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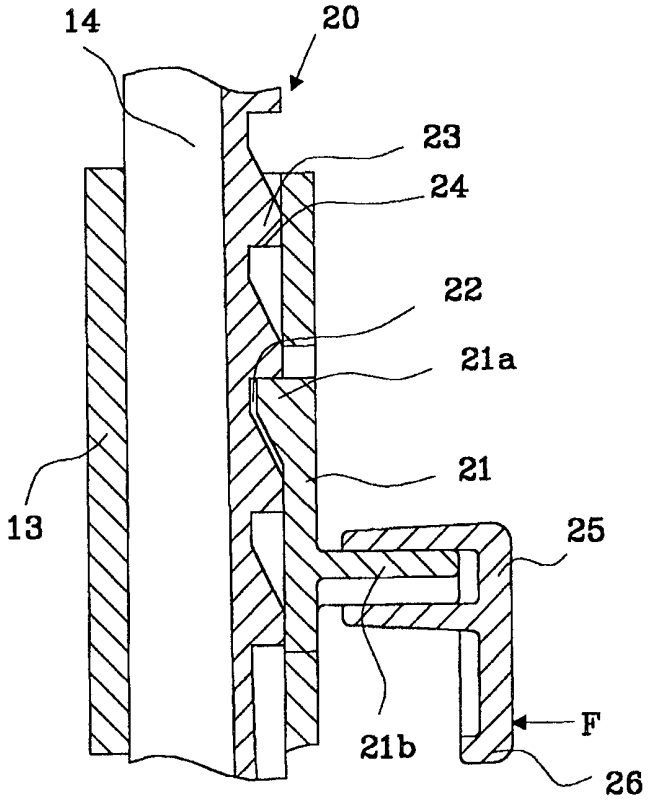
(54) Title: A LOCKING DEVICE AND AN ADJUSTABLE FRAME COMPRISING A LOCKING DEVICE

(57) Abstract

The present invention relates to a locking device for adjustable members, where an outer member (13) is partially tubular and an inner member (14) is arranged within said outer member. A tooth shaped portion being provided on the outside of the inner member (14), and a lever shaped lip (21), having an end portion (21a), being provided on the inside of the outer member (13). An actuating means (21b, 25) being provided to said lip (21) on the outside of the outer member (13), which actuating means causes said end portion (21a) to move from a first position to a second position when actuated. When said end portion is in said first position, the locking device is activated and the inner member (14) is prevented to move relative to said outer member (13) in at least one direction. When said end portion (21a) is in said second position, the locking device is deactivated and the inner member (14) may move relative to said outer member (13) in any direction. The invention also relates to an adjustable frame (10) comprising a locking device.



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A locking device and an adjustable frame comprising a locking device.

Technical field

The present invention relates to a locking device for adjustable members and an adjustable frame for elastic bags comprising such a locking device.

Prior art

When using a bag to collect garbage, such as trash, leaves, grass or the like, problem often arise with maintaining the mouth of the bag in such a position that it is possible, with one hand, to move the garbage into the opening. This problem has been noted previously and several solutions are described.

US 5,308,027, by Fullilove, shows a frame with four sides and a plate to make the transport of garbage into the bag easier. The length of two sides of the frame is adjustable to adapt to the size of the bag. The adjustment means disclosed comprises releasable fastening means to retain the telescoping legs of the frame in a selected position with respect to each other. The bag is attached to the frame by moving the frame into the bag opening and arranging clips from the outside around the frame, which means that the bag is arranged between the clips and the frame.

A similar frame is shown in US 4,548,372, by Lutzker, where the frame comprises three sides with corresponding clips for attachment of the bag, without any adjustment means to adapt to the size of the bag.

In US 5,180,126, by Bennett, another type of frame is disclosed where the mouth of the plastic bag is attached to the frame by tension. The locking mechanism of the adjustable telescopic

frame element is disclosed as a friction fit between two tubes, without any active locking means.

