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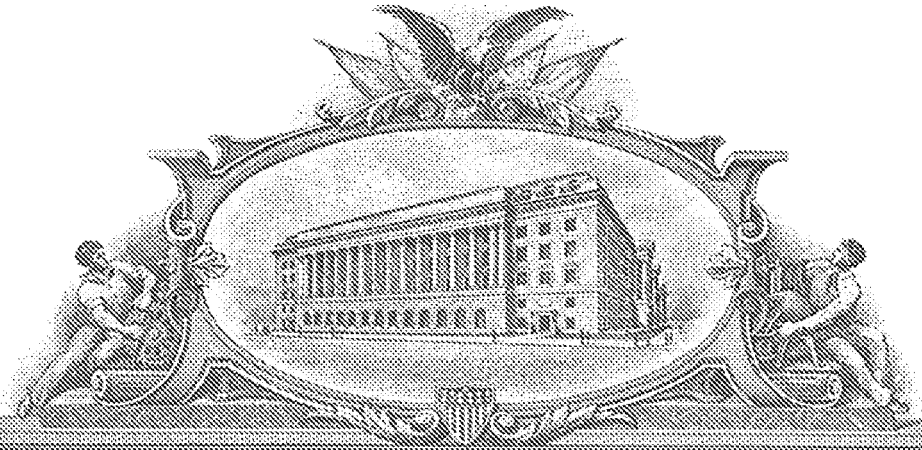
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FILING DATE: March 05, 2009

RELATED PCT APPLICATION NUMBER: PCT/US10/20498

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US61/157,579



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Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)

Approved for use through 06/30/2010 OMB 0651-0032

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Provisional Application for Patent Cover Sheet

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)

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All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

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Title of Invention

Electronic Frames for Electro-Active Lenses

Attorney Docket Number (if applicable)

P9933-USP100

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Entity Status

Applicant claims small entity status under 37 CFR 1.27

- ☐ Yes, applicant qualifies for small entity status under 37 CFR 1.27
- ☒ No

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First Name	Wesley	Last Name	Jones	Registration Number (If appropriate)	56552

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Electronic Acknowledgement Receipt	
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First Named Inventor/Applicant Name:	Claudio Dalla Longa
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Payment Type	Deposit Account
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Specification	9933_USP100_scanned_version.pdf	5144821 f2a55bb46f4d84bab9051e4da489a622/cd85ad2	no	35
Warnings:					
Information:					
2	Provisional Cover Sheet (SB16)	P9933_USP100_provisional_cover_sheet2.pdf	999774 a142c9100ac0123c36af1f32bb5ce4b96479f962	no	4
Warnings:					
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3	Fee Worksheet (PTO-06)	fee-info.pdf	28924 77b684fcb9888c770b71262b9ea942827156ae2	no	2
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Slime line Electronic Frames for use with Electro-active Lenses

The present invention involves a novel approach to designing electro-active spectacles using an expandable sections of conductive material. The present invention also provides for a low-cost, more reliable method for lens synchronization.

The present invention is best understood by describing the figures contain herein.

Figure 1 is the front view of a fully rimmed pair of electro-active spectacle frames. By fully rimmed, it is meant that the eye wire of the frame completely circle the outer edge of the lenses. This allows the two lenses to be driven directly by a single set of drive electronics which would naturally synchronize the lenses, or by two sets of drive circuit where by the lenses would be synchronized by the two wires connected to each conductive eye wire section as will be more fully described herein.

Figure 2 illustrates a side view of the electro-active spectacle frame indicating the location of the drive and control circuitry inside the front section of the frame temple. In some embodiments of the present invention the thin long drive and control circuit is located in both the left and right frame temples. In other embodiments only the right or only the left temple will contain electronics.

Figure 3 is a top view of the electro-active spectacle frames of the present invention.

Figure 4 illustrates the bottom section of a nose bridges used in the present invention.

Figure 5 illustrates a insulating separator that electrical isolates the bottom of the nose bridge section from the top of the nose bridge section shown in figure 6.

Screws or other fasteners can be used to secure the nose bridge pieces together with the under and lower eye wires of the spectacles. It is important to point out the nose bridge segments are using to electrical connect the left and right eye wires of the fully rimmed frame. Therefore they segments can be made from conductive metal coated with insulating lacquer or plastic with buried conductive sections. In the later case the insulating separator of Figure 5 may not be required.

Figure 7 illustrates the fully assembled right side of the electro-active spectacle frame.

Figure 8 illustrates the right side of the frame with the lenses removed. In the figure an upper conducting wire makes electrical contact to the upper frame rim providing a conduction path to the lens as well as one synchronization path to the left lens through the frame assembly. An insulating separator electrically isolates the upper conducting wire from the lower conducting wire as well as the upper and lower rims.

Figure 9 is another view of the frame.

Figure 10 illustrates the connection of the electronic module to the frame via two the two conductive wires. The electronic module is preferably potted or covered in water resistant materials such as

polymeric potting compounds or epoxy. Materials for potting electronic circuits are well known in the art and often used in PDAs, cell phone, and other hand held devices.

Figure 11 illustrates the insulation coated flexible spring conductor coming out of the electronic module. These two spring sections can be formed by simply bending a single wire over a cylinder of fairly small diameter. The spring like shapes allow the wires to expand and contract as the frame temples are opened and closed. Preventing the need for any moving parts associated with the connection of the lenses to the electronic module.

Figure 12 illustrates bushings in the insulating section. One bushing is for the assembly of the top and bottom frame rim and the front of the temple stem. The other is used to create a hinge point for the temple to be opened and closed.

Figure 13 illustrates the routing of the conductive wires through the insulating separator. Also shown on the figure is the exposed conductors at the end of the wires that will make contact to the electrodes on the sides of the electro-active lenses. Not shown.

Figure 14 illustrates the through holes through the insulating separator.

Figure 15 illustrates the wiring from the electronic modules. The insulated wires are bend three times to form expandable members. Insulation is removed from the ends of the wires to create contacts for the electrodes on the side of the electro-active lenses.

Figure 16 illustrates the electronic module inside the temple casing. The module can be slid into the casing from the front as shown.

Figure 17 illustrates a window in the side of the temple casing to provide for a switching mechanism. In preferred embodiments this switching mechanism would be a capacitive switch.

Figure 18 illustrates a capacitive switch extending from the window in the temple casing.

Figure 19 illustrates only electronic module, the conductive wires and the capacitive switch as an assembly.

Figure 20 illustrates the front of the frame temple formed by the temple casing, the electronic module, conductive wires and the capacitive switch.

Figure 21 illustrates the electronic module being placed within the front frame temple casing.

Figure 22 illustrates the electronic module joined to the upper and lower rims via the upper and lower rim connector.

Figure 23 illustrates the attachment of the front frame temple assembly to upper and lower rims connector forming a hinge like structure. Screws or other fastener may be used to complete the assembly.

Figure 24 is a close of view the formation of the hinge by placing front temple assembly to the assembled upper and lower rims .

Figure 26 illustrates the assembly frame temple with the back section of the frame temple or temple tip being connected to the front temple assembly which contains the electronic module.

Figure 27 illustrates the battery located in the battery holder near the very back of the temple tip

Figure 28 illustrates the wiring from the battery using two flexible wires than can be bent to change the shape of the temple tips to make them fit the patient in the most effective manner.

Figure 29 illustrates the wiring from Figure 28 connected into the electronic module.

Figure 30 is a back view of the wiring from the battering going into the electronic module which is now covered with the front frame temple casing.

Figure 31 illustrates the battery holder and battery connected to the flexible wires. It also shows the temple tip attachment points which will attach the front temple assembly to the back temple frame section or frame tip.

It is important that point out that this basic design could be made semi-rimless by removing the lower sections of the eye wire. In such cases, one wire synchronization would be required unless conductive instead of nylon wires could be used in the grooves normally cut in the lower have of the lens to accommodate the nylon wires typically used to secure lenses into a semi-rimless frame.

A nearly rimless design could also be made by remove most of the upper and lower rims only leaving enough of the rim in place on the top and bottom sides to make good electrical contact. Such a design could then be synchronized using conductive wires in a channel on the upper and lower edge of the frames or by using wireless synchronization .

What is claimed,

1. A electronic frame design that includes an expandable conducting member to allow for an opening and closing of the frame temple without lose of electrical connection from the drive electronics and the electro-active lenses.
2. A frame as in claim 1, wherein one or more batteries is located at the back of the frame temple and are physically separated from the drive circuitry.

