

Nov. 9, 1954

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2,693,799

BREATHING ATTACHMENT FOR SWIMMERS

Filed March 16, 1950

2 Sheets-Sheet 1

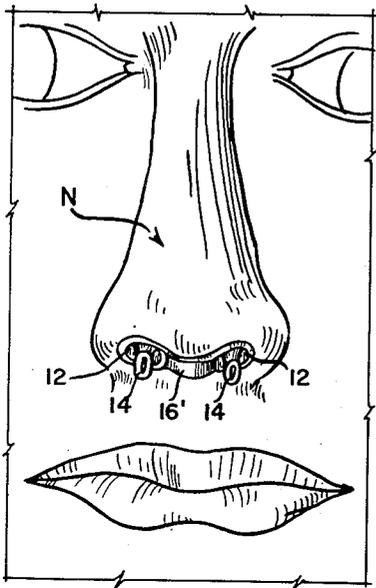


FIG. - 1

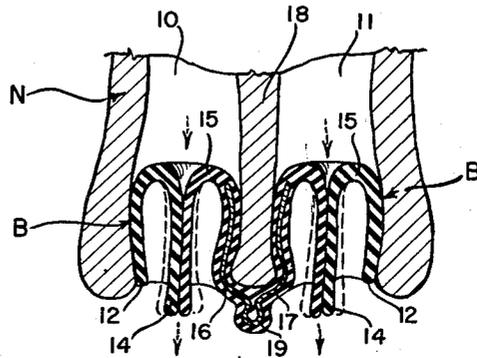


FIG. - 2

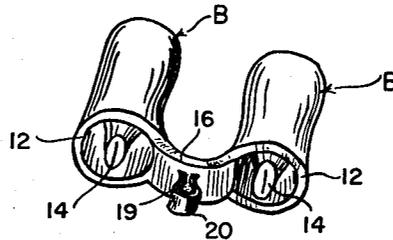


FIG - 3

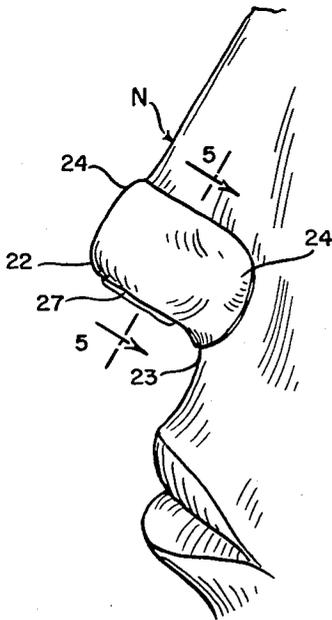


FIG. - 4

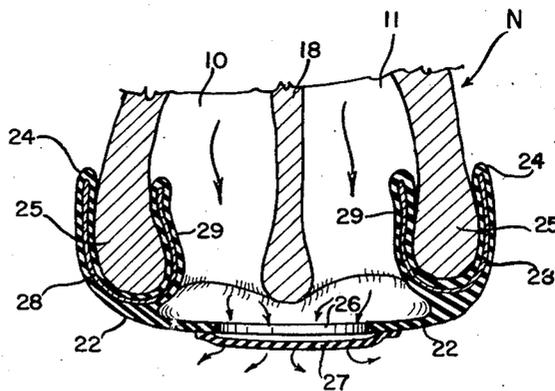


FIG. - 5

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2 Sheets-Sheet 2

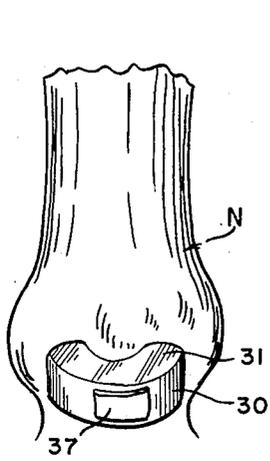


FIG. - 6

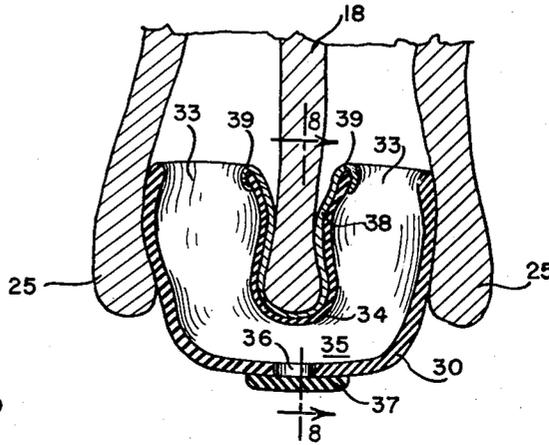


FIG. - 7

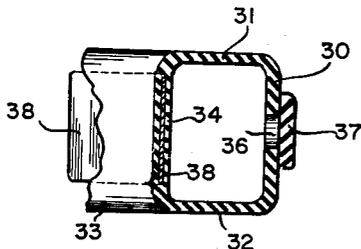


FIG. - 8

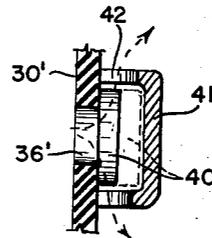


FIG. - 9

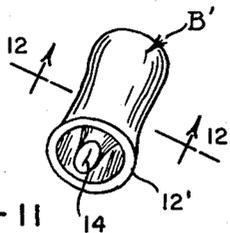


FIG. - 11

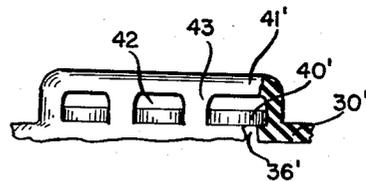


FIG. - 10

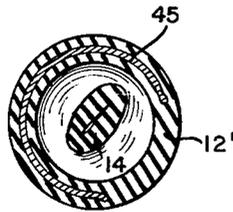


FIG. - 12

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## BREATHING ATTACHMENT FOR SWIMMERS

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15 Claims. (Cl. 128—148)

This invention relates to breathing attachments for swimmers.

The human species is equipped with breathing or respiratory mechanism specifically adapted to extract oxygen from the air, but this mechanism is not adapted to extract oxygen from water. Thus, it is not only disagreeable and uncomfortable for a person to receive water through or into the respiratory passages or tracts, but even sometimes fraught with danger. Since normal inhalation and exhalation takes place through the nose, there is a tendency for a swimmer to draw in water through the respiratory opening and into the respiratory passages. For a number of swimming strokes, particularly wherein the head of the swimmer is submerged for at least a portion of a stroke or a number of strokes, and also in water disturbed by wind or the like to form waves, it is particularly desirable for a swimmer to inhale through the mouth and exhale through the nose. With proper training, a swimmer can avoid inhalation of water through the nose a large proportion of the time, but for individuals who have not been so trained, or individuals who have difficulty in so doing, it often happens that water passes into the nose during inhalation. Also, in rough or choppy conditions, water is often accidentally forced into the nose. One attempt to overcome such a problem has resulted in devices for closing off the nose entirely, such as a device fitting over the nose and held in place by a band passing rearwardly around the head. However, such devices require both inhalation and exhalation to be made through the mouth, which is contrary to the desired breathing procedure in many swimming strokes and thus prevent the proper training of a swimmer for such strokes. Also, such devices tend to cause the wearer to gulp or drink greater quantities of water than would otherwise be the case, since the mouth is not only open for inhalation when out of the water, as for example, when the head is turned to the side, but is also open under water, during exhalation. The drinking of excess quantities of water does not cause discomfort in the respiratory tract, but often causes discomfort or inconvenience in the alimentary tract.

