US 20250263205A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0263205 A1**

CHEN (43) **Pub. Date: Aug. 21, 2025**

(54) **DISPENSING CONTAINTER WITH BRUSH APPLICATOR**

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(21) Appl. No.: **18/444,160**

(22) Filed: **Feb. 16, 2024**

Publication Classification

(51) **Int. Cl.**

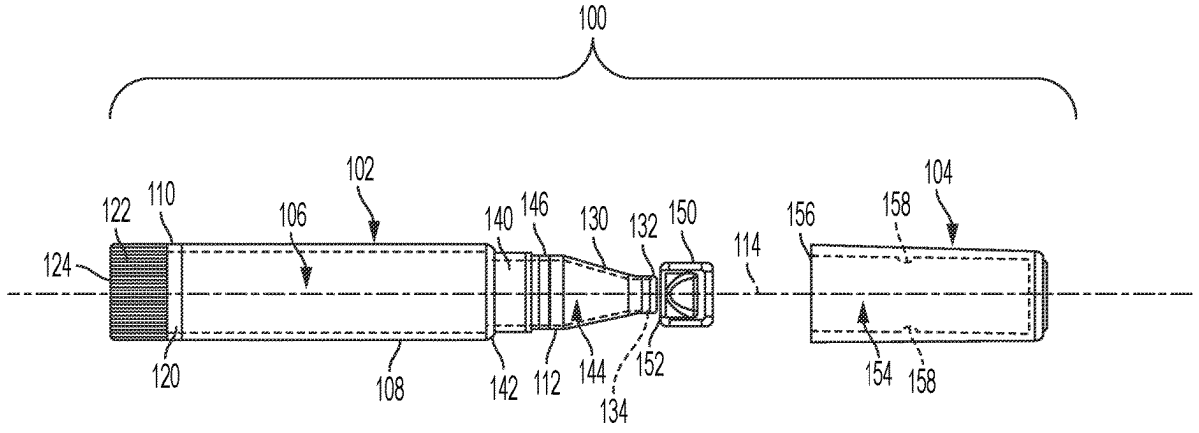
B65D 35/12	(2006.01)
A46B 5/00	(2006.01)
A46B 11/00	(2006.01)
B65D 35/26	(2006.01)
B65D 35/38	(2006.01)
B65D 35/44	(2006.01)

(52) **U.S. Cl.**

CPC ***B65D 35/12*** (2013.01); ***A46B 5/0095*** (2013.01); ***A46B 11/0041*** (2013.01); ***A46B 11/0089*** (2013.01); ***B65D 35/26*** (2013.01); ***B65D 35/38*** (2013.01); ***B65D 35/44*** (2013.01); *A46B 2200/20* (2013.01)

(57) **ABSTRACT**

A squeezable dispensing container for accommodating and applying liquid adhesive includes a main body having a nozzle with a dispensing orifice therein and a separate brush applicator including a brush that is selectively connectable to the nozzle. To enable selective connection of the components, the nozzle tip and the brush applicator can form a cooperative coupling structure. To dispense the liquid adhesive, the brush applicator may include a ferrule defining a channeling bore establishing fluid communication between the dispensing orifice and the proximate end of the brush retained in the ferrule. The liquid adhesive may flow through or around the brush to the surface or substrate to which it should be applied.



