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(54) **Molded mascara brush with oval core**

(57) A molded brush assembly (10) has a core (20) with an oval cross-section and a plurality of radially outwardly fingers (40) extending from sides of the oval core along the major axis (A-A) of the core (20), fingers (40) aligned with or near to the minor axis (B-B). The alignment of the fingers with or near to the minor axis allows an increase in the effective surface area of

the brush without increasing its overall peripheral circumference. The oval core (20) creates a brush assembly that is relatively stiffer along the major axis, leaving the brush flexible only along the minor axis. The use of fingers (40) of varying length provides a generally circular profile (50) which is convenient for use with conventional bottles. Furthermore fingers (40) having different lengths are adapted to different lashes.

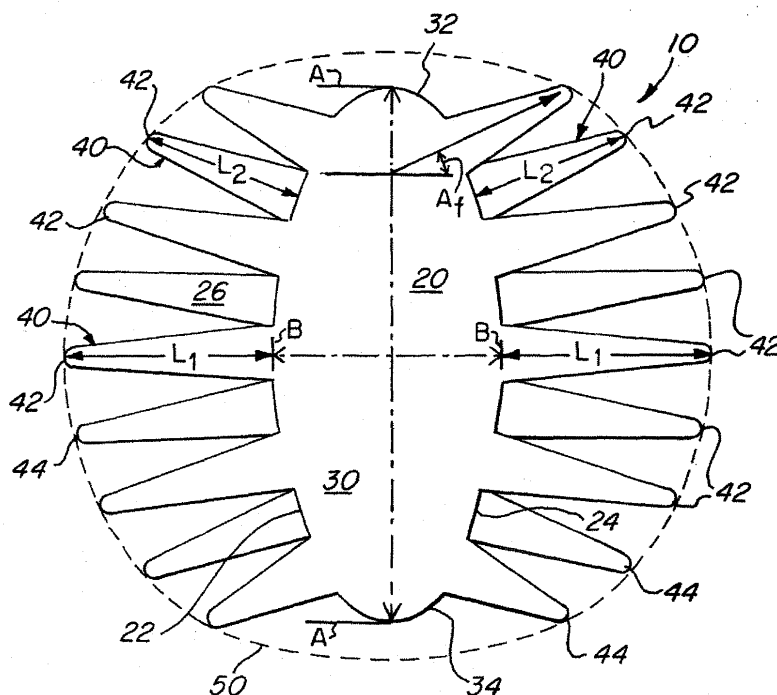


FIG. 1

Description

FIELD OF THE INVENTION

[0001] The present application relates to the field of molded brushes, and has particular application to brushes used for application of cosmetics, such as mascara.

BACKGROUND OF THE INVENTION

[0002] The application of cosmetics to enhance one's appearance is an age-old practice. Accordingly, different kinds of cosmetics have been developed for enhancing particular physical features, such as mascara, which is used to lengthen, thicken, and color one's eyelashes. Typically, these kinds of liquid-type cosmetics are applied with a twisted wire bristle brush.

[0003] A mascara brush must perform several functions. First, the brush must accumulate mascara within the bottle, and carry the mascara through the wiper, which removes the excess mascara from the bristles. The mascara brush must then apply the mascara to the eyelashes. Preferably, the brush also is capable of one or more additional functions, including, curling or lifting the eyelashes, and/or combing and separating the eyelashes, as well as spreading the mascara relatively evenly thereon. Desirably the brush is capable of more precise applications such as application of mascara to the smaller, bottom lashes, the corners of the lashes, and general touch-up. In all these functions, the brush is desirably comfortable for the consumer to use.

[0004] There are different mascara formulations, ranging from the traditional highly viscous formulations, to less viscous, more lacquer-like formulations, which are in common use. In general, a brush that works well for one type of formulation does not work well with other types of formulations.

[0005] A typical mascara brush comprises a series of bristles held in a twisted wire, which is in turn mounted to an applicator rod, which extends from the underside of a bottle cap. When not in use, the rod and bristles are inserted into an opening in a bottle containing the mascara, and the cap closes the bottle. There is usually a wiper in the neck of the bottle, through which the rod extends when the bottle is closed, such that the bristles are immersed in the mascara.

[0006] Molded rubber or plastic mascara brush designs have also been proposed, including designs of brushes as disclosed in U.S. Patent 4,635,659; 6,616,366; and 7,121,284; as well as in U.S. Patent Pub. No. US 2005/0034740.

[0007] These molded brush designs require molding in an appropriately shaped mold. Compared to adapting existing twist machinery used to manufacture a twisted wire mascara brush, the fabrication and setup of a mold is complicated and expensive. The above identified patents disclosing molded rubber or plastic mascara brushes typically require molds with a minimum of four moving

mold parts, which move between a molding position and a mold release position, in order that the molded brush can be removed from the mold. This manufacturing requirement for four cams moving four mold parts is typical in all brush designs which use generally circular center cores with radially extending fingers. The presence of four moving molds means there is an increased likelihood of flash on the molded product due to leakage at the mold seams. To prevent flash on the molded product, maintenance/resurfacing of the tool may be required.

[0008] Furthermore, small molded brushes, particularly one piece brush elements that do not have a central reinforcing rod have a tendency to bend and deform when force is applied to them. Typically, it has taken far less force to bend a one piece molded brush than is required for a twisted wire brush. This is a disadvantage to one piece molded construction; and alternative constructions with a reinforcing central rod are more expensive to fabricate.

SUMMARY OF THE INVENTION

[0009] A molded brush assembly has a core with an oval cross-section and a plurality of radially outwardly fingers extending from sides of the oval core along the major axis of the core. The fingers located in a central part of the major axis of the core having a longer length, and fingers located in upper and lower parts of the major axis of the core have a shorter length, so that distal ends of the fingers define a brush perimeter of generally circular cross-section.

