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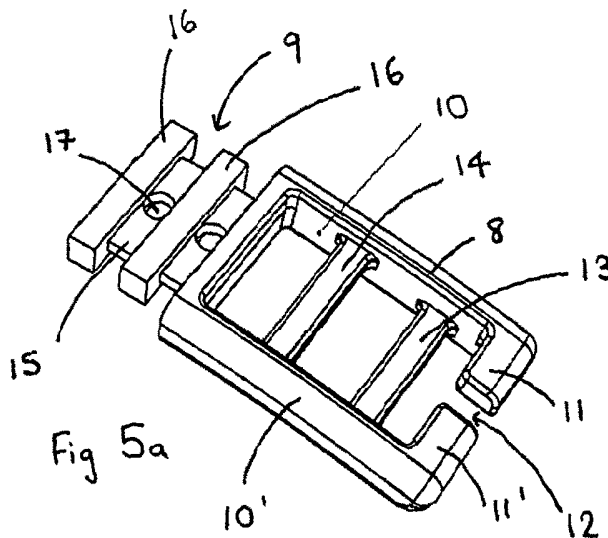
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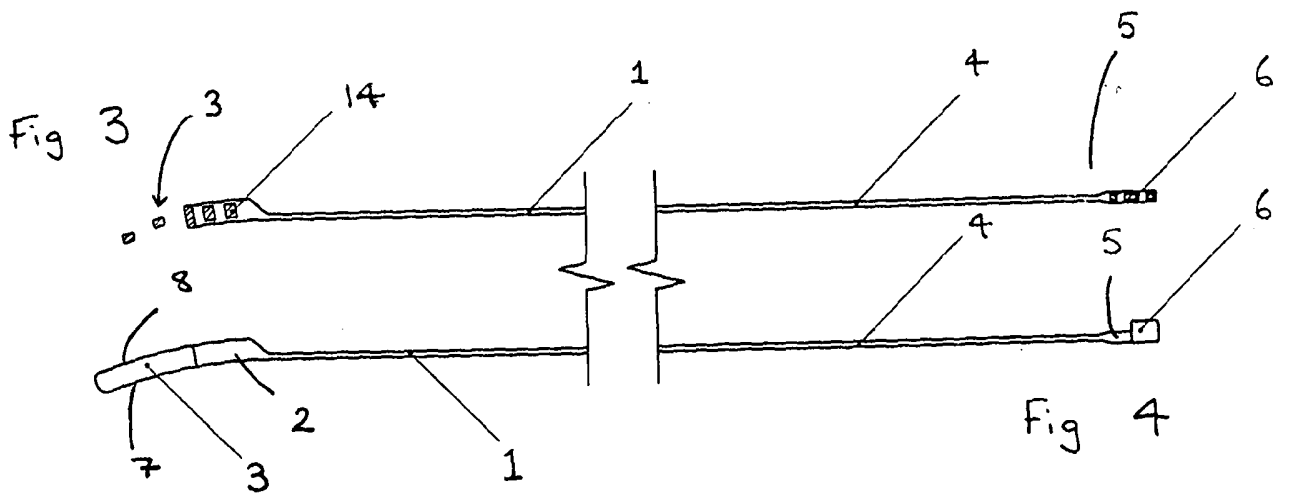
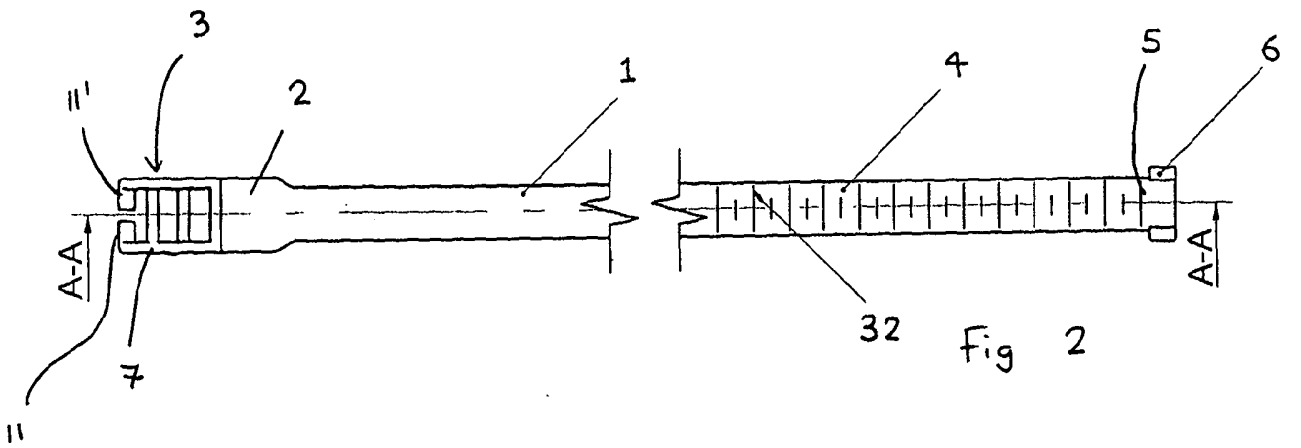
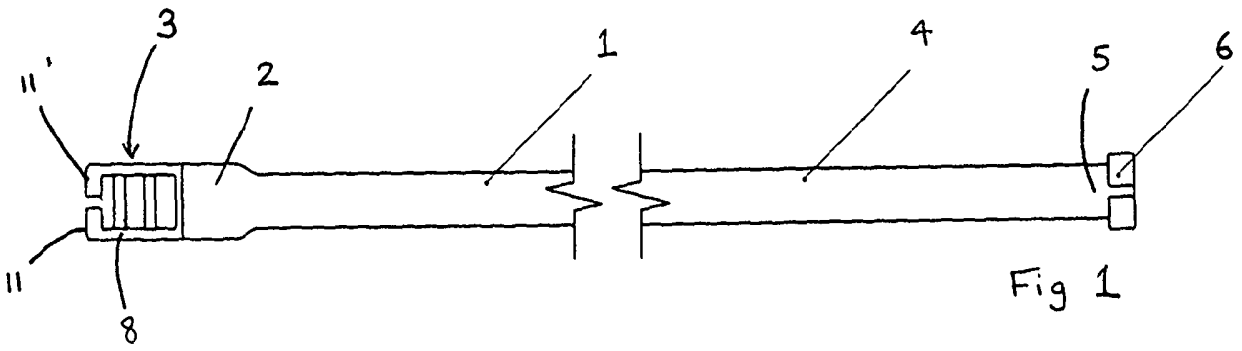
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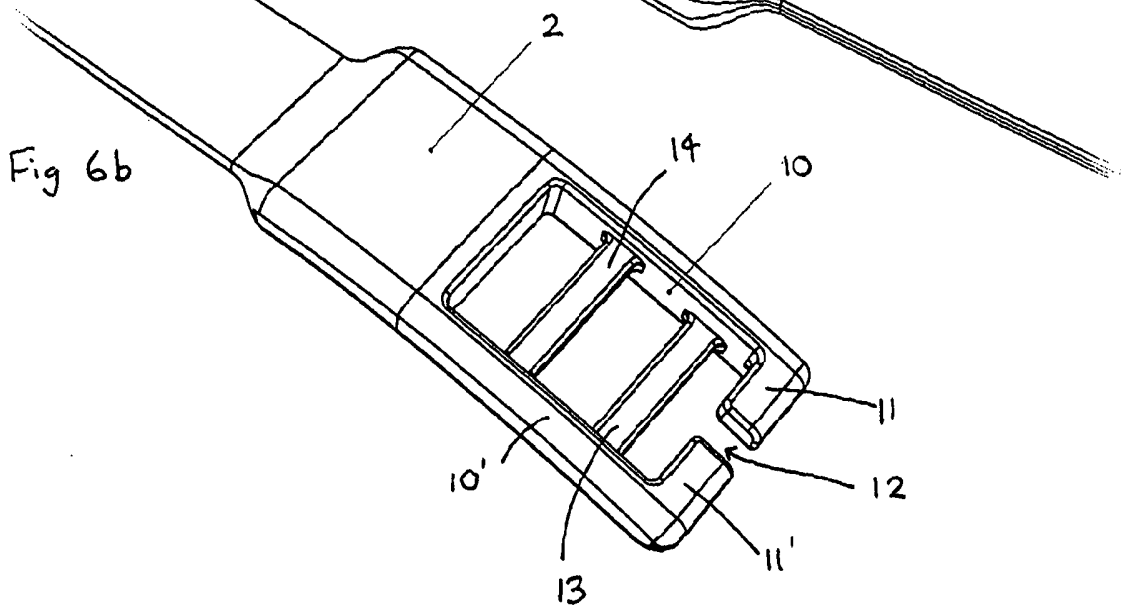
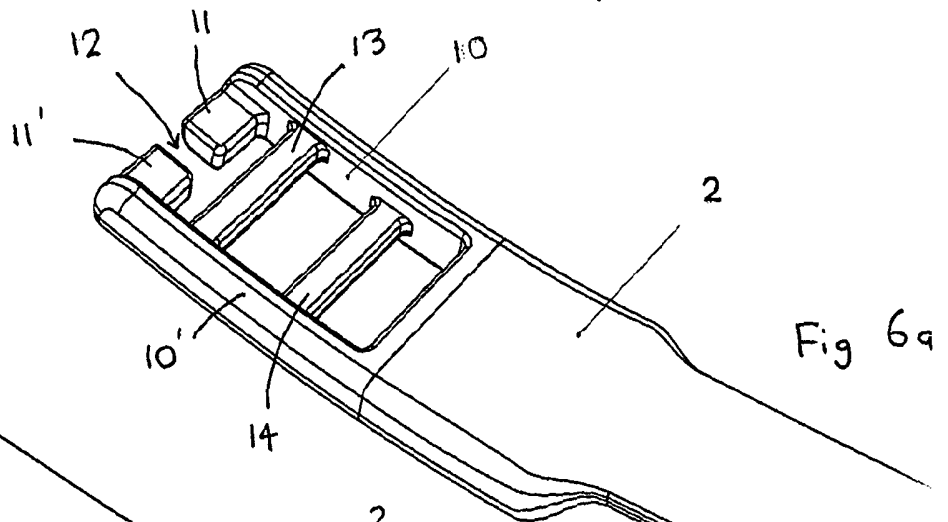
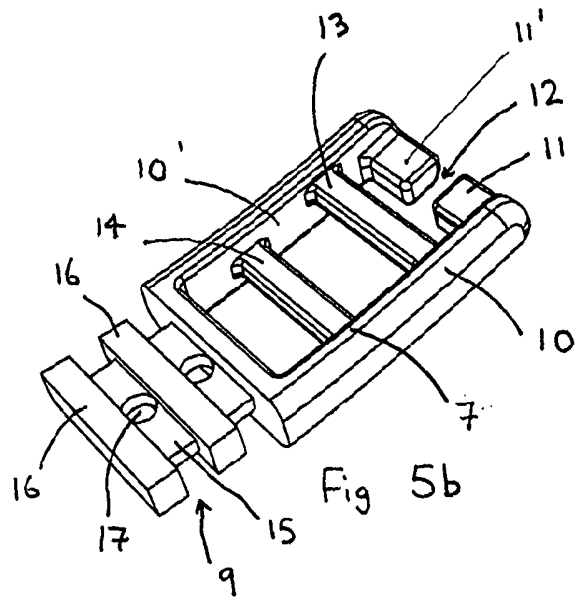
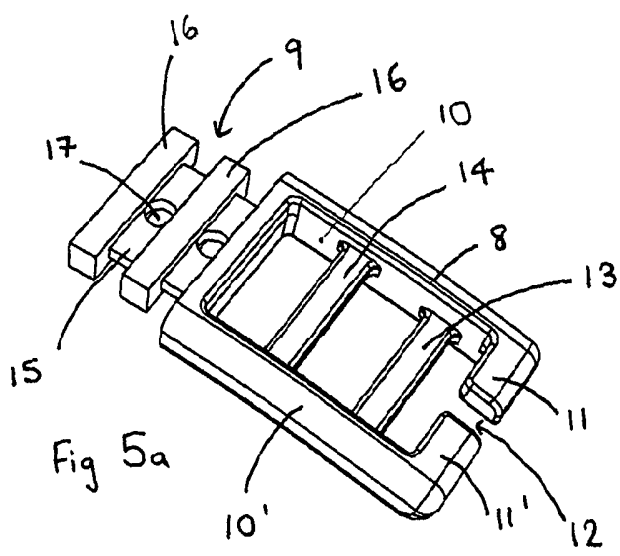
(54) Title of the Invention: Head strap tensioner
Abstract Title: Head strap tensioner

