(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 620 073 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
11.03.2020 Bulletin 2020/11

(21) Application number: **18745150.5**

(22) Date of filing: **25.01.2018**

(51) Int Cl.:
A42B 1/12 *(2006.01)* ***A42B 1/22*** *(2006.01)*

(86) International application number:
PCT/ES2018/000006

(87) International publication number:
WO 2018/138393 (02.08.2018 Gazette 2018/31)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD TN

(30) Priority: **26.01.2017 ES 201700048 U**

(71) Applicant: **Borrás Esteve, Vicenta Isabel**
46680 Algemesí (Valencia) (ES)

(72) Inventor: **Borrás Esteve, Vicenta Isabel**
46680 Algemesí (Valencia) (ES)

(54) SWIMMING CAP THAT IS GENTLE ON THE HAIR

(57) This invention relates to a swimming article consisting of a cap that protects the hair, for use during recreational swimming and other water sports. The cap comprises a three-part cavity for receiving the hair, including a lower concave portion that is joined to the middle and upper convex portions at the ears, creating a stable, non-constrictive internal space. The cap also comprises an internal positioning-blocking unit consisting of: 1) an annular band, one end of which is joined to the edge the cap, gently securing the cap to the user's head; and 2) a leak-preventing strip which overhangs the annular band at the nape of the neck, such as to fill in the irregular spaces in the shape of the head in this region, in order to stop and absorb any possible leaks. The invention includes graphical illustrations of three embodiments of the cap.

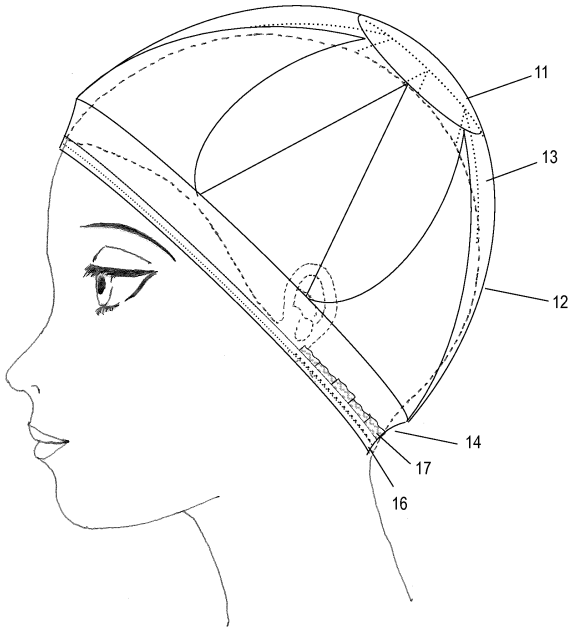

FIG. 4
(Embodiment "A")

EP 3 620 073 A1

Description

TECHNICAL FIELD

[0001] Nowadays, many swimwear manufacturers seem interested in making swimming caps that owing to their materials and design, manage to reduce the friction in the water of the frontal surface of the head and, consequently, to improve the speed of competition swimmers, its supposedly main users.

[0002] By concentrating chiefly on such features and end users, the manufacturers of the sector seem to ignore the existence of this other large group of potential users composed of recreational bathers of all ages, who would like to be able to use swimming caps that were: *roomy* (with adequate and well distributed interior space, able to properly accommodate hair of different lengths or to preserve hairdos of different shapes and volumes); *watertight* (of materials and structures that made them waterproof and resistant to liquid filtration); *comfortable* (of materials and structures that made its placement and removal easy and its grip on the head comfortable); and *sober* (of making, size, and materials that made them inconspicuous).

[0003] Unfortunately, the swimming caps available in the market do not necessarily meet these qualities. Therefore, and given that in many public aquatic facilities the use of the cap is mandatory, numerous potential users, not having the swimming cap that meets their needs, renounce to the practice of aquatic exercise and, therefore, to its beneficial effects on their physical and mental health.

BACKGROUND ART

[0004] Despite the sparse presence in the market of swimming caps with the qualities mentioned above (*roominess, watertightness, comfort, and sobriety*), many inventors have been trying to achieve them since long ago.

[0005] Representative examples of inventions particularly interested in the roominess of the swimming cap include those of the following patents: "Bathing cap" US Pat. No. 2465998 A, by Frederick W. Bowditch (1949); "Bathing cap" US Pat. No. 3206761 A, by Beatrice Melnikolf (1965); "Water Aerobic Cover for the Hair" US Pat. No. 20150000002 A1, by Linda Gale Brown (2015); "Bathing cap" US Pat. No. 3996621 "A, by Liselotte Martienssen (1974); and "Swimming cap" US Pat. No. 20140109281 by Waller, Johnson and Neal (2014).

[0006] To achieve capacity, the cap in the Bowditch patent (1949) uses a cavity for receiving the hair, composed of several wide segments of rigid material that fold on both sides of a zipper that, when closed, constricts them adjusting the back of the cap. The cap also includes a strap that fastens below the chin to ensure the grip and tightness of the cap's front.

[0007] The cap in the Melnikolf patent (1965) consists of a hemispherical flexible piece with laces crimped with eyelets that adjust its volume to that of the user's hair. The hemispherical piece has a lateral expansion gusset to facilitate the accommodation of the hair, and is bordered by a strip that secures the cap to the head with a snap closure or similar.

[0008] The Brown patent (2015) relates to a swimming cap that resembles a wide shower cap bordered by a silicone adjusting band. Given its ampleness, the cap easily adapts to different head sizes and receives hairstyles of varying lengths and volumes.

[0009] The Martienssen patent (1974) presents a cap composed of a flexible receptacle that covers the hair loosely, an annular band made up of three segments that follow the outline of the hairline in the forehead, temples and neck areas, and an elastic oval ring placed between the receptacle and the band and glued to both of them.

[0010] The cap patented by Waller, Johnson, and Neal (2014) consists of a cavity bordered internally by a band of silicone that widens at the nape of the neck. The widening allows the placement of long hair collected in a low bun, in the area below the upper nuchal line and the external occipital protuberance of the occipital bone. This minimizes the neck depression in said area and, supposedly, improves swimming hydrodynamics.

