

(19)



(11)

**EP 4 059 370 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**21.09.2022 Bulletin 2022/38**

(51) International Patent Classification (IPC):  
**A42B 1/012<sup>(2021.01)</sup> A42B 1/245<sup>(2021.01)</sup>**

(21) Application number: **22162839.9**

(52) Cooperative Patent Classification (CPC):  
**A42B 1/245; A42B 1/012**

(22) Date of filing: **17.03.2022**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
 Designated Extension States:  
**BA ME**  
 Designated Validation States:  
**KH MA MD TN**

(72) Inventors:  
 • **GARRIDO MEDINA, Javier**  
**Barcelona (ES)**  
 • **MAS GRABOLEDA, Xavier**  
**Barcelona (ES)**

(74) Representative: **De Arpe Tejero, Manuel**  
**Arpe Patentes y Marcas**  
**Alcalá, 26, 5ª Planta**  
**28014 Madrid (ES)**

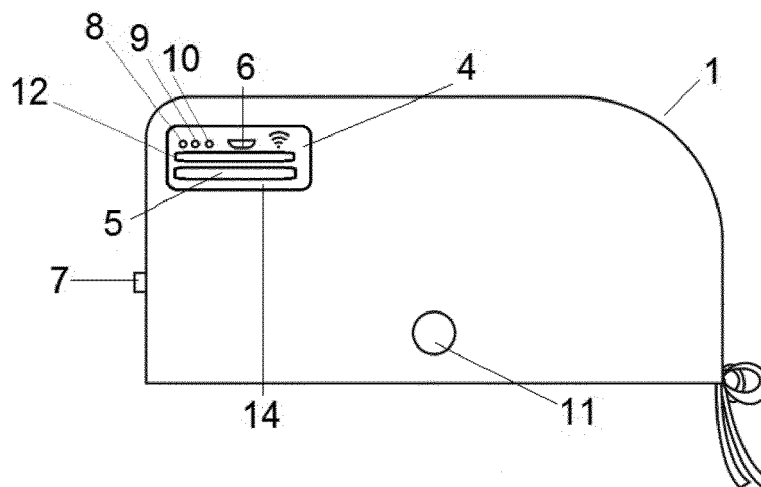
(30) Priority: **18.03.2021 ES 202130547 U**

(71) Applicant: **Robin Innova Tech, S.L.**  
**08191 Rubi-Barcelona (ES)**

(54) **WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL**

(57) The invention refers to a wireless fabric recording cap (1) that has a removable module (7) located on the front, which removable module incorporates a high-resolution micro-camera (2), a laser pointer (3), and a coupling LED (13). In addition, the hat (1), has another removable module (14), located in the upper part of the cap (1), incorporating the WIFI system (4), a battery (5)

as well as a mini USB connector (6), for connecting said battery to an external energy source, and an internal storage memory (12). In addition, this other removable module (14) incorporates LED light indicators, in red (8), orange (9) and green (10). The cap device is also equipped with a proximity sensor (11), arranged externally to said removable modules (7, 14).



**FIG.-2**

**EP 4 059 370 A1**

## Description

### OBJECT OF THE INVENTION

**[0001]** The present invention, as expressed in the wording of this description, relates to a wireless fabric recording cap with sensory proximity and voice control, which is intended for making recordings in operating theatres, kitchens, or in certain facilities since, thanks to the elements that comprise it, it enables to make recordings for training or illustrative purposes.

**[0002]** Thus, for example, if a surgeon wishes to record a surgical operation to show a specific technique, it is not necessary for him to incorporate an additional element, other than his/her own usual scrubs, since the camera is perfectly integrated into his/her scrubs cap. In the same way, the said cap, which is the object of the present invention, could also be used by professionals belonging to fields other than medicine, or in fields that require a certain control, such as for example in the field of food processing (food safety), quality control, etc.

**[0003]** Thus, the main field targeted by the subject matter of the present invention is medicine/surgery. Many surgeons use phones, tablets and other devices to record or tape their surgical procedures and share clinical cases. These devices are by no means typical operating theatre devices, even if they are being used inside the ORs. Thanks to the recording cap, it is possible to record valuable surgical interventions, which can serve as inspiration and training for other surgeons or students. In this way, taking advantage of the boom in new technologies and communications, we can have a very useful piece of equipment to share knowledge between hospitals, clinics or training centres that are remote from each other. Sharing a particular clinical practice can help to improve the care received by surgical patients.

