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(54) Title: SHAPING TOOL FOR RESHAPING NON-EMPTY METALLIC CANS

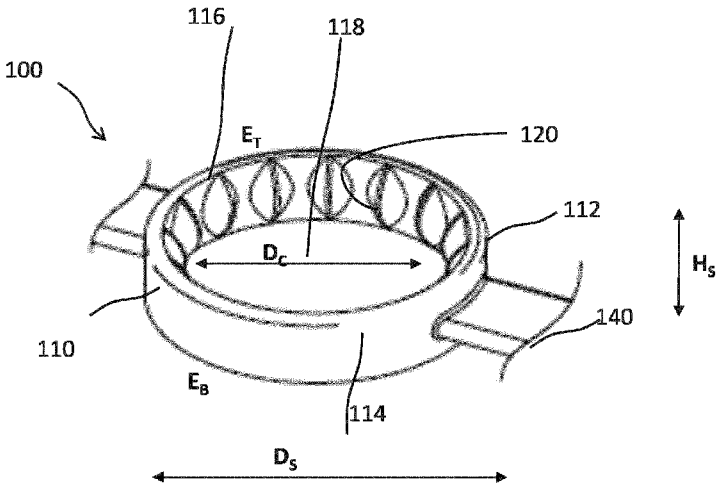


Figure 1

(57) Abstract: The present invention discloses a shaping tool for reshaping a metallic can already filled with a fluid such as beverage, or the like, is provided. The shaping tool includes a shaping portion and a gripping portion. The shaping portion includes a generally cylindrical shaping body having outer sidewalls, inner sidewalls and an open cavity extending from a top end towards a bottom end of the shaping body. The shaping portion further includes a shaping structure, corresponding to a predetermined pattern, configured onto the inner sidewalls of the shaping body. In operation, when a contact portion of the metallic can is pushed through the shaping body, the predetermined pattern of the shaping structure gets engraved / embossed onto the outer sidewalls of the metallic can.

[Continued on next page]

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Shaping Tool for reshaping Non-Empty Metallic Cans

Field of Invention

[0001] The present invention relates generally to a shaping tool. More particularly, the present invention relates to a shaping tool for reshaping metallic cans already filled with beverages.

Background of the Invention

[0002] Over the last few decades, there has been a considerable rise in use of metallic cans for variety of purposes such as, for example, storing various personal grooming and household products including, among others, food products such as pickles, beverages, beer, and the like.

[0003] Particularly within the beverage industry, the use of different kind of metallic cans for storage and distribution of liquids has significantly increased due to various factors such as relative cost advantages and durability of metallic cans.

[0004] These metallic cans generally includes a main body section having generally a cylindrical shape with sidewalls having a uniform diameter, and a separate closure member at the top and / or bottom portion. It may be desirable to form the side walls into different and/or more complex shapes for reasons related to aesthetics and/or product identification, apart from other reasons such as, for example, handling, durability, or the like.

[0005] Accordingly, the beverage manufacturers may want to shape their beverage cans with unique configurations. For example, it may be desirable to form a can in the well-known shape of a renowned beverage bottle. Such a can would enable a consumer to identify the can by its shape itself.

[0006] Other factors include ease of handling and / gripping these metallic cans. For example, it is believed that a can with certain specific aesthetics such as having a contoured sidewall eases the holding of the metallic cans.

[0007] Further, during handling of can bodies, small dents may be made onto the sidewalls and these dents not only diminishes the aesthetics of the can but also provide localized points of weakness. It has been found that the various designs such as, a plurality of parallel longitudinally extending outwardly convex ribs in the central portion of the can body may reduce or eliminate the effect of such dents and give axial strength to the can. Therefore, the cans may be required to reshaped to remove the deformation and maintain the aesthetics of such dented cans.

[0008] Therefore, numerous shapes have been developed by the beverage can manufacturers according to their specific objective. For example, numerous patterns such as symmetric longitudinal flutes or ribs, and diamond, waffle and numerous other patterns, counters, outlines etc, have been imparted to metallic can by different manufacturers. Those of skill in the art may understand “shaping” (or “reshaping”) to include not only forming or changing a general contour, outline, section, or the like, but to also include a number of other items such as, e.g., embossing (or debossing), texturizing and the like.

[0009] Over the years, a number of other patents have been issued which describe various can shaping and / or reshaping techniques. One such technique include injecting a disposable and pressurizing fluid within the can to be shaped during the forming process itself. For example, U.S. Pat. No 5,794,474, describes method and techniques for making shaped metal cans. In general, such patents describe placement of a preform can in a mold whose interior surface is formed into the desired final shape. Thereafter, a pressurized fluid is injected into the can which forces to expand the sidewall of the container against the inner surface of the mold so to conform the shape of the container to the shape of the mold.

[0010] While the above technique needs to access the inside of the metallic containers and generally used for shaping during the forming process of the metallic can. Such techniques have a further disadvantage of possibly damaging the internal surface / coating of the metallic can due to the pressure applied internally. Further, these techniques have a disadvantage of requiring an additional step of emptying and then a sterilization of the container before they can be filled with beverages.

[0011] Some techniques have been developed to reshape these cans from outside without accessing the inside thereof. One such method is disclosed in U.S Patent number 7188499 which mentions an outer shape processing device equipped with a plurality of can shell retention means that rotate circumferentially around a rotary shaft, and pressing members that are pressed against the peripheral wall of the can shell to provide outer shape processing to the can shell.

[0012] While the above mentioned technique allows for reshaping the metallic can after the forming operation, these are performed before the operations for filling with the beverages and before closing the container with its final closure. Accordingly, these reshaping techniques are not applicable for the scenarios when it is desired to changes the shape for aesthetic purpose and to remove the dents made after the cans are filled with beverages.

[0013] Additionally, in some instances, the shape of thin metallic cans may either be damaged by the internal pressure created when the can has been filled with a beverage product and sealed. If however, the walls of the can body are made thicker to compensate for the reduced physical strength, there arises another disadvantage that increased mass of metal makes the can body less economical.

[0014] Further, the use of known tools is very complicated and cannot be operated by a person not skilled in the art. However, since most of the times, the deformation takes place at the retailer end due to improper handling - the known tools are not convenient for restoring the shape of the metallic cans.

[0015] Accordingly, there is a need in the art for a tool and a method for reshaping the metallic cans after the latter are filled with the beverages. Further, such a tool should preferably be cost efficient and easy to operate by the end consumers.

Summary of the Invention

[0016] In one aspect of the present disclosure, a shaping tool for reshaping a metallic can already filled with a fluid such as beverage, or the like, is provided. The shaping

tool includes a shaping portion and a gripping portion. The shaping portion includes a generally cylindrical shaping body having outer sidewalls, inner sidewalls and an open cavity extending from a top end towards a bottom end of the shaping body. The shaping portion further includes a shaping structure, corresponding to a predetermined pattern, configured onto the inner sidewalls of the shaping body. In operation, when a contact portion of the metallic can is passed through the shaping body, the predetermined pattern of the shaping structure gets engraved / embossed onto the outer sidewalls of the metallic can.

[0017] Generally, the shaping structure includes one or more outwardly projected portions and / or one or more inwardly recessed portions such that when engraved and / or embossed, the predetermined pattern is formed onto the outer wall of the metallic can.

[0018] Preferably, the shaping structure is integrally molded within the inner sidewalls of the shaping body.

[0019] Alternatively, the shaping structure is a separate structure, removably mounted onto the inner sidewalls of the shaping body using fixation mechanism such as screwing, adhesives, or any of the suitable fixation mechanism known in the art.

[0020] Possibly the contact portion of the metallic can may be selected from one of but not limited to of a bottom portion, a neck portion, a shoulder portion, and the outer sidewall of the metallic can.

[0021] Possibly, the shaping structure is of a diameter 0.05 mm to 0.10 mm lesser than the diameter of the contact portion when the contact portion is selected from one of the bottom portion, the neck portion and the shoulder portion.

[0022] Alternatively, the shaping structure is of a diameter more than the diameter of the of the metallic can.

[0023] Further, in such instances, the shaping tool includes a tightening mechanism for tightening the shaping structure onto the contact portion of the metallic can.

[0024] Furthermore, the tightening mechanism is selected from but not limited to one of sealing rings, tightening screws, belt tightening, or any other suitable tightening mechanism already known in the art.

[0025] Optionally, the shaping tool further comprising a movement mean for moving the shaping body axially and / or radially and / or helically.

[0026] Possibly, the movement mean may be a manual mean such as a handgrip, or the like

[0027] Alternatively, the movement mean may be an automatic movement mean selected from one or more from the group consisting of electric / hydraulic motors, automatic pistons, automatic gear mechanism, and the like.