Fully-Rimmed Electro-Active Spectacle Frame

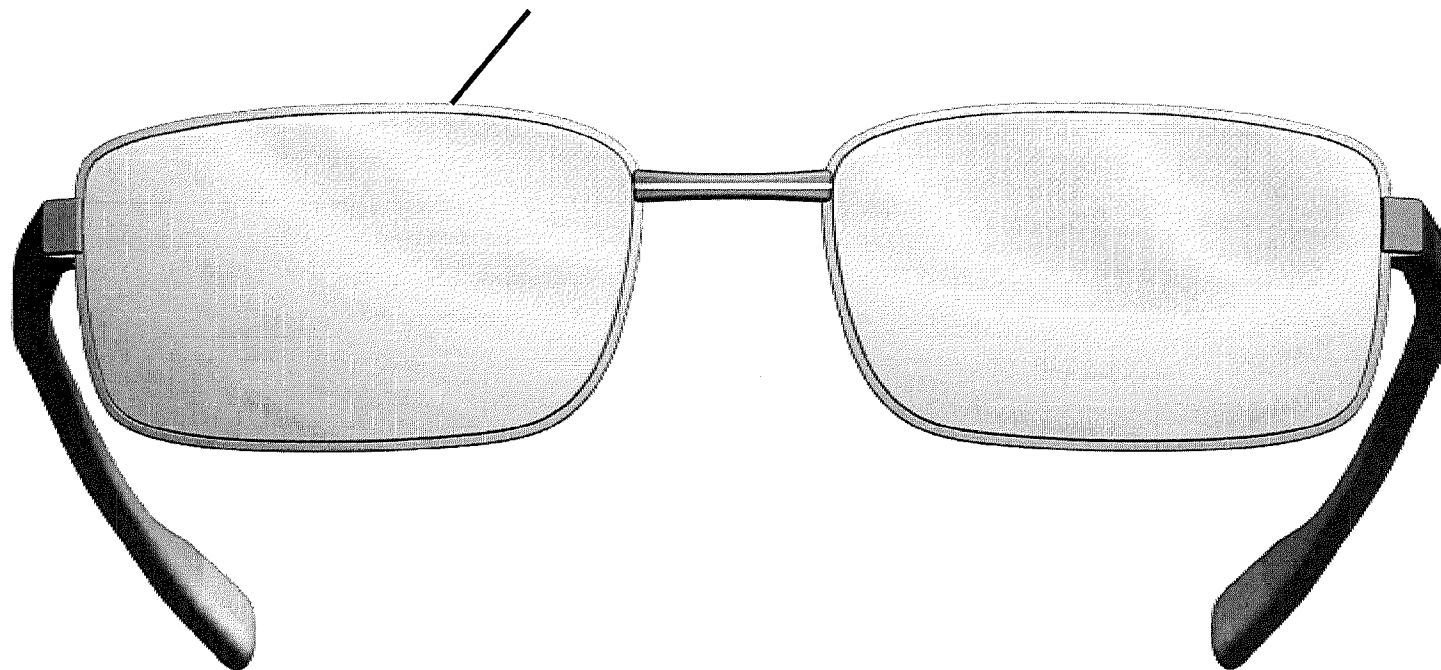


Fig. 1

Location for thin long drive and control circuitry

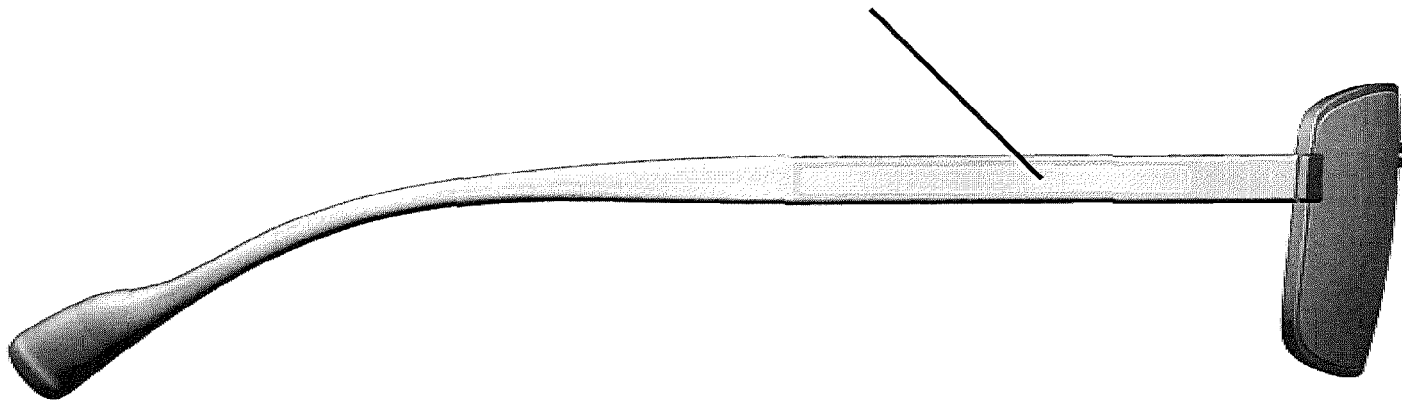
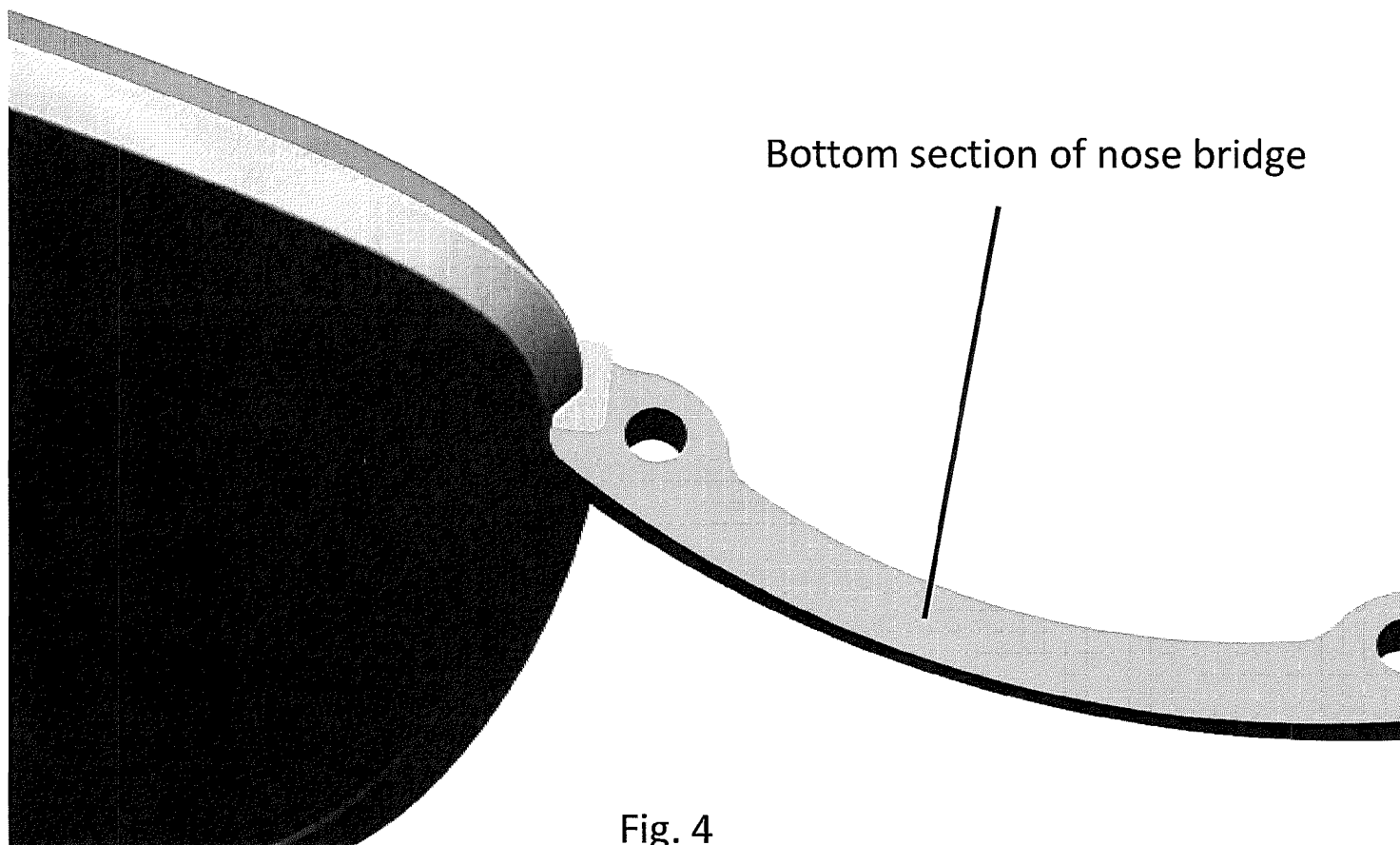


