

[54] SELF-ERECTING TENT

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[51] Int. Cl.A45f 1/00
[58] Field of Search.....135/1, 1 A, 3, 4, 4 A, 5 D,
135/5 A

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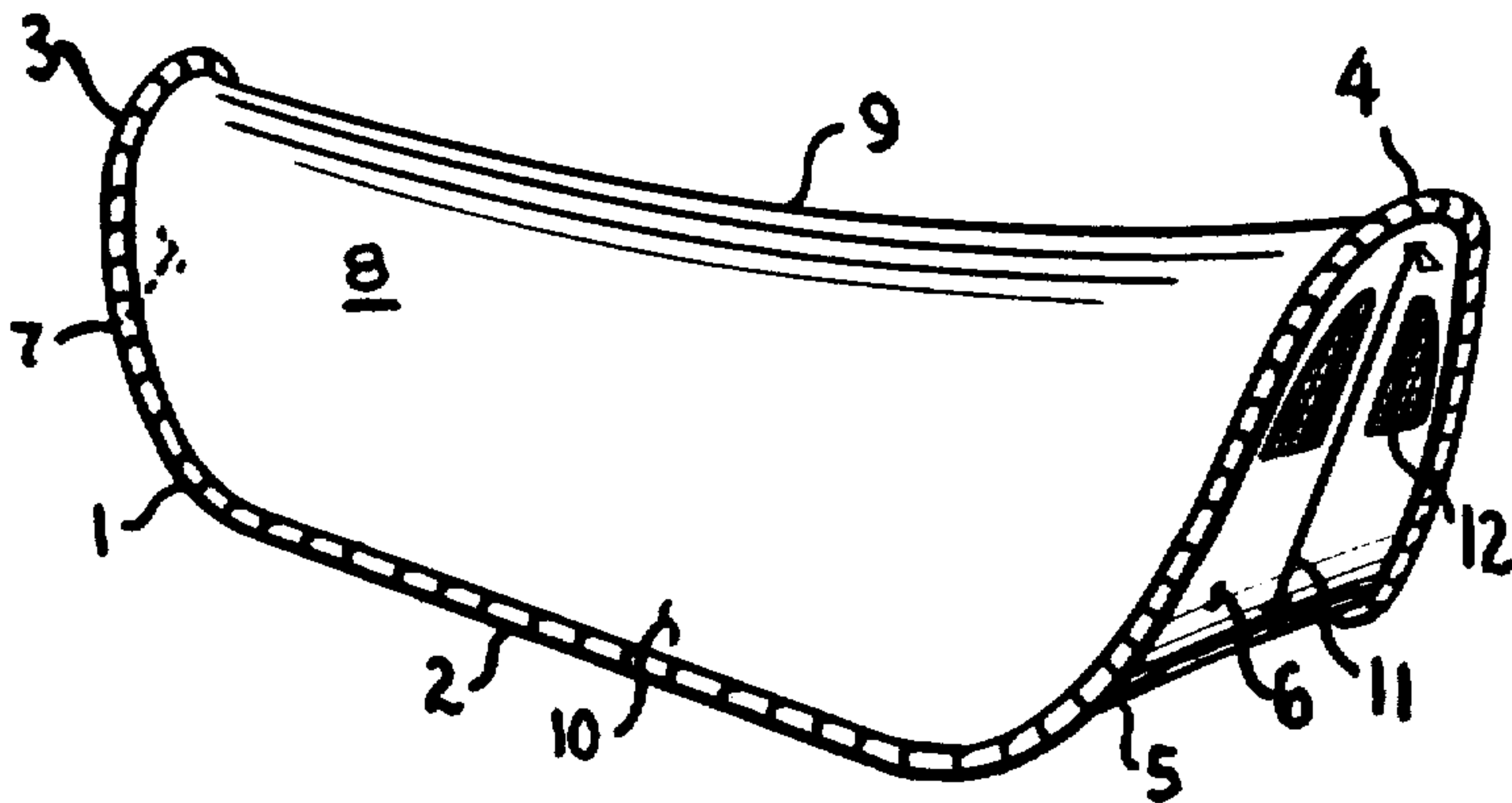
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Primary Examiner—Kenneth Downey
Attorney—John E. Wagner

[57] ABSTRACT

A tent supported entirely by a single resilient member of closed geometry, so shaped that it maintains the tent covering material in an inhabitable shape by keeping the material under constant biaxial membrane stress. The support member is sufficiently flexible to be manually formable into a series of superimposed loops whereby the tent is collapsed into a generally disc-shaped flat volume.

9 Claims, 13 Drawing Figures



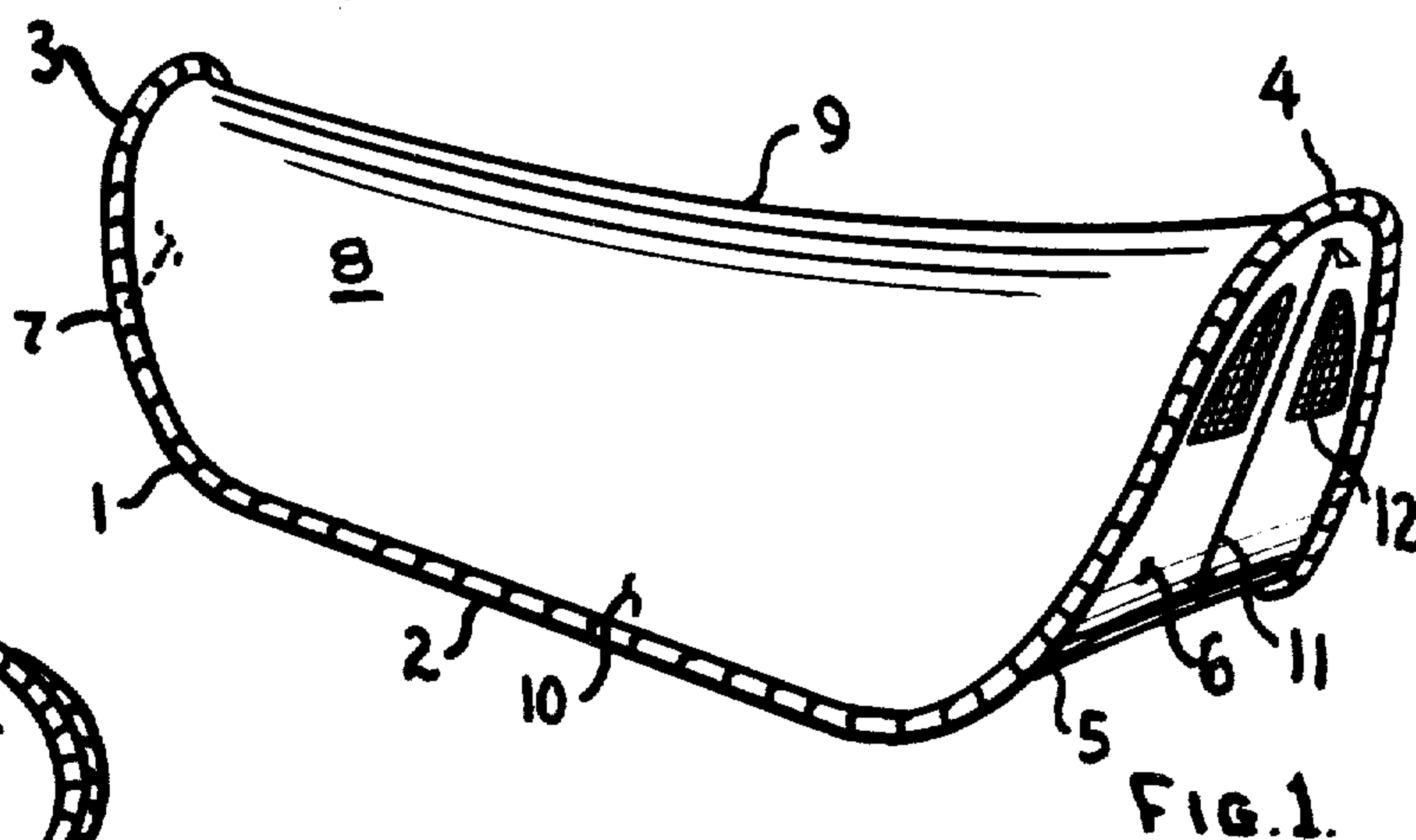


FIG. 1.

