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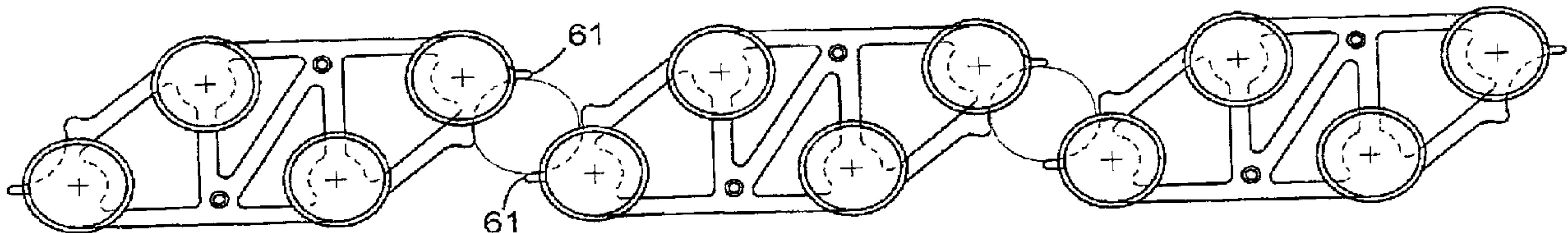
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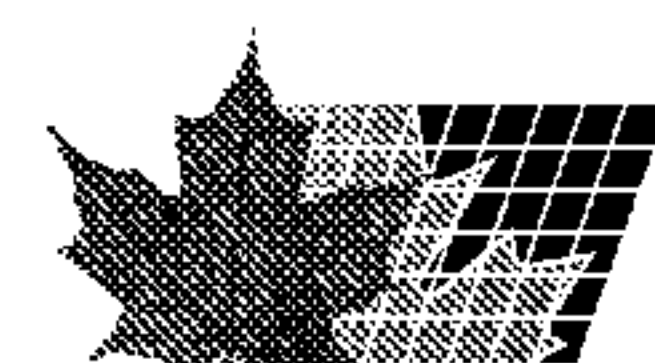
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(54) **Titre : SUPPORT D'INTERFACE POUR LA FIXATION DE RECIPIENTS RECYCLABLES ET MATERIAU DE TOITURE FABRIQUE EN L'UTILISANT**
(54) **Title: INTERFACE BRACKET FOR ATTACHMENT OF RECYCLABLE VESSELS AND ROOFING MATERIAL MADE USING SAME**



(57) **Abrégé/Abstract:**

The invention relates to an apparatus, e.g., a bracket, configured for reception of vessels, such as plastic bottles which have been cut in a way which makes them useful upon assembly, as roofing construction elements. The roofing elements, the roofing structures which result and kits for manufacturing these structures, are all features of the invention.



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(54) Title: INTERFACE BRACKET FOR ATTACHMENT OF RECYCLABLE VESSELS AND ROOFING MATERIAL MADE USING SAME

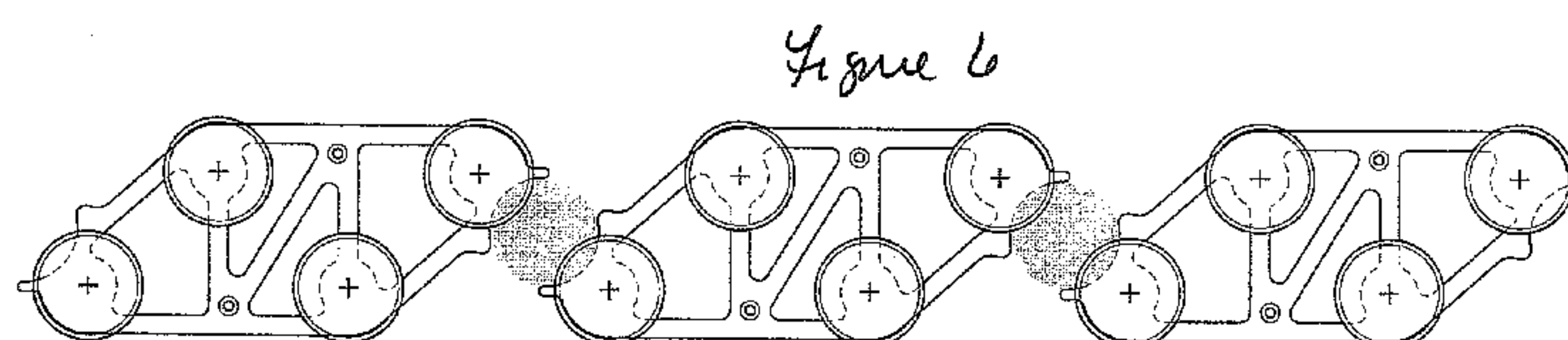


FIGURE A

(57) Abstract: The invention relates to an apparatus, e.g., a bracket, configured for reception of vessels, such as plastic bottles which have been cut in a way which makes them useful upon assembly, as roofing construction elements. The roofing elements, the roofing structures which result and kits for manufacturing these structures, are all features of the invention.

INTERFACE BRACKET FOR ATTACHMENT OF RECYCLABLE VESSELS AND ROOFING MATERIAL MADE USING SAME

[001] This invention relates to an interface bracket useful in constructing roofing devices made of recyclable materials, such as bottles or other vessels. It also relates to the roofing materials thus made.

BACKGROUND AND PRIOR ART

[002] The inventors are not the first investigators to have addressed the issue of inexpensive building materials made of used recyclable materials.

[003] Interest in using discarded, post-consumer materials as building supplies is evidenced via, e.g., U.S. Pat. Nos. 6,161,355; 4,068,429; and 3,982,362, which describe the use of cans for manufacturing walls, storage systems, temporary shelters, and so forth. U.S. Pat. No. 5,675,954 evidences use of discarded tires in roofing structures.

[004] Interest in using discarded, post-consumer bottles in construction is seen in, e.g., U.S. Pat. Nos. 6,907,703; 4,624,383; and 4,057,946. These patents essentially describe structural modifications to bottles and other liquid container means, such that these may interlock with each other to form large, stable structures. Published patent application 2010/0122504 teaches structures which can employ waste materials as so-called "form inclusion" materials.

[005] None of these references, however, disclose structures or methods for producing relatively light weight roofing materials which can be constructed of waste materials, e.g., vessels for liquid containment, such as plastic bottles, or structures which can be used to facilitate the manufacture of these structures.

[006] The invention as described herein provides a universal building attachment system which allows for the simple, rapid building of durable roofs that may be adjusted for the needs of a particular climate. It provides a practical alternative to other makeshift systems,

such as asbestos ridden corrugated tin roofs. These suffer from various disadvantages, including overheating, and the use of hazardous material.

BRIEF DESCRIPTION OF THE FIGURES

[007] Figures 1a - 1d depict different embodiments of the bracket means of the invention and its deployment in components of roofing structures.

[008] Figures 2a₁, 2b₁, 2c₁, 2a₂, 2b₂ and 2c₂ show details as to how disposable vessels are prepared and used in connection with the bracket means of Figures 1a - 1d.

[009] Figures 3a - 3d show the preparation of components of the roofing system of the invention in more detail.

[0010] Figures 4a - 4c and 5a - 5d all show elaboration of aspects of the invention.

[0011] Figures 6a - 6c present embodiments of the BIB in greater detail, so as to show spacing between a plurality of the BIBs, as well as adjustable means positioned on the BIB so as to permit adjustment for different vessel sizes.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0012] With reference to the figures, Figures 1a-1d displays a so-called "bottle interface brackets **10**," which will be called a "BIB" hereafter. The bracket comprises a base **11** made of durable material, such as plastic, having attached thereto a plurality of nesting means, or mounts **12** each of which is adapted to receive a bottle or other vessel, as described infra. Preferably, the material is recyclable or made from recycled materials. The nesting means or mounts are configured so as to engage the vessels, such as bottles, via the commonly found threaded portion **13** thereof, e.g., their neck. The bracket also contains a plurality of fastening means **14**, adapted to receive, e.g., standard screws, nails, bottle caps, or other fastening means to engage vessels to or with a permanent structure, such as a roofing purlin.

[0013] Figure 1a depicts a plurality of interface brackets aligned on the base of a bottle interface bracket **11**.

[0014] Figure 1b shows one view of an embodiment of a BIB in accordance with the invention, while Figure 1c shows the embodiment of Figure 1b from another view point. Figure 1d shows a second embodiment of the BIB.

[0015] Figures 2a - 2c depicts how the vessel components are prepared for use in the invention. Figure 2a shows an unprocessed member of the roofing apparatus, e.g., a standard plastic bottle **16**, while Figures 2b and 2c show the standard cuts discussed infra. In practice, the vessels used for the roofing device must have a uniform neck portion **17**. The diameter and shape of the vessels may vary as long as accommodated by the BIB. While there are standard sized bottles and necks, the BIBS of the invention may be configured for any size or style of bottle, and may contain any number of mounts. Especially preferred are BIBs with from 2-24 mounts, and those with 2-6 are especially preferred. A BIB with a sufficient number of mounts may in fact act as a support means itself.

[0016] Exemplary, but by no means the only potential embodiments of the invention are BIBs adapted to hold liter, half-liter, two liter, pint, quart, and half-gallon vessels, as well as other sizes which will be immediately apparent to the skilled artisan. Similarly, while the depicted BIB holds four vessels, it will be apparent to the artisan that the BIB may be configured to hold any number of vessels. In one, non-limiting embodiment, the threadings of the bracket are adapted to fasten to vessels closed by a standard bottle cap. Threadings may vary and include, e.g., standard threadings, such as those disclosed for "SPI Neck Finish Specification for Standard Closures," 400H, 410H, 415H, and other art recognized sizes.

[0017] The backing of the bracket is designed to reposition the threaded mounts at any number of adjustable intervals. The adjustments can reposition threading to be wider apart or closer together in the horizontal dimension. The adjustments can reposition threading to also be at different intervals in the vertical spacing as well. The adjustments are intended to allow the BIB to accommodate vessels between, e.g., 1½" and, 8" diameter, or larger.

[0018] To reposition threading to adjustable intervals, the lateral and vertical members have pre-set, adjustable means to adjust and lock BIB interval sizes quickly, as can be seen more clearly in Figure 6.

[0019] Important to the function of the invention is the ability to align and space multiple BIBs rapidly along any flat roofing surface. To accommodate proper spacing of the BIBs, adjustable mounts on the side of the BIB can be set to frame a vessel's cap. Caps are used to space the BIBs at constant intervals. Spacing BIBs by cap sizes insures that rows of vessels are spaced evenly.

[0020] The vessels are washed and dried prior to use. Following this, half of the vessels in Figure 2a receive one of a series of standard cuts **18**, such as a single lateral cut, leaving the end opposite the neck intact. This is shown in Figure 2b.

[0021] The other half of the bottles receive one of a series of standard cuts, such as a lateral cut **19** and a circular cut **20** to remove the bottom portion thereof, as shown in Figure 2c.

[0022] Hereafter, the bottles prepared as shown in Figure 2b will be referred to as the "top thatch" component and those of Figure 2c, the "bottom thatch" component.

[0023] Following preparation of the top and bottom thatch components, they are attached to the BIB, as shown in Figures 3a - 3d. The attachment can take place before or after attachment of the BIBs to a structure. Bottom thatch vessels are inserted in to the lower portion of the BIB with the cut out portion facing upwards **30**, as shown in Figure 3a.

[0024] If desired appropriate materials can be inserted into the cavity of the vessels, or be used to coat their interior or exterior before assembly. For a reflective roof, e.g., (to prevent green-house conditions within), reflective elements can be inserted in the vessels such as tin foil, aluminum foil, unwrapped cans, and so forth. Similarly, for an opaque roof (to darken conditions within), opaque elements can be inserted in the vessels, e.g., paint, papers, mud, etc. Paint, mud, and so forth may be used for coating the vessels, especially the bottom thatch vessels.

