

[5] NASAL HEMOSTATIC DEVICE

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[21] Appl. No.: 406,844

2,589,388	3/1952	Hunter.....	128/239 X
2,927,584	3/1960	Wallace.....	128/349 B
3,049,125	8/1962	Kriwkowitsch .....	128/325
3,154,077	10/1964	Cannon.....	128/325
3,509,884	5/1970	Bell.....	128/246 X
3,516,407	6/1970	Ruggero.....	128/325
3,653,388	4/1972	Tenckhoff.....	128/347

**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 34,330, May 4, 1970, abandoned, and a continuation of Ser. No. 183,579, Sept. 24, 1971, abandoned.

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- [52] U.S. Cl. .... 128/325; 128/246
- [51] Int. Cl.<sup>2</sup> ..... A61B 17/12
- [58] Field of Search ..... 128/239, 246, 325, 347, 128/349 B

[57] **ABSTRACT**

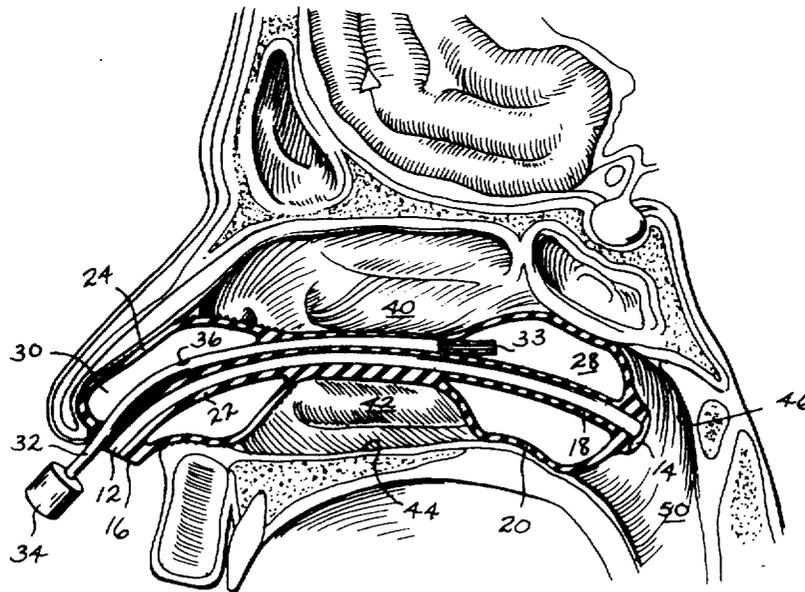
A nasal hemostatic device, including a flexible tube having a breathing passage therethrough. The end portions of the tube include expandable annular wall parts which, when the tube is inserted through a nostril and into a nasal passage, are expanded so as to engage selected internal parts of the nose and thus form a hemostatic seal.

