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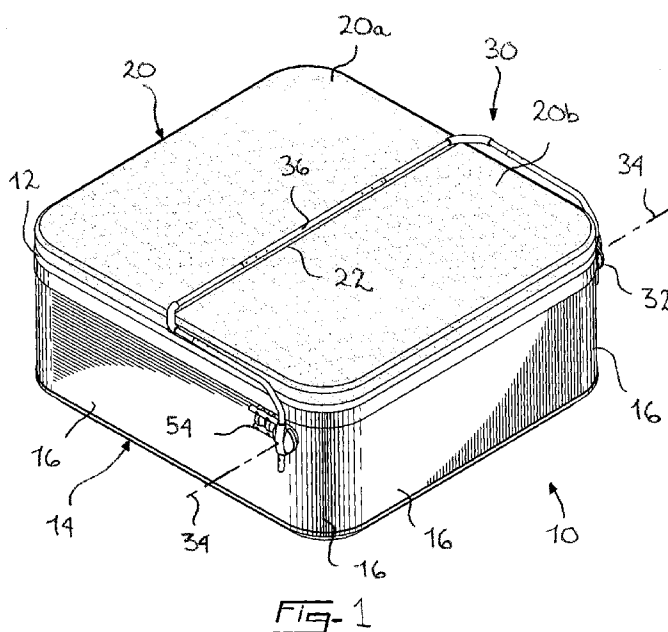
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(57) Abstract: The spa cover lifting device comprises a tubular frame connected to opposite pivot couplings. Each pivot coupling has two adjacent members that are pivotally interconnected to each other around a pivot axis. The interconnection is provided by a guide plate having at least one circular guiding surface whose center is co-incident with the pivot axis. Followers are in engagement with the circular guiding surface. At least one pivotal stop is provided to limit a pivot angle between the members. The pivot couplings can have a very compact construction.

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DEVICE FOR LIFTING A SPA COVER

Most heated spas have an insulated spa cover to retain the heat of the spa water as well as to protect the water from debris when the spa is not in use. A number of different spa cover arrangements exist. Some include two rigid insulating foam pads enclosed in a protective jacket, for instance a jacket made of flexible sheets of vinyl on the outside, the cover being
5 foldable in two halves joined along a medial hinge. Such spa covers are often removed by first folding one cover half over the other, and then removing both cover halves from the top of the spa. Other arrangements exist as well.

A spa cover lifting device may be used to facilitate the removal and the repositioning of a
10 spa cover. Such lifting device can engage, for example, a spa cover at its medial hinge and move the folded cover to a vertical storage position beside the spa. Although different spa cover lifting devices are already available, there is always a need for improvements in this area.

In one aspect, there is provided a pivot coupling for a spa cover lifting device, the pivot
15 coupling having a first member and a second member that is adjacent to the first member, the pivot coupling being characterized in that the first and the second member are pivotally interconnected to each other around a pivot axis by: a guide plate attached to the first member, the guide plate being radially oriented with reference to the pivot axis and including at least one circular guiding surface having a center that is co-incident with the
20 pivot axis; a set of at least three circumferentially-disposed followers attached to the second member, the followers being in engagement with the at least one circular guiding surface;

and a pivotal stop provided between the guide plate and the second member to limit a pivot angle between the first and the second member.

In another aspect, there is provided a spa cover lifting device comprising: a tubular frame having two opposite ends, the tubular frame including an elongated cross member having a longitudinal axis; and a pair of pivot couplings having coaxial pivot axes extending in a direction that is parallel to the longitudinal axis of the cross member, each pivot coupling having adjacent first and second members, one of the two members of each pivot coupling being a fixed member and the other one being pivotable around the pivot axis relative to the fixed member, the pivotable member being connected to a respective one of the ends of the tubular frame, the first and the second members being interconnected by a guide plate, a set of at least three circumferentially-disposed followers and a pivotal stop that is provided to limit a pivot angle between the first and the second member, the guide plate being attached to the first member and being radially oriented with reference to the pivot axis, the followers being attached to the second member and being in engagement with at least one circular guiding surface provided on the guide plate, the at least one circular guiding surface having a center that is co-incident with the pivot axis.

Reference will now be made to the accompanying figures and the following non-limitative detailed description of an example of a spa cover lifting device as improved. In the figures:

FIG. 1 is an isometric view showing an example of a generic spa, of a generic spa cover and of a spa cover lifting device as improved, the spa cover being in a covering position;

FIG. 2 is a top view of the items shown in FIG. 1;

FIG. 3 is a first side view of the items shown in FIG. 1;

FIG. 4 is a second side view of the items shown in FIG. 1;

FIG. 5 is a view similar to FIG. 1 but in which the spa cover is in an uncovering position;

FIG. 6 is an isometric exploded view of one of the pivot couplings used in the spa cover lifting device shown in FIG. 1;

- 5 FIG. 7 is a partially exploded side view showing the parts providing the interconnection between the first member and the second member of the pivot coupling shown in FIG. 6;

FIG. 8 is a view similar to FIG. 7, showing the parts once assembled;

FIG. 9 is a semi-schematic side view of the pivot coupling in FIG. 6, showing the relative position of the tabs of the pivotal stop when the device is positioned as in FIG. 1; and

- 10 FIG. 10 is a view similar to FIG. 9, showing the relative position of the tabs of the pivotal stop when the device is positioned as in FIG. 5.

FIGS. 1 to 5 illustrate an example of a generic spa 10. The term "spa" is used to generally describe a hot tub, a bath facility or a similar structure filled with water and in which batters soak. A spa is generally provided with a whirlpool device, but not always.

- 15 The spa 10 has a shell 12 for holding the water. The shell 12 is best shown in FIG. 5, FIGS. 1, 3 and 4 only illustrating the top edge thereof. The shell 12 is supported by a spa housing 14. The spa housing 14 includes an interior frame (not shown) for supporting the shell 12, and outer walls 16 attached to the interior frame all around the periphery of the spa housing 14. The walls 16 at the corners of the spa housing 14 are rounded in the illustrated
20 example.

An example of a generic spa cover 20 is also shown in FIGS. 1 to 5. The illustrated spa cover 20 has two halves 20a, 20b interconnected at a medial cover hinge 22. The spa cover 20 may include a jacket made of a flexible sheet of material on the outside and the jacket can be designed with two pockets for receiving corresponding rigid insulated foam pads therein, each pocket and its corresponding foam pads forming one of the halves 20a, 20b. The flexible sheet of the jacket can be used to pivotally attach the two pockets and provide the joint at the medial cover hinge 22, as shown.

It should be noted that the generic spa 10 and the generic spa cover 20 illustrated in FIGS. 1 to 5 are only examples among a multitude of various possible models with which the improvements described herein can be used.