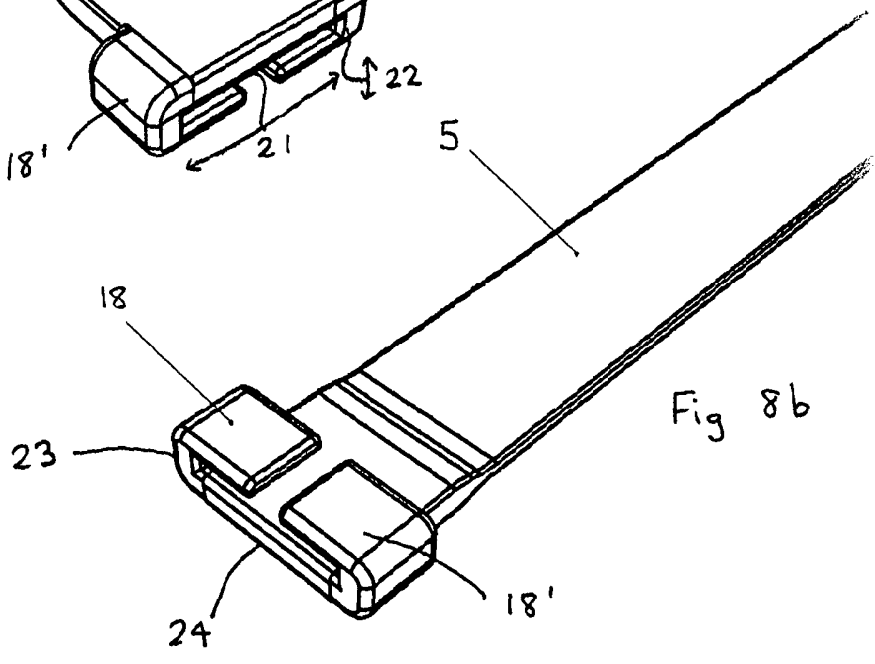
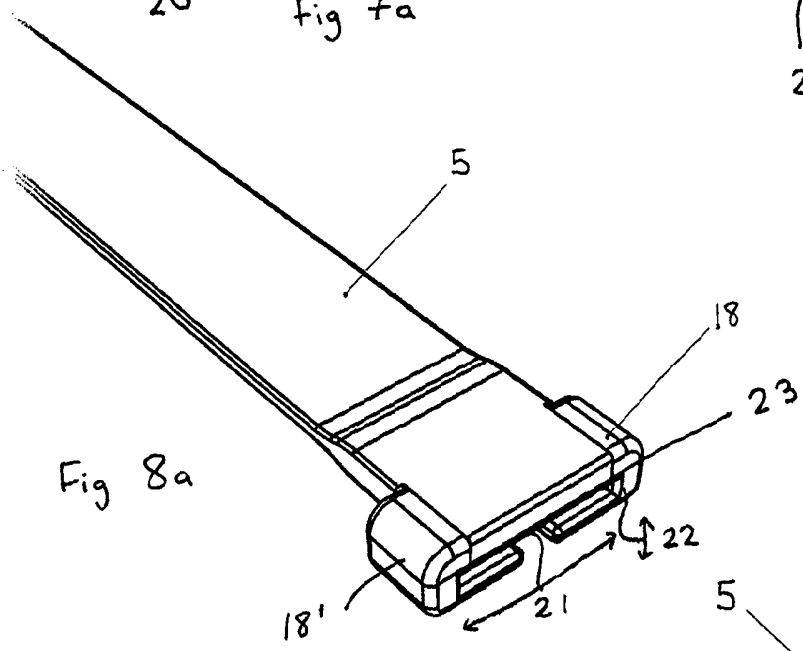
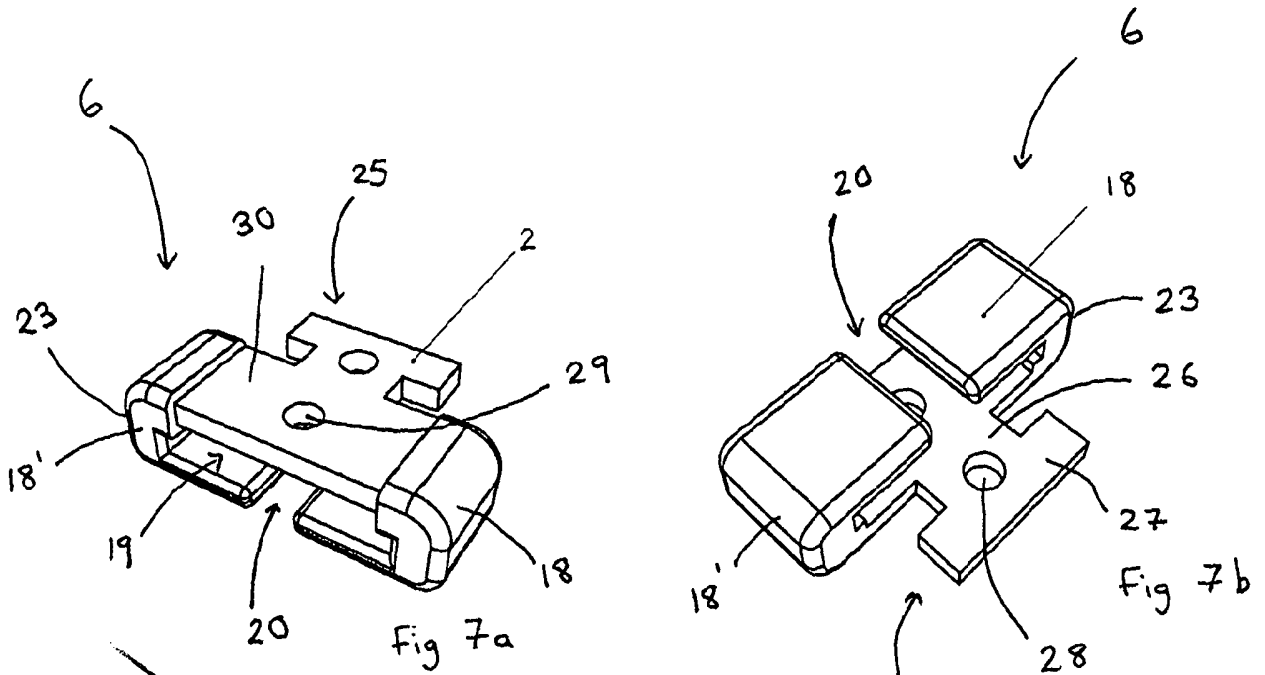
(57) A tensioner for adjusting the tension in a head strap for eyewear. The tensioner has a tension adjustment portion, an attachment portion 9 for attachment to said head strap, a lower surface which, in use, faces the wearer's head and an opposing upper surface. The attachment portion comprises a tab 15 extending away from the tension adjustment portion and having at least one rib 16 extending across the width of the tab. The rib has a greater width and/or depth than the tab. There is preferably two ribs, which extend perpendicularly across the tab. The combination of ribs and tab may provide a cruciform and/or T shaped attachment portion. Preferably, the tab also has at least one aperture 17. The tension adjustment portion may comprise two arms 10, 10' with teeth 11, 11' at their ends extending from the attachment portion and two cross bars 13, 14 extending between the bars.