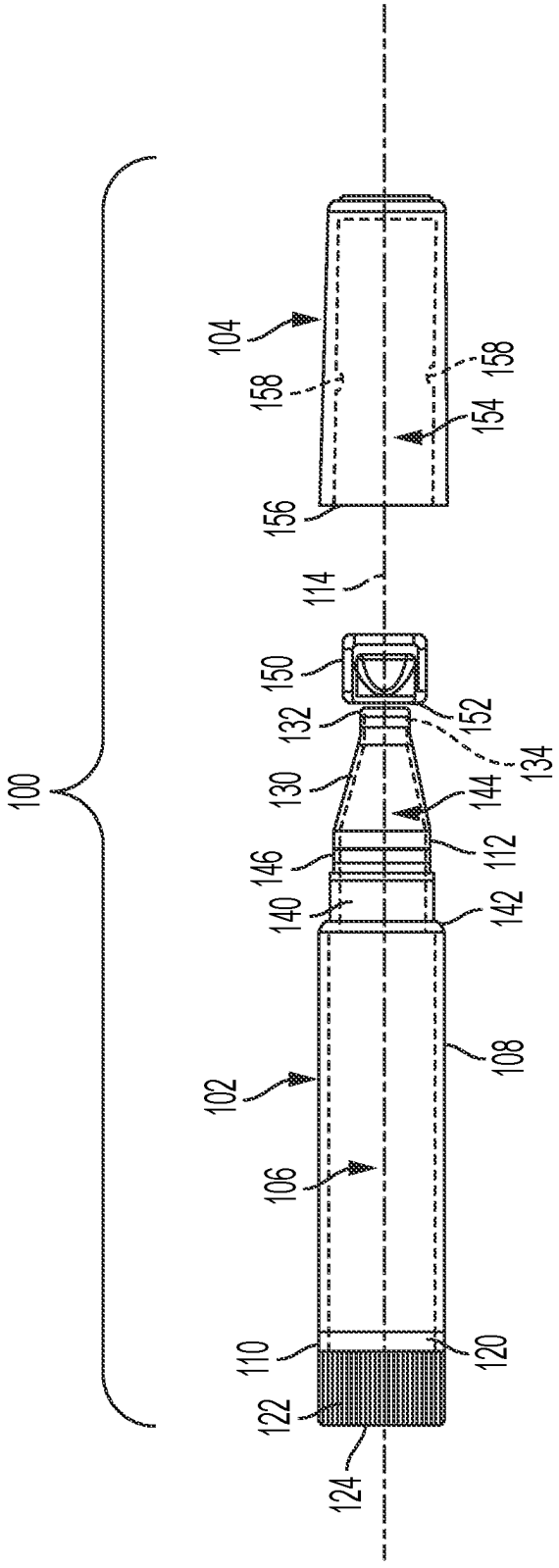

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FIG. 1

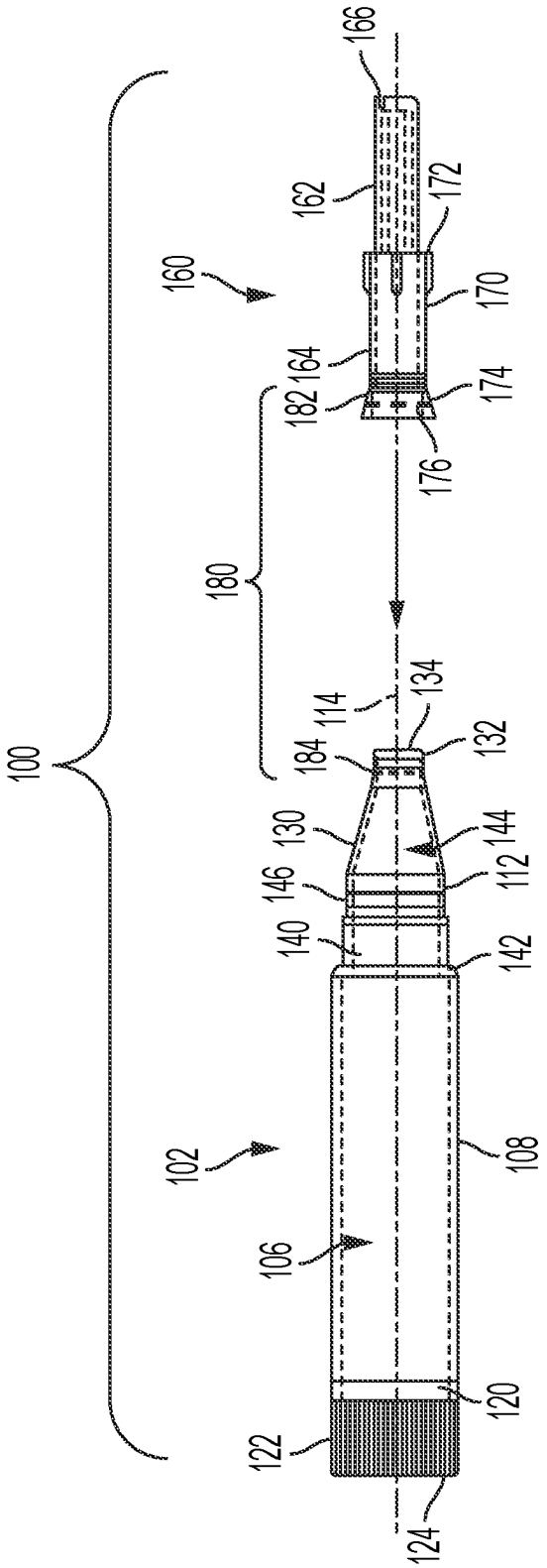
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FIG. 2

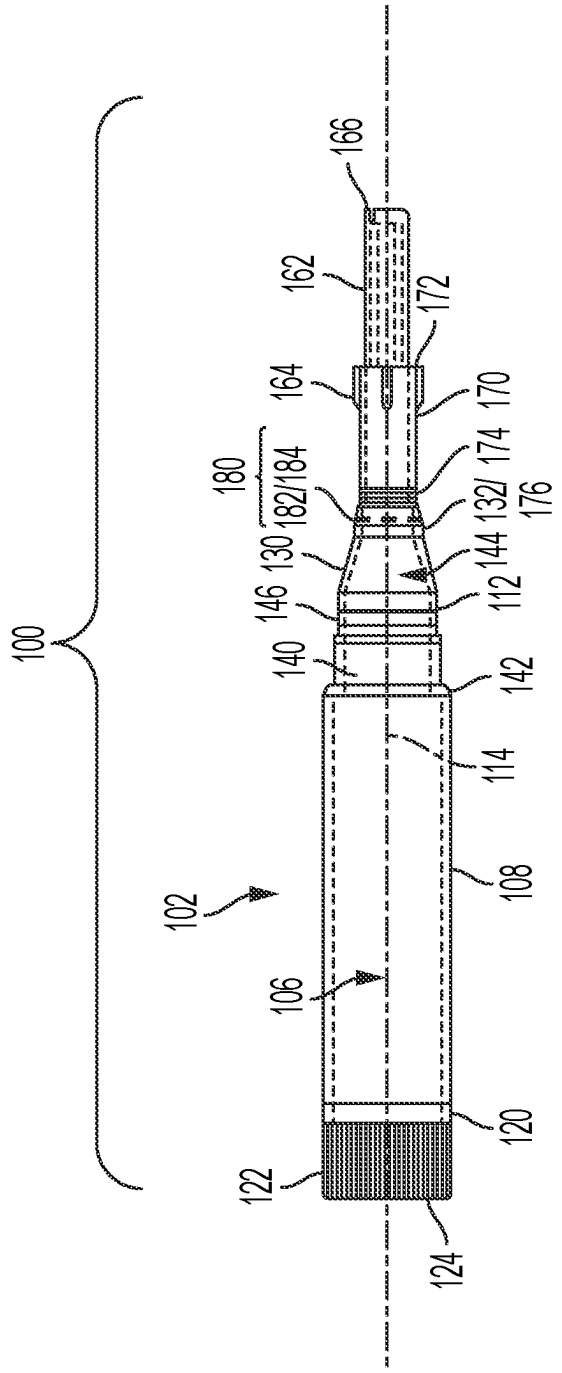
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FIG. 3

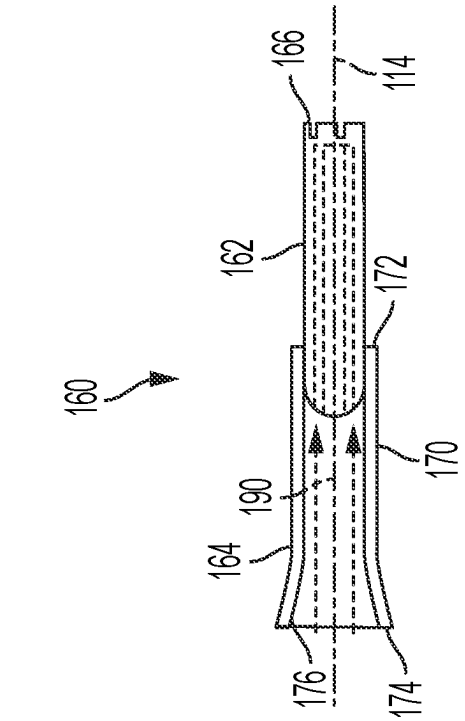
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FIG. 5

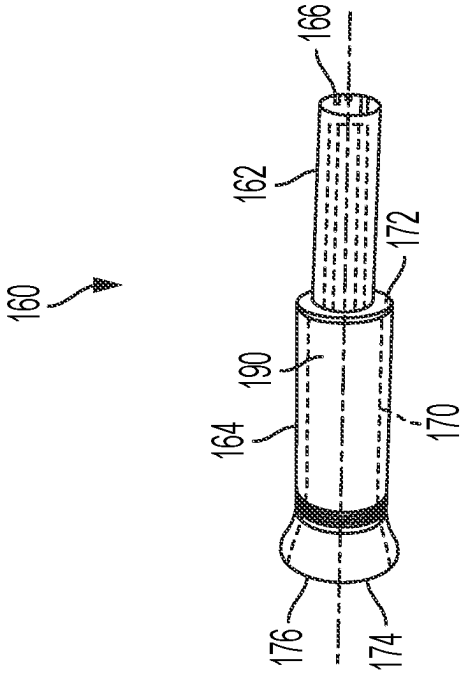
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FIG. 4

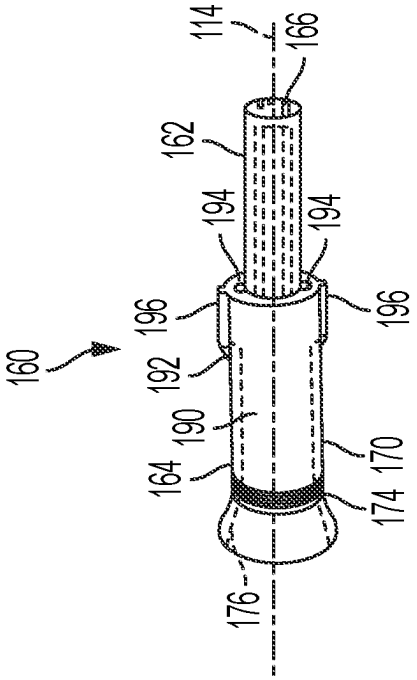
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FIG. 7