Among the objects of the present invention are to provide a novel breathing attachment for swimmers; to provide such an attachment which permits inhalation through the mouth and exhalation through the nose, in the manner utilized in certain swimming strokes; to provide such an attachment which may be worn during training of a swimmer, and which will assist in such training; to provide such an attachment by which proper breathing operations are encouraged; to provide such an attachment which may be placed on and taken off with ease; to provide such an attachment which may be worn with a relative minimum of discomfort; and to provide such an attachment which is comparatively easy to manufacture.

Additional objects of this invention, together with the novel features thereof, will become apparent from the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation of the nose and adjacent portions of the face of a person equipped with a breathing attachment constructed in accordance with this invention;

Fig. 2 is a transverse longitudinal section taken through the attachment and the lower end of the nose of the user of Fig. 1;

Fig. 3 is a perspective view of the attachment of Figs. 1 and 2;

Fig. 4 is a side elevation of the nose and the adjacent portion of the face of a person equipped with another form of breathing attachment constructed in accordance with this invention;

Fig. 5 is a partial transverse longitudinal section taken along line 5—5 of Fig. 4;

Fig. 6 is a fragmentary front elevation of the lower portion of the nose of a person equipped with an additional form of breathing attachment constructed in accordance with this invention;

Fig. 7 is a transverse longitudinal section, on an enlarged scale, taken through the attachment and the lower end of the nose of the user of Fig. 6;

Fig. 8 is a cross section taken through the attachment, along line 8—8 of Fig. 7;

Fig. 9 is an enlarged fragmentary cross section, taken similarly to Fig. 8 and illustrating an alternative valve construction;

Fig. 10 is a top plan view of a valve similar to that of Fig. 9;

Fig. 11 is a perspective view of one of a pair of attachments which can be utilized in lieu of the unitary construction of Figs. 1—3; and

Fig. 12 is an enlarged cross section taken along line 12—12 of Fig. 11.

As illustrated in Figs. 1—3, inclusive, one form of this invention may comprise an attachment which includes a pair of bodies or plugs B, adapted to be inserted in the nostrils 10 and 11 of the nose N of the user. Each body B may include a generally cylindrical outer portion 12, having an outer diameter or shape corresponding to that of the nostril 10 or 11, and an inner portion 14, connected at its rear end 15 with the outer portion 12 or formed integrally therewith. Inner portion 14 extends outwardly within the outer portion 12, and also may be formed as a flattened tube, so as to act as a valve. Thus, when the air within the nostrils 10 and 11 is relatively quiescent, or when suction is produced therein, as during inhalation through the mouth, the tubular portions 14 will be closed, as shown in solid lines in Fig. 2. However, during exhalation, air may be expelled through the nostrils 10 and 11 since the inner portions 14 will be distended, as to approximately the position indicated by the dotted lines of Fig. 2. But when the valves are not opened by escaping air, i. e. when the pressure within the nostril does not exceed that outside the nostril, the valves will be closed, thus preventing an inflow of water into the nostrils, even during inhalation through the mouth.

In order to mount the bodies B securely within the nostrils 10 and 11, the former may be connected by a strip 16 having embedded therein a spring 17, which is adapted to clamp the septum 18 of the nose N. The form of the spring 17 is preferably U-shaped, so that the spring will be spread in slipping over the enlargement at the end of the septal cartilage, and then will spring together to hold the attachment in place. Also, the spring 17 may be provided with a small bow 19, which may be covered with rubber or the like and extend forwardly to form a knob 20, which permits the attachment to be placed in and taken out of the nostrils more readily. Or, the front end of the spring 17 may be flat, so as to permit the elimination of a knob or protuberance, as in the case of the strip 16 of Fig. 1.