[0011] Illustrative examples of inventions concerned primarily with the watertightness of the swimming cap include those disclosed in patents such as: "Watertight cap" US Pat. No. 20,100,192,273, by Karetha Dodd (2010); "Leak-proof cap with improved seal construction" US Pat. No. 5,349,702, by John L. Runckel (1994); "Bathing cap" US Pat. No.2,285,659, by Howland Thomas (1942); and "Waterproof bathing cap" ES Pat. No. 1,074,697 U, by Fe Cerezo Miró (2012).

[0012] The swimming cap patented by Dodd (2010) consists of a cavity with an annular edge and an elastic fringe joined to the cavity by said edge. To optimize its hermetism, the cap may additionally include two straps that attached to the elastic fringe at the ears, fasten at the back of the neck with a closing mechanism like velcro.

[0013] The cap of the Runckel patent (1994) comprises a hemispherical cavity for sheltering the top of the head and a band for covering the forehead, temples, and back of the neck. The cap also comprises an internal sealing structure consisting of an inflatable air chamber and a ribbon of foam material superimposed to it. When inflated, the camera, together with the ribbon, seals the large and small protuberances in the shape of the head, thus preventing possible leaks.

[0014] The Thomas patent (1942) refers to a cap with a main cavity and two ribs mounted on a flexible piece adhered to the cap's inside. This mounting supports the protruding ribs in such a way that when the user's head presses against them, they move away from each other and oscillate towards the inside of the cavity. By doing so, the ribs force out the air from the space between them, thus preventing possible leaks.

[0015] The cap patented by Cerezo Miró (2012) con-

cerns a waterproof cap consisting of a plastic bag bordered by a tube wrapped in an elastic band of silicone that allows the adjustment of the cap to the scalp without tightening it. Both the plastic bag and the tube are inflatable and have decompression valves. An additional standard cap, made of fabric or the like, allows the hiding of the waterproof cap after its decompression with a portable vacuum pump.

[0016] Undoubtedly valuable, the previous models are not without limitations like the following:

1) the receptacles for receiving the hair in some of the caps addressing roominess (e.g., the caps patented by Brown or by Martienssen) lack the structure required to adequately keep the shape of the hairdo. In addition, the bulkiness of those receptacles makes the caps too showy, thus limiting their popularization among many water sports practitioners;
2) the structuring of the hair lodging cavity in the other models addressing roominess, poses problems of another sort. For example, in the cap patented by Waller, Johnson, and Neal, the protrusion of the long hair housing cavity in the nuchal area may compromise the watertightness of the cap since, due to its weight, the hair may cause leaks when pressing down the cap adjustment band; and
3) Certain devices utilized by some of the caps considered here are somewhat problematic. For instance, the zippers, snap fasteners, laces, or eyelets used by the caps that bet on roominess (e.g., those of Bowditch or Melnikolf) may deteriorate rapidly in contact with the chemicals used for water sanitation in aquatic facilities. Likewise, the belts, inflatable chambers, or vacuum valves used by the caps seeking watertightness (e.g., those of Dodd, Runckel, or Cerezo Miró) may be uncomfortable, difficult to handle, and easy to break.

[0017] Therefore, in light of the background art illustrated by, among others, the aforesaid models, it seems that there is still room for creating a swimming cap that, like the one described below, keeps the shape of the hairdo, prevents the hair from getting wet, is comfortable to wear, and attracts the target user for its discretion.

SUMMARY OF INVENTION

[0018] The invention disclosed here refers to a swimming cap that due to its *roominess, watertightness, comfort, and sobriety*, may interest that large female, and male, clientele, that practices or would like to practice, recreational swimming or other non-competitive water sports.

[0019] The invention materializes in the *Swimming Cap Respectful with the Hair*, which, among others, offers three possible embodiments, "A," "B," and "C." In its "A" embodiment, the cap consists of a main body for receiving the hair, and a positioning-blocking unit responsible for the grip and watertightness of the cap.

[0020] The main body includes: a) an upper portion in the form of a spherical cap for receiving long hair compactly collected (e.g., bun or horsetail) or the top of voluminous hairdos, such as to prevent its flattening, or; b) a middle portion in the form of a spherical zone composed of twelve assembled pieces that ensure the stability of the portion's shape, for receiving the bulk of the hair; and c) a lower portion in the form of a concave surface of revolution whose lower part, when the cap is put on, contacts the user's head below the hairline and separates from it above that line.

[0021] This three-part structure of the main body, which as a whole replicates to some extent the shape of a standard hairdo, gives the cap enough roominess to prevent it from ruining the hairdo and to ensure the comfort of its use.

[0022] As far as the positioning-blocking unit of the cap is concerned, it includes the annular band that secures the cap to the user's head. Made of elastic material, the band is joined to the rim of the lower portion of the cap by only one of its edges; as a result, the pressure of the band on the user's head decreases, thus increasing the comfort of the cap, and the band gains in ductility thanks to its loose edge.

[0023] The positioning-blocking unit also includes the leak-preventing strip. Joined by one of its ends to the inner surface of the annular band and overhanging by its other end the band loose edge, the strip is characterized by the absorption power it derives from its construction in folds and its manufacturing material, and by the protection area it reaches overhanging the annular band. Filling in the voids that may form between the inner face of the cap and the irregular spaces in the shape of the head in the nape of the neck, the leak-preventing strip stops and absorbs any possible leaks in that region.

[0024] In its three embodiments, the cap may include two additional leak-preventing strips. In such case, the strips are placed over the annular band at the temples to impede the latter, given their often concave contour, from becoming supplementary sources of leaks.

[0025] The cap can be manufactured in different sizes based on the size of one or several of its components, including the height and width of the three parts of the cap's main body, the diameter of the annular band, and the width of the leak-preventing strip. Validation of these standard sizes would draw on data collected from a broad population sample, on skulls and necks dimensions and on hairdos volumes.

