

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 566 062 A2

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **93105973.7**(51) Int. Cl.⁵: **A47F 5/10**(22) Date of filing: **13.04.93**(30) Priority: **16.04.92 GB 9208459**(43) Date of publication of application:
20.10.93 Bulletin 93/42(84) Designated Contracting States:
BE CH DE DK ES FR GB IT LI NL SE(71) Applicant: **MARLER HALEY EXPOSYSTEMS
LIMITED**
Exposystems House
Beaconsfield Close
Hatfield Hertfordshire AL10 8XB(GB)(72) Inventor: **Cannon, James Duncan**
West Works, Chalgrove Road
London E9 6PB(GB)(74) Representative: **Howden, Christopher Andrew
et al**
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
D-80801 München (DE)(54) **Display system.**

(57) A modular display system comprises a plurality of panels (64) interconnected along adjoining sides by interengaging hinge members (30) carried by the respective panels on the respective sides thereof and removable hinge pins (120, 122) extended through cooperating hinge members (30) of the adjoining panels to establish connections between the same. Each said hinge member (30) comprises an elongate part (32) adapted to be secured to a panel edge (64) and to extend along said panel edge and a bearing part or ring (34, 36) carried by the part (32) and projecting transversely therefrom to define a bearing axis extending parallel with the panel edge. The axial dimension of each bearing part (34, 36) is a sub-multiple of the length of the hinge member so that two or more such bearing parts of adjoining hinge members can be superimposed axially, with their bearing axes aligned, within the axial limits of a single hinge member. The system preferably includes a plurality of different types of such hinge members, the different types having said elongate parts (32) of the same length but having the bearing or ring parts (34, 36) at different longitudinal positions so that, with adjoining hinge members (30) of adjoining panels (64) at the same height, the

respective bearing parts (34, 36) can overlie one another at different heights, but in axial alignment with one another.

EP 0 566 062 A2

THIS INVENTION relates to a display system suitable for temporary exhibition displays, for example and which comprises a plurality of panels which are readily connectable and disconnectable for assembly and disassembly of the display, the panels being interconnectable at choice to form any desired one of a variety of display structures.

Such display systems are known, *per se*, and typically comprise a plurality of upright poles supported by respective bases and rectangular panels which extend from pole to pole and are clipped or otherwise attached to the respective poles at their respective edges. Such known display systems suffer from various disadvantages, ranging from low structural integrity to excessive complexity. Furthermore, some such known systems are aesthetically unsatisfactory, for example in having intervening poles, connectors, etc. exposed to view, distracting attention from the advertising or informational material which the display is intended to exhibit. In addition such known systems generally suffer from a lack of standardisation in dimensions between components, in some cases inherent in the nature of the components, so that the construction of any but the simplest display structures may require a large number of basically similar but dimensionally slightly different components. It is an object of the invention to provide an improved display system by which the above disadvantages may be avoided or mitigated.

According to the invention, there is provided a display system comprising a plurality of panels interconnected along adjoining sides by interengaging hinge formations comprising respective hinge knuckle or bearing units carried by the respective panels on the respective sides thereof and removable hinge pins extended through cooperating knuckle or bearing units of the adjoining panels to establish connections between the same. Preferably, said panels form part of a modular system wherein the dimensions of each panel, as measured between the axes of respective hinge formations, are equal to a predetermined standard dimension or to an integral multiple thereof.

An embodiment of the invention is described below by way of example with reference to the accompanying drawings wherein:-

FIGURE 1 is a perspective view of a display constructed using the system of the present invention;

FIGURE 2 is a plan view of another display constructed using the system;

FIGURE 3 is a fragmentary elevation view showing the interconnection between adjacent panels in the system;

FIGURE 4 is a view in section along the line 4-4 of Figure 3,

FIGURES 5a - 5d shows various views of a hinge member forming part of the system and FIGURES 6a illustrates a single hinge member, Figures 6b to 6f illustrate the interconnection of various other connector configurations and Figure 6g illustrates, in section, an edge finishing connector,

FIGURE 7 shows, in elevation, various different sizes of panel,

FIGURE 8 is a cross-sectional view, to an enlarged scale, of a horizontal rail,

FIGURE 9 is a cross-sectional view, to an enlarged scale, of a glazing strip,

FIGURES 10a to 10d are respectively an end view, side view, end view from opposite end and axial section view of a hinge pin,

FIGURE 11 shows, in various views, a foot pad/connector cap,

FIGURE 12 is a cross sectional view showing the manner of fitting a horizontal rail to a vertical panel edge,

FIGURE 13 is a schematic cross-sectional view showing the uses of the horizontal rail of Figure 8,

FIGURE 14 shows, in various views, a clamping nut,

FIGURE 15 is a cross-sectional view, to an enlarged scale, of a connector strip,

FIGURE 16 shows, in various views, a spacer ring,

FIGURE 17 shows a spigot in various views, and FIGURE 18 shows various sizes of open frames.

Referring to the drawings, a display system embodying the invention comprises a plurality of panels having predetermined modular dimensions, (as shown in Figure 7) interconnected in such a way as to ensure that the resultant composite structure is also modular - i.e. has dimensions which are a simple integral multiple of the basic modular dimension or dimensions. The modular nature of the system is of significance in minimising manufacturing costs and in maximising efficient use of spaces allocated at exhibitions, for example, for such spaces are nowadays often allocated on a modular basis - i.e. the area allocated for each display has its length and breadth determined according to simple multiples of predetermined modular dimensions.

In accordance with the principle of maintaining modularity, the system is so arranged as to ensure that interconnections between adjoining panels are made along lines of interconnection which have fixed predetermined positions in relation to the panels themselves, irrespective, so far as possible, of variations in, for example, angular relationships between adjoining panels.

In the embodiment illustrated, the connection between adjoining panels is by way of hinge mem-

bers carried by adjoining panels, with the respective line of interconnection between adjoining panels being determined by the pivotal axis of cooperating hinge members, as disclosed in detail below.

Figure 5 illustrates the form of a single such hinge member, referenced 30. Figure 5a is an end elevation view of a member 30, Figure 5b is a rear elevation view of the member 30, Figure 5c is a side elevation view and Figure 5d is a front elevation view of member 30. Figure 5e is an elevation view from the opposite end from Figure 5a and Figure 5f is a view in longitudinal section of the member 30. As shown, such member 30 comprises an elongate body part 32 adapted to be secured to a respective edge of a respective panel proper, the body part 32 having, integrally formed therewith, a laterally projecting ring or eye 34 defining a bearing aperture 36 (see Figure 5a). The central axis of the aperture 36 is parallel with the longitudinal dimension of the part 32 and the length of the ring 34, measured along this axis, corresponds with one sixth of the axial length of the part 32 (minus a predetermined dimension for clearance purposes). The system utilises three different types of connector elements, each with its respective ring 34 projecting therefrom at a different one of three axial positions along the part 32, as indicated at A, B and C in Figure 5, the pitch between the three positions corresponding to 1/6 of the effective length of the element 32. As the hinge members, apart from the rings 34, are substantially symmetrical about the median centre line shown extending vertically in Figures 5a, 5b and 5d, it is possible, in effect, to obtain six different locations of ring 34 relative to member 32 taking account of the possibility of reversing the members 30. In the type of element shown in solid lines in Figures 5c and 5d and 5f, the outer end of the ring 34 has a counter-recess 42 formed therein, which is substantially circular in plan apart from a flat, indicated at 44 in Figure 5a extending chordally across the peripheral wall of the counter-recess. This flat 44 cooperates with a complementary flat on a retaining flange at one end of the hinge pin (see Figures 10a to 10d) used to connect cooperating members 30 of adjoining panels together as explained below.