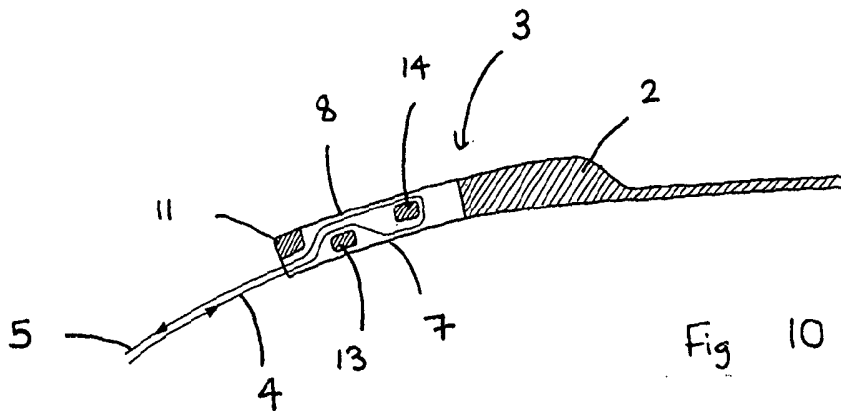
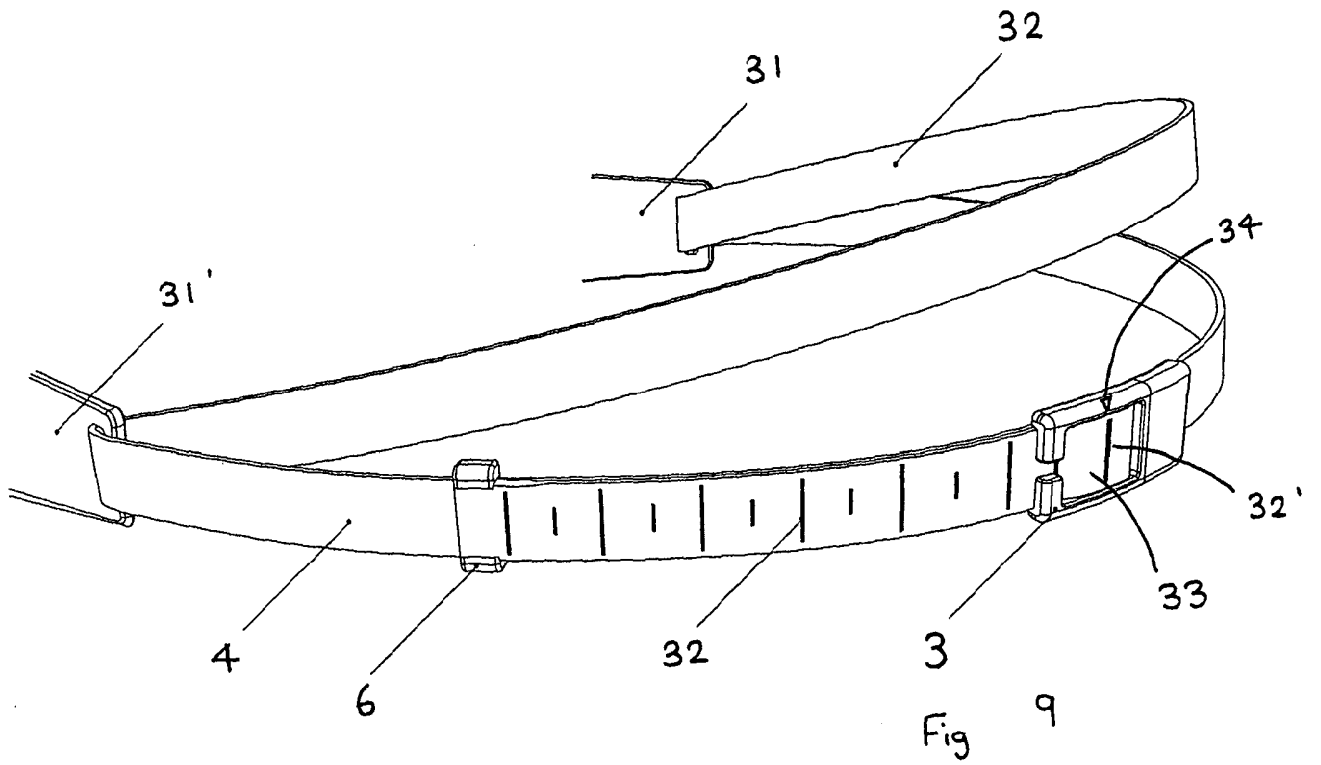