Bodies B and strip 16 may be made of any suitable resilient or rubber-like material adapted to conform generally to the inside of the nostrils, such as rubber, synthetic rubber, plastic or the like, although it will be understood that the inner portions 14, which provide valves, may be made of a different material, such as more readily expansible rubber or the like, but joined to or formed integrally with the outer portions 12. Also, the spring 17 may be made of any suitable spring material, such as spring steel or the like. It will be evident, of course, that the bodies B not only form plugs in the nostrils, but also provide a wall having an opening and valves controlling the flow of fluid through the opening, so as to permit the flow of air from the nose but prevent flow of fluid, such as water, into the nose.

In another form of the invention, illustrated in Figs. 4 and 5, the attachment may comprise a wall or partition 22 which extends across the front of the nose N and into

engagement with the upper lip 23 of the user, and is provided with an outer extension 24 adapted to engage the lower top surface of the nose, as well as the outer surface of each ala or wing 25 of the nose. Wall 22 is further provided with an opening 26 and cooperating valve means 27, to permit flow of fluid from the nose but to prevent flow of fluid into the nose. Opening 26 may be elongated and normally covered by a flap or strip valve 27, larger than opening 26 and attached to wall 22 at each end of opening 26, as shown. Flap 27 is formed of rubber or other sufficiently resilient material so that, as in Fig. 5, during exhalation, the air, such as following along the lines of the arrows, will force the flap 27 away from the opening 26, to permit discharge of the air. As will be evident, upon a reverse pressure on the flap 27, it will close against the opening 26, thus preventing flow of fluid into the nose.

The wall 22 of the attachment of Figs. 4 and 5 may be mounted on the nose by being clipped to each ala or wing 25, as by U-shaped springs 28, the outer leg of each spring being embedded in the outer extension 24 and each inner leg being embedded in an inner extension 29 of the wall 22, each inner extension 29 being adapted to engage the inside of the corresponding wing 25. In general, the springs 28 are made sufficiently strong that there is little possibility of the attachment being blown off the nose during a sudden exhalation, but preferably exert insufficient clamping pressure to cause pain or acute discomfort. The wall or partition 22, as well as the extensions 24 and 29, conveniently formed integrally with the wall 22, may be made of rubber, synthetic rubber, plastic, or other suitable material, while the springs 28 may be made of suitable spring material of the type indicated previously.

In the embodiment illustrated in Figs. 6 to 8, the attachment fits inside the nostrils, but only a single valve is utilized. Thus, as in Fig. 7, the attachment may comprise an outer wall or partition 30, which is arcuate in front, or relatively flat in front and arcuate at the sides, as shown, and may have a relatively flat top 31 and a corresponding bottom 32, as in Figs. 6 and 8, to permit the attachment to be more readily grasped by the fingers of a user in placing and removing the attachment from the nose. The top, bottom and sides of outer wall 30 also merge at each side into a rearwardly extending, generally cylindrical legs 33, each of which extends rearwardly into one of the nostrils 10 and 11. On the inside, the legs 33 are joined by a bridge or strip 34 which extends around the end of the septum 18 and is spaced from the outer wall 30 to form a passageway 35 connecting the legs 33, i. e. the nostrils 10 and 11. The outer wall 30 may be provided with a single opening 36 and a valve flap 37, such as formed of more readily extensible rubber than the remainder of the attachment and attached to the wall 30 at each side of the opening 36, thus being adapted to be pushed away from the opening 36 upon exhalation, to permit the discharge of air, but adapted to be closed against the opening 36 upon a reverse pressure, to prevent the inflow of fluid, particularly water. A U-shaped spring 38 may be embedded in or attached to the inside of each leg 33 and the bridge 34, so as to be clipped over the septal cartilage, at the end of septum 18, thus holding the attachment securely in the nose. The spring 38 may be a relatively thin strip, sufficiently wide so that undue discomfort will not be produced by engagement of the spring with the septum, and may either be embedded within the rubber or similar material, as indicated in Fig. 8, or may be merely molded thereto, as in Fig. 7, with a hook 39 at each end tending to lock the spring to the inside of each.

