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Crider, Jr. et al.

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(54) **LIVESTOCK HEALTH MONITORING
SYSTEM AND METHOD OF USE**

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(Continued)

Primary Examiner — Mohammad K Islam

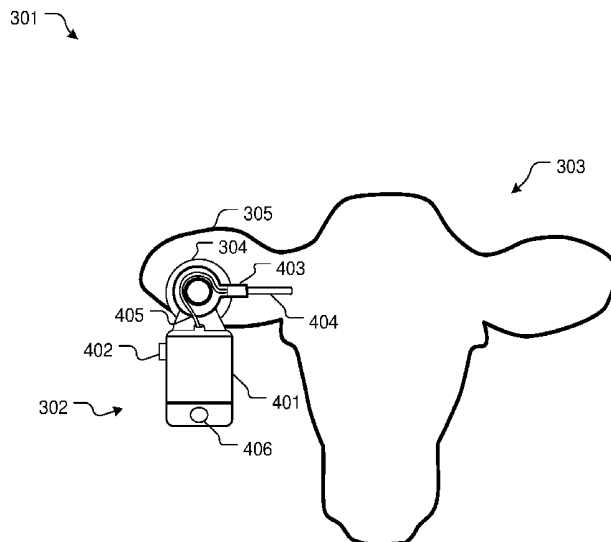
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(57)

ABSTRACT

An animal wellness notification system includes an attach-
ment body configured to securely engage with an ear of the
animal; an elongated temperature probe secured to the
attachment body and configured to extend within the ear of
the animal; a housing secured to the attachment body; a
computer disposed within the housing and operably associ-
ated with the temperature probe; and a notification device in
data communication with the computer, the notification
device being configured to provide notice if a temperature of
the animal goes beyond a determined threshold.

20 Claims, 7 Drawing Sheets



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G01K 1/02 (2006.01)
G01K 3/00 (2006.01)
G01K 13/00 (2006.01)

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(58) **Field of Classification Search**

CPC ... A61B 5/7405; A61B 5/0022; A61B 5/0008; A61B 5/6817; A61B 2503/40
 See application file for complete search history.

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Foreign communication from a related counterpart application—International Search Report and Written Opinion, PCT/US2017/019464 dated May 30, 2017, 12 pages.

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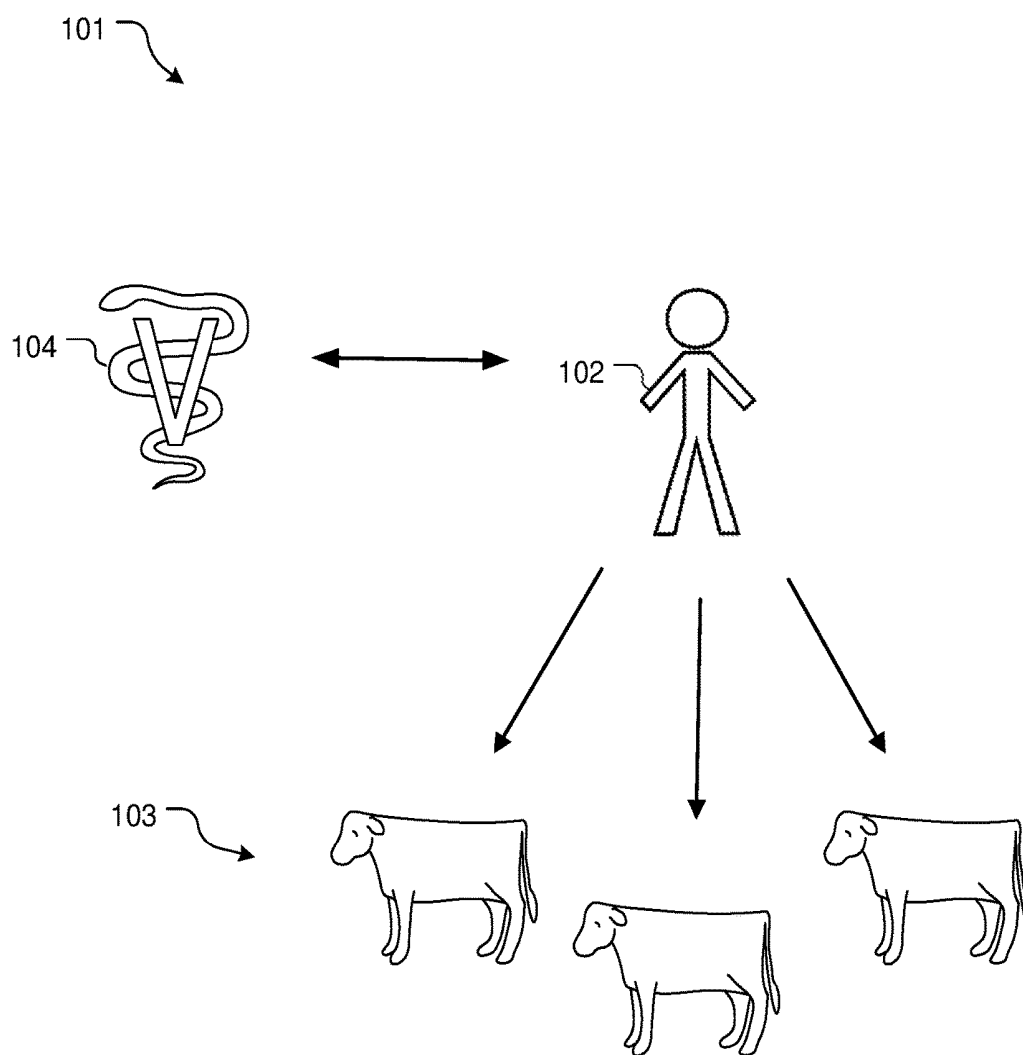


