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(54) **CONTAINER RACK WITH LOCKING MEMBER**

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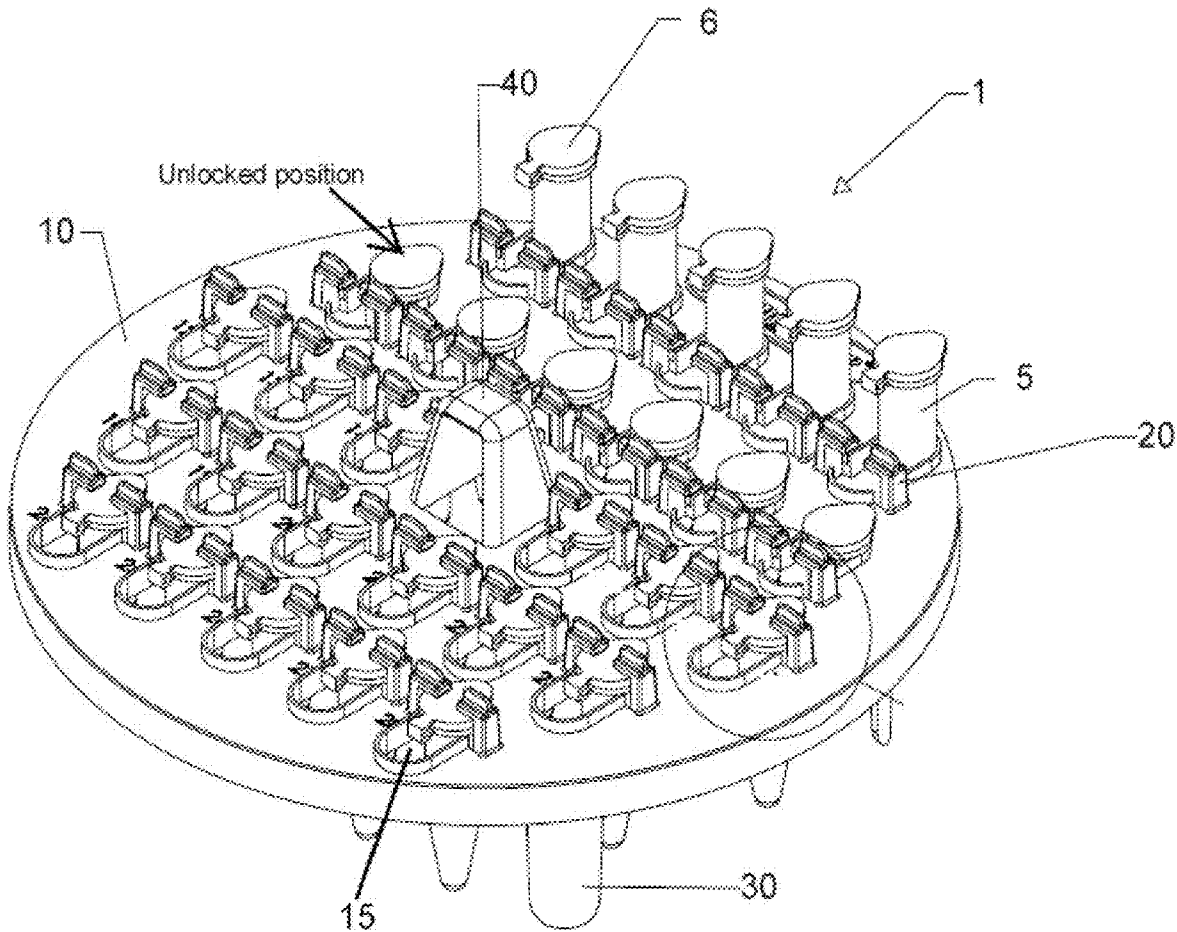
(57) **ABSTRACT**

A container rack with a locking member configured to hold one or more containers in a secure, transportable, and closed fashion. The rack includes a platform having a plurality of slots sized and shaped to accept containers of various sizes, with each slot having at least one locking member associated with it to form a locking groove. The locking member and platform form the locking groove which is adapted to secure a container in the rack in an upright and stable position. Advantageously, when containers having lids are in the locked position within the rack, the locking member makes contact with the lid to keep the lid in its closed position.

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Related U.S. Application Data

(60) Provisional application No. 61/094,505, filed on Sep. 5, 2008, provisional application No. 61/097,410, filed on Sep. 16, 2008.



