A housing and tray assembly for holding coffee pods. The housing has a rectangular shape formed by a wire frame. A tray is removably inserted into an opening in the front of the housing. The tray has pairs of dividers defining rows running from the front to the back of the tray. The dividers in each pair are spaced apart a distance so the lips on coffee pods in adjacent rows do not abut. The dividers defining each row are spaced apart so the coffee pods are suspended on the lips of the coffee pods or spaced apart to squeeze and hold the coffee pod body to suspend the coffee pod in the row.
SLIDABLE WIRE TRAY & CONTAINER

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND

[0002] This invention relates to an improved tray for holding coffee pods.

[0003] Coffee pods suitable for use in Keurig coffee making machines are currently of two general types as shown in FIGS. 8-10, with these and other pods shown in U.S. Pat. Nos. D452,433, D474,110, D502,362, D647,399, D647,398 and D637,484. The coffee pods comprise a thin plastic cup having a continuous sidewall and an outwardly extending flange at the opening of the cup. The cup 1 can have various shapes but the shapes are typically tapered, being smaller at the bottom and larger at the top. Sometimes the walls of the cups 1 are stepped to form strengthening ribs 4 encircling the cup, especially near the flange 3. Sometimes longitudinal stiffening ribs 5 are used. Many coffee pods are symmetric about a longitudinal axis L. Some coffee pods have an outwardly extending projection 6 formed by the side of the container and shaped to form a pouring spout, with the flange 3 extending around the entire periphery of the top, including the spout. These coffee pods are symmetric about a plane through the middle of the spout and the longitudinal axis L. A foil sheet 7 is fastened to the flange 3, with a tab of foil or the foil itself usually extending outward from the flange a distance sufficient so that a user may grab the tab. In use, coffee is placed in the cups 1 and sealed by the foil to form a coffee pod. The contents are printed on the foil 7 covering the top of the cups 1. The pods are placed in holders having various shapes, including trays having rows separated by dividers, with the pods placed in the rows according to the printed indicia on the foil lids 7, which indicia usually identifies the type of coffee. A user selects a preferred type of coffee based on the printed indicia on the lid 7, removes the pod, pulls the tab to remove the foil and uses the coffee in the pod with a coffee brewing machine to make coffee.

[0004] Rectangular trays with open tops are made to hold several rows of coffee pods. The trays may be slid in and out of a protective housing through an opening in the front of the housing into and out of which the tray is slid. The top of the tray is covered with a solid structure to support a coffee making machine in which the coffee pods are used. The trays have dividers which separate rows of coffee pods that sit on the bottom of the tray so the contents of the coffee pod are on the top, readily viewable by a user. As the coffee pods are removed for use the movement of the tray in and out of the housing cause the coffee pods to tip over and lay against the bottom of the tray, making top of the coffee pod difficult or impossible to read. There is thus a need for a way to better position coffee pods in such trays. Further, as the trays are removed and inserted into the housing the coffee pods sometimes tend to slip to the rear of the tray where they are harder to reach and sometimes not seen by the user. There is thus a further need to restrain movement of the individual coffee pods within the tray during storage and use.

BRIEF SUMMARY

[0005] A housing and tray assembly for holding coffee pods is provided. The coffee pods have a body with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereeto. The coffee pods have a sealing flange extending a distance d beyond the pod body diameter D. The housing and tray assembly include a rectangular, wire frame housing wider than it is high and having two opposing sides, a top and bottom, a back and a front. A housing corner post is at each corner of the housing. The top includes a sheet of material fastened to the housing corner posts. Each side of the housing may include a side connecting rod fastened to two of the housing corner posts on the side where the side connecting rod is located. The front and back of the housing may include a front and back connecting rod each fastened to two of the housing corner posts on the respective front or back where the front or back connecting rod is located. The housing front defines an opening.

[0006] The assembly includes a rectangular, open, wire frame tray sized to fit into the opening in the front of the housing. The tray may have an upper and lower rectangular frame held in relative position by tray corner posts to form two opposing tray sides, an open tray top and an opposing located tray bottom, a tray back and a tray front. Each tray side may include a side connecting rod fastened to two of the corner posts on the side where the side connecting rod is located. The tray may include a plurality of paired first and second dividers extending from a front to the back of the tray to define rows. The dividers in each pair of dividers are spaced apart a distance. A second and first divider from two different pairs of adjacent dividers define at least one row. The second and first dividers may be spaced a distance apart of at least Db so that at least the bottom of the body of the coffee pod may be placed in a row between the adjacent dividers. In further variations, the assembly may have the distance between the second and first dividers be about D or slightly larger so the coffee pods may be by the dividers on the rims of the coffee pods during use. Preferably, the distance between the second and first dividers is between D and Db. Advantageously, the dividers in each pair of dividers are spaced apart a distance sufficient to avoid the flanges of coffee pods in the adjacent rows defined by the pairs of dividers from hitting each other during use. Alternatively, the dividers in each pair of dividers may spaced apart a distance sufficient to avoid the flanges of coffee pods in the adjacent rows defined by the pairs of dividers from hitting each other during use. Moreover, the dividers in each pair of dividers may be spaced apart a distance of about 2 d, measured edge to edge on the dividers. Advantageously, each pair of dividers is closer together at the back of the tray and further apart at the front of the tray.