FIG. 1
(Prior Art)

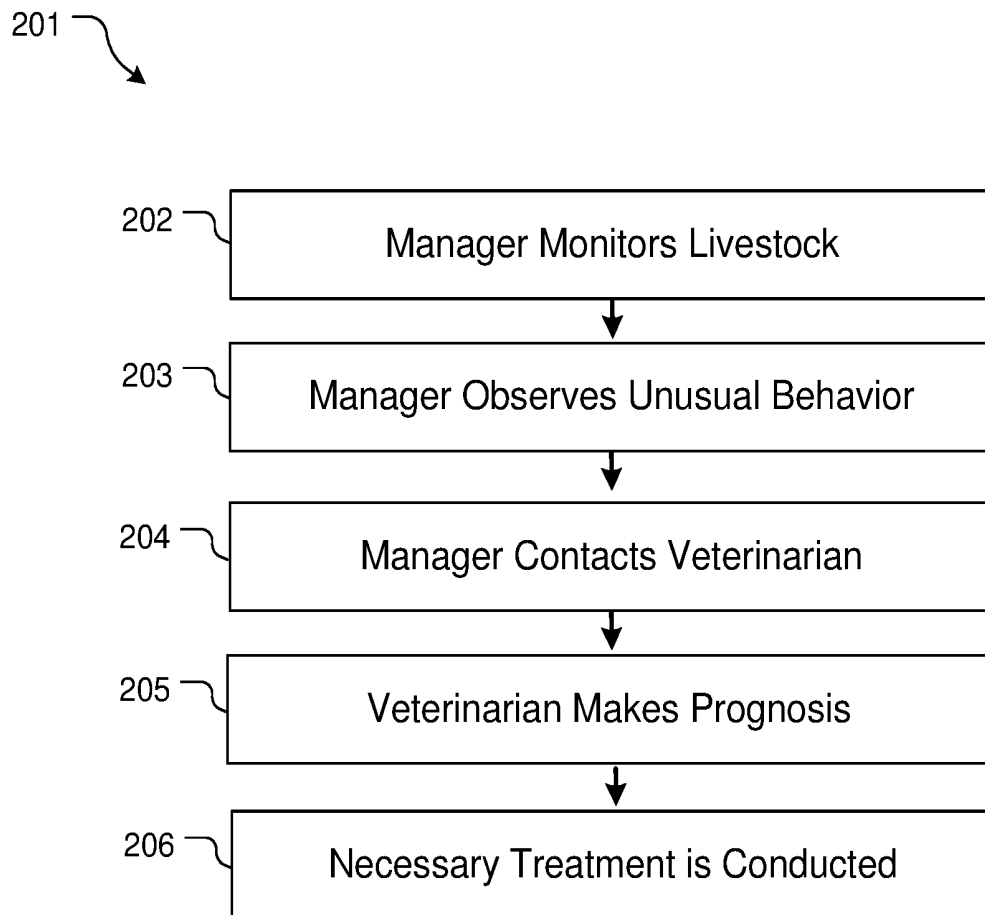


FIG. 2
(Prior Art)

