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(54) Flexible resilient clamp device and a container comprising said flexible resilient clamp device

(57) The present invention refers to container system which comprises at least one flexible resilient clamp device (1) which is adapted to be detachably fixable in and/or to a container, and which comprises at least two essentially opposite clamp halves (10,12) which are in particular at least interconnected at the top part (4) of the clamp device, which are adapted to be moved, at least in one part, towards each other, and which exert an outward pressure when compressed, said clamp device further comprising at least in one segment, in particular in the bottom part towards one end, of at least one clamp half at least one fixation means (3) adapted to hold the clamp in a fixed position, in particular in a vertical and/or horizontal position; and a container, which comprises a bottom plate, at least two, in particular longitudinal and/or essentially vertical and/or essentially parallel, side walls, on opposing sides, and at least one fixation means on each opposing side wall, in particular on and/or adjacent to the bottom plate, of the container, which are adapted to engage a clamp device having essentially complementary fixation means in or on the container in at least one essentially fixed position.

Fig. 1a

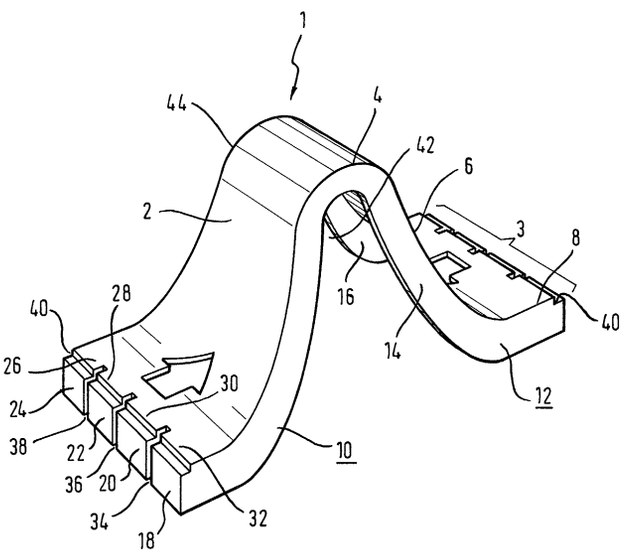

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Fig. 1b

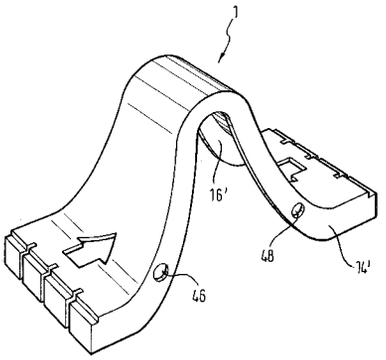


Fig. 1c

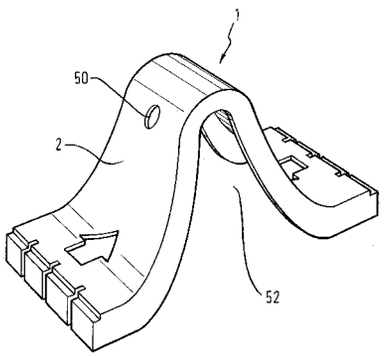


Fig. 1d

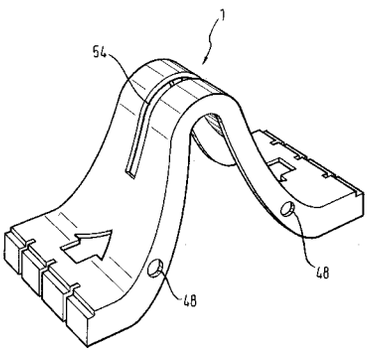
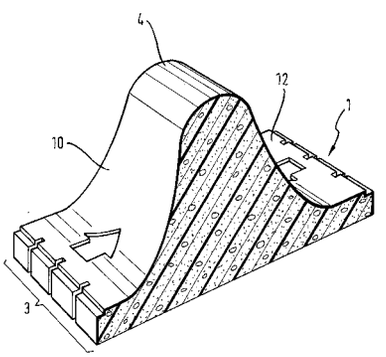


Fig. 1e



Description

[0001] The present invention refers to a flexible resilient clamp device which is adapted to be detachably fixable in and/or to a container, said container and also to a container system, in particular a storage container system, which comprises said flexible resilient clamp device and said container.

[0002] Resilient clips or clamps, for example made from plastic or metal, are commonly used to engage or attach loose or light weight products like sheets or bags to a receptacle or support means. Also, container lids are frequently affixed to a receptacle with the aid of a flexible clip element which engages into respective fixtures. Although a multitude of different clip applications is known, the potential which resides in clip or clamp fastening has not been exploited yet to its full extent.

[0003] Containers or boxes for the storage or take up of, for example, CDs or DVDs are nowadays in wide-spread use. Data carriers of every type are nowadays not only frequently used in households, but in particular also at the working place. As the number of such data carriers, irrespective of whether in private or professional use, is steadily growing, it becomes more and more difficult to keep up with the amount of individual items to be stored, as well as to keep record of all these items For these purposes a variety of different container types which may vary in form, shape and dimension are available.

[0004] According to U.S. 5,372,263, data carriers like CD-boxes can be located and relocated in a display rack which has a substantially rectangular shape in elevation view for positioning and locking, unlocking and taking out a flat data box carrier. These carriers are located on a plurality of intermediate longitudinal locking means extending from a surface of said modular display rack. The carrier can be removed only by lifting and tilting it against a protrusion, which extends from a rear surface of the module display rack and which acts as a fulcrum causing an upper portion of the carrier to move into said space thereby allowing the carrier to be removed from the display rack. The display rack and also the flat data box carriers are aligned in a vertical direction. Although the data carriers can be clearly arranged with such vertical display rack, only a very limited number of data box carriers can be stored.

[0005] From U.S. 5,564,801 a combination system of rectangular combination plates and linear connecting strips for holding boxed compact discs can be derived. The compact disc box carriers are placed in insertion channels a multitude of which is aligned on a profiled plate. The insertion channels are formed by parallel grips into which the CD-boxes can be placed in a vertical manner. As the individual rips are usually very thin in order to not waist any material and also to provide for a maximum of storage capacity, there is little intermediate space left to remove the data box carriers rather conveniently. Also, compared to the length of the data box carrier, the height of the rips of the insertion channels or spacer slots is rather small in order to facilitate insertion and removal of the data box carrier. However, the lesser the height of the rips the more the data box carriers are prone to fall over.

[0006] U.S. 5,947,301 discloses a device for filing standard boxes for compact disks by hooks fixable in openings for hanging standard boxes in a hanging file. The hooks are usually shaped onto two sides of a U-shaped member which engages round the boxes and has an elastically flexible connecting web.

[0007] To properly store data box carriers with the above mentioned devices the material and dimensions chosen have to be well adjusted as otherwise the storage and/or filing of these boxes is hampered or impossible. For example, only those plastic materials should be suited to form insertion channels for compact disc boxes which are insensitive to temperature changes with respect to thermal expansion. Also, if those racks or profiled plates are, for example, extruded or injection molded their manufacture has to meet high standards to reliably furnish standardized products each having identical dimensions.

[0008] It is therefore the object of the present invention to provide a system for storing or holding individual items, in particular data box carriers, which overcomes the drawbacks of the state of the art and with which these items can easily be inserted, removed and stored and which do not tend to fall over irrespective of the number of data box carriers already placed inside a container, simultaneously allowing for a clear arrangement of these data box carriers.

[0009] This object is achieved by a flexible resilient clamp device which is adapted to be detachably fixable in and/or to a container, comprising at least two essentially opposite clamp halves which are in particular at least interconnected at the top part of the clamp device, which are adapted to be moved, at least in one part, towards each other, and which exert an outward pressure when compressed, said clamp further comprising at least in one segment, in particular in the bottom part towards one end, of at least one clamp half at least one fixation means adapted to hold the clamp in a fixed position, in particular in a vertical and/or horizontal position, in and/or on a container, in particular by engaging. According to the present invention in one embodiment only one clamp half be provided with a fixation means as described herein whereas the opposite clamp half exhibits a segment which is adapted to be pressed against the side wall of for example a container. The part of said segment which comes in contact with a wall when clamped can preferably have a non-ship surface.

[0010] Further, the invention proposes that a fixation means is selected from the group consisting of a notch, indentation, protrusion, groove, tongue- or tooth-like element, a hole, a groove-like depression, and a pin, adapted to be fixed to and/or on a container.

[0011] Also, according to the invention the width of the clamp device is smaller than the distance between the opposite clamp halves adjacent to their fixation means.

[0012] A preferred modification according to the invention is characterized in that the opposite clamp) halves are part of an arc-like structure, said opposite clamp halves adjacent to the bottom part of the clamp device being further apart than intermediate and/or top parts of the clamp device.

[0013] Provisions may be made that the flexible resilient clamp has opposite side faces which confine the width of the clamp device.

[0014] Further, the invention proposes that the space between opposite clamp halves is partially or completely filled with an elastic and/or elastomeric and/or foam material and/or with at least one spring. Thus, if for example the material or structure of the outer walls of the clamp device do not suffice to furnish a clamp being resilient and/or flexible the space between the clamp halves can be filled with an appropriate material.

[0015] Also, according to the invention a flexible resilient clamp device is provided wherein at least one side face of at least one clamp half comprises, at least partially, a rim or a wall element, in particular adjacent to the upper wall of the clamp. By using in addition to the wall of the clamp halves further structural elements such as a rim, in particular along the one or both entire side edges of the clamp, the clamp structure can be stiffened.

[0016] In one preferred embodiment of the present invention at least one portion of the rim and/or wall element and/or surface of at least one clamp half comprises at least one hole and/or depression adapted to take up pencils, scissors and/or glue sticks or the like. Especially when the clamp is used in different orientations, for example in a CD-box container, a hole in a rim of the clamp device can be used as a receptacle used temporarily for a pen.

[0017] Provisions may be made that the flexible resilient clamp device according to the invention essentially consists of a metal, plastic and/or wooden material. Most preferred, the clamp devices are made from plastic, especially thermoplastic polymers or impact modified thermoplastic polymers or blends thereof. Clamp devices out of plastic can be manufactured, for example, by injection molding or extrusion, preferably in a single step.

[0018] In another preferred embodiment of the invention the flexible resilient clamp device is characterized in that at least one clamp half is extendible. With extendible clamp devices the upper part can be used already as a handle, when the clamp device is fixated in a container Also, in particular when the clamp halves form an arc-like structure extendible clamp halves allow for being used in storage boxes and containers of various sizes. The more extended the clamp halves are the further apart the fixations means on both clamp halves will be and the broader the containers can be.