Referring to Figure 4, each panel, referenced 64, comprises a wooden frame with honeycomb core, with skins of MDF or similar material pressed and adhered to the frame. The frame is provided with a central groove on the outside edge, on all four sides. This groove, on any such side, may receive a tongue 46 of a connector strip for example of aluminium alloy, having a body portion 48. Such connector strips are formed, for example, as extrusions of aluminium alloy having the constant cross section shown in Figure 4. Figure 15 shows

such a strip, in cross section, in greater detail.

Referring again to Figure 5, it will be noted that the body part 32 of each member 30 forms a longitudinally extending channel, on the side of the part 32 remote from the ring 34, said channel including an outer region 52 and an inner region 54 separated by inwardly extending ribs 56 on either side of the channel, the part 32 having inwardly projecting flanges 58 which define a restricted longitudinally extending opening to the channel portion 52. Midway along the part 32, a transverse web 60 extends across the channel portion 54 for reinforcement purposes. The channel portions 52, 54, and the inner edges of ribs 56, 58, preferably converge slightly from the free ends of the part 32 to the plane of web 60.

The form of the head portion 48 of the connector strip is such as to be received snugly within the channel portion 52 but to project sufficiently far between the ribs 56 to interfere with the web 54. Consequently, whilst a length of connector strip may be extended into a body 32 from either end thereof, the member 32 is not entirely free to slide along the connector strip so that each connector member 32 is located longitudinally with respect to the panels to which it is fitted by two lengths of connector strip extending into the member from either end thereof, to engage the web 60. The members 30, with intervening fill members 70 (see below), are fitted to the vertical edges of the panels 64 at the upper and lower ends of such edges. In assembly, a respective fill member 70 is slid along each panel vertical edge, on the respective strip 46, 48, to an intermediate position along such edge, leaving end portions of the respective strip 46 and 48 exposed. The hinge members 30 are then fitted over the end parts of the respective strips 46, 48 and pushed into their final positions in which their respective webs 60 engage the respective (slightly inset) ends of the respective strips 48. Thus, for each panel, the respective members 30 project by half of their axial extent above and below the upper and lower edges of the respective panels. The rings 34, in superimposed relationship, of the hinge members of the panels to be interconnected along a common vertical axis, are connected at the upper and lower ends of the panels respectively by upper and lower hinge pins (see below) passed through the aligned rings 34. For assembly reasons, in view of the use of headed hinge pins retained by circlips at their lower ends, the desired hinge members 30 are preferably interconnected by their respective hinge pins before fitting to the edges of their respective panels.

Referring to Figures 5a to 5f, each body part 32, externally, has two planar side faces 68 which converge, as shown in end view in Figures 5a and 5c, towards the axis of the ring member 34, the

included angle between these side faces being 60° or slightly less. As shown in Figures 4 and 6g each fill member 70 has a cross section similar to that of the body portion 32 but, in this case, the mutually inclined side faces actually meet along a line which, in the assembled display, lies on the axis of adjacent members 30. For convenience, the channel parts of the members 70 and the flanges and ribs thereof, which correspond with the channel parts, flanges and ribs of the members 30, have the same references. In the members 30, the body part 32 terminates, at its closest approach to the axis of ring member 34, in a concave cylindrical surface centred on that axis and at a radius corresponding substantially with the radius of each ring member 34.

In assembly of a display using the system of the preferred embodiment, the panels at each level are assembled before fitting the panels of the next panel above. Thus, the panels of each row above the first are fitted between the upwardly projecting halves of the members 30 carried by the row of panels below, with the ends of the strips 46, 48 of the upper panels being fitted in the channel parts 52 of the upwardly projecting halves of the members 30 carried by the lower panels.

In addition to the solid panels described above and shown in Figure 7, the preferred display system also includes rectangular frames, in the same modular sizes as the solid panels and which may carry posters, for example or glass or clear plastics "glazing" sheets. Such frames are assembled using extrusions identical with the infill members 70 as the vertical frame members and rails of a cross section shown in Figure 8 as the horizontal frame members.

In such frames, the horizontal rails 80 are connected at their ends to the respective members 70 by screw and nut clamping arrangements as illustrated in Figure 12. The screws in such screw and nut arrangements may be, for example, hexagon socket screws.

Referring to Figures 8 and 13, each horizontal rail 80 comprises two parallel transversely spaced vertical webs 82 connected by an intermediate horizontal web 84 from which project, at positions intermediate the web 82, a pair of upwardly extending inner webs 86 and a pair of downwardly extending inner webs 86, the webs 86 being parallel with the webs 82 and each upwardly extending web 86 being in substantially the same plane as a respective one of the downwardly extending webs 86. The webs 86 extend upwardly and downwardly slightly further than the webs 82 and each web 86 carries along its free edge a respective flange or lip directed towards the opposing web 86 on the same side as the web 84 whereby there is formed, above and below the web 84 in each member 80, a

central channel, (defined between the respective pair of webs 86) having a restricted mouth, bounded on either side by a respective side channel (defined between the respective web 86 and the adjoining part of the adjacent web 80). Figures 14a to 14e illustrate one component of the screw and nut connection used to connect an end of a rail 80 to the adjoining member 70. This component effectively forms a nut having an elongate rectangular head 90 adapted to fit snugly within the channel part 52 of the member 70 and having a rectangular spigot 92 extending from the head portion 90 at right angles thereto. A screw threaded bore extends through the head portion 90 and the spigot 92, along the axis indicated at 94 in Figure 14b to receive a screw 96 (see Figure 12). The width of the spigot portion 92 corresponds substantially to the spacing between adjacent webs 86 in the rail 80. As shown in Figures 14c and 14d, a horizontal slot extends through the spigot 92 from its free end to a position closely adjacent the head 90. The end portion of each rail 80 is prepared by eliminating the portion of the web 84 lying between the webs 86 over a predetermined distance from the free end of the rail 80 to form, as viewed in plan (Figure 12) an elongate slot to receive the shank of screw 96, and eliminating the webs 86 and a slightly larger part of the web 84 at an intermediate position along said elongate slot to accommodate the head of the screw 96. The shank portion 92 fits snugly between the webs 86, the slot receiving the residual portions of the web 84 between the opposing webs 86. The nut 90 thus serves to locate the screw 96 with its axis lying in the plane of the web 84. With the nut and screw thus assembled to the end of rail 80, the head 90 can be slipped into the channel 52' of the adjoining member 70 from the free end of the latter, whereafter, by tightening the screw 96 using an appropriate tool, for example a hexagonal key, the head portion 90 of the nut may be drawn towards the rail 80 until the flanges 58 of the member 70 are clamped firmly between the head 90 and the end of the rail 80. A spigot 81 (see below) may be located relatively loosely by the free end of the shank with the screw 96 extending therethrough an aperture provided in such spigot.

Lengths of a glazing strip, formed as a plastics extrusion of the cross section shown at 100 in Figure 13 (shown to a larger scale in Figure 9) are mounted on the vertical and horizontal members of the frames. These glazing strips are constructed to support plastics or glass glazing panels or other infill panels. The extrusion 100 comprises a base portion 102 adapted to fit snugly within the outer portions of the channels defined between opposing webs 86 and likewise to fit in the channel parts 52 of the members 70. The extrusion 100 further com-

prises opposing web formations 104 extending from such base portion 102 and defining a channel to receive plastics or glass glazing strips, or the like. Each extrusion 100 has, on each side of its base portion, a respective groove to receive the respective flange of the respective web 86, or the respective flanges 58 of a member 70 whereby each strip of extrusion 100 is held snugly within its respective channel. The lengths of extrusion 100 are, of course, fitted into such channels by longitudinal sliding and are so fitted before the frames are assembled. The ends of such strips 100 are mitred as shown in Figure 13a. The dimensions of the base portion of the extrusions 100 are such as to provide clearance between the base portions and the nut shanks 92 at the ends of the horizontal rails 80.

