

APPARATUS FOR TRANSPORTING LABORATORY ANIMALS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to provisional U.S. Application No. 63/584,749 filed September 22, 2023, the contents of which are hereby incorporated by reference in its entirety.

BACKGROUND

[0002] Unless otherwise indicated herein, the description in this section is not prior art to the claims in this application and is not admitted to be prior art by inclusion in this section.

[0003] Laboratory animals are frequently transported between various facilities for testing or experimental purposes. The animals should be transported in a sterile environment to protect the animal's health. Therefore, the apparatuses used to transport them must be durable enough to withstand periodic sterilization.

[0004] Furthermore, the various facilities between which laboratory animals are transported can be located in different nations. Thus, the apparatus used to transport the animals can be inspected when passing through customs of the different nations. The inspection generally includes the interior of the apparatus. However, it can be undesirable for the customs officials to come into contact with the animals. Therefore, a need exists for an apparatus that allows inspection of the interior without opening the apparatus or coming into direct contact with the animals.

[0005] Additionally, it can be desirable for the apparatus used to transport the animals to have a divider separating the interior of the apparatus and thereby being between two or more

animals in the apparatus. The divider in the apparatus should be easy to install while still preventing the animals from interacting with each other directly and/or getting stuck in the divider. It can also be desirable to: (i) prevent laboratory animals from escaping during transport, (ii) for the doors with which to allow for ingress/egress of laboratory animals to be simultaneously secure and easy to use, (iii) to have visibility into the interior of the shipping container, and (iv) to have a secure method of closing off the container without having to use a strapping system.

[0006] Thus, there is a need in this art for apparatus for transporting animals and particularly laboratory animals having these desirable features.

SUMMARY

[0007] This disclosure provides an apparatus for transporting laboratory animals. The apparatus includes a container defining a cavity, the container having a bottom and at least four side walls. The cavity is capable of being divided into a first cavity and a second cavity by placement of a divider into the cavity. Also provided is a cover capable of being removably coupled to the top rim of the container. The cover includes a first portal that extends through the cover positioned over the first cavity and a second portal that extends through the cover positioned over the second cavity. The cover also includes a first filtering mechanism disposed in the cover. The first filtering mechanism includes a first plurality of air passages which permit airflow into and out of the first cavity through a first filter aperture in the cover. A first filter device is coupled to the cover over the first plurality of air passages. A second filtering mechanism is also disposed in the cover. The second filtering mechanism includes a second plurality of air passages which permit airflow into and out of the second cavity through a second

filter aperture in the cover. A second filter device is coupled to the cover over the second plurality of air passages. The apparatus further includes a first lid removably coupled to the first portal, the first lid being rotatable relative to the first portal, and a second lid removably coupled to the second portal, the second lid being rotatable relative to the second portal.

[0008] This disclosure provides a further apparatus for transporting laboratory animals. The apparatus includes a container defining a cavity, the container having a bottom and at least four side walls. The cavity is capable of being divided into a first cavity and a second cavity by placement of a divider into the cavity. Also provided is a cover capable of being removably coupled to the top rim of the container. The cover includes a first portal that extends through the cover positioned over the first cavity and a second portal that extends through the cover positioned over the second cavity. The cover also includes a first filtering mechanism disposed in the cover. The first filtering mechanism includes a first filter receptacle to allow airflow into and out of the first cavity, a first a wire mesh panel inserted into the first filter receptacle, and a first filter cartridge coupled to the cover over the first filter receptacle. A second filtering mechanism is also disposed in the cover. The second filtering mechanism includes a second filter receptacle to allow airflow into and out of the second cavity, a second a wire mesh panel inserted into the second filter receptacle, and a second filter cartridge coupled to the cover over the second filter receptacle. The apparatus further includes a first lid removably coupled to the first portal, the first lid being rotatable relative to the first portal, and a second lid removably coupled to the second portal, the second lid being rotatable relative to the second portal.

[0009] These as well as other aspects, advantages, and alternatives will become apparent to those of ordinary skill in the art by reading the following detailed description, with reference,

where appropriate, to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1A is a depiction of an apparatus for transporting laboratory animals, according to example embodiments.

[0011] Figure 1B is an exploded view of the apparatus for transporting laboratory animals in Figure 1A, according to example embodiments.

[0012] Figure 2 is a depiction of a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0013] Figure 3A is a depiction of a lid for a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0014] Figure 3B is a depiction of an underside of the lid for a cover for an apparatus for transporting laboratory animals in Figure 3A, according to example embodiments.

[0015] Figure 3C is a depiction of a lid for a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0016] Figure 3D is a depiction of an underside of the lid for a cover for an apparatus for transporting laboratory animals in Figure 3C, according to example embodiments.

[0017] Figure 3E is a depiction of two lids locked together providing a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0018] Figure 4A is a photograph depicting lids and a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0019] Figure 4B is a photograph depicting an underside of the lids and the cover for an apparatus for transporting laboratory animals in Figure 4A, according to example embodiments.

[0020] Figure 5 is a depiction of a divider for an apparatus for transporting laboratory animals, according to example embodiments.

[0021] Figure 6 is a photograph depicting a container for an apparatus for transporting laboratory animals, according to example embodiments.

[0022] Figure 7 is a photograph depicting a divider within a container for an apparatus for transporting laboratory animals, according to example embodiments.

[0023] Figure 8 is a depiction of a wire mesh and a filter to be inserted within a container for an apparatus for transporting laboratory animals, according to example embodiments.

[0024] Figure 9A is a depiction of a stack of apparatuses for transporting laboratory animals, according to example embodiments.

[0025] Figure 9B is a photograph depicting a stack of apparatuses for transporting laboratory animals, according to example embodiments.

[0026] Figure 10A is a depiction of an apparatus for transporting laboratory animals, according to example embodiments.

[0027] Figure 10B is an exploded view of the apparatus for transporting laboratory animals in Figure 10A, according to example embodiments.

[0028] Figure 10C is a depiction of a cover for an apparatus for transporting laboratory animals, according to example embodiments.

[0029] Figure 10D is a further depiction of the apparatus for transporting laboratory animals in Figure 10A, according to example embodiments.

[0030] Figure 10E is a front view of the apparatus for transporting laboratory animals in Figure 10A, according to example embodiments.

[0031] Figure 10F is a rear view of the apparatus for transporting laboratory animals in Figure 10A, according to example embodiments.

[0032] Figure 10G is a side view of the apparatus for transporting laboratory animals in Figure 10A, according to example embodiments.

