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(54) **INTERNET CANINE COMMUNICATION DEVICE AND METHOD**

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A01K 15/02	(2006.01)
H04N 7/14	(2006.01)

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CPC ***A01K 5/02*** (2013.01); ***A01K 5/0114*** (2013.01); ***A01K 15/02*** (2013.01); ***A01K 15/021*** (2013.01); *H04N 7/142* (2013.01)

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CPC A01K 15/02; A01K 15/021; A01K 5/0114; A01K 5/02; A01K 5/0275; A01K 5/0291
See application file for complete search history.

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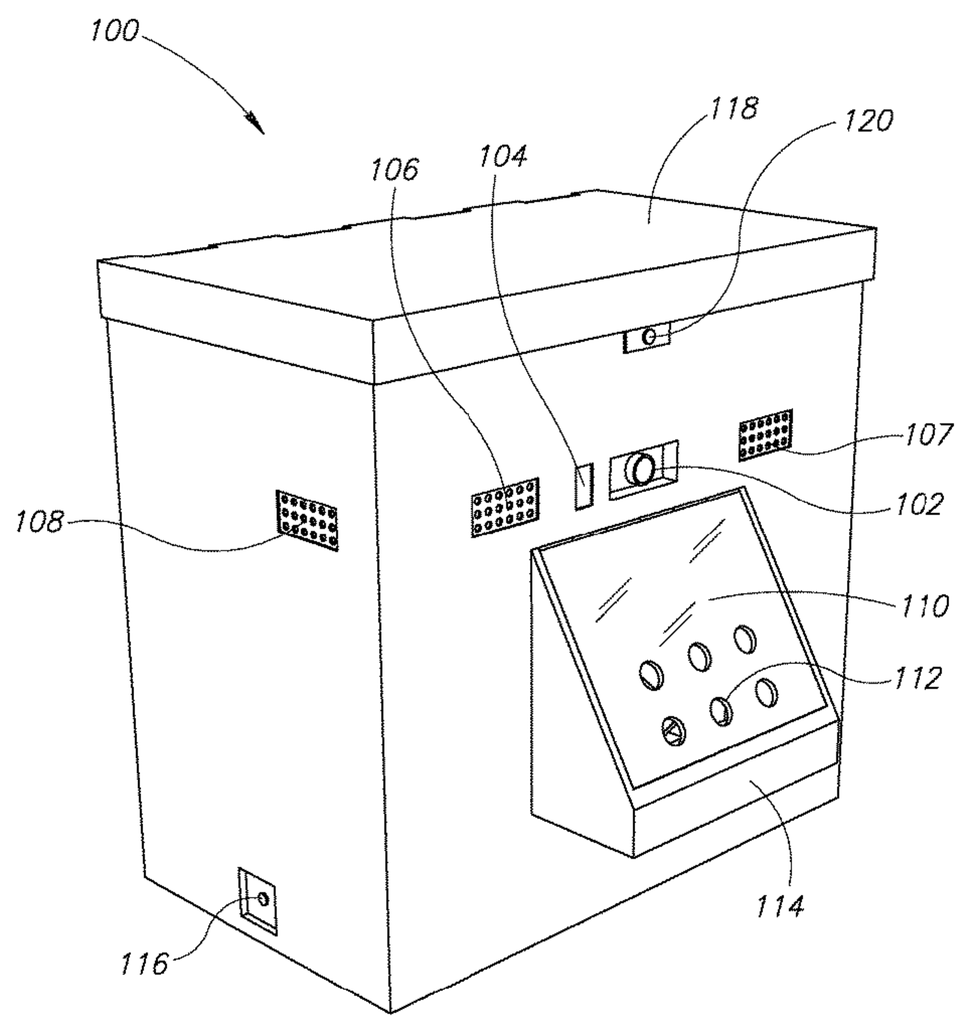
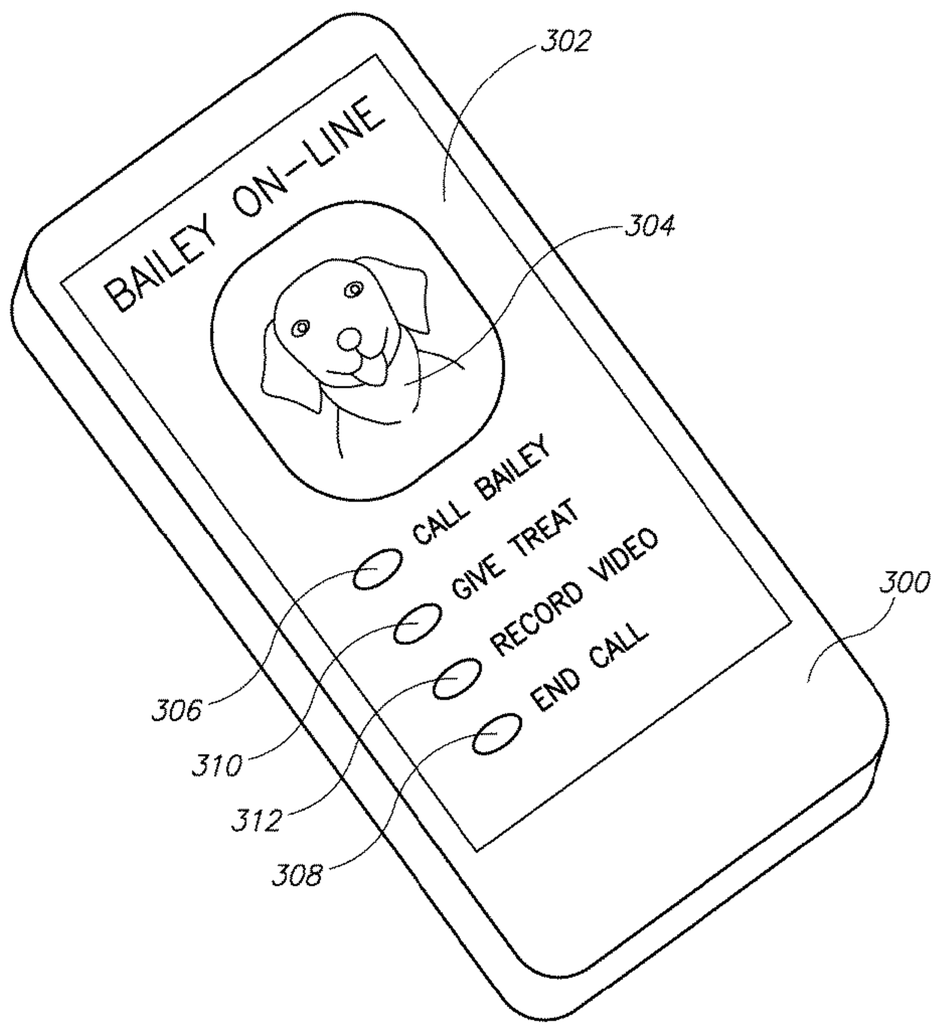
(57) **ABSTRACT**

Enhanced methods and systems for human-pet communication are described. Example embodiments provide an Internet Canine Communication System ("ICCS"). The ICCS facilitates remote communication and interaction with between a dog and its owner, caretaker, trainer, family member, or the like. The ICCS may include a base station or similar device that is configured to deliver treats to a dog and to transmit audio/visual communication between the dog and a remote client device operated by a human user. The ICCS may also facilitate training the dog to utilize the ICCS to communicate with the user, such as by answering calls from or initiating calls to the remote client device of the user.

27 Claims, 15 Drawing Sheets





Related U.S. Application Data

application for the reissue of Pat. No. 10,314,288, which is a continuation of application No. 14/988,066, filed on Jan. 5, 2016, now Pat. No. 9,723,814, which is a continuation of application No. 13/765,546, filed on Feb. 12, 2013, now Pat. No. 9,723,813, which is a continuation of application No. 13/752,217, filed on Jan. 28, 2013, now Pat. No. 9,226,477.

(60) Provisional application No. 61/689,270, filed on Jun. 2, 2012.

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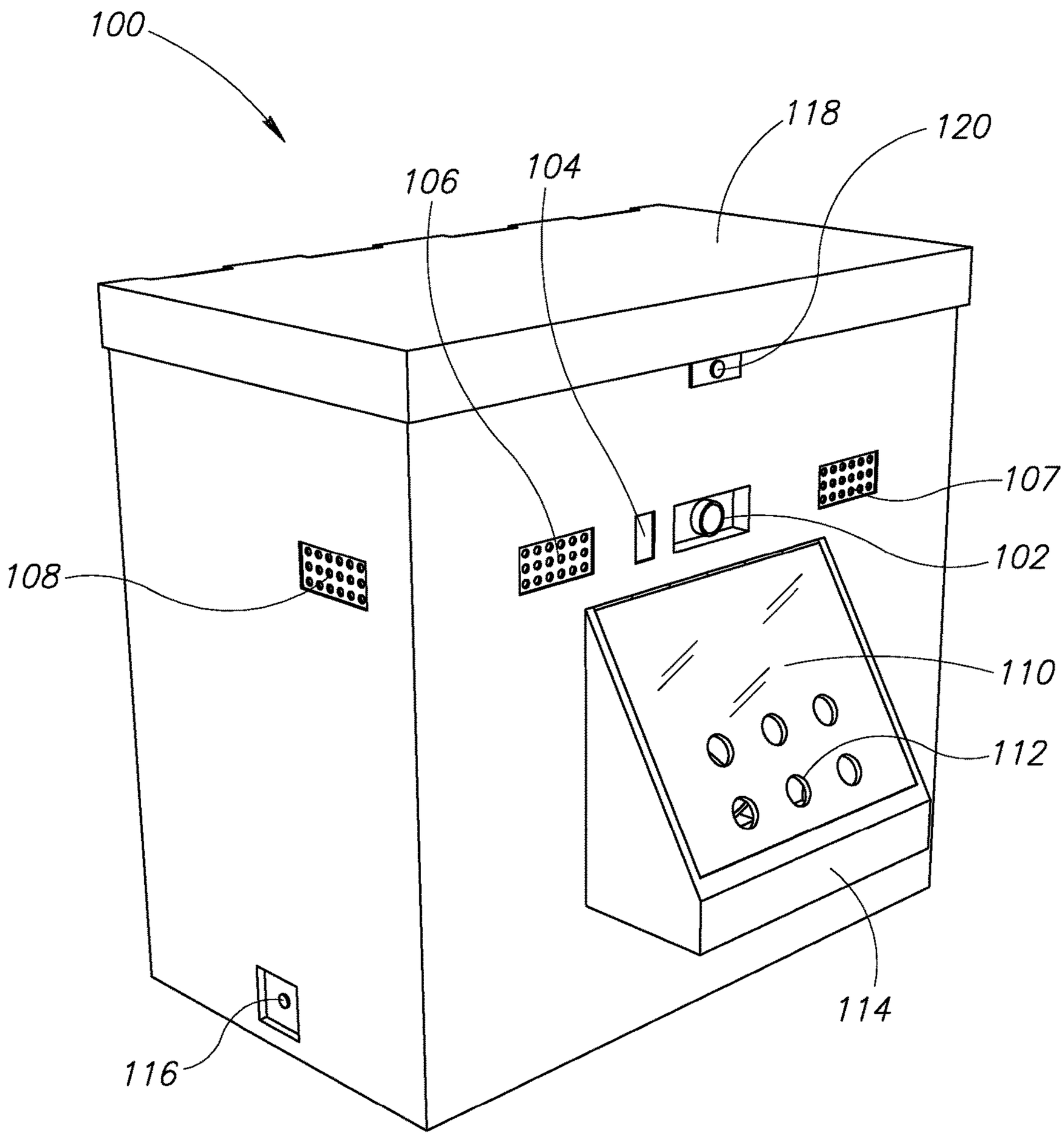

