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Goggles

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(71) Applicant(s)
Yamamoto Kogaku Co., Ltd.

(72) Inventor(s)
Tadashi Kita; Tomoyuki Yashiro

(74) Agent/Attorney
GRIFFITH HACK,GPO Box 4164,SYDNEY NSW 2001

(56) Related Art
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Abstract of the Disclosure

Goggles allowing their eyecups and nasal belt to be adaptable to vertical movements and providing an increased degree of fitting freedom onto wearer's face are provided including a pair of right and left eyecups, a nasal belt interconnecting respective opposing inner end portions of the eyecups, and an elastic band connecting to respective outer end portions of the eyecups, the connection between each of the eyecups and the nasal belt being achieved by a stick-like projection having a substantially circular cross sectional configuration and a projection engaging hole in which the stick-like projection is rotatably fitted.

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AUSTRALIA

Patents Act 1990

ORIGINAL

COMPLETE SPECIFICATION

STANDARD PATENT

Invention Title: GOGGLES

The following statement is a full description of this invention, including the best method of performing it known to us:

GH REF: P24722-B:RPW:RK

GOGGLES

BACKGROUND OF THE INVENTION

The present invention relates to goggles for protecting eyes in various activities such as swimming, skiing, motorcycling and different operations.

Figs. 14 to 16 illustrate an example of conventional goggles of this type (refer to, for example, Japanese Unexamined Utility Model Publication No. SHO 53-153700 and Japanese Examined Utility Model Publication No. HEI 1-23494).

Goggles 21 shown are for use in swimming and include a pair of right and left eyecups 22,22, a nasal belt 23 interconnecting opposing inner ends, or nasal ends, of the eyecups 22,22, an elastic band 24 connecting to outer ends of the eyecups 22,22, and an annular cushion pad 25 having a soft elasticity and bonded to the rear peripheral edge of each eyecup 22.

On each of the opposing inner ends of the eyecups 22,22 is provided a nasal belt mounting seat 26 protruding therefrom. The nasal belt mounting seat 26 defines a substantially rectangular belt insertion hole 27 extending through the seat 26 in the thicknesswise direction thereof. The nasal belt 23 is molded of a flexible material such as rubber or a resin into a rectangular shape in section as having a plurality of engagement projections 28 on the side adapted to face op-

AUSTRALIAN PATENT

engagement projections 28 on the side adapted to face opposite the face of the wearer. The nasal belt 23 is inserted into the belt insertion hole 27, so that any of the engagement projections 28 engages the peripheral edge of the belt insertion hole 27 on the wearer's face side.

Each eyecup 22 defines at an outer end portion thereof an elastic band insertion hole 29 horizontally extending therethrough. The elastic band 29 is a single continuous strap of rubber and is inserted through the band insertion holes 29,29 and the both ends 24A,24A thereof are connected together by being inserted through an adjustment buckle 30 in a superposed fashion. Thus, the goggles 21 are double-supported at the back of the wearer's head by the elastic band 24, resulting in improved wearing stability.

With the foregoing conventional goggles, both end portions of the nasal belt 23 inserted through the belt insertion holes 27 of the nasal belt mounting portion 26 project too long from the mounting portion 26 thereby degrading the appearance of the goggles. Further, the belt insertion holes 27 are each shaped rectangular, so that the nasal belt 23 is less adaptable to movements. Consequently, vertical movements of the eyecups are restricted by the nasal belt 23, resulting in a difficulty in fine positional adjustments of the goggles and a limited degree of fitting freedom.

The present invention has been attained in view of the

foregoing problems, and therefore, it would be advantageous if at least preferred embodiments of the present invention provided goggles which allow the eyecups and the nasal belt to be relatively movable vertically, enable easy fine positional adjustments and enjoy an increased degree of fitting freedom.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, there is provided goggles comprising a pair of right and left eyecups having respective lens portions, a nasal belt interconnecting respective opposing inner end portions of the eyecups, and an elastic band connecting to respective outer end portions of the eyecups, the connection between each of the eyecups and the nasal belt being achieved by an elongate projection extending substantially perpendicular to one of said lens portions, said projection having a substantially circular cross sectional configuration, and the nasal belt having a projection engaging hole in which the elongate projection is rotatably fitted, said eye cups and elastic band being constructed and arranged such that said connection is a freely pivotal connection.

With this feature of the present invention, each eyecup and the nasal belt are pivotable relative to each other about the stick-like projection thereby rendering the eyecups vertically movable with flexibility. By vertically moving the eyecups it is possible to achieve positional adjustments of the eyecups relative to wearer's face with ease, resulting in an increase degree of fitting freedom with respect to the wearer's face.