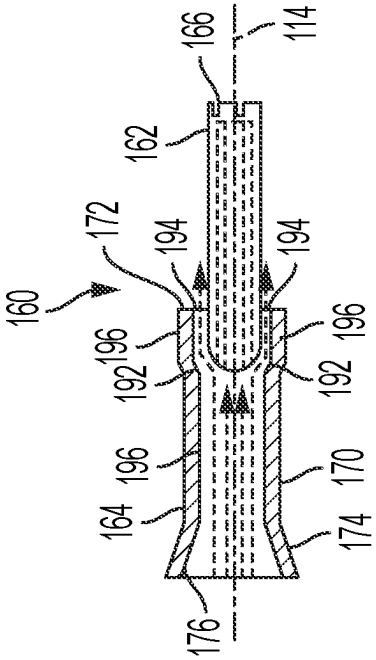
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FIG. 6

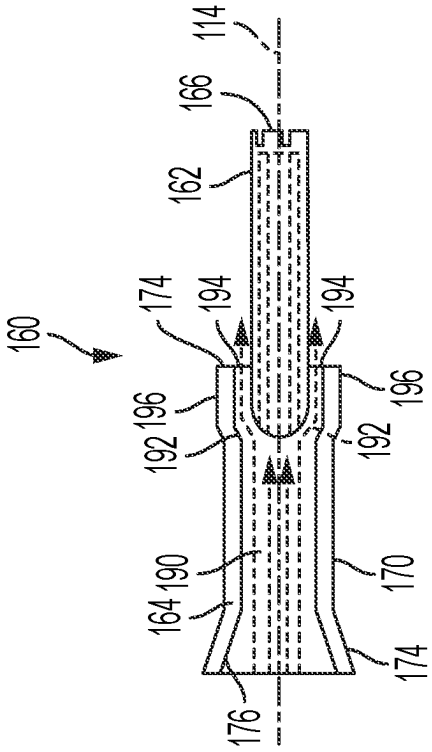
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FIG. 9

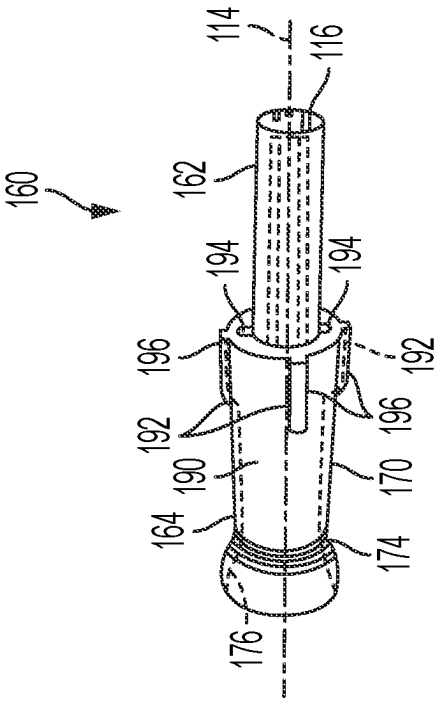
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FIG. 8

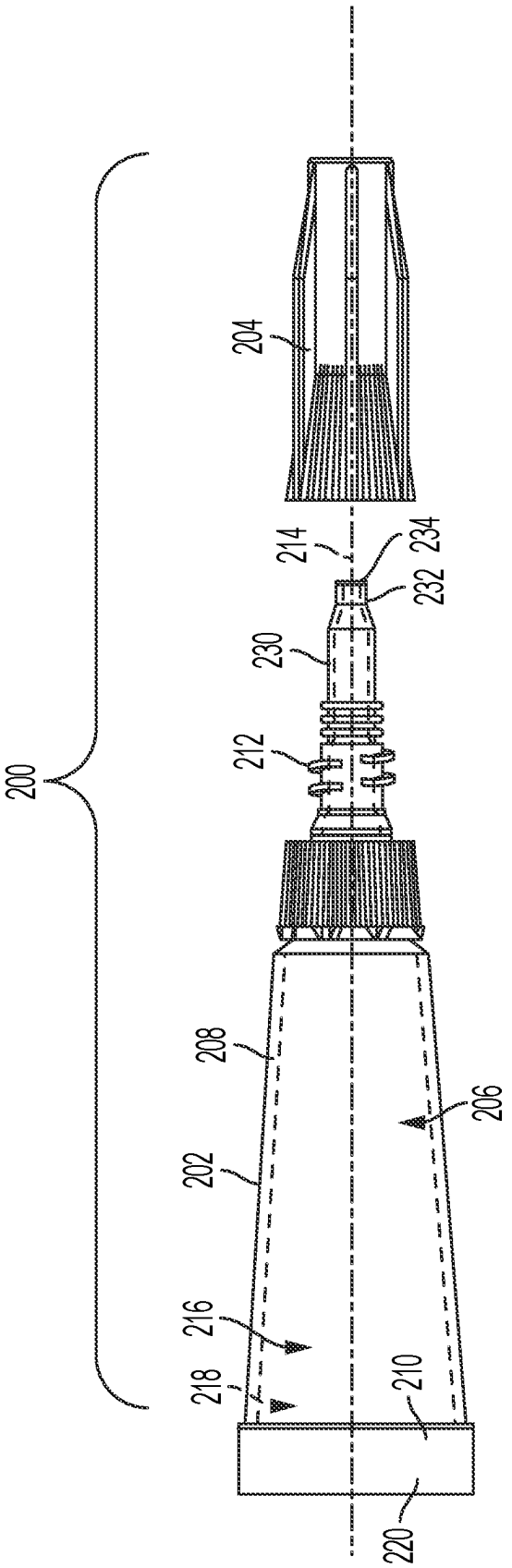

FIG. 10

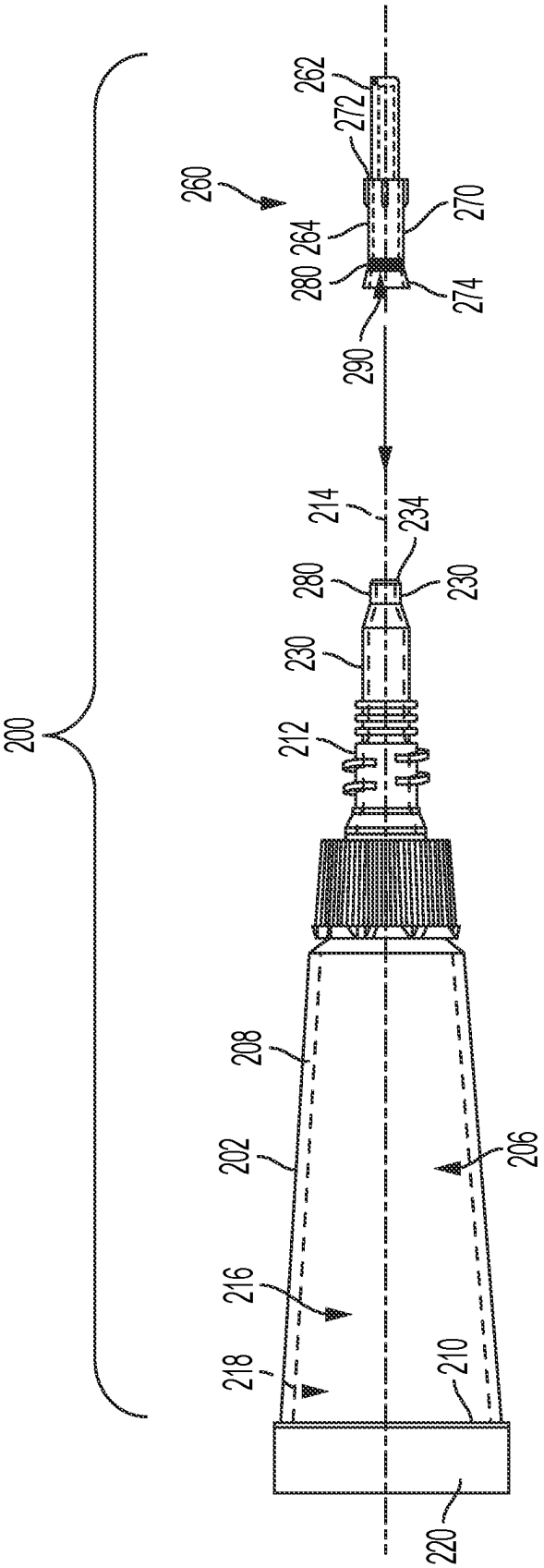
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FIG. 11