Another frame is disclosed in US 4,749, 519, by Cheng, having adjustment means and clips to attach the plastic garbage bag to the frame. The adjustment means comprises a spring loaded part that is contained inside an inner tube and which part fixates an outer tube, when openings in the outer tube align with the spring loaded part.

A more sophisticated locking mechanism is disclosed in the German document DE 3625287 A1, where an inner tube is provided with tapered recesses and an outer tube is provided with two lips, each lip having a tapered protrusion. The outer tube also have a spring loaded locking mechanism that holds each protrusion in one of the recesses, thereby preventing the inner tube to move in relation to the outer tube. When the locking mechanism is removed from the lips, the inner tube may, due to the tapering of the protrusions/lips, be moved in relation to the outer tube when the inner tube is subject to a force in the desired direction.

Summary of the invention

The problem with present locking mechanisms is that they either are difficult to manufacture, and thus expensive, due to narrow tolerances or due to parts mounted inside the adjustable element, or comprises loose parts, such as locking pins, to maintain the length of an adjustable element.

Another problem with the prior art locking mechanisms on adjustable frames is that the length of an adjustable element, comprising such a locking mechanism, cannot be increased without deactivating the locking mechanism, and at the same time prevent the adjustable member to decrease in length.

The object with the present invention is to provide a locking device for adjustable members that is easy to manufacture, comprising no loose parts.

A further object is to provide an adjustable frame, comprising at least one locking device, where the frame easily may be fixated to the mouth of an elastic bag with tension, when the locking device is activated, and may be easily removed from the mouth of the elastic bag by deactivating said locking device.

These objects are achieved by a locking device defined according to the independent claim 1, and an adjustable frame defined according to the independent claim 6.

The above mentioned problems concerning the locking device is solved by a locking device comprising an outer member having a lever shaped lip provided thereon, said outer member being at least partially tubular, said lip having an end portion being arranged to the inside of said outer member, an inner member having at least one recess being provided thereon, said inner member being arranged inside said outer member, said at least one recess being provided on an outside of said inner member, said end portion, in a first position, is extendable into one of said at least one recess, whereby said inner member is prevented from moving relative to said outer member in at least one direction, said end portion, in a second position, is retractable from said at least one recess, whereby said inner member is movable relative to said outer member in said at least one, said end portion being biased into said first position, and said lever shaped lip is provided with an actuating device provided on an outside of said outer member, whereby said end portion is movable to said second position when said actuating device is actuated.

The problems concerning the adjustable frame comprising a locking device is solved a frame comprising the features of claim 6.

An advantage with the present invention is that said locking device is cheap to manufacture and does not contain any loose parts.

An advantage with the adjustable frame comprising a locking device is that the length of an adjustable element may be increased, but not decreased, when the locking device is activated. The length of the adjustable element may easily be either increased or decreased when the locking device is deactivated.

The invention will now be described in more detail by the preferred embodiments and in connection to the attached drawings.

Description of the drawings

Fig. 1 shows a side view of a first embodiment according to the invention.

Fig. 2a shows a cross-sectional view of a detail regarding an adjustment device according to Fig. 1.

Fig. 2b shows a side view of an adjustment device according to Fig. 1.

Fig. 3 shows a partly cross-sectional detail regarding fastening means according to Fig. 1.

Fig. 4 shows a side view of a second embodiment according to the invention.

Fig. 5 shows a side view of a third embodiment according to the invention.

Preferred embodiments

Fig. 1 shows a side view of a first embodiment of an adjustable frame 10 according to the invention, which frame comprises four elements 11, 12. These elements are divided into two different groups, where a first group of elements 11 forms two rigid opposite sides of the frame 10. A second group of elements 12 forms two adjustable sides of the frame 10, which adjustable elements 12 comprises an outer partly tubular member 13 and an inner member 14, which inner member 14 is arranged to move within the outer member 13. Furthermore, the adjustable elements 12 comprises a locking device 15, which may be activated or deactivated and which is described in more detail below.