Fig. 2



Fig. 3



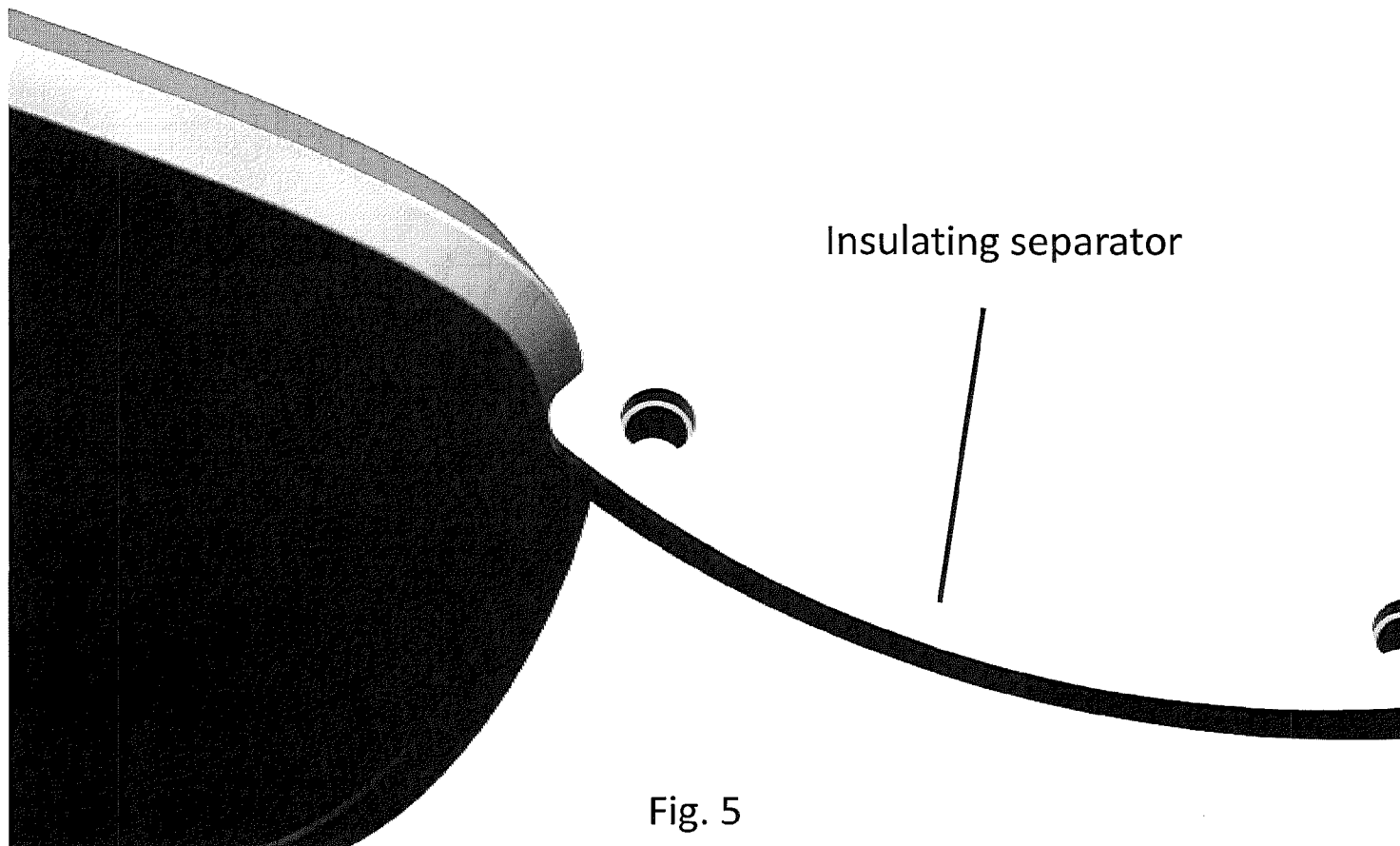


Fig. 5

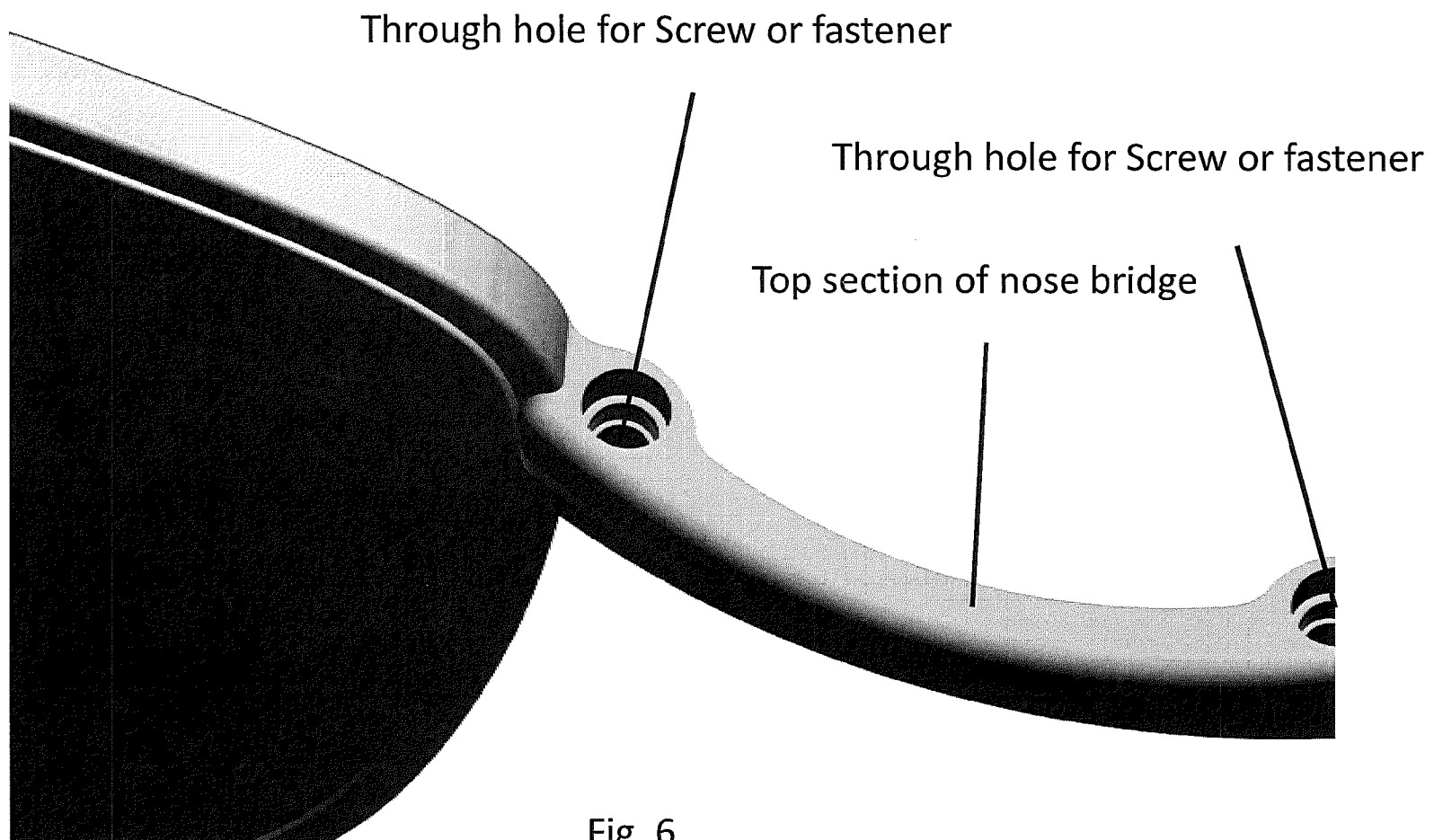


Fig. 6

Right side of Spectacle Frame

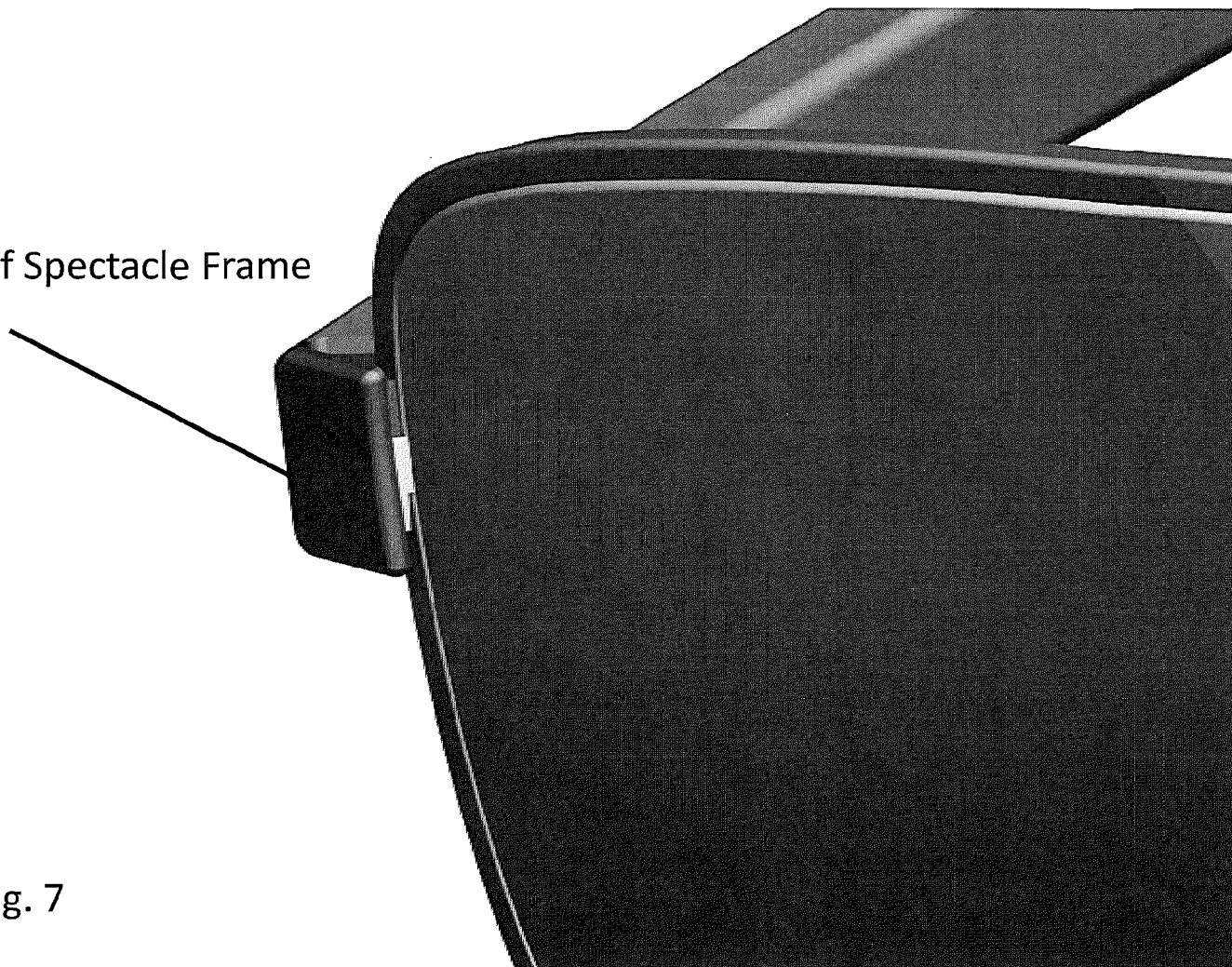


Fig. 7

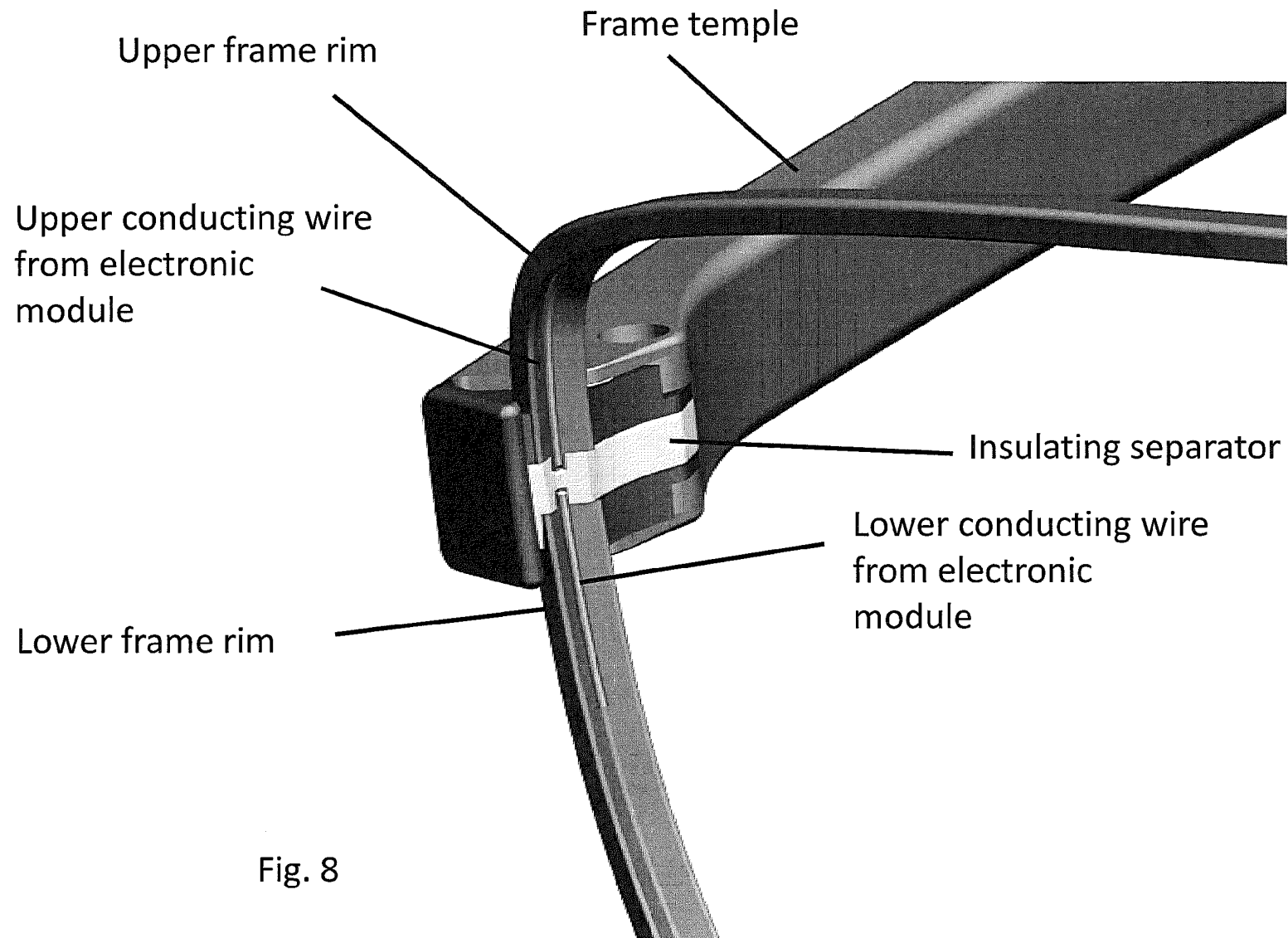


Fig. 8



Fig. 9