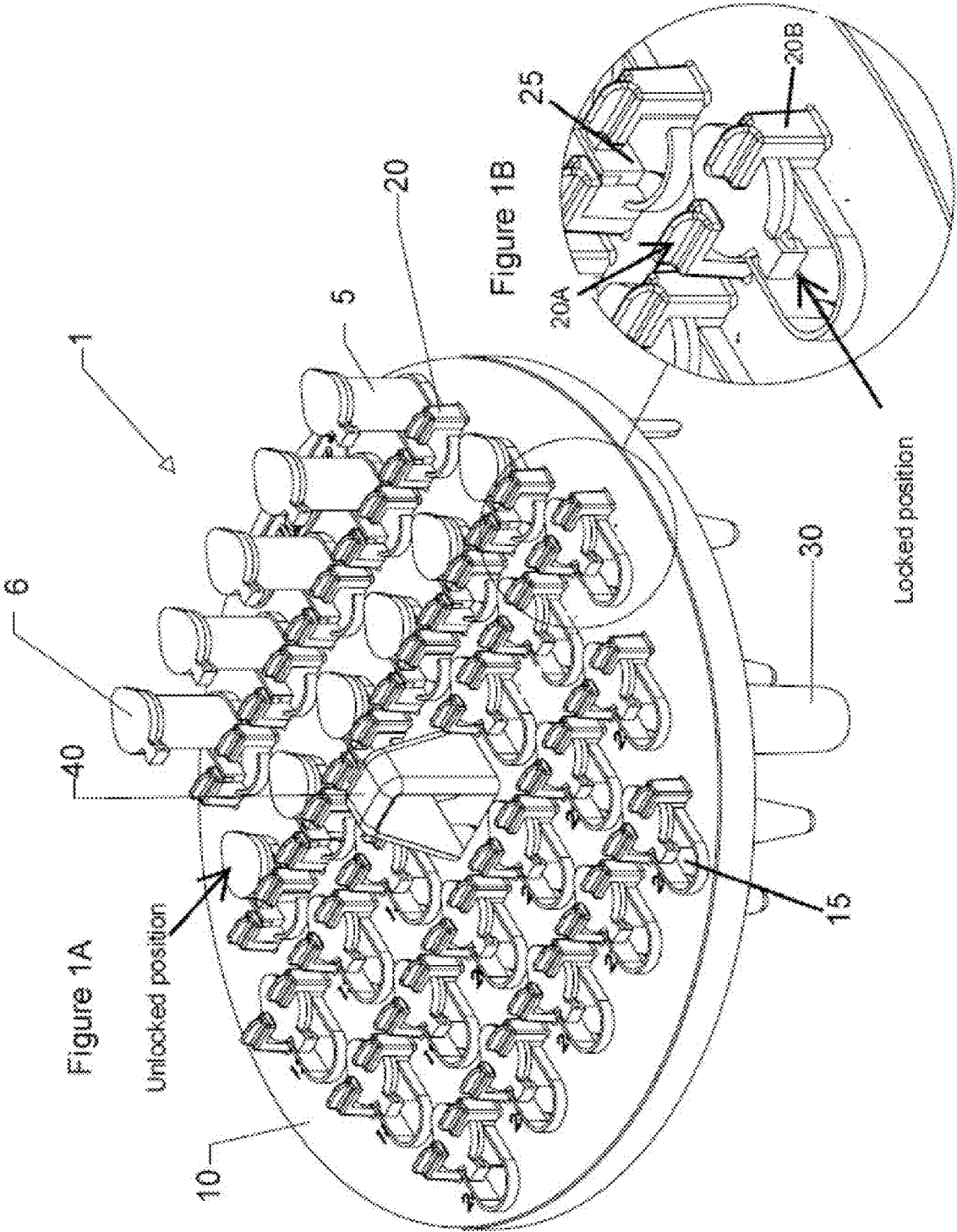


FIGURE 1C

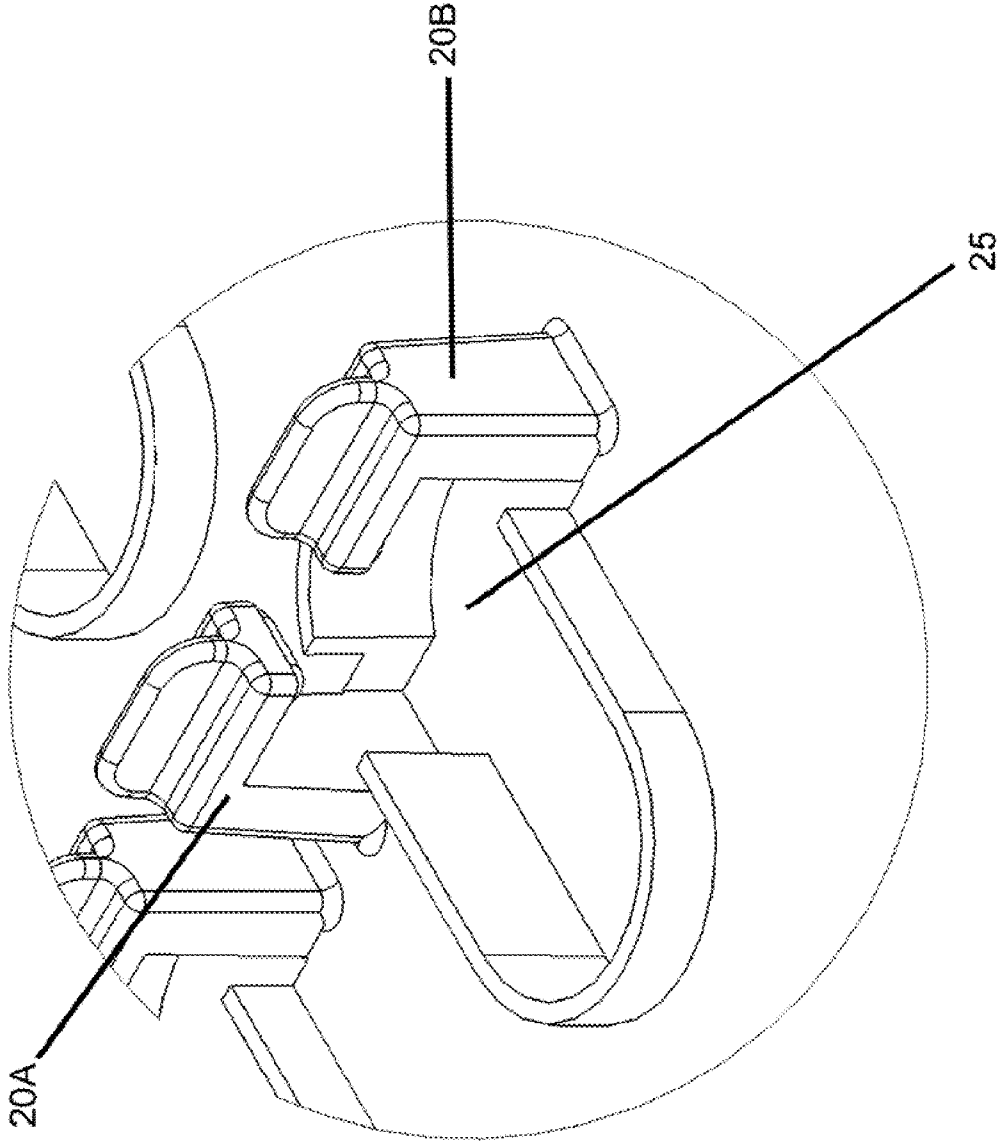