DETAILED DESCRIPTION

[0030] Example methods and systems of an apparatus for transporting at least one laboratory animal, such as a rodent, and methods of use thereof are disclosed herein. Any example embodiment or feature described herein is not necessarily to be construed as preferred or advantageous over other embodiments or features. Further, the example embodiments described herein are not meant to be limiting. It will be readily understood that certain aspects of the disclosed systems and methods can be arranged and combined in a wide variety of different configurations, all of which are contemplated herein. In addition, the particular arrangements shown in the figures should not be viewed as limiting. It should be understood that other embodiments might include more or less of each element shown in a given figure. Additionally, some of the illustrated elements can be combined or omitted. Yet further, an example embodiment can include elements that are not illustrated in the figures.

[0031] Figures 1A-7 depict various aspects of an apparatus for transporting laboratory animals. Figure 1A depicts an apparatus 100 that includes a container 102, a divider 104, and a cover 106. The apparatus 100 further includes a first lid 108 receivable in a portion of the cover 106 and a second lid 110 receivable in a different portion of the cover 106. Figure 1B shows an exploded view of the components of Figure 1A, and Figures 2-7 depict various components of the apparatus 100 depicted in Figures 1A-1B.

[0032] For example, Figure 2 depicts the cover 106 to the apparatus 100, according to example embodiments. The cover 106 is connectable with the container 102 that closes an open top of the container 102. In some embodiments, the cover 106 is connectable with the container 102 at a top rim surrounding a periphery of the open top of the container 106. Further, in some embodiments, the cover 106 is made of a material that is capable of being sterilized without damaging deformation to the cover 106. For instance, in some embodiments, the cover 106 is molded from a thermoplastic, such as polypropylene. In other embodiments, the entire cover 106 is constructed from clarified polypropylene to allow inspection of the contents. In some embodiments, the cover 106 is approximately two millimeters thick.

[0033] The cover 106 includes a first portal 112 extending through the cover 106 configured to be positioned over a first cavity of the container 102. In some embodiments, the first portal 112 is the threshold through which a first laboratory animal passes during insertion into and extraction from the container 102. The cover 106 also includes a second portal 114 extending through the cover 106 configured to be positioned over a second cavity of the container 102. In some embodiments, the second portal 114 is the threshold through which a second laboratory animal passes during insertion into and extraction from the container 102. In some embodiments, the first portal 112 further includes a first receiving mechanism 116 to receive a portion of the first lid 108 and the second portal 114 includes a second receiving mechanism 118 to receive a portion of the second lid 110. In some embodiments, such as shown in Figure 2, both the first portal 112 and the second portal 114 can be round in shape. Other shapes for the first portal 112 and the second portal 114 are also within the scope of this disclosure.

[0034] The cover 106 also includes a first filtering mechanism 120 in a first aperture in the cover 106 and a second filtering mechanism 122 in a second aperture in the cover 106. In some embodiments, the first filtering mechanism 120 includes a first plurality of air passages which permit airflow into and out of the container 102 through the first aperture in the cover 106 wherein a first filter device covers the first plurality of air passages and prevents contaminants from entering the container 102 and the second filtering mechanism 122 includes a second plurality of air passages which permit airflow into and out of the container 102 through the second aperture in the cover 106 wherein a second filter device covers the second plurality of air passages and prevents contaminants from entering the container 102.

[0035] In some embodiments, the first filtering mechanism 120 and the second filtering mechanism 122 can each comprise a wire mesh panel inserted into at least a portion of the cover 106. Further, in such embodiments, multiple filters and/or prefilters can be attached to the wire mesh panel, as described below. In some embodiments, the wire mesh panel can have between 4 and 8 openings per inch, such as 6 openings per inch, have a wire diameter between 0.015 inches and 0.050 inches, such as 0.028 inches, and be made from stainless steel, mild steel with a coating, or the like.

[0036] In some embodiments, the cover 106 also includes an extrusion 124 extending towards an interior of the container 102 when the cover 106 is coupled to the top rim of the container 102 wherein the cover 106 is in a closed position relative to the container 102. The extrusion 124 is designed to be removably coupled with the divider 104 when the divider 104 is installed into the container 102.

[0037] In some embodiments, the cover 106 also includes a plurality of cover fastening

mechanisms 126 wherein the plurality of cover fastening mechanisms 126 interact with a plurality of container fastening mechanisms of the container 102 to secure an interior of the apparatus 100. The plurality of cover fastening mechanisms 126 can include any style of fastening mechanism, including snaps, locks, tabs, or the like.

[0038] In some embodiments, the cover 106 also includes one or more stacking protrusions 128. The one or more stacking protrusions 128 aid in the stacking of one apparatus on top of another wherein a container of an apparatus above is received in the one or more stacking protrusions 128 of the apparatus 100. Similarly, the container 102 of the apparatus 100 is received in one or more stacking protrusions of an apparatus below when being stacked. As shown in Figure 2, the cover 106 of the apparatus 100 includes four stacking protrusions 128, located near each rounded corner of the cover 106. In some embodiments, each stacking protrusion 128 includes an arcuate outer wall that extends upwardly from an upper surface of the cover 106 that tapers inwardly as it extends upwardly from the cover 106. In such embodiments, each stacking protrusion 128 also includes an arcuate inner wall that extends upwardly from the cover 106 to a height approximately half the distance of the arcuate outer wall that tapers outwardly as it extends upwardly from the cover 106. Further, in such embodiments, a horizontal support wall extends outwardly from the arcuate inner wall toward the arcuate outer wall in a direction generally parallel to the cover 106 and a vertical support wall connects the horizontal support wall with the upper support wall of each stacking protrusion 128. In some embodiments, each stacking protrusion 128 is open from an underside of the cover 106. Thus, when viewed from below, the stacking protrusion 128 each form pockets on the underside of the cover 106. The pockets formed by the stacking protrusions 128 allow multiple cover pieces to

be nested together for storage or other transport purposes. When nested together, the stacking protrusions 128 from one cover 106 are received in the pockets formed by the stacking protrusions of another cover. The ability of the cover 106 to nest allows multiple cover pieces to be sterilized at once, preferably, while nested.

[0039] In some embodiments, the cover 106 also includes one or more mating protrusions 130. In some embodiments, each of the plurality of mating protrusions 130 extend outwardly from an outer portion of the cover 106. For instance, in some embodiments, each mating protrusion 130 includes first and second projection wherein the first projection of each mating protrusion 130 extends outwardly by a first distance and the second projection of the mating protrusion 130 includes a stepped profile having a first portion that extends outwardly by a second distance, which is greater than the first distance, and a second portion on an opposite side of the first portion from the first projection that extends outwardly by the first distance. In such embodiments, a space separates the second projection of the mating protrusion 130 from the first projection. As shown in Figure 2, each long side of the cover 106 can include more than 1 mating protrusion 130. In other embodiments, each short side of the cover 106 can also include one or more mating protrusions 130.

