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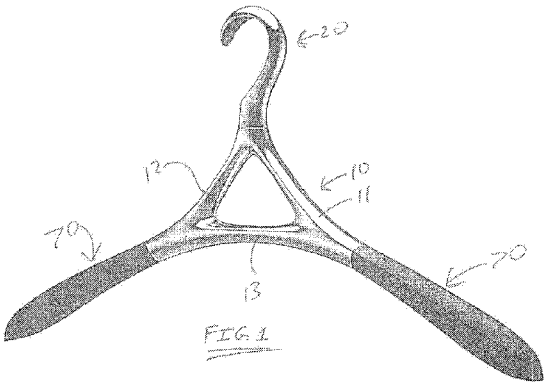


FIG. 1

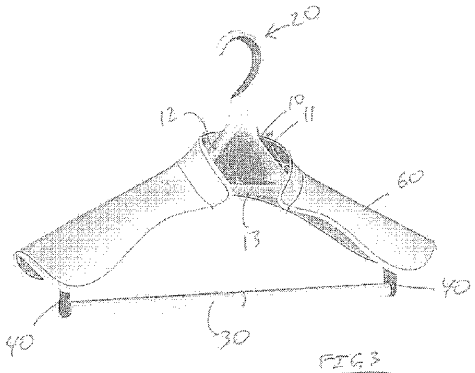


FIG. 3

(57) Abstract: A clothing hanger includes a base member, a rotatable hook connectable to the base member, first and second -arm members connectable to the base member, first and second, support members connectable to the first and second arm members, and first and second support cover members connectable to the first and second support members,

CLOTHING HANGER

BACKGROUND OF THE INVENTION

[0001] The present invention relates to clothing hangers and to a system of clothing hangers in which the individual hangers are configured for use with different garment types.

BACKGROUND AND SUMMARY OF THE INVENTION

[0002] In one embodiment of the present invention, a clothing hanger includes a base member having a first arm having a first end and a second end, a second arm having a first end connected to the first end of the first arm and a second end, a third arm having a first end connected to the second end of the first arm and a second end connected to the second end of the second arm, a first mounting structure adjacent the first end of the first arm and the first end of the second arm, a second mounting structure adjacent the second end of the first arm and the first end of the third arm and a third mounting structure adjacent the second end of the second arm and the second end of the third arm. The first mounting structure includes a surface and a post extending from the surface. The second and third mounting structures each include an opening. The hanger further includes a hook having a mounting structure for engaging the first mounting structure of the base member and selectively securing the hook to the base member in multiple orientations with respect to the base member. The mounting structure of the hook includes a surface having an opening for receiving the post of the first mounting structure such that the hook is rotatable about the post. The hanger further includes a first arm member having a first end having a projection extending therefrom for engaging the opening in the second mounting structure to secure the first arm to the base member, and a second arm member having a first end having a projection extending therefrom for engaging the opening in the third mounting structure to secure the second arm to the base member.

[0003] In one embodiment, the hanger further includes an opening in the first arm member, a first support member having a projection for engaging the opening in the first arm member to secure the first support member to the first arm member, an opening in the second arm member, a second support member having a projection for engaging the opening in the second arm member to secure the second support member to the second arm member, an opening in the first support

member, a first support cover member having a projection for engaging the opening in the first support member to secure the first support cover member to the first support member, an opening in the second support member, and a second support cover member having a projection for engaging the opening in the second support member to secure the second support cover member to the second support member.

[0004] In another embodiment of the present invention, a clothing hanger includes a base member having a first arm having a first end and a second end, a second arm having a first end connected to the first end of the first arm and a second end, and a third arm having a first end connected to the second end of the first arm and a second end connected to the second end of the second arm, a first mounting structure adjacent the first end of the first arm and the first end of the second arm, a second mounting structure adjacent the second end of the first arm and the first end of the third arm, and a third mounting structure adjacent the second end of the second arm and the second end of the third arm. The hanger further includes a hook having a mounting structure for engaging the first mounting structure of the base member and securing the hook to the base member. The hanger also includes a first arm member having a first end and a second end and a second arm member having a first end and a second end. The first end of the first arm member is configured to engage the second mounting structure of the base member to secure the first arm member to the base member and the first end of the second arm member is configured to engage the third mounting structure of the base member to secure the second arm member to the base member.

[0005] In one embodiment, the first mounting structure includes a surface having a post extending therefrom. In another embodiment, the mounting structure of the hook includes a surface having an opening for receiving the post of the first mounting structure. In certain embodiments, the post includes a retaining member. In other embodiments, the mounting structure of the hook has a first section having a first diameter and a second section having a second diameter differing from the first diameter and the second section receives the retaining member when the hook is connected to the base member. In one embodiment, the hook is rotatable about the post. In certain embodiments, the surface of the first mounting structure includes a projection and the mounting structure of the hook includes a recess for receiving the projection to resist rotation of the hook about the post. In other embodiments, the surface of the first mounting structure includes

a plurality of projections and the mounting structure of the hook includes a plurality of recesses for receiving the projections to selectively position the hook in a plurality or orientations with respect to the base member.

[0006] In another embodiment, the second mounting structure of the base member includes an opening and the first end of the first arm member includes a projection for engaging the opening to connect the first arm member to the base member. In some embodiments, the second mounting structure and the projection for engaging the opening in the second mounting structure are configured so as to permit the first arm member to be connected to the base member in only one orientation. In other embodiments, the opening in the second mounting structure and the projection for engaging the opening in the second mounting structure are configured so as to prevent rotation of the first arm member when the first arm member is connected to the base member.

[0007] In another embodiment, the hanger further includes a rod having a first end with an opening therein and the second end of the first arm member includes a projection configured to engage the opening in the first end of the rod to secure the rod to the first arm member. In some embodiments, the opening in the rod and the projection for engaging the opening in the rod are configured so as to prevent rotation of the rod when the rod is connected to the first arm member.

[0008] In another embodiment, the hanger further includes an opening in the first arm member and a support member having a projection for engaging the opening in the first arm member to secure the support member to the first arm member. In certain embodiments, the hanger further includes an opening in the support member and a support cover member having a projection for engaging the opening in the support member to secure the support cover member to the support member.

[0009] In another embodiment of the present invention, a clothing hanger includes a base member, a first arm member, a second arm member, a first support member, a second support member, a first support cover member, a second support cover member and a hook. The hanger further includes first means for connecting the first arm member to the base member, second means for connecting the second arm member to the base member, third means for connecting the first support member to the first arm member, fourth means for connecting the second support member

to the second arm member, fifth means for connecting the first support cover member to the first support member, sixth means for connecting the second support cover member to the second support member and seventh means for connecting the hook to the base member.

[0010] These and other features of the present invention will be apparent to those skilled in the art from the following detailed description of embodiments of the invention and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Figure 1 is a perspective view of a clothing hanger according to one embodiment of the present invention.

[0012] Figure 2 is a perspective view of a clothing hanger according to another embodiment of the present invention.

[0013] Figure 3 is a perspective view of a clothing hanger according to another embodiment of the present invention.

[0014] Figure 4 is a perspective view of a clothing hanger according to another embodiment of the present invention.

[0015] Figure 5 is a perspective view of a clothing hanger according to another embodiment of the present invention.

[0016] Figure 6 is a perspective view of a clothing hanger according to another embodiment of the present invention.

[0017] Figure 7A is a perspective view of a base member that is a component of the clothing hangers shown in Figures 1-3.

[0018] Figure 7B is a front elevational view of the base member shown in Figure 7A.

[0019] Figure 7C is a top plan view of the base member shown in Figure 7A.

[0020] Figure 7D is an enlarged view of the area shown in detail 7D in Figure 7C.

[0021] Figure 8 is a perspective view of a mounting structure that is a portion of the base members shown in Figures 7 and 13.

[0022] Figure 9A is a perspective view of a hook that is a component of the clothing hangers shown in Figures 1-3.

[0023] Figure 9B is a front elevational view of the hook shown in Figure 9A.

[0024] Figure 9C is a bottom plan view of the hook shown in Figure 9A.

[0025] Figure 10A is a perspective view of an arm member that is a component of the clothing hanger shown in Figure 3.

[0026] Figure 10B is a right side elevational view of the arm member shown in Figure 10A.

[0027] Figure 10C is a top plan view of the arm member shown in Figure 10A.

[0028] Figure 10D is a cross-sectional view of the arm member shown in Figure 10A.

[0029] Figure 11A is a perspective view of a skin support member that is a component of the clothing hanger shown in Figure 3.

[0030] Figure 11B is a front elevational view of the skin support member shown in Figure 11A.

[0031] Figure 11C is a top plan view of the skin support member shown in Figure 11C.

[0032] Figure 12A is a perspective view of a skin support cover member that is a component of the clothing hanger shown in Figure 3.

[0033] Figure 12B is a front elevational view of the skin support cover member shown in Figure 12A.

[0034] Figure 12C is a top plan view of the skin support cover member shown in Figure 12A.

[0035] Figure 12D is a bottom plan view of the skin support cover member shown in Figure 12A.

[0036] Figure 13A is a perspective view of a base member that is a component of the clothing hangers shown in Figures 4-6.

[0037] Figure 13B is a front elevational view of the base member shown in Figure 13A.

[0038] Figure 13C is a top plan view of the base member shown in Figure 13A.

[0039] Figure 13D is an enlarged view of the area shown in detail 13D in Figure 13C.

[0040] Figure 14A is a perspective view of a hook that is a component of the clothing hangers shown in Figures 4-6.

[0041] Figure 14B is a front elevational view of the hook shown in Figure 14A.

[0042] Figure 14C is a bottom plan view of the hook shown in Figure 14A.

[0043] Figure 14D is a cross sectional view taken along line 14D-14D in Figure 14A.

[0044] Figure 15A is a first perspective view of an arm member that is a component of the clothing hanger shown in Figure 6.

[0045] Figure 15B is a second perspective view of the arm member shown in Figure 15A.

[0046] Figure 15C is a front elevational view of the arm member shown in Figure 15A.

[0047] Figure 15D is a cross-sectional view of the arm member shown in Figure 15A.

[0048] Figure 16A is a perspective view of a skin support member that is a component of the clothing hanger shown in Figure 6.

[0049] Figure 16B is a front elevational view of the skin support member shown in Figure 16A.

[0050] Figure 16C is a top plan view of the skin support member shown in Figure 16A.

[0051] Figure 16D is a bottom plan view of the skin support member shown in Figure 16A.

[0052] Figure 17A is a perspective view of a skin support cover member that is a component of the clothing hanger shown in Figure 6.

[0053] Figure 17B is a rear elevational view of the skin support cover member shown in Figure 17A.

[0054] Figure 17C is a top plan view of the skin support cover member shown in Figure 17A.

[0055] Figure 18A is a perspective view of a skin support member that is a component of a clothing hanger according to other embodiments of the present invention.