BRIEF DESCRIPTION OF DRAWINGS

[0026] The *Swimming Cap that is Gentle on the Hair* offers, among other possible ones, three embodiments illustrated by the seven Figures included in this Report: embodiment "A," exemplified by Figures 1 to 4; embodiment "B," visualized by Figure 5; and embodiment "C," represented by Figures 6 and 7.

Embodiment "A"

Figure 1.- Shows a front view of the cap.
Figure 2.- Shows a front view of the interior of the cap.
Figure 3.- Shows a front view of an enlarged fragment of Figure 2 that highlights components (16) and (17) of the interior of the cap.
Figure 4.- Shows a side view of the interior of the cap positioned on the user's head.

Embodiment "B"
Figure 5.- Shows a front view of the cap.
Embodiment "C"

Figure 6.- Shows a front view of the interior of the cap.
Figure 7.- Shows a front view of an enlarged fragment of Figure 6 that highlights components (17), (21), and (22) of the interior of the cap.

DRAWINGS: REFERENCE NUMBERS

[0027]

11: upper portion of the cap in the shape of a spherical cap
12: middle portion of the cap in the form of a spherical zone
13: one of the twelve pieces of material that make up the middle portion of the cap
14: lower portion of the cap consisting of a concave surface of revolution
15: shirring covering part of lower portion 14
16: annular band that holds the hat to the user's head
17: leak-preventing strip attached to annular band 16
18: in embodiment "B," the lower portion of the main body of the cap
19: in embodiment "B," one of the twelve pieces that make up lower portion 18
20: in embodiment "C," main body of the cap molded in one piece
21: in embodiment "C," annular band consisting of an extension of 20 folded inwards from the edge of the cap opening
22: in embodiment "C," loop that holds leak-preventing strip 17 attached to annular band 21

DESCRIPTION OF EMBODIMENTS

[0028] Next, with the support of the aforementioned Figures 1-7, the three embodiments of the cap mentioned above are described in detail.

Embodiment "A"

[0029] Figure 1 offers a front view of portions (11), (12) and (14) of the main body of the *Swimming Cap that is Gentle on the Hair in* its "A" embodiment.

[0030] The upper portion (11) is a spherical cap whose shape can be obtained, among other ways, by applying sewing darts to a circular piece of the material chosen for the manufacture of the cap, or by joining by two of their sides several triangular pieces of the manufacturing material, so as to make them converge on a vertex.

[0031] The middle portion (12) consists of a spherical zone composed of twelve pieces (13). Six of the pieces alternate with the other six placed in reverse direction, which optimizes the control of possible curvature variations of the portion.

[0032] The lower portion (14) is a concave surface of revolution made possible by the shirring (15) that covers part of the portion and frames the opening of the cap.

[0033] Figure 2 provides a front view of the inside of the cap showing the reverse of portions (11), (12) and (14), and the components of the positioning-blocking unit. Those components include the annular band (16) that secures the cap to the user's head, and the leak-preventing strip (17) that stops leaks through the edge of the cap

[0034] Figure 3 offers a front view of an enlarged fragment of the lower portion (14) that allows a detailed view of components (16) and (17) of the positioning-blocking unit. The Figure shows the annular band (16) with its lower edge stitched to the rim of the cap, and the leak-preventing strip (17) stitched to the inner face of (16) and overhanging freely over its upper edge.

[0035] Being sewn to the lower portion (14) of the cap only by its lower edge, the annular band (16) exerts less pressure on the head, and thus makes the cap more comfortable.

[0036] In addition, the fact that the annular band (16) is loose on its upper edge facilitates the function of the leak-preventing strip (17) joined to it. Thanks to its "flexible union" with the annular band, the leak-preventing strip and particularly its overhanging portion, fills in the spaces that may form between the cap inner face and the irregularities in the shape of the head in the nape of the neck, shape which varies greatly from one person to another, so as to stop and absorb any possible leaks in that region.

[0037] Figure 4 shows an internal side view of the cap positioned on the user's head, which displays: the upper portion (11) covering the top of the skull, the middle portion (12) covering the area of the frontal, parietal, temporal, and occipital bones, and the lower portion (14) contouring the left side of the face and neck.

[0038] Figure 4 also shows the annular band (16) surrounding the head by the area of the frontal, sphenoid, and temporal bones, below the ear lobe, and by the nape of the neck. The Figure equally reveals the position of the leak-preventing strip (17) over the section of the band (16) that goes behind the head between both ears, in the neck region.

[0039] The inside view of the left side of the cap provided by Figure 4 reveals the space between the cap and the user's head. Such space begins at the hairline in (14),

increases gradually in (12) and reaches its maximum in (11), thereby minimizing the flattening of the hair and the ruining of the hairdo.

Embodiment "B"

[0040] Figure 5 provides a front view of the *Swimming Cap that is Gentle on the Hair* in its "B" embodiment, which differs from that of embodiment "A" in the structure of its lower portion (18).

[0041] In this embodiment, the **concave surface of revolution** of the lower portion (18) results not from the shirring (15) of the lower portion (14) as in embodiment "A," but from the twelve pieces (19) joined to each other in a straight and reverse sense.

[0042] The structure of portion (18) allows the diversification of the cap's manufacturing materials. While embodiment "A" uses waterproof and rigid materials (e.g., polyethylene-vinyl acetates), embodiment "B" uses materials that are waterproof and elastic (e.g., waterproof and elastic lycra and waterproof spandex).

[0043] These differences de structure and materials of embodiments "A" and "B" impacts the stretching experienced by lower portions (14) and (18) when the cap is positioned on the head, as well as the interior space generated by such stretching.

[0044] While in embodiment "A" the stretching of shirring (15) affects the entire lower portion (14), in embodiment "B," the stretching of the lower portion (18) impacts mainly the six pieces (19) whose assembled bases form the rim of the cap opening.

[0045] The other six pieces (19) stretch little since, given their inverted position with respect to their homonymous, they affect the opening of the cap only by their vertices. However, these pieces (19) being connected to the six pieces (13) of the middle portion (12), they ensure that the space between their internal face and the skull distributes and increases uniformly from the lower to the middle portion of the cap.