**[0004]** There are several reasons why the recording cap that constitutes the object of the present invention will be wirelessly connected in order to be able to transmit without cables: one of them is for the convenience of the user, as he/she will not have annoying cables around him/her that could interfere with his/her professional activity when the user wears the cap that is the subject of the invention and wants to carry out some kind of recording; and another reason is to transmit the recording wirelessly, through video streaming, as well as the fact of enjoying connectivity to tablets and cell phones so that the recording can be controlled and monitored by means of external applications.

**[0005]** The recording cap will be activated by the user by means of a series of commands such as Stop/Start/Record/Stop, always without physically touching the equipment or device, either by means of proximity sensors or by voice, as this system allows the surgeon, cook or operator not to drop any element or instrument that is being manipulated at that moment. Simply, if the user deems it convenient to start recording at a given point in time, he/she will pronounce the word

"recording", or will simply raise his/her arm to a certain distance from the cap, a movement that will be picked up by the proximity sensor and will activate the recording mechanism incorporated in the recording cap that is the object of the invention.

**[0006]** Thus, the wireless fabric recording cap with sensory proximity and voice control provides a series of technical advantages that offer a solution to the problem posed. Therefore, the advantages that improve the prior art are those that allow the operation and functioning of the recording cap without any interaction between the user and the device, i.e., in no case will the user manipulate or touch the equipment, to execute any of the commands that allow its normal operation, such as Stop/Start/Record/Stop, from which it may be inferred that this will benefit those activities that require extra neatness, or cleanliness, or even concentration and precision, for example in activities of a surgical or medical nature. In addition to all this, there is the possibility that these images, regardless of whether it is a surgical procedure, the preparation of a culinary recipe, or any other activity carried out by the user of the recording cap, may be streamed to any device located anywhere in the world which has a Wi-Fi system.

**[0007]** Therefore, among other technical advantages provided by the recording cap which is the object of the present invention, one of them is its accuracy when being used, as it has a laser pointer which allows to focus millimetrically on the recording area chosen.

**[0008]** Furthermore, the recording cap that constitutes the object of the present invention has two very important characteristics, such as being both lightweight and comfortable, since the recording system it incorporates is small in size, which means that its weight is only a few grams heavier than that of a conventional cap not equipped with the aforementioned recording system, and it is not bothersome for the performance of the task to be carried out, since the location and configuration of the equipment has been studied to promote its ergonomics..

### FIELD OF APPLICATION

**[0009]** The field of application of the present invention is the manufacturing industry of fabric and wireless caps, hats, helmets, etc. incorporating sensorial proximity and voice controls.

### BACKGROUND OF THE INVENTION

**[0010]** Until today, the market for caps, especially those intended for use in the surgical field, has only one purpose, which is to serve as a barrier against microorganisms, which can be found in the hair of surgeons, in addition to the sweating on the head.

**[0011]** Surgical scrub caps are just another item of clothing used by surgeons or healthcare personnel in the operating theatre in order to preserve the highest levels of hygiene in the operating room, so that there is no pos-

sibility of transmitting viruses to other objects or people. However, this purpose is not enough nowadays, as new technologies allow the incorporation of innovative and interesting functionalities to these textile items, which are essential in highly disinfected environments.

**[0012]** For that reason, the present invention is presented as a genuine solution that not only allows the capture and recording of images and sound, which due to their importance and interest from a medical and academic point of view can be of great help to other medical professionals or to students of any branch of science, but which, due to its method of operation, through the incorporation of a sensorial proximity and voice control system, allows it to be operated in "hands-free" mode.

### DESCRIPTION OF THE INVENTION

**[0013]** In order to solve the inconveniences mentioned in the previous paragraphs, and seeking to offer an important technical advantage, such as the possibility of capturing, storing and streaming images, together with the possibility of operating the device without having to touch it, the inventors have designed the wireless fabric recording cap with sensorial proximity and voice control (1), which is made up of the following elements:

A removable module (7), located on the front of the said cap (1), which incorporates a high-resolution micro-camera (2), a laser pointer (3), which allows the millimetric demarcation of the recording area, and a coupling LED (13), which provides information about the correct assembly of the camera (2), to the cap (1), as well as the switching on or off of the camera (2).

