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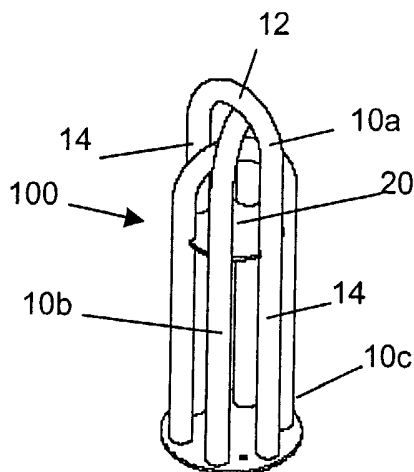
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(54) Title: UNIVERSAL PUBLIC-SPACE FIXTURE AND ACCESSORIES FOR USE THEREWITH



(57) Abstract: A universal public-space fixture comprising a series of at least two nested, inverted U-shaped forms (10a and 10b) of decreasing height set around a common vertical axis. Each U-shaped form has an upper transverse portion (12) and two parallel, vertical legs (14) extending from the upper transverse portion (12). The fixture further comprises at least one center joining plate (20) located below the upper transverse portions (12) of the forms (10a and 10b) and being substantially perpendicular to the forms, for joining the U-shaped forms (10a and 10b) together as a unit, the forms being fastened to the at least one center joining plate (20). The fixture can also include an anchor plate (24) attached to the forms at or adjacent their bottom, for anchoring the forms to a support surface. The fixture can be used in a system comprising at least one other universal public-space fixture and/or at least one site amenity (for example, seating, lighting, signage, a shelter, a trash can receptacle, and an ash urn), wherein the at least one site amenity is associated with the at least one other universal public-space fixture, for example by being attached thereto.

## UNIVERSAL PUBLIC-SPACE FIXTURE AND ACCESSORIES FOR USE THEREWITH

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present patent application is a continuation-in-part of Application No. 29/165,862, filed August 20, 2002, which is incorporated herein by reference in its entirety.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

[0002] The present invention relates to public-space fixtures. More specifically, the invention relates to a universal public-space fixture that is adaptable to use as a bollard, usable alone or in a system of bollards, and/or with accessories including but not limited to seating, shelters, signage, lamps, ash-urns, and litter receptacles.

#### 2. Related Art

[0003] As a result of the newly defined threat to people occupying ordinary public places in their daily activities, it has now become apparent that conventional public-space fixtures (for example, benches and chairs, litter receptacles, lamps, etc.) must evolve into devices that enhance security, provide conventional function (for example, seating, litter

control, lighting, etc.) and allow for the subtle directing of pedestrian traffic. They also must allow for a pleasing, cohesive design system that integrates multiple functions.

[0004] Such devices must also eventually meet standards now being written to accommodate the threats posed by vehicular traffic in or near pedestrian spaces. They must likewise provide reasonable barrier protection to entrances, plazas, city streets, areas of congestion, etc. They must simultaneously be cost effective and flexible in design to provide multiple functions. Their design must be easily modified to provide increased strength and protection without inordinately higher cost or significantly larger size, as larger size can easily overwhelm public spaces, making the function of providing protection a deterrent to the successful use of public spaces. Scale is important given the limited space available, the footprint of such devices, and the necessity for the safe movement of pedestrians.

[0005] In addition, as a standard requirement, public-space fixtures must be sufficiently attractive to provide permanent and otherwise successful replacement for the concrete slabs and "Jersey Walls" that have been placed temporarily to provide safety.

[0006] The same design fixture must be adaptable to seating, shelters, bollards, signage, lamps, and the holding of such elements as ash-urns and litter receptacles. In all such configurations, the fixture must be easily installable as an in-ground or above-ground (bolted-down) structure. The fixture must be configurable to accommodate the evolving

standards for the spacing of bollards and barriers, while meeting conventional requirements for accessibility for all people.

[0007] These diverse and constantly changing criteria make it necessary to design the elements of public fixtures as part of a set of safety, protective, informational, and convenience requirements.

[0008] It is to the solution of these and other problems that the present invention is directed.

#### SUMMARY OF THE INVENTION

[0009] It is accordingly a primary object of the present invention to provide a universal public-space fixture that is cost effective and flexible in design to provide multiple functions.

[00010] It is another object of the present invention to provide a universal public-space fixture that can be easily modified to provide increased strength and protection without inordinately higher cost or significantly larger size.

[00011] It is still another object of the present invention to provide a universal public-space fixture that is adaptable to seating, shelters, bollards, signage, lighting, and the holding of such elements as ash-urns and litter receptacles.

[00012] It is still another object of the present invention to provide a universal public-space fixture that is adaptable to use as a bollard, usable alone or in a grouping of other bollards, or with accessories including but not limited to seating, shelters, signage, lighting, ash-urns, and litter receptacles.

[00013] These and other objects of the invention are achieved by the provision of a universal public-space fixture comprising a series of at least two nested, inverted substantially U-shaped forms of decreasing height set around a common vertical axis. Each substantially U-shaped form has an upper transverse portion and two parallel, vertical legs extending from the upper transverse portion. The upper transverse portion can be curved, either symmetrically or asymmetrically, with a smooth transition to the legs, or it can be linear and joined to the legs at a miter joint.

[00014] In one aspect of the invention, the fixture further comprises means for joining the substantially U-shaped forms together as a unit, for example, at least one center joining plate located below the upper transverse portions of the forms, the forms being fastened to the at least one center joining plate. The at least one center joining plate is substantially

perpendicular to the forms, and can comprise a disc having notches at the perimeter thereof for engaging the substantially U-shaped forms, or a spider having radiating arms that engage the substantially U-shaped forms.

[00015] In another aspect of the invention, the forms are substantially vertical and the at least one center joining plate is substantially horizontal.

[00016] In another aspect of the invention, the fixture further comprises means for anchoring the forms to a support surface, for example, an anchor plate attached to the forms at or adjacent their bottom.

[00017] In still another aspect of the invention, the fixture can be used in a public-space system comprising at least one other universal public-space fixture and/or at least one site amenity (for example, seating, lighting, signage, a shelter, a trash can receptacle, and an ash urn). Where the public-space system includes at least one site amenity, the site amenity is associated with the universal public-space fixture, for example by being attached thereto.

[00018] Other objects, features and advantages of the present invention will be apparent to those skilled in the art upon a reading of this specification including the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

[00019] The invention is better understood by reading the following Detailed Description of the Preferred Embodiments with reference to the accompanying drawing figures, in which like reference numerals refer to like elements throughout, and in which:

[00020] FIGURES 1A and 1B are respectively perspective and top plan views of a first embodiment of a universal public-space fixture in accordance with the present invention.

[00021] FIGURE 2A and 2B are respectively perspective and top plan views of a second embodiment of a universal public-space fixture in accordance with the present invention.

[00022] FIGURE 3A is a perspective view of a third embodiment of a universal public-space fixture in accordance with the present invention.

[00023] FIGURE 3B is a perspective view of a fourth embodiment of a universal public-space fixture in accordance with the present invention.

[00024] FIGURE 4A is a perspective view of the joining plate of the universal public-space fixture of FIGURE 3B.

[00025] FIGURE 4B is a perspective view of a first alternative embodiment of a joining plate.

[00026] FIGURE 4C is a perspective view of a second alternative embodiment of a joining plate.

[00027] FIGURE 5 is a top plan view of an anchor plate of the universal public-space fixture of FIGURE 3.

[00028] FIGURE 6 is a side elevational view of a universal public-space figure anchored in a concrete footing.

[00029] FIGURES 7A, 7B, and 7C are respectively perspective, side elevational, and top plan views of a grouping of universal public-space fixtures in accordance with the present invention.

[00030] FIGURES 8A, 8B, and 8C are respectively perspective, side elevational, and top plan views of a first embodiment of a single universal public-space fixture having seating associated therewith.

[00031] FIGURES 9A, 9B, and 9C are respectively perspective, side elevational, and top plan views of a second embodiment of a single universal public-space fixture having seating associated therewith.

[00032] FIGURES 10A, 10B, and 10C are respectively perspective, side elevational, and top plan views of a third embodiment of a single universal public-space fixture having seating associated therewith.

[00033] FIGURES 11A, 11B, 11C, and 11D are respectively perspective, front elevational, side elevational, and top plan views of a first embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00034] FIGURES 12A, 12B, 12C, and 12D are respectively perspective, front elevational, side elevational, and top plan views of a second embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00035] FIGURES 13A, 13B, 13C, and 13D are respectively perspective, front elevational, side elevational, and top plan views of a third embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00036] FIGURES 14A, 14B, 14C, and 14D are respectively perspective, front elevational, side elevational, and top plan views of a fourth embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00037] FIGURES 15A, 15B, 15C, and 15D are respectively perspective, front elevational, side elevational, and top plan views of a fifth embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00038] FIGURES 16A, 16B, 16C, and 16D are respectively perspective, front elevational, side elevational, and top plan views of a sixth embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00039] FIGURES 17A, 17B, 17C, and 17D are respectively perspective, front elevational, side elevational, and top plan views showing a seventh embodiment of a grouping of universal public-space fixtures having seating associated therewith.

[00040] FIGURES 18A, 18B, and 18C are respectively perspective, front elevational, and side elevational views of a first embodiment of a grouping of universal public-space fixtures having a shelter associated therewith.

[00041] FIGURES 19A, 19B, and 19C are respectively perspective, front elevational, and side elevational views of a second embodiment of a grouping of universal public-space fixtures having a shelter associated therewith.

[00042] FIGURES 20A and 20B are respectively perspective and side elevational views of a grouping of a third embodiment of a grouping of universal public-space fixtures having a shelter associated therewith.

[00043] FIGURES 21A and 21B are respectively perspective and side elevational views of a universal public-space fixture having a lamp associated therewith.

[00044] FIGURES 22A, 22B, and 22C are respectively perspective, front elevational, and side elevational views of a first embodiment of a universal public-space fixture having a matching ash urn and trash can receptacle associated therewith.

[00045] FIGURES 23A, 23B, 23C, and 23D are respectively perspective, front elevational, side elevational, and top plan views of a second embodiment of a universal public-space fixture having a matching ash urn and trash can receptacle associated therewith.

[00046] FIGURES 24A and 24B are respectively perspective and side elevational views of a first embodiment of a universal public-space fixture having a trash can receptacle associated therewith.

[00047] FIGURES 25A and 25B are respectively perspective and side elevational views of a second embodiment of a universal public-space fixture having a trash can receptacle associated therewith.

[00048] FIGURES 26A, 26B, and 26C are respectively perspective, front elevational, and side elevational views of a first embodiment of a universal public-space fixture having an ash urn associated therewith.

[00049] FIGURES 27A, 27B, and 27C are respectively perspective, front elevational, and side elevational views of a second embodiment of a universal public-space fixture having an ash urn associated therewith.

[00050] FIGURES 28A, 28B, 28C, 28D, and 28E are respectively perspective, front elevational, left and right side elevational, and top plan views of a grouping of universal public-space fixtures having seating and a matching ash urn and trash can receptacle associated therewith.

[00051] FIGURES 29A, 29B, 29C, 29D, and 29E are respectively perspective, front elevational, side elevational, and top plan views of a grouping of universal public-space fixtures having seating and signage associated therewith.

[00052] FIGURES 30A, 30B, 30C, and 30D are respectively perspective, front elevational, side elevational, and top plan views of a fifth embodiment of a universal public-space fixture in accordance with the present invention.

[00053] FIGURES 31A, 31B, 31C, and 31D are respectively perspective, front elevational, side elevational, and top plan views of a sixth embodiment of a universal public-space fixture in accordance with the present invention.

[00054] FIGURES 32A, 32B, 32C, and 32D are respectively first perspective, second perspective, first side elevational, and second side elevational views of a seventh embodiment of a universal public-space fixture in accordance with the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00055] In describing preferred embodiments of the present invention illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the invention is not intended to be limited to the specific terminology so selected, and it is to be understood

that each specific element includes all technical equivalents that operate in a similar manner to accomplish a similar purpose.

[00056] Referring to FIGURES 1A-1B and 2A-2B, there are shown first and second embodiments 10 and 10' of a universal public-space fixture that, when used individually or in combination with other similar universal public-space fixtures, functions as a bollard. The structure of the universal public-space fixture 10 and 10' is based on the formation of continuous cross-sections in a series of at least two nested, inverted U-shaped forms (10a and 10b in shown FIGURES 1A and 1B; 10a, 10b, and 10c shown in FIGURES 2A and 2B) set around a common vertical axis A. In order to achieve a nested configuration, the substantially U-shaped forms 10a, 10b, and 10c are of decreasing height. Each substantially U-shaped form has an upper transverse portion 12 and two parallel, vertical legs 14 extending from the upper transverse portion 12. In the embodiments of FIGURES 1A-1B and 2A-2B, the upper transverse portion 12 is curved, with a smooth transition to the legs 14, although other configurations are possible, as discussed below.

[00057] Referring to FIGURE 3A, an embodiment of a universal public-space fixture 100 is shown that includes means such as at least one center joining plate for joining the substantially U-shaped forms 10a, 10b, and 10c together as a unit. In this embodiment, the center joining plate is in the form of a disc 20. Preferably, the forms 10a, 10b, and 10c are fastened to the joining means below the upper transverse portions 12 of the forms 10a, 10b,

and 10c. Means such as an anchor plate 24 attached to the bottom of the substantially U-shaped forms 10a, 10b, and 10c can also be provided to anchor the substantially U-shaped forms 10a, 10b, and 10c to a support surface. The "footprint" of the assembly is governed by the transverse cross-sections of the substantially U-shaped forms 10a, 10b, and 10c and the number of such forms that are nested.

[00058] The forms are not limited to tubing of circular cross-section, but can be made of tubing of other cross-sections including, but not limited to square or rectangular cross-sections. FIGURES 30A-30D and FIGURES 31A-30D show fifth and sixth embodiments 110 and 110', respectively, of a universal public-space fixture in which the forms 110a, 110b, 110c, and 110d are made of tubing having a square cross section. Each substantially U-shaped form has an upper transverse portion 112 (which in the embodiment of FIGURES 30A-30D and 31A-31D is linear) and two parallel vertical legs 114. In this configuration, the upper transverse portion 112 and the legs 114 can be fit together using miter joints that are welded together to provide a continuous structure. Preferably, the universal public-space fixtures 110 and 110' include joining means such as at least one center joining plate for joining the forms 110a, 110b, 110c, and 110d together as a unit below the upper transverse portion 112. In this embodiment, the center joining plate is in the form of a square 120. Anchoring means are also provided to anchor the substantially U-shaped forms 110a, 110b, 110c, and 110d to a support surface, as discussed hereinafter.

[00059] Also, the widths of the forms (that is, the distance between the outside edges of the legs) can either be the same for all forms, which will yield a substantially circular footprint (as shown, for example, FIGURES 3A, 3B, 30A-30D, and 31A-31D), or they can be varied to yield a non-circular footprint. For example, in a universal public-space fixture comprising four forms set around a common vertical axis to form an angle of  $45^\circ$  between adjacent forms, alternating forms can have widths in a ratio of  $1:\sqrt{2}$ , which will yield a square footprint (not shown). Thus, a universal public-space fixture in which the substantially U-shaped forms are made from tubing with a circular cross-section can have a circular or non-circular footprint; and a universal public-space fixture in which the substantially U-shaped forms are made from tubing with a square cross-section also can have a circular or non-circular footprint.

[00060] For most applications, the forms 10a, 10b, and 10c and 110a, 110b, 110c, and 110d will have a substantially vertical orientation, and where the joining means is a center joining plate, the joining means will have a substantially horizontal orientation. However, it is contemplated that in some applications, the universal public-space fixture may have a substantially horizontal or other orientation, and the center joining plate will have a substantially vertical orientation or an orientation otherwise substantially perpendicular to that of the forms 10a, 10b, and 10c and 110a, 110b, 110c, and 110d.

[00061] The center joining plate can be a disc 20 (as shown in FIGURES 3B and 4A), a square 120 (as shown in FIGURES 30A-30D and 31A-31D), a rectangle, or other shape with notches 20b at the perimeter complimentary in shape to the cross-section of the legs 14 or 114 to engage facing surfaces of the legs 14 or 114. The center joining plate can also be a spider 20' or 20" (FIGURES 4B and 4C) having radiating arms 22' or 22", respectively, that engage the facing surfaces of the legs 14 or 114. FIGURE 4B shows a first embodiment of a spider 20', in which the sides of the arms 22' are parallel, while FIGURE 4C shows a second embodiment of a spider 20", in which the sides of the arms 22" converge. It will be appreciated by those of skill in the art that a center joining plate in the form of a spider, such as the spiders 20' and 20" as shown in FIGURES 4B and 4C can also be adapted to forms made from tubing of non-circular cross-section, such as forms 110a, 110b, 110c, and 110d. It will also be appreciated by those of skill in the art that other configurations of center joining plate can be used.

