

[54] **TRACHEOTOMY MASK**
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[73] Assignee: **Sandoz-Wander, Inc.**, Hanover, N.J.
[22] Filed: **Apr. 11, 1973**
[21] Appl. No.: **349,978**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 289,823, Sept. 18, 1972, which is a continuation-in-part of Ser. No. 152,358, June 11, 1971, abandoned.
[52] U.S. Cl. **128/185, 128/141 R**
[51] Int. Cl. **A61m 15/00**
[58] Field of Search **128/185, 188, 145, 146, 128/351**

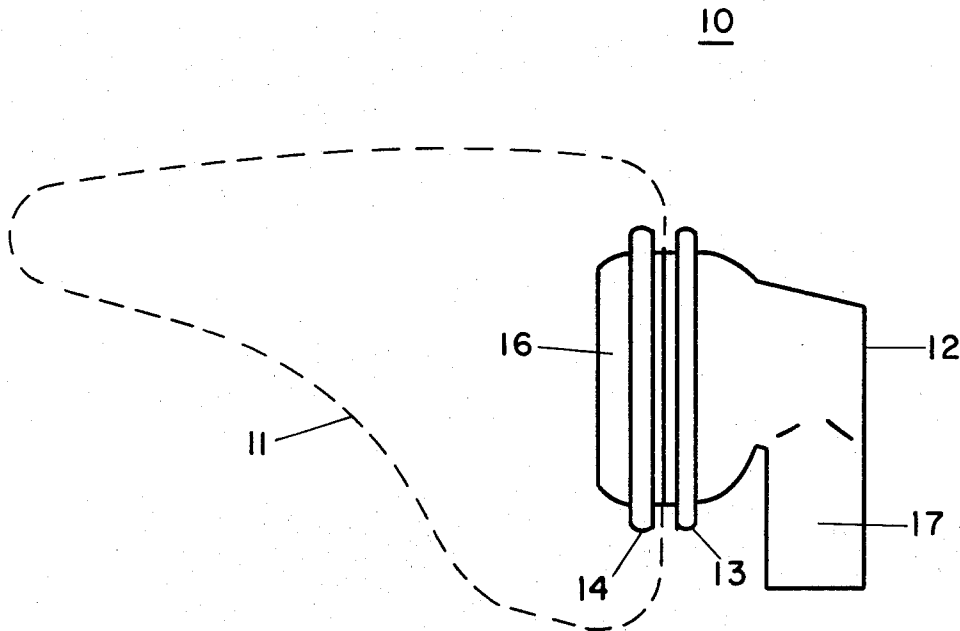
[56] **References Cited**

UNITED STATES PATENTS			
2,860,633	11/1958	Phillips	128/188
3,042,035	7/1962	Coanda	128/146
3,236,236	2/1966	Hudson	128/185

Primary Examiner—Lawrence W. Trapp
Attorney, Agent, or Firm—Gerald D. Sharkin; Robert S. Honor; Walter F. Jewell

[57] **ABSTRACT**
A tracheotomy mask having a tubing adapter with a ball joint socket, for improved rotatability of the adapter with respect to the mask.

27 Claims, 7 Drawing Figures



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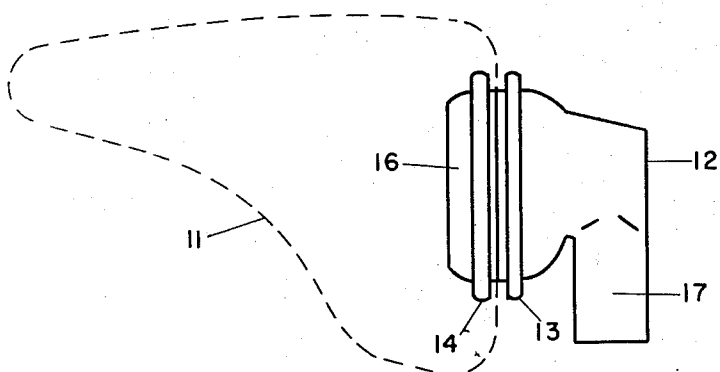


