Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2171425 C 2002/02/05

(11)(21) 2 171 425

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 1994/09/12
(87) Date publication PCT/PCT Publication Date: 1995/03/23
(45) Date de délivrance/Issue Date: 2002/02/05
(85) Entrée phase nationale/National Entry: 1996/03/08
(86) N° demande PCT/PCT Application No.: US 1994/010237
(87) N° publication PCT/PCT Publication No.: 1995/007669
(30) Priorités/Priorities: 1993/09/13 (08/120,602) US;
1994/09/09 (08/303,691) US

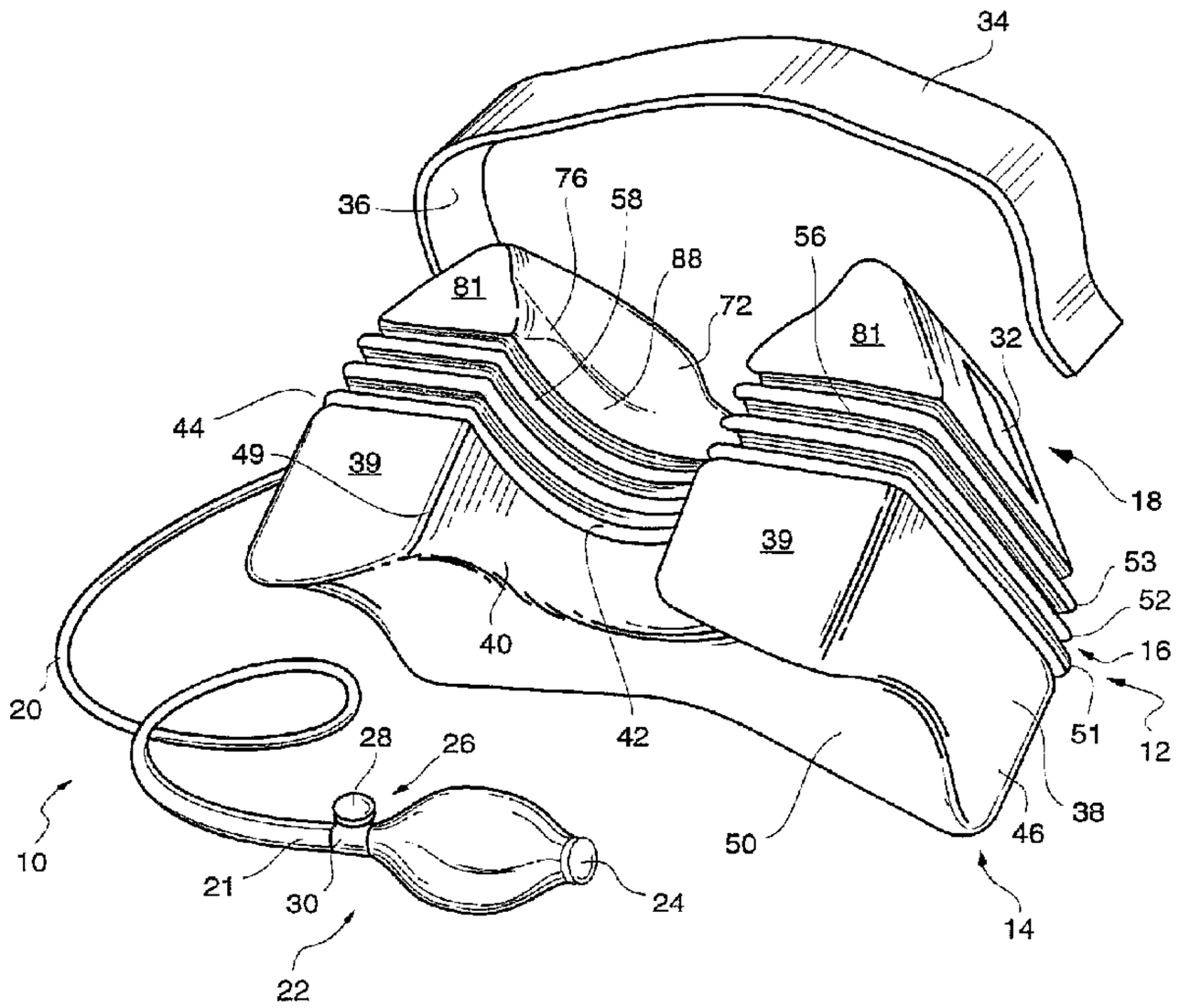
(51) Cl.Int.^{6}/Int.Cl.^{6} A61F 5/042

(72) Inventeur/Inventor:
Chitwood, Ralph M., US

(73) Propriétaire/Owner:
Glacier Cross, Inc., US

(74) Agent: BORDEN LADNER GERVAIS LLP

(54) Titre : DISPOSITIF GONFLABLE POUR TRACTION/EXTENSION CERVICALES
(54) Title: INFLATABLE CERVICAL TRACTION/STRETCH DEVICE



(57) Abrégé/Abstract:
A novel cervical traction or stretch device provided herein. Such device includes a hollow a cervical traction or stretch device. That device includes a hollow inflatable body which is made of an elastically-expandable material. The body includes a shoulder portion, a head portion and a bellows portion which is situated between the shoulder portion and the head portion. The bellows portion, the shoulder portion and the head portion have aligned U-shaped openings therein which are configured to receive and support a neck of a user. Structure is connected to the body, for pumping air into the body, thereby to extend the distance between the shoulder portion and the head portion and for relieving or releasing air out of the body. The head portion, the bellows portion and the shoulder portion have an uninflated condition, a first inflated condition and a second inflated condition. In the second inflated condition the bellows portion is expanded and acts against, and between, the head portion and the shoulder portion, thereby to extend the distance between the shoulder portion and the head portion.

ABSTRACT

A novel cervical traction or stretch device provided herein. Such device includes a hollow a cervical traction or stretch device. That device includes a hollow inflatable body which is made of an elastically-expandable material. The body includes a shoulder portion, a head portion and a bellows portion which is situated between the shoulder portion and the head portion. The bellows portion, the shoulder portion and the head portion have aligned U-shaped openings therein which are configured to receive and support a neck of a user. Structure is connected to the body, for pumping air into the body, thereby to extend the distance between the shoulder portion and the head portion and for relieving or releasing air out of the body. The head portion, the bellows portion and the shoulder portion have an un-inflated condition, a first inflated condition and a second inflated condition. In the second inflated condition the bellows portion is expanded and acts against, and between, the head portion and the shoulder portion, thereby to extend the distance between the shoulder portion and the head portion.

(a) **TITLE OF THE INVENTION**

INFLATABLE CERVICAL TRACTION/STRETCH DEVICE

(b) **TECHNICAL FIELD TO WHICH THE INVENTION RELATES**

The present invention relates to an inflatable, one-piece cervical traction/stretch device which is positioned under the neck of a user who is lying on a flat surface and between the shoulders and the head of the user.

(c) **BACKGROUND ART**

Heretofore it has been proposed to provide a traction pillow and a inflatable cervical traction pillow. Examples of such pillows are disclosed in the following U.S. Patents:

U.S.Patent No.	Patentee
5,060,661	Howard
4,832,007	Davis, Jr. et al.
4,805,603	Cumberland
4,771,493	Park
4,732,144	Cunanan

(d) **DESCRIPTION OF THE INVENTION**

By a first broad aspect, the present invention provides a cervical traction or stretch device which includes a hollow inflatable body which is made of an elastically-expandable material. The body includes a shoulder portion, a head portion and a bellows portion which is situated between the shoulder portion and the head portion. The bellows portion, the shoulder portion and the head portion have aligned U-shaped openings therein which are configured to receive and support a neck of a user. Means are connected to the body for pumping air into the body, thereby to extend the distance between the shoulder portion and the head portion and for relieving or releasing air out of said body. The head portion, the bellows portion and the shoulder portion have an un-inflated condition, a first inflated condition and a second

inflated condition. In the second inflated condition, the bellows portion is expanded and acts against, and between, the head portion and the shoulder portion, thereby to extend the distance between the shoulder portion and the head portion.

By one variant of this first broad aspect of this invention, the elastically-expandable material is thicker in the shoulder portion and in the head portion than in the bellows portion so that, when the body is inflated from the first inflated condition to the second inflated condition, the bellows portion expands more than the head and shoulder portion.

By a second variant of this first broad aspect of this invention and/or the first variant thereof, the shoulder portion has an outer end surface which is specifically contoured to seat over the top centre and front chest portions of the left and right shoulders when the body is inflated in the first inflated condition or in the second inflated condition.

By a third variant of this first broad aspect of this invention and/or the above variants thereof, the aligned U-shaped openings are defined by U-shaped surfaces, and the U-shaped surfaces in the middle, bight area, of the U-shaped openings conform generally to the natural cervical curve of a neck of a user which is receivable therein.

By a fourth variant of this first broad aspect of this invention and/or the above variants thereof, the head portion has means for receiving the neck and head of a user of the device, the means including contoured curved head-receiving surfaces for receiving and supporting a neck or head of a patient, and support structure in the contoured surfaces including a shoulder and an adjacent lift surface for engaging and exerting pressure against the occipital bone of a head of a patient which is received in the head portion.

By a fifth variant of this first broad aspect of this invention and/or the above variants thereof, the cervical traction or stretch device further includes a head strap, fastening means on each side of the head portion and attachment means on one side of the head strap adjacent to at least each end of the head strap for coupling with the

fastening means on each side of the head portion.

By a sixth variant of this first broad aspect of this invention and/or the above variants thereof, the means for releasing air into, and for releasing air out, or relieving air from, the bellows portion includes a conduit and a bulb-type air pump at the outer end of the conduit, the bulb-type air pump having a one way inlet valve at an outer end thereof and, at an inner end thereof, a manually-operated relief valve.