[00062] The center joining plate can have a central aperture 20b therein (as shown in FIGURES 3B and 4A-4C), for example to receive a center shaft (as discussed in greater detail below) for enclosing electrical lines and supporting at least one electrically-operated device, such as a lamp, or to receive a center pole for supporting a second fixture above the universal public-space fixture; although the central aperture 20b can be omitted, as shown and described in connection with the universal public-space fixture of FIGURE 3A.

[00063] Referring again to FIGURES 3A-3B, and also to FIGURE 5 and FIGURES 31A-31D, the anchoring means can be an anchor plate attached to the bottoms of the forms 10a, 10b, and 10c and 110A, 110b, 110c, and 110d, for example by welding. The anchor plate can be a disc 24, as shown in FIGURES 3A-3B and 5, or a square 124, as shown in FIGURES 31A-31D, and is also fastened to a support surface (for example, pavement) by bolts or the like inserted through apertures 24b spaced around the anchor plate 24 or 124 inward of its perimeter. Like the joining means and for the same purpose, the anchor plate can have a central aperture 24a, as shown in FIGURES 3B and 5 in connection with the anchor plate 24. Alternatively, the bottoms of the forms 10a, 10b, and 10c and 110a, 110b, 110c, and 110d can be buried in the ground, preferably anchored in a concrete footing 26, as shown in FIGURE 6 and FIGURES 30A-30D. When the forms 10a, 10b, and 10c are anchored in a concrete footing 26, the anchor plate 24 can be omitted.

[00064] In one embodiment, shown in FIGURES 2A-2B, the universal public-space fixture has three substantially U-shaped forms 10a, 10b, and 10c of 2  $\frac{3}{8}$  inch O.D. steel pipe, with the substantially U-shaped forms 10a, 10b, and 10c being at an angle of 120° to each other. The footprint formed represents a circle.

[00065] The size and strength of the material used can have a significant effect on the behavior and strength of the finished universal public-space fixture. For example, with no

change in general appearance, using standard schedule 40 pipe will provide one set of characteristics, while using high-tensile-strength tubular steel of the same outer diameter will yield far different characteristics. Moving the center joining plate up or down, or changing the cross-section of the tubing used to make the forms, or increasing the heights of the substantially U-shaped forms, or changing the configuration of the joining plate, or adding additional joining plates will also have a significant effect on the characteristics of the fixture. Filling the inside of the substantially U-shaped forms with concrete or other filler materials will yield other results. Using multiple universal public-space fixtures of different heights (the height of each universal public-space fixture being determined by the height of its tallest substantially U-shaped form) placed adjacent to each other as shown and described in connection with FIGURES 7A-7C will also result in different characteristics, as will joining or linking universal public-space fixtures together using seating sections shown and described in connection with 11A-11C, 12A-12D, 13A-13D, 14A-14D, and 14A-15D, or a sign frame as shown and described in connection with FIGURES 29A-29D, or the canopy of a shelter as shown and described in connection with FIGURES 18A-18C, 19A-19C, and 20A-20B, as functional and structural elements. There are conflicting requirements for strength, rigidity, and ductility that must be addressed.

[00066] Assume, for example, that a car is deliberately or accidentally driven toward a facility in which a plurality of the universal public-space fixtures in accordance with the invention are arrayed in front of it as bollards. Also assume, for example, that the strength

of the anchoring means anchoring the bollards to the ground is sufficient to restrain the fastened portion of each bollard over a known and defined range. Such anchoring means include but are not limited to an anchor plate 24 or 124 held in place by anchor bolts, the extended ends of the legs 14 or 114 held in concrete footings 26, and an in-ground assembly acting as a receiver for the legs 14 or 114 or a joining plate (which would make the bollard removable), etc. Such anchoring means can also include a radially-extending assembly below ground.

[00067] When a vehicle strikes the outer circumference of the vertical bollard either used by itself or as part of a larger assembly, it is intended that the bollard will initiate a reaction similar to the concept of the "crumple zone" in automobile design. The energy of the impact will deform the bollard significantly. The horizontal energy of the crash will be deflected in a series of distortions that are both vertical and horizontal, with most of the horizontal energy being deflected in the vertical legs 14. The steel will deform, stretch, and translate energy to the adjacent sections of the substantially U-shaped forms, the joining plates, and any other elements attached to them.

[00068] The energy needed to tear, bend, or deform each element of the bollard can be defined by the grade, weight, and characteristics of the material used. In the absorption of energy, the bollard will deform such that enormous energy is absorbed in the translating of the horizontal vector of the collision into the vertical and horizontal distortion of the

bollard elements into the bollard cross-section itself. The relationship of the height of the arches, the placement of the joining plates, the number of joining plates, the number of arches, the combination of bollards, etc., all provide enormous flexibility in a homogeneous design motif. Similarly, using other attached elements, including benches, increases the area and function of the "crumple zone" significantly, distributing energy over more space, material, linked bollards, etc.

[00069] As discussed above, the joining plates can be in the form of a steel or other disc 20 (FIGURES 3B and 4), a square (FIGURES 30A-30D and 31A-31D) or "spider" framework (FIGURES 4B and 4C) that allows for more or less movement of the individual sections of each substantially U-shaped form. Likewise, changing the height of the inverted substantially U-shaped forms and the number, type, and placement of the joining elements can provide design flexibility in matching sections of the universal public-space fixture to the intended use.

[00070] Examples of applications of the universal public-space fixture to public-space systems or assemblies are shown and described in connection with FIGURES 7A-7C, 8A-8C, 9A-9C, 10A-10C, 11A-11D, 12A-12D, 13A-13D, 14A-14D, 15A-15D, 16A-16D, 17A-17D, 18A-18C, 19A-19C, 20A-20B, 21A-21B, 22A-22C, 13A-23D, 24A-24B, 25A-25B, 26A-26C, 27A-27C, 28A-28D, and 29A-29D, and include, but are not limited to barriers, seating, lighting, signage, shelters, and litter control. The universal public-space fixture can be used

in a system comprising one or more other universal public-space fixtures and/or site amenities (for example, seating, lighting, signage, shelters, trash can receptacles, and ash urns) that adds security to the usual functions of site amenities. For example, as shown in FIGURES 7A-7C, a plurality of universal public-space fixtures 100 in accordance with the invention can be placed in a grouping 30 for use as a barrier, with a universal public-space fixture 30a of a first height at the center, and the other universal public-space fixtures 30b of a second, shorter height spaced circumferentially around the first, center universal public-space fixture 30a. In the embodiment of FIGURES 7A-7C, four universal public-space fixtures 30b are equidistantly spaced around the center universal public-space fixture 30a. However, it will be appreciated by those of ordinary skill in the art that the number of second, circumferential universal public-space fixtures 30b, as well as their size and spacing, can be varied according to the intended use, available space, and esthetic considerations. It will also be appreciated by those of skill in the art that it is possible to vary the configuration of the universal public-space fixtures used in a grouping 30, for example by changing the number and/or cross-section of substantially U-shaped forms (as shown and described, for example, in connection with FIGURES 30A-30D and FIGURES 31A-31D), by changing the number and configuration or type of the joining means (as shown and described in connection with FIGURES 4A-4C), and by changing the configuration or type of anchoring means.

[00071] With minor changes in fastening hardware, one or more universal public-space fixtures can be used as supports for installing seating, lighting, signage, shelters, etc., with secure and protected electrical connections (where needed), flexible spacing, etc. For example, seating can be installed around a single universal public-space fixture 100 (FIGURES 8A-8C, 9A-9C, and 10A-10C) or around a grouping of two or more universal public-space fixtures 100 (FIGURES 11A-11D, 12A-12D, 13A-13D, 14A-14D, 15A-15D, 16A-16D, and 17A-17D); lamps can be installed within or above a universal public-space fixture 100 (FIGURES 21A-21B); signage can be supported by a single universal public-space fixture 100 or between a pair of universal public-space fixtures 100 (FIGURES 29A-29D); a shelter can be supported by two or more universal public-space fixtures 100 (FIGURES 18A-18C, 19A-19C, and 20A-20B); and trash can receptacles and/or ash urns can be supported by a single universal public-space fixture 100 (FIGURES 22A-22C, 23A-23D, 24A-24B, 25A-25B, 26A-26C, and 27A-27C) or between a pair of universal public-space fixtures (not shown) or on separate universal public-space fixtures 100 in a system of at least one universal public-space fixture and at least one site amenity (FIGURES 28A-28D). In some embodiments the at least one site amenity will function to join or link together at least two universal public-space fixtures 100 to provide a public-space system having different behavior and strength characteristics than a single universal public-space fixture 100.

[00072] It will also be appreciated by those of skill in the art that it is possible to vary the configuration of the universal public-space fixture combined with the site amenities, for

example by changing the number and/or cross-section of substantially U-shaped forms (as shown and described, for example, in connection with FIGURES 30A-30D and FIGURES 31A-31D), by changing the number and configuration or type of the joining means (as shown and described in connection with FIGURES 4A-4C), and by changing the configuration or type of anchoring means.

[00073] Referring to FIGURES 8A-8C, 9A-9C, and 10A-10C, there are shown three embodiments in which a single universal public-space fixture 100 has seating fixtures in the form of fan-shaped benches 40 associated therewith. In the embodiment shown in FIGURES 8A-8C, the fan-shaped benches 40 are installed around the universal public-space fixture 100, supported by pedestals 42 set into a support surface radially outwardly from the universal public-space fixture 100. In the embodiments shown in FIGURES 9A-9C and 10A-10C, the fan-shaped benches 40 are attached to the universal public-space fixture 100 by different styles of brackets 44 and 44'. It will be appreciated by those of skill in the art that either multiple seating fixtures or a single, continuous seating fixture can be associated with the universal public-space fixture 100, that the seating fixture can be solid, slatted, latticed, and other styles; and that the style of brackets and pedestals used to support the seating fixtures are not limited to those illustrated, but can be selected from any other style suitable to the intended use.

[00074] Referring to FIGURES 11A-11D, 12A-12D, 13A-13D, 14A-14D, 15A-15D, 16A-16D, and 17A-17D, there are shown seven embodiments in which groupings of at least two universal public-space fixtures 100 have at least one seating fixture associated therewith. FIGURES 11A-11D, 12A-12D, and 13A-13D show embodiments in which the universal public-space fixtures 100 are arranged in a line. In the embodiment shown in FIGURES 11A-11D, two universal public-space fixtures 100 are spaced apart, and brackets 44 attached to the universal public-space fixtures support an elliptical bench 50, the vertical axes of the universal public-space fixtures 100 being positioned approximately at the foci of the ellipse. The embodiment of FIGURES 12A-12D is similar to the embodiment of FIGURES 11A-11D, except that three, rather than two universal public-space fixtures 100 are provided. The embodiment of FIGURES 13A-13D is similar to the embodiment of FIGURES 11A-11D, except that the curved portions of the bench 50 and their supporting brackets 44 are omitted, so that the seating fixture comprises two separate rectangular benches 52, between which the two universal public-space fixtures 100 are sandwiched.

[00075] FIGURES 14A-14D, 15A-15D show embodiments in which three universal public-space fixtures 100 are arranged in a triangle. In the embodiment shown in FIGURES 14A-14D, brackets 44 attached to the universal public-space fixtures 100 support a separate rectangular bench 52 on each side of the triangle. In FIGURES 15A-15D, brackets 44 attached to the universal public-space fixtures 100 support a triangular bench 54 around the universal public-space fixtures 100.

[00076] In FIGURES 16A-16D, four fan-shaped benches 40 are associated (by attachment with brackets 44) with the exterior public-space fixtures 100 in a grouping 30 of five universal public-space fixtures 100 arranged as described in connection with FIGURES 7A-7C. The embodiment of FIGURES 17A-17D is similar to the embodiment of FIGURES 16A-16D, except that the universal public-space fixtures 100 are more closely spaced to each other.

[00077] It will be appreciated by those of skill in the art that the configuration of the seating fixtures and their supports can be varied in any manner suitable to their intended use, and taking into account esthetic considerations. For example, a pair of universal public-space fixtures 100 can be surrounded by an elliptical bench 50, as in the embodiment of FIGURES 11A-11D, sandwiched between a pair of rectangular benches 52, as in the embodiment of FIGURES 13A-13D, or can even be associated with a single bench 52 between them; and more than two universal public-space fixtures 100 can be arranged in a line between the seating fixtures, as shown in FIGURES 12A-12D. The embodiments of FIGURES 14A-14D and FIGURES 15A-15D can be modified for use with more than three universal public-space fixtures 100, with the universal public-space fixtures 100 being positioned at the vertices of a polygon, and the seating fixture or fixtures being configured accordingly, with a separate seating fixture (for example, a rectangular bench 52) on each side of the polygon or a polygonal bench extending around the universal public-space

fixtures 100. Similarly, the embodiments of FIGURES 16A-16D and 17A-17D can be modified for use with two, three, or more than four public-space fixtures 100, with the shape of the fan-shaped benches 40 being adjusted in accordance with the spacing of the universal public-space fixtures 100; and can also be modified by adjusting the spacing between the public-space fixtures 100, as shown in FIGURES 17A-17D. Also, the seating fixtures can be attached to the universal public space fixtures 100 by brackets of any suitable configuration, such as brackets 44 or 44' as shown in FIGURES 9A-9C, 10A-10C, 11A-11D, 12A-12D, 13A-13D, 14A-14D, and 15A-15D; or can be supported on pedestals, such as pedestals 42 as shown in FIGURES 8A-8C, in close proximity to the universal public space fixtures 100.

[00078] It will also be appreciated by those of skill in the art that it is possible to vary the configuration of the universal public-space fixture combined with the various seating fixtures and their supports, for example by changing the number and/or cross-section of substantially U-shaped forms (as shown and described, for example, in connection with FIGURES 30A-30D and FIGURES 31A-31D), by changing the number and configuration or type of the joining means (as shown and described in connection with FIGURES 4A-4C), and by changing the configuration or type of anchoring means.

[00079] Referring to FIGURES 18A-18C, 19A-19C, and 20A-20C, there are shown three embodiments 60, 60', and 60" of shelters in which a canopy is supported by multiple

public-space fixtures. In the embodiment of FIGURES 18A-18B, the shelter 60 comprises a pair of universal public-space fixtures 100, a canopy 62 above and spaced from the universal public-space fixtures 100, and a pair of brackets 64 extending outwardly from opposite sides of the upper transverse portion 12 of on one of the forms 10a, 10b, and 10c, in this case shortest of the forms, 10c. Alternatively, the canopy 62 can be supported by center poles 64' extending through and above a pair of spaced public-space fixtures 100', as shown in FIGURES 19A-19C. The center poles 64' extend through the universal public-space fixtures 100' to the bottom of the substantially U-shaped forms 10a, 10b, and 10c, and the center joining plates 20 of the universal public-space fixtures 100' have a central aperture 20a therein, for receiving the center poles 64'. In the embodiment of FIGURES 20A-20B, the shelter 60" comprises a canopy 62" supported by four center poles 64' arranged in a rectangle and extending from four correspondingly arranged public-space fixtures 1000. Each of the universal public-space fixtures 1000 has two center joining plates 20, spaced vertically along the vertical axis of the universal public-space fixtures 1000.

[00080] It will be appreciated by those of skill in the art that the shape and size of the canopy can be varied according to the intended use and esthetic considerations. Such variations include, but are not limited to, a shape that is elliptical in outline, as shown in FIGURES 18A-18C and 19A-19C, a shape that is peaked, as also shown in FIGURES 18A-18C and 19A-19C, a shape that is rectangular in outline, as shown in FIGURES 20A-20B, and a shape that is bowed, as also shown in FIGURES 20A-20B. Similarly, the number of

public-space fixtures used to support the canopy can be varied, for example by arranging at least two in spaced linear fashion, as shown in FIGURES 18A-18C and 19A-19C, or by using multiple pairs as shown in FIGURES 20A-20B. As will be appreciated by those of skill in the art, the length of the shelter can be increased by increasing the number of universal public-space fixtures used to support the canopy. As also will be appreciated by those of skill in the art, the shelter can also include other site amenities, such as one or more fan-shaped benches 40 associated with each universal public-space fixture 100 or 100', or at least one rectangular bench 52 or elliptical bench 50 associated with pairs of the universal public-spaced fixtures 100 or 100'.