[56] **References Cited**

**UNITED STATES PATENTS**

851,530	4/1907	Lampert.....	128/246
2,493,326	1/1950	Trinder.....	128/325

**6 Claims, 6 Drawing Figures**



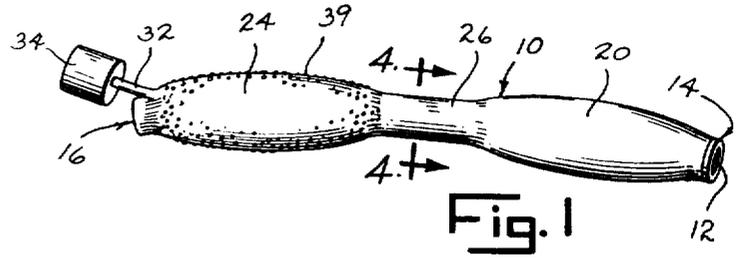


Fig. 2

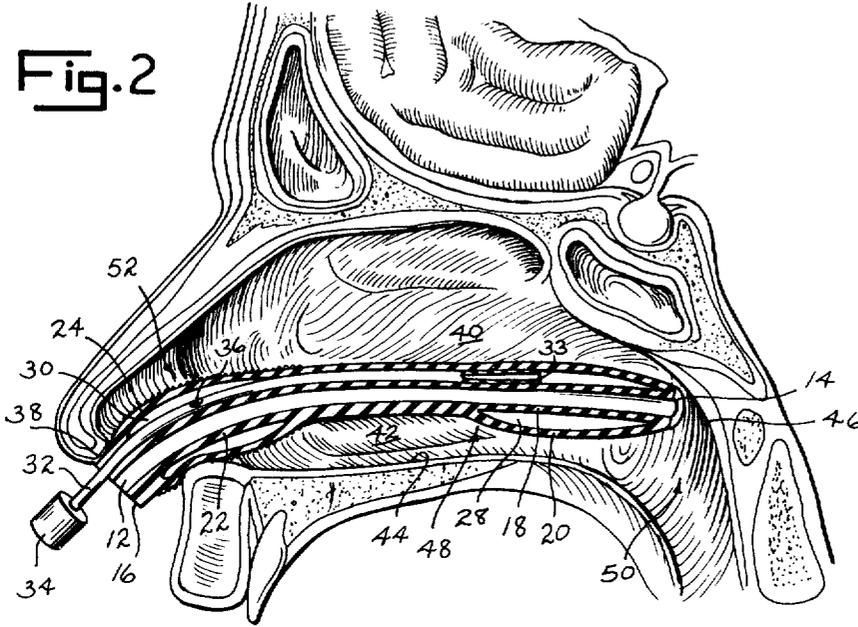


Fig. 4

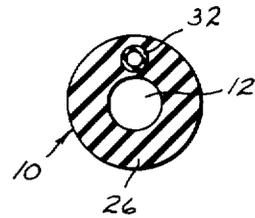
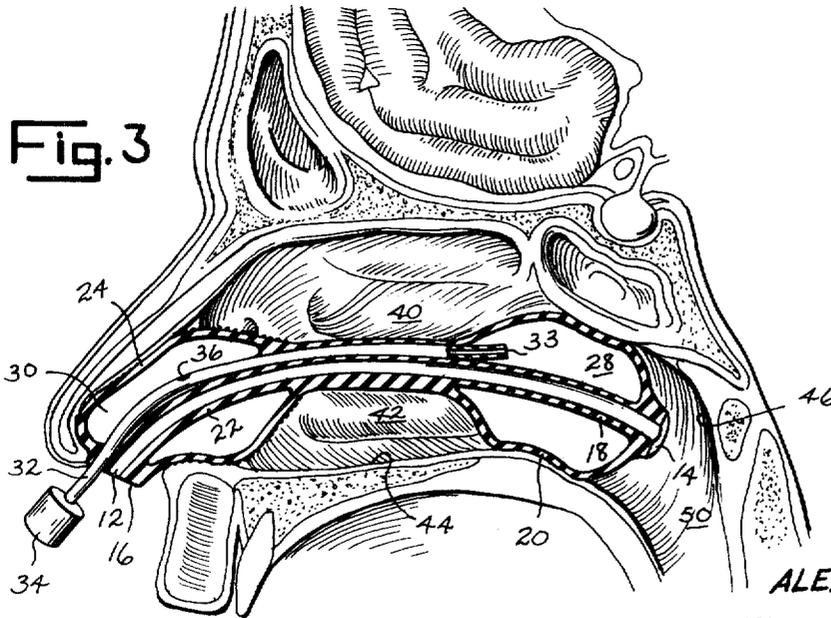


