Sept. 15, 1942. T. J. HOWLAND 2,295,659

BATHING CAP

Filed June 29, 1940

Fig. 1,

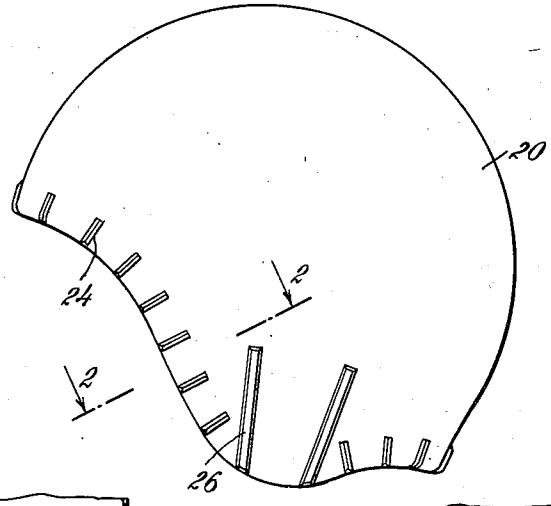


Fig. 2,

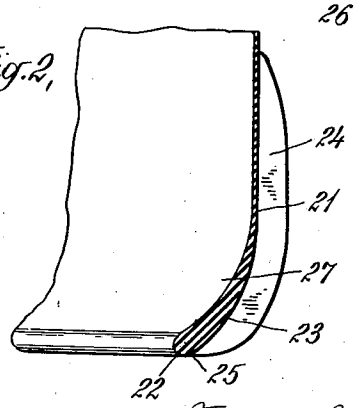


Fig. 3,

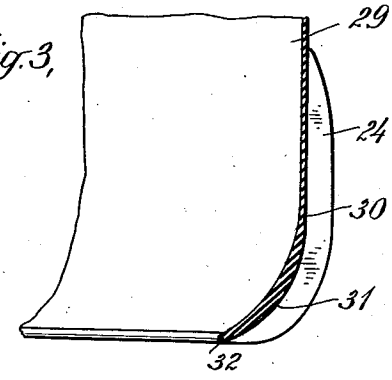


Fig. 4,

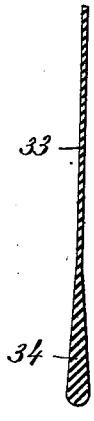


Fig. 5,

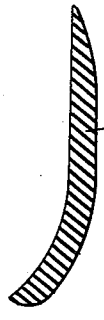


Fig. 6,

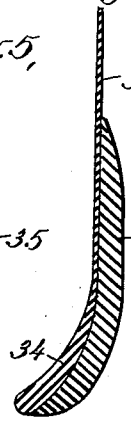


Fig. 7

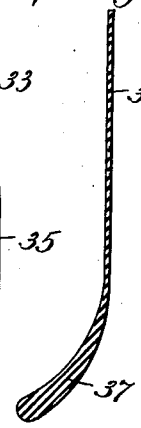


Fig. 8,

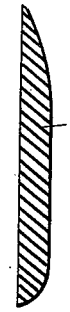


Fig. 9,

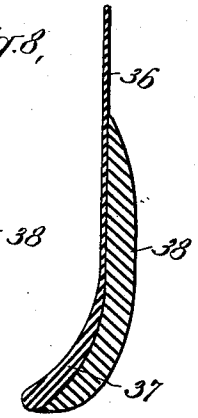
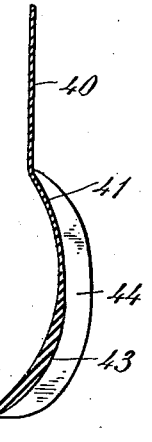


Fig. 10.



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BATHING CAP

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Application June 29, 1940, Serial No. 343,113

8 Claims. (Cl. 2—68)

This invention relates to rubber articles of wearing apparel, such as bathing caps, rubber boots, and the like, and is concerned more particularly with a novel article of this character which may be worn with comfort and at the same time is extremely resistant to the seepage of fluid into the article. The article of my invention is of a simple construction adapted for manufacture at low cost and is substantially waterproof by reason of its inclusion of a novel construction along the edge of the article which prevents the passage of water into it even when it is subjected to severe use.

For illustrative purposes, the principles of the invention will be described and illustrated in connection with a bathing cap, although it will be understood that the invention is not limited to this use but is applicable to other articles of apparel as well.

