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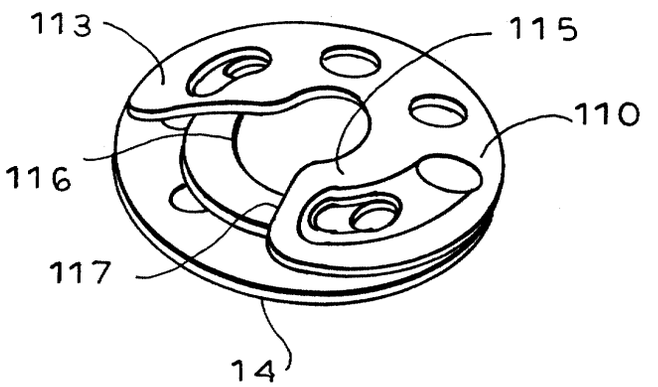
(54) Adjustable strap fastener for brassieres and the like and method of making same

(57) A strap fastener and method of making such a strap fastener for articles of clothing including brassieres, lingerie and corsetry, said fastener comprising a first elongated fabric web of a thermoplastic yarn having at least one coupling member molded onto said first fabric web; a second elongated fabric web of a thermoplastic yarn into which said first fabric web is enfolded and having a pair of edge portions of said second web overlying one face of said first fabric web at opposite sides of said coupling member, and another portion of said second fabric web covering the other face of said first fabric web; a pair of ultrasonic welding seams along opposite longitudinal edges of said webs joining said edge portion of said second fabric web to said first fabric web and said first fabric web to said other portion to form one coupling tape; and a third elongated fabric web of a thermoplastic yarn having another coupling member molded onto said third web and engageable with said one coupling member, said third web and said other coupling member forming another coupling tape, said coupling tapes being attachable to respective parts of a garment to be held together by said engagement of the coupling members of said tapes.

FIG. 33



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Description

[0001] My present invention relates to the strap fasteners of brassieres, lingerie and corsetry and particularly with so-called hook and eye strap fasteners of the type in which a fastener member on one strap can be affixed to a coupling member on another strap, usually adjustably, to secure the garment which can be a brassiere. The invention also relates to an improved method of making the new strap fastener.

[0002] While brassiere-type fasteners for conveniently and comfortably securing the two straps at the back of a brassiere together, usually adjustably, have been provided in many configurations heretofore, perhaps the most common utilize a hook and eyelet configuration. The male member of the strap fastener can be formed by one or more hooks on one of the straps while the female member is constituted by a plurality of eyelets spaced apart in a longitudinal direction to engage with the hook selectively for adjustable fastening of the brassiere. The eyelets may be metal, or powder-coated metal. Problems have been encountered in prior constructions of this type with respect to the uniform dying of the product since the tape was frequently provided with a lining or cover member by stitching and the tapes, the lining, the threads used for attaching coupling members or joining the lining to the tape, etc. all tended to dye differently. This applies also to the coupling members themselves. When the prior-art tape was fed to the strap fabric and cut parallel to the longitudinal dimension of the strap by ultrasonic means, a sharp edge was formed which was uncomfortable or injurious.

[0003] It has thus been long sought in the brassiere, corsetry and lingerie field to be able to provide a strap fastener or brassiere-type closure which would not snag on other garments, which would not be damaged in the wash, which would be comfortable for the wearer, which could be dyed uniformly and preferably with the same dying characteristics as the garment and which would be simple to fasten and unfasten, especially since the fastener is often provided at the back of the wearer.

[0004] It is, therefore, the principal object of the present invention to provide an improved strap fastener, especially for brassieres but also suitable for garment closures of other types, e.g. for lingerie and corsetry, whereby these desiderata will be satisfied. Another object is to provide a method of making the fastener.

[0005] According to the present invention, these objects are attained by the methods of claim 1 and 16 and the articles of claims 11 and 18. The fastener can be made by fabricating a coupling half of the strap fastener with an inner or first web or tape of a woven or tricot knit fabric (or a woven fabric having a tricot knit facing layer) composed of thermoplastic yarn and bonding that tape or web to a second tape or web into which the first tape or web is at least partly enfolded, by ultrasonic seaming along the longitudinal edges of the tape and by providing the inner tape with its coupling member by a melding operation so that, in the construction of this fastener half, no stitching is required.

[0006] The application of the coupling members, which can be eyelets lining holes formed in the first tape by ultrasonic punching techniques, and the assembly of the two tapes together, as well as the severing of a length forming the fastener half form the continuous webs which are used to produce the successive lengths can all be effected by ultrasonic means so that no stitching is required, except, possibly, for attaching the fastener strip to the garment.

[0007] When all of the webs used are woven tapes or tricot knits (or layers of woven and knit tapes) of say a polyamide (nylon) yarn and the molded coupling members are themselves composed of polyamide (e.g. a nylon) all of the elements of the fastener have substantially identical dying characteristics and can be dyed with the garment without any significant difference being visible between the garment and the fastener.

[0008] The second web or tape into which the first tape is enfolded covers the eyelets from the back and thus provides a cushion against the skin of the wearer and, if desired, a further tape or strip, preferably also of a tricot knit fabric, can be inserted between the second web and the first if desired.

[0009] According to a feature of the invention, the first and second webs are longitudinally seamed at spaced apart locations by the ultrasonic welding, leaving turned over flaps of the fastener strip beneath which a portion of the garment can be inserted for attachment of the strip to the garment, e.g. also by ultrasonic seaming or, as is less preferred, by stitching.

[0010] The first web can be ultrasonically or mechanically pierced to form a succession of holes and the eyelets can be molded onto the first web around the holes. Of course, coupling members other than eyelets can be used although they are not preferred. The studs are also molded to the tape. Such coupling members can be hook and loop type fasteners, for example.

[0011] The webs can also be ultrasonically joined together along an end of the length formed by ultrasonically severing the lengths from the band.

[0012] The eyelets are preferably molded onto the first web in a succession of spaced apart groups of at least three eyelets per group.

[0013] The male fastener can comprise a hook molded onto a tape composed of thermoplastic yarn, preferably a woven polyamide. According to a feature of the invention, a succession of the hooks is molded onto the tape of the male fastener and the tape of the male fastener is severed ultrasonically between the hooks into respective male fastener lengths which are secured to the garment, the hooks, the eyelets and the webs and the tape being all composed of polyamide.

[0014] According to another aspect of the invention, the coupling members which are applied to the fabric tape are male and female members forming a press button which can be joined by pressing the male member

into the female member.

[0015] According to another feature of this aspect of the invention, the female member is open laterally through a constriction and the male member can be slid transversely into engagement with the female member to connect the members together. Separation can be effected by pulling the male and female members apart or by sliding the male member out of the female member in a direction opposite to that in which the male member was inserted.

[0016] When a row of male members on one strap end and a row of female members on the other strap end form the back fastener of the brassiere, a high degree of flexibility is ensured by reason of the separation of the male and female members along the respective row.

[0017] In an important aspect of the invention, the continuous tape carrying the members may have rolled over edges which are ultrasonically seamed except at locations at which the rolled over edges are to be opened at least to a limited degree to insert the respective straps which then can be ultrasonically seamed to the tape.

[0018] The tape is cut transversely and runs in the direction of the longitudinal edges so that, upon cutting, rounded corners can be formed to protect the wearer against injury from sharp corner edges.

[0019] The fasteners of the invention are substantially thinner than metal hook and eyes or metal snap tapes.

[0020] The hook and eye fastener can comprise:

a male fastener half injection-moldable onto a first tape and adapted to be secured to one part of a garment, the male fastener half being formed with a generally flat circular body having an outer body portion on one side of the first tape and an inner body portion on another side of the first tape, a pin projecting generally centrally from the inner body portion, and a head formed on the pin; and

a female fastener half injection-moldable onto a second tape and adapted to be secured to another part of the garment, the female fastener half being formed with a generally flat circular body having an outer body portion on one side of the second tape and an inner body portion on another side of the second tape, the inner body portion having an eyelet dimensioned to receive and retain the head and an inlet slot leading to the eyelet through which the pin is laterally insertable, the head being withdrawable from the eyelet in a direction perpendicular to the tapes.

[0021] According to the invention, the slot has an inwardly convergent mouth and the head, which can be split for flexibility, is tapered from a narrow portion to a thick position in a direction of insertion of the pin into the eyelet through the slot. The inner portion of the female fastener half can have inclined flanks engaging the head and guiding the head into the eyelet.

[0022] As in our earlier fastener it is highly advantageous to provide the inner body portion of one of the fastener halves as a convex element and the inner body portion of the other fastener half as a concave element which receives the convex inner body portion of the first fastener half in a nested relationship.

[0023] According to another aspect of the invention, each of the tapes may have a plurality of the respective fastener halves spaced apart thereon in a row transverse to the aforementioned insertion direction and for adjustability of the back strap, at least the tape provided with the female fastener members may have a plurality of such rows longitudinally spaced thereon.

[0024] The tapes may each be covered at least on one side with a brushed fabric strip ultrasonically welded to the tape along the edges and the garment part can be stitched or otherwise fastened between the respective tape and the brushed fabric strips.

[0025] The tapes can be woven of a synthetic resin yarn and the fastener halves can be composed of polyoxymethylene (POM) or polyamide (PA). A brassiere according to the invention can have a back strap, portions of which are interconnected by at least one garment fastener comprising:

a male fastener half injection-moldable onto a first tape and adapted to be secured to one portions of the back strap, the male fastener half being formed with a generally flat circular body having an outer body portion on one side of the first tape and an inner body portion on another side of the first tape, a pin projecting generally centrally from the inner body portion, and a head formed on the pin;

a female fastener half injection-moldable onto a second tape and adapted to be secured to another of the portions of the back strap, the female fastener half being formed with a generally flat circular body having an outer body portion on one side of the second tape and an inner body portion on another side of the second tape, the inner body portion having an eyelet dimensioned to receive and retain the head and an inlet slot leading to the eyelet through which the pin is laterally insertable, the head being withdrawable from the eyelet in a direction perpendicular to the tapes; and

a respective brushed fabric strip covering at least one side of each tape and ultrasonically welded to the respective tape along longitudinal weld seams, the respective part or portion of the back strap being inserted between each tape and the respective strip and being affixed thereto.

[0026] The method of the invention for making a garment fastener or a brassiere in which such a garment fastener is used can comprise:

(a) injection molding a multiplicity of a male fastener halves onto a first woven synthetic-resin fabric

band, the male fastener halves each being formed with a generally flat circular body having an outer body portion on one side of the first band and an inner body portion on another side of the first band, a pin projecting generally centrally from the inner body portion, and a head formed on the pin;

(b) injection molding a multiplicity of female fastener halves onto a second woven synthetic-resin fabric band, each of the female fastener halves being formed with a generally flat circular body having an outer body portion on one side of the second band and an inner body portion on another side of the second band, the inner body portion having an eyelet dimensioned to receive and retain the head and an inlet slot leading to the eyelet through which the pin is laterally insertable;

(c) covering at least one side of each of the bands with a strip of brushed knit fabric and ultrasonically welding the respective strip to the respective band along opposite longitudinal edges thereof to form respective weld seams having gaps therein;

(d) transversely severing the first band at gaps in the weld seams thereof to form first tapes each having at least one of the male fastener halves thereon and transversely severing the second band at gaps in the weld seams thereof to form second tapes each having at least one of the female fastener halves thereon, openings being provided between each tape and the respective strip at an end of the respective tape; and

(e) inserting a respective garment portion into each of the openings and securing the respective garment portion to the respective tape and strip.

[0027] One of the advantages of the method of the invention is that the free ends of the tape/strip assembly to which the respective portions of the back strap are connected can be separated from the respective hands by cold cutting so that they remain relatively soft. Having not been stiffened by a heated cutting tool there is less likelihood of injury to the wearer from the fastener parts. The halves, when they are joined together by hooking motion, form a relatively thin flat closure without the danger of pressing into the back of the wearer. The thinness of the closure makes it less likely that the back strap of the brassiere will show through the outer garment of the wearer. The parts of the fastener can be connected by the standard hook-and-eye motion to which brassiere wearers are accustomed, although opening of the brassiere can be facilitated because the parts of the closure can be separated by simply pulling the strap parts apart.

[0028] The above and other objects, features, and advantages will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a somewhat diagrammatic elevational view of a female fastener half for a strap fastener according to the invention;

FIG. 2 is a view similar to FIG. 1 of the reverse side;

FIG. 3 is a cross sectional view taken along the line III - III OF FIG. 1;

FIG. 4 is a cross sectional view taken along the line IV - IV of FIG. 1;

FIG. 5 is a cross sectional view taken along the line V - V of FIG. 1;

FIG. 6 is a view similar to FIG. 1 showing a portion of the male half of the strap fastener;

FIG. 7 is a cross sectional view taken along the line VII - VII of FIG. 6;

FIG. 8 is a view similar to FIG. 1 showing the complete strap fastener as formed with a closure for the back of a brassiere;

FIG. 9 is a view similar to FIG. 8 showing the reverse of the fastener, i.e. the portion of the fastener which contacts the skin of the user;

FIG. 10 is a cross sectional view drawn to a larger scale taken along line X - X of FIG. 1;

FIG. 11 is an elevational view showing the formation of the successions of eyelets on the first web according to the invention;

FIG. 12 illustrates the continuous band after the application of the second web thereto;

FIG. 13 is an elevational view illustrating the step of severing the length of the fastener from the continuous band; and

FIG. 14 is a view similar to FIG. 5 but showing the insertion of an additional cushioning tape into the fastener.