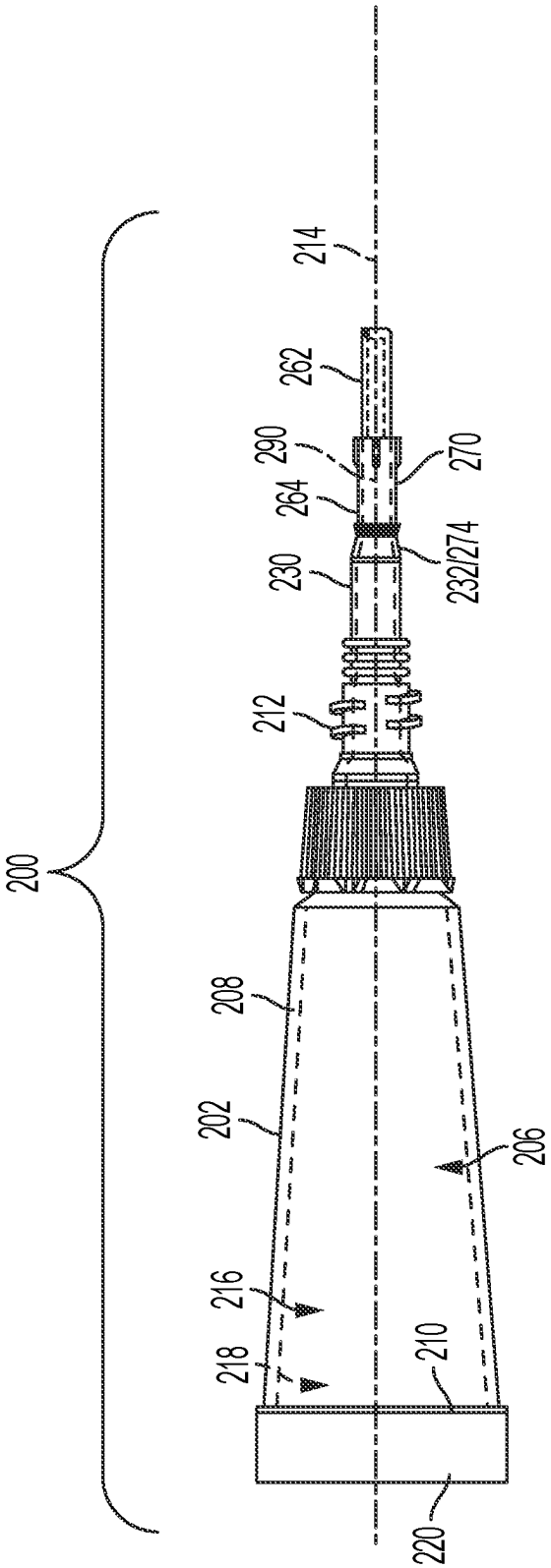
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FIG. 12

DISPENSING CONTAINTER WITH BRUSH APPLICATOR

BACKGROUND

[0001] Cyanoacrylates are a family of strong, fast acting adhesive glues that quickly form strong, irreversible bonds. Cyanoacrylates are initially in a liquid state and contain monomers that rapidly polymerize upon exposure to moist or humid air. The molecular chains intertwine and link to form strong bonds resulting in a rigid structure. In liquid form, cyanoacrylates may be transparent and typically have viscosities on the order of 1 to 2500 centipoise that enables the adhesive to be cast onto a part as a liquid that can freely flow to fill gaps prior to hardening. Cyanoacrylates are used as adhesives in a variety of applications in industry, medicine, household uses, and the like. Examples of cyanoacrylates are available in variations including methyl 2-cyanoacrylate, ethyl-2-cyanoacrylate, butyl cyanoacrylate, and octyl cyanoacrylate, but are often commercially referred to as a family as "super glues."

[0002] Because they rapidly polymerize in the presence of moist air, cyanoacrylates are typically distributed in hermetically sealed containers of a non-reactive material to preserve the adhesive in its liquid state. Examples of suitable dispensing containers include small tubes and tube-like bottles made of thin-walled, pliable plastic or non-brittle metallic enclosures from which the adhesive can be extruded by, for example, squeezing. Prior to applying the adhesive, the hermetic container must be opened, for example, by piercing or cutting an opening through which the liquid adhesive can be dispensed. A tapered nozzle may be provided at one end of the dispensing container that is configured to be cut or pierced for the purpose of controllably directing and applying the cyanoacrylate adhesive as droplets or a bead onto a surface.

[0003] In some applications, it may be desirable to apply adhesive over a wider surface area than is possible with a nozzle. To satisfy such an application, liquid adhesive is sometime provided in jars in which a brush and handle to attached to the cap of the jar. When the cap is attached to the jar, for example, by a threaded connection or the like, the brush extends into the adhesive contained therein.

[0004] Because of the rapidity at which cyanoacrylate adhesives set and harden, it is desirable that when in the liquid state they are maintained in an isolated state to avoid unintended contamination that may initiate polymerization. It is also possible that the adhesive may harden proximate to the piercing or opening, thereby creating a blockage and requiring the user to re-pierce or recut another opening into the nozzle, or may polymerize and harden on the brush rendering it inoperable. The present application is directed to an improved dispensing container to remedy the aforementioned problems and others as described herein.

BRIEF SUMMARY

[0005] The disclosure describes a squeezable dispensing container for accommodating and applying liquid adhesive and similar contents. The squeezable dispensing container can include a main body that defines an internal volume for accommodating the liquid adhesive and a forward dispensing end that may have an nozzle terminating in a dispensing orifice though which the liquid adhesive can exit the dispensing container. In accordance with the disclosure, the squeezable dispensing container can be provided via commercial distribution with a brush applicator as a separate component. If it is desired to apply the liquid adhesive over a relatively wide area of a surface or substrate, the brush applicator can be selectively connected to the forward dispensing end. The brush applicator can include a brush of the conventional type, for example, including bristles or fluid permeable foam, and a rigid ferrule that retains the brush. The rigid ferrule and the nozzle of the forward dispensing end can form a cooperative coupling structure to connect the brush applicator to the squeezable dispensing container. To enable liquid adhesive to flow through the brush applicator, the rigid ferrule can include a tubular barrel defining a channeling bore that establishes fluid communication between the dispensing orifice and the brush.