[0019] Additionally, the flexible resilient clamp device may preferably be adapted in that the upper part of the clamp device, in particular adjacent to where the clamp halves are interconnected, comprises at least one handle or is formed as a handle. Provision can be made to design the upper part of the clamp device that it can be used best for transport.

[0020] Further, a flexible resilient clamp device is preferred wherein at least the upper part of the clamp comprises at least one trench or slot adapted to take up flat items. Usually, a multitude of data box carries are stored in one container. With a trench or slot in the upper part of the clamp device, for example, the CD-box of the data carriers presently in use can be placed in this slot thereby helping to keep an overview. Also, the trench can serve as a means to insert a wall element which corresponds in shape to the clamp device thereby yielding, for example, together with the clamp an inner container wall, especially when the trench or slot is located across opposite clamp halves in the bottom part of the clamp. The trench can, as an alternative, also be placed across the top part of the clamp so that the clamp halves lie on opposite sides of the trench walls.

[0021] In one preferred embodiment of the invention a flexible resilient clamp device is characterized in that the fixation means on at least one clamp half, in particular in the bottom part, comprises at least two, three, four or more adjacent, in particular identical or similar, protrusions or tooth-like elements in a row being separated by, in particular essentially parallel, indentations adapted to take up, in particular wall-like, fixing elements, in particular of a container, said protrusions having, in particular vertical, rim elements, in particular on the lateral side of the clamp half.

[0022] Provisions maybe made that the upper edge of in particular each protrusion comprises a notch, each notch being in particular aligned in the same direction and in essentially the same height.

[0023] In another preferred embodiment of the invention the flexible resilient clamp device is characterized in that the fixation means on at least one clamp half, in particular in the bottom part, comprises an essentially vertical outer wall having at least one, in particular at least two, in particular essentially circular, holes or groove-like depression, arranged in a pattern adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

[0024] Further, a flexible resilient clamp device is preferred in which the fixation means on at least one clamp half, in particular in the bottom part, comprises an essentially vertical outer wall having at least one hole or grove-like depression of irregular shape or of regular shape, which is not circular, in particular of a polygonal shape, adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

[0025] In an another preferred embodiment of a flexible resilient clamp device the fixation means on at least one

clamp half, in particular in the bottom part, comprises an, in particular essentially vertical, outer wall having at least one, in particular two pins, the cross section of which is in particular essentially circular in shape, projecting, in particular horizontally, from the wall, in particular arranged in a pattern adapted to be inserted into holes or groove-like depressions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

[0026] Also preferred is a flexible resilient clamp device in which the fixation means on at least one clamp half, in particular in the bottom part, comprises an, in particular essentially vertical, outer wall having at least one pin or stick, the cross section of which is in particular of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, said pin projecting, in particular horizontally, from the vertical wall, adapted to be inserted into a hole or a groove-like depression and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

[0027] In another aspect of the present invention a container system, in particular a container system for the storage of flat items like CDs and/or DVDs has been found comprising at least two essentially opposite clamp halves which are in particular at least interconnected at the top part of the clamp device, which are adapted to be moved, at least in one part, towards each other, and which exert an outward pressure when compressed, said clamp further comprising at least in one segment, in particular in the bottom part, towards one end of at least one clamp half at least one fixation means adapted to hold the clamp in a fixed position, in particular in a vertical and/or horizontal position, in and/or on a container, in particular by engaging; and a container which comprises a bottom plate, two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate, on each opposing side on and/or adjacent to the bottom plate of the container at least one fixation means which is essentially complementary to the fixation means of the clamp device so that when both complementary fixation means are engaged the clamp device is in an essentially fixed position, in particular fixed in all directions.

[0028] As a container according to the present invention also a base plate or bottom plate being essentially void of any side walls can be used as long as the base plate comprises on opposing sides fixation means which allow for a clamp which is according to the invention to be fixated. For example, the base plate can contain side walls of a very limited height which just suffices to provide for fixation means for a clamp device according to the invention. Also, a container can comprise circumferential walls as well as only the above described opposing walls leaving part of the container side uncovered. Further, the container of the invention can be provided with a lid.

[0029] Provisions may be made that complementary fixation means allow for a fixation of the clamp device in at least two distinct orientations, in particular in a horizontal and a vertical orientation. In vertical orientation the clamp device can function similar to a book stand, i.e. it can keep flat items like data box carries from falling over. The clamp can also help to furnish different compartments in a container. If only a few data box carriers are left in a respective container or when there is a lot of space left between individual data box carriers or other flat items the clamp device according to the invention can also be fixed in a horizontal orientation thereby also stabilizing flat items which are further apart from each other in a container.

[0030] In the container systems according to the invention the flexible resilient clamp device preferably is fixed in all directions when engaged.

[0031] In one preferred embodiment the fixation means on at least one clamp half, in particular in the bottom part, comprises at least two, three, four or more adjacent, in particular identical or similar, protrusions or tooth-like elements in a row being separated by, in particular essentially parallel, indentations adapted to take up wall-like fixing elements, in particular of a container, said protrusions having, in particular vertical, rim elements on the lateral side of the clamp half. These fixation means can for examples interact with a container having complementary fixation means on opposite sides.

[0032] The present invention also provides for a container which comprises a bottom plate, at least two, in particular longitudinal and/or essentially vertical and/or essentially parallel, side walls on opposing sides, and at least one fixation means on each opposing side wall, in particular on and/or adjacent to the bottom plate, of the container, which are adapted to engage a clamp device having essentially complementary fixation means in or on the container in at least one essentially fixed position.

[0033] Preferably, with the above clamp device a container is employed which comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of essentially vertical, spaced apart wall elements, which in particular have essentially the same height and/or length, and which are essentially aligned in parallel to each other in a row, adjacent to each side wall, wherein vertical wall elements on opposing sides are aligned on essentially parallel lines thereby being adapted to hold flat items; at least one, in particular essentially horizontal, strip above each sequence of vertical wall elements which preferably is connected with at least one vertical wall element and/or with the adjacent side wall, wherein the width of the strip is smaller than the length of the vertical wall elements, thereby leaving that portion of the vertical wall elements uncovered which is further apart from the respective adjacent side wall. The vertical wall elements, i.e. those wall parts which are not covered by the strips, form insertion channels or slots which, e.g., can grip and hold data box carriers. The protrusions of the above clamp device are designed as such that the vertical wall elements of the container fit into the indentations

whereby the protrusions fill the space between the vertical wall elements when the clamp device is inserted in vertical orientation. The height of these protrusion is adjusted to the distance between the bottom plate and the strip so that in the vertical orientation of the clamp at least the front part of the protrusions can slide under the strip.

[0034] In a preferred embodiment the upper edge of in particular each protrusion comprises a notch, each notch being in particular aligned in the same direction and in essentially the same height. The use of such a notch provides for an even more uniform fixation of the clamp device as the clamp halves are pressed against the edge of the strip when inserted.

[0035] In one aspect of the invention a container system is provided which comprises a container as described above but without any strips, and also a clamp device identical or similar to the one as described above. This clamp device is detachably fixed to the container by adjusting the width of the indentations so that they fit properly with the width of the vertical wall elements. Such a close fit can also be used with those containers having a strip on opposite sides as described above.

[0036] In another embodiment a container according to the invention comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of pins, the cross section of which is in particular essentially circular in shape, projecting from in particular the bottom part of each side wall towards each other in the form of at least two rows of pins, aligned above each other, wherein at least two pins are located on an essentially vertical line, and wherein the distance between these vertical lines preferably is essentially identical. This container is adapted to take up flat items, in particular in an essentially vertical manner.

[0037] With the above container at least one clamp device according to the invention is proposed to form a container system according to the invention, said clamp device exhibits fixation means on at least one clamp half, in particular in the bottom part, comprises an essentially vertical outer wall having at least two, in particular essentially circular, holes or groove-like depression, in particular arranged in a pattern adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations in a container. If, for example, two, three, four or more holes are used as a fixation means on one clamp half which correspond to a complementary arrangement of pins on each side wall of a container the clamp device can be fixed in, for example, a horizontal as well as in a vertical orientation.

[0038] In another embodiment a container according to the invention comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of pins or sticks the cross section of which is of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, projecting from, in particular the bottom part, of each side wall towards each other in the form of at least one row of pins, wherein opposing pins on opposing side walls are in particular located on essentially parallel lines, and wherein the distance between these lines preferably is essentially identical. Thus, another preferred embodiment of a container system makes use of pins or protrusions the cross section of which does not have the form of a circle but has an irregular or regular form, in particular a polygonal form, i.e. the shape of a triangle, square, rectangle, pentagon or hexagon, to mention a few. With such a pin shape only one pin already suffices to interact with a clamp devices having a corresponding fixation means, i.e. a hole in the shape of a triangle, square, rectangle, etc., on at least one of both or several clamp halves in order to be able to fixate the clamp device in different orientations within the container, preferably in a horizontal and vertical orientation. Therefore, in a preferred container system with the above container at least one clamp device is employed having fixation means on at least one clamp half, in particular in the bottom part, which comprises an essentially vertical outer wall having at least one hole or grove-like depression of irregular or of regular shape, which is not circular, in particular of a polygonal shape, adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations in a container.

[0039] In another embodiment a container according to the invention comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of holes or groove-like depressions in each opposing side wall, the cross section of which is in particular essentially circular in shape, in particular aligned adjacent to the bottom part of each side wall and/or within essentially identical distance to the bottom plate, wherein opposing holes or depressions on opposing side walls are at least located in particular on essentially parallel lines, and wherein the distance between these parallel lines preferably is essentially identical. Also, these container systems allow for a horizontal and vertical orientation of a clamp device.

[0040] With the above container at least one clamp device according to the invention is proposed to form a container system according to the invention, said clamp device having the fixation means on at least one clamp half, in particular in the bottom part, comprises an, in particular essentially vertical, outer wall having at least two pins, the cross section of which is in particular essentially circular in shape, projecting, in particular horizontally, from the wall, in particular arranged in a pattern adapted to be inserted into holes or groove-like depressions and to be detachably fastened in at least two fixed orientations in a container.

[0041] In another embodiment a container according to the invention comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of holes or groove-like depressions in each opposing side wall, the cross section of which is of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, in particular aligned adjacent to the bottom part of

each side wall and/or within essentially identical distance to the bottom plate, wherein opposing holes or depressions on opposing side walls are at least located in particular on essentially parallel lines, and wherein the distance between these parallel lines preferably is essentially identical.

[0042] With the above container at least one clamp device according to the invention is proposed to form a container system according to the invention, said clamp device having fixation means on at least one clamp half, in particular in the bottom part, which comprise an, in particular essentially vertical, outer wall having at least one pin or stick, the cross section of which is in particular of irregular or regular shape, which is not essentially circular, in particular of polygonal shape, said pin projecting, in particular horizontally, from the vertical wall, adapted to be inserted into a hole or a groove-like depression and to be detachably fastened in at least two fixed orientations in a container.