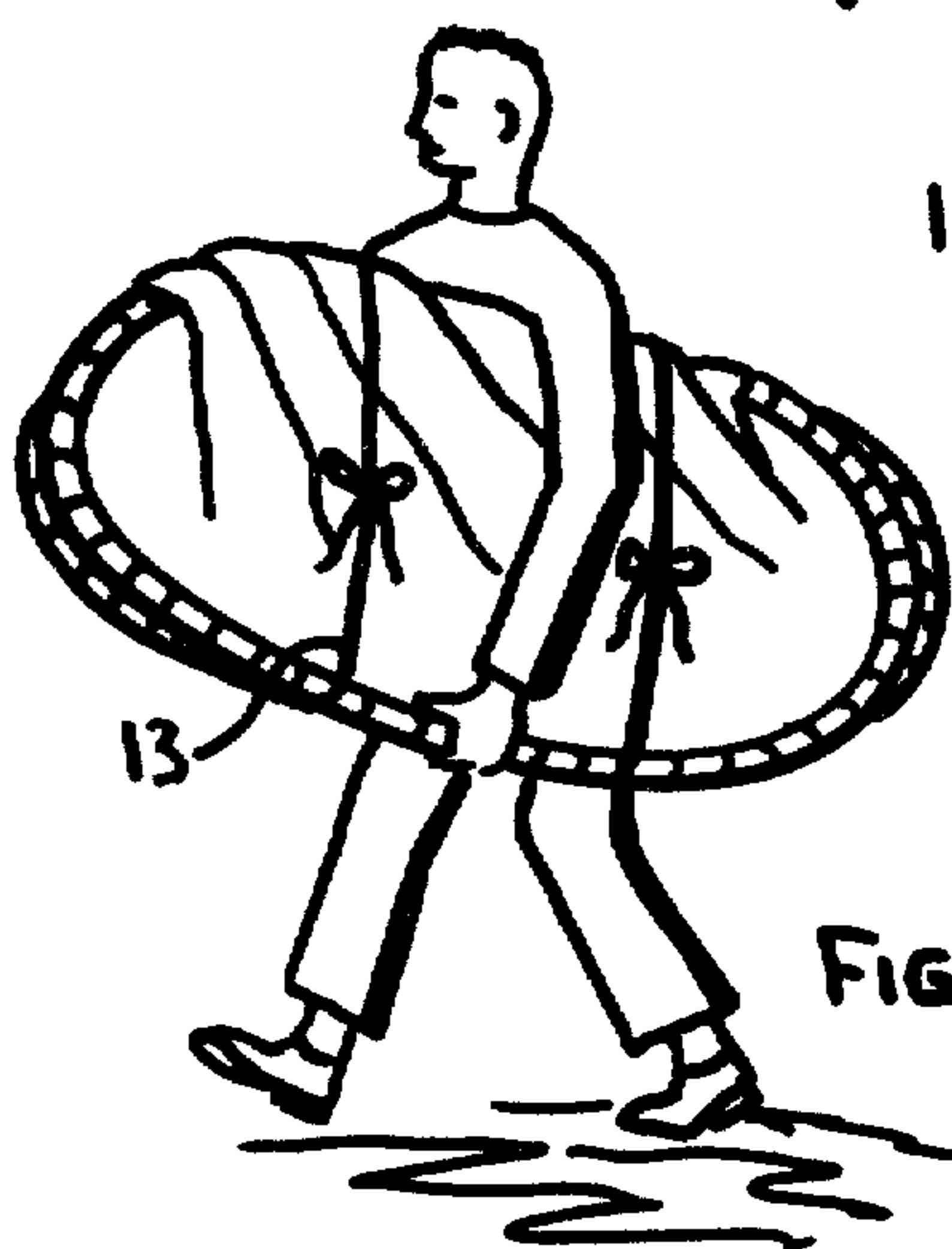


FIG. 6.

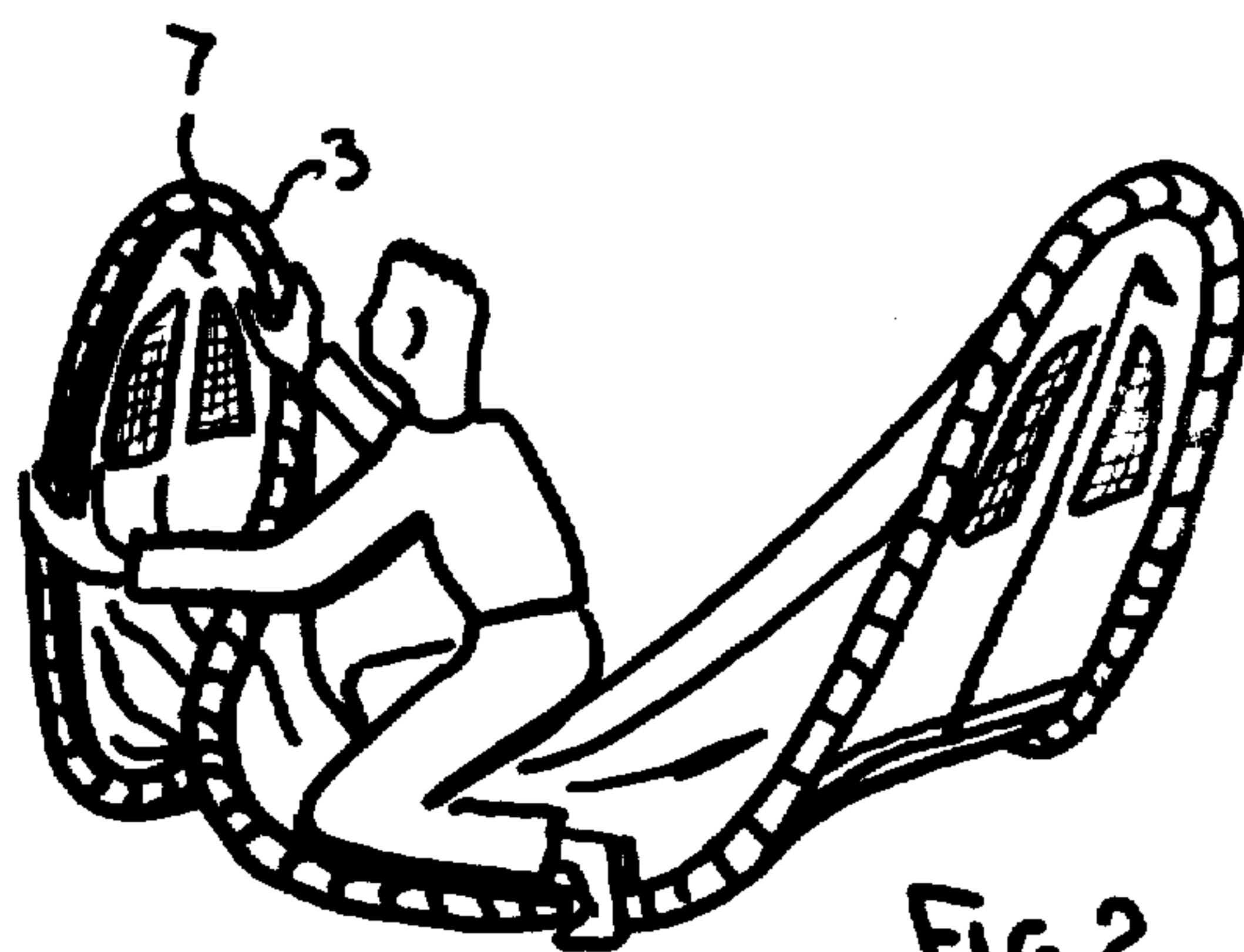


FIG. 2.