[0046] The result is a cap with an interior space that is structurally more defined and stable than the one of embodiment "A," something that may particularly attract those users who do not want water exercise to ruin their hair.

[0047] Although not shown in Figure 5, embodiment "B" of the cap also includes the annular band (16) and the leak-preventing strip (17) of embodiment "A" of the cap, illustrated in Figures 2 and 3.

Embodiment "C"

[0048] Figure 6 provides a front view of the interior of the *Swimming Cap that is Gentle on the Hair* in its "C" embodiment. Made of rubber compounds or custom molded polymers such as silicones (e.g., methyl vinyl silicone), the main body of the cap according to this embodiment integrates in one piece (20) portions (11) and (12) of embodiment "A" and portion (18) of embodiment "B." The piece retains the ribbings of the joints of the three portions of the cap as well as the ribbings of the joints of the various parts (13) and (19) constitutive of those portions.

[0049] Inside, the cap features the annular band (21). Unlike band (16) that is a separate element sewn or glued to portion (14) in embodiments "A" or to portion (18) in embodiment "B," band (21) is an extension of the one piece (20) constitutive of the main body, bent inward from the **rim** of the cap opening. However, like band (16), band (21) has its innermost edge loose.

[0050] Also inside, embodiment "C" of the cap features the leak-preventing strip (17). This strip is not sewn or glued to (16), as it is in embodiments "A" and "B," but held on to (21) by several loops (22) made of the same materials of (20) and (21) (e.g., rubber or custom molded polymers).

[0051] Figure 7 provides an inside view of an enlarged part of Figure 6 showing three of the loops (22) joined to the annular band (21) by their two ends, one to the loose upper edge of the band and the other to the band internal face.

[0052] The use of the loops (22) in embodiment "C" of the cap allows the extraction of the leak-preventing strip (17) for its washing and drying. This prevents the untimely deterioration that the strip could suffer if it were stationary and hence in constant contact with the cap non-breathable manufacturing materials (e.g., rubber or polymers).

INDUSTRIAL APPLICABILITY

[0053] The three modalities "A", "B," and "C" of the swimming cap described here allow the use of manufacturing materials like those which, noted above, are summarized below.

[0054] The manufacture of the main body of the cap in its "A" embodiment uses rigid, very lightweight, and waterproof materials such as, among others, polyethylene vinyl acetate and nylon woven fabrics coated with silicone (e.g., silnylon).

[0055] The manufacture of the main body of the cap in its "B" embodiment resorts to waterproof, lightweight, and highly stretchable fabrics (e.g., waterproof and elastic lycra, waterproof spandex).

[0056] The annular band of the "A" and "B" embodiments of the cap is made of elastic materials such as rubber, latex, silicone, or the like. As for the leak-preventing strip of the three embodiments of the cap, it is made of microfiber fabric, or similar, very thin and highly absorbent.

[0057] In embodiment "C of the cap, the main body, the annular band, and the loops that hold the leak-preventing strip, are made of custom-molded rubber or polymer compounds such as silicones (e.g., methyl vinyl silicone).

[0058] Elastic yarn, or other suitable equivalents, is used to make the shirring of the lower portion of the cap in embodiment "A," and the folds of the leak-preventing

strip in the three embodiments of the cap.

Claims

1. Swimming cap that for its manufacture allows the use of diverse techniques and waterproof materials and that is **characterized by**:

   a. A main body comprising:

   - an upper portion consisting of a spherical cap where lodges long hair compactly collected or the top of voluminous hairdos,
   - a middle portion consisting of a spherical zone composed of twelve pieces where seats the bulk of the hair, and
   - a lower portion consisting of a concave surface of revolution, achievable in various ways, where lodges the hair adjacent to the face, temples, and back of the neck.

   b. An internal positioning-blocking unit comprising:

   - an annular band, made of elastic material such as latex, joined to the rim of the lower portion of the main body by only one of its edges, and
   - a leak-preventing strip, pleated and made of absorbent material like microfiber, that by one of its ends attaches to the inner surface of the annular band while by the other overhangs the band loose edge, and that filling in the spaces that may form between the cap inner face and the head, due to the irregularities in the shape of the latter in the nape of the neck, it stops and absorbs any possible leaks in that region.

2. Swimming cap according to claim 1 that in its "A" embodiment (Figures 1 to 4) is **characterized by**:

   - the shirring that covers part of the lower portion of the main body and gives the portion its concave shape , and
   - the waterproof and rigid materials used for the manufacturing of the three portions, upper, middle, and lower, of the main body, such as polyethylene-vinyl acetate, silnylon, or the like.

3. Swimming cap according to claim 1 that in its "B" embodiment (Figure 5) is **characterized by**:

   - the twelve pieces that confer the concave shape to the lower portion of the main body, and
   - the waterproof and elastic materials used for the manufacturing of the three portions, upper, middle and lower, of the main body, such as lycra, spandex, or similar.

4. Swimming cap according to claim 1 that in its "C" embodiment (Figures 6 and 7) is **characterized in that**:

   - the main body is a one piece molded on the upper and middle portions of the cap in its "A" and "B" embodiments and on the lower portion of the cap in its "B" embodiment.
   - the annular band is an extension of the main body bent towards the inside of the cap from its opening and detached from the cap wall,
   - the leak-preventing strip is removable and holds over the inner face of the annular band by means of loops whose ends respectively join the internal face and the loose edge of said band, and
   - the manufacture of the main body, the annular band, and the loops, uses custom-molded rubber or polymer compounds such as silicones (e.g., methyl vinyl silicone), and it resorts to molding techniques rather than to those of sewing or gluing applied in embodiments "A" and "B."

5. Swimming cap according to claim 1 that in its "A", "B" and "C" embodiments is **characterized by**:

   - the possible addition over the annular band at the temples, of two leak-preventing strips to avoid any leaks at those regions due to the temples often concave contour.

