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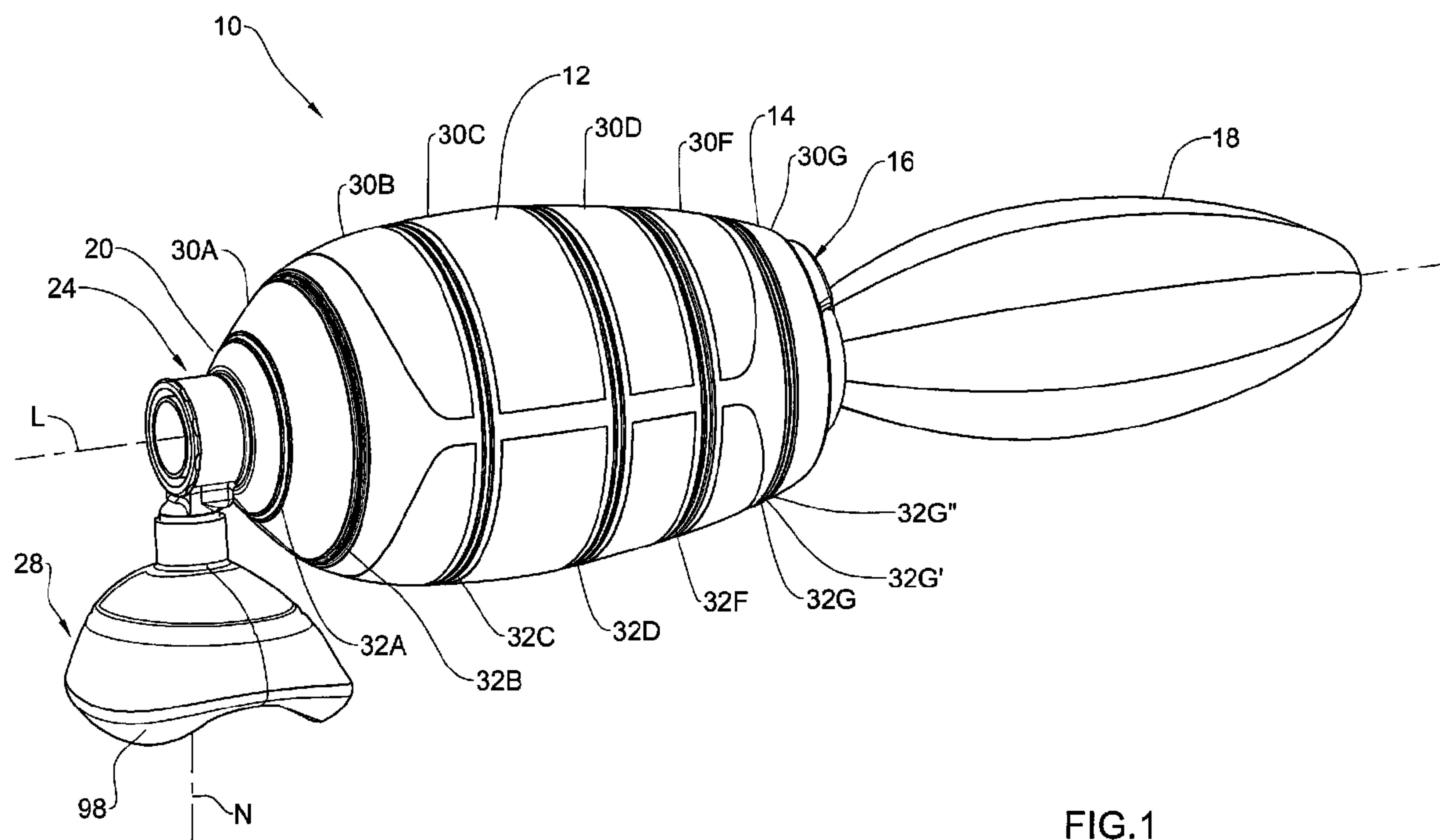


FIG.1

(57) **Abrégé/Abstract:**

A collapsible respiration bag assembly (10) is provided comprising a flexible hollow body (12) longitudinally extending about a longitudinal axis (L) thereof between an air intake end and an air outlet end and formed with at least three annular folds (32). A patient valve (24) is fitted at the outlet end comprising a face mask coupler transversing the longitudinal axis. An intake valve assembly (16) is also included and a face mask (28) fitted with a face engaging rim (98), a dome portion and a valve coupler detachably connectable to the face mask coupler. The dome portion of the face mask is deformable between an operative, concave position and a convex stowing position, where the dome portion is inverted and where the valve coupler is detached from the face mask coupler. The assembly is configurable between at least one extended, operative position and a fully collapsed stowed position where the annular fold zones (32) at least partially overlap.

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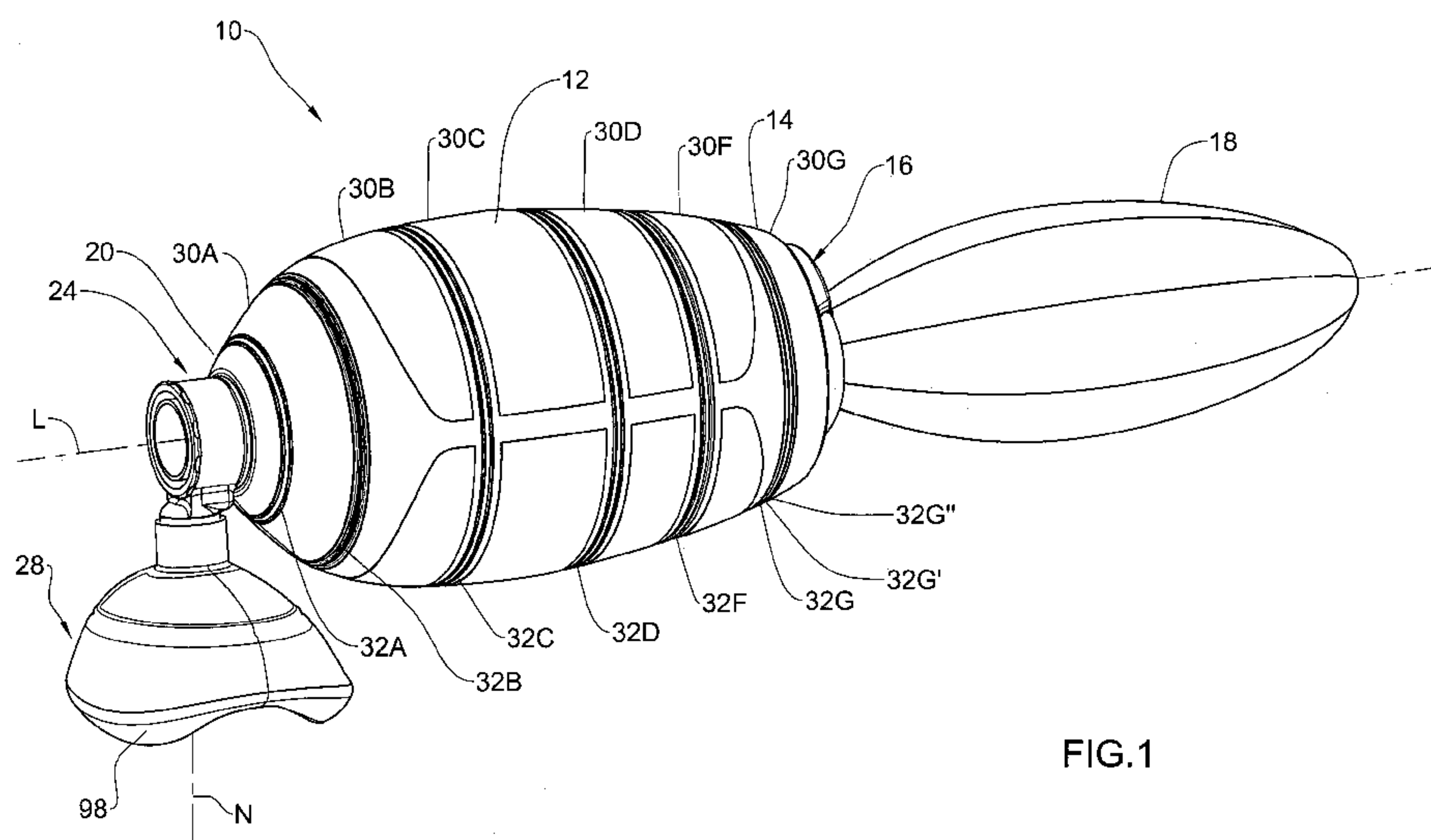


FIG.1

(57) **Abstract:** A collapsible respiration bag assembly (10) is provided comprising a flexible hollow body (12) longitudinally extending about a longitudinal axis (L) thereof between an air intake end and an air outlet end and formed with at least three annular folds (32). A patient valve (24) is fitted at the outlet end comprising a face mask coupler transversing the longitudinal axis. An intake valve assembly (16) is also included and a face mask (28) fitted with a face engaging rim (98), a dome portion and a valve coupler detachably connectable to the face mask coupler. The dome portion of the face mask is deformable between an operative, concave position and a convex stowing position, where the dome portion is inverted and where the valve coupler is detached from the face mask coupler. The assembly is configurable between at least one extended, operative position and a fully collapsed stowed position where the annular fold zones (32) at least partially overlap.

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RESPIRATION BAG

FIELD OF THE INVENTION

The present invention is generally in the field of respiration bags and more particularly it is directed to compactable respiration bags. Such bags are often referred to also as resuscitators, artificial respiration bags, bag valve masks, etc.

5 BACKGROUND OF THE INVENTION

A respirator bag is a device using positive pressure to inflate the lungs of an unconscious person who is not breathing or to support shallow ineffective spontaneous breathing, in order to keep him oxygenated and alive. A hand-operable version comprises a face mask and a large hand-squeezed flexible bulb using ambient air, or with
10 supplemental oxygen from a pressurized cylinder or the like.

Conventional artificial respiration bags have a cuff with which the artificial respiration bag is connected to an oxygen feed-line and with which it can be connected to a breathing mask, face mask, larynx tubus, pip-valve, etc.

The manually operated respiration bag is standard equipment in ambulances,
15 operation and emergency rooms, first aid bags, civil and army medics, rescue units and the like.

It is an ever growing requirement to design respirator bags of compact size such that they can be easily carried by emergency professionals and such that a larger number of such units can be stored in a given space.

20 A variety of respirator bags and components used in conjunction therewith (face masks, one way valves, cuffs, etc.) are known in the art, for example:

US Patent Serial No. 5,295,478 discloses a mouth-to-mask resuscitator which can be carried in a person's pocket consisting of an oronasal mask and a check valve which is inserted into the mask and allows a person to administer artificial ventilation to
25 fill the victim's lung with air and to allow the victim to exhale air through an exit in the valve assembly away from the person administering the resuscitation. The mask is

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foldable into itself to form a cavity for storing the check valve which has inspiratory and exhalation air flow back pressures.

US Patent serial No. 5,163,424 discloses a disposable resuscitator including an elongated, elastically compressible squeeze bag having a first opening, a one-way valve
5 for the intake of oxygen-containing gas into the bag mounted on the first opening, a second opening which is in airtight communication with a valve housing in the form of a transparent pipe having a pipe stub for the attachment of the resuscitator to a facial mask, and an outlet for exhalation air, the tubular valve housing containing a valve including a valve seat and a disc-shaped valve body of an elastomeric material and
10 having a centrally mounted, projecting guide pin which is axially displaceable in a hole in the valve seat, a body having a central passage forming the outlet for exhalation air being provided in the free end of the transparent pipe, the central passage being surrounded by an annular bead which is located co-axially and in contact with the valve member, the pipe stub for the attachment of the resuscitator to a facial mask extending
15 from the side of the transparent pipe and being in communication with the zone located between the valve member and the body located in the free end of the transparent pipe.

