



January 19, 2021

John Doe
1 Happy Lane
Sunny, CA 12345

In re: Patentability Search
Invention: **Temperature Controlled Dog House**
Our Docket: **1**

Dear John,

Pursuant to your request, a preliminary patentability search has been conducted through the official records and files of over thirty-three full-text and sixty-eight bibliographic patent authorities worldwide. The search was directed towards a **portable dog house with an fan controlled by a temperature sensor**, as fully described in your provided disclosure.

Search Areas

Patents are organized globally in the Cooperative Patent Classification (CPC) system. This classification system allows the searches to really focus in on the important aspects or your invention. These areas are also valuable to your attorney when the review your search. Additionally, the searcher will reference US design patent classes when applicable. The most relevant search areas are identified by class/subclass and are as follows:

CPC: A01K1/00, 0047, 0052, 0058, 0064, 0076, 02, 03, 033, 034

US: D30/108



Search Results

Your search results are broken down into two distinct types of patents. The first type of patents are called Utility patents. Utility patents address the structure and function of your invention. In simpler terms, Utility patents will cover what your invention does and how it does it. The second type of patent is a Design patent. Design patent documents only protect how the invention looks. The searcher will provide design patent documents that are similar in appearance to your invention.

With respect to this search, we are providing a single set of the discovered patents. The set consists of PDF “working” copies of the patents wherein the searchers have used highlighting and other indicators to identify why they chose to include each patent with this report.

Utility features: A list of the discovered utility patents along with a brief description is below:

US3,962,993 – discloses a temperature controlled animal house with a pair of fans each controlled by a thermostat as shown in Figures 1 and 3. Please see the highlighted sections in the Abstract and columns 3 and 4.

US2020/0060219 – discloses a portable dog house with an electric fan and a manual controller. See Figures 2 and 5 and paragraphs [0015] and [0018].

US7,243,614 – discloses a portable enclosure for a dog with a fan that is controlled by a thermostatic switch. This is shown in Figures 7, 9 and 10 and described by the highlights in column 4.

US5,746,271 – discloses a temperature controlled animal enclosure with an air conditioning unit and an optional thermometer. Please see Figure 1A and the highlighted sections of columns 3 and 4.

US10,208,975 – discloses a smart pet crate that has sensors to control the environment within the crate. Please see the highlighted Abstract and the highlighted paragraph on column 2.

866-539-7550

222 22nd Street South
St. Petersburg FL 33712

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Your Patent Search

WO2006/127110A1 – discloses a temperature regulated pet kennel. Refer to the highlighted Abstract, Figures 4 and 11 as well as the highlights in paragraphs [0030], [0032] and [0038].

Design features: As it is sometimes desirable to file concurrent design and utility patent applications for the same invention, we searched for patent references relating strictly to the overall appearance of the present invention irrespective of function. As a result of the design search, the following U.S. design patent documents were located and are provided below:

D717,005 – shows the ornamental design of a pet carrier.

If you have any questions regarding the accuracy or completeness of this search please contact Shane Davis at 866-539-7550. Thank you for using our services.

Warm regards,

A handwritten signature in black ink, appearing to read 'Shane Davis', enclosed in a thin black rectangular border.

Shane Davis
Founder
Your Patent Search, LLC

[54] TEMPERATURE CONTROLLED ANIMAL HOUSE 3,557,756 1/1971 Ramsey..... 119/19

[76] Inventor: Donald P. Dattilo, 9405 Doral Court, Louisville, Ky. 40220

Primary Examiner—Hugh R. Chamblee
Attorney, Agent, or Firm—Diller, Brown, Ramik & Wight

[22] Filed: Feb. 21, 1975

[21] Appl. No.: 551,593

[57] ABSTRACT

[52] U.S. Cl. 119/19
[51] Int. Cl.²..... A01K 1/00
[58] Field of Search 119/19, 1, 33, 16

This disclosure relates to a temperature controlled animal house, particularly a dog house, which includes first and second chambers, the first of which houses an animal and the second of which includes means for generating heat which is blown into the first chamber, the heat generating means including a socket to receive a conventional light bulb with the heat therefrom being blown by a fan into the first chamber. A thermostat in the first chamber regulates the temperature thereof and a second thermostat in the second chamber prevents overheating in the second chamber.

[56] References Cited

UNITED STATES PATENTS

1,715,175	5/1929	Stark et al.	119/19
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16 Claims, 5 Drawing Figures

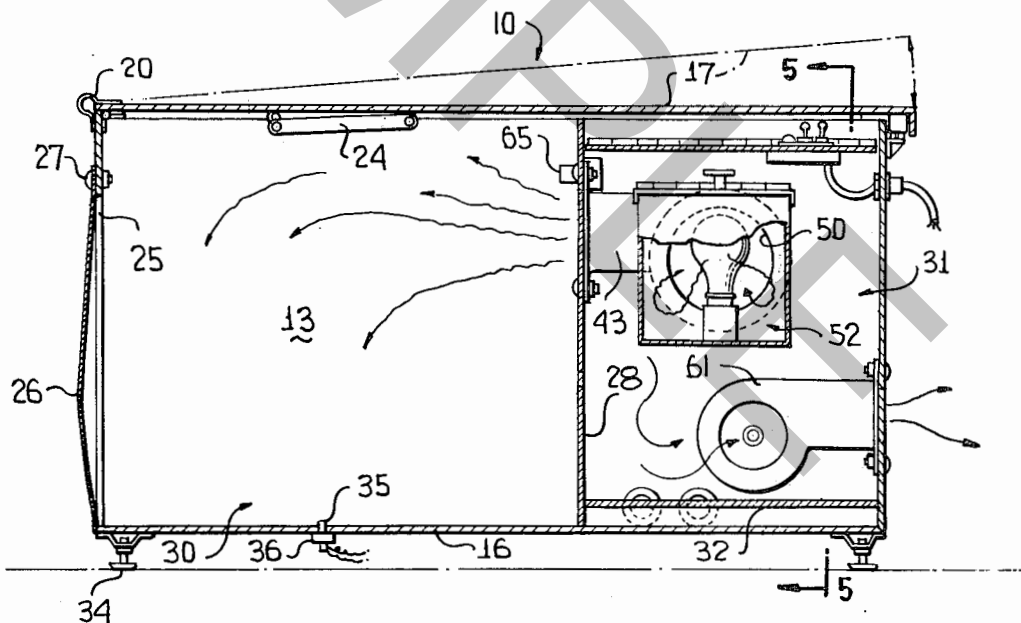


FIG. 3

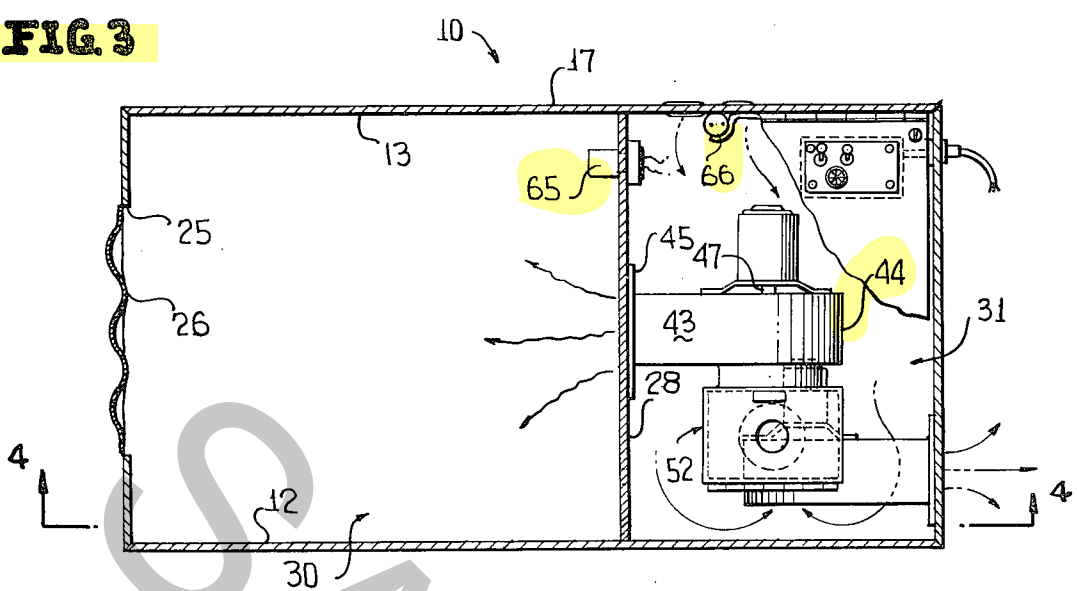


FIG. 4

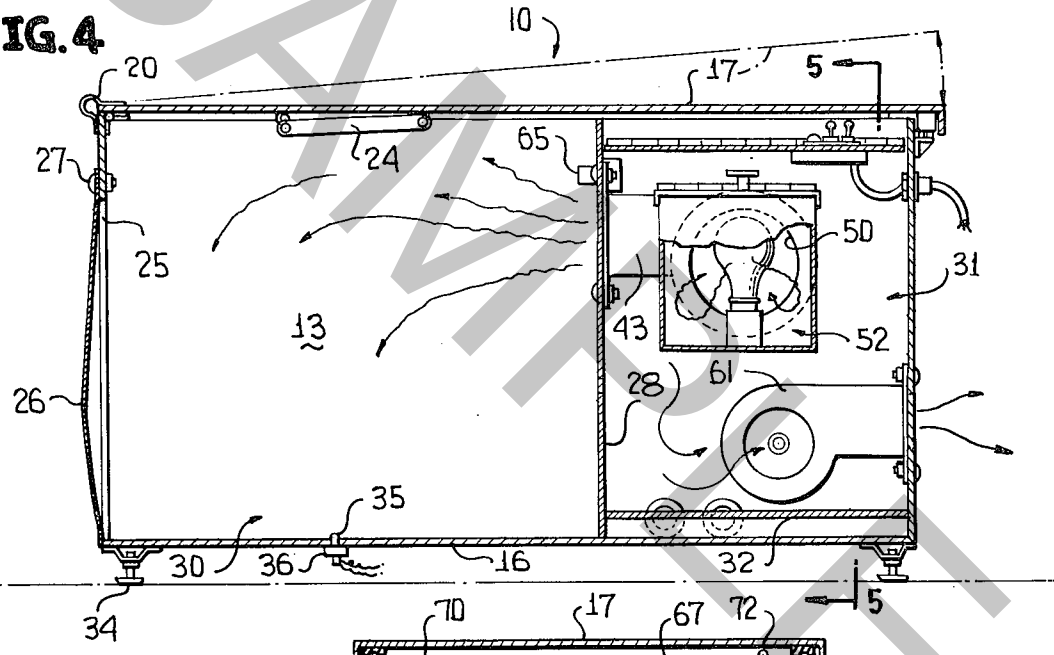
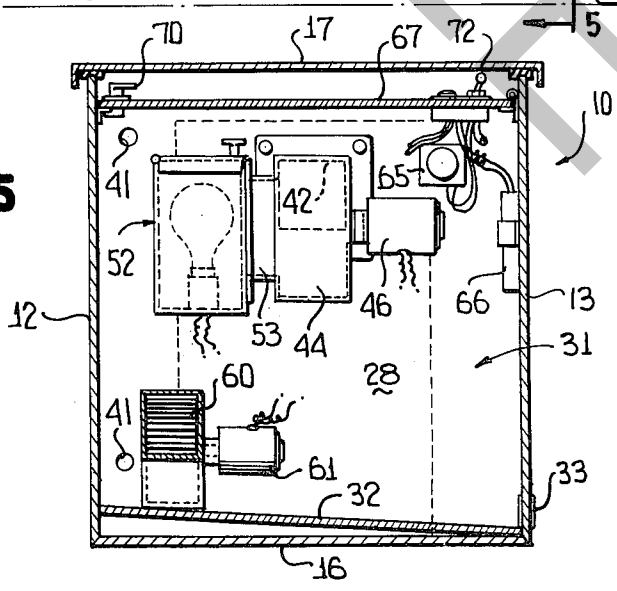


FIG. 5



TEMPERATURE CONTROLLED ANIMAL HOUSE

Conventional houses for dogs, cats, or similar animals have been constructed in a multiplicity of different ways, generally to satisfy the particular desires of the owner of the occupant-animal. Little overall sophistication has been employed because for the most part domestic animals were kept generally indoors during inclement or cold weather, and out of doors otherwise. When pet owners left their homes for an appreciable length of time neighbors were generally entrusted with the care of their pets, or the pets were simply boarded with professional "pounds". However, absent the latter two possibilities pets were simply permitted to fend for themselves out of doors, in basements or the like and found themselves more than uncomfortable, particularly during cold weather if out of doors or if indoors the house thermostat was lowered appreciably, as is the usual practice of persons who leave their dwellings for extended periods of time.

The problems noted heretofore are compounded if the pet owners live in apartments, townhouses, condominiums or the like which have no basements or common areas, other than a porch or patio, for the tethering, keeping, etc. of unattended pets.

In keeping with the foregoing, it is a primary object of this invention to provide a novel house for animal pets, such as dogs, cats or the like which is divided into a first chamber for the animal and a second chamber housing heat generating means and means for conducting the heat from the second chamber to the first chamber with both chambers being thermostatically controlled and with the heat being generated by a conventional or standard light bulb which maintains heating costs at a minimum yet provides excellent ambient internal temperature in the chamber occupied by the animal.

In keeping with the present invention two different thermostats are provided, one in the first or animal occupied chamber to maintain its temperature at approximately 70°F., and the other thermostat being located in the second chamber to assure that it is maintained at a safe internal temperature. For example, a temperature of about 150°F. would cause energization of an exhaust fan and thus evacuate any excess heat from the second non-occupied chamber.

It is a further object of this invention to construct a novel animal house of the type described heretofore wherein a bottom wall of the second chamber is inclined toward apertures so that any condensation which might accumulate therein, although this possibility is remote, would be removed by gravity with the apertures further serving the purpose as air inlets to assure a constant circulation of fresh air inlets to assure a constant circulation of fresh air between the first and second chambers.

In addition, in keeping with this invention, the standard light bulb is housed within a third chamber located in the second chamber and being coupled to the fan for conducting the heat generated by the energized light bulb to be transmitted into the first or animal occupied chamber.

Still another object of this invention is to provide the third chamber with vent openings and a removable closure along with a sight opening, preferably though not necessarily in the latter, for viewing the lit or unlit condition of the bulb without removing the closure or

otherwise gaining access into the interior of the third chamber.

A final object of this invention is to provide an exhaust fan in the second chamber to evacuate any excess heat produced by the light bulb in the third chamber.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claimed subject matter, and the several views illustrated in the accompanying drawings.

IN THE DRAWINGS

FIG. 1 is a perspective view with parts broken away for clarity of the animal house of this invention, and illustrates a pair of chambers, a pivoted cover, two separate thermostats, a light bulb in a third chamber, and two fans, one used to force heated air into the area occupied by the animal, the other used to evacuate excess internal heat created in the second chamber.

FIG. 2 illustrates circuitry for controlling the electrical components of the animal or dog house.

FIG. 3 is a sectional view taken generally along line 3-3 of FIG. 1, with the cover in the open position, and illustrates more clearly various components of the second chamber, as well as an additional cover thereof which includes an on-off switch, circuit breaker, etc.

FIG. 4 is a sectional view taken generally along line 4-4 of FIG. 3, and additionally illustrates the components of the second chamber.

FIG. 5 is a sectional view taken generally along line 5-5 of FIG. 4, and additionally illustrates the components of the second chamber.

A novel animal house for dogs, cats or similar pets is fully illustrated in FIGS. 1, 3, 4 and 5 of the drawings, and is generally designated by the reference numeral 10. The animal house 10 includes a housing 11 defined by side walls 12, 13, end walls 14, 15, a bottom wall and a top wall or cover 17 which is joined by a conventional piano hinge 18 or the equivalent to an upper portion (unnumbered) of the end wall 14. A strip 20 (FIGS. 1 and 4) of weathering material, such as rubber, is secured to adjacent edges (unnumbered) of the cover 17 and the end wall 14 to prevent moisture from entering into the housing 11. The cover 17 additionally includes along three of its edges (unnumbered) strips 21, 22 and 23 of insulating material which in the closed position (FIGS. 4 and 5) of the cover 17 rest upon the respective upper edges (unnumbered) of the walls 12, 15 and 13, respectively. A conventional hinge 24 has opposite ends of two arms pivotally connected to the cover 17 and the side wall 13 such that in the conventional manner the hinge 24 in the position shown in FIG. 1 is self locking and supports the cover 17 in its open position.

The end wall 14 has an opening 25 which, though shown to be rectangular, may be of any desired configuration and the exterior thereof is closed by a flap 26 of relatively flexible though weather-resistant material, such as rubber, canvas, or plastic, which is secured by rivets, screws or the like 27 to an upper edge portion (unnumbered) of the end wall 14.

Means in the form of a wall 28 serves to partition the housing 11 into a chamber 30 and a second chamber 31.

The first chamber 30 is the chamber occupied by the animal and is defined by portions of the walls 12, 13, the wall 14, and the partition 28.

The second chamber 31 houses various mechanical and electrical components to be described immediately hereinafter and is defined by portions of the walls 12, 13, the end wall 15, the partition wall 28, and a further bottom wall 32 (FIGS. 1, 4 and 5), which is inclined downwardly from left-to-right, as viewed in FIGS. 1 and 5 toward aperture means 33 formed in the side wall 13 contiguous the bottom for the purpose of permitting any undesired condensation which may form in the chamber 31 to flow by gravity to the exterior thereof through the apertures 33. That portion of the bottom wall 16 which underlies the wall 32, as best shown in FIG. 4 may, of course, be eliminated. However, due to the fact that the bottom wall 16 spans the entire distance between the end walls 12, 15 for conventional screw adjusted feet 34 are readily welded, riveted, or otherwise secured at each corner of the bottom wall 16 and moreover leveling of the overall housing 11 is rendered much easier when all screw feet 34 are reactive relative to the same plane (the bottom wall 16) as opposed to an alternative construction when two of the screw feet might be attached to the inclined bottom wall 32.

The partition wall 28 may if desired though not necessary have one or more vent openings 41 formed either at the top or bottom thereof and another opening 42 (FIG. 5) covered by a conduit 43 which in effect forms a portion of a blower housing 44. Flanges 45 are riveted, screwed or otherwise fastened to the partition wall 28. A conventional electric motor 46 is supported by the blower housing 44 and a shaft 47 as secured thereto a fan blade 48 (FIG. 1). The shaft 47 passes, of course, through an opening (not shown) in the blower housing which opposes an opposite larger opening 50 (FIG. 4) surrounded by a like opening 51 formed in a wall (unnumbered) of a third chamber 52 which is suitably secured to a short conduit portion 53 (FIG. 5) of the blower housing 44. The third housing 52 includes a plurality of vent openings 53 (FIG. 1) and a cover 54 hinged thereto for opening and closing along with a sight opening 55 for visually inspecting whether or not a standard light bulb 56 received in an electrical socket 57 is lit or unlit when the circuit of FIG. 4 is energized.

Another conventional fan 60 having a housing 61 is secured conventionally to the end wall 15 and blows air from the interior of the second chamber 31 to atmosphere through an opening 62. The fan 60, housing 61, and apertures 62 may be totally eliminated since the purpose thereof is simply to exhaust air from the second chamber 31 which in turn causes air to be drawn from atmosphere through the apertures 33 causing a high degree of ambient air from atmosphere to be recirculated by the fan 48 into the chamber 30 to prevent odors or the like from being created which might otherwise occur to a greater degree absent the introduction of fresh air and simply the recirculation of generally stagnant air except that which might normally enter into the first chamber 30 through the apertures 41 and leakage through the opening 25 or the opening and closing thereof by the opening and closing of the flap 26. As another alternate a conduit could be coupled from the housing 44 to atmosphere, though the latter would exhaust heated air to atmosphere but would also draw fresh air into the chamber 31 through the apertures 33. However, the air lost by exhausting in the latter manner would be negligible due to the use of a relatively small diametered pipe or conduit.

Thermostats 65, 66 form a part of the circuit 40 and are suitably connected to the walls 28, 13.

An additional cover 67 is joined by a hinge 68 to the wall 13 and spans the entire open upper end of the second chamber 31 in the manner best illustrated in FIG. 5 with an edge thereof opposite the hinge 68 being provided with a conventional rotatable or magnetic latch 70.

The cover 67 carries a neon lamp 71, and on-off switch 72, and a circuit breaker 73.

Reference is now made to FIG. 2 and the circuitry 40 which has reference numerals thus far described applied thereto. A portion of the circuit 40 is sealed in epoxy or similar weatherproof housing 80 connected to the underside of the cover 67 below the area of the components 71 through 73. Upon manual closure of switch 72 in the chamber 30 a circuit is established through the circuit breaker 73 to light the neon light 71 which is in parallel to a varistor 81.

Located in the circuit of the thermostat 65, the lamp 56, and the motor (unnumbered) of the fan 48 is a resistor 82 and a triac 83. Likewise, located in the circuit of the motor (not shown) of the fan 60 and the thermostat 66 is a resistor 84 and a triac 85.

Assuming that the temperature within the chamber 30 is at or above desired (72°F.), neither the lamp 56 nor the motor of the fan 48 are energized. However, when the switch (not shown) of the thermostat 65 closes at a temperature below that desired within the chamber 30 the circuit through the components 56, 48, 82, and 83 closes lighting the lamp 56 and energizing the motor 48 to thereby generate heat and blow this heat by the fan 48 into the chamber 30. When the temperature in chamber 30 rises to 72°F. the switch in the thermostat 65 opens and deenergizes the lamp 56 and the motor for the fan 48.

In addition to the operation of the fan 60 heretofore described which would simply require the fan 60 to be placed in parallel with the components 56, 48, a further embodiment of the invention includes the inclusion of the motor of the fan 60 in the circuit of the electrical components 84, 85 and 66. In this case the switch of the thermostat 66 closes should the temperature within the chamber 31 reach 150°F. In this case the fan 60 is energized and air is exhausted from the chamber 31 to thereby assure that overheating in the chamber 31 will not occur.

The foregoing specific description of the animal house 10 is considered ample evidence of the objectives attained thereby as heretofore described.

While preferred forms and arrangements of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in detail and arrangement of parts may be made without departing from the spirit and scope of this disclosure.

I claim:

1. An animal house comprising a housing, means setting off a pair of chambers in said housing, entrance means through which an animal may pass into and out of a first of said chambers, closure means openable to gain access into said chambers, heat generating means located in a second of said chambers for generating heat to heat said first chamber, means for conducting the heat generated by said heat generating means into said first chamber, said heat conducting means including first fan means for blowing the generated heat into said first chamber, second fan means in said second chamber for circulating air in said second chamber,

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and means for regulating the operation of said second fan means to preclude the internal temperature of said second chamber from rising above a desired maximum temperature to thereby preclude overheating of said second chamber by said generated heat.

2. The animal housing as defined in claim 1 including means in said second chamber for precluding the internal temperature of said second chamber from rising above a desired maximum temperature by deenergizing said heat generating means.

3. The animal housing as defined in claim 2 wherein said heat generating means includes a socket for an electric light bulb, and said heat conducting means includes a fan for blowing the generated heat of an electric light bulb adopted for connection to said socket into said first chamber.

4. The animal house as defined in claim 2 wherein said closure means is a cover common to both of said chambers.

5. The animal house as defined in claim 2 wherein said closure means is a first cover common to both of said chambers, and a second cover for said second chamber internally of said first cover.

6. The animal house as defined in claim 2 including aperture means through said housing of said second chamber, and means for exhausting air from said second chamber to atmosphere.

7. The animal housing as defined in claim 1 wherein said heat generating means includes a socket for an electric light bulb, and said heat conducting means includes a fan for blowing the generated heat of an electric light bulb adopted for connection to said socket into said first chamber.

8. The animal house as defined in claim 7 wherein said closure means is a cover common to both of said chambers.

9. The animal house as defined in claim 7 wherein said closure means is a first cover common to both of said chambers, and a second cover for said second chamber internally of said first cover.

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10. The animal house as defined in claim 7 including aperture means through said housing contiguous a bottom of said second chamber.

11. The animal house as defined in claim 1 wherein said closure means is a cover common to both of said chambers.

12. The animal house as defined in claim 1 wherein said closure means is a first cover common to both of said chambers, and a second cover for said second chamber internally of said first cover.

13. The animal house as defined in claim 1 including aperture means through said housing contiguous a bottom of said second chamber.

14. The animal house as defined in claim 1 including aperture means through said housing of said second chamber, and said regulating means includes means for exhausting air from said second chamber to atmosphere.

15. An animal house comprising a housing, means setting off a pair of chambers in said housing, entrance means through which an animal may pass into and out of a first of said chambers, closure means openable to gain access into said chambers, heat generating means located in a second of said chambers for generating heat to heat said first chamber, means for conducting the heat generated by said heat generating means into said first chamber, first and second aperture means through said housing of said second chamber, and conduit means connecting said heat conducting means to said first aperture means whereby air exhausted to atmosphere through said first aperture means is replenished by air drawn into said second chamber through said second aperture means thus precluding stagnation of air in said first chamber.

16. The animal house as defined in claim 15 including a third chamber in said second chamber housing said heat generating means, and said heat conducting means includes conduit means placing said first and third chambers in fluid communication.

* * * * *

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US005746271A

United States Patent [19]
DeCosta

[11] **Patent Number:** 5,746,271
[45] **Date of Patent:** May 5, 1998

[54] **CLIMATE CONTROLLED DOGHOUSE**

[76] **Inventor:** Daniel J. DeCosta, 443 W. Church Ave., Longwood, Fla. 32750

[21] **Appl. No.:** 762,191

[22] **Filed:** Dec. 9, 1996

[51] **Int. Cl.⁶** F25D 23/00

[52] **U.S. Cl.** 165/53; 62/263; 119/448

[58] **Field of Search** 62/262, 263; 165/53; 119/448

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,119,084	10/1978	Eckels	126/270
4,700,887	10/1987	Timmons	119/448
5,361,981	11/1994	Albert et al.	165/53

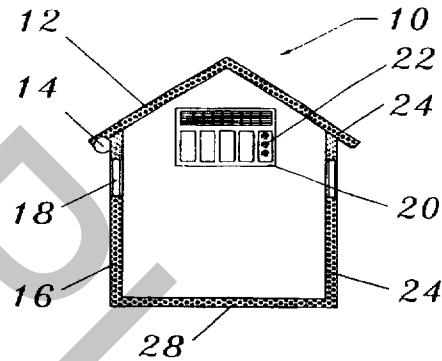
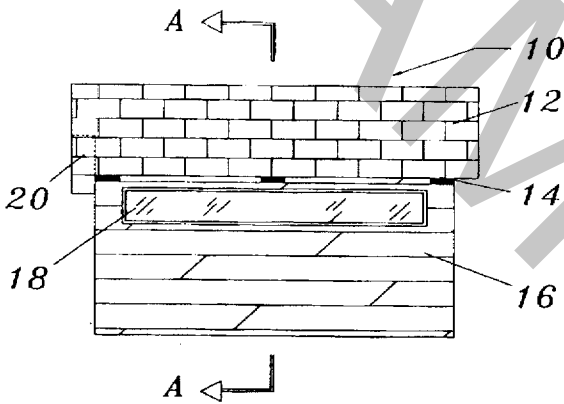
Primary Examiner—William E. Tapoical

Attorney, Agent, or Firm—Dorothy S. Morse; American Inovations Inc

[57] **ABSTRACT**

A doghouse having an heating and air conditioning unit installed therein with insulated walls, an insulated roof, hinges connecting the roof on one of its sides to the upright walls for easy access by the pet owner to the controls of the heating and air conditioning unit. The present invention also has a flexible door covering with laterally overlapping parallel strips that are made from a heavy material so as to be minimally affected by tangling and frequent wind interaction. The strips are vertically hung from the upper part of the door opening to allow pets freedom of access in and out of the doghouse, while at the same time retaining the major portion of the climate controlled air within the insulated walls and roof of the doghouse during pet use.

7 Claims, 2 Drawing Sheets



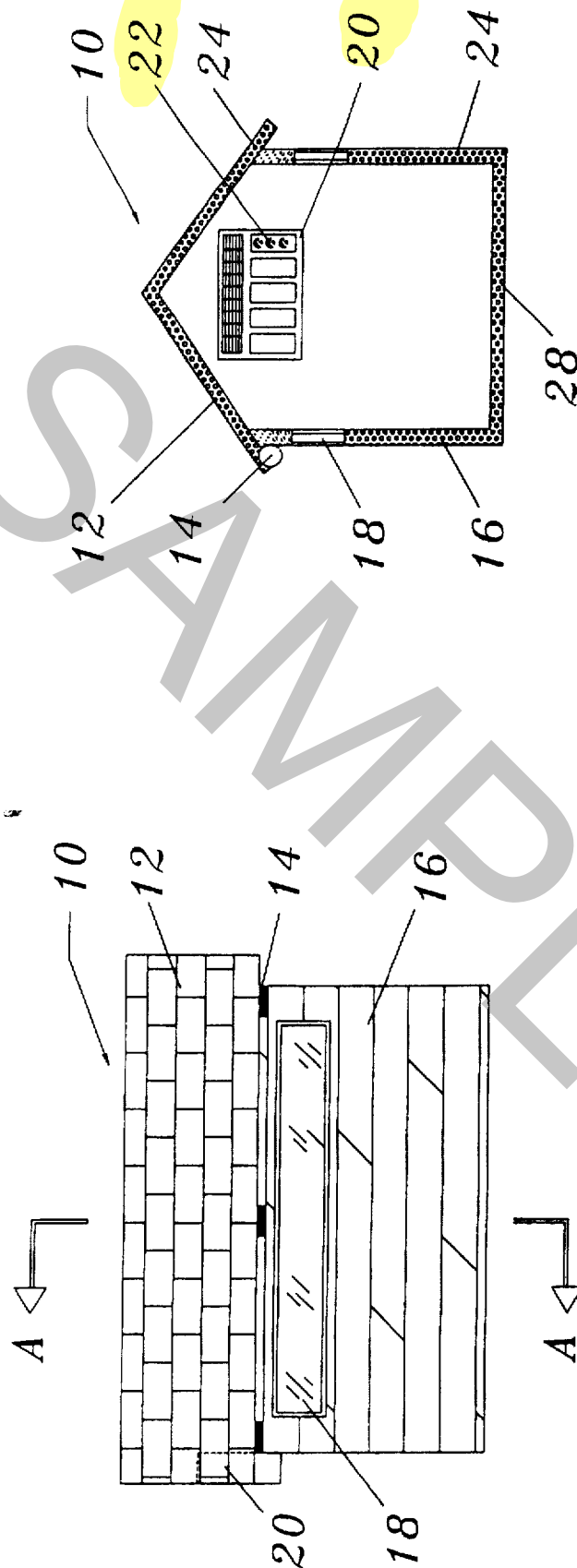


Fig. 1A

Fig. 1

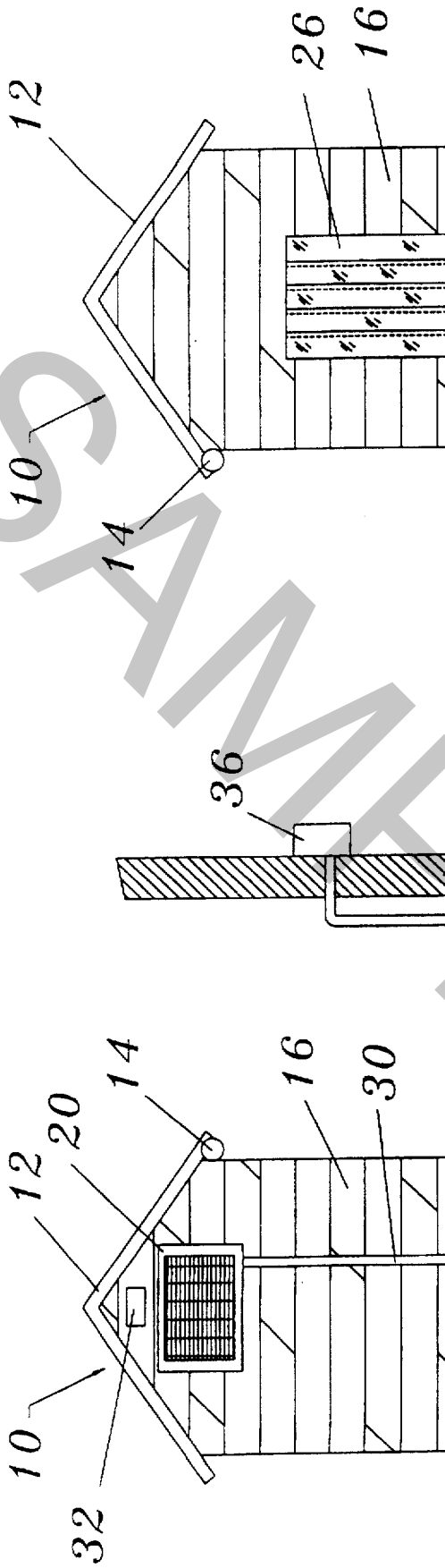


Fig. 3

Fig. 2

CLIMATE CONTROLLED DOGHOUSE**BACKGROUND—FIELD OF INVENTION**

This invention relates to doghouses and pet shelters, specifically to a doghouse having an heating and air conditioning unit installed therein with insulated walls, an insulated roof, hinges connecting the roof to its upright walls for easy access to the controls of the heating and air conditioning unit, as well as a flexible door covering having vertically parallel members made from a heavy material and hung from the upper part of the door opening to allow freedom of access in and out of the doghouse by the animals using it, while retaining the major portion of the climate controlled air within the insulated walls and roof of the doghouse.