Amended claims under Art. 19.1 PCT

1. Swimming cap that for its manufacture allows the use of diverse techniques and waterproof materials and that is **characterized by**:

   a. A main body comprising:

   - an upper portion consisting of a spherical cap for receiving long hair compactly collected or the top of voluminous hairdos,
   - a middle portion consisting of a spherical zone composed of twelve pieces for receiving the bulk of the hair, and
   - a lower portion consisting of a concave surface of revolution that contacts the user's head below the hairline and separates from it above that line.

   b. An internal positioning-blocking unit comprising:

- an annular band, made of elastic material, attached to the rim of the lower portion of the main body by only one of its edges, and
- a leak-preventing strip, pleated and made of an absorbent material, that attaches by one of its ends to the inner surface of the annular band while by the other end protrudes above the loose edge of said band, and that by filling the spaces that may form between the inner face of the cap and the head because of the irregularities in the shape of the latter in the nape of the neck, it stops and absorbs any possible leaks in that region.

2. Swimming cap according to claim 1 that in its "A" embodiment is **characterized in that**:

- its lower portion is partially covered by a shirring that frames the opening of the cap, and
- for its manufacture it uses waterproof and rigid materials such as polyethylene-vinyl acetate or silnylon.

3. Swimming cap according to claim 1 that in its "B" embodiment is **characterized in that**:

- its lower part is composed of twelve pieces alternately arranged in straight and reverse sense, such as the bases of six of them form the edge of the cap opening, and
- for its manufacture it uses waterproof and elastic materials such as waterproof and elastic lycra or waterproof spandex.

4. Swimming cap according to claim 1 that in its "C" embodiment is **characterized in that**:

- the main body is molded in one piece that keeps the ribbings of the joints of the three portions of said body,
- the annular band is an extension of the single piece of the main body, bent inwardly from the rim of the cap opening and loose at its innermost side,
- the leak-preventing strip is removable and holds over the inner face of the annular band by means of loops whose ends respectively join the internal face and the free edge of said band, and
- for its manufacture it uses rubber compounds or custom molded polymers such as silicones.

Statement under Art. 19.1 PCT

In the Written Opinion of the International Search Administration on PCT / ES2018 / 000006 (Form PCT/ISA/237(Box V continued 2) (January 2015), it is said that claims 1 and 3 do not meet the requirement of inventive activity, and it is questioned that claim 4 depends on claim 1.

In relation to the inventive activity requirement of claim 1, the modifications made (see Replacement Sheets p. 11, lines 6, 8-9, 10-12 and 19-22) concerning the function of the three portions of the main body of the cap and the function of the positioning of the leak-preventing strip, indicate that said claim fulfills that requirement.

With respect to the inventive activity requirement of claim 3, the modification made (see Replacement Sheets p. 11, lines 33-35) relative to the way in which the twelve pieces of the lower portion of the main body of the cap in its "B" embodiment shape the concave surface of revolution that characterizes the portion, indicates that said claim meets such requirement.

Regarding the dependence of claim 4 of claim 1, the reformulation made (see Replacement Sheets: page 12, lines 5-6) shows that, although molded in one piece, the main body of the cap in its "C" embodiment retains the characteristics of the main body of the cap according to claim 1 as far as its tripartite shape and appearance is concerned, thereby securing such dependence.

The aforementioned modifications (together with those included in the Replacement Sheets and explained in the Accompaniment Letter) reaffirm the characteristics and relationships of claims 1, 2, 3, and 4 of the filed PCT patent.

These modifications could involve the replacement of the paragraph (lines 26-29, page 4) of the original Description by this one:

"The invention materializes in the *Swimming Cap that is Gentle on the Hair*, consisting of a main body for inserting the hair and a positioning-blocking unit reponsible for the grip and watertightness of the cap."

This would avoid the potential confusion that the original paragraph could cause vis-a-vis independent claim 1.

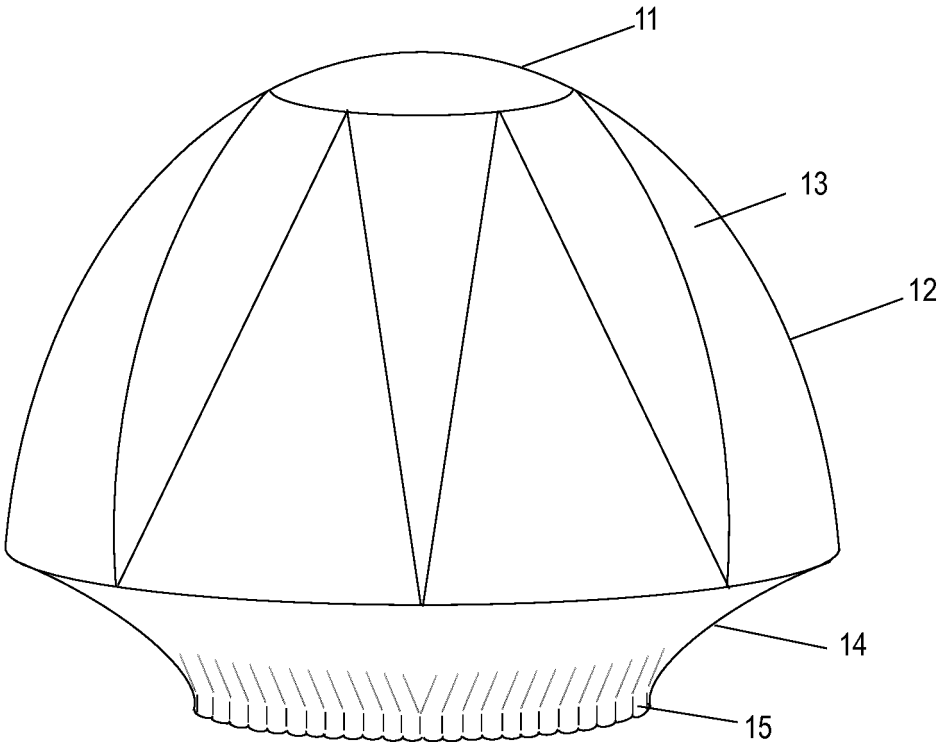

Fig. 1
(Embodiment "A")