As shown at the intermediate level in Figure 13, the horizontal beams 80 also provide a means of supporting horizontal members of the system, for example shelves, by providing the latter with downwardly directed hooks or flanges which extend into the outer channels of the rails 80 (defined between the upper webs 86 and the upper portions of the webs 80). As shown also in Figure 13, infill panels 110 may be fitted into such frames by having their edges accommodated within the outer channels of the horizontal rails and abutting or closely approaching the outer faces of the flanges 58 of the members 70.

The horizontal rails 80 may likewise be utilised to fill in the spaces defined, at the top of the panel assembly, between the upwardly projecting portions, from the uppermost row of panels, of the uppermost members 30. The nut and screw clamping arrangement may be used to clamp the ends of the horizontal beams 80 to the members 30 in much the same way as to the members 70 forming the vertical limbs of the rectangular frame.

A similar provision may be made at the lower ends of the panel assembly.

The frames shown in Figure 18 have spigots 81 projecting upwardly and downwardly from the upper and lower ends of their respective members 70. These spigots 81 engage in the channel parts 54 of the members 30 fitted to superimposed or underlying panels of the type shown in Figure 7, in an assembled display, or into frames corresponding to those shown in Figure 18 but without such spigots (not shown), or into intervening infill panels. The spigots 81 at the top and bottom of a display may also engage in grooves formed in the foot pads 107 or connector caps 107.

The spigots 81 (see Figure 17) are inserted into the channel parts 54 of the members 70 from which they project and are retained by the end of the respective screw 96 which projects through a transverse bore 83 in the spigot 81.

Referring to Figures 10a to 10d each of the hinge pins referred to comprises a tubular externally cylindrical body or shank 120 dimensioned to fit snugly within the rings 34, a head 122 at one end of the shank which is in the form of a circular plate with a flat cut along one side and is adapted to fit snugly and non-rotatably within the recess 42 in an outermost ring member 34 to be held non-rotatably therein. At the opposite end of the shank 120, a groove 124 is provided to receive a retaining circlip (not shown). As shown in Figure 10d, the central bore, extending through the shank portion 120 and head 122 is screw threaded from either end of the hinge pin, to receive, where appropriate, a correspondingly screw threaded stud 106 on an upper or lower foot pad or connector cap 107 (according to whether the item 107 shown in Figure 11 is fitted at the upper or lower end of the assembled panel system). The screw threaded interengagement between the foot pad or cap and the hinge pin allows for vertical adjustment of the foot pad or cap relative to the remainder of the panel system to adapt to uneven floor surfaces. The cap has, on its side nearer the panel system, in use, i.e. the side from which the threaded stud extends, circumferential grooves adapted to receive the projecting portions 31 of the connector body parts 32.

In the same manner as the shelves may be mounted, ceiling panels may be extended between rails 80 carried by transversely spaced panels, at the upper end of the display structure.

The infill members 70 may be used as trunking to carry electrical cabling unobtrusively (within their inner channels 54).

The preferred system according to the invention allows up to six adjoining panels at the same level to be connected at a common vertical axis, the panels radiating from said axis (see Figure 2). In the simplest arrangement illustrated (in plan and side view, in Figure 6b), where two adjacent panels only are to be interconnected, the adjacent panels are provided, on their adjacent edges, with respective hinge members 30 having their rings 34 displaced relative to each other, so that, in the assembled condition, the rings 34 of the members 30 of the two panels lie one above the other, the body parts 32 of the adjoining hinge members of the adjoining panels being, of course, at the same level as each other. The otherwise unoccupied portions of the axial length of the two adjoining parts 32 is occupied by spacer rings 111 which are fitted over the respective hinge pins in the appropriate number, so that, for example, where only two hinge members are interconnected, four such spacer rings are required. Similarly, where three adjoining panels are to radiate from a common vertical axis, (see Figure 6c), three interconnected hinge mem-

bers 30 are utilised having their rings 34 at three different axial positions relative to the "common" axial extent of the body parts 32 of the three members, the axial space unoccupied by the rings 34 being occupied by spacer rings (in this case three in number). In the same way, as shown in Figures 6d to 6f, four, five or six hinge members may be interconnected, using two, one or no auxiliary rings to occupy the otherwise unoccupied space on the hinge pins.

Whilst, for convenience, the term "hinge member" has been used in relation to the components 30, 32, 34, it will be appreciated that, in practice, once a chosen display is assembled, there will not normally be pivotal movement between adjoining interconnected panels and indeed, where six adjoining panels are so interconnected, such pivotal movement is substantially excluded because there is no freedom for any significant pivotal movement between the members due to the interaction between the inclined vertical flanks of the various body parts 32 and infill members 70. On the other hand, it may well be desired to build a structure having a door and this can, of course, be done simply by providing a standard panel, or two or more superimposed standard panels connected along one vertical edge only by hinge members 30 to the adjacent stationary panels and bearing on the other vertical edge, a member or members 70 to which may also be fitted a handle attachment and/or a catch attachment.

