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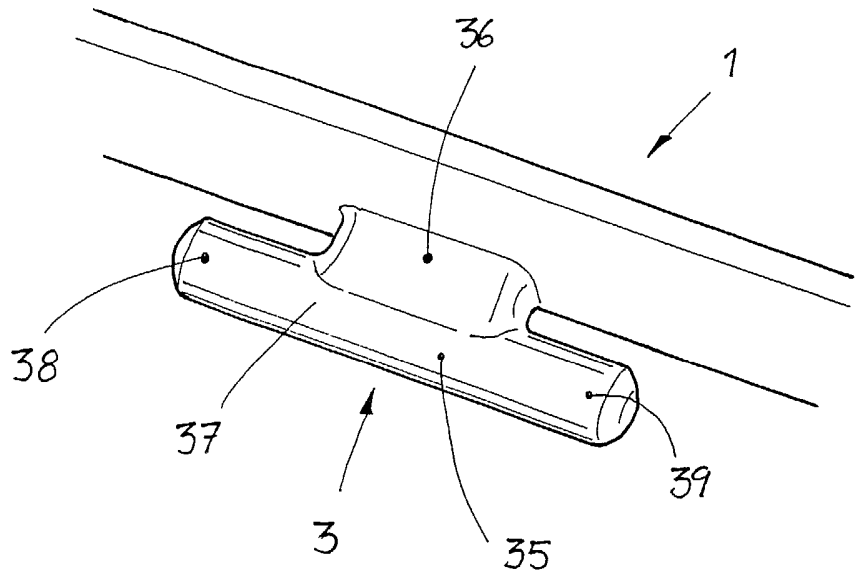
(54) Title: COLLAPSIBLE CONTAINER



(57) Abstract: Collapsible container for transport and storage, comprising a bottom part (2) and inwards foldable side walls (1). The parts (1 and 2 respectively) are manufactured through injection moulding of a thermoplastic material. The side walls (1) are movably connected to the bottom part (2) via hinges (3), formed by a plurality of lower hinge parts (30) which are manufactured in one piece together with the bottom part (2) and a plurality of upper hinge parts (35) which are manufactured in one piece together with the foldable side walls (1). The number of lower hinge parts (30) are the same or more than the number of upper hinge parts (35). At least one of the upper hinge parts (35) comprises a central connector piece (36), having one end connected to the lower portion of the side wall (1) while the other end is connected to a pivot pin (37). The pivot pin (37) has two pivot pin ends (38 and 39 respectively) extending on both sides of the central connector piece (36). The two pivot pin ends (38 and 39 respectively) extends parallel to the side wall (1) and its lower portion. At least one of the lower hinge parts (30) comprises a horizontal longitudinal slot (31) being open towards the inside of the collapsible container by being formed by a lower and upper wall portion (32 and 33 respectively). The lower hinge part further comprises a central slot (34). The horizontal length of the horizontal longitudinal slot (31) is longer than the horizontal length of the pivot pin (37).

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Collapsible container.

The present invention relates to radical improvements on collapsible containers for transport and storage.

Containers made from different materials such as wood, metal, plastic etc. are frequently used. One problem with such containers are that they often demand the same transport volume when returned to the source as when delivered with goods.

An alternative to the return transport is a so-called one way package which is disposed of after delivery.

Another common way to solve the problem is to provide the package with a so-called nesting function. This means that empty containers are partly placed in one another, by providing the containers with sloping sides.

Yet another way to solve the problem is to dismantle or fold the sides of the container. The mostly known side dismantling is the pallet and pallet collar. An example of commonly used containers with foldable sides is the collapsible pallet container. The sides are here made foldable by attaching their respective lower end to the bottom part via a hinge.

A disadvantage with this type of container is that the load carrying ability is radically impaired when compared to solid, non-collapsible containers. This is mainly due to the fact that the corner parts, on non-collapsible containers taking up around 80% of the weight from above, are parted on collapsible containers. Since these load carrying corners are parted on collapsible containers, this will have to be compensated for in some way.