[0025] Following this, a first top thatch vessel is inserted in an upper mount of the BIB **31**, as shown in Figure 3b. Note that the BIB is angled such that when the top thatch bottle is inserted, it locks the two bottom thatch vessels in place. Adding a second top thatch bottle **32**, as shown in Figures 3c and 3d, permits the user to lock bottom thatch members of adjoining BIBs in place.

[0026] Important to the functioning of the invention is the ability of the threaded mounts positioned in the BIB, to rotate freely. Also, these threaded mounts must be fixed to the depicted back plates. This configuration means that vessels, when attached, cannot and need not be turned. Then obviates any issue with the vessels needing to pass through each other in order to be threaded on to the BIBs. It should be noted, however, that only the top thatch mounting means must be attached to allow free rotation. If bottom thatch vessels are attached before the top thatch vessels, this may be done with rotation, without impeding other vessels.

[0027] In practice, a framing means such as is shown in Figure 4a is prepared by inserting the requisite number of BIBs thereon, followed by attachment of the thatching vessels. Figures 4a - 4c illustrate this. Specifically, Figure 4a, shows an embodiment **40** where interface brackets designed to hold four vessels **41** are aligned and attached to a purlin **42**.

[0028] The cut bottles, as shown in Figure 2a, are then attached to the purlin of Figure 4a with the so-called "bottom thatch" being attached first, followed by the top thatch. Once these structures have been prepared, they are aligned on a roof structure, as shown in **43** of Figure 4b, culminating in a complete roof structure, as per **44** of Figure 4c.

[0029] One aspect of the invention relates to a kit useful in manufacturing a roof of the type described herein. Such a kit comprises, as separate components, a plurality of BIBs of the type described supra and examples of which are depicted in, e.g., Figures 1b and 1d, as well as attachments, such as that shown in **50** of Figure 5a. Such attachments are standard in the art and may be used for attachment to, e.g., purlins or other supports useful in preparing a roof structure.

[0030] Also a part of such kits is a cutting means for cutting the vessels employed to make the roof. Again, such cutting means, exemplified by, e.g., **51a - 51d** of Figure 5b, are well known and will be familiar to the skilled artisan.

[0031] In the kits of the invention, BIBs such as the embodiment shown in Figures 1b and 1d are attached to the purlin **52**, or other support, as shown in Figure 5c. Note that, in this embodiment, the BIBs include a pair of flared extensions **61**, such that when paired with another bracket, the appropriate spacing therebetween can be determined by positioning the extensions so as to form a space that is identical to that of the cap of the vessels to be inserted into the brackets. This can also be seen in Figure 6a, in greater detail.

[0032] As noted, supra, each BIB or bracket contains pre-set adjustable means for locking BIB interval sizes quickly. Figure 6b shows these, via rows of circles **62** positioned at various points thereon. Figure 6c is a close-up view of a portion of the BIB, showing how these adjustable means may be moved to accommodate vessels of different sizes.

[0033] The assembled supports, e.g., purlins **52** with brackets attached thereto, may then be positioned on pallets **53**, or other supporting means, as shown in Figure 5d, so that upon reaching the desired destination they can be assembled into a roof means using the attachment of Figure 5a to set an appropriate slope for drainage, and attachment of vessels prepared "in situ."

[0034] The resulting structure is a lightweight, well ventilated, thermally conductive, and protective roof. For example, when rain strikes the roof it hits top thatch bottles, and slides down to the receiving, open end of a bottom thatch issue there under. The overlap between assemblies ensures the movement of water from one bottom thatch vessel, to the next. The mode of construction allows air trapped under the structure to escape, which in turn provides a surface which naturally and passively cools an enclosed, warm space.

[0035] Other aspects of the invention will be clear to the skilled artisan and need not be set forth herein.

CLAIMS

1. A structural bracket useful for attaching a plurality of vessels having threaded necks, comprising a flat base, said flat base having attached thereto a plurality of threaded mounts, wherein each of said plurality of threaded mounts is configured to engage a single vessel of said plurality of vessels having a threaded neck, wherein said plurality of threaded mounts are adjustable within said flat base in both horizontal and vertical directions so that spacing between each of said plurality of threaded mounts may be changed.
2. The structural bracket of claim 1, wherein said plurality of threaded mounts includes from 2-6 threaded mounts.
3. The structural bracket of claim 1, wherein said structural bracket is constructed of recycled material.
4. A construction element useful in fabricating roofing means, comprising the structural bracket of claim 1, having attached thereto a first array of top thatch cavity containing vessels positioned in a row, said first array positioned above a second array of bottom thatch cavity containing vessels, said first array and second array containing an equal number of vessels of equal size.
5. The construction element of claim 4, wherein each cavity of each of said vessels contains an element to modulate light reception by said construction element.
6. A roof structure comprising a plurality of the construction element of claim 4, appended to a support means.
7. The roof structure of claim 6, wherein said support means is a purlin.
8. The roof structure of claim 6, comprising a frame structure with said support means positioned therein.
9. A kit useful in construction of a roofing means of disposable vessels, comprising:
 - (i) a plurality of the structural bracket of claim 1;

(ii) cutting means for preparing top thatch and bottom thatch vessels for use in said roofing means; and

(iii) support means for attachment of the plurality of the structural bracket of claim 1 thereto.