[00081] Referring to FIGURES 21A and 21B, there is shown a universal public-space fixture 100' having a lamp 70 installed therein. In this embodiment, both the center joining plate 20 and the anchor plate 24 have apertures 20a therethrough to accommodate a center shaft 72 for enclosing electrical lines (not shown) and supporting the lamp 70, and the shaft 72 terminates just above the center joining plate 20 so that the lamp 70 supported thereby is fully enclosed by the upper end of the universal public-space fixture 100'. It will be appreciated by those of skill in the art that the shaft 72 can be extended above the universal public-space fixture 100' so that the lamp 70 is above it, rather than enclosed by it.

[00082] Referring to FIGURES 22A-22B and 23A-23B, there are shown two embodiments of an ash urn 80a and matching trash can receptacle 80b, associated with a

universal public-space fixture 100. In the embodiment of FIGURES 22A-22B, the brackets 82 are attached at one end between adjacent legs 14 of two substantially U-shaped forms and at the other end to the sides of the ash urn 80a and trash can receptacle 80b. In the embodiment of FIGURES 23A-23B, a single bracket 82' is provided, attached at its center portion to the top of the anchor plate 24 and at the ends to the bottoms of the ash urn 80a and the trash can receptacle 80b. It will be appreciated by those of skill in the art that the ash urn 80a and trash can receptacle 80b can have a variety of configurations (examples of different configurations include, but are not limited to the designs of U.S. Patent Nos. D304,253, D304,632, D314,461, D322,347, D322,348, D322,702, D353,250, D417,053, D441,932, D445,982, D450,166, D452,760, D454,238, D458,431, D460,591, D460,592, D460,593, D461,939, which are incorporated herein by reference in their entireties), they can be attached to the universal public-space fixture 100 relative to different pairs of legs 14, and they can be associated singly with the universal public-space fixture 100, as shown in FIGURES 24A-24B, 25A-25B, 26A-26C, and 27A-27C, rather than together (that is, an ash urn 80a alone can be associated with the universal public-space fixture 100, as shown in FIGURES 26A-26C and FIGURES 27A-27C, as can the trash can receptacle 80b, as shown in FIGURES 24A-24B and 26A-26B).

[00083] It is contemplated that the universal public-space fixture 10, 10', 100, 100', and 1000 in accordance with the present invention can be combined with multiple types of public space fixtures, to provide a multi-function public-space system. For example, two or

more universal public-space fixtures fixture 10, 10', 100, 100', and 1000 can be used to support both seating and litter control fixtures, such as the benches 40 and 52 and ash urn 80a and trash can receptacle 80b as shown in FIGURES 28A-28D; and two or more spaced universal public-space fixtures fixture 10, 10', 100, 100', and 1000 can be used to support both seating and signage fixtures, such as the bench 50 and sign 90 as shown in the embodiment of FIGURES 29A-29D, which are respectively attached to the universal public-space fixtures 100 by brackets 44 and brackets 92.

[00084] As can be appreciated from the foregoing, the esthetic requirement for public-space fixtures is well-served by the universal public-space fixture in accordance with the invention, as opposed to conventional concrete or other protective fixtures. The system of the universal public-space fixture and associated site amenities is also extremely cost effective in that for little more than the cost of the amenities themselves, the added element of security can be addressed. The universal public-space fixture alone or the system can be installed with relatively common and available materials and equipment at relatively low cost.

[00085] Modifications and variations of the above-described embodiments of the present invention are possible, as appreciated by those skilled in the art in light of the above teachings. For example, as shown in FIGURES 32A-32D with respect to a seventh embodiment 110" of a universal public-space fixture, the upper transverse portion 12" of the

substantially U-shaped forms can be asymmetrically inclined, rather than symmetric about the axis A. It is therefore to be understood that, within the scope of the appended claims and their equivalents, the invention may be practiced otherwise than as specifically described.

## WHAT IS CLAIMED IS:

1. A universal public-space fixture comprising a series of at least two nested, substantially U-shaped forms of decreasing height set around a common vertical axis.
2. The fixture of claim 1, further comprising means for joining the substantially U-shaped forms together as a unit.
3. The fixture of claim 2, wherein each substantially U-shaped form has an upper transverse portion and two parallel, vertical legs extending from the upper transverse portion, and wherein the means for joining comprises at least one center joining plate located below the upper transverse portions of the forms, the forms being fastened to the at least one center joining plate.
4. The fixture of claim 3, wherein the forms are substantially vertical and the at least one center joining plate is substantially horizontal.
5. The fixture of claim 3, wherein the at least one center joining plate is substantially perpendicular to the forms.

6. The fixture of claim 3, wherein the center joining plate comprises a disc having notches at the perimeter thereof complimentary in shape to the cross-section of the legs for engaging the substantially U-shaped forms.

7. The fixture of claim 2, wherein the center joining plate comprises a spider having radiating arms that engage the substantially U-shaped forms.

8. The fixture of claim 1, further comprising means for anchoring the forms to a support surface.

9. The fixture of claim 8, wherein the means for anchoring comprises a plate attached to the forms in the vicinity of their bottom.

10. The fixture of claim 1, comprising three substantially U-shaped forms.

11. A public-space system comprising at least one universal public-space fixture and at least one site amenity, wherein:

the fixture comprises a series of at least two nested, substantially U-shaped forms of decreasing height set around a common vertical axis; and

the at least one site amenity is associated with the at least one universal public-space fixture.

12. The public-space system of claim 11, further comprising mean for attaching the at least one site amenity to the at least one fixture.

13. The public-space system of claim 11, wherein the at least one site amenity comprises seating.

14. The public-space fixture of claim 13, further comprising mean for attaching the seating to the at least one fixture.

15. The public-space fixture of claim 13, further comprising means for supporting the seating in close proximity to the at least one fixture.

16. The public-space system of claim 11, wherein the at least one site amenity comprises lighting.

17. The public-space fixture of claim 16, further comprising mean for attaching the lighting to the at least one fixture.

18. The public-space system of claim 11, wherein the at least one site amenity comprises signage.

19. The public-space fixture of claim 18, further comprising mean for attaching the signage to the at least one fixture.

20. The public-space system of claim 11, wherein the at least one site amenity comprises a canopy and means for attaching the canopy to the at least one public-space fixture.

21. The public-space system of claim 11, wherein the at least one site amenity comprises a trash can receptacle.

22. The public-space fixture of claim 21, further comprising mean for attaching the trash can receptacle to the at least one fixture.

23. The public-space system of claim 11, wherein the at least one site amenity comprises an ash urn.

24. The public-space system of claim 23, further comprising means for attaching the ash urn to the at least one fixture.

25. The public-space system of claim 11, wherein the at least one site amenity comprises seating and signage.

26. The public-space system of claim 11, comprising at least two universal public space fixtures linked together by at site amenity, whereby the system has different behavior and strength characteristics than a single universal public-space fixture.

27. A public-space system comprising a center universal public-space fixture and a plurality of circumferential universal public-space fixtures arranged circumferentially around the center fixture, wherein each fixture comprises a series of at least two nested, substantially U-shaped forms of decreasing height set around a common vertical axis.

28. The public-space system of claim 25, further comprising at least one site amenity associated with at least one of the fixtures.

29. The public-space system of claim 28, further comprising means for attaching the site amenity to the fixture.

30. The public-space system of claim 28, wherein the at least one site amenity comprises seating associated with each circumferential fixture.

FIG. 1A

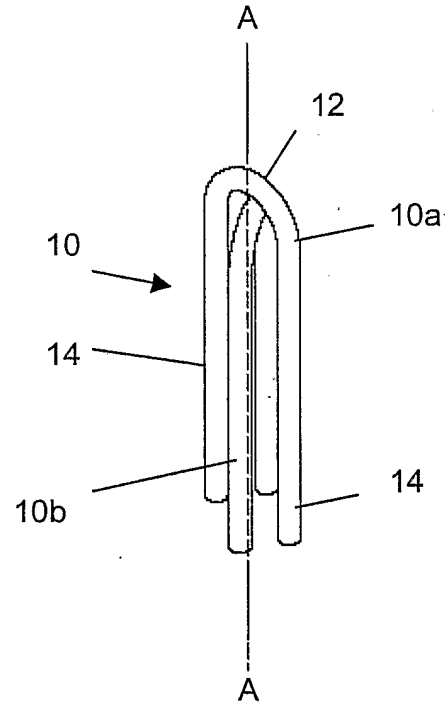


FIG. 1B

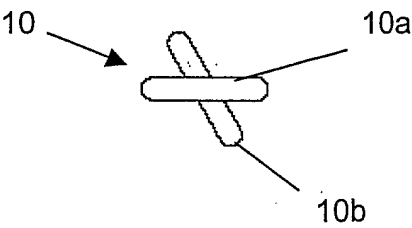


FIG. 2A

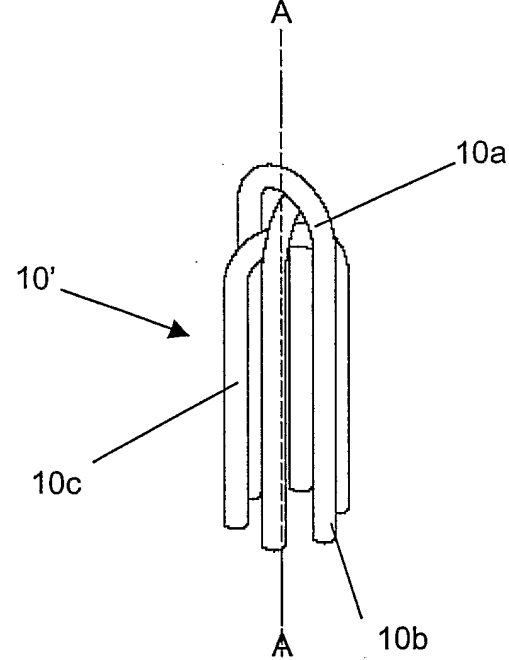
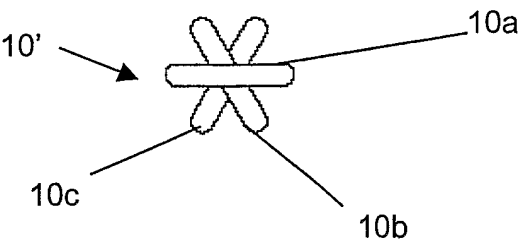


FIG. 2B



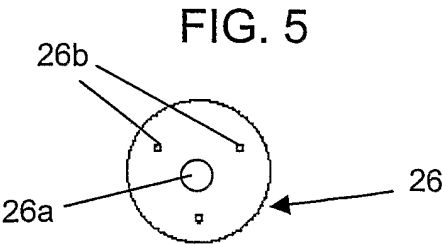
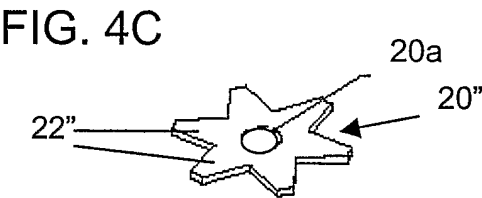
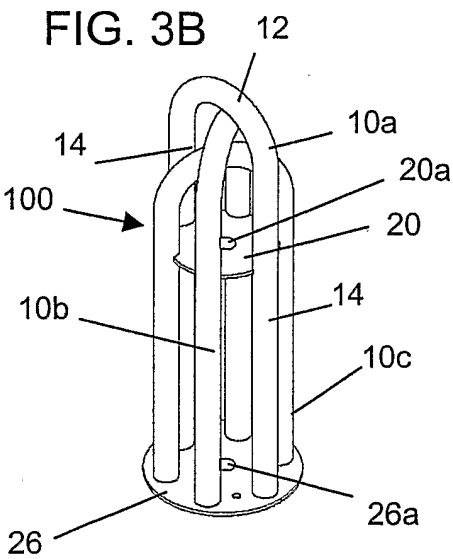
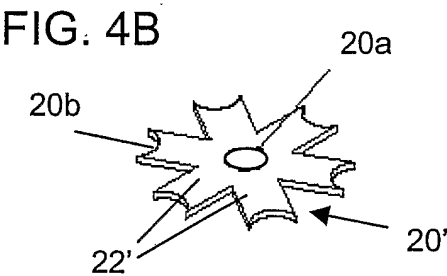
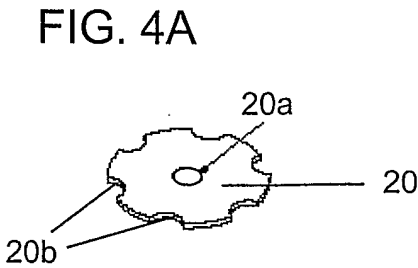
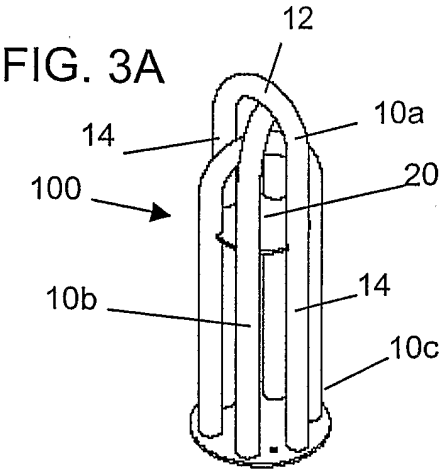