[0040] Figures 3A and 3B depict an upper side of the first lid 108 and an underside of the first lid 108, respectively. The first lid 108 is receivable in the first portal 112 wherein the first lid 108 is rotatable relative to the first portal 112 between a locked position and an unlocked position. The first lid 108 includes a handle 132 having a hole 134 adjacent to an outer end of the handle 132. The hole 134 is configured to receive a zip tie or other fastening mechanism when the first lid 108 is engaged with the first portal 112 to ensure the first lid 108 remains in a

locked, untampered position. The zip tie can be connected to another lid, a specific portion of a cover of a container for locking the first portal 112, or any other locking device. The first lid 108 also includes a first engaging mechanism 136 on its underside configured to interact with the first receiving mechanism 116 of the first portal 112 when the first lid 108 is in a closed position with respect to the first portal 112. The first engaging mechanism 136 and the first receiving mechanism 116 can include any known fastening and/or attaching components, such as screws, flanges, snaps, and the like. For instance, the first lid 108 can connect to the first portal 112 in a secure manner via locking tabs or snap engagement to eliminate the need for strapping of the apparatus 100, as well as provide an airtight seal against unfiltered air entering the interior of the apparatus.

[0041] Similarly, as shown in Figures 3C and 3D, the second lid 110 is receivable in the second portal 114 wherein the second lid 110 is rotatable relative to the second portal 114 between a locked position and an unlocked position. The second lid 110 includes a handle 138 having a hole 140 adjacent to an outer end of the handle 138. The hole 140 is configured to receive a zip tie or other fastening mechanism when the second lid 110 is engaged with the second portal 114 to ensure the second lid 110 remains in a locked, untampered position. The zip tie can be connected to another lid, a specific portion of a cover of a container for locking the second portal 114, or any other locking device. The second lid 110 also includes a second engaging mechanism 142 on its underside configured to interact with the second receiving mechanism 118 of the second portal 114 when the second lid 110 is in a closed position with respect to the second portal 114. The second engaging mechanism 142 and the second receiving mechanism 118 can also include any known fastening and/or attaching components, such as

screws, flanges, snaps, and the like. For instance, the second lid 110 can connect to the second portal 114 in a secure manner via locking tabs or snap engagement to eliminate the need for strapping of the apparatus 100, as well as provide an airtight seal against unfiltered air entering the interior of the apparatus.

[0042] In some embodiments, such as is shown in Figure 3E, the first lid 108 and the second lid 110 will engage with the first portal 112 and the second portal 114, respectively, in such a way that, when in a closed position, the handle 132 of the first lid 108 will be side by side with the handle 138 of the second lid 110. Accordingly, when each lid is in its closed positions, a single locking mechanism – such as the anti-tamper device 137 – can be inserted through both the hole 134 of the first lid 108 and the hole 140 of the second lid 110 to ensure secure closure of the apparatus 100. In some embodiments, the anti-tamper device 137 can be a zip tie, a twist tie, a padlock, or any other locking mechanism able to be inserted into the holes 134 and 140, respectively.

[0043] In some embodiments, both the first lid 108 and the second lid 110 can be made of a transparent or translucent material, such as clarified polypropylene or another mostly-translucent substance and produced in a polished mold to aid in visibility to the contents during transit of the apparatus 100. In some embodiments, the first lid 108 and the second lid 110 can be identical. In other embodiments, the first lid 108 and the second lid 110 can be exact inverse of each other wherein the first lid 108 screws into the first portal 112 in a first direction and the second lid 110 screws into the second portal 114 in a second direction that is the opposite of the first direction.

[0044] Figure 4A depicts the cover 106 having the first lid 108 in an open position

relative to the first portal 112 and the second lid 110 in a closed position relative to the second portal 114. Figure 4B depicts an underside of the cover 106 after the first lid 108 and the second lid 110 are each in a closed position relative to the first portal 112 and the second portal 114, respectively. The cover 106 can also include viewing windows, as shown in Figures 4A-4B, or the viewing windows can be replaced with filters as set forth herein, and as are shown in Figures 1A-2.

[0045] Figure 5 depicts the divider 104 receivable by the container 102 such that the divider 104 separates the container 102 into a first cavity and a second cavity. The divider 104 includes an upper channel 152 along an upper edge, a lower channel 154, a first side channel 156 along a first side, and a second side channel 158 along a second side of the divider 104. In some embodiments, the upper channel 152, the lower channel 154, the first side channel 156, and the second side channel 158 each are semi-circular indentations in the divider 104. Accordingly, the lower channel 154 is configured to receive a lower extrusion of the container 102, the first side channel 156 is configured to receive a first side extrusion of the container 102, and the second side channel 158 is configured to receive a second side extrusion of the container 102. Other shapes and sizes of these channels are possible. In addition, the divider 104 can comprise a variety of materials having assorted material properties that can be the same as or different from the container 102 and/or the cover 106. For instance, the divider 104 can be transparent and/or translucent in some embodiments and opaque in other embodiments.

[0046] Figure 6 depicts the container 102 having an open top. In some embodiments, the container 102 includes a rectangular bottom, a first and second short side wall extending upwardly from the rectangular bottom, and a first and second long side wall extending upwardly

from the rectangular bottom. In some embodiments, the container 102 can further include a top rim 170 running around a perimeter of a top of the container 102 configured to interact with the cover 106 to enclose the apparatus 100. In some embodiments, the container 102 can also include a plurality of container fastening mechanisms (not shown) configured to interact with the plurality of cover fastening mechanisms 126 of the cover 106 to secure the cover 106 to the container 102.

[0047] Further, in some embodiments, the container 102 is made of a material that is capable of being sterilized without damaging deformation to the container 102. For instance, in some embodiments, the container 102 is molded as one piece from a thermoplastic, such as polypropylene having high flow characteristics and having high heat stability characteristics. Further, in some embodiments, the wall thickness of each wall of the container 102 is approximately two millimeters, but other thicknesses are also within the scope of this disclosure.

[0048] In some embodiments, the rectangular bottom of the container 102 is a generally rectangular, planar surface with rounded corners. The rectangular bottom of the container 102 can also have equal sides, and therefore be square in shape, in some embodiments. In such embodiments, a divider inserted in the container can be arrayed within the container to bisect the container's volume along the diagonal dimension of the square container. Further, in some embodiments, a length of the rectangular bottom between the first short side wall and the second short side wall is approximately twice as long as a width of the rectangular bottom between the first long side wall and the second long side wall.

