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(54) **APPARATUS, SYSTEMS AND METHODS FOR USING HANDHELD MEASUREMENT DEVICES TO CREATE ON-DEMAND PACKAGING**

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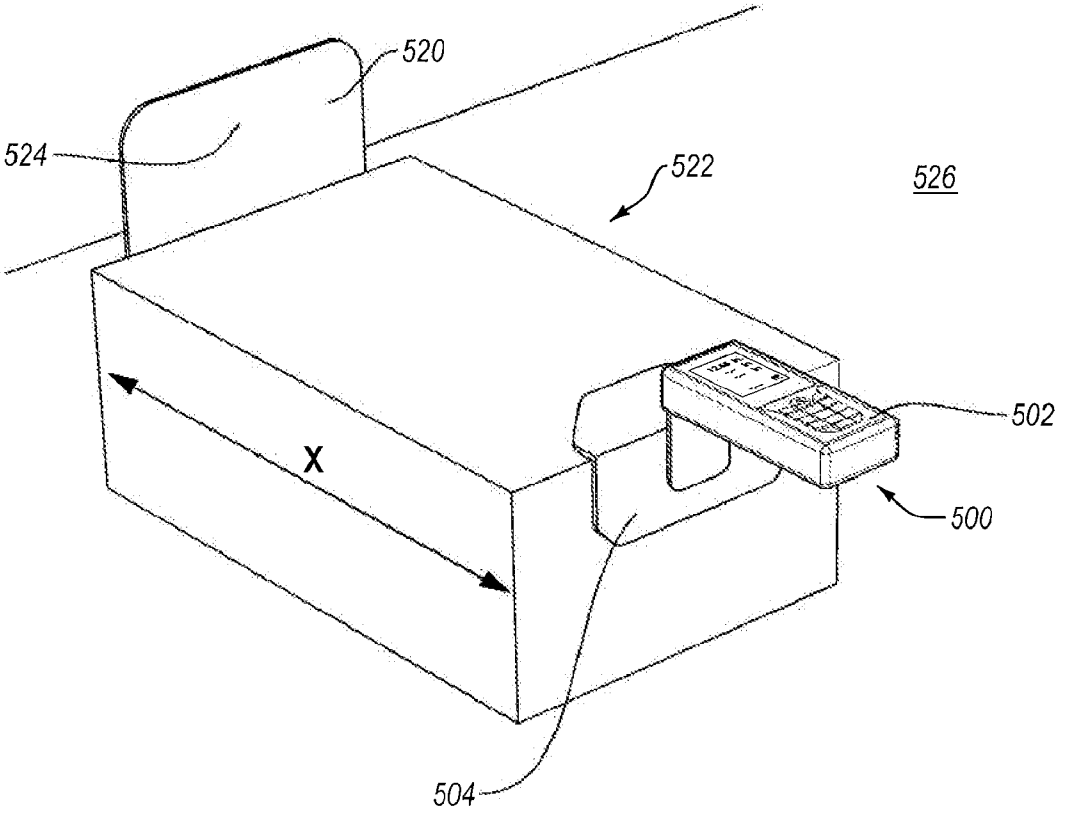
(57) **ABSTRACT**

Methods, apparatus, assemblies, and systems relate to producing on-demand packaging. For example, packaging can be automatically produced on-demand and be sized and configured for use with a customized set of items and/or a customized arrangement of items. In one aspect, one or more items are arranged. The one or more items are then measured using a measurement device. The measurement device includes, in some aspects, a bracket that engages the arranged one or more items. The bracket may, in some embodiments, elevate a measurement component relative to the arranged one or more items so as to provide clear line of sight unobstructed by the arranged one or more items. Measurements in three dimensions may be obtained and used to create a custom, on-demand package.



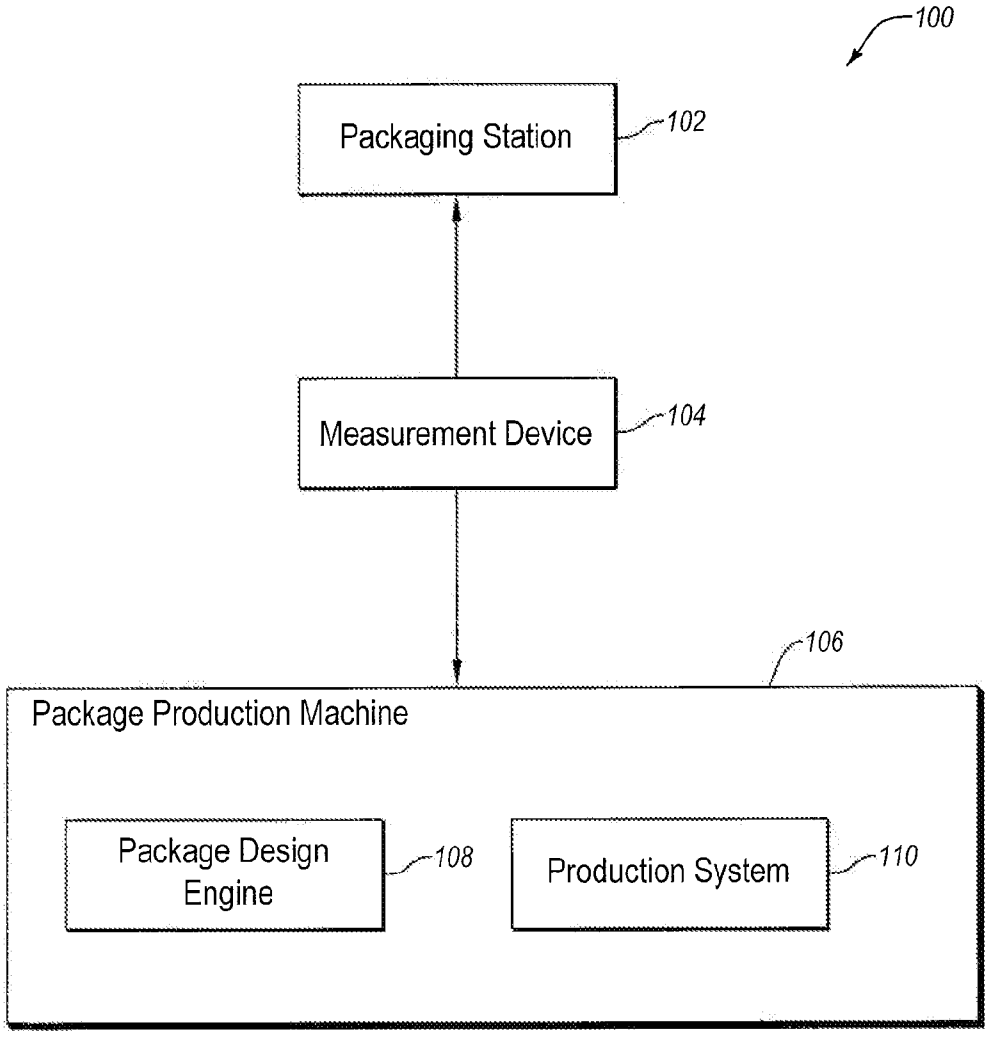

100
Packaging Station
102
Measurement Device
104
106
Package Production Machine
Package Design Engine
108
Production System
110