[0028] Preferably, the shaping body may be made of a material selected from one of but not limited to thermoset polymers such as polyoxymethylene (POM), Acrylonitrile butadiene styrene (ABS), Nylon 6, Nylon 6-6, Polyamides (PA),

Polybutylene terephthalate (PBT), Polycarbonates (PC), Polyetheretherketone (PEEK), Polyetherketone (PEK), Polyethylene terephthalate, (PET), Polyimides, Polyphenylene sulfide (PPS), Polyphenylene oxide (PPO), Polysulphone (PSU), and Polytetrafluoroethylene (PTFE / Teflon).

[0029] Alternatively, the shaping body may be made of a hard material such as a steel with a coating of a material selected but not limited to thermoset polymers such as polyoxymethylene (POM), Acrylonitrile butadiene styrene (ABS), Nylon 6, Nylon 6-6, Polyamides (PA), Polybutylene terephthalate (PBT), Polycarbonates (PC), Polyetheretherketone (PEEK), Polyetherketone (PEK), Polyethylene terephthalate , (PET), Polyimides, Polyphenylene sulfide (PPS), Polyphenylene oxide (PPO), Polysulphone (PSU), and Polytetrafluoroethylene (PTFE / Teflon) or thermoset resins such as selected from group consisting of but not limited to selected from a group consisting of: Polyurea, Bis-maleimides, Epoxy, Phenolic, Melamine formaldehyde, Polyester, Polymide, Polyurethane, Urea-formaldehyde, Epoxy and Novolac

[0030] In another aspect of the present disclosure, a method for reshaping a metallic can already filled with a fluid such as a beverage, or the like. The method include pushing the contact portion of the metallic can through the shaping body of the shaping tool which in turn engraves and / or embosses the predetermined pattern of the shaping structure onto the contact portion of the metallic can.

[0031] Preferably, the contact portion of the metallic can passed through the shaping body may be selected from one of but not limited to of a bottom portion, a neck portion, a shoulder portion, and the outer sidewall of the metallic can.

[0032] Possibly the method includes tightening of the shaping body onto the contact portion of the metallic can such that the contact portion is in a tight contact with the shaping structure.

[0033] Optionally, the step of pushing the metallic can is replaced with a step of moving the shaping body axially and / or radially and / or helically.

[0034] Additionally, the method includes adding a food grade lubricant for avoiding unnecessary strain onto the contact portion of the metallic can and onto the shaping structure of the shaping tool.

[0035] The details of one or more implementations are set forth in the accompanying drawings and the description below. Other aspects, features and advantages of the subject matter disclosed herein will be apparent from the description, the drawings, and the claims.

Brief Description of drawings

[0036] FIG. 1a illustrates a schematic view of a shaping tool for reshaping a metallic can, in accordance with one preferred embodiment of the present disclosure;

[0037] FIG. 1b illustrates a perspective view of a shaping tool for reshaping a metallic can, in accordance with an embodiment of the present disclosure

[0038] FIG. 3 illustrates a schematic view of the a metallic can shaped with a predetermined longitudinal pattern, in accordance with a preferred embodiment of the present disclosure;

[0039] FIG. 4 illustrates a schematic view of the a metallic can shaped with a predetermined radial pattern, in accordance with the another embodiment of the present disclosure;

[0040] FIG. 5 illustrates a schematic view of the a metallic can shaped with a predetermined circumferential pattern, in accordance with the another embodiment of the present disclosure;

[0041] FIG. 6 illustrates a schematic view of a metallic can shaped with a predetermined shoulder shaping pattern, in accordance with the another embodiment of the present disclosure;

[0042] FIG. 7 illustrates a schematic view of a metallic can shaped with a predetermined top shaping pattern, in accordance with an embodiment of the present disclosure;

[0043] FIG. 8 depicts a flowchart illustrating the steps for reshaping a metallic can already filled with beverage, in accordance with an embodiment of the present disclosure;

Detailed Description of the Preferred Embodiments

[0044] As required, a schematic, exemplary-only embodiment of the present application is disclosed herein; however, it is to be understood that the disclosed embodiment is merely exemplary of the present disclosure, which may be embodied in various and / or alternative forms. Specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present disclosure in virtually any appropriately detailed structure.

[0045] Aspects, advantages and/or other features of the exemplary embodiment of the disclosure will become apparent in view of the following detailed description, which discloses various non-limiting embodiments of the invention. In describing exemplary embodiments, specific terminology is employed for the sake of clarity. However, the embodiments are not intended to be limited to this specific terminology. It is to be understood that each specific portion includes all technical equivalents that operate in a similar manner to accomplish a similar purpose.

[0046] Exemplary embodiments may be adapted for many different purposes and are not intended to be limited to the specific exemplary purposes set forth herein. Those skilled in the art would be able to adapt the exemplary-only embodiment of the present disclosure, depending for example, on the intended use of adapted embodiment. Moreover, examples and limitations related therewith brought herein below are intended to be illustrative and not exclusive. Other limitations of the

related art will become apparent to those of skill in the art upon a reading of the following specification and a study of the related figures.

[0047] The present application discloses a shaping tool for reshaping metallic cans already filled with a fluid such as for example, beverages, beer, or the like. The coupling assembly while being hand-held, allows the possibility of a dynamic reshaping of metallic cans to achieve a variety of goals such as for example, restoration of a dented can, or providing a unique predetermined shape / pattern to a a contact portion of the metallic can. Further, the shaping tool being hand-held and easy to operate enables the reshaping of already filled beverage cans by the end-consumer as per his desire. In a preferred embodiment, the shaping tool includes a shaping portion extended towards a gripping portion. The shaping portion includes a generally cylindrical shaped shaping body having inner sidewalls, outer sidewalls, and an open cavity extended from a top end towards a bottom end. The shaping body further includes a shaping structure corresponding to predetermined patterns such as textures / shapes / embossing / or the like, configured onto the inner sidewalls of the shaping body.

[0048] It is to be understood that unless otherwise indicated this invention need not be limited to applications in beverage industry. As one of ordinary skill in the art would appreciate, variations of the invention may be applied to other applications such as in food industry, personal grooming packaging, or the like. Moreover, it should be understood that embodiments of the present invention may be applied in combination with various known tools, and / or devices, to achieve any desired

application. It must also be noted that, as used in this specification and the appended claims, the singular forms “a,” “an” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, the term “an opening” is intended to mean a single opening or a combination of openings, “a pattern” is intended to mean patterns, shapes, textures, embossing, logos, or a combination thereof. For present purposes, a “shaped can” is a thin walled metal container in which the sidewall surface may contain regular surfaces of revolution, bulges, ribs, and flutes; irregular surfaces such as flutes, ribs, embossments, letters, company or other logos, diamonds, faces, geometric renderings of artwork, triangles, textures, bubbles, or fanciful shapes. The possible shapes and surfaces are not limited to the above list and include combinations and permutations of these geometric surfaces.

[0049] Figs. 1 illustrates a shaping tool **100** for reshaping a metallic can **(not shown)**. The shaping tool includes a shaping portion **110**, and one or more gripping portion **140.** Preferably, the shaping portion **110** and the gripping portion **140** is a one-piece arrangement and integrally molded together. However, in some embodiments, the shaping portion **110**, and the one or more gripping portions **140** are separate modules of the shaping tool **100** and may be attached or detached as according to the requirement. The shaping portion **110** includes a generally cylindrical shape shaping body **112** having outer sidewalls **114**, inner sidewalls **116** and an open cavity **118** longitudinally extending between a top end E_T of the shaping body **112** towards a bottom end E_B of the shaping body **112.** The open cavity **118** is a cylindrical bore having a diameter D_C lesser than a maximum diameter D_M (not

shown) of the metallic can to be reshaped using the shaping tool **100**. The shaping portion **110** further includes a shaping structure **120**, configured onto the inner sidewalls **116** of the shaping body **112.** The shaping structure **120** corresponds to a predetermined pattern / texture **(not shown)** to be engraved / embossed onto the metallic can.

[0050] In preferred embodiments of the present invention, the shaping body **112** has a Height H_S generally same or more than the dependent on the height of the pattern of the shaping structure **120.** Further the shaping body has an outer diameter D_s more than the diameter D_C of the open cavity **118**. The difference in the diameter generally depends upon the thickness of the shaping structure **120.**

[0051] It is to be contemplated for a person skilled in the art that while the disclosure has been detailed with an exemplary two piece metallic can, it will be readily appreciated that the shaping tool **100** of this invention may be used in conjunction with conventional three piece can bodies in which an open ended cylindrical side wall is sealed, top and bottom, by separate end panels. Further, while any kind of variation may be applied to the shape, size, material, cross-section, etc of the metallic can and accordingly the variations may be applied to the shaping tool **100** for working thereon.