[0008] In further variations, the side connecting rods may be above the front and rear connecting rods and located vertically above the lower frame when the tray is inserted into the housing so as to limit tilting of the tray about a horizontal axis. Moreover, a back stop may be connected to at least one of the rear housing corner posts and located to abut the tray and limit motion of the tray relative to the housing. Preferably the back stop comprises a connecting rod extending between two of the rear housing corner posts and located to abut the tray and limit motion of the tray relative to the housing. Also, a motion limit stop may be fastened to the tray to limit removal of the tray from the front of the housing.
In the above and other embodiments, the tray may have a bottom surface located below the dividers a distance so the coffee cups do not abut the bottom surface when suspended vertically from the dividers during use. Advantageously, the top comprises a transparent sheet of material removably fastened to the top of the four housing corner posts. The divider rods may have an inverted U-shape with the ends of the legs of the U located at the front of the tray being fastened to a lower member that is fastened to the front of the lower frame.

The housing and tray assembly may include a second tray as described above and as further described herein, placed in a housing with a second opening to receive the second tray. There are preferably a plurality of paired first and second dividers extending from a front to the back of the tray, with the dividers in each pair of dividers being spaced apart a distance. A second and first divider from two different pairs of adjacent dividers define at least one row between them. The second and first dividers may be spaced a distance apart of at least Db so that at least the bottom of the body of the coffee pod may be placed between the adjacent dividers. Preferably, the dividers may have an upper support portion in the same plane as the upper frame of the tray and be spaced apart from the adjacent divider a distance of about D to form a row within which to suspend a coffee pod during use.

There is also provided a further embodiment of a housing and tray assembly for holding rows of coffee pods which assembly includes a rectangular, wire frame having four housing corner posts joined by four connecting rods to include form a front, back and two side connecting rods. A transparent top is fastened to the top of each housing corner post to define a housing with a front, back, two sides and a back. Advantageously, the side connecting rods may be above the front connecting rod. The assembly further includes a tray slidably insertable into and removable from the front of the housing. The tray may include four tray corner posts joining the corners of a rectangular upper frame and a rectangular lower frame. The tray may also include a plurality of dividers defining rows running from the front to the back of the tray. The dividers form adjacent rows with two dividers defining one row. The dividers may have tops located a distance apart sufficient to engage a lip of the coffee pod between the dividers to suspend the coffee pod on the dividers and in the row during use. This further embodiment may include the variations described above and hereinafter.

A still further embodiment of the housing and tray assembly for holding rows of coffee pods includes a housing having a front and opposing back, two opposing sides, a top and a bottom, the top formed by a surface fastened to the housing to cover the housing. A tray is removably inserted into an opening in the front of the housing. The tray may have a plurality of dividers defining rows running from the front to the back of the tray between each of two of said plurality of dividers. The two dividers forming each row may have an upper support in substantially the same plane and located a distance apart sufficient to engage a lip of the coffee pod between the dividers to suspend the coffee pod in the row between the dividers during use.

Variations of this still further embodiment include an assembly with the dividers formed in pairs, with each divider supporting coffee pods in only one row during use so the pairs of dividers support coffee pods in two different and adjacent rows during use. The pairs of dividers may be spaced apart a distance sufficient so that the flanges of the coffee pods in the two rows supported by the pair of dividers do not abut each other. Further, the tray may have an upper frame in substantially the same plane as a top of the dividers with sides of the upper frame cooperating with an adjacent divider to define a row and with the sides of the upper frame spaced a distance apart a distance between about Db and D. The assembly may optionally have a bottom surface located below the dividers a distance so the coffee cups do not abut the bottom surface when suspended vertically from the dividers during use, but the bottom is preferably open.

There is also provided a method of supporting coffee pods in a tray where the tray has a plurality of dividers forming rows running from the front to the back of the tray. The method includes placing a coffee pod in one row between two adjacent dividers and applying force as needed so the coffee pod body or sealing flange contacts each adjacent divider to suspend the coffee pod.

In further variations, the method may use dividers in the tray defining each row and spaced apart a distance between slightly less than D and larger than Db with the method including placing the coffee pod in a row and between adjacent dividers so the adjacent dividers support the coffee pod by contacting the coffee pod body during use. The method may also use dividers in the trays are spaced apart a distance of about D and the method includes placing the coffee pod in a row and between adjacent dividers so the adjacent dividers support the coffee pod by contacting the coffee pod lip.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will be better understood by referring to the following description and drawings, in which like numbers refer to like parts throughout, and in which:

FIG. 1 is a front perspective view of a single tray, coffee pod holder with an empty tray extended;

FIG. 2 is a front perspective view of the coffee pod holder of FIG. 1 with the tray inside the housing;

FIG. 3 is a front plan view of the coffee pod holder of FIG. 2;

FIG. 4 is a left side view of the coffee pod holder of FIG. 2, with the opposing side being a minor image thereof;

FIG. 5 is a back plan view of the coffee pod holder of FIG. 2;

FIG. 6 is a top plan view of the coffee pod holder of FIG. 2;

FIG. 7 is a bottom plan view of the coffee pod holder of FIG. 2;

FIG. 8 is a perspective view of a K-cup coffee pod;

FIG. 9 is a perspective view of Vue® (a registered trademark of Keurig Corp.) cup coffee pod;

FIG. 10 is a perspective view of a further embodiment of a coffee pod;

FIG. 11 is a front perspective view of the coffee pod holder of FIG. 1 with an opaque top;

FIG. 12 is a front plan view of the coffee pod holder of FIG. 11;

FIG. 13 is a partial sectional view showing a coffee pod suspended on the bottom of its encircling rib by two dividers each on an opposing side of a row; and

FIG. 14 is a partial sectional view showing a coffee pod resiliently gripped by two dividers each on an opposing side of a row.
Referring to FIGS. 1-7 and 11-12, a coffee pod holder 10 has a frame housing 12 with a drawer or tray 14 slidably insertable into and out of the holder 10 so that a user can access coffee pods from the tray 14. A housing top 16 is fastened to the housing 12 so that a coffee maker (not shown) can be placed on and supported by the top 16. The housing top 16 is preferably made of a transparent material such as glass or plastic so a user can view at least some of the contents of the tray through the top. But the top 16 may be opaque or translucent, as reflected in FIGS. 11-12.

