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(54) Title: PAEDIATRIC TRACHEAL RESERVOIR OXYGEN MASK

(57) Abstract: The invention relates to a paediatric tracheal reservoir oxygen mask, in which pressure injuries are prevented by means of a bandage net (1) which can grasp the head of the infant or child, and a restrictor (2) made of feathered jersey, which ensures that the mask remains fixed, and in which the reservoir (6) is prevented from bending and breaking.



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PAEDIATRIC TRACHEAL RESERVOIR OXYGEN MASK

5 **Technical Field Related to the Invention**

The invention relates to a tracheal reservoir oxygen mask for infant and child patients comprising a reservoir bag that does not break, bend or compress and does not cause pressure wounds after prolonged use.

10 **State of the Art**

Oxygen flow therapy is a medical treatment that provides supplementary oxygen to the body. This treatment is applied when the body cannot receive enough oxygen due to conditions such as respiratory failure or circulatory system problems. Oxygen therapy is usually used in cases where the patient has respiratory distress, lung
15 diseases, heart failure, anaemia, or carbon monoxide poisoning. Today, high oxygen flow is needed especially in COVID treatment or the treatment of certain respiratory system diseases.

Oxygen therapy is usually carried out by inhaling clean oxygen from an oxygen
20 source. This can be done through devices such as oxygen masks or nasal cannulae. Oxygen masks cover the patient's mouth and nose, allowing high concentrations of oxygen to be taken in. There are different types, and the design of the mask chosen can vary depending on the patient's needs and health status. Nasal cannulas are small tubes inserted through the nose. Oxygen is delivered to
25 the patient through these cannulas.

In addition, another frequently used device for oxygen flow therapy is the reservoir oxygen mask. A reservoir oxygen mask is a type of mask that allows oxygen to come from a reservoir. These masks are used to provide high concentrations of
30 oxygen. A reservoir on the face mask is filled with air containing carbon dioxide, which is released as the patient breathes. Thus, as the patient exhales, carbon dioxide is released to the outside, while high concentrations of oxygen enter inside.

The reservoir masks used today are designed as standard oxygen masks and are suitable for the treatment of patients in a sitting position. It consists of a face mask connected to a reservoir bag filled with a high concentration of oxygen. Non-return reservoir masks have a one-way valve that prevents inhalation of room air and allows breathing through the reservoir. The reservoir bag is connected to an oxygen tank. A thin rubber strap connects the face mask made of PVC to the patient. An apparatus provides the connection between the reservoir bag and the mask. This mask is also available in a small size and can be used for children and babies.

The strap used in the masks in the known state of the art poses difficulties in terms of fixing to the head of the infant and child patient. The strap used to provide the connection between the mask and the face is hard. The use of this strap is not suitable for active babies and children. If the strap is properly adjusted and tightened, it may cause pressure wounds in the baby; if left loose, effective oxygen therapy cannot be administered.

In addition, due to the lack of a wide apparatus between the reservoir used in the invention CN217366830U and the mask, the reservoir may be bent, broken, clamped or jammed. Accordingly, the inability to deliver oxygen to the patient may adversely affect the active treatment process. If the patient is in a sitting position, the continuity of oxygen therapy is ensured. However, if the patient is in the supine position, bending in the specified area may occur. Especially in a paediatric patient requiring intensive oxygen therapy protocol, if this situation is not recognised by the patient's relatives or caregivers, correct and adequate oxygen therapy may not be applied.

Due to the limitations and inadequacies of the solutions in the current technique, the inability to fix these masks on the head of the infant and child patient, the risk of pressure wounds, the inability to apply effective oxygen therapy if left loose, bending, breaking or jamming of the reservoir, it has become necessary to make a development in the field of tracheal reservoir oxygen mask.

Brief Description and Objectives of the Invention

The invention relates to a paediatric tracheal reservoir oxygen mask comprising a bandage net (1) grasping the head of the infant or child so that it fits perfectly on the face, a fastenable restrictor (2) made of a feathering jersey connecting the bandage net (1) to the face, a mask, an oxygen connection (4), a trachea (5) structure made of an accordion-like mount catheter and a reservoir (6) made of a material which is unbendable, unbreakable and non-compressible.