In bathing caps of the form most commonly used, there is a tendency for water to seep into the interior of the cap between its edge and the head of the wearer, the amount of seepage depending on how tightly the cap fits the head. The seepage is naturally reduced when the cap fits tightly on the head, but on the other hand a tight fit generally impairs the comfort of the wearer. It has been proposed heretofore to provide a relatively tight fit along the edge of the cap by forming a bead on the cap encircling the edge portion so that the resistance to stretching is considerably greater at the edge than at any other portion. While this construction causes the edge of the cap to engage the head with a greater pressure than the remaining portion of the cap, the increased pressure is concentrated in a line extending around the head with the result that the cap is uncomfortable and leaves a mark on the skin. Moreover, there is a tendency for the bead to roll up on the head, especially when the edge is fouled by a wave or other force, whereby the sealing effect along the edge is spoiled.

The present invention, therefore, is directed to the provision of a novel bathing cap which overcomes these objections to prior caps and which is both comfortable and waterproof to a high degree. A cap made in accordance with my invention comprises a cap body of any desired form made of rubber, or the like, and so constructed that it increases gradually in thickness toward the edge from a region located a substantial distance above the edge and at the same time curves inwardly toward the edge, due either to the formation of the cap body or to the action of a series of ribs on the outside of the cap body when the latter is stretched, as will be described presently. Thus, the circumference of the cap when stretched decreases gradually while the thickness increases gradually toward the edge from this upper region. Because of the transverse curvature of the thickened portion, the pressure exerted against the head is greatest along the edge where it is most effective in sealing the cap, but the pressure is not concentrated at the edge but increases gradually toward the edge. Also, by reason of the increased thickness of the cap in the region of the curvature, the resistance of this region to straightening under the pressure is much greater so that the edge portion is held firmly against the head at all times. Since the thickness increases gradually toward the edge, the tendency for the edge portion to roll up is prevented. The thickened region of the cap may swing on the remaining upper portion of the cap as a pivot, whereby the edge portion may adjust itself readily to irregularities in the contour of the head.

In the preferred construction of my new cap, the outside of the cap body is provided with a plurality of ribs spaced along the edge and extending generally transversely of the edge. I have found that such ribs do not substantially increase the resistance of the edge portion to stretching and therefore do not impair the comfort of the wearer, but when the cap is stretched on the head these ribs tend to curve so that the part of the cap intermediate their ends bulges outwardly while the parts adjacent their ends are forced inwardly to provide the desired transverse curvature of the thickened portion. Accordingly, the pressure at the edge of the cap and at the region adjacent the upper ends of the ribs is increased and seals off the region intermediate the ends of the ribs where the pressure is decreased. By forcing the air out from under this normally bulging intermediate region, a suction effect may be obtained whereby the cap is held more securely on the head and seepage of water into the cap is more effectively prevented.

For a better understanding of the invention reference may be had to the accompanying drawing, in which—

Fig. 1 is a side view of a bathing cap made in accordance with the invention;

Fig. 2 is an enlarged sectional view on the line 2—2 in Fig. 1;

Fig. 3 is a sectional view similar to Fig. 2 showing a modified form of the cap;

Figs. 4, 5 and 6 are sectional views of the edge portion of a cap body and a rib for the outside of the body, showing the parts before and after they are assembled;

Figs. 7, 8 and 9 are sectional views similar to Figs. 4, 5 and 6, respectively, showing modified forms of the cap body and rib, and

Fig. 10 is a sectional view similar to Fig. 3 showing another modified form of the cap.

Referring to the drawing, I have shown a bathing cap having a body 20 of any desired form

made of rubber, or the like, and shaped to fit the general contour of the head. The material forming the upper portion of the body is of relatively thin gage down to a region 21 located a substantial distance above the lower edge of the cap. From the region 21, the cap increases gradually in thickness to the edge 22 which has the greatest thickness of material, and, also, the cap curves inwardly from the region 21 toward the edge 22, as shown at 23. Thus, the circumference of the cap decreases while its thickness increases gradually from the region 21 of thin gage material to the edge 22.

On the outside, the cap body 20 is provided with a series of ribs 24 spaced along the edge of the cap and extending generally transversely of the edge. The ribs 24, which are preferably of rubber, or the like, may be made integral with the cap in the same molding operation by which the main body is formed, or they may be secured to the cap after it has been formed. As shown, the ribs follow the curved contour of the thickened portion of the cap and each rib tapers to a thin edge 25 at its lower end so that this end of the rib and the edge of the cap form a smooth surface. If desired, the ear portions of the cap may be provided with ribs 26 similar to the ribs 24 except that they extend upwardly a greater distance to a point near the top of the region under which the wearer's ears normally lie.