[0010] The brush assembly of the present invention provides manufacturing and functional advantages over prior art molded brushes. It can be molded in a two part mold, reducing mold cost, setup cost, and maintenance cost, therefore providing a substantial cost savings over molded brushes that require a four part mold system. The oval core creates a brush assembly that is relatively stiffer along the major axis, leaving the brush flexible only along the minor axis. The alignment of the fingers with or near to the minor axis allows an increase in the effective surface area of the brush without increasing its overall peripheral circumference. The use of fingers of varying length provides a generally circular profile which is convenient for use with conventional bottles. The fingers of different lengths permit the different length fingers to be adapted to different lashes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a cross-sectional view of a molded mascara brush with oval core in accordance with one embodiment of the invention.

[0012] FIG. 2 is a perspective view of the molded mascara brush of FIG. 1.

[0013] FIG. 3 is a top plan view of the molded mascara brush of FIG. 1.

[0014] FIG. 4 is a side elevation view of the molded

mascara brush of FIG. 1.

[0015] FIG. 5 is a cross-sectional view of a molded mascara brush with oval core in accordance with a second embodiment of the invention.

[0016] FIG. 6 is a cross-sectional view of a molded mascara brush with oval core in accordance with a third embodiment of the invention.

[0017] FIG. 7 is a cross-sectional view of a two part mold releasing the molded mascara brush with oval core of FIG. 1.

[0018] FIG. 8 is a cross-sectional view of a molded mascara brush with oval core in accordance with a fourth embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Referring now to FIGS. 1-4 and 7, a molded brush assembly 10 is shown. Molded brush assembly 10 comprises a core 20 of oval cross-section having a major axis A-A and a minor axis B-B. As used herein, the term "oval cross-section" includes all convex closed curves, and specifically includes elliptical cross-sections, rounded rectangle (i.e., racetrack) cross-sections, lens shaped or lenticular cross-sections. "Oval cross-section" also includes Cassini ovals, and other convex curves, such as semicircles or curved ends connected by curved lines or by intersecting straight lines. "Oval cross-section" expressly excludes circular cross-sectional shapes. Preferably, the oval cross-section is symmetrical across both the major axis A-A and the minor axis B-B, e.g. the oval cross-section has two axes of symmetry.

[0020] The oval cross-sectional core of the brush of the present invention provides an advantage over circular core molded brushes in that the oval core permits the brush to be flexible in the direction of the minor axis B-B only. The brush is relatively more rigid along the A-A axis because the amount of material to be bent is thicker along the A-A axis. This provides an advantage over the limper circular core molded brushes which can be excessively deformed when force is applied to them. In particular, the design of the molded brush of the present invention provides a brush in which the flexibility is controlled and limited to be along one specific axis only.

[0021] A plurality of radially outwardly fingers 40 extend from sides 22 and 24 of oval core 20. Specifically, the fingers 40 extend from the sides of the oval core 20 along the major axis A-A of core 20, as best seen in FIG. 1. Fingers 40 each have a distal end 42. In the preferred embodiment, fingers 40 are generally conical with rounded tips 44 at their distal ends 42. However, other finger shapes may be used, and the fingers described in the specification and claims should be understood to include fingers which have cross-sectional shapes which are circular or oval; polygonal (especially triangular, rectangular or square, pentagonal, or hexagonal); cross-shaped or x-shaped or y-shaped. Furthermore, such finger cross-sectional shapes can be solid, or hollow. Also, channels or cutaways may be provided in such solid or hollow

shapes to provide other cross-sectional shapes, for example, circular or oval finger of hollow cross-section can have a channel in one side of the wall of the finger, creating a C-shaped cross-section. The fingers may have a constant cross-sectional diameter/shape over their length (such as in a cylinder), or a tapering cross-sectional diameter/shape over their length (such as in a conical shape).

[0022] Fingers 40 located in a central part 26 of the major axis A-A of core 20 have first length L_1 . Fingers 40 located in upper and lower parts 28 and 30 of the major axis A-A of core 20 have an incrementally shorter length L_2 which is shorter than the length L_1 of the fingers 40 located in the central part 26. The lengths of the fingers 40 are selected such that their distal ends 42 define a brush perimeter 50 of generally circular cross-section. A circular brush perimeter 50 is generally preferred because it is most versatile and allows the brush to easily be adapted for use with conventional round bottles. However, if desired, the distal ends can define other cross-sectional brush perimeter shapes, such as oval shapes, triangular shapes, or square or rectangular shapes, or pentagonal, hexagonal or other polygonal shapes. In the most preferred embodiment, the distal ends 42 define a brush perimeter 50 of generally circular cross-section in which none of the fingers 40 extend from the top 32 and bottom 34 of the core along the minor axis B-B of the core.

[0023] It should be noted that the fingers 40 extending from oval core 20 do not have the same pattern of radially extending fingers or bristles that is typical of circular core brushes and twisted wire bristles. Instead, in the oval core molded brush assembly 10, the fingers extend from the left and right sides of the oval core 20 and the directional orientations of the fingers 40 are aligned with or are near to the axis B-B. Preferably, the fingers 40 extend at an angle A_f of no more than 45 degrees relative to axis B-B. More preferably, the fingers 40 extend at an angle of no more than 30 degrees relative to axis B-B, and most preferably, the fingers 40 extend at an angle of no more than 15 degrees relative to axis B-B. In the most preferred embodiment, the fingers 40 extend perpendicularly from the surface of the oval core 20. Thus, the fingers 40 extend in different directions depending on their position on the sides 22 or 24 of oval core 20.

[0024] As best seen in FIG. 3, at the distal end 36 of core 20 the fingers 40 also have an incrementally shorter length L_3 which is shorter than the length L_1 of the fingers 40 located in a central part 26 of the major axis A-A of core 20. Similarly, at the proximal end 38 of the core 20 the fingers 40 have an incrementally shorter length L_4 which is shorter than the length L_1 of the fingers 40 located in a central part 26 of the major axis A-A of core 20.

[0025] The molded brush assembly 10 may be integrally molded as a single unit as in FIGS. 1-4. The brush assembly will typically have a stem 52 at its proximal end, which is adapted to be mounted to a handle or a rod of a mascara brush assembly.

