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(54) Title: SURGICAL SKIN STAPLES WITH SILVER ION COATING

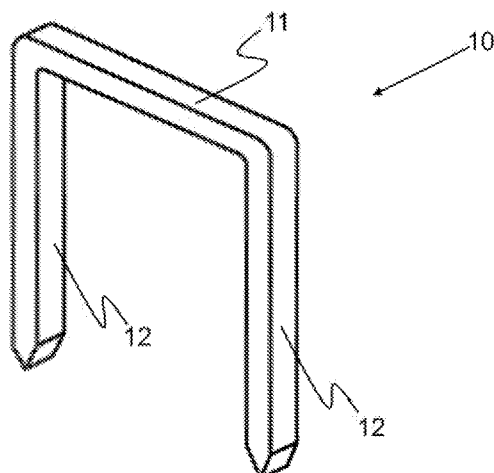


Figure 1

(57) Abstract: The present invention relates to a surgical skin staple (10) that is used in surgical staplers (20) for the purpose of closing skin incisions in surgeries or emergency surgery units in the medical field, consists of a strip (11) in flat form, foot (12) running down from both ends of the strip (11), is made of titanium and stainless steel alloy. The present invention is characterized in that; the entire surface of the surgical skin staple (10) is coated with silver ions.

## **Surgical skin staples with silver ion coating**

### **5 Field of the Invention**

The invention present relates to surgical skin staples that are used in surgical stapler machines for the purpose of closing skin incisions in surgeries or emergency surgery units in the medical field.

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In particular, the present invention relates to surgical skin staples, which are antibacterial by coating the entire surface with silver ion coating, and minimizes the risk of infection at the wound and wound edges.

### **15 State of the Art**

The method of suturing the skin tissues with a manual needle and thread has been replaced with the method of suturing with surgical staplers called staplers with the development of medical science and technology. Said surgical staplers are machines  
20 that staple the tissues by using the cartridge.

Staples that are used in surgical staplers in the state of the art are made of titanium and steel alloy. However, said staples carry the risk of infection due to their long stay in body tissues and high corrosion resistance. The risk of infection increases especially  
25 due to hospital conditions, patient cleaning, care of wound edges, and open wound conditions. Accordingly, although dressing is applied to the seams made with staples made of titanium and steel alloy, it is not possible to prevent any contamination and reaction on the wound edges and on the wound. For this reason, a surgical skin stapler that eliminates the negativities experienced in the sutures applied with surgical skin  
30 staples is required in the state of the art.

The document numbered JP2014033768 can be shown as an example of the state of the art in the research carried out in the literature. Said document relates to a medical stapler. A medical stapler supported in cooperation with a medical stapler used to  
35 suture a biological tissue is disclosed in said invention. Said staple is basically made of stainless steel wire rod, a pair of legs is formed that are bent in a U shape and have

sharp ends at both ends so as to reduce resistance during tissue puncture. However, there is a risk of infection in body tissues since said staple is made of stainless steel wire rod.

- 5 Document No US2020054323 can be shown as another example of the state of the art. Said document relates to a surgical staple manufacturing method. The production method of the staple cartridge used in surgical staplers is disclosed in the said invention. Said surgical staple is made of stainless steel or titanium. Thus, there is a risk of infection in body tissues in sutures performed with said surgical stapler.

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As a result, in order to solve the abovementioned problems and the insufficiency of the current solutions makes it necessary to make a development in the relevant technical field.

## 15 **Aim of the Invention**

The present invention relates to a surgical skin staple with silver ion coating which eliminates the abovementioned disadvantages and brings new advantages to the relevant technical field.

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The main purpose of the invention is to make the surgical skin staple surface antibacterial by coating the same with a silver ion coating.

- The aim of the invention is to minimize the risk of infection in wounds and wound edges  
25 by making use of the antibacterial and antifungal properties of silver.

Another aim of the invention is to minimize the risks associated with wound healing using silver-ion-plated surgical skin staples in skin sutures applied to patients with diabetes, blood pressure, and chronic diseases with delayed wound healing.

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Another aim of the invention is to accelerate the wound healing process with the help of the blood circulation enhancing feature of silver.