Preferably each of the eyecups has a nasal belt mount portion on which the elongate projection is provided, while the nasal belt has opposite end portions each defining the projection engaging hole.

With this feature, the eyecups and the nasal belt can be molded with a high moldability, and the connection

therebetween is achieved with a sufficient connection strength.

According to yet another aspect of the present invention, the elongate projection is provided at a top end thereof with an engaging protrusion slanted at an acute angle with respect to the central axis of the elongate projection, while each of the opposite end portions of the nasal belt is slanted rearward, and the engaging protrusion detachably engages a slanted surface of the corresponding end portion of the nasal belt.

With this feature, the nasal belt and the eyecups are connected together and separated from each other with ease when required. Further, when the goggles are worn by the wearer, a tension produced by the elastic band is exerted such that the elongate projection is urged into the corresponding engaging hole of the nasal belt, thus preventing the eyecups and the nasal belt from being detached from each other during use of the goggles.

According to a further aspect of the present invention, there is provided goggles comprising a pair of right and left eyecups having respective lens portions, a nasal belt interconnecting respective opposing inner end portions of the eyecups, and an elastic band connecting to respective outer end portions of the eyecups, the connection between each of the eyecups and the nasal belt being achieved by an elongate projection having a substantially circular cross sectional configuration, and the nasal belt having a projection engaging hole in which the elongate projection is rotatably fitted, wherein the elongate projection is provided at a top end thereof with an engaging protrusion slanted at an acute angle with respect to the long axis of the elongate projection, while each of the opposite end portions of the nasal belt is slanted rearward, and the engaging protrusion detachably engages a slanted surface of the corresponding end portion of the nasal belt.

Preferably, the eyecups each have a peripheral wall having a rear edge face adapted to come into direct contact with wearer's face.

Goggles with such feature do not require cushion pads and hence have a lightened weight.

The foregoing and other object, features and attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing one embodiment of the present invention;

Fig. 2 is an enlarged front view of an eyecup of the embodiment;

Fig. 3 is a plan view of Fig. 2;

Fig. 4 is a sectional view taken along line A-A of Fig. 2;

Fig. 5 is an enlarged view of portion B shown in Fig. 3;

Fig. 6 is a front view of portion B as viewed from line C-C of Fig. 5;

Fig. 7 is a plan view showing the shape of a band insertion hole defined in each eyecup of the embodiment;

Fig. 8 is a front view of a nasal belt of the embodiment;

Fig. 9 is a top plan view of Fig. 8;

Fig. 10 is a sectional view showing another form of an eyecup of the embodiment;

Fig. 11 is a perspective view showing another form of an engaging protrusion of a stick-like projection of the eyecup;

Fig. 12 is a perspective view showing yet another form of the engaging protrusion;

Fig. 13 is a perspective view showing another form of the nasal belt of the embodiment;

Fig. 14 is a side view of conventional goggles as fitted onto a head;

Fig. 15 is an enlarged plan view of the conventional goggles; and

Fig. 16 is a front view showing an eyecup of the conventional goggles.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described in detail with reference to the drawings.

Figs. 1 to 13 illustrate one embodiment of the present invention. Referring to Fig. 1, goggles 1 include a pair of right and left eyecups 2,2, a nasal belt 3, an elastic band 4 and a band buckle 5.

The eyecups 2,2 are formed of a transparent rigid plastic and each include a planar front lens portion 6 and a

peripheral wall portion 7 rearwardly extending from the peripheral edge of the lens portion 6. The peripheral wall portion 7 has a rear edge portion 7A having a gently curved surface so as to be well fitted onto wearer's face without the need of a pad. The peripheral wall portion 7 of each eyecup 2 has an inner side portion opposing the corresponding portion of the other eyecup 2, which inner side portion is provided with an inwardly protruding mount portion 8 for mounting the nasal belt 8. An outer end portion of the peripheral wall 7 forms a band connecting portion 9.

The mount portion 8 of each eyecup 2 protrudes diagonally forward beyond the front face of the lens portion 6. The mount portion 8 has a rear face (slanted surface on the wearer's face side) 8A provided with a stick-like projection 10 having a substantially circular section and projecting toward the wearer's face. The projection 10 is acute-angled with respect to the rear face 8A on the peripheral wall side. As shown in Fig. 5, the projection 10 has a rear end face 10A which is inclined with respect to the central axis of the projection 10 so as to be substantially parallel to the rear face 8A of the mount portion 8. The stick-like projection has an engaging protrusion 11 on the inner side of the rear end thereof.