Figure 2B

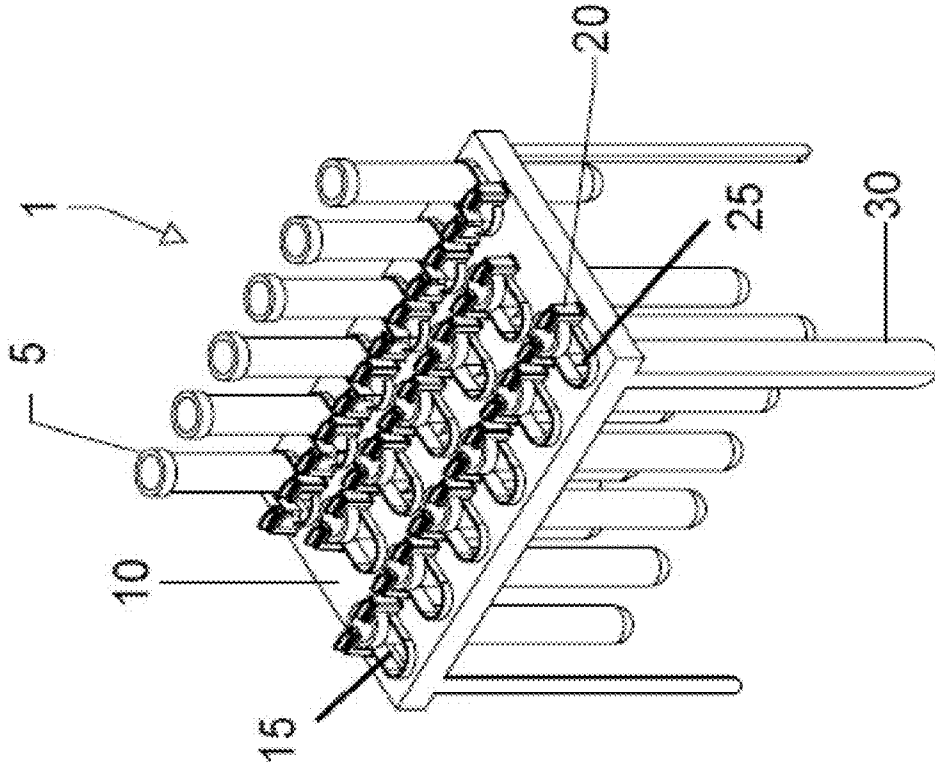
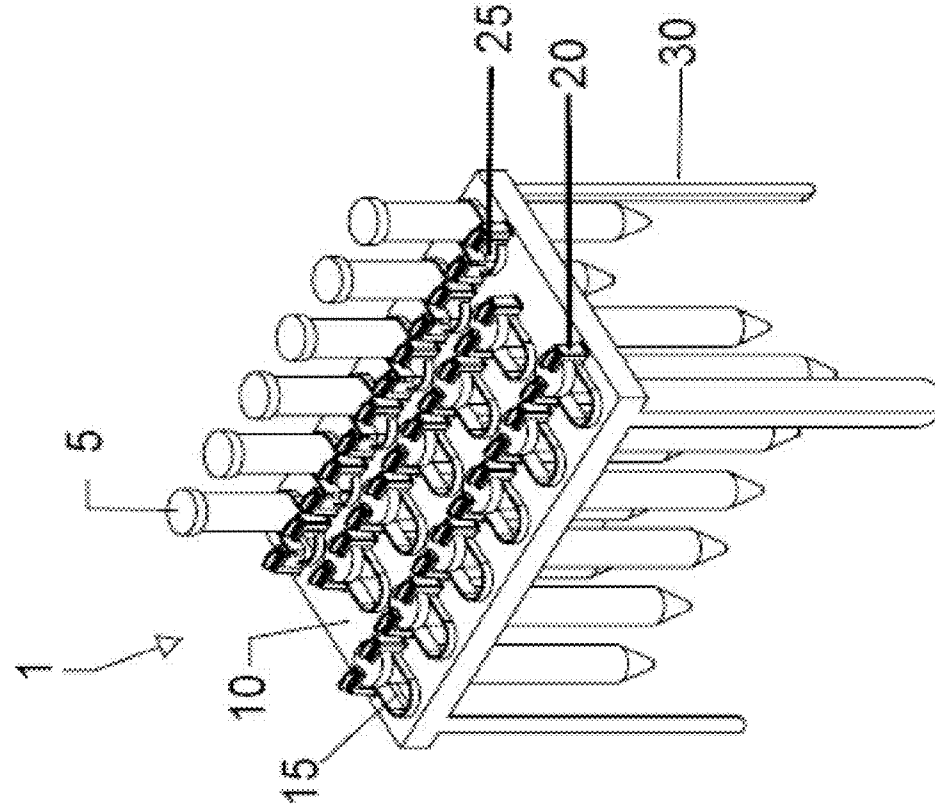