BACKGROUND—DESCRIPTION OF PRIOR ART

Many sizes and configurations of doghouses are known. Doghouses have been made as rectangular structures, as well as in the shapes of igloos, castles, and domed structures. Some pet shelters have windows and some do not. However, many pet shelters are unusable in warm weather as the internal temperatures within the pet shelters become too hot for the comfort and well-being of the pet. Also, many pet shelters are unusable in cold weather and when nighttime temperatures become too cold for the comfort and well-being of a pet. Therefore, a climate controlled pet shelter with means of to moderate its internal temperature would be advantageous for extended use of the pet shelter in summer and winter months.

A rectangular-shaped pet shelter having windows is disclosed in U.S. Design Pat. D335,002 to Read (1993), while one with a circular cross-section and windows is disclosed in U.S. Design Pat. D357,769 to Connelly (1995). Also, igloo-shaped pet shelters are disclosed in U.S. Design Pat. D360,709 to Northrop (1995) and U.S. Design Pat. D244,949 to Welker (1977). Even though the upper surfaces of the Northrop and Welker inventions appear to be removable, and the Connelly and Read inventions have windows, none of these inventions is shown to have an insulated roof, insulated walls, and a door closing that is designed to retain climate controlled air within its insulated walls and roof structure.

The prior art thought to be most closely related to the present invention are the inventions disclosed in U.S. Design Pat. D330,274 to Smith (1992), U.S. Design Pat. D328,505 to Perry (1992), and U.S. Design Pat. D335,965 to Spring (1993). The Spring invention shows an enclosed, heated car seat for infants with fans for circulation of warm air and a rotatable cover attached thereto for use in placing the infant into, and removing the infant from, the enclosed spaced over the car seat. The Spring invention is also shown to have an electrical cord attached thereto with an adapter on its distal end for plugging the car seat heater and fan into the cigarette lighter, or electrical power access point, on the dashboard of a motorized vehicle. The present invention is dissimilar to the Spring invention in configuration, and the present invention has a climate control system that cools the doghouse in addition to heating it. The Perry invention discloses a rectangular-shaped doghouse having a door flap. However, the Perry door flap appears to be made from a single sheet of material which would let more climate controlled air escape each time a pet moved around it than does the door covering of the present invention. Therefore, the present invention with its door covering made from strips of heavy material hung vertically parallel to one another and in an

overlapping manner within the door opening of the doghouse, its upwardly movable roof, and its climate control system make it distinguishable from the Perry invention. The present invention is also distinguishable from the Smith invention which is shown to be an elongated rectangular container with mesh doors and a flat top that is attached to a supporting bar so that the top can be placed in an opened position for reasons such as additional interior ventilation, easy cleaning of the interior, and easy access to the pets placed inside. It is not known to have a doghouse having an heating and air conditioning unit installed therein with insulated walls, an insulated roof, hinges connecting the roof to the upright walls for easy access to the heating and air conditioning unit, as well as a flexible door covering having vertically parallel members made from a heavy material and hung from the upper part of the door opening to allow freedom of access in and out of the doghouse by the animals using it, while retaining a major part of the conditioned air within the insulated walls and roof of the doghouse.

SUMMARY OF INVENTION—OBJECTS AND ADVANTAGES

It is the primary object of this invention to provide a doghouse with a climate controlled interior. It is also an object of this invention to provide a doghouse with an insulated floor, roof, and walls to lower the cost of maintaining a moderate temperature within the doghouse interior. A further object of this invention is to provide a doghouse with a hinged roof for easy access by the pet owner to the air conditioning and heating unit controls. It is also an object of this invention to provide a doghouse with an attractive exterior design.

As described herein, properly manufactured and used, the present invention would provide a doghouse having a climate controlled interior for use by pets when ambient temperatures are too hot or cold for the comfort and well being of the pets. The present invention would have insulated walls, an insulated floor, and an insulated roof. The present invention would also have a heating and air conditioning unit installed therein, with hinges connecting the roof to its upright walls for easy access to the controls of the heating and air conditioning unit. In addition, the present invention would have a flexible door covering through which the pet could have access to the climate controlled interior, but which would retain the major portion of the climate controlled air within the insulated walls and roof. In the preferred embodiment the door covering would be made from strips of heavy material, hung so as to be vertically parallel to one another and overlapping one another so as to completely cover the door opening. In the preferred embodiment the air conditioner and heating unit would be powered by an electrical cable that is buried so that the pet would not be tempted to chew it. Alternatively, it is also contemplated for the air conditioner and heating unit to be powered by a battery, generator, or an overhead cable connected over the roof of the present invention. Optional features of the present invention would comprise an L.E.D. display on the exterior of the doghouse for monitoring internal temperatures therein without having to open its hinged roof, an L.E.D. display within the interior of the pet owner's house for use by the pet owner in remotely monitoring internal temperatures within the doghouse, remote controls located within the interior of the pet owner's house for use by the pet owner for remotely adjusting the interior temperature of the doghouse, and the positioning of a maximum/minimum thermometer within the interior of the doghouse so that the pet owner can use such information to evaluate the effectiveness of the heating and air conditioning unit.

The description herein provides preferred embodiments of the present invention but should not be construed as limiting the scope of the doghouse invention. For example, variations in the configuration and dimension of the walls and roof, the size of the air conditioning and heating unit installed, the type of hinging means used for the roof, the exterior design, the number of windows used, and the material from which the door covering is made, other than those shown and described herein, may be incorporated into the present invention. Thus the scope of the present invention should be determined by the appended claims and their legal equivalents, rather than the examples given.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the invention.

FIG. 1A is a sectional end view of the invention across the line A—A in FIG. 1.

FIG. 2 is a back end view of the invention.

FIG. 3 is a front end view of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 shows a preferred embodiment of a climate controlled doghouse 10 having a roof 12 supported on top of walls 16. Although walls 16 are formed into a rectangular configuration, such a rectangular shape is not critical to the present invention. FIG. 1 also shows climate controlled doghouse 10 having a horizontally elongated window 18 positioned near the upper surface of wall 16, and a plurality of hinges 14 connected between roof 12 and wall 16. It is contemplated for hinges 14 to be made from plastic so they won't deteriorate upon exposure to humid outdoor air. In addition, FIG. 1 shows air conditioning and heating unit 20 positioned under roof 12 at one end of climate controlled doghouse 10. It is preferred that air conditioning and heating unit 20 be positioned through the upper portion of one wall 16 so as to minimize contact with pets housed within climate controlled doghouse 10. In the preferred embodiment it is contemplated for roof 12, walls 16, and windows 18 to be made from materials that are easily washable, such as plastic materials. Also since it is contemplated for climate controlled doghouse to be used in both summer and winter seasons, it is contemplated for roof 12, walls 16, and windows 18 to be made from materials that are resistant to the deteriorating effects of solar radiation and temperature extremes. Hinges 14 allow roof 12 to be raised on one of its sides for easy access to thermostatic controls, shown in FIG. 1A as number 22, as well as access to the interior of climate controlled doghouse 10 for cleaning purposes.

FIG. 1A shows roof 12 supported on top of walls 16, with hinges 14 positioned between one wall 16 and roof 12. FIG. 1A also shows windows 18 positioned through opposed walls 16 near the upper surface of each wall 16, and air conditioning and heating unit 20 positioned under roof 12 through one end of climate controlled doghouse 10. Although the thermostatic controls 22 for air conditioning and heating unit 20 are could be positioned on the outside of climate controlled doghouse 10, it is preferred that thermostatic controls 22 be positioned within climate controlled doghouse 10 to limit access to them by young children (not shown). Hinges 14, attached between roof 12 and one wall 16, allow ease of access to thermostatic controls 22 by adults (not shown) needing to adjust the temperature within the interior of climate controlled doghouse 10. In addition, FIG. 1A shows roof 12, walls 16, and the floor 28 of climate controlled doghouse 10 being made from insulated materials

24. In the preferred embodiment of the present invention it is contemplated for windows 18 to be made from a shatterproof, transparent material, such as PLEXIGLASS®.

FIG. 2 shows air conditioning and heating unit 20 under roof 12 and positioned through wall 16. FIG. 2 also shows hinge 14 connected between one edge of roof 12 and wall 16 so that the opposed side of roof 12 may be raised for easy cleaning of the interior of climate controlled doghouse 10, as well as easy access to thermostatic controls 22 positioned within the interior of climate controlled doghouse 10. FIG. 2 further shows wall 16 having a design on its outer surface which has the appearance of siding used in residential construction for decorative enhancement of climate controlled doghouse 2 and a power cord 30 for connecting air conditioning and heating unit 20 to a remote power source (not shown). In addition, FIG. 2 shows an L.E.D. display 32 positioned on the exterior of wall 16 above heating and air conditioning unit 20 for monitoring internal temperatures within walls 16 and roof 12 without having to open roof 12. Although FIG. 2 shows L.E.D. display 32 positioned on the exterior of wall 16 above heating and air conditioning unit 20, such positioning is not critical to the present invention and it is contemplated to have any positioning of L.E.D. display 32 which makes it easily read. FIG. 2 also shows a house wall 34 at a spaced distance from wall 16, a control box 36 positioned on the interior side of wall 34, and wiring 38 connected between heating and air conditioning unit 20 and control box 36. Although not shown, in the preferred embodiment it is contemplated for control box 36 to comprise both controls for adjusting the temperature within climate controlled doghouse 10 and an L.E.D. display for remote monitoring of internal temperatures within doghouse 10. Further, although not shown, it is contemplated for a minimum/maximum thermometer to be placed within doghouse 10 to give the pet owner information to evaluate the effectiveness of heating and air conditioning unit 20.

FIG. 3 shows climate controlled doghouse 10 having roof 12 supported on wall 16 with hinge 14 connected between one edge of roof 12 and wall 16. FIG. 3 also shows wall 16 having a design on its outer surface which resembles siding used in residential construction and a door covering 26 made from laterally overlapping strips of material. It is contemplated for door covering 26 to be made from a heavy material so that strips are not easily tangled by movement of large pets through the door opening and so that wind does not easily move door covering 26 to disturb its closure function. It is also contemplated for door covering 26 to be made of transparent material, hung from the upper surface of the door opening in wall 16, and to completely cover the door opening in climate controlled doghouse 10 so as to retain a maximum amount of the climate controlled air (not shown) within insulated roof 12 and walls 16, while pets move through door covering 26, as well as during times when door covering 26 remains undisturbed.

To use the present invention, a pet owner would place climate controlled doghouse 10 on level ground. After securing air conditioning and heating unit 20 through wall 16 in one end of climate controlled doghouse 10, the pet owner would connect it to a remote power source, preferably through use of an underground cable, or an overhead one, so that the pet would not be tempted to play with and chew the cable. In the alternative a generator (not shown) or a battery (not shown) could be used to power air conditioning and heating unit 20. After lifting roof 12 upward from hinges 14 and positioning thermostatic controls 22 on appropriate settings to activate air conditioning and heating unit 20, the pet owner would ensure that door covering 26 completely

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covered the door opening in climate controlled doghouse 10 so that the major portion of climate controlled air would be retained within insulated roof 12 and walls 16 during pet use.

What is claimed is:

1. A pet shelter which has an interior that is climate controlled for the comfort of pets therein during times of outdoor temperatures extremes, said pet shelter comprising a floor; a plurality of walls each having an upper portion, one of said walls having a door opening therethrough; a roof having opposite sides; said walls upwardly depending from said floor; said roof supported by said walls; said floor, said roof, and said walls being made from insulated materials that are easily washable, said materials also being resistant to solar radiation and exposure to temperature extremes; a plurality of hinges, each of said hinges being connected between one of said opposite sides of said roof and one of said walls so that the other of said opposite sides of said roof is movable between a closed position and opened positions; an air conditioning and heating unit positioned through said upper portion of one of said walls so as to minimize contact between a pet placed within said pet shelter and said air conditioning and heating unit; said pet shelter also comprising a connection means for connecting said air conditioning and heating unit to a remote power source; and a door covering made from a plurality of strips of material having opposed ends, one of said opposed ends being hung from the one of said walls having said door opening and hung in positions to laterally overlap one another so that said strips completely cover the width of said door opening, the other end of each of said strips hanging downwardly so as to completely cover the length of said door opening, said strips each having sufficient weight so as not to become tangled as a result of movement therethrough of pets and not to be frequently disturbed by winds for a maximum retention within said pet shelter of air that has been moderated in temperature by said air conditioning and heating unit.

2. The pet shelter of claim 1 further comprising a rectangular configuration and a plurality of windows, each of said windows being positioned through one of said walls.

3. The pet shelter of claim 1 wherein said air conditioning and heating unit has a plurality of thermostatic controls, and wherein said thermostatic controls are positioned within said roof and walls to minimize interference by young children.

4. The pet shelter of claim 1 wherein said strips are made from transparent material.

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5. A pet shelter which has an interior that is climate controlled for the comfort of pets therein during times of outdoor temperatures extremes, said pet shelter comprising a floor; a plurality of walls each having an upper portion, one of said walls having a door opening therethrough; a roof having opposite sides; said walls upwardly depending from said floor; said roof supported by said walls; said floor, said roof, and said walls being made from insulated materials that are easily washable, said materials also being resistant to solar radiation and exposure to temperature extremes; a plurality of hinges, each of said hinges being connected between one of said opposite sides of said roof and one of said walls so that the other of said opposite sides of said roof is movable between a closed position and opened positions; an air conditioning and heating unit positioned through said upper portion of one of said walls so as to minimize contact between a pet placed within said pet shelter and said air conditioning and heating unit; said pet shelter also comprising a connection means for connecting said air conditioning and heating unit to a remote power source; and a door covering made from a plurality of strips of transparent material having opposed ends, one of said opposed ends being hung from the one of said walls having said door opening and hung in positions to laterally overlap one another so that said strips completely cover the width of said door opening, the other end of each of said strips hanging downwardly so as to completely cover the length of said door opening, said strips each having sufficient weight so as not to become tangled as a result of movement therethrough of pets and not to be frequently disturbed by winds for a maximum retention within said pet shelter of air that has been moderated in temperature by said air conditioning and heating unit.

6. The pet shelter of claim 5 further comprising a remote control box connected to said air conditioning and heating unit and a quantity of wiring connecting said remote control box to said air conditioning and heating unit, said remote control box having a temperature display means so that a person can remotely monitor temperatures within said pet shelter and adjust them accordingly.

7. The pet shelter of claim 5 wherein said walls have an outside surface and further comprising a temperature display means positioned on said outside surface of one of said walls so that a person can monitor temperatures within said pet shelter without having to open said roof.

* * * * *



US007243614B1

(12) **United States Patent**
Byers

(10) **Patent No.:** **US 7,243,614 B1**
(45) **Date of Patent:** **Jul. 17, 2007**

(54) **MODULAR ANIMAL ENCLOSURE**

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Mustang, OK (US) 73064

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 172 days.

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(21) Appl. No.: **10/664,259**

(22) Filed: **Sep. 17, 2003**

(51) **Int. Cl.**
A01K 1/02 (2006.01)
B65D 43/14 (2006.01)

(52) **U.S. Cl.** **119/482**; 119/500; 119/416;
119/448; 119/492; 119/499; 119/493; 119/474;
220/4.34; 220/810; 220/817; 220/848

(58) **Field of Classification Search** 119/500,
119/436, 416, 418, 448, 453, 454, 474, 482,
119/492, 496-499, 300-320, 484-486, 309,
119/493; D30/108; 454/242, 250, 83, 173,
454/275, 364, 365, 367, 368; 220/4.34, 810,
220/817, 831, 832, 833, 848; 165/48.1, 254,
165/53, 59; 52/198

See application file for complete search history.

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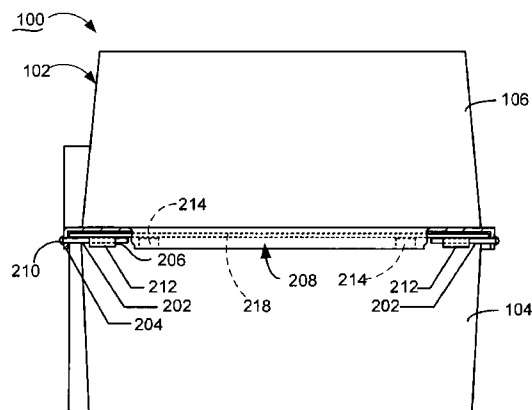
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Primary Examiner—Andrea M. Valenti
(74) *Attorney, Agent, or Firm*—Fellers, Snider, et al.

(57) **ABSTRACT**

A modular animal enclosure includes a housing comprising a top portion affixed to a base portion to form a sheltered interior. The housing includes a door aperture and a climate conditioning aperture. A remove ably attachable climate conditioning unit is installed over the climate conditioning aperture to facilitate a flow of atmospheric air from the exterior environment into the interior of the housing. The climate conditioning unit can variously comprise a cover assembly, a heating unit, a cooling unit and a forced air unit, and different types of units can be installed at different times. In another aspect, the bottom portion can be selectively hinged to the top portion on opposing sides of the housing to allow pivotal movement of the top portion in two opposite directions, as desired to permit access to the interior of the housing for inspection, maintenance and cleaning of the interior.

7 Claims, 11 Drawing Sheets



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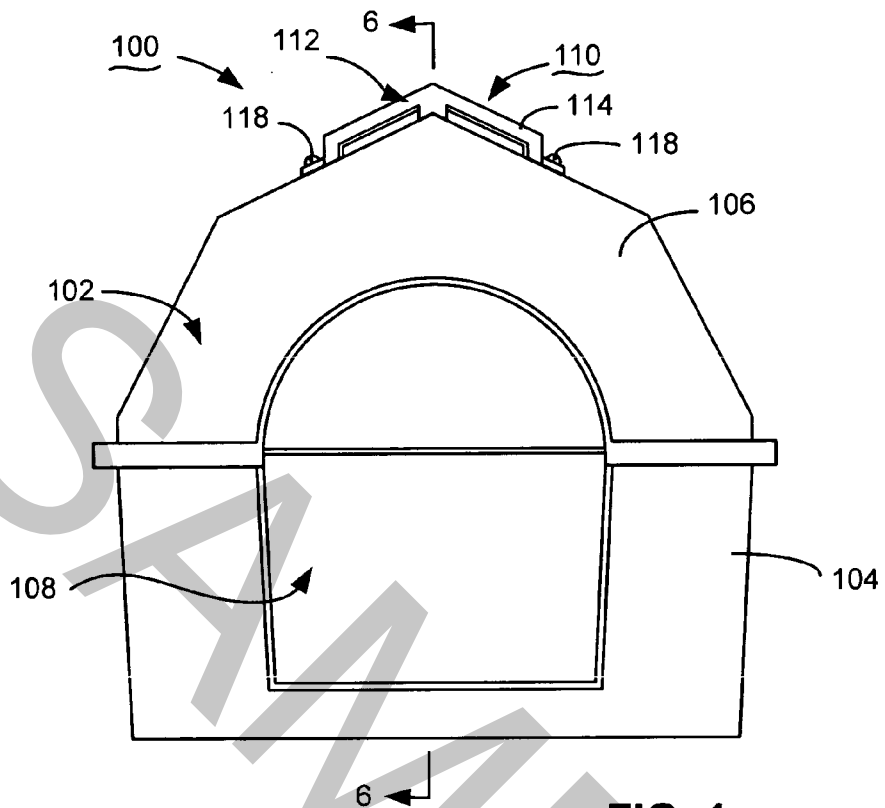