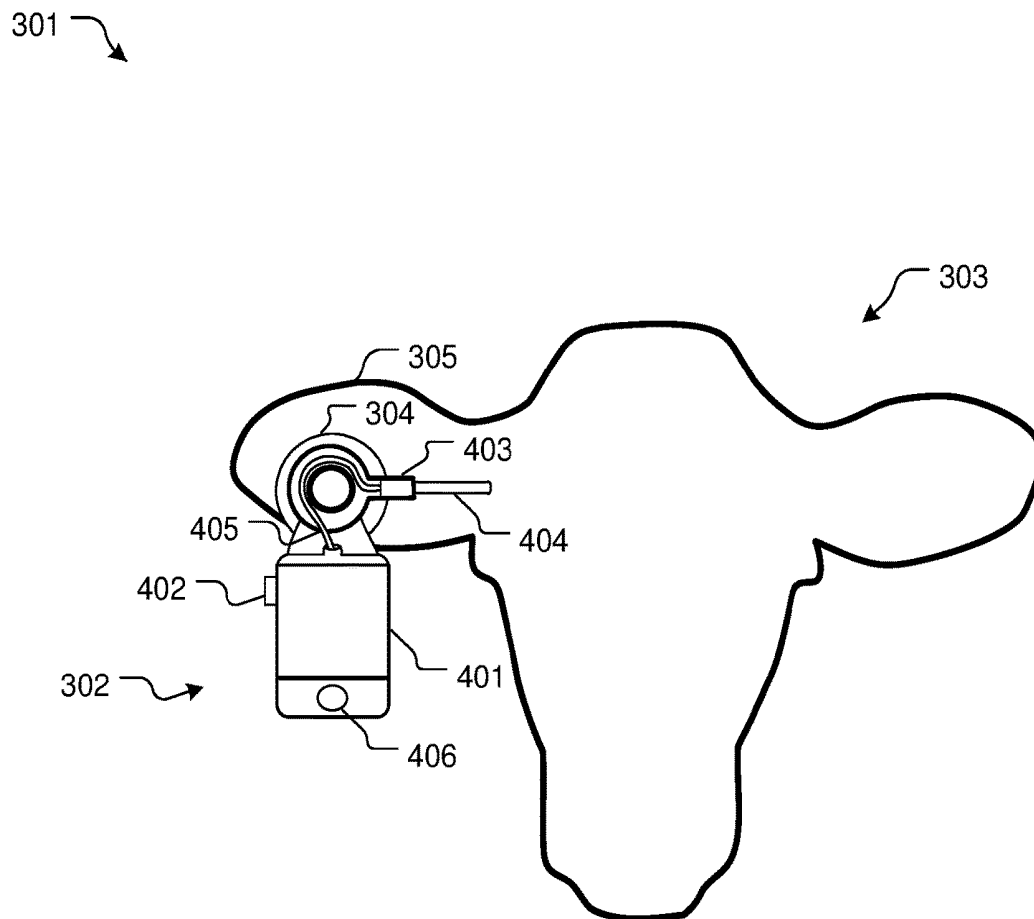


FIG. 3

302 ↘

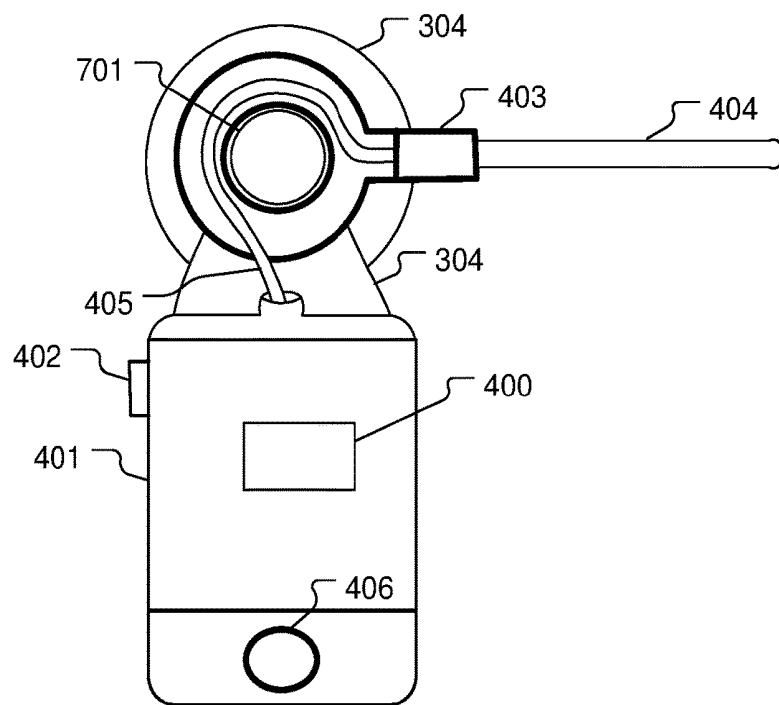


FIG. 4

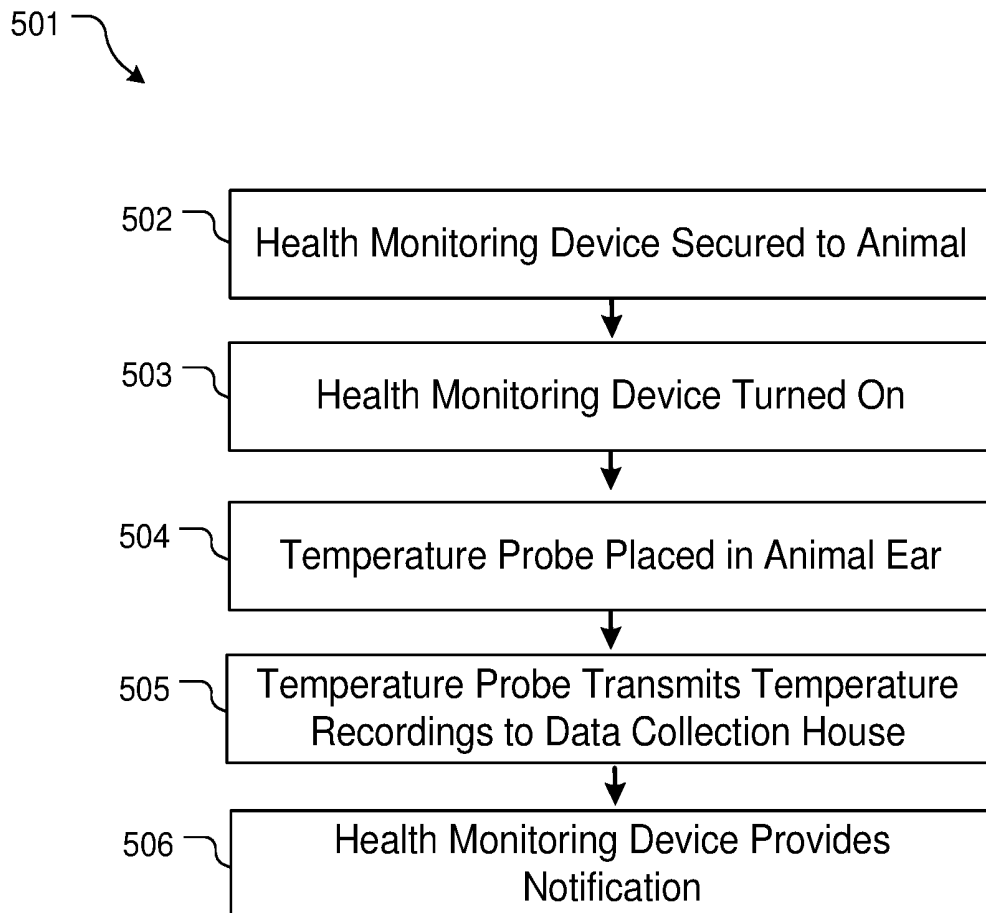


FIG. 5

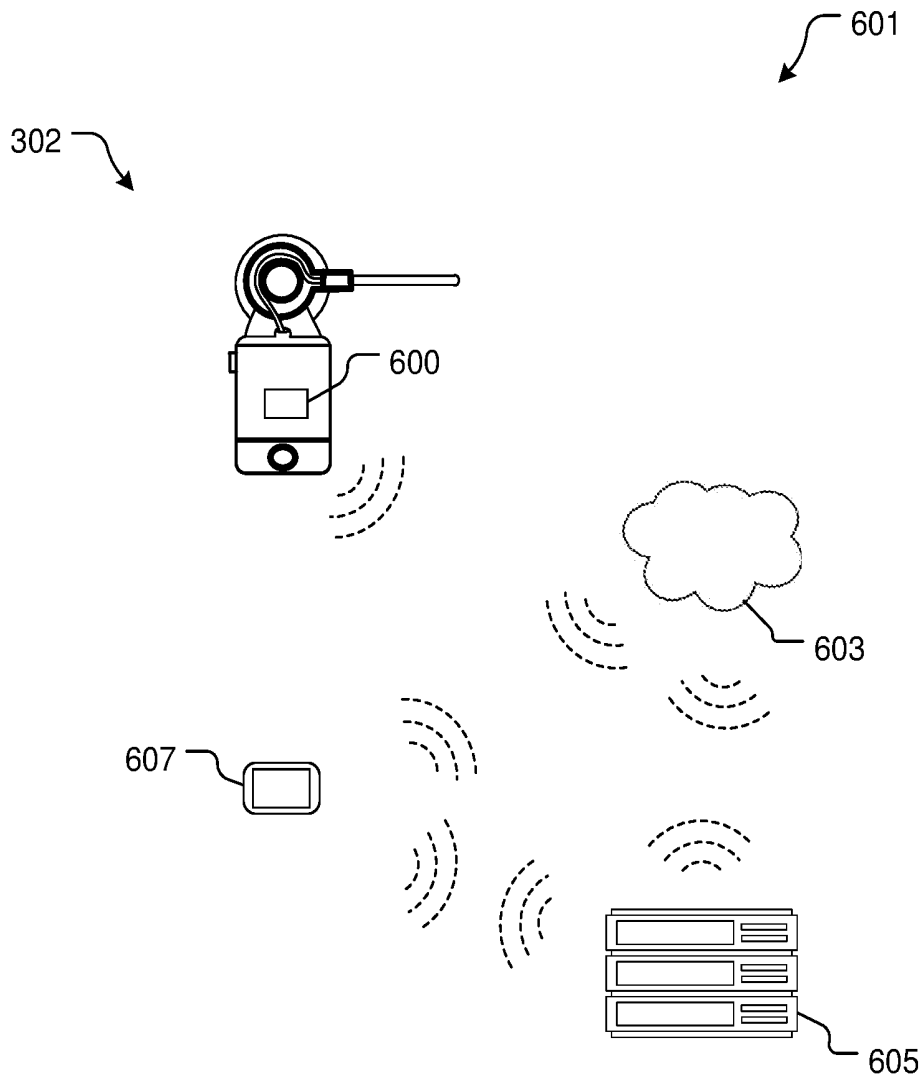


FIG. 6

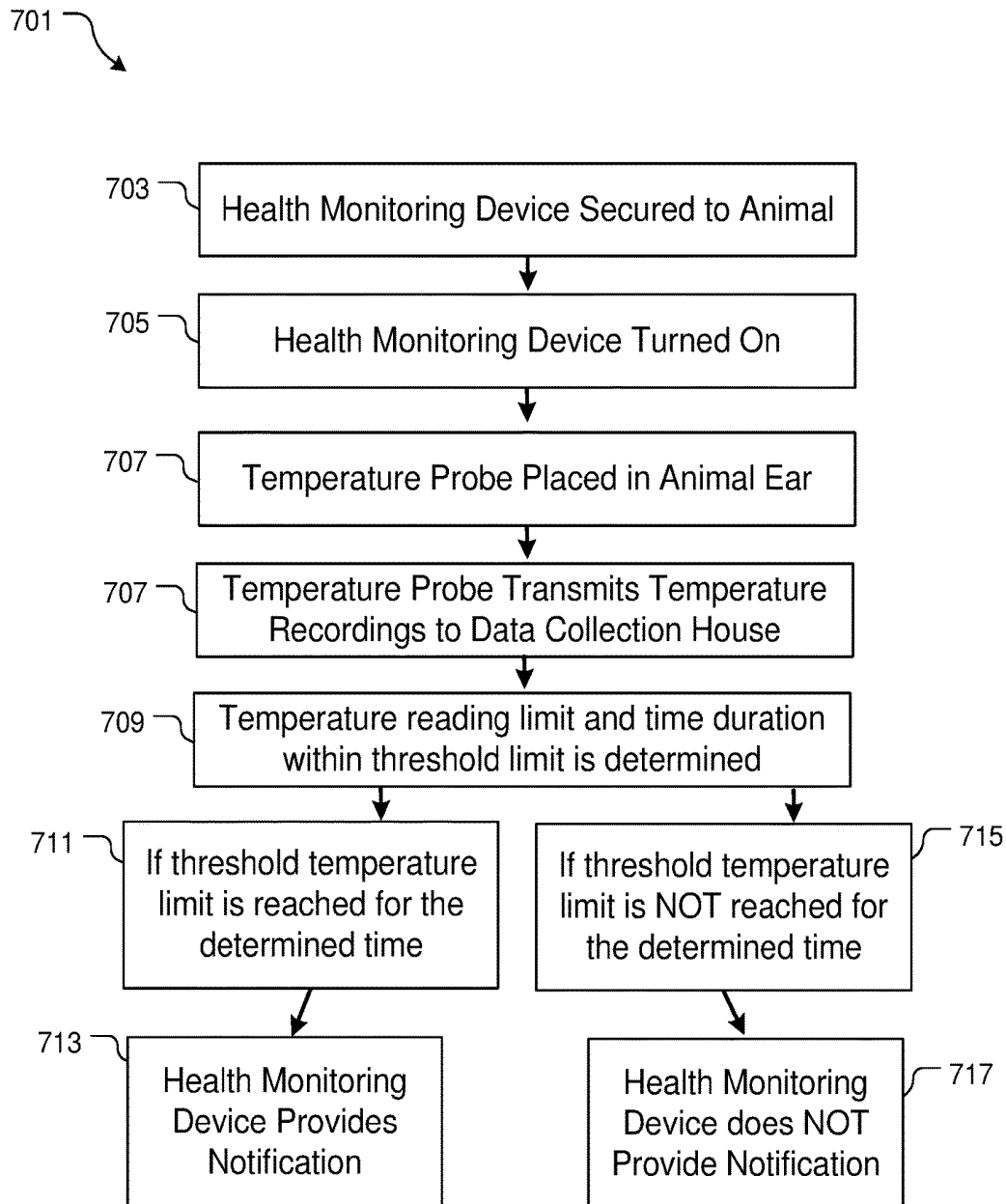


FIG. 7

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LIVESTOCK HEALTH MONITORING SYSTEM AND METHOD OF USE

BACKGROUND

1. Field of the Invention

The present invention relates generally to systems and methods to determine the health of livestock, and more specifically, to a livestock health monitoring system for data collection and detection of abnormal health conditions.

2. Description of Related Art

Systems and methods to determine the health of livestock are well known in the art and are effective means to detect illness and implement treatment in livestock. For example, FIG. 1 depicts a simplified schematic of a conventional livestock monitoring system **101** having a livestock manager **102** overseeing a plurality of livestock **103** and in communication with a veterinarian **104**. As shown in FIG. 2, a flowchart **201** depicts an example of the process of system **101**. The livestock manager **102** monitors livestock **103** via visual inspection. When unusual behavior of the livestock occurs, as indicative of illness, the livestock manager **102** contacts a veterinarian **104**, who then makes a prognosis and begins treatment accordingly, as shown with boxes **203-206**.

