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SIEMENS MEDICAL INSTRUMENTS PTE. LTD.; Patent Issued for Hearing Aid Device and a Method of Manufacturing a Hearing Aid Device

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By a News Reporter-Staff News Editor at China Weekly News -- Siemens Medical Instruments Pte. Ltd. (Singapore, SG) has been issued patent number 8224006, according to news reporting originating out of Alexandria, Virginia, by VerticalNews editors.

The patent's inventors are Beck, Frank (Spardorf, DE); De Finis, James Edward (Flanders, NJ); Holst, Jens-Christian (Berlin, DE); Klemenz, Harald (Furth, DE); Lamba, Lavlesh (Piscataway, NJ); Lim, Pei Chyi Kristy (Singapore, SG); Rass, Uwe (Nurnberg, DE); Sauer, Joseph (Strullendorf, DE); Vaze, Amit (Parlin, NJ).

This patent was filed on August 28, 2009 and was cleared and issued on July 24, 2012.

From the background information supplied by the inventors, news correspondents obtained the following quote: "Hearing aid devices and hearing devices generally comprise a housing, in which a microphone, an amplifier or amplifying device, a receiver, a power supply, mostly a zinc-air battery inter alia are arranged. The receiver is connected to an acoustic output of the housing, which emits the acoustic signals generated and prepared by the hearing aid device into an auditory canal of a wearer of the hearing aid device.

"In order to meet the aesthetic requirements of a wearer of the hearing aid device, this is to be as minimally externally visible on the wearer as possible. These requirements are particularly high especially in the case of hearing devices worn in the ear, referred to as in-ear hearing aid device. The components needed for an in-ear hearing aid device are thus to be designed as small as possible within the in-ear hearing aid device, to be packed as tightly as possible and to be reduced to a minimum.

"Additionally, the components of the hearing aid device are to be shielded from external interferences for efficient functioning of the hearing aid device. Compensating elements such as coils, capacitors or certain topology of conductive lines and cables may be arranged within the inner space of a housing of the hearing aid device to reduce the electromagnetic interferences (EMI) within the housing. Alternatively, a shielding layer, such as having a gold plated layer on the inner surface of the hearing aid device may reduce the EMI within the housing of the hearing aid device. However, the use of compensating elements and the shielding layer may provide limitations on the miniaturization of the hearing aid device. Further, the manufacturing time of the hearing aid device is increased as the compensating elements are to be carefully positioned into the hearing aid device or the gold plated layer is to be provided onto the inner surface of the housing after the after has been made."

Supplementing the background information on this patent, VerticalNews reporters also obtained the inventors'

summary information for this patent: "It is an object of the invention to provide shielding of components from external electromagnetic interferences.

"The above object is achieved by a hearing aid device and a method of manufacturing the hearing aid device, wherein the hearing aid device comprises a housing having a first non-conductive layer and a second non-conductive layer, and a first conductive layer between the first non-conductive layer and the second non-conductive layer.

"The first conductive layer embedded in between the first non-conducive layer and the second non-conducive layer of the housing of the hearing aid device shields an inner space of the housing from external electromagnetic interferences. The inner space of the housing accommodates the electrical components therein. Further this facilitates further miniaturization of the hearing aid device as the inner space of the housing may be used more efficiently and thus the hearing aid device can be more compact.

"According to another embodiment, the hearing aid device further comprises a second conductive layer attached onto at least a portion of the inner surface of the second non-conductive layer. The second conductive layer attached onto the inner surface of the second non-conductive layer of the housing of the hearing aid device enables in miniaturization of the hearing aid device. Additionally, the requirement of loose wires leads may be reduced and thus the electromagnetic interference within the housing of the hearing aid device is reduced.

"According to yet another embodiment, the second conductive layer is conductively connected to an electrical component. Connecting an electrical component to the second conductive layer enables miniaturization of the hearing aid device and eliminates the requirement of loose wire leads.