The invention relates to the field of health and is a type of mask having a reservoir (6) at the lower end. Oxygen passes through the reservoir (6) and reaches the mask. Between the mask and the reservoir (6), there is a trachea (5) which provides a two-way air passage. Thanks to the trachea (5), the oxygen stored in the reservoir (6) goes to the patient with inspiration (inhalation), and some of the air given in expiration (exhalation) comes out while the rest enters the reservoir (6). In the next inspiration, the air remaining from the previous expiration mixed with the oxygen in the reservoir (6) is taken. In this way, low-density oxygen is supplied at the high flow rate required by the patient. While adjusting the oxygen flow rate, it is recommended to pay attention that the bag is not collapsed (deflated).

One object of the invention is to provide a reservoir (6) system that can be implemented optimally. For this reason, a mount catheter resembling an accordion was placed in the connection area to prevent jamming, breakage or clamping in the specified connection area. By analogy with the human body, the reservoir (6) acts as a lung, while the inserted mount catheter acts as a trachea (5).

Another object of the invention is to obtain a mask more suitable for the face of infant and child patients. For this reason, in order for the mask to fit the face of infant or child patients perfectly and to prevent potential pressure wounds, a bandage net (1) that can grasp the patient's head and a non-elastic restrictor (2) that can connect this bandage net (1) to the face are used. Unlike the old product, it is made of a net (1) and a feathering jersey and is a product that can be easily adhered when overlapped.

In addition, the invention aims to improve the comfort of the patient to whom the mask is applied. For this reason, the parts of the restrictor (2) used in the mask that will touch the patient are made of cotton resistant to friction and heat and can absorb moisture such as water and body heat.

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Description of Figures

Figure 1. General structure of the mask

Reference Numbers

- | | |
|----|----------------------|
| 10 | 1. Bandage Net |
| | 2. Restrictor |
| | 3. Face mask |
| | 4. Oxygen connection |
| | 5. Trachea |
| 15 | 6. Reservoir |

Detailed Description of the Invention

The invention relates to a tracheal reservoir oxygen mask product suitable for oxygen therapy of infant and child patients.

A tracheal reservoir oxygen mask to be used in the oxygen therapy of infant and child patients, which can be easily fixed on the patient's head and has an unbreakable, non-bending and non-compressible reservoir (6) includes the following parts:

- a bandage net (1), which grips the head of the infant or child and to which the restrictor (2) can adhere so that the face mask (3) fits perfectly on the face,
- a restrictor (2), made of feathering jersey, connecting the bandage net (1) and the face mask (3), which can be adhered when overlapped with the

bandage net (1),

- a face mask (3) with a connection to the trachea (5) at the lower end,
 - oxygen connection (4),
 - a tubular trachea (5) made of an accordion-like mount catheter, providing
- 5 bidirectional air passage between the face mask (3) and the reservoir (6),
- a reservoir (6) which acts as a lung and is made of a rigid, unbreakable and non-compressible material.

The working method of the tracheal reservoir oxygen mask is as follows;

- oxygen passing through the reservoir (6) and reaching the face mask (3),
- 10 - passing the oxygen stored in the reservoir (6) to the patient with inspiration (inhalation) through the trachea (5), which provides two-way air passage between the face mask (3) and the reservoir (6),
- some of the exhaled air being released during expiration (exhalation) while the rest enters the reservoir (6),
- 15 - intake of the air remaining from the previous expiration mixed with the oxygen in the reservoir (6) in the next inspiration.

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CLAIMS

1. It is a trachea reservoir oxygen mask to be used in the oxygen therapy of infant and paediatric patients, which can be easily fixed on the patient's head and has an unbreakable, non-bending and non-compressible reservoir (6) characterised by the following steps:

- a bandage net (1), which grips the head of the infant or child and to which the restrictor (2) can adhere so that the face mask (3) fits perfectly on the face,
- a restrictor (2), made of feathering jersey, connecting the bandage net (1) and the face mask (3), which can be adhered when overlapped with the bandage net (1),
- a face mask (3) with a connection to the trachea (5) at the lower end,
- oxygen connection (4),
- a tubular trachea (5) made of an accordion-like mount catheter, providing bidirectional air passage between the face mask (3) and the reservoir (6),
- a reservoir (6) which acts as a lung and is made of a rigid, unbreakable and non-compressible material.