One of the problems commonly associated with system **101** is insufficient monitoring and/or inexperience of the livestock manager. For example, the process of monitoring could involve a large number of livestock, making the monitoring process difficult. In addition, the process suffers a substantial risk of human error, as many livestock illnesses are visually undetectable and/or the livestock manager fails to adequately determine whether the livestock is ill.

Accordingly, although great strides have been made in the area of system and methods to determine livestock wellness, many shortcomings remain.

DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the embodiments of the present application are set forth in the appended claims. However, the embodiments themselves, as well as a preferred mode of use, and further objectives and advantages thereof, will best be understood by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a simplified schematic of a common livestock method to determine wellness of the livestock;

FIG. 2 is a flowchart of a process of the simplified schematic of FIG. 1;

FIG. 3 is a front view of a livestock health monitoring system in accordance with a preferred embodiment of the present application;

FIG. 4 is a front view of the health monitoring device from FIG. 3;

FIG. 5 is a flowchart of the process of FIG. 3;

FIG. 6 is a simplified schematic of a system in accordance with an alternative embodiment of the present application; and

FIG. 7 is a flow chart depicting the preferred method of use.

While the system and method of use of the present application is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and are herein

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described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the present application as defined by the appended claims.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Illustrative embodiments of the system and method of use of the present application are provided below. It will of course be appreciated that in the development of any actual embodiment, numerous implementation-specific decisions will be made to achieve the developer's specific goals, such as compliance with system-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

The system and method of use in accordance with the present application overcomes one or more of the above-discussed problems commonly associated with conventional livestock monitoring systems. Specifically, the present invention provides a rapid and effective means to monitor large numbers of livestock and reduces the risk of human error. These and other unique features of the system and method of use are discussed below and illustrated in the accompanying drawings.

The system and method of use will be understood, both as to its structure and operation, from the accompanying drawings, taken in conjunction with the accompanying description. Several embodiments of the system are presented herein. It should be understood that various components, parts, and features of the different embodiments may be combined together and/or interchanged with one another, all of which are within the scope of the present application, even though not all variations and particular embodiments are shown in the drawings. It should also be understood that the mixing and matching of features, elements, and/or functions between various embodiments is expressly contemplated herein so that one of ordinary skill in the art would appreciate from this disclosure that the features, elements, and/or functions of one embodiment may be incorporated into another embodiment as appropriate, unless described otherwise.

The preferred embodiment herein described is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described to explain the principles of the invention and its application and practical use to enable others skilled in the art to follow its teachings.

Referring now to the drawings wherein like reference characters identify corresponding or similar elements throughout the several views, FIG. 3 depicts a front view of a livestock health monitoring system **301** in accordance with a preferred embodiment of the present application. It will be appreciated that system **301** overcomes one or more of the above-listed problems commonly associated with conventional systems and method to monitor livestock wellness.