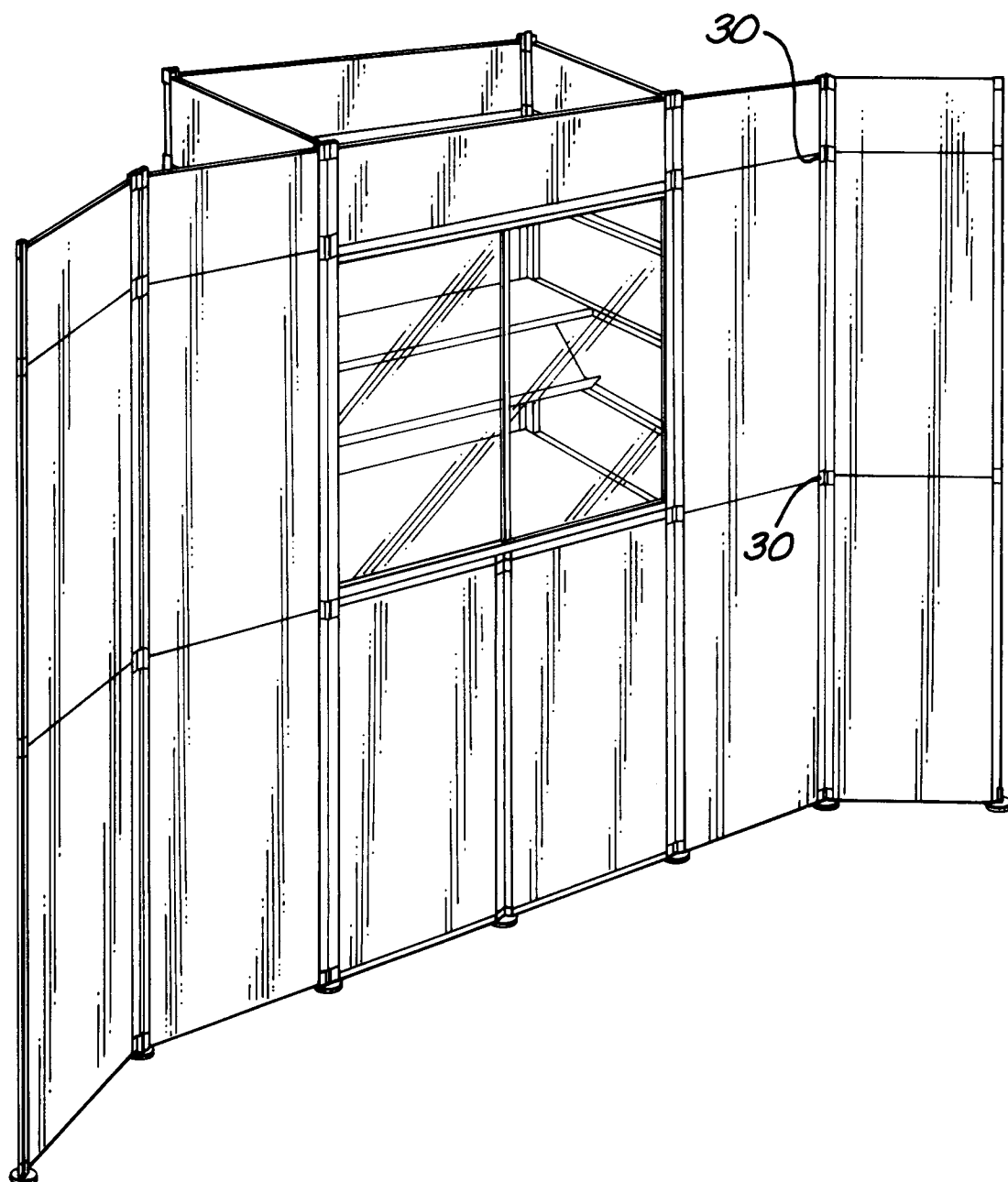
Claims

1. A display system comprising a plurality of panels interconnected along adjoining sides by interengaging hinge members carried by the respective panels on the respective sides thereof and removable hinge pins extended through cooperating hinge members of the adjoining panels to establish connections between the same.
2. A system according to claim 1 wherein said panels form part of a modular system wherein the dimensions of each panel, as measured between the axes of respective hinge formations are equal to a predetermined standard dimension or to an integral multiple thereof.
3. A system according to claim 1 or claim 2 wherein each said hinge member comprises an elongate part adapted to be secured to a panel edge and to extend along said panel edge over a first length, and a bearing part or ring carried by said member and projecting transversely therefrom to define a bearing axis extending parallel with such panel edge, the

axial dimension of said bearing part being a sub-multiple of the length of said member whereby two or more such bearing parts of respective adjoining hinge members may be superimposed axially, with their bearing axes aligned, within the axial limits of a said elongate part secured to a panel edge.

4. A system according to claim 3 including a plurality of different types of such hinge members, the different types having said elongate parts thereof of the same length but said bearing or ring parts thereof at different longitudinal positions along their respective elongate parts, whereby, with adjoining said hinge members of adjoining said panels at the same height, the respective bearing parts may overlie one another at different heights, but in axial alignment with one another.