FIG.1

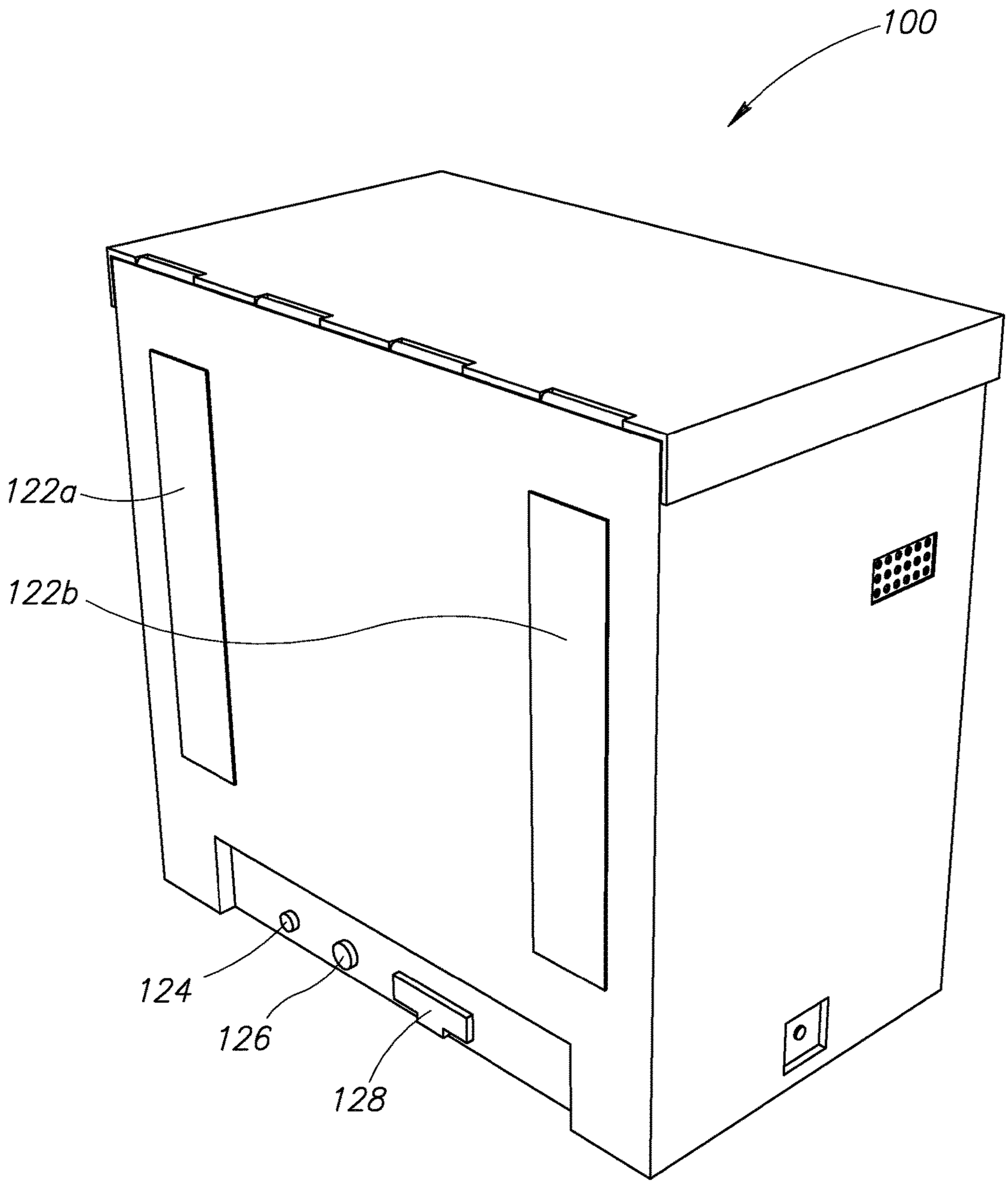

FIG.2

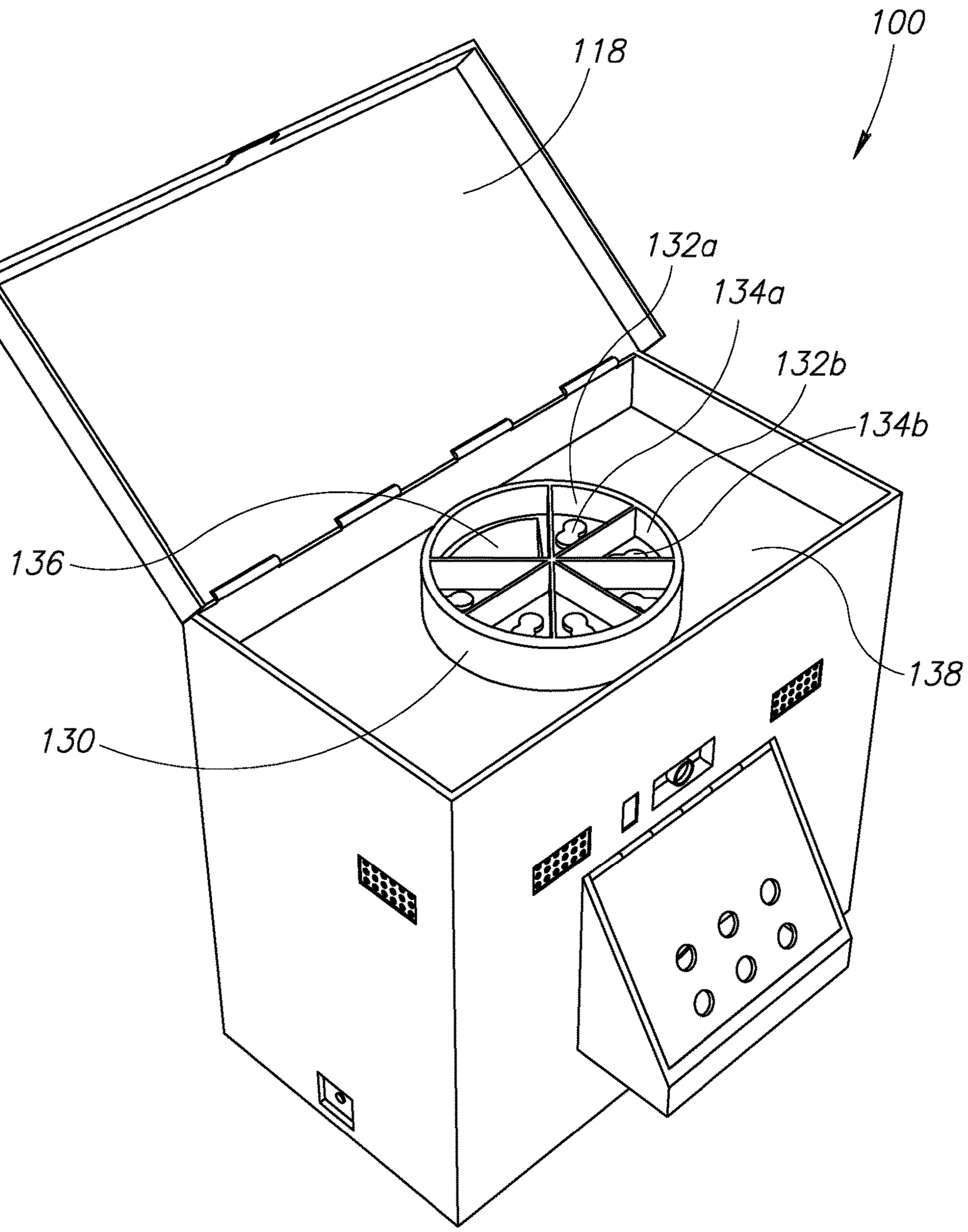

FIG.3

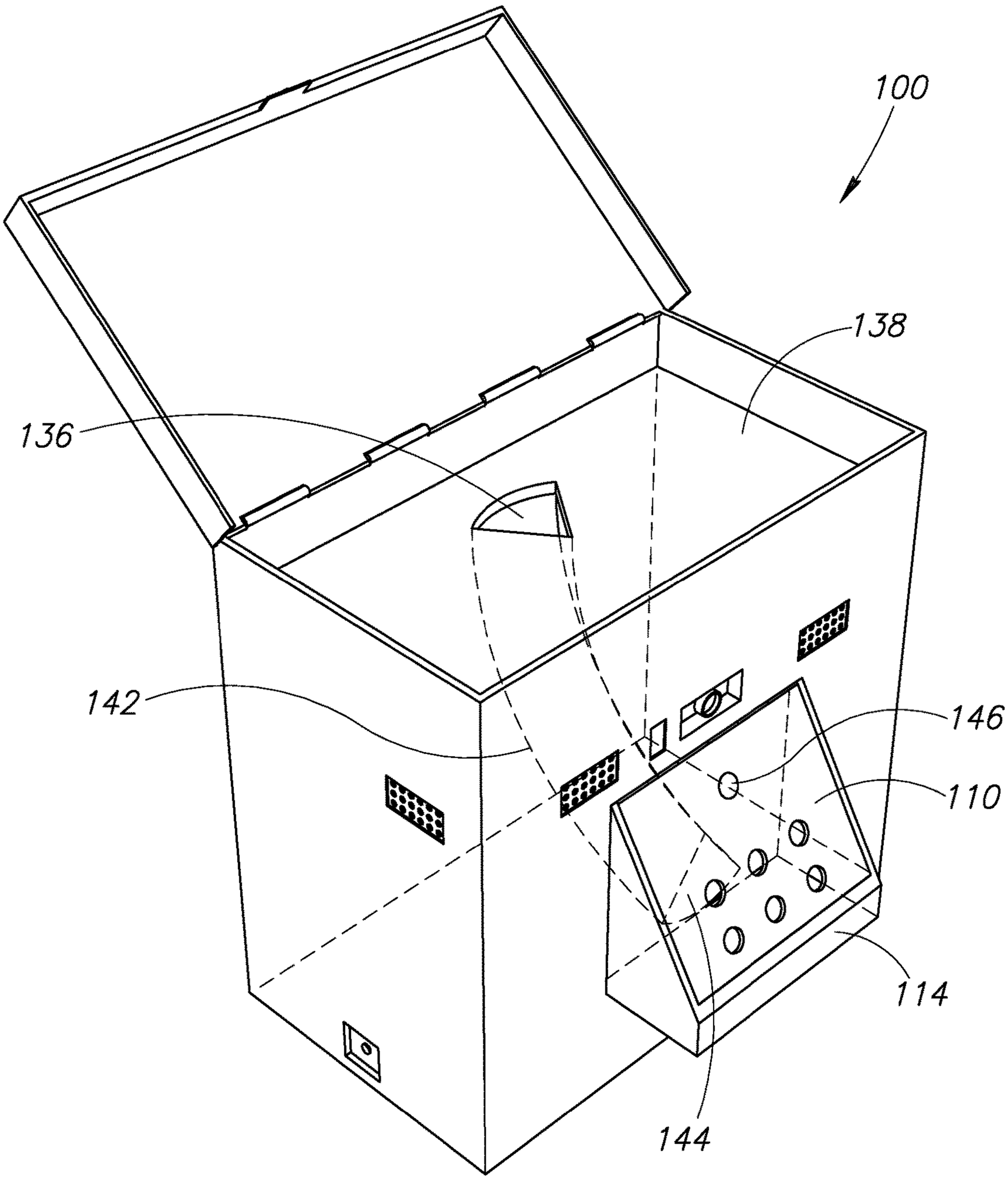

FIG.4

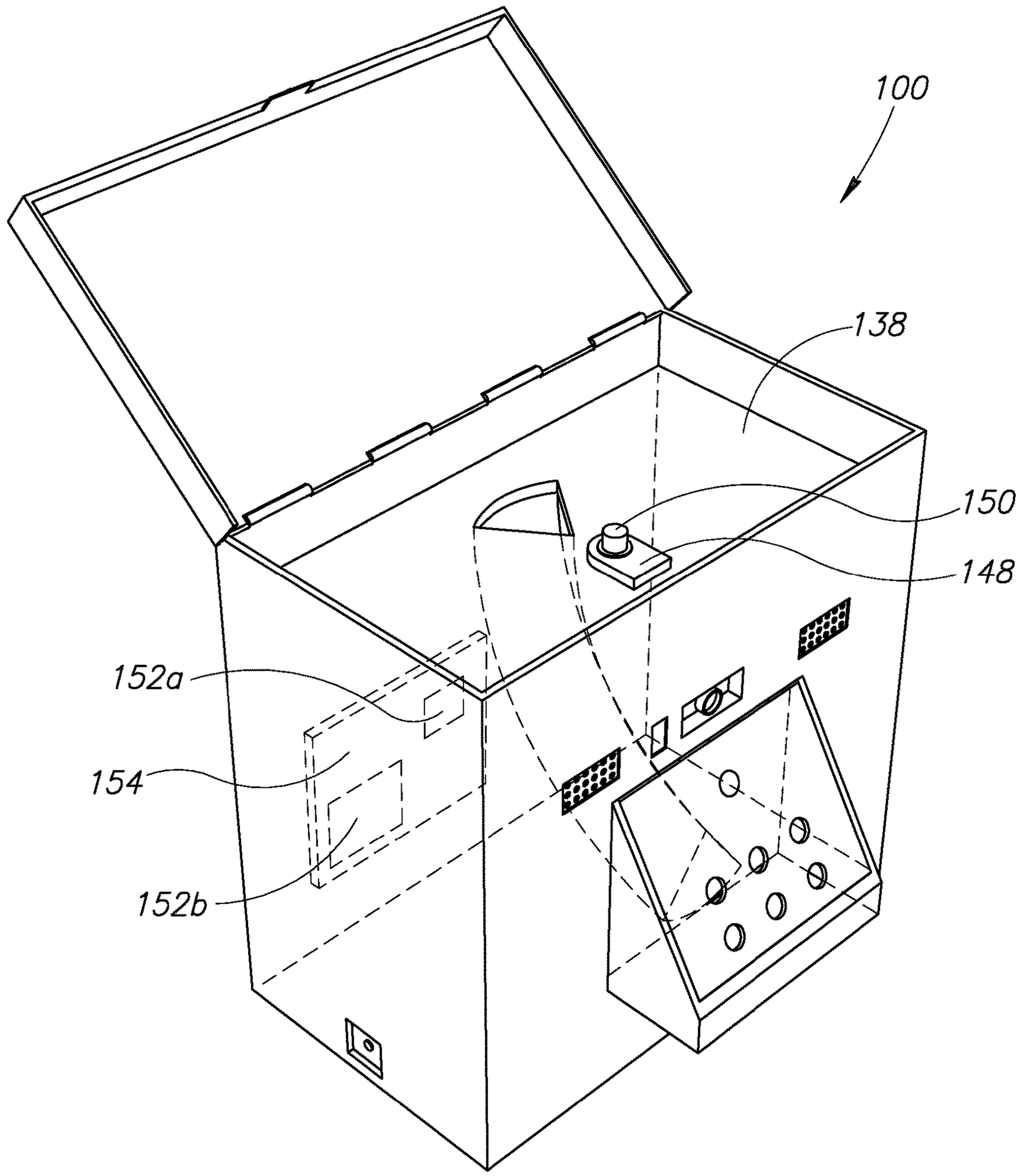

FIG.5

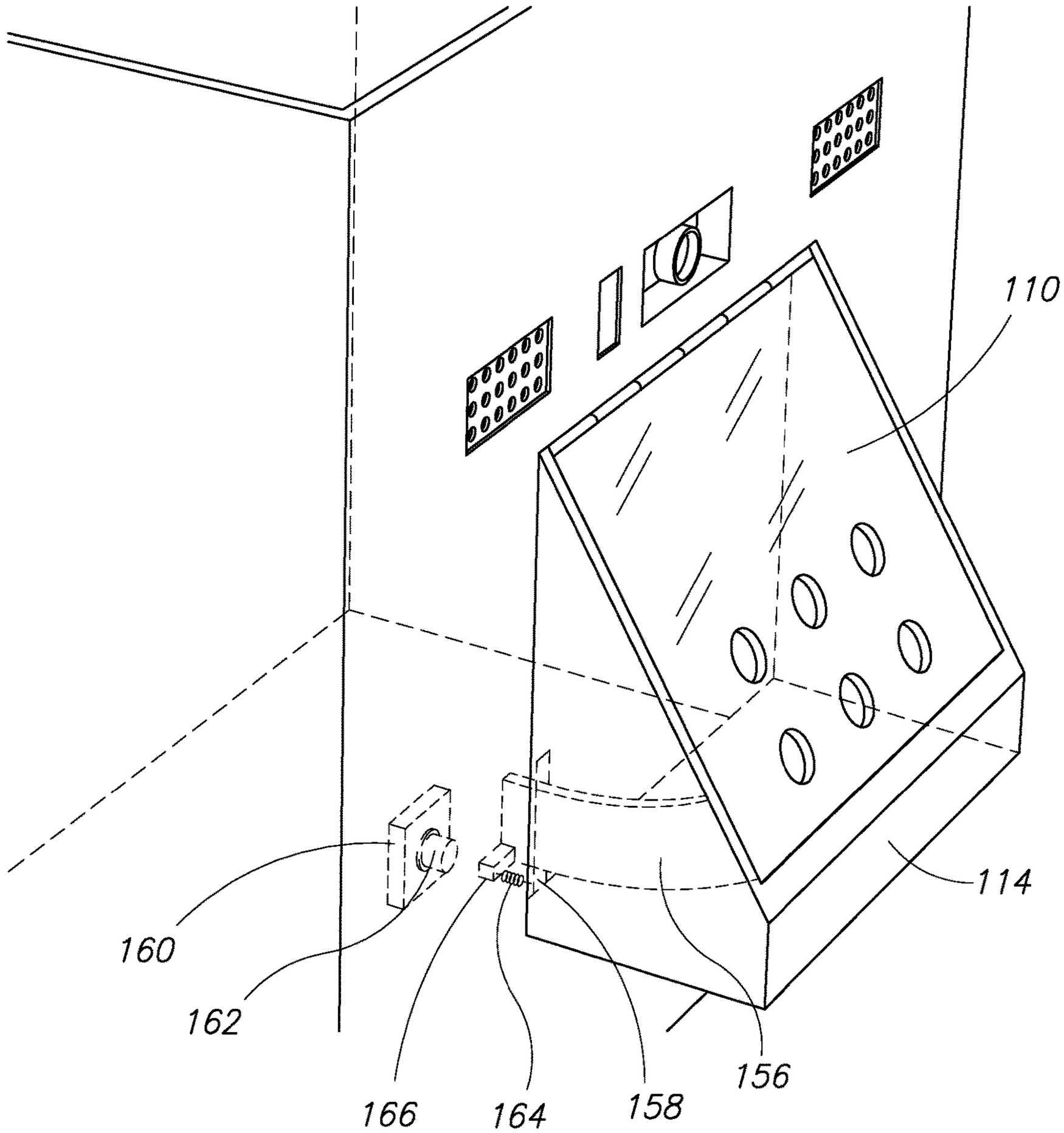

FIG.6

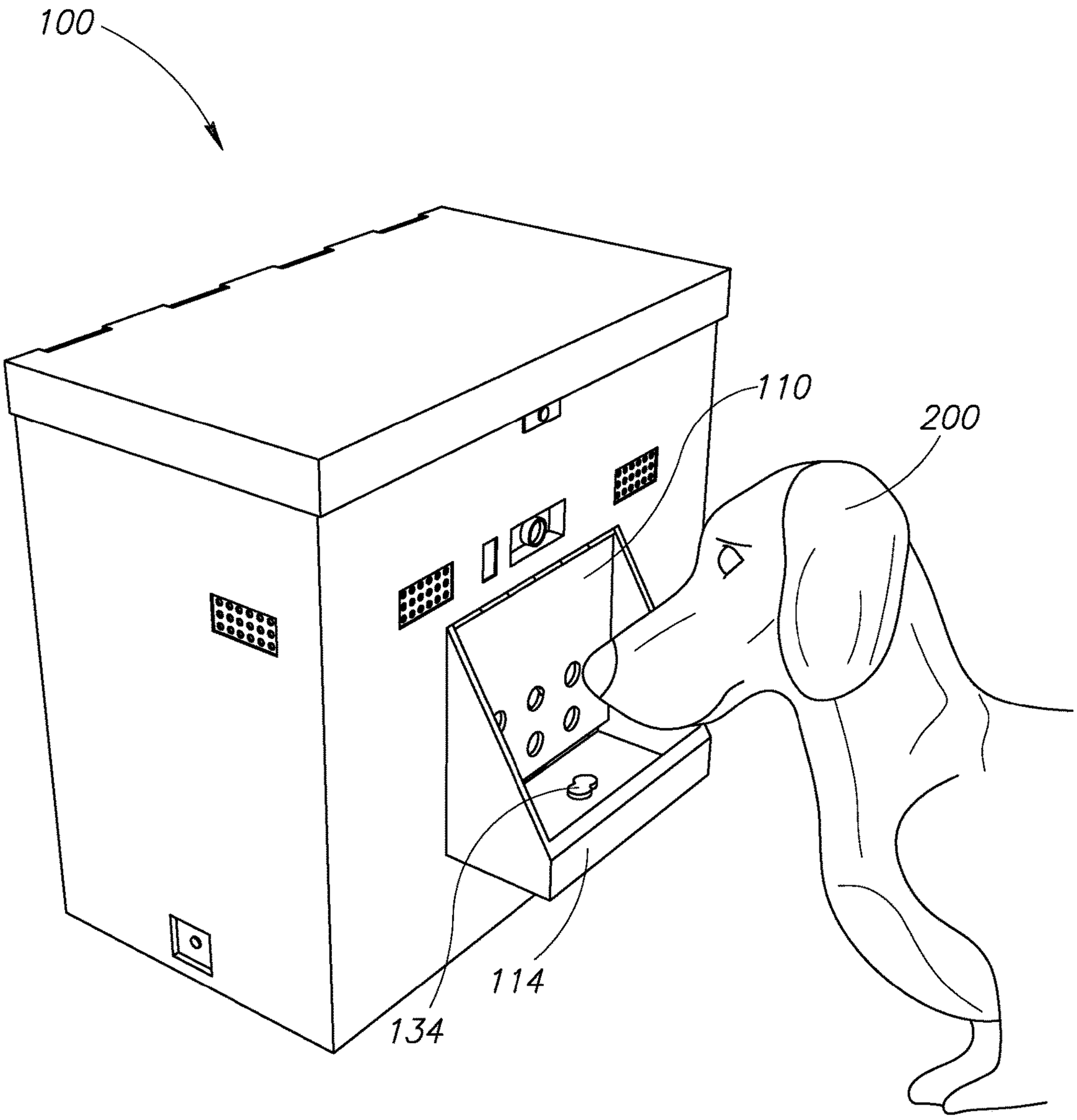