As used herein, the directions up or down, top, bottom, front, back, left and right are each with respect to the coffee pod holder as viewed in FIG. 1. Thus, FIG. 1 shows a perspective view of the coffee pod holder 10 from the upper, right side of the coffee pod holder, looking downward onto that holder and the extended tray.

The housing 12 is preferably an open, wire frame housing and may have a rectangular shape. As used herein, rectangular includes square. The depicted housing 12 has four corner supports or housing posts 18 with the top preferably fastened to these housing posts 18. The housing posts 18 are generally vertical during use and may have a threaded fastener 20 removably fastened to the top end of the post and passing through aligned holes in the top 16 with a mating, larger diameter connector 22 engaging the fastener 20 to fasten the top 18 to the post 18. Similarly, the connector 22 could have the threaded fastener 20 extending therefrom to be received in a threaded recess in the post 18. Advantageously, each of the posts 18 has a top 19 having a hole therein to threadingly receive fastener 20. A top 19 made of plastic, silicon or other polymer provides a softer surface to abut the top 16 that is preferably glass. A top 19 inserted into a tubular post 18 is preferred, with the top 19 having a stepped shoulder to overlap the edge of the tube forming the post 18. A plastic washer is preferably located between the connector 22 and the top 16 to cushion the connection between the connector and the top 16. A transparent silicon washer is preferred. Other materials could be used for the top 19 and washer. Other ways of fastening the top 18 to the housing 12 may be used. The housing posts 18 may optionally have feet or pads 23 on the lower end, with the feet made of a material that does not mar surfaces and that preferably resists sliding, such as rubber, a polymer or a plastic material. The depicted housing posts 18 have generally rectangular cross-sectional shapes with are of tubular metal, such as aluminum, but any cross-sectional shape or material may be used, including plastic tubes.

As shown in FIG. 7, two opposing sides of the housing posts 18 may be slightly curved, preferably outward, but a variety of cross-sectional shapes may be used.

The housing posts are held in relative position by one or more rods 24 extending between adjacent housing posts 18 hold the housing posts in position. The depicted rods 24 extend between two adjacent housing posts. Advantageously, the rods 24 on the sides of the housing 12 are at a different vertical height than the rods between the two housing posts 18 on the front, or on the back of the housing. Advantageously, the rods 24 extending between the front and back housing posts 18 and are fastened to the flat sides of the housing posts 18. The rods 24 may be spot welded, glued, held in brackets, or received in holes in the housing posts 18, which holes may optionally be threaded to receive threaded rod ends. The rods 24 are located adjacent to the bottom of the housing posts 18 and connect adjacent to the bottom of the housing posts. The top 16 connects to the top of the housing posts 18. The top 16 and bottom rods 24 provide a stable housing sufficient to resist distortion of that housing during normal use, handling and shipping.

The housing 12 optionally has guide rods 26 extending from the front to the back of the housing. The guide rods 26 preferably extend between and are connected to the front rod 24 connecting the front housing posts 18, and the rear rod connecting the rear housing posts 18. The guide rods 26 are parallel to each other and to sides of the housing formed by the housing posts 18. The guide rods 26 advantageously rest on top of and are spot welded to the front and rear connecting rods 24, although various connection mechanisms may be used, including other connection mechanisms disclosed herein. The guide rods 24, 26 are preferably cylindrical in cross-section, although other cross sectional shapes may be used. As described later, the guide rods 26 provide guides for the tray 14 as it slides in and out of the housing.

The housing 12 advantageously has a stop 25 with the stop configured to hit the back of the tray 14 and thus to limit motion of the tray past the plane in which the rear housing posts 18 lie. The stop 25 could comprises one or both of the back posts 18 located to abut the back of the tray 14, but the stop 25 is preferably a connecting rod 24 extending between the two rear housing posts 18 and located near them idle of the housing posts as measured from the bottom of the top 16 and the bottom of the feet or pads 23. The exact location or construction of the stop 25 is not critical. Preferably, the stop 25 also helps hold the rear housing posts 18 in relative position and thus helps strengthen the housing 12— as does the stop 25 in the configuration of an elongated member extending between two rear corner posts 18.

Still referring to FIGS. 1-5, but especially to FIGS. 1-2, the tray 14 may have an open wire frame. Advantageously upper and lower rectangular frames, 30, 32, respectively are joined at four corners by tray housing posts 34. Preferably, but optionally, the front tray posts 34 are the short legs of a U shaped frame with a bottom member 36 joining the bottom of those front tray posts 34 to form a U shaped member with short legs and a long space between them. The rear tray posts 34 are similarly formed. The U shaped member is preferably bent from a single elongated member. The bottom member 36 may be fastened to the corresponding one of the front or back side of the lower frame 32, but more preferably the front posts 34 are fastened to the upper and lower frames 30, 32 adjacent the front of those frames, with rear posts 34 fastened to the frames 30, 32 at the rear end of those frames. The posts 34 could also be fastened to the corners of the upper and lower frames 30, 32. The upper end of the tray posts 34 is thus preferably fastened to the upper frame 30, advantageously at the inside of the corner joining one of the sides to the front or back, and preferably at the inside front and rear ends of the sides of the upper frame 30. Spot welding is preferred fastening mechanism, but other fastening methods can be used including the fastening methods disclosed herein.