[0006] As stated, the brush applicator can be provided as a component separate from the rest of the dispensing container, for example, in the same commercial packaging but unconnected to the dispensing container. A possible advantage of providing the dispensing container and the brush applicator as separate components is that the brush is not exposed to the liquid adhesive in the internal volume prior to the time of application. The liquid adhesive, especially if a fast setting cyanoacrylate, may prematurely polymerize and harden on the brush if the two are maintained in contact prior to the point of use. Another possible advantage is that the brush applicator, which may be detachable from the nozzle, can be disconnected and discarded after use. Thereafter, if it is desired to dispense more liquid adhesive from the squeezable dispensing container, another fresh brush applicator can be connected thereto. Accordingly, the setting of liquid adhesive on the initial brush applicator will not hinder or prevent subsequent use of the squeezable dispensing container to apply adhesive. These and other advantages and features of the disclosure will become apparent from the following detailed description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. **1** is a side elevational view of a dispensing container in accordance with an embodiment of the disclosure having a tubular shape with an internal volume for containing a dispensable liquid adhesive such as cyanoacrylate.

[0008] FIG. **2** is a side elevational view of the dispensing container of FIG. **1** showing the nozzle of the dispensing container being aligned with a brush applicator that is connectable to the nozzle to fluidly communicate with a dispensing orifice therein.

[0009] FIG. **3** is a side elevational view of the dispensing container of FIGS. **1** and **2** showing the brush applicator connected to the nozzle by, for example, a cooperative coupling structure so that liquid adhesive can be dispensed through the brush applicator.

[0010] FIGS. **4** and **5** are a perspective view and cross-sectional view, respectively, of an embodiment of the brush applicator configured to direct and dispense liquid adhesive there through when connected to the dispensing container.

[0011] FIGS. **6** and **7** are a perspective view and cross-sectional view, respectively, of another embodiment of the brush applicator configured to direct and dispense liquid adhesive there through when connected to the dispensing container.

[0012] FIGS. **8** and **9** are a perspective view and cross-sectional view, respectively, of another embodiment of the brush applicator configured to direct and dispense liquid adhesive there through when connected to the dispensing container.

[0013] FIG. **10** is a side elevational view of a dispensing container in accordance with another embodiment of the disclosure in the form of a collapsible squeeze tube for containing a dispensable liquid adhesive.

[0014] FIG. **11** is a side elevational view of the dispensing container of FIG. **10** showing the nozzle of the dispensing tube being aligned with a brush applicator.

[0015] FIG. **12** is a side elevational view of the dispensing container of FIGS. **10** and **11** showing the brush applicator connected to the nozzle by, for example, a cooperative coupling structure so that liquid adhesive can be dispensed through the brush applicator.

DETAILED DESCRIPTION

[0016] Now referring to the figures, wherein whenever possible like reference numbers will refer to like elements, there is illustrated in FIG. **1** a squeezable dispensing container **100** for the distribution and application of liquid adhesive like cyanoacrylate glues and other fast polymerizing adhesives. In accordance with the disclosure, squeezable dispensing containers **100** of the type described herein are classified as pliable or deformable tubular containers that can be deformed by, for example, squeezing by hand pressure, to expel the contents therein. Squeezable dispensing containers can further be categorized as dispensing containers that can generally recover their initial shape after deformation by squeezing and those dispensing containers whose shape is permanently deformed or distorted by squeezing. The squeezable dispensing container **100** illustrated in FIG. **1** can be of the former type that may generally recover its initial shape after being partially collapsed by squeezing, although in other embodiments, it may be permanently deformed.

[0017] Preferably, the squeezable dispensing container **100** functions as both the container for bulk distribution of adhesive to the point of sale and as a tool for application of adhesive in use. As packaging, the exterior of the squeezable dispensing container **100** may include indicia such as logos and instructions for use. The squeezable dispensing container **100** can include a hollow main body **102** and a cap **104** that can be releasably attached to a forward end of the hollow main body **102**. To accommodate the adhesive, the hollow main body **102** can define an internal volume **106** enclosed by the peripheral sidewall **108** of the main body that functions as a reservoir for storing adhesives in a liquid state. The main body **102** can be tubular in shape and can extend between a rear end **110** that may be configured for filling the internal volume **106** and a forward dispensing end **112**. The tubular shape of the main body **102** defines an axis **114** that extends longitudinally between the rear end **110** and the forward dispensing end **112**.

[0018] The hollow main body **102** can be cylindrical in shape such that the peripheral sidewall **108** is annular and concentrically disposed around the axis **114**, although in other embodiments, the hollow main body **102** can have other suitable shapes such as, for example, oval. An advantage of the cylindrical shape of the hollow main body **102** is that it facilities handling and manipulation of the squeezable dispensing container **100** by hand of a user. To enable squeezing and deformation of the squeezable dispensing container **100**, the peripheral sidewall **108** may be of a thin-walled construction as indicated by the dashed lines outlining the internal volume **106**. The dimensional thickness of the peripheral sidewall **108** can depend upon the degree of deformability desired and may be dependent upon the viscosity of the liquid adhesive to be dispensed from the container.

[0019] To fill the internal volume **106** with liquid adhesive, the rear end **110** can be configured as an opened filling end that provides access to the internal volume through a filling opening **120**. The filling opening **120** may be associated with the rearward cuff end of the tubular shaped, peripheral sidewall **108** and can be circular and concentric with the axis **114**. To seal the filling opening **120** after introducing the liquid adhesive to the internal volume **106**, a stopper **122** can be attached to the rear end **110**. The stopper **122** can be a cap-like plug having an external diameter similar to that of the hollow main body **102** and can be configured to be partially inserted via a force fit into the internal volume **106** so that the stopper **122** is partially surrounded and securely retained by the peripheral sidewall **108**. In other embodiments, the stopper **122** may be ultrasonically welded or otherwise joined to the peripheral sidewall **108** to join the stopper to the rear end **110**. In an embodiment, the stopper **122** can define a planar exterior end face **124** normal to the axis **114** that allows the squeezable dispensing container **100** to stand vertically on the rear end **110** during use to avoid unintended discharge of liquid adhesive.

[0020] To facilitate dispensing of the liquid adhesive, the forward dispensing end **112** can include a generally tapered nozzle **130** configured to guide and control the direction of fluid flow from the hollow main body **102**. For example, the nozzle **130** may protrude axially forward from the main body **102** concentric to the axis **114** and can have a gradually decreasing diameter with respect to the main body **102**. The tapered nozzle **130** thus has the general shape of a tapering cone, the shape of which may facilitate application of the liquid adhesive by enabling access into tight places. The diameter of tapered nozzle **130** can progressively reduce to terminate at a distally forward most nozzle tip **132** that include a rim defining a dispensing orifice **134**. The rim of the nozzle tip **132** and the dispensing orifice **134** can be circular in shape and can be concentric to the axis **114**, although other shapes are contemplated. In addition, the nozzle may have other shapes and configurations beyond being tapered.

