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— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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(54) **Title**: DENTAL ISOLATION BLOCK

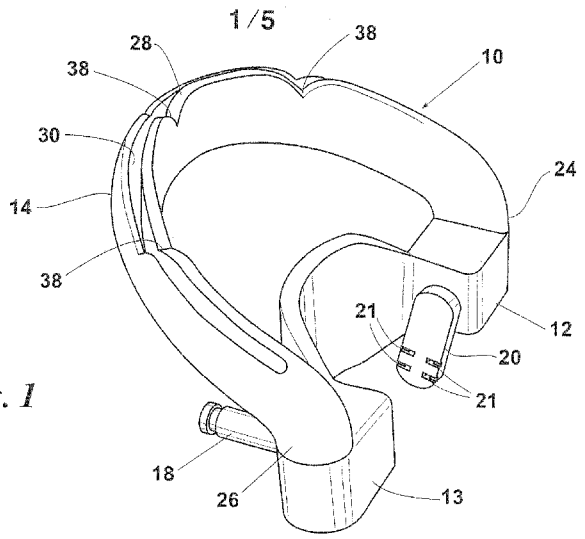

Fig. 1

(57) **Abstract**: A dental isolation block adapted for maintaining the mouth of the dental patient open, white keeping the work field dry and exposed with the lip retracted and the tongue suppressed to facilitate performance of a dental procedure by a dental practitioner. The dental isolation block includes a first and second bite platform capable of being disposed between the maxillary arch and mandibular arch, a lip retractor with a first end adjacent the first bite platform and a second end adjacent the second bite platform, and a tongue shield extending between the first and second bite platform. The lip retractor may include a channel for receiving and directing saliva to a suction drain and suction holes all in fluid communication with a dental office suction system. A suction extension may be affixed to the first and/or second bite platform to further evacuate saliva from entering the work field.

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DENTAL ISOLATION BLOCK

FIELD OF THE INVENTION

The present invention relates, generally, to bite block structures for dental procedures. More particularly, the present invention relates to bite block structures for holding the dental patient's mouth open such that the work field is exposed for the dental procedure.

DESCRIPTION OF THE BACKGROUND ART

When a dental professional performs a dental procedure on a dental patient it is often necessary for the patient's mouth to be held open for access by the dental practitioner to the work field. For simple procedures, it may suffice for the patient to hold his or her mouth open. However, for more complex procedures, such as for the installation of implants or orthodontic devices, especially for children, it is not practical for the patient to hold his or her mouth open. For such dental procedures, the use of a dental bite block is frequently necessary in order to hold open the mouth of a patient.

Dental bite block devices are known in the art and include clamps, rubber dams or rolled pieces of rubber inserted between the upper and lower teeth. The problems encountered with such known devices are that they often fail to properly expose the work field or are very uncomfortable to the dental patient.

In addition, it is often necessary for the lip of the patient to be retracted away from the work field. This is particularly the case with the installation of orthodontic brackets on the teeth of a dental patient. In such instances, the help of a dental assistant is often required to retract the patient's lip(s) thereby requiring additional time, reducing efficiency, and introducing another set of hands into the work field which could also further reduce exposure.

It is also known that a dental patient's tongue may extend into the work field and thereby interfere with the dental procedure. The tongue may reduce the available work space and visibility in the work field and potentially introduce unwanted moisture. It is known that it is a common reflex when a dental patient's teeth are separated during a dental procedure for the tongue to extend into the work field particularly during swallowing. A need therefore exists for a bite block structure which provides exposure to a work field by holding the dental patient's mouth open

while also simultaneously retracting the patient's lip and suppressing the tongue of the patient.

It is additionally known by those skilled in the art that many dental procedures require a dry work field in order to achieve a successful result. It is known that a large percentage of dental procedures fail, especially where chemical bonding is required, due to the presence of moisture in the work field. During a typical dental procedure, the oral cavity produces saliva which is known to commonly migrate into the work field and interfere with the bonding process. Other types of debris, such as water or blood are also known to migrate into the work field. As a result, an additional need exists in the art for a bite block device which provides the ability to evacuate such saliva and debris from the work field in order to reduce the possibility of failure of the dental procedure.

SUMMARY OF THE INVENTION

The product of the present disclosed invention is a dental isolation bite block that can be attached to the suction hand piece to help maintain a dry work field during dental procedures. The device has a portion of the block that extends into the vestibule to help retract the lip and keep the teeth dry. It can be used on the maxillary or mandibular arches. In one embodiment is an autoclavable version that is reusable and composed of rubber. A second embodiment includes a disposable version that is composed of a light weight plastic. Three (or more) sizes for different size arches are contemplated

The dental isolation block of the present disclosure is designed to be bit between the upper and lower teeth of a dental patient during a dental procedure. The dental isolation block includes, generally at least one bite platform, a lip retractor extending from the bite platform for retracting the lip of the dental patient and thereby exposing the work field to the dental practitioner, and a tongue shield for suppressing the tongue of the dental patient from entering the work field. The lip retractor preferably includes at least one suction hole in fluid communication with a standard dental office suction system known in the art for evacuating saliva and other debris.

More particularly, the dental isolation block includes a first and second bite platform capable of being clenched between the maxillary (upper) and mandibular (lower) arches. The lip retractor includes a first end, adjacent the first bite platform

and a second end adjacent the second bite platform. The lip retractor is preferably arcuate in geometry with a top edge including a channel therein for collecting saliva and other debris and directing it to a plurality of suction drains which are in fluid communication, via a series of internal passageways in the lip retractor to the first bite platform. The bottom edge of the lip retractor includes a plurality of suction holes to additionally evacuate saliva away from the work field. The first bite platform includes a suction attachment in fluid communication with the suction drains and suction holes. A suction extension may be attached to the first and/or second bite platform to evacuate saliva and other debris from the sublingual region. The suction extension(s) are in fluid communication with the dental office suction system. The dental isolation block thereby evacuates saliva where released in the mouth.