FIG. 1

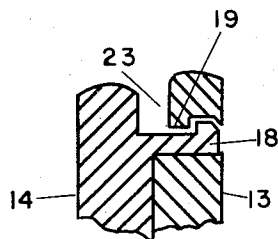


FIG. 3

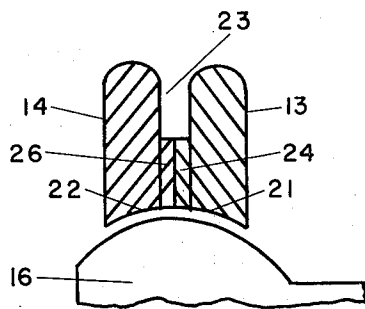


FIG. 4

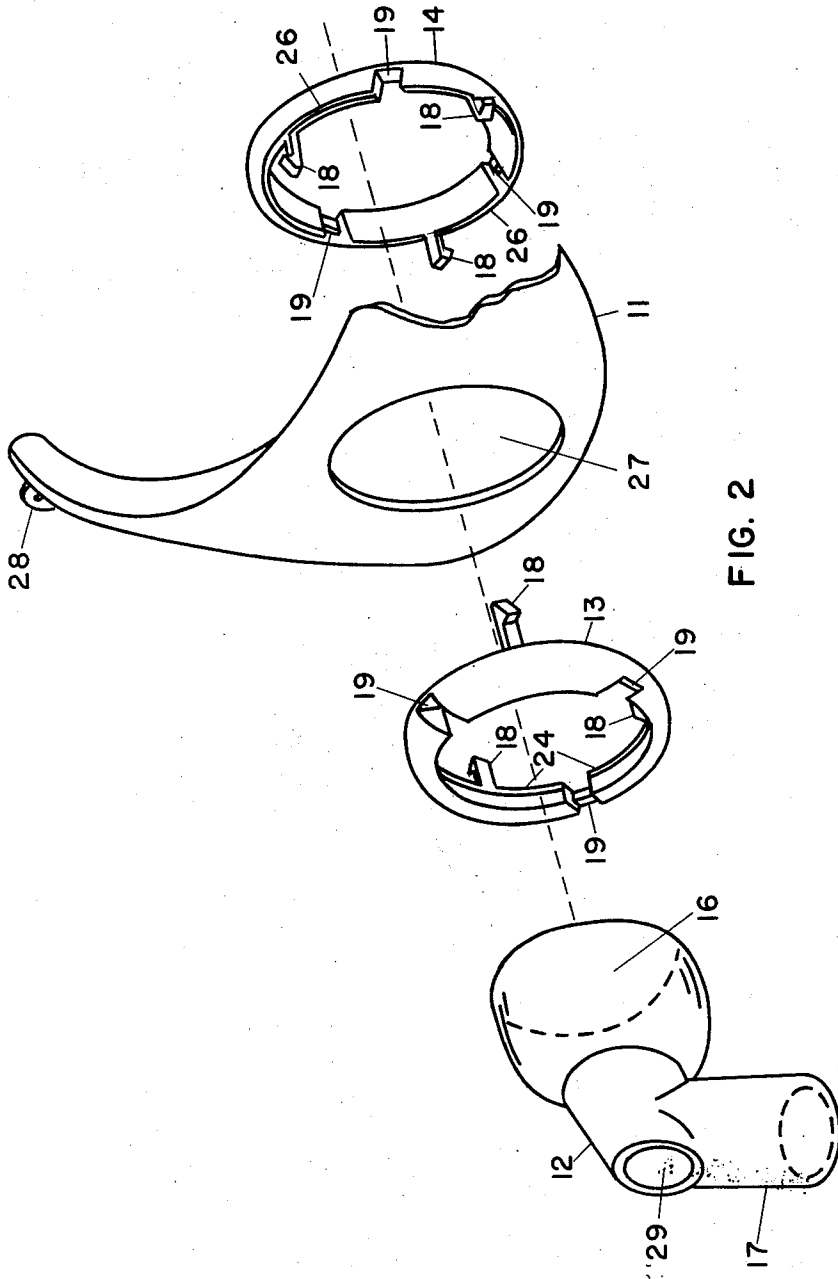


FIG. 2

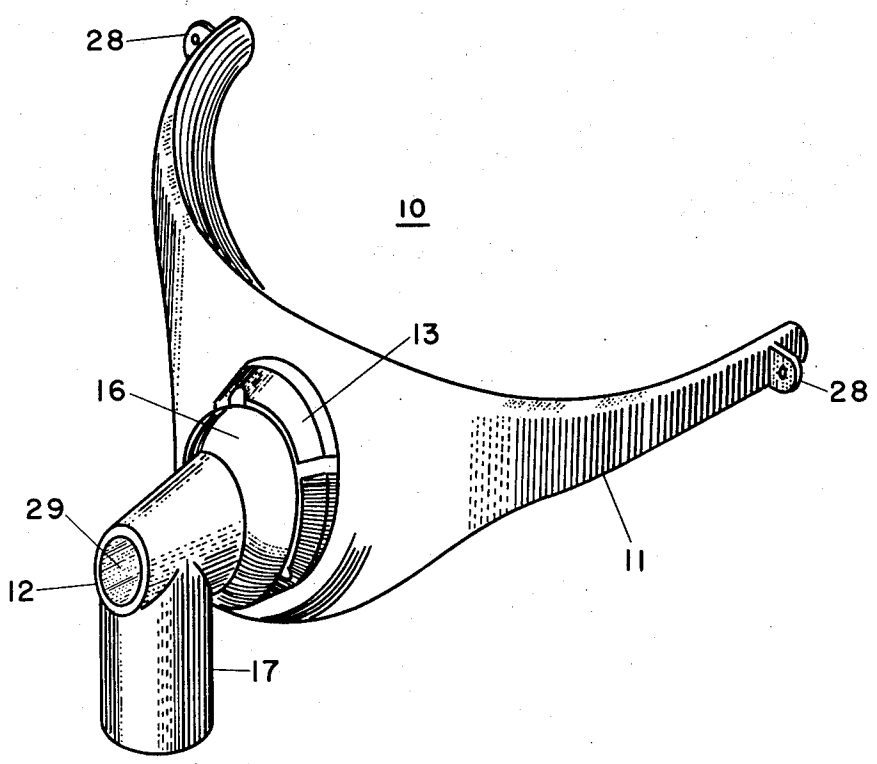


FIG 5

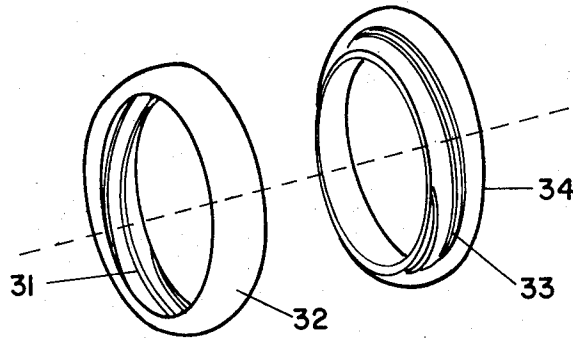


FIG. 6

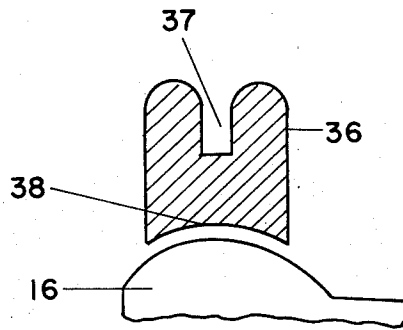


FIG. 7

TRACHEOTOMY MASK

This application is a continuation-in-part of application, Ser. No. 289,823, filed Sept. 18, 1972, which application is a continuation-in-part of application, Ser. No. 152,358, filed June 11, 1971, now abandoned.

This invention relates to tracheotomy masks. More specifically, it relates to an improved tubing adapter and interconnecting mechanisms for the mask body and tubing adapter in tracheotomy masks.