[0021] To connect the nozzle **130** with the main body **120**, the forward dispensing end **112** can also include a bridge-like intermediate stem **140** that can have a substantially consistent diameter over its axial length and that is joined to the peripheral sidewall **108** at an annular shoulder **142** that is generally normal to the axis **114**. The nozzle **130** and intermediate stem **140** are symmetrically concentric with respect to the axis **114** and delineate an interior dispensing channel **144** that establishes fluid communication between the internal volume **106** and the dispensing orifice **134**. The surfaces or walls that define the nozzle **130** and the intermediate stem **140** can have a construction relatively thicker than the peripheral sidewall **108** so that the forward dispensing end **112** is generally more rigid than the compressible main body **102** of the squeezable dispensing container **100**. The forward dispensing end **112** can thus maintain its

general shape and configuration when the hollow main body **102** is squeezed or deformed to dispense adhesive. As described further below, the intermediate stem **140** can also have disposed into its exterior surface one or more annular grooves **146** that encircle the axis **114** and that are axially located between the tapered nozzle **130** and the annular shoulder **142** connecting the intermediate stem **140** to the main body **102**.

[0022] To enclose and seal the dispensing orifice **134**, a detachable knob **150** can be integrally joined to the distal end of the nozzle **130**, for example, at the nozzle tip **132**, although as described below other methods and structures may be used to close and seal the dispensing orifice **134** in other embodiments. In the present embodiment, the detachable knob **150** can be a solid, cylindrical structure that, when joined to the tapered nozzle **130**, blocks fluid flow through the dispensing orifice **134**. As used herein, the integral joinder between the tapered nozzle **130** and the detachable knob **150** means they can be mutually united together as a contiguous, single component, for example, by being formed from a continuous piece of material. In an embodiment, the main body **102** and the detachable knob **150** can be formed by the same molding charge or shot, for example, when formed from plastic. Blocking the dispensing orifice **134** with the detachable knob **150** integrally joined to the tapered nozzle **130** facilitates filling the main body **102** with fluid adhesive through the rear end **110** since the internal volume **106** is hermetically enclosed at the forward dispensing end **112** by the knob prior to the filling step. In other embodiments, the detachable knob **150** can be formed separately and connected to the nozzle tip **132** of the tapering nozzle **130**, for example, when formed from metal.

[0023] To enable detachment of the detachable knob **150** from the nozzle **130**, the two structures can be joined by a frangible neck **152**. The frangible neck **152** can form the intersection between the nozzle tip **132** and the base of the detachable knob **150** and can be located proximate to and encircle the dispensing orifice **134** enclosed by the detachable knob **150**. The frangible neck **152** can have a thickness and diameter that is reduced compared to the detachable knob **150**, resulting in a reduction of material at the location of the frangible neck. The reduction of material results in a weakened intersection between the nozzle tip **132** and the detachable knob **150**. Accordingly, when a twisting force is applied to the detachable knob **150** as rotation with respect to the axis **114**, the frangible neck **152** can fracture such that the detachable knob **150** breaks away from the nozzle **130** unsealing and opening the dispensing orifice **134**.

[0024] In an embodiment, to selectively enclose the nozzle **130** and the dispensing orifice **134** when the squeezable dispensing container **100** is not in use, the cap **104** can be releasably attached to the forward end **112**. For example, the cap **104** can have a generally cylindrical shape with a diameter equal to that of the main body **102** and can define an interior cavity **154** that is accessible via an opened cap end **156**. The cap **104** can be axially aligned with the main body **102** and the components axially moved together so that the nozzle **130** and intermediate stem **140** are received into the interior cavity **154** via the opened cap end **156**. Preferably, the axial length of the cap **104** corresponds to the axial length of the forward dispensing end **112**.

[0025] To secure the main body **102** and cap **104**, the cap may include one or more annular protrusions or annular rings **158** protruding radially inward into the interior cavity **154** that are axially coextensive with the annular grooves **146** disposed into the intermediate stem **140**. Further, the annular groove **146** and the annular rings **158** can have generally corresponding diameters. When the forward dispensing end **112** is fully inserted into the interior cavity **154**, the annular rings **158** axially align with and can be received in the annular grooves **146** to cooperatively form a snap-fit connection.

[0026] In some applications, the presence and shape of the tapering nozzle **130** may be desirable as it facilitates application of the liquid adhesive, for example, because the nozzle enable focusing the dispensed adhesive toward the intended location for the adhesive in individual droplets, a continuous bead, or another form. In other words, the nozzle **130** directs the adhesive to the surfaces where the nozzle is placed. In other applications, it may be desirable to spread the dispensed adhesive over a wider area than can be done with a tapered nozzle **130**. Brushes are a known tool for dispensing adhesives and other liquids onto a surface or other substrate and, depending upon the shape and configuration, can apply an even coat of liquid to relatively large area compared to a nozzle. Accordingly, the disclosed squeezable dispensing container **100** can be selectively configured with an brush applicator **160** through which the liquid adhesive accommodated in the internal volume **106** of the main body **102** can be dispensed.

[0027] Referring to FIG. **2**, the brush applicator **160** can be a separate component of the squeezable dispensing container **100** that can be selectively connected to the forward dispensing end **112** of the squeezable dispensing container **100** when the application characteristics of a brush are desired. The brush applicator **160** includes a brush **162** for application of the liquid adhesive and a rigid ferrule **164** for retaining the brush and connecting to the forward dispensing end **112**.

[0028] The brush **162** can have any suitable configuration for temporarily absorbing then applying the liquid adhesive. For example, to retain and transfer liquid adhesive to a surface or substrate, the brush **162** can include a plurality of bristles **166** held adjacently together. The bristles **166** can be made from natural filaments such as animal hair or can be synthetic fibers such as nylon, polyester, or other polymeric materials. The filament-like bristles **166** are aligned together and retentively held together at their proximal ends with their distal ends free or unconstrained. Liquid adhesive can be temporarily absorbed and retained between the adjacent bristles **166** and, when the brush **162** is placed against and moved along a surface or substrate, the liquid adhesive is transferred to the surface or substrate when the free distal ends of the bristles disperse with respect to each other. The adjacent bristles **166** of the brush **162** may be arranged in a round or cylindrical configuration, i.e., a round brush, although in other embodiments, the brush **162** may have other shapes such as flat with the plurality of bristles arranged in a rectangular shape.

[0029] In another embodiment, the brush **162** can be made from a fluid permeable foam including a plurality of open-cell interconnected voids dispersed in a polymeric matrix such as, for example, flexible polyurethane. The liquid adhesive can be temporally absorbed and retained in the voids of the foam and transferred to the surface or substrate when the brush **162** is pressed there against to collapse the voids.

[0030] The ferrule **164** can be a tubular structure such as a barrel **170** having a solid or rigid characteristic relative to the brush **162** and to the peripheral sidewall **108** that is collapsible. The ferrule **164** can extend between a retention end **172** to which the brush **162** is secured and a nozzle coupling end **174** that connected to the forward dispending end **112** of the squeezable dispensing container **100**. The retention end **172** of the ferrule **164** can encircle the bristles **166** of the brush **162** to gather and clamp them tightly together and the retention end **172** may annular in shape or have another shape corresponding to the shape of the brush **162**. To enable selective connection of the squeezable dispensing container **100** and brush applicator **160**, the two components can form a cooperative coupling structure **180** by which they are releasably secured together. Cooperative coupling structures **180** refer to connection methods in which structural features are included on each of two components that can structurally interact to join to the components together. Examples of cooperative coupling structures **180** include but are not limited to snap-fit connections, threaded connections, and others.