2. A method of operating a tracheal reservoir oxygen mask according to claim 1, characterised in that it comprises the following steps:

- oxygen passing through the reservoir (6) and reaching the face mask (3),
- passing the oxygen stored in the reservoir (6) to the patient with inspiration (inhalation) through the trachea (5), which provides two-way air passage between the face mask (3) and the reservoir (6),
- some of the exhaled air being released during expiration (exhalation) while the rest enters the reservoir (6),
- intake of the air remaining from the previous expiration mixed with the oxygen in the reservoir (6) in the next inspiration.

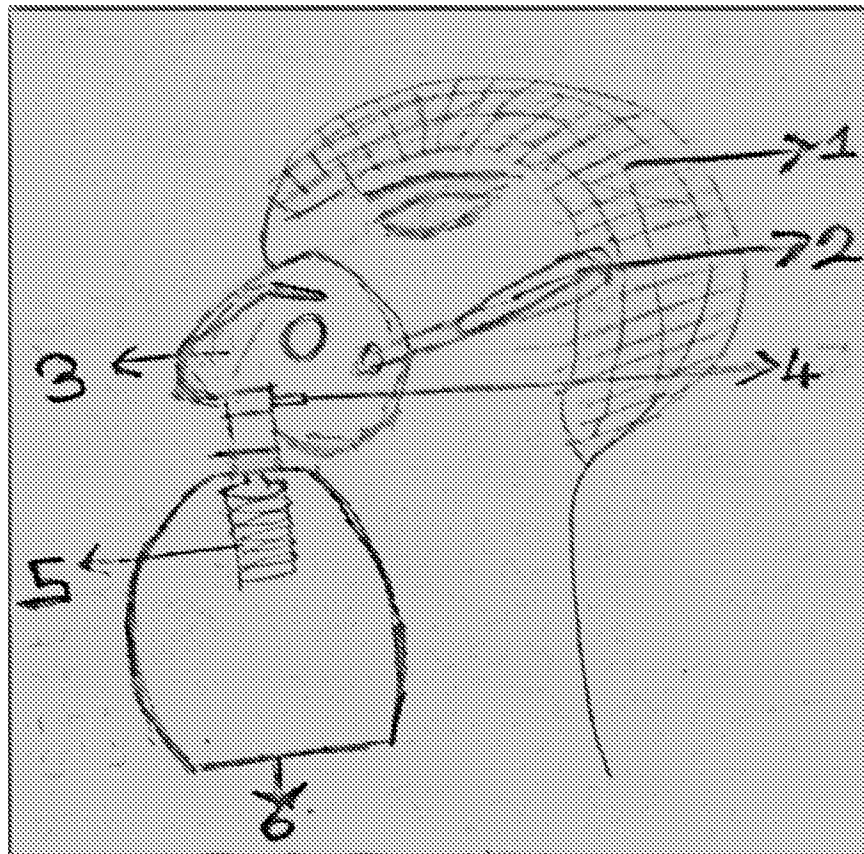


Figure 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2024/051778

A. CLASSIFICATION OF SUBJECT MATTER A61M 16/06 (2006.01)i 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) A61M Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Published patent and utility model applications of Turkey, 2005-2025 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Abs KIME Database; EPOUQE Abstract & Fulltext Database & Keywords: reservoir mask, non-rebreather mask, oxygen, bidirectional flow., elastic net bandage, tubular bandage net, bandage netting, retention net bandage, net bandage		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2006231091 A1 (CAMARILLO MELINDA [US]) 19 October 2006 (2006-10-19) Whole document	1, 2
Y	CN 113975577 A (LI YANG) 28 January 2022 (2022-01-28) Whole document	1, 2
Y	CN 204502019 U (FOURTH MILITARY MEDICAL UNIV) 29 July 2015 (2015-07-29) Whole document	1, 2
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: “A” document defining the general state of the art which is not considered to be of particular relevance “D” document cited by the applicant in the international application “E” earlier application or patent 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 “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 “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone “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		
Date of the actual completion of the international search 24 April 2025		Date of mailing of the international search report 25 April 2025
Name and mailing address of the ISA/TR Turkish Patent and Trademark Office (Turkpatent) Hipodrom Caddesi No. 13 06560 Yenimahalle Ankara Türkiye Telephone No. +903123031000 Facsimile No. +903123031220		Authorized officer Ahmet Burak EROĞLU Telephone No. +903123031743

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
US	2006231091	A1	19 October 2006	NONE	
CN	113975577	A	28 January 2022	CN 113975577	B 04 August 2023
CN	204502019	U	29 July 2015	NONE	