US patent Serial No. 6,745,769 is concerned with a respiration bag having at least one connecting stub, the respiration bag comprising: a bag-shaped hollow body defining a longitudinal axis having a direction; at least one fold region extending
20 annularly over said body; said bag-shaped body being foldable in the direction of said longitudinal axis from a first stable position wherein said hollow body extends smoothly over said fold region to a second stable position wherein said bag-shaped body is bent inwardly in the direction of said axis at said fold region to define an annular fold in said fold region; and, holding means for responding to pressure within said bag-shaped
25 hollow body to hold said hollow body in said second stable state during operational use of said respiration bag.

US Patent Serial No. 5,121,745 discloses a disposable self-inflatable rescue mask comprising a transparent, flexible form-retaining plastic dome-shaped foldable portion having around its peripheral edge an inflatable bladder provided with a built-in
30 self-sealing air valve, which allows the ambient air to flow into the inflatable bladder and self-seals the air in the self-inflated mask which retains its shape firmly, said bladder being shaped to fit around the nose and mouth areas, and effectively seal against the patient's face; and a blow-in tube disposed in an opening at the apex of the dome is

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provided with a mouthpiece for delivery of expired air to the patient. The mask is packaged in a carrying case comprising two similar parts to form a container which is shaped to receive said deflated mask in a flattened and folded state, and sealed with a closure means.

5 US Patent Serial No. 4,532,923 discloses a manually operable resuscitator bag of one-piece construction having a generally elongated football shape, an inlet at one said end, and an outlet at the other end, fold-rings in each end portion having walls of reduced thickness, whereby the ends may be telescoped, ridges of thickened wall section between the fold-rings, the center of the bag having a wall thickness equal to the
10 thickness of said ridges in the tapering ends between the fold-rings, and longitudinal ribs formed on the outer surface of the center of the bag spaced around the circumference, providing increased resiliency and a rapid recovery for the shape of the bag.

US Patent Serial No 4,062,357 relates to a disposable respirator mask.

15 SUMMARY OF THE INVENTION

The present invention is directed to a collapsible respiration bag assembly comprising a face mask and being displaceable between at least one extended, operative position and a fully collapsed storage position, though readily available for deployment into the operative, extended position.

20 According to the invention there is provided a collapsible respiration bag assembly comprising a flexible hollow body longitudinally extending about a longitudinal axis thereof between an air intake end and an air outlet end and formed with at least three annular fold zones; and a patient valve fitted at said outlet end and comprising a face mask coupler transversing said longitudinal axis; an intake valve
25 assembly; a face mask fitted with a face engaging rim, a dome portion and a valve coupler detachably connectable to said face mask coupler; said dome portion being deformable between an operative, concave position and a convex stowing position, where said dome portion is inverted and where said valve coupler is detached from said face mask coupler; said assembly being configurable between at least one extended,
30 operative position and a fully collapsed stowed position where the at least three annular fold zones at least partially overlap.

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The flexible hollow body collapses in a bellows-type arrangement ('accordion') such that several fold zones at least partially overlap.

According to a particular embodiment of the invention the intake valve assembly is a substantially flat body formed with a confined flow space extending between a front
5 plate and a rear plate; and the thickness of said intake valve assembly does not exceed about 10 mm.

According to a design of the invention the intake valve assembly comprises a first check valve facilitating ambient air flow into the confined flow space, a discharge check valve to facilitate flow from said confined flow space to the environment upon
10 pressure rise within said confined flow space beyond a predetermined pressure threshold, a reservoir coupler for connecting an oxygen reservoir bag, an oxygen coupler for attaching to an oxygen supply line, and a second inlet check valve to facilitate air flow in direction from the confined flow space into flexible hollow body.

Any one or more of the following features and embodiments may be
15 incorporated in the respiration bag and constitute an embodiment of the invention:

- the valves of the intake valve assembly are flap-type valves (at times referred to as 'mushroom-type valves');
- the front plate is formed with a depression for receiving a rearwards facing projection of the patient filter, at the fully collapsed stowed position;
- 20 • the oxygen coupler is a flexible pipe stub radially extending from the confined flow space;
- the oxygen coupler is a flexible pipe stub tangentially extending from the confined flow space; alternatively, the pipe stub projects radially therefrom. However, the tube does not protrude larger than valve, i.e. does not project
25 from the perimeter of the intake valve assembly;
- a diameter of an annular fold zone at the air intake end of the hollow body is designed to accommodate the intake valve assembly with at least a portion of a flexible pipe stub extending from the confined flow space at least partially coiled over said intake valve assembly;
- 30 • at the stowed position the valve coupler of the face mask is received within a valve coupler receptacle of the patient valve;
- at the stowed position the intake valve and the face mask are fully received within the collapsed hollow body;

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- the hollow body is readily available for deployment into the operative, extended position by pulling the air intake end and the air outlet end at opposite directions;
- at the fully collapsed, stowing position the thickness of the assembly does not exceed about 55mm
- at the fully collapsed, stowing position the thickness of the assembly does not exceed the combined thickness of the intake valve assembly and the patient valve;
- at the fully collapsed, stowing position the thickness of the assembly does not exceed that of a central annular fold zone of the hollow body;
- the reservoir coupler is fitted with a collapsible support element for maintaining a free flow path between an opening of the reservoir bag and the reservoir coupler;
- the hollow body may be deployed into several different intermediate positions where a rear-most annular fold zone at the air intake end of the hollow body overlaps an adjoining annular fold zone, to thereby reduce the effective volume of the hollow body;
- at the intermediate position an inside face of the rear-most annular fold zone overlaps a corresponding inside face of the adjoining annular fold zone;
- at the intermediate position an outside face of the rear-most annular fold zone overlaps a corresponding outside face of the adjoining annular fold zone;
- the face mask coupler substantially vertically extending with respect to the longitudinal axis of the hollow body; an air flow path extends between the hollow body to the face mask coupler via an annular path of the patient valve, said annular path surrounding the valve coupler receptacle of the patient valve;
- optionally the face mask/ patient valve/ flexible hollow body are transparent to facilitate inspection of operation of the valves and check for valve obstruction and to allow inspection of secretions from the patient;
- the hollow body comprises 6 annular fold lines and 7 fold zones;
- the hollow body has at least one partially collapsed though operative position wherein at least one annular fold zone is inverted and at least partially

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overlaps at least one other annular fold zone, wherein a volume within said hollow body is reduced though retaining elasticity of the hollow body to thereby spontaneously expand after manual squeeze thereof;

- 5 • the patient valve comprises a coupler for detachably attaching thereto a peep valve;
- a fastener is provided for securing the hollow body at a partially collapsed positions thereof;
- at the operative position the valve coupler of the face mask extends before the face engaging rim whilst at the convex, stowing position the dome of the face mask is inverted such that the valve coupler extends after the face engaging rim;
- 10 • the face mask may be detachably attached to the patient valve via a flexible, collapsible conduit in the form of a bellows-type pipe attached at one end to the patient valve and at an opposite end thereof it is attached to a coupler of the face mask;
- 15 • at the stowed position the intake valve assembly and the patient valve at least partially overlap along the longitudinal axis of the device.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how it may be carried out in practice, embodiments will now be described, by way of non-limiting examples only, with reference to the accompanying drawings, in which:

Fig. 1 is an isometric view of the respiration bag according to the present invention, fitted with an oxygen reservoir bag, at a fully extended, operative position;

Fig. 2 is an exploded isometric view of the respiration bag of Fig. 1;

25 **Fig. 3** is a top view of the respiration bag of Fig. 1;

Fig. 4A is a sectioned, rear isometric view of an intake end of the respiration bag;

Fig. 4B is a rear isometric view of an intake end of the respiration bag;

Figs. 5A to 5D are respective views of the respiration bag at a fully collapsed, stowed position, wherein:

30 **Fig. 5A** is a side view of the respiration bag at a fully collapsed, stowed position;

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Fig. 5B is a cross-sectioned side view of the respiration bag of Fig. 5A;

Fig. 5C is a rear sectioned isometric view of the respiration bag of Fig. 5A; and

Fig. 5D is a front view of the respiration bag of Fig. 5A;

Fig. 6 is a sectioned view of a side portion of the respiration bag, the patient
5 valve fitted with a peep valve;

Fig. 7A is a side sectioned side view of the respiration bag in a second operative position, partially extended;

Fig. 7B is a side sectioned side view of the respiration bag in another operative position, partially extended

10 **Figs. 8A and 8B** illustrate a modification of a respiration bag according to the present invention, at an expanded position and a collapsed position, respectively.

DETAILED DESCRIPTION OF EMBODIMENTS

Attention is first directed to Figs. 1 to 3 of the drawings illustrating a collapsible respiration bag in accordance with the present invention generally designated 10
15 comprising a flexible hollow body 12 extending between an air intake end 14 fitted with an intake valve assembly generally designated 16, and a air outlet end generally designated 20. Attached to the intake valve assembly 16 there is an oxidation reservoir bag 18 and the air outlet end 20 is fitted with a patient valve designated 24 to which is detachably attached a face mask generally designated 28.

20 Flexible hollow body 12 longitudinally extends about a longitudinal axis L (Fig. 1) extending between the air intake end 14 and the outlet end 20. The hollow body is made of resilient material e.g. silicon rubber and is formed with a plurality of annular fold zones, 6 in the present example, designated 30A, 30B, 30C, 30D, 30F, and 30G integrally molded and enabling one another with an intermediate fold zone 32A, 32B,
25 32C, 32D, 32F and 32G, respectively, whereby the hollow bag may be collapsed into one or more other operative positions (Figs. 5A to 5C) wherein the hollow body volume are into a fully collapsed stowed position (Figs. 7A and 7B).

Deploying the hollow body 12 from either of its collapsed positions into its fully deployed position takes place by pulling the air intake end 14 and the air outlet end 20
30 in opposite directions along the longitudinal axis of the hollow body. Collapsing the hollow body into its partially collapsed, though operative positions takes place by

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gripping the hollow body 12 at its center and depressing the air intake end 14 in direction of the air outlet end 20, to the desired extent.

Further attention is now made in particular to Figs. 2 and 4A for better visualizing the air intake assembly 16. As can be seen, the intake valve assembly is a substantially flat body formed with a confined space 40 extending between a front plate 42 and a rear plate 44 valves fitted therein, as will follow. Extending into the confined space 40 there is oxygen (or other breathing air supply line) in the form of a tangentially extending type tube 46 fitted at its end with a stub 48 for coupling to an oxygen supply line. The tube 46 is flexible and is coiled about the intake valve assembly 16 such that it does not project from the overall size of the intake valve assembly and also from the collapsed state of the respiration bag, e.g. as in Fig. 4B, the tube 46 does not extend from the intake valve assembly 16 or the hollow body boundaries.

The intake valve assembly 16 comprises an array of check valves comprising in turn an ambient air intake valve 50 fitted on the rear plate 44 and adapted for facilitating ingress of ambient air into the confined space 40. An inlet valve 54 is fitted on the front plate 42 to facilitate airflow in a direction from the confined space 40 into the hollow body 12. A pressure threshold valve 58 is mounted on the rear plate 44 designed to discharge oxygen or other pressurized gas introduced into the confined space 40 through the gas supply tube 46, in case of pressure exceed within the confined space 40. A reservoir coupler 62 is fitted on the rear plate 44 for connecting thereto the oxygen reservoir bag 18 with a free flow passage extending between the oxygen reservoir bag 18 and the confined space 40 via the coupler 62.