FIG. 15 is a cross sectional view of a press button which can be provided on a tape according to a feature of the invention;

FIG. 16 is a plan view from the projection side of that male member;

FIG. 17 is a side elevational view thereof;

FIG. 18 is a cross sectional view through the female press bottom fastener;

FIG. 19 is a plan view thereof;

FIG. 20 is a side view of the female half of the press button;

FIG. 21 is a cross sectional view showing the press button parts fitted together and on respective tapes;

FIG. 22 is an elevational view showing a press button with a slide interfitting capability;

FIG. 23 is a view similar to FIG. 22 showing another embodiment;

FIG. 24 is a view similar to FIGS. 22 and 23 of an elongated female fastener member;

FIG. 25 is a side view of the male member cooperating with that female member;

FIG. 26 is a plan view of the male member of that fastener;

FIG. 27 is a view similar to FIG. 22 of another embodiment;

FIG. 28 is a diagram showing the taper of the thickness of the latter female member;

FIG. 29 is a plan view showing a tape having rows of the female member;
FIG. 30 shows the back fastener for a brassiere upon separation;
FIG. 31 is a similar view showing the male and female member connected together.
FIG. 32 is a plan view of a first tape covered with a brushed knit fabric strip which can be connected to one part of the back strap of a brassiere showing a plurality of female fastener halves according to a feature of the invention;
FIG. 33 is a perspective view of one of the female halves from its inner sides;
FIG. 34 is a plan view of the female fastener half;
FIG. 35 is a perspective view of the female fastener half from its outer side;
FIG. 36 is a view similar to FIG. 1 showing the tape portion with the male fastener half;
FIG. 37 is a perspective view of the male fastener half;
FIG. 38 is a plan view of the outer portion of the male fastener half;
FIG. 39 is a perspective view of the male fastener half as seen from the side of its inner portion;
FIG. 40 is an elevational view of the fastener;
FIG. 41 is a cross sectional view taken along the line XXXXI-XXXXI of FIG. 10;
FIG. 42 is a cross sectional view along the line XLII-XLII of FIG. 40;
FIG. 43 is a side elevational view of the female fastener half;
FIG. 44 is a bottom plan view thereof;
FIG. 45 is a top plan view thereof;
FIG. 46 is a rear view of the female member;
FIG. 47 is a cross sectional view thereof without the engagement of the head of the male half in the eyelet;
FIG. 48 is a side elevational view of the male fastener half;
FIG. 49 is a bottom view of the male fastener half;
FIG. 50 is a front view of the male fastener half;
FIG. 51 is a cross section through the male fastener half;
FIG. 52 is an elevational view of the back strap of a brassiere showing the application of the fastener thereto;
FIG. 53 is a view of one tape of the brassiere;
FIG. 54 is a view of the other tape;
FIG. 55 is a cross section through the tape of the male fastener half;
FIG. 56 is an elevational view of the back side of a female fastener half having a different configuration;
FIG. 57 is an elevational view of the front side of this latter fastener half;
FIG. 58 is a side view of the latter fastener half;
FIG. 59 is a diagrammatic illustration of the coupling of male and female fastener halves utilizing the wedge shaped projection;
FIG. 60 is a similar view showing the positions of the parts upon full coupling;
FIG. 61 is a cross sectional view drawn to an enlarged scale of the tape showing the cushioning strip;
FIG. 62 is a plan view of the tape from the woven fastener carrier side;
FIG. 63 is a plan view of this tape from the opposite side; and
FIG. 64 shows the use of a thin soft flexible plastic film on which the fastener half is injection molded.

[0029] As can be seen from FIGS. 1 and 2, the strap fastener of the present invention comprises a female fastener half generally represented at 10 and having a first web or strip 11 of a tricot knit or woven polyamide (nylon) in which are ultrasonically or mechanically pierced, elongated holes 12 shown here to be three in number in a group and along the margins of each of which a frame or eyelet 13 is injection molded. The eyelet 13 is composed of a the same polyamide as constitutes the yarn from which the web 11 is fabricated. As can be seen from FIG. 10, the eyelet 13 surrounds the edge 14 of the hole and continues onto the flanks or faces 15 and 16 of the first web. The first web 11 is, in turn, partly enfolded in a second web or tape 17, also of a tricot knit of polyamide yarn which has a pair of edge portions 18 and 19 bent over onto the face 15 of the first web 11 and a further portion 20 covering the reverse face 16 of the web 11 (see FIGS. 3-5).

[0030] In the region of the group of eyelets 13, the bent over portions 18 and 19 are ultrasonically welded to the face 15 of the first web 11 and the first web 11 is welded to the web 17, the ultrasonically welding being represented at 21 by the light lines there shown and by the arrows 22 visible in FIG. 4, for example, Beyond the ultrasonic weld seams 21, the inwardly bent portions 18 and 19 form flaps as shown in FIG. 5 into which the edges of the garment can be inserted so that, by a further ultrasonic welding or by stitching, the strips shown at 10 in FIG. 1 and 2 can be fixed to the garment. The end of the strip 10 is rounded at 23 and can be formed with a further ultrasonic weld seam as represented at 24 to bond the two webs together.

[0031] As a comparison of FIGS. 1 and 2 will show, the portion 20 covers the eyelets 13 at the back of the strip to provide a protective layer between these eyelets and the skin of the user.

[0032] The male strip 30 comprises a tricot knit web 31 onto which the coupling member 32 is molded, the coupling member 32 (FIGS. 6 and 7) having a lip 33 which engages in the eyelet 13 beneath the bar 34 thereof while the shoulder 35 can snap against the bar 36 to retain the hook in the eyelet.

[0033] All of the tapes or webs described can be composed of the identical polyamide as can form the coupling members 13 and 32 so that the entire fastener has

uniform dying characteristics.

[0034] As can be seen from FIG. 8, the two coupling strips 10 and 30 can be connected to parts 37 and 38 of the garment, e.g. by stitching at 39 or by ultrasonic welding so that the two parts of the garment can be held together in the position shown in FIG. 8. From the back, the fastener has only the smooth region 20 in contact with the skin (compare FIGS. 8 and 9).

[0035] Further cushioning against the back of the user can be afforded by a further strip 40 of tricot knit tape composed of the same polyamide yarn and inserted between the first web 11 and the portion 20 of the second web 17 as seen from FIG. 14.

[0036] The mode of fabrication can be seen from FIG. 11 in which a band of the first web 11 is fed along a path continuously and is ultrasonically punched to produce the holes 12 in groups of three and the eyelets 13 injection molded onto the web 11 around the holes 12. Further downstream along the same path or in a separate path, the second web 17 is partially enfolded around the first web so that the portions 18 and 19 overlie the web 11 and the ultrasonic weld seams 21 are formed at spaced apart locations but in the regions of the groups of eyelets the resulting band of interconnected webs can be ultrasonically cut at 41 to sever the length 42 from the remaining band 43 and form the transverse welds 23, the lengths 42 constituting the strips 10 previously described. The step represented in FIG. 13 is further downstream along the path represented by FIG. 12.

[0037] The male coupling strips are similarly fabricated in a fabrication line and the lengths of the two strips are applied to the garments as has previously been described.

[0038] FIGS. 15 - 21 show a press button connector which can be provided on respective tapes carrying the male and female members, the female member being formed as an eyelet in accordance with the principles previously described.

[0039] As can be seen from FIGS. 15 - 17, the male member 50 of the press button has a head 51 formed with a slot 52 in which the tape is received and a convex surface 53 which is formed with a depression 54. On the opposite side of this head, a projection 55 is provided which is surrounded by a concave portion or recess 56 whose curvature matches the convex curvature of the female member which is described in connection with FIGS. 18 - 20. As can be seen from FIGS. 16 and 17, the projection 55 has a shank 57 which is split at 58 and is formed with bulges 59 at its ends circular depressions or holes 60 angularly equipspaced around the head permit molding of the fastener member on the tape with greater security.

[0040] As can be seen from FIGS. 18 - 20, the female member 61 is disk shaped and is formed with a slot 62 in which the tape is received and has a hole 63 provided with a constriction 64 past which the projection 55 can be pressed so that the bulges 59 lie on the opposite side of the constriction from that on which the head of the male fastener is located (see FIG. 21).

[0041] To facilitate insertion and removal of the projection, the hole 63 has conical convergent and divergent flanks 65 and 66 on opposite sides of the constriction 64.

[0042] The curvature of the concave portion 67 of the female member 61 matches the curvature of the concavity 56 so that the overall thickness of the assembled press button (FIG. 21) is comparatively small and substantially less than 5mm.

[0043] The male member 50 is shown to be mounted on the tape 68 in FIG. 21 while the female member 61 is mounted on the tape 69 and the back of the fastener is additionally covered by a brushed or plush fabric strip at 70 to cushion the fastener toward the body of the user.

[0044] While the press button of FIGS. 15 - 21 is engaged by pressing the male member into the female member and released by pulling the members apart, the same principle can be used with a lateral engagement of the male member in the female member. In that case, the male member of the fastener may be that described in connection with FIGS. 15 - 17 while the female member 71 as shown in FIG. 22 has a lateral mouth 72 connected to the hole 73 by a constriction 74 passed which the projection of the male member can be pressed. The female member is formed on the tape 75 in this embodiment. Alternatively, the female member 76 can be elongated and provided with the constriction 77 passed which the projection can be forced, a funnel shaped guide 78 being provided to guide the projection into the female member. As can be seen from FIG. 28, the female member can be tapered so that the projection can be guided into the bore by feel since the user can readily discern the direction of insertion by the increased thickness in that direction.

[0045] Another configuration of the female member has been shown at 79 in FIG. 27 and operates with the same principle as that of the female member 76 of FIGS. 23 and 28.

[0046] It will be noted that a number of such female members will normally be provided in a row transversely to the tape (FIGS. 29 - 31) in a brassiere fastener. However, it is possible to provide a single fastener 80 on the tape 81 at each location longitudinally of the tape and in that case, the fastener may be elongated but otherwise operates in accordance with the principles described, enabling the male member 82 (FIG. 25) with its projections 83 to engage behind the constriction 84 by laterally inserting the male member in the female member. The male and female members can be pulled apart like the press button in the manner already described.

[0047] From FIGS. 29 - 31 it will be apparent that rows 84 of the female members 71 can be provided on the tape 75 which can have rolled edges 85 provided with weld seams 86 holding those rolled edges in place. The welding seams are interrupted at 87 between groups of rows 84 and at which the tape is cut to secure each tape segment with say three rows on a respective brassiere

back strap 88 (FIG> 30) for that purpose, after the tape 75 has been cut through in a region between groups of rows, the unseamed edge 87 is opened to receive a tongue of the strap 88 and then closed over that strap, whereupon weld seams 89 are provided to secure the tape to the brassiere strap. Simultaneously, a layer similar to that shown at 70 can be applied to cushion the strap where it contacts the back of the wearer.

[0048] Similarly, the row of male members 50 on the tape 68 can be attached to the brassiere strap 90 so that, by lateral insertion, the male members 50 can be inserted into the female members of one or the other row 84 (see FIG. 31).

[0049] When the tapes 75, 68 are severed transversely between the rows of male or female members or groups of such rows, the free corners can be rounded as has been shown at 91 and 92 in FIG. 30 to prevent injury to the user by the sharp corners. Thus not only are the tape edges rounded by reason of the rolled over edges 85, but the corners are rounded to prevent injury or snagging of garments.

[0050] As can be seen from FIG. 32, a plurality of female fastener halves 110 can be injection molded on a woven tape 111 of thermoplastic synthetic resin threads which is covered on one side by a knitted fabric strip as well be described in greater detail with reference to FIGS. 52 - 55, this strip being folded over onto the inner side of the tape at 112 and welded with a pair of longitudinal weld seams thereto. Each of the female fastener halves 110 (see FIG. 33) has an inner part 113 and an outer part 114 visible on opposite sides of the tape (not seen in FIGS. 33 - 35), the outer part or body 13 being formed with an eyelet 115 into which a slot 116 opens from the periphery of the inner part, this slot having an inwardly converging mouth 117.

[0051] Both the inner and outer parts can have throughgoing holes 18 which facilitate fastening of the injection molded body to the tape.

[0052] From the outer side, the eyelet appears as a hole 19 at a center of the injection molded body which may be composed of polyoxymethylene or polyamide.

[0053] The male fastener half 120 (FIG. 36) may be injection molded on a woven tape 121 which likewise can be covered on its outer side by a strip of knitted fabric, folded over at 122 and ultrasonically welded to the tape. The male fastener half can have an inner body portion 123 formed with a post or pin 124 and a head 125 which is provided with a split 126. The outer body portion is shown at 127 in FIG. 38 and can have a hole 128 at its center aligned with the post. The head 125 tapers from a narrow end 129 to a thick end 130 (FIG. 39) in an insertion direction into the respective eyelet.

[0054] From FIG. 41 it will be apparent that the inner body portion 113 of the female fastener half 110, shown in FIG. 41 to be injection molded onto the tape 111, is convex and received in the concave inner body portion 123 of the male fastener half 120 injection molded onto its tape 121.

[0055] From FIGS. 41 and 42 it will also be apparent that the thicker portion 130 of the head 125 of the pin 124 lies to the rear of the eyelet and is guided into this position by inclined surfaces 131 of the female fastener half 110 (FIG. 42). The female fastener half is shown in greater detail in FIGS. 43 - 47 and has a rim 132 surrounding the eyelet and beneath which the thin portion 129 of the head drops when the head is inserted into the eyelet in the direction of A (FIG. 44). Because the head is split and can be squeezed together, the male fastener half can be pulled out of the female fastener half in a direction perpendicular to the tapes.

[0056] In FIGS. 48 - 51, the split 126 of the male fastener half 120 is shown in greater detail. From FIG. 51, moreover, the concavity 132 of the inner body portion of the male fastener head is shown in greater detail.

[0057] As will be apparent from FIGS. 52 - 55, the female fastener halves 110 may be provided in a succession of rows on the tape 111 which is covered by the brushed tricot strip 133 shown in FIG. 54 so that the folded over edges 112 can be fastened to the tape 111 by ultrasonic weld seams 134 which can have a stitch pattern. The free end of the resulting band can be cold cut at 135 to leave a soft fluffy edge while the opposite end may be open for insertion of the part 136 of the back strap of the brassiere which can then be stitched in place along the seam 137. Similarly, the back strap portion 138 of the brassiere can be inserted between the tape 131 of the male fastener halves 120 and the brushed tricot strip 139 and stitched in place by a stitch seam 140.

[0058] In FIG. 55 the brushed tricot strip 139 and the woven synthetic resin tape 121 have been shown in greater detail and in section.

[0059] From FIGS. 56 - 58, it will be apparent that the fastener halves and, for example, the female fastener half 150 can have annular configurations other than circular. For example, in FIGS. 56 - 58 the fastener half is shown to be oval and to be formed with body portions 151 and 152 injection molded on opposite sides of the woven fastener carrier (FIGS. 61 - 63) or on a thin soft flexible film 153 which may be transparent as shown in FIG. 64. The converging mouth 153 here leads to the central opening 154 which has a part 155 adapted to overhang the head of the male member in the manner previously described. In any of the embodiments, the female member 155, for example, can be provided with a wedge shaped projection 156 opposite the mouth 153 and positioned to engage in the crevice 157 formed in the head 158 when the male fastener half 159 is locked into the female fastener half as shown in FIG. 60, thereby causing the wedge 156 to cam the two parts of the head apart and increase the strength with which the male fastener half is returned in the female fastener half.

[0060] FIGS. 61 - 63 show the cushioning of the tape and, while illustrated with respect to a female fastener half 160 are applicable to both the male and the female fastener halves.

[0061] The tape 161 (FIG. 61) comprises the woven fastener carrier 162 on which the fastener halves 160, etc. are injection molded as previously described. The knitted outer strip 163 has overhanging edges 164 which are ultrasonically welded to the woven fastener carrier 162 and between these two strips is a cushioning strip which has been represented at 165 and can be a knitted tape, a nonwoven strip or even a foam material.

[0062] The edge of the tape can be cold cut transversely at 166 and the surface of the knitted cover strip turned toward the body of the wearer may be brushed at 167 to provide a particularly soft hand.

Claims

1. A method of making a metal-free strap fastener for articles of clothing including brassieres, lingerie and corsetry, comprising the steps of:

(a) molding onto a first elongated knit web of a thermoplastic yarn, a succession of eyelets to form a female-fastener strip;
(b) enfolding said female-fastener strip in a second elongated web of a thermoplastic yarn so that edge portions of said second web overlie one face of said female-fastener strip alongside said succession of eyelets and another portion of said second web covers the other face of said female-fastener strip;
(c) ultrasonically joining said edge portions to said female-fastener strip and said female-fastener strip to said other portion of said second web at longitudinally spaced-apart intervals along said female-fastener strip at which said eyelets are located to form a fastener band; and
(d) ultrasonically severing successive lengths from said band, each of said lengths including at least one of said eyelets whereby said lengths can be affixed to a garment for engagement of a male fastener in the respective eyelet to secure the garment.

