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A PREFABRICATED MODULAR MULTI-FUNCTION LITTER BIN

This invention relates to a prefabricated modular multi-function litter bin or recycle container scalable in several geometric combination configurations designed to receive items for disposal or recycle refuse of diverse character.

BACKGROUND

There is a need for park users to dispose or recycle refuse when they visit parks, gardens, playgrounds, open spaces, park connectors and nature reserves. The litter bin is one of the important facilities within the recreational areas to keep the recreational environment clean and green. There is a need for an economical, flexible means of replacing individual components of the multi-function litter bin or refuse container if vandalism occurs.

The existing types of litter bin design are not without problems which include vandalism, corrosive material or inappropriate constructional material selected, insufficient capacity to cater for daily refuse disposal, insecure method of securing the bin to the concrete base, and insufficient prevention of animals such as crow, monkey, rat, rodent and cat in reaching and retrieving litter. Cleanliness is a critical criterion in maintaining the existing recreational areas. Park users are more inclined to maximise the use of the park facilities when they are satisfied that the conditions of the areas are clean and green.

The most common PVC flip top litter bin design has been in use by Parks and Recreation Department, Singapore since April 1976. This type of PVC litter bin is readily manufactured in the factory. The disadvantages of the existing design are the middle rod at the top of the bin, the top portion attached with mild steel or stainless steel chain and no opening at the base of the bin to allow drainage of surface water and rainwater. Apart from normal usage and wear and tear conditions, the bins are common objects abused by vandals and the stainless steel chains frequently being stolen or broken due to weakness at the joints. The other existing types of litter bins usually are made from PVC or plastic material that is prone to fire during the Chinese Autumn Festival. In the event that the litter bin is burnt and damaged, it can be readily replaced with an entire new bin. The traditional litter bin shapes usually comes either in cylindrical or



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parallelepiped form that does not fully fit into the different recreational areas especially the coastal marine environment.

The industry has made various attempts to solve the problem of litter bins, some of which are designed for use with disposable trash bag liners. Examples of such attempts are shown in, for instance, Disposal bin in U.S. pat No. 4,453,648 of Jun. 12, 1984, Refuse Receptacle in U.S. pat No. 4,577,778 of Mar. 25 1986, Device for Positionally Retaining Flexible Trash Bag Liner Relative To A Trash Receptacle in U.S. pat No. 4,765,579 of Aug. 23, 1988, Refuse container with Locking Handle in U.S. pat No. 4,819,827 of Apr. 11, 1989, Trash Separation Container in U.S. pat No. 4,834,262 May 30, 1989, Lid Control Device for Refuse Containers in U.S. pat no. 4,892,218 of Jan. 9, 1990, Multi-Compartment Container in U.S. pat No. 5,090,785 of Feb. 25, 1992, Compartmented Receptacle for use in Recycling and Waste Disposal in U.S. pat no. 6,047,843 of Apr. 11, 2000 and International Patent Classification B65F 1/06 of Nov. 29, 1996.

However, these examples fall short of the desired structure that would combine a multifunctional refuse receptacle having modular components that can be easily replaced when worn or damaged. The present invention contemplates elimination of drawbacks associated with the prior art and provision of a prefabricated modular multi-functional litter bin or recycle container that combines refuse disposal or recycling bin, advertising display stand and ashtray containers.

SUMMARY OF THE INVENTION

A prefabricated modular litter bin or recycle container having side walls, rear wall, an upper front wall possess the flexibility in replacing individual components. The top portion of the litter bin permits an ashtray to be fixed with a full length stainless steel hinge attached to the frame that allows for general cleaning. The top slope portion attached to the receptacle openings allows disposal of larger garbage refuse. The bottom edge of the receptacle opening is designed with a bullnose shape projection complete with end capping on both sides with an embedded beveled finish to prevent any injury caused by the sharp edges. The front door panel of the litter bin installed with stainless steel hinge provides a clearance of 180° opening that renders the easy removal of garbage

disposal. The locking device for the door panel incorporates a keyed cam lock with master key series to aid the daily cleaning process.