FIG. 1



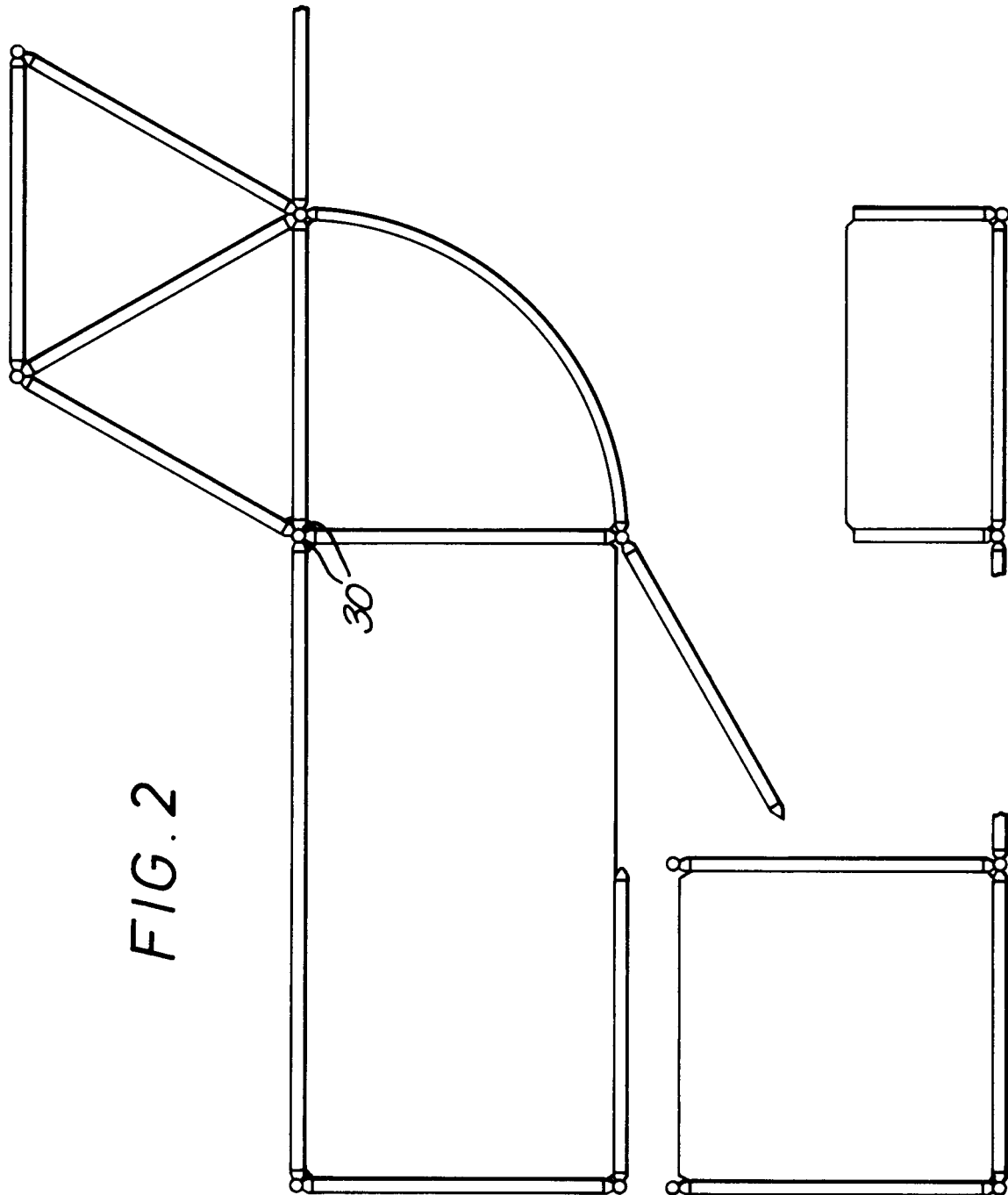


FIG. 3

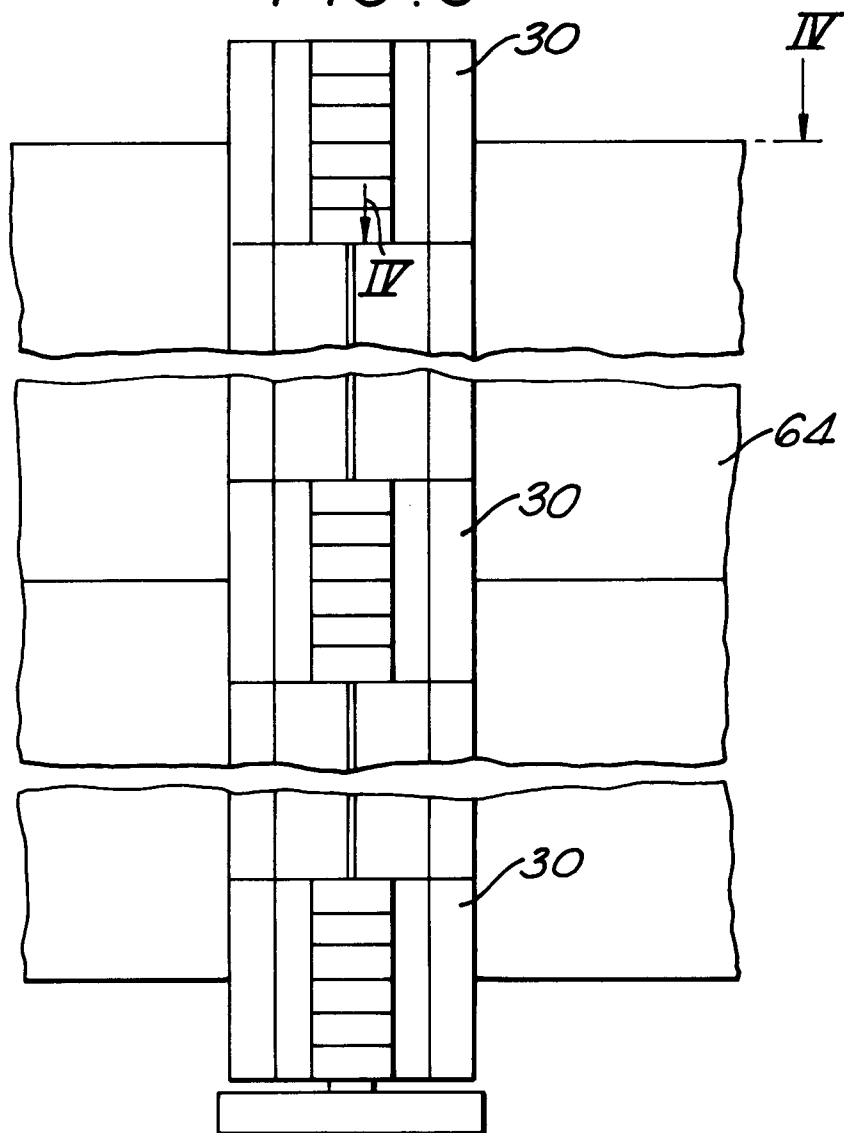


FIG. 3a

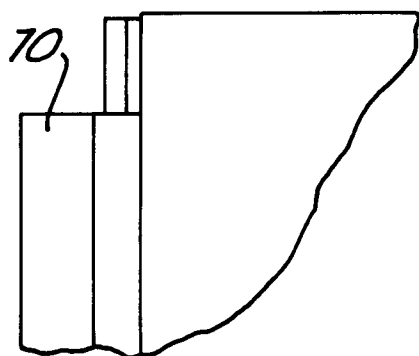


FIG. 4

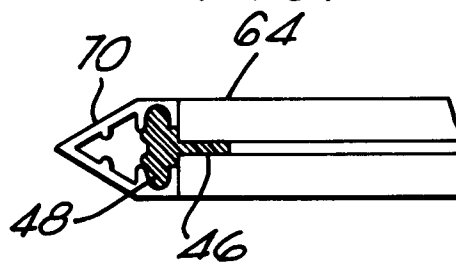


FIG. 5a

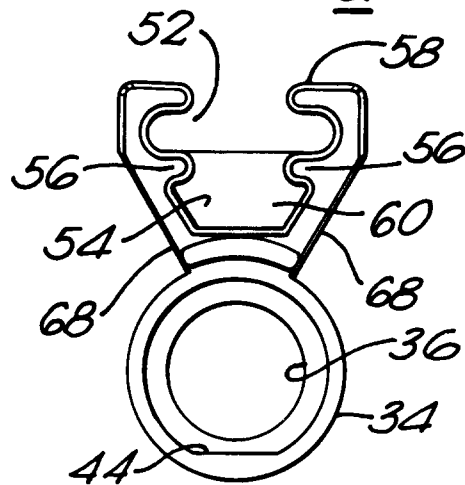


FIG. 5b

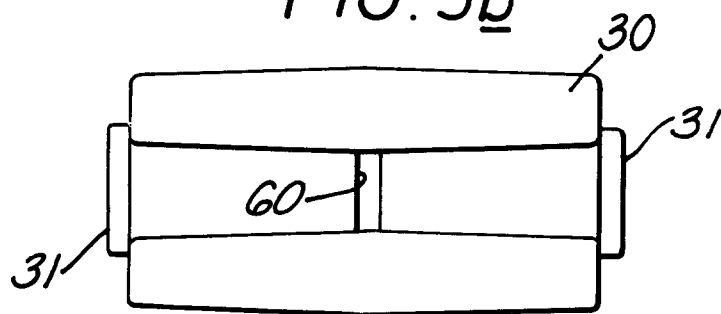


FIG. 5c

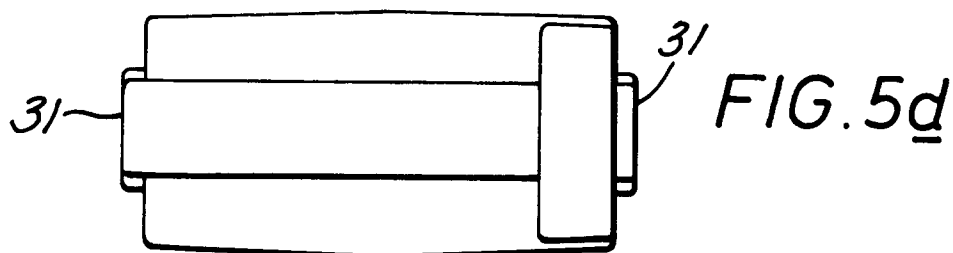
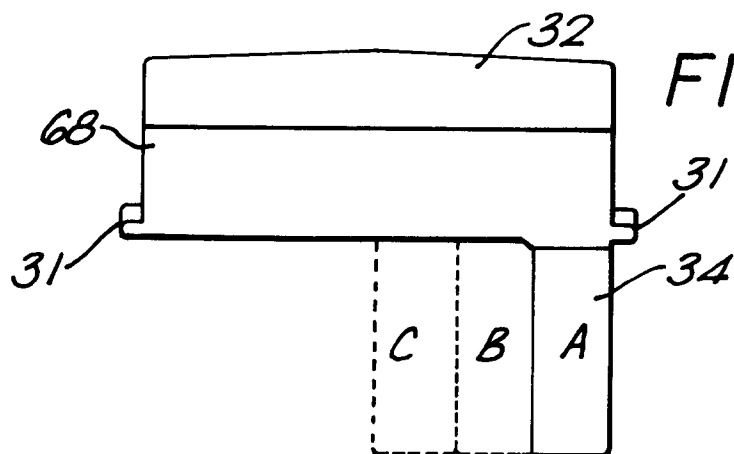