[0026] The molded brush assembly 10 can be readily

molded as an integral unit in a two part mold as seen in FIG. 7. Mold 90 has a left part 92 and a right part 94, which move towards each other to meet along a central vertical mold line, and which separate by movement in the horizontal plane to allow removal of the molded brush assembly 10. Only two mold cam mechanisms are required to move the two mold parts 92 and 94. The benefit of reducing the number of mold parts and mold cams is that it provides reduced expense in mold fabrication, as well as reduced expense in mold setup time and calibration, as well as reduced need for mold maintenance to prevent to eliminate problems such as excessive flash on the mold part arising from mold wear.

[0027] In the molded product, the fingers 40 extend primarily in two directions, shown as generally leftwardly and rightwardly as seen in FIGS. 1 and 7. As seen in FIGS. 1, 5, 6, and 7, the directional orientations of the fingers 40 are aligned with or are near to alignment with the plane of movement of the two mold parts, so that the fingers 40 are released from the mold parts 92 and 94 when those parts are retracted. Thus, in the preferred embodiment, where plane of movement of the two mold parts coincides with the axis B-B of the oval core 20, the fingers are aligned with or are near to alignment with axis B-B, and in particular, in accordance with the most preferred embodiment described above, the fingers 40 extend at an angle of no more than 15 degrees off of the axis B-B. However, it is to be appreciated that greater angles, as described above, can be fabricated by using a four part mold or other mold configurations.

[0028] Although in the preferred embodiment, none of the fingers 40 extend from the top 32 and bottom 34 of the core along the minor axis B-B of the core, additional fingers may be located there and be readily molded using a two part mold.

[0029] The design of molded brush assembly 10 therefore allows the use of a two part mold, providing a significant cost savings in the fabrication of the mold, as well as in the setup of the mold for manufacturing, as well as in the maintenance of the mold over time. The present invention is not restricted to a molded mascara brush molded in a two part mold; however, the ability to mold preferred embodiments of the mascara brush of the invention in a two part mold is an advantage of those embodiments. It should be noted that alternate mold orientations may be used if desired, for example, the mold parts may be positioned in upper and lower positions and move upwardly and downwardly.

[0030] Instead of being an integrally molded assembly, the mascara brush assembly may comprise a central rod unit and a sleeve having the fingers 40 associated therewith. For example, in one embodiment shown in FIG. 5, molded brush assembly 210 has a core 220 which comprises a central rod unit 260 and a sleeve 262. The sleeve 262 consists of a body 264 having fingers 240 provided thereon. In the embodiment shown in FIG. 5, the rod unit 260, and the body 264 have oval cross-sections. In another embodiment, shown in FIG. 6, molded brush as-

sembly 310 has a core 320 which comprises a central rod unit 360 having a circular cross-section, and a sleeve 362. The sleeve 362 has body 364 having an oval cross-section. Fingers 340 are provided on the body 364. Embodiments of the type having a central rod unit and a sleeve as shown in FIGS. 5 and 6 can be manufactured by overmolding the sleeve onto the central rod unit, or alternatively, by molding a sleeve separately from the rod and then sliding the sleeve onto the rod with or without an adhesive. In these type of embodiments having central rod unit and a sleeve, the rod can be fabricated of acetate, polypropylene, LDPE, HDPE or similar materials.

[0031] The cores 20, 220, and 320 are preferably molded from a relatively sturdy, flexible plastic material such as nylon-6, polypropylene, or low density polyethylene, or high density polyethylene, or rubber materials such as natural rubber, and isoprene rubbers, or any other elastomer. Ultimately, the choice of material will depend on the composition of the mascara the mascara brush is used with. For example, water based mascara and mascaras using other solvent bases have different properties, so the material should be selected to match the mascara it is used with. In some cases, foam materials may be used, particularly for the sleeves 262 and 362 if an embodiment in accordance with FIGS. 5 and 6 are selected.

[0032] The size of the core 20 will vary, but in general the core will have a length of about .80 to about 1.5 inches, most preferably, about 1.0 inch. The core diameter will range from a minor axis minimum diameter of about .10 inch to a major axis maximum diameter of about .50 inch. The fingers 40 have a length so that the brush perimeter 50 has a diameter of between .20 inch to about .50 inch. In one preferred embodiment, the fingers 40 have a length so that the brush perimeter 50 has a diameter of between .25 inch to about .35 inch, most preferably .28 inch.

[0033] One desirable benefit of a molded mascara brush in accordance with the present invention, in which the directional orientations of the fingers 40 are aligned with or are near to the axis B-B, and extend from sides 22 and 24 at angles of less than 45, 30 or 15 degrees relative to axis B-B, is that the effective brush surface is greater than the effective brush surface of the radially extending fingers or bristles of circular core molded brushes and twisted wire bristles. This is due to the fact that the fingers 40 are generally aligned with each other, providing a consistent applicator surface effect that is not possible in a radial brush design.

[0034] A further advantage of the present invention is that the use of fingers 40 having a variation in length such as the lengths L_1 , L_2 , L_3 , and L_4 permits the different length fingers to be adapted to different lashes. The longer length fingers 40 can be used to target longer lashes in the center of the eyelid, while the shorter length fingers can be used to target shorter lashes, for example, in the peripheral ends of the eyelid.

[0035] A further benefit of the oval core molded mas-

cara brush is that it provides two visually distinct and identifiable surfaces. This is a very significant advantage over a conventional circular core brush that has no distinct sides to it. In the present invention, the two sides 22 and 24 can be provided with two different finger layouts providing different functions. Finger layouts providing effects such as bulk application, thickening, lengthening, curling, defining, or specialty effects are possible. In the present invention, two of such functions could be provided by providing different finger layouts on the two different sides of the brush. For example, brush combinations such as thickening/curling; lengthening/defining; or thickening/specialty could be provided to consumers using the present invention. Another possible example, seen in the molded mascara assembly 810 in FIG. 8, combines a plurality of fingers 840 on one side of the oval core with a comb 841, formed of one or more rows of fingers, on the other side. In such case, the fingers on only one side of the core will define a brush perimeter 850 of partial circular cross-section as seen in FIG. 8.

