

ABRASIVE ARTICLES AND METHOD OF FORMING SAME

BACKGROUND

Field of the Disclosure

[0001] The following is directed to a system for use with abrasive articles, and more particularly, a container for containing an abrasive article.

Description of the Related Art

[0002] More and more places are conducting maintenance and improvements to infrastructure during the night to avoid delays and interruptions of the majority of people that have normal daytime routines. As more and more construction is conducted during nighttime hours in limited lighting conditions, improvements of the tools that are used in such environments are needed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The present disclosure may be better understood, and its numerous features and advantages made apparent to those skilled in the art by referencing the accompanying drawings.

[0004] FIG. 1 includes a perspective view image of a container according to an embodiment.

[0005] FIG. 2 includes a perspective view image of a container according to an embodiment.

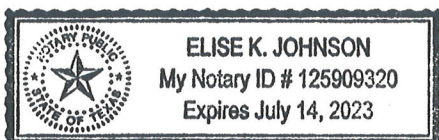
[0006] FIG. 3 includes a perspective view image of a container according to an embodiment

[0007] The use of the same reference symbols in different drawings indicates similar or identical embodiments.

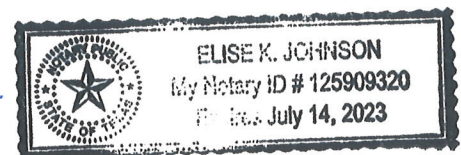
DETAILED DESCRIPTION

[0008] The following description in combination with the figures is provided to assist in understanding the teachings provided herein. The following disclosure will focus on specific implementations and embodiments of the teachings. This focus is provided to assist in describing the teachings and should not be interpreted as a limitation on the scope or applicability of the teachings. However, other teachings can certainly be used in this application.

[0009] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a method, article, or apparatus that comprises a list of features is not necessarily limited only to those features but may include other features not expressly listed or inherent to such method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive-or and not to an exclusive-or. For example, a condition A or B is satisfied by any one



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of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0010] Also, the use of "a" or "an" is employed to describe elements and components described herein. This is done merely for convenience and to give a general sense of the scope of the invention. This description should be read to include one or at least one and the singular also includes the plural, or vice versa, unless it is clear that it is meant otherwise. For example, when a single item is described herein, more than one item may be used in place of a single item. Similarly, where more than one item is described herein, a single item may be substituted for that more than one item.

[0011] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The materials, methods, and examples are illustrative only and not intended to be limiting. To the extent that certain details regarding specific materials and processing acts are not described, such details may include conventional approaches, which may be found in reference books and other sources within the manufacturing arts.

[0012] Embodiments disclosed herein are directed to a system for containing an abrasive article, and more specifically a container having at least one reflective element. Such a container may be suitable for storing abrasive articles that are used in limited lighting conditions, such as nighttime operations. The reflective capabilities of the container may be suitable for identification of the product in limited light environments. The reflective capabilities may also be used to mark certain areas of a work site.

[0013] FIGs. 1, 2, and 3, include images of a container according to an embodiment. As illustrated the container 100 can have a body 101 including a first surface 102, a second surface opposite the first surface 103, and a side surface 104 extending between the first surface 102 and the second surface 103. The side surface 104 can intersect the first surface 102 and the second surface 103 at edges extending around the body 101. The side surface may extend around and define a peripheral surface of the body 101. It will be appreciated that the embodiments of FIGs. 1-3 are non-limiting and one or more of the features of the embodiments may be optional. Moreover, other designs and structures are plausible.

[0014] As illustrated in FIGs. 1-3, the container can include at least one handle 110. In certain instances, the handle 110 can include a plurality of handles, such as handle 111 and handle 112.

[0015] The handled can be coupled to the body 101 in various manners. For example, in one embodiment (not illustrate) the handle can be integrated into one or more surfaces of the body of the container, such that the one or more handles are recessed into the body. In another embodiment, the at least one handle 110 can be coupled to an exterior surface of the body 101 of the container, such as one of the exterior surfaces of the body 101. In at least one embodiment, the at least one handle 110 can be coupled to the body 101 of the container 100 by a hinge. It will be appreciated that other suitable fasteners or coupling assemblies may be used to attach the at least one handle 110 to the body 101 of the container 100.

