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(54) Title: EARPLUG WITH INSERTION STEM

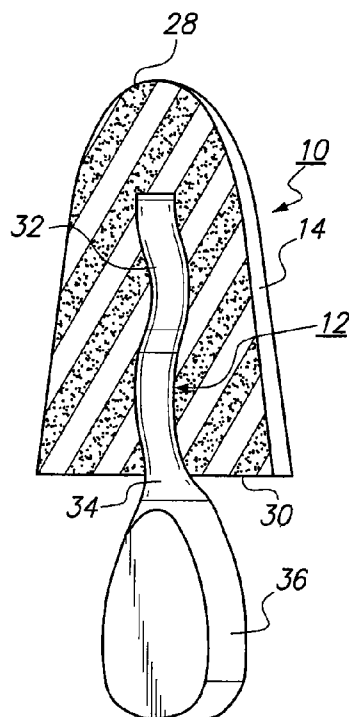


FIG. 1

(57) Abstract: An earplug having a soft resilient body comprises a main body with a front end for insertion into a human ear canal. The earplug has a stem having two ends, one being attached to the main body and extending outwardly and away therefrom, the other forming a handle. The stem is sufficiently stiff to allow manipulation of the main body into the ear canal and has a crooked or wavy configuration as it extends from the main body to the handle. As the front end of the main body is inserted into the ear canal, the stem is rotated with the handle to fit around the curved portion in the canal. This seats the main body to acoustically block the ear canal while spacing the stem within the curved portion of the ear canal to minimize contact with the sidewalls of the ear canal.



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— *with amended claims (Art. 19(1))*

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AMENDED CLAIMS

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1. A hearing protective earplug insertable into a human ear canal having sidewalls and a typical curved portion comprising:

a soft resilient body having a main body element having a front end,

an elongated stem having two ends, one end attached to the main body element, the stem extending outward from the main body element and away from the front end, the other end of the stem forming a handle portion of the stem, the stem being sufficiently stiff as to allow manipulation of the main body element during insertion into the ear canal, the stem member having a crooked or wavy configuration as it extends outward from the main body to the handle portion of the stem so that during insertion of the front end of the main body element into the ear canal, rotation of the stem member with the handle portion will fit the stem member around the typical curved portion in the human ear canal so as to seat the main body element to acoustically block the ear canal while at the same time spacing the stem member within the typical curved portion of the ear canal to minimize contact with the sidewalls of the ear canal, wherein the length of the crooked or wavy portion of the stem member as it extends outwardly from the main body to the handle portion has a range of 6m to 25m and wherein the stem member along the length of the crooked or wavy portion has at least three changes in direction along the length.

2. A hearing protective earplug for insertion into the human ear canal of a user and the human ear canal having sidewalls and a typical curved portion of the ear canal including, a soft resilient body having a main body element having a front end for insertion in the human ear canal, an elongated stem having two ends, one end attached to the main body element, the stem extending outward from the main body element and away from the front end, the other end of the stem forming a handle portion of the stem, the stem being sufficiently stiff as to allow manipulation of the main body element into the ear canal of the user, and the stem member having a crooked or wavy configuration within the ear canal as it extends outward from the main body to the handle portion of the stem and so that as the front end of the main body element is inserted into the ear canal, the stem member may be rotated during insertion with the handle portion to fit around the typical curved portion in the human ear canal so as to seat the main body to acoustically block the ear canal while at the same time spacing the stem member within the typical curved portion of the ear canal to minimize contact with the sidewalls of the ear canal, wherein the handle portion of the stem and the main body element are located along the same axis and the range of maximum deviation from the axis by the crooked or wavy portion of the stem is between 0.8 mm to 6 mm.

3. A hearing protective earplug for insertion into the human ear canal of a user and the human ear canal having sidewalls and a typical curved portion of the ear canal including, a soft resilient body having a main body element having a front end for insertion in the human ear canal, an elongated stem having two ends, one end attached to the main body element, the stem extending outward from the main body element and away from the front end, the other end of the stem forming a handle portion of the

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stem, the stem being sufficiently stiff as to allow manipulation of the main body element into the ear canal of the user, and the stem member having a crooked or wavy configuration within the ear canal as it extends outward from the main body to the handle portion of the stem and so that as the front end of the main body element is inserted into the ear canal, the stem member may be rotated during insertion with the handle portion to fit around the typical curved portion in the human ear canal so as to seat the main body to acoustically block the ear canal while at the same time spacing the stem member within the typical curved portion of the ear canal to minimize contact with the sidewalls of the ear canal, wherein the handle portion of the stem is offset from the main body element and the handle portion of the stem and the main body element are located along two separate axes and the range of maximum deviation between the axes by the crooked or wavy portion of the stem is between 0.8 mm to 6 mm.

4. A hearing protective earplug for insertion into the human ear canal of a user and the human ear canal having sidewalls and a typical curved portion of the ear canal including, a soft resilient body having a main body element having a front end for insertion in the human ear canal, an elongated stem having two ends, one end attached to the main body element, the stem extending outward from the main body element and away from the front end, the other end of the stem forming a handle portion of the stem, the stem being sufficiently stiff as to allow manipulation of the main body element into the ear canal of the user, and the stem member having a crooked or wavy configuration within the ear canal as it extends outward from the main body to the handle portion of the stem and so that as the front end of the main body element is inserted into the ear canal, the stem member may be rotated during insertion with the handle portion to fit around the typical curved portion in the human ear canal so as to seat the main body to acoustically block the ear canal while at the same time spacing the stem member within the typical curved portion of the ear canal to minimize contact with the sidewalls of the ear canal, wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed into a curved shape and wherein the rotation of the stem as it is being inserted into the ear canal accommodates variations in the shape of the ear canal by changing the position of the curved shape portion of the stem in the ear canal.

