COLLAPSIBLE SHIPPING CONTAINER WITH REMOVABLE FOUR-PIECE RAIL UNIT

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ABSTRACT
A collapsible container comprises a plastic base having four side edges, and four corners. Four plastic walls are pivotably mounted to respective side edges of the base to be swingable between erected and folded positions. A rail assembly is removably mounted to an underside of the base, the rail assembly comprising four separate plastic rail elements extending along respective side edges of the base. The four rail elements consist of a pair of first parallel rail elements and a pair of second parallel rail elements oriented perpendicular to the first rail elements. Each of the first and second rail elements extends from one of the corners to another of the corners, and is mounted by a connecting structure enabling each rail element to be separately replaced relative to the base.
COLLAPSIBLE SHIPPING CONTAINER WITH REMOVABLE FOUR-PIECE RAIL UNIT

CROSS-RELATED REFERENCE

BACKGROUND OF THE INVENTION
[0002] The present invention relates to collapsible plastic shipping containers.
[0003] Collapsible plastic shipping containers, also known as knock-down bulk containers, typically comprise a rectangular base or floor to which are fastened four walls, i.e., two side walls and two end walls. If the container is not square, the side walls will be longer than the end walls. The walls are separately pivotable about respective horizontal axes at their lower edges so as to be swingable between a vertical erected position and a horizontal folded position. Once in their erected position, the walls are joined in suitable fashion so as to be fixed in an upright state for shipping purposes. When the walls are folded, the container can be more conveniently handled and stored. See, for example, U.S. Pat. No. 4,591,065 disclosing a conventional knock-down bulk container.
[0004] The container may also include a rail unit on which the base rests. The rail unit can provide slots for receiving the fork elements of a fork-lift truck, as well as stabilizing the sides of the container when erected.
[0005] It will be appreciated that collapsible shipping containers of that type may be subjected to relatively rough handling and thus are susceptible to damage, especially at the bottom region thereof. Damage occurring to the bottom of the container, which might otherwise require replacement of the base, will instead be absorbed by the rail unit which is less costly to replace. In that regard, it would be desirable to minimize the replacement costs as much as possible, as well as to simplify the attachment of the rail unit to the base.

SUMMARY OF THE INVENTION
[0006] A collapsible container comprises:
[0007] a plastic base having four side edges, and four corners;
[0008] four plastic walls pivotally mounted to respective side edges of the base to be swingable between erected and folded positions; and
[0009] a rail assembly removably mounted to an underside of the base, the rail assembly comprising four separate plastic rail elements extending along respective side edges of the base, the four rail elements consisting of a pair of first parallel rail elements and a pair of second parallel rail elements oriented perpendicular to the first rail elements, each of the first and second rail elements extending from one of the corners to another of the corners, and being mounted by a connecting structure enabling each rail element to be separately replaced relative to the base.

