

SHELTER AND HUB SYSTEM

Field of the Technology

5 The present disclosure relates generally to shelters and hub systems for shelters, and more particularly to an improved hub system, apparatus, kit and methods, for example, for deployable shelter assemblies.

Background

10 Deployable shelters, tents, rapid-deployment shelters, forts and the like typically include sheets of fabric, or other materials, secured to a frame. Often these units are free-standing or are similarly semi-attached to a ground surface or tangential fixture. In some instances, guy ropes help anchor the unit to a ground surface once the shelter is assembled. Rapid deployment and assembly of such a shelter is often a difficult and
15 demanding task, particularly during emergency situations and in uncertain environmental conditions.

 For instance, rapid tactical shelters are used in a variety of demanding on-site scenarios including fire, incident command, communication areas, crime scene investigation, flu vaccination, military deployment and other on-site emergency response
20 spots in a variety of challenging terrains, and environmental conditions. Rapid deployment, with quick and easy set-up and take-down of such units is often beneficial, if not necessary. Deployment situations may be, for example, in extreme heat or cold, during on-going emergencies and in remote locations, making ease of assembly extremely important and transportation of weighted items impractical. Durability of items
25 in such terrain and environmental situations can also be a challenge.

 Therefore, Applicants desire improved systems, kits, assemblies, apparatus and methods for shelter and hub systems for deployment shelters toward these and other challenges.

Summary

In accordance with the present disclosure, hub systems and improved shelter systems and assemblies are provided for deployment of shelters, forts deployment tents and the like. This disclosure provides an improved hub system that is convenient,
5 efficient, easily portable and quick for the user, particularly when used in conjunction with other accessories often used in deployment shelters, for example HVAC, lighting, power cords, interior insulation, etc.

In one embodiment of the present disclosure, a hub for assembly of a shelter may include at least one receiver slot, a receiver sleeve, and at least one attachment point.

10 Other embodiments may be considered a hub for assembly of a rapid-deployment shelter. The hub may include, in some examples, a set of receiver slots, a receiver sleeve and a set of attachment projections. The receiver slot may include two parallel slot walls, a slot floor and a center slot wall. The receiver sleeve may be medially positioned to the receiver slots. The set of attachment projections may be rounded or may take on other
15 shapes. The set of attachment projections may be attached at each end to a slot wall.

In some embodiments, receiver sleeve may include an inner receiver and an outer receiver. The inner receiver and outer receiver may form a pressure lock system. The inner receiver and outer receiver walls may be angled. The angle may, for example, be between about .001 and 1 degrees, or is contemplated to also be more. In some examples,
20 the taper may be at .5 degrees. The inner receiver may be angled inwardly from the floor. The outer receiver may be angled outwardly from the floor. In some examples, the taper of the angle of the outer receiver may be opposite that of the taper of the angle of the inner receiver.

Other embodiments may be considered a shelter system including a frame, a
25 cover and a hub. The frame may include a plurality of interconnected frame poles. The frame poles may be configured to alternate between a first extended position and a second retracted position. The cover may be configured to mate with the frame and/or be secured to the frame. The hub may include a set of receiver slots, a receiver sleeve, and

a set of attachment projections.

In other examples the inventions disclosed may be considered hub and shelter methods, for example a method for a hub, a method for a shelter system kit, a method for an improved shelter and a method for rapid deployment of a shelter according to the disclosure.

The above summary was intended to summarize certain embodiments of the present disclosure. Embodiments will be set forth in more detail in the figures and description of embodiments below. It will be apparent, however, that the description of embodiments is not intended to limit the present inventions, the scope of which should be properly determined by the appended claims.

Brief Description of the Drawings

Embodiments of the disclosure will be better understood by a reading of the Description of Embodiments along with a review of the drawings, in which:

5 Figure 1 is a side perspective view of one example of a hub for a deployment shelter according to an embodiment of the disclosure;

 Figure 2 is a front view of a one example of a deployment shelter with a hub system according to an embodiment of the disclosure;

10

 Figure 3 is a top view of one example of a hub according to the present disclosure;

 Figure 4 is a top view of one example of a hub according to the embodiment of
15 Figure 1;

 Figure 5 is a side perspective view of one example of a pin and a washer element of the hub system;

20 Figure 6 is another example of a bottom view of a hub according to the present disclosure;

 Figure 7 is a side perspective view of one example of a hub according to the embodiment of Figure 1;

25

 Figure 8 is a side perspective view of one example of a portion of a hub assembly of a hub system according to the present disclosure; and

Figure 9 is a perspective view of another example of a portion of a hub assembly of a hub system, according to the present disclosure.

Description of Embodiments

In the following description, like reference characters designate like or corresponding parts throughout the several views. Also in the following description, it is to be understood that such terms as "forward," "rearward," "left," "right," "upwardly,"
5 "downwardly," and the like are words of convenience and are not to be construed as limiting terms.

Referring now to the drawings in general, it will be understood that the illustrations are for the purpose of describing embodiments of the disclosure and are not intended to limit the disclosure or any invention thereto. Collapsible shelters generally
10 have a short lifespan as they expand and then collapse into a carryable form repetitively and generally are thrown about to experience a significant amount of wear and tear. These types of shelters are often thought of as readily replaceable and priced accordingly. Rapid deployment shelters, however, are much more significant purchases and are used under extreme conditions in emergency deployments, precarious weather situations, in
15 remote locations and are expected for function seamlessly with higher expectations in repetitive deployments. Applicant realizes that durability, strength and weight associated with rapid deployment shelters are extreme challenges and can all be limiting factors. It is to these and other challenges that Applicant's improved hub and shelter system is directed.