By a seventh variant of this first broad aspect of this invention and/or the above variants thereof, the means for pumping air into, or out of, the body includes means for intermittently pumping air into, and releasing air out of, the body for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

By a first variation thereof, the means for pumping air into, or out of, said bellows portion includes an electrically-operated pump and a timer for controlling operation of the electrically operated pump whereby air can be intermittently pumped into and out of said bellows portion for treating soft tissue or disk dysfunctions, including arthritis, in the neck of a user.

A second broad aspect of this invention provides a cervical neck stretching device comprising an inflatable bladder having a central U-shaped space so that the bladder can extend at least part way around the neck of a user. The device includes a pumping mechanism coupled to the inflatable bladder and operable by a user for pumping air into the bladder. The inflatable bladder has an upper side and a lower side. The lower side is constructed and arranged to be positioned adjacent to shoulders of a user, and to exert pressure thereagainst when inflated. The upper side is constructed and arranged to engage and exert pressure against the base of a head of a user.

A third broad aspect of this invention provides a cervical traction or stretch device comprising a hollow inflatable body which is made of an elastically-expandable material. The hollow, inflatable body has a shoulder-engaging portion and a head-engaging portion. A pumping mechanism is connected to the hollow, inflatable body for

pumping air into the hollow, inflatable body and for releasing air from the body. A bellows is dispersed between the shoulder-engaging portion and the engaging portion. The bellows has an undulated or pleated wall with the undulations or pleats extending transversely of a neck of a user. The bellows also has an inflated condition where the bellows is expanded so that the shoulder-engaging portion and the head-engaging portion engage and act against, and between, a shoulder and head of a user to extend the distance between the shoulder-engaging portion and the head-engaging portion.

By a first variant of this third broad aspect of this invention, the pumping means for pumping air into the bellows includes a conduit and a bulb air pump at the outer end of the conduit where the bulb type air pump has a one-way inlet valve and, at an inner end thereof, a manually-operated relief valve.

By a second variant of this third broad aspect of this invention and/or this first variant of this third broad aspect of the invention, the cervical traction or stretch device further includes a head strap, fastening means on each side of the head portion and attachment means on one side of the head strap adjacent to at least each end of the head strap for coupling with the fastening means on each side of the head portion.

By a first variation thereof, the means for pumping air into the bellows includes an electrically-operated pump and a timer for controlled operation of the electrically-operated pump, whereby air can be intermittently pumped into, and out of, the bellows for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

By a third variant of this broad aspect of this invention and/or the above variants thereof, the shoulder-engaging portion is defined by a shoulder portion at a lower end of the bellows, the head portion at an upper side of said bellows, and the head portion and the shoulder portion have aligned U-shaped openings.

By a first variation thereof, the elastically-expandable material is thicker in the shoulder portion and in the head portion than in the bellows so that, when the body is inflated from a first inflated

condition to a second inflated condition, the bellows expands more than said shoulder portions.

By a fourth variant of this third broad aspect of this invention and/or the above variants thereof, the shoulder portion has an outer end surface which is specially contoured to seat over the top centre and front chest portions of the left and right shoulders of a user and to bear against the left and right shoulders when the hollow, inflatable body is inflated in a first inflated condition or in a second inflated condition.

By a fifth variant of this third broad aspect of this invention and/or the above variants thereof, the aligned U-shaped openings are defined by U-shaped surfaces, and the U-shaped surfaces in the middle, bight area, of the U-shaped openings conform generally to the natural cervical curve of a neck of a user which is receivable therein.

By a sixth variant of this third broad aspect of this invention and/or the above variants thereof, the head portion has surface means for receiving the neck and head of a user of the device, the surface means including contoured curved head surfaces for receiving and supporting a head of a user or a head of a patient, and support structure in the contoured surfaces including a shoulder and adjacent lift surface for engaging and exerting pressure against the occipital bone of a head of a patient which is received in said head portion.

By a seventh variant of this third broad aspect of this invention and/or the above variants thereof, the cervical traction or stretch device includes a head strap, fastening means on each side of the head portion and attachment means on one side of the head strap adjacent to at least each end of the head strap for coupling with the fastening means on each side of the head portion.

A fourth broad aspect of this invention provides a cervical traction or stretch device comprising an inflatable and expandable bellows having an undulating or pleated wall and a central U-shaped space so that the bellows can extend at least part way around the neck of a user with the undulating or pleated wall extending transversely of the neck of a user. A pumping mechanism is coupled to the bellows

and is operable by a user for pumping air into the bellows for expanding same. The bellows have an upper side and a lower side. The lower side is constructed and arranged to be positioned adjacent the shoulders of a user and to exert pressure thereagainst when the bellows is inflated and expanded. The upper side is constructed and arranged to engage and exert pressure against the base of a head of a user when the bellows is inflated and expanded.

By a first variant of this fourth broad aspect of this invention, the pumping means for pumping air into the bellows includes a conduit and a bulb-type air pump at the outer end of said conduit, the bulb-type air pump having a one way inlet valve at an outer end thereof and, at an inner end thereof, a manually-operated relief valve.

By a second variant of this fourth broad aspect of this invention and/or the above first variant of the fourth broad aspect of this invention, the pumping means includes means for intermittently pumping air into, and releasing air out of, the bellows for treating soft tissue or disk dysfunctions, including arthritis, in the neck of a user.

By a first variation thereof, the means for intermittently pumping air into the bellows includes an electrically-operated pump and a timer for controlling operation of said electrically-operated pump, whereby air can be intermittently pumped into, and out of, the bellows for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

As noted above, the device of an aspect of the invention is of a type which includes an expandable, inflatable body which is made of an elastically-expandable material and having a shoulder portion, a bellows portion and a head portion. An air pump is connected to the body for filling the head and shoulder portion and for expanding and contracting the bellows portion, thereby to stretch the neck and release stretching force on the neck.

According to an aspect of the present invention, therefore, cervical traction/stretch device is provided which includes a hollow inflatable body which is made of an elastically-expandable material.

The bellows portion, the shoulder portion and the head portion have aligned U-shaped openings therein which are configured to receive and support a neck of a patient. Air pump and relief structure are connected to the body, for pumping air into the body and for relieving, or releasing, air out of the body. The bellows portion has an un-inflated condition, a first inflated condition and a second inflated condition where the bellows portion is expanded and acts against and between the head portion and the shoulder portion.

(e) **DESCRIPTION OF THE FIGURES**

In the accompanying drawings

FIG. 1 is a perspective view of the inflatable cervical traction/stretch device constructed according to the teachings of an embodiment of an aspect of the present invention.

FIG. 2 is a top plan view of a body of the inflatable cervical traction/stretch device shown in FIG. 1.

FIG. 3 is an end plan view of the body of the cervical traction/stretch device shown in FIG. 2 and is taken along line 3-3 of FIG. 2.

FIG. 4 is a sectional view through the body of the cervical traction/stretch device shown in FIG. 2 and is taken along line 4-4 of FIG. 2.

FIG. 5 is a sectional view through the body of the cervical traction/stretch device shown in FIG. 2 and is taken along line 5-5 of FIG. 2.

FIG. 6 is a sectional view through the body of the cervical traction/stretch device shown in FIG. 2 and is taken along line 6-6 of FIG. 2.

FIG. 7 is a sectional view through a head portion of the body of the cervical traction/stretch device and is taken along line 7-7 of FIG.3.

FIG. 8 is a side plan view of the cervical traction/stretch device of an embodiment of an aspect of the present invention with the neck

of a patient resting therein and with the device being in an inflated, but non-extended condition.

FIG. 9 is a side elevational view of a patient resting in the cervical traction/stretch device of an aspect of the present invention similar to the view shown in FIG. 8, but showing the cervical traction/stretch device of an embodiment of an aspect of the present invention in an inflated and extended condition for stretching or placing traction on the neck of a patient.

(f) **AT LEAST ONE MODE FOR CARRYING OUT THE INVENTION**

Referring now to the drawings in greater detail there is illustrated in FIG. 1 an inflatable cervical traction/stretch device 10 constructed according to the teachings of an aspect of the present invention. The device 10 includes a body 12 including a shoulder portion 14, a bellows portion 16, and a head portion 18.

As shown in FIG. 1, the device is inflated in a first inflated condition from an un-inflated condition (not shown) in which the shoulder portion 14, the bellows portion 16 and the head portion 18 are completely deflated.

The shoulder portion 14, the bellows portion 16 and the head portion 18 are made of an elastically-expandable material, e.g., rubber. When in the first inflated condition, they have sufficient rigidity or hardness to establish traction, stretching or lift surfaces, thereby to enable maximum traction forces to be created.

The cervical traction/stretch device 10 of an aspect of this invention further includes a tubing 20 which is connected to the bellow portion 16 and having, at an outer end 21 thereof, an air pump 22 in the form of compressible bulb 22 for pumping the cervical traction/stretch device 10 of an aspect of this invention with air. The compressible bulb 22 has, at its outer end, a one-way inlet valve 24 which allows air to be sucked into the bulb 22, but does not allow air to flow out of the bulb 22 when it is compressed.

Adjacent to the bulb 22 and mounted on the tubing 20 is a relief valve 26 which comprises a knurled thumbscrew 28 which is mounted in

a metal collar 30 which is fixed to the tubing 20. When the thumbscrew 28 is rotated into the collar 30, no air can escape from the cervical traction/stretch device 10 of an aspect of this invention. When the thumbscrew 28 is threaded outwardly, the valve 26 is opened to allow compressed air to escape from the cervical traction/stretch device 10 of an aspect of this invention through the tubing 20 and out of the relief valve 26.