[0036] As noted, the use of the oval core provides a very clear visual distinction that the brush assembly has two different sides 22 and 24, making the possible use of two different brushes/applicator faces, one on each side of the brush, both possible and easily recognized by the consumer.

[0037] One desirable feature of a molded mascara brush is a purely marketing advantage. The molded brush can be molded in colored rubbers or plastics, so that the packaged brush as sold in the retail outlet presents the consumer with an eye-catching colored brush. However, once the brush is plunged into the mascara that coloring will become coated and obscured.

[0038] Accordingly, the present invention provides a new and unique molded mascara brush having both a manufacturing advantage and a functional advantage over prior art molded brushes. The present invention provides a manufacturing advantage in that it can be made through injection molding in a two part mold, reducing mold cost, setup cost, and maintenance cost, therefore providing a substantial cost savings over molded brushes that require a four part mold system. The oval core mascara brush of the invention provides functional advantages because the oval core creates a brush assembly that is relatively stiffer along the long axis, leaving the brush flexible only along the minor axis. The use of fingers of varying length allows use of the oval core while still providing a generally circular profile. Furthermore, having fingers of different lengths provides the opportunity of designing different zones adapted for targeting of different eyelashes, such as the center lashes and the corner lashes. The alignment of the fingers near to the axis B-B allows an increase in the effective surface area of the brush without increasing its overall peripheral circumference.

Claims

1. A molded brush assembly comprising:
 - 5 a core of oval cross-section having a major axis and a minor axis and two sides;
 - a plurality of radially outwardly fingers extending from at least one side of said oval core along said major axis.
- 10 2. The molded brush assembly of claim 1, wherein said a plurality of radially outwardly fingers extend from two sides of said oval core along said major axis; and said fingers each have a distal end; said fingers being positioned and having a length such that said distal ends of said fingers define a brush perimeter of at generally circular cross-section.
- 15 3. The molded brush assembly of claims 1 or 2, wherein fingers located in a central part of said major axis of said core have a length, and fingers located in upper and lower parts of said major axis of said oval core have an incrementally shorter length than the length of the fingers located in a central part of said major axis of said core, such that the tips of said fingers define a brush perimeter of generally circular cross-section.
- 20 4. The molded brush assembly of claims 1, 2, or 3, wherein said molded brush assembly has a distal end with fingers having an incrementally shorter length than the length of the fingers located in a central part of said major axis of said core and wherein said molded brush assembly has a proximal end with fingers having an incrementally shorter length than the length of the fingers located in a central part of said major axis of said core.
- 25 5. The molded brush assembly of claims 1, 2, 3, or 4, wherein said fingers are generally conical with rounded tips.
- 30 6. The molded brush assembly of claims 1, 2, 3, 4 or 5, said fingers being at an angle of no more than 45 degrees relative to the minor axis.
- 35 7. The molded brush assembly of claim 6, said fingers being at an angle of no more than 30 degrees relative to the minor axis.
- 40 8. The molded brush assembly of claim 7, said fingers being generally aligned with or near to alignment with the minor axis, and extend at an angle of no more than 15 degrees relative to the minor axis.
- 45 9. The molded brush assembly of claims 1, 2, 3, 4, 5, 6, 7 or 8 wherein said molded brush assembly is integrally molded as a single unit.
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10. The molded brush assembly of claims 1, 2, 3, 4, 5, 6, 7 or 8, wherein said molded brush assembly comprises a central rod unit and a sleeve located on said central rod unit, said sleeve having said fingers associated therewith.

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11. The molded brush assembly of any preceding claim, said oval core having two sides provided with different layouts of the molded fingers to provide different functions.

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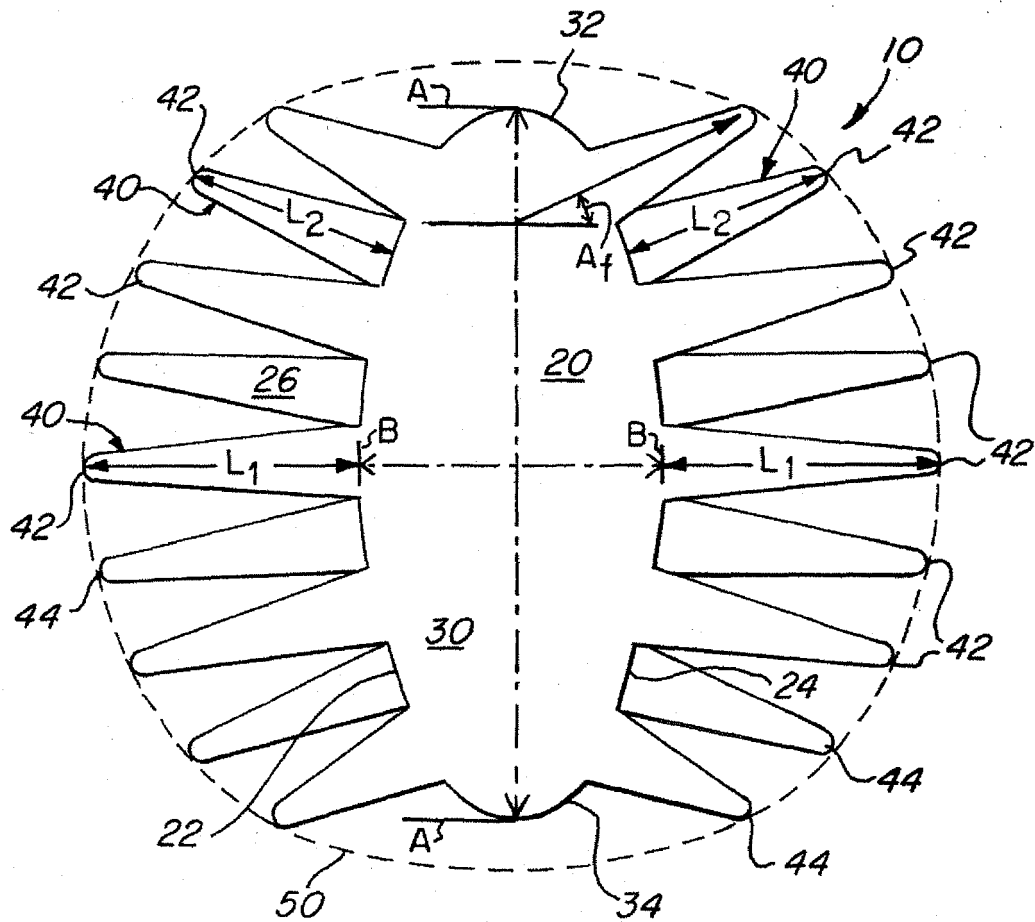