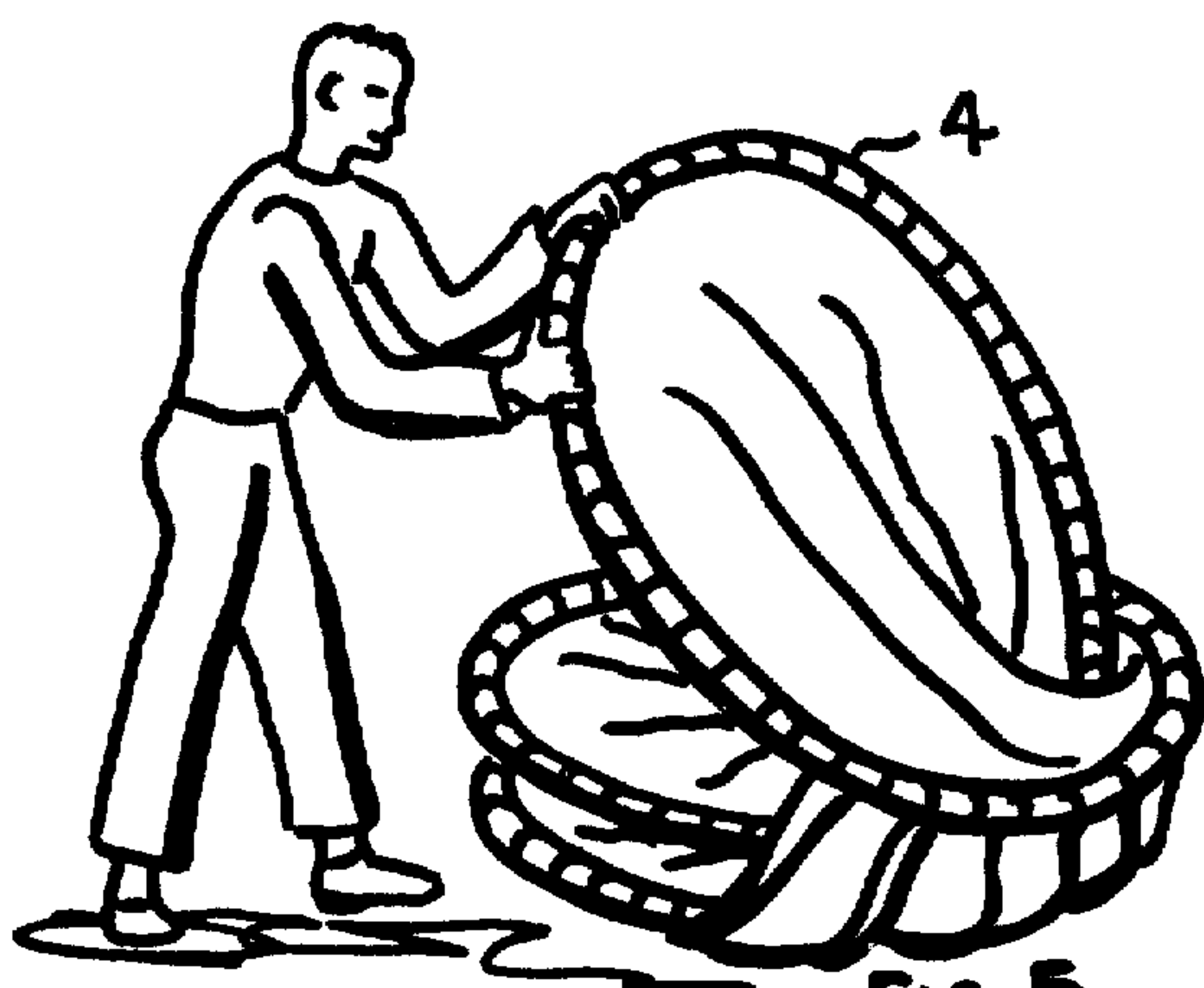


FIG. 5.

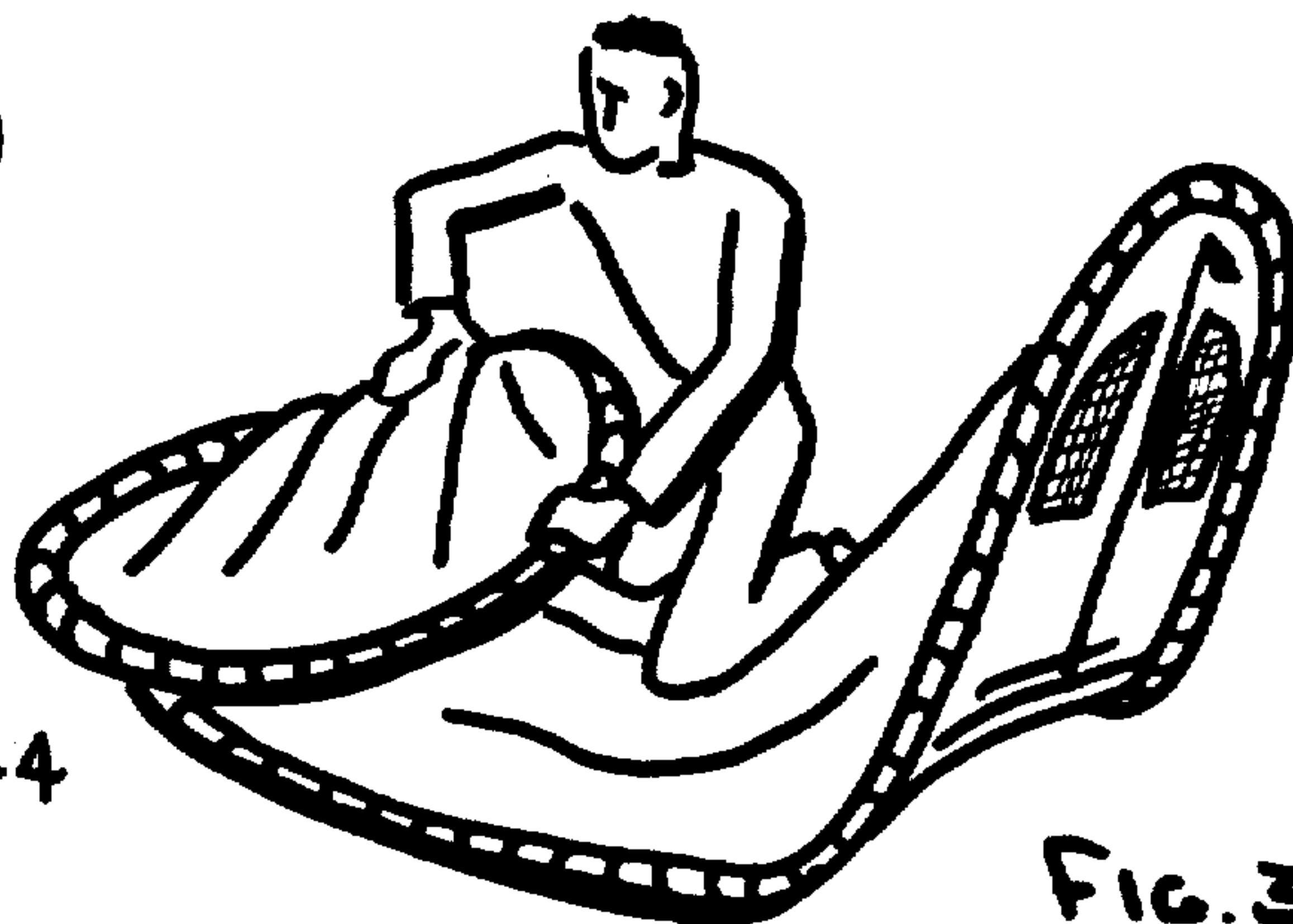


FIG. 3.