FIG. 6

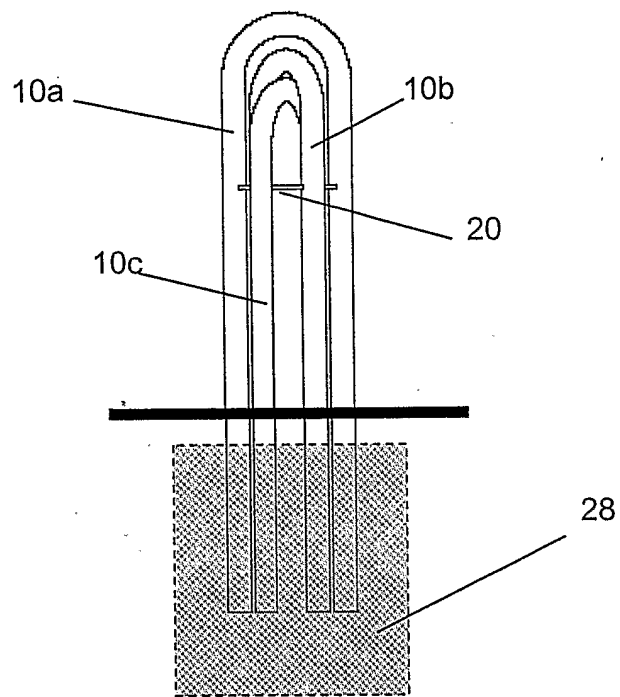


FIG. 7A

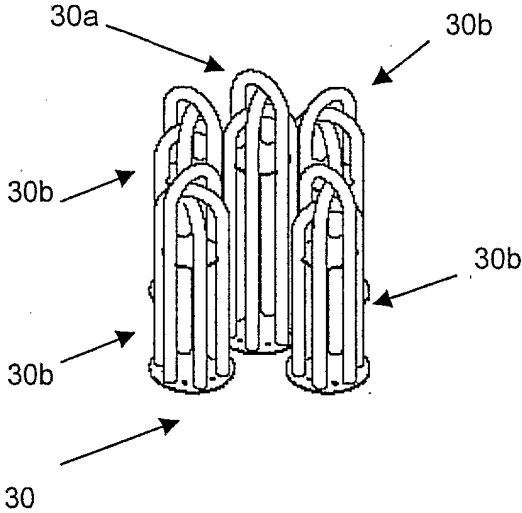


FIG. 7B

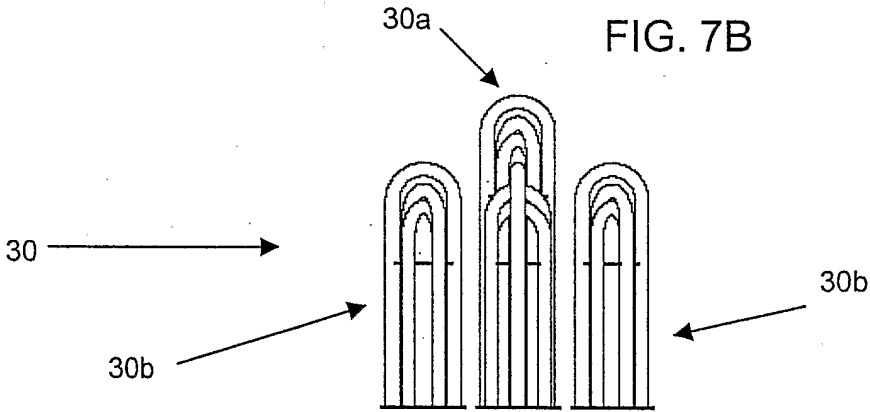


FIG. 7C

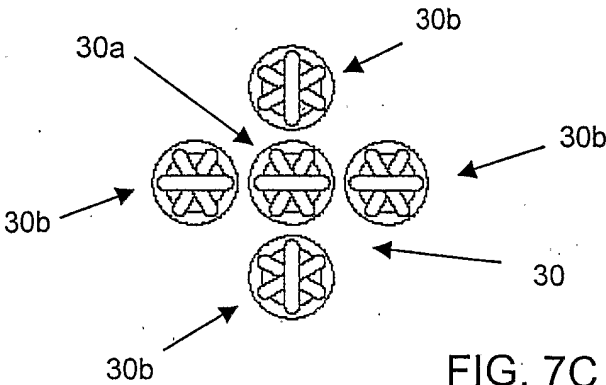


FIG. 8A

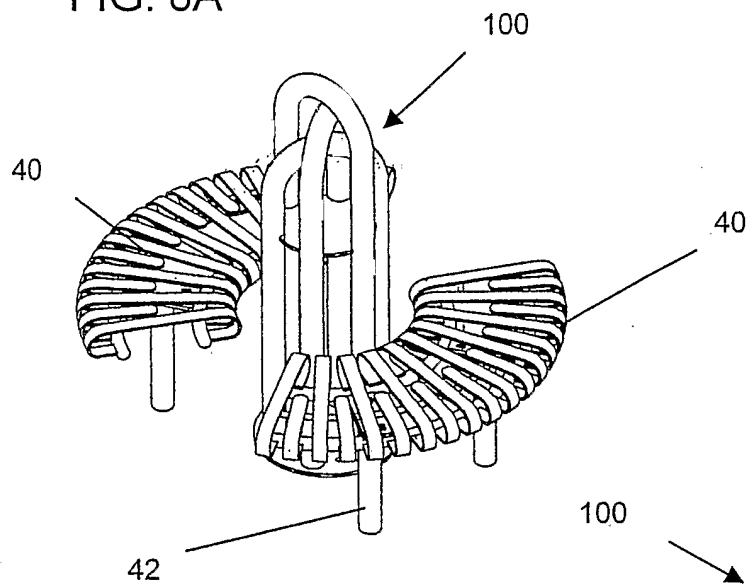


FIG. 8B

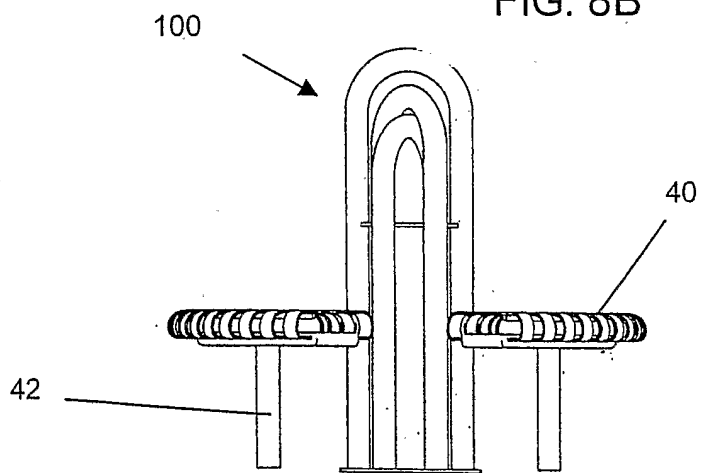


FIG. 8C

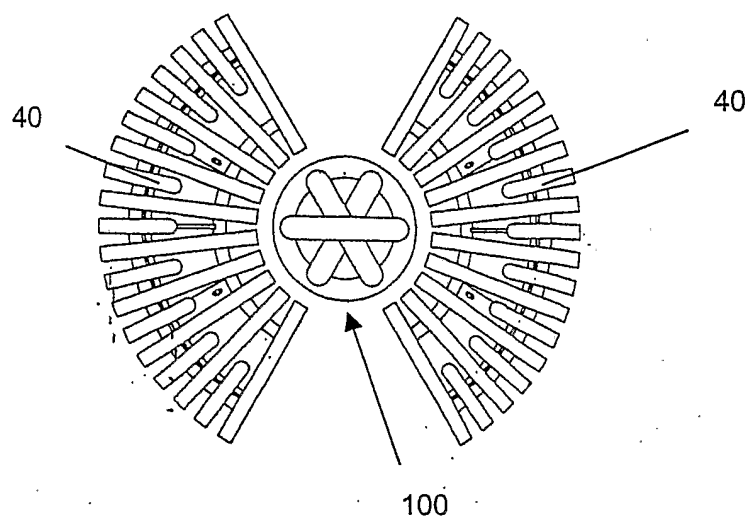


FIG. 9A

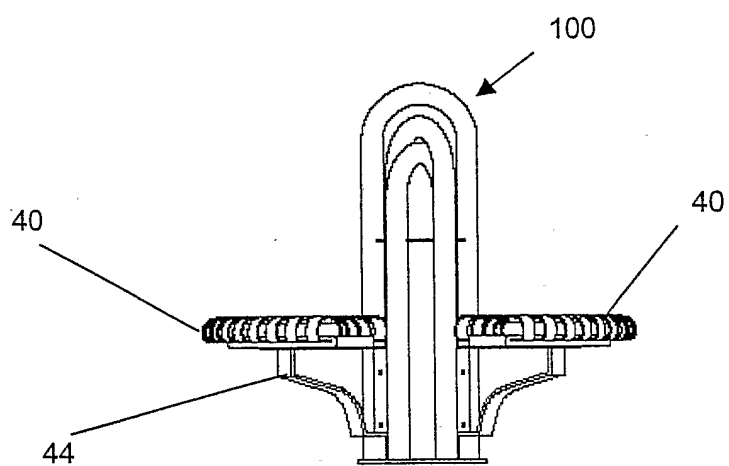
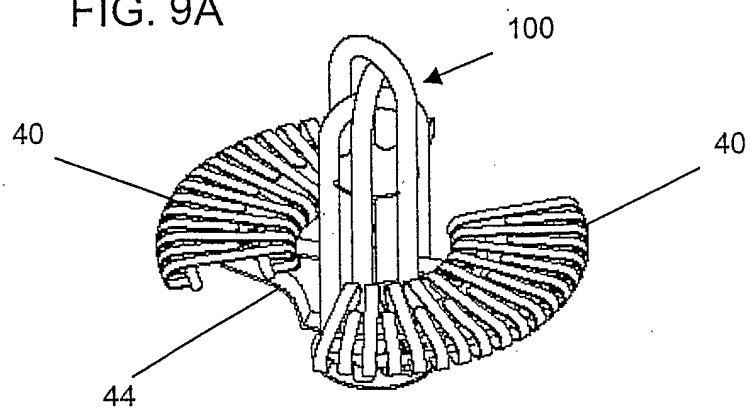