Fig. 3



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Fig. 5

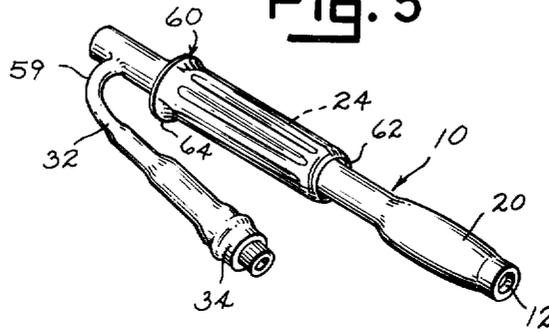
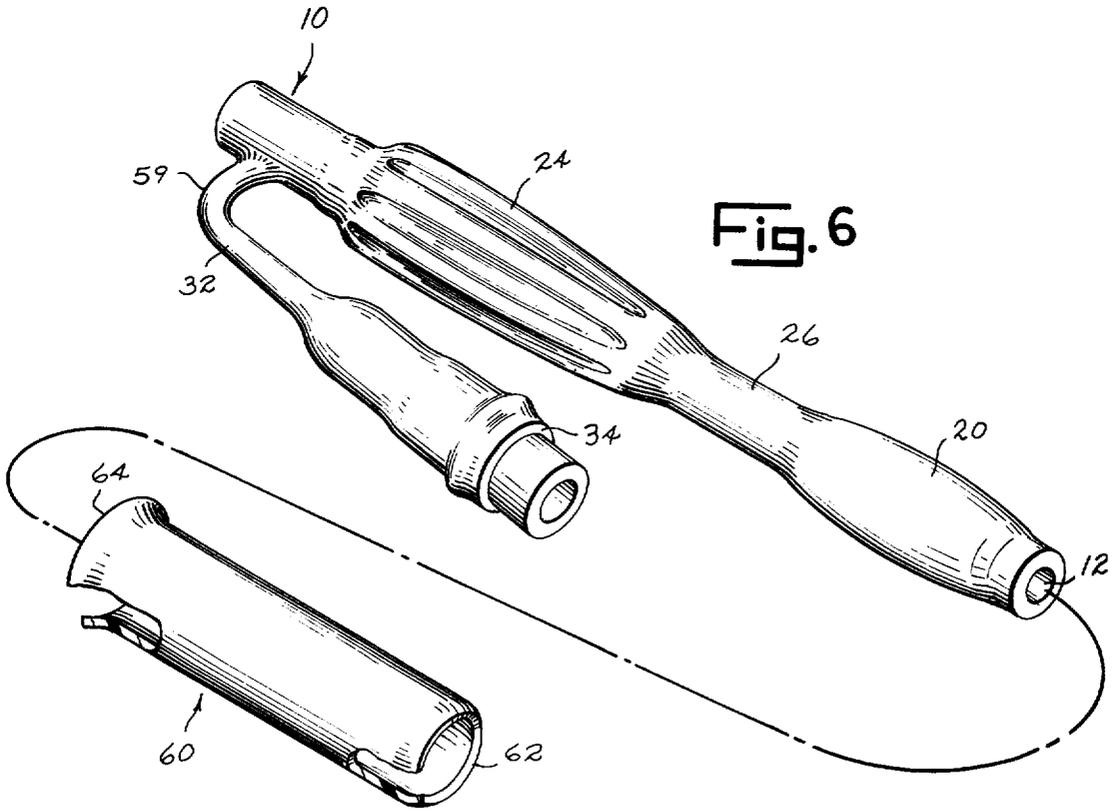


Fig. 6



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## NASAL HEMOSTATIC DEVICE

### CROSS-REFERENCE TO RELATED APPLICATION

This is a continuation-in-part of my U.S. application Ser. No. 34,330, filed May 4, 1970, now abandoned, and is a continuation of application Ser. No. 183,579, filed Sept. 24, 1971 now abandoned.

### BACKGROUND OF THE INVENTION

This invention relates to a surgical instrument and particularly concerns a hemostatic device for the nose.

It has heretofore been the practice to arrest nasal hemorrhaging by means of packing the affected nasal passage, or by means of inflating a single expandable balloon-like member well within the nasal passage and packing the forward portion of the passage. These methods are generally painful to the patient, time consuming, and in many cases require the services of a specialist and the use of special instruments. When both nasal passages are affected and, therefore, must be packed, the patient must breathe through his mouth, creating throat dryness, irritation, middle-ear and other complications.

U.S. Pat. No. 2,493,326 describes a prior art device for stopping nasal hemorrhages. This device includes two spaced expandable members, each of which must be individually inflated after the device is positioned in the nose. As in the previously discussed prior art means, no provision is made in the device for nasal breathing during its use.

### SUMMARY OF THE INVENTION

This invention includes a flexible tube which contains a breathing passage. The end portions of the tube include expandable annular wall parts which, when the tube is inserted into one nasal passage, can be expanded nearly simultaneously to engage selected parts of the nose, thus creating an effective hemostatic seal without impeding the patient's breathing.

Since the device is constructed so as to be positioned nearly totally within the nasal passage, little if any of the device will protrude from the nose where it could interfere with eating and the general comfort of the patient.

Additionally, the expandable wall part which is positioned adjacent to the vestibulum is covered by a foam material which makes the device more comfortable to the patient and prevents irritation of the vestibulum. By expanding the wall parts substantially simultaneously there will be no tendency for the device to slip down into the throat of the patient or out of the vestibulum as would be the case should either the posterior or anterior wall part be expanded separately.

In order to provide for a selected hemostasis, a restrictive sleeve may be slipped over the anterior wall part of the device to allow for the expansion of the posterior wall part only.

