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B60N 3/10 (2006.01) ***B60N 3/16*** (2006.01)

(56) Documents Cited:
EP 0628277 A1 **CN 101628552 B**
DE 004000322 A1 **DE 003144560 A1**
IE 020090367 A1 **US 3809059 A**

(58) Field of Search:
INT CL **B60N**
Other: **Online: WPI, EPODOC**

(54) Title of the Invention: **Food warmer**
Abstract Title: **In-vehicle food warmer**

(57) A food warmer is installed in a vehicle and is connected to the vehicle's heating system. The food warmer includes an enclosure where food is placed for warming. Heated fluid is circulated around a metal tube 14 that wraps around the enclosure, which is insulated 15 to prevent heat loss and is covered by an outer case 16. The food warmer is fitted with a door 11 preventing heat from escaping, an insulated handle 10, and a dial or knob (1, fig 1) to turn the warmer on and off and to choose temperature levels via a thermostat. The warmer may be connected to the fluid via fluid connectors (08, 09, fig 1).

FIG 2

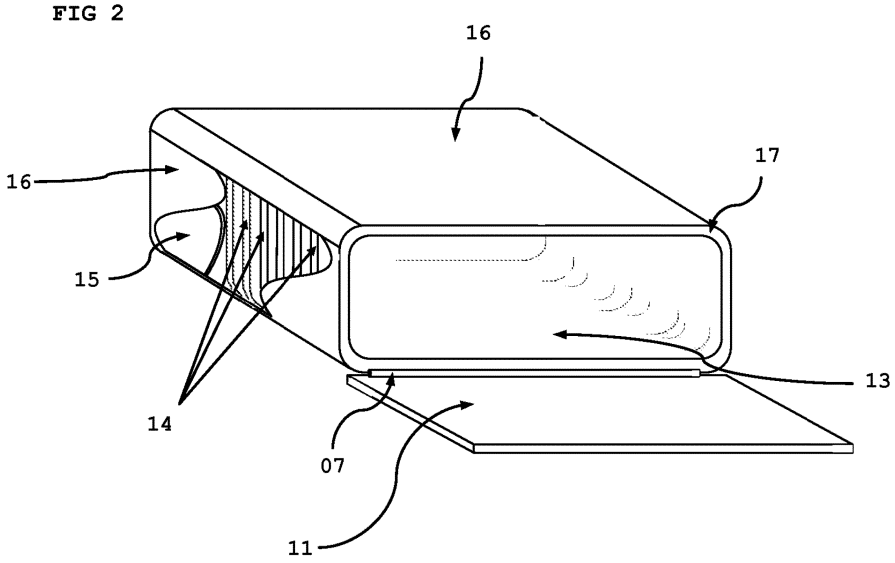

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FIG 1

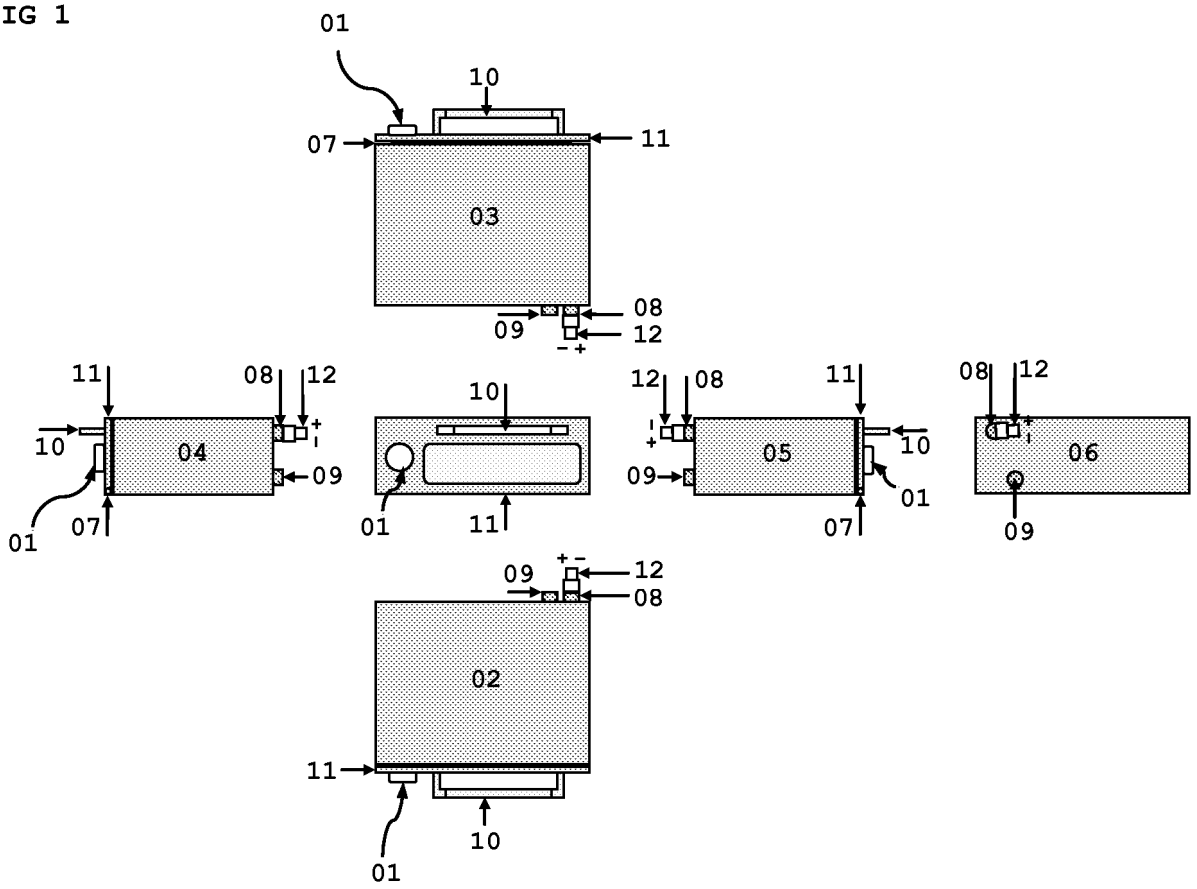
01
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FIG 2