FIG. 9B

FIG. 9C

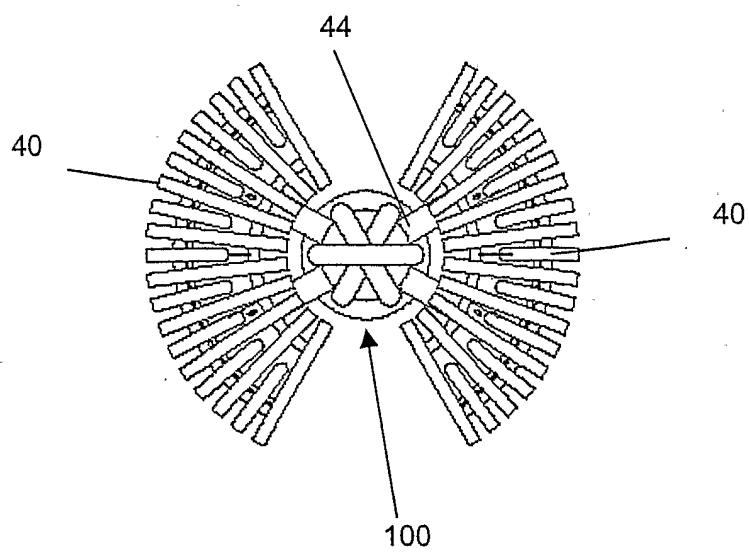


FIG. 10A

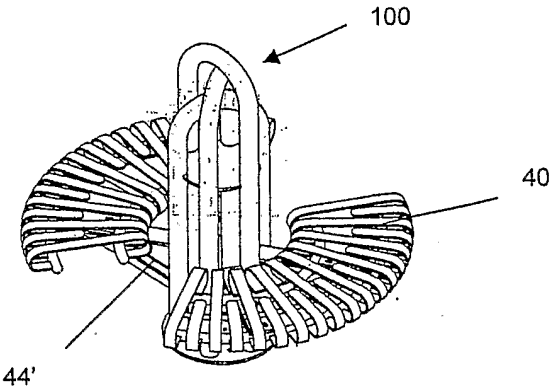


FIG. 10A

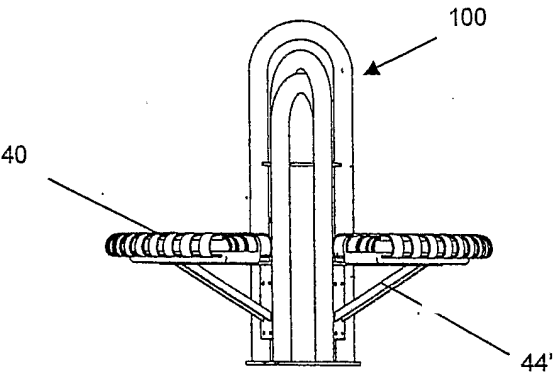


FIG. 10A

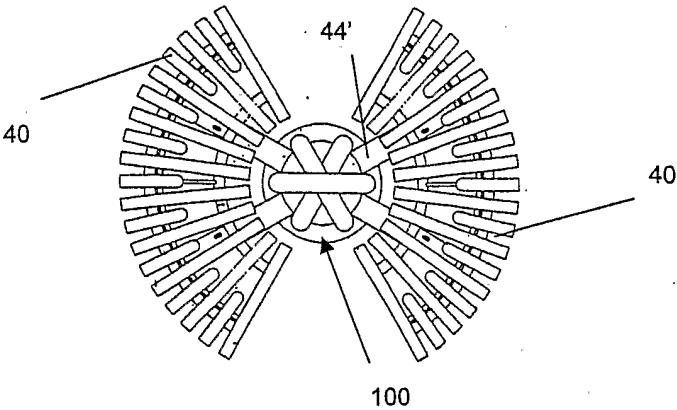


FIG. 11A

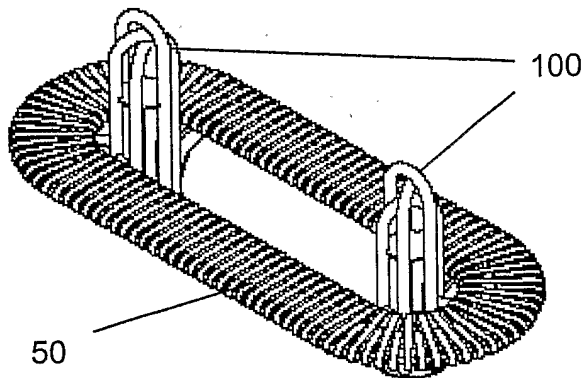


FIG. 11B

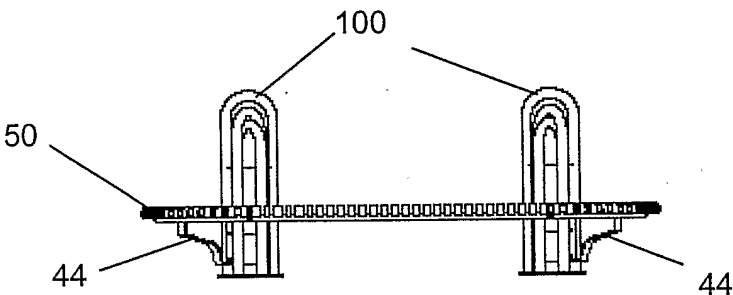


FIG. 11C

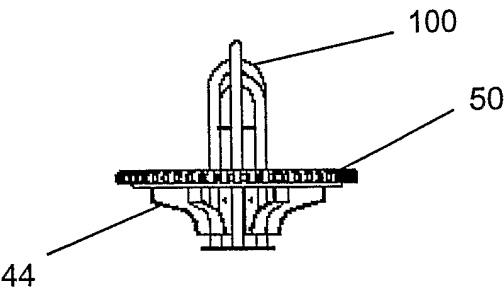


FIG. 11D

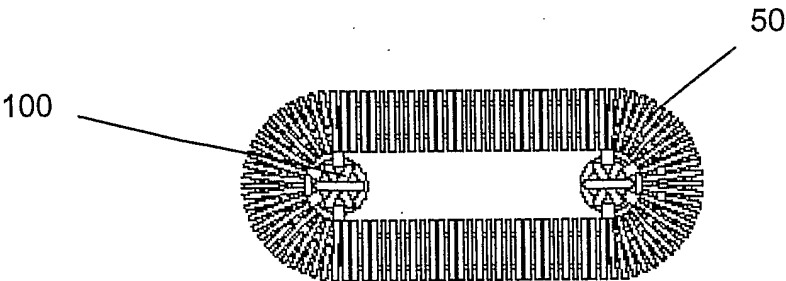


FIG. 12A

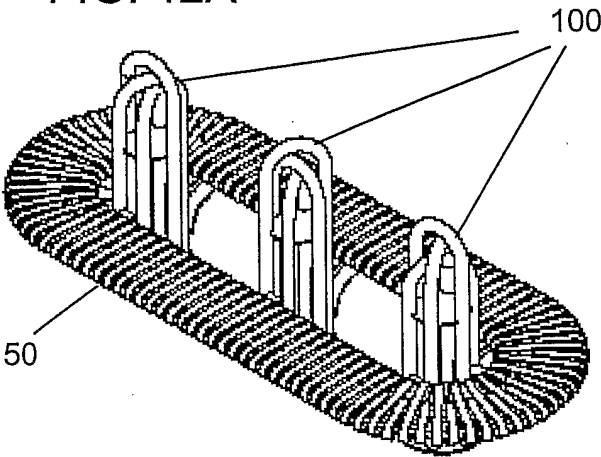


FIG. 12B

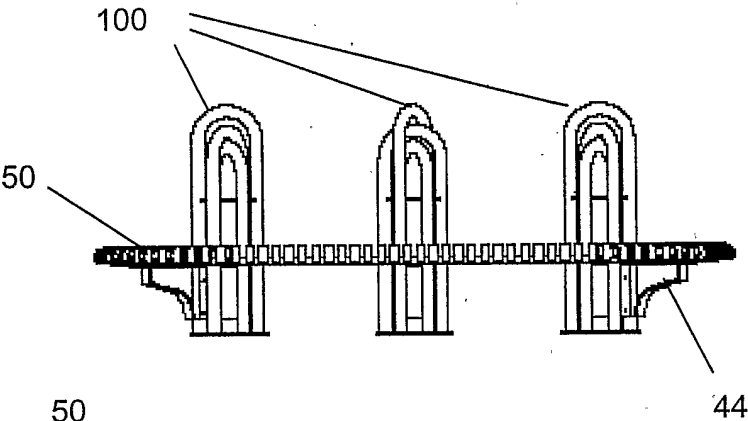


FIG. 12C

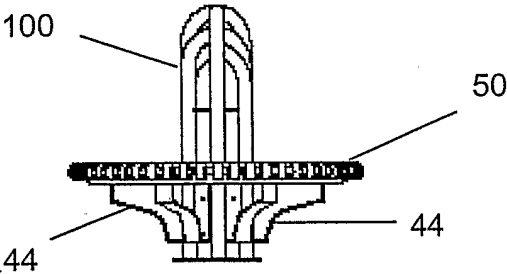


FIG. 12D

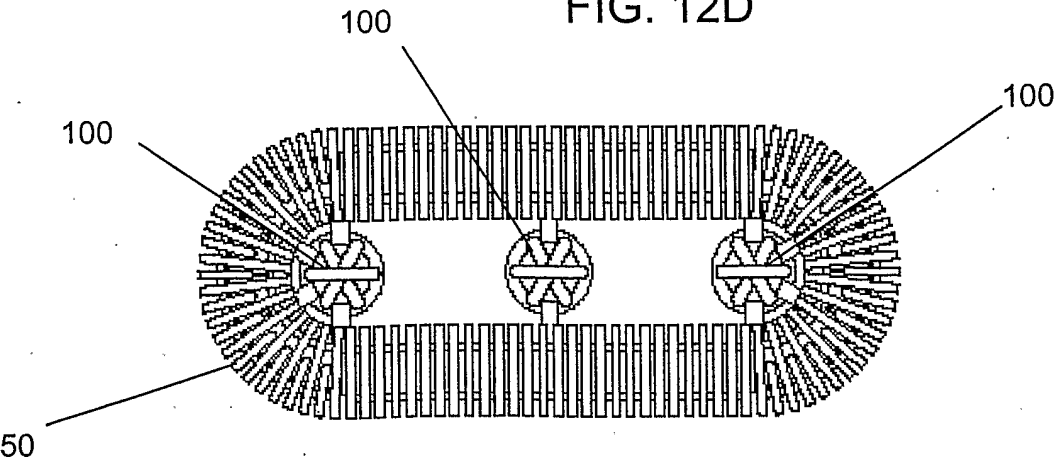


FIG. 13A

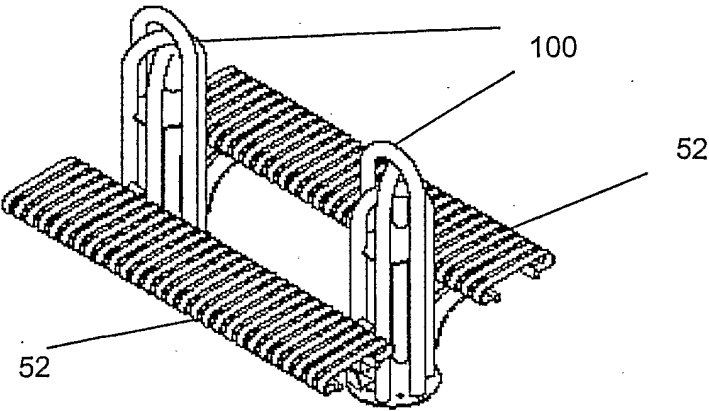


FIG. 13B

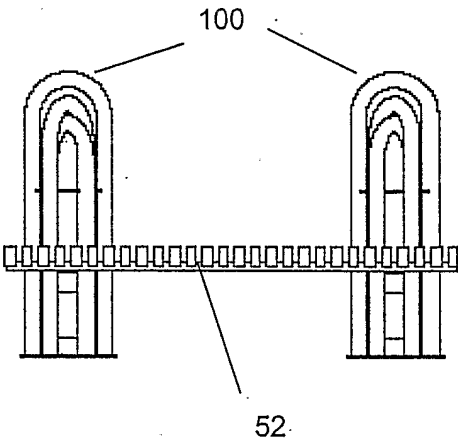


FIG. 13C

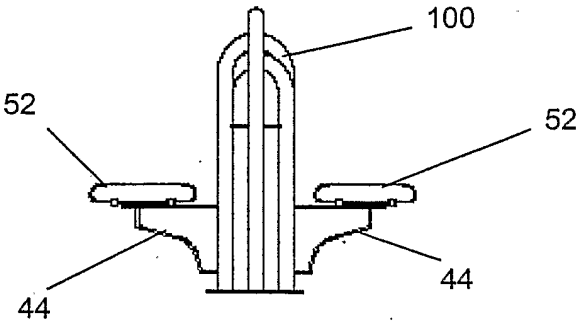


FIG. 13D

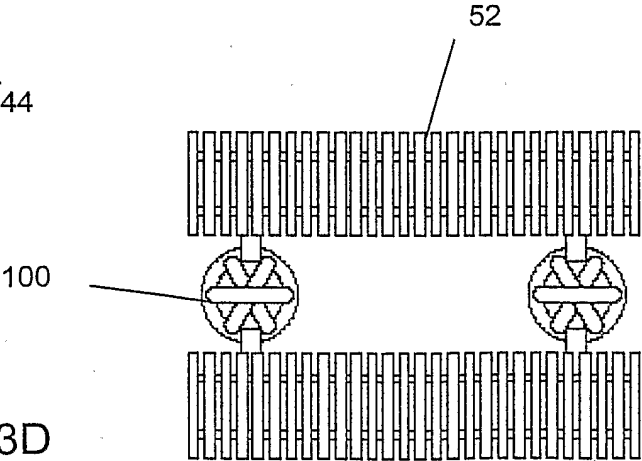


FIG. 14A

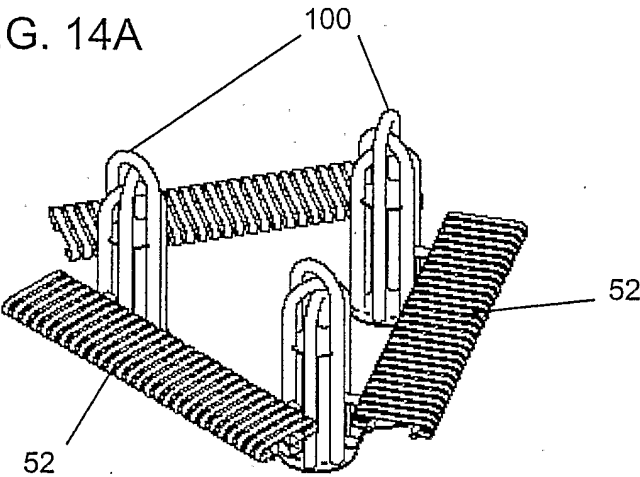


FIG. 14D

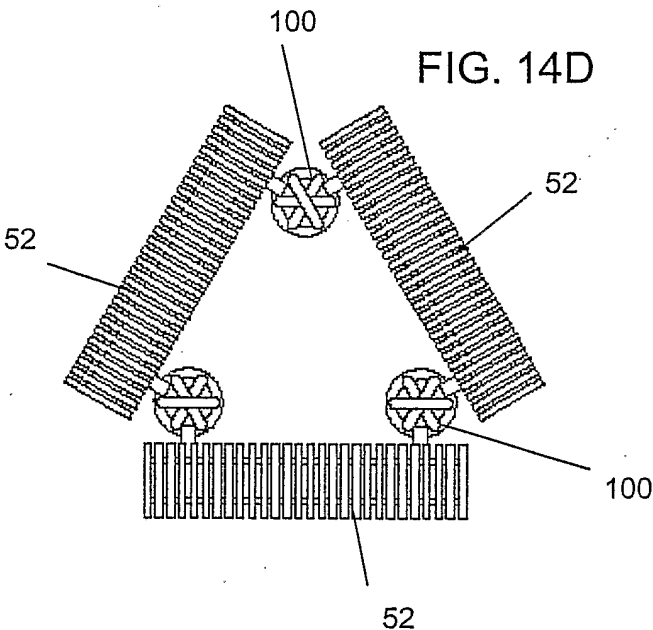


FIG. 14B

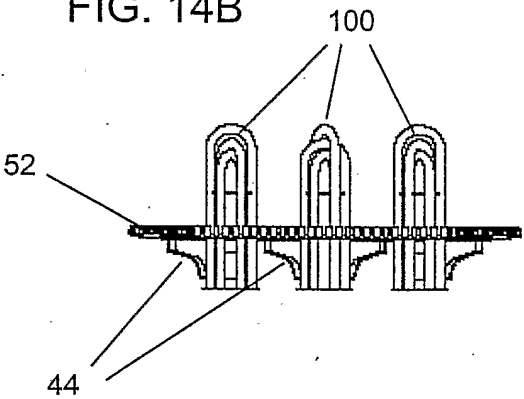


FIG. 14C

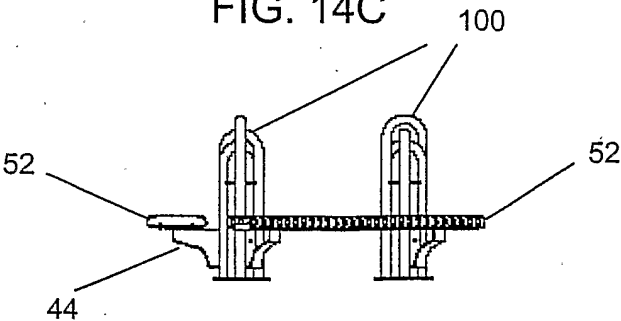


FIG. 15A

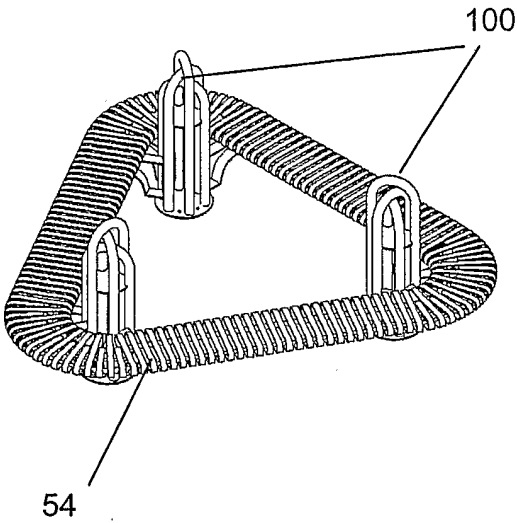


FIG. 15B

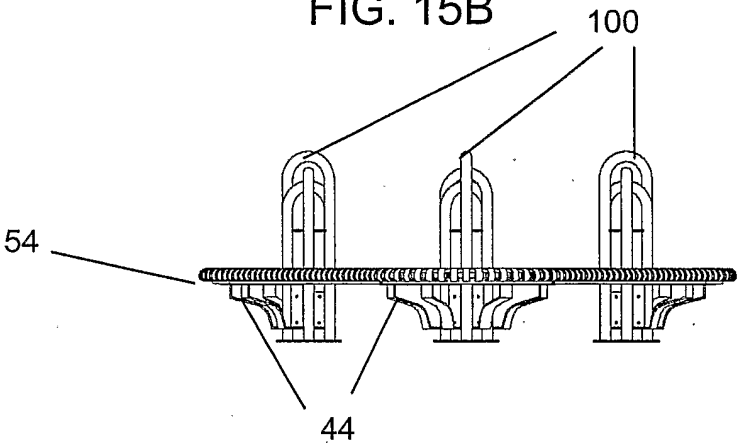


FIG. 15D

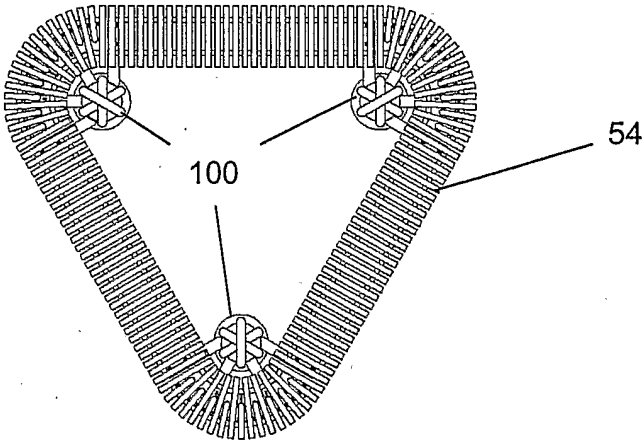


FIG. 15C

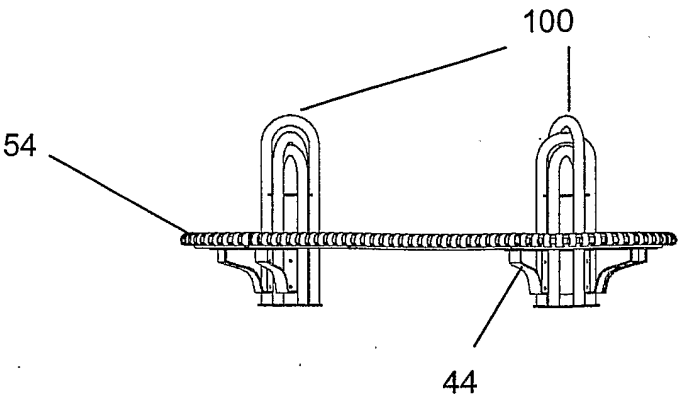


FIG. 16A

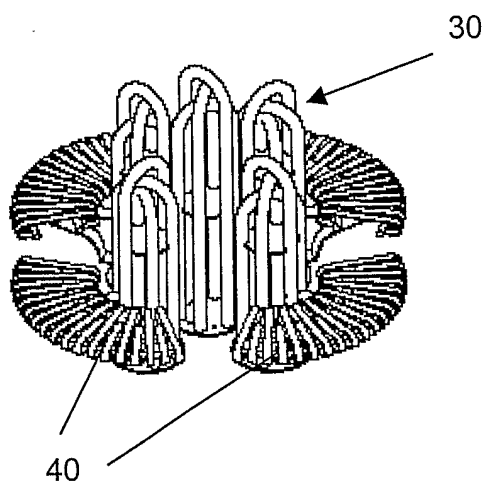


FIG. 16B

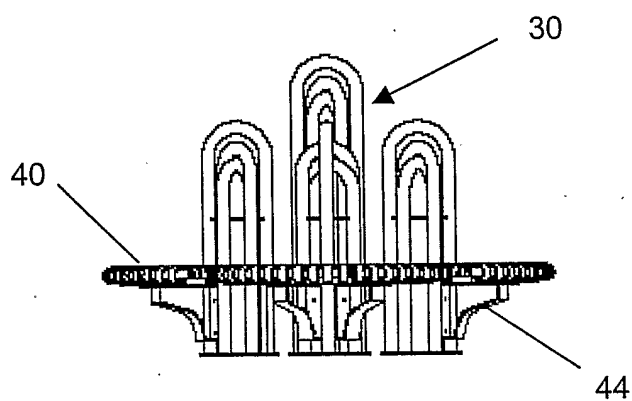


FIG. 16C

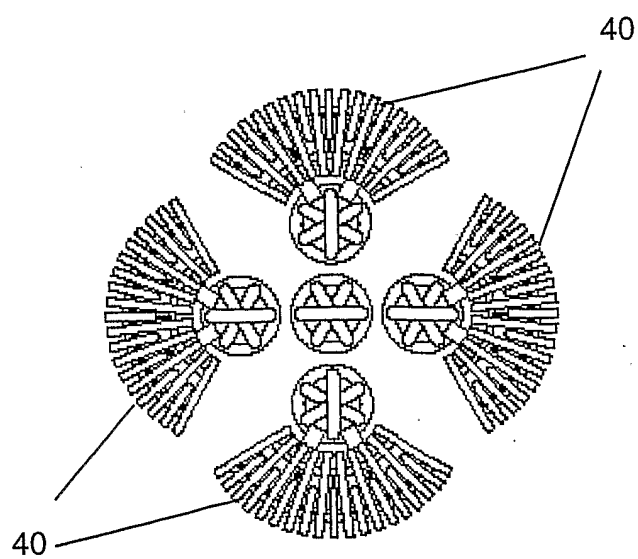
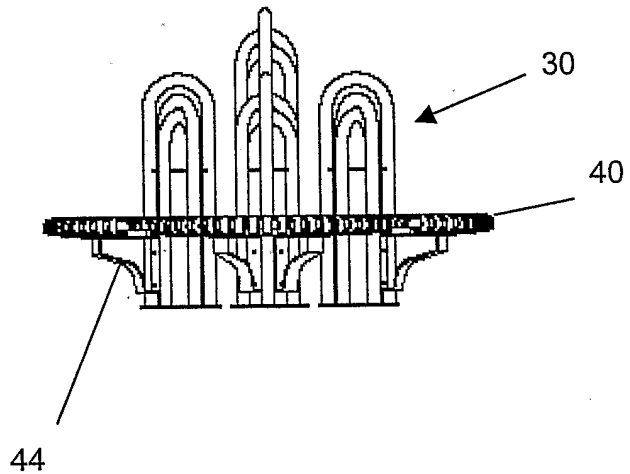


