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E-48300 Gernica (ES)(54) **PROTECTOR FOR REMOTE CONTROLS.**

(57) A protector (1) for remote controls comprises four L-shaped corner parts (4) having an elliptic cross section and which are coupled with two other pairs of longitudinal parts (2, 3) of corresponding cross section, and wherein they may slide in order to open and close the protector. The corner parts (4) are encompassed by an elastic part (5) passing through a space defined between the corner parts (4) and the longitudinal parts (2, 3) of the invention. The protector of the invention is a rigid and resistant device which is easy to use.

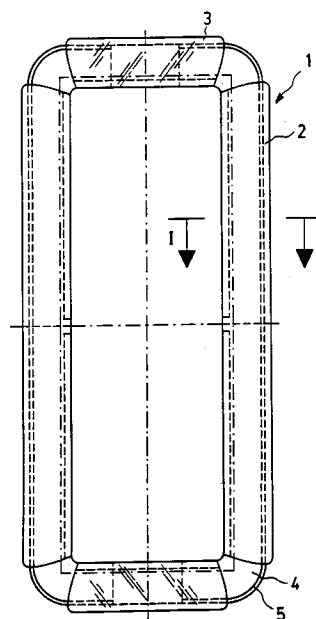


Fig.: 1

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TECHNICAL FIELD OF THE INVENTION

The present invention relates to a protection device for hand-held remote controls, mainly control units for electronic equipment such as television receivers, video recorders, HI-FI.

PRIOR ART

Protection devices are known within this technical field of hand-held remote control which comprise a single body, such as the described in EP-527712 (09.08.91). This is a rubber body, and features an internal housing space, into which different controls of varying sizes can be inserted thanks to the flexibility of the protector sleeve body where it adapts to the shape of the remote control casing. The protecting function of this device is achieved solely through the flexibility of the material from which it is made, but this brings problems that arise from ageing and consequent perishing and cracking. Moreover, when the material is stretched to envelop larger sized remote controls, the cross section of the body become thinner, and so its effectiveness as a bumper is jeopardized.

Another kind of protector described in WO 92/22918 combines the flexibility of the material with the possibility of its accommodating differing sizes of remote control, inasmuch that the protector frame is expandable in all three axes. Such extension is achieved by means of some special parts which are placed between the four half-shells that comprise the protection case. All the components in this protector are of a highly complicated configuration, and this jeopardizes the strength of the protector as a whole. Furthermore, the material here lacks toughness.

DISCLOSURE OF THE INVENTION

Is the object of the invention a shock-proof protector for hand-held remote controls. It is made in the form of a frame which surround the remote control, and includes an elastic part which allows it to expand and thus accommodate various sizes of remote control, plus an inside flexible part to enable varying thicknesses of hand-held remote controls to be accommodated, through its surface clinging to the edge thereof. Stiff parts comprising the outside layer spread the impact force, while the flexible inside layer in contact with the remote control absorb it.

The protector is extremely tough and life-long because its flexible members are guarded against outside impacts and rubbing through their location.

To achieve these objectives, the protector provided by the invention is generally prismatic in its general shape, and comprises:

- four identical "L" shaped stiff corner gussets, which make up the protector surrounding frame,
- four straight span members, of which one is located along each side of the protector,
- one close elastic strip, which longitudinally surrounds the four corner gussets,
- four flexible "L" shaped members located within the corner gusset interior hollows, and secured thereto.

The four straight span members are telescopically coupled with the corner gussets, and these are linked together by the elastic strip which is in turn affixed to the straight span members by being stretched over them. The corner gusset interior hollow is occupied by the "L" shaped flexible members which are made of rubber or cellular polyethylene. Said flexible members have a "U" shaped cross section, wherein their outside corners are chamfered to fit the hollow in the corner gussets.

A rectangular section groove runs along the centre of the whole outside length of the corner gussets, and this snugly accommodates the elastic strip, whose cross section, being basically rectangular, fits into said groove.

Each arm on the "L" shaped corner gussets is different in length from the other. The longer arm on each piece lies lengthwise, and the shorter one lies crosswise with respect to the oblong shape of the protector. Their cross section is in the shape of a "U" having an elliptical contour, where the outer surface of its base and arms are convex towards the outside of the protector. The hollow in this section has a straight bottom and sides, being chamfered the two corners.

At the straight portions of the corner gusset arms, said cross section have a sliding recess on the outside of their ends, while the rounded portion of the "L" corner gusset is not provided with this recess. The shorter arm on each corner gusset is provided with a lengthwise opening which form the shorter sides of the rectangular protector, from where the signals are sent from the control. The ends of the corner gussets are chamfered to facilitate the telescopic insertion into the straight span members.

The four straight span members are two pairs of identical members, all having the same cross section, although differing in length each pair. The members placed upon the greater sides of the protector are longer than those located upon its shorter sides. The cross section of the span members are contoured by an imaginary ellipse, and take the form of a "U", the ends of whose sides are turned inwards to accommodate in said sliding recesses of corner gussets. The insides of such turned inwards ends have guide-slots that termi-

nate in stops to prevent corner gussets from coming out.

Each straight span member is provided with a through hole in the middle, to be engaged with a securing pin belonging to the elastic strip.

The length span members are opaque, whilst the width span members are transparent or translucent, because they form the shorter sides of the protector, whence the hand held remote control signals are sent out.

The outside lengthwise groove on the four corner gussets is occupied by the elastic strip, which is at the same time in contact with the inside of the four straight span members, and whose cross section is a rectangle where one of the longer sides is convex and outwardly curved. This strip is continuous and closed, and its plan view is in the form of an oblong rim. This elastic strip is provided with four of said protruding pins, each one being located in the middle of its outside faces. Said pins are cylindrical in shape, and have an end beaded, being engaged inside said through holes at the middle of straight span members where they are secured thanks to the beaded ends.

Flexible "L" members have a "U" shaped cross section, the outside corners of which are chamfered to fit into corner gusset hollows. Like these latter, flexible "L" members arms also are different in length, the shorter ones being arranged with lengthwise openings to allow control signals to be sent out. The functions of these flexible members is to hold the sides of the hand held remote control that it is intended to protect, and absorb impacts which are distributed by the outside corner gussets.

To fit the protector, it is merely necessary to insert the remote control unit into it after pulling on the corner gussets to separate them guided by the straight span members. The remote control unit sides are held into the flexible members to prevent them from moving so that once thus positioned, corner gussets are once again closed, and the remote control is secured in place surrounded by the four flexible members.

DESCRIPTION OF THE DRAWINGS

- Figures 1, 2 and 3 are different views of a embodiment of the protector object of the invention, shown in the normal or retracted condition.
- Figure 4 is a cross section on I-I in Figure 1.
- Figures 5, 6 and 7 are different views of the protector, in the expanded condition.
- Figure 8 is a cross section on II-II in Figure 5.
- Figures 9 to 12 show the corner gussets.
- Figure 13 is a cross section on III-III in Figure 9.