In the contemplated embodiment, system **301** includes a health monitoring device **302** in communication with an animal **303** via an ear attachment **304**. During use, the ear attachment **304** is secured to the ear of the animal (not shown) via one or more types of fasteners commonly known

in the art. To achieve this feature, ear attachment **304** includes a body having a hole **701** extending therethrough. The fastener is secured to the hole **701**, which in turn is secured to the ear.

As shown in FIG. 4, the health monitoring device **302** comprises of one or more of a data collection house **401**, an on/off depression switch **402**, in communication with an ear attachment **304** via a rotational device **403** and a temperature probe **404** via a wire **405**. In the preferred embodiment, the elongated temperature probe **404** is positioned through the rotation device **403** and comprises a material capable of changing hardness upon reaching a particular temperature. In addition, the data collection house **401** can comprise a notification device **406** and is enclosed in weather resistant plastic. In the preferred embodiment, the notification device **406** is a light that can be visually seen by the worker; however, it will be appreciated that the notification device **406** could be an audible speaker and/or a transmitter configured to provide notification to a remote computer, as depicted in FIG. 6.

A computer system **400** having the necessary software, hardware, and power supply are carried within housing **401** to determine if a temperature threshold is reached and to activate device **406**.

In FIG. 5, a flowchart **501** depicts a preferred process of system **301**. The health monitoring device **302** is secured to the animal's ear **305** via the ear attachment **304** and turned on by the on/off depression switch **402**, as shown with boxes **502** and **503**. A temperature probe **404** of the appropriate length is placed in communication with the ear **305** and transmits temperature recordings to the data collection house **401** via the wire **405**, as shown with boxes **504** and **505**. The health monitoring device **302** monitors the animal's body temperature and can provide a notification when user set parameters are breached, as shown with box **506**.

It should be understood that body temperature measurements in livestock can indicate useful information in regards to illnesses, disease, distress, and hormone levels.

It should be appreciated that one of the unique features believed characteristic of the present application is the incorporation of an on/off depression switch **402**. It is understood that this switch will reduce the risk of the animal deactivating the health monitoring device. During use, the worker can determine whether the system is active by depressing the switch **402**.

Additional unique features believed characteristic of the present application are the rotational feature **403** of the health monitoring device **302** and the material of the temperature probe, capable of changing hardness. It is understood that these features allows for stabilization and comfort of the temperature probe **404** in the animal ear **305**.

In one embodiment, it is contemplated that the health monitoring device **302** can function independently by way of the notification light **406** when a user set parameter is breached. For example, if the animal's temperature increases to a certain value, as set by the user, the notification light **406** will signal to the user that such a parameter has been met. It is understood that this feature will allow for quick visual identification of ill livestock.

Accordingly, as shown in FIGS. 3-5, a notification system is disclosed herein wherein a temperature probe is secured within the ear of the animal and provides notification, preferably via a light, when a threshold temperature reading is reached. Thus, the system is configured to provide notification when the animal falls outside a determined tem-

perature range. The notification could be via a light, audible noise, and/or a wireless transmission, as discussed in the below disclosure.

Referring now to FIG. 6, a simplified schematic of a system **601** is shown in accordance with an alternative embodiment of the present application. System **601** incorporates the features of the system **301**, and is further provided with a transmission system **600** having a transmitter configured to communication wirelessly to a cloud service **603** and/or database **605** and/or a portable computer such as a phone, tablet, or personal computer.

During use, system **601** allows the monitoring of multiple animals simultaneously and reduces the chances of human error. For example, the computer **607** could provide notification when system **301** is triggered, which in turn allows the worker to conduct visual inspection of the animal.

Referring now to FIG. 7, a flowchart **701** depicting the preferred method of use is shown. The process includes activating a health monitoring device and placing a probe of the health monitoring device within the ear of the animal, as depicted in boxes **703-707**. This feature can be achieved via one or more of the devices discussed above. The temperature measured by the probe is then transmitted to a data collection house via one or more transmitters, as shown in box **707**.

One the unique features of the preferred method is selecting a temperature threshold along with a time duration that the animal's temperature reaches and/or exceed the temperature threshold, as shown in box **709**. One or more computers are utilized to record and determine whether the animal's temperature remains above the threshold for the selected duration of time. If so, the health monitoring device provides notice in the form of a visual or audible alert, as shown in boxes **711**, **713**. Further, one or more computers monitoring the animals could provide visual or audible notification via a display. In the alternative, if the threshold temperature does not last the selected duration of time, the temperature readings are recorded but the health monitoring device is not provide an alert.