FIG. 16D

FIG. 17A

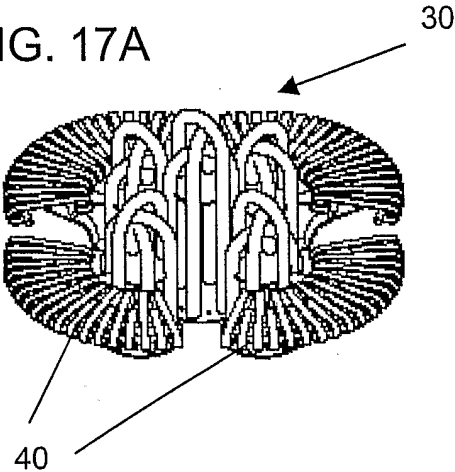


FIG. 17B

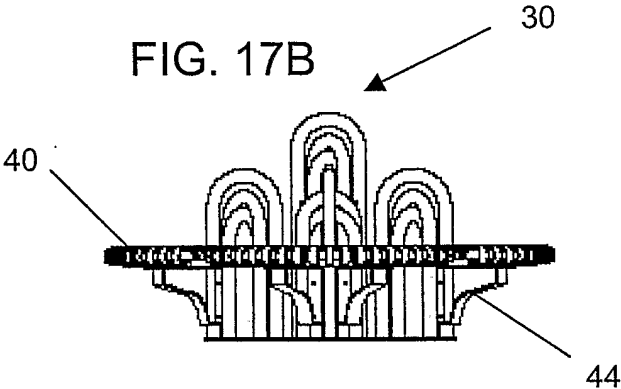


FIG. 17C

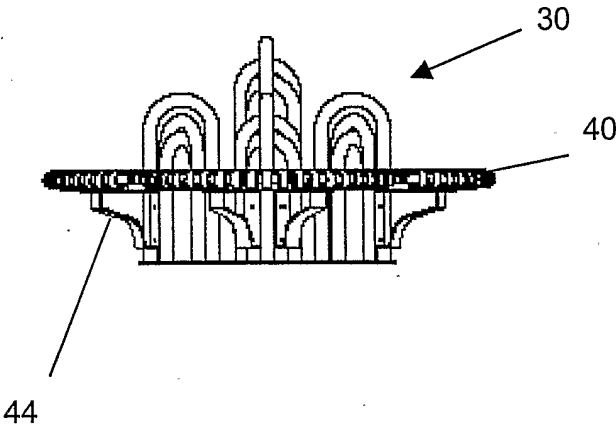


FIG. 17D

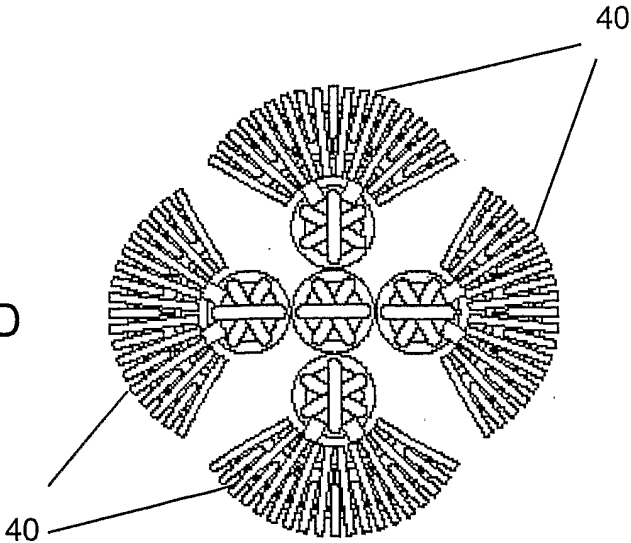


FIG. 18A

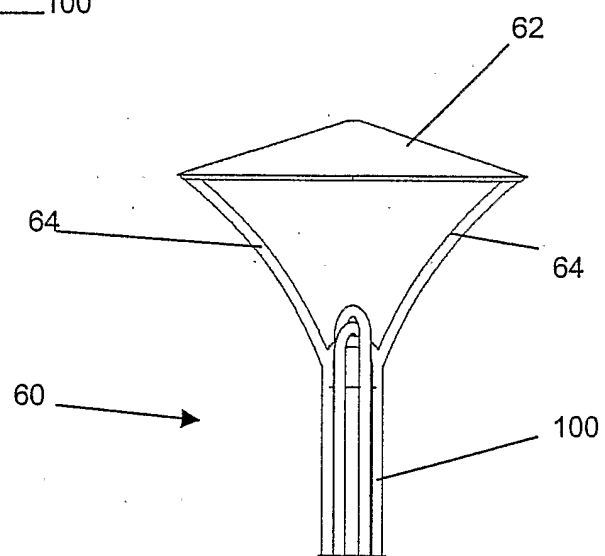
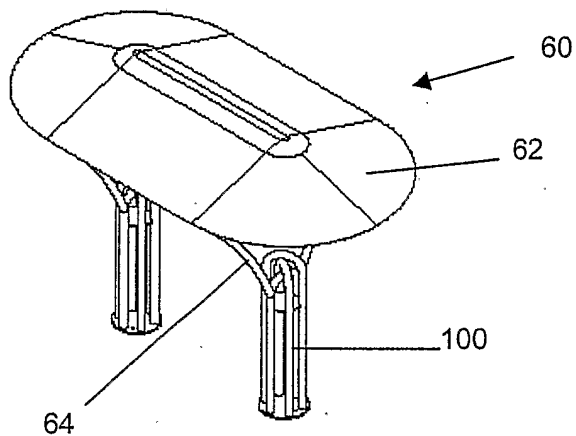


FIG. 18C

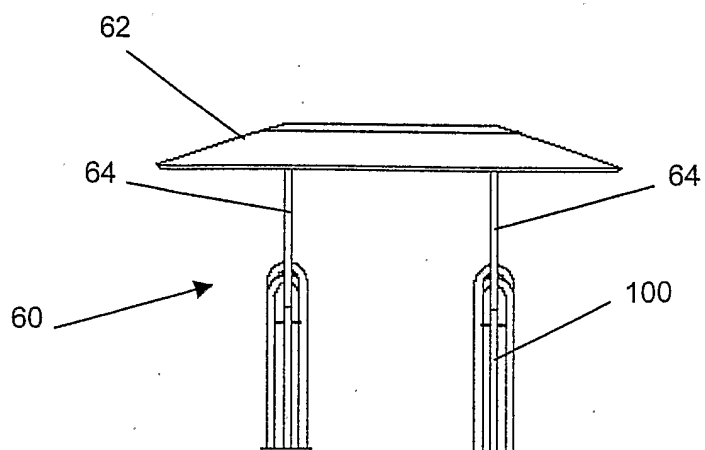


FIG. 18B

FIG. 19A

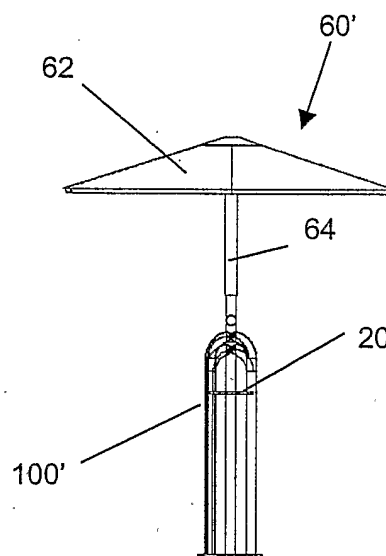
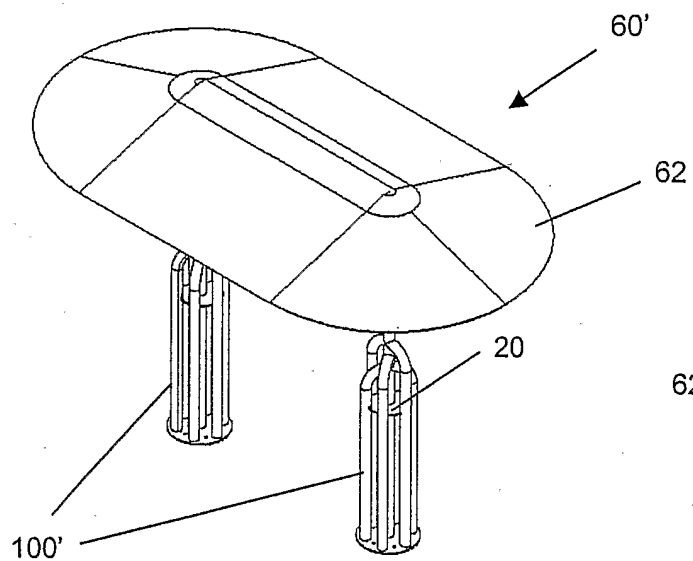


