AN APPARATUS FOR USE IN THE ADJUSTMENT OF THE SECONDARY ADJUSTMENT MEANS OF A HEARING AID.

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Description

Hearing aids, besides having the adjustment means which the patient frequently wants to operate, such as volume control, contact and switch for switching over from microphone to teleloop, are often equipped with so-called secondary adjustment means serving to vary certain properties of the apparatus, e.g. the tone reproducing characteristics and the maximum sound intensity. These adjustments are usually made once for all when the patient receives the hearing aid in order to adapt properties of the aid as best as possible to the individual requirements of the patient in question.

The adjustment means are often continuously movable, and adjustment is e.g. made by rotating a slotted shaft or by positioning a sliding button. In practice it may be of great importance to the patient's benefit of the hearing aid that optimum adjustment is provided for. There may also be interaction between two or more adjustable characteristics so that it is a matter of finding the optimum combination of adjustments. Thus, it is desirable that the user himself can adapt his aid under ordinary sound conditions or when listening under simulated test situations.

In order for the patient to get the natural hearing impression he must carry the aid in normal position on the head, i.e. either behind the ear, in the ear or in an eyeglass frame. Since, however, the adjustment means are very small and often inaccessible in the position of use, adjustment is made in practice by removing the aid followed by random adjustment and testing, and in most cases removal and random adjustment again, and so on. No matter whether the user himself performs the adjustment in this manner, or whether another person assists him, it is always doubtful whether the optimum adjustment is found.

The invention concerns an apparatus for the adjustment of the secondary adjustment means of a hearing aid, and its object is the provision of such an apparatus which enables the user to readily perform such adjustment while the hearing aid in the position of use and under ordinary conditions of listening.

This object is achieved in that it consists of an adaptor which is arranged to be applied to the hearing aid and has one or more moving means which are brought into movement-transmitting communication with one or more corresponding adjustment means of the hearing aid upon application of the adaptor, and a control desk equipped with one or more adjustable activation means and in such communication with the adaptor that movement of the activation means or each activation means thereof causes corresponding movement of the corresponding moving means or each corresponding moving means of the adaptor. This construction allows the manual adjusting process to be moved from the hearing aid itself to the control desk which can be fitted in a convenient position and whose activation means may have a suitable size allowing for ready adjustment.

The secondary adjustment means of the hearing aid are usually gathered on a panel disposed in a recessed opening in the housing of the apparatus, which may be closed by a cover when the adjustment has been performed. When used in connection with such a hearing aid, the housing of the adaptor is expeditiously formed with a protruding frame fitting in the opening in the housing of the hearing aid, the moving means or each moving means of the adaptor being placed within said frame.

A particularly simple mechanical embodiment of the apparatus is characterized in that the activation means or each activation means on the control desk is connected with the activation means or with its respective activation means on the adaptor through one or more wires in a bowden cable. More particularly the bowden cable contains a fixed wire for fixing the length. When the activation means or each activation means on the control desk is connected with the corresponding wire in the bowden cable through a movement transforming mechanism, the size and travel of the activation means or each moving means of the control desk may be selected according to the user's wishes.

The movement of the moving means or each moving means of the adaptor may also be controlled electrically from the control desk.

The invention will be explained more fully below with reference to the drawing, in which fig. 1 is an enlarged perspective view of a hearing aid of the type intended to be worn behind the ear, and fig. 2 is likewise an enlarged and perspective view of an embodiment of the apparatus of the invention for use in connection with the hearing aid of fig. 1.

The hearing aid shown in fig. 1 is generally designated by 10 and has a configuration making it suitable for positioning behind the ear. At the upwardly and obliquely downwardly directed side 11 of the housing the apparatus has an edge-positioned rotary button 12 for volume control and a switch 13 for switching between microphone and teleloop. A hose section 14 forming a sound channel extends from the front end of the housing to an earplug (not shown).

The top side 11 of the housing is moreover formed with a rectangular opening 15 in which a panel 16 is recessed; the panel has three secondary adjustment means which are slideable in slits 17 by manipulation of buttons 18 to adjust slide potentiometers placed in the housing, thereby to regulate e.g. low and high frequencies and maximum intensity.

Fig. 2 shows the adjustment apparatus of the invention which comprises a control desk 19 and an adaptor 20 interconnected through a bowden cable 21.