FIG.7

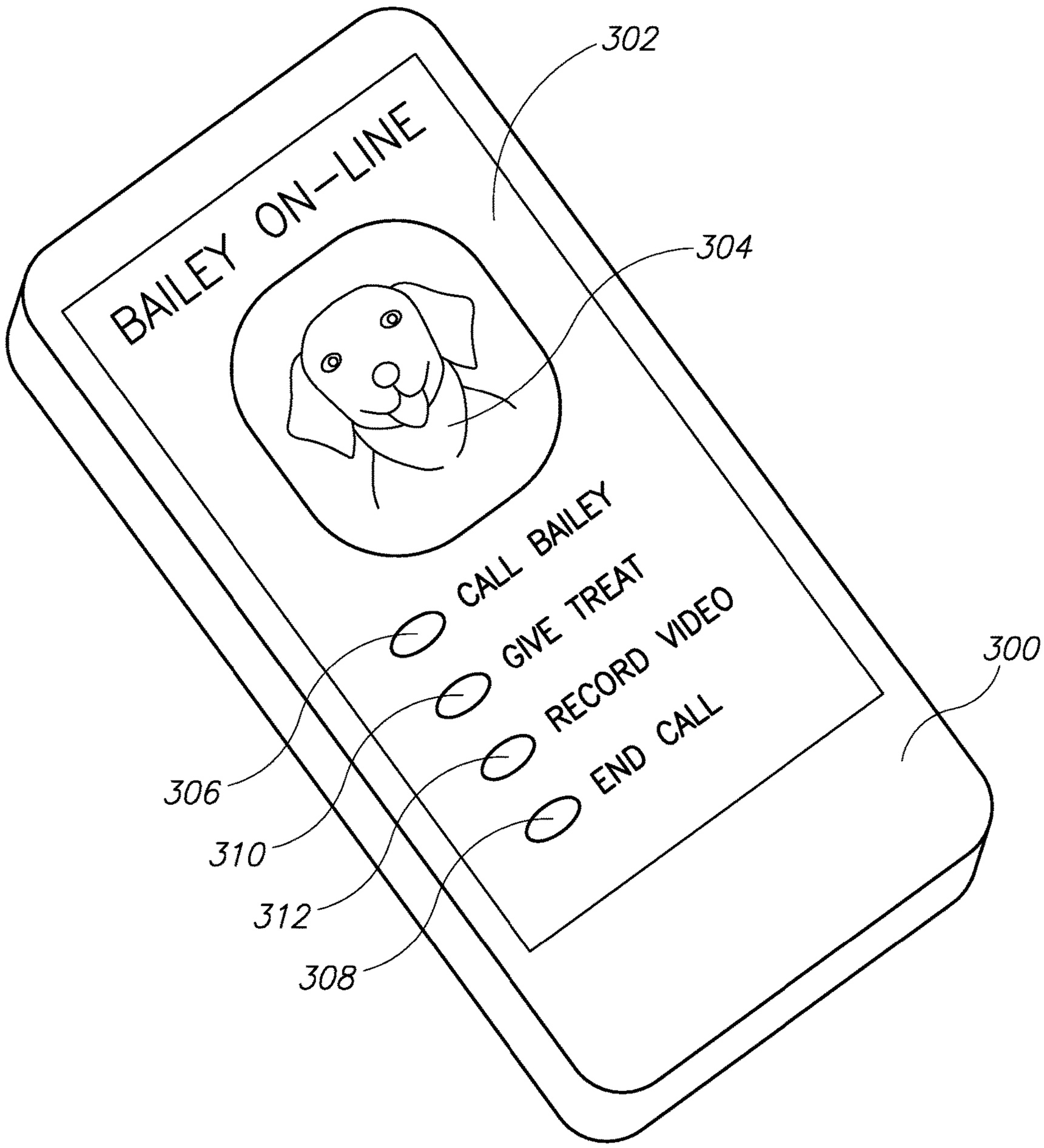
302
BAILEY ON-LINE
304
CALL BAILEY
GIVE TREAT
RECORD VIDEO
END CALL
300
306
310
312
308

FIG.8

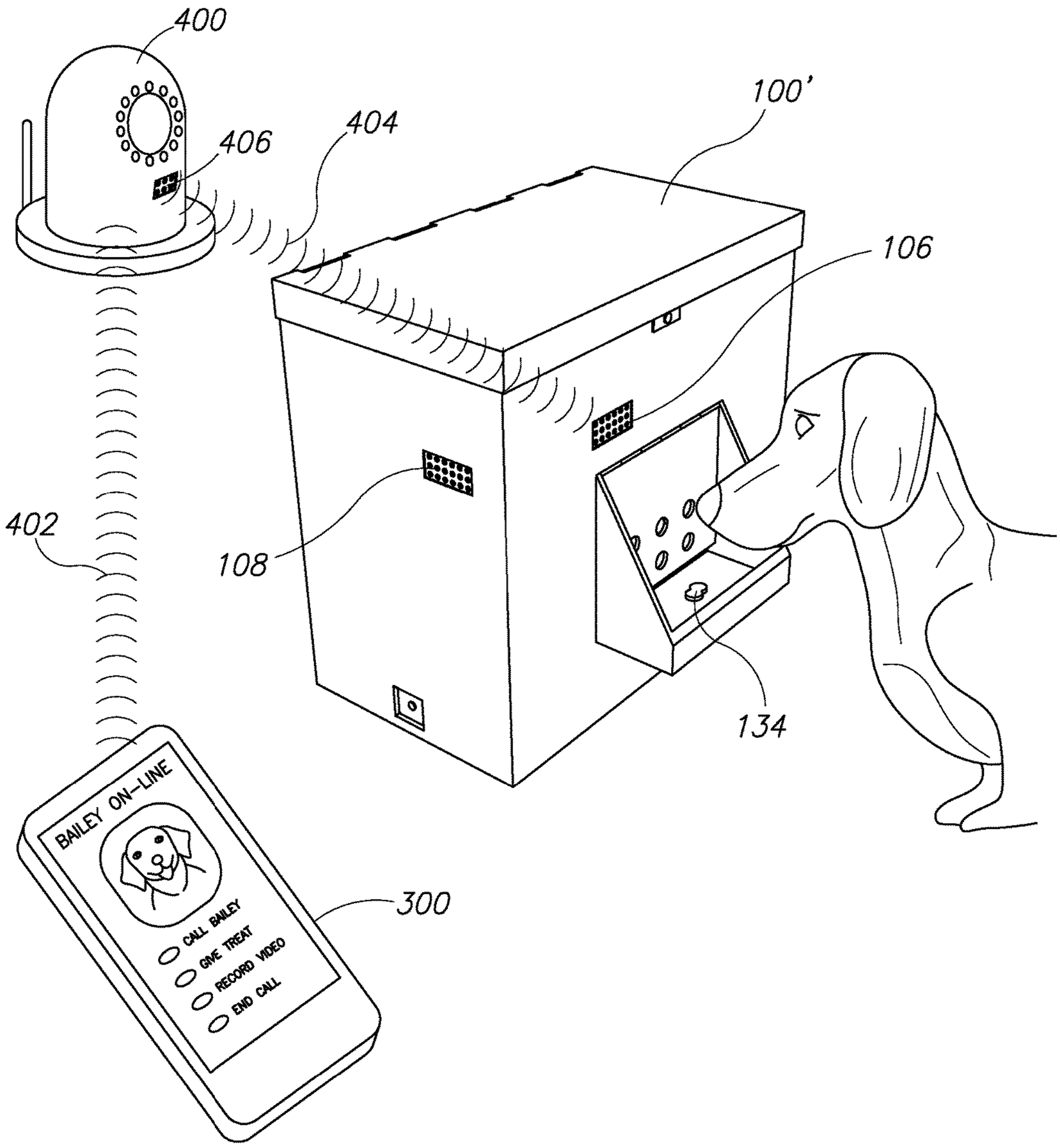
400
406
404
100'
106
402
108
134
BAILEY ON-LINE
CALL BAILEY
GIVE TREAT
RECORD VIDEO
END CALL
300