FIG. 19C

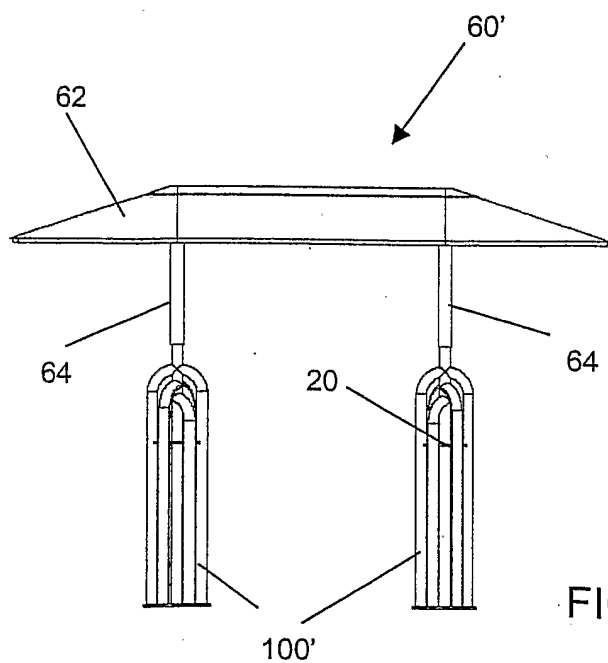


FIG. 19B

FIG. 20A

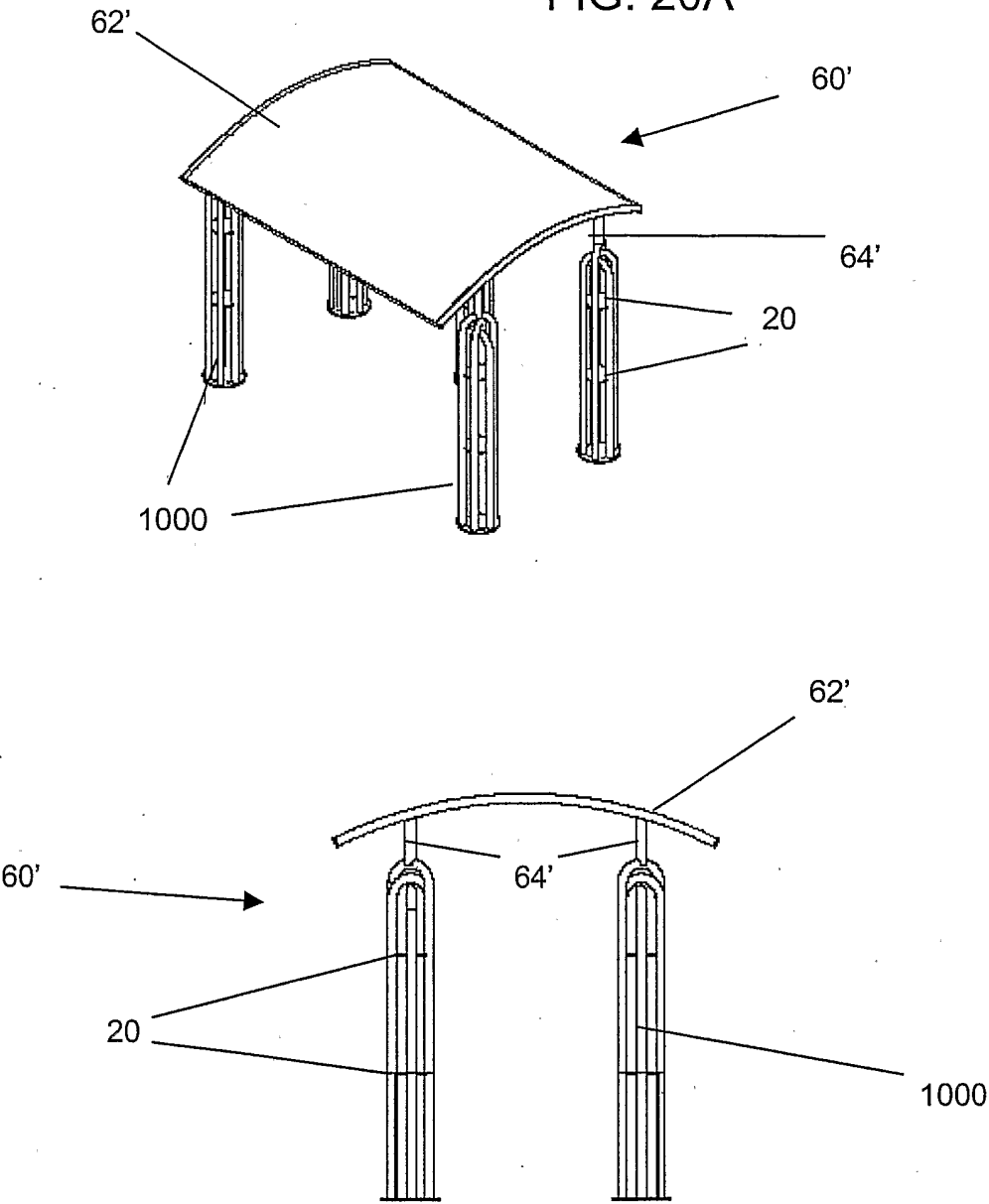


FIG. 20B

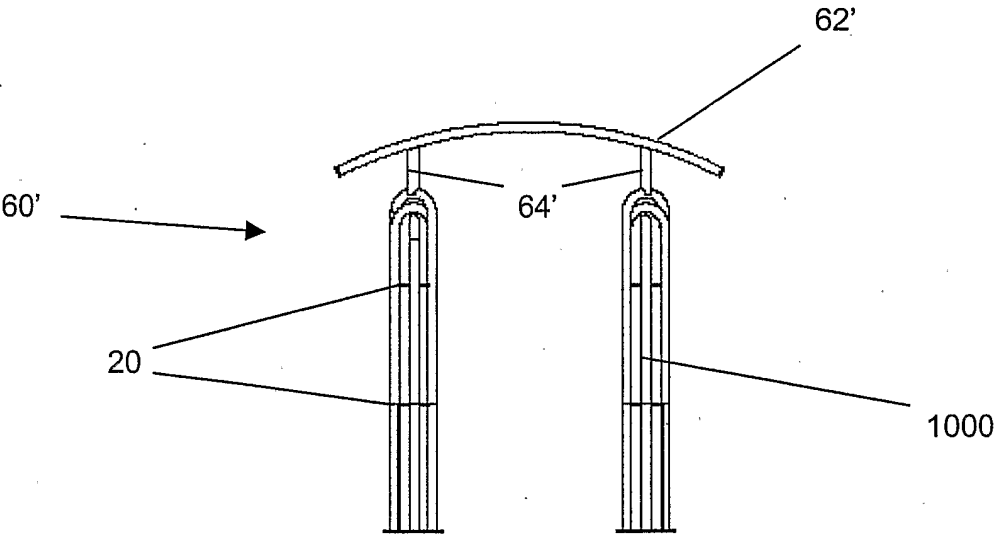


FIG. 21A

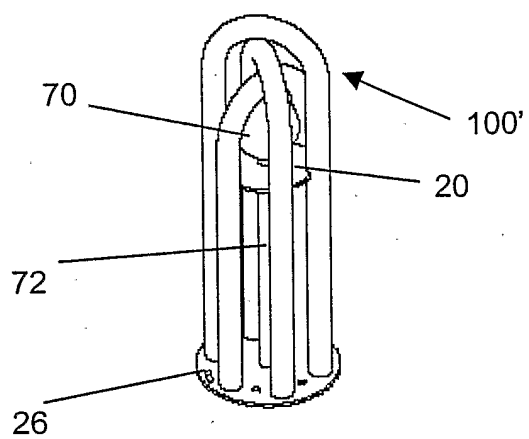


FIG. 21B

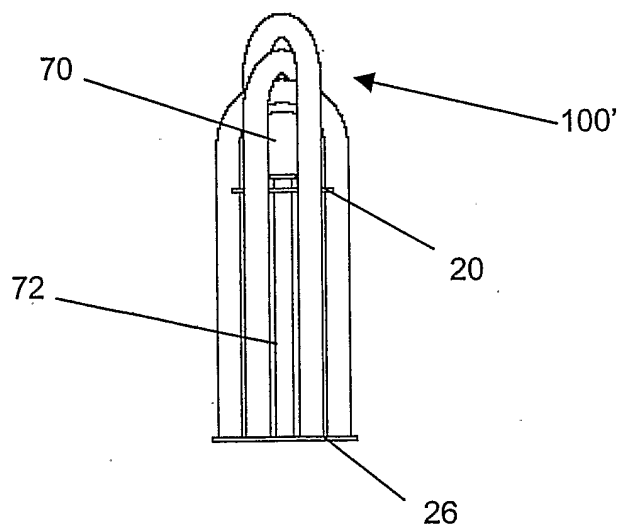


FIG. 22A

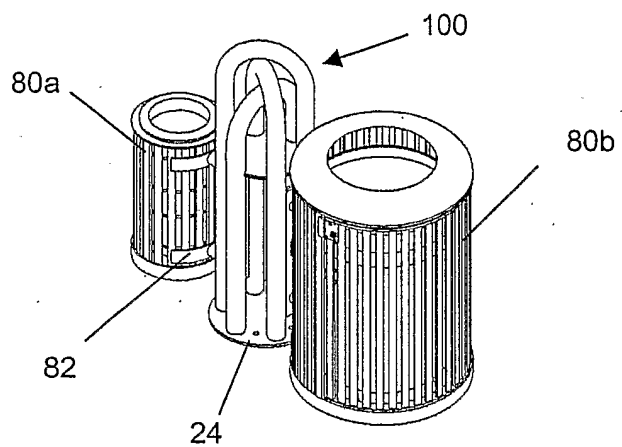


FIG. 22B

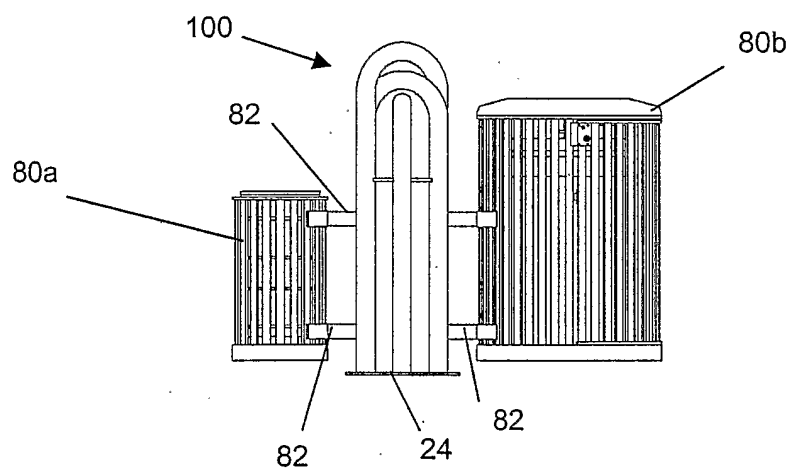
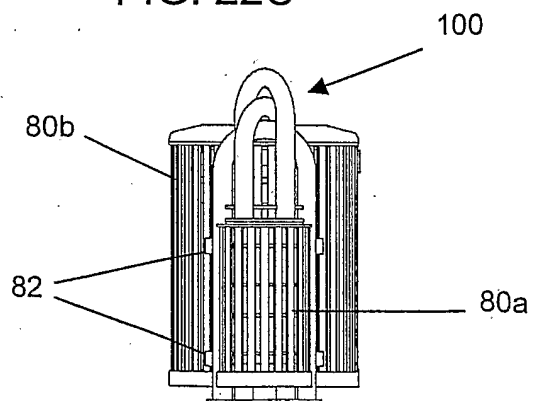


FIG. 22C



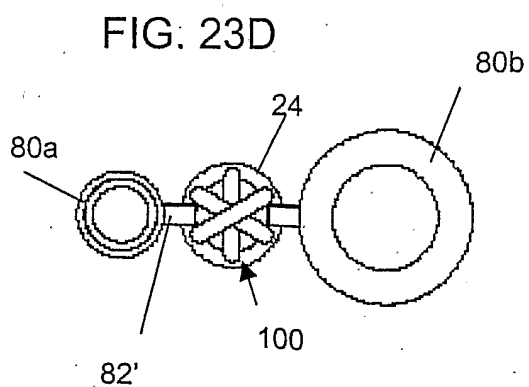
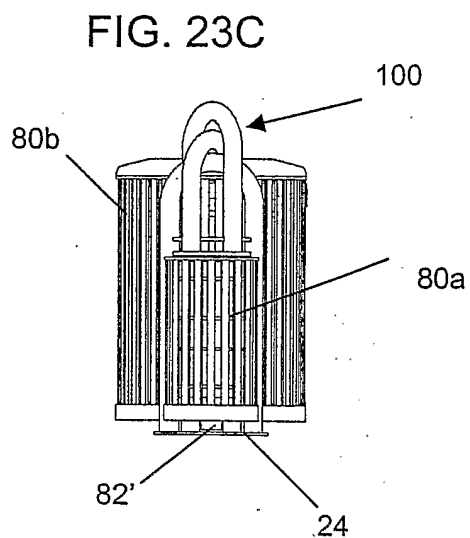
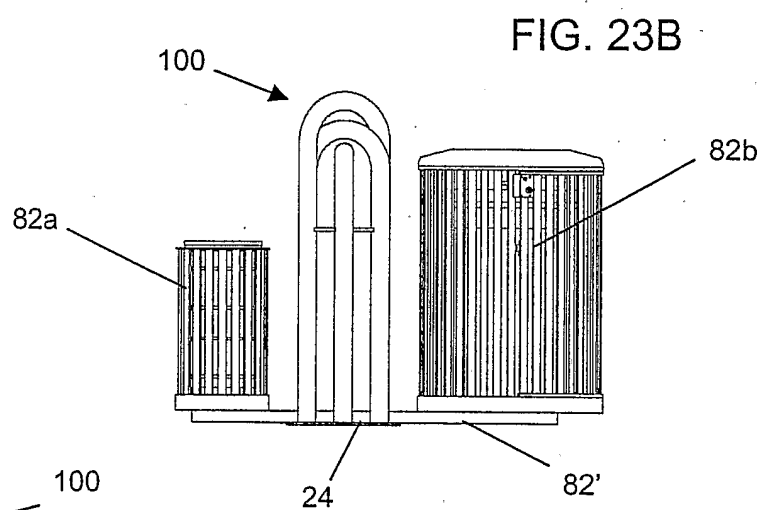
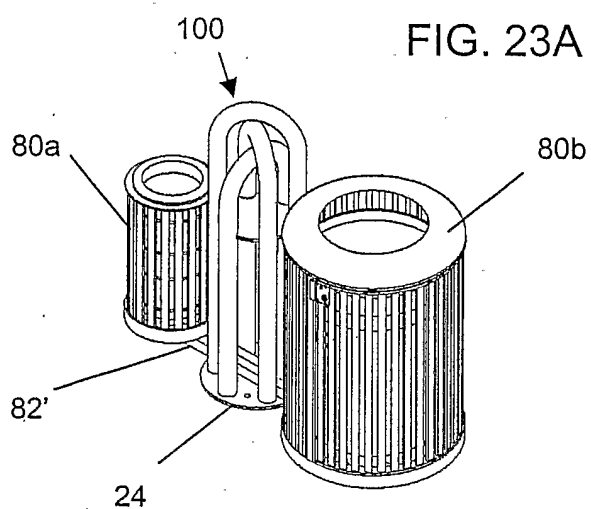


FIG. 24A

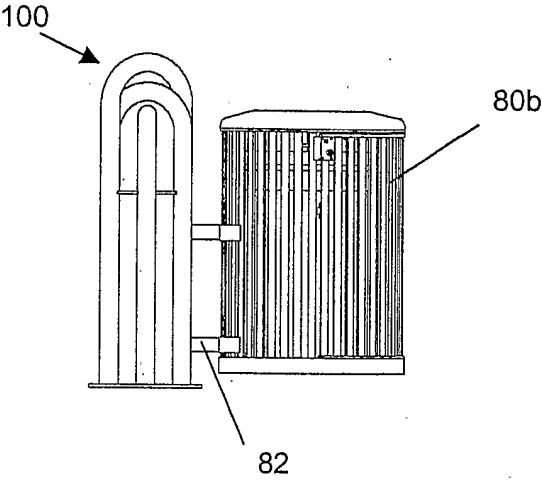


FIG. 24B

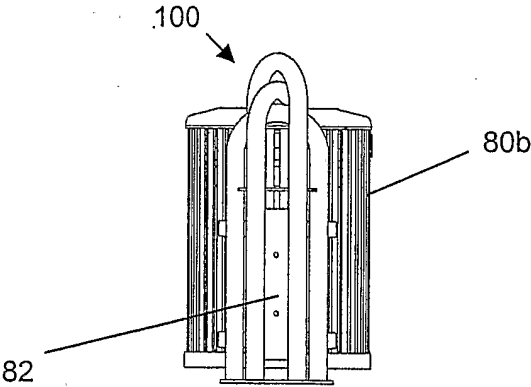


FIG. 25A

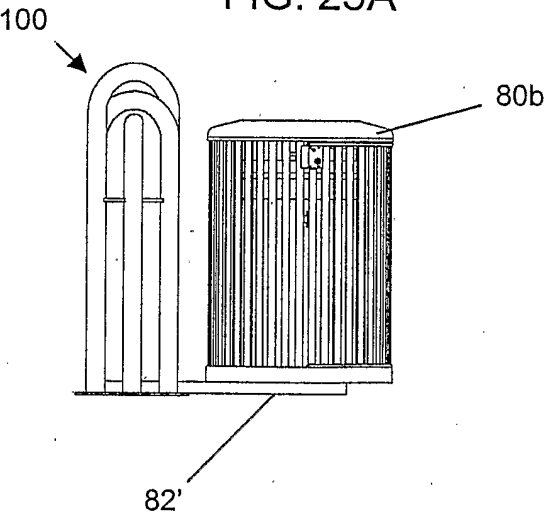
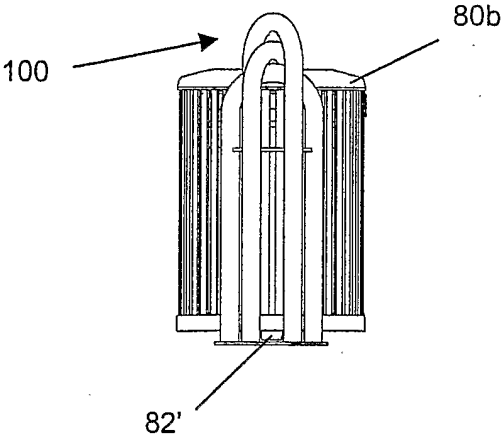
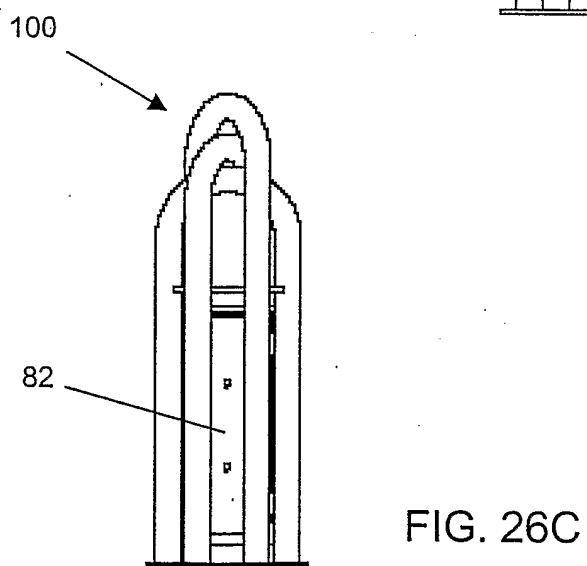
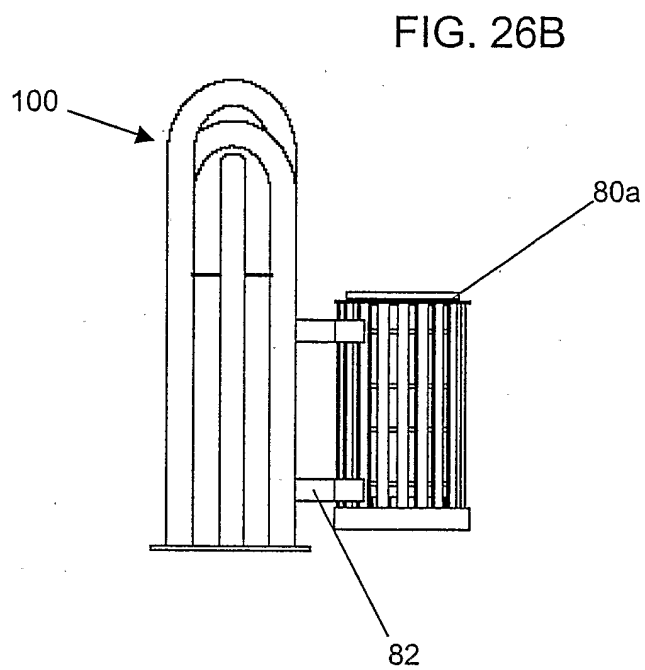
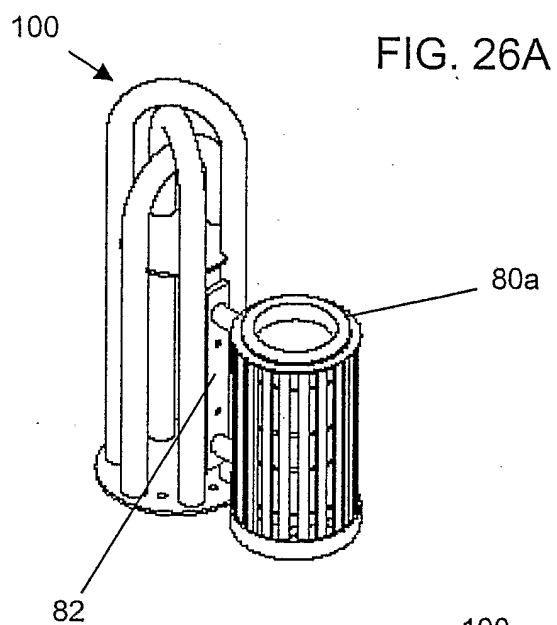
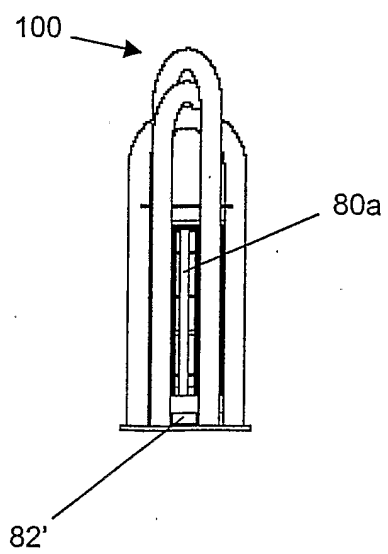
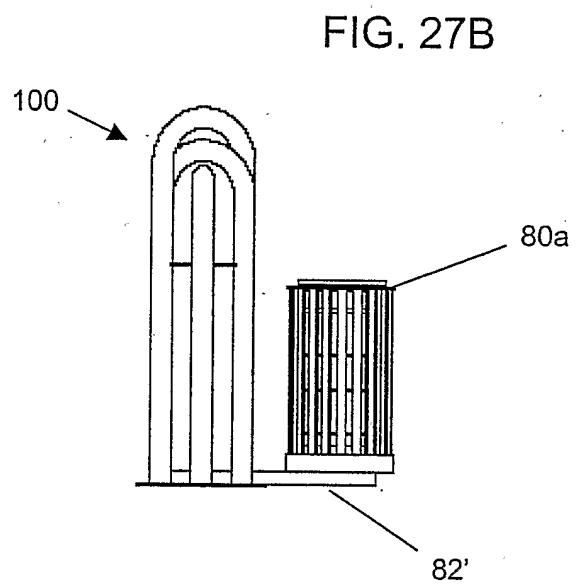
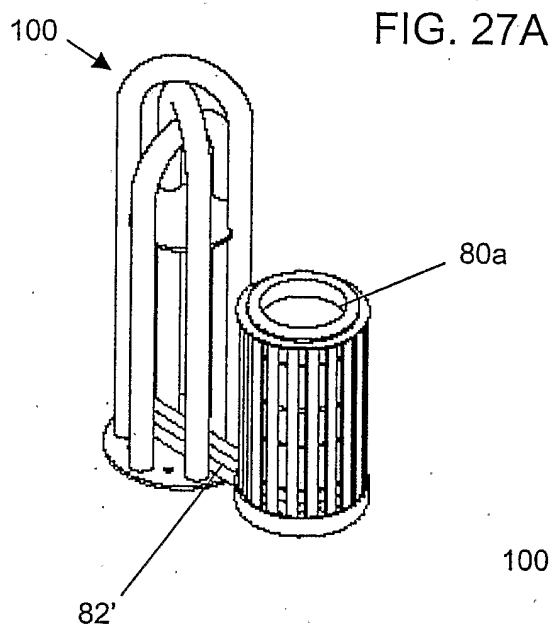