[0056] Figure 18B is a front elevational view of the skin support member shown in Figure 18A.

[0057] Figure 18C is a top plan view of the skin support member shown in Figure 18A.

[0058] Figure 18D is a bottom plan view of the skin support member shown in Figure 18A.

[0059] Figure 19A is a perspective view of a skin support cover member that is a component of a clothing hanger according to other embodiments of the present invention.

[0060] Figure 19B is a front elevational view of the skin support cover member shown in Figure 19A.

[0061] Figure 19C is a rear elevational view of the skin support cover member shown in Figure 19A.

[0062] Figure 19D is a top plan view of the skin support cover member shown in Figure 19A.

[0063] Figure 19E is a bottom plan view of the skin support cover member shown in Figure 19A.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0064] Figures 1-6 are perspective views of clothing hangers according to embodiments of the present invention. The clothing hangers illustrated in Figures 1-3 are intended primarily for use with various items of men's clothing. The clothing hangers illustrated in Figures 4-6 are intended primarily for use with various items of women's clothing.

[0065] Figures 7A-7D illustrate various views of a base member 10 that is a component of the clothing hangers shown in Figures 1-3. In the embodiment shown, base member 10 has a generally

triangular configuration and includes a first arm 11, a second arm 12 and a third arm 13. Arms 11 and 12 meet at one end thereof at a mounting structure 14 for connecting a hook to base member 10, as described in greater detail below. Mounting structure 14 generally includes an upper surface 14A having a post 14B extending therefrom (Figure 8). Post 14B, in the embodiment shown, includes a retaining member 14C of wider diameter than the remainder of post 14B. Upper surface 14 further includes a plurality of projections 14D extending therefrom. In the embodiment shown, there are four projections 14D. Projections 14D may be stationary members or may be moveable members, such as ball bearings.

[0066] The ends of first arm 11 and second arm 12 opposite mounting structure 14 each join with third arm 13 at a mounting structure 15 for connecting various arm members to base member 10, as described in greater detail below. Each mounting structure 15 includes an opening or recess 16 therein for receiving one end of various arm members. In the embodiment shown, opening or recess 16 is keyed or otherwise provided with structures designed to properly orient the various arm members with respect to base member 10 and to prevent rotation of the various arm members relative to base member 10, as described below.

[0067] Referring to Figures 9A-9C, a hook 20 includes a mounting structure 21 having a mounting surface 22. An opening or recess 23 is formed in mounting surface 22 for receiving post 14B of base member 10. Opening or recess 23, in the embodiment shown, includes a first section 23A of different diameter than second section 23B. Section 23A receives retaining member 14C of post 14B. Mounting surface 23 further includes a plurality of openings or recesses 24 for receiving projections 14D of mounting structure 14 of base member 10. Hook 20 is secured to base member 10 by inserting post 14B into opening or recess 23 so as to retain hook 20 on base member 10. Hook 20 is secured to base member 10 so as to be rotatable about post 14B. As hook 20 is rotated, projections 14D disengage from openings or recesses 24 until hook member 20 is rotated one-quarter turn, at which point projections 14D re-engage openings or recesses 24. This produces a positive stop so as to permit orientation of hook 20 in any one of four selected positions relative to base member 10. More or fewer projections 14D and openings or recesses 24 could be utilized to permit positioning of hook 20 as desired relative to base member 10.

[0068] Referring to Figures 3 and 10A-12D, one clothing hanger according to an embodiment of the present invention is shown that is primarily intended for use with men's suits. This embodiment includes a trouser bar 30, arm members 40, a skin support member 50 and a skin support cover member 60. Arm members 40 include a keyed projection 41 at one end thereof that is configured to mate with mounting structure 15 of base member 10 and a keyed projection 42 at the other end of arm members 40 that is configured to mate with correspondingly keyed openings or recesses (not shown) in the ends of trouser rod 30. Arm members 40 further include two bosses 33 having openings or recesses 34 therein for receiving projections (not shown) on skin support member 50. Skin support member 50 includes a plurality of openings or recesses 51 for receiving projections 61 on the underside of skin support cover member 60. Base member 10, hook 20, trouser bar 30, arm members 40, skin support member 50 and skin support cover member 60 may be assembled as shown in Figure 3 to produce the clothing hanger shown.

[0069] Figure 1 shows a clothing hanger primarily intended for use with men's shirts according to an embodiment of the present invention. This embodiment does not utilize a skin support member or skin support member cover. Rather, this embodiment only utilizes arm members 70 with base member 10 and hook 20. Arm members 70 are connected to base member 10 in the manner described above.

[0070] Figure 2 shows a clothing hanger primarily intended for use with men's trousers according to an embodiment of the present invention. This embodiment does not utilize a skin support member or skin support member cover. Rather, this embodiment utilizes arm members 80 and a trouser bar 30. Arm members 80 are connected to base member 10 and trouser bar 30 in the manner described above. In the embodiment shown, trouser bar 30 is provided with clips 31. However, clips 31 are an optional feature of the hanger shown in Figure 2.

[0071] Figures 13A-13D illustrate various views of a base member 110 that is a component of the clothing hangers shown in Figures 4-6. In the embodiment shown, base member 110 has a generally triangular configuration and includes a first arm 111, a second arm 112 and a third arm 113. Arms 111 and 112 meet at one end thereof at a mounting structure 114 for connecting a hook to base member 110, as described in greater detail below. Mounting structure 114 generally includes an upper surface 114A having a post 114B extending therefrom (Figure 8). Post 114B,

in the embodiment shown, includes a retaining member 114C of wider diameter than the remainder of post 114B. Upper surface 114 further includes a plurality of projections 14D extending therefrom. In the embodiment shown, there are four projections 114D. Projections 114D may be stationary members or may be moveable members, such as ball bearings.

[0072] The ends of first arm 111 and second arm 112 opposite mounting structure 114 each join with third arm 113 at a mounting structure 115 for connecting various arm members to base member 110, as described in greater detail below. Each mounting structure 115 includes an opening or recess 116 therein for receiving one end of various arm members. In the embodiment shown, opening or recess 116 is keyed or otherwise provided with structures designed to properly orient the various arm members with respect to base member 110 and to prevent rotation of the various arm members relative to base member 110.

[0073] Referring to Figures 14A-14D, a hook 120 includes a mounting structure 121 having a mounting surface 122. An opening or recess 123 is formed in mounting surface 122 for receiving post 114B of base member 110. Opening or recess 123, in the embodiment shown, includes a first section 123A of different diameter than second section 123B. Section 123A receives retaining member 114C of post 114B. Mounting surface 123 further includes a plurality of openings or recesses 124 for receiving projections 114D of mounting structure 114 of base member 110. Hook 120 is secured to base member 110 by inserting post 114B into opening or recess 123 so as to retain hook 120 on base member 110. Hook 120 is secured to base member 110 so as to be rotatable about post 114B. As hook 120 is rotated, projections 114D disengage from openings or recesses 124 until hook member 120 is rotated one-quarter turn, at which point projections 114D re-engage openings or recesses 124. This produces a positive stop so as to permit orientation of hook 120 in any one of four selected positions relative to base member 110. More or fewer projections 114D and openings or recesses 124 could be utilized to permit positioning of hook 120 as desired relative to base member 110.

[0074] Figure 4 shows a clothing hanger primarily intended for use with women's shirts according to an embodiment of the present invention. This embodiment includes arm members 170. Arm members 170 are connected to base member 110 in the manner described above.

[0075] Figure 5 shows a clothing hanger primarily intended for use with women's trousers according to an embodiment of the present invention. This embodiment includes arm members 180 and a trouser bar 130. Arm members 180 are connected to base member 110 and trouser bar 130 in the manner described above. In the embodiment shown, trouser bar 130 is provided with clips 131. However, clips 131 are an optional feature of the hanger shown in Figure 5.

[0076] Referring to Figures 6 and 15A-17C, one clothing hanger according to an embodiment of the present invention is shown that is primarily intended for use with women's shirts. This embodiment includes arm members 140, a skin support member 150 and a skin support cover member 160. Arm members 140 include a keyed projection 141 at one end thereof that is configured to mate with mounting structure 115 of base member 110. Arm members 140 further include two bosses 142 having openings or recesses 143 therein for receiving projections (not shown) on skin support member 150. Skin support member 150 includes a plurality of openings or recesses 151 for receiving projections 161 on skin support cover member 160. Base member 110, hook 120, arm member 140, skin support member 150 and skin support cover member 160 may be assembled as shown in Figure 6 to produce the clothing hanger shown.

[0077] Figures 18A-18D and 19A-19E show alternative embodiments of a skin support member and skin support cover that can be utilized to produce a clothing hanger according to an embodiment of the present invention that is primarily intended for use with women's jackets. This embodiment also utilizes arm members 140. However, it uses a skin support member 190 and a skin support cover member 200 that differ in configuration from skin support member 150 and skin support member 160. Skin support member 190 includes a plurality of openings or recesses 191 for receiving projections 201 on skin support cover member 200. Base member 110, hook 120, arm members 140, skin support member 190 and skin support cover member 200 may be assembled as described above.

[0078] Various embodiments of the invention described above are discussed as being primarily intended for use with specific clothing types. The various dimensions of the components of those hangers have been selected to best accommodate those types of clothing items.

[0079] Although the invention has been shown and described in detail the same is by way of example and not be way of limitation. Numerous modifications can be made to the embodiments shown and described without departing from the scope of the invention.

CLAIMS:

What is claimed is:

1. A clothing hanger, including:

a base member having a first arm having a first end and a second end, a second arm having a first end connected to the first end of the first arm and a second end, a third arm having a first end connected to the second end of the first arm and a second end connected to the second end of the second arm, a first mounting structure adjacent the first end of the first arm and the first end of the second arm, the first mounting structure including a surface and a post extending from the surface, a second mounting structure adjacent the second end of the first arm and the first end of the third arm, the second mounting structure including an opening and a third mounting structure adjacent the second end of the second arm and the second end of the third arm, the third mounting structure including an opening;

a hook having a mounting structure for engaging the first mounting structure of the base member and selectively securing the hook to the base member in multiple orientations with respect to the base member, the mounting structure of the hook including a surface having an opening for receiving the post of the first mounting structure such that the hook is rotatable about the post;

a first arm member having a first end having a projection extending therefrom for engaging the opening in the second mounting structure to secure the first arm to the base member; and

a second arm member having a first end having a projection extending therefrom for engaging the opening in the third mounting structure to secure the second arm to the base member.

2. The clothing hanger according to claim 1, further including an opening in the first arm member, a first support member having a projection for engaging the opening in the first arm member to secure the first support member to the first arm member, an opening in the second arm member, a second support member having a projection for engaging the opening in the second arm member to secure the second support member to the second arm member, an opening in the first support member, a first support cover member having a projection for engaging the opening in the first support member to secure the first support cover member to the first support member, an opening in the second support member, and a second support cover member having a projection

for engaging the opening in the second support member to secure the second support cover member to the second support member.