- Figure 14 is a cross section on IV-IV in Figure 10.
- Figures 15, 16 and 17 are different views of the straight length span members, Figure 16 being a cross section on VII-VII in Figure 17.
- Figure 18 is a cross section on V-V in Figure 17.
- Figure 19 is a cross section on VI-VI in Figure 17.
- Figures 20, 21 and 22 are different views of straight width span members, Figure 21 being a cross section on VIII-VIII in Figure 20.
- Cross sections on IX-IX and on X-X in Figure 20 are those are shown also in Figures 18 and 19.
- Figures 23, 24, 25 and 26 are different views of the protector interior flexible member.
- Figure 27 is a cross section on XI-XI in Figure 24.
- Figure 28 shows a dual depiction of the elastic strip in its minimum and maximum stretch conditions as differentiated by its lengthening.
- Figure 29 is a cross section on XII-XII in Figure 28.
- Figure 30 is an enlarged view of detail P in Fig. 28.
- Figure 31 is a side view of a complementary sleeve to cover the protector.
- Figure 32 is a top view of the above complementary sleeve.
- Figure 33 is an elevational view of the width span member of a second embodiment of the invention.
- Figure 34 is a top view of the width span member.
- Figure 35 is an side view of the width span member.
- Figure 36 is a cross section on I-I in Figure 33.
- Figure 37 is a cross section on II-II in Figure 33.
- Figure 38 is a cross section on III-III in Figure 33.

PREFERRED EMBODIMENT OF THE INVENTION

Referring to Figures 1, 2 and 3, the protector 1 is shown in the normal retracted condition, with length span 2 and width span 3 straight members hugging corner gussets 4 which are in turn surrounded along their whole length by the elastic strip 5 to maintain the protector in said condition. Figures 2 and 3 show the centred through holes 6 and 7 in straight span members 2 and 3 which engaged with the beaded pins 23 provided on elastic strip 5. A hollow space is formed inside the protector 1 to house the hand held remote control to be protected.

Cross section on I-I of Figure 4 shows the outline shapes of various parts included in the construction of the protector 1, where one length span member 2 hugs one of the arms of corner gussets 4 which is thus perfectly secured and moreover serves as a base to facilitate its sliding motion along the length span member 2. Between these two parts is located the elastic strip 5, and within corner gusset 4 is located the flexible member 6, which occupies approximately the same frame amount as the corner gussets 4.

The length span members 2 are made from hard opaque material, whilst width span members 3 are transparent or translucent so as to allow passage of the signal from the hand held control to the electronic equipment to be controlled thereby.

What has been described above with respect to the length span members cross section shown in Figure 4, is also valid to the width span members 3.

To expand widthwise the protector 1, the length span members 2 are drawn away from one another to overcome the force of the elastic strip 5, so that shorter arms on corner gussets 4 slide within width span members 3, and abut against stop 14 therein, all centred with respect to the beaded pin 23, so that elastic strip 5 stretches by the same amount at either side of the pin 23. To expand the protector 1 lengthwise, the width span members 3 are drawn away from one another so that longer arms of corner gussets 4 slide within the length span members 2, thus stretching elastic strip 5 at either side of the pin 23 until the corner gussets abut against stops 14 on length span members 2.

When both abovedescribed operations have been carried out, the protector 1 will adopt a shape shown in Figures 5, 6 and 7, where the hollow space is at its largest size, both the length span members 2 and the width span members 3 being separated from one another, and guiding the corner gusset 4 arms.

In the normal retracted condition of the protector 1, shown in Figures 1, 2 and 3, the corner gusset 4 longer arms on each protector longer side are substantially in contact with one another, and inside they house the flexible members 6, and outside they receive the elastic strip 5. Similarly, this linkage is the same in the corner gusset 4 shorter arms.

Figures 9 to 12 show the "L" shaped corner gussets 4, which whole perimeter is provided with the lengthwise groove 9 in which the elastic strip 5 is fitted. The shorter arm on gussets 4 has a lengthwise opening 10 to allow control signal out, and chamfers 11 and 12 are provided on the outer ends of arms in order to facilitate insertion of same into length and width span members 2 and 3.

The corner gussets 4 cross sections shown in Figures 13 and 14, are enclosed in a oval shape. Cross section in Figure 13 at the centre of the arm shows the sliding recess 13 to enable it to slide within the span straight members 2 and 3, while corner gussets 4 cross section at the rounded elbow shown in Fig. 14 does not show any recess because span members do not reach the corner area.

The length span members 2 and the width span members 3 are respectively shown in Figures 15 to 17 and Figures 20 to 22. It is also shown in Figure 18 their cross section on V-V and on IX-IX, where an oval outline shape is provided at the end of each member, with a turned inwards portion 14 at the end of the arms into which are inserted the sections of corner gussets 4.

The other cross sections of the span members 2 and 3, on VI-VI in Figure 17, and on X-X in Figure 20, are shown in Figure 19, where the turned inwards edges provided with the guide-slot 16, along which the corner gusset 4 arms slide, their travel being limited by stops 14 in both ends of the span members 2 and 3.

The corner gussets 4 are thus positioned within span straight members 2 and 3, and that mutual travel between one and the other takes place through the said recess 13 (Fig. 13) sliding along the guide-slot 16, and that such travel is limited by said end stops 14, as is also shown in Figures 4 and 8. The flexible members 6, which are shown in Figures 23 to 26, occupy almost the whole of the protector frame perimeter when in the retracted condition, and move away from each other when the protector is expanded.

The "L" shaped flexible members 6 have one arm shorter than the other, in order to fit inside corner gussets 4. The shorter arm is moreover provided with a lengthwise opening 20 whose surface is recessed. The flexible members 6 takes up almost all the space inside corner gussets 4, and is made of cellular rubber, natural rubber, neoprene, or cellular polyethylene, which cross section on XI-XI is shown in Figure 27, where its flat outer surface 22 is impregnated with an adhesive to attach it into the associated hollow in corner gussets 4, and where there is a chamfer 25 which fits against the inside chamfers on said corner gussets 4.

Figure 28 shows comparatively two views of the elastic strip 5 in its minimum and maximum stretched conditions, which is provided with an outwardly protruding pin 23 at the middle of each four side, whose purpose is to engage inside holes 7 and 8 on members 2 and 3, so as to ensure that when elastic strip is stretched and acts upon members 2 and 3, it does so in a controlled and even manner from said centre pins position.

Cross section XII-XII of the elastic strip 5 shown in Figure 29 is rectangular shaped, being convex its outer surface and provided with the pins 23, and being this convex surface which fits snugly into the concave internal space on members 2 and 3.

The Figure 30 shown enlarged the pin 23 which is beaded at the end, by means of this bead upon passing the thickness of members 2 and 3 through their holes 7 or 8 and becoming located on the outside, the members 2 and 3 are fixed to the pins 23.

The width of the internal hollow of the flexible member 6 accommodates differing thicknesses of remote control, as is shown in comparative Figures 4 and 8, and, because of its flexibility, will adapt and cling to the shape of the remote control inserted into it.

Elastic strip 5 is protected in its housing inside the lengthwise groove 9 against damage by chafing, dropping and other harmful external effects. The convex shape of its outside surface also contributes to this function in guarding against damage.

The fact that width span members 3 are made of transparent or translucent material, and that the openings 20 are provided in the corner gusset 4 shorter arms and in the flexible members 6, allows optical alignment to be accomplished between the remote control and the equipment to be controlled.

The protector 1 provided by the invention may additionally and optionally be provided with a covering sleeve 26, which is shown in Figures 31 and 32, to prevent incoming of dust and dirt.