The outer side (the side opposite to the mount portion 8) of the peripheral wall portion 7 of each eyecup 2 extends

slantingly rearward to form the band connecting portion 9 which is relatively thick and which defines a band insertion hole 12 extending vertically.

The band insertion hole 12 is substantially egg-shaped in section having a longer axis (length L) extending in substantially the forward or rearward direction, as shown in Fig. 7. The round rear end portion of the band insertion hole 12 has a radius of curvature R1 larger than the radius of curvature R2 of the round front end portion. The shape and size of the band insertion hole 12 are determined corresponding to the shape and size of the elastic band 4 to be described later.

The nasal belt 3 is curved in plan as shown in Figs. 1, 3, 5 and 9 and is formed of an elastic material such as a soft or semi-rigid plastic. The nasal belt 3 has longitudinal end portions 3A extending slantingly rearward in directions away from each other and respectively having projection engaging holes 13,13 extending therethrough in the forward or rearward direction. Each of the projection engaging holes 13,13 extends diagonal with respect to the front and rear faces of each end portion 3A.

The front face of each end portion 3A is provided with a step H which is recessed relative to the central front face of the nasal belt 3 and sized substantially the same as the thickness of the mount portion 8 measured in the forward or

rearward direction (refer to Fig. 5). This step H serves to render the front face of the mount portion 8 of each eyecup substantially flush with the central front face of the nasal belt 3. This feature, when applied to swimming goggles, is advantageous in reducing the resistance of water to the goggles.

Since the projection engaging hole 13 is shaped circular, the stick-like projection 10 having a circular cross section, when fitted into the projection engaging hole 13, allows each eyecup 2 and the nasal belt 3 to pivot therearound relative to each other. The rear face of each end portion 3A of the nasal belt 3 has on the inner end side thereof a cutout 14 for engaging the engaging protrusion 11.

The elastic band 4 is expansible and contractible since it is formed of an elastic material such as rubber. The elastic band 4 comprises a strap-shaped longitudinal central portion 4A having a substantially rectangular cross section, strap-shaped longitudinal end portions 4C having a substantially rectangular cross section, and remaining cord-like intermediate portions 4B having a substantially circular cross section, all of which are integrally molded into the elastic band. The central portion 4A and the end portions 4C have a width W slightly narrower than the longitudinal length L of the band insertion hole 12, so as to pass through the band insertion holes 12 without difficulty (refer to Fig. 7).

The intermediate portions 4B have a radius equal to or slightly smaller than the radius of curvature R1 of the round rear end portion of the band insertion hole 12 of each eyecup 2. Thickness t of the strap-shaped central portion 4A and end portions 4C is equal to or slightly smaller than the value twice as large as the radius of curvature R2 of the round front end portion, which is situated on the lens portion 6 side, of the band insertion hole 12 (refer to Fig. 7). When the elastic band is in position as inserted through the band insertion holes 12, the cord-like intermediate portions 4B are each located as extending through the corresponding band insertion hole 12. Thus, the elastic band 4 is less movable longitudinally of the insertion hole 12 (in the forward or rearward direction of the eyecups 2,2), with the result that the elastic band 4 is unlikely to move back and forth relative to the eyecups 2,2 when the goggles are not worn, ensuring positional stability.

Further, since each cord-like intermediate portion 4B located as extending through the corresponding band insertion hole 12 is substantially circular in cross section, the eyecups 2,2 and the elastic band 4 are pivotable or rotatable relative to each other. This provides an increased degree of fitting freedom of the eyecups 2,2 onto the wearer's face. If the elastic band is twisted, the cord-like intermediate portions 4B absorbs the twisting stress thereby enabling

stable fine adjustments. For these reasons, such configuration is highly suitable for goggles designed for competitive swimming which do not employ cushion pads.

The band buckle 5 is formed of a rigid plastic and configured to fasten the both end portions 4C of the elastic band 4 in a superposed manner by allowing the end portions 4C to be inserted therethrough individually. The buckle 4 allows the wearing length of the band 4 to be adjusted depending on the size of the wearer's head while at the same time interconnecting the both ends portions 4C of the elastic band. Thus, the strap-shaped central portion 4A and the both end portions 4C of the elastic band 4 can both be supported by the back of the wearer's head thereby double-supporting the goggles stably and providing improved fit.