The most pertinent prior art concerning the tracheotomy mask of the present invention is U.S. Pat. No. 3,236,236 to Hudson. This patent discloses a tracheotomy mask having a tubing adapter that may be rotated about a fixed axis in relationship to the mask. This axis of rotation is perpendicular with respect to the front of the mask. The tubing adapter of Hudson is basically limited in use to either side of a prone patient, or to a down position for a sitting patient.

It is frequently desirable in therapeutic gas (e.g. oxygen) administration to be able to position a tubing adapter not only to either side or down for a patient, but also at an acute angle with respect to the axis perpendicular to the face of the mask. This cannot be accomplished with the Hudson tracheotomy mask.

The present invention overcomes the deficiencies of the prior art tracheotomy mask by not only connecting the tubing adapter to oxygen equipment in the side or down positions but also at the acute angle with respect to an axis perpendicular to the face of the mask.

This and other objects of the invention will become apparent from the following detailed description and drawings wherein:

FIG. 1 is side view of a tubing adapter and connecting rings of a tracheotomy mask of this invention with the mask body shown in phantom.

FIG. 2 is an exploded perspective view of the tubing adapter, connecting rings and mask body of the tracheotomy mask of FIG. 1.

FIG. 3 is a fragmented cross-sectional view of an interconnecting mechanism of the connecting rings of a tracheotomy mask of this invention in an interconnected position.

FIG. 4 is fragmented cross-sectional view of connecting rings and tubing adapter of a tracheotomy mask of this invention, showing the relationship of the adapter to the rings.

FIG. 5 is an isometric view of a tracheotomy mask of this invention.

FIG. 6 is a perspective view of an interconnecting mechanism of the connecting rings of a tracheotomy mask of this invention in a non-connected position.

FIG. 7 is a fragmented cross-sectional view of a single ring mask-tubing adapter interconnector of a tracheotomy mask of this invention, showing the relationship of the adapter to the ring.

Referring now to the drawings there is depicted in FIG. 1 a tracheotomy mask 10 of this invention, having a soft flexible e.g. plastic body 11, tubing adapter 12, and adapter-body connecting rings 13 and 14. The tubing adapter 12 may be prepared from a rigid plastic such as high impact styrene and is provided with a ball like spherical portion 16, which is rotatable within the rings 13 and 14. Rings 13 and 14 may be prepared from rigid self-lubricating plastic such as polyethylene, polypropylene, nylon and the like.

In a preferred embodiment of this invention, rings 13 and 14 are adapted to interconnect by means of an interconnecting mechanism comprising a hook 18 in one ring and a corresponding hook engaging shoulder member 19 in the other ring, this is shown in fragmented cross section in FIG. 3. Each ring, 13 and 14 has both a hook member 18 and a shoulder member 19. While three pairs of hooks 18 and shoulder members 19 are shown in FIG. 2, it is only by way of illustration and not limitation. For it is understood that the interconnecting mechanism of rings 13 and 14 may consist of two, three, four, five or more hooks 18 and shoulder member 19 engaging sets. When rings 13 and 14 are interconnected, their joint inner surfaces form a concave surface for receiving in slidable engagement the spherical portion 16 of the tubing adapter 12. This is shown in cross section in FIG. 4, wherein each of rings 13 and 14 form one half of the above described concave surface, with the curved surface of ring 13 shown at 21 and the curved surface of ring 14 shown at 22. When interconnected, the inside diameter of the concave surface formed by rings 13 and 14 is slightly greater than the outside diameter of spherical portion 16 of tubing adapter 12. This allows spherical portion 16 to rotate freely within the confines of rings 13 and 14 in the manner of a ball joint.

When locked together, rings 13 and 14 form a groove 23 for the reception of the mask body 11. This groove 23 is formed between rings 13 and 14 by a ridge portion 24 on ring 13, and a ridge portion 26 on ring 14 (see FIG. 2 and 4). Groove 23 is adapted to receive the mask body 11, as the diameter of the circular opening 27 in the mask body 11 corresponds to the outside diameter of the circle formed by ridge portions 24 and 26. The depth and width of groove 23 is such that the mask body 11 is securely held by rings 13 and 14 when the rings 13 and 14 are interconnected.