Fig. 1

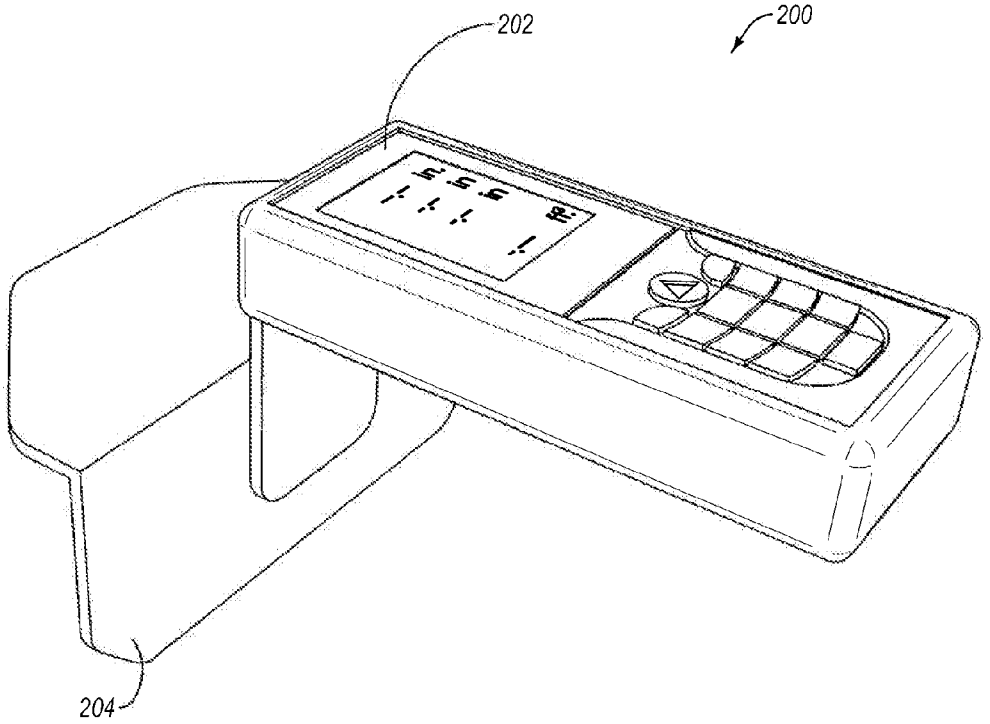


Fig. 2A

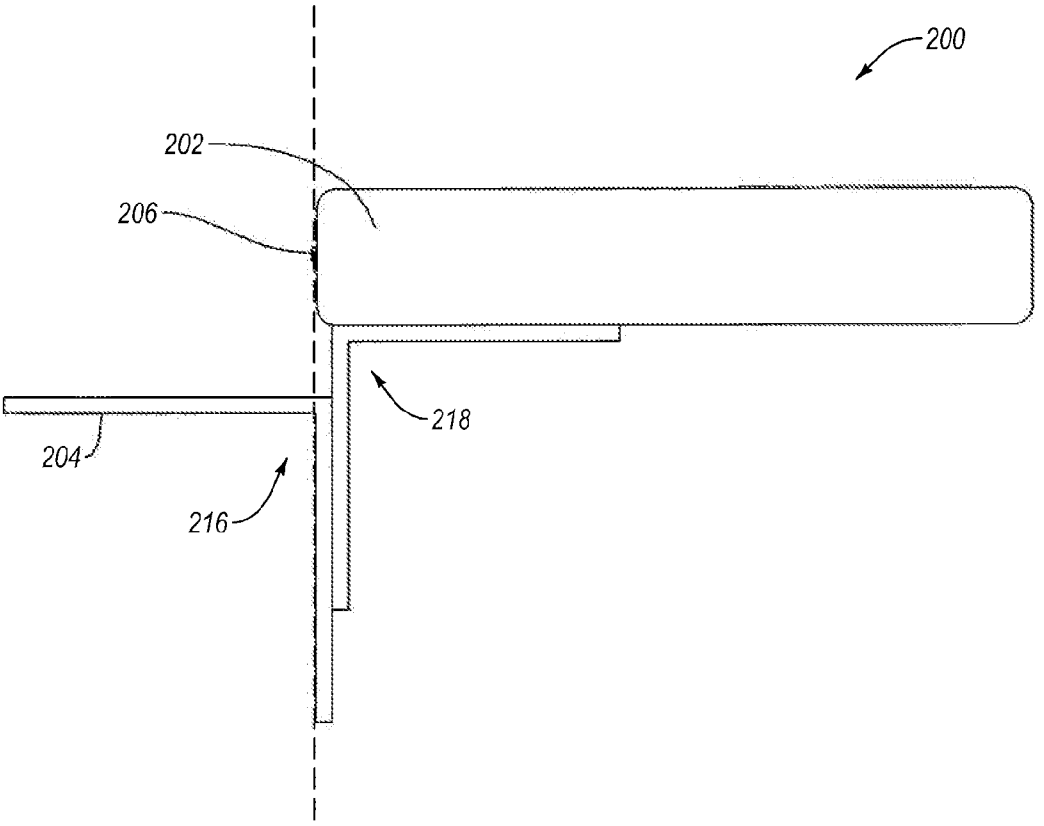


Fig. 2B

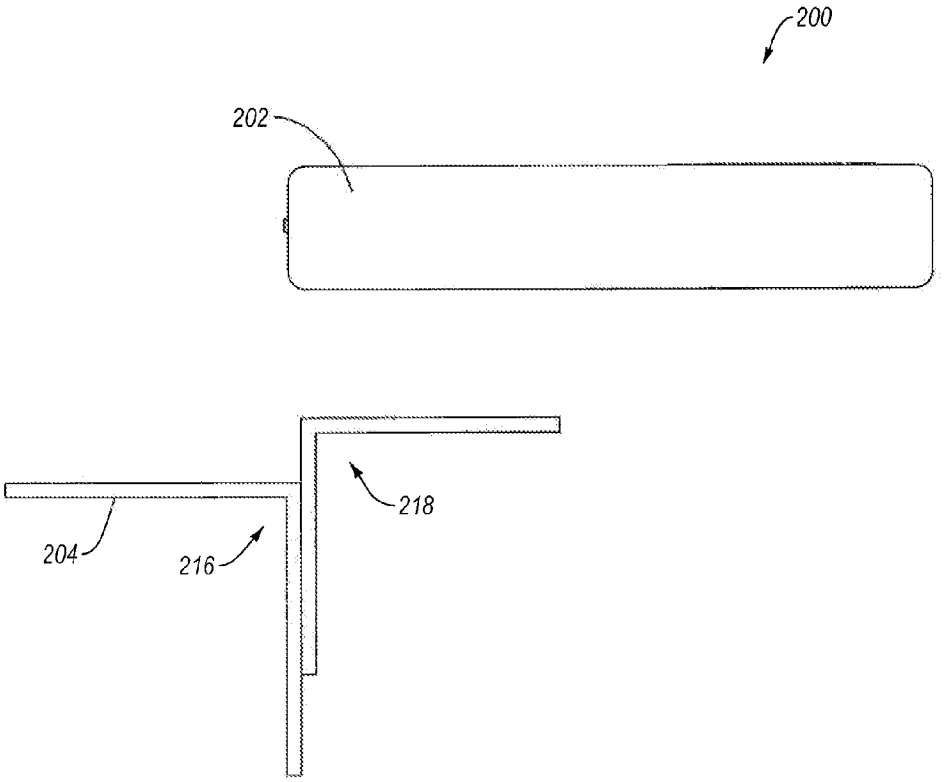


Fig. 3A

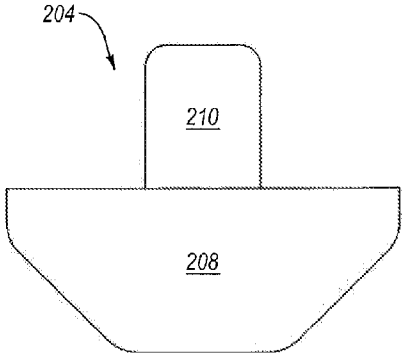


Fig. 3B

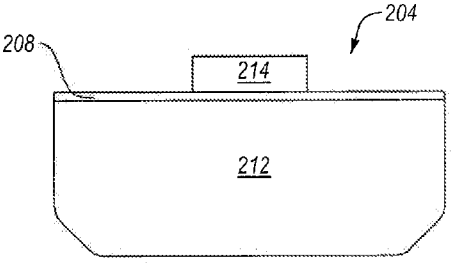


Fig. 3C

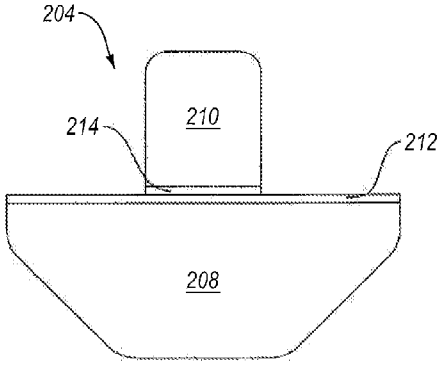


Fig. 3D

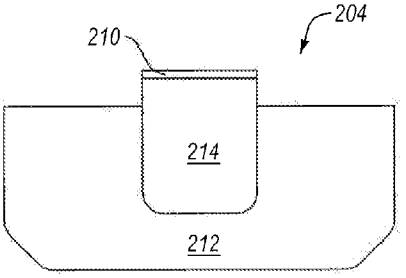


Fig. 3E

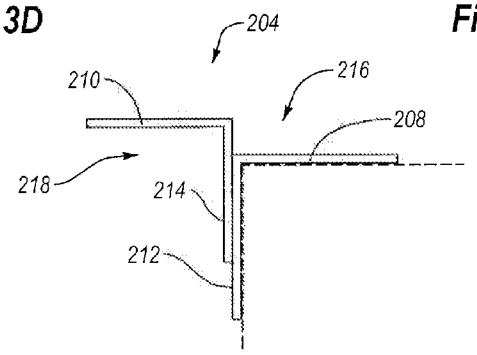


Fig. 3F

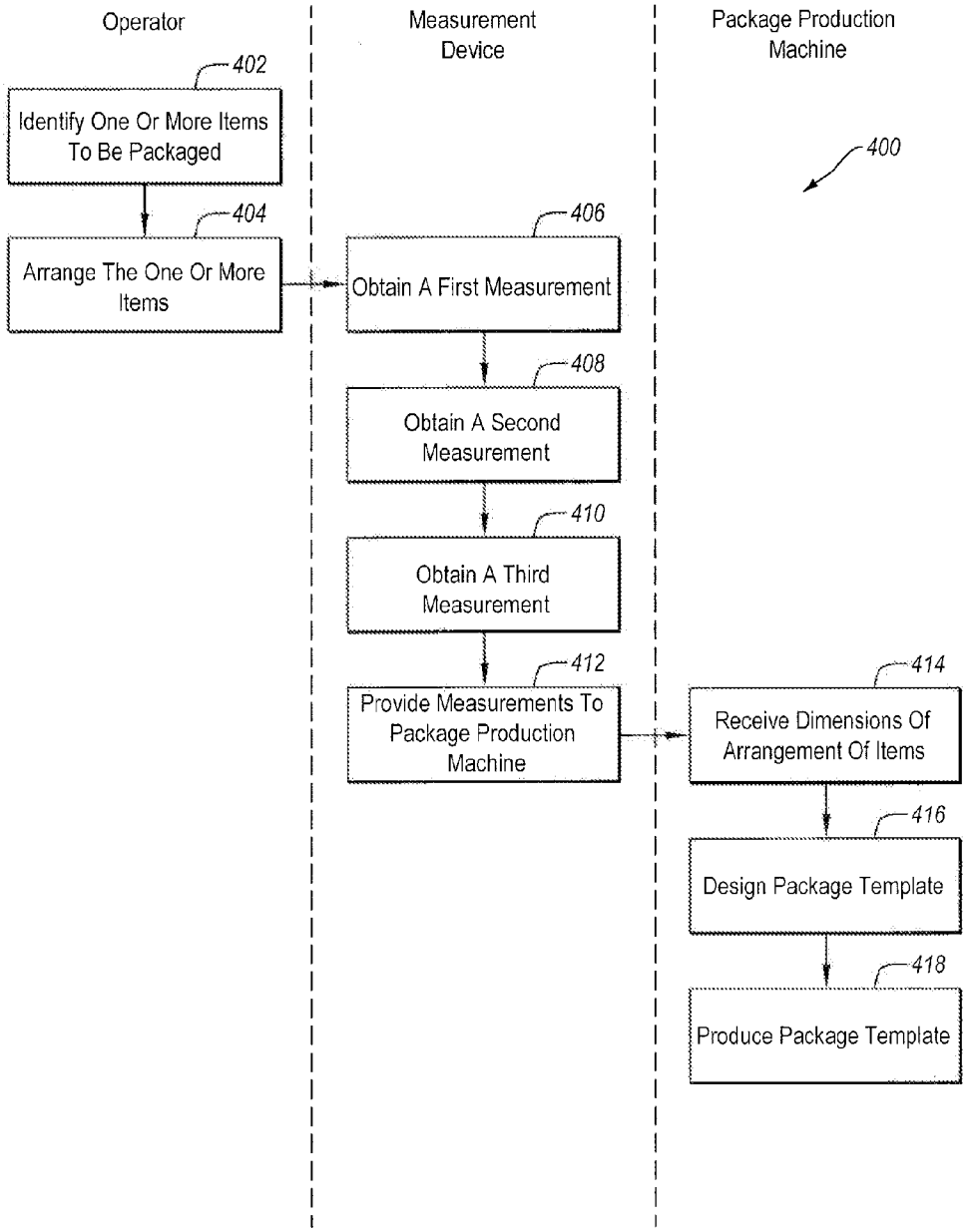

Operator
Measurement Device
Package Production Machine
400
402
Identify One Or More Items To Be Packaged
404
Arrange The One Or More Items
406
Obtain A First Measurement
408
Obtain A Second Measurement
410
Obtain A Third Measurement
412
Provide Measurements To Package Production Machine
414
Receive Dimensions Of Arrangement Of Items
416
Design Package Template
418
Produce Package Template