The lip retractor extends above and in front of the bite platforms and arcuates such that in operation, the lip retractor functions to retract the lip away from the work field. The dental isolation block may be positioned in the patient's mouth such that the lip retractor retracts the upper lip such as when the work field involves the maxillary (upper) arch or may be positioned in the patient's mouth such that the lip retractor retracts the lower lip such as when the work field involves the mandibular (lower) arch.

The lip retractor may also include indentations therein to accommodate the anatomy of the human mouth. Such indentations are positioned on the upper edge of the lip retractor so as to mate and accommodate the tissue connecting the lip to the gums.

A tongue shield extends between the first bite platform and the second bite platform. The tongue shield is shaped to comfortably suppress the tongue of the dental patient from extending into the work field during the dental procedure.

The dental isolation block of the present disclosure thereby maintains the work field dry and exposed to the dental practitioner. As a result, the need for assistance in maintaining the work field exposed and dry is thereby dramatically reduced thereby reducing time, effort and increasing efficiency. Moreover, the dental isolation block substantially reduces the failure rate of dental procedures that require dry conditions for success.

The present disclosure also includes a method of use of the disclosed dental isolation bite block to perform a dental procedure. The method includes the following steps:

a. Attaching an aspiration hose of the low volume dental suction system to the suction attachment;

b. placing the dental isolation block in the mouth of a dental patient such that the first and second bite platforms are disposed between the upper and lower arches;

c. directing the dental patient to bite on the first and second bite platforms;

d. positioning the lip retractor so as to retract the lip of the patent away from the work field;

e. activating a vacuum source of the dental office suction system so as to extract saliva and debris away from the work field;

f. performing a dental procedure on the dental patient in the work field.

A better understanding of the present invention, its several aspects, and its advantages will become apparent to those skilled in the art from the following detailed description, wherein there is described the preferred embodiment of the invention, simply by way of illustration of the best mode contemplated for carrying out the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the dental isolation block of the present disclosure.

FIG. 2 is an alternate isometric view of the dental isolation block of the present disclosure.

FIG. 3 is a front view of the dental isolation block of the present disclosure depicting certain of the suction passageways in phantom.

FIG. 4 is a plan view of the dental isolation block of the present disclosure depicting certain of the suction passageways in phantom.

FIG. 5 is a partial cut away view of the dental isolation block of the present disclosure taken along line 5-5 of FIG. 3 depicting certain of the suction passageways in phantom.

FIG. 6 is a side view taken along line 6-6 of FIG.3 of the dental isolation block of the present disclosure depicting certain of the suction passageways in phantom.

FIG. 7 is a back view of the dental isolation block of the present disclosure depicting certain of the suction passageways in phantom and an exemplary manner of installation of a suction extension onto the bite platform.

FIG. 8 depicts the dental isolation block of the present disclosure inserted in the mouth of a dental patient so as to expose the upper arch and retract the upper lip.

FIG. 9 depicts the dental isolation block of the present disclosure inserted in the mouth of a dental patient so as to expose the lower arch and retract the lower lip.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the figures, and particularly FIGs. 1 and 2, the dental isolation bite block of the present disclosure shall next be described. Dental isolation bite block **10** of the present disclosure includes, generally, first bite platform **12** and second bite platform **13** which are capable of being clenched between the maxillary (upper) and mandibular (lower) arches (**60** and **62** of FIGs. 8 and 9). In the preferred embodiment, dental isolation block **10** is molded from a suitable medical grade silicone rubber, such as Elastosil® R-401 available commercially from Wacker Chemie AG, however, other suitable materials and manufacturing methods are contemplated.

In the preferred embodiment, a lip retractor **14** including a first end **24** and a second end **26** is attached to first bite platform **12** and second bite platform **13**, respectively. In the preferred arrangement, first end **24** is adjacent and attached to first bite platform **12** and second end **26** is positioned adjacent to second bite platform **13**. A tongue shield **16** extends between first bite platform **12** and second bite platform **13** and is molded integrally therewith. First end **24** is in the preferred embodiment affixed to first bite platform **12** and second end **26** is affixed to second bite platform **13** using a multi-purpose sealant. It has been found that multi-purpose sealant 732 available from Dow Corning® is a suitable sealant for this purpose, however, it is understood that alternate sealants are available commercially and can be substituted.

Lip retractor **14** includes an arcuate geometry such that lip retractor **14** extends from bite platforms **12** and **13** at first end **24** and second end **26**, respectively, above

and in front of bite platforms **12** and **13**. Lip retractor **14** is arcuate so as to conform to the upper arch **60** and lower arch **62** (see FIGs. 8 and 9) and is capable of retracting either upper lip **64** (FIG. 8) or alternatively lower lip **66** (FIG. 9) as may be required for a particular dental procedure.

The top edge **28** of lip retractor **14** includes a channel **30** therein for collecting saliva and other debris during the dental procedure. Due to the geometry of lip retainer **14**, coupled with the dental office suction system, saliva and debris collected in channel **30** is directed toward second end **26** where channel **30** terminates. With particular reference to FIG. 4, a plan view of dental isolation block **10**, it can be seen that the saliva and debris is directed toward a suction drain **32** positioned within channel **30** adjacent second end **26** so as to evacuate the saliva and debris from the work field. Taking FIG. 4 in combination with FIGs. 3, 5, 6, and 7, it can be seen that suction drain **32** is in fluid communication, via interior passageway **34,** to a suction attachment **18** on second bite platform **13**. Suction attachment **18** extends from second bite platform **13** so as to receive an aspiration hose **36**. Aspiration hose **36** is not part of the present invention but is rather a standard part of a dental office suction system known and commonly employed in the dental industry. In the preferred embodiment, suction attachment **18** is in fluid communication with the low volume suction system of the dental office.