Accordingly, it is an object of this invention to provide a nasal hemostatic device which effectively stops hemorrhaging of the nose and yet permits the full use of the nose for breathing and mucus drainage.

It is another object of this invention to provide a nasal hemostatic device which causes a minimum of discomfort to the patient.

It is still another object of this invention to provide a nasal hemostatic device which can be effectively and

quickly positioned and actuated by any person of average intelligence and coordination.

Other objects of this invention will become apparent upon a reading of the invention's description.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a pictorial view of one embodiment of the hemostatic device.

FIG. 2 is a fragmentary sectional view with the hemostatic device of FIG. 1 shown deflated and inserted into the nose.

FIG. 3 is a fragmentary sectional view with the hemostatic device of FIG. 1 shown inflated within the nose.

FIG. 4 is a cross sectional view taken along line 4—4 of FIG. 1.

FIG. 5 is a pictorial view of another embodiment of the hemostatic device having separable parts.

FIG. 6 is a view of the hemostatic device of FIG. 5 showing the parts thereof in separated form.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments illustrated are not intended to be exhaustive or to limit the invention to the precise forms disclosed. They are chosen and described in order to explain the principles of the invention and its application and practical use to thereby enable others skilled in the art to utilize the invention to its best advantage.

The hemostatic device illustrated in FIGS. 1—4 includes a flexible tube 10 approximately 10 cm long and having a breathing passage 12 therethrough. Tube 10 may be formed of rubber or plastic and includes a distal end 14 and a proximal end 16. Tube 10 includes an inner wall part 18 and a concentric expandable outer wall part 20 adjacent distal end 14 and an inner wall part 22 and a concentric expandable outer wall part 24 adjacent proximal end 16. Outer wall parts 20 and 24 are each approximately 4 cm long and are separated by an intermediate tube part 26. Inner wall part 18 defines, in conjunction with outer wall part 20, an annular substantially fluid-tight chamber 28. Inner wall part 22 defines, in conjunction with outer wall part 24, an annular substantially fluid-tight chamber 30.

A conduit 32, embedded within tube 10, has one end 33 communicating with chamber 28 and extends therefrom longitudinally along the tube through chamber 30 and slightly beyond proximal tube end 16. There the opposite end of conduit 32 is connected to a valve 34. Conduit 32 has an opening 36 formed therein which communicates with chamber 30.

Valve 34 may be of any of a variety of well known constructions and is preferably like a tire valve in function in that selected amounts of air or other fluid can be introduced through the valve into a receiving chamber by means of a pressure source and later extracted therefrom by valve actuation. One such construction of valve 34 is found in U.S. Pat. No. 3,087,492. Conduit opening 36 and the internal diameter of conduit 32 at end 33 may be so sized relative to each other that, as fluid is introduced into the conduit and passes into chambers 28 and 30, outer wall part 20 and 24 of tube 10 expand substantially simultaneously.

Outer wall part 20 of tube 10 is preferably designed, such as by varying the wall thickness of selected portions of the wall part, to assume a generally spherical shape when expanded outside the nose in a free state.

Outer wall part 24 of tube 10 is preferably designed, again such as by varying the wall thickness of selected portions of the wall part, to assume a generally truncated cone-like shape when expanded outside the nose with a girth which increases along the length of the wall part as proximate tube end 16 is approached. The outer surface of wall part 24 is preferably coated with a sponge or resilient foam-like material 39 of rubber or plastic to promote conformation of wall part 24 to the nose inner surface.

Tube 10 with chambers 28 and 30 deflated is inserted distal end 14 first through the vestibulum 38 of the affected nasal passage and pushed gently either between the middle turbinate 40 and the inferior turbinate 42 or between the floor 44 of the nose and inferior turbinate 42 until it touches the vertebral wall 46 of the pharynx 50. Suitable lubrication applied to tube 10 will assist in inserting it into the nose. With tube 10 correctly positioned within the nose one-third of part 20 will slip naturally into the nasal passage 48, and the remainder into the nasal pharynx 50, as shown in FIG. 2. The outer wall 24 should be visible at the vestibulum 38 with approximately one-half of the wall part positioned within the strait 52 between the vestibulum and the nasal passage.

A pressurized source, such as a Luer lock syringe, is removably connected to valve 34, and pressurized fluid, such as air, is introduced through conduit 32 and simultaneously into chambers 28 and 30 in a controlled manner causing the nearly simultaneous expansion of outer wall parts 20 and 24. The expanded wall parts 20 and 24 will assume the anatomical configuration of the nose, as shown in FIG. 3, and thus form an effective hemostasis. To assure the hemostasis, sponge material 39 at proximal end 16 of tube 10 can be soaked in a sealing solution just prior to insertion of the tube into the nose.