[0016] In one particular embodiment, the container 100 can include at least one reflective element, such as a first reflective element 121 coupled to the body 101 of the container 100. The at least one reflective element may have a particular design, shape, color and quality suitable for identifying the container 100 in limited lighting conditions and may also facilitate product identification. According to one embodiment, the at least one reflective element can overlie a certain amount of the exterior surface area of the body 101 of the container. For example, the first reflective element 121 can extend around at least 5% of a total exterior surface area of the body 101 of the container 100 or at least 10% or at least 15% or at least 20% or at least 30% or at least 40% or at least 50% or at least 60% or at least 70% or at least 80% or at least 90%. Still, in one non-limiting embodiment, the at least one reflective element, such as the first reflective element 121 can extend around not greater than 90% of a total exterior surface area of the body 101 of the container 100 or not greater than 80% or not greater than 70% or not greater than 60% or not greater than 50% or not greater than 40% or not greater than 30% or not greater than 20% or not greater than 10%. It will be appreciated that the total percentage of the exterior surface area covered by the at least one reflective element can be within a range including any of the minimum and maximum percentages noted above, including but not limited to, at least 5% and not greater than 90% or within a range including at least 10% and not greater than 70% or within a range including at least 10% and not greater than 50%.

[0017] In one embodiment, the at least one reflective element can include a plurality of reflective elements. For example, as illustrated in the embodiments of FIGs. 1 and 2, the body 101 of the container 100 can include a first reflective element 121 and a second reflective element 122, which can be separate and distinct from each other. According to one embodiment, the at least one reflective element includes a first reflective element 121 located on a first portion of the

body 101 of the container 100 and a second reflective element 122 located on a second portion of the body 101 of the container 100. The first and second reflective elements 121 and 122 can be located at different portions of the body 101. In one embodiment, the first reflective element 121 can extend around a portion of the side surface 104. More specifically, the first reflective element 121 can extend around an entire peripheral portion of the body 101 of the container 100. In another embodiment, the first reflective element 121 can be spaced apart from the first surface 102 and/or the second surface 103. In certain instances, the first surface 102 can be absent any reflective elements. In another embodiment, the second surface 103 can be absent any reflective elements. Still, it will be appreciated that in other embodiments, one or more reflective elements may be placed on the first and/or second surfaces 102 and 103, respectively.

[0018] As further illustrated in FIGs. 1 and 2, the second reflective element 122 can extend around a portion of the side surface 104. More specifically, the second reflective element 122 can extend around an entire peripheral portion of the body 101 of the container 100. In another embodiment, the second reflective element 122 can be spaced apart from the first surface 102 and/or the second surface 103.

[0019] According to one embodiment, the at least one reflective element (e.g., the first reflective element 121 and/or the second reflective element 122) can be adhered to the exterior surface of the container. More specifically, the at least one reflective element can include a reflective tape, and may consist of only a reflective tape that is selectively adhered to certain portions of the body 101 of the container 100. In another embodiment, the at least one reflective element includes retroreflective tape, and more particularly, may consist only of retroreflective tape that is selectively adhered to certain portions of the body 101 of the container.

[0020] According to another embodiment, the at least one reflective element can have a particular reflection that may facilitate improved use of the container. For example, the at least one reflective element can have a reflection coefficient of at least 0.9 as measured at 440 nm or at least 0.91 or at least 0.92 or at least 0.93 or at least 0.94 or at least 0.95 or at least 0.96 or at least 0.97 or at least 0.98 or at least 0.99. Notably, the reflection coefficient can be measured according to the test procedure outlined in “Reflectivity Spectra for Commonly Used Reflectors” from Martin Janecek available at <https://www.osti.gov/servlets/purl/1184400>. In another non-limiting embodiment, the at least one reflective element may have a reflection coefficient of at least 0.98 and not greater than 1.

[0021] The container 100 may include at least one latching mechanism, such as latching mechanisms 131 and 132. In certain instances, the latching mechanisms 131 and 132 may include a locking mechanism to ensure the container cannot be opened without the proper information or key. Additionally or alternatively, the container 100 may include one or more openings 171, 172, 173, and 174 in the upper portion 181 and/or the lower portion 182 of the body 101. Such openings 171, 172, 173, and 174 may facilitate engagement of one or more locking mechanisms, such as a pad lock or key lock, therein.