[0043] Other embodiments of a container and container systems of the invention are characterized in that the fixation means are located not only adjacent to the bottom part of the side walls of the container, but are also located in the intermediate and/or top part of the side walls, so that there can be several rows of fixation means on opposing container walls on different levels.

[0044] In another embodiment the fixation means are located in the intermediate part and/or the top part of the side walls, but not at the bottom part of the side walls or adjacent to the bottom plate of the container. By also providing fixation means at a greater distance from the bottom plate of the container it has been found that clamp devices which are inserted in a horizontal orientation are well suited to keep flat items in the container from falling over.

[0045] Of course, opposing clamp halves can not only be provided with the same fixation means but also with different types of fixation means as described above. The same applies for corresponding fixation means on opposing container walls. Even fixation means on different levels on the same container wall can vary.

[0046] The container system according to the present invention can be used, for example, as a tool box, a medicine box, a cosmetic box, a media box, in particular a book, CD- and/or DVD-box, or a garden box.

[0047] The invention thus is based upon the unexpected realization of the possibility to provide a clamp device which is adapted to be detachably fixed in at least two different directions, in particular in a horizontal and a vertical direction. In both directions the clamp serves as a fixedly fastened support means for, e.g., vertically placed items, in particular flat box-like structures. Further, container systems are obtained with the present invention with which, for example, flat items can be easily and safely stored and also transported.

[0048] The invention, together with further objects and advantages, may be best understood with reference to the following description taken together with the accompanying drawings, in which

Figs. 1a to 1e	are perspective views of different embodiments of a clamp device according to the invention;
Fig. 2	is a perspective view of another embodiment of a clamp device according to the present invention;
Fig. 3	is a perspective view of a container according to the present invention;
Fig. 4	is a perspective view of another embodiment of a container according to the present invention;
Fig. 5a, b, c	are schematic views of a clamp according to the invention, shown from two different sides;
Fig. 6	is a schematic sectional view of a container system according to the invention;
Fig. 7	is a schematic sectional side view of a clamp and a container according to the invention;
Fig. 8	is a top view of the clamp and the container according to Fig. 7;
Fig. 9	is a schematic sectional side view of a clamp and a container according to the invention;
Fig. 10	is a top view of the clamp and the container according to Fig. 9;
Fig. 11	is a schematic sectional side view of a clamp and a container according to the invention;
Fig. 12a, b, c	are schematic views of another embodiment of a clamp according to the invention, shown from two sides;
Fig. 13	is a longitudinal side view of a container according to the invention adapted to fix clamps according to Fig. 12;
Fig. 14	is a schematic side view of a clamp according to the invention;
Fig. 15	is a schematic side view of a clamp according to Fig. 14 after having been turned for about 90°;
Fig. 16	is a longitudinal side view of a section of a container according to the invention adapted to fix a clamp according to Figs. 14 and 15; and
Fig. 17	is a top view of a container according to Fig. 16 and a clamp according to Figs. 14 and 15 fixed in said container.

[0049] Fig. 1a to 1e depict various modifications of an arc-like clamp device 1 according to the invention. Clamp device 1 exhibits two symmetrical axis, and is made from a flexible resilient material such as a thermoplastic polymer or an impact modified thermoplastic polymer. It comprises in general a top , intermediate and bottom part 4, 6 and 8, respectively. Top part 4 connects opposite clamp halves 10 and 12 which can be squeezed towards each other (as indicated by the arrows). Usually, intermediate part 6 is most suited to be used to squeeze both clamp halves 10 and 12 towards each other. The clamp according to Figs. 1a to 1e also comprises two opposite longitudinal rims 14 and

16 adjacent to the side edges of upper wall element 2. These side rims 14, 16 also provide additional flexible strength to the resilient clamp device 1. The clamp device 1 not only comprises longitudinal rims 14, 16, but also rim elements 18, 20, 22 and 24 on both lateral sides of clamp device 1. These rim elements are part of adjacent tooth-like elements or protrusions 26, 28, 30 and 32 being separated by essentially parallel indentations 34, 36 and 38, which together form fixation means 3. The indentations are designed as such that they can take up essentially parallel fixing elements of for example a container or a base plate. The upper edge of each tooth-like element 26, 28, 30 and 32 can comprise a notch 40, which is suited to be placed against corresponding fixing means, e.g. a protrusion or the edge of the strip, in a container. The clamp device according to Fig. 1 a is suited to be placed and detachably fixed in a container in an upright or vertical position, as depicted, as well as, when turned on one of its two side faces 42 and 44, into a horizontal orientation.

[0050] Figs. 1b, 1c and 1d show clamp devices 1, which comprise in addition to clamp device 1 of Fig. 1 at least one additional functional element. Clamp device 1 as in Fig. 1b exhibits two holes 46 and 48 in at least one of its longitudinal rims 14' and/or 16' which can serve as a holder, e.g., for pens, pencils or other tools when fixed in a horizontal position. Alternatively or in addition to these holes one ore more holes 50 can also be placed in the upper wall element 2 of clamp device 1, so that pens or pencils or the like can also be stored when clamp device 1 is vertically fixed, as shown in Fig. 1c.

[0051] In another embodiment the top part 4 of clamp device 1 contains a trench or slot 54, the depth of which can be varied. If, for example, the clamp device 1 is used as a fixation means in a CD-box, such a slot 54 is well suited to at least temporarily take up a CD box carrier, which facilitates the handling of CDs to a great extent, for example when changing individual CDs.

[0052] According to Fig. 1e the space 52 within the arc-like structure of clamp device 1 can be filled with a flexible material such as a rubber-like or foam material.

[0053] In Fig. 2 a clamp device 1' is shown similar to the one in Fig. 1 but without a notch at the lateral edges 18, 20, 22 and 24 at the bottom part 8 of the clamp device 1'.

[0054] Clamp devices as depicted in Figs. 1a to 1e and 2 can be fixedly placed, horizontally as well as vertically, in a container or box 56 as shown in Fig. 3 forming a container system 57 which is also according to the invention. Container 56 is equipped with a multitude of vertical fixation means 58, 60 which are aligned parallel to each other adjacent to the bottom part 70 of the container 56 inside the longitudinal walls 62, 64 of said container. The fixation means 58 and 60, which face each other on opposite sides, extend towards each other only to a certain extent still leaving enough space for a clamp device to be placed in between. Further, the container according to Fig. 3 comprises above the vertical fixation means 58 and 60 horizontal strips 66, 68 which is essentially aligned in parallel to the bottom part 70 of container 56. These strips 66 and 68 can be placed directly on top of the fixation means 58 and 60, respectively, and/or can be fixed to the longitudinal walls 62 and 64 of the container 56. Most preferred, the width of the strips 66 and 68 does not surpass the length of the vertical fixation means 58 and 60. Those parts of the vertical fixation means 58, 60 which are not covered by strips 66, 68 can be used to receive or grip, for example, a compact disc carrier box. As long as there are still slots 71 left without a CD-box a clamp devices 1 and 1' can be fixedly placed in these non-occupied slots 71, preferably adjacent to the terminal CD-box in order to prevent the CD-boxes in the container 56 from falling over. Also, with the aid of clamp devices 1, 1' container 56 can easily be subdivided into sections.

[0055] In Fig. 4 another container 56' according to the invention is shown. Instead of wall-like vertical fixation means several sticks 72, 74 are projecting inside the container 56'. In the present embodiment sticks 72, 74 are located on the longitudinal walls 62' and 64' in two rows which are both essentially parallel to the bottom edge of the longitudinal wall 62', 64'. Thus, there are two sticks 72, 74 above each other in a vertical line. Similar to the horizontal fixation means 58, 60 in Fig. 2, adjacent pairs of sticks 72, 74 may serve to receive or grip a CD-box.

[0056] Again, in order to prevent these CD-boxes from falling over as long as not all slots 71 of container 56' are completely filled a clamp device 1" as shown in Figs. 5a, 5b and 5c can be employed, either in a horizontally or in a vertically fixed position. Clamp devices 1" according to Figs. 5a and 5b essentially resemble clamp device 1 according to Figs. 1a to 1e with respect to their top and intermediate parts 4 and 6, respectively. The bottom parts 80 comprise a vertical wall element 82 with either one pair or two pairs of holes 84, each located on a vertical line.

[0057] From Fig. 6 the way a clamp device according to the invention can be placed inside a container according to the invention can be derived.

[0058] Fig. 7 shows a clamp device 1 "' in a container 56 in a sectional view from the lateral side of a container 56. The clamp device 1 "' is in its horizontal orientation. In Fig. 8 the arrangement of Fig. 7 is shown from above. Clamp device 1"' is fixed in a horizontal orientation. The clamp force is preferably as such that the opposite bottom parts would be further apart if not constrained within the container 56. The outer tooth-like element or protrusion 26' lies above the plane of strips 66, 68, all other tooth-like elements are beneath said strip.

[0059] Different from Fig. 7, in Fig. 9 clamp device 1"' is in vertical orientation. The tooth-like elements or protrusions are beneath strips 66, 68, thereby engaging two vertical fixation means 58, 60 adjacent to both longitudinal side walls of the container. Fig. 10 is a top view of the arrangement of Fig. 9, showing the mode of action of the clamp 1"' according

to the invention.

[0060] Fig. 11 depicts a sectional side view from the lateral side of the container, the arrangement comprising a clamp device as shown in Fig. 1a. The design of clamp device 1 according to Fig. 11 secures a very tight and reliable fixation, especially in its horizontal orientation, when notch 40 takes up the edge of the strips 66, 68.

[0061] In Fig. 12a another embodiment of the clamp device 1"" according to the invention is shown which comprises at the bottom part of its opposite clamp halves 10, 12 a vertical wall element with at least two sticks or pins 86. Figs. 12b and 12c depict two variants of said clamp device 1 "" of Fig. 12 when turned around its vertical axis for about 90°. Sticks 86 are either arranged as a pair of sticks on a vertical line or as two pairs of sticks each arranged on a separate vertical line. A clamp device 1"" according to this embodiment can be used as a fixture in a box 56" the longitudinal side walls of which comprise, for example, two rows of holes 84 which correspond in distance to the pins of clamp device 1"", as shown in Fig. 13. Also, this arrangement allows for clamp device 1"" to be fixedly arranged in a horizontal and in a vertical position. From Fig. 13, also a second row of fixation means, i.e. holes 84 in the present embodiment, in the intermediate part of the side wall can be derived, allowing for clamp devices 1 "" to be located/fixed at a greater distance from the bottom plate of the container, in particular in a horizontal orientation when flat items are to be kept from falling over. A vertical placement in these upper fixation means is preferred if the clamp device should serve as a handle.

