An endoscopic mouth guard (5) comprises a smoothly contoured, waisted tube (7), merging into a peripheral flange (9) at the front end of said tube, a manifold (12) integral with the front face of said flange defining a closed ended, transverse distributor duct (13) and two open ended, upwardly directed, branch ducts (14) ending, in use, closely below the nostrils of a patient fitted with the guard, two further, open ended, branch ducts (15) extending rearwardly from said distributor duct into the bore of said tube, and a laterally and rearwardly directed tapered spigot (17) on said manifold, defining an extension of said distributor duct, adapted to enter the bore of a gas supply tube. The finished guard is a single article of plastics material having a smooth hard surface.
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TECHNICAL FIELD

This invention relates to medical appliances, which are either used to keep a patient's mouth open for lengthy periods during some medical or surgical procedure, or, if used for some other purpose during such a procedure, necessarily have that effect. More particularly the invention relates to such appliances of an annular or tubular nature, intended to permit the patient to breathe through the mouth while fitted with the appliance.

BACKGROUND ART

One oral medical appliance which is typical of the kind to which the invention relates is the endoscopic mouth guard. This is essentially a short, rigid tube with somewhat flared or flanged ends, which is placed between the patient's lips and front teeth during gastroscopy to provide a safe and unobstructed passage for the endoscope. One such guard, characterised by its soft outer surface, is described and illustrated in U.S. Patent 4,640,273 to F.R. Greene et al.

Another typical appliance of the kind in question is the so-called Guedel airway, which is used during recovery from anaesthesia, and comprises a curved tube adapted to be inserted partly into the mouth, through which the patient may breathe, and which is shaped to prevent the patient's tongue from falling into and blocking his or her windpipe.
It has been known for some time that patients who undergo endoscopic or other procedures requiring sedation frequently undergo hypoxia, that is to say an undesirable fall in the oxygen saturation level of the blood. The level of hypoxia may be minor and, although undesirable, deemed to be tolerable. On the other hand it may be quite profound. Indeed, in elderly patients or those with compromised circulatory or pulmonary systems, the hypoxia induced by sedation and the physical presence in the windpipe of an endoscope can precipitate cardiac or respiratory arrest. Likewise the blood oxygen level may fall unduly during recovery from anaesthesia.

Thus, even though oral medical appliances of the kind in question are normally annular or tubular so that the patient may breathe through the open mouth, there is sometimes a need to administer oxygen to a patient fitted with such an appliance.

Presently used apparatus for supplying oxygen to a patient to lift the blood oxygen level comprise face masks, which cover the mouth and nose, and nasal prongs. The use of a mask is often quite impracticable when, for example during gastroscopy, the procedure requiring use of the appliance also requires unhindered access to the oral cavity. Furthermore, most conscious patients, even if sedated, find nasal prongs uncomfortable or otherwise objectionable and their use sometimes causes internal bruising or abrasion.

Therefore, conventional means for administering oxygen to a patient fitted with an oral appliance are often unsatisfactory or inconvenient.
DISCLOSURE OF INVENTION

An object of the present invention is to overcome the above indicated disabilities of the prior art by very simple means.

The invention achieves that object by the provision in an oral appliance of the kind in question of unobtrusive duct means for directing at least one supplementary stream of gas into the patient's airway. In use, that gas is usually oxygen, but of course may be an oxygen rich, breathable gas mixture if need be. The supplementary stream may be directed by the appliance into the mouth or into or towards the nostrils, but, for preference there are a plurality of streams respectively directed into the mouth and towards both nostrils simultaneously.

Therefore, the invention consists in an oral medical appliance of the kind comprising an annular or tubular body adapted to be inserted into a patient's mouth and which then defines a passage extending through the appliance into the patient's oral cavity, characterised by supplementary gas delivery means integral with said appliance and comprising an inlet port adapted for connection to a gas supply tube, at least one outlet opening positioned such that, in use, gas issuing from that outlet opening is entrained with the air inhaled by the patient, and a duct system connecting said inlet port to said outlet opening or each of them.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a front elevation of an endoscopic mouth guard according to one embodiment of the invention. This view is an "exploded" view in that the guard's two
components, namely its annular body and inlet port structure respectively, are separated.