FIG. 1

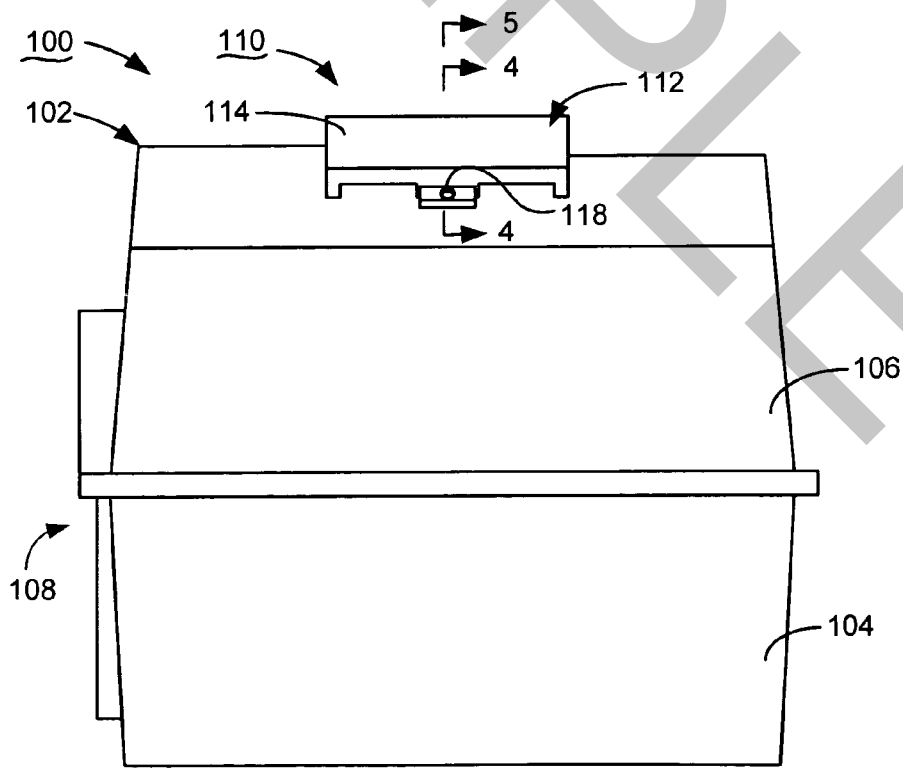


FIG. 2

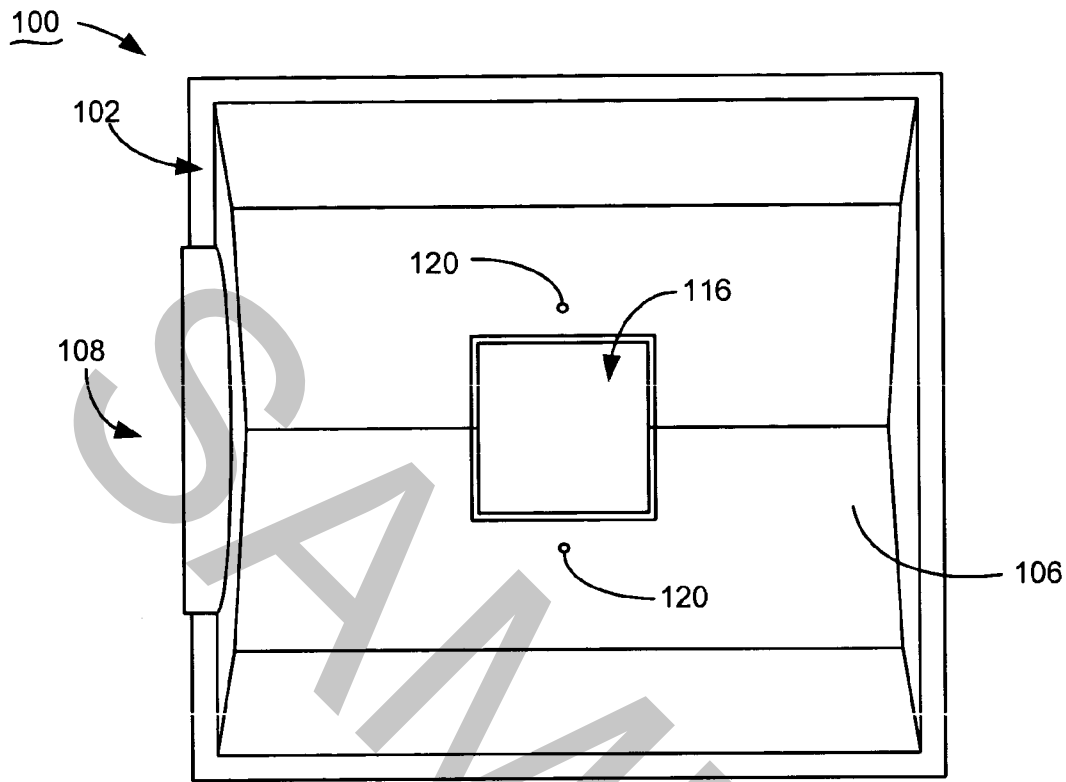


FIG. 3

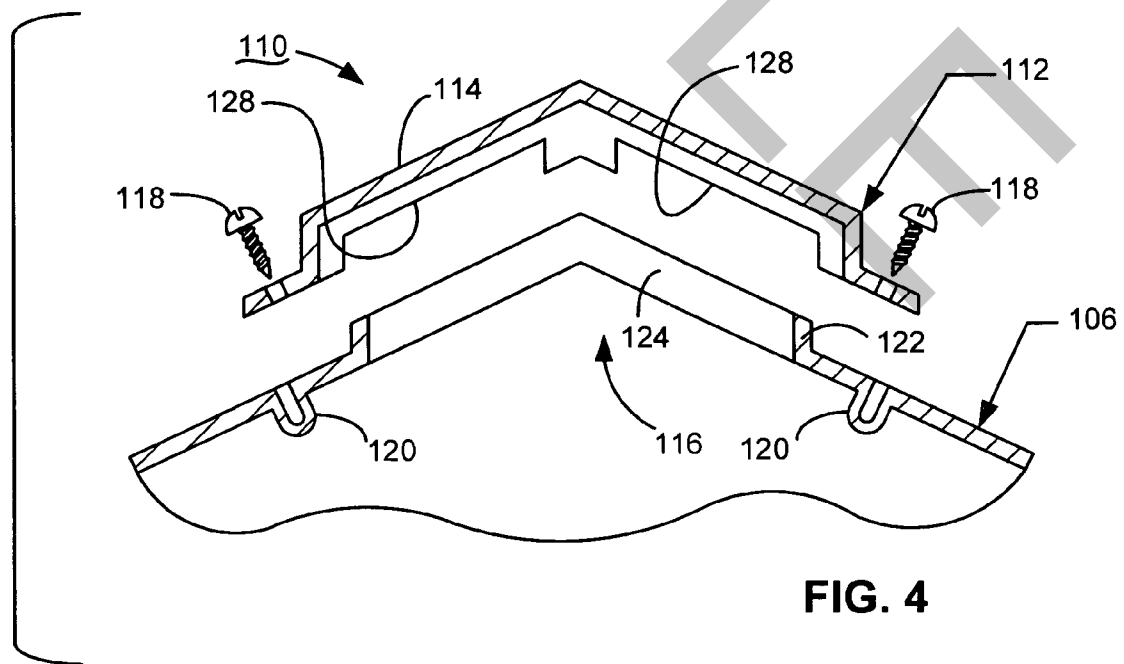


FIG. 4

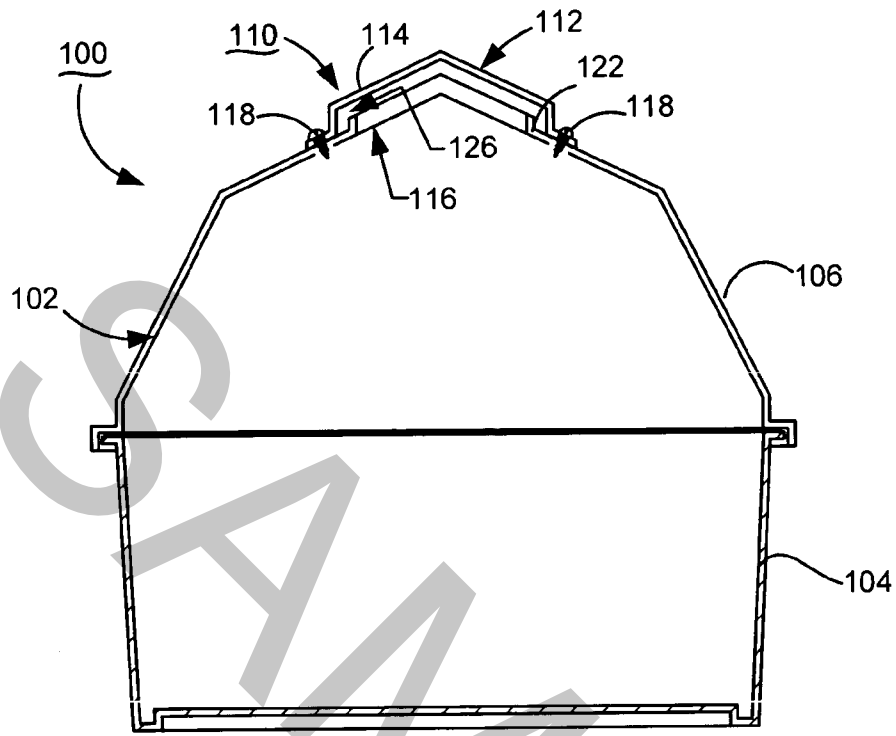


FIG. 5

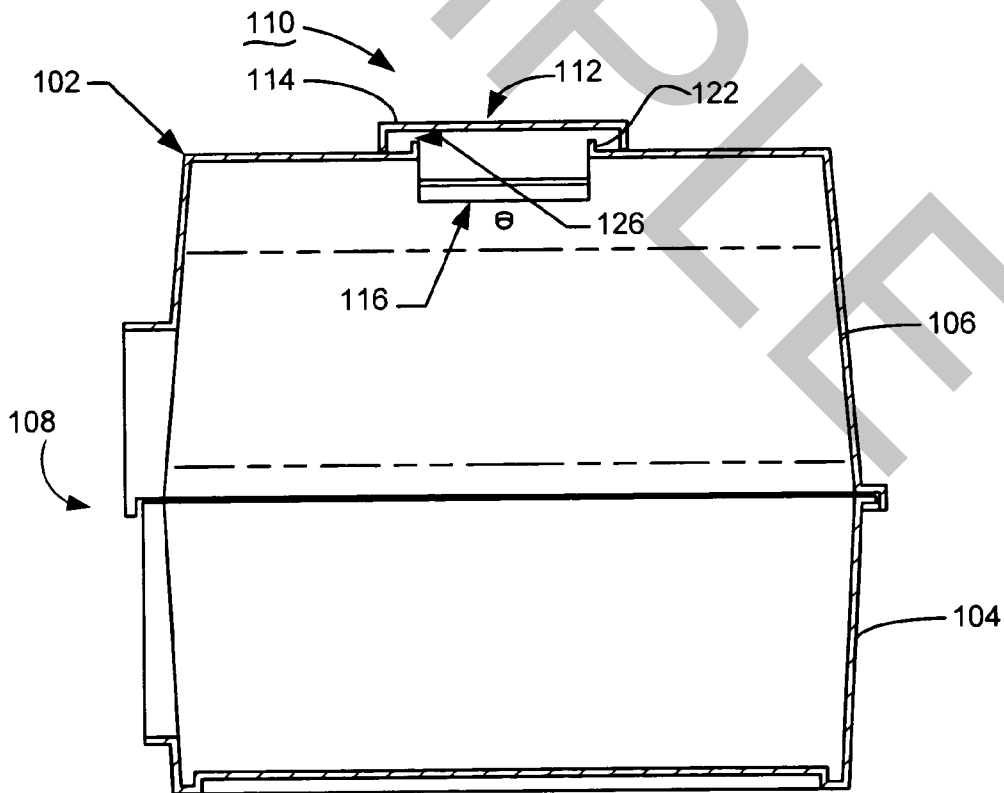


FIG. 6

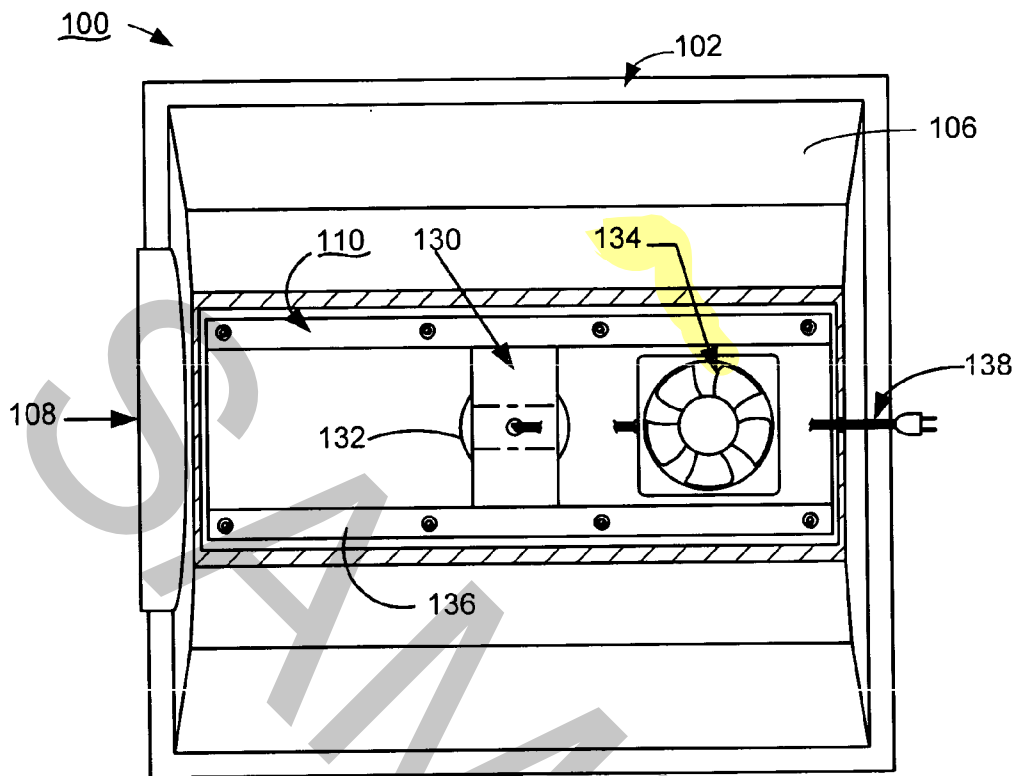


FIG. 7

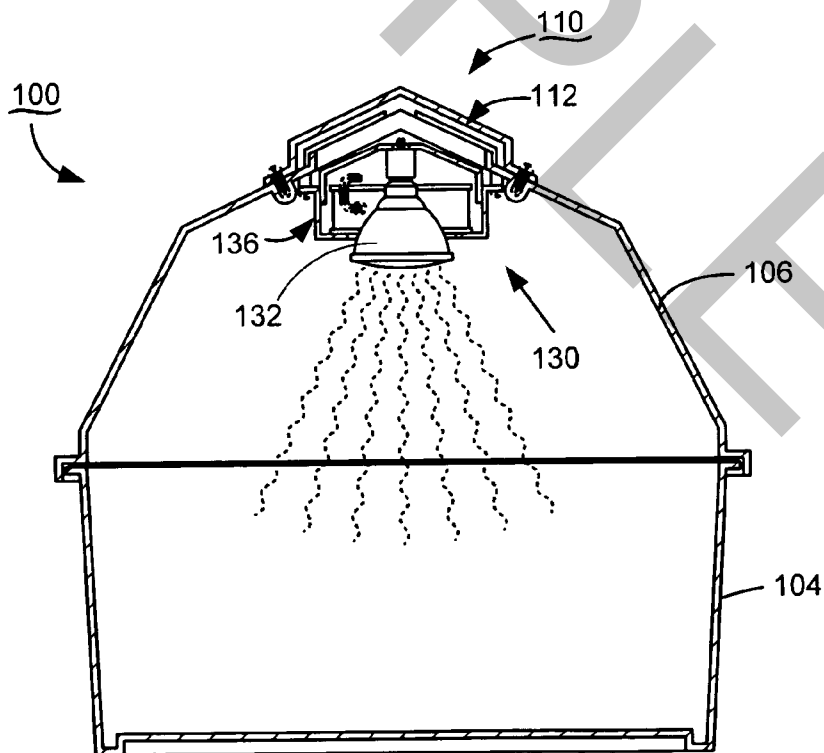


FIG. 8

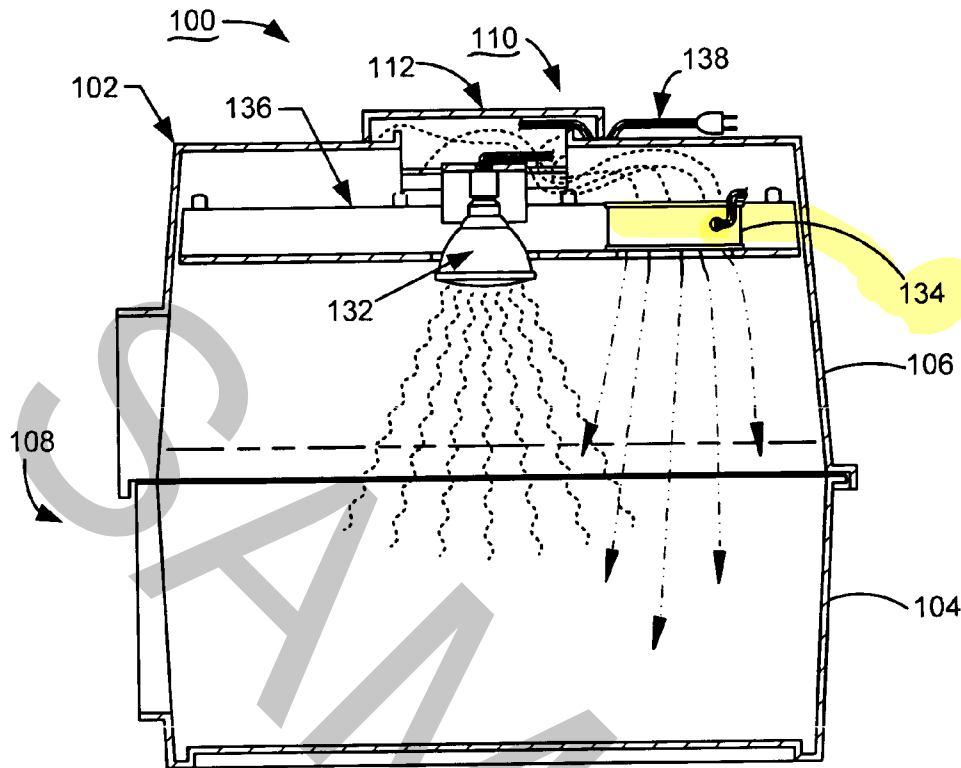


FIG. 9

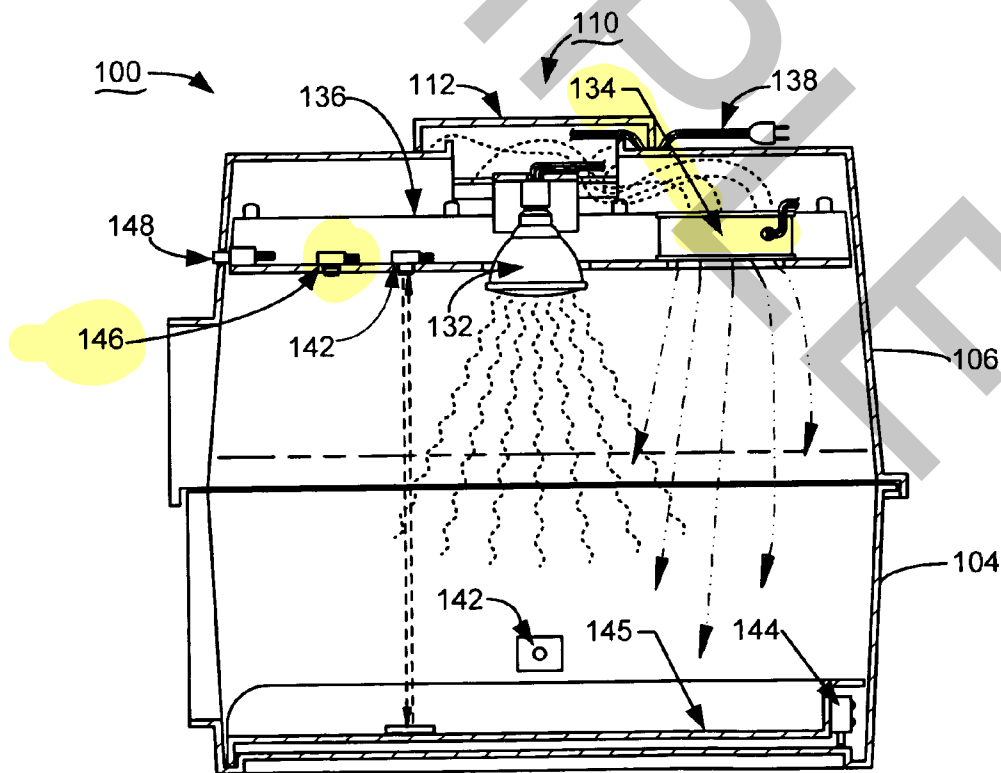


FIG. 10

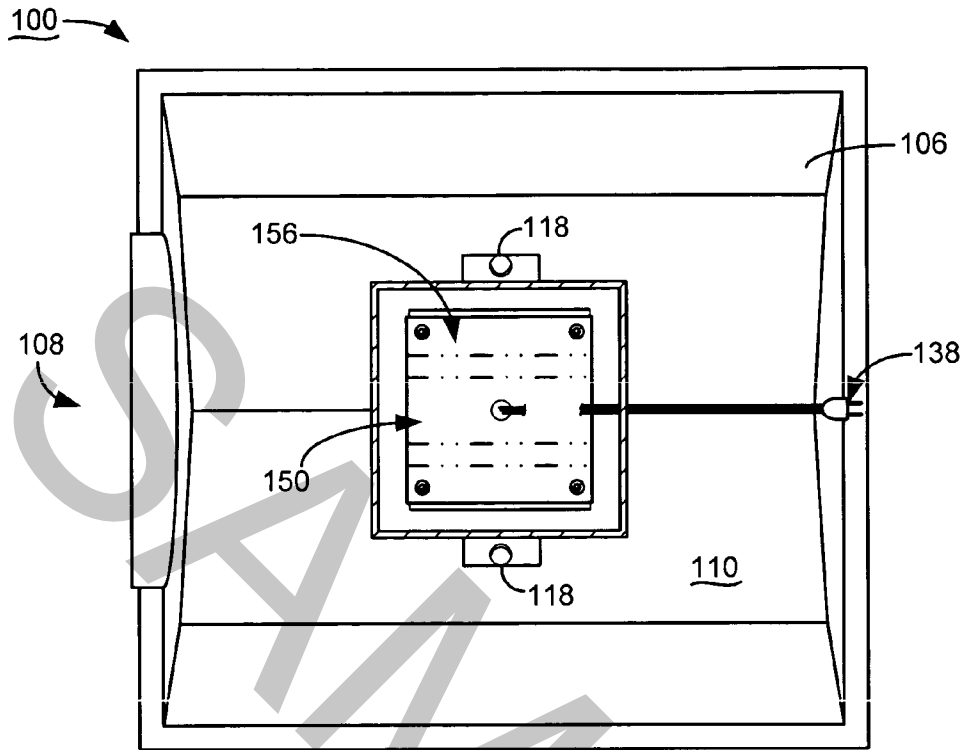


FIG. 11

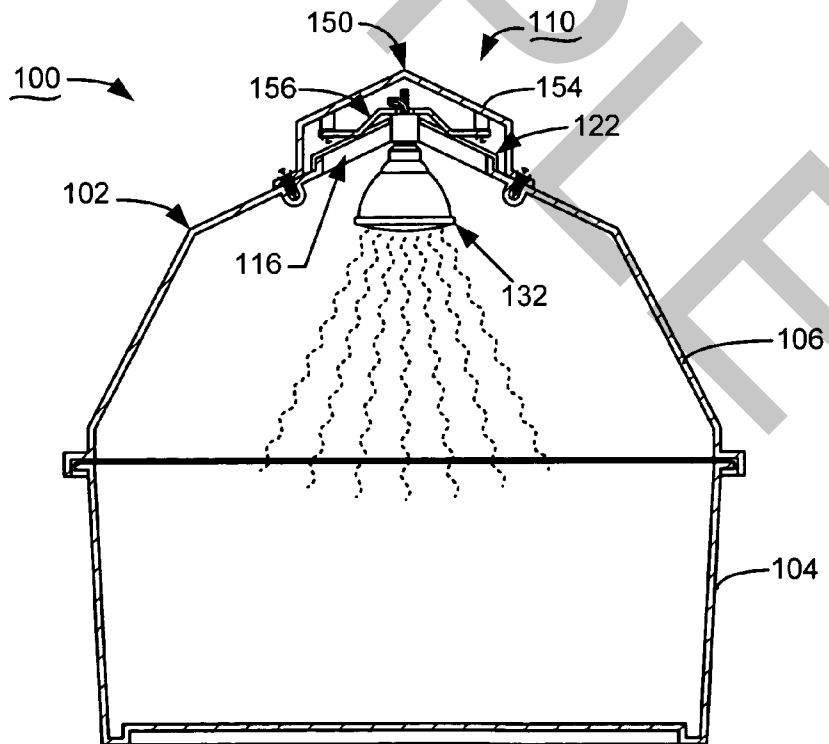


FIG. 12

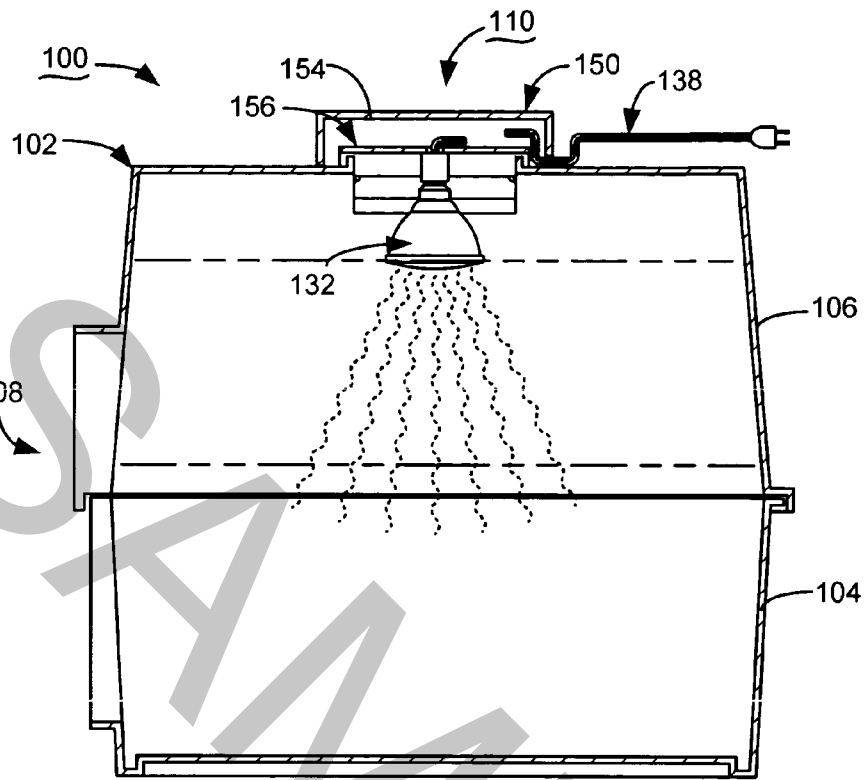


FIG. 13

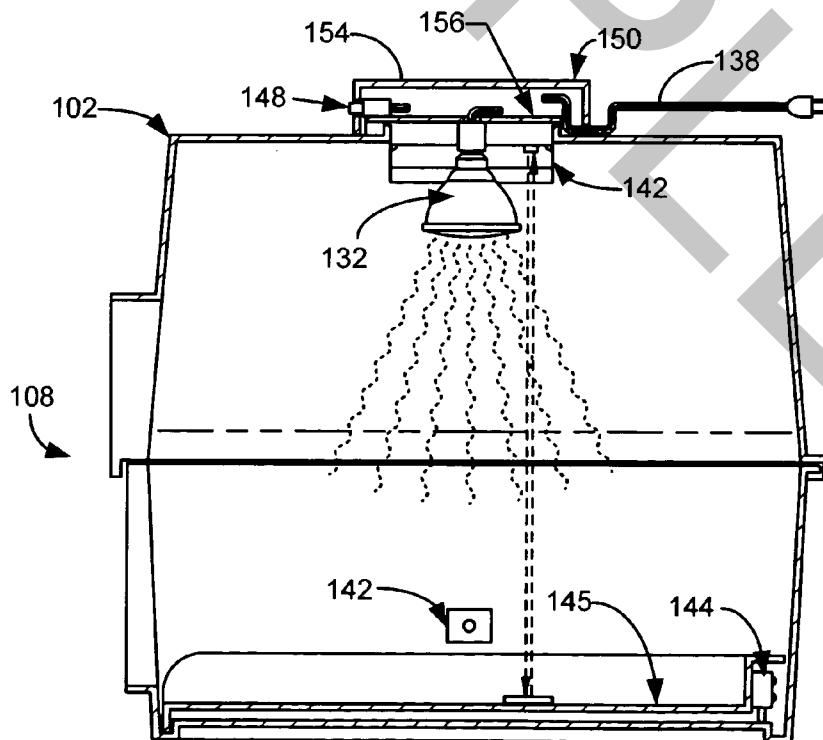


FIG. 14

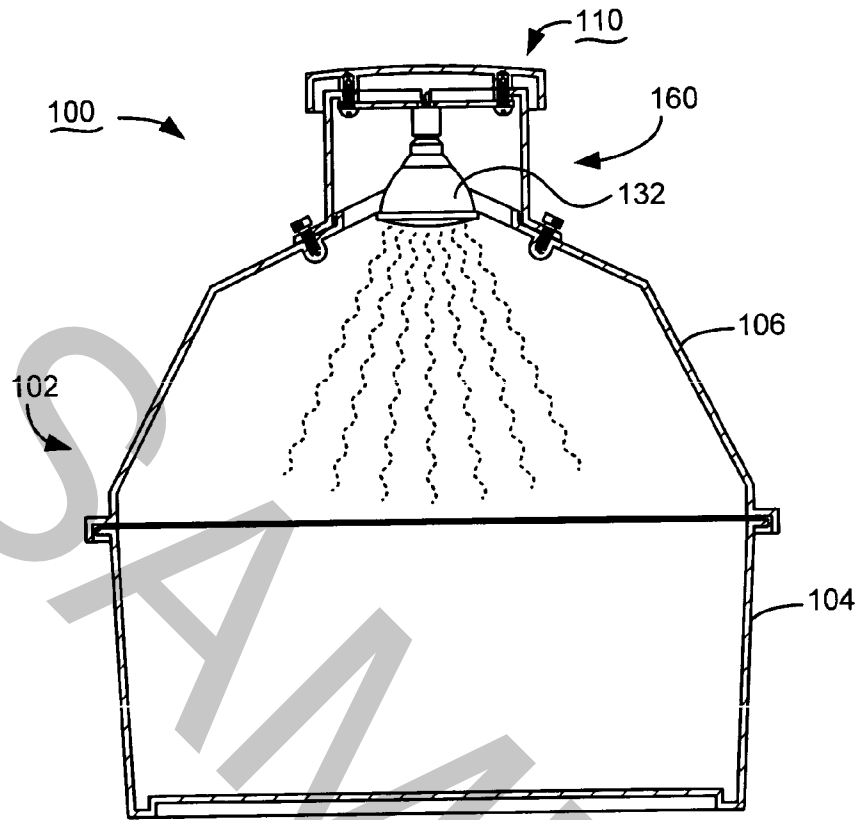


FIG. 15

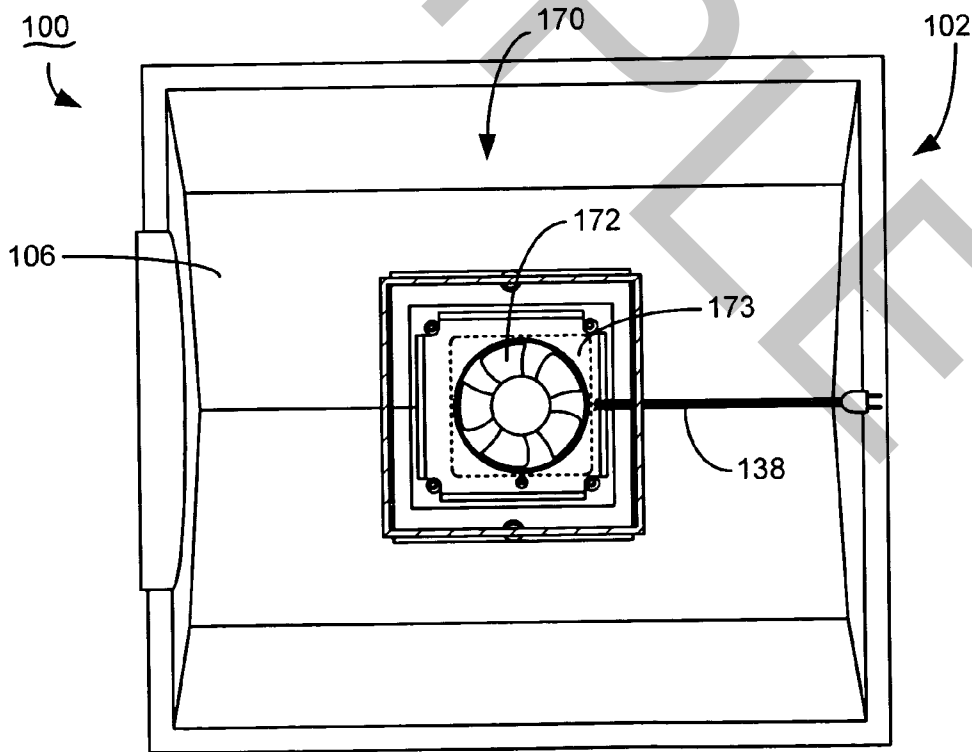


FIG. 16

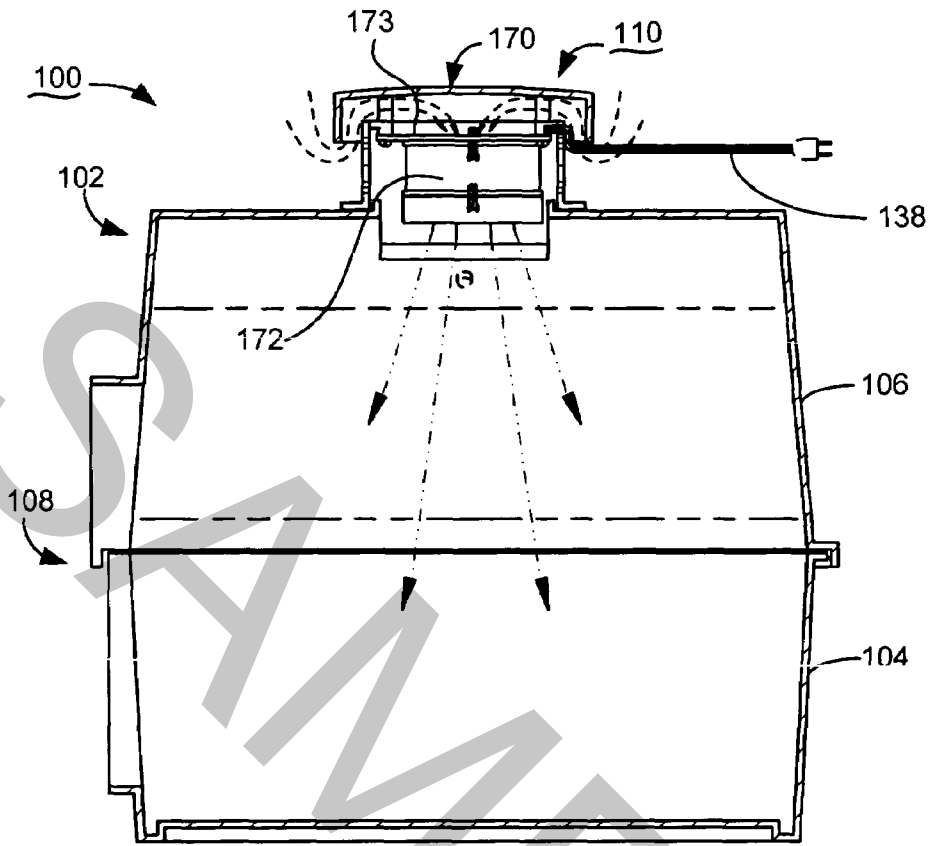


FIG. 17

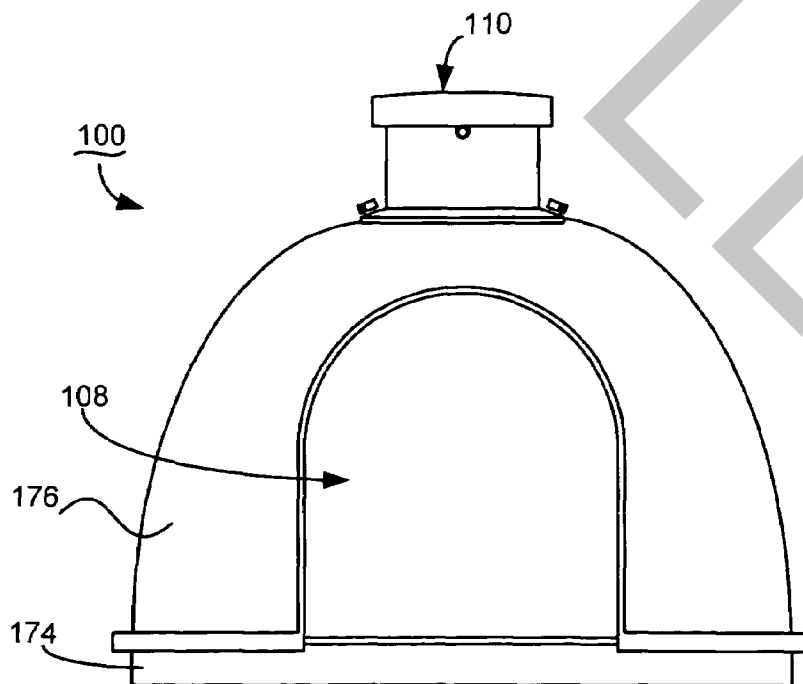


FIG. 18

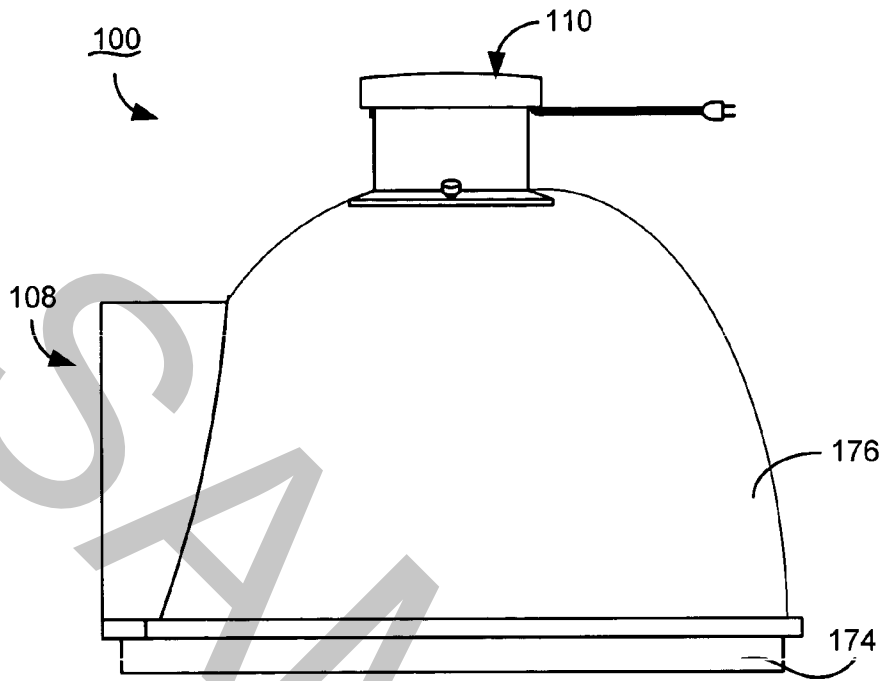


FIG. 19

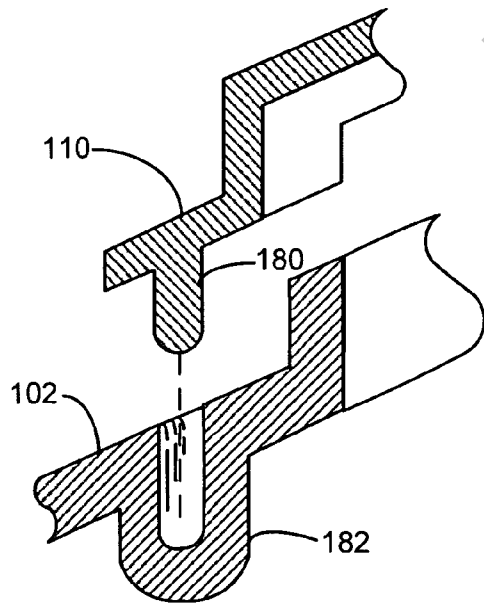


FIG. 20

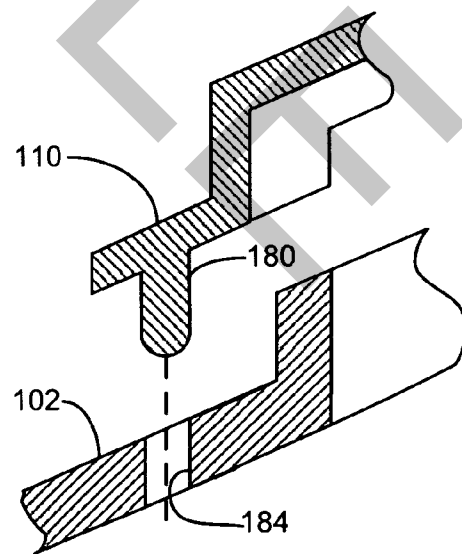


FIG. 21

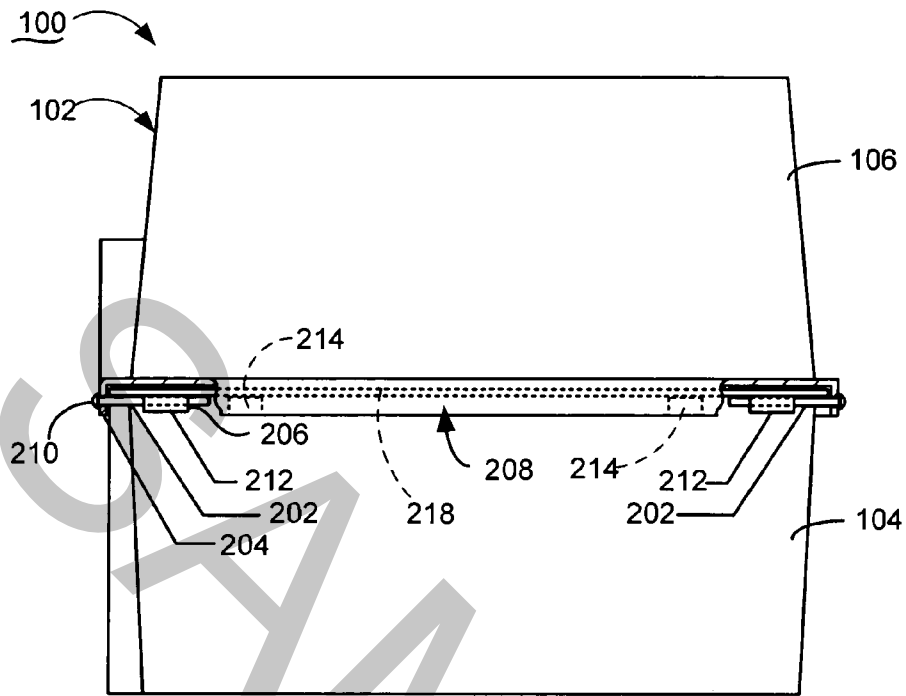


FIG. 22

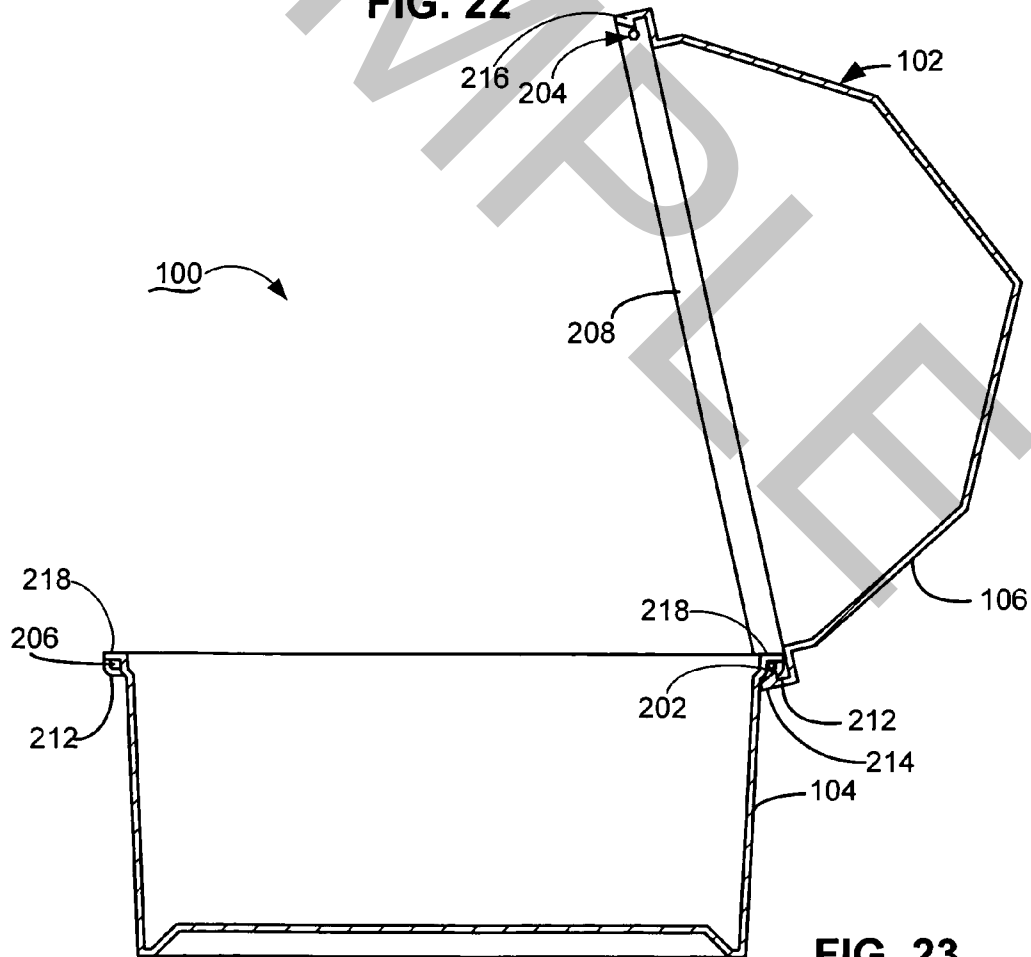


FIG. 23

MODULAR ANIMAL ENCLOSURE

FIELD OF THE INVENTION

The claimed invention relates generally to the field of animal enclosures and more particularly, but without limitation, to indoor and outdoor enclosures that can be used to provide shelter for domesticated animals such as dogs and cats.