BRIEF DESCRIPTION OF THE DRAWING FIGURES
[0010] FIG. 1 is an exploded, top perspective, schematic view of a collapsible container according to the invention.
[0011] FIG. 2 is a top perspective view of a first type of rail element on the container.
[0012] FIG. 3 is a bottom perspective view of FIG. 2.
[0013] FIG. 4 is a top perspective view of a second type of rail element on the container.
[0014] FIG. 5 is a bottom perspective view of FIG. 4.
[0015] FIG. 6 is a bottom view of a corner of the container with both types of rail elements attached.
[0016] FIG. 7 is a cross-sectional view taken along the line 7-7 in FIG. 5.
[0017] FIG. 8 is an exploded perspective bottom view showing a corner of the base, and corners of respective rail elements.
[0018] FIG. 9 is an exploded top perspective view of the base and three of the rail elements.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT
[0019] Depicted in FIG. 1 is a collapsible shipping container 10 which includes a plastic base 12, two plastic side walls 14, two plastic end walls 16, and two pairs of parallel rail elements 20, 22 only one rail element of each pair being depicted in FIG. 1. The side and end walls are pivotably mounted to the base along their lower edges in any suitable fashion so as to be swingable about respective horizontal axes between an upright erected position and a horizontal folded position. For example, each wall can possess downwardly projecting hinge elements 30 which snap into corresponding hinge elements 32 of the base to form a horizontal hinge.
[0020] Once erected, the walls can be secured together in any suitable manner, e.g., by cooperating tabs 34 and recesses 36 on their mating edges which inter-engage to hold the walls upright. One of the walls can be provided with a door 40 that can be swung open and closed to provide access to the container’s interior.
[0021] The base 12 includes a plurality of downwardly projecting posts, i.e., four corner posts 42, and four intermediate posts 44, each intermediate part situated midway between two corner posts.
[0022] The four rail elements 20, 22, which are shown only schematically in FIG. 1 and in detail in FIGS. 2-5, are removably mounted on the base in a manner enabling any one of the four rail elements 20, 22 to be replaced relative to the base and relative to the other three rail elements. Thus, in the event that one of the four rail elements is damaged, the replacement cost is minimized since the other rail units can continue to be used, i.e., it may be possible to repair the damage by replacing only ¼ of the rail unit.
[0023] The posts 42, 44 of the base serve to mount the rail elements, and the rail elements are configured to overlap one another at the corner posts, as will be explained. Each post 42, 44 includes a downwardly facing socket 50, preferably of rectangular cross-section. The socket 50 is formed by vertical surfaces 52. In each corner post 42, three of the vertical surfaces include recesses 54 adjacent lower ends thereof, each recess defining a horizontal shoulder 56. Also provided are a series of ribs 58 having lower ends terminating at an elevation above the recesses 54.
[0024] The intermediate posts 44 are similarly configured, except that recesses 54 are provided in only one of the vertical surfaces thereof.
[0025] Each of the first rail elements 20 is configured to be attached directly to two of the corner posts 42 and directly to one of the intermediate posts 44. Each of the second rail elements 22 is configured to be indirectly connected to two of the corner posts 42 through the first rail elements 20 and directly connected to one of the intermediate posts 44. For example, in the case where the container is of non-square rectangular configuration, wherein the side walls 14 are longer than the end walls 16, the rail elements extending along the side edges of the base will be longer than the rail
elements extending along the base’s shorter end edges. The reverse would also be possible, however.

[0026] Each of the first rail elements 20 extends from one corner post to another, and includes two upward corner projections 60A and one upward intermediate projection 60B. Each corner projection 60A is sized to fit within the socket 50 of a corner post 42, and the intermediate projection 60B is sized to fit within the socket of the corresponding intermediate post. Each corner projection 60A includes four sides 62, three of which include integral snap-in tabs 64 arranged to be received in the recesses 54 of the sockets 50. For example, each side 62 could include a set of three tabs 64, each set configured to be received in a respective recess 54. Each tab has an inclined cam surface 66 and a horizontal abutment surface 68. When the projection 60A is pushed into the socket 50, engagement between the socket’s sides and the cam surfaces 66 causes the tabs 64 to be elastically displaced until becoming aligned with the recesses 54, whereupon the tabs snap into the recesses. Preferably, the lower ends 69 of the projections are flush with lower ends 70 of the posts to define part of the ground-engaging surface of the rail unit.

[0027] Each corner projection 60A forms a downwardly facing socket 72 having a pair of integral downwardly projecting spring fingers 74 each of which forms hooks 76 at its lower end. Each hook has an inclined cam surface 78 and a horizontal shoulder 79.

[0028] The intermediate projection 60B includes a downward facing socket 72, but there are no spring fingers formed therein. The intermediate projections 60B will fit into the intermediate posts 44 and will be connected thereto by snap-in tabs 77.