FIGS. 1 to 5 further illustrate an example of a spa cover lifting device 30 as improved. As can be seen, FIGS. 1 to 4 show the spa 10 with the spa cover 20 in a covering position. FIG. 1 is an isometric view of the spa 10, the spa cover 20 and the device 30. FIG. 2 is a top view thereof. FIG. 3 is a first side view thereof. FIG. 4 is a second side view of what is shown in FIG. 1. FIG. 5 is a view similar to FIG. 1 but in which the spa cover 20 is in an uncovering position, the spa cover 20 being suspended by the device 30 beside the spa 10.

The device 30 comprises two opposite pivot couplings 32 having co-incident pivot axes 34. These pivot axes 34 extends substantially parallel to the medial cover hinge 22. Each pivot coupling 32 is connected to a holding structure, such as the spa housing 14. The holding structure can also be another solid structure adjacent to the spa 10 and to which the device 30 can be attached. The device 30 also comprises a tubular frame 36 whose opposite ends are connected to a respective one of the pivot couplings 32. The tubular frame 36 includes a

horizontally-disposed and elongated cross member 38 that is positioned so as to be parallel and adjacent to the medial cover hinge 22. The cross member 38 extends from one edge of the spa cover 20 to the other.

The tubular frame 36 also comprises two opposite side members 40 to which a respective
5 end of the cross member 38 is connected, for instance using a first elbow section 42 on each side, as shown in FIG. 2. Each first elbow section 42 can be made, for instance, of a plurality of smaller subsections disposed at an angle (e.g. 45 degrees) with reference to one another. Each of these side members 40 is connected to a respective one of the pivot couplings 32 and extends in a substantially vertical plane. The side members 40 in the
10 illustrated example are L-shaped, as shown in FIG. 3. They each comprise a first segment 44 that is generally horizontal when the spa cover 20 is in a covering position, and a second segment 46 that is generally vertical when the spa cover 20 is in a covering position. The two segments 44, 46 are connected by a second elbow section 48, which can be made for instance of a plurality of smaller subsections disposed at an angle (e.g. 45 degrees) with
15 reference to one another. Other constructions for the tubular frame 36 are also possible.

To move the spa cover 20 from the covering position to the uncovering position, the spa cover 20 can be first folded by the user by pivoting the cover half 20a over the other cover half 20b around the medial cover hinge 22. This encloses the cross member 38 of the tubular frame 36 inside the medial cover hinge 22 of the spa cover 20. The tubular frame 36
20 of the device 30 is then pivoted by the user around the pivot axes 34 of the two pivot couplings 32. This moves the cross member 38 aside and brings the folded spa cover 20 to a location adjacent to the spa 10, as shown in FIG. 5. To put the spa cover 20 back over the spa 10, the above-mentioned steps are simply reversed.

location adjacent to the spa 10, as shown in FIG. 5. To put the spa cover 20 back over the spa 10, the above-mentioned steps are simply reversed.

FIG. 6 is an isometric exploded view of one of the pivot couplings 32 used in the spa cover lifting device 30 shown in FIG. 1. The pivot coupling 32 has a first member 50 and a second member 52 that is adjacent to the first member 52 when the pivot coupling 32 is assembled. The illustrated first member 50 is in the form of a disc designed to be coaxially-disposed with reference to the pivot axis 34 of the pivot coupling 32. The first member 50 is attached to a base 54 by which the pivot coupling 32 is connected to the holding structure.

In the illustrated example, the base 54 is designed to be connected to a corresponding wall 16 of the spa housing 14, as shown in FIGS. 1 to 5. The base 54 shown in FIG. 6 comprises a U-shaped tube 56 at the end of which the first member 50 is welded. The first member 50 can also be attached to the base 54 using another method. The first member 50 is positioned on the U-shaped tube 56 so as to be closer to the rear side of the spa 10. The U-shaped tube 56 is shown as being longer on the top portion compared to the bottom portion. This feature is provided to indicate the orientation of the tube 56 for the convenience of the installers. It can be omitted or replaced by another indication. The tube 56 comprises a plurality of chamfered holes 57 for receiving mounting screws 58 to be inserted through the wall 16. Caps 59 can be provided, as shown, to cover the heads of the screws 58.

The U-shaped tube 56 of the illustrated example is designed to fit into a set of three spaced-apart and vertically-oriented braces 61. These braces 61 can be very useful if the spa housing 14 is provided with vertically-extending strip (not shown) projecting on the corresponding wall 16 of the spa housing 14. Other arrangements are also possible.

The first and the second members 50, 52 are pivotally interconnected to each other around the pivot axis 34 of the pivot coupling 32. This interconnection is provided in the illustrated example by a guide plate 60 attached to the first member 50. The guide plate 60 is radially oriented with reference to the pivot axis 34 and includes one or more circular guiding surfaces 62, each having a center that is co-incident with the pivot axis 34. The guide plate 60 can have a circular shape and be shaped as a disc, such as in the illustrated example, which the guide plate 60 also provides the guiding surface 62 at a periphery thereof. The disc-shaped guide plate 60 is coaxial with the pivot axis 34. As best shown in FIG. 7, it can be attached inside the first member 50 using a plurality of fasteners 64 and spacers 66. Other arrangements are possible.

Followers 70 are attached to the second member 52 and are circumferentially-disposed so as to be in engagement with the guiding surface 62. Although four followers 70 are provided in the illustrated example, it is possible to use three or more than four followers 70. The followers 70 are axisymmetric with reference to the pivot axis 34 but other configurations can be used, depending for instance on the number of followers 70. The followers 70 can include rollers, each having a rotating part with a rotation axis that is parallel to the pivot axis 34, as shown, or include sliding elements (not shown) that have no rotating parts. The followers 70 can be designed to be continuously engaged over the circular guiding surface 62. A fastener 72 is used to attach a respective one of the followers 70 to the second member 52.

As can be seen, each illustrated follower 70 includes a radially-extending groove 74 in which the outer edge of the disc-shaped guide plate 60 is fitted. When the followers 70 are

installed, the grooves 74 of the followers 70 prevent the second member 52 from moving in the axial direction with reference to the first member 50.

The interconnection between the first and the second member 50, 52 also includes at least one pivotal stop 80 provided between the guide plate 60 and the second member 52 to limit
5 a pivot angle between the first and the second member 50, 52. This way, the first and the second member 50, 52 can only pivot between two limit positions, one of these positions corresponding to the uncovering position of the device 30 shown in FIG. 5.

As shown in FIG. 6, the pivotal stop 80 can include one or more radially-oriented tabs 82 projecting inwardly from a central opening 84 of the guide plate 60. Two opposite tabs 82
10 are provided in the illustrated example. The tabs 82 are configured and disposed to be engaged by at least one interfering member attached to the second member 52. These interfering members can be inwardly-punched tabs 86 extending orthogonally from the second member 52 and made integral therewith, as shown. Edges of the tabs 82 of the guide plate 60 and of the tabs 86 of the second member 52 are simultaneously engaged to prevent
15 the device 30 from pivoting beyond the limit positions, thereby keeping the pivot angle of the illustrated device 30 to about 90 degrees.