Figure 2A



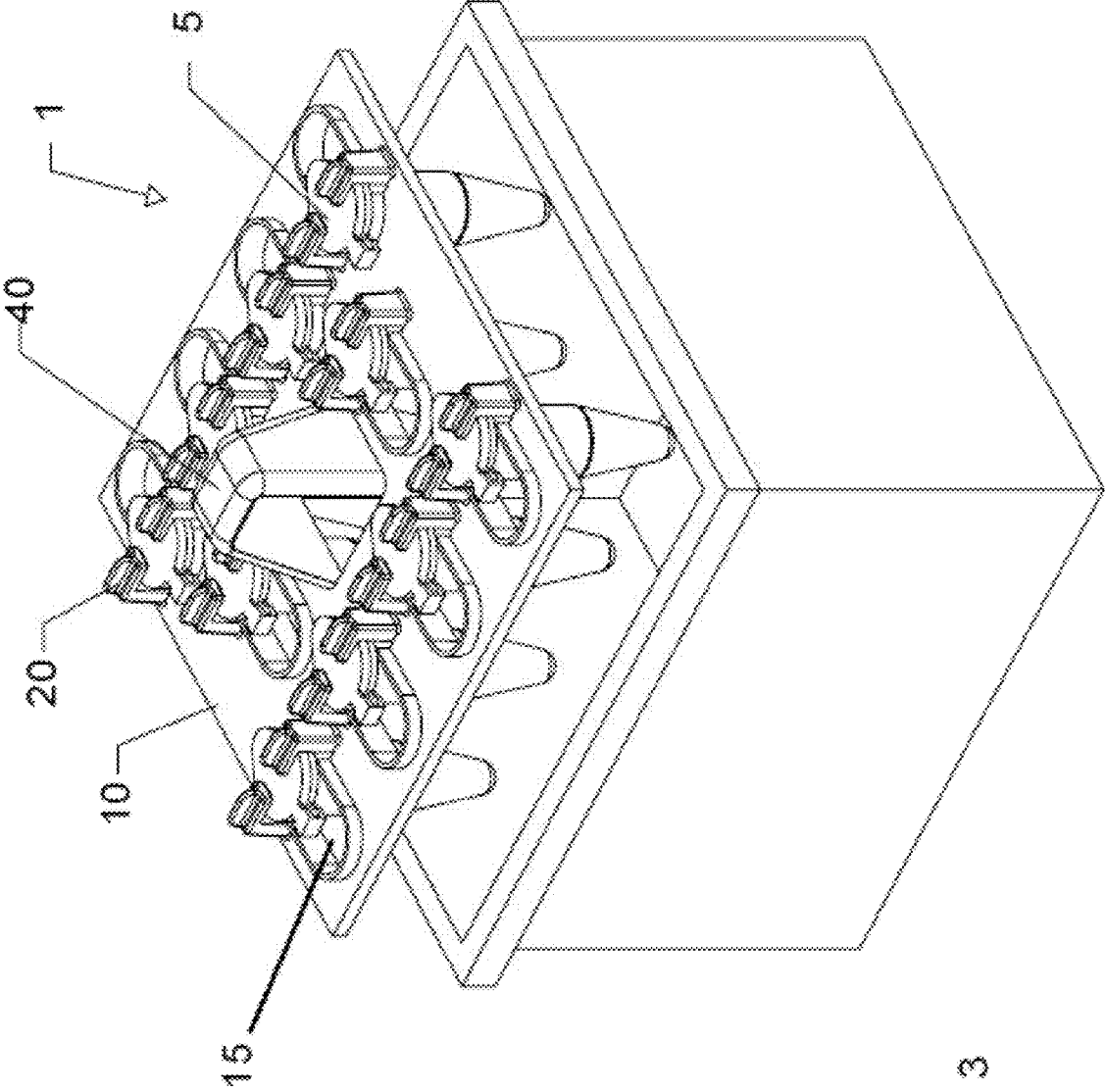