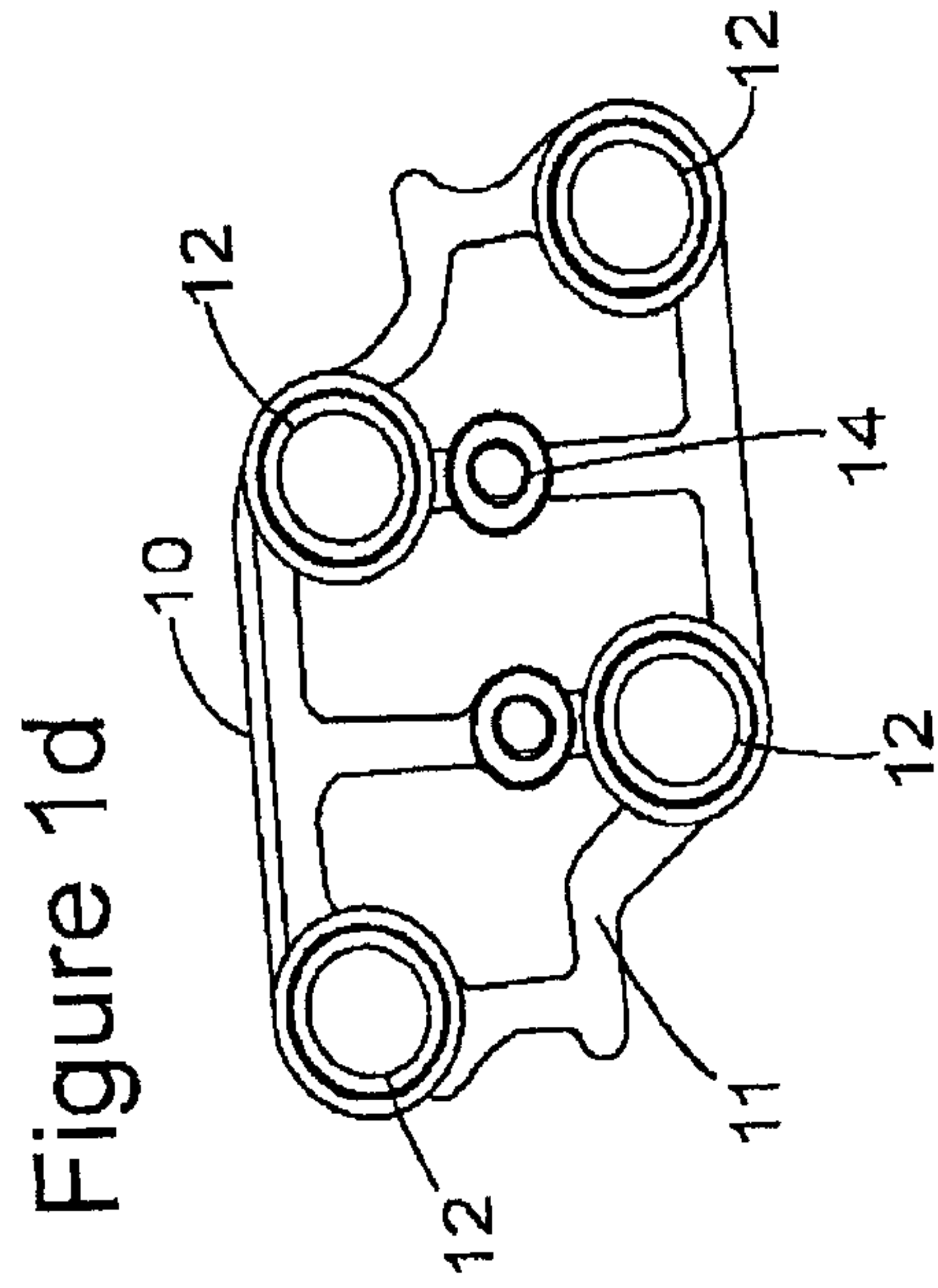
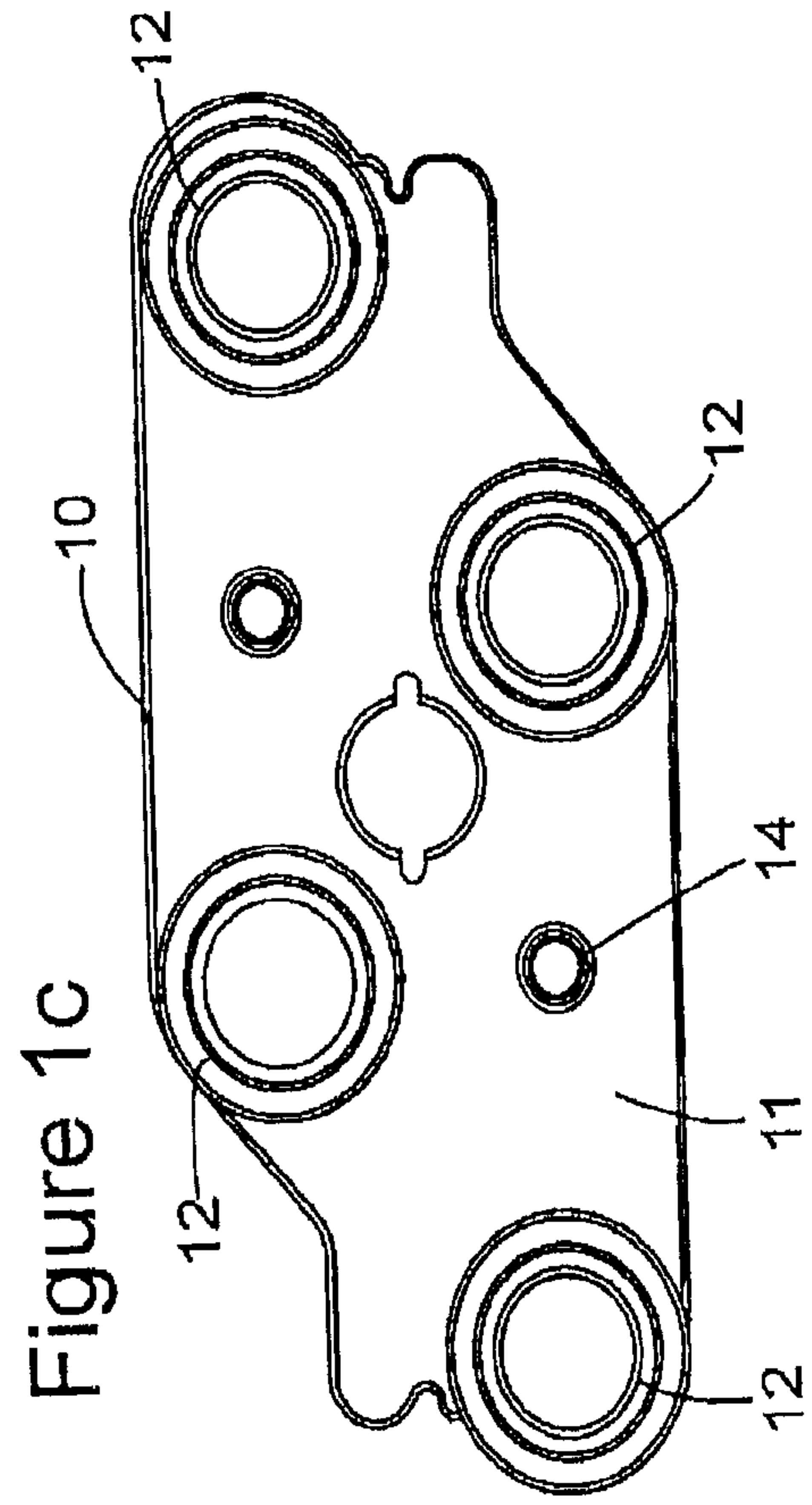
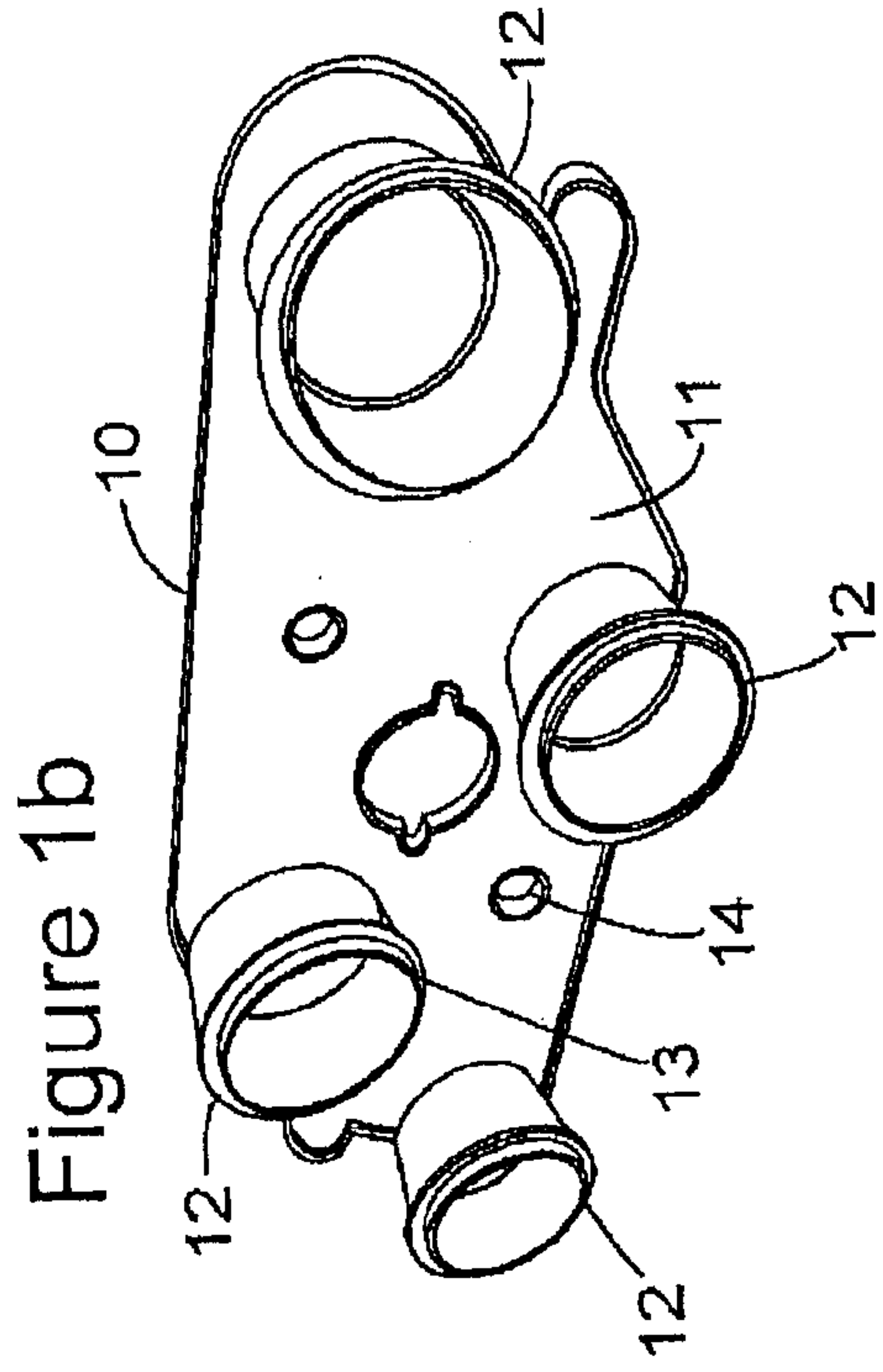
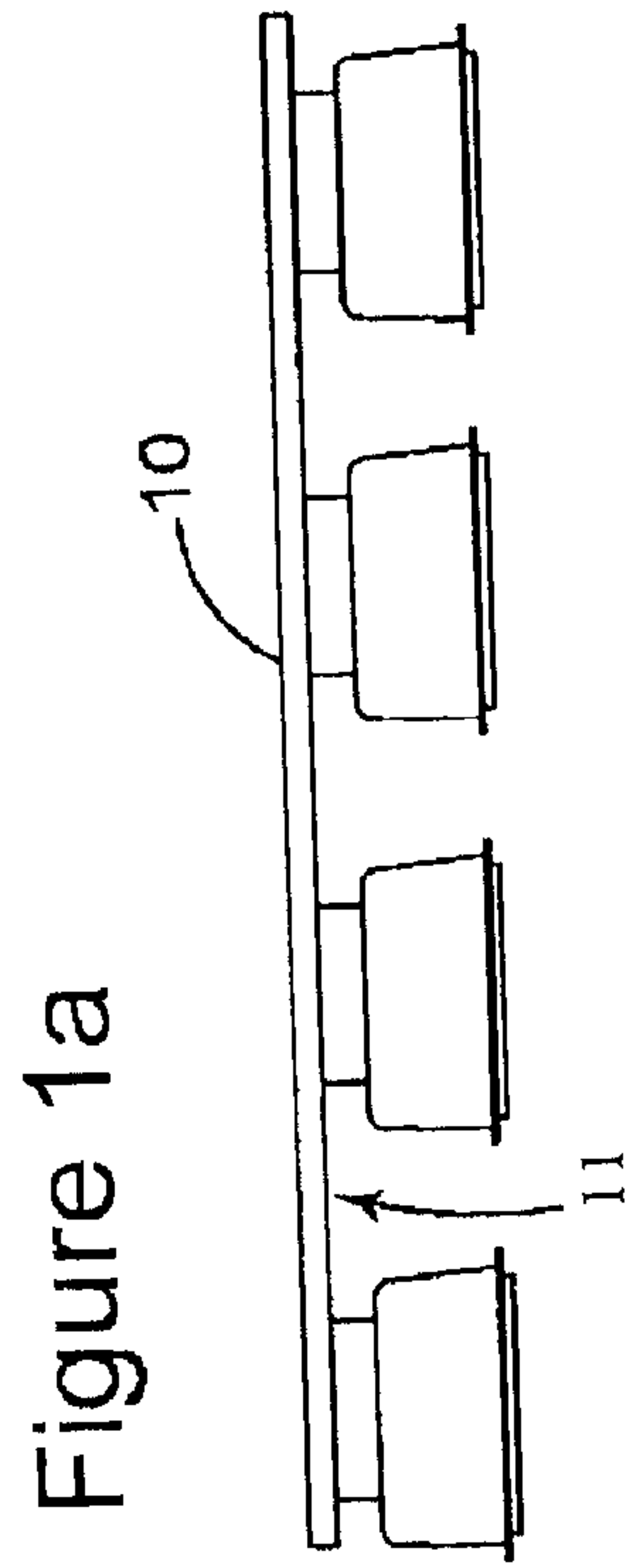


