



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.09.2001 Bulletin 2001/39

(51) Int Cl.7: **B63C 11/18**

(21) Application number: **01106529.9**

(22) Date of filing: **15.03.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR
 Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
 • **Viale, Mario**
16043 Chiavari, Genova (IT)
 • **Garofalo, Giovanni**
16035 Rapallo, Genova (IT)

(30) Priority: **24.03.2000 IT GE000047**

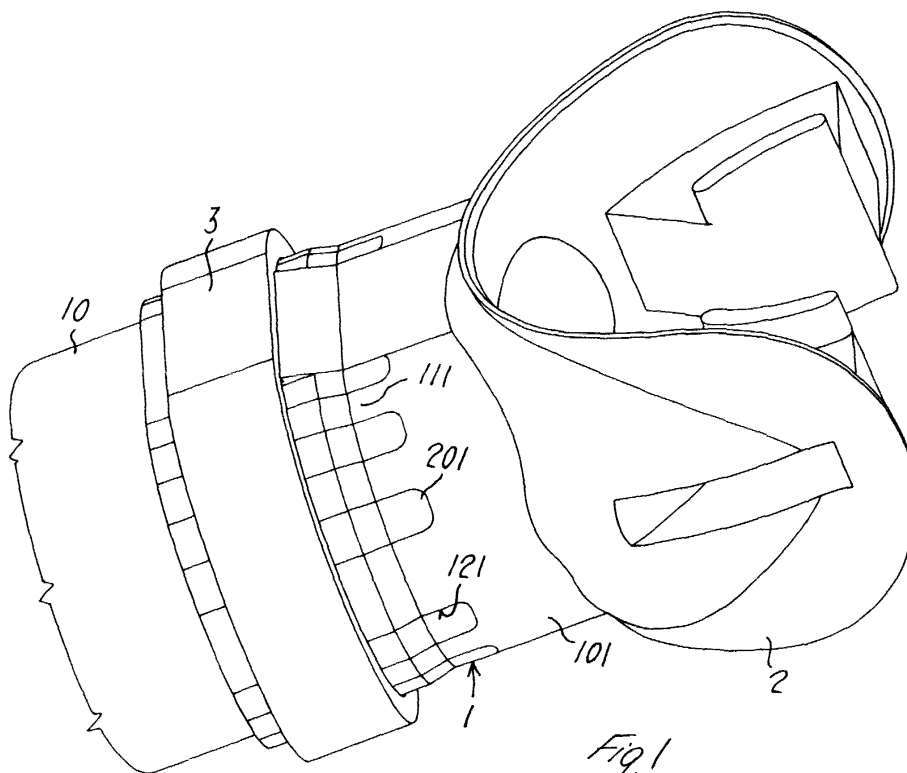
(74) Representative: **Porsia, Attilio, Dr.**
c/o Succ. Ing. Fischetti & Weber
Via Caffaro 3/2
16124 Genova (IT)

(71) Applicant: **HTM SPORT S.p.A.**
16035 Rapallo (Genova) (IT)

(54) **Mouthpiece for regulator**

(57) Mouthpiece for the regulator of an underwater breathing apparatus, comprising a tubular pipe (1; 4), for attachment at one end to the supply line (10) of the regulator by suitable clamping means (3), and having at the other end means (2) for insertion into the mouth,

these being made integrally with the said tubular pipe (1; 4) of elastomeric material, the mouthpiece being characterized in that attached to the said pipe is a stiffener (101; 104) providing stiffening along the axial direction of the said pipe (1; 4).



Description

[0001] The present invention relates to a mouthpiece for the regulator of an underwater breathing apparatus.

[0002] In currently sold underwater breathing apparatus, especially two-stage breathing apparatus, the regulator second stage is provided with a mouthpiece made of rubber, or other elastomeric material, formed by a tubular element that ends at one end in means for insertion into the mouth. This tubular element is fitted onto the supply line and fixed to it by suitable clamping means, such as a hoop or suchlike means.

[0003] The problem with this kind of mouthpiece is that as a rule the weight of the second stage of the apparatus, i.e. the regulator, can tend to deform it, making it uncomfortable for the diver to hold in the mouth. Given that the time spent under water is usually relatively long, the diver's teeth and lower jaw come under considerable stress.