Fig. 4

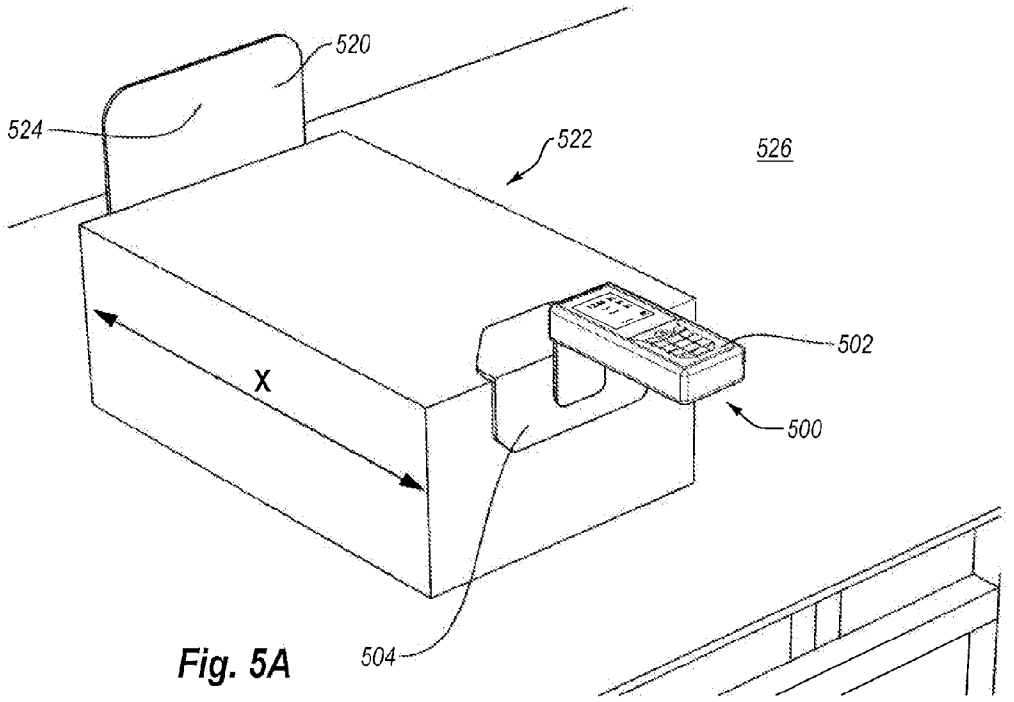


Fig. 5A

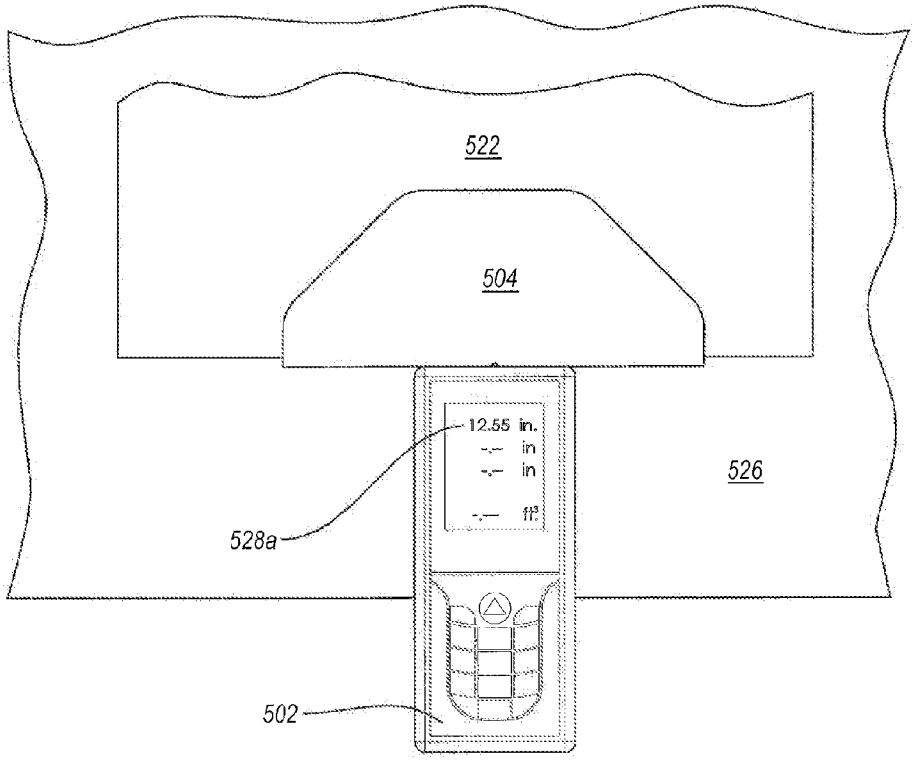


Fig. 5B

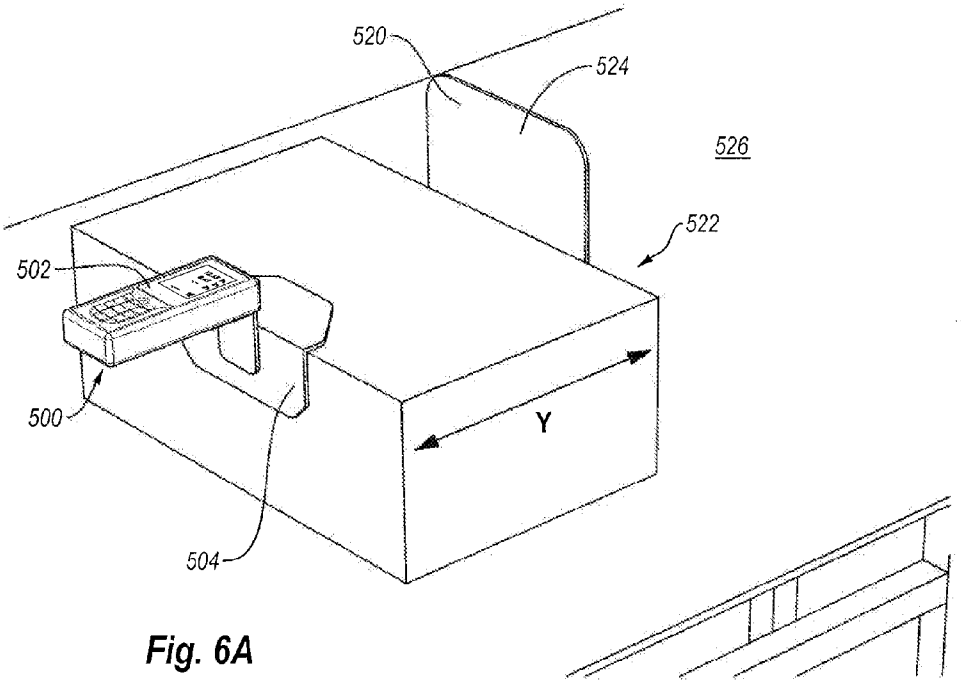

520
524
526
522
502
500
504
Y

Fig. 6A

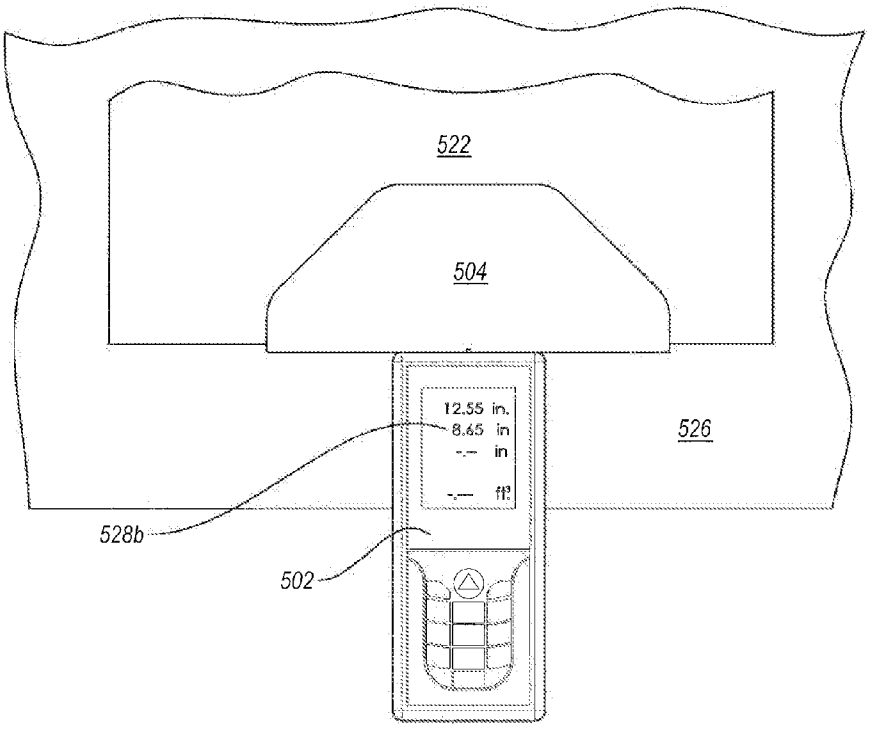

522
504
526
12.55 in.
8.65 in
-.- in
-.-- ft³
528b
502

Fig. 6B

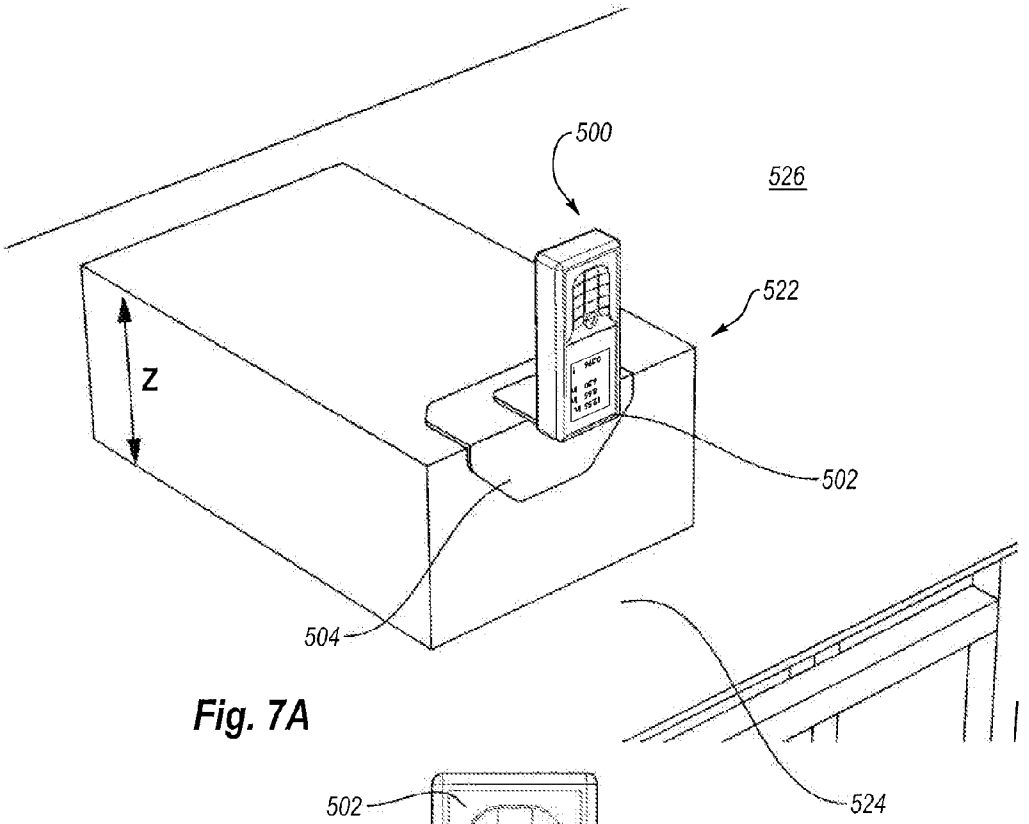


Fig. 7A

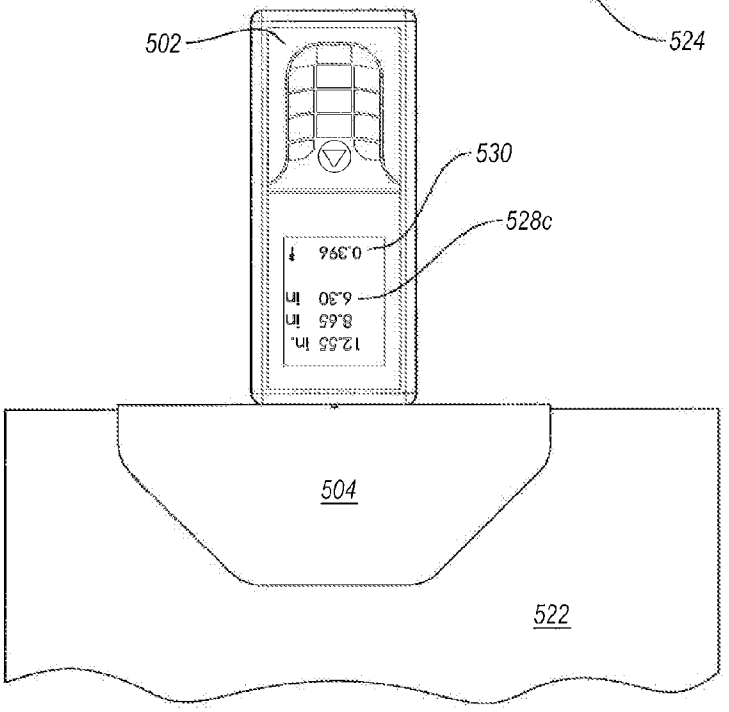


Fig. 7B

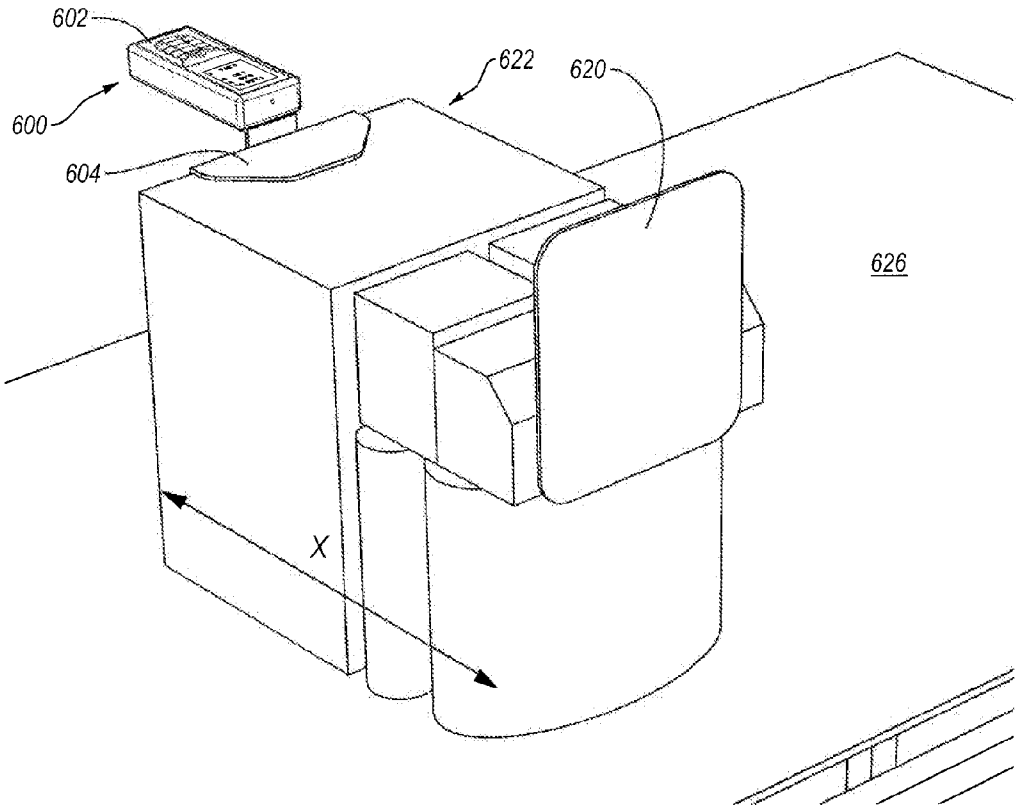


Fig. 8

APPARATUS, SYSTEMS AND METHODS FOR USING HANDHELD MEASUREMENT DEVICES TO CREATE ON-DEMAND PACKAGING

RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of U.S. Provisional Patent Application No. 61/423,567, filed on Dec. 15, 2010, entitled APPARATUS, SYSTEMS AND METHODS FOR USING HANDHELD MEASUREMENT DEVICES TO CREATE ON-DEMAND PACKAGING, which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] With the increasing availability of merchandise, products, and other items not only locally, but through a global market, the need to properly and efficiently package such materials for shipment and delivery has never been more important. Products that are improperly packaged are more likely to be damaged on arrival. Damaged products can result in a significant cost to the provider if the product needs to be returned, replaced, or even if a frustrated consumer decides simply to cancel a purchase. Fortunately, available packaging systems can now be used to produce virtually any style of packaging, including packaging that can safely enclose and store one or more products.

[0003] Perhaps the single biggest factor in producing packaging for a product is that the packaging be designed to fit the contained product as precisely as possible. With a more precise fit, the contained item or product not only is less likely to be damaged, but the need for inner packaging is also reduced and possibly eliminated. In particular, when packaging materials (e.g., corrugated cardboard, paper, etc.) are used to create a box or other packaging design, the materials are often creased and folded as near to a right angle possible. Creasing and folding at right angles increases strength characteristics of the packaging materials, thereby giving a resulting box a correspondingly increased resistance to damage when stacked, transported, moved, and the like.

[0004] A standard box has twenty-four right angles making up its rectilinear form. If one or more angles deviate from a right angle by more than even a few degrees, other angles can also be comprised and the strength of a resulting box reduced. When strength decreases, the risk of damage or loss to the enclosed item(s) increases. Likewise when packaging fits loosely, similar risks of damage or loss can occur as the sides of the packaging can bow, the corners may sag, and the right angles that make the package strong may be lost.

[0005] Using boxes or other packaging that provide a more precise fit can thus provide a dramatic reduction in loss and damage. A more precise fit also produces other significant savings, such as, for example, reducing in the amount of material used in producing a box, reducing and potentially eliminating inner packaging, reducing postage and handling fees, reducing time at the pack line, and increasing transportation yield.

[0006] For instance, in the fulfillment industry, it is estimated that shipped items are typically packaged in boxes that are about 40% larger than the shipped items. Boxes that are too large for a particular item are more expensive than a box that is custom sized for the item due to the cost of the excess material used to make the larger box. When an item is packaged in an oversized box, filling material (e.g., Styrofoam, foam peanuts, paper, air pillows, etc.) is often placed in the box to prevent the item from moving inside the box and to prevent the box from caving in when pressure is applied (e.g., when boxes are taped closed or stacked). These filling materials further increase the cost associated with packing an item in an oversized box. Furthermore, customized sized boxes also reduce the shipping costs associated with shipping items compared to shipping the items in oversized boxes. A shipping vehicle filled with boxes that are 40% larger than the packaged items is much less cost efficient to operate than a shipping vehicle filled with boxes that are custom sized to fit the packaged items. In other words, a shipping vehicle filled with custom sized packages can carry a significantly larger number of packages, which can reduce the number of shipping vehicles required to ship that same number of items. Accordingly, in addition or as an alternative to calculating shipping prices based on the weight of a package, shipping prices are often affected by the size of the shipped package. Thus, reducing the size of an item's package can reduce the price of shipping the item.

[0007] Existing packaging equipment permits a manufacturer, producer, or vendor to key in a desired box template or potentially the desired dimensions of a box or other package. The equipment can then automatically generate a box template with appropriate cuts and creases. For high volume items, box sizes may be pre-fabricated since repeated sales and/or storage of such items makes it economically feasible to design a package specific to such item or collection of items.