Figure 2a₁

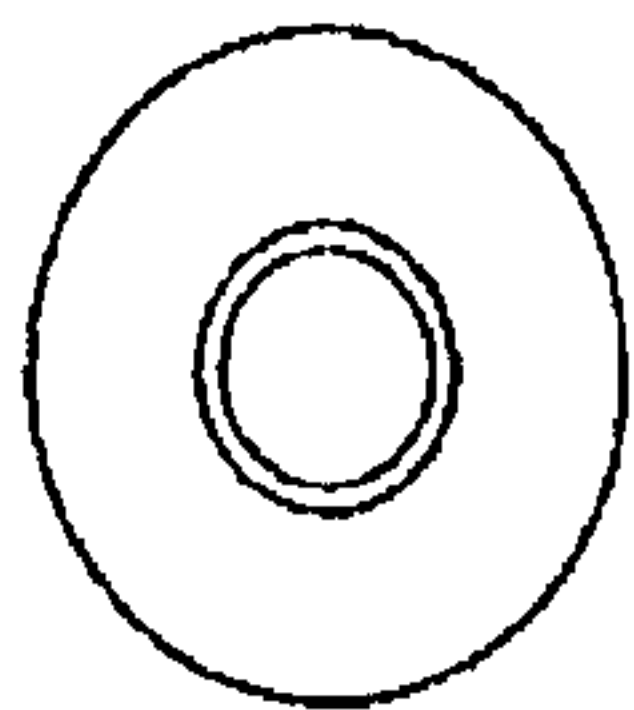


Figure 2b₁

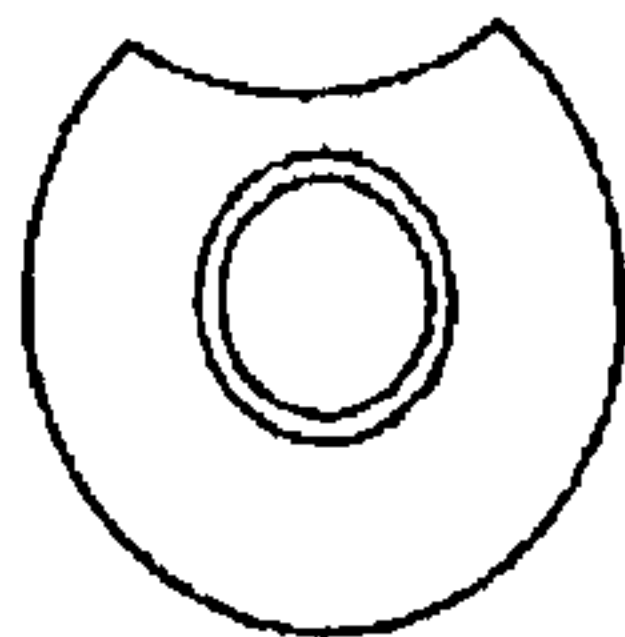


Figure 2c₁

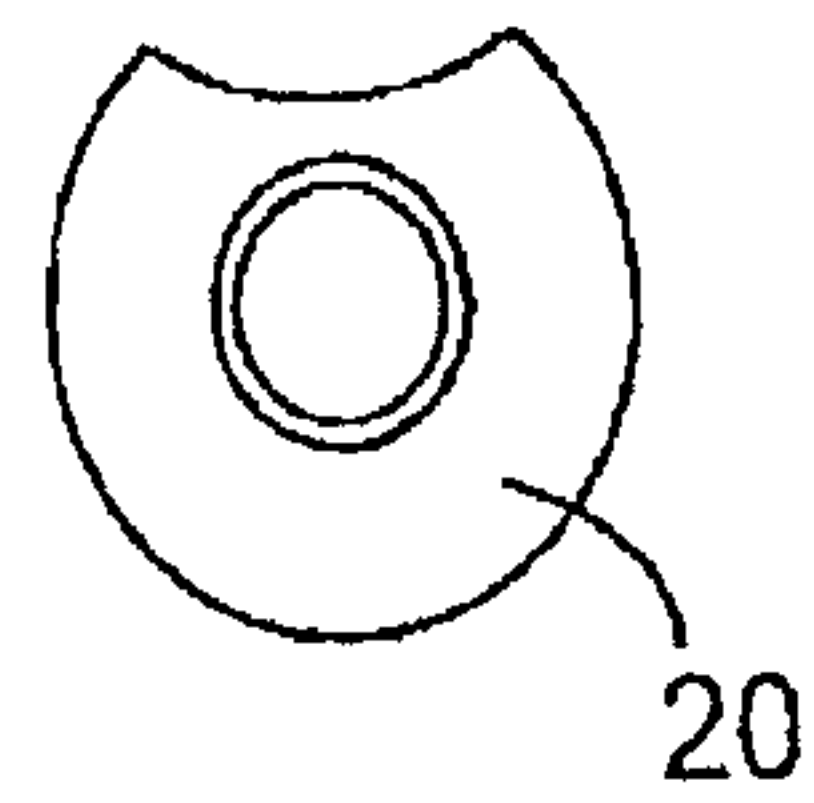


Figure 2a₂

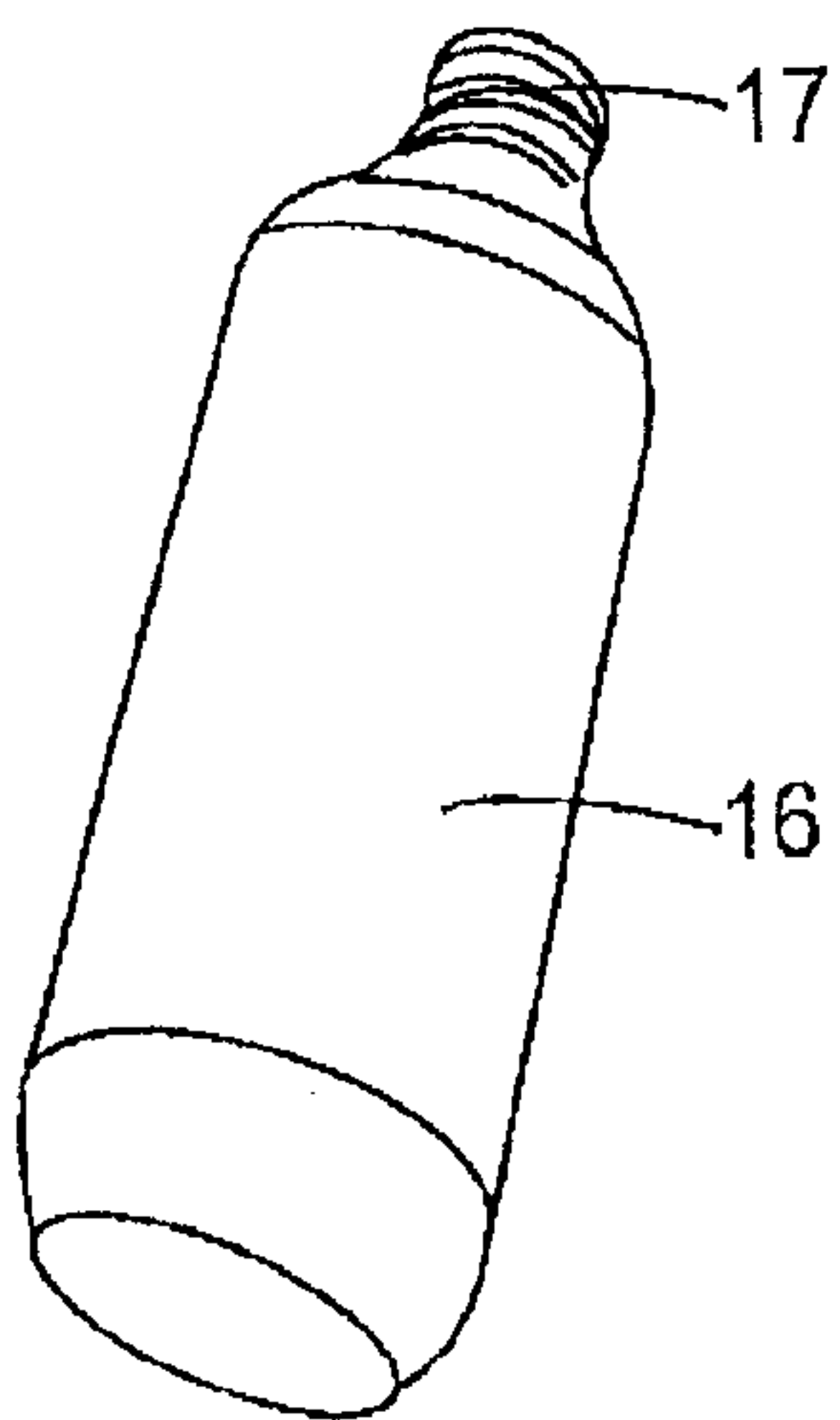


Figure 2b₂