**[0014]** In addition, the cap (1) has another removable module (14), located in the upper part of the cap (1), where the Wi-Fi system (4) for wireless connection is located, in order to have connectivity, both for streaming and for connecting cell phones and tablets, a battery (5), for energy storage, as well as a mini USB connector (6), to connect the battery to an external power source, and an internal memory (12), to store the videos, and then with the battery charging connector to download the videos digitally. The removable module (14) also contains a series of LED indicators, namely red (8), which indicates that the storage memory card is full, orange (9) and green (10), which indicate the battery charge level (5), as well as system errors. The cap (1) described above has a proximity sensor (11), which detects the movements of the user close to the device, without physically touching the device in any case, allowing the stop/run/record/stop commands to be given in this way or through voice commands. The said proximity sensor (11), operates as a laser barrier sensor.

**[0015]** This removable module (7) can be separated from the cap (1) in order to wash it appropriately. If the coupling is correct, the LED (13) will flash red. Once the recording starts, the LED (13) will start flashing.

**[0016]** Thus, the wireless fabric recording cap with sensory proximity and voice control (1) is preferably made

of fabric of any type, although the use of any other type of materials, which on account of their composition allow their application to the present invention, should not be ruled out either.

**[0017]** The cap that is the object of the present invention (1), will have two modes of operation: one which is controlled through an application with Wi-Fi connectivity, either by voice or by touch control in a graphical application, or manually by means of proximity sensors. As regards the control of the invention via an application, the sequence of use is as follows:

1) The user pronounces: "On" or the key ON is pressed in the graphical application

2) The user pronounces: "Focus on the recording area" (Laser) or the key LASER is pressed in the graphical application.

3) The user pronounces: "Recording" or the key REC is pressed in the graphical application.

4) The user pronounces: "Stop" or the key STOP is pressed in the graphical application

5) The user pronounces: "Off or the key OFF is pressed in the graphical application

**[0018]** The other method of operation consists of using the device in voiceless mode and without the app, so that the following sequence would be initiated by manually adjusting the focus of the camera lens (2) with a laser pointer (3), in order to clearly delimit the recording area. Thus, once the recording field is sharply focused, the user will bring his/her arm close to the proximity sensor (11) so that the light signal disappears, and everything will be ready to start recording.

**[0019]** To start recording, we will use the proximity sensor (11), since it may happen that when we want to start recording the surgery, it may have already started, and this way we avoid touching anything with our hands. Therefore, the user will approach his/her hand, and the device will indicate, with a vibration signal, that it is recording and the coupling LED (13) will start to blink. Once the hand is brought close to the cap (1) again, the recording will stop, and the device will vibrate twice to indicate that it is no longer recording. This record-stop cycle can occur repeatedly during a surgery or any other activity that is being performed by the user. Finally, to finish the whole sequence, we will return the arm to the front of the cap (1), and the coupling led (13) will turn off, thus completely switching off the camera.

**[0020]** Thus, the object of the present invention is to provide a wireless fabric recording cap with sensorial proximity and voice control (1), mainly comprising two removable modules (7) and (14), one of them located in the front part (7), which allows focusing and capturing images, and the other (14), located in the upper part of

the cap (1), which contains the communications, connection, storage and light alerts elements. Similarly, the device described (1) has a proximity sensor (11), located outside both removable modules (7) and (14).

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0021]** In order to complement the description herein contained, this description is accompanied by a set of drawings, showing, by way of illustration and without limitation, the following:

- Figure 1 shows a schematic front elevation view of the wireless fabric recording cap with sensory proximity and voice control (1);
- Figure 2 shows a schematic side elevation view of the wireless fabric recording cap with sensory proximity and voice control (1);
- Figure 2 shows a schematic side elevation view of the wireless fabric recording cap with sensory proximity and voice control (1).
- Figure 3 shows a schematic top plan view of the wireless fabric recording cap with sensorial proximity and voice control (1).

#### DESCRIPTION OF A PREFERRED EMBODIMENT

**[0022]** As it can be appreciated in the above mentioned figures, the cap fitted with an image and sound recording device (1) which is the object of the invention consists of a series of elements which have been sufficiently described in the preceding sections of the present description, so that a preferred embodiment of the invention would consist of its manufacture by firstly designing the paper patterns of the cap; Once the different paper patterns have been designed, they will be transferred to the fabric material, cut out and assembled by sewing together the different pieces that make up the cap.