[0008] However, it is often not feasible to pre-select box sizes and/or pre-fabricate boxes for low volume items, specialty items, unique collections of items, etc., at least not in a manner that provides a precise fit. For example, a retailer operating an online store may have thousands of different items, and could receive an order for any number of different items, such that the combined size, shape, weight, and other configuration of a desired package would be virtually impossible to predict beforehand. Such combinations have heretofore made it difficult to produce customized packaging economically, due at least in part to the time needed to arrange and measure the items, and key in a box size for each order that includes multiple items. Thus, retailers have generally been forced to select a box from available boxes of standard sizes and fill in the gaps within the box with internal packaging materials.

BRIEF SUMMARY

[0009] Embodiments of the present disclosure are directed to a system for creating on-demand packaging based on a physical arrangement of items to be placed within the created packaging. Embodiments of the present disclosure include systems, machines, methods, assemblies, and computer-readable media usable to efficiently and automatically produce customized packaging for a wide variety of combinations of different items and products.

[0010] According to one example aspect, a measurement device is disclosed and is adapted to measure an arrangement of one or more to-be-packaged items in each of three dimensions. According to at least one aspect, the measurement device may include an electronic measurement component and a bracket. The electronic measurement component may include a first end and an emission mechanism configured to direct a measurement element in a direction generally normal to the first end. The bracket may be attached to the electronic measurement component. The bracket may include a first

engagement surface generally aligned with the first end of the electronic measurement component.

[0011] In another aspect that may be combined with any one or more other aspects herein, a measurement bracket is an angle bracket.

[0012] In another aspect that may be combined with any one or more other aspects herein, a bracket includes at least first and second surfaces, with the first and second surfaces being offset at an angle that is at least about ninety degrees.

[0013] In another aspect that may be combined with any one or more other aspects herein, a bracket includes at least two portions. A first portion attaches to an electronic measurement component and a second portion includes a first engagement surface and is offset relative to an electronic measurement component.

[0014] In another aspect that may be combined with any one or more other aspects herein, a second portion of a bracket is offset in a direction generally parallel to a first end of an electronic measurement component.

[0015] In another aspect that may be combined with any one or more other aspects herein, a bracket includes a dual angle construction.

[0016] In another aspect that may be combined with any one or more other aspects herein, a bracket defines an engagement angle that includes a first engagement surface, and defines an attachment angle including a first attachment surface configured to attach to an electronic measurement component.

[0017] In another aspect that may be combined with any one or more other aspects herein, a dual angle bracket has two angles arranged back-to-back.

[0018] In another aspect that may be combined with any one or more other aspects herein, a bracket includes generally parallel first surfaces and two generally parallel second surfaces, with two angles being secured together along at least a portion of generally parallel second surfaces.

[0019] In another aspect that may be combined with any one or more other aspects herein, two angles of a bracket are at least partially offset in a direction that extends generally parallel to second surfaces and/or generally perpendicular to first surfaces.

[0020] In another aspect that may be combined with any one or more other aspects herein, an emission mechanism is configured to extend or emit at least one of a laser, sound wave, ultrasonic wave, or measuring tape.

[0021] In another aspect that may be combined with any one or more other aspects herein, an electronic measurement component is configured to measure and store dimensions obtained in three orthogonal directions.

[0022] In another aspect that may be combined with any one or more other aspects herein, an electronic measurement component is configured to display three orthogonal dimensions as they are obtained, and/or simultaneously.

[0023] In another aspect that may be combined with any one or more other aspects herein, an electronic measurement component is configured to communicate with a package production machine by transmitting dimensional information to the package production machine.