Referring to FIG. 3 taken in combination with FIG. 4, 5, 6, and 7, lip retractor **14** includes a plurality of suction holes **22** spaced around its arcuate length in order to additionally evacuate saliva away from the work field. Suction holes **22** are in fluid communication with channel **30**, suction drains **32**, fluid passageway **34**, and suction outlet **18**. In the preferred embodiment, a suction extension **20** may be attached to the second bite platform **13**. Suction extension **20** is in fluid communication with suction outlet **18** through passageway **33** extending through second bite block **13**. Suction extension **20** includes a plurality of holes **21** in order to evacuate sublingual saliva and debris. A second suction extension **20** may be inserted in first bite platform **12** and include holes **21** therein. The suction extension **20** inserted in first bite platform **12** is identical to suction extension **20** inserted in second bite platform **13** in the preferred embodiment. Suction extension **20** inserted in first bite platform **12** is in fluid communication with the suction system via passageway **35** which extends through

first bite platform **12** and into lip retractor **14** through first end **24**. FIG. 7 depicts the manner in which suction extensions **20** are secured to first bite platform **12** and second bite platform **13**. Suction extensions **20** are pivotal in relation to first bite platform **12** and second bite platform **13** respectively so as to facilitate the sublingual evacuation of saliva and debris as necessary to maintain a dry work field.

Lip retractor **14** further includes indentations **38** therein to accommodate the anatomy of the human mouth. Indentations **38** are positioned on the upper edge **28** of lip retractor **14** so as to mate and accommodate the frenula tissue connecting the human lip to the gums. FIG. 8 illustrates such labial frenulum tissue segments **40** in phantom for upper lip **64** while FIG. 9 illustrates lingual frenum tissue segments **42** for lower lip **66**. Indentations **38** provide additional comfort to lip retractor **14** and dental isolation bite block **10** of the present disclosure.

Tongue shield **16** extends between first bite platform **12** and second bite platform **13**. Tongue shield **16** includes a convex curve in the direction of lip retractor **14** so as to comfortably shield the tongue of the dental patient and suppress it from extending into the work field during the dental procedure.

Referring next to FIG. 8, a method of using the dental isolation block of the present disclosure shall be described:

A method of performing a dental procedure on a work field of dental patient having upper teeth (collectively **51**) and lower teeth (collectively **52**) using a dental isolation block having a first bite platform **12** and a second bite platform **13**, an arcuate lip retractor **14** extending between the first bite platform **12** and second bite platform **13** wherein lip retractor **14** includes a channel and a plurality of suction holes **22** in fluid communication with suction attachment **18** and in further fluid communication with a dental office suction system and a tongue shield **16** extending between the first bite platform **12** and the second bite platform **13**; said method comprising:

a.) attaching an aspiration hose **36** of the dental office suction system to the suction attachment **18**;

b.) placing dental isolation block **10** in the mouth **48** of a dental patient such that first bite platform **12** and second bite platform **13** are disposed between upper arch **60** and lower arch **62**;

c.) directing the dental patient to bite on the first bite platform **12** and second bite platform **13**;

d.) positioning lip retractor **14** so as to retract the lip (**64** or **66**) of the patient away from the work field **50**;

e.) activating the vacuum source of the dental office suction system so as to extract saliva and debris away from work field **50**;

f.) performing a dental procedure on the dental patient in work field **50**.

FIG. 8 depicts the dental isolation block **10** of the present disclosure positioned such that lip retractor **14** retracts upper lip **64**. In this orientation, dental isolation bite block **10** exposes and provides a dry work field **50** for upper maxillary arch **60**. FIG. 9 depicts the dental isolation bite block **10** of the present disclosure oriented so as to retract lower lip **66**. In this orientation, dental isolation block **10** of the present disclosure provides an exposed and dry work field **50** for lower mandibular arch **62**.

* * * *

Thus, the present invention is well adapted to carry out the objects and attain the ends and advantages mentioned above as well as those inherent therein. While presently preferred embodiments have been described for purposes of this disclosure, numerous changes and modifications will be apparent to those skilled in the art. Such changes and modifications are encompassed within the spirit of this invention as defined by the appended claims.

CLAIMS

WHAT IS CLAIMED IS:

1. A dental isolation block for use in combination with a dental office suction system, comprising:

at least one bite platform;

a lip retractor extending form said at least one bite platform for retracting the lip of a dental patient;

said lip retractor including at least one suction hole in fluid communication with the dental office suction system.

2. The dental isolation block of claim 1 wherein said lip retractor includes a plurality of suction holes each in fluid communication with the dental office suction system.

3. The dental isolation block of claim 1 wherein said dental office suction system includes an aspiration hose and the dental isolation block includes a dental office suction attachment in fluid communication with said at least one suction hole for receiving the aspiration hose.

4. The dental isolation block of claim 1 wherein said lip retractor is arcuate in geometry and includes a channel therein.

5. The dental isolation block of claim 4 wherein said channel includes at least one suction drain in fluid communication with the dental office suction system.

6. The dental isolation block of claim 1 further includes at least one suction extension attached to said at least one bite platform and in fluid communication with the dental office suction system.

7. The dental isolation block of claim 1 further including a tongue shield extending from said at least one bite platform.

8. The dental isolation block of claim 4 wherein said lip retractor includes at least one lip retractor to mate the frenula tissue connecting the upper lip to the gums.

9. A dental isolation block for use with a dental patient having upper and lower arches comprising:

a first and second bite platform capable of being disposed between the upper and lower arch;

a lip retractor having a first end adjacent said first bite platform and a second end adjacent said second bite platform;

a tongue shield extending between said first and second bite platform.