According to the present invention is it possible to manufacture a collapsible container where the above mentioned disadvantages are avoided. The invention relates to a collapsible container for transport and storage. The container comprises a bottom part and inwards foldable side walls. The different parts are manufactured through injection moulding of a thermoplastic material. The side walls are movably connected to the bottom part via hinges, formed by a plurality of lower hinge parts which are manufactured in one piece together with the bottom part, and a plurality of upper hinge parts which are manufactured in one piece

together with the foldable side walls, the number of lower hinge parts being the same or more than the number of upper hinge parts. The invention is characterised in that, at least one of the upper hinge parts comprises a central connector piece, having one end connected to the lower portion of the side wall while the other end is connected to a pivot pin. The pivot pin has two pivot pin ends extending on both sides of the central connector piece. The two pivot pin ends extends parallel to the side wall and its lower portion. At least one of the lower hinge parts comprises a horizontal longitudinal slot being open towards the inside of the collapsible container by being formed by a lower and upper wall portion. The lower hinge part further comprising a central slot. The horizontal length of the horizontal longitudinal slot is longer than the horizontal length of the pivot pin.

The distance between the upper and lower wall portion is suitably slightly smaller than the largest diameter of the pivot pin whereby a snap-action assembly is made present.

According to one embodiment of the invention, remaining upper hinge parts comprises an edge connector piece, having one end connected to the lower portion of the side wall while the other end is connected to a pivot pin. The pivot pin has a pivot pin end extending on one side of the edge connector piece. The pivot pin end extends parallel to the side wall and its lower portion. Matching lower hinge parts, arranged on positions matching the positions of the remaining upper hinge parts, comprises a horizontal longitudinal slot being open towards the inside of the collapsible container by being formed by a lower and upper wall portion. The lower hinge part further comprising a central slot. The horizontal length of the horizontal longitudinal slot is longer than the horizontal length of the pivot pin. The longitudinal slot of the matching lower hinge part suitably has a distance between the upper and lower wall portion which is slightly smaller than the largest diameter of the pivot pin whereby a snap-action assembly is made present.

According to another embodiment of the invention lower portions of the side wall is provided with stabilising girders. These stabilising girders are intended to interact with an outer edge of the bottom part when the side wall is in erected position whereby the side wall may only be assembled and disassembled when in, or close to, its fully down-folded position.

According to yet another embodiment of the invention the side wall may be provided with locking girders. These locking girders may be used together with, or as an alternative to, the stabilising girders described above. The locking girders has a section stretching downwards, as seen when the side wall is erected. This section is provided with a locking notch on its lowest end, the locking notch being intended to interact with a matching groove arranged on the bottom part. The side walls will hereby be maintained in erected position until folded by the operator.

Two side walls, placed on opposite sides, preferably the two long-side walls are provided with an inwards angled edge at each of their two ends. The edges connect with the adjoining side walls, preferably the short-side walls, when in an upright position. The inwards angled edges are provided with a number of coupling devices which are intended to interact with corresponding couplings placed at the ends of the adjoining side walls so that the side walls can be locked together in an upright position.

A container of this type can suitably be made from a polymer material from the group, polyethylene, polypropylene, polyamide, polystyrene, acryle-butadiene-styrene, poly-alkylene-terephthalate or the like.

Suitably at least two opposite side walls, preferably all four, are provided with handle openings close to their respective upper sides.

The short-side walls are preferably provided with guiding and load-transferring guiding means which are intended to interact with corresponding receiving means placed on the inside of the two inwards angled edges of the long-side walls. The shearing stress between two adjoining walls will hereby be transferred more effectively so that stress on the coupling means is decreased.

The invention is explained further together with enclosed drawings, different embodiments of the invention wherein,

-figure 1, 3, 5 and 7 shows, in perspective, the lower parts of a side wall 1.

-figure 2, 4, 6 and 8 shows, in perspective, part of the outer edge of a bottom part 2.

Figure 1 shows parts of a side wall 1 to a collapsible container for transport and storage. The container comprises a bottom part 2 (see fig. 2) and inwards foldable side walls 1, which parts 1 and 2 respectively are manufactured through injection moulding of a thermoplastic material. The side walls 1 are movably connected to the bottom part 2 via hinges 3, formed by a plurality of lower hinge parts 30 (see figure 2), and a plurality of upper hinge parts 35 which are manufactured in one piece together with the foldable side walls 1. The number of lower hinge parts 30 are the same or more than the number of upper hinge parts 35. The lower hinge parts 30 are manufactured in one piece together with the bottom part 2. At least one of the upper hinge parts 35 comprises a central connector piece 36, having one end connected to the lower portion of the side wall 1 while the other end is connected to a pivot pin 37. The pivot pin 37 has two pivot pin ends 38 and 39 respectively extending on both sides of the central connector piece 36. The two pivot pin ends 38 and 39 respectively extends parallel to the side wall 1 and its lower portion as shown in figure 1.