In order to retain a free flow path between the oxygen reservoir bag 18 and the confined space 40 there is provided a collapsible support element in the form of a coiled spring 64 which prevents unintentional collapse of the reservoir bag 18 which in this case may block the passage into the confined space 40.

The patient valve 24 fitted at the air outlet end 20 is a one-way valve allowing air flow from the hollow body 12 towards the patient, only in direction of arrow 70 in Fig. 6. The patient valve 24 is fixedly attached at the air outlet end 20 of the hollow body 12. The patient valve 24 comprises a coupler 74 for detachably attaching thereto the face mask 28 in a fit connection or a snip type connection such that the face mask 28 remains attached to the assembly during operation thereof, however it can readily be detached for stowing, as will be explained hereinafter. It is noticed that the face mask

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coupler **74** extends in a direction of axis **N** (Fig. 1), substantially transversing the longitudinal axis **L** of the hollow body. The patient valve **24** is further formed with an annular coupler at **78** for detachably attaching thereto a peep valve **80** (Fig. 6) useful in lung failure and other medical situations for increasing the outlet force required to exhale through the patient's

The patient valve **24** comprises a flexible diaphragm **84** deformable between an inhaling position upon squeezing the hollow body **12** and an exhaling position upon expansion of the hollow body **12** and exhale of air from the patient (not shown). In the inhaling position the diaphragm **84** deforms against an annular valve seat **86** (Fig. 6) allowing air flow in direction of arrow **70** whilst the exit through the coupler **78** is sealed. However, in the exhaling position the diaphragm **84** deforms to seal against seating **88** thereby presenting airflow in a direction opposite to arrow **70** rather facilitating airflow in the direction of arrow **92** e.g. to the surroundings or out through the peep cells **80**.

The inner diameter of the coupler **78** is sized so as to comfortably accommodate a corresponding coupler **94** of the face mask **28** as can be seen in Figs. 5B and 5C.

The face mask **28** is formed of a resilient material such as silicon rubber and comprises a valve coupler **94** for pressed fit over the face mask coupler **74** of the patient's valve **24**. Its opposite edge is formed with a face engaging rim **98** designed for soft and sealing engagement with a patient's nose and mouth (not shown). The arrangement is such that the dome portion of the face mask is deformable between an operative, concave position as in Figs. 1, 2, 3, 6, 7A and 7B, and wherein the face engaging ring **98** extends in continuation below the valve coupler **94**, and a convex, stowing position (Figs. 5B and 5C) wherein the face engaging ring **98** extends before the valve coupler **94**, wherein the face mask is designed to occupy a minimum space for conveniently stowing within the collapsed hollow body as seen in Figs. 5B and 5C wherein the face mask **28** does not project from the collapsed hollow body **12**.

As can further be seen in particular in Figs. 5B and 5C, the front plate **42** of the intake valve assembly **16** is formed with a rearwardly facing depression at **102** fitted for receiving a rearward projection **106** of the patient valve **24** whereby at the fully collapsed position, the intake valve assembly **16** and the patient valve **24** are adjoining one another, such that they are well received within the collapsed hollow body **12** and do not project therefrom. It is thus noted that at the stowed position the intake valve

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assembly **16** and the patient valve **24** at least partially overlap along the longitudinal axis **L** of the device.

As can be seen in Figs. 5B and 5C, at the fully collapsed position, the respiration bag assembly **10** assumes a thickness which substantially corresponds with the width of the central annular fold zone **30C** with overlapping of neighboring annular fold zones. As mentioned hereinbefore, in this position the intake valve assembly **16** and the patient valve **24** are fully received within the collapsed hollow body and do not exceed beyond the collapsed width being in the range of about 50-70mm, and by a particular embodiment does not exceed about 55 mm.

Turning now to Figs. 7A and 7B, the respiration bag assembly is illustrated in two different operative positions, partially collapsed and useful for obtaining a smaller effective volume of the resuscitator. In Fig. 7A, the hollow bag is collapsed in a first respective position wherein an inside face of the rear-most annular fold zone **30F** overlaps a corresponding inside face of the adjoining annular fold zone **30D** whereby the volume of the partially collapsed hollow bag is now reduced by about 25% useful for resuscitation of youngsters and the like. However, the volume can be designed to suit different requirements.

In the embodiment of Fig. 7B an outside face of the rear-most annular fold zone **30F** overlaps a corresponding outside face of the adjoining annular fold zone **30D**, both being partially in overlap relation with the central fold zone **30C**. In this position, the effective squeezing volume of the hollow body **12** is even more reduced, thereby useful for toddlers and the like.

As can further be seen in Fig. 7A and 7B, in order to maintain the hollow body at its partially collapsed position, there is fitted a locking mechanism designated **119** e.g. in the form of a VelcroTM fastener, magnetic fastener, snap-type fastener, etc.

Converting the respiration bag **10** into its collapsed, stowed position takes place by detaching the face mask **28** from the face mask coupler **74**, collapsing the bag **12** by compressing the air intake end **14** towards the air outlet end **20** along the longitudinal axis extending therebetween, in a bellows-type fashion, to thereby obtain a compact size of the bag corresponding with the width of the central annular fold zone (Fig. 5A). Then the face mask **28** is inverted by deforming the dome over the valve coupler **94** and introducing the valve coupler **94** into the receptacle of the coupler **78** of the patient valve **24**.

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Deploying the respiration bag **10** into its operative position (e.g. Fig. 1) is carried out at a reverse sequence of operations.

It is further appreciated that any of the components of the assembly may be transparent to provide inspection and visualizing of the operating components thereof
5 and to identify secretions from the patient.

The valves illustrated in the figures and as discussed hereinbefore are flap-type valves useful for obtaining a substantially small dimensioned device, in particular at its folded position.

The structure and design of the hollow bag is such that it spontaneously tends to
10 maintain its expanded position whereby upon squeezing the air within the hollow bag is forced through the patient valve assembly **24** (at this position air cannot escape through the air intake assembly owing to the one-way inlet valve **54**). However, upon ceasing the squeezing pressure from the hollow body, it will spontaneously retain its expanded position this time drawing air through the inlet valve assembly **16** however, without
15 drawing air or secretions from the patient through valve assembly **24**.

It is further noticed that one or more of the intermediate fold zone **32A**, **32B**, **32C**, **32D**, **32F** and **32G** are in the form of double annular rims (as seen for example in Figs. 1 and 5C and represented by reference numerals **32'** and **32''**, respectively), such that even after several years of the device being at the stowed position, the ribs will still
20 have their resilience to bounce and allow the hollow body to act as a pump.

Turning now to the embodiment of Figs. 8A and 8B, there is illustrated a collapsible respiration bag in accordance with a further embodiment of the present invention, generally designated **100** and having a flexible hollow body **112** of similar construction as discussed in connection with the previous embodiments, extending
25 between an air intake end **114** and a air outlet end generally designated **120**. Attached to an intake valve assembly there is an oxidation reservoir bag **118**. An air outlet end **120** is fitted with a patient valve designated **124**.

In this embodiment, a face mask **128** (which is also similar to the face mask previously discussed) is detachably attached to the patient valve **124** via a flexible,
30 collapsible conduit **132** which in the present example is a bellows-type pipe attached at one end to the patient valve **124** and at an opposite end thereof it is attached to a coupler **194** of the face mask **128**.

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The arrangement is such that the respiration bag **100** is readily deployable from its fully collapsed position (Fig. 8B) into its operative position (fully or partially deployed; e.g. Figs 7a and 7B), merely by pulling at opposite ends of the device and where the face mask **128** is placed over a patients face and the respiration bag can be easily manipulated.

It is noted that in the collapsed position (Fig. 8B) the collapsible conduit **132** is in its collapsed, compact position allowing for the entire device to retain a small and compact size which substantially does not exceed the width of the central annular fold zone **130**.

Those skilled in the art to which this invention pertains will readily appreciate that numerous changes, variations and modifications can be made without departing from the scope of the invention *mutatis mutandis*.

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CLAIMS:

1. A collapsible respiration bag assembly comprising a flexible hollow body longitudinally extending about a longitudinal axis thereof between an air intake end and an air outlet end and formed with at least three annular folds; and a patient valve fitted
5 at said outlet end and comprising a face mask coupler transversing said longitudinal axis; an intake valve assembly; a face mask fitted with a face engaging rim, a dome portion and a valve coupler detachably connectable to said face mask coupler; said dome portion being deformable between an operative, concave position and a convex stowing position, where said dome portion is inverted and where said valve coupler is
10 detached from said face mask coupler; said assembly being configurable between at least one extended, operative position and a fully collapsed stowed position where the at least three annular fold zones at least partially overlap.
2. A collapsible respiration bag assembly according to claim 1, wherein the intake valve assembly is a substantially flat body formed with a confined flow space extending
15 between a front plate and a rear plate, and fitted with an array of valves.
3. A collapsible respiration bag assembly according to claim 1, wherein the front plate is formed with a depression for receiving a rearwards facing projection of the patient valve, at the fully collapsed stowed position.
4. A collapsible respiration bag assembly according to claim 1, wherein the
20 thickness of the intake valve assembly does not exceed about 10mm.
5. A collapsible respiration bag assembly according to claim 2, wherein the valve array of the intake valve assembly comprises a first check valve facilitating ambient air flow into the confined flow space, a discharge check valve to facilitate flow from said confined flow space to the environment upon pressure rise within said confined flow
25 space beyond a predetermined pressure threshold, a reservoir coupler for connecting an oxygen reservoir bag, an oxygen coupler for attaching to an oxygen supply line, and a second inlet check valve to facilitate air flow in direction from the confined flow space into flexible hollow body.
6. A collapsible respiration bag assembly according to claim 5, wherein the valves
30 of the intake valve assembly are flap-type valves.
7. A collapsible respiration bag assembly according to claim 5, wherein the oxygen coupler is a flexible pipe stub radially extending from the confined flow space.

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8. A collapsible respiration bag assembly according to claim 5, wherein the oxygen coupler is a flexible pipe stub tangentially extending from the confined flow space.
9. A collapsible respiration bag assembly according to claim 5, wherein a diameter of an annular fold zone at the air intake end of the hollow body is designed to
5 accommodate the intake valve assembly with at least a portion of a flexible pipe stub extending from the confined flow space at least partially coiled over said intake valve assembly.
10. A collapsible respiration bag assembly according to claim 5, wherein at the stowed position the valve coupler of the face mask is received within a valve coupler
10 receptacle of the patient valve.
11. A collapsible respiration bag assembly according to claim 1, wherein at the stowed position the intake valve and the face mask are fully received within the collapsed hollow body.
12. A collapsible respiration bag assembly according to claim 1, wherein the hollow
15 body is readily available for deployment into the operative, extended position by pulling the air intake end and the air outlet end at opposite directions.
13. A collapsible respiration bag assembly according to claim 1, wherein at the fully collapsed, stowing position the thickness of the assembly does not exceed about 55mm.
14. A collapsible respiration bag assembly according to claim 1, wherein at the fully
20 collapsed, stowing position the thickness of the assembly does not exceed that of a central annular fold zone of the hollow body.
15. A collapsible respiration bag assembly according to claim 1, wherein at the fully collapsed, stowing position the thickness of the assembly does not exceed the combined thickness of the intake valve assembly and the patient valve.
- 25 16. A collapsible respiration bag assembly according to claim 5, wherein the reservoir coupler is fitted with a collapsible support element for maintaining a free flow path between an opening of the reservoir bag and the reservoir coupler.
17. A collapsible respiration bag assembly according to claim 1, wherein the hollow body may be deployed into an intermediate position where a rear-most annular fold
30 zone at the air intake end of the hollow body overlaps an adjoining annular fold zone, to thereby reduce the effective volume of the hollow body.