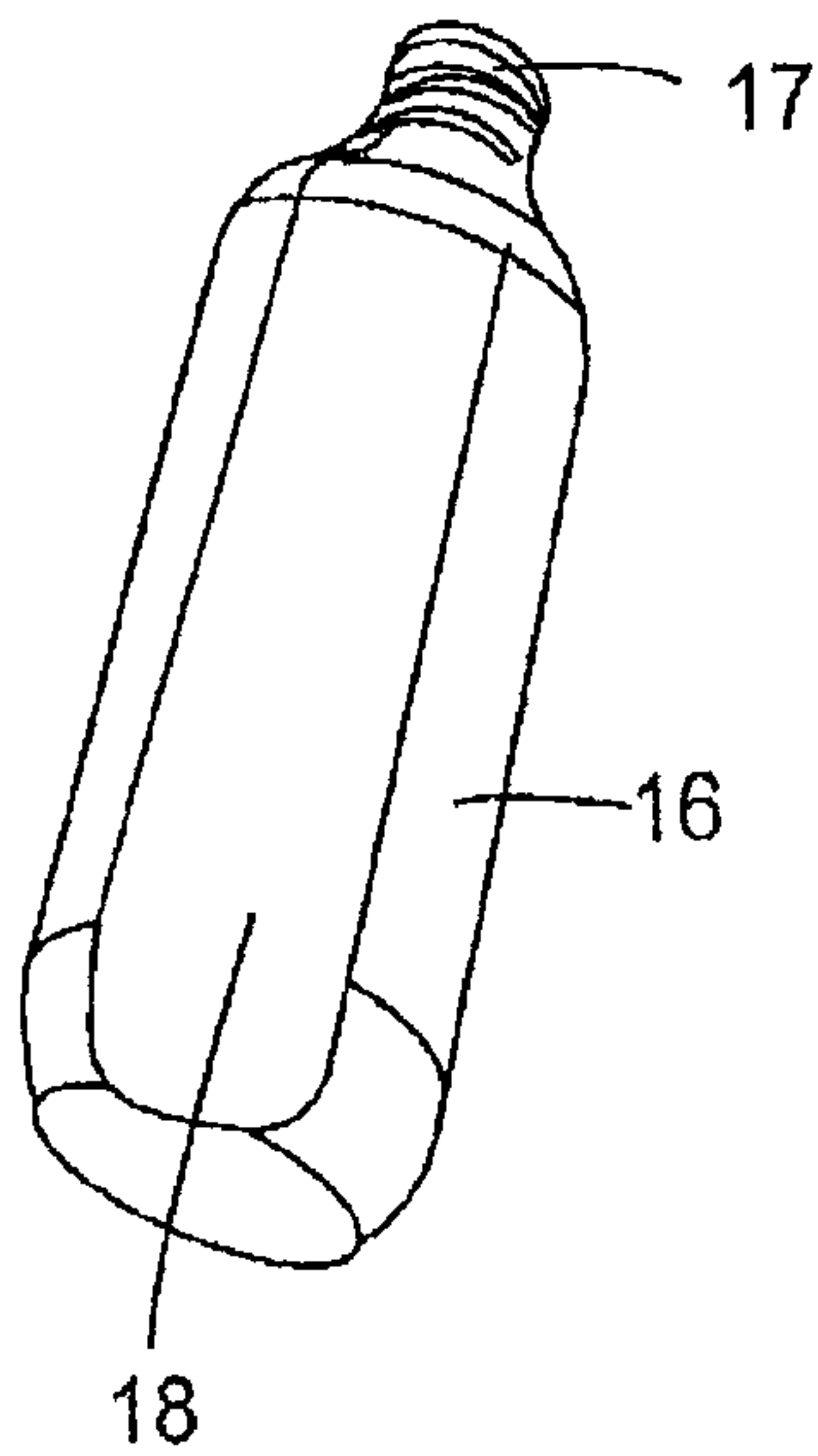


Figure 2c₂

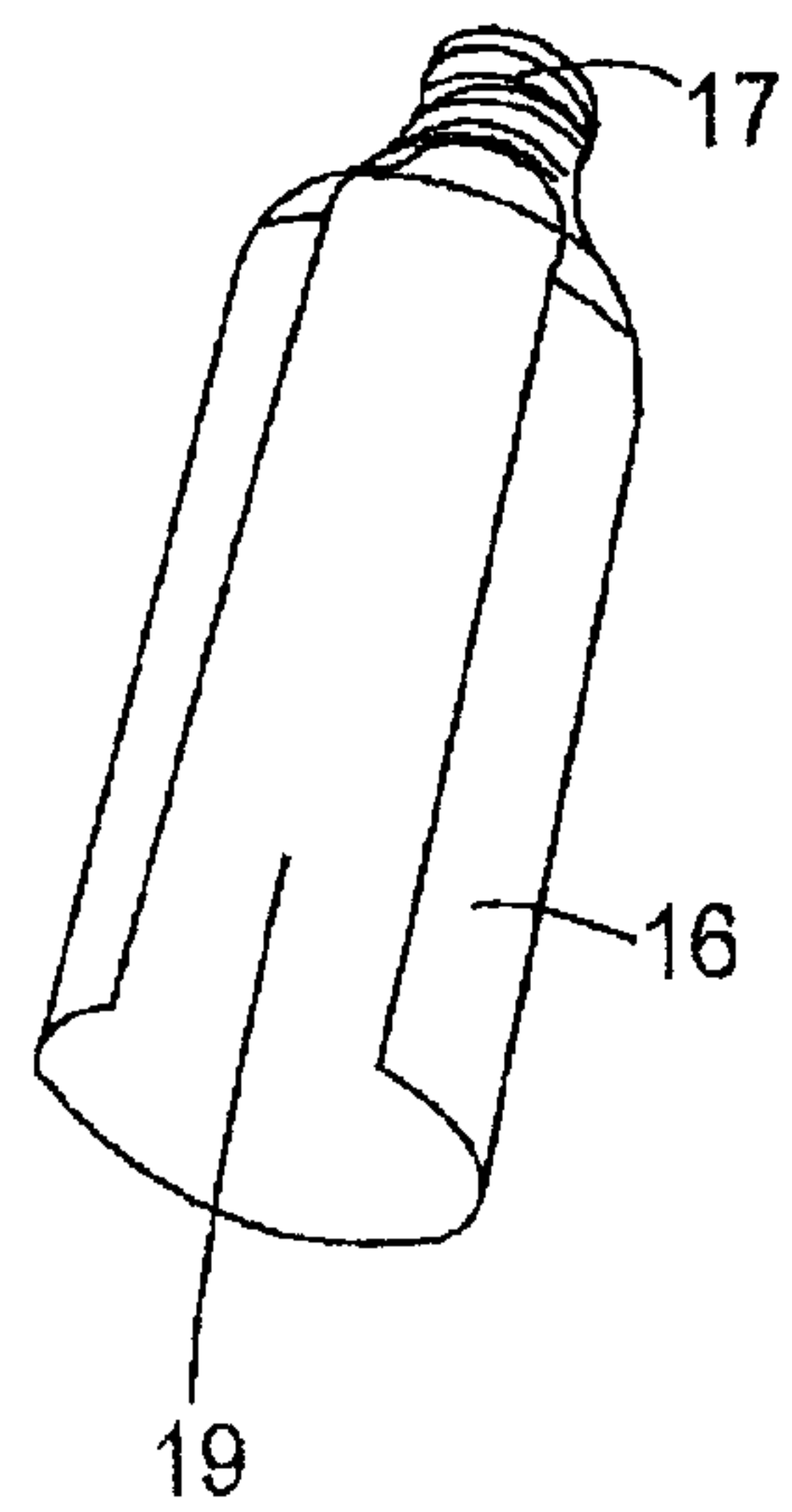


Figure 3a

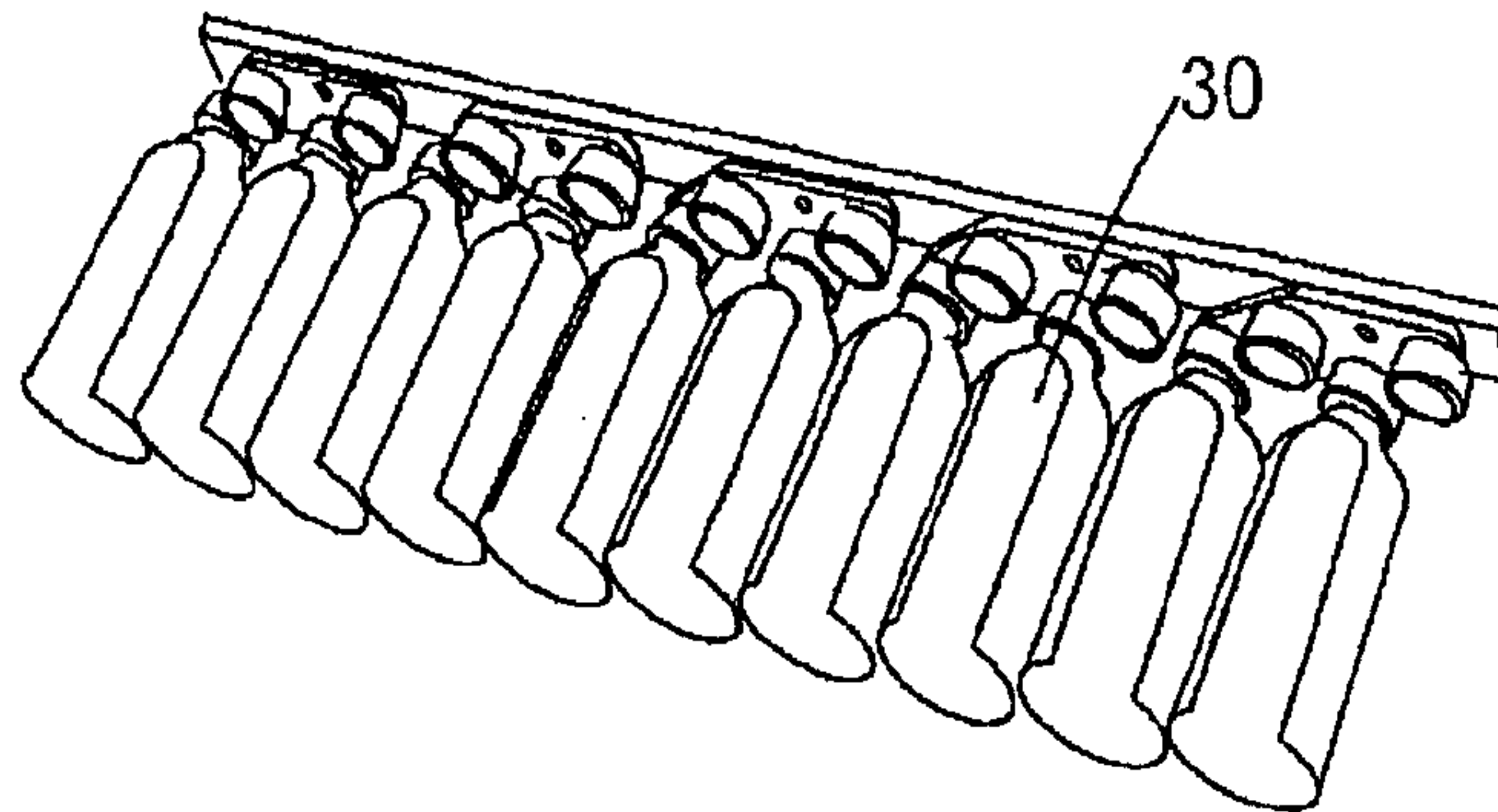


Figure 3b

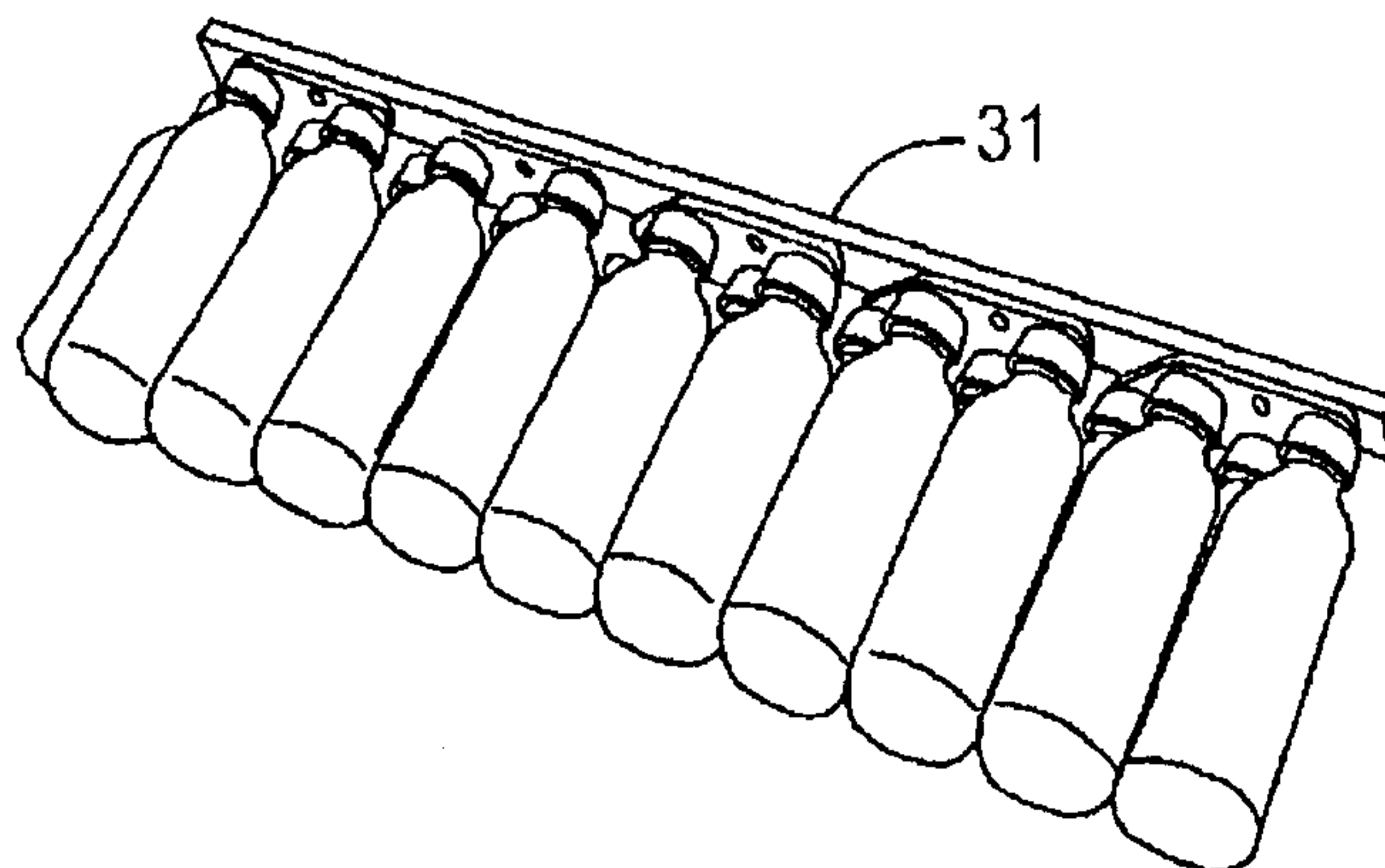


Figure 3c