[0049] In some embodiments, the first short side wall of the container 102 extends upwardly from the rectangular bottom and is trapezoidal in shape, having parallel lower and

upper edges and angled side edges. In such embodiments, the upper edge of the first short side wall is longer than the lower edge of the first short side wall. Further, in such embodiments, the lower edge of the first short side wall has a length that is approximately equal to the width of the rectangular bottom of the container 102. In some embodiments, a rounded edge connects the lower edge of the first short side wall with an associated short edge of the rectangular bottom. Further, in some embodiments, the first short side wall extends at an angle of greater than ninety degrees relative to the rectangular bottom wherein an upper edge of the first short side wall extends outwardly beyond the associated short edge of the rectangular bottom.

[0050] Similarly, in some embodiments, the second short side wall of the container 102 extends upwardly from the rectangular bottom and is trapezoidal in shape, having parallel lower and upper edges and angled side edges. In such embodiments, the upper edge of the second short side wall is longer than the lower edge of the second short side wall. Further, in such embodiments, the lower edge of the second short side wall has a length that is approximately equal to the width of the rectangular bottom of the container 102. In some embodiments, a rounded edge connects the lower edge of the second short side wall with an associated short edge of the rectangular bottom. Further, in some embodiments, the second short side wall extends at an angle of greater than ninety degrees relative to the rectangular bottom wherein an upper edge of the second short side wall extends outwardly beyond the associated short edge of the rectangular bottom.

[0051] In some embodiments, the first long side wall of the container 102 also extends upwardly from the rectangular bottom, is trapezoidal in shape, and includes parallel lower and upper edges and angled first and second side edges. In such embodiments, the upper edge of the

first long side wall is longer than the lower edge of the first long side wall. In such embodiments, the lower edge of the first long side wall has a length that is approximately equal to the length of the rectangular bottom. In some embodiments, a rounded edge connects the lower edge of the first long side wall with an associated one of the long edges of the rectangular bottom. Further, in some embodiments, the first long side wall extends at an angle of greater than ninety degrees relative to the rectangular bottom wherein an upper edge of the first long side wall extends outwardly beyond the associated long edge of the rectangular bottom.

[0052] Similarly, in some embodiments, the second long side wall of the container 102 also extends upwardly from the rectangular bottom, is trapezoidal in shape, and includes parallel lower and upper edges and angled first and second side edges. In such embodiments, the upper edge of the second long side wall is longer than the lower edge of the second long side wall. In such embodiments, the lower edge of the second long side wall has a length that is approximately equal to the length of the rectangular bottom. In some embodiments, a rounded edge connects the lower edge of the second long side wall with an associated one of the long edges of the rectangular bottom. Further, in some embodiments, the second long side wall extends at an angle of greater than ninety degrees relative to the rectangular bottom wherein an upper edge of the second long side wall extends outwardly beyond the associated long edge of the rectangular bottom.

[0053] In such embodiments, because the short side walls and the long side walls extend upwardly from the rectangular bottom at an angle of greater than ninety degrees, the open top of the container 102 is larger than the rectangular bottom of the container. Thus, multiple containers can be nested together by inserting the rectangular bottom of a first container through

the open top of a second container.

[0054] In some embodiments, the container 102 is designed to have two isolated cavities when in an assembled position, a first cavity 160 and a second cavity 162, divided by the divider 104. The container 102 also includes a lower extrusion 164 extending towards an interior of the container 102, a first side extrusion 166 on the first long side of the container 102 extending towards an interior of the container 102, and a second side extrusion 168 on the second long side of the container 102 extending towards an interior of the container 102. The extrusions 164, 166, and 168 are each designed to removably couple with the divider 104 when it is installed into the container 102. In these embodiments, the first cavity 160 is defined within the container 102 as the space between the rectangular bottom and the open top, between the first short side wall and the divider 104, and between the first and second long side walls. Similarly, the second cavity 162 is defined within the container 102 as the space between the rectangular bottom and the open top, between the second short side wall and the divider 104, and between the first and second long side walls.

[0055] In some embodiments, the container 102 is injection molded with one or more features inserted into each of the first and the second long sides at time of manufacture. For instance, as shown in Figure 6, the first long side of the container 102 can include a first feature 172 in a portion of the first long side wall comprising an edge of a first cavity and a second feature 176 in a portion of the first long side wall comprising an edge of a second cavity. Similarly, the second long side of the container 102 can include a first feature 174 in a portion of the second long side wall comprising an edge of a first cavity and a second feature 178 in a portion of the second long side wall comprising an edge of a second cavity. The features 172,

174, 176, and 178 can be viewing windows into the container 102, as shown in Figure 6, or they can be wire mesh panels inserted into the container 102, as described below.

[0056] In some embodiments, the wire mesh panels inserted into the container 102 can be the same as the wire mesh panels inserted into the cover 106. In other embodiments, the wire mesh panels of the container 102 can differ from the wire mesh panels inserted into the cover 106, such as in size, shape, material, or density of openings. The wire mesh will be included to permit airflow while simultaneously preventing unwanted egress of the laboratory animals through the long sides of the container 102. In such embodiments, the wire mesh can be covered by a layer of engineered polypropylene filter material. The layer of engineered polypropylene filter material can be positioned on the exterior of the wire mesh and attached, *inter alia* by ultrasonic welding to the outside of the container 102. Further, in such embodiments, a layer of coarse filter can be secured on the exterior of the polypropylene filter to prefilter larger particles. Further, in some embodiments, each of the first and second long side walls can include these filtering mechanisms, as described below.

[0057] Figure 7 depicts the divider 104 inserted into container 102, effectively creating the first cavity 160 and the second cavity 162 in the interior of the container 102. The divider 104 extends between the first long wall of the container 102 and the second long wall of the container 102 wherein the lower channel 154 along the lower edge is received by the lower extrusion 164 in a bottom of the container 102, the first side channel 156 along the first side is received by the first side extrusion 166 of the container 102, and the second side channel 158 along the second side is received by the second side extrusion 168 of the container 102. Accordingly, the extrusions 164, 166, and 168 can each be shaped to be fit into the channels 154,

156, and 158, respectively. When inserted into the container 102, the divider 104 creates the first cavity 160 wherein a first laboratory animal can be inserted into the first cavity 160 and the second cavity 162 wherein a second laboratory animal can be inserted into the second cavity 162.

