US006485433B1

(12) **United States Patent**
Peng

(10) **Patent No.: US 6,485,433 B1**
(45) **Date of Patent: Nov. 26, 2002**

(54) **EAR THERMOMETER WITH ROTATABLE AND REVOLVABLE DETECTOR PROBE**

(76) Inventor: **Shao-Yu Peng**, 239-67 Changyuan Rd., Huatan Hsiang, Changhua Hsien (TW)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/694,382**

(22) Filed: **Oct. 24, 2000**

(30) **Foreign Application Priority Data**

Sep. 15, 2000 (TW) ..... 089216078 U

(51) **Int. Cl.**[7] **A61B 5/00**
(52) **U.S. Cl.** **600/549**; 600/474; 374/100
(58) **Field of Search** 600/474, 549, 600/559; 374/100, 120, 208, 209; 403/122, 127, 133, 135, 141, 142

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,312,358 A * 1/1982 Barney 600/483
5,458,121 A * 10/1995 Harada 600/474
5,868,685 A * 2/1999 Powell et al. 600/585
5,954,669 A * 9/1999 Iseberg 600/559
6,059,452 A * 5/2000 Smith et al. 374/169
6,097,979 A * 8/2000 Janotte 600/474

FOREIGN PATENT DOCUMENTS

JP 04141138 A * 5/1992 ..... 600/549
JP 06142061 A * 5/1994 ..... 600/549

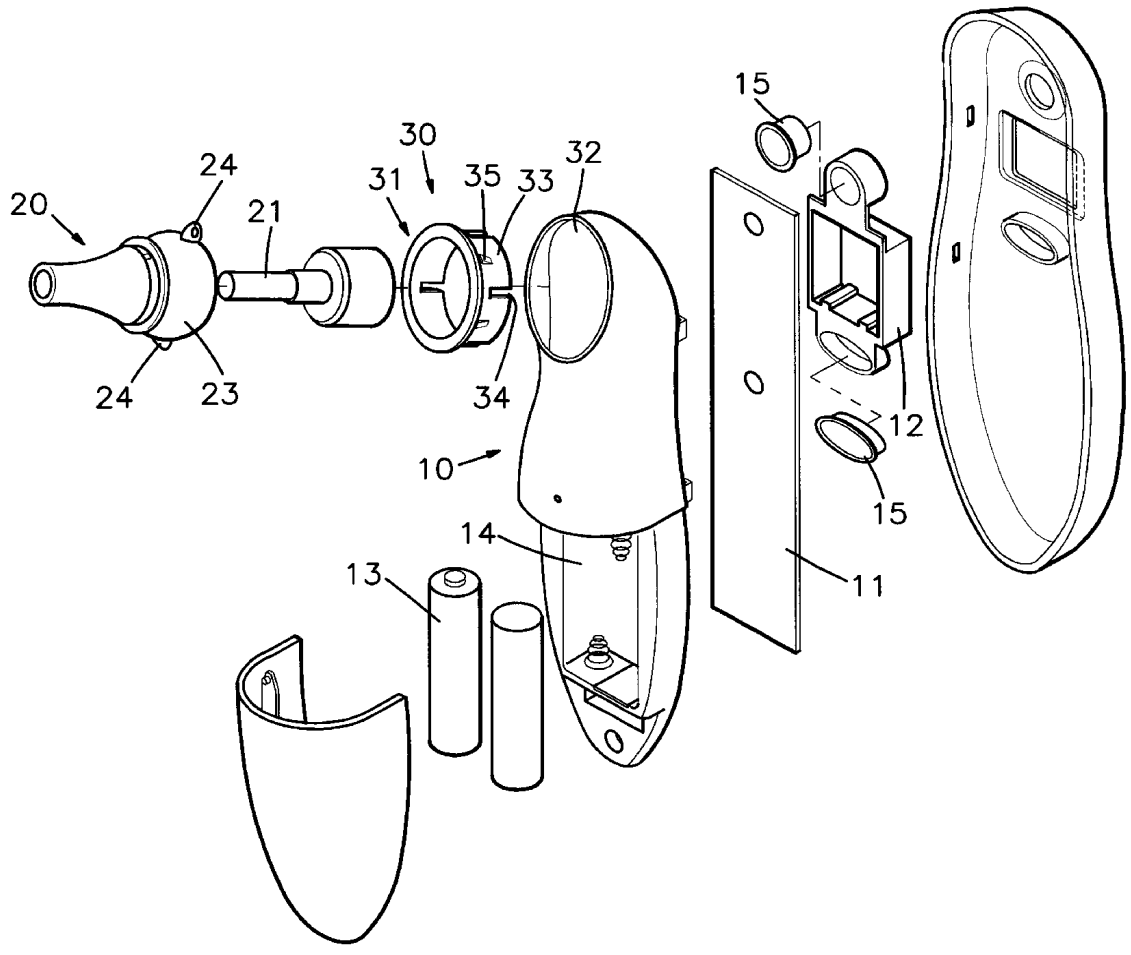
* cited by examiner

Primary Examiner—Kevin Shaver
Assistant Examiner—Charles Marmor, II
(74) *Attorney, Agent, or Firm*—Rosenberg, Klein & Lee

(57) **ABSTRACT**

An ear thermometer having a rotatable and revolvable detector probe is provided. The thermometer includes a thermometer body; a detector probe insertable into an external auditory canal; and a connecting device for rotatably and revolvably connecting the detector probe to the thermometer body. The connecting device includes a pivot journal that fixedly engages the thermometer body and receives a portion of the detector probe in pivotally engaged manner.