3. A clothing hanger, including:

a base member having a first arm having a first end and a second end, a second arm having a first end connected to the first end of the first arm and a second end, a third arm having a first end connected to the second end of the first arm and a second end connected to the second end of the second arm, a first mounting structure adjacent the first end of the first arm and the first end of the second arm, a second mounting structure adjacent the second end of the first arm and the first end of the third arm, and a third mounting structure adjacent the second end of the second arm and the second end of the third arm;

a hook having a mounting structure for engaging the first mounting structure of the base member and securing the hook to the base member;

a first arm member having a first end and a second end, the first end of the first arm member configured to engage the second mounting structure of the base member to secure the first arm member to the base member; and

a second arm member having a first end and a second end, the first end configured to engage the third mounting structure of the base member to secure the second arm member to the base member.

4. The clothing hanger according to claim 3, wherein the first mounting structure includes a surface having a post extending therefrom.

5. The clothing hanger according to claim 4, wherein the mounting structure of the hook includes a surface having an opening for receiving the post of the first mounting structure.

6. The clothing hanger according to claim 5, wherein the post includes a retaining member.

7. The clothing hanger according to claim 6, wherein the opening in the mounting structure of the hook has a first section having a first diameter and a second section having a second diameter differing from the first diameter and wherein the second section receives the retaining member when the hook is connected to the base member.

8. The clothing hanger according to claim 5, wherein the hook is rotatable about the post.

9. The clothing hanger according to claim 8, wherein the surface of the first mounting structure includes a projection and the mounting structure of the hook includes a recess for receiving the projection to resist rotation of the hook about the post.

10. The clothing hanger according to claim 8, wherein the surface of the first mounting structure includes a plurality of projections and the mounting structure of the hook includes a plurality of recesses for receiving the projections to selectively position the hook in a plurality of orientations with respect to the base member.

11. The clothing hanger according to claim 3, wherein the second mounting structure of the base member includes an opening and the first end of the first arm member includes a projection for engaging the opening to connect the first arm member to the base member.

12. The clothing hanger according to claim 11, wherein the opening in the second mounting structure and the projection for engaging the opening in the second mounting structure are configured so as to permit the first arm member to be connected to the base member in only one orientation.

13. The clothing hanger according to claim 12, wherein the opening in the second mounting structure and the projection for engaging the opening in the second mounting structure are configured so as to prevent rotation of the first arm member when the first arm member is connected to the base member.

14. The hanger according to claim 3, further including a rod having a first end with an opening therein and wherein the second end of the first arm member includes a projection configured to engage the opening in the first end of the rod to secure the rod to the first arm member.

15. The clothing hanger according to claim 14, wherein the opening in the rod and the projection for engaging the opening in the rod are configured so as to prevent rotation of the rod when the rod is connected to the first arm member.

16. The clothing hanger according to claim 3, further including an opening in the first arm member and a support member having a projection for engaging the opening in the first arm member to secure the support member to the first arm member.

17. The clothing hanger according to claim 16, further including an opening in the support member and a support cover member having a projection for engaging the opening in the support member to secure the support cover member to the support member.

18. The clothing hanger according to claim 14, further including an opening in the first arm member located between the first and second ends of the first arm member and a support member having a projection for engaging the opening in the first arm member located between the first and second ends of the first arm member to secure the support member to the first arm member.

19. The clothing hanger according to claim 18, further including an opening in the support member and a support cover member having a projection for engaging the opening in the support member to secure the support cover member to the support member.

20. A clothing hanger, including:

a base member, a first arm member, a second arm member, a first support member, a second support member, a first support cover member, a second support cover member and a hook;

first means for connecting the first arm member to the base member;

second means for connecting the second arm member to the base member;

third means for connecting the first support member to the first arm member;

fourth means for connecting the second support member to the second arm member;

fifth means for connecting the first support cover member to the first support member;

sixth means for connecting the second support cover member to the second support member and

seventh means for connecting the hook to the base member.