[0052] Fig. 2 illustrates a shaping tool **200** in accordance with a preferred embodiment of the present invention. The shaping tool **200** may be used to reshape atleast a partial portion of a metallic can **300.**

[0053] The metallic can **300** is a conventional can body, preferably a two piece beverage containers made of metallic material, particularly aluminum, that is well suited for embossing by the shaping tool **200**. The metallic can **300** consists of a can body portion **310** with a top end **320**. The body portion **310** includes a top portion **312**, a shoulder portion **314** and a continuous sidewall **316** having a beverage side **317** and a public side **318**.

[0054] The shaping tool **200, a**s illustrated in Fig. 2, includes a shaping portion **210,** a first gripping portion **240a** and a second gripping portion **240b.**

[0055] The shaping portion **210** includes a generally cylindrical shape shaping body **212** having outer sidewalls **214**, inner sidewalls **216** and an open cavity **218** longitudinally extending between a top end E_T of the shaping body **212** towards a bottom end E_B of the shaping body **212.** The shaping portion **110** further includes a shaping structure **220**, configured onto the inner sidewalls **216** of the shaping body **212.** The shaping structure **220** corresponds to a predetermined pattern / texture **230** to be engraved / embossed onto the metallic can **300.** The shaping structure **220** comprises one or more outwardly projected portions and / or one or more inwardly recessed portions such that when a relative motion takes place in a pinching engagement the pattern gets engraved and / or embossed onto the contact portion of the metallic can **300**. Such an engraving / embossing formed corresponds to the predetermined pattern **230**. The predetermined pattern **230** may correspond to various simple, uniform, complex and non-uniform shapes/designs, including geometric shapes/designs (e.g., diamonds, triangles, company logos, etc.), lettering

(e.g., product/company names, etc. in block print, script, etc.) and fanciful shapes/designs having angled and/or arcuate shape-defining edges and/or surfaces that vary around, about and along the longitudinal extent of a container body. In some embodiments, the pattern **230** may include longitudinal rib shape and / or texture as illustrated in Fig. 3. In some other embodiments, the pattern **230** may include only the radial shaping and / or texture as illustrated in fig 4. In some other embodiment, the pattern **230** may include circumferential shapes and / or textures as illustrated in fig. 5. In yet other embodiments, the pattern **230** may include only the shoulder shaping pattern as illustrated in fig 6 and / or only the top portion pattern as illustrated in fig. 7

[0056] Preferably, the shaping structure **220** is integrally molded onto the inner sidewalls of the shaping body **212**. However, in some other embodiments, the shaping structure **220** may be separate entity and detachably connected to the inner walls of the shaping body **212** using any suitable fixation mechanism already known in the art. In such embodiments, the shaping structure **220** generally comprises a resilient sleeve having an inner surface and an outer surface, mounted on the inner sidewall of the shaping body at the inner surface. The outer surface of the sleeve is configured with the shaping projections and / or recess portions corresponding to pattern **230** to be engraved / embossed onto the metallic can **300.**

[0057] The shaping structure **220** has a diameter D_S that corresponds to the diameter D_C of the open cavity **118**. Generally, the diameter D_S (and the diameter D_C), particularly in the scenarios where the contact portion to be reshaped is the one

of the top portion **312** and / or the shoulder portion **314** of metallic can **300,** is lesser than the diameter of the contact portion of the metallic can **300**. Such a difference may range between 0.01 mm to 0.1 mm.

[0058] Alternatively, and particularly in the scenarios where the contact portion to be reshaped is the sidewall **318** of the metallic can **300**, the diameter D_S (and the diameter D_C) may be more than the maximum diameter D_M of the metallic can **300**.

[0059] In some embodiments of the present invention, particularly in the embodiments where the diameter of the shaping body is more than the maximum diameter of the metallic can **300**, the shaping tool **200** comprises a tightening mechanism (not shown) for tightening the shaping body **110** onto the contact surface of the metallic can **300**. Such a tightening may be performed to provide a pinching engagement between the contact surface of the metallic can **300** and the shaping structure **220**.

[0060] In some instances, the tightening mechanism may be tightening nut and screw based tightening mechanism. In such embodiments, the shaping body may be closed loop body having open ends which when connected completes the loop. In such mechanism a threaded nut may be provided on one of the end of the shaping body and a bolt is which contains a pin is provided on the other end. The pin of the bolt may be arranged for turning relative to the bolt about an axis of the thread, wherein the pin and the nut are turned together relative to the bolt until the bolt is subjected to a predetermined tensile stress and the shaping body is tightened onto the contact portion of the metallic can **300**.

[0061] In another embodiments, the tightening mechanism may be selected from but not limited to one of tightening clamps, sealing rings, tightening screws, belt tightening, or the like. In yet other embodiments, the tightening mechanism may be any suitable tightening mechanism known in the art.

[0062] The first gripping portion **240a** and the second gripping portion **240b** are manual hand grip which may be used to hold the shaping tool in contact with the metallic can 300. Alternatively, in some embodiments, the hand grip may be utilized for moving the axially and / or radially and / or helically. Generally, the manual handgrip **240** is employed only in cases where the only axial movement or only radial movement is required for the shaping operation such as for example, during the formation of pattern as illustrated in fig. 3 and 4.

[0063] Alternatively, in some embodiments, the shaping tool **200** may include one or more automatic movement means each for moving the axially and / or radially and / or helically. The automatic movement mean may be selected from one or more of but not limited to the group consisting of an electric motor, an automatic piston, an automatic gear system and various other suitable driving means already known in the art.

[0064] The automatic movement mean are particularly required in the instances where the pattern **230** has to be engraved / embossed on a substantial longitudinal and or circumferential portion of the metallic can **300** as illustrated in fig 5. These multiple automatic movement means may work individually and / or together so as to engrave / emboss the predetermined patter **230** onto the contact portion of the

metallic can **300**. Accordingly, in some embodiments, a rotation movement and longitudinal movement may combinatively and desirably yield progressive and incremental working of a metallic can **300**. In such embodiments, the shaping tool **200** may further include a control unit **(not shown)** for controlling the operation / working / of automatic movement means.

[0065] In some embodiments, the control unit may includes a data capturing unit for receiving the pattern **230** to be formed onto the contact portion of the metallic can. The control unit 130 may further include a processor unit for processing the data captured by the data capture unit on the basis of predetermined logics / rules for facilitating the movement of the automatic movement means. The control unit may further include an instruction unit that delivers the instructions to various components such as various motors, driving units, or the like, to facilitate a desired and smooth operation.

[0066] In some embodiments, the control unit may be provided as a computer program product, such as may include a computer-readable storage medium or a non-transitory machine-readable medium maintaining instructions interpretable by a computer or other electronic device, such as to perform one or more processes. A non- transitory machine-readable medium includes any mechanism for storing information in a form (including a processing application or software) readable or interpretable by a machine (such as a computer). The non-transitory machine-readable medium may take the form of, but is not limited to, any known storage technique, including magnetic storage media, optical storage media, magneto-

optical storage media; read only memory (ROM); random access memory (RAM); erasable programmable memory (including EPROM and EEPROM); flash memory; and otherwise.

[0067] The engraving / embossing of the predetermined pattern **230** onto the contact portion of the metallic can **300** may be accredited to the relative motion between the contact portion and the shaping structure **220**. In various embodiments of the present invention the tool remains stationary while the metallic can **300** is moved through the tool in a substantially linear direction aligned with the longitudinal axis of the container. In other similar embodiments, the metallic can **300** is rotated within the shaping tool **200** where the pattern **230** are directed radially to the shaping tool **200**. It should be further appreciated that such movement may be bi-directional or uni-directional and may include a predetermined number of successive longitudinal and / or radial advancement. Accordingly by controlling the relative movement i.e. longitudinally and / or laterally (e.g., by rotation) between the contact portion of the metallic can **300** and the shaping structure **220**, formation of even complex patterns may be achieved. The metallic can **300** may thus be deformed in three separate movements giving longitudinal deformation (as illustrated in fig. 3) and / or radial (as displayed in fig 4) and / or circumferential (as illustrated in fig. 5).

[0068] Preferably, the shaping body **210** and shaping structure **220** may be made of a material selected from one of but not limited to thermoset polymers that exhibits desirable wear and acceptable formability characteristics. The preferred thermoset polymers may be selected from one of but not limited to the group consisting of

polyoxymethylene (POM), Acrylonitrile butadiene styrene (ABS), Nylon 6, Nylon 6-6, Polyamides (PA), Polybutylene terephthalate (PBT), Polycarbonates (PC), Polyetheretherketone (PEEK), Polyetherketone (PEK), Polyethylene terephthalate , (PET), Polyimides, Polyphenylene sulfide (PPS), Polyphenylene oxide (PPO) , Polysulphone (PSU), and Polytetrafluoroethylene (PTFE / Teflon).