BACKGROUND

It is often desirable to provide a domesticated animal (e.g., a dog, cat, etc.) with a suitable enclosure in which the animal can sleep, rest or retreat. Such an enclosure can be provided indoors within a family dwelling, or outdoors in a yard in which the animal can play.

Such enclosures should ideally provide adequate ventilation and, for enclosures located outdoors, shelter from the elements. Conscientious owners further tend to routinely inspect the interiors of such enclosures from time to time for maintenance and cleaning purposes.

While a number of animal enclosure designs have been proposed, there remains a continual need for improvements in the art that meet these and other requirements in an effective and efficient manner. It is to such improvements that the present invention is directed.

SUMMARY OF THE INVENTION

In accordance with preferred embodiments, a modular animal enclosure is provided suitable for use indoors or outdoors to provide shelter for a domesticated animal, such as but not limited to a cat or a dog.

The enclosure is formed of a housing comprising a base portion and a top portion which is affixed to the base portion to form a sheltered interior. The housing includes a door aperture to permit ingress of an animal into said interior and a climate conditioning aperture to accommodate a flow of atmospheric air between the interior and an external environment.

A climate conditioning unit is configured for removeable attachment to the housing adjacent the climate conditioning aperture. The climate conditioning unit is contactingly supported by the housing at a position a selected distance away from the climate conditioning aperture so as to form a gap therebetween. The climate conditioning unit facilitates the flow of atmospheric air through the gap and through the climate conditioning aperture to the interior.

In one aspect, the climate conditioning unit comprises a cover assembly comprising a plate member having a cross-sectional area greater than the cross-sectional area of the climate conditioning aperture. The plate member is supported by the housing at first and second locations on opposing sides of the climate conditioning aperture.

Preferably, first and second posts project from the plate member and into corresponding first and second apertures in the housing at said first and second locations to secure the cover assembly to the housing. An insertion depth of the first and second posts into the respective first and second apertures can be slidingly adjusted to alter a cross-sectional thickness of the gap between the cover assembly and the top cover.

In another aspect, the climate conditioning unit comprises a cooled air unit which supplies cooled air to the interior. In another aspect, the climate conditioning unit comprises a fan unit which directs increased velocity ambient air down-

wardly into the interior. In yet another aspect, the climate conditioning unit comprises a heating unit which supplies heated air to the interior. In yet another aspect, the climate conditioning unit comprises a radiant heat source which directs radiant heat into the interior.

In accordance with further preferred embodiments, the modular animal enclosure comprises a base portion and a top portion attached to the base portion to form a housing with a sheltered interior and a door aperture to permit ingress of an animal into said interior.

The top portion is configured to be hinged to the base portion to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a first direction by at least one hinge pin which projects through respective first hinge apertures in the base portion and in the top portion, respectively, on a first side of the housing.

The base portion and top portion further comprise respective second hinge apertures on a second side of the housing opposite the first side so that the hinge pin can be alternately inserted through the second hinge apertures to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a second direction.

These and various other features and advantages which characterize the claimed invention will become apparent upon reading the following detailed description and upon reviewing the associated drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of an animal enclosure constructed in accordance with preferred embodiments of the present invention.

FIG. 2 is a side elevational view of the enclosure of FIG. 1.

FIG. 3 is a top plan view of the enclosure to depict a climate conditioning aperture formed in a housing of the enclosure.

FIG. 4 is a cross-sectional, exploded view of relevant portions of the enclosure depicted along line 4—4 in FIG. 3 to illustrate a preferred manner in which a climate conditioning unit (comprising a cover assembly) is affixed adjacent the climate conditioning aperture of FIG. 3.

FIG. 5 provides a cross-sectional representation of the enclosure as depicted along line 5—5 in FIG. 2.

FIG. 6 provides a cross-sectional representation of the enclosure as depicted along line 6—6 in FIG. 1.

FIG. 7 is a top plan, partial cross-sectional view of the enclosure to illustrate the climate conditioning unit characterized as the cover assembly in conjunction with a heating assembly.

FIG. 8 provides a cross-sectional, elevational view of the embodiment of FIG. 7.

FIG. 9 provides another cross-sectional, elevational view of the embodiment of FIG. 7.

FIG. 10 is similar to the embodiment of FIG. 9, but includes the use of one or more sensors to detect the presence of an animal within the interior of the housing.

FIG. 11 is a partial cross-sectional, top plan view of the enclosure in accordance with another embodiment in which the climate conditioning unit comprises a heating assembly.

FIGS. 12–14 provide various cross-sectional, elevational views of the embodiment of FIG. 11.

FIG. 15 provides yet another embodiment in which the climate conditioning unit comprises a recessed heating assembly.

FIG. 16 is a partial cross-sectional, top plan view of the enclosure in accordance with another embodiment in which the climate conditioning unit comprises a forced cooling assembly.

FIG. 17 provides a side elevational, cross-sectional view of FIG. 16.

FIGS. 18 and 19 provide yet another embodiment in which the housing of the enclosure generally has an igloo shape.

FIG. 20 illustrates an alternative embodiment of the enclosure in which a post extending from the climate conditioning unit is inserted into a closed cup-shaped recess formed in the housing to secure the climate conditioning unit to the housing.

FIG. 21 provides another alternative embodiment in which the post is inserted into and through an aperture in the housing.

FIG. 22 illustrates yet another embodiment of the enclosure in which hinge pins are inserted into corresponding apertures in top and base portions of the housing to permit pivotal movement of the top portion with respect to the base portion.

FIG. 23 illustrates the embodiment of FIG. 22 to show the housing in the open position, as well as to illustrate opposing apertures in which the pins can be alternatively inserted to permit opening from the opposite direction.

DETAILED DESCRIPTION

FIG. 1 provides a front elevational view of a modular animal enclosure 100 constructed in accordance with preferred embodiments of the present invention.

The enclosure includes a housing 102 which provides a domesticated animal (such as a dog or cat) with a sheltered interior. The housing 102 is preferably formed of a rigid, durable material such as injection molded plastic. The housing 102 is formed of a base portion 104 and a removable attachable top portion 106 which is affixed to the base portion 104. Preferably, the top portion 106 is sized to be inverted and slipped into the base portion 104 (or vice versa) to conserve space during shipping and storage.

The housing 102 includes a door aperture 108 to permit ingress of the animal into the interior. Although not visible in FIG. 1, it will be understood that the housing 102 further includes a climate conditioning aperture, preferably located in the top portion 106, to accommodate a flow of atmospheric air between the interior and an external environment.

A climate conditioning unit 110 is secured to the housing 102 adjacent the climate conditioning aperture. Various embodiments of the climate conditioning unit 110 will be discussed shortly. However, it will be noted at this point that the climate conditioning unit 110 is configured for removable attachment to the housing and, when installed, facilitates the flow of atmospheric air between the interior and exterior environments through a gap between the unit 110 and the housing 102 and through the climate conditioning aperture.

The unit 110 as depicted in FIGS. 1 and 2 preferably comprise a cover assembly 112 which includes a plate member 114 that extends adjacent, and covers, the climate conditioning aperture (depicted at 116 in FIG. 3). The plate member 114 is affixed to the housing 102 via fasteners 118 which extend into corresponding apertures 120 in the housing at locations adjacent, and beyond, the aperture 116, as shown in FIG. 4. The climate conditioning aperture 116 is preferably defined by an upwardly extending flange 122 in the top portion material which provides the aperture 116

with a substantially vertically extending interior sidewall 124. The sidewall helps to prevent rain and the like from entering the climate conditioning aperture when the conditioning unit is attached.

The climate conditioning aperture 116 is preferably rectangular in cross-sectional shape, as shown in FIG. 3, although such is not limiting. Moreover, the aperture 116 is preferably relatively large (e.g., at least four inches across) to permit adequate air flow and clearance for different embodiments of the climate conditioning unit 110.

FIG. 5 shows the cover assembly 112 in conjunction with the housing 102, as depicted along line 5—5 in FIG. 2. FIG. 6 shows this arrangement along line 6—6 in FIG. 1. The aforementioned gap between the housing 102 and the assembly 112 is denoted at 126. Notches 128 in the plate member 114 (best viewed in FIG. 4) permit air flow from the interior to the exterior environment (and vice-versa) through the aperture 116, over the upwardly extending flange 122 into the gap 126, and then through the notches 128.

An alternative embodiment for the climate conditioning unit 110 is generally set forth by FIGS. 7–9, which illustrates the unit as comprising the aforesaid cover assembly 112 in combination with an interior mounted heating assembly 130. The heating assembly 130 comprises a radiant heat source 132 (e.g., heat lamp) and an optional fan 134 which are respectively supported by interior bracket 136. Contrary to the fan 134 can be used with or without the radiant heat source 132.

The heat source radiates heat into the interior of the housing 102, as depicted in FIGS. 8 and 9. As desired, the fan 134 further draws exterior air through the gap 126 and aperture 116 into the interior of the housing (either intermittently or continuously). Alternatively, the fan can be used to vent air from the interior to the exterior environment. Electrical power is supplied to the heat source 132 (and fan 134) via electrical cord 138. The cord 138 preferably projects out of the housing 102 toward the topmost portions of the housing to allow the cord to be routed away from reach of the animal.

As desired, one or more proximity sensors (such as photoelectric sensors 142 and a pressure detector and pad combination 144, 145) can be incorporated into the unit 110 as depicted in FIG. 10 to detect the presence of the animal within the housing 102. The climate conditioning unit can be made operationally responsive to said sensors. In this way, for example, the housing 102 can be heated upon entry and occupancy of the interior of the housing by the animal.

Alternatively, or additionally, a thermostatic switch 146 can regulate the interior temperature by modulating operation of the heat source 132 and/or fan 134 in relation to the detected temperature of the interior. A photoelectric dusk-to-dawn sensor 148 can further be used to detect nightfall so as to further permit operation at night and inhibit operation during the day, etc. For outdoor applications, the heating assembly 130 can be installed during the colder months and removed during the warmer months, or simply left in place and not used during the warmer months, as desired.

FIGS. 11–14 provide another alternative embodiment for the climate conditioning unit 110. A heating assembly 150 is provided similar to that disclosed in FIGS. 7–10, except that the heating assembly 150 does not employ a separate cover assembly; rather, the entire unit is one assembly which mounts to the housing 102 as discussed above. The heat source 132 is mounted to a plate member 154 via bracket 156, with the plate member 154 forming a gap in atmospheric communication with the exterior environment, as discussed above.

As before, the heat source **132** directs radiant heat into the interior. One or more sensors (such as photoelectric sensors **142**, pressure sensors/pad **144**, **145** and dusk-to-dawn photoelectric sensors **148** in FIG. **14**) can be used to modulate the operation of the heat source **132** as desired.

FIG. **15** provides yet another alternative embodiment for the climate conditioning unit **110**. In FIG. **15**, a heating assembly **160** is provided with the heat source **132** recessed substantially above the interior. This embodiment provides additional "head-room" within the interior and lessens the chance that the animal will come into contact with the heat source **132**, especially for relatively larger animals.

FIGS. **16-17** show another embodiment in which the climate conditioning unit **110** comprises a cooling assembly **170**. This embodiment employs a fan assembly **172** with an optional integrated cooling module **173** (such as a thermostatic cooler or similar unit). As with the embodiment of FIG. **15**, the cooling assembly **170** is preferably recessed above the interior of the housing **102**.

While preferred embodiments presented thus far have used a "barn-shaped" housing **102**, it will be appreciated that such is not necessarily limiting to the scope of the claimed invention. Rather, other shapes such as an "igloo-shape" can be used for the housing **102**, as depicted in FIGS. **18** and **19**. These figures show the housing **102** to comprise a substantially planar base portion **174** and a substantially spherical shaped top portion **176** with a climate conditioning aperture (not shown). Any of the variously described climate conditioning units **110** can be used in conjunction with this embodiment.

FIGS. **20** and **21** provide alternative methodologies for attachment of the climate conditioning unit **110** to the housing **102**. In lieu of the aforementioned fasteners **118**, rigid, vertically extending posts **180** can be formed in the plate member **114**, **154** during the same process used to form the plate member. The posts **180** are inserted into either a closed, cup shaped recess **182** (FIG. **20**) or through a post-receiving aperture **184** (FIG. **21**).

In both embodiments, the post **180** and recess/aperture **182**, **184** can be configured to permit full or partial insertion of the post **180**, thereby allowing the cross-sectional thickness of the gap **126** to be adjusted while maintaining adequate attachment of the climate conditioning unit **110** to the housing **102**.

As discussed above, the climate conditioning aperture **116** facilitates the flow of air between the interior of the housing **102** and the exterior environment. Another advantage of the aperture **116** is that, upon removal of the climate conditioning unit **110**, an owner can readily inspect the interior of the enclosure to see if maintenance or cleaning is required. That is, the aperture **116** provides an additional vantage point in addition to the door aperture **108**.

In accordance with further preferred embodiments, the top portion **106** of the housing **102** can be configured to be hinged to the base portion **104**, as depicted in FIGS. **22** and **23**. This permits further and complete access to the interior by pivotal movement of the top portion **106** with respect to the base portion.

This is preferably carried out by at least one rigid hinge pin **202** (two such pins are shown in FIG. **22**). The hinge pin **202** is preferably inserted through corresponding apertures **204**, **206** in the top portion **106** and base portion **104**, respectively. The aperture **204** in the top portion **106** extends through a downwardly depending, circumferentially extending flange **208** in the top portion. A head **210** of the hinge pin **202** abuts this flange **208** as shown to prevent further insertion of the pin.

The aperture **206** in the base portion **104** extends through a journal flange **212** that protrudes from the base portion. Preferably, the apertures **204**, **206** are provided on opposing sides of the housing **102**, so that the pin(s) **202** can be installed on either side of the housing **102**. This allows the owner to select which way the housing **102** can be opened, as one way may be more convenient than the other way depending on the placement of the enclosure. In other words, the pin(s) **202** in conjunction with the opposing sets of apertures **204**, **206** on opposing sides of the housing **102** facilitate pivotal movement of the top portion **106** (and **176** in FIGS. **18**, **19**) with respect to the base portion **104** (and **174**) in alternate, opposing first and second directions.

Preferably, the downwardly depending, circumferentially extending flange **208** of the top portion **106** supports a plurality of substantially triangularly shaped flange portions **214**, **216** which extend upwardly as shown to a position below and adjacent to an outwardly extending hat flange **218** of the base portion **104**. It can be seen that the flange portions **214**, **216** operate as retention tabs with the hat flange **218** on respective sides of the housing **102** to form respective interference latches. More particularly, using FIG. **23** as an example, the flange portion **216** (on the left side of the drawing) cooperates with that portion of the flange **218** adjacent portion **216** to impede initiation of rotation of the top portion **106** to the open position shown in FIG. **23**. At the same time, it can be seen that the flange portion **214** (on the side of the hinge pins **202**) rotates down and away from that portion of the flange **218** adjacent portion **214** during such rotation. The same respective operation occurs when the hinge pins **202** are installed on the other side of the housing **102** from that shown in FIG. **23** (i.e., adjacent flange portion **216**).

It will now be understood that the modular animal enclosure **100** provides several valuable advantages over the prior art. The climate conditioning aperture (in conjunction with the climate conditioning unit) generally tends to provide significantly improved ventilation air flow as compared to other designs. The climate conditioning aperture, as well as the hinged capabilities discussed above, provides ready access to the interior for maintenance purposes and the like. Moreover, the modular features of the climate conditioning unit result in the ability to install different units (i.e., a cover assembly, a cooling unit, a heating unit, etc.) as desired into the same enclosure.

It will now be understood that the present invention (as embodied herein and as claimed below) is generally directed to a modular animal enclosure (such as **100**).

In accordance with preferred embodiments, the enclosure comprises a housing (such as **102**) comprising a base portion (such as **104**, **174**) and a top portion (**106**, **176**) which is affixed to the base portion to form a sheltered interior. The housing includes a door aperture (such as **108**) to permit ingress of an animal into said interior and a climate conditioning aperture (such as **116**) to accommodate a flow of atmospheric air between the interior and an external environment.

A climate conditioning unit (such as **110**) is configured for removable attachment to the housing adjacent the climate conditioning aperture. The climate conditioning unit is contactingly supported by the housing at a position a selected distance away from the climate conditioning aperture (such as at apertures **120**) so as to form a gap (such as **126**) therebetween. The climate conditioning unit facilitates the flow of atmospheric air through the gap and through the climate conditioning aperture to the interior.

In one aspect, the climate conditioning unit comprises a cover assembly (such as **112**) comprising a plate member (such as **114**) having a cross-sectional area greater than the cross-sectional area of the climate conditioning aperture, wherein the plate member is supported by the housing at first and second locations adjacent the climate conditioning aperture.

Preferably, first and second posts (such as **180**) project from the plate member and into corresponding first and second apertures in the housing at said first and second locations to secure the cover assembly to the housing. An insertion depth of the first and second posts into the respective first and second apertures can be slidingly adjusted to alter a cross-sectional thickness of the gap between the cover assembly and the top cover.

In another aspect, the climate conditioning unit comprises a cooled air unit (such as **170**) which supplies cooled air to the interior. In another aspect, the climate conditioning unit comprises a fan unit (such as **134**) which directs increased velocity ambient air downwardly into the interior. In yet another aspect, the climate conditioning unit comprises a heating unit (such as **132**) which supplies heated air to the interior.

In accordance with further preferred embodiments, the modular animal enclosure comprises a base portion (such as **104, 174**) and a top portion (such as **106, 176**) attached to the base portion to form a housing (such as **102**) with a sheltered interior and a door aperture (such as **108**) to permit ingress of an animal into said interior.

The top portion is configured to be hinged to the base portion to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a first direction by at least one hinge pin (such as **202**) which projects through respective first hinge apertures (such as **204, 206**) in the base portion and in the top portion, respectively, on a first side of the housing.

The base portion and top portion further comprise respective second hinge apertures (such as **204, 206**) on a second side of the housing opposite the first side so that the hinge pin can be alternately inserted through the second hinge apertures to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a second direction.

For purposes of the appended claims, the recited “means for facilitating said flow of atmospheric air” will be understood to alternatively correspond to the disclosed cover assembly **112**, the heating unit **132**, the fan unit **134** and the cooled air unit **170**, and the disclosed combinations thereof, all of which span and cover the climate conditioning aperture and are supported by at least one location adjacent to, and outside of, the climate conditioning aperture. Accordingly, this element will be construed to cover these structures and equivalents thereof. Other structures that rely upon the interior walls of the climate conditioning aperture to support said structures inhibit the flow of atmospheric air, are not covered by this element and are expressly excluded from the definition of an equivalent.

The recited “means for allowing pivotal movement” will be similarly understood to correspond to the disclosed at least one hinge pin **202** and the corresponding first hinge apertures **204, 206** and the second hinge apertures **204, 206** on opposing sides of the base portion **104**, as shown in FIGS. **22** and **23**.

The recited “means for sensing the presence of the animal within the interior” will be similarly understood to correspond to the disclosed photoelectric sensors **142** and pressure detector and pad combination **144, 145**.

The recited “means for detecting an ambient condition” will be similarly understood to alternatively correspond to the thermostatic switch **146** which detects an ambient temperature of the interior, and to the photoelectric dusk-to-dawn sensor **148** which detects nightfall, and to a combination thereof.

It is to be understood that even though numerous characteristics and advantages of various embodiments of the present invention have been set forth in the foregoing description, together with details of the structure and function of various embodiments of the invention, this detailed description is illustrative only, and changes may be made in detail, especially in matters of structure and arrangements of parts within the principles of the present invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed. For example, the particular elements may vary depending on the particular application of the animal enclosure without departing from the spirit and scope of the present invention.

In addition, although the embodiments described herein are directed to an animal enclosure for domesticated animals, it will be appreciated by those skilled in the art that the enclosure can be used for various other types of applications without departing from the spirit and scope of the claimed invention.

What is claimed is:

1. A modular animal enclosure comprising a base portion and a top portion attached to the base portion to form a housing with a sheltered interior and a door aperture to permit ingress of an animal into said interior, wherein the top portion is configured to be hinged to the base portion to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a first direction by at least one hinge pin which projects through respective first hinge apertures in the base portion and in the top portion on a first side of the housing, wherein the base portion and top portion further comprise respective second hinge apertures on a second side of the housing opposite the first side so that the hinge pin can be alternately inserted through the second hinge apertures to facilitate access to the interior by pivotal movement of the top portion with respect to the base portion in a second direction, and wherein the top portion and base portions each further comprise respective flanges which form first and second interference latches on the respective first and second sides of the housing so that the first interference latch impedes initiation of said rotation in the second direction and so that the second interference latch impedes initiation of said rotation in the first direction.

2. The animal enclosure of claim **1**, wherein the top portion is sized to nest within the base portion when the top portion is inverted.

3. The animal enclosure of claim **1**, further comprising a climate conditioning unit configured to be contactingly supported on the top portion to facilitate a flow of atmospheric air through a climate conditioning aperture in the top portion to the sheltered interior.

4. A modular animal enclosure comprising:
 - a base portion comprising first and second pin apertures and first and second flange portions respectively adjacent the first and second pin apertures;
 - a top portion configured to mate with the base portion to form a housing with a sheltered interior and a door aperture to permit ingress of an animal into said interior, the top portion comprising third and fourth pin aperture and third and fourth flange portions respectively adjacent the third and fourth pin apertures; and

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a hinge pin configured for insertion through the respective first and third apertures to facilitate rotational movement of the top portion with respect to the base portion in a first direction to facilitate access to the interior, the hinge pin further configured for alternative insertion through the respective second and fourth apertures to facilitate rotational movement of the top portion with respect to the base portion in a second direction opposite the first direction to facilitate access to the interior, wherein the second and fourth flange portions form an interference latch to impede initiation of said rotation in the first direction when the hinge pin is inserted through the first and third pin apertures, and wherein the first and third flange portions form an interference latch to impede initiation of said rotation in the second direction when the hinge pin is inserted through the second and fourth pin apertures.

5. The apparatus of claim 4, wherein the first and second flange portions extend outwardly in a direction away from the interior, and wherein the third and fourth flange portions are each characterized as a retention tab which extends inwardly in a direction toward the interior, each retention tab configured to extend below the respective first and second flange portion.

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6. The apparatus of claim 4, wherein upon said rotational movement of the top portion with respect to the bottom portion in the first direction, the fourth flange portion rotates down and away in a clearing relation from the second flange portion so that said rotational movement of the top portion in the first direction is not impeded by said fourth flange portion, and wherein upon said rotational movement of the top portion with respect to the bottom portion in the second direction, the third portion rotates down and away in a clearing relation from the first flange portion so that said rotational movement of the top portion in the second direction is not impeded by said third flange portion.

7. The animal enclosure of claim 4, further comprising a climate conditioning unit configured to be contactingly supported on the top portion to facilitate a flow of atmospheric air through a climate conditioning aperture in the top portion to the sheltered interior.

* * * * *



US010208975B2

(12) **United States Patent**
Azevedo et al.

(10) **Patent No.:** **US 10,208,975 B2**
(45) **Date of Patent:** **Feb. 19, 2019**

(54) **SMART PET-CRATE WITH INTERACTIVE FEATURES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 88 days.

(21) Appl. No.: **15/267,610**

(22) Filed: **Sep. 16, 2016**

(65) **Prior Publication Data**

US 2017/0097169 A1 Apr. 6, 2017

Related U.S. Application Data

(60) Provisional application No. 62/236,122, filed on Oct. 1, 2015.

(51) **Int. Cl.**

F24F 11/30 (2018.01)
A01K 1/03 (2006.01)
A01K 1/00 (2006.01)
G05B 15/02 (2006.01)
H05B 37/02 (2006.01)
F24F 120/10 (2018.01)

(52) **U.S. Cl.**

CPC **F24F 11/30** (2018.01); **A01K 1/0047** (2013.01); **A01K 1/033** (2013.01); **G05B 15/02** (2013.01); **H05B 37/0218** (2013.01); **H05B 37/0227** (2013.01); **F24F 2120/10** (2018.01); **Y02B 20/46** (2013.01); **Y02B 20/48** (2013.01)

(58) **Field of Classification Search**

CPC **F24F 11/30**; **F24F 2120/10**; **F24F 11/0034**;
A01K 1/033; **A01K 1/0047**; **G05B 15/02**;
H05B 37/0209

See application file for complete search history.

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Primary Examiner — Nathan L Laughlin

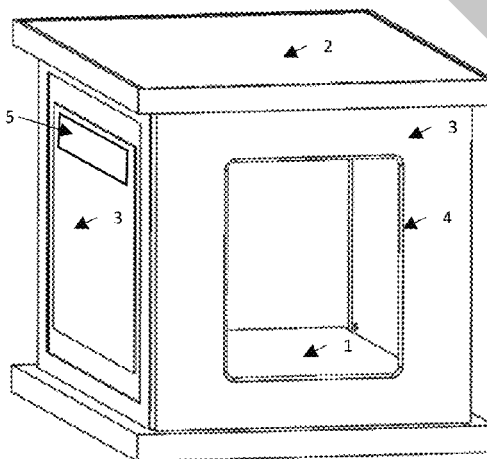
(74) *Attorney, Agent, or Firm* — Meunier Carlin & Curfman LLC

(57) **ABSTRACT**

A smart pet-crate is disclosed. The smart pet-crate provides a den-like habitat for an animal and is configured with electronics that include sensors to detect aspects of the animal's environment and environmental conditioners to adjust the environment within the pet crate in response to the detected aspects. The conditioned environment within the pet crate will provide comfort to the animal, which may help to reduce the animal's fear/anxiety. The smart pet-crate may be communicatively coupled to a body sensor worn by the animal and a computing device used by a human to form a pet care system, allowing for remote control of the pet crate and interaction with the animal. For the particular embodiment of a smart music playing pet crate, a method for selecting songs from a playlist based on sensing and computing the animal's preferences is also disclosed.