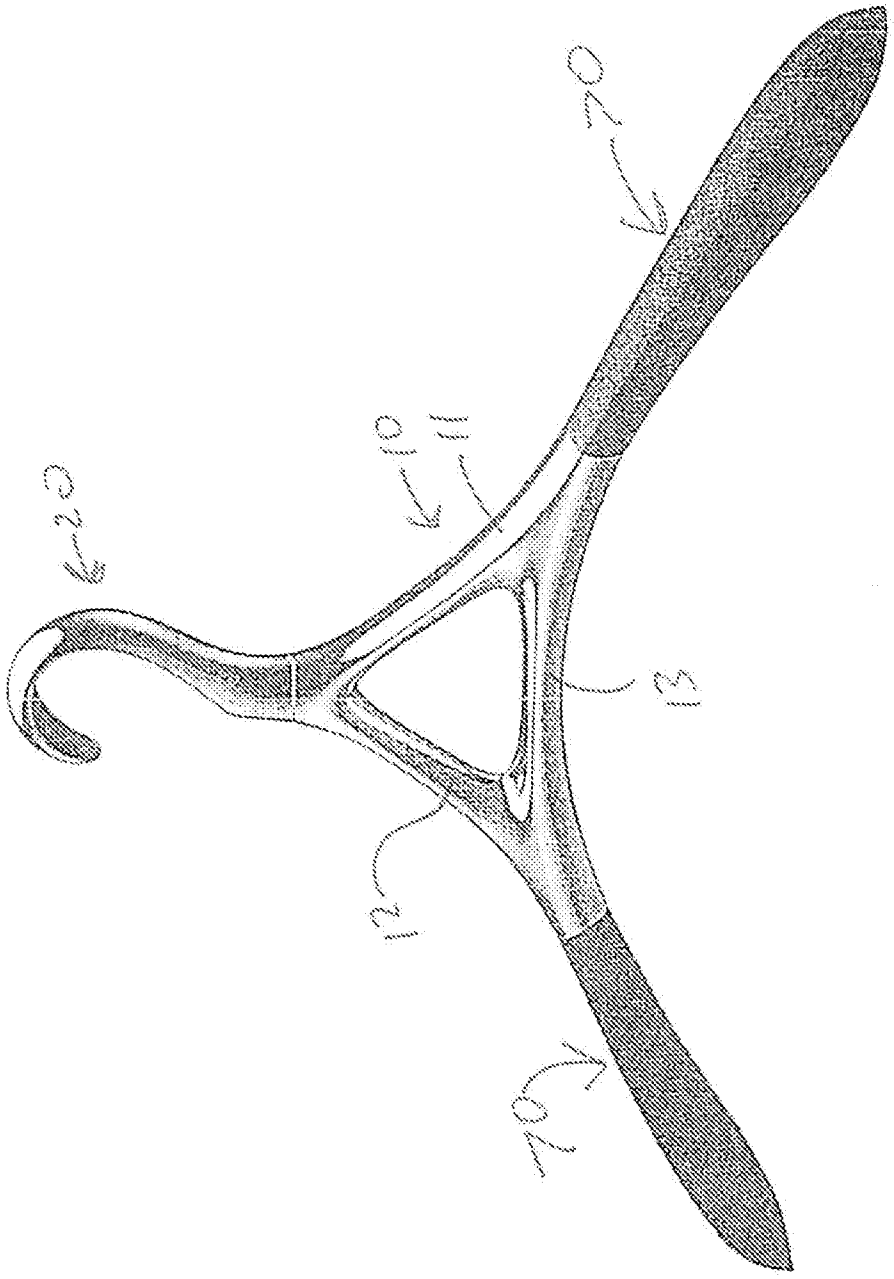


FIG. 1

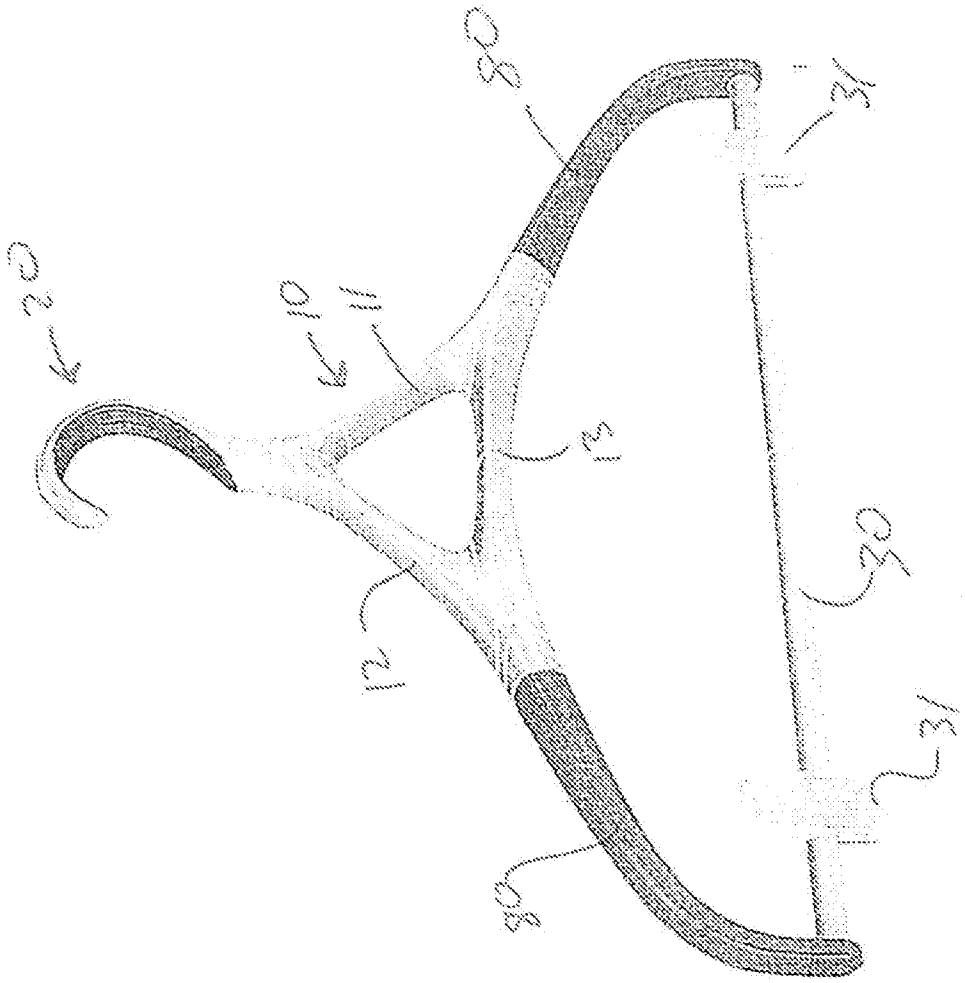


FIG. 2

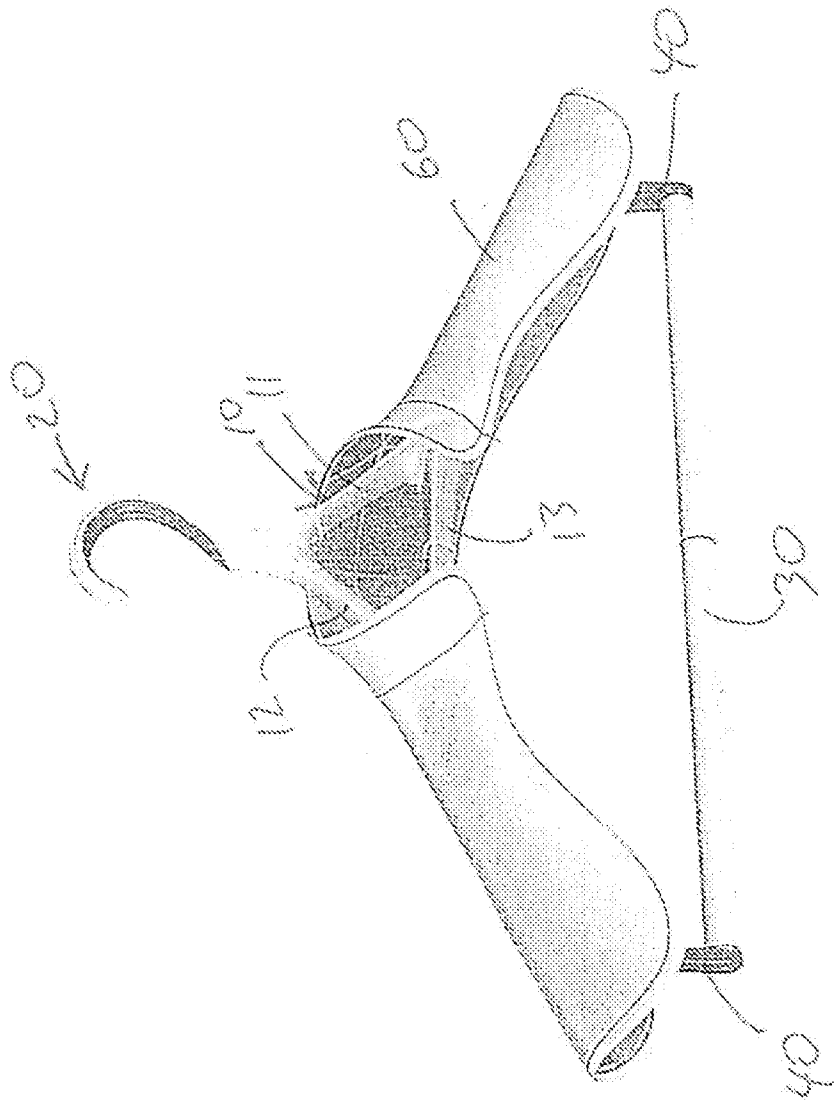


FIG 3

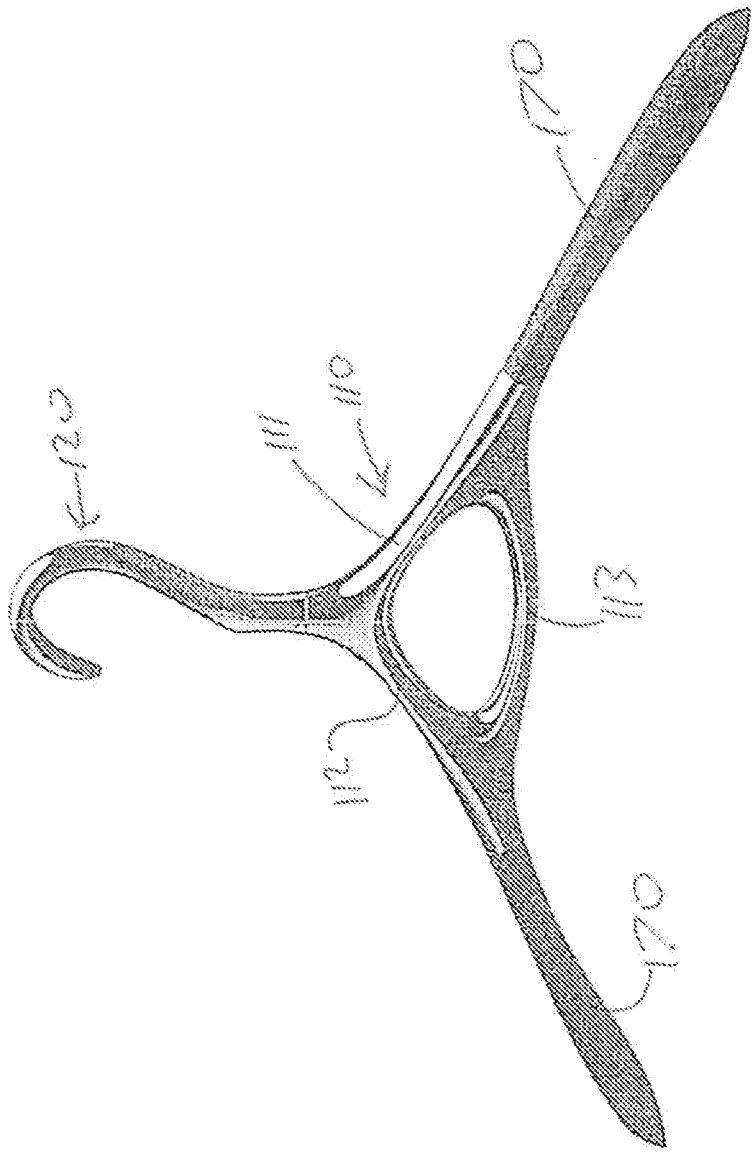


FIG. 1

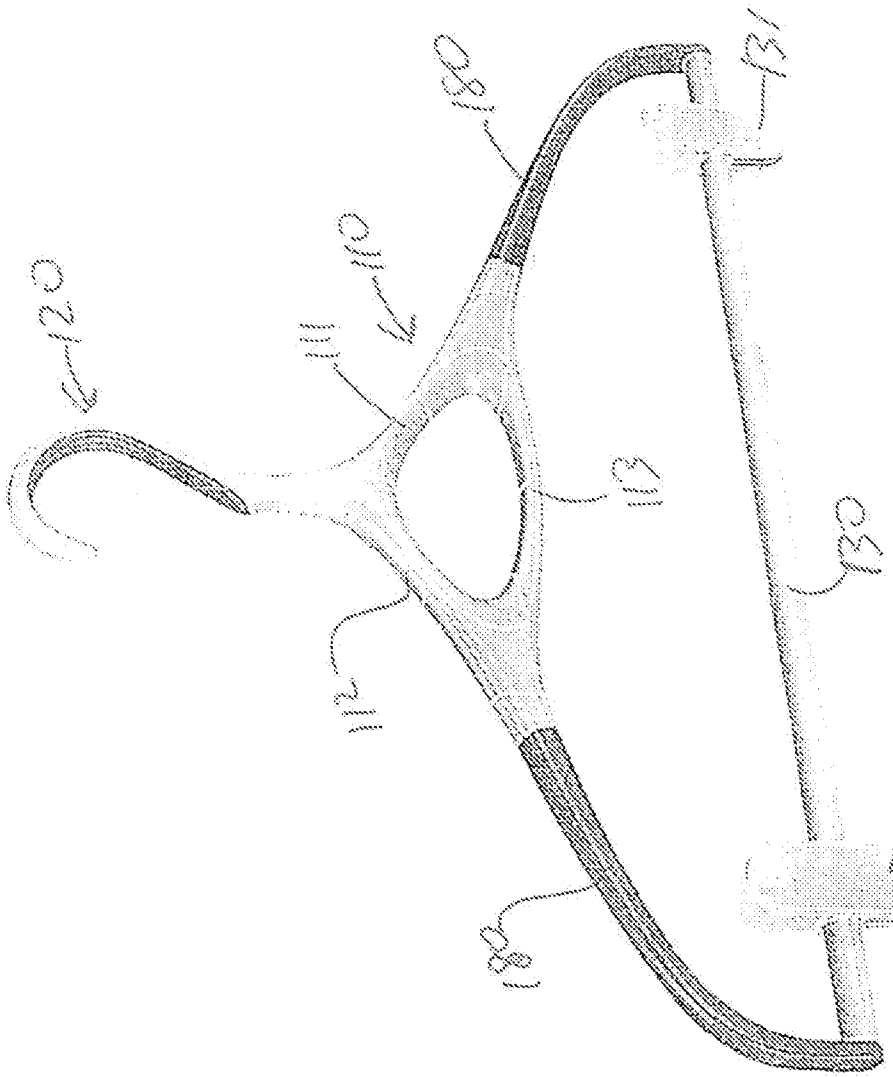


FIG. 5

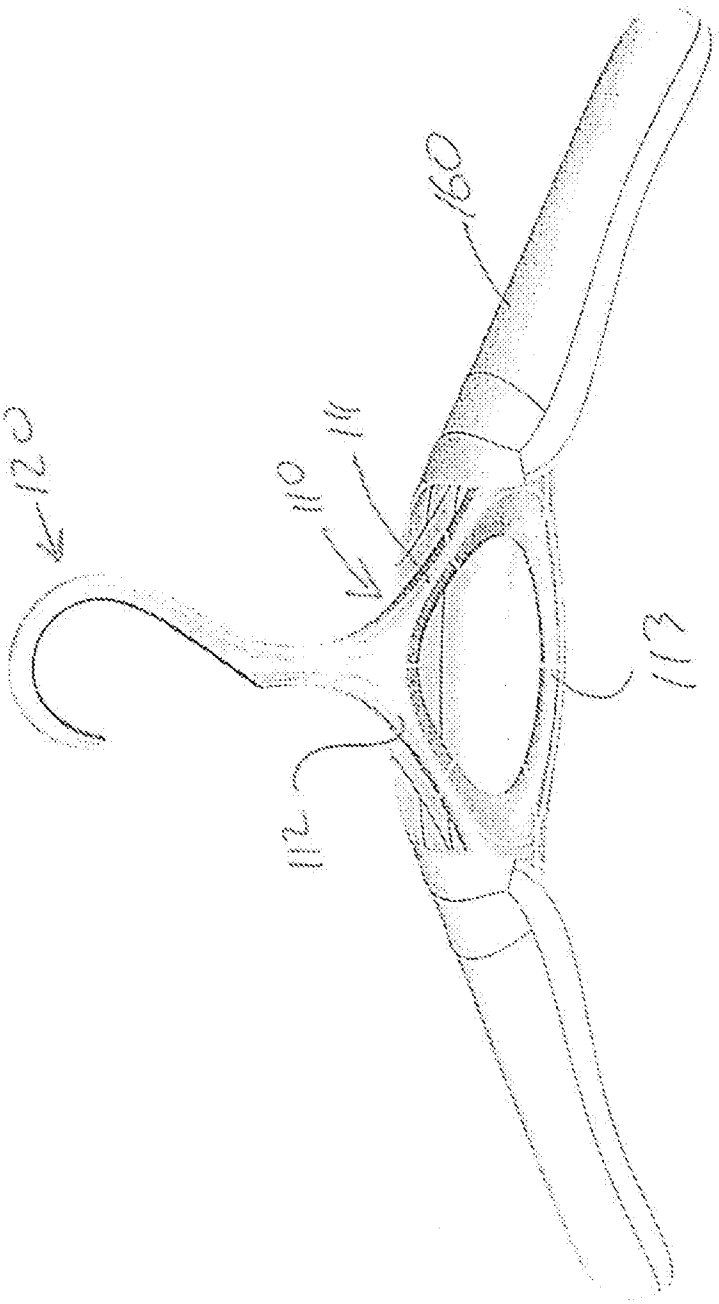


Fig. 6

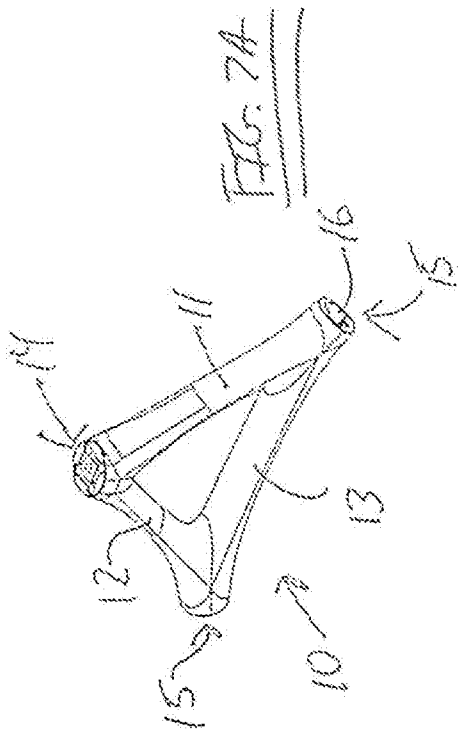


FIG. 7A

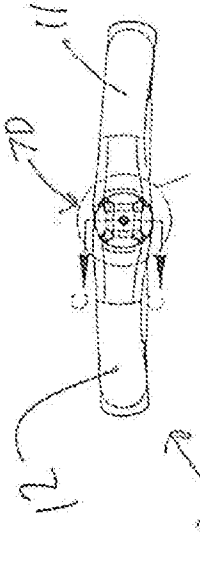


FIG. 7C

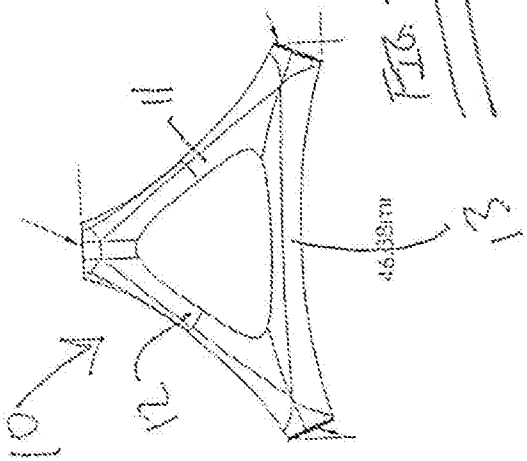


FIG. 7B

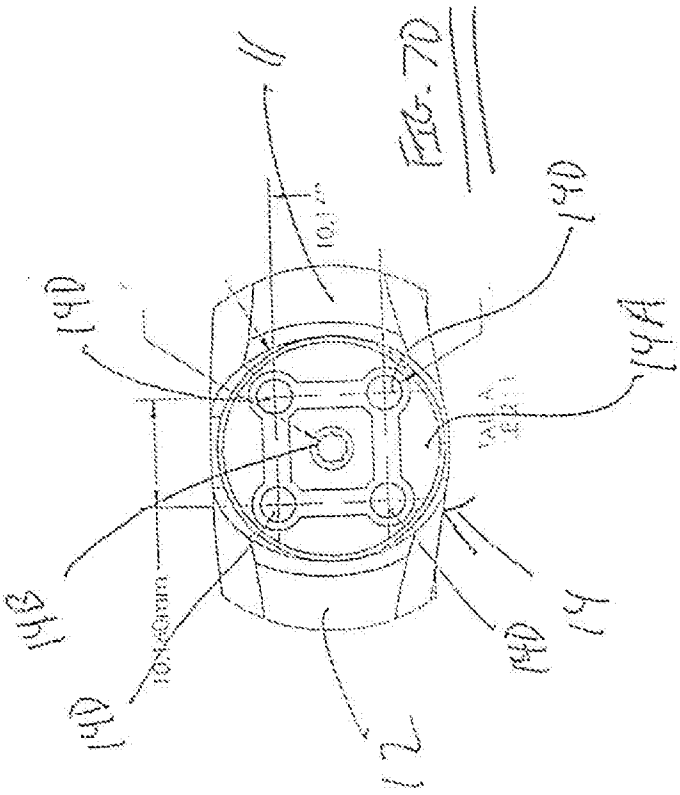


FIG. 7D

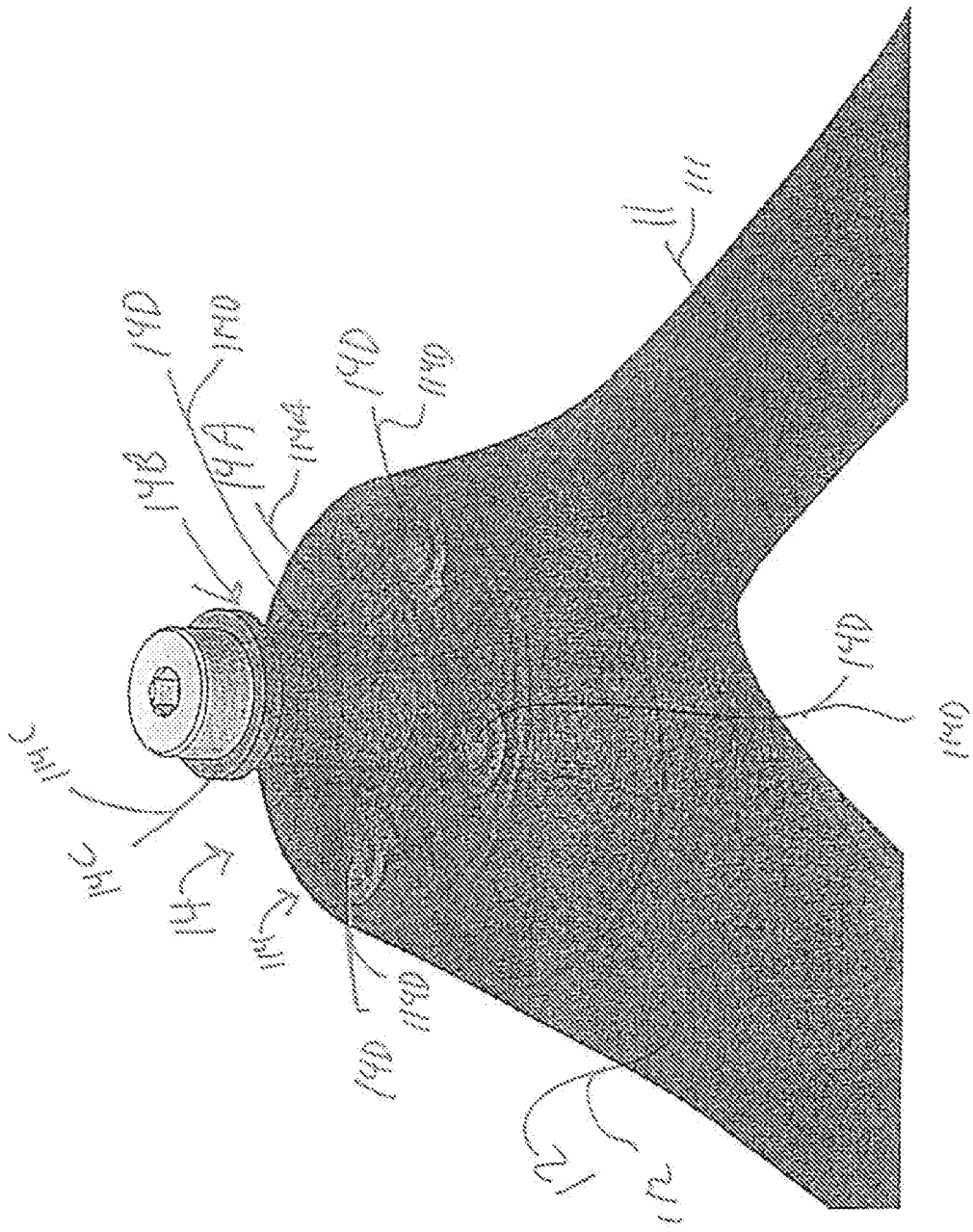


FIG 8

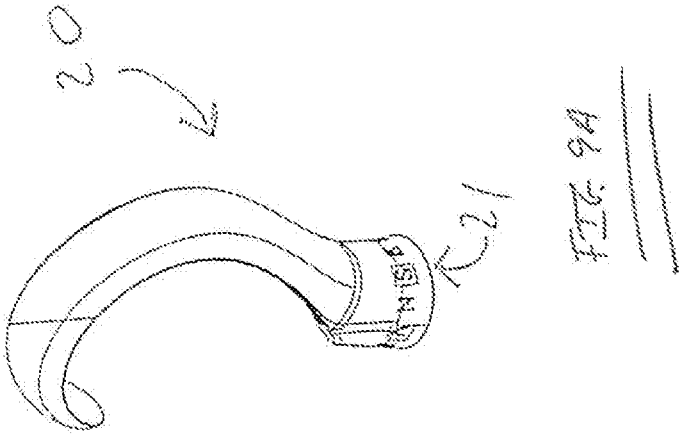


Fig. 9A

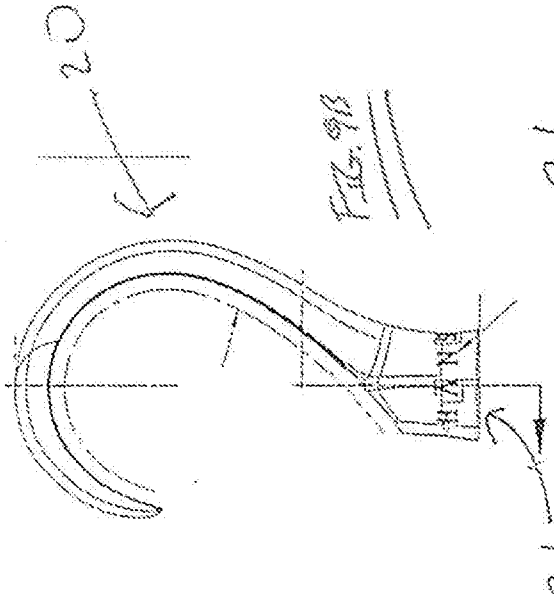


Fig. 9B

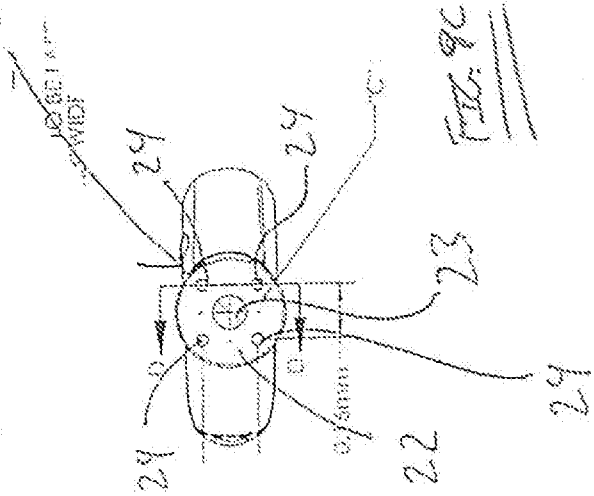


Fig. 9C

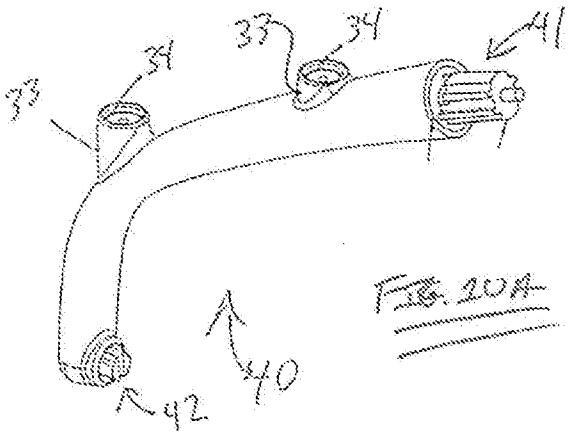


FIG. 10A

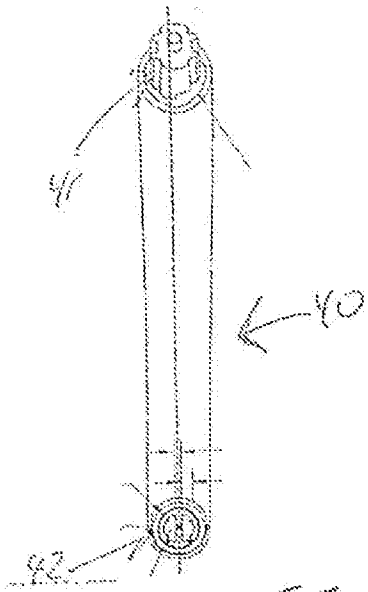


FIG. 10B