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HEAD STRAP TENSIONER

FIELD OF THE INVENTION

5 This invention relates to a tensioner for allowing adjustment of tension in a head strap. In particular, this invention relates to a tensioner for adjustment of a head strap for eyewear such as eyewear for safety and/or sporting purposes.

10 BACKGROUND

It is often desirable to secure eyewear to a wearer's head to avoid loss or movement of the eyewear. For eyewear (e.g. a goggle or mask) which is worn in sporting activities such as swimming or skiing, it is especially important to secure the eyewear to the wearer's face and elastic head straps
15 are typically used for this purpose.

Ideally these head straps need to be adjustable to cater for a range of head sizes and to allow the wearer to select their desired strap tension. One way of achieving this adjustability has been to provide a buckle through which the
20 strap passes, the free end of the strap being pulled to tighten the head strap once the eyewear is in place. One problem with the known adjustment arrangements is that the buckle can protrude significantly from the back of the head when the eyewear is being worn. This can cause discomfort especially if a tight fitting hat or cap is worn over the top of the strap. Furthermore, in the
25 case of swimming goggles, the protrusion of the buckle can create frictional

drag (whether or not the buckle is covered by a swimming cap) and this is undesirable.

Another problem occurs because, once the strap is tightened, it can be difficult to readjust the tension in the strap for several reasons. Firstly, it is more difficult to loosen the head strap than it is to tighten it and it may be necessary to remove the eyewear in order to loosen the head strap. Secondly, if the wearer is participating in competitive sporting activities, it may only become apparent that the head strap is incorrectly adjusted once the competitive activity has commenced by which time it will be too late to make any further adjustments. For this reason, it is desirable to provide some means for allowing a reliable and accurate measurement of tension within the head strap so that the wearer can ensure that the head strap is correctly adjusted.

15

Finally another problem with this the known head strap adjustment arrangement is that the free end can cause a discomfort and distraction by flapping around when the eyewear is in place.

20 SUMMARY OF THE INVENTION

In a first aspect, the present invention provides a tensioner for adjusting the tension in a head strap for eyewear, the tensioner having an attachment portion for attachment to said head strap, a lower surface which, in use, faces the wearer's head and an opposing upper surface, wherein the upper and

lower surfaces of the tensioner are substantially uniformly spaced convex surfaces.

By providing curved convex upper and lower tensioner surfaces (which equates to providing a curved tensioner), it is possible to fit the tensioner to the wearer's head so that discomfort is minimised should the wearer chose to wear a tight fitting hat or cap over the head strap. The surfaces are uniformly spaced i.e. the curve of the upper surface substantially matches the curve of the lower surface thus minimising the profile of the tensioner which helps to reduce water resistance when used on swimming goggles because the tensioner does not protrude from the wearer's head

As described above, the upper and lower surfaces are uniformly spaced i.e. the curve of the upper surface substantially matches the curve of the lower surface. The upper surface is the surface which includes the uppermost extremities of the tensioner. It will be apparent that, in order for the upper surface to be uniformly spaced from the lower surface, the upper surface cannot include any significant projections or irregularities. Any projections or irregularities, would increase the profile of the tensioner and thus decrease tensioner comfort and increase tensioner drag.