[0024] In another aspect that may be combined with any one or more other aspects herein, a bracket further includes a second engagement surface, and at least one of first or second engagement surfaces has cut corners.

[0025] In another aspect that may be combined with any one or more other aspects herein, a bracket is selectively detachable from an electronic measurement component.

[0026] In another aspect that may be combined with any one or more other aspects herein, a system for producing on-demand or custom packaging includes a measurement device having an electronic measurement component and an angle bracket detachably secured to the electronic measurement component. The electronic measurement component is capable of obtaining and simultaneously storing measurements made in at least three dimensions. The angle bracket includes an engagement angle configured to engage an arrangement of one or more to-be-packaged items, and includes an attachment angle coupled to the engagement angle and sized to be detachably secured to the electronic measurement component.

[0027] In another aspect that may be combined with any one or more other aspects herein, an engagement angle includes a first engagement surface generally aligned with an emission end of an electronic measuring component and/or an emission mechanism thereof.

[0028] In another aspect that may be combined with any one or more other aspects herein, an engagement angle includes at least a second engagement surface extending from a first engagement surface and offset from an electronic measurement component by a distance extending in a direction generally parallel to the first engagement surface or an emission end of the electronic measurement component.

[0029] In another aspect that may be combined with any one or more other aspects herein, a package production machine is communicatively coupleable to an electronic measurement device, and the package production machine is configured to receive dimensional information obtained by the electronic measurement device and dynamically and on-demand design and produce a package template from raw production materials.

[0030] In another aspect that may be combined with any one or more other aspects herein, a package production machine is communicatively coupled to an electronic measurement device using a wireless or wired connection.

[0031] In another aspect that may be combined with any one or more other aspects herein, an angle bracket is used in a custom package production system and includes a first angle and a second angle. The first angle is defined by a first plate and a second plate. The first and second plates are generally perpendicular relative to each other, and define at least two engagement surfaces for engaging an arrangement of one or more to-be-packaged items. The second angle is defined by a third and a fourth plate, the third and fourth plates being generally perpendicular relative to each other. The third plate defines an attachment surface for connecting the first angle to a measurement device, and the fourth plate defines a transition surface for connecting the third plate to the first angle.

[0032] In another aspect that may be combined with any one or more other aspects herein, a first plate and a third plate are generally parallel and a second plate and a fourth plate are generally parallel.

[0033] In another aspect that may be combined with any one or more other aspects herein, a first plate and a second plate are offset from each other by a distance extending in a direction generally parallel to a second plate and/or a fourth plate.

[0034] In another aspect that may be combined with any one or more other aspects herein, a first angle has a first width and a second angle has a second with, with the second width being less than the first width.

[0035] In another aspect, a method is disclosed for producing a customized, on-demand package. In the method, one or more items that are to be packaged are identified and/or arranged in some manner. First, second, and third measurements are obtained using an electronic measuring device. The measurements are provided to a package production machine. The package production machine receives dimensions of the arrangement of items, designs a package template, and produces a package template.

[0036] In another aspect that may be combined with any one or more other aspects herein, a method includes using a handheld electronic measuring device to obtain first, second, or third measurements of an arrangement of items.

[0037] In another aspect that may be combined with any one or more other aspects herein, a stop component is positioned opposite an electronic measurement device when obtaining at least one measurement.

[0038] In another aspect that may be combined with any one or more other aspects herein, a handheld electronic measurement device communicates with the package production machine in a wireless or wired manner, or using removable storage media.

[0039] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0040] Additional features and advantages of the embodiments disclosed herein will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by the practice of the embodiments disclosed herein. The features and advantages of the disclosed embodiments and variations thereof may be realized and obtained by means of the instruments and combinations particularly pointed out in the appended claims. These and other features of the present disclosure will become more fully apparent from the following description and appended claims, or may be learned by the practice of the embodiments as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] To further clarify various aspects of embodiments of the present disclosure, a more particular description of various features and aspects will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the disclosure and are therefore not to be considered limiting of its scope, nor are the figures necessarily drawn to scale. The embodiments herein will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[0042] FIG. **1** schematically illustrates a system architecture including a measurement apparatus and a packaging production machine;

[0043] FIG. **2**A illustrates an orthogonal view of a measurement apparatus usable in the system architecture of FIG. **1**;

[0044] FIG. **2**B illustrates a side view of the measurement apparatus of FIG. **2**A;

[0045] FIG. **3**A illustrates an exploded view of the measurement apparatus of FIG. **1**, showing a handheld device detached from a measurement assisting bracket;

[0046] FIGS. **3**B-**3**F illustrate additional views of the measurement assistance bracket of FIG. **3**A;

[0047] FIG. **4** illustrates a flow chart of a method of producing a customized package for one or more items;

[0048] FIGS. **5**A and **5**B illustrate obtaining a first measurement for a customized package;

[0049] FIGS. **6**A and **6**B illustrate obtaining a second measurement for a customized package;

[0050] FIGS. **7**A and **7**B illustrate obtaining a third measurement for a customized package;

[0051] FIG. **8** illustrates another embodiment of obtaining a first measurement for a customized package; and **[text missing or illegible when filed]**

DETAILED DESCRIPTION OF SOME EXAMPLE EMBODIMENTS

[0052] Example embodiments of the present disclosure are directed to apparatus, methods, systems, assemblies, and architectures for creating on-demand packaging. More particularly, exemplary embodiments of the present disclosure are directed to systems, machines, and assemblies, usable to efficiently and automatically produce customized packaging for a wide variety of combinations of different items. Accordingly, example embodiments of the present disclosure may be utilized to efficiently produce packaging on-demand. For instance, such packaging may be customized for a single item or a combination of items in any manner. Such custom and/or on-demand packaging may reduce the likelihood of damage or loss to the items, reduce costs associated with packaging materials or supplies, reduce handling costs, reduce packaging time, or provides any of a number of other benefits, or any combination of the foregoing.

[0053] With reference now to FIG. **1**, one example embodiment of an on-demand packaging system **100** is illustrated. The illustrated on-demand packaging system includes a packaging station **102**, a measurement device **104** and a package production machine **106**. The package production machine **106** may further include one or more sub-systems. For instance, the package production machine **106** may include a package design engine **108** and/or a production system **110**. The operation of such components of the on-demand packaging system **100** is described in greater detail hereafter.

[0054] For instance, in accordance with one embodiment, the packaging station **102** may be any location at which one or more to-be-packaged items are gathered. Such items may be gathered for insertion into a package, for arranging in a manner simulating how they will be placed when packaged, for transport of the items, or in any other suitable manner. By way of illustration, in one embodiment, the packaging station **102** may be a conveyor belt, table, arranging station, or any other suitable location(s).

[0055] Upon placement of one or more items at the packaging station **102**, the items may be measured using the measurement device **104**. Operation of the measurement device **104** may occur in any suitable manner, including those disclosed herein. For instance, a single item may be placed at the packaging station **102**, and the measurement device **104** may obtain dimensional information about the single item. Such measurements may include, for instance, a full scan of the item, three measurements (e.g., height, width, and length) for the item, or any other suitable type of measurement.

[0056] The measurement device **104** may also be used to obtain information about more than a single item. For instance, two or more items may be selected for packaging together, and can be arranged at the packaging station **102**. The measurement device **104** may then obtain dimensional information about the collection of items. For instance, height, width, and length information may be obtained for the collective set of items, rather than for each item individually. A full scan may also be obtained to obtain three-dimensional information or other dimensional analysis.

[0057] Once the measurement device **104** has obtained desired dimensional information, the measurement device **104** may transfer collected data to the package production machine **106**. The package production machine **106** may be primarily responsible for producing a template that can be assembled into a package having desired a desired configuration. By way of illustration, the package production machine **106** optionally includes the package design engine **108**. The package design engine **108** may be usable to design a template based on supplied information, such as the dimensions of a desired package. There may be multiple styles or types of packages that can be produced. For instance, one type of package may be a one-piece folding box having full-size flaps; another may be a two-piece box with separate top and bottom portions. These examples are merely illustrative and other types of packages may also be available.

[0058] The package production machine **106** can use a particular box style and input the dimensions or other information provided by the measurement device to determine the precise locations of sections and segments of a box template. Optionally, the package design engine **108** may automatically select the type of package to be produced, although in other embodiments an operator of the package production machine **106** may select a type of package, or there may be a combination of manual and automatic processes. For instance, the package design engine **108** may evaluate the dimensional information and make various recommendations to the operator. Moreover, in some aspects, the package design engine **108** may swap the measured dimensions to evaluate different potential templates, thereby performing real-time design optimization, and such may be performed automatically, manually, or as a combination of the foregoing. Accordingly, the package design engine **108** may assist in manually or automatically making an intelligent choice for the packaging design. Such design may vary based on factors such as the dimensions (e.g., different choices for large vs. small arrangements), proportions (e.g., long and narrow, flat, cubic, etc.), and the like. Exemplary characteristics and operation of a real-time packaging design optimization system are provided in greater detail in U.S. Patent Ser. No. 61/359,753, filed on Jun. 29, 2010, and entitled "REAL-TIME PACKAGING DESIGN OPTIMIZATION," which is incorporated herein by reference in its entirety.

[0059] Dimensional information provided by the measurement device **104** may in any case be used to automatically design the box. Thereafter, the template design can be conveyed to the production system **110** within the package production machine **106**. The production system **110** can be responsible for producing the box or other package template by cutting, creasing, scoring, perforating, or otherwise manipulating raw production materials available to the production system. Using such techniques, or any combination thereof, corrugated cardboard or other materials supplied in a fanfold, roll, or other fashion, can be formed into a package template that, when assembled, will have a particular size and shape. Such size and shape may generally correspond to the dimensions provided by the measurement device **104**. For instance, the interior capacity of the package assembled from the package template may generally be sized to receive therein the arrangement of one or more items on which the measurement device **104** received dimensional information.

[0060] The foregoing description is exemplary only. In some embodiments, for instance, the package design engine **108** and the production system **110** may be housed within a unitary device, although in other embodiments they may be separate. For instance, the package design engine **108** may be housed outside of the package production machine **106** and be in communication with the package production machine **106** in a manner that allows the design of a package template to be conveyed to the package production machine **106** in a manner that allows production of the template by the production system **110**. The communication between such a package production machine **106** and package design engine **108** may take any form. For instance, there may be a continuously available wireless or wired connection, an intermittent connection, or some other connection. In another embodiment, the package design engine **108** may store package template information on a medium and that medium can be used to transfer the information to the package production machine **106**.

[0061] Turning now to FIGS. **2**A and **2**B, an exemplary measurement device **200** is illustrated in greater detail. In particular, measurement device **200** includes a measurement component **202** and a bracket **204**. The measurement component **202** may be useful to, for instance, obtain a measurement of a particular distance. For instance, the measurement component **202** may utilize a laser, ultrasonic waves, a physical tape, or other mechanism, or any combination thereof to determine a distance, length, or other dimension. By way of illustration, the measurement component **202** may, in one embodiment, include a Leica Disto laser distance meter capable of measuring distance, area, and volume. Such a device may also be able to add or subtract distances, areas, or volumes, determine indirect height and distance measurements for inaccessible locations and measure tilts. In another embodiment, the measurement component **202** may include a Mastech Digital Laser Tape Measure that sends narrow beams of ultrasonic waves. The waves bounce back to the device and a microprocessor converts the elapsed time into a distance and displays it on an LCD screen. A laser may also be included for accuracy of the device. In still other embodiments, the measurement component **202** may include Neiko or Starline digital tape measure. Such a device may include a tape that physically extends a distance and, based on the extension of the tape, includes an LCD display that indicates the measured distance. The foregoing are presented by way of illustration only, other similar devices, or any other device suitable for obtaining a measurement may also be used. Optionally such devices obtain a measurement without an operator being required to interpret the particular dimension measured (e.g., by displaying a particular value rather than having an operator determine a tick mark and the value of such tick mark).