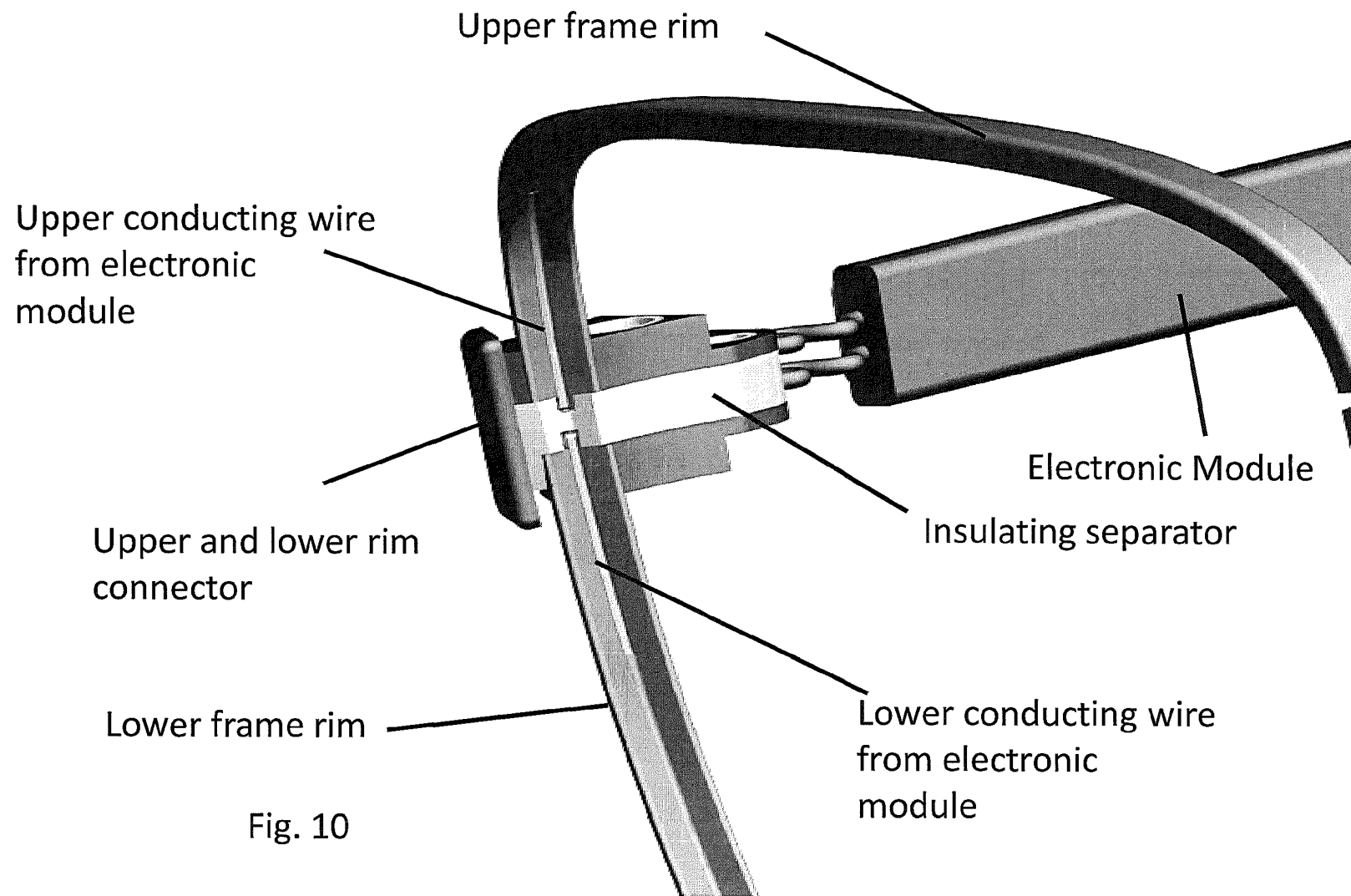


Fig. 10

Insulation Coated Flexible Spring Conductors

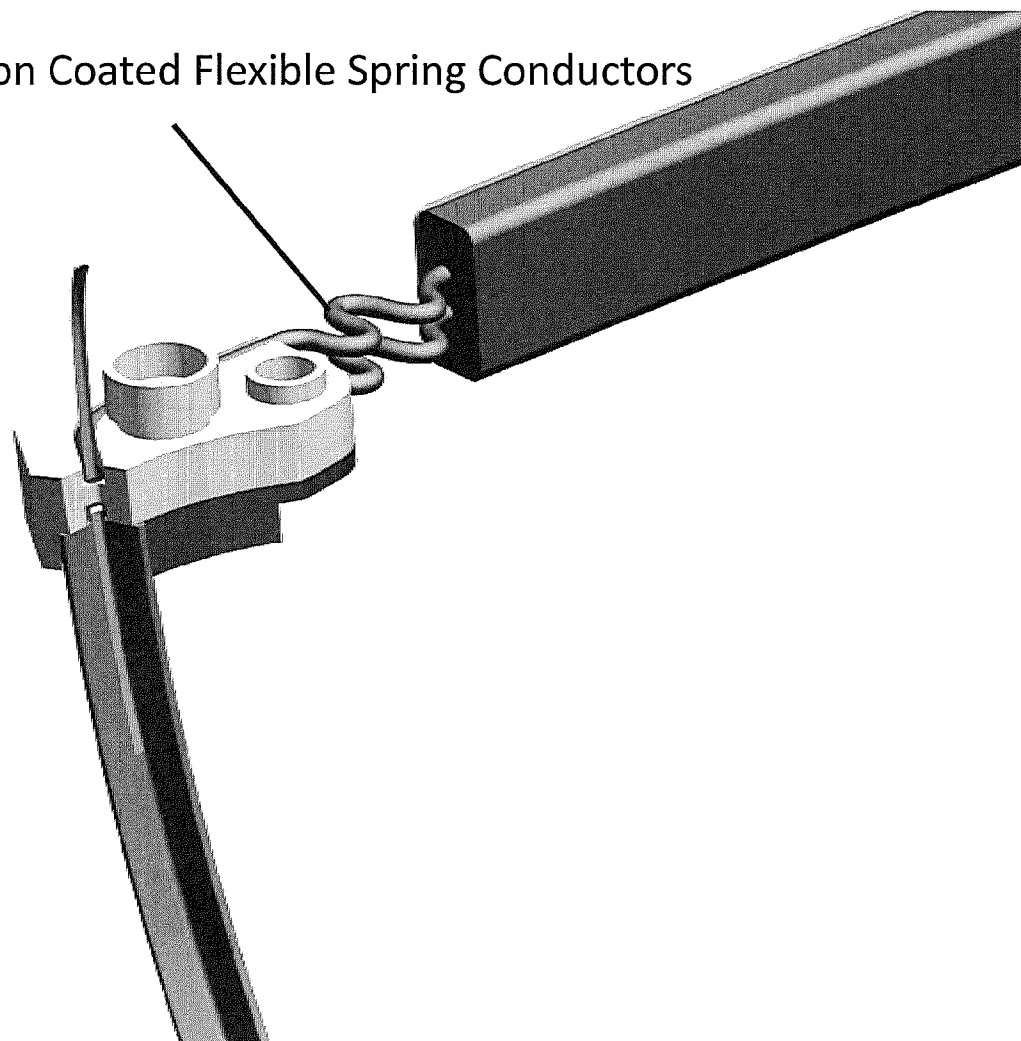


Fig. 11

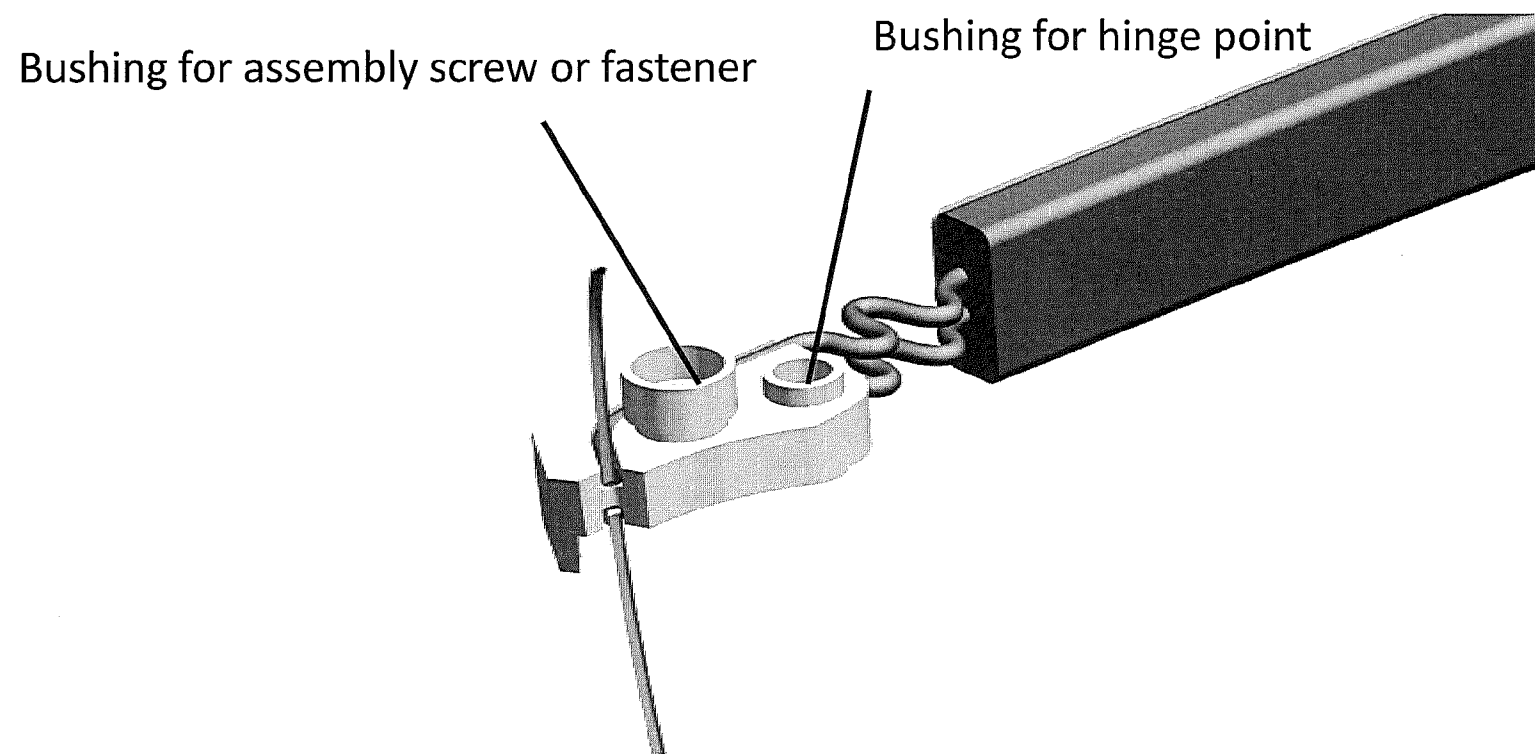


Fig. 12

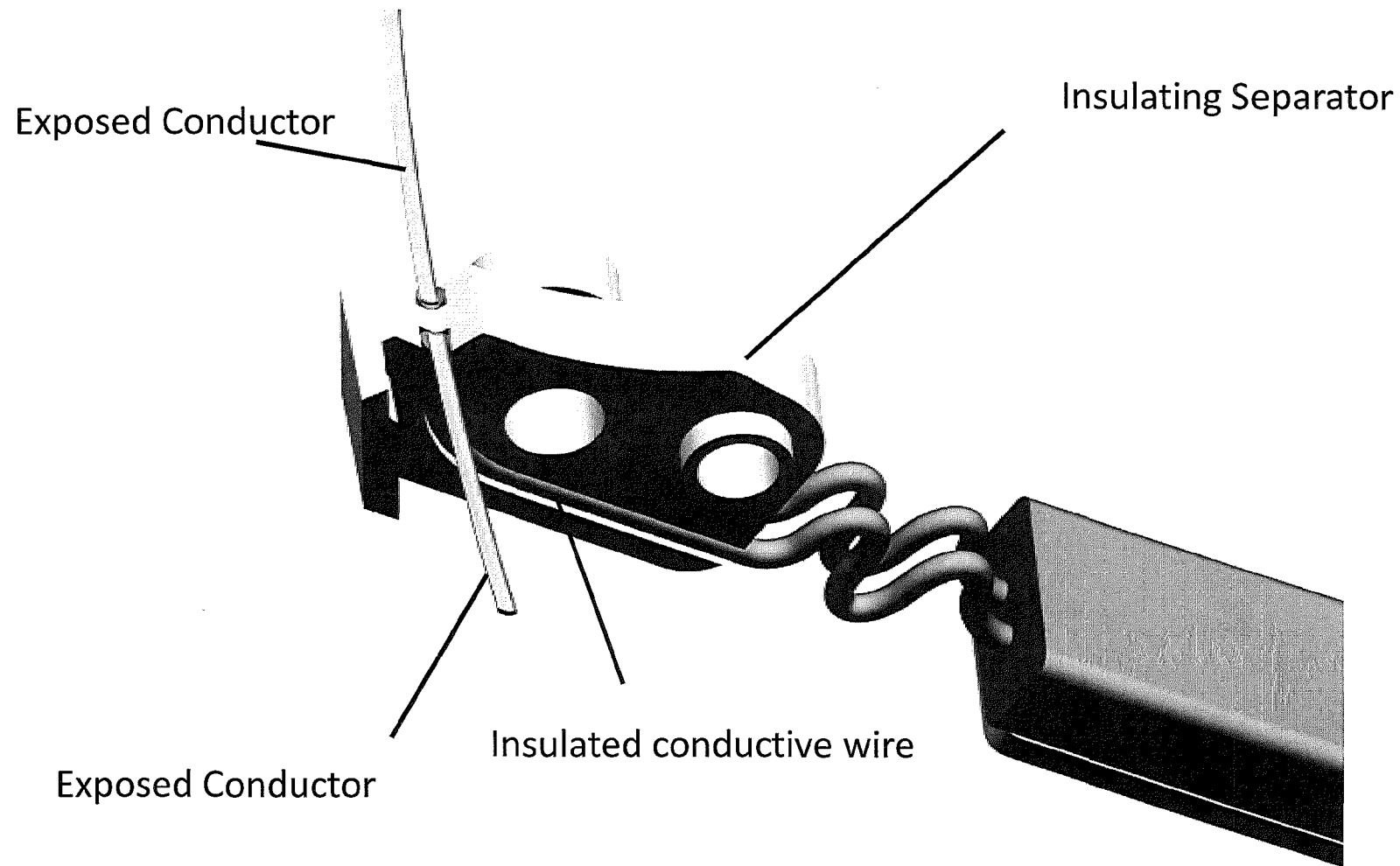


Fig. 13

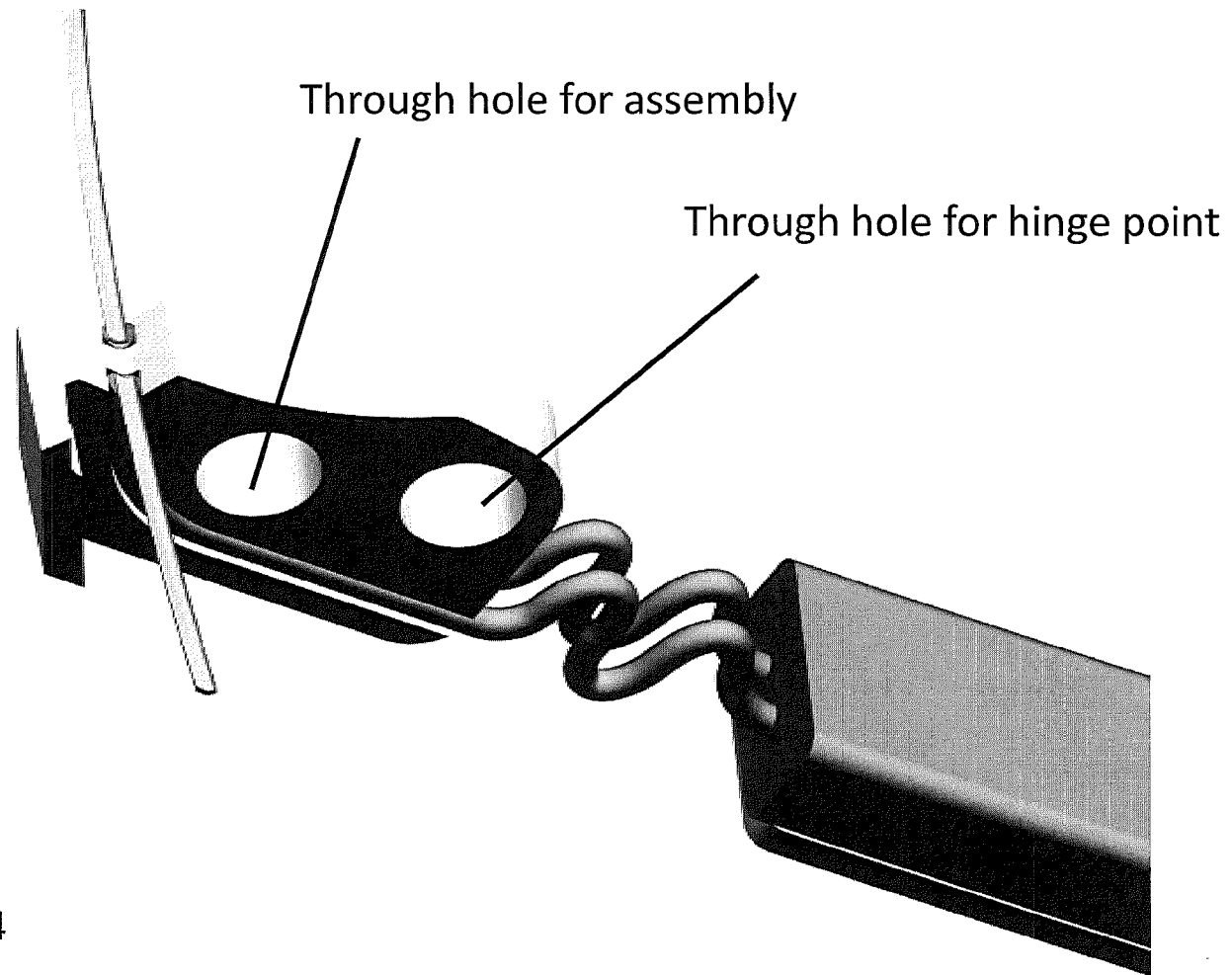