10. The dental isolation block of claim 9 for use with a dental office suction system wherein said lip retractor includes at least one suction hole in fluid communication with the dental office suction system.

11. The dental isolation block of claim 10 wherein said lip retractor includes a plurality of suction holes each in fluid communication with the dental office suction system.

12. The dental isolation dock of claim 10 wherein the dental office suction system includes an aspiration hose and the dental isolation block includes a suction attachment in fluid communication with said plurality of suction holes.

13. The dental isolation block of claim 9 wherein said lip retractor is arcuate in geometry and extends above and outward from said first and second bite platform.

14. The dental isolation block of claim 13 wherein said lip retractor includes a channel having at least one suction drain in fluid communication with the suction system.

15. The dental isolation block of claim 13 wherein said lip retractor includes at least one indentation positioned therein to mate the tissue connecting the lip to the gums.

16. The dental isolation block of claim 10 includes a suction extension attached to said first bite platform and in fluid communication with the dental office suction system.

17. The dental isolation block of claim 16 further including a second suction extension attached to said suction bite platform and in fluid communication with the dental office suction system.

18. A method of performing a dental procedure on a work field of dental patient having upper and lower teeth using a dental isolation block having a first and a second bite platform, an arcuate lip retractor extending between the first and second bite platform wherein the lip retractor includes a plurality of suction holes in fluid communication with a suction attachment in further fluid communication with a dental office suction system and a tongue shield extending between the first and second bite platform in said method comprising:

a.) attaching an aspiration hose of the dental office suction system to the suction attachment;

b.) placing said dental isolation block in the mouth of a dental patient such that the first and second bite platforms are disposed between the upper and lower arches;

c.) directing the dental patient to bite on the first and second bite platforms;

d.) positioning the lip retractor so as to retract the lip of the patient away from the work field;

e.) activating a vacuum source of the dental office suction system so as to extract saliva and debris away from the work field;

f.) performing a dental procedure on the dental patient in the work field.

19. The method of claim 18 wherein the work field is on the upper arch of the dental patient and lip retractor is positioned to retract the upper lip.

20. The method of claim 18 wherein the work field is on the lower arch of the dental patient and the lip retractor is positioned to retract the lower lip.

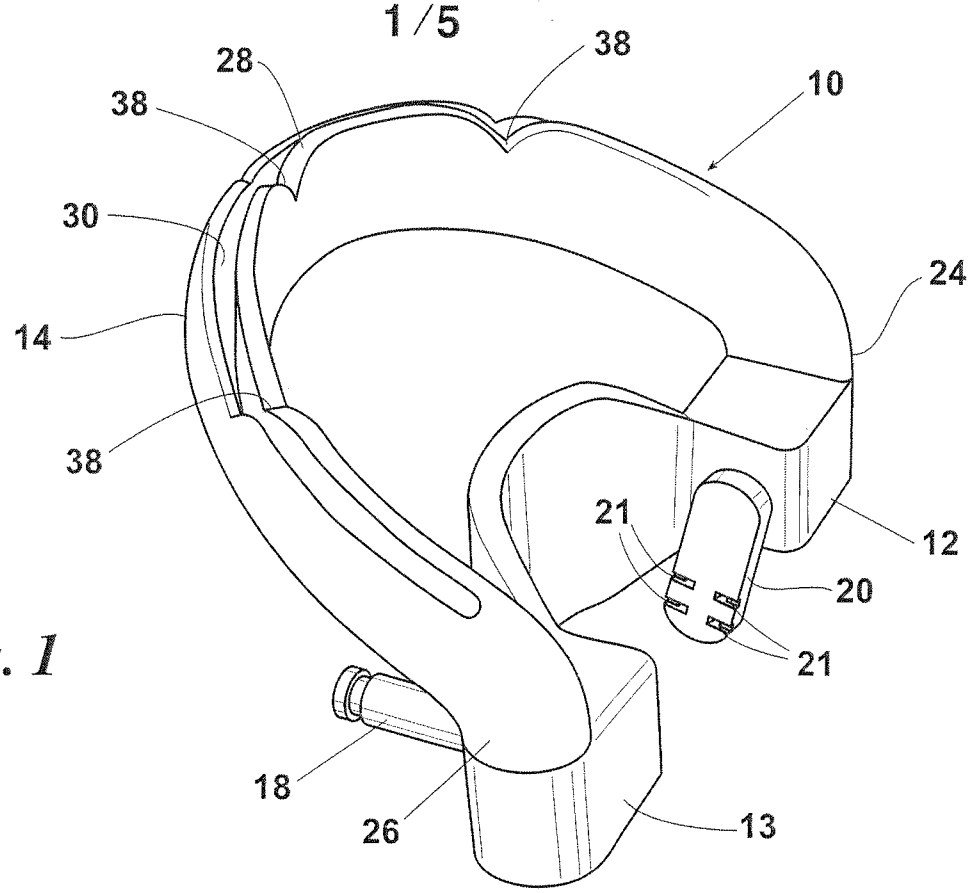
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Fig. 1

