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AN ARTICLE CONTAINER

Field of Invention

The present invention relates generally to an article container.



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Background

Article containers, also referred to as transit cases, are used for containing articles, for example aeronautical instrumentation modules, when being transported from one location to another. The article containers are typically formed from a pair of shells defining a concavity for containing the article when inter-coupled. During transit or transportation thereof, the article containers may be subjected to external shock, for example when being dropped by handlers of the article container. Coupling means affixed on the pair of shells prevent the shells from coming apart and spilling or exposing contents contained therein. Locating means sometimes exist on the shells to inter-locate the shells and prevent positional displacement lateral the interface between the shells that may decouple or impair the coupling means. However, introducing the locating means to the article containers is difficult as substantially effective designs are non-existent. Further, the cost associated with introducing the locating means to the pair of shells of the article container is cost prohibitive as additional tooling is required for producing two separate mold assemblies for the two pair of shells that are now varied in design due to the introduced locating means. Therefore, there is an apparent need for an improved approach for addressing the foregoing problems.

Summary

In accordance with a first aspect of the invention, there is disclosed an article container comprising a first container structure and a second container structure. Each of the first container structure and the second container structure comprises a base, a rim structure defining a trough, a sidewall and a rib. The sidewall extends from the base and terminates at the rim structure. The rim structure is formed substantially parallel a first plane with the base and the sidewall defining a cavity wherein at least a portion of an article is receivable. The rib protrudes from the rim structure and is shaped and dimensioned for being received by the trough. The rim structure of the first container structure is for mating with the rim structure of the second container structure for enclosing the article receivable in the cavity of

at least one thereof. The rib of one of the first container structure and the second container structure is shaped and dimensioned for being received by the trough of the other of the first container structure and the second container structure. The trough of the first container structure substantially dimension and shape matches the trough of the second container structure to substantially impede spatial displacement of the second container structure along the first plane when the rim structure of the second container structure is mated with the rim structure of the first container structure.

In accordance with a second aspect of the invention, there is disclosed a container structure comprising a base, a rim structure defining a trough, a sidewall and a rib. The sidewall extends from the base and terminates at the rim structure with the rim structure being formed substantially along a first plane. The rib protrudes from the rim structure and is shaped and dimensioned for being received by the trough. The base and the sidewall defines a cavity wherein at least a portion of an article is receivable. The rim structure is for mating with a cover structure for enclosing the article received in the cavity. The cover structure having a rib shaped and dimensioned for being received by the trough of the rim structure, and a trough for receiving the rib of the rim structure. The trough of the rim structure substantially dimension and shape matches the trough of the cover structure to substantially impede spatial displacement of the cover structure along the first plane when the cover structure is mated with the rim structure.

Brief Description of the Drawings

FIG. 1 shows a perspective view of an article container having a first container structure and a second container structure in a closed position in accordance with an aspect of the invention;

FIG. 2 shows a partial front elevation of the article container of FIG. 1 with the first container structure and the second container structure in an open position;

FIG. 3 shows a partial first side elevation of the article container of FIG. 2;

FIG. 4 shows a partial side sectional view of the article container of FIG. 1 according to view A-A of FIG. 2 and detail view C of FIG. 3;

FIG. 5 shows a partial second side elevation of the article container of FIG. 2;

FIG. 6 shows a partial side sectional view of the article container of FIG. 1 according to view B-B of FIG. 2 and detail view D of FIG. 5;

FIG. 7 shows a front elevation of the article container of FIG. 1 with the first container structure and the second container structure in the closed position;

FIG. 8 shows a side elevation of the article container of FIG. 1 with the first container structure and the second container structure in the closed position; and

FIG. 9 shows a partial side sectional view of the article container of FIG. 1 according to view A-A of FIG. 7 and detail view E of FIG. 8.

Detailed Description

Reference will now be made in detail to an exemplary embodiment of the present invention, examples of which are illustrated in the accompanying drawings. While the invention will be described in conjunction with the embodiment, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of embodiments of the present invention, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be recognized by one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail as not to unnecessarily obscure aspects of the embodiments of the present invention.