[0004] It is therefore an object of the present invention to provide a mouthpiece for the regulator of an underwater breathing apparatus that is better suited and better able to respond adequately to the requirement of the distribution of loads in the gripped region of the mouthpiece, the purpose being to minimize the effort required of the user.

[0005] The subject of the present invention is therefore a mouthpiece for the regulator of an underwater breathing apparatus, comprising a tubular pipe, for attachment at one end to the supply line of the regulator, and having at the other end means for insertion into the mouth, these being made integrally with the said pipe of elastomeric material, the mouthpiece being characterized in that attached to the said pipe is a stiffener providing stiffening along the axial direction of the said pipe.

[0006] The said stiffener is preferably elastically compliant along its radial components; in particular it has at least one at least partial discontinuity along a direction parallel to the axis of the said pipe.

[0007] The said stiffener may comprise one or more elements of relatively stiffer material located on the outer lateral wall of the said pipe, or embedded in it; the stiffener and the tubular pipe preferably being connected to each other by overmoulding the relatively softer material onto the relatively stiffer material.

[0008] Other advantages and characteristics of the device according to the present invention will become clear in the course of the following detailed description of a number of embodiments thereof. The description, which is given by way of non-restrictive example, refers to the attached drawings, in which:

Figure 1 is a perspective view of a first embodiment of the mouthpiece according to the present invention;

Figure 2 is an exploded perspective view of the mouthpiece of Figure 1;

Figure 3 is a longitudinal section through a second

embodiment of the mouthpiece according to the present invention; and

Figure 4 is a perspective view of the stiffener of the mouthpiece of Figure 3.

[0009] Figure 1 shows a first embodiment of the mouthpiece according to the present invention; the number 1 denotes the tubular pipe made of elastomeric material connected to the supply line 10 of a regulator (not shown in the figure) by the clamping means represented by the ring 3. On the tubular pipe 1 is the sleeve 101 of relatively stiffer material, which in the portion nearest the line 10 of the regulator has the cutouts 121 that separate the fingers 111 from each other; it is in these cutouts that the elements 201 of the pipe 1 are positioned. On the opposite end of the pipe 1 from that connected to the line 10 are the means 2 held in the mouth. These are formed integrally with the pipe 1.

[0010] In Figure 2 the mouthpiece of Figure 1 is illustrated in an exploded drawing. This view shows more clearly that the elements 201 actually project from the wall of the pipe 1 and fit into the cutouts 121 formed in the sleeve 101. Also visible is the flange 131, which was not shown in Figure 1, running around the perimeter of the sleeve.

[0011] Figure 3 illustrates a second embodiment of the mouthpiece of the invention, with identical parts being given the same numbers. The tubular pipe 4 of elastomeric material contains internally the stiffener, which consists of a tubular element 104 (depicted in perspective in Figure 4) which has the longitudinal cutouts 114 and 124. Near the outlet edge of the pipe 4, the latter has an annular relief 134 against which the outlet flange of the supply line 10 of the regulator abuts.

[0012] The operation and construction of the mouthpiece according to the present invention will become clearer below. Referring to the illustrations of Figures 1 and 2, the sleeve 101 is made in such a way as to give the mouthpiece greater stiffness along its axial component, thus saving the diver from having to make unnecessary efforts to grip the regulator between his or her lips. At the same time the sleeve 101 must allow the pipe 1 to be clamped efficiently to the line 10 of the regulator; it is for this purpose that the longitudinal cutouts 121 are formed in the portion of the sleeve nearest the line 10 so as to give the sleeve a certain degree of elastic deformability in its radial components.

[0013] The pipe and the sleeve 101 are assembled by overmoulding the two materials; in practice, after the sleeve 101 has been produced, it is inserted in the mould of the pipe 1, and the latter is then moulded to the sleeve 101. When inserted into the cutouts 121 of the sleeve, the elements 201 not only give elasticity but also ensure the structural cohesion between the two components of the mouthpiece according to the invention.

[0014] In addition, the connection between the pipe and the means for insertion into the mouth on the one

hand, and the sleeve on the other, is made still more complete by the flange projecting radially from the end of the sleeve 101 nearest the means 2 for insertion into the mouth, this flange being designed to be embedded in these means at the production stage.