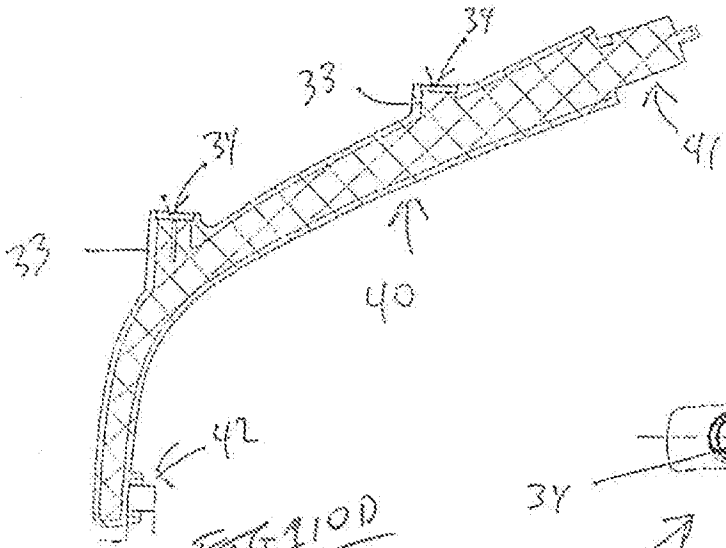


FIG. 10D

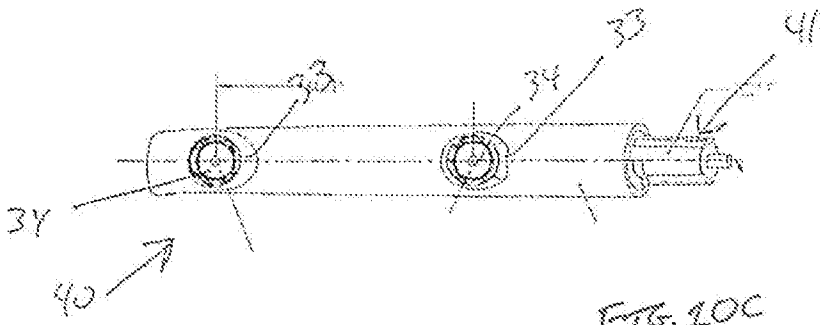


FIG. 10C

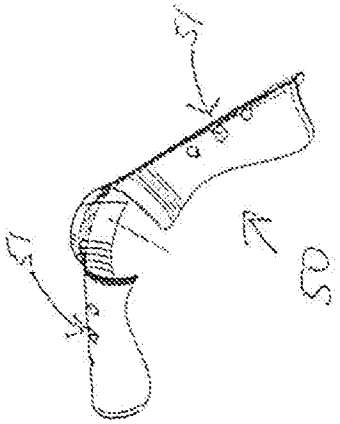


FIG. 11A

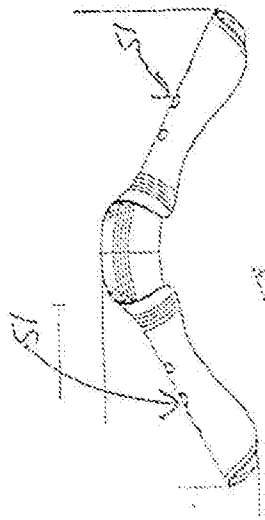


FIG. 11B

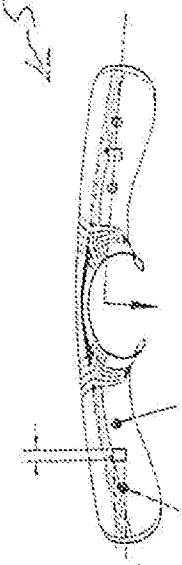


FIG. 11C

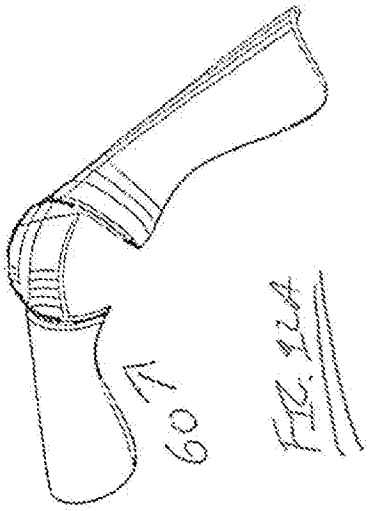


FIG. 12A

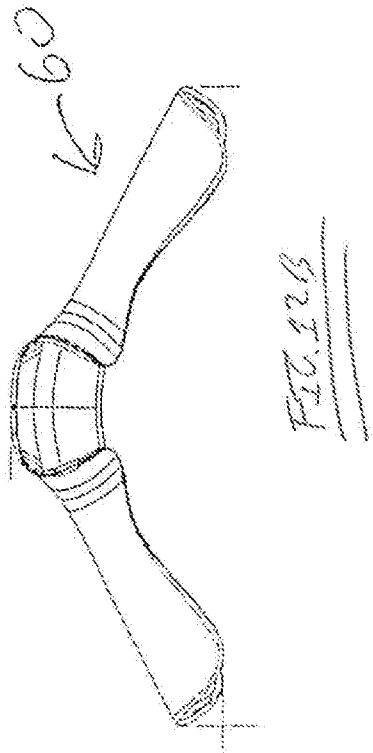


FIG. 12B

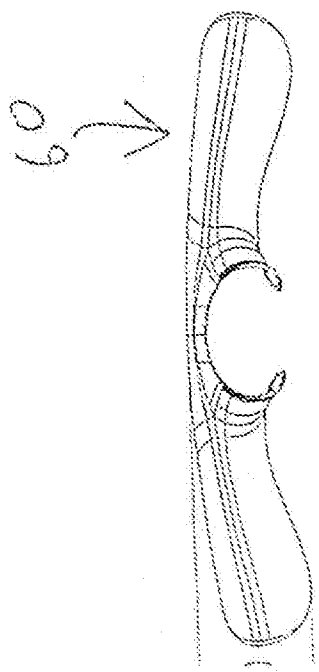


FIG. 12C

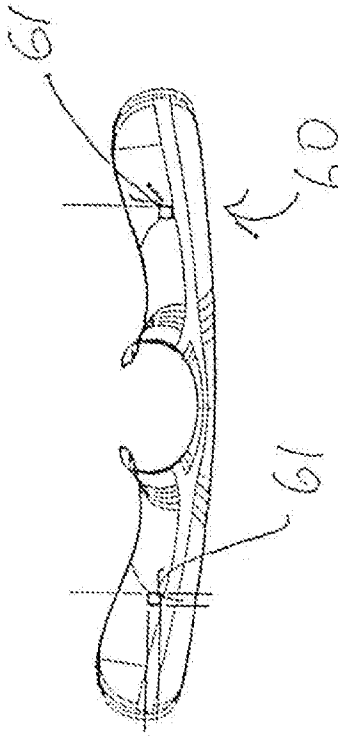


FIG. 12D

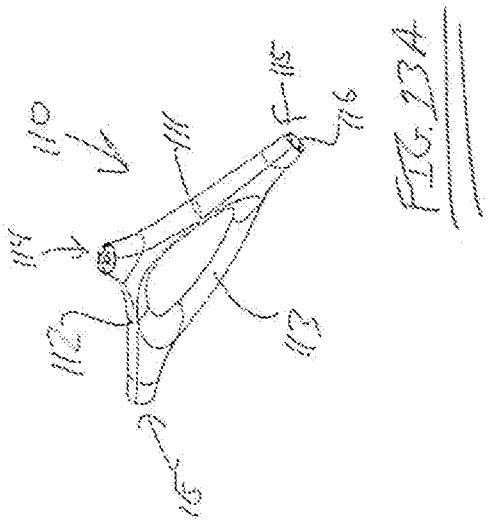


FIG. 13A

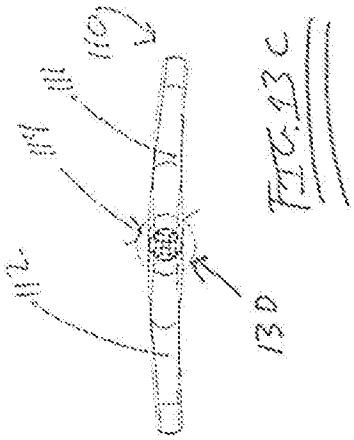


FIG. 13C

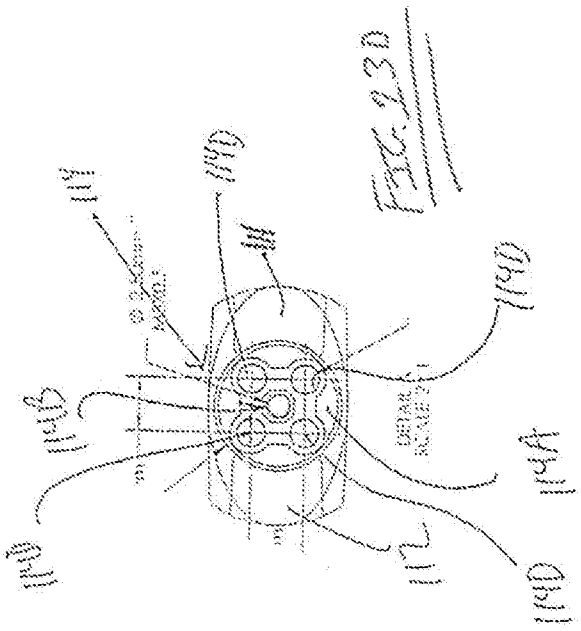


FIG. 13D

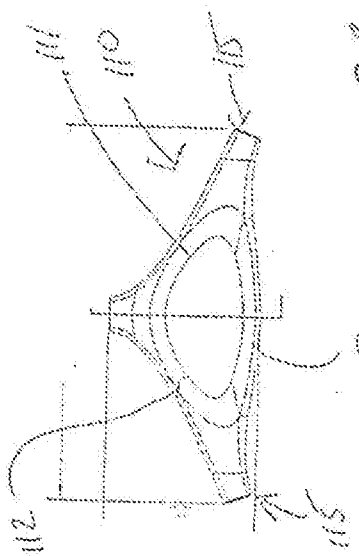


FIG. 13B

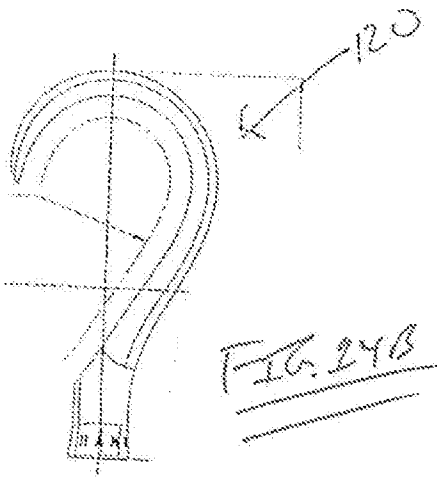


FIG. 14B

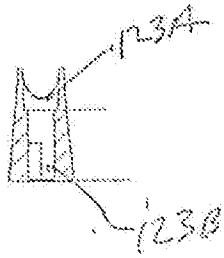


FIG. 14D

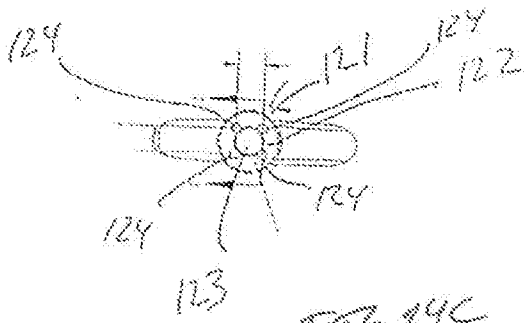


FIG. 14C