Fig. 14

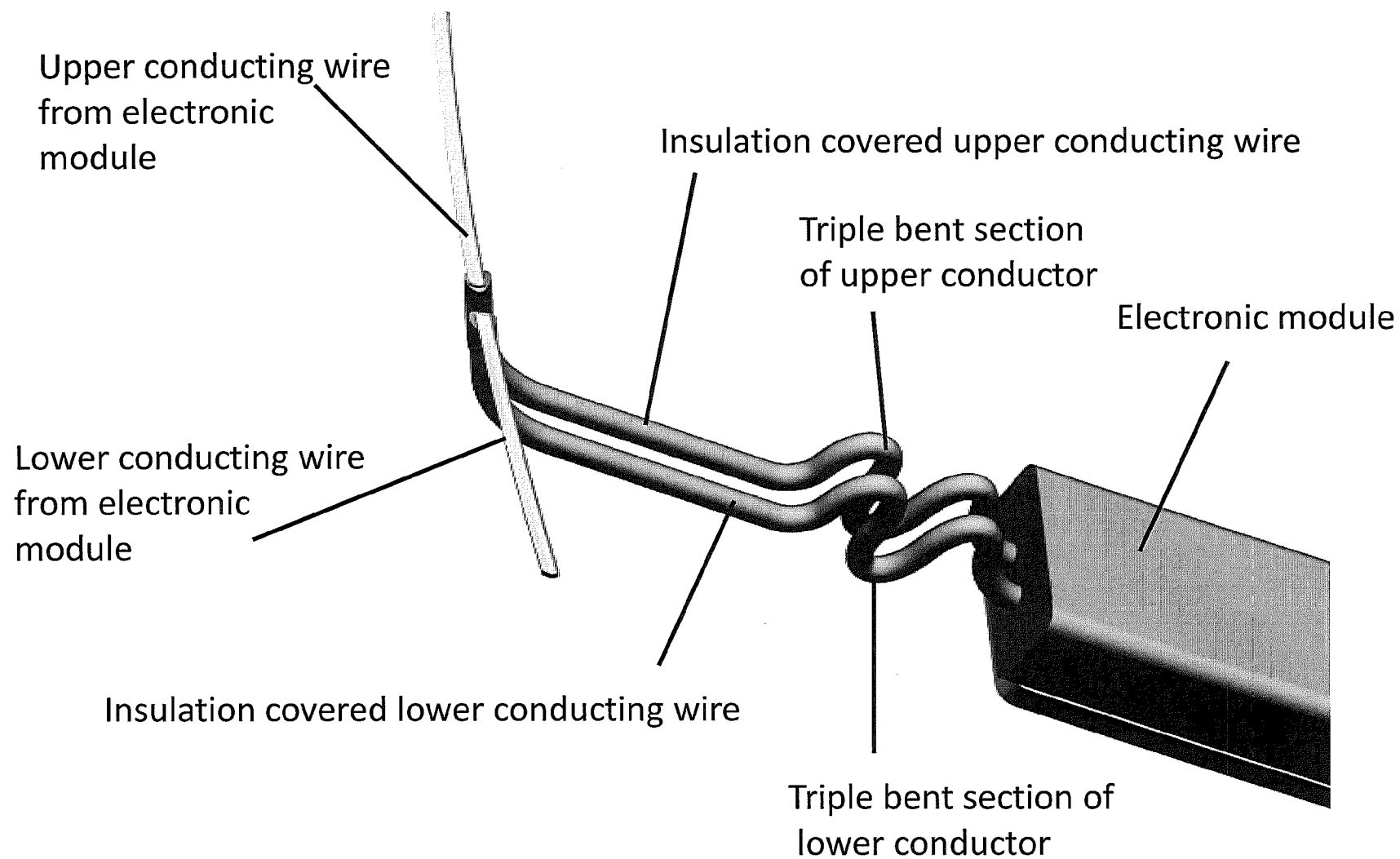


Fig. 15

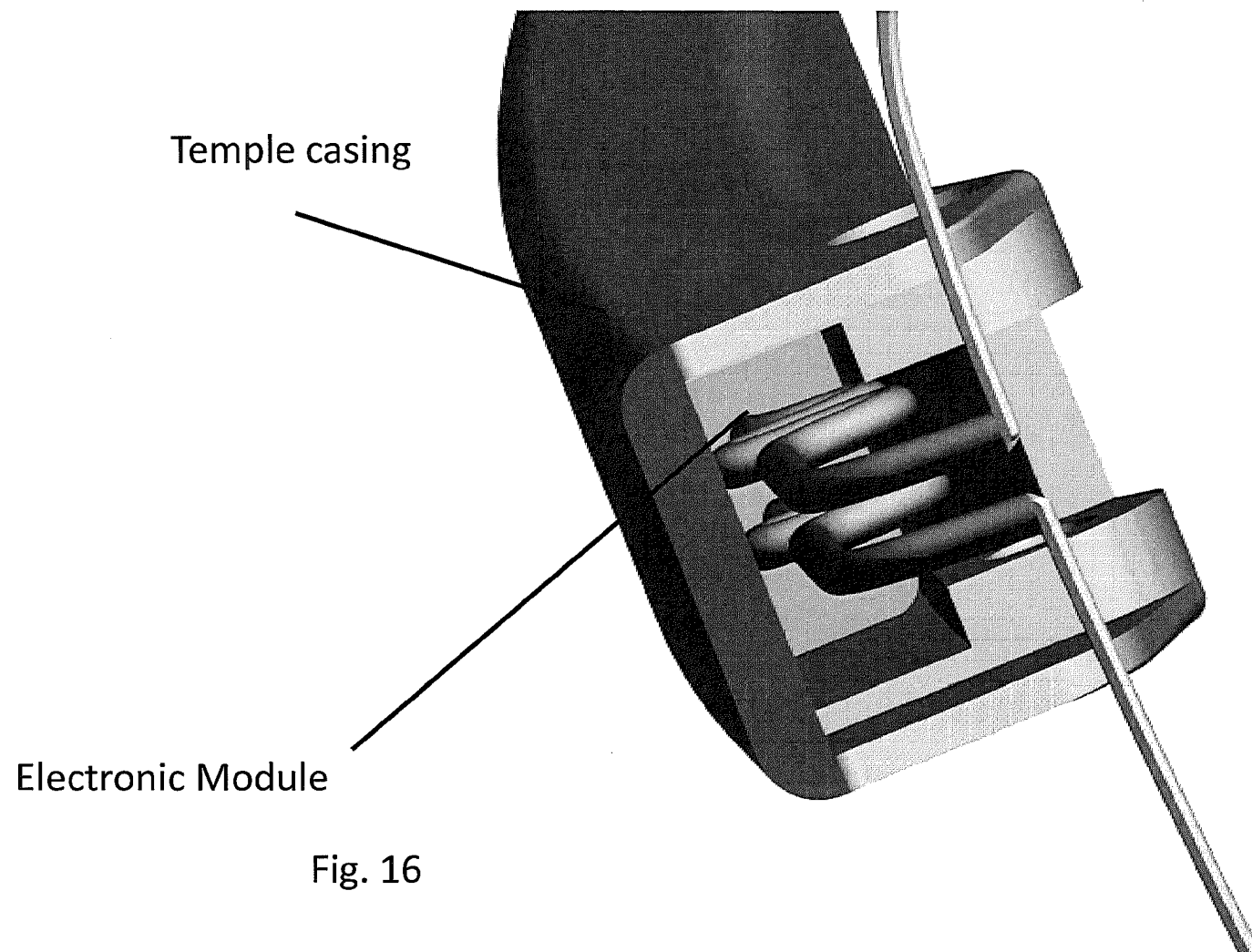


Fig. 16

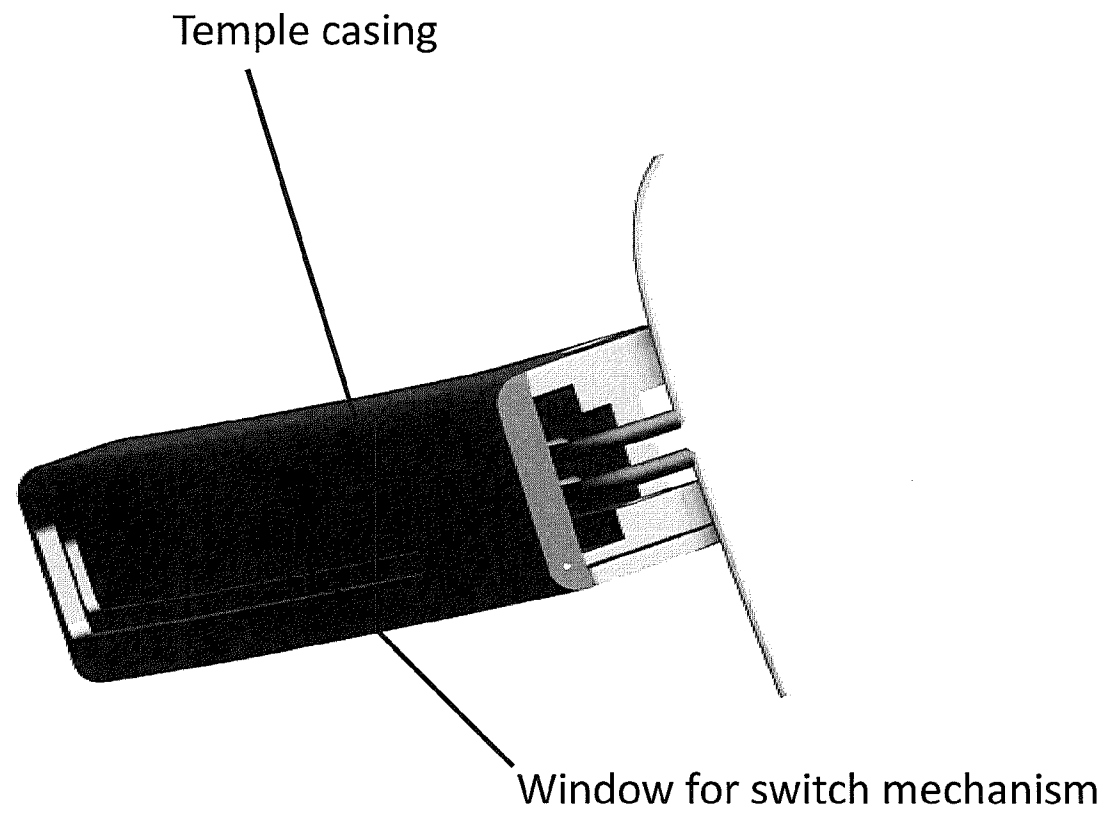


Fig. 17

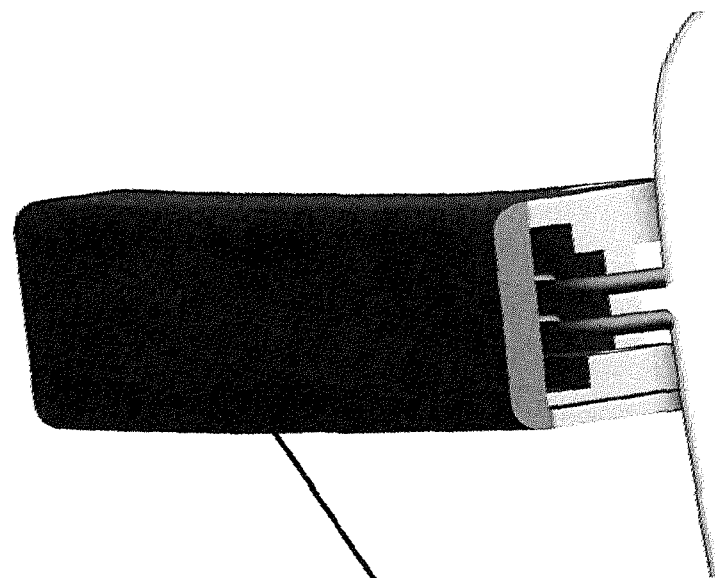
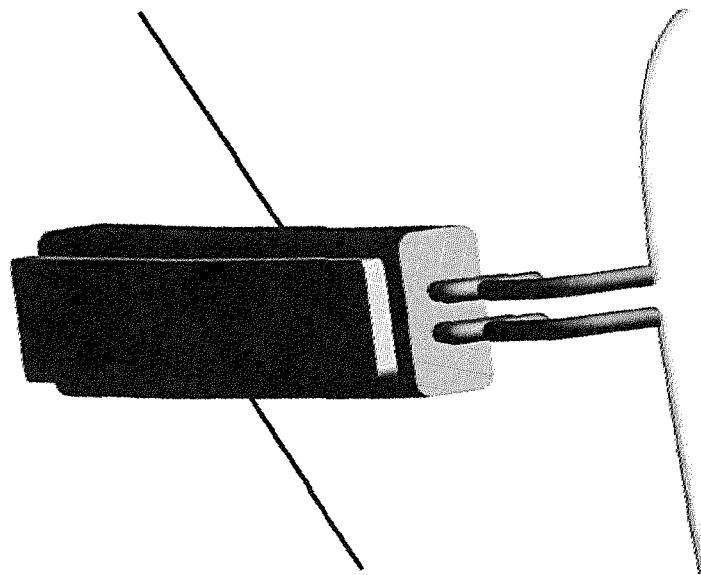