FIG. 1

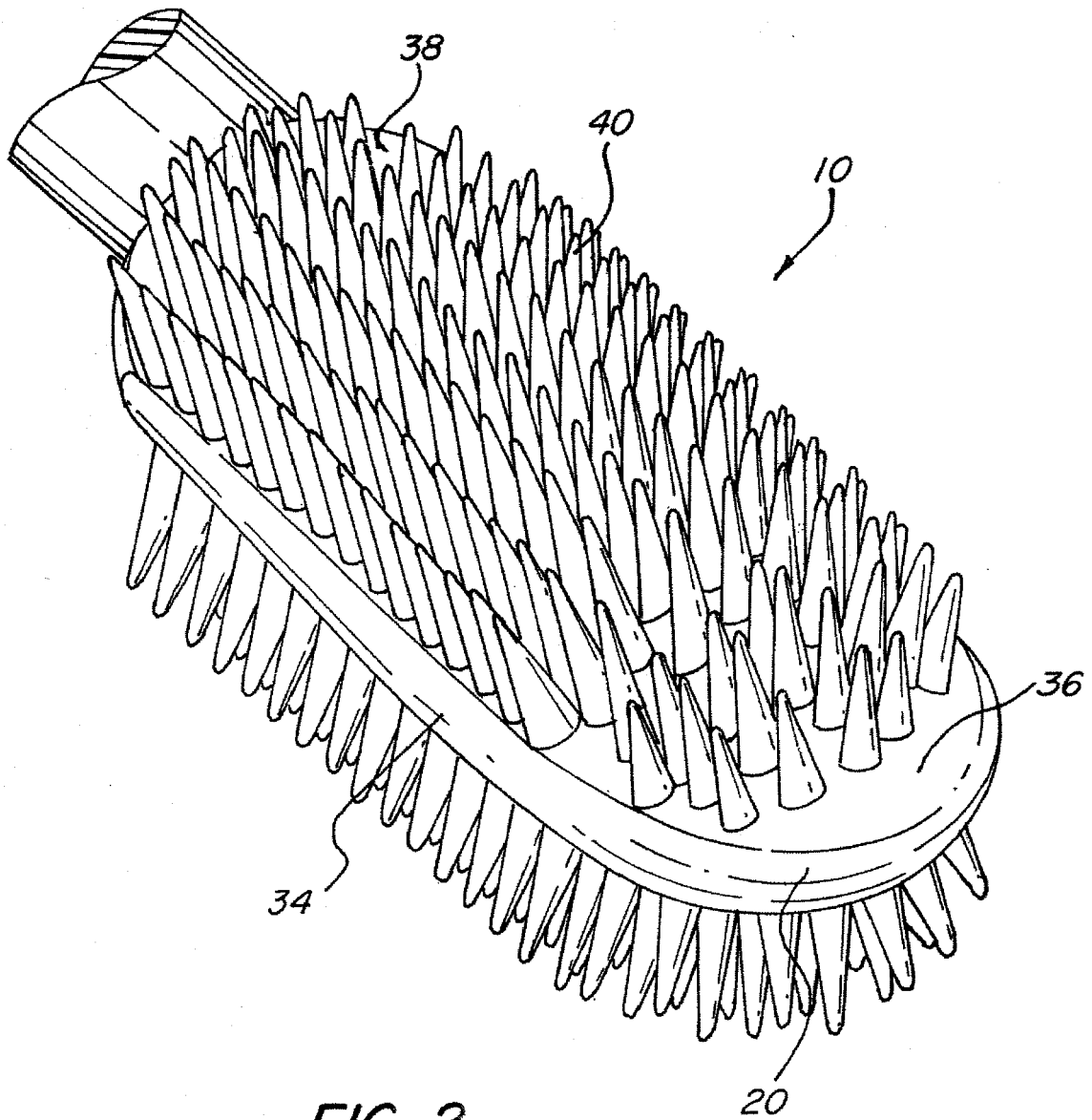


FIG. 2

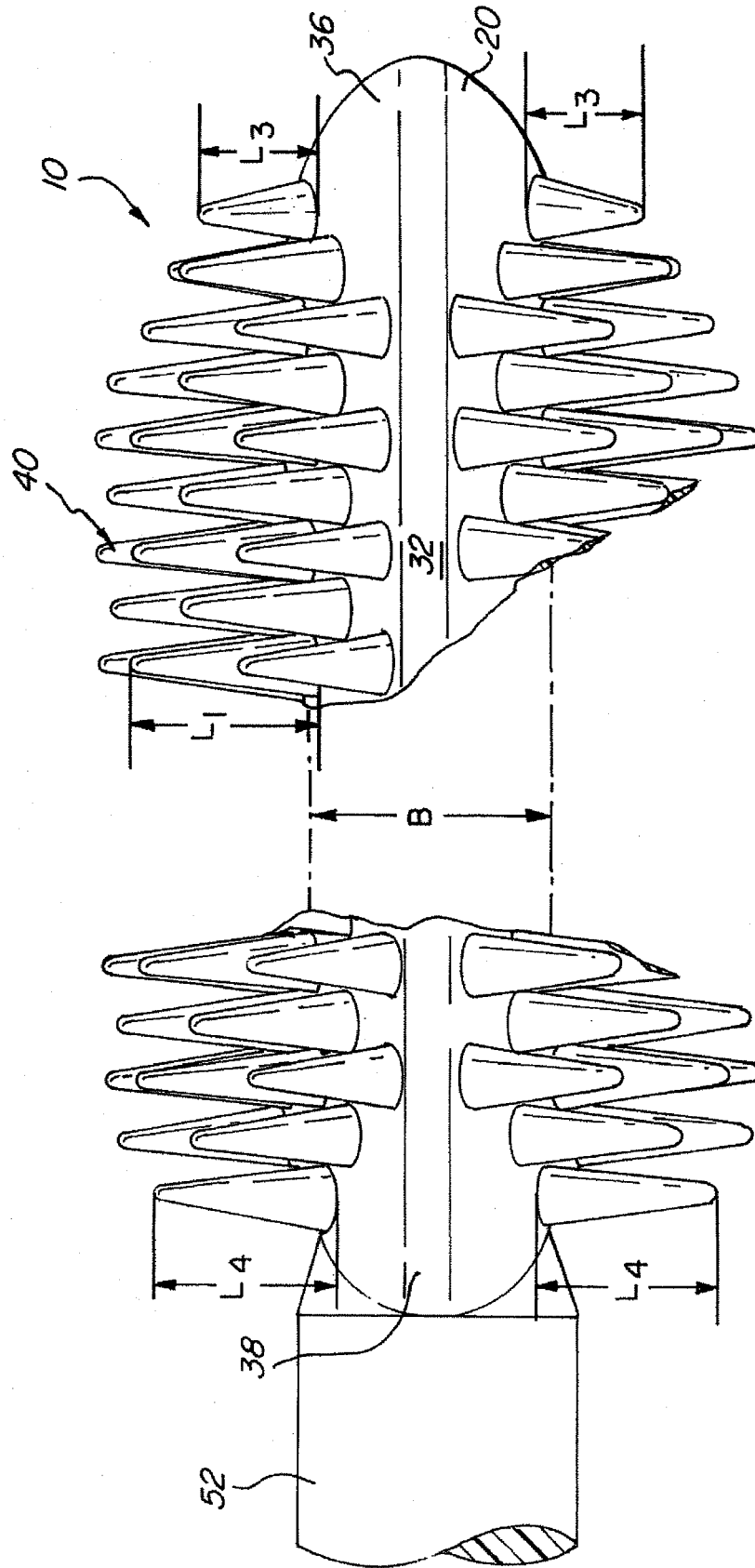


FIG. 3

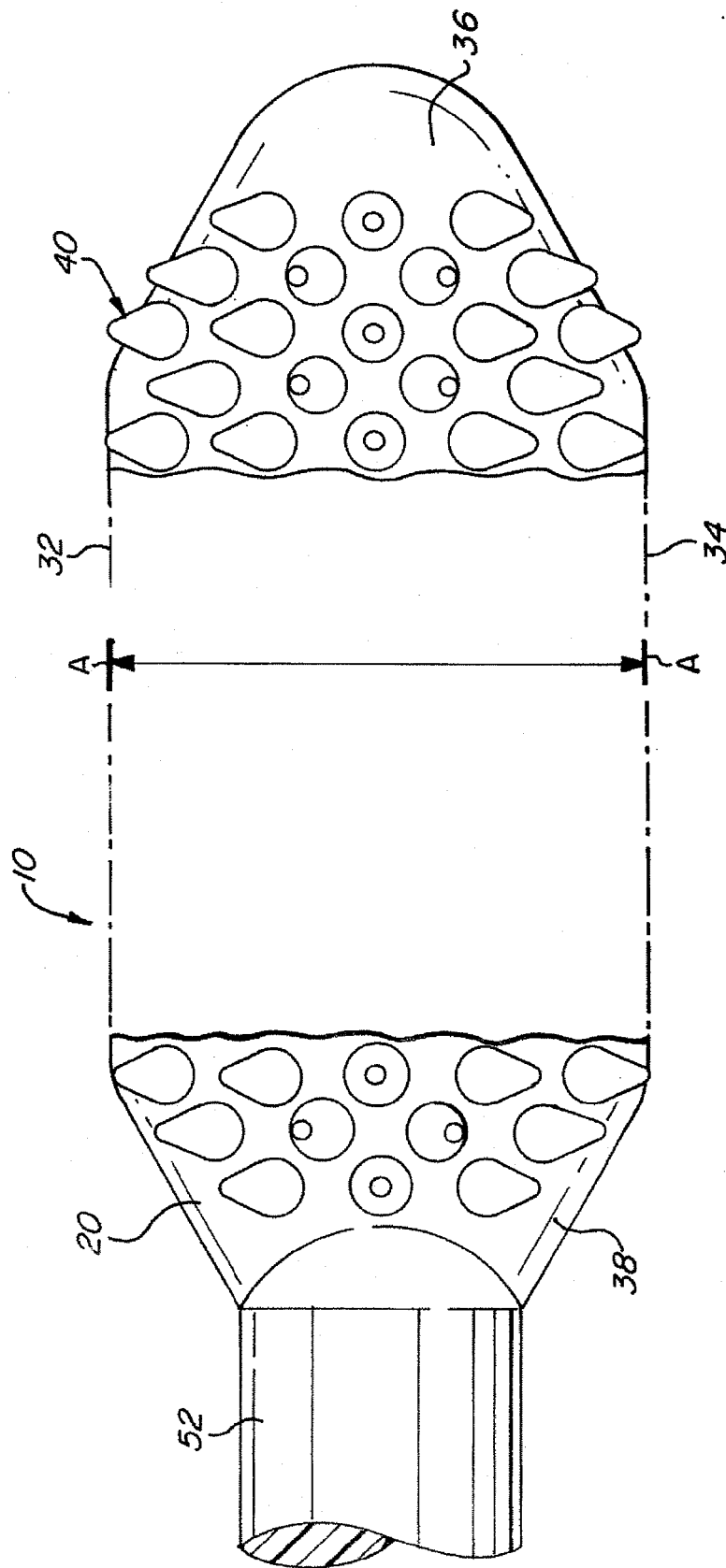