[0058] Figure 8 depicts an example filtering mechanism 200 that can be used anywhere on apparatus 100 that requires filtration, such as in the container 102 or the cover 106. For instance, in some embodiments, the filtering mechanism 200 can cover a wire mesh panel installed in the apparatus 100 that permits airflow while simultaneously preventing unwanted egress of the laboratory animals from the apparatus 100. In such embodiments, the wire mesh can be covered by a layer of engineered polypropylene filter 202. The layer of engineered polypropylene filter 202 can be positioned on the exterior of the wire mesh and attached, *inter alia* by ultrasonic welding to the outside of the container 102. Further, the polypropylene filter 202 can include a plurality of air passages 204 which permit airflow into and out of the apparatus 100. In such embodiments, a layer of coarse filter 206 can be secured on the exterior of the polypropylene filter 202 to prefilter larger particles. Further, the coarse filter 206 can cover a portion of the plurality of air passages 204 to prevent contaminants from entering the apparatus 100. Further, in some embodiments, the layer of engineered polypropylene filter 202 and/or the layer of coarse filter 206 can be removable from the wire mesh wherein the wire mesh can remain exposed or can be covered by another filtration system.

[0059] Figures 9A and 9B depict a series of apparatuses cooperating with similar apparatuses for the transport of large numbers of laboratory animals using multiple apparatuses. Each apparatus can include any components of apparatus 100 described above.

[0060] In some embodiments, as shown in Figure 9A apparatuses 310, 330, and 350 are

stacked vertically with regard to each other, apparatuses 320, 340, and 360 are stacked vertically with regard to each other, and apparatuses 310 and 320, 330 and 340, and 350 and 360 are stacked side-by-side to each other, respectively.

[0061] To enable stacking of multiple apparatuses, the stacking protrusions 314 of the apparatus 310, which can include any component of the stacking protrusion 128 of apparatus 100, are arranged to be capable of receiving a rectangular bottom of the container 330 stacked above. Thus, as shown in Figure 9A, the stacking protrusions 314 of the apparatus 310 can be used to support the second apparatus 330 wherein the rectangular bottom of the apparatus 330 rests on a horizontal support wall of the stacking protrusions 314 of the first apparatus 310. As a result, the rectangular bottom of the apparatus 330 is spaced from a cover of the apparatus 310, which allows air to flow through the cover of the apparatus 310. Additionally, the vertical support walls of the stacking protrusions 314 of the apparatus 310 prevent movement of the apparatus 330 in a horizontal direction, i.e., parallel to the rectangular bottom of the apparatus 330.

[0062] To enable side-by-side or end-by-end connection of adjacent apparatuses, the mating protrusions 312 on the cover of the apparatus 310 can be interlocked with corresponding mating protrusions 322 of an adjacent apparatus 320. For example, as shown in Figure 9A, the mating protrusions 312 of the apparatus 310 interlock with the mating protrusions 122 of the adjacent apparatus 320. In some embodiments, when interlocked, the first portion of the second projection of each mating protrusion 312 is received in the space between the first and second projections of a corresponding mating protrusion 322. Accordingly, it should be noted that when positioned side-by-side and end-by-end, the side walls of the containers of the adjacent

apparatuses are separated from one another for enabling airflow into and out of each apparatus through the side walls of the container of the apparatus.

[0063] Similarly, as shown in Figure 9B, a first row of apparatuses include apparatus 350 and apparatus 360 in a side-by-side configuration. A second row of apparatuses also includes apparatus 355 and apparatus 365 in a side-by-side configuration wherein apparatus 350 is end-to-end with apparatus 355 and apparatus 360 is end-to-end with apparatus 365. Further, apparatus 375 is vertically stacked on top of apparatus 355 and apparatus 385 is vertically stacked on top of apparatus 365 wherein apparatus 375 and apparatus 385 are in a side-by-side configuration.

[0064] To enable stacking of multiple apparatuses, the stacking protrusions of each apparatus are used as described above. To enable side-by-side or end-by-end connection of adjacent apparatuses, the mating protrusions are used as described above.

[0065] Figures 10A-10G depict various aspects of another example apparatus for transporting laboratory animals. Figures 10A-10B depict an apparatus 400 that includes a container 402, a divider 404, and a cover 406. The apparatus 400 further includes a first lid 408 receivable in a portion of the cover 406 and a second lid 410 receivable in a different portion of the cover 406. The apparatus 400 can further include any component described in apparatus 100 above.

[0066] In some embodiments, the apparatus 400 also includes a push-in tamper evidence seal 416 that is secured to the first lid 408 and the second lid 410. Further, in some embodiments, the apparatus 400 also includes a plurality of tear-band seals 418 around the edge of the cover 406, as shown in the corners of the cover 406 in Figure 10B. Figure 10B shows an exploded view of the components of Figure 10A, and Figures 10C-10G depict various

components of the apparatus 400 depicted in Figures 10A-10B.

[0067] For example, Figure 10C depicts the cover 406 to the apparatus 400, according to example embodiments. The cover 406 is connectable with the container 402 that closes an open top of the container 402. In some embodiments, the cover 406 is connectable with the container 402 at a top rim surrounding a periphery of the open top of the container 406. Further, in some embodiments, the cover 406 is made of a material that is capable of being sterilized without damaging deformation to the cover 406. For instance, in some embodiments, the cover 406 is molded from a thermoplastic, such as polypropylene. In other embodiments, the entire cover 406 is constructed from clarified polypropylene to allow inspection of the contents. In some embodiments, the cover 406 is approximately two millimeters thick.

[0068] The cover 406 includes a first portal 412 extending through the cover 406 configured to be positioned over a first cavity of the container 402. In some embodiments, the first portal 412 is the threshold through which a first laboratory animal passes during insertion into and extraction from the container 402. The cover 406 also includes a second portal 414 extending through the cover 406 configured to be positioned over a second cavity of the container 402. In some embodiments, the second portal 414 is the threshold through which a second laboratory animal passes during insertion into and extraction from the container 402. In some embodiments, such as shown in Figure 10C, both the first portal 412 and the second portal 414 can be round in shape. Other shapes for the first portal 412 and the second portal 414 are also possible.