In some applications, the signal transmitted from the remote control housed inside the protector may be weaker than normal due to the fact that its path will necessarily pass through the materials that comprise elastic strip 5 and width span member 3.

To overcome this drawback, a second embodiment 30 of width span members, shown in Figures 33 to 38 through which the remote control signal travels, being provided with a centered window 31, which communicates directly with the outside when the elastic strip 5 surface is closed, and so removes an obstacle to the passage of the signal, which means that same will emerge more easily and clearly.

Said window 31, essentially oblong in shape, and being lengthwise positioned with respect to the width span member 30, can be provided in one only of the width span members 30 or in both.

The ends of window 31 are rounded, and their size will adjust to the whole surface of the hand held remote control enveloped by the protector 1, although the surface taken up by the window 31 can also be smaller than that of the remote control transmitting face.

An alternative that may be embodied in this construction involves the provision of an area in the width span member 30 that is covered with a plurality of evenly arranged holes or perforations such as to allow sufficient passage of the signal with no appreciable fall off in the transmission.

In combination with this embodiment of width span members 3, the elastic strip 5 surrounding the four corner gussets 4 is made from transparent silicone.

As is shown in Figures 33 and 34, the width span member 30 is provided centrally with a window 31 in a horizontal oblong shape with rounded ends.

The lengthwise section of the opening 31 is shown in Figure 36, and its cross section is shown in Figure 38, which shows the elliptical outline 34 of the length span member 30.

The "U" shaped member section 30 is closed by means of the turned inwards ends 32 and 33, and its inside receives the elastic strip 5, the ends of the corner gussets 4, and the internal flexible member 6 as has been described elsewhere with respect to Figure 4.

Claims

1. A protector (1) for hand held remote controls comprising of a set of parts that adapt to varying sizes of remote control characterized by two pairs of straight span members (2, 3) differing in length, which section is in the form of a "U" with turned inwards ends, accommodate internally the arms of four uneven sides "L" shaped corner gussets (4), whose cross section corresponds with said span members (2,3), where the longer arms of corner gussets (4) are accommodated inside the length span members (2), and their shorter arms inside the width span members (3), and where the corner gussets (4) outside face have a length groove (9) to hold a elastic strip (5) in the form of a closed rim to hug the four corner gussets (4) and at the same time being positioned between them and the span members (2,3), this four span members (2, 3) being provided with a centred through hole (7, 8), which is engaged with a pin (23) on the outside of the elastic strip (5), and where internally, said corner gussets (4) fit a flexible member (6) likewise "L" shaped, the arms of which are the same length as those arms of said corner gussets (4).
2. A protector for hand held remote controls, according to claim 1, characterized in that the cross section of the straight span members (2,3), and of the corner gussets (4) arms, being

"U" shaped are contoured by a theoretical ellipse which make the outside shape of the gussets (4) fit with the inside shape of the span members (2, 3).

3. A protector for hand held remote controls, according to claim 1, characterized in that the two straight portions on the corner gusset (4) arms have along the outside surface of their edges a recess (13) which provide a sliding surface within the guide-slots (16) upon the inside of span member (2,3), being these guide-slots (16) abut in a stop (14) at a certain distance from the ends of the span members (2, 3).
4. A protector for hand held remote controls, according to claims 1 and 3, characterized in that said guide-slots (16) are equally separated at their ends (14) from the ends of length span members (2), where such separation is greater on length span members (2) than it is on width span members (3).
5. A protector for hand held remote controls, according to claim 1, characterized in that the cross section of elastic strip (5) is rectangular, and its external face in contact with the span members (2, 3) is convex.
6. A protector for hand held remote controls, according to claim 1, characterized in that the flexible members (6) have a "U" shaped cross section, and their outer flat surface (22) is impregnated with adhesive for their attachment to the inside of corner gussets (4), and having moreover outside chamfers (25) which mate with other inside chamfers within said corner gussets (4).
7. A protector for hand held remote controls, according to claim 1, characterized in that the shorter arms of both the corner gusset (4) and the flexible member (6) are provided with a open lengthwise window (20).
8. A protector for hand held remote controls, according to claim 1, characterized in that the width span members (3) are transparent, and the elastic strip (5) is translucent.
9. A protector for hand held remote controls, according to claim 1, characterized in that in a second preferred embodiment, the width span members (30) have a centred window (31) of a basically oblong shape lengthwise positioned through which signals from the control can pass, where in this case, said width span

members (30) are made indifferently either from opaque or translucent material.

10. A protector for hand held remote controls, according to claims 1 and 9, characterised in that the elastic strip (5) in the form of a closed rim which is placed between the span members (2, 30) and upon the "L" shaped corner gussets (4) is made of silicone and is transparent.

Amended claims

1. A protector (1) for hand-held remote controls formed as a oblong frame surrounding the control unit edge perimeter to protect it against impact damage, incorporating different sections of hard and flexible materials, which comprise four identical corner gussets (4) in the shape of a "L" of uneven sides, each covering one of the control unit corners forming a hollow space in both uppermost and lowermost flat faces of the protector (1) for inserting the control unit inside, guide means (2,3) for interconnecting said corner gussets (4) and elastic means (5) that allow the protector (1) to expand and to contract lengthwise and widthwise in order to get adapted to different sizes of control units, and one of the shorter sides of the protector (1) is provided with an opening to facilitate the passage of the signals by transmits, **characterised in that** said guide means (2,3) comprise two pairs of straight span members different in length, whose section is in the shape of a "U" with the ends turned inwards, being one of said pairs two identical length span members (2) located in the longer sides of the protector and the other pair being two identical width span members (3) located in the shorter sides, and the arms of the corner gussets (4) being received inside the span members (2,3) telescopically guided; said corner gussets (4) have a cross section matched to said "U" shaped cross section of the span members (2,3), the longer gussets (4) arms being housed into the length span members (2) and the shorter into the width span members (3); said elastic means (5) comprise an elastic strip in the form of a closed rim which is fitted into a lengthwise groove (9) provided in the exterior contour of the four corner gussets (4) to hug them, and being positioned between the gussets (4) and the span members (2,3); the four straight span members (2,3) are provided with a centre through hole (7,8) in which is engaged a pin (23) protruding on the elastic strip (5) external face; each of the four corner gusset (4) interior hol-

low is occupied by a flexible member (6) which likewise is in the shape of a "L" which arms are the same length as those arms of the corner gusset (4).

2. A protector for hand held remote controls, according to claim 1, characterized in that the cross section of the straight span members (2,3), and of the corner gussets (4) arms, being "U" shaped are contoured by a theoretical ellipse which make the outside shape of the gussets (4) fit with the inside shape of the span members (2, 3). 5 10
3. A protector for hand held remote controls, according to claim 1, characterized in that the two straight portions on the corner gusset (4) arms have along the outside surface of their edges a recess (13) which provide a sliding surface within the guide-slots (16) upon the inside of span member (2,3), being these guide-slots (16) abut in a stop (14) at a certain distance from the ends of the span members (2, 3). 15 20
4. A protector for hand held remote controls, according to claims 1 and 3, characterized in that said guide-slots (16) are equally separated at their ends (14) from the ends of length span members (2), where such separation is greater on length span members (2) than it is on width span members (3). 25 30
5. A protector for hand held remote controls, according to claim 1, characterized in that the cross section of elastic strip (5) is rectangular, and its external face in contact with the span members (2, 3) is convex. 35
6. A protector for hand held remote controls, according to claim 1, characterized in that the flexible members (6) have a "U" shaped cross section, and their outer flat surface (22) is impregnated with adhesive for their attachment to the inside of corner gussets (4), and having moreover outside chamfers (25) which mate with other inside chamfers within said corner gussets (4). 40 45
7. A protector for hand held remote controls, according to claim 1, characterized in that the shorter arms of both the corner gusset (4) and the flexible member (6) are provided with a open lengthwise window (20). 50
8. A protector for hand held remote controls, according to claim 1, characterized in that the width span members (3) are transparent, and 55

the elastic strip (5) is translucent.