When it is desired to remove tube 10 from the nose, the syringe is again connected to valve 34 and chambers 28 and 30 deflated.

In the case of bilateral bleeding, a tube 10 can be inserted into each nostril of the patient and inflated. Due to the presence of the breathing passage 12 in each tube 10, the patient is able to breathe through his nose in substantially normal fashion. Also, tube 10 can be formed from a radio-opaque material to permit X-ray pictures to be taken of its location in the patient.

In FIGS. 5 and 6 the hemostatic device includes a flexible tube 10 having a breathing passage 12 therethrough and outer expandable wall parts 20 and 24. This hemostatic device is of a construction like the device shown in FIGS. 1-4 and above described with the exception that the exposed end of conduit 32 to which valve 34 is attached is return bent at 59 and outer wall part 24 is more truncated in its unexpanded state and does not have a sponge coating. The return bent end of conduit 32 will extend exteriorly around the nose at the nostril to prevent the device from slipping down into the throat of the patient and to position valve 34 clear of the mouth area of the patient so as not to interfere with the patient's eating and drinking. A generally rigid sleeve 60 is fitted around tube 10 at its wall part 24. Sleeve 60 preferably extends the full length of wall part 24 and engages tube 10 in a slip frictional fit. The sleeve may be formed of a shape-retaining, substantially non-expandable material, such as polyethylene.

Sleeve 60 will prevent wall part 24 of tube 10 from expanding against the nasal passage as a pressurized fluid is introduced into the tube through conduit 32. The hemostatic device can be used with sleeve 60 encircling wall part 24 of the tube in those cases where bleeding is behind the nose in the nasal pharynx. With sleeve 60 so positioned about tube 10 and the tube and sleeve inserted into the nasal passage, only wall part 20 of the tube will be expanded upon the introduction of fluid into conduit 32. To provide for easier insertion of the sleeve-encircled tube into the nasal passage, distal end 62 of sleeve 60 is provided with an inturned annular lip. The proximal end 64 of the sleeve may be flared to resist accidental total insertion of the sleeve into the nasal passage. When it is desired to expand both wall parts 20 and 24 against the nasal passage of a patient, sleeve 60 is removed from tube 10, preferably prior to the insertion of the hemostatic device into the patient.

It is to be understood that the invention is not to be limited to the details herein given but may be modified within the scope of the appended claims. Also, in other applications of this invention, a sleeve 60 without the flared proximal end 64 may be fitted over the wall part 20 of tube 10 and not wall part 24.

What I claim is:

1. A nasal hemostatic device comprising a flexible tube having a breathing passage therethrough and including proximal and distal ends, said tube adapted for insertion through the vestibulum and into the nasal passage, said tube including first inner and outer annular wall parts adjacent its said distal end and second inner and outer annular wall parts adjacent its said proximal end, said first inner and outer wall parts being spaced from said second inner and outer wall parts, said first outer wall part being expandable and defining in conjunction with said first inner wall part a first chamber, said second outer wall part being expandable and defining in conjunction with said second inner wall part a second chamber, conduit means communicating with said first and second chambers and adapted to connect to a fluid source, said conduit means for introducing fluid simultaneously and at controlled rates into said first and second chambers to cause the expansion of said first and second wall parts, and a removable sleeve means encircling said tube at one of said first and second outer wall parts for preventing the expansion of said one outer wall part against the nasal passage when said device is located in said nasal passage.

2. The hemostatic device of claim 1 wherein said sleeve means encircles said tube at said second outer wall part for preventing the expansion of said second outer wall part against the nasal passage when said device is located in said nasal passage.

3. The hemostatic device of claim 1 wherein said second outer wall part is shiftable between a collapsed position and an expanded position, said sleeve means being snugly fitted about said outer wall part in its collapsed position.

4. The hemostatic device of claim 3 wherein said sleeve is formed of a shape-retaining substantially non-expandable material.

5. The hemostatic device of claim 1 wherein said sleeve means extends the length of said second outer wall part and has one end located adjacent the proximate end of said tube and its other end located adjacent said first outer wall part, said other sleeve means end being defined by an inturned annular lip.

6. The hemostatic device of claim 5 wherein said one sleeve means end is flared.

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