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18. A collapsible respiration bag assembly according to claim 17, wherein at the intermediate position an inside face of the rear-most annular fold zone overlaps a corresponding inside face of the adjoining annular fold zone.
19. A collapsible respiration bag assembly according to claim 17, wherein at the
5 intermediate position an outside face of the rear-most annular fold zone overlaps a corresponding outside face of the adjoining annular fold zone.
20. A collapsible respiration bag assembly according to claim 1, wherein the face mask coupler substantially vertically extending with respect to the longitudinal axis of the hollow body.
- 10 21. A collapsible respiration bag assembly according to claim 1, wherein an air flow path extends between the hollow body to the face mask coupler via an annular path of the patient valve, said annular path surrounding the valve coupler receptacle of the patient valve.
22. A collapsible respiration bag assembly according to claim 1, wherein at least the
15 face mask/ patient valve/ flexible hollow body is transparent.
23. A collapsible respiration bag assembly according to claim 1, wherein the hollow body comprises 6 annular fold lines and 7 fold zones.
24. A collapsible respiration bag assembly according to claim 1, wherein the hollow body has at least one partially collapsed though operative position wherein at least one
20 annular fold zone is inverted and at least partially overlaps at least one other annular fold zone, wherein a volume within said hollow body is reduced though retaining elasticity of the hollow body to thereby spontaneously expand after manual squeeze thereof.
25. A collapsible respiration bag assembly according to claim 1, wherein there is
25 further provided a fastener for securing the hollow body at partially collapsed positions thereof.
26. A collapsible respiration bag assembly according to claim 1, wherein at the operative position the valve coupler of the face mask extends before the face engaging rim whilst at the convex, stowing position the dome of the face mask is inverted such
30 that the valve coupler extends after the face engaging rim.
27. A collapsible respiration bag assembly according to claim 1, wherein the face mask may be detachably attached to the patient valve via a flexible, collapsible conduit

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in the form of a bellows-type pipe attached at one end to the patient valve and at an opposite end thereof it is attached to a coupler of the face mask.

- 28.** A collapsible respiration bag assembly according to claim 1, wherein at the stowed position the intake valve assembly and the patient valve at least partially overlap
5 along the longitudinal axis of the device.

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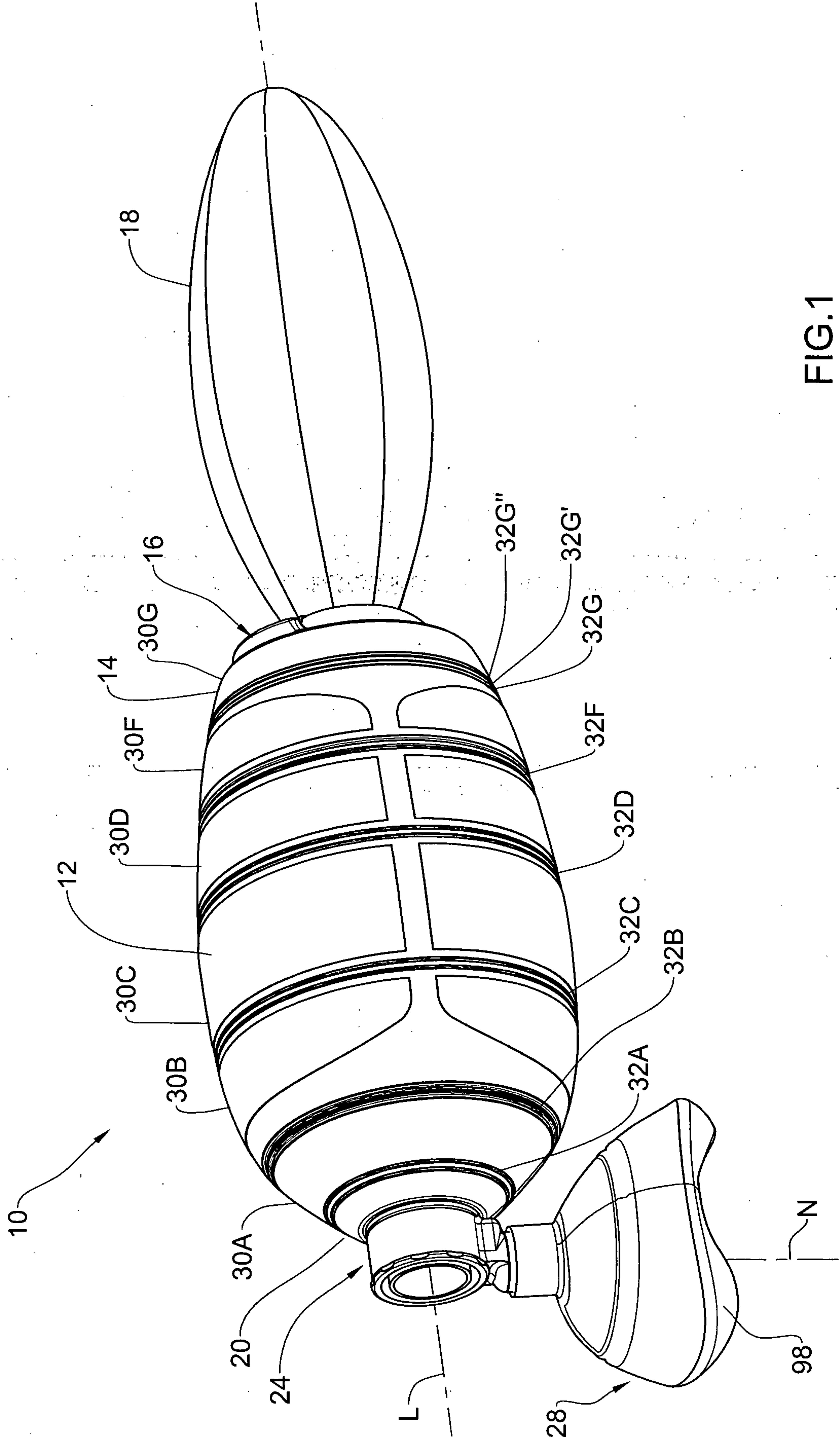


FIG.1

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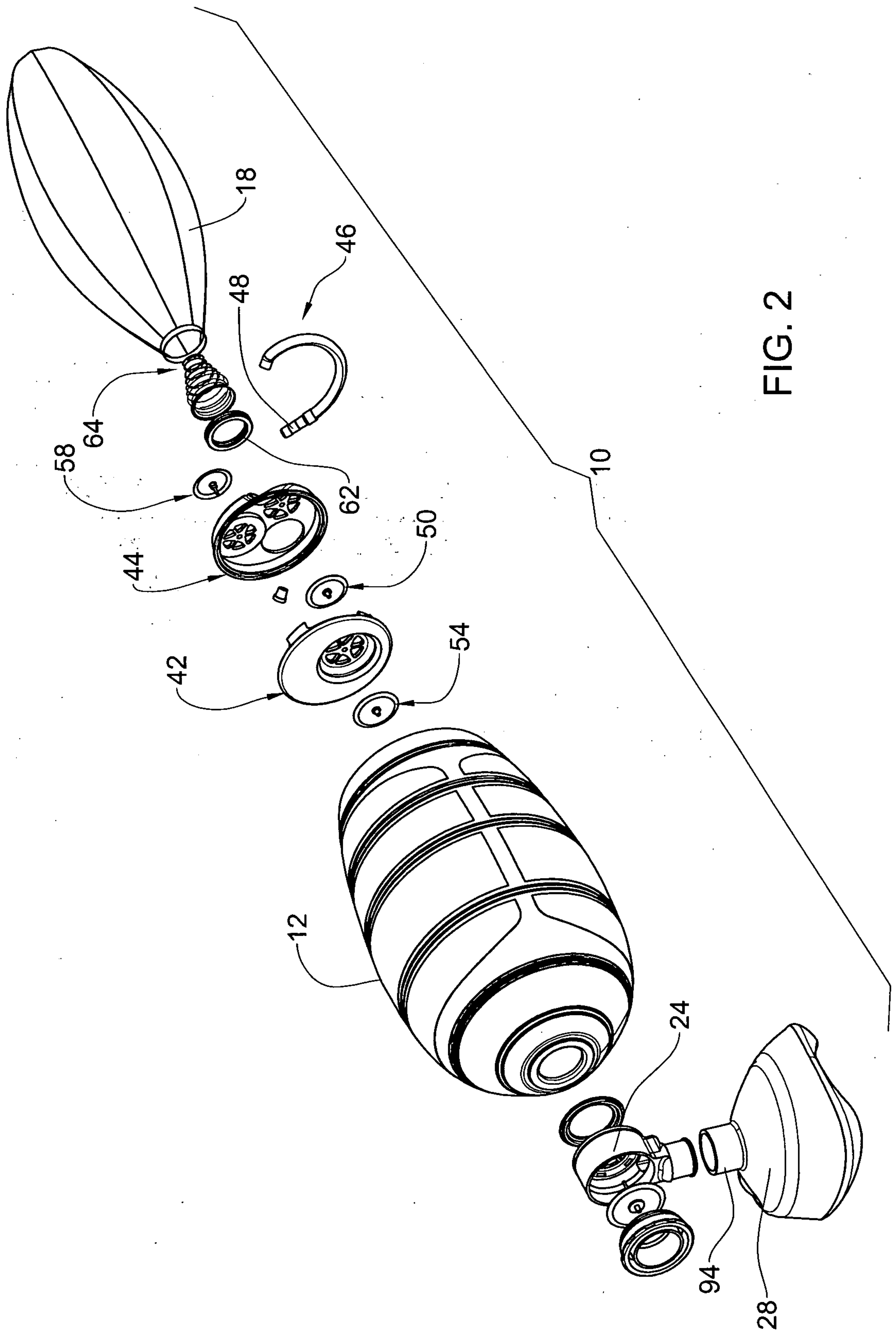


FIG. 2

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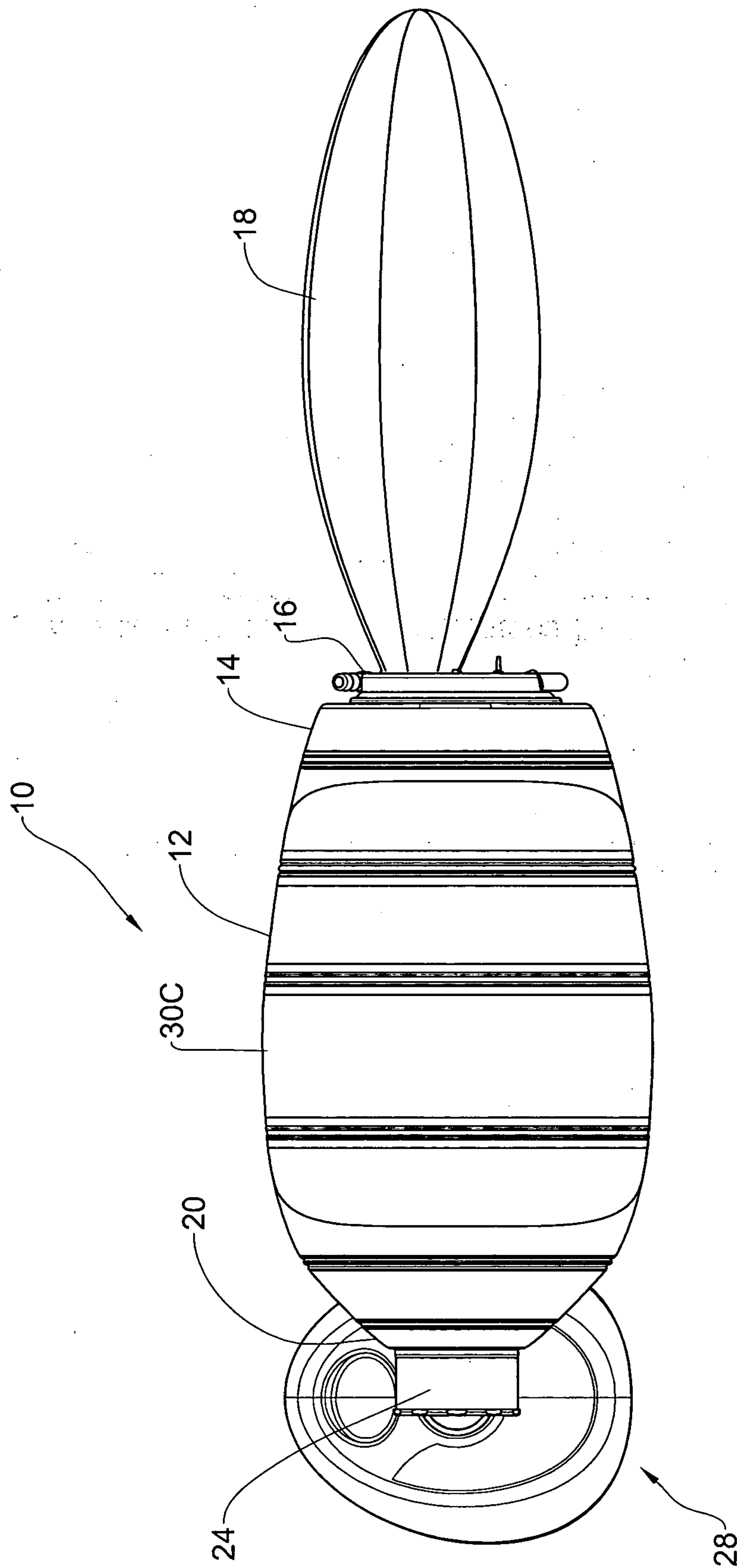