The prefabricated modular panel system incorporates an extensible feature in either a linear form, L-shaped, U-shaped, staggered or several geometric combination configurations. The prefabricated modular framing panel consist of four nos. of stainless steel tubing fixed on the main frame all round. The design caters for quick and easy future replacement of components with the provision for an additional 8 nos. of stainless steel brackets to be fixed onto the main prefabricated modular frame. The main bottom frame member panels are secured onto the concrete base with three nos. of wall plug bolts and nuts. All the internal, external framing and components are painted in green colour 357C Pantone code with zinc-plated stove-enamel between 150° C and 180° C in 30 minutes. The internal of the litter bin allows for four stainless steel hairline matt finish U-shaped hooks fixed at the front, sides and rear panel top frame.

Provision for advertising posters, informational pamphlets and other media have been incorporated into the litter bin's panel. The top and the three sides of the prefabricated panels have slots to display and to allow the frequent changes of advertising or promotional media and related products.

BRIEF DESCRIPTION OF THE TECHNICAL DRAWINGS

The above-mentioned design-concept, technical detail descriptions, functions, features and characteristics can be best understood by referring to the following technical detailed drawings, wherein:

- FIG. 1** shows the isometric view prefabricated modular multi-functional litter bin or recycling container of the present invention.
- FIG. 2** shows the plan view prefabricated modular multi-functional litter bin or recycling container of the present invention.
- FIG. 3** shows the front view prefabricated modular multi-functional litter bin or recycling container of the present invention.
- FIG. 4** shows the side view prefabricated modular multi-functional litter bin or recycling container of the present invention.
- FIG. 5** shows the rear view elevation through the prefabricated modular multi-functional litter bin.

- FIG. 6** shows a sectional side elevation through the prefabricated modular multi-functional litter bin.
- FIG. 7** shows a perspective view of the prefabricated modular multi-function litter bin of this invention.
- FIG. 8** shows a detail view of a support member for suspending a garbage bag at the side of the litter bin.
- FIG. 9** shows a detail view of securing members for securing various components and accessories of the structure.
- FIG.10** shows the isometric view at the top typical corner portion and corner constructional details of the prefabricated modular panel system.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention may be performed in various functions as a prefabricated modular litter bin for refuse or recycle container. It should be clearly understood that it is not restricted to the collection of refuse or recycling process. The prefabricated modular design multi-functional litter bin could be used to store, collect recycle material or material which need not fall into the classification category of refuse.

FIG. 1 shows an isometric view of the prefabricated modular litter bin or recycle container structure **100** according to the invention as it might appear in parks, gardens, playgrounds, open spaces, park connectors, nature reserves, institutions, residences or industries. The prefabricated litter bin container structure **100** has a pair of side walls **21**, a rear wall **31**, and a hinged front wall **18**. The walls **18**, **21** and **31** are configured for securing to a base **25**. A plurality of wall plugs **30** (three in the embodiment shown in Figure 1) facilitate replacement of modular components. The front wall **18** is pivoted against a vertical non-corrosive pivot pin **50**, which allows to swing the door **18** 180 degrees. A keyed access **19** allows periodic cleaning and removal of full garbage bags from the interior of receptacle **100**. The locking device **19** for the door panel incorporates a keyed cam lock with master key series to facilitate the cleaning process. Therefore, the cleaner only requires a single master key to empty the refuse bin daily at the various recreational areas. If desired, an owner's logo or trademark **17** may be imprinted on the exterior surface of the front panel **18**.

Any surface water permeating into the litter bin will be discharged away at the bottom through the base **25**. The base **25** can be made from heavy, non-corrosive material, for instance concrete to help stabilize the structure **100**.