Each rigid element 11 is releasable attached to the adjustable elements 12, where the attachment 16 is described in more detail below.

Fig. 2a and 2b shows two views of a locking device according to the invention. Fig. 2a shows a locking device in cross-section and Fig. 2b shows a side view of the locking device. The locking device comprises two members, where a tooth shaped portion 20 is arranged on the inner member 14 and a lip 21 is arranged at the outer member 13. The tooth shaped portion 20 is arranged to the outer member 14 in such a way that the end 21a of the lip 21, in a first position, interacts with a recess 22, which arises between adjacent teeth 23.

These teeth 23 are in the embodiment shaped as inclining ramps with a stop 24, which prevents the adjustable element to shorten when the lip is in the activated position, i.e. the end 21a of the lip 21 is in the first position. Extension of the adjustable element is in this position only possible by pulling the members apart.

When a protrusion 21b of the lip 21 is actuated so that the end 21a is released from the stop 24, i.e. is in a second position, the outer member 13 may move freely in relation to the inner member 14, which lead to that the adjustable element 12 may get shorter. The second position may also be represented as the deactivation position of the locking device. The protrusion 21b is actuated by applying a force F on a button 25, which is mounted at the protrusion 21b, at one end 26 of the button.

The lip 21 is preferably biased, e.g. spring loaded, in such a way that the end 21a of the lip returns to the first position when the protrusion 21b of the lip 21 is not subject to actuation.

Other shapes of the teeth 23 are of course possible, e.g. shoulders, provided they are shaped with a stop 24 for the lip 21.

Fig. 3 shows an additional cross-sectional detail from Fig. 1, being a releasable fastening means for the elements 11 and 12. A recess 30, adapted for receiving an end portion 14a of the inner member 14, is arranged in the rigid element 11. The recess 30 is shaped with an opening 31 and an outgrowth 32 is arranged to said end portion 14a to engage in said opening 31. This construction makes it possible to attach the elements into a frame, without the frame falling into parts, in addition may the members be separated by affecting the outgrowth 32 using a force through the opening 31 so that the outgrowth moves freely pass the edge 33 of the opening.

Fig. 4 shows a second embodiment of an adjustable frame 40 according to the present invention, which is bow-shaped. The frame 40 comprises a bow 41, which in turn comprises a number of, slightly flexible, elements 42 with accompanying lengthening joints 43. The bow may be manufactured in one single piece if the material of the bow is elastic enough. At

the ends 41a, 41b of the circle bow, an adjustable element 12 is attached, which is described in connection with Fig. 1-3.

Fig. 5 shows a third embodiment of an adjustable frame 50 according the present invention, which is triangle shaped. The frame comprises two rigid elements 51, which first ends 51a are attached to a slightly flexible joint 52. The second ends 51b of the elements 51 are attached to slightly flexible ends 53 of an adjustable element 54, respectively. The adjustable element is described in connection with Fig. 1-3.

The above described embodiments of the adjustable frame is applied to an elastic bag using the following steps:

1. set the locking device in the deactivation position and reduce the circumference of the frame by shortening the adjustable element,

2. insert the frame into the mouth of the bag,

3. restore the locking device to the activated position and expand the circumference of the frame by extending the adjustable element, and

4. make sure that the circumference of the frame is increased so much that it is larger than the circumference of the mouth of the elastic bag, which deforms and stretches the elastic bag where the frame is in contact to the bag.

The result is that the frame is fixated to the bag by tension.

The above described embodiments of the adjustable frame are dismounted from the elastic bag in the following steps:

1. set the locking device in the deactivation position and reduce the circumference of the frame by shortening the adjustable element,

2. remove the frame from the mouth of the bag, and

3. restore the locking device to the activated position

The frame is now ready to be reused in a new bag.