9 Claims, 7 Drawing Sheets

100



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SAMPLE

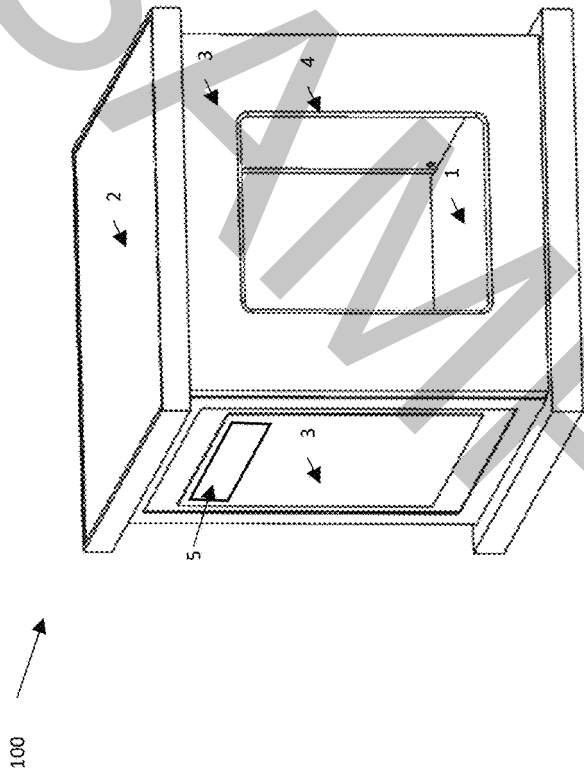


Fig. 1

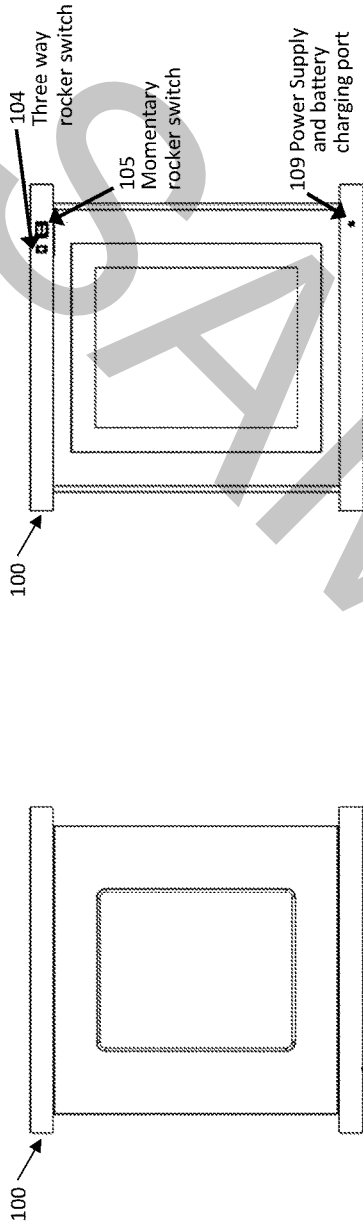


Fig. 2B

Fig. 2A

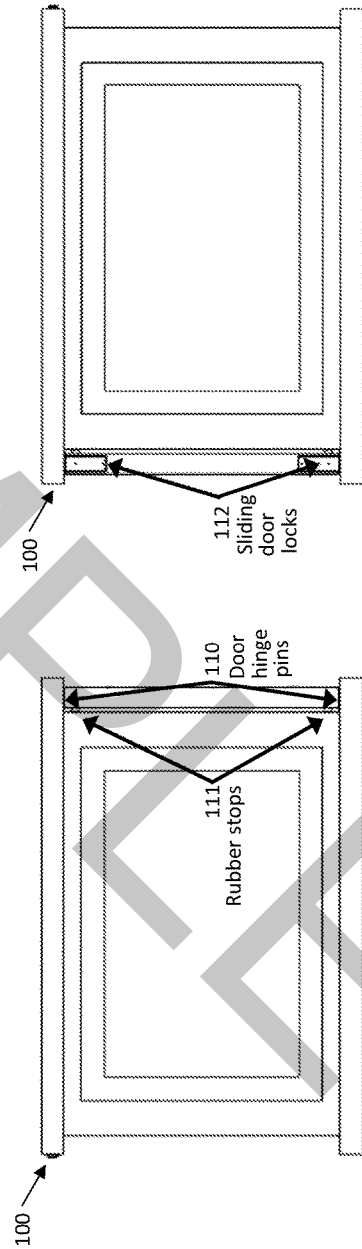


Fig. 2D

Fig. 2C

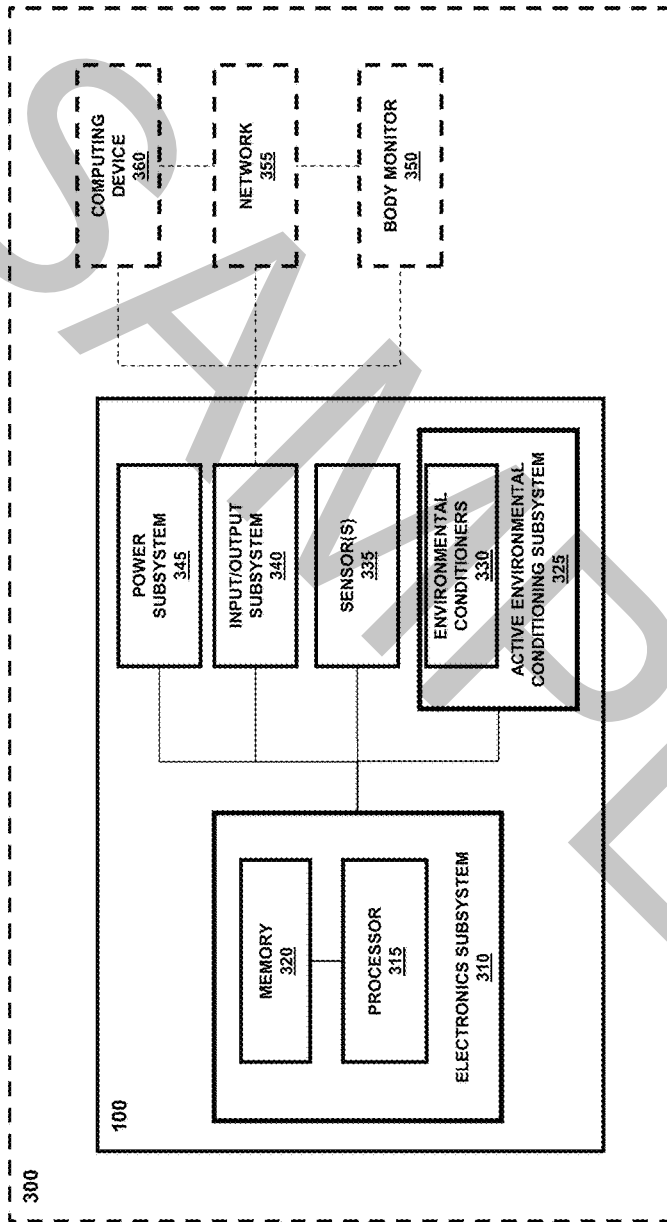


Fig. 3

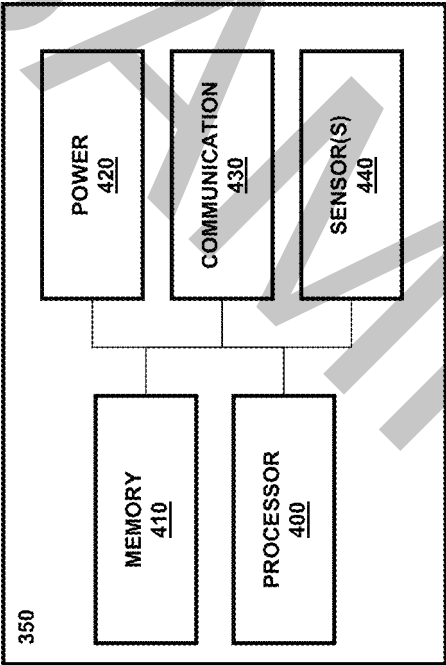


Fig. 4

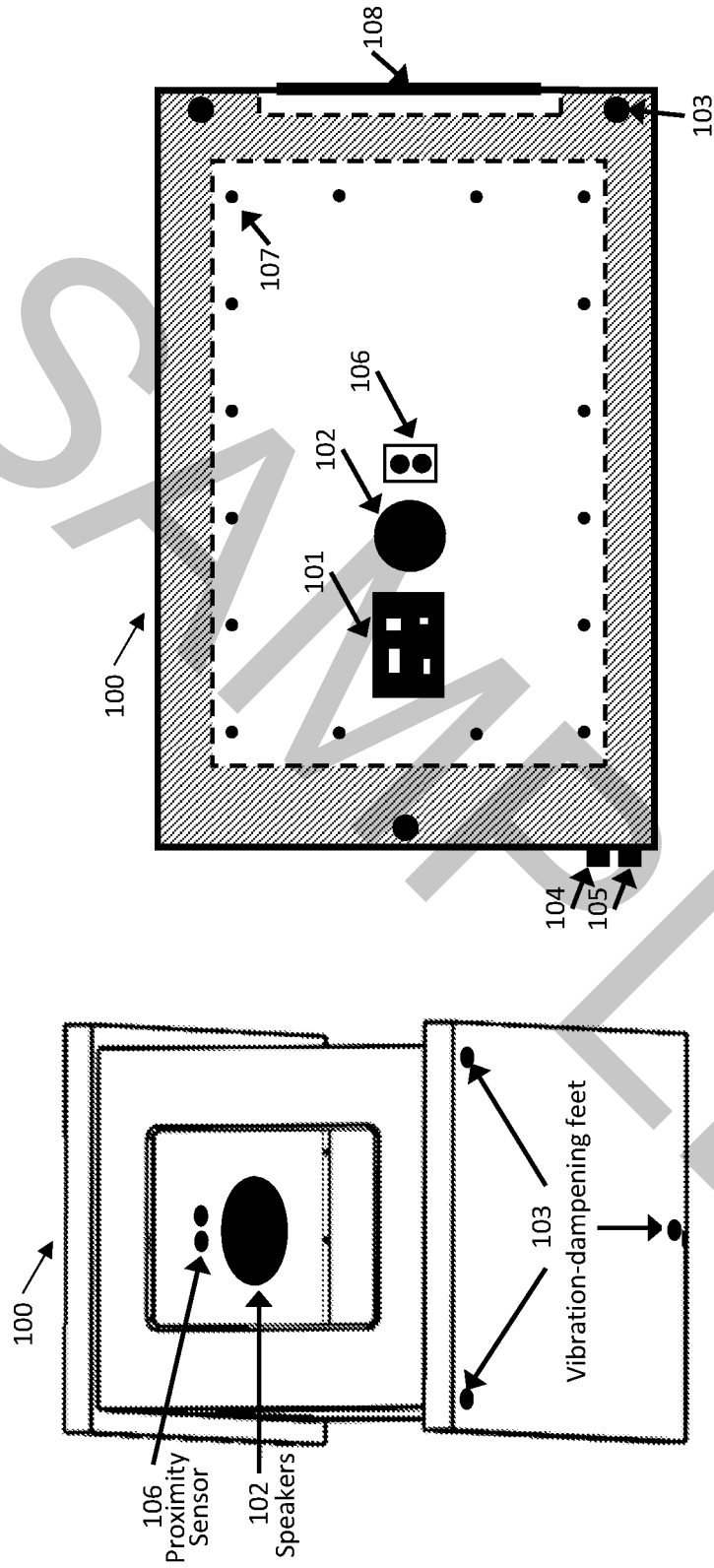


Fig. 5B

Fig. 5A

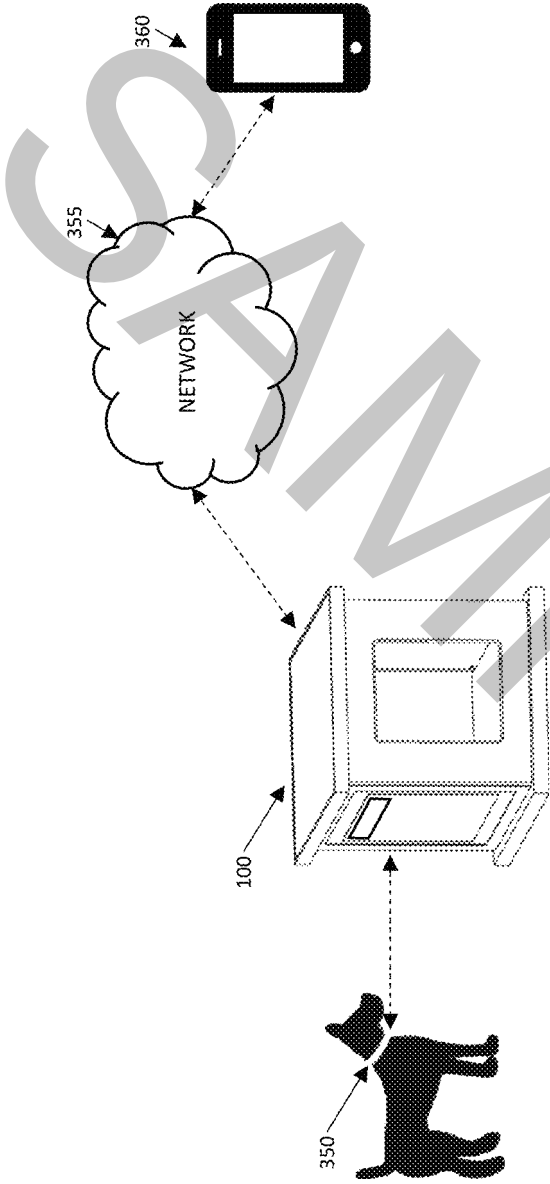


Fig. 6

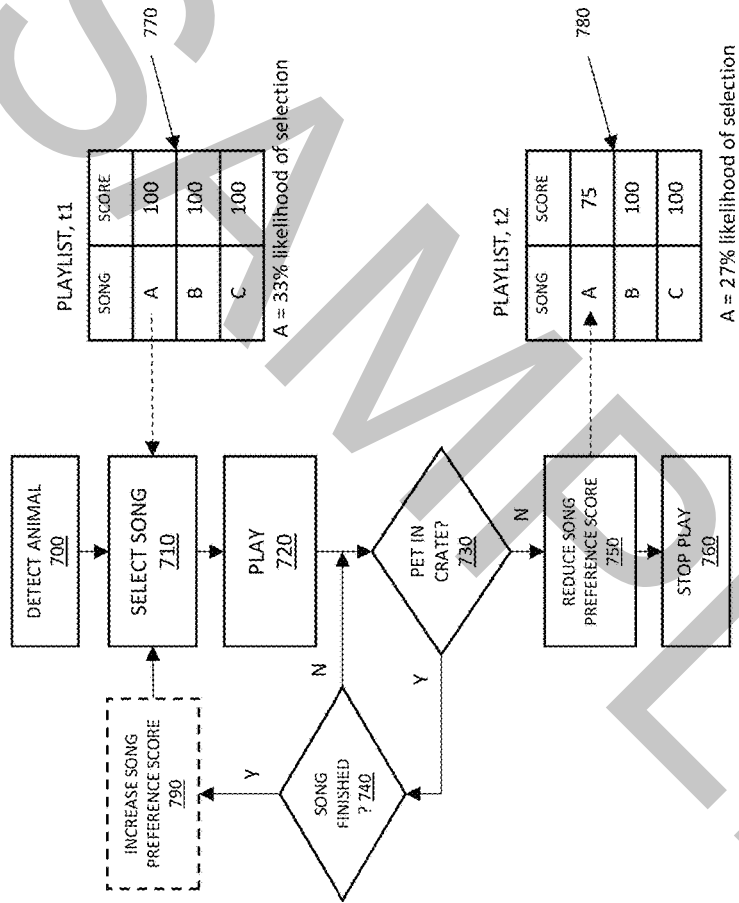


Fig. 7

SMART PET-CRATE WITH INTERACTIVE FEATURES

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. provisional patent application No. 62/236,122, filed on Oct. 1, 2015, and entitled "Music-Playing Pet Crate," the disclosure of which is expressly incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

The present disclosure relates to animal enclosures, and more specifically to a pet crate that (i) adjusts the environment inside the pet crate automatically in response to an animal or a condition and (ii) provides a human a means for monitoring the animal, interacting with the animal, and/or controlling the animal's environment.

BACKGROUND

Many domesticated animals (e.g., pets) are prone to anxiety. For example, it has been estimated that over 17% of all pets suffer anxiety due loud noises (e.g., thunder). Considering that approximately 36.5% of all households in the United States own a pet, it can be estimated that more than 40 million households have pets that are prone to anxiety.

Existing treatments for animal anxiety and excitability have drawbacks. One existing anxiety treatment is medication (e.g., XANAX™, Benzodiazepines, etc.). This treatment, however, requires the animal caregiver to be present to administer the medication, which may not be possible. For example, a pet owner, while at work, may not be able to administer a drug treatment during an episode of anxiety. Further, a drug may take time (e.g., 30-60 minutes) to become effective. As a result, drug therapy may not be effective in mitigating anxiety that results from transient events (e.g., a fast moving thunderstorm, fireworks, etc.). What is more, drug therapies are considered by many as unhealthy or punitive treatments for occasional anxiety and excitability. As a result, a pet owner may be reluctant to administer drugs due to a fear of side effects or for ethical reasons.

One drug-free anxiety treatment for animals is a close-fitting jacket that provides the pet (e.g., dog, cat, etc.) comfort in times of stress. The jacket, however, may irritate or overheat an animal when worn for extended periods. As a result, an owner typically outfits the animal with the jacket in times of stress only, thereby limiting the jacket's usefulness when the owner is away from the pet. In addition, the jacket may be too heavy or cumbersome for small animals.

Another drug-free anxiety treatment for animals is sound. Calming music, for example, may help reduce an animal's stress. Calming music, however, may be difficult to hear, and as a result, ineffective in loud environments (e.g., a thunderstorm). Further, music's calming effect may be highly variable (e.g., animal and/or situation dependent). As a result, a caregiver may need to determine the most effective sounds/music for a given situation.

In each of these approaches, a human is required to determine when a pet becomes nervous/excited and to provide an appropriate response. Often, however, humans are not with pets when they are suffering from anxiety. Indeed some anxiety is caused by the fact that the owner is

not with the pet. A need, therefore, exists for a means reduce an animal's anxiety without the need for the animal caregiver to be present.

SUMMARY

Accordingly, in one aspect, the present disclosure embraces a smart pet-crate. The smart pet-crate includes a housing for containing an animal that has a door and/or more openings in the housing's walls. One or more sensors (e.g., light, sound, vibration, temperature, humidity, moisture, time, proximity, etc.) are integrated with the housing and generate sensor signals in response to the animal's behavior (e.g., movement) and/or in response to the environmental conditions in or around the housing. Also integrated with the housing are environmental conditioners (e.g., speakers, fans, lights, food/water dispensers, motorized shades, fragrance dispensers, active vibration controllers, etc.) that control the environment within the smart pet-crate. An electronics subsystem integrated with the housing is communicatively coupled to the one or more sensors and the active environmental-conditioning subsystem. The electronics subsystem includes a processor that is configured by program code to monitor the sensor signals, and based on the sensor signals, the processor controls the active environmental-conditioning subsystem to produce, or change, the environment in the housing.

In an exemplary embodiment, the smart pet-crate further includes a passive environmental-conditioning subsystem (e.g., including sound insulation, vibration absorbers, etc.) that is integrated with the housing and isolates the interior of the housing from external sounds and/or vibrations.

In another aspect, the present disclosure embraces a pet care system that includes a pet crate and a computing device. The pet crate includes a multimedia interface with a microphone, a speaker, a camera, a display, or combination thereof. The multimedia interface provides computer-mediated communication (i.e., sounds, images, video, etc.) between a human located away from the pet crate and an animal inside the pet crate. The pet crate also includes environmental conditioners that control the environment within the pet crate, a computer network interface that communicates digitally with a network, a memory that stores software, and a processor. The pet crate's processor is communicatively coupled to the multimedia interface, the environmental conditioners, the computer network interface, and the memory. The processor is configured by the software to communicate with other devices on the network (via the computer network interface) and to control the multimedia interface and the environmental conditioners based on the communication. The pet care system's computing device (e.g., a mobile phone, tablet, etc.) includes a processor and a user interface. The computing device is communicatively coupled to the pet crate via a computer network. The computing device's processor is configured by program code to provide a graphical user interface to the user interface. The graphical user interface (i) enables computer-mediated communication between a human located away from the pet crate and the animal inside the pet crate, and (ii) enables control of the pet crate's environmental conditioners.

In one exemplary embodiment, the pet care system further includes a body monitor attached to the pet that is configured to detect the pet's motion and/or at least one vital function. The body monitor communicates the motion and/or the at least one vital function to the pet crate via the pet crate's computer network interface.

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In another exemplary embodiment, the pet care system's pet crate includes one or more sensors communicatively coupled to the processor that is configured to monitor conditions in the pet crate. In some cases, the pet care system's processor is also configured to transmit email or text messages to the computing device based on the monitored conditions.

In another exemplary embodiment, the pet crate's environmental conditioners include a food/water dispenser configured to dispense food/water in response to an input via the GUI.

In another aspect, the present disclosure embraces a method for selecting songs from a playlist in a music-enabled smart pet-crate. The method includes providing a smart pet-crate for containing an animal. The smart pet-crate includes a proximity sensor, a music player, a speaker, and a memory that contains songs in a stored playlist. The method further includes detecting that the animal has entered the pet crate and selecting a song from a playlist for playback using the music player and the speaker, wherein the selection of the song is based on a preference score computed for each song in the playlist. The method further includes playing the song and monitoring the proximity sensor to determine if the animal is in the crate. If the animal is in the smart pet-crate and the song has finished, then a new song is selected (based on preference scores) from the playlist and the played. Alternatively, if the animal leaves the smart pet-crate before the song has finished, then the playback is stopped and the preference score for the song is reduced.

The foregoing illustrative summary, as well as other exemplary objectives and/or advantages of the disclosure, and the manner in which the same are accomplished, are further explained within the following detailed description and its accompanying drawings.

Other systems, methods, features, and/or advantages will be or may become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features and/or advantages be included within this description and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 2A is a rear side elevation view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 2B is a front side elevation view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 2C is a left side elevation view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 2D is a right side elevation view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 3 is a block diagram of a smart pet crate and a pet care system according to exemplary embodiments of the present disclosure.

FIG. 4 is a block diagram of a body monitor for an animal according to an exemplary embodiment of the present disclosure.

FIG. 5A is a perspective view of a smart pet crate according to an exemplary embodiment of the present disclosure.

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FIG. 5B is a cut away bottom view of a smart pet crate according to an exemplary embodiment of the present disclosure.

FIG. 6 is a pet care system according to an embodiment of the present invention.

FIG. 7 is a flow diagram illustrating a method for selecting songs from a playlist for a music-enabled smart pet crate according to an embodiment of the present disclosure.

The components in the drawings are not necessarily to scale relative to each other and like reference-numerals designate corresponding parts throughout the several views.

DETAILED DESCRIPTION

Animal fear and anxiety is a common problem for domesticated animals (e.g., pets). Some fear and anxiety is a natural result of a survival instinct adapted for survival. Fear and anxiety may also result from learned experience (e.g., traumatic experience, interaction with other animal's etc.). Whatever the case, some level of fear and anxiety may be common in a domestic environment and may not result in negative behaviors. In some cases, however, an animal may have profound feelings of anxiety, fear, or excitement and may not be able to calm itself effectively. For example, time alone or transient/strange noises (e.g., thunder, fireworks, trucks, a stranger talking, etc.) may create anxious feelings that some animals find difficult to overcome. In these situations, anxious feelings may result in negative behaviors, including pacing, salivating, shaking, vomiting, destructive chewing, barking, howling, whining, urinating, defecating, harming itself, digging, and/or scratching. It is thus highly desirable to provide a means to comfort an animal in times of stress.

Many animals find comfort in an enclosure. This comfort may arise from an instinctual affinity for a natural den. As a result, den-like enclosures are often effective in providing an anxious, excited, and/or fearful animal a place of comfort and refuge in times of stress.

Many different animal enclosures exist. Animal enclosures may have a variety of shapes (crate-like, tent-like, house-like, igloo-like, etc.), may use a variety of architectural elements and ornamentation for construction (e.g., wire, mesh, screen, plastic, metal, wood, fabric, etc.), may be used for a variety of purposes (e.g., temporary confinement, voluntary access, permanent habitat, etc.), and may be used in a variety of environments (e.g., indoor, outdoor, a home, a kennel, a veterinarian office, etc.). In addition, animal enclosures may be designed/configured specifically for a variety of species (e.g., canine, feline, bovine, equine, mustelid, etc.) or for variety of breed characteristics (e.g., large, medium, small, active, slow, etc.). While it is anticipated that the features and principles of the present disclosure may be applied to any of these variations, the present disclosure describes the particular embodiment of a smart pet-crate (i.e., pet crate) that is voluntarily used by a pet animal (e.g., a dog) in a home while the owner is away. In this way, the present disclosure instructs those skilled in the art how to make and use the best mode of the invention; however, this should not be construed as limiting the scope of the invention. In addition, aspects that are conventional or commonly understood by those skilled in the art have been simplified or omitted for the purposes of efficiently teaching the inventive concepts.

An exemplary pet crate is shown in FIG. 1. The pet crate is box-shaped with a floor 1, a roof 2, and side walls 3. The six faces may be connected to each other using push-fit fasteners to facilitate assembly without tools. The housing

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100 (i.e., enclosure) has a door opening 4 in which the animal may enter/exit. In a possible embodiment, the door opening may include a movable door (e.g., hinged or sliding) that may be opened or shut to prevent access to the interior of the housing. The walls of the housing may include one or more openings (e.g., windows) 5 that allow for ventilation and/or light. The windows and/or the door opening may be covered with ornamental coverings (e.g., panels) or shades (e.g., curtains, blinds, etc.). In a possible embodiment, the ornamental panels or shades may be removed and exchanged to change the look of the pet crate.

Side elevations views of the exemplary pet crate are shown in FIG. 2A-2D. As shown in the rear elevation view of FIG. 2A, the crate may rest on vibration dampening feet to isolate the interior of the crate. As shown in front elevation view of FIG. 2B, controls (e.g., three way rocker switch 104, momentary rocker switch 105 for ON, OFF, and AUTO modes), indicators (e.g., an led or liquid crystal display to show status such as ON/OFF/Charging), and ports (e.g., a power supply input/battery charging port 109) may be integrated on the crate's front surface for control. As shown in side elevation view of FIG. 2C, the crate may be configured with a hinged door and include door hinge pins 110 to enable motion and rubber stopes 111 to limit motion. As shown side elevation view of FIG. 2D the crate may be configured with a sliding door with sliding door locks 112.

As previously mentioned, an animal may retreat to its crate for comfort. In one aspect, the present disclosure embraces improving the pet's comfort to reduce anxiety by automatically adjusting the environment within the crate in response to sensed conditions. Sensed conditions may include the environmental conditions in or around (i.e., proximate to) the enclosure (e.g., light level, sound level, vibration, temperature, humidity, time of day, etc.) and/or the sensed condition of the animal (e.g., the animal's presence, the animal's behavior, and/or the animal's physiology).

The environment of the interior of the pet crate may be conditioned actively or passively. Passive environmental-conditioning adjusts the environment within the pet crate by passively changing some aspect of the environment. For example, passive environmental-conditioning may include insulating the walls of the pet crate to attenuate sound (i.e., soundproofing). The sound insulation may be embodied by applying noise absorbing material (e.g., open-cell foams, fiberglass, mineral fiber board, etc.) within the walls of the pet crate or to the interior/exterior surfaces of the walls (e.g., sound baffles).

In another example, passive environmental-conditioning may include vibration damping to reduce effects vibrations caused by thunder (e.g., 20-120 Hertz vibrations). For example, passive vibration dampening elements (e.g., damped springs, pneumatic isolators, elastomeric materials, etc.) may be added to the enclosure to isolate and/or dissipate energy in the frequency range of thunder. The damping elements may be designed with specific material properties and/or shapes to provide stiffness and damping ratios that properly dissipate vibrations between 20 and 120 Hz.

The stiffness of a disk shaped damping element may be defined from the shape-corrected Young's Modulus, E_s , as:

$$K = \frac{E_s \pi a^2}{t}$$

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wherein a and t represent the disk radius and thickness, respectively. The stiffness of multiple damping elements in parallel may be defined as:

$$K = K_1 + K_2 + K_3 + K_4$$

while the natural frequency of the system may then be defined as

$$f_n = \frac{1}{2\pi} \sqrt{\frac{K}{M}}$$

wherein M represents the mass of the enclosure. The energy transmitted through the damping elements may then be defined as

$$T = \frac{A_{out}}{A_{in}} = \sqrt{\frac{1 + \left(2\xi \frac{f_d}{f_n}\right)^2}{\left(1 - \left(\frac{f_d}{f_n}\right)^2\right)^2 + \left(2\xi \frac{f_d}{f_n}\right)^2}}$$

wherein ξ represents the damping ratio, and f_d represents the driving frequency (i.e., the frequency of thunder). Damping elements may be designed according to these principles to maximize the damping of vibrations in the pet crate caused by low frequency thunder.

As mentioned, the environment of the interior of the pet crate may be conditioned actively or passively. Active environmental-conditioning adjusts the environment within the pet crate by actively changing some aspect of the pet crate's environment.

In one example, active environmental-conditioning may include playing sounds (e.g., music, white noise, noise cancelling sounds, an owner's voice, nature sounds, etc.) through one or more speakers directed to interior of the pet crate. Playing sounds may mask sounds emanating from outside the pet crate (e.g., children playing, people talking, thunder, fireworks, lawn mowers, vehicles, etc.). The sounds played may be adjustable (e.g., volume, duration, content, etc.) and may be controlled (i.e., adjusted) based on a desired environment (i.e., to soothe the animal's anxiety). In some cases, the sounds played are adjusted in response to a particular stimulus (e.g., a particular time, a particular noise, the pet's behavior, as part of active noise cancellation, etc.).

In another example, active environmental-conditioning may include adjusting the lighting in the interior of the pet crate. This adjustment may be accomplish by turning on/off a light inside the pet crate (e.g., turning a light on at dusk) or by changing the intensity of a light inside the pet crate. The light or lights inside the pet crate may be embodied in a variety of ways (e.g., LED, incandescent, compact fluorescent, etc.), and when more than one light is used, each light may be controlled independently.

In another example, active environmental-conditioning may include adjusting the lighting or ventilation in the interior of the pet crate by adjusting shades covering the door and/or the one or more openings (i.e., windows) in the walls. The shades may be embodied in a variety ways (e.g., blinds, drapes, etc.). The shades may flexible or solid panels that may be raised, lowered, or otherwise separated (e.g., by a servo-controlled motor) to adjust light levels or ventilation. The shades may be automatically adjusted based on a setting and in response to a particular stimulus (e.g., a particular time, a particular light level, the pet's behavior, etc.). When a shade covers the door, a flexible fabric may be preferable to allow the animal push past the shade when entering or exiting.

In another example, active environmental-conditioning may include adjusting the temperature in the interior of the

pet crate by adjusting one or more fans affixed to the pet crate. The one or more fans may circulate air within the crate, move air from the outside to the inside of the crate, or move air from the inside to the outside of the crate. The fan (or fans) may be automatically adjusted (e.g., turned on/off, rotated, speed increased/decreased, direction changed, etc.) based on a sensed temperature/humidity level or in response to a particular stimuli (e.g., a sensed time or animal behavior). Alternatively, the fan (or fans) may be manually controlled via controls on the crate or through a computing device (e.g., a mobile phone).

In another example, active environmental-conditioning may include dispensing a fragrance to the interior of the pet crate. For example, an aerosol spray of fragrance may be dispensed using a fragrance dispenser to mask scents in pet crate (e.g., urine, defecation, etc.). The fragrance may be dispensed when needed (e.g., after an animal urinates or defecates) or on a timed schedule, or manually controlled via controls on the crate or through a computing device (e.g., a mobile phone).

In another example, active environmental-conditioning may include active vibration control. This may be done to reduce the vibrations experienced inside the pet crate caused by a variety of loud and/or low frequency noise sources, including (but not limited to) thunder, trucks, motorcycles, fireworks, blasting, or guns. Active vibration control may be accomplished by resting the floor of the pet crate on piezohaptic actuators that are driven to apply forces, which are equal/opposite to the forces (e.g., measured by an accelerometer) imposed on the crate by any external source.

In another example, active environmental-conditioning may include dispensing food or water to a dispenser integrated with the crate. The dispenser may provide water at particular times, when the level of food or water drops below a level, or manually controlled via controls on the crate or through a computing device (e.g., a mobile phone).

An exemplary block diagram of a pet crate with active environmental-conditioning to provide comfort for a pet is shown in FIG. 3. The pet crate includes a housing 100 with integrated electronics. For example, as shown in FIG. 5A and FIG. 5B, an electronics subsystem 310 (e.g., including an electronics board 101) may be mounted on the ceiling of the housing. The electronics subsystem 310 includes one or more processors (e.g., microprocessor, controller, ASIC, etc.) to execute program code (e.g., software, firmware, etc.) stored in a nonvolatile computer readable storage device (i.e., memory) 320 to enable the function of the pet crate. The memory 320 (e.g., hard-drive, solid state drive) may also store files (e.g., audio files for playback, configuration settings, playlists, etc.) to facilitate the environmental conditioning.

The electronics subsystem is communicatively coupled to one or more sensors 335 that monitor the pet, the pet's behavior, or the pet's environment. For example, proximity sensors 106 integrated with the housing (as shown in FIGS. 5A, 5B) and directed to the interior of the pet crate may be used to produce sensor signals that correspond with a pet entering/exiting the crate or with a pet's presence in (or absence from) the crate. Proximity sensors suitable for these purposes include (but are not limit to) ultrasonic range finders, IR temperature sensors, accelerometers (i.e., vibration sensors), passive infrared sensors (i.e., PIR sensors), and light detection and ranging sensors (i.e., LIDAR sensors). A camera may also be used to detect the entering/exiting or presence/absence of a pet.

The one or more sensors 335 may also include sensors to produce sensor signals in response to (or corresponding

with) light, temperature, humidity, or moisture (e.g., urine in the crate), and may also include a clock or timer to measure time of day and/or mark periods, events, or schedules. For example, sensor signals from a clock or timer may be used to control a food/water dispenser at particular feeding times.

A processor 315 receives the sensor signals from the one or more sensors 335 and is configured by software to determine if active environmental conditioning is required and/or should be adjusted. In response to the sensor signals, the processor 315 transmits signals to control an active environmental conditioning subsystem 325. The active environmental conditioning system 325 includes environmental conditioners 330 that adjust the environment within the crate as previously described. Environmental conditioners may include speakers, lights, shades, fans, fragrance dispensers, food/water dispensers, and active vibration controllers.

The pet crate also includes a power subsystem 340 for energizing the electronics and enabling function. The power subsystem may be attached to a power grid or may function from a battery. For example, a rechargeable battery may provide power when it is needed during a power outage or during travel.

The pet crate also has an input/output subsystem 350 to allow for external control (e.g., adjustment) of the pet crate's function or for data input/output. For example, the input/output subsystem may include the necessary electronics and components for wired and/or wireless data communication with a computing device 360, a computer network (i.e., network) 355, and/or the body monitor 350. In addition, the input/output subsystem 350 may include the electronics and components necessary for manual control. In an exemplary embodiment, the pet crate may be switched to one of three different modes (i.e., ON, OFF, and AUTO) by means of an external rocker switch 104 (FIG. 5B). In the ON mode, the device may continuously play music from the internal playlist stored in memory (e.g., randomly selecting tracks). In the OFF mode, the device is disconnected from the power supply and disabled. In the AUTO mode, the device may continuously scan for the presence of an animal and automatically start streaming music from a preset playlist once an animal has been detected. In addition, a momentary rocker switch 105 may be used to adjust the volume of music playing. In an alternative exemplary embodiment, the rocker switches may include push-button or slider controls for selecting the operating mode and increasing/decreasing the volume. In addition, the input/output subsystem 350 may include a user interface for increasing/decrease the sensitivity of the sensors 335. For example, a proximity sensor may require a higher sensitivity to detect small dogs.

The input/output subsystem 350 may also include a multimedia interface comprising a microphone, a speaker, a camera, a display, or combination thereof to provide computer mediated communication between an animal inside the pet crate and a human. For example, a computing device 360 (e.g., a mobile phone) configured by software may receive video, images, and/or sound data from a human and then transmit the data to the input/output subsystem 340 (e.g., via a network 355). The processor 315, configured by software, can process the received data and transmit the process data to the multimedia interface for display and/or playback. In the same way, the processor 315 may be configured by software to enable the multimedia interface inside the housing 100 to capture video, images, and/or sound data from an animal and transmit this data to the computing device 360 for display and/or playback.

The input/output system may also enable a data link between the pet crate and the computing device 360 (e.g.,

via the network 355). The data link may enable the computing device to transmit software updates to the pet crate or control the pet crate's sensor/conditioner settings (e.g., music mode, music playback settings). In addition, the computing device may send/receive log reports from the pet crate (e.g., number of times animal detected by sensor, times of environmental conditioner use, etc.), videos/images from the pet crate, or text/email message alerts from the pet crate.

In a possible embodiment, a body monitor 350 may be attached to a pet and used for sensing the pet's behavior or health status. For attachment, the body monitor 350 may be integrated into a collar worn by the pet (as shown in FIG. 7). The body monitor 350 may measure heart rate using a light source and a detector directed at the pet's skin. The light source illuminates the pet's skin and senses the reflection to detect blood volume changes that correspond with heart rate. The body monitor 350 may also detect/measure the motion or activity (e.g., steps taken, activity levels, periods of inactivity, etc.) of the pet using an accelerometer. The body monitor 350 may also detect barking, growling, whining, yelping, or howling using a microphone. The body monitor may also detect the animal's temperature. The body monitor may communicate this information to the pet crate's electronics via a wireless communication link (e.g., BLUETOOTH, Wi-Fi, ZigBee, etc.) as shown in FIG. 7. The pet crate may store this information in memory 320 or transmit this information to the network 355 or a computing device 360, as mentioned previously. Alternatively, the information communicated to the pet crate may be processed by the pet crate's processor 315 for control of the pet crate's environmental conditioners 350. For example, the communicated information may help to determine a dog's anxiety levels. The anxiety levels may, in turn, determine the type of environmental conditioning necessary, the duration of environmental conditioning, or the settings of a particular environmental conditioner.

An exemplary block diagram of the body monitor 350 is shown in FIG. 4. The body monitor 350 is energized by a power module (e.g., battery) 420 and includes one or more sensors 440 energized by the power module 420 to detect the pet's heart rate, temperature, activity, and/or sound. The sensors are communicatively coupled to a processor 400 that, when configured by software, monitors the sensors 440 and generates logs, alerts and/or reports. The logs, alerts, and/or reports may be transmitted to the pet crate's electronics using a wireless communication module 430. The communication module 430 includes the necessary components (e.g., processing, amplification, filtering, RF modulation, etc.) to communication with other systems via a wireless communication link (e.g., BLUETOOTH, Wi-Fi, ZigBee, etc.). Alternatively, the logs, alerts, and/or reports may be stored in a non-volatile computer readable storage medium (i.e., memory) 410 for later read-out. For example, a log of sensor readings (i.e., health/activity report) can be transmitted to the pet crate 100 at regular intervals (i.e., when the body monitor is in range with the pet crate electronics) or when a particular health condition has occurred (e.g., elevated heart rate). In this way, the pet crate 100, the body monitor 350, and the computing device (e.g., via a network) 360 may be used as a pet care system, allowing the pet owner to monitor and care for the pet (i.e., via the pet crate) while the owner is away. FIG. 6 illustrates a pet care system showing the interaction each element.

In addition to monitoring the animal's vitals, the body monitor 350 may also be configured with a sensor to sense the animal's position (e.g., a global positioning system (GPS) sensor). The location sensor may communicate the

animal's position to the pet crate, which can alert the owner when a dog has entered or left a region. The body monitor 350 may also be configured with a moisture sensor. The moisture sensor may communicate that an animal has entered water to the pet crate, which can alert the owner when a dog is water (e.g., a pool, pond, etc.). The body monitor 350 may also be configured with a temperature sensor to alert that a dog has been left in a hot car, or an accelerometer or altimeter may be used to alert that a dog unusually inactive (e.g., sedated, dead, etc.).

In one possible embodiment of the present disclosure, the pet crate is music enabled. The music enabled smart pet crate begins playing sounds (e.g., music, white noise, nature sounds, etc.) when the animal enters the pet crate and stops playing sounds when the animal exits the pet crate. Playback is accomplished using a proximity sensor, a music player, a speaker, and a memory that contains songs (i.e., audio recordings, tracks, sounds, etc.) in a stored playlist.

A method for selecting songs from the playlist is shown in FIG. 7. A song is selected 710 from the playlist and played 720 when the proximity sensor detects that an animal has entered the crate 700. The song selection is selected based on a preference score assigned to each song in a playlist. For the example shown in FIG. 7, the playlist 770 includes three songs "A", "B", and "C". Each song at the start (i.e., at time t1) is assigned a preference score of 100. These scores imply that the probability that a song is selected from the playlist is 33% (i.e., $\text{song-score}/\text{total-score} \times 100\% = \text{probability of selection}$). In general, songs that have a high preference score are more likely to be selected than songs with low preference scores.