Figure 2 is a similarly "exploded" plan view of the guard of figure 1, showing some hidden detail in broken line.

Figure 3 is a side elevation of the guard of figure 1 with its inlet port structure omitted.

Figure 4 is a sectional view taken on line 4-4 of figure 1.

**BEST MODE OF CARRYING OUT THE INVENTION**

As indicated above, the illustrated mouth guard comprises two components, an annular body 5 and an inlet port structure 6. Both components are preferably plastics mouldings. They may be of a highly polished durable material able to be heat sterilised a number of times, in which instance the appliance is intended for repeated use, or they may of a less expensive material and finish, in the instance of a disposable appliance intended to be used once only and then discarded.

The body 5 has rounded contours with no sharp edges. It comprises a short, rigid tube 7 which is waisted at 8 and merges at its outer end into a flared flange 9. It terminates at its inner end in a peripheral bead 10. It is of a size such that it may be inserted comfortably between the teeth of an adult patient with the flange 9 contacting and overlying the external lip area of the patient concerned, and the lips themselves making comfortable, more or less sealing, contact with the waisted portion of the tube 7. The guard as a whole may be secured in that position by a pliable, resilient, for example, elastomeric, band (not shown) extending from
affixure eyes 11 around the back of the head of the patient.

Insofar as described above the guard's main body 5 is substantially conventional, but in accordance with the invention it incorporates supplementary gas delivery means comprising, in this instance, the inlet port structure 6 and a manifold structure 12 integral with the outer face of the flange 9 and the inner surface of the tube 7.

That manifold structure 12 defines a transverse distributor duct 13, two open ended upright branch ducts 14 extending from the distributor duct 13, and two horizontal branch ducts 15 also extending from the distributor duct 13. In use, the upright branch ducts 14 end close below and in substantial alignment with the nostrils of the patient, so that gas fed to them from the distributor duct 13 and issuing from them as the patient inhales is substantially entrained with any air breathed in through the nose. The rearwardly directed, horizontal branch ducts 15 end within the endoscope access passage defined by the tube 7, and thus any gas issuing from them will be entrained with any air breathed in through the mouth.

The inlet port structure 6 is essentially tubular and comprises a first tapered spigot 16 adapted to enter a correspondingly tapered mouth of the distributor duct 13 and a second tapered spigot 17 adapted to enter the bore of a conventional plastics oxygen supply tube. The taper and size of the spigot 17 is such that such a supply tube is frictionally retained on the spigot for leak-free communication therewith.

It will be seen that the spigots 16 and 17 meet at an included angle of about 150°. This enables the supply
tube to extend away from the guard across and close to the patient's cheek so as not to interfere with the activities of the endoscopist.

The illustrated guard comprises two components purely for manufacturing convenience, as it would be difficult to mould the appliance in one piece. In the finished guard the inlet port structure 6 is permanently fixed to the main body 5 by virtue of the spigot 16 of the port structure 6 being welded or adhered permanently in the tapered mouth of duct 13.

In other embodiments of the invention the inlet port may be adapted for connection to the gas supply tube by means other than a tapered spigot. For example, it may be an enlarged end portion of the distributor duct functioning as a socket into which the end of the tube may be thrust.