As is apparent from the discussion above, it is envisaged that, in use, the tensioner faces the rear of the wearer's head and preferably contacts the rear of the wearer's head (as opposed to the side of the wearer's head). Tensioners provided at the side of the head e.g. connected to the goggle

frame are not typically covered by the wearer's cap and so issues of discomfort caused by the pressure of a tight-fitting cap do not generally arise.

Preferably, the upper and lower surfaces of the tensioner are curved into
5 convex cylindrical surfaces. The radius of curvature is preferably 65-90mm.
More preferably, the radius of curvature is between 75-90mm and most
preferably between 84-88mm. The radius of curvature is preferably selected
so that it matches the curve of the rear of the average male 95th percentile
head. In this case, the radius of curvature is about 86mm.

10

In a second aspect, the present invention provides a tensioner for adjusting
the tension in a head strap for eyewear, the tensioner having a tension
adjustment portion and an attachment portion for attachment to said head
strap, a lower surface which, in use, faces the wearer's head and an opposing
15 upper surface, wherein the attachment portion comprises a tab extending
away from the tension adjustment portion and having at least one rib
extending across the width of the tab, the at least one rib having a greater
width and/or depth than the tab.

20 The term "width of the tab" is intended to refer to the dimension of the tab
which is perpendicular to the direction of extension of the tab away from the
tension adjustment portion.

Preferably, the attachment portion comprises at least two ribs. More
25 preferably, said tab further comprises at least one aperture.

The tab, rib(s) and apertures are provided to assist in attachment of the tensioner to the tensioner end of the head strap. Preferably, the head strap is formed of plastic material e.g. silicone which is molded (e.g. injection molded or compression molded) around the attachment portion. By providing the rib(s) and optionally, the aperture(s), it is possible to ensure a firm bond between the molded plastic material and the attachment portion.

Preferably, the rib(s) extend perpendicularly across the tab. Preferably, the at least one rib and the tab provide a cruciform- and/or T- shaped attachment portion. In a cruciform-shaped attachment portion, the at least one rib extends perpendicularly across the width of the tab at a point spaced from the end of the tab (the end of the tab being distal the tension adjustment portion of the tensioner). The rib may bisect the tab. The tab may bisect the at least one rib. In a T-shaped attachment portion, the at least one rib extends perpendicularly across the end of the tab (distal the tension adjustment portion of the tensioner). Ribs may be provided both spaced from the end of the tab and at the end of the tab to provide an attachment portion which is both cruciform and T-shaped.

In a third aspect, the present invention provides a tensioner for adjusting the tension in a head strap for eyewear, the tensioner having an attachment portion for attachment to said head strap, a lower surface which, in use, faces the wearer's head and an opposing upper surface, wherein the tensioner comprises two arms extending from the attachment portion, wherein the ends

of the arms distal the attachment portion each comprise a tooth, the teeth defining an opening distal the attachment portion, the teeth being closer to the upper surface of the tensioner than the lower surface, wherein the tensioner further comprises two cross bars extending between the arms and wherein
5 the cross bar which is distal the attachment portion is closer to the lower surface of the tensioner than the upper surface.

This arrangement is provided to help minimise the profile of the tensioner (to reduce discomfort when a tight-fitting hat/cap is worn and to reduce frictional
10 resistance). In use, the second portion of the head strap rests as a double layer against the teeth and the cross bar distal the attachment portion (whereas the second portion loops around the cross bar proximal the attachment portion so that only a single layer rests on each side of the proximal cross bar). The off-setting of the distal cross bar and the teeth helps
15 to reduce any protrusion of the double layered second portion beyond the surfaces of the tensioner. The double layer of the second portion passes over the distal cross bar so positioning of the distal cross bar away from the upper surface helps to provide space in which the double layer can sit without protruding above the upper surface. The double layer of the second portion
20 passes under the teeth so positioning of the teeth away from the lower surface (e.g. flush with the upper surface) helps to provide space in which the double layer can sit without protruding below the lower surface.

The cross bar proximal the attachment portion can be located midway
25 between the upper and lower surfaces of the tensioner but preferably is off-set

slightly towards the upper surface. This helps to facilitate insertion of the second portion into the tensioner.

The features defined in the first, second and third aspects can be combined
5 with any of the features described in any of the other aspects. For example,
the features defined in the first aspect can be combined with the features
defined in the second and/ or third aspects. That is, the present invention
additionally provides a tensioner with curved upper and lower surfaces as
defined in relation to the first aspect which may additionally comprise an
10 attachment portion as described in relation to the second aspect and/or an off-
set cross bar distal the attachment portion as described in relation to the third
aspect. The features defined in the second aspect can be additionally
combined with the features defined in the third aspect. That is, the present
invention additionally provides a tensioner with an attachment portion as
15 described in relation to the second aspect and an off-set cross bar distal the
attachment portion as described in relation to the third aspect.

Preferably the tensioner according to any of the aspects is formed of plastics
material such as polycarbonate.

20

In a fourth aspect, the present invention provides a head strap for eyewear,
the head strap including the tensioner according to any of the first, second
and third combinations (or any combinations thereof). In embodiments where
the head strap comprises a tensioner according to the second aspect, the
25 head strap is formed of a plastics material e.g. silicone which at least partially

(and preferably fully) encloses the tab and at least one rib. The rib(s) and optionally the aperture(s) provide for a good bond between the plastic material and the attachment portion.

- 5 The head strap of the fourth aspect preferably comprises a first portion having a tensioner end terminating at the tensioner, and a second portion comprising a clip end, the clip end including and terminating at a clip, wherein, in use, the second portion passes through the tensioner and the clip is releasably securable onto along the second portion.

10

By providing a head strap having two ends which terminate at a tensioner and a clip, the clip being releaseably securable to the second portion after the second portion has passed through the tensioner, any free ends which could flap around and cause discomfort and distraction are eliminated.

15

Preferably, the clip is releaseably securable onto and moveable (e.g. by sliding) along the second portion. This allows any slack in the second portion between the tensioner and the clip end to be eliminated, again decreasing the possibility of discomfort and distraction.

20

Preferably, the clip comprises a pair of jaws defining a channel and an opening, the second portion of the head strap being insertable into said channel through said opening to releasably secure the clip onto the second portion. The channel preferably has a cross section (e.g. a rectangular cross

25 section) with a major dimension and a minor dimension, the major dimension

of the cross-section substantially matching the width of the second section. This ensures a snug fit of the second portion in the channel which prevents inadvertent movement of the clip along the second portion.