Instead of the flap valve of Figs. 6 to 8, a cage valve, as illustrated in Figs. 9 and 10, may be utilized. Such a cage valve may comprise a disc 40 or 40', made of metal, fiber or the like, and disposed within a cage 41 or 41', which is provided with a series of openings 42 between legs 43 in the side and/or ends, so that the disc 40 or 40' will be lifted during exhalation from the opening 36' in wall 30', as to the dotted position of Fig. 9, thus permitting air to pass beneath the disc and outwardly through the openings 42. As will be evident, upon reverse pressure, the disc 40 or 40' will be forced back against the wall 30', to close the opening 36'. As in Fig. 9, the cage 41 may be made of metal or fiber, or, as in Fig. 10, the cage 41' may be made of the same material, such as rubber or rubber substitute, as the

wall 30'. The cage 41' may be formed integrally with the wall 30', as in Fig. 10, and the disc 40' may be inserted later by distention of the opening 36'. When the cage 41 is made of metal, as in Fig. 9, it may be attached to the wall 30' in a suitable manner, as by the legs between openings 42 being embedded in the wall. The disc and cage preferably have a similar shape, such as a generally circular disc 40 and a generally cylindrical cage 41, as in Fig. 9, or, as in the case of disc 40' and cage 41' of Fig. 10, a shape corresponding to an elongated oval or an elongated rectangle with rounded corners, generally similar in shape to the flap 27 of Figs. 4 and 5. It will be evident, of course, that a cage valve may be substituted for the flap valve in the embodiment of Figs. 4 and 5.

In an additional embodiment of this invention, illustrated in Figs. 11 and 12, a separate body or plug B' is provided for each nostril, rather than the two plugs being connected together, as in Figs. 1 to 3. Thus, the body B' may include a cylindrical outer portion 12' and a flattened tubular inner portion 14, connected together at the rear with the inner portion 14 adapted to provide a valve, in the same manner as in the case of the bodies B of Fig. 2. However, a spring 45 may be embedded in each of the outer portions 12', as illustrated in Fig. 12, each such spring 45 extending circumferentially for a sufficient distance around the periphery of the outer portion 12', so that the plug or body B' will be held securely within the nostril. The spring 15 may be made of round wire or a relatively wide, thin strip, and more than one spring may be provided in a body B'. Also, the material of which the bodies B' are made may be selected so that the outer portions 12' will have sufficient resilient strength to hold the plugs in the nostrils, without the necessity of embedding springs therein. It will be evident, of course, that the springs may be placed in other positions and have other shapes.

It will be evident, of course, that various changes may be made in the attachment of this invention. As will be noted, in the embodiment of Figs. 1 to 3, a valve is provided in the body fitting into each nostril, while in the embodiment of Figs. 4 and 5, and Figs. 6-8, a single valve is utilized. It will be understood, of course, that the wall or partition 22 of Fig. 5 or 30 of Fig. 7 may be provided with more than one valve. Also, different types of valves may be used in the various embodiments, since a tubular flap valve may be provided at the opening 26 of Fig. 5 or the opening 36 of Fig. 7, while the outer end of each body B of Fig. 3 may be provided with a flap valve, such as shown in Figs. 5 and 7, or a cage valve, such as shown in Figs. 9 and 10. When metal springs are utilized, they are preferably embedded in the rubber or other material of which substantially the remainder of the attachment is made, to prevent direct metal contact with the skin of the user. However, in some instances such contact may be unobjectionable, in which case the springs may be only partly embedded in, or otherwise attached to, the remainder of the attachment, as by riveting or the like. Non-metallic spring material also may be utilized, it being understood, of course, that ordinarily metal spring material has considerably greater torsional strength and resistance to bending and twisting, than plastic. Furthermore, any of the embodiments may be formed integrally but of composite material, to provide the different properties desired in each portion of the attachment. Thus, that portion which clips over either the septum or the ala or wing of the nose, may be made of plastic or similar material having sufficient spring qualities to hold the attachment to the nose, while the remainder of the attachment, except for the valves, may be made of relatively soft rubber, synthetic rubber or plastic, adapted to accommodate slight variations in nasal structure. The valves, of course, when tubular or flap valves, are preferably made of relatively highly resilient material, such as natural rubber or equivalent synthetic rubber, which can be stretched or distended with little difficulty, to permit easy exhalation, yet will spring back quickly to prevent the accidental inhalation or splashing of water into the nostrils. Retention of such elastic qualities during a relatively long life is, of course, highly desirable for the valve material. The entire attachment, except for metal springs where used, may be made of a relatively highly resilient rubber, with certain portions having a thicker section where maximum resiliency is not desired.

