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(54) DRY SHAVER

(71) We, KABUSHIKI KAISHA SUWA SEIKOSHA and KABUSHIKI KAISHA HAMAZAWA KOGYO, both Japanese bodies corporate, of 3-4, 4-chome, Ginza, Chuo-ku, Tokyo, Japan and 5-11, 2-chome, Kogan-dori, Suwa-shi, Nagano-ken, Japan, respectively, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to dry shavers such as, for example, electrical rotary dry shavers.

In a conventional dry shaver a comb or foil is rigidly mounted on an outer ring by mechanical caulking. Mechanical caulking has the disadvantage that it tends to cause the foil to be stressed and so the useful life of the foil is reduced. Since the foil is rigidly mounted and since, moreover the foil is easily damaged or wears out, the whole of the shaver head consisting of the foil, the outer ring, etc. must be exchanged or replaced. Such conventional dry shavers are thus expensive to manufacture and also to repair.

According to the present invention there is provided a dry shaver including a foil having an outer rim, an outer ring having an inwardly projecting lip and an internally screw-threaded portion, an inner ring having an externally screw-threaded portion, the internally screw-threaded portion of the outer ring mating with the externally screw-threaded portion of the inner ring so that the rim of the foil is gripped between the lip of the outer ring and the inner ring, the internally screw-threaded portion of the outer ring also mating with a screw-threaded portion of a main casing.

Preferably means are provided to enable the inner ring to be screwed into or un-

screwed from the outer ring. Said means may comprise a pair of grooves in one end of the inner ring, the grooves being arranged to co-operate with a tool.

The inner ring and outer ring may be maintained with the rim of the foil gripped therebetween by means of adhesive material.

The inner ring and the outer ring may be made of plastics material.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:—

Figure 1 is a longitudinal section of part of a dry shaver according to the present invention;

Figure 2 is a perspective view of an inner ring of the dry shaver of Figure 1; and

Figure 3 is a partially enlarged longitudinal section of the dry shaver of Figure 1.

Referring to the drawings there is shown one embodiment of a dry shaver according to the present invention. This dry shaver has a shaver head 11 which includes a comb or foil 13 having a rim 12. The foil 13 is mounted on an outer ring 14 by means of an inner ring 15, the latter having an externally screw-threaded portion 18 which mates with an internally screw-threaded portion 18 of the outer ring. The dry shaver has a main casing 16 which houses the conventional drive means, such as an electric motor and a battery, of the dry shaver, and on which the shaver head 11 is mounted. The outer ring 14 has a radially inwardly directed flange or lip 17 (best seen in Figure 3) at its upper (as seen in the drawings) end.

During assembly of the shaver head, the foil 13 is fitted inside the outer ring 14 with the rim 12 thereof in contact with the lip 17. The inner ring 15 is then screwed into the outer ring 14 until the rim 12 of 90

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the foil is tightly gripped between the inner ring and the lip 17 of the outer ring.

(1) The internally screw-threaded portion 18 of the outer ring 14 enables the shaver head 11 to be screwed onto an externally screw-threaded portion 18" of the main casing 16, thus rigidly connecting the shaver head and the main casing together. Thus, the internally screw-threaded portion 18 of the outer ring 14 serves not only for mounting the foil 13 in the shaver head but also serves for mounting the shaver head 11 on the main casing 16.

Since the rim 12 of the foil 13 is gripped evenly throughout its peripheral extent between the lip 17 of the outer ring 14 and the inner ring 15, stresses in the foil are reduced or prevented. The foil 13 is formed of relatively thin sheet material, for example, 80 microns in thickness, and consequently is susceptible to stress and easily deformed. Conventionally, the foil is mounted in the shaver head by means of mechanical caulking but this has a tendency to cause stress in and deformation of the foil. In the dry shaver according to the present invention and described above such stress and deformation in the foil can be reduced or prevented. Furthermore, the clearance between a plurality of cutting blades 20 in the shaver head and the foil 13 can be reduced, so that the cutting efficiency or sharpness of the dry shaver can be improved.

Moreover, the foil 13 can be exchanged relatively easily by releasing the inner ring 15. This may be necessary if the foil is damaged or worn out. To this end, a pair of diametrically opposite grooves 19 (Figure 2) are formed in the lower (as seen in the drawings) end of the inner ring 15. Thus the inner ring 15 can be screwed or unscrewed from the outer ring 14 by means of a suitable tool (not shown) engaging these grooves 19. Thus the foil 13 can be exchanged in a simple and rapid manner.

If desired, the inner ring and the outer ring can be semi-rigidly retained together using an adhesive material in order to prevent the inner ring and the outer ring from unscrewing and the foil from becoming loose. Further, it is possible to increase the force with which the rim of the foil is grip-

ped between the inner and outer rings by making the latter not only of metal but also of a flexible material such as plastics material.