The structure **100** is provided with a top opening **15** defined by upper edges of the walls **18**, **21** and **31**. Access to the opening **15** is restricted by a pivotal access door **13**, which is inclined with respect to the front wall **31**. A non-corrosive hinge **12** is secured along a top edge **33** of the access door **13** to allow pivotal movement of the access door **13**. The bottom edge of receptacle opening **15** is designed with a bullnose shape projection **31** complete with end capping on both sides. The projection **31** allows users to hold the receptacle open when disposing larger garbage refuse.

A pair of side panels **34**, **35** are mounted on opposite sides of the access door **13**. Top edges **36**, **37**, of the panels **34**, **35** follow the general configuration of the access door **13**, while the bottom edges **38**, **39** form circular openings. Of course, other suitable shapes and configurations of the side panels **34**, **35** can be selected depending on the manufacturing preference. A transverse handle **31** having a generally C-shaped configuration allow the user to move the access door **13** when required. Each of the panels **34** and **35** is provided with a circular opening **38**, **39**, respectively for receiving disposed items of small size. If desired, the edges of the panels **34**, **35** defining the openings **38**, **39** may be made bevel to protect the user's hand. This will allow users a hygienic and convenient way to dispose of litter without touching the other surface areas of the refuse bin **100**. Larger volume debris can be deposited into the litter bin **100** when the access door is **12** pivoted about 146° at the top and about 124° at the bottom near handle **31**.

The top portion of the prefabricated modular litter bin **100** carries an ashtray **11**, designed with a full length non-corrosive hinge **40** attached to the rear panel **41** to allow for routine general cleaning. The provision of the ashtray component is an optional element for the litter bin. A pair of spaced-apart water drain openings **42**, **43** are formed in the panel **41** and serve as discharge points **10** for surface water or rain water. If desired, the ashtray **11** may be removably mounted on top of the structure **100**. As can be seen in more detail in **Figure 1**, the access door **13** is unitary connected to an upper shelf **60**, which supports the bottom of the ashtray **11**. A downwardly extending upper panel **61** extends transversely to the horizontal shelf **60**. The panel **61** forms an upper part of the

back wall of the structure 100. A rear vertical edge 62 and 63 of the side panels 34, 35 is secured to a respective vertical edge 64, 65 of the upper panel 61. An upwardly extending lip 66 is formed along the proximate edge of the shelf 60. The lip 66 facilitates retaining of the ashtray 11 on the shelf 60.

In addition to functioning as a refuse or recycling container, the structure 100 can serve as a display for advertising posters, informational pamphlets and other media. The top access door 13 and modular sidewalls 21 have means to allow display and frequent changes of advertising or promotion media and products. As can be seen in the drawings, each side wall 21 comprises a peripheral frame 22 having a discreet width, with the planar panels portions 52 having substantially equal or smaller width. The panel portions 52 may lie within the plane of the exterior surface of the corresponding frame member 22, or the panel portions 52 may be recessed with respect to the exterior surface in order to provide displayed media some protection against the elements.

A pair of opposing elongated retainer members 14 are secured along opposing sides of the side walls 21. The retainer members 14 have a generally U-shaped cross-section, allowing a poster and the like to be positioned on the outside of the sidewalls 21. A transverse retainer member 54 forms a rest for a bottom edge of an advertising poster, preventing the display poster from sliding down. A similar pair of opposing retainer members 55, 56 may be provided on the module serving as the access door 13. A bottom stop 57 extends transversely to the retainer members 55, 56 and prevents advertising poster from sliding off the access door 13.

One or more of the sidewalls 21 may be used for advertising. If the structure 100 is positioned with the rear wall facing another structure, or one of the side panels become obstructed by other adjoining structure, the advertisers may wish to restrict the number of other advertisements appearing on any view of the side panels 21. The advertising display can be frequently changed by removing them from the access door 13 and side walls 21 and positioning other desired material thereon. Of course, other means for securing the advertising displays may be employed and still fall within the scope of the present invention.

FIG. 2 illustrates a plan view of one form of geometric layout. The square cross-section configuration form of modular system can be transformed into other rectangular

prismatic forms by shortening or elongating its height, width or depth. The dimensional transformations can be compressed into planar form or stretched into a linear one.