FIG .5_e

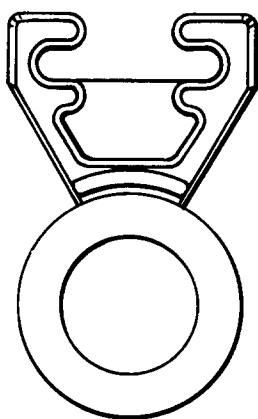


FIG .5_f

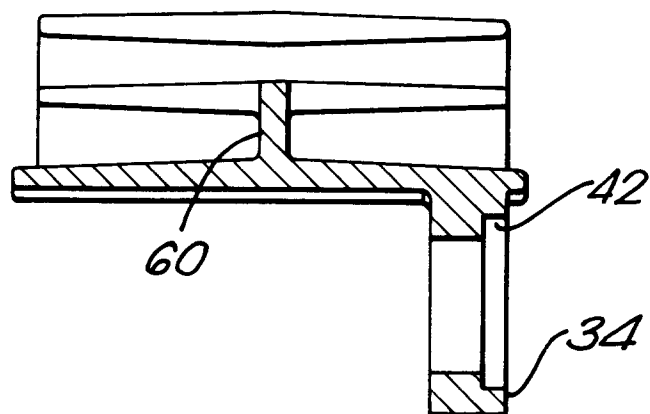


FIG. 6a

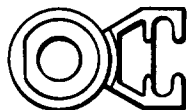


FIG. 6b

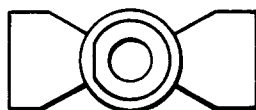


FIG. 6c

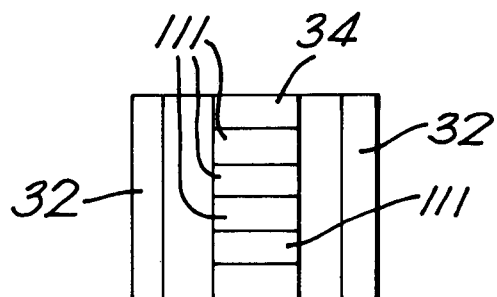
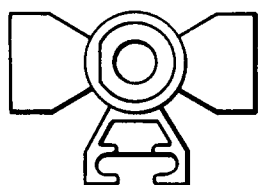


FIG. 6e

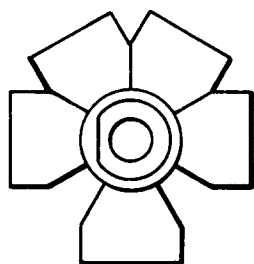


FIG. 6d

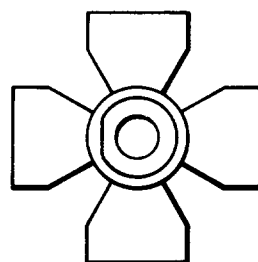


FIG. 6g

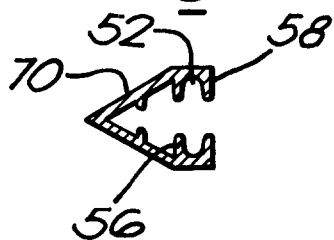


FIG. 6f

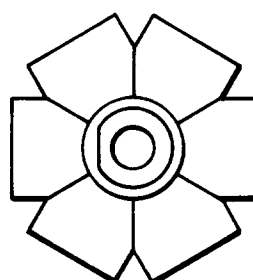
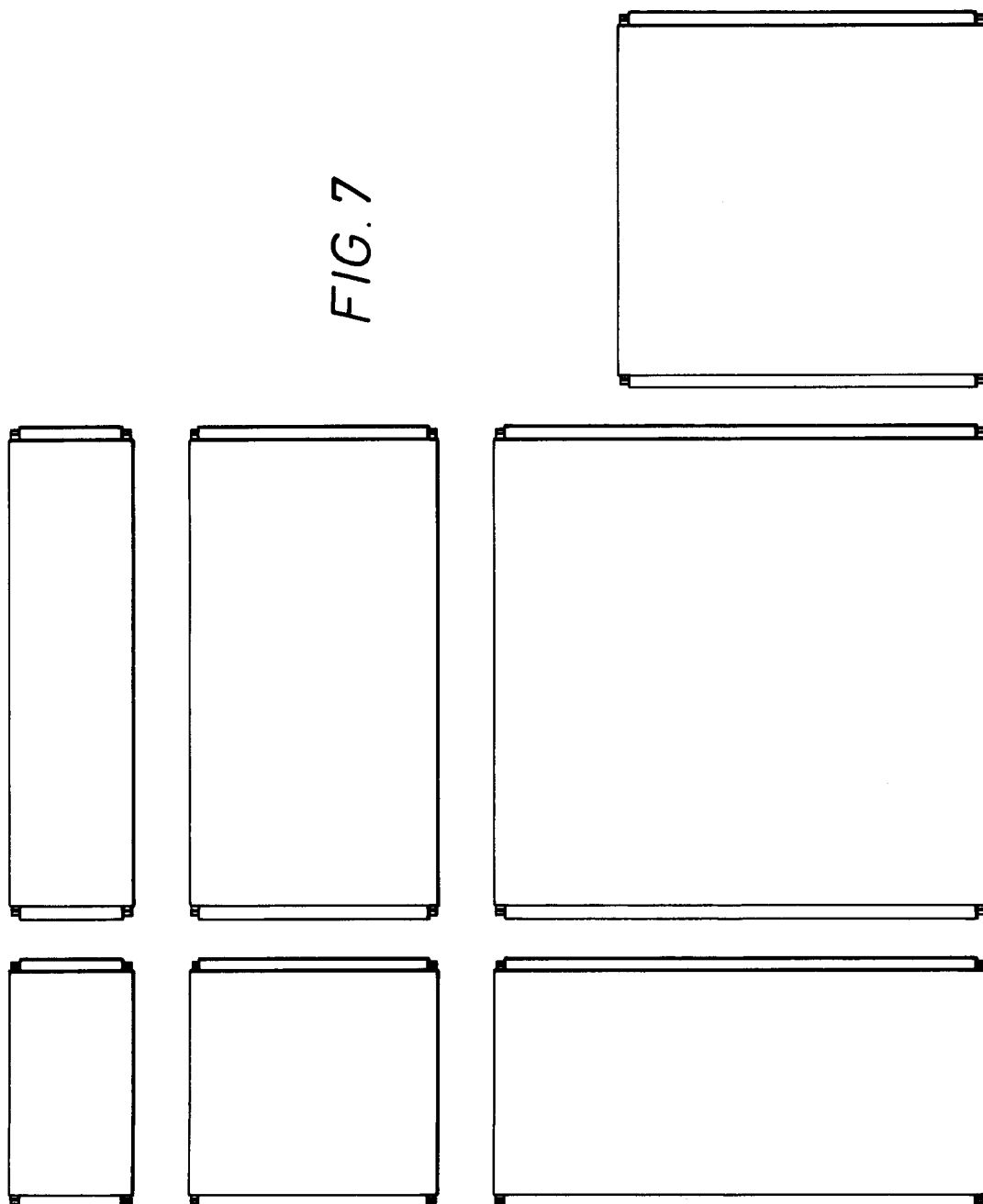