2. The method defined in claim 1, further comprising the step of ultrasonically or mechanically piercing said first web to form a succession of holes, said eyelets being molded onto said first web around said holes.

3. The method defined in claim 1 wherein said webs are ultrasonically joined together along an end of the length formed by ultrasonically severing said lengths from said band.

4. The method defined in claim 1 wherein said webs are formed of woven or tricot knit fabrics or a woven tape covered with a tricot fabric tape.

5. The method defined in claim 4 wherein said webs are formed from a polyamide synthetic resin and said eyelets are molded from a polyamide synthetic resin.

6. The method defined in claim 1 wherein between said locations, said edge portions are not bonded to said strip so that, for attachment of said lengths to said garments, a strip of a garment is insertable under said edge portions and said edge portions are then secured to said strip.

7. The method defined in claim 1 wherein said eyelets are molded onto said first web in a succession of spaced-apart groups of at least three eyelets per group.

8. The method defined in claim 1, further comprising the step of inserting a fabric tape between said other portion and said female-fastener strip.

9. The method defined in claim 1 wherein said male fastener comprises a hook molded onto a tape composed of a fabric of thermoplastic yarn.

10. The method defined in claim 9 wherein a succession of said hooks is molded onto the tape of said male fastener and said tape of said male fastener is severed ultrasonically between said hooks into respective male fastener lengths which are secured to said garment, said hooks, said eyelets and said webs and said tape being all composed of polyamide.

11. A strap fastener for articles of clothing including brassieres, lingerie and corsetry, said fastener comprising:

(a) a first elongated fabric web of a thermoplastic yarn having at least one coupling member molded onto said first fabric web;
(b) a second elongated fabric web of a thermoplastic yarn into which said first fabric web is enfolded and having a pair of edge portions of said second web overlying one face of said first fabric web at opposite sides of said coupling member, and another portion of said second fabric web covering the other face of said first fabric web;
(c) a pair of ultrasonic welding seams along opposite longitudinal edges of said webs joining said edge portion of said second fabric web to said first fabric web and said first fabric web to said other portion to form one coupling tape; and
(d) a third elongated fabric web of a thermoplastic yarn having another coupling member molded onto said third web and engageable with

said one coupling member, said third web and said other coupling member forming another coupling tape, said coupling tapes being attachable to respective parts of a garment to be held together by said engagement of the coupling members of said tapes.

12. The strap fastener defined in claim 11 wherein said one coupling member is an eyelet and said other coupling member is a hook engageable in said eyelet, said eyelet, said hook, and said webs all being composed of polyamide.

13. The strap fastener defined in claim 12 wherein said first web is formed with an ultrasonically pierced hole surrounded by said eyelet.

14. The strap fastener defined in claim 13 wherein each of said webs is a woven tape which can be covered with a tricot knit fabric.

15. The strap fastener defined in claim 11, further comprising a fabric strip received between said other portion and said first fabric web.

16. A method of making a strap fastener for articles of clothing including brassieres, lingerie and corsetry, comprising the steps of:

(a) molding onto a first elongated knit web of a thermoplastic yarn, a succession of synthetic resin coupling members a fastener strip;
(b) enfolding said fastener strip in a second elongated knit web of a thermoplastic yarn so that edge portions of said second web overlie one face of said fastener strip alongside said succession of coupling members and another portion of said second web covers the other face of said fastener strip;
(c) ultrasonically joining said edge portions to said fastener strip and said fastener strip to said other portion of said second web at longitudinally spaced-apart intervals along said fastener strip at which said coupling members are located to form a fastener band; and
(d) ultrasonically severing successive lengths from said band, each of said lengths including at least one of said coupling members whereby said lengths can be affixed to a garment for engagement of a complementary coupling member in the respective coupling member of the fastener band to secure the garment.

17. The method defined in claim 16 wherein said webs are composed of polyamide woven fabric and said coupling members are composed of polyamide.

18. A press-button fastener comprising:

a female member mounted on a tape and disposed on opposite sides thereof, said female member having a generally flat body with a hole formed with a constriction, said body having a peripheral slot receiving the tape and having a convex surface on at least one side thereof; and
a male member having a disk-shaped head mounted on another tape and disposed on opposite sides thereof, said disk having a peripheral slot receiving the respective tape and having on one side of the respective tape a pin receivable resiliently in said hole and, around said projection, a concavity matching a curvature of said convex surface and receiving said convex surface upon insertion of said projection into said hole.

19. The press-button fastener defined in claim 18 wherein said members each have formations spaced about respective peripheries for anchoring said members to the respective tapes.

20. The press-button fastener defined in claim 18 or 19 wherein said body is formed with a lateral opening communicating with said hole and through which said pin is insertable into said hole.

21. The press-button fastener defined in any of claims 18 - 20 wherein a plurality of the female members are mounted upon a respective tape in at least one row and the tape carrying said female members is secured to a brassiere strap.

22. The press-button fastener defined in any of claims 18 - 21 wherein said female members are tapered in thickness and have increased thickness in a direction of lateral insertion of the pin into a respective female member.

23. The press-button fastener defined in any of claims 18 - 22 wherein a plurality of said female members are provided in each of a plurality of transverse rows across the respective tape and a plurality of said rows are spaced apart longitudinally of the tape on said brassiere strap.

24. The press-button fastener defined in any of claims 18 - 23 wherein said female members are circular.

25. The press-button fastener defined in any of claims 18 - 24 wherein said female members are elongated in a direction of lateral insertion of the pin into a respective female member.

26. The press-button fastener defined in any of claims 18 - 24 wherein said female members are elongated transversely to a direction of lateral insertion of the pin into a respective female member.

27. The press-button fastener defined in any of claims 18 - 26 wherein said pin has a head receivable behind said construction said female member being formed with a wedge-shaped projection engageable in a crevice in said head to cam parts of said head apart, upon insertion of said male member into said female member.

28. The fastener defined in claim 27 wherein said slot has an inwardly convergent mouth.

29. The fastener defined in claim 28 wherein said head is tapered from a narrow portion to a thick portion in a direction of insertion of said pin into said hole through said slot.

30. The garment fastener defined in claim 29 wherein an inner body portion of said female member half has inclined flanks engaging said head and guiding said head into said hole.

31. The fastener defined in one of claims 18-30 wherein said tapes are woven and are each provided with a brushed-fabric strip along a side of the fastener turned toward the body of a wearer.

32. The fastener defined in claim 31 wherein each of said strips is ultrasonically welded to the respective tape along opposite longitudinal edges thereof.

33. The garment fastener defined in claim 32, further comprising a cushioning strip received between each tape and the respective brushed-fabric strip.

34. The fastener defined in one of claims 18 - 30 wherein at least one of said tapes is a transparent soft plastic film.

35. A brassiere having portions of a back strap interconnected by at least one garment fastener comprising:

a male fastener half injection-moldable onto a first tape and adapted to be secured to one portions of said back strap, said male fastener half being formed with a generally flat circular body having an outer body portion on one side of the first tape and an inner body portion on another side of the first tape, a pin projecting generally centrally from said inner body portion, and a head formed on said pin;

a female fastener half injection-moldable onto a second tape and adapted to be secured to another of said portions of said back strap, said female fastener half being formed with a generally flat circular body having an outer body portion on one side of the second tape and an inner body portion on another side of the second tape, said inner body portion having an eyelet dimensioned to receive and retain said head and an inlet slot leading to said eyelet through which said pin is laterally insertable, said head being withdrawable from said eyelet in a direction perpendicular to said tapes; and

a respective brushed fabric strip covering at least one side of each tape and ultrasonically welded to the respective tape along longitudinal weld seams, the part of the back strap being inserted between each tape and the respective strip and being affixed thereto.

36. The brassiere defined in claim 35 wherein each of said tapes has a plurality of the respective fastener halves spaced apart thereon in a row transverse to said direction.

37. The brassiere defined in claim 35 or 36 wherein said inner body portion of one of said fastener halves is convex and the inner body portion of the other of said fastener halves is concave to receive the convex inner body portion of said one of said fastener halves in a nested relationship.

38. A method of making a garment fastener comprising the steps of:

(a) injection molding a multiplicity of a male fastener halves onto a first woven synthetic-resin fabric band, said male fastener halves each being formed with a generally flat circular body having an outer body portion on one side of the first band and an inner body portion on another side of the first band, a pin projecting generally centrally from said inner body portion, and a head formed on said pin;

(b) injection molding a multiplicity of female fastener halves onto a second woven synthetic-resin fabric band, each of said female fastener halves being formed with a generally flat circular body having an outer body portion on one side of the second band and an inner body portion on another side of the second band, said inner body portion having an eyelet dimensioned to receive and retain said head and an inlet slot leading to said eyelet through which said pin is laterally insertable;

(c) covering at least one side of each of said bands with a strip of brushed knit fabric and ultrasonically welding the respective strip to the respective band along opposite longitudinal edges thereof to form respective weld seams having gaps therein;

(d) transversely severing said first band at gaps in the weld seams thereof to form first tapes each having at least one of said male fastener halves thereon and transversely severing said

second band at gaps in the weld seams thereof to form second tapes each having at least one of said female fastener halves thereon, openings being provided between each tape and the respective strip at an end of the respective tape; and

(e) inserting a respective garment portion into each of said openings and securing the respective garment portion to the respective tape and strip.

39. The method defined in claim 19 wherein said portions are parts of a back strap of a brassiere and are stitched to the respective tape and strip.

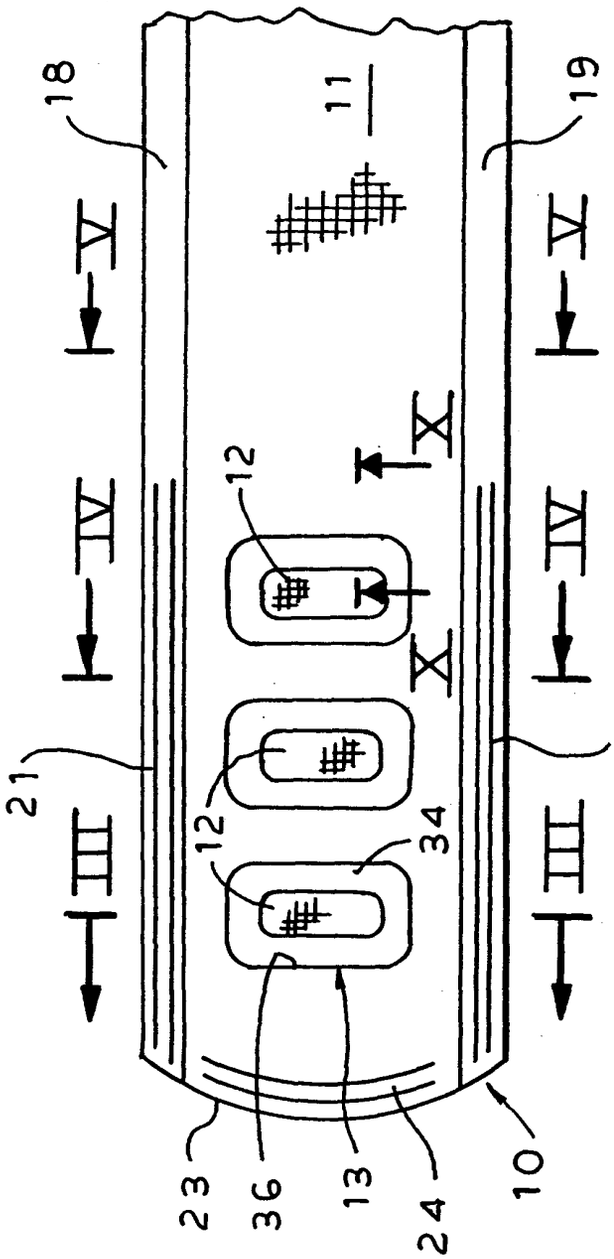

18
19
11
V
V
IV
IV
X
X
12
12
21
21
III
III
34
23
36
13
24
10

FIG. 1

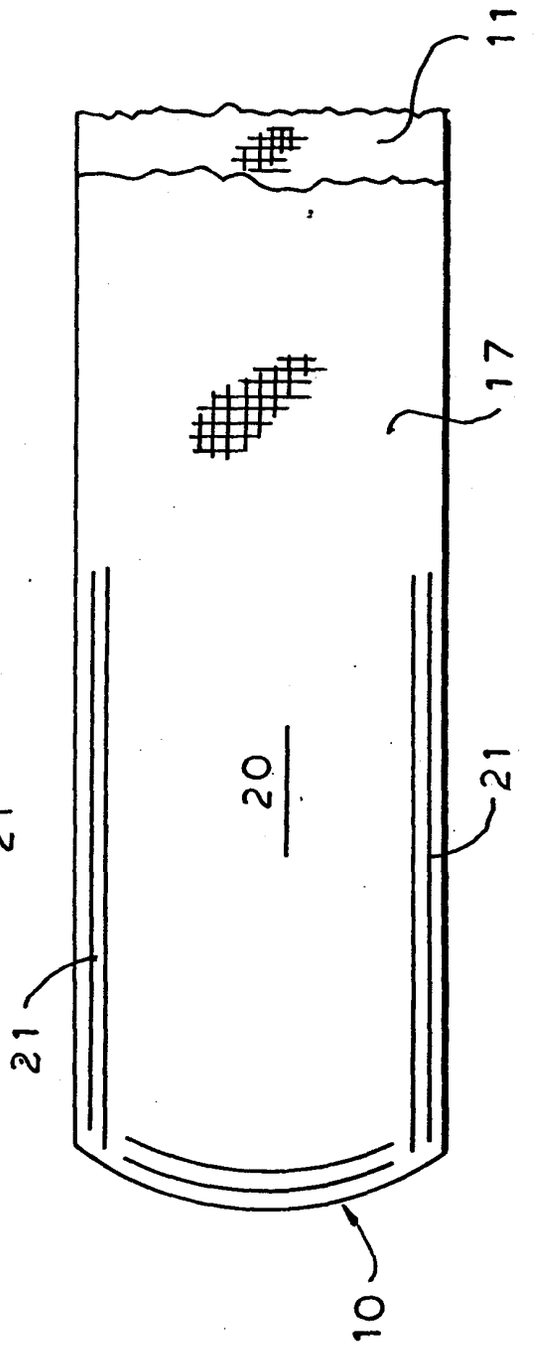

11
17
20
21
21
10

FIG. 2

FIG.5

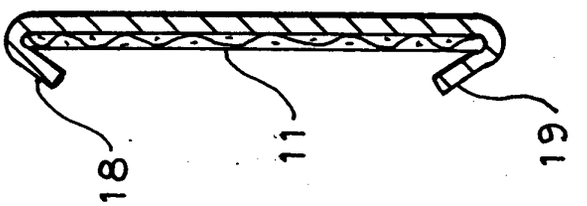


FIG.14

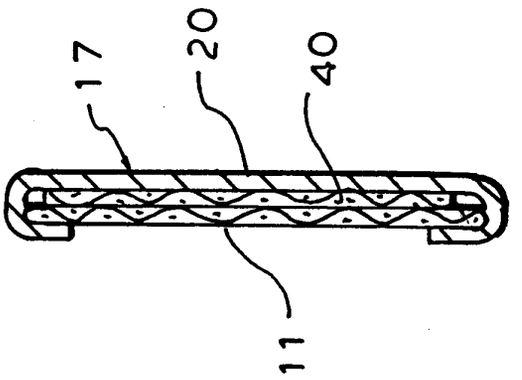


FIG.4

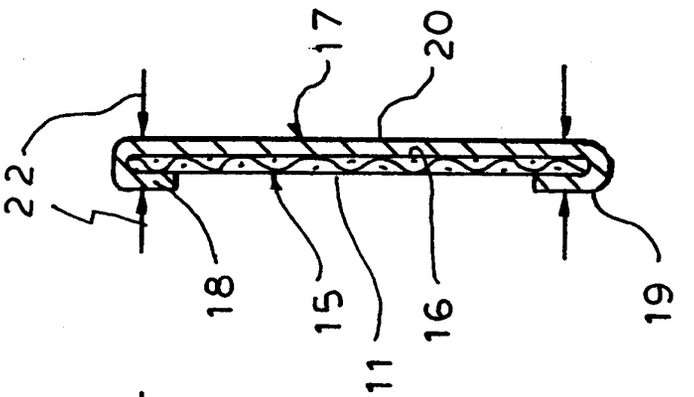
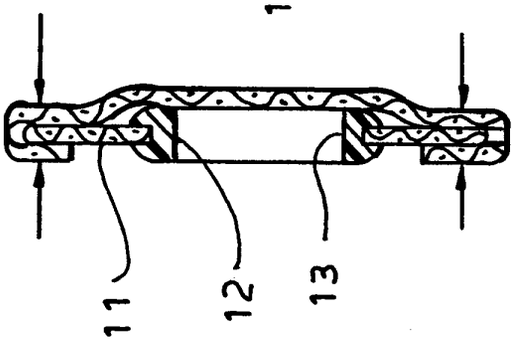