FIG. 4 shows the side elevation of the contemporary innovatively prefabricated modular multi-function litter bin which has been adapted in order to allow a cost effective and versatile litter bin or recycle container to be manufactured and its modular panels **21** conveniently replaced in the future. It is understood that the embodiments of the present invention disclosed above are susceptible to the various modifications, changes and adaptations which are to be considered to be within the spirit and scope of the invention. For example, the prefabricated peripheral frame **22** incorporates an extensible feature in either a linear form, L-shaped, U-shaped, staggered or several geometric combination configurations. It is envisioned that the minimum standard capacity for a single module litter bin **100** caters for 160 litres of refuse.

Any combination of the prefabricated modular side panels **21** and components could be provided for the framing system. The limitation in the number of modules is directly related to the function and the physical dimensions of the framing system itself **21**. The preferred embodiment incorporates the characteristics of the several geometric combination configurations that could be effected to simplify the structure or to render it to be a more versatile multi-functional container.

In the embodiment shown in the drawings, the prefabricated modular framing panel comprises four stainless steel circular tubing members **20** fixed longitudinal vertical side of the frame members **22**. The tubing members **20**, complete with hairline finish support the four corners of the litter bin's rectangular geometric form. The construction system of the bin structure **100** incorporates eight right angle stainless steel brackets **23** fixedly engaged with vertical circular tubing members **20** with stainless steel bolt-and-nut assemblies **58** and washers **59**.

In order to interlock and allow quick and easy future replacement of the modular components, in the event of vandalism, corrosion or damage, an additional set of 8 stainless steel brackets **24** is provided for securing to the frame members **22**. The main bottom frame member panels are secured into the concrete base **25** with three wall plug bolt-and-nut assemblies **28**. Each of the fixing points may be selectively placed at the centre of both sides and rear panel mainframe.

The present invention provides for a means for suspending a disposable garbage bag (not shown) inside the structure **100**. To this end, a plurality of hook-shaped suspension members **16** are secured on the interior side of the modular panels **21**. Each of the hooks **16** is fixed at the underside centre of the top frame **22** to provide maximum balance and grip of the garbage bag. The hooks **16** will hold the garbage bag in a stable position when the litter bin is in full load. The practical design and the ease will allow the garbage bags to be emptied or replaced conveniently. Refuse will be deposited through the openings **38, 39** on both sides of the panels **34, 35**, respectively. Any larger bulk refuse will be disposed through the top access door **13**, which is designed to swing to a maximum of 180° to protect its contents and prevent spillage thereof.

The concrete support base **25** of the prefabricated modular multi-function litter bin **100** can be executed in either linear form, L-shaped, U-shaped, staggered or several geometric combination configurations may be specially made for supporting the bottom of the frames **22**. Additionally, the concrete support structure **25** may be part of the footpath, foundation, concrete slab or other structures. The bottom frame can be firmly anchored or predrilled to any solid surface such as concrete, brick, stone etc. Where the bottom frame is to be anchored to a pre-existing structure, the structure can be pre-drilled and 3 wall plugs can then be secured to the support structure using appropriate fasteners adapted to engage the wall plug bolts. The fastening method allows for expeditious future replacement of components or parts.

FIG. 9 shows the predrilled holes onto the main panels **22** to receive stainless steel bolts and nuts **28** and washers **29**.

If desired, all the internal and external framing and component surfaces may be painted in green colour 357C Pantone code with zinc-plated stove-enamel set at temperatures between 150° C to 180° C in 30 minutes. The new litter bin explored uses AISI stainless steel 304 bolts and nuts **28** to prevent corrosion for future maintenance and dismantling purposes. The selection of the AISI stainless steel 304 material and protective coating technique system will prolong the life span of the refuse bin/ recycle container components in the normal surrounding and the coastal marine environment. The selected material should preferably be impervious to moisture and sunlight since the refuse bin is likely to be stationed outdoors.