[0029] Each of the second rail elements 22 extends from one corner post to another and includes two upward corner projections 90A and one upward intermediate projection 90B. Each corner projection 90A is sized to fit within the socket 72 of a respective corner projection 60A of a first rail element. On two opposing sides of the corner projections 90A are provided slots 92 arranged to receive the respective hooks 76 of the spring fingers 74. Thus, when the corner projections 90A are pushed into the sockets 72, the spring fingers 74 are flexed elastically outwardly and then snap-back into the slots 92 and opposing engagement surfaces 94 thereof to retain the corner posts 90A therein. The intermediate projection 90B is provided with tabs 95 for connection with the intermediate post 44.

[0030] In order to remove the rail elements, it is only necessary to pry the tabs 64, 77, 95 and hooks 76 off their respective shoulders which is facilitated by the elastic nature of the surfaces or fingers on which the tabs/hooks are disposed. Thus, if one of the second panel elements needs replacement, it can be detached from the sockets of its associated first rail elements by prying the hooks 76 of the corner projections, and the tabs 77 of the intermediate projection, away from their respective engagement surfaces.

[0031] If one of the first rail elements 10 must be replaced, it will be necessary to remove both of the second rail elements as described above, and then remove the first rail element(s).

[0032] As an optional additional feature any or all of the posts and projections 60A, 60B, 90A, 90B can be configured to form holes suitable for receiving screws. In that regard, FIG. 6 shows a downward hollow post 110 integral with the sockets 50 of the corner posts 42. That post 110 passes downwardly through a passage 112 formed in the corner projection 60A and is aligned with an aperture 114 formed in the corner projection 90A. Thus, by inserting a screw through the aperture 114 and into the post, both corner projections 60A, 90A will be secured to the corner post 42. There can be any number of such post/aperture pairs, e.g., two as shown in FIG. 7.

What is claimed is:

1. A collapsible container comprising:
a plastic base having four side edges, and four corners;
four plastic walls pivotably mounted to respective side edges of the base to be swingable between erected and folded positions; and

a rail assembly removably mounted to an underside of the base, the rail assembly comprising four separate plastic rail elements extending along respective side edges of the base, the four rail elements consisting of a pair of first parallel rail elements and a pair of second parallel rail elements oriented perpendicular to the first rail elements, each of the first and second rail elements extending from one of the corners to another of the corners, and being mounted by a connecting structure enabling each rail element to be separately replaced relative to the base.

2. The collapsible container according to claim 1 wherein the first rail elements are of identical configuration and of different configuration from the second rail elements, the second rail elements being of identical configuration.

3. The collapsible container according to claim 2 wherein the first rail elements are removably connected directly to the base at said corners, and each of the second rail elements being removably connected directed to both of the first rail elements at said corners.

4. The collapsible container according to claim 3 wherein each of the first and second rail elements is also connected directly to the base at a location between two said corners.

5. The collapsible container according to claim 1 wherein the base and the first rail elements include a first cooperating snap-in connecting structure wherein the first rail elements are attached by snap-in fit to the base; and the first rail elements and the second rail elements include a second cooperating snap-in connecting structure wherein the second rail elements are attached by a second snap-in fit to the first rail elements.

6. The collapsible container according to claim 5 wherein the first and second snap-in structures are disconnectable to permit removal of the respective rail elements.

7. The collapsible container according to claim 1 wherein each of the first rail elements includes two first corner portions disposed at respective ones of said corners, and each of the second rail elements includes two second corner portions disposed at respective ones of said corners, wherein each of the first corner portions is sandwiched between the base and a second corner portion.

8. The collapsible container according to claim 7 wherein at each corner a threaded fastener extends through the first and second corner portions and is attached to the base to define at least part of the connecting structure.

9. The collapsible container according to claim 7 wherein the base includes posts forming an open socket at each said corner; each first corner portion including two first projections each extending upwardly into a respective socket of the base; each first corner portion forming an open socket; each second corner portion including two second projections extending upwardly into respective sockets of the first projections.

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