As shown in figure 2, showing a portion of the bottom part, matching the section showed in figure 1, at least one of the lower hinge parts 30 comprises a horizontal longitudinal slot 31 being open towards the inside of the collapsible container by being formed by a lower and upper wall portion 32 and 33 respectively. The lower hinge part further comprises a central slot 34. The distance between the upper and lower wall portion is slightly smaller than the largest diameter of the pivot pin 37 (see fig. 1) whereby a snap-action assembly is made present.

The horizontal length of the horizontal longitudinal slot 31 (see figure 2) is longer than the horizontal length of the pivot pin 37 (see figure 1).

As shown in figure 3 and 4 the remaining upper hinge parts 35^{I} comprises an edge connector piece 36^{I}, having one end connected to the lower portion of the side wall 1 while the other end is connected to a pivot pin 37. The pivot pin 37 has a pivot pin end 38 extending on one side of the edge connector piece 36^{I}. The pivot pin end 38 extends parallel to the side wall 1 and its lower portion as is understood studying figure 3. Matching lower hinge parts 30^{I} are arranged on

positions matching the positions of the remaining upper hinge parts 35^{I}. These matching lower hinge parts 30^{I} comprises a horizontal longitudinal slot 31 being open towards the inside of the collapsible container by being formed by a lower and upper wall portion 32 and 33 respectively. The lower hinge part 30^{I} further comprises a central slot 34. Also the longitudinal slot 31 of the matching lower hinge part 30^{I} suitably has a distance between the upper and lower wall portion which is slightly smaller than the largest diameter of the pivot pin 37 whereby a snap-action assembly is made present. The straight forward snap action-assembly of the side walls 1 into the bottom part 2 will radically facilitate assembly, as well as disassembly of the container. It will hereby be very easy to change damaged parts of the container 1 without having to be specially trained for the task.

The horizontal length of the horizontal longitudinal slot 31 (see figure 4) is longer than the horizontal length of the pivot pin 37 (see figure 3).

As shown in figure 5, where lower portions of the side wall 1 is shown, the side wall 1 may further be provided with stabilising girders 40. These stabilising girders 40 are intended to interact with an outer edge 41 (see figure 6) of the bottom part 2 when the side wall 1 is in erected position. This will also mean that the side wall 1 may only be assembled and disassembled when in, or close to, its fully down-folded position. The risk for accidental disassembly of the side wall 1, when in normal use, will be radically reduced. The stabilising girders 40 may further be accompanied by additional and optional locking girders 42 (see figure 7), having a section 42' stretching downwards (as seen when the side wall 1 is erected) which section 42' is provided with a locking notch 43 on its lowest end. This notch 43 is intended to interact with a matching groove 44 (see figure 8) arranged on the bottom part 2. This will further facilitate the handling of the container as the side walls 1 will maintained in erected position until folded by the operator. The sections 42' will act as a spring and will allow the side wall 1 to snap into the erected position.

It has during test shown suitable to provide the side walls 1 with hinges as shown in figure 3 as an outermost hinge on the two vertical edges of the side wall 1 while the rest of the hinges, arranged between these two outermost hinges are constituted by hinges of the type shown in figure 1. As is understood by the

contents of the present application the bottom part is provided with lower hinges that are intended to match the hinges of the side walls 1 as here described. This is further described in figures 2 and 4 above.

It has also shown, during tests, that it is advantageous to provide one or more of the pivot pins 37 with a notch which give a cam shaft effect. The notch is then arranged so that the side wall will stay in an erected position 1.

The invention is not limited to the embodiment shown, since it can be varied in different ways within the scoop of the invention.