[0062] Fig. 14 represents a side view of another embodiment of a clamp device 1"" of the invention. Again, the clamp device has an arc-like structure which resembles in its top and intermediate parts 4 and 6 those clamp devices as described above. Also, the clamp arms are provided in their bottom parts 88 with a vertical wall element 90. These wall elements comprise a stick 92 which projects from the surface of these wall elements 90, having a square-like or rectangular cross section, as can be seen from Fig. 15. As with the clamp of Fig. 1d clamp device 1 "" can also be provided with a slot 54. Clamp devices 1"" are well suited to be pressed into boxes 56"' the longitudinal side walls 62', 64' of which each comprise a row of holes 94 adjacent to the bottom part of the longitudinal side walls 62', 64' having a shape which corresponds to the cross section of sticks 92. These holes 94 are preferably arranged in such a way that clamp device 1"" can be fixedly placed in box 56"' in a horizontal as well as in a vertical orientation, Fig. 16. Also, the fixation means of the container 56"' can be arranged at, for example, two different levels at the side walls 62', 64'. In Fig. 17 a box 56"' can be seen in which clamp device 1"" has been placed in a vertical orientation. Stick 92 can also have any other cross section as long as this allows clamp device 1 "" to be placed in a fixed orientation, especially in a horizontal and/or vertical orientation. Suitable cross sections also comprise polygonal forms different from a square or a rectangle, such as a triangle, or a pentagonal or a hexagonal form.

[0063] Although modifications and changes may be suggested by those skilled in the art, it is the intention of the applicant to embody within the patent warranted hereon all changes and modifications as reasonably and probably come within the scope of this contribution to the art. The features of the present invention which are believed to be novel are set forth in detail in the appended claims. The features disclosed in the description, the Figures as well as the claims could be essential alone or in every combination for the realization of the invention in its different embodiments.

REFERENCE LIST

[0064]

1, 1', 1", 1"', 1"",1"""	clamp device
2	upper wall element of clamp device 1
3	fixation means
4	top part of clamp 1
6	intermediate part of clamp 1
8	bottom part of claim 1
10, 12	clamp halves
14, 14', 16, 16'	longitudinal rims
18, 20, 22, 24	lateral rim elements
26, 26' 28, 30, 32	tooth-like elements
34, 36, 38	indentations
40	notch
42, 44	side face of clamp
46, 48	holes in the rim of clam device 1
50	holes in the wall element 2
52	space in arc-like structure
54	trench

56, 56', 56", 56"'	container
57	container system
58, 60	vertical fixation means
62, 62', 64, 64'	longitudinal side walls of container
66, 68	horizontal strips
70	bottom part of container
71, 71'	slot
72, 74	sticks, pins
80	bottom part of clamp 1"
82	vertical wall element
84	holes
86	pins of clamp
88	bottom part of clamp device 1 """
90	vertical wall element
92	stick, pin
94	hole, groove like depression

Claims

1. Flexible resilient clamp device which is adapted to be detachably fixable in and/or to a container, comprising at least two essentially opposite clamp halves (10, 12) which are in particular at least interconnected at the top part (4) of the clamp device (1, 1', 1", 1"', 1"", 1"""), which are adapted to be moved, at least in one part, towards each other, and which exert an outward pressure when compressed, said clamp device further comprising at least in one segment, in particular in the bottom part (8) towards one end, of at least one clamp half (10, 12) at least one fixation means adapted to hold the clamp in a fixed position, in particular in a vertical and/or horizontal position, in and/or on a container, in particular by engaging.

2. Flexible resilient clamp device according to claim 1, wherein a fixation means is selected from the group consisting of a notch, indentation, protrusion, groove, tongue- or tooth-like element, hole, and pin, adapted to be fixed to a container.

3. Flexible resilient clamp device according to claim 1 or 2, wherein the width of the clamp device (1, 1', 1", 1 "', 1"", 1 """) is smaller than the distance between opposite clamp halves (10, 12) adjacent to their fixation means.

4. Flexible resilient clamp device according to one of the preceding claims, wherein the opposite clamp halves (10, 12) are part of an arc-like structure, said opposite clamp halves adjacent to the bottom part (8) segment of the clamp device being further apart than intermediate (6) and/or top (4) parts of said clamp halves (10,12).

5. Flexible resilient clamp device according to one of the preceding claims, having opposite side faces (42, 44) which confine the width of the clamp device (1, 1', 1", 1"', 1"". 1""").

6. Flexible resilient clamp device according to one of the preceding claims, wherein the space between opposite clamp halves (10, 12) is partially or completely filled with an elastic and/or elastomeric and/or foam material and/or a spring.

7. Flexible resilient clamp device according to one of the preceding claims, wherein at least one side face (40, 42) of at least one clamp half (10, 12) comprises, at least partially, a rim or a wall element (14, 16), in particular adjacent to the upper wall (2) of the clamp.

8. Flexible resilient clamp device according to claim 7, wherein at least one portion of the rim and/or wall element (14, 16) and/or upper wall (2) of at least one clamp half (10, 12) comprises at least one hole and/or depression (46, 48, 50) adapted to take up pencils, scissors and/or glue sticks or the like.

9. Flexible resilient clamp device according to one of the preceding claims,

essentially consisting of metal, plastics and/or wood.

10. Flexible resilient clamp device according to one of the preceding claims, wherein at least one clamp half (10, 12) is extendible.

11. Flexible resilient clamp device according to one of the preceding claims, wherein the upper part (4) of the clamp (1, 1', 1", 1"', 1"", 1""'), in particular adjacent to where the clamp halves (10, 12) are interconnected, comprises at least one handle or is formed as a handle.

12. Flexible resilient clamp device according to one of the preceding claims, wherein at least the upper part (4) of the clamp (1, 1', 1", 1 "', 1"", 1""') comprises at least one trench (54) adapted to take up flat items.

13. Flexible resilient clamp device (1, '1, 1"') according to one of the preceding claims, wherein the fixation means on at least one clamp half, in particular in the bottom part (8), comprises at least two, three, four or more adjacent, in particular identical or similar, protrusions or tooth-like elements in a row (26, 28, 30, 32) being separated by, in particular essentially parallel, indentations (34, 36, 38) adapted to take up, in particular wall-like, fixing elements, in particular of a container, said protrusions having, in particular vertical, rim elements (18, 20, 22, 24), in particular on the lateral side of the clamp half.

14. Flexible resilient clamp device (1) according to claim 13, wherein the upper edge of in particular each protrusion (26, 28, 30, 32) comprises a notch (40), each notch being in particular aligned in the same direction and in essentially the same height.

15. Flexible resilient clamp device (1") according to one of claims 1 to 12, wherein the fixation means on at least one clamp half, in particular in the bottom part (8), comprises an essentially vertical outer wall (82) having at least one, in particular at least two, in particular essentially circular, holes (84) or groove-like depression, in particular arranged in a pattern adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

16. Flexible resilient clamp device according to one of claims 1 to 12, wherein the fixation means on at least one clamp half, in particular in the bottom part, comprises an essentially vertical outer wall having at least one hole or grove-like depression of irregular shape or of regular shape, which is not circular, in particular of a polygonal shape, adapted to take up pins or protrusions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

17. Flexible resilient clamp device (1"") according to one of claims 1 to 12, wherein the fixation means on at least one clamp half, in particular in the bottom part (8), comprises an, in particular essentially vertical, outer wall having at least one, in particular two pins (86), the cross section of which is in particular essentially circular in shape, projecting, in particular horizontally, from the wall, in particular arranged in a pattern adapted to be inserted into holes or groove-like depressions and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

18. Flexible resilient clamp device (1""') according to one of claims 1 to 12, wherein the fixation means on at least one clamp half, in particular in the bottom part (8), comprises an, in particular essentially vertical, outer wall (90) having at least one pin or stick (92), the cross section of which is in particular of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, said pin (92) projecting, in particular horizontally, from the vertical wall, adapted to be inserted into a hole or a groove-like depression and to be detachably fastened in at least two fixed orientations, in particular in a vertical and a horizontal, in a container.

19. A container comprising a bottom plate, at least two, in particular longitudinal and/or essentially vertical and/or essentially parallel, side wall, on opposing sides, and at least one fixation means (58, 60) on each opposing side wall, in particular on and/or adjacent to the bottom plate, of the container (56, 56', 56", 56"'), which are adapted to engage a clamp device having essentially complementary fixation means in or on the container in at least one essentially fixed position.

20. The container (56, 56', 56", 56"') according to claim 19, wherein

the fixation means are located, in particular in a row, which is in particular essentially parallel to the bottom plate, at opposing side walls adjacent to the bottom plate and/or in an intermediate part and/or in the top part of both opposing side walls.

21. Container (56) according to claim 19 or 20, comprising
a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls (62, 64) being connected to said bottom plate; a sequence of essentially vertical, spaced apart wall elements (58, 60), which in particular have essentially the same height and/or length, and which are essentially aligned in parallel to each other in a row, adjacent to each side wall (62, 64), wherein vertical wall elements (58, 60) on opposing sides are aligned on essentially parallel lines thereby being adapted to hold flat items; at least one, in particular essentially horizontal, strip (66, 68) above each sequence of vertical wall elements (58, 60) which preferably is connected with at least one vertical wall element (58, 60) and/or with the adjacent side wall (62, 64), wherein the width of the strip (66, 68) is smaller than the length of the vertical wall elements (58, 60).

22. Container (56') according to claim 19 or 20, comprising
a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls (62, 64) being connected to said bottom plate; a sequence of pins (72, 74), the cross section of which is in particular essentially circular in shape, projecting from in particular the bottom part of each side wall (62, 64) towards each other in the form of at least two rows of pins (72, 74), aligned above each other, wherein at least two pins are located on an essentially vertical line, and wherein the distance between these vertical lines preferably is essentially identical.

23. Container according to claim 19 or 20, comprising
a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; a sequence of pins the cross section of which is of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, projecting from, in particular the bottom part, of each side wall towards each other in the form of at least one row of pins, wherein opposing pins on opposing side walls are in particular located on essentially parallel lines, and wherein the distance between these lines preferably is essentially identical.

24. Container (56") according to claim 19 or 20, comprising
a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls (62, 64) being connected to said bottom plate; a sequence of holes or groove-like depressions (84) in each opposing side wall, the cross section of which is in particular essentially circular in shape, in particular aligned adjacent to the bottom part of each side wall (62, 64) and/or within essentially identical distance to the bottom plate, wherein opposing holes or depressions on opposing side walls (62, 64) are at least located in particular on essentially parallel lines, and wherein the distance between these parallel lines preferably is essentially identical.