[0069] As shown in Figure 10C, in some embodiments, the cover 406 also includes one or more stacking protrusions 428. The one or more stacking protrusions 428 aid in the stacking

of one apparatus on top of another wherein a container of an apparatus above is received in the one or more stacking protrusions 128 of the apparatus 400. Similarly, the container 402 of the apparatus 400 is received in one or more stacking protrusions of an apparatus below when being stacked. In such embodiments, the cover 406 of the apparatus 400 can include four stacking protrusions 428, each located near a rounded corner of the cover 406. In some embodiments, each stacking protrusion 428 includes an arcuate outer wall that extends upwardly from an upper surface of the cover 406 that tapers inwardly as it extends upwardly from the cover 406. In such embodiments, each stacking protrusion 428 also includes an arcuate inner wall that extends upwardly from the cover 406 to a height approximately half the distance of the arcuate outer wall that tapers outwardly as it extends upwardly from the cover 406. Further, in such embodiments, a horizontal support wall extends outwardly from the arcuate inner wall toward the arcuate outer wall in a direction generally parallel to the cover 406 and a vertical support wall connects the horizontal support wall with the upper support wall of each stacking protrusion 428. In some embodiments, each stacking protrusion 428 is open from an underside of the cover 406. Thus, when viewed from below, the stacking protrusion 428 each form pockets on the underside of the cover 406. The pockets formed by the stacking protrusions 428 allow multiple cover pieces to be nested together for storage or other transport purposes. When nested together, the stacking protrusions 428 from one cover 406 are received in the pockets formed by the stacking protrusions of another cover piece. The ability of the cover 406 to nest allows multiple cover pieces to be sterilized at once, preferably, while nested. The stacking protrusions 428 can be used as illustrated in Figures 9A and 9B.

[0070] In some embodiments, the cover 406 also includes one or more mating

protrusions 430. In some embodiments, each of the plurality of mating protrusions 430 extend outwardly from an outer portion of the cover 406. For instance, in some embodiments, each mating protrusion 430 includes first and second projection wherein the first projection of each mating protrusion 430 extends outwardly by a first distance and the second projection of the mating protrusion 430 includes a stepped profile having a first portion that extends outwardly by a second distance, which is greater than the first distance, and a second portion on an opposite side of the first portion from the first projection that extends outwardly by the first distance. In such embodiments, a space separates the second projection of the mating protrusion 430 from the first projection. As shown in Figure 10C, each long side of the cover 406 can include more than 1 mating protrusion 430. In other embodiments, each short side of the cover 406 can also include one or more mating protrusions 430. The mating protrusions 430 can be used as illustrated in Figures 9A and 9B and as described in reference to them.

[0071] In some embodiments, such as is shown in Figure 10D, each of the first lid 408 and the second lid 410 further includes a respective first tamper evident push-in seal hole 432 and second tamper evident push-in seal hole 434. The first tamper evident push-in seal hole 432 and the second tamper evident push-in seal hole 434 can be configured to be aligned when both the first lid 408 and the second lid 410 are in a fully locked position. In these embodiments, the tamper evidence seal 416 can be inserted into both the first tamper evident push-in seal hole 432 and the second tamper evident push-in seal hole 434. In such embodiments, the tamper evidence seal 416 consists of two one-way fastener barbs that are inserted into the first tamper evident push-in seal hole 432 and the second tamper evident push-in seal hole 434, respectively, and has an easily breakable bar connecting the two one-way fastener barbs. When either the first lid 408,

the second lid 410, or both are turned, the easily-breakable bar of the tamper evidence seal 416 is broken, indicating that the apparatus 400 has been tampered with.

[0072] Further, in some embodiments, the plurality of tear-band tamper evident seals 418 in the cover 406 also indicate whether the apparatus 400 has been tampered with. The plurality of tear-band tamper evident seals 418 are molded to the cover 406 wherein each of the plurality of tear-band tamper evident seals is a thinned track or profile in the cover 406 that guides the tear and a hand grip feature at a corner the user would pull to remove. When the plurality of tear-band tamper evident seals 418 are untouched, and the cover 406 is placed on the container 402, engaging hooks on each of the plurality of tear-band tamper evident seals 418 grip the container 402 so the cover 406 cannot be removed from the container 402 until the plurality of tear-band tamper evident seals 418 are torn off. In such embodiments, the cover 406 itself can also include lesser engaging hooks on it so that it can be snapped back on the container 402 for secondary use.

[0073] In some embodiments, each of the first lid 408 and the second lid 410 further include a serrated edge 436 configured to provide an easily grippable surface by a user. Further, in some embodiments, leverage bars 438 are provided on a top of each of the first lid 408 and the second lid 410. The leverage bars can be used in order to aid in the twisting on and off of each of the first lid 408 and the second lid 410. This can be accomplished because the leverage bars 438 can be suitable to hold and/or retain tools, forceps, pens, and the like, each of which can be used as leverage for the user to more easily twist each of the first lid 408 and the second lid 410.

[0074] Further, in some embodiments, each of the first lid 408 and the second lid 410 include an indicator arrow 440. The indicator arrow can point in a direction toward a symbol

that might indicate whether of each of the first lid 408 and the second lid 410 are locked, unlocked, or neutral. In such embodiments, imprinted on the cover 406 itself can be a neutral position symbol 442, an unlock position symbol 444 and a lock position symbol 446. In such embodiments, each of the first lid 408 and the second lid 410 should be turned wherein the arrow 440 on each of the first lid 408 and the second lid 410 points to the neutral position symbol 442 when the cover 406 is not in use for travel and storage. In some embodiments, when each of the first lid 408 and the second lid 410 are in the neutral position, a small biasing feature can be included on the underside of each of the first lid 408 and the second lid 410 that prevents undesired rotation of each of the first lid 408 and the second lid 410 from the neutral position to the unlocked position.

[0075] Further, in such embodiments, in order to release each of the first lid 408 and the second lid 410 from the respective first portal 412 and second portal 414, each of the first lid 408 and the second lid 410 should be turned such that the arrow 440 on each of the first lid 408 and the second lid 410 points to the unlock position symbol 444. In order to secure each of the first lid 408 and the second lid 410 in the respective first portal 412 and second portal 414, each of the first lid 408 and the second lid 410 should be turned such that the arrow 440 on each of the first lid 408 and the second lid 410 points to the lock position symbol 444.

[0076] In some embodiments, the cover 406 also includes an extrusion 450 extending below the cover, as illustrated in Figure 10C. When the cover 406 is coupled to the top rim of the container 402 the extrusion 450 extends into an interior of the container 402. The extrusion 450 is designed to be removably coupled with the divider 404 when the divider 404 is installed into the container 402. In some embodiments, one or more reinforcement ribs 452 extend across the

extrusion 450 atop the cover 406 to help reduce warpage and/ or deformation of the cover 406.

[0077] As illustrated in Figure 10C, the cover 406 includes a first filter receptacle 424 and a second filter receptacle 426. The first filter receptacle 424 and the second filter receptacle 426 each are a designated region in the cover 406. In some embodiments, each of the first filter receptacle 424 and the second filter receptacle 426 comprises an opening in the cover 406 with a bordering projection configured to receive a first filtering mechanism 420 and a second filtering mechanism, respectively. In some embodiments, the first filtering mechanism 420 includes a first plurality of air passages which permit airflow into and out of the container 402 through the first filter receptacle 424. In such embodiments, the first filtering mechanism 420 covers the first filter receptacle 424 in the cover 406 and prevents contaminants from entering the container 402. Similarly, the second filtering mechanism 422 includes a second plurality of air passages which permit airflow into and out of the container 402 through the second filter receptacle 426. The second filtering mechanism 420 covers the second filter receptacle 426 in the cover 406 and prevents contaminants from entering the container 402.