Fig. 18

Capacitive Switch

Electronic module



Capacitive Switch

Fig. 19

Front of frame temple with Electronic Drive and Control Circuit

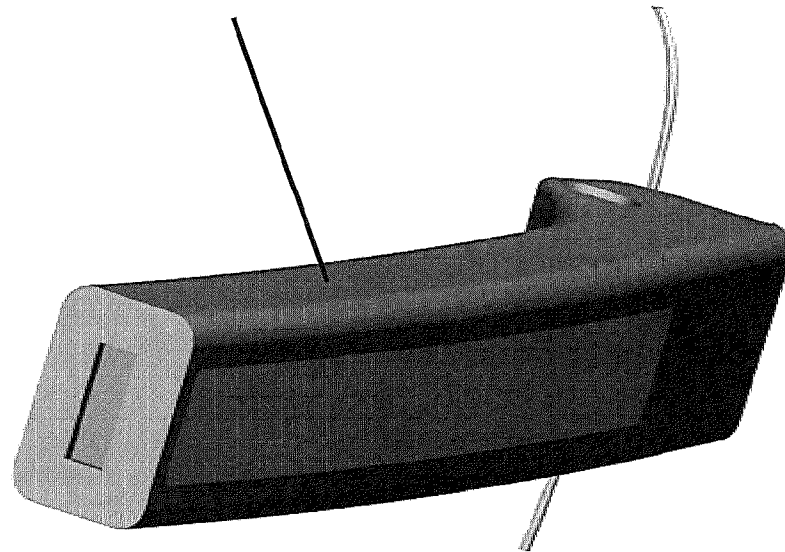


Fig. 20

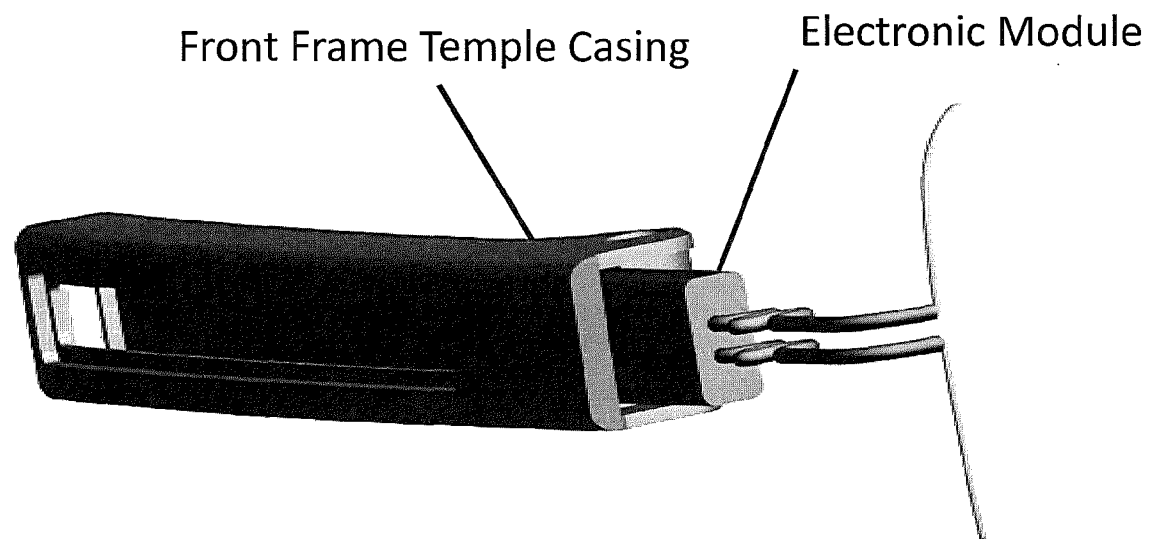


Fig. 21

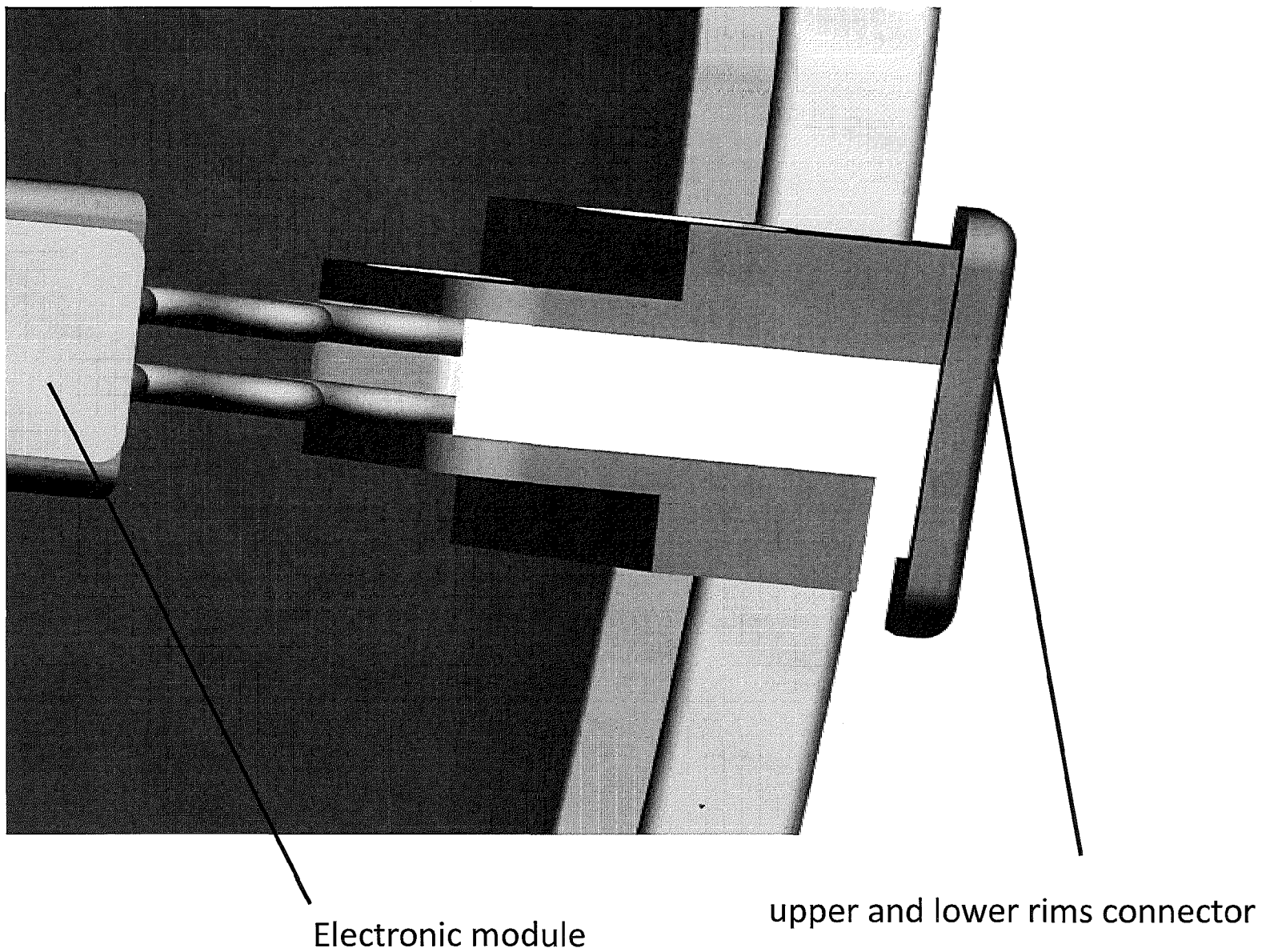
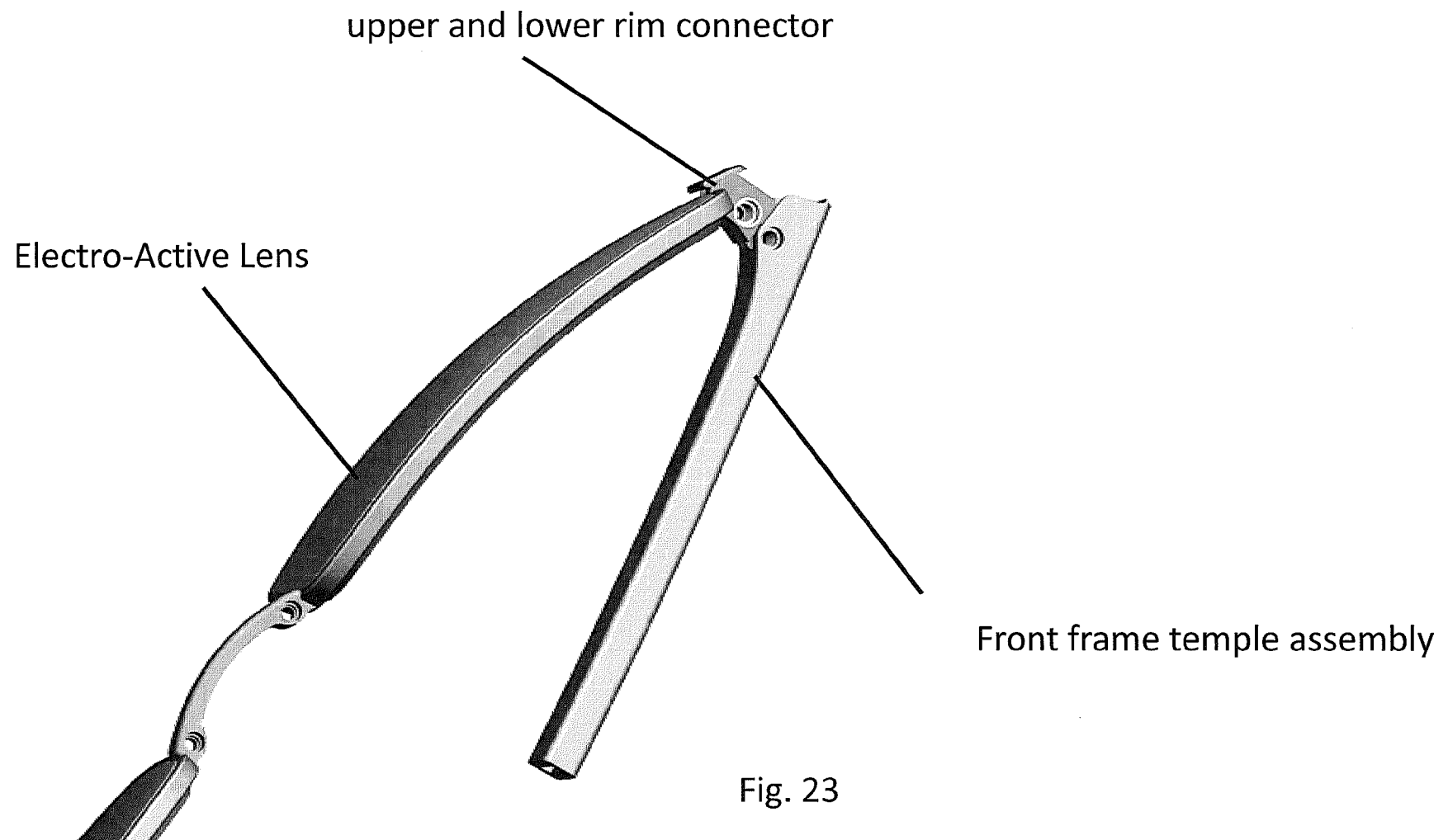