[0069] Alternatively, the shaping body **210** and shaping structure **220** may be made of a hard material such as a steel with a coating of a material selected but not limited to thermoset polymers such as polyoxymethylene (POM), Acrylonitrile butadiene styrene (ABS), Nylon 6, Nylon 6-6, Polyamides (PA), Polybutylene terephthalate (PBT), Polycarbonates (PC), Polyetheretherketone (PEEK), Polyetherketone (PEK), Polyethylene terephthalate , (PET), Polyimides, Polyphenylene sulfide (PPS), Polyphenylene oxide (PPO), Polysulphone (PSU), and Polytetrafluoroethylene (PTFE / Teflon) or thermoset resins such as selected from group consisting of but not limited to selected from a group consisting of: Polyurea, Bis-maleimides, Epoxy, Phenolic, Melamine formaldehyde, Polyester, Polymide, Polyurethane, Urea-formaldehyde, Epoxy and Novolac

[0070] In some embodiments, the shaping structure **220** may include an additional thin film of mercury to provide a protective coating which performs the triple function of lubricating, eliminating charring, and preventing chemically induced deterioration of the tool surface. such a thin mercury film, may form a firm bond with the contact portion during amalgamation and presents an immobile, self-sustaining, contiguous surface to the shaping structure **220.**

[0071] Fig. 8 with reference to Figs.1 through 7, is a flow diagram illustrating a method **800** of using the shaping tool **200** for reshaping the metal can **300** already filled with a fluid such as beverage, or the like. The method starts at step **802** and proceeds to step **804** where a contact portion of the metallic can **300,** that needs to be deformed / embossed / engraved with the predetermined pattern of the shaping structure, is brought in contact with the shaping structure **220** of the shaping portion **210**. In some embodiments, the contact portion may be the top portion **312** of the metallic can **300**. In some other embodiments, the contact portion may be the shoulder portion **314** of the metallic can **300**. In yet other embodiments, the contact portion may be a partial portion or otherwise, an entire surface of the outer sidewall **318** of the metallic can **300**.

[0072] The method **800** then proceeds to an optional step **804**, where the shaping structure **220** is tightened on to the contact portion of the metallic can **300** to enable a pinching engagement there between**.** Generally, the step **804** is performed in the scenarios where the diameter D_C of the open cavity **118** is more than the maximum diameter D_M of the metallic can **300.** Thereafter, the method **800** then proceeds to step **806** where the metallic can **300** is pushed through the shaping portion **210** of the shaping tool **200**. Such a relative movement engraves and / or embosses the predetermined pattern **300** of the shaping structure **220** onto the contact portion of the metallic can **300**.

[0073] In some instances, generally when the diameter D_C of the open cavity **118** is lesser than the diameter of the contact portion, particularly, when the contact portion

is the one of the top portion **312** and / or shoulder portion **314.** Such a difference in the diameter may range between 0.01 mm to 0.1 mm. In such instances, the step of tightening is not required and the method **800** proceeds directly from step **802** to **806** where the metallic can is pushed through the shaping structure thereby engraving / embossing the predetermined pattern **230** onto the contact portion of the metallic can **300** at step **808** due to a relative movement while being tightly in contact.

[0074] In some embodiments, the step **806** of the method **800** is replaced with an optional step **806a** performed either directly after step **802**, or otherwise after step **804.** The step **806a** includes moving the shaping tool **200** axially and / or radially and / or helically relative to the metallic can **300**. Such a relative movement may be performed either manually using the hand grip **212** or otherwise automatically in some embodiments where the automatic movement mean is present within the shaping tool **200**. The type of movement that will be imparted to the shaping tool depend on the predetermined pattern **230** to be embossed / engraved on to metallic can. For example, in embodiments where the pattern **230** is only a longitudinal texture / shape, an axial movement is imparted to the shaping tool **200**. In some other embodiments, where the pattern **230** is a horizontal / radial texture / shape, a radial movement is imparted to the shaping tool **200**. In yet other embodiments, where a where the pattern **230** is a circumferential and continuous texture / shape, a helical movement is desired. Alternatively, a combination of radial movement and the axial movement is imparted so as to engrave / emboss the pattern **230** onto the metallic can **300**. The method **800** then proceeds to the step **808** where the relative movement between the metallic can **300** and the shaping structure **220** enables an

engraving / embossing of the predetermined pattern **230** onto the contact portion of the metallic can **300**.

[0075] After step **806** or step **806a,** the method **800** proceeds to step **808** where the metallic can **300** is released from the shaping portion **210** to obtain a metallic can **300** with the desired pattern **230** configured onto the contact portion thereof. Once released the shaping tool **200** may be reused again and again for different shaping operations.

[0076] It is to be contemplated that one or more aspects of method 800 discussed above allow for the achievement of complex and non-uniform shapes/designs, including geometric shapes/designs (e.g., diamonds, triangles, company logos, etc.), lettering (e.g., product/company names, etc. in block print, script, etc.) and fanciful shapes/designs having angled and/or arcuate shape-defining edges and/or surfaces that vary around, about and along the longitudinal extent of the metallic can **300**. These can simply be achieved by configuring the shaping structure **220** of the shaping tool **200** with an appropriately designed combination of recess portions, the projection portions and the flat portions such that the combined pattern **230** corresponds to the desired shapes / designs, or the like.

INDUSTRIAL APPLICABILITY

[0077] The present disclosure relates to a hand-held shaping tool **100** for reshaping non-empty metallic cans such as foodstuff containers, beverage cans, aerosol canisters, and other such containers for consumer or industrial products. The

shaping tool, while being cost-efficient and portable, is very quick and easy to be operated by end consumers, or by the retailers in various shops, bars etc. Further, the tool is self-sufficient to reshape any portion of the metallic cans such as a same tool for reshaping different portions such as including neck and/or shoulder area apart from sidewalls of the metallic cans.

[0078] As should be appreciated, the realization of such reshaping / embossing / engraving capabilities allows for marked product differentiation, aesthetically tailored designs for targeted consumers, and other significant marketing-related opportunities in consumer product markets. Further, the shaping tool **100** of the current disclosure is helpful in restoring the shape when a dent is formed on the sidewall of the metallic can during handling thereof.

[0079] The present invention can be adopted to enable various uniform and / or non uniform three-dimensional patterns of significant design performance to be provided at low cost on any type of metallic can regardless of its shape, while preventing damage of the inner surface of the metallic cans and deterioration of the coatings thereof. Moreover, since the reshaping may be performed dynamically while providing a perfectly smooth pattern without causing any detrimental stress concentrations, a consequent reduction of the risk of having rejects of the beverages at the retail point is achieved.

[0080] The shaping tool and the method of embossing / engraving of a can body already filled with beverage, or the like may be used to enhance the appearance of the container wherein the pattern / texture / reshaping is performed in a

predetermined manner that may coordinates the embossing / engraving with the can's existing graphics or decoration. The embossing / engraving structure may include any kind of known pattern / texture / shapes, or the like, which the end consumer may prefer. Further, the pattern may be decided and applied in a predetermined manner such that it may coordinates the embossing / engraving with the can's existing shape and / or design.

[0081] The shaping of the metallic cans using the shaping tool **100** of the current disclosure, in some instances, may substantially weaken the can which in turn have numerous benefits, such as for example, easy and improved collapsing of the can once it is emptied. Such collapsing of the beverage cans avoids the possibility of reuse of the cans which in turn help reduce counterfeiting of the beverage and the cans thereof.

[0082] Further, the shaping tool **100** of the current disclosure reduces the problem of liquid spillage due to the formation of the bubbles on the inner sidewalls of the metallic cans. This may be explained as an impact of the working of the shaping tool on the sidewalls of the metallic can which causes a release of the bubbles within the beverage even prior to opening the can and thereby avoids liquid spillage.

[0083] Additionally, while reshaping using the current shaping tool **100**, as an impact of compression of the sidewalls, pressure is increased within the metallic can thereby resulting in popping up of the top portion thereof. Such a popping up of the can top provides a better access to the tab handle of the metallic can. Further, this also eliminates the requirement of designing the metallic can with a bulged upper

portion, which in turn is beneficial in easy and better stacking and pasteurization of the metallic cans. Alternatively, the increased pressure may be utilized in a cost-beneficial way by providing a carbonation lower than the degree of carbonation manufacturer wishes to provide as since the level of carbonation also increases with increased pressure.

[0084] In some designs / patterns, the sidewalls of the metallic cans gets strengthened due to the compression of the material. The improved performance of can bodies as a result of the deformation may be used to increase the axial load strength, or to allow a reduction of the wall thickness of the central portion without loss of axial strength.

[0085] In some embodiments of the present invention, there are instances where the contact portion to be engraved / embossed extends either over the substantial and / or multiple contact portions of the metallic can. In some other instances, the diameter of the sidewall of the metallic can is not uniform. In all such instances multiple shaping tools **100** may be used together on the same metallic can either simultaneously or sequentially, each of such shaping tool 100 having a diameter corresponding to the contact portion in contact thereof allowing a progressive reshaping of the can. Alternatively, the end user may simply progressively tighten the shaping tool **100** at each position for shaping action at each of the contact portion of the metallic can.