[0015] In the embodiment illustrated in Figure 3, the stiffener represented by the tubular element 104 exhibits its greater simplicity of construction, which simplifies the production of the mouthpiece according to the invention. This tubular element can be completely embedded in the pipe 4 of elastomeric material, or can project inside or outside of the thickness thereof.

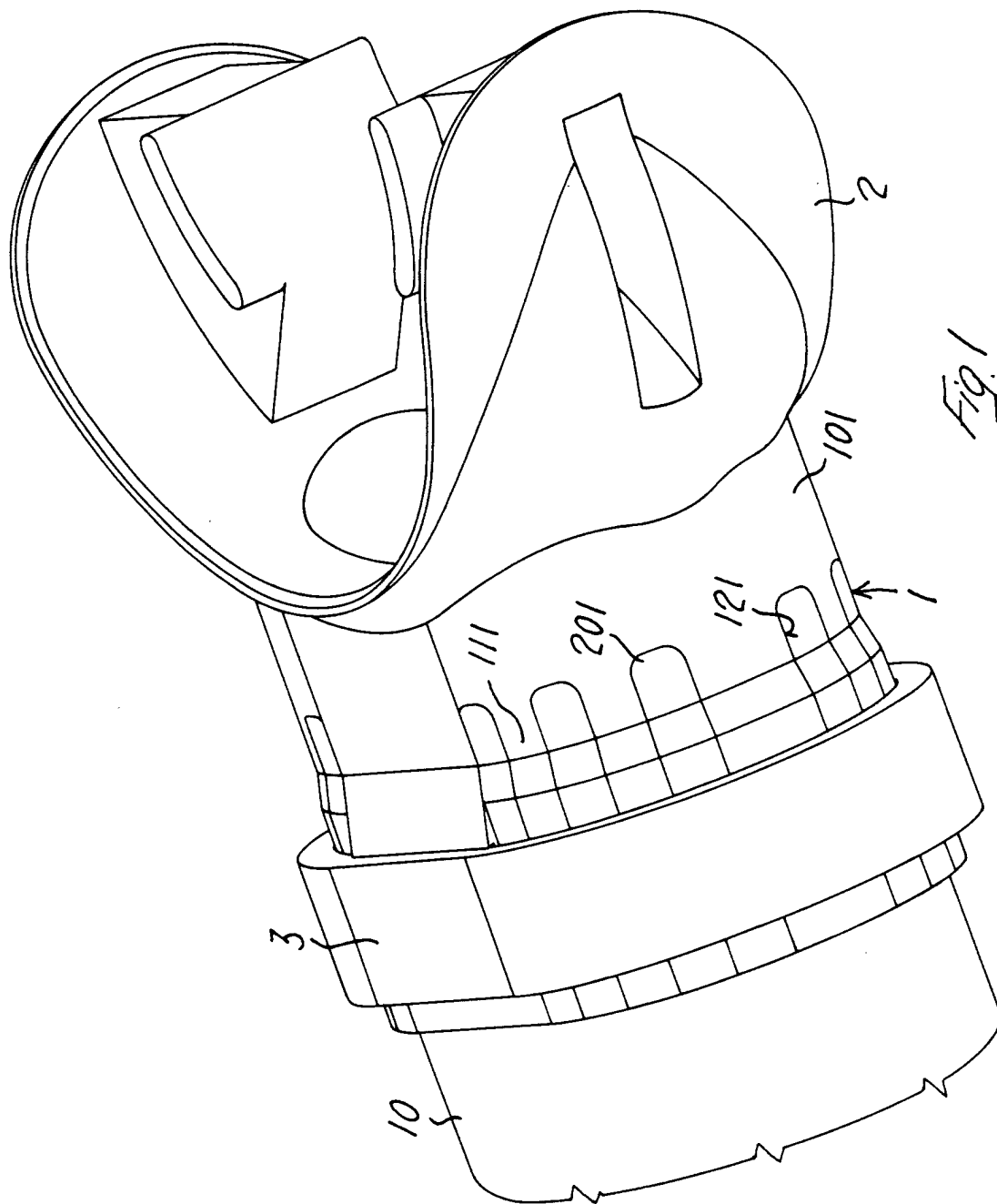
[0016] The mouthpiece set forth herein adopts a simpler structure and in so doing efficiently solves the problem of the loads which the user has to put up with in gripping the mouthpiece. Also, the mouthpiece according to the invention is more resistant to external stresses and better designed for clamping on the supply line of the regulator.

there are formed, alternating with each other, a series of cutouts (114, 124) both in the portion nearest the line (10) of the regulator and in the portion nearest the means for insertion into the mouth.