The front of the tray may have a handle 38 configured for a user to grab and slide the tray 14 in and out of the housing 12. The upper frame 30 is shown as being curved downward at the front, middle of the frame, to form a curved handle 38. Other handle configurations and locations may be used, but the handle is preferably formed by deforming one or both of the upper or lower frames 30, 32 to form the handle.
member and 36b the rear or back bottom member. The dividers 40 have a generally inverted U shape with short legs 30 on opposing ends of an elongated top member 42. The distal ends of the short legs 42 are connected to the front and rear bottom members 36a, 36b, respectively so that the dividers 40 extend along a length of the tray 14, from the front to the back of the tray. The dividers 40 are preferably made by bending a single elongated member to form the divider, but the legs 42 could be separate parts fastened to the top 44 of the divider. The dividers 40 and members 36 may be assembled separately and then fastened to the tray 14. If separately assembled, the dividers 40 and members 36 must be sized to fit within the upper and lower frames 30, 32 and provide the corner post 34. In the depicted embodiment, as best seen in FIG. 6, there is a slight gap of about 1/6 inch or less between the lower member 36a and the adjacent lower frame 32, and also a slight gap at the back, while the posts 34 are close enough to abut the upper and lower frames 30, 32 for tack welding connections.

[0040] The dividers 40 are preferably provided in spaced apart pairs 40a, 40b that are spaced closely together a distance sufficient to prevent the rims on coffee pods from hitting each other. The tray 14 and its dividers 40 may have various shapes and configurations, with the illustrated configuration being optional. The divider legs 42 are long enough so the top 44 of the dividers are at the same height and in substantially the same plane as the upper frame 30. Alternatively, a single divider 40 may be fastened to the lower or upper frame 30, 32 to extend along the side of the tray with the top 44 of that single divider in substantially the same plane as the tops 44 other dividers 40. The dividers 40 of adjacent pairs are of dividers are spaced apart a distance selected to suspend a coffee pod without resting the bottom of the coffee pod on a supporting surface, so that dividers 40a, 40b suspend opposing sides of a single coffee pod. Since the coffee pods are suspended by their rims there is no need for a bottom in the tray 14 and the manufacturing cost of the unit may be reduced. A bottom may nonetheless be optionally provided, as desired.

[0041] The suspension may be provided by engaging the rim/flange 3 or the encircling rib 4 of the coffee pod so the coffee pod rests on and is suspended by the upper surfaces of the dividers 40a, 40b, or by a divider 40 and the adjacent side of the upper frame 30. Further, when the coffee pods are suspended by their rims on dividers 40, opening and closing the tray may impart sufficient momentum to slide the coffee pods along the length of the dividers. Thus, pulling the tray forward to open it quickly may cause the coffee pods to slide to the rear of the tray, while stopping the forward motion of tray suddenly may cause the coffee pods to slide to the front of the tray. The spacing between the dividers 40a, 40b may be varied to control the amount of friction with which the body of the divider adjacent the flange is gripped and thus vary the ability of the coffee pod to slide along the length of the dividers 40. The spacing between the dividers may be adjusted to lightly grip the coffee pods and keep them from sliding as the tray is opened and closed. Ideally, the dividers 40 are spaced apart from the other dividers and upper frame 30 a distance so that the dividers slightly squeeze the sides of the coffee pod an amount sufficient to prevent sliding along the length of the dividers in the row formed by the dividers.

[0042] Alternatively, the dividers 40 may be spaced so that they abut the bottom of the encircling rib 4 at the top of the coffee pod so that the coffee pod hangs downward with gravity against the dividers 40 on opposing sides of the row in which the coffee pod hangs. When the tray 14 is slid into and out of the housing 12 the coffee pods may swing on the contact of the encircling rib with the tops 44 of the dividers 40. If a bottom surface is provided in the tray 14, the bottom preference is far enough from the top of the dividers 40 that when the coffee pods swing the bottom of the coffee pod does not hit the tray bottom.

[0043] Moreover, the top 44 of the dividers 40 may be located so that while the coffee pods are suspended on and hang from the dividers 40, the bottom of the coffee pods is close to the bottom of the tray such that any rocking of the coffee pod rim on the dividers causes the bottom corners of the coffee pod to hit the bottom of the tray and thus limit rotation or rocking of the coffee pod about the dividers 42.

[0044] Referring to FIGS. 13 and 14, preferably, the dividers 40 are spaced so that they abut the bottom of the encircling rib 4 at the top of the coffee pod so that the coffee pod hangs downward with gravity against the dividers 40 on opposing sides of the row in which the coffee pod hangs—as shown in FIG. 13. By pushing down the tops 44 of the dividers 40 move apart and about both the bottom of the flange 3 of the coffee pod and the side of the encircling rib 4, to gently squeeze and hold the coffee pod as shown in FIG. 14. The encircling rib 4 of the coffee pod is inclined slightly toward the centerline of the coffee pod so the coffee pod does not pop out easily and is instead resiliently urged toward this contact position with both the flange 3 and rib 4. This is shown in FIG. 14, where the dividers abut the flange 3 and side of the encircling rib 4. When the coffee pod flange 3 is abutting the top 44 of the dividers 40 the bottom of the coffee pod should not hit any optional bottom of the tray 14, and should also clear the frame of the holder 10 so the tray 14 can be move into and out of the housing.