When the cap is stretched on the head, the thickened portion below the region 21 presses against the head with a pressure which increases gradually from the region 21 to the lower edge 22 due to the gradual curvature of the thickened portion. Thus, while the greatest pressure is along the edge 22, the pressure is not concentrated along the edge but is distributed over the thickened portion from the region where it commences to curve inwardly. Accordingly, there is no uncomfortable binding of the cap on the head due to a concentration of the pressure, and a firm contact is maintained with the head over a substantial area of the cap below the thin gage material. Since the material in the region of the curvature is relatively thick, this region offers a substantial resistance to straightening under the pressure of the cap against the head, so that the cap when applied to the head tends to maintain some of its curvature in the thickened region. In other words, the part of the cap between the region 21 and the edge 22 tends to bulge somewhat when the cap is in use and thereby form a small space or pocket 27, and by pressing this bulging part inwardly, the air may be forced out of the pocket 27 so that a suction effect is created. As a result, the cap is held more securely on the head and an effective seal is formed near the lower edge. It will be apparent that any tendency for the edge of the cap to roll upwardly is prevented by reason of the gradual increase in the thickness of the material from the region 21 toward the edge.

In stretching the cap on the head, the ribs 24 assume a more pronounced bow shape with the ends of the ribs curving inwardly and their intermediate portions bulging outwardly. Therefore, the lower edge of the cap and the part adjacent the upper ends of the ribs are forced inwardly with a greater pressure so as to seal off the intermediate space 27. Also, the tendency for the thickened portion of the cap to bulge outwardly is increased by the bowing effect of the ribs 24, with the result that the suction effect in the intermediate region 27 is accentuated. It will be observed that by reason of the curvature of the thickened portion of the cap, any glancing blow against this portion resulting from a wave or other force will strike the curved surface 23 and force the edge 22 inwardly against the head so that leakage of water under the edge is more effectively prevented.

While the thickened part of the cap below the region 21 offers considerable resistance to straightening, it may swing on the relatively thin upper region 21 as a pivot so as to adjust itself to any irregularities in the contour of the wearer's head. Accordingly, the thickened part of the cap in the region of the curvature may in effect act independently of the upper thin gage portion due to the hinge action between the thickened part and the upper region 21. The action of the ribs 26 over the ear portions is similar to the action of the ribs 24. The bowing effect of the ribs 26 increases the pressure of the cap against the head along the edge portion of the cap below the ears and in the region above the ears but relieves the pressure directly over the ears.

The modified construction shown in Fig. 3 is similar to that shown in Fig. 2 except that the cap body 29 increases gradually in thickness from the upper region 30 of thin gage material down to a point 31 intermediate this region and the edge 32, and then gradually decreases in thickness. While the greatest thickness is at the intermediate region 31 of the curved portion, the edge 32 is considerably thicker than the upper region 30 so that the edge portion is more resistant to stretching and engages the head more firmly. With this construction, the intermediate region 31 offers a greater resistance to bending of the curved portion and insures an effective seal along the edge of the cap and also tends to maintain the bulge above the edge so that the suction effect is preserved even under severe conditions of use.

When the thickened part of the cap is to be provided with an initial transverse curvature, as illustrated, the cap may be molded with the desired curvature, or it may be formed with straight sides and the curvature obtained by securing the ribs to the outside of the cap so that they hold the thickened part in a curved form. Thus, as shown in Fig. 4, the cap body 33 may be made without any transverse curvature along its edge portion but with a thickness increasing gradually toward the lower edge, as shown in 34. The ribs 35 are normally curved, as shown in Fig. 5, the curvature corresponding substantially to that which is desired in the finished cap, and these ribs are secured to the outside of the cap body in any desired manner, as by means of an adhesive, whereby they cause the thickened portion 34 to assume the curved form of the ribs, as shown in Fig. 6.

Referring to Fig. 7, the cap body 36 there shown is molded so that the thickened portion 37 below the thin gage material curves gradually inwardly toward the lower edge. The ribs 38, which are normally straight (Fig. 8), are secured to the outside of the cap 36 and assume the curvature of the thickened portion, as shown in Fig. 9.

In the cap shown in Fig. 10, the lower part of the cap body is formed with an arc-shaped portion 41 which bulges outwardly. The upper part of the cap body is made of relatively thin gage material, but the lower, arc-shaped part gradually increases in thickness toward the lower edge 42 to a point 43 and then gradually decreases in thickness. A plurality of ribs 44 are provided on

the outside of the cap over the arc shaped portion 41 and are spaced along the edge of the cap in the same manner as the ribs 24 shown in Fig. 1. When the cap is stretched on the head, the ribs 44 tend to assume a more pronounced bow shape and preserve the curvature of the arc-shaped portion 41. Thus, a pocket is formed under the bulging part from which the air may be forced so as to create the desired suction effect. By reason of the thickened portion of the cap body below the region of the thin gage material, the tendency for the edge portion to straighten under the pressure against the head is reduced and the bulging effect is maintained.