The body of the illustrated embodiment is that of an endoscopic mouth guard but in other embodiments it may be that of a Guedel airway. As is well known such an airway comprises a short, straight, tubular mouthpiece with a front end peripheral flange and a long, rearwardly directed, arcuate, tubular tail adapted to overlie the patient's tongue and reaching to the top of the throat. Both the mouthpiece tube and the tail may be somewhat flattened and made of a softly resilient plastics material. In accordance with the invention such an appliance may have a manifold defining a distributor duct and two open ended branch ducts directed towards the patient's nostrils and one or more further open ended branch ducts extending through the front flange into the bore of the tail tube, in substantial accordance with the corresponding duct system of the illustrated mouthguard.
CLAIMS

1. An oral medical appliance of the kind comprising an annular or tubular body (5) adapted to be inserted into a patient's mouth and which then defines a passage extending through the appliance into the patient's oral cavity, characterised by supplementary gas delivery means integral with said appliance and comprising, an inlet port (6) adapted for connection to a gas supply tube, at least one outlet opening positioned such that, in use, gas issuing from that outlet opening is entrained with the air inhaled by the patient, and a duct system (12,13,14,15) connecting said inlet port to said outlet opening or each of them.

2. An appliance according to claim 1, further characterised in that there are a plurality of said outlet openings, at least one of which is within said passage and two of which are respectively closely below or within the patient's nostrils.

3. An appliance according to either claim 1 or claim 2 wherein said body has a front peripheral flange (9) adapted to overlie the patient's lips, further characterised in that said duct system is defined in part by a manifold (12) integral with the front face of that flange.

4. An appliance according to either claim 1 or claim 2 further characterised in that said inlet port comprises a tapered spigot (17) adapted to enter the bore of a gas supply tube.

5. An appliance according to claim 4 wherein said spigot is directed laterally and rearwardly relative to the appliance as a whole.
6. An endoscopic mouth guard (5) comprising a waisted tube (7), a peripheral flange (9) at the front end of said tube, a manifold (12) integral with the front face of said flange defining a closed ended, transverse distributor duct (13) and two open ended, upwardly directed, branch ducts (14) ending, in use, closely below the nostrils of a patient fitted with the guard, at least one further, open ended, branch duct (15) extending rearwardly from said transverse duct into the bore of said tube, and means to connect a gas supply tube (6) to said distributor duct.

7. An endoscopic mouth guard according to claim 6 wherein said means to connect a gas supply tube comprise a tapered spigot (17) extension of said distributor duct adapted to enter the bore of the gas supply tube.

8. An appliance according to any one of claims 1 to 5 wherein said body is a Guedel airway.
I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl. 5 A61M 16/04, 16/06, A61B 1/24

II. FIELDS SEARCHED

Minimum Documentation Searched 7

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Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched 8

AU: IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

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<td>Y</td>
<td>GB,A, 2173105 (NEIL CHRISTOPHER BARNES) 8 October 1986 (08.10.86) See page 1 lines 58-91</td>
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* Special categories of cited documents: 10

"T" Later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"A" Document defining the general state of the art which is not considered to be of particular relevance

"E" Earlier document but published on or after the international filing date

"L" Document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" Document referring to an oral disclosure, use, exhibition or other means

"P" Document published prior to the international filing date but later than the priority date claimed

"X" Document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" Document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"*" Document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search 20 February 1991 (20.02.91)

International Searching Authority Australian Patent Office

Date of Mailing of this International Search Report 27 February 1991

Signature of Authorized Officer

A. HENDRICKSON
V. [ ] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE 1

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2. [ ] Claim numbers ..., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. [ ] Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a):

VI. [X] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING 2

This International Searching Authority found multiple inventions in this international application as follows:

- Claim 1 is directed to an oral medical device with an outlet and a supplementary gas delivery system. Claim 6 is directed to an endoscopic mouth guard with a branched duct system for supplying additional gas to the nostrils, and a transverse duct in the bore of the waisted tube for supplying gas to the mouth.
- Specifications DE 3543951 and DE 3719009 clearly show that the common concept between claims 1 and 6 (the use of a supplementary gas stream directed to the nostrils) lacks novelty.
- Therefore, there is lack of unity a posteriori.

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. [X] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest
[ ] The additional search fees were accompanied by applicant's protest.
[ ] No protest accompanied the payment of additional search fees.
This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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