FIG. 4

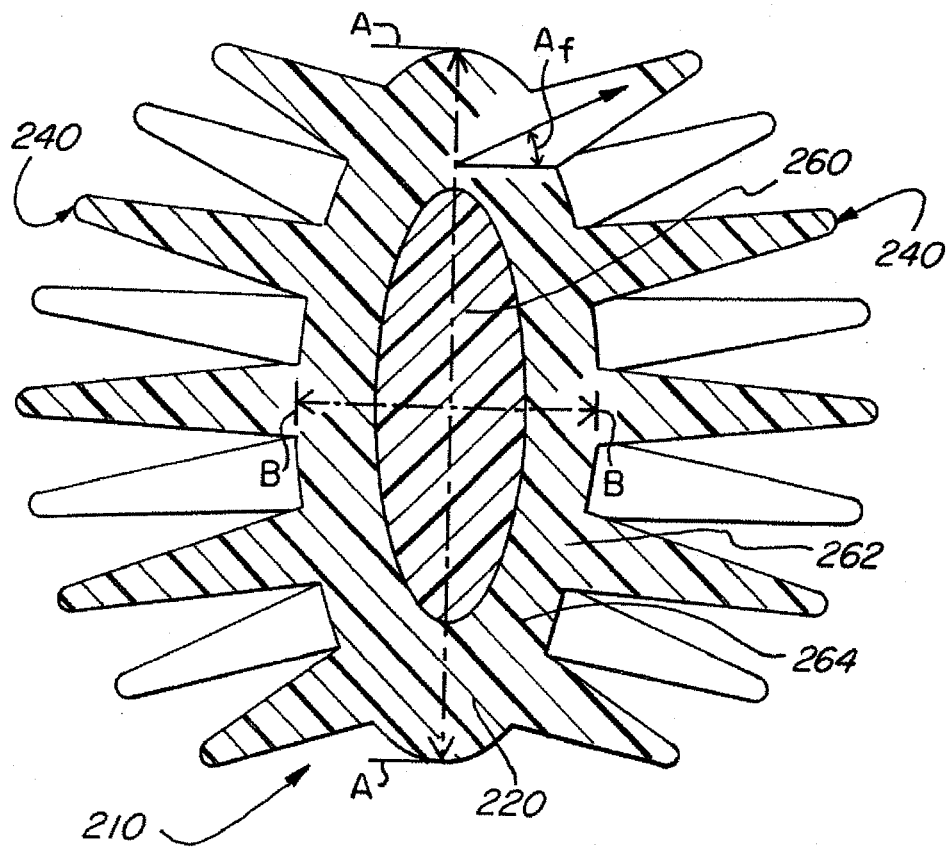


FIG. 5

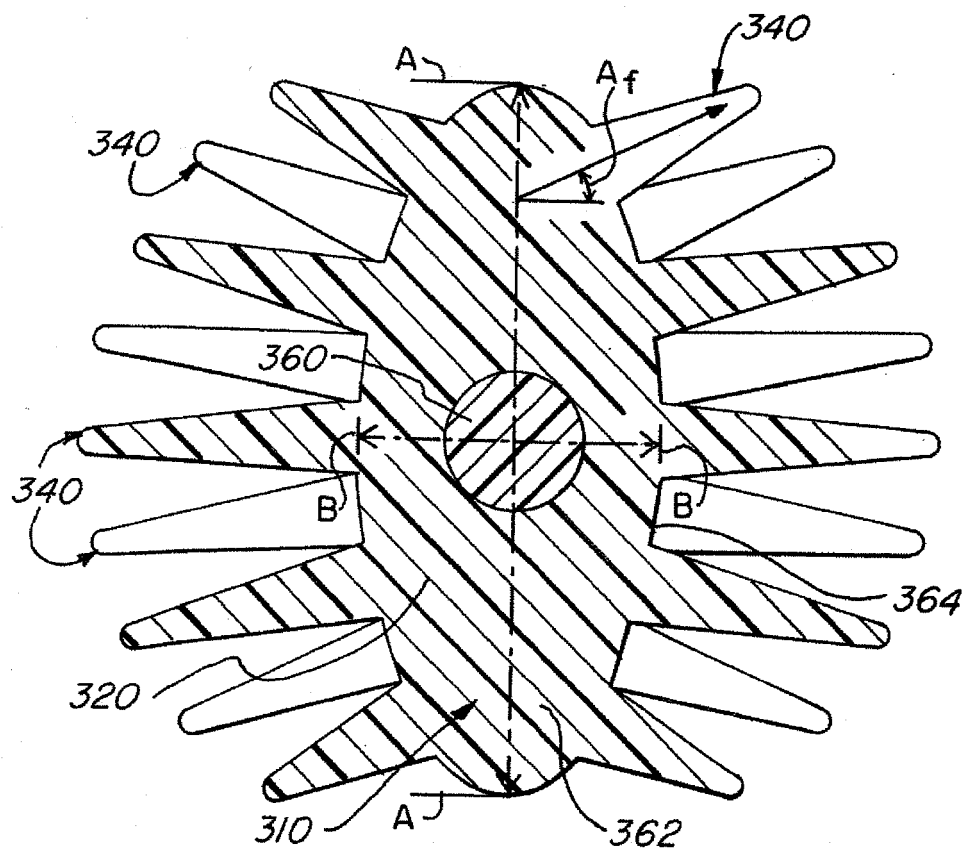
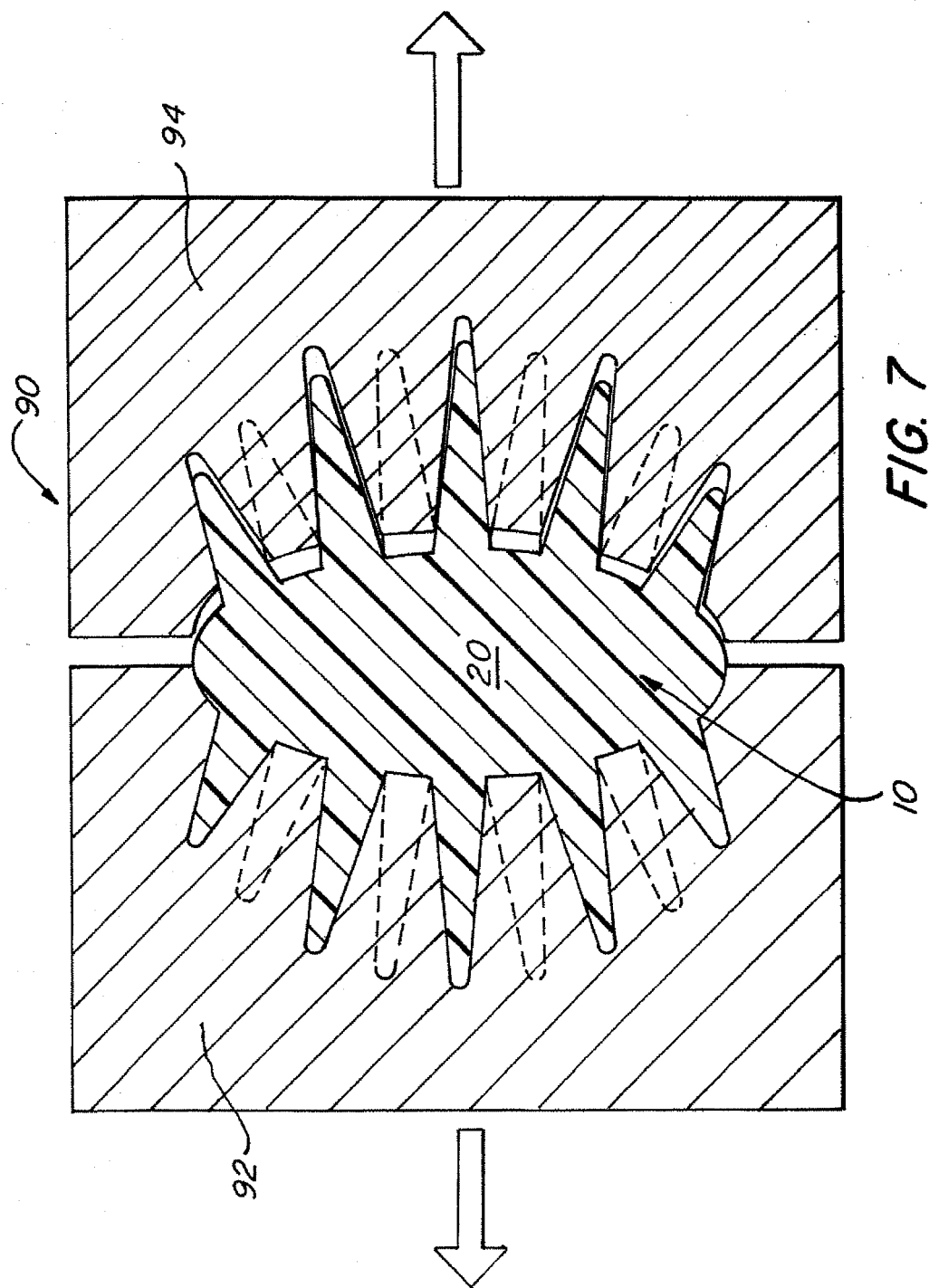