FIG. 3

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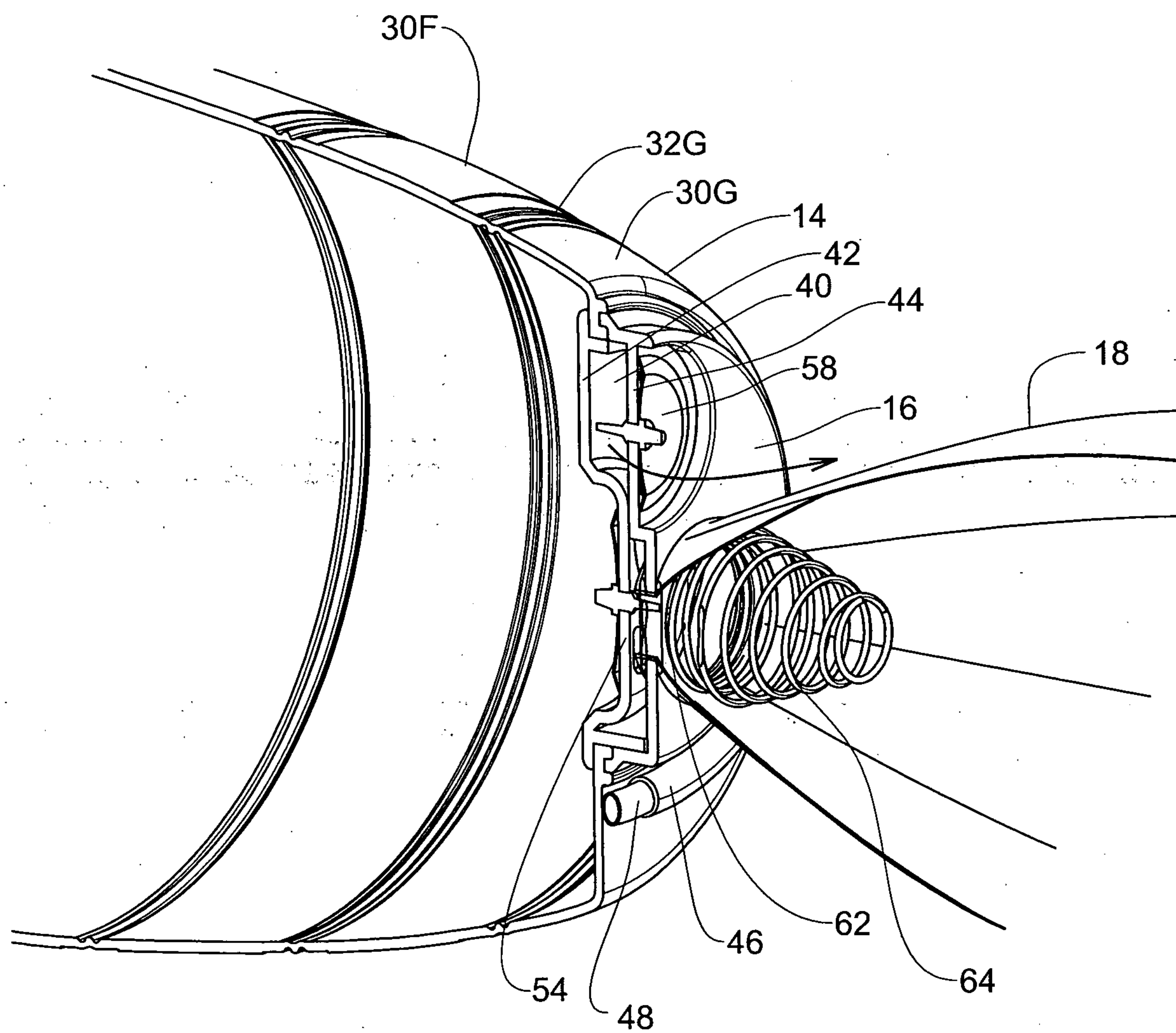


FIG. 4A

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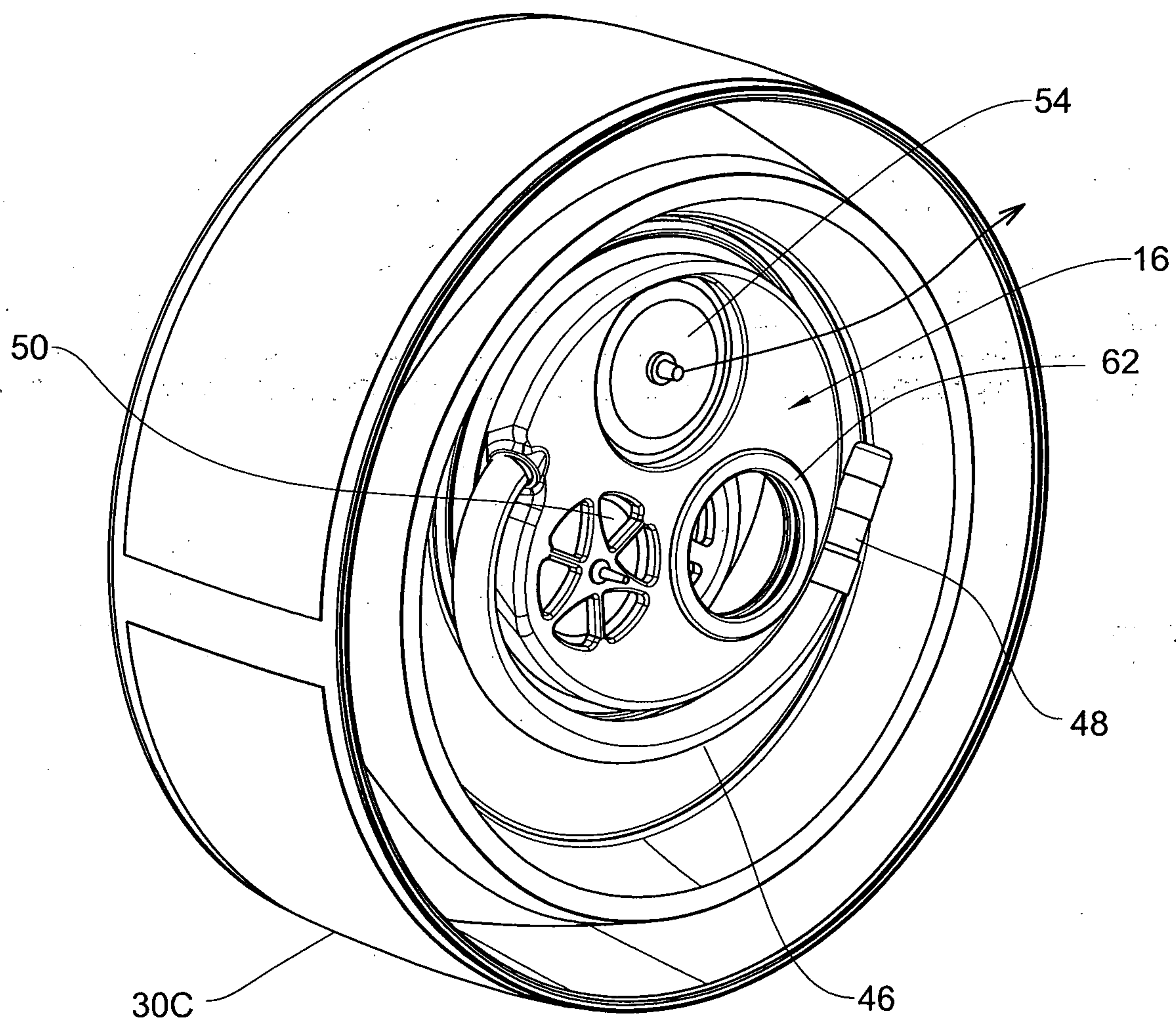


FIG. 4B

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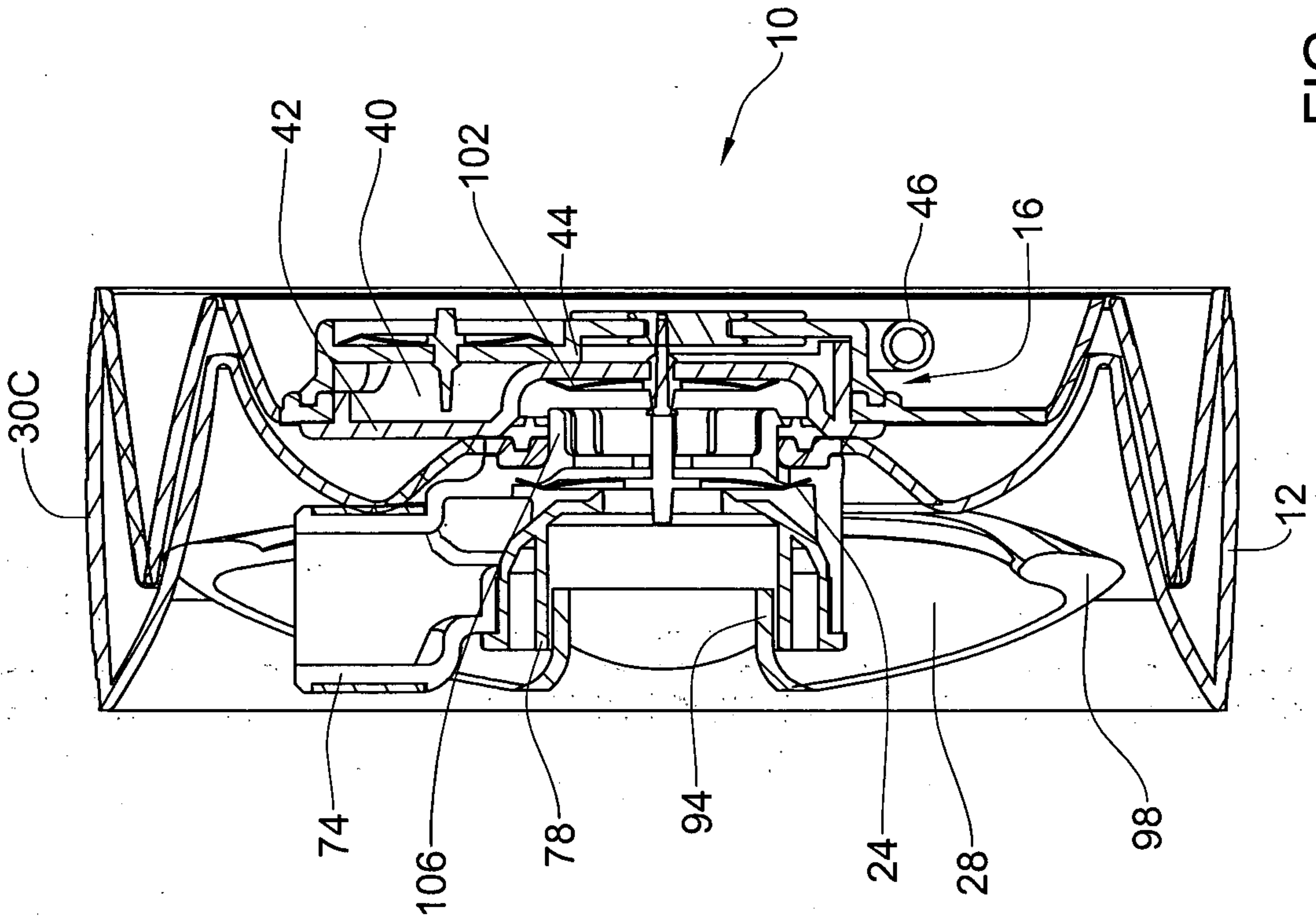