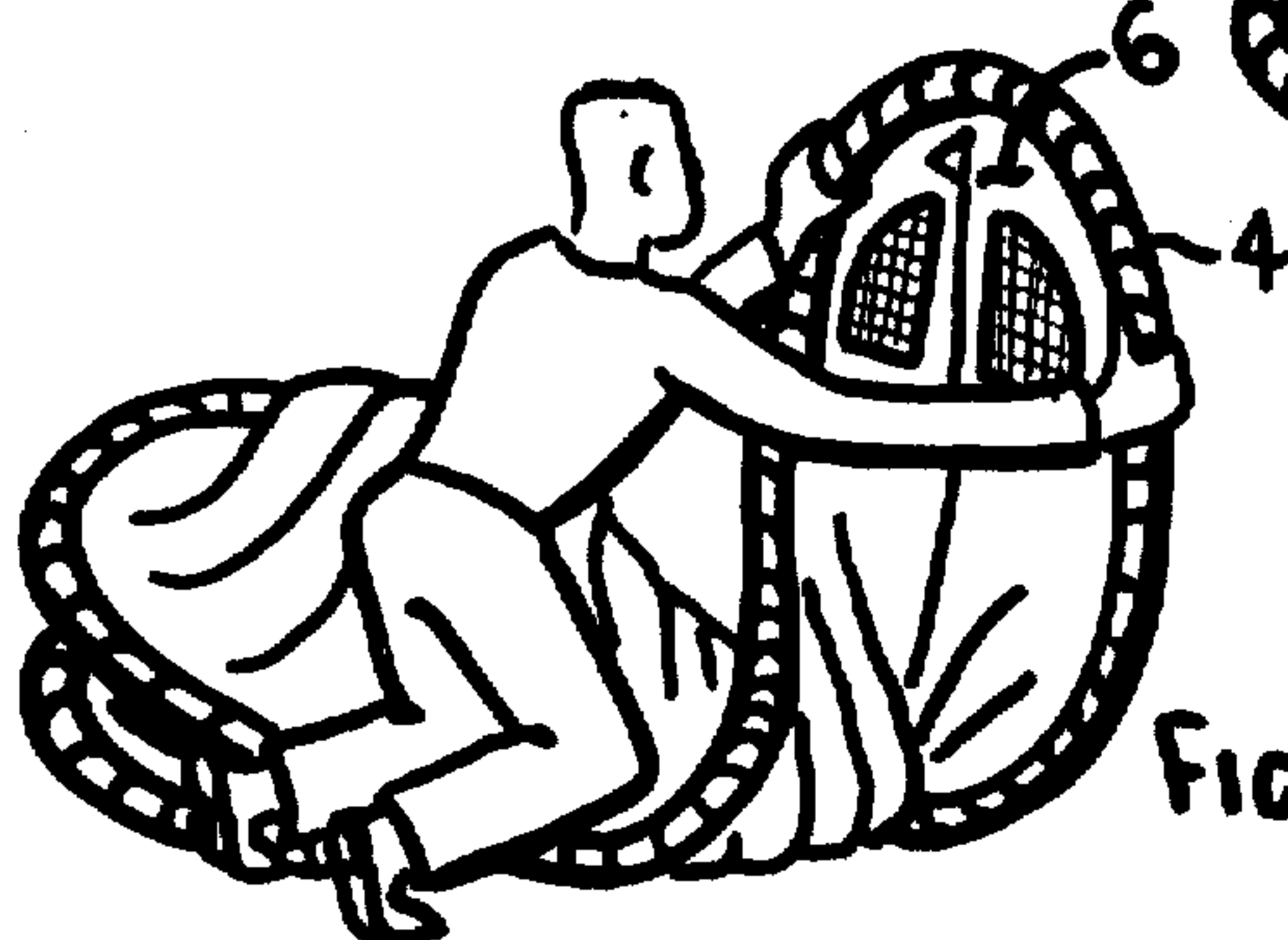


FIG. 4.

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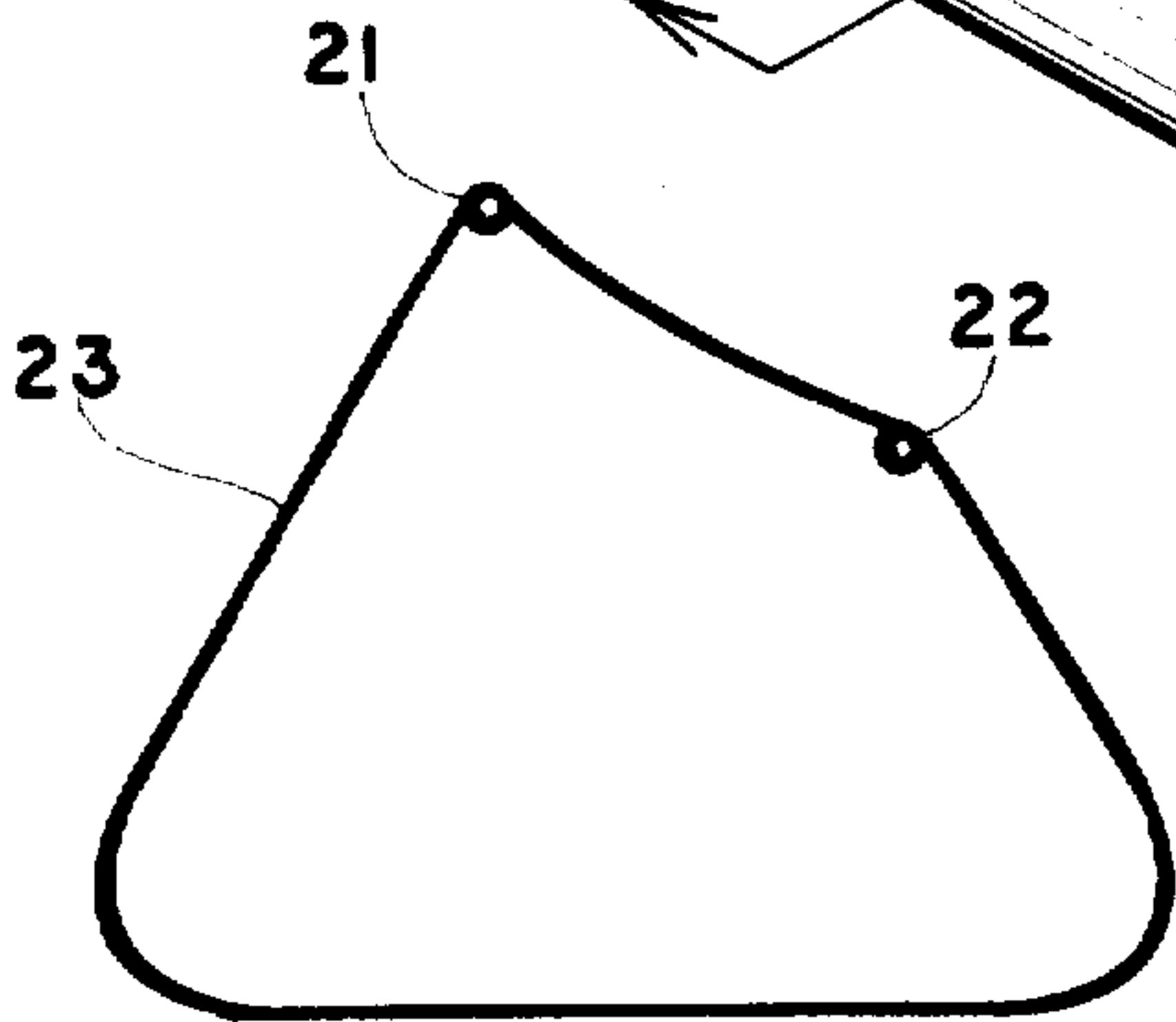
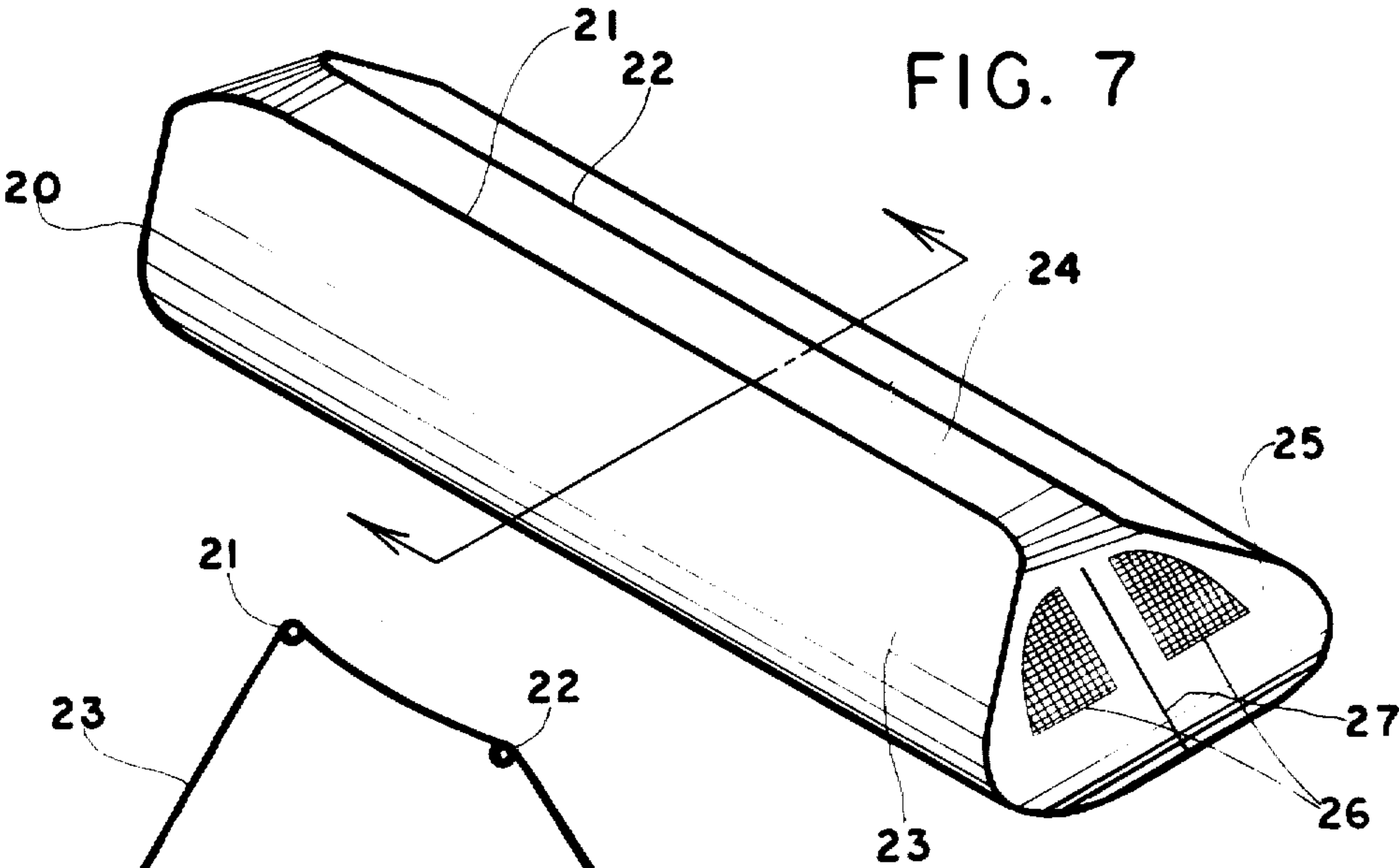