It will be appreciated that due to the simplicity of the structure, the above described dry shaver may be made at a relatively low cost and since the shaver head 11 is mounted on the main casing 16 by means of the screw-threaded portions 18, 18", assembly of the dry shaver is simplified.

WHAT WE CLAIM IS:—

1. A dry shaver including a foil having an outer rim, an outer ring having an inwardly projecting lip and an internally screw-threaded portion, an inner ring having an externally screw-threaded portion, the internally screw-threaded portion of the outer ring mating with the externally screw-threaded portion of the inner ring so that the rim of the foil is gripped between the lip of the outer ring and the inner ring, the internally screw-threaded portion of the outer ring also mating with a screw-threaded portion of a main casing.

2. A dry shaver as claimed in claim 1 in which means are provided to enable the inner ring to be screwed into or unscrewed from the outer ring.

3. A dry shaver as claimed in claim 2 in which said means comprises a pair of grooves in one end of the inner ring, the grooves being arranged to co-operate with a tool.

4. A dry shaver as claimed in any preceding claim in which the inner ring and the outer ring are maintained with the rim of the foil gripped therebetween by means of adhesive material.

5. A dry shaver as claimed in any preceding claim in which the inner ring and the outer ring are made of plastics material.

6. A dry shaver substantially as herein described with reference to and as shown in the accompanying drawings.

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the foil is tightly gripped between the inner ring and the lip 17 of the outer ring.

(1) The internally screw-threaded portion 18 of the outer ring 14 enables the shaver head 11 to be screwed onto an externally screw-threaded portion 18" of the main casing 16, thus rigidly connecting the shaver head and the main casing together. Thus, the internally screw-threaded portion 10 18 of the outer ring 14 serves not only for mounting the foil 13 in the shaver head but also serves for mounting the shaver head 11 on the main casing 16.

Since the rim 12 of the foil 13 is gripped 15 evenly throughout its peripheral extent between the lip 17 of the outer ring 14 and the inner ring 15, stresses in the foil are reduced or prevented. The foil 13 is formed of relatively thin sheet material, for 20 example, 80 microns in thickness, and consequently is susceptible to stress and easily deformed. Conventionally, the foil is mounted in the shaver head by means of mechanical caulking but this has a tendency to cause stress in and deformation of 25 the foil. In the dry shaver according to the present invention and described above such stress and deformation in the foil can be reduced or prevented. Furthermore, the 30 clearance between a plurality of cutting blades 20 in the shaver head and the foil 13 can be reduced, so that the cutting efficiency or sharpness of the dry shaver can be improved.

35 Moreover, the foil 13 can be exchanged relatively easily by releasing the inner ring 15. This may be necessary if the foil is damaged or worn out. To this end, a pair of diametrically opposite grooves 19 40 (Figure 2) are formed in the lower (as seen in the drawings) end of the inner ring 15. Thus the inner ring 15 can be screwed or unscrewed from the outer ring 14 by means of a suitable tool (not shown) engaging these grooves 19. Thus the foil 13 45 can be exchanged in a simple and rapid manner.

If desired, the inner ring and the outer ring can be semi-rigidly retained together 50 using an adhesive material in order to prevent the inner ring and the outer ring from unscrewing and the foil from becoming loose. Further, it is possible to increase the force with which the rim of the foil is grip-

ped between the inner and outer rings by 55 making the latter not only of metal but also of a flexible material such as plastics material.

It will be appreciated that due to the simplicity of the structure, the above de- 60 scribed dry shaver may be made at a relatively low cost and since the shaver head 11 is mounted on the main casing 16 by means of the screw-threaded portions 18, 18", assembly of the dry shaver is simpli- 65 fied.

WHAT WE CLAIM IS:—

1. A dry shaver including a foil having an outer rim, an outer ring having an inwardly projecting lip and an internally 70 screw-threaded portion, an inner ring having an externally screw-threaded portion, the internally screw-threaded portion of the outer ring mating with the externally screw-threaded portion of the inner ring so 75 that the rim of the foil is gripped between the lip of the outer ring and the inner ring, the internally screw-threaded portion of the outer ring also mating with a screw-threaded portion of a main casing. 80

2. A dry shaver as claimed in claim 1 in which means are provided to enable the inner ring to be screwed into or unscrewed from the outer ring.

3. A dry shaver as claimed in claim 2 85 in which said means comprises a pair of grooves in one end of the inner ring, the grooves being arranged to co-operate with a tool.

4. A dry shaver as claimed in any pre- 90 ceding claim in which the inner ring and the outer ring are maintained with the rim of the foil gripped therebetween by means of adhesive material.

5. A dry shaver as claimed in any pre- 95 ceding claim in which the inner ring and the outer ring are made of plastics material.

6. A dry shaver substantially as herein described with reference to and as shown 100 in the accompanying drawings.

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