In addition to the compressible bulb 22 and the tubing 20, the cervical traction/stretch device 10 of an aspect of this invention includes, on either side of the head portion 18, a loop-and-hook-type fastening structure 31, 32 (FIG. 3) of the type sold under the trademark VELCRO™, and a head strap 34 which is adapted to be received over a head of a patient. The strap 34 has, on its inner surface 36, a fabric texture which is adapted to attach to the fastening structures 31 and 32. This is shown in FIGS. 8 and 9 where there is shown a head of a patient resting in the cervical traction/stretch device 10 of an aspect of this invention with the shoulder portion 14 bearing against the shoulders of the patient and the head of the patient being received in the head portion 18 with the head strap 34 extending over the forehead and being connected to the fastening structures 31 and 32 on either side of the head portion 18.

When inflated to the first inflated condition, as shown in FIGS. 2-7, the shoulder portion 14 is contoured to rest on the shoulders of a patient for enabling a counter-stretch force to be created by the cervical traction/stretch device 10 of an aspect of this invention. In this respect, it will be noted that the shoulder portion 14, the bellows portion 16 and the head portion 18 have various specially-shaped curved surfaces for allowing the device 10 of an aspect of this invention to create comfortable and therapeutic stretching to a neck of a patient.

The shoulder portion 14 has a bottom 36, opposite end walls 37 and 38, a contoured curved outer end surface 40 and an arcuate, semi-cylindrical or U-shaped surface 42 that extends downwardly from the top side 39 in the middle area thereof between two spaced-apart block

portions 44 and 46 of the shoulder portion 14.

As best shown in FIG. 1, the outer end surface 40 of the shoulder portion 14 inclines slightly inwardly towards the bellows portion 16 from each side wall 37 and 38 of the shoulder portion 14 to the middle of the shoulder portion 14 to accommodate the natural sloping of shoulders of a patient. Also from the top to bottom, the contoured end surface 40 is curved inwardly and then outwardly to form arcuate surfaces 49 or 50 on the respective block portions 44 and 46 which are received over the natural contour of left and right shoulders of a patient. The extent of the U-shaped surface 42 varies from one inch in the middle area of the body 12 to two inches at the top side 39.

The construction of the curved outer end surface 40 of the shoulder portion 14 enables the shoulder portion 14 to fit easily over the front and centre portions of the shoulders of a patient or user to enable a better and more manageable stretch force to be applied against the shoulders of a patient with a minimum of slippage.

The bellows portion 16 is constructed with a plurality, e.g., three, undulations 51, 52 and 53 in the illustrated embodiment and is constructed and arranged to raise and support the cervical curve of a neck of a patient during inflation. It also provides an even force along the width of the shoulder portion 14 and most importantly, along the width of the head portion 18.

The bellows portion 16 is generally rectangular and extends substantially the full height and width of the body 12 of the device 10 of an aspect of this invention. The bellows portion 16 has a top side 56 and an arcuate, semi-circular or U-shaped surface 58 extending downwardly from the top side 56 generally aligned with the U-shaped surface 42 of the shoulder portion 14 to provide a nesting support for a neck of a patient.

Most cervical injuries to patients involve the loss of the natural cervical curve forming a so-called military neck or straight neck syndrome. This creates stress on the upper thoracic muscles, as these muscles are forced to hold the head upright. When the natural curve is in place, the head weight is distributed throughout the skeletal

system. The body 12 of the cervical traction/stretch device 10 of an aspect of this invention is constructed so that the cervical curve of the patient is supported to relieve upper thoracic muscles from unnatural stress. The manner in which the shoulder portion 14 achieves this function at the centre of the body 12 of the cervical traction/stretch device 10 of an aspect of this invention is shown in FIG. 4, where the contoured surface 40 has a downwardly-inclined portion 60 going up to a flat or slightly upwardly-inclined surface portion 62 of the U-shaped surface 42.

Like the shoulder portion 14, the head portion 18 is also integrally-formed with the bellows portion 16. The head portion 18 has a generally arcuate or semi-cylindrical U-shaped surface 68 having a portion 70 (see FIG. 3) that inclines slightly downwardly at the centre to fit the cervical curve of the neck of a patient and has a head-receiving surface 72 having a centre portion 74 that curves downwardly for mating with the cervical curve.

The U-shaped surface 68 extends toward the outer end of the head portion 18 a distance 3/4 of an inch to one inch and forms a shoulder 76 on opposite sides of the U-shaped curved surface 68 but not at the centre of the U-shaped curved surface 68. This can be best seen in FIGS. 4, 5 and 6.

As shown in FIG. 4, there is very little of the shoulder 76, with the U-shaped surface 68, 70, at the bottom of the U connecting with the surface portion 74 of the head receiving 5 surface 72.

Also, as shown in FIGS. 4, 5 and 6, the inside of the inflatable cervical traction/stretch device 10 of an aspect of this invention is a hollow chamber 77 which encompasses the combined interior of the shoulder portion 14, the bellows portion 16 and the head portion 18.

The thickness of the rubber material that forms the device 10 of an aspect of this invention is generally uniform throughout the horizontal and vertical cross-section of the shoulder portion 14 as shown in FIGS. 4, 5, 6 and 7. The thickness of the material throughout the horizontal and vertical cross-section of the head portion 18 is also uniform. Finally, the thickness of the material throughout the

horizontal and vertical cross-sections of the bellows portion 16 is also uniform. However, preferably, the rubber material is thicker in the shoulder portion 14 and in the head portion 18 than in the bellows portion 16.

The thicker material in the shoulder portion 14 and the head portion 18 results in the bellows portion 16 being more readily expandable than the shoulder portion 14 and the head portion 18. Consequently, once the device 10 of an aspect of this invention is inflated from the un-inflated condition to the first inflated condition to take the shape shown in FIGS. 2-7, further inflation of the device causes the bellows portion 16 to expand a greater amount than the head and shoulder portions 14 and 18. The shoulder portion 14 and the head portion 16 remain inflated in a shape similar to the first inflated condition and do not become distorted while further expanding.

The further expansion of the bellows portion 16 occurs through the expansion of the undulations in the bellows portion 16, e.g., undulations 51, 52 and 53, in a controlled manner, to cause even pressure against and separation of the shoulder portion 14 and the head portion 18. This expansion causes comfortable and therapeutic stretching to a neck of a patient, while allowing the shoulder portion 14 and the head portion 18 to maintain the traction, stretching or lift surfaces created when the device 10 of an aspect of this invention is inflated to the first inflated condition.

As shown in FIG. 5, part way up either side of the U-shaped surface 68, the shoulder 76 is pronounced and is located at the junction between the U-shaped surface 68 and the specially-contoured head receiving surface 72. The shoulder 76 at this location is adapted to bear against the occipital bone and defines, in the head-receiving surface, an occipital cervical pressure or lift surface 78 just outwardly of the shoulder 76.

This shoulder 76 and the adjacent pressure or lift surface 78 on the head-receiving surface 72 enables the head portion 18 to apply pressure at the region of the occipital bone of a patient on each side of the neck. It is believed that this pressure on the occipital bone

applied with the cervical traction/stretch device 10 of an aspect of this invention also can alleviate or relieve headache pain.

Looking now at FIGS. 4, 5 and 6, it will be appreciated that the body 12 has in the U-shaped openings and at the centre of the U-shaped surfaces 42, 58, 68 the curved straight or inclined surface portions 62, 60, 42, 58, 70 and 74 for receiving the cervical curve of the neck (FIG. 4). Then, as one moves to the left side or the right side of the U-shaped openings in the area of the U-shaped opening in the head portion 18, the head-receiving surface 72 has the pronounced shoulder 76, the occipital bone-receiving surface 78 and then a gentle sloping curving surface portion 80 (FIG. 6) for supporting the head above the occipital bone one each side of the head.

As shown in FIG. 6, near a top side 81 of the head portion 18, the U-shaped surface 68 slopes in a longitudinal direction downwardly and merges in or with a smooth downwardly-extending curved surface portion 82 of the head-receiving surface 72 which extends to an outer end 84 of the head portion 18 on each side of the head-receiving surface 72.

The U-shaped opening 58 in the bellows portion 16 has, in the extended or inflated condition, a depth of between three and four inches and preferably three and one-half inches.

Looking now at FIG. 2, it will be apparent that the specially contoured head-receiving surface 72 extends downwardly to a bottom 86 (FIG. 3) in the central area of the head portion 18 such that the head portion has a U-shaped notch 87 at the bottom thereof where the head of a patient can then rest on a flat surface.

Then the ends 84 of the head portion 18, on either side of the centre thereof, has left and right end wall portions 87, 88 extending upwardly from the flat bottom 86 of the head portion 18 to sloping end wall portions 89, 90 which slope upwardly and inwardly toward the top side 81 of the head portion 18.

Also, as best shown in FIG. 2 left and right outer sides 91, 92 of the head portion 18 are inclined from the bellows portion 16 inwardly and outwardly to the upwardly and inwardly inclined end wall portions 89, 90. On each of these left and right outer sides 91, 92 there is

provided the patches 31, 32 (FIG. 3) of hook-and-loop attaching material of the type sold under the trade-mark VELCRO™. Each patch 31, 32 is located on the inclined side 91 or 92 adjacent the bottom 86.

If desired, the bottom 86 of the head portion 18 can have an inclined slot or flute 94 or 95 therein on either side of the U-shaped notch 87 as shown in FIG. 3.

As best shown in FIGS. 1, 8 and 9 the head strap 34 has a fabric attachment structure 36 of the type sold under the trade-mark VELCRO™ on the inside 36 of the strap 34 which, at each end of the strap 34, is adapted to be received over a forehead of the patient and secured to the patches 31, 32 securely to hold the head of the patient to the head portion 18 of the body 12 of the cervical traction/stretch device 10 of an aspect of this invention to achieve the greatest stretch or traction.