CLAIMS

1. Collapsible container for transport and storage, comprising a bottom part (2) and inwards foldable side walls (1), which parts (1 and 2 respectively) are manufactured through injection moulding of a thermoplastic material, wherein the side walls (1) are movably connected to the bottom part (2) via hinges (3), formed by a plurality of lower hinge parts (30) which are manufactured in one piece together with the bottom part (2) and a plurality of upper hinge parts (35) which are manufactured in one piece together with the foldable side walls (1), the number of lower hinge parts (30) being the same or more than the number of upper hinge parts (35),

   -wherein at least one of the upper hinge parts (35) comprises a central connector piece (36), having one end connected to the lower portion of the side wall (1) while the other end is connected to a pivot pin (37), the pivot pin (37) having two pivot pin ends (38 and 39 respectively) extending on both sides of the central connector piece (36), the two pivot pin ends (38 and 39 respectively) extending parallel to the side wall (1) and its lower portion, and,

   -wherein at least one of the lower hinge parts (30) comprises a horizontal longitudinal slot (31) being open towards the inside of the collapsible container by being formed by a lower and upper wall portion (32 and 33 respectively), the lower hinge part further comprising a central slot (34), and,

   -wherein the horizontal length of the horizontal longitudinal slot (31) is longer than the horizontal length of the pivot pin (37).

2. Collapsible container according to claim 1, wherein the distance between the upper and lower wall portion is slightly smaller than the largest diameter of the pivot pin (37) whereby a snap-action assembly is made present.

3. Collapsible container according to claim 1, wherein remaining upper hinge parts (35^{I}) comprises an edge connector piece (36^{I}), having one end connected to the lower portion of the side wall (1) while the other end is connected to a pivot pin (37), the pivot pin (37) having a pivot pin end (38) extending on one side of the edge connector piece (36^{I}), the pivot pin end (38) extending parallel to the side wall (1) and its lower portion, and, wherein matching lower hinge parts (30^{I}), arranged on positions matching the positions of the remaining upper hinge parts (35^{I}), comprises a horizontal longitudinal slot (31) being open towards the inside of the collapsible container by being formed by a lower and upper wall portion (32 and 33 respectively), the lower hinge part further comprising a central slot (34), wherein the horizontal length of the horizontal longitudinal slot (31) is longer than the horizontal length of the pivot pin (37).

4. Collapsible container according to any of the claims 1 - 3, wherein lower portions of the side wall (1) is provided with stabilising girders (40), which stabilising girders (40) are intended to interact with an outer edge (41) of the bottom part (2) when the side wall (1) is in erected position whereby the side wall (1) may only be assembled and disassembled when in, or close to, its fully down-folded position.

5. Collapsible container according to any of the claims 1 - 4, wherein locking girders (42), having a section (42') stretching downwards, as seen when the side wall (3) is erected, which section (42') is provided with a locking notch (43) on its lowest end, the locking notch (43) being intended to interact with a matching groove (44) arranged on the bottom part (2) whereby the side walls (3) will maintained in erected position until folded by the operator.

6. Collapsible container according to claim 3, wherein the longitudinal slot (31) of the matching lower hinge part (30^{I}) has a distance between the upper and lower wall portion which is slightly smaller than the largest diameter of the pivot pin (37) whereby a snap-action assembly is made present.