FIG. 8

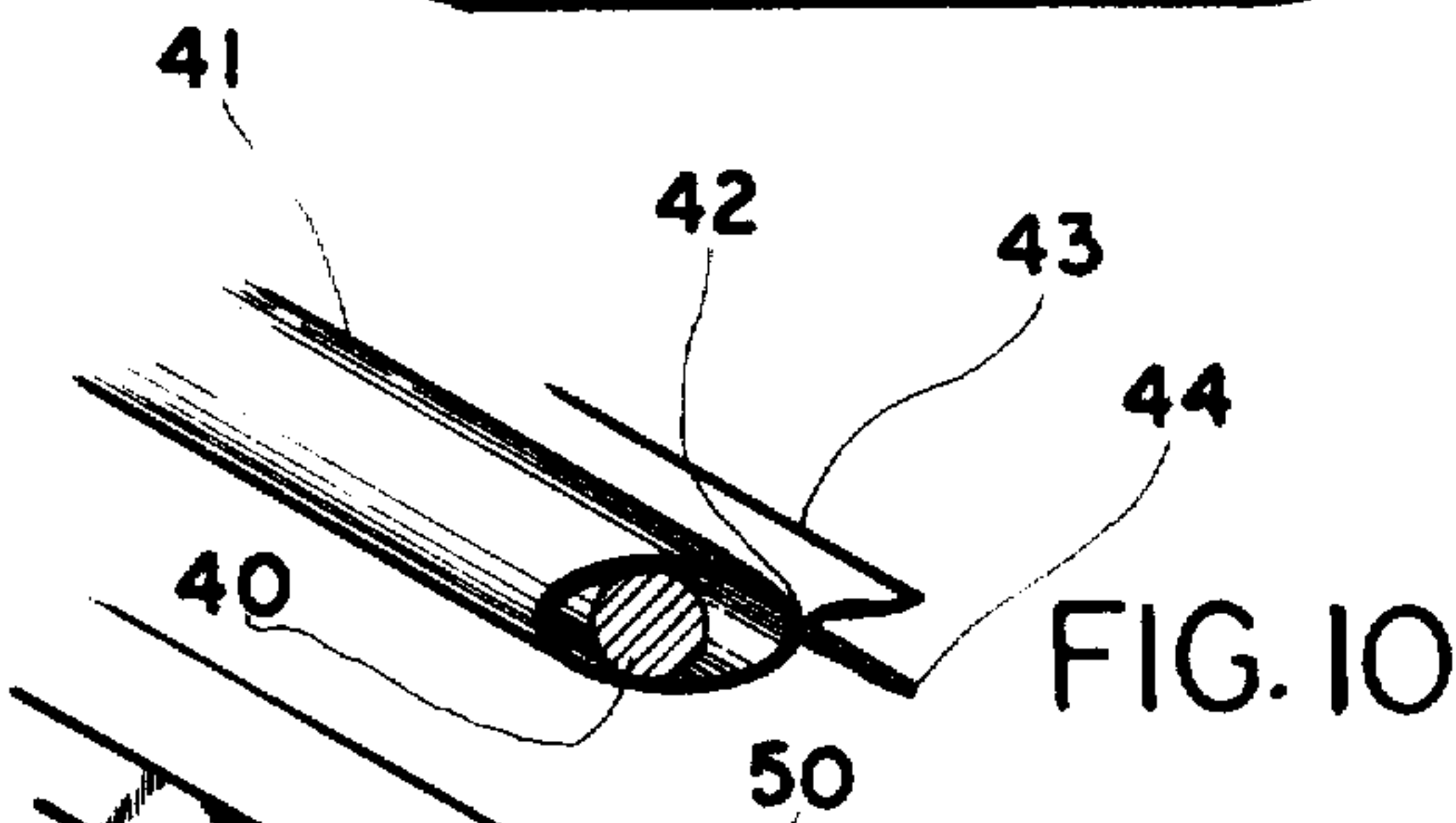


FIG. 10

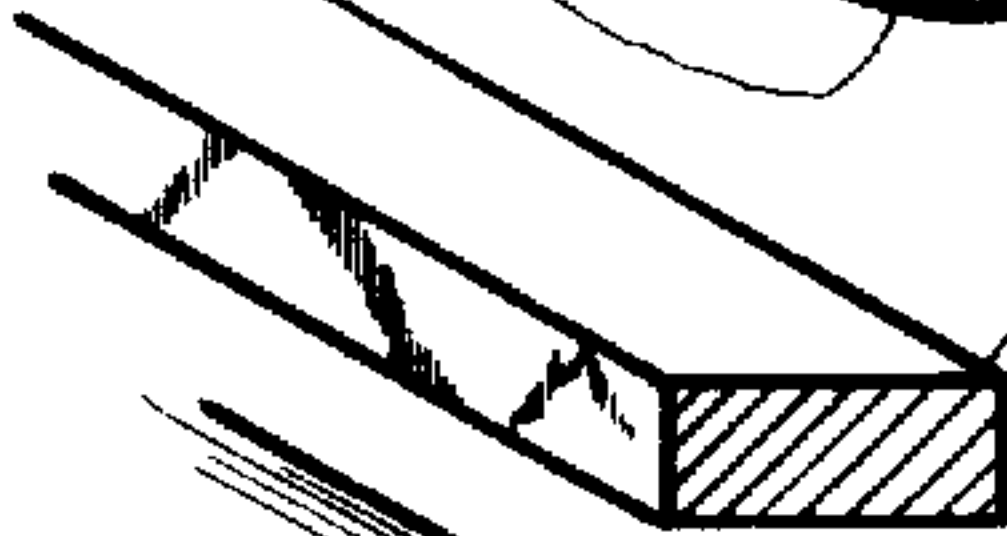


FIG. 11

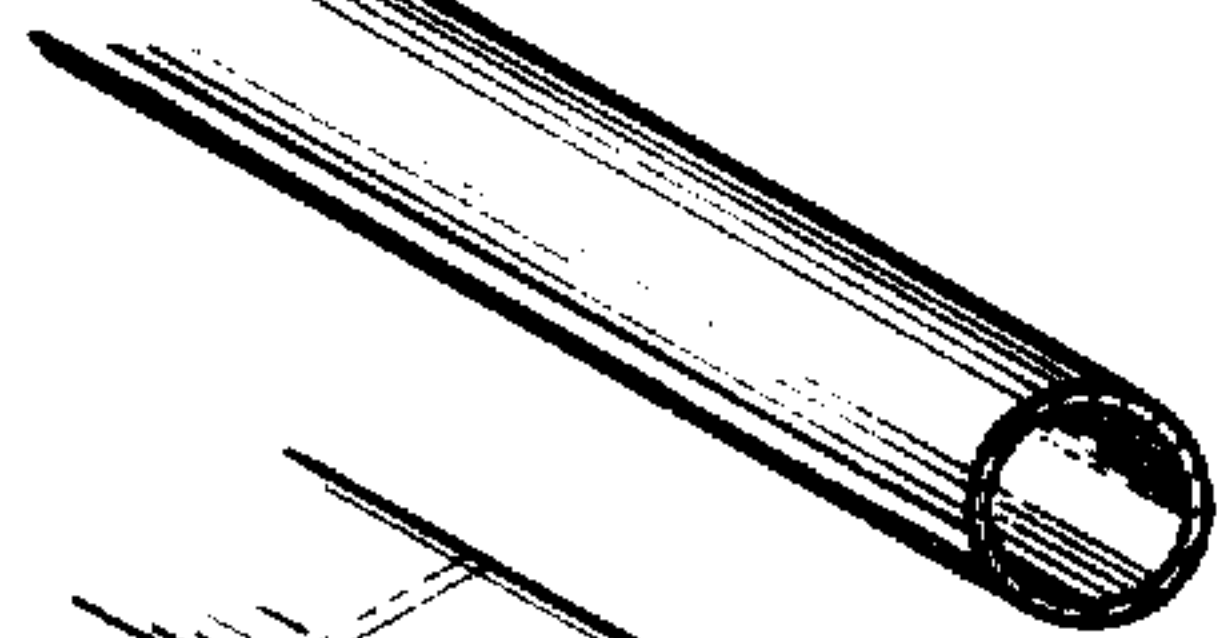


FIG. 12

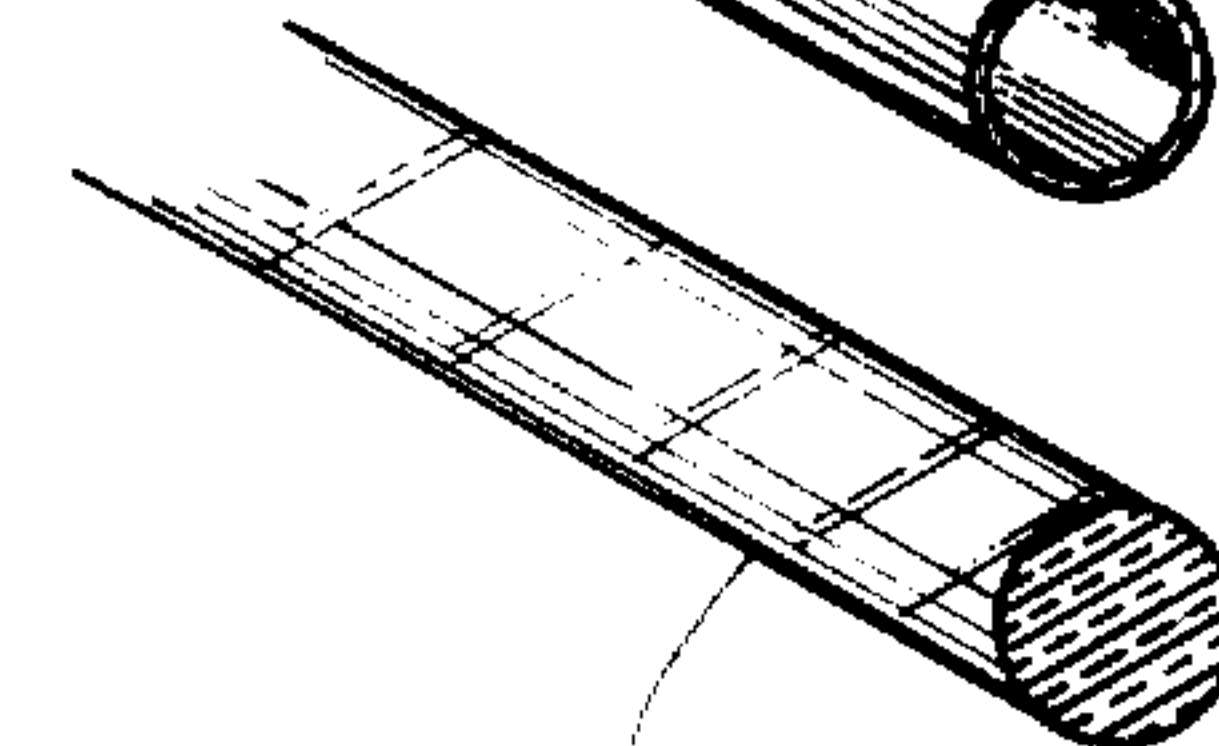


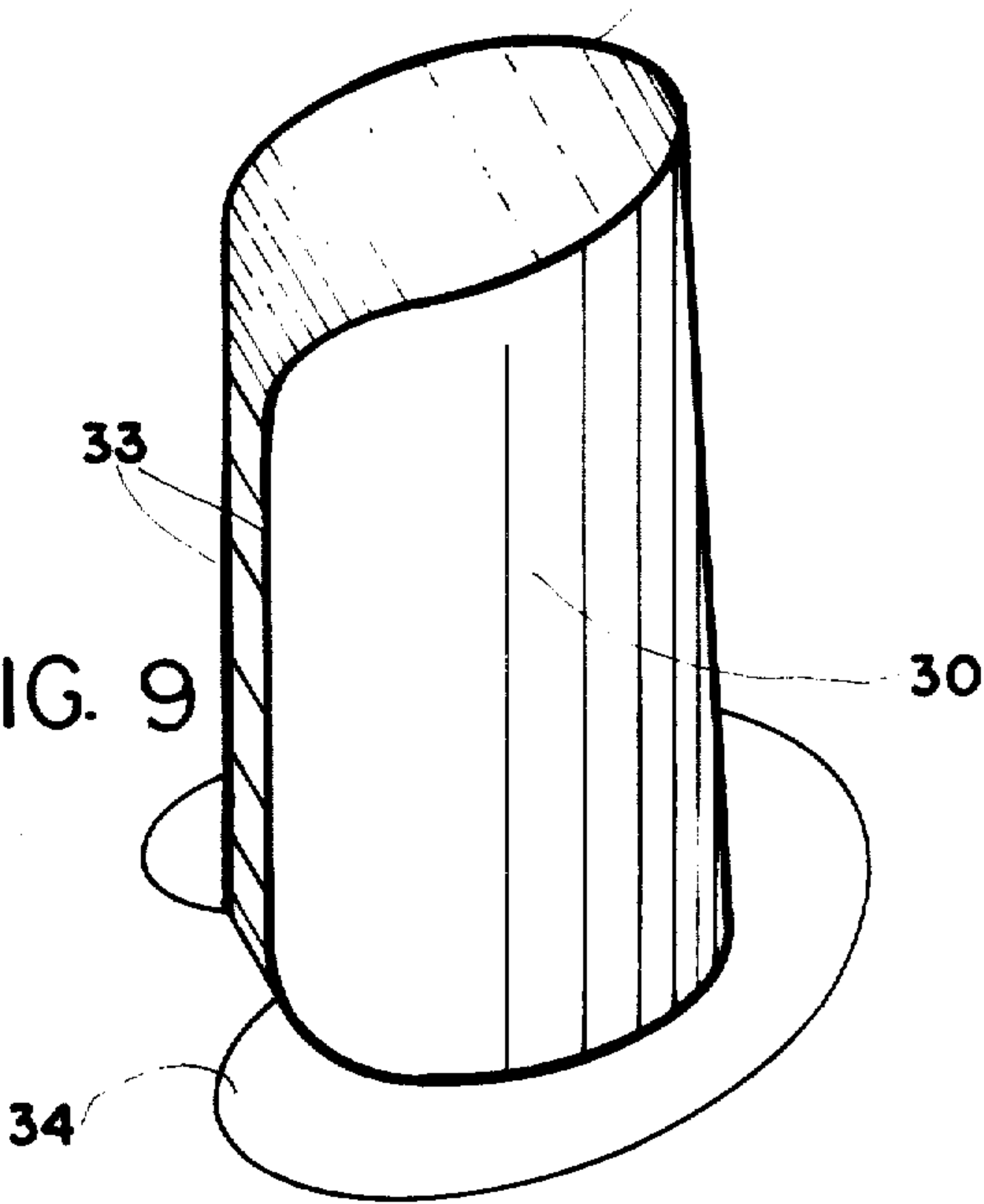
FIG. 13

GLASS OR FIBERGLASS

32

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FIG. 9



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SELF-ERECTING TENT

FIELD OF THE INVENTION

This invention relates to tents, and more specifically, to quick-erecting tents.

BACKGROUND OF THE INVENTION

Tents of any substantial size greater than a pup tent have always been complex in construction and difficult to erect. Exoskeletal tent supports have evolved which reduce the time for erection or striking, but do so by increasing structural support complexity. It is the object of this invention to provide a tent of such simplicity that a single structural member supports the entire tent, and of a pre-stressed design that will literally erect itself if placed on the ground and released from confinement means.

SUMMARY OF THE INVENTION

This invention provides a tent which is supported by a single resilient member of closed geometric shape, forming two spaced parallel rails adjacent to the ground and curving upwards at each end to join in a nearly vertical smoothly-curved arch at each end of the tent. A floor membrane is stretched between the parallel portions of the support member, and is attached to the support member along its entire perimeter, so that the floor membrane curves upwards with the curve of the support members to form both the front and back walls of the tent. A door opening is provided in the so formed front wall. A roof membrane also attaches to the support member along its entire perimeter so that it is stretched between the front and back walls, and is biaxially stretched in extending downwards and attaching to the parallel portions of the support member. The completed structure then comprises one membrane forming the back, floor and front of the tent; a second membrane forming the roof and two side walls of the tent, which is attached along its entire perimeter to the entire perimeter of the first membrane; and a closed-form resilient supporting member which is attached to follow the contour of the joined perimeters of the two membranes.

In another embodiment of this invention, the pair of spaced parallel rails actually define the back of a generally triangular shaped tent with no longitudinal bottom rails. In this embodiment, the same membrane forming the floor of the tent is extended around to constitute the major side walls while the front and rear portions are made up by second membrane constituting the bridging portion between the side walls.