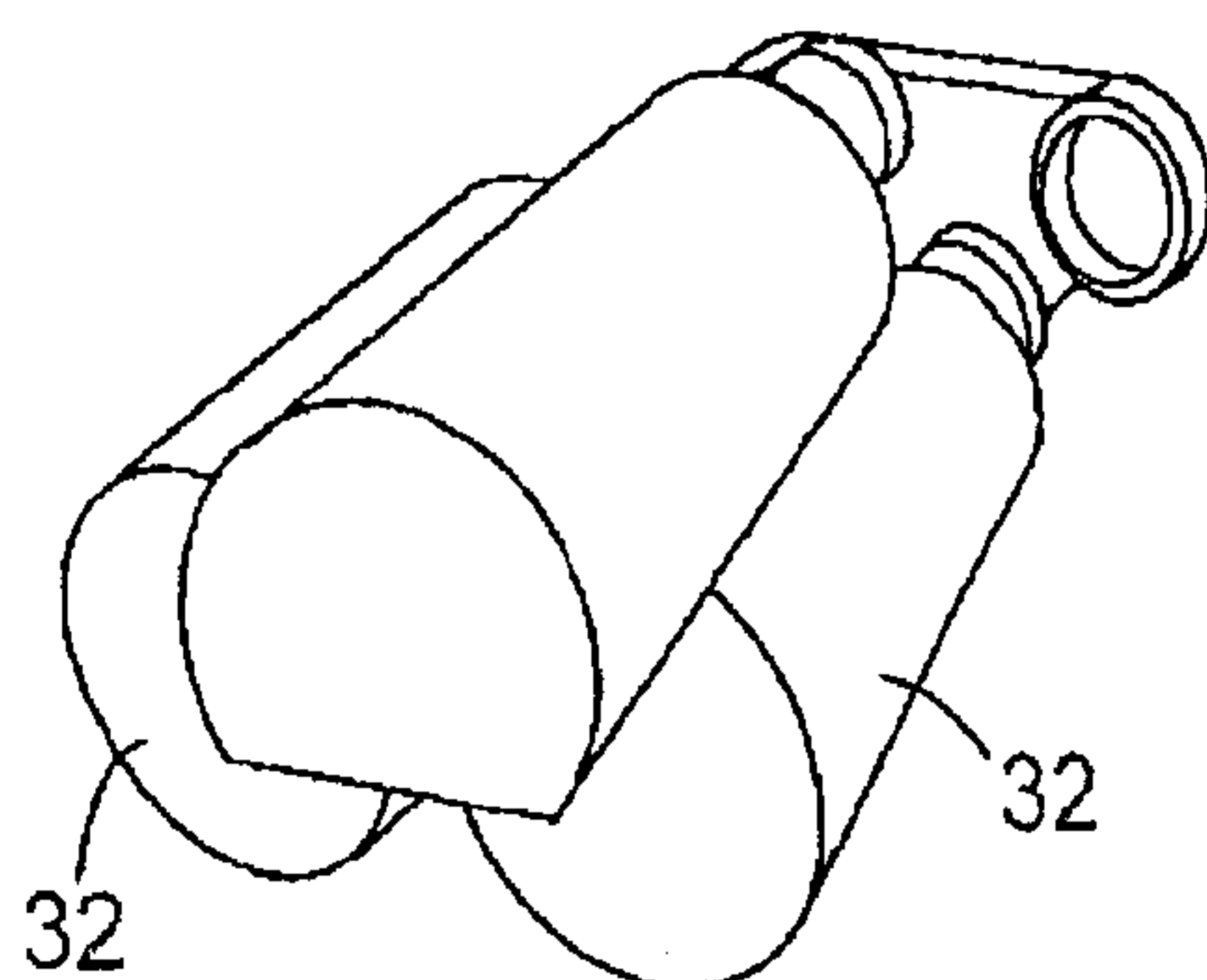


Figure 3d

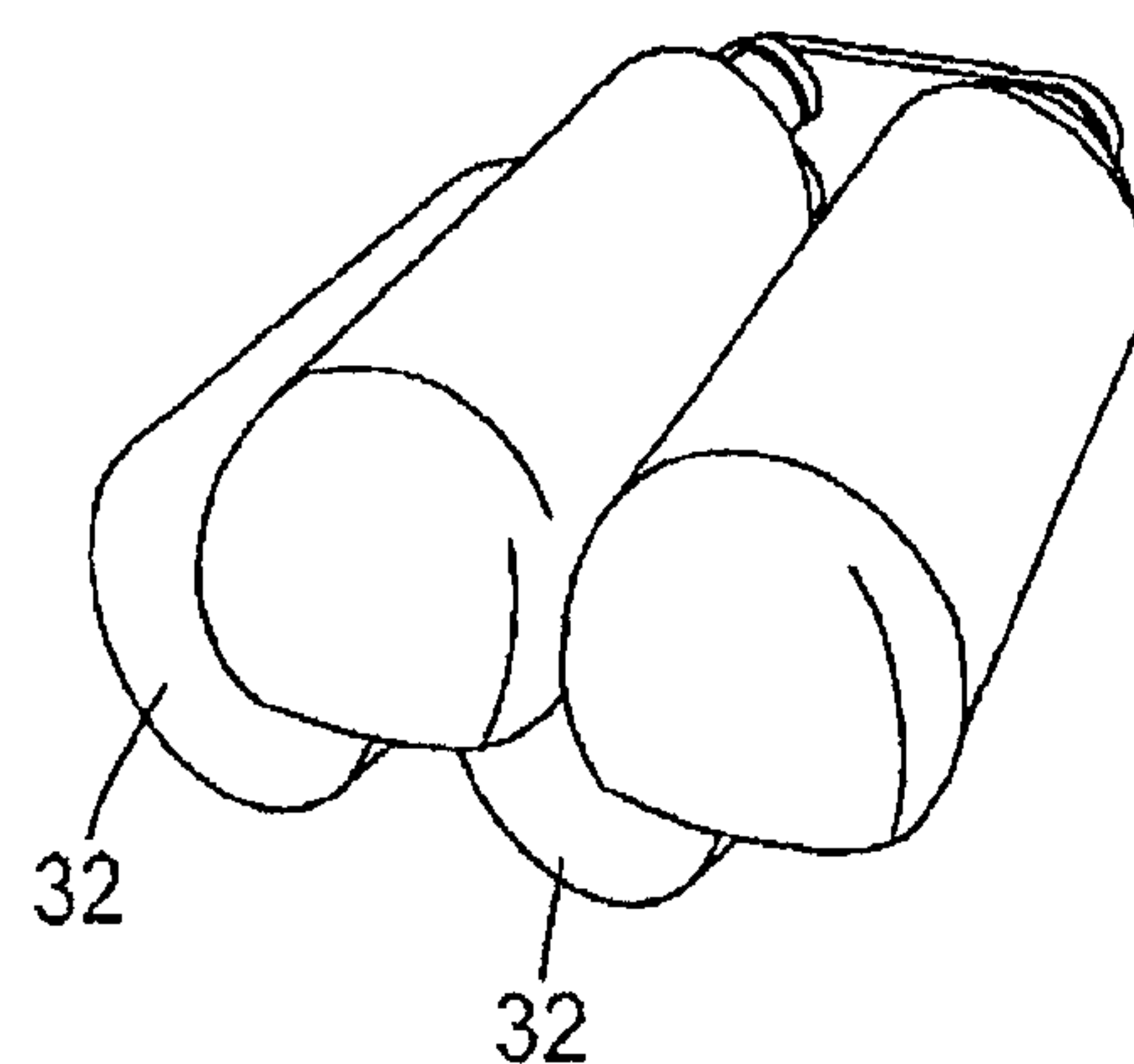


Figure 4a

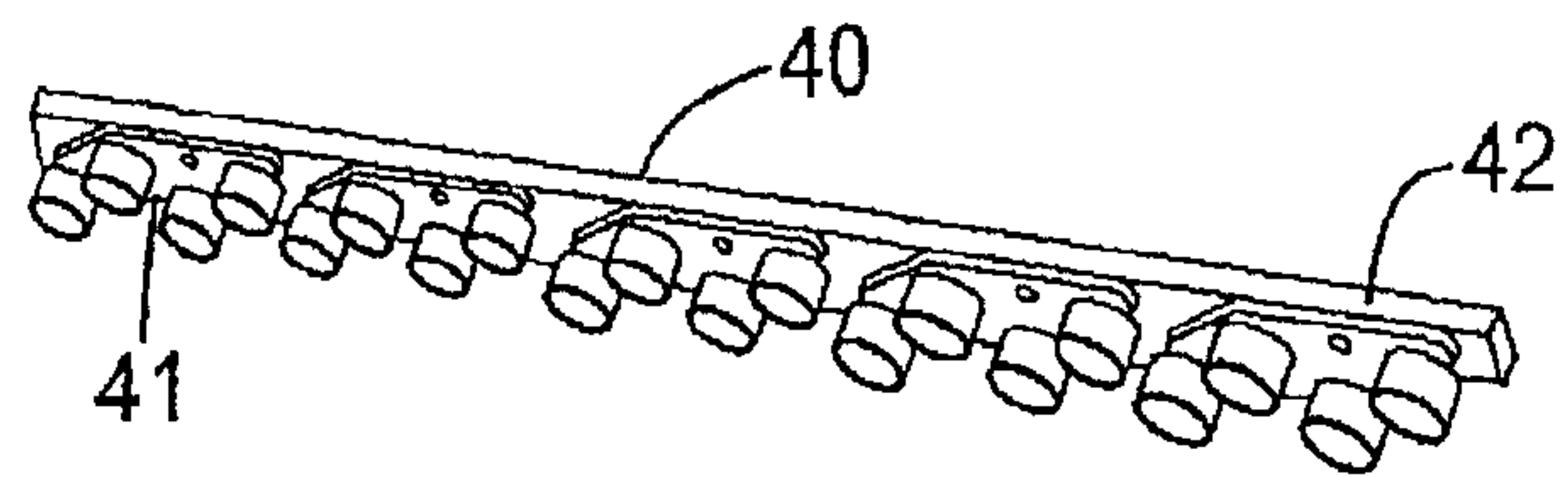


Figure 4b

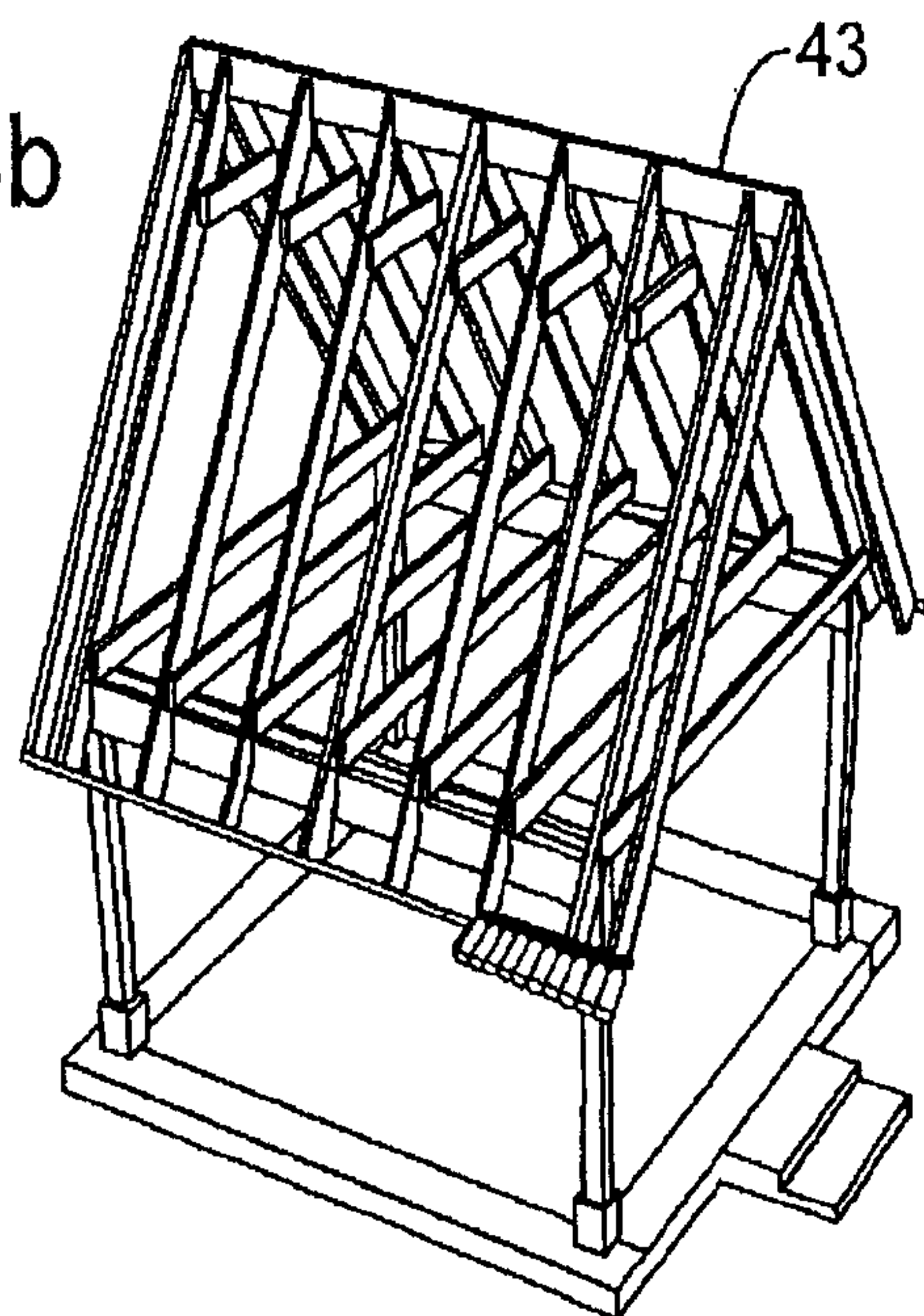
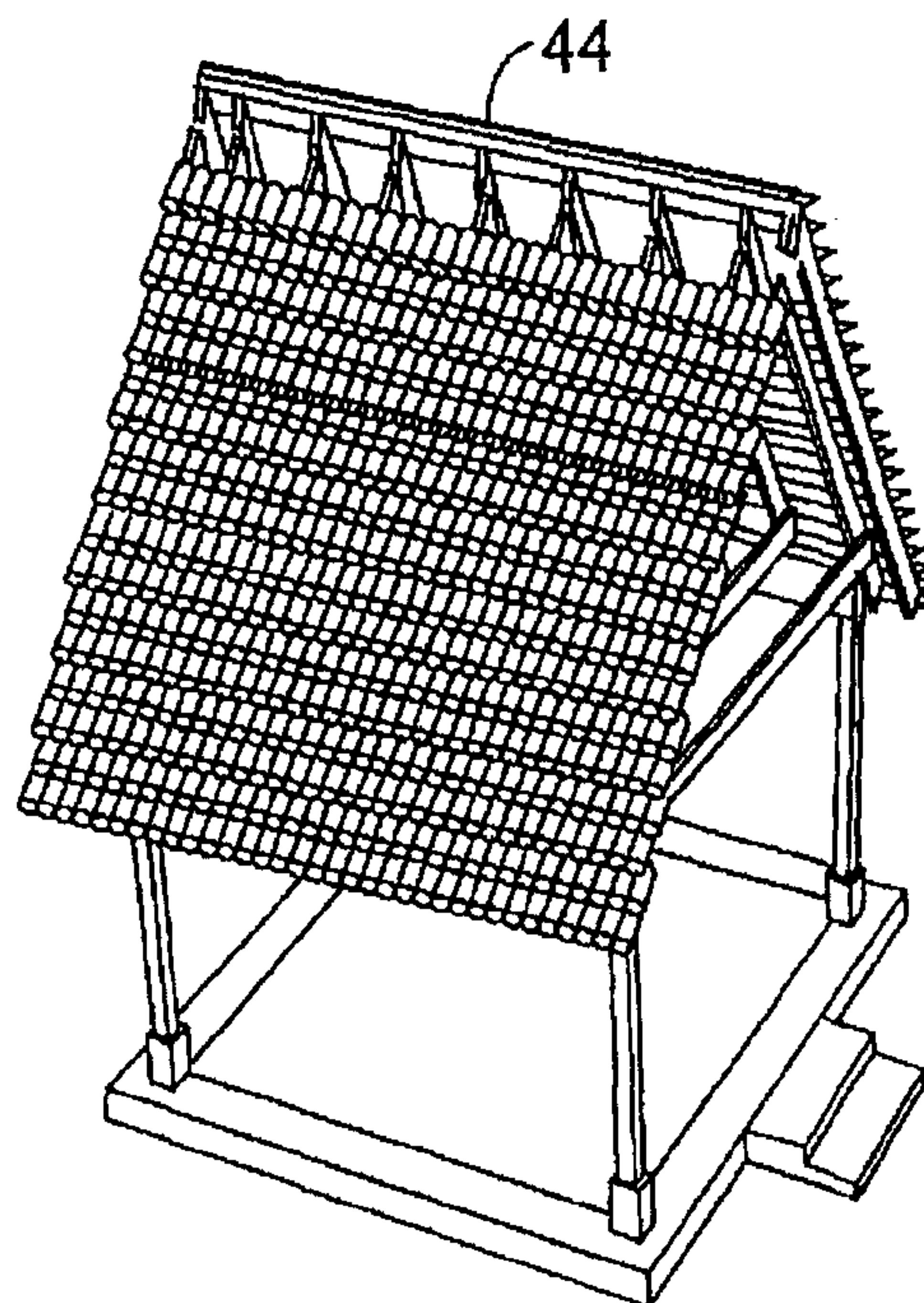