An exemplary embodiment of the invention, an article container 20, is described with reference to FIGS 1 to 9. The article container 20 is preferably used for containing articles. Preferably, the article container 20 is adaptable to function as a transit case for mitigating shock and vibrational loading to sensitive articles, for example precision instrumentation, containable therein for transport via various transportation means, for example sea freight, air freight, rail locomotive or the like.

The article container 20 comprises a first container structure 22 and a second container structure 24. The first container structure 22 comprises a base 26, a rim structure 28 defining a trough 30, and a sidewall 32 extending from the base 26 and terminating at the rim structure 28. Preferably, the rim structure 28 is formed substantially along a first plane 36. The base 26 and the sidewall 32 define a cavity 38 wherein at least a portion of an article (not shown) is receivable. The first container structure 22 further comprises a rib 42 protruding from the rim structure 28. The rib 42 is shaped and dimensioned for being received by the trough 30.

Preferably, the second container structure 24 has the same shape and size as the first container structure 22. Preferably, the second container structure 24 comprises a base 44, a rim structure 46 defining a trough 48, and a sidewall 50 extending from the base 44 and terminating at the rim structure 46. Preferably, the rim structure 46 is formed substantially along a first plane 52. The base 44 and the sidewall 50 define a cavity 54 wherein at least a portion of the article is receivable. The second container structure 24 further comprises a rib 56 protruding from the rim structure 46. The rib 56 is shaped and dimensioned for being received by the trough 48.

The base 26 and the sidewall 32 of the first container structure 22 forms a shell made of polymeric material, for example, polyethylene, metal or the like hardwearing material. Similarly, the base 44 and the sidewall 50 of the second container structure 24 also forms a shell made of polymeric material, for example, polyethylene, metal or the like hardwearing material.

The rim structure 28 of the first container structure 22 is for mating with the rim structure 46 of the second container structure 24 for enclosing the article receivable in the cavity 38/54 of at least one thereof. The rib 42 of the first container structure 22 is shaped and dimensioned for being received by the trough 48 of the second container structure 24, while the rib 56 of the second container structure 24 is shaped and dimensioned for being received by the trough 30 of the first container structure 22.

The trough 30 of the first container structure 22 is substantially dimensioned and shape matches the trough 48 of the second container structure 24 to substantially impede spatial displacement of the second container structure 24 along the first plane 36 when the rim structure 46 of the second container structure 24 is mated with the rim structure 28 of the first container structure 22.

The first plane 36/52 of each of the first container structure 22 and the second container structure 24 defines a second plane 58/60 perpendicular thereto. The second plane 58 of the first container structure 22 segregates the rim structure 28 into a first segment 62 and a second segment 64. The rib 42 extends from the first segment 62 and the trough 30 is

defined along the second segment 64. Preferably, each of the extremities of the rib 42 of the rim structure 28 is adjacent one of the extremities of the trough 30. Preferably, the first segment 62 of the rim structure 28 is symmetrical to the second segment 64. It is further preferred that the cross-sectional outline of the rib 42 along the first plane 36 is substantially symmetrical about the second plane 58 to the cross-sectional outline of the trough 30 along the first plane 36.

The second plane 60 of the second container structure 24 segregates the rim structure 46 into a first segment 66 and a second segment 68. The rib 56 of the second container structure 24 extends from the first segment 66 and the trough 48 is defined along the second segment 68. Preferably, each of the extremities of the rib 56 of the rim structure 46 is adjacent one of the extremities of the trough 48. Preferably for the second container structure 24, the first segment 66 of the rim structure 46 is symmetrical to the second segment 68 thereof. It is further preferred that the cross-sectional outline of the rib 56 along the first plane 36 of the second container structure 24 is substantially symmetrical about the second plane 60 to the cross-sectional outline of the trough 48 along the first plane 52 thereof.