20 Figure 1 shows a side view of one example of a hub 10 for a shelter according to an embodiment of the disclosure. A hub 10 for assembly of a shelter may include at least one receiver slot 12, a receiver sleeve 20, and at least one attachment projection 30. In some examples, at least a portion of the hub 10 is made of glass filled nylon and in other examples; the hub 10 may be entirely made of glass filled nylon. Applicant realized that
25 formulating the hub 10 out of glass filled nylon, for example instead of the traditional metal, could give the hub slightly more flexibility than a metal hub, however, strength and durability were concerns. Applicant's hub 10 may exclude metal parts.

One or more hubs 10 may make up a hub system for a deployment shelter 50, as seen in figure 2. An articulating frame system of frame poles 52 may mate with a shelter cover. Shelter covers are often made of a fabric or canvas material that may be torn or ripped during contact with traditional frames, especially those with metal parts and assemblies. Applicant's hub reduces the chances of wear and tear on both the frame and the cover of the shelter. In many cases, when a shelter is expanded, a cover is required to be secured to the frame by way of an attachment strap with an attachment buckle that expands between the cover and the hub. The need for such attachment straps have been eliminated with Applicant's improved hub, in one example, by the hub pressure lock structure, described in more detail later.

Any of the shelters 50 shown or described herein may include a variety of field deployment elements. For instance, the shelter may be light weight for easy carry transport and may include an articulated frame, robust coverings, canopy and canopy features, door openings, lighting features, power features, liners and additional water bladders, anchor weights, and sand bags. The shelters may be any size and multiple shelters may be joined through door openings to create scalable complexes with the advantages of the inventions herein. Particular shelter examples include, but are not limited thereto, a unit with floor space of about fifteen feet by twelve feet and an area of about one hundred and height square feet; a unit with floor space of fifteen feet by eighteen feet and an area of about two hundred and seventy feet; and a variety of other sizes.

In other embodiments, the disclosure includes a shelter kit. In this embodiment, the kit may comprise a shelter 50, e.g. any of the shelters previously shown or described, and a plurality of hubs 10, e.g. any of the hub embodiments shown or described.

Other embodiments, as seen in Figures 3-8, may be considered a hub 10 for assembly of a rapid-deployment shelter 50. The hub may include, in some examples, a set of receiver slots 12, a receiver sleeve 20 and a set of attachment projections 30. The receiver slot 12 may include slot walls 14, a slot floor 16 and a center slot wall. The

receiver sleeve 20 may be medially positioned to the receiver slots 12. The set of attachment projections 30 may be rounded or may take on other shapes. The set of attachment projections 30 may be attached at each end to a slot wall 14.

5 The receiver slot 12 may include a first slot wall 14 and a second slot wall 14, positioned such that the two slot walls are substantially parallel and each attached to a slot center wall and a slot floor 16. In some examples, a slot wall 14 of one receiver slot 12 is substantially perpendicular to the slot wall 14 of an adjacent receiver slot 14.

10 In some embodiments, receiver sleeve 20 may include an inner receiver 24 and an outer receiver 22 and a sleeve bottom 26. The inner receiver 24 and outer receiver 22 may form a pressure lock system. The inner receiver 24 and outer receiver 22 walls may be angled. The angle may, for example, be between about .001 and 1 degrees, or is contemplated to also be more. The inner receiver 24 may be angled inwardly from the floor. The outer receiver 22 may be angled outwardly from the floor. The inner receiver 24 and outer receiver 22 walls may be angled away from each other at the top of the receiver 20 and toward each other toward the floor of receiver 20. The angled inner receiver 24 wall and the angled outer receiver wall 22 may form a pressure lock system for accepting a frame pole 52, for example and specifically a spacer pole 51, and securing the pole with the hub 10.

20 Attachment projections 30 may be attached on one end to a slot wall 14 that is perpendicular to the slot wall 14 attached to the other attachment projection end. Attachment projections may be curved, rounded or take on any other applicable shape. Many shelter accessories 60 (see Figure 9) are utilized with rapid deployment shelters, as previously discussed, and these items often need to be attached or secured with the shelter. Such items as HVAC components and insulation sheets can be heavy and place a large weight load on the shelter, especially the shelter frame, and there is traditionally not a good place to attach such items. Applicant's hub system includes attachment projections 30 and a pin system 80 that collectively simplify assembly of the shelter and

also provide unique attachment options for accessory items, without compromising the frame and shelter integrity and without increasing shelter carry weight.

The attachment projections 30 are configured to allow shelter accessory 60 attachment with accessory attachments 60.

5 The hub weight, in some examples, may be less than or equal to about 1.75 oz. The hub weight in other examples may be between about 1.25 oz. to about 1.75 oz. The hub may be at least about 4mm thick. The hub may be at least about 5mm thick in other examples. Applicant was able to realize a reduced hub weight of over 40% of that of conventional hubs, while increasing the strength and durability of the hub 10.

10 Applicant conducted vertical break testing to simulate the weight that is often supported from a hanging position on attachment points for rapid deployment shelters by accessory items. Applicant desired attachment points with low weight, ease of access, durability and strength. In some examples, hub 10 and the attachment projections 30 may have an average vertical break of above 125 lbs., 145 lbs. or 155 lbs. In some examples,
15 the vertical break may be between about 145 lbs and about 170 lbs.

 Applicant conducted lateral break testing to simulate the side pull that is may be withstood from a side load position. Again, Applicant desired attachment points with low weight, ease of access, durability and strength. In some examples, the hub 10 and attachment projections 30 may have an average lateral break of above 150 lbs., 160 lbs.,
20 or 170 lbs. In some examples, the lateral break may be between 150 lbs. and about 200 lbs.

 Other embodiments may be considered a shelter system including a frame, a cover and a hub. The frame may include a plurality of interconnected frame poles. The frame poles may be configured to alternate between a first extended position and a
25 second retracted position. The cover may be configured to mate with the frame and/or be secured to the frame. The hub may include a set of receiver slots, a receiver sleeve, and a set of attachment projections.