7. Mouthpiece according to any of Claims 1 to 6, in which the said pipe (1; 4) and the said stiffener (101; 104) are joined together by moulding the pipe (1; 4) of relatively softer material onto the said stiffener (101; 104) of relatively stiffer material.
8. Mouthpiece according to Claim 7, in which the said stiffener (104) can be completely embedded in the pipe (4) of elastomeric material, or can project inside or outside of the thickness thereof.

Claims

1. Mouthpiece for the regulator of an underwater breathing apparatus, comprising a tubular pipe (1; 4), for attachment at one end to the supply line (10) of the regulator by suitable clamping means (3), and having at the other end means (2) for insertion into the mouth, these being made integrally with the said tubular pipe (1; 4) of elastomeric material, the mouthpiece being **characterized in that** attached to the said pipe is a stiffener (101; 104) providing stiffening along the axial direction of the said pipe (1; 4).
2. Mouthpiece according to Claim 1, in which the said stiffener (101; 104) is elastically compliant along its radial components.
3. Mouthpiece according to Claim 2, in which the said stiffener (101; 104) has at least one at least partial discontinuity (121; 114, 124) along a the direction parallel to the axis of the said pipe (1; 4).
4. Mouthpiece according to Claim 3, in which the said stiffener (101) comprises one or more elements of relatively stiffer material located on the outer lateral wall of the said pipe (1).
5. Mouthpiece according to Claim 4, in which the said stiffener comprises a sleeve (101) of relatively stiffer material, which in the portion nearest the line (10) of the regulator has a plurality of axial cutouts (121) that separate a plurality of fingers (111) from each other.
6. Mouthpiece according to Claim 3, in which the said stiffener comprises a tubular element (104) in which



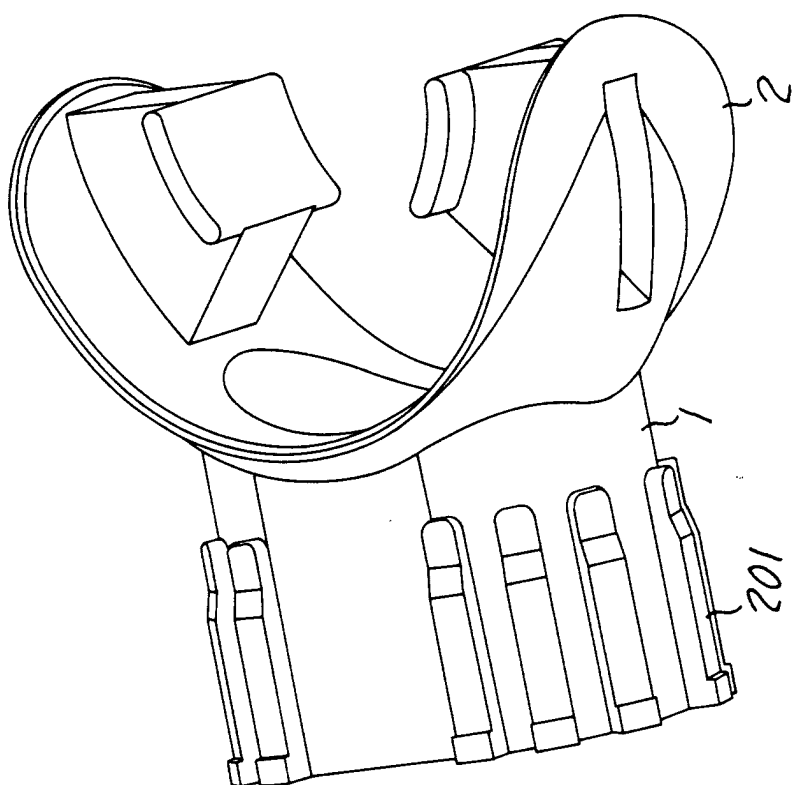


Fig. 2