5 Preferably, the minor side of the clip defining the minor dimension is small enough such that the minor side of the clip can pass through the tensioner between the side arms and between the two cross bars. Conversely, the major side of the clip defining the major dimension (which must at least match the width of the second portion of the head strap) is, typically, larger than the
10 distance between the tensioner side arms and cross bars so that the clip cannot pass through when the major side of the clip is presented. This arrangement allows the width of the tensioner (in the direction of the cross bars) to be reduced (which helps to reduce frictional drag and increase comfort for the wearer). The tensioner need only have a width sufficient to
15 allow passage of the minor side of the clip and not the major side.

Preferably, the clip is formed of plastics material such as polycarbonate.

In preferred embodiments, the clip comprises an attachment portion having a
20 tab with at least one rib extending across the width of the tab, the at least one rib having a greater width than the tab. More preferably, said tab further comprises at least one aperture.

The tab, rib and apertures are provided to assist in attachment of the clip to
25 the clip end of the head strap. Preferably, the head strap is formed of plastic

material e.g. silicone which is molded (e.g. injection molded or compression molded) around the clip attachment portion. By providing the rib and optionally, the aperture(s), it is possible to ensure a firm bond between the molded plastic material and the clip attachment portion.

5

In preferred embodiments, the second portion has indicia provided along at least a part of its length. The tensioner preferably includes a window in which at least one of said indicia on the second portion is visible when the head strap is in use. The window is preferably defined by the side arms, the teeth
10 and the attachment portion. By providing indicia on the second portion, it is possible to reliably reproduce a desired tension in the head strap. For example, the wearer can fit the head strap to the desired tension and then can observe the indicium framed by the tensioner window at the desired tension. The wearer then knows that, in order to recreate the desired tension, they can
15 set the head strap so that the same indicium is framed by the tensioner window.

The indicia may be visible and or tactile indicia. The indicia may be numerical indicia.

20

Preferably, the head strap includes an indicator which helps to accurately position the desired indicium in the tensioner window. The indicator may be provided on the tensioner side arms, the tensioner attachment portion or on the first portion of the head strap adjacent the tensioner. The indicator may
25 be a linear or arrow-shaped element. It may be raised from, recessed into or

printed onto the surface of the tensioner/first portion. By providing an indicator, the wearer can more accurately determine the required location of the desired indicium in the tensioner window.

5 Preferably, the first portion of the head strap has a first eyewear connection end opposite the tensioner end and the second portion of the head strap has a second eyewear connection end opposite the clip end. Most preferably, the first and second eyewear connection ends are connected to each other via a connection portion which, in use, passes round the rear of the wearer's head
10 such that, in use, the first portion, second portion and connection portions form a double loop around the rear of the wearer's head. In this case, the present invention provides a one-piece double loop strap with integral tensioner and clip.

15 Preferably, the head strap is for sports eye wear such as a mask (e.g. for diving or skiing) or goggles (e.g. for swimming). Double loop straps (as described above) are especially desirable especially for sports eyewear used in competitive events such as swimming goggles.

20 Preferred embodiments of the present invention will now be described with reference to the accompanying figures in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a top view of a goggles head strap including a tensioner
25 according to a first preferred embodiment of the present invention;

Figure 2 shows a bottom view of the goggles head strap shown in Figure 1;
Figure 3 shows a longitudinal cross section along line A-A shown in Figure 2;
Figure 4 shows a side view of the goggles head strap shown in Figure 1;
Figures 5a and 5b show top and bottom elevational views respectively of the
5 first preferred embodiment;
Figures 6a and 6b show a top and bottom elevational view respectively of an
assembly the first preferred embodiment;
Figures 7a and 7b show top and bottom elevational views respectively of a
clip;
10 Figures 8a and 8b show a top and bottom elevational view respectively of a
clip/strap assembly;
Figure 9 shows the goggle head strap shown in Figures 1-4 assembled with
goggle head strap supports; and
Figure 10 shows a cross section through the first preferred embodiment when
15 the goggle head strap of Figures 1-4 is assembled as shown in Figure 9.

DETAILED DESCRIPTION OF THE INVENTION

Figures 1, 2, 3 and 4 show a top, bottom, longitudinal cross section and side
view of a head strap for swimming goggles. The head strap comprises a first
20 portion 1 having a tensioner end 2. The tensioner end 2 includes and
terminates at a tensioner 3 which is shown in more detail in Figures 5a, 5b, 6a
and 6b. The head strap further comprises a second portion 4 which
comprises a clip end 5. The clip end includes and terminates at a clip 6 which
is shown in more detail in Figures 7a, 7b, 8a and 8b. The first and second
25 portions 1, 4 are joined to one another via a connection portion (not shown).

In use, the second portion 4 passes through the tensioner 3, and the clip 6 is releasably securable onto the second portion 4 as described below.

5 Figures 5a/b and 6a/b show a polycarbonate tensioner which is a first preferred embodiment of the invention. It has a lower surface 7 which, in use, faces the wearer's head and an opposing upper surface 8. It also includes an attachment portion 9 for attachment to the tensioner end 2.

The upper and lower surfaces 7, 8 of the tensioner 3 are curved into convex, 10 cylindrical surfaces having a radius of curvature around 86mm. The radius of curvature is selected so that it matches the curve of the rear of the average male 95th percentile head. This curved profile improves the fitting of the tensioner to the wearer's head so that discomfort is minimised should the wearer chose to wear a tight fitting hap or cap over the head strap. The 15 curved surfaces are substantially uniformly spaced i.e. the curve of the upper surface matches the curve of the lower surface. The upper surface is free of any significant projections or irregularities.

The tensioner comprises a frame formed of two arms 10, 10' extending from 20 the attachment portion 9. The ends of the arms distal the attachment portion each comprise a tooth 11, 11'. The teeth define an opening 12 distal the attachment portion 9. The teeth 11, 11' are closer to the upper surface 8 of the tensioner 3 than the lower surface 7. The tensioner further comprises two cross bars, 13, 14 extending between the arms 10, 10'. The cross bar 13 25 which is distal the attachment portion 9 is closer to the lower surface 7 of the

tensioner 3 than the upper surface 8. The cross bar 14 proximal the attachment portion 9 can be located midway between the upper and lower surfaces 7, 8 of the tensioner but preferably is off-set slightly towards the upper surface 8. This arrangement helps minimise the profile of the tensioner
5 when the second portion has been passed through it as described below.