FIG.9

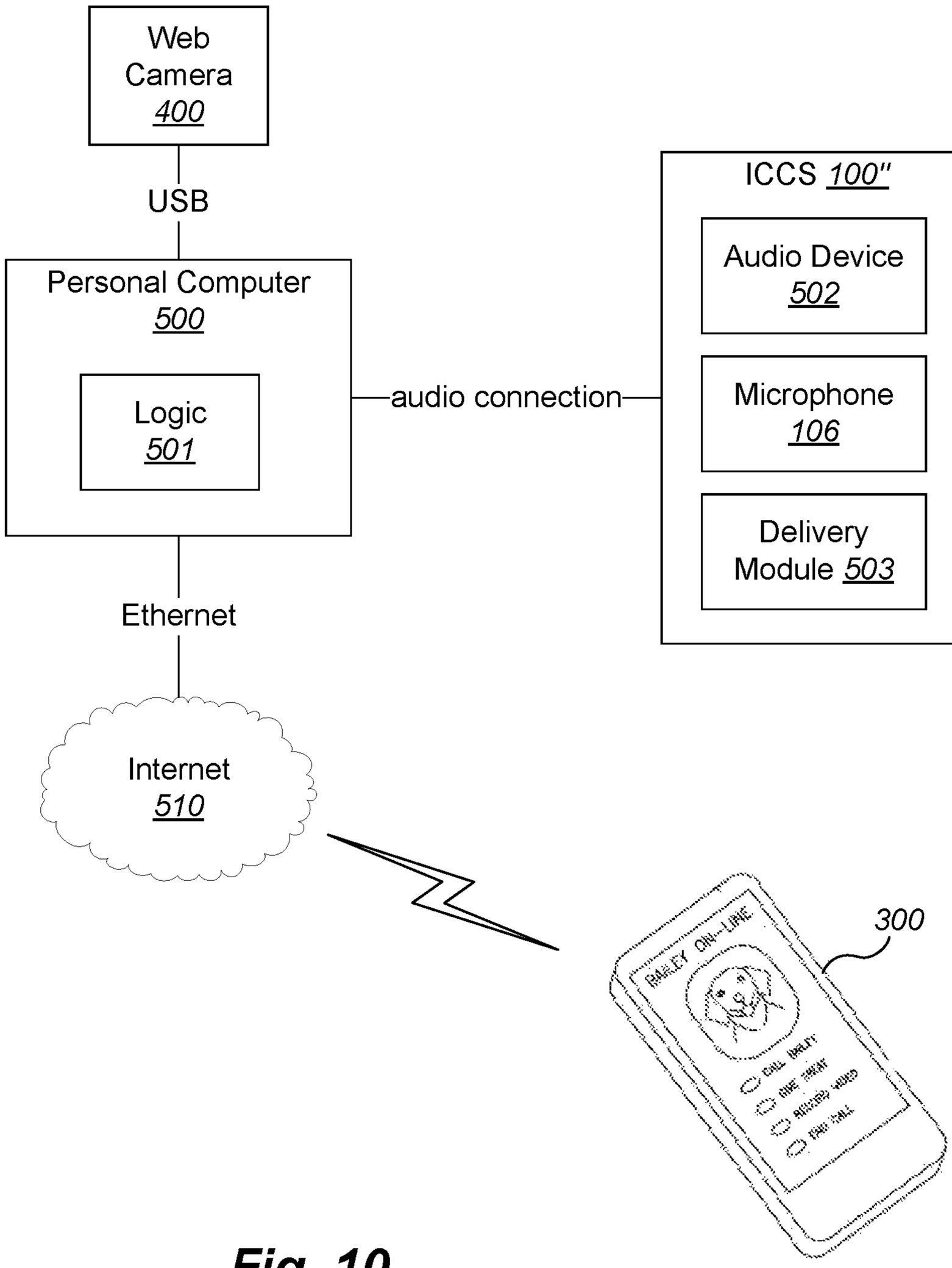
Web Camera 400
USB
Personal Computer 500
Logic 501
audio connection
ICCS 100"
Audio Device 502
Microphone 106
Delivery Module 503
Ethernet
Internet 510
300
BARLEY ON-LINE
CALL BARLEY
GIVE TREAT
REWARD MOUSE
FIND BALL

Fig. 10

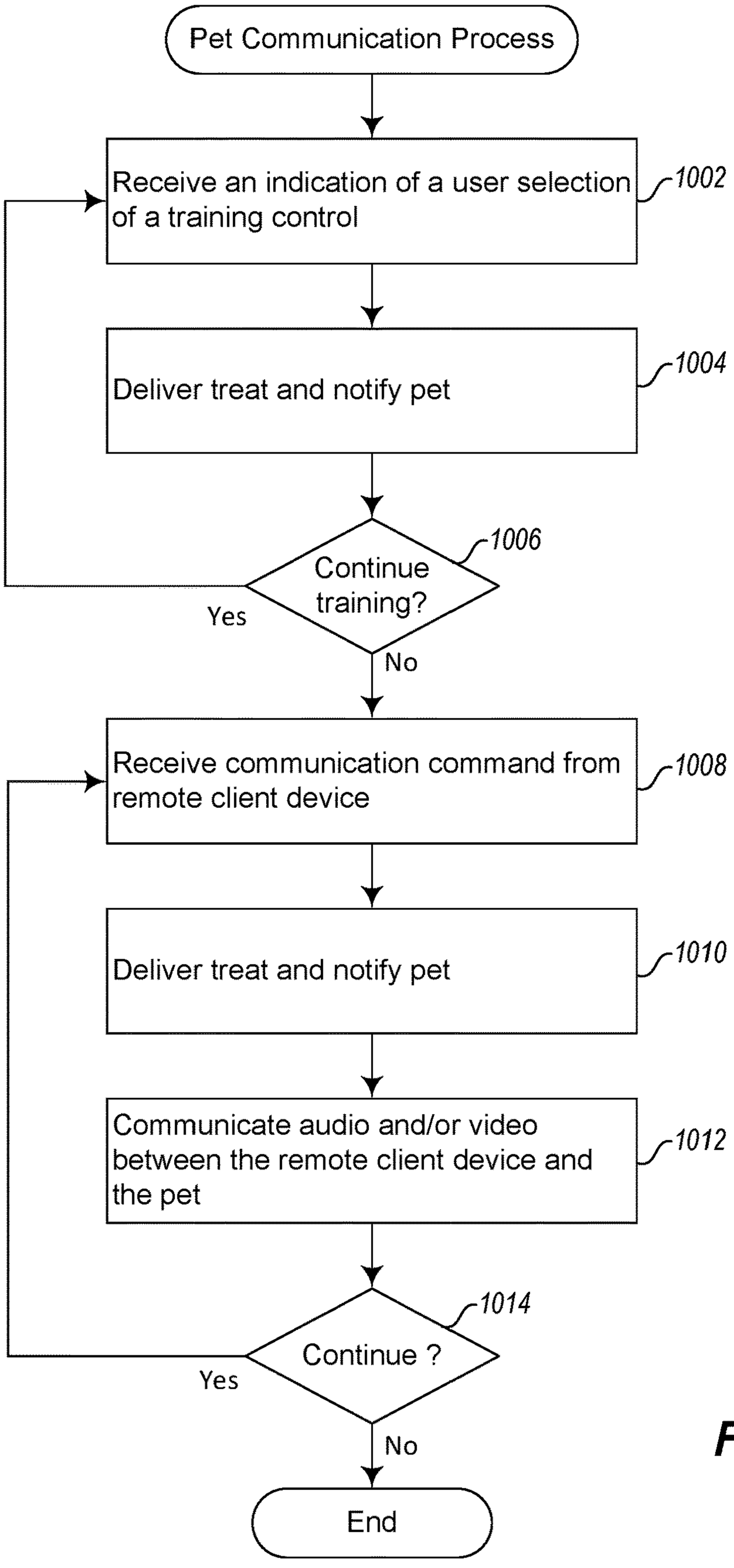
Pet Communication Process
Receive an indication of a user selection of a training control
1002
Deliver treat and notify pet
1004
Continue training?
1006
Yes
No
Receive communication command from remote client device
1008
Deliver treat and notify pet
1010
Communicate audio and/or video between the remote client device and the pet
1012
Continue ?
1014
Yes
No
End

Fig. 11

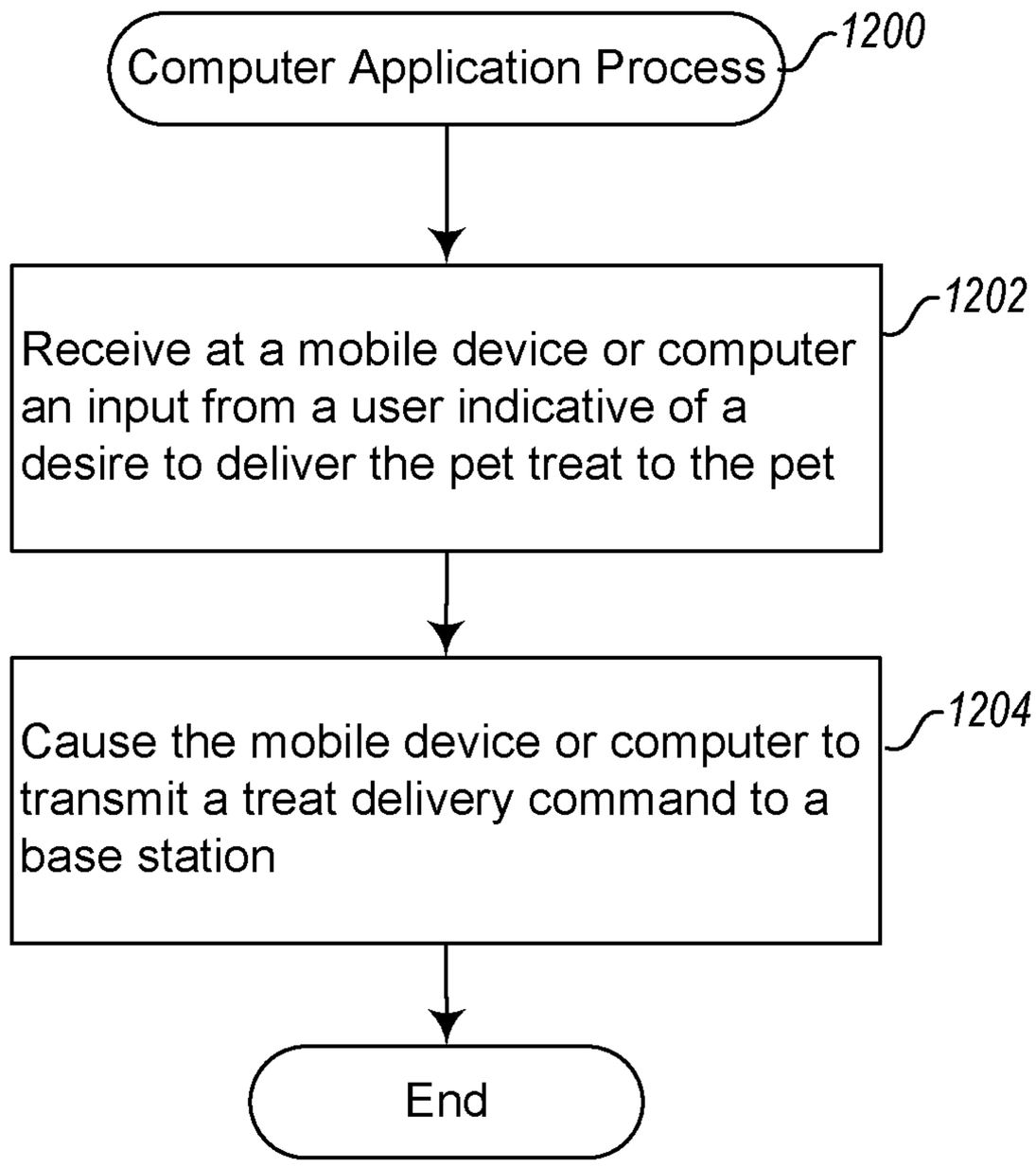
Computer Application Process
1200
Receive at a mobile device or computer an input from a user indicative of a desire to deliver the pet treat to the pet
1202
Cause the mobile device or computer to transmit a treat delivery command to a base station
1204
End

FIG. 12 (NEW)