FIG. 5B

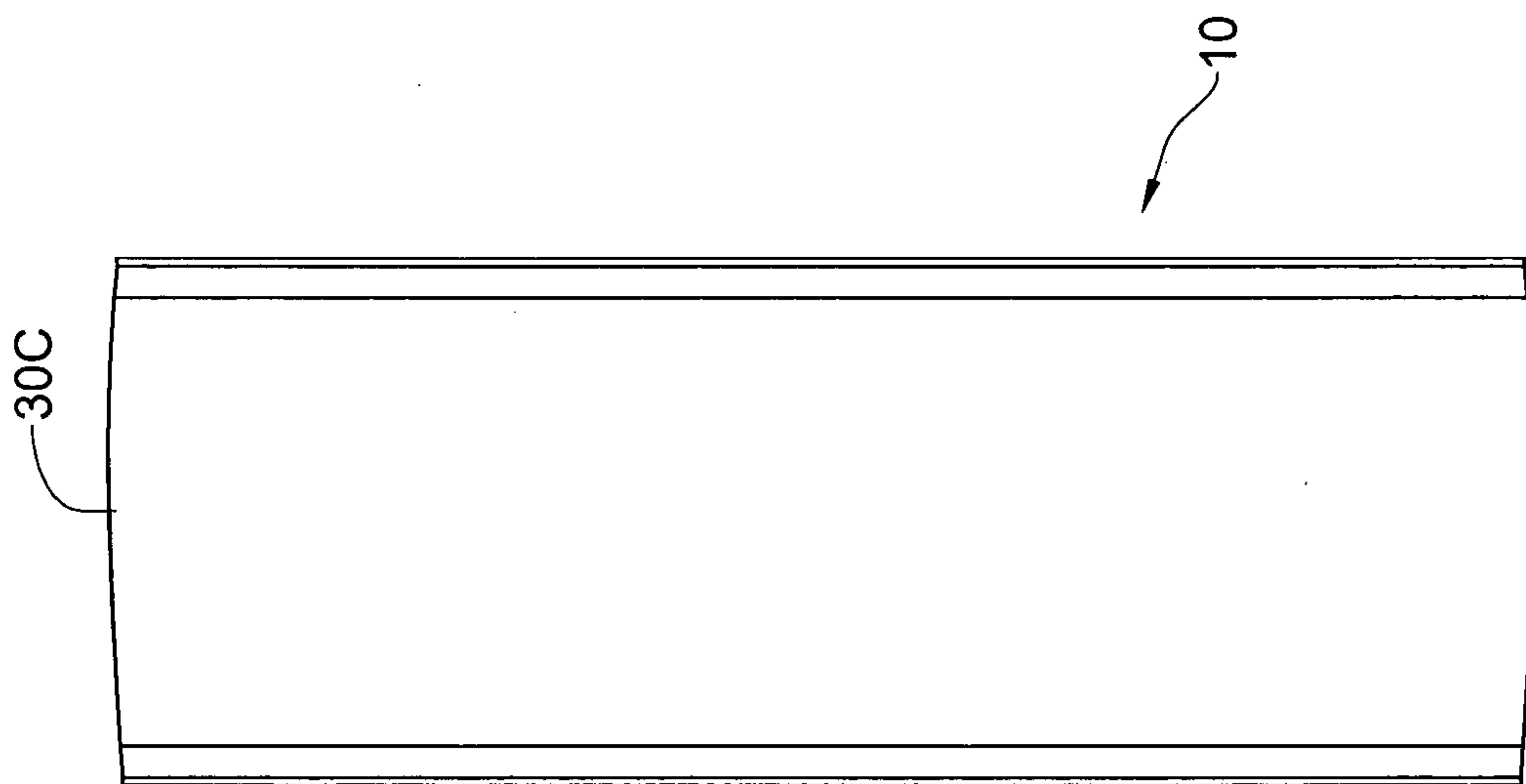


FIG. 5A

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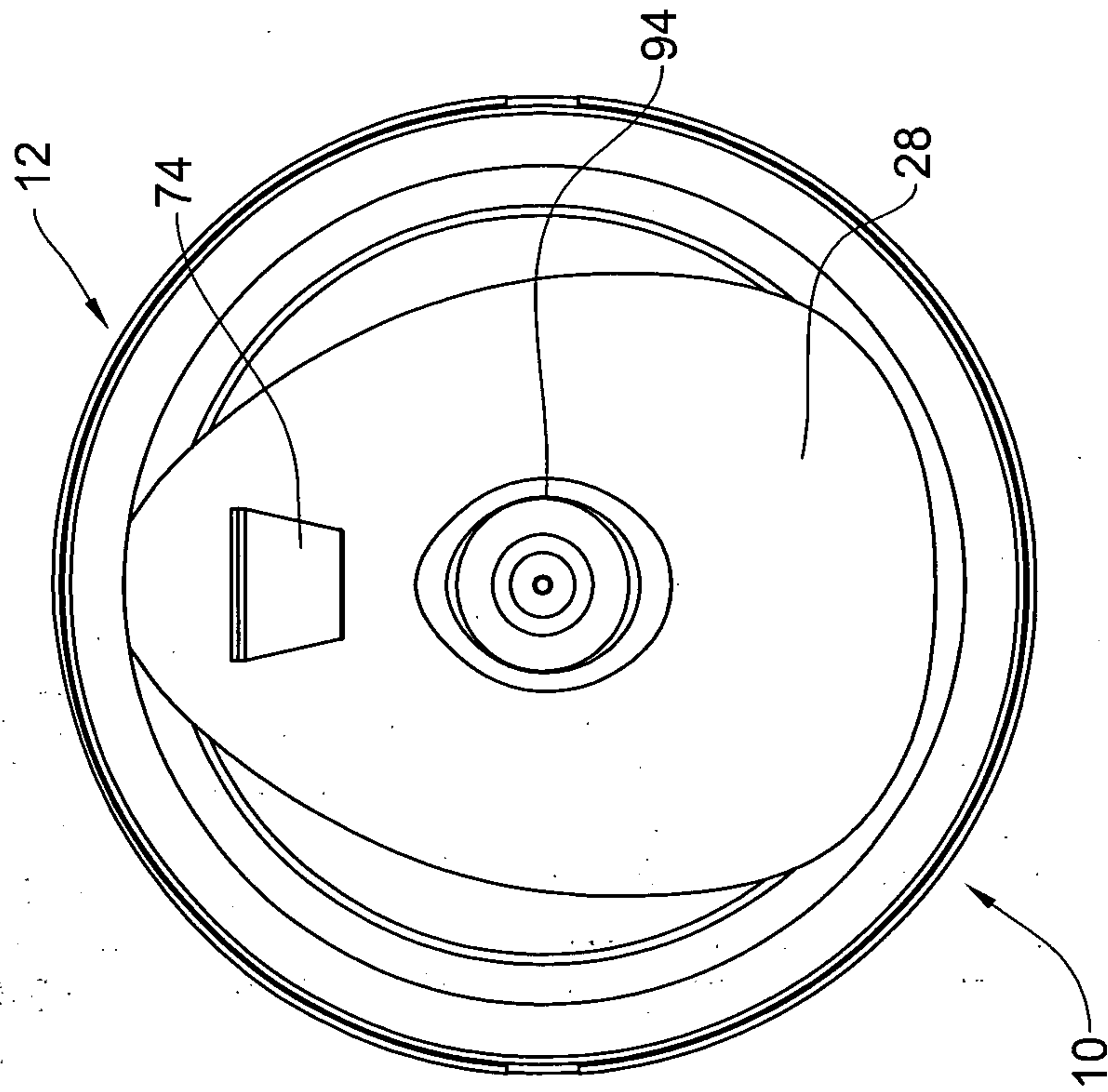