The above described locking device and frame are preferably manufactured using injection moulding with a plastic material, which greatly will reduce the weight of the manufactured items.

Claims

1. A locking device for adjustable members, comprising:

- an outer member (13) having a lever shaped lip (21) provided thereon, said outer member (13) being at least partially tubular, said lip (21) having an end portion (21a) being arranged to the inside of said outer member (13),
- an inner member (14) having at least one recess (22) provided thereon, said inner member (14) being arranged inside said outer member (13), said at least one recess (22) being provided on the an outside of said inner member (14),
- said end portion (21a), in a first position, is extendable into one of said at least one recess (22), whereby said inner member (14) is prevented from moving relative to said outer member (13) in at least one direction,

characterised in that

- said end portion (21a), in a second position, is retractable from said at least one recess (22), whereby said inner member (14) is moveable relative to said outer member (13) in said at least one direction, said end portion (21a) being biased into said first position, and
- said lever shaped lip (21) is provided with an actuating device (21b, 25), provided on an outside of said outer member (13), whereby said end portion (21a) is movable to said second position when said actuating means is actuated.

2. The locking device according to claim 1, wherein said actuating device comprises a protrusion (21b) and a lever button (25), said button (25) being mounted at a first end on said protrusion, whereby said actuating device is actuated by applying a force (F) to a second end (26) of said button (25), opposite to said first end to retract said end portion (21a) to said second position.

3. The locking device according to claim 1 or 2, wherein a tooth (23) is formed between every two adjacent of said at least one recess (22), each tooth comprising a stop (24) arranged on a first side of each tooth, whereby said stop (24) interacts with said end portion (21a) to prevent said inner member (14) from moving relative to said outer member (13) in a first direction, when said end portion (21a) is in said first position.

4. The locking device according to claim 3, wherein each tooth (23) comprises an inclined surface, arranged on a second side of each tooth, opposite said first side, whereby said inner member (14) is movable in a second direction, opposite to said first direction, relative to said outer member (13), when said end portion (21a) is in said first position.

5. The locking device according to any of claims 1-4, wherein said lever shaped lip (21) is integrated with said outer member (13).

6. An adjustable frame (10) for holding up the mouth of an elastic bag by tension, said adjustable frame comprising:

at least two elements (11, 12) having a length,

means for attaching said elements to each other at their ends thereof,

at least one of said element (12) including an adjustment device for changing the length of the element (12), said adjustment device including an outer member (13) at least partially tubular, and an inner member (14), said inner member (14) being arranged within said outer member (13),

characterised in that

said outer member (13) is provided with a lever shaped lip (21), having an end portion (21a) arranged on an inside of said outer member (13),

said inner member (14) is provided with at least one recess (22), said at least one recess (22) being arranged on an outside of said inner member (14),

said end portion (21a), in a first position, is extendable into one of said at least one recess (22), whereby said inner member (14) is prevented from moving relative to said outer member (13) in at least one direction,

said end portion (21a), in a second position, is retractable from said at least one recess (22), whereby said inner member (14) is movable relative to said outer member (13) in said at least one direction, said end portion (21a) being biased into said first position, and

said lever shaped lip (21) is provided with an actuating device (21b, 25) provided on an outside of said outer member (13), whereby said end portion (21a) is movable to said second position when said actuating device is actuated,.

7. The adjustable frame according to claim 6, wherein said actuating device comprises a protrusion (21b) and a lever button (25), said button (25) being mounted at a first end on said protrusion, whereby said actuating device is activated by applying a force (F) to a second end (26) of said button (25), opposite to said first end to retract said end portion (21a) to said second position.

8. The adjustable frame according to claim 6 or 7, wherein a tooth (23) is formed between every two adjacent of said at least one recess (22), each tooth comprising a stop (24) arranged on a first side of each tooth, whereby said stop (24) interacts with said end portion (21a) to prevent said inner member (14) from moving relative to said outer member (13) in a first direction when said end portion (21a) is in said first position.