[0078] In some embodiments, the first filtering mechanism 420 and the second filtering mechanism 422 each comprise a wire mesh panel 460 and a filter cartridge 462, such as is shown in Figure 10D. The wire mesh panel 460 can be configured to be inserted into a respective one of the first filter receptacle 424 and the second filter receptacle 426. Further, in some embodiments, the wire mesh panel 460 can have between 4 and 8 openings per inch, such as 6 openings per inch, have a wire diameter between 0.015 inches and 0.050 inches, such as 0.028 inches, and be made from stainless steel, mild steel with a coating, or the like. Further, in some embodiments the wire mesh panel 460 is of a double crimp construction.

[0079] In some embodiments, after the wire mesh panel 460 is placed in the designated portion in the cover 406, the filter cartridge 462 is placed above the wire mesh panel 460 and attached to the bordering projection of a respective one of the first filter receptacle 424 or the second filter receptacle 424. The filter cartridge 462 can include a plastic filter frame and filter material welded to the plastic filter frame. In such embodiments, the plastic filter frame of the filter cartridge 462 includes a plurality of through holes. When the filter cartridge 462 is covering the wire mesh panel 460, heat stakes 464 can be inserted into the through holes of the filter cartridge 462. In these embodiments, a heat stake tool is able to be brought down on the heat stakes 464 and secure the filter cartridge 462 to the cover 406 via the bordering projection of a respective one of the first filter receptacle 424 and the second filter receptacle 424.

[0080] In such embodiments, the wire mesh panel 460 is loosely held between the filter cartridge 462 and the cover 406 in a respective one of the first filter receptacle 424 or the second filter receptacle 424. Because it is loosely held, the wire mesh panel 460 is spaced from the filter material of the filter cartridge 462. Further, in such embodiments, removal of the filter cartridge 462 and the wire mesh panel 460 from the remainder of the apparatus 400 is also possible via removal of the heat stakes 464.

[0081] Filtering mechanisms 472 and 474, shown in Figure 10E, and filtering mechanisms 476 and 478, shown in Figure 10F, can also include the components described above. Filtering mechanisms 472 and 474 and filtering mechanisms 476 and 478 are on opposite sides of the apparatus 400. Figure 10G depicts the apparatus 400 from a side profile.

[0082] The particular arrangements shown in the figures should not be viewed as limiting. It should be understood that other embodiments can include more or less of each

element shown in a given figure. Further, some of the illustrated elements can be combined or omitted. Yet further, an example embodiment can include elements that are not illustrated in the figures.

[0083] While various aspects and embodiments have been disclosed herein, other aspects and embodiments will be apparent to those skilled in the art. The various aspects and embodiments disclosed herein are for purposes of illustration and are not intended to be limiting, with the true scope being indicated by the following claims.

CLAIMS

What is claimed is:

1. An apparatus for transporting laboratory animals, the apparatus comprising:
 - a container defining a cavity, the container comprising a bottom and at least four side walls, wherein the cavity is capable of being divided into a first cavity and a second cavity by placement of a divider into the cavity, and wherein the container comprises an open top comprising a top rim surrounding a periphery of the open top;
 - a cover removably coupled to the top rim of the container, the cover comprising:
 - a first portal, wherein the first portal extends through the cover and configured to be positioned over the first cavity,
 - a second portal, wherein the second portal extends through the cover and configured to be positioned over the second cavity,
 - a first filtering mechanism disposed in the cover, wherein the first filtering mechanism comprises a first plurality of air passages configured to allow airflow into and out of the first cavity, and a first filter device coupled to the cover over the first plurality of air passages, and
 - a second filtering mechanism disposed in the cover, wherein the second filtering mechanism comprises a second plurality of air passages configured to allow airflow into and out of the second cavity, and a second filter device coupled to the cover over the second plurality of air passages;
 - a first lid removably coupled to the first portal, wherein the first lid is rotatable relative to the first portal; and

a second lid removably coupled to the second portal, wherein the second lid is rotatable relative to the second portal.

2. The apparatus of claim 1, wherein the divider is removably coupled to the container, and wherein the divider separates the first cavity and the second cavity when inserted into the cavity.

3. The apparatus of claim 1, wherein a wire mesh panel is inserted into at least a portion of the container.

4. The apparatus of claim 3, wherein the wire mesh panel is removably covered by a layer of engineered filter, wherein the engineered filter comprises a plurality of air passages.

5. The apparatus of claim 4, wherein at least a portion of the plurality of air passages of the layer of engineered polypropylene filter are covered by a course filter.

6. The apparatus of claim 1, wherein at least four side walls includes a first long side wall extending upwardly from the bottom, a second long side wall extending upwardly from the bottom, a first short side wall extending upwardly from the bottom, and a second short side wall extending upwardly from the bottom.

7. The apparatus of claim 6, wherein the bottom further comprises a lower extrusion extending toward the container's interior, wherein the first long side wall further comprises a first

side extrusion extending toward the container's interior, wherein the second long side wall further comprises a second side extrusion extending toward the container's interior, and wherein the lower extrusion, the first side extrusion, and the second side extrusion are configured to removably couple with the divider.

8. The apparatus of claim 1, wherein the divider comprises an upper channel along an upper edge of the divider, a lower channel along a lower edge of the divider, a first side channel along a first side of the divider, and a second side channel along a second side of the divider.

9. The apparatus of claim 8, wherein the upper channel, the lower channel, the first side channel, and the second side channel each comprise semi-circular indentations in the divider.

10. The apparatus of claim 9, wherein the lower channel is configured to receive a lower extrusion of the container, wherein the first side channel is configured to receive a first side extrusion, and wherein the second side channel is configured to receive a second side extrusion.

11. The apparatus of claim 1, wherein the cover comprises a material that is capable of being sterilized.

12. The apparatus of claim 1, wherein a wire mesh panel is inserted into at least a portion of the cover, and wherein the wire mesh panel is covered by a layer of engineered filter having a plurality of air passages.

13. The apparatus of claim 12, wherein at least a portion of the plurality of air passages of the layer of engineered polypropylene filter is removably covered by a coarse filter.

14. The apparatus of claim 1, wherein the cover comprises an extrusion extending toward an interior of the container when the cover is coupled to the top rim of the container, and wherein the extrusion is configured to removably couple with the divider.