[0022] The container 100 may have a water repellant design to limit the content of water that may unintentionally enter the interior volume of the container and risk spoiling of the abrasive articles contained therein. In another embodiment, the container 100 can have a water-proof design with at least one seal or gasket configured to seal the interior volume of the container 100 and keep water from entering the interior volume. According to one embodiment, the container 100 can be made of a particular material and/or utilize certain sealing mechanisms to limit the transmission of water vapor from the exterior of the body into the interior volume 151 of the container 100. For example, the body 101 of the container 100 may be made of a particular material or combination of materials that may limit the transmission of water vapor into the interior volume 151. Such materials can include, for example, a polymer, a metal, a metal alloy, or any combination thereof.

[0023] In certain instances, the body 101 of the container may include one or more sealing mechanisms, such as gaskets, that may be placed at particular locations in the body 101 to facilitate limited transmission of gasses and water vapor between the exterior environment into the interior volume when the container 100 is closed. For example, one or more sealing mechanisms may be placed around the peripheral edge 171 where the upper portion 181 and the lower portion 182 are joined during closing of the body 101.

[0024] At least one of the first surface 102 or second surface 103 may include at least one marking 141, which may include suitable indicia for product marking. In one embodiment, at least a portion of the marking 141 may include a reflective element that can have any of the characteristics of the reflective elements described in the embodiments herein.

[0025] In another aspect, the interior volume 151 within the interior of the body 101 of the container 100 may include a compliant material contained within the internal volume 151. The compliant material may be included as a single monolithic piece or separated into different

portions. The compliant material may be suitable for absorbing shocks and protecting the abrasive articles contained in the internal volume 151. For example, as illustrated in FIG. 3, the compliant material can include a first portion 161 contained within an upper portion of the internal volume 151 adjacent the first surface 102. The compliant material may also include a second portion 162 and third portion 163 within a lower portion of the internal volume 151, which may be adjacent the second surface 103. The compliant material may be sized and oriented within the internal volume 151 to define a shaped void, wherein the shaped void is shaped to fit one or more abrasive articles. As illustrated, in the embodiment of FIG. 3, the second and third portions 162 and 163 of the compliant material can define a shaped void having a quadrilateral two-dimensional shape having a suitable size to properly contain a box 155 configured to hold bonded abrasive grinding wheels.

[0026] In one embodiment, the first and second portion 162 and 163 of the compliant material can be formed to have openings 164 and 165, respectively. The openings 164 and 165 can provide a suitable means for handling of the box 155, including the placement and removal of the box 155 from the shaped void formed by the first and second portions 162 and 163 of the compliant material.

[0027] The foregoing embodiments are directed to bonded abrasive products, and particularly grinding wheels, which represent a departure from the state-of-the-art.

[0028] Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any feature(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature of any or all the claims. Reference herein to a material including one or more components may be interpreted to include at least one embodiment wherein the material consists essentially of the one or more components identified. The term “consisting essentially” will be interpreted to include a composition including those materials identified and excluding all other materials except in minority contents (e.g., impurity contents), which do not significantly alter the properties of the material. Additionally, or in the alternative, in certain non-limiting embodiments, any of the compositions identified herein may be essentially free of materials that are not expressly disclosed. The embodiments herein include range of contents for certain components within a

material, and it will be appreciated that the contents of the components within a given material total 100%.

[0029] The specification and illustrations of the embodiments described herein are intended to provide a general understanding of the structure of the various embodiments. The specification and illustrations are not intended to serve as an exhaustive and comprehensive description of all of the elements and features of apparatus and systems that use the structures or methods described herein. Separate embodiments may also be provided in combination in a single embodiment, and conversely, various features that are, for brevity, described in the context of a single embodiment, may also be provided separately or in any subcombination. Further, reference to values stated in ranges includes each and every value within that range. Many other embodiments may be apparent to skilled artisans only after reading this specification. Other embodiments may be used and derived from the disclosure, such that a structural substitution, logical substitution, or another change may be made without departing from the scope of the disclosure. Accordingly, the disclosure is to be regarded as illustrative rather than restrictive.