- In order to fulfill all the aims mentioned above and which may arise from the detailed  
35 description, the present invention relates to a surgical skin staple that is used in surgical staplers for the purpose of closing skin incisions in surgeries or emergency

surgery units in the medical field, consists of a strip in flat form, foot running down from both ends of the strip, is made of titanium and stainless steel alloy.

- the entire surface of the surgical skin staple is coated with silver ion.

5 The structural and characteristic features of the present invention and its all advantages will be understood clearly by the following drawings and the detailed description made with reference to these drawings. Therefore the evaluation shall be made by taking these figures and the detailed description into consideration.

## 10 **Figures Clarifying the Invention**

**Figure 1:** Is a view of the inventive surgical skin stapler

### **Description of the Part References**

15

**10.** Surgical skin staple

**11.** Strip

**12.** Foot

**20.** Surgical skin stapler

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### **Detailed Description of the Invention**

In this detailed description, the preferred alternatives of the inventive surgical skin staple (10) are described only for clarifying the subject matter such that no limiting effect is created.

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The general view of the inventive surgical skin staple (10) is given in Figure 1. Accordingly, the surgical skin staple (10) in its most basic form comprises; a strip (11) in flat form, and a foot (12) extending down from both ends of the strip (11).

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The inventive surgical skin staple (10) is made of titanium or stainless steel alloy and is produced by bending in a U shape. The entire surface of the U-shaped surgical skin staple (10) is coated with silver ions.

The inventive surgical skin stapler (10) with silver ion coating is applied by applying the same over the skin incisions by means of a surgical skin stapler (20) as seen in figure 2.

## CLAIMS

1. A surgical skin staple (10) that is used in surgical staplers machines (20) for the purpose of closing skin incisions in surgeries or emergency surgery units in the medical field, consists of a strip (11) in flat form, foot (12) running down from both ends of the strip (11), is made of titanium and stainless steel alloy, ***characterized in that;***

- the entire surface of the surgical skin staple (10) is coated with silver ions.

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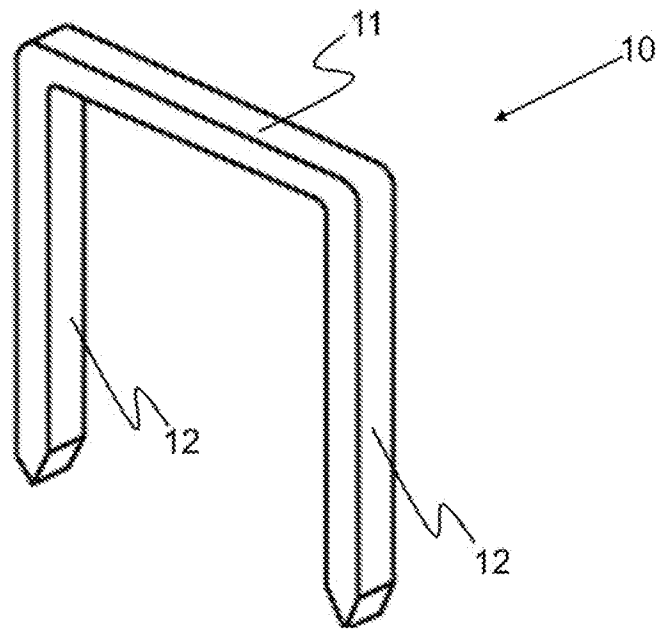