[0031] For example, in the illustrated embodiment, the nozzle coupling end **174** of the tubular barrel **170** can be flared outward and delineate an internal seat **176** that corresponds in shape and dimension with the nozzle tip **132** of the tapered nozzle **130** at the forward dispensing end **112**. Accordingly, when the squeezable dispensing container **100** and the brush applicator **160** are moved axially together, the nozzle tip **132** can be received in and accommodated by the internal seat **176** of the barrel **170** in an abutting relationship.

[0032] Furthermore, to interlock the components, there can be formed on the internal seat **176** one or more protrusions **182** and formed into the nozzle tip **132** can be one or more corresponding cutouts **184**. The protrusions **182** and cutouts **184** are indicated in dashed line. In a preferred embodiment, the protrusions **182** can be arranged as annular rings and the cutouts **184** can be formed as annular grooves, similar to the annular rings **158** on the cap **104** and the annular grooves **146** on the intermediate stem **140**. When the nozzle tip **132** is received in the internal seat **176**, as shown in FIG. **3**, the annular protrusions **182** are displaced and deflect into the annular cutouts **184** interlocking the applicator brush **160** to the forward dispensing end **112** together. The relative rigidity between the nozzle **130** and the ferrule **164** facilitate cooperative interaction between the protrusions **182** and dimples **184** allowing them to snap together while maintain a sufficiently secure connection to retain brush applicator **160** to the nozzle tip **132** when pressurizing and dispensing adhesive there through. In alternative embodiments, the location of the protrusions **182** and the cutouts **184** can be reversed with the protrusions **182** on the nozzle tip **132** and the cutouts **184** in the tubular barrel **170**.

[0033] In other embodiments, the protrusions **182** may merely be bumps and the cutouts **184** may merely be dimples to receive the bumps. Still, in other embodiments, the cooperative coupling structure **180** can be a threaded coupling structure in which the internal protrusions **182** include a helical internal thread and the cutouts **184** form a corresponding helical external tread. Relative rotation between the brush applicator **160** and the squeezable dispensing container **100** will engage the threaded internal protrusions **184** and threaded external cutouts **184** interlocking the nozzle tip **132** into the internal seat **176**.

[0034] When cooperative coupling structure **180** couples and connects the brush applicator **160** to the forward dispensing end **112** as illustrated in FIG. **3**, the brush applicator **160** is aligned with the axis **114** of the squeezable dispensing container **100** and the brush **162** is directed and oriented forwardly of the forward dispensing end **112**. Moreover, the tubular barrel **170** of the brush applicator **160** is in direct fluid communication with the opened dispensing orifice **134** disposed in the nozzle tip **132**. Accordingly, the brush applicator **160** can receive liquid adhesive accommodated in the internal volume **106** defined by the main body **102**.

[0035] To direct and communicate the liquid adhesive from the dispensing orifice **134** to the brush **162** through the brush applicator **160**, the tubular barrel **170** of the ferrule **164** can include and delineate a channeling bore **190**. For example, as illustrated in FIGS. **4** and **5**, the tubular barrel **170** can be a sleeve-like structure cylindrical in shape with the channeling bore **190** disposed there through between the flared nozzle coupling end **174** defining the internal seat **176** and the retaining end **172** retaining the brush **162**. The channeling bore **190**, or lumen of the tubular barrel **170**, can extend along and be aligned with the axis **114** of the squeezable dispensing container when the brush applicator **160** is connected to the forward dispensing end **112** thereof. The channeling bore **190** thereby defines a fluid flow path to channel liquid adhesive in the axially forward direction between the nozzle coupling end **174** and the retention end **172** of the ferrule **164**. In the examples where the tubular barrel **170** is cylindrical, the channeling bore **190** may also be cylindrical in shape and concentric with the tubular barrel **170**. In the embodiments where the brush **162** of the brush applicator **160** has other shapes such as a flat brush, the channeling bore **190** can have other corresponding shapes such as rectangular.

[0036] After the liquid adhesive has flowed through the channeling bore **190** to retention end **172** of the tubular barrel **170** proximate the proximal end of the brush **162**, the liquid adhesive can further progress between the adjacent bristles **166** of the brush **162** by a wicking action so that the liquid adhesive emerges from the ferrule **164** and can be deposited on the intended surface. In the embodiments where the dispensing container is a squeeze tube, continued deformation of the main body will pressurize the liquid adhesive in the channeling bore **190** to forcibly drive the adhesive through the brush **162** between the bristles **166**. In the embodiment of FIGS. **4** and **5**, the liquid adhesive can pass through the brush **162** due merely to the loose adhesion between the adjacent bristles **166** retained in the retention end **172** of the tubular barrel **170**.

[0037] However, in other embodiments, the brush applicator **160** can include features to promote the flow and dispensing of the liquid adhesive from the channeling bore **190**. For example, referring to FIGS. **6** and **7**, the ferrule **164** can include one or more internal flutes **192** disposed in the internal surface of the tubular barrel **170** and are thus exposed to the channeling bore **190**. The internal flutes **192** can extend in elongated, straight lines between the coupling end **174** and the brush retention end **172** and are therefore parallel to and aligned with the axis **114**, although in other possible embodiments, the internal flute **192** can be helical or partially helical.

[0038] At the brush retention end **172**, the internal flutes **192** can terminate in and fluidly communicate with a brush bypass passage **194** that extends around and outwardly of

the proximal end of the brush **162**. In particular, the brush bypass passage **194** can be formed or defined by a radially protruding lobes **196** extending radially outwardly from the brush retention end **172** of the tubular sleeve **170**. The protruding lobes **196**, which can be integrally formed with the brush retention end **170** of the tubular sleeve **170**, can likewise be parallel to and aligned with the axis **114** so that the brush bypass passages **194** function as a continuation of the internal flutes **192**. The remaining segments of the of the retention end **172** can have a diameter sufficient to retain and hold the proximal end of the brush **162** to the ferrule **160**. The internal flutes **192** and the brush bypass passage **194** thereby define a fluid path beyond and around the proximal end of the brush **162** so that liquid adhesive can be dispensed from the brush applicator **160** without significant hindrance.

[0039] The ferrule **164** of the brush applicator **160** can include any suitable number of internal flutes **192** and brush bypass passages **194** and corresponding protruding lobes **196** sufficient to dispense liquid adhesive from the channeling bore **190**. For example, in FIGS. **6** and **7**, the ferrule **164** can include two protruding lobes **196** defining the brush bypass passages **194** located 180° opposite each other and in FIGS. **8** and **9** the ferrule **164** can include four protruding lobes **196** defining the brush bypass passages **194** located at 90° orientation with respect to each other. Other numbers of protruding lobes **196** and brush bypass passages **194** are contemplated such as one or three. In addition, the internal flutes **192** may extend the entire axial length of the ferrule **164** or less than the axial length, for example, or only proximate the brush retention end **162**.

[0040] Referring to FIGS. **10-12**, there is illustrated another embodiment of a squeezable dispensing container **200** for storing and dispensing liquid adhesive such as cyanoacrylate in accordance with the disclosure. The squeezable dispensing container **200** includes a main body **202** and a removable cap **204** that can be releasably attachable to the main body. The main body **202** defines a internal volume **206** for the liquid adhesive and can extend between a rearward end **210** configured for filling the interior and a forward dispensing end **212** configured for dispensing the adhesive. The rearward end **210** and the forward dispensing end **212** of the main body **202** can be oppositely located and define an axis **214** of the squeezable dispensing container **200**. In distinction from the embodiment of FIGS. **1-3**, the main body **202** can be configured as a squeeze tube that may deformed under pressure and is not intended to return to its original shape.