FIG.3



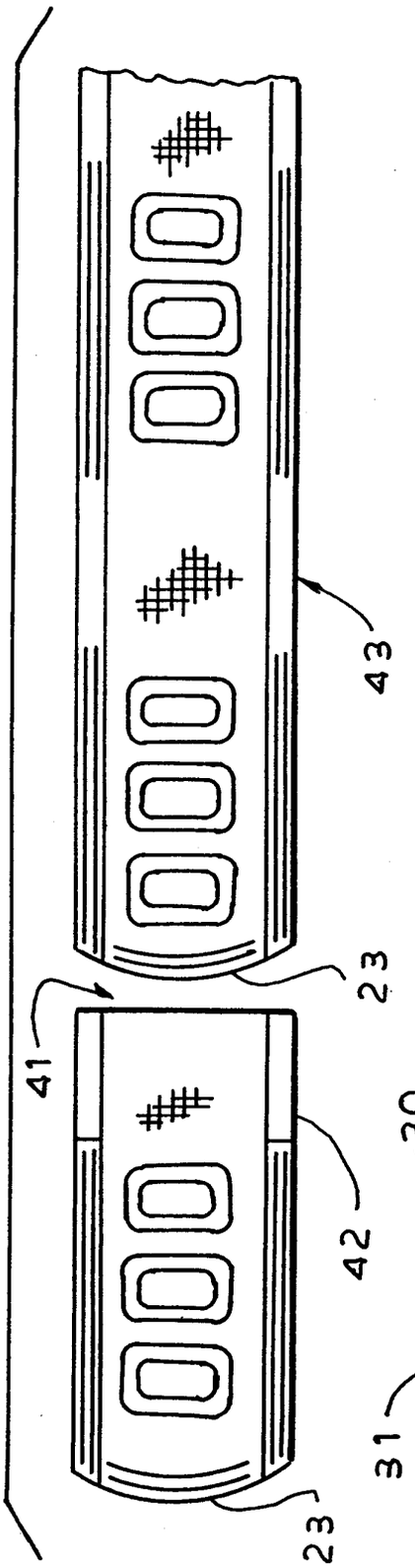


FIG.13

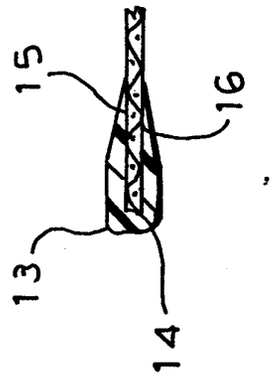


FIG.10

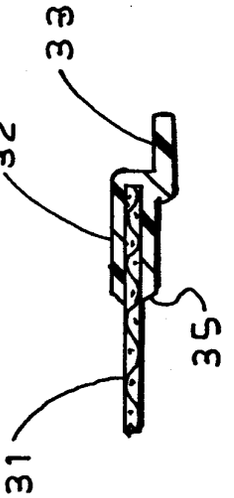


FIG.7

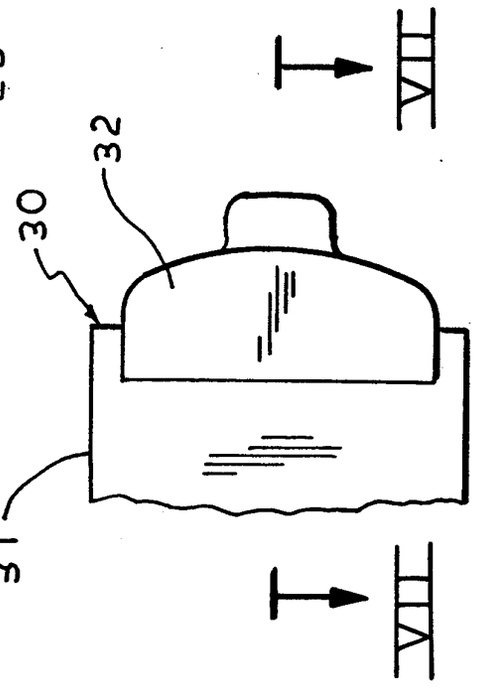


FIG.6

FIG.8

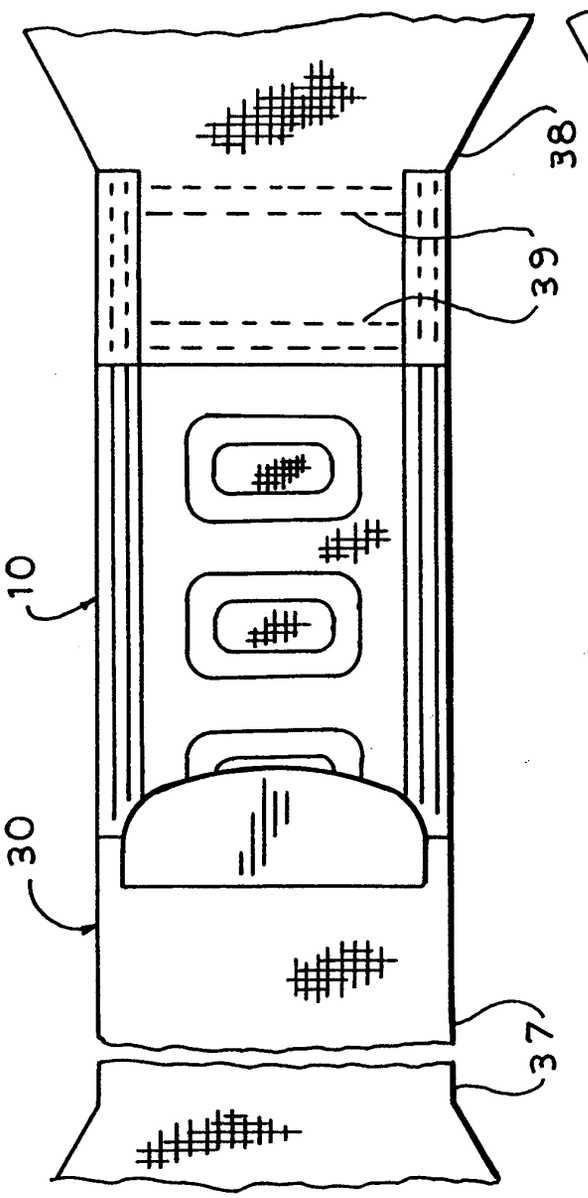


FIG.9

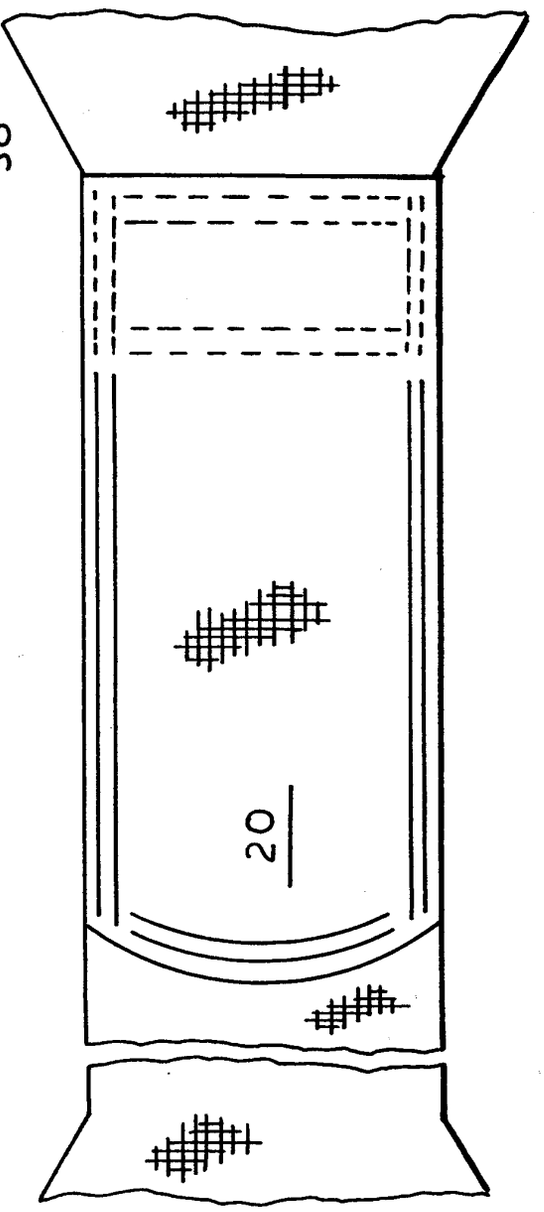


FIG.11

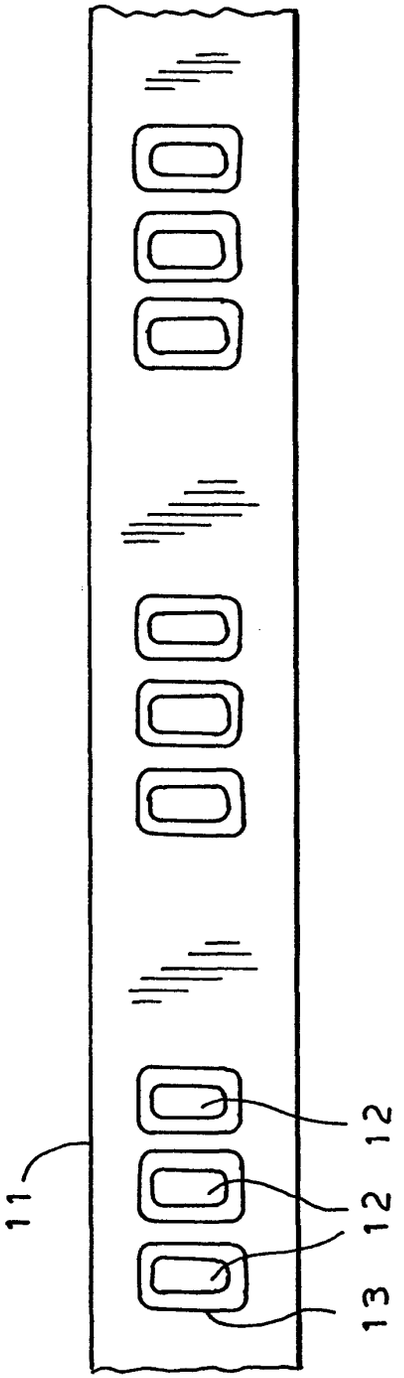


FIG.12

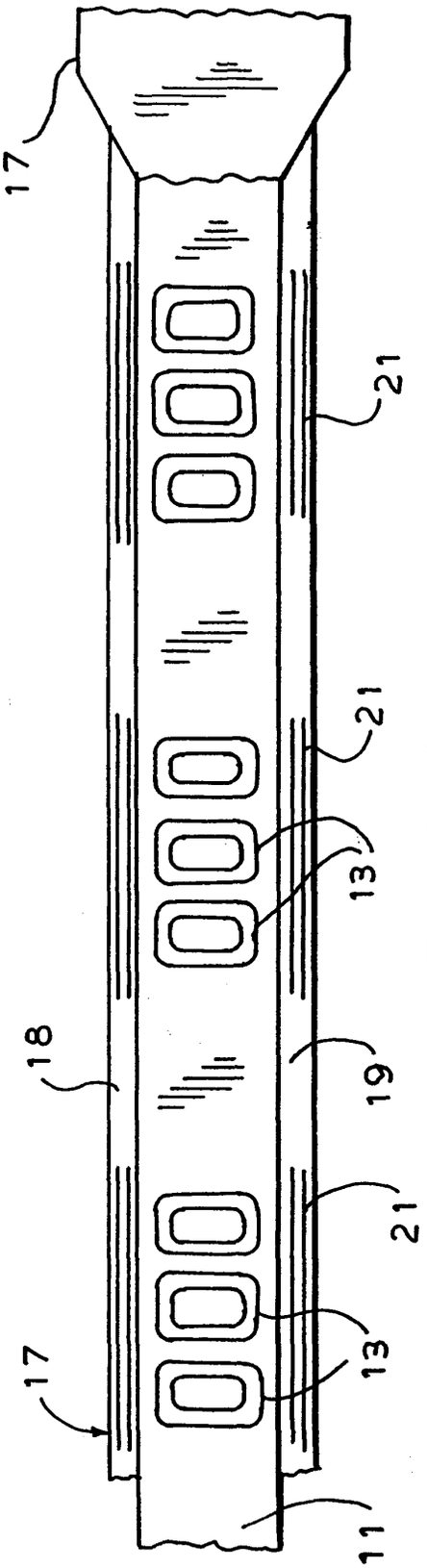


FIG.15

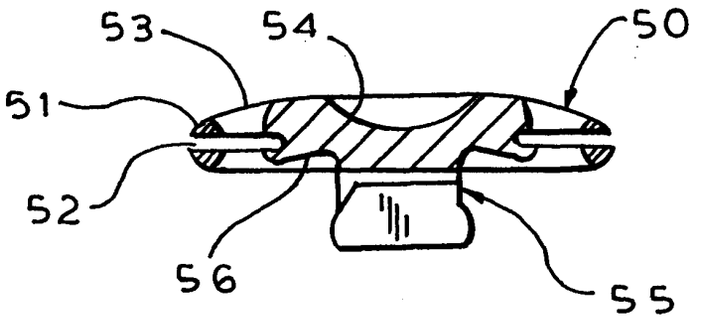


FIG.16

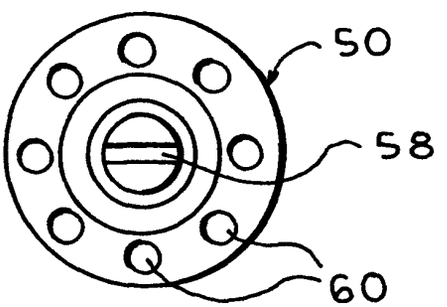
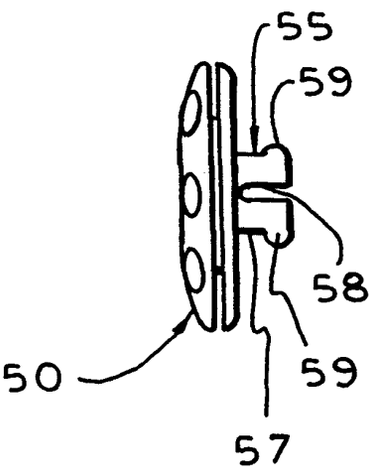