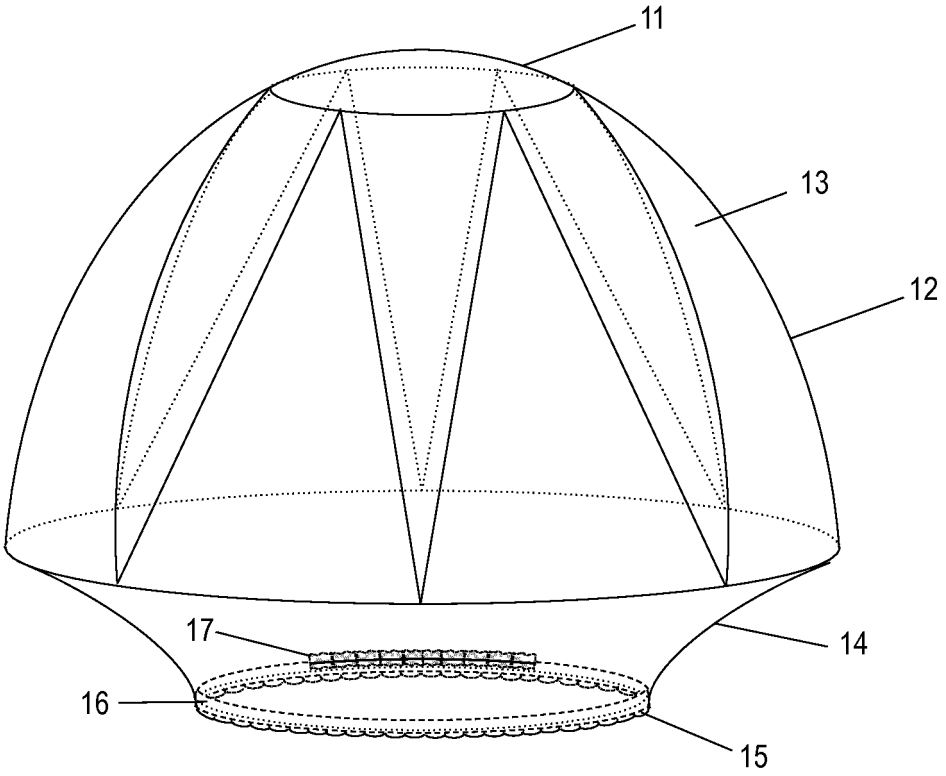

Fig. 2
(Embodiment "A")

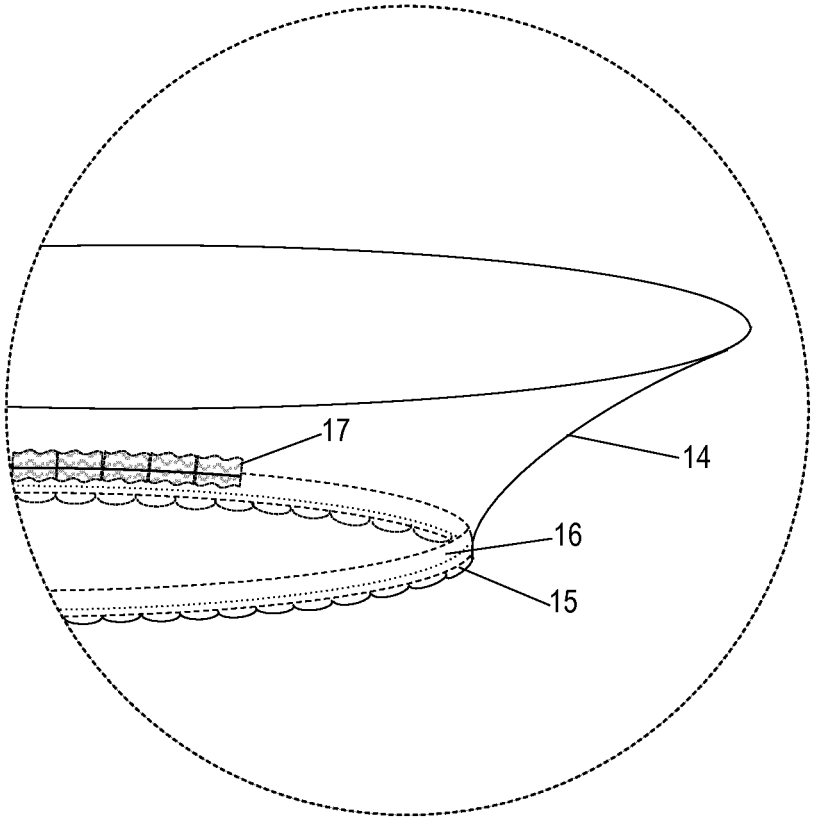

Fig. 3
(Embodiment "A")