The particular embodiments disclosed above are illustrative only, as the embodiments may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. It is therefore evident that the particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application. Accordingly, the protection sought herein is as set forth in the description. Although the present embodiments are shown above, they are not limited to just these embodiments, but are amenable to various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. An animal wellness notification system, comprising:
 - an attachment body configured to securely engage with an ear of the animal;
 - an elongated temperature probe secured to the attachment body and configured to extend within the ear of the animal;
 - a housing secured to the attachment body;
 - a computer disposed within the housing; and
 - a notification device in data communication with the computer, wherein the notification device is configured to provide notice,
 wherein the computer is configured to:
 - receive a selection of a temperature threshold along with a time duration;

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record animal's core temperature for the selected duration and time;
 determine whether the animal's core temperature remains above the temperature threshold for the time duration; and
 cause the notification device to provide the notice, after the time duration, if the animal's core temperature exceeds the temperature threshold for the time duration.

2. The system of claim 1, further comprising:
 a switch secured to the housing and operably associated with computer.

3. The system of claim 2, wherein the switch is configured to reset the computer.

4. The system of claim 1, wherein the notification device is a light.

5. The system of claim 1, wherein the notification device is a speaker.

6. The system of claim 1, the notification device having:
 a transmitter configured to wirelessly communicate with a portable computer.

7. The system of claim 6, further comprising:
 a database in communication with the computer;
 wherein the database is configured to store data from the notification device.

8. An animal wellness notification system, comprising:
 a temperature probe configured to extend within and secure to an ear of an animal and to generate temperature data; and
 a notification device secured to the temperature probe, wherein the animal wellness notification system is configured to:
 receive a selection of a temperature threshold along with a time duration;
 record animal's core temperature for the selected duration and time;
 determine whether the animal's core temperature remains above the temperature threshold for the time duration; and
 cause the notification device to provide notice, after the time duration, if the temperature data indicates that the animal's core temperature exceeds the temperature threshold for the time duration.

9. The system of claim 8, further comprising:
 an attachment body configured to securely engage with the ear of the animal;
 wherein the temperature probe is secured to the attachment body.

10. The system of claim 9, further comprising:
 a housing secured to the attachment body.

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11. The system of claim 10, further comprising:
 a computer disposed within the housing and operably associated with the temperature probe.

12. The system of claim 11, further comprising:
 a switch secured to the housing and operably associated with computer.

13. The system of claim 12, wherein the switch is configured to reset the computer.

14. The system of claim 8, wherein the notification device is a light.

15. The system of claim 8, wherein the notification device is a speaker.

16. The system of claim 8, wherein system further comprises:
 a remote computer; and
 a transmitter configured to wirelessly communicate the temperature data with the remote computer;
 wherein the remote computer is configured to determine if the temperature data indicates that animal's core temperature exceeds the selected temperature threshold for the selected duration of time.

17. The system of claim 16, further comprising: a database in communication with the remote computer; wherein the database is configured to store data from the transmitter.

18. A method to determine the wellness of an animal, comprising:
 placing a temperature probe associated with an animal wellness notification system within an ear of the animal;
 securing the temperature probe to the ear of the animal;
 selecting, via a computer associated with the animal wellness notification system, a temperature threshold along with a time duration,
 wherein the computer is configured to:
 record animal's core temperature for the selected duration and time;
 determine whether the animal's core temperature remains above the temperature threshold for the time duration; and
 cause a notification device associated with the animal wellness notification system to provide notice, after the time duration, if temperature data from the temperature probe indicates that the animal's a temperature exceeds the selected temperature threshold for the selected time duration.

19. The method of claim 18, wherein the notice comprises a p visual notification.

20. The method of claim 18, further comprising:
 transmitting the temperature data to a computer.

* * * * *

专利名称(译)	畜牧健康监测系统和使用方法		
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发明人	CRIDER, JR., RICHARD ARELIN FULTS, ALVIN CECIL		
IPC分类号	A01K29/00 G01K13/00 A61B5/00 A01K11/00 G01K1/02 G01K3/00 G08B21/18 A61B5/01		
CPC分类号	A61B5/6816 A61B5/6817 A61B5/7405 A61B5/742 G08B21/182 G01K3/005 G01K13/002 A01K11/001 A01K11/004 A01K29/005 A01K11/00 A61B5/0008 A61B5/0022 G01K1/024 A61B5/01 A61B2503/40		
优先权	62/337400 2016-05-17 US		
其他公开文献	US20190059741A1		
外部链接	Espacenet		

摘要(译)

动物健康通知系统包括附接体，该附接体被配置为与动物的耳朵牢固地接合；细长的温度探针固定在附着体上，并配置成在动物的耳朵内延伸；固定在连接体上的外壳；计算机设置在壳体内并可操作地与温度探测器相关联；以及与计算机进行数据通信的通知设备，该通知设备被配置为如果动物的温度超过确定的阈值则提供通知。