FIG. 9 shows the pivot coupling of FIG. 6 with a relative position of the tabs 82, 86 of the pivotal stop 80 when the device 30 is positioned as in FIG. 1. This corresponds to the covering position of the spa cover 20. The spa cover 20 can be opened by having the two
20 halves 20a, 20b of the spa cover 20 over one another, as aforesaid, and by moving the tubular frame 36 in the direction of the arrow 110.

FIG. 10 is a view similar to FIG. 9, but showing the relative position of the tabs 82, 86 of the pivotal stop 80 when the device 30 is positioned as in FIG. 5. This corresponds to the uncovering position of the spa cover 20.

It should be noted that other pivotal stop arrangements are possible.

- 5 The second member 52 of the pivot coupling 32 is connected to the side member 40 of the tubular frame 36 in the illustrated example using a laterally adjustable arrangement 90. Such adjustable arrangement 90 can be useful for a device 30 designed for use with more than one spa model or size. The end of the side member 40 includes a plurality of equally-spaced holes 92 over which can be engaged a two-part support 94 provided with internal
- 10 pegs 96. The illustrated support 94 can engage three holes 92 simultaneously. Pins 98 are inserted through the pegs 96 at the opposite ends. The parts of the support 94, the end of the side member 40 and the second member 52 are attached together using a bolt 100 inserted through them, the bolt 100 being retained by a nut 102 at the inner side of the second member 52. In the illustrated example, the bolt 100 is co-incident with the pivot axis 34.
- 15 Other ways of attaching the end of the side member 40 to the second member 52 of the corresponding pivot coupling 32 can be used as well, including some that provide no lateral adjustments.

As best shown in FIG. 6, an end cap 104 can be provided to hide the internal parts of the pivot coupling 32. The end cap 104 can be made of molded plastic, for instance.

- 20 As can be appreciated, the pivot couplings 32 of the spa cover lifting device 30 can have a very compact construction. It also provides the device 30 with no tethers or stops visible to the users.

It should be noted that the appended figures only show one example of how the spa cover lifting device can be constructed. Variants can be devised without departing from the concept. For instance, the tubular frame of the spa cover lifting device can have a different shape than that illustrated. For example, the junctions between the first and second
5 segments of the side members, and between the side members and the cross member can have another shape instead of those shown and described. The first and second segments of the side members do not necessarily have to define a right angle. The tubular frame can be constructed using elements that do not necessarily have a circular cross section. For instance, the tubes can be square-shaped or have any other cross section. As aforesaid, the
10 base can be connected to a holding structure outside the spa. The number of followers engaged on the guide plate can be different than four. For instance, the guide plate can be guided with three followers or more than four followers. The relative position of the guide plate and the followers can be inverted, the followers being provided on the non-pivoting side of the pivot coupling and the guide plate being provided on the pivoting side. Fasteners
15 can be different than those shown and described. One can provide the at least one circular guiding surface in the guide plate as a plurality of slots, for instance. The ends of the slots can further act as pivot stops. Other variants are possible as well.

CLAIMS:

1. A pivot coupling for a spa cover lifting device, the pivot coupling having a first member and a second member that is adjacent to the first member, the pivot coupling being characterized in that the first and the second member are pivotally interconnected to each other around a pivot axis by:

a guide plate attached to the first member, the guide plate being radially oriented with reference to the pivot axis and including at least one circular guiding surface having a center that is co-incident with the pivot axis;

a set of at least three circumferentially-disposed followers attached to the second member, the followers being in engagement with the at least one circular guiding surface; and

a pivotal stop provided between the guide plate and the second member to limit a pivot angle between the first and the second member.

2. The pivot coupling as defined in claim 1, characterized in that the guide plate has a circular shape.

3. The pivot coupling as defined in claim 2, characterized in that the guide plate is a disc, the at least one guiding surface being provided at a periphery of the disc.

4. The pivot coupling as defined in claim 2 or 3, characterized in that the pivotal stop includes at least one radially-oriented tab projecting inwardly from a central opening of the guide plate, the at least one tab being configured and disposed to be engaged by at least one interfering member attached to the second member.

5. The pivot coupling as defined in claim 4, characterized in that the at least one interfering member includes at least one tab inwardly projecting from the second member.
6. The pivot coupling as defined in claim 5, characterized in that the at least one tab is made integral with the second member.
7. The pivot coupling as defined in any one of claims 1 to 6, characterized in that the followers include rollers.
8. The pivot coupling as defined in claim 7, characterized in that each roller comprises a radially-extending groove, the at least one circular guiding surface being engaged from within the groove.
9. A spa cover lifting device comprising:
 - a tubular frame having two opposite ends, the tubular frame including an elongated cross member having a longitudinal axis; and
 - a pair of pivot couplings having coaxial pivot axes extending in a direction that is parallel to the longitudinal axis of the cross member, each pivot coupling having adjacent first and second members, one of the two members of each pivot coupling being a fixed member and the other one being pivotable around the pivot axis relative to the fixed member, the pivotable member being connected to a respective one of the ends of the tubular frame, the first and the second members being interconnected by a guide plate, a set of at least three circumferentially-disposed followers and a pivotal stop that is provided to limit a pivot angle between the first and the second member, the guide plate being attached to the first member and

being radially oriented with reference to the pivot axis, the followers being attached to the second member and being in engagement with at least one circular guiding surface provided on the guide plate, the at least one circular guiding surface having a center that is co-incident with the pivot axis.

10. The device as defined in claim 9, characterized in that each end of the tubular frame is connected to the corresponding pivot coupling using a laterally-adjustable arrangement.

11. The device as defined in claim 10, characterized in that the laterally-adjustable arrangement includes a two-part support selectively positioned to engage at least some among a plurality of equally spaced-apart holes provided at one of the ends of the tubular frame.

12. The device as defined in any one of claims 9 to 11, characterized in that the guide plate of each pivot coupling has a circular shape.

13. The device as defined in claim 12, characterized in that the guide plate of each pivot coupling is a disc, the at least one guiding surface being provided at a periphery of the disc.

14. The device as defined in any one of claims 9 to 13, characterized in that the pivotal stop of each pivot coupling includes at least one radially-oriented tab projecting inwardly from a central opening of the guide plate, the at least one tab being configured and disposed to be engaged by at least one interfering member attached to the second member.