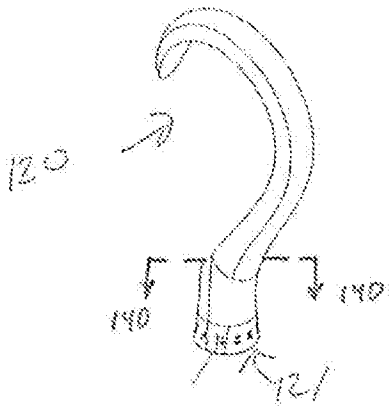


FIG. 14A

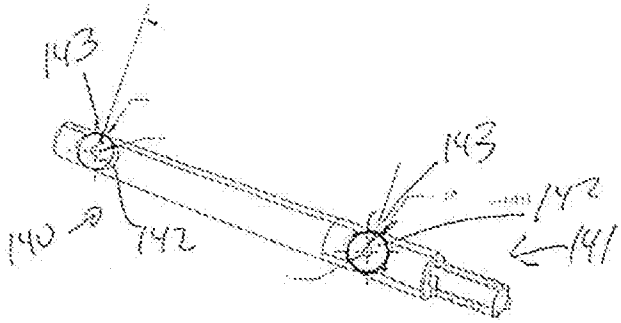


FIG. 15B

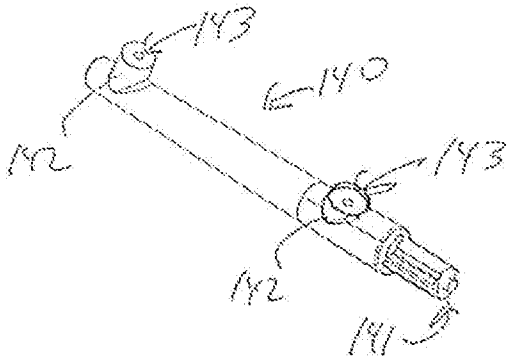


FIG. 15A

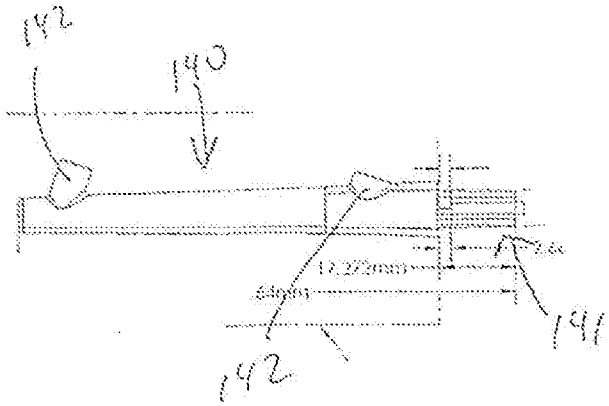


FIG. 15C

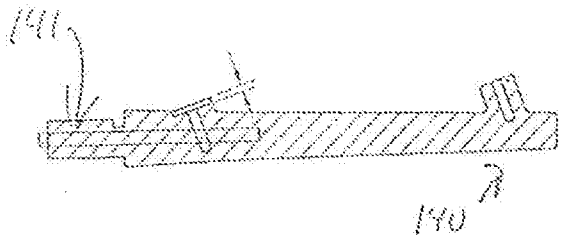


FIG. 15D

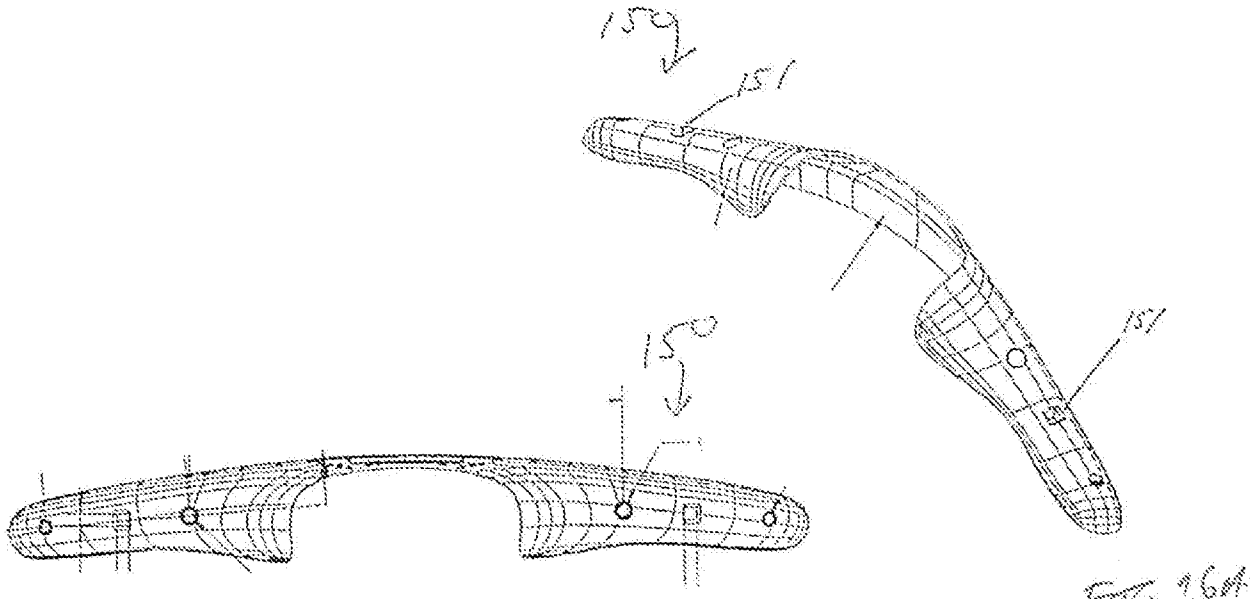


FIG. 16C

FIG. 16A

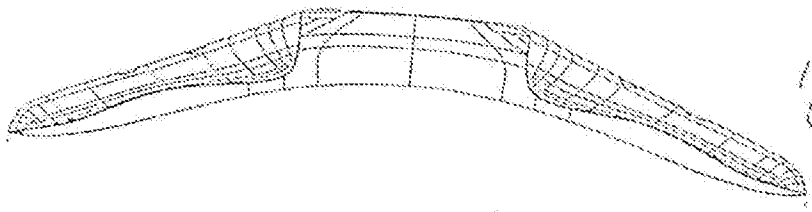


FIG. 16B

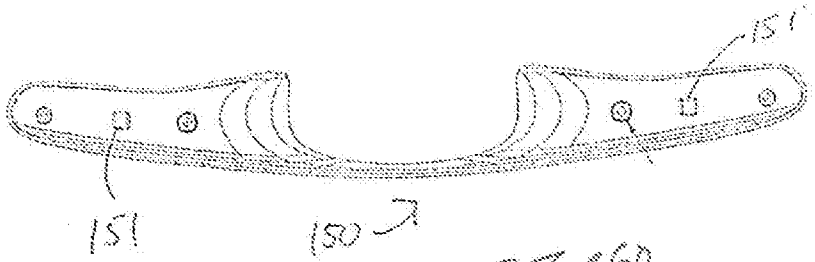


FIG. 16D

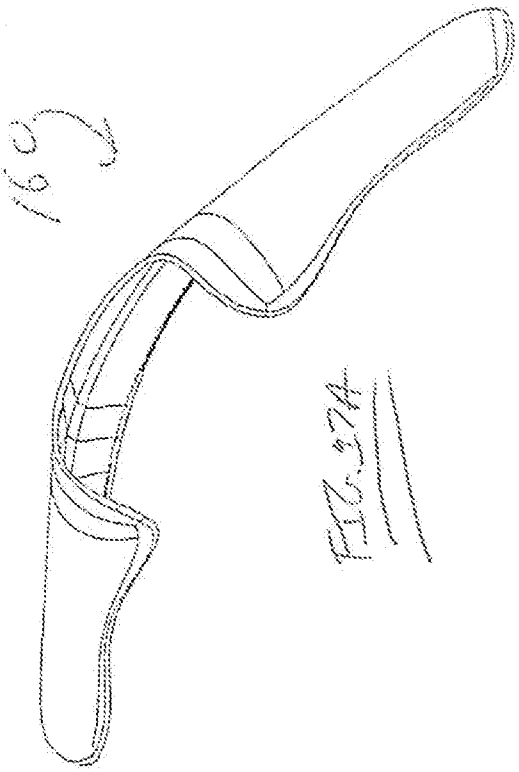


FIG. 17A

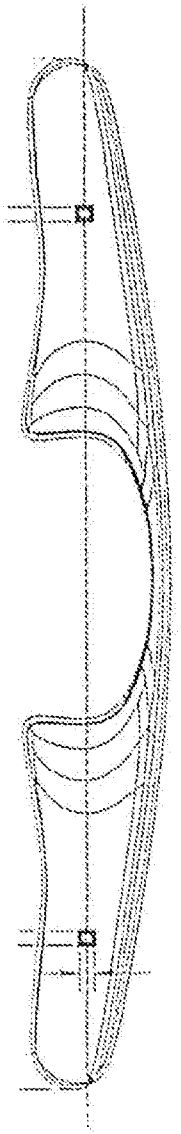


FIG. 17C

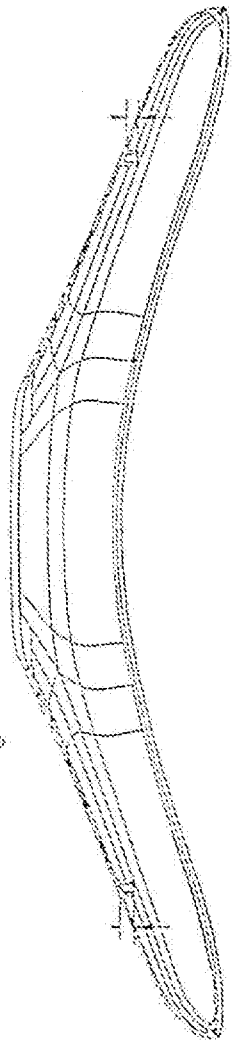


FIG. 17B

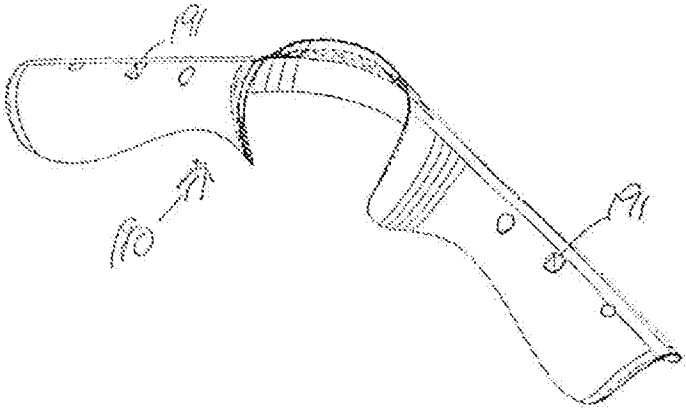


FIG. 18A

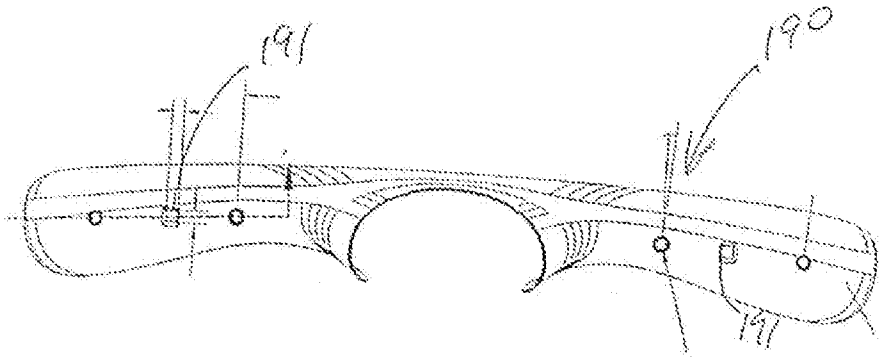


FIG. 18C

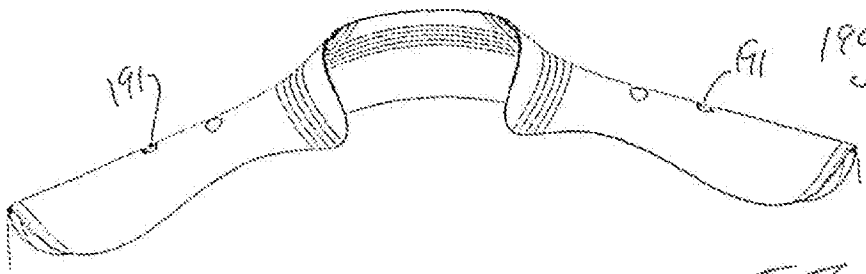


FIG. 18B

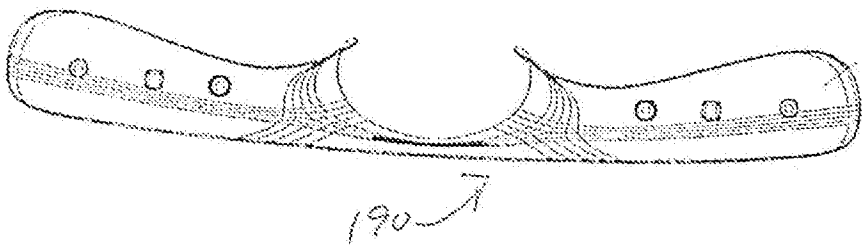


FIG. 18D

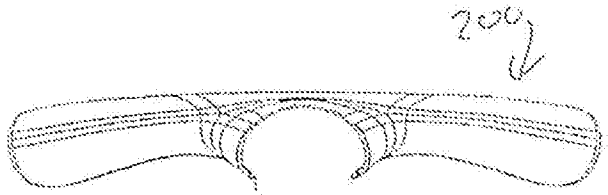


FIG. 19A