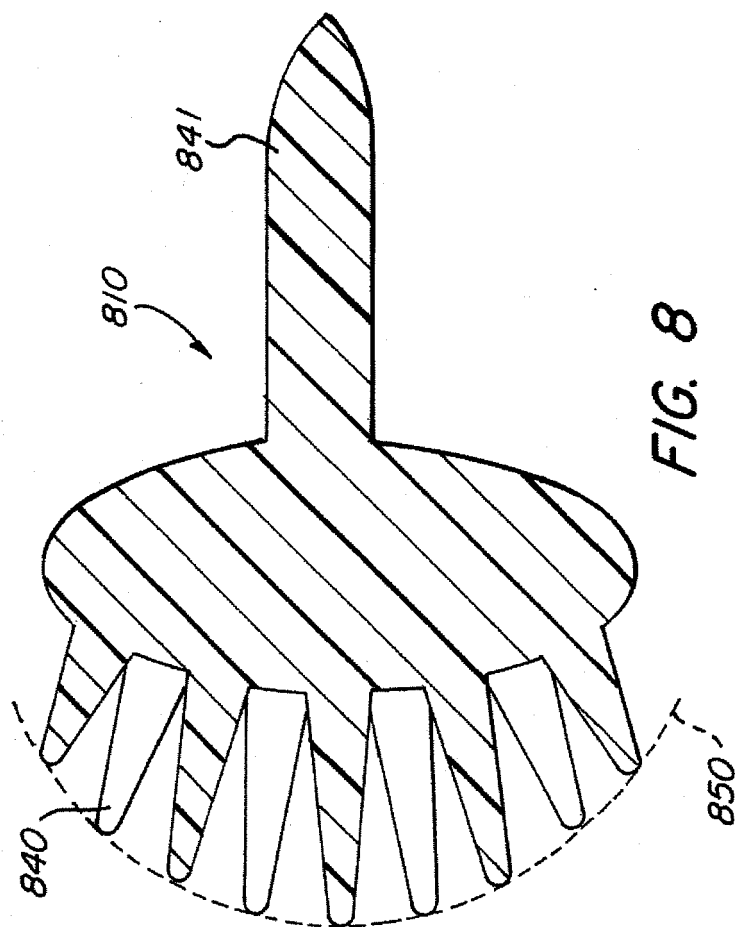


FIG. 6







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 11 9321

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 11 9321

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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