To assemble the preferred tracheotomy mask 10 of this invention, the tubing adapter 12 is inserted into ring 13 by placing the cylindrical tubing 17 of the adapter 12 through ring 13. The tubing adapter 12 and ring 13 are then placed on the front of mask body 11 with the ridge 24 and spherical portion 16 protruding into opening 27. Ring 14 is then placed at the back of the mask body 11 at opening 27 with hooks 18 aligned with the corresponding hook engaging shoulder 19 of ring 13, and ridges 24 and 26 in corresponding alignment. Rings 13 and 14 are then interconnected by snapping the hooks 18 and corresponding shoulders 19 together. When rings 13 and 14 are interconnected, the tracheotomy mask 10 is then assembled and ready for use by a patient. A mask strap (not shown) may be connected to the mask body 11 by any convenient means as for example by inserting a strap through the holes in tabs 28.

As stated above, rings 13 and 14 may be prepared from plastic such as polyethylene, preferably high density polyethylene, and each ring preferably prepared in one piece. The use of a high density polyethylene allows for sufficient flexibility in hooks 18 such that they may snap into a secure locking position with the corresponding shoulders 19 without distortion, and may be disconnected if desired without fracture.

Other interconnecting mechanisms may be used to secure the interconnection of the rings on either side of a mask body, and are within the scope of this invention. The rings may be interconnected by screwing them to-

gether (see FIG. 6). This may be accomplished by having a female thread 31 on one of the rings 32 and a male thread 33 on the other ring 34. When the threads of the rings are engaged to interconnect the rings, a groove is formed between the rings (similar to that illustrated at 23 in FIGS. 3 and 4) for receiving the mask body. Also when the rings are thus interconnected their joint surfaces form a concave surface (similar to that illustrated at 21 and 22 of FIG. 4) for receiving in slidable engagement a spherical portion of a tubing adapter, as described above. A tracheotomy mask utilizing this screw type of interconnection may be assembled in the manner similar to that described above for the hook and shoulder mechanism.

It is also within the scope of this invention to have the interconnector mechanism between a mask body and a tubing adapter (such as the rings described above) in the form of a single ring (see FIG. 7). The single ring 36 would correspond to, two of the interconnected rings described above, having a peripheral groove 37 adapted to receive a mask body, and an inner concave surface 38 for receiving in slidable engagement the spherical portion 16 of a tubing adapter. The single ring may be molded in one piece from the above described self-lubricating plastics.

To assemble a tracheotomy mask having a single ring interconnector between the mask body and the tubing adapter, the ring is flexed to enlarge the circular opening on one side of it, such that the spherical portion of the tubing adapter may be inserted, and the ring is then released so that the tubing adapter is secure but rotatable within it.

As may be seen from the above description and drawings, the spherical portion of a tubing adapter, and the interconnected rings, or single ring interconnector, together form a ball joint member in which a tubing adapter is free to rotate not only about an axis perpendicular to the front of a tracheotomy mask but also at an acute angle with respect to that axis.

When using a tracheotomy mask of this invention, a breathable gas (e.g. air, oxygen) tubing may be connected to the cylindrical tubing portion of the tubing adapter (e.g. 17), and exhalation air passed out through the front opening of the adapter (e.g. 29 in FIGS. 2 and 5). The opening 29 may also be used for the insertion of any tubes for suction, or other instruments that may be needed.

What is claimed is:

1. A tracheotomy mask comprising in combination, a flexible body, an opening in said body, a pair of interconnected rings, one of said rings being in the front of said mask with respect to said opening, the other ring being in the back of said mask with respect to said opening, said rings forming a peripheral groove between them, said groove being adapted to receive said mask, a tubing adapter having a cylindrical portion and a spherical portion, said spherical portion positioned within said opening and within said rings, so that said tubing adapter is rotatable with respect to said body and can be rotated in any direction, said tubing adapter having an unobstructed exhalation opening therethrough and a short tubing portion projecting out at substantially right angles to the axis of the cylindrical portion adapted for connection to an oxygen hose.

2. A tracheotomy mask according to claim 1 wherein said rings are interconnected by the interaction of a plurality of hook members and hook engaging shoulder

members in one ring, with corresponding hook members and hook engaging shoulder members in the opposing ring.