In one other embodiment, the same general combination of two membranes and a continuous support member may be formed into a vertical standing structure or cabana designed particularly for beach use.

In all embodiments, the supporting member is sufficiently rigid to maintain the tent in an inhabitable configuration, and is sufficiently resilient to permit the entire tent to be twisted into superimposed loops, thereby collapsing the tent into a generally flat disc-shaped package, to be held therein by some restraining means. Upon release from restraint, the supporting member is sufficiently strong and resilient to cause the tent to erect itself to its inhabitable shape again.

The advantages of the tent according to the invention include ease of erection and striking, compact stowage, low-cost ease of manufacture, the ability to yield resiliently without breaking in high winds, and a completely sewn or jointed perimeter which is snake and insect resistant.

DESCRIPTION OF THE DRAWINGS

The features of the invention are set forth in the following detailed explanation which is presented with reference to the drawings.

FIG. 1 is a perspective view of the exterior of the tent. The segmented appearance of the perimeter is not indicative of the structure, but is provided to clarify the general contour of the tent.

FIG. 2 is a view of the first step in striking the tent wherein the back wall is formed into a loop.

FIG. 3 is a view of the second step in striking the tent in which the back wall loop is folded against the floor.

FIG. 4 is a view of the third step in striking the tent wherein the front wall is formed into a loop.

FIG. 5 is a view of the fourth step in striking the tent wherein the front wall loop is folded down.

FIG. 6 is a view of the struck and restrained tent being carried.

FIG. 7 is a perspective view of another embodiment of this invention in an erected form.

FIG. 8 is a sectional view through the embodiment of FIG. 7 taken along lines 88 of FIG. 7.

FIG. 9 is a perspective view of a cabana embodiment of this invention.

FIG. 10 is a fragmentary detail of the edge assembly of the embodiment in accordance with this invention.

FIG. 11 is a perspective view of an alternate form of support member.

FIG. 12 is a perspective view of another form of support member.