In the use of the cervical traction/stretch device 10 of an aspect of this invention a user or patient will inflate the device from the un-inflated condition to the first inflated condition. Then the person will rotate the thumbscrew 28 to prevent air from escaping from the device 10 of an aspect of this invention. Then the person will place the inflated device 10 of an aspect of this invention on a flat surface, e.g., a floor or table and lay down on the floor or table with the cervical curve of the neck of the patient received over the centre of the U-shaped opening formed by the U-shaped opening, i.e., over surfaces or surface portions 62, 60, 42, 58, 72, 74, in the shoulder portion 14, the bellows portion 16 and the head portion 18. Then the user or patient or a doctor or other medical technician will place the strap 34 over the head of the user or patient and secure it firmly to the patches 31, 32. Next, the user, or a medical technician will pump the hand-held bulb-type air pump 22 further to inflate the device 10 of an aspect of this invention to the second inflated condition where the bellows portion 16 is expanded to create traction on the cervical area of the neck of the patient supported by the surface portions 62, 60, 42, 58, 72, 74, in the shoulder portion 14, the bellows portion 16 and the head portion 18.

If desired, an electrically-operated air pump (not shown) can be connected to the tubing 20 in place of the bulb-type hand-operated air pump 22. Such an electrically-operated pump will include a timer for cycling the electrical pump through intermittent pump and relief cycles, thereby to apply intermittent traction/stretch to the neck of the patient for treating soft tissue or disk dysfunctions, not limited to arthritis, of a patient. Intermittent traction/stretch is preferred by healthcare professionals as a method of treatment. In this modification, air can be pumped into, or released out of, the bellows portion 54 under the control of a timer having several different time cycles.

A user, patient or clinician can achieve some of the same benefits of electrically-controlled intermittent traction/stretch by intermittently pumping the inflation bulb 22 and operating the release valve 26.

From the foregoing description, it will be apparent that the cervical traction/stretch device 10 of an aspect of this invention has a number of advantages, some of which have been described above and others of which are inherent in the invention.

CLAIMS

1. A cervical traction or stretch device comprising:

a hollow, inflatable body made of an elastically-expandable material, said hollow, inflatable body including a shoulder portion, a head portion and a bellows portion which is situated between said shoulder portion and said head portion;

said bellows portion, said shoulder portion and said head portion having aligned U-shaped openings therein which are configured to receive and support a neck of a user;

means, which are connected to said hollow, inflatable body, for pumping air into said hollow, inflatable body, thereby to extend the distance between said shoulder portion and said head portion and for relieving or releasing air out of said hollow, inflatable body; and

said head portion, said bellows portion and said shoulder portion having an un-inflated condition, a first inflated condition and a second inflated condition, where said bellows portion is expanded and acts against, and between, said head portion and said shoulder portion, thereby to extend the distance between said shoulder portion and said head portion.

2. The cervical traction or stretch device of claim 1, wherein said elastically-expandable material is thicker in said shoulder portion and in said head portion than in said bellows portion so that, when said hollow, inflatable body is inflated from said first inflated condition to said second inflated condition, said bellows portion expands more than said head portion and said shoulder portion.

3. The cervical traction or stretch device of claim 1 or claim 2, wherein said shoulder portion has an outer end surface which is specifically contoured to seat over the top centre and front chest portions of the left and right shoulders when said body is inflated in said first inflated condition or in said second inflated condition.

4. The cervical traction or stretch device of claim 1, claim 2 or claim 3, wherein said aligned U-shaped openings are defined by U-shaped surfaces, and wherein said U-shaped surfaces in the middle, bight area, of said U-shaped openings conform generally to the natural cervical curve of a neck of a user which is receivable therein.

5. The cervical traction or stretch device of claims 1 to 4, wherein said head portion has means for receiving the neck and head of a user of the device, said means including contoured curved head-receiving surfaces for receiving and supporting a neck on head of a patient, and support structure in said contoured surfaces including a shoulder and an adjacent lift surface for engaging and exerting pressure against the occipital bone of a head of a patient which is received in said head portion.

6. The cervical traction or stretch device of claims 1 to 5, further including a head strap, fastening means on each side of said head portion and attachment means on one side of said head strap adjacent to at least each end of said head strap for coupling with said fastening means on each side of said head portion.

7. The cervical traction or stretch device of claims 1 to 6, wherein said means for releasing air into, and for releasing air out, or relieving air from, said bellows portion includes a conduit and a bulb-type air pump at the outer end of said conduit, and wherein said bulb-type air pump has a one-way inlet valve at an outer end thereof and, at an inner end thereof, a manually-operated relief valve.

8. The cervical traction or stretch device of claims 1 to 6, wherein said means for pumping air into, or out of, said body includes means for intermittently pumping air into, and releasing air out of, said body for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

9. The cervical traction or stretch device of claim 8, wherein said means for pumping air into, or out of, said bellows portion includes an electrically-operated pump and a timer for controlling operation of said electrically-operated pump, whereby air can be intermittently pumped into and out of said bellows portion for treating soft tissue or disk dysfunctions, including arthritis, in the neck of a user.

10. A cervical neck stretching device comprising an inflatable bladder having:

a central U-shaped space so that said inflatable bladder can extend at least part way around the neck of a user;

a pumping mechanism which is coupled to said inflatable bladder and which is operable by a user for pumping air into said bladder;

said inflatable bladder having an upper side and a lower side;

said lower side being constructed and arranged to be positioned adjacent to shoulders of a user, and to exert pressure thereagainst when inflated; and

said upper side being constructed and arranged to engage and exert pressure against the base of a head of a user.

11. A cervical traction or stretch device comprising:

a hollow inflatable body which is made of an elastically-expandable material;

said hollow, inflatable body having a shoulder-engaging portion and a head-engaging portion;

a pumping mechanism which is connected to said hollow, inflatable body for pumping air into said hollow, inflatable body and for releasing air from said hollow, inflatable body;

a bellows between said shoulder engaging portion and said head-engaging portion;

said bellows having an undulated or pleated wall with the undulations or pleats extending transversely of a neck of a user; and

said bellows having an inflated condition where said bellows is expanded so that said shoulder-engaging portion and said head-engaging

portion engage and act against, and between, a shoulder and head of a user to extend the distance between said shoulder-engaging portion and said head-engaging portion.

12. The cervical traction or stretch device of claim 11, wherein:

said pumping means for pumping air into said bellows includes a conduit and a bulb air pump at the outer end of said conduit; and

said bulb type air pump having a one-way inlet valve and, at an inner end thereof, a manually-operated relief valve.

13. The cervical traction or stretch device of claim 11 or claim 12, further including a head strap, fastening means on each side of said head portion and attachment means on one side of said head strap adjacent at least each end of said head strap for coupling with said fastening means on each side of said head portion.

14. The cervical traction or stretch device of claim 13, wherein said means for pumping air into said bellows includes an electrically-operated pump and a timer for controller operation of said electrically-operated pump, whereby air can be intermittently pumped into, and out of, said bellows for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

15. The cervical traction or stretch device of claims 11 to 14, wherein:

said shoulder-engaging portion is defined by a shoulder portion at a lower end of said bellows;

said head portion at an upper side of said bellows; and

said head portion and said shoulder portion having aligned U-shaped openings.

16. The cervical traction or stretch device of claim 15, wherein said elastically-expandable material is thicker in said shoulder portion and in said head portion than in said bellows so that, when said hollow,

inflatable body is inflated from a first inflated condition to a second inflated condition, said bellows expands more than said shoulder portions.

17. The cervical traction or stretch device of claim 15 or claim 16, wherein said shoulder portion has an outer end surface which is specially contoured to seat over the top centre and front chest portions of the left and right shoulders of a user and to bear against said left and right shoulders when said hollow, inflatable body is inflated in a first inflated condition or in a second inflated condition.

18. The cervical traction or stretch device of claim 15, claim 16 or claim 17, wherein said aligned U-shaped openings are defined by U-shaped surfaces, and said U-shaped surfaces in the middle, bight area, of said U-shaped openings conform generally to the natural cervical curve of a neck of a user which is receivable therein.

19. The cervical traction or stretch device of claims 15 to 18, wherein said head portion has surface means for receiving the neck and head of a user of the device, said surface means including contoured curved head surfaces for receiving and supporting a head of a user or a head of a patient, and support structure in said contoured surfaces including a shoulder and adjacent lift surface for engaging and exerting pressure against the occipital bone of a head of a patient which is received in said head portion.

20. The cervical traction or stretch device of claims 15 to 19, including a head strap, fastening means on each side of said head portion and attachment means on one side of said head strap adjacent at least each end of said head strap for coupling with said fastening means on each side of said head portion.

21. A cervical traction or stretch device comprising:

an inflatable and expandable bellows having an undulating or pleated wall and a central U-shaped space so that said bellows can extend at least part way around the neck of a user with said undulating or pleated wall extending transversely of the neck of a user; and

a pumping mechanism which is coupled to said bellows and which is operable by a user for pumping air into said bellows for expanding same;

said bellows having an upper side and a lower side;

said lower side being constructed and arranged to be positioned adjacent shoulders of a user and to exert pressure thereagainst when said bellows is inflated and expanded; and

said upper side being constructed and arranged to engage and exert pressure against the base of a head of a user when said bellows is inflated and expanded.

22. The cervical traction or stretch device of claim 21, wherein said pumping means for pumping air into said bellows includes a conduit and a bulb-type air pump at the outer end of said conduit;

said bulb-type air pump having a one way inlet valve at an outer end thereof and, at an inner end thereof, a manually-operated relief valve.

23. The cervical traction or stretch device of claim 21 or 22, wherein said pumping means includes means for intermittently pumping air into and releasing air out of said bellows for treating soft tissue or disk dysfunctions, including arthritis, in the neck of a user.

24. The cervical traction or stretch device of claim 23 wherein means for intermittently pumping air into said bellows includes an electrically-operated pump and a timer for controlling operation of said electrically-operated pump, whereby air can be intermittently pumped into, and out of, said bellows for treating soft tissue or disk dysfunctions, or arthritis, in the neck of a user.