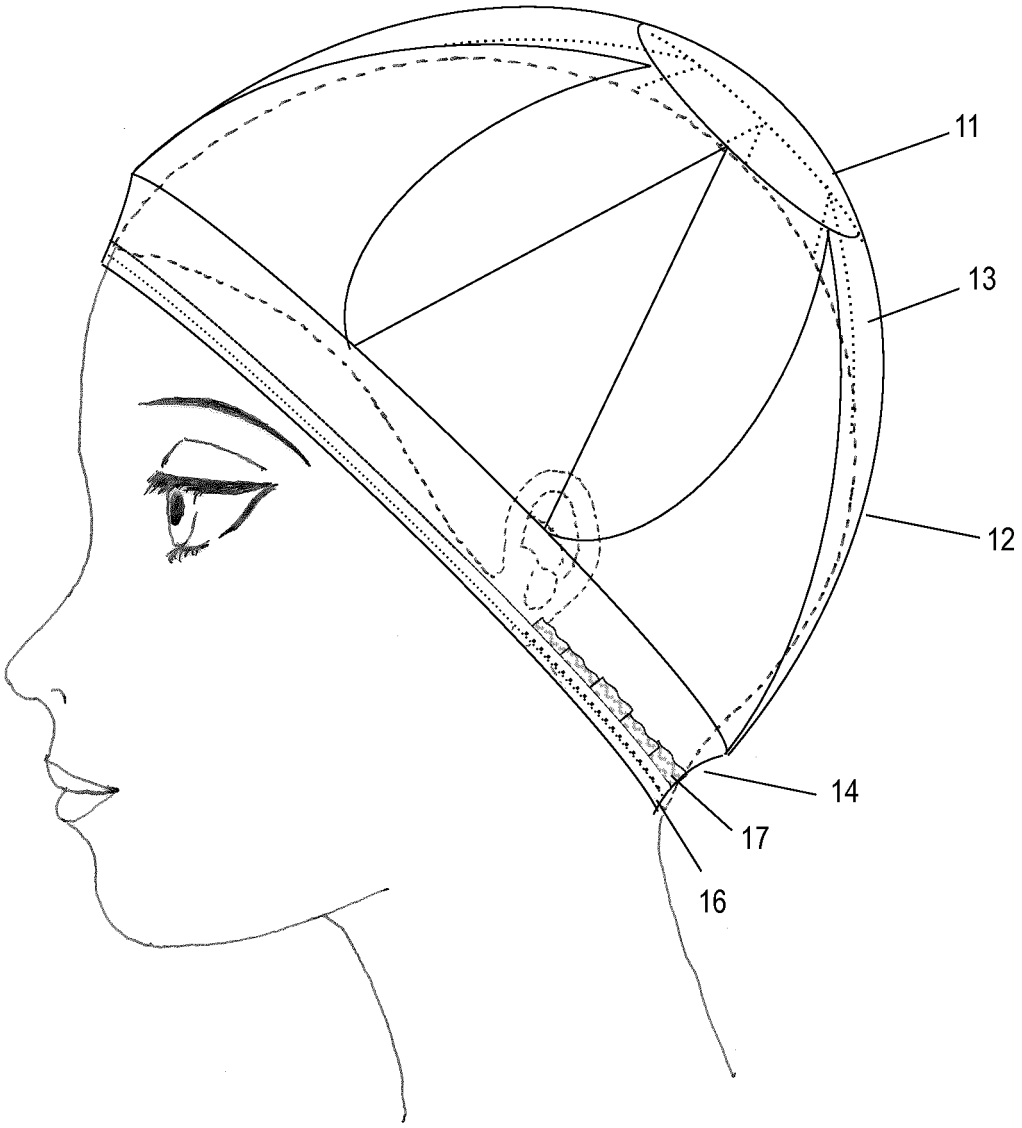

FIG. 4
(Embodiment "A")

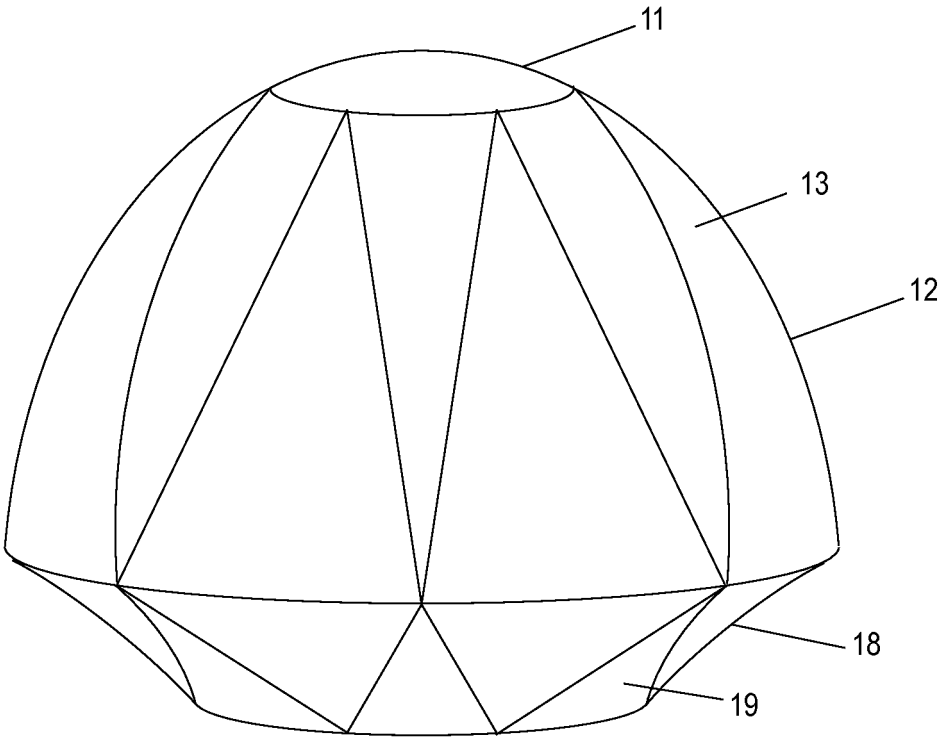

Fig. 5
(Embodiment "B")