Because of the ribs on the outside of my new cap, the curved portion near the lower edge does not have to be made as heavy or so thick as would otherwise be necessary to maintain its curvature under the pressure of the cap against the head. These ribs, therefore, greatly increase the resistance of the curved portion to straightening under pressure without increasing the resistance of this portion to stretching, and, accordingly, the comfort of the wearer is not impaired.

While the several forms of the new bathing cap shown in the drawing are provided with an initial transverse curvature at the thickened portion, it will be understood that the sides of the cap may be made normally straight in a transverse direction and the curvature obtained by the action of the outside ribs, that is, by the tendency for these ribs to bow when the thickened portion is stretched. However, I prefer to form the cap with a normal transverse curvature either by molding it with such a curvature or by securing to the outside of the body ribs which are normally curved (Fig. 8) because this construction increases the bulging effect of the thickened portion.

I claim:

1. An article of apparel comprising a hollow body having an opening therein and an elastic portion around the opening, the elastic portion gradually increasing in thickness toward the opening, and a plurality of ribs on the outside of the body spaced along said edge and extending generally transversely thereof, the ribs acting to curve said elastic portion transversely when it is stretched and thereby cause the median part thereof to bulge outwardly.

2. An article of apparel comprising a hollow body having an opening therein and an elastic portion around the opening, the elastic portion curving inwardly toward the edge of the opening from a region located a substantial distance from the opening and gradually increasing in thickness toward the opening, and a plurality of ribs on the outside of the body spaced along said edge and extending generally transversely thereof, the ribs being integral with the body and acting to accentuate the curvature of said elastic portion when it is stretched.

3. An article of apparel comprising a hollow body having an opening therein and an elastic portion around the opening, the elastic portion being normally substantially straight transversely and gradually increasing in thickness toward the opening from a region located a substantial distance from the opening, and a plurality of ribs on the outside of the body spaced along said edge and extending generally transversely thereof for holding the elastic portion in a curved form whereby it curves inwardly toward the edge of the opening from said region, the ribs acting to accentuate the curvature of said elastic portion when it is stretched.

4. An article of apparel comprising a hollow body having an opening therein and an elastic portion around the opening, the elastic portion normally curving inwardly toward the edge of the opening from a region located a substantial distance from the opening and gradually increasing in thickness toward the opening, and a plurality of normally straight ribs secured to the outside of the body in spaced relation along said edge and extending generally transversely thereof, the ribs being held in a curved form by the elastic portion and acting to accentuate the curvature of said elastic portion when it is stretched.

5. An article of apparel comprising a hollow body having an opening therein and an integral, thin elastic portion around the opening, said elastic portion being arc-shaped in transverse section with the inner surface of its median part bulging outwardly, the elastic portion gradually increasing in thickness toward the opening from a region located a substantial distance from the opening, whereby the pressure of the body on the wearer gradually increases toward said edge and the thickened part preserves some of the curvature of the elastic portion under the pressure.

6. An article of apparel comprising a hollow body having an opening therein and an elastic portion around the opening, said elastic portion being arc-shaped in transverse section with its median part bulging outwardly, the elastic portion gradually increasing in thickness toward the opening from a region located a substantial distance from the opening, and a plurality of ribs on the outside of the body spaced along said edge and extending generally transversely thereof, the ribs acting to accentuate the curvature of said elastic portion when it is stretched.

7. An article of apparel comprising a hollow body having an opening therein and a thin elastic portion around the opening, the elastic portion gradually increasing in thickness toward the opening, and biasing means on the body for maintaining said elastic portion in a curved form in transverse section with its outer surface curving inwardly to the edge of the opening from a region located a substantial distance from the opening, whereby the pressure of the body on the wearer gradually increases toward said edge and the thickened part preserves some of the curvature of the elastic portion under the pressure.

8. An article of apparel comprising a hollow body having an opening therein and a thin elastic portion around the opening, the elastic portion gradually increasing in thickness toward the opening, and means on the body responsive to stretching of the elastic portion for causing the outer surface of said portion to curve inwardly to the edge of the opening from a region located a substantial distance from the opening, whereby the pressure of the body on the wearer gradually increases toward said edge and the thickened part preserves some of the curvature of the elastic portion under the pressure.

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