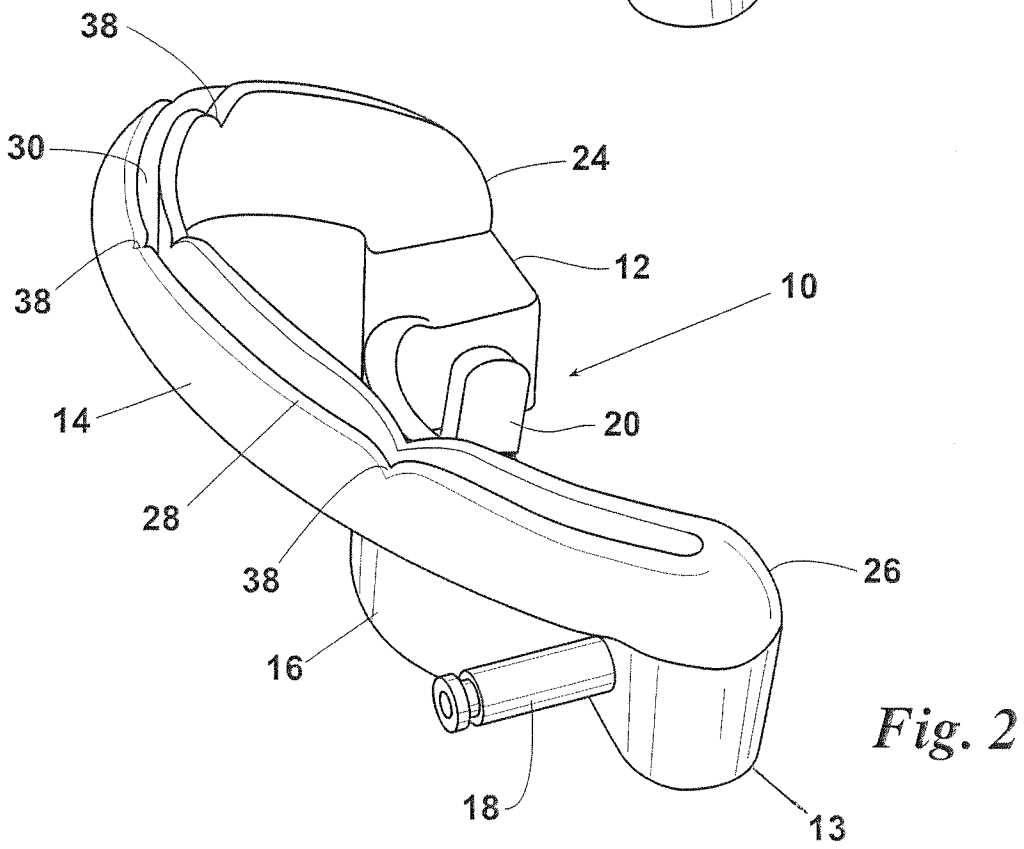
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Fig. 2

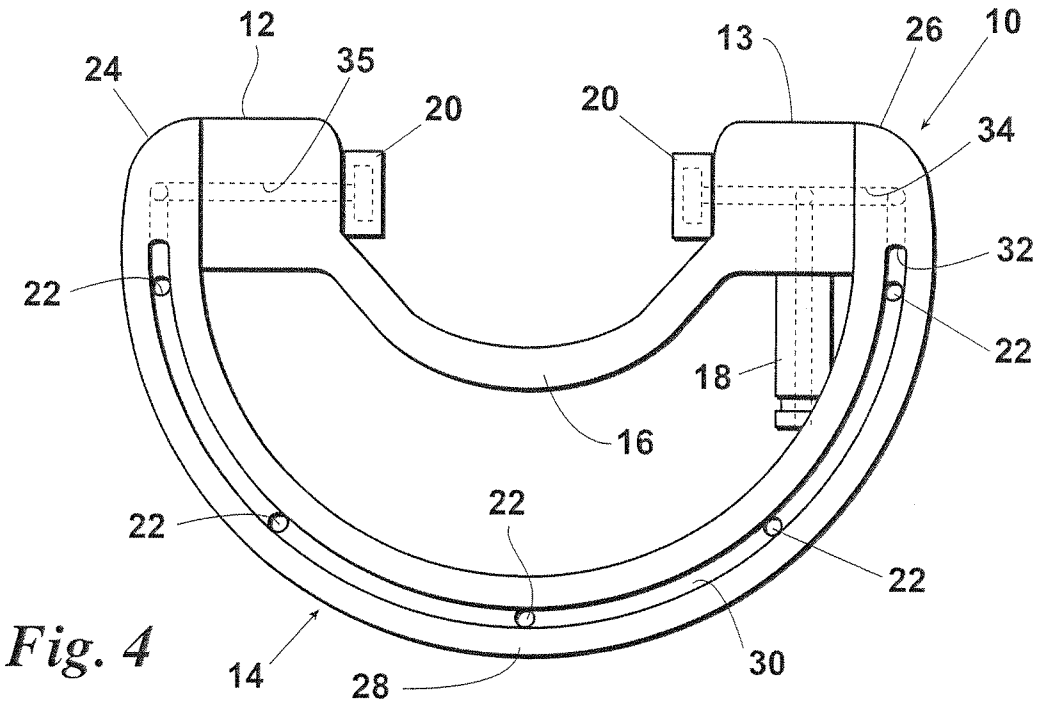
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Fig. 4