9. A protector for hand held remote controls, according to claim 1, characterized in that in a second preferred embodiment, the width span members (30) have a centred window (31) of a basically oblong shape lengthwise positioned through which signals from the control can pass, where in this case, said width span members (30) are made indifferently either from opaque or translucent material.
10. A protector for hand held remote controls, according to claims 1 and 9, characterised in that the elastic strip (5) in the form of a closed rim which is placed between the span members (2, 30) and upon the "L" shaped corner gussets (4) is made of silicone and is transparent.

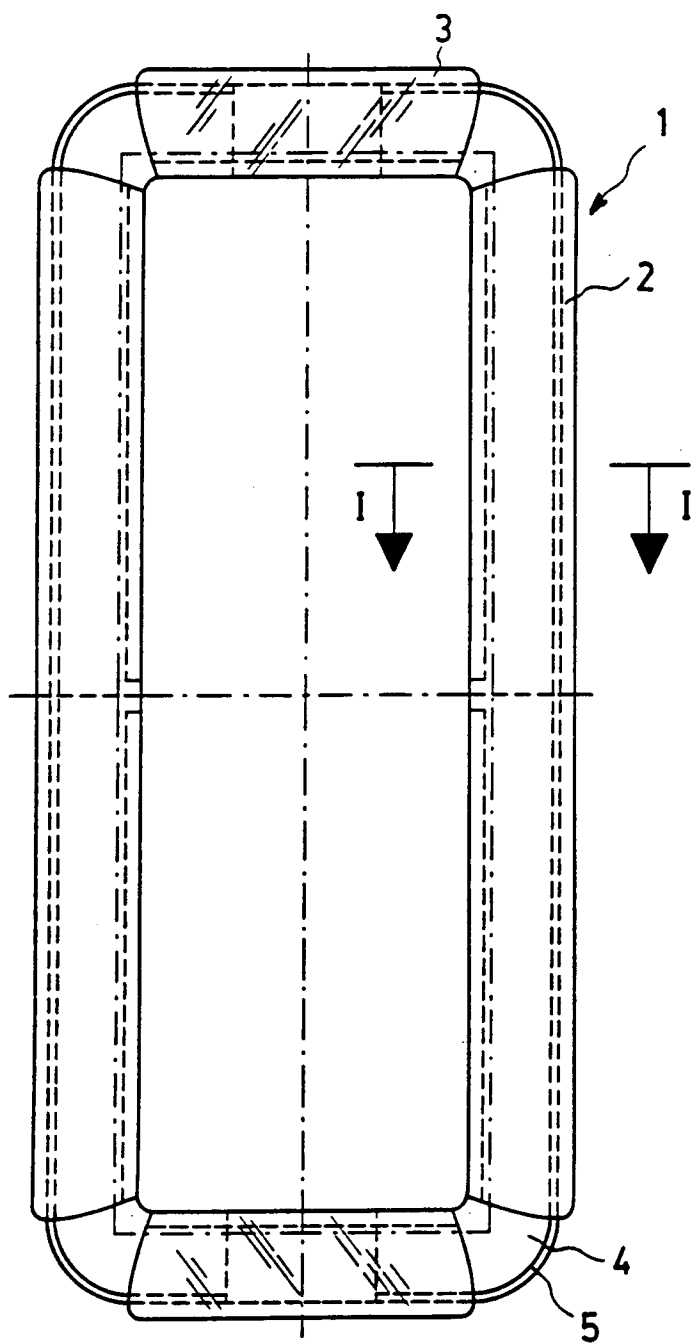


Fig.: 1

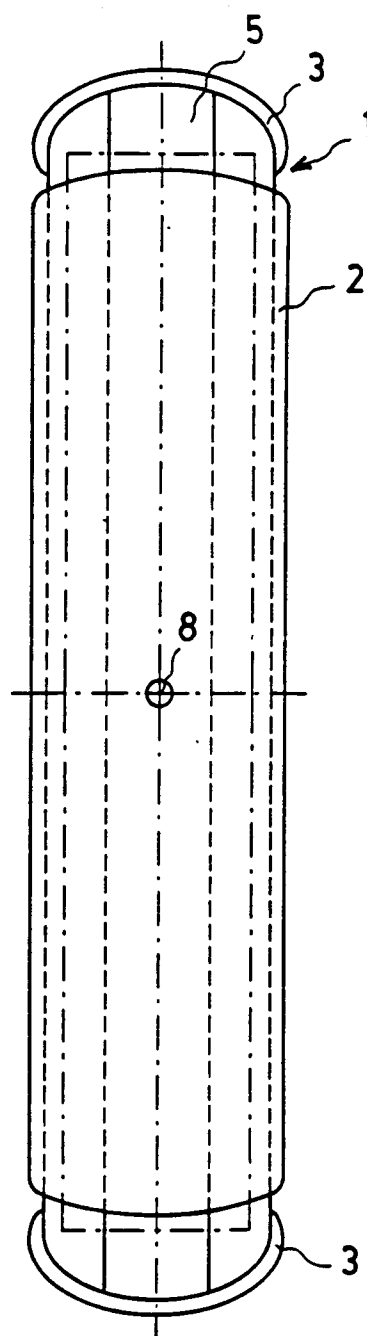


Fig.: 2

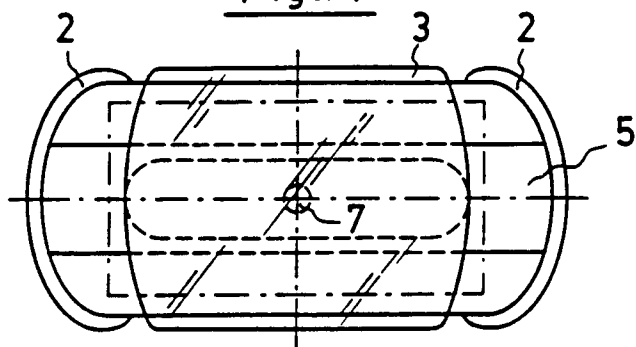


Fig.: 3

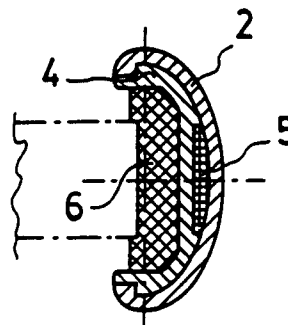


Fig.: 4

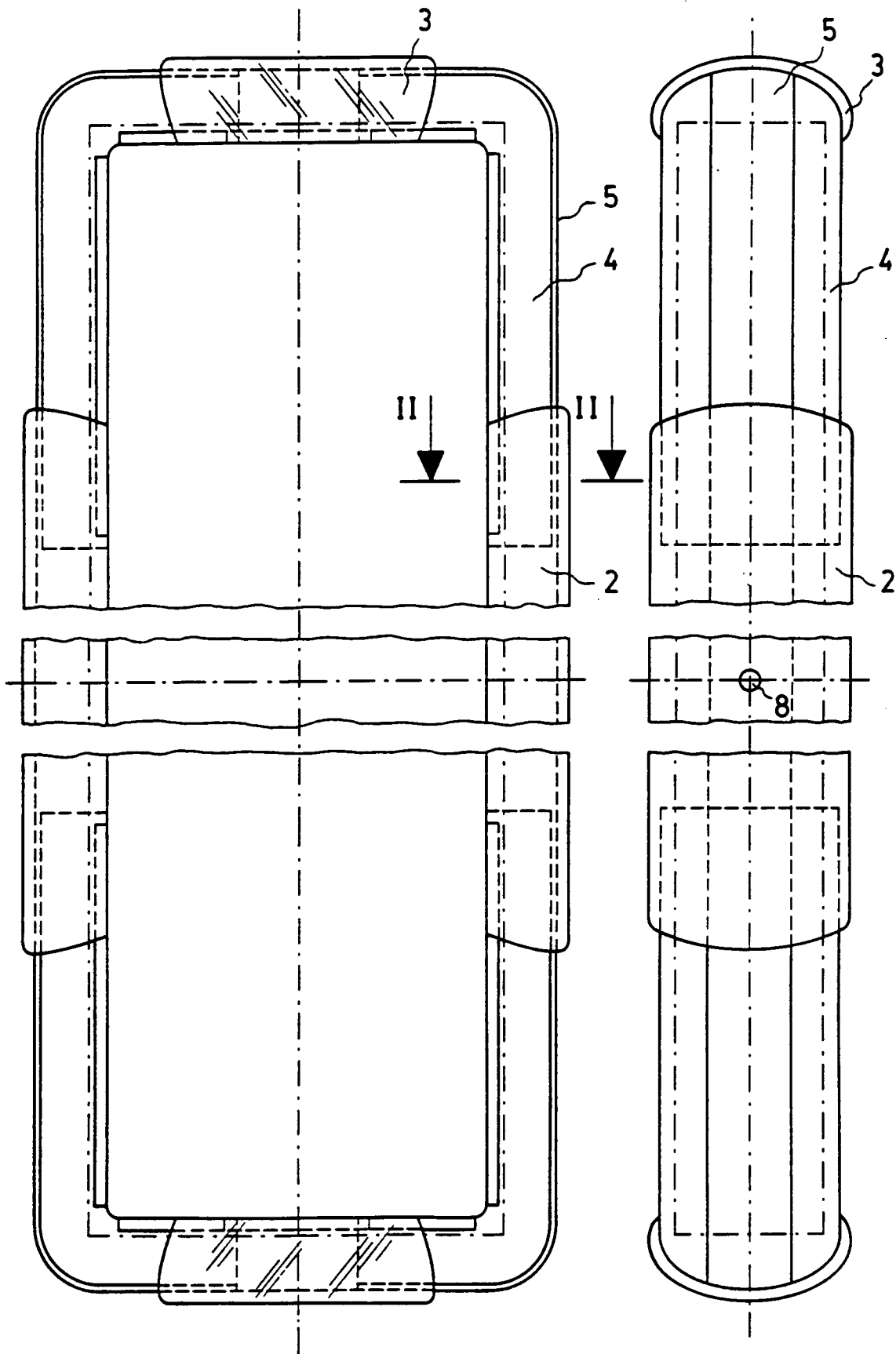


Fig.: 5

Fig.: 6

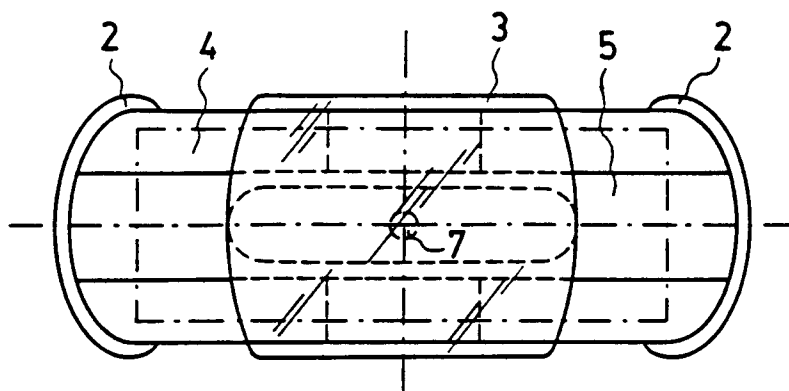


Fig.: 7

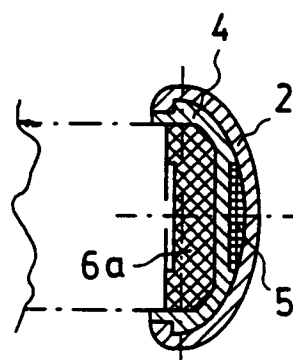


Fig.: 8

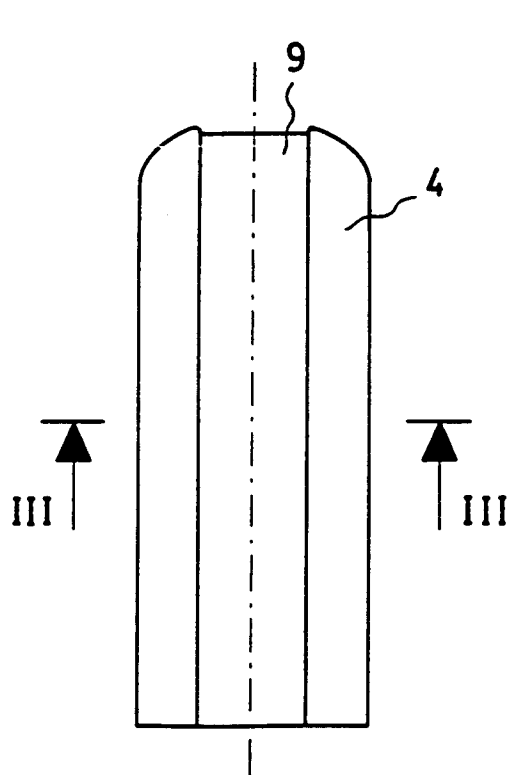


Fig.: 9

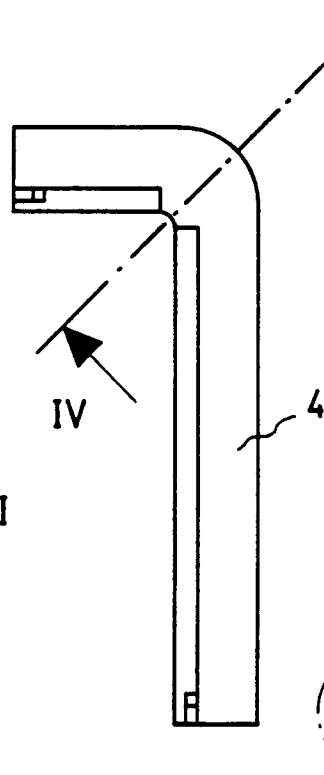


Fig.: 10

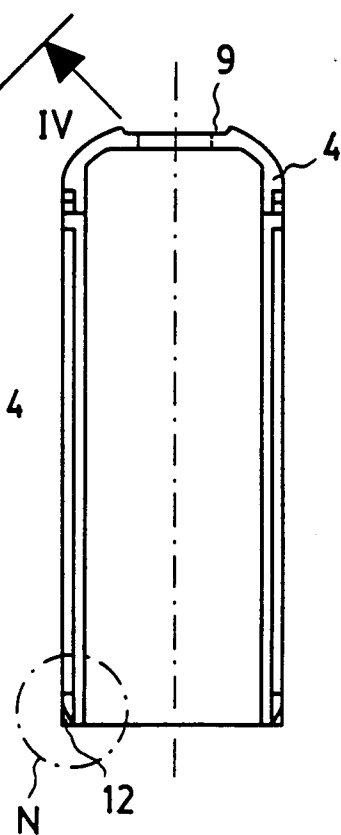


Fig.: 11

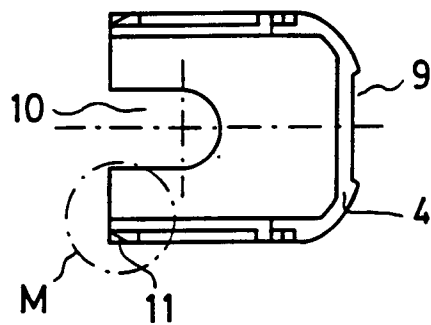


Fig.: 12

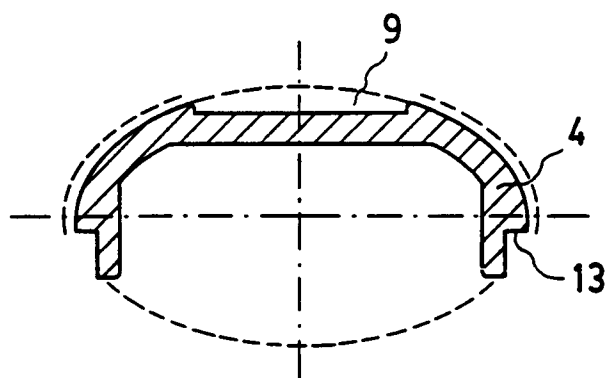


Fig.: 13

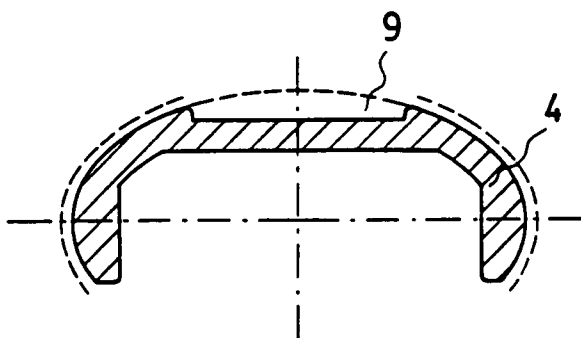