In molding each eyecup 2, as shown in Figs. 4 and 10, parting line P is positioned to extend on the line apart from the rear edge face 7A of the peripheral wall portion 7 or from the outer end face of flange portion 7F by a distance D which is greater than the half of the thickness T of the peripheral wall portion 7 or flange portion 7F. Consequently, even if the rear edge face 7A of the peripheral wall portion comes into direct contact with the wearer's face, it contacts the wearer's face softly or gently and does not cause any pain or any feeling of physical disorder.

According to the foregoing embodiment, the right and

left eyecups 2,2 each pivot about the corresponding stick-like projection 10 relative to the nasal belt 3 as indicated by the arrows in Fig. 6 in wearing the goggles 1. This permits flexible vertical movements of the eyecups, so that the rear edge faces 7A of the eyecups fit the wearer's face. Further, each eyecup 2 can pivot back and forth as indicated by arrows X and Y in Fig. 3 about the corresponding intermediate portion 4B of the elastic band 4 thereby facilitating positional adjustments thereof.

When the goggles 1 are being worn by the wearer, tension F of the elastic band 4 works on the eyecups 2,2 and the nasal belt 3 in the directions indicated by arrows in Fig. 5, so that a force in the direction indicated by arrow FA in Fig. 3 is exerted on each end portion 3A of the nasal belt 3. Thus, the outer half of the peripheral wall of the projection engaging hole 13 is pressed into the angled space between the mount portion 8 and the stick-like projection 10 of each eyecup 2, while the engaging protrusion 11 of the stick-like projection 10 securely engages the cutout portion 14 of the projection engaging portion 13 of the nasal belt 3. Thus, during use of the goggles 1 the stick-like projection 10 will never come off from the engaging hole 13 and, hence, the eyecups 2,2 and the nasal belt 3 will never be separated from each other.

Since the elastic band 4 is vertically inserted through

the band insertion holes 12 of the eyecups 2,2, the eyecups 2,2 are unlikely to be twisted, resulting in favorable fit properties. Further, since the strap-shaped portions 4A and 4c of the elastic band 4 are adapted to be located on the back of the wearer's head, the elastic band 4, hence, the eyecups 2,2 can be stably supported. Moreover, the intermediate portions 4B having a substantially circular cross section are located on the side portions of the wearer's face, the goggles 1, if applied to swimming goggles, will be subjected to a decreased resistance of water and hence are best suited for competitive swimming.

In the foregoing embodiment the engaging protrusion 11 of the stick-like projection 11 may be configured to extend along the entire peripheral edge of the end portion of the projection 10 as shown in Fig. 11, or otherwise may protrude toward the peripheral wall 7 side of the adjacent eyecup 2 as shown in Fig. 12. The nasal belt 3 may be in the form of a strap as shown in Fig. 13.

It should be noted that the foregoing embodiment is not limitative of the present invention and may be modified in design within the scope of the present invention. For example, the stick-like projection 10 may be formed on the front face of each mount portion 8; the nasal belt 3 may be provided with a stick-like projection, while the mount portion 8 of each eyecup 2 may be formed with a projection engaging hole;

each eyecup 2 may be bonded with a cushion pad on the rear edge face 7A of the peripheral wall portion 7; the band insertion hole of each eyecup may be configured substantially circular, egg-shaped, elliptic, substantially oval or the like; and the elastic band may be shaped substantially circular in section throughout the entire length thereof.

Further, the present invention is applicable to any goggles having an elastic band and band connecting portions of conventional forms.

As has been described, the present invention is characterized by the connection between each of the eyecups and the nasal belt being achieved by a stick-like projection having a substantially circular cross sectional configuration and an engagement hole in which the stick-like projection is rotatably fitted. This feature makes the eyecups adaptable to vertically movements, facilitates positional adjustments of the goggles relative to the wearer's face, and provides an increased degree of fitting freedom.

The present invention is yet characterized in that each of the eyecups has a nasal belt mount portion on which the stick-like projection is provided, while the nasal belt has opposite end portions each defining the projection engaging hole. This feature allows the eyecups and the nasal belt to be molded with a high moldability and ensures a sufficient connecting strength between the nasal belt and the eyecups.

The present invention is still characterized in that the stick-like projection is provided at a top end thereof with an engaging protrusion slanted at an acute angle with respect to the central axis of the stick-like projection, while each of the opposite end portions of the nasal belt is slanted rearward, and the engaging protrusion detachably engages a slanted surface of the corresponding end portion of the nasal belt. With this feature, the nasal belt and the eyecups can be connected together and separated from each other with ease when required, and the connection therebetween is unlikely to come off during use of the goggles.