[0062] In the illustrated embodiment, the measurement component **202** is connected to a bracket **204**. The bracket **204** may be connected to the measurement component **202** and facilitate obtaining of an accurate measurement by the measurement component **202**. For instance, as shown by the

dashed line in FIG. **2**B, an interior contact surface of the bracket **204** may be generally aligned with the front surface or edge of the measurement component **202** and/or the emission mechanism **206**. As described in greater detail hereafter, the bracket **204** may be securely placed against an item such that the interior contact surface of the bracket **204** abuts an item or collection of items that is to be measured. A measurement may then be read and the length, height, width or other dimension of the item or collection can be determined.

[0063] In FIGS. **2**A and **2**B, it can be seen that bracket **204** has a dual angle design. In particular, an engagement angle **216** may be used to contact an item being measured. An attachment angle **218** may connect to the engagement angle **216** and can be used to couple the engagement angle **216** to the measurement component **202**. Thus, the engagement angle **216** may be used to secure the measurement device **200** at a particular position relative to an item being measured, while the attachment angle **218** facilitates securement of the engagement angle **216** relative to the measurement component **202**.

[0064] In more particular detail, engagement angle **216** and attachment angle **218** each define angles that are about right angles. The right angle of the engagement angle **216** may facilitate, for instance, abutting the bracket **204** against a box, container, object, or other item that has an edge formed by two surfaces that are oriented about perpendicular relative to each other.

[0065] In some embodiments, the bracket **204** may be formed separate from the measurement component **202** and/or may be detachable with respect thereto. In other embodiments, the bracket **204** may be formed integrally with the measurement component **202**. For instance, the measurement component **202** may include a casing or skin integrally molded, machined, or otherwise formed with all or a portion of the bracket **204**.

[0066] An embodiment in which the bracket **204** is formed separate from the measurement component **202** and/or is detachable with respect thereto is illustrated in FIG. **3**A. In such an embodiment, the bracket **204** may be attached to the measurement component **202** in any suitable manner. For instance, the bracket **204** may be secured in place using one or more screws, clamps, rivets, hook and loop fasteners (e.g., VELCRO), or other mechanical fasteners. The bracket **204** may also be secured using an adhesive (e.g., glue, double-sided tape, epoxy, etc.), or a thermal joint (e.g., a weld), or in any other manner.

[0067] The bracket **204** is illustrated in additional detail in FIGS. **3**A-**3**F. It should be appreciated that such an embodiment is merely illustrative of any number of different types of brackets that may be attached to a measurement component **202** and/or used in connection with the methods, systems, assemblies, and devices of the present disclosure.

[0068] In the illustrated embodiment, the bracket **204** is generally composed of four generally flat plates. More particularly, the engagement angle **216** may be composed of two plates **208**, **212** while the attachment angle **218** is also composed of two plates **210**, **214**. As described above, plates **208**, **212** may be angularly offset relative to each other, and in some embodiments may be about perpendicular relative to each other. Similarly, plates **210**, **214** may be angularly offset relative to each other, and in some embodiments may be about perpendicular relative to each other. Such an arrangement is, however merely exemplary.

[0069] As best illustrated in FIGS. **3**B and **3**D, an upper plate **208** of the engagement angle **216** may have a tapered construction. In particular, in the illustrated embodiment, the upper plate **208** is generally trapezoidal, such that at least a portion of the side edges tapers towards the front and rear edges. In other cases, however, the upper plate **208** may take other forms or shapes, including trapezoidal in an opposing direction, rectangular, square, or any other regular or irregular geometric shape. The upper plate **208** may also be considered as having a generally rectangular shape with cut distal corners. In this embodiment, the corners are cut such that a length of the cut corner extends between about 70-80% of the length of the side edges of the upper plate **208**, although the corners may be cut anywhere from 0-100%. For instance, at 0%, there may be no cut corners, whereas at 100%, the corners may help to define a pure trapezoidal shape.

[0070] The back plate **212** may also have a generally tapered construction as shown in FIGS. **3**C and **3**E. In particular, the back plate **212** mates with the upper plate **208** along an edge and extends downward in the illustrated embodiment. At the lower edge, the side edges taper or are inclined inward, so as to form a cut-corner at the lower edge of the back plate **212**. The degree to which the corners may vary. In this embodiment, for instance, the corners may be cut at approximately 25-35% of the length of the side edges; however, the corners may be cut at any desired degree, or may not be cut at all.

[0071] Together, the back plate **212** and the upper plate **208** define the engagement angle **216** which can be used to assist in mounting a measurement apparatus to an item that is being measured. This is best illustrated in FIG. **3**F which illustrates an example measurable item in dashed lines. The lower surface of the upper plate **208** and the interior surface of the back plate **212** (illustrated as the right surface) may abut against a corner of an item. Thereafter, a measurement device may be used to take a measurement. For instance, if a laser measuring device is used, a laser may extend in a direction that is generally parallel to the upper plate **208** and generally perpendicular to the back plate **212**.

[0072] The attachment angle **218** may have a similar construction as the engagement angle **216** although this is merely exemplary. In the illustrated embodiment, for instance, the attachment angle **218** also defines a substantially right angle and itself may resemble an L-bracket. In some embodiments, the width of the attachment angle **218** may be less than a width of the engagement angle **216**. For instance, the engagement angle **216** may be configured to engage items of any of a number of different sizes. In contrast, the attachment angle **218** may be configured to attach directly between the engagement angle **216** and a measurement component **202**. Thus, the attachment angle **218** may not necessarily be adaptable to accommodate different sized objects. Thus, in one embodiment, a width of the attachment angle **218** generally conforms to a size of a measurement component **202**. For instance, an upper plate **210** may attach to a measurement component **202**. Consequently, the upper plate **210** may have a size that is about the same size as or less than a width of the measurement component **202**. In other embodiments, however, the upper plate **210** may be larger than the measurement component **202** to which it is attached. In this embodiment, a transition plate **214** is used to connect the upper plate **210** of the attachment angle **218** to the engagement angle **216**. More particularly, and as best shown in FIGS. **3**A, **3**C and **3**E, the engagement angle **216** and attachment angle **218** may be offset relative to

each other. In particular, in this embodiment, both the engagement angle **216** and the attachment angle **218** form L-shaped brackets that are aligned back-to-back. The transition plate **214** may, however, be offset relative to the back plate **212** of the engagement angle **216**. More particularly, in the illustrated orientation, the transition plate **214** is vertically offset relative to at least a portion of the back plate **212**, such that the upper plate **210** of the attachment angle **218** is vertically above the upper plate **208** of the engagement angle **216**.

[0073] As a result of the offset of the transition plate **214** relative to the back plate **212**, a measurement device **202** may be offset relative to the upper plate **208** of the engagement angle **216**. For instance, as best illustrated in FIG. **2**B, the measurement component **202** may be vertically higher relative to the upper plate **208** of the engagement angle **216**. This may be desirable for any number of reasons. For instance, in one embodiment, an emission mechanism **206** may project, or be positioned relative to the front surface of the measurement component **202**. By positioning the upper surface **208** lower relative to the measurement component **202**, a beam, laser, wave, tape, or other element extended/emitted from the emission mechanism **206** may be sent outward without obstruction from the bracket **204**. The emission mechanism **206** may emit light, another wave, a measuring tape, or another element in a direction generally normal to the front surface of the measurement component **202**.

[0074] The plates **208**, **210**, **212**, **214** of the angles **216**, **218** may be connected to each other in any suitable manner. For instance, in one embodiment, plates **208**, **212** are integrally formed and are bent relative to each other to form separate plates at an angle relative to each other. Plates **210** and **214** may be similarly formed. Thereafter, the attachment angle **218** may be attached to the engagement angle **216** by using a mechanical fastener, adhesive, thermal process, or in a variety of different manners. In other embodiments, the plates **208**, **212** and/or the plates **210**, **214** may be formed separate relative to each other and thereafter joined. In still other embodiments, plates **208**, **210**, **212**, **214** may be formed as an integral or unitary piece, such at through an extrusion process.

[0075] Turning now to FIG. **4**, an exemplary method **400** for creating a customized package on-demand is illustrated. In the illustrated embodiment, various steps of the method may be performed by different components, although this is not necessarily the case. For instance, a human, robotic, or other operator may perform some aspects of the method **400**. A measurement device may perform other aspects of the method, while a package production machine may perform still other embodiments. It should be noted that various steps may, however, be performed by other components. For instance, the measurement device may be integrated within the package production machine, or connected thereto, such that various acts illustrated as being performed by the measurement device may be performed at least partially by the package production machine. In still other embodiments, a package template may be designed external to the package production machine.

[0076] In the illustrated embodiment, an operator of some type may identify one or more items as to-be-packaged items (act **402**). The items may be arranged (act **404**). For instance, if there is a single item, the item may be arranged at a packaging station such as a table, conveyor belt, or the like. Arranging the single item may include determining which way the sides or faces of the item should be oriented. If there are multiple items, arranging the items may include arranging the multiple items in a custom manner in which the operator would also package the items in a custom, on-demand package, and can also be manipulated at by the user during measurement (e.g., where an item is flexible or compressible). Alternatively, or additionally, each of multiple items may be measured independently and thereafter packaged. For instance, the system may recommend a manner for arranging the measured items.

[0077] When the items are arranged, a first measurement may be obtained (act **406**). For instance, the length of an item or an overall length of an arrangement of items may be obtained. A second measurement can also be obtained (act **408**). This may include obtaining a measurement of a width of the item or collection of items. A third measurement may also be obtained (act **410**). Such a measurement may correspond to a height of an item or collection of items. Of course, one will appreciate in view of the disclosure herein that the particular type of measurement or dimension obtained (e.g., length, width, height) can be obtained in any order. Moreover, some dimensions may be obtained at the same time. For instance, a three-dimensional scanner may be able to obtain all measurements at approximately the same time.

[0078] The obtained measurements may also be provided by the measurement device to a package production machine (act **412**). The manner in which the measurements are provided can vary in accordance with any number of factors. For instance, the measurement device may have wireless capabilities (e.g., short range radio, Bluetooth, 802.11, etc.). A package production machine may be within range of the measurement device such that measurements of the item or collection of items can be transmitted automatically and/or wirelessly. In other embodiments, the measurement device may be tethered or connectable via a physical, wired connection to the package production machine, so as to transfer obtained measurements. In still other embodiments, a storage device such as a disk, memory card, or the like may store obtained measurements. The storage device may be removed from the measurement device and connected to the package production machine to transfer the dimensional information.