FIG.17



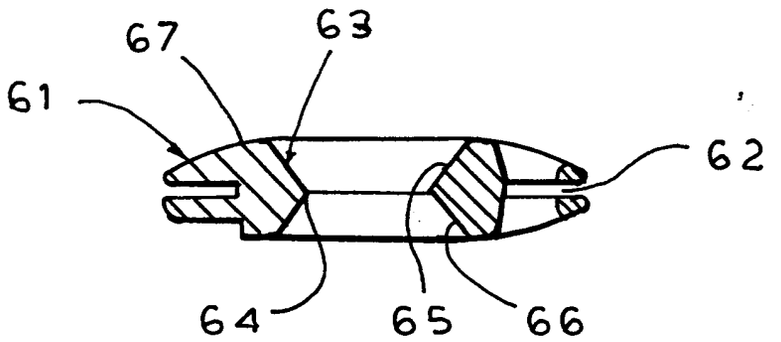


FIG.18

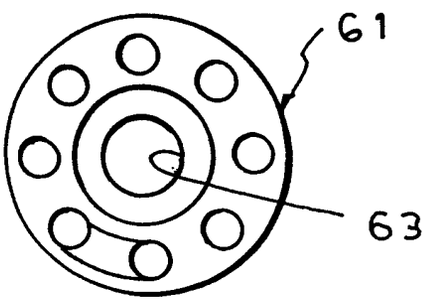


FIG.19

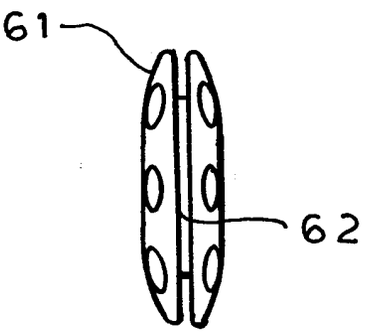


FIG.20

FIG.21

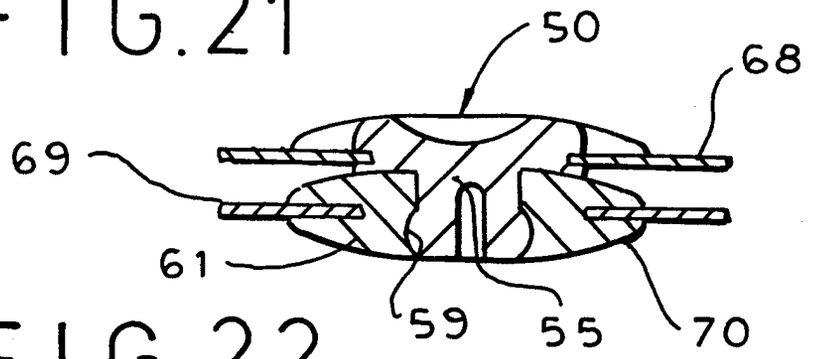


FIG.22

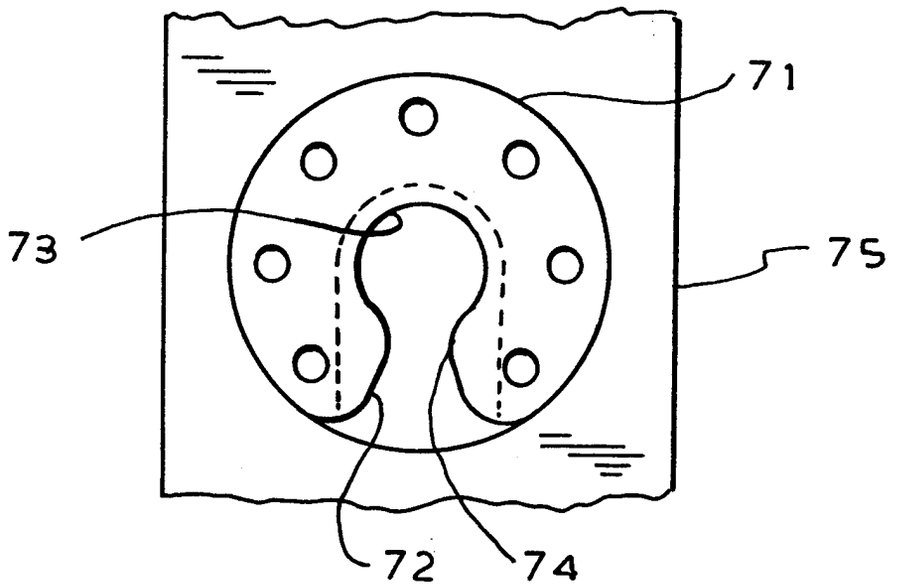


FIG.23

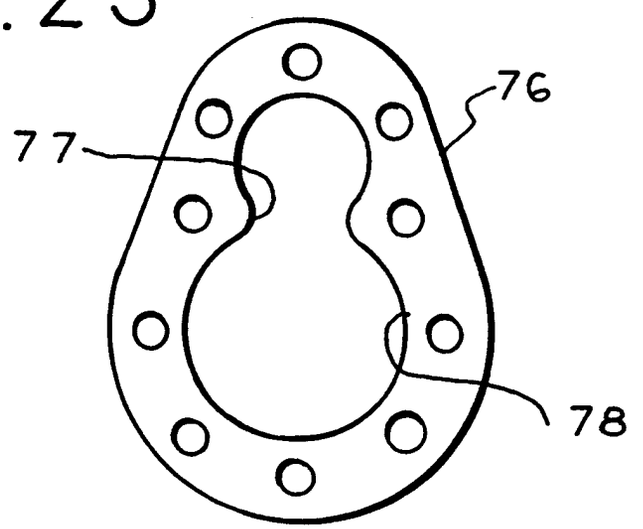


FIG.26

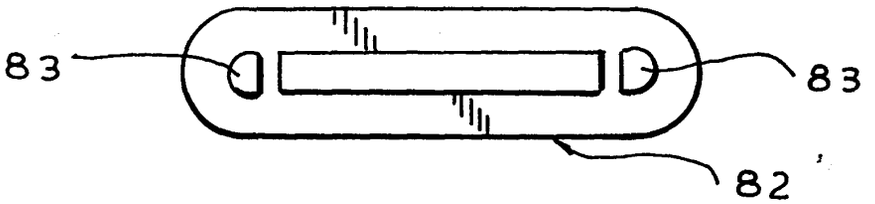


FIG.25

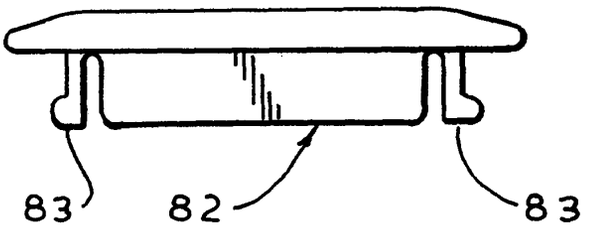
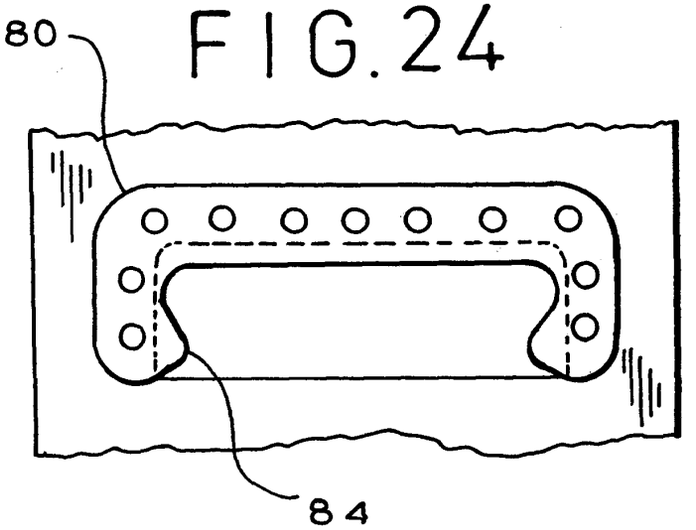