In some embodiments the pin system 80 may include a plurality of pins and matched washers. Applicant's pin system, as seen in Figure 5, may fit through slot openings 17 on slot receiver walls 14 to secure in place attachments and/or frame poles 52. Applicant's articulating frame poles and configuration may be include openings that
5 accommodate and match with the openings 17 and the pin system 80. By way of example, the pin and washer may be made of glass filled nylon. In this example, the pin is configured to slide through the hub and tubes of the frame and to mate with its mated washer that is configured to pop over the end of the pin to lock tight. Conventionally, metal pins with split rings have been utilized with shelters, with the split rings being
10 difficult to remove and assemble quickly and extremely difficult to replace in the field. Applicant's pin system increases speed of assembly and removal, maintains strength and decreases weight load.

In other examples the inventions disclosed may be considered hub and shelter methods, for example a method for a hub, a method for a shelter system kit, a method for
15 an improved shelter and a method for rapid deployment of a shelter according to the disclosure.

In yet another embodiment of the disclosure, included is a method for assembling a collapsed shelter 10 and securing the shelter 10 with a hub system. In one example, the method may include carrying the shelter 10 collapsed, separating and/or unfolding the
20 walls 12, expanding the shelter 10, aligning the frame of the shelter with a hub system to secure the shelter, e.g. including any of the embodiments previously shown or described. The method may also include attaching accessory items to an attachment projection 30 of a hub 10.

Portability of the shelter allows any of the shelter embodiments and examples
25 shown and described herein to be transported to remote and difficult to reach locations, for instance because the hub and shelter components are lightweight to carry and collapsible. Often, in rapid deployment situations, shelters may be quickly set-up in a variety of environments, quickly taken-down and remain easily mobile.

Those of ordinary skill in the art having the benefit of this disclosure will recognize that any of the shelters and hub system described herein includes a variety of sizes, shapes, styles and support materials, all of which are considered within the scope of this disclosure.

5 Numerous characteristics and advantages have been set forth in the foregoing description, together with details of structure and function. Many of the novel features are pointed out in the appended claims. The disclosure, however, is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts, within the principle of the disclosure, to the full extent indicated by the broad
10 general meaning of the terms in which the general claims are expressed. It is further noted that, as used in this application, the singular forms “a,” “an,” and “the” include plural referents unless expressly and unequivocally limited to one referent.

Claim Examples:

1. A hub for assembly of a shelter, said hub comprising:
 - a. at least one receiver slot;
 - 5 b. a receiver sleeve; and
 - c. at least one attachment projection.

2. A hub for assembly of a rapid-deployment shelter, said hub comprising:
 - a. a set of receiver slots, each receiver slot including:
 - 10 i. two parallel slot walls
 - ii. a slot floor
 - iii. a center slot wall;
 - b. a receiver sleeve medially positioned to the receiver slots, said receiver sleeve including
 - 15 i. an inner receiver sleeve,
 - ii. an outer receiver sleeve,
 - iii. a sleeve bottom; and
 - c. a set of attachment projections, said attachment projections attached at each end to a slot wall.

- 20 3. The hub of claim 2, wherein a slot wall of one receiver slot is substantially perpendicular to the slot wall of said adjacent receiver slot.

4. The hub of claim 3, wherein the attachment projections are attached on one end to
 - 25 a slot wall that is perpendicular to the slot wall attached to the other attachment projection end.

5. The hub of claim 4, wherein said attachment projections are curved.

6. The hub of claim 4, wherein said attachment projections are not curved.
7. The hub of claim 1, wherein at least a portion of said hub is made of glass filled nylon.
- 5 8. The hub of claim 7, wherein said hub excludes metal.
9. The hub of claim 7, wherein said hub weight is less than or equal to about 1.75 oz.
- 10 10. The hub of claim 9, wherein said hub weight is between about 1.25 oz to about 1.75 oz.
11. The hub of claim 9, wherein said attachment projections have an average vertical break of above 125 lbs., 145 lbs. or 155 lbs.
- 15 12. The hub of claim 9, wherein said attachment projections have an average lateral break of above 150 lbs., 160 lbs., or 170 lbs.
13. The hub of claim 9, wherein said hub is at least about 4mm thick.
- 20 14. The hub of claim 9, wherein said hub is at least about 5mm thick.
15. The hub of claim 1, including a pressure lock system.
- 25 16. The hub of claim 15, wherein said outer receiver sleeve is angled outward from the floor from about 1 degree to about 8 degrees.

17. The hub of claim 16, wherein said inner receiver sleeve is angled inward from the floor from about 1 degrees to about 8 degrees.
18. The hub of claim 15, wherein said angled inner receiver wall and said angled outer receiver wall form said pressure lock system for accepting a frame pole and securing said frame pole with the hub.
19. The hub of claim 2 including a pin system.
20. The hub of claim 19 wherein said pin system includes a pin and washer for securing frame poles.
21. The hub of claim 20 wherein said pin and washer are made of glass filled nylon.
22. A shelter system, said shelter system comprising:
- a. a frame, said frame including a plurality of interconnected frame poles and said frame configured to alternate between a first extended position and a second retracted position;
 - b. a cover configured to fit with said frame;
 - c. a hub, said hub including:
 - i. a set of receiver slots
 - ii. a receiver sleeve, and
 - iii. a set of attachment projections.
23. A shelter system kit according to claims 1-19.
24. A method for a hub according to any of the claims 1-19.