The present invention is further characterized by the eyecups each having a peripheral wall having a rear edge face adapted to come into direct contact with the wearer's face. This feature eliminates the need of cushion pads thereby realizing a reduction in weight and cost. Such goggles are best suited for competitive swimming.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Goggles comprising a pair of right and left eyecups having respective lens portions, a nasal belt interconnecting respective opposing inner end portions of the eyecups, and an elastic band connecting to respective outer end portions of the eyecups, the connection between each of the eyecups and the nasal belt being achieved by an elongate projection extending substantially perpendicular to one of said lens portions, said projection having a substantially circular cross sectional configuration, and the nasal belt having a projection engaging hole in which the elongate projection is rotatably fitted, said eye cups and elastic band being constructed and arranged such that said connection is a freely pivotal connection.

2. Goggles as set forth in claim 1, wherein each of the eyecups has a nasal belt mount portion on which the elongated projection is provided, while the nasal belt has opposite end portions each defining the projection engaging hole.

3. Goggles comprising a pair of right and left eyecups having respective lens portions, a nasal belt interconnecting respective opposing inner end portions of the eyecups, and an elastic band connecting to respective outer end portions of the eyecups, the connection between each of the eyecups and the nasal belt being achieved by an elongate projection having a substantially circular cross sectional configuration, and the nasal belt having a projection engaging hole in which the elongate projection is rotatably fitted, wherein the elongate projection is provided at a top end thereof with an engaging protrusion slanted at an acute angle with respect to the long axis of the elongate projection, while each of the opposite end portions of the nasal belt is slanted rearward, and the

engaging protrusion detachably engages a slanted surface of the corresponding end portion of the nasal belt.

4. Goggles as set forth in any one of the preceding claims, wherein the eyecups each have a peripheral wall having a rear edge face adapted to come into direct contact with a wearer's face.

5. Goggles substantially as herein described with reference to Figures 1 to 13 of the accompanying drawings.

Dated this 28th day of September 1999

YAMAMOTO KOGAKU CO., LTD.