The adaptor 20 has a substantially box-shaped housing 22, whose front 23 is formed with a protruding, rectangular frame 24 which fits in the
opening 15 in the top side 11 of the hearing aid so that the frame is retained in the opening by clamping. The adaptor 20 may in this manner be detachably fixed on the hearing aid 10. Within the frame 24 the front 23 is formed with three slits 25 of the same extent and relative location as the slits 17 in the hearing aid panel 16 and in register with their respective ones of the slits 17 in the applied position of the adaptor. Each slit 25 slidably mounts a moving means 26 in the shape of a forwardly open box which can be moved down over the corresponding adjustment button 18 on the hearing aid.

A wire 27 in the bowden cable 21 connects each moving means 26 with a corresponding activation means 28 slidably fitted in a slit 29 in the top side 30 of the box-shaped housing 31 of the control desk 19. For reasons of convenience and accuracy of adjustment, the activation buttons 28 and their slits 29 have larger dimensions than the moving means 26 of the adaptor and their slits 25, and each wire 27 in the bowden cable 21 is therefore connected with its activation means 28 through a transformation mechanism (not shown) e.g., of the pantograph type, contained in the housing 31.

In addition to the three motion transmitting wires 27 slidable in their respective channels in the bowden cable 21, the cable contains a wire 32 which is fixed in a central channel and fixes the distance between the activation buttons 28 and the moving means, i.e., the length of the cable.

When the hearing aid 10 is to be adapted to a specific patient, the secondary adjustment buttons 18 are first placed at one end of their slits, and the moving means 26 of the adaptor are placed at the corresponding end of their slits 25. When the adaptor frame 24 is then fitted in the opening 15 in the hearing aid housing, the moving means 26 will extend downwards over and thus be coupled to their respective adjustment means 18. The patient now places the hearing aid with the applied adaptor in the normal position of use and can then finely adjust the secondary adjustment means by manipulating the buttons 28 of the control panel under natural or simulated conditions of listening. The desk may optionally also be operated by an assistant. When the optimum adjustment has been found in this manner, the adaptor 20 is removed, and the secondary adjustment means 18 are covered preferably by a cover (not shown) fitted over the opening 15 to protect the adjustment means against unintentional action.

The apparatus of the invention can be constructed in many other ways than the one shown and described in the foregoing. For example, rotary potentiometers with a slot at the end of the shaft may be substituted for the slide potentiometers with linearly movable adjustment buttons, and in that case the moving means on the adaptor are formed by screwdrivers, and the wires of the bowden cable are arranged to transmit a rotary movement from rotary buttons on the control desk. It is also possible to activate the moving means of the adaptor, no matter whether they are slidable or rotary, by remote control from the control desk. Such remote control can take place through electric leads between the desk and the adaptor or wirelessly by means of generally known equipment. Electromagnetic waves or ultrasonic waves may be used for wireless transmission of signals. Also the coupling between the moving means of the adaptor and the secondary adjustment means of the hearing aid may be effected in other ways than those described in the foregoing and shown in the drawing.

Claims

1. An apparatus for the adjustment of secondary adjustment means on a hearing aid, characterised in that it consists of an adaptor (20) which is arranged to be applied to the hearing aid (10) and has one or more moving means (26) which are brought into movement-transmitting communication with one or more corresponding secondary adjustment means (18) of the hearing aid (10) upon application of the adaptor (20), and a control desk (19) equipped with one or more adjustable activation means (28) and in such remote control communication with the adaptor (20) that movement of the activation means (28) or each activation means (28) thereof causes corresponding movement of the corresponding moving means (26) or each corresponding moving means (26) of the adaptor (20).

2. An apparatus according to Claim 1, for use in connection with a hearing aid (10) whose secondary adjustment means (18) are placed on a panel (16) which is recessed in an opening (15) in the housing of the hearing aid characterised in that the housing (22) of the adaptor (20) is formed with a protruding frame (24) fitting in the opening (15) in the housing of the hearing aid (10), the moving means (26) or each moving means (26) of the adaptor (20) being placed within said frame (24).

3. An apparatus according to Claim 1 or 2, characterised in that the activation means (28) or each activation means (28) on the control desk (19) is connected with the moving means (26) or with its respective moving means (26) on the adaptor (20) through one or more wires (27) in a bowden cable (21).

4. An apparatus according to Claim 3, characterised in that the bowden cable (21) contains a fixed wire (32) for fixing the length.

5. An apparatus according to Claim 3 or 4, characterised in that the activation means (28) or each activation means (28) on the control desk (19) is connected with the corresponding wire (27) in the bowden cable (21) through a movement transforming mechanism.