25. A method for shelter according to any of the claims 1-19.

26. A method for rapid deployment of a shelter according to any of the claims 1-19.

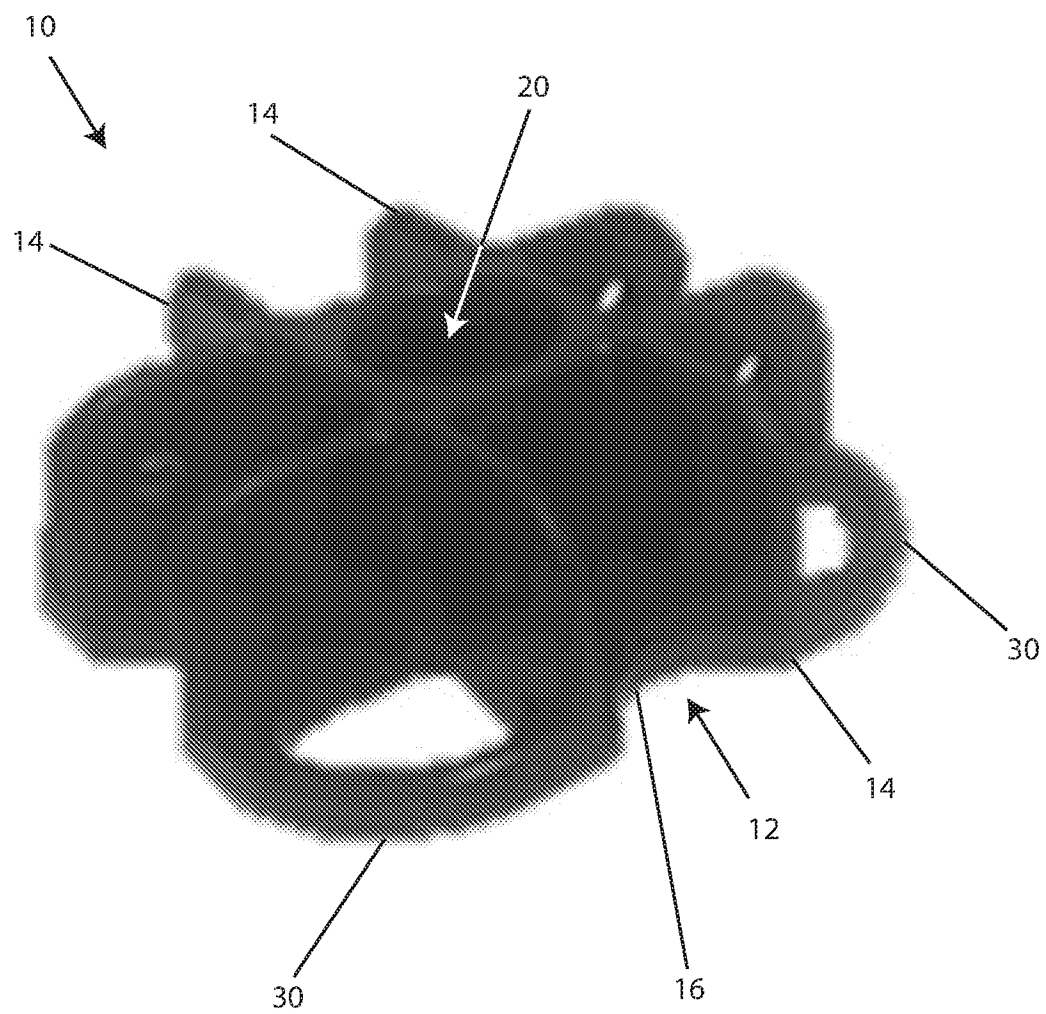


FIG. 1

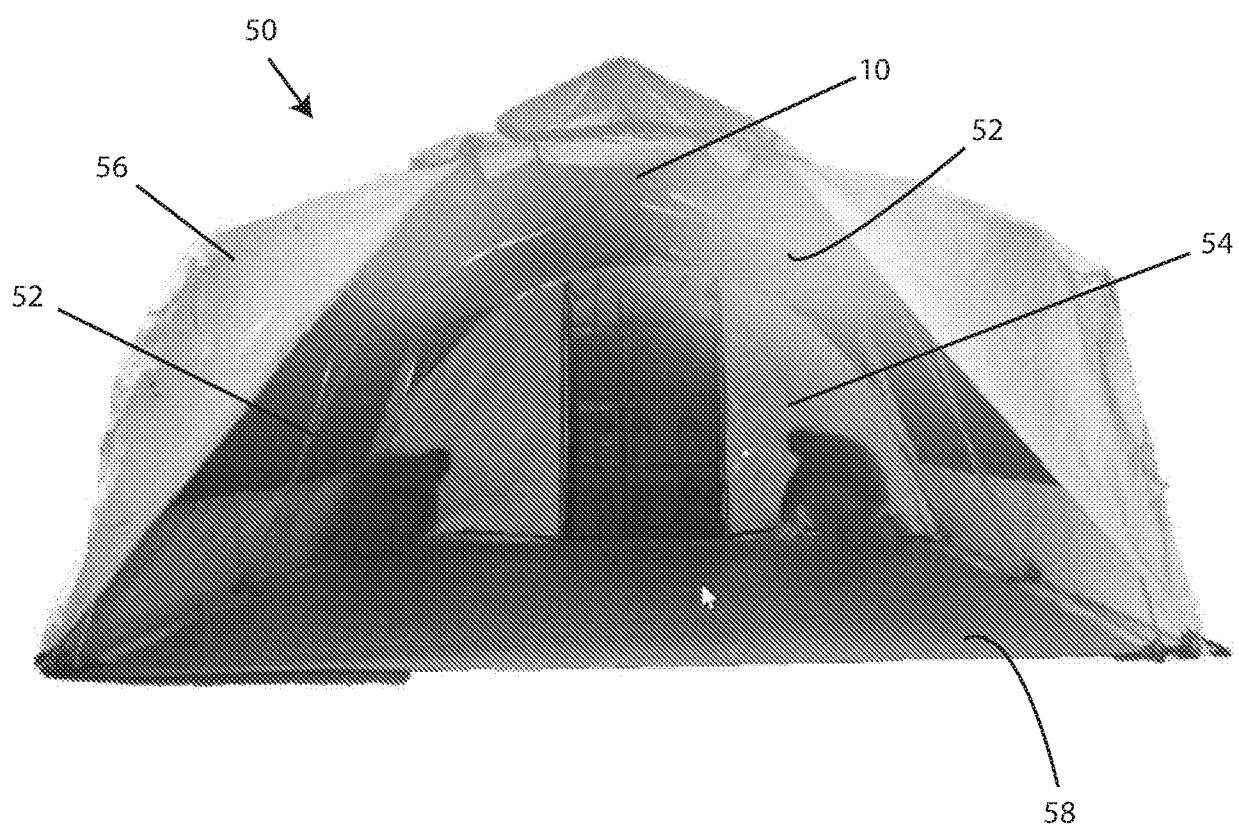