By their Patent Attorneys

GRIFFITH HACK

FIG. 1

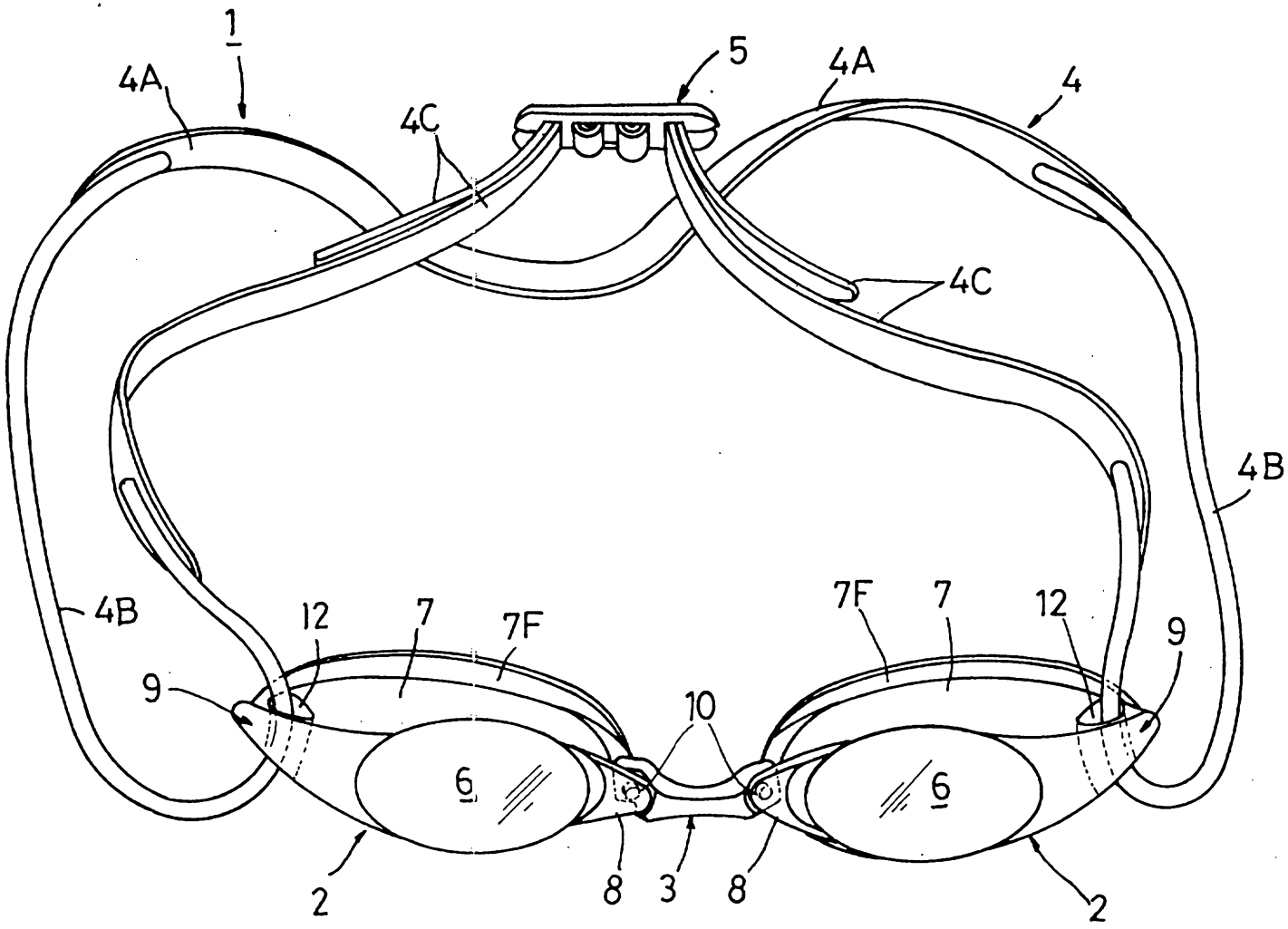


FIG. 2

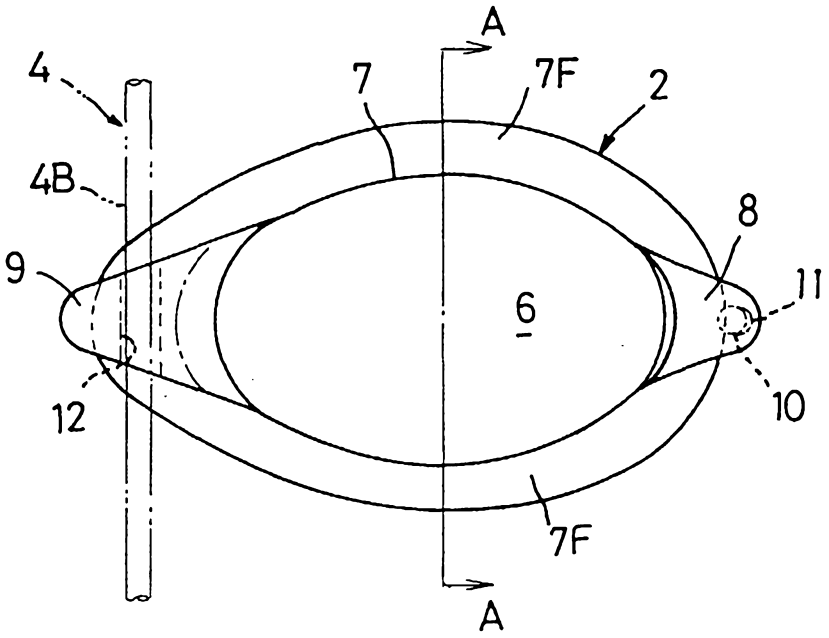

A
4
7
7F
2
4B
8
9
11
6
12
10
7F
A

FIG. 3

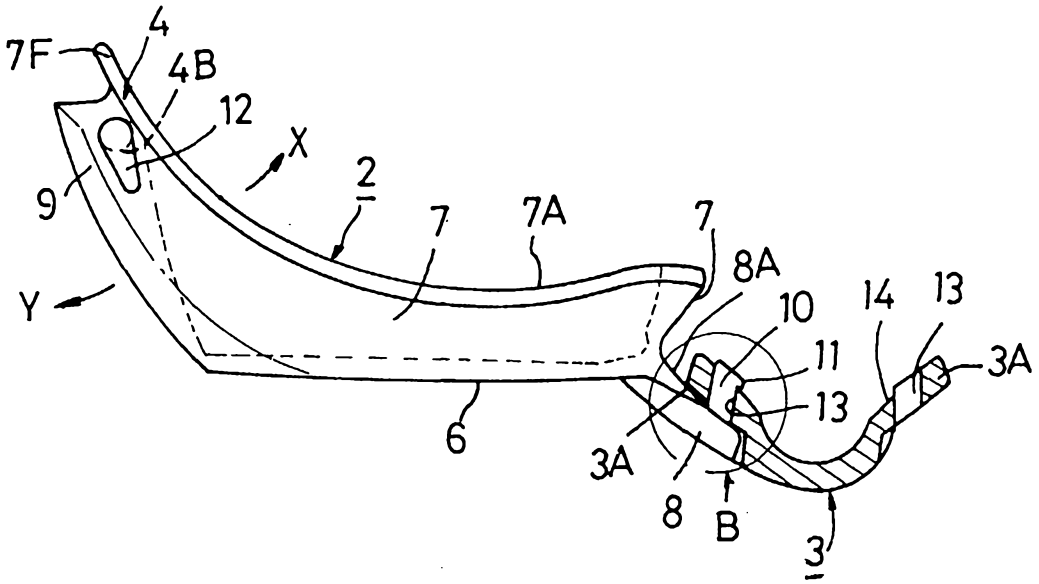

7F
4
4B
12
X
9
2
7
7A
7
8A
Y
10
14
13
11
3A
13
6
3A
8
B
3

FIG. 4