What is claimed is:

1. A system for use with abrasive articles comprising a container having an internal volume configured to contain an abrasive article, wherein the container comprises at least one reflective element attached to an exterior surface of the container.
2. The system of claim 1, wherein the container comprises at least one handle.
3. The system of claim 2, wherein the handle is coupled to an exterior surface of the container.
4. The system of claim 2, wherein the handle is coupled to the container by a hinge.
5. The system of claim 1, wherein the reflective element extends around at least 5% of a total exterior surface area of the container or at least 10% or at least 15% or at least 20% or at least 30% or at least 40% or at least 50% or at least 60% or at least 70% or at least 80% or at least 90%.
6. The system of claim 1, wherein the at least one reflective element extends around not greater than 90% of a total exterior surface area of the container or not greater than 80% or not greater than 70% or not greater than 60% or not greater than 50% or not greater than 40% or not greater than 30% or not greater than 20% or not greater than 10%.
7. The system of claim 1, wherein the container includes a first surface, a second surface opposite the first surface, and a side surface extending between the first surface and the second surface, wherein the at least one reflective element extends around at least a portion of the side surface.
8. The system of claim 7, wherein the at least one reflective element extends around an entire peripheral portion of the container as defined by at least a portion of the side surface.
9. The system of claim 7, wherein the at least one reflective element is spaced apart from the first surface.
10. The system of claim 7, wherein the first surface is absent an reflective element.
11. The system of claim 1, wherein the at least one reflective element includes a first reflective element located on a first portion of the container and a second reflective element located on a second portion of the container.
12. The system of claim 1, wherein the at least one reflective element is adhered to the exterior surface of the container.

13. The system of claim 1, wherein the at least one reflective element includes reflective tape.

14. The system of claim 1, wherein the at least one reflective element includes retroreflective tape.

15. The system of claim 1, wherein the at least one reflective element has a reflection coefficient of at least 0.9 at 440 nm or at least 0.91 or at least 0.92 or at least 0.93 or at least 0.94 or at least 0.95 or at least 0.96 or at least 0.97 or at least 0.98 or at least 0.99.

16. The system of claim 1, wherein the at least one reflective element has a reflection coefficient of at least 0.98 and not greater than 1.

17. The system of claim 1, further comprising a compliant material contained within the internal volume.

18. The system of claim 1, further comprising a shaped void in the compliant material.

19. The system of claim 18, wherein the shaped void is shaped to fit one or more abrasive articles.

20. The system of claim 1, wherein the container has a latching mechanism.

ABSTRACT OF THE DISCLOSURE

A system for use with abrasive articles including a container having an internal volume to contain an abrasive article, the container having at least one reflective element attached to an exterior surface of the container.

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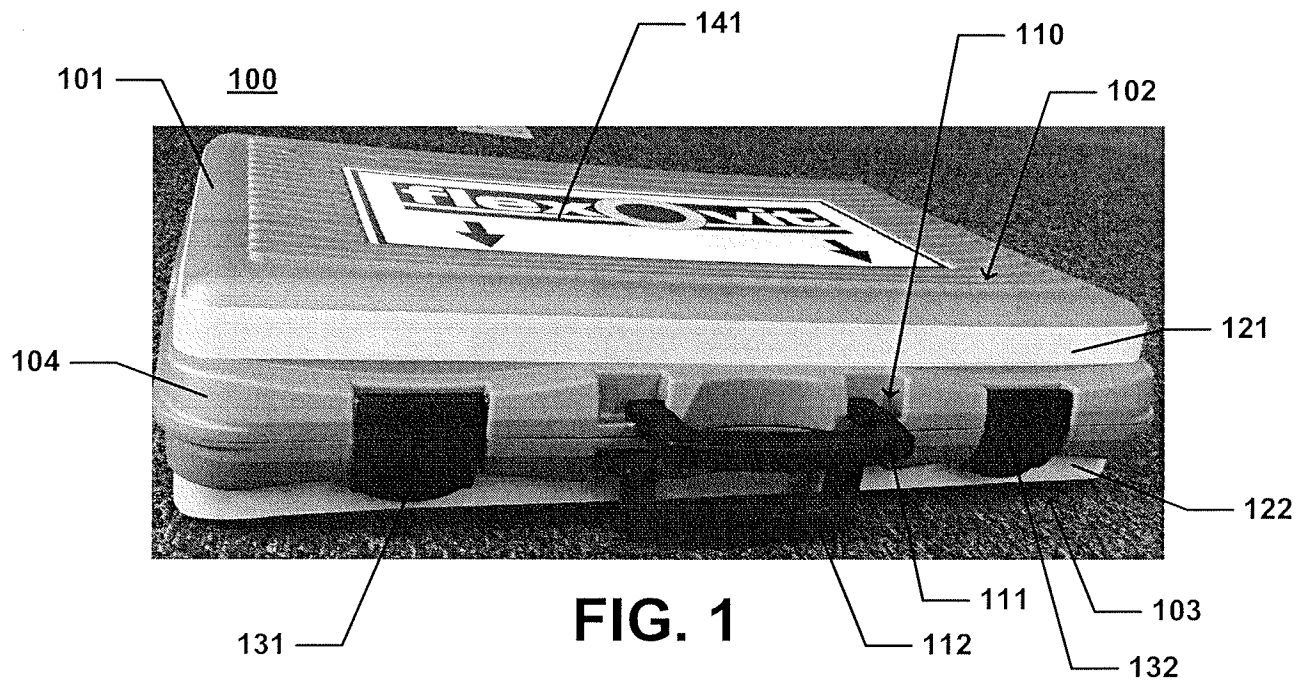