FIG. 1

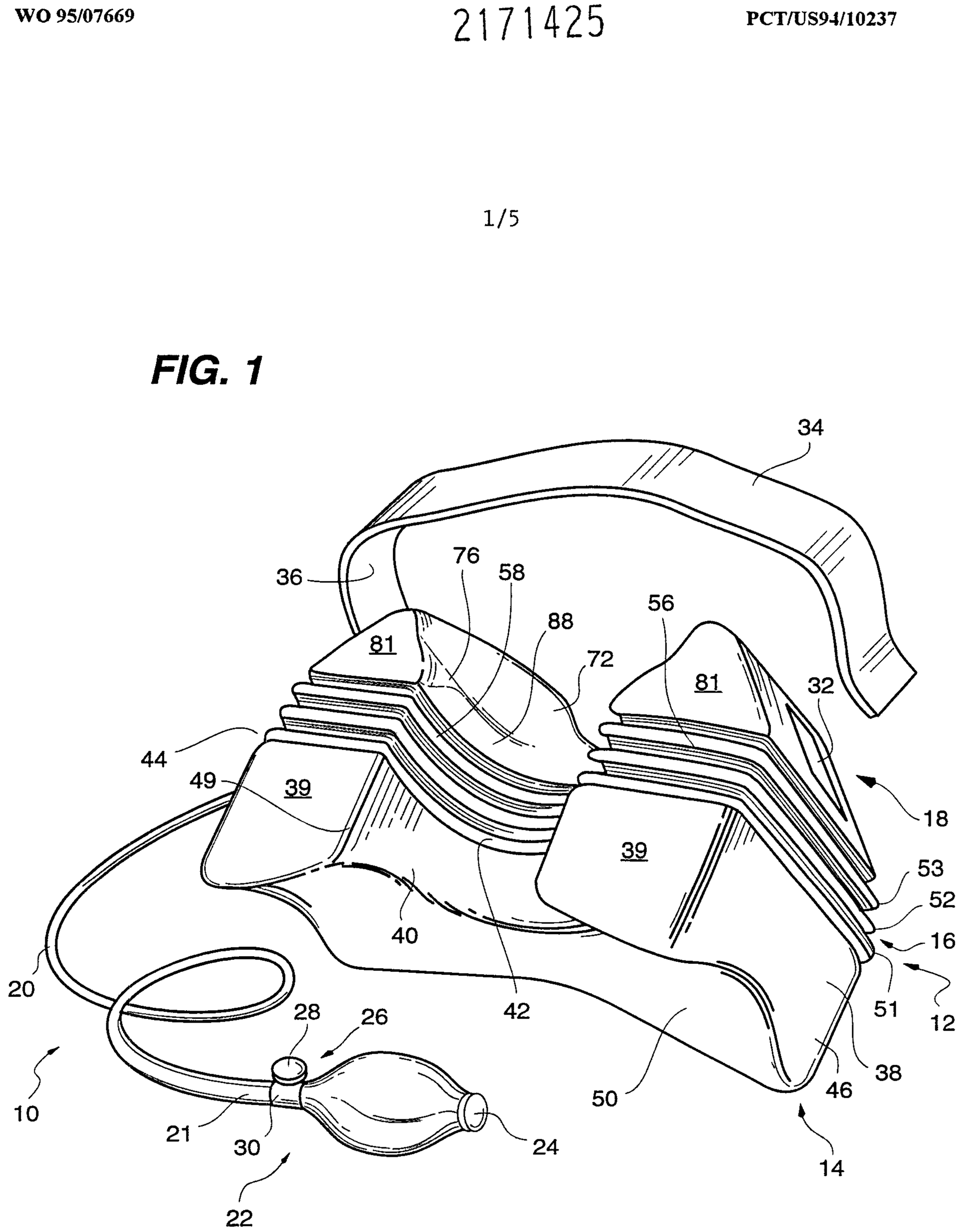

34
36
76
58
88
56
81
72
81
32
44
49
39
39
18
53
52
16
40
42
20
28
26
51
12
38
46
50
10
21
30
24
14
22

FIG. 2

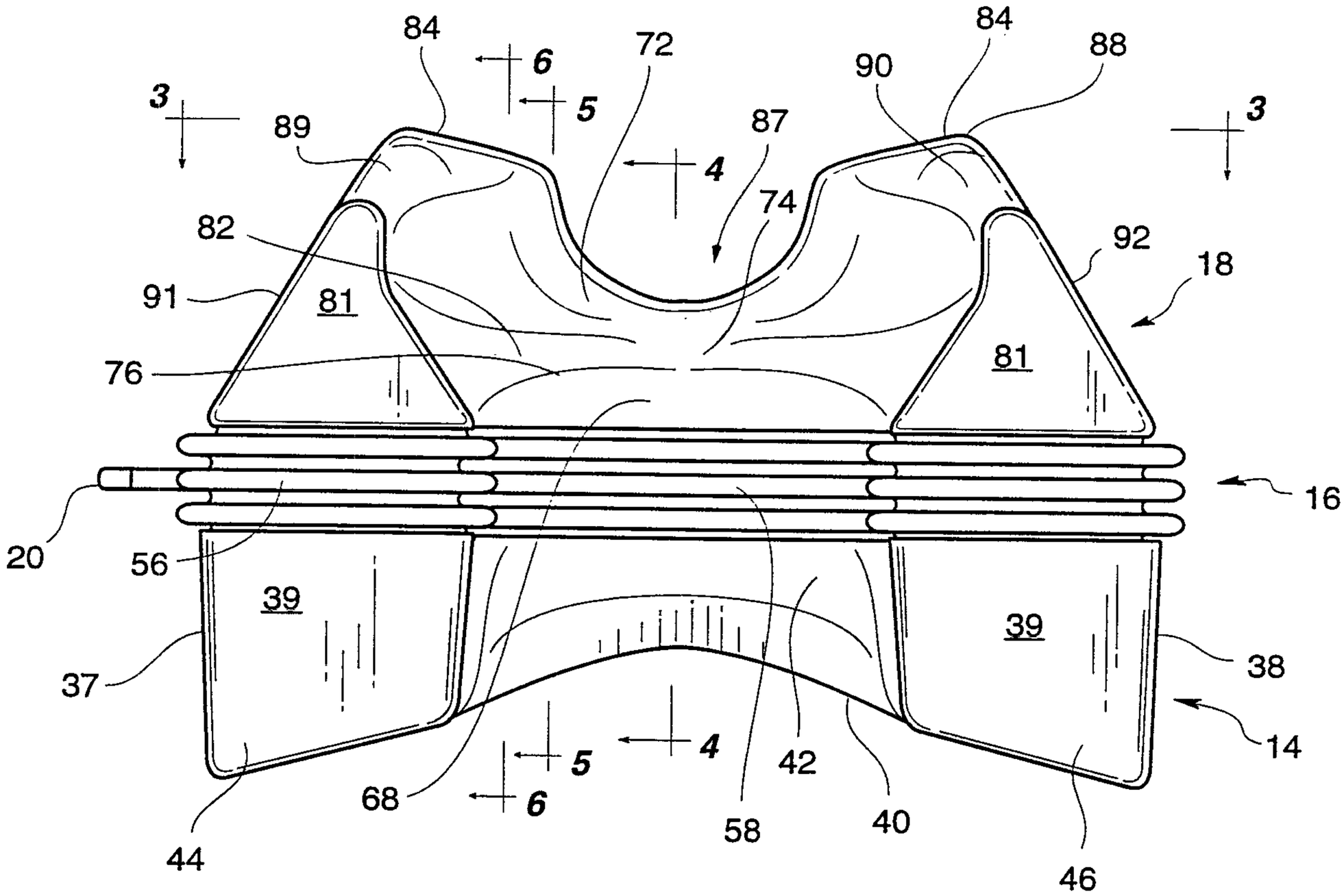

84
6
72
5
3
89
87
4
90
84
88
3
74
82
92
18
91
81
81
76
16
20
56
39
39
38
37
14
5
4
42
68
6
58
40
44
46