[0045] The suspension of the coffee pods may also be provided by spacing the dividers 40a, 40b apart a distance selected to squeeze the flexible sides of the coffee pod an amount sufficient to hold the coffee pod in place while not squeezing the sides enough to rupture the pod’s foil seal and not squeezing enough to make the pods pop out. In this suspension the coffee pods are not held by the rim abutting the dividers but by friction and deformation of the coffee pod housing by the dividers. For this way of holding the coffee pods, the user inserts the narrower bottom of the coffee pod between adjacent dividers 40a, 40b and pushes slightly downward so the dividers hold the coffee pod in place. The dividers 40 are an inverted U shape and may be several inches long, with the legs 42 adding to that length. The length of the dividers forms a leaf spring that may resiliently squeeze the sides of a coffee pod, with the divider flexing sideways as the force squeezing the coffee pod increases. The height, length and cross-sectional dimensions of the dividers 40 may be selected to provide a desired stiffness, with the spacing between the adjacent dividers 40a, 40b being selected relative to a specific coffee pod to achieve a desired contact location with the coffee pod and a desired amount of squeeze.

[0046] The distance between adjacent dividers 40a, 40b or dividers 40a and upper frame 30 is referred to herein as the gripping distance. The location from the bottom of the coffee pod along an axis parallel to the longitudinal axis L of a coffee pod at which the gripping distance contacts the opposing sides of the coffee pod in referred to herein as the initial contact location. As the coffee pod is pushed further into the dividers 40a, 40b the sides of the coffee pod begin to deform and the dividers 40 start to move further apart an amount that normally varies with the distance from the divider legs 42.
Preferably, the coffee pod may be pushed toward downward between dividers 40a, 40b until the flange of the coffee pod abuts the top 44 of the divider—without irreparably damaging the coffee pod. Preferably, the entire tray may be filled with coffee pods so positioned without damaging any of the pods. But the coffee pod need not be pushed all the way down; it need only be pushed down enough to hold the coffee pod in place in the tray 14. Further, some coffee pods have a circumferential rib below the flange, and it is believed desirable to space the dividers 40 so they abut the bottom of this circumferential rib when the coffee pod is pressed between the dividers.

As the tray opens and closes the gripped coffee pods may tilt about the dividers 40 gripping the coffee pod. Advantageously, the initial contact location is located at about the center of gravity of the coffee pod or above the center and toward the rim, so that the coffee pod does not tilt about a line between the opposing dividers 40. If the coffee pod tilts then the upwardly inclined edge of the coffee pod may hit the housing or top 24 as the tray is inserted into the housing. Thus, adequate clearance for tilted coffee pods is desirable if the dividers are spaced to squeeze the coffee pods and hold them in place.

Some coffee pods have longitudinally extending ribs on the outer surface, adjacent the rim. It is believed useful to not have the dividers 40 press against these longitudinal ribs since it increases the deformation of the coffee pod sides. Further, it is believed that squeezing the coffee pod between two such adjacent ribs may use the ribs to stabilize the coffee pod between the dividers.

Returning to FIGS. 1-7 and especially FIGS. 1, 2 and 3, the guiding members 46 are fastened to and extend between the front and back of the tray 14. The depicted members 46 are rods with opposing ends fastened to the bottom members 36 at the front and rear of the tray. The guide members 46 are located so they are close to the guide rods 26, and either inside of the guide rods as shown, or optionally outside of the guide rods (not shown). The guide rods 26 keep the rods 46 from rotating in the plane of the guide rods which is generally horizontal. Thus, the rods 26, 46 help the tray 14 slide in and out of the housing 12 along the path defined by guide rods 26.

The guide members 46 have, adjacent the back of the tray 14, a downwardly extending bend forming a forward limit stop 48. The limit stop 48 extends below the front connecting rod 24 a distance sufficient to abut the connecting rod and thus limit the distance which a tray 14 may be withdrawn from the housing 12. The limit stop 48 is conceptually a protrusion on the tray that hits the housing to limit relative motion between the tray and housing. The depicted limit stop 46 comprises a downward extending bend in the guide rod 46. The bend forming the limit stop 48 is located so that the tray 14 can be tilted to insert the back into the housing and slide the limit stop over the front connecting rod 24, and then orientate the tray horizontally to complete the insertion. When the tray is removed horizontally the limit stop 48 hits the front connecting rod 24 to limit relative motion of the tray 14 and housing 12.

Further, as best seen in FIG. 3, the lower frame 32 advantageously is wide enough that it fits between the front posts 18, and low enough that it fits beneath the side connecting rods 24 that connect the front and rear posts 18 on opposing sides of the housing 12. Thus, the side connecting rods 24 help limit downward rotation of the tray 12 as it is pulled out of the housing.

The adjacent dividers 40a, 40b define the rows within the coffee pods are placed, and which, along with the end dividers and the adjacent side of the upper frame 30, suspend the coffee pods from the rims of the pods or by squeezing the body of the coffee pods. It is believed advantageous to have the spacing between the dividers be slightly smaller at the back of the tray 14 than at the front of the tray in order to slightly urge the coffee pods toward the front of the tray. This slight widening of the space between dividers 40 can be achieved for all rows of the tray 14 only if the upper frame 30 is also slightly wider at the front than at the back of the tray, since the sides of the upper frame 30 cooperate with the adjacent dividers 40 to suspend the coffee pods in the row adjacent those two sides. Thus, the back of the upper frame 30 is slightly smaller than the front of the upper frame 30, and preferably both the upper and lower frames 30, 32 both have a back that is slightly smaller than the front, with the difference in the length of the front and back corresponding to the slight widening of the rows formed by adjacent dividers 40. The spacing between dividers 40 on opposing sides of each row is preferably small enough so that the rim of a coffee pod is always supported even when the side of a coffee pod is against one of the supporting dividers 40 or the sides of the upper frame 30.