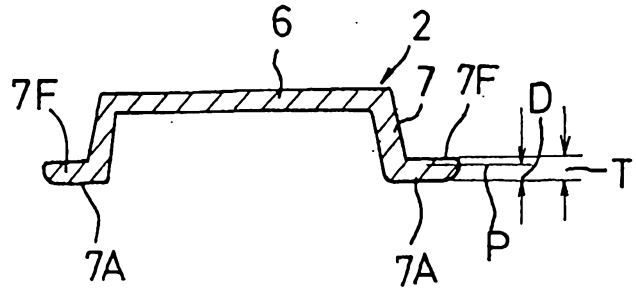


FIG. 5

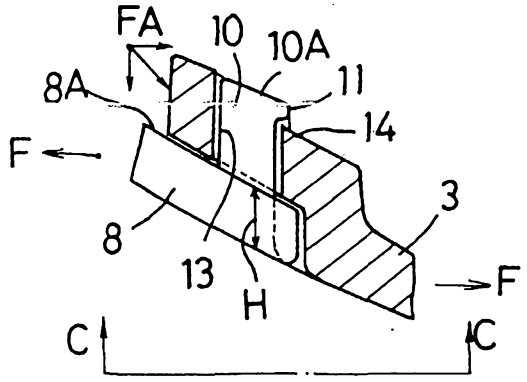


FIG. 6

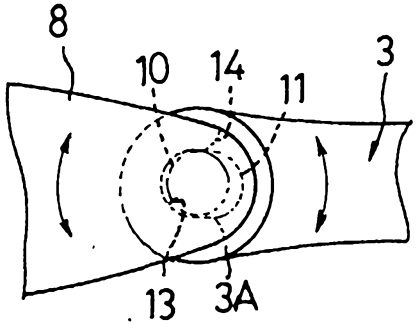


FIG. 7

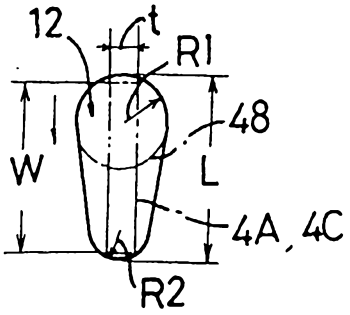


FIG. 8

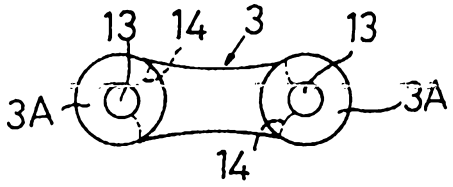
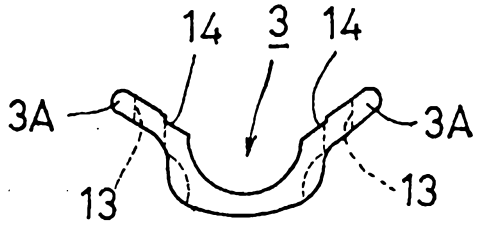