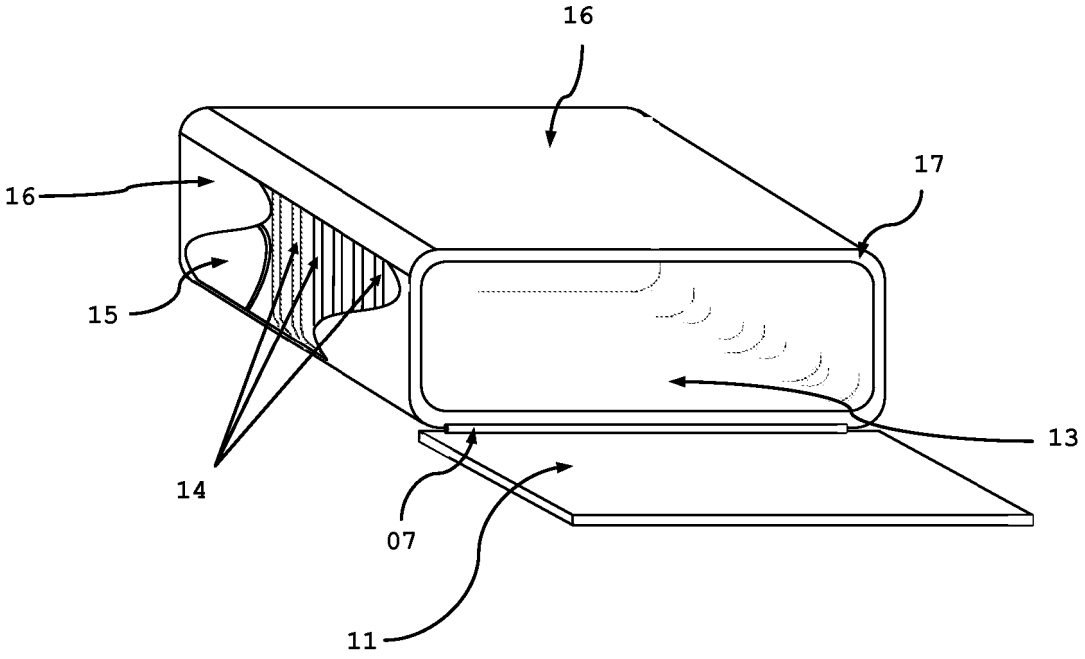
16
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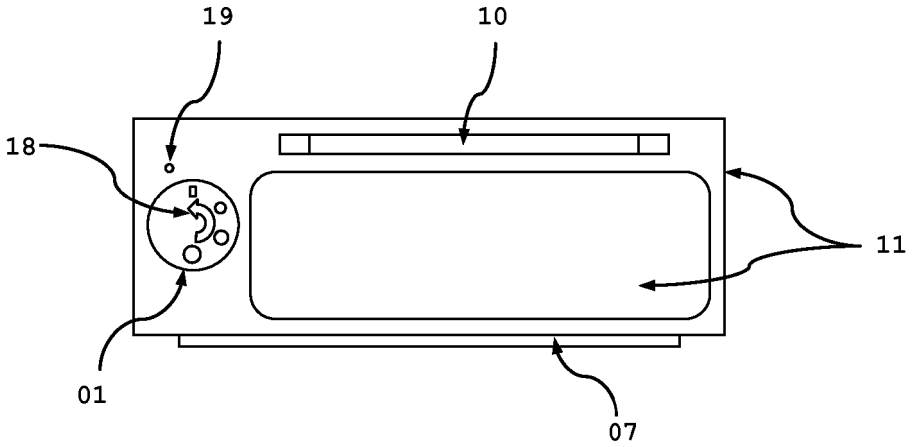
FIG 3



Food Warmer

This invention relates to a food warmer for vehicles.