Fig.: 14

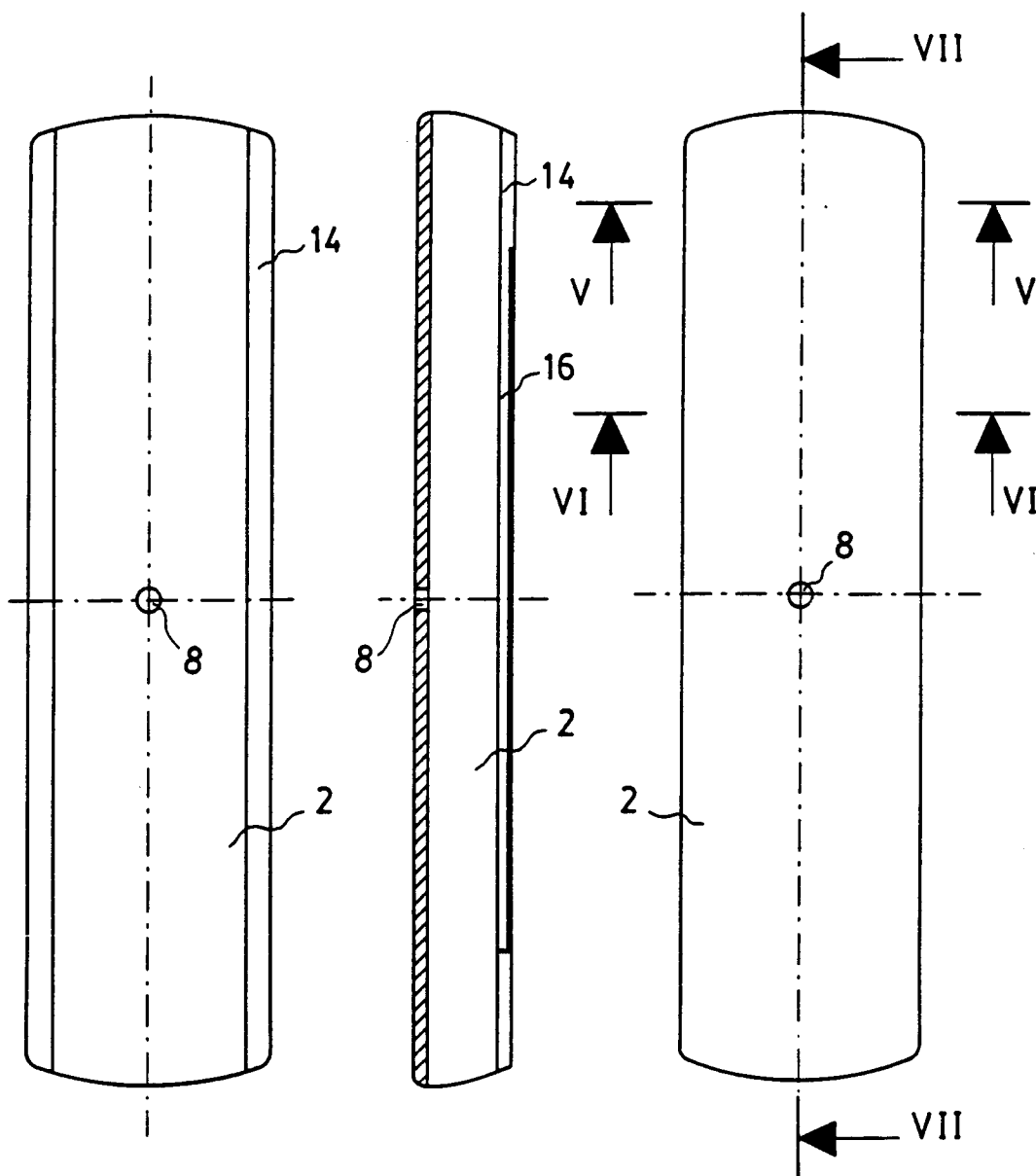


Fig.: 15

Fig.: 16

Fig.: 17

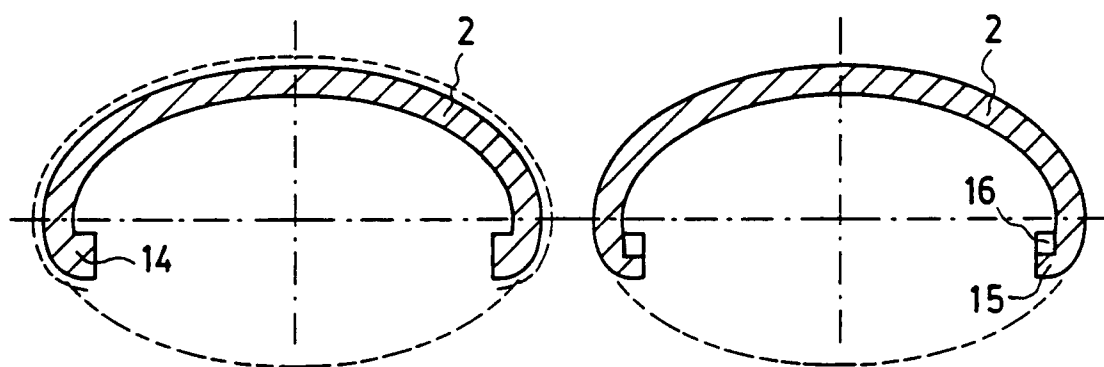


Fig.: 18

Fig.: 19

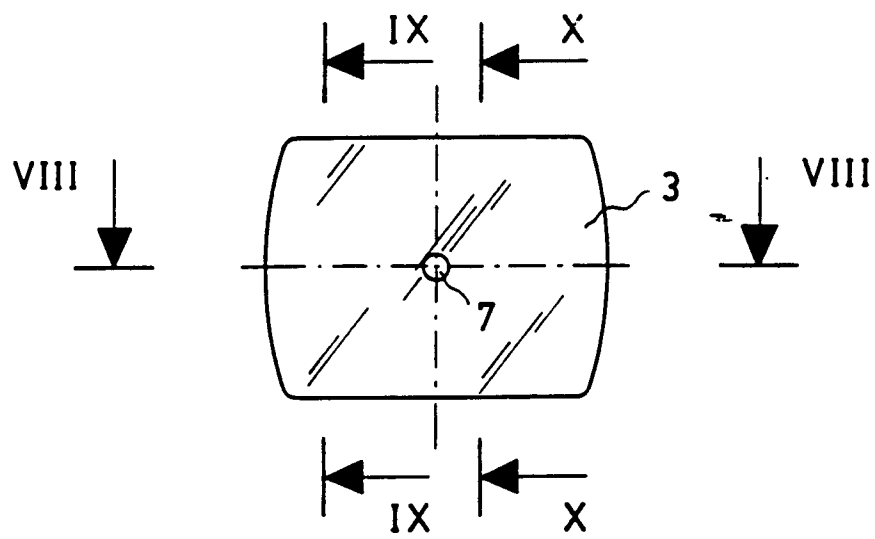


Fig.: 20

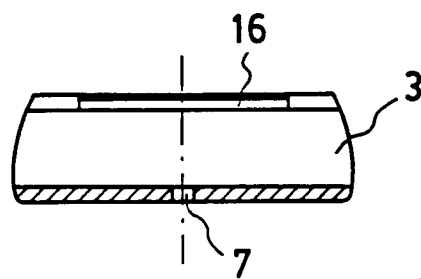


Fig.: 21

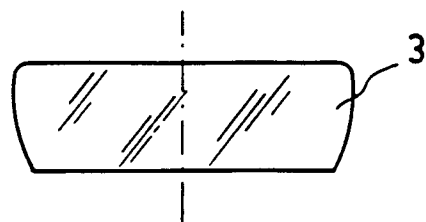


Fig.: 22

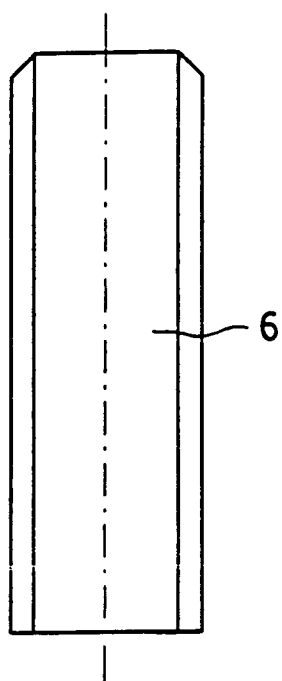


Fig.: 23

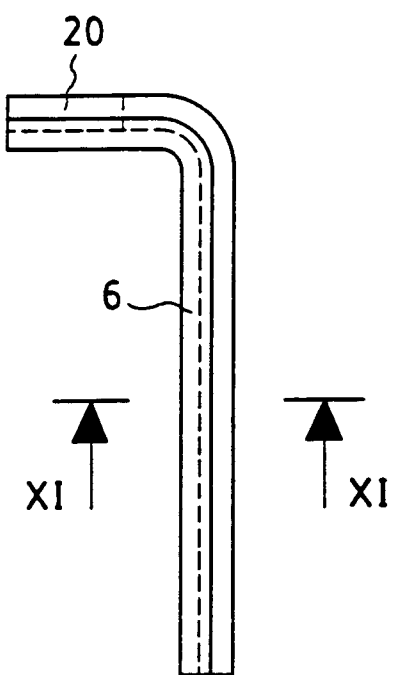


Fig.: 24

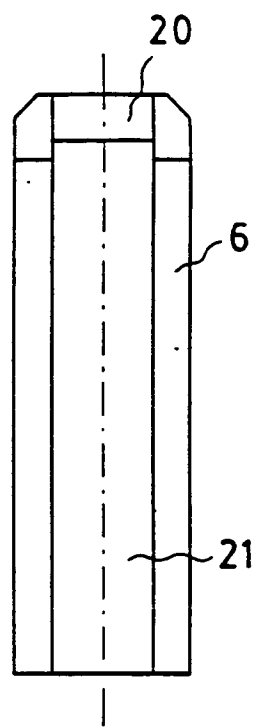


Fig.: 25

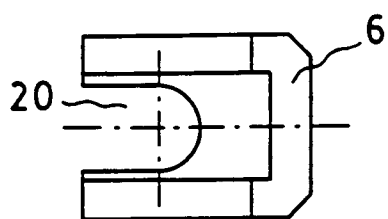


Fig.: 26

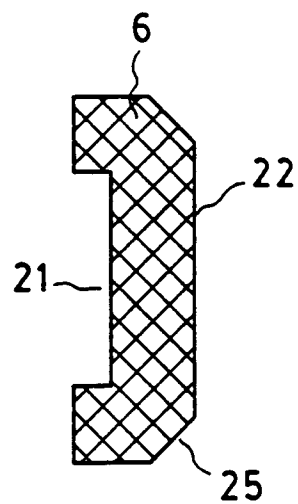


Fig.: 27

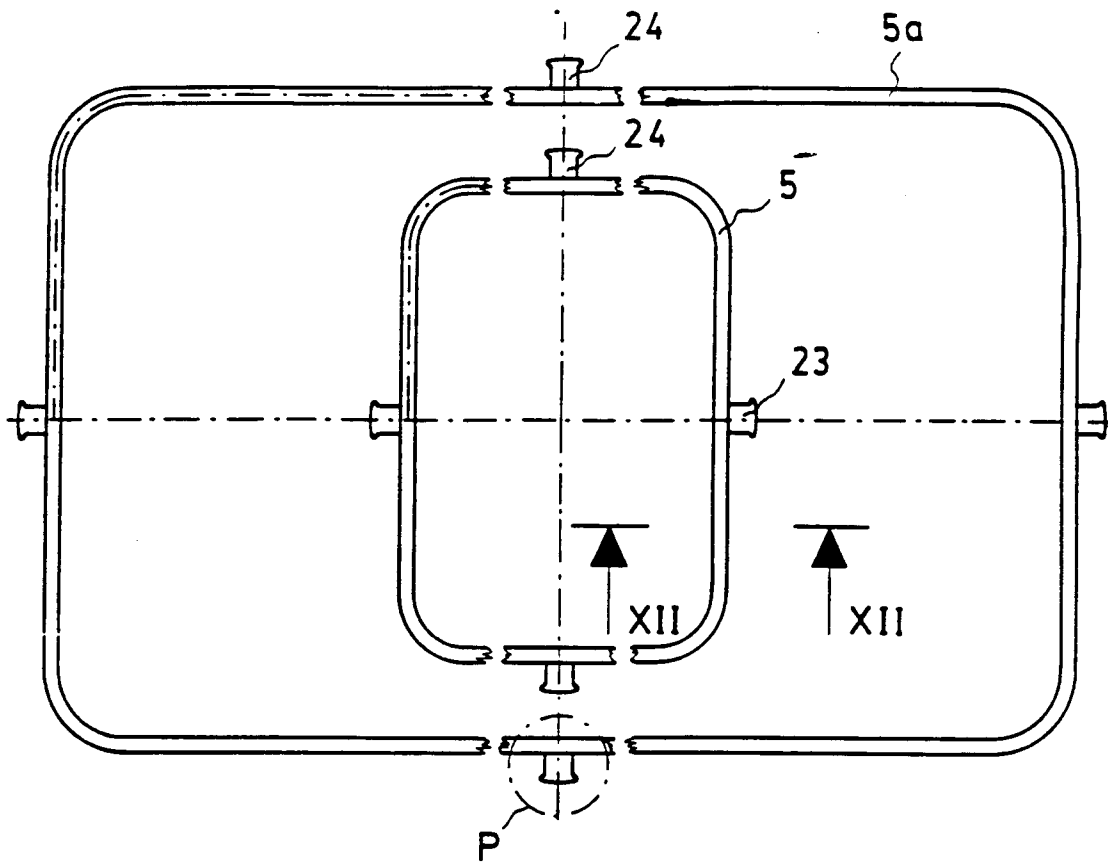


Fig.: 28

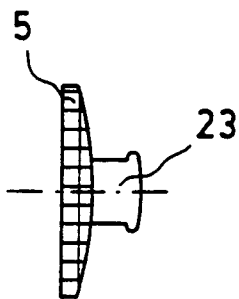