Fig. 1

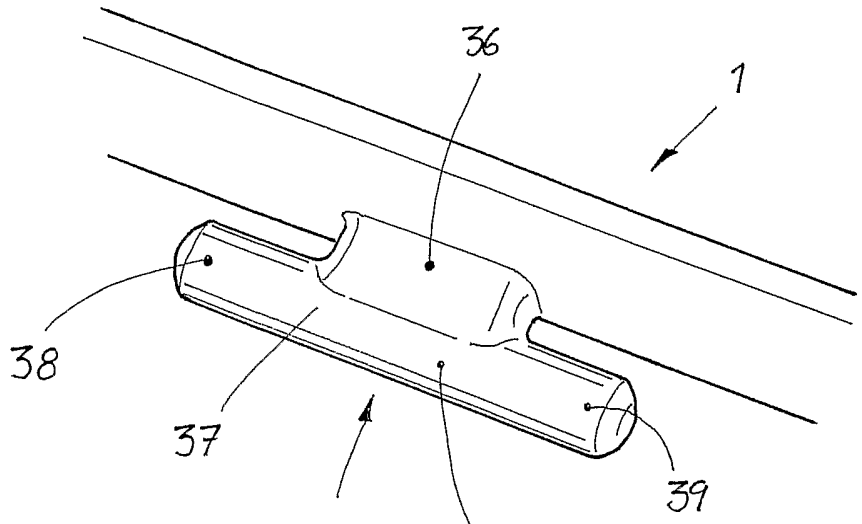


Fig. 2

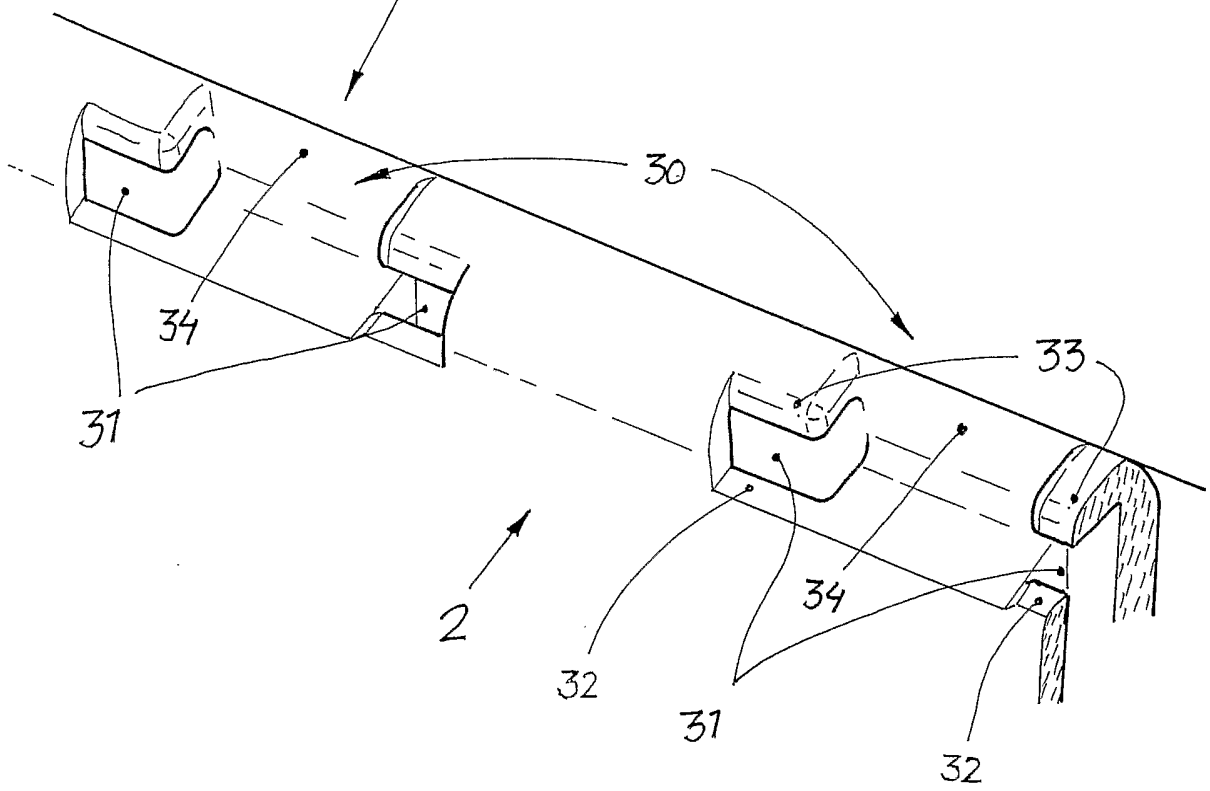


Fig. 3

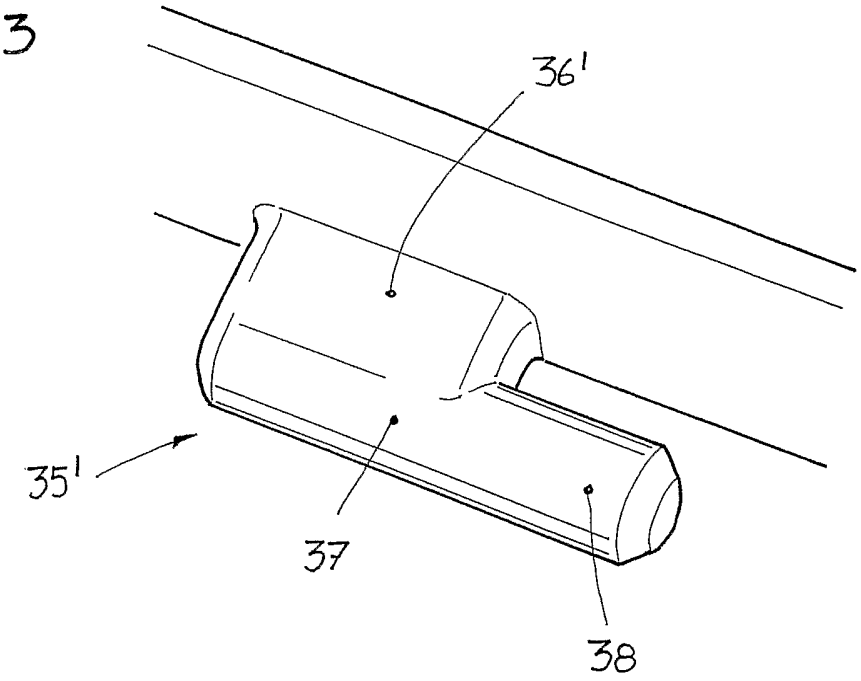


Fig. 4

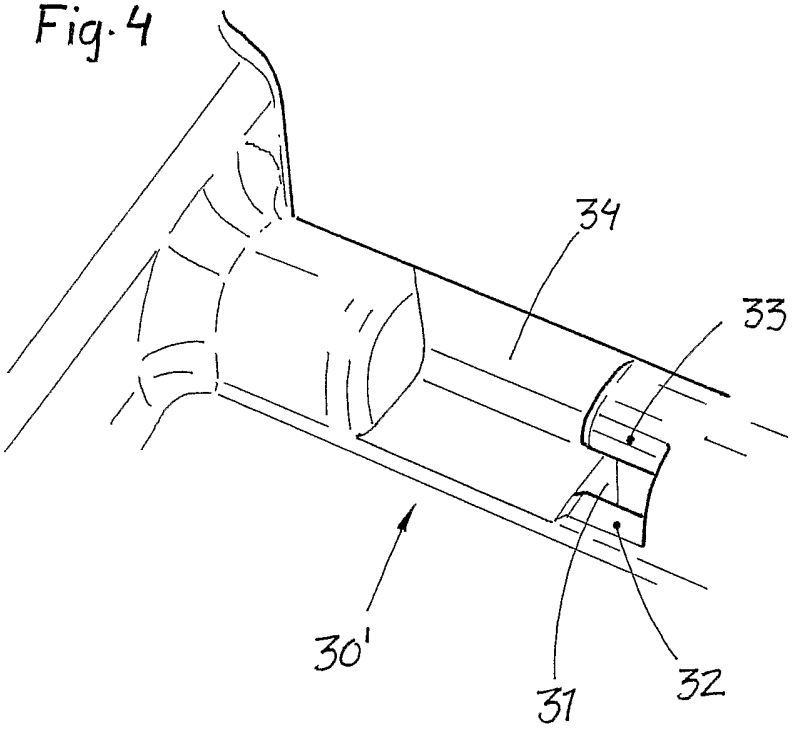


Fig. 5

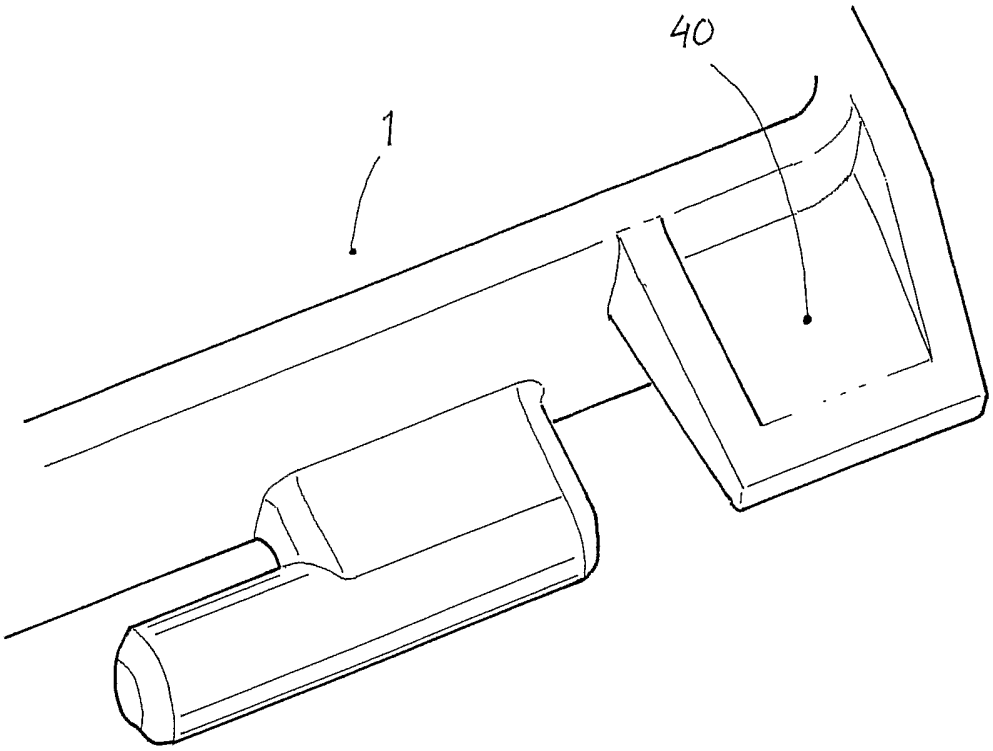


Fig. 6

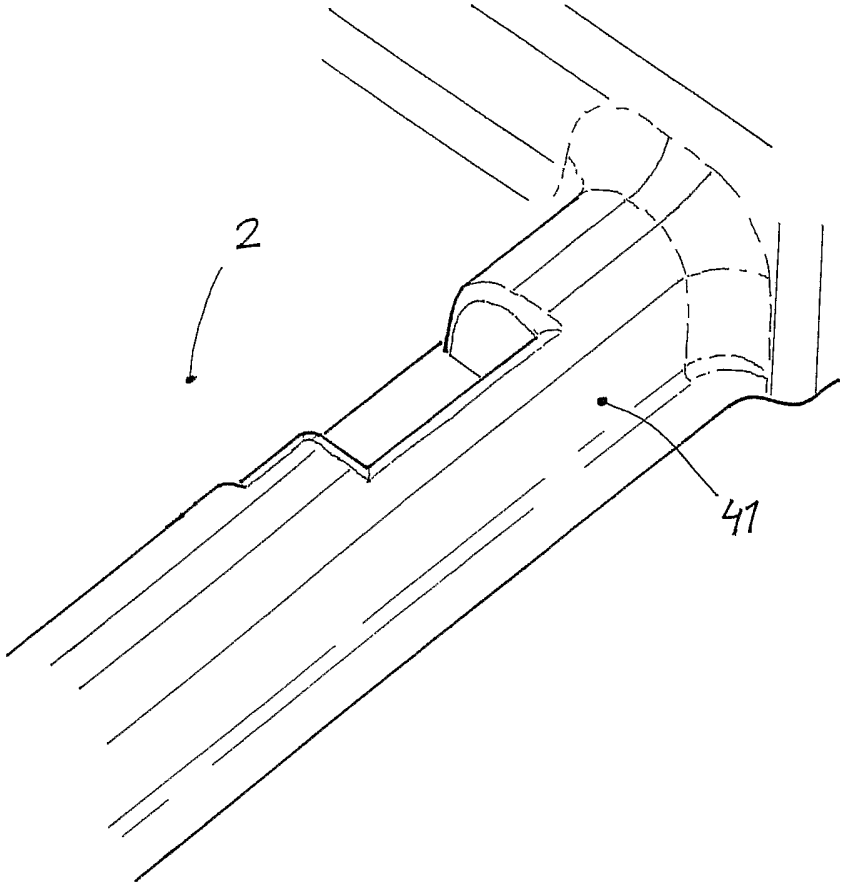


Fig. 7

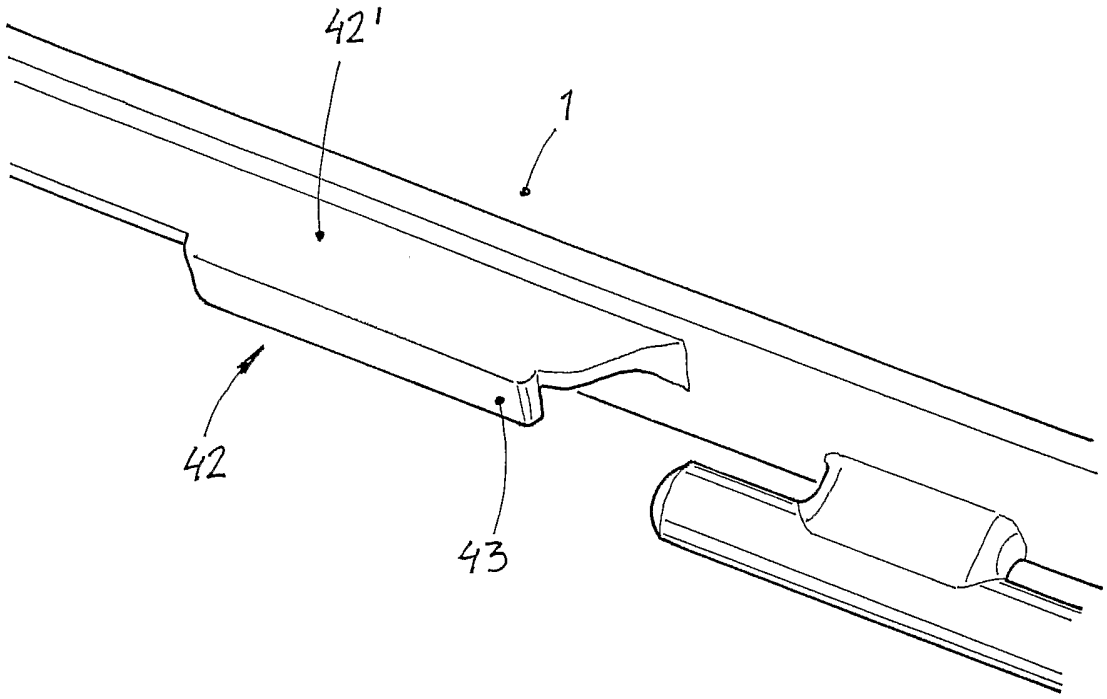
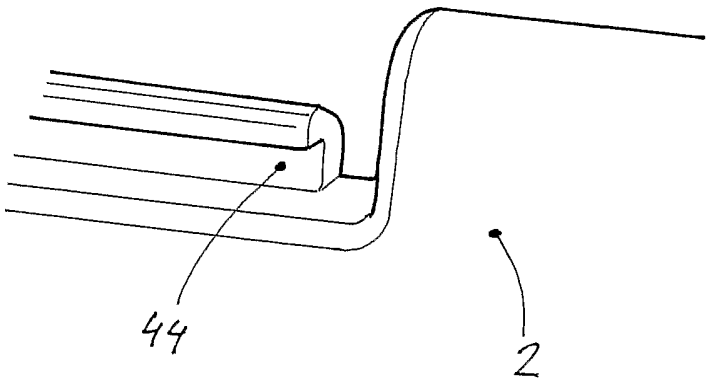


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2003/001720

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 6/18, B65D 88/52, B65D 21/02, B65D 90/02
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)

IPC7: B65D

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

SE,DK,FI,NO classes as above

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

WPI, PAJ, FULLTEXT, EPOQUE, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6209741 B1 (RICHARD BOUCHER-GILES), 3 April 2001 (03.04.2001), column 1, line 14 - line 15; column 1, line 43 - line 46, figures 6,8	1-6
Y	US 4663803 A (PAUL R. GORA), 12 May 1987 (12.05.1987), column 1, line 41 - column 2, line 34, figures 1-10	1-6
Y	GB 2203191 A (FRANK BORAM), 12 October 1988 (12.10.1988), figures 1-6, claims 1-7	1-6

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 January 2004	10 -02- 2004
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Beata Slusarczyk/Els Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2003/001720

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0071144 A1 (FIAT AUTO S.P.A.), 9 February 1983 (09.02.1983), figure 6, claim 1 ---	1-6
A	EP 0570945 A1 (W. HAUTAU GMBH), 24 November 1993 (24.11.1993), figure 13, abstract ---	1-6
A	GB 2235429 A (LIN PAC MOULDINGS LIMITED), 6 March 1991 (06.03.1991), figure 3, claim 1 --- ---	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

24/12/2003

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