[0041] For example, the peripheral sidewall **208** of the main body **202** can be formed of a flexible pliable material including one or more layers of plastics or non-brittle metals. The peripheral sidewall **208** can assume a circular or oval shape where it connects with the forward dispensing end **212** that, as described above, can have a relatively more rigid construction to retain its shape and dispensing characteristics. However, as the main body **202** extends axially rearward, the peripheral sidewall **208** may flatten to form two parallel surfaces **216**, **218** that merge together at the rearward end **210**. Accordingly, the parallel surfaces **216**, **218** at the rearward end **202** may be adjacent to each other. For filling the internal volume **206**, the two parallel surface **216**, **218** can be separated to expand the internal volume and liquid adhesive introduced therein. After filling, the rearward end **210** can be closed by folding the two parallel surfaces **216**, **218** over each other and crimping them to form a closed crimp **220**. Alternatively, the two parallel surface **216**, **218** may be welded together.

[0042] The forward dispensing end **212** can be configured to controllable dispense adhesive from the internal volume **206** and, in an embodiment, may include a nozzle **230** that projects axially forward of the main body **202**. The nozzle **230** may have a reduced diameter compared to that of the main body **202** and can terminate at a nozzle tip **232** of the smallest diameter. The nozzle tip **232** defines a dispensing orifice **234** communicating with the internal volume **206** which the liquid adhesive can be fluidly dispensed. The dispensing orifice **234** may be closed and sealed by a membrane that may thereafter be pierced to open the dispensing orifice **234** allowing the fluid communication of the liquid adhesive.

[0043] To disperse the liquid adhesive over a wider area than is possible with a nozzle, the squeezable dispensing container **200** can be selectively configured with a brush applicator **260** as described above. For example, referring to FIG. **11**, the squeezable dispensing container **200** can be provided with the brush applicator **260** as a separate component that can be selectively attached to the forward dispensing end after the dispensing end **234** has been unsealed. The brush applicator **260** includes a brush **262** that is retained in a ferrule **264** configured to be releasably connected to the nozzle **230** of the forward dispensing end **212**. In particular, and as described above, the ferrule **264** can be formed as a tubular barrel **270** that includes a nozzle coupling end **274**, axially opposite the brush retention end **272**, that is configured to receptively seat the nozzle tip **232** in an interior seat **276**. To interlockingly mate the two components, the nozzle tip **232** and the nozzle coupling end **274** can cooperatively form any of the aforementioned cooperative coupling structures **280** including a snap fit connection and a threaded connection.

[0044] To enable dispensing of the liquid adhesive from the main body **202** through the brush applicator **260** and the brush **262**, the tubular barrel **270** of the ferrule **264** can delineate a channeling passage **290**. As described above, the channeling passage **290** can axially extend between the nozzle coupling end **274** and the brush retention end **272**. When the brush applicator **260** is connected to the forward dispensing end **212**, the channeling passage **290** is in fluid communication with the dispensing orifice **234** and can channel or direct liquid adhesive to the brush retention end **272** and proximate to the proximal end of the brushed retained thereat. The liquid adhesive may thereafter progress through or past the brush **262** in accordance with any of the foregoing embodiments of the brush applicator described herein.

[0045] The use of the terms "a" and "an" and "the" and "at least one" and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The use of the term "at least one" followed by a list of one or more items (for example, "at least one of A and B") is to be construed to mean one item selected from the listed items (A or B) or any combination of two or more of the listed items (A and B), unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e,

meaning "including, but not limited to,") unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

[0046] Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

1. A squeezable dispensing container for liquid adhesives comprising:

a hollow main body delineating an internal volume for receiving liquid adhesive and extending between a forward dispensing end and a rear end, the forward dispensing end including a nozzle terminating at a dispensing orifice;

a brush applicator selectably connectable to the nozzle, the brush applicator including brush partially retained in a ferrule that is rigid relative to the brush, the ferrule defining a channeling bore to establish fluid communication between the dispensing orifice and the brush when the brush applicator is connected to the nozzle.

2. The squeezable dispensing container of claim **1**, wherein the ferrule and the nozzle form a cooperative coupling structure to selectively connect the brush applicator to the nozzle.

3. The squeezable dispensing container of claim **2**, wherein the cooperative coupling structure including a cut-out and a protrusion receivable in the cutout.

4. The squeezable dispensing container of claim **3**, wherein the cooperative coupling structure is selected from the group comprising a snap-fit connection and a threaded connection.

5. The squeezable dispensing container of claim **1**, wherein the ferrule includes a tubular barrel extending between a brush retention end for retaining the brush and a nozzle coupling end for receiving the nozzle.

6. The squeezable dispensing container of claim **5**, wherein the tubular barrel including one or more internal flutes defining brush bypass passages extending around and outwardly of a proximal end of the brush retained in the brush retention end.

7. The squeezable dispensing container of claim **6**, wherein the hollow main body defines an axis and the dispensing orifice of the nozzle and the channeling bore of the brush applicator are concentric with the axis.

8. The squeezable dispensing container of claim **7**, wherein the internal flutes are parallel with the axis.

9. The squeezable dispensing container of claim **8**, wherein the internal flutes are structurally associated with protruding lobes protruding radially outwardly of the brush retention end.

10. The squeezable dispensing container of claim **1**, wherein the nozzle generally tapers with reduced diameter between the hollow main body and the dispensing orifice.

11. The squeezable dispensing container of claim **1**, wherein the hollow main body includes a peripheral sidewall that is cylindrical in shape and is generally recoverable to its initial shape after being compressed.

12. The squeezable dispensing container of claim **1**, wherein the hollow main body includes a peripheral sidewall that is permanently deformable after being compressed.

13. The squeezable dispensing container of claim **1**, wherein the brush includes a plurality of bristles retained in the ferrule.

14. The squeezable dispensing container of claim **1**, wherein the brush includes a fluid permeable foam.

15. The squeezable dispensing container of claim **1**, further comprising a cap releasably attachable to the forward dispensing end, the cap delineating an internal cavity for receiving the nozzle.

16. The squeezable dispensing container of claim **1**, wherein the rear end of the main body is configured for filling the internal volume.

17. The squeezable dispensing container of claim **16**, wherein the rear end is closed after filling by one of a plug and a crimp.

18. A squeezable dispensing container comprising:

a hollow main body delineating a hollow interior for receiving liquid adhesive, the hollow main body extending between a forward dispensing end and a rear and defining an axis between the forward dispensing end and the rear end, the forward dispensing end including a nozzle tip defining a dispensing orifice concentric to the axis; and

a brush applicator selectively connectable to the nozzle tip, the brush applicator including a brush retained in a ferrule that is rigid relative to the brush, the ferrule defining a channeling bore that is concentric with the axis and establishes fluid communication between the dispensing orifice and the brush when the brush applicator is connected to the nozzle tip.

19. The squeezable dispensing container of claim **18**, wherein the ferrule and the nozzle form a cooperative coupling structure to selectively connect the brush applicator to the nozzle.

20. The squeezable dispensing container of claim **18**, wherein the ferrule includes a tubular barrel with one or more internal flutes defining brush bypass passages extending around and outwardly of a proximal end of the brush retained in ferrule.

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