3. A tracheotomy mask according to claim 2 wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

4. A tracheotomy mask according to claim 3 wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

5. A tracheotomy mask according to claim 1 wherein said rings are interconnected by the engagement of a male thread on one of said rings, with a female thread on the other of said rings.

6. A tracheotomy mask according to claim 5, wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

7. A tracheotomy mask according to claim 6, wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

8. In a tracheotomy mask comprising in combination a flexible body, an opening in said body, a tubing adapter having a cylindrical portion with an unobstructed exhalation opening therethrough, a tubing portion adapted for connection to a breathable gas hose, the improvement which comprises a pair of interconnected rings, one of said rings being in front of said mask with respect to said opening, the other ring being in the back of said mask with respect to said opening, said rings forming a peripheral groove between them, said groove being adapted to receive said mask, said tubing adapter having a spherical portion, said spherical portion being positioned within said opening and within said rings, so that said tubing adapter is rotatable with respect to said body and can be rotated in any direction.

9. A tracheotomy mask according to claim 8 wherein said rings are interconnected by the interaction of a plurality of hook members and hook engaging shoulder members in one ring, with corresponding hook members and hook engaging shoulder members in the opposing ring.

10. A tracheotomy mask according to claim 9, wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

11. A tracheotomy mask according to claim 10, wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

12. A tracheotomy mask according to claim 8 wherein said rings are interconnected by the engagement of a male thread on one of said rings, with a female thread on the other of said rings.

13. A tracheotomy mask according to claim 12, wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

14. A tracheotomy mask according to claim 13, wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

15. A tracheotomy mask comprising in combination, a flexible body, an opening in said body, a pair of inter-

connected rings, one of said rings being in the front of said mask with respect to said opening, the other of said rings being in the back of said mask with respect to said opening, said rings forming a peripheral groove between them, said groove being adapted to receive said mask, a tubing adapter having a spherical portion, said spherical portion, positioned within said opening and within said rings, so that said tubing adapter is rotatable with respect to said body and can be rotated in any direction.

16. A tracheotomy mask according to claim 15, wherein said rings are interconnected together by the interaction of a plurality of hook members and hook engaging shoulder members in one ring, with corresponding hook members and hook engaging members in the opposing ring.

17. A tracheotomy mask according to claim 16 wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

18. A tracheotomy mask according to claim 17, wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

19. A tracheotomy mask according to claim 15, wherein said rings are interconnected by the engagement of a male thread on one of said rings, with a female thread on the other of said rings.

20. A tracheotomy mask according to claim 19, wherein the joint inner surface of said rings form a concave surface, adapted to receive said spherical portion of said tubing adapter.

21. A tracheotomy mask according to claim 20, wherein the inside diameter of said rings is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

22. A tracheotomy mask comprising in combination,

a flexible body, an opening in said body, a ring having a peripheral groove, said groove being adapted to receive said mask, a tubing adapter having a spherical portion, said spherical portion, positioned within said opening and with in said rings, so that said tubing adapter is rotatable with respect to said body and can be rotated in any direction.

23. A tracheotomy mask according to claim 22, wherein the inner surface of said ring forms a concave surface, adapted to receive said spherical portion of said tubing adapter.

24. A tracheotomy mask according to claim 23, wherein the inside diameter of said ring is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

25. In a tracheotomy mask comprising in combination a flexible body, an opening in said body, a tubing adapter having a cylindrical portion with an unobstructed exhalation opening therethrough, a tubing portion adapted for connection to a breathable gas hose, the improvement which comprises a ring having a peripheral groove, said groove being adapted to receive said mask, said tubing adapter having a spherical portion, said spherical portion being positioned within said ring, so that said tubing adapter is rotatable with respect to said body and can be rotated in any direction.

26. A tracheotomy mask according to claim 25, wherein the inner surface of said ring forms a concave surface, adapted to receive said spherical portion of said tubing adapter.

27. A tracheotomy mask according to claim 26 wherein, the inside diameter of said ring is slightly greater than the outside diameter of said spherical portion of said tubing adapter.

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