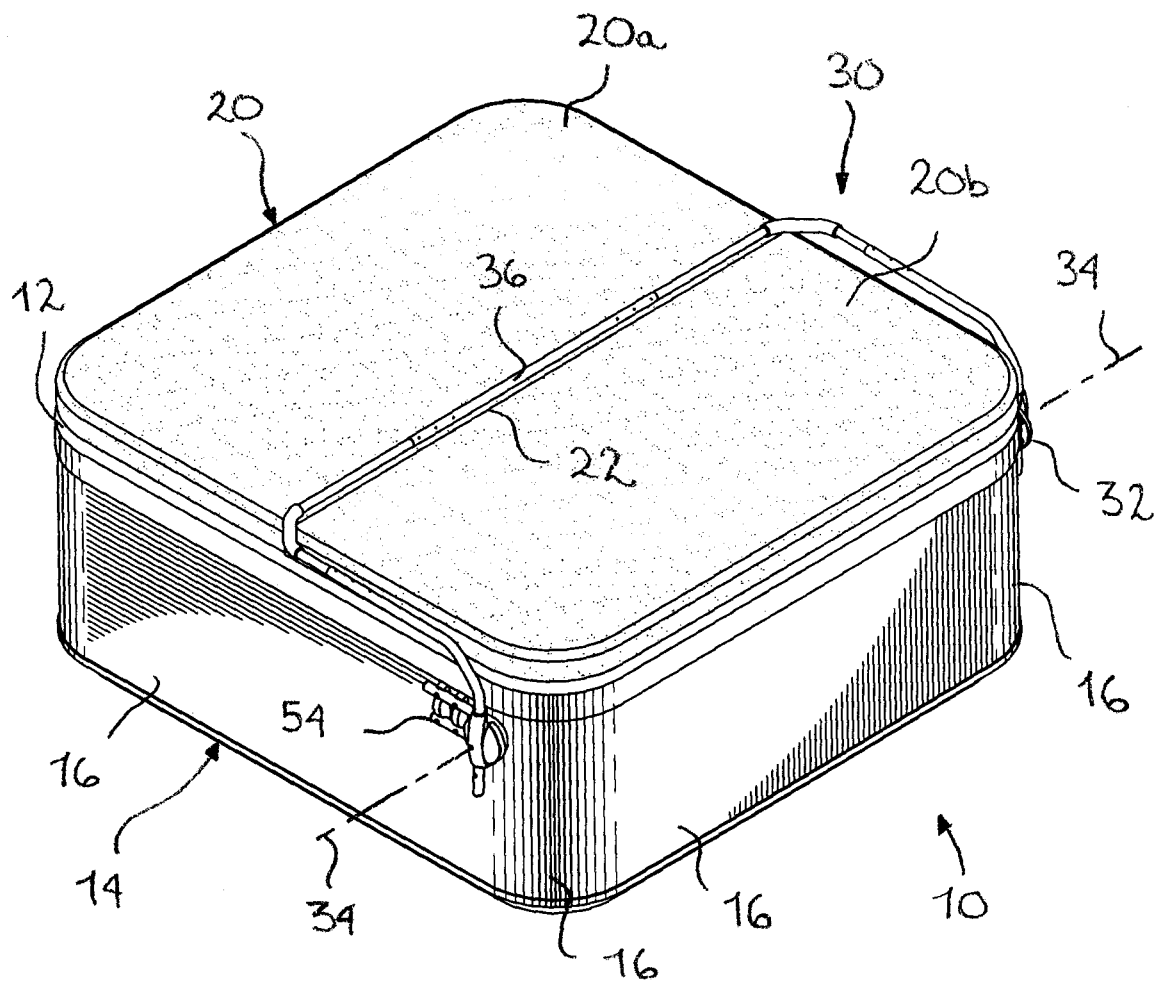
15. The device as defined in claim 14, characterized in that the at least one interfering member includes at least one tab inwardly projecting from the second member.

16. The device as defined in claim 15, characterized in that the at least one tab is made integral with the second member.

17. The device as defined in any one of claims 9 to 16, characterized in that the followers include rollers.

18. The device as defined in claim 17, characterized in that each roller comprises a radially-extending groove, the at least one circular guiding surface on each pivot coupling being engaged from within the groove.