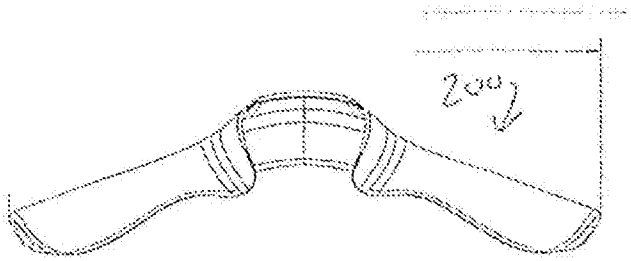


FIG. 19B

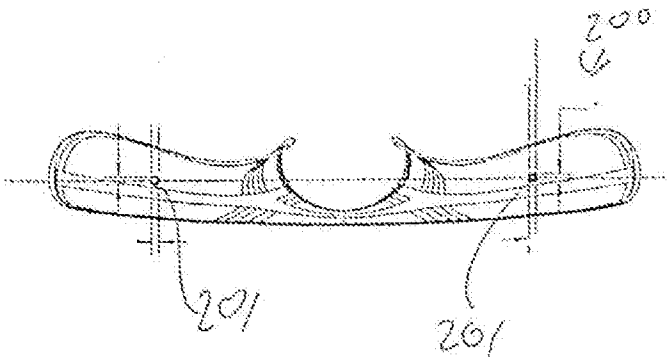


FIG. 19C

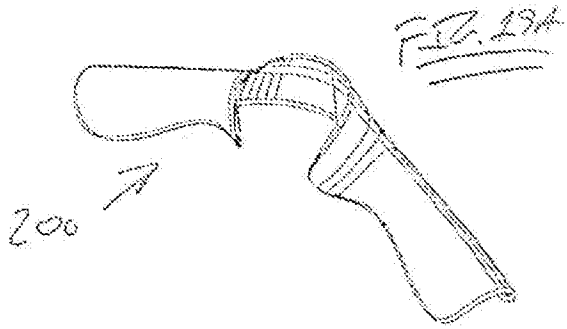


FIG. 19A

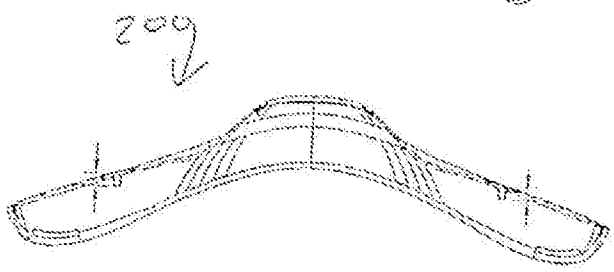


FIG. 19B

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/059022

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47G25/14 A47G25/20 A47G25/32 A47G25/48
ADD.

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)
A47G

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	DE 94 07 762 U1 (LONG CHIN IND CO [TW]) 18 August 1994 (1994-08-18) figures 2,4	1,3-9, 11-13 14,15 2,10, 16-19
X	EP 1 498 054 A2 (WHIRLPOOL CO [US]) 19 January 2005 (2005-01-19) paragraphs [0014], [0016]; figures 1,2	20
A	FR 2 667 233 A1 (ROZENBLIT [FR]) 3 April 1992 (1992-04-03) page 6, lines 10-18; figure 2	1
A	KR 2009 0007444 U (.) 22 July 2009 (2009-07-22) figure 1	1,3

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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	Date of mailing of the international search report
4 February 2020	12/02/2020

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	van Overbeek, Kajsa

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/059022

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 295 14 501 U1 (CHANG YOU TEH [TW]) 9 November 1995 (1995-11-09) figure 4 -----	14,15

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2019/059022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 9407762 U1	18-08-1994	NONE	
EP 1498054 A2	19-01-2005	AU 2004202910 A1	03-02-2005
		BR PI0402736 A	29-03-2005
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		EP 1498054 A2	19-01-2005
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