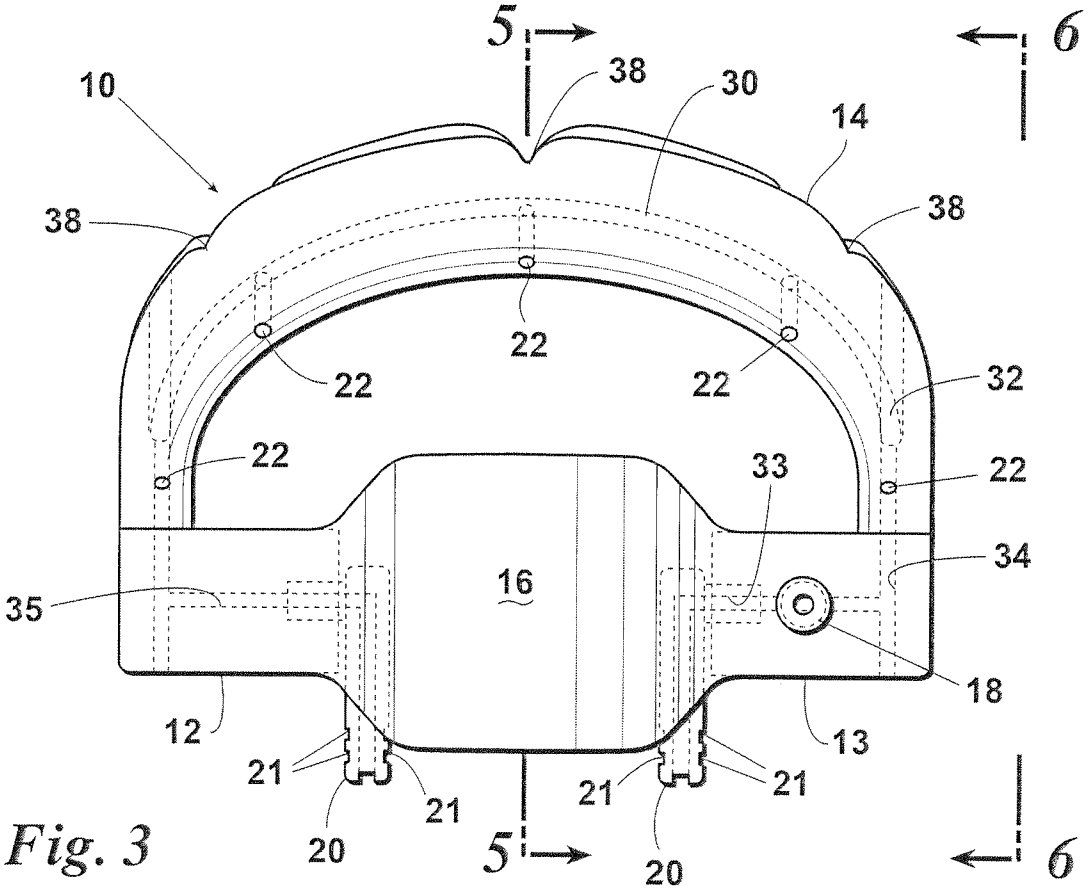
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Fig. 3

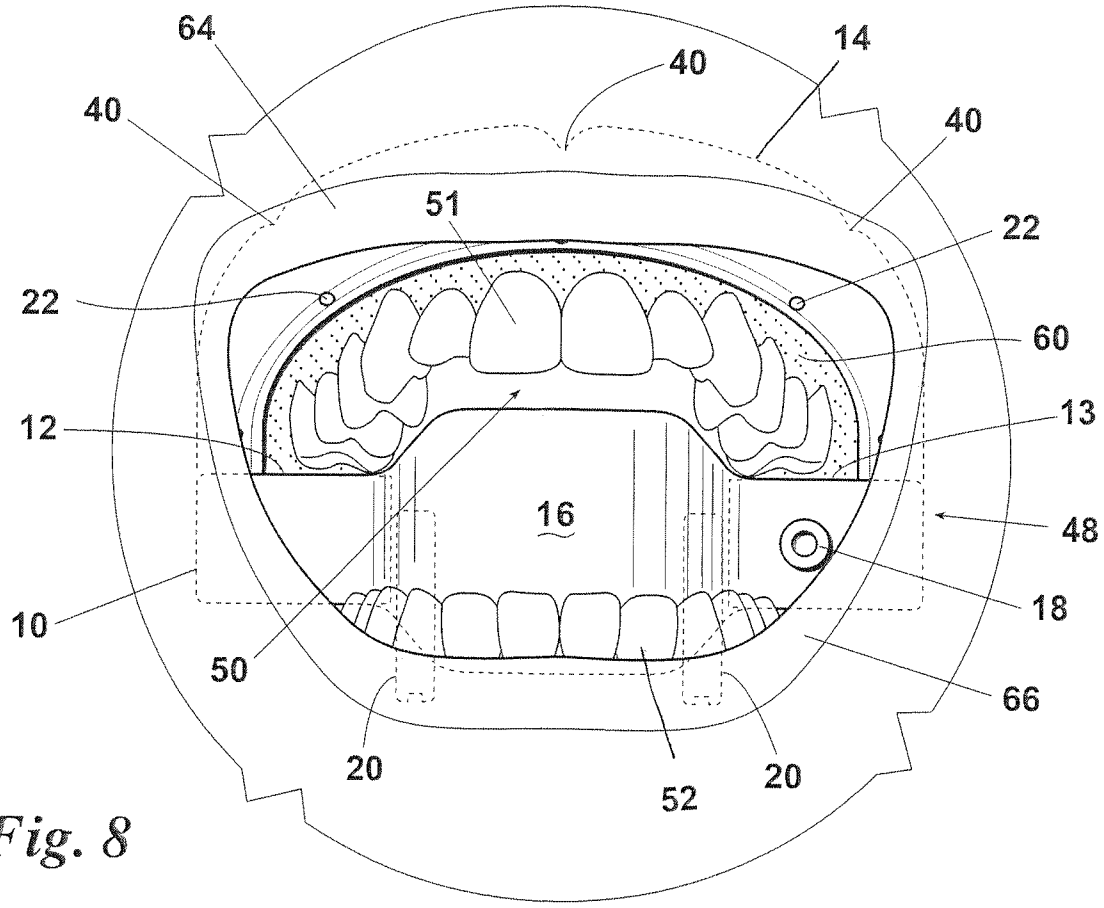
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Fig. 8