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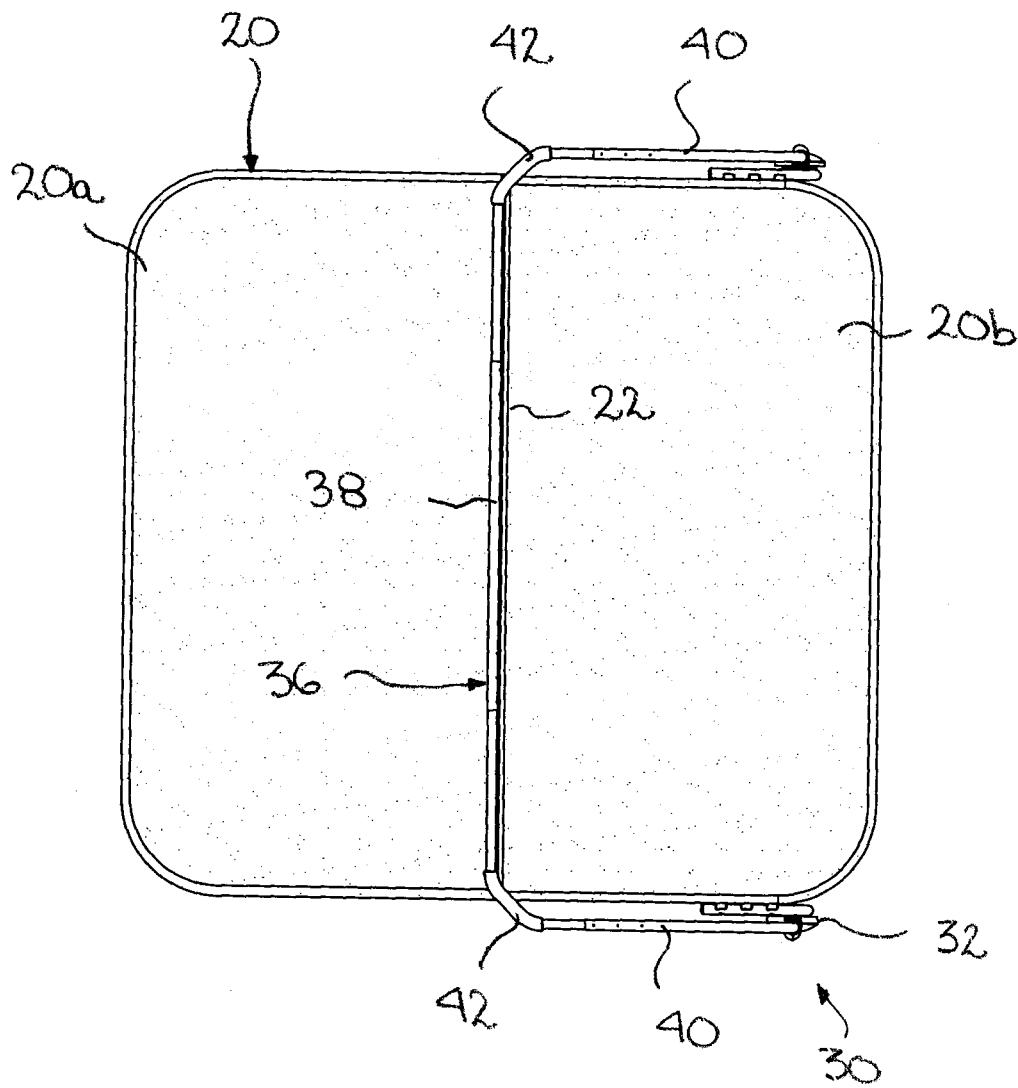
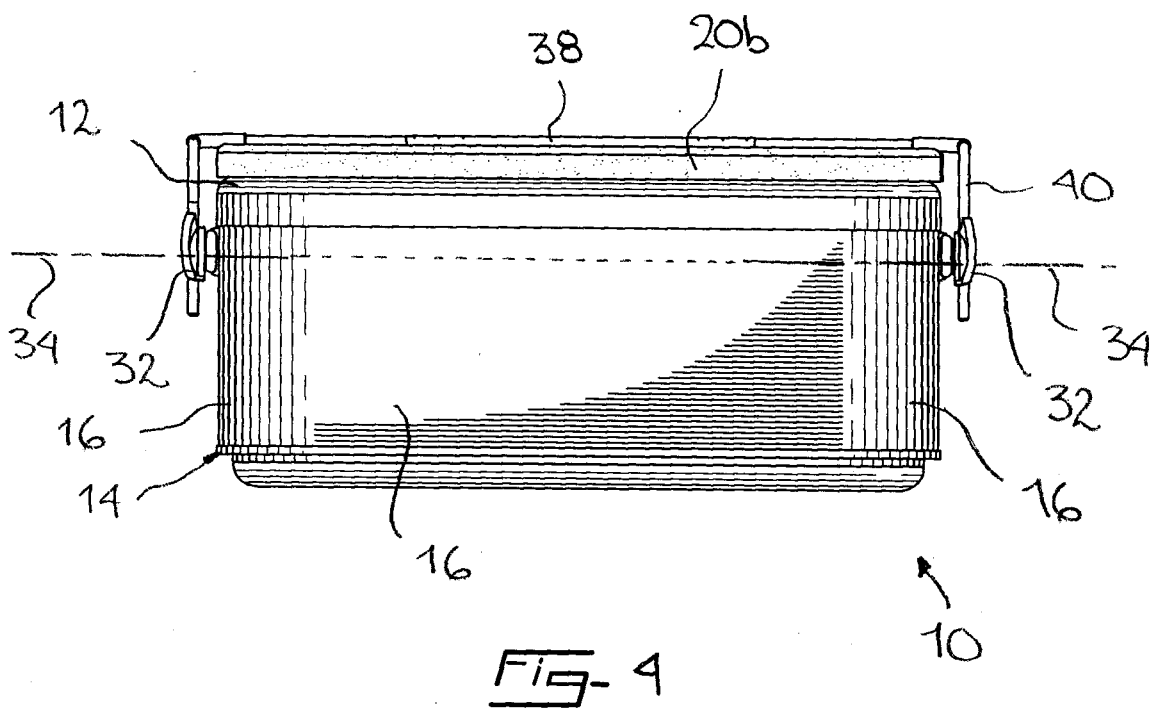
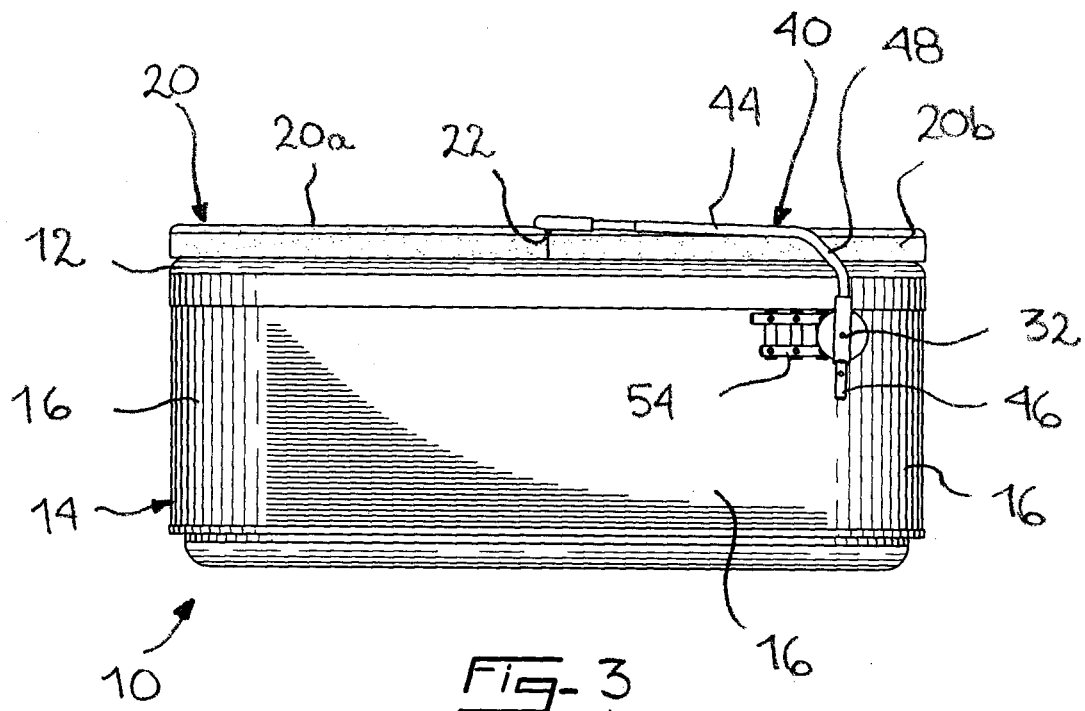