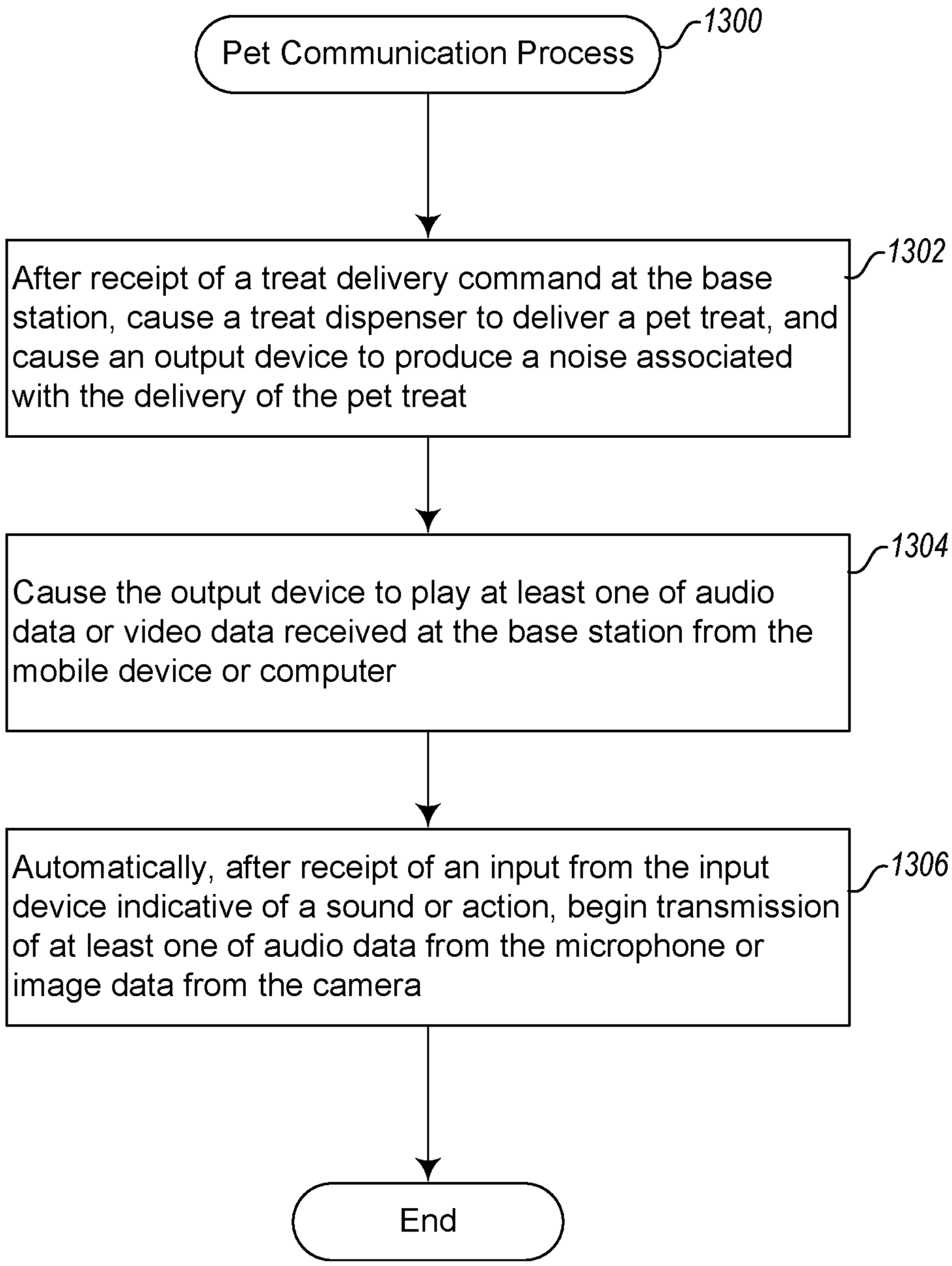
Pet Communication Process
1300
After receipt of a treat delivery command at the base station, cause a treat dispenser to deliver a pet treat, and cause an output device to produce a noise associated with the delivery of the pet treat
1302
Cause the output device to play at least one of audio data or video data received at the base station from the mobile device or computer
1304
Automatically, after receipt of an input from the input device indicative of a sound or action, begin transmission of at least one of audio data from the microphone or image data from the camera
1306
End

FIG. 13 (NEW)

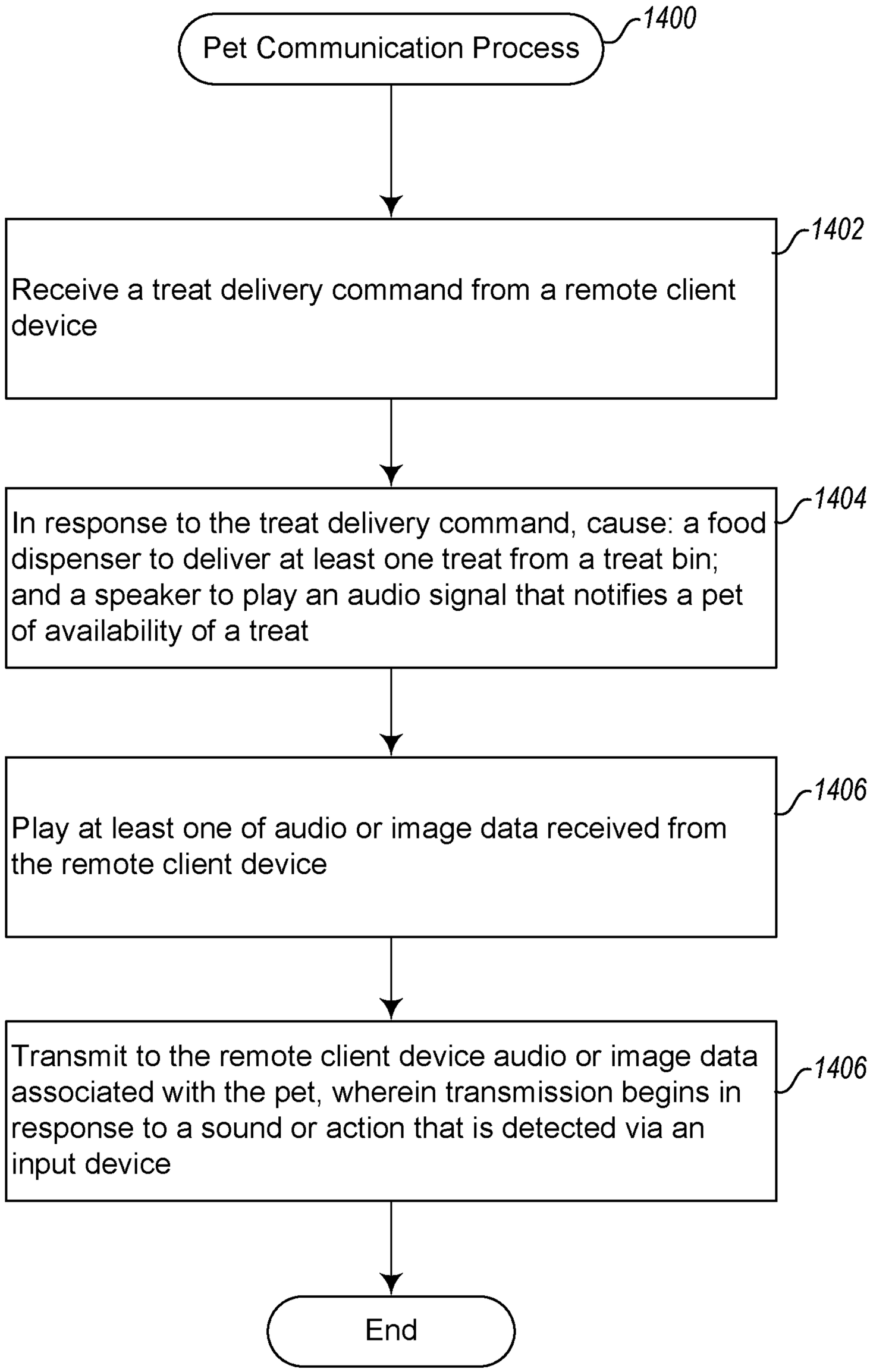
Pet Communication Process
1400
Receive a treat delivery command from a remote client device
1402
In response to the treat delivery command, cause: a food dispenser to deliver at least one treat from a treat bin; and a speaker to play an audio signal that notifies a pet of availability of a treat
1404
Play at least one of audio or image data received from the remote client device
1406
Transmit to the remote client device audio or image data associated with the pet, wherein transmission begins in response to a sound or action that is detected via an input device
1406
End

FIG. 14 (NEW)

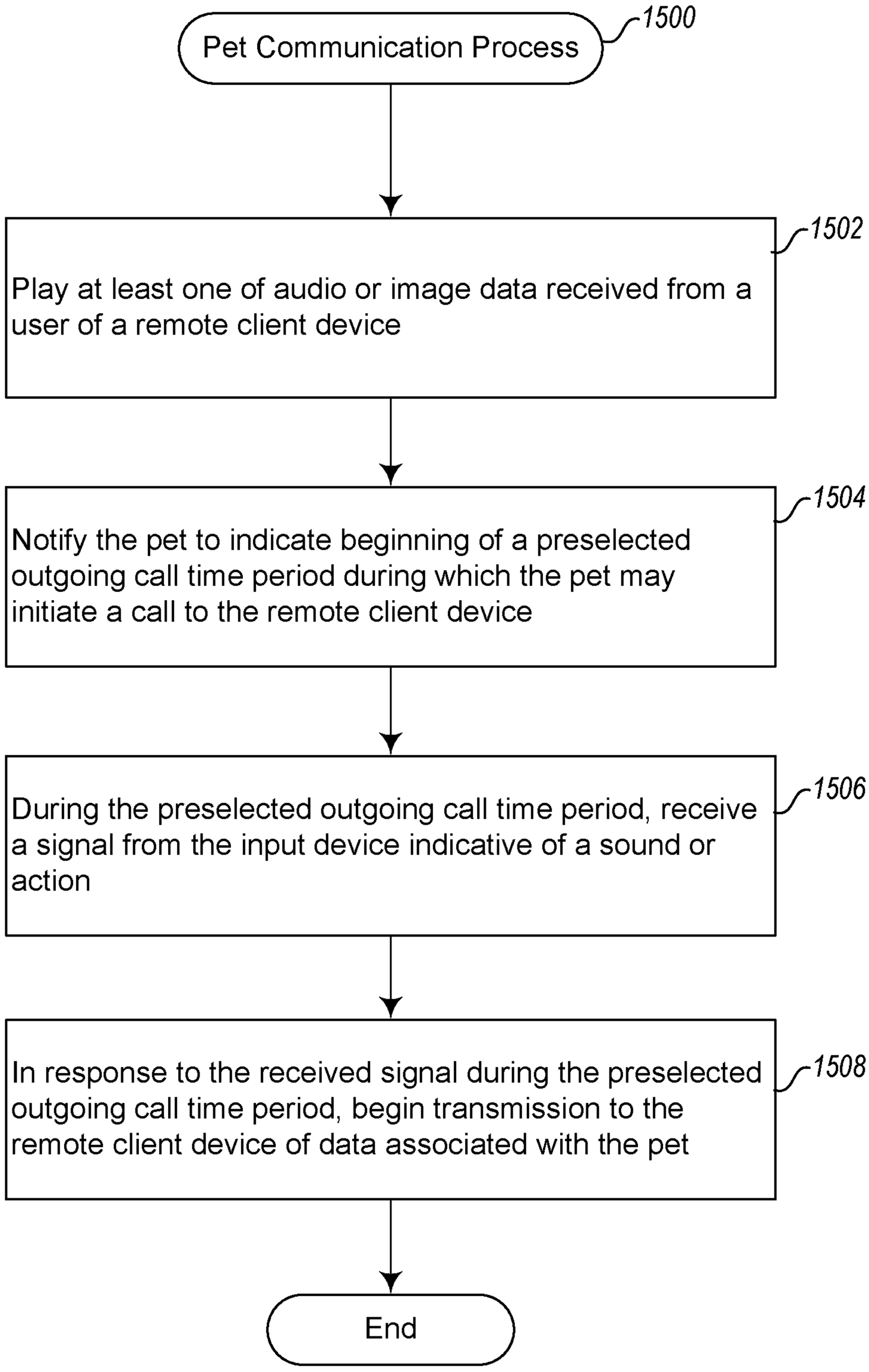
Pet Communication Process
1500
Play at least one of audio or image data received from a user of a remote client device
1502
Notify the pet to indicate beginning of a preselected outgoing call time period during which the pet may initiate a call to the remote client device
1504
During the preselected outgoing call time period, receive a signal from the input device indicative of a sound or action
1506
In response to the received signal during the preselected outgoing call time period, begin transmission to the remote client device of data associated with the pet
1508
End

FIG. 15 (NEW)

INTERNET CANINE COMMUNICATION DEVICE AND METHOD

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue; a claim printed with strikethrough indicates that the claim was canceled, disclaimed, or held invalid by a prior post-patent action or proceeding.

PRIORITY CLAIM

This application is a *reissue divisional of application Ser. No. 16/988,318 filed Aug. 7, 2020 (now RE49,265), which is an application for reissue of U.S. Pat. No. 10,314,288, issued Jun. 11, 2019; which is a* continuation of U.S. patent application Ser. No. 14/988,066 filed Jan. 5, 2016 (*now U.S. Pat. No. 9,723,814*); which is a continuation of U.S. patent application Ser. No. 13/765,546 filed Feb. 12, 2013 (*now U.S. Pat. No. 9,723,813*); which is a continuation of U.S. patent application Ser. No. 13/752,217 filed Jan. 28, 2013 (*now U.S. Pat. No. 9,226,477*); which claims the benefit of priority from U.S. Provisional Patent Application No. 61/689,270 filed Jun. 2, 2012, each of which is incorporated herein by reference in its entirety.