The attachments of this invention may be made in a number of different ways. Perhaps the simplest way to make the attachment of Figs. 1 to 3 is in a single molding operation, it being noted that when a bow on the spring provides a projection, the projecting end of the spring may be held securely in the mold, while the rubber is being vulcanized or plastic molded therearound. The embodiment of Figs. 4 and 5, and also of Figs. 6-8, may be made in two operations, the first being the molding of the attachment except for the valve, and the second being the attachment of the valve flap to the front wall. As indicated previously, when the cage of a cage valve is made of metal, the cage may have legs embedded in the metal, and when the cage is made of the same material as the front wall, the cage may be molded integrally therewith. The plug or body of Figs. 11 and 12 may be conveniently formed in a single molding operation. It will be evident, of course, that different portions of the various attachments may be made of different materials, and in such instances more than one operation may be desirable for making the same.

From the foregoing, it will be evident that the breathing attachment for swimmers of this invention fulfills to a marked degree the requirements and objects hereinbefore set forth. Through the provision of a wall having an opening and valve means controlling the flow of fluid through the opening, so that the outflow of fluid from the nose is permitted but the inflow of fluid is prevented, inhalation through the mouth and exhalation through the nose, as in certain swimming strokes, is clearly permitted. Also, since the attachment permits inhalation through the mouth and exhalation through the nose, it may be worn during training and will assist in the training of a swimmer in such strokes, as well as encouraging the proper breathing operations. As will further be evident, the attachment may be placed on the nose and taken off with relative ease, since there is no necessity for tying bands or straps around the head, which tend to slip off during use. In distinction thereto, it is a relatively simple matter merely to slip the attachment of this invention into or over the nose, or to remove the same. Because of the material of which the attachment is preferably made, and also because the attachment tends to fit the nose and/or nostrils, it may be worn with a relative minimum of discomfort.

It will further be evident that additional variations and embodiments of this invention may exist, without departing from the spirit and scope thereof.

What is claimed is:

1. A breathing attachment for swimmers, comprising the combination of a wall having an opening, said wall being shaped to fit against a portion of the nose of a user and when so fitted preventing the flow of fluid into or out of each nostril of such nose except through said opening; and valve means including a flat strip extending over said opening to permit flow of fluid from said nose but to prevent flow of fluid into said nose.
2. A breathing attachment for swimmers, comprising the combination of a wall having an opening, said wall being shaped to fit against a portion of the nose of a user and when so fitted preventing the flow of fluid into or out of each nostril of such nose except through said opening; valve means associated with said opening to permit flow of fluid from said nose but to prevent flow of fluid into said nose; and resilient means for clamping the ala cartilage at each side of the nose of a user.
3. A breathing attachment for swimmers, as defined in claim 2, wherein said wall encloses the top and side surfaces at the lower end of the nose of a user.
4. A breathing attachment for swimmers, as defined in claim 2, wherein at least a portion of said wall extends across the front of the lower end of the nose of a user and is spaced from the septum, said opening being in such portion of said wall.
5. A breathing attachment for swimmers, comprising a pair of bodies formed of resilient, rubber-like material and each having a generally cylindrical outer portion constructed and arranged to fit within a nostril of a user, each said body having an inner portion connected at its rear end with said outer portion and extending outwardly within said outer portion, said inner portion being formed as a flattened tube adapted to provide a valve for discharge of air from the nostril but prevent flow of fluid into the nostril; a strip connecting the outer portions of said bodies, said strip extending across the end of the

septum of a user with said bodies in the nostrils; and a spring embedded in said strip and in said outer portions of said bodies, said spring being U-shaped so as to clamp the septum of a user and thereby maintain said attachment in position.