Fig.: 29

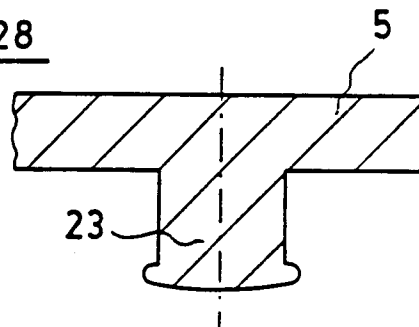


Fig.: 30

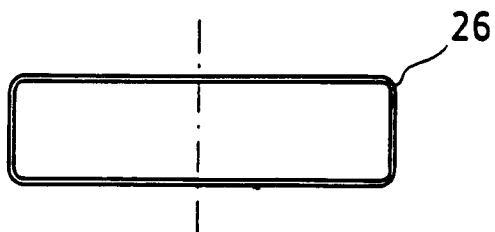


Fig.: 31

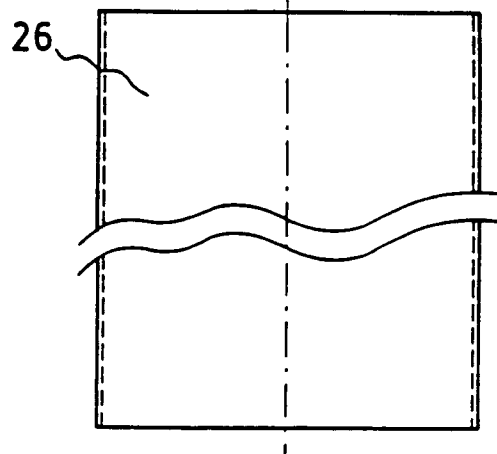


Fig.: 32

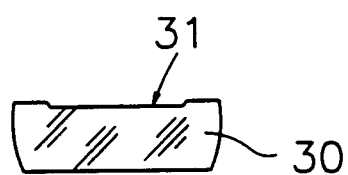


FIG. 34

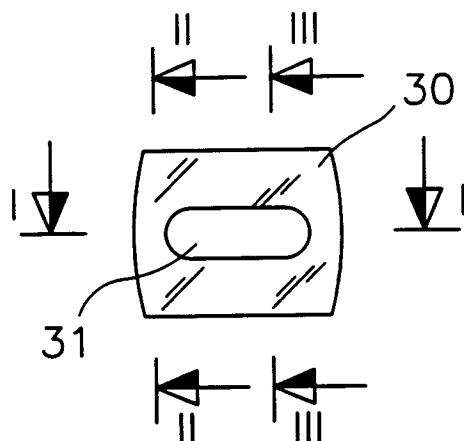


FIG. 33

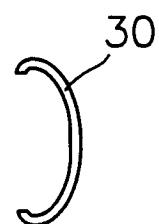
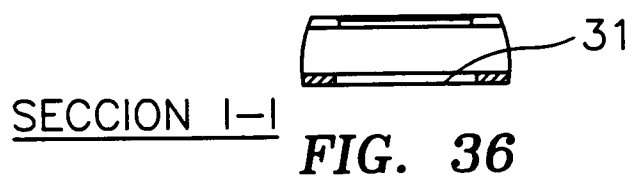


FIG. 35



SECCION II-II

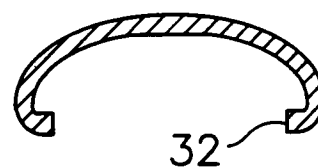


FIG. 37

SECCION III-III

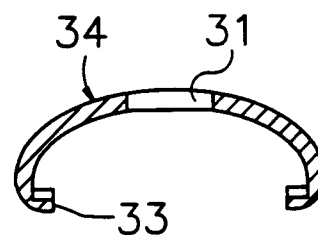


FIG. 38

INTERNATIONAL SEARCH REPORT

International Application No
PCT/ES 94/00050

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 H01H9/02

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)
IPC 5 H01H H04B

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO,A,92 07372 (MELICONI) 30 April 1992 see page 6, line 5 - line 25 see claim 1; figures 6-10 ---	1
A	WO,A,92 22918 (DANIELS) 23 December 1992 cited in the application see claims 1,2; figures -----	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *O* document referring to an oral disclosure, use, exhibition or other means
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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

19 August 1994

Date of mailing of the international search report

24.08.94

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