FIG-2

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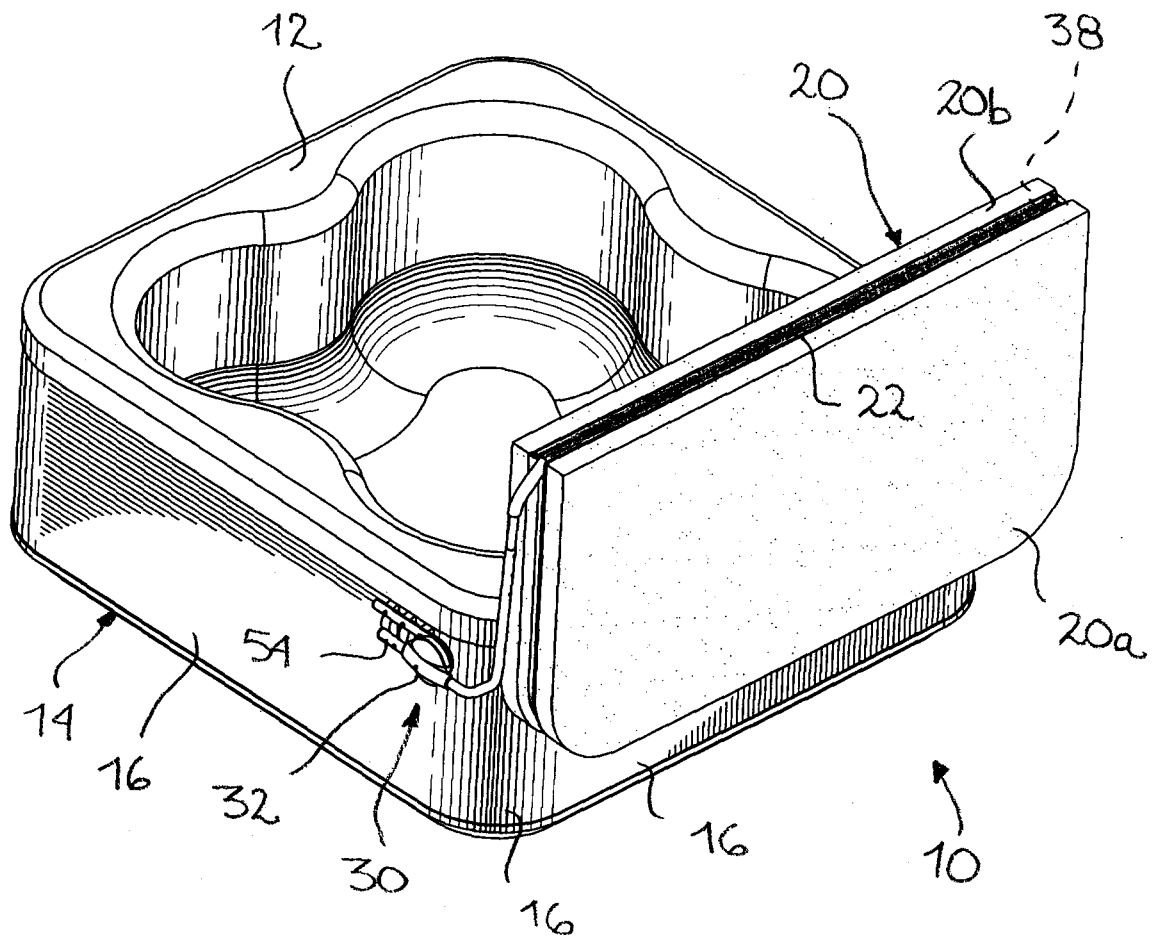
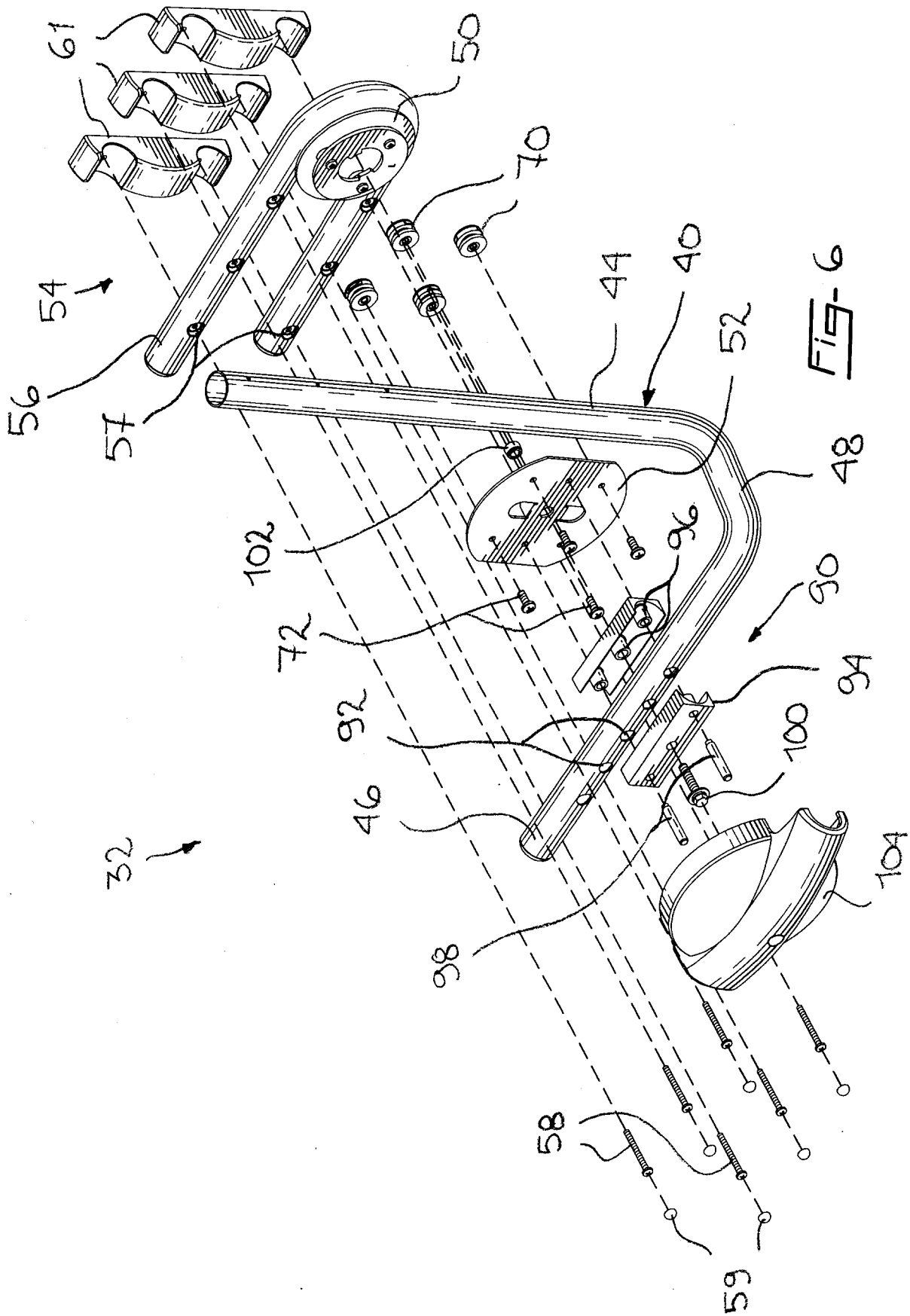