Background

On journeys through high traffic environment such as on motorways, less developed city highways or even cross country, where it's hard to find facilities that provides heated nutritious essentials, there are times when toddlers cry for their bottle but parents find that the formula is cold, times when we just want a warm drink, and there are other times especially in winter when we want a hot meal or to warm-up the provisions while travelling for long distances.

Statement of Invention

A food warmer installed inside the vehicle, which is connected to the (engine cooling system) vehicle's fluid heating system, or the Rapid Heater vehicle heating system's fluid flow line and fluid return line adjacent to the heater matrix. As heated fluid occupies the vanes/ports of the metal tube that surrounds all the inner enclosure (where food is heated) or the tubes are made into the inner enclosure as a single unit, the heat transferred is protected by a circumference of insulation which confines heat centrally to the inner enclosure only. An outer casing that wraps all-around the food warmer so as to protect its inner essential parts, heat trapped inside the inner enclosure is secured by a thermal sealed door with an insulated handle. The food warmer is equipped with a dial which via a thermostat connected to the solenoid and battery relates temperature differences inside the inner enclosure, while visual indicators on the door and knob/dial displays on/off positions and temperature levels, a back light inside the food warmer aids visually while warming food.

The food warmer may be inside the vehicle and or underneath the radio or even occupies some of the space inside the glove compartment so it's out of reach to children etc.

Advantages

A food warmer will provide instant access to a facility that produces hot food or drink every time.

The food warmer uses existing energy and does not deplete or consume a separate fuel source such as the battery.

The food warmer can be made to deliver higher temperatures if use with the Rapid Heater vehicle heating system.

The food warmer is hygienic, does not produce ash from spent fuel, oil bi-products, smoke from the engine exhaust, carbon monoxide or carbon dioxide etc.

The food warmer can be turned on or off when not in use.

A food warmer will allow for you never to miss breakfast, lunch or dinner again.

During winter the food warmer supplements thermoses and will always sustain heating food.

Description

The vehicle's engine is equipped with fluid/coolant heated by combustion that is also used as heating for passenger inside the vehicle.

This invention will now be descried solely by the way of example and with reference to the accompanying drawings in which:

Fig 1 shows the different views of the food warmer, Knob **01**, with visual calibrations **18**, on the door **11**, for choosing different warming levels. A top view **02**, a bottom view **03**, the right view **04**, the left view **05**, a view from the back **06** with the fluid flow **08** and fluid return connection **09**, and the solenoid **12** that stops fluid movement when the food warmer is turned off. The door is hinge **07** in a position so as to allow maximum access to the warming space inside the food warmer, and an insulated door handle **10** for safe access.

Fig 2 shows a partial cutaway view of the interior layers of the food warmer. The inner enclosure **13** consists of metal tube **14** wrapped all around a metal chassis but both can be manufactured as a single unit **13**. It is covered with insulation **15** in order to prevent heat from escaping, and is protected by an outer case/cover **16** with a smooth surface so the door seals properly.

Fig 3 shows the controls **01, 10, 18** on the food warmer's thermal sealed door **11** and insulated handle **10**.

The food warmer is installed and connected to the engines cooling system's fluid line, as the engine produces heated fluid, it is then circulated through the tube wrapped all around and at the back or impregnated into the inner enclosure of the food warmer, this heated fluid heats the metal tube and in turn heats the entire inner enclosure which captures and compacts heat to be utilised for cooking.

A food warmer installed inside the vehicle comprising of;

An inner enclosure **13** that retains the food to be heated, consist of a metal tube **14** wrapped all around a metal chassis; but can be made as one unit **13**, that connects to the engine cooling system's flow and return fluid lines for the heated fluid to circulate through, heat resistant material **15** prevents heat loss and keeps the heat central to the food warmer's inner enclosure **13**, An outer protective casing **16** covers and secures the food warmer's inner essential parts. A thermal door **11** seals with the smooth surface **17** of the casing **16** and keeps heat inside the inner enclosure. An insulated handle **10** provides easy access to the food warmer by opening and closing the sealed heat resistant door **11**, a thermostatic temperature knob/dial **01** that regulate food warming temperature via a thermostat placed on the body of the inner enclosure. An on/off indicator light **19** that indicates usage position and an on/off switch with heating levels which is integrated into the knob/dial, a solenoid **12** stops the flow of fluid to the inner enclosure by default while on OFF, but is actuated by the thermostat via the battery and allows fluid to flow around the vanes/ports when turned to ON, the heating levels allow the choice of different temperature settings for warming food.