The litter receptacle of the present invention facilitates the prefabrication of standardized components and parts to achieve cost effectiveness. This modular design of the instant invention will reduce cutting, reshaping or resizing of various components and parts at the site as well as reduce waste of material, time and manpower resources. The standardization of components enables suppliers, vendors and manufacturers to produce parts in the factory as prefabricated components. The modular components allow for mass production that will result in higher productivity and produce better consistency in quality surface finishes.

CLAIMS

We claim:

1. A waste receptacle, comprising:
a hollow container comprising an interior chamber for receiving waste items, said container having modular vertical side walls, a rear wall and a pivotally mounted front door, said side walls and said rear wall being provided with a means for supporting an advertising medium thereon, said container further comprising a means for detachably securing said side walls with the rear wall and the front door, said securing means comprising a plurality of upright tubular members secured between adjoining vertical edges of the frame members and a plurality of brackets securing the upright tubular members to the frame members.
2. The receptacle of Claim 1, wherein said container has an open top and an upper portion enclosing the open top.
3. The receptacle of Claim 2, wherein said upper portion comprises a pivotally mounted access door oriented at an angle in relation to the vertical front door, said door being movable between a normally closed position, covering the open top of the container and a plurality of selected open positions allowing access to interior of the container.
4. The receptacle of Claim 3, wherein said upper portion further comprises a pair of upper side panels mounted on opposite sides of said access door.
5. The receptacle of Claim 4, wherein each of said upper side panels is provided with an opening to allow depositing of waste items into the interior chamber therethrough.
6. The receptacle of Claim 3, wherein said access door is unitary connected to an upper shelf, and wherein an ash tray is supported on said shelf.

7. The receptacle of Claim 3, wherein a front edge of said access door is provided with a handle to allow pivotal movement of said access door upon demand.
8. The receptacle of Claim 3, wherein said access door is configured for carrying an advertising display item on a top surface thereof.
9. The receptacle of Claim 1, wherein each of said side walls, said front door and said rear wall comprises a peripheral frame member, a panel member mounted within said frame member, and a means supported by said frame member for suspending a waste-receiving bag inside the interior chamber.
10. The receptacle of Claim 9, wherein said means for suspending a bag comprises a hook-shaped member secured to an underside of said frame member.
11. The receptacle of Claim 1, wherein said means for supporting an advertising medium comprises a pair of elongated retainer members mounted along opposing vertical sides of each of the panel members and a transverse member extending along a lower end of each of the panel members for supporting a bottom of an advertising medium mounted on the said panel member.
12. The receptacle of Claim 11, wherein each of said retainer members has a U-shaped cross section.
13. The receptacle of Claim 1, further comprising a base for supporting the hollow container thereon.
14. The receptacle of Claim 1, wherein said front door is provided with a keyed access to facilitate cleaning of the interior chamber.

15. A waste receptacle, comprising:

a hollow container comprising an interior chamber for receiving waste items, said container having modular vertical side walls, a rear wall and a pivotally mounted front door, said side walls, said rear wall and said front door being retained in a vertical orientation by upright tubular members secured between adjoining vertical edges, said side walls and said rear wall being provided with a means for supporting an advertising medium thereon, each of said modular walls and front door comprising a peripheral frame and a panel mounted within the frame, each of said modular walls carrying a pair of retainer members for supporting a flat advertising display item.

16. The receptacle of Claim 15, wherein said container has an open top and further comprises an upper portion for enclosing said open top, said upper portion having an inclined pivotal access door to facilitate depositing of waste items into the interior chamber.

17. The receptacle of Claim 16, wherein said upper portion further comprises an ashtray mounted on a top part of the upper portion.

18. The receptacle of Claim 16, wherein said upper portion comprise a pair of upper side panels, each of said upper side panels being provided with an opening to allow depositing of waste items in the interior chamber.

19. The receptacle of Claim 15, wherein each of said modular walls and front door carry a hook-shaped member on an interior thereof to facilitate suspending of a disposable garbage bag inside the interior chamber.