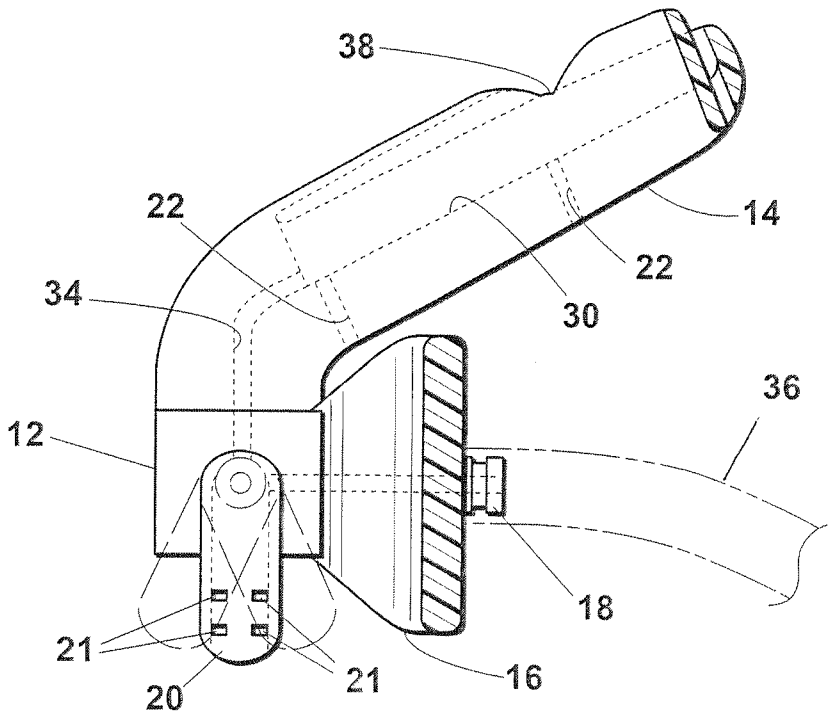
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Fig. 5

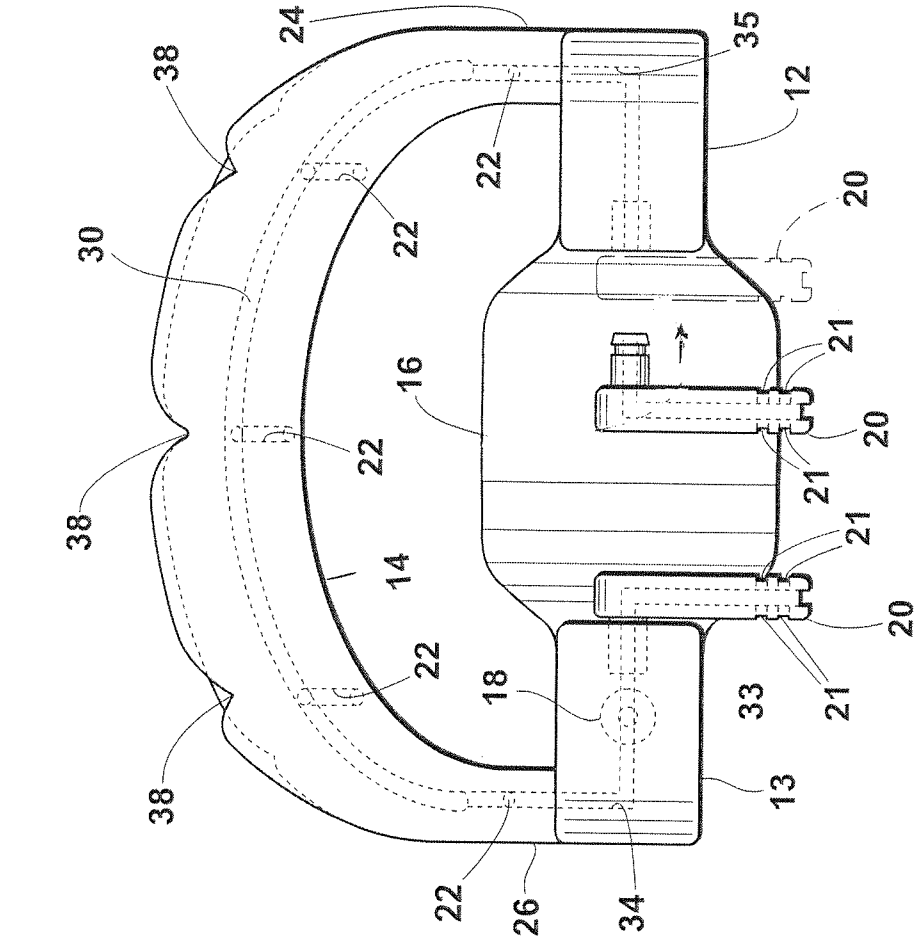
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Fig. 7

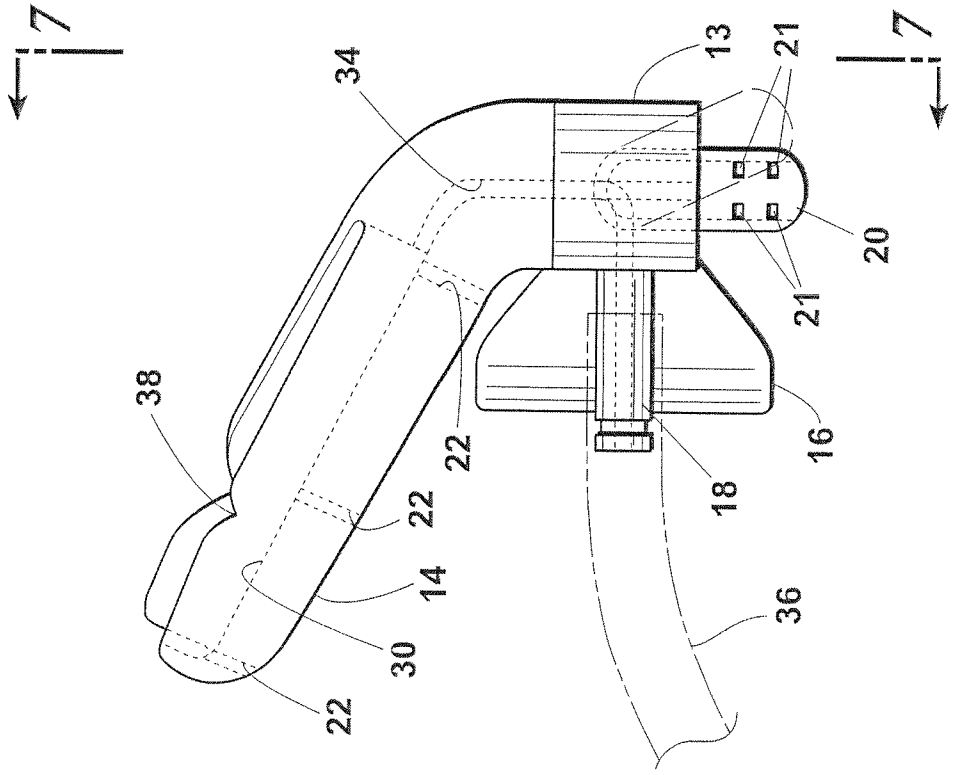
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Fig. 6