[0086] While the shaping tool **100** is described for reshaping metallic cans having a generally cylindrical shape, it is also contemplated for a person skilled in the art that

the shaping tool **100** may be may be used to reshape containers of the type comprising a hollow container body having various shapes such as a rectangular cross-section, or the like. In such instances, the shape of the shaping body **110** of the shaping tool **100** is changed according to the shape of the metallic can without deviating from the scope of the invention.

[0087] Referring to Fig. 6, methodology in accordance with a preferred embodiment of the claimed subject matter is illustrated. While, for purposes of simplicity of explanation, the methodology is shown and described as a series of acts, it is to be understood and appreciated that the claimed subject matter is not limited by the order of acts, as some acts may occur in different orders and/or concurrently with other acts from that shown and described herein. For example, those skilled in the art will understand and appreciate that a methodology could alternatively be represented as a series of interrelated states or events, such as in a state diagram. Moreover, not all illustrated acts may be required to implement a methodology in accordance with the claimed subject matter. Additionally, it should be further appreciated that the methodologies disclosed hereinafter and throughout this specification are capable of being stored on an article of manufacture to facilitate transporting and transferring such methodologies to computers. The term article of manufacture, as used herein, is intended to encompass a computer program accessible from any computer-readable device, carrier, or media.

[0088] Throughout the specifications of the present disclosure, the term "comprising" means including but not necessarily to the exclusion of other elements or steps. In

other words, the term comprising indicates an open list. Furthermore, all directional references (such as, but not limited to, upper, lower, inner, outer, upward, downward, inwards, outwards, right, left, rightward, leftward, inside, outside, top, bottom, above, below, vertical, horizontal, clockwise, and counter=clockwise, lineal, axial and/or radial, or any other directional and/or similar references) are only used for identification purposes to aid the reader's understanding of illustrative embodiments of the present disclosure, and may not create any limitations, particularly as to the position, orientation, or use unless specifically set forth in the claims. Moreover, all directional references are approximate and should not be interpreted as exact, but rather as describing a general indicator as to an approximate attitude.

[0089] Similarly, joinder references (such as, but not limited to, attached, coupled, connected, accommodated, and the like and their derivatives) are to be construed broadly and may include intermediate members between a connection of segments and relative movement between segments. As such, joinder references may not necessarily infer that two segments are directly connected and in fixed relation to each other.

[0090] In some instances, components are described with reference to "ends" having a particular characteristic and/or being connected with an-other part. However, those skilled in the art will recognize that the present disclosure is not limited to components which terminate immediately be-yond their points of connection with other parts. Thus, the term "end" should be interpreted broadly, in a manner that

includes areas adjacent, rearward, forward of, or otherwise near the terminus of a particular segment, link, component, part, member or the like. Additionally, all numerical terms, such as, but not limited to, “second”, “second”, “third”, “fourth”, or any other ordinary and/or numerical terms, should also be taken only as identifiers, to assist the reader’s understanding of the various embodiments, variations and/or modifications of the present disclosure, and may not create any limitations, particularly as to the order, or preference, of any embodiment, variation and/or modification relative to, or over, another embodiment, variation and/or modification.

[0091] As will be readily apparent to those skilled in the art, the present invention may easily be produced in other specific forms without departing from its essential characteristics. The present embodiments is, therefore, to be considered as merely illustrative and not restrictive, the scope of the invention being indicated by the claims rather than the foregoing description, and all changes which come within therefore intended to be embraced therein. Many variations, modifications, additions, and improvements are possible. More generally, embodiments in accordance with the present disclosure have been described in the context of preferred embodiments. Functionalities may be separated or combined in procedures differently in various embodiments of the disclosure or described with different terminology. These and other variations, modifications, additions, and improvements may fall within the scope of the disclosure as defined in the appended claims.

Claims:

1. A shaping tool for shaping outer walls of a metallic can, the shaping tool comprising;

a shaping portion, the shaping portion comprising

a generally cylindrical shaping body having outer sidewalls, inner sidewalls and an open cavity longitudinally extending from and between a top end towards a bottom end, the cavity adapted to allow the metallic can to pass there through;

a shaping structure corresponding to a predetermined pattern configured onto the inner sidewalls of the shaping body;

one or more gripping portion for holding the shaping tool;

wherein when the metallic can is at least partially passed through the open cavity, the shaping structure embosses and / or engraves the predetermined pattern onto the outer sidewalls of the metallic can.

2. The shaping tool of claim 1, wherein the shaping structure is integrally molded within the inner sidewalls of the shaping body.

3. The shaping tool of claim 1, further comprising one or more movement means for moving the shaping portion axially and / or radially and / or helically.

4. The shaping tool of claim 3, wherein the movement means comprising manual hand grip configured onto the gripping portion.

5. The shaping tool of claim 3, wherein the movement means comprising an automatic mean selected from one or more from but not limited electric motor, automatic piston, automatic gear, or the like.

6. The shaping tool of claim 1, wherein the shaping structure comprising one or more outwardly projected portions and / or one or more inwardly recessed portions such that when engraved / embossed, the predetermined pattern is formed onto the outer wall of the metallic can.

7. The shaping tool of claim 1, wherein the at least partial portion of the metallic comprising a contact portion to be deformed using the shaping tool.

8. The shaping tool of claim 7, wherein the contact portion may be one or more of a bottom portion, a neck portion, a shoulder portion, and the outer sidewall of the metallic can.

9. The shaping tool of claim 1, wherein the shaping body has a diameter 0.01 mm - 0.05 mm lesser than the contact portion of the metallic can

10. The shaping tool of claim 1, wherein the shaping body further comprising a tightening mechanism for tightening the shaping body onto the metallic can.

11. The shaping tool of claim 10, wherein the tightening mechanism is selected from but not limited to one of nut-bolt tightening mechanism, clamping based tightening mechanism. sealing rings, tightening screws and belt based tightening mechanism.

12. The shaping tool of claim 1, wherein the shaping body may be made of a material selected from one of but not limited to thermoset polymers such as polyoxymethylene (POM), Acrylonitrile butadiene styrene (ABS), Nylon 6, Nylon 6-6, Polyamides (PA), Polybutylene terephthalate (PBT), Polycarbonates (PC), Polyetheretherketone (PEEK), Polyetherketone (PEK), Polyethylene terephthalate , (PET), Polyimides, Polyphenylene sulfide (PPS), Polyphenylene oxide (PPO) , Polysulphone (PSU), and Polytetrafluoroethylene (PTFE / Teflon)

13. A method for reshaping an already filled metallic can using the shaping tool of aforementioned claims, the method comprising the step of:
bringing the contact portion in contact with the shaping structure of the shaping portion;
obtaining a relative movement between the shaping structure and the metallic can embossing / engraving the predetermined pattern onto the outer walls of the metallic can at the contact portion.

14. The method of claim 13, wherein the relative motion is obtained by pushing the contact portion of the metallic can through the shaping portion of the shaping tool.

15. The method of claim 13, optionally comprising the step of tightening the shaping portion on to the contact portion of the metallic can before performing the step of obtaining the relative movement.

16. The method of claim 13, wherein the relative movement is obtained by moving the shaping portion axially and / or radially and / or helically.

17. The method of claim 16, wherein the step of moving the shaping portion is performed manually using the hand grip.

18. The method of claim 16, wherein the step of moving the shaping portion is performed automatically using automatic moving means selected from one or more of but not limited to electric motor, automatic gears, automatic pistons, and the like.