Fig. 22



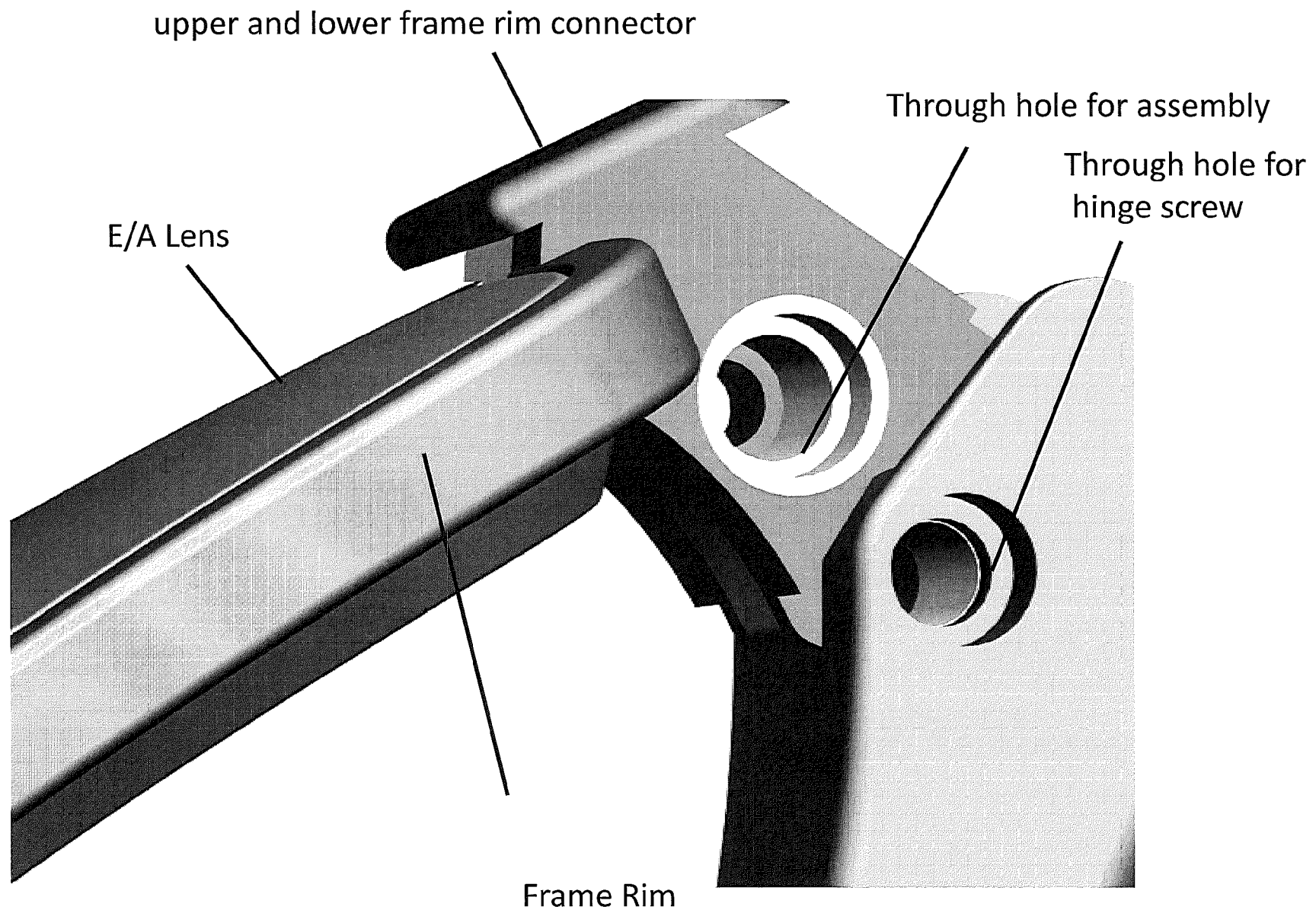


Fig. 24

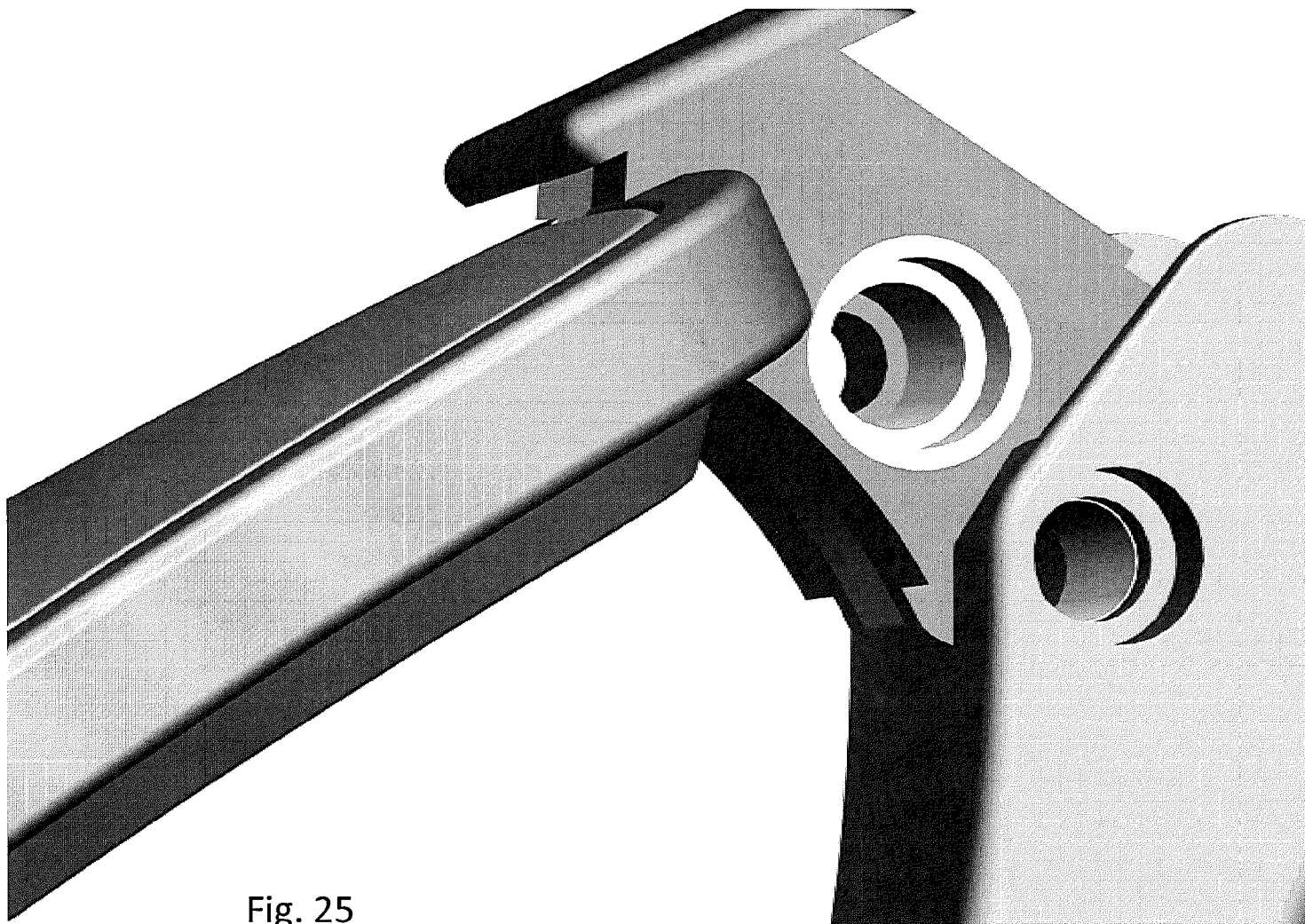


Fig. 25

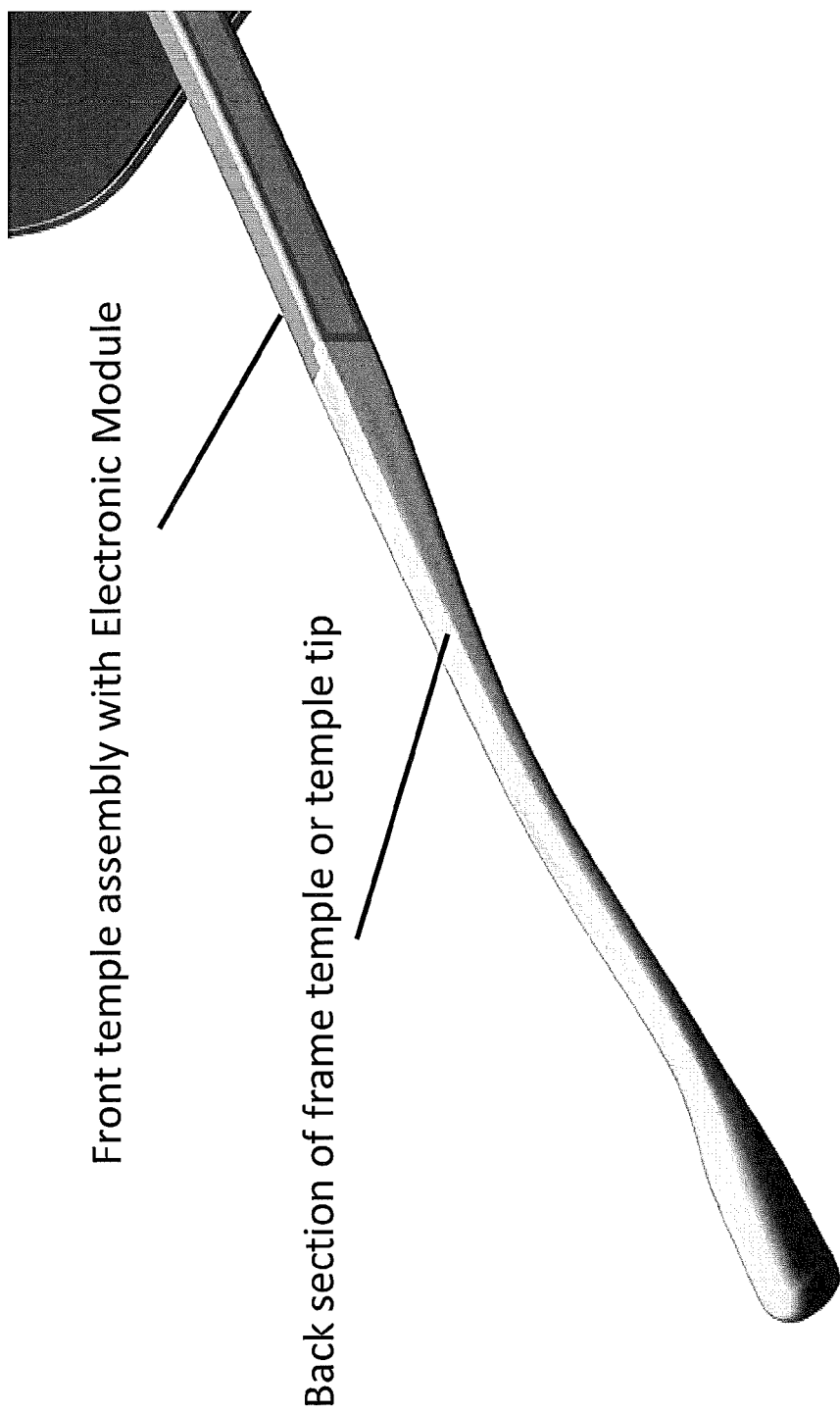


Fig. 26

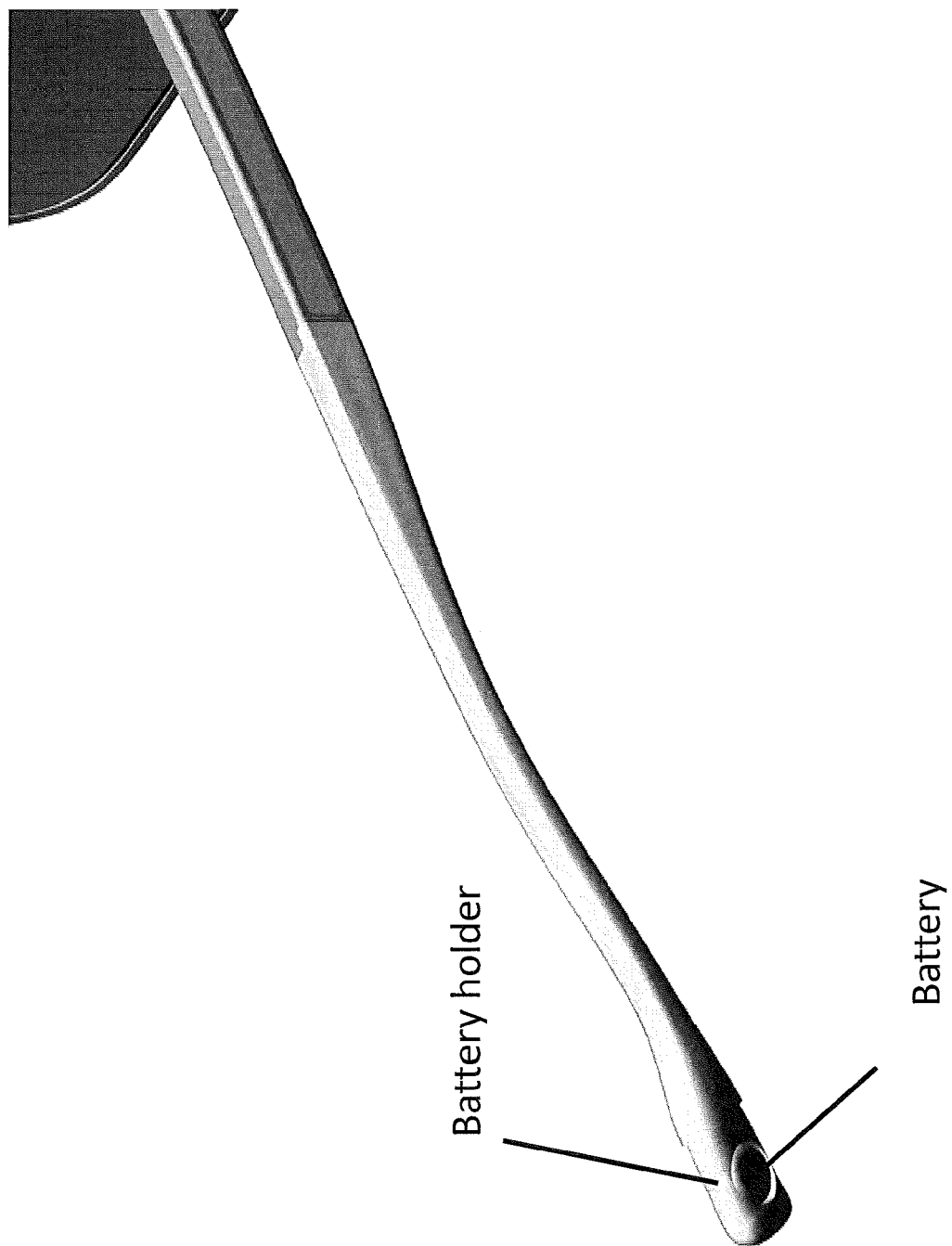


Fig. 27