FIG-5

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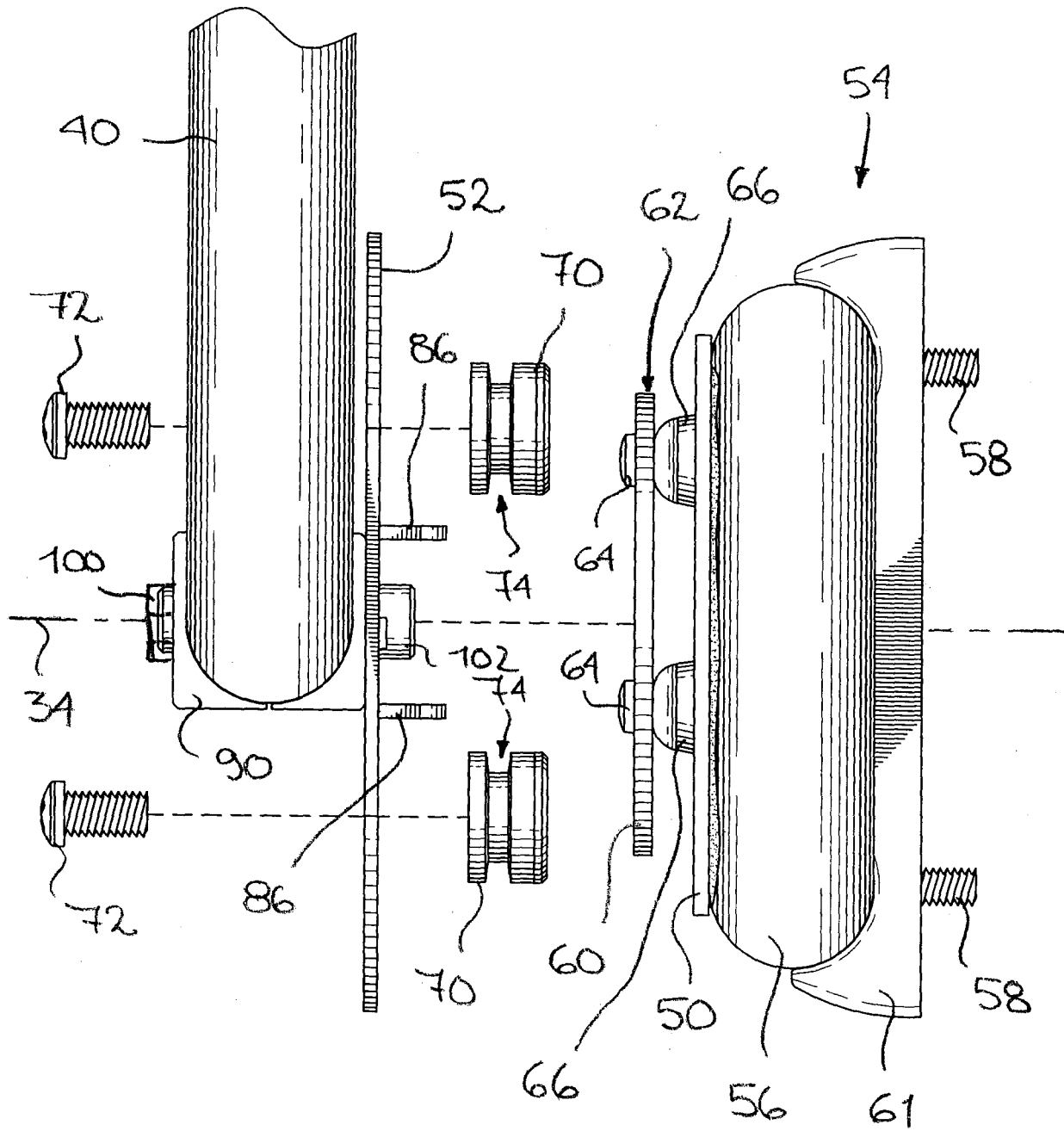


FIG-7

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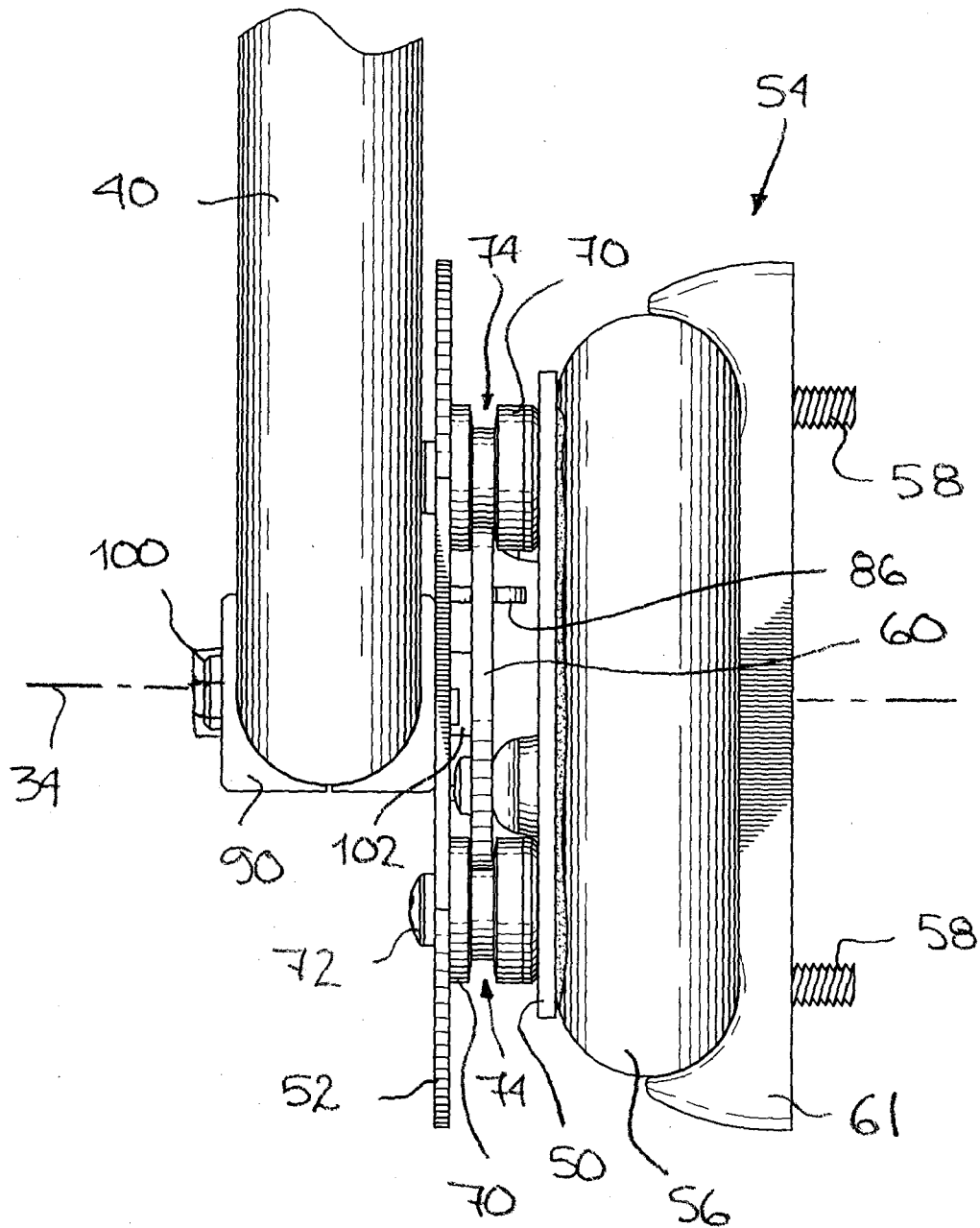
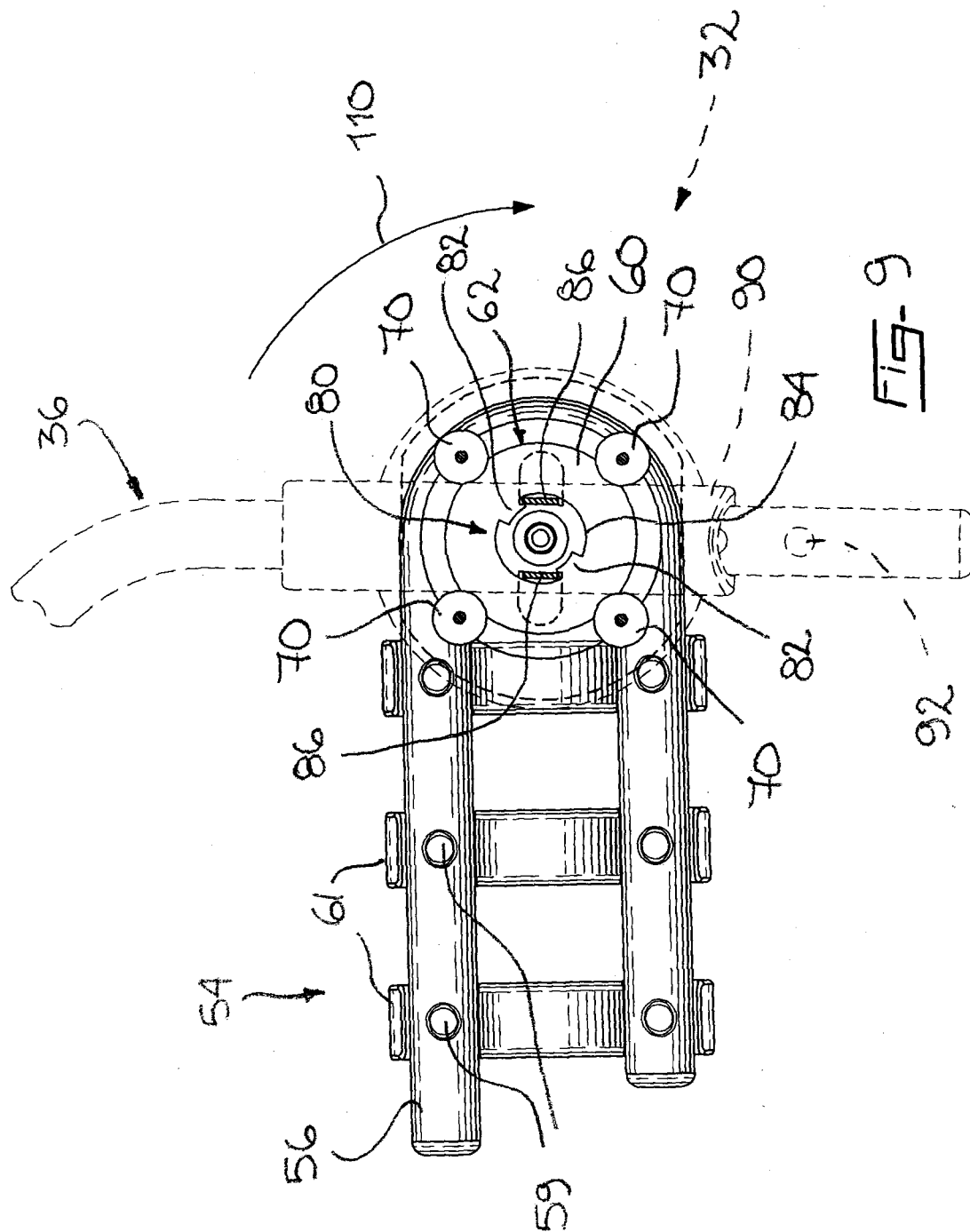