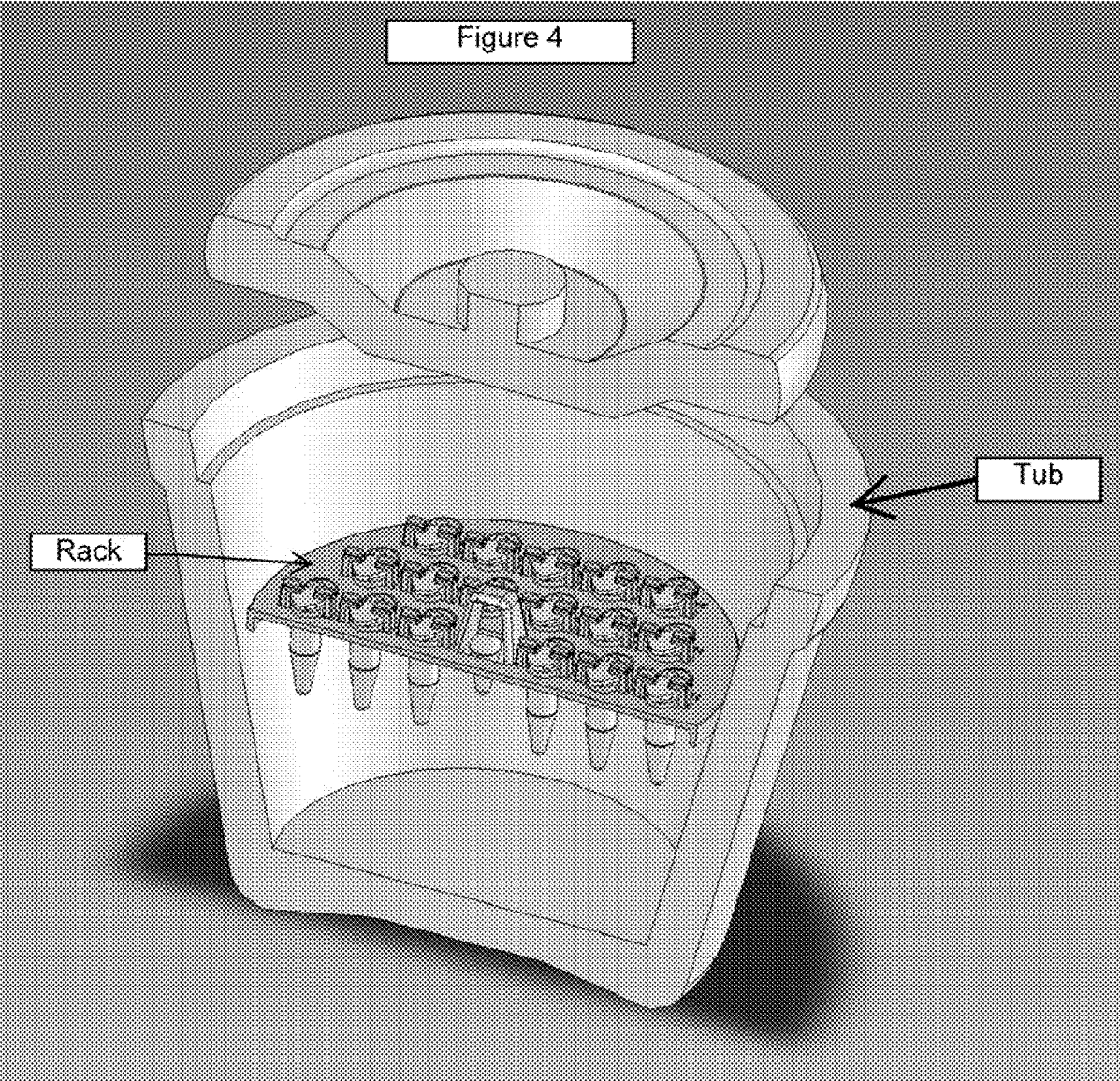
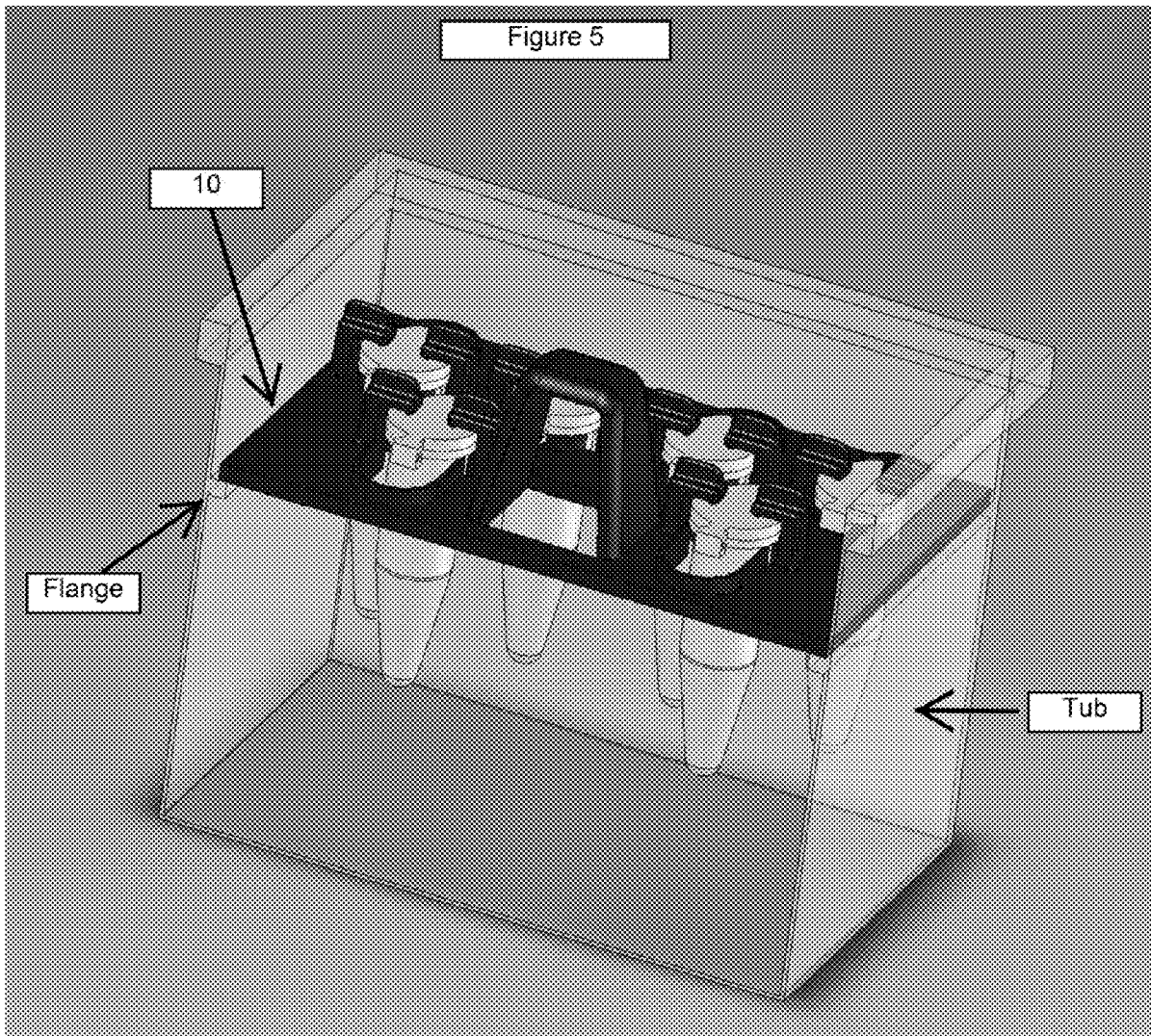