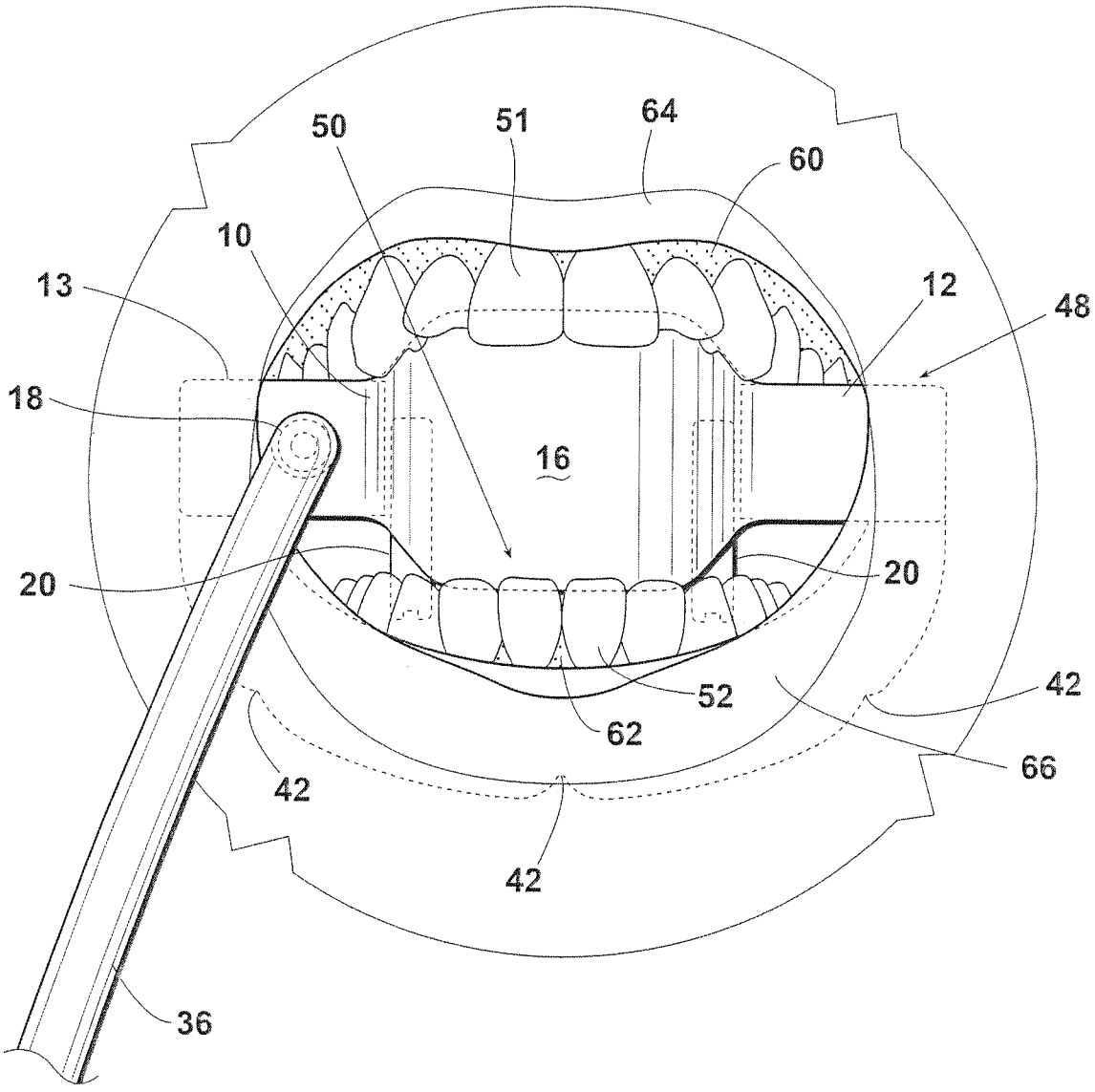

Fig. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/079854

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A61C 5/12 (2008.04)
USPC - 433/136
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A61C 5/12, 5/14 (2008.04)
USPC - 433/91, 92, 93, 94, 96, 136

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO EAST System (US, USPG-PUB, EPO, DERWENT)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,516,286 A (KUSHNER) 14 May 1996 (14.05.1996) entire document	1-20
Y	US 3,772,790 A (SWAN-GETT et al) 20 November 1973 (20.11.1973) entire document	1-20
Y	US 7,293,990 B2 (HIRSCH et al) 13 November 2007 (13.11.2007) entire document	6, 7
Y	US 2007/0015113 A1 (LAVI et al) 18 January 2007 (18.01.2007) entire document	8, 15

☐ Further documents are listed in the continuation of Box C. ☐

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Date of the actual completion of the international search	Date of mailing of the international search report
30 November 2008	12 DEC 2008
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