Notice: More than one reissue application has been filed for the reissue of U.S. Pat. No. 10,314,288. The reissue applications are application Ser. Nos. 17/585,532 (the present application) and 16/988,318, now RE49,265, all of which are divisional reissues of U.S. Pat. No. 10,314,288.

FIELD OF THE INVENTION

This invention relates generally to systems, devices, and methods for communicating with a pet.

BACKGROUND

In the past few years, there has been a rapid advance and convergence of communication technologies which exploit the low cost and ubiquitous nature of Wi-Fi and the Internet. Low cost Internet cameras (e.g., Web cameras or "web-cams") are configured to transmit live audio and video feeds over the Internet. Some Internet cameras allow remote control tilting and panning. Video "chat" services, such as Skype and Apple's Face Time, provide video communication with another person who has Internet access. One of the driving forces in the rapid progress and evolution of these communication technologies is our desire to keep in touch with family and friends.

This desire to communicate with family and friends also applies to one of the most important members of a typical family, the pet dog. A simple Internet camera to keep an eye on the family dog when he is home alone suffers from a number of drawbacks. As one example, Internet cameras and their associated computers typically cannot be controlled by typical dogs, as dogs cannot manipulate the requisite input devices, such as keyboards and/or mice. The advance of Internet communication technologies now make possible devices, systems, and methods to better communicate with family dogs.

BRIEF DESCRIPTION OF THE DRAWINGS

Example embodiments of the present invention are described in detail below with reference to the following drawings:

FIG. **1** is an isometric view showing the side, front, and top of an Internet Canine Communication System according to an example embodiment;

FIG. **2** is an isometric view showing the side, rear, and top of the example Internet Canine Communication System;

FIG. **3** is an isometric view illustrating a treat carousel of the example Internet Canine Communication System;

FIG. **4** illustrates a treat slide located in the interior of the example Internet Canine Communication System;

FIG. **5** illustrates a carousel motor located in the interior of the example Internet Canine Communication System;

FIG. **6** illustrates the activation cover of the example Internet Canine Communication System;

FIG. **7** illustrates operation of the example Internet Canine Communication System by a dog;

FIG. **8** illustrates a mobile client device according to example embodiments;

FIG. **9** illustrates interacting via a Web camera with an Internet Canine Communication System according to an example embodiment;

FIG. **10** illustrates an Internet Canine Communication System according to another example embodiment; and

FIG. **11** is a flow diagram that illustrates a process for communicating with a pet according to an example embodiment.

FIG. 12 is a flow diagram of a process performed by a mobile device or computer according to some embodiments.

FIGS. 13-15 are flow diagrams of processes for communicating with a pet according to example embodiments.

DETAILED DESCRIPTION

Embodiments described herein provide enhanced methods and systems for human-pet communication and, more particularly, for remote communication and interaction with between a pet and its owner, caretaker, trainer, family member, or the like. Example embodiments provide an Internet Canine Communication System ("ICCS"). Some embodiments of the ICCS include a device (e.g., base station, home device) that is configured to deliver treats to a dog and to transmit audio/visual communication between the dog and a remote client device operated by a human user.

FIG. **1** is an isometric view showing the side, front, and top of an Internet Canine Communication System **100** according to an example embodiment. In FIG. **1**, the ICCS **100** contains a video camera **102**, a camera positioning lever **104**, a microphone **106**, and a speaker **107**. The ICCS **100** also includes a food tray **114** and an activation cover **110**. In this embodiment, the activation cover **110** is substantially transparent and includes open holes **112**, so that the dog can both see and smell the presence of a treat in the food tray **114**. In other embodiments, the activation cover **110** may be opaque and/or may not include holes **112**. A small bell **108** and a training button **116** are located on the side of the ICCS **100**. The ICCS **100** also includes a hinged top **118** and latch **120** for securing the hinged top **118** in the closed position. The speaker **107** and bell **108** are examples of audio output devices that may be used to communicate with the dog.

In this embodiment, the components of the ICCS **100** are arranged in a housing that is substantially in the shape of a rectangular prism. In other embodiments, other shapes may be used, including cylindrical, pyramidical, or the like. In some embodiments, the ICCS **100** may be built into the wall of a house or other structure (e.g., a cabinet, refrigerator).

FIG. **2** is an isometric view showing the side, rear, and top of the example Internet Canine Communication System **100**. In particular, FIG. **2** shows the back of the ICCS **100**, with

Velcro (e.g., hook and loop fastener) wall fasteners **122**a and **122**b. The ICCS **100** may be permanently or removably attached to a wall or other stable structure in other ways, including brackets, screws, magnets, or the like. Attaching the ICCS **100** to a wall or other stable structure is advantageous because even small dogs may be able to move, tip over, or otherwise disrupt the location, orientation, or operation of the ICCS **100**. Also shown are connections or ports for power **124**, Wi-Fi antenna **126** and Ethernet **128**. Other or additional networking mechanisms may be supported, such as USB, FireWire, infrared, or the like.

FIG. **3** is an isometric view illustrating a treat carousel of the example Internet Canine Communication System **100**. FIG. **3** shows the ICCS **100** with its top **118** open, showing an open-bottom treat carousel **130** resting on a carousel floor layer **138**. The treat carousel **130** contains multiple individual treat compartments, such as compartments **132**a and **132**b, each housing a respective treat **134**a and **134**b. An opening **136** in the carousel floor layer **138** is visible through the open-bottom carousel **130**. In other embodiments, the ICCS **100** may include a treat bin. A treat bin may be any container configured to hold and dispense treats. One example treat bin is a container that includes an activatable door configured to open and release one or more treats stored in the bin, or a rotating vertical wheel with notches/baskets to dispense the treats. The carousel **130** (or one or more of its compartments) may also be considered a treat bin.

FIG. **4** illustrates a treat slide located in the interior of the example Internet Canine Communication System **100**. FIG. **4** shows the carousel floor layer **138** with the carousel **130** removed. A treat passage (e.g., slide or chute) **142** connects the opening **136** in the carousel floor layer **138** with an opening **144** to the food tray **114**. Also visible is a light **146** (e.g., an LED light), positioned so that it illuminates the food tray **114** and activation cover **110**.

FIG. **5** illustrates a carousel motor located in the interior of the example Internet Canine Communication System **100**. FIG. **5** depicts the carousel motor **148** below the carousel floor layer **138**. The carousel motor **148** includes a shaft **150** that protrudes through the floor layer **138**. The shaft **150** is rotated by the carousel motor **148**. The shaft **150** drives the rotation of the carousel **130**. Also shown is a printed circuit board **154** and its microprocessors **152**a and **152**b. The circuit board **154** and its data processing modules may actuate the carousel motor **148** and/or other subsystems of the ICCS **100** in response to signals, commands, or other indications received via various input devices of the ICCS **100**, including the training button **116**, Wi-Fi antenna **126**, Ethernet port **128**, or the like.

FIG. **6** illustrates the activation cover **110** of the example Internet Canine Communication System. Visible in this view is an activator arm **156** that extends from the back of the activation cover **110** through a slot **158** in the back of the food tray **114** area towards an activator switch **160** having an activator button **162**. An activator flange **166** protrudes from end of the activator arm **156**, and is positioned so that it engages the activator button **162** as the activation cover **110** is pushed inward. A spring **164** is attached to the activator flange **166** and the wall of the ICCS **100** so that the activation cover **110** is kept in the forward (closed) position.

FIG. **7** illustrates operation of the example Internet Canine Communication System **100** by a dog. In particular, FIG. **7** shows a dog **200** pushing in the activation cover **110** with his nose (or paw) to get to the treat **134** in the food tray **114**.

FIG. **8** illustrates a mobile client device according to example embodiments. In particular, FIG. **8** shows a mobile device **300** having a screen **302** for a mobile app for the ICCS **100**. Image data such as a video **304** of the dog **200** is shown on the screen **302**. The screen **302** also includes controls (e.g., touch-screen buttons) for interacting with the ICCS, including a call button **306**, a deliver treat button **310**, a record video button **312**, and an end call button **308**. The mobile device **300** may take other forms, such as a cell phone, smart phone, tablet computer, laptop computer, or the like. Other embodiments may provide client software for execution on other types of computers, such as desktop or kiosk-based systems.

To use the ICCS **100**, a family member, pet owner, caretaker, or other user (e.g., trainer) first trains the dog to use the ICCS **100**. The ICCS **100** is initially mounted on a wall or other suitable stable surface (e.g., cabinet, chest of drawers, computer table) using Velcro fasteners **122**a and **122**b, at a height that is appropriate for the size of the dog. The user next places treats **134** in each of the treat compartments **132** of the treat carousel **130**, closes the top **118**, and then secures the top **118** with the latch **120**.

Next, with the dog in the room, the user pushes the training button **116** on the side of the ICCS **100**. Pushing the training button **116** causes a treat delivery command or signal to be transmitted to a treat delivery subsystem or module of the ICCS **100**, including those components that are involved in delivering a treat to the food tray **114**, notifying the dog, and the like. More specifically, pushing the training button **116** activates the bell **108** and flashing light **146**, and also activates the carousel motor **148** to rotate and advance the carousel **130** until the next treat compartment **132** is positioned above the opening **136** in the carousel floor layer **138**. Upon rotation of the carousel **130**, the treat **134** drops through the opening **136**, down the treat slide **142**, and onto the food tray **114**. Transmission of the treat delivery command or signal may be direct (e.g., via hard wiring between the training button **116** and the carousel **130**) or indirect (e.g., intermediated via a microprocessor or other data processing module).

While the bell **108** is ringing and the light **146** is flashing, the dog's attention is easily directed to the food tray **114**, since the dog can see the treat through the activation cover **110**, and can smell the treat through the holes **112**. As shown in FIG. **7**, the dog will soon learn that he can use his nose (or paw) to push open the activation cover **110** to reach the treat **134** in the food tray **114**. As the dog pushes open the activation cover **110**, the activation arm **156** is advanced through the slot **158**, causing the activator flange **166** to contact the activator button **162**, which turns off the bell **108**.

The above training procedure, initiated by pressing the training button **116**, can be repeated as often as necessary until the dog **200** is trained to push open the activation cover **110** every time he hears the bell **108**. The final step in the training process is to push the training button **116** when the dog **200** is not in the room. It may take several repetitions (possibly initially requiring some other command to get the dog to come into the room), but the dog will soon learn to enter the room, approach the ICCS **100**, and push the activation cover **110** to obtain a treat every time he hears the bell **108**.

Before the ICCS **100** can be used to remotely communicate with the dog **200**, it is first configured to interact with a user's mobile device **300**. Some embodiments may include security and/or authentication (e.g., based on passwords, device identifiers, or the like), such that only authorized users can access the ICCS **100**. In addition, the camera positioning lever **104** is used to adjust the camera angle to

accommodate the size of the dog. Before leaving the house, the user also fills the treat compartments **132** and secures the top **118**.

To use the ICCS **100**, as shown in FIG. **8**, the user activates client software (e.g., an "app") on their mobile device **300**, and pushes the "call dog" button **306** visible on the screen **302**. This causes a treat delivery command to be delivered to the treat delivery subsystem or module of the ICCS **100**. In particular, pressing the call dog button **306** remotely activates the bell **108**, light **146**, and carousel motor **148**. The carousel tray **130** rotates, sending a treat **134** onto the food tray **114**. The dog **200** hears the bell **108**, approaches the ICCS **100**, and pushes the activation cover **110** to obtain his treat. Pushing the activation cover **110** engages the activation button **162**, which in turn turns off the bell **108**, and at the same time activates the camera **102** and microphone **106**, thus allowing the dog to "answer" the phone (or "accept" the call). In another embodiment, the camera **102** and microphone **106** may be activated directly from the "call dog" button, rather than from the dog pushing the activation button **162**. Image data (e.g., video or still images) obtained by the camera **102** is presented in the video window **304** of the mobile device screen **302**.

Note that other embodiments may have different mechanisms or employ different techniques for delivering treats and determining when to turn off the bell **108**. Some embodiments may, for example, eject a treat onto the floor or into a tray of the ICCS **100**, and then determine to turn off the bell **108** (or other audio device of the ICCS) in response to an input received from the dog. An input may include pushing an activation cover **110** (as above), but may also or instead include a response lever or panel configured to make it easy for the dog to push with nose or paw, detecting motion (e.g., via a motion detector of the ICCS), detecting a sound (e.g., a bark detected via a microphone of the ICCS), detecting heat (e.g., via an infrared sensor), or the like. Some embodiments thus may not include one or more of the components related to determining when the treat has been taken, such as the activation cover **110**, and the like.

Once the dog has accepted the call, the user can further interact with the dog. The user can speak to the dog through the speaker **107**, and give additional rewards by pressing the "give treat" button **310** on the mobile app. Pushing the "give treat" button **310** activates the rotation of the carousel and rings the bell, in a similar fashion to the "call dog" button **306**, allowing the dog to receive additional treats during the call. Finally, at the end of the interaction with the dog **200**, the user presses the "end call" button **308** on the mobile app. This turns off the camera **102**, microphone **106**, and light **146**, thereby resetting the ICCS **100** for the next call. The "record video" button **312** allows the family member to record entertaining or memorable video received during a call.

Other embodiments of the ICCS may include the option to allow the ICCS to be used as a simple remote camera, along with remote panning and zooming. Other embodiments of the ICCS may include multiple treat chutes and/or trays, so that the dog is not sure which platter, tray, or position the treat will go to. Having multiple treat trays achieves entertaining movements of the dog's head and eyes visible on the video during the call. In addition, a toy such as a spinning dial or moving object, activated by the mobile device client app and positioned near the camera on the ICCS, makes the dog's excitement visible on the video, as well as helps direct the dog's attention to the camera. Interesting toys or puzzle accessories may be attached to the ICCS, or linked remotely to the ICCS, in order to present to additional challenges or games for the dog to get to a treat while being viewed on the app. In addition, recorded videos may be shared on line with other family members and others in an online ICCS community.