25. Container (56"') according to claim 19 or 20, comprising
a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls (62, 64) being connected to said bottom plate; a sequence of holes or groove-like depressions in each opposing side wall, the cross section of which is of irregular shape or regular shape, which is not essentially circular, in particular of polygonal shape, in particular aligned adjacent to the bottom part of each side wall (62, 64) and/or within essentially identical distance to the bottom plate, wherein opposing holes or depressions on opposing side walls (62, 64) are at least located in particular on essentially parallel lines, and wherein the distance between these parallel lines preferably is essentially identical.

26. Container system, in particular for the storage of flat items like CDs and/or DVDs, comprising at least one detachable flexible resilient clamp device according to one of claims 1 to 12; and a container which comprises a bottom plate, two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate, on each opposing side on and/or adjacent to the bottom plate of the container at least one fixation means which is essentially complementary to the fixation means of the clamp device so that when both complementary fixation means are engaged the clamp device is in an essentially fixed position, in particular fixed in all directions.

27. Container system according to claim 26, wherein
the complementary fixation means allow for a fixation of the clamp device (1, 1', 1", 1"', 1"", 1""') in at least two distinct orientations, in particular in a horizontal and a vertical orientation, in a container (56, 56', 56", 56"').

28. Container system according to claim 26 or 27, comprising

at least one resilient flexible clamp device according to claim 13 or 14 and a container according to claim 21, or at least one resilient flexible clamp device according to claim 15 and a container according to claim 22, or at least one resilient flexible clamp device according to claim 16 and a container according to claim 23, or at least one resilient flexible clamp device according to claim 17 and a container according to claim 24, or a at least one resilient flexible clamp device according to claim 18 and a container according to claim 25.

29. Container system according to claim 26 or 27, comprising
at least one resilient flexible clamp device according to claim 13 or 14 and a container which comprises a bottom plate; two opposing, in particular longitudinal and/or essentially vertical, side walls being connected to said bottom plate; and a sequence of essentially vertical, spaced apart wall elements, which in particular have essentially the same height and/or length, and which are essentially aligned in parallel to each other in a row, adjacent to each side wall, wherein vertical wall elements on opposing sides are aligned on essentially parallel lines thereby being adapted to hold flat items.

30. Container system according to one of claims 26 to 29, wherein
the container (56, 56', 56", 56"') is a tool box, a medicine box, a cosmetic box, a media box, in particular a book, CD- and/or DVD-box, or a garden box.

31. Use of a container system (57) according to one of claims 26 to 29
as a tool box, a medicine box, a cosmetic box, a media box, in particular a book, CD- and/or DVD-box, or a garden box.

32. Use of a flexible resilient clamp (1, 1', 1", 1"', 1"", 1""') according to one of claims 1 to 18 as a fixation means and/or as a movable divider wall in a container.

33. Use of a container system (57) according to one of claims 26 to 29 for the storage of in particular flat items such as books, photographs, CDs, DVDs, paper, cards, envelopes.

