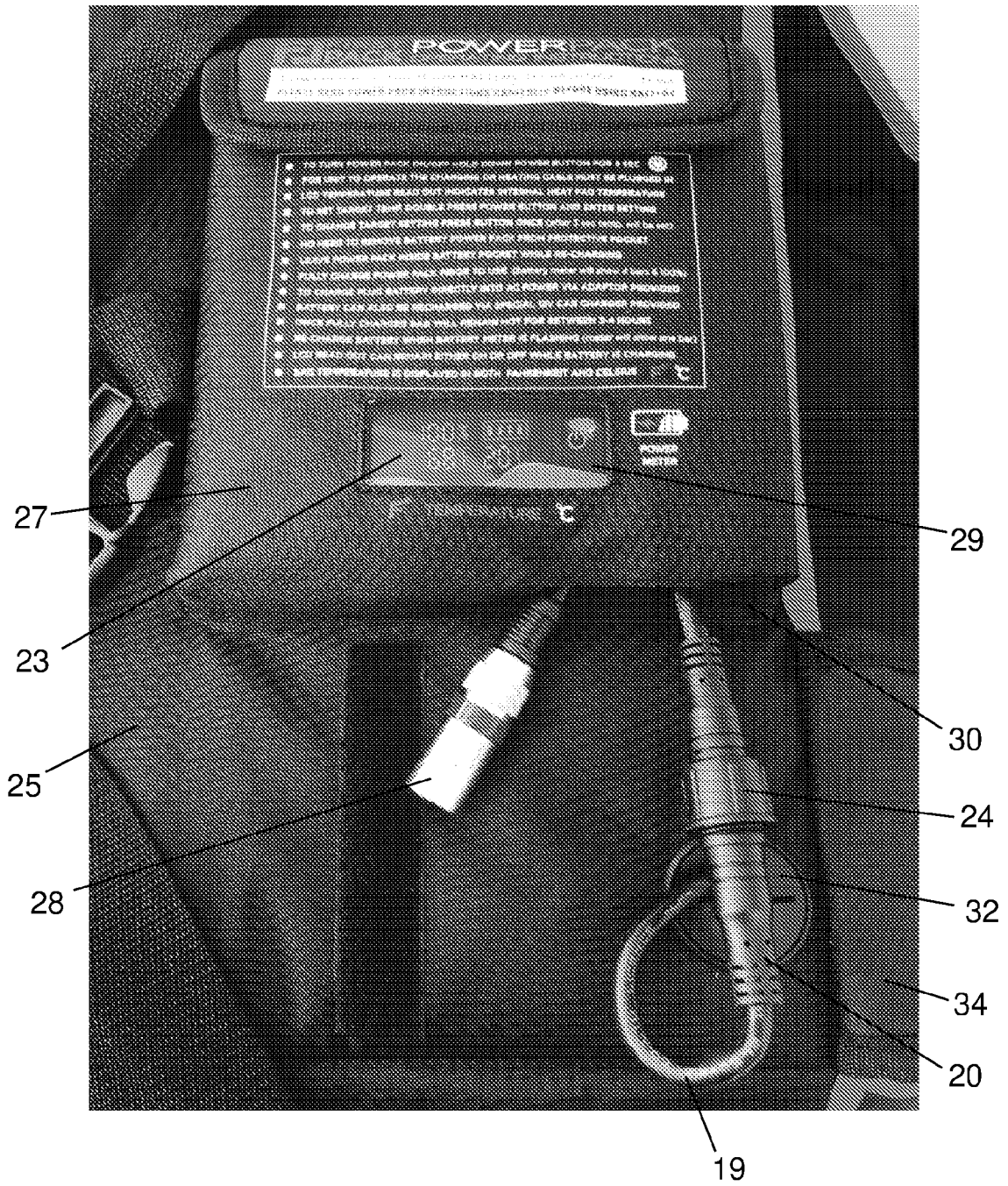


Figure 2A



Figure 3

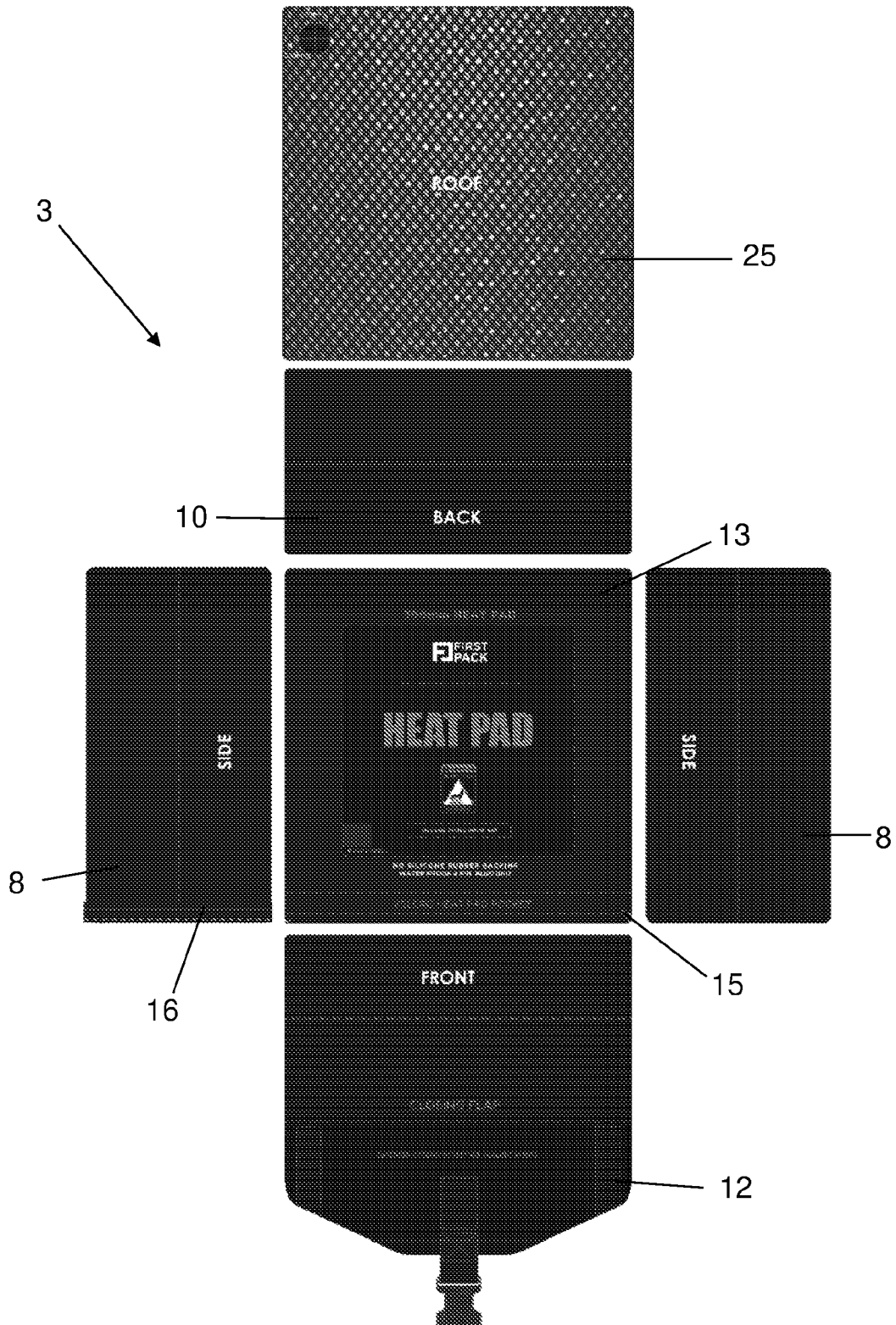


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2019/050886

A. CLASSIFICATION OF SUBJECT MATTER A47J 47/14 (2006.01) B65D 81/38 (2006.01)		
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)		
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) PATENW, IPC/CPC: A47J36/2483, A47J41/005, A47J47/145, A47J47/14, B65D81/3825, B65D81/3888, B65D81/3476, B65D2581/3406 & Keywords: heat, warm, thermal, element, grid, pad, insert, electric, battery, portable power, rechargeable, lithium, pack, temperature, power, output, current, thermostat, sensor, detect, measure, control, adjust, select, choice, pizza, food, carrier, delivery, bag and like terms. Applicant/inventor name search in Espacenet, Auspat & IP Australia internal database.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Documents are listed in the continuation of Box C	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input type="checkbox"/> See patent family annex		
* Special categories of cited documents:		
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"D" document cited by the applicant in the international application	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
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"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 4 November 2019	Date of mailing of the international search report 04 November 2019	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA Email address: pct@ipaaustralia.gov.au	Authorised officer John Ho AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262832329	

INTERNATIONAL SEARCH REPORT

International application No.

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

PCT/AU2019/050886

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6353208 B1 (BOSTIC et al.) 05 March 2002 Figures 1-10, column 1 line 56 - column 8 line 40, column 11 lines 25-26	1-15
Y	US 2006/0288949 A1 (AXINTE et al.) 28 December 2006 Figures 1-3C, [0046-0053]	1-15
X	KR 1020130061389 A (KIM YOUNG MIN et al.) 11 June 2013 & machine translation provided by Espacenet Figures 1-3 & [0038, 0068]	1-2, 5-15
A	EP 1580145 A1 (MARTINI CARLO) 28 September 2005 Figures 1-2	1-15
A	US 2005/0252904 A1 (GRABOWSKI et al.) 17 November 2005 Figures 1-5A & [0018]	1-15
A	US 4806736 A (SCHIRICO) 21 February 1989 Figures 1-4 & column 2 lines 23-29	1-15