FIG.24



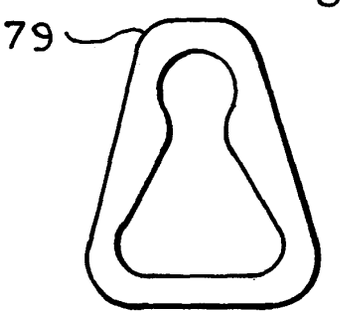


FIG.27

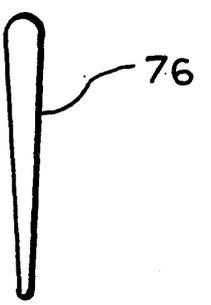


FIG.28

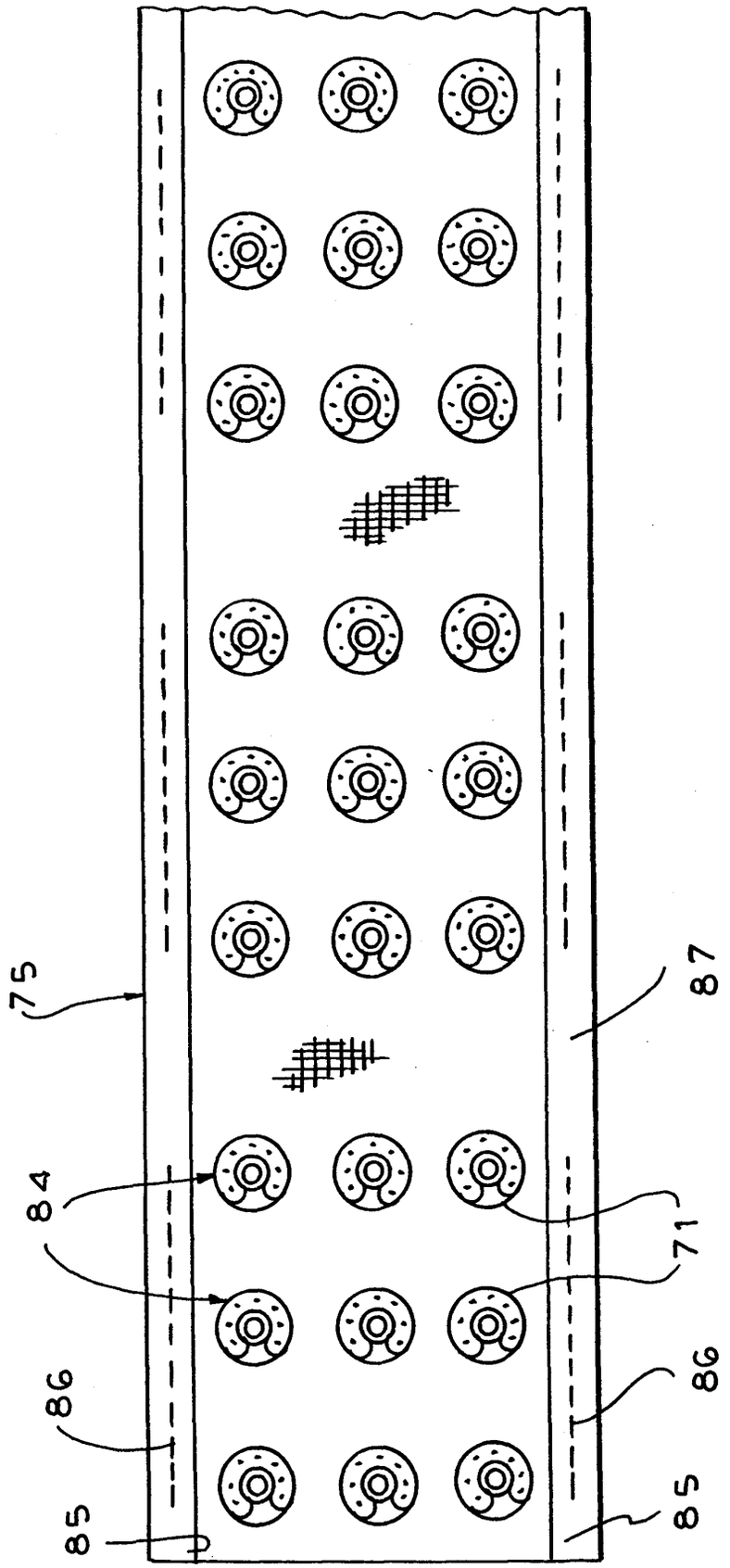


FIG.29

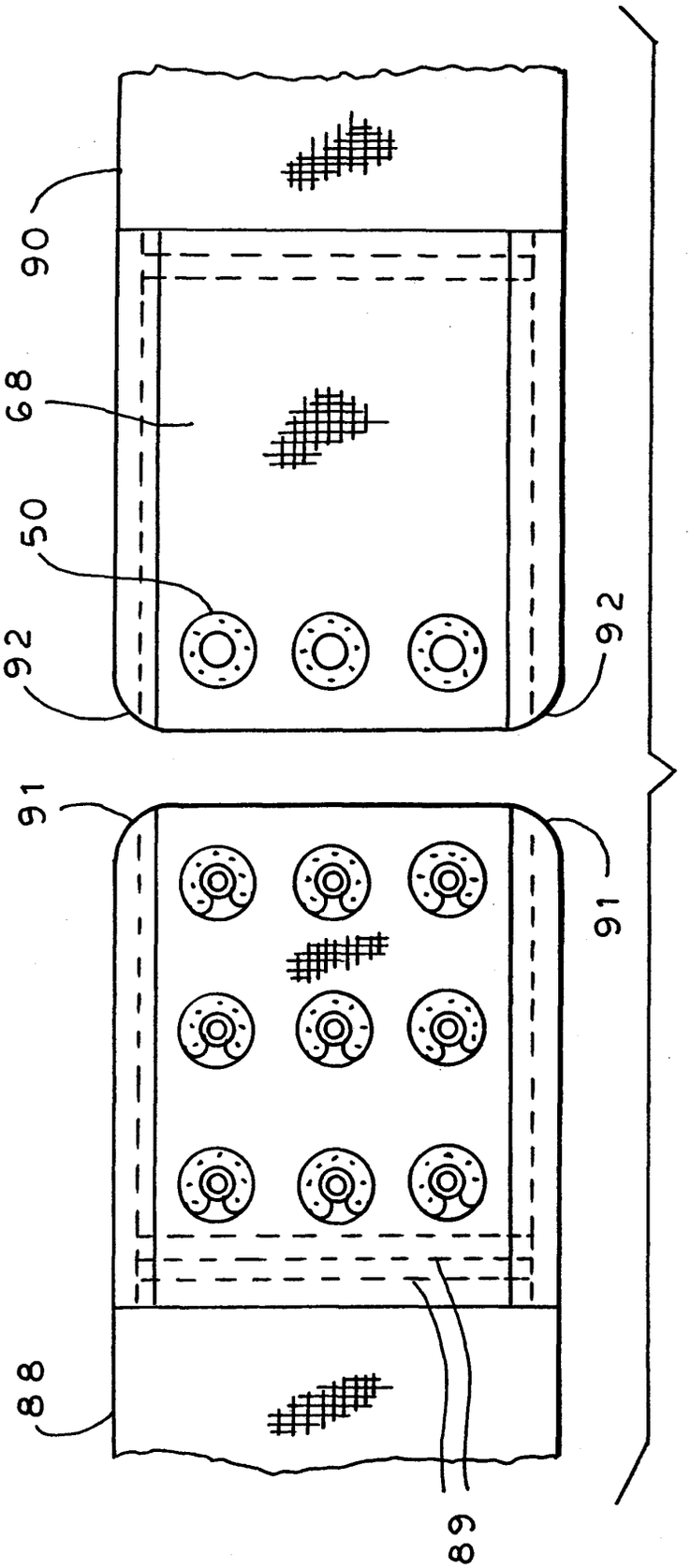


FIG. 30

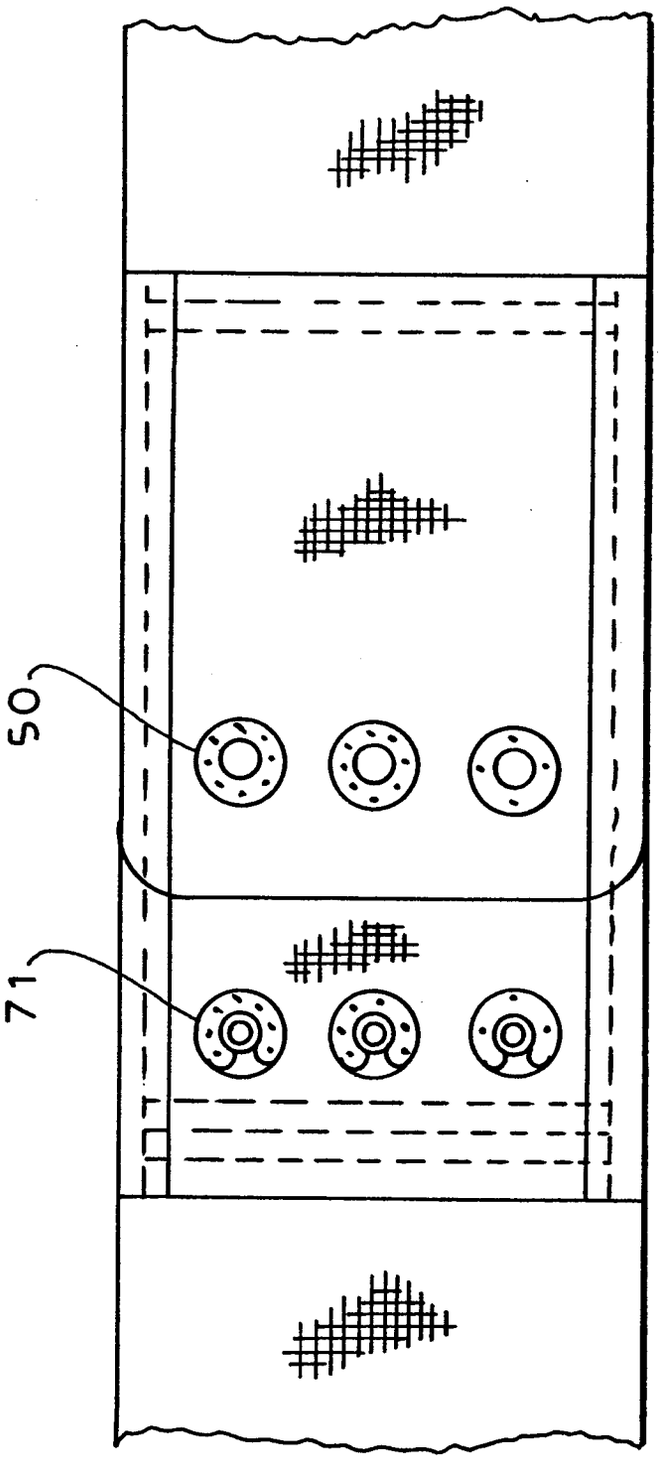


FIG. 31

FIG. 33

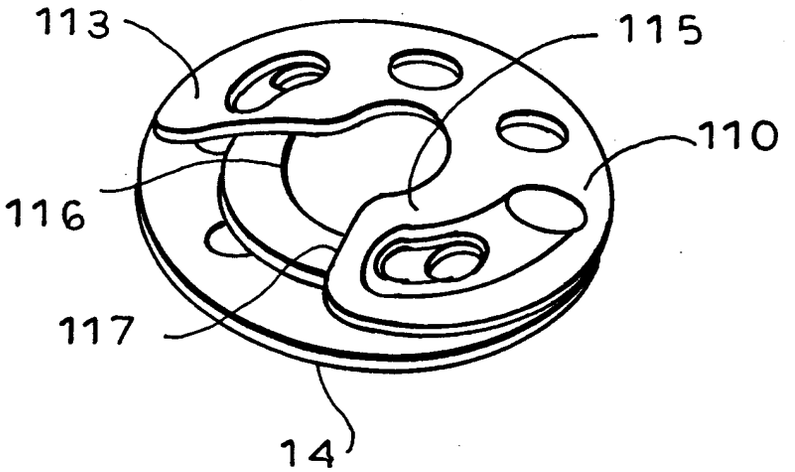


FIG. 34

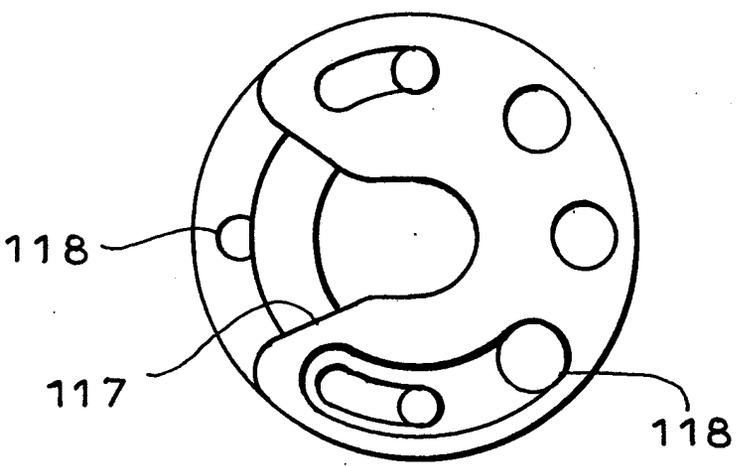


FIG. 35

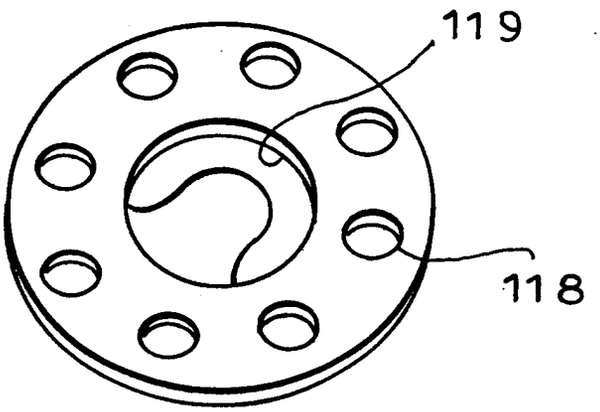
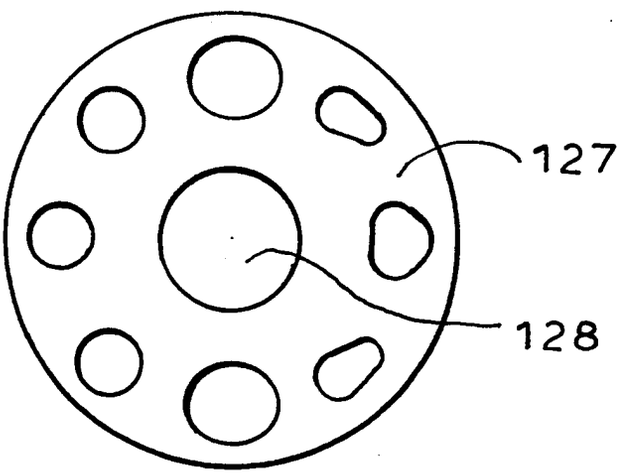