**[0023]** Subsequently, the different holes where the removable modules will be located will be drilled, either manually or mechanically, both in the front area of the cap and in the upper area of the same, and then the micro-camera will be attached to the aforementioned removable front module by gluing it or using any other means of attachment, and the laser pointer and the coupling LED will be inserted; The remaining elements (power supply, Wi-Fi system, battery, mini-USB connector, etc.) will be placed on the other removable module and fixed to the cap; finally, the cable that will keep the different elements and the camera connected will be attached.

**[0024]** Once the nature of the invention and its practical embodiment have been sufficiently described, it should be noted that the above-mentioned arrangements shown in the attached drawings may be modified in detail as

long as they do not alter the basic principle of the invention.

#### 5 Claims

1. A WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL (1), **characterised in that** it comprises a removable module (7), located on the front of the said cap (1), which incorporates a high resolution micro-camera (2), a laser pointer (3), and a coupling LED (13). In addition, the cap (1) has another removable module (14), located in the upper part of the cap (1), where the Wi-Fi system (4), a battery (5), for energy storage, and a mini USB connector (6), for connecting the battery to an external energy source, as well as an internal memory (12) for the storage of images are located. Also, this removable module (14) contains a series of red (8), orange (9) and green (10) LEDs. Similarly, the device disclosed herein has a proximity sensor (11), located outside the removable module (14) and the removable module (7).
2. A WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL (1), according to claim 1, **characterised in that** the integrated Wi-Fi system (4) enables wireless connections for the purpose of providing connectivity for both streaming and connecting cellular phones and tablets.
3. A WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL (1), according to claim 1, **characterised in that** the laser pointer (3), enables millimetric focusing on the chosen recording area.
4. A WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL (1), according to claim 1, **characterised in that** it has two operating modes: a fully voice-controlled mode, once it is connected to a mobile phone or tablet application, and a manual mode featuring a proximity sensor (11).
5. A WIRELESS FABRIC RECORDING CAP WITH SENSORIAL PROXIMITY AND VOICE CONTROL (1), according to claim 1, **characterised in that** the LED indicators inform about the battery charge level (5), using three indicators, namely red (8), orange (9), and green (10), and the LED coupling indicator (13), informs about the correct integration of the camera, and whether or not the camera is switched on.