Fig. 1a

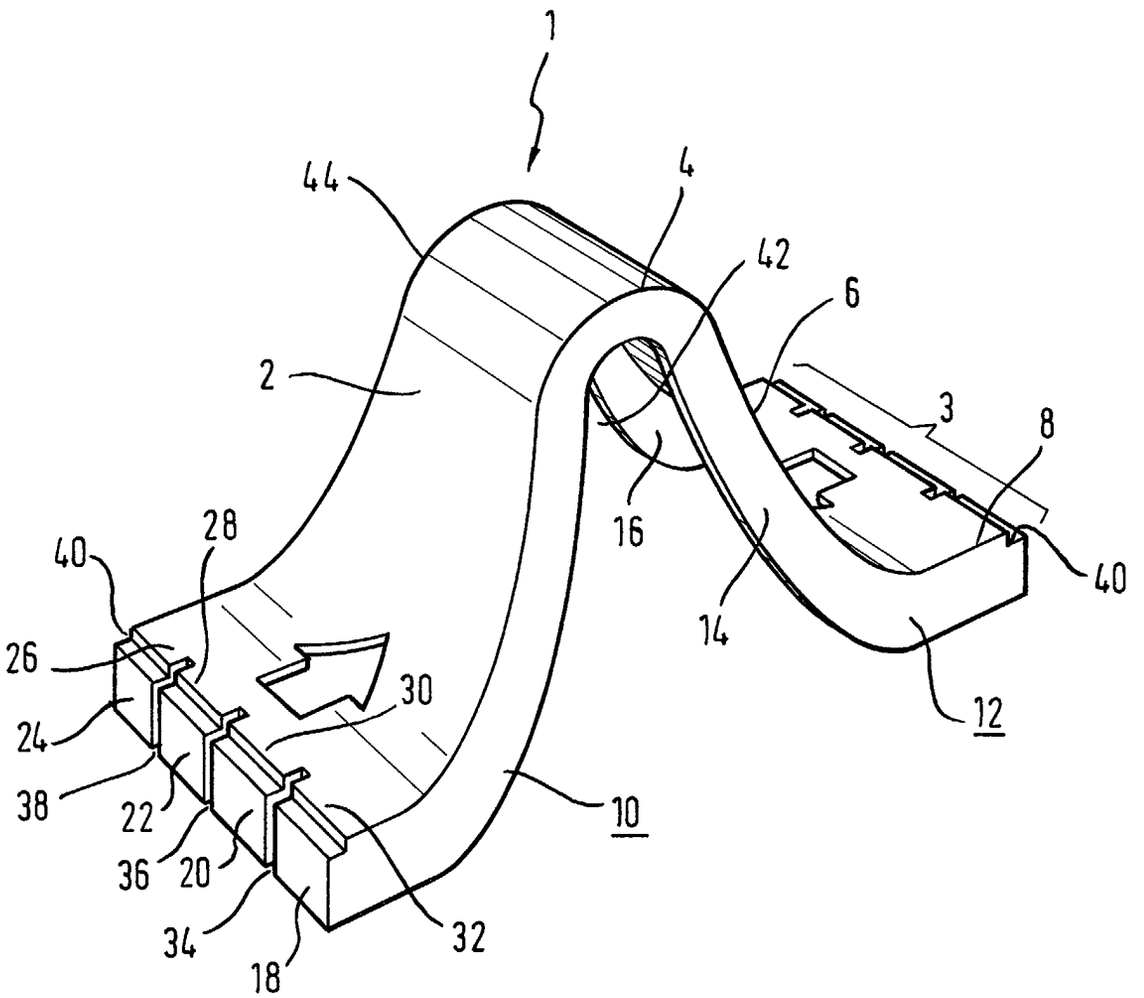


Fig. 1b

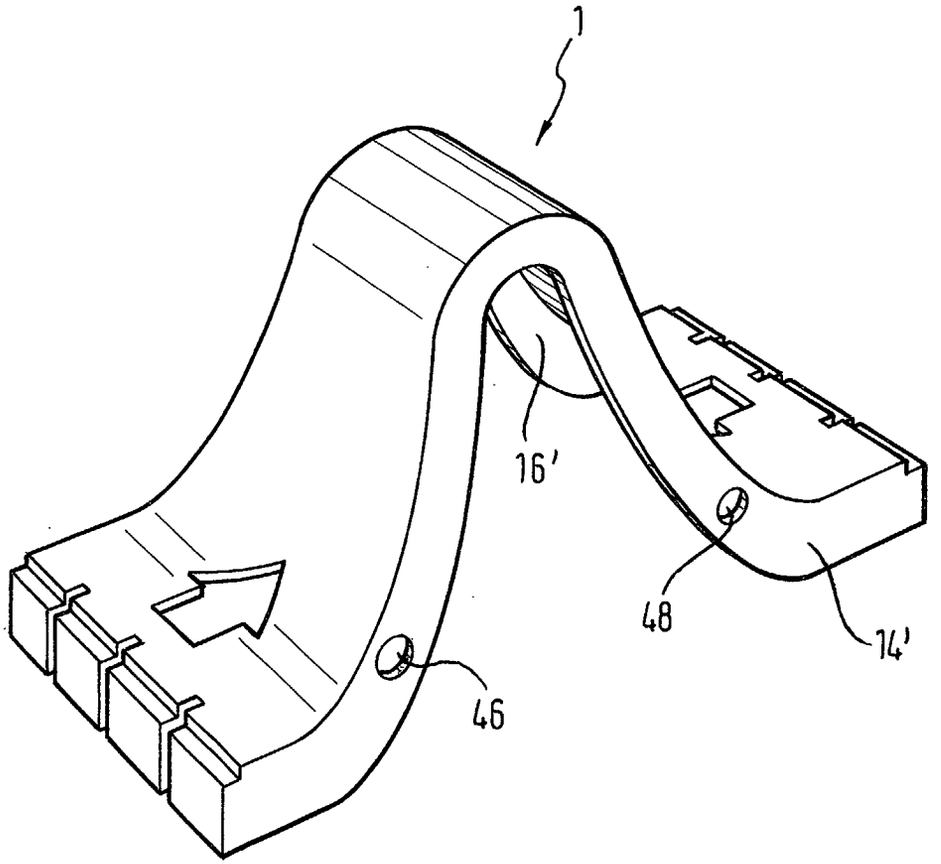


Fig. 1c

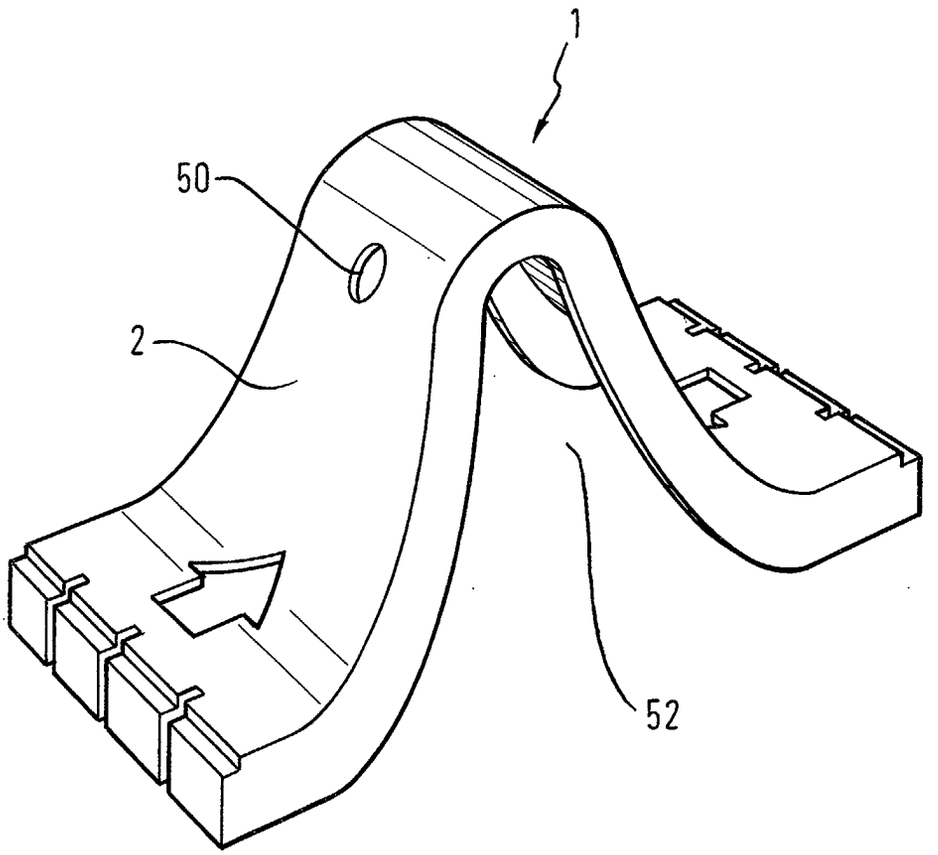


Fig. 1d

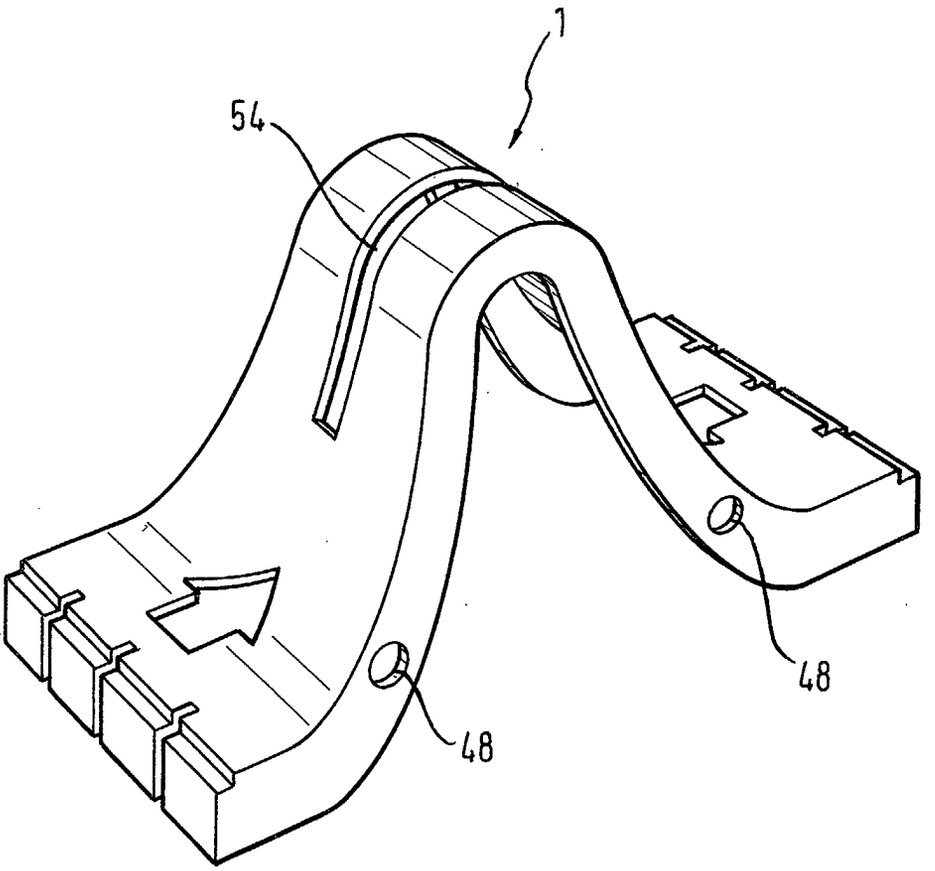


Fig. 1e

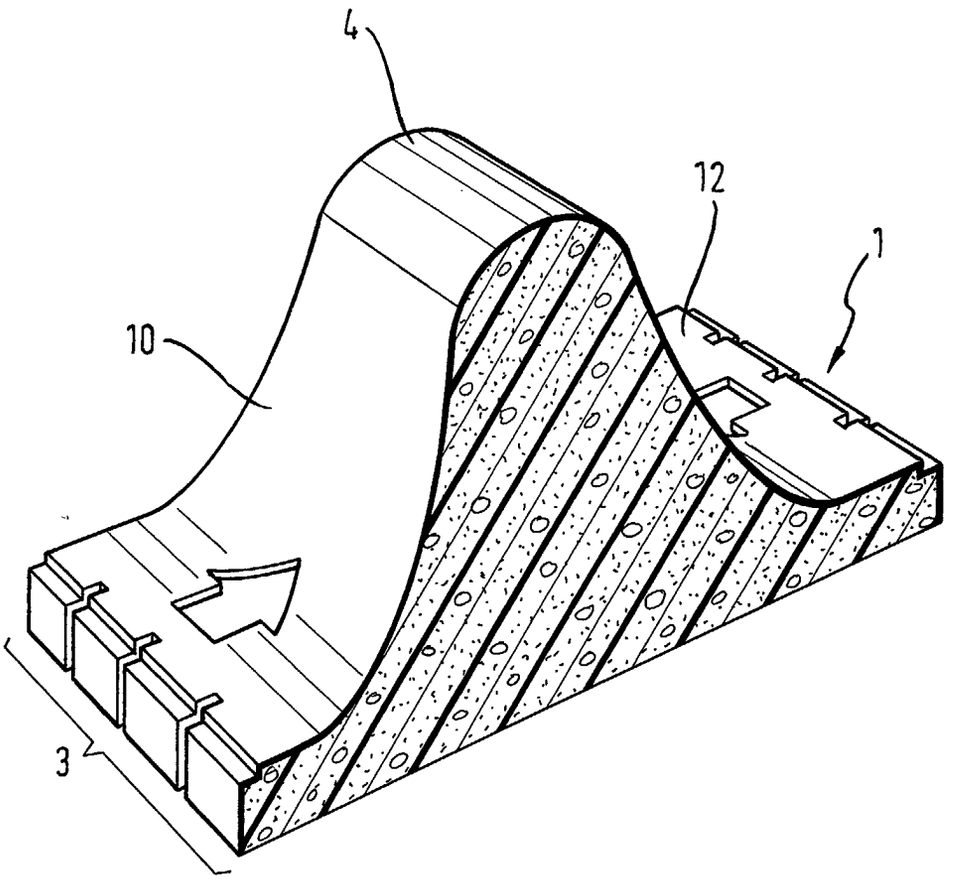


Fig. 2

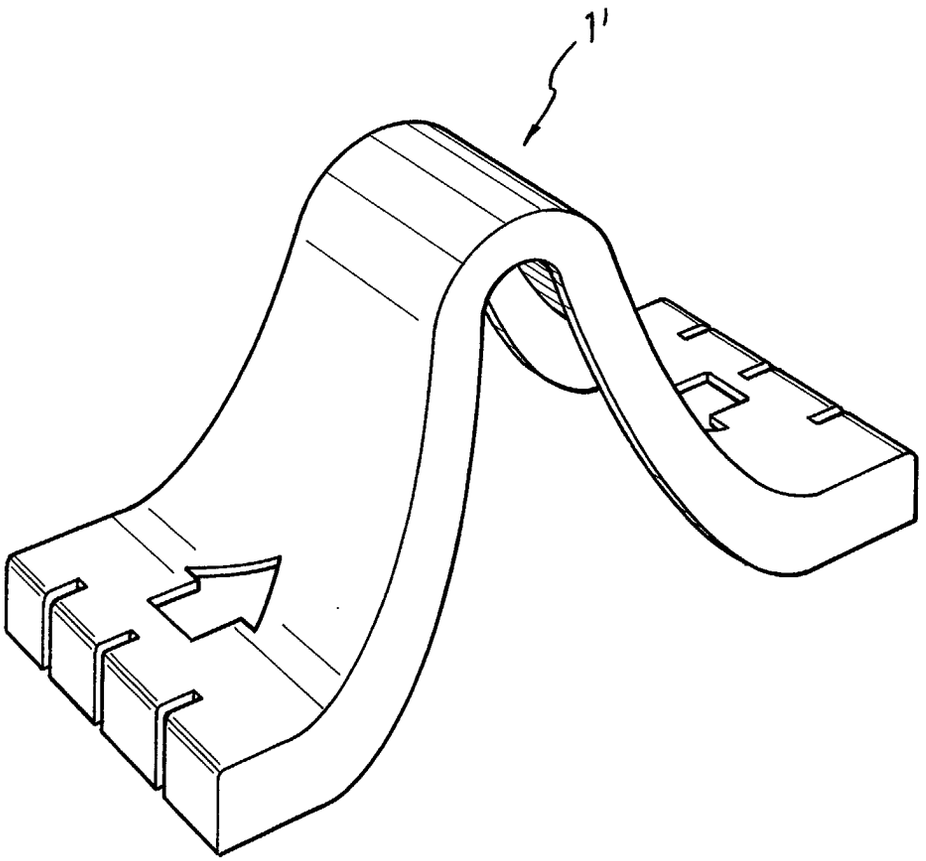


Fig. 3

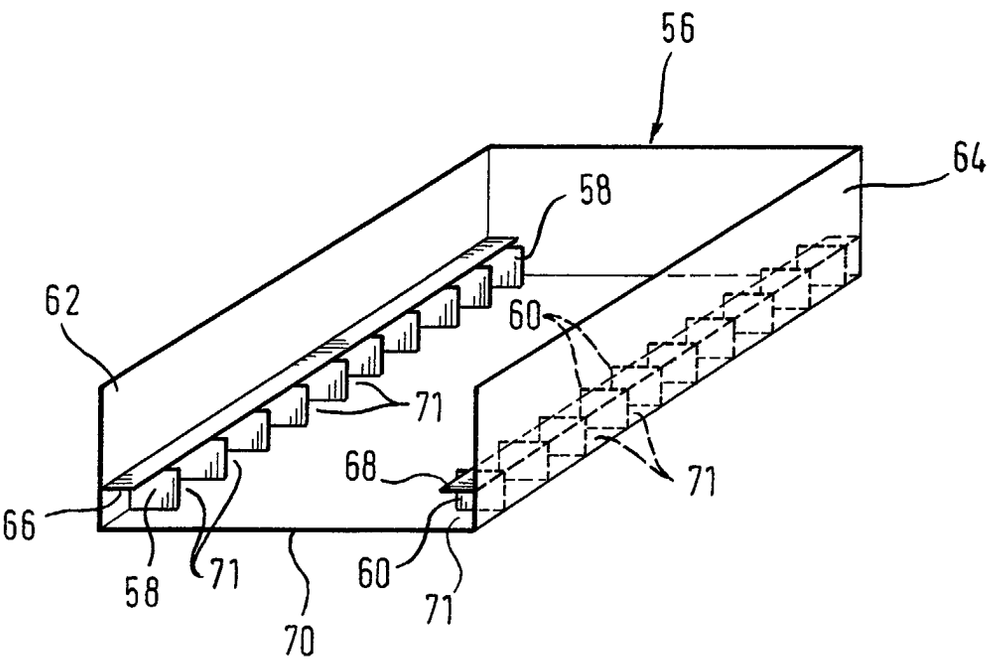


Fig. 4

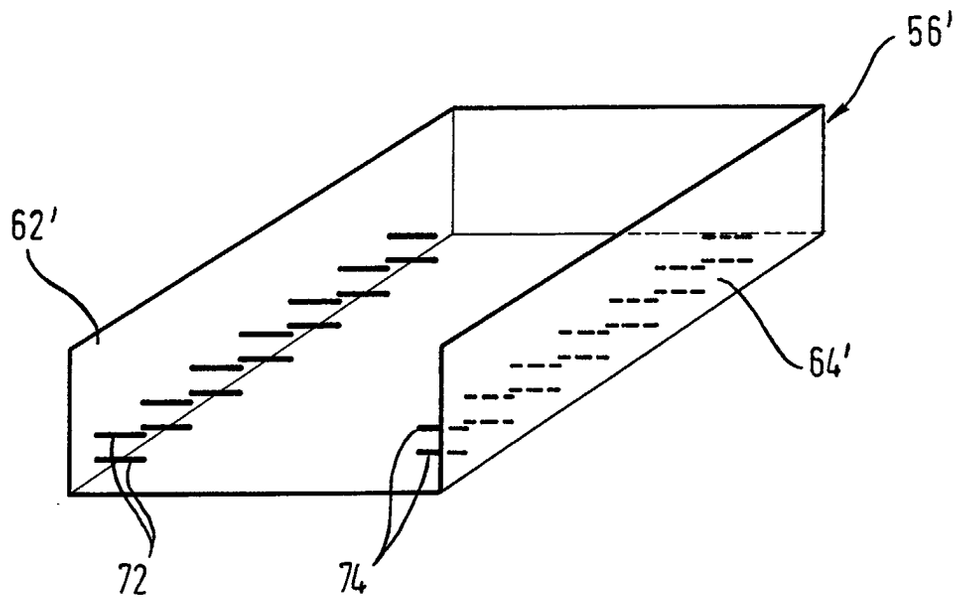


Fig. 5

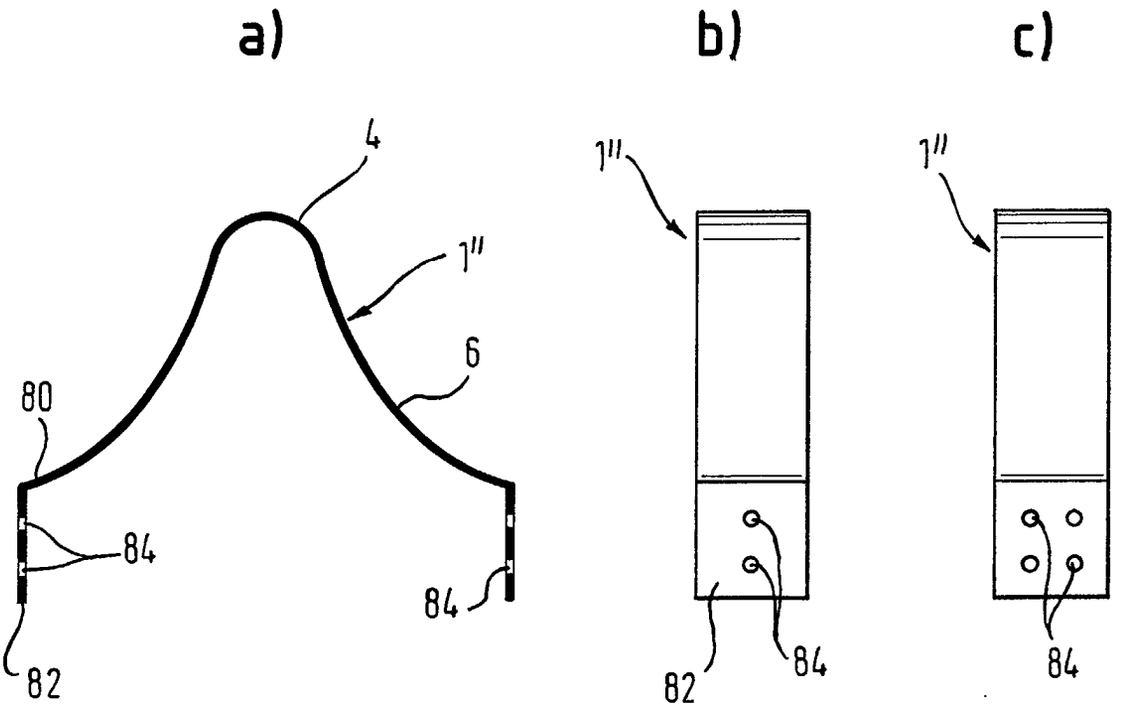


Fig. 6