9. The adjustable frame according to claim 8, wherein each tooth (23) comprises an inclined surface, arranged on a second side of each tooth opposite said first side, whereby said inner member (14) is movable in a second direction, opposite to said first direction, relative to said outer member (13) when said end portion (21a) is in said first position.

10. The adjustable frame according to any of claims 6-9, wherein said lever shaped lip (21) is integrated with said outer member (13).

11. The adjustable frame according to any of claims 6-10, wherein there are at least two of said at least one the element and said at least two elements are releasable attached to each other.

12. The adjustable frame according to any of claims 6-11, wherein the frame includes of four sides.

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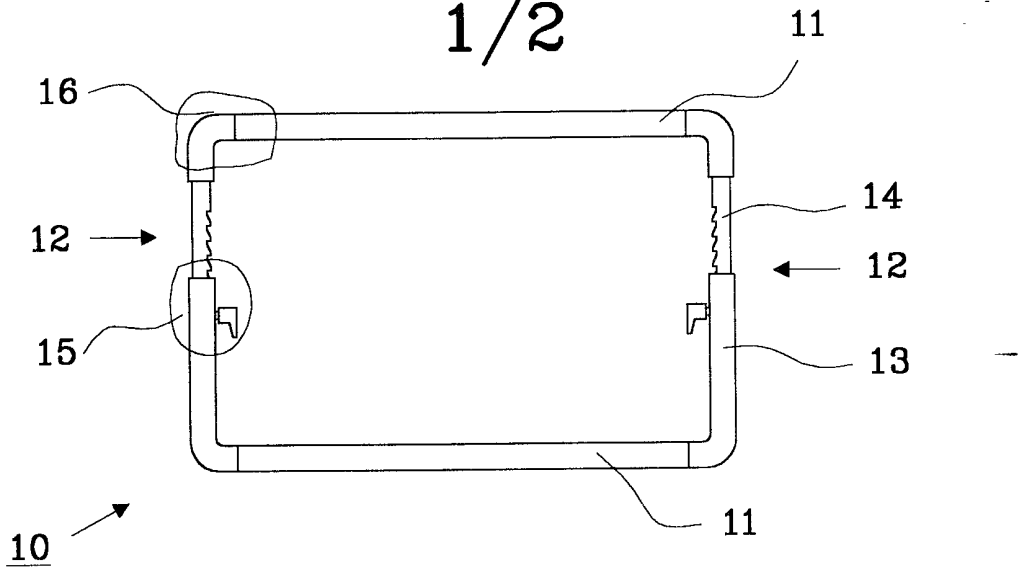