The tensioner attachment portion 9 (shown in Figures 5a and 5b) comprises a tab 15 having two ribs 16 extending across the width of the tab 15. This forms an attachment portion which is both cruciform and T-shaped. The ribs have a
10 greater width and depth than the tab 15. The tab also comprises two apertures 17. The tab 15, ribs 16 and apertures 17 are provided to assist in attachment of the tensioner 3 to the tensioner end 2 of the head strap. The head strap is formed of plastic material e.g. silicone which is molded (e.g. injection molded or compression molded) around the attachment portion 9 as
15 shown in Figures 6a and 6b. By providing the ribs and apertures, it is possible to ensure a firm bond between the molded plastic material of the tensioner end 2 and the attachment portion 9. Figure 3 shows how the cross bars 13, 14 are embedded within the plastics material forming the tensioner end 2.

20 Figures 7a/b and 8a/b show a polycarbonate clip 6 which is useful in combination with the present invention. The clip 6 comprises a pair of jaws 18, 18' defining a channel 19 and an opening 20. The second portion 4 of the head strap is insertable into the channel 19 through the opening 20 to releasably secure the clip 6 onto the second portion 4. The channel has a
25 rectangular cross section with a major dimension 21 and a minor dimension

22, the major dimension 21 of the cross-section substantially matching the width of the second section. This ensures a snug fit of the second portion in the channel which prevents inadvertent movement of the clip along the second portion.

5

The minor side 23 of the clip 6 defining the minor dimension 22 is small enough such that the minor side of the clip can pass through the tensioner 3 between the side arms 10, 10', between the two cross bars 13, 14 and between the cross bar 14 proximal the attachment portion and the attachment
10 portion 9. Conversely, the major side 24 of the clip 6 defining the major dimension 21 (which must at least match the width of the second portion 4 of the head strap) is, typically, larger than the distance between the tensioner side arms 10, 10', cross bars 13, 14 and cross bar 14 and the attachment
15 portion so that the clip 6 cannot pass through when the major side of the clip is presented. This arrangement allows the width of the tensioner (in the direction of the cross bars) to be reduced (which helps to reduce frictional drag and increase comfort for the wearer. The tensioner needs only have a width sufficient to allow passage of the minor side of the clip and not the major side.

20

The clip comprises an attachment portion 25 having a tab 26 with a rib 27 extending across the width of the tab, the rib having a greater width than the tab. The tab further comprises an aperture 28 and another aperture 29 is provided on a recessed portion 30 of the clip.

25

The tab, rib and apertures are provided to assist in attachment of the clip 6 to the clip end 5 of the head strap. The head strap is formed of plastic material e.g. silicone which is molded (e.g. injection molded or compression molded) around the clip attachment portion 25 and the recessed portion 30 of the clip.

- 5 By providing the rib and apertures, it is possible to ensure a firm bond between the molded plastic material and the clip 6.

In use, the head strap is initially connected to swimming goggles by passing the clip 6 and the clip end 5 through an aperture provided in a first head strap support 31 followed by an aperture provided in a second head strap support 10 31'. These apertures are dimensioned to only receive the minor side 23 of the clip 6 in order to minimise dimensional height of the head strap supports, 31, 31'. Passing the clip 6 and clip end 5 through the head strap support apertures results in a loop 32 of strap (the connection portion) extending 15 between the two head strap supports 31, 31' as shown in Figure 9. The tensioner end 2 of the strap remains to one side of the first head strap support 31 and the clip end 5 of the strap to the opposite side of the second head strap support 31'.

The following steps are then carried out:

- 1) The clip 6 and clip end 5 are then passed through the tensioner 3 between the teeth 11, 11' and the cross bar 13 distal from the attachment portion. The clip is passed through from the lower surface 7 towards the upper surface 8 on its side as only the minor side 23 can fit between the teeth and cross bar.
- 2) The clip 6 and clip end 5 are then passed through the tensioner 3 between the cross bar 13 distal from the attachment portion and the cross bar 14 proximal the attachment portion. The clip is passed through from the upper surface 8 towards the lower surface 7 on its side as only the minor side 23 can fit between the cross bars.
- 3) The clip 6 and clip end 5 are then passed through the tensioner 3 between the cross bar 14 proximal the attachment portion and the attachment portion 9. The clip is passed through from the lower surface 7 towards the upper surface 8 on its side as only the minor side 23 can fit between the cross bar and the attachment portion.
- 4) The second portion 4 of the strap proximal the clip end 5 is then looped back over the cross bar 14 proximal the attachment portion 9 and is inserted through the opening 12 to pass under the teeth 11, 11'. This results in the clip end 5 being looped back onto the second portion 4 of the head strap as shown in Figure 10.

As shown in Figure 10 the arrangement of the tensioner teeth 11, 11' and the cross bars 13, 14 helps to minimise the profile of the tensioner (which reduces discomfort when a tight-fitting hat/cap is worn and reduces frictional

resistance). It can be seen that the second portion 4 of the head strap rests as a double layer against the teeth 11, 11' and the cross bar 13 distal the attachment portion whereas the second portion 4 loops around the cross bar 14 proximal the attachment portion 9 so that only a single layer rests on each side of the proximal cross bar 14. The off-setting of the distal cross bar 13 and the teeth 11, 11' helps to reduce any protrusion of the double layered second portion 4 beyond the surfaces 7, 8 of the tensioner 3. The double layer of the second portion 4 passes over the distal cross bar 13 so positioning of the distal cross bar 13 away from the upper surface 8 helps to provide space in which the double layer can sit without protruding above the upper surface 8. The double layer of the second portion 4 passes under the teeth 11, 11' so positioning of the teeth away from the lower surface 7 helps to provide space in which the double layer can sit without protruding below the lower surface 7.

15

As can be seen in Figure 9, the clip is secured onto the second portion 4 remote from the clip end by inserting the second portion 4 into the channel 19 through the opening 20.

20 By providing a head strap having two ends which terminate at a tensioner 3 and a clip 6, the clip 6 being releaseably securable to the second portion 4 after the second portion has passed through the tensioner 3, any free ends which could flap around and cause discomfort and distraction are eliminated.

The clip 6 is releaseably securable onto and moveable by sliding along the second portion 4. This allows any slack in the second portion 4 between the tensioner 3 and the clip end 5 to be eliminated, again decreasing the possibility of discomfort and distraction. This movement is also desirable to help adjustment of the tension of the head strap as explained below.

The second portion 4 has visible indicia 32 provided along at least a part of its length on the underside. The tensioner 3 includes a window 33 in which at least one of said indicia 32 on the second portion 4 is visible when the head strap is in use. The window is defined by the side arms 10, 10', the teeth 11, 11' and the attachment portion 9. By providing indicia 32 on second portion, it is possible to reliably reproduce a desired tension in the head strap. The wearer can fit the head strap to the desired tension and then can observe the indicium 32' framed by the tensioner window at the desired tension. The wearer then knows that, in order to recreate the desired tension, they can set the head strap so that the same indicium 32' is framed by the tensioner window 33.

The tensioner includes an indicator 34 which helps to accurately position the desired indicium 32' in the tensioner window 33. The indicator is an arrow-shaped element. It is raised from the upper surface 8 of the tensioner. By providing an indicator 34, the wearer can more accurately determine the required location of the desired indicium 32' in the tensioner window 33.