Note that while operation of the ICCS is herein primarily described with respect to a pet dog, other embodiments may be configured to operate with other types of pets or animals (e.g., in a zoo or scientific study). For example, one embodiment may provide an Internet Feline Communication System that dispenses food treats, cat toys, and/or catnip to cause the cat to interact with the system. The Internet Feline Communication System may also or instead present audio/video of birds or other animals to attract a pet cat's attention.

FIG. **9** illustrates interacting via a Web camera with an Internet Canine Communication System according to an example embodiment. This embodiment provides an ICCS **100'** that is similar to the ICCS **100** described above, except that it does not include at least some of the audio and/or video capabilities in the base station (e.g. the housing that performs treat delivery). More specifically, the ICCS **100'** is located proximate to Web camera ("webcam") **400** already installed at a residence or other location. The webcam **400** includes a speaker **406**. To use the ICCS **100'**, a mobile app on the user's mobile device **300** transmits (e.g., via an Internet connection) a specific encoded audio signal **402** to the webcam **400**. The signal **402** is received by the webcam **400** and is then played via the speaker **406** as audio signal **404**. The microphone **106** on the ICCS **100'** then receives and processes the audio signal **404**, activating the ICCS **100'** to ring the bell **108** and deliver a treat **134**. The webcam **400** performs the video and audio transmission functions performed by the camera **102** and speaker **107** of the ICCS **100** described above.

In the embodiment of FIG. **9**, the ICCS **100'** does not have a network connection to the webcam **400**. Instead, the ICCS **100'** receives commands or signals from the webcam **400** that are transmitted as sound waves by the speaker **406** of the webcam **400**. The ICCS **100'** is configured to function with any networked (e.g., Internet, intranet, cellular) video camera that includes an audio output facility as long as the transmitted audio signal **404** is strong or loud enough for the ICCS **100'** to detect it. In addition, being able to position the ICCS **100'** some distance away from the webcam **400** gives greater flexibility in generating more interesting and dynamic videos of the dog as he interacts with the ICCS **100'**.

Another embodiment of the ICCS may bypass some or all of the electronics and programming associated with providing audio/video communication by using conventional video conferencing software (e.g., Skype) and/or devices, such as the webcam **400** described above. For example, a desktop computer installed in the same room as the ICCS may include an attached webcam and speakers and have installed video conferencing software that is configured to transmit video and/or audio between the room and a remote client device. In other embodiments, the ICCS may itself include a computer processor that is configured to run a stock or customized video conferencing client. Such approaches potentially lower the cost of producing an ICCS by reducing or eliminating some of the data processing functions and/or software requirements included in the treat delivery housing.

FIG. **10** illustrates an Internet Canine Communication System according to another example embodiment. In particular, FIG. **10** depicts an ICCS **100"** that is a variation of the ICCS **100** and **100'** described above. The ICCS **100"** includes an audio device **502**, such as bell, speaker, or other audio output device. The ICCS **100"** also includes a micro-

phone **106** and a treat delivery module **503**. The treat delivery module **503** includes a mechanism (e.g., including one or more of a carousel, slide, bin, actuator, motor) for delivering treats in response to a received command or signal.

Also shown is a personal computer **500** (e.g., a laptop or desktop computer) that is communicatively coupled via a USB or similar connection to a webcam **400**. In other embodiments, the personal computer **500** and the webcam **400** are in wireless communication. The personal computer **500** is also communicatively coupled to a mobile device **300** via the Internet **510** or other communication network.

The personal computer **501** includes logic **501** that is configured to communicate with the mobile device **300**, the webcam **400**, and the ICCS **100"**. In particular, the logic **501** is configured to receive inputs from the mobile device **300** and to forward them (or signals based thereon) to the ICCS **100"**. The logic **501** is also configured to receive video/audio data from the webcam **400** and forward it to the mobile device **300**.

In one embodiment, the logic **501** may be video conferencing software (e.g., Skype) that is configured to ring or play some other tone or sound in response to an incoming call from a video conferencing app executing on the mobile device **300**, or able to receive voice or sound commands from the mobile device **300**. The logic **501** plays the ring or other sound via the audio connection to the ICCS **100"**. For example, if the audio connection is a cable to the ICCS **100"**, the sound may be played via the audio device **502** and then detected by the microphone **106**. In another configuration, the logic **501** plays the sound via a speaker of the personal computer **500**, such that the sound can be detected by the microphone **106** of the ICCS **100"**. In general, after the logic **501** automatically answers an incoming call, the ICCS **100"** may be activated in one or more of the following ways: a sound initiated by the logic **501** and played by the audio device **502**; a sound initiated by the mobile device **300** (e.g., in response to a button pressed by a user), received by the logic **501**, and then played by the audio device **502**; a spoken command uttered by the user of the mobile device **300**, transmitted to the logic **501**, and then played by the audio device **502**. Any of these sounds (or other ones generated in other ways) can then be detected by the microphone **106**, causing activation of the ICCS **100"** as described further below. In some embodiments, the ICCS **100"** includes logic (e.g., software, hardware, and/or firmware) to recognize spoken commands received via the microphone **106**. The recognition logic may be a speech recognizer that is configured to recognize specific words, phrases, speakers (e.g., to differentiate between different users based on features of their voices), and the like.

In response to the sound detected by the microphone **106**, the ICCS **100"** causes the delivery module **503** to dispense a treat and/or causes the audio device **502** to play a sound (e.g., a whistle or bell) that calls the dog. Concurrently, the logic **501** automatically answers the incoming call, and begins to transmit audio/video captured by the Web camera **400** to the mobile device **300**. The logic **501** may also receive audio/video from the mobile device **300**, and play it via a display or speaker of the personal computer **500** or the audio device **502** of the ICCS **100"**.

During the communication session, the user of the mobile device **300** may transmit other commands to the ICCS **100**." For example, the user may press keys or other input controls that generate sounds or issue a voice command word, that are configured, when played by the personal computer **500**, to cause the ICCS **100"** to perform certain functions, such as delivering a treat, making a sound, shaking a toy, or the like.

As noted, the logic **501** and the corresponding client software on the mobile device **300** may be standard video conferencing software. In other embodiments, the logic **501** and client on the mobile device client **300** may be custom software. For example, the logic **501** may be configured to respond to dial tones (e.g., DTMF tones) generated by the mobile device and to forward those tones (or signals/commands based thereon) to the ICCS **100"**. Other hardware arrangements are also contemplated. For example, the webcam **400** may be incorporated into the personal computer **500**, such as is often the case with laptops or tablet computers.

Another embodiment of the ICCS provides an outgoing call feature. More specifically, the ICCS may provide and implement a protocol for allowing the dog or other pet to call or videoconference with family members or other persons. A sound and/or visual cue is programmed in the ICCS to activate at a certain time or time interval. This sound can be distinct from the sound indicating an incoming call. For example, a softer sound or visual cue can catch the dog's attention when the dog wanders into the room, rather than a louder sound indicating an incoming call that needs to be heard throughout the house and answered immediately. During the "outgoing call period" the dog is trained to push the treat door (or another door or button), and receive a treat. Alternatively, the treat can be dispensed when the outgoing call period begins. Operation of the treat door by the dog activates ICCS to initiate an outgoing call to a designated user (or users). Once the outgoing call is accepted by the user, the user can interact and give treats as described with respect to incoming calls, above. It should be noted that the dog gets a treat for initiating the call during the outgoing call period, even if the call is not answered by the user. If the dog activates the treat door at other periods, no treat is given. In some embodiments, once the dog initiates an outgoing call during the outgoing call period, the period is ended; this way, the dog cannot repeatedly make a call in order to obtain more treats.

Embodiments of the ICCS may also provide various training-related techniques. For example, a disembodied voice coming from the ICCS may be confusing to the dog, since it sounds quite different to the dog than a "live voice", and since it is disassociated from the smell and sight of the person speaking. For this reason, the dog may need to re-learn his established repertoire of tricks in response to a new set of speaker commands. One process for training tricks with the ICCS involves having the dog hear both the sound of a person's live voice and the sound of the person's voice thru the speaker of the ICCS. This process may be effectuated by having the user give commands via a mobile client device while in the room with the dog and the ICCS. Thus, the dog will hear both the user's voice live and via the speaker of the ICCS at the same time. Over time, the user can move further and further away from the ICCS while uttering a command, causing the commands played via the ICCS speaker to become more dominant. Alternatively, the user can cause (e.g., via the mobile client device) the commands played via the ICCS speaker to become louder (e.g., at increased volume), such as by pressing an appropriate input on the mobile client device, thereby causing the commands played via the ICCS speaker to become more dominant.

In another training process, the ICCS includes an audio recording function, which can be used to record commands for training purposes. The user can use a mobile client

device (or controls on the ICCS) to play recorded commands via the ICCS speaker. The user can further reinforce such commands with a live voice to the extent necessary to train the dog to do tricks in response to commands played by the ICCS speaker.

In some embodiments, the treat carousel of the ICCS is configured to facilitate selection of a specific treat for the pet. For example, the user of a mobile client device may specify a particular treat compartment or treat type by way of a remote command. In response to receiving the command, the ICCS rotates the treat carousel to the selected compartment and delivers a treat therefrom. In this manner, the ICCS may facilitate the delivery of different types of treats to the pet.

FIG. **11** is a flow diagram that illustrates a process for communicating with a pet according to an example embodiment. The illustrated process may be performed by embodiments of the ICCS, described above.

In blocks **1002-1006**, the process operates in a training mode, during which the pet is trained to interact with the ICCS. More specifically, the process begins at block **1002**, where it receives an indication of a user selection of a training control. As discussed above, the ICCS may include a training control such as a button or switch, or circuitry/logic to receive voice command words from the trainer in the room, or from the mobile device. The training control may also or instead be situated on a remote client device operated by a user, and thus transmitted from the client device to the ICCS base station.

At block **1004**, the process delivers a treat and notifies the pet. In response to receiving the indication of the selection of the training control, the process may transmit a delivery command to a delivery module in the ICCS base station or housing. The treat delivery module may include logic and/or mechanical elements (e.g., treat carousel, carousel motor, treat slide) configured to deliver a treat to a food tray, initiate a sound (e.g., play an audio signal, ring a bell, cause a local or remote audio device to output a sound) to notify the pet of the presence of a treat in the food tray, and stop playing the audio signal when the pet accesses the food tray to obtain the treat.

At block **1006**, the process determines whether to continue training. If so, the process returns to block **1002** to await another selection of the training control; otherwise the process continues with block **1008**.

In blocks **1008-1014**, the process operates in a communication mode, in which it facilitates communication between the pet and a user operating a remote client device. More specifically, at block **1008**, the process receives a communication command from a remote client device. The communication command may be a network packet, request, or other signal received via a networking interface of the ICCS. In other embodiments, the communication command may be a sound (e.g., audio signal) received from a speaker of a nearby webcam or other videoconferencing apparatus (e.g., a PC with attached speakers and camera; a laptop with integral speakers and camera).

At block **1010**, the process delivers a treat and notifies the pet. Delivering the treat and notifying the pet may include transmitting the delivery command, as discussed above with respect to block **1004**.

At block **1012**, the process communicates audio and/or video between the remote client device and the pet. Communicating the audio and/or video may include transmitting audio and/or video of the pet to the remote client device in addition to receiving and presenting audio and/or video of the user received from the remote client device. The communication may be performed by communication modules that are integral to the ICCS housing (e.g., as shown in FIG. **1**) and/or by communication modules that are separate from the treat delivery portion of the ICCS (e.g., as shown in FIG. **9** or **10**).

At block **1014**, the process determines whether to continue. If so, the process returns to block **1008** to await receipt of another communication command. If not, the process ends. For example, if an end call signal or command is received from the client device, the process may return to block **1008** to await the next call. Alternatively, the process may receive a shutdown signal or command, in which case the process ends.

FIG. 12 is a flow diagram of a process 1200 performed by a mobile device or computer according to some embodiments. The process 1200 begins at block 1202, where it receives at a mobile device or computer an input from a user indicative of a desire to deliver the pet treat to the pet. At block 1204, the process causes the mobile device or computer to transmit a treat delivery command to a base station.

FIG. 13 is a flow diagram of a process 1300 for communicating with a pet according to one embodiment. The process 1300 begins at block 1302, where, after receipt of a treat delivery command at the base station, the process causes a treat dispenser to deliver a pet treat and causes an output device to produce a noise associated with the delivery of the pet treat. At block 1304, the process causes the output device to play at least one of audio data or video data received at the base station from the mobile device or computer. At block 1306, the process automatically, after receipt of an input from the input device indicative of a sound or action, begins transmission of at least one of audio data from the microphone or image data from the camera.

FIG. 14 is a flow diagram of a process 1600 for communicating with a pet according to another embodiment. The process 1400 begins at block 1402, where it receives a treat delivery command from a remote client device. At block 1404, in response to the treat delivery command, the process causes a food dispenser to deliver at least one treat from a treat bin and causes a speaker to play an audio signal that notifies a pet of availability of a treat. At block 1406, the process plays at least one of audio or image data received from the remote client device. At block 1408, the process transmits to the remote client device audio or image data associated with the pet, wherein transmission begins in response to a sound or action that is detected via an input device.