7 Claims, 4 Drawing Sheets



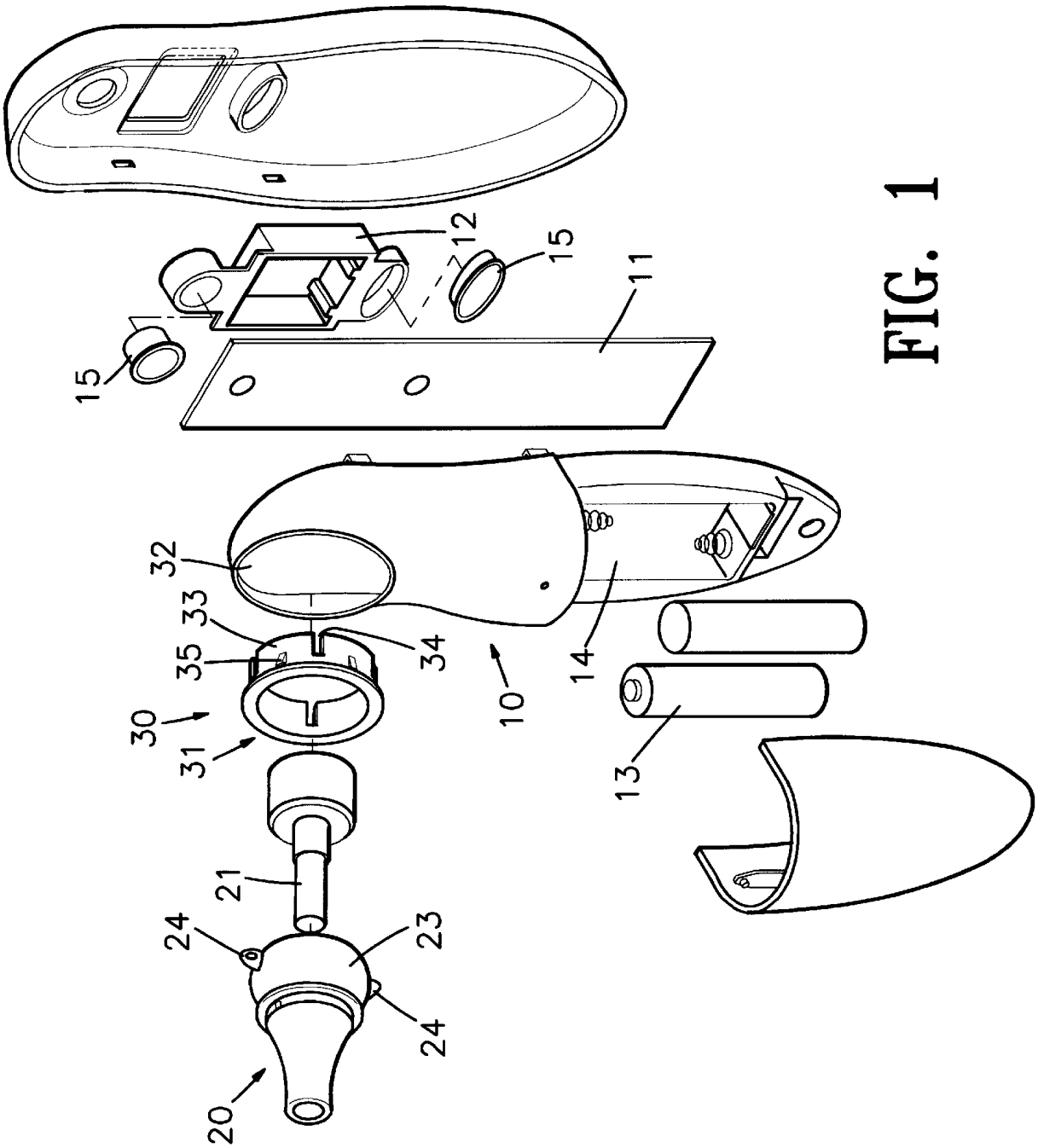


FIG. 1

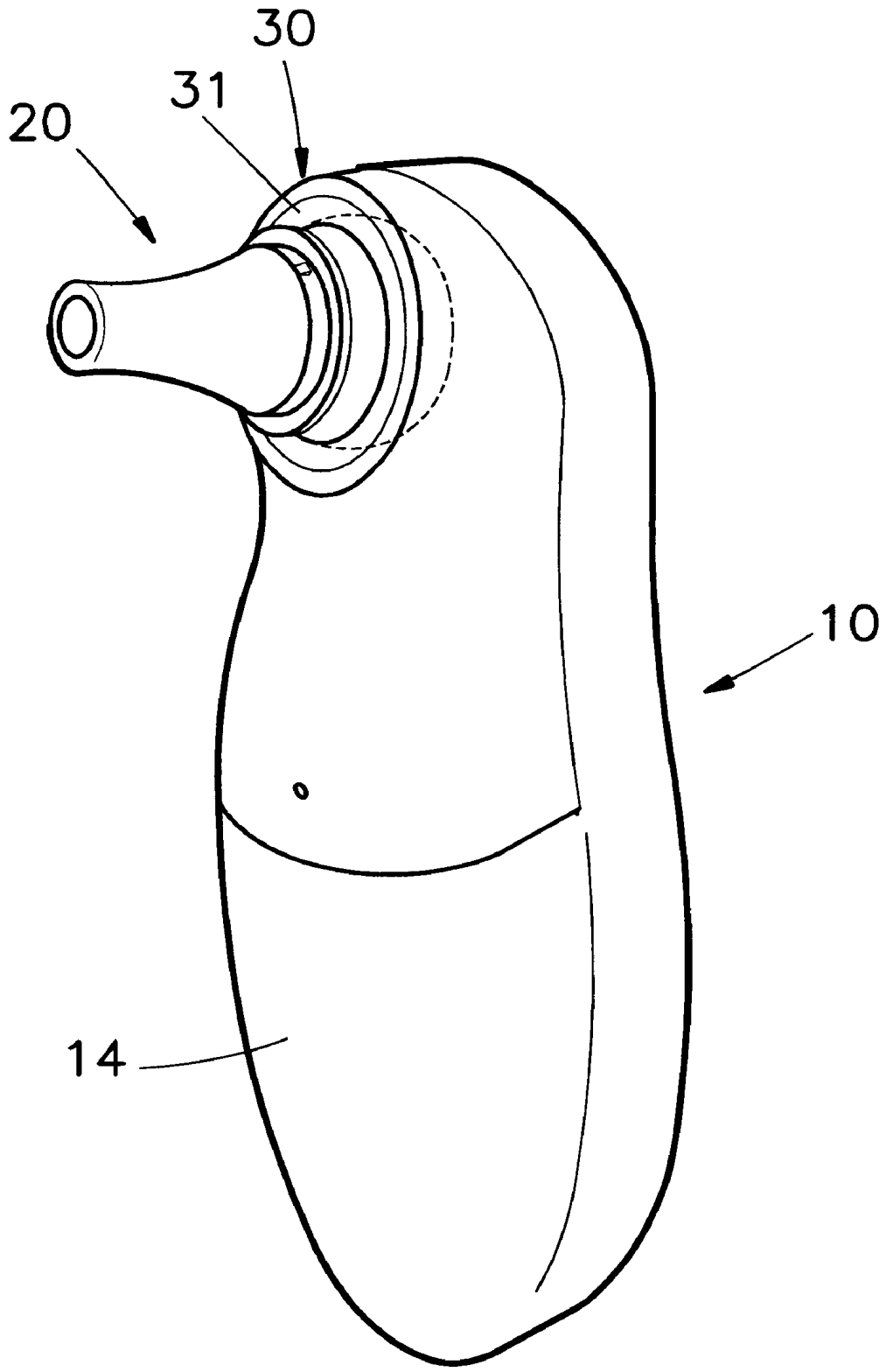


FIG. 2

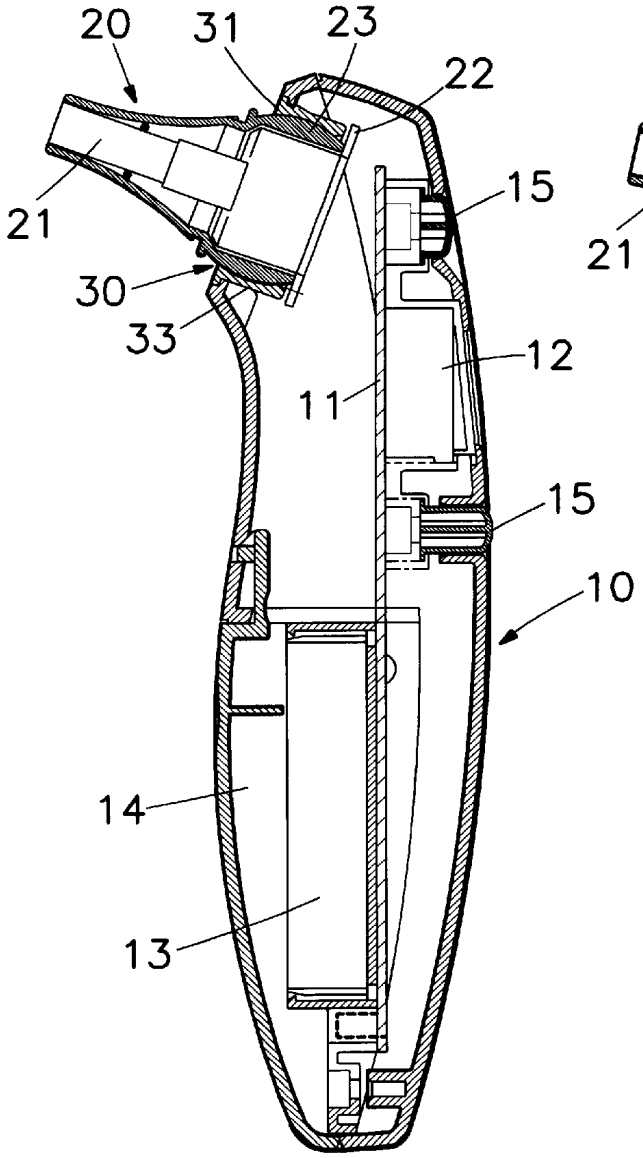

20
31
23
22
21
15
30
33
12
11
15
10
14
13

FIG. 3

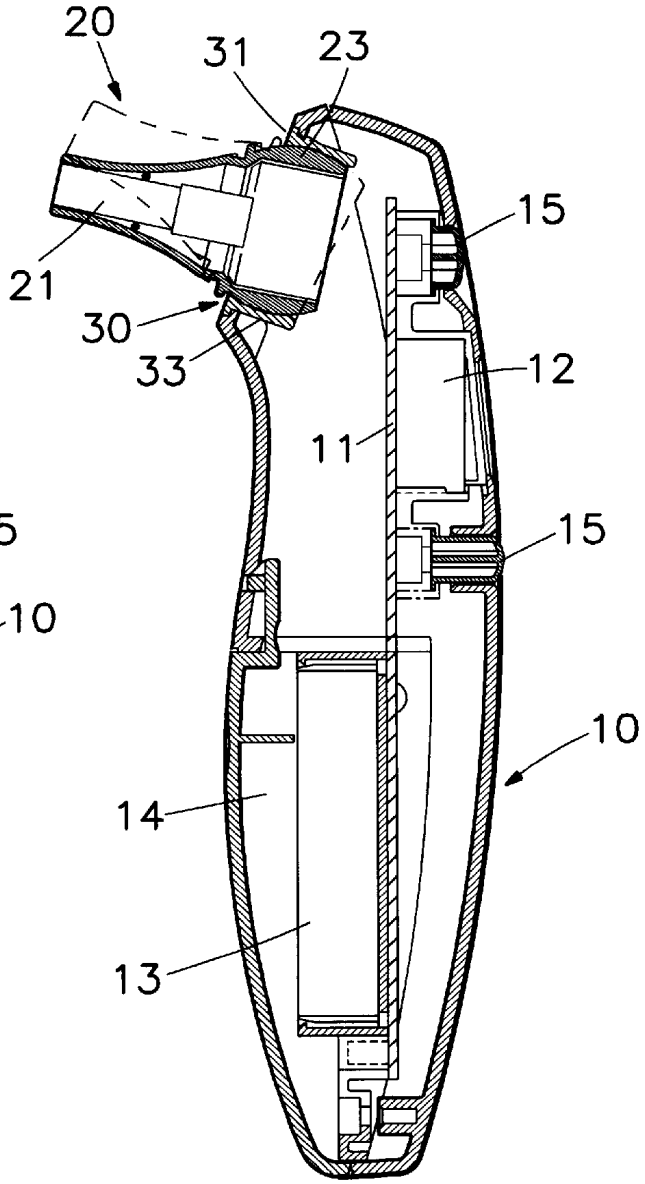

20
31
23
21
15
30
33
12
11
15
10
14
13

FIG. 4

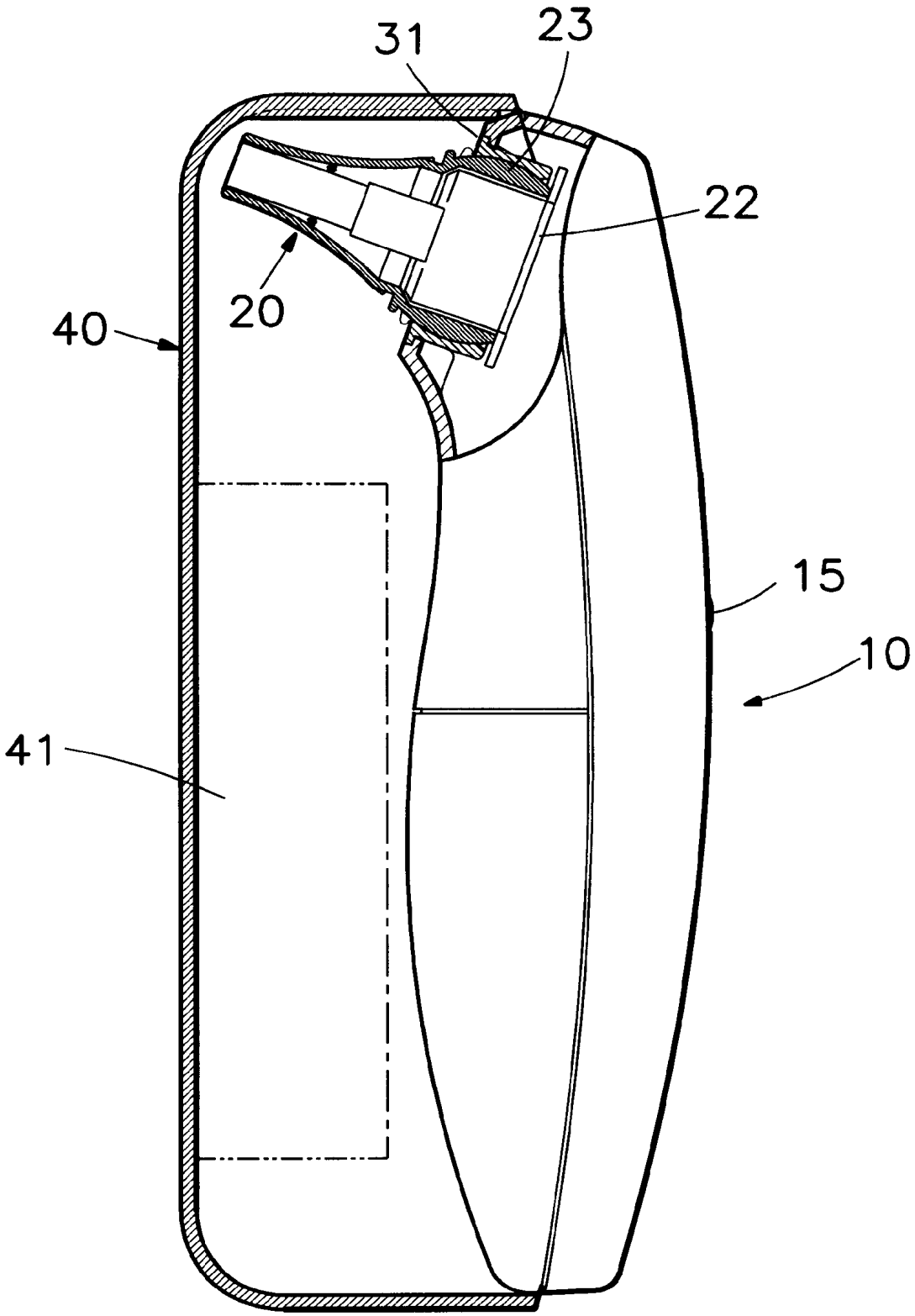


FIG. 5

EAR THERMOMETER WITH ROTATABLE AND REVOLVABLE DETECTOR PROBE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a newly designed ear