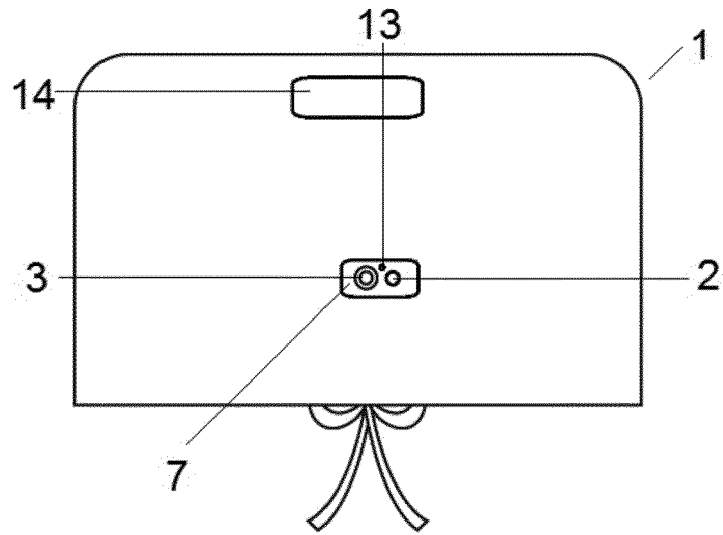


FIG.-1

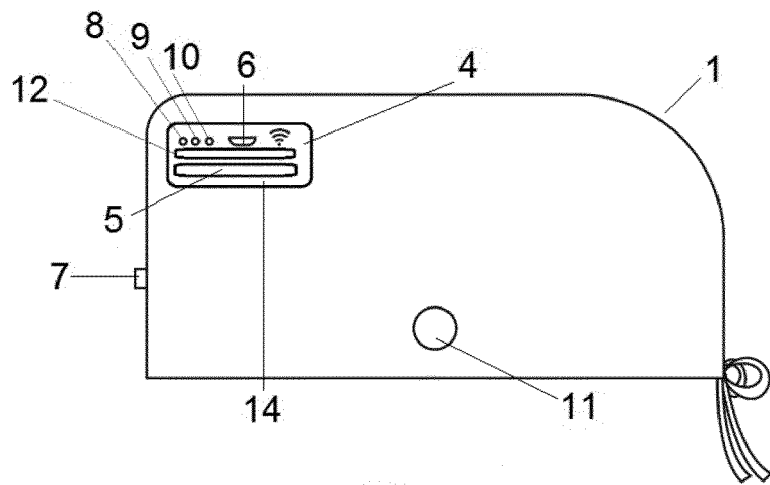


FIG.-2

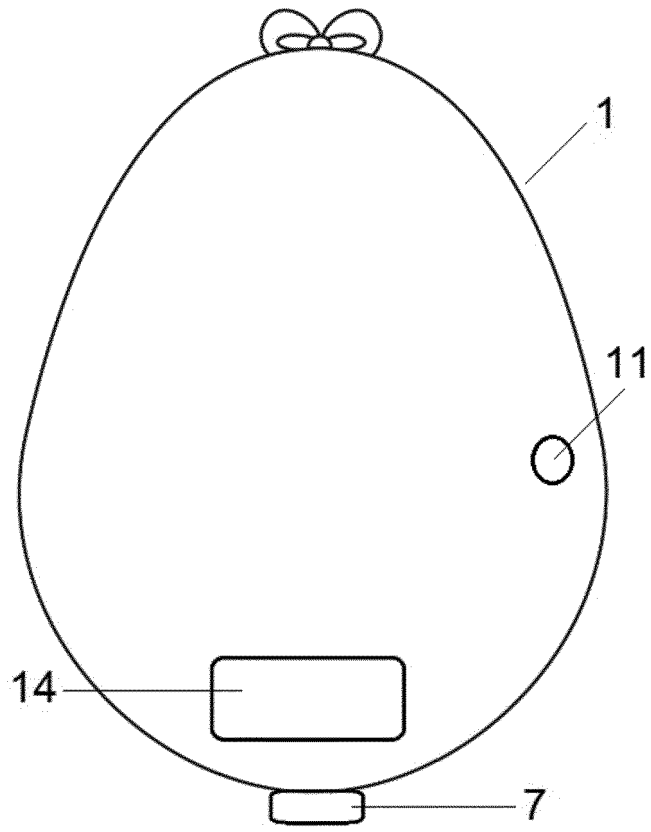


FIG. 3



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 2839

5

DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

20

25

30

35

40

45

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2017/126939 A1 (SALEMNIA SAM [US]) 4 May 2017 (2017-05-04) * paragraphs [0037] - [0042]; figures 1, 2 *	1-5	INV. A42B1/012 A42B1/245
A	DE 10 2006 059535 A1 (DEMONTY MONIQUE [BE]; SCHNITZLER BORIS [DE]) 19 June 2008 (2008-06-19) * claim 1; figure 1 *	1-5	
A	JP 2010 185155 A (TANIZAWA SEISAKUSHO LTD) 26 August 2010 (2010-08-26) * abstract *	1-5	
A	CN 107 713 145 A (STATE GRID JIANGXI ELECTRIC POWER CO ELECTRIC POWER RES INST ET AL.) 23 February 2018 (2018-02-23) * abstract *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			A42B

1

The present search report has been drawn up for all claims

50

Place of search <b>The Hague</b>	Date of completion of the search <b>28 July 2022</b>	Examiner <b>D'Souza, Jennifer</b>
-------------------------------------	---	--------------------------------------

55

EPO FORM 1503 03:82 (P04C01)

CATEGORY OF CITED DOCUMENTS  
 X : particularly relevant if taken alone  
 Y : particularly relevant if combined with another document of the same category  
 A : technological background  
 O : non-written disclosure  
 P : intermediate document

T : theory or principle underlying the invention  
 E : earlier patent document, but published on, or after the filing date  
 D : document cited in the application  
 L : document cited for other reasons  
 .....  
 & : member of the same patent family, corresponding document

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 16 2839

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-07-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
<b>US 2017126939 A1</b>	<b>04-05-2017</b>	<b>US 2017126939 A1</b>	<b>04-05-2017</b>
		<b>US 2020177772 A1</b>	<b>04-06-2020</b>
		<b>US 2021136259 A1</b>	<b>06-05-2021</b>
-----			
<b>DE 102006059535 A1</b>	<b>19-06-2008</b>	<b>NONE</b>	
-----			
<b>JP 2010185155 A</b>	<b>26-08-2010</b>	<b>NONE</b>	
-----			
<b>CN 107713145 A</b>	<b>23-02-2018</b>	<b>NONE</b>	
-----			

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82