Figure 4c



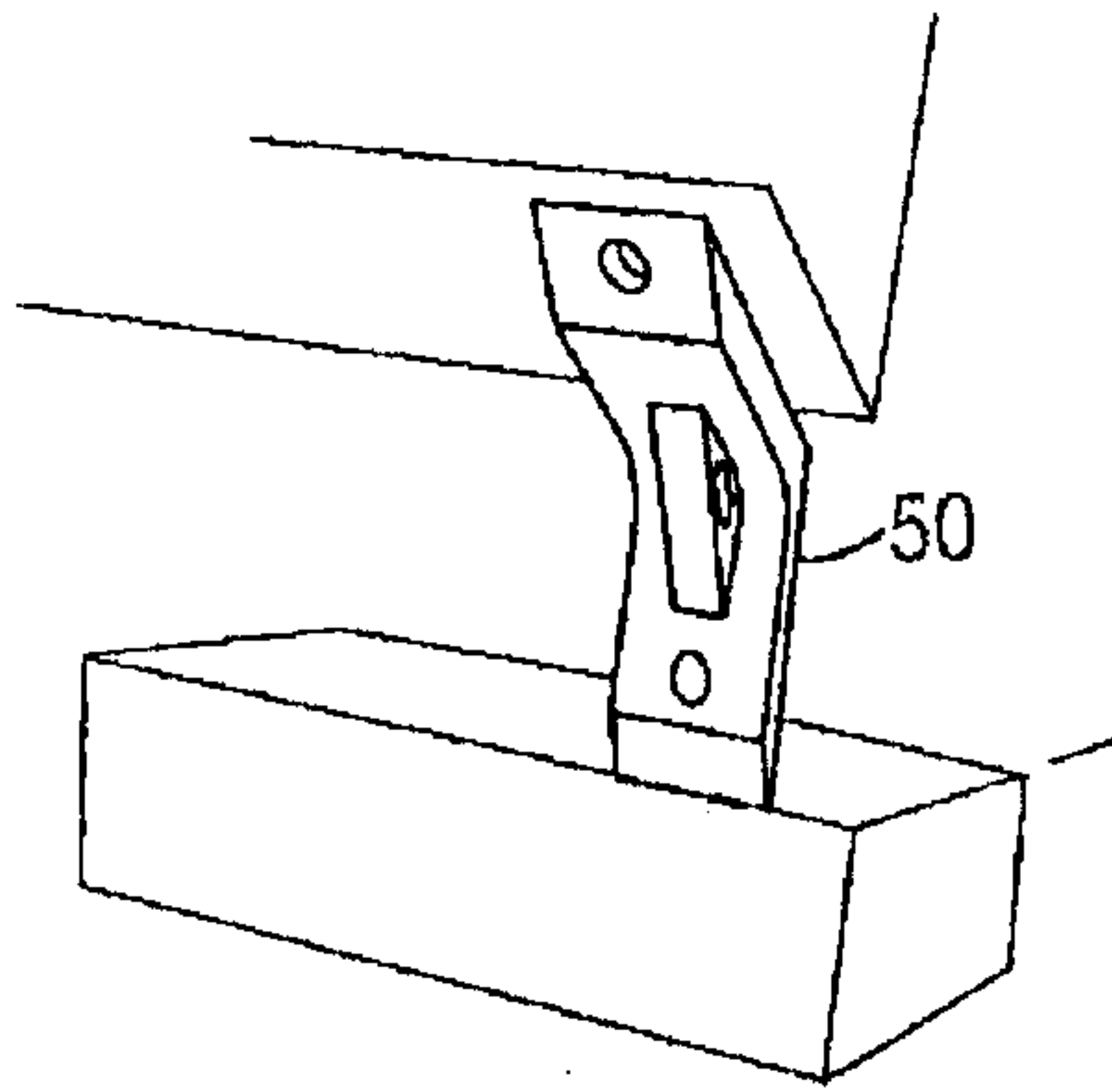


Figure 5a

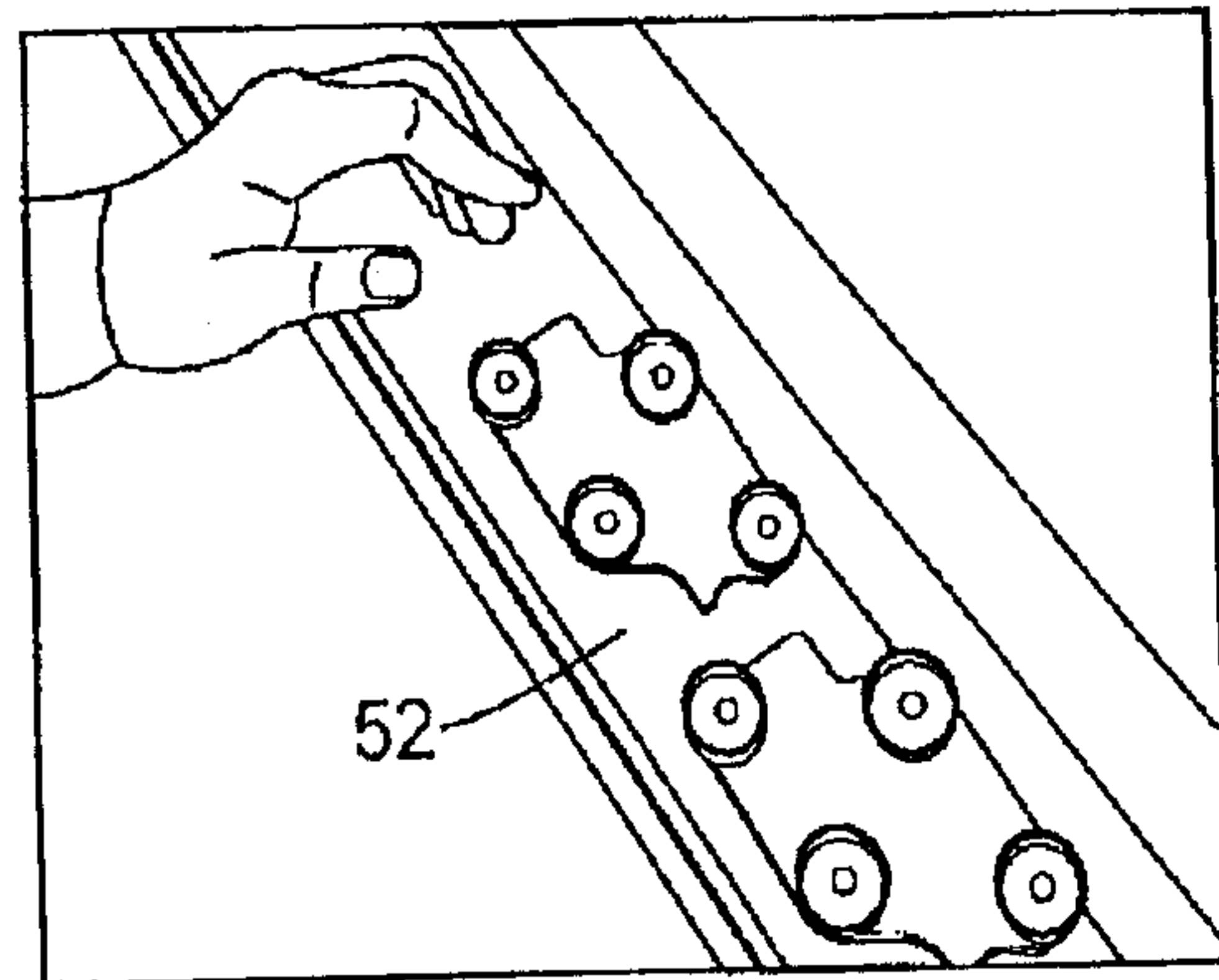


Figure 5c

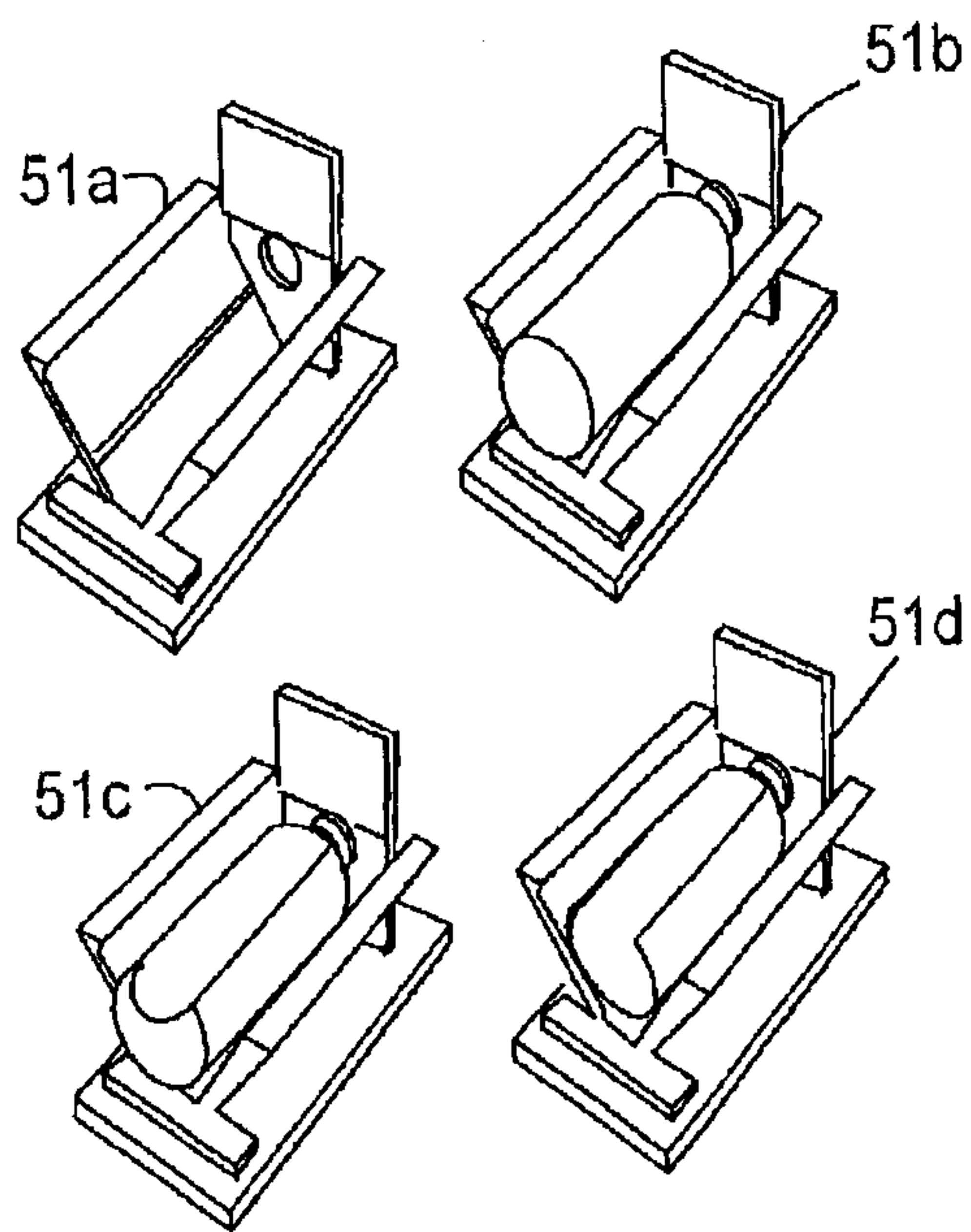


Figure 5b