FIG. 15 is a flow diagram of a process 1500 for communicating with a pet according to a further embodiment. The process 1500 begins at block 1502, where it plays at least one of audio or image data received from a user of a remote client device. At block 1504, the process notifies the pet to indicate beginning of a preselected outgoing call time period during which the pet may initiate a call to the remote client device. At block 1506, the process, during the preselected outgoing call time period, receives a signal from the input device indicative of a sound or action. At block 1508, the process, in response to the received signal during the preselected outgoing call time period, begins transmission to the remote client device of data associated with the pet.

The process of FIG. **11** and the other processes or functions described herein may be performed at least in part by conventional computer hardware and software arrangements. For example, the described processes may be performed by the microprocessors **152**a and/or **152**b. Microprocessors **152** may each include a memory, central processing unit ("CPU"), input/output devices or ports, and

the like. Memory may be or include any computer-readable media, including as volatile or non-volatile memory, such as RAM, ROM, Flash memory, magnetic storage, optical storage, and the like. Some embodiments may store in memory instructions or other contents that are configured, when executed by a CPU or other processing unit, to perform one or more of the described processes. Some embodiments may implement one or more of the described processes by way of fixed or configurable hardware arrangements including as application specific integrated circuits, field-programmable gate arrays, programmable logic arrays, or the like.

It should be apparent to those skilled in the art that many more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the spirit of the appended claims. Moreover, in interpreting both the specification and the claims, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "includes," "including," "comprises," and "comprising" should be interpreted as referring to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced. Where the written description and/or claims refer to at least one of something selected from the group consisting of A, B, C and N, the text should be interpreted as requiring at least one element from the group (A, B, C N), rather than A plus N, or B plus N, etc.

U.S. patent application Ser. No. 14/988,066, filed Jan. 5, 2016 and entitled "INTERNET CANINE COMMUNICATION DEVICE AND METHOD;" U.S. patent application Ser. No. 13/765,546, filed Feb. 12, 2013 and entitled "INTERNET CANINE COMMUNICATION DEVICE AND METHOD;" U.S. patent application Ser. No. 13/752,217, filed Jan. 28, 2013 and entitled "INTERNET CANINE COMMUNICATION DEVICE AND METHOD;" and U.S. Provisional Patent Application No. 61/689,270, filed Jun. 2, 2012 and entitled "INTERNET CANINE COMMUNICATION DEVICE," are incorporated herein by reference in their entireties. Where a definition or use of a term in an incorporated reference is inconsistent with or contrary to the definition or use of that term provided herein, the definition or use of that term provided herein governs.

While one or more embodiments of the invention have been illustrated and described above, many changes can be made without departing from the spirit and scope of the invention. Accordingly, the scope of the invention is not limited by the disclosure of specific embodiment. Instead, the invention should be determined entirely by reference to the claims that follow.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

[**1**. A method for interacting with a pet, comprising:

providing a system for communicating with a pet from a user of a communication device, the system including a treat dispenser for delivery of treats to a pet, a personal computing device in communication with the treat dispenser and further comprising a processor for sending and receiving communication commands, and a speaker in proximity to the treat dispenser;

training the pet to make a call to the user by:

playing an audio signal via the speaker;

causing one of the treats to be delivered from the treat dispenser to the pet; and

stopping the play of the audio signal; and

facilitating outgoing calls from the pet to the communication device, by:

initiating a sound to indicate a preselected outgoing call time period during which the pet may initiate a call to the communication device;

during the preselected outgoing call time period, receiving an indication that the pet has selected a control of the treat dispenser; and

in response to the received indication, initiating an outgoing call to the communication device, the outgoing call including transmitting live audio or video of the pet.]

[**2**. The method of claim **1**, wherein the treat dispenser includes multiple food trays that are each configured to deliver treats to the pet, and further comprising:

receiving from the communication device a selection of one of the multiple food trays; and

in response to the received selection, delivering a treat to the selected food tray.]

[**3**. The method of claim **1**, wherein the treat dispenser has an associated toy that is moveable in response to commands received from the communication device, and further comprising:

receiving from the communication device a command to move the toy; and

in response to the received command, causing the toy to move.]

[**4**. The method of claim **1**, further comprising:

receiving at the system a communication command;

recognizing the communication command; and

in response to the communication command, causing one of the treats to be delivered from the treat dispenser to the pet.]

[**5**. The method of claim **4**, wherein the communication command is a spoken command uttered by a user of the communication device, the spoken command played by the personal computing device via the speaker.]

[**6**. The method of claim **4**, wherein the communication command is a verbal command from the user, and the system further comprising an audio input device configured to receive the communication command.]

[**7**. The method of claim **1**, further comprising during the preselected outgoing call time period, delivering a treat, wherein receiving the indication that the pet has selected the control of the treat dispenser includes receiving an indication that the pet has accessed the treat.]

[**8**. The method of claim **1**, wherein facilitating outgoing calls from the pet to the communication device includes in response to the received indication, providing the pet with a treat, thereby rewarding the pet for initiating the outgoing call.]

[**9**. The method of claim **1**, further comprising training the pet to respond to spoken commands of a user when played via the speaker by, when the user is in the room with the training dispenser:

playing audio of a spoken command via the speaker in time proximity to when the user utters the spoken command so that the pet hears and associates the spoken command played by the speaker and the spoken command uttered by user; and

causing one of the treats to be delivered from the treat dispenser to the pet.]

[**10**. The method of claim **9**, wherein training the pet to respond to spoken commands of the user includes:

recording the spoken commands via an audio input device; and

playing one of the recorded spoken commands via the speaker.]

[11. The method of claim 1, wherein the audio signal is played from one of an audio signaling device or the speaker.]

[12. The method of claim 1, wherein the audio signal is played continuously until receipt of input from the pet.]

[13. A method for interacting with a pet, comprising:

providing a system for communicating with a pet from a user communication device, the system including a treat dispenser having a pet detection mechanism for detecting input from the pet, video conferencing software, and an audio/video device;

training the pet to answer a call from a user by:

playing an audio signal via the audio/video device;

causing one of the treats to be delivered from the treat dispenser to the pet; and

stopping the play of the audio signal;

facilitating outgoing calls from the pet to the communication device, by:

initiating a sound to indicate a preselected outgoing call time period during which the pet may initiate a call to the communication device;

during the preselected outgoing call time period, receiving an indication that the pet has selected a control of the treat dispenser via the pet detection mechanism; and

in response to the received indication, initiating an outgoing call to the communication device, the outgoing call including transmitting live audio or video of the pet.]

[14. The method of claim 13, further comprising connecting a computing device to the treat dispenser, the computing device executing the video conferencing software, wherein the computing device is connected to the treat dispenser via at least one of a cable or wireless connection.]

[15. The method of claim 13, further comprising during the preselected outgoing call time period, delivering a treat, wherein receiving the indication that the pet has selected the control of the treat dispenser includes receiving an indication that the pet has accessed the treat.]

[16. The method of claim 13, wherein facilitating outgoing calls from the pet to the communication device includes in response to the received indication, providing the pet with a treat, thereby rewarding the pet for initiating the outgoing call.]

[17. The method of claim 13, further comprising training the pet to obtain a treat from the treat dispenser by:

playing an audio signal that notifies the pet of the availability of a treat;

playing audio of a spoken command via the audio/video device in time proximity to when the user utters the spoken command so that the pet hears and associates the spoken command played by the audio/video device with the spoken command uttered by the user; and

causing one of the treats to be delivered from the treat dispenser to the pet.]

[18. The method of claim 13, wherein training the pet to obtain a treat from the treat dispenser by playing the spoken command includes:

recording the spoken command via an audio input device; and

playing the spoken command via the audio/video device.]

[19. The method of claim 13, wherein the treat dispenser includes multiple food trays that are each configured to deliver treats to the pet, and further comprising:

receiving from the communication device a selection of one of the multiple food trays; and

in response to the received selection, delivering a treat to the selected food tray.]

20. A system for interacting with a pet, comprising:

a base station having:

a treat bin configured to hold a pet treat;

a treat dispenser configured to deliver the pet treat from the treat bin;

one or more output devices including an audio device;

an input device comprising at least one of a microphone, a motion detector, or a camera; and

a microprocessor in communication with the treat dispenser, the input device, and the one or more output devices;

a computer application operable on a mobile device or computer, the computer application having instructions which, when executed by the mobile device or computer, are configured to receive at the mobile device or computer an input from a user indicative of a desire to deliver the pet treat to the pet, and to cause the mobile device or computer to transmit a treat delivery command to the base station;

the microprocessor further being configured to:

after receipt of the treat delivery command at the base station, cause the treat dispenser to deliver the pet treat, and cause the output device to produce a noise associated with the delivery of the pet treat;

cause the output device to play at least one of audio data or video data received at the base station from the mobile device or computer; and

automatically, after receipt of an input from the input device indicative of a sound or action, begin transmission of at least one of audio data from the microphone or image data from the camera.

21. The system of claim 20, wherein the computer application executes on a smart phone operated by the user.

22. The system of claim 20, wherein the one or more output devices include a video display.

23. The system of claim 20, wherein the transmission is to the mobile device or computer for substantially live play of the transmission on the mobile device or computer.

24. A system for communicating with a pet, comprising:

a base station having:

a treat bin;

a treat dispenser configured to deliver a pet treat from the treat bin;

an audio device including at least one of a speaker or a bell; and

an input device comprising at least one of a microphone, a motion detector, or a camera;

a mobile application that includes instructions that, when executed by a central processing unit of a remote client device, cause the remote client device to transmit to the base station a treat delivery command in response to input from a user,

wherein the base station is configured to:

in response to the treat delivery command received from the mobile application, cause the treat dispenser to deliver to a pet the treat from the treat bin and cause the audio device to play a sound that notifies the pet of availability of the treat;

play at least one of live audio or image data received from the remote client device; and

transmit for receipt by the remote client device audio or image data associated with the pet, wherein the base station begins transmission of the audio or image data associated with the pet in response to a signal from the input device indicative of a sound or action.

25. The system of claim 24, wherein the base station transmits the data over a communication network.

26. The system of claim 24, wherein the transmission of the audio or image data comprises live audio of the pet.

27. The system of claim 24, wherein the transmission of the audio or image data comprises video of the pet.

28. The system of claim 24, wherein the base station, in response to an incoming call from the remote client device:

notifies the pet of the incoming call; and

transmits audio or image data of the pet to the remote client device.

29. A system for communicating with a pet, comprising:

a base station comprising:

a treat bin;

a treat dispenser configured to deliver a pet treat from the treat bin; and

an input device comprising at least one of a microphone, a motion detector, or a camera;

wherein the base station is configured to:

play at least one of audio or image data received from a user of a remote client device;

notify the pet to indicate beginning of a preselected outgoing call time period during which the pet may initiate a call to the remote client device;

during the preselected outgoing call time period, receive a signal from the input device indicative of a sound or action; and

in response to the received signal during the preselected outgoing call time period, begin transmission to the remote client device of data associated with the pet.

30. The system of claim 29, wherein the base station notifies the pet by playing a sound.

31. The system of claim 29, wherein the base station notifies the pet by activating a light.

32. The system of claim 29, wherein the base station begins transmission of the data associated with the pet by transmitting audio of the pet.

33. The system of claim 29, wherein the base station begins transmission of the data associated with the pet by transmitting image data of the pet.

34. The system of claim 29, wherein the base station:

in response to a treat delivery command:

deliver to a pet the pet treat from the treat bin; and

notifies the pet of availability of a treat.

35. The system of claim 34, wherein the base station notifies the pet of the availability of the treat by playing an audio signal via a speaker.

36. The system of claim 35, wherein the base station notifies the pet of the availability of the treat by activating a light.

37. A system for communicating with a pet, comprising:

a base station comprising:

a treat bin;

a treat dispenser that delivers treats from the treat bin;

an audio device;

an input device comprising at least one of a microphone, a motion detector, or a camera; and

a microprocessor that is configured to:

receive a treat delivery command from a remote client device; and

in response to the received treat delivery command, cause:

the treat dispenser to deliver at least one treat from the treat bin; and

the audio device to play an audio signal that notifies the pet of availability of a treat; and

wherein the system:

in response to user input to an application that includes instructions executing on a central processing unit of the remote client device, causes the treat delivery command to be communicated to the microprocessor;

plays at least one of audio or image data received from the remote client device; and

transmits to the application on the remote client device audio or image data associated with the pet, wherein the system begins transmission of the audio or image data associated with the pet in response a sound or action that is detected via the input device.

38. The system of claim 37, wherein the system begins transmission of the audio or image data associated by the pet by beginning transmission of video data of the pet.

39. The system of claim 37, wherein input device is a microphone and wherein the signal from the input device is based a sound that is made by the pet and that is detected by the microphone.

40. The system of claim 38, wherein the input device is a motion sensor and wherein the signal from the input device is based on motion of the pet that is detected by a motion sensor.

41. A system for communicating with a pet, comprising:

a base station including a speaker and an input device comprising at least one of a microphone, a motion detector, or a camera; and

a mobile application that includes instructions that are configured to execute on a central processing unit of a remote client device to cause, in response to user input, a treat delivery command to be communicated to the base station,

wherein the base station is configured to:

receive the treat delivery command;

in response to the treat delivery command:

dispense at least one treat; and

play via the speaker an audio signal that notifies the pet of availability of a treat; and

transmit to the mobile application data associated with the pet, wherein the base station begins transmission of the data associated with the pet in response to a sound or action that is detected via the input device.

42. The system of claim 41, wherein the data associated with the pet is image data of the pet.

43. The system of claim 42, wherein the image data of the pet is video of the pet.

44. The system of claim 41, wherein the data associated with the pet is sound made by the pet.

45. The system of claim 41, wherein the input device is a microphone and wherein the signal is based on a sound that is made by the pet and detected by the microphone.

46. The system of claim 41, wherein the input device is a motion sensor and wherein signal is based on motion of the pet that is detected by the motion sensor.

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