6. An apparatus according to Claim 1 or 2, characterised in that the moving means (26) or each moving means (26) of the adaptor (20) is adapted to be controlled electrically from the control desk (19).
Patentansprüche

1. Vorrichtung zur Einregelung eines sekundären Reglers an einer Höhrhilfe, vorzugsweise einer Höhrhilfe der hinter dem oder im Ohr oder in einem Brillengestell zu tragenden Art, dadurch gekennzeichnet, dass sie aus einem Adapter, der an der Höhrhilfe anbringbar ist und ein oder mehrere bewegliche Mittel aufweist, welches oder welche durch Anbringen des Adapters in eine bewegungsfähige Art und Weise in einem oder mehreren entsprechenden sekundären Reglern der Höhrhilfe gebracht werden; und
aus einem mit einem oder mehreren einstellbaren Betätigungspfannen versehenen Reglerpult besteht, das in einer derartigen Fernsteuerungs-Verbindung mit dem Adapter steht, dass eine Bewegung des Betätigungspfanns, oder jeder seiner Betätigungspfanns, eine entsprechende Bewegung des beweglichen Mittels oder der entsprechenden beweglichen Mittel des Adapters bewirkt.


3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass das Betätigungspfannsorgane oder alle Betätigungspfannsorgane am Reglerpult durch einen oder mehrere Drähte in einem Bowden-Kabel mit dem Betätigungspfannsorgane oder mit seinem entsprechenden Betätigungspfannsverbindung sind.

4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, dass das Bowden-Kabel einen Festdraht zur Längenfixierung aufweist.

5. Vorrichtung nach Anspruch 3 oder 4, dadurch gekennzeichnet, dass das Betätigungspfannsorgane am Reglerpult durch einen Bewegungsvandlermechanismus mit dem entsprechenden Draht im Bowden-Kabel verbunden sind.

6. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass das bewegliche Mittel oder alle beweglichen Mittel des Adapters vom Reglerpult elektrisch steuerbar sind.

Revendications

1. Dispositif de réglage de moyens d’ajustement secondaires sur un appareil acoustique, caractérisé en ce qu’il comporte un adaptateur (20) prévu pour être mis à l’appareil acoustique (10) et a un ou plusieurs moyens déplaçables (26) qui sont mis en mouvement en transmettant une communication à un ou plusieurs moyens d’ajustement secondaires correspondants (18) de l’appareil acoustique (10) via l’adaptateur (20), et
un pupitre de contrôle (19) équiper d’un ou plusieurs moyens d’activation réglables (28) communiquant avec l’adaptateur (20) par un tel contrôle à distance que le mouvement des moyens d’activation (28) ou de chaque moyen d’activation (28) entraîne un mouvement correspondant des moyens déplaçables (26) correspondants ou de chaque moyen déplaçable (26) correspondant de l’adaptateur (20).

2. Dispositif selon la revendication 1, utilisable en relation avec un appareil acoustique (10) dont les moyens d’ajustement secondaires (18) sont placés sur un panneau (16) logé dans une ouverture (15) du boîtier de l’appareil acoustique, caractérisé en ce que le boîtier (22) de l’adaptateur (20) comporte un cadre en saillie (24) s’engageant dans l’ouverture (15) du boîtier de l’appareil acoustique (10), les moyens déplaçables (26), ou chaque moyen déplaçable (26) de l’adaptateur (20) étant disposés dans l’etat cadre (24).

3. Dispositif selon la revendication 1 ou 2, caractérisé en ce que les moyens d’activation (28), ou chaque moyen d’activation (28) sur le pupitre de contrôle (19), sont reliés aux moyens déplaçables (26), ou à son moyen déplaçable (26) respectif, sur l’adaptateur (20), par un ou plusieurs fils (27) dans un câble sous gaine (21).

4. Dispositif selon la revendication 3, caractérisé en ce que le câble sous gaine (21) comporte un fil de fer fixe, pour déterminer la longueur.

5. Dispositif selon la revendication 3 ou 4, caractérisé en ce que les moyens d’activation (28), ou chaque moyen d’activation (28), du pupitre de contrôle (19) sont reliés au fil correspondant (27) dans le câble sous gaine (21) par un mécanisme transformant le mouvement.

6. Dispositif selon la revendication 1 ou 2, caractérisé en ce que les moyens déplaçables (26), ou chaque moyen déplaçable (26) de l’adaptateur (20) sont prêts pour être contrôlés électriquement à partir du pupitre de contrôle (19).