FIG. 13 is a perspective view of still another form of support member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The tent illustrated in FIG. 1 has a resilient support member 1 bounding the entire perimeter of the tent, so shaped as to form two generally parallel spaced rails 2, adjacent to the ground. The rails curve upwards at the back of the tent and join in a smoothly-curved arch 3, and curve upwards at the front to join in another smoothly-curved arch 4. A membrane 5 of flexible material extends between the rails and spans the arch 4 to form front wall 6. Similarly membrane 5 spans the arch 3 to form the back wall 7. A second membrane 8 is stretched between arch 3 and arch 4 to form the roof 9, and stretches down to join rails 2 to form side walls 10. Membrane 5 and membrane 8 are completely joined at their perimeters, which meet along the continuous length of support member 1. Front wall 6 is provided with a door opening 11, and any of the walls described may be provided with optional windows 12.

The tent of FIG. 1 is shown in erected condition and may be of size sufficient for one, two or four individuals merely by scaling up or scaling down the size of membranes 5 and 8 and the supporting member 2. It employs no additional support other than the continuous support member 12 which has a natural shape as shown in FIG. 1 with the tent erected. It, therefore, tends to maintain the shape in use and wear under either wind or snow loading where it may be slightly distorted but remains erected.

The folding of the tent is demonstrated in FIGS. 2 thru 5. In order to start striking the tent, as in FIG. 2, arch 3 is grasped and rotated 180° about a vertical axis so that back wall 7 is facing the front of the tent. The loop so formed is then pressed downwards towards the floor of the tent as shown in FIG. 3.

In FIG. 4 arch 4 is grasped and rotated 180° so that the front wall 6 is facing the back of the tent. The loop so formed is then pressed downwards towards the floor of the tent as is shown in FIG. 5.

Once collapsed into a generally disc form, the tent may be then held flat with restraining means 13 and carried as shown in FIG. 6.

The size of the collapsed tent is a function of first the size of the tent, the model of the tent (whether it be for one, two or four men) and, additionally, the number of turns taken in folding. As shown in FIGS. 2 thru 5, three loops were taken and this is sufficient to provide the folded size as shown in FIG. 6. It is recognized that often such tents are desirably carried on a backpack in which case an additional number of turns of the frame are taken in the folding process. For example, the same size tent with four or five turns taken in the frame results in a folded size which is easily carried on the back.