In use, coffee pods are placed in the rows defined by the dividers 40, including the rows on each side between the sides of the upper frame 30 and the adjacent dividers. The coffee pods are suspended by the dividers and the sides of the upper frame either by the rims or by squeezing the body of the coffee pods. As needed, the coffee pods are pushed down so the tops of the coffee pods clear the opening in the housing into which the tray is inserted. After coffee pods are placed in the tray, the tray is inserted into the housing by pushing against the front of the upper or lower frames 30, 32, or by pushing on the handle 38. To remove the tray 14 from the housing 12, the handle 38 is grabbed by a user's fingers. The tray 14 slides in and out of the housing on the front connecting rod 24, with the side connecting rods 24 cooperating with the lower frame 32 to guide the tray as it slides in and out. The stop 48 hits the front connecting rod 24 to limit motion of the tray out of the housing (FIG. 1), with the tray being removable by tipping the tray up or down so the stop 48 can be moved past the front connecting rod 24. The opening in the front of the housing 12 is large enough to allow the initial tray 14 insertion and removal, as the housing and tray are designed to allow insertion, slideable operation and removal of the tray.

The various rods and members 24, 26, 30, 32, 34, 36, 40, 42, 44, 46, 48 are advantageously formed out of metal rod, preferably circular or rectangular in cross section. But other materials and shapes could be used. The parts are fastened together by any convenient manner as long as the fastening provides sufficient connection for the intended use as a coffee pod or support for the suspended containers. Common ways of fastening the parts include welding, adhesives, mechanical fasteners and interference fits.

The tray 14 is advantageously made in two parts which are fastened together. The opposing ends of the dividers 40 are fastened to the U shaped assembly formed by the corner posts 34 and bottom member 36 located at the front and back of the tray. The upper frame member 30 is fastened to the end of the posts 34. The rods 47 containing the limit
The order of fastening the various parts can vary according to manufacturing needs. The assembly comprising the dividers, lower members, and rods is then placed in and fastened to the lower frame. The lower frame is the second part of the assembly.

While the above disclosed embodiment has an open frame, various walls could be provided and fastened to the framework forming the housing and or tray(s). Thus, for example, a bottom wall may optionally be provided that is fastened to the lower frame or fastened to the lower portion of the tray posts or, or both. Tray walls could be provided on the sides of the tray and attached to the side frames formed by front and rear posts and the sides of the upper and lower frames, respectively, or fastened to the tray posts, or both. Front and rear walls could be provided and fastened to the front and rear portions of the upper and lower frames, respectively, or fastened to the tray posts, or both.

Likewise, the housing may have side walls fastened to one or more of the, as may a front and back posts, side connecting rods or the top. The front and back may have a wall fastened to the front and back posts, front or rear connecting rods, or the top, although any wall on the front of the housing must have an opening suitably sized for the tray to be inserted into and removed therefrom. A bottom may be fastened to one or more of the posts, connecting rods or guide rods. Any walls could be continuous, or have one or more openings as formed, for example, by a wire or plastic mesh. This includes the top, although the top is advantageously made of glass or plastic, with a hard plastic such as acrylic plastic.

The upper and lower tray frames may advantageously be spaced apart a distance greater than the height of a coffee pod. The seen in the figures, housing has an open front or an opening in the front that is sufficiently large to receive the tray, and thus the distance between the upper and lower tray frames is preferably less than the distance between the top and the front housing connecting rod.

While the above description has the dividers fastened to the lower frame through the bottom member, the dividers could be fastened to the upper frame member, in which case the divider legs could be omitted or shortened depending on the construction.

The pairs of dividers are preferably spaced apart a distance large enough so that the lips or flanges on the circular portion of the coffee pod holders do not abut—not including any flange on a spur or similarly non-circular portion of the cup. The flange on the K-cup coffee pods extend about 2-3 mm from the cup body, and the flange on the Vue® (a trademark of Keurig Corp.) coffee pods extend about 5-6 mm from the cup body. Thus, for suspended coffee pods the dividers are spaced apart about twice the length of the cup lip, measured center to center on the divider, or slightly more. Paired dividers of 3 mm circular cross-section wire spaced about 95 mm apart are believed suitable.

The spacing between adjacent dividers on opposing sides of a row, which dividers define rows for the coffee pods, is selected to support a specific type of coffee pod since the dimensions for the various coffee pods may change. The K-cup type of coffee pod as generally shown in FIG. 8, has a bottom about 36 mm in diameter, a flange about 50 mm in diameter, an encircling rib about 45 mm in diameter and extending about 4-5 mm in length along the longitudinal axis, and a height of about 45 mm. The walls of the cup are straight and flexible as they may be squeezed inward a distance less than the diameter of the bottom of the K-cup. Thus, the K-cup coffee pod has a cup or body with a maximum body diameter of 45 mm and a lip extending beyond that maximum body diameter a distance d of about 2-3 mm, with a bottom diameter of about 36 mm.

The Vue® cup coffee pod has a cup or body with a maximum body diameter of about 50 mm and a lip extending beyond that maximum body diameter a distance d of about 5-6 mm, with a bottom diameter of about 36 mm.