Figure 1

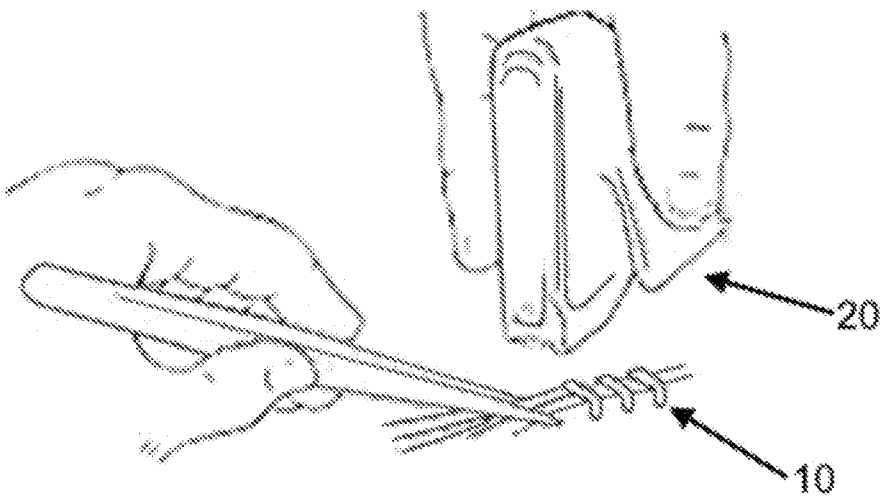


Figure 2

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2021/051529

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>A61B 17/064 (2006.01)i; A61B 17/068 (2006.01)i<br>A61B 17/064; A61B 17/068; A61B 2017/00889(CPC)<br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                    |                                                                                       |           |                                                                                    |                       |   |                                                                                                                                                                                                                    |   |   |                                                                                            |   |   |                                                                                               |   |
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| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>A61B<br>A61B 17/064; A61B 17/068; A61B 2017/00889(CPC)<br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)<br>EPODOC, Google Patents, Turkish National Patent Database Keywords: surgical stapling instrument, skin staples, cover, coat, stainless steel, titanium, silver ion, foot, strip, u/n/c shape                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                    |                                                                                       |           |                                                                                    |                       |   |                                                                                                                                                                                                                    |   |   |                                                                                            |   |   |                                                                                               |   |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 2017056007 A1 (ETHICON ENDO-SURGERY LLC [US] (B2)ETHICON ENDO SURGERY LLC [US]; ETHICON LLC [US]) 02 March 2017 (2017-03-02)<br/>abstract, paragraphs [0150]-[0158], [0210], [0247]-[0265], examples 126-132,222</td> <td>1</td> </tr> <tr> <td>X</td> <td>CN 203220398U U (EBOUR ORTHOPEDICS LTD) 02 October 2013 (2013-10-02)<br/>the whole document</td> <td>1</td> </tr> <tr> <td>X</td> <td>WO 9213491 A1 (MINNESOTA MINING &amp; MFG [US]) 20 August 1992 (1992-08-20)<br/>the whole document</td> <td>1</td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                    |                                                                                       | Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | X | US 2017056007 A1 (ETHICON ENDO-SURGERY LLC [US] (B2)ETHICON ENDO SURGERY LLC [US]; ETHICON LLC [US]) 02 March 2017 (2017-03-02)<br>abstract, paragraphs [0150]-[0158], [0210], [0247]-[0265], examples 126-132,222 | 1 | X | CN 203220398U U (EBOUR ORTHOPEDICS LTD) 02 October 2013 (2013-10-02)<br>the whole document | 1 | X | WO 9213491 A1 (MINNESOTA MINING & MFG [US]) 20 August 1992 (1992-08-20)<br>the whole document | 1 |
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| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                    |                                                                                       |           |                                                                                    |                       |   |                                                                                                                                                                                                                    |   |   |                                                                                            |   |   |                                                                                               |   |
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| Date of the actual completion of the international search<br><b>30 April 2022</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                    | Date of mailing of the international search report<br><b>30 April 2022</b>            |           |                                                                                    |                       |   |                                                                                                                                                                                                                    |   |   |                                                                                            |   |   |                                                                                               |   |
| Name and mailing address of the ISA/TR<br><b>Turkish Patent and Trademark Office (Turkpatent)</b><br><b>Hipodrom Caddesi No. 13</b><br><b>06560 Yenimahalle</b><br><b>Ankara</b><br><b>Turkey</b><br>Telephone No. +903123031000<br>Facsimile No. +903123031220                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                    | Authorized officer<br><br><b>Ceren Bora Orçun</b><br><br>Telephone No. 00903123031620 |           |                                                                                    |                       |   |                                                                                                                                                                                                                    |   |   |                                                                                            |   |   |                                                                                               |   |