thermometer, and more particularly, to an ear thermometer with a rotatable and revolvable detector probe.

2. Description of the Prior Art

An ear thermometer for measuring human body temperature mainly comprises a thermometer gun body; a detector probe fixedly connected to the front end of the gun body, and which is suitable for plugging into the human external auditory canal; a liquid crystal display (LCD); and, an electronic erasable and programmable ROM, By measuring the temperature of the human tympanic membrane with the infrared ray inductive detector probe, an input signal is digitalized by a micro processor provided in the thermometer gun body, and compared with a calibrated datum stored in the ROM, thereby outputting a confirmed value of the measured temperature to the LCD for displaying.

As it is mentioned above, the detector probe of a conventional ear thermometer is fixedly connected to the front end of the gun body so that sensing devices such as a wave guide and an infrared ray inductor can be installed therein. This immovably tilted detector probe may sometimes be difficult to plug into a patient's external auditory canal. For instance, when the ear of the patient is hindered by bed cloths or a pillow; or the available access to the emerged inlet of the patient's external auditory canal does not correspond to the fixed inclination angle of the detector probe, the detector probe may not be sufficiently inserted into the ear, especially to an infant's ear, without causing possible damage. Moreover, such a conventional detector probe may also be dangerous for use with a hyper child or a person of abnormal or weakened mental state who many respond with strong refusal and thereby cause accidental damage to the ear,

SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide an ear thermometer with a three dimensionally rotatable detector probe which may be smoothly and securely plugged into the external auditory canal of a patient in spite of its emerging state.