FIG. 5D

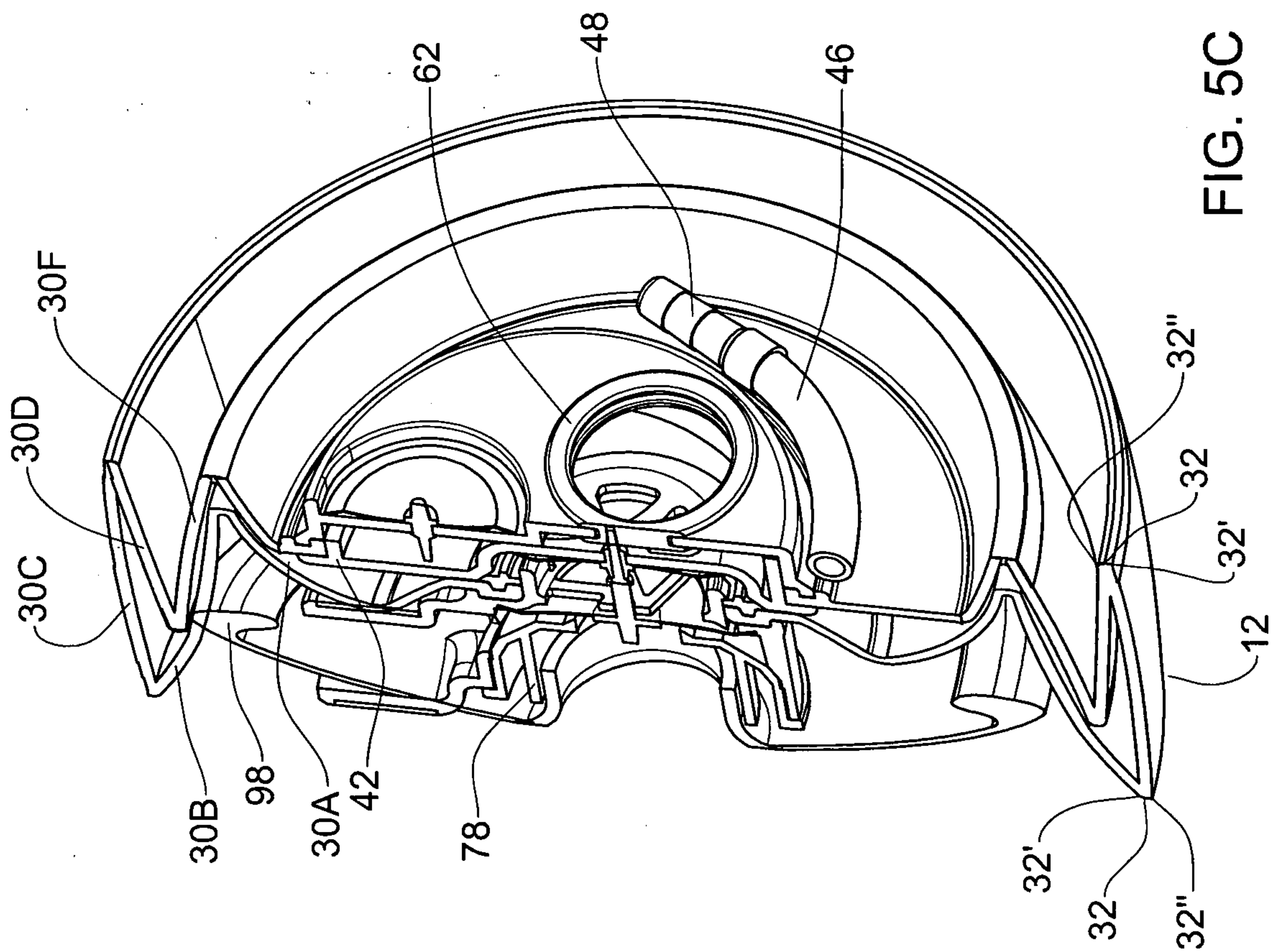


FIG. 5C

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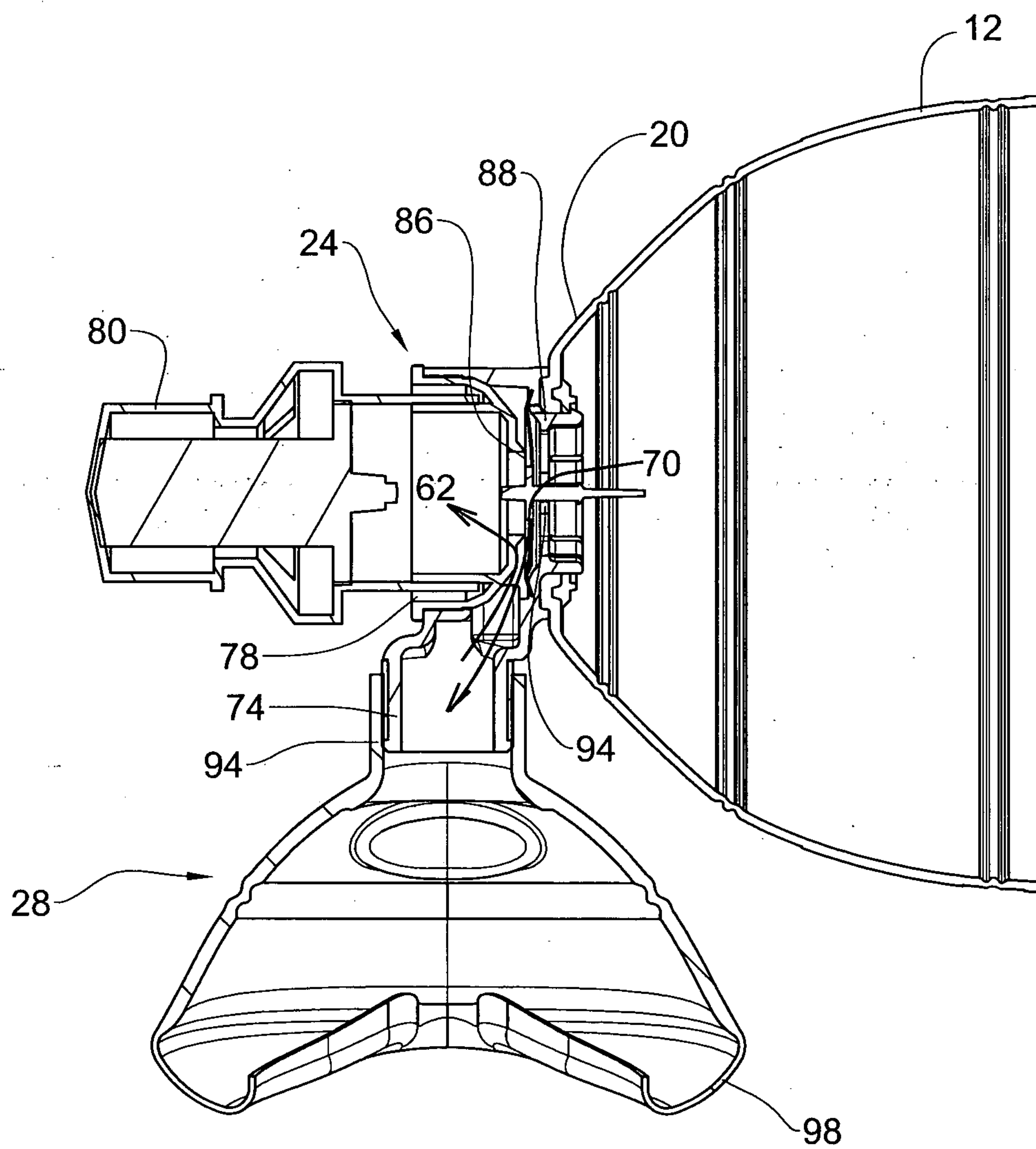


FIG. 6

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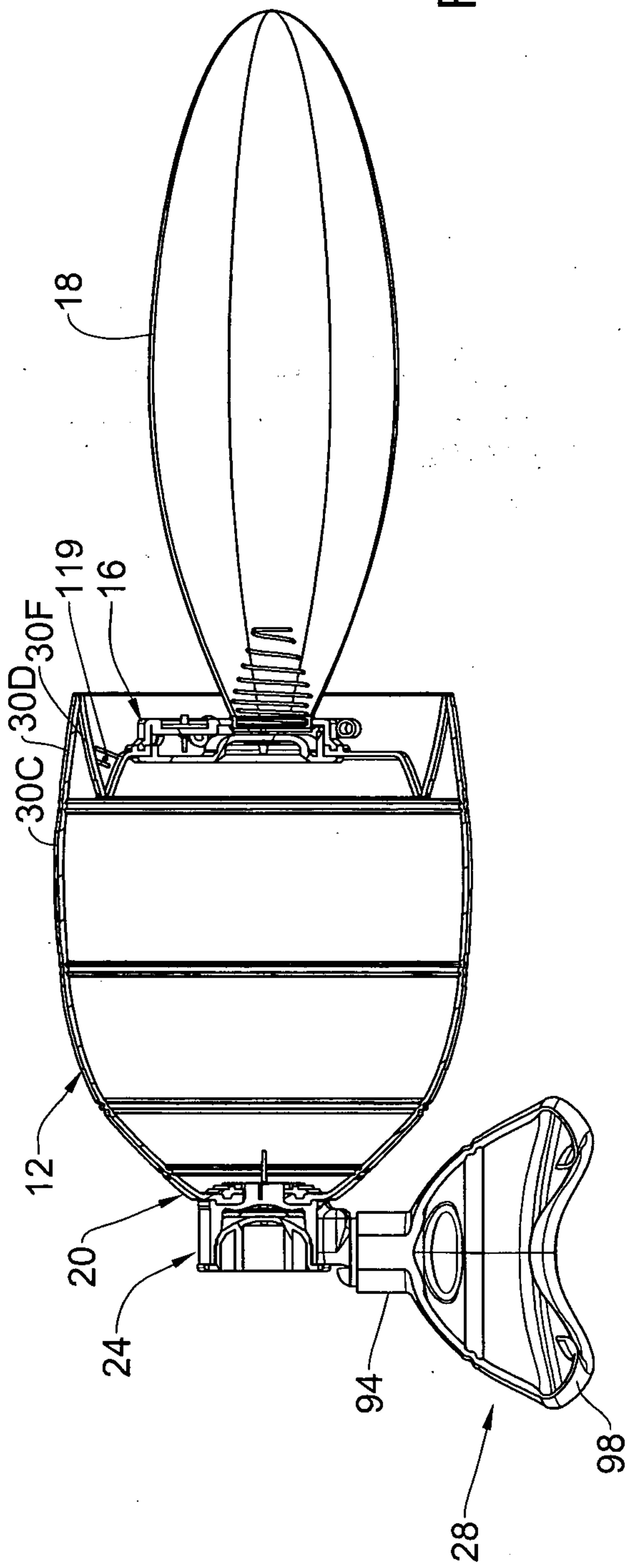