FIG. 25B







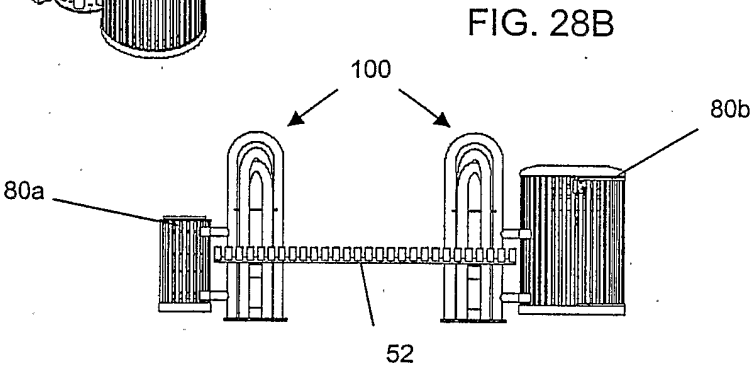
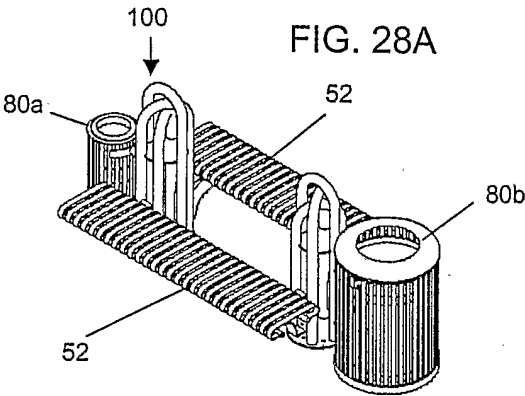


FIG. 28E

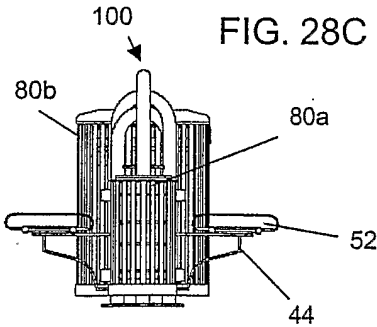
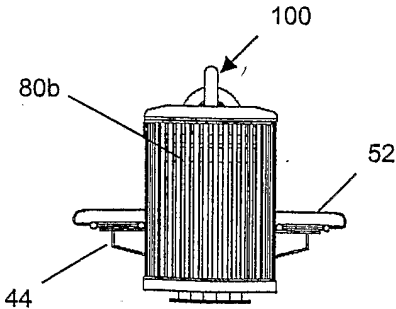
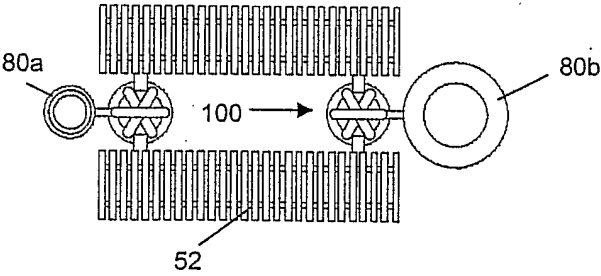


FIG. 28D

FIG. 29A

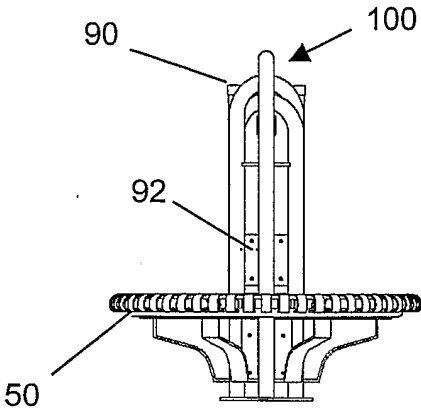
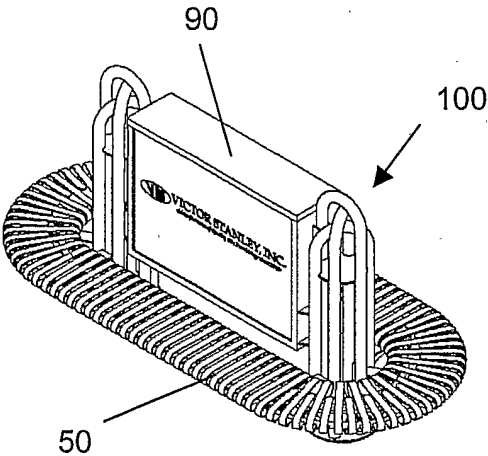


FIG. 29C

FIG. 29B

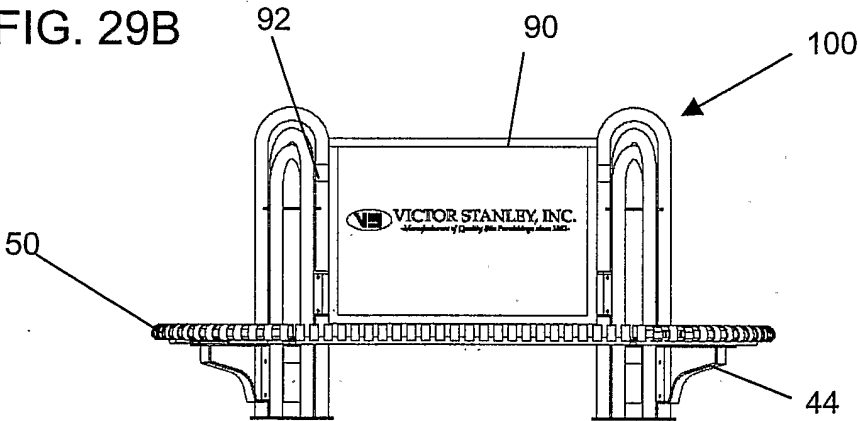


FIG. 29D

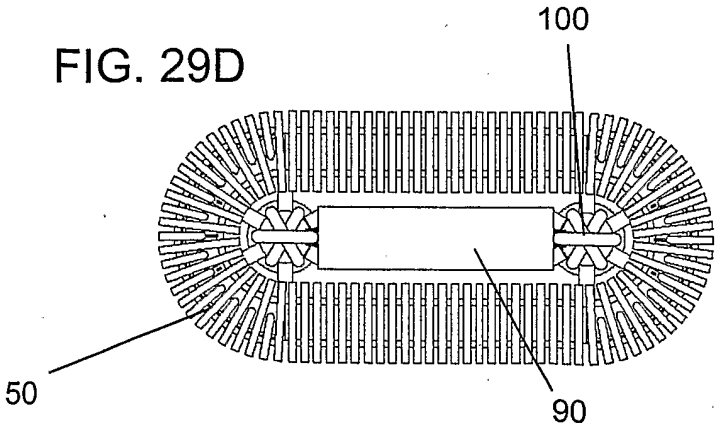


FIG. 30A

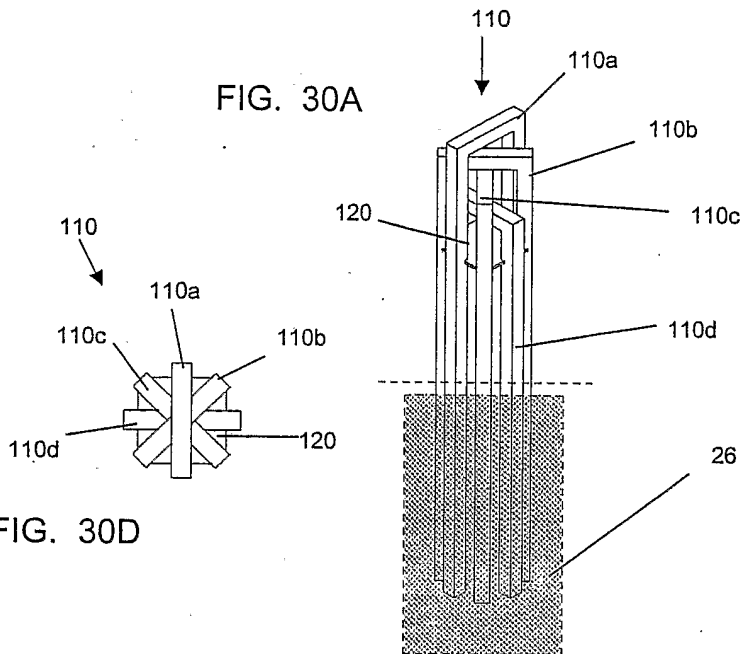


FIG. 30D

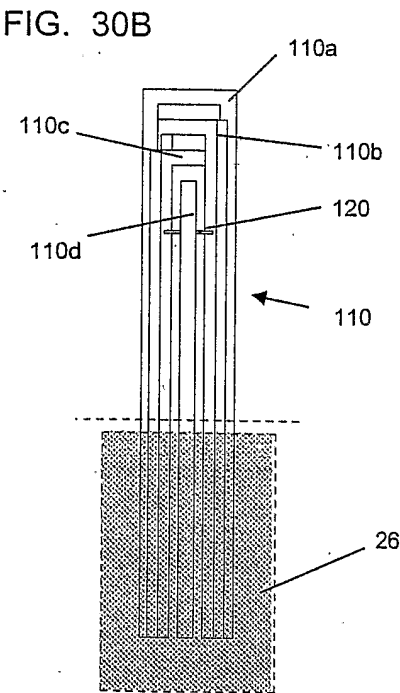


FIG. 30C

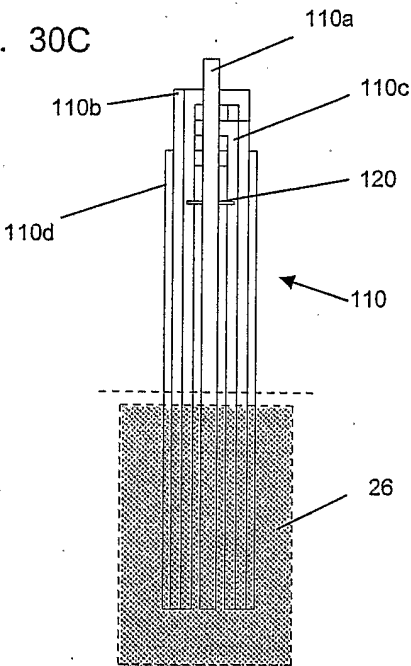


FIG. 31A

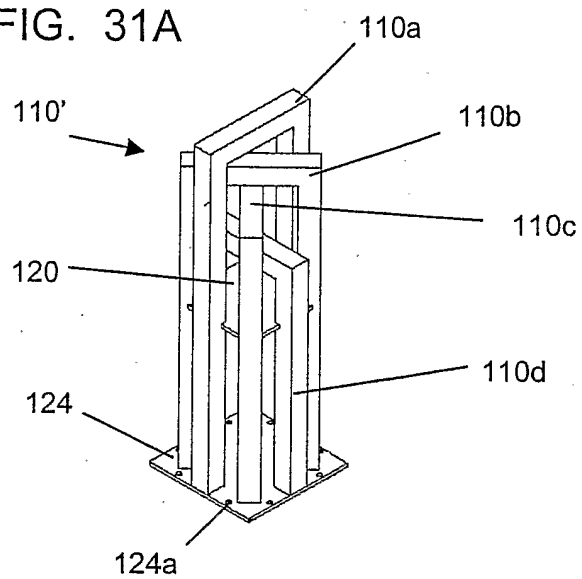


FIG. 31D

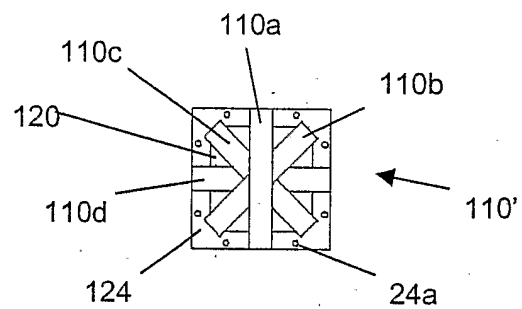


FIG. 31B

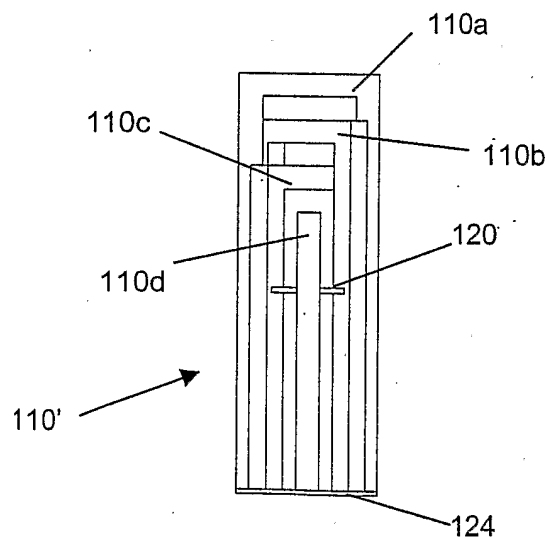
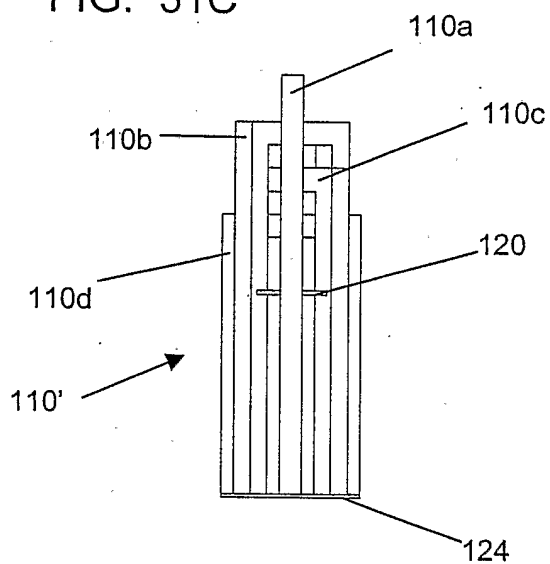


FIG. 31C



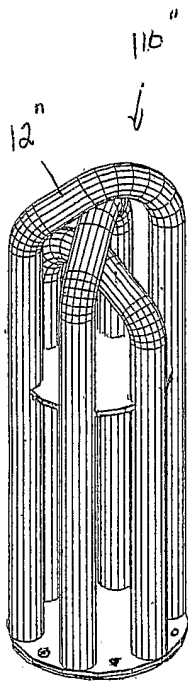


FIG. 32A

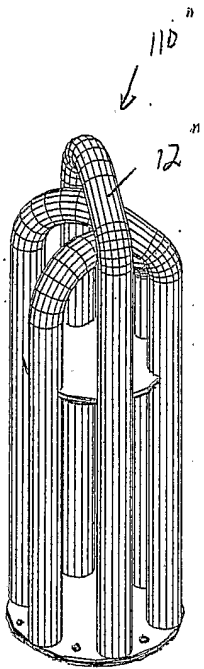


FIG. 32B

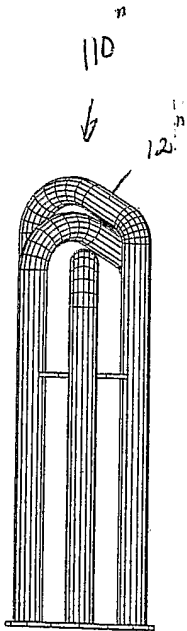


FIG. 32C

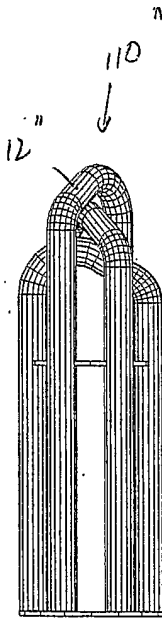


FIG. 32D

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/04988

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : F16M 11/00

US CL : 248/694, 188.1, 316.8

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)

U.S. : 248/694, 188.1, 316.8, 466, 469

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)  
Please See Continuation Sheet**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|------------------------------------------------------------------------------------|-----------------------|
| X          | US 4,103,853 A (BANNAN) 01 August 1978 (01.08.1978), fig. 1.                       | 1, 2, 8-12, and 27-29 |
| Y          |                                                                                    | 16-19 and 26          |
| X          | US Des. 265,364 S (WALKER) 13 July 1982 (13.07.1982), figs. 1 and 2.               | 1 and 2               |

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

"B" earlier application or patent 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

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

14 May 2003 (14.05.2003)

Date of mailing of the international search report

23 JUN 2003

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Facsimile No. (703)305-3230

Authorized officer

Steven Marsh

Telephone No. (703)305-0098

# INTERNATIONAL SEARCH REPORT

PCT/US03/04988

## Continuation of B. FIELDS SEARCHED Item 3:

EAST text search

search terms: U-shaped legs and brackets, fixtures, nest, overlap