5. A hearing protective earplug for insertion into the human ear canal of a user and the human ear canal having sidewalls and a typical curved portion of the ear canal including, a soft resilient body having a main body element having a front end for insertion in the human ear canal, an elongated stem having two ends, one end attached to the main body element, the stem extending outward from the main body element and away from the front end, the other end of the stem forming a handle portion of the stem, the stem being sufficiently stiff as to allow manipulation of the main body element into the ear canal of the user, and the stem member having a crooked or wavy configuration within the ear canal as it extends outward from the main body to the handle portion of the stem and so that as the front end of the main body element is inserted into the ear canal, the stem member may be rotated during insertion with the handle portion to fit around the typical curved portion in the human ear canal so as to seat the main body to acoustically block the ear canal while at the same time spacing the stem member within the typical curved portion of the ear canal to minimize

contact with the sidewalls of the ear canal, wherein the stem member having the crooked or wavy configuration as it extends outwardly from the main body and within the ear canal is formed with straight angularly displaced adjacent stem portions and wherein the rotation of the stem as it is being inserted into the ear canal accommodates variations in the shape of the ear canal by changing the position of the straight angularly displaced adjacent stem portions of the stem in the ear canal.

6. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element is bullet shaped.

7. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element is a hemispherical pod shape.

8. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element has lateral projections in the nature of one or more flange elements.

9. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element is elongated to enclose a substantial portion of the length of the stem member.

10. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element is elongated to enclose substantially all of the length of the stem member.

11. The earplug of claim 1, 2, 3, 4 or 5 wherein the exterior shape of the main body element is elongated to enclose substantially all of the length of the stem member and wherein the main body element includes a flared shape adjacent the handle portion of the stem member.

12. The earplug of claim 1, 2, 3, 4 or 5 wherein the main body is formed of a resilient foam material.

13. The earplug of claim 1, 2, 3, 4 or 5 wherein the main body is an injection molded resilient thermoplastic elastomer material such as synthetic rubber material.

14. The earplug of claim 2, 3, 4 or 5 wherein the distance between the one end of the stem and the handle portion of the stem has a range between 6 mm to 25 mm.

15. The earplug of claim 1, 2, 3, 4 or 5 wherein the distance between the one end of the stem and the handle portion of the stem has a preferred distance of 14 mm.

16. The earplug of claim 1, 3, 4 or 5 wherein the handle portion of the stem and the main body element are located along the same axis.

17. The earplug of claim 1, 4 or 5 wherein the handle portion of the stem and the main body element are located along the same axis and the range of maximum deviation from the axis by the crooked or wavy portion of the stem is between 0.8 mm to 6 mm.

18. The earplug of claim 1, 4 or 5 wherein the handle portion of the stem and the main body element are located along the same axis and the preferred maximum deviation

from the axis by the crooked or wavy portion of the stem is 1.3 mm.

19. The earplug of claim 1, 4 or 5 wherein the handle portion of the stem is offset from the main body element and the handle portion of the stem and the main body element are located along two separate axes and the range of maximum deviation between the axes by the crooked or wavy portion of the stem is between 0.8 mm to 6 mm.

20. The earplug of claim 1, 4 or 5 wherein the handle portion of the stem is offset from the main body element and the handle portion of the stem and the main body element are located along two separate axes and the preferred maximum deviation between the axes being 1.3 mm.

21. The earplug of claim 1, 2 or 3 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed into a curved shape and wherein the rotation of the stem as it is being inserted into the ear canal accommodates variations in the shape of the ear canal by changing the position of the curved shape portion of the stem in the ear canal.

22. The earplug of claim 4 or 5 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed into a curved shape and wherein the distance between the one end of the stem and the handle portion of the stem has a range between 6 mm to 25 mm and wherein the handle portion of the stem and the main body element are located along the same axis and the range of maximum deviation from the axis by the portion of the stem formed into a curved shape is between 0.8 mm to 6 mm.

23. The earplug of claim 4 or 5 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed into a curved shape and wherein the distance between the one end of the stem and the handle portion of the stem has a range between 6 mm to 25 mm and wherein the handle portion of the stem is offset from the main body element and the handle portion of the stem and the main body element are located along two separate axes and the range of maximum deviation between the axes by the portion of the stem formed into a curved shape is between 0.8 mm to 6 mm.

24. The earplug of claim 1, 2, or 3 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed with straight angularly displaced adjacent stem portions and wherein the rotation of the stem as it is being inserted into the ear canal accommodates variations in the shape of the ear canal by changing the position of the straight angularly displaced adjacent stem portions of the stem in the ear canal.

25. The earplug of claim 1 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed with straight angularly displaced adjacent stem portions and wherein the handle portion of the stem and the main body element are located along the same axis and the range of maximum deviation from the axis by the portion of the stem formed with straight angularly displaced adjacent stem portions is between 0.8 mm to 6 mm.

26. The earplug of claim 1 wherein the stem member having the crooked or wavy configuration as it extends outward from the main body and within the ear canal is formed with straight angularly displaced adjacent stem portions and wherein the handle portion of the stem is offset from the main body element and the handle portion of the stem and the main body element are located along two separate axes and the range of maximum deviation between the axes by the portion of the stem formed with straight angularly displaced adjacent stem portions is between 0.8 mm to 6 mm.

27. The earplug of claim 1, 2, 3, 4, or 5 wherein the handle portion of the stem is formed as a flattened portion of the stem.

28. The earplug of claim 1, 2, 3, 4, or 5 wherein the handle portion of the stem is formed as an enlarged portion of the stem.

29. The earplug of claim 1, 2, 3, 4, or 5 wherein the handle portion of the stem is formed as a continuation of the stem.

AMENDED SHEET (ARTICLE 19)