The dividers are also selected to be small enough in cross section so as to hold the coffee pods by the lips or flanges. Dividers having a circular cross section of about 3 mm are believed suitable, with the paired dividers of 3 mm being about 95 mm apart, center to center, and the distance between adjacent dividers on opposing sides of the rows being about the same as or slightly less than the diameter of the coffee pods at the flange, or about 45-50 mm for the K-cup pods, and about 50-67 mm for the Vue® pods, with those distances being measured center-to-center on the dividers.

That spacing suspends the coffee pods if they are in the middle of the rows. If the pods move to one side so the body of the cup rests against one divider, then the flange on the other side of the cup may slip off, depending on the size of the divider's cross-section. Thus, the dividers are preferably spaced apart to define rows of about 45-50 mm for the K-cup coffee pods, and more preferably about 45-48 mm apart. The dividers are preferably spaced apart to define rows of about 50 mm for the Vue® cup coffee pods, and more preferably about 50-56 mm. The above described spacing applies for the rows defined by a divider and an adjacent side of upper support.

If the dividers are spaced apart a distance to slightly squeeze the coffee pods, the spacing is more variable for the K-cup coffee pods as their walls are much more flexible than are the walls of the cup on the Vue® pods. Advantageously, the spacing between the dividers defining rows for the coffee pods is between the minimum and maximum diameter of the body of the cup, with the minimum diameter being the diameter of the bottoms of the cup. For the K-cup pods the minimum spacing could be smaller than the diameter of the bottom since the walls of the cup are more flexible. But the spacing is not so small as to rupture the seal formed by foil top 7 or to permanently deform or damage the walls of the pods when the pods are forced between the dividers so as to rest against the flanges of the coffee pods.

There is also provided a method of supporting coffee pods in a tray where the tray has a plurality of dividers forming rows running from the front to the back of the tray.
The coffee pods each have a body 2 with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereto, with a sealing flange 3 extending a distance d beyond the pod body's maximum diameter D. The method includes placing a coffee pod in one row between two adjacent dividers 40b, 40a so one of the coffee pod body 2 or sealing flange 3 contacts each adjacent divider 40 to suspend the coffee pod. Preferably, the method includes a tray where the dividers are spaced apart a distance that is between slightly less than D and larger than Db, so the adjacent dividers support the coffee pod by contacting the coffee pod body during use. More preferably, the method includes supporting coffee pods by placing them in trays 14 where the dividers 40b, 40a defining the rows are apart a distance of about D, the method including placing the coffee pod in a row and between adjacent dividers so the adjacent dividers support the coffee pod by contacting the coffee pod lip.

[0066] As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which may be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present invention in virtually any appropriately detailed structure.

[0067] The above description is given by way of example, and not limitation. Given the above disclosure, one skilled in the art could devise variations that are within the scope and spirit of the invention. Further, the various features of this invention can be used alone, or in varying combinations with each other and are not intended to be limited to the specific combination described herein. Thus, the invention is not to be limited by the illustrated embodiments but is to be defined by the following claims when read in the broadest reasonable manner to preserve the validity of the claims.

What is claimed is:

1. A housing and tray assembly for holding coffee pods having a body with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereto, and having a sealing flange extending a distance d beyond the pod body diameter D, comprising:
   a rectangular, wire frame housing wider than it is high and having two opposing sides, a top and bottom, a back and a front, with a housing corner post at each corner of the housing, the top comprising a sheet of material fastened to the housing corner posts, each sides comprising a side connecting rod fastened to two of the housing corner posts on the side where the side connecting rod is located, the front and back comprising a front and back connecting rod each fastened to two of the housing corner posts on the respective front or back where the front or back connecting rod is located, the housing defining an opening;
   a rectangular, open, wire frame tray sized to fit into the opening in the front of the housing, the tray having an upper and lower rectangular frame held in relative position by tray corner posts to form two opposing tray sides, an open tray top and an opposing located tray bottom, a tray back and a tray front, each sides comprising a side connecting rod fastened to two of the corner posts on the side where the side connecting rod is located;
   a plurality of paired first and second dividers extending from a front to the back of the tray, the dividers in each pair of dividers being spaced apart a distance, a second and first divider from two different pairs of adjacent dividers defining at least one row, the second and first dividers being spaced a distance apart of at least Db so that at least the bottom of the body of the coffee pod may be placed between the adjacent dividers.

2. The housing and tray assembly of claim 1, wherein the distance between the second and first dividers is about D or slightly larger so the coffee pods may be by the dividers on the rims of the coffee pods during use.

3. The housing and tray assembly of claim 1, wherein the dividers in each pair of dividers are spaced apart a distance sufficient to avoid the flanges of coffee pods in the adjacent rows defined by the pairs of dividers from hitting each other during use.

4. The housing and tray assembly of claim 1, wherein the dividers in each pair of dividers are spaced apart a distance sufficient to avoid the flanges of coffee pods in the adjacent rows defined by the pairs of dividers from hitting each other during use.

5. The housing and tray assembly of claim 1, wherein the dividers in each pair of dividers are spaced apart a distance sufficient to avoid the flanges of coffee pods in the adjacent rows defined by the pairs of dividers from hitting each other during use.

6. The housing and tray assembly of claim 1, wherein the dividers in each pair of dividers are spaced apart a distance of about 2 d, measured edge to edge on the dividers.

7. The housing and tray assembly of claim 1, wherein each pair of dividers is closer together at the back of the tray and further apart at the front of the tray.

8. The housing and tray assembly of claim 1, wherein the side connecting rods are above the front and rear connecting rods and located vertically above the lower frame when the tray is inserted into the housing so as to limit tilting of the tray about a horizontal axis.