FIG. 38



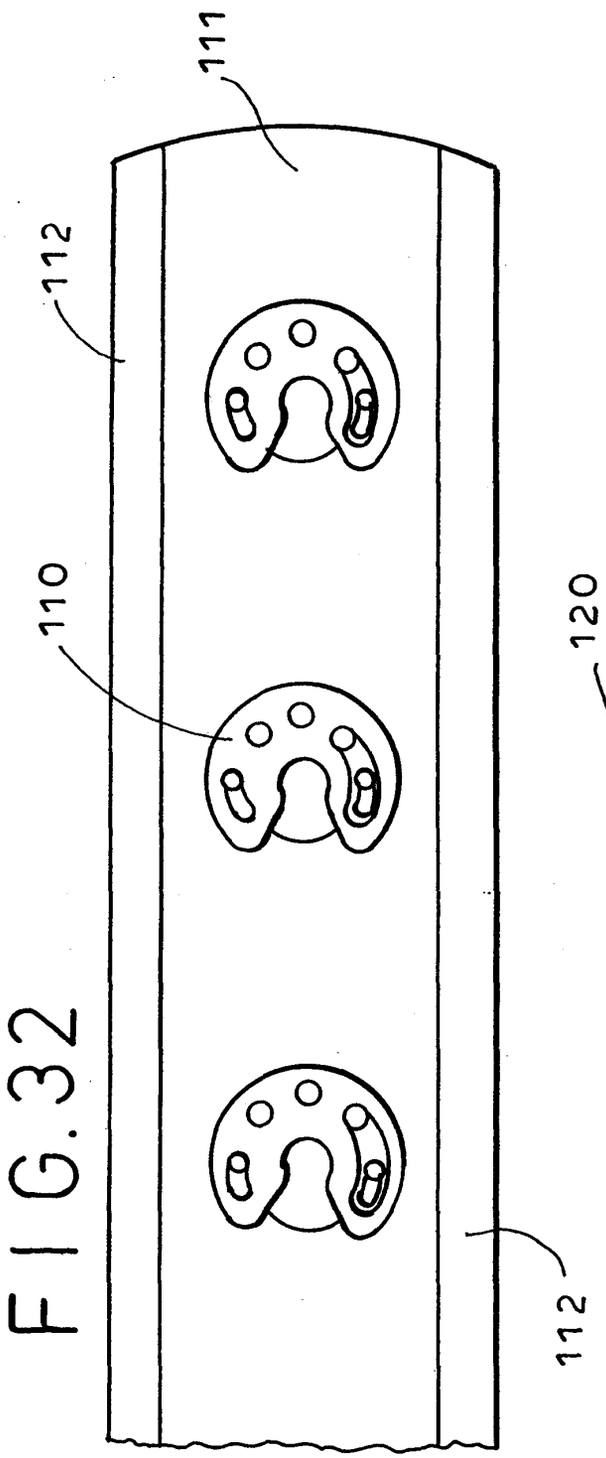


FIG.32

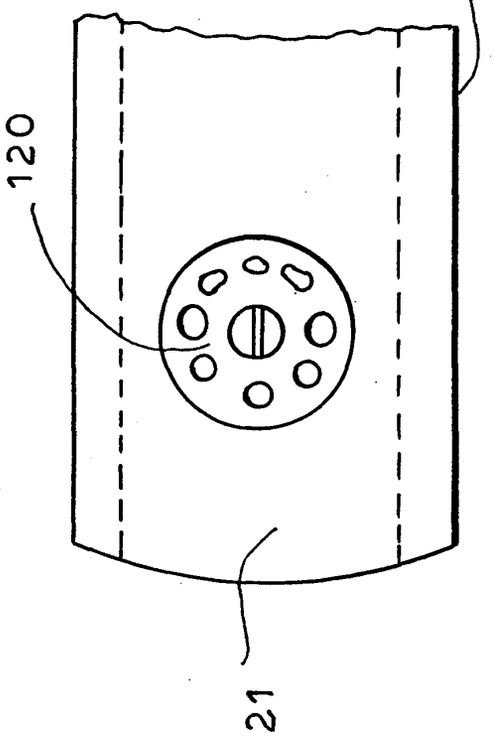


FIG.36

FIG.37

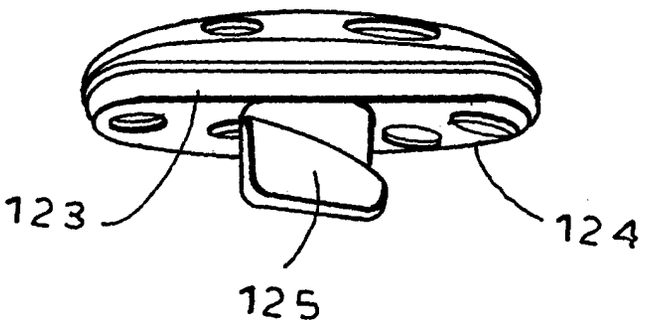


FIG.39

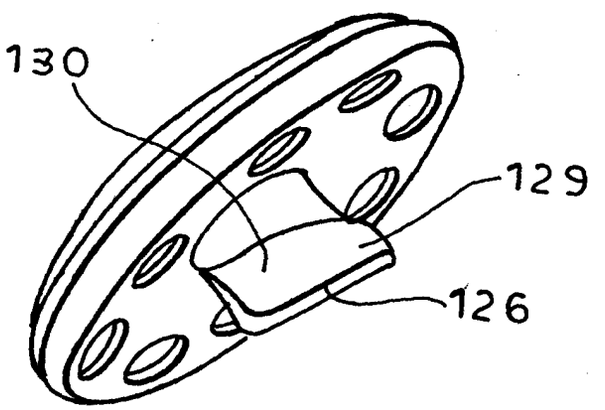


FIG.41

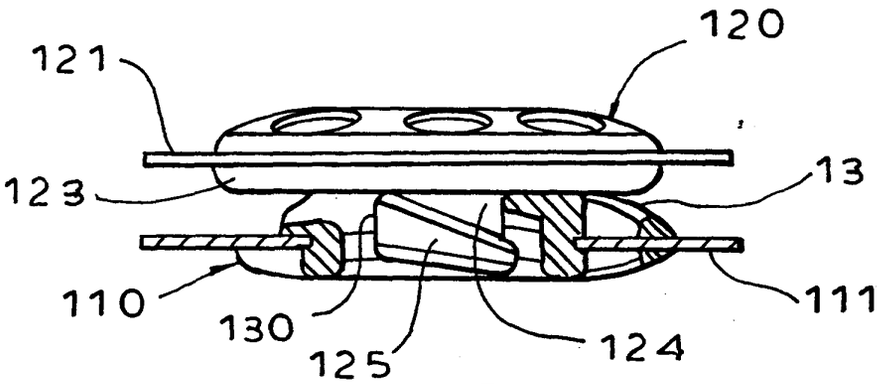


FIG.42

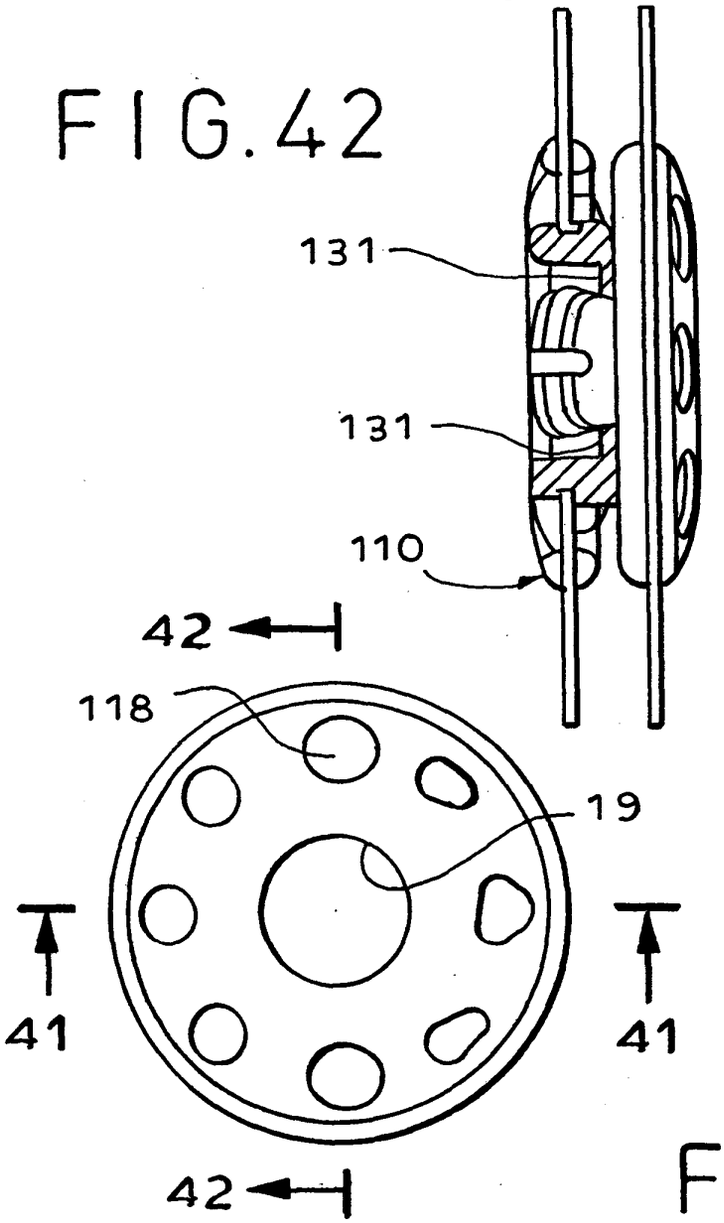


FIG.40

FIG. 47

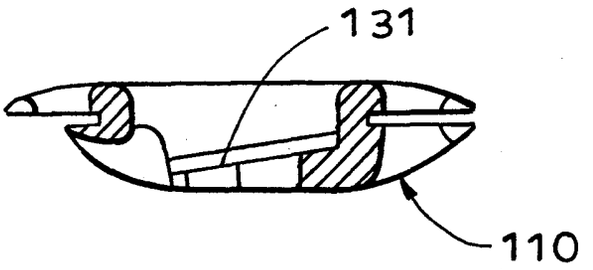


FIG. 45

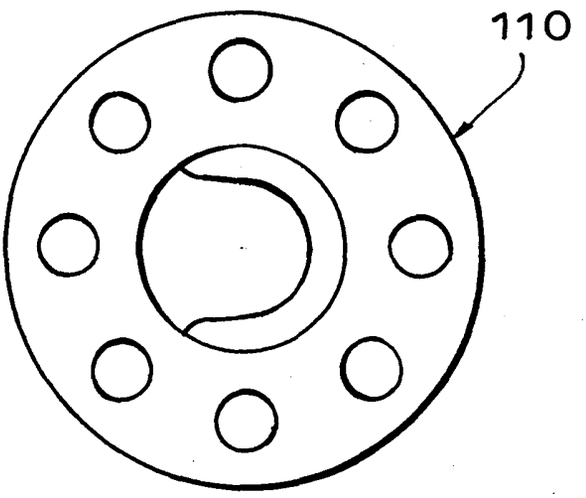


FIG. 43

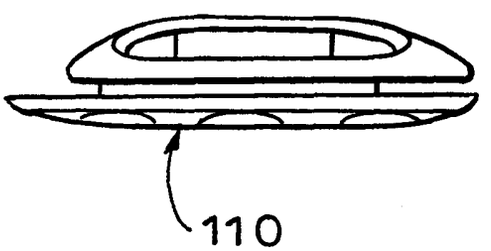


FIG. 50

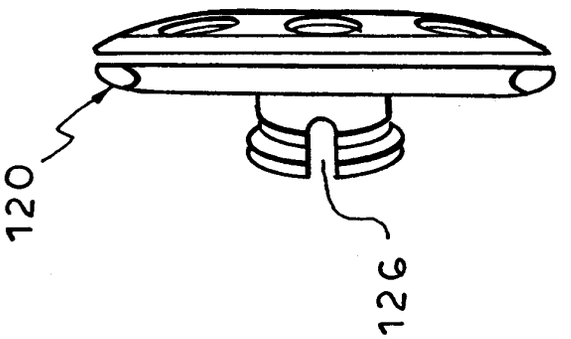


FIG. 46

FIG. 44

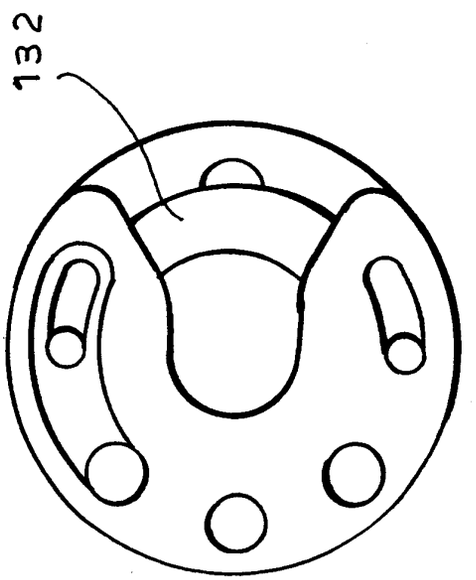


FIG.51

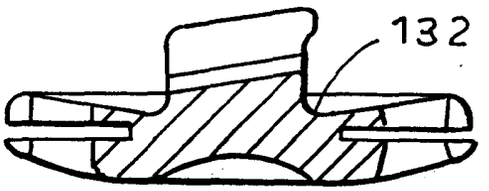


FIG.49

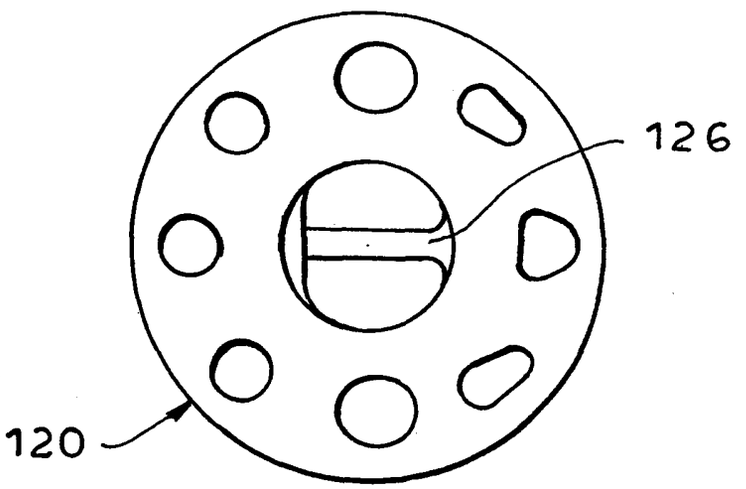


FIG.48

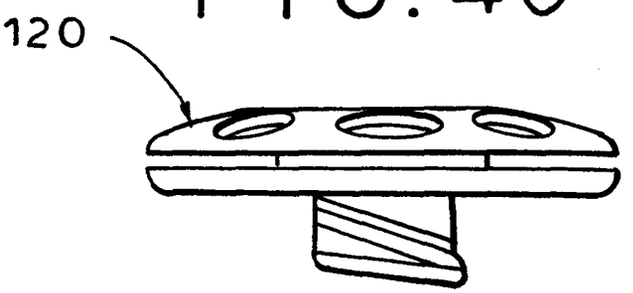


FIG.52

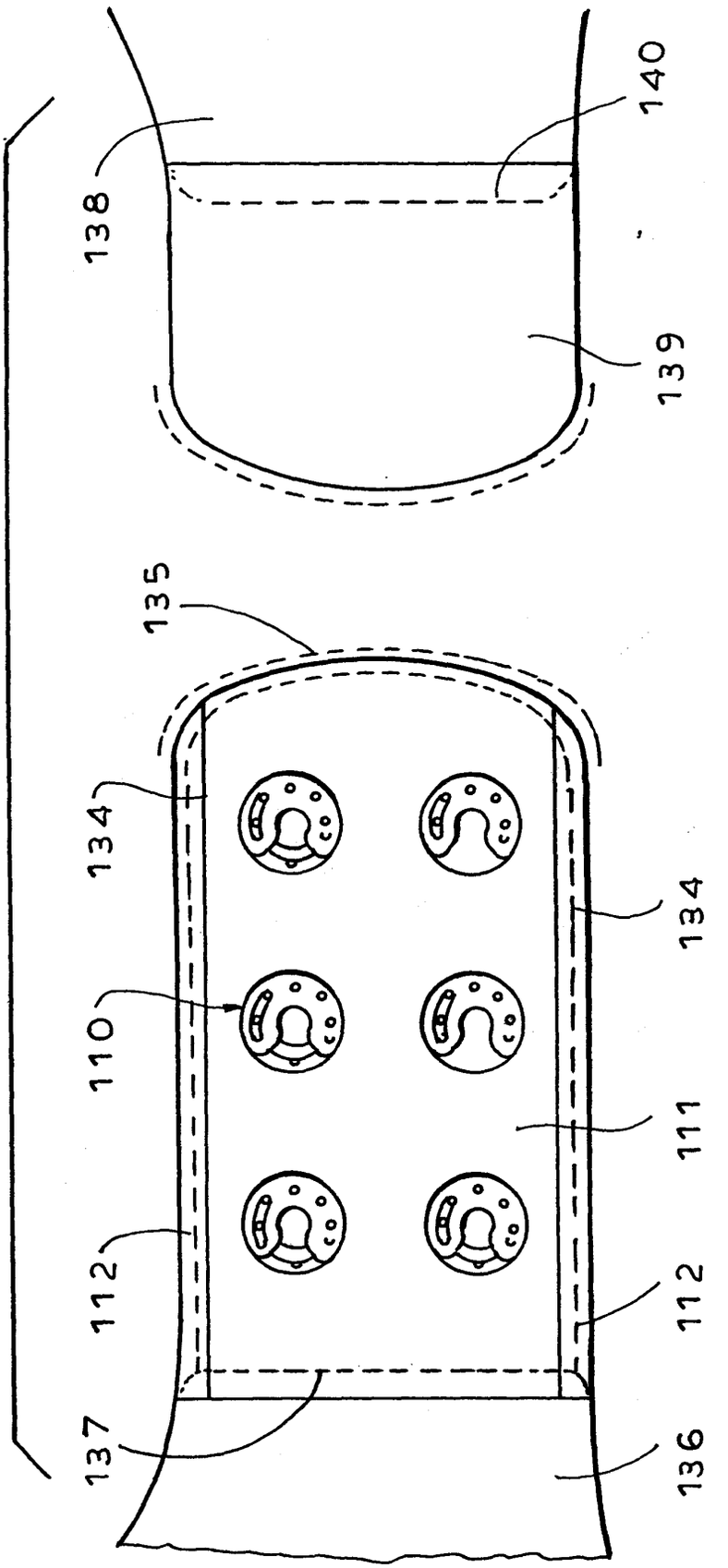
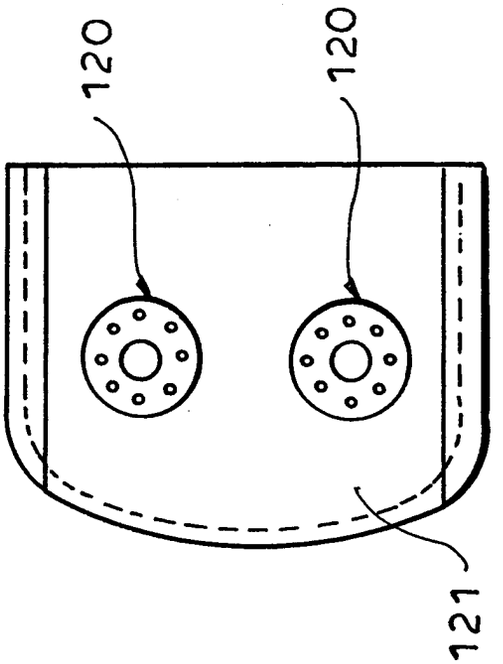


FIG.53



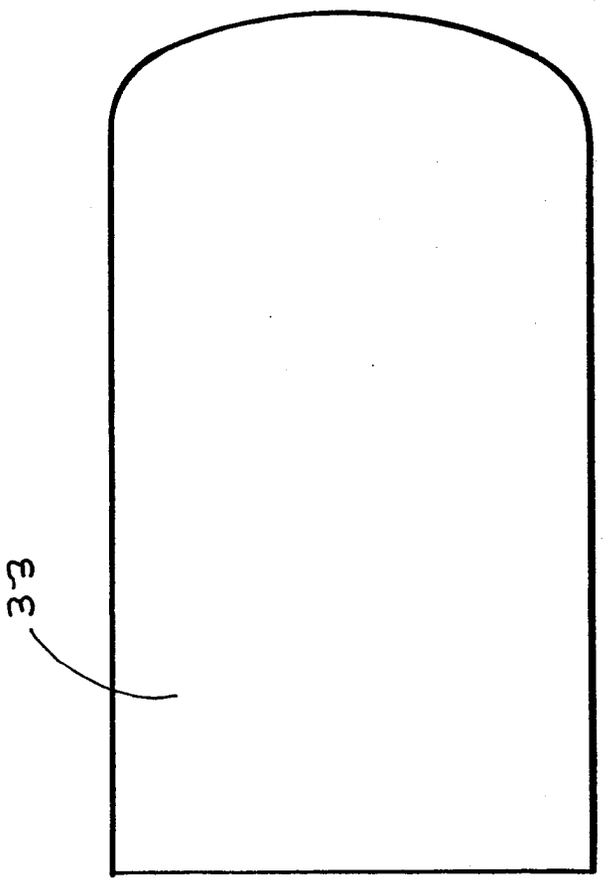
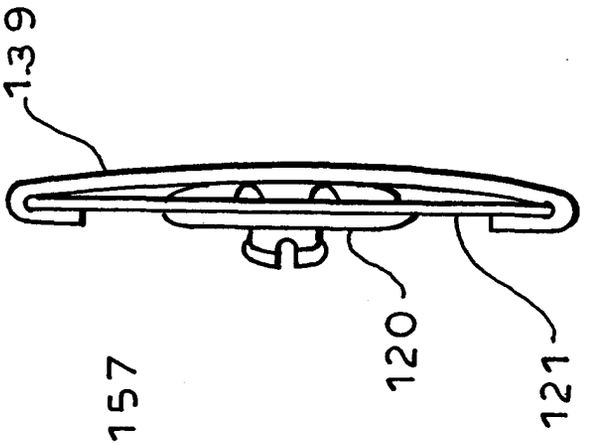