FIG. 9



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FIG. 10

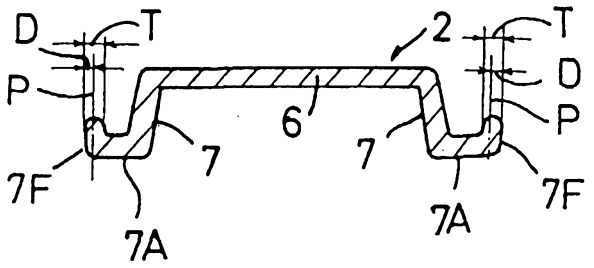


FIG. 11

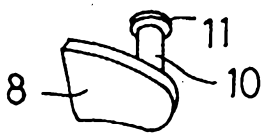


FIG. 12

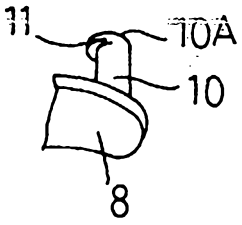


FIG. 13

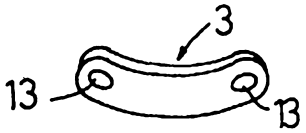


FIG. 14

PRIOR ART

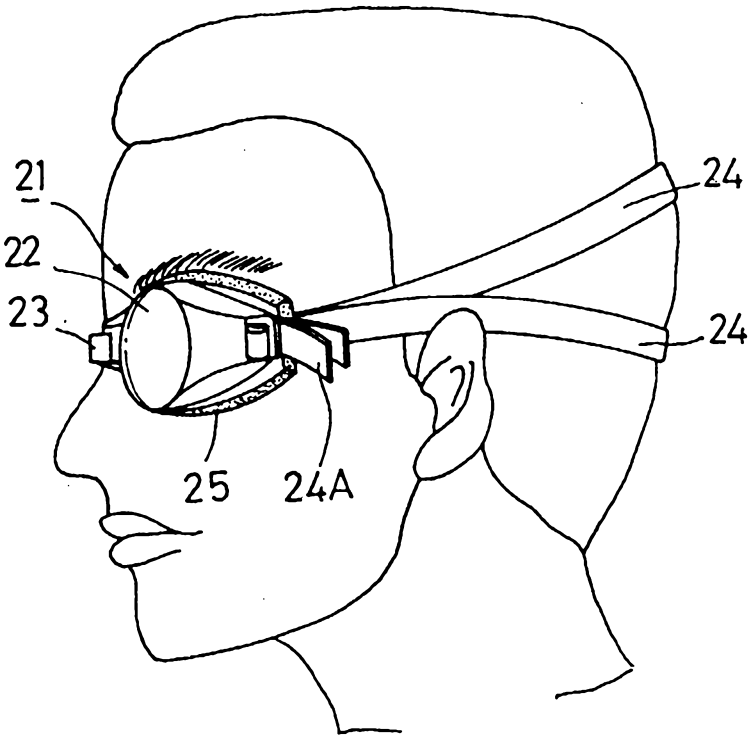


FIG. 15

PRIOR ART

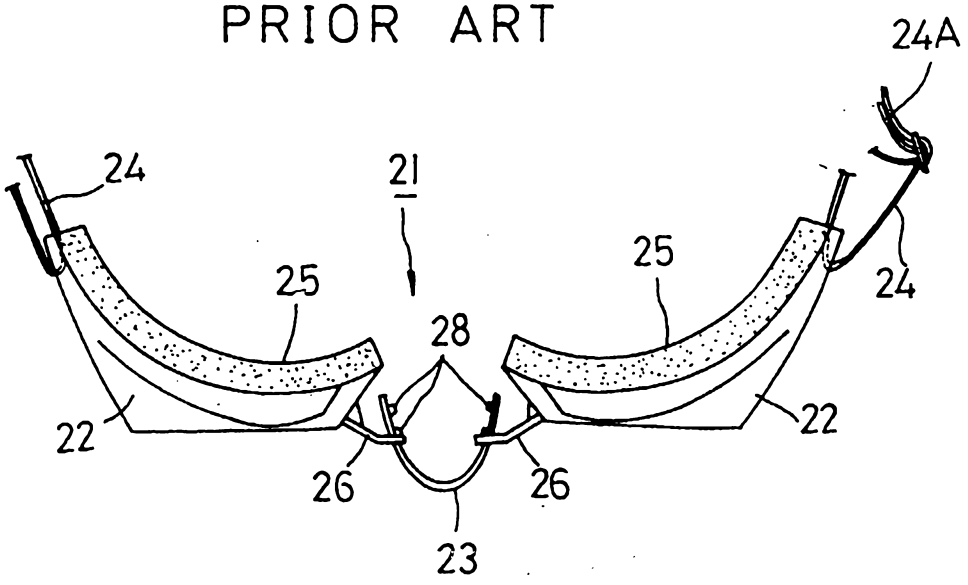


FIG. 16

PRIOR ART