15. The apparatus of claim 1, wherein the cover further comprises a plurality of cover fastening mechanisms, and wherein the plurality of cover fastening mechanisms are configured to interact with a plurality of container fastening mechanisms.

16. The apparatus of claim 1, wherein the cover further comprises a plurality of stacking protrusions configured to support a second apparatus in a stacked relationship above the apparatus.

17. The apparatus of claim 1, wherein the cover further comprises a plurality of mating protrusions extending outwardly from the cover, wherein the plurality of mating protrusions are configured to interlock with second mating protrusions on a second cover of a second apparatus.

18. The apparatus of claim 1, wherein the first lid is rotatable relative to the first portal between a locked position and an unlocked position, and wherein the second lid is rotatable relative to the second portal between a locked position and an unlocked position.

19. The apparatus of claim 18, wherein the first lid further comprises an first underside and a first engaging mechanism coupled to the first underside, wherein the first engaging mechanism is configured to interact with a first receiving mechanism coupled to the first portal when the first lid is in the locked position, and wherein the second lid further comprises a second underside and a second engaging mechanism coupled to the second underside, wherein the second engaging mechanism is configured to interact with a second receiving mechanism coupled to the second portal when the second lid is in the locked position.

20. The apparatus of claim 18, wherein the first or second lids comprise a transparent material.

21. The apparatus of claim 1, wherein the first or second lids further comprise a handle comprising a hole adjacent to an outer end of the handle.

22. The apparatus of claim 21, wherein a fastening mechanism is configured to be received by the hole in the handle of the first lid and the hole in the handle of the second lid.

23. An apparatus for transporting laboratory animals, the apparatus comprising:

a container defining a cavity, the container comprising a bottom and at least four side walls, wherein the cavity is capable of being divided into a first cavity and a second cavity by placement of a divider into the cavity, and wherein the container comprises an open top comprising a top rim surrounding a periphery of the open top;

a cover removably coupled to the top rim of the container, the cover comprising:

a first portal, wherein the first portal extends through the cover and configured to be positioned over the first cavity;

a second portal, wherein the second portal extends through the cover and configured to be positioned over the second cavity;

a first filter receptacle to allow airflow into and out of the first cavity;

a first filtering mechanism disposed in the first filter receptacle, wherein the first filtering mechanism comprises, a first a wire mesh panel inserted into the first filter receptacle, and a first filter cartridge coupled to the cover over the first filter receptacle;

a second filter receptacle to allow airflow into and out of the second cavity

a second filtering mechanism disposed in the cover, wherein the second filtering mechanism comprises, a second a wire mesh panel inserted into the second filter receptacle, and a second filter cartridge coupled to the cover over the second filter receptacle;

a first lid removably coupled to the first portal, wherein the first lid is rotatable relative to the first portal; and

a second lid removably coupled to the second portal, wherein the second lid is rotatable relative to the second portal.

24. The apparatus of claim 23, wherein the divider is removably coupled to the container, and wherein the divider separates the first cavity and the second cavity when inserted into the cavity.

25. The apparatus of claim 23, wherein at least four side walls includes a first long side wall extending upwardly from the bottom, a second long side wall extending upwardly from the bottom, a first short side wall extending upwardly from the bottom, and a second short side wall extending upwardly from the bottom.

26. The apparatus of claim 25, wherein the bottom further comprises a lower extrusion extending toward the container's interior, wherein the first long side wall further comprises a first side extrusion extending toward the container's interior, wherein the second long side wall further comprises a second side extrusion extending toward the container's interior, and wherein the lower extrusion, the first side extrusion, and the second side extrusion are configured to removably couple with the divider.

27. The apparatus of claim 23, wherein the divider comprises an upper channel along an upper edge of the divider, a lower channel along a lower edge of the divider, a first side channel along a first side of the divider, and a second side channel along a second side of the divider.

28. The apparatus of claim 27, wherein the upper channel, the lower channel, the first side channel, and the second side channel each comprise semi-circular indentations in the divider.

29. The apparatus of claim 28, wherein the lower channel is configured to receive a lower extrusion of the container, wherein the first side channel is configured to receive a first side extrusion, and wherein the second side channel is configured to receive a second side extrusion.

30. The apparatus of claim 23, wherein the cover comprises an extrusion extending toward an interior of the container when the cover is coupled to the top rim of the container, and wherein the extrusion is configured to removably couple with the divider.

31. The apparatus of claim 23, wherein the cover further comprises a plurality of stacking protrusions configured to support a second apparatus in a stacked relationship above the apparatus.

32. The apparatus of claim 23, wherein the cover further comprises a plurality of mating protrusions extending outwardly from the cover, wherein the plurality of mating protrusions are configured to interlock with second mating protrusions on a second cover of a second apparatus.

33. The apparatus of claim 23, wherein the first lid is rotatable relative to the first portal between a locked position and an unlocked position, and wherein the second lid is rotatable relative to the second portal between a locked position and an unlocked position.

34. The apparatus of claim 23, wherein the first lid further comprises a serrated edge, and wherein the second lid further comprises a serrated edge.

35. The apparatus of claim 23, wherein the first lid further comprises a leverage bar, and wherein the second lid further comprises a leverage bar.

36. The apparatus of claim 23, further comprising a tamper evidence seal.

37. The apparatus of claim 36, wherein the tamper evidence seal is configured to be inserted into a first tamper evident push-in seal hole in the first lid and a second tamper evident push-in seal hole in the second lid to further secure the first lid and the second lid to the apparatus.

38. The apparatus of claim 23, further comprising a plurality of tear-band seals.

39. The apparatus of claim 38, wherein each of the plurality of tear-band seals are molded to the cover, and wherein the plurality of tear-band seals further secure the cover to the container.

40. The apparatus of claim 23, wherein the first filter receptacle comprises a first aperture in the cover and a first bordering protrusion around the first aperture, and wherein the second filter receptacle comprises a second aperture in the cover and a second bordering protrusion around the second aperture.

41. The apparatus of claim 40, wherein the first filter cartridge is coupled to the cover over the first filter receptacle via the first bordering protrusion of the first filter cartridge, and wherein the

second filter cartridge is coupled to the cover over the second filter receptacle via the second bordering protrusion of the second filter cartridge.

42. The apparatus of claim 41, wherein the first filter cartridge comprises a first filter material coupled to a first filter frame having a first plurality of through holes, and wherein the second filter cartridge comprises a second filter material coupled to a second filter frame having a second plurality of through holes.

43. The apparatus of claim 42, wherein heat stakes are placed in the first plurality of through holes and the second plurality of through holes, and wherein the heat stakes secure the first filter cartridge to the first filter receptacle and the second filter cartridge to the second filter receptacle.