FIG. 2

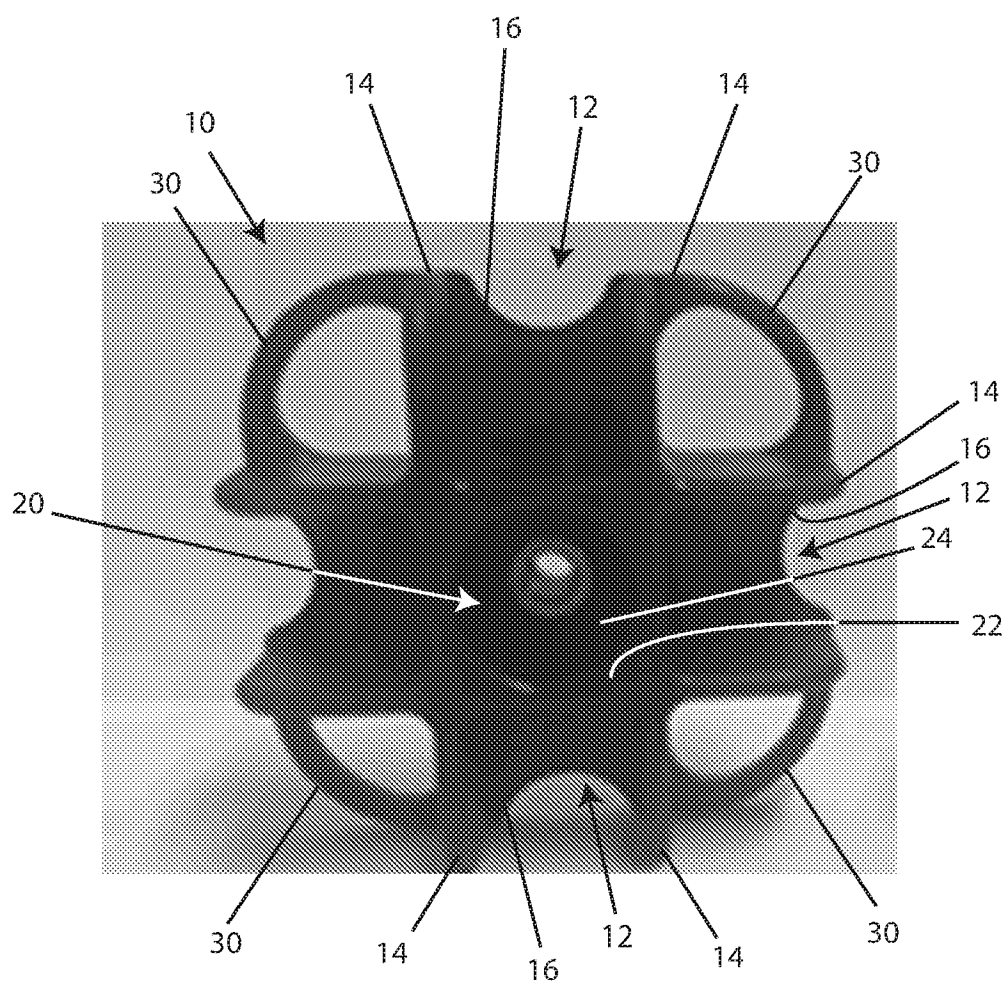


FIG. 3

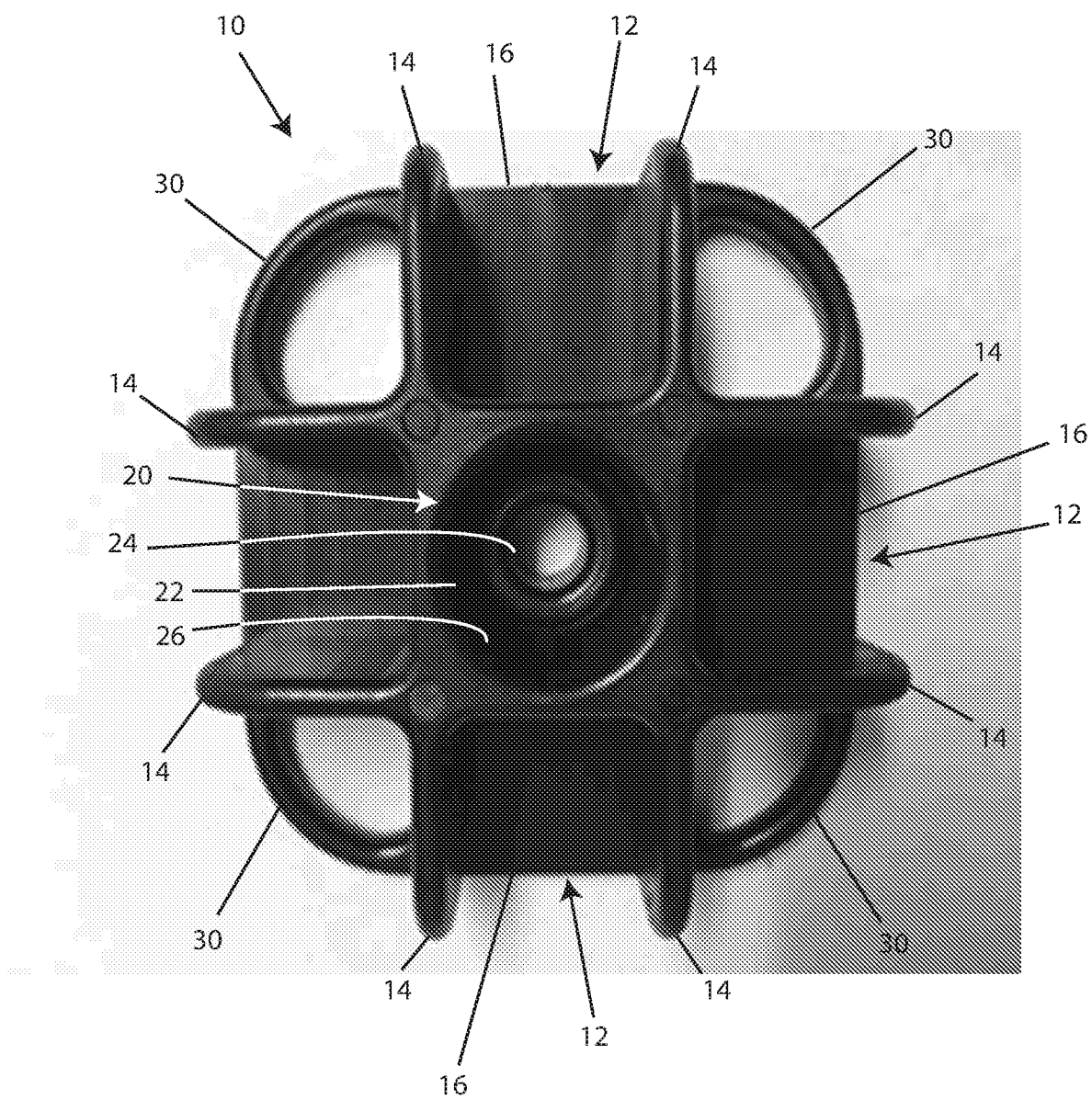


FIG. 4