The preference score for a song may be adjusted (or not) based on when the animal enters and exits the crate. For example, the score for a particular song may be reduced when the dog exits the crate while this song is playing. The amount that the score is reduced may be constant or varying based on the playing time of the song when the dog exits the crate. As shown in FIG. 7, song "A" preference score has been reduced by 25 points when the pet leaves the pet crate before the song has ended 750. As a result, the likelihood that song "A" is subsequently selected for playback is reduced to 27% in the playlist at a second time (t2) 780. In this way, the animal's preferences are learned by the music enabled pet crate.

In order to allow music songs to come back into the playlist after reaching 0 points, a fixed number of points may be added to all songs after a specified duration (e.g., 10 points are added to all songs every 10 days). Song preference scores may also be increased if a pet remains present for the entire song.

In addition to the animal entering/leaving the pet crate, physiological factors may be used to determine song selection. For example, temperature, heart rate, and/or respiratory rate may be monitored over time by a body sensor 350 to establish a baseline for a pet's typical physiological state. This state may be used to determine the effectiveness of a song in reducing the anxiety or fear-related stress of the pet. For example, the normal respiratory rate for a dog falls between 10-35 breaths per minute while at rest, and the normal heart rate falls between 60 and 140 beats per minute. The preference score for a song may be increase based on a decrease in heart rate or respiratory rate sensed during the song. In addition, the preference score for a song may be decreased based on an increase in heart rate or respiratory rate sensed during the song.

In the specification and/or figures, typical embodiments have been disclosed. The present disclosure is not limited to

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such exemplary embodiments. The use of the term “and/or” includes any and all combinations of one or more of the associated listed items. The figures are schematic representations and so are not necessarily drawn to scale. Unless otherwise noted, specific terms have been used in a generic and descriptive sense and not for purposes of limitation.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art. Methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present disclosure. As used in the specification, and in the appended claims, the singular forms “a,” “an,” “the” include plural referents unless the context clearly dictates otherwise. The term “comprising” and variations thereof as used herein is used synonymously with the term “including” and variations thereof and are open, non-limiting terms. The terms “optional” or “optionally” used herein mean that the subsequently described feature, event or circumstance may or may not occur, and that the description includes instances where said feature, event or circumstance occurs and instances where it does not. Ranges may be expressed herein as from “about” one particular value, and/or to “about” another particular value. When such a range is expressed, an aspect includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent “about,” it will be understood that the particular value forms another aspect. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

The invention claimed is:

1. A smart pet-crate comprising:

a housing for containing an animal, wherein the housing comprises a door and one or more openings in the housing’s walls;

one or more sensors integrated with the housing and configured to generate sensor signals in response to the animal’s behavior and/or environmental conditions, wherein the one or more sensors comprise a motion sensor configured to generate sensor signals corresponding the housing’s motion and/or vibration;

an active environmental-conditioning subsystem integrated with the housing and configured to activate, deactivate, enhance, diminish, or otherwise alter vibration, lighting, and/or sounds in the interior of the housing, wherein the active environmental-conditioning subsystem comprises active vibration dampers configured to attenuate the housing’s motion and/or vibration;

and

an electronics subsystem integrated with the housing and communicatively coupled to the one or more sensors and the active environmental-conditioning subsystem, wherein the electronics subsystem comprises a processor configured by program code to:

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monitor the sensor signals, and based on the sensor signals, control the active environmental-conditioning subsystem to produce or change the environment in the housing,

wherein the attenuation of the housing’s motion and/or vibration is controlled by the electronics subsystem and based on sensor signals from at least the motion sensor.

2. The smart pet-crate according to claim 1, further comprising a passive environmental-conditioning subsystem integrated with the housing and isolating the interior of the housing from external sounds and/or vibrations.

3. The smart pet-crate according to claim 1, wherein the one or more sensors comprise a proximity sensor configured to generate sensor signals to indicate that the animal is in the housing or that the animal is not in the housing.

4. The smart pet-crate according to claim 3, wherein: the electronics system transmits music, white noise, and/or nature sounds to the active environmental-conditioning subsystem when the proximity sensor indicates that the animal is in the housing, and wherein the active environmental-conditioning subsystem comprises one or more speakers configured to play the music, white noise and/or nature sounds within the housing’s interior.

5. The smart pet-crate according to claim 4, wherein the music, white noise, and/or nature sounds are retrieved from a network or a memory communicatively coupled to the electronics subsystem.

6. The smart pet-crate according to claim 1, wherein the one or more sensors comprise a light sensor configured to generate sensor signals corresponding to ambient light levels inside or outside the housing.

7. The smart pet-crate according to claim 6, wherein: the active environmental-conditioning subsystem comprises one or more lights configured to illuminate the interior of the housing, and wherein the intensity or on/off condition of the one or more lights are controlled by the electronics subsystem and based on sensor signals from at least the light sensor.

8. The smart pet-crate according to claim 6, wherein: the active environmental-conditioning subsystem comprises one or more motorized shades covering, at least partially, the door and/or the one or more openings, and wherein the extent of the covering is controlled by the electronics subsystem and based on the sensor signals from at least the light sensor.

9. The smart pet-crate according to claim 1, wherein: the one or more sensors comprise a time sensor configured to generate sensors signals corresponding to intervals and/or scheduled events, and wherein the activation/deactivation of lighting and/or sounds is controlled by the electronics subsystem and based on sensor signals from at least the time sensor.

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US 20200060219A1

(19) **United States**

(12) **Patent Application Publication**

Levin et al.

(10) **Pub. No.: US 2020/0060219 A1**

(43) **Pub. Date: Feb. 27, 2020**

(54) **COMBINATION ANIMAL CRATE WITH RHEOSTAT FAN**

(52) **U.S. Cl.**

CPC *A01K 1/0047* (2013.01); *A01K 1/0245* (2013.01); *A01K 1/0272* (2013.01); *A01K 1/033* (2013.01)

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(57) **ABSTRACT**

(21) Appl. No.: **16/194,305**

(22) Filed: **Nov. 17, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/721,002, filed on Aug. 22, 2018.

Publication Classification

(51) **Int. Cl.**
A01K 1/00 (2006.01)
A01K 1/03 (2006.01)
A01K 1/02 (2006.01)

Active Air Animal Crates is an appliance for the housing and transportation of dogs, and other animals, with self-contained cooling fan affixed to the crate. Active Air Animal Crates is an active ventilation animal crate made of a durable plastic. The crate can be manufactured in various sizes. The crate appliance has self-contained fans, designed for active air movement to assist in cooling that helps keep animals cooler and more comfortable in warm surroundings. The fans used are electric fans of a 115-120 AC Voltage. The fan provides white noise to decrease surrounding environmental noise and aide in calming an animal. Both side panels of the crate incorporate cut-out slots of Active Air Animal Crates trademarked logo and spiral decorative cut-outs to allow air circulation.

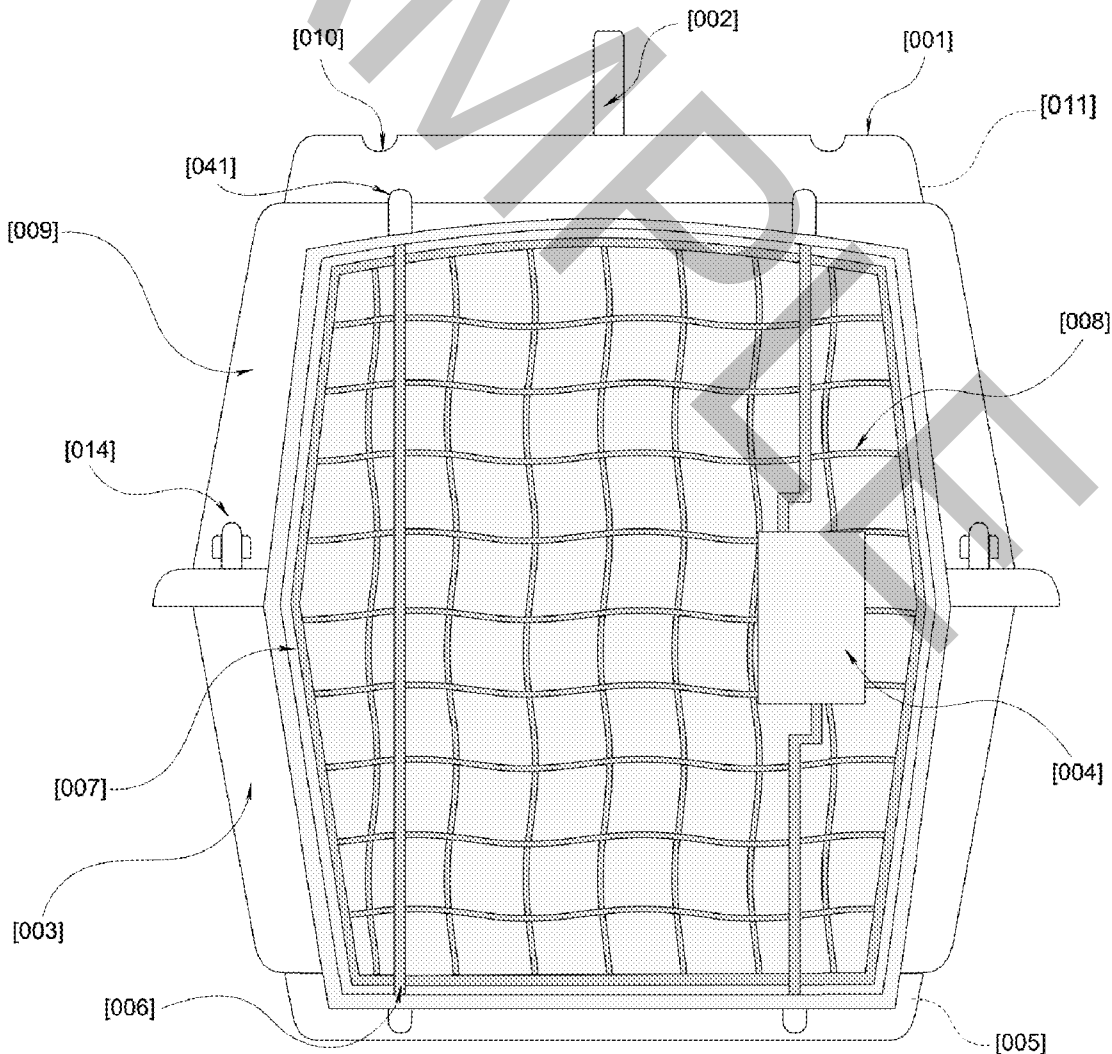


FIG. 1

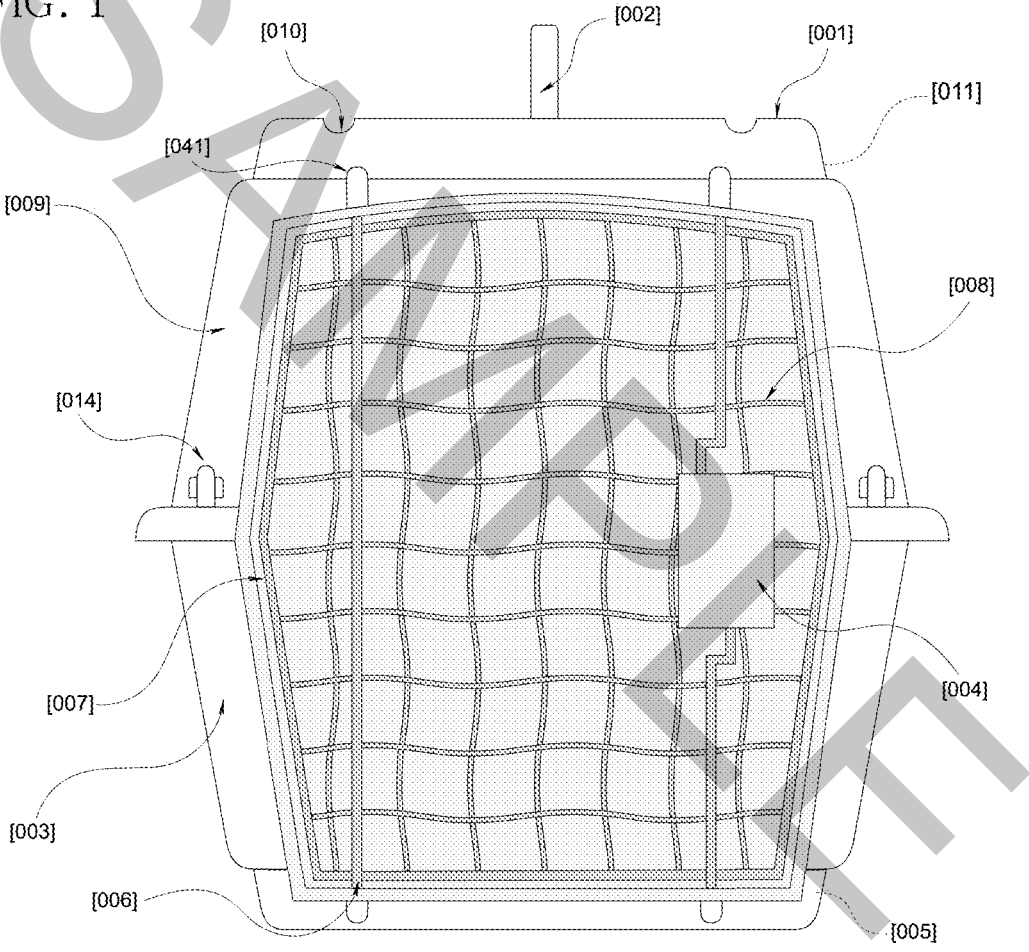
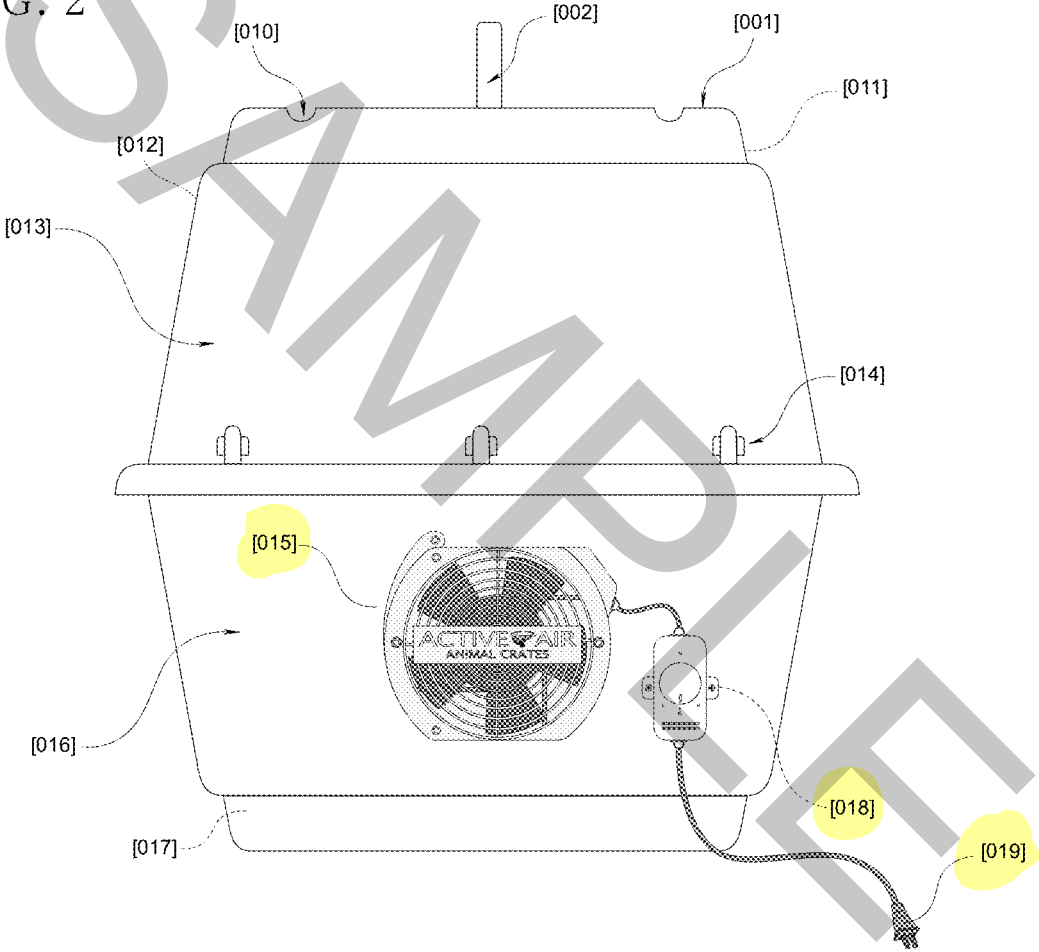


FIG. 2



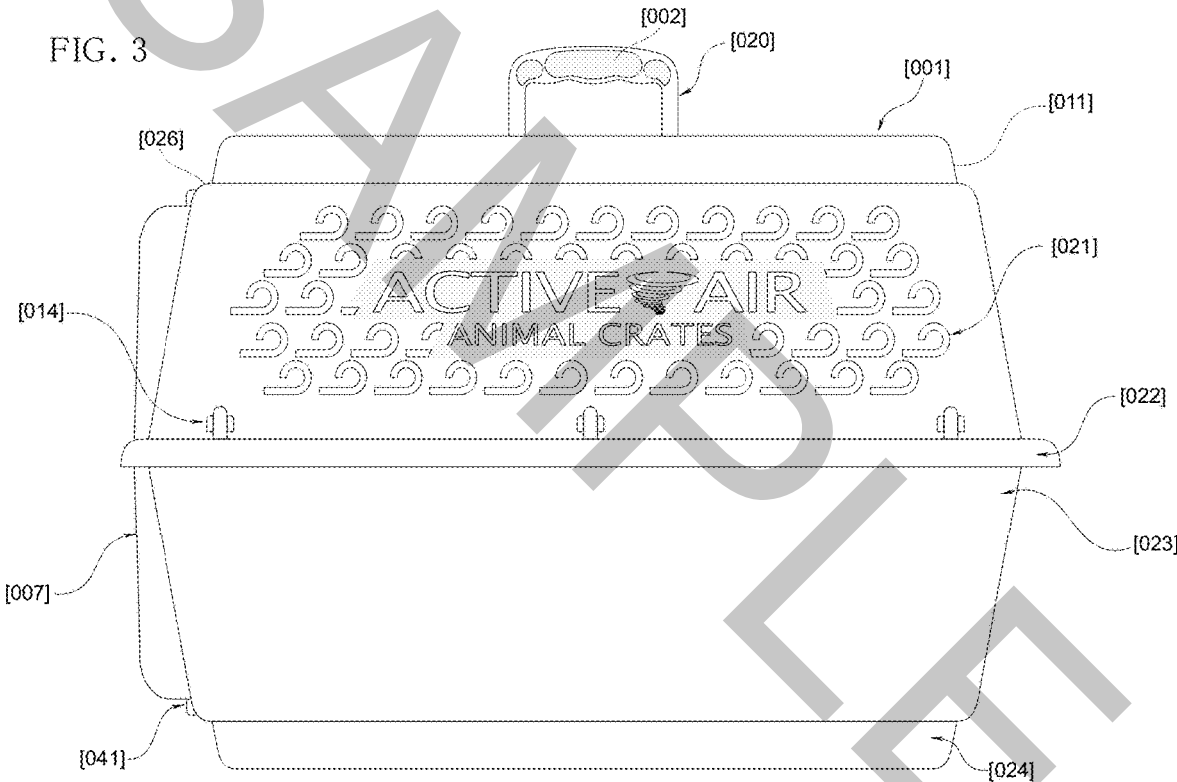


FIG. 4

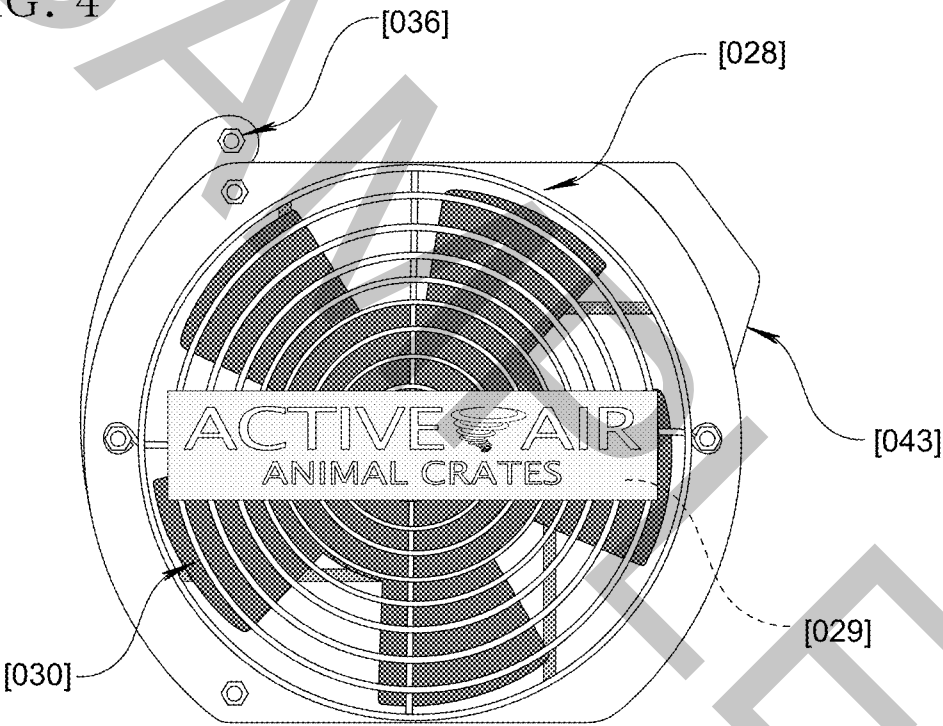


FIG. 5

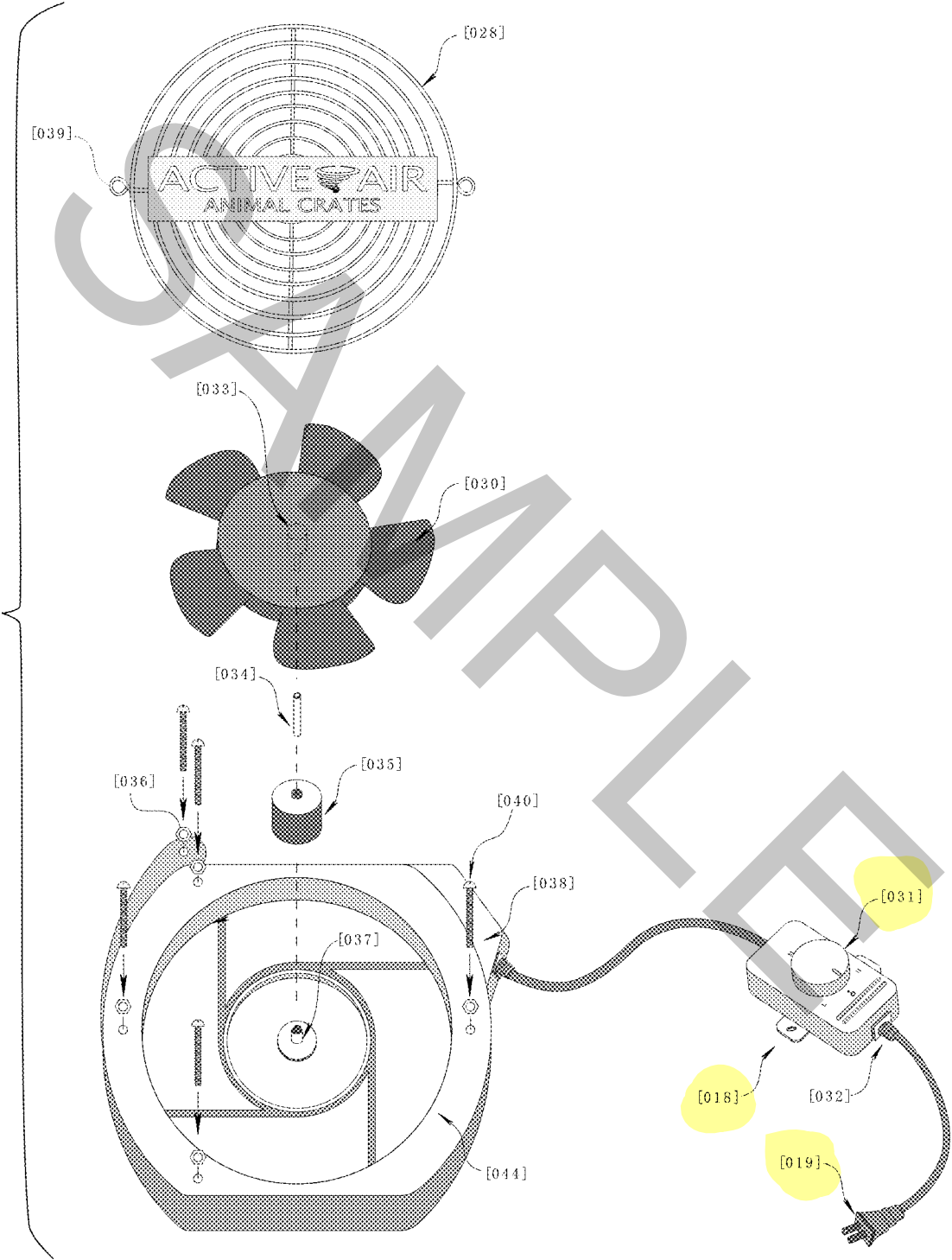


FIG. 6

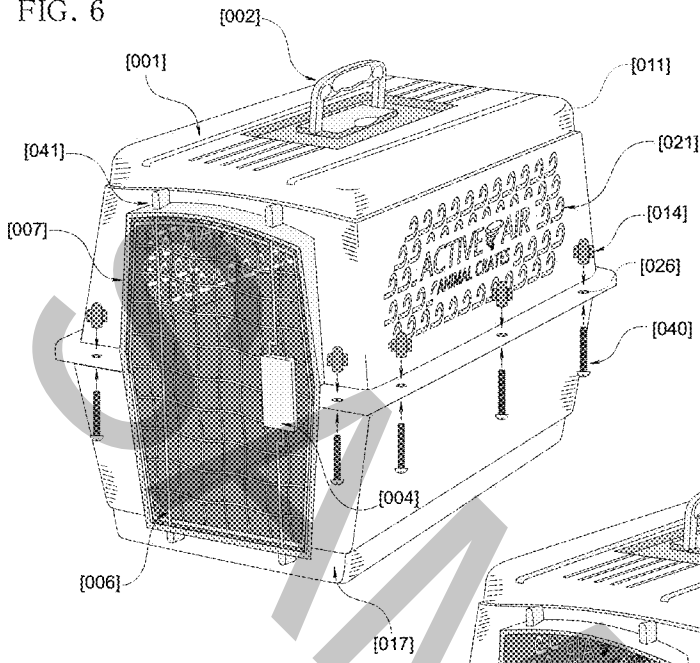
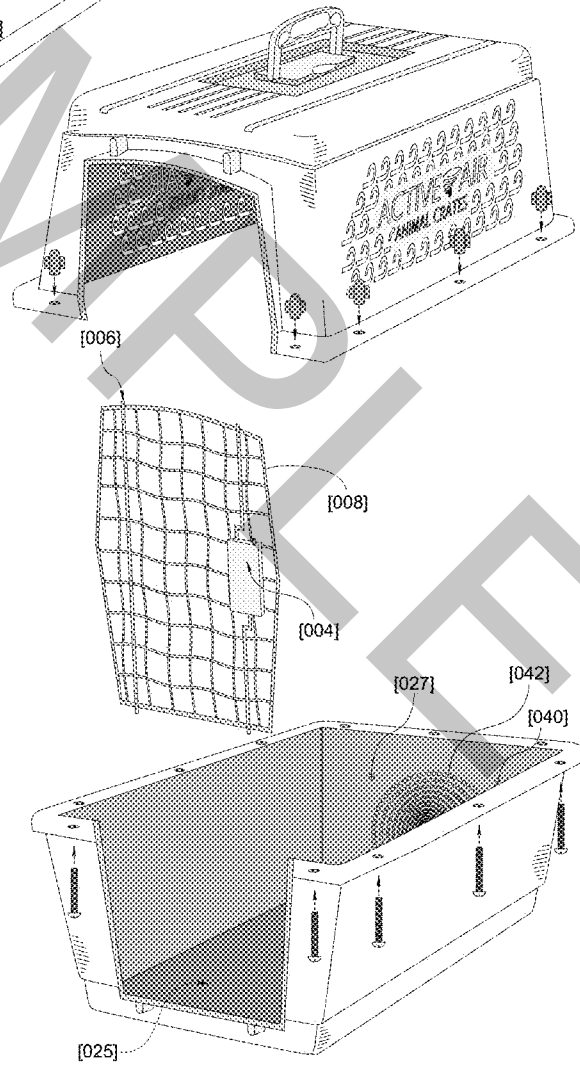


FIG. 7



COMBINATION ANIMAL CRATE WITH RHEOSTAT FAN

[0001] The present application claims the benefit of the filing date of U.S. Provisional Patent Application Ser. No. 62/721,002, filed Aug. 22, 2018, and hereby incorporated in its entirety herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

REFERENCE TO A MICROFICHE APPENDIX

[0003] Not applicable.

BACKGROUND INFORMATION AND DISCUSSION OF RELATED ART

[0004] U.S. Pat. Ser. No. 62/721,002, discloses a crate which provides an enclosure that is lightweight and collapsible for travel and storage.

[0005] The above object and other objects which will become apparent upon reading the following specification and claims are achieved by a clam-shell crate having two sides, a front and a rear and a top and also including an openable front door panel, of open mesh panel construction in which the various sides.

[0006] The side themed panels contour to create a themed appearance consistent with the graphics of the side fan blade covering.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a forward facing view of an animal crate apparatus of this invention.

[0008] FIG. 2 is a rear-facing view of an animal crate apparatus of this invention.

[0009] FIG. 3 is a side perspective that demonstrates the use of a cut-out of a logo decorating either side of the crate, that serves as ventilation.

[0010] FIG. 4 is a perspective view of the rheostat fan with Active Air Animal Crates trademarked logo embedded on the plate covering.

[0011] FIG. 5 is a side elevation view of the cooling system illustrated in FIG. 4.

[0012] FIG. 6 is a perspective of the dog crate illustrating its specific structure.

[0013] FIG. 7 is a perspective view of a dog crate with portions broken away illustrating the orientation of the rheostat fan in relation to the dog crate illustrated in

DETAILED DESCRIPTION OF THE INVENTION

[0014] FIG. 1 is a forward facing view of an animal crate apparatus of this invention. Crate includes a travel handle for mobility 2, at the top of the crate 1. The forward facing view of the crate composes of a crate dome 11, upper front crate panel 9, crate base 5, and lower front crate panel 3. The crate front includes a door opening 7, allowing the crate door 8 to open and close. The crate door comprises of two door pins 6 that control the locking of the crate spring latch 4. These pins 6 connect into the upper and lower crate door pin housing 41 to contain an animal within the crate. The crate

includes grooves 10 visible on the front facing portion of the crate for the purpose of stacking crates when they are not in use, to easily store away the top and lower components of the cage into a more compact size.

[0015] FIG. 2 is a rear-facing view of an animal crate apparatus of this invention that displays the positioning of the crate fan motor housing 15, located on the lower crate back panel 16. The mounted rheostat attachment 18 includes a cable and wall plug at its base 19. The upper crate back panel 13, comprised of an upper side panel 12 and crate top 1, and lower crate back panel 16 compose the back and lower crate base 17 secured with the use of upper and lower attachment bolt and nuts 14.

[0016] FIG. 3 is a side view of a crate apparatus upper 26 and lower side panel 23, including its upper 11 and lower dome 24. The upper side panel consists of a decorative cut out of Active Air Animal Crates Trademark logo 21 and wind spirals for air ventilation. The upper crate attachment grooves 22 locks together by three upper and lower attachment bolt and nuts 14. The perspective of the crate demonstrates a side view of the crate door 7 extending out beyond the side panels of the crate. The perspective of the crate demonstrates a side view of the crate handle 2 and the side attachment point for the crate handle 20 for the purpose of moving and relocating the crate.

[0017] FIG. 4 is an elevation view of a rheostat fan with Active Air Animal Crates trademarked logo 29 embedded on the fan blade grate cover 28 to contain the fan blades 30. The fan housing 43 is mounted to the crate with two 2¼ inch bolt attachment sites 36.

[0018] FIG. 5 is a side elevation view of the cooling system illustrated in FIG. 4 with portions broken away illustrating the orientation of the rheostat fan components. From the topmost perspective of the dog fan shown represents the fan blade cover 28 displaying the two fan blade attachment points on either side of the diameter of the fan cover 39. Descending from the fan covering shows the fan blade 30, and the respective fan shaft attachment point 33. Below the fan blade is the fan blade shaft 34 that fixes into the fan shaft brushing 35. Beyond the fan blade shaft and shaft brushing lies the fan motor that runs off of a 115-120 AC current 37. The fan motor housing 44 encases the fan motor as the fans base. Superior to the fan motor housing 44 on the upper right is the power cord attachment site 38 for the cable and wall plug 19 which delivers a 115-120 AC current 32 to the fan. Along the cable lies the rheostat power and speed adjustment 31 to control the air current delivered into the crate. Lateral to the power cord attachment site is the first bolt attachment site 36 to affix the fan housing to the crate. The fan housing and fan covering comprise of five screws 40 for secure attachment of all essential pieces.

[0019] FIG. 6 is a perspective of the dog crate illustrating its specific structure.

[0020] FIG. 7 is a perspective view of a dog crate from FIG. 6, with portions broken away illustrating the orientation of the rheostat fan in relation to the dog crate base. The perspective view of the crate base and its floor 25 demonstrates the ventilation holes for fan air 42 access point and the fan attachment point 27 views from inside the base crate by the means of four screws 40.