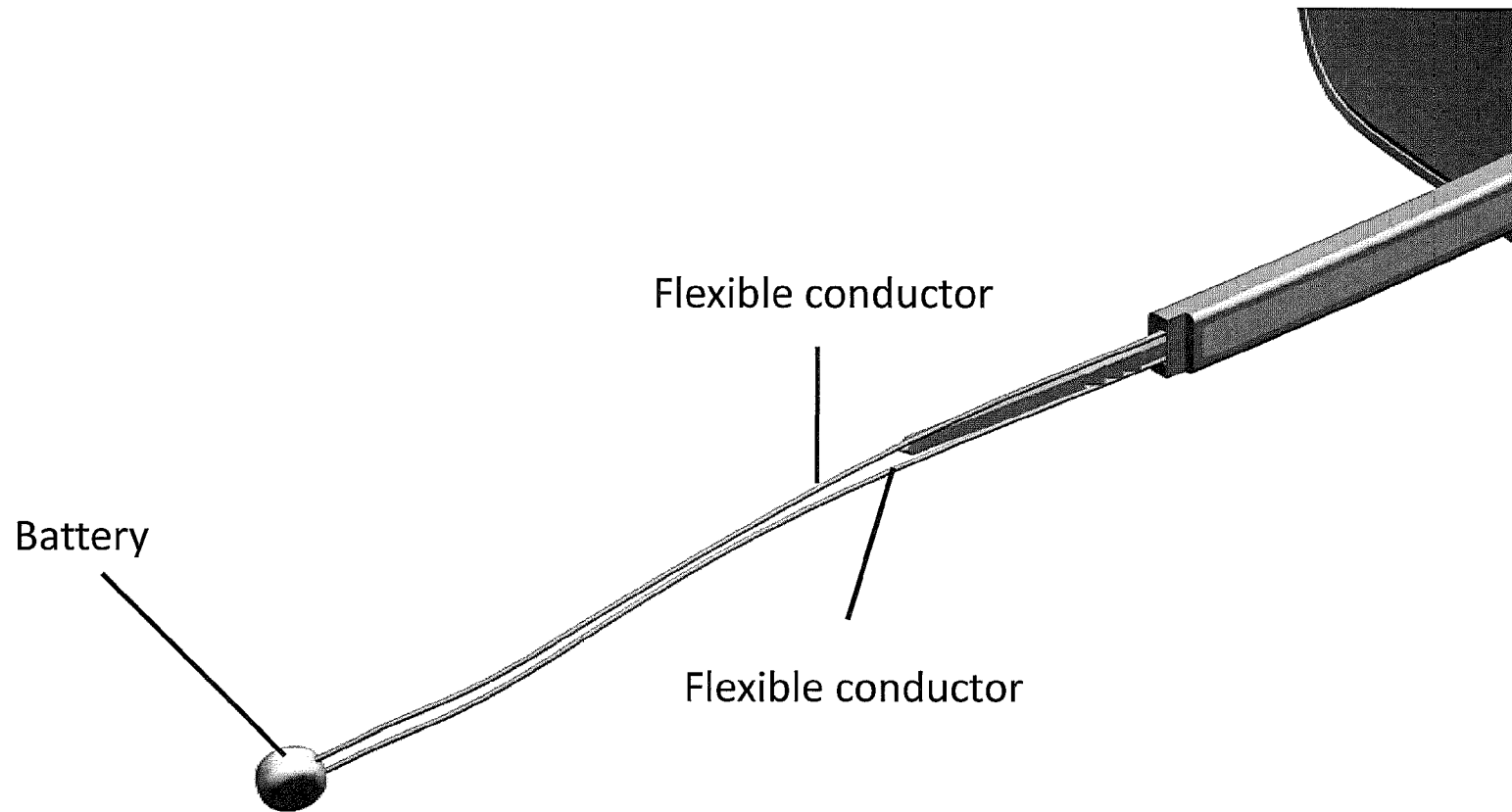


Fig. 28

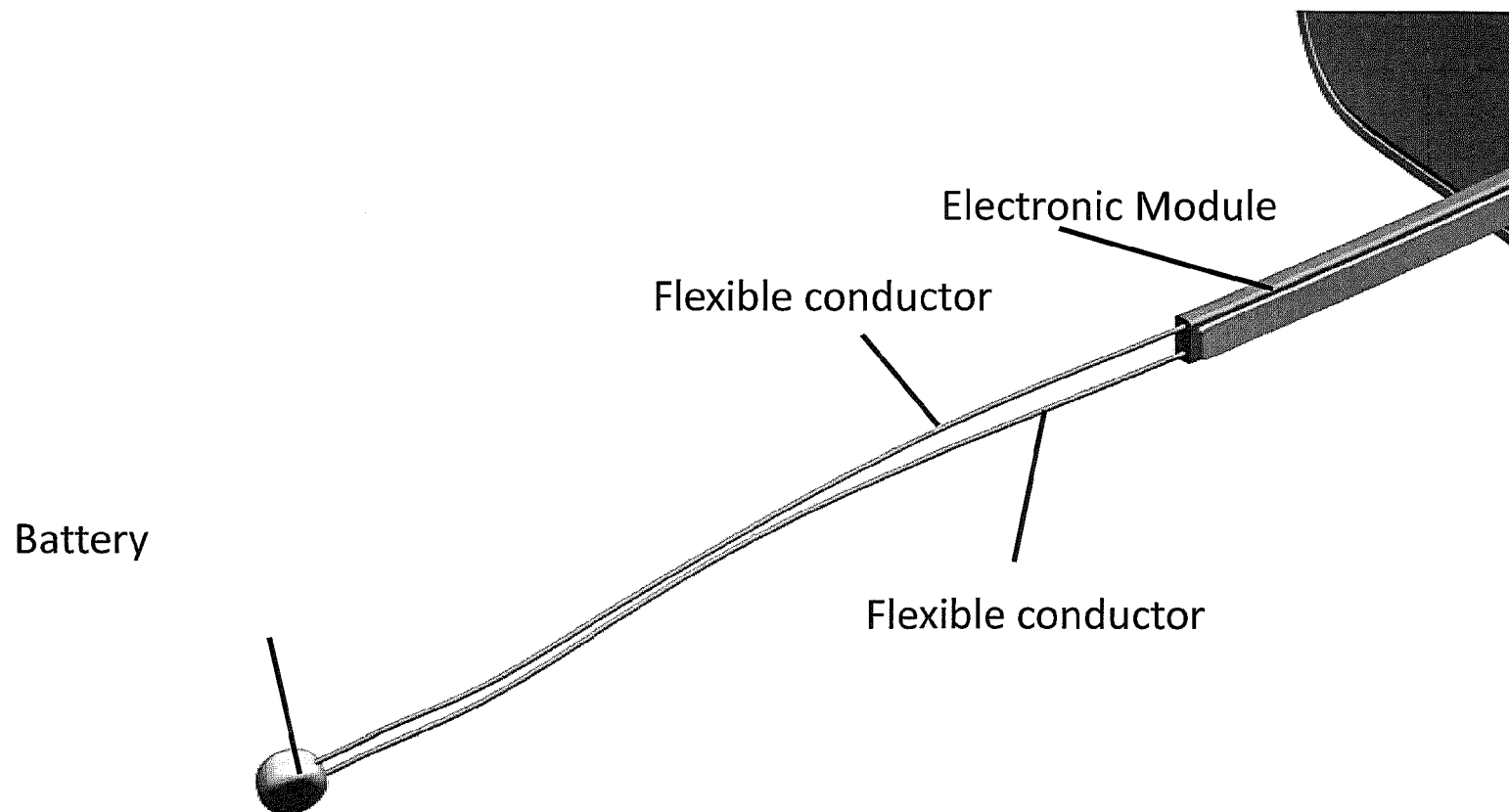


Fig. 29

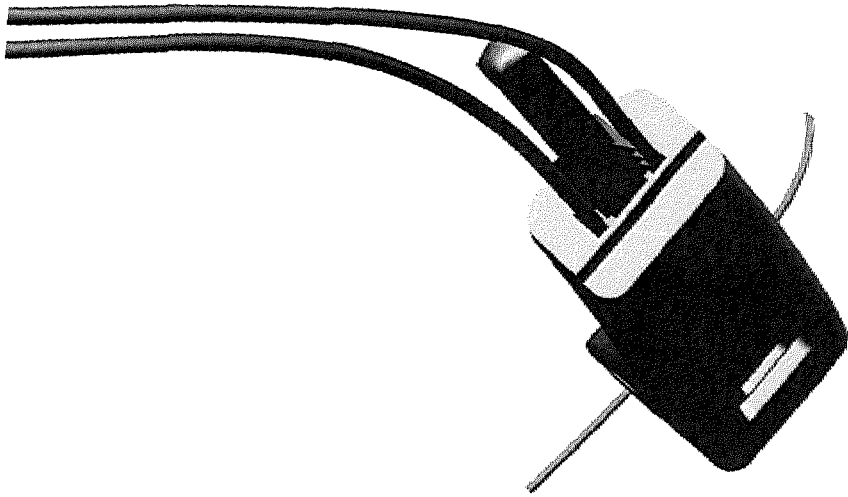


Fig. 30

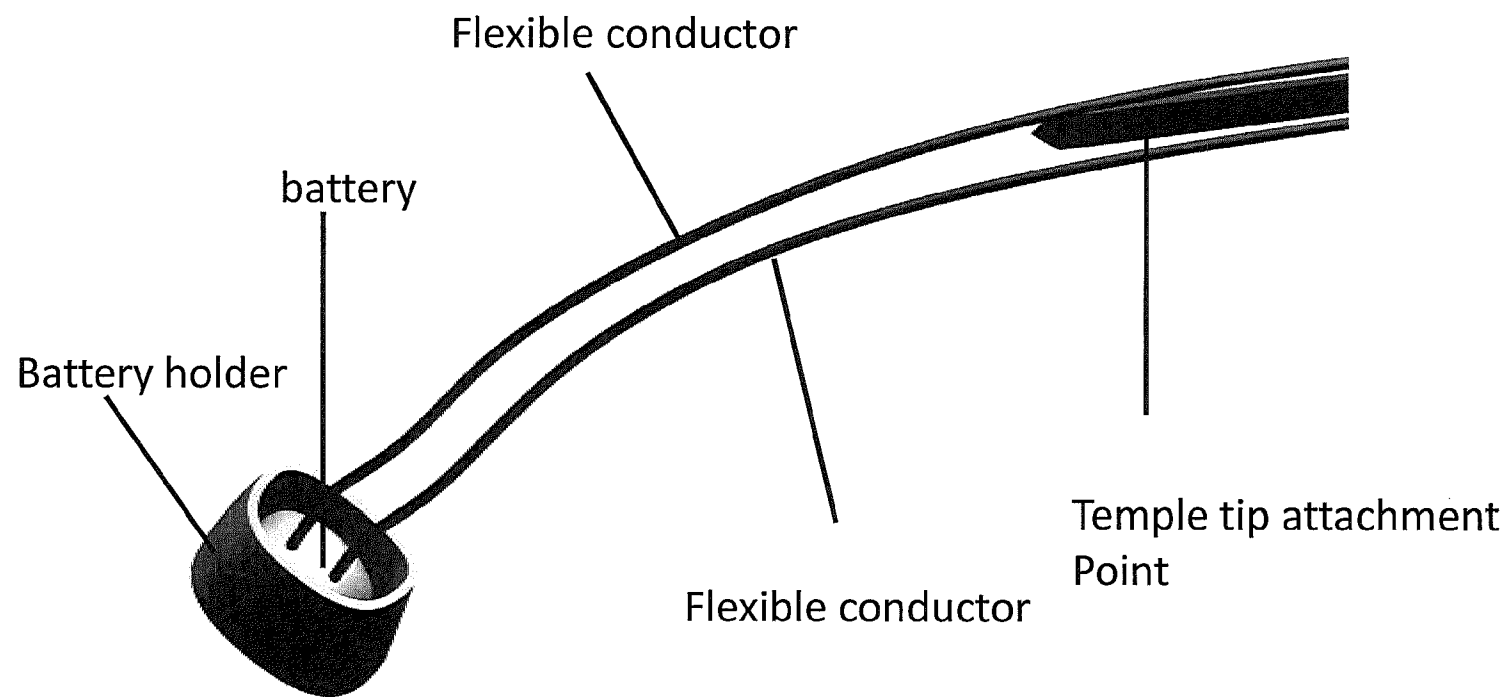


Fig. 31

Slim Electro-active Lens Frame