FIG.54

FIG.55



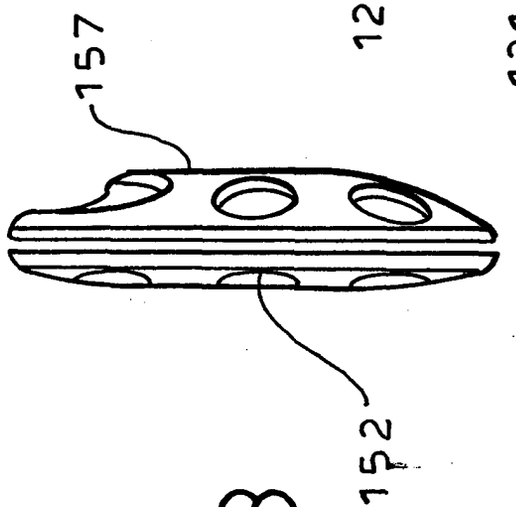


FIG.58

FIG. 56

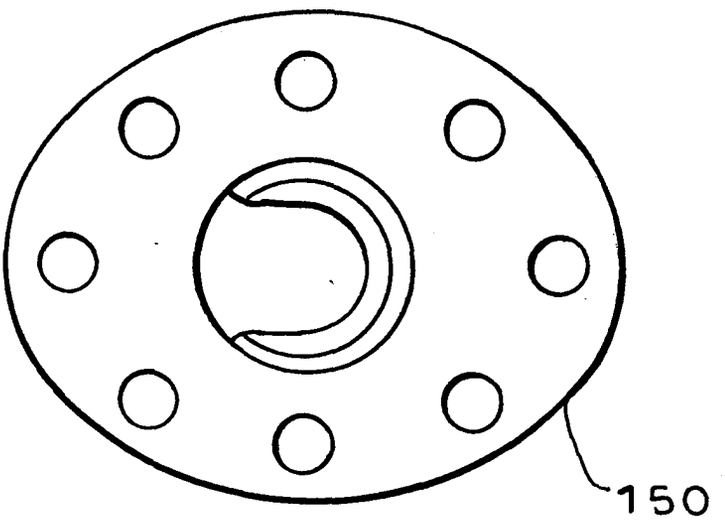


FIG. 57

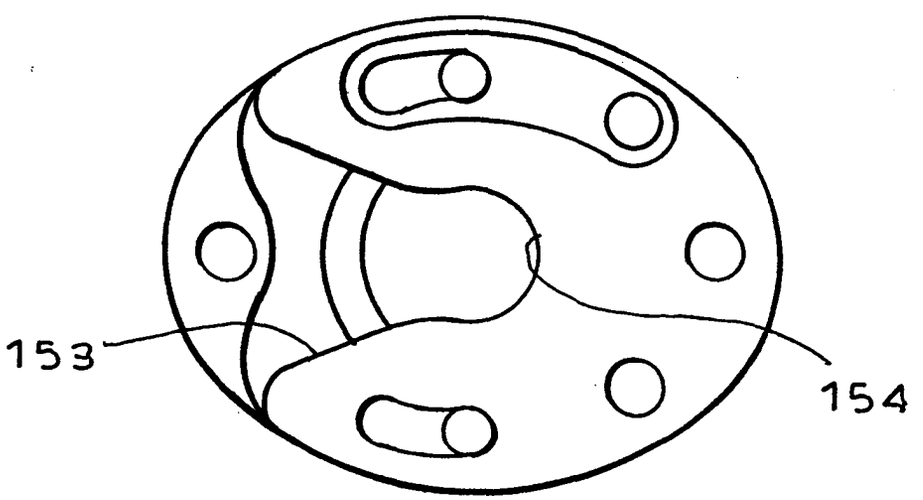
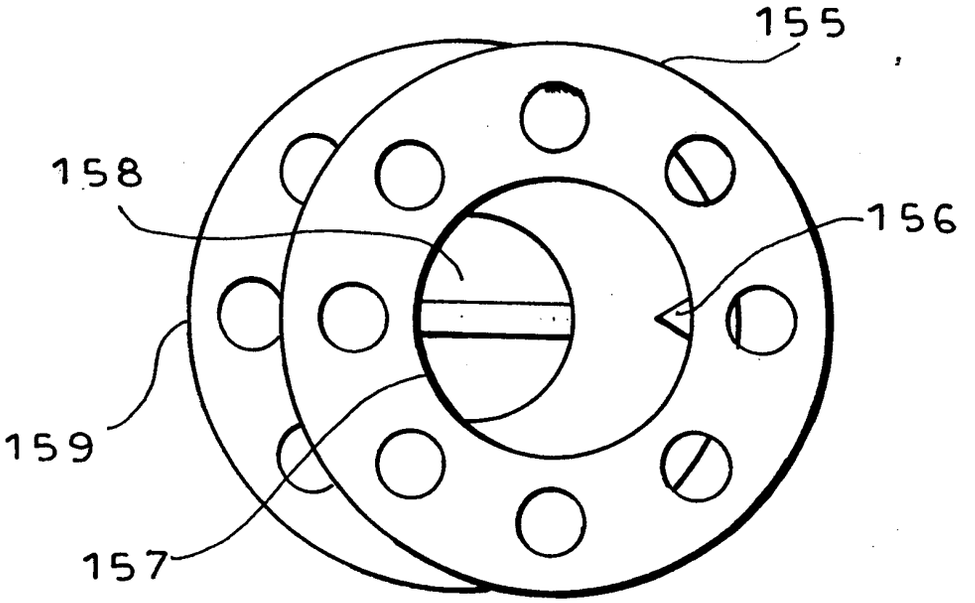


FIG.59



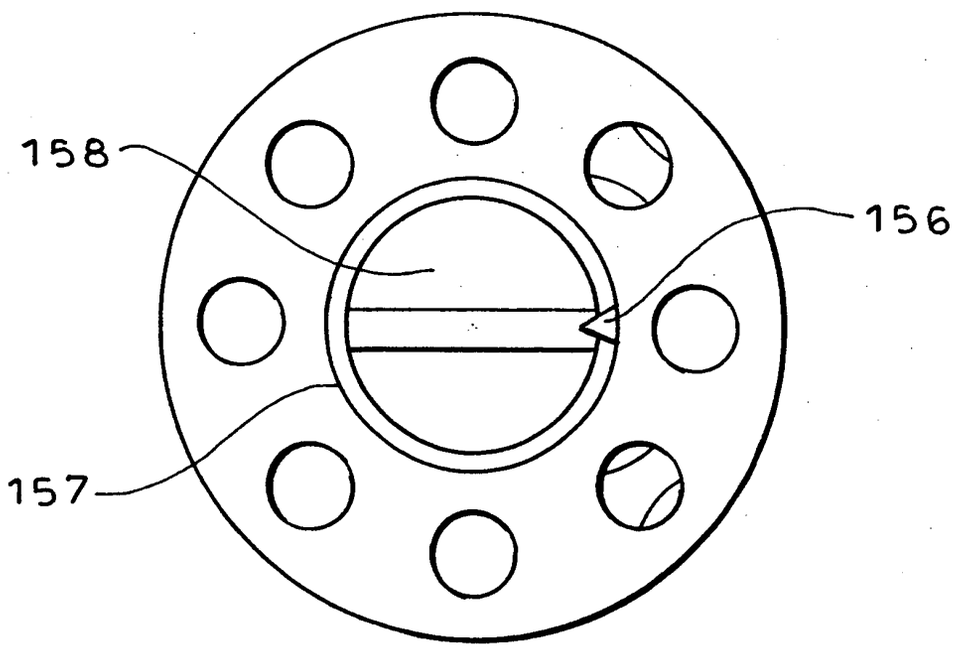


FIG.60

FIG.61

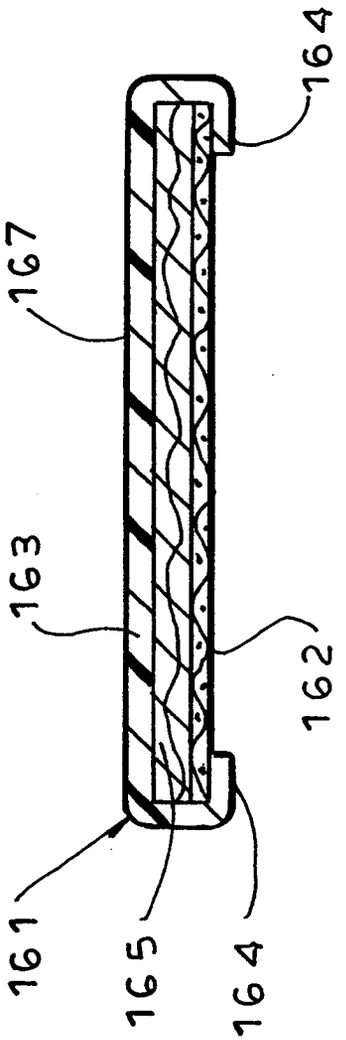


FIG.62

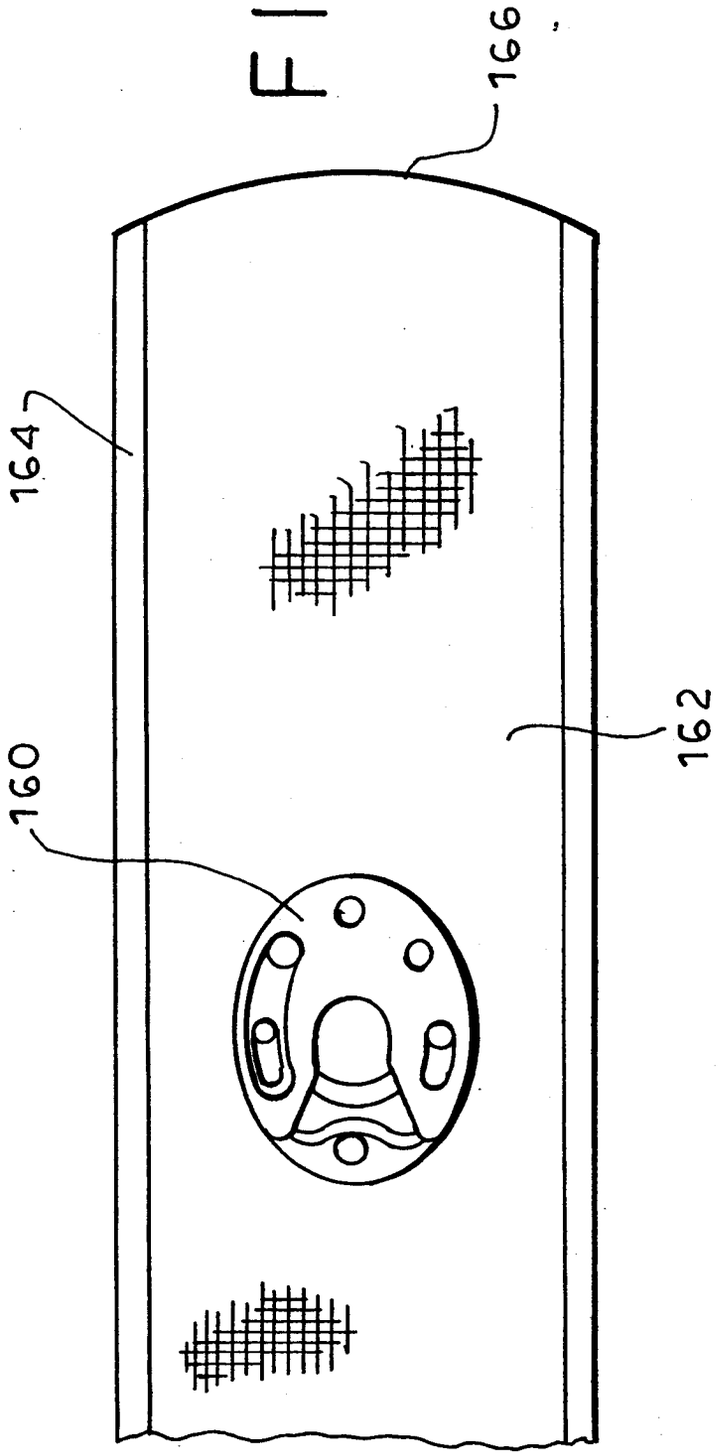


FIG.63

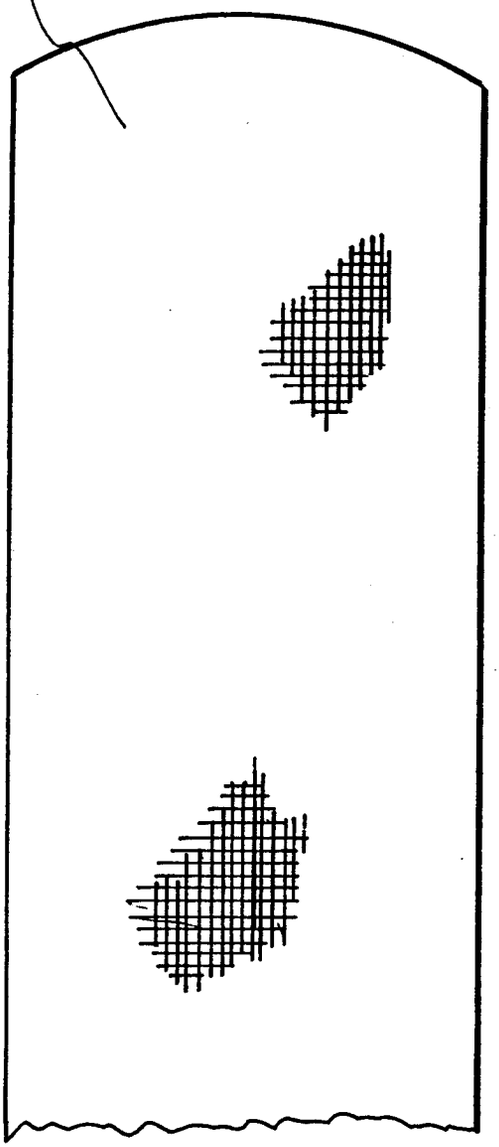


FIG.64