FIG. 7



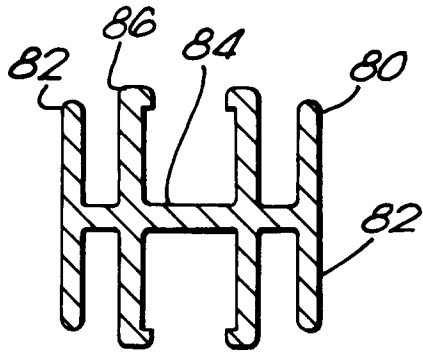


FIG. 8

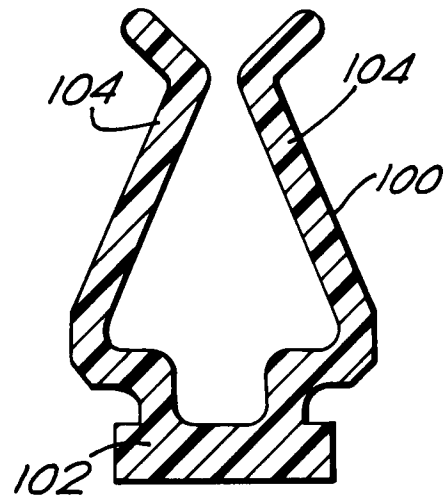


FIG. 9

FIG. 10a

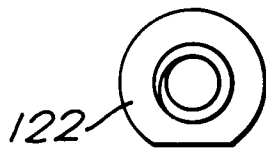


FIG. 10b

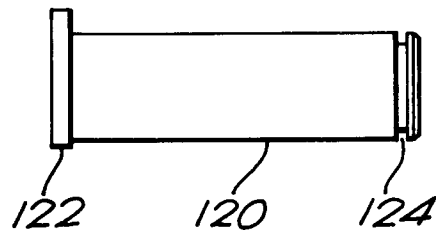


FIG. 10c

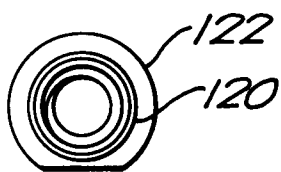
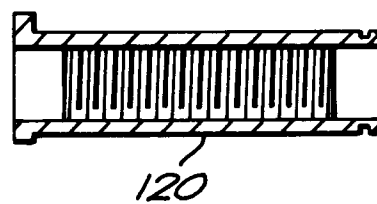