[0079] Regardless of the particular manner in which the measurements are provided, the package production machine may receive or otherwise access the dimensions of the arrangement of one or more items (act **414**). Based on the dimensions, a package template may be designed (act **416**). Design of the package template may also include other aspects, such as the selection of a particular style of package or box to be created. Such selection may be made manually by an operator, or may be automatically performed. After the package template is designed, the package template can be produced (act **418**). Producing the package template may include, for instance, use of an automated process within the package production machine that makes the necessary or desired cuts, creases, perforations, scores, and the like.

[0080] Examples of portions of the method **400** are illustrated in greater detail with respect to FIGS. **5**A-**8**. In particular, FIGS. **5**A-**8** illustrate example manners in which measurements of an item or arrangement of items may be obtained, although such embodiments are merely exemplary.

[0081] In FIGS. **5**A-**7**B, a single item **522** is to he measured and packaged. The item **522** is illustrated as having a generally regular, box-like shape. It will be appreciated that this is, however, merely for simplicity in illustration and that in other embodiments, the item **522** may take any number of regular, irregular, or other shapes, and may indeed be a combination of

a number of different components, each of which may have any of a number of different sizes, shapes, or other configurations.

[0082] In FIG. **5**A, the to-be-packaged item **522** is positioned relative to a packaging station **526**. In this embodiment, the packaging station **526** is a table on which the item **522** is positioned, although the packaging station **526** may take any other suitable form. To obtain a first measurement, a measurement device **500** is positioned relative to the item **522**. In this particular embodiment, the measurement device **500** includes a measurement component **502** attached to a bracket **504**. The bracket **504** may be abutted against the item **522**. As show in FIG. **5**A, for instance, the bracket **504** may have upper and back plates. The upper and back plates have interior surfaces that are positioned in engagement with a top and side surface of the item **522**. Thereafter, the measurement device **500** may be activated to obtain a measurement.

[0083] In this particular embodiment, a stop component **520** is also positioned against the item **522**. In particular, the stop component **520** may be positioned along a surface opposing the side surface of the item **522** engaged by the back plate of the bracket **504**. As a result, surfaces of the bracket **504** and the stop component **520** may be separated by a distance generally corresponding to one dimension of the item **522**. In FIG. **5**A, the measurement device **500** and the stop component **520** are separated by an "x" dimension of the item **522**.

[0084] The stop component **520** may take any suitable form. In particular, the stop component **520** may provide a surface that reflects back light, waves, or another particle, matter, wave, or other form emitted from the measurement component **502**. For instance, in FIG. **5**A, a reflection point **524** is illustrated where a laser or other measurement means is directed. The stop component **520** can thus facilitate obtaining of an accurate measurement with respect to the distance "x".

[0085] It should be appreciated that the stop component **520** may be arranged or formed in a variety of different ways. In one embodiment, the stop component **520** may be built into the packaging station **526**. For instance, the packaging station **526** may have a three-plane rest in which an item can be positioned, with each of three planes acting as a stop plate to engage a corresponding surface of to-be-packaged items. In another embodiment, the stop component **520** may be handled manually. For instance, an operator of the measurement device **500** may hold the measurement component **502** in one hand, and the stop component **520** in another hand. When the measurement component **502** and stop component **520** are aligned the operator may then selectively activate the measurement device **500** and obtain a first dimension.

[0086] In FIG. **5**B, a more particular view of the result of obtaining the first measurement (i.e., in the "x" dimension) is shown. In this particular embodiment, the first measurement is about 12.55 inches and is identified with first indicia **528***a* on a display of the measurement device **502**. While the illustrated dimension is measured in inches, any measurement convention or unit may be used. Thus, a measurement may be made in any suitable English or Metric unit. In some embodiments, the measurement component **502** can be selectively changed between desired measurement conventions or units.

[0087] FIGS. **6**A and **6**B illustrate a second measurement being taken of the item **522**. In particular, the measurement device **500** is being used in connection with the stop component **520** to obtain a second measurement in the "y" direction. The manner of obtaining the measurement is substantially the same as that described above with respect to FIGS. **5**A and **5**B, except that the bracket **204** is engaged against a different side surface of the item **522**, and the different side surface is offset at about ninety degrees relative to the side surface used in obtaining the first measurement.

[0088] As shown in FIG. **6**B, when the second measurement is obtained, second indicia **528***b* on the display of the measurement component **502** may be updated. Although not illustrated, the area of a surface or plane defined by the "x" and "y" dimensions may also be updated at that time, although such a configuration is merely optional.

[0089] A third measurement is also obtained, as is illustrated in FIGS. **7**A and **7**B. In this particular embodiment, the measurement deice **500** is being used to obtain the illustrated "z" dimension. To obtain such a dimension, the measurement device **500** is positioned against the item **522** by, for example, abutting the bracket **504** against two surfaces of the item **522**. In this embodiment, the back plate of the bracket **504** is abutted against the top surface of the item **522** while an upper surface of the bracket **504** is abutted against a side surface of the item **522**. As a result, in the orientation shown in FIG. **7**A, the measurement device **500** is directed downward. A reflection point **524** may be made on the packaging station **526** such that, in this embodiment, the operator may not use a separate stop component. When the measurement device **500** is activated—which may be selectively or continuously—the obtained measurement may be made and/or updated. For instance, as shown in FIG. **7**B, the obtained measurement may be indicated by indicia **528***c* on the display of the measurement component **502**. As measurements in each of three orthogonal dimensions have thus been obtained, the measurement component **502** may also calculate a volume of the item **522**, which is illustrated by indicia **530**. The indicated measurements and volume may also generally correspond to an interior volume of an on-demand or other custom package created to enclose the item **522**.

[0090] As noted above, the systems, methods, components, apparatus, and assemblies of the present invention are not limited to use with single items or items having a regular shape. As shown in FIG. **8**, for instance, a measurement device **600** according to the present disclosure may also be used in connection with an arrangement of multiple items that do not form a perfect rectangular shape. For instance, in FIG. **8**, at least six items are arranged to form a generally rectangular shape; however, the shape has openings and voids not filled in with other items. Nevertheless, the measurement device **602** may obtain a measurement of each of three dimensions. For instance, in the illustrated aspect, a stop component **620** may be placed at a distal end of the collection of items **622**, and the measurement device **602** at a proximal, opposing end. For instance, a bracket **604** attached to a measurement component **602** may engage one of the items **622**. A measurement may then be taken of the items in the "x" dimension. Although not illustrated, the measurement device **600** and/or stop component **620** may then be moved or repositioned so as to obtain measurements in other dimensions. In some embodiments, the bracket **604** may not be suitable based on a shape or configuration of the items **622**. In such a case, the bracket **604** may be removable for a measurement to be made without the aid of the bracket **604**.

[0091] As will be appreciated in view of the disclosure herein, various embodiments of the present disclosure can provide any number of benefits, not the least of which is a

reduction in errors in packaging design and/or cost savings at least in terms of production time. For instance, example embodiments may be usable with large as well as small items. For instance, even items having dimensions as small as an inch may be measured. Larger items may also be measured. For very large items, a stop component (e.g., a target plate or angle) may be placed against the items, or the item may be placed against a wall or another object to obtain a reading.

[0092] Furthermore, embodiments of the present disclosure may be used to measure items of a variety of different types, including rigid, compressible, flexible, and other items. Compressible or flexible items may, for instance, be easily adjusted by an operator of a measurement device to obtain an accurate measurement. Moreover, items of different shapes, including items with sharp objects that stick-out from other objects, or a pile of items may be measured. Further still, a measurement device may obtain measurements regardless of the color or surface finish of the items or location of the items. Such benefit may be particularly desirable in cases where, for instance, items or a location of items is difficult for use with a camera or scanner. More particularly, a scanner or camera may have difficultly identifying dimensions based on color or surface finish features, but measurement devices of the present disclosure may eliminate such difficulties.

[0093] In accordance with other aspects, embodiments of the present disclosure allow lean, mobile, and fast production. For instance, as items are transported by a conveyor, cart, belt, roller, or other mechanism, or placed at a packaging location, the items can be measured without any need to move the products. Thus, by reducing the movement of the items (e.g., to a particular measurement location) the production time can be decreased and efficiency increased.

[0094] Further still, systems reliant on manual input for dimensional input are often prone to error. By way of illustration, an operator reading a value from a measuring stick or tape can rely on a slow and human-error prone process of interpreting the results and thereafter also attempting to accurately record the measurements into an on-demand package production machine. Regardless of whether such transfer is performed by voice, keyboard, touch screen, or other means, the manual input can be affected by human and/or communication errors. By automating not only the determination of the measurements but also the transfer thereof, such errors can be reduced if not eliminated.

[0095] Errors may also exist in other automated systems. For instance, and as previously noted, an automated scanner based on laser, light-grid, ultra-sound, or other technologies may have difficulty distinguishing between items that are to be packaged and materials that should not be measured, such as a surrounding placement device. Items may also be positioned within a bulky plastic bag, have straps that hang out, or otherwise include items that are not easily stackable or do not remain in a desired state (e.g., compressed, or moved state for a flexible device). These issues may interfere with accuracy in automated imaging processes, but using embodiments of the present disclosure may be avoided as an operator can control a measurement device while also manipulating the items into a desired position or state. Some devices, such as a three-dimensional camera, may also have difficulty detecting dark or other colors, high gloss or reflective materials, or thin or sharp objects that stick out from a main body, which could lead to errors.

[0096] Further still, in accordance with some aspects, volumetric data may be computed by a measurement device and/or a package production machine. The volumetric data optionally exists as a check value that can ensure that communication between the measurement device and an on-demand or other package production machine results in correct data transfer.

[0097] In addition, the disclosed system has a reduced cost relative to other systems that could be used or produced. While a tape measurer or other similar manual system may have a reduced direct cost, errors as discussed above may increase costs by way of errors or inefficiencies. The costs may be significantly less than other alternatives that limit the risk for human error, and even further reduced compared to fully automated systems that do not require direct labor.

[0098] The discussion herein refers to a number of methods and method steps and acts that may be performed. It should be noted, that although the method steps and acts may be discussed in a certain order or illustrated in a flow chart as occurring in a particular order, no particular ordering is necessarily required unless specifically stated, or required because an act is dependent on another act being completed prior to the act being performed.

[0099] Embodiments of the present disclosure may comprise or utilize a special purpose or general-purpose computer including computer hardware, such as, for example, one or more processors and system memory, as discussed in greater detail below. Embodiments within the scope of the present disclosure also include physical and other computer-readable media for carrying or storing computer-executable instructions and/or data structures. Such computer-readable media can be any available media that can be accessed by a general purpose or special purpose computer system. Computer-readable media that store computer-executable instructions are physical storage media. Computer-readable media that carry computer-executable instructions are transmission media. Thus, by way of example, and not limitation, embodiments of the disclosure can comprise at least two distinctly different kinds of computer-readable media, including at least computer storage media and/or transmission media.

[0100] Examples of computer storage media include RAM, ROM, EEPROM, CD-ROM or other optical disk storage, magnetic disk storage or other magnetic storage devices, or any other non-transmission medium which can be used to store desired program code means in the form of computer-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer.