We claim:

1. An animal crate comprising:

a crate having a fan mounted on a back wall that operates at 115J/120V AC, with an adjustable speed Rheostat fan of home current and inverter for power when in a vehicle.

* * * * *

SAMPLE



US00D717005S

(12) **United States Design Patent**
Skaggs

(10) **Patent No.:** **US D717,005 S**

(45) **Date of Patent:** **** Nov. 4, 2014**

(54) **PET CARRIER**

(71) Applicant: **Craig Skaggs**, Troy, IL (US)

(72) Inventor: **Craig Skaggs**, Troy, IL (US)

(73) Assignee: **Pet Cooler Carrier, LLC**, Troy, IL (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/446,011**

(22) Filed: **Feb. 19, 2013**

(51) **LOC (10) Cl.** **30-02**

(52) **U.S. Cl.**

USPC **D30/108**; D30/109

(58) **Field of Classification Search**

USPC D30/108-109, 112-117, 160-161;
119/452-453, 474, 481-482, 489, 491,
119/494, 496-498, 501, 513-514

See application file for complete search history.

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(Continued)

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Skaggs, Craig; "Pet Carrier"; Design U.S. Appl. No. 29/445,635; filed Feb. 14, 2013.

Primary Examiner — Cathy A MacCormac

(74) *Attorney, Agent, or Firm* — Polsinelli PC

(57) **CLAIM**

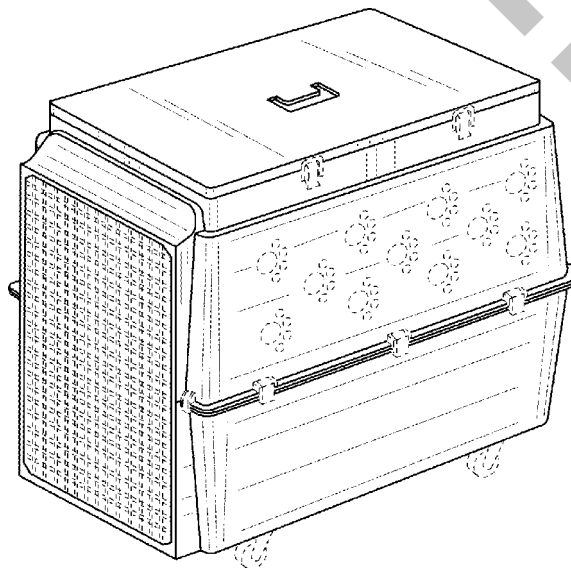
The ornamental design for a pet carrier, as shown and described.

DESCRIPTION

FIG. 1 is a front perspective view of the pet carrier; FIG. 2 is a front view of the pet carrier; FIG. 3 is a rear view of the pet carrier; FIG. 4 is a left side view of the pet carrier; FIG. 5 is a right side view of the pet carrier; FIG. 6 is a top view of the pet carrier; and, FIG. 7 is a bottom view of the pet carrier.

The broken lines showing in FIGS. 1-7 are included for the purpose of illustrating portions of the pet carrier that form no part of the claimed design.

1 Claim, 3 Drawing Sheets



(56)

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D30/108

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SAMPLE

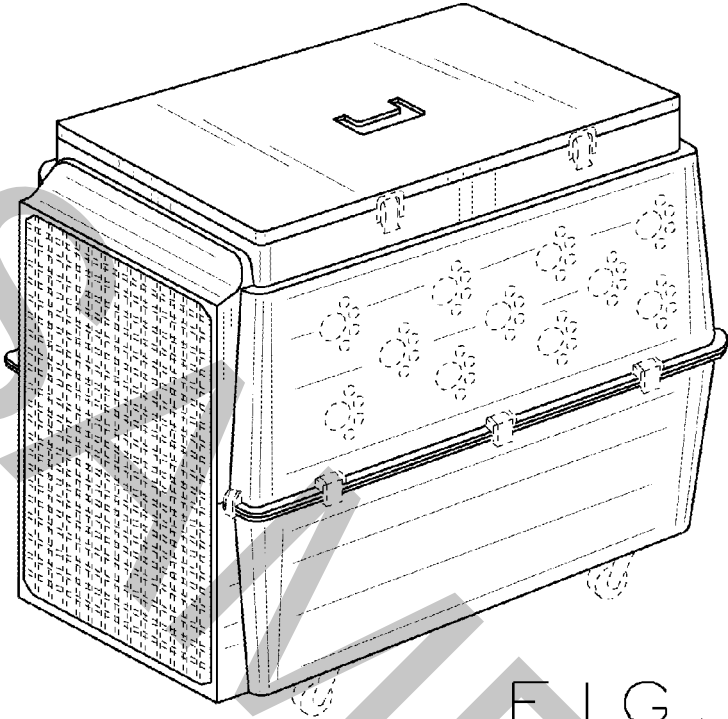


FIG. 1

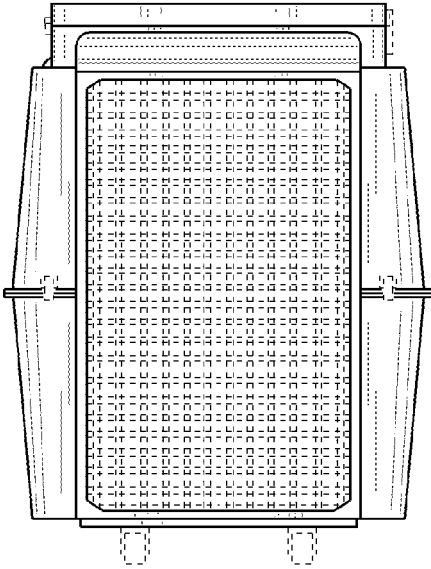


FIG. 2

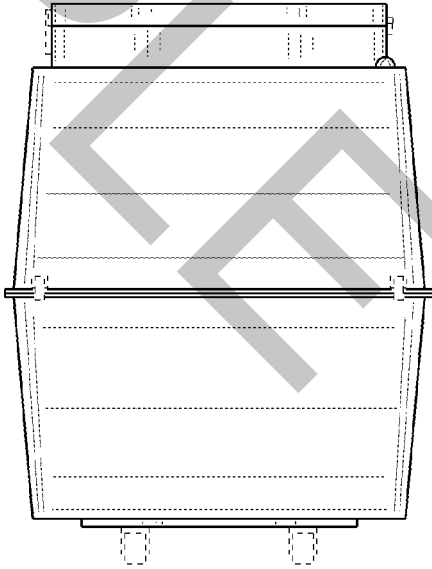


FIG. 3

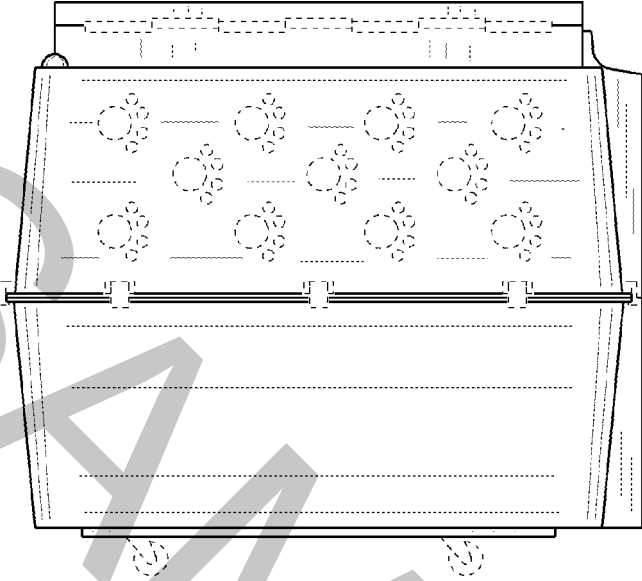


FIG. 4

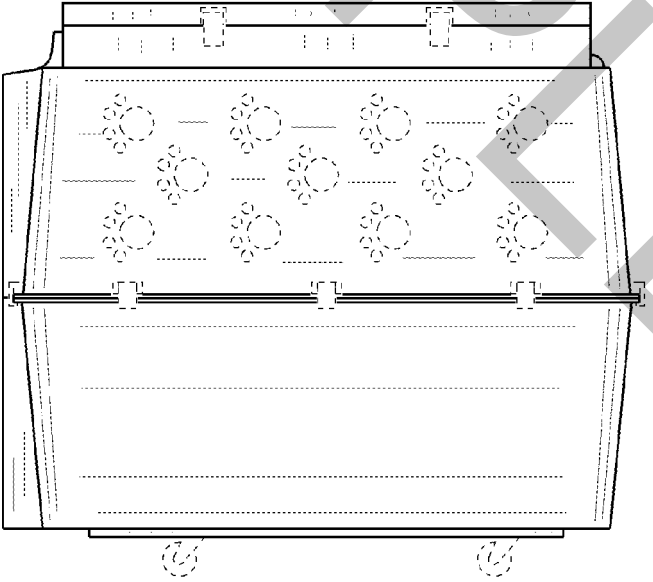


FIG. 5

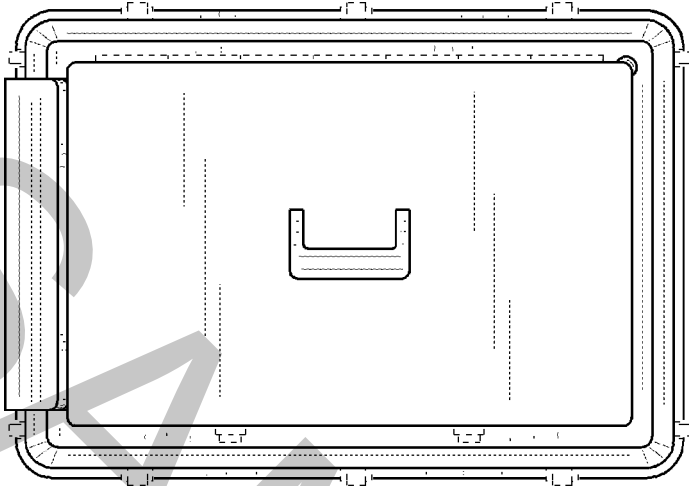


FIG. 6

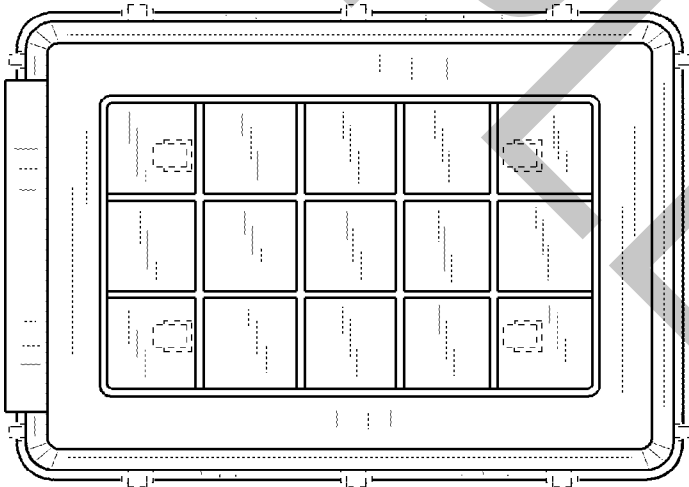


FIG. 7

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 November 2006 (30.11.2006)

PCT

(10) International Publication Number
WO 2006/127110 A1

- (51) International Patent Classification:
A01K 1/02 (2006.01)
- (21) International Application Number:
PCT/US2006/010960
- (22) International Filing Date: 22 March 2006 (22.03.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/684,328 25 May 2005 (25.05.2005) US
- (71) Applicant (for all designated States except US):
COVENANT PARTNERS, INC. [US/US]; 727 Revere Beach Park, Revere, Massachusetts 02141 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MCKINNEY, Cecil [US/US]; 111 Cattail Court, Kissimmee, Florida 34743 (US).
- (74) Agents: HANKIN, Marc, E. et al.; Hankin Patent Law, A Professional Corporation, 11414 Thurston Circle, Los Angeles, California 90049 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

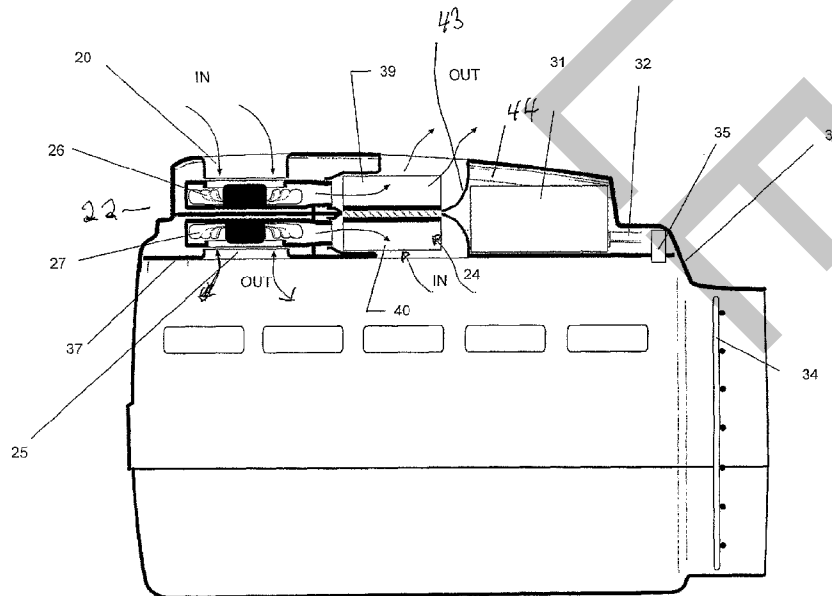
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report

[Continued on next page]

(54) Title: TEMPERATURE CONTROLLED PET KENNEL



(57) Abstract: The present invention is directed to a pet kennel that allows pet owners to leave their pets in an enclosure that is portable, and is temperature regulated for both cold and hot climates. The invention is comprised of an enclosure (11) with a side (14), rear (15), bottom (13) and top walls (12), and an openable access port (16) with a plurality of thermoelectric elements (22), fans (26, 27) to circulate either the cool or warm air through out the enclosure, an imaging device (35), and a remote control unit (42).

WO 2006/127110 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SAMPLE

TEMPERATURE CONTROLLED PET KENNEL

[0001] This application claims priority to U.S. *Provisional Application* No. 60/684,328, filed
5 May 25, 2005 entitled "Temperature Controlled Pet Carrier," which is incorporated herein by
reference.

FIELD OF INVENTION

10 [0002] This invention relates, generally, to an apparatus for housing pets; more particularly
an apparatus that is temperature controlled.

BACKGROUND

15 [0003] A number of pet kennels exist for transporting and housing pets. For instance,
kennels are placed in a vehicle such as a car, truck, RV, boat, or aircraft so the animal may be
contained during travel. Kennels also exist to keep pets restrained indoors, or outdoors, while
their owners are away for the day. Regardless of whether the apparatus is placed in vehicles,
buildings or outdoors, a problem is presented whenever the owner wishes to leave the pet
20 during extremes in weather conditions. For instance, ambient temperatures in the summer
could reach well over 120 degrees Fahrenheit. In contrast, during the winter, a pet in such a
confined area offers the pet little opportunity to move around to generate the necessary body
heat. These extremes in temperature could injure, or kill, the pet. Regardless of the
temperatures involved, it would also be convenient for owners to remotely monitor their pets
25 and the temperatures they will be exposed to.

[0004] Several devices have been proposed and patented which address the problem of
controlling the environment of a pet. U.S. Patent No. 4,899,693 by Arnold discloses a
Cooled Pet Bed and uses ice cubes placed within a container underneath an open weave
30 mattress. The problem with these pet cooling devices is that cooling duration is limited to the
amount of ice present inside the container, which therefore reduces its portability. Further
safety issues also arise because as the ice melts, water spills could result.

[0005] U.S. Patent Nos. 4,878,359 and 4,939,911 by Mandell disclose a portable kennel and a method for keeping pets cool using a Peltier device. U.S. Patent No. 5,887,436 by Duddlestone also discloses a portable cooled pet carrier that, like Mandell, uses the Peltier effect to provide cooling for the animal. However, these prior inventions are limited because the carriers are to be used within vehicles; they cannot warm the pets; and temperature conditions within the carrier cannot be monitored remotely.

[0006] U.S. Patent No. 6,725,805 discloses a pet shelter with at least one electric heat generator positioned within the housing to radiate into the interior, where the heat generator is preferably a ceramic member with a resistance heating element therein. The problem with this invention is that it is neither capable of cooling the pets, nor portable enough to transport pets, if the necessity arose. U.S. Patent No. 6,446,577 shows an insulated cloth cover for a portable kennel which provides full insulation of all side, top and bottom, such that an animal can be shipped during cold weather without concerns about exposure to the cold. However, this invention relies on the insulation being able to maintain the enclosed heat, and is problematic because it does not easily allow the pet to receive replenished air.

[0007] Therefore, there has been a long felt need in the art for a pet kennel that allows pet owners to leave their pets in an enclosure that is temperature regulated for both cold and hot climates, and one that allows remote monitoring. The present invention can be used outside of vehicles and used in a home, office, garage or other building, or outdoors. The ability to regulate temperature in the kennel and leave it unattended, but monitored remotely, is an improvement over all of the earlier attempts to solve the problem of providing a comfortable and safe environment for a pet.

25

SUMMARY OF THE INVENTION

[0008] This invention is directed towards overcoming the above shortcomings by disclosing an apparatus that enables a pet owner to be able to leave their pet with assurance, knowing that the pet's environment will be regulated for cold and hot temperatures, and monitored remotely.

[0009] In one embodiment, the apparatus in accord with the invention is comprised of an enclosure including bottom and top walls, first and second end walls, and rear and front walls connected to define a generally rectilinear interior section; where the front wall has an openable access port communicating with the interior section of the enclosure and being of shape to allow insertion of an animal into the interior section and removal therefrom, and at least one thermoregulatory unit, which has at least one thermoelectric element, attached to the enclosure that is capable of both cooling and heating the air in the enclosure.

[0010] In another embodiment, the apparatus in accord with the invention is comprised of one thermoelectric element. Alternatively, there are two thermoelectric elements.

[0011] In another embodiment, the apparatus in accord with the invention is comprised of an enclosure including bottom and top walls, first and second end walls, and rear and front walls connected to define a generally rectilinear interior section; wherein the front wall has an openable access port communicating with the interior section of the enclosure and being of shape to allow insertion of an animal into the interior section and removal therefrom, and one thermoregulatory unit, which has one thermoelectric element, attached to the enclosure that is capable of both cooling and heating the air in the enclosure, where the enclosure walls are made of anti-microbial molded plastic; an imaging device; a cell phone-like device to send and receive information from the kennel to a remote control device; where the cell phone can send and receive information from the cell phone to the kennel; where the information is data in a group consisting of sound, physical vibration, text, still images, moving images; and where the enclosure is powered from a battery. The remote control device can send information to and receive information from a cell phone, PDA, or computer.

[0012] An advantage of the present invention is that it can automatically regulate the temperature within a pet kennel.

[0013] A further advantage of the present invention is that it can allow the pet owner to remotely monitor the pet, as well as the environmental temperature within the pet kennel.

5 [0014] Another advantage of the present invention is that it can allow the pet owner to remotely adjust temperature settings for the pet kennel.

[0015] The foregoing, and other features and advantages of the invention, will be apparent from the following, more particular description of the preferred embodiments of the
10 invention, the accompanying drawings, and the claims.

SAMPLE

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a side prospective view of the carrier in accordance with the first embodiment of this invention.

5 [0017] FIG. 2 is a front perspective view of the carrier in accordance with first embodiment of this invention.

[0018] FIG. 3 is a cross-sectional perspective of the first embodiment of this invention.

[0019] FIG. 4 is cross-sectional perspective of the first embodiment of this invention.

[0020] FIG. 5 is a block diagram of the circuitry used.

10 [0021] FIG. 6 is a side prospective of the kennel in accordance with the second embodiment of this invention.

[0022] FIG. 7 is a side prospective of the kennel in accordance with the second embodiment of this invention.

15 [0023] FIG. 8 is a side view of the regulatory unit used in the second embodiment of the invention.

[0024] FIG. 9 is a side perspective of the thermoregulatory unit used in the second embodiment of the invention.

[0025] FIG. 10 is a side perspective of the thermoregulatory unit used in the second embodiment of the invention.

20 [0026] FIG. 11 is a block diagram showing the relationships of some of the components involved in the invention.

DRAWINGS--REFERENCE NUMERALS

	10	pet carrier
25	11	enclosure
	12	top wall
	13	bottom wall
	14	side wall
	15	back wall
30	16	openable access port
	17	upper enclosure
	18	lower enclosure
	19	handle
	20	external air intake port

	21	vent
	22	thermoregulatory unit of embodiment 1
	23	external air exhaust port
	24	internal air intake port
5	25	internal air exhaust port
	26	upper fan
	27	lower fan
	28	thermal element
	29	internal heat exchanger fins
10	30	external heat exchanger fins
	31	battery
	32	control printed circuit board
	33	ceiling barrier
	34	resilient panel
15	35	imaging device
	36	detents
	37	horizontal divider
	38	control panel
	39	upper chamber
20	40	lower chamber
	41	switches
	42	remote control device
	43	wall
	44	control chamber
25	45	prism
	46	second embodiment of the invention
	47	rear wall
	48	first end wall
	49	second end wall
30	50	roof
	110	thermoregulatory unit of embodiment 2
	111	seat back
	112	external deflector
	113	external heat exchanger fins

- 114 vertical divider
- 115 fan unit
- 116 internal heat exchanger fins
- 117 internal deflector
- 5 118 fan
- 119 internal air exhaust/conditioned port
- 120 external air intake port
- 121 external chamber
- 122 internal chamber
- 10 123 thermoelectric element I
- 124 thermoelectric element II
- 125 heating unit

15

SAMPLE

DETAILED DESCRIPTION OF THE DRAWINGS

[0027] In the following detailed description of various embodiments of the invention, numerous specific details are set forth in order to provide a thorough understanding of various aspects of one or more embodiments of the invention, however, one or more
5 embodiments of the invention may be practiced without these specific details. In other instances, well-known methods, procedures, and/or components have not been described in detail so as not to unnecessarily obscure aspects of embodiments of the invention.

10 [0028] This invention is generally directed to a pet kennel which allows owners to be able to leave their pets indoors, in a building, or even outdoors, within a safe, monitored, and temperature controlled environment.

[0029] Referring to **FIG. 1** and **2**, there is shown therein a pet carrier **10** according to the first
15 embodiment of the present invention. The carrier **10** includes a pet enclosure portion **11** including top **12**, bottom **13**, side **14**, rear walls **15** and an openable access port **16**, which define a space into which a pet can comfortably be received. A resilient panel **34** is removably attached to the inside of the openable access port **16** by removable detent elements in the form of screws. As will be understood by those skilled in the art, other forms of
20 detents can be employed if desired. The resilient panel **34** does not completely cover the door **16** but leaves a gap (range 1 cm – 30 cm) around its perimeter to allow air to exchange between the outside and inside of the pet enclosure. The pet enclosure portion **11** is also divided into upper **17** and lower **18** detachable enclosure portions, which are removably connected together by removable detents. The upper and lower enclosures of the carrier can
25 be disassembled, if need be, for transport, or to gain better access for cleaning. There are vents **21** on the sides of the upper enclosure portion which permit air therein to be replenished by fresh air. A handle **19** is positioned on the top of the housing/kennel to facilitate movement of the carrier. A thermoregulatory unit **22** located at the ceiling side of the upper enclosure **11**.

30 [0030] **FIG. 3** a cross-sectional perspective of the pet carrier, showing a thermoregulatory unit reveals a detachable ceiling barrier **33** which separates the thermoregulatory unit from the upper enclosure **17**. The barrier **33** can be disengaged by removing some detents. The thermoregulatory unit **22** comprised of an external **20** and internal **24** air intake ports;

external 23 and internal 25 air exhaust ports; upper 26 and lower 27 fans; a single thermoelectric element 28; upper 39 and lower 40 chambers; external 30 and internal 29 heat exchanger fins; thermal control printed circuit board 32, imaging device 35, and control panel 38 to operate the unit either manually, automatically, and/or remotely.

5

[0031] The external air intake 20 and an external air exhaust ports 23 are unconnected to and separated from the internal air intake 24 and internal air exhaust ports 25, respectively, by a horizontal divider 37, thereby creating an upper 39 and a lower 40 chamber. This divider 37 prevents ambient air mixing with air from the pet enclosure, thereby limiting the volume of air to be temperature regulated by the thermo-regulatory unit 22.

10

[0032] FIG 4 shows a preferred thermoregulatory unit 22 for the first embodiment which utilizes two fans and one thermoelectric element 28. The typical thermoelectric element is manufactured using two thin ceramic wafers with a series of P and N doped bismuth-telluride semiconductor material sandwiched between them. Connected to the thermoelectric element 28 are the external 30 and internal heat exchanger fins 29. The external and internal fins are composed of materials such as, but limited to, copper and aluminum. There can be more than one thermoregulatory unit 22 and may have more than one thermoelectric element 28.

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[0033] In the first embodiment, the thermoregulatory unit 22 is powered by a battery 31 connected thereto (e.g. stand-alone battery or the vehicle battery). The battery 31 is placed within the control chamber 44, which is sealed from the upper and lower chambers by a wall 43. In a preferred embodiment, one or more stand alone batteries are used so that the charge on the vehicle's primary battery is not depleted. It is also understood that the battery can be included as part of the carrier itself, or can be positioned separately in the vehicle and connected to the carrier by appropriate cables. In another aspect, the pet carrier can be provided with 110 volt AC to 12 volt DC power inverters so that the carrier can be used in a house, office, or outdoors, or may run on energy generated from solar panels. In practice, any power source could be used to power the unit. It is possible to conserve battery power of the unit if the owner selects only to operate the lower fan (and not also the upper fan and thermoelectric elements) in a more comfortable environment.

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[0034] Also within the control chamber 44 of the thermoregulatory unit 22 is the imaging device 35. The imaging device 35 is removably affixed to the upper ceiling of the regulatory

unit, and has a prism 45 attached to it that protrudes via a small hole approximately ¼ inch down into the ceiling barrier 33. The result is that the imaging device is able to point back inside the enclosure to capture moving images/stills of the pet.

5 [0035] As the TE operates, the current flowing through it has two effects: (1) the Peltier Effect (cooling) and (2) the Joulian Effect (heating). DC current applied across dissimilar materials causes a temperature differential. Using a thermoelectric in the heating mode is very efficient because all the internal heating (Joulian heat) and the load from the cold side are pumped to the hot side. This reduces the power needed to achieve the desired heat.
10 Thermoelectric elements can be stacked to achieve even lower temperatures.

[0036] For the first embodiment, when the thermoregulatory unit is in the heating mode, the action of the lower fan 27 gently pushing air into the enclosure through the internal exhaust port 25 creates an air current that results in air from the enclosure being gently pulled up into
15 the lower chamber 40 through the internal intake port 24. Here the air encounters the internal heat exchanger fins 29, which are heated. The resultant warm air is then pulled back through to the lower fan 27 (see FIG. 4). As this is happening, the upper fan 26 is extracting ambient air through the external air intake port 20. The ambient air is then blown across into the upper chamber 39, where it encounters the external heat exchanger fins 30, which are chilled.
20 The resulting cool air is then expelled outside of the pet carrier by flowing through the external air exhaust port 23.

[0037] When the thermoregulatory unit is in the cooling mode, the action of the lower fan 27 gently pushing air into the enclosure through the internal exhaust port 25 creates an air
25 current that results in air from the enclosure being gently pulled up into the lower chamber 40 through the internal intake port 24. Here the air encounters the internal heat exchanger fins 29, which are chilled. The resulting cool air is then pulled back through to the lower fan 27 (see FIG. 4). As this is happening, the upper fan 26 is extracting ambient air through the external air intake port 20. The ambient air is then blown across into the upper chamber 38,
30 where it encounters the external heat exchanger fins 30, which are now heated. The resultant warm air is then expelled, through the external air exhaust port 23, outside of the pet enclosure. Vents 21 as well as the air gap between the door 16 and the resilient panel 34 ensure that sufficient fresh air can be exchanged between the enclosure and the outside. As

mentioned above, the presence of the divider 37 prevents air from the upper and lower chambers from mixing.

5 [0038] In FIG. 5, the control printed circuit board 32 comprised of a temperature sensor feedback (thermistor or solid-state sensor) with a closed-loop control circuit to control/regulate the temperature. Using the thermistor, for example, the regulatory unit would be able to determine the current temperature within the pet enclosure, and then determine if the thermoregulatory unit should be placed in a COOL, HEAT or OFF mode. When the sensor detects an over temperature condition within the enclosure, the thermoregulatory unit 22 is activated to begin cooling the air inside the enclosure. 10 Alternatively, when the sensor detects an under temperature condition within the enclosure, the unit 22 is activated to begin heating the air. In another embodiment, a temperature may be selected and the unit can turn on and off keeping the carrier 10 within the selected temperature range.

15 [0039] There are also circuitry, within the printed circuit board 32, that control the imaging device 35, as well as those to the transmitter/receiver unit which enables the pet carrier to transmit and receive signals/images to and from a remote control device 42 (see FIG. 12). In the preferred embodiment, the carrier will use a transmitter/receiver unit that incorporates existing cell phone technology to achieve this purpose. The remote device 42 would be able to display a temperature indicator so that the pet owner can discern the temperature inside the carrier remotely. The remote 42 will able to display information such as visual and/or audio alarms (or vibration mode similar to a paging device) when the temperature reaches a certain threshold, as well as still and moving images within the enclosure. The remote control device 20 can be specifically manufactured and supplied with the pet carrier, or could be a user's cell phone/PDA/computer. In the latter case, conventional software would be installed to allow these devices to receive and transmit information to and from the kennel. Information is defined here as, but not limited to, text, still images; moving images; sounds, vibrations, or the any combination thereof. It is also understood that a global positioning satellite unit, as well as its circuitry, could be adapted to work with this first embodiment. 25 30

[0040] FIGS. 6 and 7 shows the second embodiment of this invention comprising of a non-portable kennel 46 with the thermoregulatory unit 110 removably connected to the back end 47 of the kennel. The thermoregulatory unit 110 is shown here to be completely exposed.

However, it is understood that thermoregulatory unit **110** will be covered either with a metal, or durable plastic to protect its components therein from the environment. It should be appreciated that the thermoregulatory unit **110** could also be on the first wall **48**, second wall **49**, or the top wall **50** of the kennel, or inside the kennel itself. An openable access port can act as a vent, it is understood that smaller windows/openings (not shown) could also be present on the walls of the enclosure. In this second embodiment of the invention, the imaging device **35** is installed on a portion of the front wall above the openable access port.

[0041] It should also be noted that the thermoregulatory unit **110** used in this second embodiment is different in terms of size and components compared to the first embodiment of this invention (the pet carrier). FIGs. **8–10** show that the preferred second embodiment of the invention comprised of an upper heating unit **125**; a lower fan unit **115**; two thermoelectric elements **123** and **124**; external heat exchanger fins **113**; internal heat exchanger fins **116**, vertical divider **114**; external deflector shield **112**; external air intake port **120**; internal exhaust/conditioned air port **119**; external exhaust port **126**; fan **118**; and external **121** and internal **122** chambers. The second embodiment, however, shares the same printed circuit board, and electronic devices as the first embodiment to detect and regulate temperature, and to transmit information to and from the kennel to a remote control device. There can be more than one thermoregulatory unit **22** and each may have more than one thermoelectric element **28**. In practice, any power source could be used to power the unit.

[0042] For the second embodiment, when the thermoregulatory unit **110** is in the heating mode, fan **118** (see FIG. **8**) gently extracts air from the environment and pushes the air up to the separated internal **122** and external **121** chambers, which are separated by a vertical divider **114**. The air in the internal chamber will encounter the internal heat exchanger fins **116**, which are heated. The resulting heated air is then expelled and deflected by the internal deflector shield (not shown) out through the internal air exhaust/conditioned port **119**, which directs air into the dog kennel, via an intake port present on the dog kennel. Air in the external chamber will encounter the external heat exchanger fins **113**, which are chilled. The resulting chilled air is then expelled out through external exhaust port **126**, where it is deflected by deflector shield **112**. When the thermoregulatory unit **110** is in the cooling mode, the internal heat exchanger fins are now chilled, resulting in cooled air being expelled out to the dog kennel.

[0043] The first (portable kennel) and second (stationary kennel) embodiments can be fabricated using a number of different materials such as, but not limited to, anti-microbial coated molded plastic, extruded or molded polymer, enhanced polymer, cardboard, wood, metal or fiber glass. In another aspect, the inside walls of the carrier could be coated with insulated fabric composed of materials known in the art as insulators, such as, but not limited to, poly-fiber. In first embodiment, the openable access port 16 can be made of the same material as the carrier itself but may include a gasket disposed on an inside of the gate, and a resilient panel 34 made of, but not be limited to, Plexiglas™ (Rohm and Haas Company, Independence Mall, West Philadelphia, Pennsylvania 19195), glass, or plastic. Alternatively, the openable access port for the first can be made of a more flexible type of material such as, but not limited to, fabric and fabric and metal mesh netting, in which case the resilient panel 34 is not needed. In the second embodiment, the openable access port for the kennel is plastic flap-type, commonly used for dog doors; or alternatively, it may comprise of multiple stripe(s) of fabric, or plastic material, hanging down from the top of the openable access port frame, similar to those used in freezer rooms.

[0044] It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the present invention without departing from the scope or spirit of the invention. In view of the foregoing, it is intended that the present invention cover modifications and variations of this invention provided they fall within the scope of the following claims and their equivalents.