"According to yet another embodiment, the electrical component includes a printed electrical component. Printed electrical components occupy less space and can easily be printed during the manufacturing of the housing. Thus, printed electrical components enable in miniaturization of the hearing aid device and also reduce the manufacturing time of the hearing aid device.

"According to yet another embodiment, the first conductive layer and the second conductive layer are fabricated using a solid freeform fabrication technique selected from the group consisting of inkjet printing, pneumatic spraying, screen printing, pad printing, laser printing, dot matrix printing, thermal printing, lithography, and 3D printing. Fabricating or printing the first and the second conductive layer using a solid freeform fabrication technique enables in fabricating the first conductive layer between the first non-conducive layer and the second non-conductive layer and the second conductive onto the inner surface of the second non-conductive layer of the housing at the time of the manufacturing of the housing.

"According to yet another embodiment, the first conductive layer and the second conductive layer comprises an element from the group consisting of copper, gold, silver and electrically conductive polymer. These elements comprise enhanced conductive properties and therefore enable the first conductive layer and the second conductive layer to have good electrical conductance.

"According to yet another embodiment, the housing further comprises a third non-conductive layer arranged outwardly to the first non-conductive layer. Providing the third non-conductive layer enables providing additional features to the hearing aid device.

"According to yet another embodiment, the hearing aid device further comprises a coil between the third non-conductive layer and the first non-conductive layer. The coil enables wireless communication with the hearing aid device. Additionally, the coil enables wireless charging of the hearing aid device. This enables efficient use of the inner space of the hearing aid device, and thus, enables miniaturization of the hearing aid device. Additionally, as the coil is provided external to the first conductive layer, the inner space is shielded from any EMI arising out of the coil by the first conductive layer.

"Another embodiment includes a method of manufacturing a hearing aid device, wherein the method comprises embedding a first conductive layer between a first non-conductive layer and a second non-conductive layer of a housing of the hearing aid device.

"Embedding the first conductive layer between the first non-conductive layer and the second non-conductive layer of the housing provides shielding of the inner space of the housing from EMI interferences. Further this facilitates further miniaturization of the hearing aid device as the inner space of the housing may be used more efficiently and thus the hearing aid device can be more compact.

"According to yet another embodiment, the embedding includes fabricating the first conductive layer between the first non-conductive layer and the second non-conductive layer using a solid freeform technique selected from the group consisting of inkjet printing, pneumatic spraying, screen printing, pad printing, laser printing, dot matrix printing, thermal printing, lithography, and 3D printing.

"According to another embodiment, the method further comprises attaching a second conductive layer onto an inner surface of the second non-conductive layer. The second conductive layer attached onto the inner surface of the second non-conductive layer of the housing of the hearing aid device enables in miniaturization of the hearing aid device. Additionally, the requirement of loose wires leads may be reduced and thus the electromagnetic interference within the housing of the hearing aid device is reduced.

"According to yet another embodiment, the second conductive layer is conductively connected to an electrical component.

"According to yet another embodiment, wherein the electrical component includes a printed electrical component.

"According to yet another embodiment, the method comprises embedding a coil between the first non-conductive layer and a third non-conductive layer, the third non-conductive layer arranged outwardly to the first non-conductive layer.

"According to yet another embodiment, wherein the first conductive layer, the second conductive layer and the coil comprises an element from the group consisting of copper, silver, gold and electrically conductive polymer."

For the URL and additional information on this patent, see: Beck, Frank; De Finis, James Edward; Holst, Jens-Christian; Klemenz, Harald; Lamba, Lavlesh; Lim, Pei Chyi Kristy; Rass, Uwe; Sauer, Joseph; Vaze, Amit. Hearing Aid Device and a Method of Manufacturing a Hearing Aid Device. U.S. Patent Number 8224006, filed August 28, 2009, and issued July 24, 2012. Patent URL: http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=38&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=185

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