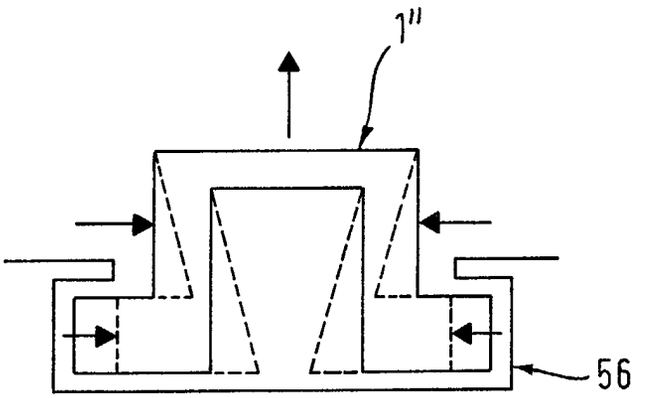


Fig. 7

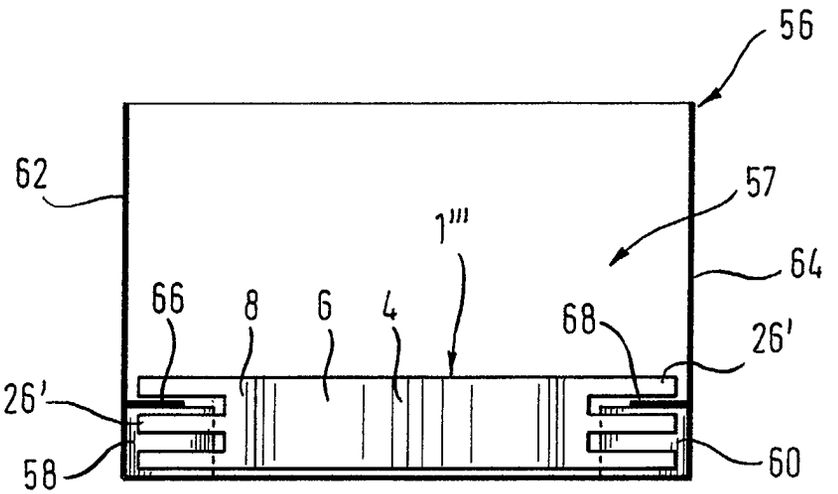


Fig. 8

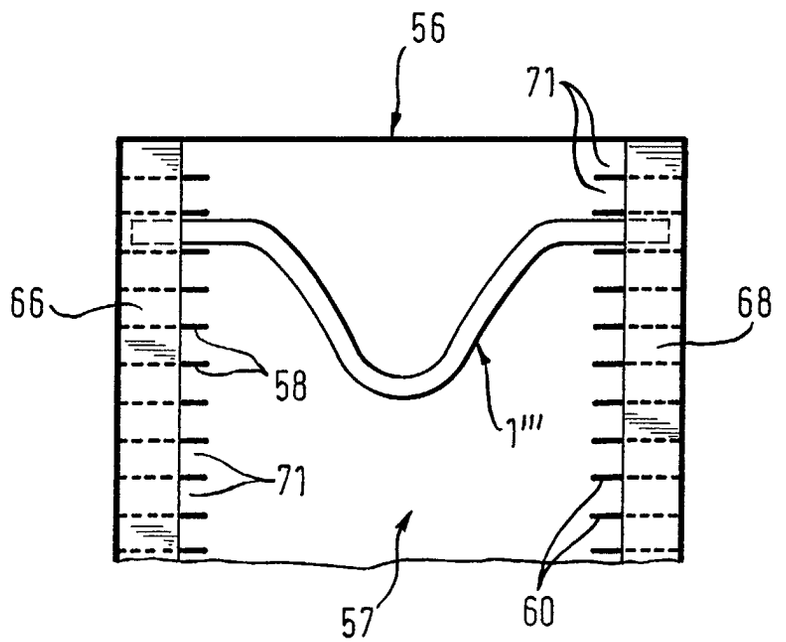


Fig. 9

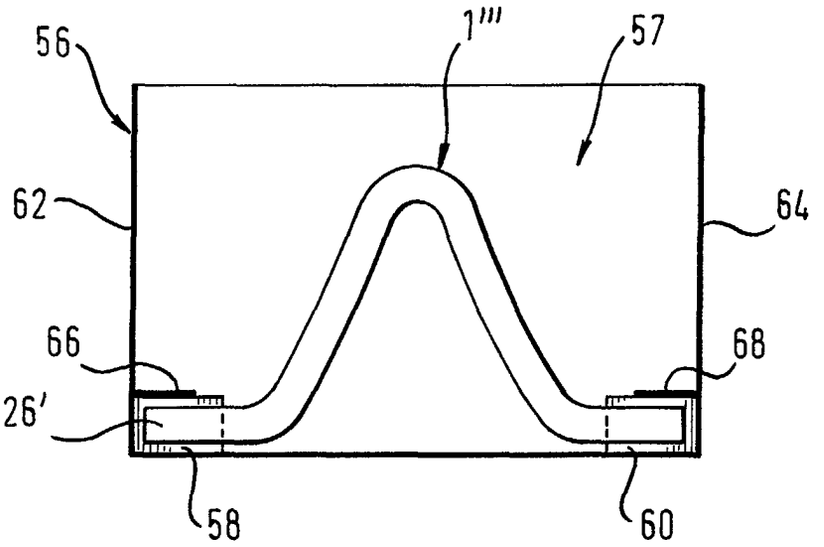


Fig. 10

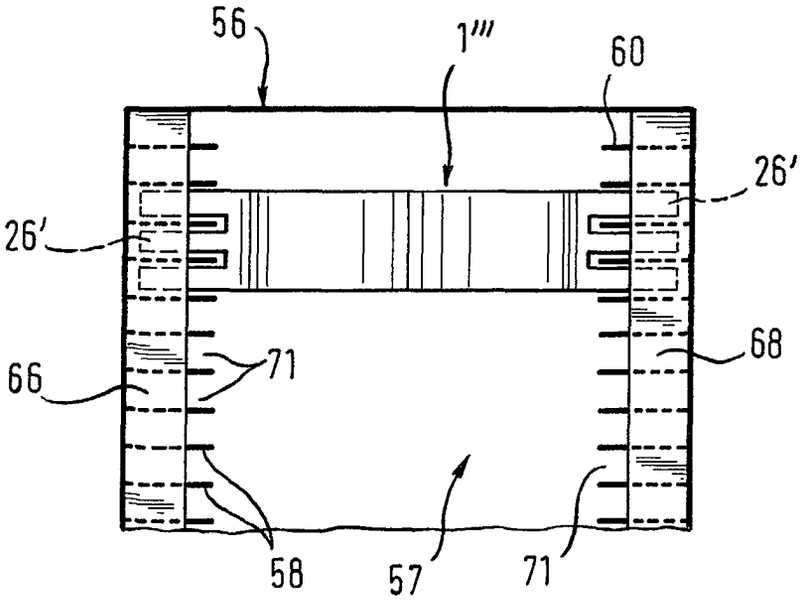


Fig. 11

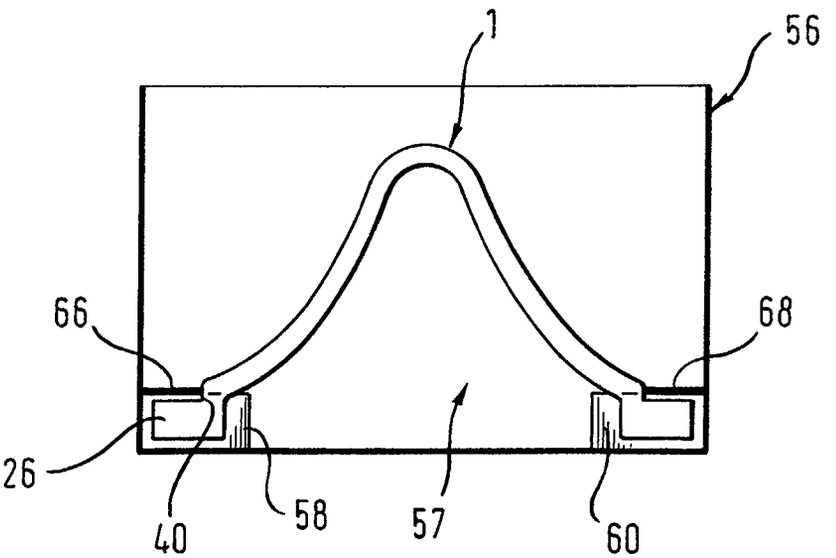


Fig. 12

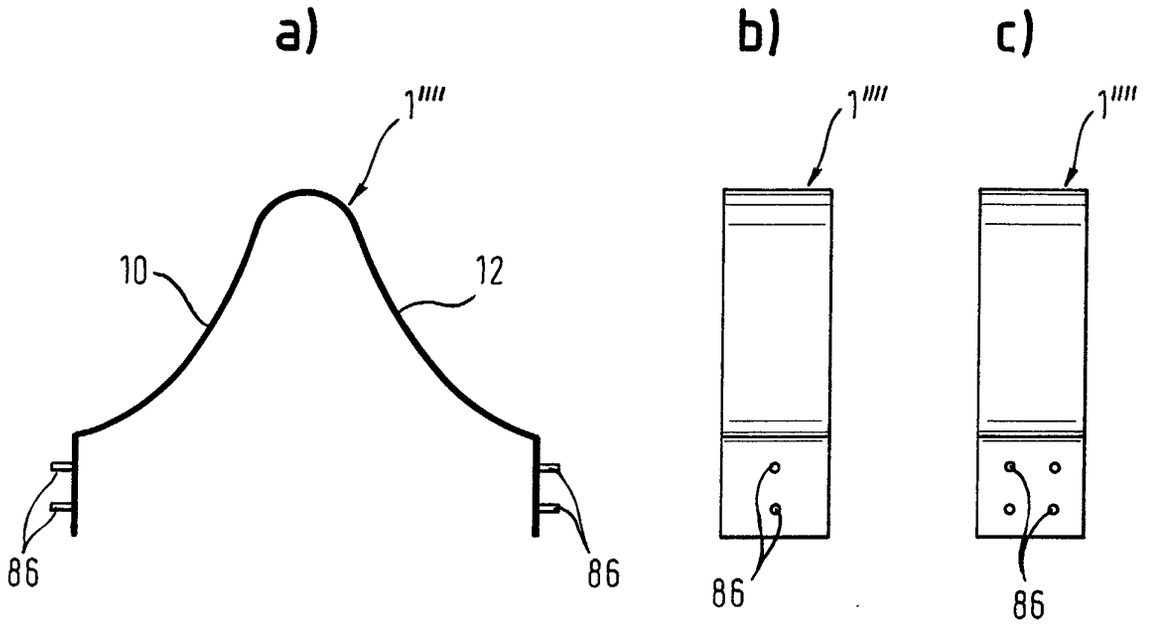


Fig. 13

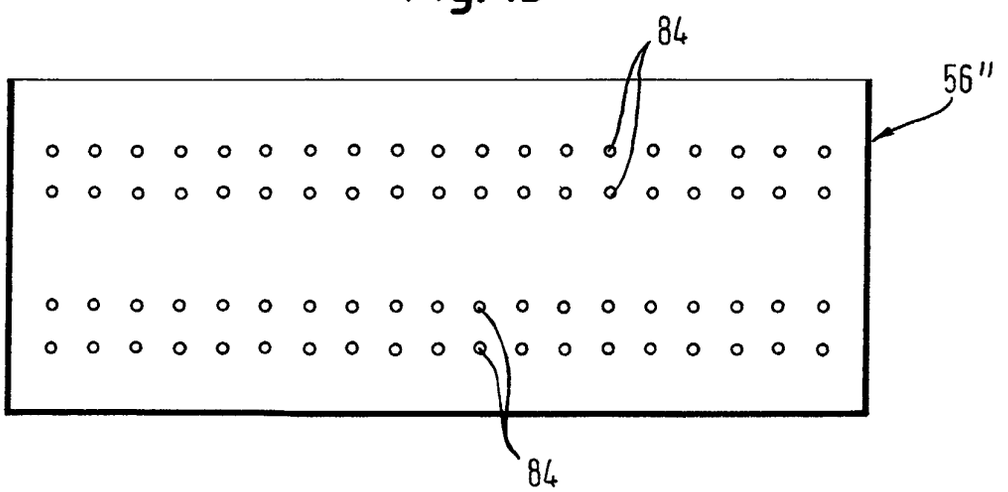


Fig. 14

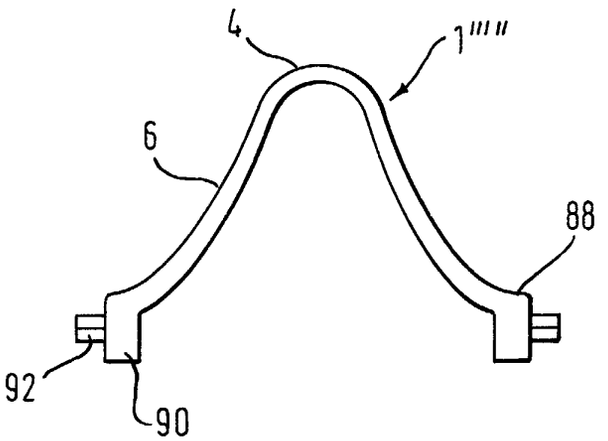


Fig. 15

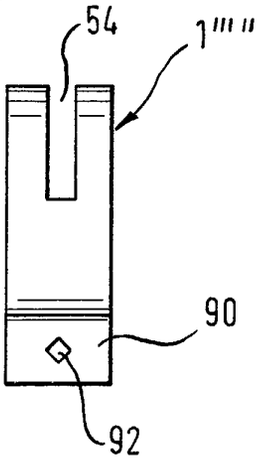