Preferably for each of the first container structure 22 and the second container structure 24, the height of the rib 42 extending from the rim structure 28 of the first container structure 22 is similar to or less than the depth of the trough 48 defined in the rim structure 46 of the second container structure 24. Further, the height of the rib 56 extending from the rim structure 46 of the second container structure 24 is similar to or less than the depth of the trough 30 defined in the rim structure 28 of the first container structure 22.

For use as the article container 20, the first container structure 22 is configured with the second container structure 24 by being inter-coupled using at least one coupling means 70. Preferably, the at least one coupling means 70 comprises at least one hinge for hinging the second container structure 24 to the first container structure 22. Hinging the first container structure 22 with the second container structure 24 enables the article container 20 to be positioned between an open position and a closed position. In the open position, the cavity of at least one of the first container structure 22 and the second container structure 24 is accessible for disposing of the article therewith or for access to and enabling removal of the

article therefrom. In the closed position, the article, when disposed within the cavity of at least one of the first container structure 22 and the second container structure 24 is substantially enclosable by the first container structure 22 and the second container structure 24. It is disclosed herein that depending on intended use of the article container 20, at least one of the first container structure 22 and the second container structure 24 may contain one or more apertures to enable access to or fluid communication with the inside of the article container 20 when in the closed position.

Preferably, the at least one coupling means 70 further comprises one or more latch assemblies attached to one or both of the first container structure 22 and the second container structure 24. The one or more latch assemblies, for example butterfly latches, enable the first container structure 22 to be removably secured to the second container structure 24 to impede the article container 20 from being positioned away from the closed position. It is preferred that the one or more latches be substantially shock resistant to impede de-latching of the one or more latches and unintended opening of the article container 20 from the closed position to the open position when subjected to shock, for example when being dropped from a height or when subjected to external impact forces.

Preferably, the rim structure 28/46 of each of the first container structure 22 and the second container structure 24 further defines a channel 72/74 defined extending adjacent the respective rib 42/56 and trough 30/48. The channel 72 of the first container structure 22 is defined to positionally align with the channel 74 of the second container structure 24 when the article container 20 is in the closed position. The first container structure 22 further comprises a seal 76, for example an elastomeric seal, located in and along the channel 72 thereof. Therefore when the article container 20 is in the closed position, the seal 76 is aligned to abut the channel 74 of the second container structure 24 to form a sealed enclosure between the first container structure 22 and the second container structure 24.

It is preferred that when in use, the cavity of at least one of the first container structure 22 and the second container structure 24 is padded with or lined with shock absorbing material, for example foam, to provide shock and vibrational dampening to the article when contained within the article container 20.

As aforementioned, the first container structure 22 and the second container structure 24 preferably shares the same shape and dimensions. This enables the first container structure 22 and the second container structure 24 to be moulded from a single mold assembly, for example by injection moulding, thus reducing production costs. Further, the existence of the rib 42/56 and trough 30/48 on each of the first container structure 22 and the second container structure 24 enables inter-complementing features to be used for positionally locating the first container structure 22 with the second container structure 24.

However, the article container 20 is not precluded from introduce variations to one of the first container structure 22 and the second container structure 24 that varies one or both of shape and dimension thereof from the other. For example, the first container structure 22 can have a substantially deep cavity for containing the article while the second container structure 24 may have a substantially shallow cavity to function as just a cover structure or lid to the first container structure 22.

In a forgoing manner, an article container is described according to an exemplary embodiment of the invention. Although only one embodiment of the invention is disclosed in this document, it will be apparent to one skilled in the art in view of this disclosure that numerous changes and/or modifications can be made to the disclosed embodiment without departing from the scope and spirit of the invention.