[0101] A "network" is defined as one or more data links that enable the transport of electronic data between computer systems and/or modules, engines, and/or other electronic devices. When information is transferred or provided over a network or another communications connection (either hardwired, wireless, or a combination of hardwired or wireless) to a computer, the computer properly views the connection as a transmission medium. Transmissions media can include a network and/or data links, carrier waves, wireless signals, and the like, which can be used to carry desired program code means in the form of computer-executable instructions or data structures and which can be accessed by a general purpose or special purpose computer. Combinations of physical storage media and transmission media should also be included within the scope of computer-readable media.

[0102] Further, upon reaching various computer system components, program code means in the form of computer-executable instructions or data structures can be transferred automatically from transmission media to computer storage

media (or vice versa). For example, computer-executable instructions or data structures received over a network or data link can be buffered in RAM within a network interface module (e.g., a "NIC"), and then eventually transferred to computer system RAM and/or to less volatile computer storage media at a computer system. Thus, it should be understood that computer storage media can be included in computer system components that also (or even primarily) utilize transmission media.

[0103] Computer-executable instructions comprise, for example, instructions and data which, when executed at a processor, cause a general purpose computer, special purpose computer, or special purpose processing device to perform a certain function or group of functions. The computer executable instructions may be, for example, binaries, intermediate format instructions such as assembly language, or even source code. Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the described features or acts described above, nor performance of the described acts or steps by the components described above. Rather, the described features and acts are disclosed as example forms of implementing the claims.

[0104] Those skilled in the art will appreciate that the embodiments may be practiced in network computing environments with many types of computer system configurations, including, personal computers, desktop computers, laptop computers, message processors, hand-held devices, multi-processor systems, microprocessor-based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, mobile telephones, PDAs, pagers, routers, switches, and the like. Embodiments may also be practiced in distributed system environments where local and remote computer systems, which are linked (either by hardwired data links, wireless data links, or by a combination of hardwired and wireless data links) through a network, both perform tasks. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

[0105] Those skilled in the art will also appreciate that embodiments of the present disclosure may be practiced in special-purpose or other computing devices integrated within or coupled to packaging machines, whether by a network connection, wireless connection, or hardwire connection. Exemplary packaging machines may include machines that cut or crease packaging materials to form packaging templates. Example packaging machines suitable for use with embodiments of the present disclosure may also directly, or indirectly, execute program code that enables the packaging machine to accept dimensional inputs and design a customized packaging template based on the input. Such input may be provided manually or, as described herein, may be provided by a measurement device that, for example, determines desired dimensions and automatically transfers them to the packaging machine without requiring that the operator or user manually input dimensions.

[0106] Although the foregoing embodiments have been described in some detail by way of illustration and example, for purposes of clarity and understanding, certain changes and modifications will be obvious to those with skill in the art in view of the disclosure herein. The described embodiments are to be considered in all respects only as illustrative and not restrictive. Thus, all changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. A measurement device adapted to measure an arrangement of one or more to-be-packaged items in each of three dimensions, the measurement device comprising:

an electronic measurement component, wherein the electronic measurement component includes:

a first end; and

an emission mechanism configured to direct a measurement element in a direction generally normal to the first end; and

a bracket attached to the electronic measurement component, wherein the bracket includes a first engagement surface generally aligned with the first end of the electronic measurement component.

2. The measurement device recited in claim **1**, wherein the bracket is an angle bracket.

3. The measurement device recited in claim **1**, wherein the bracket includes at least first and second surfaces, the first and second surfaces being offset at an angle that is at least about ninety degrees.

4. The measurement device recited in claim **1**, wherein the bracket includes at least two portions, wherein a first portion attaches to the electronic measurement component and wherein the second portion includes the first engagement surface and is offset relative to the electronic measurement component.

5. The measurement device recited in claim **4**, wherein the second portion is offset in a direction generally parallel to the first end of the electronic measurement component.

6. The measurement device recited in claim **1**, wherein the bracket includes a dual angle construction.

7. The measurement device recited in claim **6**, wherein the dual angle construction includes:

an engagement angle, the engagement angle including the first engagement surface; and

an attachment angle, the attachment angle including a first attachment surface configured to attach to the electronic measurement component.

8. The measurement device recited in claim **6**, wherein the dual angle construction includes two angles arranged back-to-back.

9. The measurement device recited in claim **8**, wherein the two angles include generally parallel first surfaces and generally parallel second surfaces, and wherein the two angles are secured together along at least a portion of the generally parallel second surfaces.

10. The measurement device recited in claim **9**, wherein the two angles are at least partially offset a distance extending in a direction generally parallel to the second surfaces and generally perpendicular to the first surfaces of the two angles.

11. The measurement device recited in claim **1**, wherein the emission mechanism is configured to extend or emit at least one of a laser, a sound wave, or a measuring tape.

12. The measurement device recited in claim **1**, wherein the electronic measurement component is configured to measure dimensions obtained in three orthogonal directions.

13. The measurement device recited in claim **1**, wherein the electronic measurement component is configured to communicate with a package production machine by transmitting dimensional information to the package production machine.

14. The measurement device recited in claim **13**, wherein the package production machine is configured to use the dimensional information received from the electronic measurement component to design a package template for the one or more to-be-packaged items.

15. The measurement device recited in claim **14**, wherein the package production machine is configured to produce the package template from raw production materials based on the dimensional information received from the electronic measurement component.

16. The measurement device recited in claim **13**, wherein the package production machine comprises a package design engine.

17. The measurement device recited in claim **16**, wherein the package design engine is adapted to design a packaging template based on dimensional information received from the electronic measurement component.

18. The measurement device recited in claim **17**, wherein the package design engine is configured to automatically select a packaging template style from a plurality of packaging template styles based on the dimensional information of the one or more to-be-packaged items.

19. The measurement device recited in claim **18**, wherein the plurality of packaging template styles include at least a one-piece folding box template and a two-piece box with separate top and bottom portions.

20. The measurement device recited in claim **16**, wherein the package design engine is adapted to design a packaging template based on the proportions of the one or more to-be-packaged items.

21. The measurement device recited in claim **13**, wherein the package production machine comprises a production system that is adapted to produce a package template for the one or more to-be-packaged items based on the dimensional information received from the electronic measurement component.

22. The measurement device recited in claim **13**, wherein the package production machine produces the package template by cutting, creasing, scoring, perforating, or otherwise manipulating raw production materials.

23. The measurement device recited in claim **1**, wherein the bracket further includes a second engagement surface, wherein at least one of the first or second engagement surfaces defines cut corners.

24. The measurement device recited in claim **1**, wherein the bracket is selectively detachable from the electronic measurement component.

25. A system for producing on-demand, custom sized packages, comprising:

a measurement device, wherein the measurement device includes:

an electronic measurement component, the electronic measurement component being capable of obtaining measurements made in at least three dimensions;

one or more angle brackets secured to the electronic measurement component, wherein each of the one or more angle brackets includes at least an engagement angle configured to engage an arrangement of one or more to-be-packaged items to facilitate proper positioning of the electronic measurement component relative to the to-be-packaged items.

26. The system recited in claim **25**, wherein the engagement angle includes at least a first engagement surface generally aligned with an emission end of the electronic measurement component.

27. The system recited in claim **26**, wherein the engagement angle includes at least a second engagement surface extending from the first engagement surface and offset from the electronic measurement component by a distance extending in a direction generally parallel to the first engagement surface or the emission end of the electronic measurement component.

28. The system recited in claim **25**, further comprising:

a package production machine communicatively coupleable to the electronic measurement device, wherein the package production machine is configured to obtain dimensional information obtained by the electronic measurement device and design and produce a package template from raw production materials.

29. The system recited in claim **28**, wherein the package production machine is communicatively coupled to the electronic measurement device using a wireless or wired connection.

30. The system recited in claim **29**, wherein the package production machine is adapted to receive the measurements obtained by the electronic measurement device.

31. The system recited in claim **30**, wherein the package production machine comprises:

a package design engine adapted to design a packaging template based on the measurements obtained by the electronic measurement component; and

a production system communicatively connected to the package design engine, the production system being adapted to produce the package template designed by the package design engine.

32. The system recited in claim **31**, wherein the package design engine is configured to automatically select a packaging template style from a plurality of packaging template styles based on the proportions of the measurements obtained by the electronic measurement component.

33. The system recited in claim **31**, wherein the package production machine produces the package template by cutting, creasing, scoring, perforating, or otherwise manipulating raw production materials.

34. An angle bracket for use in a custom package production system, the angle bracket including:

a first angle defined by a first plate and a second plate, the first and second plates being generally perpendicular relative to each other, the first and second plates defining at least two engagement surfaces for engaging an arrangement of one or more to-be-packaged items; and

a second angle defined by a third plate and a fourth plate, the third and fourth plates being generally perpendicular relative to each other, the third plate defining an attachment surface for connecting the first angle to a measurement device, and the fourth plate defining a transition surface for connecting the third plate to the first angle,

wherein the first plate and the third plate are generally parallel and the second plate and the fourth plate are generally parallel, and wherein the first plate and the second plate are offset from each other by a distance, the distance extending in a direction generally parallel to the second plate and the fourth plate.

35. The angle bracket recited in claim **34**, wherein the first angle has a first width, and wherein the second angle has a second width, the second width being less than the first width.

36. A system for producing on-demand, custom packages, comprising:

a handheld measurement device, wherein the measurement device includes:

an electronic measurement component adapted to obtain at least three dimensional measurements of one or more to-be-packaged items;

a bracket secured to the electronic measurement component, wherein the bracket is adapted to engage with one or more surfaces of the one or more to-be-packaged items to facilitate proper positioning of the electronic measurement component relative to the one or more to-be-packaged items in order to accurately obtain the at least three dimensional measurements;

a stop component, wherein a surface of the one or more to-be-packaged items that is opposite to the surface engaged by the bracket and the stop component are configured to be placed adjacent to one another to facilitate obtaining of the at least three dimensional measurements; and

a package production machine communicatively linked to the measurement device, the package production machine having:

a package design component configured to receive the at least three dimensional measurements from the electronic measurement component and design a package template using the at least three dimensional measurements; and

a production component configured to access the package template design and use available raw packaging materials to produce the package template, wherein the production component includes tools to perform any combination of making cuts, scores, perforations, and/or creases.

37. The system recited in claim **36**, wherein the bracket comprises:

an engagement angle defined by an upper plate and a back plate, the upper plate and the back plate being perpendicular and integrally formed, wherein each of the upper plate and the back plate have an interior surface configured to engage a surface adjacent a corner of the one or more to-be-packaged items.

38. The system recited in claim **37**, wherein the bracket comprises:

an attachment angle defined by a transition plate and a mounting plate, the transition plate being perpendicular to, and integral with, the mounting plate, wherein the transition plate is secured to an exterior surface of the back plate and is vertically offset with respect thereto, such that the mounting plate is parallel to the upper plate but resides in a plane offset with respect thereto.

39. The system recited in claim **36**, wherein the electronic measurement component comprises:

a processor; and

a light beam emitter and receiver, wherein the light beam emitter and receiver are communicatively linked to the processor, and wherein the light beam emitter and receiver are configured to be selectively activated and to thereby collectively determine a distance based on emission and reception of a light beam.

40. The system recited in claim **36**, wherein the stop component comprises a handheld stop component.

41. The system recited in claim **36**, wherein the stop component comprises one or more walls or a surface of a table.

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