9. The housing and tray assembly of claim 1, further comprising a back stop connected to at least one of the rear housing corner posts and located to abut the tray and limit motion of the tray relative to the housing, and wherein the tray has a bottom surface located below the dividers a distance so the coffee cups do not abut the bottom surface when suspended vertically from the dividers during use.

10. The housing and tray assembly of claim 1, further comprising a back stop extending between two of the rear housing corner posts and located to abut the tray and limit motion of the tray relative to the housing.

11. The housing and tray assembly of claim 1, wherein the top comprises a transparent sheet of material removably fastened to the top of the four housing corner posts.

12. The housing and tray assembly of claim 1, further comprising a motion limit stop fastened to the tray to limit removal of the tray from the front of the housing.

13. The housing and tray assembly of claim 1, wherein the divider rods have an inverted U-shape with the ends of the legs of the U located at the front of the tray being fastened to a lower member that is fastened to the front of the lower frame.

14. The housing and tray assembly of claim 1, further comprising a second tray as defined in claim 1 located in the housing below the first tray.

15. The housing and tray assembly of claim 1, wherein the a plurality of paired first and second dividers extending from a front to the back of the tray, the dividers in each pair of
dividers being spaced apart a distance, a second and first divider from two different pairs of adjacent dividers defining at least one row, the second and first dividers being spaced a distance apart of at least Db so that at least the bottom of the body of the coffee pod may be placed between the adjacent dividers.

16. The housing and tray assembly of claim 1, wherein the dividers have an upper, support portion in the same plane as the upper frame of the tray and are spaced apart from the adjacent divider a distance of about D to form a row within which to suspend a coffee pod during use.

17. A housing and tray assembly for holding rows of coffee pods, the coffee pods each having a body with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereto, and having a sealing flange extending a distance d beyond the pod body diameter D, comprising:

- a rectangular, wire frame having four housing corner posts joined by four connecting rods comprising a front, back and two side connecting rods, with a transparent top fastened to the top of each housing corner post to define a housing with a front, back, two sides and a back, the side connecting rods being above the front connecting rod;
- a tray slidably insertable into and removable from the front of the housing, the tray comprising four tray corner posts joining the corners of a rectangular upper frame and a rectangular lower frame;
- a plurality of dividers defining rows running from the front to the back of the tray, the dividers forming adjacent rows with two dividers defining one row, the dividers having tops located a distance apart sufficient to engage a lip of the coffee pod between the dividers to suspend the coffee pod on the dividers and in the row during use.

18. The housing and tray assembly of claim 18, wherein the dividers are formed in pairs, with each divider supporting coffee pods in only one row during use so the pairs of dividers support coffee pods in two different rows during use, the pairs of dividers spaced apart a distance sufficient so that the flanges of the coffee pods in the two rows supported by the pair of dividers do not abut each other.

19. The housing and tray assembly of claim 19, further comprising a stop limiting movement of the tray relative to the housing, and wherein the tray has a bottom surface located below the dividers a distance so the coffee cups do not abut the bottom surface when suspended vertically from the dividers during use.

20. The housing and tray assembly of claim 18, wherein the side connecting rods of the housing are located vertically above the sides of the lower frame of the tray so as to restrict rotation of the tray about an axis parallel to the front connecting rod.

21. A housing and tray assembly for holding rows of coffee pods, the coffee pods each having a body with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereto, and having a sealing flange extending a distance d beyond the pod body diameter D, comprising:

- a housing having a front and opposing back, two opposing sides, a top and a bottom, the top formed by a surface fastened to the housing to cover the housing;
- a tray removably inserted into an opening in the front of the housing, the tray having a plurality dividers defining rows running from the front to the back of the tray between each of two of said plurality of dividers, the two dividers forming each row having an upper support in substantially the same plane and located a distance apart sufficient to engage a lip of the coffee pod between the dividers to suspend the coffee pod in the row between the dividers during use.

22. The housing and tray assembly of claim 21, wherein the dividers are formed in pairs, with each divider supporting coffee pods in only one row during use so the pairs of dividers support coffee pods in two different adjacent rows during use, the pairs of dividers spaced apart a distance sufficient so that the flanges of the coffee pods in the two rows supported by the pair of dividers do not abut each other.

23. The housing and tray assembly of claim 21, wherein the tray has an upper frame in substantially the same plane as a top of the dividers with sides of the upper frame cooperating with an adjacent divider to define a row and with the sides of the upper frame spaced a distance apart a distance between about Db and D.

24. The housing and tray assembly of claim 21, wherein the tray has a bottom surface located below the dividers a distance so the coffee cups do not abut the bottom surface when suspended vertically from the dividers during use.

25. A method of supporting coffee pods in a tray, the tray having a plurality of dividers forming rows running from the front to the back of the tray, the coffee pods each having a body with maximum body diameter D adjacent a sealed opening of the coffee pod and a smaller diameter bottom Db opposite thereto, and having a sealing flange extending a distance d beyond the pod body's maximum diameter D, the tray having comprising:

- placing a coffee pod in one row between two adjacent dividers;
- applying force as needed so the coffee pod body or sealing flange contacts each adjacent divider to suspend the coffee pod.

26. The method of supporting coffee pods defined in claim 26, wherein the dividers defining each row are spaced apart a distance between slightly less than D and larger than Db, the method including placing the coffee pod in a row and between adjacent dividers so the adjacent dividers support the coffee pod by contacting the coffee pod body during use.

27. The method of supporting coffee pods defined in claim 26, wherein the dividers are spaced apart a distance of about D and the method includes placing the coffee pod in a row and between adjacent dividers so the adjacent dividers support the coffee pod by contacting the coffee pod lip.