Claims

1. An article container comprising:
 - a first container structure; and
 - a second container structure, each of the first container structure and the second container structure comprising:
 - a base;
 - a rim structure defining a trough;
 - a sidewall extending from the base and terminating at the rim structure, the rim structure being formed substantially parallel a first plane, the base and the sidewall defining a cavity wherewithin at least a portion of an article is receivable; and
 - a rib shaped and dimensioned for being received by the trough, the rib protruding from the rim structure,

wherein the rim structure of the first container structure is for mating with the rim structure of the second container structure for enclosing the article receivable in the cavity of at least one thereof, the rib of one of the first container structure and the second container structure being shaped and dimensioned for being received by the trough of the other of the first container structure and the second container structure, the trough of the first container structure substantially dimension and shape matches the trough of the second container structure to substantially impede spatial displacement of the second container structure along the first plane when the rim structure of the second container structure is mated with the rim structure of the first container structure.
2. The article container as in claim 1, the first plane defining a second plane perpendicular thereto, the second plane segregating the rim structure of each of the first container structure and the second container structure into a first segment and a second segment, the rib extending from the first segment and the trough being defined along the second segment of each of the first container structure and the second container structure.

3. The article container as in claim 2, each of the extremities of the rib of the rim structure being adjacent one of the extremities of the trough of the rim structure of each of the first container structure and the second container structure.
4. The article container as in claim 2, the first segment being symmetrical to the second segment about the second plane for each of the first container structure and the second container structure.
5. The article container as in claim 2, the cross-section of the rib along the first plane and the cross-section of the trough along the first plane being symmetrical about the second plane for each of the first container structure and the second container structure.
6. The article container as in claim 1, the base and the sidewall of each of the first container structure and the second container structure forming a polymeric shell.
7. The article container as in claim 1, the height of the rib extending from the rim structure of the first container structure being less than the depth of the trough defined in the rim structure of the second container structure.
8. The article container as in claim 1, each of the first container structure and the second container structure further comprising a channel extending adjacent the rib and the trough thereof, the channel of the first container structure being adaptable for locating a seal thereto such that when rim structure of the first container structure is mated to the rim structure of the second container structure, the rim structure is positioned between the channel of the first container structure and the channel of the second container structure to form a sealed enclosure between the first container structure and the second container structure.
9. The article container as in claim 1, further comprising at least one coupling means adaptable for coupling the rim structure of the first container structure to the rim structure of the second container structure.

10. A container structure comprising:
 - a base;
 - a rim structure defining a trough;
 - a sidewall extending from the base and terminating at the rim structure, the rim structure being formed substantially along a first plane; and
 - a rib shaped and dimensioned for being received by the trough, the rib protruding from the rim structure,wherein the base and the sidewall defines a cavity wherewithin at least a portion of an article is receivable, the rim structure is for mating with a cover structure for enclosing the article received in the cavity, the cover structure having a rib shaped and dimensioned for being received by the trough of the rim structure, and a trough for receiving the rib of the rim structure, the trough of the rim structure substantially dimension and shape matches the trough of the cover structure to substantially impede spatial displacement of the cover structure along the first plane when the cover structure is mated with the rim structure.
11. The container structure as in claim 10, the first plane defining a second plane perpendicular thereto, the second plane segregating the rim structure into a first segment and a second segment, the rib extending from the first segment and the trough being defined along the second segment.
12. The container structure as in claim 11, each of the extremities of the rib of the rim structure being adjacent one of the extremities of the trough of the rim structure.
13. The container structure as in claim 11, the first segment being symmetrical to the second segment about the second plane.
14. The container structure as in claim 11, the cross-section of the rib along the first plane and the cross-section of the trough along the first plane being symmetrical about the second plane.

15. The container structure as in claim 10, the base and the sidewall forming a polymeric shell.
16. The container structure as in claim 10, the height of the rib of the rim structure being less than the depth of the trough of the cover structure.
17. The container structure as in claim 10, further comprising a channel extending adjacent the rib and the trough, the channel being adaptable for locating a seal thereto such that when rim structure is mated with the cover structure, the cover structure, base and sidewall forms a sealed enclosure.
18. The container structure as in claim 10, further comprising at least one coupling means operable for coupling the rim structure with the cover structure.