FIG. 1

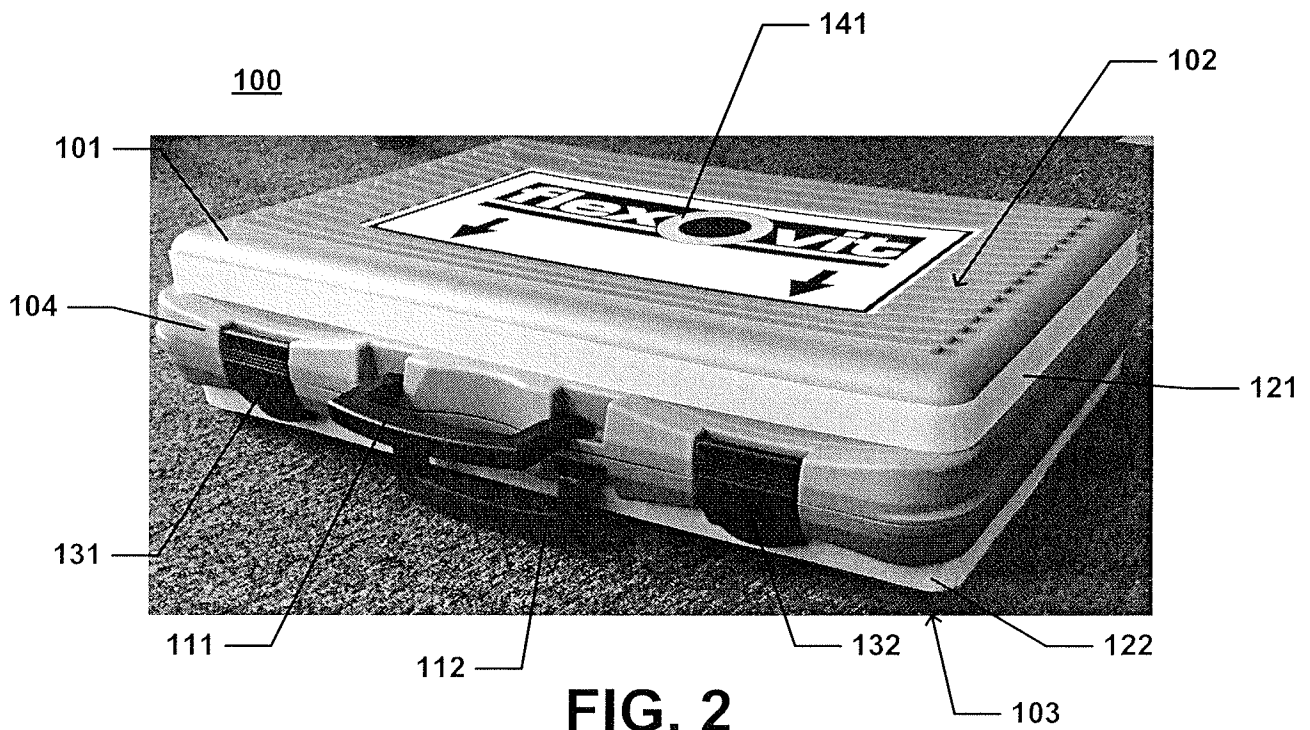


FIG. 2