Fig. 16

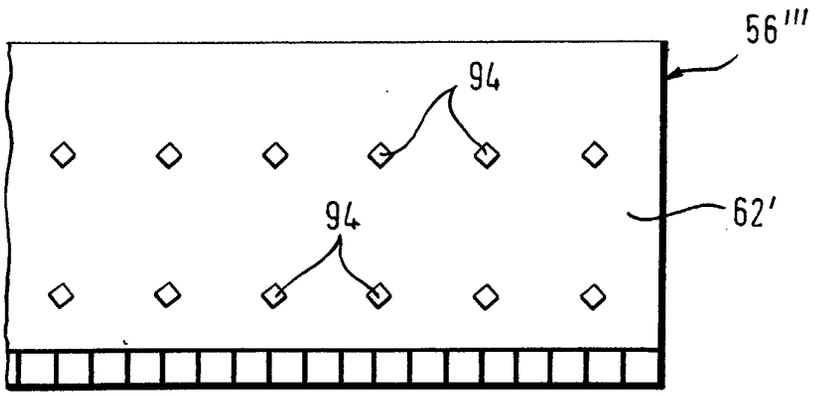
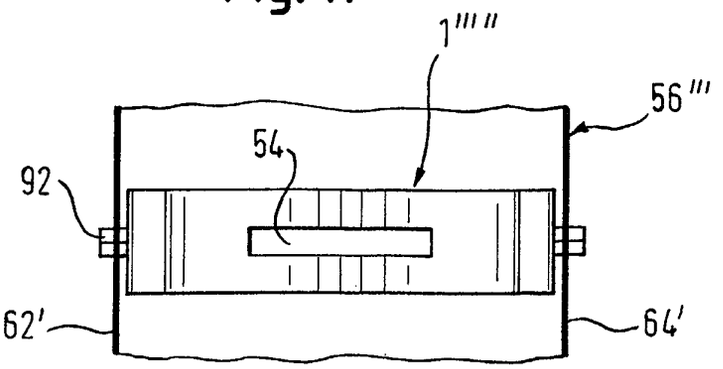


Fig. 17



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 01 5710

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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B42F
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	10 January 2003	Bevilacqua, V

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 01 5710

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82