It should be noted that there are no separable parts to become lost as is the case in virtually every tent heretofore made and, further, no external support or connection to either the ground or trees is required for the tent. It is a free standing, unitary tent which is actually self-erecting and collapsible into a flat hoop configuration.

Now refer to FIG. 7 where another embodiment of the invention may be seen. This embodiment employs a single unitary support member 20 encased in an edge rib and, in this case, forming generally triangular end portions, including a pair of top rail portions 21 and 22 which are generally parallel and slightly asymmetric as is apparent from the sectional view of FIG. 8. The asymmetry of the portions of the tent defined by the two linear rails 21 and 22 provides an overall slope to the tent to avoid catching rain. The tent is completed by a pair of membranes 23 and 24. The membrane 23 constitutes the bottom and major portions of the side of the tent while the membrane 24 constitutes the top and front and rear portions. The front face of the tent 25 may include optional windows 26 and sealable opening 27.

Although the structure of FIG. 7 is significantly different in appearance from FIG. 1, it includes basically the two membranes and the single unitary support member, consequently, it may be folded, stored, erected, struck and carried in the same manner as illustrated in FIGS. 1 thru 6.

The only significant difference between the structure of FIG. 7 and that of FIG. 1 is illustrated by FIG. 8 constituting a transverse cross-sectional view. Note that the edges of the tent of FIGS. 7 and 8 do not include the typical sharp corner of a two man tent which generally involves lost space. The tent of this invention has a curving side which corresponds almost exactly to a sleeping bag edge configuration, therefore, sleeping bags may be pushed all the way to the edge if desired. The version of this invention as shown in FIGS. 7 and 8 employs a pre-formed support member 20 of markedly different configuration because of the end enlargements but one which again is capable of twisting into a carryable flat assembly.

Another embodiment of the invention is shown in FIG. 9 and is apparent to be an upstanding version of the embodiments of FIGS. 1 and 2. In this case, the tent has a generally circular cross-section and a slightly truncated shape in the vertical direction. It is designed particularly for use as a beach cabana which may be folded and carried in the manner similar to FIG. 6 and, upon release, self-erects into the form of FIG. 9. A vertical zipper or other closure in the major membrane 30, unshown in the drawings, is used for entering and leaving the cabana. This structure again employs a support member 31 in an edge bead and a second membrane 32 completing the structure. It may or may not have a closed bottom, depending upon the requirements. If an open bottom is satisfactory, then membrane 32 terminates at the bottom of the straight portions 33 of support member 31. As an additional feature, an edge skirt 34 is included and designed to be buried in the sand to maintain the tent vertical against wind. The advantage of this structure is again similar to the basic concept of having no separable parts and one which is easily erected and easily struck. In the embodiment of FIG. 9, it is recognized that the membranes 30 and 32 may be of canvas, duck or lightweight material suitable for privacy and wind or rain protection. The top portion of membrane 32 is inclined to allow runoff of water.

Now refer to FIGS. 10 thru 13 which disclose a number of alternative forms of the support members 1 and 20. In FIG. 10, a metal rod or wire 40 is shown enclosed within a fabric tube 41 with a sewn or sealed joint 42 and a pair of membrane portions 43 and 44 equivalent to the membranes 5 and 8 of FIG. 1. The support member 40 is typically in the form of a continuous rod or wire, pre-formed to the erected form of the tent and having sufficient stiffness to support the tent against its normal loading while sufficient flexibility to allow distortion into its folded configuration as shown in FIGS. 2 thru 6. To avoid a possible problem of corrosion or rusting, the wire should be treated with a rust-resistant paint or coating or,

where cost is not a serious factor, stainless steel wire may be used. The fabric forming the tube 41 must have sufficient tear strength to avoid damage by the local stress applied by the support member 40 in both the folded and erected position.

5 An alternate form of support member appears in FIG. 11, in this case a flat strip 50 similar to conventional steel strapping used in the packaging industry. Such a form is quite inexpensive and can be formed into overlapping loops when folded but does not have the bi-directional bending capability of a wire similar to FIG. 10.

Where extreme weight is a factor, the support member in the form of a flexible tube may be used as is illustrated as item 60 of FIG. 12. Typically, it is stainless steel.

15 Another form of suitable support member which has a particular advantage of high strength to weight ratio and immunity from corrosion and rusting is shown in FIG. 13. Typically, it is a rod of glass or resin bonded glass fibers. A variety of plastic materials may be used for small structures, however, most plastics such as polyethylene, polypropylene and vinyl were found to be of insufficient strength and have inadequate plastic memory to insure a reliable structure. For that reason, the preferred material for support member remain stainless steel strapping, tubing or glass or fiberglass.

25 It is recognized that other tent configurations and other minor variations from the structure of this invention may be made without departing from the teaching given above. Protection granted under U.S. Patent laws for this invention, therefore, shall not be limited to the foregoing specified structures, but to the invention as defined by the claims set forth below.

I claim:

1. A tent comprising:

a continuous closed loop resilient support member;
a first membrane extending between opposed portions of said support member;
a second membrane extending between opposing portions of said support member and spaced from said first membrane when said support member is in unrestrained condition;
said support member being distortable to reduce the volume of said tent for storage;
said support member including a pair of elongated straight portions which, when the tent is in the erected condition, generally define the length of said tent; and
said elongated straight portions constitute the ground rails for the tent.

2. A tent comprising:

a continuous closed loop resilient support member;
a first membrane extending between opposed portions of said support member;
a second membrane extending between opposing portions of said support member and spaced from said first membrane when said support member is in unrestrained condition;
said support member being distortable to reduce the volume of said tent for storage;
said support member including a pair of elongated straight portions which, when the tent is in the erected condition, generally define the length of said tent; and said elongated straight portions being generally parallel and defining the apex of the peak of the tent.

3. A tent having a single unitary supporting member in the form of a resilient, closed geometric shape so that in use the supporting member is in the shape of two generally parallel spaced rails adjacent to the ground and curving upwards at each end to join in a nearly vertical smoothly-curved arch at each end of the tent; a floor membrane stretched between the parallel portions of said supporting member, and curving upwards to span said arch portions of the supporting member, thereby forming a front wall and back wall of the tent; a roof membrane extending from the front arch to the back arch of said supporting member, and extending downwards to said parallel portions of said supporting member, thereby forming a roof and both sidewalls of the tent.

4. A tent as in claim 3, in which a door opening is provided in at least one of the walls of the tent.

5. A tent as in claim 4, in which at least one window is provided in at least one wall of the tent.

6. A tent as in claim 3, wherein the supporting member is sufficiently resilient to be twisted into a plurality of superimposed loops, thereby collapsing the tent into a generally flat disc for transportation and storage, and to also cause the tent to erect itself again to an inhabitable configuration.

7. A cabana-type tent comprising:
a closed-loop flexible support member defining a generally circular base portion, a pair of generally straight upright portions and a generally circular top portion, said pair of generally straight upright portions constituting spacers for said circular base portion and said circular top portion to define a generally cylindrical shape when in erected condition;
a first membrane secured to said flexible support member and extending generally between opposed portions of the support member;
a second membrane secured to said flexible support member and spaced from said first membrane thereby defining an enclosed volume, the first a generally circular

portion of said support member defining a base for the tent.

8. A cabana-type tent comprising:
a closed-loop flexible support member defining a generally circular base portion, a pair of upright portions and a generally circular top portion;

a first membrane secured to said flexible support member and extending generally between opposed portions of the support member;

a second membrane secured to said flexible support member and spaced from said first membrane thereby defining an enclosed volume, the first a generally circular portion of said support member defining a base for the tent;

said generally circular top portion is slightly inclined when the support member is in a generally unrestrained condition to define a tapered roof of said tent.

9. The combination in accordance with claim 7 including an extensible member secured to the first generally circular portion of support member for securing said tent to the ground.

10. The combination in accordance with claim 9 wherein said extensible member constitutes a fabric skirt.

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