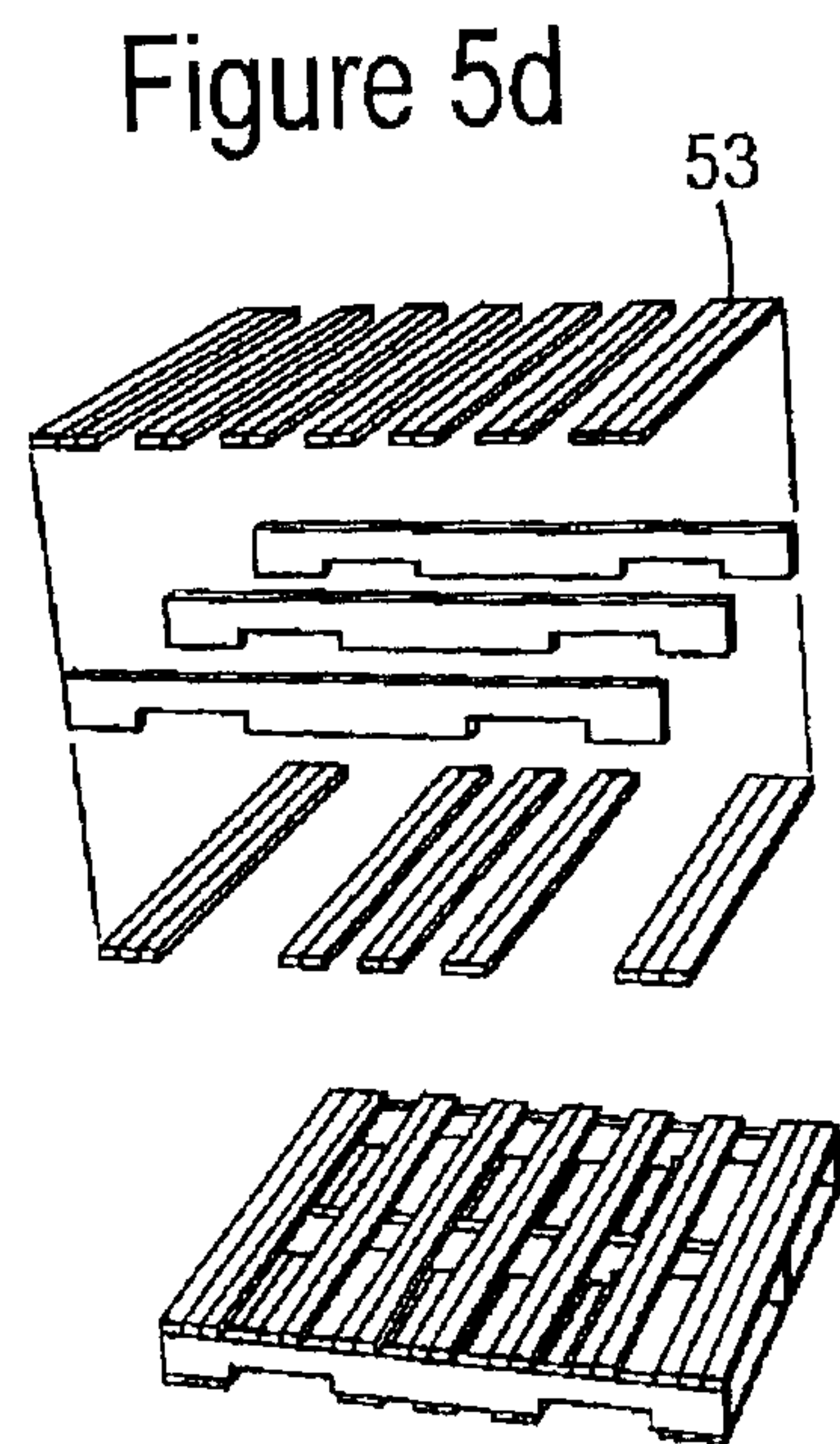


Figure 5d

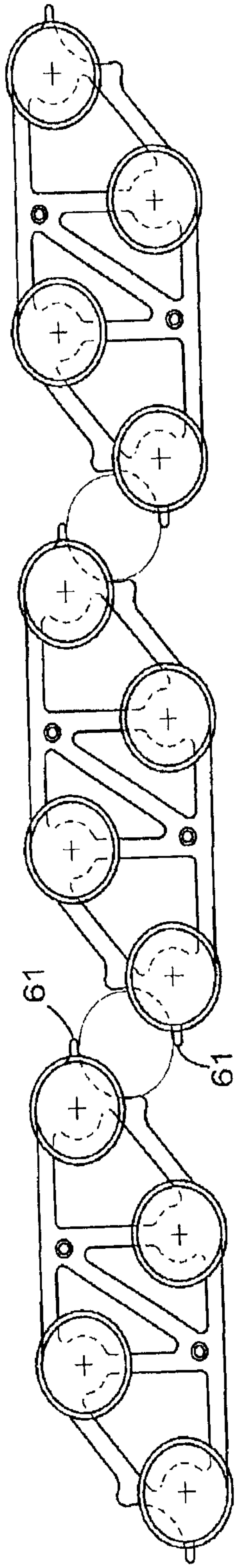


Figure 6a

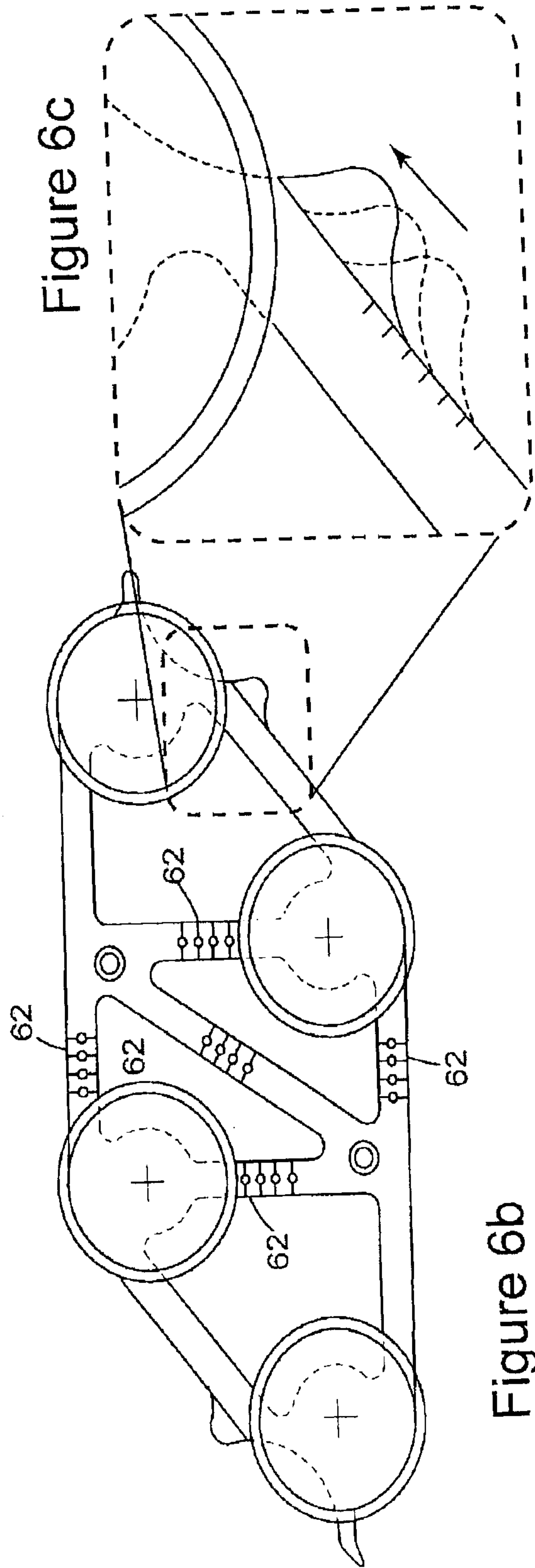


Figure 6b

Figure 6c