Figure 3





CONTAINER RACK WITH LOCKING MEMBER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. Patent Application No. 61/094,505, titled "Container Rack With Locking Member", filed on Sep. 5, 2008, which is hereby incorporated by reference herein in its entirety. The present application also claims the benefit of U.S. Patent Application No. 61/097,410, titled "Container Rack With Locking Member", filed on Sep. 16, 2008, which is hereby incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to an accessory appurtenant to containers, and, more particularly, to a rack for housing and securing one or more containers, such as, for example, test tubes or vials commonly used in a laboratory environment.

BACKGROUND OF THE INVENTION

[0003] Conventional laboratory settings include many different types of containers to hold various types of materials, including in some instances, hazardous materials. Said containers typically include a lid for sealing contents of the container in when the lid is in its closed position. Furthermore, a rack is often employed to provide a stable housing for a plurality of containers.

[0004] In many cases, there is a need to ensure that the containers loaded in a rack remain securely closed when held by the rack. This is of particular concern when the rack is at least partially submerged and/or immersed in a liquid bath. In such cases, the liquid bath, particularly those having an elevated temperature, may produce a force which acts on the container and/or the contents of the container such that the lid covering the main access port of the container is forced open. However, existing racks designed for introduction into a liquid bath provide no means to keep the lids of containers closed.

[0005] In addition, existing racks include slots that are precisely sized and shaped to match the size and shape of a particular container so that the slot and container are frictionally engaged with one another when the container is pushed into the slot. Because the slots must be dimensioned precisely to correspond to a particularly sized container to achieve the necessary frictional engagement, conventional racks are suited to fit containers of only one size. In this regard, containers of differing sizes and shapes can not be maintained on a single prior art rack having uniformly dimensioned slots. Furthermore, these frictional-fit racks secure the container using only a frictional force operating on the side of the container, and do not in any way secure the lid of the container in place.