FIG. 3

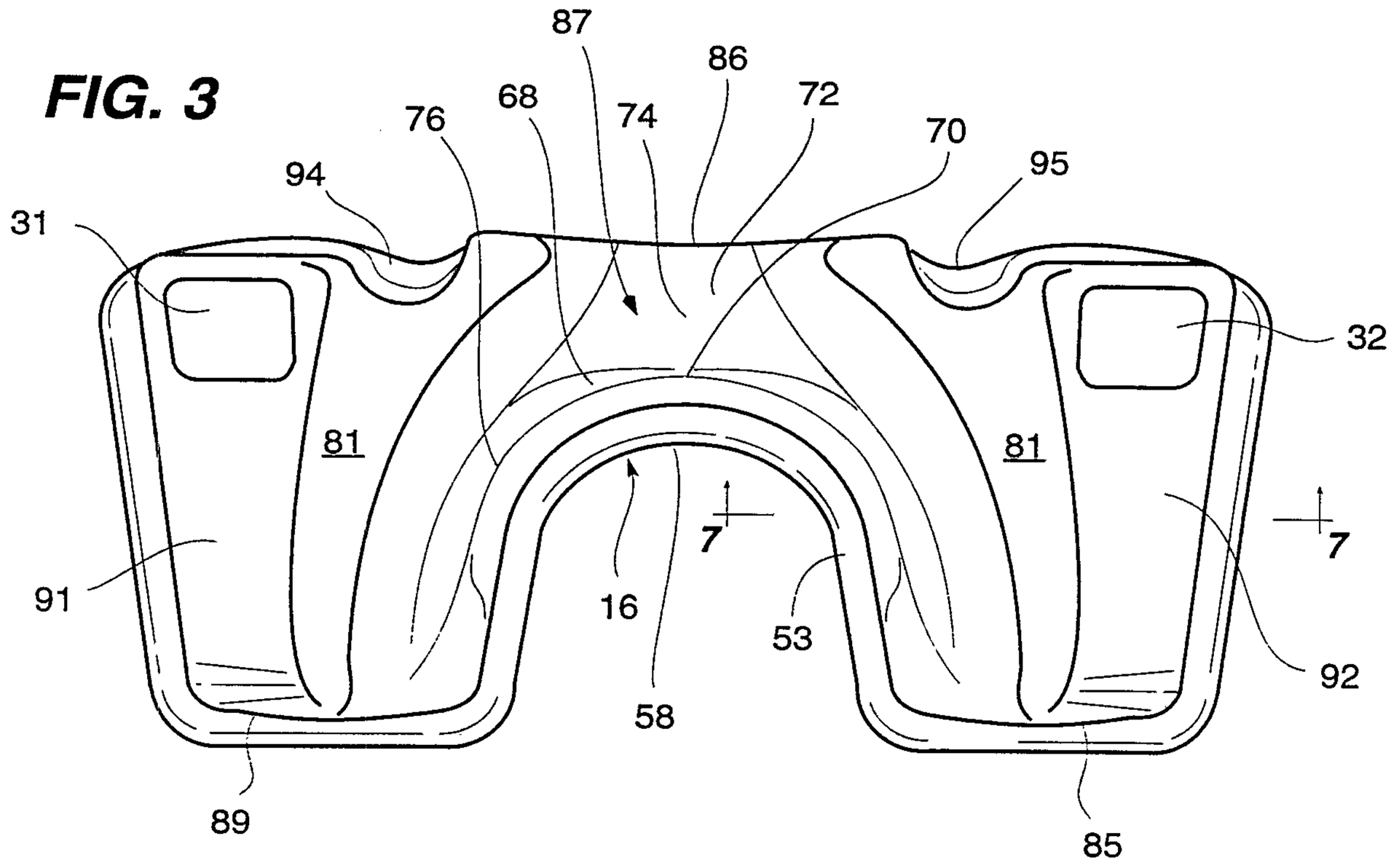

87
86
68
72
76
74
70
94
95
31
32
81
81
91
7
7
16
53
92
58
89
85

FIG. 4

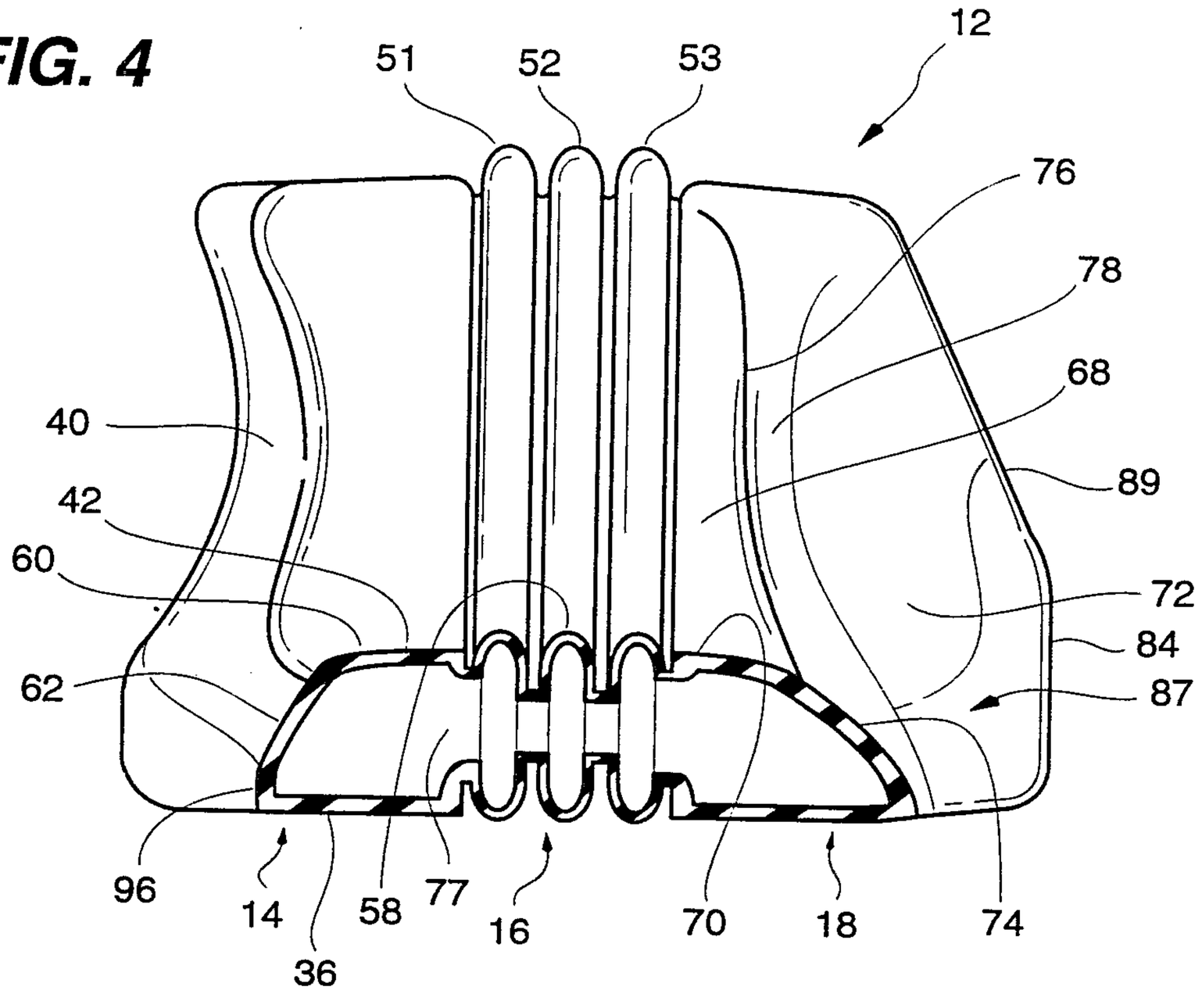

12
51
52
53
76
78
68
40
89
42
60
72
84
62
87
96
14
58
77
16
70
18
74
36

FIG. 5