Claims

A food warmer installed inside the vehicle, which is connected to the (engine cooling system) vehicle's fluid heating system, or the Rapid Heater vehicle heating system's fluid flow line and fluid return line adjacent to the heater matrix, As heated fluid occupies the vanes/ports of the metal tube that wraps all around and at the back of the inner enclosure (where food is heated)**13** or the tubes are made into the inner enclosure as a single unit **13**, the heat transferred is protected by a circumference of insulation **15** which confines heat centrally to the inner enclosure only, An outer casing **16** that wraps all-around the food warmer so as to protect its inner essential parts, heat trapped inside the inner enclosure is secured by a thermal sealed door **11** with an insulated handle **10**, The food warmer is equipped with a dial/knob **01** which via a thermostat connected to the solenoid **12** and battery, relates temperature differences inside the inner enclosure, while visual indicators **18** on the door and knob/dial displays on/off positions, a back light inside the food warmer aids visually while warming food.

1. A food warmer according to claim 1 in which the food warmer is installed inside the vehicle and is connected to the engine cooling system or the Rapid Heater vehicle heating system's flow and return fluid lines.

2. A food warmer according to claim 1 in which the food warmer has two tube ports extended outside the case for connection to the fluid flow and fluid return ports/pipes from the engine's cooling system fluid pipelines

3. A food warmer according to claim 1 in which the food warmer enclosure is encircled with hollow metal tube which allows fluid to flow through it freely, it can be wrapped on the outside, on the inside or sandwich in-between the layer of the enclosure so they become one unit.

4. A food warmer according to claim 1 in which the food warmer inner enclosure is covered all around but on the outside by insulation that allows heat to be retained inside the inner enclosure only.

5. A food warmer according to claim 1 in which the food warmer has an outer cover which protects the inner enclosure with its insulation and thermostat, it's on/off knob/switch, its back lighting and provides a smooth surface for the door to close properly.

6. A food warmer according to claim 1 in which the food warmer consist of a thermal or temperature resistant door that hinges so as to allow maximum use of the inner enclosure and for the purpose of opening/closing via an insulated handle and locking mechanism to keep the door close, a seal on the door/the outside front face of the inner enclosure or the outside front face of the outer cover to prevent heat escaping from inside the inner enclosure

7. A food warmer according to claim 1 in which the food warmer is fitted with a heat resistant back light inside the inner enclosure so as to aid in visuals while warming food.

8. A food warmer according to claim 1 in which the food warmer's varying temperature levels are set via a thermostat placed close to but outside the body of the inner enclosure and is displayed by calibration settings or levels on the on/off switch/knob on the door or front face of the food warmer.

9. A food warmer according to claim 1 in which the food warmer on/off switch, while in on or off positions actuates/deactivate a solenoid connected to the thermostat and the battery which opens or closes a valve on the flow line in order to permit or prevent fluid movement.

10. A food warmer according to claim 1 in which the food warmer on/off switch actuates a solenoid which connects to the thermostat and battery when in the (ON Position) which opens a valve so as to allow fluid to circulate through the inner enclosure's tube vanes/ports, but is deactivated and stops fluid entering the food warmer's tube vanes/ports when set to the OFF position.

Intellectual Property Office

Application No: GB1318602.8 **Examiner:** Alan Jones

Claims searched: 1-10 **Date of search:** 25 April 2014

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	1-10	IE20090367 A1 (CSOFT S R L) See whole document, esp. thermostat 3 in fig 2
X	1-10	EP0628277 A1 (RIAL) See e.g. figs, abstract & col. 4 line 51 - col. 5 line 5 regarding thermostat
X	1-10	DE3144560 A1 (HUNFELD) See e.g. figs, WPI Abstract Accession No 1983-G8552K & thermostat 15
X	1-10	CN101628552 B (SAIC CHERY AUTOMOBILE CO LTD) Scc e.g. figs & WPI Abstract Accession No. 2010-B27885
X	1-10	DE4000322 A1 (BMW AG) See e.g. figs & WPI Abstract Accession No. 1991-209209
X	1-10	US3809059 A (BURK ET AL) See e.g. figs & abstract

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

B60N

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

Online: WPI, EPODOC

Intellectual Property Office

International Classification:

Subclass	Subgroup	Valid From
B60N	0003/10	01/01/2006
B60N	0003/16	01/01/2006