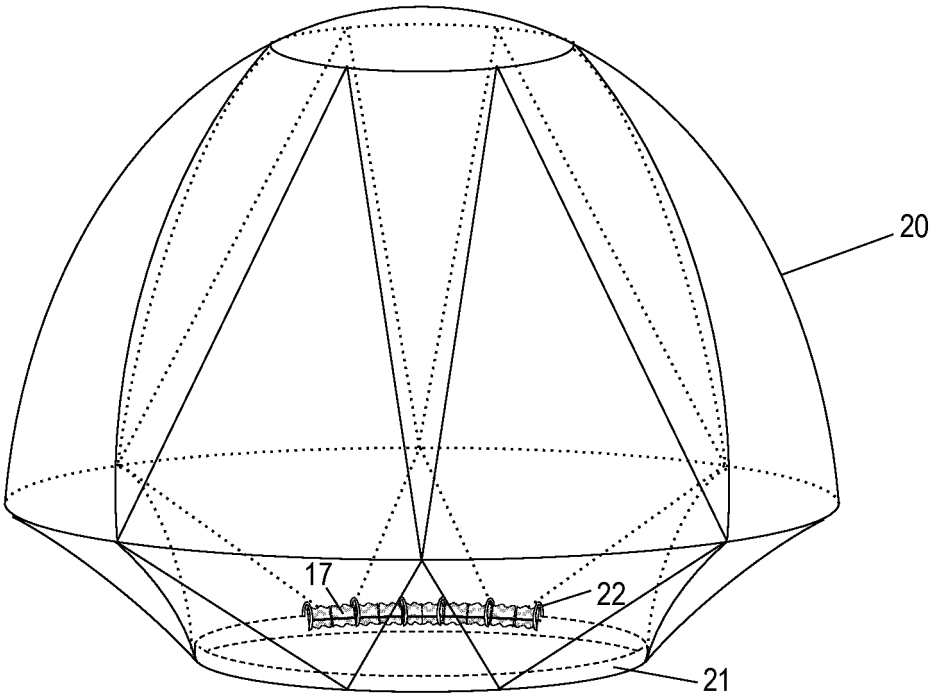

Fig. 6
(Embodiment "C")

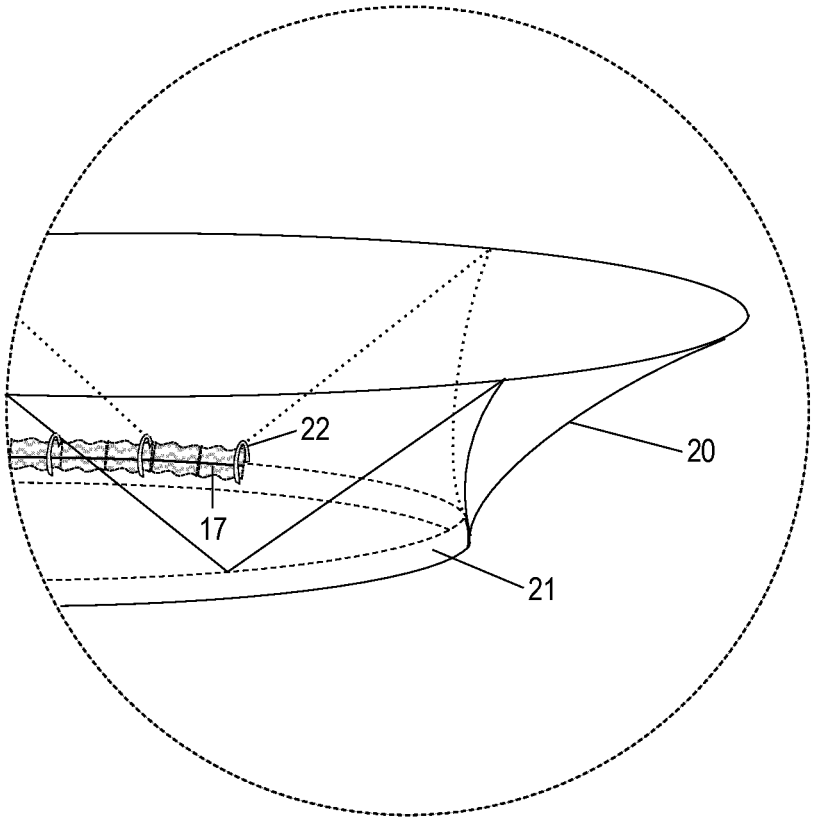

Fig. 7
(Embodiment "C")

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2018/000006

A. CLASSIFICATION OF SUBJECT MATTER

A42B1/12 (2006.01)
A42B1/22 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A42B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2016309824 A1 (ULIAN SANDRA ET AL.) 27/10/2016, page 1, paragraphs [6 - 11, 15 - 19]; figures 1 - 2.	1,3,5
Y	US 2929071 A (STERLING EVELYN H ET AL.) 22/03/1960, column 1, lines 20 - 30; column 2, lines 22 - 28; column 3, lines 18 - 23; figures 1 - 2.	1,3,5
A	US 2014109281 A1 (WALLER TOM ET AL.) 24/04/2014, page 1, paragraphs [13 - 16]; page 2, paragraphs [20 - 21]; figures 3 - 4.	1-4
A	GB 461143 A (JEAN STUART CHAPPLE ET AL.) 11/02/1937, page 2, lines 5 - 43; figures 1 - 2.	1-5

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure use, exhibition, or other means.
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
01/06/2018	**(15/06/2018)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer C. Marín Calvo Telephone No. 91 3495594

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2018/000006

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
GB461143 A	11.02.1937	NONE	
US2929071 A	22.03.1960	NONE	
US2016309824 A1	27.10.2016	EP3003509 A1	13.04.2016
		WO2014192036 A1	04.12.2014
		WO2014192036 A4	19.02.2015
		ITTV20130085 A1	01.12.2014
US2014109281 A1	24.04.2014	BR112013031116 A2	29.11.2016
			27.08.2014
		ZA201309570 B	20.07.2015
		RU2013157916 A	02.10.2017
		RU2632032 C2	07.08.2014
		JP2014518958 A	19.10.2016
		JP6008952B B2	08.05.2014
		KR20140053920 A	16.04.2014
		CN103732093 A	20.03.2018
		CN103732093B B	15.01.2014
		AR086671 A1	16.01.2013
		TW201302270 A	09.04.2014
		EP2713790 A1	06.12.2012
		WO2012164298 A1	11.04.2012
		GB2484437 A	24.10.2012
		GB2484437 B	25.01.2012
		GB2482258 A	25.07.2012
		GB2482258 B	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2465998 A, Frederick W. Bowditch **[0005]**
- US 3206761 A, Beatrice Melnikolf **[0005]**
- US 20150000002 A1, Linda Gale Brown **[0005]**
- US 3996621 A, Liselotte Martienssen **[0005]**
- US 20140109281 A, Waller, Johnson and Neal **[0005]**
- US 20100192273 A, Karetha Dodd **[0011]**
- US 5349702 A, John L. Runckel **[0011]**
- US 2285659 A, Howland Thomas **[0011]**
- ES 1074697 U, Fe Cerezo Miró **[0011]**