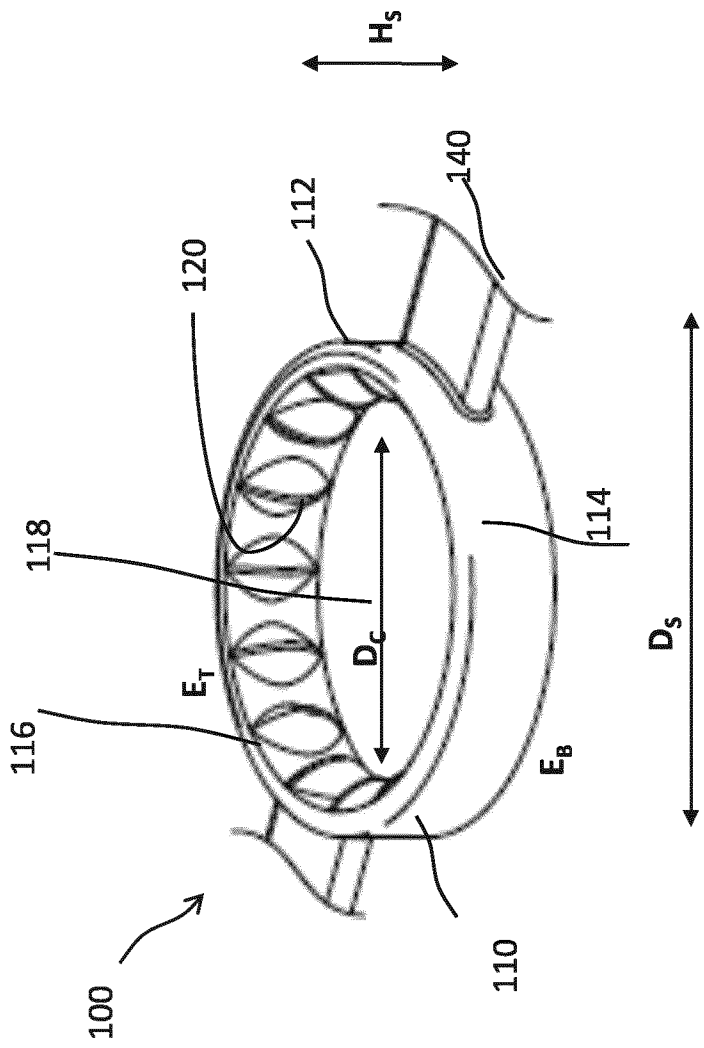


Figure 1

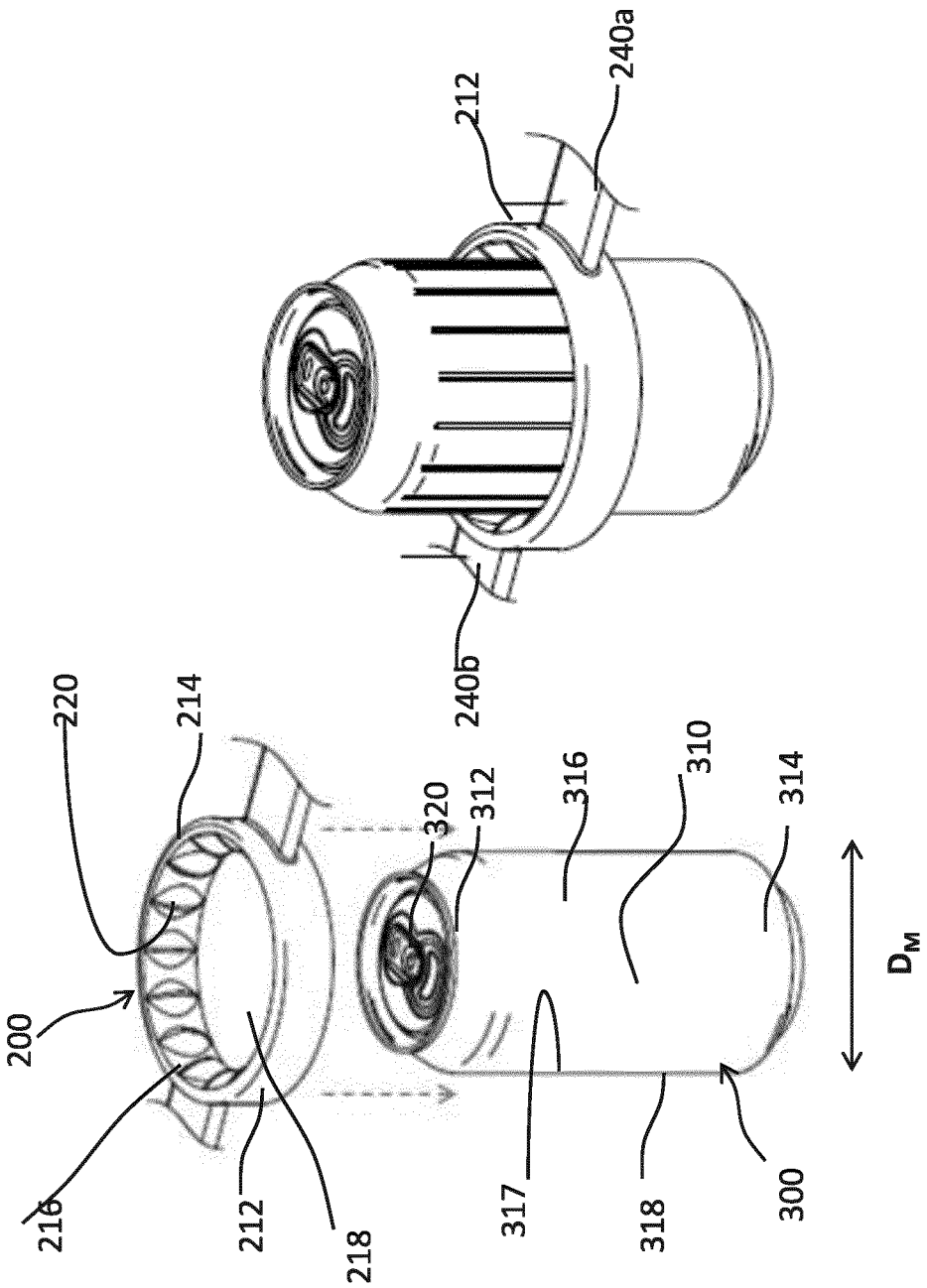

240a
212
240b
220
214
200
216
212
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320
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318
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D_M