Fig. 1

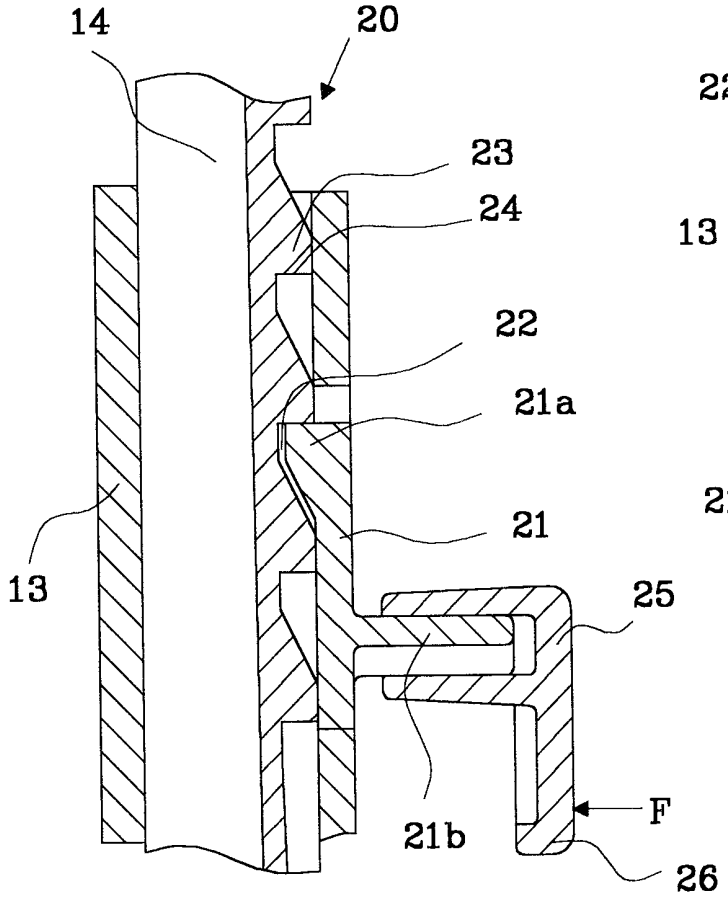

Fig. 2a

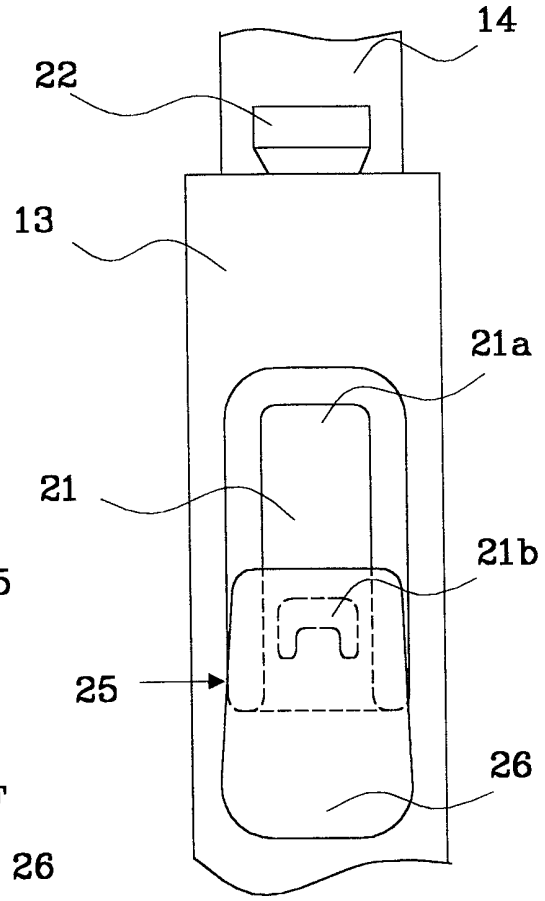

Fig. 2b

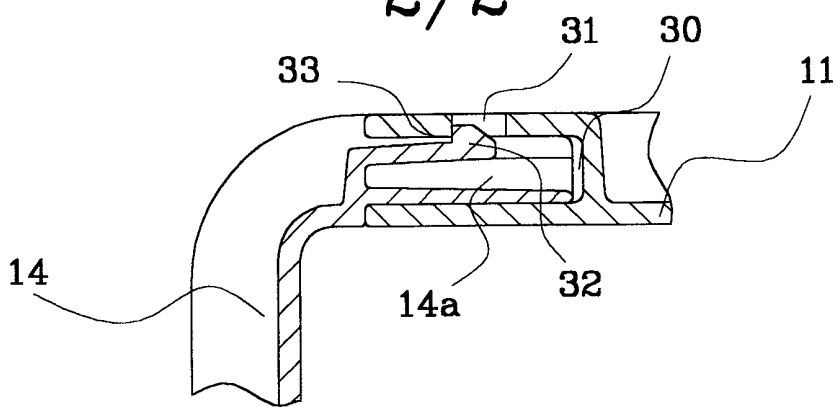

Fig. 3

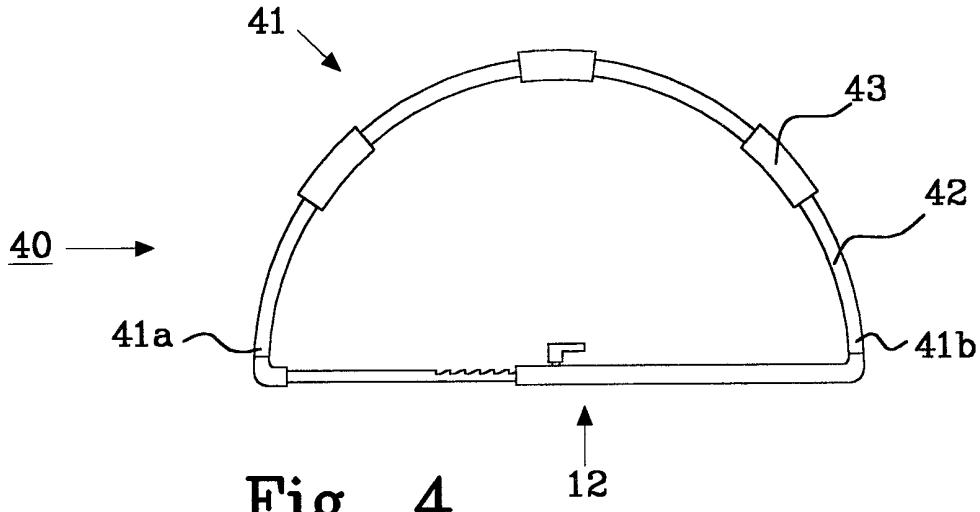

Fig. 4

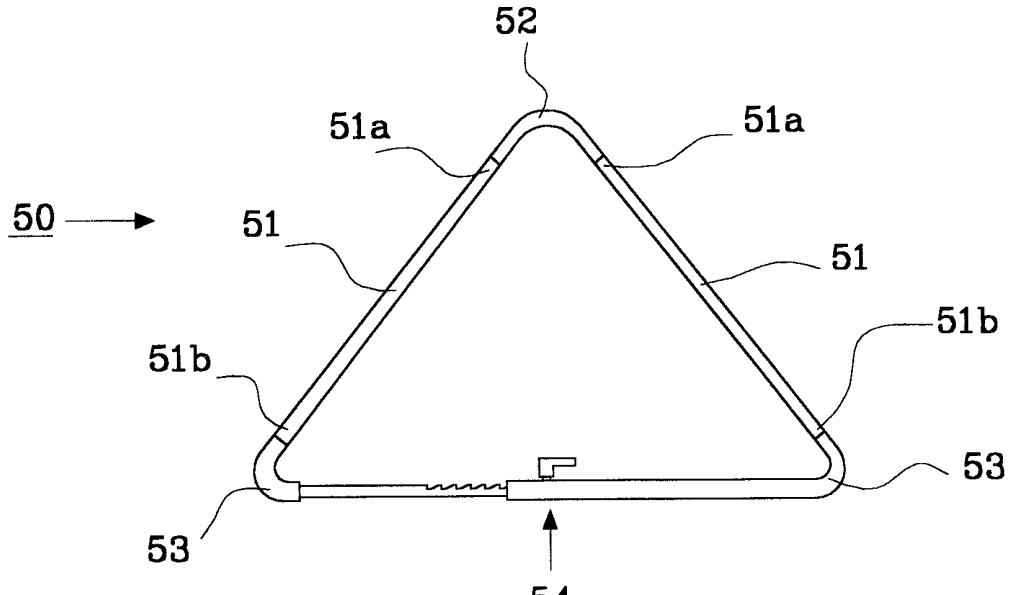

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 99/01614

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: F16B 7/16, B65B 67/12
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A		5
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Y		6,10-12
A		2-4
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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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International application No.
PCT/SE 99/01614

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

02/11/99

International application No.
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