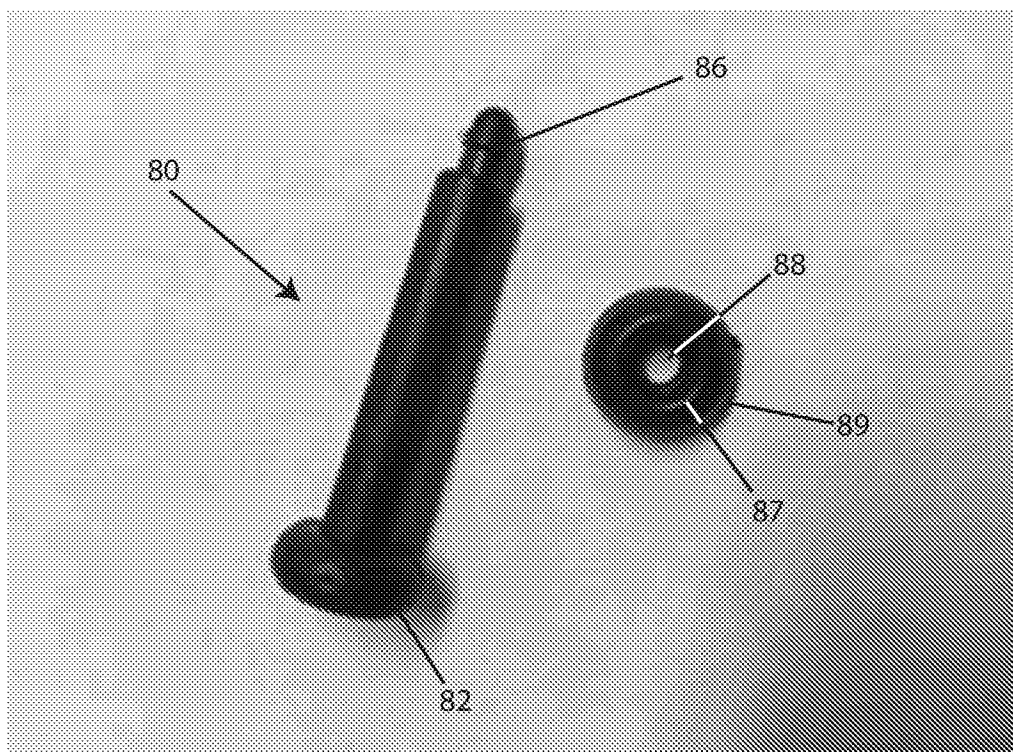


FIG. 5

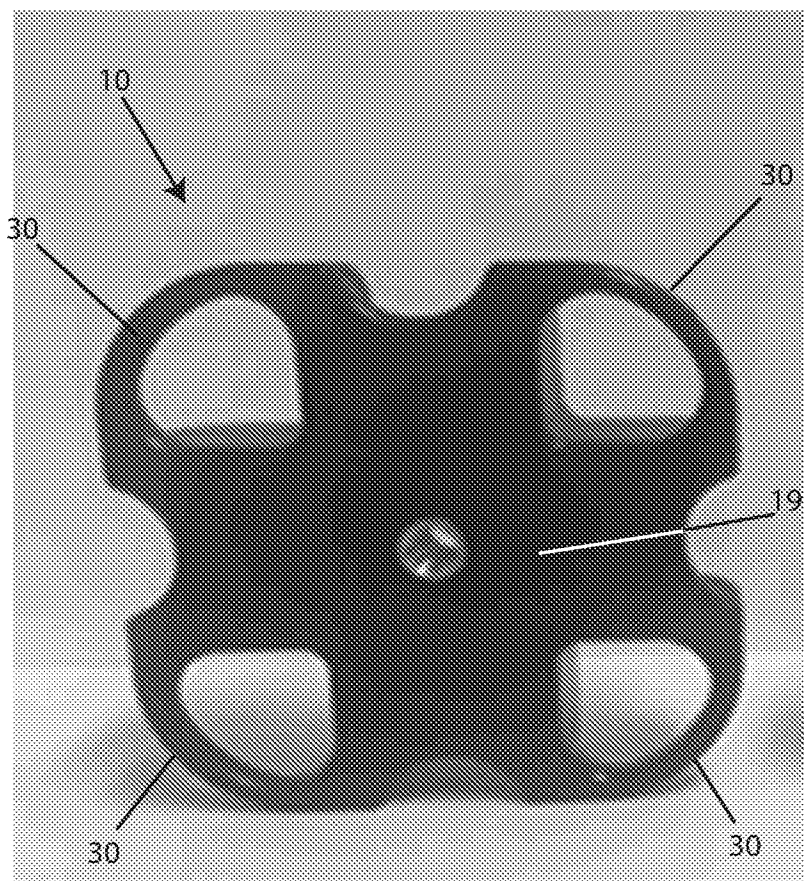


FIG. 6

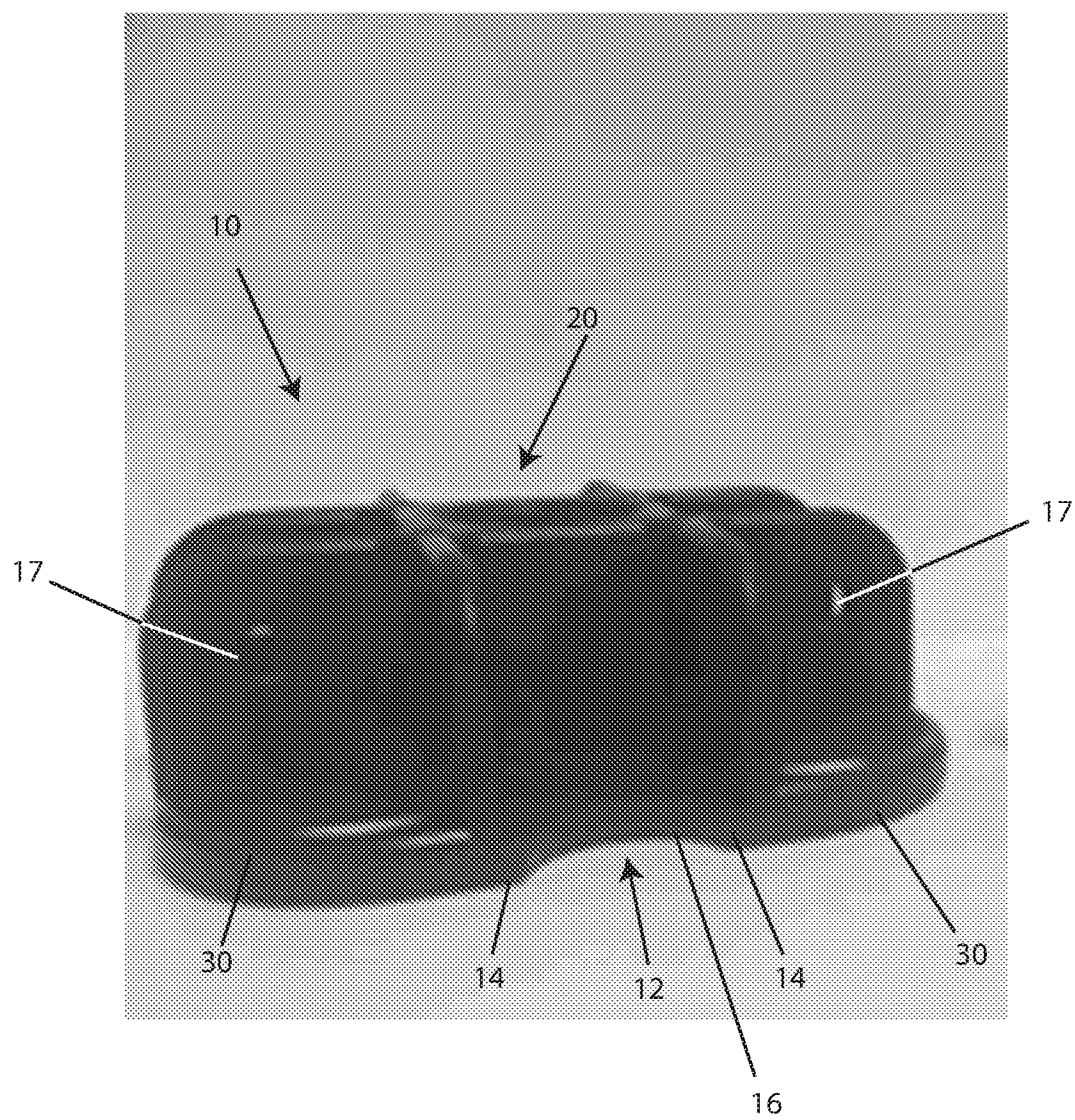