Preferred features of the invention are defined in the following numbered paragraphs:

1. A tensioner for adjusting the tension in a head strap for eyewear, the tensioner having an attachment portion for attachment to said head strap, a
5 lower surface which, in use, faces the wearer's head and an opposing upper surface, wherein the upper and lower surfaces of the tensioner are substantially uniformly spaced convex surfaces.
2. A tensioner according to paragraph 1 wherein the upper surface is substantially free of projections or irregularities.
- 10 3. A tensioner according to paragraph 1 or 2 wherein, in use, the lower surface faces the rear of the wearer's head.
4. A tensioner according to any one of paragraphs 1 to 3 wherein, in use, the lower surface contacts the rear of the wearer's head.
5. A tensioner according to any one of paragraphs 1 to 4 wherein the
15 upper and lower surfaces have a radius of curvature matching the radius of curvature of the rear of the male 95th percentile head.
6. A tensioner according to paragraph 5 wherein the upper and lower surfaces have a radius of curvature of 65mm-90mm.
7. A tensioner according to paragraph 5 or 6 wherein the upper and lower
20 surfaces have a radius of curvature of about 86mm.
8. A tensioner according to any one of paragraphs 1 to 7, wherein the tensioner comprises two arms extending from the attachment portion, wherein the ends of the arms distal the attachment portion each comprise a tooth, the teeth defining an opening distal the attachment portion, the teeth being closer
25 to the upper surface of the tensioner than the lower surface, wherein the

tensioner further comprises two cross bars extending between the arms and wherein the cross bar which is distal the attachment portion is closer to the lower surface of the tensioner than the upper surface.

9. A tensioner according to any one of paragraphs 1 to 8 wherein the attachment portion comprises a tab having at least one rib extending across the width of the tab, the at least one rib having a greater width and/or depth than the tab.

10. A tensioner according to paragraph 9 wherein the at least one rib extends perpendicularly across the tab.

11. A tensioner according to paragraph 10 wherein the at least one rib and the tab provide a cruciform- and/or T- shaped attachment portion.

12. A tensioner according to paragraph 11 wherein the attachment portion comprises at least two ribs.

13. A tensioner according to paragraph 11 or 12 wherein said tab further comprises at least one aperture.

14. A tensioner for adjusting the tension in a head strap for eyewear, the tensioner having a tension adjustment portion, an attachment portion for attachment to said head strap, a lower surface which, in use, faces the wearer's head and an opposing upper surface, wherein the attachment portion comprises a tab extending away from the tension adjustment portion and having at least one rib extending across the width of the tab, the at least one rib having a greater width and/or depth than the tab.

15. A tensioner according to paragraph 14 wherein the at least one rib extends perpendicularly across the tab.

16. A tensioner according to paragraph 15 wherein the at least one rib and the tab provide a cruciform- and/or T- shaped attachment portion.
17. A tensioner according to any one of paragraphs 14 to 16 wherein the attachment portion comprises at least two ribs.
- 5 18. A tensioner according to any one of paragraphs 14 to 17 wherein said tab further comprises at least one aperture.
19. A tensioner according to any one of paragraphs 14 to 18, wherein the upper and lower surfaces of the tensioner are substantially uniformly spaced convex surfaces.
- 10 20. A tensioner according to paragraph 19 wherein the upper and lower surfaces have a radius of curvature matching the radius of curvature of the rear of the male 95th percentile head.
21. A tensioner according to paragraph 19 wherein the upper and lower surfaces have a radius of curvature of 65mm-90mm.
- 15 22. A tensioner according to paragraph 20 or 21 wherein the upper and lower surfaces have a radius of curvature of about 86mm.
23. A tensioner according to any one of paragraphs 14 to 22, wherein the tension adjustment portion comprises two arms extending from the attachment portion, wherein the ends of the arms distal the attachment portion
- 20 each comprise a tooth, the teeth defining an opening distal the attachment portion, the teeth being closer to the upper surface of the tensioner than the lower surface, wherein the tension adjustment position further comprises two cross bars extending between the arms and wherein the cross bar which is distal the attachment portion is closer to the lower surface of the tensioner
- 25 than the upper surface.

24. Swimming goggles or mask having a head strap including a tensioner according to any one of the paragraphs 1 to 23.

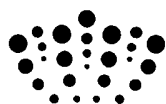
CLAIMS

1. A tensioner for adjusting the tension in a head strap for eyewear, the
5 tensioner having a tension adjustment portion, an attachment portion for
attachment to said head strap, a lower surface which, in use, faces the
wearer's head and an opposing upper surface, wherein the attachment portion
comprises a tab extending away from the tension adjustment portion and
having at least one rib extending across the width of the tab, the at least one
10 rib having a greater width and/or depth than the tab.
2. A tensioner according to claim 1 wherein the at least one rib extends
perpendicularly across the tab.
- 15 3. A tensioner according to claim 2 wherein the at least one rib and the
tab provide a cruciform- and/or T- shaped attachment portion.
4. A tensioner according to any one of claims 1 to 3 wherein the
attachment portion comprises at least two ribs.
- 20 5. A tensioner according to any one of claims 1 to 4 wherein said tab
further comprises at least one aperture.

6. A tensioner according to any one of claims 1 to 5, wherein the upper and lower surfaces of the tensioner are substantially uniformly spaced convex surfaces.
- 5 7. A tensioner according to claim 6 wherein the upper and lower surfaces have a radius of curvature matching the radius of curvature of the rear of the male 95th percentile head.
8. A tensioner according to claim 7 wherein the upper and lower surfaces
10 have a radius of curvature of 65mm-90mm.
9. A tensioner according to claim 7 or 8 wherein the upper and lower surfaces have a radius of curvature of about 86mm.
- 15 10. A tensioner according to any one of claims 1 to 9, wherein the tension adjustment portion comprises two arms extending from the attachment portion, wherein the ends of the arms distal the attachment portion each comprise a tooth, the teeth defining an opening distal the attachment portion, the teeth being closer to the upper surface of the tensioner than the lower
20 surface, wherein the tension adjustment position further comprises two cross bars extending between the arms and wherein the cross bar which is distal the attachment portion is closer to the lower surface of the tensioner than the upper surface.

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11. Swimming goggles or mask having a head strap including a tensioner according to any one of the preceding claims.



Application No: GB1200882.7

Examiner: Carrie-Ann Williams

Claims searched: 1-11

Date of search: 13 February 2012

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
A	--	GB 2414565 A (CHIANG) see figures 2 and 4 in particular
A	--	GB 2456539 A (CHIANG) see figures
A	--	US 5467508 A (FENG) see figures

Categories:

X Document indicating lack of novelty or inventive step	A Document indicating technological background and/or state of the art.
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& Member of the same patent family	E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

A61F; A63B

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
None		