It is another object of the present invention to provide an ear thermometer with a three dimensionally revolvable detector probe which when being plugged into the patient's ear, is adaptively displaceable so as to avoid puncturing any tissue of the patient's ear in case the operator encounters resistance, In order to achieve the above objects and other advantages, the ear thermometer with a rotatable and revolvable detector probe of the present invention for measuring and displaying the human tympanic membrane temperature comprises a thermometer body; a detector probe having an arcuate neck portion pluggable into the human external auditory canal; and a connecting device for rotatably and revolvably connecting the detector probe to the thermometer body, the connection is carried out by an inwardly deflectable clastomer having an arcuate skirt portion which accommodates an arctuate neck portion of the detector probe in such manner that the detector probe is universally revolvable with respect to the thermometer body. The detector probe can be easily plugged into the patients external auditory canal, no matter how oriented.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, advantages and features of the present invention will become more readily appreciated and understood from a consideration of the following detailed description of the preferred embodiments of the present invention taken together with the accompanying drawings in which:

FIG. **1** is a three dimensional exploded view of the present view;

FIG. **2** is a three dimensional perspective view of the present invention;

FIG. **3** is a longitudinal cross-sectional view of the present invention;

FIG. **4** is a longitudinal cross-sectional view of the present invention when its detector probe is tilted at a different orientation from that shown in FIG. **3**; and,

FIG. **5** is a partial cross-sectional view of the present invention enclosed in a housing.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. **1** through **3** simultaneously, the car thermometer with revolvable prove of the present invention for measuring and displaying human tympanic membrane temperature essentially comprises a thermometer body **10**; a detector probe **20** pluggable into the human external auditory canal; and a connecting device **30** for rotatably and revolvably connecting the detector probe **20** the thermometer body **10**.

The thermometer body **10** further includes a micro processor, and electronic erasable and programmable ROM, an IC board **11** containing several control circuits, a liquid crystal display (LCD) and its base **12** a battery chamber **14** accommodating several batteries **13** and at least one control switch **15**. The ear temperature signal corresponding to the infrared ray emitted therefrom is detected by the detector probe **20** and is digitalized by the micro processor and compared with the calibrated datum stored in the erasable and programmable ROM; then the confirmed temperature volume is outputted to the LCD **12** for display. The ear thermometer contains a wave guide **21** and an infrared ray inductor as its sensing elements therein, Such electronic devices common to conventional techniques can also be installed in the thermometer body **10** and the detector probe **20** of the present invention.

Meanwhile the present invention is characterized in that a detector probe **20** is revolvable universally with respect to the thermometer body **10**, such that it is self rotatable, enabling it to freely adjust its tilted orientation to adaptively match the direction of the emerged inlet of the patient's external auditory canal. The detector probe **20** can thus be smoothly and securely plugged therein. The detector probe **20** had an arcuate neck portion **23**, and the connecting device **30** includes a pivot journal **31** fixedly engaged with an inlaying bole **32** provided at a top end of the thermometer body **10**. The pivot journal **31** has an arcuate skirt portion **33** corresponding to the arcuate neck portion **23** of the detector probe **20**, and the arcuate skirt portion **33** suspendedly extends into the thermometer body **10**. A plurality of parallel axial slots **34** are formed on the arcuate skirt portion **33** to split the skin portion **33** to several inwardly deflectable resilient claws wherein the arcuate neck portion **23** of the detector probe **20** is accommodated. With this structure the detector probe **20** is made revolvable about three dimensions with respect to the thermometer body **10**, to thereby be self-rotatable as shown in FIG. **4**.

Moreover, several wedge cotters **35**, each with a vertical stopper surface are formed on the outer wall surface of the arcuate skirt portion **33**. By a stopping function of the wedge cotters **35**, backwards slipping of the pivot journal **31** in the inlaying hole **32** is prevented. It should be understood that the engagement of the pivot journal **31** with the thermometer body **10** is by no means limited only to the away described above, other ways such as screw combining, binding with a binder, supersonic wave binding and welding are applicable to the present invention.

Meanwhile a plurality of screw holed lags **24** are formed around the bottom edge of the arcuate neck portion **23** of the detector probe **20** for retaining, for example, a control circuit board **22** of an infrared ray inductor with screws, and/or preventing the detector probe **20** from loosening from the pivot journal **31** after assembly is completed. The outer diametric extent defined by the screw hole lugs **24** is made greater than that of the skirt portion **33** of the journal **31**.