FIG. 7

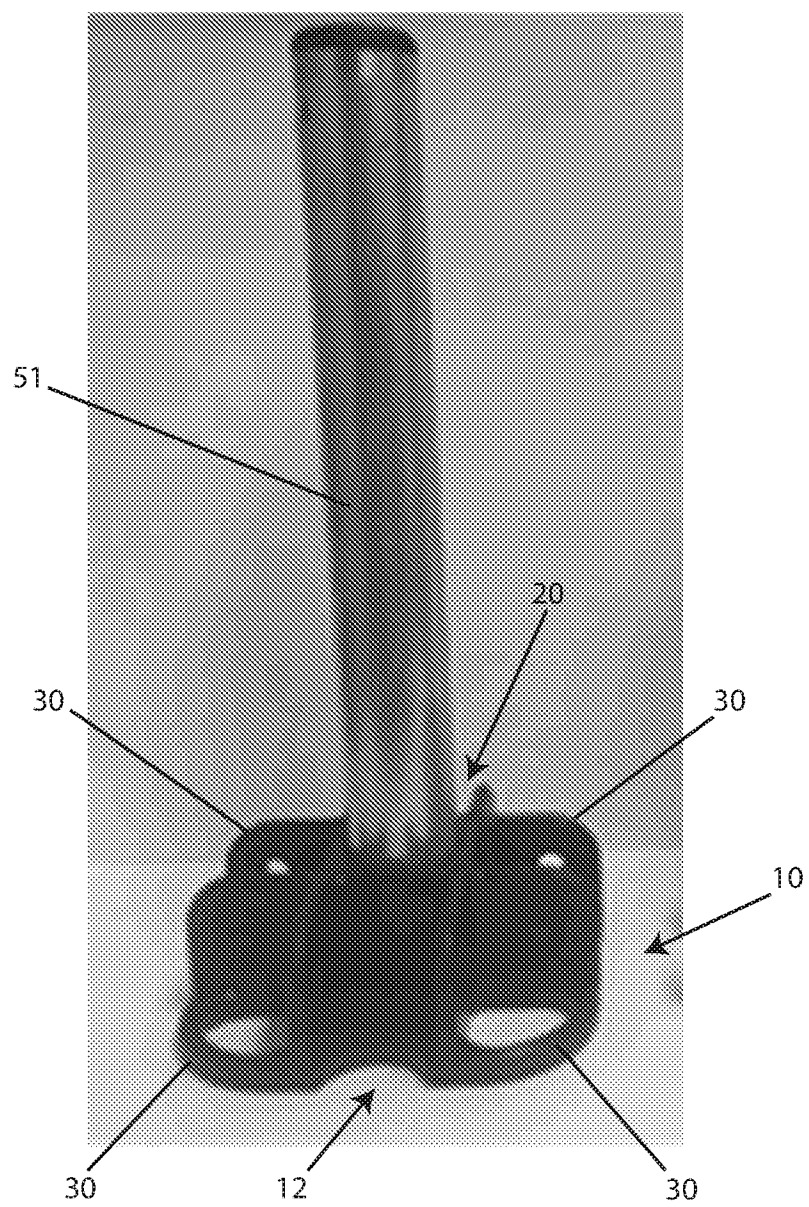


FIG. 8

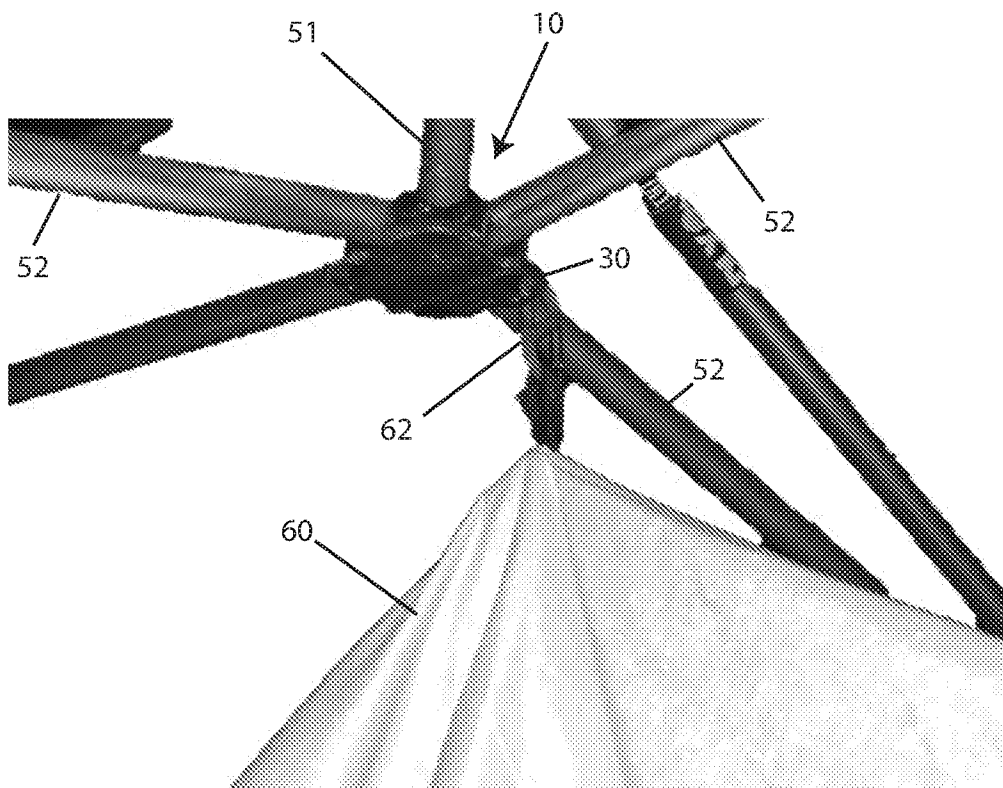


FIG. 9

FIG. 9