[0006] Therefore, there is a need in the art for a rack configured to securely maintain containers such that the lids of the containers are kept closed and wherein the rack may be used to secure containers of varying sizes and/or shapes.

SUMMARY OF THE INVENTION

[0007] The above-described problems are addressed and a technical solution is achieved in the art by a rack configured to hold one or more containers, such as, for example, one or

more vials or test tubes. Advantageously, the rack may be loaded with the one or more containers that include lids, such that the container lids are maintained in a closed position. In addition, the rack includes 'universal' slots configured to accept containers of varying sizes and shapes. One having ordinary skill in the art will appreciate that a rack according to embodiments of the present invention may be used in connection with containers that do not include lids.

[0008] According to an embodiment of the invention, the rack includes a platform comprising one or more slots, wherein each slot is configured to accept one or more containers during the loading of the container(s). One or more locking members extend from the platform and are positioned relative the slots to form a locking groove. In operation, the container may be moved into position into the locking groove formed by the one or more locking members such that the container is securely held in place. In this 'locked position', the one or more locking members are in communication with at least a portion of the container lid to provide a downward force against the lid, to offset any counter-force acting to lift the lid (e.g., a pressure caused by exposure of the container to a liquid bath, particularly a liquid bath having an elevated temperature).

[0009] According to an embodiment of the present invention, the rack provides for a safe and efficient way to load and secure containers thereon. The rack both securely fastens the loaded containers in place within the rack and securely maintains the lid of the container in a closed position, thereby preventing contaminants from entering the container. Furthermore, the rack according to the present invention advantageously locks the one or more containers in a substantially upright position, thereby enabling a user to safely and easily handle and/or transport the one or more containers.

[0010] According to an embodiment of the present invention, the rack comprises slots or openings for the containers that are not sized and shaped for a frictional engagement with the container. Therefore the rack is adapted to accept and securely fit containers of varying sizes and shapes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will be more readily understood from the detailed description of exemplary embodiments presented below considered in conjunction with the attached drawings, of which:

[0012] FIG. 1A illustrates a rack including a plurality of containers loaded thereon, according to an embodiment of the present invention;

[0013] FIG. 1B illustrates an exploded view representation of a portion of a rack having a container in a locked position, according to an embodiment of the present invention;

[0014] FIG. 1C illustrates an exemplary locking groove, according to an embodiment of the present invention;

[0015] FIGS. 2A and 2B illustrate a rack including a plurality of containers loaded thereon, according to an embodiment of the present invention;

[0016] FIG. 3 illustrates an exemplary submersible rack being loaded into a tub, according to an embodiment of the present invention;

[0017] FIG. 4 illustrates an exemplary submersible rack as loaded into a tub, according to an embodiment of the present invention; and

[0018] FIG. 5 illustrates an exemplary rack loaded into a tub including a flange adapted to engage with the platform of

the rack to secure the rack within the tub, according to an embodiment of the present invention.

[0019] It is to be understood that the attached drawings are for purposes of illustrating the concepts of the invention and may not be to scale.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] The present invention relates to a rack configured to securely hold one or more containers loaded onto the rack. The entire rack is designed to be transported, such that the loaded containers are maintained in a safe and secure manner. Although the device of the present invention functions both as a carrier (i.e., a transportable unit) and a rack (i.e., a unit adapted to be maintained in a stationary position) the term "rack" will be used herein to represent both terms.

[0021] FIGS. 1A, 2A, 2B, 3, 4 and 5 each depict an exemplary rack 1 according to the present invention. According to an embodiment of the present invention, the rack 1 comprises a platform 10, one or more slots 15, and one or more locking members 20 associated with each slot 15. One having ordinary skill in the art will appreciate that the rack 1 may be configured to include any number slots and that each slot 15 may be configured to accept and hold more than one container 5. In addition, the rack 1 may be configured to hold and secure any number of containers 5.

[0022] According to an embodiment of the present invention, the slots 15 are configured to allow a portion of a container 5 to pass therethrough during the loading of the container 5 onto or into the rack 1. During loading, the container 5 is in an 'unlocked position,' such that the container 5 passes through the slot 15 and is loosely held within the slot 15 by contact between a top portion of the container 5 and the platform 10. The slot 15 is sized and shaped to permit the container 5 to be moved within the slot 15 from the unlocked position to a 'locked position,' as described in detail below. Advantageously, according to an embodiment of the present invention, at least a portion of the slot 15 is sized and shaped such that it does not securely fit the container 5 when the container 5 is in the unlocked position. In this regard, the container 5 is not frictionally engaged when initially loaded, thereby allowing containers 5 of various sizes and shapes to be loaded into the slot 15. The slot 15 may be any size and/or shape, including, but not limited to the exemplary oblong shape shown in FIGS. 1-5. According to an embodiment of the present invention, at least a portion of the slot 15 has a diameter which is less than the diameter of the container lid, such that the lid contacts the platform 10 when in the unlocked and locked positions.