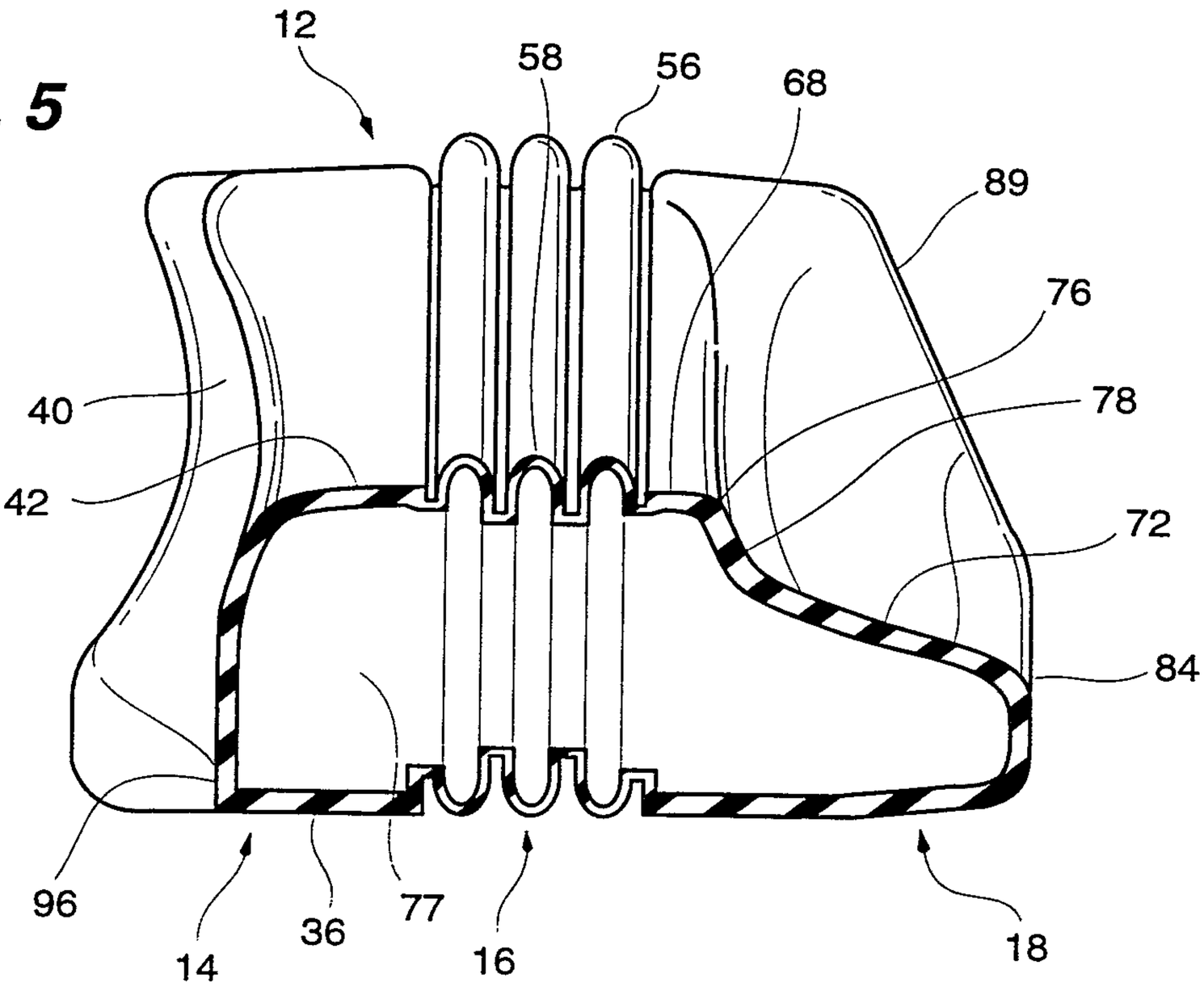

12
58
56
68
89
76
40
78
42
72
84
96
14
36
77
16
18

FIG. 6

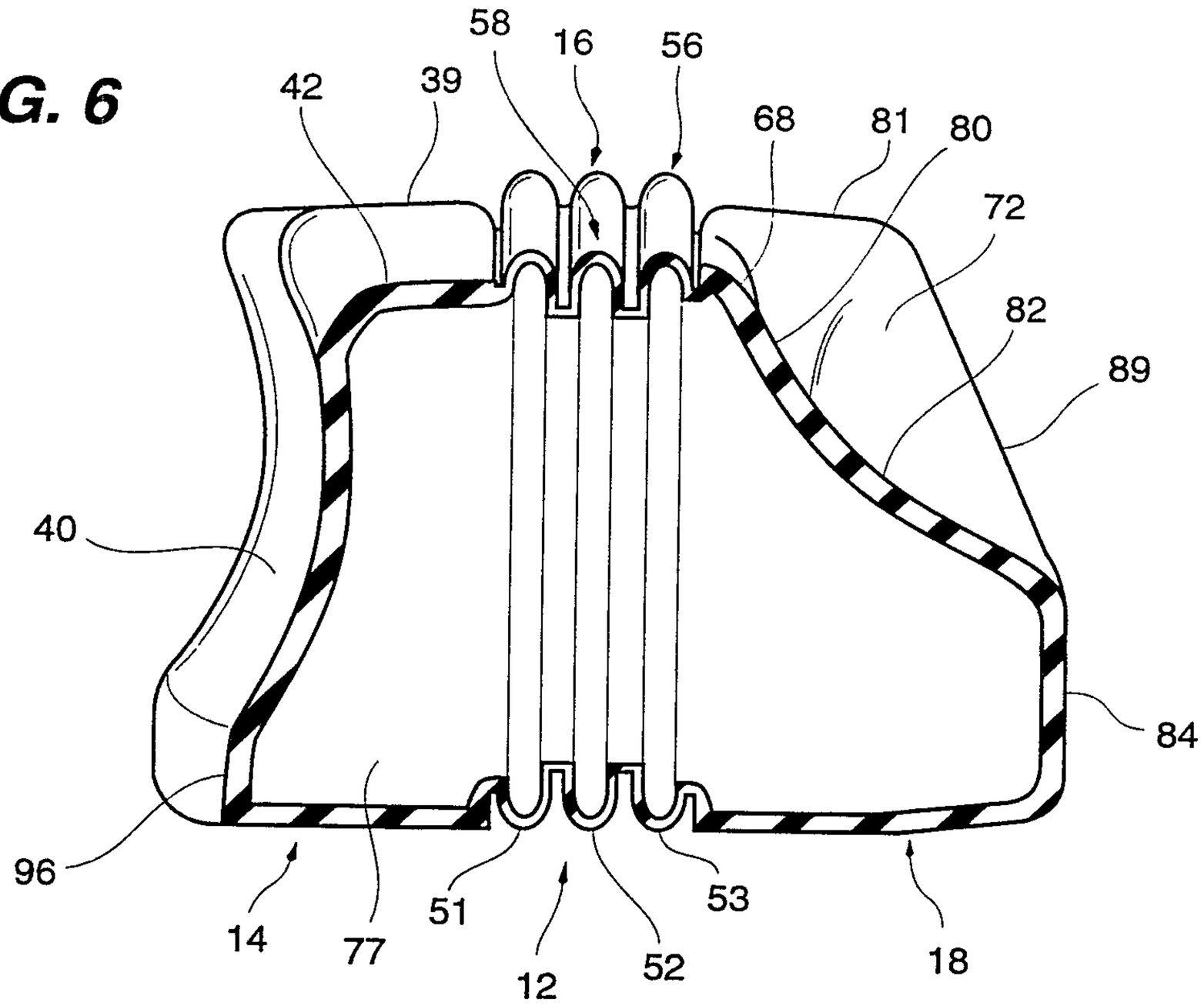

58
16
56
42
39
68
81
80
72
82
89
40
84
96
14
77
51
12
52
53
18

FIG. 7

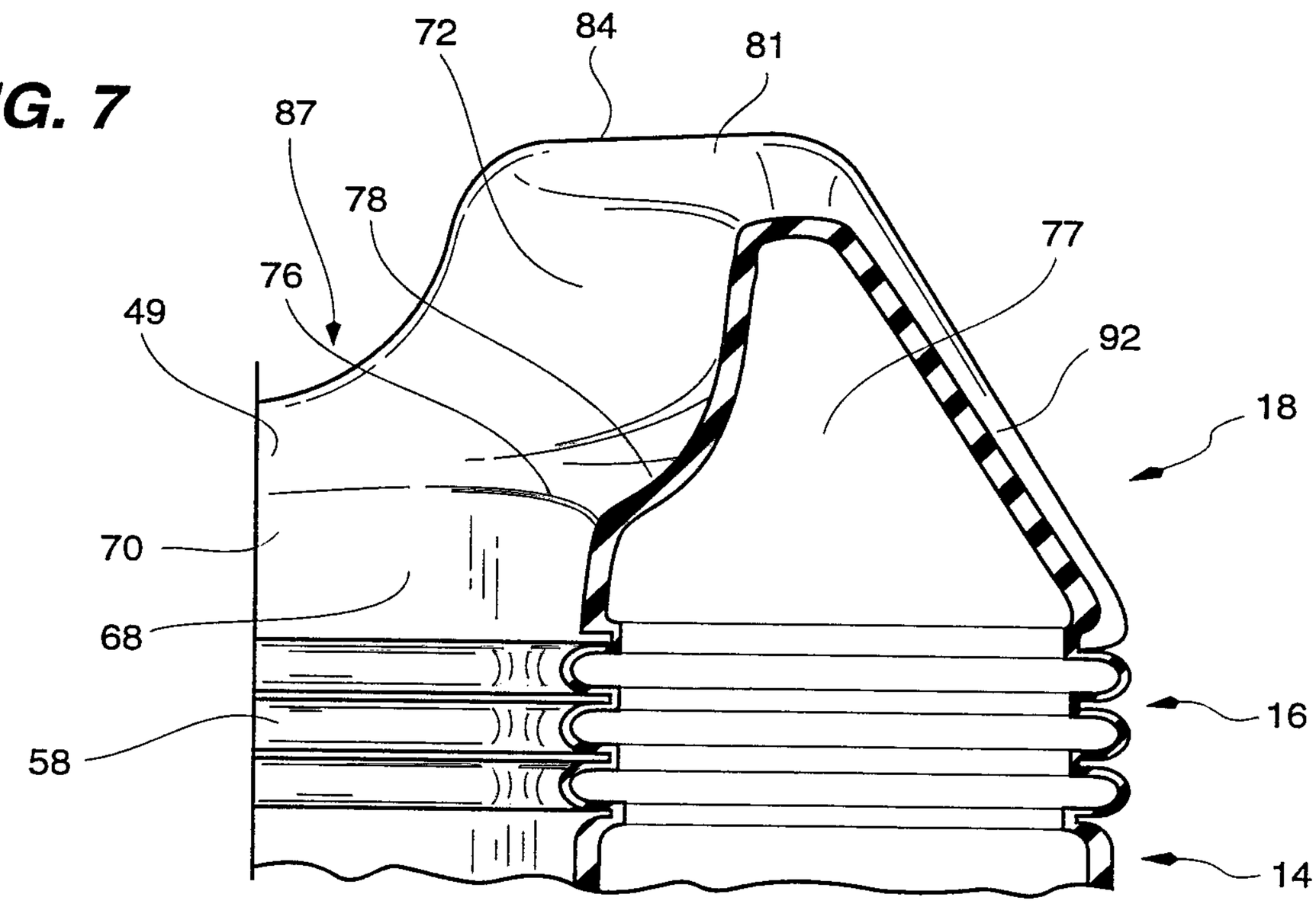

72
84
81
87
78
77
76
49
92