FIG. 7A

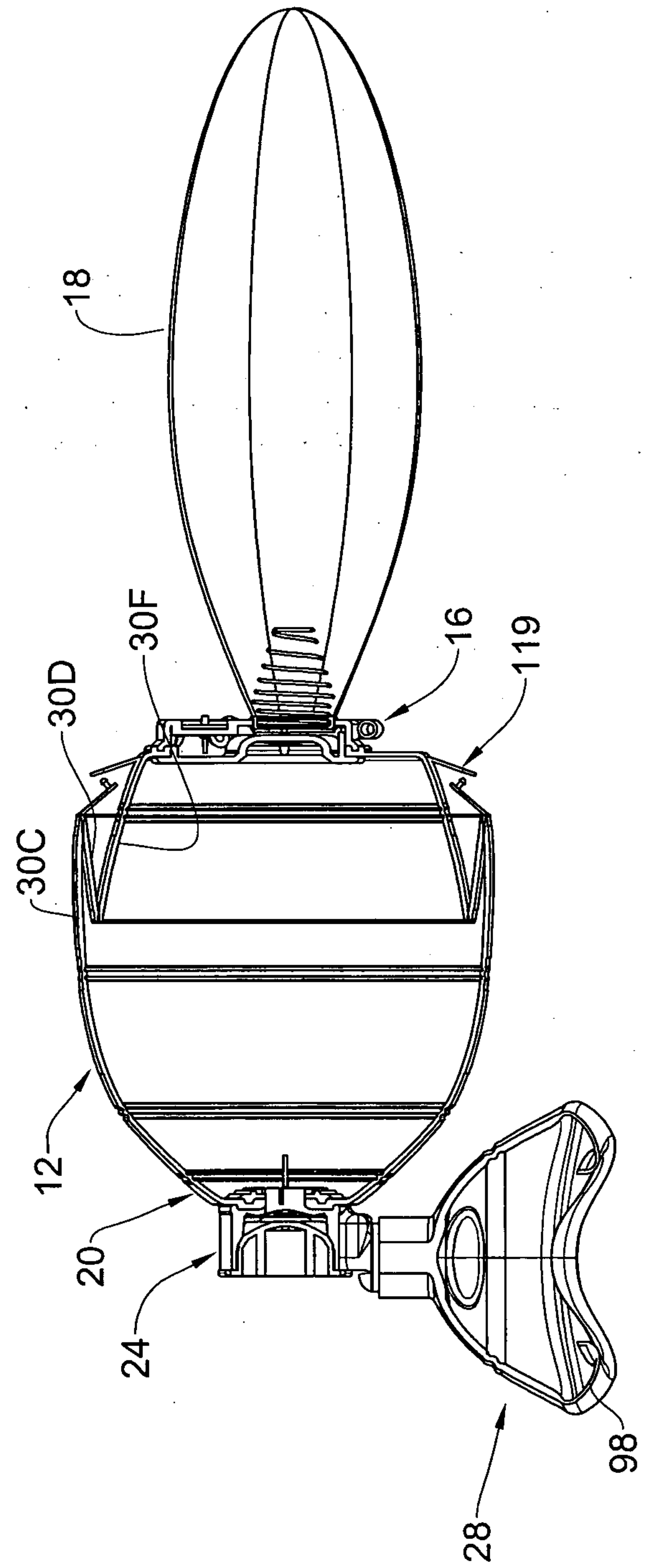
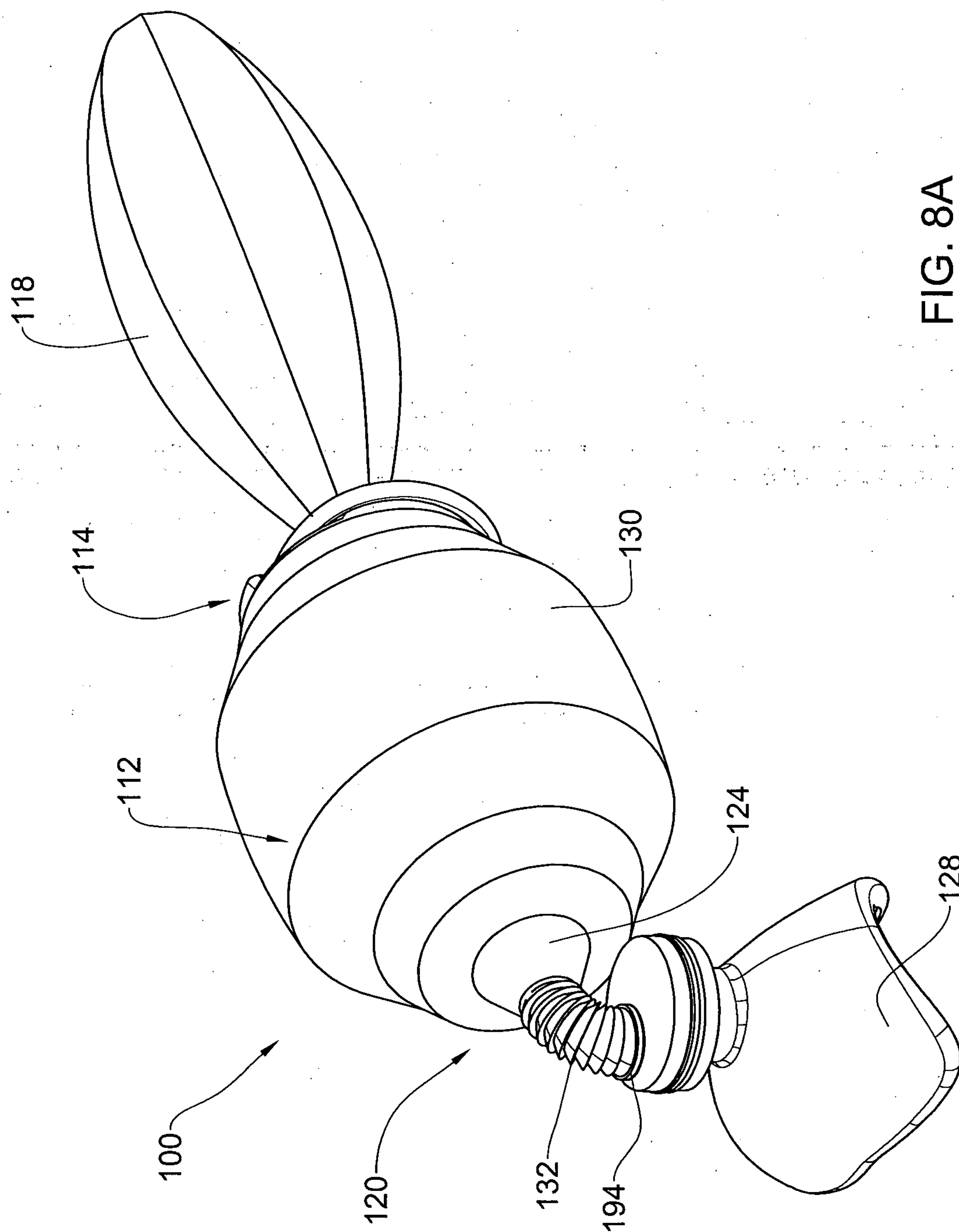


FIG. 7B

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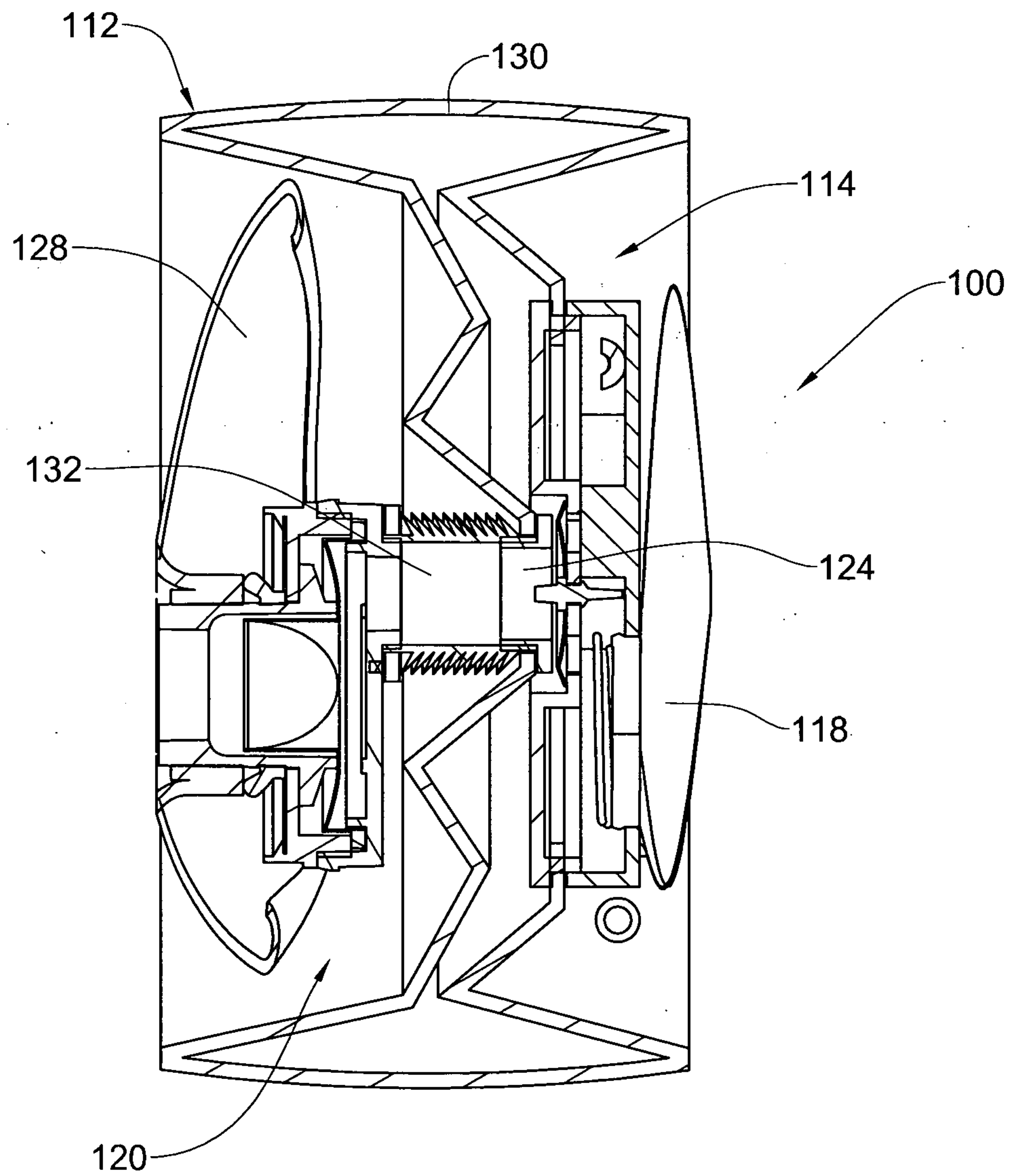


FIG. 8B

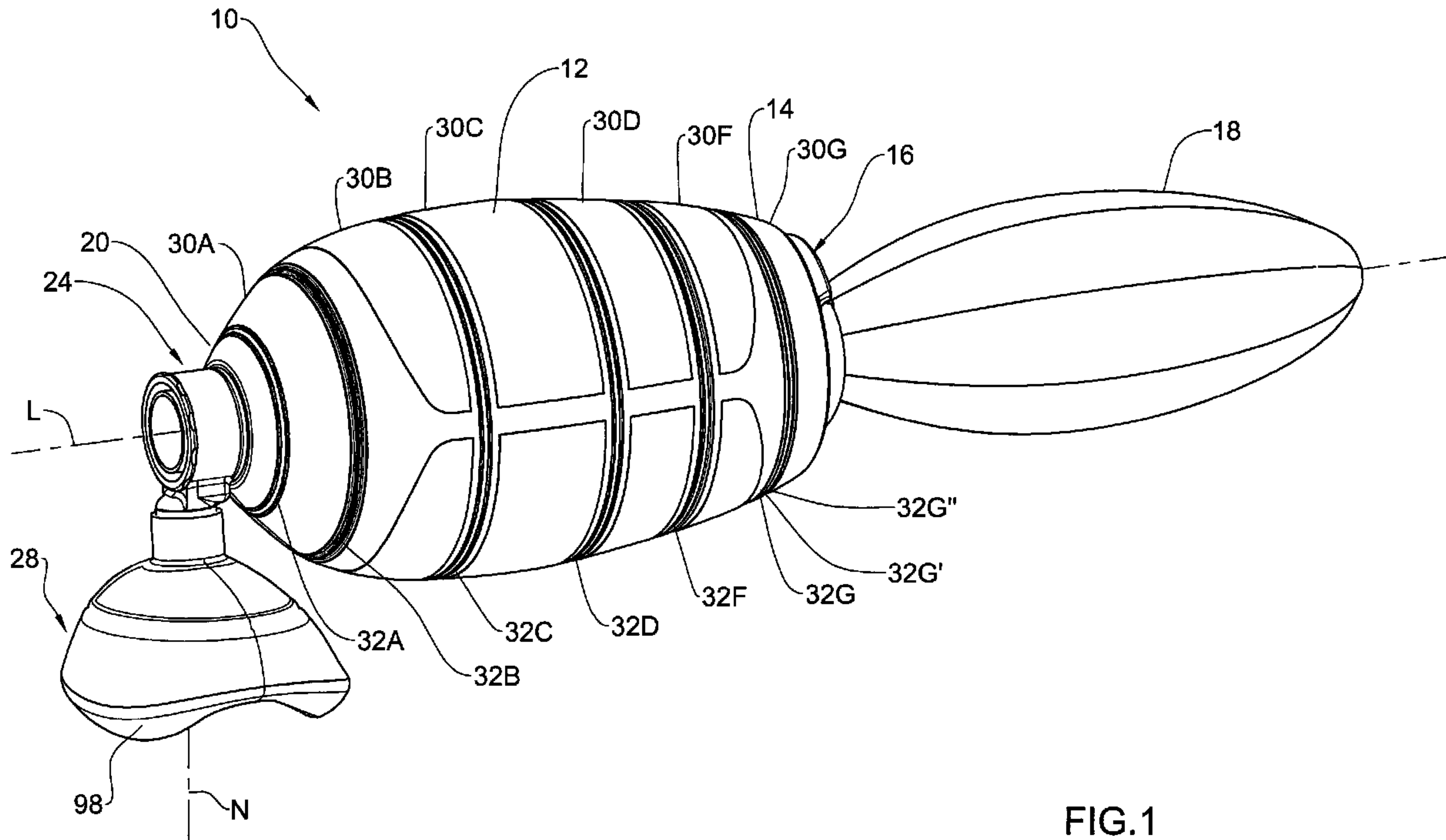


FIG.1