[0023] According to an embodiment of the present invention, at least one locking member 20 is associated with each slot 15 to form a locking groove 25, as shown in FIG. 1B (illustrating a container in the locked position) and 1C (illustrating a locking groove with no container loaded therein). One having ordinary skill in the art will appreciate that although two locking members 20A, 20B are associated with each slot 15 in FIGS. 1B and 1C, any number of locking members 20 may be used to cooperate with the slot 15 to form the locking groove 25. For example, the embodiment shown in FIGS. 1B and 1C may be adapted to include a single locking member 20 configured to straddle the slot 15. The locking member 20 may be any suitable shape or size such that it cooperates with the platform 10 to form the locking groove 25 and is positioned to make contact with the container lid when the container 5 is in the locked position.

[0024] In operation, the container 5 is moved from the unlocked position to the locked position by securely engaging the container 5 within the locking groove 25. When the container 5 is securely engaged within the locking groove 25, the locking member 20 makes contact with the container 5 to hold the container 5 in a stable, substantially upright position against a portion of the platform 10, as shown in FIGS. 1A, 1B, and 2-5.

[0025] Advantageously, as shown in FIGS. 1, 2A, 3, 4, and 5, the locking member 20 provides a force against the lid of the container 5 when the container 5 is in the locked position. The force applied by the locking member 20 to the lid of the container 5 is particularly important when the rack 1 is at least partially submerged in a liquid bath (e.g., a cold or hot liquid bath). In such cases, the liquid bath may cause a change in pressure in the contents of the container 5 which may act on the interior of the container lid to force the lid upward and out of its closed position. According to an embodiment of the present invention, the locking member 20 and slot 15 cooperate to form the locking groove 25 adapted to securely lock the container 5 in place in the rack 1. In addition, the locking member 20 provides a force to the lid of the container 5 to maintain the lid in a closed position. In addition, as shown in FIG. 2B, the rack 1 may be configured to retain containers which do not include lids. In this embodiment, the locking member 20 is configured to contact a top portion of the container 5 securely lock the container 5 in place in the rack 1.

[0026] Optionally, as shown in FIGS. 1A, 2A, and 2B, the rack 1 may comprise one or more legs 30 to enable the rack 1 to stand. According to this embodiment, the one or more legs 30 have a greater length than the containers 5 or the rack 1 is adapted to hold, to ensure that the containers 5 do not make contact with the surface upon which the rack 1 is placed. According to another option, the rack 1 may comprise a handle 40 to permit a user to pick up the rack 1 to facilitate transporting of the rack 1.

[0027] Optionally, the rack 1 may be adapted for placement in a liquid bath (i.e., a hot or a cold liquid) or other vat, as shown in FIGS. 3 and 5. As illustrated in FIG. 5, the platform 10 may be configured to engage with a flange extending around at least a portion of the inner wall of a tub to hold the rack 1 in place in the tub.

[0028] The rack 1 may be composed of any suitable material, such as, for example, plastic, polypropylene, autoclavable polypropylene, flexible rubbers, foam, or a combination thereof.

[0029] One having ordinary skill in the art will appreciate that the container described herein may be composed of any suitable material, and may include, but is not limited to, any conventional container (i.e., a container with or without a lid), such as, for example, a flask, beaker, cup, or other like holder typically used in a laboratory environment. Furthermore, one having ordinary skill in the art will appreciate that a container suitable for use with a rack 1 according to embodiments of the present invention may comprise any shaped bottom portion, including, for example, a square, triangular, or rectangular bottom portion.

[0030] It is to be understood that the exemplary embodiments presented herein are merely illustrative of the invention and that many variations of the above-described embodiments may be devised by one skilled in the art without departing from the scope of the invention.

What is claimed is:

1. A container rack comprising:
a platform comprising one or more slots configured to accept one or more containers in an unlocked position;
and
one or more locking members extending from the platform, each locking member positioned relative to the one or more slots to form a locking groove,
wherein movement of an unlocked container into engagement with in the locking groove transitions the container into a locked position.
2. The container rack of claim 1, wherein the one or more slots are configured to accept containers of varying sizes and shapes which are capable of being placed in the locked position.
3. The container rack of claim 1, wherein the one or more locking members are configured to provide a downward force against a lid of a container in the locked position.
4. The container rack of claim 1, wherein a container in the locked position is maintained in a substantially upright position.
5. The container rack of claim 1, wherein each of the one or more slots has a width which is less than the diameter of a container lid, such that the lid contacts the platform when in the unlocked and locked positions.
6. The container rack of claim 1, further comprising one or more legs having a greater length than the one or more containers the rack is adapted to hold.
7. The container rack of claim 1, wherein in the unlocked position the loaded container does not frictionally engage the locking member.
8. The container rack of claim 1, further comprising a handle facilitating transport of the rack.
9. The container rack of claim 1, wherein the locking member is configured to contact a top portion of a container in the locked position.

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