18
70
68
58
16
14

FIG. 8

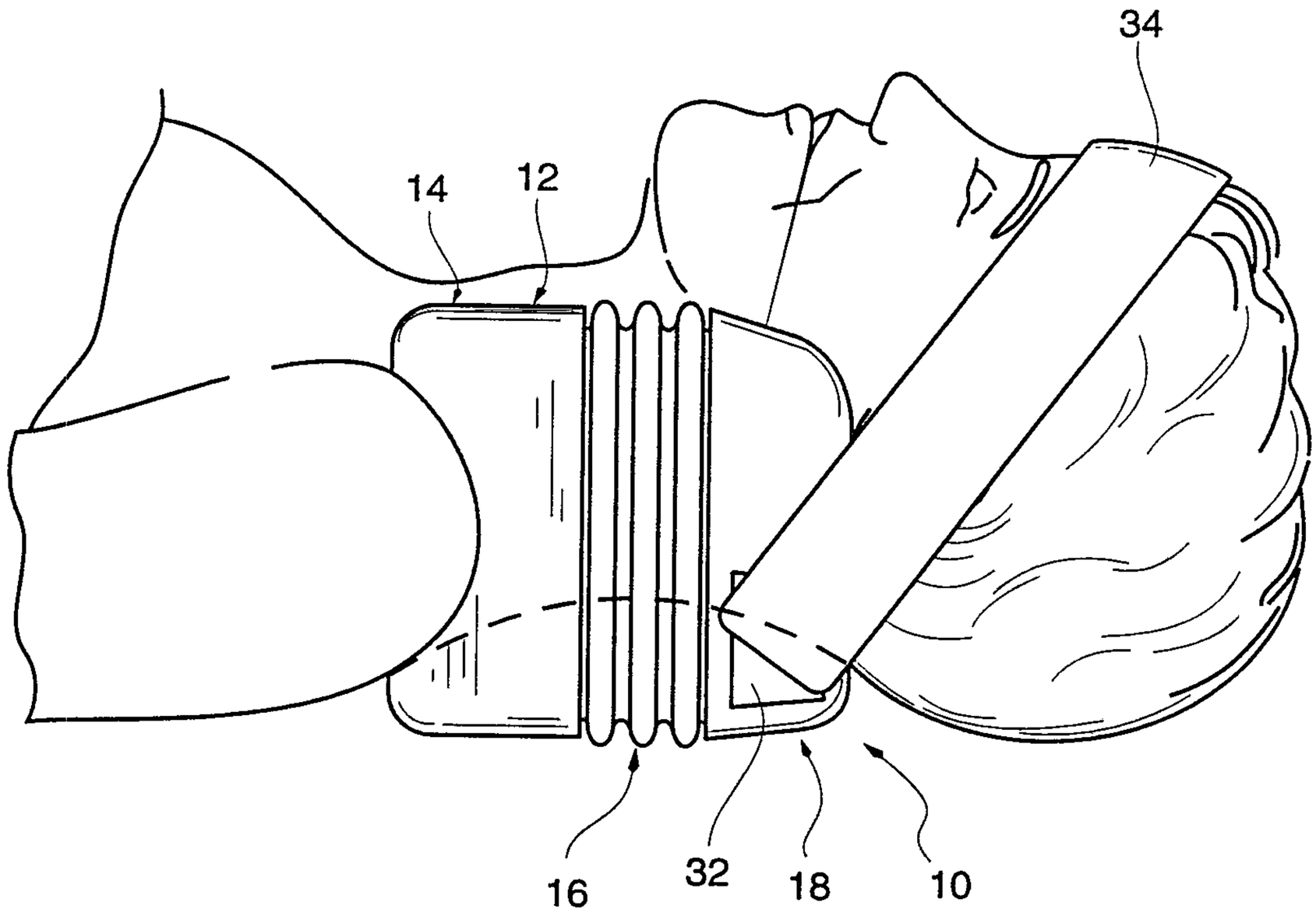
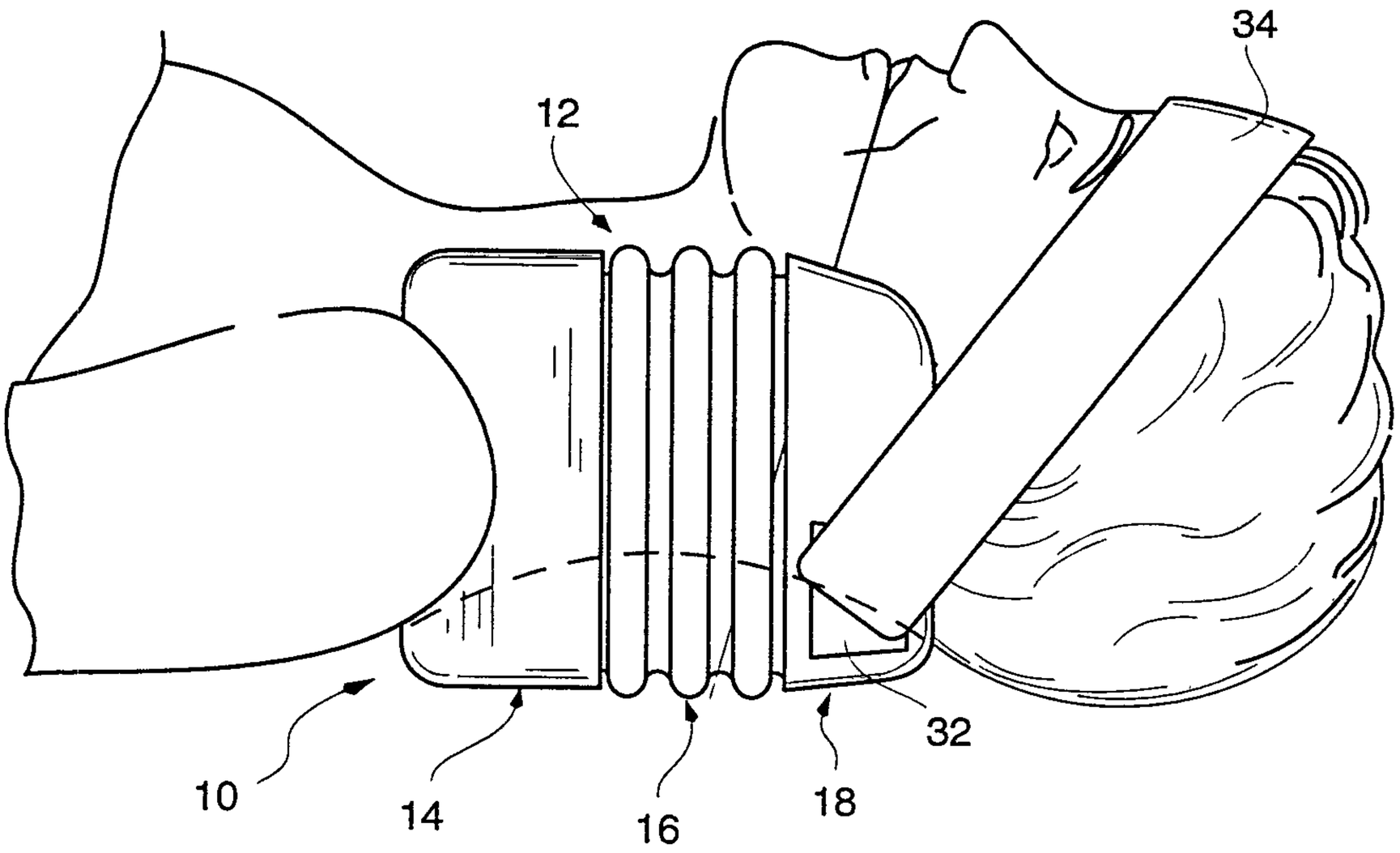
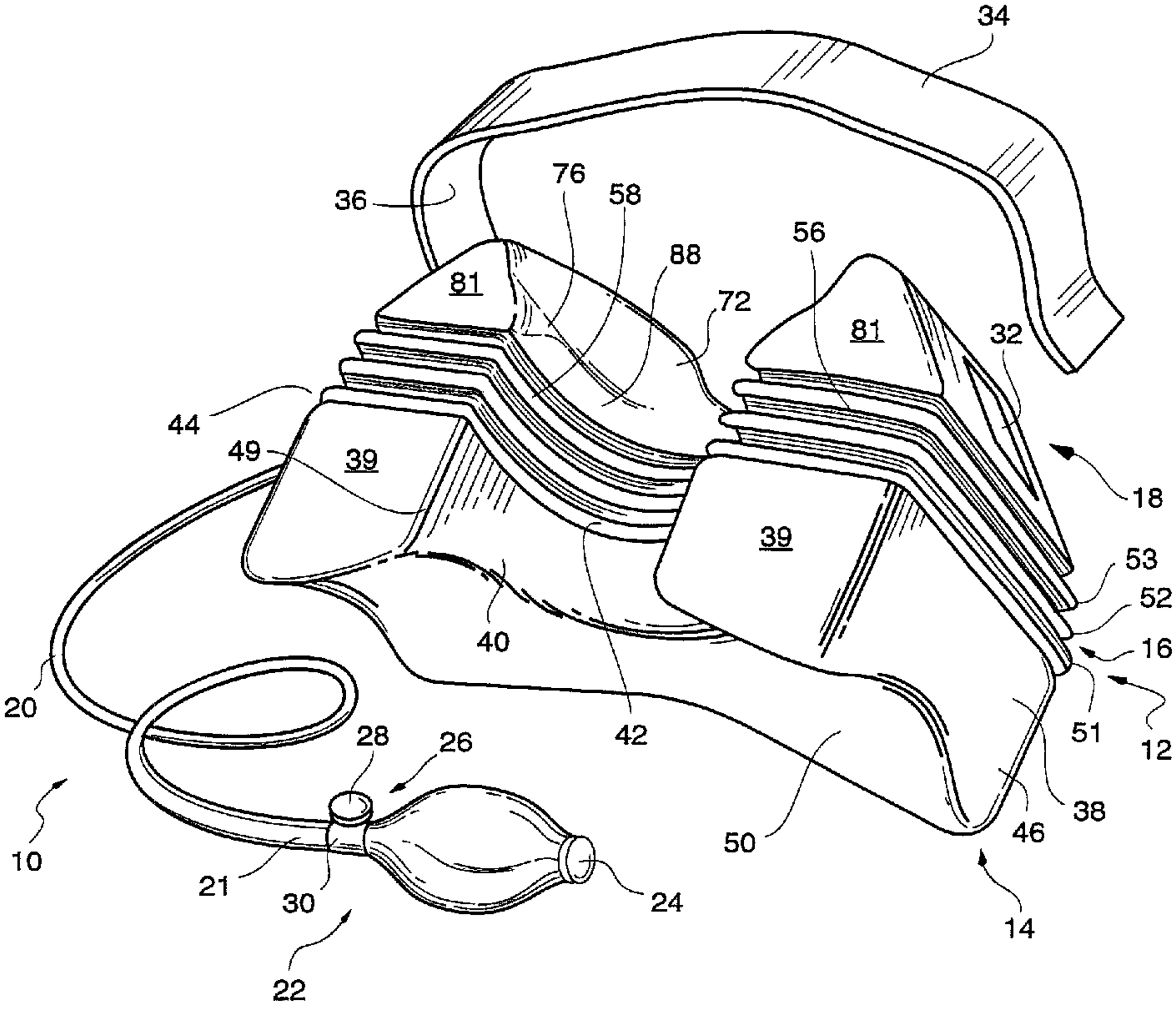


FIG. 9




34
36
76
58
88
56
81
72
81
32
44
49
39
39
18
53
52
16
40
42
51
12
20
28
26
38
50
46
10
21
30
24
14
22