CLAIMS

1. An animal kennel that can be used outdoors or indoors, comprising:
5 an enclosure including bottom and top walls, first and second end walls, and rear and front walls connected to define a generally rectilinear interior section;
wherein said front wall has an openable access port communicating with the interior section of said enclosure and being of a shape to allow insertion of an animal into the interior section and removal therefrom, and
10 at least one thermoregulatory unit, which has at least one thermoelectric element, attached to said enclosure that is capable of both cooling and heating the air in said enclosure.
2. An animal kennel of claim 1, further comprising a transmitter/receiver unit to send and receive information from said transmitter/receiver to a remote control device.
15
3. An animal kennel of claim 2, further comprising a remote control device to send and receive information from said remote control device to said transmitter/receiver unit.
4. An animal kennel of claim 3, wherein said information is data in a group consisting of
20 sound, physical vibration, text, still images, and moving images.
5. An animal kennel of claim 4, further comprising an imaging device.
6. An animal kennel of claim 4, wherein said enclosure is made of material selected from the
25 group consisting of anti-microbial molded plastic, cardboard, wood, metal, metal alloy, and fiber glass.
7. An animal kennel of claim 5 wherein said remote control device is an appliance selected from the group consisting of cell phone, PDA, and computer.
30
8. An animal kennel of claim 6, wherein said thermoregulatory unit is further comprised of at least one thermoelectric element, and a handle connected to the top of said kennel.

9. An animal kennel of claim 6, wherein said enclosure is powered from a source selected from the group consisting of a battery, a car battery, and a 110 volt AC to 12 volt DC power inverter.

- 5 10. An animal kennel that can be used outdoors or indoors, comprising:
an enclosure including bottom and top walls, first and second end walls, and rear and front
walls connected to define a generally rectilinear interior section;
wherein said front wall has an openable access port communicating with the interior section
of said enclosure and being of a shape to allow insertion of an animal into the interior section
10 and removal therefrom, and
at least one thermoregulatory unit, each of which has at least one thermoelectric element,
attached to said enclosure that is capable of both cooling and heating the air in said enclosure;
further comprising, a handle attached to the top of said kennel;
a transmitter/receiver unit to send and receive information from said transmitter/receiver to a
15 cell phone, PDA, or computer;
wherein said cell phone, PDA, or computer can send and receive information to and from
said transmitter/receiver unit;
wherein said information is data selected from a group consisting of sound, physical
vibration, text, still images, and moving images; and
20 wherein said enclosure draws power from a power source.

11. An animal kennel of claim 10, wherein said thermoregulatory unit is comprised of two thermoelectric elements.

- 25 12. An animal kennel of claim 12, wherein said power source is selected from the group consisting of a battery, a car battery, and a 110 volt AC to 12 volt DC power inverter.

13. An animal kennel that can be used outdoors or indoors, comprising:
an enclosure including bottom and top walls, first and second end walls, and rear and front
30 walls connected to define a generally rectilinear interior section;
wherein said front wall has an openable access port communicating with the interior section
of said enclosure and being of a shape to allow insertion of an animal into the interior section
and removal therefrom, and

at least one thermoregulatory unit, each of which has at least two thermoelectric elements, attached to said enclosure that are capable of both cooling and heating the air in said enclosure,

5 further comprising a transmitter/receiver unit to send and receive information to and from a cell phone, PDA, or computer;

a cell phone, PDA, or computer to send and receive information to and from said transmitter/receiver unit;

wherein said information is data in a group consisting of sound, physical vibration, text, still images, and moving images; and

10 wherein said enclosure obtains power from a power source.

14. A method for leaving a pet in a kennel that is temperature regulated and monitored, comprising:

15 placing a pet inside the kennel that has at least one thermoregulatory unit with at least one thermoelectric element, capable of cooling and heating the kennel, and a transmitter/receiver unit,

activating the thermoregulatory unit to achieve the desired temperature inside the kennel;

monitoring the temperature inside the kennel;

monitoring the pet inside the kennel; and

20 adjusting the temperature within the kennel remotely, using a cell phone, PDA, or computer.

15. A method for leaving a pet in a kennel that is temperature regulated and monitored, comprising:

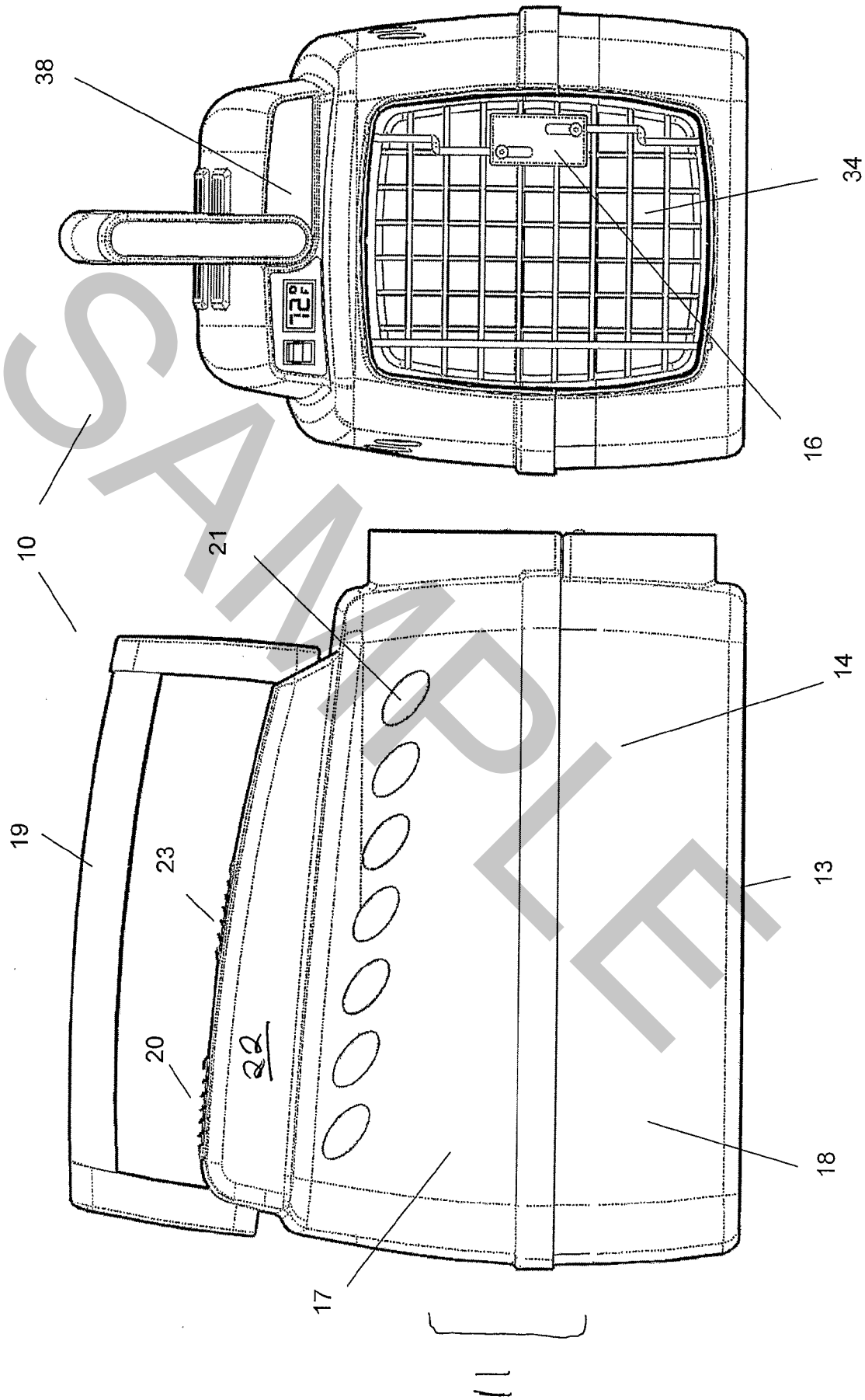
25 activating the thermoregulatory unit of the kennel to achieve the desired temperature inside the kennel, where the thermoregulatory unit has at least one thermoelectric element capable of cooling and heating the kennel; an imaging device, and a transmitter/receiver unit,

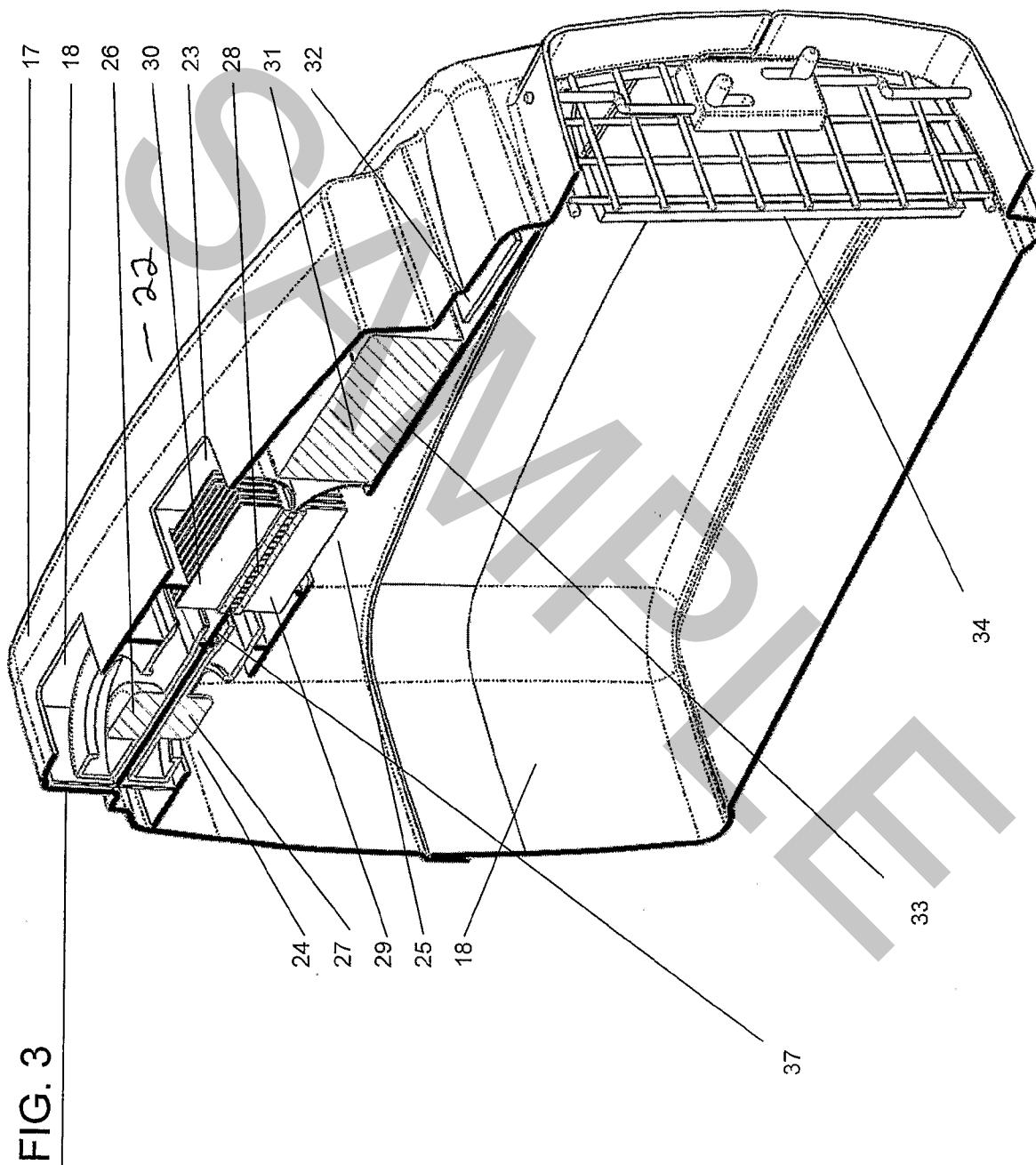
monitoring the temperature inside the kennel; and

adjusting the temperature within the kennel remotely, using a cell phone, PDA, or computer.

FIG. 1

FIG. 2





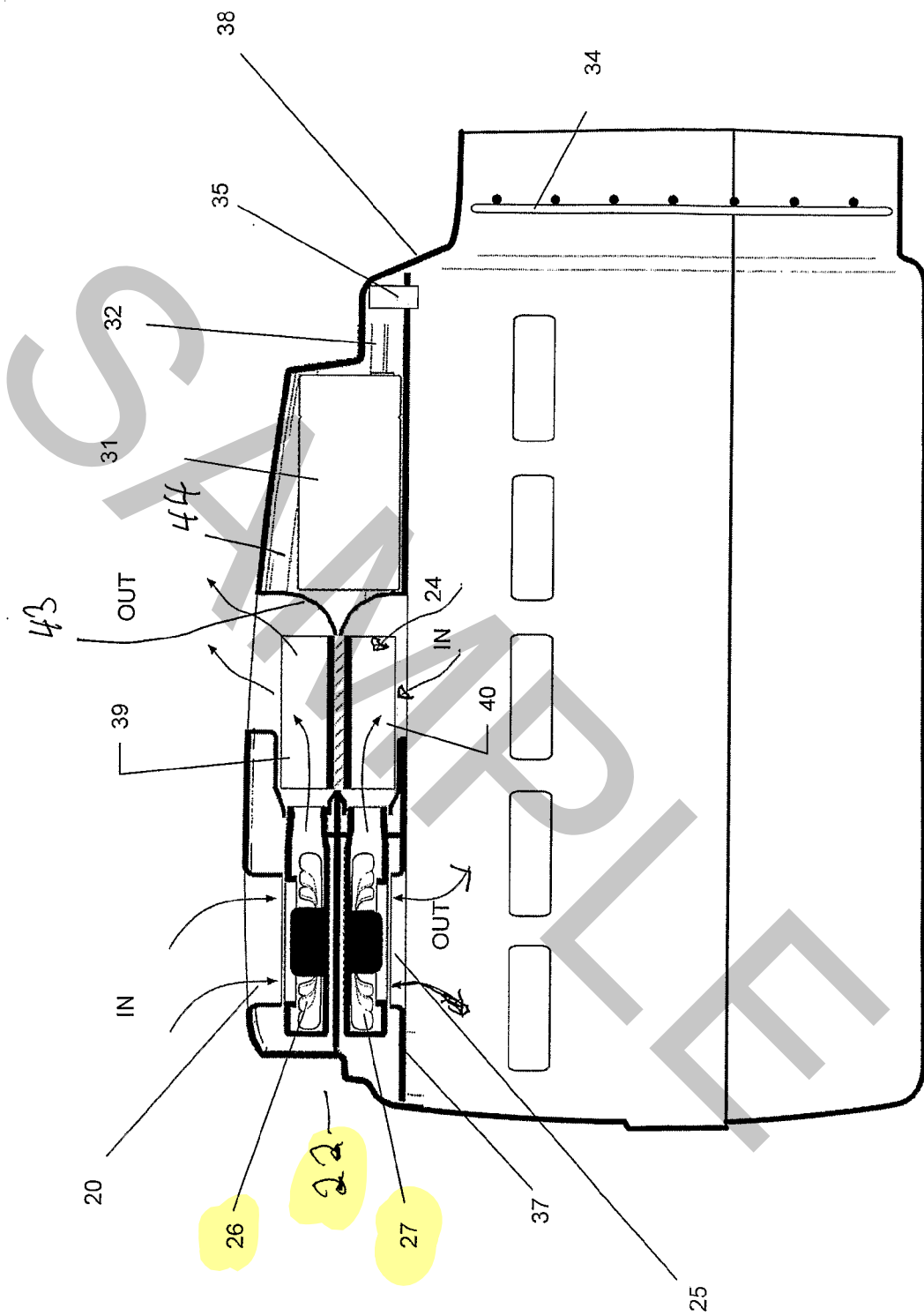


FIG. 4

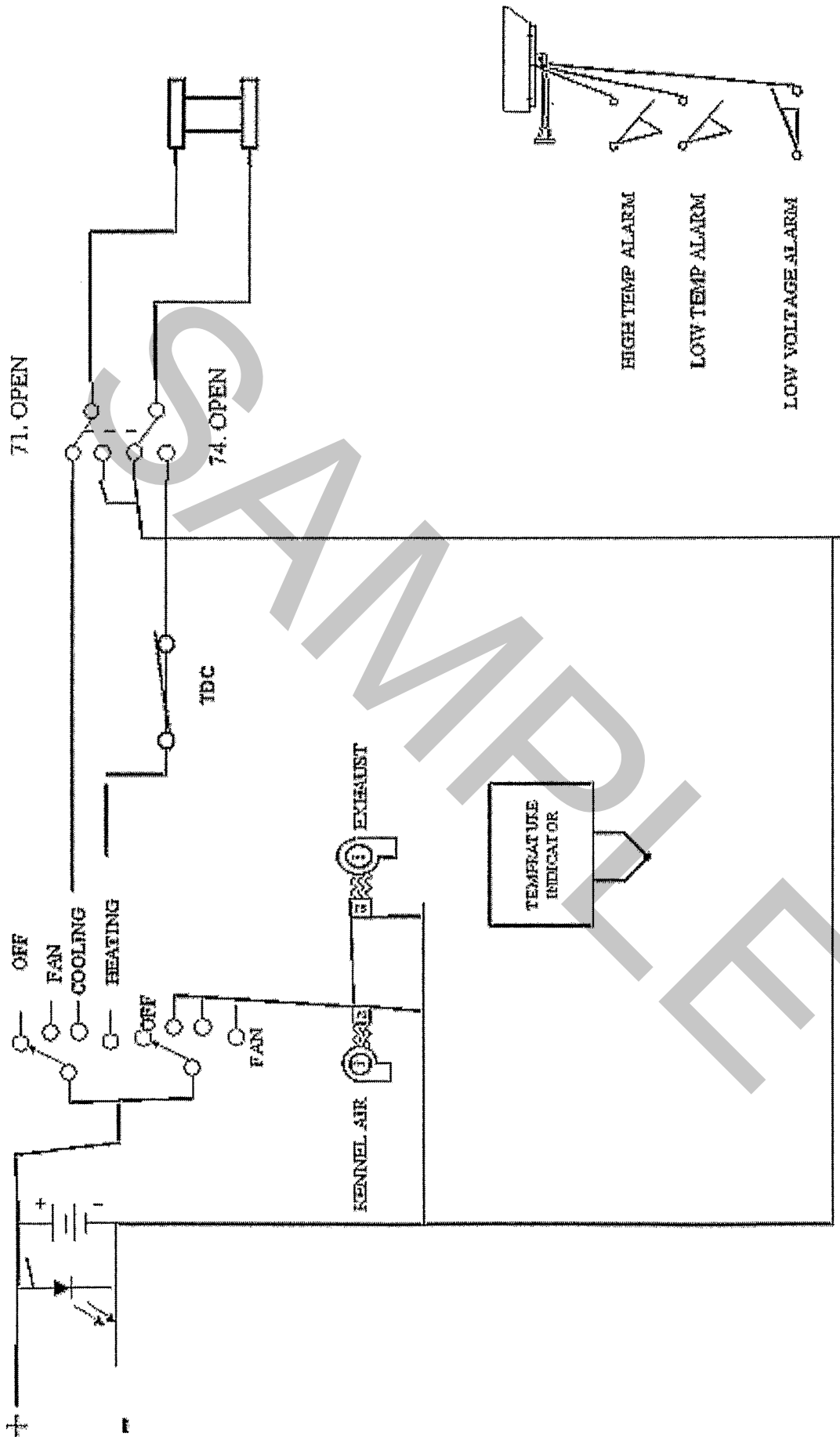
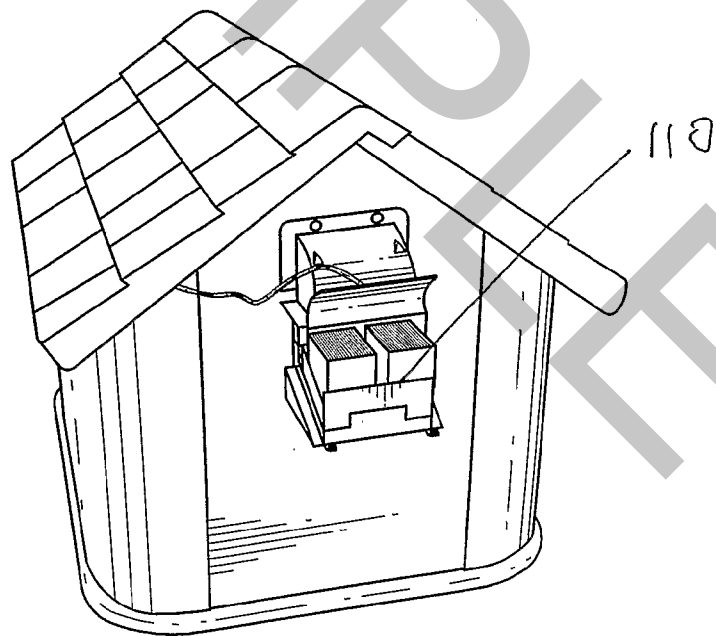
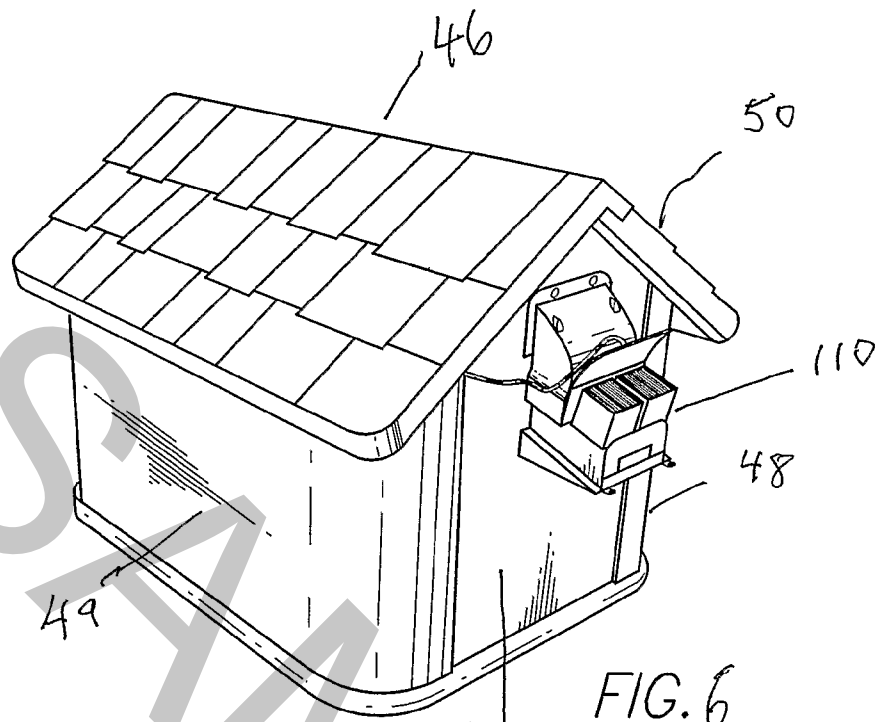


FIG. 5



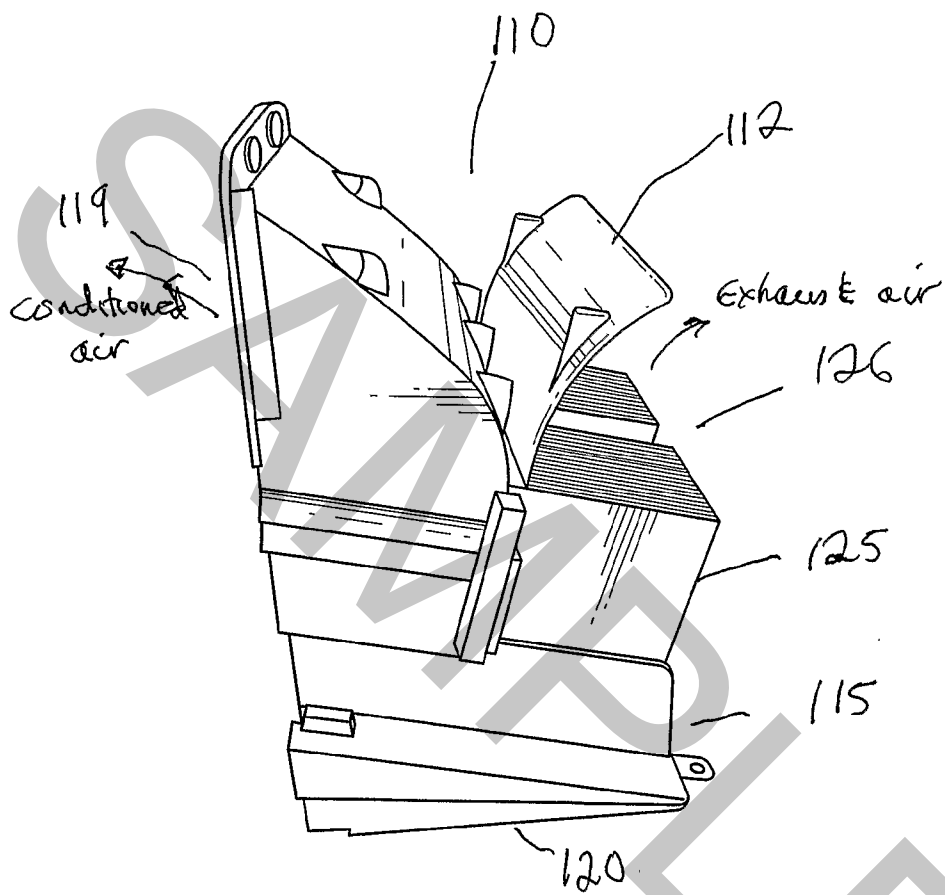
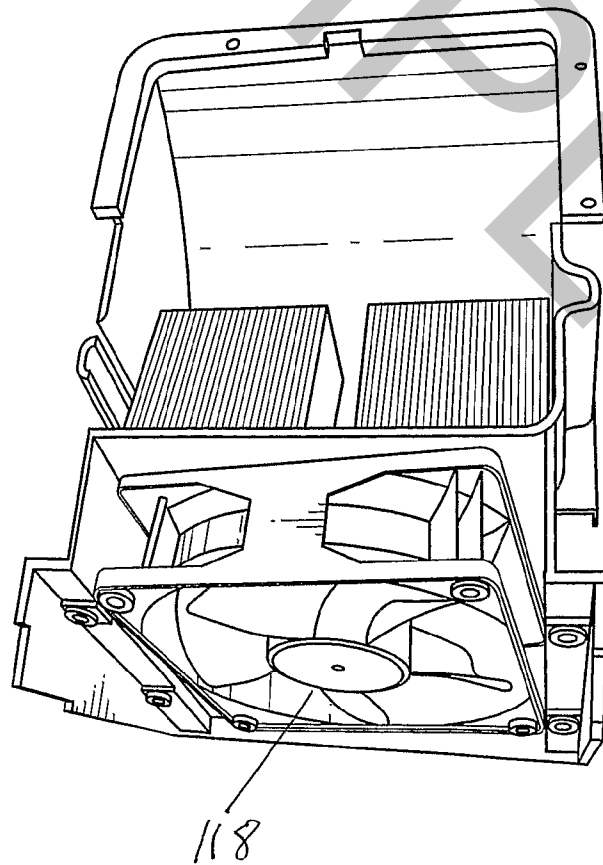
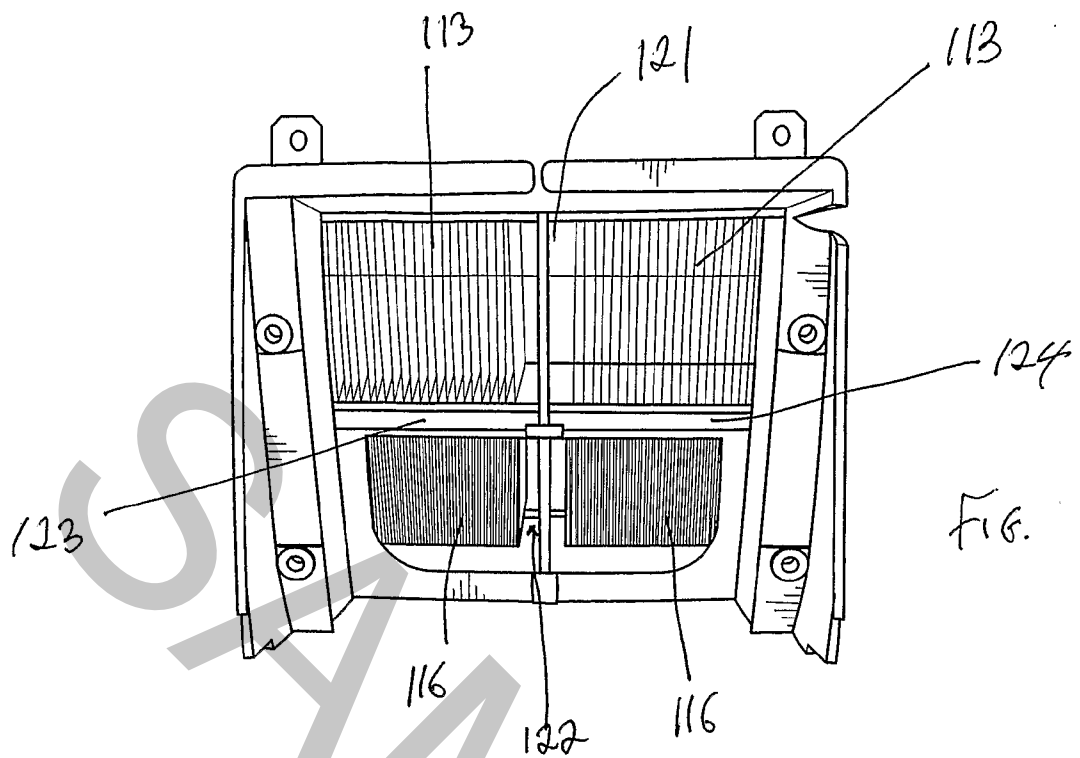


FIG. 8



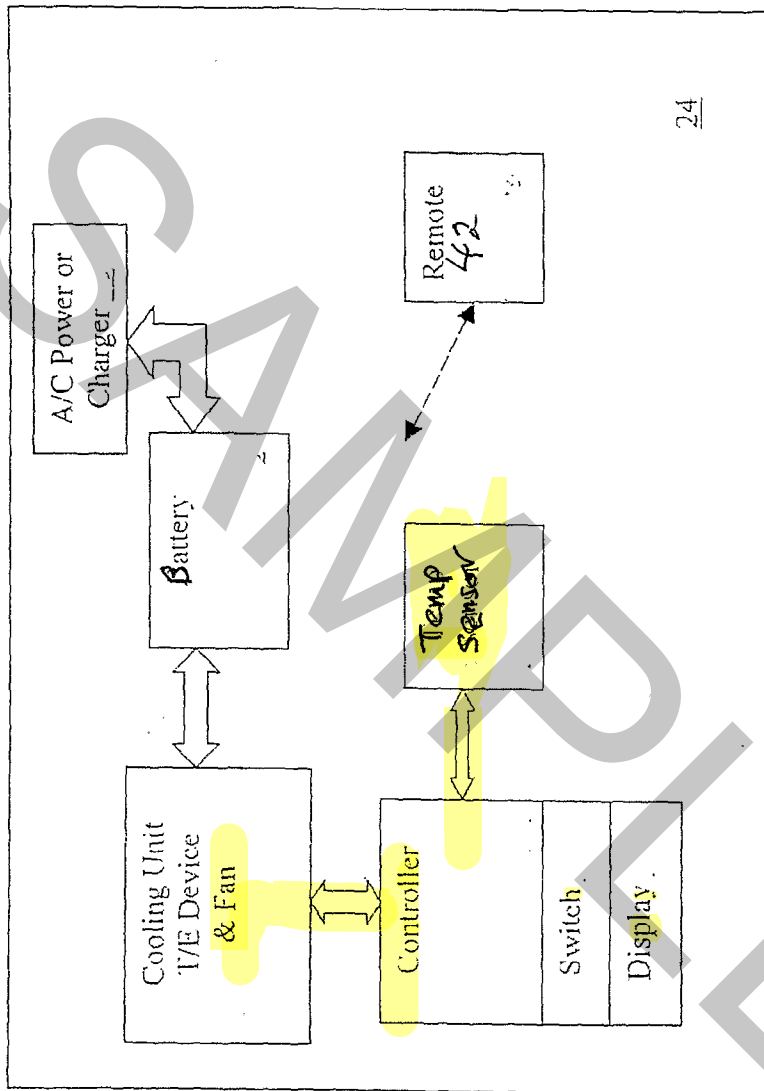


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/010960

A. CLASSIFICATION OF SUBJECT MATTER INV. A01K1/02				
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) A01K				
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 practical, search terms used) EPO-Internal, WPI Data, PAJ				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 5 746 271 A (DECOSTA ET AL) 5 May 1998 (1998-05-05)	1-3		
Y	column 2, line 49 - column 4, line 64; claim 6; figures	4-15		
Y	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 04, 2 April 2003 (2003-04-02) & JP 2002 345358 A (RICOH CO LTD), 3 December 2002 (2002-12-03) abstract; figures	4-15		
X	WO 92/05691 A (SOLINDO EQUIPMENT LEASING LIMITED) 16 April 1992 (1992-04-16)	1		
A	page 14; figures	2-15		
A	US 6 647 925 B1 (WAITERS LAWRENCE A) 18 November 2003 (2003-11-18) abstract; figures	1, 10, 13-15		
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.				
* Special categories of cited documents : <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *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 </td> <td style="vertical-align: top;"> *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family </td> </tr> </table>			*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *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	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *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	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *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 *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family			
Date of the actual completion of the international search 15 June 2006		Date of mailing of the international search report 26/06/2006		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer A. Forjaz		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2006/010960

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SAMPLE