FIG. 10d



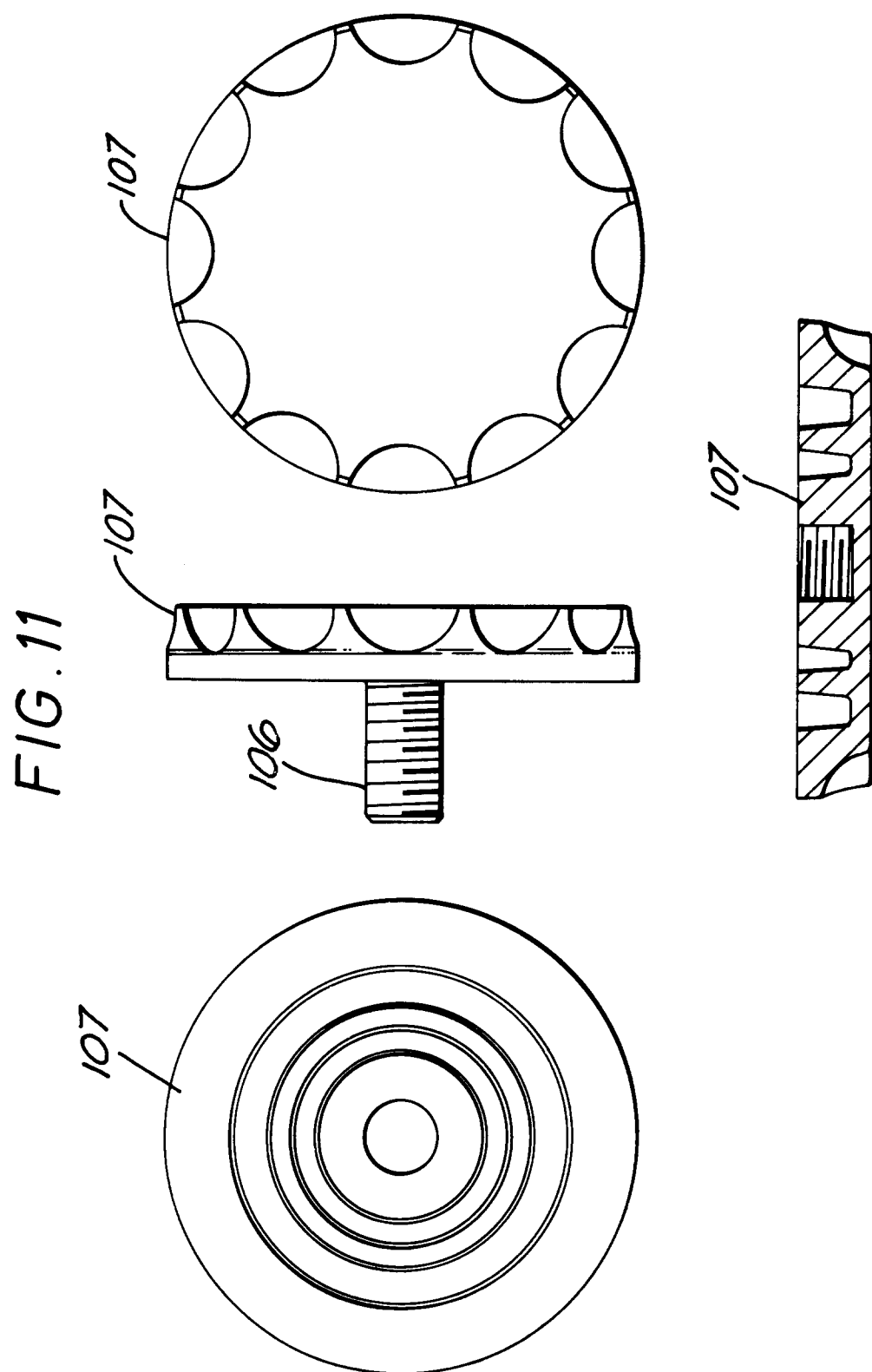


FIG. 12

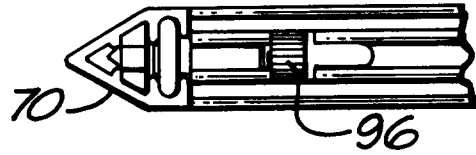


FIG. 13

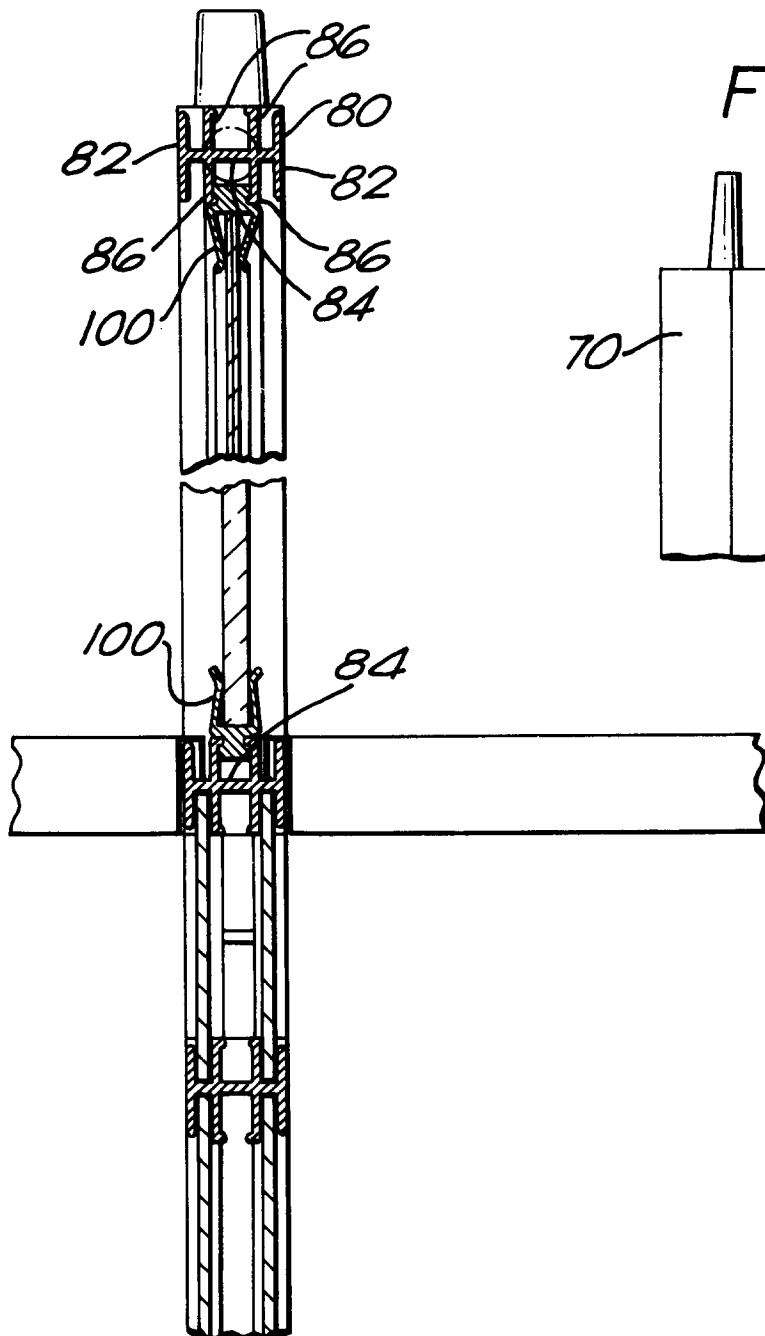


FIG. 13a

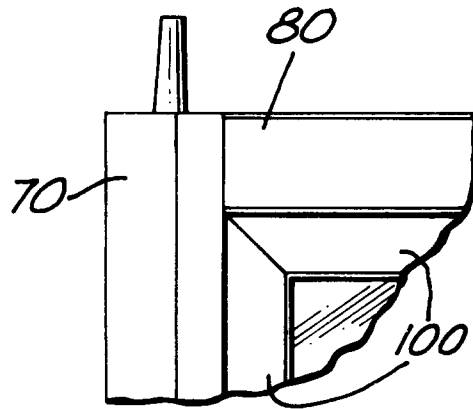


FIG. 14a

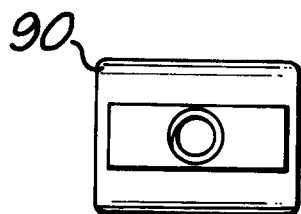


FIG. 14b

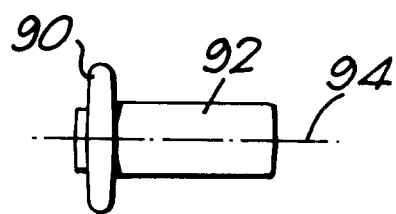


FIG. 14c

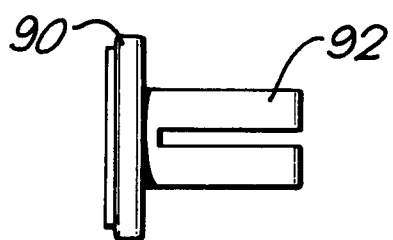


FIG. 14d

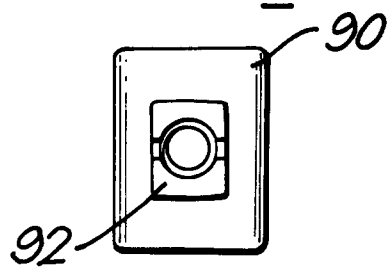


FIG. 15

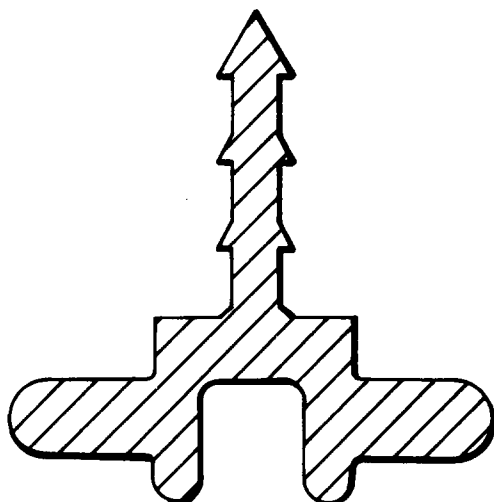


FIG. 16

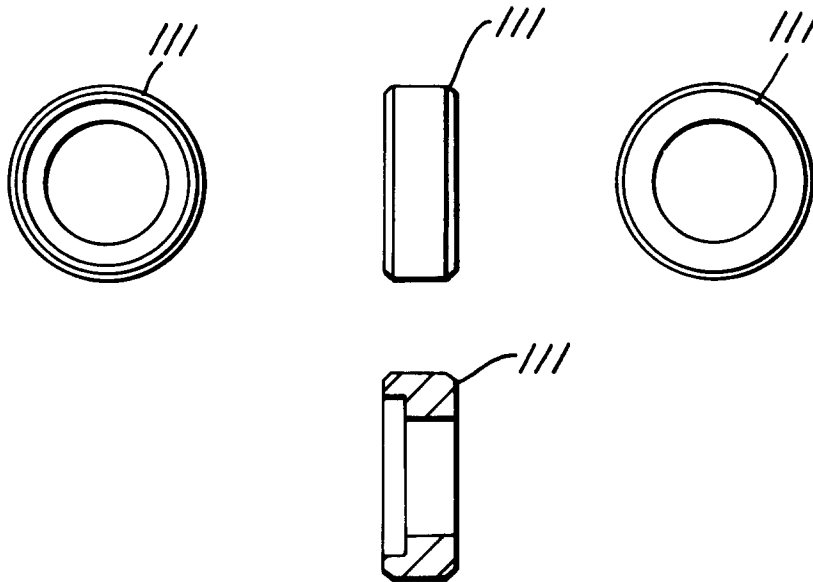


FIG. 17

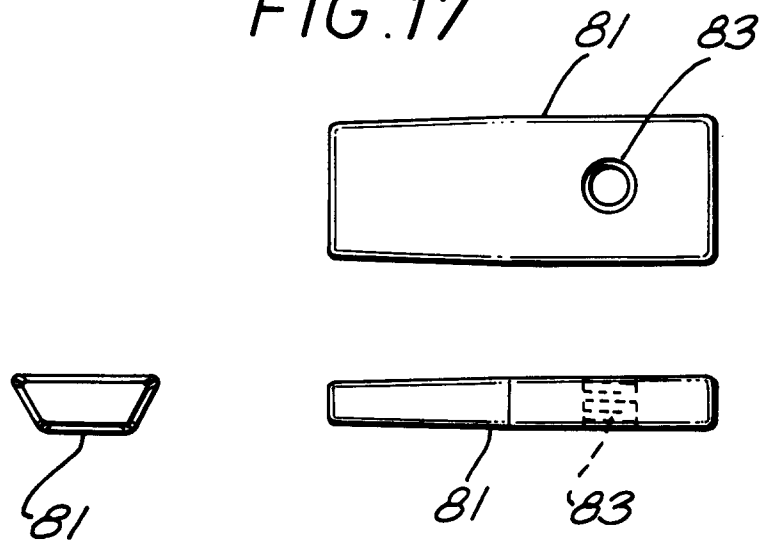


FIG. 18