6. A breathing attachment for swimmers, as defined in claim 5, wherein said spring extends outwardly from said strip and is covered with said material, to form a projection adapted to be grasped by the user in placing and removing said attachment.

7. A breathing attachment for swimmers, comprising a wall formed of rubber-like material and having an opening, said wall being shaped to fit the end of the nose of a user and having an extension engaging the outer surface of the lower end of the nose and the outer surface of each wing and also extending into engagement with the upper lip of said user, said wall having an inner extension adapted to engage the inside surface of the wing of each nostril, said opening being in the central portion of said wall, said wall when so fitted preventing the flow of fluid into or out of such nose except through said opening; a pair of U-shaped springs, each having one leg embedded in an inner extension of said wall and the other leg embedded in the adjacent portion of the outer extension of said wall, each spring thereby clamping a wing of said nose; and a flap valve strip extending across said opening to permit flow of fluid from said nose but to prevent flow of fluid into said nose.

8. A breathing attachment for swimmers, comprising an outer wall having an arcuate front, a relatively flat top and bottom and a pair of rearwardly extending, generally cylindrical legs, each leg being constructed and arranged to fit within a nostril of a user; a bridge connecting said legs on the inside and extending around the septum of said nose in spaced relation to said arcuate front of said outer wall, said arcuate front having an opening, and said outer wall and bridge being formed of resilient, rubber-like material; valve means associated with said opening to permit discharge of air from the nostril but prevent flow of fluid into the nostril; and a U-shaped spring at least partially embedded in the inner portion of each leg and said bridge for clamping said attachment to said septum.

9. A breathing attachment for swimmers, as defined in claim 8, wherein said spring is embedded in said legs and bridge so that rubber-like material contacts said septum.

10. A breathing attachment for swimmers, comprising the combination of a wall shaped to fit against a portion of the nose of a user and when so fitted preventing the flow of fluid into each nostril of such nose; valve means associated with said wall to permit flow of fluid from said nose; and resilient means for clamping at least one cartilage of the nose of a user, to hold said attachment to the nose of such user.

11. A breathing attachment for swimmers, as defined in claim 10, wherein said wall extends into each nostril of a user; and including a valve for the portion of said wall extending into each nostril.

12. A breathing attachment for swimmers, as defined in claim 10, wherein an outer portion of such wall is spaced from the septum of the nose of a user, said outer portion having an opening with which said valve is associated.

13. A breathing attachment for swimmers, as defined in claim 10, wherein said resilient means includes a spring.

14. A breathing attachment for swimmers, comprising the combination of a wall having an opening, said wall being shaped to fit against a portion of the nose of a user and when so fitted preventing the flow of fluid into or out of each nostril of such nose except through said opening; means including at least one spring for clamping said wall to at least one cartilage of said nose; and valve means associated with said opening to permit flow of fluid from said nose but to prevent flow of fluid into said nose, said valve means including a cage having apertures, and a disc in said cage and adapted to cover said opening in said wall.

15. A breathing attachment for swimmers, comprising a body formed generally of resilient, rubber-like material and being shaped to conform to a portion of the nose of a user and to contact the surface of said nose at least adjacent the discharge end of each nostril and hav-

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ing sufficient extent to prevent the flow of fluid through the nostril openings; valve means associated with said body to permit flow of fluid from said nostrils, but prevent flow of fluid into said nostrils; and means including at least one spring for clamping said body to at least one cartilage of said nose.

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8

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