Referring to FIG. **5**, a housing **40** can be employed to entirely cover the front portion of the car thermometer of the present invention for protecting the detector probe **20**. Furthermore, an accommodation space **41** usable for storing accessories of the thermometer is provided.

From the above description, it is to be understood that the present invention is characterized in that its detector probe is made revolvable about three dimensions with respect to the thermometer body, and is constructed to remain self-rotatable. The detector probe is thus able to adjust in its tilted angle so as to freely match different directional orientations of the merged inlet of a patient's external auditory canal. Hence, the detector probe can smoothly and securely plugged therein.

Many changes and modifications in the above described embodiment of the invention can, of course, be carried out without departing from the scope of the present invention. Accordingly, to promote the progress in science and the useful arts, the invention is disclosed and is intended to be limited only by the scope of the appended claims.

What is claimed is:

1. An ear thermometer for measuring and displaying a tympanic membrane temperature, said ear thermometer comprising:

(a) a thermometer body having formed in a top end portion thereof an inlaying hole;

(b) a detector probe for insert into an external auditory canal; and,

(c) a connecting device rotatably and revolvably connecting said detector probe to said thermometer body, said connecting device including a pivot journal fixedly engaging said inlaying hole of said thermometer body.

2. The ear thermometer as recited in claim **1** wherein said detector probe includes an arcuate neck portion extending therefrom to engage said pivot journal of said connecting device.

3. The ear thermometer as recited in claim **2** wherein said pivot journal includes a deflectable arcuate skirt portion receiving said arcuate neck portion of said detector probe resiliently biased manner.

4. The car thermometer as recited in claim **3** wherein said arcuate skirt portion has formed therein a plurality of axial slots defining a plurality of resiliently deflectable claws.

5. The ear thermometer as recited in claim **3** wherein said arcuate skirt portion of said pivot journal has formed thereon a plurality of radially projecting wedge cotters, each said wedge cotter defining a stopper surface for engaging said thermometer body within said inlaying hole thereof.

6. The ear thermometer as recited in claim **3** wherein said arcuate neck portion of said detector probe has formed thereon a plurality of radially projecting screw holed lugs, said screw holed lugs extending radially beyond a radial extent of said arcuate skirt portion of said pivot journal.

7. An ear thermometer for measuring and displaying a tympanic membrane temperature, said ear thermometer comprising:

(a) a thermometer body having an inlaying hole formed therein;

(b) a detector probe for insert into an external auditory canal; and,

(c) a connecting device coupling said detector probe to said thermometer body, said connecting device including a pivot journal fixedly engaging said inlaying hole of said thermometer body, said pivot journal receiving a portion of said detector probe in pivotally engaged manner.

* * * * *

专利名称(译)	带可旋转和可旋转探测器探头的耳温计		
公开(公告)号	US6485433	公开(公告)日	2002-11-26
申请号	US09/694382	申请日	2000-10-24
[标]申请(专利权)人(译)	彭邵宇		
申请(专利权)人(译)	彭绍禹		
当前申请(专利权)人(译)	MESURE TECHNOLOGY CO.，LTD.		
[标]发明人	PENG SHAO YU		
发明人	PENG, SHAO-YU		
IPC分类号	G01K13/00 A61B5/01 G01J5/04 A61B5/00		
CPC分类号	G01J5/04 G01J5/047 G01J5/049 G01J5/08 G01J5/0843		
审查员(译)	刨，KEVIN		
优先权	089216078 2000-09-15 TW		
外部链接	Espacenet USPTO		

摘要(译)

提供一种具有可旋转且可旋转的检测器探针的耳温计。温度计包括温度计主体;可插入外耳道的探测器探头;连接装置，用于将探测器探头可旋转地和可旋转地连接到温度计主体上。连接装置包括枢轴轴颈，枢轴轴颈固定地接合温度计本体并以枢轴接合的方式接收探测器探针的一部分。