FIG-8

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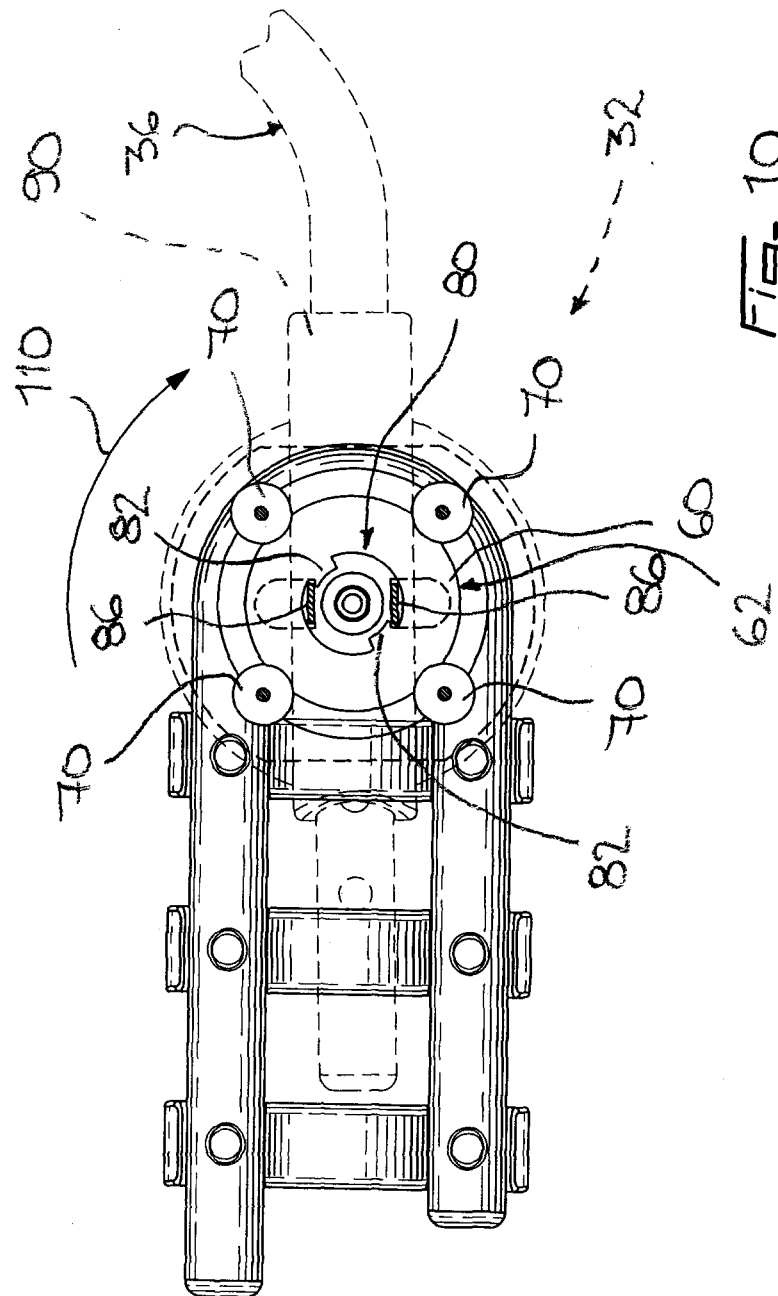


Fig-10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2008/001203

A. CLASSIFICATION OF SUBJECT MATTER
IPC: **A61H 33/00** (2006.01) , **E04H 4/10** (2006.01)
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)
IPC: A61H-33/00 (2006.01)

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

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Delphion, Canadian Patent Database

Keywords: cover, lid, open, lift, pivot, rotate, roller and follower

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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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search

23 July 2008 (23-07-2008)

Date of mailing of the international search report

19 September 2008 (19-09-2008)

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INTERNATIONAL SEARCH REPORTInternational application No.
PCT/CA2008/001203

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT
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