Figure 2

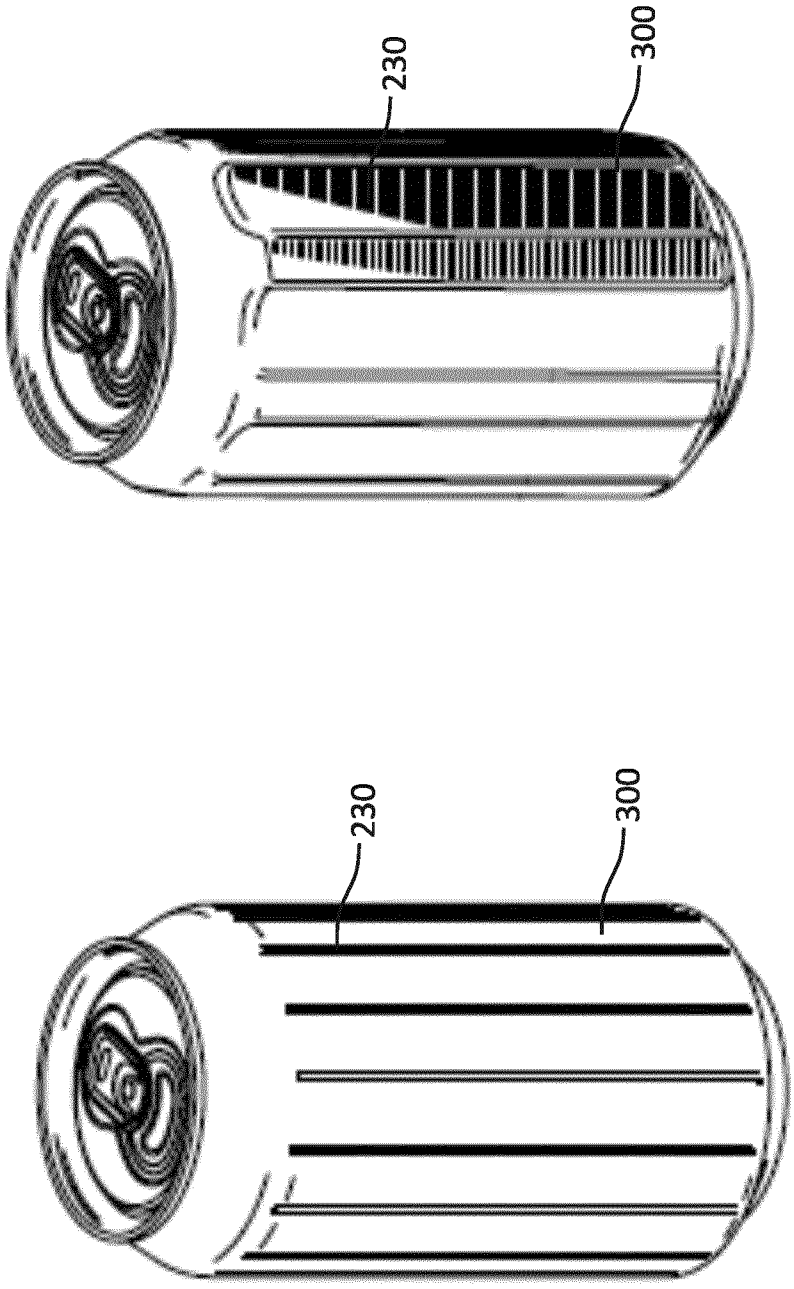


Figure 3

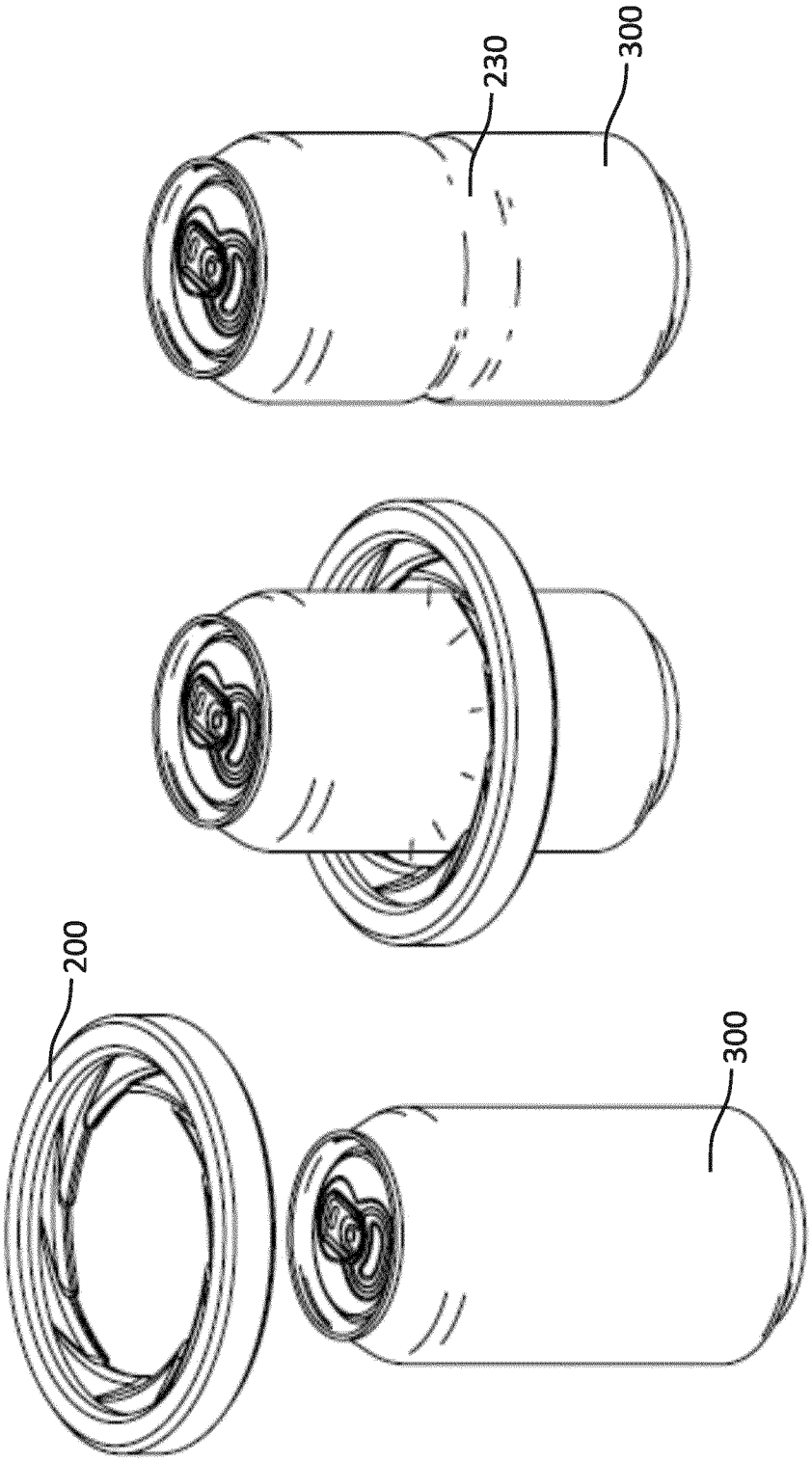


Figure 4

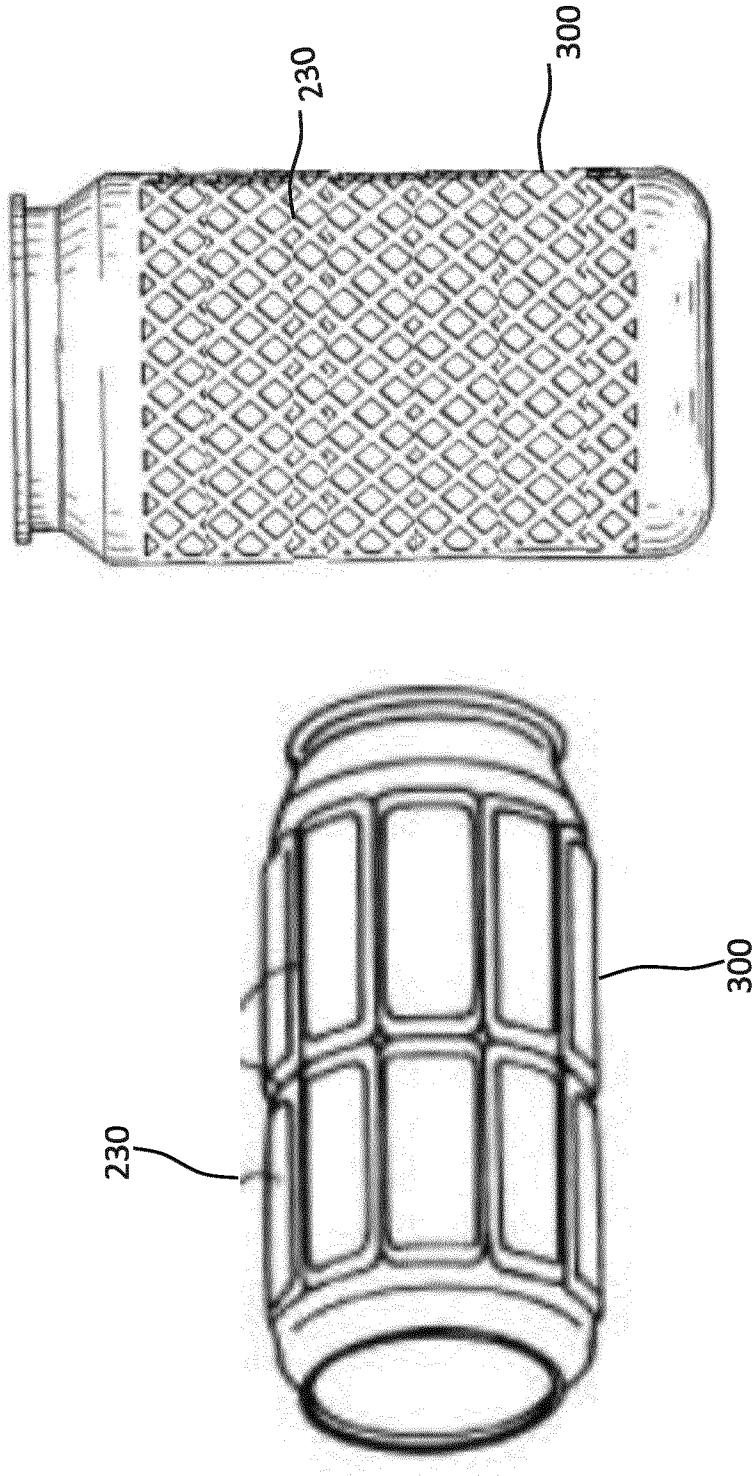


Figure 5

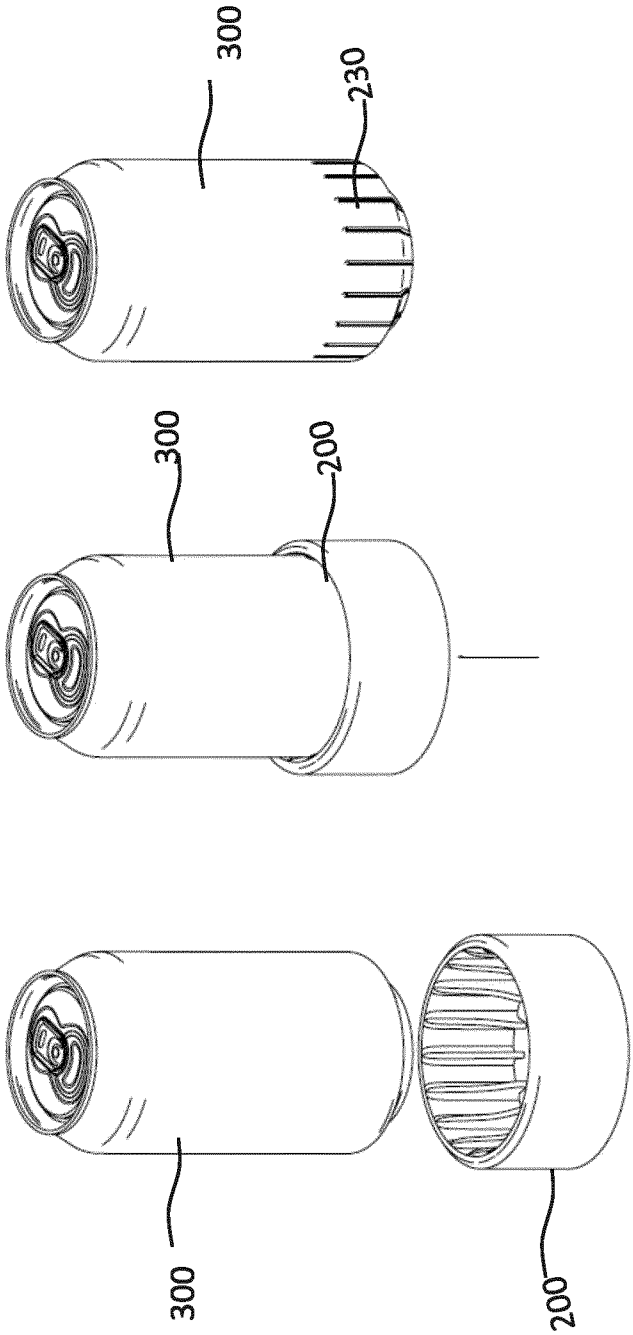


Figure 6

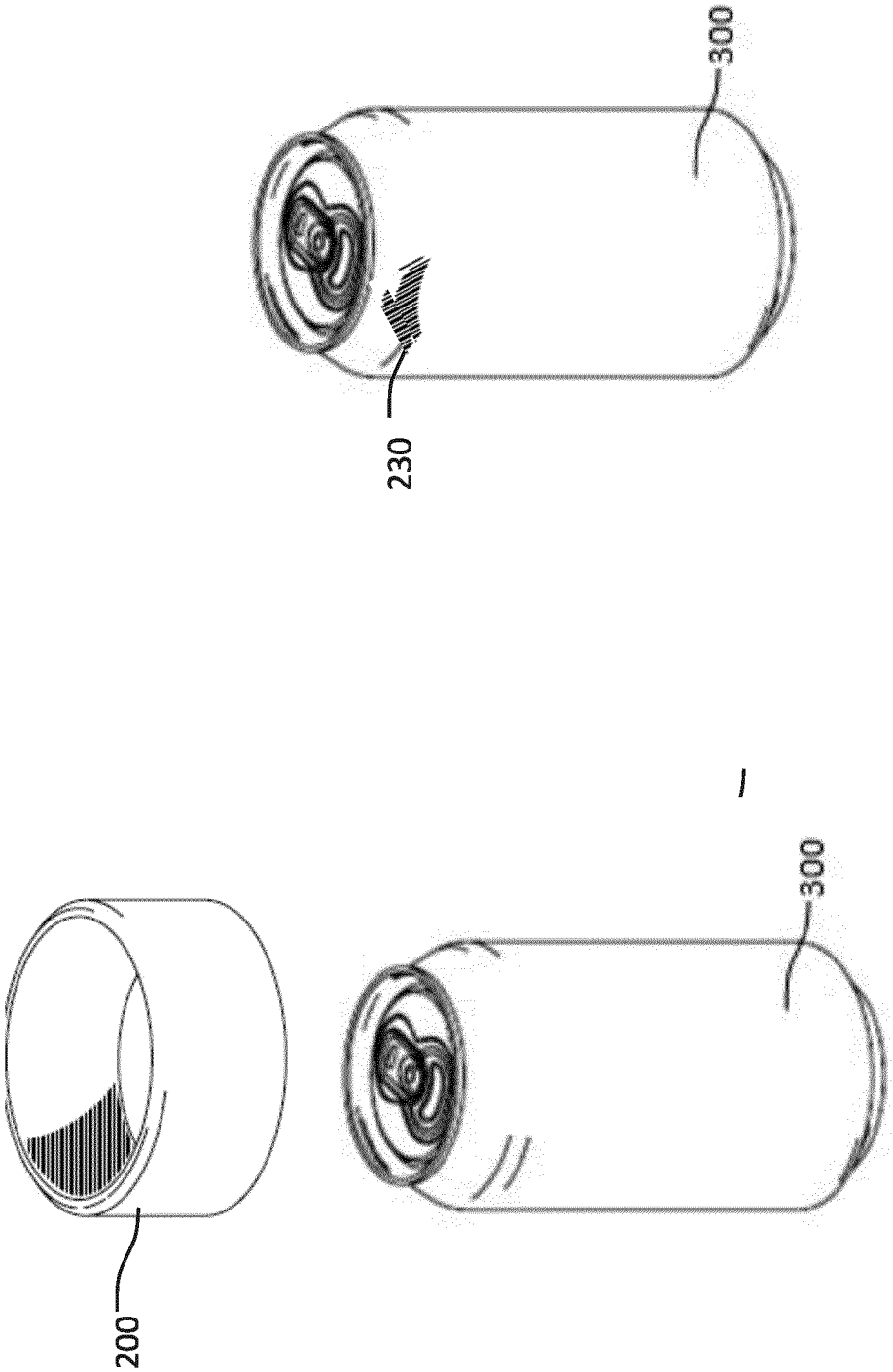


Figure 7

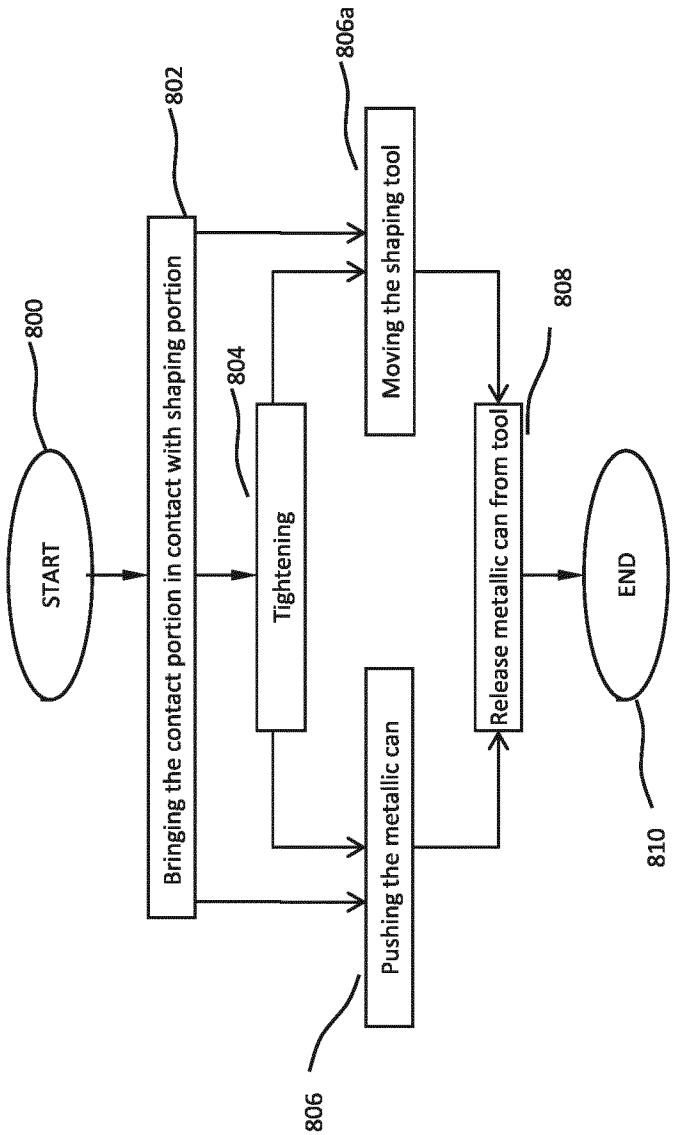

METHOD 800
START
800
Bringing the contact portion in contact with shaping portion
802
Tightening
804
Moving the shaping tool
806a
Pushing the metallic can
806
Release metallic can from tool
808
END
810

Figure 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/064990

A. CLASSIFICATION OF SUBJECT MATTER
INV. B21D51/26 B44B5/02 B44B3/06
ADD. B65B61/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B21D B31B B44B B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP S61 88933 A (TAKEUCHI PRESS) 7 May 1986 (1986-05-07)	1-12
A	abstract; figures	13-18

X	FR 2 606 686 A1 (CEBAL [FR]) 20 May 1988 (1988-05-20)	1-12
A	claim 1; figures 6a,6b	13-18

X	WO 2015/191379 A1 (BALL CORP [US]) 17 December 2015 (2015-12-17) abstract; figures	1-12

X	WO 2011/120905 A1 (SACMI IMOLA S C [IT]; STOCCHI GABRIELE [IT]; PARRINELLO FIORENZO [IT];) 6 October 2011 (2011-10-06)	1-13,15, 16,18
A	abstract; figures page 7, lines 19-23	14,17

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 September 2018	28/09/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Knecht, Frank

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2018/064990

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